
Integrated Circuits Circuits Intégrés Integrierte Schaltungen

**Volume 2: Digital Circuits
Volume 2: Circuits Logiques
Band 2: Digitale Schaltungen**

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INTRODUCTION

PRO ELECTRON

A type designation or type number identifies a device so that it can be ordered by electronic equipment manufacturers or service engineers with confidence that it will meet a certain specification, even if it is made by more than one manufacturer or if several years have passed since it was first introduced. It is helpful to include information in the type number which readily associates it with a category, group or range of devices, without making it too long or difficult to memorize.

A common type designation code for receiving tubes was introduced by a number of manufacturers in the 1930's and for semiconductor devices in the 1950's. Later, as more and more manufacturers realized the advantages of the use of a common type numbering code for tubes and semiconductors and became interested in using the system, it was decided to found a separate organization to administer the allocation and registration of type numbers.

So in 1966 an international association "PRO ELECTRON" was set up in Brussels to perform this function. There are now 20 members representing the large majority of the West European tube and semiconductor manufacturers. They have, through their committees, evolved a comprehensive type numbering system covering the whole range of active electronic components - receiving tubes, electronic tubes for professional equipment, cathode ray tubes, discrete semiconductor devices and integrated circuits.

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PERMANENT SECRETARIAT

Boulevard de Waterloo, 103

B - 1000 BRUXELLES

Tel. : (02) 538.38.87

Telex : 22 810

PRO ELECTRON TYPE DESIGNATION CODE FOR INTEGRATED CIRCUITS

The original code for integrated circuits was analogue to the code for discrete semiconductor devices and consisted of a prefix (family letters), a function letter, a serial number of two figures and a figure indicating the operating temperature range, example : FLH101.

Most of the circuits manufactured in Europe, particularly the digital integrated circuits, were copies of devices developed in the United States and sold under wellknown "house" numbers. Therefore PRO ELECTRON developed a new code which could incorporate the existing "house" numbers. So the last figure of the original PRO ELECTRON code system, indicating the operating temperature range, could no longer be used for this purpose and therefore in the new code, the third letter (formerly indicating the function) now indicates the temperature range.

So that a clear distinction could be made between the new and the former codes it was agreed to use a serial number of at least 4 digits in future. Types with existing company numbers of less than 4 figures are completed to a 4 digit number by adding zeros in front of the serial number.

For more details see page 8.

PRO ELECTRON INTEGRATED CIRCUITS REFERENCE BOOK

The book consists of two separate volumes, Volume 1 Analogue Circuits, Volume 2 Digital Circuits.

Volume 1 : Analogue Circuits, lists all analogue circuits registered with a PRO ELECTRON type number which are still commercially available, with the most relevant data (description, function(s), application(s), characteristic(s) circuit diagrams and outline drawings, as well as a list of suppliers.

Volume 2 : Digital Circuits, lists all digital circuits registered with a PRO ELECTRON type number which are still commercially available, with abbreviated data tables (description of function, characteristics), logic diagrams and outline drawings, as well as a list of suppliers.

The primary aims of this book are to aid the selection of integrated circuits suitable for a particular application and to direct potential users to the sources of supply. These volumes are not intended to replace the data sheets of individual manufacturers, so it is always necessary to check the suitability of any device against the manufacturer's data sheets.

In exceptional cases, particularly for digital circuits where the data are published in table form, the brief characteristics published may be the same for several devices with different type numbers.

In these cases it is especially important to examine the manufacturer's detailed data carefully, as different type numbers will have been allocated because of deviations in more detailed characteristics which may be of importance for certain applications.

The terminology, letter and graphical symbols used conform where possible with the recommendations of the INTERNATIONAL ELECTRONIC COMMITTEE (IEC).

These books contain the characteristics of all types having a PRO ELECTRON type number. Some manufacturers also sell other types with "house" or other type numbers, so that the lists in this book do not necessarily represent the entire sales programme of the manufacturers mentioned.

The information has been prepared with the full support of the manufacturers of the types mentioned.

Every effort has been made to ensure the accuracy of the data published : however, PRO ELECTRON can not be held responsible for obvious incompatibilities, errors or omissions.

TYPE DESIGNATION CODE FOR INTEGRATED CIRCUITS

This type nomenclature for integrated circuits applies to semiconductor monolithic, semiconductor multi-chip, thin film and thick film hybrid integrated circuits.

A basic type number consists of :

THREE LETTERS FOLLOWED BY A SERIAL NUMBER

FIRST AND SECOND LETTER :

1. DIGITAL FAMILY CIRCUITS (see Note 1)

The FIRST TWO LETTERS (FA...FZ, GA...GZ, HA...HZ, PC...PZ) identify the family.

2. SOLITARY CIRCUITS

The FIRST LETTER divides the solitary circuits into :

- S -- Solitary digital circuits
- T -- Analogue Circuits
- U -- Mixed analogue/digital circuits

The SECOND LETTER is a serial letter without any further significance except "H" which stands for hybrid circuits.

3. MICROPROCESSORS

The FIRST TWO LETTERS identify microprocessors and correlated circuits as follows :

- MA - Micro computer
Central processing unit
- MB - Slice processor (see Note 2)
- MD - Correlated memories
- ME - Other correlated circuits (Interface, clock, peripheral controller, etc).

THIRD LETTER :

It indicates the operating ambient temperature range.

The letters A through G give information about the temperature :

- A -- temperature range not specified below
 - B -- 0°C to +70°C
 - C -- -55°C to +125°C
 - D -- -25°C to +70°C
 - E -- -25°C to +85°C
 - F -- -40°C to +85°C
 - G -- -55°C to +85°C
- Note : If a circuit is published for another temperature range, the letter indicating a narrower temperature range may be used or the letter "A".

Example : the range 0°C to +75°C can be indicated by "B" or "A".

SERIAL NUMBER :

It may be either a 4-digit number assigned by Pro Electron or the serial number (even a combination of figures and letters) of an existing company type designation of the manufacturer.

(contd)

To the basic type number may be added :

A VERSION LETTER

It indicates a minor variant of the basic type or the package.
Except "Z" which means customized wiring, the letter has no fixed meaning. For packages the following letters are recommended :

- C -- for cylindrical
- D -- for ceramic DIL
- F -- for flat pack
- L -- for chip on tape (foil)
- P -- for plastic DIL
- Q -- for QUIL
- T -- for miniature plastic
- U -- for uncased chip.

Alternatively a TWO LETTER-SUFFIX may be used instead of a single package-version letter, if the manufacturer (sponsor) wishes to give more information.

FIRST LETTER : General shape

- C = Cylindrical
- D = Dual-in-line (DIL)
- E = Power DIL (with extern.heat sink)
- F = Flat (leads on 2 sides)
- G = Flat (leads on 4 sides)
- K = Diamond (TO-3 family)
- M = Multiple-in-line (except Dual-, Triple-, Quadruple-in-line)
- Q = Quadruple-in-line (QUIL)
- R = Power QUIL (with extern.heat sink)
- S = Single-in-line (as TO-127 or -220)
- T = Triple-in-line

SECOND LETTER : Material

- C = Metal-ceramic
- G = Glass-ceramic (cerdip)
- M = Metal
- P = Plastic

Remark : To avoid confusion with a version letter a hyphen is used preceding the suffix.

Examples :

- GMB74LS00A-DC = digital IC, GM family, oper.temp.0 to 70°C, company N°74LS00, A version, ceramic DIL package.
- TDA1000P = analogue circuit, no standard temp. range, serial N°1000, plastic DIL package.
- SAC2000 = solitary digital circuit, oper.temp. -55 to +125°C, serial N°2000.

Note 1 : A logic family is an assembly of digital circuits designed to be interconnected and defined by its basic electrical characteristics (such as : supply voltage, power consumption, propagation delay time, noise immunity). The basic characteristics of the registered digital families are listed at the beginning of the Reference Book on Integrated Circuits, Volume 2 : Digital Circuits.

Note 2 : With "slice processor" is meant a functional slice of microprocessor.

Note 3 : The First Letter S should be used for all solitary memories, to which, in the event of hybrids, the Second Letter H should be added (e.g.SH for Bubble-memories).

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INTRODUCTION

PRO ELECTRON

La désignation d'un dispositif par un "numéro de type" permet son identification par les constructeurs de matériel électronique et les techniciens utilisateurs. Grâce à cette identification, le composant répond à des données techniques définies même s'il est produit par plusieurs fabricants ou si plusieurs années se sont écoulées depuis son apparition sur le marché. Il est avantageux que le numéro de type contienne déjà des informations concernant la catégorie, le groupe ou la famille où se situe le composant, ceci sans que cette désignation ne soit ni trop longue ni trop difficile à mémoriser.

Un code commun de désignation pour les tubes récepteurs avait déjà été introduit dans la décennie 1930-1940 par un certain nombre de fabricants et pour les semiconducteurs dans la décennie 1950-1960. Par la suite, comme un nombre croissant de fabricants se mirent à réaliser les avantages d'un code commun pour les tubes et les semiconducteurs et se montrèrent intéressés à l'utiliser, il fut décidé de fonder une organisation privée et autonome pour l'attribution et l'enregistrement des désignations. C'est ainsi qu'en 1966, l'Association Internationale PRO ELECTRON a été créée à Bruxelles dans ce but. Elle comporte actuellement 20 membres représentant la plupart des fabricants de tubes et de semiconducteurs d'Europe occidentale. Les Comités qu'ils ont constitués ont mis sur pied un vaste système de codification couvrant l'ensemble des composants actifs : tubes récepteurs, tubes électroniques pour équipements professionnels, tubes à rayons cathodiques, dispositifs discrets à semiconducteurs, circuits intégrés et microprocesseurs.

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B - 1000 BRUXELLES

Tél. : (02) 538.38.87

Telex : 22 810

CODE DE DÉSIGNATION PRO ELECTRON POUR CIRCUITS INTÉGRÉS

Par analogie avec le code des dispositifs discrets à semiconducteurs, le code pour circuits intégrés comportait initialement trois lettres et trois chiffres à savoir :

- un préfixe de deux lettres désignant la famille technologique de série, une troisième lettre indiquant la fonction, un numéro d'ordre de deux chiffres caractérisant le modèle, et enfin un troisième chiffre donnant les limites de température de fonctionnement.
ex : FLH101.

Cependant la plupart des circuits intégrés fabriqués en Europe, en particulier les circuits numériques, répondaient à des spécifications de dispositifs créés aux Etats-Unis et étaient vendus sous des "appellations maison" très connues sur le marché; cette situation amena PRO ELECTRON à élaborer un nouveau code dont la partie chiffrée significative du modèle est identique à celle de ces "appellations maison".

Il n'était dès lors plus possible d'utiliser le dernier chiffre pour indiquer les limites de température de fonctionnement. C'est pourquoi, dans le nouveau code, la troisième lettre est utilisée à cette fin. Pour établir une distinction nettement apparente entre l'ancien et le nouveau code, il fut décidé que désormais la partie chiffrée comporterait un minimum de 4 chiffres, des zéros étant ajoutés au début de la partie chiffrée de moins de 4 chiffres utilisée par les firmes.

Pour plus amples détails voir page 13.

GUIDE DES CIRCUITS INTÉGRÉS PRO ELECTRON

Ce guide comprend deux volumes : le Volume 1 pour les circuits analogiques et le Volume 2 pour les circuits numériques.

Il contient tous les circuits intégrés enregistrés sous une désignation PRO ELECTRON qui sont disponibles sur le marché. Pour chacun des circuits, il fournit, sous une forme concise et pratique, les données techniques principales (la description de la fonction, les valeurs limites et caractéristiques essentielles), le schéma synoptique du circuit avec l'identification des connexions, le dessin d'encombrement et enfin la liste des fournisseurs.

Le but essentiel de ce répertoire est de permettre l'identification rapide des circuits intégrés PRO ELECTRON, d'en faciliter le choix et d'indiquer les sources d'approvisionnement. Ces volumes ne sont pas destinés à remplacer les notices techniques des fabricants, de sorte qu'il est conseillé de toujours vérifier dans les caractéristiques détaillées de ces notices que le circuit convient bien à l'application particulière envisagée.

La terminologie, les symboles littéraux et graphiques utilisés sont, autant que possible, conformes aux recommandations de la COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE (CEI).

Ces volumes mentionnent tous les dispositifs auxquels PRO ELECTRON a attribué un "numéro de type". Cependant comme certains fabricants vendent également d'autres circuits sous d'autres appellations, il en résulte que ces volumes ne contiennent pas nécessairement la totalité des dispositifs présentés par les fournisseurs.

Les renseignements fournis ont été rassemblés en collaboration avec les fabricants des dispositifs mentionnés. Le plus grand soin a été apporté en vue de l'exactitude des données publiées. Cependant PRO ELECTRON ne peut être tenu pour responsable des quelques erreurs ou omissions qui pourraient subsister.

CODE DE DÉSIGNATION DES CIRCUITS INTÉGRÉS

Le code de désignation s'applique aux circuits intégrés monolithiques à semiconducteurs, aux circuits intégrés comprenant plusieurs puces à S.C. et aux circuits intégrés hybrides à couches minces ou à couches épaisses.

La désignation d'un type de base se compose de :

TROIS LETTRES ET UN NUMÉRO D'ORDRE

DEUX PREMIÈRES LETTRES :

1. CIRCUITS FAMILLES (voir Note 1)

Les DEUX PREMIÈRES LETTRES (FA...FZ, GA...GZ, HA...HZ, PC...PZ) indiquent la FAMILLE.

2. CIRCUITS SOLITAIRES

La PREMIÈRE LETTRE répartit les circuits solitaires comme suit :

- S -- circuits logiques solitaires
- T -- circuit analogiques
- U -- circuits mixtes logique/analogique

La DEUXIÈME LETTRE est une lettre de série sans signification fixe, sauf la lettre "H" qui indique un circuit hybride.

3. MICROPROCESSEURS

Les DEUX PREMIÈRES LETTRES identifient les microprocesseurs et répartissent les circuits comme suit :

- MA - Micro ordinateur
 - Unité centrale de traitement de données
- MB - Processeur en tranches (voir Note 2)
- MD - Mémoires collatérales
- ME - Autres circuits collatéraux (Interface, horloge, contrôleur périphérique, etc...)

LA TROISIÈME LETTRE :

Indique la gamme de température ambiante d'utilisation.

Les lettres "A" à "G" renseignent sur la température :

- A -- gamme de température non spécifiée
- B -- 0°C à + 70°C
- C -- -55°C à +125°C
- D -- -25°C à + 70°C
- E -- -25°C à + 85°C
- F -- -40°C à + 85°C
- G -- -55°C à + 85°C

Note : Dans le cas où un circuit est produit pour une autre gamme, on peut utiliser soit la lettre désignant une gamme plus étroite, soit la lettre "A".

Exemple : La gamme de 0°C à 75°C peut être indiquée par "B" ou "A".

LE NUMÉRO D'ORDRE

Peut être un nombre de 4 chiffres attribués par PRO ELECTRON ou un numéro de modèle existant utilisé par un fabricant (éventuellement lettres + chiffres).

(suite)

A la désignation d'un type de base, on peut ajouter :

UNE LETTRE DE VERSION :

Elle indique une variante du type de base ou le boîtier.
Sauf "Z" qui signifie connexions internes à la demande, la lettre n'a pas de signification fixe.
Pour indiquer le boîtier, les lettres de versions suivantes sont recommandées :

"C" pour cylindrique
"D" pour DIL céramique
"F" pour boîtier plat
"L" pour puces en ruban (feuille de métal)
"P" pour DIL plastique
"Q" pour QUIL
"T" pour boîtiers miniatures en plastique
"U" pour puce (sans boîtier)

En variante, un SUFFIXE DE DEUX LETTRES peut être utilisé au lieu d'une simple lettre de version pour désigner le boîtier, si le fabricant (sponsor) désire donner plus d'informations :

PREMIÈRE LETTRE : Forme générale

DEUXIÈME LETTRE : Matériau

C = Cylindrique	C = Métal-céramique
D = "Dual-in-line" (DIL = 2 rangées de sorties)	
E = "DIL" avec radiateur extérieur	
F = Boîtier plat (sorties sur 2 côtés)	G = Verre-céramique
G = Boîtier plat (sorties sur 4 côtés)	
K = Famille "TO-3" (losange)	
M = "Multiple-in-line" (sauf "Dual-", "Triple-" et "Quadruple-in-Line")	M = Métal
Q = "Quadruple-in-line" (QUIL = 4 rangées de sorties)	
R = "QUIL" avec radiateur extérieur	P = Plastique
S = "Single-in-line" (comme TO-127 ou TO-220)	
T = "Triple-in-line" (trois rangées de sorties)	

Remarque : Pour éviter toute confusion avec une lettre de version, un tiret précède le suffixe.

Exemples :

GMB74LS00A-DC = circuit intégré logique, famille GM, température d'utilisation 0 à 70°C, n°"maison"74LS00 version A, boîtier DIL céramique.
TDA1000P = circuit analogique, pas de gamme standard de température, n°d'ordre 1000, boîtier DIL plastique.
SAC2000 = circuit logique solitaire, température d'utilisation -55 à +125°C, n°d'ordre 2000.

Note 1 : Une famille logique est un ensemble de circuits logiques conçus pour être interconnectés et définis par des caractéristiques électriques communes (telles que : tension d'alimentation, puissance dissipée, temps de propagation, immunité au bruit).

Note 2 : Un processeur en tranches est un microprocesseur daté d'une certaine longueur de mot par la juxtaposition (mise en parallèle) d'un certain nombre de circuits élémentaires offrant chacun une longueur de mot moindre (2 ou 4 bits).

Note 3 : La première lettre S peut être utilisée pour toutes les mémoires solitaires, et, dans le cas de mémoires hybrides, on utilisera la seconde lettre H (c.a.d. : SH pour les mémoires à bulles).

INHALTSVERZEICHNIS

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VORWORT

PRO ELECTRON

Eine Typenbezeichnung (Typennummer) soll ein Bauelement so kennzeichnen, dass man es danach bestellen kann, und dass die damit festgelegten Daten gelten selbst wenn es von mehreren Herstellern gefertigt wird, oder seine Erstfertigung mehrere Jahre zurück liegt.
Ein zusätzlicher Vorteil ist es, wenn die Typenbezeichnung eine technische Information darüber enthält, zu welcher Gruppe, Kategorie, Familie oder Art das Bauelement gehört, ohne dass sie dabei zu lange gerät oder schwer zu merken ist.

Ein erstes gemeinsames Typenbezeichnungssystem wurde für Rundfunkröhren in den dreissiger Jahren, und für Halbleiter in den fünfziger Jahren von einigen Herstellern eingeführt. Als dann später mehr und mehr Hersteller die Vorteile eines gemeinschaftlichen Typenbezeichnungssystems erkannten und sich dafür interessierten, es zu benutzen, entschloss man sich, eine treuhänderisch arbeitende Gesellschaft ins Leben zu rufen, deren Aufgabe es ist Typenbezeichnungen auszugeben und zu registrieren. So wurde 1966 die internationale Organisation "PRO ELECTRON" mit Sitz in Brüssel geschaffen und mit dieser Aufgabe betraut. Ihr gehören 20 Mitgliedsfirmen an: sie repräsentiert also die grosse Mehrheit aller westeuropäischen Röhren- und Halbleiter-Hersteller. In verschiedenen technischen Komitees wurde ein geschlossenes Typenbezeichnungssystem herarbeitet, das den gesamten Bereich der aktiven Bauelemente - Empfängerröhren, Röhren für industrielle (professionelle) Anwendung, Elektronenstrahl- (Oszillographen) Röhren, Halbleiter und integrierte Schaltungen (I.C.'s) - umfasst.

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PHILIPS (Eindhoven)

Grossbritannien :

FERRANTI ELECTRONICS (Oldham)
LUCAS ELECTRICAL (Sutton Coldfield)
MULLARD (London)
TEXAS INSTRUMENTS (Bedford)
THORN BRIMAR (Brimdown, Enfield)

Switzerland :

TAG SEMICONDUCTORS Ltd

PERMANENTES SEKRETARIAT

Boulevard de Waterloo, 103

B - 1000 BRUXELLES

Tél. : (02) 538.38.87

Telex : 22810

PRO ELECTRON TYPENBEZEICHNUNGSSYSTEM FÜR INTEGRIERTE SCHALTUNGEN

Der ursprüngliche Code für integrierte Schaltungen bestand, analog dem Typenbezeichnungssystem für diskrete Halbleiter, aus Vorbuchstaben (Familiebuchstaben), einem Funktionsbuchstaben, einer Seriennummer von zwei Ziffern und einer Ziffer die dem Betriebstemperaturbereich diente.
Beispiel : FLH101.

Viele in Europa hergestellte integrierte Schaltungen, es sind meistens Digitalschaltungen, waren Kopien von in Vereinigten Staaten entwickelten Bauelementen mit allgemein bekannt gewordenen Firmenbezeichnungen. Aus diesem Grunde erarbeitete PRO ELECTRON einen neuen Code in den die bestehenden Firmenbezeichnungen integriert werden können. Die letzte Ziffer in der ursprünglichen Typenbezeichnung, die den Betriebstemperaturbereich angab, konnte zu diesem Zweck nicht mehr verwendet werden, deswegen wurde in dem neuen Code der dritte Buchstabe (vorher Funktionsbuchstabe) für diesen Temperaturbereich verwendet. Damit ein deutlicher Unterschied zwischen dem neuen und dem ursprünglichen Code gemacht werden kann, wurde übereingekommen, in Zukunft nur noch eine Seriennummer von mindestens 4 Ziffern zu gebrauchen. Falls eine bestehende Firmenseriennummer weniger als 4 Ziffern umfasst, wird sie von vorn an mit Nullen ausgefüllt.

PRO ELECTRON INTEGRIERTE SCHALTUNGEN REFERENZBUCH

Dieses Buch besteht aus zwei Separatausgaben, Band 1 : Analoge Schaltungen und Band 2 : Digitalschaltungen. Band 1 : Analoge Schaltungen enthält alle analoge Schaltungen die bei PRO ELECTRON registriert sind und noch geliefert werden. Ferner sind die wichtigsten Daten (Beschreibung, Funktion(en), Anwendung(en), technische Daten), Funktionsschaltbilder, Gehäuseabmessungen und die Lieferfirmen genannt. Band 2 : Digitalschaltungen enthält alle Digitalschaltungen die bei PRO ELECTRON registriert sind und noch geliefert werden. Ferner sind die technischen Daten in Kurzfassung, die Blockschaltbilder, Gehäuseabmessungen und die Lieferfirmen genannt. Das Buch ersetzt nicht die Datenblätter der einzelnen Firmen. Es bezweckt lediglich eine Hilfe bei der Auswahl von integrierten Schaltungen für eine bestimmte Anwendung mit Hinweis auf die Hersteller, die als Lieferanten in Betracht kommen. Es ist möglich, dass für einzelne Typen, besonders für Digitaltypen, wo die Daten in Tabellenform gebracht sind, dieselben Daten für verschiedene Typen erscheinen. In diesem Falle können Abweichungen in Charakteristiken vorliegen die nicht in den Tabellen publiziert werden. In solchen Fällen sollen die Veröffentlichungen des Herstellers zu Rate gezogen werden. Die Terminologie, graphische und Buchstabensymbole sind, soweit möglich, konform den I.E.C.-Vorschlägen. Diese Bücher enthalten die Daten von allen Typen, die eine PRO ELECTRON Typenbezeichnung haben. Einige Firmen stellen integrierte Schaltungen her, die mit einer Firmen oder sonstigen anderen Typenbezeichnung geliefert werden. Die in diesem Buch genannten Typen sind daher nicht repräsentativ für das vollständige Verkaufsprogramm der Firmen. Die Angaben und Daten in diesem Buch sind in engster Zusammenarbeit mit den Herstellern erfasst worden. Alle Anstrengungen sind gemacht worden, korrekte Daten zu veröffentlichen. PRO ELECTRON ist jedoch nicht verantwortlich für deutliche Widersprüche, Irrungen oder Unzulänglichkeiten.

TYPENBEZEICHNUNGSSYSTEM FUER INTEGR. SCHALTUNGEN

Diese Typenomenklatur trifft zu für monolithische Halbleiter, Halbleiter-Multi-Chip-Bauelemente sowie für integrierte Hybridschaltungen in Dünnschicht und Dickschicht.

Die Bezeichnung von einem Grundtyp besteht aus :

DREI BUCHSTABEN UND EINER SERIENNUMMER

ERSTE ZWEI BUCHSTABEN :

1. FAMILIENSCHALTUNGEN (siehe Note 1)

Die ERSTEN ZWEI BUCHSTABEN (FA...FZ, GA...GZ, HA...HZ, PC...PZ etc.) kennzeichnen die FAMILIE.

2. EINZELNSCHALTUNGEN

Der erste Buchstabe unterscheidet die alleinstehenden Schaltkreise in :

- S -- Einzelne digitale Schaltung
- T -- Analoge Schaltung
- U -- Gemischte Analog/Digitalschaltung

Der ZWEITE BUCHSTABE ist eine Serienbuchstabe ohne feste Bedeutung, mit Ausnahme des Buchstabes "H", der eine Hybridschaltung bezeichnet.

3. MIKROPROZESSOREN

Die ersten 2 Buchstaben bestimmen Mikroprozessoren und zugehörige Schaltkreise wie folgt :

- MA - Mikrocomputer
 - zentrale Recheneinheit
- MB - Slice-Prozessor (siehe Note 2)
- MD - zugehörige Speicher
- ME - andere zugehörige Schaltkreise (Anpässchaltung, Taktschaltung, periphere Steuerung usw.)

DER DRITTE BUCHSTABE :

Gibt den Temperaturbereich oder ausnahmsweise eine Bedeutung an.

Die Buchstaben "A" bis "G" geben den Temperaturbereich an :

A -- Kein hiernach bestimmter Temperaturbereich

B -- 0°C bis +70°C

C -- -55°C bis +125°C

D -- -25°C bis +70°C

E -- -25°C bis +85°C

F -- -40°C bis +85°C

G -- -55°C bis +85°C

Note : Wenn eine Schaltung für einen abweichenden Temperaturbereich spezifiziert ist, kann entweder der Buchstabe für den schmaleren Temperaturbereich oder der Buchstabe "A" verwendet werden.

Beispiel : Für den Temperaturbereich 0°C bis +75°C kann "B" oder "A" verwendet werden.

DIE SERIENNUMMER

Ist entweder eine 4-Ziffern Nummer (von PRO ELECTRON gegeben) oder eine Seriennummer (Ziffern und eventuelle Buchstaben) einer bestehenden Firmennummer. Falls die Firmennummer aus weniger als 4 Buchstaben besteht werde sie vorn ausgefüllt mit Nullen (0).

(Forts.)

Zu der Bezeichnung eines Grundtyps kann angehängt sein :

EIN VERSIONSBUCHSTABE :

Bezeichnet eine geringfügige Abweichung vom Basistyp oder vom Gehäuse.
Ausgenommen "Z" (=innere Verbindungen nach Kundenwunsch) hat sie keine feste Bedeutung.
Die folgenden Buchstaben werden empfohlen für Gehäusevarianten :

C = für zylinderförmiges Gehäuse
D = für Keramik DIL
F = für flaches Gehäuse
L = für Kristall auf Film (Folie)
P = für plastic DIL
Q = für QUIL
T = für Miniatur-Plastikgehäuse
U = für Chip (ohne Gehäuse)

EIN ZWEI BUCHSTABEN - ANHANG (benützt anstatt der Gehäuse-Versionsbuchstaben)

ERSTE BUCHSTABE : Allgemeine Form

ZWEITE BUCHSTABE : Material

C = Zylindrisch	C = Metal-Keramik
D = "Dual-in-Line" (DIL=2 Reihen von Anschlüssen)	
E = DIL mit zusätzlicher Wärmeableitung	
F = Flaches Gehäuse (Anschlüsse an 2 Seiten)	G = Glas-Keramik
G = Flaches Gehäuse (Anschlüsse an 4 Seiten)	
K = "T0-3"-Familie (Rhombus)	
M = "Multiple-in-line" (mehr als 4 Reihen von Anschlüssen)	M = Metal
Q = "Quadruple-in-line" (QUIL=4 Reihen von Anschlüssen)	
R = "QUIL" mit zusätzlicher Wärmeableitung	
S = "Single-in-line" (eine Reihe von Anschlüssen) -wie T0-127 oder T0-220	P = Plastik
T = "Triple-in-line" (drei Reihen von Anschlüssen)	

Anmerkung : Um Verwirrung mit einem Versionsbuchstabe zu vermeiden benützt man einen Bindestrich vor dem Anhang.

Beispiele :

GMP74LS00A-DC = Digitale I.S., GX-Familie, Temperaturbereich : 0 bis 70°C, Firmen Nr 74LS00, Version A, Keramik DIL Gehäuse.
TDA1000P = Analoge Schaltung, kein Standardtemperaturbereich, Seriennummer 1000, Plastik DIL Gehäuse.
SAC2000 = Einzelne digitale Schaltung, Temperaturbereich -55° bis +125°C, Seriennummer 2000.

Note 1 : Eine Logikfamilie ist eine Gruppierung von Digitalschaltungen, die untereinander verbunden werden können und die durch eine bestimmte Technologie mit gemeinsamen elektrischen Eigenschaften (wie : Versorgungsspannung, Leistungsverbrauch, Durchlaufzeit, Störungsimunität) festgelegt sind. Die grundlegenden Kenndaten der registrierten Digitalfamilien sind am Anfang des Referenz-Buches über integrierte Schaltungen, Band 2 : "Digitale Schaltkreise" aufgeführt.

Note 2 : Mit "Slice-Prozessor" ist eine funktionsfähige Scheibe des Mikroprozessors gemeint.

Note 3 : Der erste Buchstabe S ist für alle allein stehenden Speicher anzuwenden, dem, im Falle von Hybrid-Bausteinen, der 2. Buchstabe H hinzufügen ist (z.B. SH für Blasenspeicher).

DESIGNATION OF OUTLINE DRAWING NUMBERS

COMPOSITION :

2 LETTERS, 1 NUMBER/SERIAL NUMBER

Exemples : DP14/1
 QP16/3

DESIGNATION :

FIRST LETTER : GENERAL SHAPE (see Type Nomenclature page 8)

SECOND LETTER : MATERIAL (see Type Nomenclature page 8)

FIRST NUMBER : NUMBER OF LEADS

SERIAL NUMBER (separated from the "leads number" by a stroke)

DÉSIGNATION DES DESSINS D'ENCOMBREMENTS

COMPOSITION :

2 LETTRES, 1 NUMÉRO/NUMÉRO DE SÉRIE

Exemples : DP14/1
 QP16/3

SIGNIFICATION :

PREMIÈRE LETTRE : FORME GÉNÉRALE (voir Code de Désignation page 10)

DEUXIÈME LETTRE : MATÉRIAU (voir Code de Désignation page 10)

PREMIER NUMÉRO : NOMBRE DE SORTIES

NUMÉRO DE SÉRIE (séparé du "numéro du nombre de conducteurs" par un trait oblique)

BEDEUTUNG DER GEHÄUSEABMESSUNGENBEZEICHNUNGEN

ZUSAMMENSTELLUNG :

2 BUCHSTABEN, EINE NUMMER/SERIENNUMMER

Beispiele : DP14/1
 QP16/3

BEDEUTUNG :

ERSTE BUCHSTABE : ALLGEMEINE FORM (Siehe Typenbezeichnung Seite 10)

ZWEITE BUCHSTABE : MATERIAL (Siehe Typenbezeichnung Seite 10)

ERSTE NUMMER : ZAHL DER ANSCHLUSSE

SERIENNUMMER (getrennt von "Anschlussummer" durch einen Strich)

BASIC CHARACTERISTICS OF DIGITAL FAMILIES
 CARACTÉRISTIQUES DE BASE DES FAMILLES LOGIQUES
 GRUNDEIGENSCHAFTEN DER DIGITALFAMILIEN

FAMILY	Technology	SUPPLY VOLTAGE RANGE	t_{pd} (typ)	P (typ)	NOISE IMMUNITY (3)	
		V_{CC} (typ)			V_{nL} (typ)	V_{nH} (typ)
			(2)	(1)	V_n (typ)	
		V	ns	nW or mW	V or mV	V or mV
FL	TTL(Standard)	°5V	10ns	10mW	°1V	
FZ	LSL	°12V or °15V	175ns (6) 175ns (6)	16mW (6) 27mW (6)	5V 5V	5V 8V
(GA)*	TTL(Low Power)	°5V	33ns	1mW	°1V	
GF	TTL(Standard)	°5V	10ns	10mW	°1V	
GJ	TTL(High speed)	°5V	6ns	22mW	°1V	
GM	TTL(Low Power Schottky)	°5V	9,5ns	2mW	°1V	
GT	TTL(Schottky)	°5V	3ns	19mW	°1V	
GX	ECL	-5,2V (V_{EE})	2ns	25mW	200mV	200mV
GZ* HB*						
HC	CMOS	3 to 20 V	40ns(4)(5)	50nW	45 % of V_{DD} (typ)	
HE	LOC MOS	3 to 18 V	40ns (4)	50nW	45 % of V_{DD} (typ)	
HX	ECL	-4,5V (V_{EE}) V_{CC} = ground	75ps	-	135mV	130mV
HY (r)	MOS					
PC (r)	CMOS					

*The GA, GZ and HB families have been cancelled since last edition.

- NOTES : (1) Quiescent power dissipation per gate at $V_{CC} = 5V$ (5) at $C_L = 15 pF$
 (2) t_{pd} per gate at $V_{CC} = 5V$ (6) at V_{CC} (typ)
 (3) typical static noise immunity (r) reserved series
 (4) at $V_{CC} = 5V$

Symbols

Symboles

Symbole

B_I	INPUT INDUCTION	Induction d'entrée	Eingangsenduktion
B_O	OUTPUT INDUCTION	Induction de sortie	Ausgangsenduktion
f_o	OUTPUT FREQUENCY	Fréquence de sortie	Ausgangsfrequenz
f_{oper}	OPERATING FREQUENCY	Fréquence de fonctionnement	Betriebsfrequenz
f_{ϕ}	CLOCK FREQUENCY	Fréquence d'horloge	Taktfrequenz
I_{DD}	QUIESCENT SUPPLY CURRENT	Courant d'alimentation au repos	Speiseruhestrom
I_{DN}	OUTPUT DRIVE CURRENT N-CHANNEL	Courant de sortie canal N	Ausgangsstrom N-Kanal
I_{DP}	OUTPUT DRIVE CURRENT P-CHANNEL	Courant de sortie canal P	Ausgangsstrom P-Kanal
I_F	FORWARD CONTINUOUS (DIRECT CURRENT)	Courant direct continu	Durchlasstrom
I_L	LOAD CURRENT	Courant dans la charge	Belastungsstrom
I_O	OUTPUT CURRENT	Courant de sortie	Ausgangsstrom
I_{OH}	HIGH-LEVEL OUTPUT CURRENT	Courant de sortie pour l'état haut	H-Ausgangsstrom
I_{OL}	LOW-LEVEL OUTPUT CURRENT	Courant de sortie pour l'état bas	L-Ausgangsstrom
I_Q	LOW-LEVEL OUTPUT CURRENT	Courant de sortie pour l'état bas	L-Ausgangsstrom
I_{OS}	SHORT-CIRCUIT OUTPUT CURRENT	Courant de sortie en court-circuit	Kurzschlussausgangsstrom
I_R	CONTINUOUS(DIRECT) REVERSE BLOCKING CURRENT	Courant inverse continu à l'état bloqué	(Negative) Sperrstrom (bei rückwärtssperrendem Element)
N	FAN-OUT	Sortance	Ausfächerung
P, P_D, P_{DL}	POWER DISSIPATION	Dissipation de puissance	Verlustleistung
P_{AV}	AVERAGE POWER CONSUMPTION	Puissance moyenne de consommation	Mittlere Verlustleistung
R_e	COLLECTOR RESISTANCE	Résistance de collecteur	Kollektorwiderstand
R_L	LOAD RESISTOR	Résistance de charge	Lastwiderstand
t_{ACC}	ACCESS TIME	Temps d'accès	Zugriffzeit
t_{DHL}	HIGH-TO-LOW DELAY TIME	Temps de délai, la sortie allant vers l'état bas	Verzögerungszeit (von H nach L)
t_{DLH}	LOW-TO-HIGH DELAY TIME	Temps de délai, la sortie allant vers l'état haut	Verzögerungszeit (von L nach H)
$t_{f\phi}$	CLOCK FALL TIME	Temps de descente de l'horloge	Taktabfallzeit
t_{hold}	HOLD TIME	Temps de maintien	Haltezeit
t_{off}	TURN-OFF-TIME	Temps total de coupure	Ausschaltzeit
t_{on}	TURN-ON-TIME	Temps total d'établissement de courant	Einschaltzeit
t_{pd}	MEAN PROPAGATION DELAY-TIME	Temps moyen de propagation	Mittlere Laufzeit
t_{PHL}	HIGH-TO-LOW PROPAGATION DELAY TIME	Temps de propagation, la sortie allant vers l'état bas	Laufzeit (von H nach L)
t_{PLH}	LOW-TO-HIGH PROPAGATION DELAY TIME	Temps de propagation, la sortie allant vers l'état haut	Laufzeit (von L nach H)
t_{RC}	READ CYCLE TIME	Temps de cycle de lecture	Lesezykluszeit
$t_{r\phi}$	CLOCK RISE TIME	Temps de montée de l'horloge	Taktausstiegszeit
$t_{set up}, t_s$	SET UP TIME	Temps de préétablissement	Stellimpulsdauer
t_{THL}	HIGH-TO-LOW TRANSITION DELAY TIME	Temps de transition, la sortie allant vers l'état bas	Übergangszeit (von H nach L)
t_{TLH}	LOW-TO-HIGH TRANSITION DELAY TIME	Temps de transition, la sortie allant vers l'état haut	Übergangszeit (von L nach H)
t_{WC}	WRITE CYCLE TIME	Temps de cycle d'écriture	Schreibzykluszeit
$t_{W\phi H}$	MINIMUM CLOCK PULSE WIDTH, HIGH LEVEL	Largeur d'impulsion minimum, état haut	H-Impulsbreite des Taktsignal
$t_{W\phi L}$	MINIMUM CLOCK PULSE WIDTH, LOW LEVEL	Largeur d'impulsion minimum, état bas	L-Impulsbreite des Taktsignal

Symbols	Symboles	Symbole	Symbole
V_{CC}	SUPPLY VOLTAGE	Tension d'alimentation	Speisespannung
V_{DD}	DRAIN SUPPLY VOLTAGE	Tension (d'alimentation) de drain	Drain (Speise) spannung
V_{EE}	SUPPLY VOLTAGE	Tension d'alimentation	Speisespannung
V_{GG}	GATE SUPPLY VOLTAGE	Tension (d'alimentation) de grille	Gate (Speise) spannung
V_{IH}	HIGH-LEVEL STATIC VOLTAGE AT INPUT	Tension d'entrée pour l'état haut	Eingangs-H-Pegel
V_{IL}	LOW-LEVEL STATIC VOLTAGE AT INPUT	Tension d'entrée pour l'état bas	Eingangs-L-Pegel
V_{nH}	NOISE IMMUNITY AT HIGH LEVEL	Tension d'immunité au bruit à l'état haut	H-Störsicherheit
V_{nL}	NOISE IMMUNITY AT LOW LEVEL	Tension d'immunité au bruit à l'état bas	L-Störsicherheit
V_O	OUTPUT VOLTAGE	Tension de sortie	Ausgangsspannung
V_{ϕ}	CLOCK VOLTAGE	Tension d'horloge	Taktspannung
V_{OH}	HIGH-LEVEL STATIC VOLTAGE AT OUTPUT	Tension de sortie pour l'état haut	Ausgangs-H-Pegel
V_{OL}	LOW-LEVEL STATIC VOLTAGE AT OUTPUT	Tension de sortie pour l'état bas	Ausgangs-L-Pegel
V_{Osat}	OUTPUT SATURATION VOLTAGE	Tension de sortie en saturation	Ausgangs sättigungsspannung
V_R	REVERSE (continuous) DIRECT VOLTAGE	Tension inverse continue	Gleichsperrspannung, Rückwärtsspannung
V_{SS}	SOURCE SUPPLY VOLTAGE	Tension (d'alimentation) de source	Source (Speise) Spannung
Microprocessor Systems			
f	OSCILLATION FREQUENCY	fréquence d'oscillation	Schwingungsfrequenz
f_{ϕ}	CLOCK FREQUENCY	fréquence d'horloge	Taktfrequenz
$\phi (n^{\circ})$	CLOCK NUMBER	numéro de l'horloge	Taktnummer
GND	GROUND VOLTAGE	tension de masse	Massespannung
I_o	OUTPUT CURRENTS	courants de sortie	Ausgangsströme
PD	POWER DISSIPATION	dissipation de puissance	Verlustleistung
t_{ACC}	ADDRESS TO OUTPUT DELAY TIME	temps de propagation entre l'adressage et la sortie	Verzögerungszeit zwischen Adresse und Datenausgabe
$t_c, t_{\phi c}$	CLOCK PERIOD	période d'horloge	Taktperiode
t_d	DELAY TIME	temps de propagation	Laufzeit
t_{RC}	READ CYCLE	durée d'un cycle de lecture	Lesezykluszeit
t_{WC}	WRITE CYCLE	durée d'un cycle d'écriture	Schreibzykluszeit
T_{oper}	OPERATING TEMPERATURE RANGE	plage de température de fonctionnement	Betriebstemperatur
V_{BB}, V_{CC}, V_{DD}	SUPPLY VOLTAGES	tensions d'alimentation	Speisespannung
V_{IH}	INPUT HIGH VOLTAGE	tension d'entrée, niveau haut	H - Eingangsspannung
V_{IL}	INPUT LOW VOLTAGE	tension d'entrée, niveau bas	L - Eingangsspannung
V_{OH}	OUTPUT HIGH VOLTAGE	tension de sortie, niveau haut	H - Ausgangsspannung
V_{OL}	OUTPUT LOW VOLTAGE	tension de sortie, niveau bas	L - Ausgangsspannung

GLOSSARY

GLOSSAIRE

GLOSSAR

ADDER	additionneur	Addierer
ADDRESSABLE	adressable	adressierbar
ANALOG	analogique	analoge
ARITHMETIC	arithmétique	arithmetisch
ASTABLE	astable	astabil
ASYNCHRONOUS	asynchrone	asynchron
AT	à	bei
BIDIRECTIONAL	bi-directionnel	zweiweg
BILATERAL	bilatéral, bidirectionnel	zweiseitig
BINARY	binaire	binär
BLANKING	suppression, effacement	Unterdrückung
BUFFER	tampon	Buffer
CARRY (GENERATOR)	(générateur) de retenue, report	Übertrags (einheit)
CASCADABLE	avec possibilité de mise en cascade	aufstockbar
CATCH	dispositif d'arrêt	Sperrklinke
CHANNEL	canal, voie	Kanal
CHECK (to)	vérifier, contrôler	nachprüfen
CLOCK	(d')horloge	Takt-
COLLECTOR	collecteur	Kollektor
COMPARATOR	comparateur	Komparator
COMPLEMENT	complément	Komplement
CONNECTION	connexion	Anschluss, Verbindung
CONVERTER	convertisseur	Umformer, Wandler
COUNTER	compteur	Zähler
CURRENT	courant	Strom
D-TYPE	type-D	D-Kippschaltung
DATA	données, caractéristiques, renseignements	Daten
DECADE	décade	Dekade
DECODER	décodeur	Dekoder
DELAY	retard	Verzögerung
DEMODULATOR	démodulateur	Demodulator
DEMULTIPLEXER	démultiplexeur	Demultiplexer
DIFFERENTIAL	différentiel	differential
DISPLAY	affichage	Anzeige
DIVIDER	diviseur	Verteiler
DRAWING	dessin	Zeichnung
DRIVE (to)	commander	treiben, steuern
DRIVER	dispositif de commande	Treiber
DUAL	double	zweifach, doppelt
EACH	chaque	jede, jedes, jeder
EDGE	coin, flanc	Ecke, Flanke
ENCODER	codeur	Kodierer
EVEN	pair	gerade
EXCLUSIVE-OR	OU exclusif	exklusiv-ODER
EXPANDER	expandeur	Erweiterungseinheit
FLIP FLOP	bascule	Kippschaltung

GLOSSARY

GLOSSAIRE

GLOSSAR

FREQUENCY	fréquence	Frequenz
FULL	plein, complet	voll
FUNCTION	fonction	Funktion
GATE	porte, opérateur	Gatter
GENERATOR	générateur, -trice	Generator
HALF	demi	halb
HEX	sextuple	sechsfach
HOWEVER	cependant	(je)doch
INDICATOR	indicateur	Indikator
INPUT	entrée	Eingang
INVERT (to)	inverser	umkehren
LATCH	circuit à verrouillage	Verriegelungsglied, -schaltung
LEVEL	niveau	Stufe, Pegel
LOAD	charge	Belastung
LOCKED	verrouillé	verriegelt
LOOK-AHEAD (to)	anticiper	vorwegnehmen
LOOP	boucle	Schleife
LOW	bas, faible	niedrig, tief
MAGNITUDE	grandeur, amplitude	Grösse
MARGIN	marge	Abstand, Zwischenstück
MASTER-SLAVE	maître-esclave	Master-slave
MATERIAL	matériau	Material
MEMORY	mémoire	Speicher
MODULATOR	modulateur	Modulator
MONOSTABLE	monostable	monostabil
MULTIFUNCTION	à fonctions multiples	Vielfachfunktion
MULTIPLEXER	multiplexeur	Multiplexer
MULTIVIBRATOR	multivibrateur	Multivibrator
NAND	NON-ET, ET-NON	NAND
NODE	noeud (d'un circuit)	Schaltungspunkt
NOISE	bruit	Geräusch
NOR	NON-OU, OU-NON	NOR
ODD	impair	ungerade
OPEN	ouvert	offen
OPERATE (to)	opérer, fonctionner	betätigen, bedienen
OR	OU	ODER
OUTLINES	encombrement, dimensions	Aussenabmessungen
OUTPUT	sortie	Ausgang
OSCILLATOR	oscillateur	Oszillator
PAIR	paire	Paar
PARALLEL	parallèle	parallel
PARITY	parité	Gleichheit
PHASE	phase	Phase
POWER	puissance	Leistung

GLOSSARY

GLOSSAIRE

GLOS SAR

PRESETTABLE	pré réglable	rückstelleingängen
PROGRAMMABLE	programmable	programmierbar
PULSE	impulsion	Impuls
QUADRUPLE	quadruple	vierfach
RANDOM ACCESS MEMORY	mémoire à accès aléatoire	Speicher mit Beliebigen Zugriff
RATINGS	valeur, limite	Grenswert
RATE	vitesse, taux	Verhältnis, Wiederholung
READ ONLY (memory)	(mémoire) morte, à lecture seulement	Nur-Lese (speicher) Festwert-
READ WRITE (memory)	(mémoire) vive à lecture-écriture	Lese-Schreib-(speicher)
RESET	voir : SET	siehe : SET
RETRIGGERABLE	voir : TRIGGER	siehe : TRIGGER
RIPPLE	ondulation	Welligkeit
SCHMITT-TRIGGER	Trigger de Schmitt	Schmitt-trigger
SEGMENT	segment	Segment
SELECTOR	sélecteur	Selektor
SERIAL	série	Serie
SET and RESET	positionnement et repositionnement	Sehen und Rücksehen
SHAPE	forme	Form
SHIFT (register)	(registre) (à) décalage, glissement	Schiebe (register)
SINGLE	unique	einfach
S/R LATCH	bascule S/R	RS-Kippschaltung
STAGE	étage	Stufe
STATE	état	Zustand
STORAGE	stockage, emmagasinage	Speicherung
STROBE	repère	Festlegung
SUPPLY	alimentation	Speisung
SWITCH	commutateur	Schalter
SYNCHRONOUS	synchrone	synchron
TRIGGER	déclancher	trigger, anstoszen
TRIPLE	triple	dreifach
TRUE	vrai, de vérité	wahr
UP-DOWN (counter)	compteur-décompteur	vorwärts-rückwärts (Zähler)
VOLTAGE	tension	Spannung
WIDE	large	weit
WORD	mot	Wort

CROSS REFERENCE LIST

In the event you only know the serial number of a device, it is possible to find with this list the relevant type number.

SERIAL NUMBER	PRO ELECTRON PREFIX	PRO ELECTRON DESIGNATION	SEE PAGE
0600	SAB	SAB0600	117

N.B. The third letter indicates the temperature range.

SERIAL NUMBER	P.E. PREFIX	SEE PAGE	SERIAL NUMBER	P.E. PREFIX	SEE PAGE
0600	SAB	117	1276	SAA	113
1006	SAA	110	1350	SAA	113
1009B	SAB	117	1351	SAA	113
1016	SAB	117	1534E	SAB, SAF	118, 127
1018/A	SAB	117	1534P	SAB	118
1020	SAA	110	1702A/B	SAB	118
1025	SAA	110	1801D	SAB	118
1027	SAA	110	1900	SAA	113
1028	SAA	110	2000	SAB	118
1029	SAA	110	2001	SDA	134
1032	SAF	127	2002	SDA	134
1034E	SAB, SAF	117, 127	2003	SDA	134
1034P	SAB	117	2004	SDA	134
1039P	SAF	127	2005	SDA	134
1046	SAB	117	2006	SDA	134
1047	SAB	118	2007	SDA	134
1048	SAB	118	2008	SAA, SDA	113, 134
1056D/P	SAA	110	2010	SAB, SDA	118, 134
1057	SAA	110	2014	SDA	134
1058/A	SAA	110	2015	SAB	119
1059	SAA	110	2020	SAB	119
1060	SAA	111	2022	SAB	142
1061	SAA	111	2024	SAB	119
1062/T	SAA	111	2101A/B	SAB	142
1070	SAA	111	2102A	SAB	142
1075	SAA	111	2104A	SAB	142
1082P	SAA	111	2108	SAB	142
1121	SAA	111	2109	SAB	142
1130	SAA	112	2111A	SAB	142
1174	SAA	112	2114C/P	SAB	142
1220	SAA	112	2116	SAB	142
1224	SAA	112	2117	SAB	142
1230	SAA	112			
1250	SAA	112			
1251	SAA	112	2141	SAB	142
1274	SAA	113	2142	SAB	142

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SERIAL NUMBER	PE. PREFIX	SEE PAGE	SERIAL NUMBER	PE. PREFIX	SEE PAGE
2308	SAB	140	3205D/P	SAB	123
2316A/E	SAB	140	3206	SDA	134
2332A	SAB	119	3209	SAB	123
2364A	SAB	119	3210	SAB	123
2416P	SAB	119	3211/Z	SAB	123
2608	SAB	140	3212D/P	SAB	123
2616	SAB	140	3214D/P	SAB	123
2621	MEB	144	3216D	SAB	123
2632D/E/P	SBB	133	3222B	SAB	123
2633D/E/P	SBB	133	3226D/P	SAB	123
2636	MEB	144	3232	SAB	143
2637	MEB	144	3242	SAB	143
2650A	MAB	138	3245D	SAB	123
2664D/E/P	SBB	133	3271	SAB	123
2704C	SAB	120	3404P	SAB	124
2708C	SAB	140	3408P	SAB	144
2716B/C	SAB	140	3604D	SAB	124
2716D	SAF	140	3624D	SAB	124
2732	SAB	140	40--	HCC, HCF, HEF	90, 96, 102
2758	SAB	140	4001P	SAB	124
2808	SAB	140	4002P	SAB	124
3002D	SAB	120	4003P	SAB	124
3003D	SAB	120	4004C/D/P	SAB	124
3011	SAB	120	4008P	SAB	124
3012/A	SAB	120	4009P	SAB	124
3013	SAB	120	4040	SDA	134
3015	SAB	120	4040C/D/P	SAB	124
3017	SAB	121	4041	SDA	134
3019	SAB	121	4101P	SAB	124
3021	SAB	121	4201A/P	SAB	124
3022	SAB	121	4209	SAB	125
3023/B	SAB	121	4265D/P	SAB	125
3024	SAB	121	4269D	SAB	125
3032	SAB	121	4289C	SAB	125
3033	SAB	122	4308P	SAB	125
3034	SAB	122	45--	HCC, HCF, HEF	94, 100, 104
3042/B	SAB	122	47--	HEF	106
3044	SAB	122	4702A/B	SAB	125
3050	SAB	122	5000	SAA	113
3060P	SAB	122	5010	SDA	134
3064	SAB	122	5012A	SAA	113
3090	SAB	138	5020	SAA	114
3104D	SAB	122	5025A/B	SAA	114
3205	SDA	134	5030	SAA	114

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SERIAL NUMBER	P.E. PREFIX	SEE PAGE	SERIAL NUMBER	P.E. PREFIX	SEE PAGE
5040A/B/C	SAA	114	8021P	MAB, SAB	138
5041	SAA	114	8022	SAB	138
5042	SAA	114	8035L	MAB, SAF	138
5043	SAA	114	8035P	SAB	138
5050	SAA	114	8039D/P	SAB	139
5051	SAA	114	8041A/D/P	SAB	139
5052	SAA	114	8048	SAB	139
5053	SAA	114	8048D	MAB, SAF	138
5055/5070	SAA	114	8048P	MAB	139
5089/5091	SBA	133	8049D/P	SAB	139
5101L	SAB	125	8080A	SAB	139
5110	SAA	115	8085A	SAB, SAF	139
5111	SAA	115	8086	SAB	139
5120	SAA	115	8101/A	SAB	143
5125	SAA	115	8102A/D	SAB	143
5150	SAA	115	8111A	SAB	143
5151	SAA	115	8155	SAB, SAF	143
5155	SAA	115	8156	SAB, SAF	143
54--	GFC	64-68	8156C	SAB	143
54H--	GJC	72	8156D	SAF	143
54LS--	GMC	78-80	8165	SAB	126
54S--	GTC	84	8202	SAB	143
5650F/R	SDA	134	8205D/P	SAB	144
5680A/B	SDA	134	8212C	SAB	144
5690/C/R	SDA	135	8212D	SAF	144
5800	SAS	131	8212P	SAB	144
5900	SAS	131	8214C/D/P	SAB	145
6000	SAA	116	8216D	SAB, SAF	145
6002	SAA	116	8216P	SAB	145
6020	SDA	135	8224D/P	SAB	145
6030	SDA	135	8226D	SAB, SAF	145
6600	SAS	131	8226P	SAB	145
6610	SAS	132	8228D/P	SAB	145
6700	SAS	131	8238D/P	SAB	126
6710	SAS	132	8243D	SAF	145
6800	SAS	132	8243P	SAB	145
6810	SAS	132	8251A/P	SAB	145
74--	GFB	58-62	8251D	SAB/SAF	145
74H--	GJB	70	8253CL	SAB	146
74LS--	GMB	74-76	8253D	SAB/SAF	146
74S--	GTB	82	8255C/D	SAB	146
8000	MEA	144	8257C/D	SAB	146
8008C	SAB	125	8259A/C	SAB	146
8021D	MAB	138	8259D	SAB, SAF	146

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SERIAL NUMBER	P.E. PREFIX	SEE PAGE	SERIAL NUMBER	P.E. PREFIX	SEE PAGE
P 271D	SAB	146			
8273D	SAB	146			
8275D	SAB	146			
8278D	SAB	146			
8279/P	SAB	147			
8279D	SAB/SAF	147			
8291	SAB	147			
8292	SAB	147			
8294	SAB	147			
8295	SAB	147			
8308/16,A,P	SAB	140			
8332	SAB	126			
8355D/P	SAB	141			
8702/A	SAB	141			
8708	SAB	141			
8748/B	SAB	138			
8748D	SAF, SAB	138,139			
8755	SAB	141			
8755A	SAF	141			
101--	GXB	86			
102--	GXB	88			
104--	GXB	88			
400--	HEF	106			
401--	HCC,HCF,HEF	94,100,106			
402--	HCC,HCF,HEF	94,100,106			
403--	HEF	106			
54---	GFC	66-68			
54H---	GJC	72			
54LS---	GMC	78-80			
54S---	GTC	84			
74---	GFB	60-62			
74H---	GJB	70			
74LS---	GMB	74-76			
74S---	GTB	82			
1001--	HXA	108			
1004--	HXA	108			

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FLH			FLH541	FLH545 48	SIE	FLJ461	FLJ465 52	SIE
FLH101	FLH105 48	SIE	FLH551	FLH555 "	SIE	FLJ471	FLJ475 "	SIE
FLH111	FLH115 "	SIE	FLH561	FLH565 50	SIE	FLJ481	FLJ485 "	SIE
FLH121	FLH125 "	SIE	FLH571	FLH575 "	SIE	FLJ491	FLJ495 "	SIE
FLH131	FLH135 "	SIE	FLH601	FLH605 "	SIE	FLJ501	FLJ505 "	SIE
FLH141	FLH145 "	SIE	FLH611	FLH615 "	SIE	FLJ511	FLJ515 "	SIE
FLH151	FLH155 "	SIE	FLH621	FLH625 "	SIE	FLJ521	FLJ525 "	SIE
FLH161	FLH165 "	SIE	FLH631	FLH635 "	SIE	FLJ531	FLJ535 "	SIE
FLH171	FLH175 "	SIE	FLH641	FLH645 "	SIE	FLJ541	FLJ545 "	SIE
FLH181	FLH185 "	SIE	FLH661	FLH665 "	SIE	FLJ551	FLJ555 "	SIE
FLH191	FLH195 "	SIE	FLH731	FLH735 "	SIE	FLJ561	FLJ565 "	SIE
FLH191S	FLH195S "	SIE	FLH731T	FLH735T "	SIE	FLK		
FLH201	FLH205 "	SIE	FLH951	"	SIE	FLK101	FLK105 52	SIE
FLH201S	FLH205S "	SIE	FLH961	"	SIE	FLK111	FLK115 "	SIE
FLH201T	FLH205T "	SIE	FLH981	"	SIE	FLK121	FLK125 "	SIE
FLH211	FLH215 "	SIE	FLJ			FLL		
FLH221	FLH225 "	SIE	FLJ101	FLJ105 50	SIE	FLJ101	FLJ105 52	SIE
FLH231	FLH235 "	SIE	FLJ111	FLJ115 "	SIE	FLJ111	FLJ115 "	SIE
FLH241	FLH245 "	SIE	FLJ121	FLJ125 "	SIE	FLJ111T	FLJ115T "	SIE
FLH251	FLH255 "	SIE	FLJ131	FLJ135 "	SIE	FLJ121U	FLJ125U "	SIE
FLH271	FLH275 "	SIE	FLJ141	FLJ145 "	SIE	FLJ121V	FLJ125V "	SIE
FLH271S	FLH275S "	SIE	FLJ151	FLJ155 "	SIE	FLJ131	FLJ135 "	SIE
FLH271T	FLH275T "	SIE	FLJ161	FLJ165 "	SIE	FLJ131T	FLJ135T "	SIE
FLH281	FLH285 "	SIE	FLJ171	FLJ175 "	SIE	FLJ141	FLJ145 "	SIE
FLH291	FLH295 "	SIE	FLJ181	FLJ185 "	SIE	FLJ141T	FLJ145T "	SIE
FLH291S	FLH295S "	SIE	FLJ191	FLJ195 "	SIE	FLJ151	FLJ155 "	SIE
FLH291T	FLH295T "	SIE	FLJ201	FLJ205 "	SIE	FLJ171T	FLJ175T "	SIE
FLH291U	FLH295U "	SIE	FLJ211	FLJ215 "	SIE	FLQ		
FLH321	FLH325 "	SIE	FLJ221	FLJ225 "	SIE	FLQ101	FLQ105 52	SIE
FLH331	FLH335 "	SIE	FLJ231	FLJ235 "	SIE	FLQ111	FLQ115 "	SIE
FLH341	FLH345 "	SIE	FLJ241	FLJ245 "	SIE	FLQ121	FLQ125 "	SIE
FLH351	FLH355 "	SIE	FLJ251	FLJ255 "	SIE	FLQ131	FLQ135 "	SIE
FLH361	FLH365 "	SIE	FLJ261	FLJ265 "	SIE	FLQ141	FLQ145 "	SIE
FLH371	FLH375 "	SIE	FLJ271	FLJ275 "	SIE	FLY		
FLH381	FLH385 "	SIE	FLJ281	"	SIE	FLY101	FLY105 52	SIE
FLH391	FLH395 "	SIE	FLJ291	"	SIE	FLY111	FLY115 "	SIE
FLH391T	FLH395T "	SIE	FLJ301	FLJ305 "	SIE	FLY121	FLY125 "	SIE
FLH401	FLH405 "	SIE	FLJ311	FLJ315 "	SIE	FLY131	FLY135 "	SIE
FLH411	FLH415 "	SIE	FLJ321	FLJ325 "	SIE	FLY141	FLY145 "	SIE
FLH421	FLH425 "	SIE	FLJ331	"	SIE	FLY151	FLY155 "	SIE
FLH431	FLH435 "	SIE	FLJ341	FLJ345 "	SIE	FLY161	FLY165 "	SIE
FLH441	FLH445 "	SIE	FLJ351	FLJ355 "	SIE	FLY171	FLY175 "	SIE
FLH451	FLH455 "	SIE	FLJ361	FLJ365 "	SIE	FLY181	FLY185 "	SIE
FLH461	FLH465 "	SIE	FLJ371	FLJ375 "	SIE	FLY971	"	SIE
FLH471	FLH475 "	SIE	FLJ381	FLJ385 "	SIE			
FLH481	FLH485 "	SIE	FLJ391	FLJ395 "	SIE			
FLH481T	FLH485T "	SIE	FLJ401	FLJ405 "	SIE			
FLH491	FLH495 "	SIE	FLJ411	FLJ415 "	SIE			
FLH491T	FLH495T "	SIE	FLJ421	FLJ425 "	SIE			
FLH501	FLH505 "	SIE	FLJ431	FLJ435 "	SIE			
FLH511	FLH515 "	SIE	FLJ441	FLJ445 "	SIE			
FLH521	FLH525 "	SIE	FLJ451	FLJ455 "	SIE			
FLH531	FLH535 "	SIE						

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FZH				FZH265/B	54	SIE		FZL121	56	SIE	PHIN MBLE
				FZH271	"	SIE	PHIN MBLE MULL VAD				MULL VAD
FZH101	54	SIE	PHIN MBLE MULL VAD	FZH275	"	SIE		FZL121S	"	SIE	
FZH101A	"	SIE		FZH281	"	SIE	PHIN MBLE MULL VAD	FZL125	"	SIE	
FZH105	"	SIE		FZH285	"	SIE		FZL125S	"	SIE	
FZH105A	"	SIE		FZH285B	"	SIE		FZL131	"	SIE	PHIN MBLE MULL VAD
FZH111	"			FZH291	"	SIE	PHIN MBLE MULL VAD	FZL131S	"	SIE	
FZH111A	"	SIE		FZH295	"	SIE		FZL135	"	SIE	
FZH115	"	SIE		FZH295B	"	SIE		FZL135S	"	SIE	
FZH115A	"	SIE		FZH301	"	SIE		FZL141	"	SIE	PHIN MBLE MULL VAD
FZH115B	"	SIE		FZH305	"	SIE		FZL141S	"	SIE	
FZH121	"	SIE	PHIN MBLE MULL VAD					FZL145	"	SIE	
FZH125	"	SIE						FZL145S	"	SIE	
FZH131	"	SIE	PHIN MBLE MULL VAD	FZJ				FZY			
FZH135	"	SIE		FZJ101	56	SIE	PHIN MBLE MULL VAD	FZY101	56	SIE	
FZH141	"	SIE	PHIN MBLE MULL VAD	FZJ105	"	SIE		FZY105	"		
FZH145	"	SIE		FZJ111	"	SIE	PHIN MBLE MULL VAD				
FZH151	"	SIE	PHIN MBLE MULL VAD	FZJ115	"	SIE					
FZH155	"	SIE		FZJ121	"	SIE	PHIN MBLE MULL VAD				
FZH161	"	SIE	PHIN MBLE MULL VAD	FZJ125	"	SIE					
FZH165	"	SIE		FZJ131	"	SIE	PHIN MBLE MULL VAD				
FZH165B	"	SIE		FZJ135	"	SIE					
FZH171	"	SIE	PHIN MBLE MULL VAD	FZJ141	"	SIE	PHIN MBLE MULL VAD				
FZH175	"	SIE		FZJ141A	"	SIE					
FZH181	"	SIE	PHIN MBLE MULL VAD	FZJ145	"	SIE					
FZH185	"	SIE		FZJ145A	"	SIE					
FZH191	"	SIE	PHIN MBLE MULL VAD	FZJ151	"	SIE	PHIN MBLE MULL VAD				
FZH195	"	SIE									
FZH201	"	SIE	PHIN MBLE MULL VAD	FZJ151A	"	SIE					
FZH205	"	SIE		FZJ155	"	SIE					
FZH211	"			FZJ155A	"	SIE					
FZH211S	"	SIE		FZJ161	"	SIE	PHIN MBLE MULL VAD				
FZH215	"	SIE		FZJ165	"	SIE					
FZH215B	"	SIE									
FZH231	"	SIE	PHIN MBLE MULL VAD	FZK							
FZH235	"	SIE		FZK101	56	SIE	PHIN MBLE MULL VAD				
FZH241	"	SIE	PHIN MBLE MULL VAD	FZK105	"	SIE					
FZH245	"	SIE									
FZH245B	"	SIE		FZL							
FZH251	"	SIE	PHIN MBLE MULL VAD	FZL101/FZL111	56	SIE	PHIN MBLE MULL VAD				
FZH255	"	SIE		FZL115/FZL105	"	SIE					
FZH255B	"	SIE									
FZH261	"	SIE	PHIN MBLE MULL VAD								

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GFB			GFB7490-DC, -DP	60	MULL	GFB74279-DC, -DP	62	MULL
GFB7400-DC, -DP	58	MULL	GFB7491A-DC, -DP	"	MULL	GFB74298-DC, -DP	"	MULL
GFB7401-DC, -DP	"	MULL	GFB7492-DC, -DP	"	MULL	GFB74365A-DC, -DP	"	MULL
GFB7402-DC, -DP	"	MULL	GFB7493-DC, -DP	"	MULL	GFB74366A-DC, -DP	"	MULL
GFB7403-DC, -DP	"	MULL	GFB7494-DC, -DP	"	MULL	GFB74367A-DC, -DP	"	MULL
GFB7404-DC, -DP	"	MULL	GFB7495A-DC, -DP	"	MULL	GFB74368A-DC, -DP	"	MULL
GFB7405-DC, -DP	"	MULL	GFB7496-DC, -DP	"	MULL	GFC		
GFB7406-DC, -DP	"	MULL	GFB74100-DC, -DP	"	MULL	GFC5400-DC, -FC	64	MULL
GFB7407-DC, -DP	"	MULL	GFB74107-DC, -DP	"	MULL	GFC5401-DC, -FC	"	MULL
GFB7408-DC, -DP	"	MULL	GFB74109-DC, -DP	"	MULL	GFC5402-DC, -FC	"	MULL
GFB7409-DC, -DP	"	MULL	GFB74116-DC, -DP	"	MULL	GFC5403-DC, -FC	"	MULL
GFB7410-DC, -DP	"	MULL	GFB74121-DC, -DP	"	MULL	GFC5404-DC, -FC	"	MULL
GFB7412-DC, -DP	"	MULL	GFB74122-DC, -DP	"	MULL	GFC5405-DC, -FC	"	MULL
GFB7413-DC, -DP	"	MULL	GFB74123-DC, -DP	"	MULL	GFC5406-DC, -FC	"	MULL
GFB7414-DC, -DP	"	MULL	GFB74125-DC, -DP	"	MULL	GFC5407-DC, -FC	"	MULL
GFB7416-DC, -DP	"	MULL	GFB74126-DC, -DP	"	MULL	GFC5408-DC, -FC	"	MULL
GFB7417-DC, -DP	"	MULL	GFB74128-DC, -DP	"	MULL	GFC5409-DC, -FC	"	MULL
GFB7420-DC, -DP	"	MULL	GFB74132-DC, -DP	"	MULL	GFC5410-DC, -FC	"	MULL
GFB7423-DC, -DP	"	MULL	GFB74133-DC, -DP	"	MULL	GFC5412-DC, -FC	"	MULL
GFB7425-DC, -DP	"	MULL	GFB74145-DC, -DP	"	MULL	GFC5413-DC, -FC	"	MULL
GFB7426-DC, -DP	"	MULL	GFB74147-DC, -DP	"	MULL	GFC5414-DC, -FC	"	MULL
GFB7427-DC, -DP	"	MULL	GFB74148-DC, -DP	"	MULL	GFC5416-DC, -FC	"	MULL
GFB7428-DC, -DP	"	MULL	GFB74150-DC, -DP	"	MULL	GFC5417-DC, -FC	"	MULL
GFB7430-DC, -DP	"	MULL	GFB74151A-DC, -DP	"	MULL	GFC5420-DC, -FC	"	MULL
GFB7432-DC, -DP	"	MULL	GFB74152A-DC, -DP	"	MULL	GFC5423-DC, -FC	"	MULL
GFB7433-DC, -DP	"	MULL	GFB74153-DC, -DP	"	MULL	GFC5425-DC, -FC	"	MULL
GFB7437-DC, -DP	"	MULL	GFB74154-DC, -DP	"	MULL	GFC5426-DC, -FC	"	MULL
GFB7438-DC, -DP	"	MULL	GFB74155-DC, -DP	"	MULL	GFC5427-DC, -FC	"	MULL
GFB7440-DC, -DP	"	MULL	GFB74156-DC, -DP	"	MULL	GFC5428-DC, -FC	"	MULL
GFB7442-DC, -DP	"	MULL	GFB74157-DC, -DP	"	MULL	GFC5430-DC, -FC	"	MULL
GFB7443-DC, -DP	"	MULL	GFB74160-DC, -DP	"	MULL	GFC5432-DC, -FC	"	MULL
GFB7444-DC, -DP	"	MULL	GFB74161-DC, -DP	"	MULL	GFC5433-DC, -FC	"	MULL
GFB7445-DC, -DP	"	MULL	GFB74162-DC, -DP	"	MULL	GFC5437-DC, -FC	"	MULL
GFB7446A-DC, -DP	"	MULL	GFB74163-DC, -DP	"	MULL	GFC5438-DC, -FC	"	MULL
GFB7447A-DC, -DP	"	MULL	GFB74164-DC, -DP	"	MULL	GFC5440-DC, -FC	"	MULL
GFB7448-DC, -DP	"	MULL	GFB74165-DC, -DP	"	MULL	GFC5442-DC, -FC	"	MULL
GFB7450-DC, -DP	"	MULL	GFB74166-DC, -DP	"	MULL	GFC5443-DC, -FC	"	MULL
GFB7451-DC, -DP	"	MULL	GFB74170-DC, -DP	"	MULL	GFC5444-DC, -FC	"	MULL
GFB7453-DC, -DP	"	MULL	GFB74173-DC, -DP	"	MULL	GFC5445-DC, -FC	"	MULL
GFB7454-DC, -DP	"	MULL	GFB74174-DC, -DP	"	MULL	GFC5446A-DC, -FC	"	MULL
GFB7460-DC, -DP	"	MULL	GFB74175-DC, -DP	"	MULL	GFC5447A-DC, -FC	"	MULL
GFB7470-DC, -DP	"	MULL	GFB74180-DC, -DP	"	MULL	GFC5448-DC, -FC	"	MULL
GFB7472-DC, -DP	"	MULL	GFB74181-DC, -DP	"	MULL	GFC5450-DC, -FC	"	MULL
GFB7473-DC, -DP	"	MULL	GFB74182-DC, -DP	"	MULL	GFC5451-DC, -FC	"	MULL
GFB7474-DC, -DP	"	MULL	GFB74190-DC, -DP	"	MULL	GFC5453-DC, -FC	"	MULL
GFB7475-DC, -DP	"	MULL	GFB74191-DC, -DP	"	MULL	GFC5454-DC, -FC	"	MULL
GFB7476-DC, -DP	"	MULL	GFB74192-DC, -DP	"	MULL	GFC5460-DC, -FC	"	MULL
GFB7480-DC, -DP	"	MULL	GFB74193-DC, -DP	"	MULL	GFC5470-DC, -FC	"	MULL
GFB7483-DC, -DP	"	MULL	GFB74194-DC, -DP	"	MULL	GFC5472-DC, -FC	"	MULL
GFB7485-DC, -DP	"	MULL	GFB74195-DC, -DP	"	MULL	GFC5473-DC, -FC	"	MULL
GFB7486-DC, -DP	"	MULL	GFB74196-DC, -DP	62	MULL	GFC5474-DC, -FC	"	MULL
			GFB74197-DC, -DP	"	MULL			
			GFB74198-DC, -DP	"	MULL			
			GFB74199-DC, -DP	"	MULL			
			GFB74221-DC, -DP	"	MULL			

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GFC5475-DC, -FC	64	MULL	GFC54221-DC, -FC	68	MULL	GJC54H50-DC, -FC	72	MULL
GFC5476-DC, -FC	"	MULL	GFC54279-DC, -FC	"	MULL	GJC54H51-DC, -FC	"	MULL
GFC5480-DC, -FC	"	MULL	GFC54298-DC, -FC	"	MULL	GJC54H52-DC, -FC	"	MULL
GFC5483-DC, -FC	"	MULL	GFC54365A-DC, -FC	"	MULL	GJC54H53-DC, -FC	"	MULL
GFC5485-DC, -FC	"	MULL	GFC54366A-DC, -FC	"	MULL	GJC54H54-DC, -FC	"	MULL
GFC5486-DC, -FC	"	MULL	GFC54367A-DC, -FC	"	MULL	GJC54H55-DC, -FC	"	MULL
GFC5490-DC, -FC	66	MULL	GFC54368A-DC, -FC	"	MULL	GJC54H60-DC, -FC	"	MULL
GFC5491A -DC, -FC	"	MULL				GJC54H61-DC, -FC	"	MULL
GFC5492-DC, -FC	"	MULL				GJC54H62-DC, -FC	"	MULL
GFC5493-DC, -FC	"	MULL				GJC54H71-DC, -FC	"	MULL
GFC5494-DC, -FC	"	MULL				GJC54H72-DC, -FC	"	MULL
GFC5495A-DC, -FC	"	MULL				GJC54H73-DC, -FC	"	MULL
GFC5496-DC, -FC	"	MULL				GJC54H74-DC, -FC	"	MULL
GFC54100-DC, -FC	"	MULL				GJC54H76-DC, -FC	"	MULL
GFC54107-DC, -FC	"	MULL				GJC54H101-DC, -FC	"	MULL
GFC54109-DC, -FC	"	MULL				GJC54H102-DC, -FC	"	MULL
GFC54116-DC, -FC	"	MULL				GJC54H103-DC, -FC	"	MULL
GFC54121-DC, -FC	"	MULL				GJC54H106-DC, -FC	"	MULL
GFC54122-DC, -FC	"	MULL				GJC54H108-DC, -FC	"	MULL
GFC54123-DC, -FC	"	MULL						
GFC54125-DC, -FC	"	MULL						
GFC54126-DC, -FC	"	MULL						
GFC54128-DC, -FC	"	MULL						
GFC54132-DC, -FC	"	MULL						
GFC54145-DC, -FC	"	MULL						
GFC54147-DC, -FC	"	MULL						
GFC54148-DC, -FC	"	MULL						
GFC54150-DC, -FC	"	MULL						
GFC54151A-DC, -FC	"	MULL						
GFC54152A-DC, -FC	"	MULL						
GFC54153-DC, -FC	"	MULL						
GFC54154-DC, -FC	"	MULL						
GFC54155-DC, -FC	"	MULL						
GFC54156-DC, -FC	"	MULL						
GFC54157-DC, -FC	"	MULL						
GFC54160-DC, -FC	"	MULL						
GFC54161-DC, -FC	"	MULL						
GFC54162-DC, -FC	"	MULL						
GFC54163-DC, -FC	"	MULL						
GFC54164-DC, -FC	"	MULL						
GFC54165-DC, -FC	"	MULL						
GFC54166-DC, -FC	"	MULL						
GFC54170-DC, -FC	"	MULL						
GFC54173-DC, -FC	"	MULL						
GFC54174-DC, -FC	"	MULL						
GFC54175-DC, -FC	"	MULL						
GFC54180-DC, -FC	"	MULL						
GFC54181-DC, -FC	"	MULL						
GFC54182-DC, -FC	"	MULL						
GFC54190-DC, -FC	"	MULL						
GFC54191-DC, -FC	"	MULL						
GFC54192-DC, -FC	"	MULL						
GFC54193-DC, -FC	"	MULL						
GFC54194-DC, -FC	"	MULL						
GFC54195-DC, -FC	"	MULL						
GFC54196-DC, -FC	68	MULL						
GFC54197-DC, -FC	"	MULL						
GFC54198-DC, -FC	"	MULL						
GFC54199-DC, -FC	"	MULL						
			GJB					
			GJB74H00-DC, -DP	70	MULL			
			GJB74H01-DC, -DP	"	MULL			
			GJB74H04-DC, -DP	"	MULL			
			GJB74H05-DC, -DP	"	MULL			
			GJB74H10-DC, -DP	"	MULL			
			GJB74H11-DC, -DP	"	MULL			
			GJB74H20-DC, -DP	"	MULL			
			GJB74H21-DC, -DP	"	MULL			
			GJB74H22-DC, -DP	"	MULL			
			GJB74H30-DC, -DP	"	MULL			
			GJB74H40-DC, -DP	"	MULL			
			GJB74H50-DC, -DP	"	MULL			
			GJB74H51-DC, -DP	"	MULL			
			GJB74H52-DC, -DP	"	MULL			
			GJB74H53-DC, -DP	"	MULL			
			GJB74H54-DC, -DP	"	MULL			
			GJB74H55-DC, -DP	"	MULL			
			GJB74H60-DC, -DP	"	MULL			
			GJB74H61-DC, -DP	"	MULL			
			GJB74H62-DC, -DP	"	MULL			
			GJB74H71-DC, -DP	"	MULL			
			GJB74H72-DC, -DP	"	MULL			
			GJB74H73-DC, -DP	"	MULL			
			GJB74H74-DC, -DP	"	MULL			
			GJB74H76-DC, -DP	"	MULL			
			GJB74H101-DC, -DP	"	MULL			
			GJB74H102-DC, -DP	"	MULL			
			GJB74H103-DC, -DP	"	MULL			
			GJB74H106-DC, -DP	"	MULL			
			GJB74H108-DC, -DP	"	MULL			
						GMB		
						GMB74LS00-DC, -DP	74	MULL
						GMB74LS01-DC, -DP	"	MULL
						GMB74LS02-DC, -DP	"	MULL
						GMB74LS03-DC, -DP	"	MULL
						GMB74LS04-DC, -DP	"	MULL
						GMB74LS05-DC, -DP	"	MULL
						GMB74LS08-DC, -DP	"	MULL
						GMB74LS09-DC, -DP	"	MULL
						GMB74LS10-DC, -DP	"	MULL
						GMB74LS11-DC, -DP	"	MULL
						GMB74LS12-DC, -DP	"	MULL
						GMB74LS13-DC, -DP	"	MULL
						GMB74LS14-DC, -DP	"	MULL
						GMB74LS15-DC, -DP	"	MULL
						GMB74LS20-DC, -DP	"	MULL
						GMB74LS21-DC, -DP	"	MULL
						GMB74LS22-DC, -DP	"	MULL
						GMB74LS26-DC, -DP	"	MULL
						GMB74LS28-DC, -DP	"	MULL
						GMB74LS30-DC, -DP	"	MULL
						GMB74LS32-DC, -DP	"	MULL
						GMB74LS33-DC, -DP	"	MULL
						GMB74LS42-DC, -DP	"	MULL
						GMB74LS51-DC, -DP	"	MULL
						GMB74LS54-DC, -DP	"	MULL
						GMB74LS55-DC, -DP	"	MULL
						GMB74LS73-DC, -DP	"	MULL
						GMB74LS74A-DC, -DP	"	MULL
						GMB74LS75-DC, -DP	"	MULL
						GMB74LS76-DC, -DP	"	MULL
						GMB74LS78-DC, -DP	"	MULL
						GMB74LS83A-DC, -DP	"	MULL
						GMB74LS85-DC, -DP	"	MULL

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GTB74S112-DC, -DP	82	MULL	GTC54S175-DC, -FC	84		MULL	GXB10162D, P	86	PHIN	MBLE MULL	
GTB74S113-DC, -DP	"	MULL	GTC54S181-DC, -FC	"		MULL	GXB10164D, P	"	PHIN	MBLE MULL	
GTB74S114-DC, -DP	"	MULL	GTC54S182-DC, -FC	"		MULL	GXB10165D, P	"	PHIN	MBLE MULL	
GTB74S133-DC, -DP	"	MULL	GTC54S194-DC, -FC	"		MULL	GXB10170D, P	"	PHIN	MBLE MULL	
GTB74S134-DC, -DP	"	MULL	GTC54S195-DC, -FC	"		MULL	GXB10171D, P	"	PHIN	MBLE MULL	
GTB74S135-DC, -DP	"	MULL	GTC54S251-DC, -FC	"		MULL	GXB10172D, P	"	PHIN	MBLE MULL	
GTB74S138-DC, -DP	"	MULL	GTC54S257-DC, -FC	"		MULL	GXB10173D, P	"	PHIN	MBLE MULL	
GTB74S139-DC, -DP	"	MULL	GTC54S258-DC, -FC	"		MULL	GXB10174D, P	"	PHIN	MBLE MULL	
GTB74S140-DC, -DP	"	MULL	GTC54S260-DC, -FC	"		MULL	GXB10175D, P	88	PHIN	MBLE MULL	
GTB74S151-DC, -DP	"	MULL	GTC54S280-DC, -FC	"		MULL	GXB10176D, P	"	PHIN	MBLE MULL	
GTB74S153-DC, -DP	"	MULL	GTC54S289-DC, -FC	"		MULL	GXB10179D, P	"	PHIN	MBLE MULL	
GTB74S157-DC, -DP	"	MULL					GXB10180D, P	"	PHIN	MBLE MULL	
GTB74S158-DC, -DP	"	MULL					GXB10181D, P	"	PHIN	MBLE MULL	
GTB74S174-DC, -DP	"	MULL					GXB10188D, P	"	PHIN	MBLE MULL	
GTB74S175-DC, -DP	"	MULL					GXB10189D, P	"	PHIN	MBLE MULL	
GTB74S181-DC, -DP	"	MULL					GXB10190D, P	"	PHIN	MBLE MULL	
GTB74S182-DC, -DP	"	MULL					GXB10191D, P	"	PHIN	MBLE MULL	
GTB74S194-DC, -DP	"	MULL					GXB10192D, P	"	PHIN	MBLE MULL	
GTB74S195-DC, -DP	"	MULL					GXB10210D, P	"	PHIN	MBLE MULL	
GTB74S251-DC, -DP	"	MULL					GXB10211D, P	"	PHIN	MBLE MULL	
GTB74S257-DC, -DP	"	MULL					GXB10216D, P	"	PHIN	MBLE MULL	
GTB74S258-DC, -DP	"	MULL					GXB10231D, P	"	PHIN	MBLE MULL	
GTB74S260-DC, -DP	"	MULL					GXB10415D, AD	"	PHIN	MBLE MULL	
GTB74S280-DC, -DP	"	MULL					GXB10422D, AD	"	PHIN	MBLE MULL	
GTB74S289-DC, -DP	"	MULL									
			G X B								
			GXB10100D, P	86	PHIN	MBLE MULL					
			GXB10101D, P	"	PHIN	MBLE MULL					
			GXB10102D, P	"	PHIN	MBLE MULL					
			GXB10103D, P	"	PHIN	MBLE MULL					
			GXB10104D, P	"	PHIN	MBLE MULL					
			GXB10105D, P	"	PHIN	MBLE MULL					
			GXB10106D, P	"	PHIN	MBLE MULL					
			GXB10107D, P	"	PHIN	MBLE MULL					
			GXB10108D, P	"	PHIN	MBLE MULL					
			GXB10109D, P	"	PHIN	MBLE MULL					
			GXB10110D, P	"	PHIN	MBLE MULL					
			GXB10111D, P	"	PHIN	MBLE MULL					
			GXB10112D, P	"	PHIN	MBLE MULL					
			GXB10113D, P	"	PHIN	MBLE MULL					
			GXB10114D, P	"	PHIN	MBLE MULL					
			GXB10115D, P	"	PHIN	MBLE MULL					
			GXB10116D, P	"	PHIN	MBLE MULL					
			GXB10117D, P	"	PHIN	MBLE MULL					
			GXB10118D, P	"	PHIN	MBLE MULL					
			GXB10119D, P	"	PHIN	MBLE MULL					
			GXB10121D, P	"	PHIN	MBLE MULL					
			GXB10123D, P	"	PHIN	MBLE MULL					
			GXB10124D, P	"	PHIN	MBLE MULL					
			GXB10125D, P	"	PHIN	MBLE MULL					
			GXB10129D, P	"	PHIN	MBLE MULL					
			GXB10130D, P	"	PHIN	MBLE MULL					
			GXB10131D, P	"	PHIN	MBLE MULL					
			GXB10132D, P	"	PHIN	MBLE MULL					
			GXB10133D, P	"	PHIN	MBLE MULL					
			GXB10134D, P	"	PHIN	MBLE MULL					
			GXB10135D, P	"	PHIN	MBLE MULL					
			GXB10136D, P	"	PHIN	MBLE MULL					
			GXB10137D, P	"	PHIN	MBLE MULL					
			GXB10139D, P	"	PHIN	MBLE MULL					
			GXB10141D, P	"	PHIN	MBLE MULL					
			GXB10145D, P	"	PHIN	MBLE MULL					
			GXB10147A	"	PHIN	MBLE MULL					
			GXB10155D, E, P	"	PHIN	MBLE MULL					
			GXB10158D, P	"	PHIN	MBLE MULL					
			GXB10159D, P	"	PHIN	MBLE MULL					
			GXB10160D, P	"	PHIN	MBLE MULL					
			GXB10161D, P	"	PHIN	MBLE MULL					
							H C C				
							HCC4000BD, BF, BK 90		SGAI		
							HCC4001BD, BF, BK "		SGAI		
							HCC4002BD, BF, BK "		SGAI		
							HCC4006BD, BF, BK "		SGAI		
							HCC4007UBD,UBF,UBK "		SGAI		
							HCC4008BD, BF, BK "		SGAI		
							HCC4011BD, BF, BK "		SGAI		
							HCC4012BD, BF, BK "		SGAI		
							HCC4013BD, BF, BK "		SGAI		
							HCC4014BD, BF, BK "		SGAI		
							HCC4015BD, BF, BK "		SGAI		
							HCC4016BD, BF, BK "		SGAI		
							HCC4017BD, BF, BK "		SGAI		
							HCC4018BD, BF, BK "		SGAI		
							HCC4019BD, BF, BK "		SGAI		
							HCC4020BD, BF, BK "		SGAI		
							HCC4021BD, BF, BK "		SGAI		
							HCC4022BD, BF, BK "		SGAI		
							HCC4023BD, BF, BK "		SGAI		
							HCC4024BD, BF, BK "		SGAI		
							HCC4025BD, BF, BK "		SGAI		
							HCC4026BD, BF, BK "		SGAI		
							HCC4027BD, BF, BK "		SGAI		
							HCC4028BD, BF, BK "		SGAI		
							HCC4029BD, BF, BK "		SGAI		
							HCC4030BD, BF, BK "		SGAI		
							HCC4031BD, BF, BK "		SGAI		
							HCC4032BD, BF, BK "		SGAI		
							HCC4033BD, BF, BK "		SGAI		

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HCC4034BD	90	SGAI		HCC4527BD, BF, BK	94	SGAI		HCF4033BE, BF	96	SGAI	
HCC4035BD, BF, BK	"	SGAI		HCC4532BD, BF, BK	"	SGAI		HCF4034BD, BE	"	SGAI	
HCC4038BD, BF, BK	"	SGAI		HCC4555BD, BF, BK	"	SGAI		HCF4035BE, BF	"	SGAI	
HCC4040BD, BF, BK	"	SGAI		HCC4556BD, BF, BK	"	SGAI		HCF4038BE, BF	"	SGAI	
HCC4041UBD,UBF,UBK	"	SGAI		HCC40100BD, BF, BK	"	SGAI		HCF4040BE, BF	"	SGAI	
HCC4042BD, BF, BK	"	SGAI		HCC40101BD, BF, BK	"	SGAI		HCF4041UBE, UBF	"	SGAI	
HCC4043BD, BF, BK	"	SGAI		HCC40102BD, BF, BK	"	SGAI		HCF4042BE, BF	"	SGAI	
HCC4044BD, BF, BK	"	SGAI		HCC40103BD, BF, BK	"	SGAI		HCF4043BE, BF	"	SGAI	
HCC4045BD, BF, BK	"	SGAI		HCC40105BD, BF, BK	"	SGAI		HCF4044BE, BF	"	SGAI	
HCC4046BD, BF, BK	"	SGAI		HCC40106BD, BF, BK	"	SGAI		HCF4045BE, BF	"	SGAI	
HCC4047BD, BF, BK	"	SGAI		HCC40107BD, BF, BK	"	SGAI		HCF4046BE, BF	"	SGAI	
HCC4048BD, BF, BK	"	SGAI		HCC40108BD, BF, BK	"	SGAI		HCF4047BE, BF	"	SGAI	
HCC4049UBD,UBF,UBK	"	SGAI		HCC40109BD, BF, BK	"	SGAI		HCF4048BE, BF	"	SGAI	
HCC4050BD, BF, BK	"	SGAI		HCC40160BD, BF, BK	"	SGAI		HCF4049UBE, UBF	"	SGAI	
HCC4051BD, BF, BK	92	SGAI		HCC40161BD, BF, BK	"	SGAI		HCF4050BE, BF	"	SGAI	
HCC4052BD, BF, BK	"	SGAI		HCC40162BD, BF, BK	"	SGAI		HCF4051BE, BF	98	SGAI	
HCC4053BD, BF, BK	"	SGAI		HCC40163BD, BF, BK	"	SGAI		HCF4052BE, BF	"	SGAI	
HCC4054BD, BF, BK	"	SGAI		HCC40174BD, BF, BK	"	SGAI		HCF4053BE, BF	"	SGAI	
HCC4055BD, BF, BK	"	SGAI		HCC40181 BF, BK	"	SGAI		HCF4054BE, BF	"	SGAI	
HCC4056BD, BF, BK	"	SGAI		HCC40182BD, BF, BK	"	SGAI		HCF4055BE, BF	"	SGAI	
HCC4060BD, BF, BK	"	SGAI		HCC40192BD, BF, BK	"	SGAI		HCF4056BE, BF	"	SGAI	
HCC4063BD, BF, BK	"	SGAI		HCC40193BD, BF, BK	"	SGAI		HCF4060BE, BF	"	SGAI	
HCC4066BD, BF, BK	"	SGAI		HCC40194BD, BF, BK	"	SGAI		HCF4063BE, BF	"	SGAI	
HCC4067BD, BF, BK	"	SGAI		HCC40208BD, BF, BK	"	SGAI		HCF4066BE, BF	"	SGAI	
HCC4068BD, BF, BK	"	SGAI		HCC40257BD, BF, BK	"	SGAI		HCF4067BD, BE	"	SGAI	
HCC4069UBD,UBF,UBK	"	SGAI						HCF4068BE, BF	"	SGAI	
HCC4070BD, BF, BK	"	SGAI						HCF4069UBE, UBF	"	SGAI	
HCC4071BD, BF, BK	"	SGAI						HCF4070BE, BF	"	SGAI	
HCC4072BD, BF, BK	"	SGAI						HCF4071BE, BF	"	SGAI	
HCC4073BD, BF, BK	"	SGAI						HCF4072BE, BF	"	SGAI	
HCC4075BD, BF, BK	"	SGAI						HCF4073BE, BF	"	SGAI	
HCC4076BD, BF, BK	"	SGAI						HCF4075BE, BF	"	SGAI	
HCC4077BD, BF, BK	"	SGAI						HCF4076BE, BF	"	SGAI	
HCC4078BD, BF, BK	"	SGAI						HCF4077BE, BF	"	SGAI	
HCC4081BD, BF, BK	"	SGAI						HCF4078BE, BF	"	SGAI	
HCC4082BD, BF, BK	"	SGAI						HCF4081BE, BF	"	SGAI	
HCC4085BD, BF, BK	"	SGAI						HCF4082BE, BF	"	SGAI	
HCC4086BD, BF, BK	"	SGAI						HCF4085BE, BF	"	SGAI	
HCC4089BD, BF, BK	"	SGAI						HCF4086BE, BF	"	SGAI	
HCC4093BD, BF, BK	"	SGAI						HCF4089BE, BF	"	SGAI	
HCC4094BD, BF, BK	"	SGAI						HCF4093BE, BF	"	SGAI	
HCC4095BD, BF, BK	"	SGAI						HCF4094BE, BF	"	SGAI	
HCC4096BD, BF, BK	"	SGAI						HCF4095BE, BF	"	SGAI	
HCC4097BD, BF, BK	"	SGAI						HCF4096BE, BF	"	SGAI	
HCC4098BD, BF, BK	"	SGAI						HCF4097BE, BF	"	SGAI	
HCC4099BD, BF, BK	"	SGAI						HCF4098BE, BF	"	SGAI	
HCC4502BD, BF, BK	94	SGAI						HCF4099BE, BF	"	SGAI	
HCC4508BD	"	SGAI						HCF4502BE, BF	100	SGAI	
HCC4510BD, BF, BK	"	SGAI						HCF4508BE, BF	"	SGAI	
HCC4511BD, BF, BK	"	SGAI						HCF4510BE, BF	"	SGAI	
HCC4512BD, BF, BK	"	SGAI						HCF4511BE, BF	"	SGAI	
HCC4514BD, BF, BK	"	SGAI						HCF4512BE, BF	"	SGAI	
HCC4515BD, BF, BK	"	SGAI						HCF4514BE, BF	"	SGAI	
HCC4516BD, BF, BK	"	SGAI						HCF4515BE, BF	"	SGAI	
HCC4518BD, BF, BK	"	SGAI						HCF4516BE, BF	"	SGAI	
HCC4520BD, BF, BK	"	SGAI						HCF4518BE, BF	"	SGAI	
				HCF							
				HCF4000BE, BF	96	SGAI		HCF4000BE, BF	96	SGAI	
				HCF4001BE, BF	"	SGAI		HCF4001BE, BF	"	SGAI	
				HCF4002BE, BF	"	SGAI		HCF4002BE, BF	"	SGAI	
				HCF4006BE, BF	"	SGAI		HCF4006BE, BF	"	SGAI	
				HCF4007UBE, UBF	"	SGAI		HCF4007UBE, UBF	"	SGAI	
				HCF4008UBE, UBF	"	SGAI		HCF4008UBE, UBF	"	SGAI	
				HCF4011BE, BF	"	SGAI		HCF4011BE, BF	"	SGAI	
				HCF4012BE, BF	"	SGAI		HCF4012BE, BF	"	SGAI	
				HCF4013BE, BF	"	SGAI		HCF4013BE, BF	"	SGAI	
				HCF4014BE, BF	"	SGAI		HCF4014BE, BF	"	SGAI	
				HCF4015BE, BF	"	SGAI		HCF4015BE, BF	"	SGAI	
				HCF4016BE, BF	"	SGAI		HCF4016BE, BF	"	SGAI	
				HCF4017BE, BF	"	SGAI		HCF4017BE, BF	"	SGAI	
				HCF4018BE, BF	"	SGAI		HCF4018BE, BF	"	SGAI	
				HCF4019BE, BF	"	SGAI		HCF4019BE, BF	"	SGAI	
				HCF4020BE, BF	"	SGAI		HCF4020BE, BF	"	SGAI	
				HCF4021BE, BF	"	SGAI		HCF4021BE, BF	"	SGAI	
				HCF4022BE, BF	"	SGAI		HCF4022BE, BF	"	SGAI	
				HCF4023BE, BF	"	SGAI		HCF4023BE, BF	"	SGAI	
				HCF4024BE, BF	"	SGAI		HCF4024BE, BF	"	SGAI	
				HCF4025BE, BF	"	SGAI		HCF4025BE, BF	"	SGAI	
				HCF4026BE, BF	"	SGAI		HCF4026BE, BF	"	SGAI	
				HCF4027BE, BF	"	SGAI		HCF4027BE, BF	"	SGAI	
				HCF4028BE, BF	"	SGAI		HCF4028BE, BF	"	SGAI	
				HCF4029BE, BF	"	SGAI		HCF4029BE, BF	"	SGAI	
				HCF4030BE, BF	"	SGAI		HCF4030BE, BF	"	SGAI	
				HCF4031BE, BF	"	SGAI		HCF4031BE, BF	"	SGAI	
				HCF4032BE, BF	"	SGAI		HCF4032BE, BF	"	SGAI	

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HCF4527BE, BF	"	SGAI		HEF4018BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4060BDB	"	PHIN	MBLE MULL VAD
HCF4532BE, BF	"	SGAI		HEF4019BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4066BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF4555BE, BF	"	SGAI		HEF4020BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4067BD, BP	"	PHIN	MBLE MULL VAD
HCF4556BE, BF	"	SGAI		HEF4021BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4068BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40100BE, BF	"	SGAI		HEF4022BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4069BD, UBP, UBT	"	PHIN	MBLE MULL VAD
HCF40101BE, BF	"	SGAI		HEF4023BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4070BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40102BE, BF	"	SGAI		HEF4024BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4071BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40103DE, BF	"	SGAI		HEF4025BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4072BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40105BE, BF	"	SGAI		HEF4027BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4073BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40106BE, BF	"	SGAI		HEF4028BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4075BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40107BE, BF	"	SGAI		HEF4029BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4076BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40108BE, BF	"	SGAI		HEF4030BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4077BD, BP, BT	104	PHIN	MBLE MULL VAD
HCF40109BE, BF	"	SGAI		HEF4031BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4078BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40160BE, BF	"	SGAI		HEF4035BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4081BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40161BE, BF	"	SGAI		HEF4040BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4082BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40162BE, BF	"	SGAI		HEF4041BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4085BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40163BE, BF	"	SGAI		HEF4042BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4086BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40174BE, BF	"	SGAI		HEF4043BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4093BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40181BE, BF	"	SGAI		HEF4044BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4094BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40182BE, BF	"	SGAI		HEF4046BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4104BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40192BE, BF	"	SGAI		HEF4047BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4502BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40193BE, BF	"	SGAI		HEF4049BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4505BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40194BE, BF	"	SGAI		HEF4050BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4508BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40208BE, BF	"	SGAI		HEF4051BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4510BD, BP, BT	"	PHIN	MBLE MULL VAD
HCF40257BE, BF	"	SGAI		HEF4052BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4511BD, BP, BT	"	PHIN	MBLE MULL VAD
HEF				HEF4053BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4512BD, BP, BT	"	PHIN	MBLE MULL VAD
HEF4000BD, BP, BT	102	PHIN	MBLE MULL VAD	HEF4059BD, BP	"	PHIN	MBLE MULL VAD	HEF4514BD, BP, BT	"	PHIN	MBLE MULL VAD
HEF4001BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4001UBD, UBP, UBT	"	PHIN	MBLE MULL VAD								
HEF4002BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4006BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4007UBD, UBP, UBT	"	PHIN	MBLE MULL VAD								
HEF4008BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4011BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4011UBD, UBP, UBT	"	PHIN	MBLE MULL VAD								
HEF4012BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4013BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4014BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4015BD, BP, BT	"	PHIN	MBLE MULL VAD								
HEF4016BD, BP, BT	"	PHIN	MBLE MULL VAD								

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HEF4515BD, BP	104	PHIN	MBLE MULL VAD	HEF4738VE	106	PHIN	MBLE MULL				
HEF4516BD, BP, BT	"	PHIN	MBLE MULL VAD	VP		PHIN	MBLE MULL VAD				
HEF4517BD, BP	"	PHIN	MBLE MULL	HEF4739VP	"	PHIN	MBLE MULL VAD				
HEF4518BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4750VD, VP	"	PHIN	MBLE MULL VAD	HXA			
HEF4519BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4751VD, VP	"	PHIN	MBLE MULL VAD	HXA100101D, F	108	PHIN	MBLE MULL
HEF4520BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4752VD, VP	"	PHIN	MBLE MULL VAD	HXA100102D, F	"	PHIN	MBLE MULL
HEF4521BD, BP, BT	"	PHIN	MBLE MULL RTC VAD	HEF4753BD, BP	"	PHIN	MBLE MULL VAD	HXA100107D, F	"	PHIN	MBLE MULL
HEF4522BD, BP, BT	"	PHIN	MBLE MULL RTC VAD	HEF4753VD, VP	"	PHIN	MBLE MULL	HXA100112D, F	"	PHIN	MBLE MULL
HEF4526BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF4754VD, VP	"	PHIN	MBLE MULL VAD	HXA100114D, F	"	PHIN	MBLE MULL
HEF4527BD, BP, BT	"	PHIN	MBLE VAD	HEF4755VD, VP	"	PHIN	MBLE MULL	HXA100117D, F	"	PHIN	MBLE MULL
HEF4527BDB	"	PHIN	MBLE MULL	HEF40097BD, BP, BT	106	PHIN	MBLE MULL VAD	HXA100118D, F	"	PHIN	MBLE MULL
HEF4528BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40098BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100122D, F	"	PHIN	MBLE MULL
HEF4531BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40106BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100123D, F	"	PHIN	MBLE MULL
HEF4532BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40160BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100130D, F	"	PHIN	MBLE MULL
HEF4534BD, BP	"	PHIN	MBLE MULL VAD	HEF40168BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100131D, F	"	PHIN	MBLE MULL
HEF4538BD, BT	"	PHIN	MBLE MULL VAD	HEF40162BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100136D, F	"	PHIN	MBLE MULL
HEF4538BP	"	PHIN	MBLE MULL RTC VAD	HEF40163BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100141D, F	"	PHIN	MBLE MULL
HEF4539BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40174BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100142D, F	"	PHIN	MBLE MULL
HEF4541BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40175BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100145D, F	"	PHIN	MBLE MULL
HEF4543BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40192BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100150D, F	"	PHIN	MBLE MULL
HEF4555BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40193BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100151D, F	"	PHIN	MBLE MULL
HEF4556BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40194BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100155D, F	"	PHIN	MBLE MULL
HEF4557BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40195BD, BP, BT	"	PHIN	MBLE MULL VAD	HXA100156D, F	"	PHIN	MBLE MULL
HEF4585BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40244BD, BP, 8DB	"	PHIN	MBLE MULL	HXA100158D, F	"	PHIN	MBLE MULL
HEF4720BD, BP	106	PHIN	MBLE MULL VD, VP	HEF40245BD, BP, 8DB	"	PHIN	MBLE MULL	HXA100160D, F	"	PHIN	MBLE MULL
HEF4724BD, BP, BT	"	PHIN	MBLE MULL VAD	HEF40373BD, BP, 8DB	"	PHIN	MBLE MULL	HXA100164D, F	"	PHIN	MBLE MULL
HEF4731BD, BP	"	PHIN	MBLE MULL VD, VP	HEF40374BD, BP, 8DB	"	PHIN	MBLE MULL	HXA100166D, F	"	PHIN	MBLE MULL
HEF4737BD, BP	"	PHIN	MBLE MULL VD, VP					HXA100166D, F	"	PHIN	MBLE MULL
								HXA100170D, F	"	PHIN	MBLE MULL
								HXA100171D, F	"	PHIN	MBLE MULL
								HXA100175D, F	"	PHIN	MBLE MULL
								HXA100179D, F	"	PHIN	MBLE MULL
								HXA100180D, F	"	PHIN	MBLE MULL
								HXA100181D, F	"	PHIN	MBLE MULL
								HXA100194D, F	"	PHIN	MBLE MULL
								HXA100414E, F	"	PHIN	MBLE MULL
								HXA100415D, AD	"	PHIN	MBLE MULL VAD
								HXA100415E, F	"	PHIN	MBLE MULL
								HXA100416E, F	"	PHIN	MBLE MULL
								HXA100422D, AD	"	PHIN	MBLE MULL VAD
								HXA100422E, F	"	PHIN	MBLE MULL

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MAB				SAA1174	112	ITT		SAB1018A	117	PHIN	
				SAA1220	"	ITT		SAB1034E	"	RTC	VAD
				SAA1224	"	ITT		SAB1034P	"	RTC	MBLE MULL
				SAA1230	"	ITT					PHIN VAD
				SAA1250	"	ITT		SAB1046	"		MBLE MULL
				SAA1251	"	ITT		SAB1047			PHIN
				SAA1274	113	ITT		SAB1048	118		MBLE MULL
MAB2650A-D	138	MULL		SAA1276	"	ITT					PHIN
A-P	"	MULL		SAA1350	"	ITT		SAB1534E	"	RTC	VAD
MAB8021D, P	"	PHIN	MBLE MULL	SAA1351	"	ITT		SAB1534P	"	RTC	MBLE MULL
MAB8035LD, LP	"	PHIN	MBLE MULL	SAA1900	"	ITT					PHIN VAD
MAB8048D, P	"	PHIN	MBLE MULL	SAA2008	"	ITT		SAB1702A-2B	"	SIE	
				SAA5000	"	MULL	MBLE PHIN	SAB1801D	"	RTC	MBLE MULL
				SAA5012A	"	MULL	MBLE PHIN				PHIN
				SAA5020	114	MULL	MBLE PHIN	SAB2000	"	TFKH	
MEA								SAB2010	"	TFKH	
MEA8000	144	MULL		SAA5025A, B	"	MULL	MBLE PHIN	SAB2020	"	TFKH	
								SAB2015/22/24	119	VAD	
				SAA5030	"	MULL	MBLE PHIN	SAB2101A	142	SIE	
								SAB2102A	"	SIE	
MEB				SAA5030	"	MULL	MBLE PHIN	SAB2104A	"	SIE	
MEB2621	144	MULL		SAA5040A, B	"	MULL	MBLE PHIN	SAB2108	"	SIE	
MEB2636	"	MULL		SAA5040C	"	PHIN	MBLE MULL	SAB2109	"	SIE	
MEB2637	"	MULL		SAA5041	"	MULL	MBLE PHIN	SAB2111A	"	SIE	
								SAB2114C, P	"	SIE	
				SAA5042	"	MULL	MBLE PHIN	SAB2116	"	SIE	
				SAA5043	"	MULL	MBLE PHIN	SAB2117	"	SIE	
				SAA5050	"	MULL	MBLE PHIN	SAB2141	"	SIE	
SAA								SAB2142	"	SIE	
SAA1006	110	MTLA		SAA5051	"	MULL	MBLE PHIN	SAB2308	140	SIE	
SAA1020	"	ITT						SAB2316A, E	"	SIE	
SAA1025	"	ITT		SAA5052	"	MULL	MBLE PHIN	SAB2332A	119	SIE	
SAA1027	"	PHIN	MBLE MULL					SAB2364A	"	SIE	
			VAD	SAA5053	"	MULL		SAB2416P	"	SIE	
SAA1056D	"	PHIN	MBLE MULL	SAA5055	"	MULL		SAB2608	140	SIE	
SAA1056P	"	PHIN	MBLE MULL	SAA5070	"	MULL	MBLE PHIN	SAB2616	"	SIE	
			VAD	SAA5110	115	RTC		SAB2704C	120	SIE	
SAA1057	"	PHIN	MBLE MULL	SAA5111	"	RTC		SAB2708C	140	SIE	
			VAD	SAA5120	"	MULL	MBLE PHIN	SAB2716B	"	SIE	
SAA1058, A	"	PHIN	MBLE MULL	SAA5135	"	MULL	MBLE PHIN	SAB2716C	"	SIE	
			VAD	SAA5150	"	MULL	MBLE PHIN	SAB2732 /58	"	SIE	
SAA1059	"	PHIN	MBLE MULL	SAA5151	"	MULL	MBLE	SAB2808	"	SIE	
			VAD	SAA5155	"	MULL	MBLE	SAB3002D	120	SIE	
SAA1060	111	PHIN	MBLE MULL	SAA6000	116	ITT		SAB3003D	"	SIE	
			VAD	SAA6002	"	ITT		SAB3011	"	VAD	
SAA1061	"	PHIN	MBLE MULL	SAB				SAB3012	"	VAD	
			VAD	SAB0600	117	SIE		SAB3012A	"	VAD	
SAA1062, T	"	PHIN	MBLE MULL	SAB1009B	"	PHIN	MBLE MULL	SAB3013	"	VAD	MBLE MULL
			VAD					SAB3015	"	VAD	PHIN
SAA1070	"	PHIN	MBLE MULL					SAB3017	121	VAD	MBLE MULL
								SAB3019	"	VAD	PHIN
SAA1075	"	ITT		SAB0600	117	SIE		SAB3021	"	VAD	
SAA1082P	"	PHIN	MBLE MULL	SAB1009B	"	PHIN	MBLE MULL	SAB3022	"	VAD	MBLE MULL
SAA1121	"	ITT									PHIN
SAA1130	112	ITT		SAB1016	"	VAD					
				SAB1018	"	VAD					

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INDEX OF TYPE NUMBERS AND THEIR SUPPLIERS

INDEX DES DESIGNATIONS ET DES FOURNISSEURS

INDEX DER TYPENBEZEICHNUNGEN UND LIEFERANTEN

TYPE NUMBER	DATA see page	S P O N S O R	Suppliers	TYPE NUMBER	DATA see page	S P O N S O R	Suppliers	TYPE NUMBER	DATA see page	S P O N S O R	Suppliers
SAB3023	121	VAD		SAB4308P	125	SIE		SAB8253CL	146	SIE	
SAB3023B	"	PHIN	MBLE MULL	SAB4702A-B	"	SIE		SAB8253D	"	SIE	
SAB3024	"	VAD		SAB5101L-C	143	SIE		SAB8255C	"	SIE	
SAB3032	"	VAD		SAB8008C	125	SIE		SAB8255D	"	SIE	
SAB3033	122	VAD		SAB8021P	138	SIE		SAB8257C	"	SIE	
SAB3034	"	PHIN	MBLE MULL	SAB8022	"	SIE		SAB8257D	"	SIE	
			VAD	SAB8035P	"	SIE		SAB8259A, C, D	"	SIE	
SAB3042	"	VAD	MBLE MULL	SAB8039D,P	139	SIE		SAB8271D	"	SIE	
			PHIN	SAB8041A, D, P	"	SIE		SAB8273D	"	SIE	
SAB3042B	"	PHIN		SAB8048C	"	SIE		SAB8275D/78D	"	SIE	
SAB3044	"	PHIN	MULL VAD	SAB8049D, P	"	SIE		SAB8279D	147	SIE	
SAB3050	"	SIE		SAB8080A, C	"	SIE		SAB8279P	"	SIE	
SAB3060P	"	SIE		SAB8080A-1-C	"	SIE		SAB8291	"	SIE	
SAB3064	"	RTC		SAB8080A-2-C	"	SIE		SAB8292	"	SIE	
SAB3090	138	SIE		SAB8080A-D	"	SIE		SAB8294	"	SIE	
SAB3104D	122	SIE		SAB8080A-1D	"	SIE		SAB8295	"	SIE	
SAB3205D	123	SIE		SAB8080A-2D	"	SIE		SAB8308/16A, P	140	SIE	
SAB3205P	"	SIE		SAB8080A-P	"	SIE		SAB8332	126	SIE	
SAB3209	"	SIE		SAB8085A-C	"	SIE		SAB8355D	141	SIE	
SAB3210	"	SIE		SAB8085A-P	"	SIE		SAB8355P	"	SIE	
SAB3211	"	SIE		SAB8085A-2-D	"	SIE		SAB8702, A/08	"	SIE	
SAB3211Z	"	SIE		SAB8085A-2-C	"	SIE		SAB8748B, D	138	SIE	
SAB3212D	"	SIE		SAB8086	139	SIE		SAB8755	141	SIE	
SAB3212P	"	SIE		SAB8101A	143	SIE		SAF			
SAB3214D	"	SIE		SAB8101P	"	SIE		SAF1032P	127	PHIN	MBLE MULL
SAB3214P	"	SIE									RTC
SAB3216D	"	SIE		SAB8102A-D	"	SIE		SAF1034E	127	RTC	MBLE MULL
SAB3222B	"	SIE		SAB8102A-P	"	SIE					PHIN VAD
SAB3226D/P	"	SIE		SAB8111A-D	"	SIE		SAF1039P	127	PHIN	MBLE MULL
SAB3232/42	143	SIE		SAB8111A-P	"	SIE		SAF1534E	127	RTC	MBLE MULL
SAB3245D	123	SIE		SAB8155	"	SIE					PHIN VAD
SAB3271	"	SIE		SAB8156	"	SIE		SAF2716D	140	SIE	
SAB3404P	124	SIE		SAB8156C	"	SIE		SAF8035L-D	138	SIE	
SAB3408P	144	SIE		SAB8165	126	SIE		SAF8048D	138	SIE	
SAB3604D	124	SIE		SAB8202	143	SIE		SAF8085A, D	139	SIE	
SAB3624D	"	SIE		SAB8205 D/P	144	SIE		SAF8155D	143	SIE	
SAB4001P	"	SIE		SAB8212C	"	SIE		SAF8156D	143	SIE	
SAB4002P	"	SIE		SAB8212D	"	SIE		SAF8212D	144	SIE	
SAB4003P	"	SIE		SAB8212P	"	SIE		SAF8216D	145	SIE	
SAB4004C	"	SIE		SAB8214C	145	SIE		SAF8226D	145	SIE	
SAB4004D	"	SIE		SAB8214D	"	SIE		SAF8243D	145	SIE	
SAB4004P	"	SIE		SAB8214P	"	SIE		SAF8251D	145	SIE	
SAB4008P	"	SIE		SAB8216D	"	SIE		SAF8253D	146	SIE	
SAB4009P	"	SIE		SAB8216P	"	SIE		SAF8259D	146	SIE	
SAB4040C	"	SIE		SAB8224D	"	SIE		SAF8279D	147	SIE	
SAB4040D	"	SIE		SAB8224P	"	SIE		SAF8748D	139	SIE	
SAB4040P	"	SIE		SAB8226D	"	SIE		SAF8755A	141	SIE	
SAB4101P	"	SIE		SAB8226P	"	SIE					
SAB4201A-D	"	SIE		SAB8226C, D	"	SIE					
SAB4201A-P	"	SIE		SAB8228P	"	SIE					
SAB4201P	"	SIE		SAB8238D	126	SIE					
SAB4209	125	SIE		SAB8238P	"	SIE					
SAB4265D	"	SIE		SAB8243P	143	SIE					
SAB4265P	"	SIE		SAB8251A, C	145	SIE					
SAB4269D	"	SIE		D, P	"	SIE					
SAB4289C	"	SIE									

INDEX OF TYPE NUMBERS AND THEIR SUPPLIERS

INDEX DES DESIGNATIONS ET DES FOURNISSEURS

INDEX DER TYPENBEZEICHNUNGEN UND LIEFERANTEN

TYPE NUMBER	DATA see page	Sponsor	Suppliers	TYPE NUMBER	DATA see page	Sponsor	Suppliers	TYPE NUMBER	DATA see page	Sponsor	Suppliers
SAJ				SAY				SDA5690R	135	SIE	
								SDA6020	"	SIE	
								SDA6030	"	SIE	
SAJ141	128	SIE		SAY115X	132	ITT					
SAJ150	"	THCF		SAY115Y	"	ITT					
SAJ180E	"	THCF									
SAJ205	"	SIE									
SAJ210	"	SGAI									
SAJ240	"	THCF									
SAJ240E	"	THCF									
SAJ300R	"	ITT									
SAJ300T	"	ITT									
SAJ341A	129	SIE									
SAJ410A	"	SIE									
				SBA							
				SBA5089	133	ITT					
				SBA5091	"	ITT					
SAK				SBB							
SAK110	129	ITT		SBB2632D	133	MULL					
SAK135	"	THCF		SBB2632E	"	MULL					
SAK150A	"	PHIN	MBLE MULL RTC VAD	SBB2632P	"	MULL					
SAK215	"	ITT		SBB2633D	"	MULL					
				SBB2633E	"	MULL					
				SBB2633P	"	MULL					
				SBB2664D	"	MULL					
				SBB2664E	"	MULL					
				SBB2664P	"	MULL					
SAS				SDA							
SAS221S2	130	SIE		SDA2001	134	SIE					
SAS221S4	"	SIE		SDA2002	"	SIE					
SAS231	"	SIE		SDA2003	"	SIE					
SAS231L	"	SIE		SDA2004	"	SIE					
SAS241	"	SIE		SDA2005	"	SIE					
SAS241S4	"	SIE		SDA2006	"	SIE					
SAS250	"	SIE		SDA2007	"	SIE					
SAS251	"	SIE		SDA2008	"	SIE					
SAS251S4	"	SIE		SDA2010	"	SIE					
SAS251S5	"	SIE		SDA2014	"	SIE					
SAS261	"	SIE									
SAS261S4	"	SIE									
SAS560	131	SIE		SDA3205	134	SIE					
SAS560S	"	SIE		SDA3206	"	SIE					
SAS570	"	SIE		SDA4040	"	SIE					
SAS570S	"	SIE		SDA4041	"	SIE					
SAS580/590	"	SIE		SDA5010	"	SIE					
SAS660/670	"	TFKH		SDA5650F	"	SIE					
SAS5800	"	SIE		SDA5650R	"	SIE					
SAS5900	"	SIE		SDA5680A	"	SIE					
SAS6600	"	TFKH		SDA5680B	"	SIE					
SAS6610	132	SIE		SDA5690	135	SIE					
SAS6700	131	SIE		SDA5690C	"	SIE					
SAS6710	132	SIE									
SAS6800	"	SIE									
SAS6810	"	SIE									

ADDRESSES OF SUPPLIERS : see page
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Type numbers cancelled by their SPONSOR since 1978 edition

Type numbers registered but not yet publishable

TYPE NUMBER	SPONSOR	TYPE NUMBER	SPONSOR	TYPE NUMBER	SPONSOR	TYPE NUMBER	SPONSOR
GDR101	SIE	SAA1173	ITT	SAF8355D	SIE	FZH101	SIE
GDR106	SIE	SAA1176	ITT	SAH215	ITT	FZH105	SIE
GRB75395D	RTC	SAA1271	ITT	SAH220	PHIN	FZH111	SIE
GXB10140D, P	PHIN	SAA1272	ITT	SAJ110	ITT	FZJ151	SIE
GXB10142D, P	PHIN	SAA3000	ITT	SAJ110Q	PHIN	FZJ155	SIE
GXB10144D, E, P	PHIN	SAA3001	ITT	SAJ131, A, I, AI	SIE	GXB100473	SIE
GXB10146D, E	PHIN	SAA3100	ITT	SAJ135, A, I, AI	SIE	GXB100474	SIE
GXB10147E	PHIN	SAA5010	MULL	SAJ250A, B	PHIN	GXB100475	SIE
GXB10148D, P	PHIN	SAA5011	MULL	SAJ270E	ITT	HCC40104	SGAI
GXB10149A	SIE	SAA5060	MULL	SAJ290D	PHIN	HCC40110	SGAI
GXB10151E, P	PHIN	SAA5080	MULL	SAJ300N	ITT	HYB4116A	SIE
GXB10196D, P	PHIN	SAA5090	MULL	SAJ330, X	PHIN	SAA1063	PHIN
GXB10405D, E	PHIN	SAA5140	MULL	SAJ341	SIE	SAA1094	ITT
GXB10415E, AE	PHIN	SAA6001	ITT	SAJ410	SIE	SAA1141	ITT
GYQ101D, P	MULL	SAA6003	ITT	SAK140	PHIN	SAA1252	ITT
GZF1100D, P	PHIN	SAB1000	SIE	SAK150	VAD	SAA1253	ITT
GZF1106D, P	PHIN	SAB1001	SIE			SAB1078D, P	PHIN
GZF1200D, P	PHIN	SAB1002	SIE			SAB8282	SIE
GZF1202D, P	PHIN	SAB1011	VAD			SAB8283	SIE
GZF1400D, P	PHIN	SAB1012	VAD			SAB8284	SIE
HBC Family	SGAI	SAB1013	VAD			SAB8286	SIE
HBF Family	SGAI	SAB1014	VAD			SAB8287	SIE
HEF4067BT	PHIN	SAB1015	VAD			SAB8288	SIE
HEF4086BT	PHIN	SAB1017	VAD			SAF0300	ITT
HEF4514BT	PHIN	SAB1077P	PHIN			SAF1091	ITT
HEF4515BT	PHIN	SAB1103	PHIN			SAF1092	ITT
HEF4516BT	PHIN	SAB2011	VAD			SAF1093	ITT
HEF4583BD, BP, BT	PHIN	SAB2013	VAD			SAF1200D	PHIN
HEF4720V-S1	PHIN	SAB2014	VAD			SAF1201D	PHIN
HEF4721BD, BP, BT	PHIN	SAB2016	VAD			SAF1202D	PHIN
HEF4736BD, BP, BT	PHIN	SAB2021	VAD			SAF1203D	PHIN
HEF4739VD	PHIN	SAB2026	VAD			SAF1204D	PHIN
HYB4060, A	SIE	SAB2064	VAD			SAS201	SIE
MAB8027P	PHIN	SAB2758	SIE			SAS205	SIE
MAB8028P	PHIN	SAB3014	VAD			SAS211	SIE
MAB8029P	PHIN	SAB3016	VAD			SAS215	SIE
MAB8030P	PHIN	SAB3017A	VAD				
MAB8099	PHIN	SAB3017B, C	PHIN				
MAB80C27P	PHIN	SAB3022B, C, E	VAD				
MAB80C28P	PHIN	SAB3023C	PHIN				
MAB80C29P	PHIN	SAB3023E	VAD				
MAB80C30P	PHIN	SAB3025	VAD				
MAF8027P	PHIN	SAB3026	VAD				
MAF8028P	PHIN	SAB3032D	PHIN				
MAF8029P	PHIN	SAB3033D	VAD				
MAF8030P	PHIN	SAB3042A	PHIN				
MAF8099	PHIN	SAB3207A	SIE				
MAF80C27P	PHIN	SAB3208A	SIE				
MAF80C28P	PHIN	SAB8101P	SIE				
MAF80C29P	PHIN	SAB8111C, P	SIE				
MAF80C30P	PHIN	SAB8185	SIE				
SAA1004, N	ITT	SAB8222C	SIE				
SAA1005, P	ITT	SAB8228C	SIE				
SAA1008	ITT	SAB8252C, P	SIE				
SAA1021	ITT	SAB8278D	SIE				
SAA1024	ITT	SAB8308P	SIE				
SAA1028	PHIN	SAB8708C	SIE				
SAA1030	ITT	SAB8741A	SIE				
SAA1049	PHIN	SAB8785	SIE				
SAA1050	ITT	SDA2009	SIE				
SAA1051	ITT	SDA2104	SIE				
SAA1071	ITT	SDA2110	SIE				
SAA1072	ITT	SDA2112	SIE				
SAA1073	ITT	SDA2113	SIE				
SAA1074	ITT	SDA2114	SIE				
SAA1076	ITT	SDA2130	SIE				
SAA1080	ITT	SDA4650	SIE				
SAA1081	VAD	SAF1031P	PHIN				
SAA1089D, P	PHIN	SAF1055	ITT				
SAA1114, Z	PHIN	SAF2708D	SIE				
SAA1124	ITT	SAF8255A, D	SIE				

Discontinued types

TYPE NUMBER	SPONSOR	TYPE NUMBER	SPONSOR				
GAB family	T.I.	GFC54185A	T.I.				
GAC family	T.I.	GFC54186	T.I.				
*GFB7447	T.I.	GFC54187	T.I.				
GFB7481	T.I.	GFC54246	T.I.				
GFB7482	T.I.	GFC54247	T.I.				
GFB7483A	T.I.	GFC54248	T.I.				
GFB7484A	T.I.	GFC54249	T.I.				
GFB7488A	T.I.	GFC54251	T.I.				
GFB7489	T.I.	GFC54265	T.I.				
GFB7490A	T.I.	GFC54278	T.I.				
GFB7497	T.I.	GFC54283	T.I.				
GFB74104	T.I.	GFC54284	T.I.				
GFB74105	T.I.	GFC54285	T.I.				
GFB74110	T.I.	GFC54290	T.I.				
GFB74111	T.I.	GFC54293	T.I.				
GFB74120	T.I.	GFC54390	T.I.				
GFB74136	T.I.	GFC54393	T.I.				
GFB74141	T.I.	GFC54490	T.I.				
GFB74142	T.I.	* GJB74H15	T.I.				
GFB74143	T.I.	GJB74H78	T.I.				
GFB74144	T.I.	GJB74H87	T.I.				
GFB74167	T.I.	GJB74H183	T.I.				
GFB74172	T.I.	* GJC54H15	T.I.				
GFB74176	T.I.	GJC54H78	T.I.				
GFB74177	T.I.	GJC54H87	T.I.				
GFB74178	T.I.	GJC54H183	T.I.				
GFB74184	T.I.	* GMB74LS37	T.I.				
GFB74185A	T.I.	GMB74LS38	T.I.				
GFB74186	T.I.	GMB74LS40	T.I.				
GFB74187	T.I.	GMB74LS47	T.I.				
GFB74188A	T.I.	GMB74LS48	T.I.				
GFB74200	T.I.	GMB74LS49	T.I.				
GFB74246	T.I.	GMB74LS63	T.I.				
GFB74247	T.I.	GMB74LS91	T.I.				
GFB74248	T.I.	GMB74LS122	T.I.				
GFB74249	T.I.	GMB74LS170	T.I.				
GFB74251	T.I.	GMB74LS247	T.I.				
GFB74265	T.I.	GMB74LS248	T.I.				
GFB74273	T.I.	GMB74LS249	T.I.				
GFB74278	T.I.	* GMC54LS47	T.I.				
GFB74283	T.I.	GMC54LS48	T.I.				
GFB74284	T.I.	GMC54LS49	T.I.				
GFB74285	T.I.	GMC54LS63	T.I.				
GFB74290	T.I.	GMC54LS77	T.I.				
*GFB74293	T.I.	GMC54LS91	T.I.				
GFB74351	T.I.	GMC54LS122	T.I.				
GFB74390	T.I.	GMC54LS247	T.I.				
GFB74393	T.I.	GMC54LS248	T.I.				
GFB74490	T.I.	GMC54LS249	T.I.				
*GFC5449	T.I.	* GTB74S270	T.I.				
GFC5477	T.I.	GTB74S271	T.I.				
GFC5481	T.I.	GTB74S274	T.I.				
GFC5482	T.I.	GTB74S275	T.I.				
GFC5483A	T.I.	GTB74S281	T.I.				
GFC5484A	T.I.	GTB74S287	T.I.				
GFC5488A	T.I.	GTB74S299	T.I.				
GFC5489	T.I.	GTB74S370	T.I.				
GFC5490A	T.I.	GTB74S371	T.I.				
GFC5492A	T.I.	GTB74S381	T.I.				
GFC5493A	T.I.	GTB74S387	T.I.				
GFC54110	T.I.	* GTC54S270	T.I.				
GFC54111	T.I.	GTC54S275	T.I.				
GFC54120	T.I.	GTC54S281	T.I.				
GFC54136	T.I.	GTC54S370	T.I.				
GFC54143	T.I.	HCC4067BF, BK	RCA				
GFC54144	T.I.	HCC4069BD, BF, BK	RCA				
GFC54151	T.I.	HCC4514BF	RCA				
GFC54176	T.I.	HCC4515BF	RCA				
GFC54177	T.I.	HCC4528BD, BF, BK	RCA				
GFC54178	T.I.						
GFC54179	T.I.						
GFC54184	T.I.						

* + all the GFB74, GJB74H, GMB74LS, GTB74S types with suffix FC and GFC54, GJC54H, GMC54LS, GTC54S types with suffix DP are also discontinued.

GENERAL AND ELECTRICAL DATA

GENERALITES ET PARAMETRES ELECTRIQUES

ALLGEMEINE UND ELEKTRISCHE DATEN

FL

Basic Characteristics: See page 21

Operating Temp. Range: 1) 0 to 70 °C
2) -25 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			FLH101	FLH105	QUADRUPLE 2-INPUT NAND GATE	100A	DP	14	1											
FLH111	FLH115	TRIPLE 3-INPUT NAND GATE	101	DP	14	1														
FLH121	FLH125	DUAL 4-INPUT NAND GATE	102A	DP	14	1														
FLH131	FLH135	8-INPUT NAND GATE	103A	DP	14	1														
FLH141	FLH145	DUAL 4-INPUT NAND POWERGATE	102A	DP	14	1														
FLH151	FLH155	DUAL 2X2 INPUT AND/OR GATE, INVERTING, WITH EXPANDER NODES	104	DP	14	1														
FLH161	FLH165	DUAL 2X2 INPUT AND/OR GATE, INVERTING, WITH EXPANDER NODES (4)	104	DP	14	1														
FLH171	FLH175	4X2 INPUT AND/OR GATE, INVERTING, WITH EXPANDER NODES	105	DP	14	1														
FLH181	FLH185	4X2 INPUT AND/OR GATE, INVERTING, WITH EXPANDER NODES (4)	105	DP	14	1														
FLH191	FLH195	QUADRUPLE 2-INPUT NOR GATE	106	DP	14	1														
FLH191S	FLH195S	QUADRUPLE 2-INPUT NOR GATE	106	DP	14	1														
FLH201	FLH205	QUADRUPLE 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	107	DP	14	1														
FLH201S	FLH205S	QUADRUPLE 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	107	DP	14	1														
FLH201T	FLH205T	QUADRUPLE 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	107	DP	14	1														
FLH211	FLH215	HEX INVERTER	108	DP	14	1														
FLH221	FLH225	1-BIT FULL ADDER	109	DP	14	1														
FLH231	FLH235	2-BIT FULL ADDER	110	DP	14	1														
FLH241	FLH245	4-BIT FULL ADDER	111	DP	16	1														
FLH251	FLH255	DUAL 2-INPUT NAND GATE AND QUAD INVERTER	112	DP	16	1														
FLH271	FLH275	HEX INVERTER WITH OPEN COLLECTOR OUTPUT	108	DP	14	1														
FLH271S	FLH275S	HEX INVERTER WITH OPEN COLLECTOR OUTPUT	108	DP	14	1														
FLH271T	FLH275T	HEX INVERTER WITH OPEN COLLECTOR OUTPUT	108	DP	14	1														
FLH281	FLH285	BCD DECIMAL DECODER	113	DP	16	1														
FLH291	FLH295	QUAD 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	100A	DP	14	1														
FLH291S	FLH295S	QUAD 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	100A	DP	14	1														
FLH291T	FLH295T	QUAD 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	100A	DP	14	1														
FLH291U	FLH295U	QUAD 2-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	100A	DP	14	1														
FLH321	FLH325	QUAD 2-INPUT NAND POWERGATE	114	DP	14	1														
FLH331	FLH335	DUAL 5-INPUT NAND GATE	115	DP	14	1														
FLH341	FLH345	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE	116	DP	14	1														
FLH351	FLH355	DUAL 4-INPUT NAND SCHMITT TRIGGER	117	DP	14	1														
FLH361	FLH365	EXCESS-3 DECIMAL DECODER	113	DP	16	1														
FLH371	FLH375	EXCESS-3-GRAY DECIMAL DECODER	113	DP	16	1														
FLH381	FLH385	QUADRUPLE 2-INPUT AND GATE	118	DP	14	1														
FLH391	FLH395	As FLH381/385 with OPEN COLLECTOR OUTPUT	118	DP	14	1														
FLH391T	FLH395T	As FLH381/385 with OPEN COLLECTOR OUTPUT (15V/0,25mA)	118	DP	14	1														
FLH401	FLH405	4-BIT ARITHMETIC LOGIC UNIT (ALU)	119	DP	24	2														
FLH411	FLH415	LOOK-AHEAD CARRY-GENERATOR FOR ALU	120	DP	16	1														
FLH421	FLH425	8-BIT PARITY GENERATOR	121	DP	14	1														
FLH431	FLH435	4-BIT COMPARATOR	122	DP	16	1														
FLH441	FLH445	4-BIT COMPLEMENT UNIT	123	DP	14	1														
FLH451	FLH455	DUAL 1-BIT-FULL ADDER	124	DP	14	1														
FLH461	FLH465	HEX INVERTER WITH EXPANDER NODE AND OPEN COLLECTOR OUTPUT	125	DP	14	1														
FLH471	FLH475	HEX INVERTER WITH EXPANDER NODE	125	DP	14	1														
FLH481	FLH485	HEX BUFFER, INVERTING WITH OPEN COLLECTOR OUTPUT (30V)	108	DP	14	1														
FLH481T	FLH485T	HEX BUFFER, INVERTING WITH OPEN COLLECTOR OUTPUT (15V)	108	DP	14	1														
FLH491	FLH495	HEX BUFFER, WITH OPEN COLLECTOR OUTPUT (30V)	126	DP	14	1														
FLH491T	FLH495T	HEX BUFFER, WITH OPEN COLLECTOR OUTPUT (15V)	126	DP	14	1														
FLH501	FLH505	TRIPLE 3-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	101	DP	14	1														
FLH511	FLH515	DUAL 4-INPUT NOR GATE WITH STROBE AND EXPANDER NODE	127	DP	16	1														
FLH521	FLH525	DUAL 4-INPUT NOR GATE WITH STROBE	128	DP	14	1														
FLH531	FLH535	QUADRUPLE 2-INPUT NAND POWERGATE	100A	DP	14	1														
FLH541	FLH545	QUADRUPLE 2-INPUT NAND POWERGATE WITH OPEN COLLECTOR OUTPUT	100A	DP	14	1														
FLH551	FLH555	BCD 7-SEGMENT DECODER	129	DP	16	1														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"
(4) Pins 11 + 12 must be connected

V_{CC} = 5 V ± 5 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS		
			I _{OH}	I _{OL}	t _{set up} (2)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f	
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz	
			max	max	min	min	min	max	min	max	min	max	max	max				typ	
FLH101	FLH105	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH111	FLH115	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH121	FLH125	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH131	FLH135	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH141	FLH145	10,5	26 (g)	-1,2	48			2	0,8	2,4	0,4	-70	133	22	15				
FLH151	FLH155	10,5	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH161	FLH165	10,5	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH171	FLH175	10,5	23 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH181	FLH185	10,5	23 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH191	FLH195	10	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH191S	FLH195S	10	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH201	FLH205	22	10 (g)		16			2	0,8		0,4		400	45	15				(I _{OH} = 0,5 mA at V _O = 6,5 V)
FLH201S	FLH205S	22	10 (g)		16			2	0,8		0,4		400	45	15				At R _L = 4 kΩ
FLH201T	FLH205T	22	10 (g)		16			2	0,8		0,4		400	45	15				Output : 15V/0,25 mA
FLH211	FLH215	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				Output : 5,5/0,05 mA
FLH221	FLH225	105	105	-0,4	16			2	0,8	2,4	0,4	-57	400	70	80				At R _L = 4 kΩ
FLH231	FLH235	87 (b)	87 (b)	-0,2	16			2	0,8	2,4	0,4	-70	19	27					At R _L = 4 kΩ
FLH241	FLH245	76 (b)	76 (b)		20			2	0,8	2,4	0,4	-35'	400	30	25				At R _L = 4 kΩ
FLH251	FLH255			-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				At R _L = 4 kΩ
FLH271	FLH275	22	10 (g)		16			2	0,8		0,4		400	55	15				At R _L = 4 kΩ
FLH271S	FLH275S	22	10 (g)		16			2	0,8		0,4		400	55	15				At R _L = 4 kΩ
FLH271T	FLH275T	22	10 (g)		16			2	0,8		0,4		400	55	15				At R _L = 4 kΩ
FLH281	FLH285				16			2	0,8	2,4	0,4	-35'	400	35	35				
FLH291	FLH295	22	10 (g)		16			2	0,8		0,4		400	45	15				At R _L = 4 kΩ
FLH291S	FLH295S	22	10 (g)		16			2	0,8		0,4		400	45	15				At R _L = 4 kΩ
FLH291T	FLH295T	22	10 (g)		16			2	0,8		0,4		400	45	15				At R _L = 4 kΩ
FLH291U	FLH295U	13,5	10 (g)		16			2	0,8		0,4		1000	24	17				
FLH321	FLH325			-1,2	48			2	0,8	2,4	0,4	-70	400	22	15				
FLH331	FLH335			-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH341	FLH345	14	150	-0,8	16			2	0,8	2,4	0,4	-55	400	23	17				A or B
FLH351	FLH355	16,5		-0,8	16			2	0,8	2,4	0,4	-55	400	27	22				
FLH361	FLH365			-0,8	16			2	0,8	2,4	0,4	-55	400	30	30				
FLH371	FLH375			-0,8	16			2	0,8	2,4	0,4	-55	400	30	30				
FLH381	FLH385	15	19 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	27	19				
FLH391	FLH395	18,5	19,4 (g)		16			2	0,8		0,4		400	29	32				
FLH391T	FLH395T	18,5	19,4 (g)		16			2	0,8		0,4		400	29	32				Output : 15V/0,25 mA
FLH401	FLH405			-0,8	16			2	0,8	2,4	0,4	-57	400	18	19				C _n
FLH411	FLH415	13	180 (b)	-0,8	16			2	0,8	2,4	0,4	-100	400	17	22				C _{n+4}
FLH421	FLH425	35	170	-0,8	16			2	0,8	2,4	0,4	-55	400	60	68				Data
FLH431	FLH435		275	-0,4	16			2	0,8	2,4	0,4	-55	400	20	17				A = B
FLH441	FLH445			-1	20			2	0,8	2,4	0,4	-100	280	20	19				Q
FLH451	FLH455			-1	20			2	0,8	2,4	0,4	-100	280	18	15				At C _L = 25pF
FLH461	FLH465				16			2	0,8		0,4		400	40	40				At C _L = 25pF
FLH471	FLH475			-0,4	16			2	0,8	2,4	0,4	-55	400	40	40				
FLH481	FLH485	12,5	26 (g)		40			2	0,8		0,7		110	15	23				
FLH481T	FLH485T	12,5	26 (g)		40			2	0,8		0,7		110	15	23				
FLH491	FLH495	13	21 (g)		40			2	0,8		0,7		110	10	30				
FLH491T	FLH495T	13	21 (g)		40			2	0,8		0,7		110	10	30				
FLH501	FLH505	22	10 (g)		16			2	0,8		0,4		400	45	15				
FLH511	FLH515	10,5	23 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	22	15				At R _L = 4 kΩ
FLH521	FLH525	10,5	23 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	22	15				
FLH531	FLH535	10,5	27 (g)	-1,2	48			2	0,8	2,4	0,4	-70	133	22	18				At C _L = 25pF
FLH541	FLH545	12,5	24 (g)		48			2	0,8		0,4		133	22	18				At C _L = 45pF
FLH551	FLH555		265	-0,2	8			2	0,8	2,4	0,4	-4	667	100	100				

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate
(') : typical value

(2) (r):referred to rising edge
(f):referred to falling edge
(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max
(8) V_{CC}= min, V_I=V_T-min=0,6V, I_{OH}=max
(9) V_{CC}= min, V_I=V_T+max=2V, I_{OL}=max
(10) E or Ē
(11) C₂

FL

Basic Characteristics: See page 21

Operating Temp. Range: 1) 0 to 70°C
2) -25 to 85°C

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			FLH561	FLH565	6-BIT-BCD BINARY CONVERTER	130	DP	16	1											
FLH571	FLH575	6-BIT-BCD BINARY CONVERTER	130	DP	16	1														
FLH601	FLH605	QUADRUPLE 2-INPUT NAND SCHMITT TRIGGER	131	DP	14	1														
FLH611	FLH615	DUAL 4-INPUT NAND GATE WITH OPEN COLLECTOR OUTPUT	102A	DP	14	1														
FLH621	FLH625	TRIPLE 3-INPUT NOR GATE	132	DP	14	1														
FLH631	FLH635	QUADRUPLE 2-INPUT OR GATE	133	DP	14	1														
FLH641	FLH645	DELAY UNIT DUAL 2-INPUT NAND POWERGATE (gates 3,4) 2-INVERTER (gates 1,6); DUAL AND STAGE (gates 2,5)	134	DP	16	1														
FLH661	FLH665	QUADRUPLE 2-INPUT NOR GATE	134	DP	16	1														
FLH731	FLH735	DUAL 3-INPUT NAND SCHMITT TRIGGER WITH HIGH INPUT IMPEDANCE	106	DP	14	1														
FLH731T	FLH735T	DUAL 3-INPUT NAND SCHMITT TRIGGER WITH HIGH INPUT IMPEDANCE	135	DP	14	1														
FLH951		2X3 INPUT AND/NOR GATES, 2X3 INPUT	135	DP	14	1														
FLH961		1X2 and 1X3 INPUT AND/NOR	139	DP	16	9														
FLH981		DUAL 2-INPUT NAND GATE, DUAL 2-INPUT AND/NAND GATE	140	DP	16	9														
			141	DP	16	9														
FLJ101	FLJ105	3-INPUT JK FLIP FLOP	142	DP	14	1														
FLJ111	FLJ115	JK MASTER-SLAVE-FLIP FLOP	143	DP	14	1														
FLJ121	FLJ125	DUAL JK MASTER-SLAVE-FLIP FLOP WITH RESET	144	DP	14	1														
FLJ131	FLJ135	DUAL JK MASTER-SLAVE-FLIP FLOP WITH SET AND RESET	145	DP	16	1														
FLJ141	FLJ145	DUAL D-FLIP FLOP	146	DP	14	1														
FLJ151	FLJ155	QUADRUPLE D-FLIP FLOP	147	DP	16	1														
FLJ161	FLJ165	DECIMAL COUNTER	148	DP	14	1														
FLJ171	FLJ175	DEVIDE-BY-12 COUNTER	149	DP	14	1														
FLJ181	FLJ185	4-BIT BINARY COUNTER	150	DP	14	1														
FLJ191	FLJ195	4-BIT SHIFT REGISTER REVERSIBLE PARALLEL IN/OUT	151	DP	14	1														
FLJ201	FLJ205	DECIMAL COUNTER, REVERSIBLE WITH SET AND RESET	152	DP	16	1														
FLJ211	FLJ215	BINARY COUNTER, REVERSIBLE WITH SET AND RESET	153	DP	16	1														
FLJ221	FLJ225	8-BIT SHIFT REGISTER, SERIAL IN/OUT	154	DP	14	1														
FLJ231	FLJ235	4-BIT SHIFT REGISTER, PARALLEL IN, SERIAL OUT	155	DP	16	1														
FLJ241	FLJ245	DECIMAL COUNTER, REVERSIBLE WITH CLOCK INPUT FOR UP AND DOWN COUNT	156	DP	16	1														
FLJ251	FLJ255	BINARY COUNTER, REVERSIBLE WITH CLOCK INPUT FOR UP AND DOWN COUNT	157	DP	16	1														
FLJ261	FLJ265	5-BIT SHIFT REGISTER, PARALLEL IN; PARALLEL OUT	158	DP	16	1														
FLJ271	FLJ275	DUAL JK MASTER-SLAVE FLIP FLOP WITH RESET	159	DP	14	1														
FLJ281		JK MASTER-SLAVE FLIP FLOP WITH JK INPUT	160	DP	14	1														
FLJ291		JK MASTER-SLAVE FLIP FLOP WITH J,K and JK INPUT	161	DP	14	1														
FLJ301	FLJ305	EIGHT D-FLIP FLOP	162	DP	24	2														
FLJ311	FLJ315	SYNCHRONOUS BIDIRECTIONAL 8-BIT SHIFT REGISTER, PARALLEL IN/OUT	163	DP	24	2														
FLJ321	FLJ325	SYNCHRONOUS 8-BIT SHIFT REGISTER WITH J-K-INPUTS, PARALLEL IN/OUT	164	DP	24	2														
FLJ331		PROGRAMMABLE 6-BIT RATE MULTIPLIER	165	DP	16	1														
FLJ341	FLJ345	JK MASTER-SLAVE FLIP FLOP WITH DATA LOCKOUT	166	DP	14	1														
FLJ351	FLJ355	DUAL JK MASTER-SLAVE FLIP FLOP WITH DATA LOCKOUT WITH SET AND RESET	167	DP	16	1														
FLJ361	FLJ365	HEX RS FLIP FLOP WITH COMMON RESET	168	DP	16	1														
FLJ371	FLJ375	HEX RS FLIP FLOP WITH SEPARATE RESET	169	DP	24	2														
FLJ381	FLJ385	DECIMAL COUNTER FOR 50MHz WITH SET AND RESET	170	DP	14	1														
FLJ391	FLJ395	4-BIT BINARY COUNTER FOR 50MHz WITH SET AND RESET	171	DP	14	1														
FLJ401	FLJ405	SYNCHRONOUS DECIMAL COUNTER WITH SYNC SET INPUT AND ASYNC RESET INPUT	172	DP	16	1														
FLJ411	FLJ415	SYNCHRONOUS 4-BIT BINARY COUNTER WITH SYNC SET INPUT AND ASYNC RESET INPUT	173	DP	16	1														
FLJ421	FLJ425	SYNCHRONOUS DECIMAL COUNTER WITH SYNCHRONOUS SET AND RESET INPUTS	172	DP	16	1														
FLJ431	FLJ435	SYNCHRONOUS 4-BIT BINARY COUNTER WITH SYNCHRONOUS SET AND RESET INPUTS	173	DP	16	1														
FLJ441	FLJ445	8-BIT SHIFT REGISTER, PARALLEL OUT	174	DP	14	1														
FLJ451	FLJ455	8-BIT SHIFT REGISTER, PARALLEL IN	175	DP	16	1														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{CC} = 5V \pm 5\%$

TYPE		t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS				
				I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM	TO		f			
				mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz			
				max	max	min	min	min	max	min	max			max	max				typ			
FLH561	FLH565	25	280		12			2	0,8		0,4		400	30	35	Enable G						
FLH571	FLH575	25	280		12			2	0,8		0,4		400	30	35	Enable G						
FLH601	FLH605	15		-0,8	16					2,4	0,4	-55	400	27	22							
FLH611	FLH615	22	10 g		16			2	0,8		0,4		400	45	15							
FLH621	FLH625	8,5	22 g	-0,8	16			2	0,8	2,4	0,4	-55	400	11	15							
FLH631	FLH635	12	24 g	-0,8	16			2	0,8	2,4	0,4	-55	400	15	22							
FLH641	FLH645			-12	48			2	0,8	2,4	0,4	-70	133	22	15							
				-0,1	2			2	0,8	2,4	0,4	-15	4000	60	60							
FLH661	FLH665	7	28 g	-2,4	48			2	0,8	2,4	0,4	-180	133	9	12							
		7	28 g	-42,4	48			2	0,8	2,4	0,4	-180	133	9	12							
				-13,2	48			2	0,8	2,4	0,4	-180	133	15	12							
FLH731	FLH735			-0,8	16					2,4	0,4	-55	400	27	22	A or B	Q					
FLH731T	FLH735T			-0,8	16					2,4	0,4	-55	400	27	22	A or B	Q					
FLH951				-1,6	20			2,5!	1,5"	2,8	0,5	-40'	230	12	12	$I_{SH}=50; I_{SL}=69(mA)$					At $C_L = 50 pF$	
FLH961				-1,6	20			2,5!	1,5"	2,8	0,5	-40'	230	12	12	$I_{SH}=50; I_{SL}=40(mA)$					At $C_L = 50 pF$	
FLH981				-1,6	20			2,5!	1,5"	2,8	0,5	-40'	230	12	12	$I_{SH}=50; I_{SL}=69(mA)$					At $C_L = 50 pF$	
FLJ101	FLJ105		65(f1)	-0,4	16	20 (r)	0 (r)	2	0,8	2,4	0,4	-57	400	50	50	CLOCK	Q or \bar{Q}					35
FLJ111	FLJ115		50	-0,4	16	0 (r)	0 (f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}					20
FLJ121	FLJ125		50	-0,4	16	0 (r)	0 (f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}					20
FLJ131	FLJ135		50	-0,4	16	0 (r)	0 (f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}					20
FLJ141	FLJ145		43	-0,4	16	20	5 (r)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}					25
FLJ151	FLJ155	15	160	-0,4	16	20		2	0,8	2,4	0,4	-57	400	30	25	D	Q					
FLJ161	FLJ165		160	-0,8	16	25		2	0,8	2,4	0,4	-57	400	16	18	A	QA					42
FLJ171	FLJ175		160	-0,8	16	25		2	0,8	2,4	0,4	-57	400	16	18	A	QA					42
FLJ181	FLJ185		160	-0,8	16	25		2	0,8	2,4	0,4	-57	400	16	18	A	QA					42
FLJ191	FLJ195		195	-0,8	16	10	0	2	0,8	2,4	0,4	-57	400	27	32	CLOCK						36
FLJ201	FLJ205		325	-0,8	16	20	0	2	0,8	2,4	0,4	-65	400	42	52	CLOCK	MAX/MIN					25
FLJ211	FLJ215		325	-0,8	16	20	0	2	0,8	2,4	0,4	-65	400	42	52	CLOCK	MAX/MIN					25
FLJ221	FLJ225		175	-0,4	16	25	0	2	0,8	2,4	0,4	-57	400	40	40							18
FLJ231	FLJ235		175	-0,4	16	25	0	2	0,8	2,4	0,4	-57	400	40	40	CLOCK						10"
FLJ241	FLJ245		325	-0,4	16	20	0	2	0,8	2,4	0,4	-65	400	40	40	LOAD	Q					32
FLJ251	FLJ255		325	-0,4	16	20	0	2	0,8	2,4	0,4	-65	400	40	40	LOAD	Q					32
FLJ261	FLJ265		240	-0,4	16	30	0	2	0,8	2,4	0,4	-57	400	40	40	CLOCK						
FLJ271	FLJ275		50	-0,4	16	0 (r)	0 (f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}					20
FLJ281						35		1,8	0,85	2,4	0,45	-100	400	20	35	PRESET	Q					20
FLJ291						15		1,8	0,85	2,4	0,45	-100	400	20	35	PRESET	Q					50
FLJ301				-0,4	16	20	0	2	0,8	2,4	0,4	-57	400	30	25	D	Q					
FLJ311	FLJ315		360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK						35
FLJ321	FLJ325					0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK							35
FLJ331			345	-0,4	16	25	0	2	0,8	2,4	0,4	-55	400	20	21	ENABLE	ENABLE					32
FLJ341	FLJ345		100	-0,8	16	20 (r)	5 (r)	2	0,8	2,4	0,4	-57	400	30	20	CLOCK	Q or \bar{Q}					25
FLJ351	FLJ355		70	-0,8	16	0 (r)	30 (r)	2	0,8	2,4	0,4	-57	400	17	30	CLOCK	Q or \bar{Q}					25
FLJ361	FLJ365			-0,8	16			2	0,8	2,4	0,4	-57	400	29	17	R or S	Q					
FLJ371	FLJ375			-0,8	16			2	0,8	2,4	0,4	-57	400	29	17	R or S	Q					
FLJ381	FLJ385		240	-0,8	16	20	10	2	0,8	2,4	0,4	-57	400	33	36	LOAD	ANY					70
FLJ391	FLJ395		240	-0,8	16	20	10	2	0,8	2,4	0,4	-57	400	33	36	LOAD	ANY					70
FLJ401	FLJ405		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q					32
FLJ411	FLJ415			-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q					32
FLJ421	FLJ425		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q					32
FLJ431	FLJ435		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q					32
FLJ441	FLJ445		167	-0,4	8	15	5	2	0,8	2,4	0,4	-27,5	800	27	32	CLOCK	ANY Q					36
FLJ451	FLJ455		210	-0,8	16	45	0	2	0,8	2,4	0,4	-55	400	24	3'	CLOCK	ANY					26

NOTES : (1) P: Power dissipation
b: per bit
fl: per flip-flop
g: per gate

(2) (r): referred to rising edge
(f): referred to falling edge
(3) at $V_{CC} = \min, V_{IL} = \max, V_{IH} = \min, I_{OH} = \max$
(4) at $V_{CC} = \min, V_{IL} = \max, V_{IH} = \min, I_{OL} = \max$

(5) at V_{CCmax}
(8) $V_{CC} = \min, V_I = V_{T-} = 0,6 V, I_{OH} = \max$
(9) $V_{CC} = \min, V_I = V_{T+} = 2V, I_{OL} = \max$

FL

Basic Characteristics: See page 21

Operating Temp. Range: 1) 0 to 70 °C
2) -25 to 85 °C

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			FLJ461	FLJ465	SYNCHRONOUS 8-BIT SHIFT REGISTER, PARALLEL-IN, SERIAL OUT	176	DP	16	1											
FLJ471	FLJ475	PROGRAMMABLE DECIMAL RATE MULTIPLIER	177	DP	16	1														
FLJ481	FLJ485	DUAL 8-BIT SHIFT REGISTER SERIAL IN/OUT	178	DP	14	1														
FLJ491	FLJ495	QUADRUPLE D-FLIP FLOP WITH COMMON RESET	179	DP	16	1														
FLJ501	FLJ505	DUAL 4-BIT BINARY COUNTER FOR 50MHz	180	DP	16	1														
FLJ511	FLJ515	DUAL DECIMAL COUNTER FOR 50MHz	180	DP	16	1														
FLJ521	FLJ525	DUAL JK MASTER-SLAVE FLIP FLOP WITH DATA LOCKOUT WITH RESET	181	DP	14	1														
FLJ531	FLJ535	HEX D-FLIP FLOP WITH RESET	182	DP	16	1														
FLJ541	FLJ545	QUADRUPLE D-FLIP FLOP WITH RESET	183	DP	16	1														
FLJ551	FLJ555	SYNCHRONOUS 4-BIT SHIFT REGISTER, PARALLEL IN/OUT, RIGHT/LEFT	184	DP	16	1														
FLJ561	FLJ565	SYNCHRONOUS 4-BIT SHIFT REGISTER, PARALLEL IN/OUT, WITH J-K-INPUTS	185	DP	16	1														
FLK101	FLK105	MONOSTABLE MULTIVIBRATOR	186	DP	14	1														
FLK111	FLK115	RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH RESET	187	DP	14	1														
FLK121	FLK125	DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH RESET	188	DP	16	1														
FLL101		BCD-DECIMAL-DECODER-DRIVER WITH OPEN COLLECTOR OUTPUTS	189	DP	16	1														
FLL111	FLL115	BCD-DECIMAL-DECODER/DRIVER WITH OPEN COLLECTOR OUTPUTS	113	DP	16	1														
FLL111T	FLL115T	BCD-DECIMAL-DECODER/DRIVER WITH OPEN COLLECTOR OUTPUTS	113	DP	16	1														
FLL121U	FLL125U	BCD-7-SEGMENT DECODER/DRIVER WITH OPEN COLLECTOR OUTPUTS	190	DP	16	1														
FLL121V	FLL125V	BCD-7-SEGMENT DECODER/DRIVER WITH OPEN COLLECTOR OUTPUTS	190	DP	16	1														
FLL131	FLL135	DUAL AND POWERDRIVER, and DUAL 2-INPUT NAND GATE	191	DP	16	1														
FLL131T	FLL135T	DUAL AND POWERDRIVER, and DUAL 2-INPUT NAND GATE	191	DP	16	1														
FLL141	FLL145	QUADRUPLE POWERDRIVER	192	DP	16	1														
FLL141T	FLL145T	QUADRUPLE POWERDRIVER	192	DP	16	1														
FLL151		DECIMAL COUNTER, MEMORY, DECODER AND DRIVER FOR INDICATOR TUBES	193	DP	16	1														
FLL171	FLL175	4-BIT BINARY COUNTER, MEMORY, 7-SEGMENT DECODER AND DRIVER	194	DP	24	2														
FLL171T	FLL175T	4-BIT BINARY COUNTER, MEMORY, 7-SEGMENT DECODER AND DRIVER	194	DP	24	2														
FLQ101	FLQ105	64-BIT RANDOM ACCESS MEMORY WITH OPEN COLLECTOR OUTPUTS	195	DP	16	1														
FLQ111	FLQ115	16-BIT RANDOM ACCESS MEMORY (RAM)	196	DP	14	1														
FLQ121	FLQ125	16-BIT RAM WITH 2 READ AND WRITE INPUTS EACH	197	DP	16	1														
FLQ131	FLQ135	16-BIT RAM, 4 WORDS OF 4 BITS	198	DP	16	1														
FLQ141	FLQ145	256-BIT RAM WITH TRI-STATE OUTPUT	199	DP	16	1														
FLY101	FLY105	DUAL 4-INPUT EXPANDER	203	DP	14	1														
FLY111	FLY115	16-BIT DATA SELECTOR/MULTIPLEXER	204	DP	24	2														
FLY121	FLY125	8-BIT DATA SELECTOR/MULTIPLEXER	205	DP	16	1														
FLY131	FLY135	DUAL 4-BIT DATA SELECTOR/MULTIPLEXER	206	DP	16	1														
FLY141	FLY145	4-BIT BINARY DECODER/DEMUTIPLEXER	207	DP	24	2														
FLY151	FLY155	DUAL 2-BIT BINARY DECODER/DEMUTIPLEXER	208	DP	16	1														
FLY161	FLY165	DUAL 2-BIT BINARY DECODER/DEMUTIPLEXER	208	DP	16	1														
FLY171	FLY175	QUADRUPLE 2-BIT DATA SELECTOR/MULTIPLEXER	209	DP	16	1														
FLY181	FLY185	DUAL PULSE SYNCHRONIZER	210	DP	16	1														
FLY971		5-4-3 INPUTS WITH EXPANDER GATE	137	DP	16	1														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

V_{CC} = 5 V ± 5 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS	
			I _{OH}	I _{OL}	t _{set up} (2)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (3)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			max	max	min	min	min	max	min	max			max	max				typ
FLJ461	FLJ465	360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK		35	
FLJ471	FLJ475	270	-0,4	16	25	0	2	0,8	2,4	0,4	-55	400	39	30	CLOCK	Y	32	
FLJ481	FLJ485		-0,8	16			2	0,8	2,4	0,4	-57	400	40	40	T	Q		
FLJ491	FLJ495		-0,8	16			2	0,8	2,4	0,4	-57	400	25	40	T	Q		
FLJ501	FLJ505		-0,8	16			2	0,8	2,4	0,4	-57							
FLJ511	FLJ515		-0,8	16			2	0,8	2,4	0,4	-57							
FLJ521	FLJ525	70	-0,8	16	0 (r)	30 (r)	2	0,8	2,4	0,4	-57	400	17	30	CLOCK	Q or Q̄	25	
FLJ531	FLJ535	225	-0,8	16	20	5	2	0,8	2,4	0,4	-57	400	30	30	CLOCK		35	
FLJ541	FLJ545	150	-0,8	16	20	5	2	0,8	2,4	0,4	-57	400	30	30	CLOCK		35	
FLJ551	FLJ555	195	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	22	26	CLOCK		36	
FLJ561	FLJ565		-0,8	16			2	0,8	2,4	0,4	-57	400	22	26	T	Q		
FLK101	FLK105	90	-0,4	16					2,4	0,4	-55	400						
FLK111	FLK115	115	-0,8	16			2	0,8	2,4	0,4	-40	400						
FLK121	FLK125	230	-0,8	16			2	0,8	2,4	0,4	-40	400						
FLL101		80		7			2	0,8		2,5								
FLL111	FLL115	215					2	0,8				100	50	50			Output:30V/80mA	
FLL111T	FLL115T	215					2	0,8				100	50	50			Output:15V/80mA	
FLL121V	FLL125V	320	-0,2	8			2	0,8	2,4	0,4	-4	120	100	100			Output:30V/40mA	
FLL121V	FLL125V	320	-0,2	8			2	0,8	2,4	0,4	-4	120	100	100			Output:15V/40mA	
FLL131	FLL135	650	-0,4	16			2	0,8	2,4	0,4							Output:30V/400mA	
FLL131T	FLL135T	650	-0,4	16			2	0,8	2,4	0,4							Output:60V/400mA	
FLL141	FLL145	650	-0,4	2			2	0,8		0,3							Output:30V/130mA	
FLL141T	FLL145T	650	-0,4	2			2	0,8		0,3							Output:60V/130mA	
FLL151		340	-0,4	8	15		2	0,8	2,4	0,4	-55	800	55	45	CLOCK	Q _D		
FLL171	FLL175	280	-0,56	11,2	60 (r)		2	0,8	2,4	0,4	-55	560	40	45	CLOCK	Max count 18	Output:15V/25mA	
FLL171T	FLL175T	280	-0,56	11,2	60 (r)		2	0,8	2,4	0,4	-55	560	40	45	CLOCK	Max count 18		
FLQ101	FLQ105	5,9 (b)			0	5	2	0,8				300	60	60	SELECT		at C _L = 30 pF	
FLQ111	FLQ115	14 (b)			15 (6)	15 (7)	2	0,8		0,4			19	20			at C _L = 30 pF	
FLQ121	FLQ125	14 (b)			15 (6)	15 (7)	2	0,8		0,4			19	20			at C _L = 30 pF	
FLQ131	FLQ135	635			10	15	2	0,8		0,4		400	30	45	DATA	ANY Q		
FLQ141	FLQ145		-3,2	16			2	0,8	2,4	0,4	-60							
FLY101	FLY105	4 (g)					2	0,8										
FLY111	FLY115	11	200	-0,8	16		2	0,8	2,4	0,4	-55	400	38	38	A, B, C	Y		
FLY121	FLY125	8	145	-0,8	16		2	0,8	2,4	0,4	-55	400	38	38	A, B, C	Y		
FLY131	FLY135	22	180	-0,8	16		2	0,8	2,4	0,4	-57	400	18	23	DATA	Y	at C _L = 30 pF	
FLY141	FLY145	23	170	-0,8	16		2	0,8	2,4	0,4	-57	400	36	33	A, B, C, D	Y		
FLY151	FLY155	21	125	-0,8	16		2	0,8	2,4	0,4	-57	400	32	32	A or B	Y		
FLY161	FLY165	21	125		16		2	0,8		0,4		400	34	34	A or B	Y		
FLY171	FLY175	9	150	-0,8	16		2	0,8	2,4	0,4	-55	400	14	14	DATA	Y		
FLY181	FLY185	16	255	-2,4	48	12	3	2	0,8	2,4	0,4	-90	133	22	25	C	Y	at C _L = 45 pF
FLY971								2,5!	1,5!	3,8	0,5	-40!	15!	15!	connected with FLH951			

NOTES : (1) P: Power dissipation
b: per bit
fl: per flip-flop
g: per gate
(') : typical value
(") : minimum value
(!) : maximum value

(2) (r): referred to rising edge
(f): referred to falling edge
(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max
(6) typ address time
(7) typ enable time

FZ

Basic Characteristics: See page 21

Operating Temp. Range: 1) 0 to 70 °C
2) -25 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			FZH101	FZH105	QUADRUPL 2-INPUT NAND GATE	373	DP	16	1										
FZH101A	FZH105A	As FZH101/105 with SHORT-CIRCUIT-PROOF OUTPUT	373	DP	16	1													
FZH111	FZH115	QUADRUPL 2-INPUT NAND GATE WITH N-INPUT	373	DP	16	1													
FZH111A	FZH115A FZH115B	As FZH111/115 with SHORT-CIRCUIT-PROOF OUTPUT Similar to FZH111A but with permissible input voltage : 30 V	373	DP	16	1													
FZH121	FZH125	DUAL 5-INPUT NAND GATE	374	DP	16	1													
FZH131	FZH135	DUAL 5-INPUT NAND GATE WITH N-INPUT	374	DP	16	1													
FZH141	FZH145	DUAL 5-INPUT NAND POWERGATE WITH N-INPUT	375	DP	16	1													
FZH151	FZH155	DUAL AND-OR GATE WITH N-INPUT	376	DP	16	1													
FZH161	FZH165 FZH165B	QUADRUPL LSL-TTL-LEVEL-CONVERTER with max permissible voltage : 18 V Max permissible voltages : input 30 V : output 30 V.	377	DP	16	1													
FZH171	FZH175	DUAL 4-INPUT NAND GATE (4)	378	DP	16	1													
FZH181	FZH185	QUADRUPL TTL-LSL-LEVEL-CONVERTER	100A	DP	14	1													
FZH191	FZH195	TRIPLE 3-INPUT NAND GATE WITH N-INPUT	379	DP	16	1													
FZH201	FZH205	HEX INVERTER WITH STROBE INPUTS	380	DP	16	1													
FZH211	FZH215 FZH215B	QUADRUPL 2-INPUT NAND GATE (5) with max permissible output voltage;18V Max permissible voltages : input 30 V : output 30 V	381	DP	16	1													
FZH211S		FOUR NAND DRIVERS WITH OPEN COLLECTOR, 2 inputs, and N inputs for delay circuits.	632																
FZH231	FZH235	DUAL 5-INPUT NAND GATE (5)	382	DP	16	1													
FZH241	FZH245 FZH245B	DUAL 4-INPUT NAND SCHMITT TRIGGER WITH N-INPUT AND EXPANDER NODES Max permissible input voltage : 30 V.	383	DP	16	1													
FZH251	FZH255 FZH255B	QUADRUPL 2-INPUT AND GATE WITH N-INPUT Max permissible input voltage : 30 V.	384	DP	16	1													
FZH261	FZH265 FZH265B	DUAL 2-INPUT NAND GATE AND QUADRUPL INVERTER Max permissible input voltage : 30 V.	385	DP	16	1													
FZH271	FZH275	QUADRUPL 2-INPUT EXCLUSIVE-OR GATE WITH N-INPUT	386	DP	16	1													
FZH281	FZH285 FZH285B	QUADRUPL 2-INPUT NOR-GATE WITH N-INPUT Max permissible input voltage : 30 V.	386A	DP	16	1													
FZH291	FZH295 FZH295B	QUADRUPL 2-INPUT OR-GATE WITH N-INPUT Max permissible input voltage : 30 V.	387	DP	16	1													
FZH301	FZH305	QUAD 2-INPUT NOR GATE WITH DESTRUCTION PROTECTION.	633																

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"
(4) with Expander Nodes N1 and N-input
(5) with Open Collector Output and N-input

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ELECTRICAL DATA : next page. PARAMETRES ELECTRIQUES : page suivante

ELEKTRISCHE DATEN : rechte Seite

FAMILY CIRCUITS
CIRCUITS FAMILLE
FAMILIEN SCHALTUNGEN

ELECTRICAL DATA
PARAMETRES ELECTRIQUES
ELEKTRISCHE DATEN
V_{CC}: Range I : 12V typ (11,4 to 13,5V)
Range II: 15V typ (13,5 to 17V)
T_{amb}: 25°C

FZ

TYPE	V _{CC}	ELECTRICAL CHARACTERISTICS						SWITCHING CHARACTERISTICS (at V _{CC} =typ; N=1; C _L =10pF)					REMARKS
		V _{IH} (1)	V _{IL} (2)	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	P (6)	t _{PLH}	t _{PHL}	t _{TLH}	t _{THL}	f	
		V	V	V	V	mA	mW	ns	ns	ns	ns	MHz	
		min	max	min	max	max	max	typ	typ	typ	typ		
FZH101	FZH105	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	
FZH101A	FZH105A	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	
FZH111	FZH115	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	
FZH111A	FZH115A	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	at I _{OL} = 15 mA
	FZH115B	Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	at I _{OL} = 18 mA
FZH121	FZH125	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	
FZH131	FZH135	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	
FZH141	FZH145	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	at I _{OL} = 45 mA
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	at I _{OL} = 45 mA
FZH151	FZH155	Range I	7,5	4,5	10	1,7	-50	250	340	230	330	200	at I _{OL} = 30 mA
		Range II	7,5	4,5	12	1,7	-60	425					at I _{OL} = 30 mA
FZH161	FZH165	Range I	7,5	4,5		0,4		70 (g)	250	130	75	30	at I _{OL} = 20 mA/C _L = 15 pF
	FZH165B	Range II	7,5	4,5		0,4		78 (g)	180	140	70	30	at I _{OL} = 20 mA/C _L = 15 pF
FZH171	FZH175	Range I	7,5	4,5	10	1,7	-50	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-60	52 (g)	195	140	410	75	
FZH181	FZH185	4,75-5,25	2	0,8		0,4		37 (g)	130	20			at C _L = 15 pF
FZH191	FZH195	Range I	7,5	4,5	10	1,7	-25	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-25	46 (g)	410	75	95	140	at I _{OL} = 18 mA
FZH201	FZH205	Range I	7,5	4,5	10	1,7	-25	31 (g)	175	175	340	120	
		Range II	7,5	4,5	12	1,7	-25	46 (g)	410	75	95	140	at I _{OL} = 18 mA
FZH211	FZH215	Range I	7,5	4,5		1,7		18 (g)	70	175	230	120	at C _L = 15 pF/I _{OL} = 15 mA
		Range II	7,5	4,5		1,7		30 (g)	90	155	300	70	at C _L = 15 pF/I _{OL} = 18 mA
FZH211S	FZH215B	Range I	7,5	4,5		1,7		18 (g)	79	175	230	120	at C _L = 15 pF/I _{OL} = 18 mA
FZH231	FZH235	Range I	7,5	4,5		1,7		30 (g)					at C _L = 15 pF/I _{OL} = 18 mA
		Range II	7,5	4,5		1,7		85 (g)	175	175	340	120	at I _{OL} = 15 mA
FZH241	FZH245	Range I	7,5	4,5	10	1,7	-25	105 (g)	205	170	340	120	at I _{OL} = 18 mA
	FZH245B	Range II	7,5	4,5	12	1,7	-25		340	175	340	120	at I _{OL} = 15 mA
FZH251	FZH255	Range I	7,5	4,5	10	1,7	-25		340	180	390	130	at I _{OL} = 18 mA
	FZH255B	Range II	7,5	4,5	12	1,7	-25		175	175	340	120	at I _{OL} = 15 mA
FZH261	FZH265	Range I	7,5	4,5	10	1,7	-25		185	150	410	70	at I _{OL} = 18 mA
	FZH265B	Range II	7,5	4,5	12	1,7	-25		340	175	340	120	
FZH271	FZH275	Range I	7,5	4,5	10	1,7	-25		175	340	340	120	at I _{OL} = 18 mA
		Range II	7,5	4,5	12	1,7	-25		305	280	340	120	at I _{OL} = 15 mA
FZH281	FZH285	Range I	7,5	4,5	10	1,7	-25		340	175	340	120	at I _{OL} = 18 mA
	FZH285B	Range II	7,5	4,5	12	1,7	-25		340	180	390	130	at I _{OL} = 15 mA
FZH291	FZH295	Range I	7,5	4,5	10	1,7	-25		340	180	390	130	at I _{OL} = 18 mA
	FZH295B	Range II	7,5	4,5	12	1,7	-25		1000	1000	600	600	at C _L = 100pF/I _{OL} = 1,8mA
FZH301	FZH305	Range I	8	4,5	10	1,7							

NOTES: (1) at V_{CC} = min

(2) at V_{CC} = min and max

(3) at V_{CC} = min and max; V_{IL} = max; I_{OH} = -0,1mA

(4) at V_{CC} = min; V_{IH} = min; I_{OL} = 15mA

(5) at V_{CC} = max; V_I = V_{OS} = 0 V

(6) P = Power consumption at V_{CC} = max
g = per gate

FZ

Basic Characteristics: See page 21

Operating Temp. Range: 1) 0 to 70 °C
2) -25 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
FZJ101	FZJ105	JK MASTER-SLAVE-FLIP FLOP WITH 2 J AND K INPUTS	388	DP	16	1														
FZJ111	FZJ115	JK MASTER-SLAVE-FLIP FLOP WITH N-INPUTS	389	DP	16	1														
FZJ121	FZJ125	DUAL JK MASTER-SLAVE-FLIP FLOP WITH SET AND RESET	390	DP	16	1														
FZJ131	FZJ135	QUADRUPLE-D-FLIP FLOP	391	DP	16	1														
FZJ141	FZJ145	SYNCHRONOUS DECIMAL COUNTER	392	DP	16	1														
FZJ141A	FZJ145A	SYNCHRONOUS DECIMAL COUNTER WITH N-INPUT	392	DP	16	1														
FZJ151	FZJ155	SYNCHRONOUS 4-BIT BINARY COUNTER	393	DP	16	1														
FZJ151A	FZJ155A	SYNCHRONOUS 4-BIT BINARY COUNTER WITH N-INPUT	393	DP	16	1														
FZJ161	FZJ165	4-BIT SHIFT REGISTER WITH N-INPUT	394	DP	16	1														
FZK101	FZK105	TIMING CIRCUIT WITH N-INPUT	395	DP	16	1														
FZL101	FZL105	BCD-DECIMAL-DECODER-DRIVER FOR INDICATOR TUBES	113	DP	16	1														
FZL111	FZL115	BCD-7-SEGMENT DECODER-DRIVER WITH OPEN COLLECTOR OUTPUTS WITH 16,5V/20mA	396	DP	16	1														
FZL121	FZL125	DRIVER WITH OPEN COLLECTOR OUTPUT AND 3 INPUTS FOR 20 V.	397																	
FZL121S	FZL125S	DRIVER WITH OPEN COLLECTOR OUTPUT AND 3 INPUTS FOR 30 V.	397																	
FZL131	FZL135	DRIVER WITH OPEN EMITTER OUTPUT AND 4 INPUTS FOR 20 V.	398																	
FZL131S	FZL135S	DRIVER WITH OPEN EMITTER OUTPUT AND 4 INPUTS FOR 30 V.	398																	
FZL141	FZL145	DRIVER FOR POWER TRANSISTOR FOR 20 V.	399																	
FZL141S	FZL145S	DRIVER FOR POWER TRANSISTOR FOR 30 V.	399																	
FZY101	FZY105	DUAL VOLTAGE REGULATOR FOR 12V, 15V or 17V	401	DP	16															

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

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ELECTRICAL DATA : next page. PARAMETRES ELECTRIQUES : page suivante

ELEKTRISCHE DATEN : rechte Seite

FAMILY CIRCUITS
CIRCUITS FAMILLE
FAMILIEN SCHALTUNGEN

ELECTRICAL DATA
PARAMETRES ELECTRIQUES
ELEKTRISCHE DATEN
V_{CC}: Range I : 12V typ (11.4 to 13.5V)
Range II: 15V typ (13.5 to 17V)
T_{amb}=25°C

FZ

TYPE	V _{CC}	ELECTRICAL CHARACTERISTICS						SWITCHING CHARACTERISTICS (at V _{CC} =typ; N=1; C _L =10pF)					REMARKS	
		V _{IH} (1)	V _{IL} (2)	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	P (6)	t _{PLH}	t _{PHL}	t _{TLH}	t _{THL}	f		
		V	V	V	V	mA	mW	ns	ns	ns	ns	MHz		
		min	max	min	max	max	max	typ	typ	typ	typ			
FZJ101	FZJ105	Range I	7,5	4,5	10	1,7	-50		290 ⁷	450 ⁷	340	120	0,5'	V _{IL} = 4 V at C V _{IL} = 4 V at C/at I _{OL} =18mA V _{IL} = 4 V at C V _{IL} = 4 V at C/at I _{OL} =18mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA at I _{OL} = 18 mA
		Range II	7,5	4,5	12	1,7	-60		330 ⁷	470 ⁷	410	75		
FZJ111	FZJ115	Range I	7,5	4,5	10	1,7	-50		290 ⁷	450 ⁷	340	120	0,5'	
		Range II	7,5	4,5	12	1,7	-60		330 ⁷	470 ⁷	410	75		
FZJ121	FZJ125	Range I	(8)	(8)	10	1,7	-25		290 ⁷	450 ⁷	349	120	0,5'	
		Range II	(8)	(8)	12	1,7	-25		330 ⁷	470 ⁷	410	75		
FZJ131	FZJ135	Range I	7,5	4,5	10	1,7	-25	432	160 ⁷	120 ⁷	90	35	0,5"	
		Range II	7,5	4,5	12	1,7	-25	720						
FZJ141	FZJ145	Range I	7,5	4,5	10	1,7	-25		200 ⁷	200 ⁷	250	20	1,5'	
FZJ141A	FZJ145A	Range II	7,5	4,5	12	1,7	-25							
FZJ151	FZJ155	Range I	7,5	4,5	10	1,7	-25		200 ⁷	200 ⁷	250	20	1,5'	
		Range II	7,5	4,5	12	1,7	-25							
FZJ151A	FZJ155A	Range I	7,5	4,5	10	1,7	-25		200 ⁷	200 ⁷	250	20	1,5'	
		Range II	7,5	4,5	12	1,7	-25							
FZJ161	FZJ165	Range I	7,5	4,5	10	1,7	-25	340	140 ⁹	140 ⁹	150	20	1,5'	
		Range II	7,5	4,5	12	1,7	-25	715						
FZK101	FZK105	Range I	7,5	4,5	10	1,7	-25		270 ⁷	180 ⁷	100	80		
		Range II	7,5	4,5	12	1,7	-25							
FZL101	FZL105	Range I	8	5		2,5		340	70 ⁷	150 ⁷				
		Range II	8	5		2,5	460							
FZL111	FZL115	Range I	7,5	4,5	10	1,7								
		Range II	7,5	4,5	12	1,7								
FZL121	FZL125	11,4-20	8	6		2,2								
FZL121S	FZL125S	11,4-30	8	6		2,2								
FZL131	FZL135	11,4-20	8	6		2,2								
FZL131S	FZL135S	11,4-30	8	6		2,2								
FZL141	FZL145	11,4-20	8	6		2,2								
FZL141S	FZL145S	11,4-30	8	6		2,2								
FZY101	FZY105	VOLTAGE REGULATOR 1 : V _{CC1} 30 V max (16-8) V _O 12 V typ (9-15) at V _I = 15 V : I _O = 120 mA V _O 13 V typ (10-15;9-14) at V _I = 15 V : I _O = 120 mA V _O 14 V typ (14-15;9-10) at V _I = 15 V : I _O = 120 mA V _O 15 V typ (9-10) at V _I = 15 V : I _O = 120 mA V _O 17 V typ (9-14) at V _I = 15 V : I _O = 120 mA I _O = 120 mA VOLTAGE REGULATOR 2 : V _{CC1} 30 V max (1-8) V _O 12 V typ (2-7) at V ₂ = 15 V : I _O = 25 mA V _O 17 V typ (2-8) at V ₂ = 20 V : I _O = 25 mA												

NOTES: (1) at V_{CC}=min
(2) at V_{CC}=min and max
(3) at V_{CC}=min and max; V_{IL}=max; I_{OH}=-0,1mA
(4) at V_{CC}=min; V_{IH}=min; I_{OL}=15mA
(5) at V_{CC}=max; V_I=V_{OS}=0 V

(6) P=Power consumption at V_{CC}=max
g=per gate
(7) from C to Q
(9) from Cl to Q

(8)

	V _{IH}	V _{IL}
At C	8	4
At J and K	8	5,5
At R and S	7,5	4,5

(') : typical value
(") : minimum value

GF Basic Characteristics: See page 21
 Operating Temp. Range: 0 to 70 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
GFB7400	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NAND GATE	100A,B,A	DC	14	2	DP	14	10											
GFB7401	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NAND GATE	100C,B,C	DC	14	2	DP	14	10											
GFB7402	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NOR GATE	211A,B,A	DC	14	2	DP	14	10											
GFB7403	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NAND GATE	100A	DC	14	2	DP	14	10											
GFB7404	-DC, -DP	HEX INVERTER	212A,B,A	DC	14	2	DP	14	10											
GFB7405	-DC, -DP	HEX INVERTER	212A,B,A	DC	14	2	DP	14	10											
GFB7406	-DC, -DP	HEX INVERTER BUFFER/DRIVER	212A	DC	14	2	DP	14	10											
GFB7407	-DC, -DP	HEX BUFFER/DRIVER	212A	DC	14	2	DP	14	10											
GFB7408	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-AND GATE	233	DC	14	2	DP	14	10											
GFB7409	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-AND GATE	118	DC	14	2	DP	14	10											
GFB7410	-DC, -DP	TRIPLE 3-INPUT POSITIVE-NAND GATE	118	DC	14	2	DP	14	10											
GFB7412	-DC, -DP	TRIPLE 3-INPUT POSITIVE-NAND GATE	213A,B,A	DC	14	2	DP	14	10											
GFB7413	-DC, -DP	DUAL 4-INPUT POSITIVE-NAND SCHMITT TRIGGER	213A,B,A	DC	14	2	DP	14	10											
GFB7414	-DC, -DP	HEX SCHMITT TRIGGER INVERTER	234	DC	14	2	DP	14	10											
GFB7416	-DC, -DP	HEX INVERTER BUFFER/DRIVER	235	DC	14	2	DP	14	10											
GFB7417	-DC, -DP	HEX BUFFER/DRIVER	212A	DC	14	2	DP	14	10											
GFB7420	-DC, -DP	DUAL 4-INPUT POSITIVE-NAND GATE	233	DC	14	2	DP	14	10											
GFB7423	-DC, -DP	DUAL 4-INPUT POSITIVE-NOR GATE WITH STROBE	102A,B,A	DC	14	2	DP	14	10											
GFB7425	-DC, -DP	DUAL 4-INPUT POSITIVE-NOR GATE WITH STROBE	236	DC	16	2	DP	16	10											
GFB7426	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NAND BUFFER	237	DC	16	2	DP	16	10											
GFB7427	-DC, -DP	TRIPLE 3-INPUT POSITIVE-NOR GATE	100A	DC	14	2	DP	14	10											
GFB7428	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NOR BUFFER	238	DC	14	2	DP	14	10											
GFB7430	-DC, -DP	8-INPUT POSITIVE NAND GATE	211A	DC	14	2	DP	14	10											
GFB7432	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-OR GATE	103A,B,A	DC	14	2	DP	14	10											
GFB7433	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NOR BUFFER	239	DC	14	2	DP	14	10											
GFB7437	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NAND BUFFER	211A	DC	14	2	DP	14	10											
GFB7438	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NAND BUFFER	100A	DC	14	2	DP	14	10											
GFB7440	-DC, -DP	DUAL 4-INPUT POSITIVE NAND-BUFFER	100A	DC	14	2	DP	14	10											
GFB7442	-DC, -DP	BCD-TO-DECIMAL DECODER	102A,B,A	DC	14	2	DP	14	10											
GFB7443	-DC, -DP	4-LINE-TO-10-LINE, EXCESS-3-TO-DECIMAL DECODER/DEMULTIPLER	113	DC	16	2	DP	16	10											
GFB7444	-DC, -DP	4-LINE-TO-10-LINE, EXCESS-3-GRAY-TO-DECIMAL DECODER/DEMULTIPLER	113	DC	16	2	DP	16	10											
GFB7445	-DC, -DP	BCD-TO-DECIMAL DECODER/DRIVER	113	DC	16	2	DP	16	10											
GFB7446A	-DC, -DP	BCD-TO-7-SEGMENT DECODER/DRIVER	214	DC	16	2	DP	16	10											
GFB7447A	-DC, -DP	BCD-TO-7-SEGMENT DECODER/DRIVER	214	DC	16	2	DP	16	10											
GFB7448	-DC, -DP	BCD-TO-7-SEGMENT DECODER/DRIVER	214	DC	16	2	DP	16	10											
GFB7450	-DC, -DP	DUAL 2-WIDE AND-OR-INVERT EXPANDABLE GATE	240	DC	16	2	DP	16	10											
GFB7451	-DC, -DP	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	242A,B,A	DC	14	2	DP	14	10											
GFB7453	-DC, -DP	4-WIDE AND-OR-INVERT GATE	243A,B,A	DC	14	2	DP	14	10											
GFB7454	-DC, -DP	4-WIDE 2-INPUT AND-OR-INVERT GATE	244A,B,A	DC	14	2	DP	14	10											
GFB7460	-DC, -DP	DUAL 4-INPUT EXPANDER	245A,B,A	DC	14	2	DP	14	10											
GFB7470	-DC, -DP	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	246A,B,A	DC	14	2	DP	14	10											
GFB7472	-DC, -DP	SINGLE PULSE-TRIGGERED FLIP FLOP	247A,B,A	DC	14	2	DP	14	10											
GFB7473	-DC, -DP	DUAL PULSE-TRIGGERED FLIP FLOP	218A,B,A	DC	14	2	DP	14	10											
GFB7474	-DC, -DP	DUAL D-TYPE FLIP FLOP	219	DC	14	2	DP	14	10											
GFB7475	-DC, -DP	4-BIT DG (CLOCKED) LATCH	220A,B,A	DC	14	2	DP	14	10											
GFB7476	-DC, -DP	DUAL PULSE TRIGGERED FLIP FLOP	248	DC	16	2	DP	16	10											
GFB7480	-DC, -DP	SINGLE 1-BIT GATED FULL ADDER	249	DC	16	2	DP	16	10											
GFB7483	-DC, -DP	4-BIT BINARY FULL ADDER	251A,B,A	DC	14	2	DP	14	10											
GFB7485	-DC, -DP	4-BIT MAGNITUDE COMPARATOR	254	DC	16	2	DP	16	10											
GFB7486	-DC, -DP	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES	256	DC	16	2	DP	16	10											
			257	DC	14	2	DP	14	10											

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

$V_{CC} = 5V \pm 5\%$

TYPE	t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS		
			I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM	TO		f	
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz	
			typ	typ	max	min	min	min	max	min	max		max	max				typ	
GFB7400	-DC, -DP	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				at $R_L = 4 kohms$
GFB7401	-DC, -DP	22	10 (g)		16			2	0,8		0,4		400	45	15				
GFB7402	-DC, -DP	10	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				at $R_L = 4 kohms$
GFB7403	-DC, -DP	22	10 (g)		16			2	0,8		0,4		400	45	15				
GFB7404	-DC, -DP	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				at $R_L = 4 kohms$
GFB7405	-DC, -DP	22	10 (g)		16			2	0,8		0,4		400	55	15				
GFB7406	-DC, -DP	12,5	26 (g)		40			2	0,8		0,7		110	15	23				
GFB7407	-DC, -DP	13	21 (g)		40			2	0,8		0,7		110	10	30				
GFB7408	-DC, -DP	15	19 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	27	19				
GFB7409	-DC, -DP	18,5	19,4 (g)		16			2	0,8		0,4		400	32	24				
GFB7410	-DC, -DP	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				at $R_L = 4 kohms$
GFB7412	-DC, -DP	22	10 (g)		16			2	0,8		0,4		400	45	15				
GFB7413	-DC, -DP	16,5		-0,8	16					2,4	0,4	-55	400	27	22				
GFB7414	-DC, -DP	15		-0,8	16					2,4	0,4	-55	400	22	22				
GFB7416	-DC, -DP	12,5	26 (g)		40			2	0,8		0,7		110	15	23				
GFB7417	-DC, -DP	13	21 (g)		40			2	0,8		0,7		110	10	30				
GFB7420	-DC, -DP	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7423	-DC, -DP	10,5	23 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7425	-DC, -DP	10,5	23 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7426	-DC, -DP	13,5	10 (g)		16			2	0,8		0,4		1000	24	17				
GFB7427	-DC, -DP	8,5	22 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	11	15				at $C_L = 50 pF$
GFB7428	-DC, -DP	7	28 (g)	-2,4	48			2	0,8	2,4	0,4	-180	133	9	12				
GFB7430	-DC, -DP	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7432	-DC, -DP	12	24 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	15	22				
GFB7433	-DC, -DP	11	28 (g)		48			2	0,8		0,4		133	15	18				at $C_L = 50 pF$
GFB7437	-DC, -DP	10,5	27 (g)	-1,2	48			2	0,8	2,4	0,4	-70	133	22	18				at $C_L = 45 pF$
GFB7438	-DC, -DP	12,5	24,4 (g)		48			2	0,8		0,4		133	22	18				at $C_L = 45 pF$
GFB7440	-DC, -DP	10,5	26 (g)	-1,2	48			2	0,8	2,4	0,4	-70	133	22	15				
GFB7442	-DC, -DP							2	0,8	2,4	0,4	-35	400	35	35				
GFB7443	-DC, -DP		140	-0,8	16			2	0,8	2,4	0,4	-55	400	30	30				
GFB7444	-DC, -DP		140	-0,8	16			2	0,8	2,4	0,4	-55	400	30	30				
GFB7445	-DC, -DP		215					2	0,8		0,4		100	50	50				
GFB7446A	-DC, -DP		320	-0,2	8			2	0,8	2,4	0,4	-4	120	100	100				
GFB7447A	-DC, -DP		320	-0,2	8			2	0,8	2,4	0,4	-4	120	100	100				
GFB7448	-DC, -DP		265	-0,2	8			2	0,8	2,4	0,4	-4	667	100	100				
GFB7450	-DC, -DP	10,5	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7451	-DC, -DP	10,5	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7453	-DC, -DP	10,5	23 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7454	-DC, -DP	10,5	23 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15				
GFB7460	-DC, -DP		4 (g)					2	0,8										
GFB7470	-DC, -DP		65 (f)	-0,4	16	20 (r)	0(r)	2	0,8	2,4	0,4	-57	400	50	50	CLOCK	Q or \bar{Q}	35	
GFB7472	-DC, -DP		50	-0,4	16	0 (r)	0(r)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}	20	
GFB7473	-DC, -DP		50	-0,4	16	0 (r)	0(f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}	20	
GFB7474	-DC, -DP		43	-0,4	16	20 (r)	5(r)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}	25	
GFB7475	-DC, -DP	15	160	-0,4	16	20		2	0,8	2,4	0,4	-57	400	30	25	D	Q	20	
GFB7476	-DC, -DP		50	-0,4	16	0(r)	0(f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or \bar{Q}	20	
GFB7480	-DC, -DP		105	-0,4	16			2	0,8	2,4	0,4	-57	400	70	80	A _c	Σ		
GFB7483	-DC, -DP		76		20			2	0,8	2,4	0,4	35	400	30	25	C0	C4		
GFB7485	-DC, -DP		275	-0,4	16			2	0,8	2,4	0,4	-55	400	20	17	A = B	A = B		
GFB7486	-DC, -DP	14	150	-0,8	16			2	0,8	2,4	0,4	-55	400	23	17	A or B	A = B		

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(*) typical value

(2) (r):referred to rising edge
(f):referred to falling edge

(3) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OH}=\max$

(4) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OL}=\max$

(5) at $V_{CC}=\max$

(8) $V_{CC}=\min, V_I=V_{T-}, \min=0,6V, I_{OH}=\max$

(9) $V_{CC}=\min, V_I=V_{T+}, \max=2V, I_{OL}=\max$

(10) Σ or $\bar{\Sigma}$

GF

Basic Characteristics: See page 21

Operating Temp. Range: 0 to 70 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			GFB7490	-DC, -DP	DECADE COUNTERS															
GFB7491A	-DC, -DP	8-BIT SHIFT REGISTERS	224	DC	14	2	DP	14	10											
GFB7492	-DC -DP	DIVIDE-BY-12 COUNTERS	260	DC	14	2	DP	14	10											
GFB7493	-DC -DP	4-BIT BINARY COUNTERS	261	DC	14	2	DP	14	10											
GFB7494	-DC, -DP	4-BIT PARALLEL-IN, SERIAL-OUT SHIFT REGISTER	262	DC	14	2	DP	14	10											
GFB7495A	-DC, -DP	4-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	263	DC	16	2	DP	16	10											
GFB7496	-DC, -DP	5-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	264	DC	14	2	DP	14	10											
GFB74100	-DC, -DP	8-BIT D _g (CLOCKED) LATCH	265	DC	16	2	DP	16	10											
GFB74107	-DC, -DP	DUAL PULSE-TRIGGERED FLIP FLOP	267	DC	24	2	DP	24	3											
GFB74109	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	269	DC	14	2	DP	14	10											
GFB74116	-DC, -DP	DUAL 4-BIT LATCHES WITH CLEAR	270	DC	16	2	DP	16	10											
GFB74121	-DC, -DP	SINGLE MONOSTABLE MULTIVIBRATOR WITH SCHMITT-TRIGGER INPUTS	273	DC	24	2	DP	24	3											
GFB74122	-DC, -DP	SINGLE RETRIGGERABLE MONOSTABLE MULTIVIBRATOR	229	DC	14	2	DP	14	10											
GFB74123	-DC, -DP	DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR	230	DC	14	2	DP	14	10											
GFB74125	-DC, -DP	QUADRUPLER BUS BUFFER	275	DC	14	2	DP	14	10											
GFB74126	-DC, -DP	QUADRUPLER BUS BUFFER	276	DC	14	2	DP	14	10											
GFB74128	-DC, -DP	DUAL 4-INPUT POSITIVE NAND LINE DRIVER	277	DC	14	2	DP	14	10											
GFB74132	-DC, -DP	QUADRUPLER 2-INPUT POSITIVE-NAND SCHMITT-TRIGGER	211A	DC	14	2	DP	14	10											
GFB74145	-DC, -DP	BCD-TO-DECIMAL DECODER/DRIVER	278	DC	14	2	DP	14	10											
GFB74147	-DC, -DP	FULL BCD PRIORITY ENCODER	113	DC	16	2	DP	16	10											
GFB74148	-DC, -DP	CASCADABLE OCTAL PRIORITY ENCODER	282	DC	16	2	DP	16	10											
GFB74150	-DC, -DP	16-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	283	DC	16	2	DP	16	10											
GFB74151A	-DC, -DP	8-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	284	DC	24	2	DP	24	3											
GFB74152A	-DC, -DP	8-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	285	DC	16	2	DP	16	10											
GFB74153	-DC, -DP	DUAL 4-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	286	DC	14	2	DP	14	10											
GFB74154	-DC, -DP	4-LINE-TO-16-LINE DECODER/DEMULTIPLEXER	231	DC	16	2	DP	16	10											
GFB74155	-DC, -DP	DUAL 2-LINE-TO-4-LINE DECODER/DEMULTIPLEXER	287	DC	24	2	DP	24	3											
GFB74156	-DC, -DP	DUAL 2-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	288	DC	16	2	DP	16	10											
GFB74157	-DC, -DP	QUADRUPLER 2-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	288	DC	16	2	DP	16	10											
GFB74160	-DC, -DP	SYNCHRONOUS DECADE COUNTER-POSITIVE-EDGE TRIGGERED	289	DC	16	2	DP	16	10											
GFB74161	-DC, -DP	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFB74162	-DC, -DP	SYNCHRONOUS DECADE COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFB74163	-DC, -DP	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFB74164	-DC, -DP	8-BIT SERIAL-IN, PARALLEL-OUT SHIFT REGISTER	290	DC	16	2	DP	16	10											
GFB74165	-DC, -DP	8-BIT PARALLEL-IN, SERIAL-OUT SHIFT REGISTER	232	DC	14	2	DP	14	10											
GFB74166	-DC, -DP	8-BIT PARALLEL-IN, SERIAL-OUT SHIFT REGISTER	291	DC	16	2	DP	16	10											
GFB74170	-DC, -DP	16-BIT (4x4) REGISTER FILE	292	DC	16	2	DP	16	10											
GFB74173	-DC, -DP	QUADRUPLER BUS-BUFFER REGISTER	294	DC	16	2	DP	16	10											
GFB74174	-DC, -DP	HEX D-TYPE REGISTER	296	DC	16	2	DP	16	10											
GFB74175	-DC, -DP	QUADRUPLER D-TYPE REGISTER	297	DC	16	2	DP	16	10											
GFB74180	-DC, -DP	9-BIT ODD/EVEN PARITY GENERATOR/CHECKER	298	DC	16	2	DP	16	10											
GFB74181	-DC, -DP	4-BIT ARITHMETIC LOGIC UNITS/FUNCTION GENERATOR	302	DC	14	2	DP	14	10											
GFB74182	-DC, -DP	LOOK AHEAD CARRY GENERATOR	303	DC	24	2	DP	24	3											
GFB74190	-DC, -DP	SYNCHRONOUS DECADE UP/DOWN COUNTER-POSITIVE-EDGE TRIGGERED	304	DC	16	2	DP	16	10											
GFB74191	-DC, -DP	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	307	DC	16	2	DP	16	10											
GFB74192	-DC, -DP	SYNCHRONOUS DECADE UP/DOWN COUNTER-POSITIVE-EDGE TRIGGERED	307	DC	16	2	DP	16	10											
GFB74193	-DC, -DP	SYNCHRONOUS DECADE UP/DOWN COUNTER-POSITIVE-EDGE TRIGGERED	308	DC	16	2	DP	16	10											
GFB74194	-DC, -DP	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	308	DC	16	2	DP	16	10											
GFB74195	-DC, -DP	4-BIT BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	309	DC	16	2	DP	16	10											
		4-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	310	DC	16	2	DP	16	10											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"



$V_{CC} = 5V \pm 5\%$

TYPE	t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)						REMARKS
			I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM	TO	f	
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns			MHz	
			typ	typ	max	max	min	min	min	max	min	max		max	max			
GFB7490 -DC, -DP						2	0,8	2,4	0,4	-35'	400	100	100	Ai	C	18		
GFB7491A -DC, -DP		175	-0,4	16	25	0	0,8	2,4	0,4	-57	400	40	40		D	18		
GFB7492 -DC, -DP						2	0,8	2,4	0,4	-35'	400	100	100	CLOCK	D	18		
GFB7493 -DC, -DP						2	0,8	2,4	0,4	-35'	400	135	135	CLOCK	D	18		
GFB7494 -DC, -DP		175	-0,4	16	25	0	0,8	2,4	0,4	-57	400	40	40	CLOCK		10"		
GFB7495A -DC, -DP		195	-0,8	16	10	0	0,8	2,4	0,4	-57	400	27	32	CLOCK		36		
GFB7496 -DC, -DP		240	-0,4	16	30	0	0,8	2,4	0,4	-57	400	40	40	CLOCK				
GFB74100 -DC, -DP	15	320	-0,4	16	20	0	0,8	2,4	0,4	-57	400	30	25	D	Q			
GFB74107 -DC, -DP		50	-0,4	16	0 (r)	0(f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or Q	20	
GFB74109 -DC, -DP		45(f1)	-0,8	16	10 (r)	6(r)	2	0,8	2,4	0,4	-85	400	16	28	CLOCK	Q or Q	33	
GFB74116 -DC, -DP	11	250	-0,8	16	8	8	2	0,8	2,4	0,4	-57	400	30	22	ENABLE	ANY Q		
GFB74121 -DC, -DP		90	-0,4	16			2	0,8	2,4	0,4	-40	400						
GFB74122 -DC, -DP		115	-0,8	16			2	0,8	2,4	0,4	-40	400						
GFB74123 -DC, -DP		230	-0,8	16			2	0,8	2,4	0,4	-40	400						
GFB74125 -DC, -DP	10	40(g)	-5,2	16			2	0,8	2,4	0,4	-70	400	13	18			at $C_L = 50$ pF	
GFB74126 -DC, -DP	10	45(g)	-5,2	16			2	0,8	2,4	0,4	-70	400	13	18			at $C_L = 50$ pF	
GFB74128 -DC, -DP	7	28(g)	-42,4	48			2	0,8	2,4	0,4	-180	133	9	12			at $C_L = 50$ pF	
GFB74132 -DC, -DP	15		-0,8	16			2	0,8	2,4	0,4	-55	400	27	22			at $C_L = 50$ pF	
GFB74145 -DC, -DP		215					2	0,8			100	50	50					
GFB74147 -DC, -DP	10	225	-0,8	16			2	0,8	2,4	0,4 ³	-85	400	14	11	ANY	ANY		
GFB74148 -DC, -DP	10	190	-0,8	16			2	0,8	2,4	0,4	-85	400	13	19	E1	E0		
GFB74150 -DC, -DP	11	200	-0,8	16			2	0,8	2,4	0,4	-55	400	38	38	A,B,C	Y		
GFB74151A -DC, -DP	8	145	-0,8	16			2	0,8	2,4	0,4	-55	400	38	38	A,B,C	Y		
GFB74152A -DC, -DP	8	130	-0,8	16			2	0,8	2,4	0,4	-55	400	38	38	A,B,C	Y		
GFB74153 -DC, -DP	22	180	-0,8	16			2	0,8	2,4	0,4	-57	400	18	23	DATA	Y	at $C_L = 30$ pF	
GFB74154 -DC, -DP	23	170	-0,8	16			2	0,8	2,4	0,4	-57	400	36	33	A,B,C,D	Y		
GFB74154 -DC, -DP	23	170	-0,8	16			2	0,8	2,4	0,4	-57	400	32	32	A or B	Y		
GFB74155 -DC, -DP	21	125	-0,8	16			2	0,8	2,4	0,4	-57	400	34	34	A or B	Y		
GFB74156 -DC, -DP	21	125					2	0,8			400	34	34					
GFB74157 -DC, -DP	9	150	-0,8	16			2	0,8	2,4	0,4	-55	400	14	14	DATA			
GFB74160 -DC, -DP		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32	
GFB74161 -DC, -DP		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32	
GFB74162 -DC, -DP		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32	
GFB74163 -DC, -DP		325	-0,8	16	25	0	2	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32	
GFB74164 -DC, -DP		167	-0,4	8	15	5	2	0,8	2,4	0,4	-27,5	800	27	32	CLOCK	ANY Q	36	
GFB74165 -DC, -DP		210	-0,8	16	45	0	2	0,8	2,4	0,4	-55	400	24	3'	CLOCK	ANY	26	
GFB74166 -DC, -DP		360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK		35	
GFB74170 -DC, -DP		635					2	0,8			400	30	45	DATA				
GFB74173 -DC, -DP	23	250	-5,2	16	10	10	2	0,8	2,4	0,4	-70	400	43	31	CLOCK	ANY Q	35	
GFB74174 -DC, -DP		225	-0,8	16	20	5	2	0,8	2,4	0,4	-57	400	30	30	CLOCK		35	
GFB74175 -DC, -DP		150	-0,8	16	20	5	2	0,8	2,4	0,4	-57	400	30	30	CLOCK		35	
GFB74177 -DC, -DP		170	-0,8	16			2	0,8	2,4	0,4	-55	400	60	68	DATA	Σ EVEN		
GFB74180 -DC, -DP	35	170	-0,8	16			2	0,8	2,4	0,4	-57	400	18	19	C_n	C_n+4		
GFB74181 -DC, -DP		455(b)	-0,8	16			2	0,8	2,4	0,4	-100	400	17	22				
GFB74182 -DC, -DP	13	180(b)	-0,8	16			2	0,8	2,4	0,4	-65	400	42	52	CLOCK	MAX/MIN	25	
GFB74190 -DC, -DP	20	325	-0,8	16	20	0	2	0,8	2,4	0,4	-65	400	42	52	CLOCK	MAX/MIN	25	
GFB74191 -DC, -DP	20	325	-0,8	16	20	0	2	0,8	2,4	0,4	-65	400	40	40	LOAD	Q	32	
GFB74192 -DC, -DP		325	-0,4	16	20	0	2	0,8	2,4	0,4	-65	400	40	40	LOAD	Q	32	
GFB74193 -DC, -DP		325	-0,4	16	20	0	2	0,8	2,4	0,4	-65	400	22	26	CLOCK		36	
GFB74194 -DC, -DP		195	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	22	26	CLOCK		36	
GFB74195 -DC, -DP		195	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	22	26	CLOCK		39	

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge

(3) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OH}=\max$

(4) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OL}=\max$

(5) at V_{CCmax}

(6) $V_{CC}=\min, V_I=V_{T-}, \min=0,6V, I_{OH}=\max$

(9) $V_{CC}=\min, V_I=V_{T+}, \max=2V, I_{OL}=\max$

(') typical value

('') minimum value

GF Basic Characteristics: See page 21
 Operating Temp. Range: 0 to 70 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GFB74196 -DC, -DP	ASYNCHRONOUS DECADE COUNTER-NEGATIVE-EDGE TRIGGERED	311	DC	14	2	DP	14	10								
GFB74197 -DC, -DP	ASYNCHRONOUS 4-BIT BINARY COUNTER-NEGATIVE-EDGE TRIGGERED	311	DC	14	2	DP	14	10											
GFB74198 -DC, -DP	8-BIT BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	312	DC	24	2	DP	24	3											
GFB74199 -DC, -DP	8-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	313	DC	24	2	DP	24	3											
GFB74221 -DC, -DP	DUAL MONOSTABLE MULTIVIBRATORS WITH SCHMITT TRIGGER INPUT	314	DC	16	2	DP	16	10											
GFB74279 -DC, -DP	4-BIT QUADRUPLE S-R LATCH	321	DC	16	2	DP	16	10											
GFB74298 -DC, -DP	QUADRUPLE 2-INPUT MULTIPLIERS WITH STORAGE	327	DC	16	2	DP	16	10											
GFB74365A -DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	329	DC	16	2	DP	16	10											
GFB74366A -DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	330	DC	16	2	DP	16	10											
GFB74367A -DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	331	DC	16	2	DP	16	10											
GFB74368A -DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	332	DC	16	2	DP	16	10											

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

V_{CC} = 5 V ± 5 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS	
			I _{OH}	I _{OL}	t _{set up} (2)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			max	max	min	min	min	max	min	max			max	max				typ
GFB74196 -DC, -DP		240	-0,8	16	20	10	2	0,8	2,4	0,4	-57	400	33	36	LOAD	ANY	70	
GFB74197 -DC, -DP		240	-0,8	16	20	10	2	0,8	2,4	0,4	-57	400	33	36	LOAD	ANY	70	
GFB74198 -DC, -DP		360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK		35	
GFB74199 -DC, -DP		360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK		35	
GFB74221 -DC, -DP		130	-0,8	16	15				2,4	0,4	-55	400						
GFB74279 -DC, -DP	12	90	-0,8	16			2	0,8	2,4	0,4	-57	400	22	15				
GFB74298 -DC, -DP		195	-0,8	16	15	5	2	0,8	2,4	0,4	-57	400	27	32				
GFB74365A -DC, -DP		54(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	16	22			at C _L =50pF	
GFB74366A -DC, -DP		49(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	17	16			at C _L =50pF	
GFB74367A -DC, -DP		54(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	16	22			at C _L =50pF	
GFB74368A -DC, -DP		49(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	17	16			at C _L =50pF	

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge
(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max
(6) typ address time
(7) typ enable time

GF

Basic Characteristics: See page 21

Operating Temp. Range: -55 to 125 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			GFC5400	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND GATE	100A, B, A	DC	14	2	FC	14	2								
GFC5401	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND GATE	100C, B, C	DC	14	2	FC	14	2											
GFC5402	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NOR GATE	211A, B, A	DC	14	2	FC	14	2											
GFC5403	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND GATE	100A	DC	14	2	FC	14	2											
GFC5404	-DC, -FC	HEX INVERTER	212A, B, A	DC	14	2	FC	14	2											
GFC5405	-DC, -FC	HEX INVERTER	212A, B, A	DC	14	2	FC	14	2											
GFC5406	-DC, -FC	HEX INVERTER BUFFER/DRIVER	212A	DC	14	2	FC	14	2											
GFC5407	-DC, -FC	HEX BUFFER/DRIVER	233	DC	14	2	FC	14	2											
GFC5408	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-AND GATE	118	DC	14	2	FC	14	2											
GFC5409	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-AND GATE	118	DC	14	2	FC	14	2											
GFC5410	-DC, -FC	TRIPLE 3-INPUT POSITIVE-NAND GATE	213A, B, A	DC	14	2	FC	14	2											
GFC5412	-DC, -FC	TRIPLE 3-INPUT POSITIVE-NAND GATE	213A, B, A	DC	14	2	FC	14	2											
GFC5413	-DC, -FC	DUAL 4-INPUT POSITIVE-NAND SCHMITT TRIGGER	234	DC	14	2	FC	14	2											
GFC5414	-DC, -FC	HEX SCHMITT TRIGGER INVERTER	235	DC	14	2	FC	14	2											
GFC5416	-DC, -FC	HEX INVERTER BUFFER/DRIVER	212A	DC	14	2	FC	14	2											
GFC5417	-DC, -FC	HEX BUFFER/DRIVER	233	DC	14	2	FC	14	2											
GFC5420	-DC, -FC	DUAL 4-INPUT POSITIVE-NAND GATE	102A, B, A	DC	14	2	FC	14	2											
GFC5423	-DC, -FC	DUAL 4-INPUT POSITIVE-NOR GATE WITH STROBE	236	DC	16	2	FC	16	2											
GFC5425	-DC, -FC	DUAL 4-INPUT POSITIVE-NOR GATE WITH STROBE	237	DC	16	2	FC	16	2											
GFC5426	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND BUFFER	100A	DC	14	2	FC	14	2											
GFC5427	-DC, -FC	TRIPLE 3-INPUT POSITIVE-NOR GATE	238	DC	14	2	FC	14	2											
GFC5428	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NOR BUFFER	211A	DC	14	2	FC	14	2											
GFC5430	-DC, -FC	8-INPUT POSITIVE NAND GATE	103A, B, A	DC	14	2	FC	14	2											
GFC5432	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-OR GATE	239	DC	14	2	FC	14	2											
GFC5433	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NOR BUFFER	211A	DC	14	2	FC	14	2											
GFC5437	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND BUFFER	100A	DC	14	2	FC	14	2											
GFC5438	-DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND BUFFER	100A	DC	14	2	FC	14	2											
GFC5440	-DC, -FC	DUAL 4-INPUT POSITIVE NAND-BUFFER	100A	DC	14	2	FC	14	2											
GFC5442	-DC, -FC	BCD-TO-DECIMAL DECODER	102A, B, A	DC	14	2	FC	14	2											
GFC5443	-DC, -FC	4-LINE-TO-10-LINE, EXCESS-3-TO-DECIMAL DECODER/DEMULTIPLEXER	113	DC	16	2	FC	16	2											
GFC5444	-DC, -FC	4-LINE-TO-10-LINE, EXCESS-3-GRAY-TO-DECIMAL DECODER/DEMULTIPLEXER	113	DC	16	2	FC	16	2											
GFC5445	-DC, -FC	BCD-TO-DECIMAL DECODER/DRIVER	113	DC	16	2	FC	16	2											
GFC5446A	-DC, -FC	BCD-TO-7-SEGMENT DECODER/DRIVER	214	DC	16	2	FC	16	2											
GFC5447A	-DC, -FC	BCD-TO-7-SEGMENT DECODER/DRIVER	214	DC	16	2	FC	16	2											
GFC5448	-DC, -FC	BCD-TO-7-SEGMENT DECODER/DRIVER	214	DC	16	2	FC	16	2											
GFC5450	-DC, -FC	DUAL 2-WIDE AND-OR-INVERT EXPANDABLE GATE	240	DC	16	2	FC	16	2											
GFC5451	-DC, -FC	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	242A, B, A	DC	14	2	FC	14	2											
GFC5453	-DC, -FC	4-WIDE AND-OR-INVERT GATE	243A, B, A	DC	14	2	FC	14	2											
GFC5454	-DC, -FC	4-WIDE 2-INPUT AND-OR-INVERT GATE	244A, B, A	DC	14	2	FC	14	2											
GFC5460	-DC, -FC	DUAL 4-INPUT EXPANDER	245A, B, A	DC	14	2	FC	14	2											
GFC5470	-DC, -FC	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	246A, B, A	DC	14	2	FC	14	2											
GFC5472	-DC, -FC	SINGLE PULSE-TRIGGERED FLIP FLOP	247A, B, A	DC	14	2	FC	14	2											
GFC5473	-DC, -FC	DUAL PULSE-TRIGGERED FLIP FLOP	218A, B, A	DC	14	2	FC	14	2											
GFC5474	-DC, -FC	DUAL D-TYPE FLIP FLOP	219	DC	14	2	FC	14	2											
GFC5475	-DC, -FC	4-BIT DG (CLOCKED) LATCH	220A, B, A	DC	14	2	FC	14	2											
GFC5476	-DC, -FC	DUAL PULSE TRIGGERED FLIP FLOP	248	DC	16	2	FC	16	2											
GFC5480	-DC, -FC	SINGLE 1-BIT GATED FULL ADDER	249	DC	16	2	FC	16	2											
GFC5483	-DC, -FC	4-BIT BINARY FULL ADDER	251A, B, A	DC	14	2	FC	14	2											
GFC5485	-DC, -FC	4-BIT MAGNITUDE COMPARATOR	254	DC	16	2	FC	16	2											
GFC5486	-DC, -FC	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES	256	DC	16	2	FC	16	2											
			257	DC	14	2	FC	14	2											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

V_{CC} = 5 V ± 10 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS			
			I _{OH}	I _{OL}	t _{set up} (2)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (3)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f		
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz		
			max	max	min	min	min	max	min	max			max	max				typ		
GFC5400 -DC, -FC	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5401 -DC, -FC	22	10 (g)		16			2	0,8		0,4		400	45	15						at R _L = 4 kohms
GFC5402 -DC, -FC	10	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5403 -DC, -FC	22	10 (g)		16			2	0,8		0,4		400	45	15						at R _L = 4 kohms
GFC5404 -DC, -FC	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5405 -DC, -FC	22	10 (g)		16			2	0,8		0,4		400	55	15						at R _L = 4 kohms
GFC5406 -DC, -FC	12,5	26 (g)		40			2	0,8		0,7		110	15	23						
GFC5407 -DC, -FC	13	21 (g)		40			2	0,8		0,7		110	10	30						
GFC5408 -DC, -FC	15	19 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	27	19						
GFC5409 -DC, -FC	18,5	19,4		16			2	0,8		0,4		400	32	24						
GFC5410 -DC, -FC	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5412 -DC, -FC	22	10 (g)		16			2	0,8		0,4		400	45	15						at R _L = 4 kohms
GFC5413 -DC, -FC	16,5		-0,8	16					2,4	0,4	-55	400	27	22						
GFC5414 -DC, -FC	15		-0,8	16					2,4	0,4	-55	400	22	22						
GFC5416 -DC, -FC	12,5	26 (g)		40			2	0,8		0,7		110	15	23						
GFC5417 -DC, -FC	13	21 (g)		40			2	0,8		0,7		110	10	30						
GFC5420 -DC, -FC	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5423 -DC, -FC	10,5	23 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5425 -DC, -FC	10,5	23 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5426 -DC, -FC	13,5	10 (g)		16			2	0,8		0,4		1000	24	17						
GFC5427 -DC, -FC	8,5	22 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	11	15						
GFC5428 -DC, -FC	7	28 (g)	-2,4	48			2	0,8	2,4	0,4	-180	133	9	12						at C _L = 50 pF
GFC5430 -DC, -FC	10	10 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5432 -DC, -FC	12	24 (g)	-0,8	16			2	0,8	2,4	0,4	-55	400	15	22						
GFC5433 -DC, -FC	11	28 (g)		48			2	0,8		0,4		133	15	18						at C _L = 50 pF
GFC5437 -DC, -FC	10,5	27 (g)	-1,2	48			2	0,8	2,4	0,4	-70	133	22	18						at C _L = 45 pF
GFC5438 -DC, -FC	12,5	24,4 (g)		48			2	0,8		0,4		133	22	18						at C _L = 45 pF
GFC5440 -DC, -FC	10,5	26 (g)	-1,2	48			2	0,8	2,4	0,4	-70	133	22	15						
GFC5442 -DC, -FC							2	0,8	2,4	0,4	-35'	400	35	35						
GFC5443 -DC, -FC		140	-0,8	16			2	0,8	2,4	0,4	-55	400	30	30						
GFC5444 -DC, -FC		140	-0,8	16			2	0,8	2,4	0,4	-55	400	30	30						
GFC5445 -DC, -FC		215					2	0,8		0,4		100	50	50						
GFC5446A -DC, -FC		320	-0,2	8			2	0,8	2,4	0,4	-4	120	100	100						
GFC5447A -DC, -FC		320	-0,2	8			2	0,8	2,4	0,4	-4	120	100	100						
GFC5448 -DC, -FC		265	-0,2	8			2	0,8	2,4	0,4	-4	667	100	100						
GFC5450 -DC, -FC	10,5	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5451 -DC, -FC	10,5	14 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5453 -DC, -FC	10,5	23 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5454 -DC, -FC	10,5	23 (g)	-0,4	16			2	0,8	2,4	0,4	-55	400	22	15						
GFC5460 -DC, -FC		4 (g)					2	0,8												
GFC5470 -DC, -FC		65 (f1)	-0,4	16	20 (r)	0 (r)	2	0,8	2,4	0,4	-57	400	50	50	CLOCK	Q or Q				35
GFC5472 -DC, -FC		50	-0,4	16	0 (r)	0 (r)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or Q				20
GFC5473 -DC, -FC		50	-0,4	16	0 (r)	0 (f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or Q				20
GFC5474 -DC, -FC		43	-0,4	16	20 (r)	5 (r)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or Q				25
GFC5475 -DC, -FC		160	-0,4	16	20		2	0,8	2,4	0,4	-57	400	30	25	D	Q				
GFC5476 -DC, -FC	15	50	-0,4	16	0 (r)	0 (f)	2	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or Q				20
GFC5480 -DC, -FC		105	-0,4	16			2	0,8	2,4	0,4	-57	400	70	80	A _c	I				
GFC5483 -DC, -FC		76		20			2	0,8	2,4	0,4	35'	400	30	25	C ₀	C ₄				
GFC5485 -DC, -FC		275	-0,4	16			2	0,8	2,4	0,4	-55	400	20	17	A = B	A = B				
GFC5486 -DC, -FC	14	150	-0,8	16			2	0,8	2,4	0,4	-55	400	23	17	A or B					

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge
(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max
(8) V_{CC}=min, V_I=V_T-min=0,6V, I_{OH}=max
(9) V_{CC}=min, V_I=V_T+max=2V, I_{OL}=max
(10) E or Ē

GF

Basic Characteristics: See page 21

Operating Temp. Range: -55 to 125 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GFC5490 -DC, -FC	DECADE COUNTERS	224	DC	14	2	DP	14	10								
GFC5491A -DC, -FC	8-BIT SHIFT REGISTERS	260	DC	14	2	DP	14	10											
GFC5492 -DC, -FC	DIVIDE-BY-12 COUNTERS	261	DC	14	2	DP	14	10											
GFC5493 -DC, -FC	4-BIT BINARY COUNTERS	262	DC	14	2	DP	14	10											
GFC5494 -DC, -FC	4-BIT PARALLEL-IN, SERIAL-OUT SHIFT REGISTER	263	DC	16	2	DP	16	10											
GFC5495A -DC, -FC	4-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	264	DC	14	2	DP	14	10											
GFC5496 -DC, -FC	5-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	265	DC	16	2	DP	16	10											
GFC54100 -DC, -FC	8-BIT D ₀ (CLOCKED) LATCH	267	DC	24	2	DP	24	3											
GFC54107 -DC, -FC	DUAL PULSE-TRIGGERED FLIP FLOP	269	DC	14	2	DP	14	10											
GFC54109 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	270	DC	16	2	DP	16	10											
GFC54116 -DC, -FC	DUAL 4-BIT LATCHES WITH CLEAR	273	DC	24	2	DP	24	3											
GFC54121 -DC, -FC	SINGLE MONOSTABLE MULTIVIBRATOR WITH SCHMITT-TRIGGER INPUTS	229	DC	14	2	DP	14	10											
GFC54122 -DC, -FC	SINGLE RETRIGGERABLE MONOSTABLE MULTIVIBRATOR	230	DC	14	2	DP	14	10											
GFC54123 -DC, -FC	DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR	275	DC	14	2	DP	14	10											
GFC54125 -DC, -FC	QUADRUPLE BUS BUFFER	276	DC	14	2	DP	14	10											
GFC54126 -DC, -FC	QUADRUPLE BUS BUFFER	277	DC	14	2	DP	14	10											
GFC54128 -DC, -FC	DUAL 4-INPUT POSITIVE NAND LINE DRIVER	211A	DC	14	2	DP	14	10											
GFC54132 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT-TRIGGER	278	DC	14	2	DP	14	10											
GFC54145 -DC, -FC	BCD-TO-DECIMAL DECODER/DRIVER	113	DC	16	2	DP	16	10											
GFC54147 -DC, -FC	FULL BCD PRIORITY ENCODER	282	DC	16	2	DP	16	10											
GFC54148 -DC, -FC	CASCADABLE OCTAL PRIORITY ENCODER	283	DC	16	2	DP	16	10											
GFC54150 -DC, -FC	16-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	284	DC	24	2	DP	24	3											
GFC54151A -DC, -FC	8-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	285	DC	16	2	DP	16	10											
GFC54152A -DC, -FC	8-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	286	DC	14	2	DP	14	10											
GFC54153 -DC, -FC	DUAL 4-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	231	DC	16	2	DP	16	10											
GFC54154 -DC, -FC	4-LINE-TO-16-LINE DECODER/DEMULTIPLEXER	287	DC	24	2	DP	24	3											
GFC54155 -DC, -FC	DUAL 2-LINE-TO-4-LINE DECODER/DEMULTIPLEXER	288	DC	16	2	DP	16	10											
GFC54156 -DC, -FC	DUAL 2-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	288	DC	16	2	DP	16	10											
GFC54157 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE 2-STATE DATA SELECTOR/MULTIPLEXER	289	DC	16	2	DP	16	10											
GFC54160 -DC, -FC	SYNCHRONOUS DECADE COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFC54161 -DC, -FC	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFC54162 -DC, -FC	SYNCHRONOUS DECADE COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFC54163 -DC, -FC	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	290	DC	16	2	DP	16	10											
GFC54164 -DC, -FC	8-BIT SERIAL-IN, PARALLEL-OUT SHIFT REGISTER	232	DC	14	2	DP	14	10											
GFC54165 -DC, -FC	8-BIT PARALLEL-IN, SERIAL-OUT SHIFT REGISTER	291	DC	16	2	DP	16	10											
GFC54166 -DC, -FC	8-BIT PARALLEL-IN, SERIAL-OUT SHIFT REGISTER	292	DC	16	2	DP	16	10											
GFC54170 -DC, -FC	16-BIT (4x4) REGISTER FILE	294	DC	16	2	DP	16	10											
GFC54173 -DC, -FC	QUADRUPLE BUS-BUFFER REGISTER	296	DC	16	2	DP	16	10											
GFC54174 -DC, -FC	HEX D-TYPE REGISTER	297	DC	16	2	DP	16	10											
GFC54175 -DC, -FC	QUADRUPLE D-TYPE REGISTER	298	DC	16	2	DP	16	10											
GFC54180 -DC, -FC	9-BIT ODD/EVEN PARITY GENERATOR/CHECKER	302	DC	14	2	DP	14	10											
GFC54181 -DC, -FC	4-BIT ARITHMETIC LOGIC UNITS/FUNCTION GENERATOR	303	DC	24	2	DP	24	3											
GFC54182 -DC, -FC	LOOK AHEAD CARRY GENERATOR	304	DC	16	2	DP	16	10											
GFC54190 -DC, -FC	SYNCHRONOUS DECADE UP/DOWN COUNTER-POSITIVE-EDGE TRIGGERED	307	DC	16	2	DP	16	10											
GFC54191 -DC, -FC	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	307	DC	16	2	DP	16	10											
GFC54192 -DC, -FC	SYNCHRONOUS DECADE UP/DOWN COUNTER-POSITIVE-EDGE TRIGGERED	308	DC	16	2	DP	16	10											
GFC54193 -DC, -FC	SYNCHRONOUS 4-BIT BINARY COUNTER-POSITIVE-EDGE TRIGGERED	308	DC	16	2	DP	16	10											
GFC54194 -DC, -FC	4-BIT BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	309	DC	16	2	DP	16	10											
GFC54195 -DC, -FC	4-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	310	DC	16	2	DP	16	10											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"



V_{CC} = 5 V ± 10 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS	
			I _{OH}	I _{OL}	t _{set up} (?)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			typ	typ	max	max	min	min	max	min	max		max	max				typ
GFC5490 -DC, -FC						2	0,8	2,4	0,4	-35'	400	100	100	Ai	C	18		
GFC5491A -DC, -FC		175	-0,4	16	25	0	0,8	2,4	0,4	-57	400	40	40		D	18		
GFC5492 -DC, -FC				16			0,8	2,4	0,4	-35'	400	100	100	CLOCK	D	18		
GFC5493 -DC, -FC				16			0,8	2,4	0,4	-35'	400	135	135	CLOCK	D	18		
GFC5494 -DC, -FC		175	-0,4	16	25	0	0,8	2,4	0,4	-57	400	40	40	CLOCK		10"		
GFC5495A -DC, -FC		195	-0,8	16	10	0	0,8	2,4	0,4	-57	400	27	32	CLOCK		36		
GFC5496 -DC, -FC		240	-0,4	16	30	0	0,8	2,4	0,4	-57	400	40	40	CLOCK				
GFC54100 -DC, -FC	15	320	-0,4	16	20	0	0,8	2,4	0,4	-57	400	30	25	D	Q			
GFC54107 -DC, -FC		50	-0,4	16	0 (r)	0 (f)	0,8	2,4	0,4	-57	400	25	40	CLOCK	Q or Q	20		
GFC54109 -DC, -FC		45 (f)	-0,8	16	10 (r)	6 (r)	0,8	2,4	0,4	-85	400	16	28	CLOCK	Q or Q	33		
GFC54116 -DC, -FC	11	250	-0,8	16	8	8	0,8	2,4	0,4	-57	400	30	22	ENABLE	ANY Q			
GFC54121 -DC, -FC		90	-0,4	16			0,8	2,4	0,4	-55	400							
GFC54122 -DC, -FC		115	-0,8	16			0,8	2,4	0,4	-40	400							
GFC54123 -DC, -FC		230	-0,8	16			0,8	2,4	0,4	-40	400							
GFC54125 -DC, -FC	10	40 (g)	-5,2	16			0,8	2,4	0,4	-70	400	13	18				at C _L = 50 pF	
GFC54126 -DC, -FC	10	45 (g)	-5,2	16			0,8	2,4	0,4	-70	400	13	18				at C _L = 50 pF	
GFC54128 -DC, -FC	7	28 (g)	-42,4	48			0,8	2,4	0,4	-180	133	9	12				at C _L = 50 pF	
GFC54132 -DC, -FC	15		-0,8	16			0,8	2,4	0,4	-55	400	27	22				at C _L = 50 pF	
GFC54145 -DC, -FC		215		16			0,8	2,4	0,4		100	50	50					
GFC54147 -DC, -FC	10	225	-0,8	16			0,8	2,4	0,4	-85	400	14	11	ANY	ANY			
GFC54148 -DC, -FC	10	190	-0,8	16			0,8	2,4	0,4	-85	400	13	19	E ₁	E ₀			
GFC54150 -DC, -FC	11	200	-0,8	16			0,8	2,4	0,4	-55	400	38	38	A, B, C	Y			
GFC54151A -DC, -FC	8	145	-0,8	16			0,8	2,4	0,4	-55	400	38	38	A, B, C	Y			
GFC54152A -DC, -FC	8	130	-0,8	16			0,8	2,4	0,4	-55	400	38	38	A, B, C	Y		at C _L = 30 pF	
GFC54153 -DC, -FC	22	180	-0,8	16			0,8	2,4	0,4	-57	400	18	23	DATA	Y			
GFC54154 -DC, -FC	23	170	-0,8	16			0,8	2,4	0,4	-57	400	36	33	A, B, C, D	Y			
GFC54155 -DC, -FC	21	125	-0,8	16			0,8	2,4	0,4	-57	400	32	32	A or B	Y			
GFC54156 -DC, -FC	21	125		16			0,8	2,4	0,4		400	34	34	A or B	Y			
GFC54157 -DC, -FC	9	150	-0,8	16			0,8	2,4	0,4	-55	400	14	14	DATA	Y			
GFC54160 -DC, -FC		325	-0,8	16	25	0	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32		
GFC54161 -DC, -FC		325	-0,8	16	25	0	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32		
GFC54162 -DC, -FC		325	-0,8	16	25	0	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32		
GFC54163 -DC, -FC		325	-0,8	16	25	0	0,8	2,4	0,4	-57	400	20	23	CLOCK	ANY Q	32		
GFC54164 -DC, -FC		167	-0,4	8	15	5	0,8	2,4	0,4	-27,5	800	27	32	CLOCK	ANY Q	36		
GFC54165 -DC, -FC		210	-0,8	16	45	0	0,8	2,4	0,4	-55	400	24	3'	CLOCK	ANY	26		
GFC54166 -DC, -FC		360	-0,8	16	20	0	0,8	2,4	0,4	-57	400	30	26	CLOCK	ANY	35		
GFC54170 -DC, -FC		635		16	10		0,8	2,4	0,4		400	30	45	DATA	ANY Q			
GFC54173 -DC, -FC	3	250	-5,2	16	10	10	0,8	2,4	0,4	-70	400	43	31	CLOCK	ANY Q	35	at C _L = 50 pF	
GFC54174 -DC, -FC		225	-0,8	16	20	5	0,8	2,4	0,4	-57	400	30	30	CLOCK	ANY Q	35		
GFC54175 -DC, -FC		150	-0,8	16	20	5	0,8	2,4	0,4	-57	400	30	30	CLOCK	ANY Q	35		
GFC54180 -DC, -FC	5	170	-0,8	16			0,8	2,4	0,4	-55	400	60	68	DATA	Σ EVEN			
GFC54181 -DC, -FC		455(b)	-0,8	16			0,8	2,4	0,4	-57	400	18	19	C _n	C _{n+4}			
GFC54182 -DC, -FC	3	180(b)	-0,8	16			0,8	2,4	0,4	-100	400	17	22					
GFC54190 -DC, -FC	0	325	-0,8	16	20	0	0,8	2,4	0,4	-65	400	42	52	CLOCK	MAX/MIN	25		
GFC54191 -DC, -FC	0	325	-0,8	16	20	0	0,8	2,4	0,4	-65	400	42	52	CLOCK	MAX/MIN	25		
GFC54192 -DC, -FC		325	-0,4	16	20	0	0,8	2,4	0,4	-65	400	40	40	LOAD	Q	32		
GFC54193 -DC, -FC		325	-0,4	16	20	0	0,8	2,4	0,4	-65	400	40	40	LOAD	Q	32		
GFC54194 -DC, -FC		195	-0,8	16	20	0	0,8	2,4	0,4	-57	400	22	26	CLOCK		36		
GFC54195 -DC, -FC		195	-0,8	16	20	0	0,8	2,4	0,4	-57	400	22	26	CLOCK		39		

NOTES : (1) P: Power dissipation
 b: per bit
 fl: per flip-flop
 g: per gate

(2) (r): referred to rising edge
 (f): referred to falling edge
 (3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
 (4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max
 (8) V_{CC}=min, V_I=V_{T_min}=0,6V, I_{OH}=max
 (9) V_{CC}=min, V_I=V_{T+}max=2V, I_{OL}=max
 (*) typical value
 (**) minimum value

GF

Basic Characteristics: See page 21
 Operating Temp. Range: -55 to 125 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
GFC54196 -DC, -FC	ASYNCHRONOUS DECADE COUNTER-NEGATIVE-EDGE TRIGGERED	311	DC	14	2	FC	14	2										
GFC54197 -DC, -FC	ASYNCHRONOUS 4-BIT BINARY COUNTER-NEGATIVE-EDGE TRIGGERED	311	DC	14	2	FC	14	2										
GFC54198 -DC, -FC	8-BIT BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	312	DC	24	2	FC	24	1										
GFC5199 -DC, -FC	8-BIT PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	313	DC	24	2	FC	24	1										
GFC54221 -DC, -FC	DUAL MONOSTABLE MULTIVIBRATORS WITH SCHMITT TRIGGER INPUT	314	DC	16	2	FC	16	2										
GFC54279 -DC, -FC	4-BIT QUADRUPLE S-R LATCH	321	DC	16	2	FC	16	2										
GFC54298 -DC, -FC	QUADRUPLE 2-INPUT MULTIPLIERS WITH STORAGE	327	DC	16	2	FC	16	2										
GFC54365A -DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	329	DC	16	2	FC	16	2										
GFC54366A -DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	330	DC	16	2	FC	16	2										
GFC54367A -DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	331	DC	16	2	FC	16	2										
GFC54368A -DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	332	DC	16	2	FC	16	2										

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

V_{CC} = 5 V ± 10 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS	
			I _{OH}	I _{OL}	t _{set up} (⁺)	t _{hold} (⁻)	V _{IH}	V _{IL}	V _{OH} (⁺)	V _{OL} (⁻)	I _{OS} (⁺)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			typ	typ	max	max	min	min	min	max	min	max		max	max			
GFC54196 -DC, -FC		240	-0,8	16	20	10	2	0,8	2,4	0,4	-57	400	33	36	LOAD	ANY	70	
GFC54197 -DC, -FC		240	-0,8	16	20	10	2	0,8	2,4	0,4	-57	400	33	36	LOAD	ANY	70	
GFC54198 -DC, -FC		360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK		35	
GFC5199 -DC, -FC		360	-0,8	16	20	0	2	0,8	2,4	0,4	-57	400	30	26	CLOCK		35	
GFC54221 -DC, -FC		130	-0,8	16	15				2,4	0,4	-55	400						
GFC54279 -DC, -FC	12	90	-0,8	16			2	0,8	2,4	0,4	-57	400	22	15				
GFC54298 -DC, -FC		195	-0,8	16	15	5	2	0,8	2,4	0,4	-57	400	27	32				
GFC54365A -DC, -FC		54(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	16	22				
GFC54366A -DC, -FC		49(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	17	16				
GFC54367A -DC, -FC		54(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	16	22				
GFC54368A -DC, -FC		49(g)	-5,2	32			2	0,8	2,4	0,4	-130	400	17	16				

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge

(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max

(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max

(6) typ address time

(7) typ enable time

GJ

Basic Characteristics: See page 21

Operating Temp. Range: 0 to 70 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GJB74H00	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A,B,A	DC	14	2	DP	14	10							
GJB74H01	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A,B,A	DC	14	2	DP	14	10										
GJB74H04	-DC, -DP	HEX INVERTER	212A,B,A	DC	14	2	DP	14	10										
GJB74H05	-DC, -DP	HEX INVERTER	212A,B,A	DC	14	2	DP	14	10										
GJB74H10	-DC, -DP	TRIPLE 3-INPUT POSITIVE NAND GATE	213A,B,A	DC	14	2	DP	14	10										
GJB74H11	-DC, -DP	TRIPLE 3-INPUT POSITIVE AND GATE	337A,B,A	DC	14	2	DP	14	10										
GJB74H20	-DC, -DP	DUAL 4-INPUT POSITIVE NAND GATE	102A,B,A	DC	14	2	DP	14	10										
GJB74H21	-DC, -DP	DUAL 4-INPUT POSITIVE AND GATE	338A,B,A	DC	14	2	DP	14	10										
GJB74H22	-DC, -DP	DUAL 4-INPUT POSITIVE NAND GATE	102A,B,A	DC	14	2	DP	14	10										
GJB74H30	-DC, -DP	8-INPUT POSITIVE NAND GATE	103A,B,A	DC	14	2	DP	14	10										
GJB74H40	-DC, -DP	DUAL 4-INPUT NAND POSITIVE BUFFER	102A,B,A	DC	14	2	DP	14	10										
GJB74H50	-DC, -DP	DUAL 2-WIDE AND-OR-INVERT EXPANDABLE GATE	242A,B,A	DC	14	2	DP	14	10										
GJB74H51	-DC, -DP	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	243A,B,A	DC	14	2	DP	14	10										
GJB74H52	-DC, -DP	4-WIDE AND-OR EXPANDABLE GATE	340A,B,A	DC	14	2	DP	14	10										
GJB74H53	-DC, -DP	4-WIDE AND-OR-INVERT GATE	339A,B,A	DC	14	2	DP	14	10										
GJB74H54	-DC, -DP	4-WIDE 2-2-3-2-INPUT AND-OR-INVERT GATE	341A,B,A	DC	14	2	DP	14	10										
GJB74H55	-DC, -DP	2-WIDE AND-OR-INVERT GATE	342A,B,A	DC	14	2	DP	14	10										
GJB74H60	-DC, -DP	DUAL 4-INPUT EXPANDER	246A,B,A	DC	14	2	DP	14	10										
GJB74H61	-DC, -DP	TRIPLE 3-INPUT EXPANDER	343A,B,A	DC	14	2	DP	14	10										
GJB74H62	-DC, -DP	3-2-2-3-INPUT AND-OR EXPANDER	344A,B,A	DC	14	2	DP	14	10										
GJB74H71	-DC, -DP	SINGLE PULSE-TRIGGERED FLIP FLOP	345A,B,A	DC	14	2	DP	14	10										
GJB74H72	-DC, -DP	SINGLE PULSE-TRIGGERED FLIP FLOP	218A,B,A	DC	14	2	DP	14	10										
GJB74H73	-DC, -DP	DUAL PULSE-TRIGGERED FLIP FLOP	219	DC	14	2	DP	14	10										
GJB74H74	-DC, -DP	D-TYPE FLIP FLOP	220A,B,A	DC	14	2	DP	14	10										
GJB74H76	-DC, -DP	DUAL PULSE-TRIGGERED FLIP FLOP	249	DC	16	2	DP	16	10										
GJB74H101	-DC, -DP	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	347A,B,A	DC	14	2	DP	14	10										
GJB74H102	-DC, -DP	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	218A,B,A	DC	14	2	DP	14	10										
GJB74H103	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	219	DC	14	2	DP	14	10										
GJB74H106	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	249	DC	16	2	DP	16	10										
GJB74H108	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	348	DC	16	2	DP	16	10										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

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ELECTRICAL DATA : next page. PARAMETRES ELECTRIQUES : page suivante

ELEKTRISCHE DATEN : rechte Seite



$V_{CC} = 5V \pm 5\%$

TYPE	t_{pd}	RECOMMENDED OPERATING COND.					ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS		
		P (1)		I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM		TO	f
		ns	mW	mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
		typ	typ	max	max	min	min	min	max	min	max			max	max				typ
GJB74H00 -DC, -DP	6	22 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10					
GJB74H01 -DC, -DP	8	22 (g)		20			2	0,8		0,4		280	15	12					
GJB74H04 -DC, -DP	6	22 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10					
GJB74H05 -DC, -DP	8	22 (g)		20			2	0,8		0,4		280	15	12					
GJB74H10 -DC, -DP	6	22 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10					
GJB74H11 -DC, -DP	8,2	40 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	12	12					
GJB74H20 -DC, -DP	6	22 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10					
GJB74H21 -DC, -DP	8,2	40 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	12	12					
GJB74H22 -DC, -DP	8	22 (g)		20			2	0,8		0,4		280	15	12					
GJB74H30 -DC, -DP	6	22 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	12					
GJB74H40 -DC, -DP	7,5	44 (g)	-1,5	60			2	0,8	2,4	0,4	-125	93	12	12					
GJB74H50 -DC, -DP	6,5	29 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11					
GJB74H51 -DC, -DP	6,5	29 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11					
GJB74H52 -DC, -DP	9,9	88 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	15	15					
GJB74H53 -DC, -DP	6,6	41 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11					
GJB74H54 -DC, -DP	6,6	41 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11					
GJB74H55 -DC, -DP	6,8	36 (g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11					
GJB74H60 -DC, -DP		6 (g)					2	0,8											
GJB74H61 -DC, -DP		13 (g)					2	0,8											
GJB74H62 -DC, -DP		25 (g)					2	0,8											
GJB74H71 -DC, -DP		80 (f1)	-0,5	20	0 (r)	0 (f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q ⁻	30		
GJB74H72 -DC, -DP		80 (f1)	-0,5	20	0 (r)	0 (f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q ⁻	30		
GJB74H73 -DC, -DP		80 (f1)	-0,5	20	0 (r)	0 (f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q ⁻	30		
GJB74H74 -DC, -DP		80 (f1)	-0,5	20	0 (r)	0 (f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q ⁻	43		
GJB74H76 -DC, -DP		80 (f1)	-0,5	20	0 (r)	0 (f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q ⁻	30		
GJB74H101 -DC, -DP		100 (f1)	-0,5	20	13 (f)	0 (f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q ⁻	50		
GJB74H102 -DC, -DP		100 (f1)	-0,5	20	13 (f)	0 (f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q ⁻	50		
GJB74H103 -DC, -DP		100 (f1)	-0,5	20	13 (f)	0 (f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q ⁻	50		
GJB74H106 -DC, -DP		100 (f1)	-0,5	20	13 (f)	0 (f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q ⁻	50		
GJB74H108 -DC, -DP		100 (f1)	-0,5	20	13 (f)	0 (f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q ⁻	50		

NOTES : (1) P: Power dissipation
b: per bit
fl: per flip-flop
g: per gate

(2) (r): referred to rising edge
(f): referred to falling edge

(5) at V_{CCmax}

(3) at $V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max$

(6) typ address time

(4) at $V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max$

(7) typ enable time

GJ

Basic Characteristics: See page 21

Operating Temp. Range: -55 to 125 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GJC54H00	-DC, -FC	QUADRUPL 2-INPUT POSITIVE NAND GATE	100A,B,A	DC	14	2	FC	14	2							
GJC54H01	-DC, -FC	QUADRUPL 2-INPUT POSITIVE NAND GATE	100A,B,A	DC	14	2	FC	14	2										
GJC54H04	-DC, -FC	HEX INVERTER	212A,B,A	DC	14	2	FC	14	2										
GJC54H05	-DC, -FC	HEX INVERTER	212A,B,A	DC	14	2	FC	14	2										
GJC54H10	-DC, -FC	TRIPLE 3-INPUT POSITIVE NAND GATE	213A,B,A	DC	14	2	FC	14	2										
GJC54H11	-DC, -FC	TRIPLE 3-INPUT POSITIVE AND GATE	337A,B,A	DC	14	2	FC	14	2										
GJC54H20	-DC, -FC	DUAL 4-INPUT POSITIVE NAND GATE	102A,B,A	DC	14	2	FC	14	2										
GJC54H21	-DC, -FC	DUAL 4-INPUT POSITIVE AND GATE	338A,B,A	DC	14	2	FC	14	2										
GJC54H22	-DC, -FC	DUAL 4-INPUT POSITIVE NAND GATE	102A,B,A	DC	14	2	FC	14	2										
GJC54H30	-DC, -FC	8-INPUT POSITIVE NAND GATE	103A,B,A	DC	14	2	FC	14	2										
GJC54H40	-DC, -FC	DUAL 4-INPUT NAND POSITIVE BUFFER	102A,B,A	DC	14	2	FC	14	2										
GJC54H50	-DC, -FC	DUAL 2-WIDE AND-OR-INVERT EXPANDABLE GATE	242A,B,A	DC	14	2	FC	14	2										
GJC54H51	-DC, -FC	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	243A,B,A	DC	14	2	FC	14	2										
GJC54H52	-DC, -FC	4-WIDE AND-OR EXPANDABLE GATE	340A,B,A	DC	14	2	FC	14	2										
GJC54H53	-DC, -FC	4-WIDE AND-OR-INVERT GATE	339A,B,A	DC	14	2	FC	14	2										
GJC54H54	-DC, -FC	4-WIDE 2-2-3-2-INPUT AND-OR-INVERT GATE	341A,B,A	DC	14	2	FC	14	2										
GJC54H55	-DC, -FC	2-WIDE AND-OR-INVERT GATE	342A,B,A	DC	14	2	FC	14	2										
GJC54H60	-DC, -FC	DUAL 4-INPUT EXPANDER	246A,B,A	DC	14	2	FC	14	2										
GJC54H61	-DC, -FC	TRIPLE 3-INPUT EXPANDER	343A,B,A	DC	14	2	FC	14	2										
GJC54H62	-DC, -FC	3-2-2-3-INPUT AND-OR EXPANDER	344A,B,A	DC	14	2	FC	14	2										
GJC54H71	-DC, -FC	SINGLE PULSE-TRIGGERED FLIP FLOP	345A,B,A	DC	14	2	FC	14	2										
GJC54H72	-DC, -FC	SINGLE PULSE-TRIGGERED FLIP FLOP	218A,B,A	DC	14	2	FC	14	2										
GJC54H73	-DC, -FC	DUAL PULSE-TRIGGERED FLIP FLOP	219	DC	14	2	FC	14	2										
GJC54H74	-DC, -FC	D-TYPE FLIP FLOP	220A,B,A	DC	14	2	FC	14	2										
GJC54H76	-DC, -FC	DUAL PULSE-TRIGGERED FLIP FLOP	249	DC	16	2	FC	16	2										
GJC54H101	-DC, -FC	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	347A,B,A	DC	14	2	FC	14	2										
GJC54H102	-DC, -FC	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	218A,B,A	DC	14	2	FC	14	2										
GJC54H103	-DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	219	DC	14	2	FC	14	2										
GJC54H106	-DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	249	DC	16	2	FC	16	2										
GJC54H108	-DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	348	DC	16	2	FC	16	2										

NOTES : (1) Shape and material, see outlines code

(2) Number of connections

(3) Drawing serial number, see Chapter "Outlines"



TYPE	t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS	
			I_{OH}	I_{OL}	$t_{set up}$ (?)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			typ	typ	max	max	min	min	min	max	min	max		max	max			
GJC54H00 -DC, -FC	6	22(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10				
GJC54H01 -DC, -FC	8	22(g)		20			2	0,8		0,4		280	15	12				
GJC54H04 -DC, -FC	6	22(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10				
GJC54H05 -DC, -FC	8	22(g)		20			2	0,8		0,4		280	15	12				
GJC54H10 -DC, -FC	6	22(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10				
GJC54H11 -DC, -FC	8,2	40(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	12	12				
GJC54H20 -DC, -FC	6	22(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	10				
GJC54H21 -DC, -FC	8,2	40(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	12	12				
GJC54H22 -DC, -FC	8	22(g)		20			2	0,8		0,4		280	15	12				
GJC54H30 -DC, -FC	6	22(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	10	12				
GJC54H40 -DC, -FC	7,5	44(g)	-1,5	60			2	0,8	2,4	0,4	-125	93	12	12				
GJC54H50 -DC, -FC	6,5	29(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11				
GJC54H51 -DC, -FC	6,5	29(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11				
GJC54H52 -DC, -FC	9,9	88(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	15	15				
GJC54H53 -DC, -FC	6,6	41(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11				
GJC54H54 -DC, -FC	6,6	41(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11				
GJC54H55 -DC, -FC	6,8	36(g)	-0,5	20			2	0,8	2,4	0,4	-100	280	11	11				
GJC54H60 -DC, -FC		6(g)					2	0,8										
GJC54H61 -DC, -FC		13(g)					2	0,8										
GJC54H62 -DC, -FC		25(g)					2	0,8										
GJC54H71 -DC, -FC		80(f1)	-0,5	20	0 (r)	0(f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q	30	
GJC54H72 -DC, -FC		80(f1)	-0,5	20	0 (r)	0(f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q	30	
GJC54H73 -DC, -FC		80(f1)	-0,5	20	0 (r)	0(f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q	30	
GJC54H74 -DC, -FC		75(f1)	-1	20	15 (r)	5(f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q	43	
GJC54H76 -DC, -FC		80(f1)	-0,5	20	0 (r)	0(f)	2	0,8	2,4	0,4	-100	280	21	27	CLOCK	Q or Q	30	
GJC54H101 -DC, -FC		100(f1)	-0,5	20	13 (f)	0(f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q	50	
GJC54H102 -DC, -FC		100(f1)	-0,5	20	13 (f)	0(f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q	50	
GJC54H103 -DC, -FC		100(f1)	-0,5	20	13 (f)	0(f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q	50	
GJC54H106 -DC, -FC		100(f1)	-0,5	20	13 (f)	0(f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q	50	
GJC54H108 -DC, -FC		100(f1)	-0,5	20	13 (f)	0(f)	2	0,8	2,4	0,4	-100	280	15	20	CLOCK	Q or Q	50	

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge
(3) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OH}=\max$
(4) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OL}=\max$

(5) at V_{CCmax}
(6) typ address time
(7) typ enable time

GM

Basic Characteristics: See page 21
 Operating Temp. Range: 0 to 70 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GMB74LS00	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	DP	14	10							
GMB74LS01	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100C	DC	14	2	DP	14	10										
GMB74LS02	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NOR GATE	211A	DC	14	2	DP	14	10										
GMB74LS03	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	DP	14	10										
GMB74LS04	-DC, -DP	HEX INVERTER	212A	DC	14	2	DP	14	10										
GMB74LS05	-DC, -DP	HEX INVERTER	212A	DC	14	2	DP	14	10										
GMB74LS08	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE AND GATE	118	DC	14	2	DP	14	10										
GMB74LS09	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE AND GATE	118	DC	14	2	DP	14	10										
GMB74LS10	-DC, -DP	TRIPLE 3-INPUT POSITIVE NAND GATE	213A	DC	14	2	DP	14	10										
GMB74LS11	-DC, -DP	TRIPLE 3-INPUT POSITIVE AND GATE	230	DC	14	2	DP	14	10										
GMB74LS12	-DC, -DP	TRIPLE 3-INPUT POSITIVE NAND GATE WITH OPEN-COLLECTOR OUTPUT	213A	DC	14	2	DP	14	10										
GMB74LS13	-DC, -DP	SCHMITT-TRIGGER POSITIVE NAND GATE AND INVERTER	234	DC	14	2	DP	14	10										
GMB74LS14	-DC, -DP	SCHMITT-TRIGGER POSITIVE NAND GATE AND INVERTER	235	DC	14	2	DP	14	10										
GMB74LS15	-DC, -DP	TRIPLE 2-INPUT POSITIVE AND GATE	337A	DC	14	2	DP	14	10										
GMB74LS20	-DC, -DP	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	DP	14	10										
GMB74LS21	-DC, -DP	DUAL 4-INPUT POSITIVE AND GATE	338A	DC	14	2	DP	14	10										
GMB74LS22	-DC, -DP	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	DP	14	10										
GMB74LS26	-DC, -DP	QUADRUPLE 2-INPUT HIGH-VOLTAGE INTERFACE POSITIVE NAND GATE	100A	DC	14	2	DP	14	10										
GMB74LS28	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NOR BUFFER	211A	DC	14	2	DP	14	10										
GMB74LS30	-DC, -DP	8-INPUT POSITIVE NAND GATE	103A	DC	14	2	DP	14	10										
GMB74LS32	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE OR GATE	239	DC	14	2	DP	14	10										
GMB74LS33	-DC, -DP	QUADRUPLE 2-INPUT POSITIVE NOR GATE	211A	DC	14	2	DP	14	10										
GMB74LS42	-DC, -DP	4-LINE-TO-LINE, BCD-TO-DECIMAL	113	DC	16	2	DP	16	10										
GMB74LS51	-DC, -DP	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	215A	DC	14	2	DP	14	10										
GMB74LS54	-DC, -DP	4-WIDE AND-OR-INVERT GATE	216A	DC	14	2	DP	14	10										
GMB74LS55	-DC, -DP	4-WIDE 4-INPUT AND-OR-INVERT GATE	217A	DC	14	2	DP	14	10										
GMB74LS73	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	219	DC	14	2	DP	14	10										
GMB74LS74A	-DC, -DP	D-TYPE FLIP FLOP	220A	DC	14	2	DP	14	10										
GMB74LS75	-DC, -DP	4-BIT BISTABLE LATCHES	248	DC	16	2	DP	16	10										
GMB74LS76	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	249	DC	16	2	DP	16	10										
GMB74LS78	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	221B	DC	14	2	DP	14	10										
GMB74LS83A	-DC, -DP	SINGLE 4-BIT FULL ADDER	254	DC	16	2	DP	16	10										
GMB74LS85	-DC, -DP	4-BIT MAGNITUDE COMPARATOR	222	DC	16	2	DP	16	10										
GMB74LS86	-DC, -DP	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE	257	DC	14	2	DP	14	10										
GMB74LS90	-DC, -DP	DECADE COUNTER	224	DC	14	2	DP	14	10										
GMB74LS92	-DC, -DP	DEVIDE-BY-12 COUNTER	261	DC	14	2	DP	14	10										
GMB74LS93	-DC, -DP	4-BIT BINARY COUNTER	262	DC	14	2	DP	14	10										
GMB74LS95B	-DC, -DP	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	264	DC	14	2	DP	14	10										
GMB74LS107	-DC, -DP	DUAL J-K NEGATIVE-EDGE-TRIGGERED FLIP FLOP	269	DC	14	2	DP	14	10										
GMB74LS109A	-DC, -DP	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	270	DC	16	2	DP	16	10										
GMB74LS112	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	350	DC	16	2	DP	16	10										
GMB74LS113	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	351	DC	14	2	DP	14	10										
GMB74LS114	-DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	352	DC	14	2	DP	14	10										
GMB74LS123	-DC, -DP	SINGLE AND DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH CLEAR	275	DC	16	2	DP	16	10										
GMB74LS125A	-DC, -DP	QUADRUPLE BUS DRIVERS WITH 3-STATES OUTPUTS	582	DC	14	2	DP	14	10										
GMB74LS126A	-DC, -DP	QUADRUPLE BUS DRIVERS WITH 3-STATES OUTPUTS	583	DC	14	2	DP	14	10										
GMB74LS132	-DC, -DP	SCHMITT-TRIGGER POSITIVE NAND GATE	278	DC	14	2	DP	14	10										
GMB74LS136	-DC, -DP	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE	257	DC	14	2	DP	14	10										
GMB74LS138	-DC, -DP	3-LINE-TO-8-LINE DECODER/DEMULPLEXER	353	DC	16	2	DP	16	10										

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"



$V_{CC} = 5V \pm 5\%$

TYPE	t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS	
			I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (3)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			max	max	min	min	min	max	min	max			max	max				typ
GMB74LS00 -DC, -DP	9,5	2 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS01 -DC, -DP	16	2 (g)		8			2	0,8		0,5		2000	32	28				
GMB74LS02 -DC, -DP	10	2,75 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS03 -DC, -DP	16	2 (g)		8			2	0,8		0,5		2000	32	28				
GMB74LS04 -DC, -DP	9,5	2 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS05 -DC, -DP	16	2 (g)		8			2	0,8		0,5		2000	32	28				
GMB74LS08 -DC, -DP	12	4,25 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24				
GMB74LS09 -DC, -DP	20	4,25 (g)		8			2	0,8		0,5		2000	35	35				
GMB74LS10 -DC, -DP	9,5	2 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS11 -DC, -DP	12	4,25 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24				
GMB74LS12 -DC, -DP	16	2 (g)		8			2	0,8		0,5		2000	32	28				
GMB74LS13 -DC, -DP	16,5		-0,4	8					2,7	0,5	-42	2000	22	27				
GMB74LS14 -DC, -DP	15		-0,4	8					2,7	0,5	-42	2000	22	22				
GMB74LS15 -DC, -DP	20	4,25 (g)		8			2	0,8		0,5		2000	35	35				
GMB74LS20 -DC, -DP	9,5	2 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS21 -DC, -DP	12	4,25 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24				
GMB74LS22 -DC, -DP	16	2 (g)		8			2	0,8		0,5		2000	32	28				
GMB74LS26 -DC, -DP	16	2 (g)		8			2	0,8		0,5		2000	32	28				
GMB74LS28 -DC, -DP	12	5,5 (g)	-1,2	24			2	0,8	2,7	0,5	-42	667	24	24			at $C_L = 45 pF$	
GMB74LS30 -DC, -DP	17	2 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	35				
GMB74LS32 -DC, -DP	12	5 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	22	22			at $C_L = 45 pF$	
GMB74LS33 -DC, -DP	19	5,45 (g)		24			2	0,8		0,5		667	32	28				
GMB74LS42 -DC, -DP	35		-0,4	8			2	0,8	2,7	0,5	-42	2000	25	25			A, B, C, D	
GMB74LS51 -DC, -DP	12,5	2,75 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS54 -DC, -DP	12,5	4,5 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	25	20				
GMB74LS55 -DC, -DP	12,5	2,75 (g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMB74LS73 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30			45	
GMB74LS74A -DC, -DP	10	(f1)	-0,4	8	25 (r)	5 (f)	2	0,8	2,7	0,5	-42	2000	25	40			33	
GMB74LS75 -DC, -DP	11	32	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	27	17	D	Q		
GMB74LS76 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMB74LS78 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMB74LS83A -DC, -DP	19	(b)	-0,4	8			2	0,9	2,7	0,6	-42	2000	59	55	C_0	C_4		
GMB74LS85 -DC, -DP	23,5	52	-0,4	8			2	0,8	2,4	0,5	-42	2000	20	17	A = B	A = B		
GMB74LS86 -DC, -DP	10	30	-0,4	8			2	0,8	2,7	0,5	-42	2000	17	17	A or B			
GMB74LS90 -DC, -DP	40	-0,4	8	25			2	0,8	2,7	0,5	-42	2000	16	18	A	Q	42	
GMB74LS92 -DC, -DP	39	-0,4	8	25			2	0,8	2,7	0,5	-42	2000	16	18	A	QA	42	
GMB74LS93 -DC, -DP	39	-0,4	8	25			2	0,8	2,7	0,5	-42	2000	16	18	A	QA	42	
GMB74LS95B -DC, -DP	50	-0,4	8	20	0	2	2	0,8	2,7	0,5	-42	2000	45	48	CLOCK		28	
GMB74LS107 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK		45	
GMB74LS109A -DC, -DP	10	(f1)	-0,4	8	20 (r)	5 (f)	2	0,8	2,7	0,5	-42	2000	25	40	CLOCK	Q or \bar{Q}	33	
GMB74LS112 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMB74LS113 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMB74LS114 -DC, -DP	10	(f1)	-0,4	8	20 (f)	0 (f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMB74LS123 -DC, -DP	60	-0,4	8				2	0,8	2,7	0,5	-100	2000						
GMB74LS125A -DC, -DP		-2,6	16				2	0,8	2,4	0,5	-200	1000	15	18			at $C_L = 45 pF$	
GMB74LS126A -DC, -DP		-2,6	16				2	0,8	2,7	0,5	-200	1000	15	18			at $C_L = 45 pF$	
GMB74LS132 -DC, -DP	15		-0,4	8					2,7	0,5	-42	2000	22	22				
GMB74LS136 -DC, -DP	18	30		8			2	0,8		0,5		2000	30	30	A or B			
GMB74LS138 -DC, -DP	22	31	-0,4	8			2	0,8	2,7	0,5	-42	2000	18	32	ENABLE	ANY		

NOTES : (1) P: Power dissipation
b: per bit
fl: per flip-flop
g: per gate

(2) (r): referred to rising edge
(f): referred to falling edge

(3) at $V_{CC} = \min, V_{IL} = \max, V_{IH} = \min, I_{OH} = \max$

(4) at $V_{CC} = \min, V_{IL} = \max, V_{IH} = \min, I_{OL} = \max$

(5) at V_{CCmax}

(6) typ address time

(7) typ enable time



Basic Characteristics: See page 21
 Operating Temp. Range: 0 to 70 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			GMB74LS139 -DC, -DP	DUAL 2-LINE-TO-4-LINE DECODER/DEMULTIPLEXER	354	DC	16	2	DP	16	10									
GMB74LS145 -DC, -DP	BCD-TO-DECIMAL DECODERS/DRIVERS	113	DC	16	2	DP	16	10												
GMB74LS151 -DC, -DP	DATA SELECTORS MULTIPLEXERS	285	DC	16	2	DP	16	10												
GMB74LS153 -DC, -DP	DUAL 4-LINE-TO-1-LINE DATA SELECTORS/ MULTIPLEXERS	231	DC	16	2	DP	16	10												
GMB74LS155 -DC, -DP	DUAL 2-LINE-TO-1-LINE DECODERS/DEMULTIPLEXERS	288	DC	16	2	DP	16	10												
GMB74LS156 -DC, -DP	DUAL 2-LINE-TO-1-LINE DECODERS/DEMULTIPLEXERS	288	DC	16	2	DP	16	10												
GMB74LS157 -DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	355	DC	16	2	DP	16	10												
GMB74LS158 -DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	356	DC	16	2	DP	16	10												
GMB74LS164 -DC, -DP	8-BIT PARALLEL-OUT SERIAL SHIFT REGISTERS	232	DC	14	2	DP	14	10												
GMB74LS174 -DC, -DP	HEX D-TYPE REGISTER	297	DC	16	2	DP	16	10												
GMB74LS175 -DC, -DP	QUADRUPLE D-TYPE REGISTER	298	DC	16	2	DP	16	10												
GMB74LS181 -DC, -DP	4-BIT ARITHMETIC LOGIC UNITS/FUNCTION GENERATORS	303	DC	24	2	DP	24	3												
GMB74LS190 -DC, -DP	SYNCHRONOUS UP/DOWN COUNTER WITH DOWN/UP MODE CONTROL	307	DC	16	2	DP	16	10												
GMB74LS191 -DC, -DP	SYNCHRONOUS UP/DOWN COUNTER WITH DOWN/UP MODE CONTROL	307	DC	16	2	DP	16	10												
GMB74LS192 -DC, -DP	SYNCHRONOUS 4-BIT UP/DOWN COUNTERS	308	DC	16	2	DP	16	10												
GMB74LS193 -DC, -DP	SYNCHRONOUS 4-BIT UP/DOWN COUNTERS	308	DC	16	2	DP	16	10												
GMB74LS194A-DC, -DP	BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTERS	309	DC	16	2	DP	16	10												
GMB74LS195A-DC, -DP	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTERS	310	DC	16	2	DP	16	10												
GMB74LS196 -DC, -DP	NEGATIVE-EDGE TRIGGERED ASYNCHRONOUS DECADE COUNTER	311	DC	14	2	DP	14	10												
GMB74LS197 -DC, -DP	NEGATIVE-EDGE TRIGGERED ASYNCHRONOUS 4-BIT BINARY COUNTER	311	DC	14	2	DP	14	10												
GMB74LS221 -DC, -DP	DUAL MONOSTABLE MULTIVIBRATORS WITH SCHMITT-TRIGGER INPUTS	314	DC	16	2	DP	16	10												
GMB74LS251A-DC, -DP	DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS	317	DC	16	2	DP	16	10												
GMB74LS253 -DC, -DP	DUAL 4-LINE-TO-1-LINE DATA SELECTORS	357	DC	16	2	DP	16	10												
GMB74LS257A-DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	358	DC	16	2	DP	16	10												
GMB74LS258A-DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	359	DC	16	2	DP	16	10												
GMB74LS261 -DC, -DP	4-BIT-BY-4-BIT PARALLEL BINARY MULTIPLIERS	360	DC	16	2	DP	16	10												
GMB74LS266 -DC, -DP	QUADRUPLE 2-INPUT EXCLUSIVE-NOR GATES	361	DC	14	2	DP	14	10												
GMB74LS279 -DC, -DP	QUADRUPLE S-R LATCHES	321	DC	16	2	DP	16	10												
GMB74LS283 -DC, -DP	SINGLE 4-BIT FULL ADDER	322	DC	16	2	DP	16	10												
GMB74LS290 -DC, -DP	DECADE AND 4-BIT BINARY COUNTERS	325	DC	14	2	DP	14	10												
GMB74LS293 -DC, -DP	DECADE AND 4-BIT BINARY COUNTERS	326	DC	14	2	DP	14	10												
GMB74LS295B-DC, -DP	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTERS	362	DC	14	2	DP	14	10												
GMB74LS298 -DC, -DP	QUADRUPLE 2-INPUT MULTIPLEXERS WITH STORAGE	327	DC	16	2	DP	16	10												
GMB74LS365A-DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	584	DC	16	2	DP	16	10												
GMB74LS366A-DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	585	DC	16	2	DP	16	10												
GMB74LS367A-DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	586	DC	16	2	DP	16	10												
GMB74LS368A-DC, -DP	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	587	DC	16	2	DP	16	10												
GMB74LS375 -DC, -DP	4-BIT BISTABLE LATCHES	365	DC	16	2	DP	16	10												
GMB74LS386 -DC, -DP	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES	257	DC	14	2	DP	14	10												
GMB74LS395A-DC, -DP	4-BIT CASCADABLE SHIFT REGISTERS	364	DC	16	2	DP	16	10												
GMB74LS670 -DC, -DP	4 x 4 REGISTER FILES	363	DC	16	2	DP	16	10												

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"



$V_{CC} = 5V \pm 5\%$

TYPE	t_{pd} (1)		RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)						REMARKS							
			I_{OH}	I_{OL}	$t_{set up}$ (7)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}			f								
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns	FROM	TO	MHz								
			max	max	min	min	min	max	min	max			max	max			typ								
GMB74LS139 -DC, -DP	22	34	-0,4	8				2	0,8	2,7	0,5	-42	2000	24	32	ENABLE	ANY								
GMB74LS145 -DC, -DP		35						2	0,8				665	50	50										at $C_L = 45 pF$
GMB74LS151 -DC, -DP	11	30	-0,4	8				2	0,8	2,7	0,5	-42	2000	43	50	A, B, C	Y								
GMB74LS153 -DC, -DP	22	31	-0,4	8				2	0,8	2,7	0,5	-42	2000	15	26	DATA	Y								
GMB74LS155 -DC, -DP	18	30	-0,4	8				2	0,8	2,7	0,5	-42	2000	26	30	A or B	Y								
GMB74LS156 -DC, -DP		31		8				2	0,8				2000	46	51	A or B	Y								
GMB74LS157 -DC, -DP		50	-0,4	8				2	0,8	2,7	0,5	-42	2000	14	14	DATA									
GMB74LS158 -DC, -DP		24	-0,4	8				2	0,8	2,7	0,5	-42	2000	12	12	DATA									
GMB74LS164 -DC, -DP		80	-0,4	8	15		5	2	0,8	2,7	0,5	-42	2000	27	32	CLOCK	ANY Q						36		
GMB74LS174 -DC, -DP		80	-0,4	8	25		5	2	0,8	2,7	0,5	-42	2000	30	30	CLOCK							40		
GMB74LS175 -DC, -DP		55	-0,4	8	25		5	2	0,8	2,7	0,5	-42	2000	30	30	CLOCK							40		
GMB74LS181 -DC, -DP		102 (b)	-0,4	8				2	0,8	2,7	0,5	-42	2000	27	20	C_n+4	C_n+4								
GMB74LS190 -DC, -DP	20	90	-0,4	8	20		0	2	0,8	2,7	0,5	-42	2000	42	52	CLOCK	MAX/MIN						25		
GMB74LS191 -DC, -DP	20	90	-0,4	8	20		0	2	0,8	2,7	0,5	-42	2000	42	52	CLOCK	MAX/MIN						25		
GMB74LS192 -DC, -DP		85	-0,4	8	20		0	2	0,8	2,7	0,5	-42	2000	40	40	LOAD	Q						32		
GMB74LS193 -DC, -DP		85	-0,4	8	20		0	2	0,8	2,7	0,5	-42	2000	40	40	LOAD	Q						32		
GMB74LS194A -DC, -DP		60	-0,4	8	20		0	2	0,8	2,7	0,5	-42	2000	41	47	CLOCK							28		
GMB74LS195A -DC, -DP		50	-0,4	8	15		0	2	0,8	2,7	0,5	-42	2000	29	35	CLOCK							28		
GMB74LS196 -DC, -DP		60	-0,4	8	20		10	2	0,8	2,7	0,5	-42	2000	41	45	LOAD	ANY						40		
GMB74LS197 -DC, -DP		60	-0,4	8	20		10	2	0,8	2,7	0,5	-42	2000	39	45	LOAD	ANY						40		
GMB74LS221 -DC, -DP		23	-0,4	8	15					2,4	0,4	-100	2000												
GMB74LS251A -DC, -DP	17	35	-2,6	8				2	0,8	2,4	0,5	-42	2000	28	28	ANY D	Y								
GMB74LS253 -DC, -DP	12	35	-2,6	8				2	0,8	2,4	0,5	-42	2000	18	20	DATA	Y								
GMB74LS257A -DC, -DP		50	-2,6	8				2	0,8	2,4	0,5	-42	2000	18	18	DATA	ANY								
GMB74LS258A -DC, -DP		24	-2,6	8				2	0,8	2,7	0,5	-42	2000	18	18	DATA	ANY								
GMB74LS261 -DC, -DP		100	-1	8				2	0,8	2,7	0,5	-42	2000	42	37	ANY B	ANY Q								
GMB74LS266 -DC, -DP	18	40		8				2	0,8		0,5	-42	2000	30	30	A or B									
GMB74LS279 -DC, -DP	12	19	-0,4	8				2	0,8	2,7	0,5	-42	2000	22	15	S									
GMB74LS283 -DC, -DP		24 (b)	-0,4	8				2	0,8	2,7	0,5	-42	2000	24	24	C_0	ANY Σ								
GMB74LS290 -DC, -DP		40	-0,4	4	25			2	0,8	2,7	0,5	-42	400	16	18	A	QA							42	
GMB74LS293 -DC, -DP		39	-0,4	4	25			2	0,8	2,7	0,5	-42	400	16	18	A	QA							42	
GMB74LS295B -DC, -DP		62	-1	8				2	0,8	2,4	0,5	-42	2000	60	70									28	
GMB74LS298 -DC, -DP		65	-0,4	8	15		5	2	0,8	2,7	0,5	-42	2000	27	32										
GMB74LS365A -DC, -DP								2	0,8	2,4	0,5	-200	1000	15	18										at $C_L = 45 pF$
GMB74LS366A -DC, -DP			-2,6	16				2	0,8	2,4	0,5	-200	1000	15	18										at $C_L = 45 pF$
GMB74LS367A -DC, -DP								2	0,8	2,7	0,5	-100	2000	27	17	D	Q								
GMB74LS368A -DC, -DP			-2,6	16				2	0,8	2,4	0,5	-200	1000	15	18										
GMB74LS375 -DC, -DP			-0,4	8	20		0	2	0,8	2,7	0,5	-42	2000	17	17	A or B									
GMB74LS386 -DC, -DP	10	30,5	-0,4	8				2	0,8	2,7	0,5	-42	2000	17	17										
GMB74LS395A -DC, -DP		75	-2,6	8	20		10	2	0,8	2,4	0,5	-42	2000	27	32										
GMB74LS670 -DC, -DP		135	-2,6	8	10		5	2	0,8	2,4	0,5	-42	2000	45	40	DATA	ANY Q								

NOTES : (1) P:Power dissipation
 b:per bit
 fl:per flip-flop
 g:per gate

(2) (r):referred to rising edge
 (f):referred to falling edge
 (3) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OH}=\max$
 (4) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OL}=\max$

(5) at V_{CCmax}
 (6) typ address time
 (7) typ enable time

GM

Basic Characteristics: See page 21

Operating Temp. Range: -55 to 125 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GMC54LS00 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	FC	14	2								
GMC54LS01 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE AND GATE	100C	DC	14	2	FC	14	2											
GMC54LS02 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NOR GATE	211A	DC	14	2	FC	14	2											
GMC54LS03 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	FC	14	2											
GMC54LS04 -DC, -FC	HEX INVERTER	212A	DC	14	2	FC	14	2											
GMC54LS05 -DC, -FC	HEX INVERTER	212A	DC	14	2	FC	14	2											
GMC54LS08 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE AND GATE	118	DC	14	2	FC	14	2											
GMC54LS09 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE AND GATE	118	DC	14	2	FC	14	2											
GMC54LS10 -DC, -FC	TRIPLE 3-INPUT POSITIVE NAND GATE	213A	DC	14	2	FC	14	2											
GMC54LS11 -DC, -FC	TRIPLE 3-INPUT POSITIVE AND GATE	230	DC	14	2	FC	14	2											
GMC54LS12 -DC, -FC	TRIPLE 3-INPUT POSITIVE NAND GATE WITH OPEN-COLLECTOR OUTPUT	213A	DC	14	2	FC	14	2											
GMC54LS13 -DC, -FC	SCHMITT-TRIGGER POSITIVE NAND GATE AND INVERTER	234	DC	14	2	FC	14	2											
GMC54LS14 -DC, -FC	SCHMITT-TRIGGER POSITIVE NAND GATE AND INVERTER	235	DC	14	2	FC	14	2											
GMC54LS15 -DC, -FC	TRIPLE 2-INPUT POSITIVE AND GATE	337A	DC	14	2	FC	14	2											
GMC54LS20 -DC, -FC	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	FC	14	2											
GMC54LS21 -DC, -FC	DUAL 4-INPUT POSITIVE AND GATE	338A	DC	14	2	FC	14	2											
GMC54LS22 -DC, -FC	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	FC	14	2											
GMC54LS26 -DC, -FC	QUADRUPLE 2-INPUT HIGH-VOLTAGE INTERFACE POSITIVE NAND GATE	100A	DC	14	2	FC	14	2											
GMC54LS28 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NOR BUFFER	211A	DC	14	2	FC	14	2											
GMC54LS30 -DC, -FC	8-INPUT POSITIVE NAND GATE	103A	DC	14	2	FC	14	2											
GMC54LS32 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE OR GATE	239	DC	14	2	FC	14	2											
GMC54LS33 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NOR GATE	211A	DC	14	2	FC	14	2											
GMC54LS42 -DC, -FC	4-LINE-TO-LINE, BCD-TO-DECIMAL	113	DC	16	2	FC	16	2											
GMC54LS51 -DC, -FC	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	215A	DC	14	2	FC	14	2											
GMC54LS54 -DC, -FC	4-WIDE AND-OR-INVERT GATE	216A	DC	14	2	FC	14	2											
GMC54LS55 -DC, -FC	4-WIDE 4-INPUT AND-OR-INVERT GATE	217A	DC	14	2	FC	14	2											
GMC54LS73 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	219	DC	14	2	FC	14	2											
GMC54LS74A -DC, -FC	D-TYPE FLIP FLOP	220A	DC	14	2	FC	14	2											
GMC54LS75 -DC, -FC	4-BIT BISTABLE LATCH	248	DC	16	2	FC	16	2											
GMC54LS76 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	249	DC	16	2	FC	16	2											
GMC54LS78 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	221B	DC	14	2	FC	14	2											
GMC54LS83A -DC, -FC	SINGLE 4-BIT FULL ADDER	254	DC	16	2	FC	16	2											
GMC54LS85 -DC, -FC	4-BIT MAGNITUDE COMPARATOR	222	DC	16	2	FC	16	2											
GMC54LS86 -DC, -FC	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE	257	DC	14	2	FC	14	2											
GMC54LS90 -DC, -FC	DECADE COUNTER	224	DC	14	2	FC	14	2											
GMC54LS92 -DC, -FC	DEVIDE-BY-12 COUNTER	261	DC	14	2	FC	14	2											
GMC54LS93 -DC, -FC	4-BIT BINARY COUNTER	262	DC	14	2	FC	14	2											
GMC54LS95B -DC, -FC	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	264	DC	14	2	FC	14	2											
GMC54LS107 -DC, -FC	DUAL J-K NEGATIVE-EDGE-TRIGGERED FLIP FLOP	269	DC	14	2	FC	14	2											
GMC54LS109A -DC, -FC	SINGLE J-K EDGE-TRIGGERED FLIP FLOP	270	DC	16	2	FC	16	2											
GMC54LS112 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	350	DC	16	2	FC	16	2											
GMC54LS113 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	351	DC	14	2	FC	14	2											
GMC54LS114 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	352	DC	14	2	FC	14	2											
GMC54LS123 -DC, -FC	SINGLE AND DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH CLEAR	275	DC	16	2	FC	16	2											
GMC54LS125A -DC, -FC	QUADRUPLE BUS DRIVERS WITH 3-STATES OUTPUTS	582	DC	14	2	FC	14	2											
GMC54LS126A -DC, -FC	QUADRUPLE BUS DRIVERS WITH 3-STATES OUTPUTS	583	DC	14	2	FC	14	2											
GMC54LS132 -DC, -FC	SCHMITT-TRIGGER POSITIVE NAND GATE	278	DC	14	2	FC	14	2											
GMC54LS136 -DC, -FC	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE	257	DC	14	2	FC	14	2											
GMC54LS138 -DC, -FC	3-LINE-TO-8-LINE DECODER/DEMULTIPLEXER	353	DC	16	2	FC	16	2											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"



$V_{CC} = 5V \pm 10\%$

TYPE	t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS	
			I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (3)	V_{OL} (4)	I_{OS} (5)	R_L	t_{PLH}	t_{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			max	max	min	min	min	max	min	max			max	max				typ
GMC54LS00 -DC, -FC	9,5	2(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS01 -DC, -FC	16	2(g)		8			2	0,8		0,5		2000	32	28				
GMC54LS02 -DC, -FC	10	2,75(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS03 -DC, -FC	16	2(g)		8			2	0,8		0,5		2000	32	28				
GMC54LS04 -DC, -FC	9,5	2(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS05 -DC, -FC	16	2(g)		8			2	0,8		0,5		2000	32	28				
GMC54LS08 -DC, -FC	12	4,25(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24				
GMC54LS09 -DC, -FC	20	4,25(g)		8			2	0,8		0,5		2000	35	35				
GMC54LS10 -DC, -FC	9,5	2(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS11 -DC, -FC	12	4,25(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24				
GMC54LS12 -DC, -FC	16	2(g)		8			2	0,8		0,5		2000	32	28				
GMC54LS13 -DC, -FC	16,5		-0,4	8					2,7	0,5	-42	2000	22	27				
GMC54LS14 -DC, -FC	15		-0,4	8					2,7	0,5	-42	2000	22	22				
GMC54LS15 -DC, -FC	20	4,25		8			2	0,8		0,5		2000	35	35				
GMC54LS20 -DC, -FC	9,5	2(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS21 -DC, -FC	12	4,25(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24				
GMC54LS22 -DC, -FC	16	2(g)		8			2	0,8		0,5		2000	32	28				
GMC54LS26 -DC, -FC	16	2(g)		8			2	0,8		0,5		2000	32	28				
GMC54LS28 -DC, -FC	12	5,5	-1,2	24			2	0,8	2,7	0,5	-42	667	24	24			at $C_L = 45 pF$	
GMC54LS30 -DC, -FC	17	2	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	35				
GMC54LS32 -DC, -FC	12	5	-0,4	8			2	0,8	2,7	0,5	-42	2000	22	22			at $C_L = 45 pF$	
GMC54LS33 -DC, -FC	19	5,45(g)		24			2	0,8		0,5		667	32	28				
GMC54LS42 -DC, -FC	35		-0,4	8			2	0,8	2,7	0,5	-42	2000	25	25	A, B, C, D			
GMC54LS51 -DC, -FC	12,5	2,75	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS54 -DC, -FC	12,5	4,5(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	25	20				
GMC54LS55 -DC, -FC	12,5	2,75(g)	-0,4	8			2	0,8	2,7	0,5	-42	2000	20	20				
GMC54LS73 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30			45	
GMC54LS74A -DC, -FC		10(f1)	-0,4	8	25 (r)	5(r)	2	0,8	2,7	0,5	-42	2000	25	40			33	
GMC54LS75 -DC, -FC	11	32	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	27	17	D	Q		
GMC54LS76 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMC54LS78 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMC54LS83A -DC, -FC		19(b)	-0,4	8			2	0,9	2,7	0,6	-42	2000	59	55	C ₀	C ₄		
GMC54LS85 -DC, -FC	23,5	52	-0,4	8			2	0,8	2,4	0,5	-42	2000	20	17	A = B	A = B		
GMC54LS86 -DC, -FC	10	30	-0,4	8			2	0,8	2,7	0,5	-42	2000	17	17	A or B			
GMC54LS90 -DC, -FC		40	-0,4	8	25		2	0,8	2,7	0,5	-42	2000	16	18	A	Q	42	
GMC54LS92 -DC, -FC		39	-0,4	8	25		2	0,8	2,7	0,5	-42	2000	16	18	A	Q _A	42	
GMC54LS93 -DC, -FC		39	-0,4	8	25		2	0,8	2,7	0,5	-42	2000	16	18	A	Q _A	42	
GMC54LS95B -DC, -FC		50	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	45	48	CLOCK	Q _A	28	
GMC54LS107 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK		45	
GMC54LS109A -DC, -FC		10(f1)	-0,4	8	20 (r)	5(r)	2	0,8	2,7	0,5	-42	2000	25	40	CLOCK	Q or \bar{Q}	33	
GMC54LS112 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMC54LS113 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMC54LS114 -DC, -FC		10(f1)	-0,4	8	20 (f)	0(f)	2	0,8	2,7	0,5	-42	2000	20	30	CLOCK	Q or \bar{Q}	45	
GMC54LS123 -DC, -FC		60	-0,4	8			2	0,8	2,7	0,5	-100	2000						
GMC54LS125A -DC, -FC			-2,6	16			2	0,8	2,4	0,5	-200	1000	15	18			at $C_L = 45 pF$	
GMC54LS126A -DC, -FC			-2,6	16			2	0,8	2,7	0,5	-200	1000	15	18			at $C_L = 45 pF$	
GMC54LS132 -DC, -FC			-0,4	8					2,7	0,5	-42	2000	22	22				
GMC54LS136 -DC, -FC	15	30		8			2	0,8		0,5		2000	30	30	A or B			
GMC54LS138 -DC, -FC	22	31	-0,4	8			2	0,8	2,7	0,5	-42	2000	18	32	ENABLE	ANY		

NOTES : (1) P: Power dissipation
b: per bit
fl: per flip-flop
g: per gate

(2) (r): referred to rising edge
(f): referred to falling edge
(3) at $V_{CC} = \min, V_{IL} = \max, V_{IH} = \min, I_{OH} = \max$
(4) at $V_{CC} = \min, V_{IL} = \max, V_{IH} = \min, I_{OL} = \max$

(5) at V_{CCmax}
(6) typ address time
(7) typ enable time

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GMC54LS139 -DC, -FC	DUAL 2-LINE-TO-4-LINE DECODER/DEMULTIPLXER	354	DC	16	2	FC	16	2								
GMC54LS145 -DC, -FC	BCD-TO-DECIMAL DECODERS/DRIVERS	113	DC	16	2	FC	16	2											
GMC54LS151 -DC, -FC	DATA SELECTORS MULTIPLEXERS	285	DC	16	2	FC	16	2											
GMC54LS153 -DC, -FC	DUAL 4-LINE-TO-1-LINE DATA SELECTORS/ MULTIPLEXERS	231	DC	16	2	FC	16	2											
GMC54LS155 -DC, -FC	DUAL 2-LINE-TO-1-LINE DECODERS/DEMULTIPLXERS	288	DC	16	2	FC	16	2											
GMC54LS156 -DC, -FC	DUAL 2-LINE-TO-1-LINE DECODERS/DEMULTIPLXERS	288	DC	16	2	FC	16	2											
GMC54LS157 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	355	DC	16	2	FC	16	2											
GMC54LS158 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	356	DC	16	2	FC	16	2											
GMC54LS164 -DC, -FC	8-BIT PARALLEL-OUT SERIAL SHIFT REGISTERS	232	DC	14	2	FC	14	2											
GMC54LS174 -DC, -FC	HEX D-TYPE REGISTER	297	DC	16	2	FC	16	2											
GMC54LS175 -DC, -FC	QUADRUPLE D-TYPE REGISTER	298	DC	16	2	FC	16	2											
GMC54LS181 -DC, -FC	4-BIT ARITHMETIC LOGIC UNITS/FUNCTION GENERATORS	303	DC	24	2	FC	24	1											
GMC54LS190 -DC, -FC	SYNCHRONOUS UP/DOWN COUNTER WITH DOWN/UP MODE CONTROL	307	DC	16	2	FC	16	2											
GMC54LS191 -DC, -FC	SYNCHRONOUS UP/DOWN COUNTER WITH DOWN/UP MODE CONTROL	307	DC	16	2	FC	16	2											
GMC54LS192 -DC, -FC	SYNCHRONOUS 4-BIT UP/DOWN COUNTERS	308	DC	16	2	FC	16	2											
GMC54LS193 -DC, -FC	SYNCHRONOUS 4-BIT UP/DOWN COUNTERS	308	DC	16	2	FC	16	2											
GMC54LS194A-DC, -FC	BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTERS	309	DC	16	2	FC	16	2											
GMC54LS195A-DC, -FC	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTERS	310	DC	16	2	FC	16	2											
GMC54LS196 -DC, -FC	NEGATIVE-EDGE TRIGGERED ASYNCHRONOUS DECADE COUNTER	311	DC	14	2	FC	14	2											
GMC54LS197 -DC, -FC	NEGATIVE-EDGE TRIGGERED ASYNCHRONOUS 4-BIT BINARY COUNTER	311	DC	14	2	FC	14	2											
GMC54LS221 -DC, -FC	DUAL MONOSTABLE MULTIVIBRATORS WITH SCHMITT-TRIGGER INPUTS	314	DC	16	2	FC	16	2											
GMC54LS251A-DC, -FC	DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS	317	DC	16	2	FC	16	2											
GMC54LS253 -DC, -FC	DUAL 4-LINE-TO-1-LINE DATA SELECTORS	357	DC	16	2	FC	16	2											
GMC54LS257A-DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	358	DC	16	2	FC	16	2											
GMC54LS258A-DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS	359	DC	16	2	FC	16	2											
GMC54LS261 -DC, -FC	4-BIT-BY-4-BIT PARALLEL BINARY MULTIPLIERS	360	DC	16	2	FC	16	2											
GMC54LS266 -DC, -FC	QUADRUPLE 2-INPUT EXCLUSIVE-NOR GATES	361	DC	14	2	FC	14	2											
GMC54LS279 -DC, -FC	QUADRUPLE S-R LATCHES	321	DC	16	2	FC	16	2											
GMC54LS283 -DC, -FC	SINGLE 4-BIT FULL ADDER	322	DC	16	2	FC	16	2											
GMC54LS290 -DC, -FC	DECADE AND 4-BIT BINARY COUNTERS	325	DC	14	2	FC	14	2											
GMC54LS293 -DC, -FC	DECADE AND 4-BIT BINARY COUNTERS	326	DC	14	2	FC	14	2											
GMC54LS295B-DC, -FC	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTERS	362	DC	14	2	FC	14	2											
GMC54LS298 -DC, -FC	QUADRUPLE 2-INPUT MULTIPLEXERS WITH STORAGE	327	DC	16	2	FC	16	2											
GMC54LS365A-DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	584	DC	16	2	FC	16	2											
GMC54LS366A-DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	585	DC	16	2	FC	16	2											
GMC54LS367A-DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	586	DC	16	2	FC	16	2											
GMC54LS368A-DC, -FC	HEX BUS DRIVERS WITH 3-STATE OUTPUTS	587	DC	16	2	FC	16	2											
GMC54LS375 -DC, -FC	4-BIT BISTABLE LATCHES	365	DC	16	2	FC	16	2											
GMC54LS386 -DC, -FC	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES	257	DC	14	2	FC	14	2											
GMC54LS395A-DC, -FC	4-BIT CASCADABLE SHIFT REGISTERS	364	DC	16	2	FC	16	2											
GMC54LS670 -DC, -FC	4 x 4 REGISTER FILES	363	DC	16	2	FC	16	2											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"



V_{CC} = 5 V ± 10 %

TYPE	t _{pd}		RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS	
	P (1)		I _{OH}	I _{OL}	t _{set up} (2)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f
	ns	mW	mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
	typ	typ	max	max	min	min	min	max	min	max			max	max				typ
GMC54LS139 -DC, -FC	22	34	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	32	ENABLE	ANY		
GMC54LS145 -DC, -FC		35					2	0,8				665	50	50			at C _L = 45 pF	
GMC54LS151 -DC, -FC	11	30	-0,4	8			2	0,8	2,7	0,5	-42	2000	43	50	A, B, C	Y		
GMC54LS153 -DC, -FC	22	31	-0,4	8			2	0,8	2,7	0,5	-42	2000	15	26	DATA	Y		
GMC54LS155 -DC, -FC	18	30	-0,4	8			2	0,8	2,7	0,5	-42	2000	26	30	A or B	Y		
GMC54LS156 -DC, -FC		31		8			2	0,8		0,5		2000	46	51	A or B	Y		
GMC54LS157 -DC, -FC		50	-0,4	8			2	0,8	2,7	0,5	-42	2000	14	14	DATA			
GMC54LS158 -DC, -FC		24	-0,4	8			2	0,8	2,7	0,5	-42	2000	12	12	DATA			
GMC54LS164 -DC, -FC		80	-0,4	8	15	5	2	0,8	2,7	0,5	-42	2000	27	32	CLOCK	ANY Q	36	
GMC54LS174 -DC, -FC		80	-0,4	8	25	5	2	0,8	2,7	0,5	-42	2000	30	30	CLOCK		40	
GMC54LS175 -DC, -FC		55	-0,4	8	25	5	2	0,8	2,7	0,5	-42	2000	30	30	CLOCK		40	
GMC54LS181 -DC, -FC		102 (b)	-0,4	8			2	0,8	2,7	0,5	-42	2000	27	20	C _n	C _n +4		
GMC54LS190 -DC, -FC	20	90	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	42	52	CLOCK	MAX/MIN	25	
GMC54LS191 -DC, -FC	20	90	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	42	52	CLOCK	MAX/MIN	25	
GMC54LS192 -DC, -FC		85	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	40	40	LOAD	Q	32	
GMC54LS193 -DC, -FC		85	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	40	40	LOAD	Q	32	
GMC54LS194A-DC, -FC		60	-0,4	8	20	0	2	0,8	2,7	0,5	-42	2000	41	47	CLOCK		28	
GMC54LS195A-DC, -FC		50	-0,4	8	15	0	2	0,8	2,7	0,5	-42	2000	29	35	CLOCK		28	
GMC54LS196 -DC, -FC		60	-0,4	8	20	10	2	0,8	2,7	0,5	-42	2000	41	45	LOAD	ANY	40	
GMC54LS197 -DC, -FC		60	-0,4	8	20	10	2	0,8	2,7	0,5	-42	2000	39	45	LOAD	ANY	40	
GMC54LS221 -DC, -FC		23	-0,4	8	15				2,4	0,4	-100	2000						
GMC54LS251A-DC, -FC	17	35	-2,6	8			2	0,8	2,4	0,5	-42	2000	28	28	ANY D	Y		
GMC54LS253 -DC, -FC	12	35	-2,6	8			2	0,8	2,4	0,5	-42	2000	18	20	DATA	Y		
GMC54LS257A-DC, -FC		50	-2,6	8			2	0,8	2,4	0,5	-42	2000	18	18	DATA	ANY		
GMC54LS258A-DC, -FC		24	-2,6	8			2	0,8	2,7	0,5	-42	2000	18	18	DATA	ANY		
GMC54LS261 -DC, -FC		100	-1	8			2	0,8	2,7	0,5	-42	2000	42	37	ANY B	ANY Q		
GMC54LS266 -DC, -FC	18	40		8			2	0,8		0,5		2000	30	30	A or B			
GMC54LS279 -DC, -FC	12	19	-0,4	8			2	0,8	2,7	0,5	-42	2000	22	15	S			
GMC54LS283 -DC, -FC		24 (b)	-0,4	8			2	0,8	2,7	0,5	-42	2000	24	24	C ₀	ANY Σ		
GMC54LS290 -DC, -FC		40	-0,4	4	25		2	0,8	2,7	0,5	-42	400	16	18	A	QA	42	
GMC54LS293 -DC, -FC		39	-0,4	4	25		2	0,8	2,7	0,5	-42	400	16	18	A	QA	42	
GMC54LS295B-DC, -FC		62	-1	8			2	0,8	2,4	0,5	-42	2000	60	70			28	
GMC54LS298 -DC, -FC		65	-0,4	8	15	5	2	0,8	2,7	0,5	-42	2000	27	32				
GMC54LS365A-DC, -FC																		
GMC54LS366A-DC, -FC			-2,6	16			2	0,8	2,4	0,5	-200	1000	15	18			at C _L = 45 pF	
GMC54LS367A-DC, -FC																		
GMC54LS368A-DC, -FC			-2,6	16			2	0,8	2,4	0,5	-200	1000	15	18			at C _L = 45 pF	
GMC54LS375 -DC, -FC			-0,4	8	20	0	2	0,8	2,7	0,5	-100	2000	27	17	D	Q		
GMC54LS386 -DC, -FC	10	30,5	-0,4	8			2	0,8	2,7	0,5	-42	2000	17	17	A or B			
GMC54LS395A-DC, -FC		75	-2,6	8	20	10	2	0,8	2,4	0,5	-42	2000	27	32				
GMC54LS670 -DC, -FC		135	-2,6	8	10	5	2	0,8	2,4	0,5	-42	2000	45	40	DATA	ANY Q		

NOTES : (1) P: Power dissipation
b: per bit
fl: per flip-flop
g: per gate

(2) (r): referred to rising edge
(f): referred to falling edge
(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CCmax}
(6) typ address time
(7) typ enable time

GT

Basic Characteristics: See page 21

Operating Temp. Range: 0 to 70 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
GTB74S00 -DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	DP	14	10											
GTB74S03 -DC, -DP	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	DP	14	10											
GTB74S04 -DC, -DP	HEX INVERTER	212A	DC	14	2	DP	14	10											
GTB74S05 -DC, -DP	HEX INVERTER	212A	DC	14	2	DP	14	10											
GTB74S10 -DC, -DP	TRIPLE 3-INPUT POSITIVE NAND GATE	213A	DC	14	2	DP	14	10											
GTB74S11 -DC, -DP	TRIPLE 3-INPUT POSITIVE AND GATE	337A	DC	14	2	DP	14	10											
GTB74S15 -DC, -DP	TRIPLE 3-INPUT POSITIVE AND GATE	337A	DC	14	2	DP	14	10											
GTB74S20 -DC, -DP	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	DP	14	10											
GTB74S22 -DC, -DP	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	DP	14	10											
GTB74S40 -DC, -DP	DUAL 4-INPUT POSITIVE NAND BUFFER	102A	DC	14	2	DP	14	10											
GTB74S64 -DC, -DP	4-WIDE 4-2-3-2 INPUT AND-OR-INVERT GATE	366	DC	14	2	DP	14	10											
GTB74S65 -DC, -DP	4-WIDE 4-2-3-2 INPUT AND-OR-INVERT GATE	366	DC	14	2	DP	14	10											
GTB74S74 -DC, -DP	J-K FLIP FLOP WITH DATA LOCKOUT	220A	DC	14	2	DP	14	10											
GTB74S86 -DC, -DP	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE WITH TOTEM-POLE OUTPUTS	257	DC	14	2	DP	14	10											
GTB74S112 -DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	350	DC	16	2	DP	16	10											
GTB74S113 -DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	351	DC	14	2	DP	14	10											
GTB74S114 -DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	352	DC	14	2	DP	14	10											
GTB74S133 -DC, -DP	DUAL J-K EDGE-TRIGGERED FLIP FLOP	367	DC	16	2	DP	16	10											
GTB74S134 -DC, -DP	12-INPUT POSITIVE NAND-GATE WITH 3-STATE TOTEM-POLE OUTPUTS	368	DC	16	2	DP	16	10											
GTB74S135 -DC, -DP	QUADRUPLE EXCLUSIVE OR/NOR GATE	369	DC	16	2	DP	16	10											
GTB74S138 -DC, -DP	3-LINE-TO-8-LINE DECODERS/DEMULTIPLEXER	353	DC	16	2	DP	16	10											
GTB74S139 -DC, -DP	DUAL 2-LINE-TO-4-LINE DECODERS/DEMULTIPLEXER	354	DC	16	2	DP	16	10											
GTB74S140 -DC, -DP	QUADRUPLE 2-INPUT POSITIVE-NOR LINE DRIVER	102A	DC	14	2	DP	14	10											
GTB74S151 -DC, -DP	8-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	285	DC	16	2	DP	16	10											
GTB74S153 -DC, -DP	DUAL 4-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXER	231	DC	16	2	DP	16	10											
GTB74S157 -DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	289	DC	16	2	DP	16	10											
GTB74S158 -DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	336	DC	16	2	DP	16	10											
GTB74S174 -DC, -DP	HEX D-TYPE REGISTER	297	DC	16	2	DP	16	10											
GTB74S175 -DC, -DP	QUADRUPLE D-TYPE REGISTER	298	DC	16	2	DP	16	10											
GTB74S181 -DC, -DP	4-BIT ARITHMETIC LOGIC UNITS/FUNCTION GENERATOR	303	DC	24	2	DP	24	3											
GTB74S182 -DC, -DP	LOOK-AHEAD CARRY GENERATOR	304	DC	16	2	DP	16	10											
GTB74S194 -DC, -DP	BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	309	DC	16	2	DP	16	10											
GTB74S195 -DC, -DP	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	310	DC	16	2	DP	16	10											
GTB74S251 -DC, -DP	8-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	370	DC	16	2	DP	16	10											
GTB74S257 -DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	371	DC	16	2	DP	16	10											
GTB74S258 -DC, -DP	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	372	DC	16	2	DP	16	10											
GTB74S260 -DC, -DP	DUAL 5-INPUT POSITIVE-NOR GATE	618	DC	14	2	DP	14	10											
GTB74S280 -DC, -DP	9-BIT ODD/EVEN PARITY GENERATORS/CHECKERS	623	DC	14	2	DP	14	10											
GTB74S289 -DC, -DP	64-BIT RAM WITH OPEN-COLLECTOR OUTPUTS	626	DC	16	2	DP	16	10											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

V_{CC} = 5 V ± 5 %

TYPE	t _{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at V _{CC} =5V, C _L =15pF, t _{amb} =+25°C)					REMARKS		
			I _{OH}	I _{OL}	t _{set up} (2)	t _{hold} (2)	V _{IH}	V _{IL}	V _{OH} (3)	V _{OL} (4)	I _{OS} (5)	R _L	t _{PLH}	t _{PHL}	FROM	TO		f	
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz	
typ	typ	max	max	min	min	min	max	min	max		max	max			typ				
GTB74S00 -DC, -DP	3	19(g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5					
GTB74S03 -DC, -DP	5	17,5(g)	-1	20			2	0,8		0,5		280	7,5	7					
GTB74S04 -DC, -DP	3	19(g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5					
GTB74S05 -DC, -DP	5	17,5(g)	-1	20			2	0,8		0,5		280	7,5	7					
GTB74S10 -DC, -DP	3	19(g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5					
GTB74S11 -DC, -DP	4,75	31(g)	-1	20			2	0,8	2,7	0,5	-100	280	7	7,5					
GTB74S15 -DC, -DP	6	28(g)	-1	20			2	0,8		0,5		280	8,5	9					
GTB74S20 -DC, -DP	3	19(g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5					
GTB74S22 -DC, -DP	5	17,5(g)	-1	20			2	0,8		0,5		280	7,5	7					
GTB74S40 -DC, -DP	4	21(g)	-3	60			2	0,8	2,7	0,5	-225	93	6,5	6,5					at C _L = 50 pF
GTB74S64 -DC, -DP	3,5	29(g)	-1	20			2	0,8	2,7	0,5	-100	280	5,5	5,5					
GTB74S65 -DC, -DP	5,5	36(g)	-1	20			2	0,8		0,5		280	7,5	8,5					
GTB74S74 -DC, -DP		75(f1)	-1	20	3 (r)	2 (r)	2	0,8	2,7	0,5	-100	280	9	9	CLOCK		Q or Q̄	110	
GTB74S86 -DC, -DP	7	250	-1	20			2	0,8	2,7	0,5	-100	280	10,5	10	A or B		Q or Q̄	125	
GTB74S112 -DC, -DP		(f1)7,5	-1	20	3 (f)	0 (f)	2	0,8	2,7	0,5	-100	280	7	7	CLOCK		Q or Q̄	125	
GTB74S113 -DC, -DP		(f1)7,5	-1	20	3 (f)	0 (f)	2	0,8	2,7	0,5	-100	280	7	7	CLOCK		Q or Q̄	125	
GTB74S114 -DC, -DP		(f1)7,5	-1	20	3 (f)	0 (f)	2	0,8	2,7	0,5	-100	280	7	7	CLOCK		Q or Q̄	125	
GTB74S133 -DC, -DP	3	19(g)	-1	20			2	0,8	2,7	0,5	-100	280	6	7					
GTB74S134 -DC, -DP	4,5	45(g)	-6,5	20			2	0,8	2,7	0,5	-100	280	6	7,5					
GTB74S135 -DC, -DP	8	325	-1	20			2	0,8	2,7	0,5	-100	280	12	14,5	C		A = B		
GTB74S138 -DC, -DP	8	245	-1	20			2	0,8	2,7	0,5	-100	280	8	11	ENABLE		ANY		
GTB74S139 -DC, -DP	7,5	300	-1	20			2	0,8	2,7	0,5	-100	280	8	10	ENABLE		ANY		
GTB74S140 -DC, -DP		22(g)	-40	60			2	0,8		0,5	-225	93	6,5	6,5					at C _L = 50 pF
GTB74S151 -DC, -DP	4,5	225	-1	20			2	0,8	2,7	0,5	-100	280	18	18	A, B, C		Y		
GTB74S153 -DC, -DP	12	225	-1	20			2	0,8	2,7	0,5	-100	280	9	9	DATA		Y		
GTB74S157 -DC, -DP	5	250	-1	20			2	0,8	2,7	0,5	-100	280	7,5	6,5	DATA				
GTB74S158 -DC, -DP	4	195	-1	20			2	0,8	2,7	0,5	-100	280	6	6	DATA				
GTB74S174 -DC, -DP		450	-1	20	5	3	2	0,8	2,7	0,5	-100	280	22	17	CLOCK				110
GTB74S175 -DC, -DP		300	-1	20	5	3	2	0,8	2,7	0,5	-100	280	22	17	CLOCK				110
GTB74S181 -DC, -DP			-1	20			2	0,8	2,7	0,5	-100	280	10,5	10,5	C _n		C _{n+4}		
GTB74S182 -DC, -DP	7	260	-1	20			2	0,8	2,7	0,5	-100	280	6,5	10	P _{0,1,2,3}		P		
GTB74S194 -DC, -DP		450	-1	20	5	3	2	0,8	2,7	0,5	-100	280	12	16,5	Clock				105
GTB74S195 -DC, -DP		375	-1	20	5	3	2	0,8	2,7	0,5	-100	280	12	16,5	Clock				105
GTB74S251 -DC, -DP	8	275	-6,5	20			2	0,8	2,4	0,5	-100	280	12	12	ANY D		Y		
GTB74S257 -DC, -DP		320	-6,5	20			2	0,8	2,4	0,5	-100	280	7,5	6,5	DATA		ANY		
GTB74S258 -DC, -DP		280	-6,5	20			2	0,8	2,4	0,5	-100	280	6	6	DATA		ANY		
GTB74S260 -DC, -DP		54(g)	-1	20			2	0,8	2,7	0,5	-100	280	3,5	3,5					
GTB74S280 -DC, -DP	13	335	-1	20			2	0,8	2,7	0,5	-100	180	21	18	DATA		Σ		EVEN or ODD
GTB74S289 -DC, -DP		(b)5,9	-1	16	0(9)	0(9)	2	0,8		0,45		300	50	50	Address				at C _L = 50 pF

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge
(3) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OH}=max
(4) at V_{CC}=min, V_{IL}=max, V_{IH}=min, I_{OL}=max

(5) at V_{CC}max
(9) address to W/R

GT

Basic Characteristics: See page 21

Operating Temp. Range: -55 to 125 °C

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GTC54S00 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	FC	14	2								
GTC54S03 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE NAND GATE	100A	DC	14	2	FC	14	2											
GTC54S04 -DC, -FC	HEX INVERTER	212A	DC	14	2	FC	14	2											
GTC54S05 -DC, -FC	HEX INVERTER	212A	DC	14	2	FC	14	2											
GTC54S10 -DC, -FC	TRIPLE 3-INPUT POSITIVE NAND GATE	213A	DC	14	2	FC	14	2											
GTC54S11 -DC, -FC	TRIPLE 3-INPUT POSITIVE AND GATE	337A	DC	14	2	FC	14	2											
GTC54S15 -DC, -FC	TRIPLE 3-INPUT POSITIVE AND GATE	337A	DC	14	2	FC	14	2											
GTC54S20 -DC, -FC	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	FC	14	2											
GTC54S22 -DC, -FC	DUAL 4-INPUT POSITIVE NAND GATE	102A	DC	14	2	FC	14	2											
GTC54S40 -DC, -FC	DUAL 4-INPUT POSITIVE NAND BUFFER	102A	DC	14	2	FC	14	2											
GTC54S64 -DC, -FC	4-WIDE 4-2-3-2 INPUT AND-OR-INVERT GATE	366	DC	14	2	FC	14	2											
GTC54S65 -DC, -FC	4-WIDE 4-2-3-2 INPUT AND-OR-INVERT GATE	366	DC	14	2	FC	14	2											
GTC54S74 -DC, -FC	J-K FLIP FLOP WITH DATA LOCKOUT	220A	DC	14	2	FC	14	2											
GTC54S86 -DC, -FC	QUADRUPLE 2-INPUT EXCLUSIVE-OR GATE WITH TOTEM-POLE OUTPUTS	257	DC	14	2	FC	14	2											
GTC54S112 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	350	DC	16	2	FC	16	2											
GTC54S113 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	351	DC	14	2	FC	14	2											
GTC54S114 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	352	DC	14	2	FC	14	2											
GTC54S133 -DC, -FC	DUAL J-K EDGE-TRIGGERED FLIP FLOP	367	DC	16	2	FC	16	2											
GTC54S134 -DC, -FC	12-INPUT POSITIVE NAND-GATE WITH 3-STATE TOTEM-POLE OUTPUTS	368	DC	16	2	FC	16	2											
GTC54S135 -DC, -FC	QUADRUPLE EXCLUSIVE OR/NOR GATE	369	DC	16	2	FC	16	2											
GTC54S138 -DC, -FC	3-LINE-TO-8-LINE DECODERS/DEMULPLEXER	353	DC	16	2	FC	16	2											
GTC54S139 -DC, -FC	DUAL 2-LINE-TO-4-LINE DECODERS/DEMULPLEXER	354	DC	16	2	FC	16	2											
GTC54S140 -DC, -FC	QUADRUPLE 2-INPUT POSITIVE-NOR LINE DRIVER	102A	DC	14	2	FC	14	2											
GTC54S151 -DC, -FC	8-LINE-TO-1-LINE DATA SELECTOR/MULPLEXER	285	DC	16	2	FC	16	2											
GTC54S153 -DC, -FC	DUAL 4-LINE-TO-1-LINE DATA SELECTORS/MULPLEXER	231	DC	16	2	FC	16	2											
GTC54S157 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULPLEXER	289	DC	16	2	FC	16	2											
GTC54S158 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULPLEXER	336	DC	16	2	FC	16	2											
GTC54S174 -DC, -FC	HEX D-TYPE REGISTER	297	DC	16	2	FC	16	2											
GTC54S175 -DC, -FC	QUADRUPLE D-TYPE REGISTER	298	DC	16	2	FC	16	2											
GTC54S181 -DC, -FC	4-BIT ARITHMETIC LOGIC UNITS/FUNCTION GENERATOR	303	DC	24	2	FC	24	1											
GTC54S182 -DC, -FC	LOOK-AHEAD CARRY GENERATOR	304	DC	16	2	FC	16	2											
GTC54S194 -DC, -FC	BIDIRECTIONAL PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	309	DC	16	2	FC	16	2											
GTC54S195 -DC, -FC	PARALLEL-IN, PARALLEL-OUT SHIFT REGISTER	310	DC	16	2	FC	16	2											
GTC54S251 -DC, -FC	8-LINE-TO-1-LINE DATA SELECTOR/MULPLEXER	370	DC	16	2	FC	16	2											
GTC54S257 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULPLEXER	371	DC	16	2	FC	16	2											
GTC54S258 -DC, -FC	QUADRUPLE 2-LINE-TO-1-LINE DATA SELECTOR/MULPLEXER	372	DC	16	2	FC	16	2											
GTC54S260 -DC, -FC	DUAL 5-INPUT POSITIVE-NOR GATE	618	DC	14	2	FC	14	2											
GTC54S280 -DC, -FC	9-BIT ODD/EVEN PARITY GENERATORS/CHECKERS	623	DC	14	2	FC	14	2											
GTC54S289 -DC, -FC	64-BIT RAM WITH OPEN-COLLECTOR OUTPUTS	626	DC	16	2	FC	16	2											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	t_{pd}	P (1)	RECOMMENDED OPERATING COND.				ELECTRICAL CHARACTERISTICS					SWITCHING CHARACTERISTICS (at $V_{CC}=5V, C_L=15pF, t_{amb}=+25^\circ C$)					REMARKS	
			I_{OH}	I_{OL}	$t_{set up}$ (2)	t_{hold} (2)	V_{IH}	V_{IL}	V_{OH} (2)	V_{OL} (2)	I_{OS} (2)	R_L	t_{PLH}	t_{PHL}	FROM	TO		f
			mA	mA	ns	ns	V	V	V	V	mA	Ω	ns	ns				MHz
			typ	typ	max	max	min	min	min	max	min	max		max	max			
GTC54S00 -DC, -FC	3	19 (g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5				
GTC54S03 -DC, -FC	5	17,5 (g)		20			2	0,8		0,5		280	7,5	7				
GTC54S04 -DC, -FC	3	19 (g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5				
GTC54S05 -DC, -FC	5	17,5 (g)		20			2	0,8		0,5		280	7,5	7				
GTC54S10 -DC, -FC	3	19 (g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5				
GTC54S11 -DC, -FC	4,75	31 (g)	-1	20			2	0,8	2,7	0,5	-100	280	7	7,5				
GTC54S15 -DC, -FC	6	28 (g)		20			2	0,8		0,5		280	8,5	9				
GTC54S20 -DC, -FC	3	19 (g)	-1	20			2	0,8	2,7	0,5	-100	280	4,5	5				
GTC54S22 -DC, -FC	5	17,5 (g)		20			2	0,8		0,5		280	7,5	7				
GTC54S40 -DC, -FC	4	21 (g)	-3	60			2	0,8	2,7	0,5	-225	93	6,5	6,5				at $C_L = 50 pF$
GTC54S64 -DC, -FC	3,5	29 (g)	-1	20			2	0,8	2,7	0,5	-100	280	5,5	5,5				
GTC54S65 -DC, -FC	5,5	36 (g)		20			2	0,8		0,5		280	7,5	8,5				
GTC54S74 -DC, -FC		75 (f1)	-1	20	3	2	2	0,8	2,7	0,5	-100	280	9	9	CLOCK	Q or \bar{Q}	110	
GTC54S86 -DC, -FC	7	250	-1	20			2	0,8	2,7	0,5	-100	280	10,5	10	A or B	Q or \bar{Q}	125	
GTC54S112 -DC, -FC		(f1)7,5	-1	20	3	0	2	0,8	2,7	0,5	-100	280	7	7	CLOCK	Q or \bar{Q}	125	
GTC54S113 -DC, -FC		(f1)7,5	-1	20	3	0	2	0,8	2,7	0,5	-100	280	7	7	CLOCK	Q or \bar{Q}	125	
GTC54S114 -DC, -FC		(f1)7,5	-1	20	3	0	2	0,8	2,7	0,5	-100	280	7	7	CLOCK	Q or \bar{Q}	125	
GTC54S133 -DC, -FC	3	19 (g)	-1	20			2	0,8	2,7	0,5	-100	280	6	7				
GTC54S134 -DC, -FC	4,5	45 (g)	-6,5	20			2	0,8	2,7	0,5	-100	280	6	7,5				
GTC54S135 -DC, -FC	8	325	-1	20			2	0,8	2,7	0,5	-100	280	12	14,5	C	A = B		
GTC54S138 -DC, -FC	8	245	-1	20			2	0,8	2,7	0,5	-100	280	8	11	ENABLE	ANY		
GTC54S139 -DC, -FC	7,5	300	-1	20			2	0,8	2,7	0,5	-100	280	8	10	ENABLE	ANY		
GTC54S140 -DC, -FC		22 (g)	-40	60			2	0,8		0,5	-225	93	6,5	6,5				at $C_L = 50 pF$
GTC54S151 -DC, -FC	4,5	225	-1	20			2	0,8	2,7	0,5	-100	280	18	18	A, B, C	Y		
GTC54S153 -DC, -FC	12	225	-1	20			2	0,8	2,7	0,5	-100	280	9	9	DATA	Y		
GTC54S157 -DC, -FC	5	250	-1	20			2	0,8	2,7	0,5	-100	280	7,5	6,5	DATA			
GTC54S158 -DC, -FC	4	195	-1	20			2	0,8	2,7	0,5	-100	280	6	6	DATA			
GTC54S174 -DC, -FC		450	-1	20	5	3	2	0,8	2,7	0,5	-100	280	22	17	CLOCK			110
GTC54S175 -DC, -FC		300	-1	20	5	3	2	0,8	2,7	0,5	-100	280	22	17	CLOCK			110
GTC54S181 -DC, -FC				20			2	0,8	2,7	0,5	-100	280	10,5	10,5	C_n	C_{n+4}		
GTC54S182 -DC, -FC	7	260	-1	20			2	0,8	2,7	0,5	-100	280	6,5	10	$P_{0,1,2,3}$			
GTC54S194 -DC, -FC		450	-1	20	5	3	2	0,8	2,7	0,5	-100	280	12	16,5	Clock			105
GTC54S195 -DC, -FC		375	-1	20	5	3	2	0,8	2,7	0,5	-100	280	12	16,5	Clock			105
GTC54S251 -DC, -FC	8	275	-6,5	20			2	0,8	2,4	0,5	-100	280	12	12	ANY D	Y		
GTC54S257 -DC, -FC		320	-6,5	20			2	0,8	2,4	0,5	-100	280	7,5	6,5	DATA	ANY		
GTC54S258 -DC, -FC		280	-6,5	20			2	0,8	2,4	0,5	-100	280	6	6	DATA	ANY		
GTC54S260 -DC, -FC		54 (g)	-1	20			2	0,8	2,7	0,5	-100	280	3,5	3,5				
GTC54S280 -DC, -FC	13	335	-1	20			2	0,8	2,7	0,5	-100	180	21	18	DATA	Σ		
GTC54S289 -DC, -FC		(b) 5,9		16	0	0	2	0,8		0,45		300	50	50	Address			EVEN or ODD at $C_L = 50 pF$

NOTES : (1) P:Power dissipation
b:per bit
fl:per flip-flop
g:per gate

(2) (r):referred to rising edge
(f):referred to falling edge
(3) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OH}=\max$
(4) at $V_{CC}=\min, V_{IL}=\max, V_{IH}=\min, I_{OL}=\max$

(5) at V_{CCmax}
(9) address to W/R

GX

Basic Characteristics: See page 21

Operating Temp. Range: 0 to 75 °C

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			GXB10100D, P	QUADRUPLE 3-INPUT NOR GATE (1 INPUT COMMON)	599	DG	16	2	DP	16	8A									
GXB10101D, P	QUADRUPLE 2-INPUT OR/NOR GATE	418	DG	16	2	DP	16	8A												
GXB10102D, P	QUADRUPLE 2-INPUT NOR GATE	419	DG	16	2	DP	16	8A												
GXB10103D, P	QUADRUPLE 2-INPUT 3-OR and 1-OR/NOR GATE	600	DG	16	2	DP	16	8A												
GXB10104D, P	QUADRUPLE 2-INPUT AND GATE	437	DG	16	2	DP	16	8A												
GXB10105D, P	TRIPLE 2-3-2 INPUT OR/NOR GATE	420	DG	16	2	DP	16	8A												
GXB10106D, P	TRIPLE 4-3-3 INPUT NOR GATE	421	DG	16	2	DP	16	8A												
GXB10107D, P	TRIPLE EXCLUSIVE OR/EXCLUSIVE NOR GATE	422	DG	16	2	DP	16	8A												
GXB10108D, P	DUAL 3-INPUT AND/NAND GATE	601	DG	16	2	DP	16	8A												
GXB10109D, P	DUAL 4-5 INPUT OR/NOR GATE	423	DG	16	2	DP	16	8A												
GXB10110D, P	DUAL 3-INPUT/3-OUTPUT OR GATE	424	DG	16	2	DP	16	8A												
GXB10111D, P	DUAL 3-INPUT/3-OUTPUT NOR LINE DRIVER	425	DG	16	2	DP	16	8A												
GXB10112D, P	DUAL 3-INPUT/OUTPUT (1-OR and 2-NOR) LINE DRIVER	602	DG	16	2	DP	16	8A												
GXB10113D, P	QUAD EXCLUSIVE OR GATE	435	DG	16	2	DP	16	8A												
GXB10114D, P	TRIPLE LINE RECEIVER	438	DG	16	2	DP	16	8A												
GXB10115D, P	QUADRUPLE LINE RECEIVER	426	DG	16	2	DP	16	8A												
GXB10116D, P	TRIPLE LINE RECEIVER	438	DG	16	2	DP	16	8A												
GXB10117D, P	DUAL 2-WIDE 2-3 INPUT OR-AND/OR-AND-INVERT GATE	427	DG	16	2	DP	16	8A												
GXB10118D, P	DUAL 2-WIDE 3 INPUT OR/AND GATE	428	DG	16	2	DP	16	8A												
GXB10119D, P	4-WIDE 4-3-3 INPUT OR-AND GATE	429	DG	16	2	DP	16	8A												
GXB10121D, P	4-WIDE OR-AND/OR-AND INVERT GATE	430	DG	16	2	DP	16	8A												
GXB10123D, P	TRIPLE 4-3-3 INPUT BUS DRIVER	591	DG	16	2	DP	16	8A												
GXB10124D, P	QUADRUPLE TTL to ECL TRANSLATOR	439	DG	16	2	DP	16	8A												
GXB10125D, P	QUADRUPLE ECL to TTL TRANSLATOR	440	DG	16	2	DP	16	8A												
GXB10129D, P	QUADRUPLE TTL/IBM BUS RECEIVER/LATCH	593	DG	16	2	DP	16	8A												
GXB10130D, P	DUAL D-LATCH	431	DG	16	2	DP	16	8A												
GXB10131D, P	DUAL D-TYPE MASTER-SLAVE FLIP FLOP	432	DG	16	2	DP	16	8A												
GXB10132D, P	DUAL MULTIPLEXER WITH D-LATCHES	448	DG	16	2	DP	16	8A												
GXB10133D, P	QUADRUPLE LATCH	449	DG	16	2	DP	16	8A												
GXB10134D, P	DUAL MULTIPLEXER WITH D-LATCHES	450	DG	16	2	DP	16	8A												
GXB10135D, P	DUAL JK MASTER-SLAVE FLIP FLOP	592	DG	16	2	DP	16	8A												
GXB10136D, P	UNIVERSAL HEXADECIMAL COUNTER	441	DG	16	2	DP	16	8A												
GXB10137D, P	UNIVERSAL DECADE COUNTER	588	DG	16	2	DP	16	8A												
GXB10139D, P	256-BITS, 8-BITS PER WORD PROM	566	DG	16	2	DP	16	8A												
GXB10141D, P	4-BIT UNIVERSAL SHIFT REGISTER	442	DG	16	2	DP	16	8A												
GXB10145D, P	64-BIT, 4-BIT PER WORD RAM	594	DG	16	2	DP	16	8A												
GXB10147A	128-BIT RANDOM ACCESS MEMORY (HIGH SPEED)	453	DC	16	2															
GXB10155D, E, P	16 BIT ECL CONTENT ADDRESSABLE MEMORY (CAM) organized as an array of 8 words by 2 bits.	634	DG	18	2	DP	18	9												
GXB10158D, P	QUADRUPLE 2-TO-1 MULTIPLEXER (NON INVERTING)	603	DG	16	2	DP	16	8A												
GXB10159D, P	QUADRUPLE 2-TO-1 MULTIPLEXER (INVERTING)	603	DG	16	2	DP	16	8A												
GXB10160D, P	12-BIT PARITY CHECKER/GENERATOR	433	DG	16	2	DP	16	8A												
GXB10161D, P	3-BIT DECODER WITH 2 ENABLE INPUTS (LOW)	434	DG	16	2	DP	16	8A												
GXB10162D, P	3-BIT DECODER WITH 2 ENABLE INPUTS (HIGH)	434	DG	16	2	DP	16	8A												
GXB10164D, P	8-INPUT MULTIPLEXER	436	DG	16	2	DP	16	8A												
GXB10165D, P	8-INPUT PRIORITY ENCODER	443	DG	16	2	DP	16	8A												
GXB10170D, P	9-BIT PARITY CHECKER/GENERATOR	138	DG	16	2	DP	16	8A												
GXB10171D, P	DUAL BINARY 2-BIT DECODER (LOW)	454	DG	16	2	DP	16	8A												
GXB10172D, P	DUAL BINARY 2-BIT DECODER (HIGH)	454	DG	16	2	DP	16	8A												
GXB10173D, P	QUADRUPLE MULTIPLEXER WITH LATCHES	452	DG	16	2	DP	16	8A												
GXB10174D, P	DUAL 4 to 1 MULTIPLEXER	444	DG	16	2	DP	16	8A												

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	SUPPLY VOLTAGE			VOLTAGE LEVELS				NOISE MARGIN		P _{AV} (1)	t _{PHL} at		t _{PLH} at		t _{pd} (2)	t _{THL} (2)	Max f _{op.} (3)	t _{set} (3)	t _{hold} (3)	
	V _{CC1}	V _{CC2}	V _{EE}	V _{IH}	V _{IL}	V _{OH}	V _{OL}	low	high		N	N	N	N						
	V	V	V	V	V	V	V	V	V	mW	ns	ns	ns	ns	ns	ns	ns	ns		
				min	max	min	max	min	min	typ	max	max	max	typ	typ	typ	typ	typ		
GXB10100D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				2,9		2,9		2					
GXB10101D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	25g	2,9		2,9		2	2				
GXB10102D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	25g	2,9		2,9		2	2				
GXB10103D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				2,9		2,9		2					
GXB10104D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	35g	3,5	12	3,5	12	2,7	2				
GXB10105D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	25g	2,9		2,9		2	2				
GXB10106D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	25g	2,9		2,9		2	2				
GXB10107D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	40g	3,7	4	3,7	12	2,5	2,5				
GXB10108D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				3,4		3,4		2,3					
GXB10109D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	25g	2,9		2,9		2	2				
GXB10110D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	75g	3,5		3,5		2,4	2				
GXB10111D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	75g	3,5		3,5		2,4	2,2				
GXB10112D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				3,5		3,5		2,4					
GXB10113D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	40g	3,5		3,5		2,4	2,5				
GXB10114D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	145					2,4	2,1				
GXB10115D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	95	2,9		2,9		2	2				
GXB10116D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	85	2,9		2,9		2	2				
GXB10117D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	100	3,4		3,4		2,3	2,2				
GXB10118D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	100	3,4		3,4		2,3	2,5				
GXB10119D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	100	3,4		3,4		2,3	2,5				
GXB10121D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	100	3,4		3,4		2,3	2,5				
GXB10123D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65			310					3					
GXB10124D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65			380	6		6		3,5	2,5				
GXB10125D, P	0	5	-5,2	-1,105	-1,475	2,5	0,5			380	6		6		5	5				
GXB10129D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65			750	27d		27d		12d				25"	0"
GXB10130D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	110	4	6	4	6	2,5	2,1				
GXB10131D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	230	4,5		4,5		3	2,5	160	1,5	0,5	
GXB10132D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	210					3	2				
GXB10133D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	310	5,4		5,4		4	2			0,7	0,7
GXB10134D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	220					3	2			1,5	0
GXB10135D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	280	4,5		4,5		3	2	140	1	1	
GXB10136D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	625	10,5	4	10,5	4	3,3	2	150	2,1	1,9	
GXB10137D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	625	10,5	4	10,5	4	3,3	2	150	2,1	1,9	
GXB10139D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65													
GXB10141D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	425	3,8		3,8		2,9	1,7	200	2,5	1,5	
GXB10145D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65			625									3,5a	3,5a
GXB10147A	0	0	-5,2	-1,105	-1,475	-0,96	-1,65													
GXB10155D, E, P	0	0	-5,2	-1,810!	-1,850"	-0,96	-1,85				3,3		3,3		2,2				2	1
GXB10158D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				3,3		3,3		2,2					
GXB10159D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				7,5		7,5		4,5	2				
GXB10160D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	310					4	2				
GXB10161D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	315	6		6		4	2				
GXB10162D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	315	6		6		4	2				
GXB10164D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	310	6		6		3	2				
GXB10165D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	545					7	2				
GXB10170D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				6		6		4					
GXB10171D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	315	6		6		4	2				
GXB10172D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	315	6		6		4	2				
GXB10173D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	310	6		6		3,5	2			1,5	0
GXB10174D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	315	6		6		3	2				

NOTES: (1) P_{AV}=Average Power Consumption at 50% duty cycle.
g=per gate
t=total
(2) d=Data input
(3) a=Address setup time, hold time

(") minimum value
(') typical value
(!) maximum value

G X

Basic Characteristics: See page 21
 Operating Temp. Range: 0 to 75 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			GXB10175D, P	QUINT LATCH	445	DG	16	1	DP	16	8A								
GXB10176D, P	HEX "D" MASTER-SLAVE FLIP FLOP	595	DG	16	1	DP	16	8A											
GXB10179D, P	LOOK-AHEAD CARRY BLOCK	446	DG	16	1	DP	16	8A											
GXB10180D, P	DUAL 2-BIT ADDER/SUBTRACTOR	596	DG	16	1	DP	16	8A											
GXB10181D, P	4-BIT ARITHMETIC LOGIC UNIT	447	DG	24	2	DP	24	1											
GXB10188D, P	HEX BUFFER WITH ENABLE	635	DG	16	2	DP	16	8A											
GXB10189D, P	HEX INVERTER WITH ENABLE	635	DG	16	2	DP	16	8A											
GXB10190D, P	QUADRUPLE DIFFERENTIAL RECEIVER/MST-ECL TRANSLATOR	605	DG	16	1	DP	16	8A											
GXB10191D, P	HEX ECL-MST TRANSLATOR	405	DG	16	1	DP	16	8A											
GXB10192D, P	QUADRUPLE CURRENT-MODE BUS DRIVER	403	DG	16	1	DP	16	8A											
GXB10210D, P	DUAL 3-INPUT/3-OUTPUT HIGH SPEED OR GATE	589	DG	16	1	DP	16	8A											
GXB10211D, P	DUAL 3-INPUT/3-OUTPUT HIGH SPEED NOR GATE	590	DG	16	1	DP	16	8A											
GXB10216D, P	HIGH SPEED TRIPLE LINE RECEIVER	597	DG	16	1	DP	16	8A											
GXB10231D, P	HIGH SPEED DUAL D-TYPE MASTER SLAVE FLIP FLOP	598	DG	16	1	DP	16	8A											
GXB10415D, AD	1024-BIT, 1-BIT PER WORD RANDOM ACCESS MEMORIES	637	DG	16	1	DG	16	1											
GXB10422D, AD	256-WORD BY 4-BIT READ/WRITE RANDOM ACCESS MEMORIES	638	DG	24	1	DG	24	1											

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"



TYPE	SUPPLY VOLTAGE			VOLTAGE LEVELS				NOISE MARGIN		t _{PHL} at		t _{PLH} at		t _{pd}	t _{THL}	Max f _{op.}	t _{set}	t _{hold}	
	V _{CC1}	V _{CC2}	V _{EE}	V _{IH}	V _{IL}	V _{OH}	V _{OL}	low	high	P _{AV} (1)	t _{DHL}	N	t _{DLH}						N
	V	V	V	V	V	V	V	V	V	mW	ns		ns						
				min	max	min	max	min	min	typ	max		max						
GXB10175D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	400					2,5	2		1,5	0,5
GXB10176D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	400					4	2		1,5	0,5
GXB10179D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	300	5,5		5,5		3	3,5	150		
GXB10180D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	360					4,5	2			
GXB10181D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	600	11		11		4,5	2			
GXB10188D, P	0	0	-5,2	-0,810!	-1,850"	-0,96	-1,65			170 ^t					2				
GXB10189D, P	0	0	-5,2	-0,810!	-1,850"	-0,96	-1,65			180 ^t					2				
GXB10190D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				3,5		3,5		2,5				
GXB10191D, P	0	0	-5,2	-1,105	-1,475	-0,33	-0,305				4		4		2,2				
GXB10192D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65				6 ^d		6 ^d		2,8				
GXB10210D	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	75g	2,5		2,5		1,5	1,5			
GXB10211D	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	75g	2,5		2,5		1,5	1,5			
GXB10216D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65			100	2,5	2,3	2,5	2,3	1,8				
GXB10231D, P	0	0	-5,2	-1,105	-1,475	-0,96	-1,65	0,125	0,155	270	3,3		3,3		2		225		
GXB10415D, AD	0	0	-5,2	-0,810!	-1,850"	-0,96	-1,65			830 ^t					2			1"	3"
GXB10422D, AD	0	0	-5,2	-0,810!	-1,850"	-0,96	-1,65			980 ^t					2			3"	4"

NOTES: (1) P_{AV}=Average Power Consumption at 50% duty cycle. " minimum value
' typical value (*): GXB10415D } t_{pd} = 10 ns typ
GXB10422D }
g=per gate ! maximum value GXB10415AD } t_{pd} = 7,5 ns typ
t=total GXB10422AD }

HCC

Basic Characteristics: See page 21

Operating Temp. Range: - 55 to 125 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER	PACKAGES										
			(See notes)										
			(LD)	1	2	3	1	2	3	1	2	3	
HCC4000	BD, BF, BK	DUAL 3-INPUT WITH INVERTER NOR GATE	455	DC	14	1	DC	14	6	FC	14	6	6
HCC4001	BD, BF, BK	QUADRUPLE 2-INPUT NOR GATE	456	DC	14	1	DC	14	6	FC	14	6	
HCC4002	BD, BF, BK	DUAL 4-INPUT NOR GATE	457	DC	14	1	DC	14	6	FC	14	6	
HCC4006	BD, BF, BK	18-STAGE STATIC SHIFT REGISTER	458	DC	14	1	DC	14	6	FC	14	6	
HCC4007	UBD,UBF,UBK	DUAL COMPLEMENTARY PAIR PLUS INVERTER	459	DC	14	1	DC	14	6	FC	14	6	
HCC4008	BD, BF, BK	4-BIT FULL ADDER WITH PARALLEL CARRY OUTPUT	460	DC	16	4	DC	16	6	FC	16	3	
HCC4011	BD, BF, BK	QUADRUPLE 2-INPUT NAND GATE	463	DC	14	1	DC	14	6	FC	14	6	
HCC4012	BD, BF, BK	DUAL 4-INPUT NAND GATE	464	DC	14	1	DC	14	6	FC	14	6	
HCC4013	BD, BF, BK	DUAL "D"-TYPE FLIP-FLOP WITH SET-RESET	465	DC	14	1	DC	14	6	FC	14	6	
HCC4014	BD, BF, BK	8-STAGE STATIC SHIFT REGISTER	466	DC	16	4	DC	16	6	FC	16	3	
HCC4015	BD, BF, BK	DUAL 4-STAGE STATIC SHIFT REGISTER	467	DC	16	4	DC	16	6	FC	16	3	
HCC4016	BD, BF, BK	QUADRUPLE BILATERAL SWITCH	468	DC	14	1	DC	14	6	FC	14	6	
HCC4017	BD, BF, BK	DECADE COUNTER/DRIVER PLUS 10 DECODED DECIMAL OUTPUTS	469	DC	16	4	DC	16	6	FC	16	3	
HCC4018	BD, BF, BK	PRESETTABLE DIVIDE-BY-N COUNTER	470	DC	16	4	DC	16	6	FC	16	3	
HCC4019	BD, BF, BK	QUADRUPLE AND-OR SELECTED GATE	471	DC	16	4	DC	16	6	FC	16	3	
HCC4020	BD, BF, BK	14-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER	472A	DC	16	4	DC	16	6	FC	16	3	
HCC4021	BD, BF, BK	8-STAGE STATIC SHIFT REGISTER	466	DC	16	4	DC	16	6	FC	16	3	
HCC4022	BD, BF, BK	DIVIDE-BY-8-COUNTER/DIVIDER WITH 8 DECODED OUTPUTS	473	DC	16	4	DC	16	6	FC	16	3	
HCC4023	BD, BF, BK	TRIPLE 3-INPUT NAND GATE	474	DC	14	1	DC	14	6	FC	14	6	
HCC4024	BD, BF, BK	7-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER	472B	DC	14	1	DC	14	6	FC	14	6	
HCC4025	BD, BF, BK	TRIPLE 3-INPUT NOR GATE	476	DC	14	1	DC	14	6	FC	14	6	
HCC4026	BD, BF, BK	DECADE COUNTER/DIVIDER WITH 7-SEGMENT DISPLAY OUT AND DISPLAY ENABLE	477	DC	16	4	DC	16	6	FC	16	3	
HCC4027	BD, BF, BK	DUAL J-K MASTER-SLAVE FLIP-FLOP	478	DC	16	4	DC	16	6	FC	16	3	
HCC4028	BD, BF, BK	BCD-TO-DECIMAL DECODER	479	DC	16	4	DC	16	6	FC	16	3	
HCC4029	BD, BF, BK	PRESETTABLE UP/DOWN COUNTER BINARY OR BCD-DECADE	480	DC	16	4	DC	16	6	FC	16	3	
HCC4030	BD, BF, BK	QUADRUPLE EXCLUSIVE-OR GATE	223A	DC	14	1	DC	14	6	FC	14	6	
HCC4031	BD, BF, BK	64-STAGE STATIC SHIFT REGISTER	481	DC	16	4	DC	16	6	FC	16	3	
HCC4032	BD, BF, BK	TRIPLE SERIAL ADDERS	482	DC	16	4	DC	16	6	FC	16	3	
HCC4033	BD, BF, BK	DECADE COUNTER/DIVIDER WITH RIPPLE BLANKING	483	DC	16	4	DC	16	6	FC	16	3	
HCC4034	BD	8-STAGE STATIC BIDIRECTIONAL PARALLEL/SERIAL IN/OUT BUS REGISTER	484	DC	24	6							
HCC4035	BD, BF, BK	4-STAGE PARALLEL-IN/PARALLEL-OUT SHIFT REGISTER	485	DC	16	4	DC	16	6	FC	16	3	
HCC4038	BD, BF, BK	TRIPLE SERIAL ADDERS	482	DC	16	4	DC	16	6	FC	16	3	
HCC4040	BD, BF, BK	12-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER	472C	DC	16	4	DC	16	6	FC	16	3	
HCC4041	UBD,UBF,UBK	QUADRUPLE TRUE/COMPLEMENT BUFFER	490	DC	14	6	DC	14	6	FC	14	6	
HCC4042	BD, BF, BK	QUADRUPLE CLOCKED "D"-LATCH	491	DC	16	4	DC	16	6	FC	16	3	
HCC4043	BD, BF, BK	QUADRUPLE NOR S/R LATCH (3-STATE OUTPUTS)	492	DC	16	4	DC	16	6	FC	16	3	
HCC4044	BD, BF, BK	QUADRUPLE NAND S/R LATCH (3-STATE OUTPUTS)	492	DC	16	4	DC	16	6	FC	16	3	
HCC4045	BD, BF, BK	21-STAGE COUNTER	493	DC	16	4	DC	16	6	FC	16	3	
HCC4046	BD, BF, BK	MICROPOWER PHASE-LOCKED LOOP	494	DC	16	4	DC	16	6	FC	16	3	
HCC4047	BD, BF, BK	LOW-POWER MONOSTABLE/ASTABLE MULTIVIBRATOR	495	DC	14	6	DC	14	6	FC	14	6	
HCC4048	BD, BF, BK	MULTIFUNCTION EXPANDABLE 8-INPUT GATE	496	DC	16	4	DC	16	6	FC	16	3	
HCC4049	UBD,UBF,UBK	HEX BUFFER/CONVERTER INVERTING TYPE	497	DC	16	4	DC	16	6	FC	16	3	
HCC4050	BD, BF, BK	HEX BUFFER/CONVERTER NON-INVERTING TYPE	498	DC	16	4	DC	16	6	FC	16	3	

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) = 3 to 15 V ; $I_L = 10$ pA (at $T_{amb} = 25^\circ\text{C}$) ; $C_L = 5$ pF (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)												DYNAMIC ELECTRIC CHARACTER. (see note 4)							
	I_{DL} (2)	I_{DL}^{tot} (3)	V_{OL}	V_{OH}	V_{IH}	V_{IL}	V_{OL}	V_{OH}	I_{OL}	I_{OH}	I_{PLH}	I_{PLH}	t_{PLH}	t_{PHL}	t_{TLH}	t_{THL}	t_{ϕ}	t_s	$f_{\phi max}$	
	μA	μW	V	V	V	V	V	V	mA	mA	V	V	ns	ns	ns	ns	μs	ns	MHz	
	max	max	max	max	min	min	min	min	min	min	max	max	max	max	max	max	max	max	max	
HCC4000	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4001	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4002	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4006	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	45'	15'	25'	12'
HCC4007	UBD,UBF,UBK	0,5	*2.10	0,05	9,95"	*8	1-9	*2!	9-1	*1,3	0,5	*1,3	9,5	60	60	100				
HCC4008	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	320	320	100				
HCC4011	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4012	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4013	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130	130	100	40'	4	10'	16'
HCC4014	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	40'	15	25'	12'
HCC4015	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	40'	15	20'	12'
HCC4016	BD, BF, BK	0,5	*2.10	R _{ON} = 960 Ω at $R_L = 10$ k Ω , $V_C = V_{DD} = +10$ V ; $V_{SS} = 0$; $V_{IS} = +0,25$ V										100'	50'	100'	(6)	75'	12'	
HCC4017	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	80'	(6)	6'	14'
HCC4018	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	180	180	100				
HCC4019	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4020	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	170'	170'	50'	30'	(6)		16'
HCC4021	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	40'	15	15'	12'
HCC4022	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	100'	(6)	75'	12'
HCC4023	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4024	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	170'	170'	50'	30'	(6)		16'
HCC4025	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100				
HCC4026	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	125'	125'	50'	70'	(6)	30'	6'
HCC4027	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130	130	100	30'	4	35'	16'
HCC4028	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100				
HCC4029	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130'	130'	50'	30'	0,2"	10'	10'
HCC4030	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130	130	100				
HCC4031	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	45'	15'	25'	12'
HCC4032	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120'	120'	50'				
HCC4033	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	125'	125'	50'	70'	(6)	30'	6'
HCC4034	BD	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	300'	300'	50'	85'	15'	100'	5'
HCC4035	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	100'	15'	25'	12'
HCC4038	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120'	120'	50'				
HCC4040	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	170'	170'	50'	30'	(6)		16'
HCC4041	UBD,UBF,UBK	2	*2.10	0,05	9,95"	*8	1-9	*2!	9-1	*5	0,5	*5	9,5	70	70	40				
HCC4042	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	110	110	100	50'	(7)	0'	
HCC4043	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100	40'			
HCC4044	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100	40'			
HCC4045	BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*18	0,5	*18	9,5	1200'	1200'	50'	50'	10'		16'
HCC4046	BD, BF, BK	25'	*700'	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	50'	50'	50'				
HCC4047	BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	200'	5'		1,4'
HCC4048	BD, BF, BK	0,5	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130'	130'	50'				
HCC4049	BD, BF, BK	2	*2.10	0,05	9,95"	*8	1	*2!	9-1	*8	0,5	*1,8	9,5	90	30	80				
HCC4050	BD, BF, BK	2	*2.10	0,05	9,95"	*7	9	*3!	1	*8	0,5	*1,8	9,5	90	100	80				

NOTES : (1) Test conditions: $T_{amb} = 25^\circ\text{C}$
 $V_{DD} = 10\text{V}$
(2) Same as I_L
(3) Same as P_D

(4) Test conditions: $T_{amb} = 25^\circ\text{C}$; $C_L = 15\text{pF}$
Input rise and fall time = 20ns
Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ\text{C}$
(5) Same as t_{pWH} or t_{pWL} (6) Unlimited
(7) Not rise or fall time sensitive



Basic Characteristics: See page 21
 Operating Temp. Range: -55 to 125 °C

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER	PACKAGES										
			(See notes)										
			(LD)	1	2	3	1	2	3	1	2	3	
HCC4051	BD, BF, BK	SINGLE 8-CHANNEL MULTIPLEXER/DEMUTIPLEXER	499	DC	16	4		DC	16	6	FC	16	3
HCC4052	BD, BF, BK	DIFFERENTIAL 4-CHANNEL MULTIPLEXER/DEMUTIPLEXER	500	DC	16	4		DC	16	6	FC	16	3
HCC4053	BD, BF, BK	TRIPLE 2-CHANNEL MULTIPLEXER/DEMUTIPLEXER	501	DC	16	4		DC	16	6	FC	16	3
HCC4054	BD, BF, BK	4-SEGMENT DISPLAY DRIVER	502	DC	16	4		DC	16	6	FC	16	3
HCC4055	BD, BF, BK	BCD-TO-7-SEGMENT DECODER/DRIVER WITH "DISPLAY-FREQUENCY" OUTPUT	503	DC	16	4		DC	16	6	FC	16	3
HCC4056	BD, BF, BK	BCD-TO-7-SEGMENT DECODER/DRIVER WITH STROBED LATCH FUNCTION	504	DC	16	4		DC	16	6	FC	16	3
HCC4060	BD, BF, BK	14-STAGE BINARY COUNTER/DIVIDER AND OSCILLATOR	507	DC	16	4		DC	16	6	FC	16	3
HCC4063	BD, BF, BK	4-BIT MAGNITUDE COMPARATOR	508	DC	16	4		DC	16	6	FC	16	3
HCC4066	BD, BF, BK	QUADRUPLE BILATERAL SWITCH	468	DC	16	4		DC	14	6	FC	14	6
HCC4067	BD, BF, BK	ANALOG SINGLE 16-CHANNEL MULTIPLEXER/DEMUTIPLEXER	510A	DC	24	6					FC	24	2
HCC4068	BD, BF, BK	8-INPUT NAND/AND GATE	511	DC	14	1		DC	14	6	FC	14	6
HCC4069	UBD,UBF,UBK	HEX INVERTER	512	DC	14	1		DC	14	6	FC	14	6
HCC4070	BD, BF, BK	QUADRUPLE EXCLUSIVE-OR GATE	223A	DC	14	1		DC	14	6	FC	14	6
HCC4071	BD, BF, BK	QUADRUPLE 2-INPUT OR GATE	239	DC	14	1		DC	14	6	FC	14	6
HCC4072	BD, BF, BK	DUAL 4-INPUT OR GATE	514	DC	14	1		DC	14	6	FC	14	6
HCC4073	BD, BF, BK	TRIPLE 3-INPUT AND GATE	515	DC	14	1		DC	14	6	FC	14	6
HCC4075	BD, BF, BK	TRIPLE 3-INPUT OR GATE	516	DC	14	1		DC	14	6	FC	14	6
HCC4076	BD, BF, BK	4-BIT D-TYPE REGISTER	517	DC	16	6		DC	16	6	FC	16	3
HCC4077	BD, BF, BK	QUADRUPLE EXCLUSIVE-NOR GATE	361	DC	14	1		DC	14	6	FC	14	6
HCC4078	BD, BF, BK	8-INPUT NOR/OR GATE	519	DC	14	1		DC	14	6	FC	14	6
HCC4081	BD, BF, BK	QUADRUPLE 2-INPUT AND GATE	520	DC	14	1		DC	14	6	FC	14	6
HCC4082	BD, BF, BK	DUAL 4-INPUT AND GATE	521	DC	14	1		DC	14	6	FC	14	6
HCC4085	BD, BF, BK	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	522	DC	14	1		DC	14	6	FC	14	6
HCC4086	BD, BF, BK	EXPANDABLE 4-WIDE 2-INPUT AND-OR-INVERT GATE	523	DC	14	1		DC	14	6	FC	14	6
HCC4089	BD, BF, BK	BINARY RATE MULTIPLIER	538	DC	16	4		DC	16	6	FC	16	3
HCC4093	BD, BF, BK	QUADRUPLE 2-INPUT NAND SCHMITT-TRIGGERS	524	DC	14	1		DC	14	6	FC	14	6
HCC4094	BD, BF, BK	8-STAGE SHIFT-AND-STORE BUS REGISTER	525	DC	16	4		DC	16	6	FC	16	3
HCC4095	BD, BF, BK	GATED J-K MASTER-SLAVE FLIP-FLOP (NON-INVERTING)	526	DC	14	1		DC	14	6	FC	14	6
HCC4096	BD, BF, BK	GATED J-K MASTER-SLAVE FLIP-FLOP (INVERTING AND NON-INVERTING)	526	DC	14	1		DC	14	6	FC	14	6
HCC4097	BD, BF, BK	ANALOG DIFFERENTIAL 8-CHANNEL MULTIPLEXER/DEMUTIPLEXER	510B	DC	24	6		DC	24	3	FC	24	2
HCC4098	BD, BF, BK	DUAL MONOSTABLE MULTIVIBRATOR	562	DC	16	4		DC	16	6	FC	16	3
HCC4099	BD, BF, BK	8-BIT ADDRESSABLE LATCH	528	DC	16	4		DC	16	6	FC	16	3

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

$V_{DD}-V_{SS}$ (recommended) = 3 to 15 V ; $I_L = 10 \mu A$ (at $T_{amb} = 25^\circ C$) ; $C_L = 5 \text{ pF}$ (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)											DYNAMIC ELECTRICAL CHARACTERISTICS (see note 4)					
	I_{DL} (2)	P_{DL} (3)	V_{OL}	V_{OH}	V_{IH}	V_{IL}	I_{dN} at V_O	I_{dP} at V_O	t_{PLH}	t_{PHL}	t_{TLH}	t_{TTL}	$t_{r\phi}$	$t_{f\phi}$	t_s	$f_{\phi max}$	
	μA	μW	V	V	V	V	mA	mA	ns	ns	ns	ns	μs	ns	MHz		
	max	max	max	max	min	min	min	min	max	max	max	max	max	max	max	max	
HCC4051	BD, BF, BK	10	*2.10			*7		*3!									
HCC4052	BD, BF, BK	10	*2.10			*7		*3!									
HCC4053	BD, BF, BK	10	*2.10			*7		*3!									
HCC4054	BD, BF, BK	10	*2.10	0,05	9,95*	*7	1-9	*3!	9-1	*1,3	0,5	*0,45	9,5	680'	680'	200'	
HCC4055	BD, BF, BK	10	*2.10	0,05	9,95*	*8	1-9	*2!	9-1	*1,3	0,5	*0,45	9,5	1150	1150	200	
HCC4056	BD, BF, BK	10	*2.10	0,05	9,95*	*7	1-9	*3!	9-1	*1,3	0,5	*0,45	9,5	1150	1150	200	
HCC4060	BD, BF, BK	10	*2.10	0,05	9,95*	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	340'	340'	50'	
HCC4063	BD, BF, BK	10	0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	500	500	100		
HCC4066	BD, BF, BK	0,01	*2.10	R _{ON} = 120 Ω at $R_L = 10 \text{ k}\Omega$ $V_C = V_{DD} = +10 \text{ V}$; $V_{SS} = 0$; $V_{IS} = 0$ to 10 V													
HCC4067	BD, , BK	0,2'				4,5'		4,5'						200'	200'		
HCC4068	BD, BF, BK	1		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	200	260	100	
HCC4069	UBD,UBF,UBK	0,5	*2.10	0,05	9,95*	*8	1-9	*2!	9-1	*1,3	0,5	*1,3	9,5	60	60	100	
HCC4070	BD, BF, BK	0,01'		0,05	10'	3	1	3	9	1,8'	0,5	-1,8'	9,5	70'	70'	50'	
HCC4071	BD, BF, BK	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	140	200	100	
HCC4072	BD, BF, BK	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	140	200	100	
HCC4073	BD, BF, BK	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	170	130	100	
HCC4075	BD, BF, BK	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	1	100		
HCC4076	BD, BF, BK	0,02'		0,05	10'	3	1	3	9	0,9	0,5	-1,8'	9,5	120	120	50'	
HCC4077	BD, BF, BK	0,01'		0,05	10'	3	1	3	9	1,8'	0,5	-1,8'	9,5	70	70	50	
HCC4078	BD, BF, BK	1		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	340	160	100	
HCC4081	BD, BF, BK	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	170	130	100	
HCC4082	BD, BF, BK	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	170	130	100	
HCC4085	BD, BF, BK	10		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	250	180	100	
HCC4086	BD, BF, BK	1		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	280	180	100	
HCC4089	BD, BF, BK	0,02'		0	10'	4,5	1	4,5	9	1,8'	0,5	-1,8'	9,5	90'	90'	50'	
HCC4093	BD, BF, BK	1		0,01	10'	4,5	10	4,5'	0	0,9	0,5	-0,9	9,5	300	300	100	
HCC4094	BD, BF, BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	250	220	100	
HCC4095	BD, BF, BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	220	200	100	
HCC4096	BD, BF, BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	220	200	100	
HCC4097	BD, , BK	0,2'				4,5		4,5						200	200		
HCC4098	BD, BF, BK	0,02'		0	10'	4,5	1	4,5'	9	1,8'	0,5	-1,8'	9,5	125'	125'	50'	
HCC4099	BD, BF, BK	0,02'				4,5		4,5'		1,8'	0,5	-1,8'	9,5	1			

NOTES : (1) Test conditions: $T_{amb} = 25^\circ C$
 $V_{DD} = 10V$
(2) Same as I_L
(3) Same as P_D

(4) Test conditions: $T_{amb} = 25^\circ C$; $C_L = 15pF$
Input rise and fall time = 20ns
Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ C$
(5) Same as t_{pWH} or t_{pWL} (6) Unlimited

HCC

Basic Characteristics: See page 21

Operating Temp. Range: -55 to 125 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)									
			1	2	3	1	2	3	1	2	3	
			HCC4502	BD, BF, BK	STROBED HEX INVERTER BUFFER	136	DC	16	4	DC	16	6
HCC4508	BD	DUAL 4-BIT LATCH	742	DC	24	6						
HCC4510	BD, BF, BK	PRESETTABLE UP/DOWN COUNTERS	563	DC	16	4	DC	16	6	FC	16	3
HCC4511	BD, BF, BK	BCD-TO-7-SEGMENT LATCH DECODER DRIVER	529	DC	16	4	DC	16	6	FC	16	3
HCC4512	BD, BF, BK	8-CHANNEL DATA SELECTOR	743	DC	16	4						
HCC4514	BD, , BK	4-BIT LATCH/4-TO-16 LINE DECODER (OUTPUTS HIGH)	530	DC	24	6				FC	24	2
HCC4515	BD, , BK	4-BIT LATCH/4-TO-16 LINE DECODER (OUTPUTS LOW)	530	DC	24	6				FC	24	2
HCC4516	BD, BF, BK	PRESETTABLE UP/DOWN COUNTERS BINARY TYPE	564	DC	16	4	DC	16	6	FC	16	3
HCC4518	BD, BF, BK	DUAL BCD UP-COUNTER	531	DC	16	4	DC	16	6	FC	16	3
HCC4520	BD, BF, BK	DUAL BINARY UP-COUNTER	531	DC	16	4	DC	16	6	FC	16	3
HCC4527	BD, BF, BK	BCD RATE MULTIPLIER	531	DC	16	4	DC	16	6	FC	16	3
HCC4532	BD, BF, BK	8-BIT PRIORITY ENCODER	565	DC	16	4	DC	16	6	FC	16	3
HCC4555	BD, BF, BK	DUAL BINARY-TO-1-OF-4-DECODER/DEMULTIPLEXER (OUTPUTS HIGH)	533	DC	16	4	DC	16	6	FC	16	3
HCC4556	BD, BF, BK	DUAL BINARY-TO-1-OF-4-DECODER/DEMULTIPLEXER (OUTPUTS LOW)	535	DC	16	4	DC	16	6	FC	16	3
			536	DC	16	4	DC	16	6	FC	16	3
HCC40100	BD, BF, BK	32-STAGE STATIC LEFT/RIGHT SHIFT REGISTER	744	DC	16	4	DC	16	6	FC	16	3
HCC40101	BD, BF, BK	9-BIT PARITY GENERATOR/CHECKER	745	DC	14	1	DC	14	6	FC	14	6
HCC40102	BD, BF, BK	8-STAGE PRESETTABLE 2-DECADE BCD SYNCHRONOUS DOWN COUNTER	746A	DC	16	4	DC	16	6	FC	16	3
HCC40103	BD, BF, BK	8-STAGE PRESETTABLE 8-BIT BINARY SYNCHRONOUS DOWN COUNTER	746B	DC	16	4	DC	16	6	FC	16	3
HCC40105	BD, BF, BK	FIFO REGISTER	747	DC	16	4	DC	16	6	FC	16	3
HCC40106	BD, BF, BK	HEX SCHMITT TRIGGER	235	DC	14	1	DC	14	6	FC	14	6
HCC40107	BD, BF, BK	DUAL 2-INPUT NAND BUFFER/DRIVER	748	DC	14	1	DC	14	6	FC	14	6
HCC40108	BD, BF, BK	4X4 MULTIPOINT REGISTER	749	DC	24	6	DC	24	3	FC	24	2
HCC40109	BD, BF, BK	QUAD LOW-TO-HIGH VOLTAGE LEVEL SHIFTER	750	DC	16	4	DC	16	6	FC	16	3
HCC40160	BD, BF, BK	DECADE SYNCHRONOUS PROGRAMMABLE 4-BIT COUNTER WITH ASYNC. CLEAR	751A	DC	16	4	DC	16	6	FC	16	3
HCC40161	BD, BF, BK	BINARY SYNC. PROGRAMMABLE 4-BIT COUNTER WITH ASYNC. CLEAR	751B	DC	16	4	DC	16	6	FC	16	3
HCC40162	BD, BF, BK	DECADE SYNC. PROGRAMMABLE 4-BIT COUNTER WITH SYNC. CLEAR	751A	DC	16	4	DC	16	6	FC	16	3
HCC40163	BD, BF, BK	BINARY SYNC. PROGRAMMABLE 4-BIT COUNTER WITH SYNC. CLEAR	751B	DC	16	4	DC	16	6	FC	16	3
HCC40174	BD, BF, BK	HEX "D" - TYPE FLIP FLOP	752	DC	16	4	DC	16	6	FC	16	3
HCC40181	BF, BK	4-BIT ARITHMETIC LOGIC UNIT	753	DC	24	3	DC	24	3	FC	24	2
HCC40182	BD, BF, BK	LOOK-AHEAD CARRY GENERATOR	754	DC	16	4	DC	16	6	FC	16	3
HCC40192	BD, BF, BK	BCD PRESETTABLE UP/DOWN COUNTER (DUAL CLOCK WITH RESET)	755A	DC	16	4	DC	16	6	FC	16	3
HCC40193	BD, BF, BK	BINARY PRESETTABLE UP/DOWN COUNTER (DUAL CLOCK WITH RESET)	755B	DC	16	4	DC	16	6	FC	16	3
HCC40194	BD, BF, BK	4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTER	579	DC	16	4	DC	16	6	FC	16	3
HCC40208	BD, BF, BK	4 X 4 MULTIPOINT REGISTER	749	DC	24	6	DC	24	3	FC	24	2
HCC40257	BD, BF, BK	QUAD 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	756	DC	16	4	DC	16	6	FC	16	3

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) = 3 to 15 V ; $I_L = 10 \mu A$ (at $T_{amb} = 25^\circ C$) ; $C_L = 5 pF$ (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)												DYNAMIC ELECTRIC CHARACTER. (see note 4)					
	I_{DL} (2)	P_{DL} (3)	V_{OL}	V_{OH}	V_{IH}	V_{IL}	I_{dN}	I_{dP}	t_{PLH}	t_{PHL}	t_{TLH}	$t_{\phi H}$	$t_{\phi L}$	t_s	$f_{\phi max}$			
	μA	μW	V	V	V	V	mA	mA	ns	ns	ns	ns	μs	ns	MHz			
	max	max	max	max	min	min	min	min	max	max	max	max	max	max	max			
HCC4502 BD, BF, BK	0,01'		0	10'			12,5'	0,5	-1,8	9,5	90'	60	50'					
HCC4508 BD	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100			
HCC4510 BD, BF, BK	10		0,05	10'	3	1	3	9	0,9	0,5	-0,9	9,5	200	200	100			
HCC4511 BD, BF, BK	0,01'			9,1'									250'	290'	1000'			
HCC4512 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100			
HCC4514 BD, , BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	300	300	100			
HCC4515 BD, , BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	300	300	100			
HCC4516 BD, BF, BK	10		0,05	10'	3	1	3	9	0,9	0,5	-0,9	9,5	200	200	100			
HCC4518 BD, BF, BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	230	230	100			
HCC4520 BD, BF, BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	230	230	100			
HCC4527 BD, BF, BK	0,02'		0	10'	4,5'	1	4,5'	9	1,8'	0,5	-1,8	9,5	90'	90'	130'			
HCC4532 BD, BF, BK	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	110	110	100			
HCC4555 BD, BF, BK	10		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	190	190	100			
HCC4556 BD, BF, BK	10		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	190	190	100			
HCC40100 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	330	330	100			
HCC40101 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	300	300	100			
HCC40102 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	260	260	100			
HCC40103 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	260	260	100			
HCC40105 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	180	180	100			
HCC40106 BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100			
HCC40107 BD, BF, BK	2	*2.10			*7	1-9	*3!	9	*37	0,5			90	90	40			
HCC40108 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	280	280	100			
HCC40109 BD, BF, BK	2	*2.10	0,05	9,95"	*3,5	1-9	*1,5!	1-9	*1,3	0,5	*1,3	9,5	440	440	80			
HCC40160 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100			
HCC40161 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100			
HCC40162 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100			
HCC40163 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100	100	50'			
HCC40174 BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100			
HCC40181 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	320	320	100			
HCC40182 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	200	200	100			
HCC40192 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	240	240	100			
HCC40193 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	240	240	100			
HCC40194 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	150'	150'	50'			
HCC40208 BD, BF, BK	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	280	280	100			
HCC40257 BD, BF, BK	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100			

NOTES : (1) Test conditions: $T_{amb} = 25^\circ C$
 $V_{DD} = 10V$

(2) Same as I_L

(3) Same as P_D

(') typical value (") minimum value

(4) Test conditions: $T_{amb} = 25^\circ C$; $C_L = 15pF$

Input rise and fall time=20ns

Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ C$

(5) Same as t_{pWH} or t_{pWL}

(6) \emptyset to Q output

(7) carry-in set-up time

(8) \emptyset to output

HCF

Basic Characteristics: See page 21

Operating Temp. Range: -40 to 85 °C

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
HCF4000	BE, BF	DUAL 3-INPUT WITH INVERTER NOR GATE	455	DP	14	6	DC	14	6										
HCF4001	BE, BF	QUADRUPLE 2-INPUT NOR GATE	456	DP	14	6	DC	14	6										
HCF4002	BE, BF	DUAL 4-INPUT NOR GATE	457	DP	14	6	DC	14	6										
HCF4006	BE, BF	18-STAGE STATIC SHIFT REGISTER	458	DP	14	6	DC	14	6										
HCF4007	UBE, UBF	DUAL COMPLEMENTARY PAIR PLUS INVERTER	459	DP	14	6	DC	14	6										
HCF4008	UBE, UBF	4-BIT FULL ADDER WITH PARALLEL CARRY OUTPUT	460	DP	16	6	DC	16	6										
HCF4011	BE, BF	QUADRUPLE 2-INPUT NAND GATE	463	DP	14	6	DC	14	6										
HCF4012	BE, BF	DUAL 4-INPUT NAND GATE	464	DP	14	6	DC	14	6										
HCF4013	BE, BF	DUAL "D"-TYPE FLIP-FLOP WITH SET-RESET	465	DP	14	6	DC	14	6										
HCF4014	BE, BF	8-STAGE STATIC SHIFT REGISTER	466	DP	16	6	DC	16	6										
HCF4015	BE, BF	DUAL 4-STAGE STATIC SHIFT REGISTER	467	DP	16	6	DC	16	6										
HCF4016	BE, BF	QUADRUPLE BILATERAL SWITCH	468	DP	14	6	DC	14	6										
HCF4017	BE, BF	DECADE COUNTER/DRIVER PLUS 10 DECODED DECIMAL OUTPUTS	469	DP	16	6	DC	16	6										
HCF4018	BE, BF	PRESETTABLE DIVIDE-BY-N COUNTER	470	DP	16	6	DC	16	6										
HCF4019	BE, BF	QUADRUPLE AND-OR SELECTED GATE	471	DP	16	6	DC	16	6										
HCF4020	BE, BF	14-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER	472A	DP	16	6	DC	16	6										
HCF4021	BE, BF	8-STAGE STATIC SHIFT REGISTER	466	DP	16	6	DC	16	6										
HCF4022	BE, BF	DIVIDE-BY-8-COUNTER/DIVIDER WITH 8 DECODED OUTPUTS	473	DP	16	6	DC	16	6										
HCF4023	BE, BF	TRIPLE 3-INPUT NAND GATE	474	DP	14	6	DC	14	6										
HCF4024	BE, BF	7-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER	472B	DP	14	6	DC	14	6										
HCF4025	BE, BF	TRIPLE 3-INPUT NOR GATE	476	DP	14	6	DC	14	6										
HCF4026	BE, BF	DECADE COUNTER/DIVIDER WITH 7-SEGMENT DISPLAY OUT AND DISPLAY ENABLE	477	DP	16	6	DC	16	6										
HCF4027	BE, BF	DUAL J-K MASTER-SLAVE FLIP-FLOP	478	DP	16	6	DC	16	6										
HCF4028	BE, BF	BCD-TO-DECIMAL DECODER	479	DP	16	6	DC	16	6										
HCF4029	BE, BF	PRESETTABLE UP/DOWN COUNTER BINARY OR BCD-DECADE	480	DP	16	6	DC	16	6										
HCF4030	BE, BF	QUADRUPLE EXCLUSIVE-OR GATE	223A	DP	14	6	DC	14	6										
HCF4031	BE, BF	64-STAGE STATIC SHIFT REGISTER	481	DP	16	6	DC	16	6										
HCF4032	BE, BF	TRIPLE SERIAL ADDERS	482	DP	16	6	DC	16	6										
HCF4033	BE, BF	DECADE COUNTER/DIVIDER WITH RIPPLE BLANKING	483	DP	14	6	DC	14	6										
HCF4034	BD, BE	8-STAGE STATIC BIDIRECTIONAL PARALLEL/SERIAL IN/OUT BUS REGISTER	484	DC	24	6	DP	24	6										
HCF4035	BE, BF	4-STAGE PARALLEL-IN/PARALLEL-OUT SHIFT REGISTER	485	DP	16	6	DC	16	6										
HCF4038	BE, BF	TRIPLE SERIAL ADDERS	482	DP	16	6	DC	16	6										
HCF4040	BE, BF	12-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER	472C	DP	16	6	DC	16	6										
HCF4041	UBE, UBF	QUADRUPLE TRUE/COMPLEMENT BUFFER	490	DP	14	6	DC	14	6										
HCF4042	BE, BF	QUADRUPLE CLOCKED "D"-LATCH	491	DP	16	6	DC	16	6										
HCF4043	BE, BF	QUADRUPLE NOR S/R LATCH (3-STATE OUTPUTS)	492	DP	16	6	DC	16	6										
HCF4044	BE, BF	QUADRUPLE NAND S/R LATCH (3-STATE OUTPUTS)	492	DP	16	6	DC	16	6										
HCF4045	BE, BF	21-STAGE COUNTER	493	DP	16	6	DC	16	6										
HCF4046	BE, BF	MICROPOWER PHASE-LOCKED LOOP	494	DP	16	6	DC	16	6										
HCF4047	BE, BF	LOW-POWER MONOSTABLE/ASTABLE MULTIVIBRATOR	495	DP	14	6	DC	14	6										
HCF4048	BE, BF	MULTIFUNCTION EXPANDABLE 8-INPUT GATE	496	DP	16	6	DC	16	6										
HCF4049	UBE, UBF	HEX BUFFER/CONVERTER INVERTING TYPE	497	DP	16	6	DC	16	6										
HCF4050	BE, BF	HEX BUFFER/CONVERTER NON-INVERTING TYPE	498	DP	16	6	DC	16	6										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) = 3 to 15 V ; $I_T = 10 \mu A$ (at $T_{amb} = 25^\circ C$) ; $C_L = 5 \text{ pF}$ (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)											DYNAMIC ELECTRIC CHARACTER. (see note 4)								
	P_{tot}		V_{OL}	V_{OH}	V_{IH}	V_{IL}	V_{OL}	V_{OL}	I_{OL}	I_{OH}	I_{OH}	I_{OH}	t_{PLH}	t_{PHL}	t_{TLH}	$t_{W\phi H}$	$t_{r\phi}$	t_s	$f_{\phi max}$	
	I_{DL}	P_{DL}																		
	μA	μW	V	V	V	V	V	V	mA	V	mA	V	ns	ns	ns	ns	μs	ns	MHz	
max	max	max	max	min	min	min	min	min	min	min	min	max	max	max	max	max	max	max		
HCF4000 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4001 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4002 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4006 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	45'	15'	25'	12'	
HCF4007 UBE, UBF	0,5	2.10	0,05	9,95"	*8	1-9	*2!	9-1	*1,3	0,5	*1,3	9,5	60	60	100					
HCF4008 UBE, UBF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	320	320	100					
HCF4011 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4012 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4013 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130	130	100	40'	4	10'	16'	
HCF4014 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	40'	15	25'	12'	
HCF4015 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	40'	15	20'	12'	
HCF4016 BE, BF	0,5	2.10	$R_{ON} = 960 \Omega$ at $R_L = 10 \text{ k}\Omega$; $V_C = V_{DD} = +10 \text{ V}$; $V_{SS} = 0$; $V_{IS} = +0,25 \text{ V}$						9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	100'	(6)	75'	12'
HCF4017 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	180	180	100	80'	(6)	6'	14'	
HCF4018 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4019 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	170'	170'	50'	30'	(6)		16'	
HCF4020 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	40'	15	15'	12'	
HCF4021 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	100'	(6)	75'	12'	
HCF4022 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4023 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	170'	170'	50'	30'	(6)		16'	
HCF4024 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120	120	100					
HCF4025 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	125'	125'	50'	70'	(6)	30'	6'	
HCF4026 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130	130	100	30'	4	35'	16'	
HCF4027 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100					
HCF4028 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130'	130'	50'	30'	0,2"	10'	10'	
HCF4029 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	100'	(6)			
HCF4030 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130	130	100					
HCF4031 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120'	120'	50'	45'	15'	25'	12'	
HCF4032 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120'	120'	50'					
HCF4033 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	125'	125'	50'	70'	(6)	30'	6'	
HCF4034 BD, BE	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	300'	300'	50'	85'	15'	100'	5'	
HCF4035 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	100'	15'	25'	12'	
HCF4038 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	120'	120'	50'					
HCF4040 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	170'	170'	50'	30'	(6)		10'	
HCF4041 UBE, UBF	2	2.10	0,05	9,95"	*8	1-9	*2!	9-1	*5	0,5	*5	9,5	70	70	40					
HCF4042 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	110	110	100	50'	(7)	0'		
HCF4043 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100	40'				
HCF4044 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100	40'				
HCF4045 BE, BF	10	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	1200'	1200'	50'	50'	10'		16', 1,4'	
HCF4046 BE, BF	25'	700'	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100'	100'	50'	200'	5'			
HCF4047 BE, BF	2	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	130'	130'	50'					
HCF4048 BE, BF	0,5	2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	90	30	80					
HCF4049 UBE, UBF	2	2.10	0,05	9,95"	*8	1	*2!	9-1	*8	0,5	*1,8	9,5	90	30	80					
HCF4050 BE, BF	2	2.10	0,05	9,95"	*7	9	*3!	1	*8	0,5	*1,8	9,5	90	100	80					

NOTES :

- (1) Test conditions: $T_{amb} = 25^\circ C$
 $V_{DD} = 10V$
- (2) Same as I_L
- (3) Same as P_{DI}

- (4) Test conditions: $T_{amb} = 25^\circ C$; $C_L = 15pF$
Input rise and fall time = 20ns
Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ C$
- (5) Same as t_{pWH} or t_{pWL}
- (6) Unlimited
- (7) Not rise or fall time sensitive

HCF

Basic Characteristics: See page 21

Operating Temp. Range: -40 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			HCF4051	BE, BF	SINGLE 8-CHANNEL MULTIPLEXER/DEMUTIPLEXER	499	DP	16	6	DC	16	6							
HCF4052	BE, BF	DIFFERENTIAL 4-CHANNEL MULTIPLEXER/DEMUTIPLEXER	500	DP	16	6	DC	16	6										
HCF4053	BE, BF	TRIPLE 2-CHANNEL MULTIPLEXER/DEMUTIPLEXER	501	DP	16	6	DC	16	6										
HCF4054	BE, BF	4-SEGMENT DISPLAY DRIVER	502	DP	16	6	DC	16	6										
HCF4055	BE, BF	BCD-TO-7-SEGMENT DECODER/DRIVER WITH "DISPLAY-FREQUENCY" OUTPUT	503	DP	16	6	DC	16	6										
HCF4056	BE, BF	BCD-TO-7-SEGMENT DECODER/DRIVER WITH STROBED LATCH FUNCTION	504	DP	16	6	DC	16	6										
HCF4060	BE, BF	14-STAGE BINARY COUNTER/DIVIDER AND OSCILLATOR	507	DP	16	6	DC	16	6										
HCF4063	BE, BF	4-BIT MAGNITUDE COMPARATOR	508	DP	16	6	DC	16	6										
HCF4066	BE, BF	QUADRUPLE BILATERAL SWITCH	468	DP	16	6	DC	16	6										
HCF4067	BD, BE	ANALOG SINGLE 16-CHANNEL MULTIPLEXER/DEMUTIPLEXER	510A	DC	24	6	DP	24	6										
HCF4068	BE, BF	8-INPUT NAND/AND GATE	511	DP	14	6	DC	14	6										
HCF4069	UBE, UBF	HEX INVERTER	512	DP	14	6	DC	14	6										
HCF4070	BE, BF	QUADRUPLE EXCLUSIVE-OR GATE	223A	DP	14	6	DC	14	6										
HCF4071	BE, BF	QUADRUPLE 2-INPUT OR GATE	239	DP	14	6	DC	14	6										
HCF4072	BE, BF	DUAL 4-INPUT OR GATE	514	DP	14	6	DC	14	6										
HCF4073	BE, BF	TRIPLE 3-INPUT AND GATE	515	DP	14	6	DC	14	6										
HCF4075	BE, BF	TRIPLE 3-INPUT OR GATE	516	DP	14	6	DC	14	6										
HCF4076	BE, BF	4-BIT D-TYPE REGISTER	517	DP	16	6	DC	16	6										
HCF4077	BE, BF	QUADRUPLE EXCLUSIVE-NOR GATE	361	DP	14	6	DC	14	6										
HCF4078	BE, BF	8-INPUT NOR/OR GATE	519	DP	14	6	DC	14	6										
HCF4081	BE, BF	QUADRUPLE 2-INPUT AND GATE	520	DP	14	6	DC	14	6										
HCF4082	BE, BF	DUAL 4-INPUT AND GATE	521	DP	14	6	DC	14	6										
HCF4085	BE, BF	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	522	DP	14	6	DC	14	6										
HCF4086	BE, BF	EXPANDABLE 4-WIDE 2-INPUT AND-OR-INVERT GATE	523	DP	14	6	DC	14	6										
HCF4089	BE, BF	BINARY RATE MULTIPLIER	538	DP	16	6	DC	16	6										
HCF4093	BE, BF	QUADRUPLE 2-INPUT NAND SCHMITT-TRIGGERS	524	DP	14	6	DC	14	6										
HCF4094	BE, BF	8-STAGE SHIFT-AND-STORE BUS REGISTER	525	DP	16	6	DC	16	6										
HCF4095	BE, BF	GATED J-K MASTER-SLAVE FLIP-FLOP (NON-INVERTING)	526	DP	14	6	DC	14	6										
HCF4096	BE, BF	GATED J-K MASTER-SLAVE FLIP-FLOP (INVERTING AND NON-INVERTING)	526	DP	14	6	DC	14	6										
HCF4097	BE, BF	ANALOG DIFFERENTIAL 8-CHANNEL MULTIPLEXER/DEMUTIPLEXER	510B	DP	24	6	DC	24	6										
HCF4098	BE, BF	DUAL MONOSTABLE MULTIVIBRATOR	562	DP	16	6	DC	16	6										
HCF4099	BE, BF	8-BIT ADDRESSABLE LATCH	528	DP	16	6	DC	16	6										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD}-V_{SS}$ (recommended) = 3 to 15 V ; $I_L = 10$ pA (at $T_{amb} = 25^\circ\text{C}$) ; $C_L = 5$ pF (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)												DYNAMIC ELECTRIC CHARACTER. (see note 4)							
	I_{DL} (2)	P_{DL}^{tot} (3)	V_{OL}	V_{OH}	V_{IH}	V_{IL}	V_{OL}	V_{OL}	I_{OL}	I_{OH}	I_{OL}	I_{OH}	t_{PLH}	t_{PHL}	t_{TLH}	t_{WPH}	t_{WPL}	$t_{r\phi}$	t_s	$f_{\phi max}$
	μA	μW	V	V	V	V	V	V	mA	V	mA	V	ns	ns	ns	ns	ns	ns	ns	MHz
	max	max	max	max	min	min	min	min	min	min	min	min	max	max	max	max	max	max	max	max
HCF4051 BE, BF	10	*2.10			*7			*3!												
HCF4052 BE, BF	10	*2.10			*7			*3!												
HCF4053 BE, BF	10	*2.10			*7			*3!												
HCF4054 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*0,45	9,5	680'	680'	200'	50'	15'	50'		
HCF4055 BE, BF	10	*2.10	0,05	9,95"	*8	1-9	*2!	9-1	*1,3	0,5	*0,45	9,5	1150	1150	200	50'		50'		
HCF4056 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*0,45	9,5	1150	1150	200	50'		50'		
HCF4060 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	340'	340'	50'	30'	(6)		16'	
HCF4063 BE, BF	10		0,01	10'	3	9	3!	1	0,9	0,5	-0,9	9,5	500	500	100					
HCF4066 BE, BF	0,01'	*2.10	R _{ON} = 120 Ω at R _L = 10 kΩ, V _C = V _{DD} + 10 V ; V _{SS} = 0 ; V _{IS} = 0 to 10 V																	
HCF4067 BD, BE	0,2'				4,5'			4,5'					200'	200'						
HCF4068 BE, BF	1		0,01	10'		1	3	9	0,9	0,5	-0,9	9,5	200	260	100					
HCF4069 UBE, UBF	0,5	*2.10	0,05	9,95"	*8	1-9	*2!	9-1	*1,3	0,5	*1,3	9,5	60	60	100					
HCF4070 BE, BF	0,01'		0,05	10'	3	1	3	9	1,8'	0,5	-1,8'	9,5	70'	70'	50'					
HCF4071 BE, BF	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	140	200	100					
HCF4072 BE, BF	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	140	200	100					
HCF4073 BE, BF	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	170	130	100					
HCF4075 BE, BF	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	1	100						
HCF4076 BE, BF	0,02'		0,05	10'	3	1	3	9	0,9	0,5	-1,8'	9,5	120	120	50'	50'	15000'	60'	10'	
HCF4077 BE, BF	0,01'		0,05	10'	3	1	3	9	1,8'	0,5	-1,8'	9,5	70	70	50					
HCF4078 BE, BF	1		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	340	160	100					
HCF4081 BE, BF	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	170	130	100					
HCF4082 BE, BF	1		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	170	130	100					
HCF4085 BE, BF	10		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	250	180	100					
HCF4086 BE, BF	1		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	280	180	100					
HCF4089 BE, BF	0,02'		0	10'	4,5	1	4,5	9	1,8'	0,5	-1,8'	9,5	90'	90'	50'					4,5'
HCF4093 BE, BF	1		0,01	10'	4,5	10	4,5'	0	0,9	0,5	-0,9	9,5	300	300	100					
HCF4094 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	250	220	100					
HCF4095 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	220	200	100	60"	15000	55"		5
HCF4096 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	220	200	100	60"	15000	160"		
HCF4097 BE, BF	0,2'				4,5		4,5						200	200						
HCF4098 BE, BF	0,02'		0	10'	4,5'	1	4,5'	9	1,8'	0,5	-1,8'	9,5	125'	125'	50'					
HCF4099 BE, BF	0,02'								1,8'	0,5	-1,8'	9,5	1							

NOTES : (1) Test conditions: $T_{amb} = 25^\circ\text{C}$
 $V_{DD} = 10\text{V}$
(2) Same as I_L
(3) Same as P_D
(4) Test conditions: $T_{amb} = 25^\circ\text{C}$; $C_L = 15\text{pF}$
Input rise and fall time = 20ns
Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ\text{C}$
(5) Same as t_{pWH} or t_{pWL} (6) Unlimited

HCF

Basic Characteristics: See page 21

Operating Temp. Range: -40 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			HCF4502	BE, BF	STROBED HEX INVERTER BUFFER	136	DP	16	6	DC	16	6							
HCF4508	BE, BF	DUAL 4-BIT LATCH	742	DC	24	6	DP	24	6										
HCF4510	BE, BF	PRESETTABLE UP/DOWN COUNTERS	563	DP	16	6	DC	16	6										
HCF4511	BE, BF	BCD-TO-7-SEGMENT LATCH DECODER DRIVER	529	DP	16	6	DC	16	6										
HCF4512	BE, BF	8-CHANNEL DATA SELECTOR	743	DP	16	6	DC	16	6										
HCF4514	BE, BF	4-BIT LATCH/4-TO-16 LINE DECODER (OUTPUTS HIGH)	530	DC	24	6	DP	24	6										
HCF4515	BE, BF	4-BIT LATCH/4-TO-16 LINE DECODER (OUTPUTS LOW)	530	DC	24	6	DP	24	6										
HCF4516	BE, BF	PRESETTABLE UP/DOWN COUNTERS BINARY TYPE	564	DP	16	6	DC	16	6										
HCF4518	BE, BF	DUAL BCD UP-COUNTER	531	DP	16	6	DC	16	6										
HCF4520	BE, BF	DUAL BINARY UP-COUNTER	531	DP	16	6	DC	16	6										
HCF4527	BE, BF	BCD RATE MULTIPLIER	565	DP	16	6	DC	16	6										
HCF4532	BE, BF	8-BIT PRIORITY ENCODER	533	DP	16	6	DC	16	6										
HCF4555	BE, BF	DUAL BINARY-TO-1-OF-4-DECODER/DEMULTIPLER (OUTPUTS HIGH)	535	DP	16	6	DC	16	6										
HCF4556	BE, BF	DUAL BINARY-TO-1-OF-4-DECODER/DEMULTIPLER (OUTPUTS LOW)	536	DP	16	6	DC	16	6										
HCF40100	BE, BF	32-STAGE STATIC LEFT/RIGHT SHIFT REGISTER	744	DP	16	6	DC	16	6										
HCF40101	BE, BF	9-BIT PARITY GENERATOR/CHECKER	745	DP	14	6	DC	14	6										
HCF40102	BE, BF	8-STAGE PRESETTABLE 2-DECADE BCD SYNCHRONOUS DOWN COUNTER	746A	DP	16	6	DC	16	6										
HCF40103	BE, BF	8-STAGE PRESETTABLE 8-BIT BINARY SYNCHRONOUS DOWN COUNTER	746B	DP	16	6	DC	16	6										
HCF40105	BE, BF	FIFO REGISTER	747	DP	16	6	DC	16	6										
HCF40106	BE, BF	HEX SCHMITT TRIGGER	235	DP	14	6	DC	14	6										
HCF40107	BE, BF	DUAL 2-INPUT NAND BUFFER/DRIVER	748	DP	14	6	DC	14	6										
HCF40108	BE, BF	4X4 MULTIPORT REGISTER	749	DP	24	6	DC	24	3										
HCF40109	BE, BF	QUAD LOW-TO-HIGH VOLTAGE LEVEL SHIFTER	750	DP	16	6	DC	16	6										
HCF40160	BE, BF	DECADE SYNCHRONOUS PROGRAMMABLE 4-BIT COUNTER WITH ASYNC. CLEAR	751A	DP	16	6	DC	16	6										
HCF40161	BE, BF	BINARY SYNC. PROGRAMMABLE 4-BIT COUNTER WITH ASYNC. CLEAR	751B	DP	16	6	DC	16	6										
HCF40162	BE, BF	DECADE SYNC. PROGRAMMABLE 4-BIT COUNTER WITH SYNC. CLEAR	751A	DP	16	6	DC	16	6										
HCF40163	BE, BF	BINARY SYNC. PROGRAMMABLE 4-BIT COUNTER WITH SYNC. CLEAR	751B	DP	16	6	DC	16	6										
HCF40174	BE, BF	HEX "D" - TYPE FLIP FLOP	752	DP	16	6	DC	16	6										
HCF40181	BE, BF	4-BIT ARITHMETIC LOGIC UNIT	753	DP	24	6	DC	24	3										
HCF40182	BE, BF	LOOK-AHEAD CARRY GENERATOR	754	DP	16	6	DC	16	6										
HCF40192	BE, BF	BCD PRESETTABLE UP/DOWN COUNTER (DUAL CLOCK WITH RESET)	755A	DP	16	6	DC	16	6										
HCF40193	BE, BF	BINARY PRESETTABLE UP/DOWN COUNTER (DUAL CLOCK WITH RESET)	755B	DP	16	6	DC	16	6										
HCF40194	BE, BF	4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTER	579	DP	16	6	DC	16	6										
HCF40208	BE, BF	4 X 4 MULTIPORT REGISTER	749	DP	24	6	DC	16	6										
HCF40257	BE, BF	QUAD 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER	756	DP	16	6	DC	16	6										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) = 3 to 15 V ; $I_L = 10 \mu A$ (at $T_{amb} = 25^\circ C$) ; $C_L = 5 \text{ pF}$ (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)											DYNAMIC ELECTRIC CHARACTER. (see note 4)							
	I_{DL} (2)	P_{DL} (3)	V_{OL}	V_{OH}	V_{VNH} IH	V_{VO} at	V_{VNL} IL	V_{VO} at	I_{dN} OL	V_{VO} at	I_{dP} OH	V_{VO} at	t_{PLH}	t_{PHL}	t_{TLH}	t_{TFL}	$t_{r\phi}$	t_s	$f_{\phi max}$
	μA	μW	V	V	V	V	V	V	mA	V	mA	V	ns	ns	ns	ns	μs	ns	MHz
	max	max	max	max	min		min		min		min		max	max	max	max	max	max	max
HCF4502 BE, BF	0,01'		0	10'					12,5'	0,5	-1,8'	9,5	90'	60'	50'				
HCF4508 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100	70'		15,	60'
HCF4510 BE, BF	10		0,05	10'	3	1	3	9	0,9	0,5	-0,9	9,5	200	200	100		15	60,	38'
HCF4511 BE, BF	0,01'			9,1'									250'	290'	1000'	110'			
HCF4512 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100				
HCF4514 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	300	300	100			100"	
HCF4515 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	300	300	100			100"	
HCF4516 BE, BF	10		0,05	10'	3	1	3	9	0,9	0,5	-0,9	9,5	200	200	100	15		60'	8'
HCF4518 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	230	230	100				
HCF4520 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	230	230	100				
HCF4527 BE, BF	0,02'		0	10'	4,5'	1	4,5'	9	1,8'	0,5	-1,8'	9,5	90'	90'	130'				4,5'
HCF4532 BE, BF	10		0,01	10'	3	9	3	1	0,9	0,5	-0,9	9,5	110	110	100				
HCF4555 BE, BF	10		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	190	190	100				
HCF4556 BE, BF	10		0,01	10'	3	1	3	9	0,9	0,5	-0,9	9,5	190	190	100				
HCF40100 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	330	330'	100'	115'		-20'	5'
HCF40101 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	300	300	100				
HCF40102 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	260	260	100	90'		70'	3,6'
HCF40103 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	260	260	100	90'		70'	3,6'
HCF40105 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	180	180	100	40'	15	0"	6
HCF40106 BE, BF	2	*2.10	0,05	9,95"					*1,3	0,5	*1,3	9,5	140	140	100				
HCF40107 BE, BF	2	*2.10			*7	1-9	*3!	9	*37	0,5			90	90	40				
HCF40108 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	280	280	100	65'	5	35'	7'
HCF40109 BE, BF	2	*2.10	0,05	9,95"	*3,5	1-9	*1,5!	1-9	*1,3	0,5	*1,3	9,5	440	440	80				
HCF40160 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	35'	70		8,5'
HCF40161 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	35'	70		8,5'
HCF40162 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	160	160	100	35'	70		8,5'
HCF40163 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	100	100	50'	35'	70		8,5'
HCF40174 BE, BF	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100	30'	15	10'	12'
HCF40181 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	320	320	100				
HCF40182 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	200	200	100				
HCF40192 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	240	240	100	150'	15		8'
HCF40193 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	240	240	100	150'	15		8'
HCF40194 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	150'	150'	50'	35'	5'	25'	9'
HCF40208 BE, BF	10	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	280	280	100	65'	5	35'	7'
HCF40257 BE, BF	2	*2.10	0,05	9,95"	*7	1-9	*3!	9-1	*1,3	0,5	*1,3	9,5	140	140	100				

NOTES : (1) Test conditions: $T_{amb} = 25^\circ C$
 $V_{DD} = 10V$
(2) Same as I_L
(3) Same as P_D
(') typical value ('') minimum value

(4) Test conditions: $T_{amb} = 25^\circ C$; $C_L = 15pF$
Input rise and fall time = 20ns
Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ C$
(6) \emptyset to Q output
(7) carry-in set-up time
(8) \emptyset to output

HEF

Basic Characteristics: See page 21

Operating Temp. Range: -40 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)									
			1	2	3	1	2	3	1	2	3	
			HEF4000	BD, BP, BT	DUAL 3-INPUT NOR GATE, AND INVERTER	455	DG	14	3	DP	14	2
HEF4001	BD, BP, BT	QUADRUPLE 2-INPUT NOR GATE	456	DG	14	3	DP	14	2	FP	14	2
HEF4001	UBD, UBP, UBT	QUADRUPLE 2-INPUT NOR GATE	456	DG	14	3	DP	14	2	FP	14	2
HEF4002	BD, BP, BT	DUAL 4-INPUT NOR GATE	457	DG	14	3	DP	14	2	FP	14	2
HEF4006	BD, BP, BT	18-STAGE STATIC SHIFT REGISTER	458	DG	14	3	DP	14	2	FP	14	2
HEF4007	UBD, UBP, UBT	DUAL COMPLEMENTARY PAIR AND INVERTER	459	DG	14	3	DP	14	2	FP	14	2
HEF4008	BD, BP, BT	4-BIT BINARY FULL ADDER	460	DG	16	1	DP	16	8A	FP	16	2
HEF4011	BD, BP, BT	QUADRUPLE 2-INPUT NAND GATE	463	DG	14	3	DP	14	2	FP	14	2
HEF4011	UBD, UBP, UBT	QUADRUPLE 2-INPUT NAND GATE	463	DG	14	3	DP	14	2	FP	14	2
HEF4012	BD, BP, BT	DUAL 4-INPUT NAND GATE	464	DG	14	3	DP	14	2	FP	14	2
HEF4013	BD, BP, BT	DUAL D-TYPE FLIP FLOP	465	DG	14	3	DP	14	2	FP	14	2
HEF4014	BD, BP, BT	8-BIT SHIFT REGISTER	466	DG	16	1	DP	16	8A	FP	16	2
HEF4015	BD, BP, BT	DUAL 4-BIT STATIC SHIFT REGISTER	467	DG	16	1	DP	16	8A	FP	16	2
HEF4016	BD, BP, BT	QUADRUPLE BILATERAL SWITCHES	468	DG	14	3	DP	14	2	FP	14	2
HEF4017	BD, BP, BT	5-STAGE JOHNSON COUNTER	469	DG	16	1	DP	16	8A	FP	16	2
HEF4018	BD, BP, BT	PRESETTABLE DIVIDE-BY-N-COUNTER	470	DG	16	1	DP	16	8A	FP	16	2
HEF4019	BD, BP, BT	QUADRUPLE 2-INPUT MULTIPLEXER	471	DG	16	1	DP	16	8A	FP	16	2
HEF4020	BD, BP, BT	14-STAGE BINARY COUNTER	472	DG	16	1	DP	16	8A	FP	16	2
HEF4021	BD, BP, BT	8-BIT SHIFT REGISTER	466	DG	16	1	DP	16	8A	FP	16	2
HEF4022	BD, BP, BT	4-STAGE DIVIDE-BY-8 JOHNSON COUNTER	473	DG	16	1	DP	16	8A	FP	16	2
HEF4023	BD, BP, BT	TRIPLE 3-INPUT NAND GATE	474	DG	14	3	DP	14	2	FP	14	2
HEF4024	BD, BP, BT	7-STAGE BINARY COUNTER	475	DG	14	3	DP	14	2	FP	14	2
HEF4025	BD, BP, BT	TRIPLE 3-INPUT NOR GATE	476	DG	14	3	DP	14	2	FP	14	2
HEF4027	BD, BP, BT	DUAL JK FLIP FLOP	478	DG	16	1	DP	16	8A	FP	16	2
HEF4028	BD, BP, BT	1 OF 10 DECODER	479	DG	16	1	DP	16	8A	FP	16	2
HEF4029	BD, BP, BT	SYNCHRONOUS UP/DOWN, BINARY/DECADE COUNTER	480	DG	16	1	DP	16	8A	FP	16	2
HEF4030	BD, BP, BT	QUADRUPLE EXCLUSIVE OR GATE	257	DG	14	3	DP	14	2	FP	14	2
HEF4031	BD, BP, BT	64 STAGE STATIC SHIFT REGISTER	481	DG	16	1	DP	16	8A	FP	16	2
HEF4035	BD, BP, BT	4-BIT UNIVERSAL SHIFT REGISTER	485	DG	16	1	DP	16	8A	FP	16	2
HEF4040	BD, BP, BT	12-STAGE BINARY COUNTER	489	DG	16	1	DP	16	8A	FP	16	2
HEF4041	BD, BP, BT	QUADRUPLE TRUE/COMPLEMENT BUFFER	490	DG	14	3	DP	14	2	FP	14	2
HEF4042	BD, BP, BT	QUADRUPLE D-LATCH	491	DG	16	1	DP	16	8A	FP	16	2
HEF4043	BD, BP, BT	QUADRUPLE R/S LATCH WITH 3-STATE OUTPUTS	492	DG	16	1	DP	16	8A	FP	16	2
HEF4044	BD, BP, BT	QUADRUPLE R/S LATCH WITH 3-STATE OUTPUTS	492	DG	16	1	DP	16	8A	FP	16	2
HEF4046	BD, BP, BT	MICROPOWER PHASE-LOCKED LOOP	494	DG	16	1	DP	16	8A	FP	16	2
HEF4047	BD, BP, BT	MONOSTABLE/ASTABLE MULTIVIBRATOR	495	DG	14	3	DP	14	2	FP	14	2
HEF4049	BD, BP, BT	HEX INVERTING BUFFERS	497	DG	16	1	DP	16	8A	FP	16	2
HEF4050	BD, BP, BT	HEX NON-INVERTING BUFFERS	498	DG	16	1	DP	16	8A	FP	16	2
HEF4051	BD, BP, BT	8-CHANNEL ANALOGUE MULTIPLEXER/DEMUTIPLEXER	499	DG	16	1	DP	16	8A	FP	16	2
HEF4052	BD, BP, BT	DUAL 4-CHANNEL ANALOG MULTIPLEXER/DEMUTIPLEXER	500	DG	16	1	DP	16	8A	FP	16	2
HEF4053	BD, BP, BT	TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMUTIPLEXER	501	DG	16	1	DP	16	8A	FP	16	2
HEF4059	BD, BP	PROGRAMMABLE DIVIDE-BY-N COUNTER	639	DG	24	2	DP	24	1			
HEF4060	BD, BP, BT, BDB	14-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER AND OSCILLATOR	640	DG	16	1	DP	16	8A	FP	16	2
HEF4066	BD, BP, BT	QUADRUPLE BILATERAL SWITCHES	509	DG	14	3	DP	14	2	FP	14	2
HEF4067	BD, BP	16-CHANNEL ANALOG MULTIPLEXER/DEMUTIPLEXER	510	DG	24	2	DP	24	2			
HEF4068	BD, BP, BT	8-INPUT NAND GATE	511	DG	14	3	DP	14	2	FP	14	2
HEF4069	UBD, UBP, UBT	HEX INVERTER	512	DG	14	3	DP	14	2	FP	14	2
HEF4070	BD, BP, BT	QUADRUPLE EXCLUSIVE-OR GATE	257	DG	14	3	DP	14	2	FP	14	2
HEF4071	BD, BP, BT	QUADRUPLE 2-INPUT OR GATE	223A	DG	14	3	DP	14	2	FP	14	2
HEF4072	BD, BP, BT	DUAL 4-INPUT OR GATE	514	DG	14	3	DP	14	2	FP	14	2
HEF4073	BD, BP, BT	TRIPLE 3-INPUT AND GATE	515	DG	14	3	DP	14	2	FP	14	2
HEF4075	BD, BP, BT	TRIPLE 3-INPUT OR GATE	516	DG	14	3	DP	14	2	FP	14	2
HEF4076	BD, BP, BT	QUADRUPLE D-TYPE FLIP FLOP WITH 3-STATE OUTPUTS										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) = 3 to 15 V ; $I_I = 10$ pA (at $T_{amb} = 25^\circ\text{C}$) ; $C_L = 5$ pF (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)												DYNAMIC ELECTRIC CHARACTER. (see note 4)						
	I_{DD} (2)	P_{DL} (3)	V_{OL}	V_{OH}	V_{nH}	V_{nL}	at (6)		I_{OL}	I_{OH}	t_{PLH}	t_{PHL}	From to	t_{wH} t_{wL} (5)	t_{THL}	t_{TLH}	$f_{\phi max}$		
	μA	mW	V	V	V	V	V_O	V_O	mA	mA	ns	ns	ns	ns	ns	ns	MHz		
	max	typ	max	min	min	max			min	min	typ	typ		typ	typ	typ	typ		
HEF4000	BD, BP, BT	2	20	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0			
HEF4001	BD, BP, BT	2	26	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0		30	30
HEF4001	UBD, UBP, UBT	2		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	20	30	I-0		30	30
HEF4002	BD, BP, BT	2	14	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0		23	40
HEF4006	BD, BP, BT	40	15	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	70	70	CP-0			10
HEF4007	UBD, UBP, UBT	2	15	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	23	23	I-0			
HEF4008	BD, BP, BT	40	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	94	94	D-0			
HEF4011	BD, BP, BT	2	26	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0		30	30
HEF4011	UBD, UBP, UBT	2		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	20	25	I-0		30	30
HEF4012	BD, BP, BT	2	14	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	33	31	I-0		25	37
HEF4013	BD, BP, BT	8	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	38	38	CP-0	30	30	30
HEF4014	BD, BP, BT	40	13	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	57	68	CP-0	33	34	37
HEF4015	BD, BP, BT	40	27	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	85	85	CP-0	35	45	45
HEF4016	BD, BP, BT	2	17	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	3	4	I-0			10
HEF4017	BD, BP, BT	40	6	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	114	94	CP-0	37	26	31
HEF4018	BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	115	115	D-0	50	26	31
HEF4019	BD, BP, BT	40	26	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	35	37	I-0		40	42
HEF4020	BD, BP, BT	40	5	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	55	45	CP-0			15
HEF4021	BD, BP, BT	40	13	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	59	74	CP-0	21	27	31
HEF4022	BD, BP, BT	40	9	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	110	110	CP-0	50	26	31
HEF4023	BD, BP, BT	2	19	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0		18	18
HEF4024	BD, BP, BT	40	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	40	CP-0	17	30	30
HEF4025	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	20	25	I-0		15	20
HEF4027	BD, BP, BT	8	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	66	57	CP-0	35	45	45
HEF4028	BD, BP, BT	40	11	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	A-0			
HEF4029	BD, BP, BT	40	10	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	62	59	CP-0			12
HEF4030	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	45	I-0		23	23
HEF4031	BD, BP, BT	40	30	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	120	120	CP-0	50	25	25
HEF4035	BD, BP, BT	40	15	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	90	90	CP-0	30	45	45
HEF4040	BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	55	45	CP-0	20	35	35
HEF4041	BD, BP, BT	8	50	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0			
HEF4042	BD, BP, BT	40	35	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	45	D-0		26	31
HEF4043	BD, BP, BT	40	28	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	50	50	D-0			
HEF4044	BD, BP, BT	40	28	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	50	50	D-0			
HEF4046	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5						
HEF4047	BD, BP, BT	8		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	160	160	I-0			
HEF4049	BD, BP, BT	8	50	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	30	25	I-0		13	40
HEF4050	BD, BP, BT	8	50	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	30	23	I-0		13	90
HEF4051	BD, BP, BT	40	9	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	10	6	I-0			40
HEF4052	BD, BP, BT	40	18	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	10	6	I-0			40
HEF4053	BD, BP, BT	40	22	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	10	6	I-0			40
HEF4059	BD, BP	4		0,05	9,95	7	3	1	9	8	0,5	-2	9,5	60	60	CP-0		15	25
HEF4060	BD, BP, BT, BCB	4		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	260	260	RS-0	60	30	30
HEF4066	BD, BP, BT	2	17	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	3	4	I-0			10
HEF4067	BD, BP	40	15	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	10	6	I-0			40
HEF4068	BD, BP, BT	2	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	40	40	I-0		23	32
HEF4069	UBD, UBP, UBT	2	36	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	16	16	I-0			
HEF4070	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	45	I-0		23	23
HEF4071	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	23	23	I-0		21	24
HEF4072	BD, BP, BT	2	15	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	30	30	I-0		35	35
HEF4073	BD, BP, BT	2	18	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	35	35	I-0			
HEF4075	BD, BP, BT	2	18	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0			
HEF4076	BD, BP, BT	40	28	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	75	75	CP-0			10

NOTES : (1) Test conditions: $T_{amb}=25^\circ\text{C}$
 $V_{DD}=10\text{V}$
(2) Quiescent supply current
(3) Dissipation at 1 MHz ; at $C_L = 50$ pF
(4) Test conditions: $T_{amb}=25^\circ\text{C}$; $C_L = 50$ pF
Input rise and fall time=20ns
Typical temp. coeff. for all values of $V_{DD}=0,3\%/^\circ\text{C}$
(5) Same as t_{pWH} or t_{pWL} (6) at worst case input levels
D-0 : Data input to Output ; I-0 : Input to Output
A-0 : Address input to Output ; CP-0 : Clock input to Output

HEF

Basic Characteristics: See page 21

Operating Temp. Range: -40 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)									
			1	2	3	1	2	3	1	2	3	
			HEF4077	BD, BP, BT	QUADRUPLE EXCLUSIVE NOR GATE	518	DG	14	3	DP	14	2
HEF4078	BD, BP, BT	8-INPUT NOR GATE	519	DG	14	3	DP	14	2	FP	14	2
HEF4081	BD, BP, BT	QUADRUPLE 2-INPUT AND GATE	520	DG	14	3	DP	14	2	FP	14	2
HEF4082	BD, BP, BT	DUAL 4-INPUT AND GATE	521	DG	14	3	DP	14	2	FP	14	2
HEF4085	BD, BP, BT	DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE	522	DG	14	3	DP	14	2	FP	14	2
HEF4086	BD, BP, BT	FOUR-WIDE 2-INPUT AND-OR-INVERT GATE	523	DG	14	3	DP	14	2	FP	14	2
HEF4093	BD, BP, BT	QUADRUPLE 2-INPUT NAND SCHMITT TRIGGER	524	DG	14	3	DP	14	2	FP	14	2
HEF4094	BD, BP, BT	8-STAGE SHIFT AND STORE BUS REGISTER	525	DG	16	2	DP	16	8A	FP	16	2
HEF4104	BD, BP, BT	QUAD LOW VOLTAGE TO HIGH VOLTAGE TRANSLATOR WITH 3-STATE OUTPUT	570	DG	16	1	DP	16	8	FP	16	2
HEF4502	BD, BP, BT	STROBED HEX INVERTING BUFFER	136	DG	16	1	DP	16	8	FP	16	2
HEF4505	BD, BP	64-BIT, 1-BIT PER WORD RAM (RANDOM ACCESS MEMORY)										
HEF4508	BD, BP	DUAL 4-BIT LATCH										
HEF4510	BD, BP, BT	BCD UP/DOWN COUNTER	563	DG	16	1	DP	16	8	FP	16	2
HEF4511	BD, BP, BT	BCD TO 7-SEGMENT LATCH DECODER DRIVER	529	DG	16	1	DP	16	8	FP	16	2
HEF4512	BD, BP, BT	8-INPUT MULTIPLEXER WITH 3-STATE OUTPUTS										
HEF4514	BD, BP	1-OF-16 DECODERS/DEMULTIPLXERS WITH INPUT LATCHES	530	DG	24	2	DP	24	1			
HEF4515	BD, BP	1-OF-16 DECODERS/DEMULTIPLXERS WITH INPUT LATCHES	530	DG	24	2	DP	24	1			
HEF4516	BD, BP, BT	BINARY UP/DOWN COUNTER	564	DG	16	1	DP	16	8	FP	16	2
HEF4517	BD, BP	DUAL 64-BIT STATIC SHIFT REGISTER	641	DG	16	1	DP	16	8A			
HEF4518	BD, BP, BT	DUAL BCD UP COUNTER	531	DG	16	1	DP	16	8	FP	16	2
HEF4519	BD, BP, BT	QUADRUPLE 2-INPUT MULTIPLEXER	532	DG	16	1	DP	16	8	FP	16	2
HEF4520	BD, BP, BT	DUAL BINARY UP COUNTER	531	DG	16	1	DP	16	8	FP	16	2
HEF4521	BD, BP, BT	24-STAGE FREQUENCY DIVIDER	642	DG	16	1	DP	16	8A	FP	16	2
HEF4522	BD, BP, BT	PRESETTABLE DIVIDE-BY-N 4-BIT COUNTER (BCD)										
HEF4526	BD, BP, BT	PROGRAMMABLE 4-BIT BINARY DOWN DIVIDER	643	DG	16	1	DP	16	8A	FP	16	2
HEF4527	BD, BP, BT, BDB	BCD RATE MULTIPLIER	644	DG	16	1	DP	16	8A			
HEF4528	BD, BP, BT	DUAL RETRIGGERABLE RESETTABLE MONOSTABLE MULTIVIBRATOR										
HEF4531	BD, BP, BT	13-INPUT PARITY CHECKER GENERATOR										
HEF4532	BD, BP, BT	8-INPUT PRIORITY ENCODER	533	DG	16	1	DP	16	8	FP	16	2
HEF4534	BD, BP	REAL TIME 5-DECADE COUNTER	645	DG	24	2	DP	24	1			
HEF4538	BD, BP, BT	DUAL PRECISION MONOSTABLE MULTIVIBRATOR	646	DG	16	1	DP	16	8A	FP	16	2
HEF4539	BD, BP, BT	DUAL 4-INPUT MULTIPLEXER	534	DG	16	1	DP	16	8	FP	16	2
HEF4541	BD, BP, BT	PROGRAMMABLE TIMER	647	DG	14	3	DP	14	2	FP	14	2
HEF4543	BD, BP, BT	BCD TO 7-SEGMENT LATCH/DECODER/DRIVER FOR LIQUID CRYSTALS										
HEF4555	BD, BP, BT	DUAL 1-OF-4 DECODER WITH ACTIVE HIGH OUTPUT	535	DG	16	1	DP	16	8	FP	16	2
HEF4556	BD, BP, BT	DUAL 1-OF-4 DECODER WITH ACTIVE LOW OUTPUT	536	DG	16	1	DP	16	8	FP	16	2
HEF4557	BD, BP, BT	1-TO-64-BIT VARIABLE LENGTH SHIFT REGISTER										
HEF4585	BD, BP, BT	4-BIT MAGNITUDE COMPARATOR										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) = 3 to 15 V ; $I_I = 10$ pA (at $T_{amb} = 25^\circ\text{C}$) ; $C_L = 5$ pF (see note 4)

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)											DYNAMIC ELECTRIC CHARACTER. (see note 4)								
	I_{DD} (2)	P_{DL} (3)	V_{OL}	V_{OH}	V_{nH}	V_{nL}	at (6)		I_{OL}	at	I_{OH}	at	t_{PLH}	t_{PHL}	From to	t_{WH} t_{WL} (5)	t_{THL}	t_{TLH}	$f_{\phi max}$	
	μA	μW	V	V	V	V	V_0	V_0	mA	V	mA	V	ns	ns	ns	ns	ns	ns	MHz	
	max	typ	max	min	min	max			min		min		typ	typ		typ	typ	typ	typ	
HEF4077	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	27	27	I-0				
HEF4078	BD, BP, BT	2	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	46	50	I-0		32	39	
HEF4081	BD, BP, BT	2	23	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0		23	30	
HEF4082	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	25	I-0		30	30	
HEF4085	BD, BP, BT	2	13	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	25	30	I-0		22	22	
HEF4086	BD, BP, BT	2	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	40	40	I-0				
HEF4093	BD, BP, BT	2	24	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	50	50	I-0				
HEF4094	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	120	120	CP-0				7,5
HEF4104	BD, BP, BT	40	48	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	85	85	I-00		30	30	
HEF4502	BD, BP, BT	8	50	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	55	35	I-0				
HEF4505	BD, BP,			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	100	A-0				
HEF4508	BD, BP,	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	50	50	D-0				
HEF4510	BD, BP, BT	40	5	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	62	59	CP-0			12	
HEF4511	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	130	160	A-0				
HEF4512	BD, BP, BT	40	18	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	75	75	I-0				
HEF4514	BD, BP, BT	40	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	150	150	A-0		26	31	
HEF4515	BD, BP, BT	40	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	150	150	A-00		26	31	
HEF4516	BD, BP, BT	40	5	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	62	59	CP-0				12
HEF4517	BD, BP,			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	100	CP-0				8
HEF4518	BD, BP, BT	40	10	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	95	95	CP-0	50	35	35	10
HEF4519	BD, BP, BT	40	26	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	50	50	I-0		40	42	
HEF4520	BD, BP, BT	40	10	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	95	95	CP-0		35	35	10
HEF4521	BD, BP, BT	40		0,05	9,95	7	3	1	9	10	0,5	-3,2	9,5	350	350	I-0	20	30	30	25
HEF4522	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	120	120	CP-0				
HEF4526	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	120	120	CP-0				
HEF4527	BD, BP, BT, BDB	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	80	80	CP-0	10			7
HEF4528	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	80	80	I-0				
HEF4531	BD, BP, BT	40	7	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	120	D-0				
HEF4532	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	100	D-0				
HEF4534	BD, BP	100		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	130	CP-0	20	30	30	12
HEF4538	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	70	70	I-0				
HEF4539	BD, BP, BT	40	13	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	71	58	I-0		30	39	
HEF4541	BD, BP, BT	40		0,05	9,95	7	3	1	9	0,85	0,5	-1,2	9,5	150	150	RS-0	15			30
HEF4543	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	140	130	A-0				
HEF4555	BD, BP, BT	40	32	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	60	54	A-0		25	25	
HEF4556	BD, BP, BT	40	29	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	57	68	A-0		29	37	
HEF4557	BD, BP, BT	40	30	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	150	150	CP-0				10
HEF4585	BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	70	80	D-0				

NOTES : (1) Test conditions: $T_{amb} = 25^\circ\text{C}$
 $V_{DD} = 10\text{V}$
(2) Quiescent supply current
(3) Dissipation at 1 MHz ; at $C_L = 50$ pF
(4) Test conditions: $T_{amb} = 25^\circ\text{C}$; $C_L = 50$ pF
Input rise and fall time = 20ns
Typical temp. coeff. for all values of $V_{DD} = 0,3\%/^\circ\text{C}$
 $V_{DD} = 10\text{V}$; $V_{SS} = 0\text{V}$
(5) Same as t_{pWH} or t_{pWL} (6) at worst case input levels
D-0 : Data input to Output ; I-0 : Input to Output
A-0 : Address input to Output ; CP-0 : Clock input to Output

HEF

Basic Characteristics: See page 21

Operating Temp. Range: -40 to 85 °C

GENERAL DATA

GENERALITES

ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
HEF4720	BD, BP	256-BITS, 1 BIT PER WORD RAMDOM ACCESS MEMORIES	648	DG	16	1	DP	16	8A										
HEF4720	VD, VP	256-BITS, 1 BIT PER WORD RAM	572	DG	16	1	DP	16	8										
HEF4724	BD, BP, BT	8-BIT ADDRESSABLE LATCH	574	DG	16	1	DP	16	8		FP	16	2						
HEF4731	BD, BP, BT	QUAD 64-BIT STATIC SHIFT REGISTER	649	DG	14	3	DP	14	2										
HEF4731	VD, VP	QUAD 64-BIT STATIC SHIFT REGISTER	649	DG	14	3	DP	14	2										
HEF4737	BD, BP	QUADRUPLE STATIC DECADE COUNTERS	650	DG	18	3	DP	18	2										
HEF4737	VD, VP	QUADRUPLE STATIC DECADE COUNTERS	650	DG	18	3	DP	18	2										
HEF4738	VE, VP	IEC/IEEE BUS INTERFACE	651				DP	40	2										
HEF4739	VP	DIGITAL VOLTMETER CIRCUIT	652	DP	28	1													
HEF4750	VD, VP	FREQUENCY SYNTHESIZER	653	DG	28	1	DP	28	1										
HEF4751	VD, VP	UNIVERSAL DIVIDER	654	DG	28	1	DP	28	1										
HEF4752	VD, VP	A.C. MOTOR CONTROL CIRCUIT	655	DG	28	1	DP	28	1										
HEF4753	BD, BP, VD, VP	UNIVERSAL TIMER MODULE	656	DG	18	3	DP	18	2										
HEF4754	VD, VP	18-ELEMENT BAR GRAPH LCD DRIVER	657	DG	28	1	DP	28	1										
HEF4755	VD, VP	TRANSCEIVER FOR SERIAL DATA COMMUNICATION	658	DG	28	1	DP	28	1										
HEF40097	BD, BP, BT	TRI-STATE HEX-NON INVERTING BUFFER	575	DG	16	1	DP	16	8		FP	16	2						
HEF40098	BD, BP, BT	TRI-STATE HEX INVERTING BUFFER	576	DG	16	1	DP	16	8		FP	16	2						
HEF40106	BD, BP, BT	HEX SCHMITT TRIGGER INVERTER																	
HEF40160	BD, BP, BT	4-BIT SYNCHRONOUS DECADE COUNTER WITH ASYNCHRONOUS RESET																	
HEF40161	BD, BP, BT	4-BIT SYNCHRONOUS BINARY COUNTER WITH ASYNCHRONOUS RESET																	
HEF40162	BD, BP, BT	4-BIT SYNCHRONOUS DECADE COUNTER WITH ASYNCHRONOUS RESET																	
HEF40163	BD, BP, BT	4-BIT SYNCHRONOUS BINARY COUNTER WITH ASYNCHRONOUS RESET																	
HEF40174	BD, BP, BT	HEX D FLIP FLOP	577	DG	16	1	DP	16	8		FP	16	2						
HEF40175	BD, BP, BT	QUADRUPLE D FLIP FLOP	578	DG	16	1	DP	16	8		FP	16	2						
HEF40192	BD, BP, BT	4-BIT UP/DOWN DECADE COUNTER	537	DG	16	1	DP	16	8		FP	16	2						
HEF40193	BD, BP, BT	4-BIT UP/DOWN BINARY COUNTER	537	DG	16	1	DP	16	8		FP	16	2						
HEF40194	BD, BP, BT	4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTER	579	DG	16	1	DP	16	8		FP	16	2						
HEF40195	BD, BP, BT	4-BIT UNIVERSAL SHIFT REGISTER	580	DG	16	1	DP	16	8		FP	16	2						
HEF40244	BD, BP, BDB	OCTAL BUFFER WITH 3-STATE OUTPUTS	659	D	20														
HEF40245	BD, BP, BDB	OCTAL BUS TRANSCEIVER WITH 3-STATE OUTPUTS	660	D	20														
HEF40373	BD, BP, BDB	OCTAL TRANSPARENT LATCH WITH 3-STATE OUTPUTS	661	D	20														
HEF40374	BD, BP, BDB	OCTAL D-TYPE FLIP-FLOP WITH 3-STATE OUTPUTS	662	D	20														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

$V_{DD} - V_{SS}$ (recommended) 3 to 15 V ; $I_T = 10$ pA (at $T_{amb} = 25^\circ\text{C}$) ; $C_L = 5$ pF (see note 4)
suffix B =
suffix V = 4,5 to 12,5V

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)												DYNAMIC ELECTRIC CHARACTER. (see note 4)						
	I_{DD} (2)	P_{DL} (3)	V_{OL}	V_{OH}	V_{nH}	V_{nL}	at (6)		I_{OL}	at		t_{PLH}	t_{PHL}	From	$t_{\text{EW\phi H}}$	t_{THL}	t_{TLH}	$f_{\phi\text{max}}$	
	μA	mW	V	V	V	V	V_O	or	V_O	I_{OL}	I_{OH}	I_{OH}	ns	ns	ns	ns	ns	ns	MHz
	max	typ	max	min	min	max			min	min	max	typ	typ		typ	typ	typ	typ	
HEF4720 BD, BP			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	120	120	A-0				
HEF4720 VD, VP			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	120	120	A-0				
HEF4724 BD, BP, BT	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	45	D-0				
HEF4731 BD, BP, BT			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	100	CP-0				8
HEF4731 VD, VP			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	100	100	CP-0				8
HEF4737 BD, BP	100		0,05	9,95	7	3	1	9	2,3	0,5	-2	9,5	120	120	CP-0	30	18	30	16
HEF4737 VD, VP	100		0,05	9,95	7	3	1	9	2,3	0,5	-2	9,5	120	120	CP-0	30	18	30	16
HEF4738 VE, VP	100		0,05	9,95	7	3	1	9	8	0,5	-0,85	9,5							
HEF4739	100		0,05	9,95	7	3	1	9	4,8	0,5	-1,4	9,5							
HEF4750 VD, VP	100		0,05	9,95	7	3	1	9	4,6	0,5	-1,3	9,5			20				30
HEF4751 VD, VP	100		0,05	9,95	7	3	1	9	2,7	0,5	-2,5	9,5	50	50	I-0				15
HEF4752 VD, VP	100		0,05	9,95	7	3	1	9	1,17	0,5	-0,75	9,5							
HEF4753 BD, BP, VD, VP	100		0,05	9,95	7	3	1	9	8	0,5	-1,5	9,5	200	180	CP-0		15	30	14
HEF4754 VD, VP	1000		0,05	9,95	7	3	1	9	0,9	0,5	-0,7	9,5							
HEF4755 VD, VP	100		0,4	9	7	3	1	9	*5!	0	*5!	12,6			125"	25!	25!		
HEF40097 BD, BP, BT	8	55	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	28	28	I-0		20	20	
HEF40098 BD, BP, BT	8	52	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	35	35	I-0		20	20	
HEF40106 BD, BP, BT			0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	35	35	I-0				
HEF40160 BD, BP, BT	40	8	0,05	9,95	7	3	1	9	10	0,5	-3,2	9,5	55	55	CP-0				12
HEF40161 BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	55	55	CP-0				12
HEF40162 BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	55	55	CP-0				12
HEF40163 BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	55	55	CP-0				12
HEF40174 BD, BP, BT	40	22	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	35	35	CP-0				16
HEF40175 BD, BP, BT	40	22	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	35	35	CP-0				16
HEF40192 BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	105	105	CP-0	30	30	30	8
HEF40193 BD, BP, BT	40	8	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	105	105	CP-0	30	30	30	8
HEF40194 BD, BP, BT	40	18	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	45	CP-0	35	40	40	14
HEF40195 BD, BP, BT	40	20	0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5	45	45	CP-0	35	40	40	14
HEF40244 BD, BP, BDB	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5							
HEF40245 BD, BP, BDB	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5							
HEF40373 BD, BP, BDB	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5							
HEF40374 BD, BP, BDB	40		0,05	9,95	7	3	1	9	1,1	0,5	-1,1	9,5							

NOTES : (1) Test conditions: $T_{amb}=25^\circ\text{C}$
 $V_{DD}=10\text{V}$
(2) Quiescent supply current
(3) Dissipation at 1 MHz ; at $C_L = 50$ pF
D-0 : Data input to Output ; I-0 : Input to Output
A-0 : Address input to Output ; CP-0 : Clock input to Output ; RS-0 : Clock input/oscillator pin to Output
(4) Test conditions: $T_{amb}=25^\circ\text{C}$; $C_L=50$ pF
Input rise and fall time=20ns
Typical temp. coeff. for all values of $V_{DD}=0,3\%/^\circ\text{C}$
(5) Same as t_{pWH} or t_{pWL} (6) at worst case input levels

HX

Basic Characteristics: See page 21

Operating Temp. Range:

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TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			HXA100101 D, F	TRIPLE 5-INPUT OR/NOR GATE	663				GG	24	1								
HXA100102 D, F	QUINTUPLE 2-INPUT OR/NOR GATE WITH COMMON ENABLE	664				GG	24	1											
HXA100107 D, F	QUINTUPLE EXCLUSIVE OR/NOR GATE WITH COMPARE	665				GG	24	1											
HXA100112 D, F	QUADRUPLE DOUBLE FAN-OUT OR/NOR GATE	666				GG	24	1											
HXA100114 D, F	QUINTUPLE DIFFERENTIAL LINE RECEIVER	667				GG	24	1											
HXA100117 D, F	TRIPLE 1-2-2 INPUT OR/AND -OR/NAND GATE	668				GG	24	1											
HXA100118 D, F*	2-4-4-4-5 INPUT OR/AND -OR/NAND GATE	669				GG	24	1											
HXA100122 D, F	9-BIT BUFFER GATE																		
HXA100123 D, F	HEX BUS DRIVER	670				GG	24	1											
HXA100130 D, F	TRIPLE D LATCH																		
HXA100131 D, F	TRIPLE D FLIP-FLOP	671				GG	24	1											
HXA100136 D, F	MULTI PURPOSE COUNTING REGISTER																		
HXA100141 D, F	8-BIT UNIVERSAL SHIFT REGISTER																		
HXA100142 D, F	4 X 4 CONTENT ADDRESSABLE MEMORY																		
HXA100145 D, F	16 X 4 REGISTER FILE																		
HXA100150 D, F	HEX D LATCH FLIP-FLOP	672				GG	24	1											
HXA100151 D, F	HEX D MASTER-SLAVE FLIP-FLOP	673				GG	24	1											
HXA100155 D, F	QUADRUPLE 2-WAY MULTIPLEXER LATCH	674				GG	24	1											
HXA100156 D, F	MASK MERGE																		
HXA100158 D, F	8-BIT SHIFT MATRIX	675				GG	24	1											
HXA100160 D, F	DUAL 9-BIT PARITY GENERATOR/8-BIT COMPARATOR	676				GG	24	1											
HXA100163 D, F	DUAL 8-BIT MULTIPLEXER	677				GG	24	1											
HXA100164 D, F	16-INPUT MULTIPLEXER	678				GG	24	1											
HXA100165 D, F	UNIVERSAL PRIORITY ENCODER																		
HXA100166 D, F	9-BIT COMPARATOR																		
HXA100170 D, F	UNIVERSAL DECODER																		
HXA100171 D, F	TRIPLE BIT 4-WAY MULTIPLEXER	679				GG	24	1											
HXA100175 D, F	5-BIT 100 k TO 10 k INTERFACE WITH LATCH																		
HXA100179 D, F	CARRY LOOKAHEAD																		
HXA100180 D, F	FAST -6 BIT ADDER																		
HXA100181 D, F	4-BIT ALU BINARY/DECIMAL																		
HXA100194 D, F	QUINT TRANSCEIVER																		
HXA100255 D, F	5-BIT ECL/TTL INTERFACE																		
HXA100414 E, F	251X1 BIT RANDOM ACCESS MEMORIES																		
HXA100415 D, AD	1024X 1 BIT RANDOM ACCESS MEMORIES	680	DG	16	1	DG	16	1											
HXA100415 E, F	(1024X1 BIT RAM)																		
HXA100416 E, F	256 X 4 BIT PROGRAMMABLE READ ONLY MEMORIES																		
HXA100422 D, AD	256 X 4 BIT RANDOM ACCESS MEMORIES	681	DG	24	1	DG	24	1											
HXA100422 E, F	(256 X 4 BIT RAM)																		

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	STATIC ELECTRICAL CHARACTERISTICS (see note 1)											DYNAMIC ELECTRIC CHARACTER. (see note 4)						
	I_{EE} (2)	$P_{(AV)}$ (3)	V_{OL}	V_{OH}	V_{IH}	V_{IL}	V_{OH} or V_{OL}	I_{IH}	I_{IH}	I_{IL}	I_{IL}	t_{pdr}	t_{pdf}	t_{pLH}	t_{TLH}	t_r	t_f	C_L
	mA	mW	V	V	V	V	V	μA	μA	μA	μA	ns	ns	ns	ns	ns	ns	pF
	max	max	max	min	min	min	max	max	typ	min	typ	max	max	max	max	max	max	Typ
HXA100101 D, F	34	117	1,62	1,025	1,165	1,81	0,88	1,62	0,5	1,81	340	0,88	0,95	0,95		1,1	1,1	4
HXA100102 D, F	72	248	1,62	1,025	1,165	1,81	0,88	1,62	300	0,88	0,5	1,81	0,95	0,95		1,25	1,25	4
HXA100107 D, F	86	297	1,62	1,025	1,165	1,81	0,88	1,62	350	0,88	0,5	1,81	1,55	2,75		1,2	1,2	4
HXA100112 D, F	95	326	1,62	1,025	1,165	1,81	0,88	1,62	450	1,81	0,5	1,81	1,7	1,7		1,4	1,4	6
HXA100114 D, F	96	331	1,62	1,025	1,165	1,81	0,88	1,62	*95	*0,37	*1	*0,37		2,2	1,5			4
HXA100117 D, F	71	297	1,62	1,025	1,165	1,81	0,88	1,62	220	0,88	0,5	1,81	2	2		1,1	1,1	4
HXA100118 D, F	51	176	1,62	1,025	1,165	1,81	0,88	1,62	240	0,88	0,5	1,81	2	2		1,1	1,1	4
HXA100122 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100123 D, F	211	729	1,62	1,025	1,165	1,81	0,88	1,62	330	0,88	0,5	1,81	*4,5	*4,5		1,9	1,9	4
HXA100130 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100131 D, F	138	477	1,62	1,025	1,165	1,81	0,88	1,62	230	0,88	0,5	1,81	2,75	1,5		1,3	1,3	4
HXA100136 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100141 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100142 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100145 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100150 D, F	147	509	1,62	1,025	1,165	1,81	0,88	1,62	520	0,88	0,5	1,81	2,5			1,5	1,5	4
HXA100151 D, F	184	634	1,62	1,025	1,165	1,81	0,88	1,62	225	0,88	0,5	1,81	3			1,65	1,65	4
HXA100155 D, F	124	430	1,62	1,025	1,165	1,81	0,88	1,62	430	0,88	0,5	1,81	2,7			1,65	1,65	
HXA100156 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100158 D, F	156	540	1,62	1,025	1,165	1,81	0,88	1,62	340	0,88	0,5	1,81	*4,7	*2,7		2,2	2,2	
HXA100160 D, F	107	369	1,62	1,025	1,165	1,81	0,88	1,62	340	0,88	0,5	1,81	3,9	3,9		1,55	1,55	4!
HXA100163 D, F	155	535	1,62	1,025	1,165	1,81	0,88	1,62	340	0,88	0,5	1,81	*1,7	*2,2		1,2	1,2	5!
HXA100164 D, F	91	315	1,62	1,025	1,165	1,81	0,88	1,62	280	0,88	0,5	1,81	*2,15	*3,2		1,6	1,6	4
HXA100165 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100166 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100170 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100171 D, F	73	290	1,62	1,025	1,165	1,81	0,88	1,62	265	0,88	0,5	1,81	1,55	*2,2		1	1	4
HXA100175 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100179 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100180 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100181 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100194 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA100255 D, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA 100414 E, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA 100415 D, AD	195	700	1,62	1,025	1,165	1,81	0,88	1,62	220	0,88	6	1,81				2'	2'	5!
HXA 100415 E, F	195	700	1,62	1,025	1,165	1,81	0,88	1,62	220	0,88	6	1,81				2'	2'	5!
HXA 100416 E, F			1,62	1,025	1,165	1,81	0,88	1,62										
HXA 100422 D, AD	210	B10	1,62	1,025	1,165	1,81	0,88	1,62	220	0,88	6	1,81				3'	3'	8!
HXA 100422 E, F	210	B10	1,62	1,025	1,165	1,81	0,88	1,62	220	0,88	6	1,81				3'	3'	8!

NOTES : (1) Test conditions: V_{CC} = ground; V_{EE} = -4,5 V
 T_{amb} = 0 to 75°C; R_L = 50 Ω at -2V
(2) Apply 0,95 \pm 0,005 V to all inputs
(3) power consumption per package

(4) Test conditions: V_{CC} = ground; V_{EE} = -4,5 V; Load = 50 Ω to -2 V

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAA1006	DIODE MATRIX ENCODER providing a 16 line to 4-bit binary encoding for general purpose applications (I_F : 20 mA max; V_R : 6,5 V max (I_R : 30 mA max at V_R : 6 V (V_F : 1 V max at I_F : 2 mA	688	DP	16	17											
SAA1020	STATIC 288-BIT SHIFT REGISTER capable of storing 16 channel data. It can be directly connected to the SAA1121 control IC without interface.	700	DP	16	1														
SAA1025	THIRTY CHANNEL ULTRASONIC RECEIVER FOR REMOTE-CONTROLLED TV RECEIVERS It measures the frequency of the arriving signal by counting the cycles during a fixed measuring time determined by crystal. (MOS technique).		DP	16	1														
SAA1027	DRIVE CIRCUIT FOR FOUR-PHASE UNIPOLAR STEPPER MOTORS. It comprises three input stages, a logic section, and an output stage for each of the four stator windings of the motor.	539	DP	16	3														
SAA1028	CIRCUIT FOR CAR CLOCKS It consists of an oscillator, a frequency divider, an output stage and associated drive logic, realized in bipolar technology.	540	DP	16	3														
SAA1029	TRIPLE AND-GATE WITH VERY HIGH NOISE IMMUNITY FOR INDUSTRIAL APPLICATIONS		DP	16	18														
SAA1056D, P	PLL FREQUENCY SYNTHESIZER Together with a suitable prescaler (e.g. SAA1058) and a loop filter, it forms a complete PLL frequency synthesizer for AM/FM radio tuning systems	689	DG	16			DP	16	8A										
SAA1057	RADIO TUNING PLL FREQUENCY SYNTHESIZER Single chip frequency synthesizer IC in I ² L technology which performs all the tuning functions of a PLL radio tuning system. The IC is applicable to all types of radio receivers, e.g. car radios, hi-fi radios and portable radios.	690	DP	18	4														
SAA1058, A SAA1059	125 MHz AMPLIFIER AND DIVIDER BY 32/33 designed as a programmable ratio divide-by-32/33 prescaler and intended for use in digital radio tuning systems and frequency counters in radio applications with an input frequency range from 0,5 to 125 MHz.	691	DP DP	16 16	8 8														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

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TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAA1060	LED DISPLAY/INTERFACE CIRCUIT primarily designed to drive the display unit of a digital tuning system. It can also be used as a 16-bit serial to parallel decoder.	692	DP	24	1											
SAA1061	OUTPUT PORT EXPANDER converting serial inputs data into parallel output information. It is used in combination with a microcomputer.	693	DP	24	1														
SAA1062, T	LCD DISPLAY/INTERFACE CIRCUIT designed to drive a Liquid Crystal Display of a digital tuning system and to be driven by a 3 bus structure from a microprocessor and can also be used as a programmable 17 or 20 bits serial-to-parallel decoder. It is also capable of storing 60 bits of information.	694	DP	28	1	FP	28	2											
SAA1070	DISPLAY INTERFACE AND FREQUENCY COUNTER to be used together with the frequency divider SAA1058 to make a frequency indicator.	695	DP	28	1														
SAA1075	NON-VOLATILE RANDOM ACCESS MEMORY IN P-CHANNEL MNOS TECHNOLOGY provided for storing the tuning informations of 16 TV transmitters. Used together with SAA1174 and SAA1276 to make a IC kit for Digital Tuning of TV receivers.	701	DP	18	1														
SAA1082P	REMOTE TRANSMITTER intended for a general purpose infrared remote control system. It can generate 2048 different commands and utilizes a keyboard with a single-pole switch per key.	697	DP	28	1														
SAA1121	CONTROL CIRCUIT. It features all data processing needed for a TV tuning operation, whereas all storage is by the SAA1020 memory or by the SAA1220 non-volatile memory.	698 700	DP	24	6														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
			SAA1130	THIRTY CHANNEL ULTRASONIC RECEIVER WITH PROGRAMM STORE. For TV and radio receivers, remote-controlled without cable. May be combined with SAA1020.	569	DP	18	1										
SAA1174	CONTROL IC. operating as a Phase-Locked-Loop circuit. It is intended for receiving UHF channels 21 to 69 in the CCIR standard, using an IF of 39,5 MHz. Used together with SAA1075 and SAA1276 to make a IC kit for Digital Tuning of TV receivers.	703	DP	24	6													
SAA1220	NON VOLATILE READ/WRITE RANDOM ACCESS MEMORY. Its capacitance is 16 words , 18 bits each.	699	DP	18	1													
SAA1224	THIRTY CHANNEL ULTRASONIC TRANSMITTER FOR REMOTE CONTROLLED TV RECEIVERS. intended for remote control systems whereby 30 commands are transmitted by means of 30 different ultrasonic frequencies. It comprises a crystal oscillator with external 4,4 MHz crystal, a fixed and an adjustable frequency divider, a decoder circuit and an auxiliary circuit which prevents the transmission of an ultrasonic signal if more than one key is pressed.		DP	16	1													
SAA1230	SIXTEEN CHANNEL ULTRASONIC RECEIVER FOR REMOTE-CONTROLLED TV RECEIVERS. providing the receiver function in a television ultrasonic remote control system.	705	DP	18	1													
SAA1250 SAA1251	IC-KIT FOR INFRARED REMOTE CONTROL. This IC-kit is based on an interference-rejecting infrared transmission principle.	706A 706B	DP	24	6													

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAA1274	CONTROL IC. operating as a Phase-Locked-Loop circuit. Similar to SAA1174 but with an integrated ROM serving to allocate the band data to the tuning frequency (three outputs with a signal of 1 out of 3). The following allocation is realized : Band I : 40 to 108 MHz : channel 1 to channel 4 and 6 special channels. Band III : 109 to 305 MHz : channel 5 to channel 12 and 28 special channels. Band IV/V : 470 to 895 MHz : channels 21 to 74.	704	DP	24	6														
SAA1276	CHARACTER GENERATOR CIRCUIT. Serving for the display of channel number (00 to 99) and programm number (1 to 32) on the screen of the TV receiver. This is done in conjunction with the infrared remote-control system SAA1250/1251, the SAA1274 or SAA1174 control IC and the SAA1075 memory.	702	DP	18	1														
SAA1350 SAA1351	IC KIT FOR INFRARED REMOTE CONTROL. SAA1350 : Transmitter IC in CMOS Technology. SAA1351 : Receiver IC in N-channel Si-Gate Technology.	707A 707B	DP	18	1														
SAA1900	ONE-CHIP TOY ORGAN CIRCUIT. MOS circuit in P-channel Si-gate technology.	708	DP	24	6														
SAA2008	TV CHARACTER GENERATOR. Monolithic MOS circuit in P-channel silicon gate technique for displaying the program number (1 ... 16) on the screen of color TV receivers, especially in combination with infrared remote-control system SAA1050/SAA1051.	709	DP	18	1														
SAA5000	REMOTE CONTROL TRANSMITTER ENCODER providing the encoding and modulation functions for the remote control of television receivers including those equipped with teletext and viewdata facilities.	710	DP	18	4														
SAA5012A	REMOTE CONTROL RECEIVER DECODER for the control of television receivers incorporating binary addressable tuning selector systems and including those equipped with teletext and viewdata facilities. It is suitable for use either in ultrasonic or infra-red transmission systems and is intended for use with the SAA5000 transmitter encoder IC. It is also suitable for direct connection to the SAA5040 and the SAA5050 teletext decoder circuits.	711	DP	24	1														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAA5020	TELETEXT TIMING CHAIN CIRCUIT providing the necessary timing signals to the teletext page memory and to the character generator (SAA5050). It works in conjunction with the video Processor Circuit (SAA5030) and the Teletext Acquisition and Control Circuit (SAA5040). The operation of the SAA5020 maintains the synchronization between the teletext system and the incoming video signal.		DP	24	1														
SAA5025A SAA5025B	NMOS TELETEXT TIMING CHAIN CIRCUIT FOR U.S.A. designed to provide the timing signals necessary to extract data from a memory and produce a display according to the 525 lines U.S.A. television standard (system M). Display format : - SAA5025A : 40 characters per row for 20 rows. - SAA5025B : 40 characters per row for 24 rows. (1 row = 10 TV Lines).		DP	24	1														
SAA5030	TELETEXT VIDEO PROCESSOR extracting data and data clock information from the television composite video signal and feeding this to the Acquisition and Control circuit SAA5040. A 6 MHz crystal controlled phase locked oscillator is incorporated which drives the timing chain circuit SAA5020. An adaptive sync. separator is also provided which derives line and field sync pulses from the input video in order to synchronise the timing chain.	712	DP	24	1														
SAA5040,A,B,C SAA5041 SAA5042 SAA5043	TELETEXT ACQUISITION AND CONTROL CIRCUIT performing the control, data acquisition and data routing functions of the teletext system. The circuits differ in the on-screen display that is provided and in the decoding of the remote control commands. The SAA5040 receive serial teletext data from the SAA5030 video processor and data from the remote control system SAA5010 and 5012. The SAA5040 work in conjunction with the SAA5050 series of character generators. The SAA5040, 5040A, 5040B and 5040C display different boxed informations.	713	DP	28	1														
SAA5050 SAA5051 SAA5052 SAA5053 SAA5055	TELETEXT CHARACTER GENERATOR providing the video drive signals to the television necessary to procedure the teletext/viewdata display. The circuits differ only in the character set provided : SAA5050 : ENGLISH SAA5053 : ITALIAN SAA5051 : GERMAN SAA5055 : US.ASCII SAA5052 : SWEDISH	714	DP	28	1														
SAA5070	MICROCOMPUTER/MICROPROCESSOR PERIPHERAL IC FOR VIEWDATA (LUCY) intended for use in wired data communication systems notably viewdata.	715	DP	40	2														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAA5110	FIFO CONTROLER able to control a 2 K Byte Memory. It receives and controls data coming from the DIDON demultiplexer in an ANTIIOPE system. In conjunction with this demultiplexer, it can perform the complete ANTIIOPE data acquisition.		DP	40	2														
SAA5111	DIDON DEMULTIPLEXER intended to perform the demultiplexer function of a DIDON receiver in an ANTIIOPE system. It receives serial data coming from a demodulator (SAA5030) and gives on a separate parallel bus data to be written in a FIFO Memory. In conjunction with a FIFO controler, it can perform the complete ANTIIOPE data Acquisition.		DP	28	1														
SAA5120	ANTIIOPE TIMING CHAIN CIRCUIT providing the necessary timing control signals for a full Antiope/Titan decoder system. It controls the addressing of the page memory to produce a television display of 40 characters by 25 rows.		DP	28	1														
SAA5125	ANTIIOPE TIMING CHAIN CIRCUIT FOR USA 525 LINE SYSTEM. controlling the addressing of the page memory to produce a television display of 40 characters by 21 rows for the 525 line USA standard.		DP	28	1														
SAA5150 SAA5151	ANTIIOPE CHARACTER GENERATOR (AROM) providing the video signals to a television receiver to produce the Antiope/Titan (French teletext/viewdata) character display. Each character is based upon a 6 (horizontal) by 10 (vertical) dot array stored in the internal ROM. The circuit can also provide coloured and block displays (graphics) and perform some remote control commands (e.g. big characters). The SAA5151 is identical in operation but offers an alternative European character set. The devices are intended for use with the SAA5120 Antiope timing chain (ATIC).	716 716	DP DP	28 28	1 1														
SAA5155	ANTIIOPE CHARACTER GENERATOR FOR U.S. 525 LINE SYSTEM (US-AROM) Similar to SAA5150 but intended for use with SAA5125 US Antiope timing chain (USATIC).	716	DP	28	1														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

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TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
			SAA6000	4 BIT ONE-CHIP MICROCOMPUTER Designed in low-threshold CMOS Technology, it has a 3 V supply voltage and an extremely low current consumption of 20 to 50 μ A depending on the mode of operation. It is suitable for many applications in battery-powered equipment, e.g. remote control, cameras, toys, kitchen timers, biological or medical equipment, etc...	717	GP	60	1										
SAA6002	MICROCOMPUTER FOR AN INTELLIGENT PUSHBUTTON TELEPHONE SUBSET which is a mask-programmed version of the 4-bit one-chip microcomputer SAA6000.	717A	GP	60	1													

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

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TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)												
			1	2	3	1	2	3	1	2	3				
			SAB0600	DIGITALE TONE GENERATOR generating a serie of several tones. These tone frequencies are devided from a basic frequency. A loudspeaker can be driven from the IC-output directly.		DP	8	7							
SAB1009B	WIDE-BAND LIMITING AMPLIFIER. Three stage differential amplifier in the range 70 to 900 MHz with inherent limiting action. The differential inputs are internally biased to permit capacitive coupling and asymmetrical drive. The outputs are complementary with non-standard levels. The device is specified for a nominal supply voltage of 5 V.	718	DP	14	2										
SAB1016	CONTROL CIRCUIT FOR ON-SCREEN DISPLAY OF STATION AND/OR CHANNEL NUMBER generating data for partially blanking the upper part of the scan of a TV receiver and thereby displaying the number of the selected station and/or channel. The numerals are normally displayed for 2,5 seconds after station/channel selection.	819	DP	24	1										
SAB1018,A	SENSITIVE 950 MHz DIVIDER-BY-256 Prescaler in current mode logic, it contains an amplifier, a divide-by-256 scaler and an output stage. It has been designed to be driven by a sinusoidal signal from the local oscillator of a television tuner, with frequencies from 70 to 350 or 500 to 950 MHz. for a supply voltage of 5 V \pm 5% and an ambient temperature of 0 to 70°C.	719/A	DP	14	2	DP	8	8							
SAB1034E,P SAF1034E	UHF frequency divider-b-4. Guaranteed nominal frequency : 1 GHz. Operational temperature : 0 to 75°C. Power supply : -5,2 V \pm 5%. Power dissipation : 250 mW type. Differential input.		DP DC	14 14	2 1	DP	14	2							
SAB1046	1 GHz DIVIDER-BY-256. ECL fixed-ratio divide-by-256 scaler for input frequencies in the range 70 to 1000 MHz, a supply voltage of 5 or 5,2 V. The input of the circuit are differential and internally biased to permit capacitive coupling or asymmetrical drive. The divide-by-256 outputs are designed to interface with C-MOS and N-MOS circuits having a common V _{EE} (ground). They provide active pull-up.	720	DP	14	2										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)												
			1	2	3	1	2	3	1	2	3				
			SAB1047	64-T0-1 DIVIDER High speed ECL silicon monolithic IC designed as a fixed-ratio divide-by-64 scaler or prescaler. It is intended for use in digital counters or frequency synthesizers with an input frequency in the range of 0 to 250 MHz.	721	DP	14	2							
SAB1048	4-T0-1 DIVIDER ECL fixed ratio divide-by-4 scaler for input frequencies in the range of 70 to 900 MHz.	722	DP	14	2										
SAB1534E,P SAF1534E	UHF frequency divider-by-4. Guaranteed nominal frequency : 1,5 GHz. Operational temperature : 0 to 75°C. Power supply : -5,2 V to + 5 %. Power dissipation : 250 mW typ. Differential input.		DP	14	2	DP	14	2							
			DC	14	1										
SAB1702A-B	256-8 BIT PROM, electrically programmable erasable.		DC	24											
SAB1801D	DUAL DIFFERENTIAL D-TYPE FLIP-FLOP with latch, including differential inputs and enable outputs. The clock input is common to both flip-flop and each output gate is enabled by a common enable input. The input data (D) are registered at the output when the clock is HIGH and the output is latched by the negative transition of the clock (falling edge). This circuit is useful in applications such as phone repeaters, sensible line comparator-receivers and fast analogue-to-digital converters.	723	DG	14	3										
SAB2000	ULTRASONIC REMOTE-CONTROL SYSTEM FOR COLOUR TV RECEIVER CODING CIRCUIT FOR ULTRASONIC OSCILLATOR. P-channel MOS, ion implantation.		DF	18	2										
SAB2010	ULTRASONIC REMOTE-CONTROL SYSTEM FOR COLOUR TV RECEIVER DECODER FOR ULTRASONIC RECEIVER. P-channel MOS, ion implantation.		DF	14	1										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAB2015	LOC-MOS RAM AND CONTROL CIRCUIT. for the SAB2024 Tuning circuit. Supply voltage : 8-10 V/Power consumption : 0,4 mW Operating frequency :4 MHz max.		DP	24															
SAB2020	ULTRASONIC REMOTE-CONTROL SYSTEM FOR COLOUR TV RECEIVER P-channel MOS, ion implantation.	541	DP	14	1														
SAB2022	See RAM on page 142.																		
SAB2024	TIMING CIRCUIT FOR PICTURE CARRIER FREQUENCY.		DP	24															
SAB2101A SAB2102A SAB2104A SAB2108 SAB2109 SAB2111A SAB2114C,P SAB2116 SAB2117 SAB2141 SAB2142	See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142. See RAM on page 142.																		
SAB2308 SAB2316A,E	See ROM on page 140. See ROM on page 140.																		
SAB2332A	4 K X 8 - BIT READ ONLY MEMORY	798	D	24															
SAB2364A	8 K X 8 - BIT READ ONLY MEMORY	799	D	24															
SAB2416P	CHARGE COUPLED DEVICES MEMORY : 64 X 256-bit		DP	22															
SAB2608 SAB2616	See ROM on page 140. See ROM on page 140.																		

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAB2704C	512 X 8 BIT PROM, electrically programmable, erasable		DC	24												
SAB2708C SAB2716B, C SAB2732 SAB2758 SAB2808	See ROM on page 140. See ROM on page 140. See ROM on page 140. See ROM on page 140. See ROM on page 140.																		
SAB3002-D	ARITHMETIC LOGIC UNIT (ALU)		FP	28															
SAB3003-D	CARRY LOOK AHEAD GENERATOR.		FP	28															
SAB3011	REMOTE TRANSMITTER. Specifically designed for battery powered operation. It is fabricated using LOC MOS techniques to provide a circuit that consumes very little power. At standby, with no key operated, the oscillator is switched off, so only leakage currents determine the current consumption, minimum battery load.	724	DP	24	1														
SAB3012,A	RECEIVER AND ANALOGUE MEMORY. SAB3012 : Receiver for 2 X 64 commands for TV. SAB3012A : Receiver for 2 X 64 commands for radio.	725	DP	24	1														
SAB3013	6-FUNCTION ANALOGUE MEMORY; MICROCOMPUTER CONTROLLED designed to deliver analogue values in microcomputer-controlled television receivers and radio receivers. The circuit accomplishes a word format recognition, so it is able to operate one common data bus together with circuits having different word formats.	726	DP	16	8A														
SAB3015	268-BIT ELECTRICALLY ALTERABLE NON-VOLATILE MNOS MEMORY. for use in systems requiring permanent data storage. The memory has a capacity of 268 bits, organized as 16 X 16 bits plus 1 X 12 bits. The 4-bit wide input and output ports permits flexibility in design.	727	DP	18	2														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
SAB3017	IBUS SUB-SYSTEM INTERFACE enables customized systems with parallel inputs to be driven by our remote control system via the serial instruction bus (IBUS) which can be obtained from the remote control receiver circuit. Only three signal lines are necessary for the electrical connections to the TV or radio set.	728	DP	18	2													
SAB3019	CLOCK CIRCUIT with counters for minutes, hours, days and months and with timer register for the same data. It runs with very low current consumption from a 1,5 V backup battery.	771	DP	16	8													
SAB3021	REMOTE CONTROL TRANSMITTER for 2 X 64 commands with 8X8 input matrix scanner and pulse-distance coding for the output. To be used with the SAB3023 or 3042 decoders.	775	DP	24	1													
SAB3022	RECEIVER AND ANALOGUE MEMORY demodulating the pulses width modulated command words from a remote transmitter system (e.g.SAB3021). It also has four memories to provide control of four analogue functions, and five inputs to allow the use up to 31 local commands.	729	DP	24	1													
SAB3023,B	RECEIVER AND ANALOGUE MEMORY Serial Data is derived from the transmitter SAB3021 in remote or extended local operation mode. For local operation five inputs are available, via which 31 commands are parallel addressable (can be chosen by mask-programming). The ROM of the version SAB3023B is programmed by the manufacturer.	730	DP	24	1													
SAB3024	COMPUTER INTERFACE FOR TUNING SYSTEMS (CITUS). accepting commands from the microcomputer via the CBUS and performs the functions associated with frequency-locked loop digital tuning. Receiver tuning data is transmitted from the microcomputer, via the CBUS, as 18-bit words which are loaded into the data shift register. Shortly after the end of each word, the data, if valid, is loaded into the data latch.	731	DP	16	8A													
SAB3032	RECEIVER AND ANALOGUE MEMORY. Identical to the SAB3022 except for extra output functions, ANDA, ANDB, RSVE, RSVF.		DP	28	1													

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAB3033	REMOTE CONTROL RECEIVER FOR SAB3011 and SAB3021 containing inputs for control, IBUS output, 4-bit parallel programm output, 4 analogue functions, and some reserve outputs.	789																	
SAB3034	ANALOGUE AND TUNING CIRCUIT. providing closed loop digital tuning and control of up to six analogue functions. The IC is used in combination with a computer.	732	DP	18	4														
SAB3042 SAB3042B	INFRARED DECODER, MICROCOMPUTER COMPATIBLE demodulating the pulse width modulated command words from a remote transmitter system. It can also handle commands received from a local keyboard. The IC is used in combination with microcomputer concepts. SAB3042B is similar to SAB3042 but with different local commands.	733	DP	16	8														
SAB3044	LED-DISPLAY DECODER/DRIVER. MOS N-CHANNEL 7-segment LED-display decoder/driver which can drive 2 digits in multiplex mode.	734	DP	18	4														
SAB3050	SINGLE-CHIP 16-BIT MICROPROCESSOR.																		
SAB3060P	8-BIT ANALOGUE/DIGITAL CONVERTER. The reference voltages are generated by charge distribution in a binary weighted capacitance network.	778	DP	18	1														
SAB3064	DECODER/DRIVER FOR LED DISPLAY WITH SEGMENTS IN SERIES. Decoder/driver for one digit and a half LED display, the 9 segments of which are connected in series (2 groups). In conjunction with such a device, the circuit performs the display of number 1 to 16 from a binary code. It is especially intended to be used for programm indication in TV of radio equipments.	735	DP	16	8														
SAB3090	See μ P on page 138.																		
SAB3104D	COMPARATOR 16-BIT		FP	16															

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
			SAB3205D, P	1 OUT OF 8 DECODER		FP	16		DP	16								
SAB3209 SAB3210	INFRARED REMOTE CONTROL SYSTEM 3209 : receiver. 3210 : transmitter.	780A 780B	DP	18	1													
SAB3211, Z	LED DISPLAY DECODER DRIVER for 7 or 9 segment-display with common cathode. V _{DD} = V _I = V _O : -12 V to +0,3 V P _{tot} = 500 mW max.		DP	16	1													
SAB3212D,P	INPUT/OUTPUT MEMORY, 8-BIT		FP	24		DP	24											
SAB3214D,P	INTERRRUPT CONTROLLER		FP	24		DP	24											
SAB3216D	BUS DRIVER (Non inverting)		FP	16														
SAB3222B	REFRESH CONTROLLER		DC	22														
SAB3226D,P	BUS DRIVER (Inverting)		FP	26		DP	26											
SAB3232 SAB3242	See RAM on page 143. See RAM on page 143.																	
SAB3245D	CLOCK DRIVER		FP	16														
SAB3271	INFRARED RECEIVER with parallel outputs for IR remote control system. V _{SS} = -0,3 V to +18 V P _{tot} = 500 mW	781	DP	16	1													

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAB3404P	SLAVE FLIP-FLOP 6-BIT.		DP	16												
SAB3408P	See Interface on page 144.																		
SAB3604D	512X8 BIT PROM electrically programmable $t_{ACC}= 70$ ns		FP	24															
SAB3624D	512X8 BIT PROM electrically programmable $t_{ACC}= 90$ ns		FP	24															
SAB4001P	256X8 BIT ROM, 4 BIT I/O.		DP	16															
SAB4002P	RAM, 320-bit and 4 bit output.		DP	16															
SAB4003P	SHIFT REGISTER, 10 BIT.		DP	16															
SAB4004C,D,P	4-BIT MICROPROCESSOR.		DC	16		FP	16		DP	16									
SAB4008P	INTERFACE FOR STANDARD MEMORY.		DP	24															
SAB4009P	INPUT/OUTPUT CONTROLLER.		DP	24															
SAB4040C,D,P	4-BIT MICROPROCESSOR.		DC	24		FP	24		DP	24									
SAB4101P	STATIC RAM : 256 X 4-BIT.		DP	22															
SAB4201A-D/P	CLOCK GENERATOR.		DC	16		DP	16												

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			SAB4209	INFRARED RECEIVER FOR REMOTE CONTROL SYSTEM to be used with SAB3210. $V_I = V_{DD} = -18$ to $+0,3$ V $P_{tot} = 500$ mW max.	782	DP	18	1												
SAB4265D,P	PROGRAMMABLE I/O INTERFACE		FP	28		DP	28													
SAB4269D	PROGRAMMABLE KEYBOARD INDICATOR UNIT		FP	40																
SAB4289C	INTERFACE FOR STANDARD MEMORY		DG	40																
SAB4308P	1024 X 8 BIT AND 4-BIT I/O ROM		DP	28																
SAB4702A-B	256 X 8-BIT PROM, electrically programmable, erasable		DC	24																
SAB5101L-C	See RAM on page 143.																			
SAB8008C	8-BIT MICROPROCESSOR																			
SAB8021P	See MICROPROCESSORS on page 138.																			
SAB8022	See MICROPROCESSORS on page 138.																			
SAB8035P	See MICROPROCESSORS on page 138.																			
SAB8039D/P	See MICROPROCESSORS on page 139.																			
SAB8041AD,P	See MICROPROCESSORS on page 139.																			
SAB8048C	See MICROPROCESSORS on page 139.																			
SAB8049D/P	See MICROPROCESSORS on page 139.																			
SAB8080A	See MICROPROCESSORS on page 139.																			
SAB8085A	See MICROPROCESSORS on page 139.																			
SAB8086	See MICROPROCESSORS on page 139.																			
SAB8101A	See RAM on page 143.																			
SAB8102A/D	See RAM on page 143.																			
SAB8111A	See RAM on page 143.																			
SAB8155/56, C	See RAM on page 143.																			

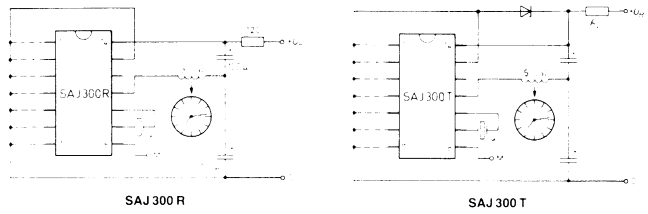
NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAB8165	1048X8-BIT STATIC ROM/ 2 PROGRAMMABLE 8-BIT I/O PORTS; 1 PROGRAMMABLE 6-BIT I/O PORT; 1 PROGRAMMABLE 16-BIT COUNTER MULTIPLEX-DATA AND ADDRESS-BUS DIRECTLY COMPATIBLE WITH SAB8048, SAB8085, SAB8086.		DP	40												
SAB8202	See RAM on page 143.																		
SAB8205D,P	See INTERFACES on page 144.																		
SAB8212C,D,P	See INTERFACES on page 144.																		
SAB8214C,D,P	See INTERFACES on page 145.																		
SAB8216D,P	See INTERFACES on page 145.																		
SAB8224D,P	See INTERFACES on page 145.																		
SAB8226D,P	See INTERFACES on page 145.																		
SAB8228C,D,P	See INTERFACES on page 145.																		
SAB8238D,P	SYSTEM CONTROLLER AND BUS-DRIVER		FP	28			DP	28											
SAB8243P	See INTERFACES on page 145.																		
SAB8251A,C,D,P	See INTERFACES on page 145.																		
SAB8253CL,D	See INTERFACES on page 146.																		
SAB8255C,D	See INTERFACES on page 146.																		
SAB8257C,D	See INTERFACES on page 146.																		
SAB8259A,C,D	See INTERFACES on page 146.																		
SAB8271D	See INTERFACES on page 146.																		
SAB8273D	See INTERFACES on page 146.																		
SAB8275D	See INTERFACES on page 146.																		
SAB8278D	See INTERFACES on page 146.																		
SAB8279D,P	See INTERFACES on page 147.																		
SAB8291	See INTERFACES on page 147.																		
SAB8292	See INTERFACES on page 147.																		
SAB8294	See INTERFACES on page 147.																		
SAB8295	See INTERFACES on page 147.																		
SAB8308	See ROM on page 140.																		
SAB8316A,P	See ROM on page 140.																		
SAB8332	4KX8-BIT ROM, Mask programmable		DP	24															
SAB8355D,P	See ROM on page 141.																		
SAB8702,A	See ROM on page 141.																		
SAB8708	See ROM on page 141.																		
SAB8748B,D	See MICROPROCESSOR on page 138.																		
SAB8755(-8D)	See ROM on page 141.																		

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			SAF1032P SAF1039P	REMOTE CONTROL SYSTEM FOR INFRARED OPERATION SAF1032P (Receiver/decoder) and the SAF1039P (transmitter) form the basic parts of a sophisticated remote control system (pcm : pulse code modulation) for infrared operation. The ICs can be used, for example, in TV, audio, industrial equipments.	736A 736B	DP DP	18 16	2 8A												
SAF1034E SAF1534E	4-T0-1 DIVIDERS (cfr SAB1034 and SAB1534) ECL fixed-ratio divide-by-4 scalars for input frequencies in the ranges 70 MHz to 1,05 GHz (SAF1034E) and 100 MHz to 1,5 GHz (SAF1534E).	737	DC DC	14 14	1 1															
SAF2716D SAF8035L-D SAF8048D SAF8085A-D SAF8155D SAF8156D SAF8212D SAF8216D SAF8226D SAF8243D SAF8251D SAF8253D SAF8259D SAF8279D SAF8748D SAF8755A	See SAB2716 on page 140. See SAB8035 on page 138. See SAB8048 on page 138. See SAB8085 on page 139. See SAB8155 on page 143. See SAB8156 on page 143. See SAB8212 on page 144. See SAB8216 on page 145. See SAB8226 on page 145. See SAB8243 on page 145. See SAB8251 on page 145. See SAB8253 on page 146. See SAB8259 on page 146. See SAB8279 on page 147. See SAB8748 on page 139. See SAB8755 on page 141.																			

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			SAJ141	FREQUENCY DIVIDER 1000:1; 100:1; 10:1 (MOS technique)		DP	8	7												
SAJ150	FLASH LIGHT CONTROL. Interval switch, pulse generator with adjustable switch-on and switch-off times and direction and warning flash.	545	DP	8	7															
SAJ180E	FREQUENCY DIVIDER WITH PUSH-PULL BUFFERS (MOS technique)	546	DP	14	4															
SAJ205	STAIRCASE GENERATOR. It is intended to generate a frequency spectrum of even- or odd-numbered harmonics, and is capable of realizing on audio-frequency generator with 9 octaves. (MOS depletion-mode technique)		DP	14	1															
SAJ210	7-STAGE FREQUENCY DIVIDER FOR ELECTRONIC ORGANS. The input and the output of each flip-flop is externally accessible. (Bipolar technique)	547	DP	14	6															
SAJ240 SAJ240E	FREQUENCY DIVIDER WITH PUSH-PULL BUFFERS FOR USE IN LONG DELAY TEMPO-RIZATION, ELECTRONIC ORGANS, ELECTRONIC ACCORDEONS. (MOS technique)	548	CM DP	10 14	1 4															
SAJ300R,T	CMOS CIRCUIT FOR RF QUARTZ CLOCKS WITH DIGITAL ADJUSTMENT AND 64 Hz OUTPUT. It comprises an oscillator circuit, a fixed 4 : 1 frequency divider, an adjustable frequency divider and a motor driver stage.		DP	14	1															
																				

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAJ341 A	4-DECADE COUNTER/TIME PIECE COMPONENT MOS technique		DP	24	6														
SAJ410 A	7-STAGE FREQUENCY DIVIDER FOR ELECTRONIC ORGANS MOS technique	551	QP	14	6														
SAK110 SAK135	INTEGRATED PULSE SHAPERS S Monostable circuits with stabilizes output voltage, intended for application in revolution counters. They can be used to build rev-counters or speed meters.		DP DP	8 8	3 3														
SAK150A	REGULATED CIRCUIT. Digital proportional sweep drive.	553	FP	14	2														
SAK215	PULSE SHAPER CIRCUIT FOR REVOLUTION COUNTERS		DP	8	7														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAS560 /S	SWITCHING AMPLIFIER FOR 4-CHANNEL TOUCH TUNING		DP	16	1											
SAS570	SEE SAS560.																		
SAS570S	SEE SAS560S.		DP	16	1														
SAS580	SWITCHING AMPLIFIER FOR 4-CHANNEL TOUCH TUNING		DP	18	2														
SAS590	SEE SAS580.		DP	18	2														
SAS660	QUADRUPLE SENSE AMPLIFIER Electronic touch plate (touch driven double contact four-channel-switch) for program selection of radio and television receivers, lift controls, test equipments, etc...		DP	16	1														
			QP	16	1														
SAS670	SEE SAS660.		DP	16	1														
			QP	16	1														
SAS5800 SAS5900	SWITCHING AMPLIFIERS FOR 4 CHANNEL TOUCH TUNING with Muting Pulse. provided for channel selection in radio and TV sets when the supply voltage has been applied, the first step in the SAB5800 is automatically set.	820 821	DP	22	3														
			DP	18	1														
SAS6600 SAS6700	ELECTRONIC SENSOR SWITCHES (touch driven quad switch unity) For program selection in radio and television receivers, lift controls, test equipments etc... SAS6600 : incorporates a priority circuit with automatically causes the first stage to be activated when the equipment is initially switched on, independently of the rise time of the 2 supply voltages. SAS6700 : has incorporated 4 equivalent electronic switches. Together with SAS6600 an 8-channel touch controlled programme selector can be built. When switching-on the power supplies, channel n°1 (SAS6600) is automatically selected. Each adding of a SAS6700 extends the programme selector to 4 more switching stages.	630 630	DP	16	5	QP	16	6											
			DP	16	5	QP	16	6											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)												
			1	2	3	1	2	3	1	2	3				
SAS6610 SAS6710	ELECTRONIC SENSOR SWITCHES. Similar to SAS6600 and SAS6700 respectively But provided for equipments with bridge-connected rectifier without mains decoupling; and has sensor inputs with <u>protecting diodes</u> .	631 631	DP	16	5	QP	16	6							
SAS6800 SAS6810	SEQUENCE SWITCHES FOR 5 CHANNEL TOUCH TUNING. SAS6800 intended for use in radio sets to switch on and off noise filters, AFC, sound control, etc... dependently from each other. SAS6810 : including only one switching stage, which is selected by a sensor key after every actuation it changes its output state. It is suited for use in radio sets to switch on or off functions such as AFC or noise filter.	822 823	DP	18	1										
SAY115X SAY115Y	SPEEDOMETER AND MILLEAGE INDICATOR It comprises a monostable flip-flop with Schmitt trigger input and an output stage comprising a current source whose current is indicated by a moving coil instrument. The frequency divider of the SAY115X consists of five stages and the SAY115Y of six stages.	554	RP	12	6										

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)												
			1	2	3	1	2	3	1	2	3				
			SBA5089	DUAL-TONE MULTI-FREQUENCY TELEPHONE DIALER specifically designed for integrated tone-dialer application that require the following : fixed supply operation, negative-tone keyboard-input, tone disable input, stable output tone level, and an Any Key Down output that is open circuit when no keyboard buttons are pushed and pulls to GND when a button is pushed.	738	DP	16	1							
SBA5091	DUAL-TONE MULTI-FREQUENCY TELEPHONE DIALER specifically designed to meet European CEPT specifications. It meets the following integrated tone dialer application requirements : compatibility with European CEPT specifications, regulated-supply operation, single contact keyboard input, chip-disable input, stable output tone level, and an Any Key Down output that is open circuit when no keyboard buttons are pushed, and pulls to V _B when a button is pushed.	739	DP	18	1										
SBB2632D, E, P SBB2633D, E, P	32,768 BIT STATIC READ ONLY MEMORY manufactured to contain customer-defined data. The two chip select inputs are also programmable and any combination of active high or low or not connected chip select inputs can be defined by the customers. This combined with the 3-state data outputs allows the circuits to be "OR TIED" for direct memory expansion. The circuit requires a 5 V power supply and all inputs and outputs are directly TTL compatible. SBB2633 is electrically similar to SBB2632 but with functions of pins 18 and 21 reversed.	740	DG	24	2	DC	24	4	DP	24	1				
SBB2664D, E, P	65, 536-BIT STATIC MOS READ ONLY MEMORY designed for memory applications where high performance, large bit storage, and simple interfacing are important design objectives.	741	DG	24	2	DC	24	4	DP	24	1				

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
			SDA200-	MICROCOMPUTER-CONTROLLED FREQUENCY SYNTHESIS SYSTEM INCLUDING IR REMOTE CONTROL FOR TV SETS. SDA2001 : GHz preamplifier and 64 : 1 divider. SDA2002 : PLL including programmed divider, reference divider, integrator 3 band selection outputs. SDA2003 : Channel processor ROM, instruction routines. SDA2004 : LED.7-segment decoder (driver for 2 ro 4 digits) SDA2005 : Gating module for 2 X 2 digits. SDA2006 : Non-volatile memory. SDA2007 : IR receiver module with 4 analog functions, teletext IBUS,etc.. SDA2008 : IR transmitter.	824 825 826 827 828 829	DP	18	1												
SDA2010	Specific applications 1 chip Microcalculator.	830	D	40																
SDA2014	CASCAD3E LED INDICATOR/DRIVER	831	DP	18	1															
SDA3205	IR RECEIVER FOR REMOTE CONTROL SYSTEM.	832	DP	18	1															
SDA3206	IR TRANSMITTER FOR REMOTE CONTROL SYSTEM.	833	DP	18	1															
SDA4040 SDA4041	HIGH-SPEED FREQUENCY DIVIDERS IN ECL TECHNOLOGY FOR FREQUENCY SYNTHESIZERS UP TO 1 GHz. Divider ratio : 1 / 256 SDA4040 : TTL output. SDA4041 : with integrated wideband preamplifier 2 antiparallel ECL outputs.	834 835	DP	14	1															
SDA5010	ULTRAFast A/D CONVERTER WITH 6-BIT RESOLUTION.	836	DP	16	16															
SDA5650F SDA5650R	16X14(16)-BIT NON-VOLATILE MEMORY (for TV) 16X10(12)-BIT NON-VOLATILE MEMORY (for Radio)	837	DP	18	1															
SDA5680A B	FREQUENCY COUNTER FOR LMS AND VHF. SDA5680A : LMS : f_{zf} = 460 kHz. VHF : f_{zf} = 10,7 MHz SDA5680B : LMS : f_{zf} = 452 kHz. VHF : f_{zf} = 10,7 MHz	838	DP	28	3															

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

SDA

GENERAL DATA
 GENERALITES
 ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)											
			1	2	3	1	2	3	1	2	3			
			SDA5690,C,R	UHF-TUNING VOLTAGE CONTROL.		DP	28	3						
SDA6020	6-BIT A/D CONVERTER.	839	DC	16	7									
SDA6030	6-BIT A/D CONVERTER.	840	DC	16	7									

NOTES : (1) Shape and material, see outlines code
 (2) Number of connections
 (3) Drawing serial number, see Chapter "Outlines"

MICROPROCESSOR SYSTEMS

MIKROPROZESSOR-BAUSTEINE

SYSTÈMES DE MICROPROCESSEURS

MICROPROCESSORS

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			MAB2650A-D A-P	8-BIT General purpose microprocessors. executing a fixing instruction set, with each instruction being one to three byte in length. It contains seven general purpose registers which may be used as a source or destination for arithmetic operations, as index registers, and for I/O memory transfers. An 8-level subroutine return address stack is included on the chip.	682 682	DG DP	40 40	2 2											
MAB8021D P	SINGLE-CHIP 8-BIT MICROCOMPUTER containing a 1 K X 8 programme memory, a 64 X 8 data memory, 21 I/O lines, and an 8-bit timer/event counter in addition to on-board oscillator and clock circuits.	683 683	DG DP	28 28	2 4														
MAB8035LD LP	SINGLE-CHIP 8-BIT MICROCOMPUTER designed to be efficient control processors as well as arithmetic processors. The instruction set allows the user to directly set and reset individual I/O Lines as well as test individual bits within the accumulator; over 70 % of the instructions are single byte all others are two bytes.	684 684 684	DG DP DG	40 40 40	3 3 3														
MAB8048D P	MAB8035L : without resident programme memory for use with external EPROM/ROM. MAB8048 : with resident mask-programmed ROM.	684	DP	40	3														
SAB3090	SINGLE-CHIP 16-BIT MICROCOMPUTER including ROM, RAM and I/O.	779	DP	40	3														
SAB8021P	SINGLE 8-BIT MICROCOMPUTER including a subset of the SAB8048 optimized for low-cost, high volume applications, plus I/O flexibility and power.	683	DP	28	4														
SAB8022	SINGLE 8-BIT MICROCOMPUTER.	788																	
SAB8035P SAF8035L-D SAB8048C SAF8048D SAB8748B,D SAF8748D	SINGLE 8-BIT MICROCOMPUTERS containing 1 K X 8 programme memory, a 64 X 8 RAM data memory. 27 I/O lines, and an 8-bit timer/counter in addition to on board oscillator and clock circuits. 8048 : Mask Programmable ROM. 8748 : User Programmable Erasable EPROM. 8035 : External ROM or EPROM.	790	DP DG DC DG DC DG	40 40 40 40 40 40	3 3 3 3 2 3				DG	40	3								

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

MICROPROCESSORS

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																	
			1	2	3	1	2	3	1	2	3									
SAB8039D P SAB8049D P	SINGLE 8-BIT MICROCOMPUTER. It contains 2KX8 programm memory, a 128X8 RAM data memory, 275/0 lines and an 8-bit timer/counter in addition to on board oscillator and clock circuit : 8039 : without programme memory 8049 : with factory-programmed mask ROM programmable memory.	783	DG	40	3															
SAB8041A,D,P	UNIVERSAL PERIPHERAL INTERFACE 8-BIT MICROCOMPUTER designed for use with a variety of 8-bit microprocessor systems.	784				DG	40	3			DP	40	3							
SAB8048C	See SAB8035.																			
SAB8080A-C A-D A-P A-1-C A-1-D A-2-C A-2-D	SINGLE 8-BIT N-CHANNEL MICROPROCESSORS containing six 8-bit general purpose working registers and an accumulator. The six registers may be addressed individually or in pairs providing both single and double precision operators. Arithmetic and logical instructions set or reset four testable flags. A fifth flag provides decimal arithmetic operation.	200	DC	40	1						DG	40	3							
SAB8085A-C A-P A-2-D A-2-C SAF8085A-D	SINGLE CHIP 8-BIT N-CHANNEL MICROPROCESSOR designed to improve the SAB8080's performance by higher system speed. It uses a multiplexed Data Bus. The address is split between the 8-bit address bus and the 8-bit data bus. The on-chip address latches of SAB8155/8156 (RAM)/8355/8755A (ROM/PROM) memory products allows a direct interface with SAB8085A.	757	DC	40	2						DP	40	3							
SAB8086	16-BIT HMOS MICROPROCESSOR Having attributes of both 8- and 16-bit microprocessor, it addresses memory as a sequence of 8-bit bytes, but has 16-bit wide physical path of memory for high performance.	785	DP	40	3															
SAB8748B,D SAF8748D	See SAB8035.																			

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

READ ONLY MEMORIES

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			SAB2308 SAB8308	1 K X 8 BIT STATIC ROM. with tri-state output.	796 796	D	24												
SAB2316A SAB8316A SAB2316E	2 K X 8 BIT STATIC ROM. with tri-state output.	797 797A	D	24															
SAB2608	1 K X 8 BIT PROM.	800	D	24															
SAB2616	2 K X 8 BIT PROM.	801	D	24															
SAB2708C SAB8708	1 K X 8 BIT EPROM, electrically programmable, erasable.	802	DC	24															
SAB2716B,C SAF2716D	2 K X 8 BIT UV ERASABLE PROM. operating from a single 5-volt power supply, having a static power down mode, and featuring fast single address location programming.	761	DC DG	24 24	5B 3	DC	24	5A											
SAB2732	4 K X 8 BIT EPROM. with tri-state output for direct bus-connection.	786	DG	24	3														
SAB2758	1 K X 8 BIT UV ERASABLE EPROM.	803	D	24															
SAB2808	8.192.BIT EAROM.	787	DG	24	3														
SAB8308	Similar to SAB2308.	796	DG	24	3														
SAB8316A,P	Similar to SAB2316A.	797	D	24		DP	24	6											

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

READ ONLY MEMORIES

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)												
			1	2	3	1	2	3	1	2	3				
SAB8355D,P	ROM AND I/O EXPANDER. designed to expand both the program memory and I/O capability of the SAB8748, 8048 and 8035 single comosant microcomputers. It increases programme memory by 2 K words and adds 16 I/O lines to the basic micro-computer without the necessity of any additional components.	763	DG	40	2	DP	40	3							
SAB8702A-B -4-B -4-C	ERASABLE AND ELECTRICALLY REPROGRAMMABLE READ ONLY MEMORY (REPROM) 2048-BIT. with entirely static circuitry, no clock _s are required. Its low threshold technology allows the design and production of higher performance MOS circuits and provides a higher functional density on a monolithic chip than conventional MOS technologies.	616	DC	24	5B										
SAB8708	Similar to SAB2708C.	802	DC	24	5A										
SAB8755-8D SAF8755A	EPROM Version of SAB8355.	763	DG	40	3										
			DC	40	2	DG	40	3							

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

RANDOM ACCESS MEMORIES

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)														
			1	2	3	1	2	3	1	2	3						
			SAB2022	16 X 5 BIT RAM	772	DP	16	1									
SAB2101A SAB8101A	256 X 4 BIT STATIC RANDOM ACCESS MEMORY It uses fully DC stable (static) circuitry and therefore requires no clocks or refreshing to operate. The data is read out non-destructively and has the same polarity as the input data.	606	DP	22	2												
SAB2102A SAB8102A	1 K X 1 BIT RAM	804	DG	16	3	DP	16	1									
			DG	16	3	DP	16	1									
SAB2104A	4 K X 1 BIT RAM	805	D	16													
SAB2108	8 K X 1 BIT RAM	806	D	16													
SAB2109	8 K X 1 BIT RAM	807	D	16													
SAB2111A SAB8111A	256 X 4 BIT RAM	808 557	DG	18	4	DP	18	3									
			DC	18	2												
SAB2114C, P	1 K X 4 BIT RAM	809	DC	18	2	DP	18	3									
SAB2116	16 K X 1 BIT RAM	810	D	16													
SAB2117	16 K X 1 BIT RAM	811	D	16													
SAB2141	4 K X 1 BIT RAM	812	D	18													
SAB2142	1 K X 4 BIT RAM	813	D	20													

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

RANDOM ACCESS MEMORIES

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
SAB3232	ADDRESS MULTIPLEXER AND BUFFER COUNTER FOR DYNAMIC 4K RANDOM ACCESS MEMORY. especially designed for use with the SAB2104A RAM.	814	D	24														
SAB3242	ADDRESS MULTIPLEXER AND BUFFER COUNTER FOR DYNAMIC 16K RANDOM ACCESS MEMORY. especially designed for use with the SAB2116/2117 RAM's.	815	D	28														
SAB5101L	256 X 4 BIT RAM	816	DC	22	2A													
SAB8101A / P	Similar to SAB2101A.	606	DC	22	2B	DP	22	2										
SAB8102A -D / A-P	Similar to SAB2102A.	804	DG	16	3	DP	16	1										
SAB8111A -D / A-P	Similar to SAB2111A.	808	DG	18	4	DP	18	3										
SAB8155 / SAF8155D 8156,C SAF8156D	256 X 8 BIT RAM AND 2 X 8 BIT + 1 X 6 BIT I/O EXPANDER designed to expand the data memory.	760	DP DP DG	40 40 40	3 3 3	DG DC	40 40	3 2										
SAB8202	CONTROL CIRCUIT FOR DYNAMIC RAM's. especially designed for use with the SAB2104A, SAB2116 and SAB2117 RAM's.	817	D	40														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

INTERFACES

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
			MEAB000	VOICE SYNTHESIZER. for generating good quality speech from digital code with a programmable bit rate. The circuit is primarily intended for applications in microprocessor controlled systems, when the speech code is stored separately in a ROM.	685	DP	24												
MEB2621	UNIVERSAL SYNC GENERATOR (PAL). providing the timing and control signals necessary for generating and displaying TV video information in the PAL format. The USG accepts a single 3.55 MHz input clock and generates various timing outputs. It is primarily intended for use in microprocessor-controlled video games.	686	DP	14															
MEB2636	PROGRAMMABLE VIDEO INTERFACE (PVI). intended for use in microprocessor-controlled game systems, it provides all of the common game circuits on a single chip. Circuits are provided for player inputs, background, moving objects, scoring and audio signals.	687	DP	40															
MEB2637	UNIVERSAL VIDEO INTERFACE (UVI). providing a means of interfacing a microprocessor based system to a color or black and white television receiver or monitor. It is intended primarily for use in microprocessor controlled TV game systems and home computers, but may also be used in other applications where the display of alphanumeric and graphic data is required.																		
SAB3408P	HEX BIPOLAR SENSE AMPLIFIER WITH LATCHES. The sensed data may be stored in the latches through application of a write pulse. The SAB3408P has three-state TTL outputs, hence in the non-enable state the outputs float allowing wire-OR memory expansion.		DP	18	3														
SAB8205D,P	HIGH SPEED 1 OUT OF 8 BINARY DECODER. It can be used for expansion of system which utilize input parts, output parts, and memory components with active low chip select input. When it is enabled, one of its eight outputs goes "low", thus a single row of a memory system is selected.	558	DG	16	3	DP	16	1											
SAB8212C,D,P SAF8212D	EIGHT-BIT INPUT/OUTPUT PORT consisting of an 8-bit latch with 3-state output buffers along with control and device selection logic, it also includes a service request flip-flop for the generation and control of interrupts to the microprocessor.	607	DC	24	5A	DG	24	3	DP	24	6								
			DG	24	3														

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

INTERFACES

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)								
			1	2	3	1	2	3	1	2	3
			SAB8214C,D,P	PRIORITY INTERRUPT CONTROL UNIT designed to simplify interrupt driven microcomputer systems. The PICU can accept eight requesting levels; determine the highest priority, compare this priority to a software controlled current status register and issue an interrupt to the system along with vector information to identify the service routine.	608	DC	24	5A	DG	24	3
SAB8216D,P SAF8216D SAB8226D,P SAF8226D	4 BIT PARALLEL BIDIRECTIONAL BUS DRIVER/RECEIVER. SAB8216 : NON INVERTING SAB8226 : INVERTING	609 610	DG	16	3	DP	16	1	DG	16	3
SAB8224D,P	CLOCK GENERATOR AND DRIVER FOR THE SAB8080. It is controlled by a crystal, selected by the designer, to meet a variety of system speed requirements. Also included are circuits to provide power-up reset, advanced status strobe and synchronization of ready.	559	DG	16	3	DP	16	1			
SAB8226	See SAB8216.										
SAB8228C,D,P SAB8238D,P	SYSTEM CONTROLLER AND BUS DRIVER for SAB8080 microcomputer systems. It generates all signals required to directly interface the RAM, ROM and I/O components. A bi-directional bus driver is included to provide high system TTL fan-out. It also provides isolation of the microprocessor data bus from memory and I/O.	406	DC	28	1	DG	28	2	DP	28	4
SAB8243P SAF8243D	INPUT/OUTPUT EXPANDER. specifically designed to provide a low cost means of I/O expansion for the SAB8048 family of single-chip microcomputers. It consists of four 4-bit bi-directional static I/O ports and one 4-bit port which serves as an interface to the SAB8048 microcomputers.	765	DP	24	6	DG	24	3			
SAB8251A C D P SAF8251D	PROGRAMMABLE COMMUNICATION INTERFACE. Universal Synchronous/Asynchronous Receiver/Transmitter (USART) chip designed for data communications in microcomputer systems. It is used as a peripheral device and is programmed by the CPU to operate using virtually any serial data transmission technique presently in use (including IBM Bi-sync.).	612	DC	28	1	DG	28	2	DP	28	4

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

INTERFACES

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)															
			1	2	3	1	2	3	1	2	3							
			SAB8253CL D SAF8253D	PROGRAMMABLE INTERVAL TIMER Counter/timer chip designed for use as an SAB8080 peripheral. It is organized as three independent 16-bit counters, each with a count rate up to 2 MHz. All modes of operation are software programmable by the SAB8080.		DC DG	24 24 24	5A 3 3										
SAB8255C D	PROGRAMMABLE PERIPHERAL INTERFACE. designed for use with both the SAB8008 and 8080 Microprocessors. It has 24 I/O pins which may be individually programmed in two groups of twelve and used the three major modes of operation.	766	DC DG	40 40	2 3													
SAB8257C D	PROGRAMMABLE FOUR CHANNEL DMA CONTROLLER. primarily designed to generate upon a peripheral request a sequential memory address which will allow the peripheral to access or deposit data directly from or to memory. It uses the hold feature of the SAB8080 to acquire the system bus.	767	DC DG	40 40	2 3													
SAB8259A C D SAF8259D	PROGRAMMABLE INTERRUPT CONTROLLER handling up to eight vectored priority interrupts for the SAB8080A CPU. It is cascadable for up to 64 vectored priority interrupts, without additional circuitry. It is designed to minimize the software and real time overhead in handling multi-level priority interrupts.	768	DC DG	28 28 28	1 2 2													
SAB8271D	PROGRAMMABLE FLOPPY DISK CONTROLLER designed to interface from one to four floppy disk drive to the SAB8080 microcomputer system. Its powerfull control functions minimize both hardware and software overhead normally associated with floppy disk interface.	769	DG	40	3													
SAB8273D	PROGRAMMABLE HDLC/SDLC PROTOCOL CONTROLLER designed to support the ISO/CCITT's HDLC and IBM's SDLC communication line protocols.	770	DG	40	3													
SAB8275D	PROGRAMMABLE CRT CONTROLLER primary designed to refresh the display by buffering the information from main memory and keeping track of the display position of the screen.	791	DG	40	3													
SAB8278D	PROGRAMMABLE KEYBOARD INTERFACE providing a scanned interface to 128 Key contact or capacitive-coupled keyboards.	818	DG	40	3													

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

INTERFACES

GENERAL DATA
GENERALITES
ALLGEMEINE DATEN

TYPE	DESCRIPTION	LOGIC DRAWING NUMBER (LD)	PACKAGES (See notes)																
			1	2	3	1	2	3	1	2	3								
SAB8279D P SAF8279D	PROGRAMMABLE KEYBOARD/DISPLAY INTERFACE The keyboard portion can provide a scanned interface to a 64-contact key matrix. The keyboard portion will also interface to an array of sensors or a strobed interface keyboard, such as the hall effect and fenite variety. SAB8085 compatible SAB8279-5.	771	DG	40	3														
SAB8291	GPIB TALKER/LIST designed to interface microprocessors (e.g.8048,8089,8086) to an IEC-BUS. It implements all of the standard's interface functions except for the controller.	792	D	40															
SAB8292	GPIB CONTROLLER designed to connect with the SAB8291 to implement the full IEC standard controller function, including transfer control protocol.	793	D	40															
SAB8294	DATA ENCRYPTION UNIT. designed to encrypt and decrypt 64-bit blocks of data using the algorithm specified in the Federal Information Processing Data Encryption Standard. It operates on 64-Bit text words using a 56-bit user specified key to produce 64-bit cipher words.	795	D	40															
SAB8295	DOT MATRIX PRINTER CONTROLLER. providing an interface for microprocessors to the "LRC 7040" series dot matrix impact printers. It may also be used as an interface to other similar printers.	796	D	40															

NOTES : (1) Shape and material, see outlines code
(2) Number of connections
(3) Drawing serial number, see Chapter "Outlines"

ELECTRICAL DATA
PARAMETRES ELECTRIQUES
ELEKTRISCHE DATEN

MICROPROCESSORS

TYPE	REGISTERS	ARITHMETIC LOGIC UNIT	ORGANISATION DATA BITS	BASIC INSTRUCTION	V _{IH}	V _{IL}	f _c	t _c	at	V _{DD}	V _{CC}	V _{BB}	P _D	T _{oper}	I/O devices	MEMORY	
					V	V	°MHz	µs	n°	V	V	V	W	°C	°C	directly addressed	
					min	max	max		max	max	max	max	min	max	max	max	
MAB2650A-D A-P	7X8-BIT General Purpose 8-BIT-Instruction Regist. 8-BIT-Holding Register 8-BIT-Data Bus Register 7X8-BIT Register Stack 15-BIT Instruction Address Register 15-BIT Oper and Address Reg.		8	75	2,2	0,8	*1,25				5		0,525	0	70	258	32K
MAB80210,P	1KX8-BIT Programm memory(ROM) 64X8-BIT Data Memory (RAM) 21 I/O lines 8-Bit timer/event counter		8		3	0,8	50				6,5		1	0	70		
MAB8035LD,LP MAB8048D,P	1KX8 programm memory (ROM) 64X8 data memory (RAM) 27 I/O lines 17 internal registers : - accumulator - 16 addressable regist.	1X8-Bit accu 1X8-Bit TMP flag	8	90	2	0,8	4,17	2	5,5	5,5			1	0	70		4K
SAB3090	1KX12-BIT prog.mem. (ROM) 15X16-Bit date mem. (RAM) 34 I/O Lines	1X16-Bit flag 1X16-Bit Acc.	16		2	0,8	*4				7		1	0	70		
SAB8021P	1KX8-BIT Programm memory(ROM) 64X8-BIT Data Memory (RAM) 21 I/O lines 8-Bit timer/event counter		8		2	0,8	50				7		1	0	70		
SAB8022	2KX8-BIT progr.mem. (ROM) 64X8-BIT data mem.(RAM) 8-Bit counter/timer 28 I/O lines 8-Bit A/D converter		8		2	0,8	10	2			6,5			0	70		
SAB8035P 8048C 8748B	1K X 8-BIT prog.mem. (ROM) 64X8-BIT data mem. (RAM) 27 I/O lines		8	90	2	0,8	15		5				1,5	0	70		

MICROPROCESSORS

ELECTRICAL DATA
PARAMETRES ELECTRIQUES
ELEKTRISCHE DATEN

TYPE	REGISTERS	ARITHMETIC LOGIC UNIT	ORGANISA-TION DATA BITS	BASIC IN-STRUC-TION	V _{IH}	V _{IL}	f _t	t _c	t _φ	V _{DD}	V _{CC}	V _{BB}	P _D	T _{oper}	I/O devices	MEMORY
							°MHz	n°	V	V	V	W	°C	°C	bit	byte
					min	max	μs	max	max	max	max	max	min	max	max	max
					directly addressed											
SAB8039D,P 49D,P	2KX8-BIT progr.mem. (ROM) 128X8-BIT data mem. (RAM) 27 I/O lines 8-BIT timer/counter		8	90	2	0,8				5				0	70	
SAB8041A,D,P	1KX8-BIT progr.mem.(ROM) 64X8-BIT data mem. (RAM) 8-BIT CPU 18 I/O Lines		8		2	0,8				5				0	70	
SAB8080A-C,D,P	6X8-BIT general purpose 1X16-BIT progr. counter 1X16-BIT stack pointer 2X8-BIT temp. (W,Z) 1X16-BIT increm/decrem. address latch.	1X8-Bit Accu 1X8-Bit TMP 1X5-Bit flag 1X8-Bit ACT	8	72	3,3	0,8	2	2	12	5	-5	1,5	0	70	512	64K
8080A-1 8080A-2			8 8	72 72	3,3 3,3	0,8 0,8	1,3 1,5	2 2	12 12	5 5	-5 -5	1,5 1,5	0 0	70 70	512 512	64K 64K
SAB8085A-C,P	1X16-BIT progr. counter 1X16-BIT stack pointer 1X16-BIT increm/decrem. address latch.	1X8-Bit Accu 1X5-Bit Flag	8		2	0,8	1,3	2		5		1,5	0	70	512	64K
8085A-2,C,D	6X8-BIT gen.purpose		8		2	0,8	0,8	2		5		1,5	0	70	512	64K
SAB8086	8 Words data pointer and index regs. 5 words segment registers and instruction pointer 6 Byte instruction queue	16-Bit Alu Flags	8		2	0,8	*5			5			0	70		1M
8086-2 8086-4			8 8		2 2	0,8 0,8	*8 *4			5 5			0 0	70 70		1M 1M
SAB8748B,D	See SAB8035															

GENERAL DATA:

GENERALITES : page 139

ALLGEMEINE DATEN:

ELECTRICAL DATA
PARAMETRES ELECTRIQUES
ELEKTRISCHE DATEN

READ ONLY MEMORIES

TYPE	CLASSIFI- CATION	CAPACITY	BITS PER WORD	MODE	P R O D U C T I O N C O D E R E G I S T R A T I O N N O. A. M.	R A T I N G S						CHARACTERISTICS			R E M A R K S
						POWER SUPPLY			P _D	T _{oper}		D.C.		t _{ACC}	
						V _{DD}	V _{CC}	V _{BB}		°C	°C	V _{IH}	V _{IL}		
						V	V	V	mW	min	max	V	V	ns	
max	max	max	max	min	max	min	max	max							
SAB2308/8308	ROM	1024	8	STATIC	C	12	5	-5	1000	-25	+85	3,3	0,8	450	
SAB2316A	ROM	2048	8	STATIC	E	-	5	-	1000	-10	+80	2	0,8	850	
E	ROM	2048	8	STATIC	E	-	5	-	1000	-10	+80	2,4	0,8	450	
SAB2608	PROM	1024	8	STATIC	C	12	5	-5	800	-25	+85	3	0,65	450	
SAB2616	PROM	2048	8	STATIC	C	-	5	-	525	-10	+80	2	0,8	450	
SAB2708C	EPROM	1024	8	STATIC	E	12	5	-5	1500	-25	+85	3	0,65	450	
SAB2716B,C	EPROM	2048	8	STATIC	E	-	5	-	525	-10	+80	2	0,8	450	
SAB2732	EPROM	4096	8	STATIC	E	-	5	-	-	-10	+80	2	0,8	450	
SAB2758	EPROM	1024	8	STATIC	E	-	5	-	-	-10	+80	2	0,8	450	
SAB2808	EAROM	1024	8	STATIC	E	-	5	-	400	0	70	2,2	0,8	450	
SAB8308	ROM	1024	8	STATIC	C	12	5	-5	1000	-25	+85	3,3	0,8	450	
SAB8316A,P	ROM	2048	8	STATIC	E	-	5	-	1000	-10	+80	2	0,8	850	
SAB8355D,P	ROM	2048	8		E	-	5	-	1500	0	70	2	0,8	320"	Clock Cycle Time
SAB8702A	REPROM	256	8	STATIC	E	-	5	-	2000	0	70	3	0,65	1300	
SAB8708	EPROM	1024	8	STATIC	E	12	5	-5	1500	-25	+85	3	0,65	450	
SAB8755 -8-D	EPROM	2048	8		E	-	5	-	1500	-10	70	2	0,8	320"	Clock Cycle Time

RANDOM ACCESS MEMORIES

TYPE	CAPACITY	BITS PER WORD	MODE	R A T I N G S					CHARACTERISTICS				RE M A R K S
				POWER SUPPLY		T _{oper}		P _D	A.C.		D.C.		
	NEG	POS	°C	°C	mW	t _{WC}	t _{RC}	V _{IH}	V _{IL}				
	V	V	min	max	max	ns	ns	V	V				
words	max	max	max	max	min	min	min	max					
SAB2022	16	5	STATIC	0,3	11	0	70	300			7	3	at V _{DD} = 10 V
SAB2101,A	256	4	STATIC	0,5	7	-10	80	1000	220	350	2	0,8	
SAB8101,A	256	4	STATIC	0,5	7	-10	80	1000	270	450	2	0,8	
SAB2102A	1024	1	STATIC	0,5	7	-10	80		350	350	2	0,8	
SAB8102A	1024	1	STATIC	0,5	7	-10	80		450	450	2	0,8	
SAB2104A	4096	1	DYNAMIC	0,3	20	-10	80	1000	375	375	2,4	0,8	
SAB2108	8192	1	DYNAMIC	0,3	20	-10	80	1250	350	350	2,4	0,8	
SAB2109	8192	1	DYNAMIC	0,3	20	-10	80	1000	375	375	2,4	0,8	
SAB2111A	256	4	STATIC	0,5	7	-10	80	1000	220	350	2	0,8	
SAB8111A	256	4	STATIC	0,5	7	-10	80	1000	270	450	2	0,8	
SAB2114,C,P	1024	4	STATIC	0,5	7	-10	80	1000	300	300	2	0,8	
SAB2116	16384	1	DYNAMIC	0,3	20	-10	80	1250	375	375	2,4	0,8	
SAB2117	16384	1	DYNAMIC	0,3	20	-10	80	1000	375	375	2,4	0,8	
SAB2141	4096	1	STATIC	1,5	7	-10	85	1200	150	150	2	0,8	
SAB2142	1024	4	STATIC	0,5	7	-10	80	1000	300	300	2	0,8	
SAB3232	<u>64X64</u>	-	-	0,5	7	-65	125	1000	-	-	2	0,8	Structure (4K.Bit)
SAB3242	<u>128X128</u>	-	-	0,5	7	-10	85	1000	-	-	2	0,8	Structure (16K.Bit)
SAB5101	256	4	STATIC	0,3	7	-10	80	1000	450	450	2,2	0,65	
SAB8101A	See SAB2101A												
SAB8102A	See SAB2102A												
SAB8111A	See SAB2111A												
SAB8155	256	8	STATIC			-10	80				2	0,8	
SAB8156,C	256	8	STATIC			-10	80				2	0,8	
SAB8202	<u>128K-Bytes</u>		(DYNAMIC)	-1	0	70		1400		640	2	0,8	Addressing capacity

INTERFACES

ELECTRICAL DATA
PARAMETRES ELECTRIQUES
ELEKTRISCHE DATEN

TYPE	CLASSIFICATION	MAX NBER BIT (1)	RATINGS						CHARACTERISTICS				REMARKS		
			I _O			T _{oper}			POWER SUPPLY			D.C.		A.C.	
			mA	°C	°C	V	V	V	V _{IH}	V _{IL}	t _d	f			
			max	min	max	max	max	max	min	max	ns	MHz			
ME8000	VOICE SYNTHESIZER	8-W	0,1	0	70	0	-	7	2	0,8	30	4!	Address set-up.		
MEB2621	PAL UNIV.SYNC.GEN.			0	55	0	6	-	2,2	0,8	100		Output signal delay with C _L = 75 pF		
MEB2636	PROGRAM.VIDEO(PVI)			0	55	0	6	-	2,2	0,8	50"		Address set-up.		
MEB2637	UNIVERSAL VIDEO(UVI)														
SAB3408P	AMPLIFIER		300	-55	125	0	7	-	2	0,85	25		Sense Amp.Input to Output delay.		
SAB8205D,P	DECODER	8-OL	125	-65	75	0	5	-	2	0,85	18		Address or enable to output delay.		
SAB8212C,D,P	REGISTER/BUFFER	8-L	125	-65	75	0	5	-	2	0,85	30		Data to output delay.		
SAB8214C,D,P	CONTROL/SEQUENCER	8-PL	100	0	70	0	5	-	2	0,8	*50'				
SAB8216D,P	DRIVER/RECEIVER	4	125	0	70	0	5	-	2	0,95	30		In.to Out. delay DB outputs		
SAB8224D,P	φ/BUFFER	2-CP		0	70	0	5	12	2	0,8		27	Except for reset input = 2,6 V		
SAB8226	DRIVER/RECEIVER	4	125	0	70	0	5	-	2	0,95	25		In to Out delay DB outputs		
SAB8228C,D,P	φ/BUFFER	8	90	0	70	0	5	-	*2,4	*0,45			at I _{OH} = -1mA (2); I _{OL} =10mA(3)		
SAB8238D,P	φ/BUFFER	8	90	0	70	0	5	-	*3,6	*0,45	22"		at I _{OH} = 1μA ; I _{OL} = 2mA		
SAB8243P	I/O EXPANDER	4-IOP		0	70	0	5	-	2	0,8					
SAB8251A,C,D,P	GEN.PURPOSE	8		0	70	0	5	-	2	0,8	1350		Clock period.		
SAB8253CL,D	COUNTER/TIMER	16		0	70	0	5	-	2	0,8	300"	0	Clock period		
SAB8255C/D	GEN.PURPOSE	3-OP		0	70	0	5	-	2	0,8					
SAB8257C/D	D.M.A. Controller			0	70	0	5	-							
SAB8259A/C/D	INTERRUPT CONTROLLER	8-PL		0	70	0	5	-	2	0,8			No clocks.		

NOTES : (1) OL : Output Lines IOL : Input/ Output Ports
 PL : Priority Levels
 CP : Clock Phases
 L : Latch
 OP : Output Ports

INTERFACES

TYPE	CLASSIFICATION	MAX NBER BIT (1)	RATINGS						CHARACTERISTICS				remarks
			I _O	Toper		POWER SUPPLY			D.C.		A.C.		
				°C	°C	V	V	V	V _{VOH}	V _{VOL}	t _d	f	
									max	min	max	max	
SAB8271D	FLOPPY DISC CONTROLLER		0	70	0	5	-					4'	
SAB8273D	HDLC/SDLC Protocol cont.		0	70	0	5	-						
SAB8275D	CRT CONTROLLER		0	70	0	5	-	2	0,8	250			Read/write pulse width
SAB8278D	GEN. PURPOSE		0	70	0	5	5	2	0,8				
SAB8279D/ /P	GEN. PURPOSE		0	70	0	5	-	2	0,8	120			Clock pulse width
SAB8291	TALKER/LISTERNER		0	70	0	5,5	-	2	0,8				
SAB8292	CONTROLLER		0	70	0	5,5	-	2	0,8				
SAB8294	μP/PERIPHERAL		0	70	0	5,5	-	2	0,8				
SAB8295	CONTROLLER		0	70	0	5,5	-	2	0,8				

NOTES : (1) OL : Output Lines
 PL : Priority Level
 CP : Clock Phases
 L : Latch
 OP : Output Ports

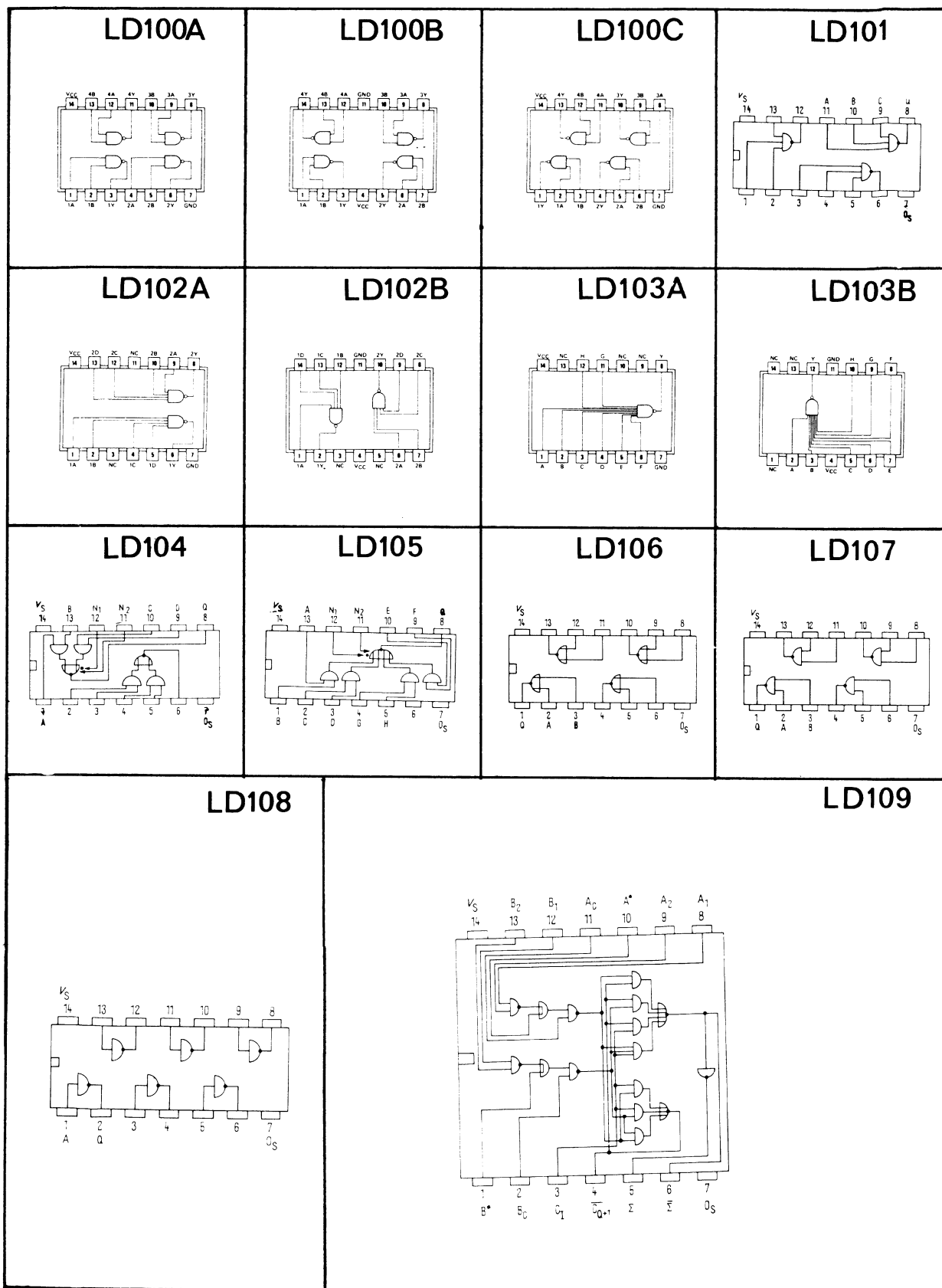
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 GENERALITES :
 ALLGEMEINE DATEN :

LOGIC DIAGRAMS

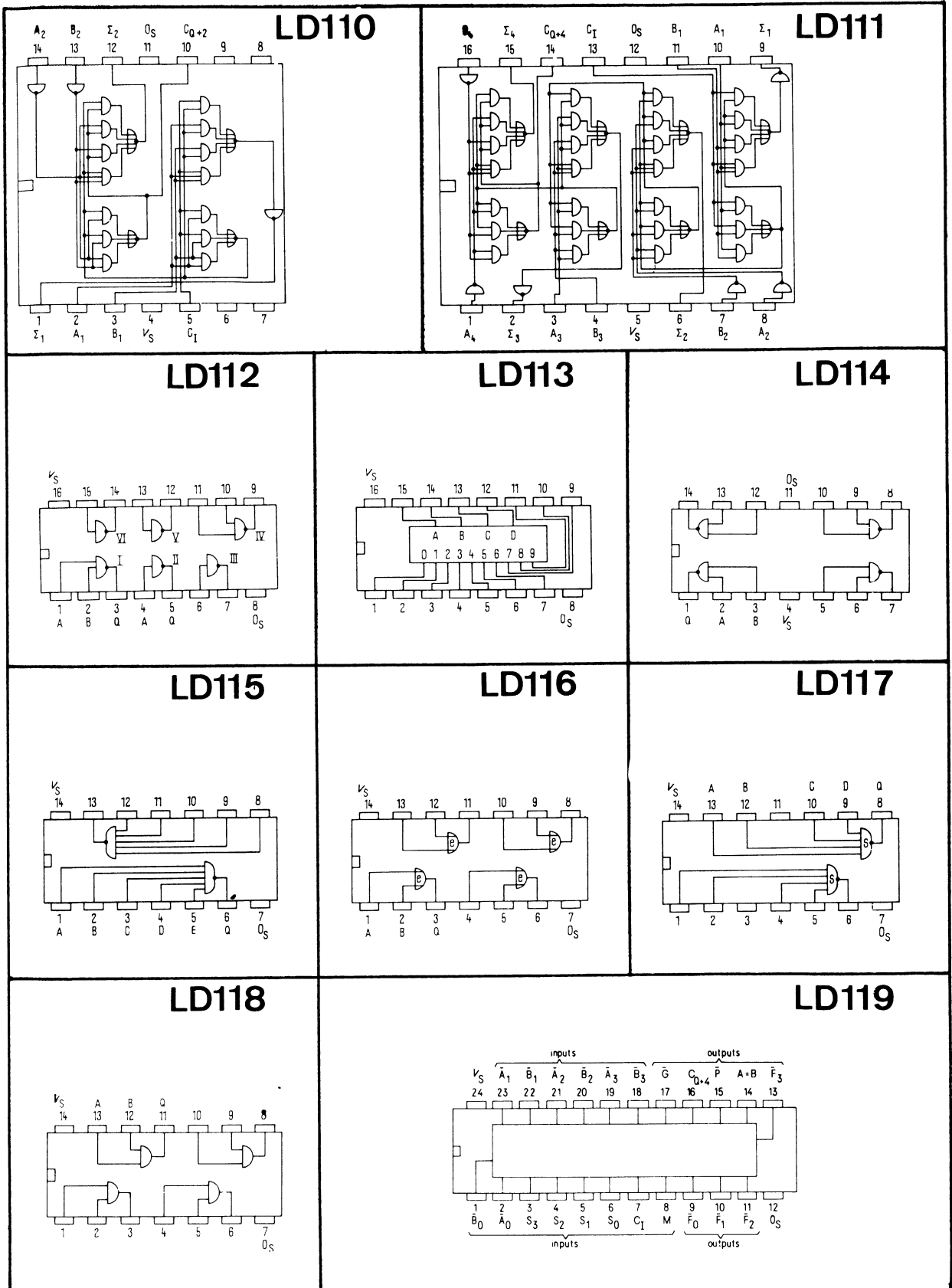
SCHÉMAS LOGIQUES

LOGIK-SCHALTPLÄNE

LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

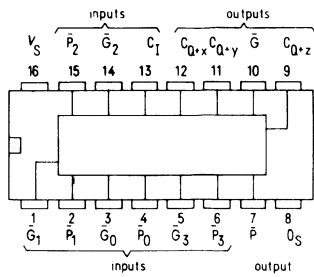


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

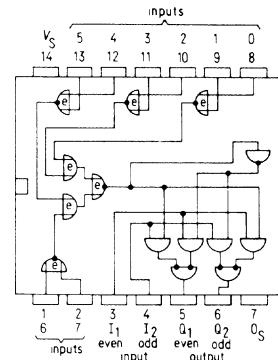


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

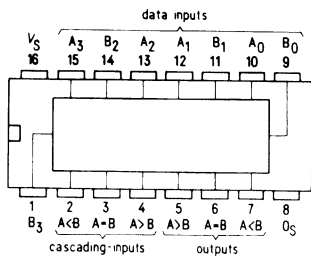
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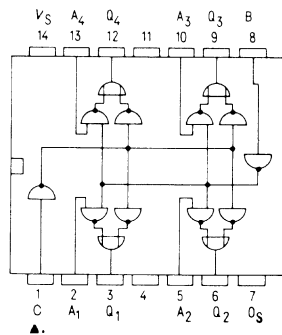
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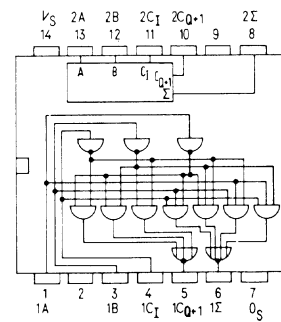
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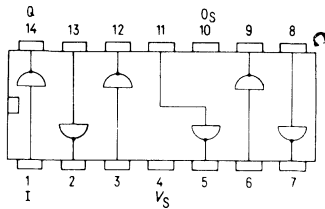
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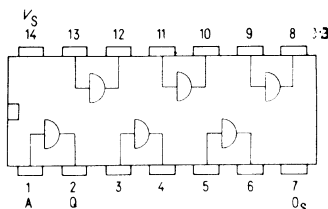
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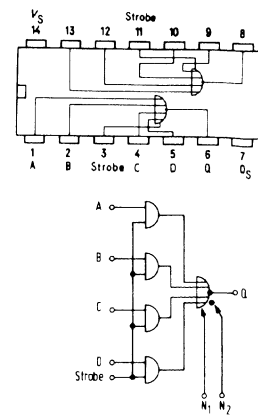
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LD126

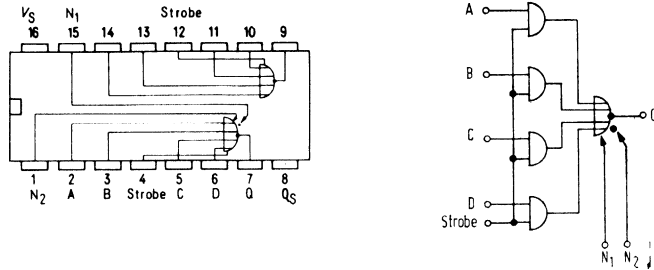


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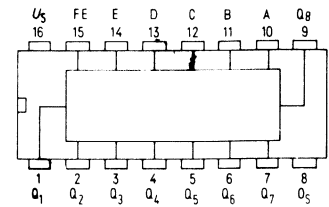


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

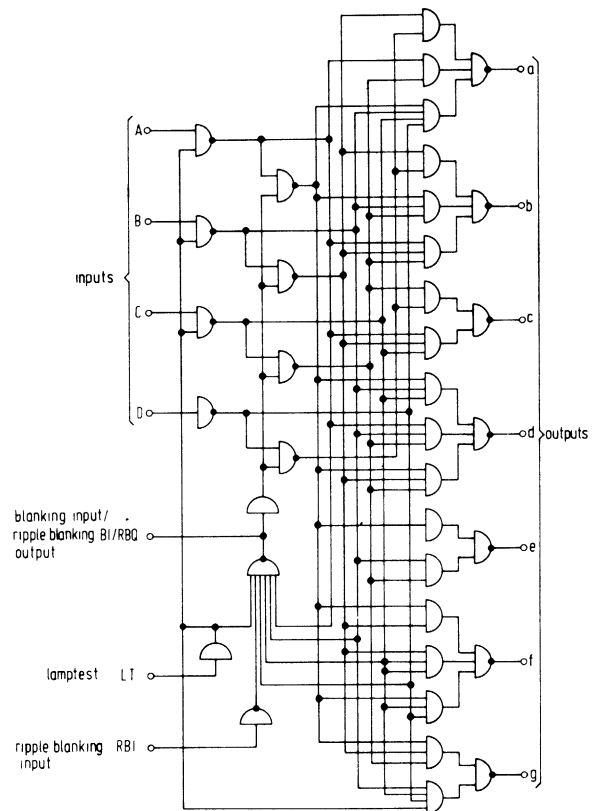
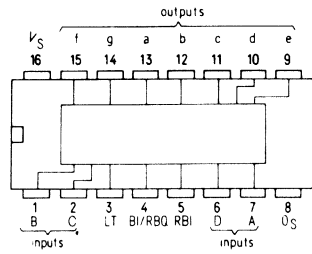
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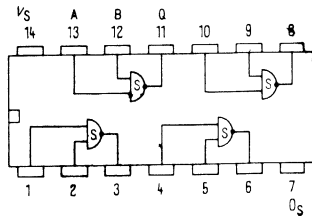
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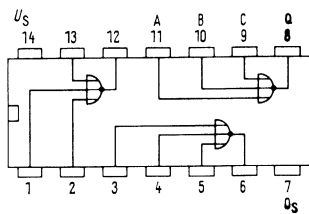
LD129



LD131

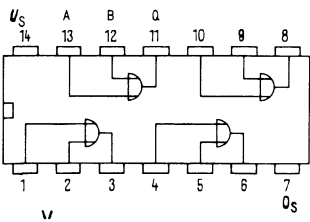


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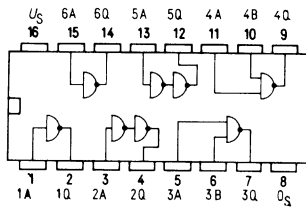


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

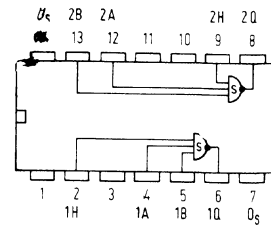
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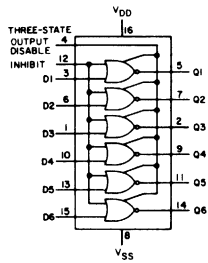
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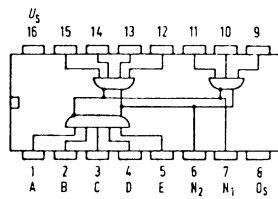
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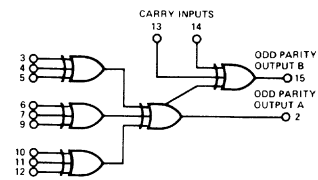
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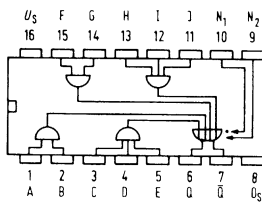
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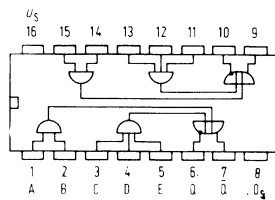
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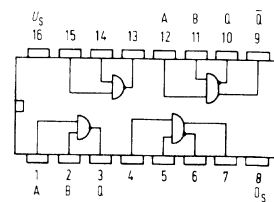
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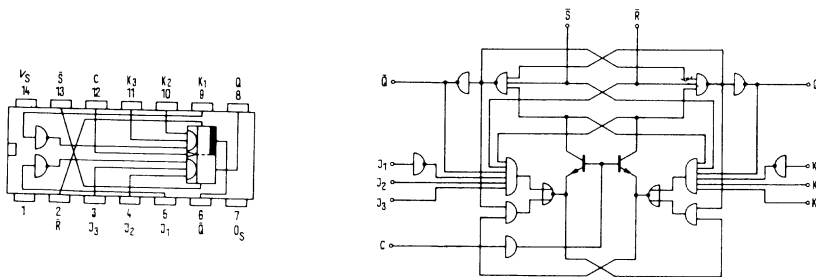
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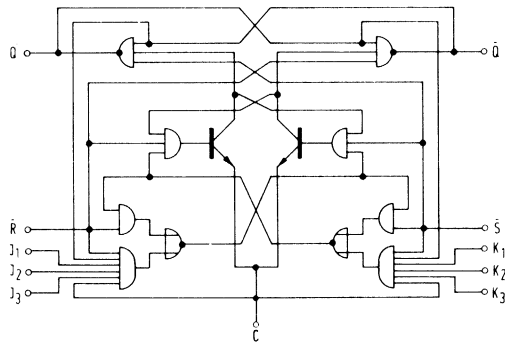
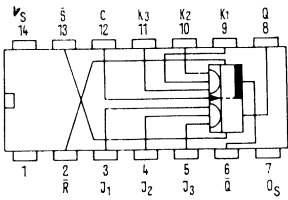
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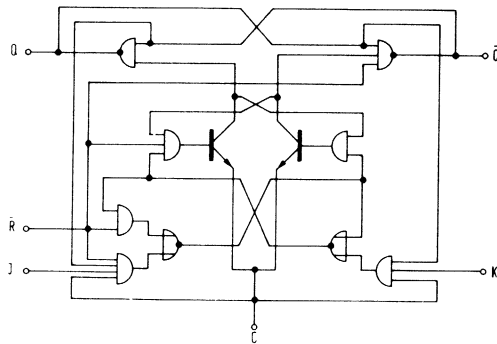
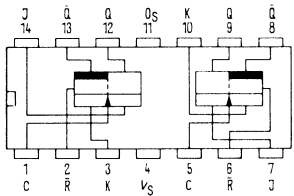
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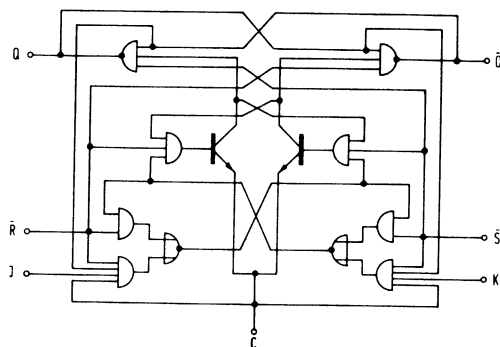
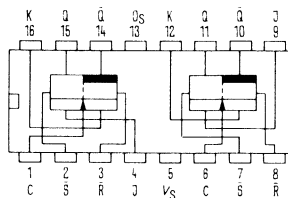
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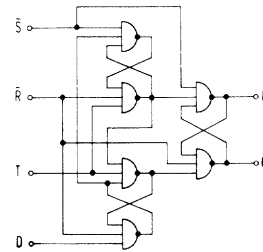
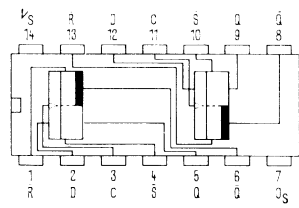
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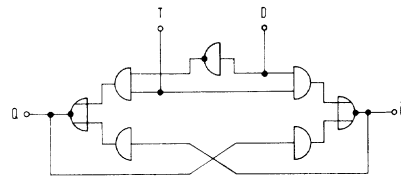
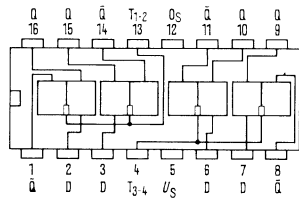
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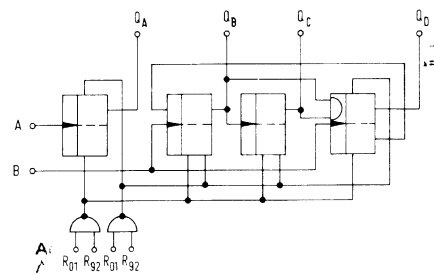
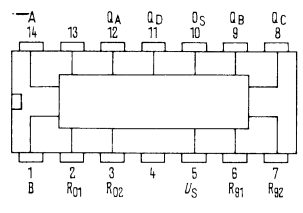
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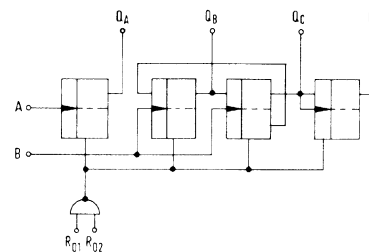
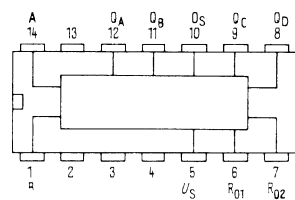
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LD148

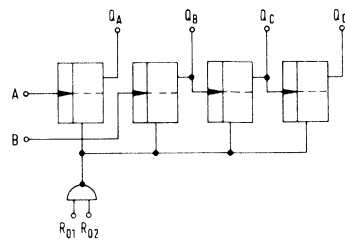
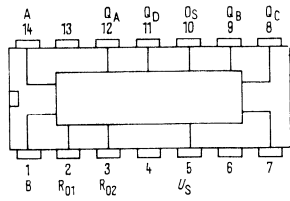


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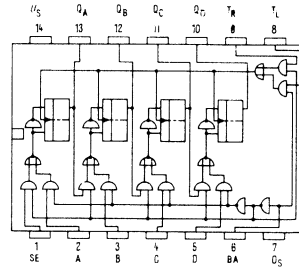


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

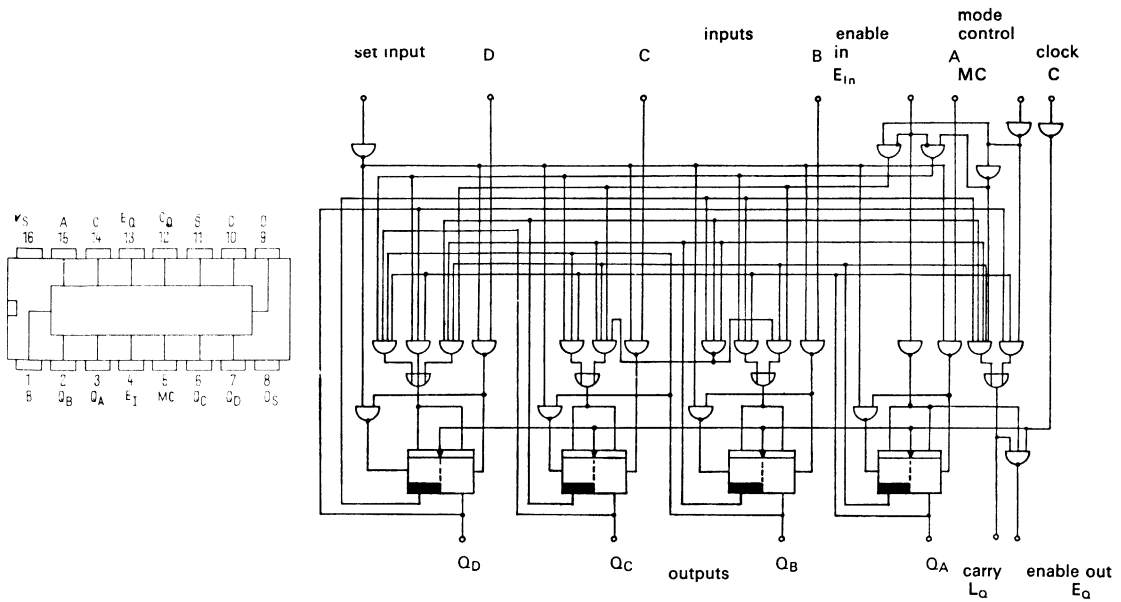
LD150



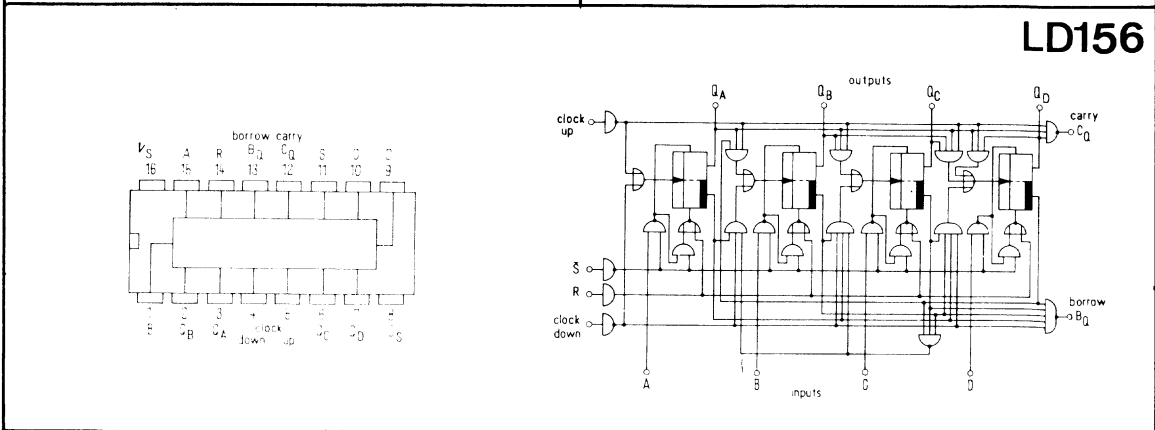
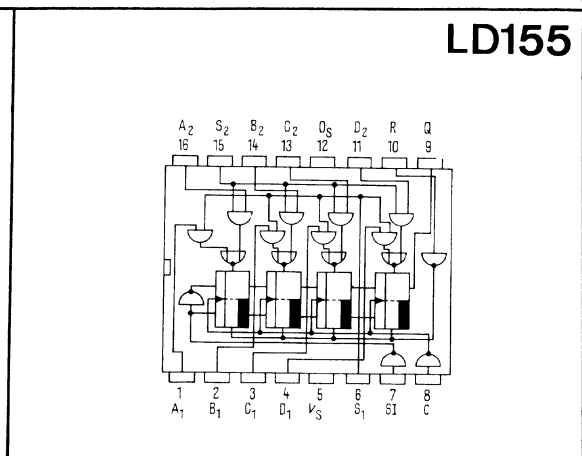
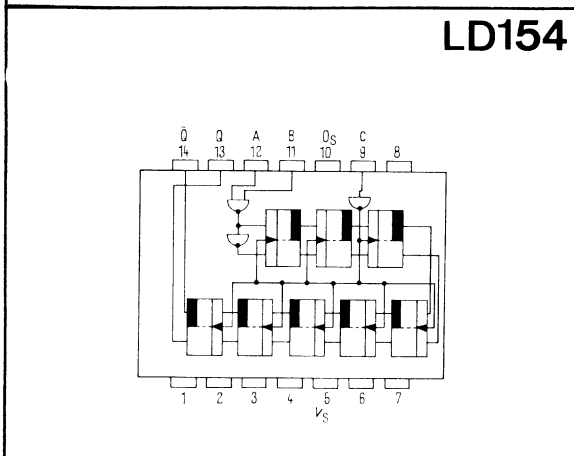
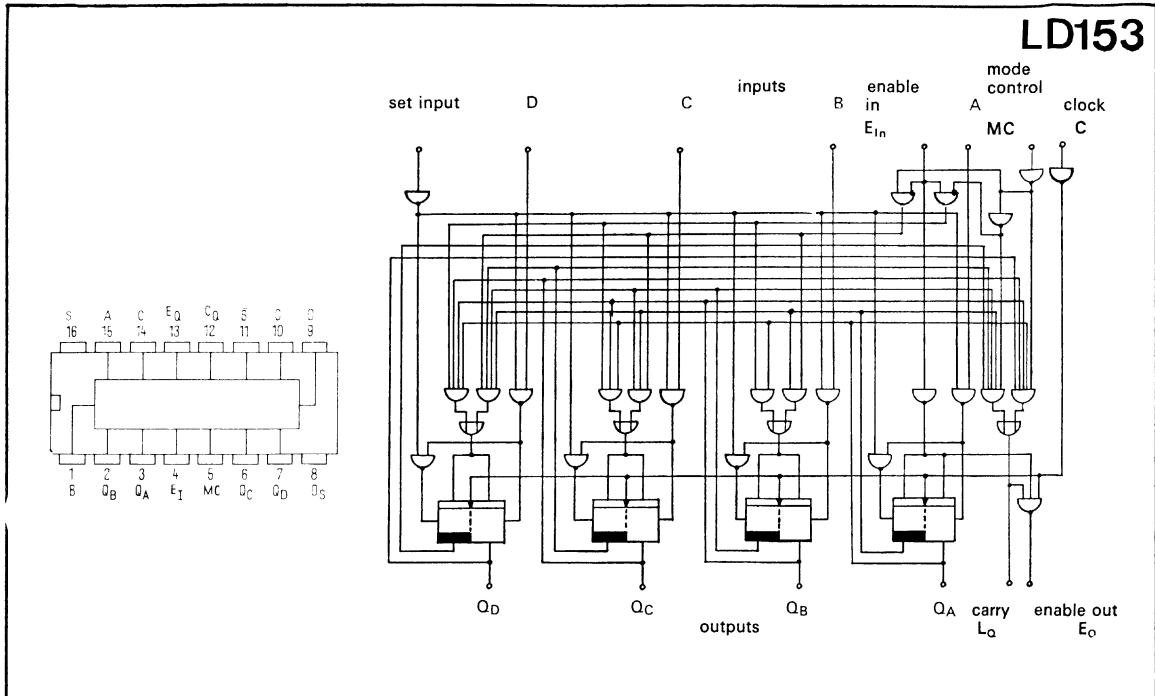
LD151



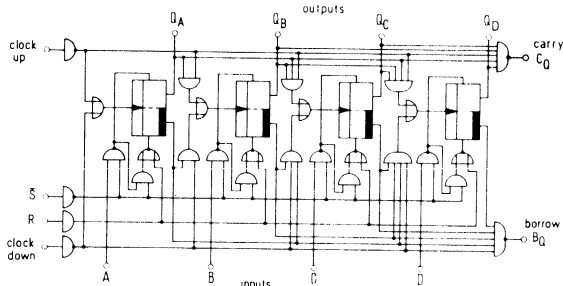
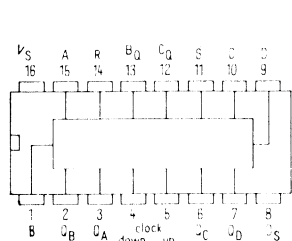
LD152



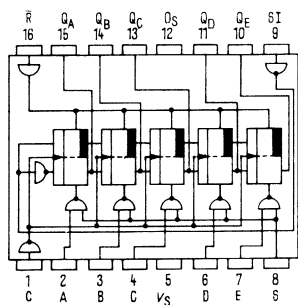
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



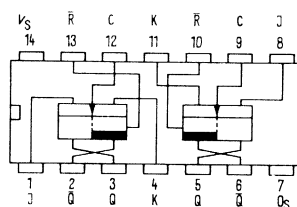
LD157



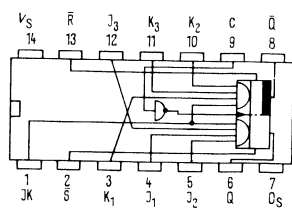
LD158



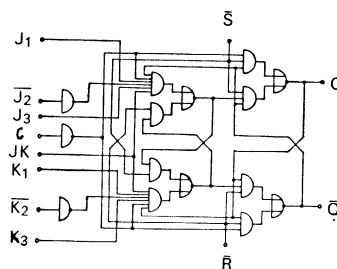
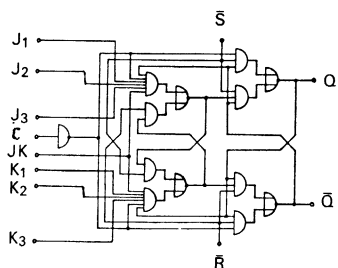
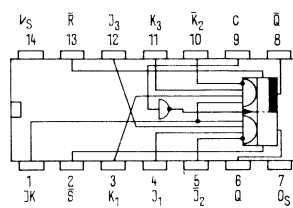
LD159



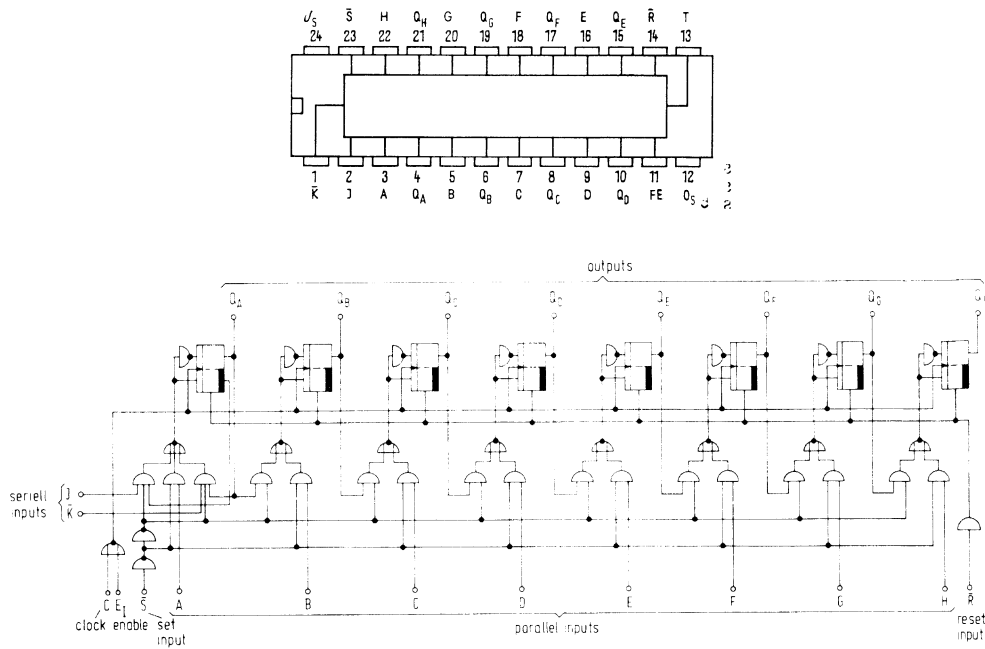
LD160



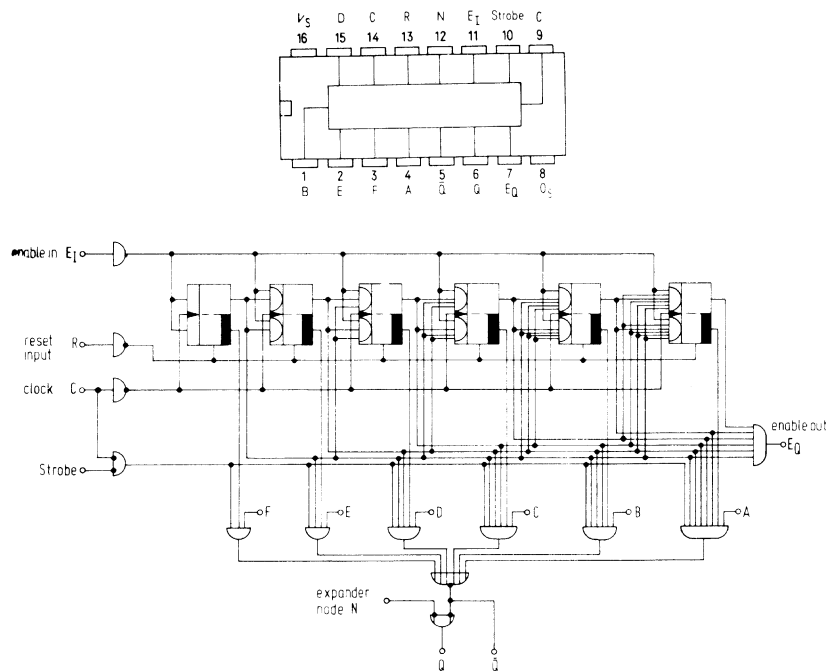
LD161



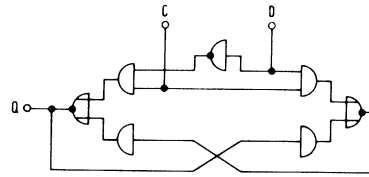
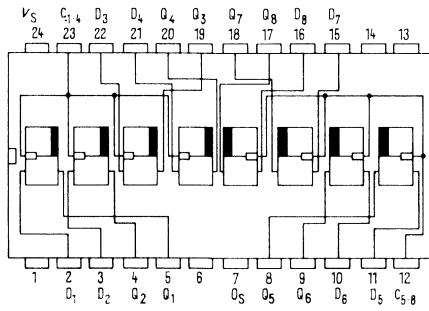
LD162



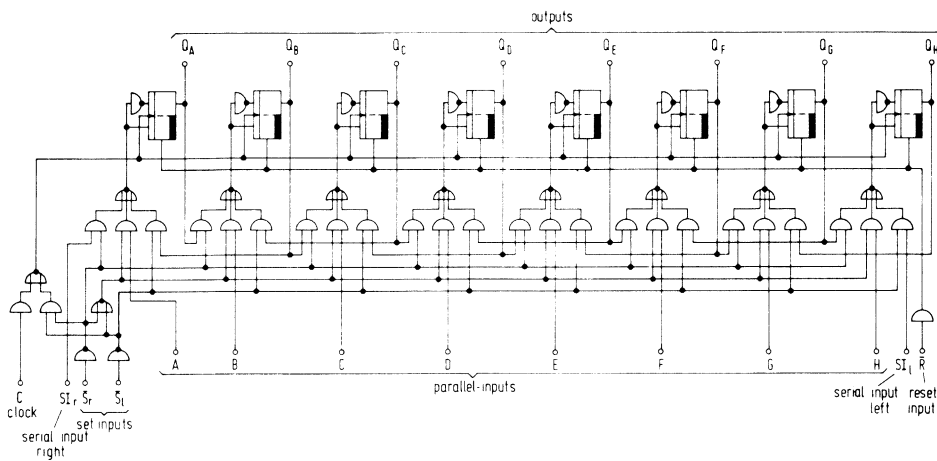
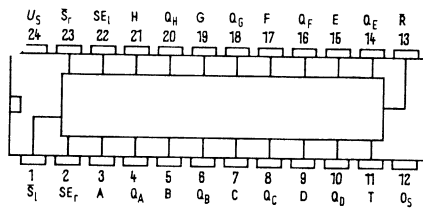
LD163



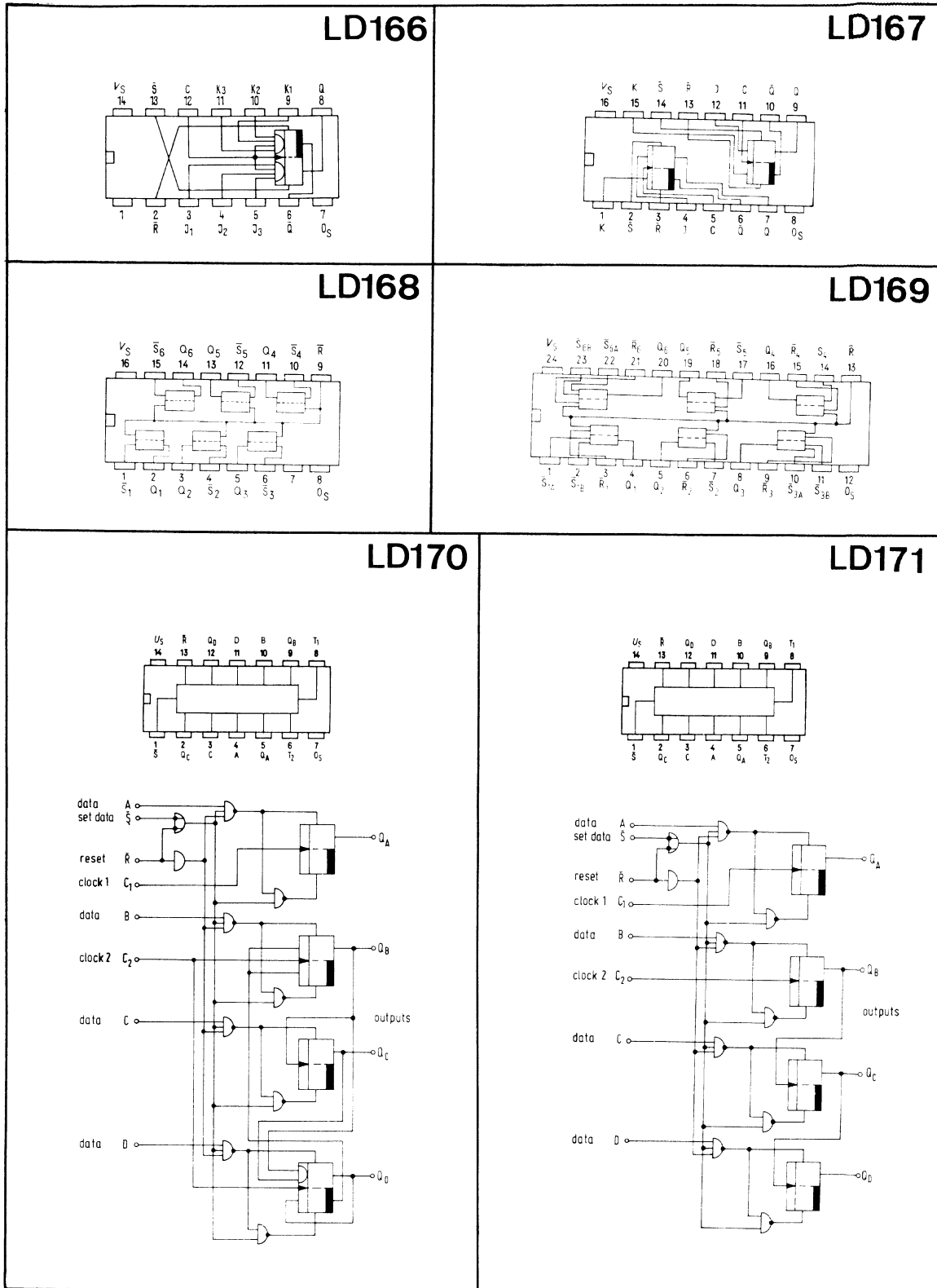
LD164



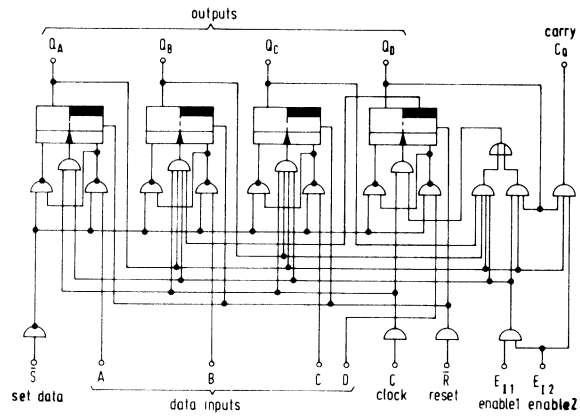
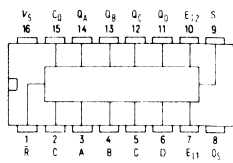
LD165



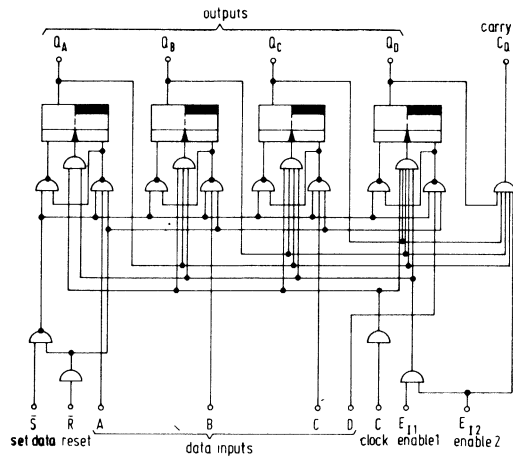
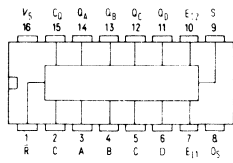
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



LD172

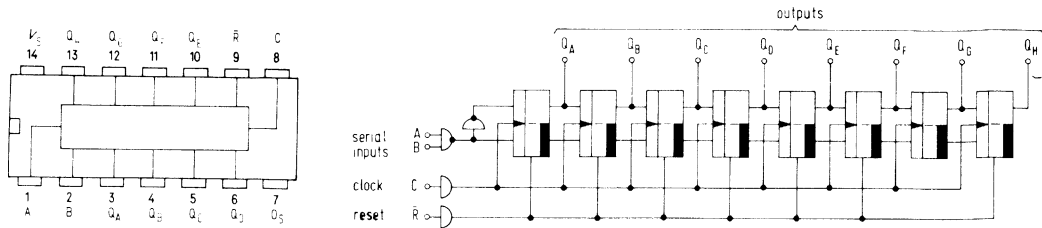


LD173

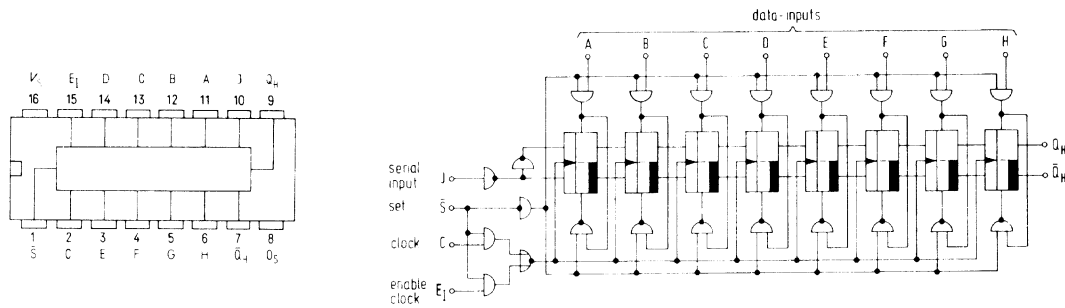


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

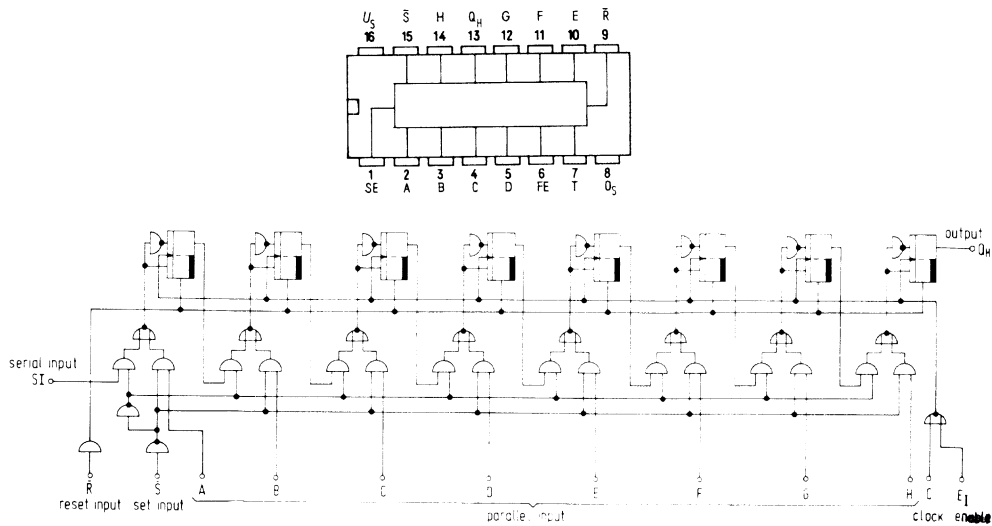
LD174

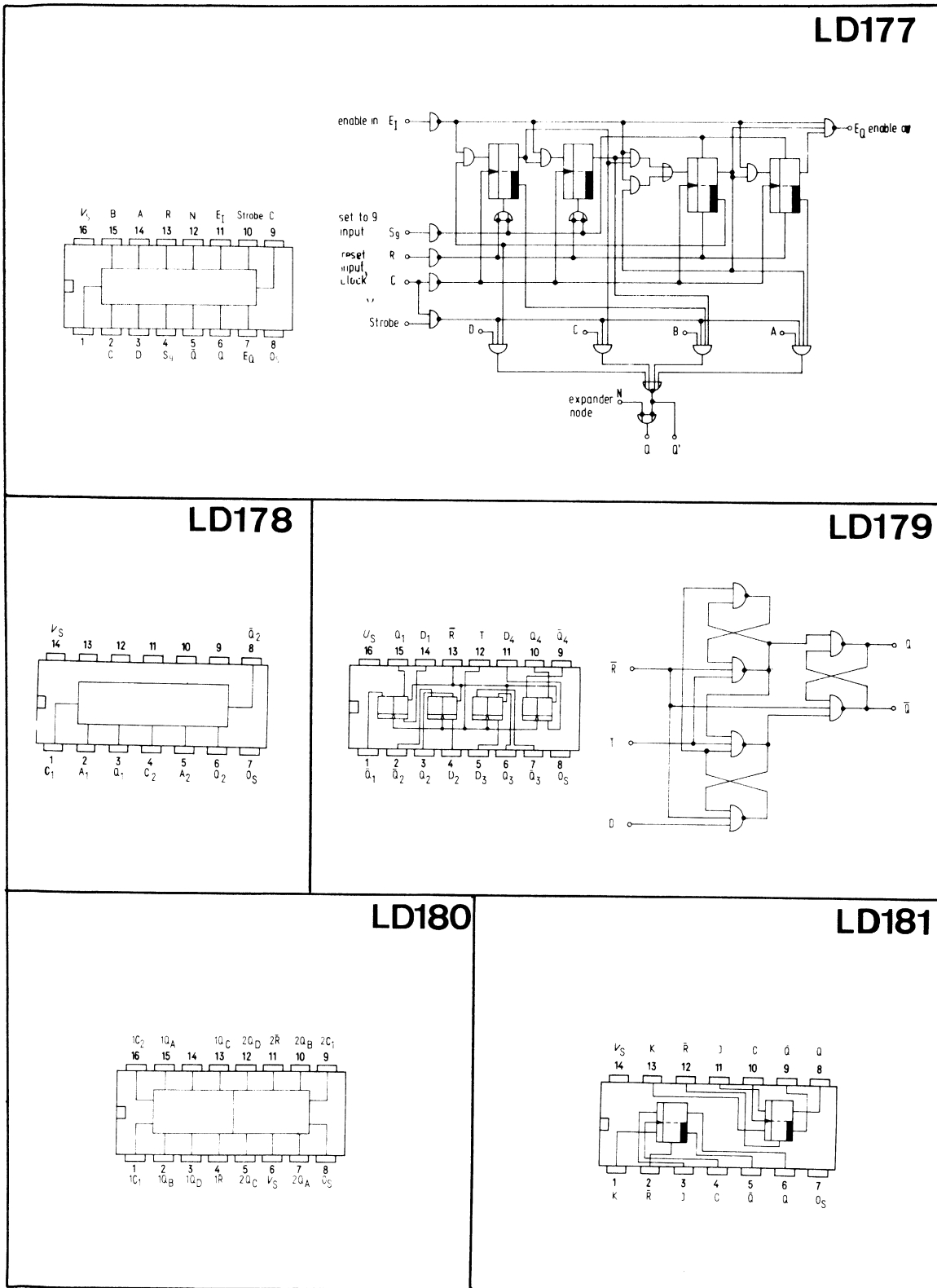


LD175

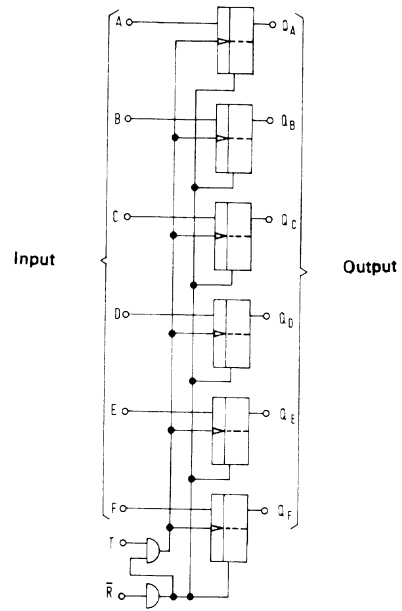
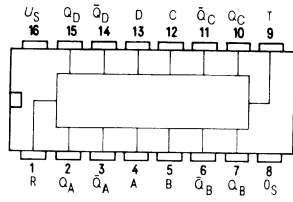


LD176

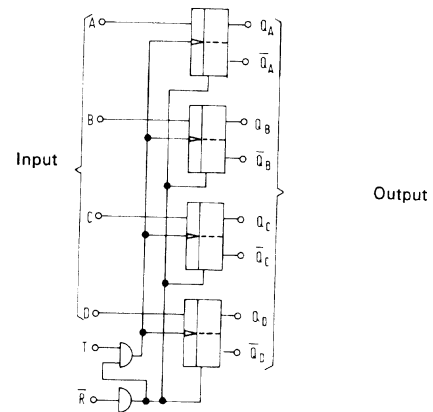
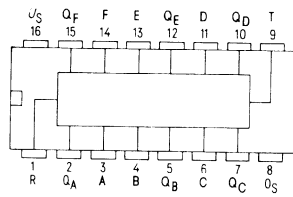




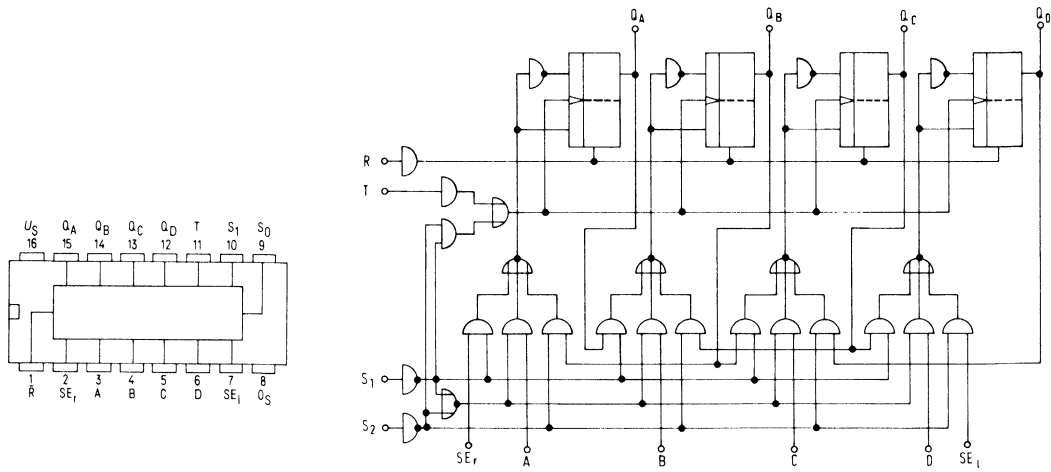
LD182



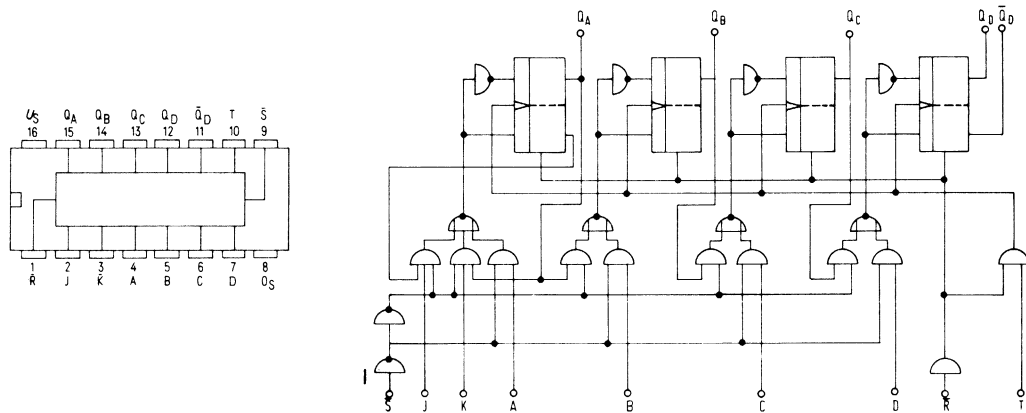
LD183



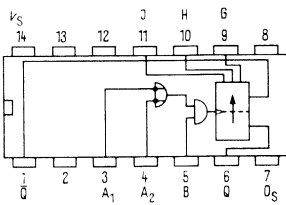
LD184



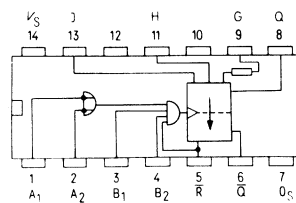
LD185



LD186

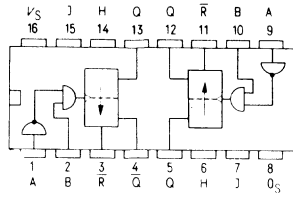


LD187

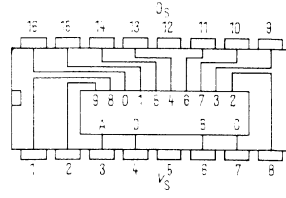


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

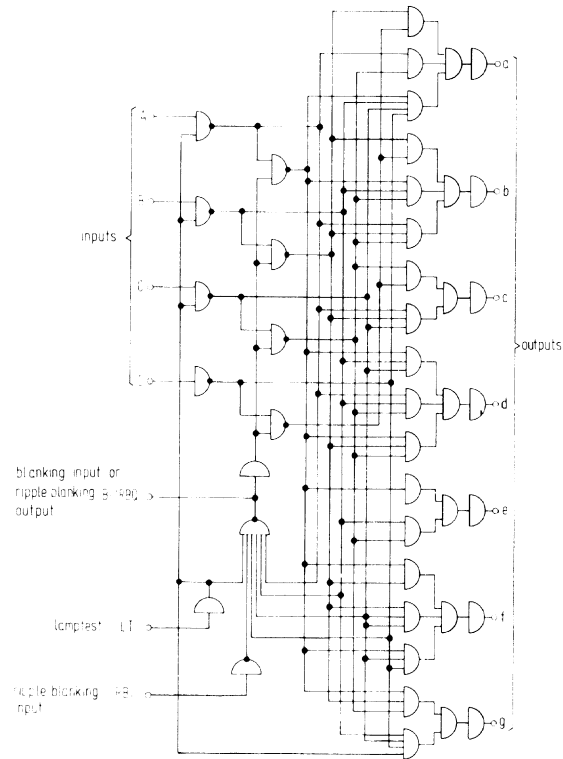
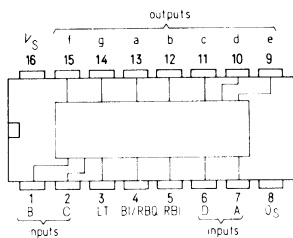
LD188



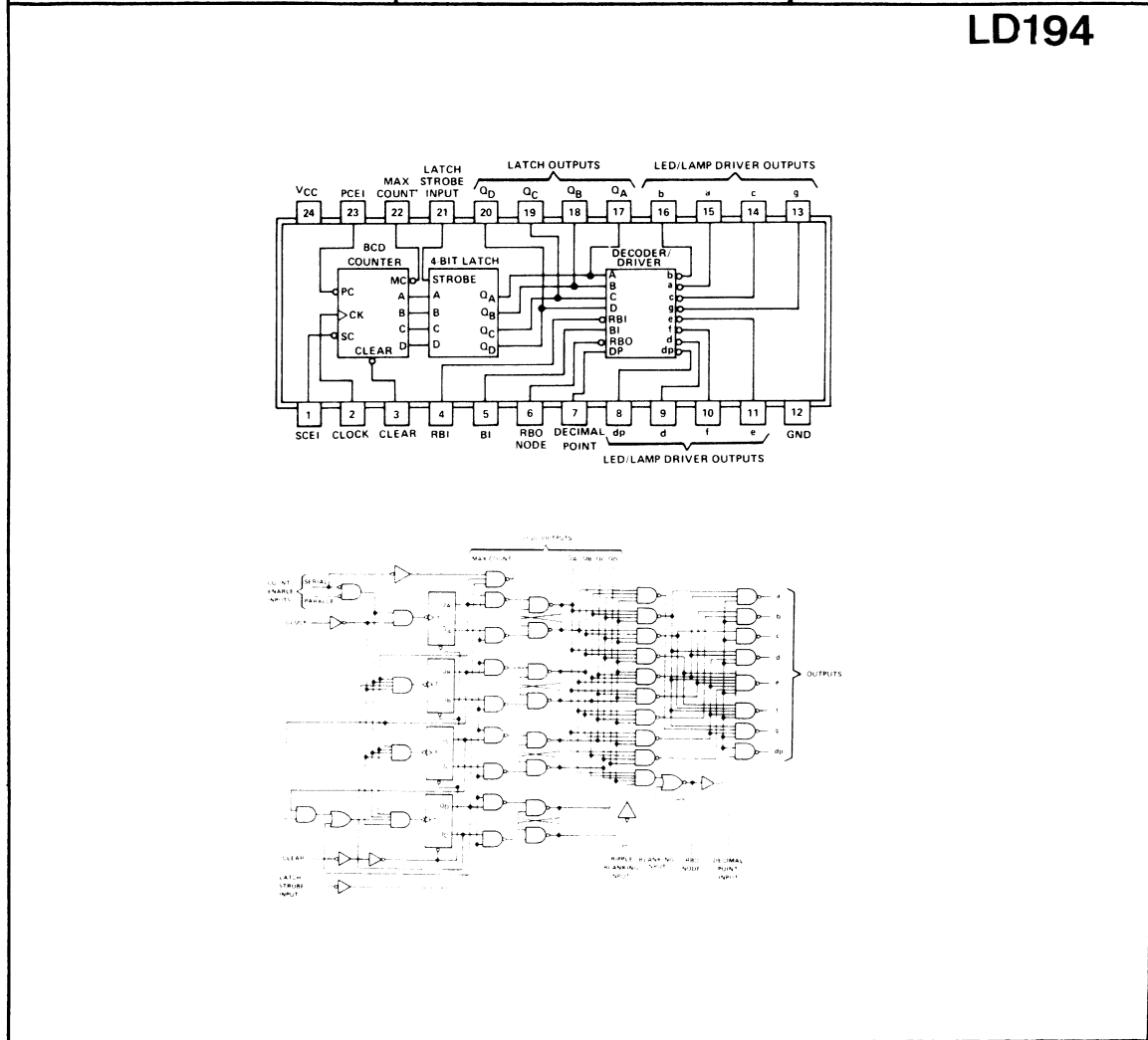
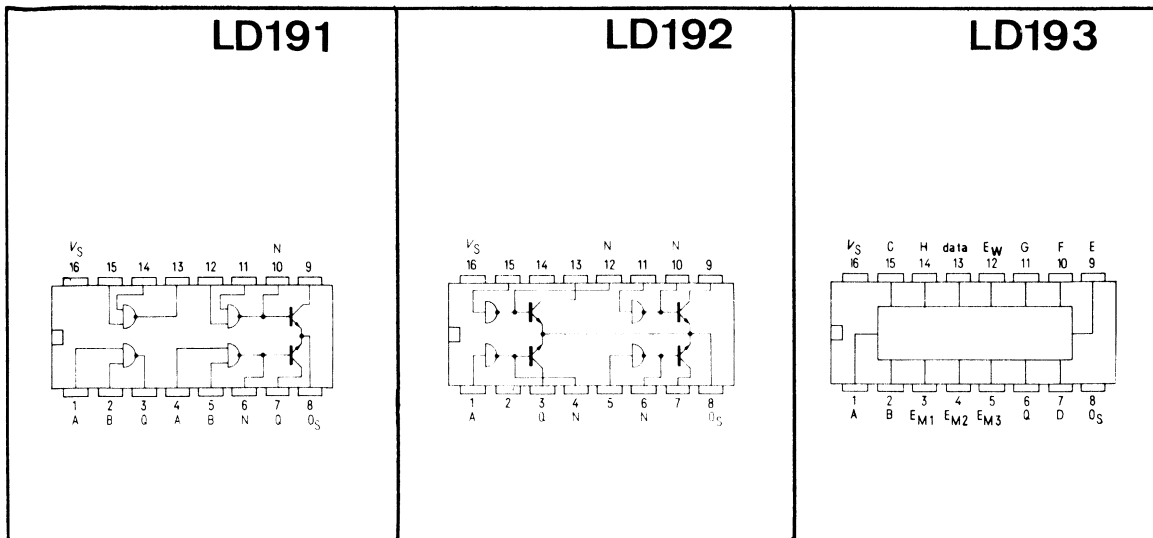
LD189



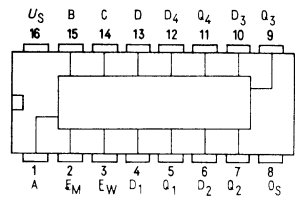
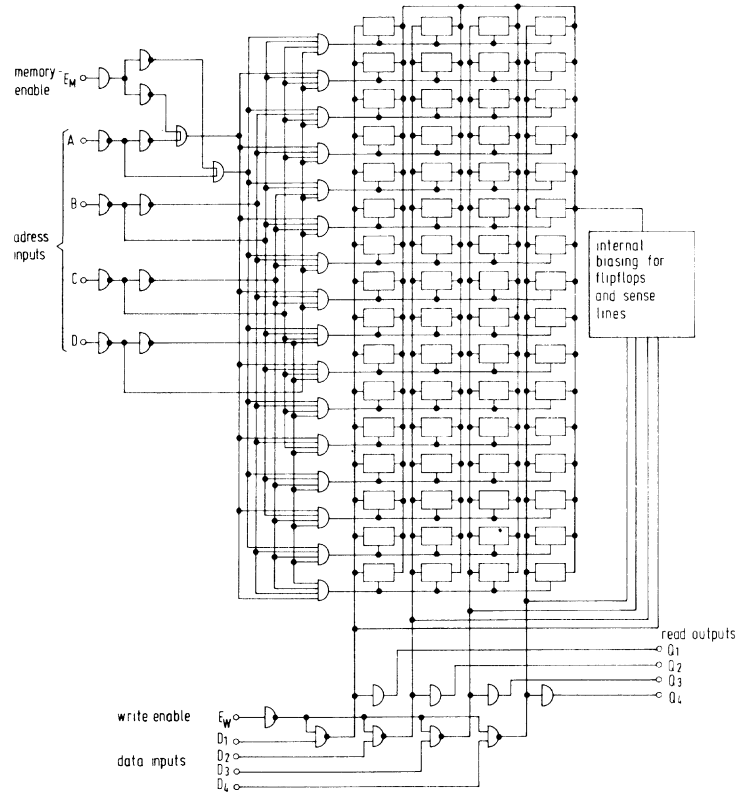
LD190



LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

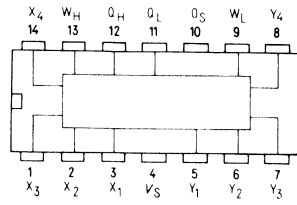


LD195

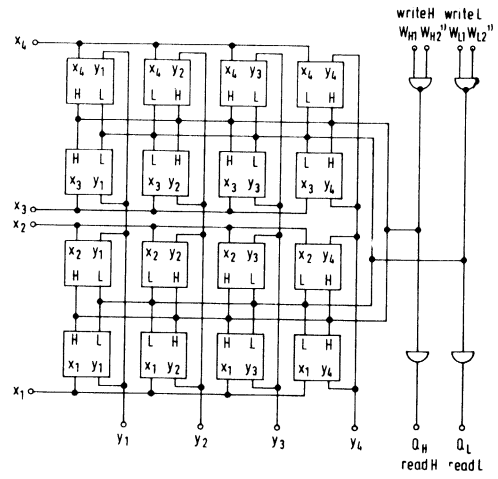
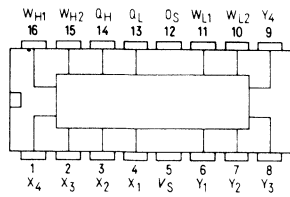


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

LD196

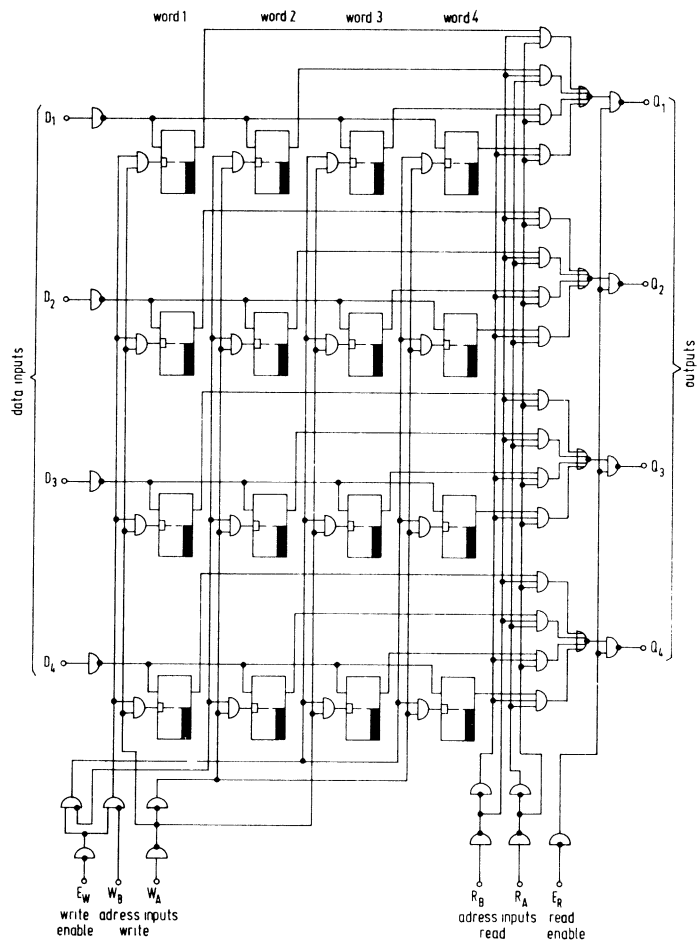
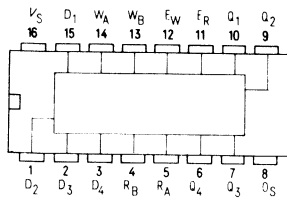


LD197

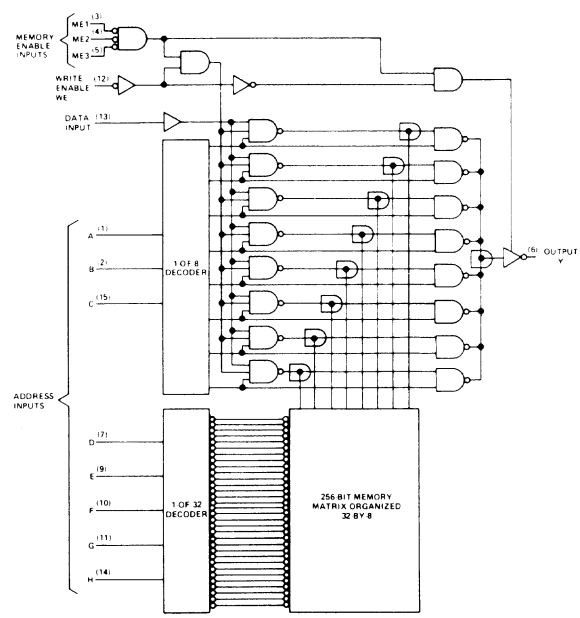
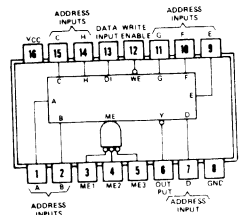


Note: 1) inputs W_{H2} and W_{L2} FLQ 121 only

LD198

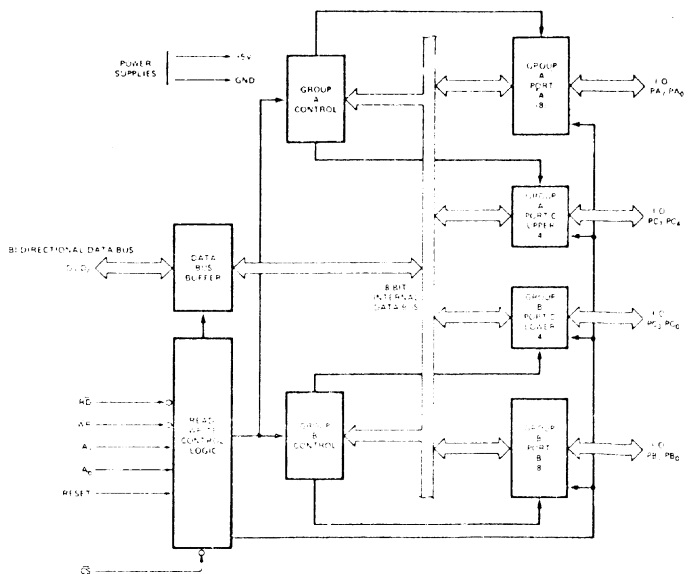
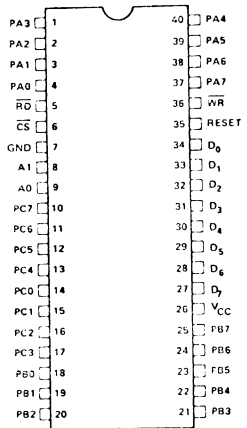


LD199



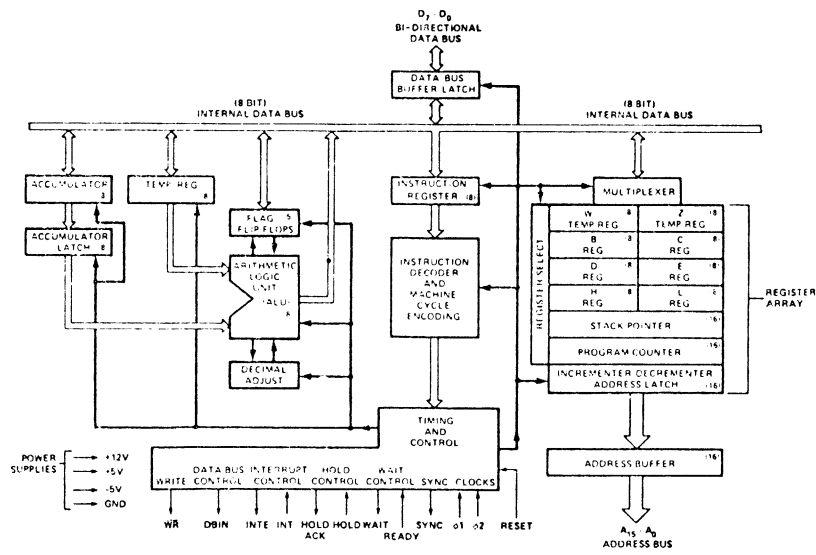
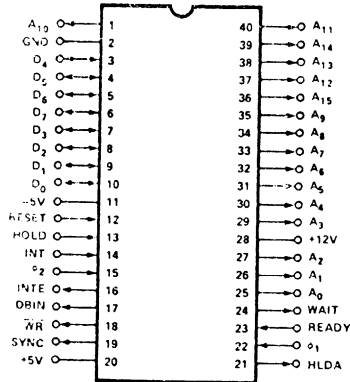
LD200: see next page

LD201

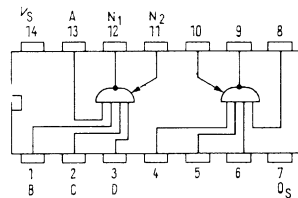


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

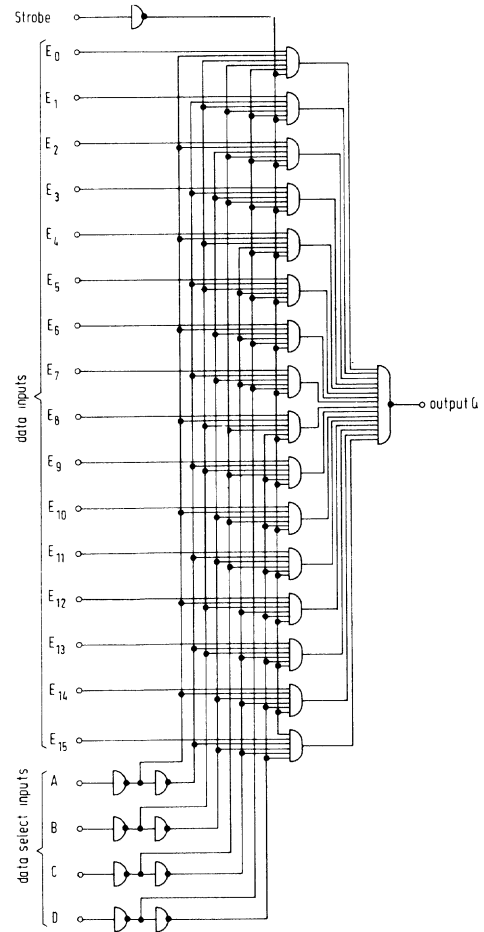
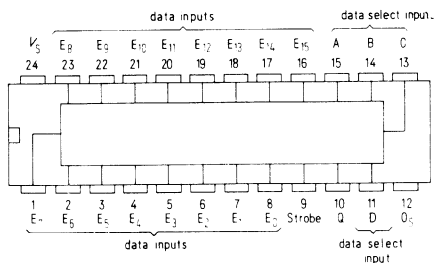
LD200



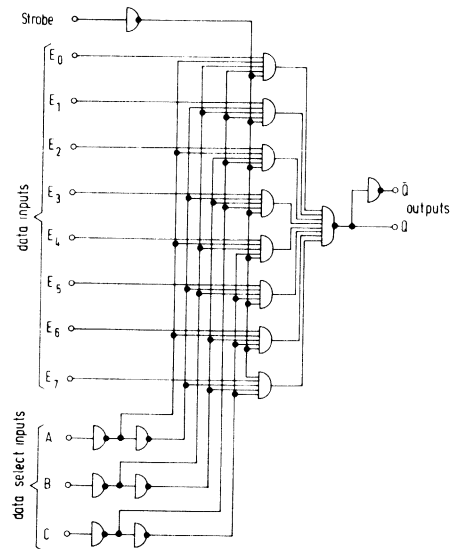
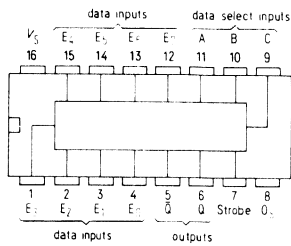
LD203



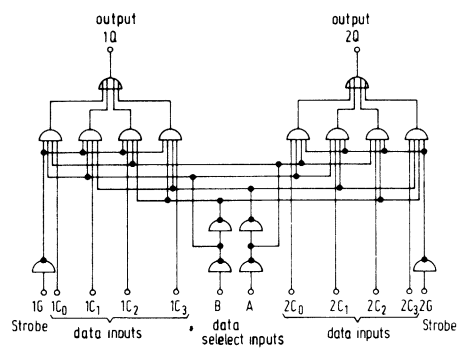
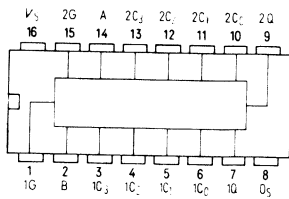
LD204



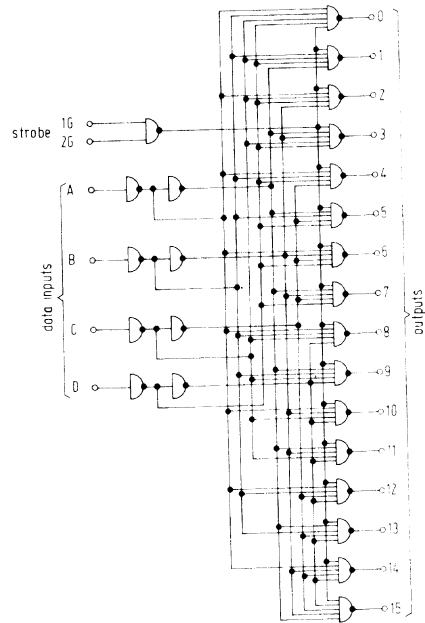
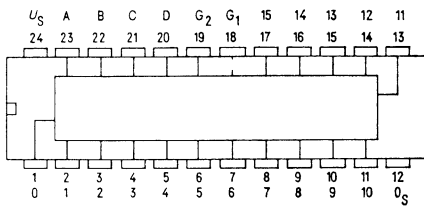
LD205



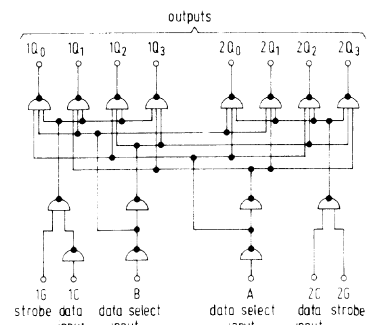
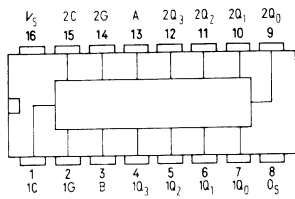
LD206



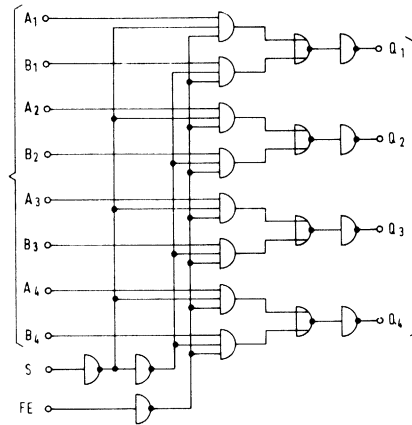
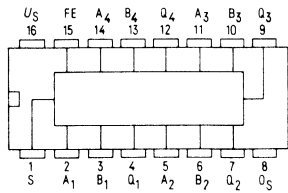
LD207



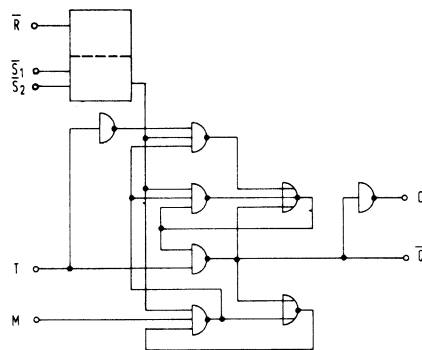
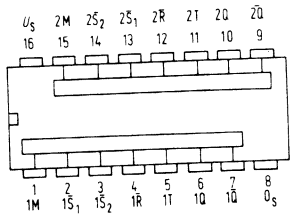
LD208



LD209



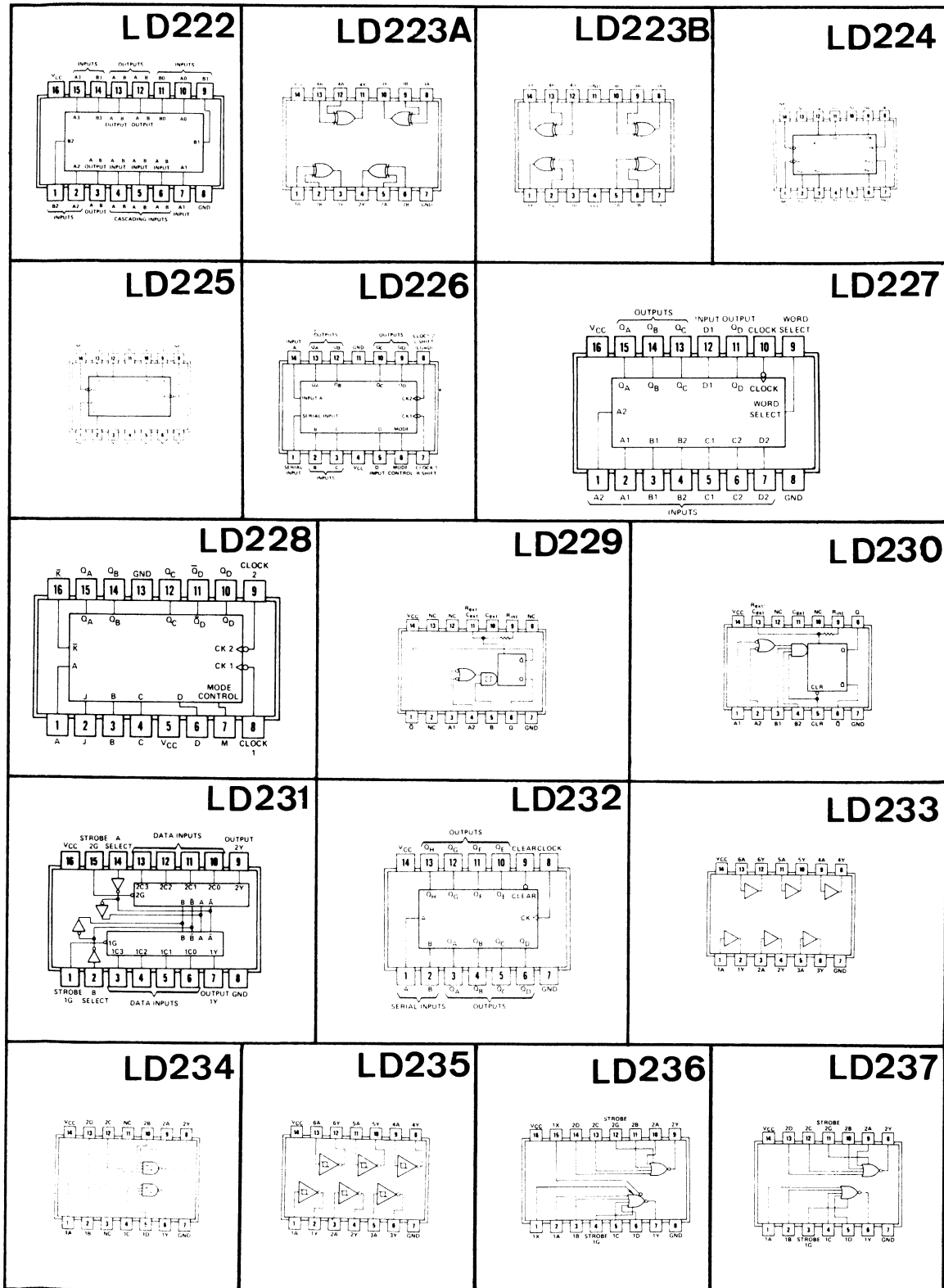
LD210



LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

<p>LD211A</p>	<p>LD211B</p>	<p>LD212A</p>	<p>LD212B</p>
<p>LD213A</p>	<p>LD213B</p>	<p>LD214</p>	<p>LD215A</p>
<p>LD215B</p>	<p>LD216A</p>	<p>LD216B</p>	<p>LD217A</p>
<p>LD217B</p>	<p>LD218A</p>	<p>LD218B</p>	<p>LD219</p>
<p>LD220A</p>	<p>LD220B</p>	<p>LD221A</p>	<p>LD221B</p>

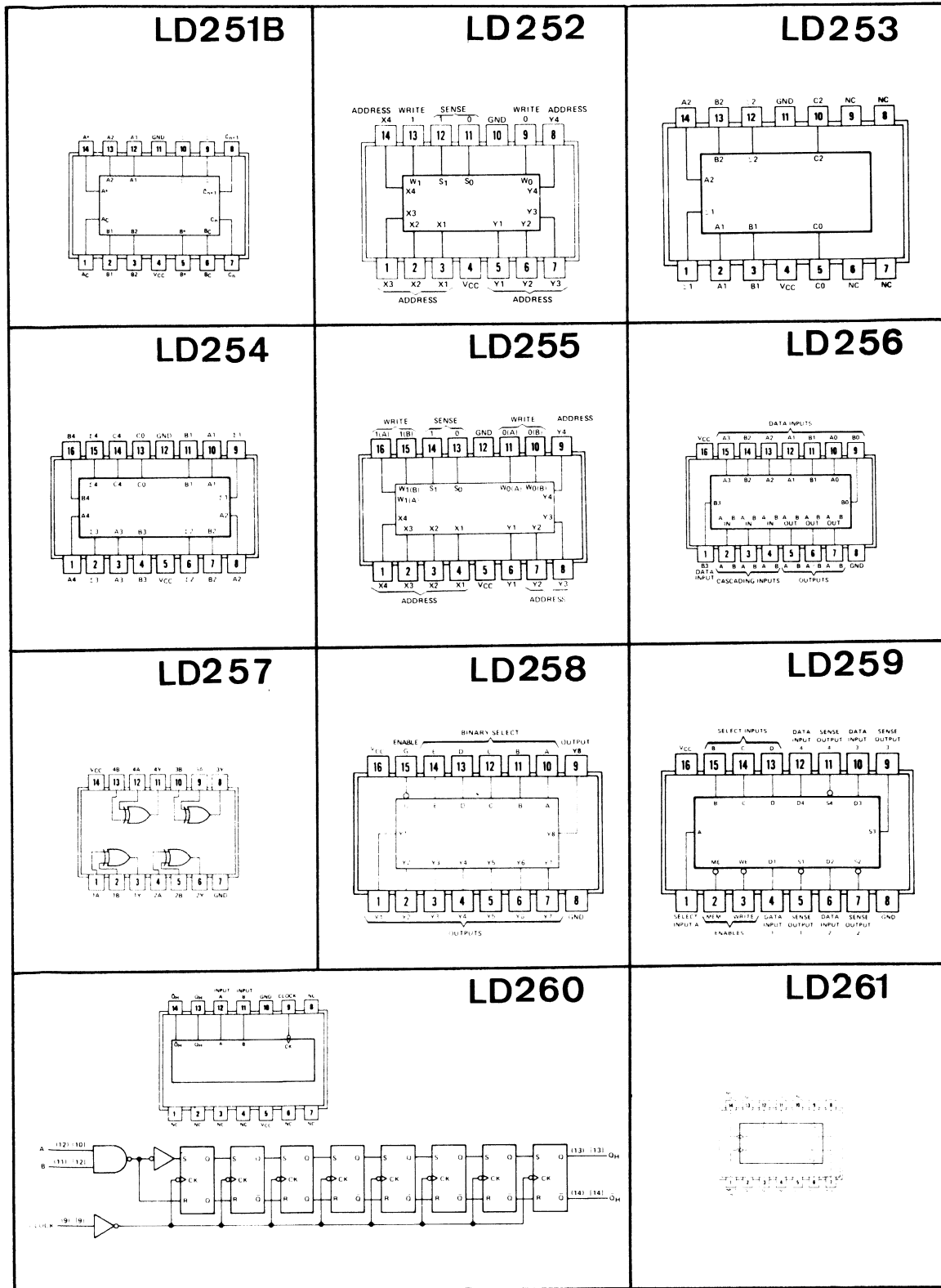
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



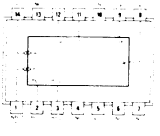
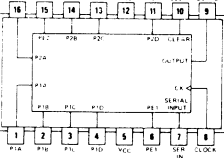
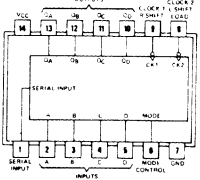
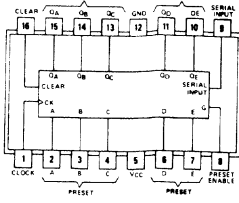
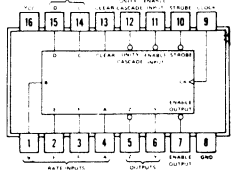
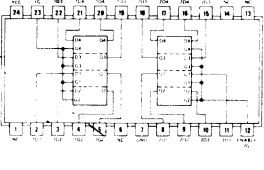
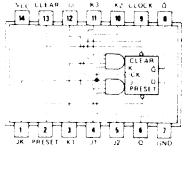
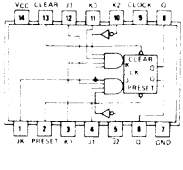
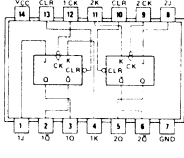
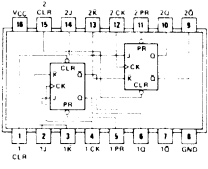
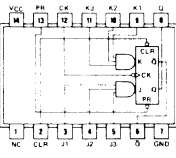
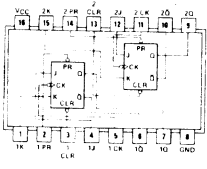
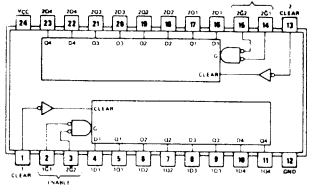
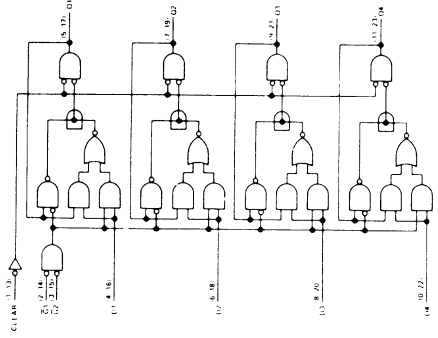
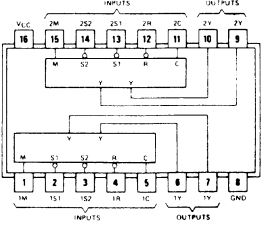
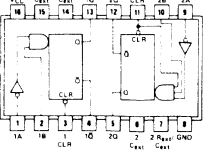
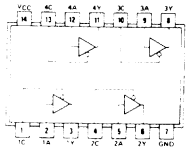
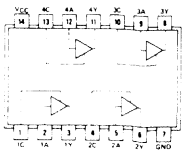
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

<p style="text-align: center;">LD238</p>	<p style="text-align: center;">LD239</p>	<p style="text-align: center;">LD240</p>	<p style="text-align: center;">LD241</p>
<p style="text-align: center;">LD242A</p>	<p style="text-align: center;">LD242B</p>	<p style="text-align: center;">LD243A</p>	<p style="text-align: center;">LD243B</p>
<p style="text-align: center;">LD244A</p>	<p style="text-align: center;">LD244B</p>	<p style="text-align: center;">LD245A</p>	<p style="text-align: center;">LD245B</p>
<p style="text-align: center;">LD246A</p>	<p style="text-align: center;">LD246B</p>	<p style="text-align: center;">LD247A</p>	<p style="text-align: center;">LD247B</p>
<p style="text-align: center;">LD248</p>	<p style="text-align: center;">LD249</p>	<p style="text-align: center;">LD250</p>	<p style="text-align: center;">LD251A</p>

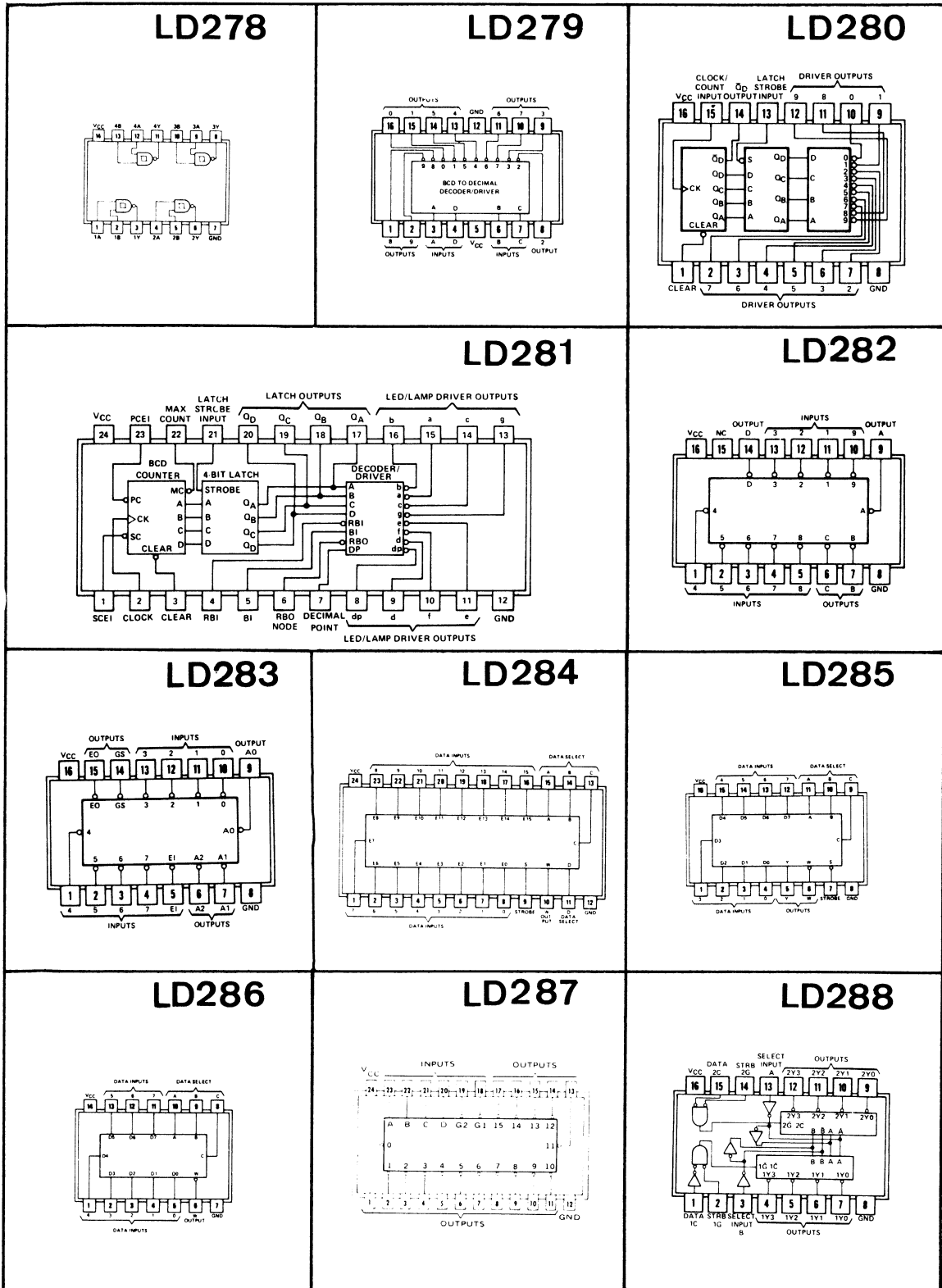
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



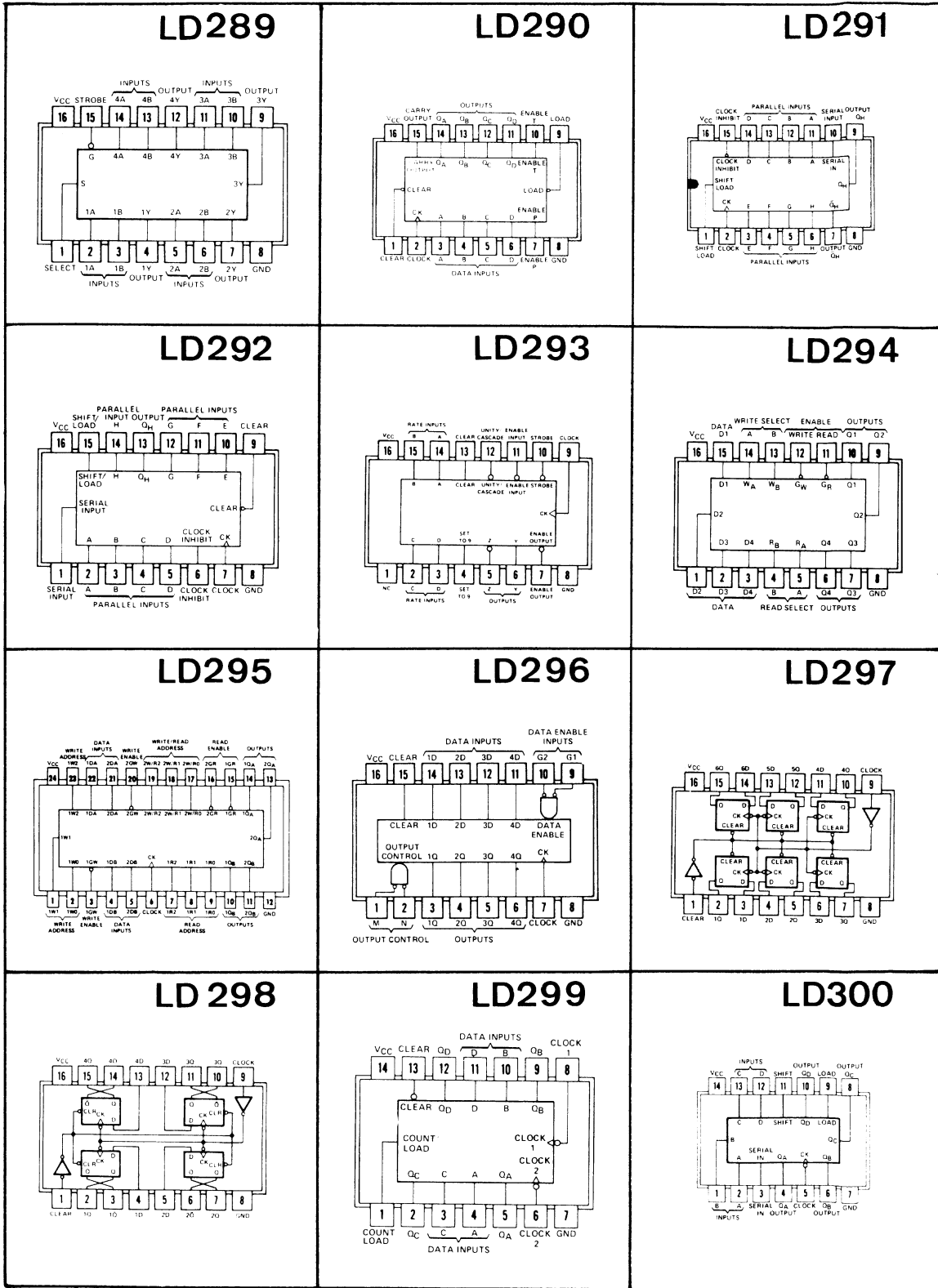
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

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<p style="text-align: center;">LD266</p> 	<p style="text-align: center;">LD267</p> 	<p style="text-align: center;">LD268</p> 	<p style="text-align: center;">LD268A</p> 
<p style="text-align: center;">LD269</p> 	<p style="text-align: center;">LD270</p> 	<p style="text-align: center;">LD271</p> 	<p style="text-align: center;">LD272</p> 
<p style="text-align: center;">LD273</p>  	<p style="text-align: center;">LD274</p> 	<p style="text-align: center;">LD275</p> 	
<p style="text-align: center;">LD276</p> 	<p style="text-align: center;">LD277</p> 		

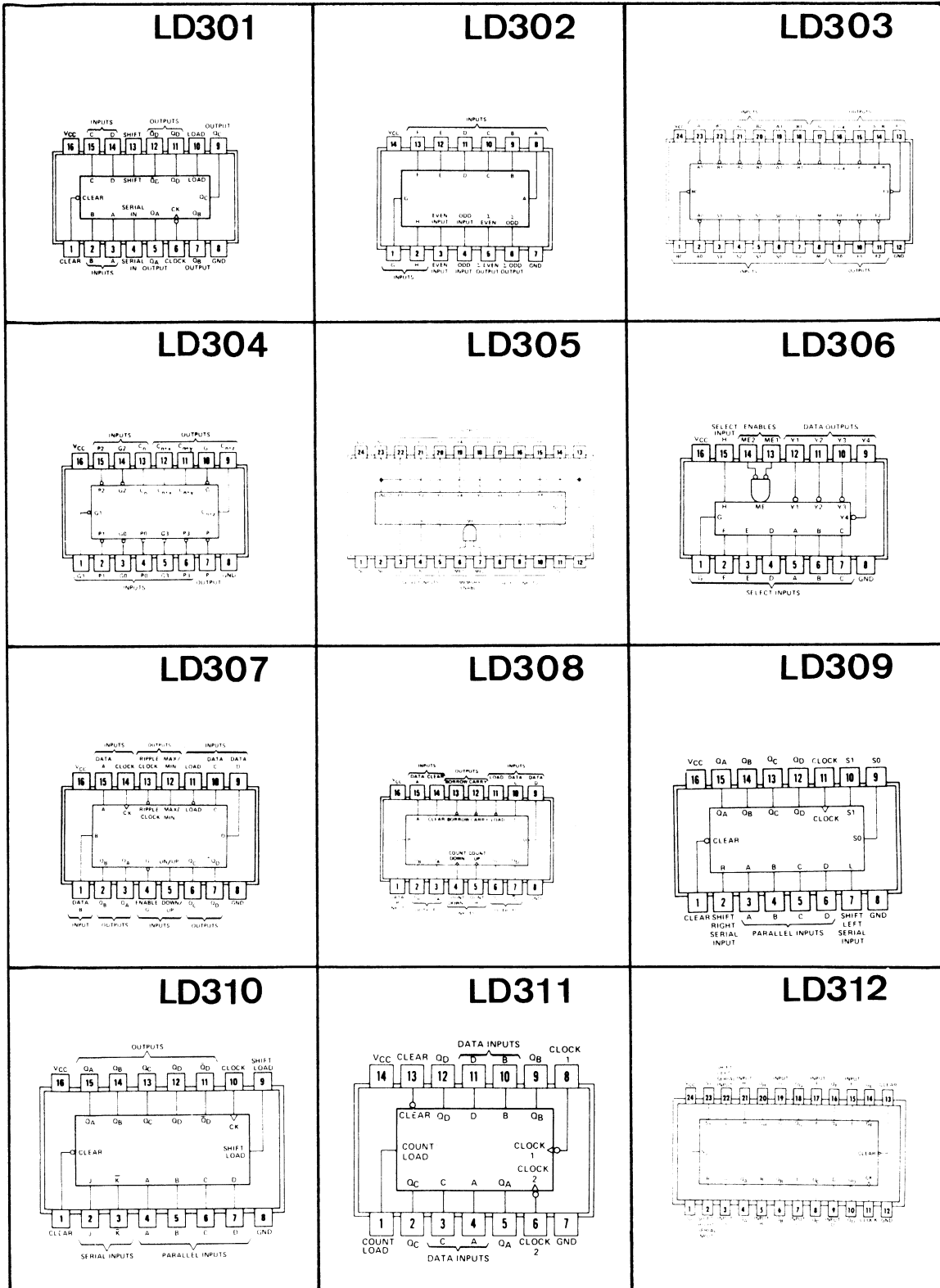
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



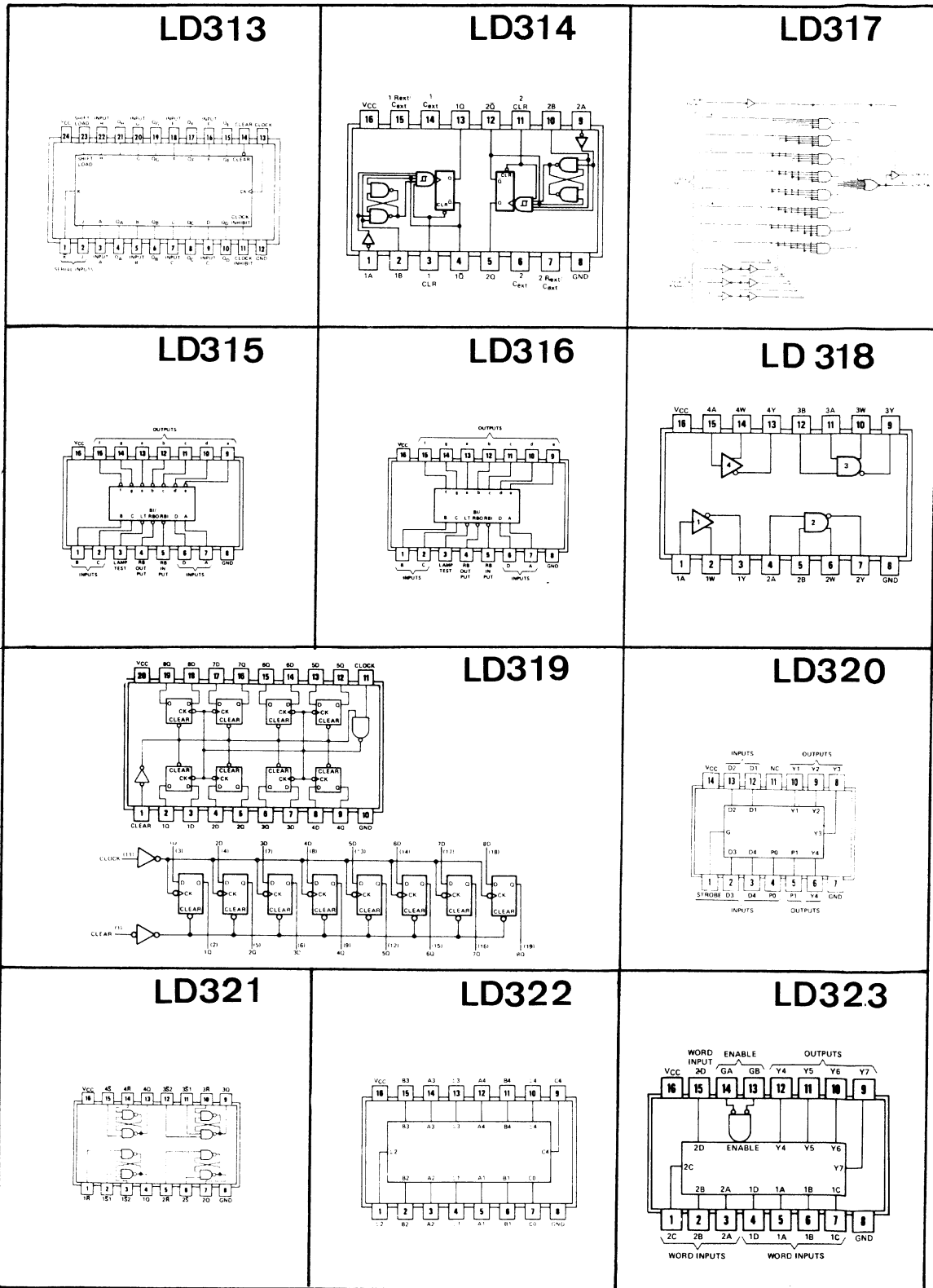
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



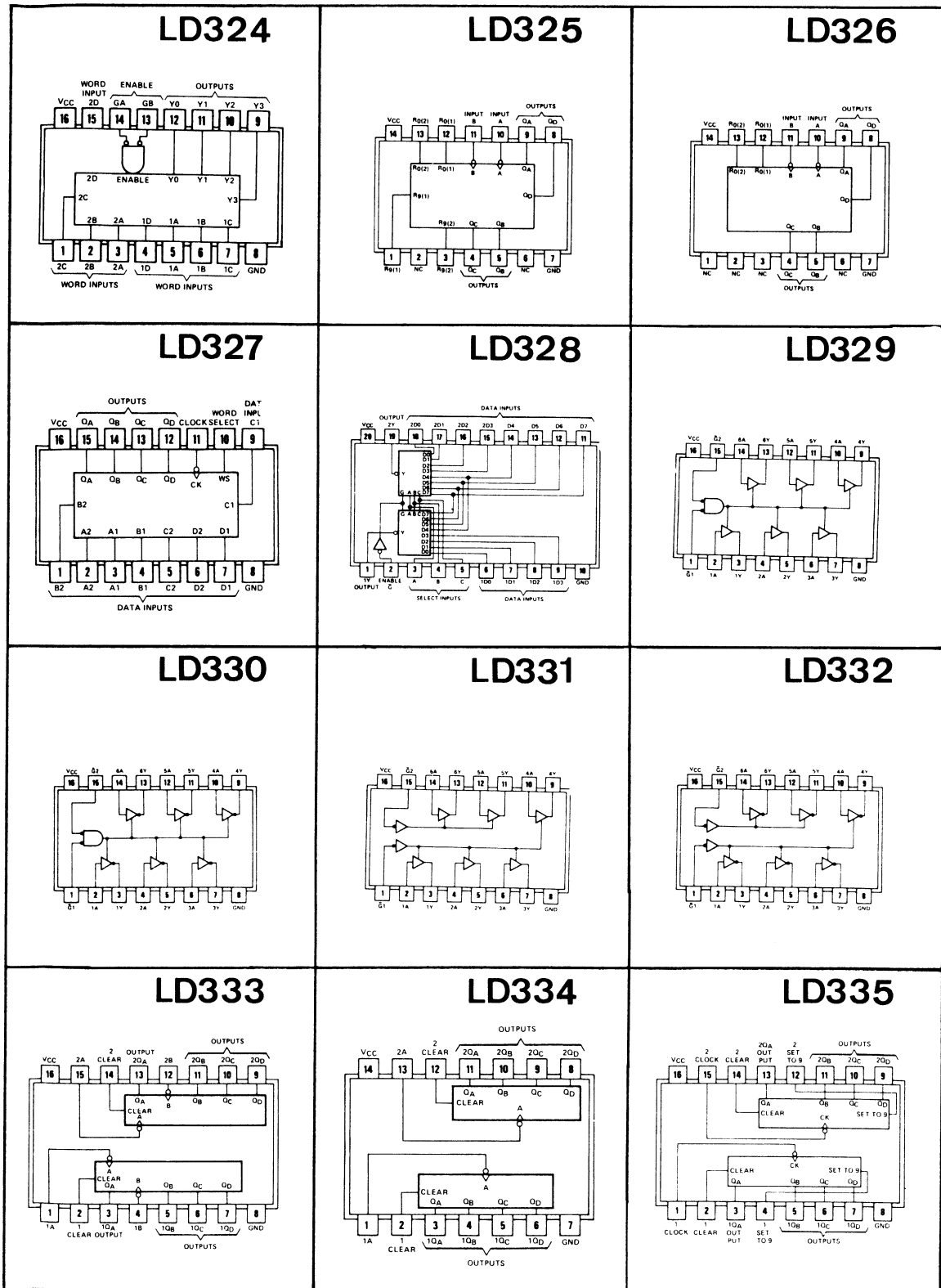
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



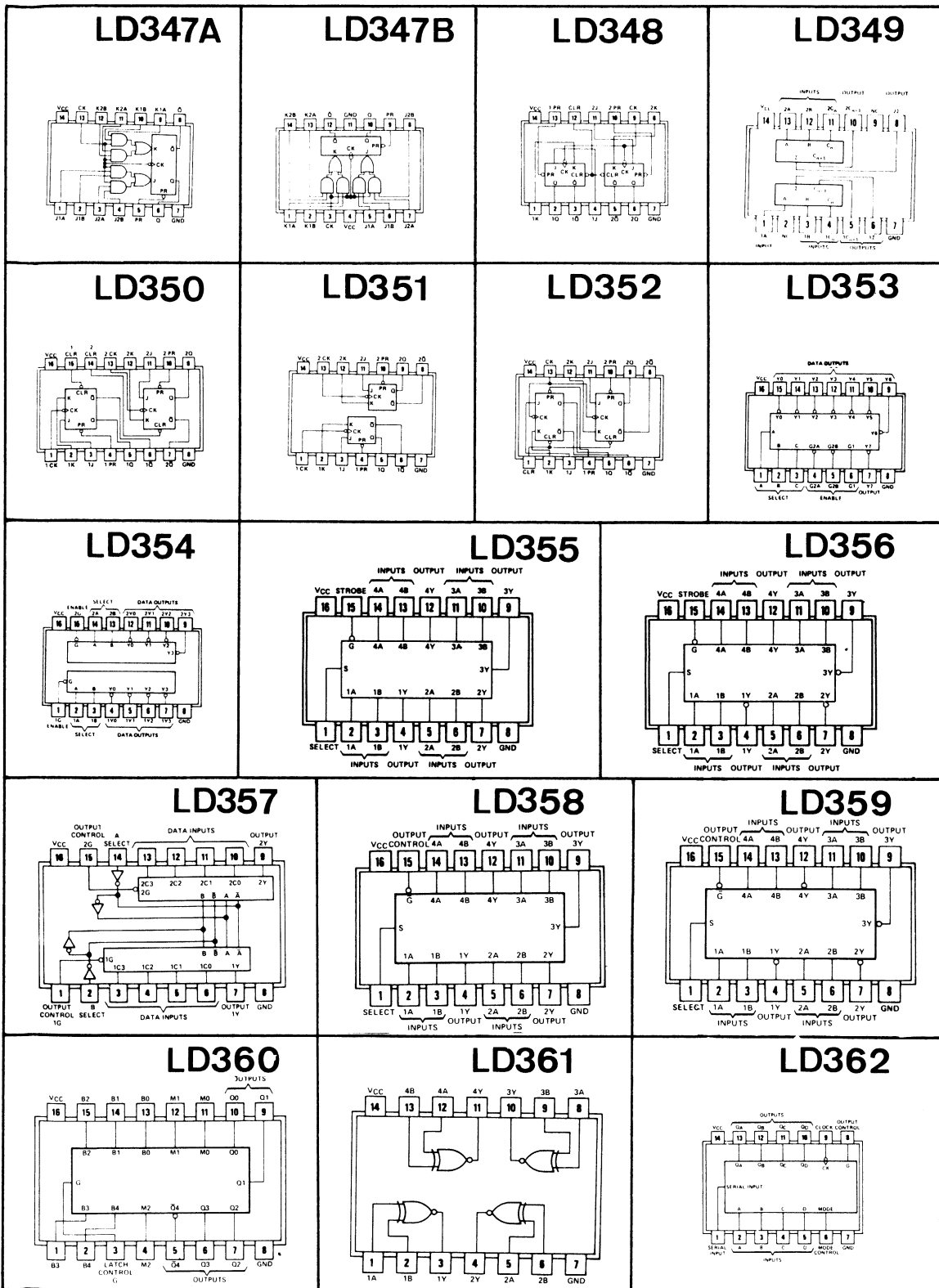
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

<p style="text-align: center;">LD336</p>	<p style="text-align: center;">LD337A</p>	<p style="text-align: center;">LD337B</p>	<p style="text-align: center;">LD338A</p>
<p style="text-align: center;">LD338B</p>	<p style="text-align: center;">LD339A</p>	<p style="text-align: center;">LD339B</p>	<p style="text-align: center;">LD340A</p>
<p style="text-align: center;">LD340B</p>	<p style="text-align: center;">LD341A</p>	<p style="text-align: center;">LD341B</p>	<p style="text-align: center;">LD342A</p>
<p style="text-align: center;">LD342B</p>	<p style="text-align: center;">LD343A</p>	<p style="text-align: center;">LD343B</p>	<p style="text-align: center;">LD344A</p>
<p style="text-align: center;">LD344B</p>	<p style="text-align: center;">LD345A</p>	<p style="text-align: center;">LD345B</p>	<p style="text-align: center;">LD346</p>

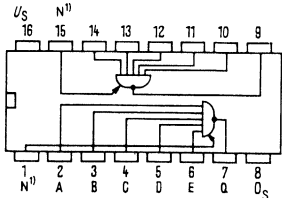
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



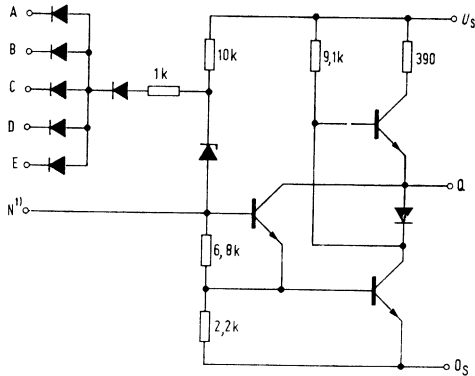
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

<h3 style="text-align: center;">LD363</h3>	<h3 style="text-align: center;">LD364</h3>	<h3 style="text-align: center;">LD365</h3>
<h3 style="text-align: center;">LD366</h3>	<h3 style="text-align: center;">LD367</h3>	<h3 style="text-align: center;">LD368</h3>
<h3 style="text-align: center;">LD369</h3>	<h3 style="text-align: center;">LD370</h3>	<h3 style="text-align: center;">LD371</h3>
<h3 style="text-align: center;">LD372</h3>	<h3 style="text-align: center;">LD373</h3> <p style="text-align: center;">Schematic (one gate)</p> <p style="text-align: center;">for FZH111A and FZH115B only</p>	
<h3 style="text-align: center;">LD372</h3> <p style="text-align: center;">Pin configuration top view</p>		

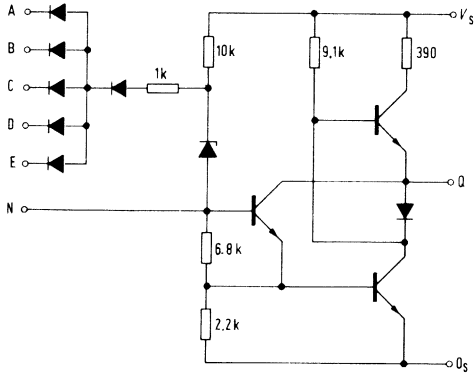
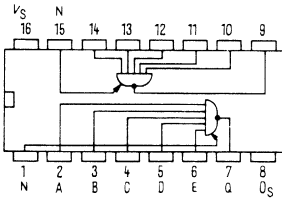
LD374



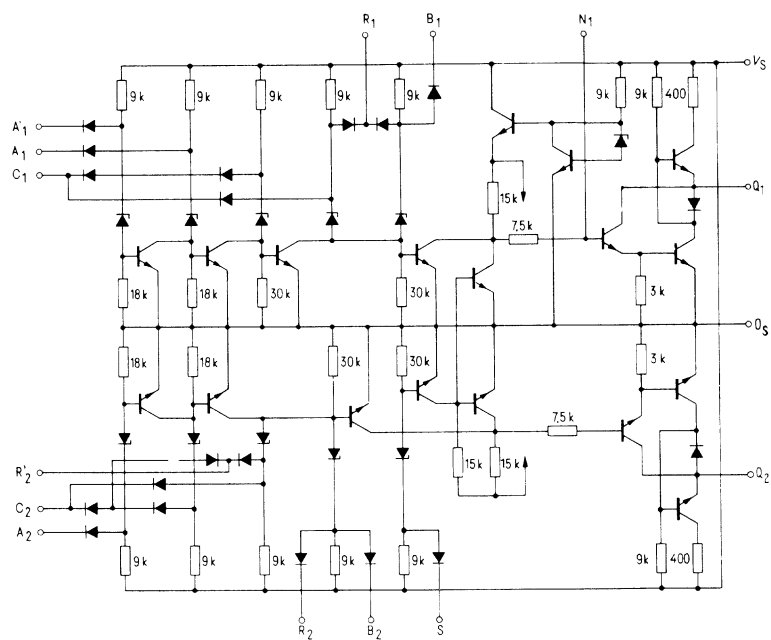
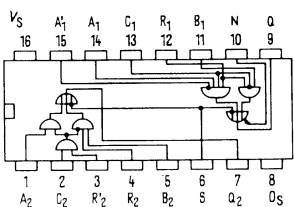
1) FZH 131/135 only



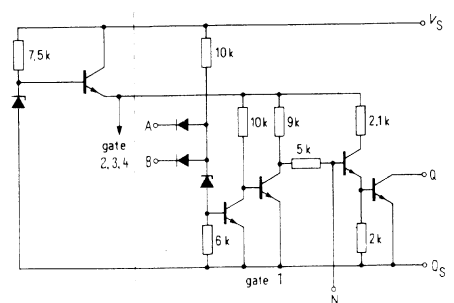
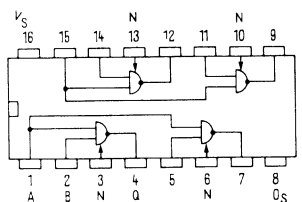
LD375



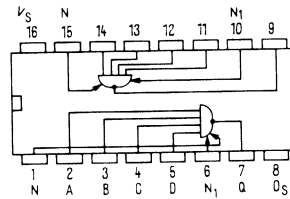
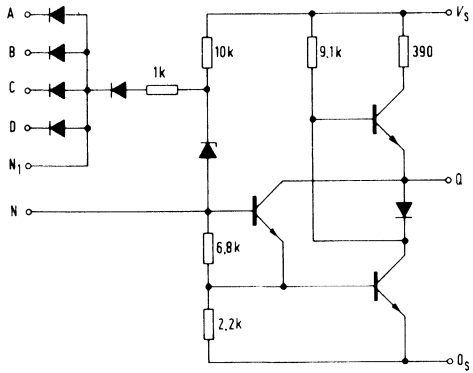
LD376



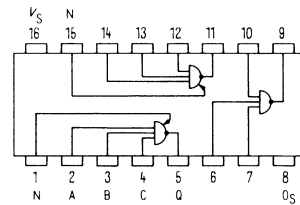
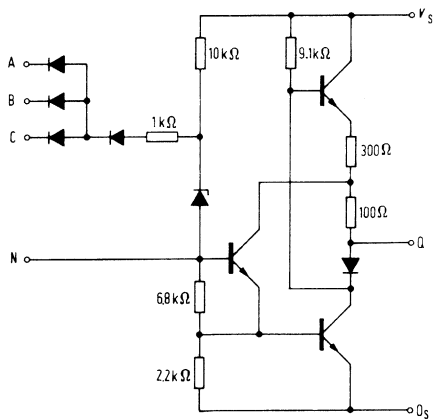
LD377



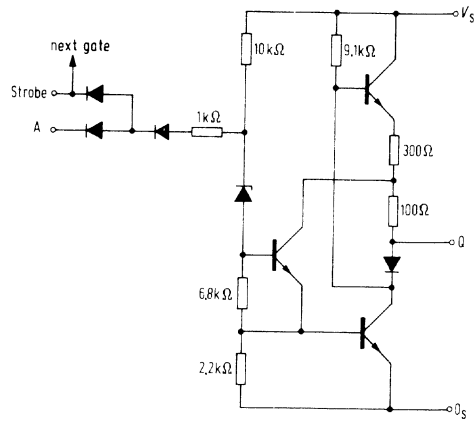
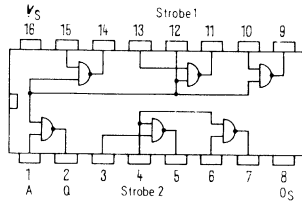
LD378



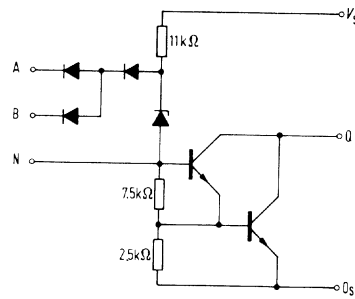
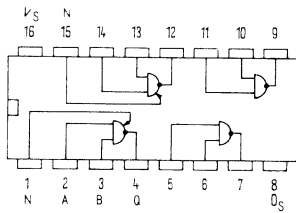
LD379



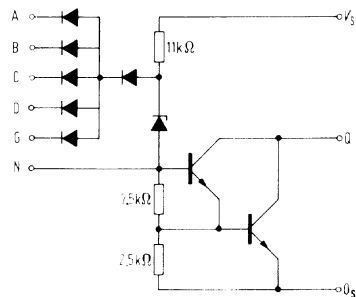
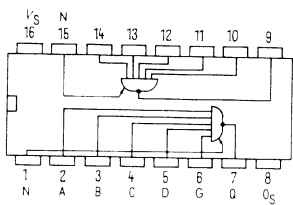
LD380



LD381

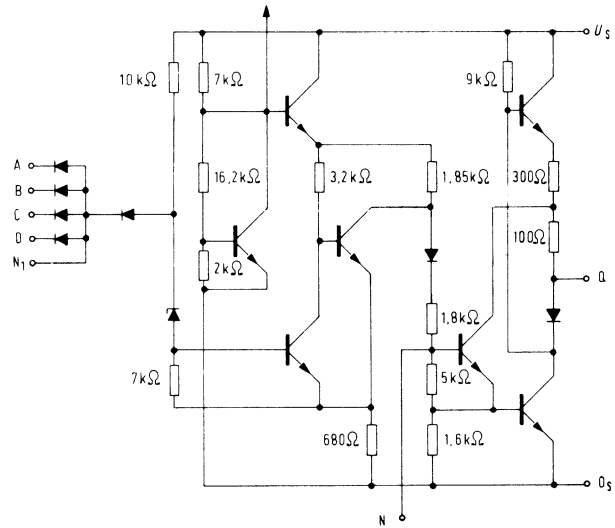
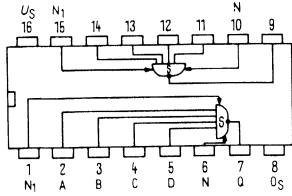


LD382

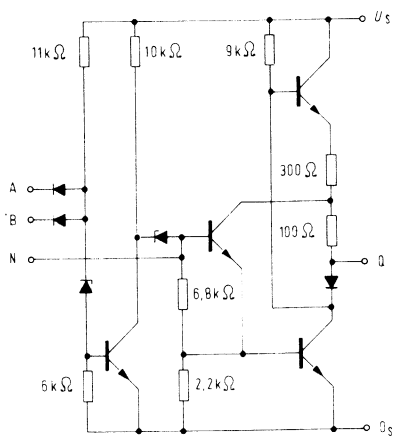
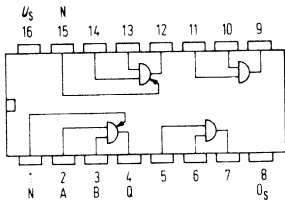


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

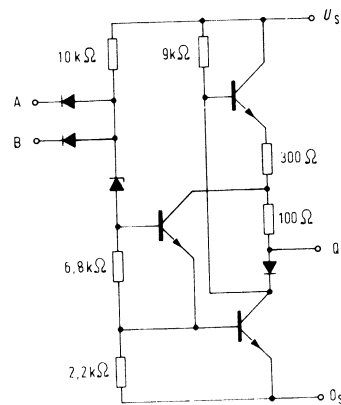
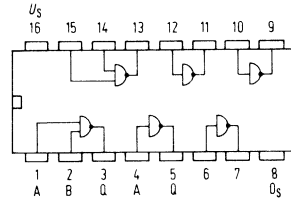
LD383

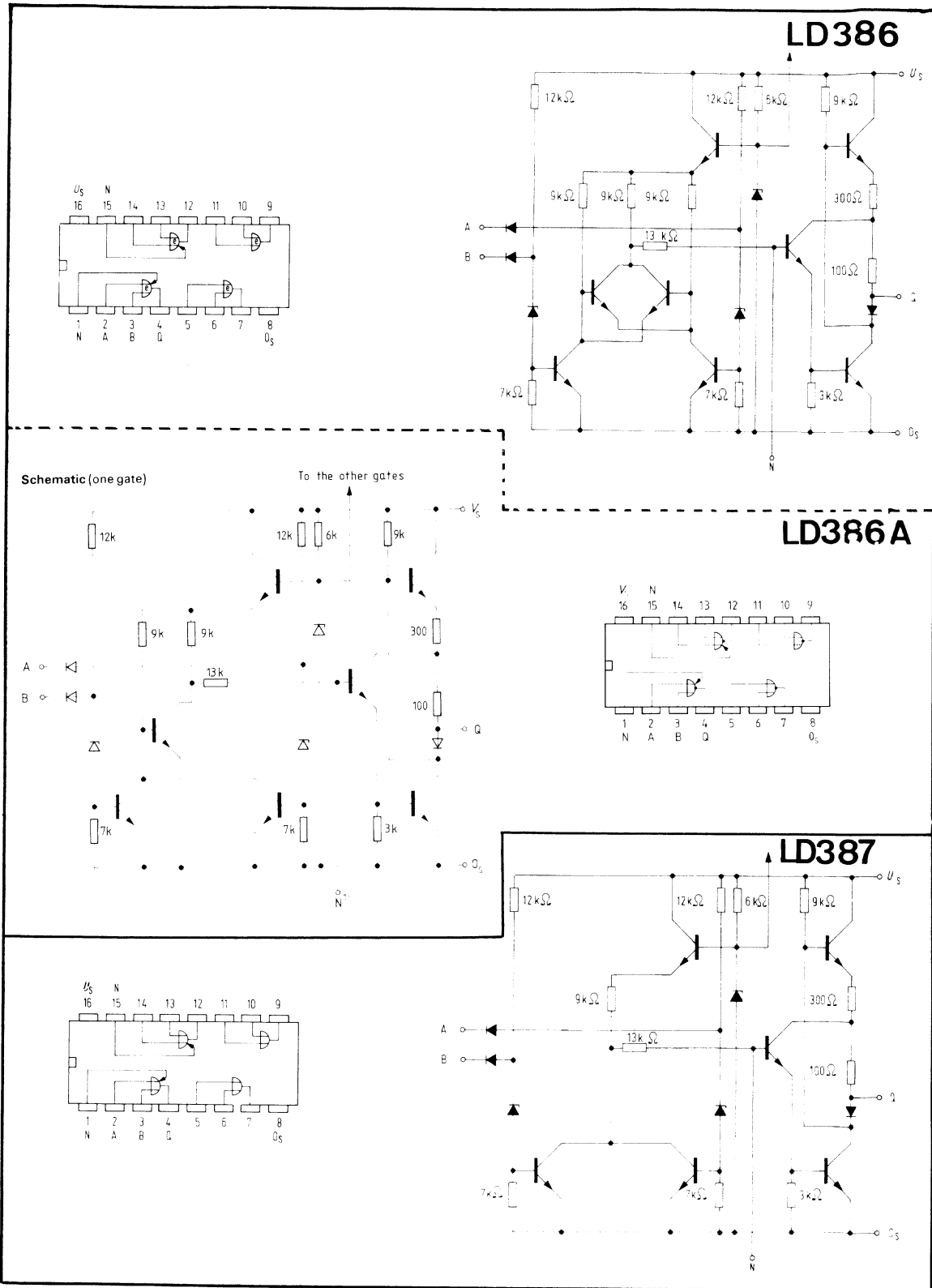


LD384

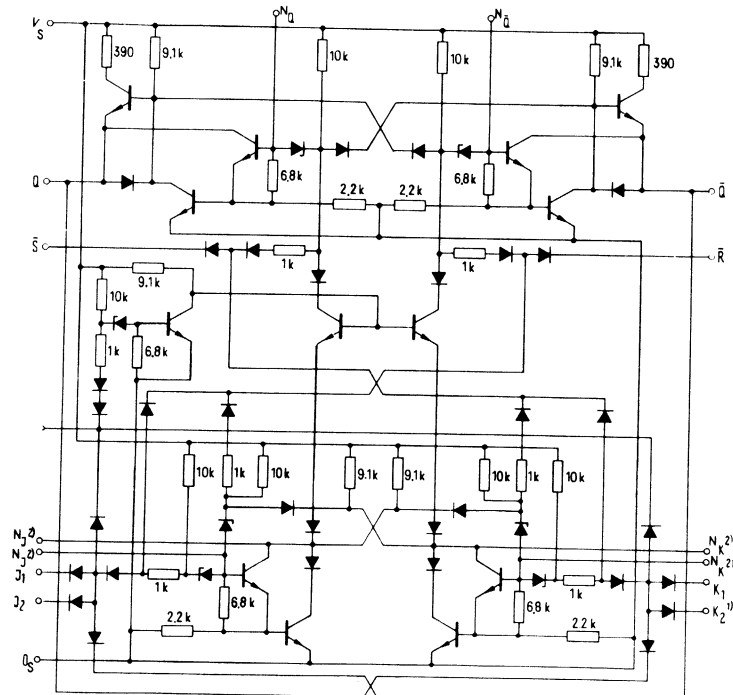
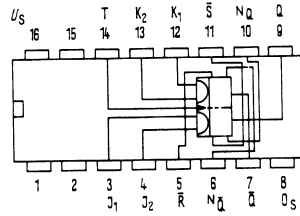


LD385



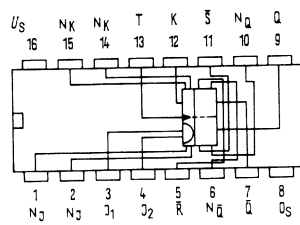


LD388



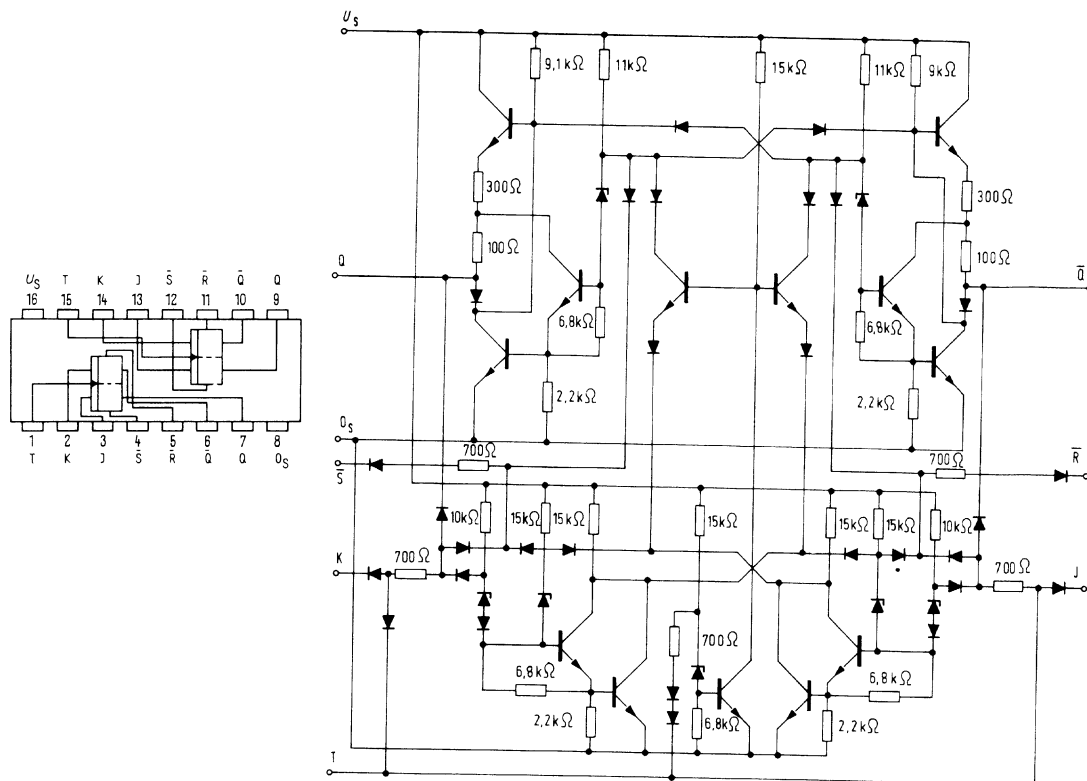
\bar{R} = reset input, \bar{S} = set input, C = clock input

LD389

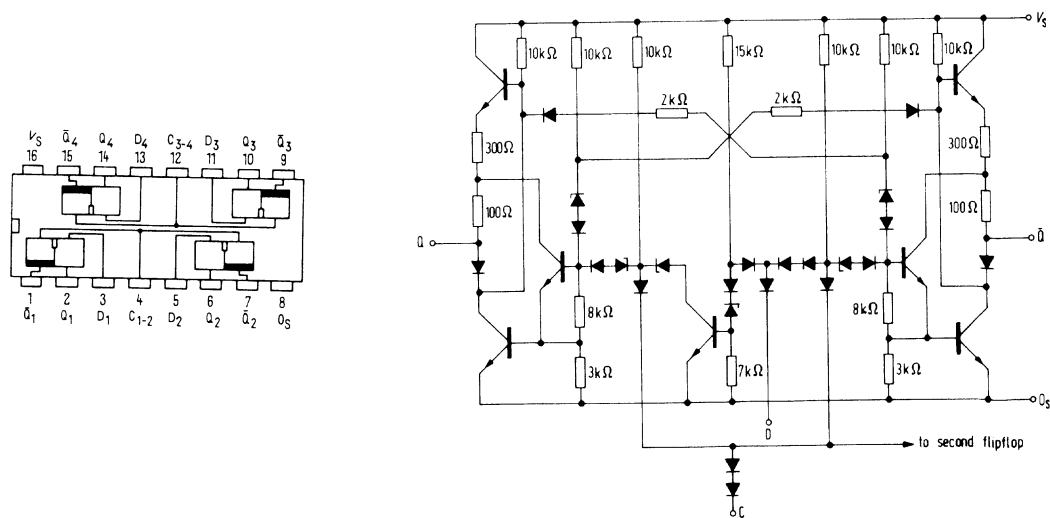


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

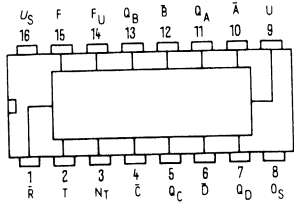
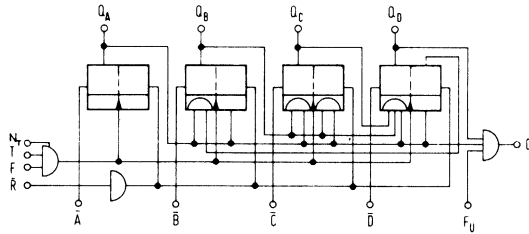
LD390



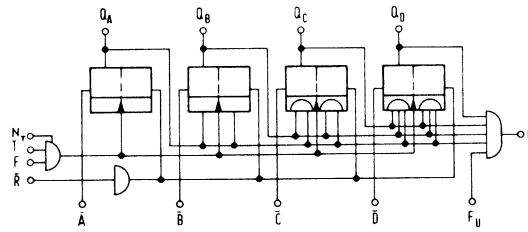
LD391



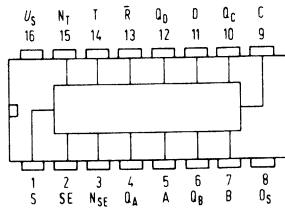
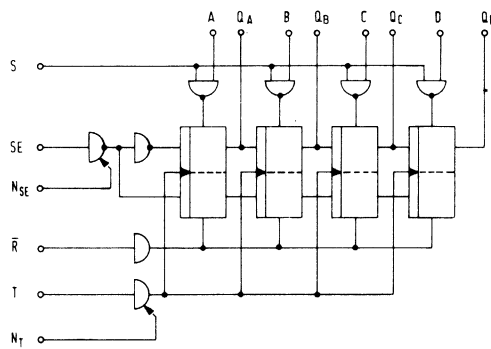
LD392



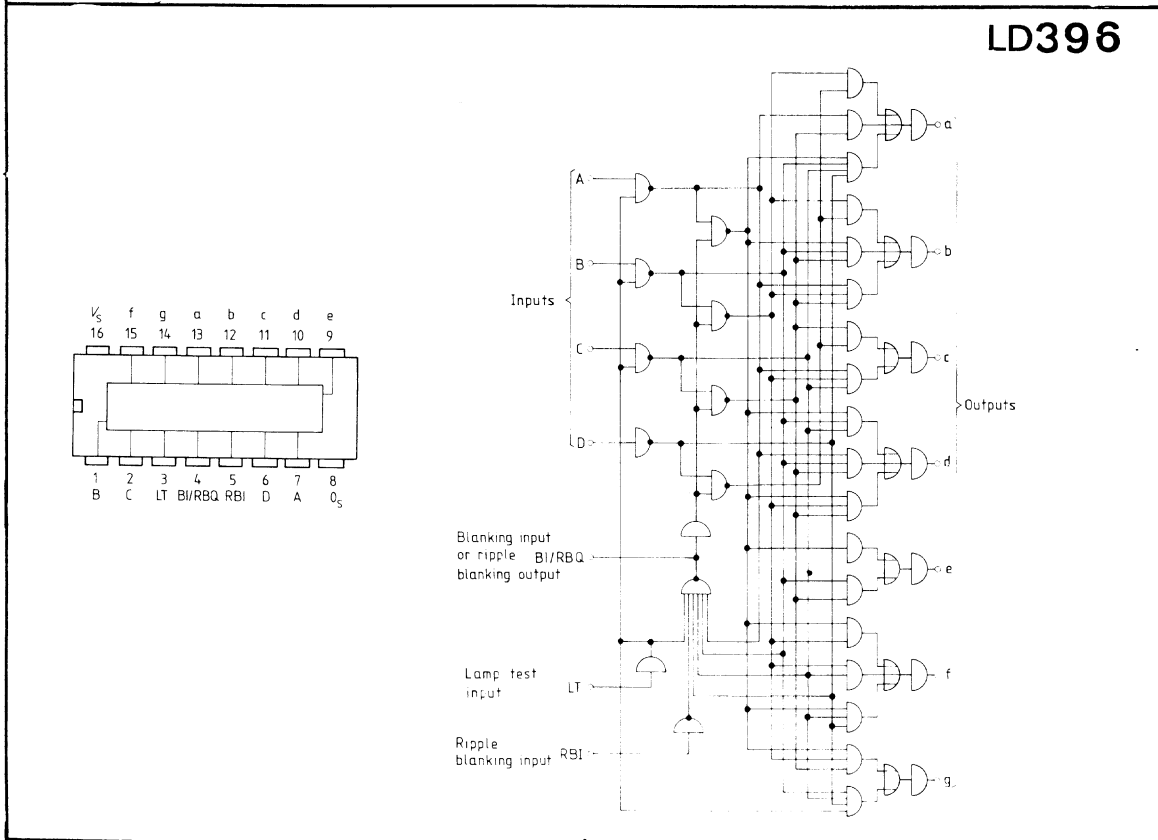
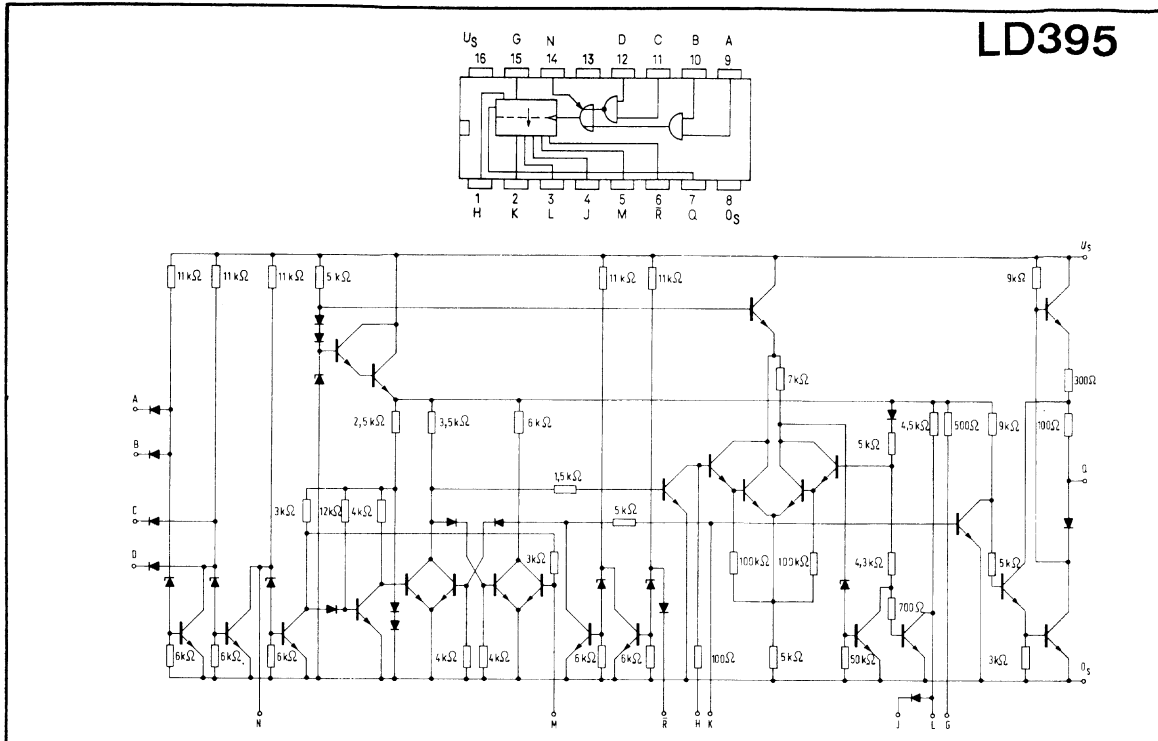
LD393



LD394

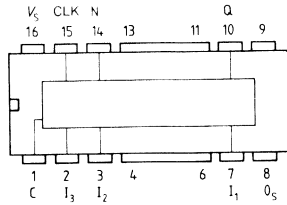


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

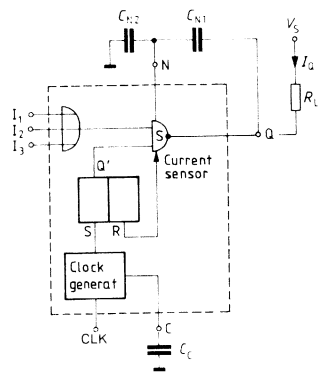


LD397

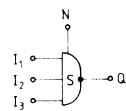
Pin configuration top view
 I_1, I_2, I_3 = Inputs
 Q = Output
 CLK = Clock output
 C = Terminal for clock capacitance



Logic diagram for short-circuit operation

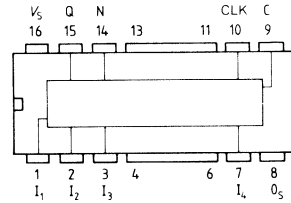


Logic diagram for normal operation (no short circuit)

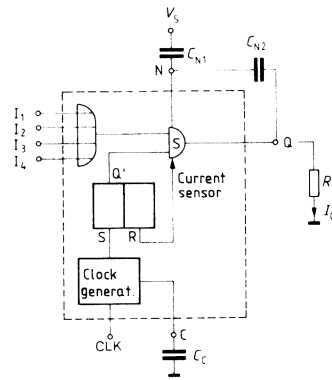


LD398

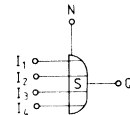
Pin configuration top view
 I_1, I_2, I_3, I_4 = Inputs
 Q = Output
 CLK = Clock output
 C = Terminal for clock capacitance



Logic diagram for short-circuit operation



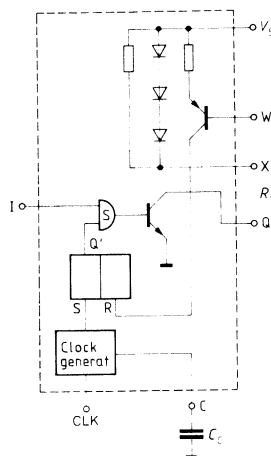
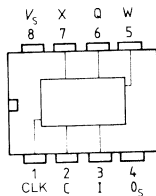
Logic diagram for normal operation (no short circuit)



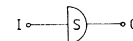
Logic diagram for short-circuit operation

LD399

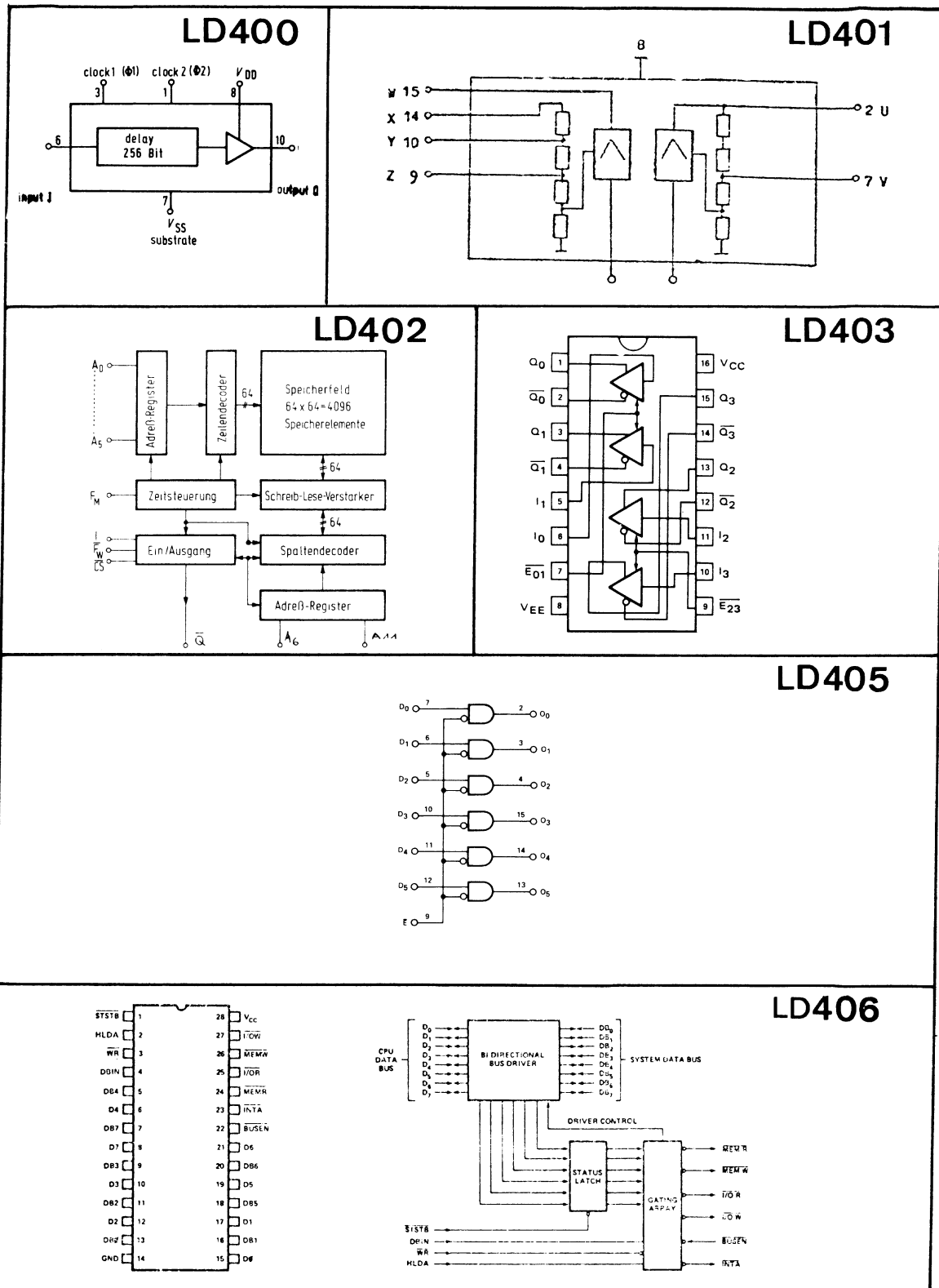
Pin configuration top view
 I = Input
 Q = Output
 CLK = Clock output
 C = Terminal for clock capacitance
 X, W = Inputs for short-circuit protection



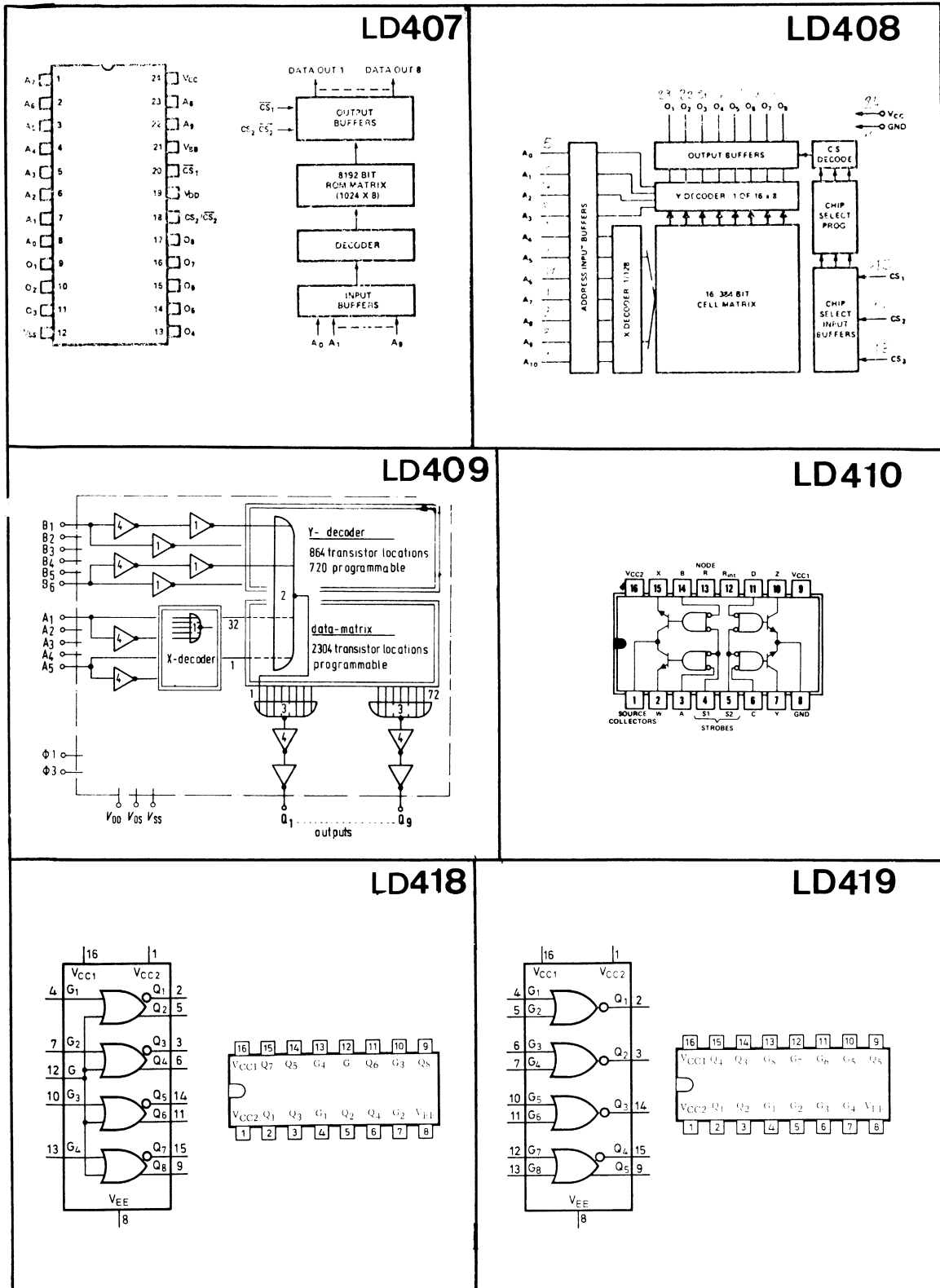
Logic diagram for normal operation (no short circuit)



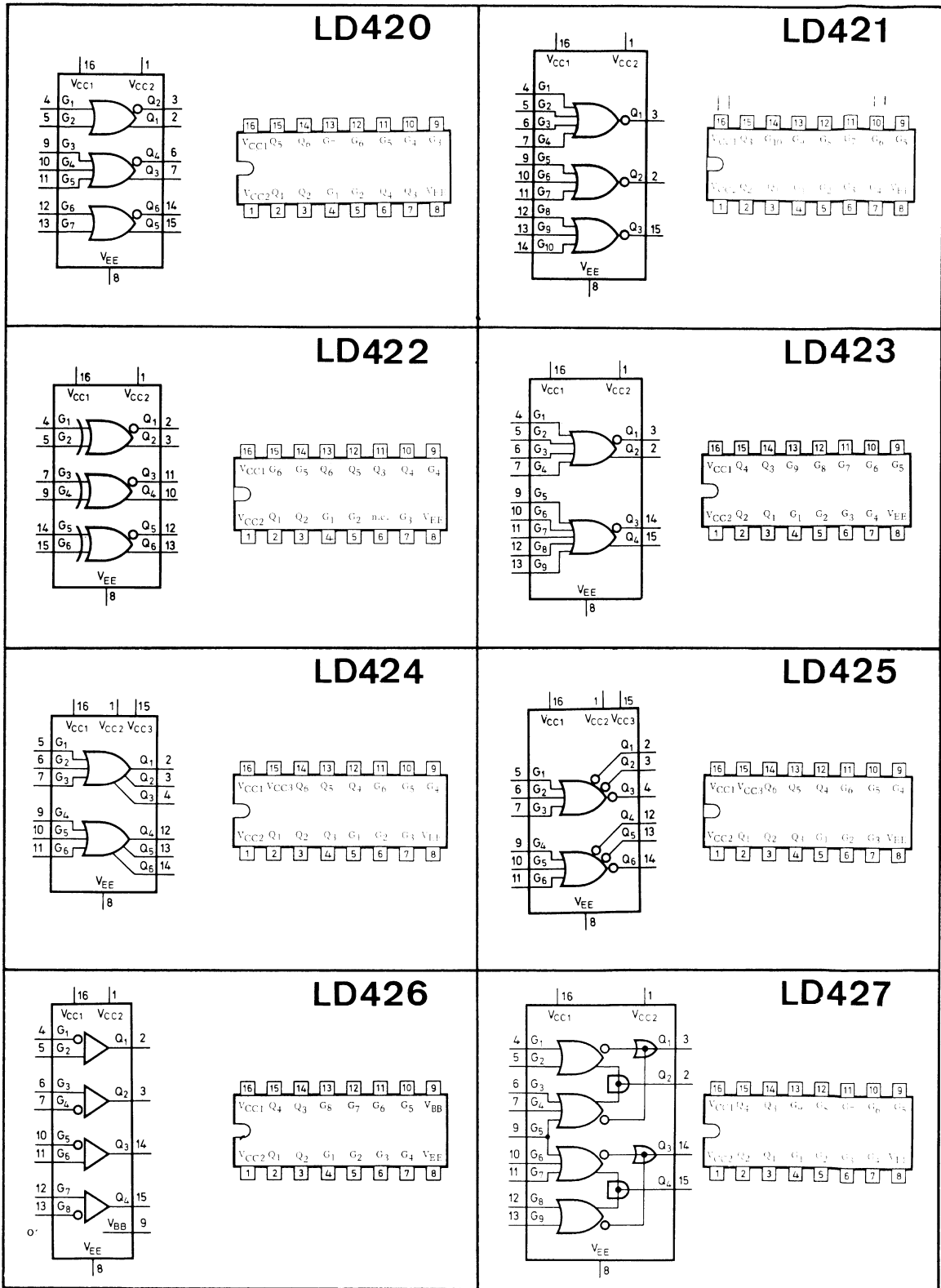
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



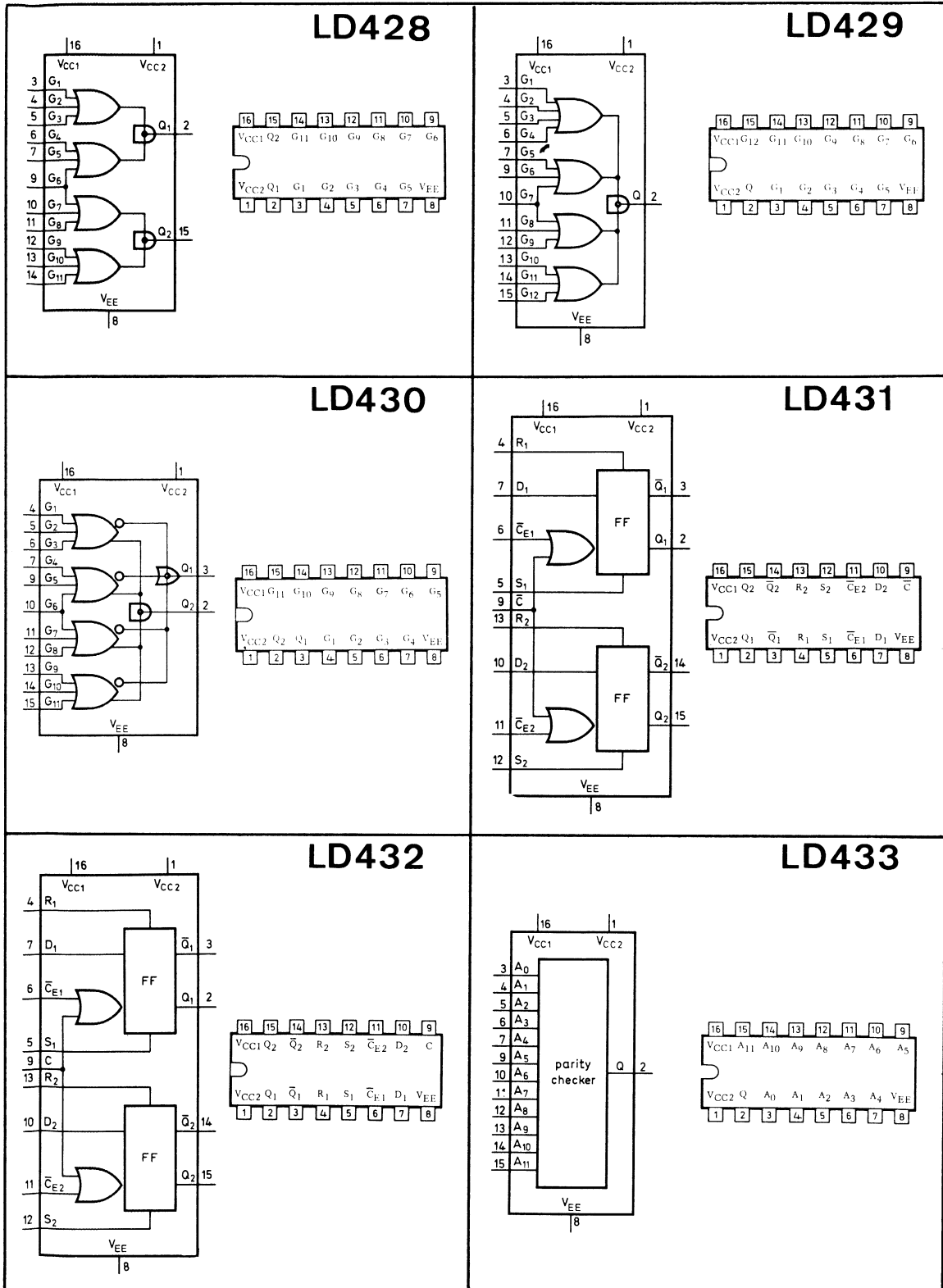
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



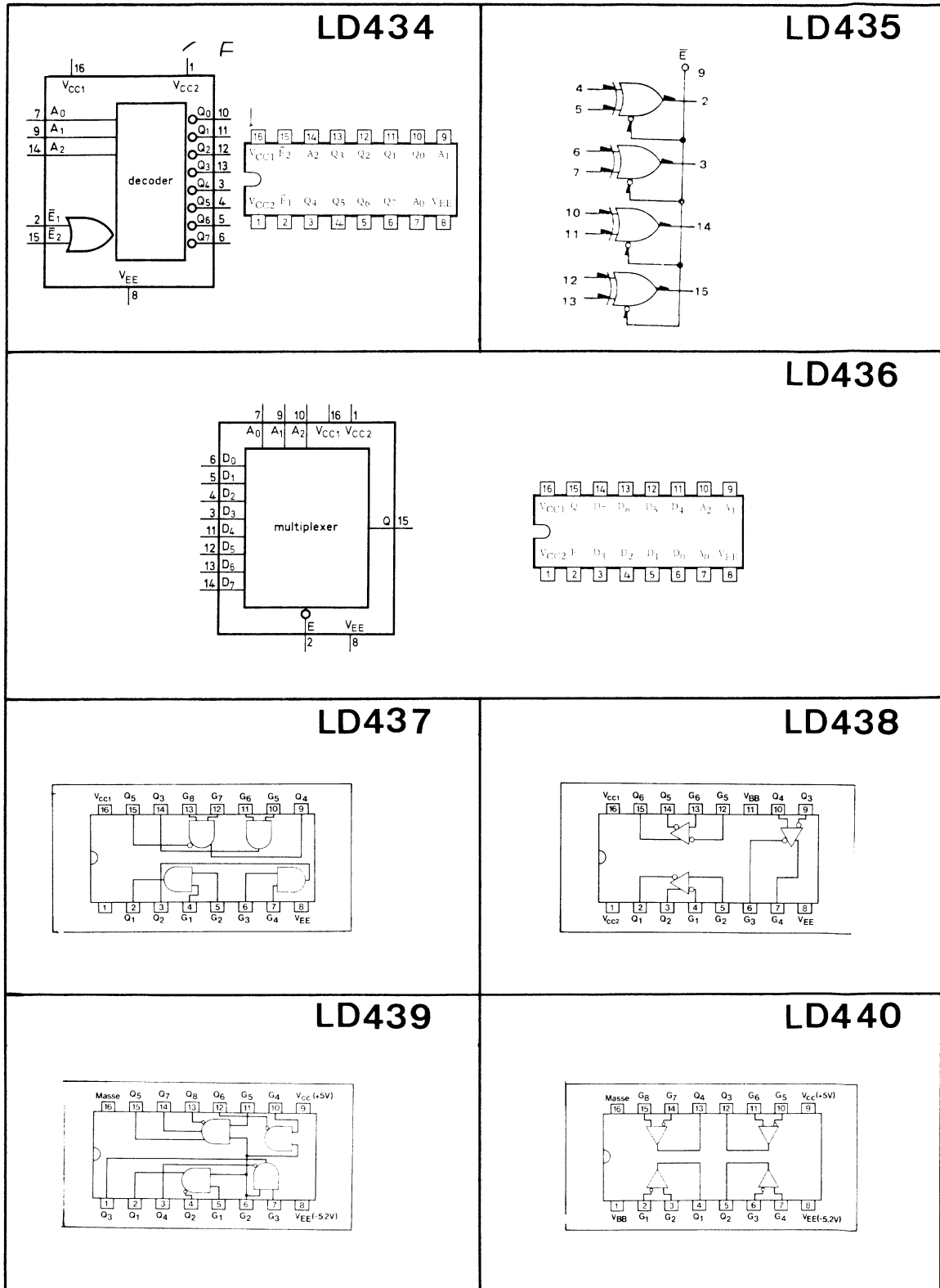
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



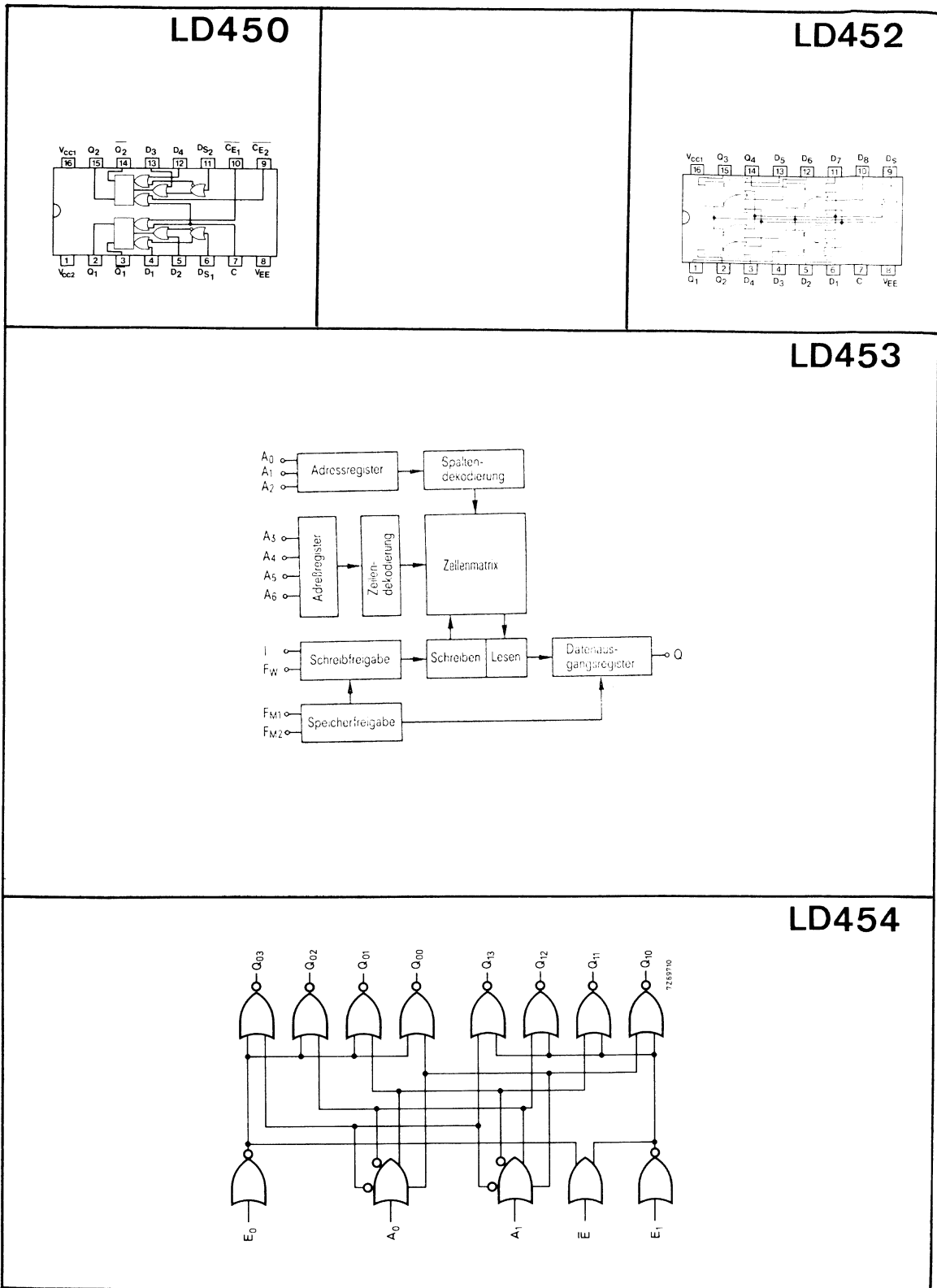
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



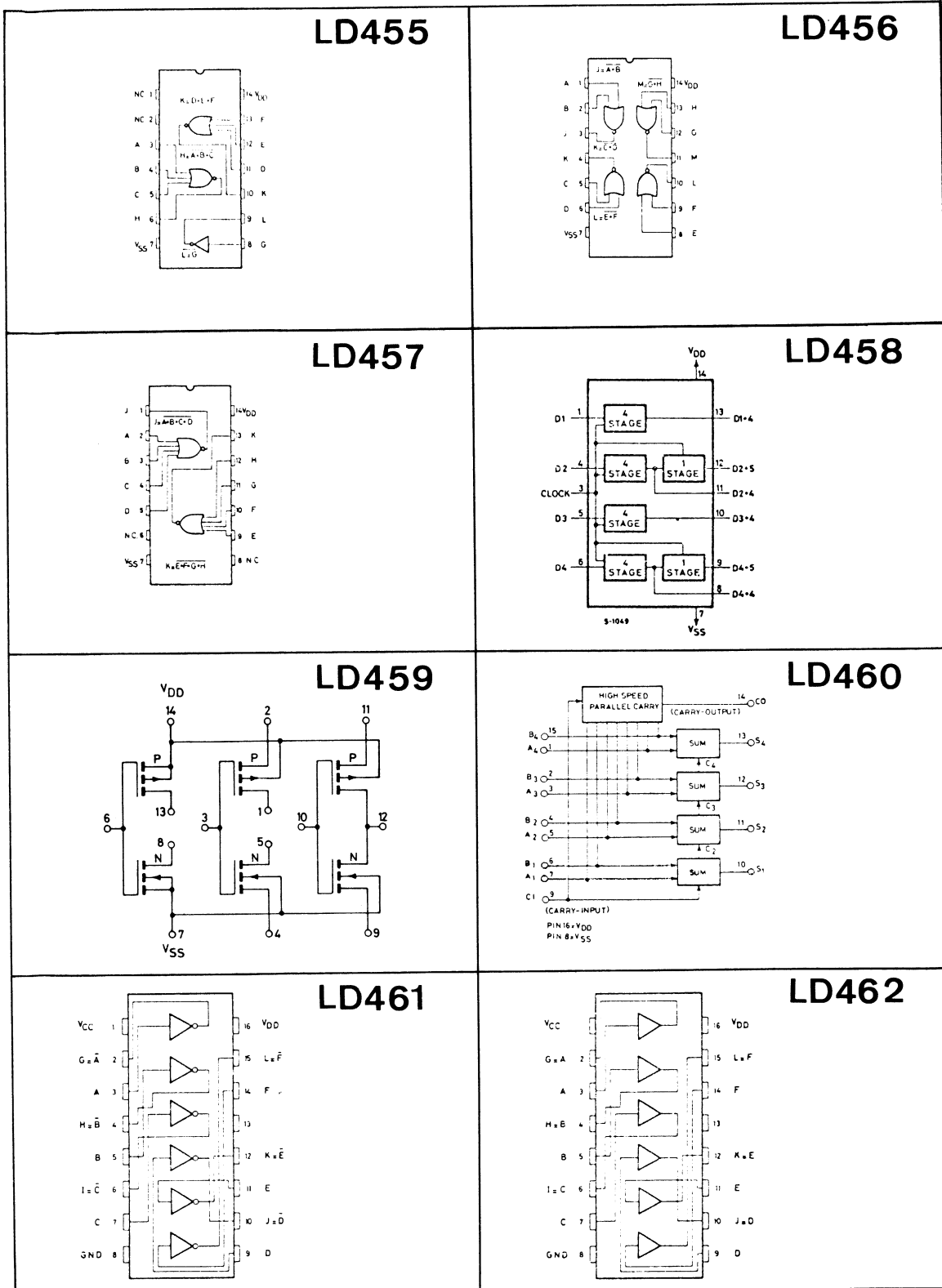
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

<p style="text-align: center;">LD441</p>	<p style="text-align: center;">LD442</p>	
<p style="text-align: center;">LD443</p>	<p style="text-align: center;">LD444</p>	
<p style="text-align: center;">LD445</p>	<p style="text-align: center;">LD446</p>	
<p style="text-align: center;">LD447</p>	<p style="text-align: center;">LD448</p>	<p style="text-align: center;">LD449</p>

LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

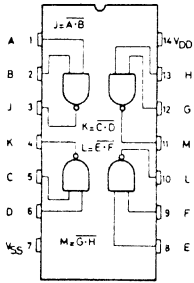


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

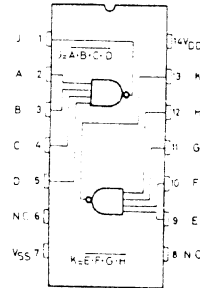


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

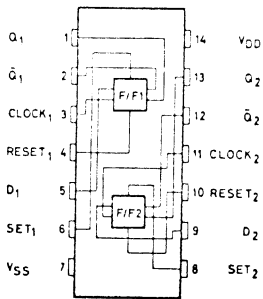
LD463



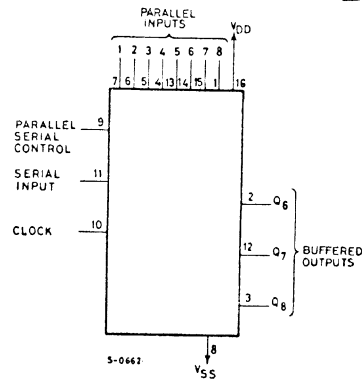
LD464



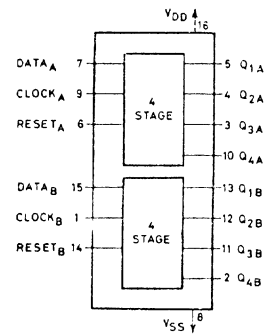
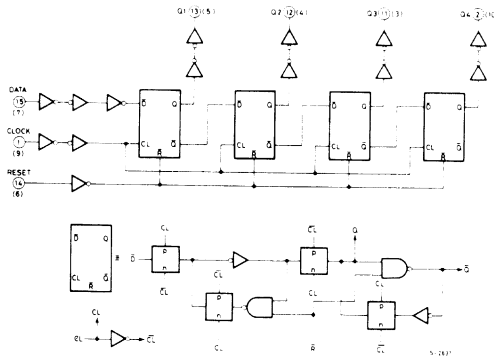
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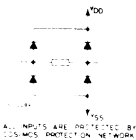
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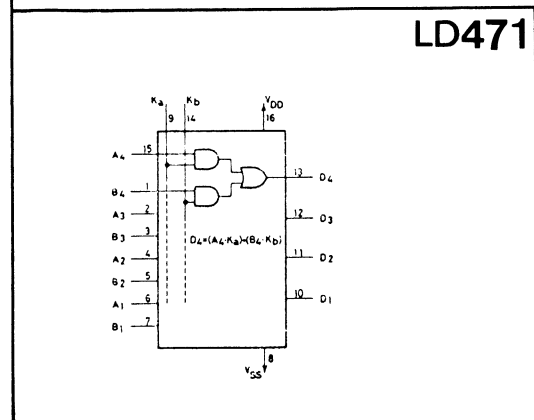
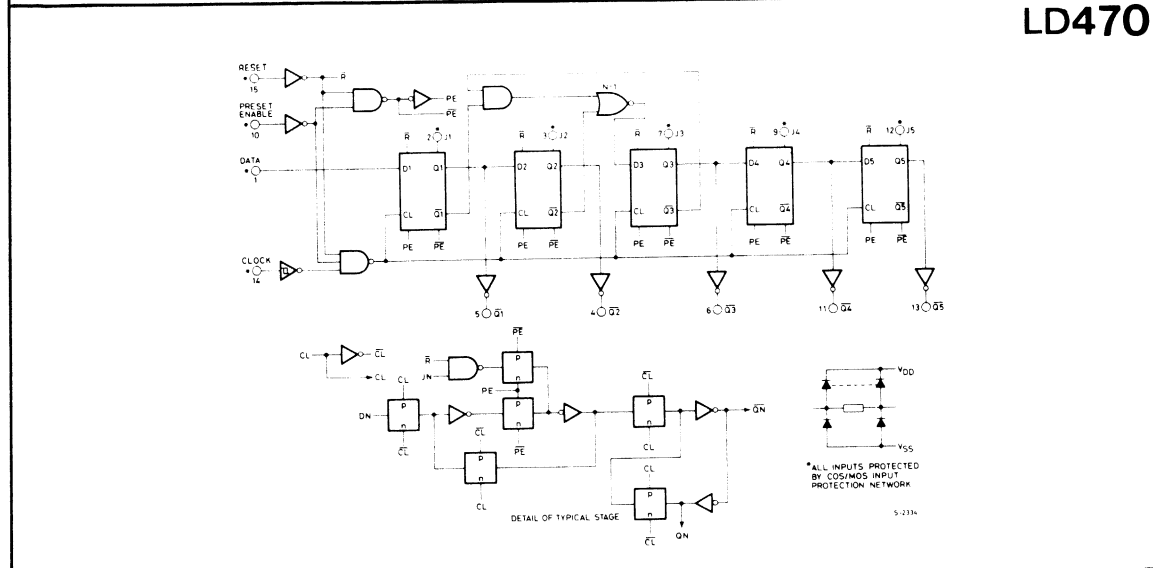
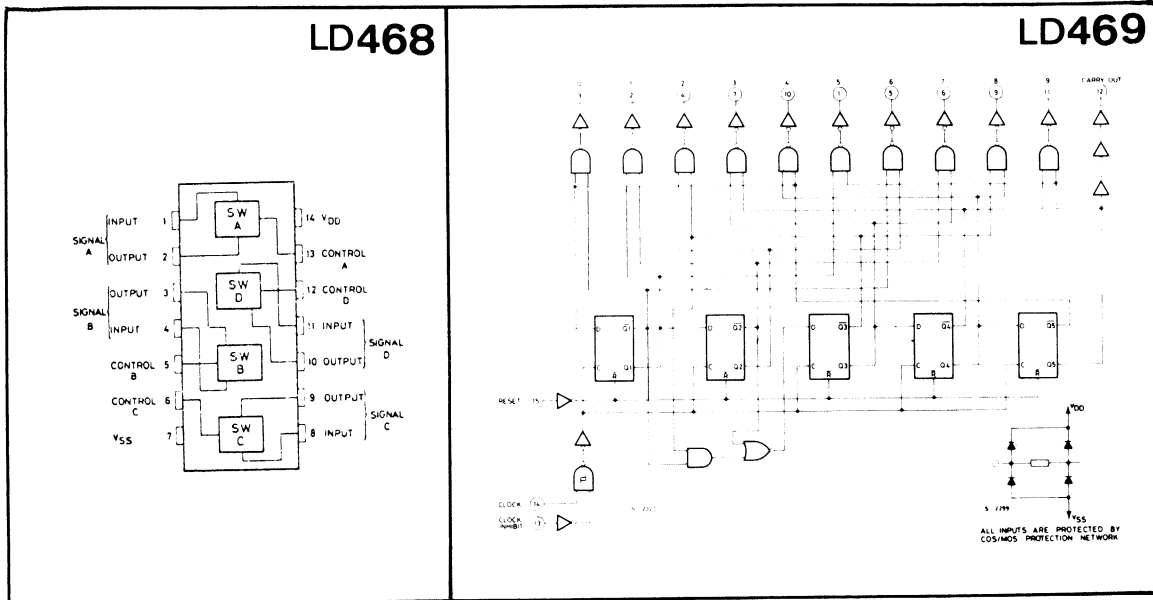
LD467



CL	D	R	Q _i	Q _n
	0	0	0	Q _{n-1}
	1	0	1	Q _{n-1}
	X	0	Q _i	Q _{n-1} (No change)
X	X	1	0	0

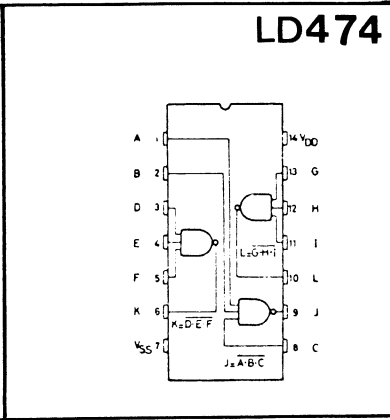


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

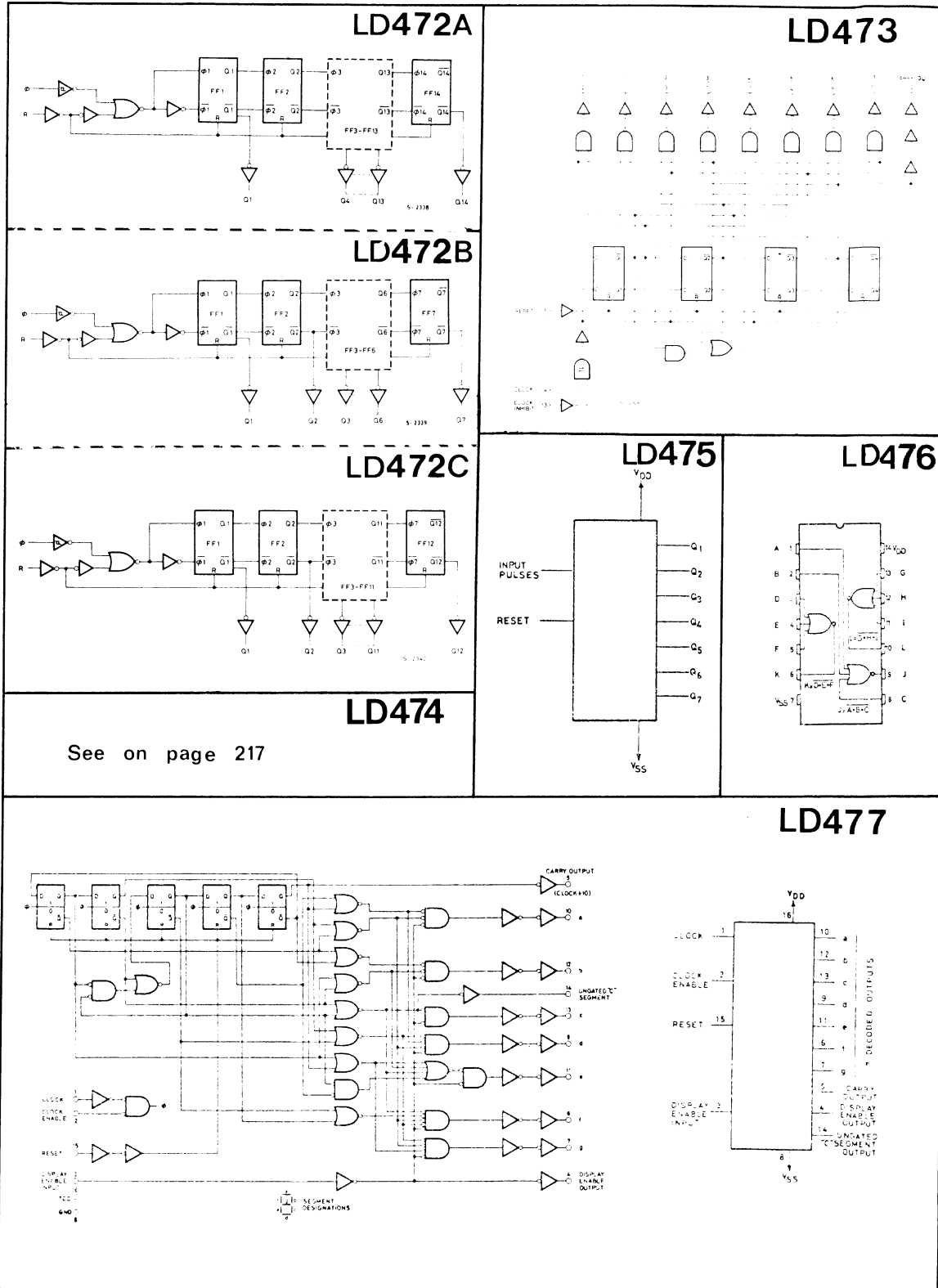


LD472 LD473

See on
page 218

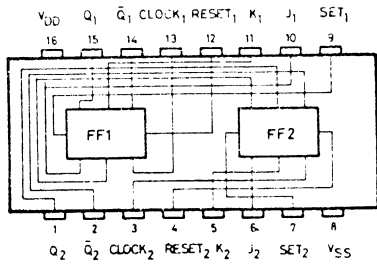


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

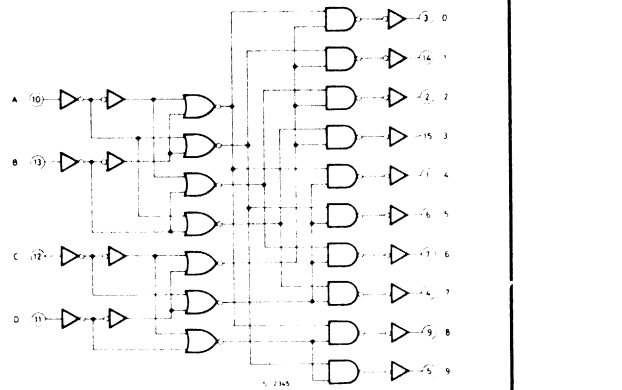


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

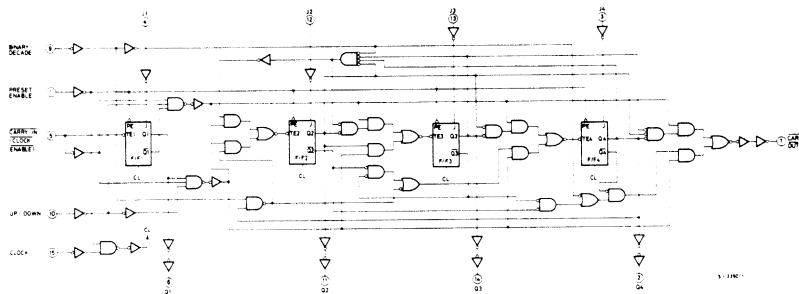
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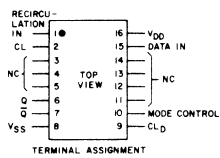
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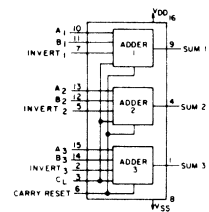
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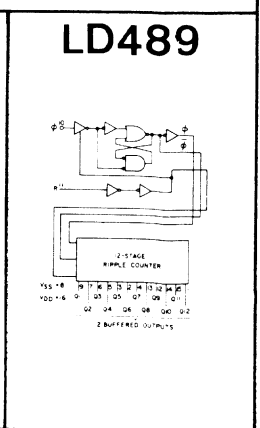
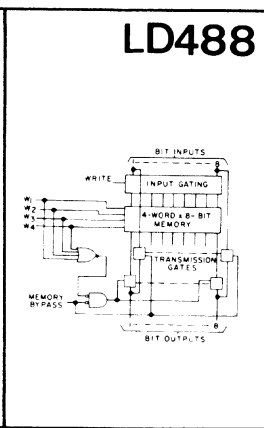
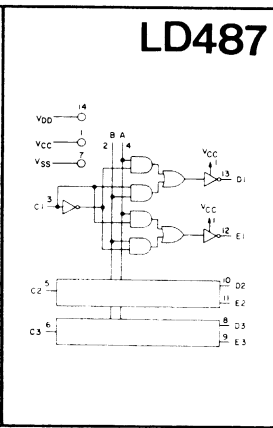
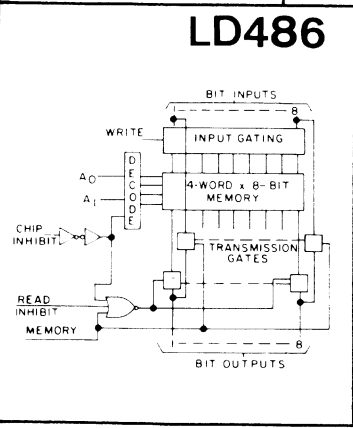
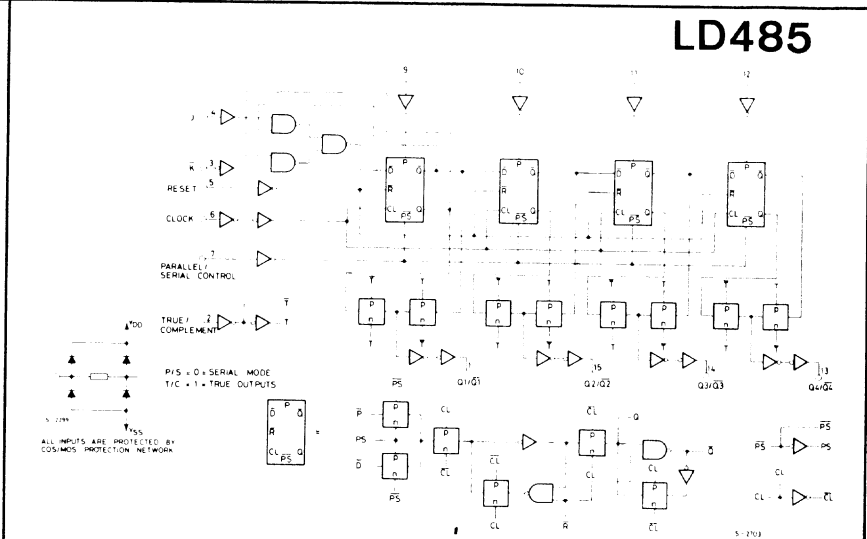
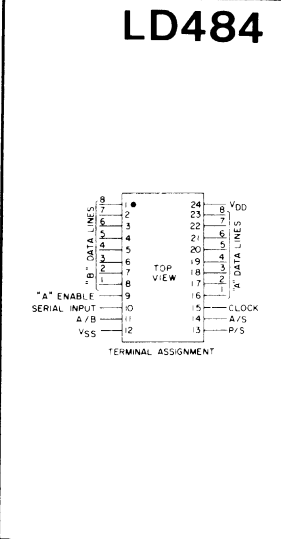
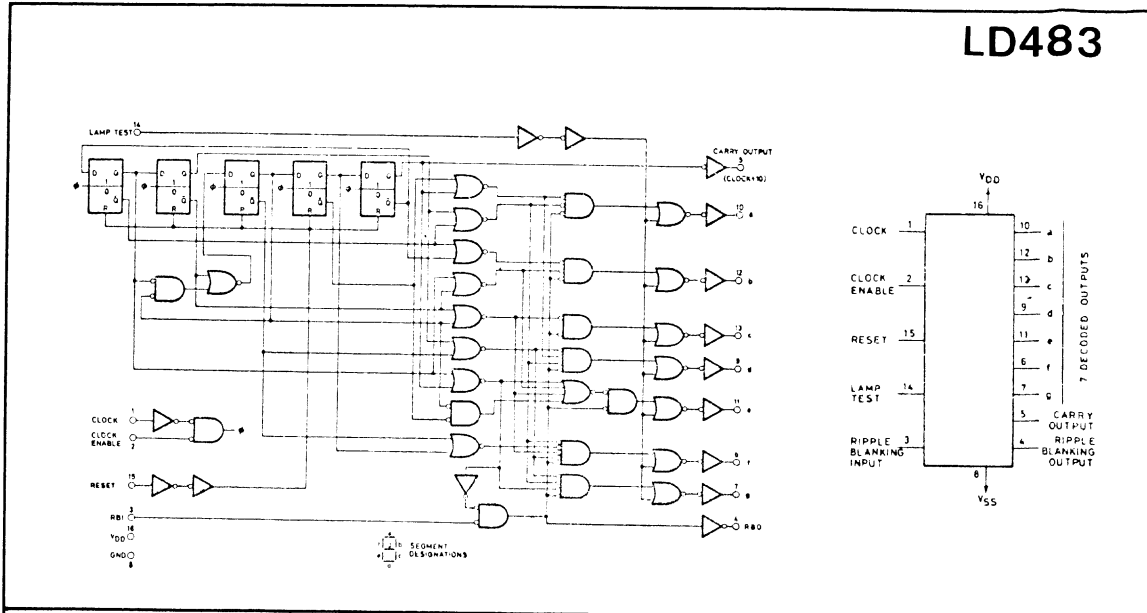
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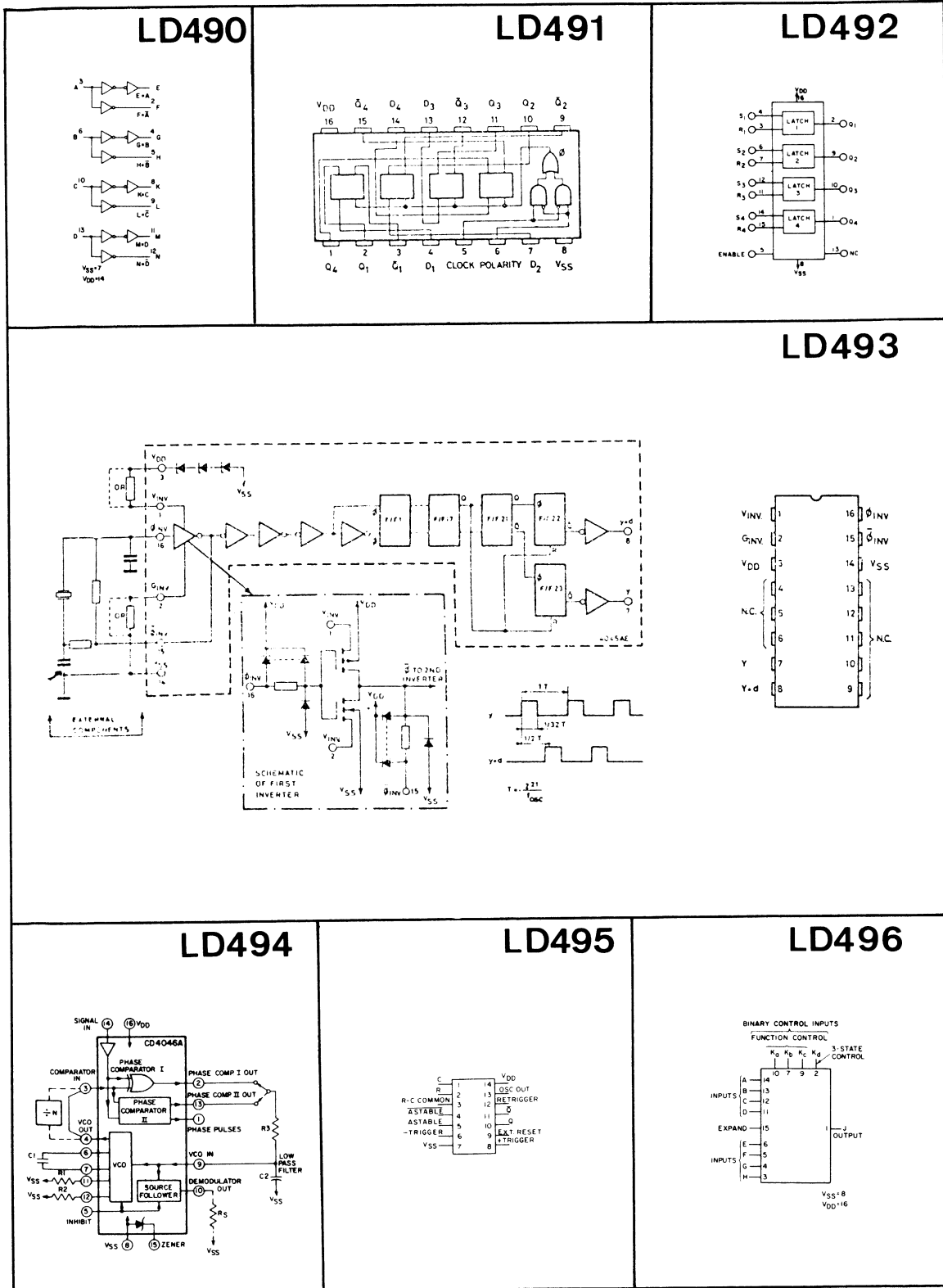
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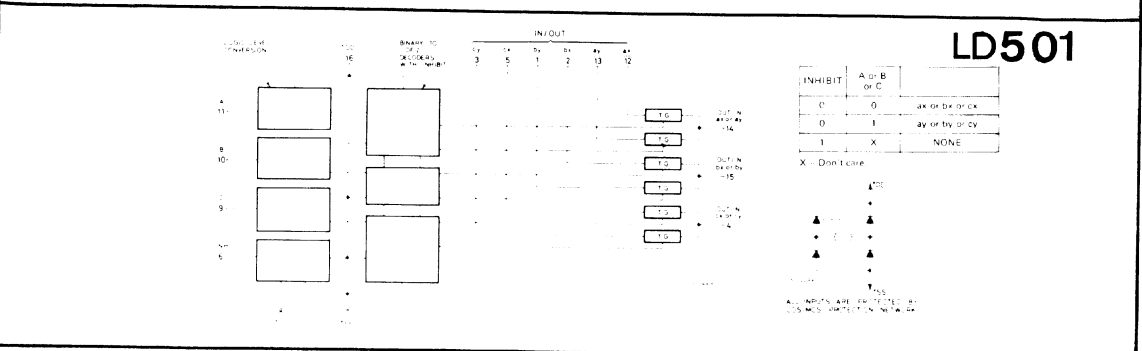
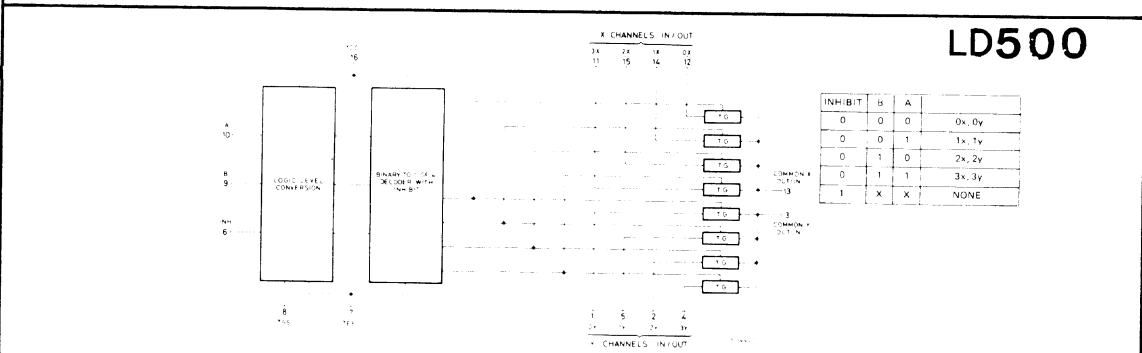
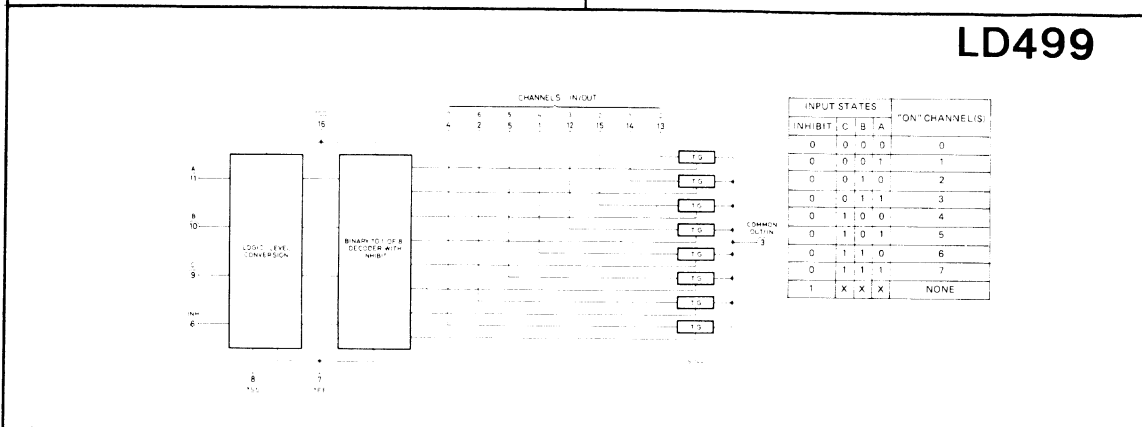
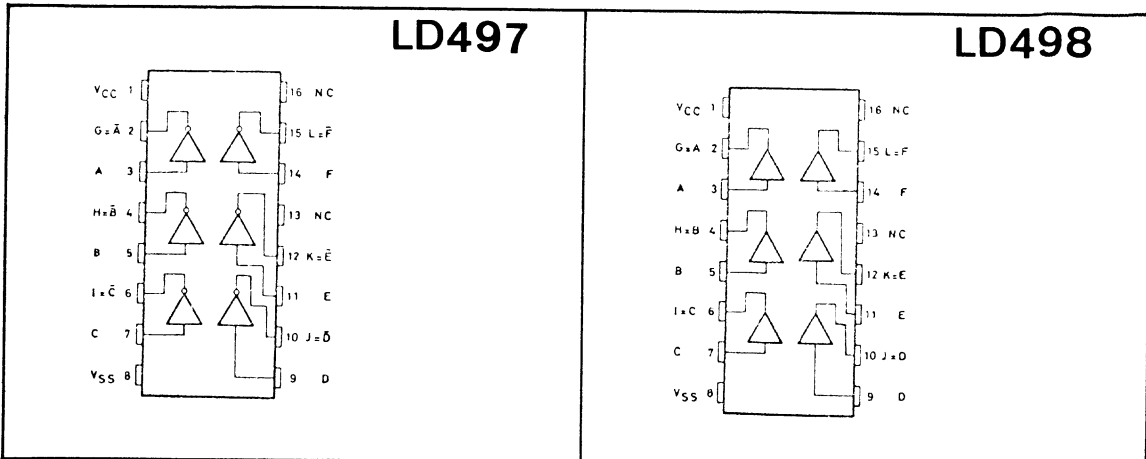
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



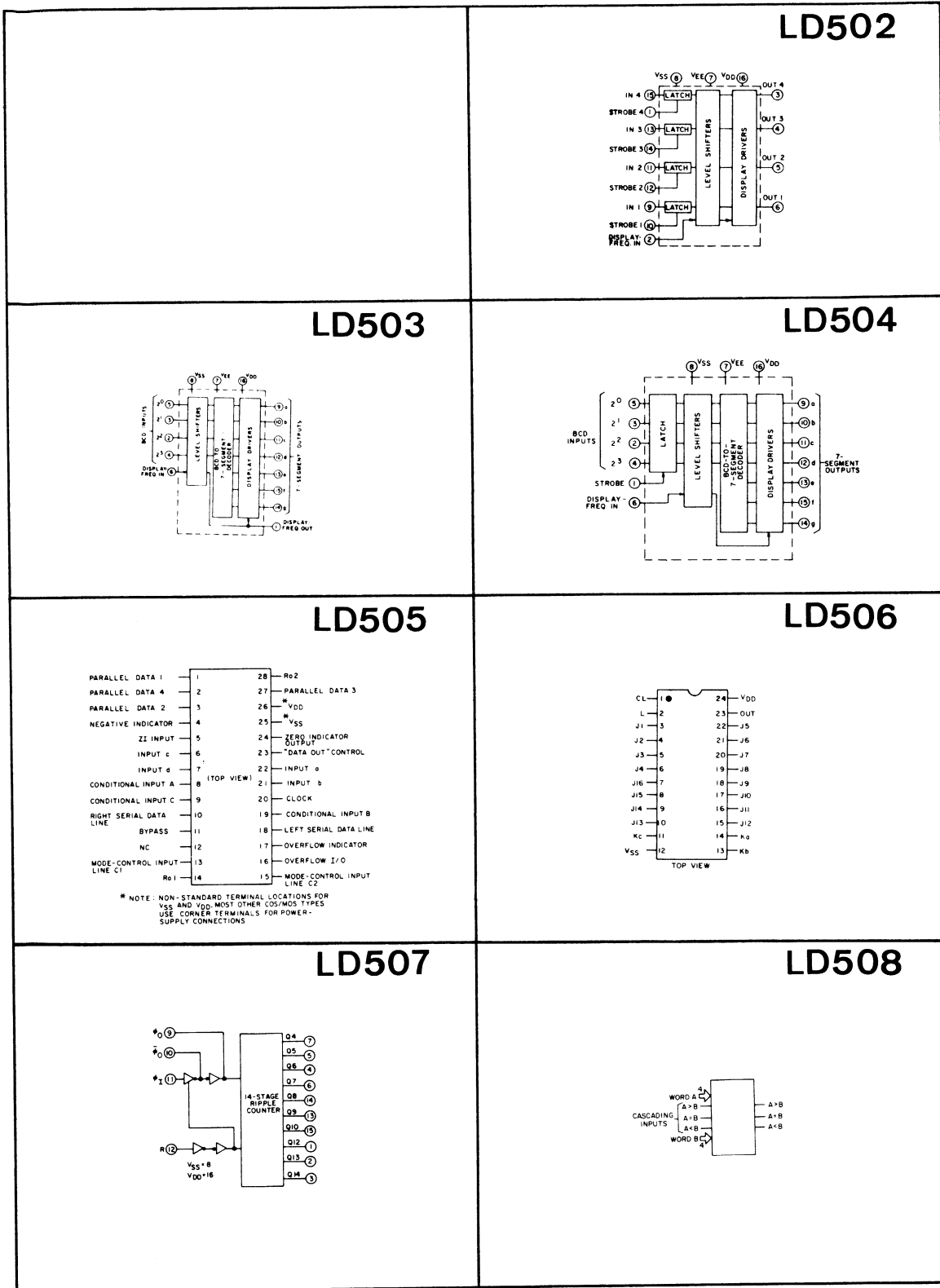
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



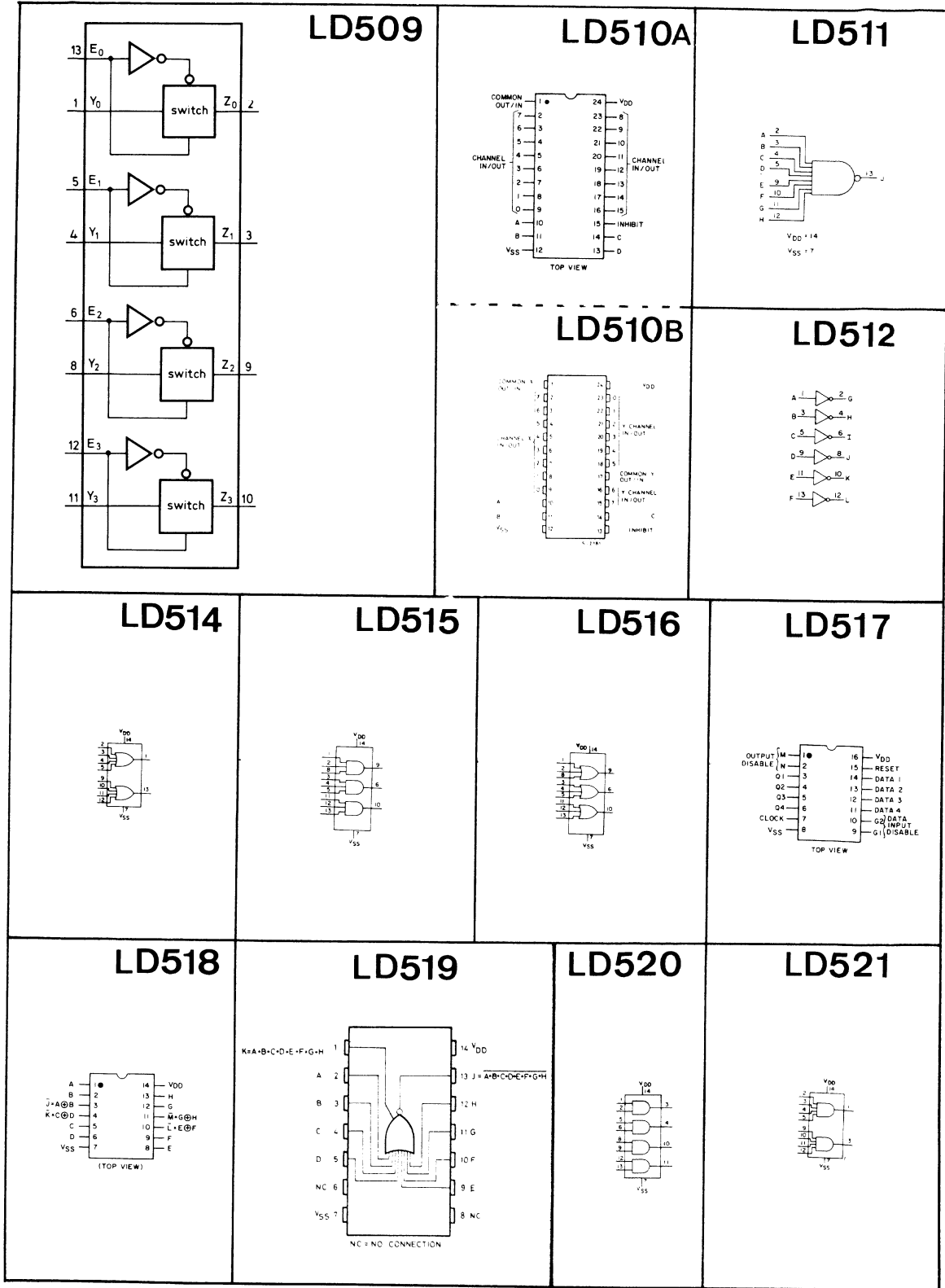
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



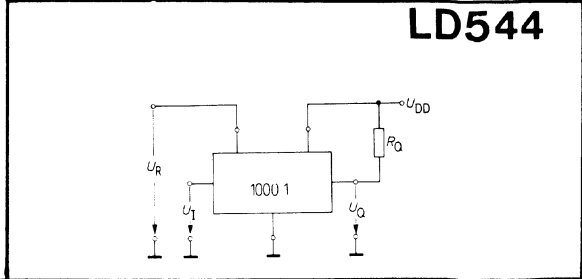
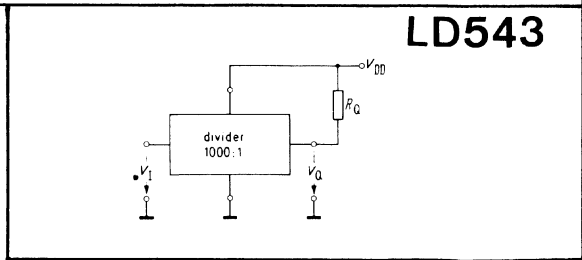
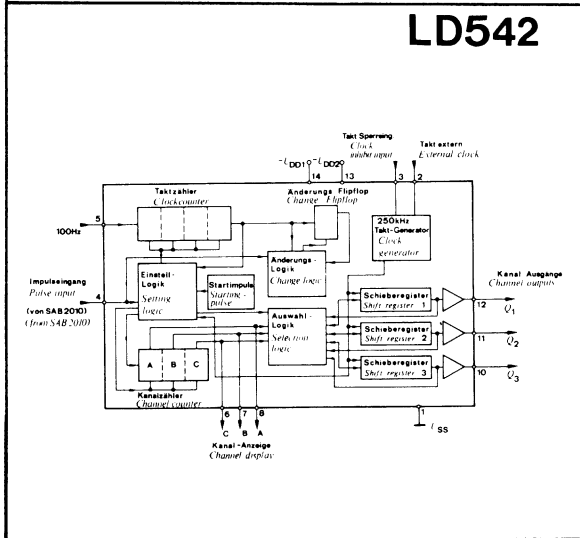
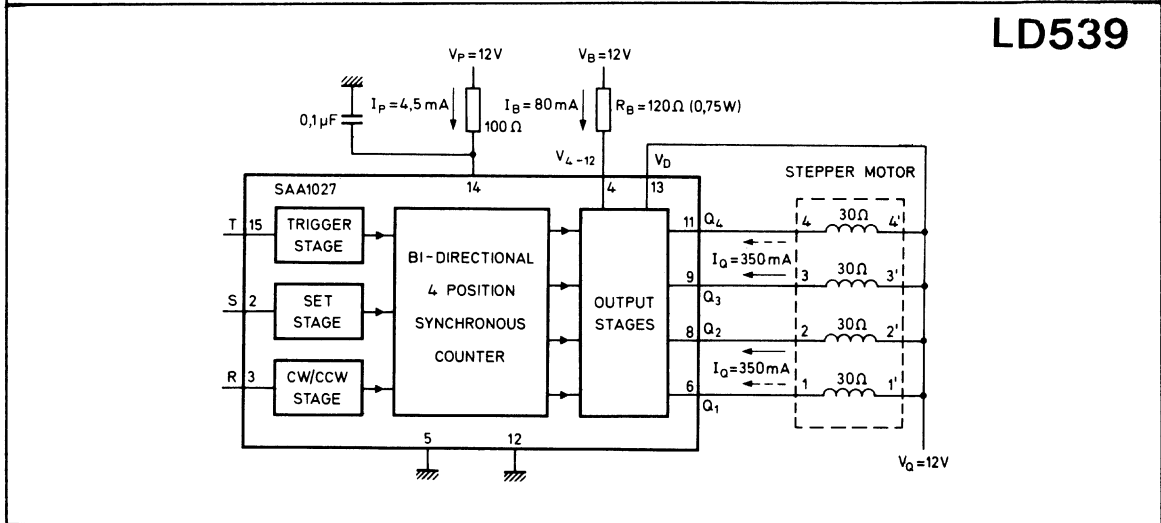
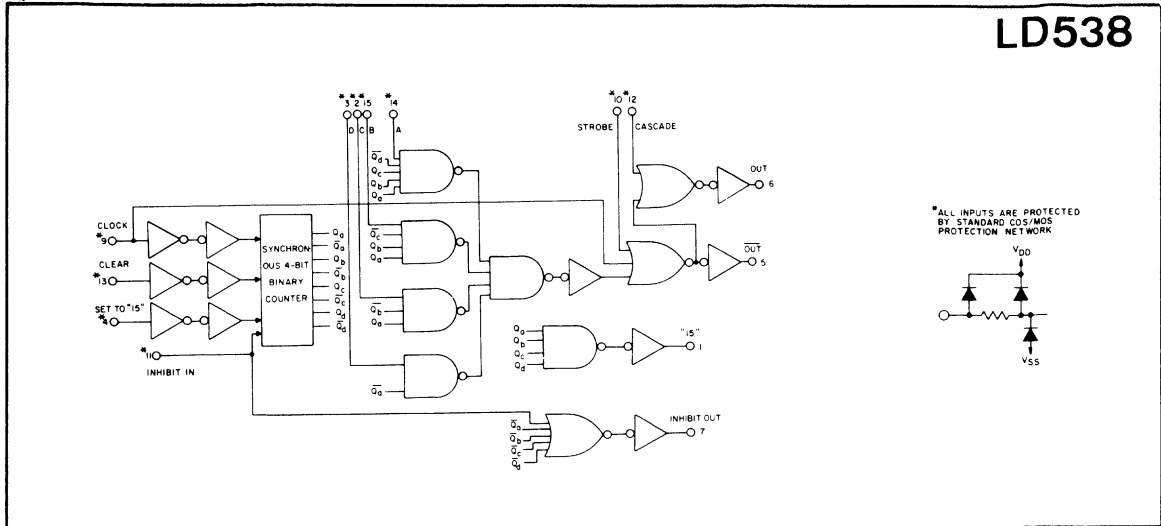
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

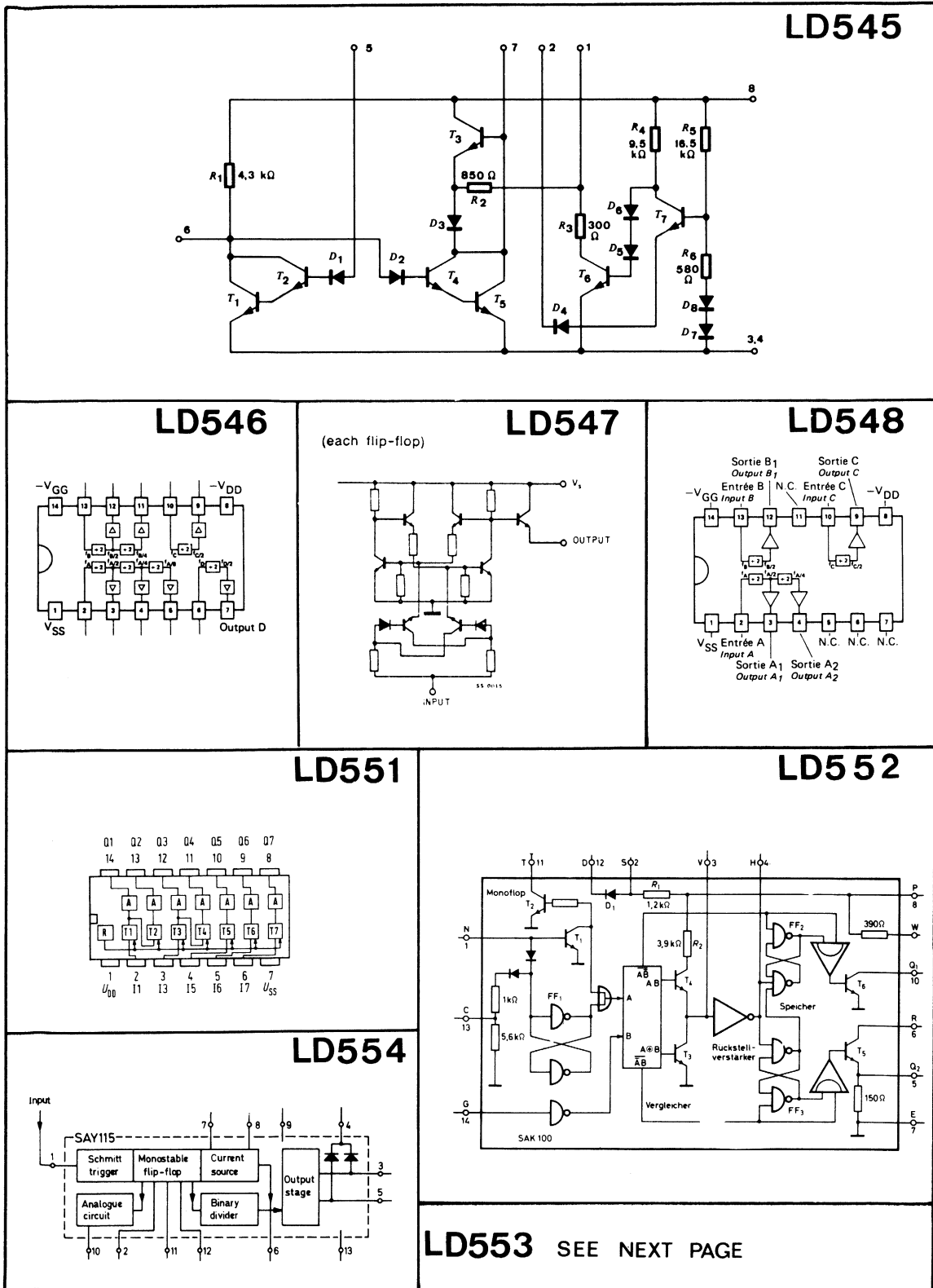


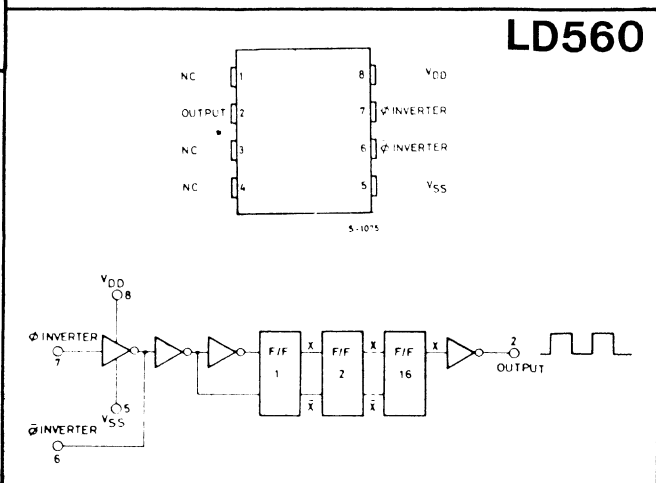
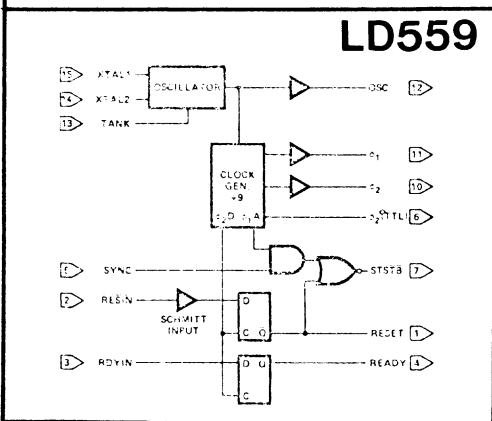
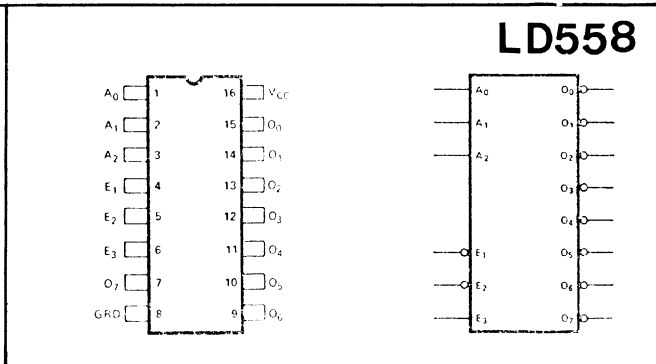
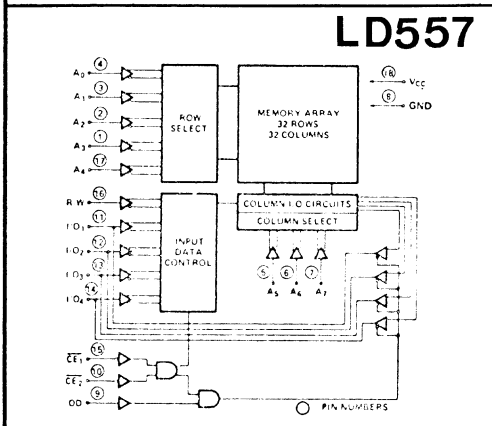
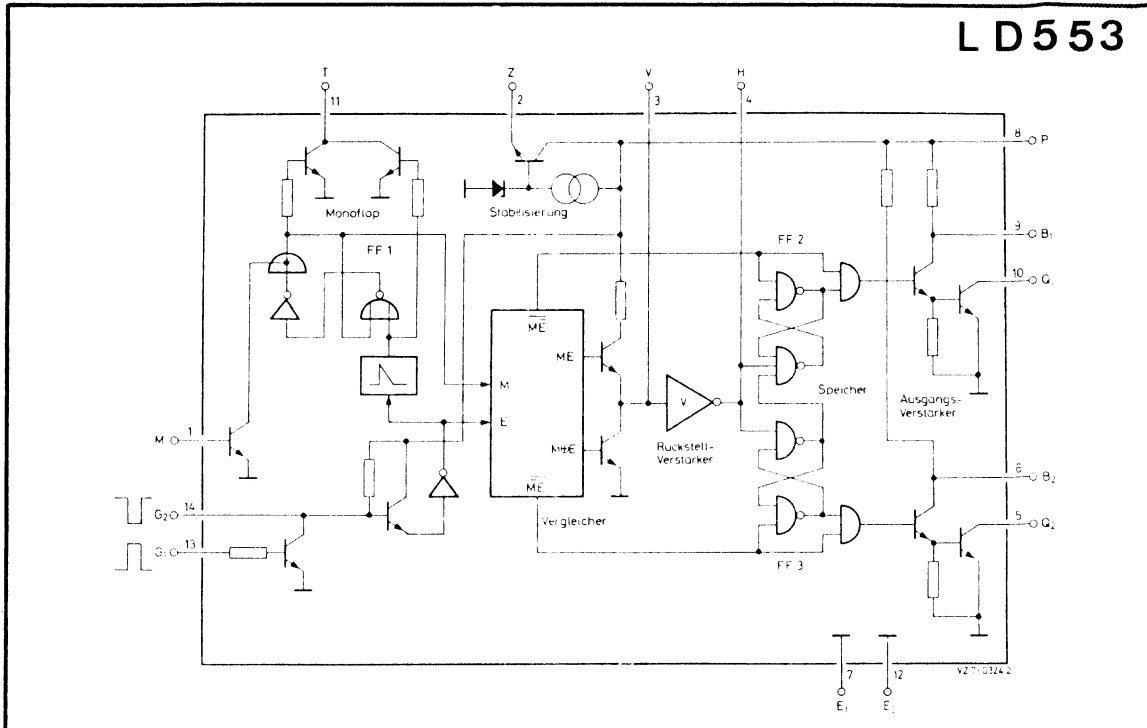
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

<p>LD522</p> <p>INHIBIT 10 A1 1 B1 2 C1 13 E1 3</p> <p>INHIBIT 2 11 A2 3 B2 5 C2 12 E2 4</p> <p>$E = \text{INHIBIT} + AB + CD$ LOGIC 1 = HIGH LOGIC 0 = LOW</p> <p>$J = \text{INH} + \text{ENABLE} + AB + CD + EF + GH$</p>	<p>LD523</p> <p>INHIBIT/EXP A B C D E F G H ENABLE/EXP</p> <p>LOGIC 1 = HIGH LOGIC 0 = LOW</p> <p>$J = \text{INH} + \text{ENABLE} + AB + CD + EF + GH$</p>	<p>LD524</p> <p>J + A + B K + C + D</p> <p>VDD VSS</p>	<p>LD525</p> <p>SERIAL OUTPUTS Q5 Q8</p> <p>8-STAGE SHIFT REGISTER 8-BIT STORAGE REGISTER 3-STATE OUTPUTS</p> <p>DATA CLOCK STROBE OUTPUT ENABLE</p> <p>PARALLEL OUTPUTS Q1-Q8</p>
<p>LD526</p> <p>SET J1 K1 RESET</p> <p>Q Q-bar</p> <p>() for HCC4096</p>	<p>LD527</p> <p>24 VDD 23 0 22 1 21 2 20 3 19 4 18 5 17 COMMON Y OUT/IN 16 6 15 7 14 C 13 INHIBIT 12 VSS</p> <p>COMMON X OUT/IN 7 2 6 3 5 4 4 5 3 6 2 7 1 8 0 9 A 10 B 11 VSS 12</p> <p>Y CHAN IN/OUT 23 0 22 1 21 2 20 3 19 4 18 5 17 COMMON Y OUT/IN 16 6 15 7 14 C 13 INHIBIT 12 VSS</p> <p>TOP VIEW</p>	<p>LD528</p> <p>WRITE DISABLE DATA RESET</p> <p>Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7</p>	<p>LD529</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p> <p>TOP VIEW</p>
<p>LD530</p> <p>24 VDD 23 0 22 1 21 2 20 3 19 4 18 5 17 COMMON Y OUT/IN 16 6 15 7 14 C 13 INHIBIT 12 VSS</p> <p>DATA 1 DATA 2 DATA 3 DATA 4 STROBE INHIBIT</p> <p>S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15</p>	<p>LD531</p> <p>CLOCK A ENABLE A RESET A</p> <p>Q1A Q2A Q3A Q4A</p> <p>CLOCK B ENABLE B RESET B</p> <p>Q1B Q2B Q3B Q4B</p>	<p>LD532</p> <p>SA SB</p> <p>Q1A Q2A Q3A Q4A</p> <p>Q1B Q2B Q3B Q4B</p> <p>multiplexer</p> <p>Z0 Z1 Z2 Z3</p>	<p>LD533</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p>
<p>LD533</p> <p>PRIORITY SELECT D0 D1</p> <p>Q0 Q1</p> <p>E0 E1</p>	<p>LD534</p> <p>EA EB</p> <p>SA SB</p> <p>dual multiplexer</p> <p>Z0 Z1 Z2 Z3</p>	<p>LD533</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p>	<p>LD534</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p>
<p>LD535</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p>	<p>LD536</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p>	<p>LD537</p> <p>up/down counter</p> <p>CP0 CP1 P0 P1 TC0 TC1</p> <p>O0 O1 O2 O3</p>	<p>LD537</p> <p>16 VDD 15 1 14 0 13 1 12 0 11 1 10 0 9 1 8 VSS 7 0 6 1 5 0 4 1 3 0 2 1 1 0</p>

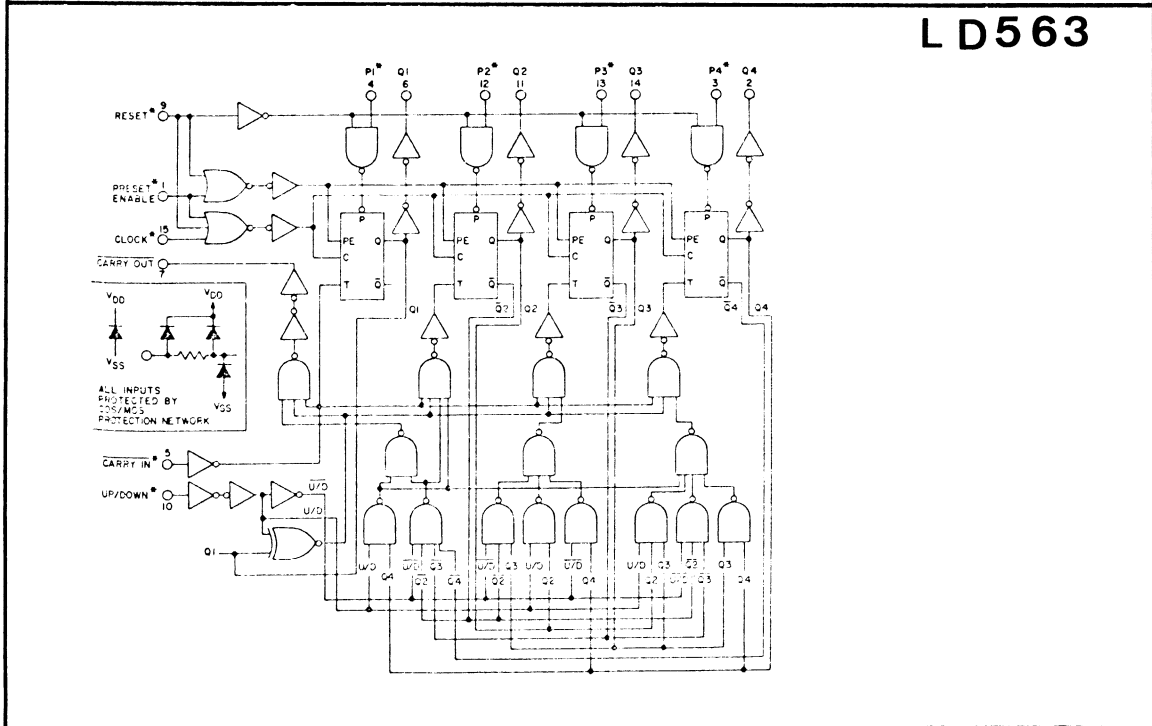
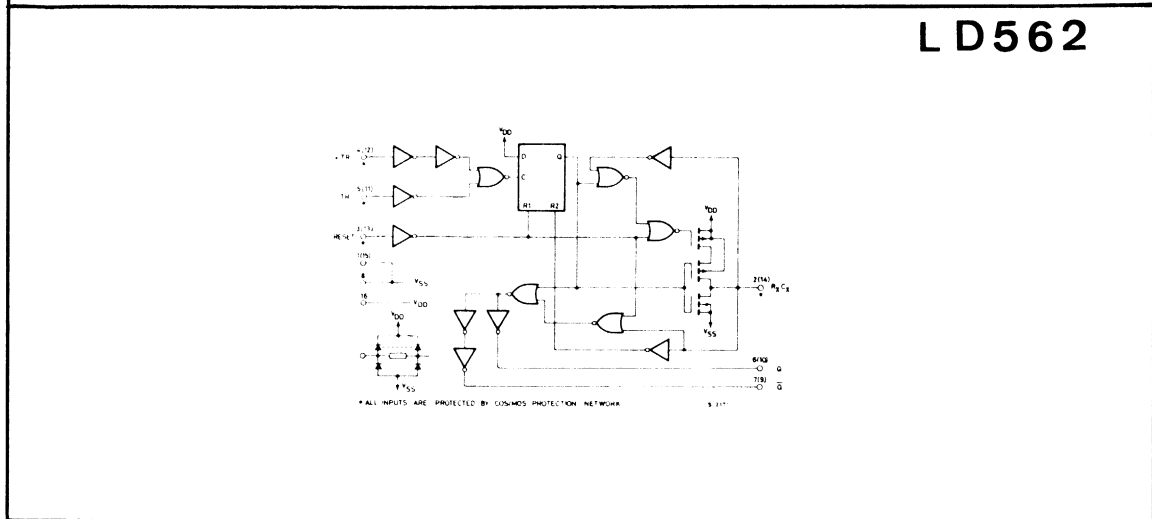
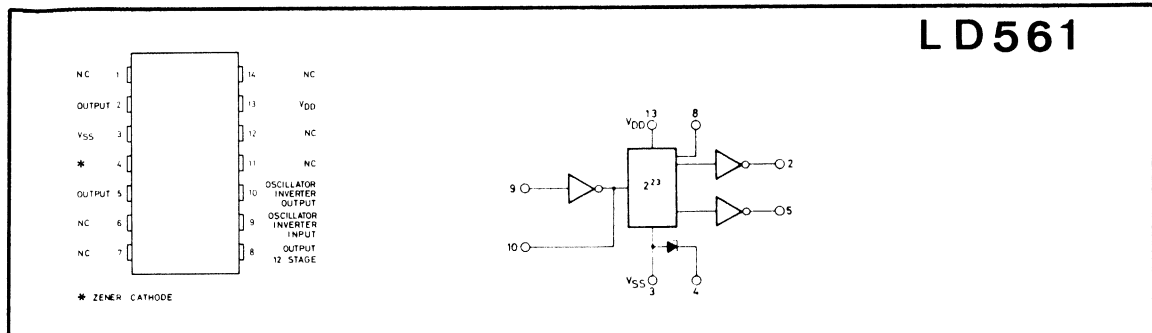
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE





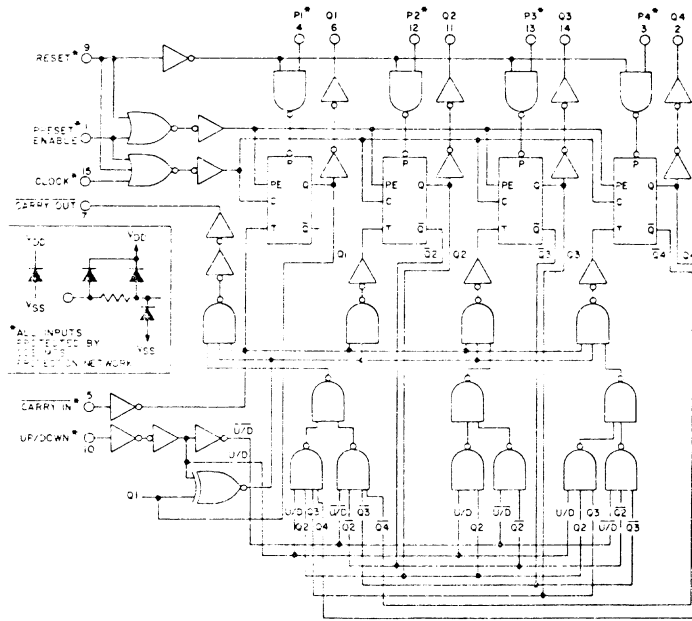


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

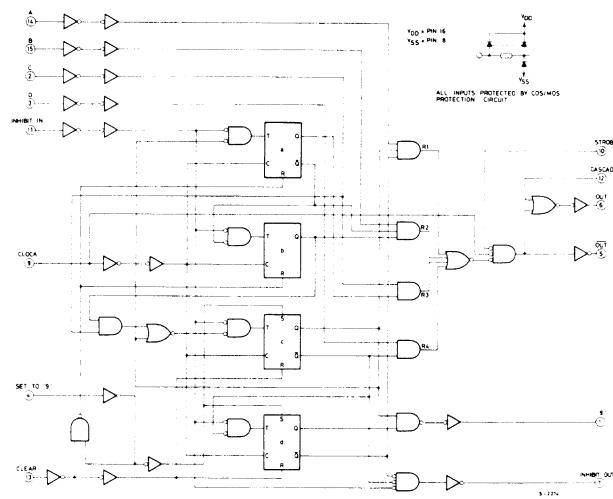


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

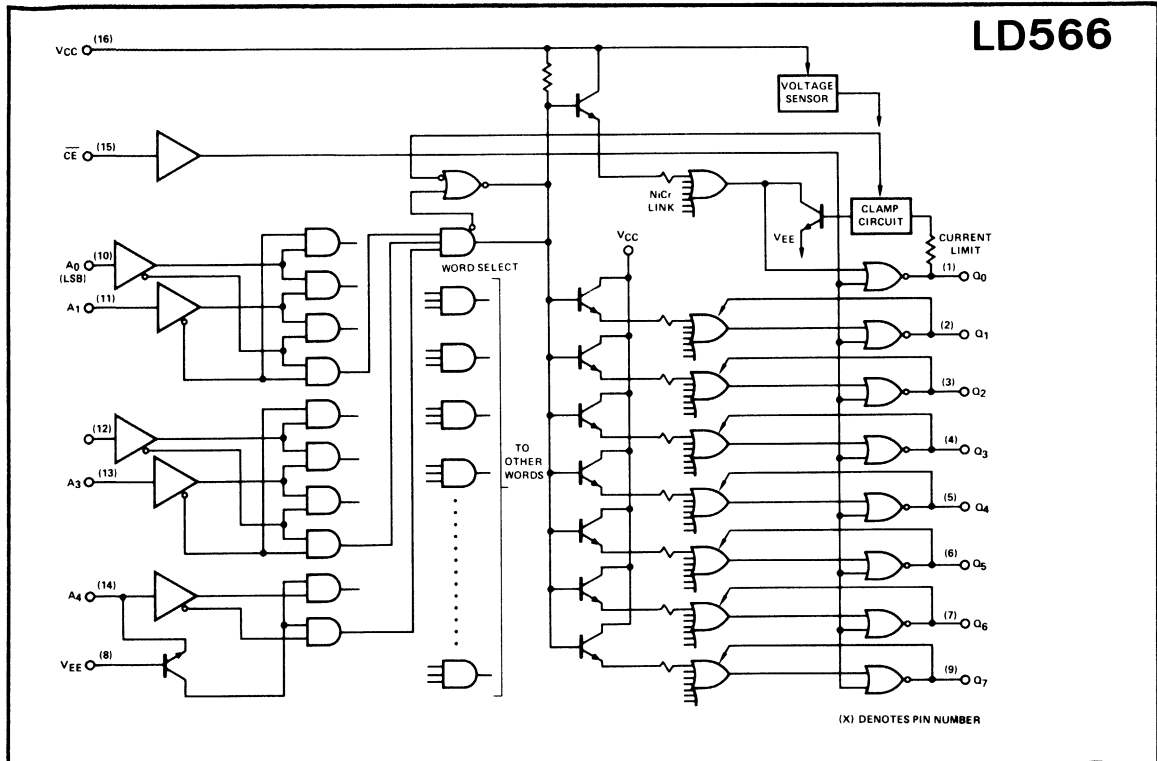
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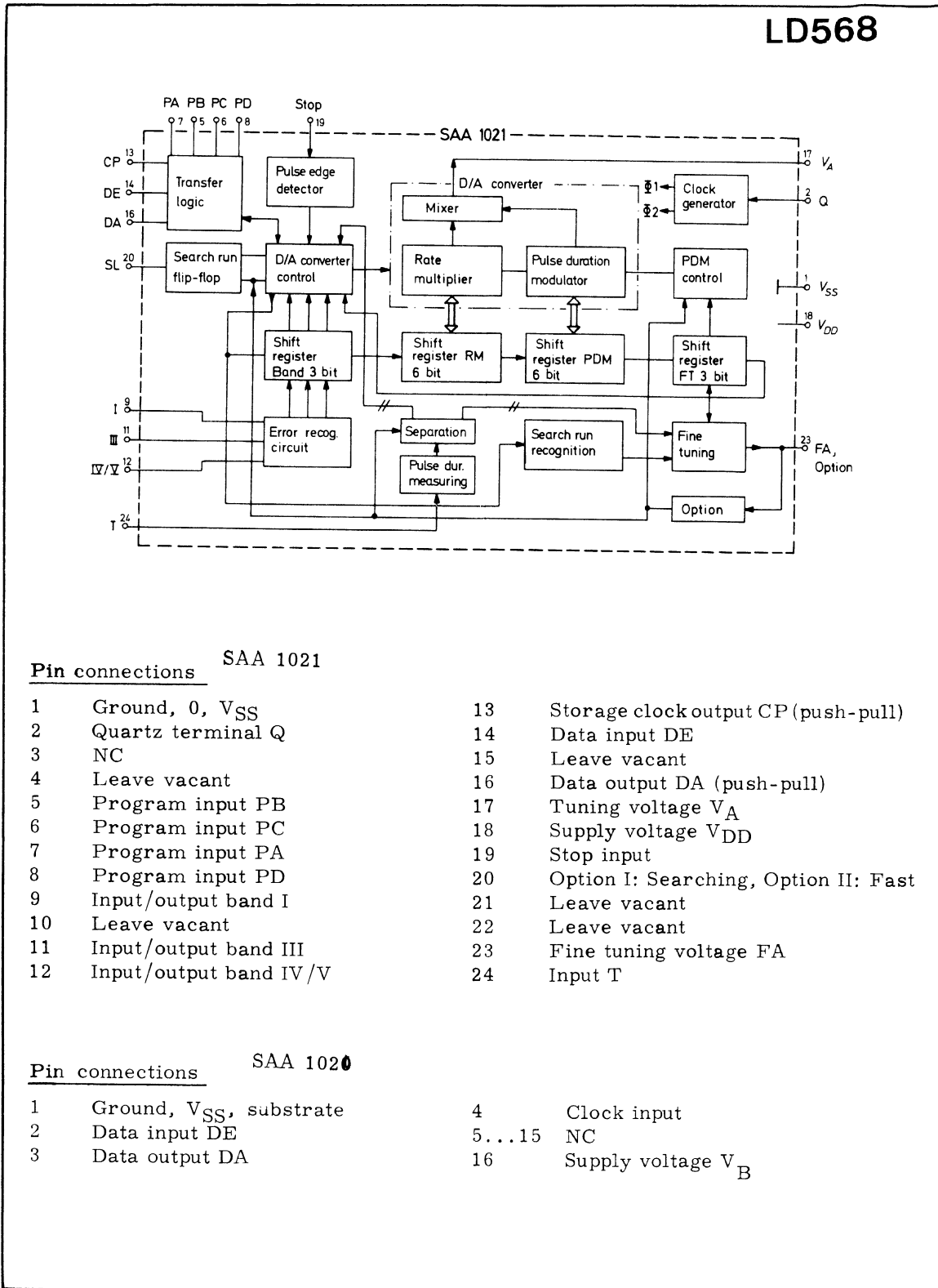


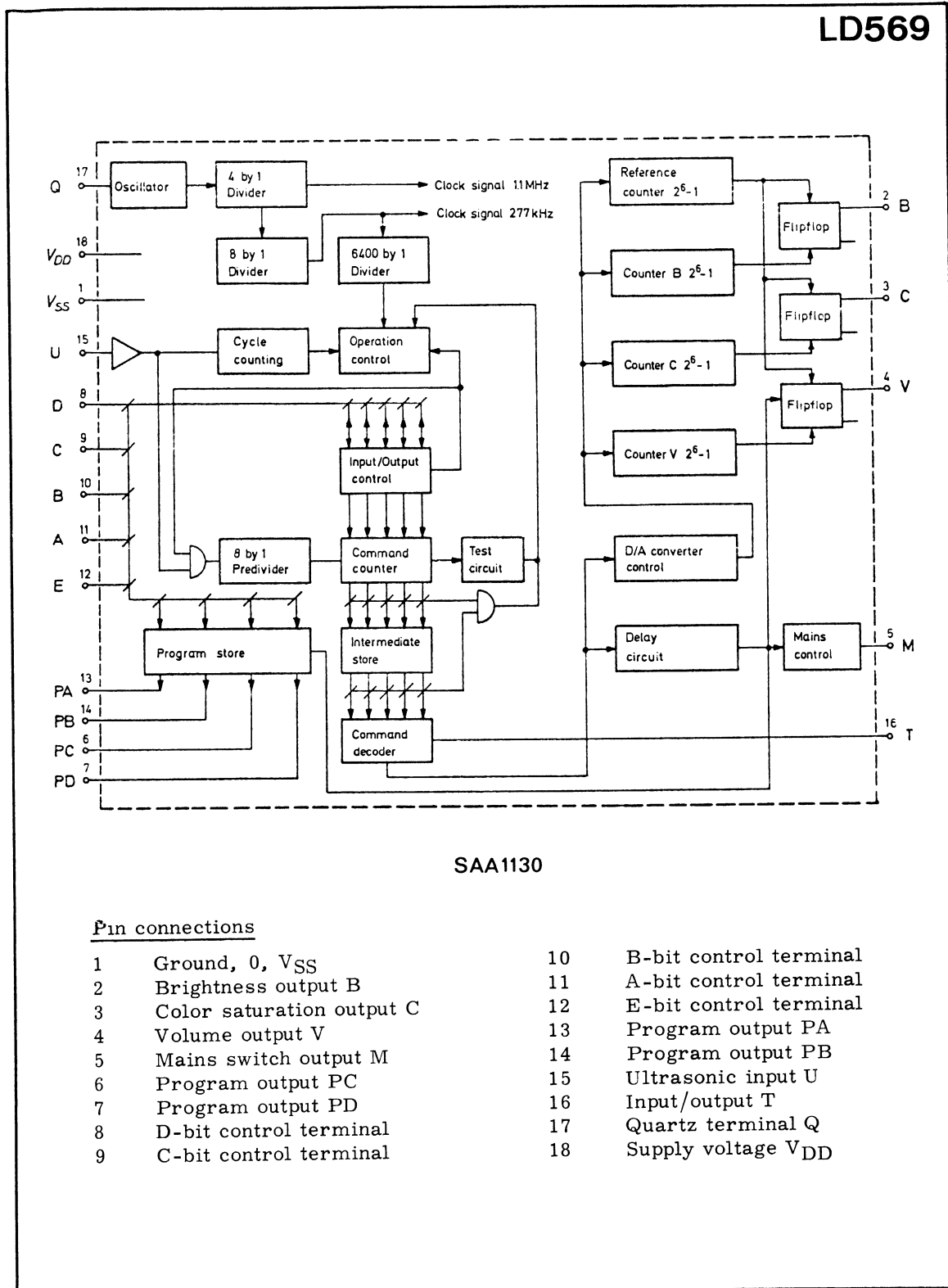
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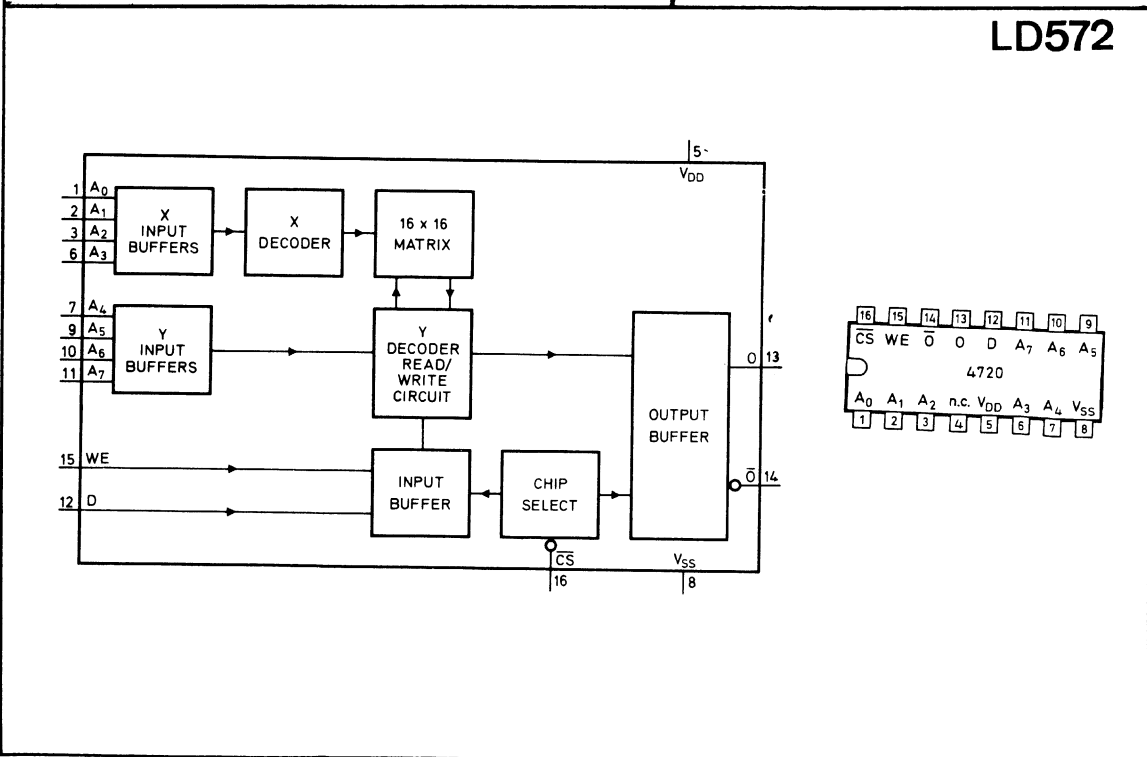
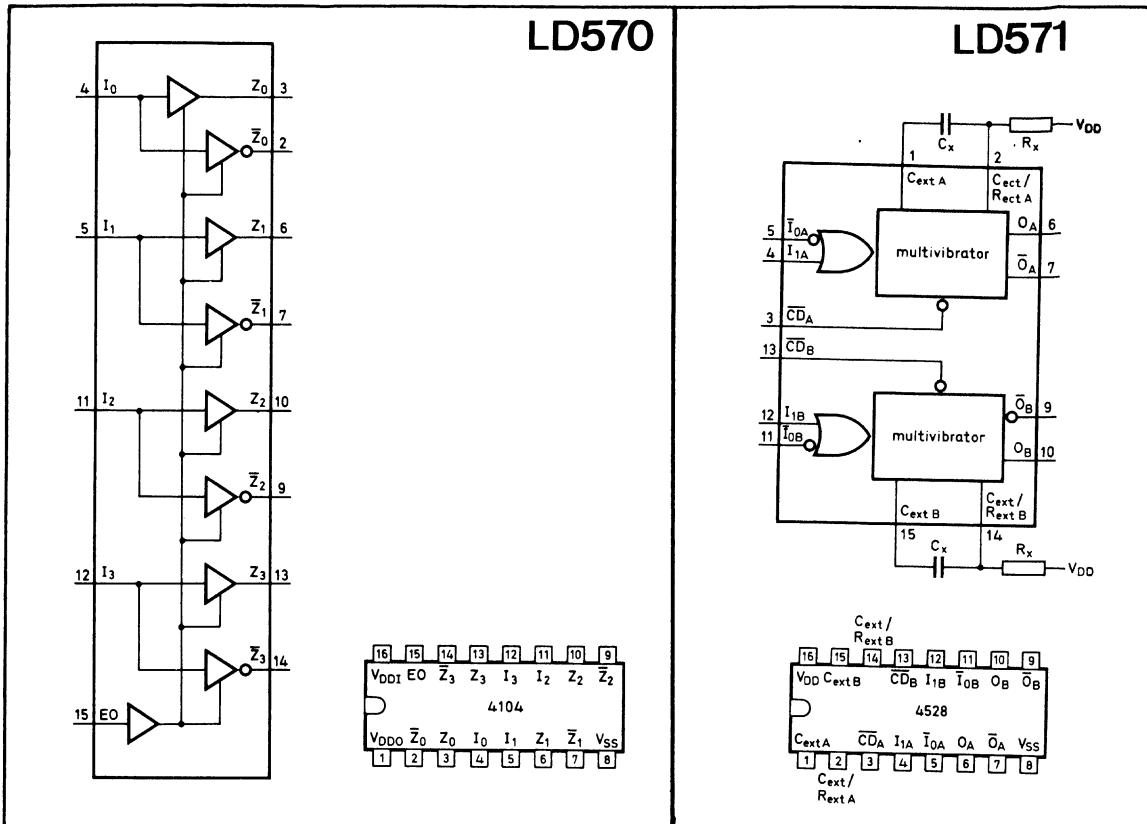
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



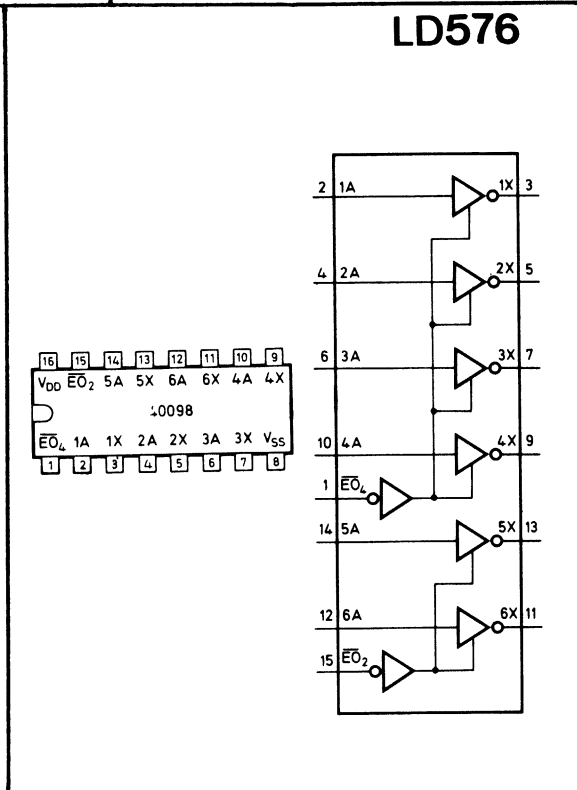
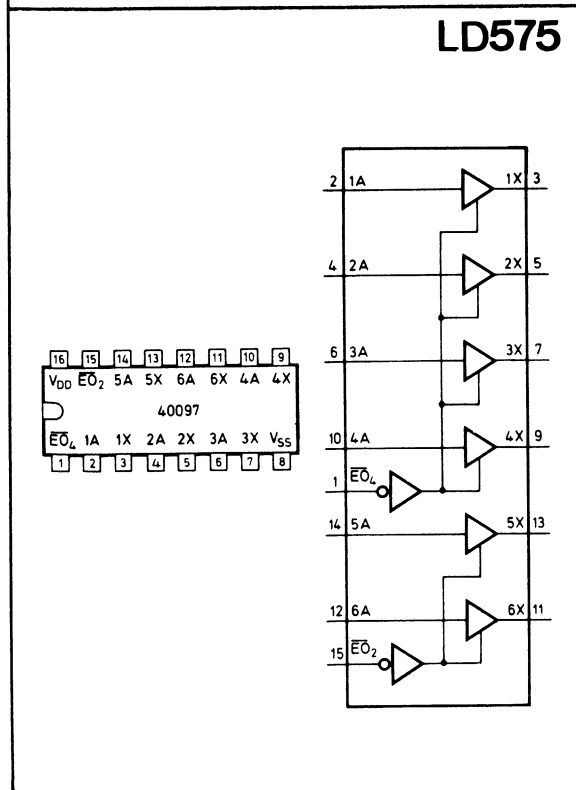
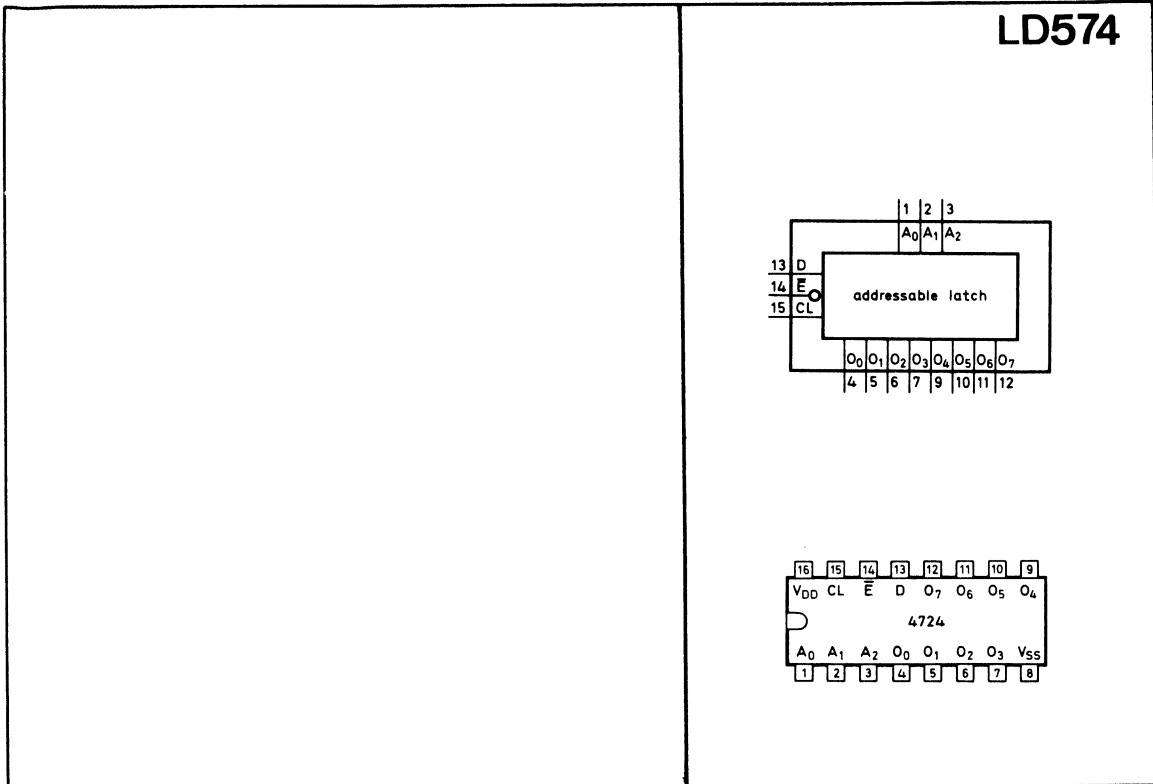




LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

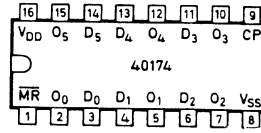
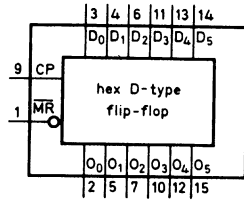


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

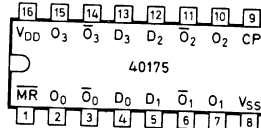
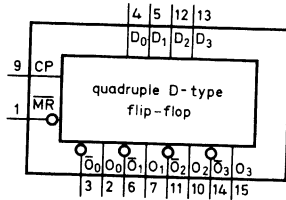


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

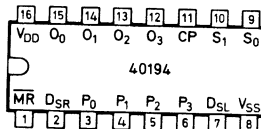
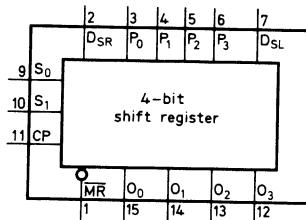
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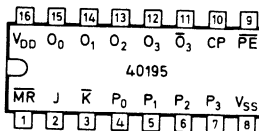
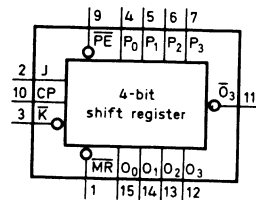
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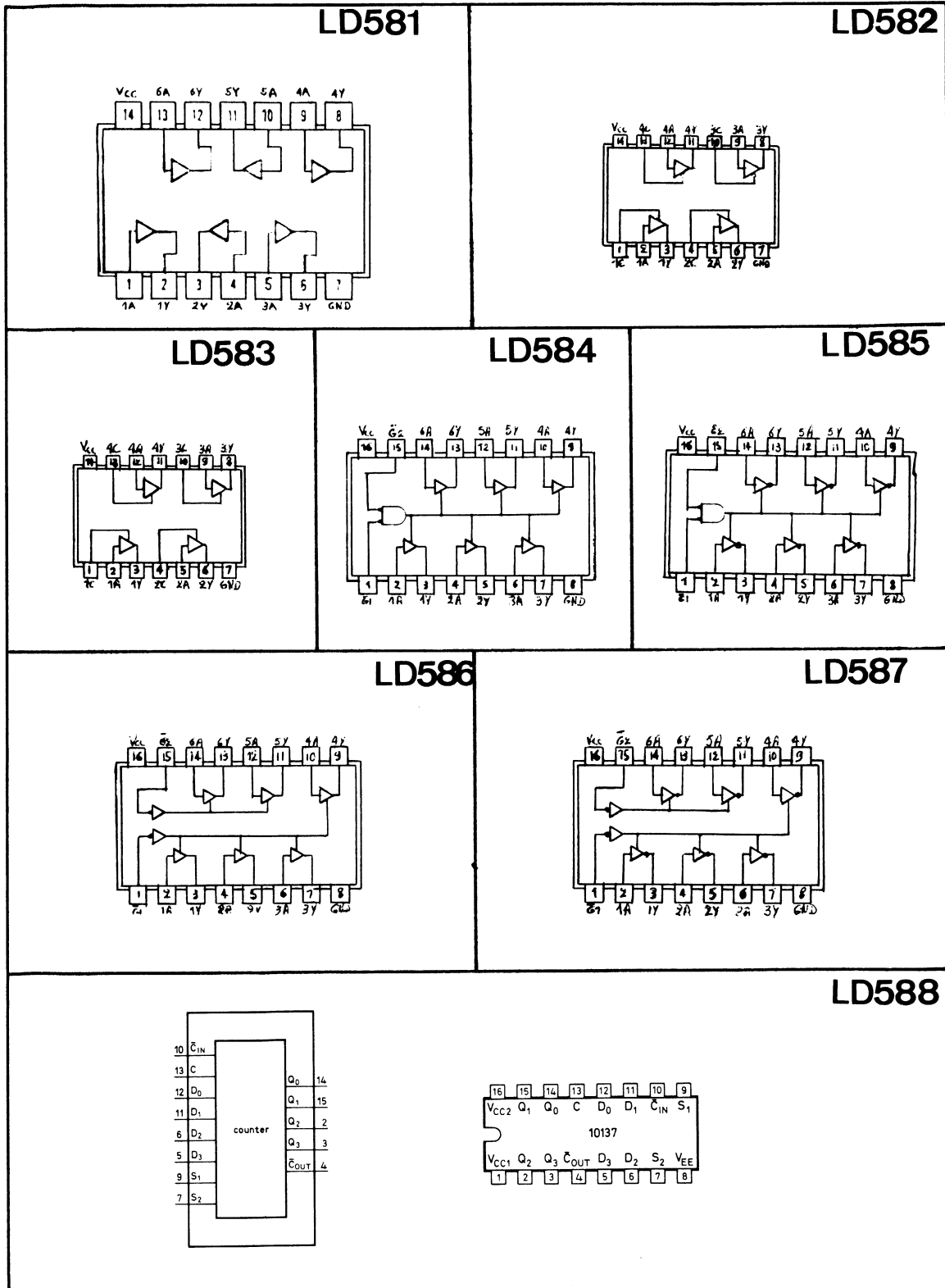
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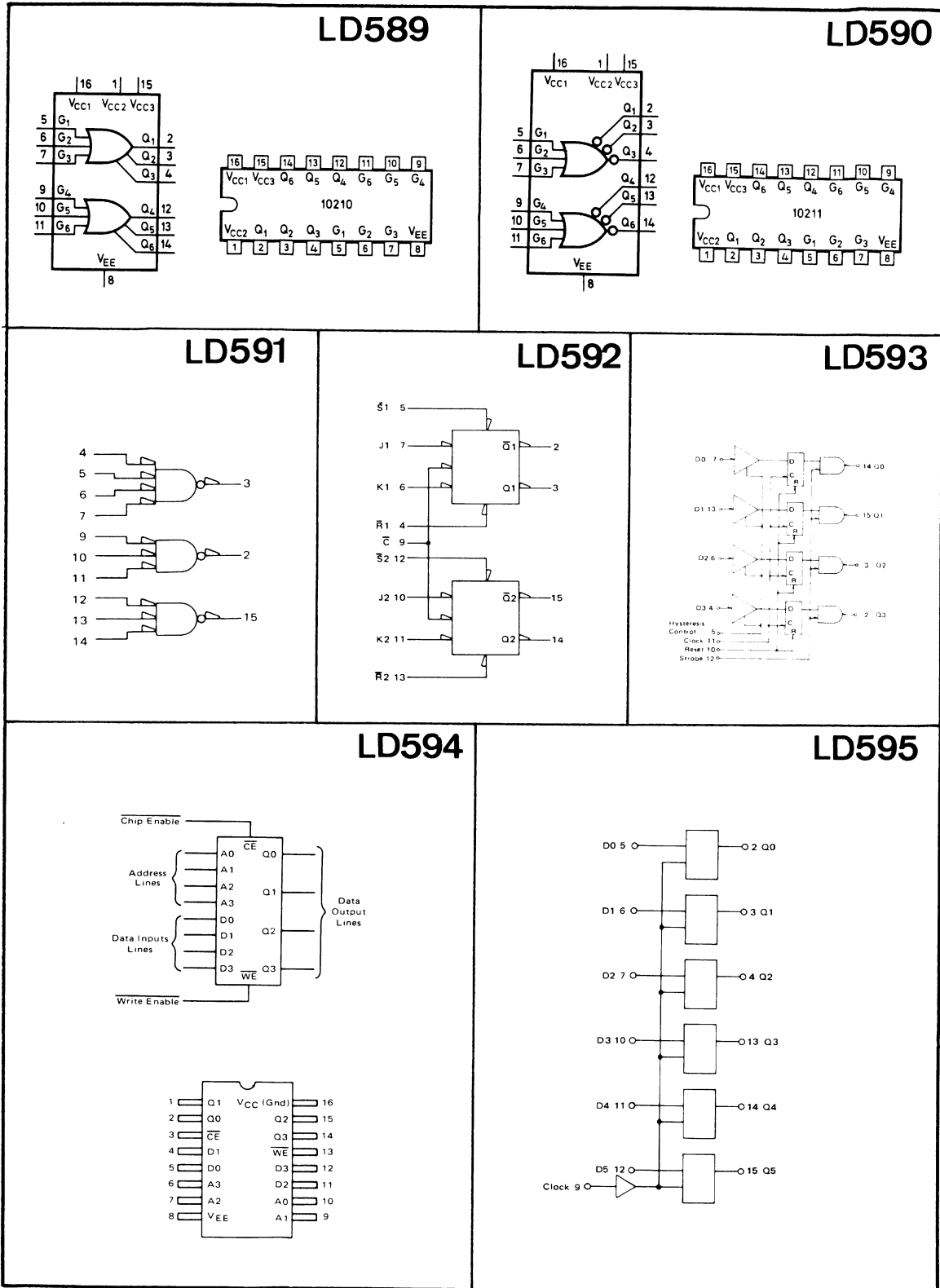
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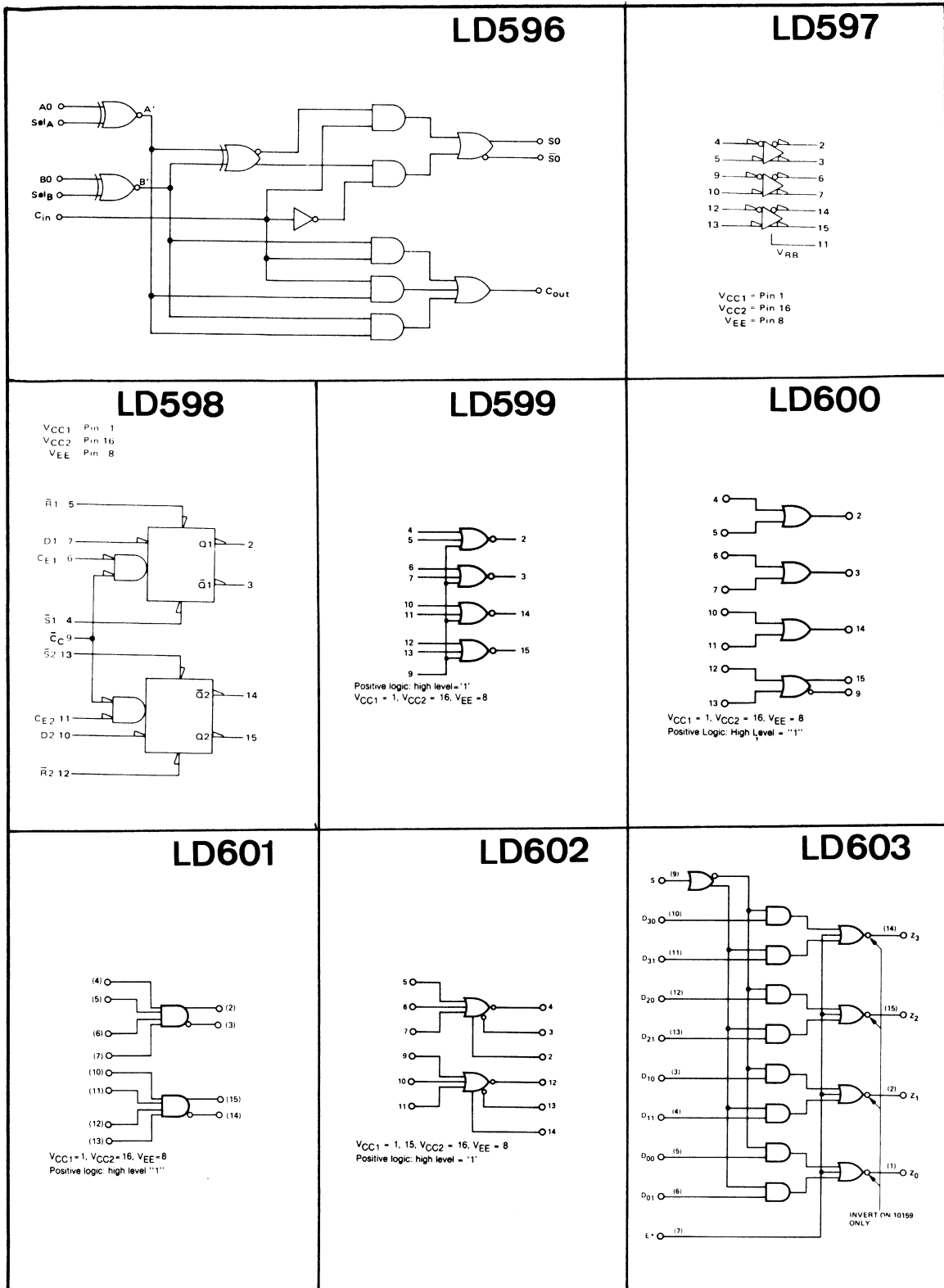
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



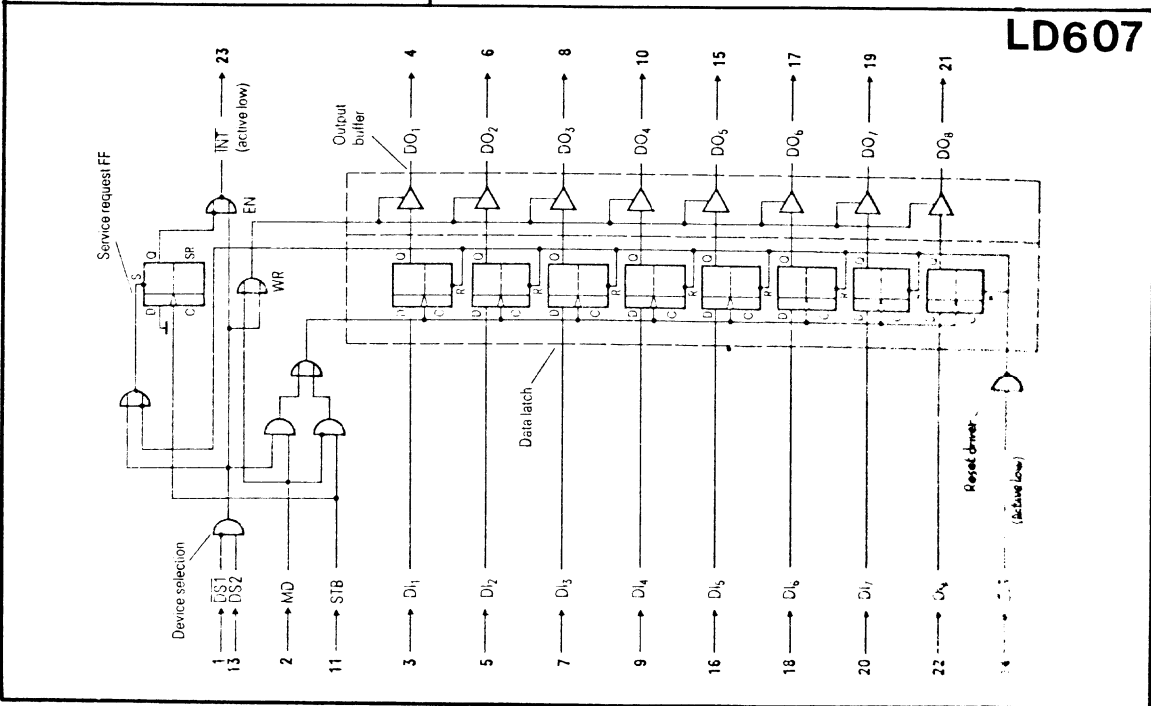
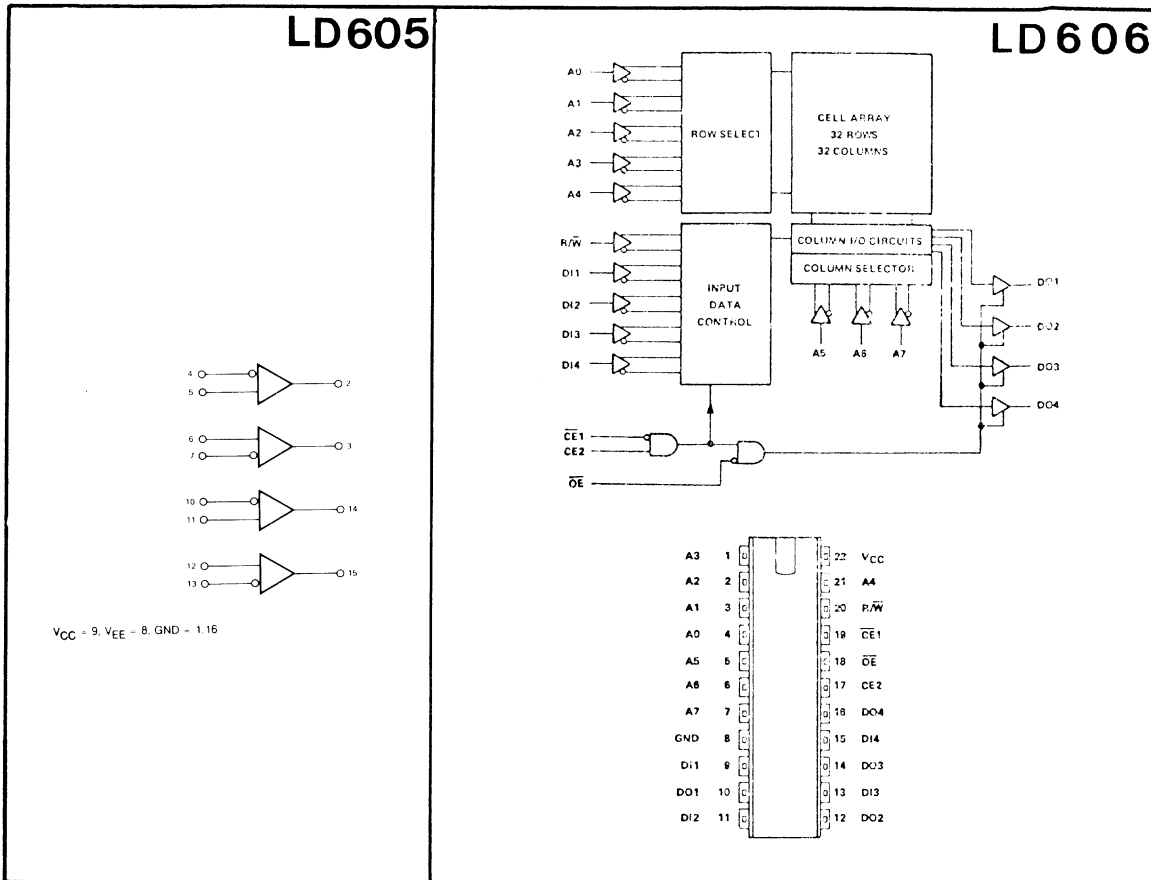
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



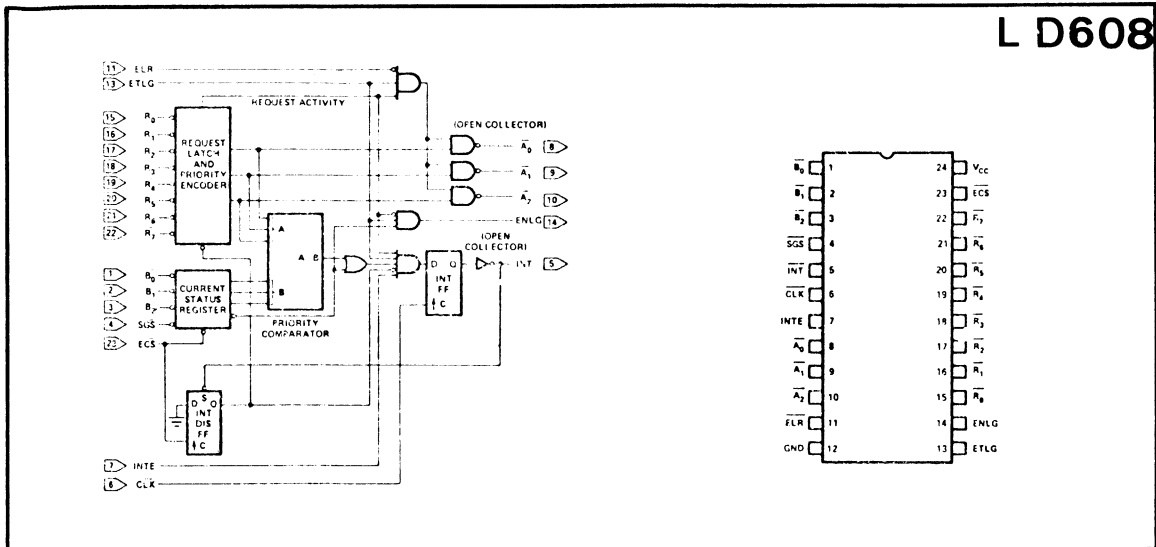
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



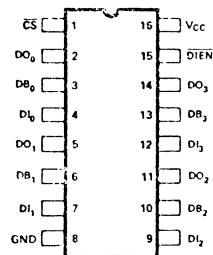
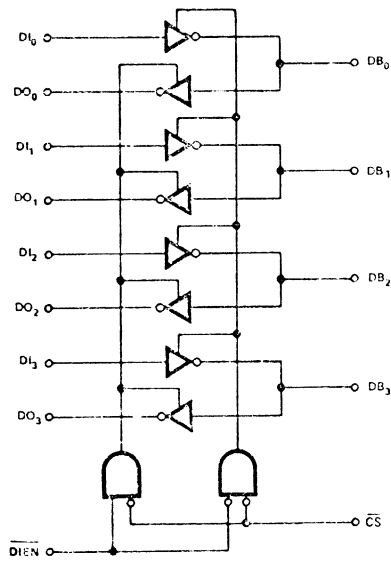
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



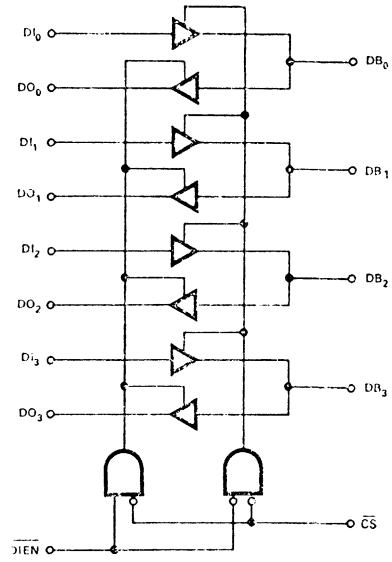
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



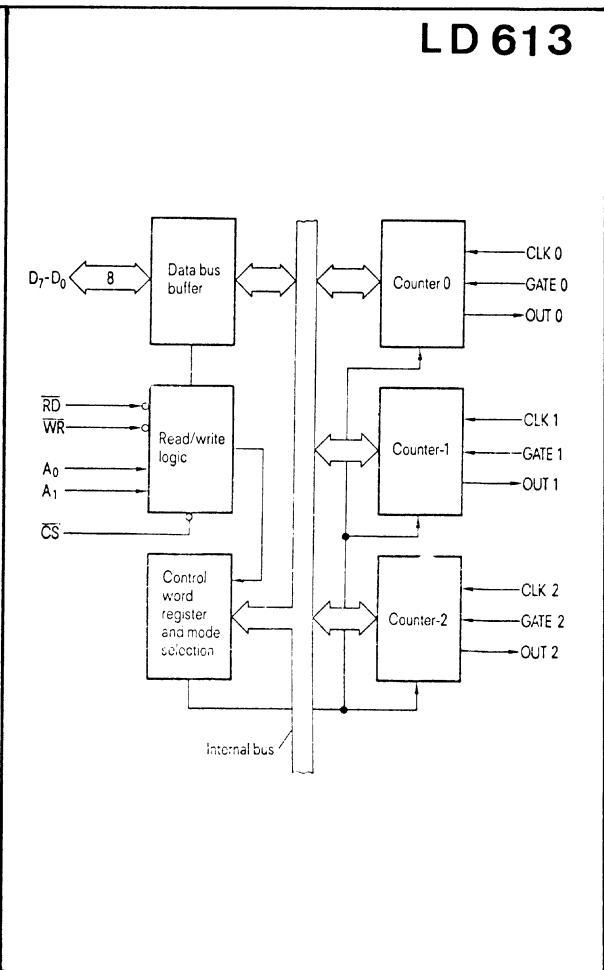
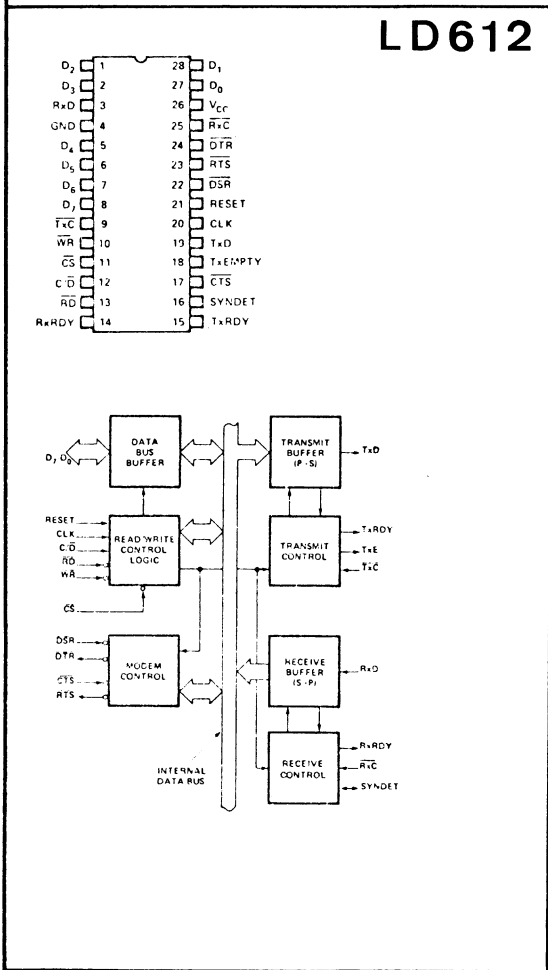
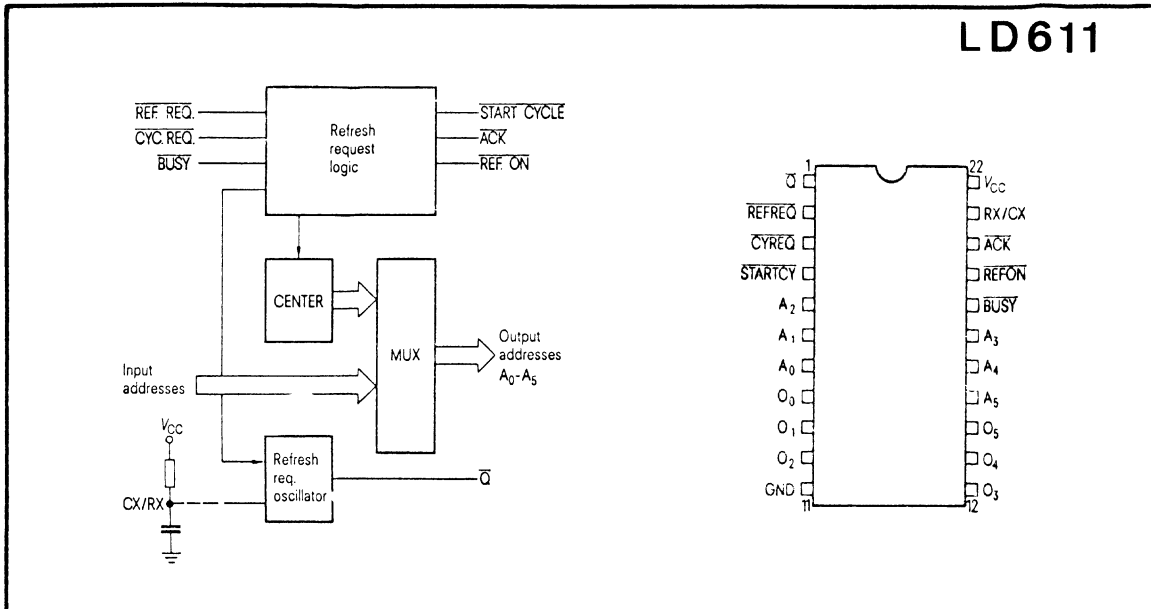
L D609



L D610

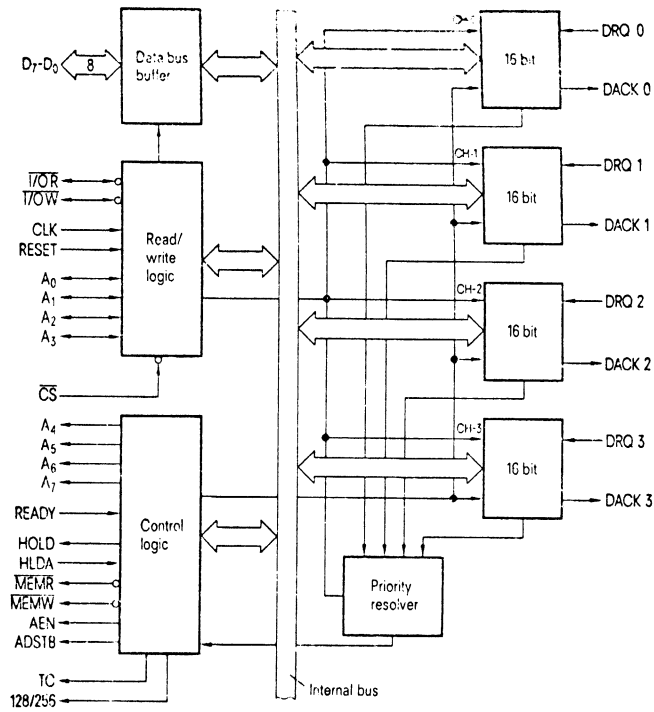


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

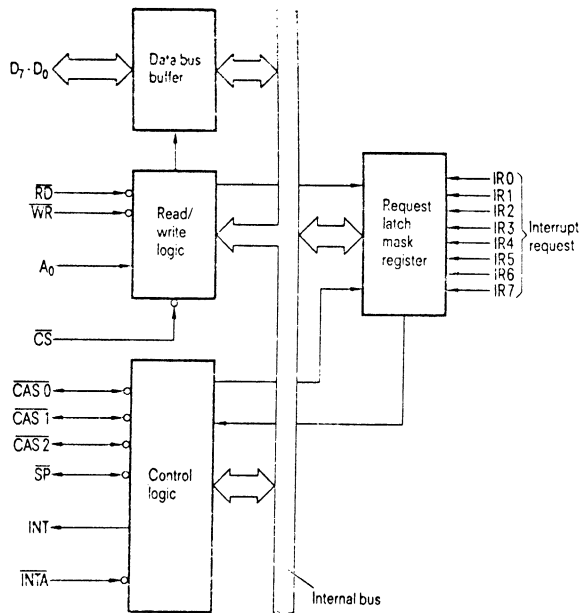


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

L D614

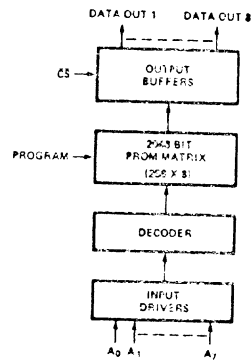
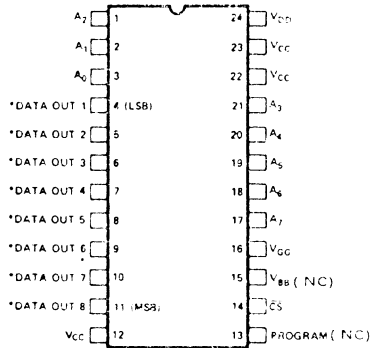


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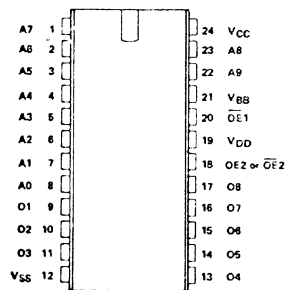
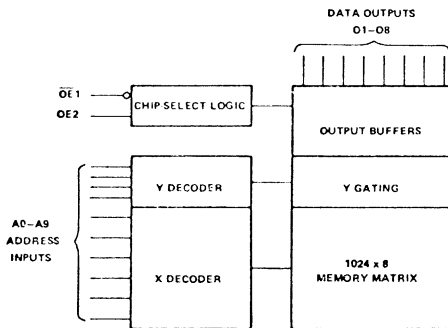


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

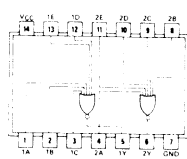
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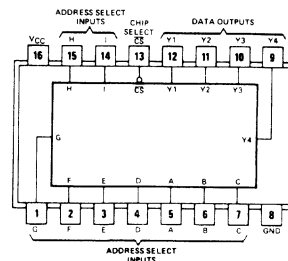
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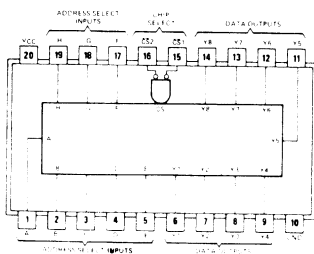
LD618



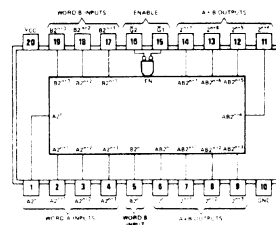
LD619



LD620



LD621

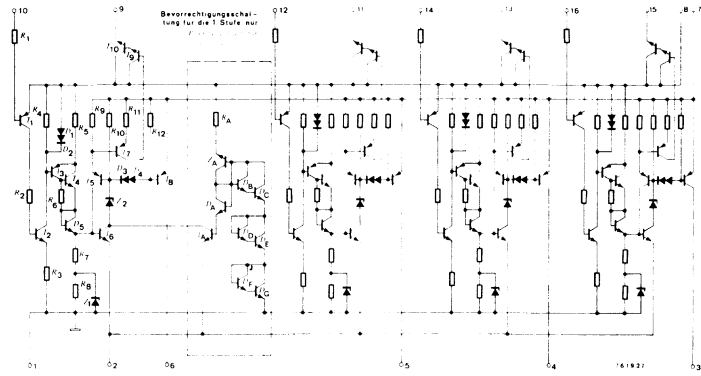


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

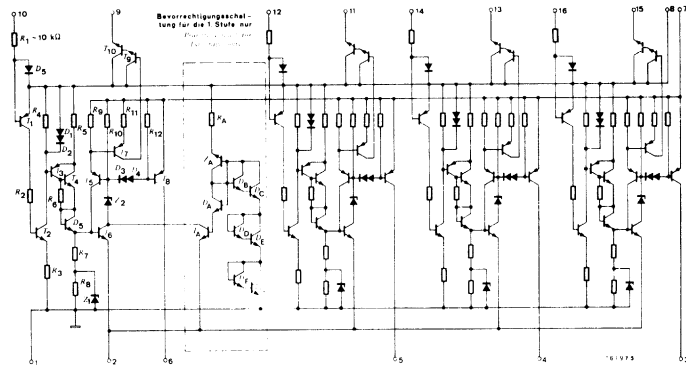
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<p style="text-align: center;">LD625</p>	<p style="text-align: center;">LD626</p>	<p style="text-align: center;">LD627</p>
<p style="text-align: center;">LD628</p>	<p style="text-align: center;">LD629</p> <p style="text-align: center;">Block-Schaltbild</p> <p style="text-align: center;">Grenzbedingungen¹⁾</p>	

LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

LD630

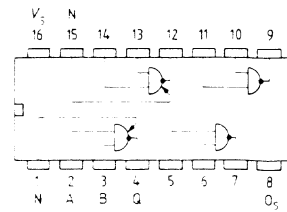
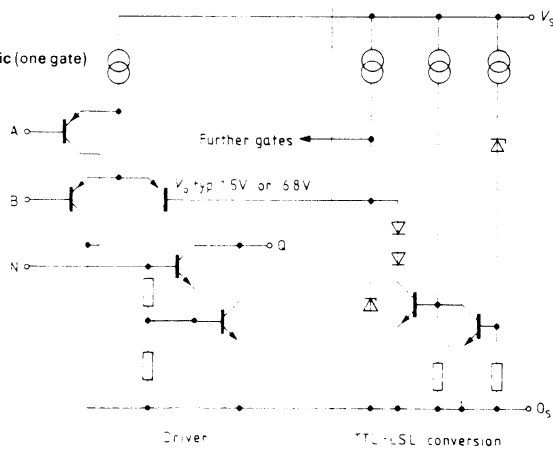


LD631



LD632

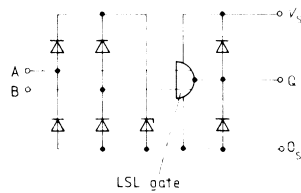
Schematic (one gate)



Logic function $Q = \overline{A \wedge B}$

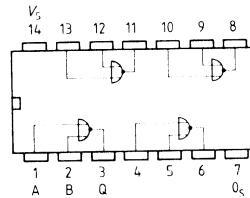
LD633

Schematic (one gate)



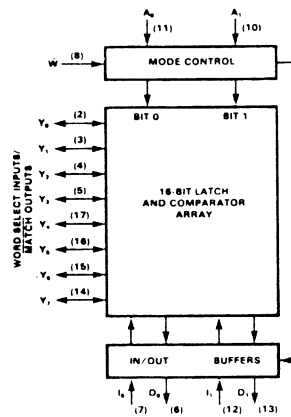
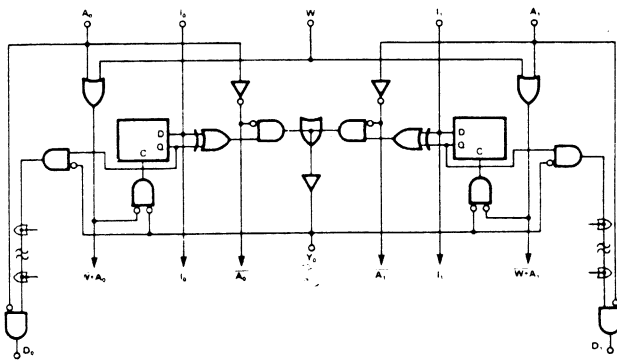
LSL gate

Logic function $Q = \overline{A \wedge B}$

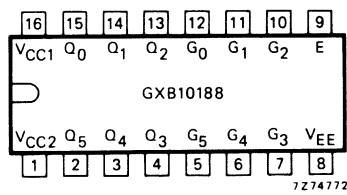
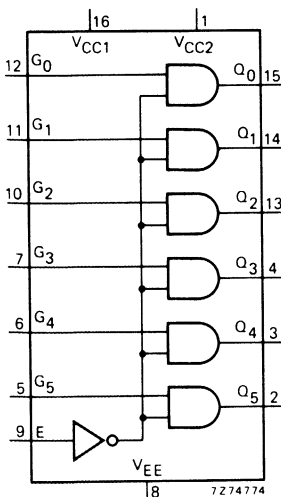


Pin configuration top view

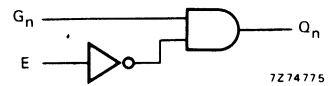
LD634



LD635



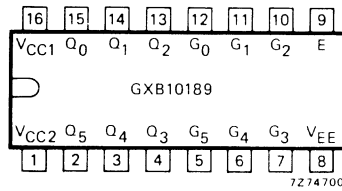
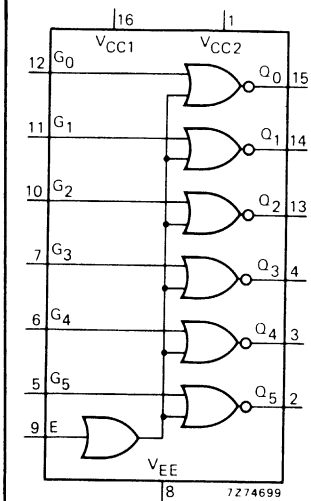
Pin designation.
 $V_{CC1} = V_{CC2} = 0 \text{ V (ground)}$
 $V_{EE} = -5,2 \text{ V}$



Logic diagram (one buffer).

LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

LD636

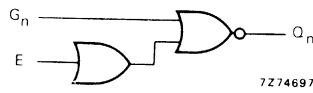


VCC1 = VCC2 = 0 V (ground)
VEE = -5,2 V

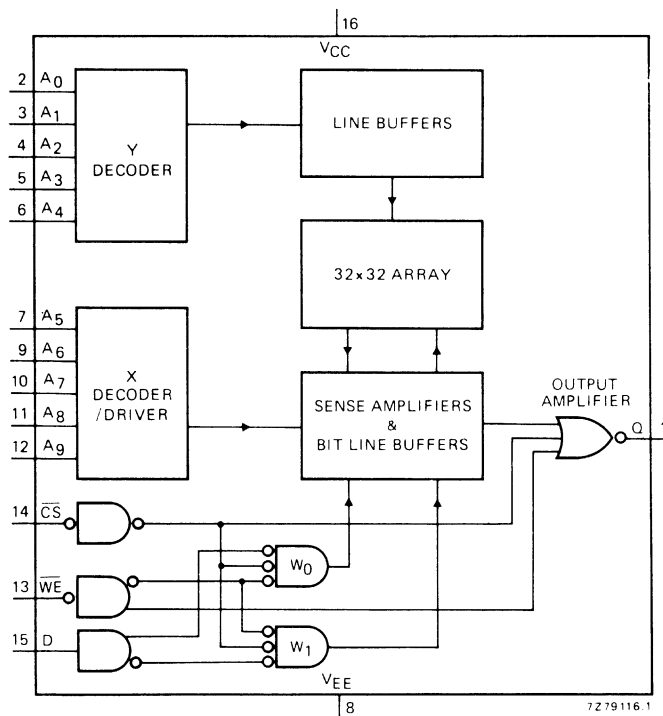
LOGIC FUNCTION
 $Q_n = \overline{G_n} + E$

Positive logic
H = HIGH state (the more positive voltage) = 1
L = LOW state (the less positive voltage) = 0

LOGIC DIAGRAM (one inverter)



LD637



Block diagram.

FUNCTION TABLE

inputs			output	mode
CS	WE	D	Q	
H	X	X	L	not selected
L	L	L	L	write "0"
L	L	H	L	write "1"
L	H	X	D	read

Positive logic
H = HIGH state (the more positive voltage) = 1
L = LOW state (the less positive voltage) = 0
X = state is immaterial

LOGIC FUNCTION
 $W_0 = \overline{D} \cdot \overline{WE} \cdot CS$
 $W_1 = D \cdot WE \cdot CS$

LD638

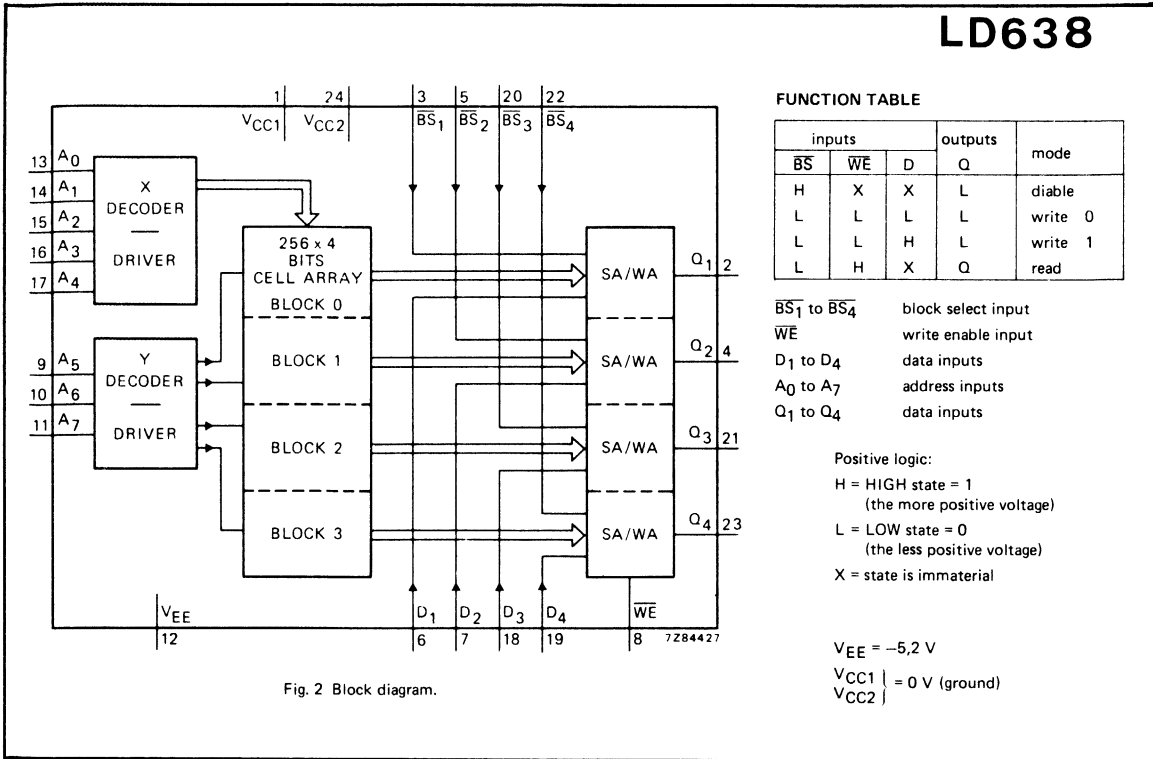
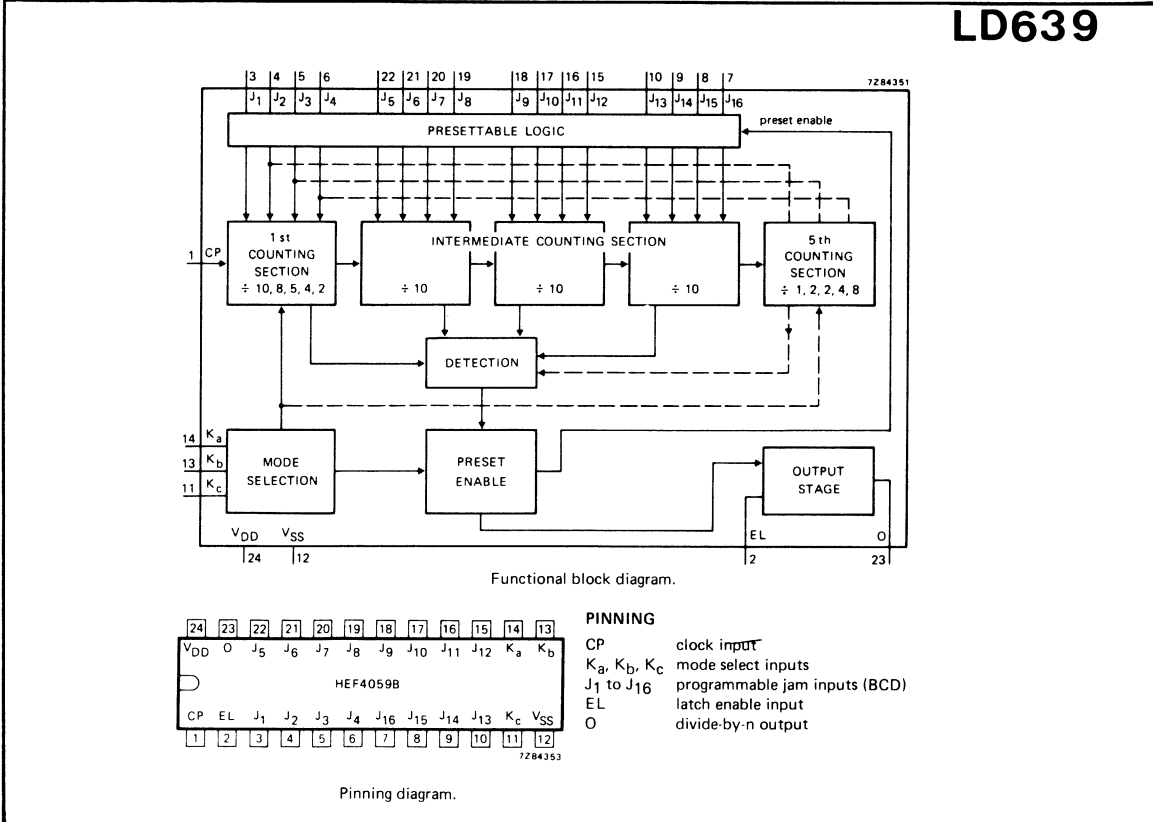


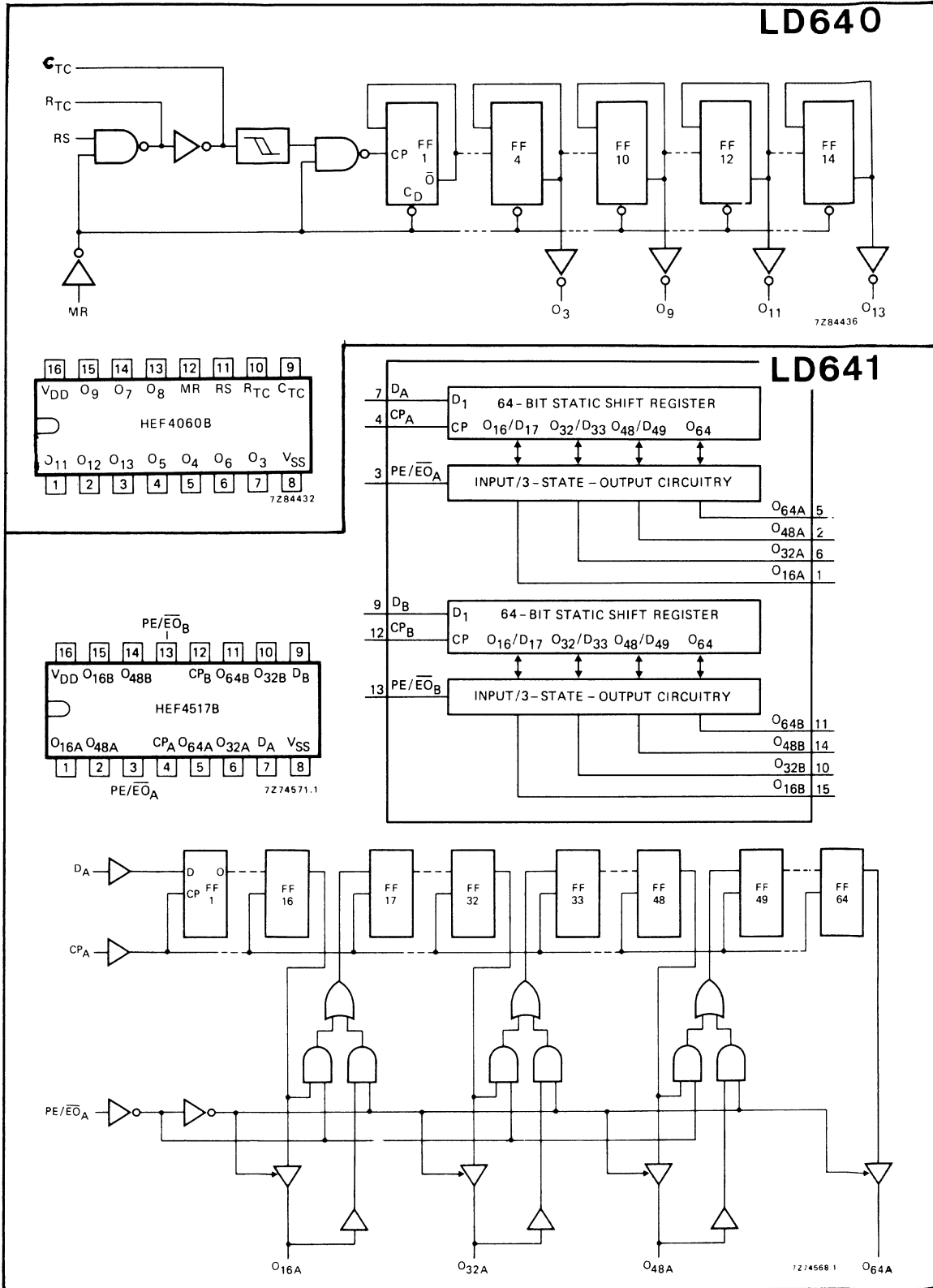
Fig. 2 Block diagram.

LD639

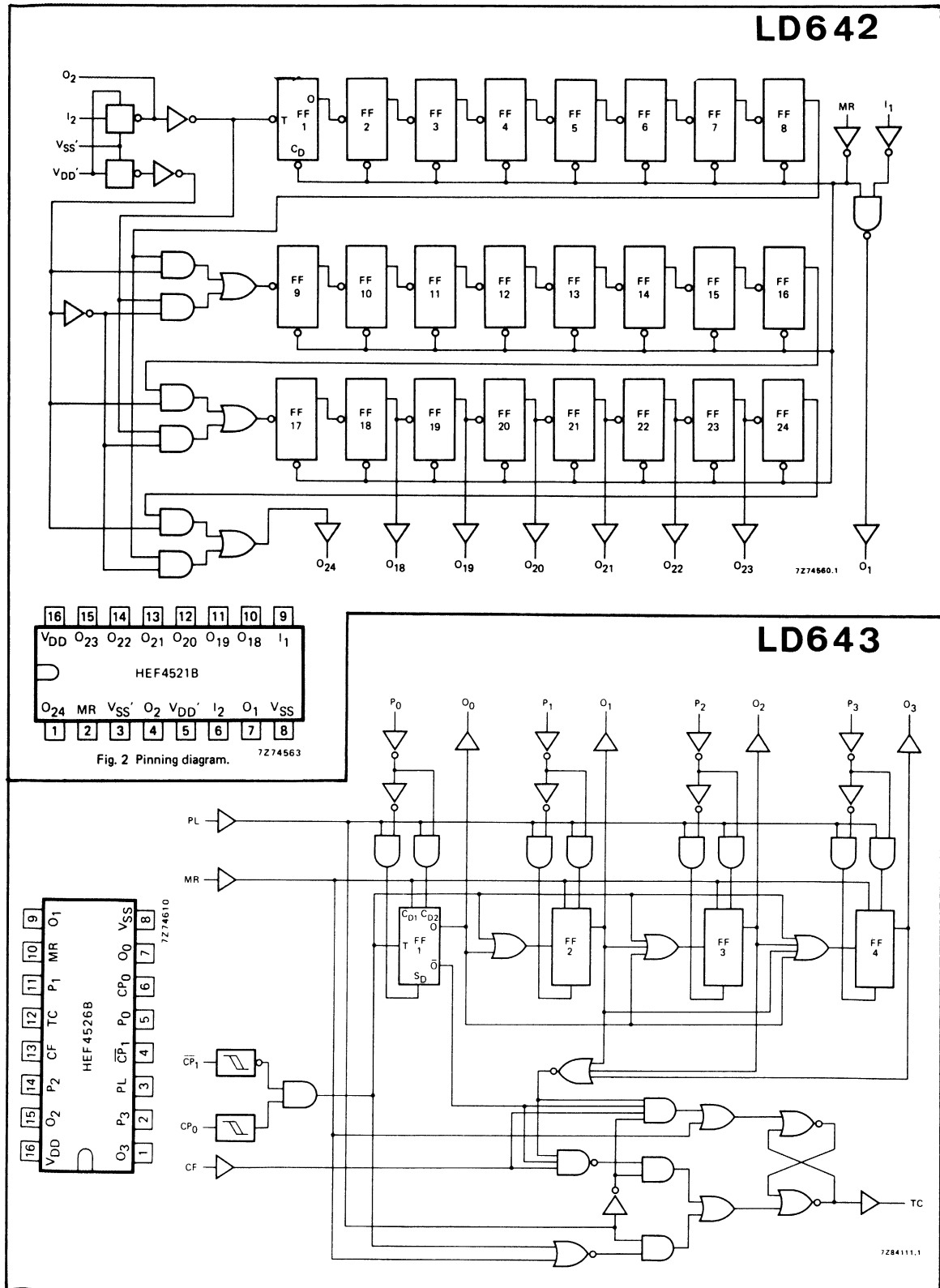


Pinning diagram.

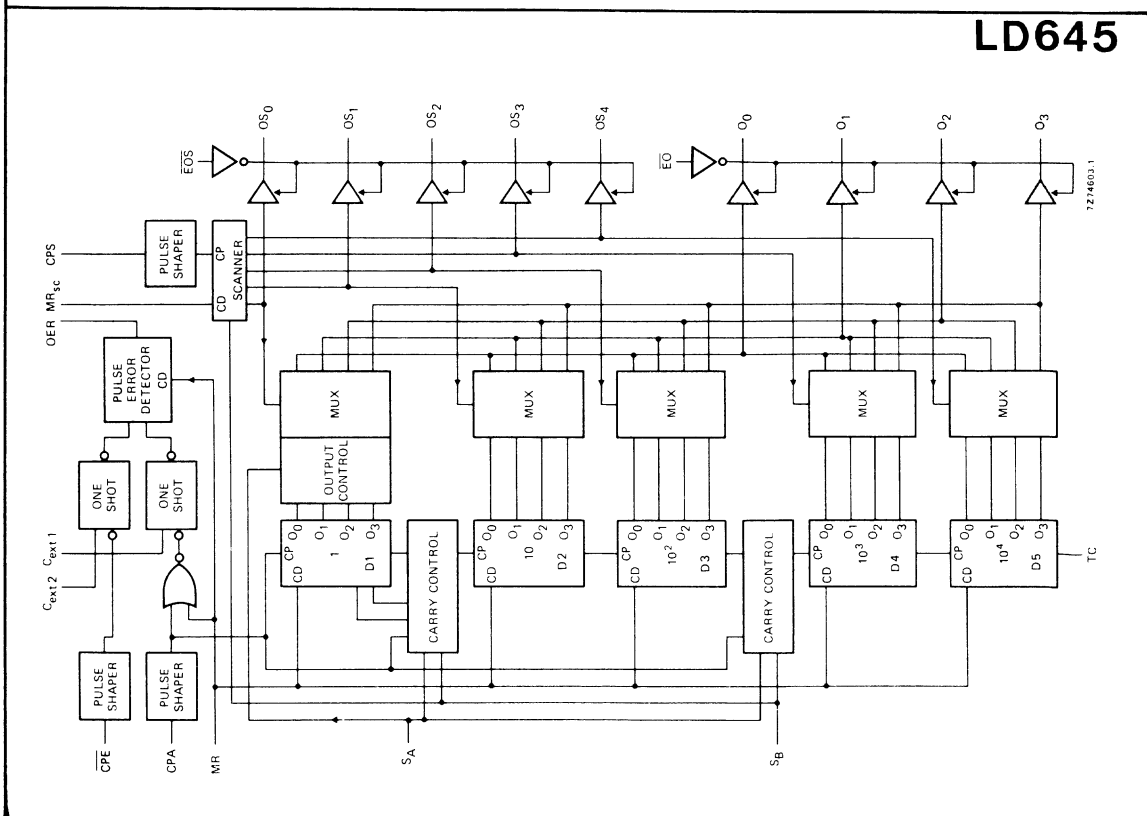
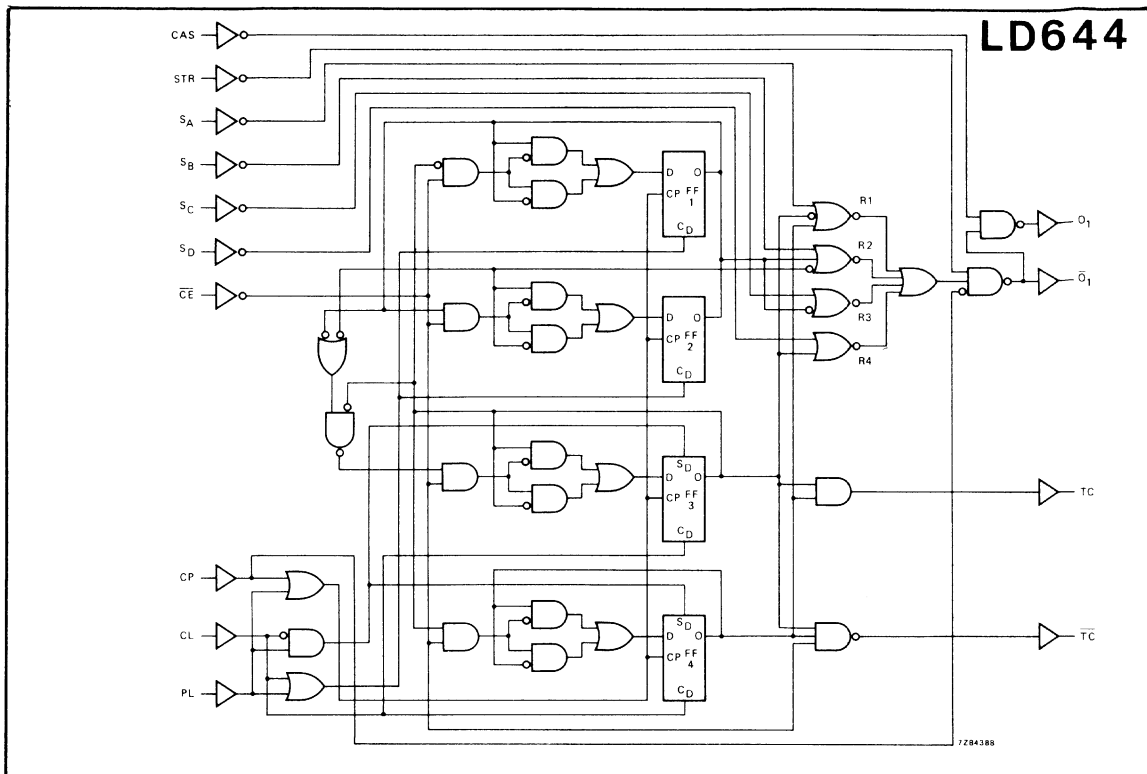
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

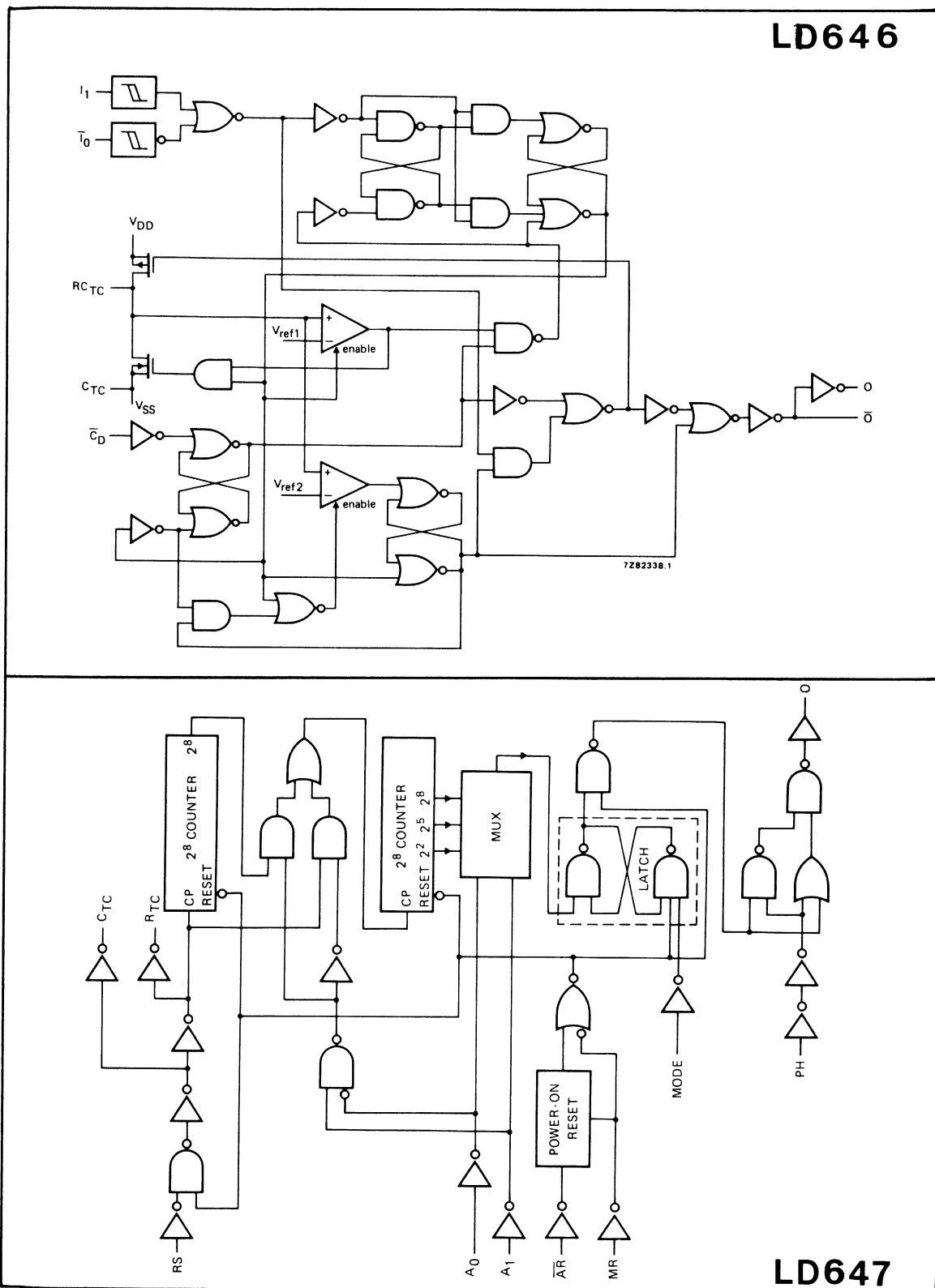


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

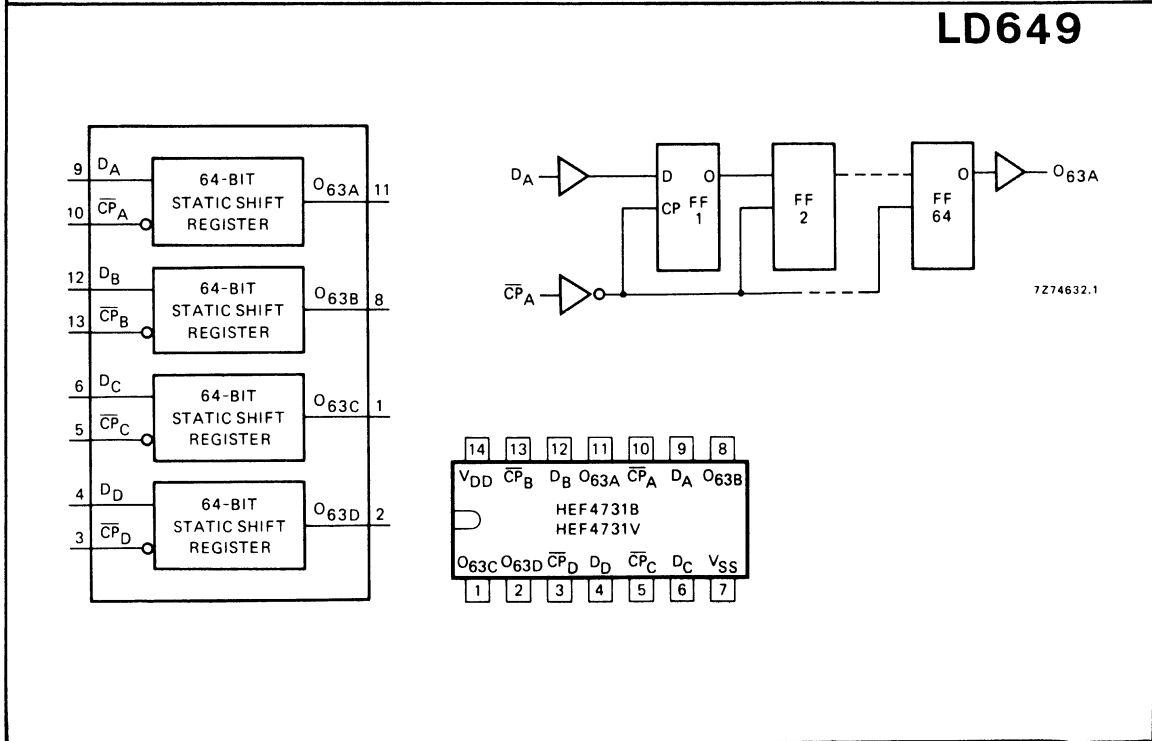
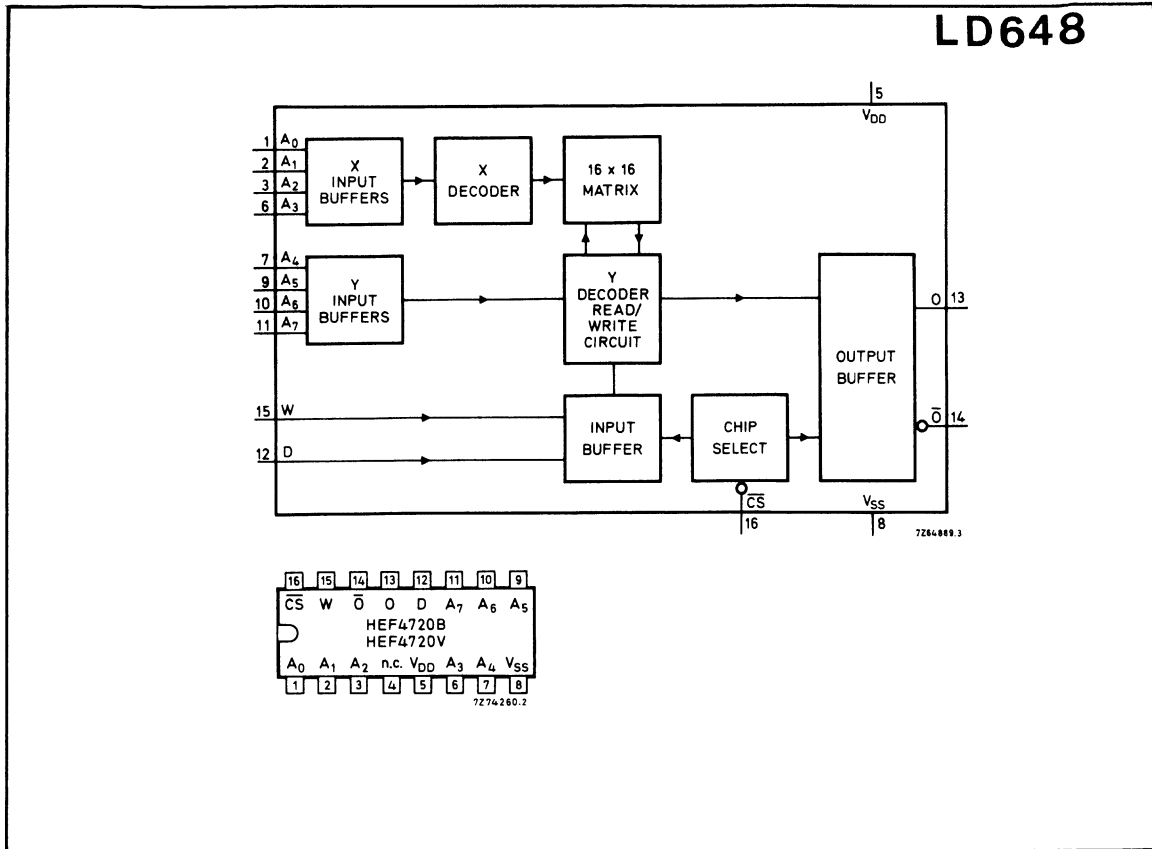


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

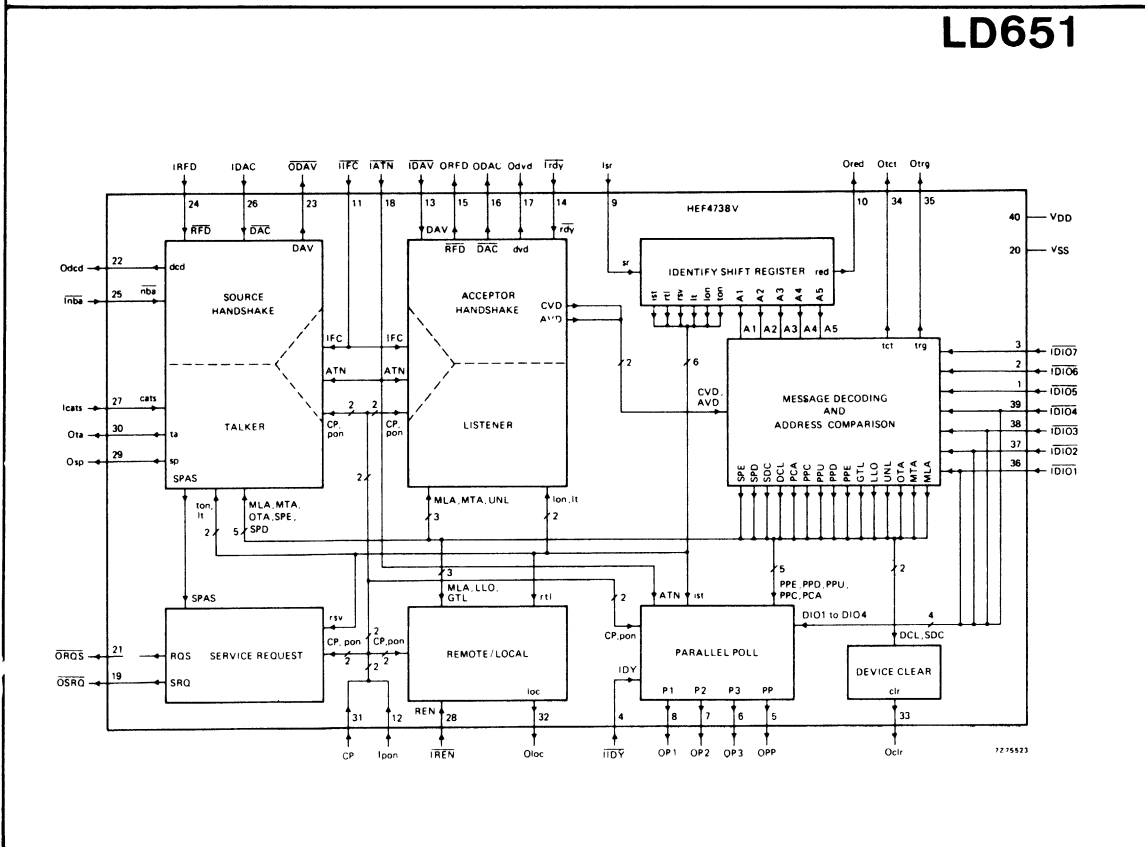
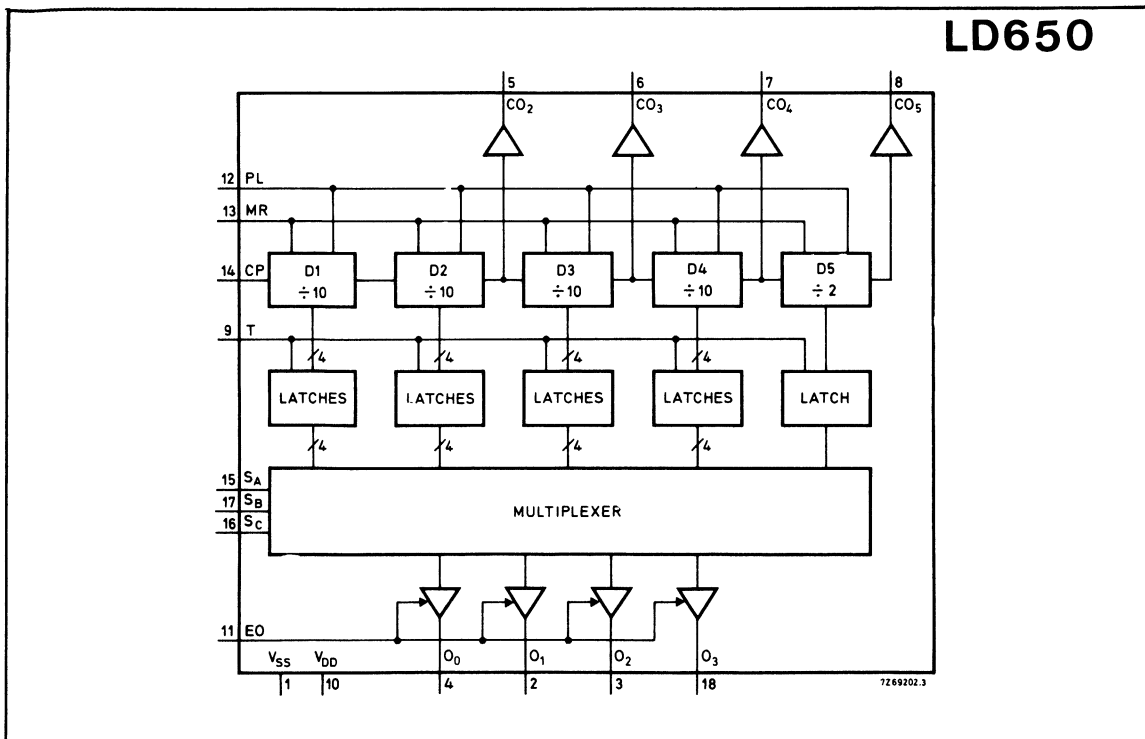




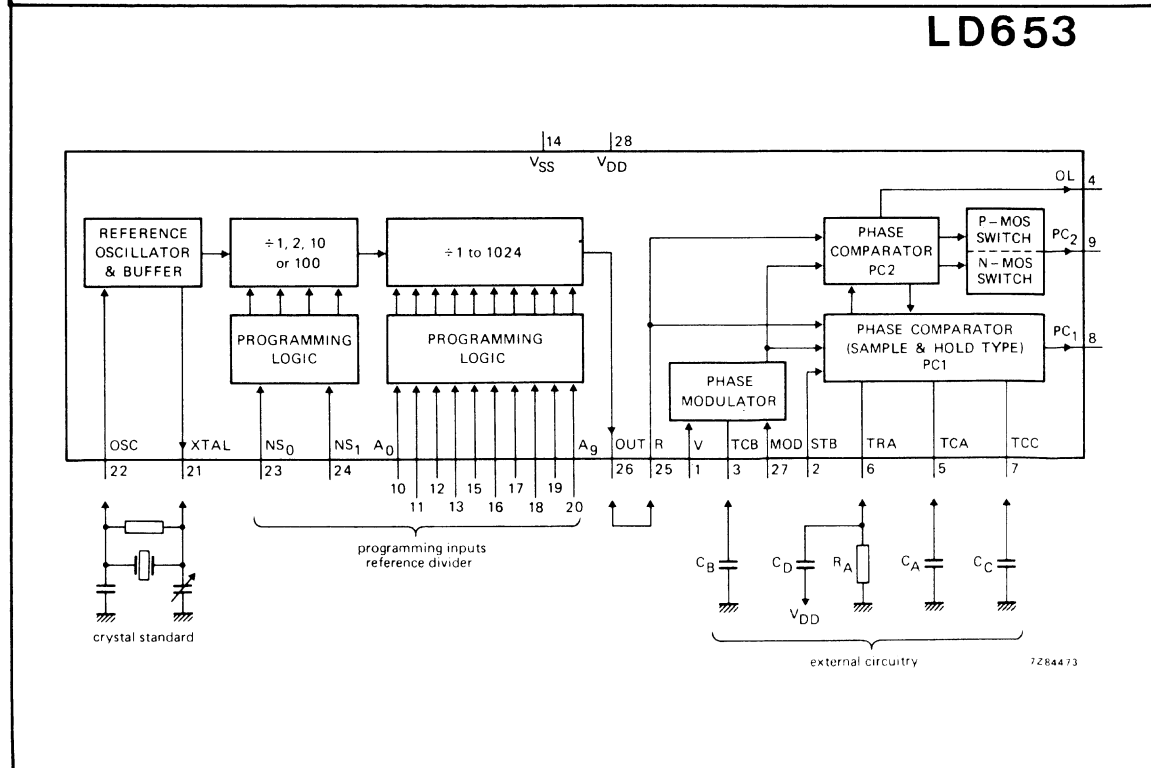
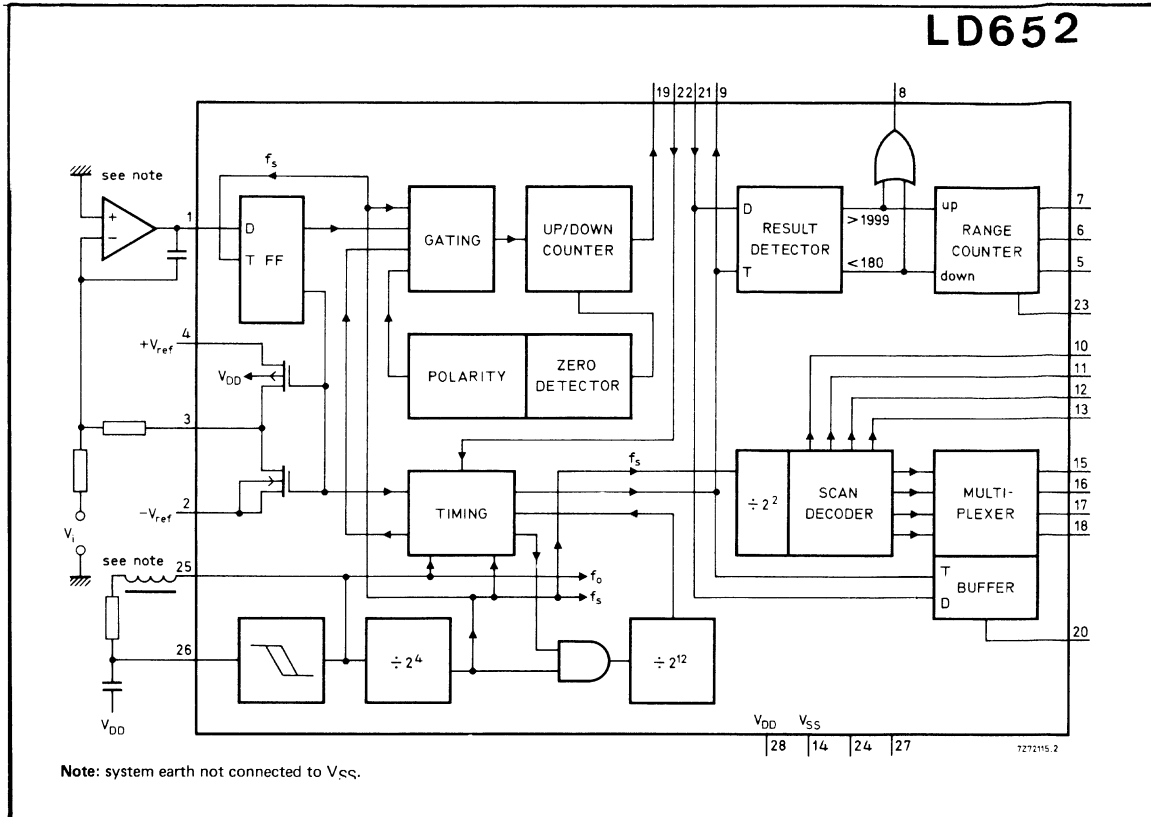
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



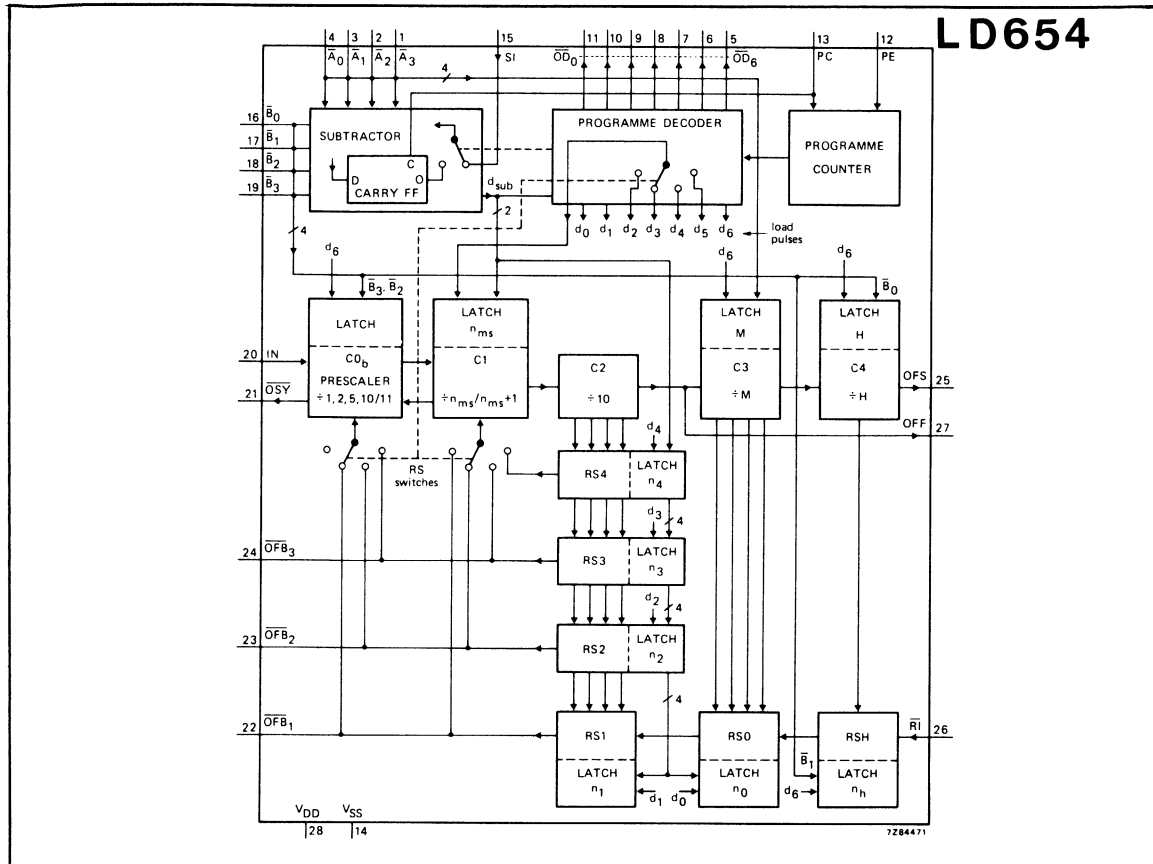
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



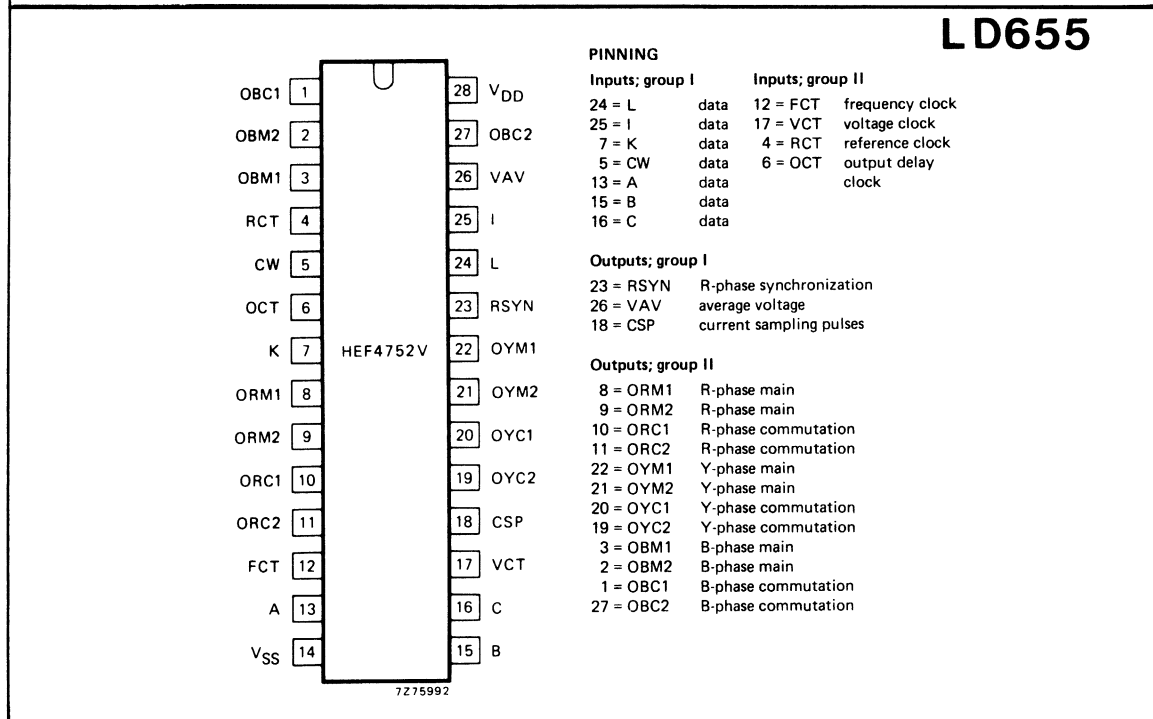
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



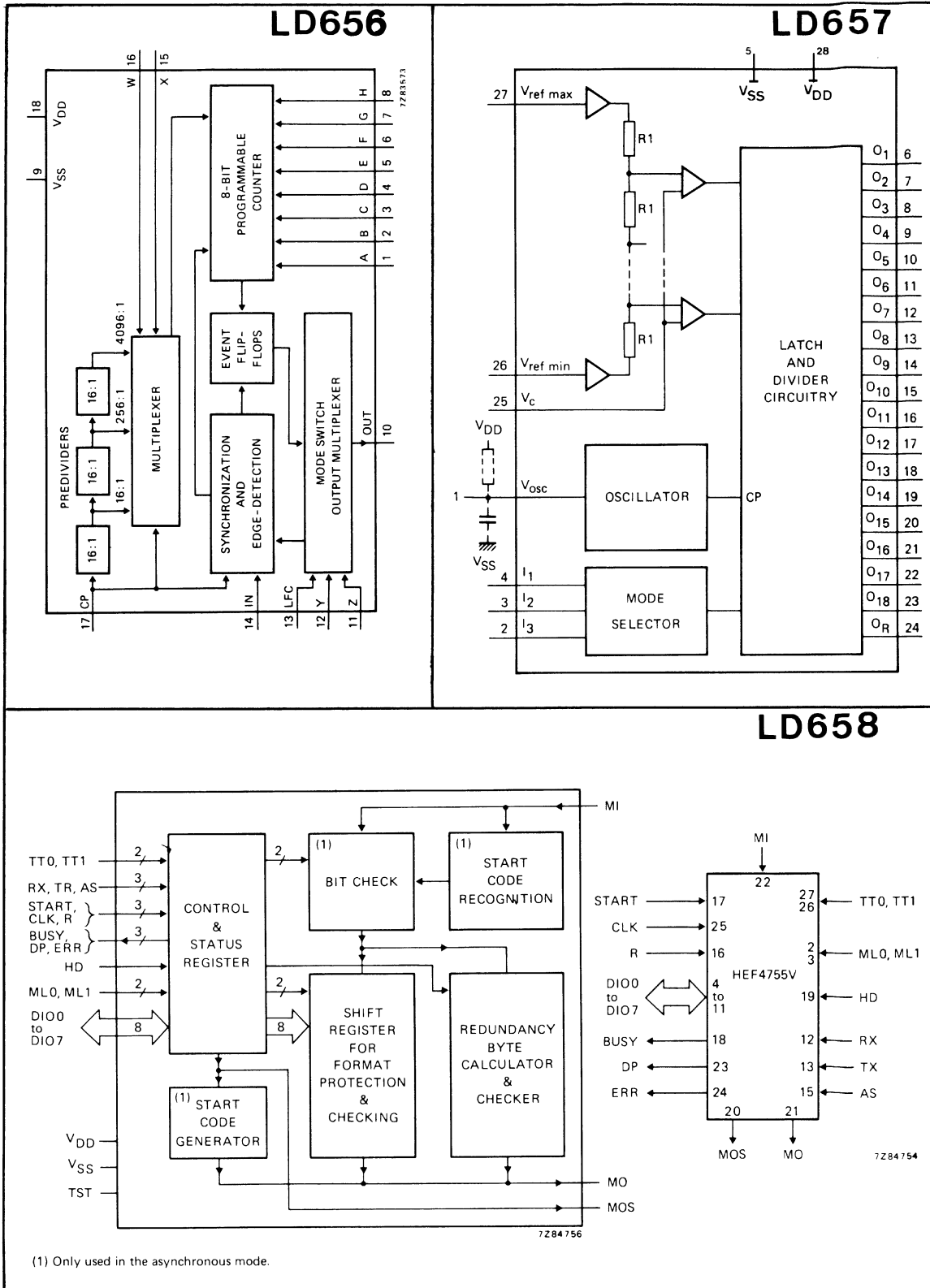
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



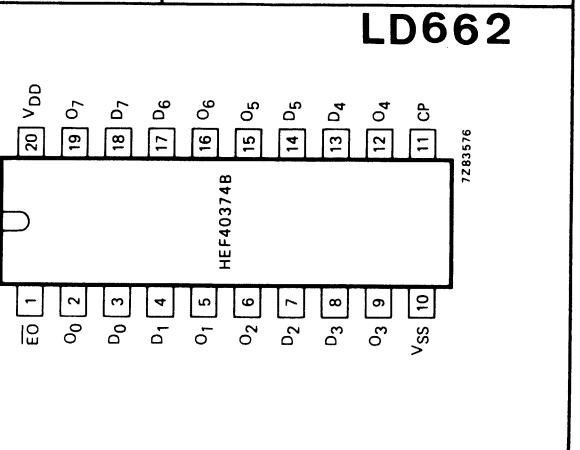
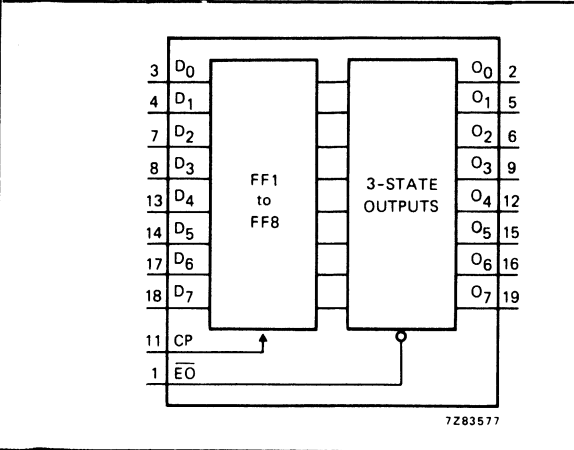
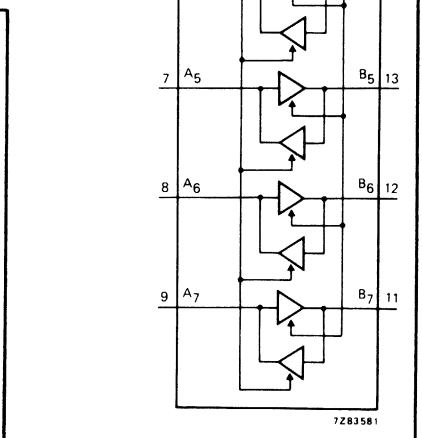
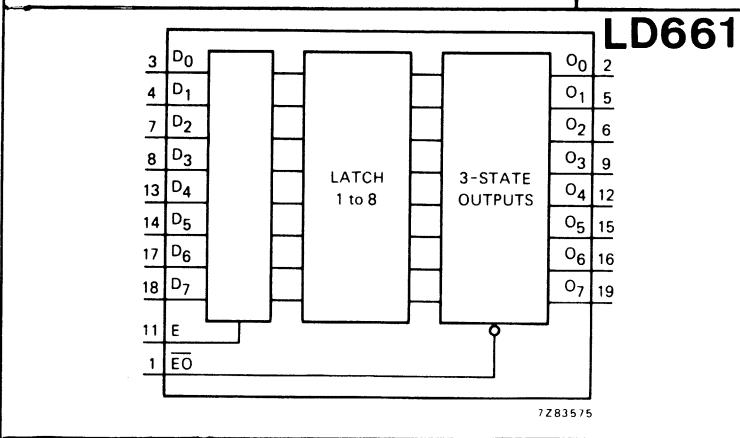
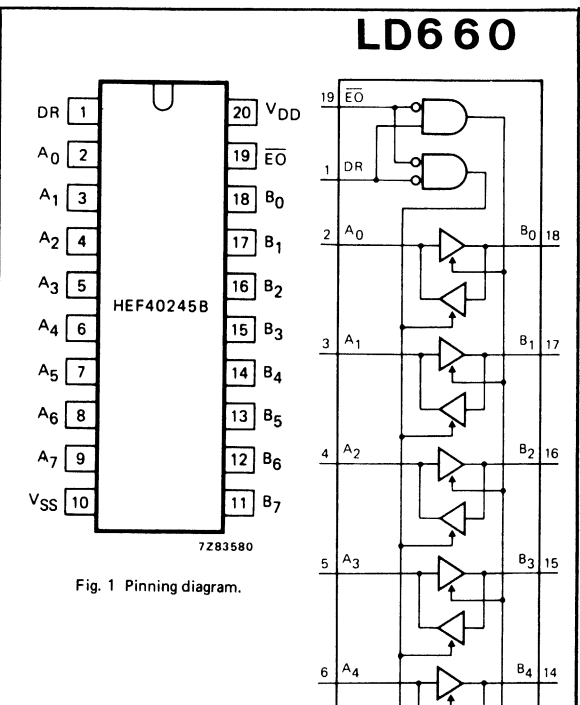
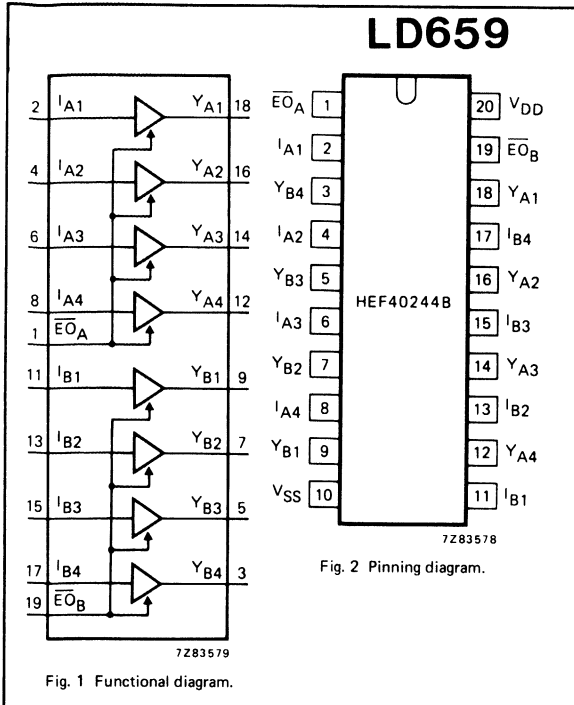
LD654



LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



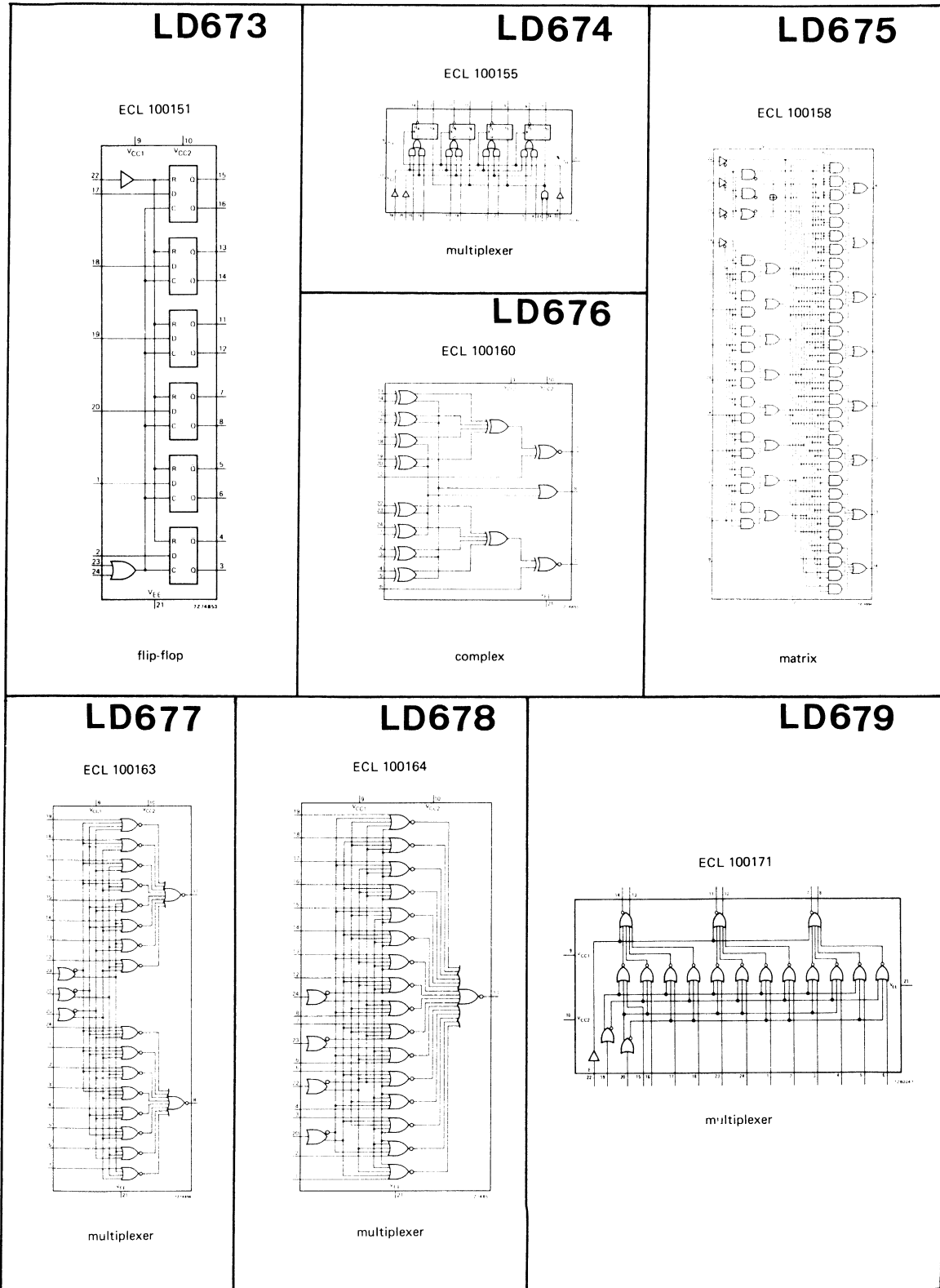
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

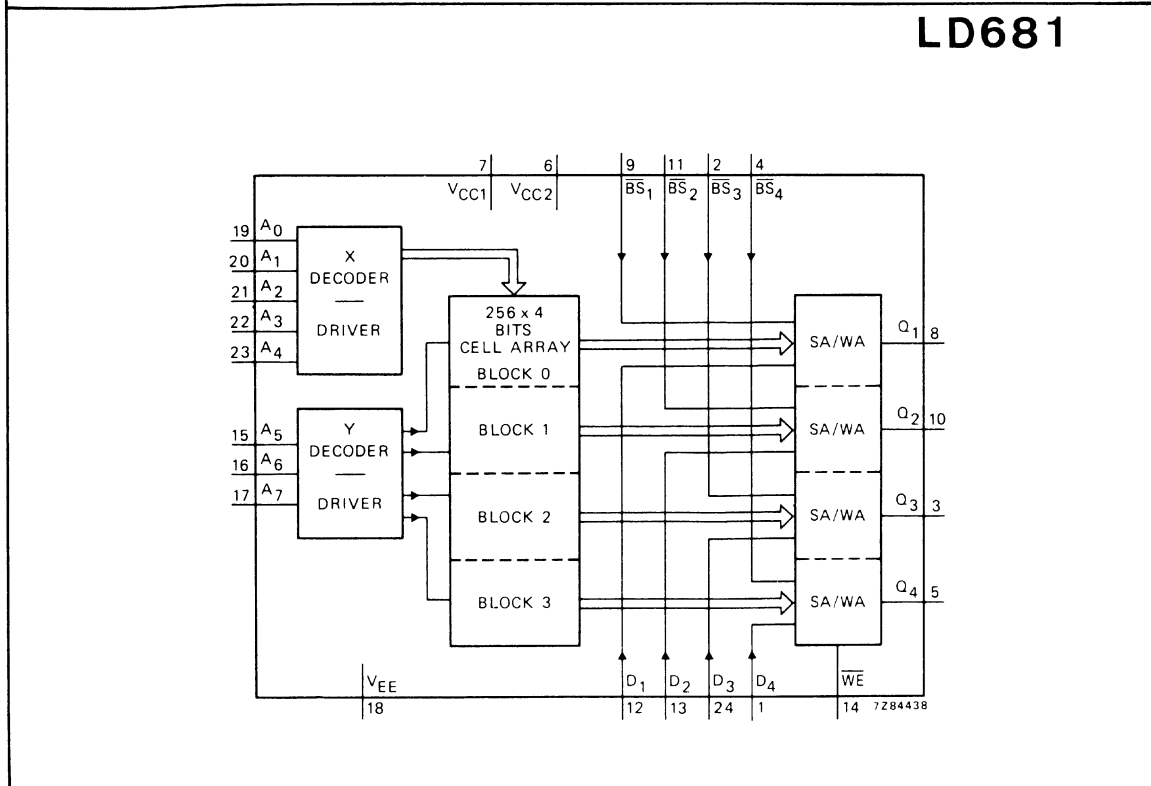
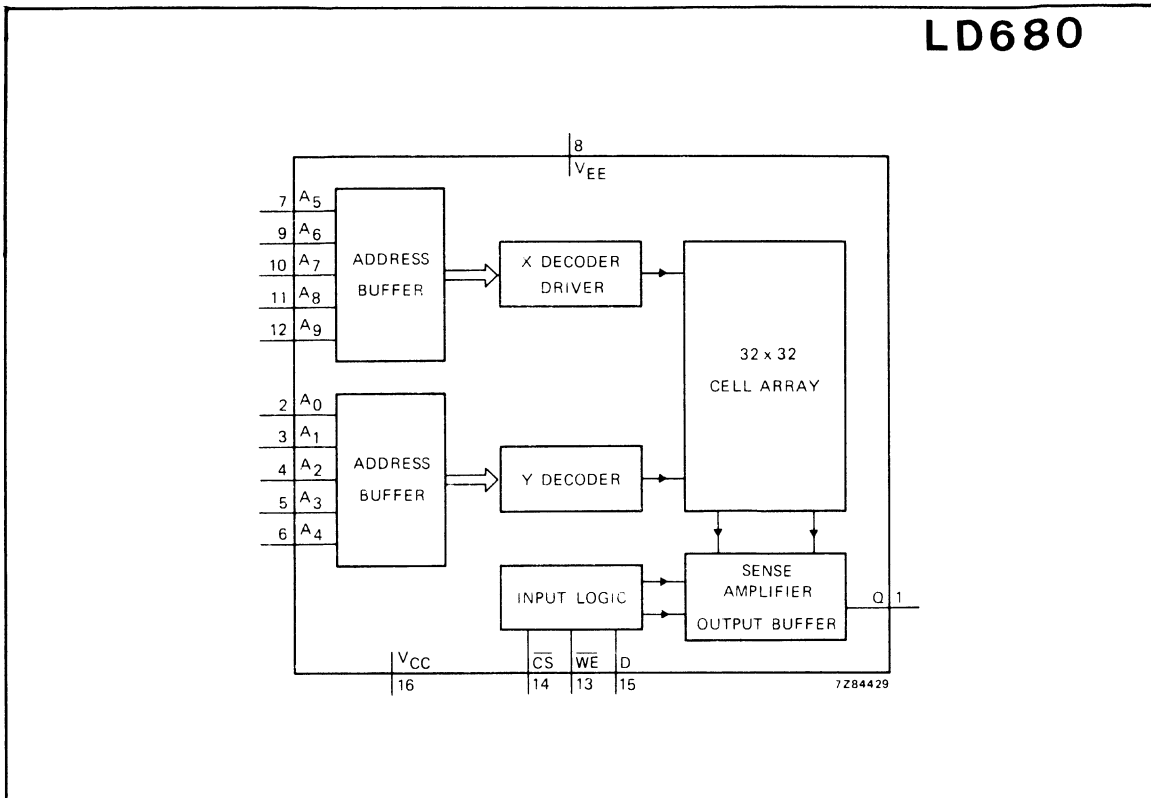


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

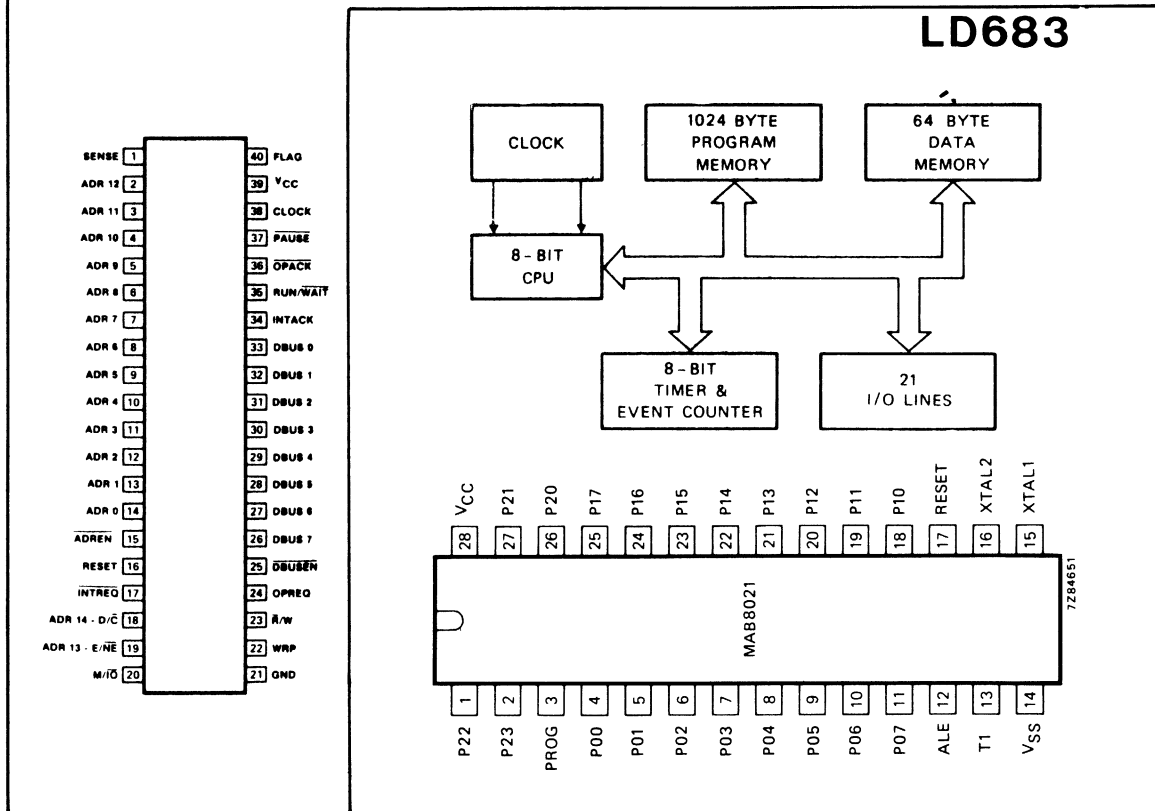
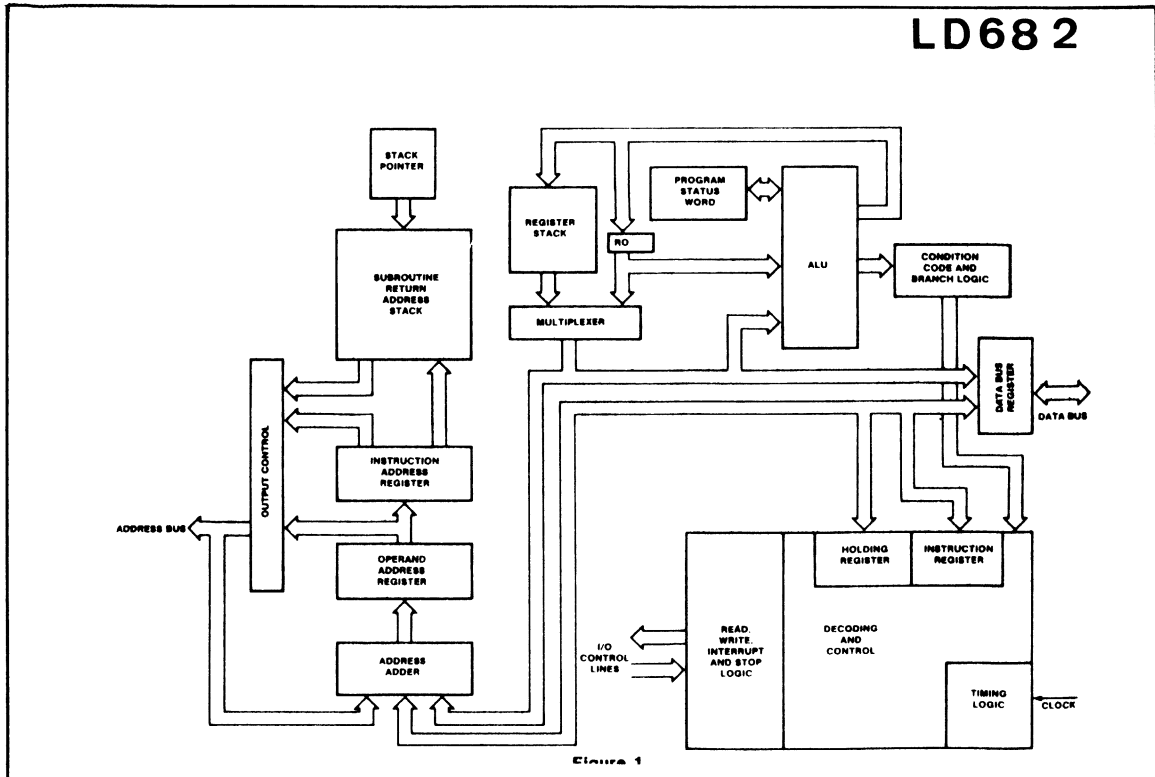
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<p>D667 ECL 100114</p> <p>interface</p>	<p>LD668 ECL 100117</p> <p>gate</p>	<p>LD669 ECL 100118</p> <p>gate</p>	<p>LD670 ECL 100123</p> <p>driver</p>
<p>LD671 ECL 100131</p> <p>flip-flop</p>		<p>LD672 ECL 100150</p> <p>flip-flop</p>	

LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

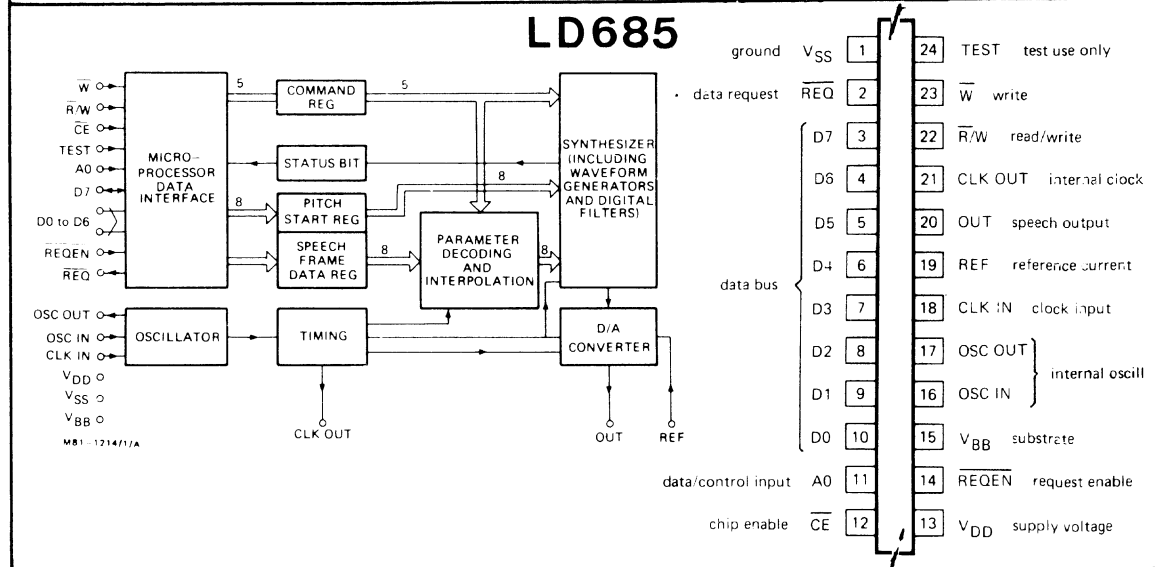
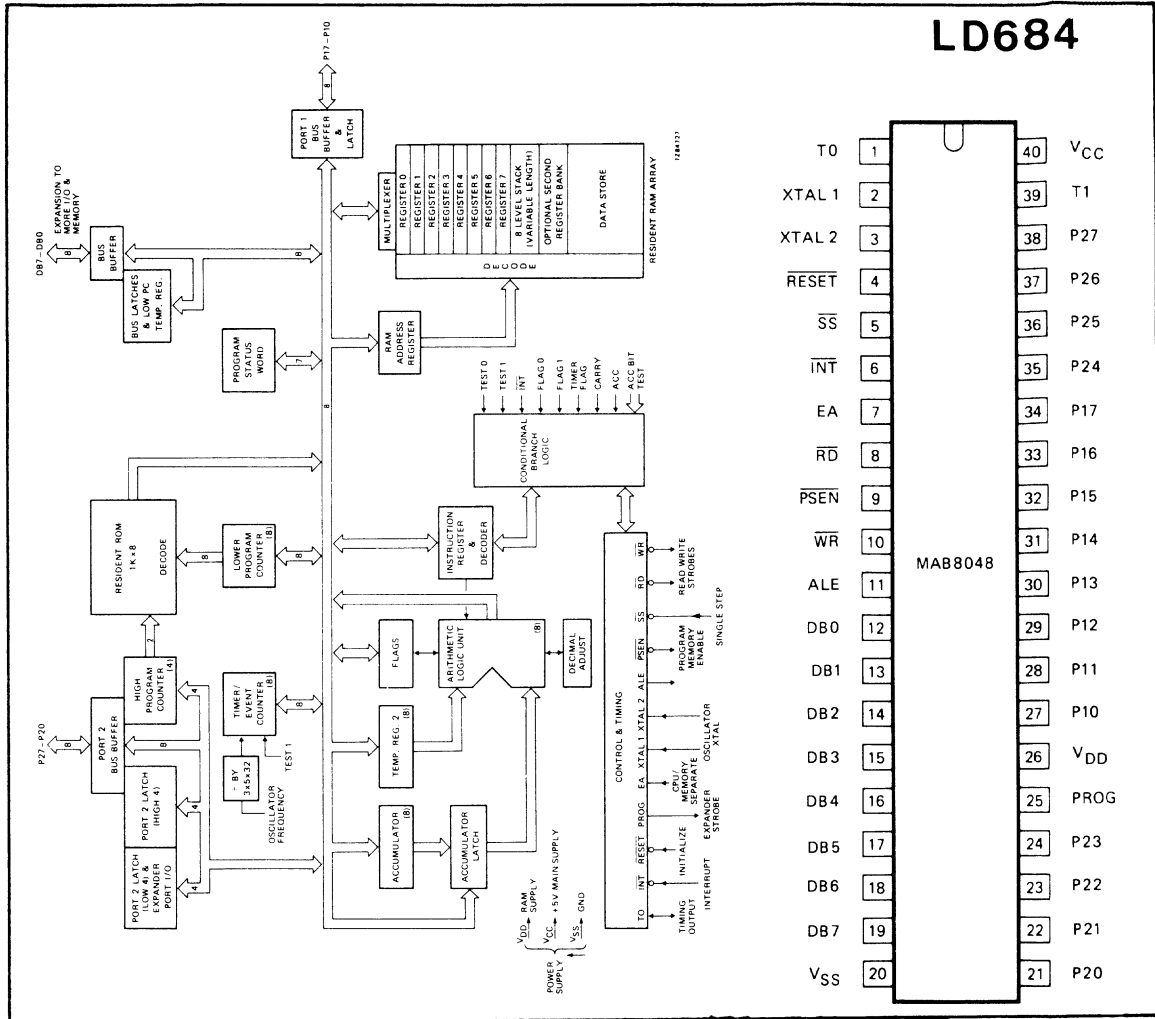




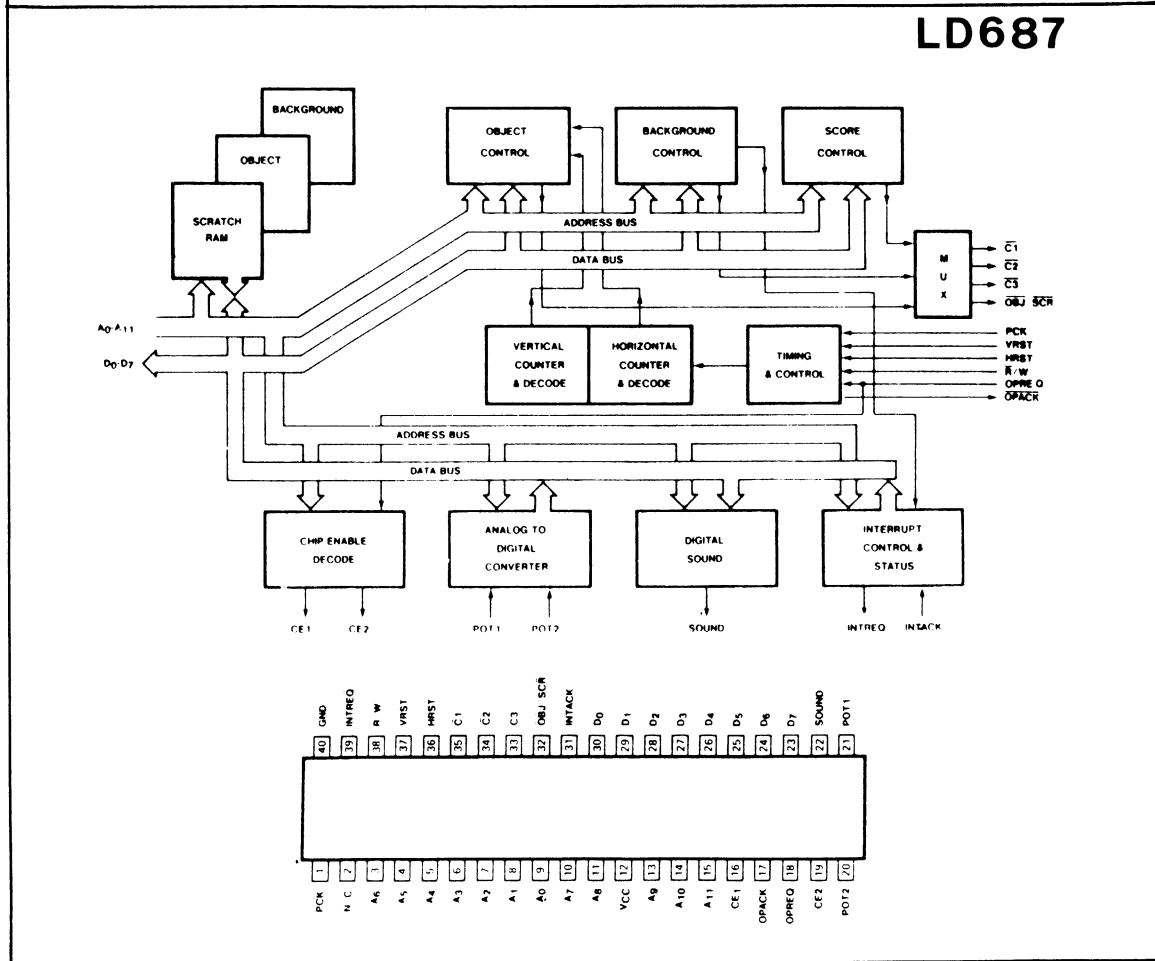
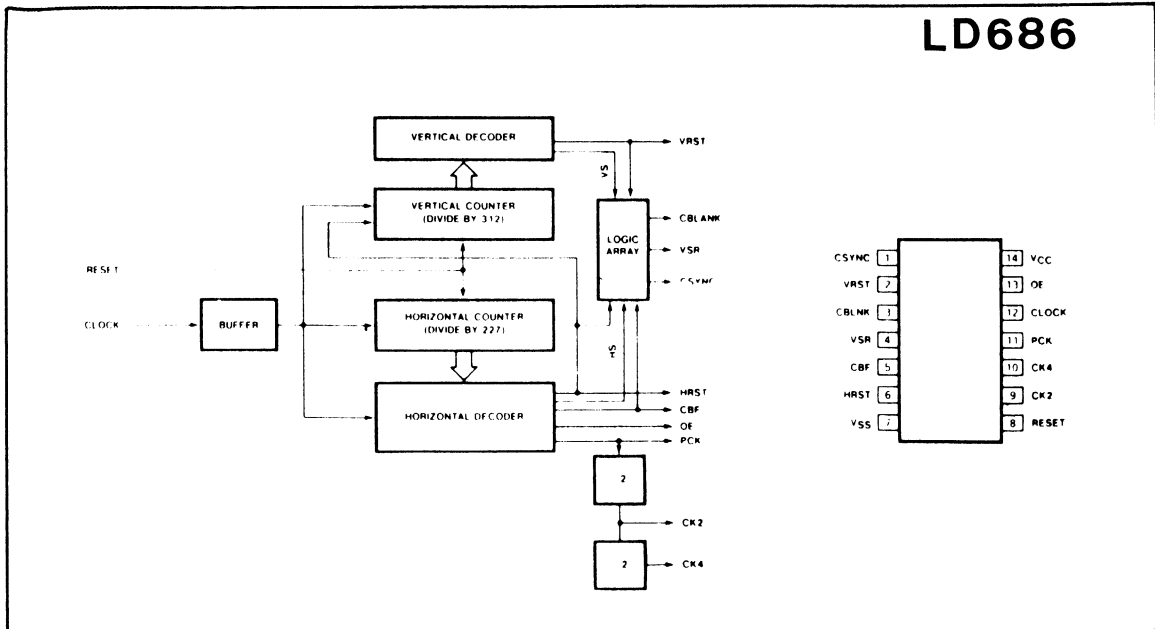
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



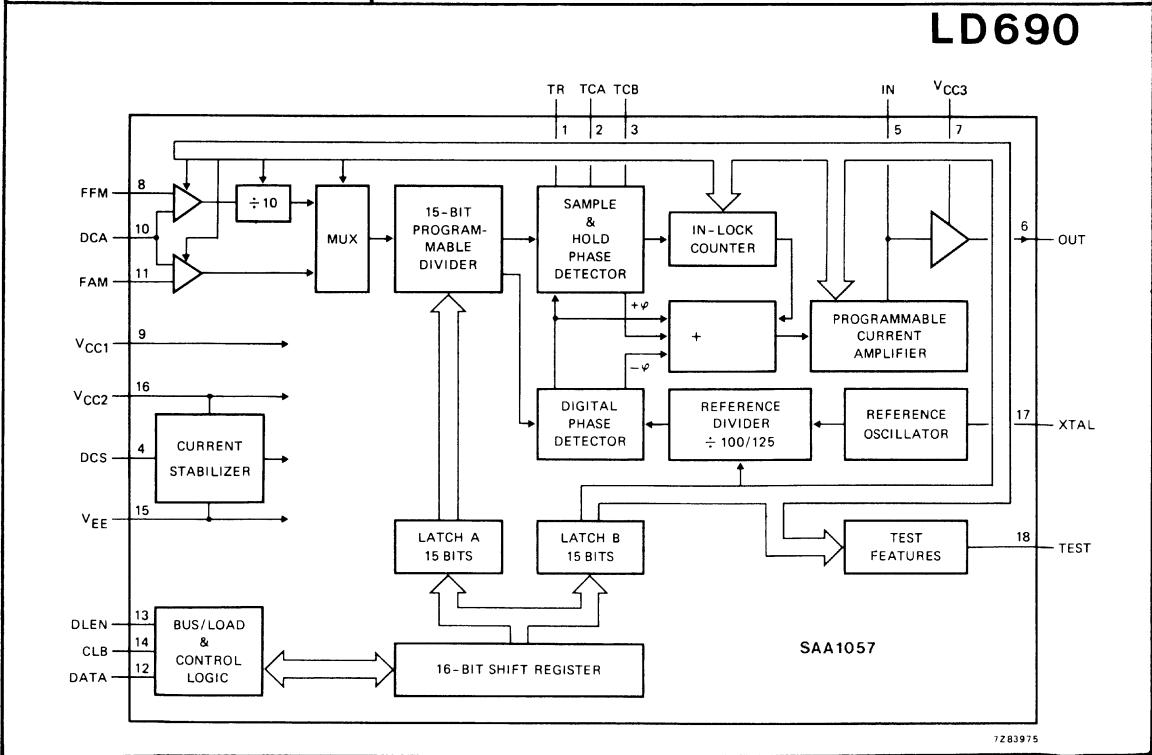
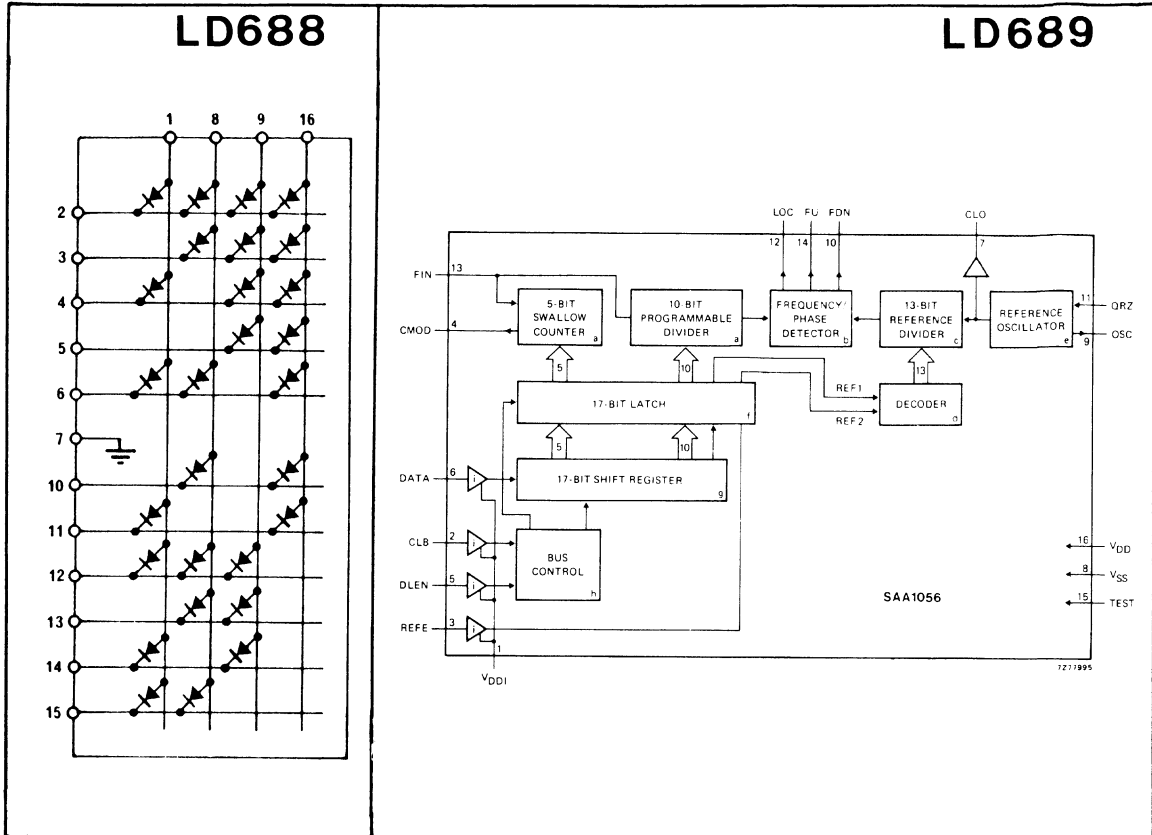
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



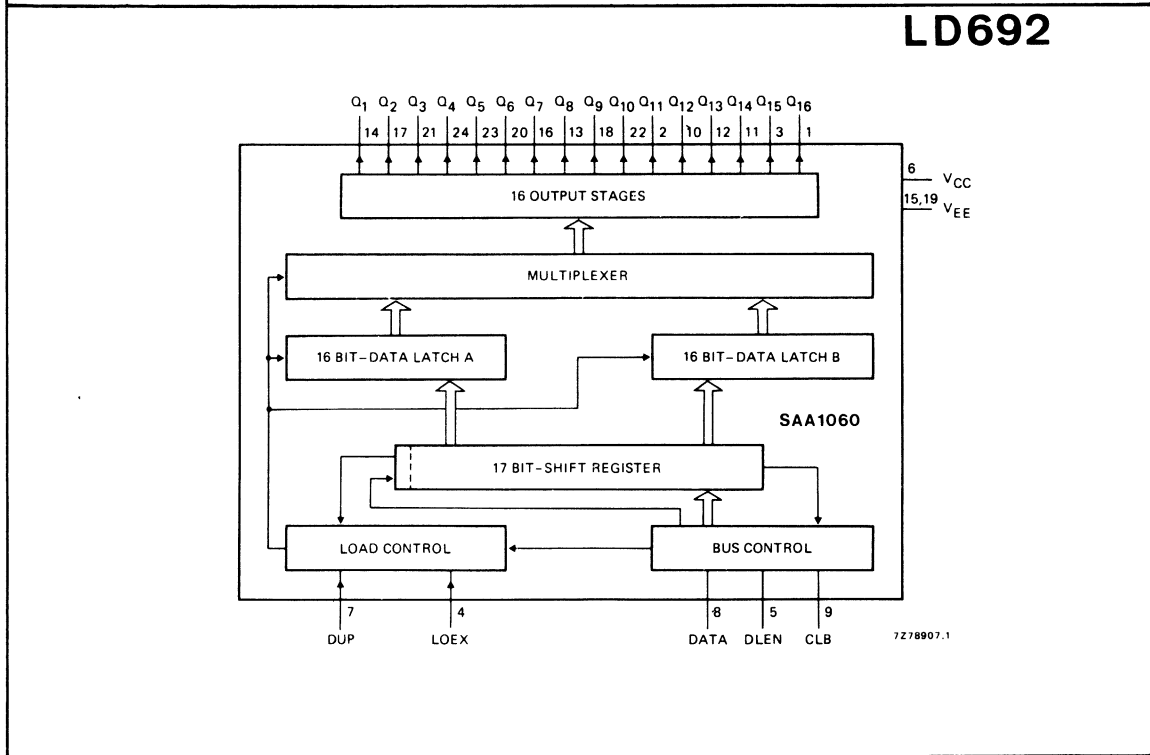
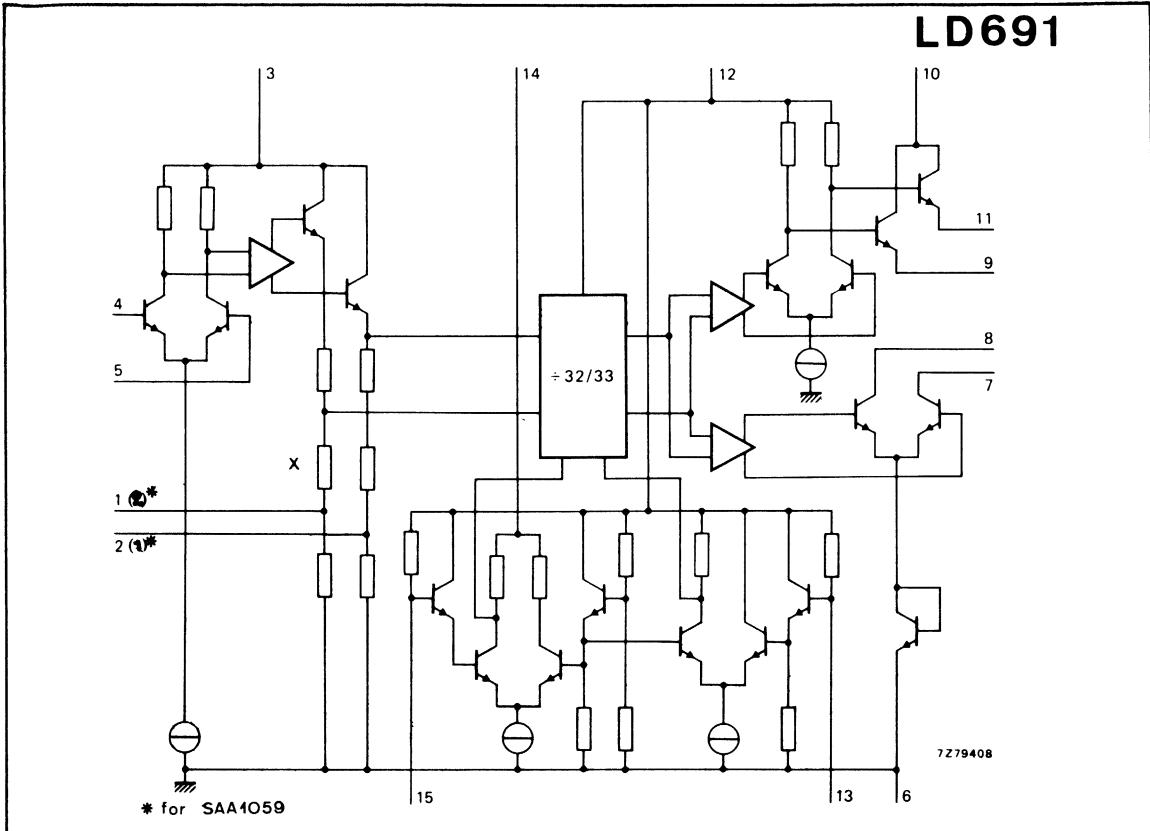
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



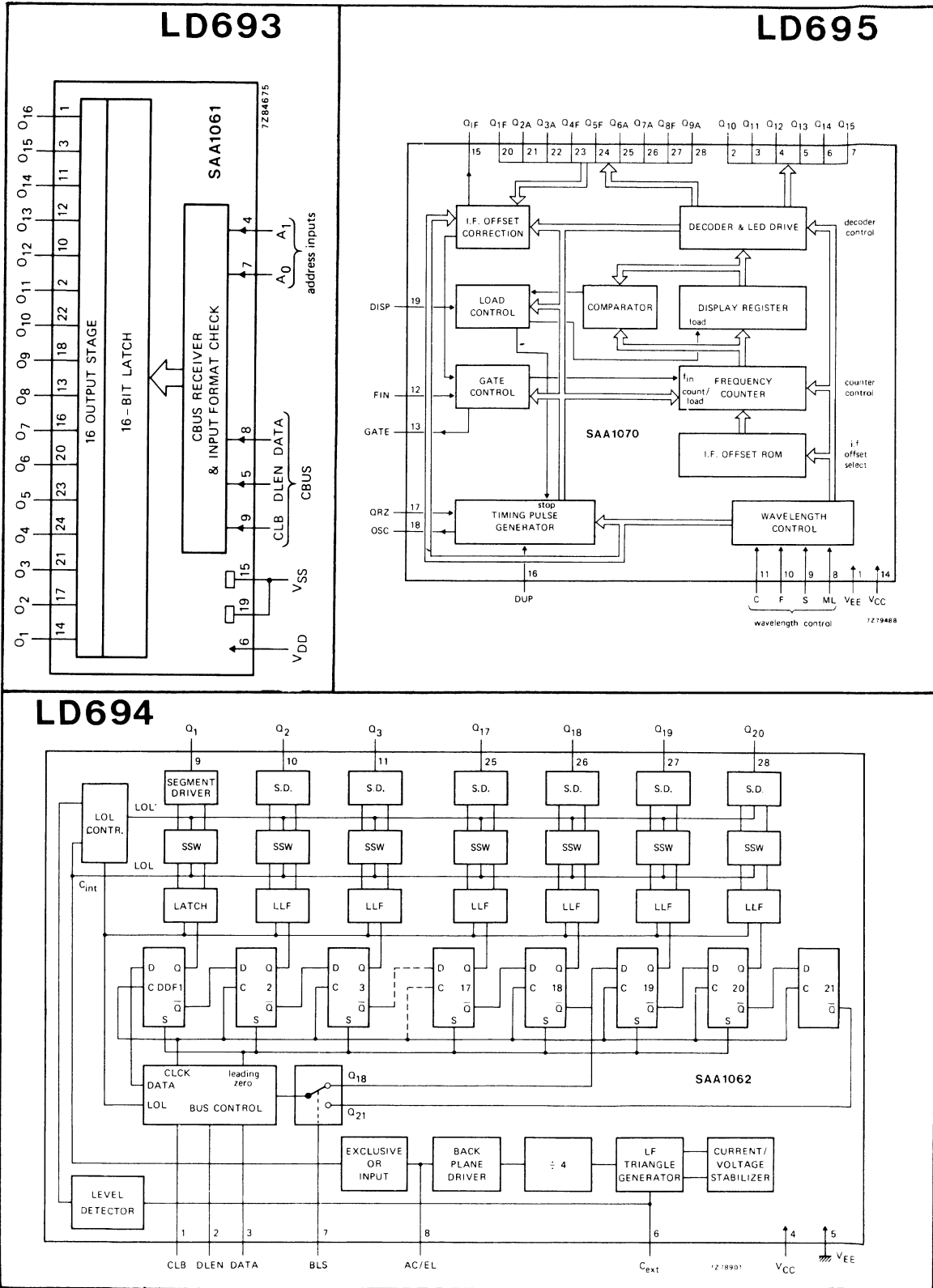
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



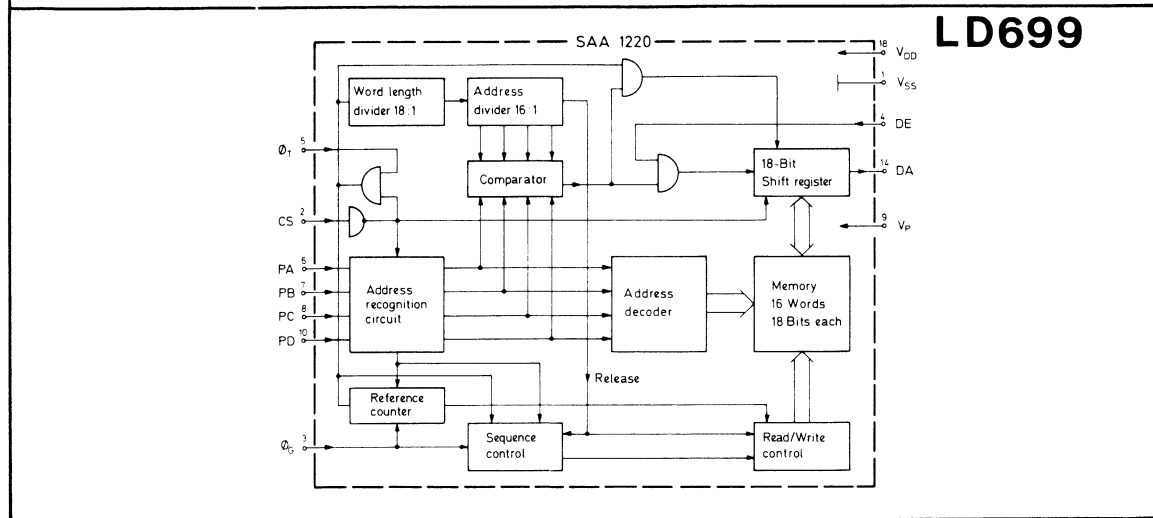
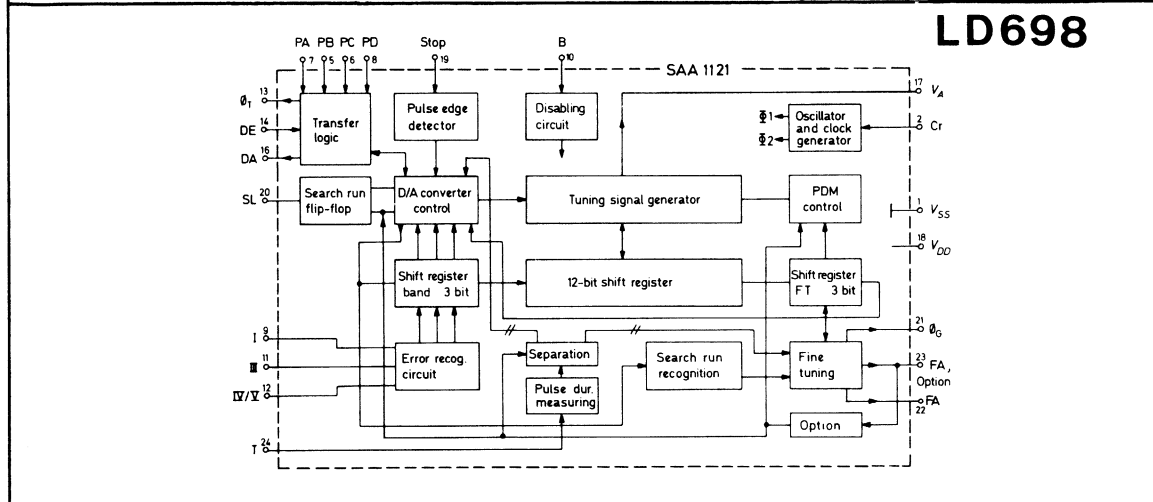
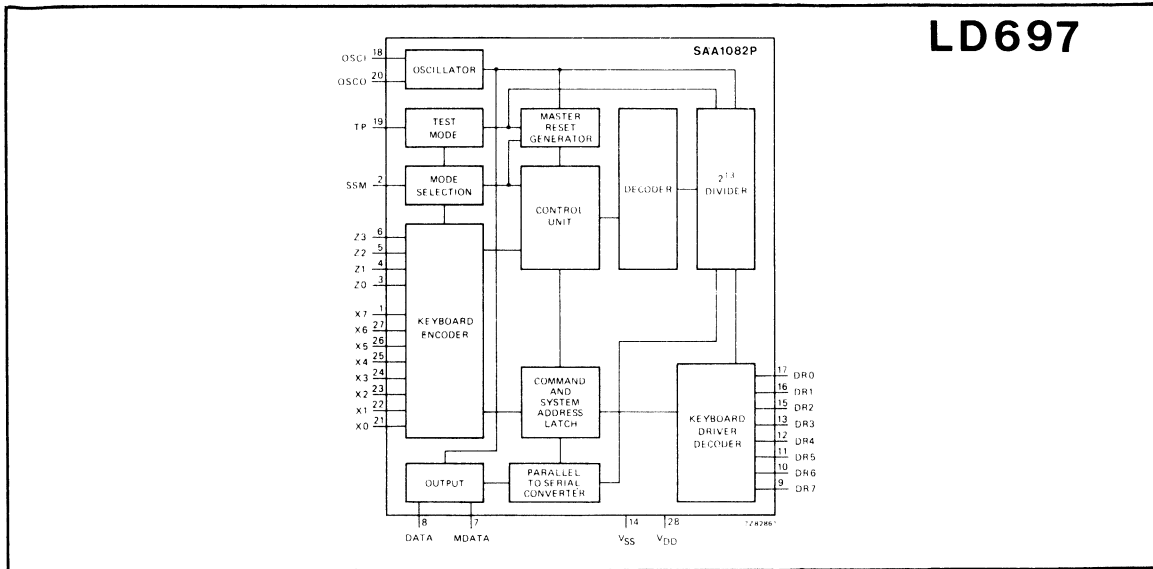
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



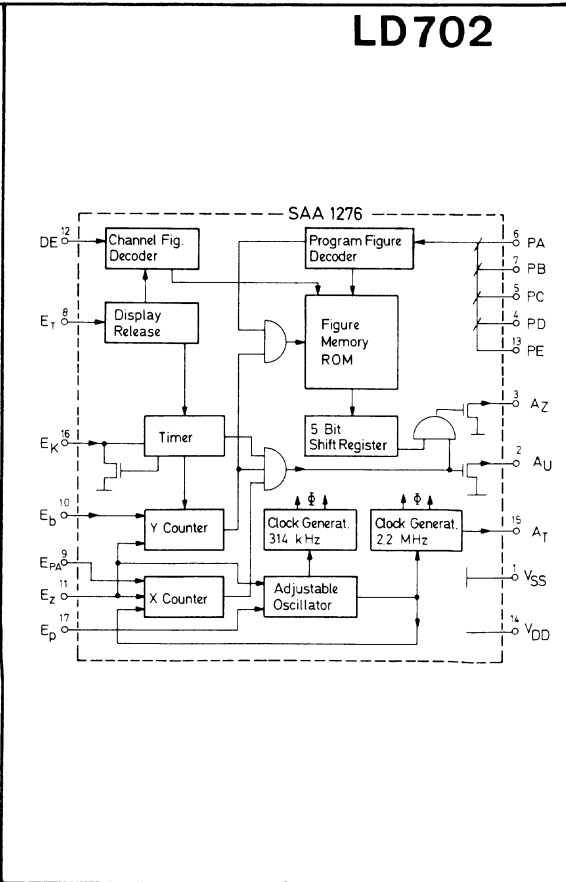
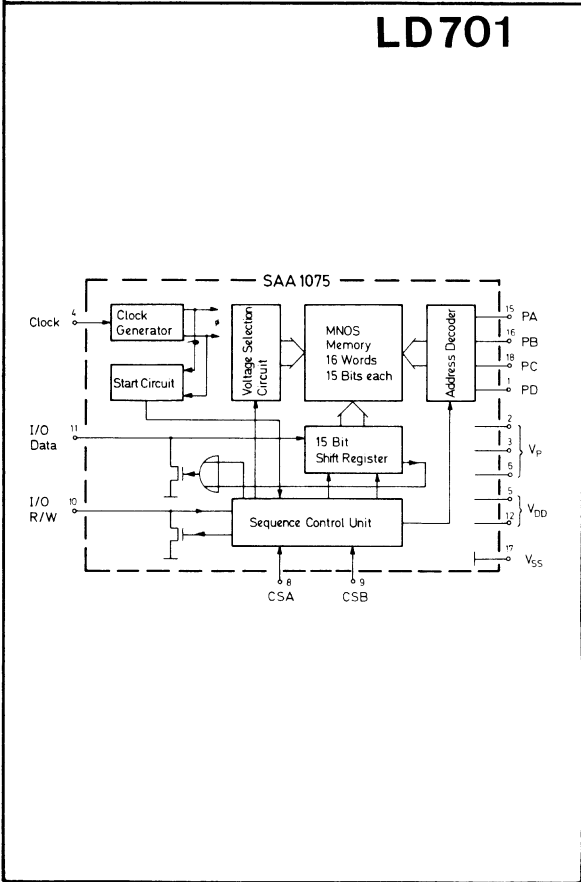
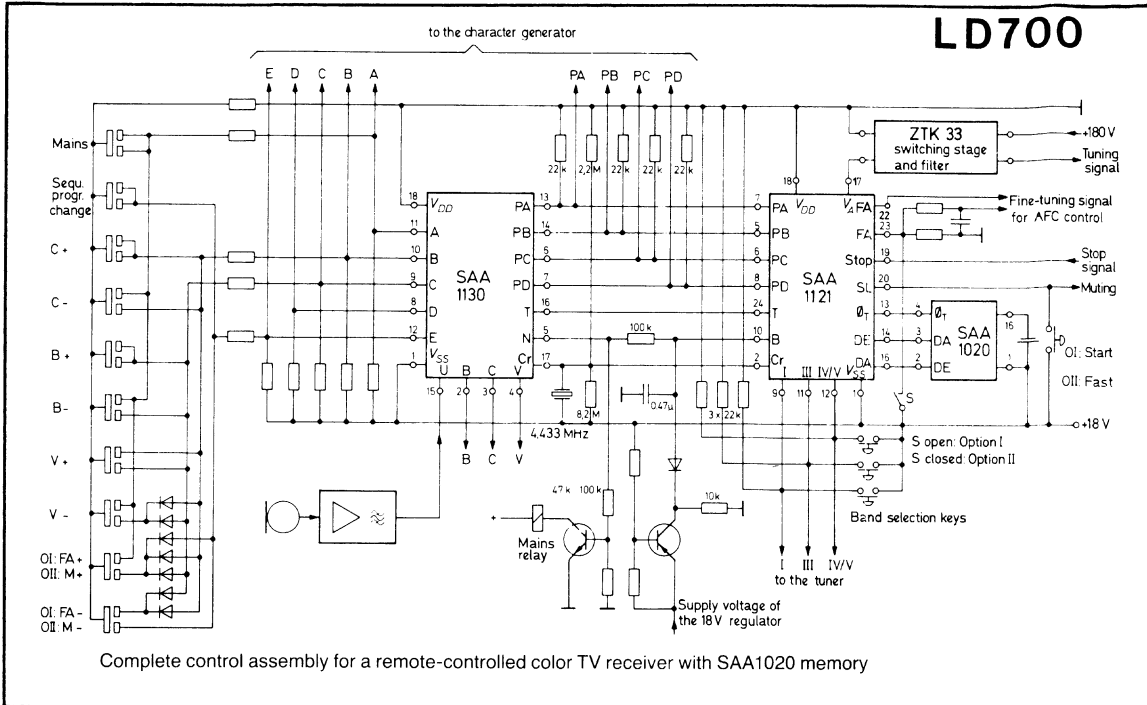
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



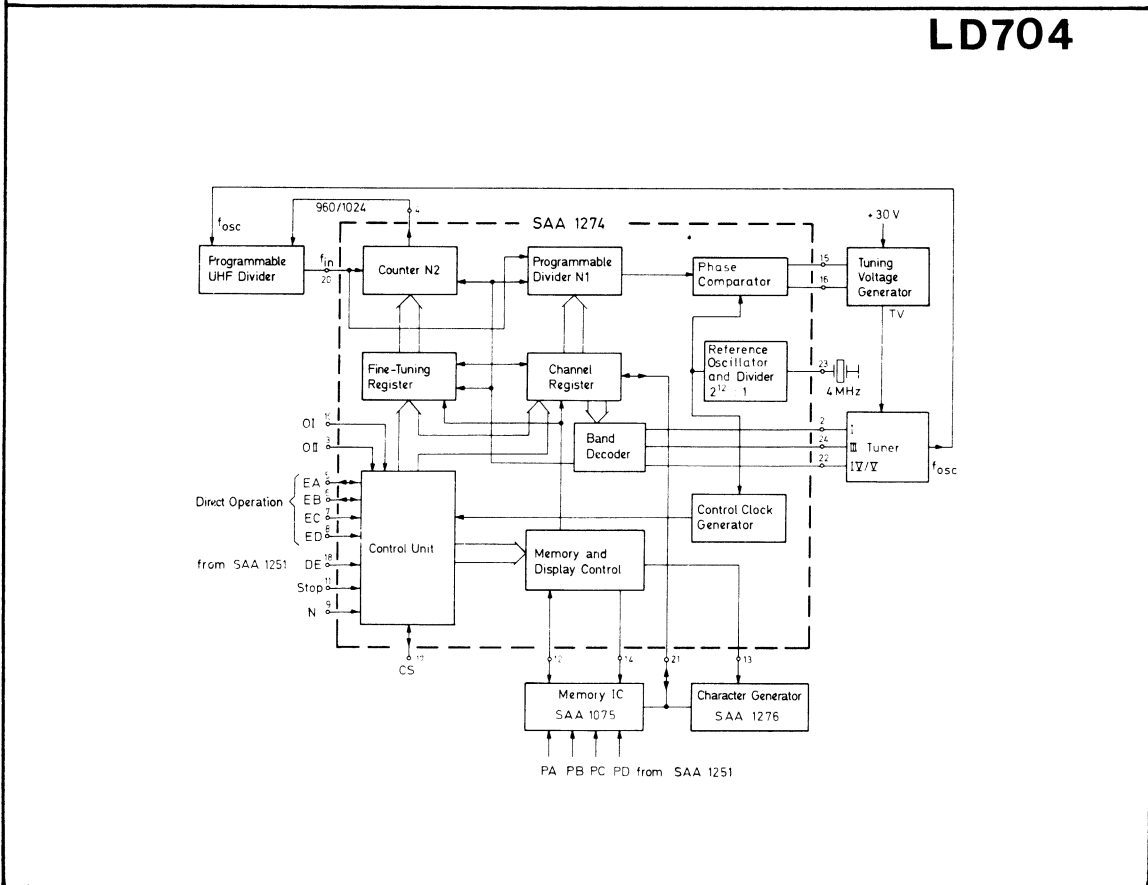
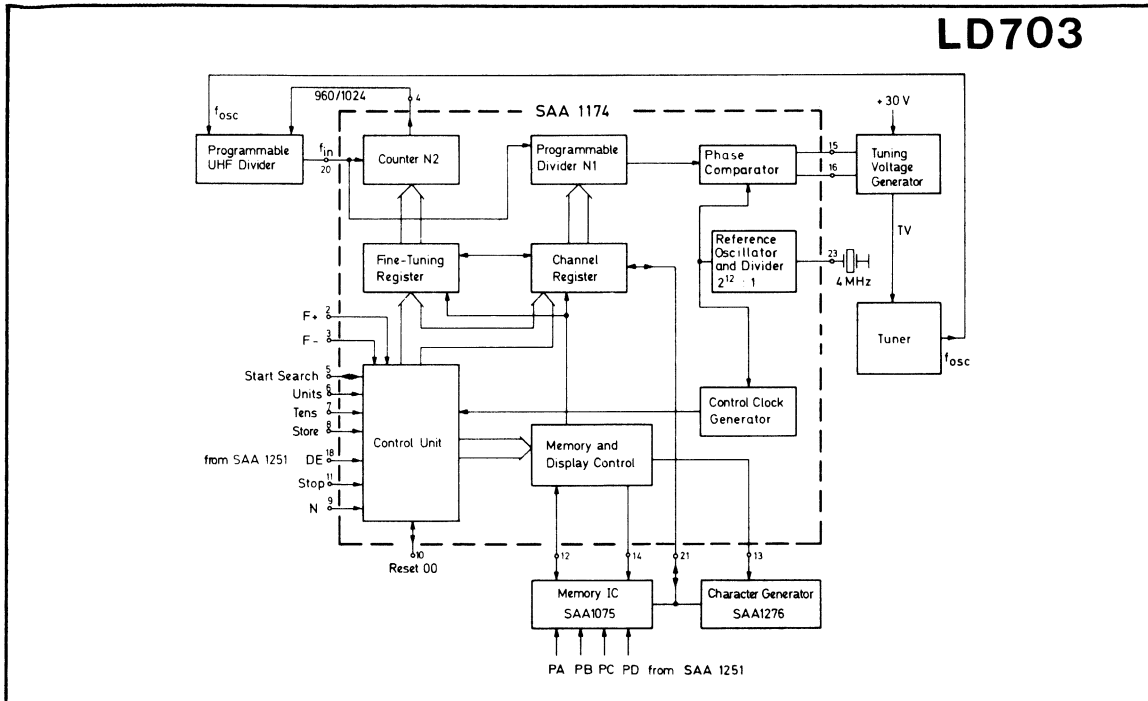
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



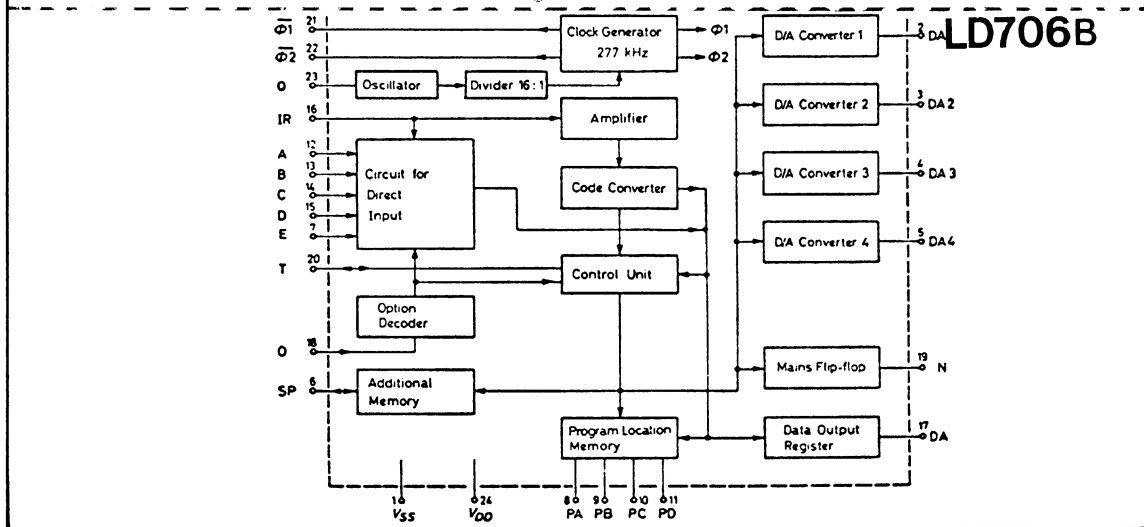
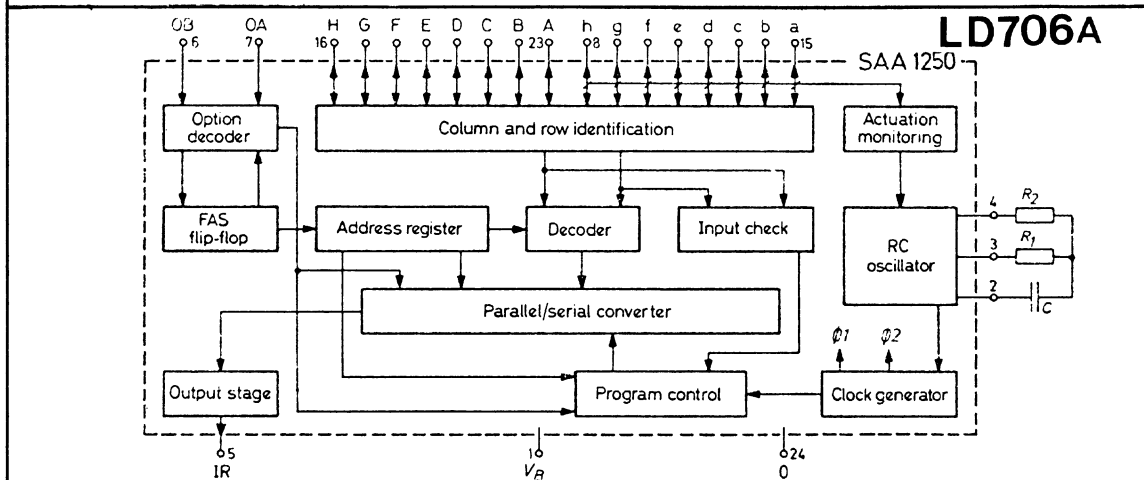
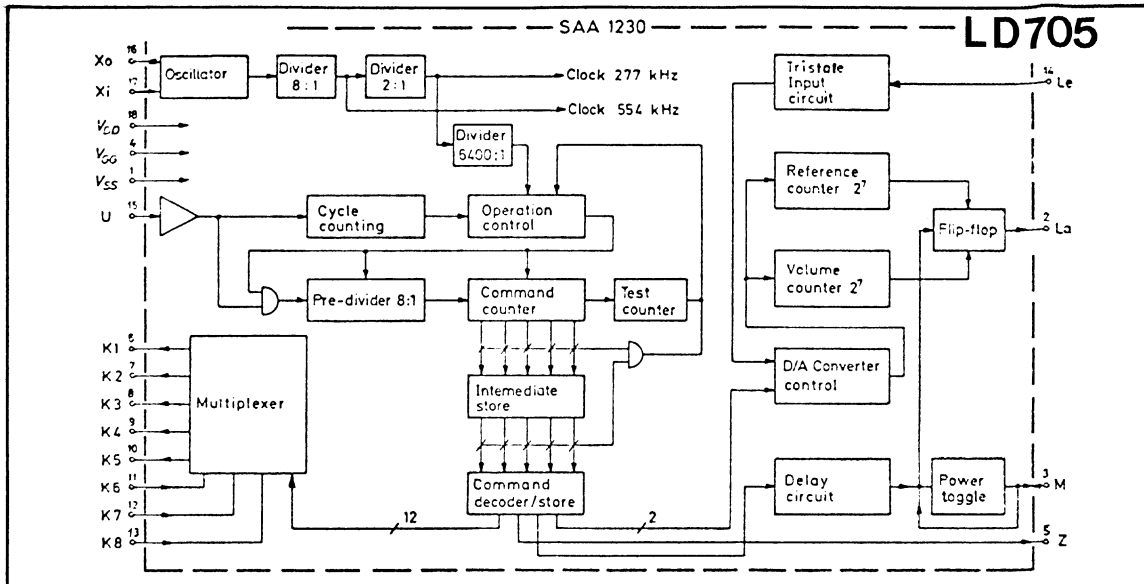
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



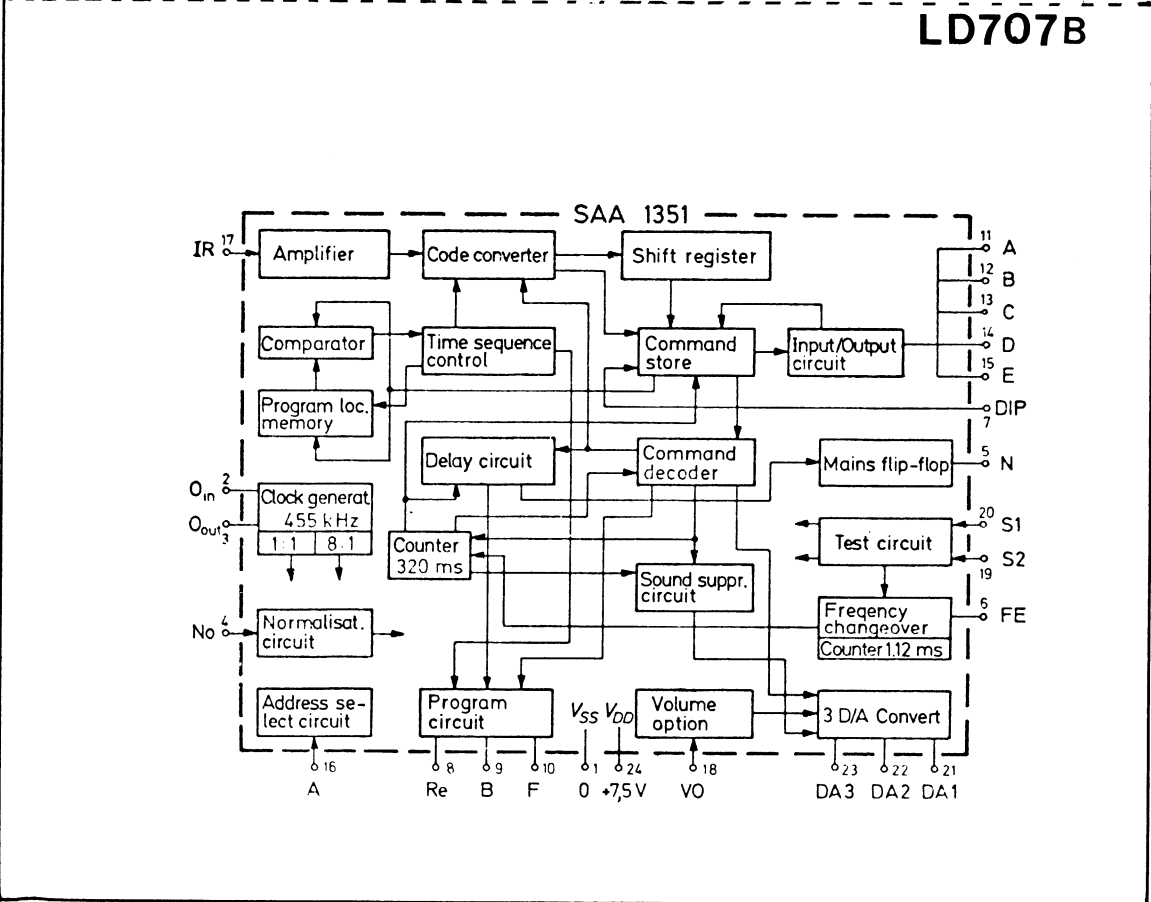
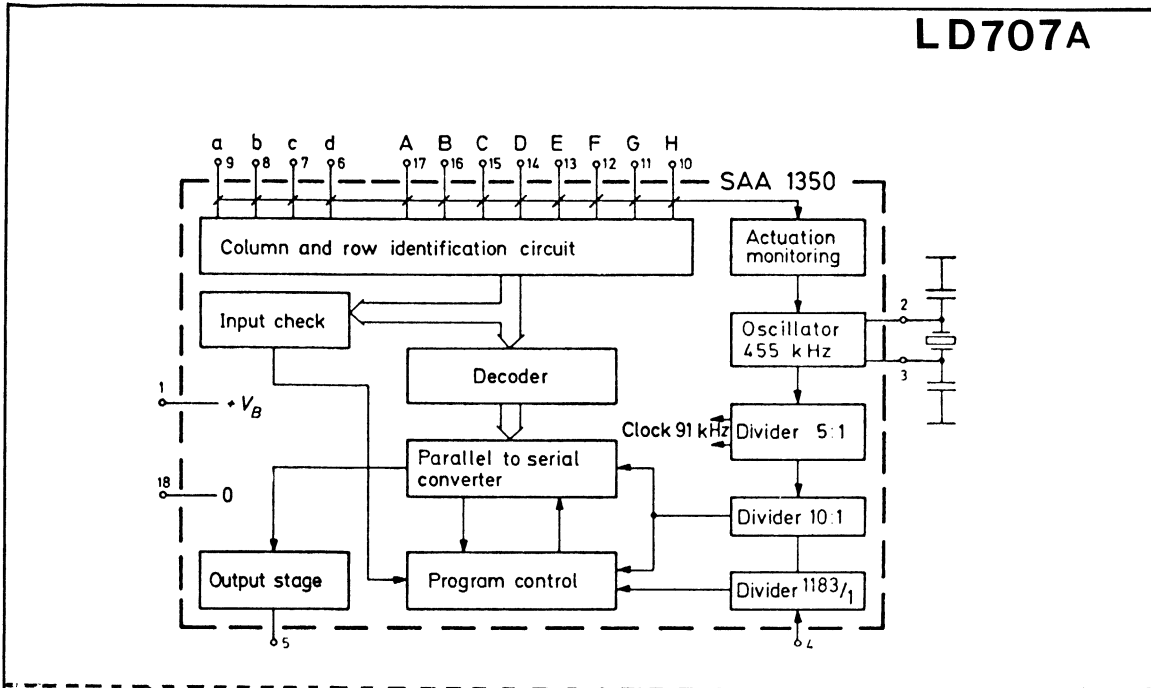
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

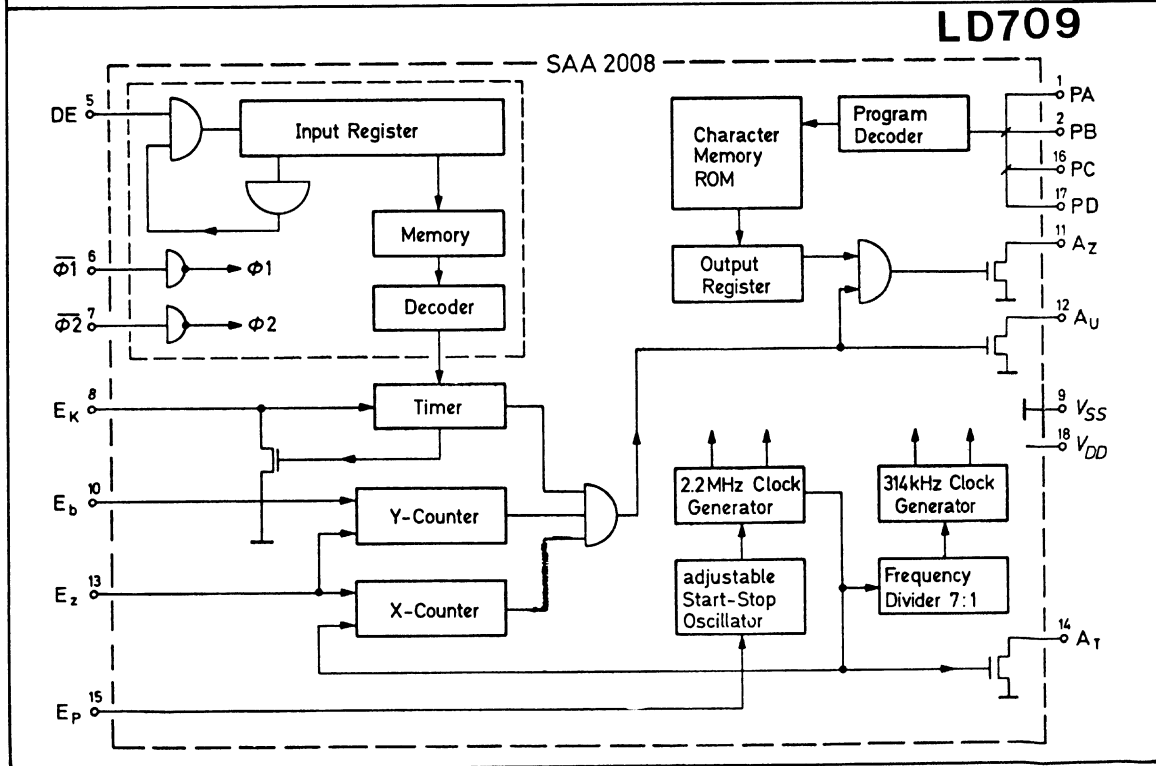
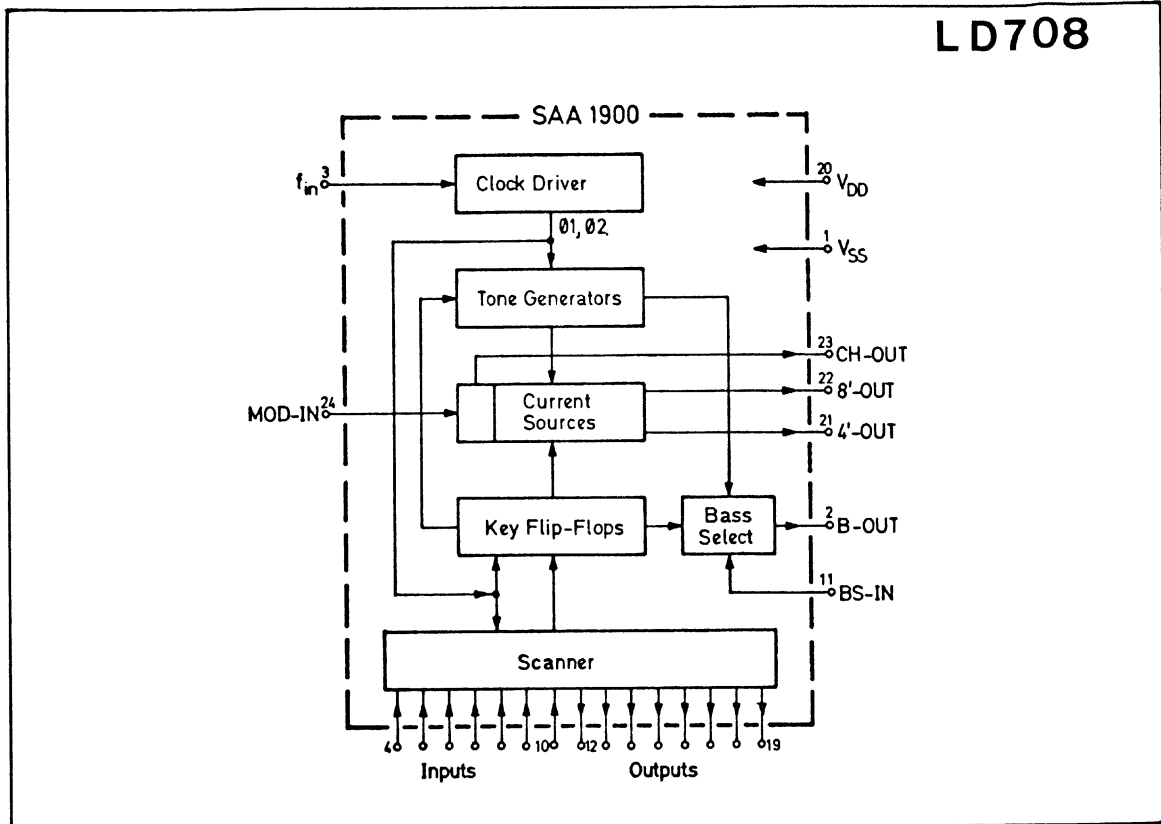


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



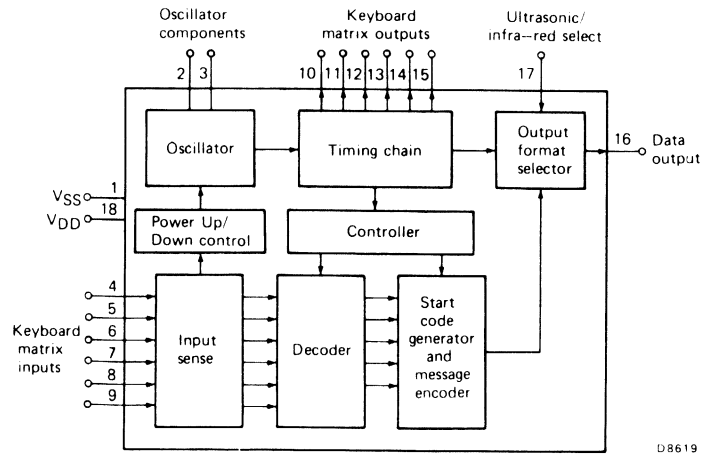
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE





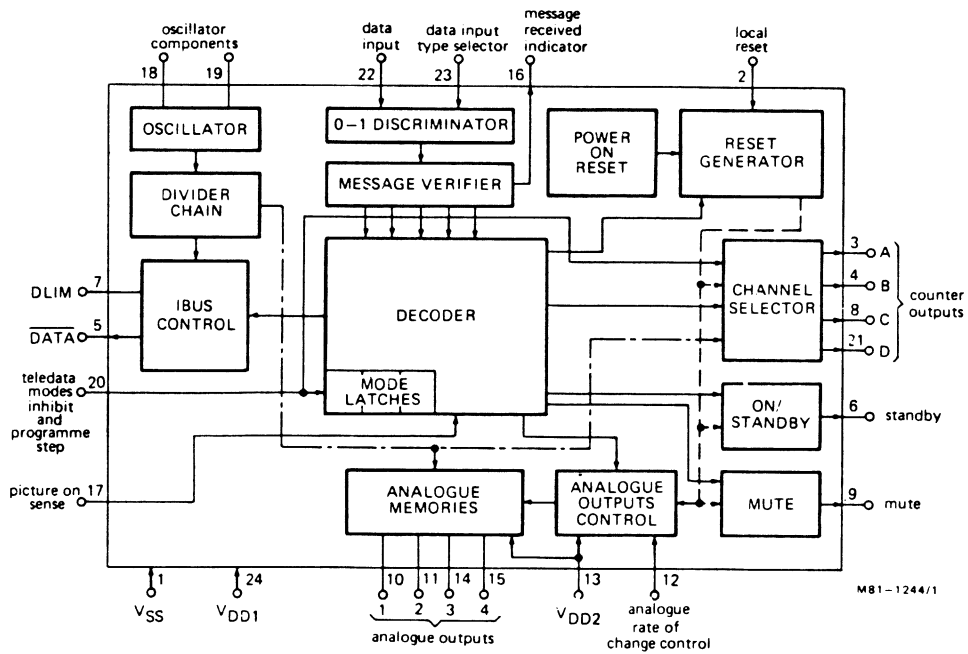
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

LD710

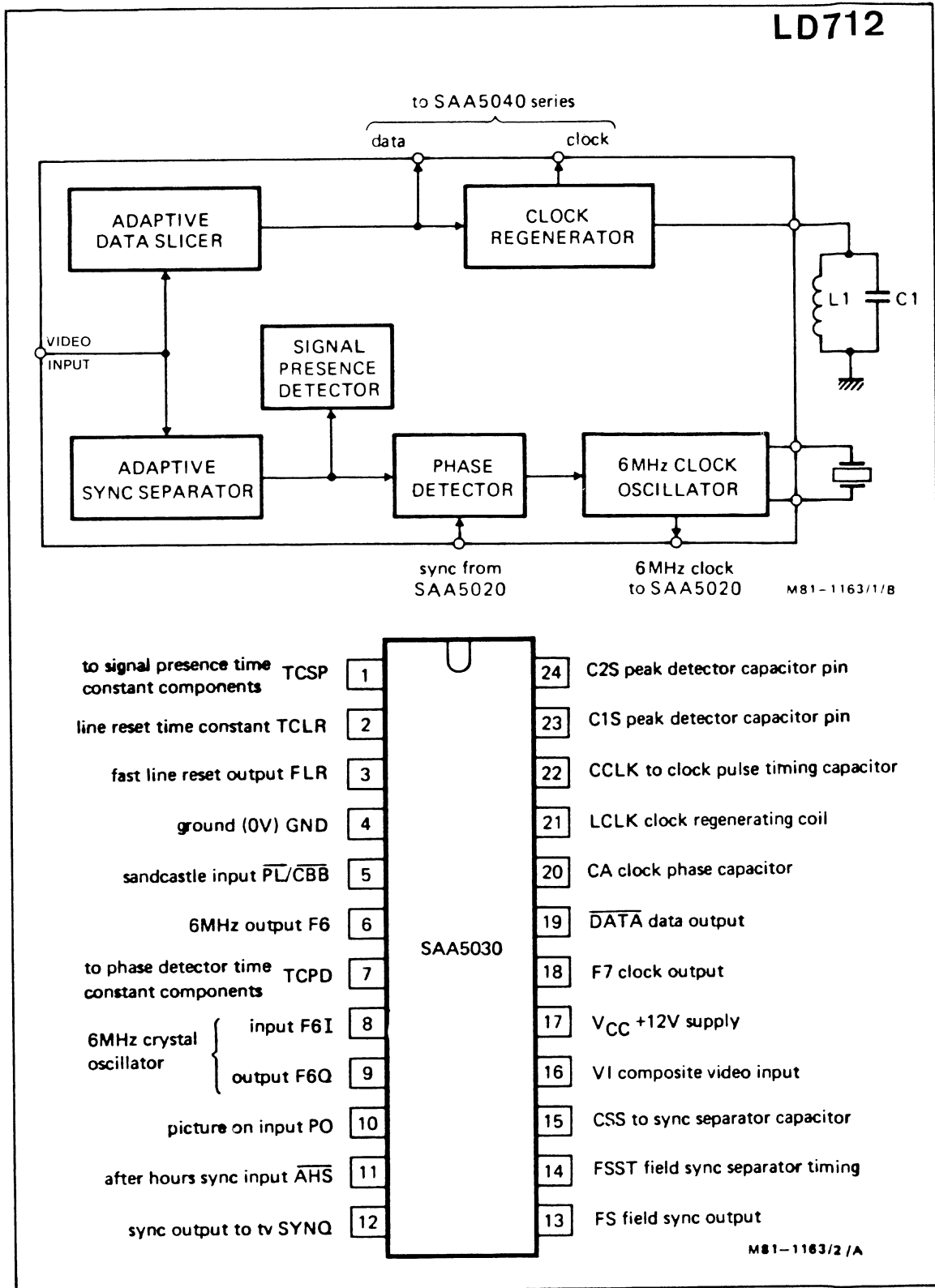


D8619

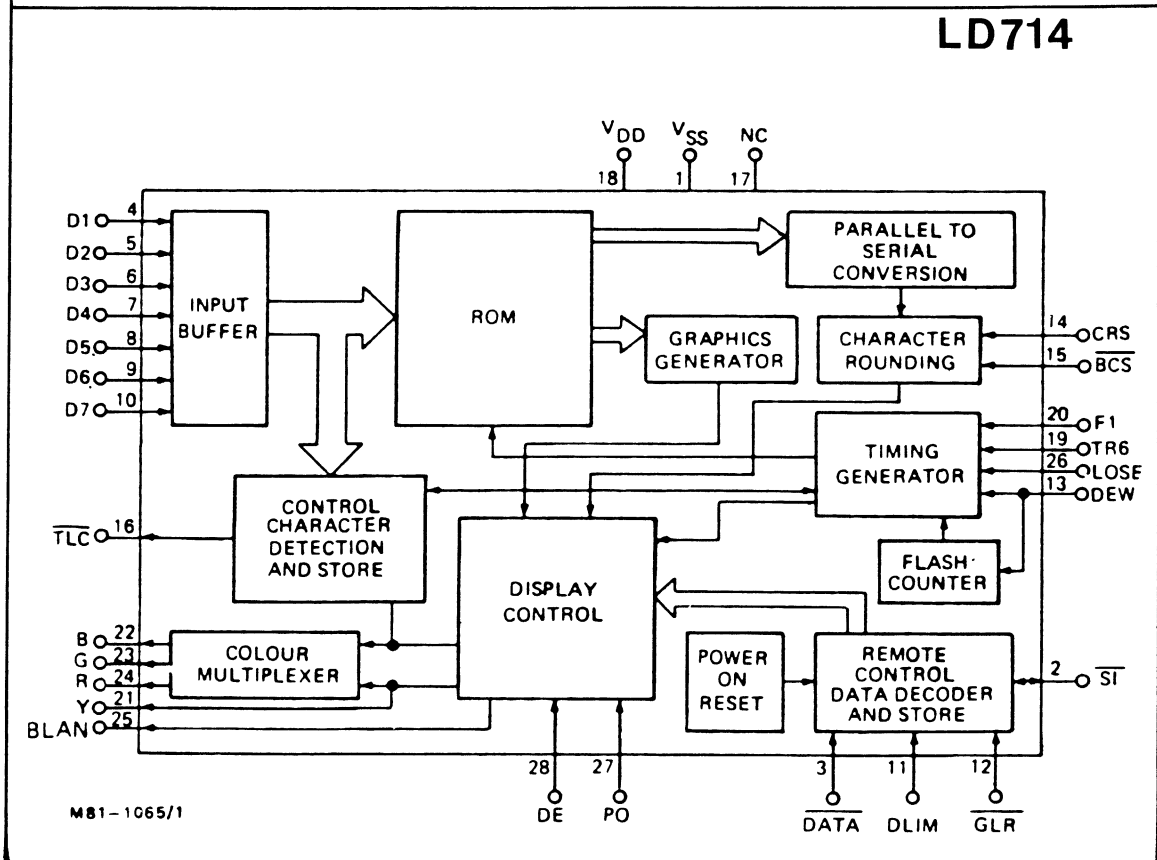
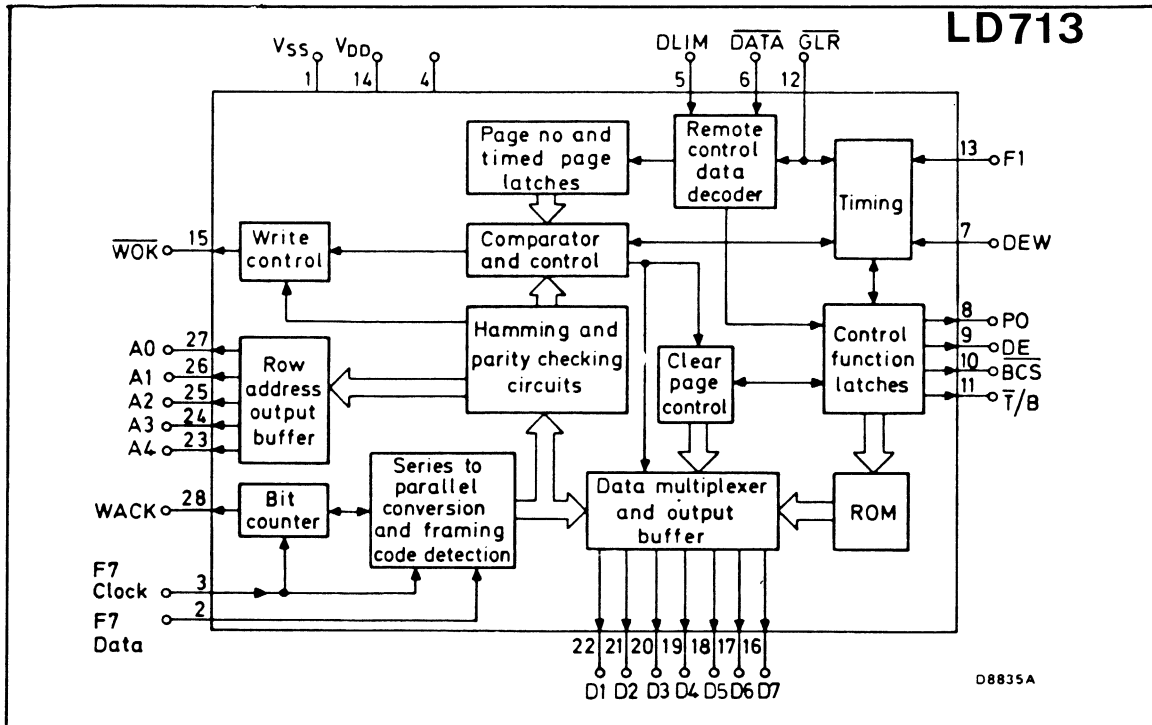
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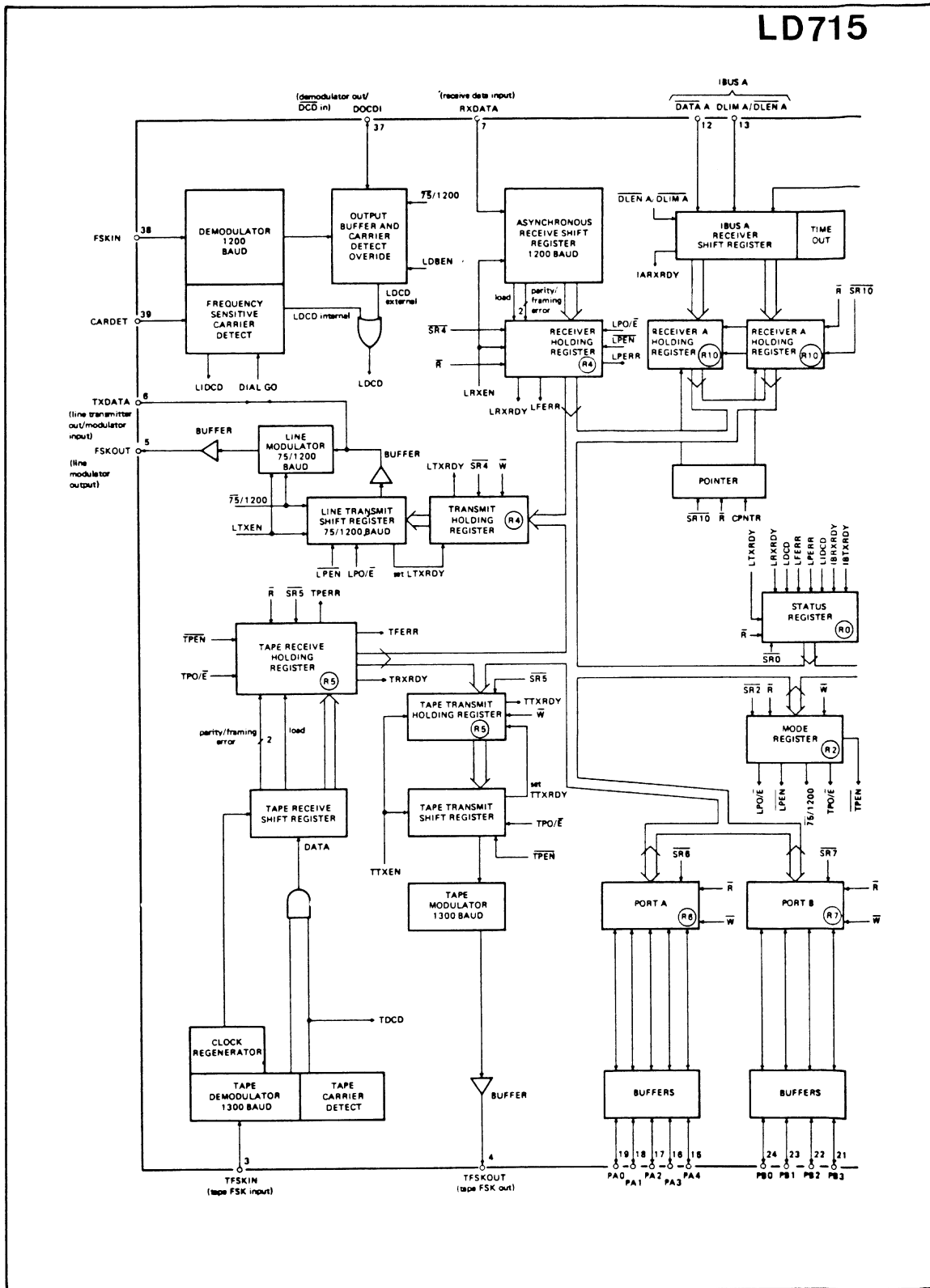
M81-1244/1



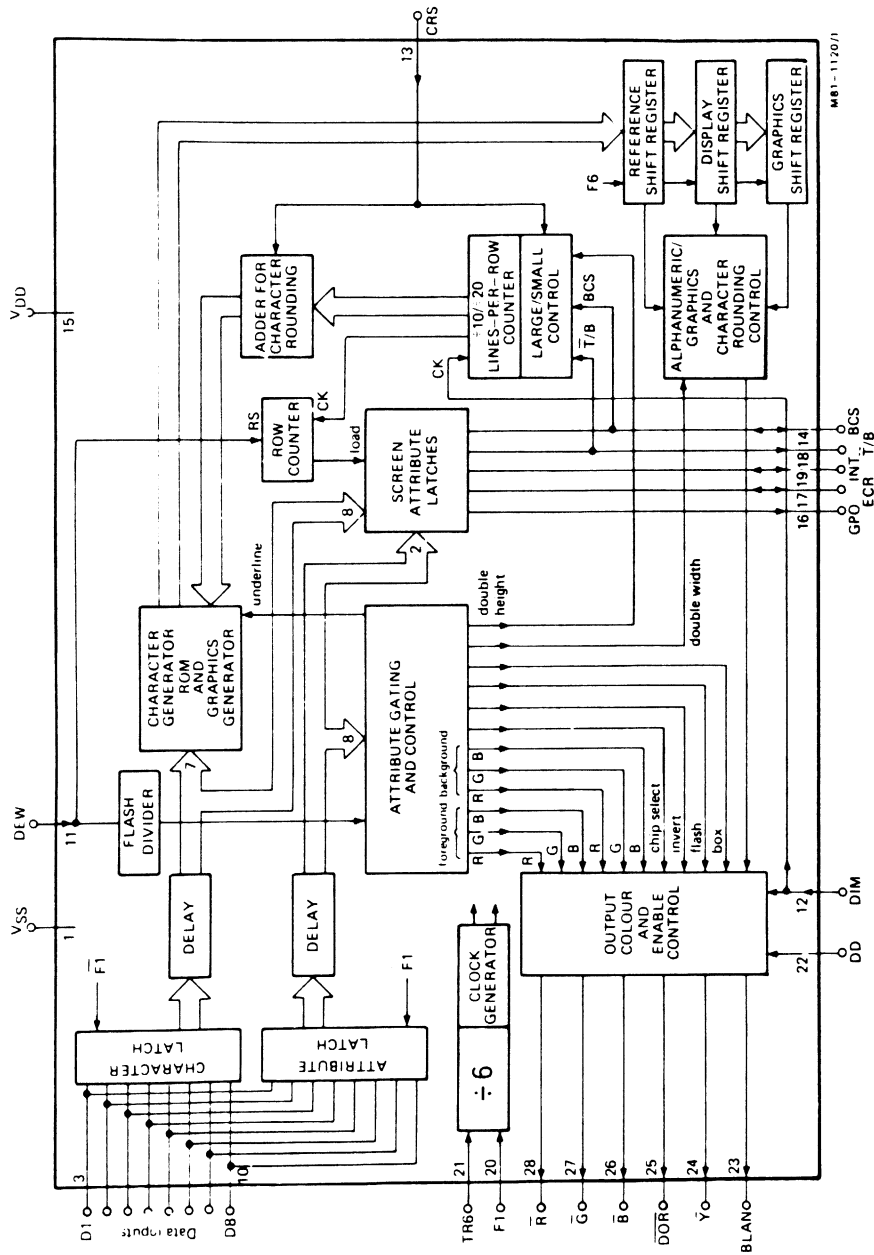
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

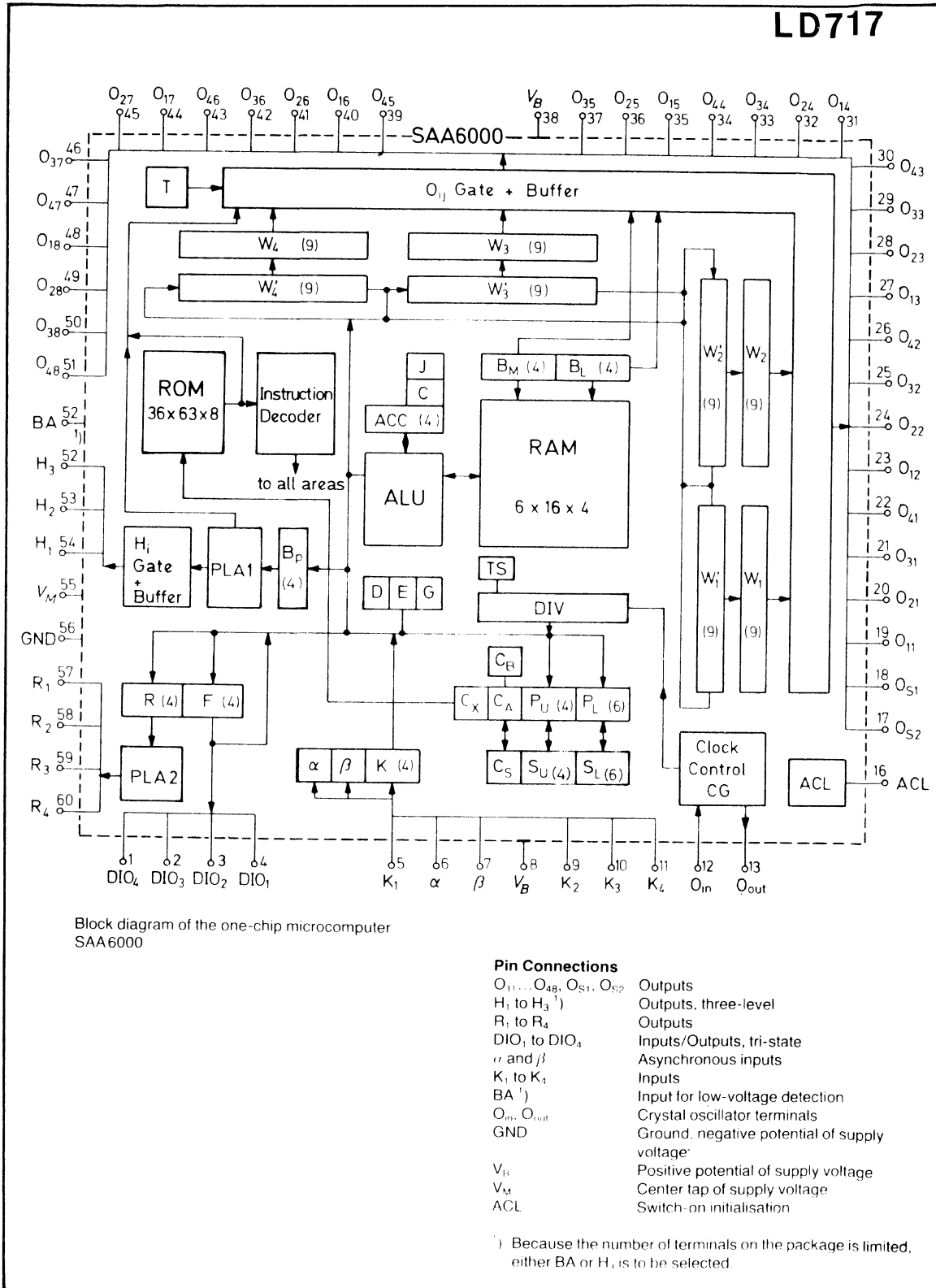


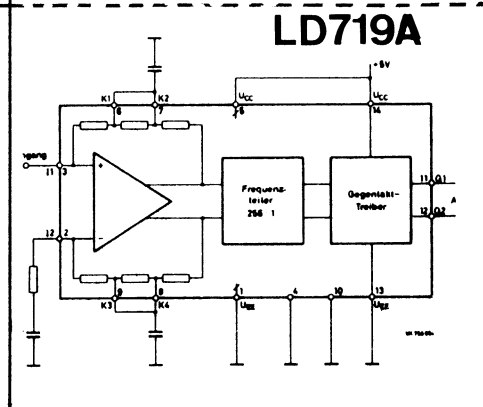
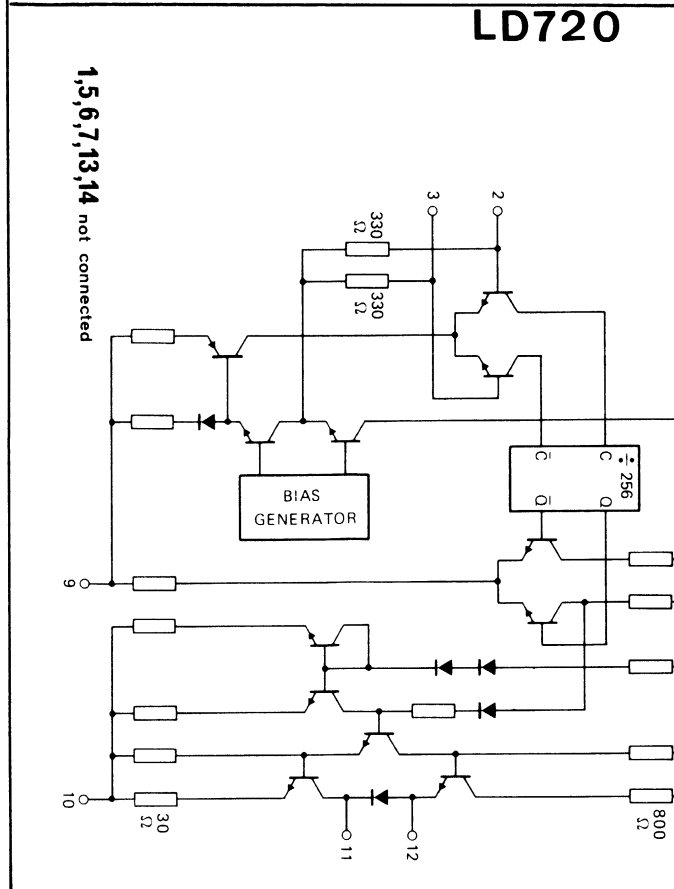
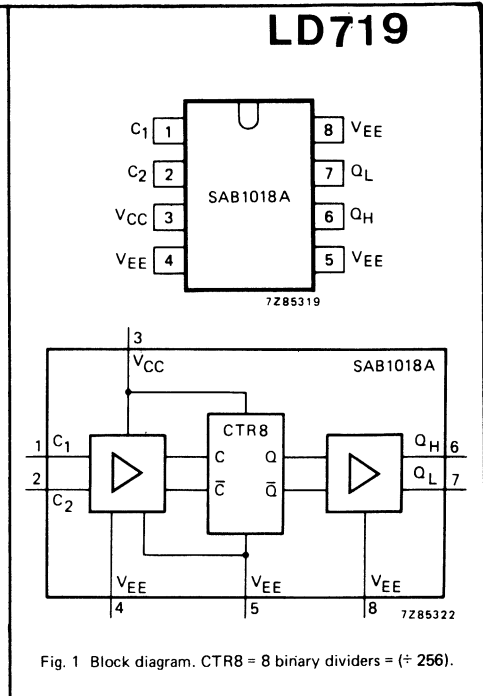
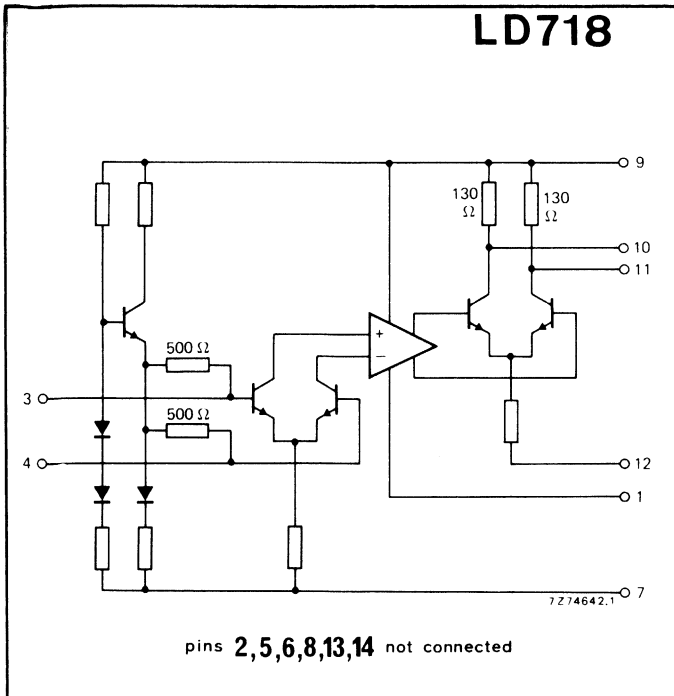
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



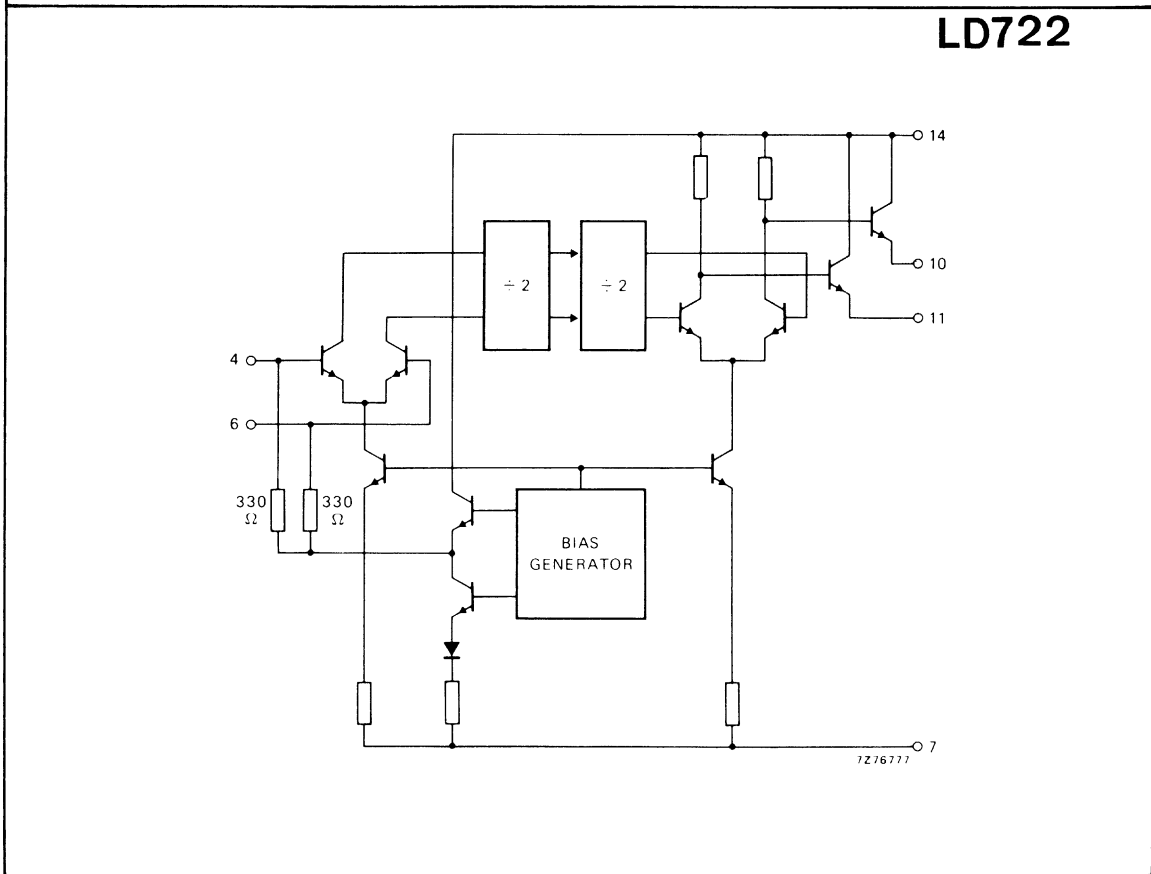
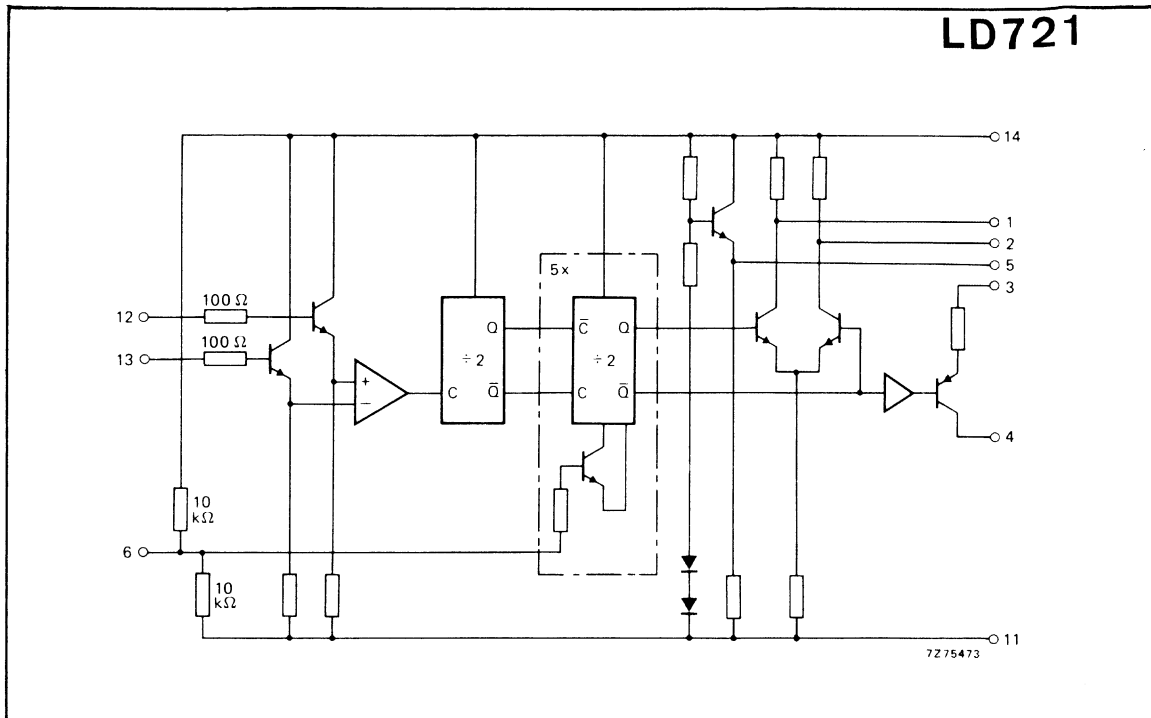
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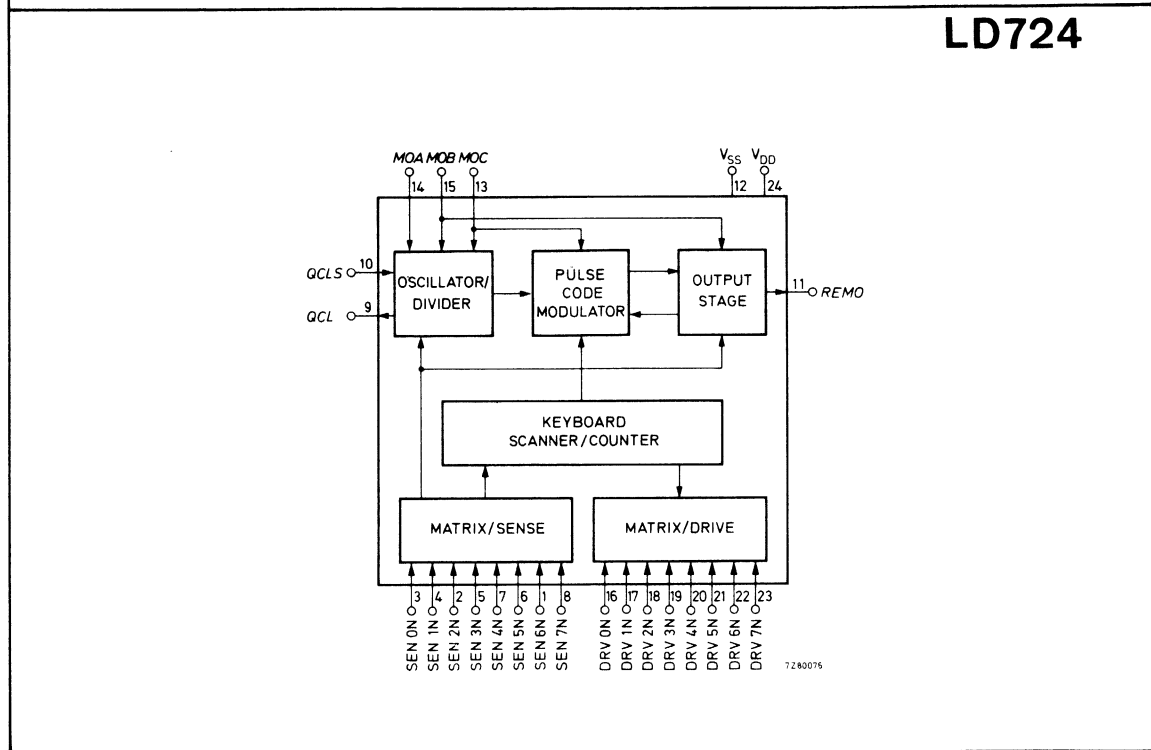
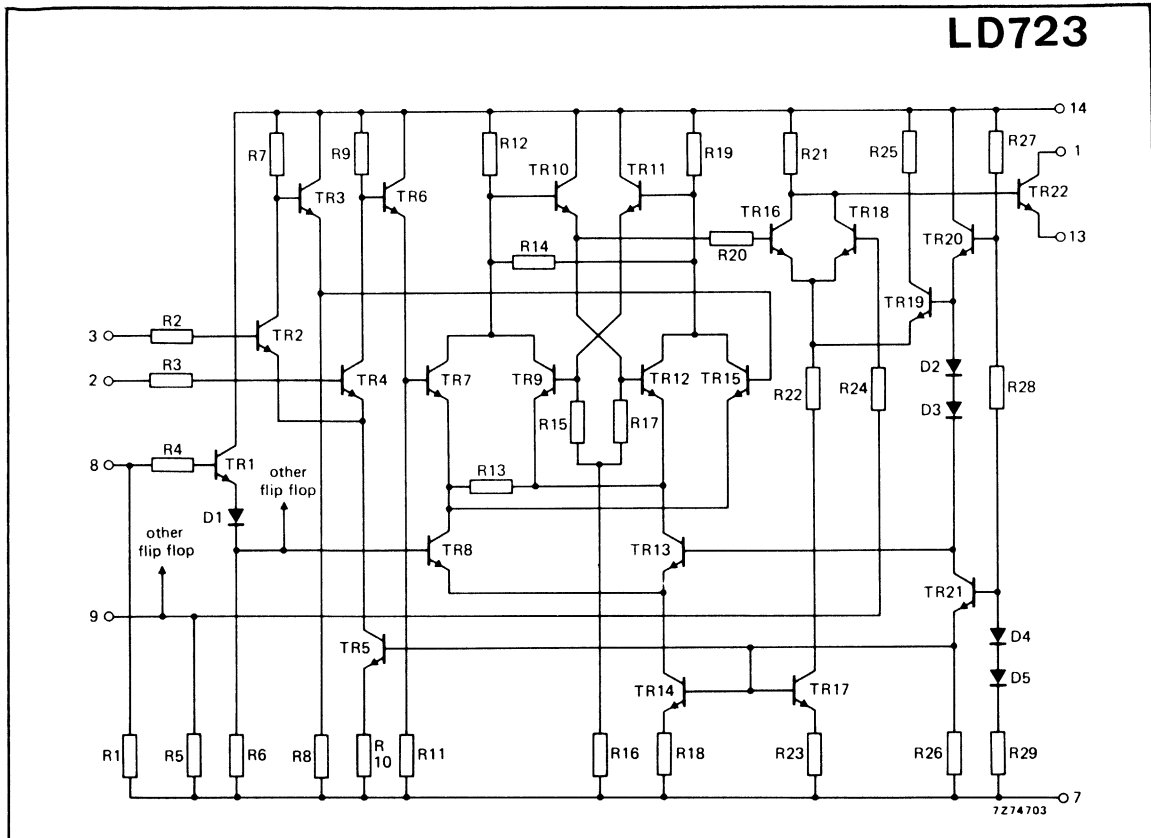




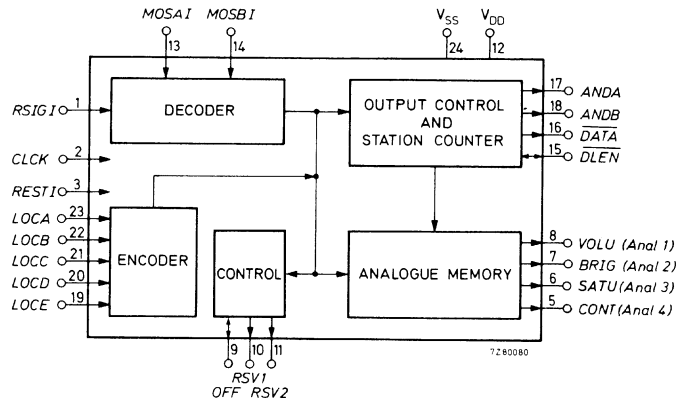
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



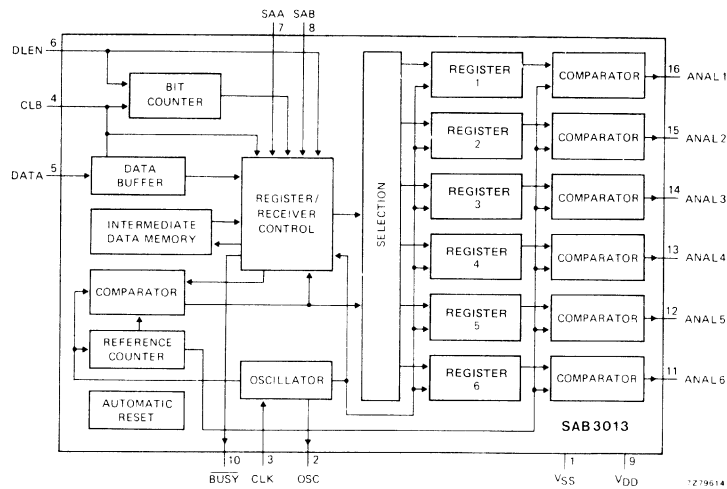
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



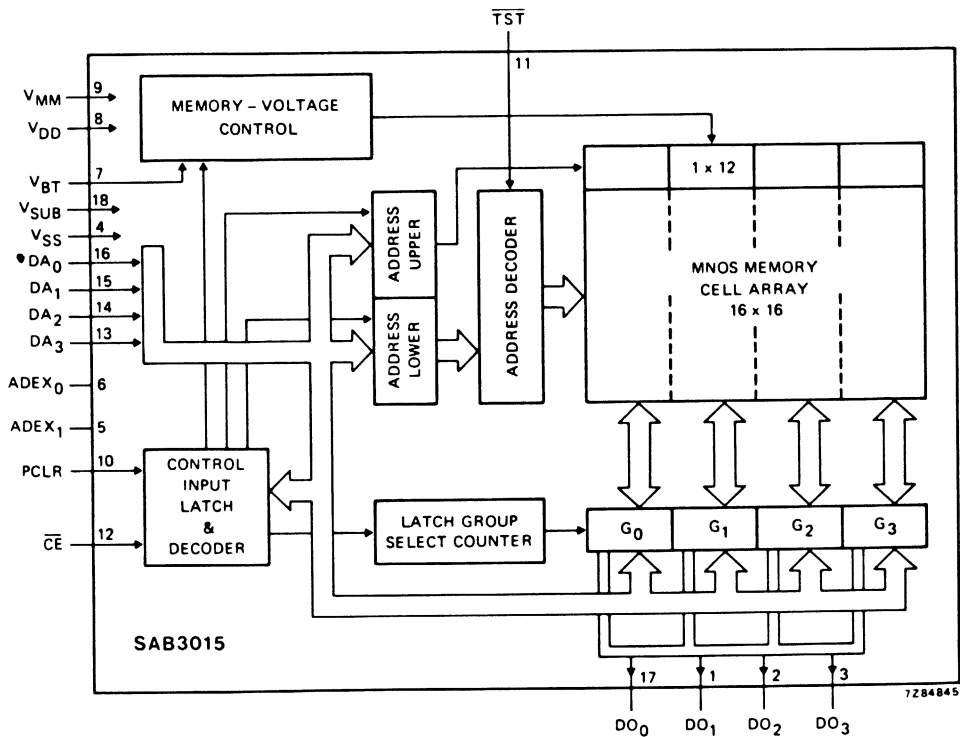
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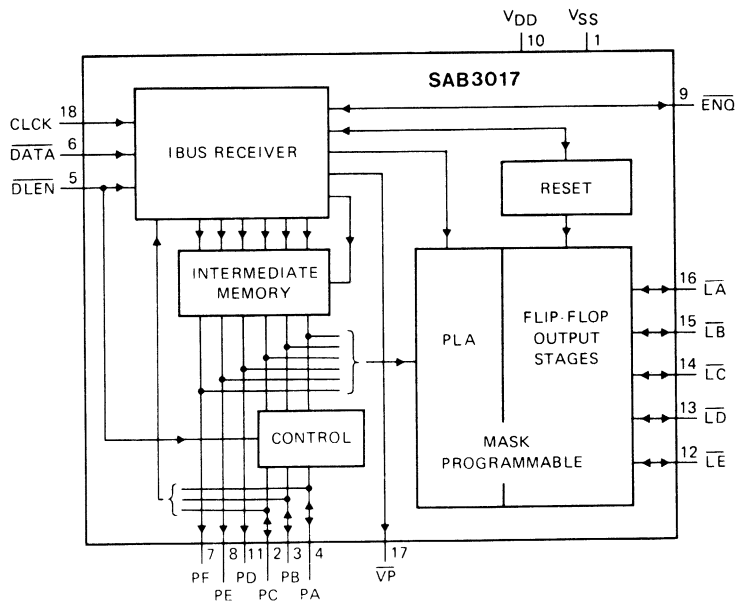
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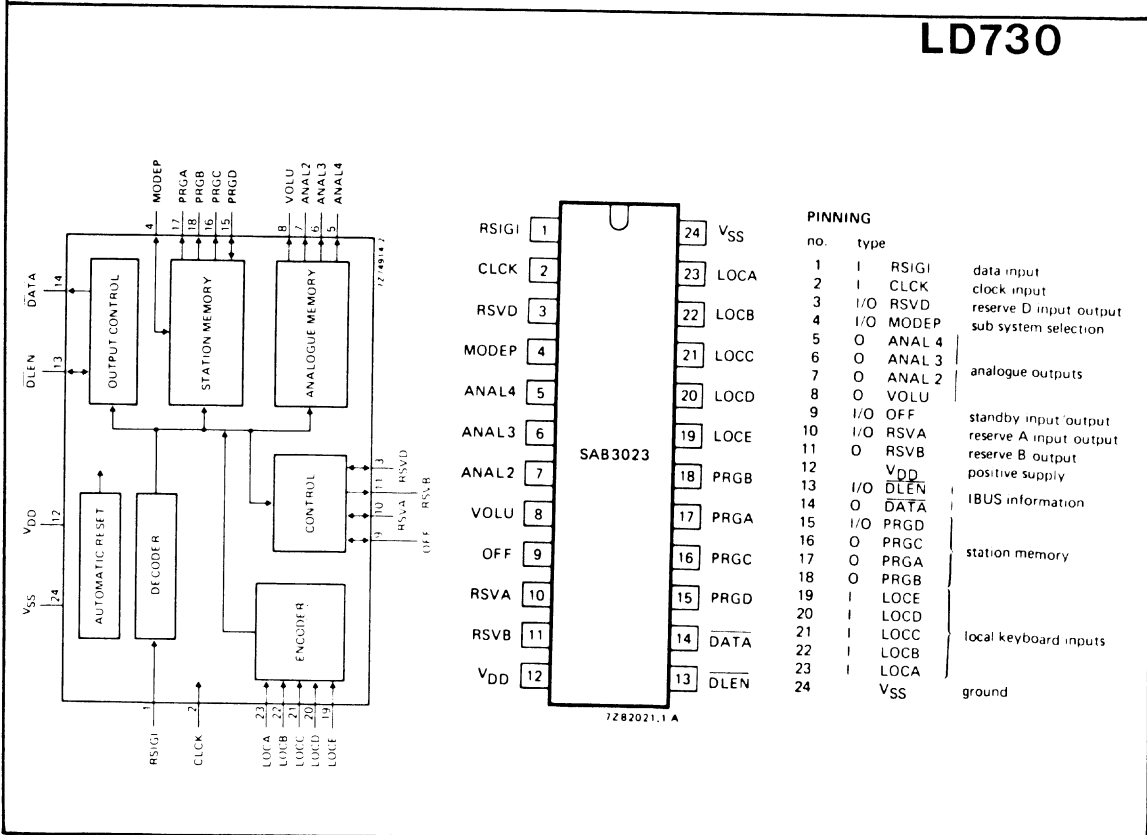
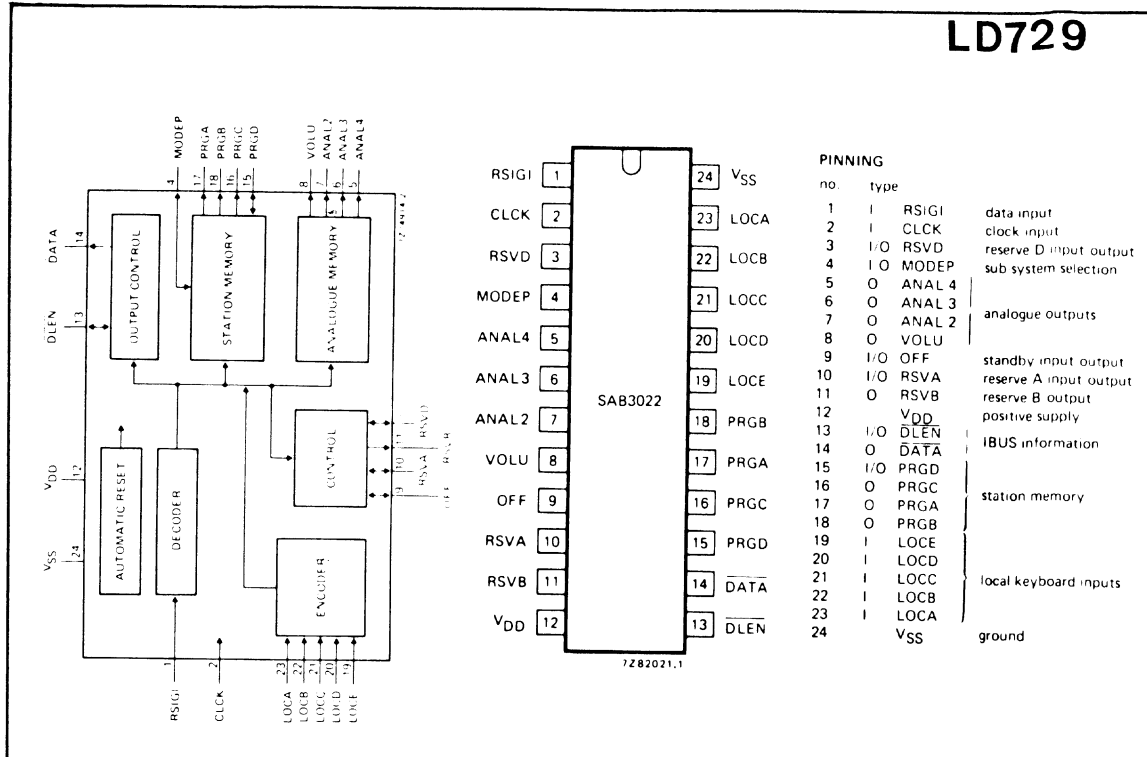
LD727



LD728

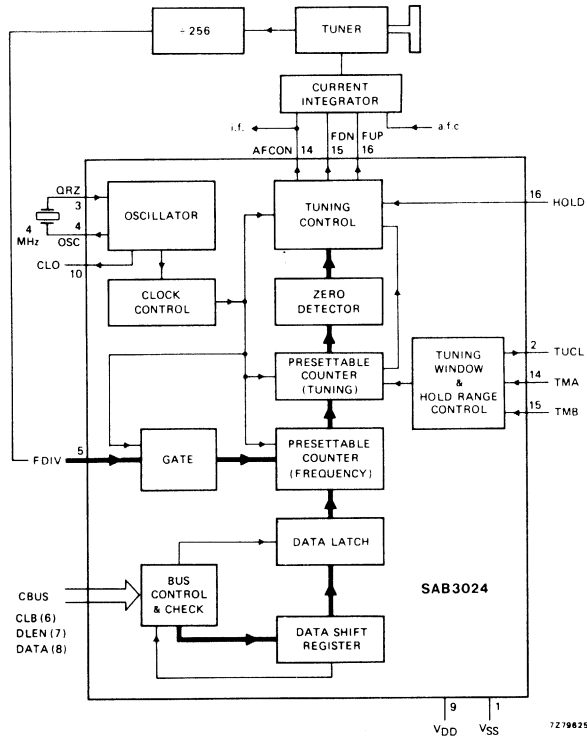


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

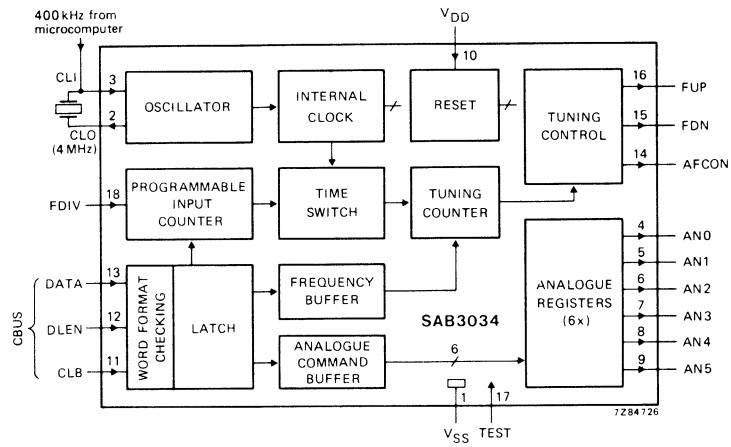


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

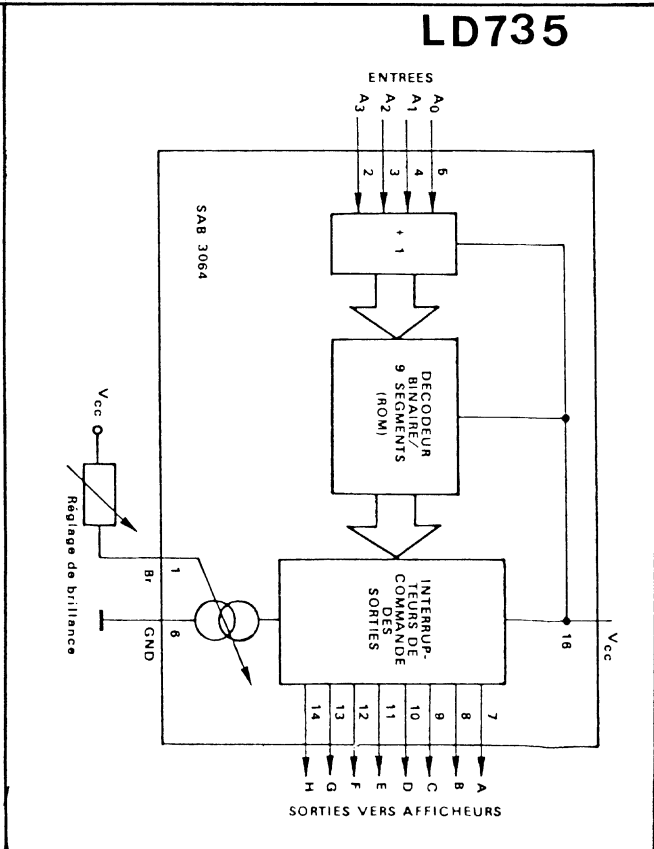
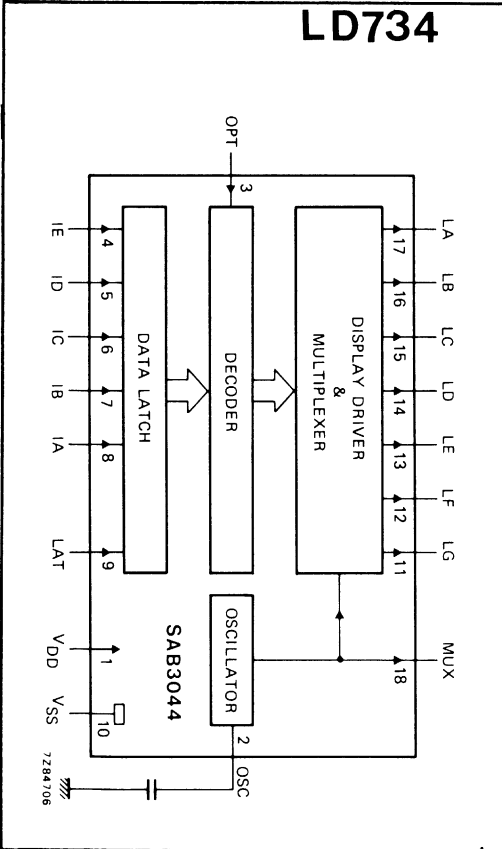
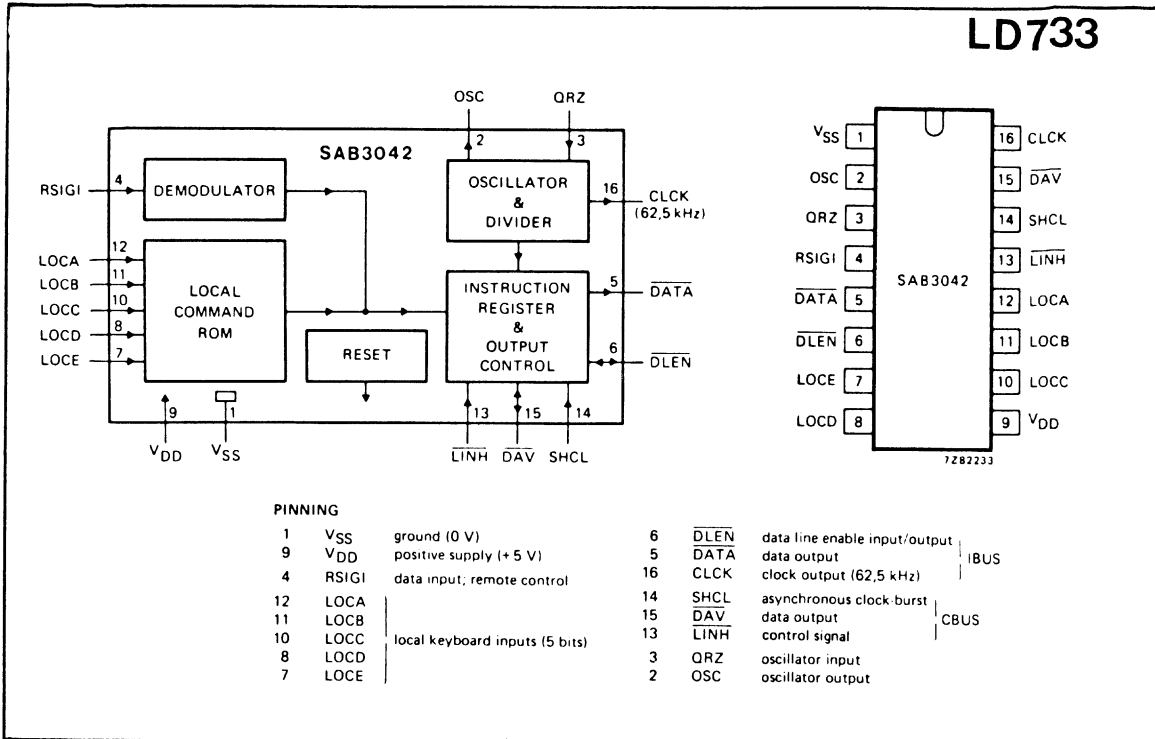
LD731



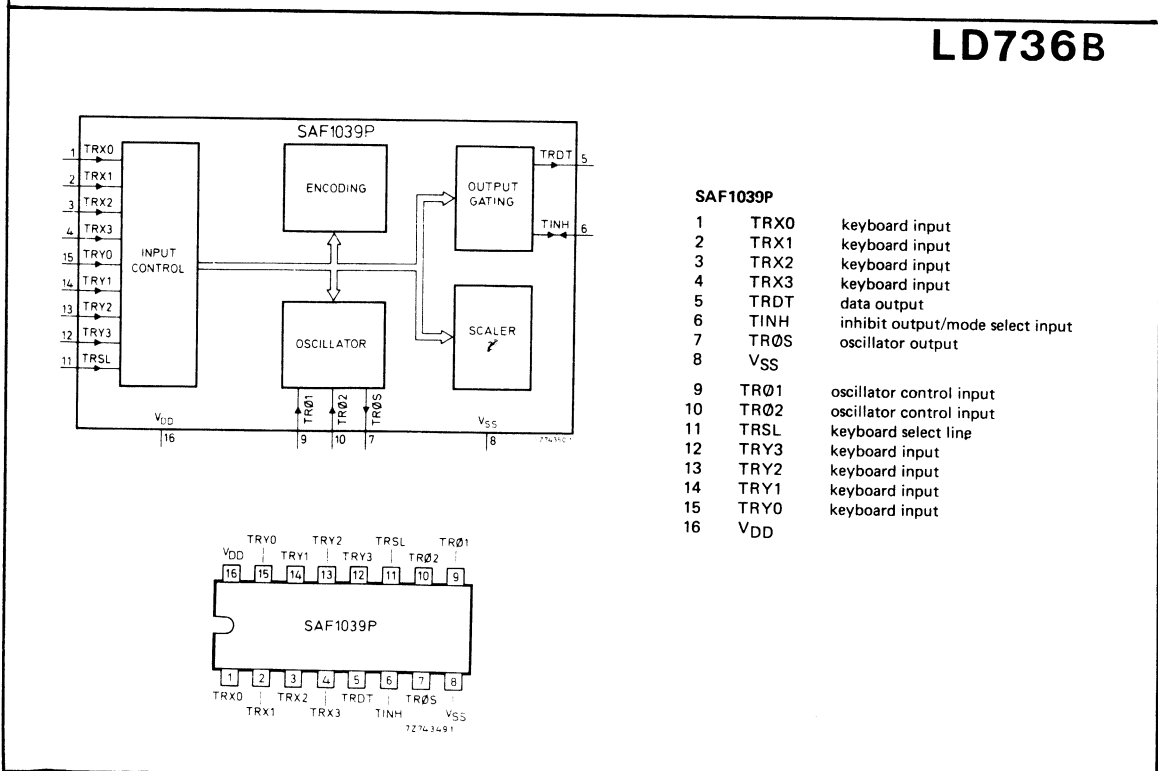
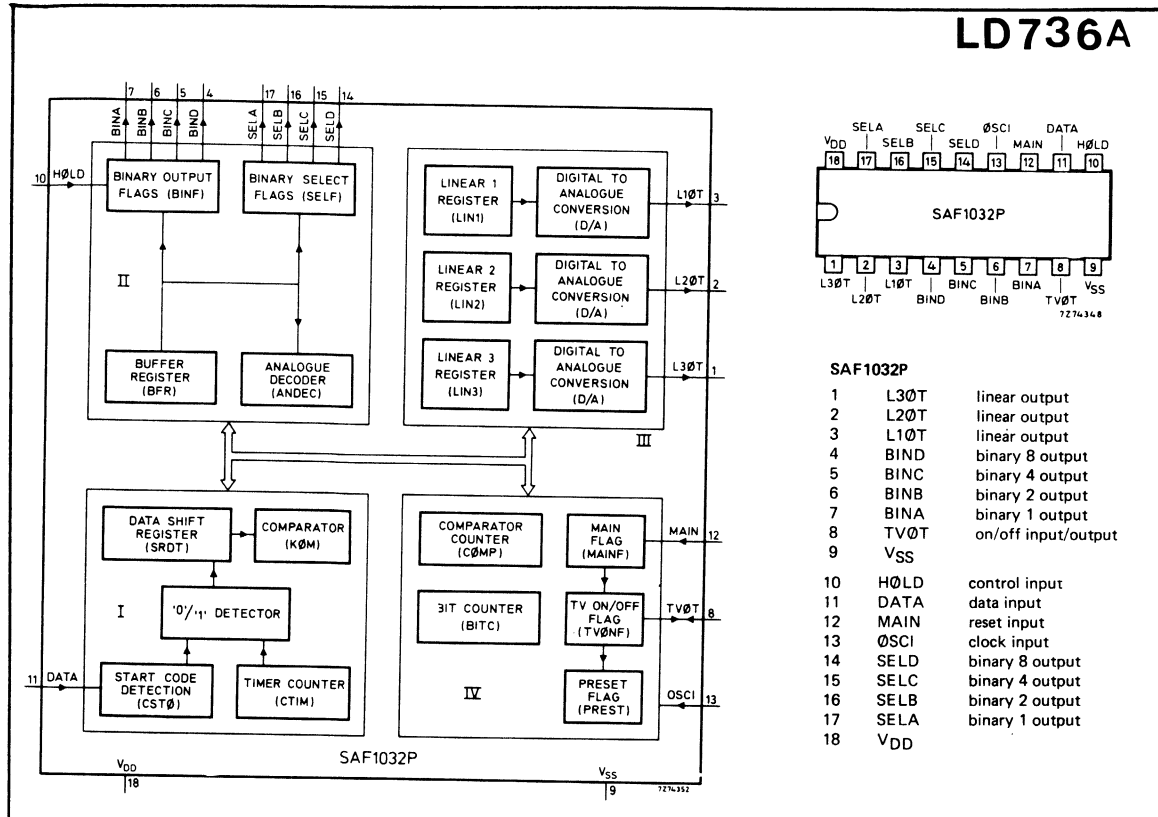
LD732



LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

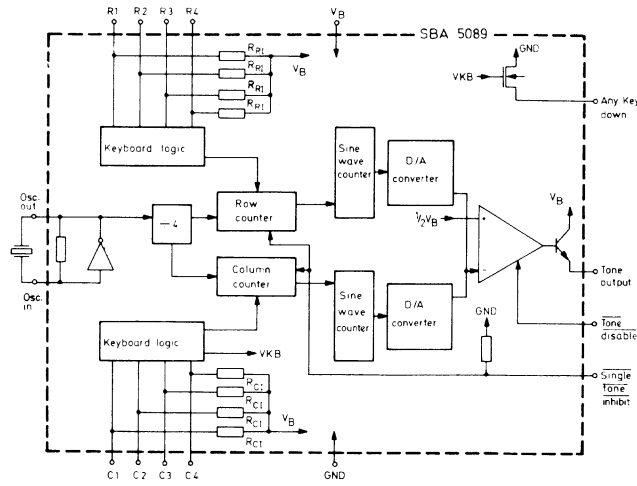


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

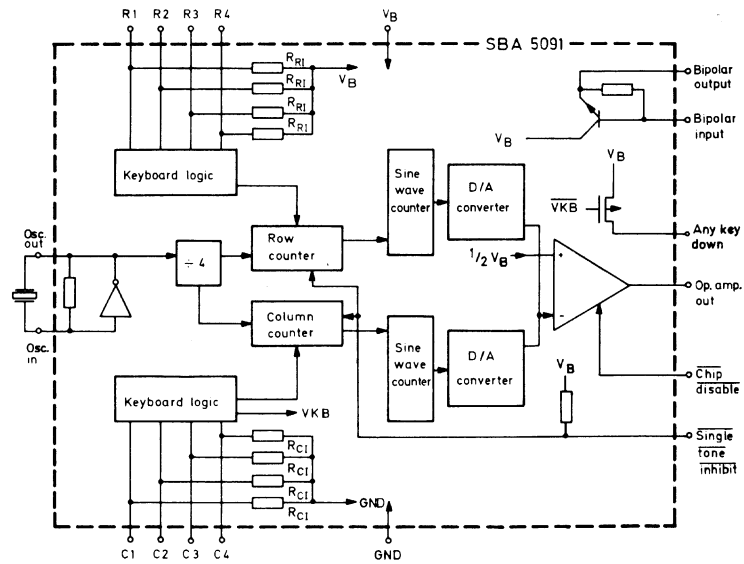


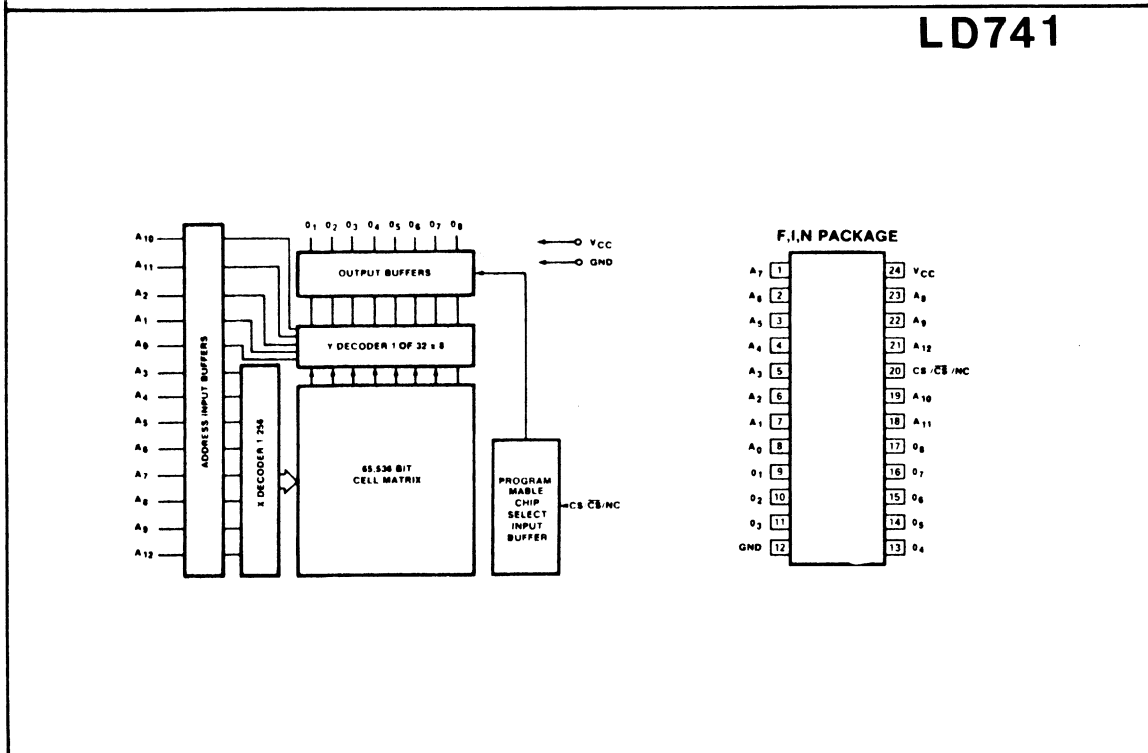
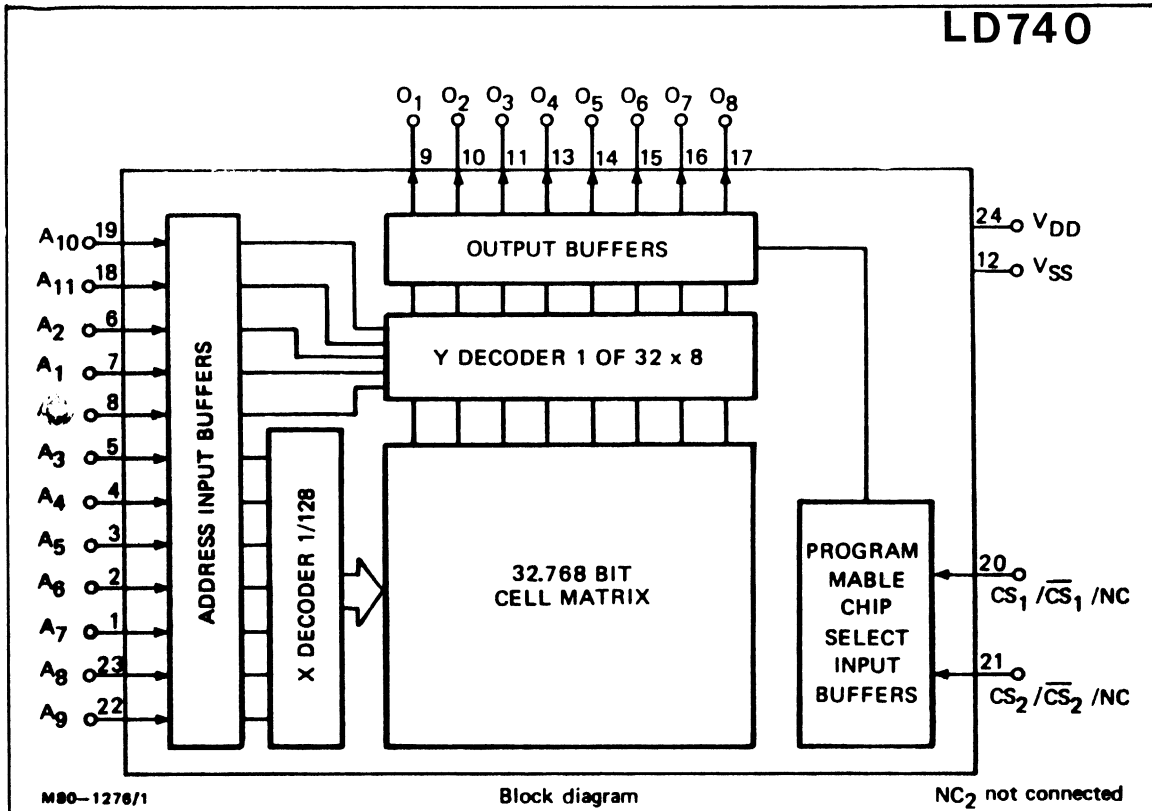
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

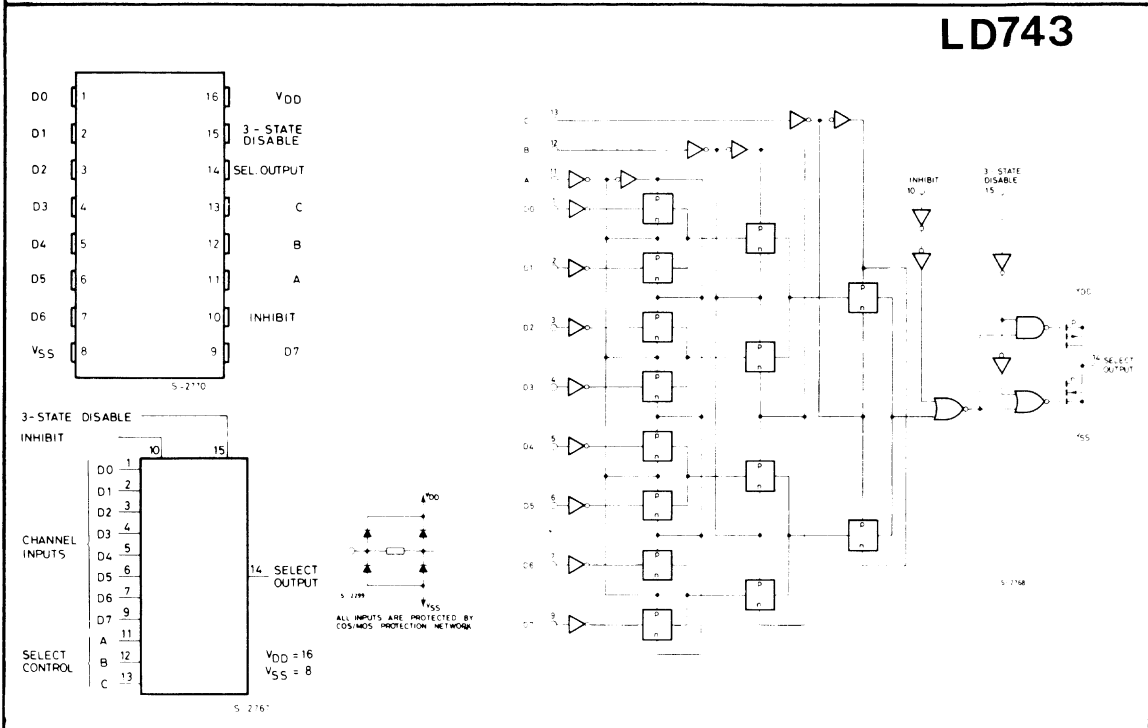
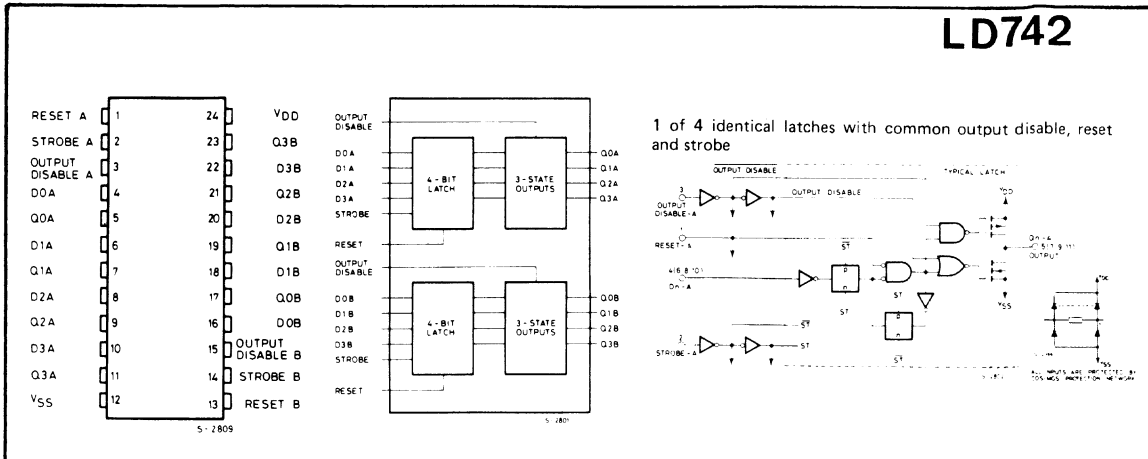
LD738



LD739

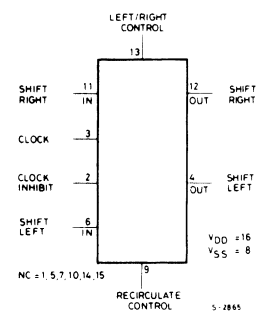
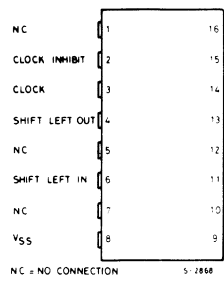
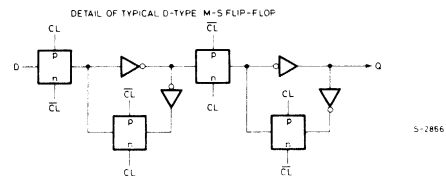
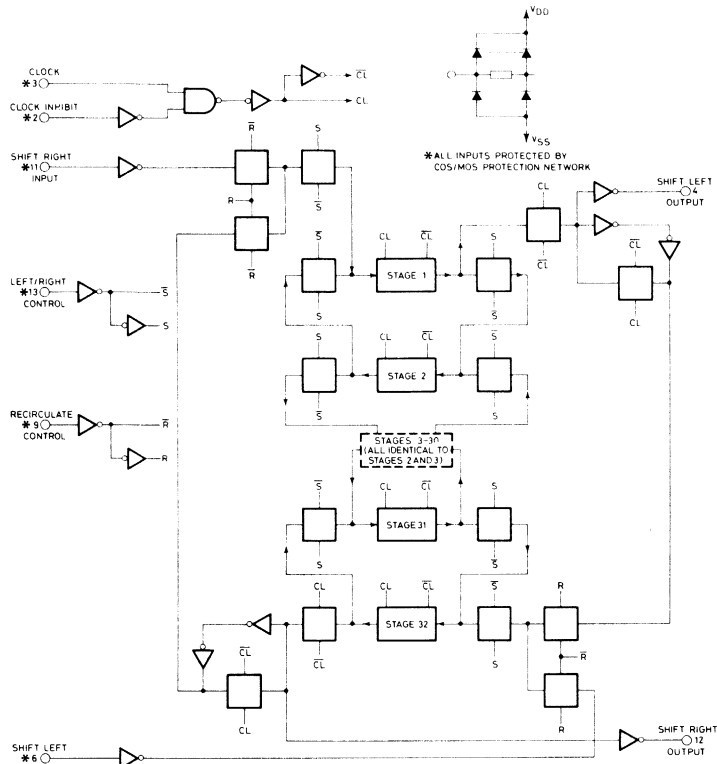




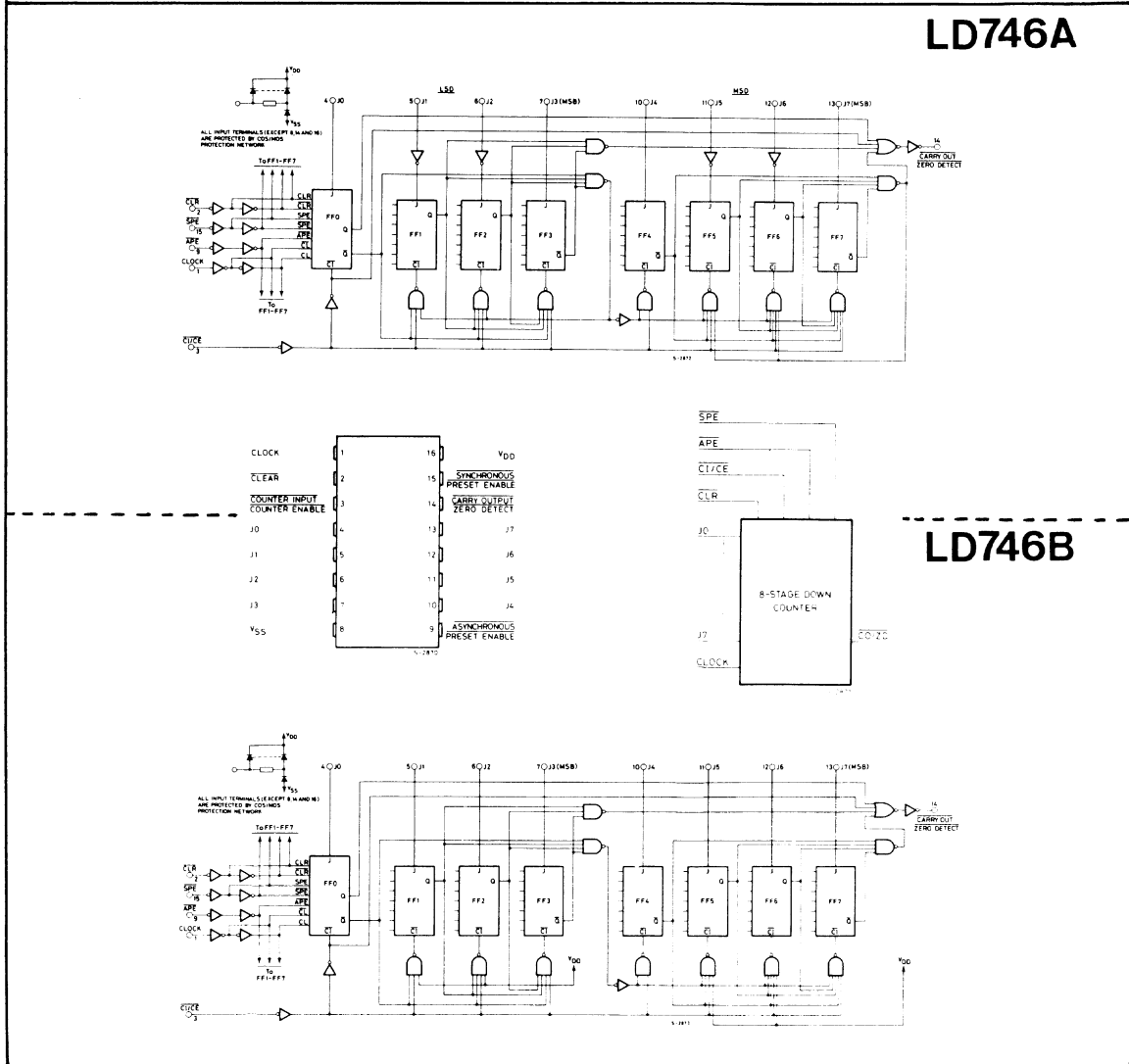
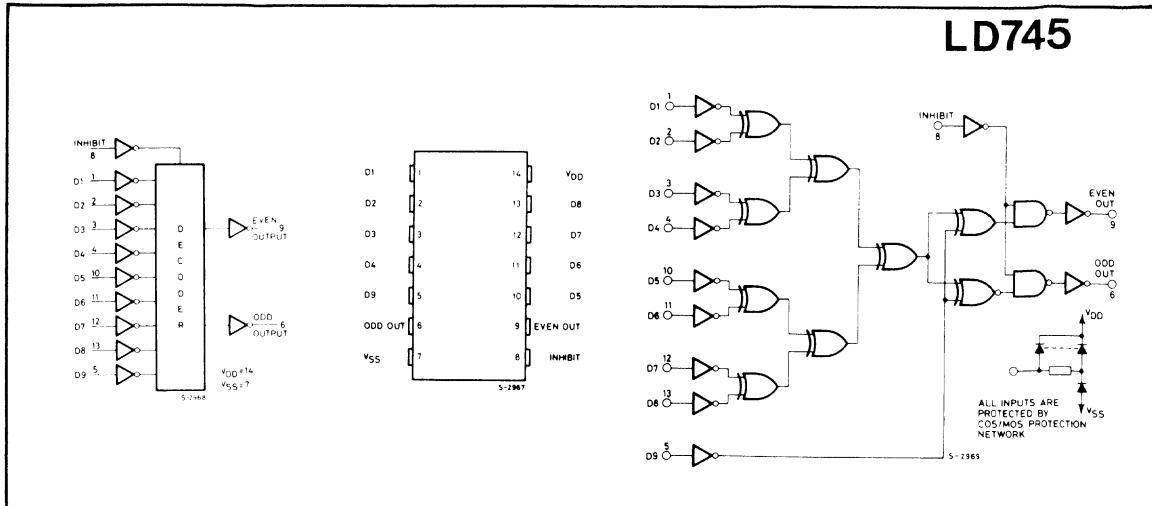


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

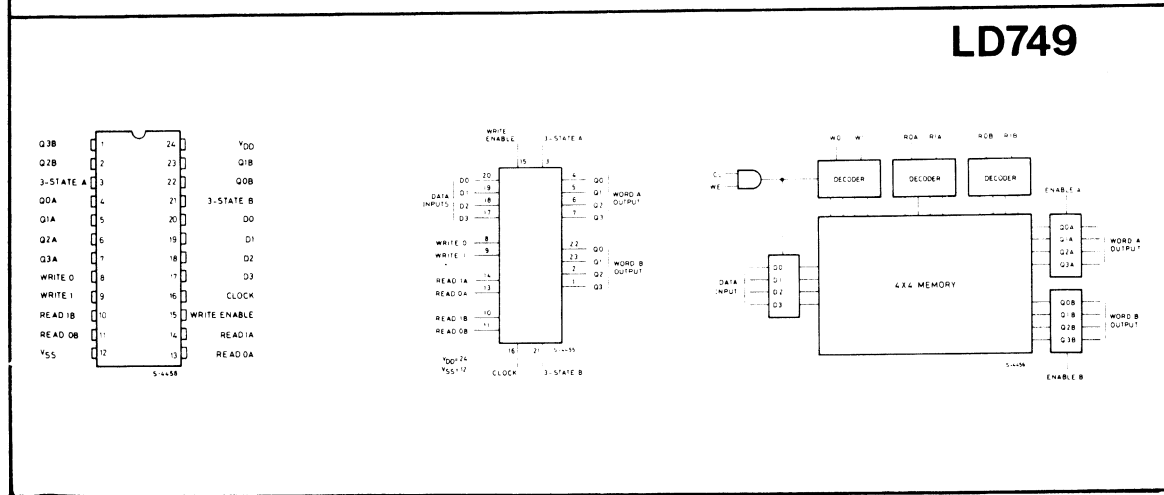
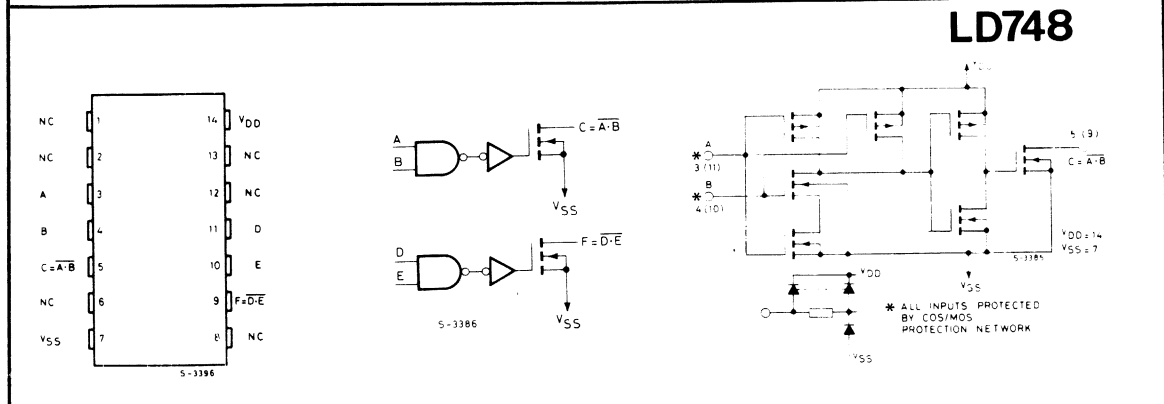
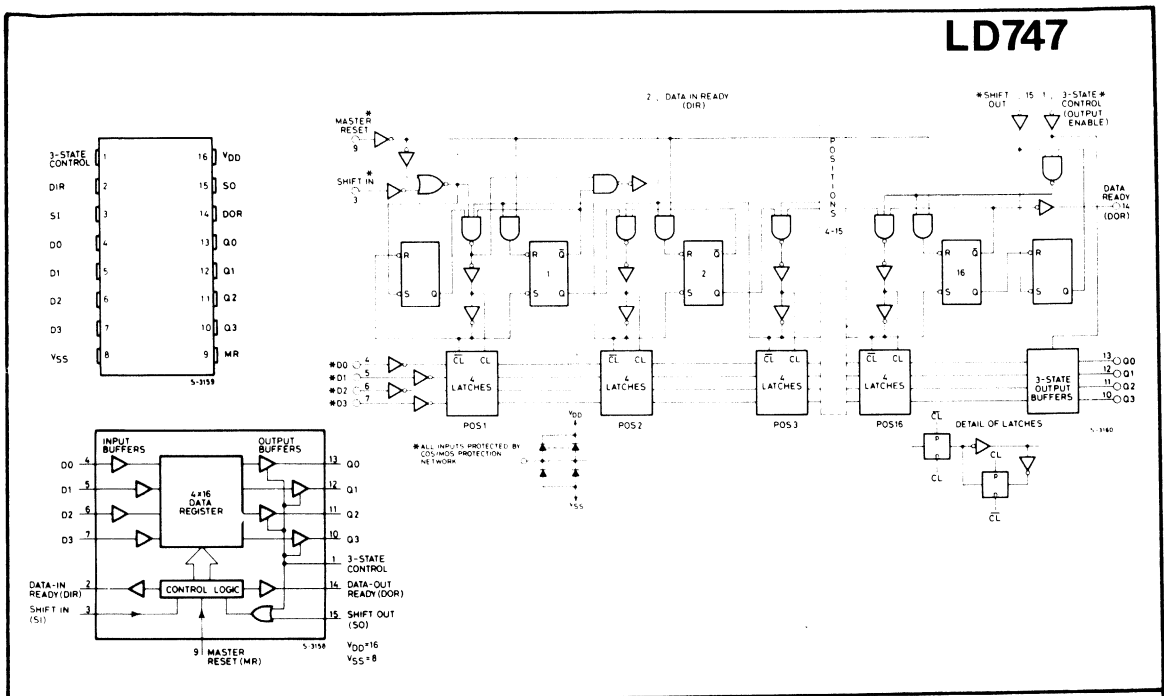
LD744



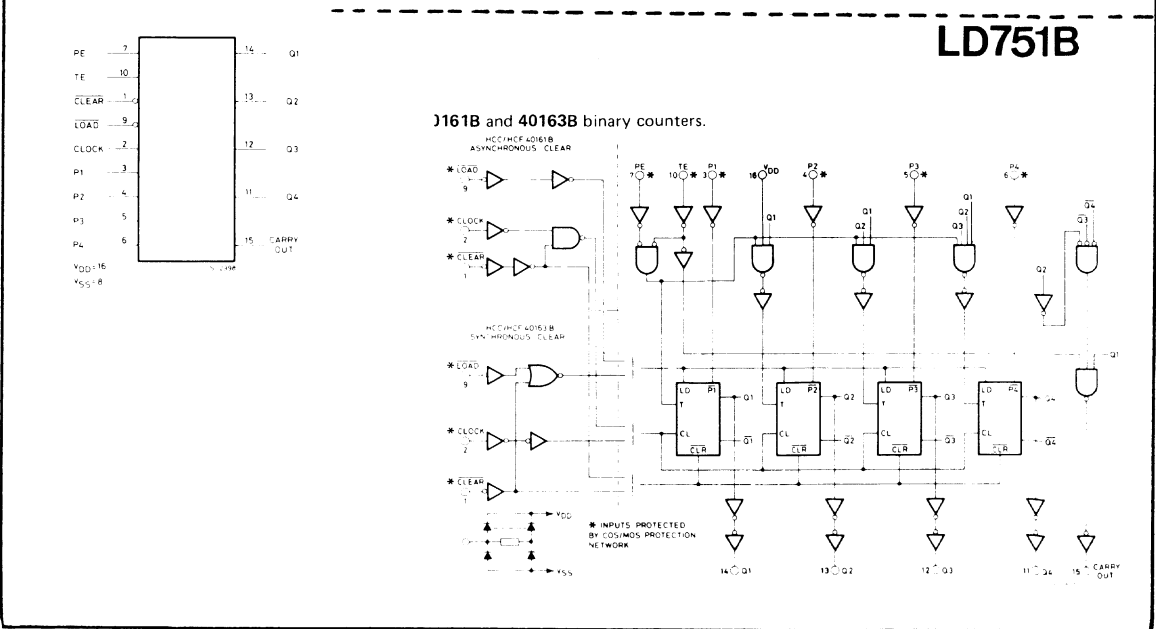
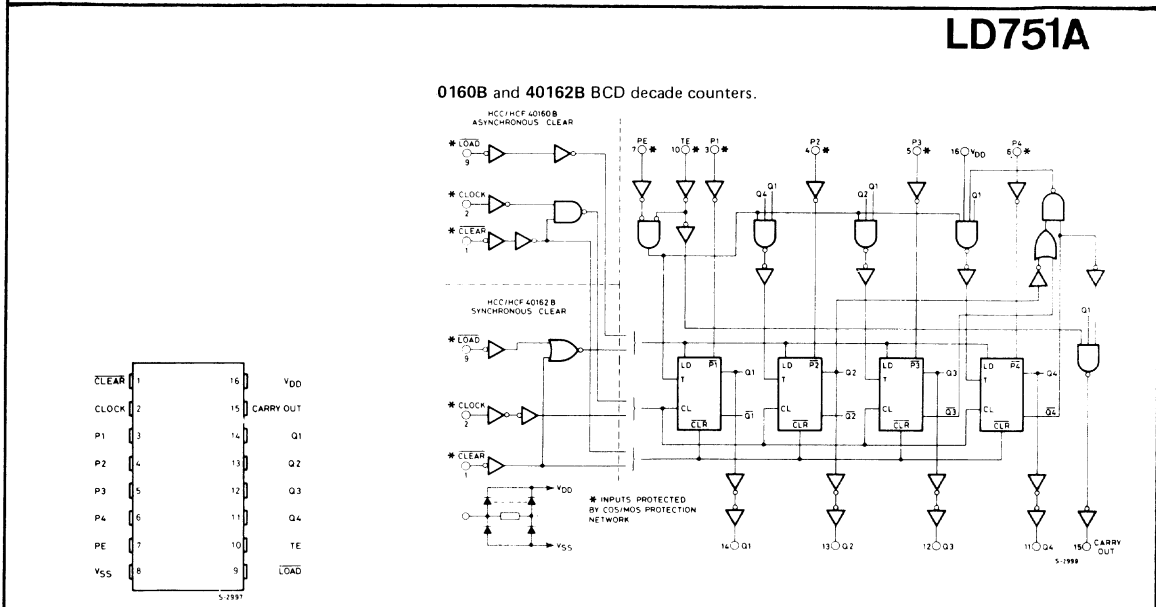
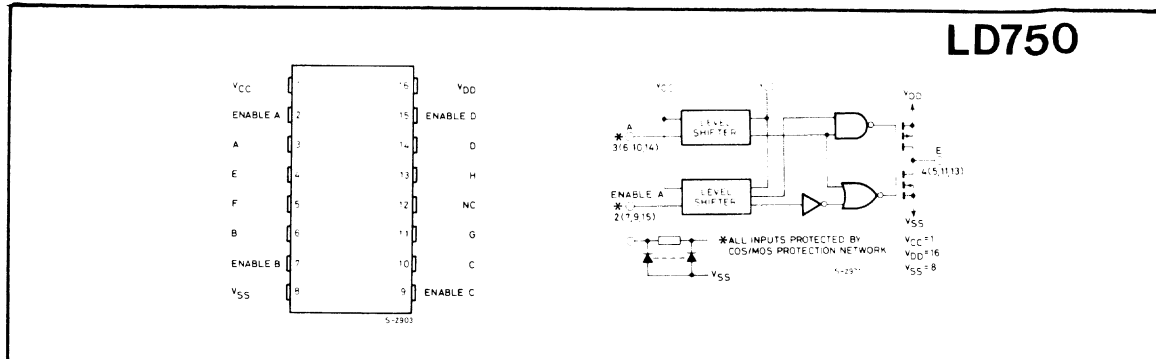
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

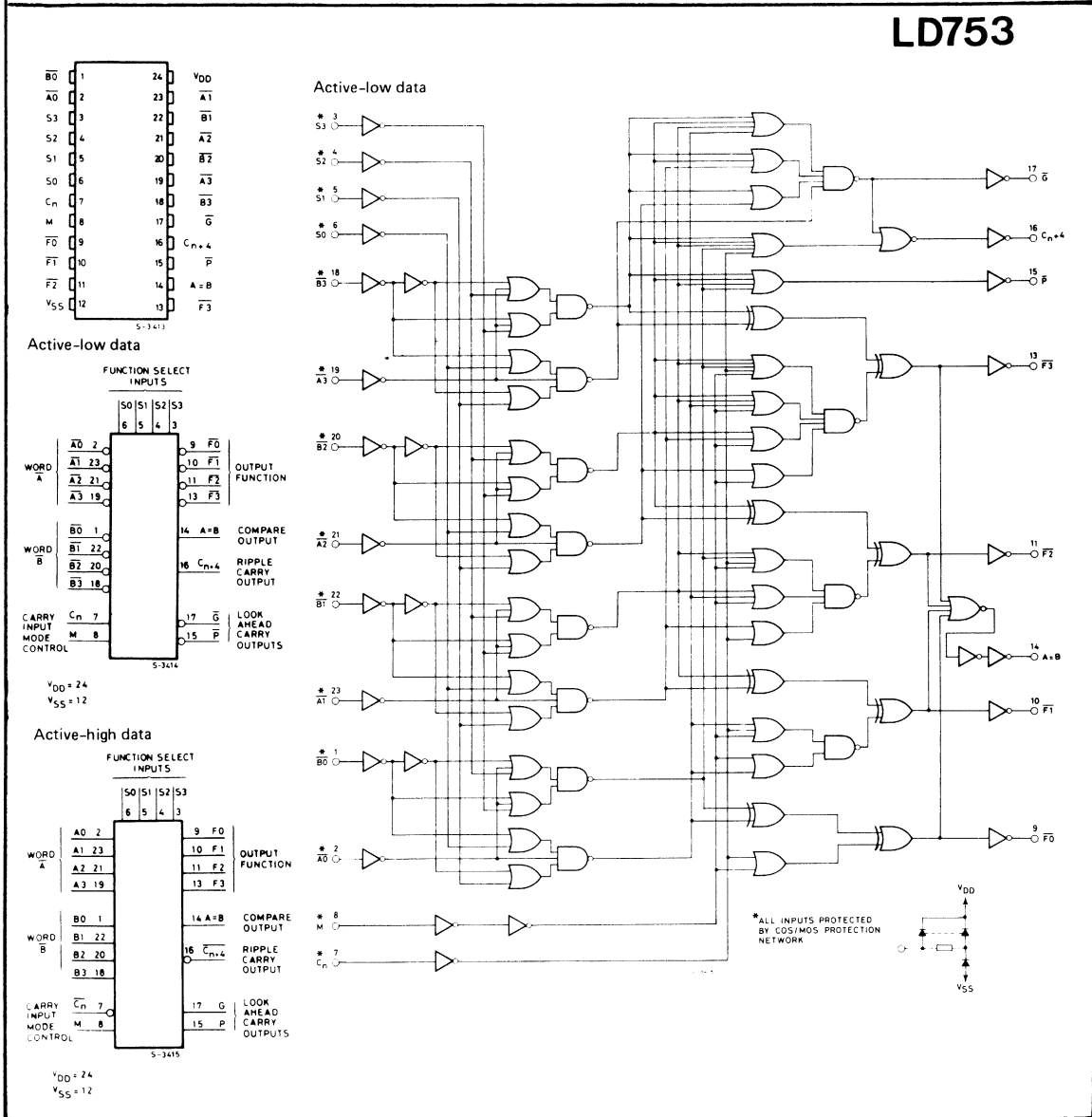
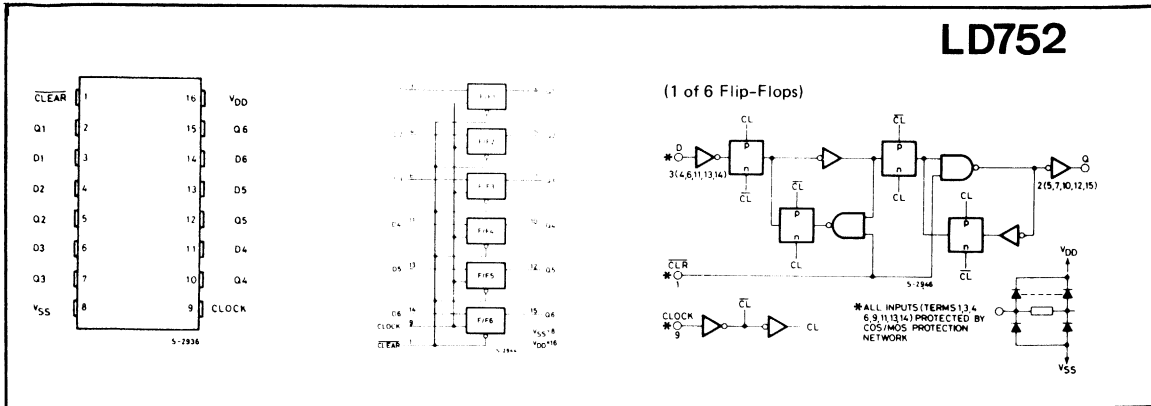


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

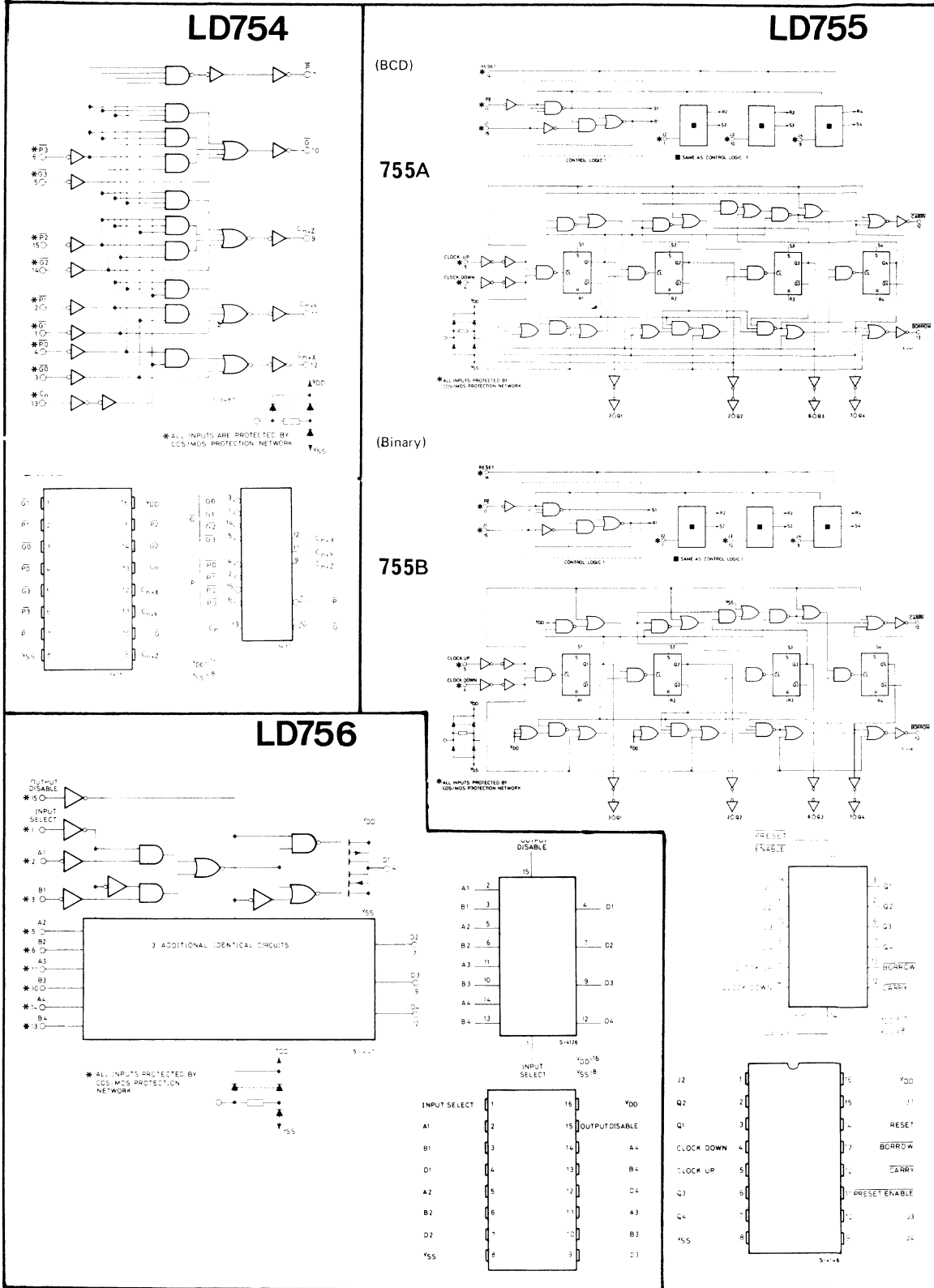


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

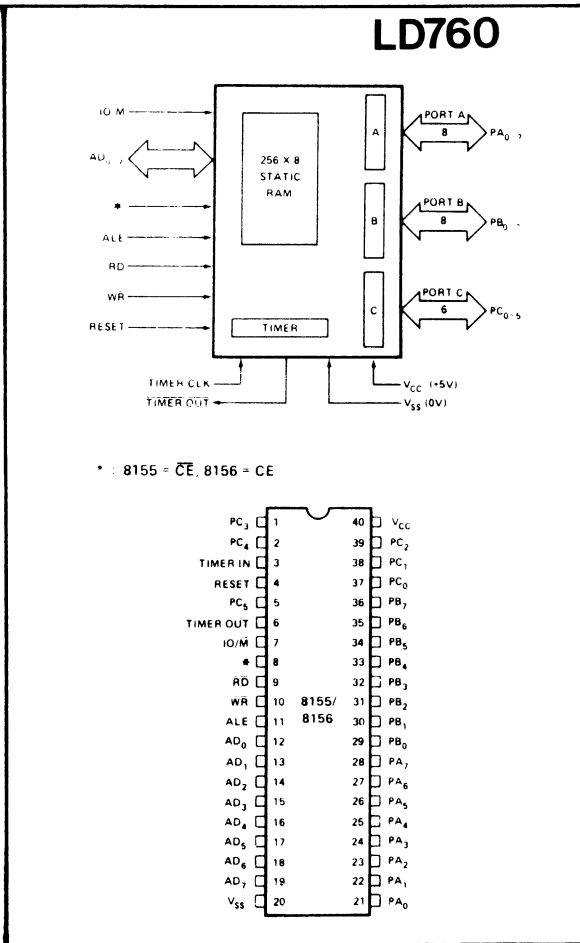
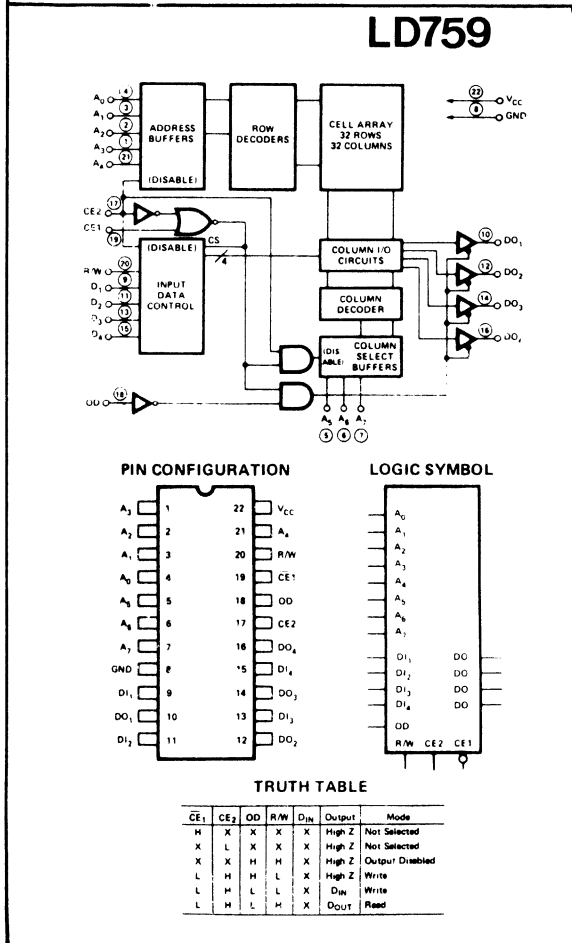
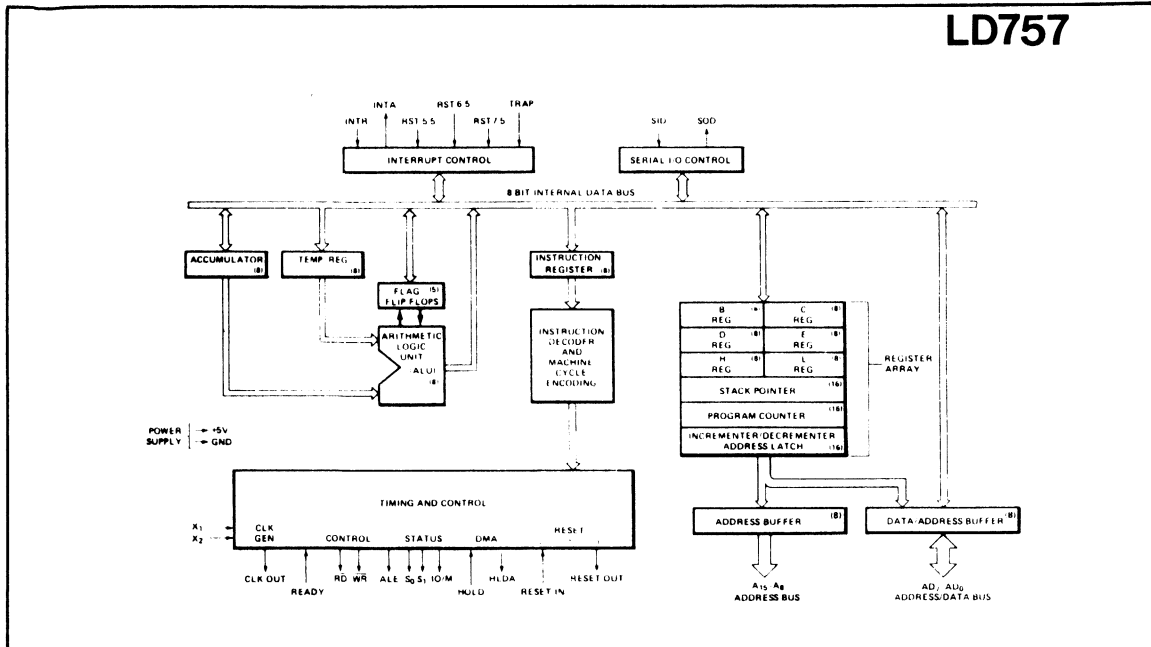




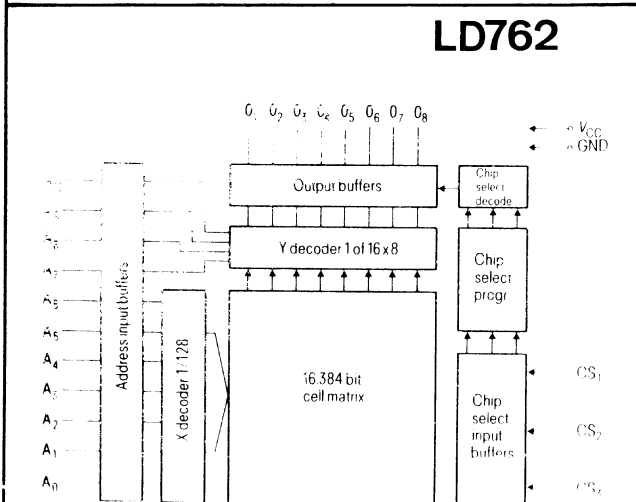
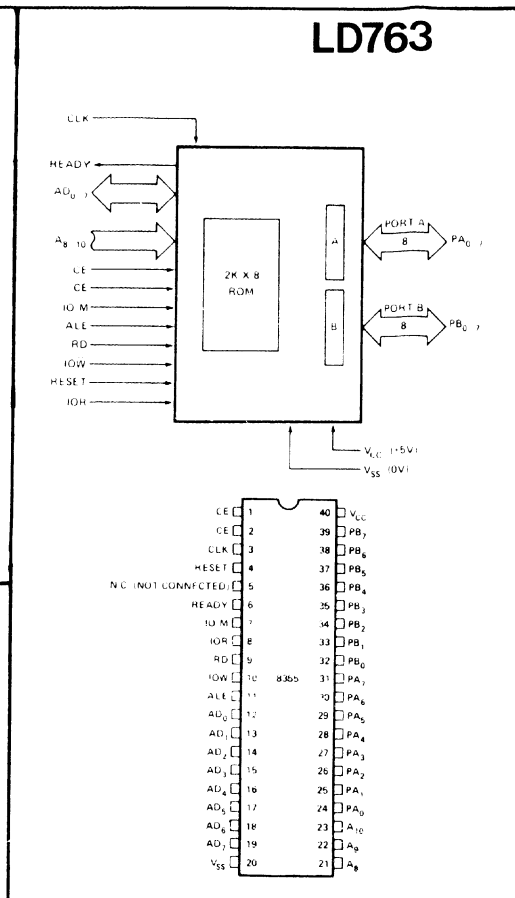
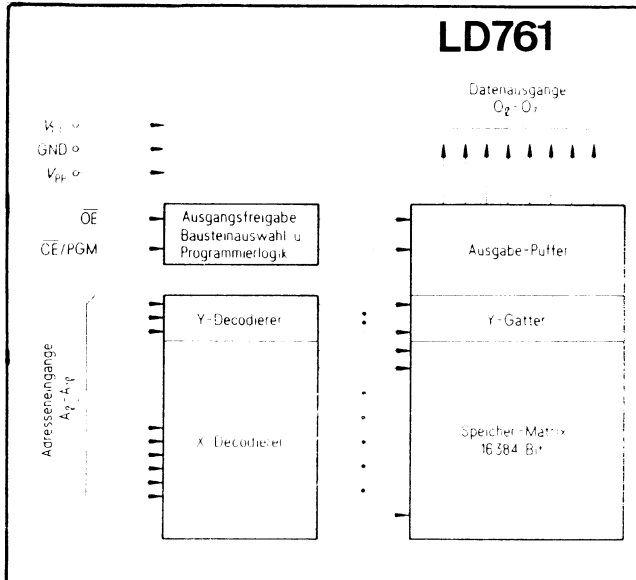
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



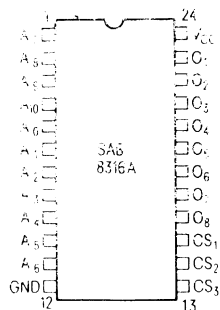
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

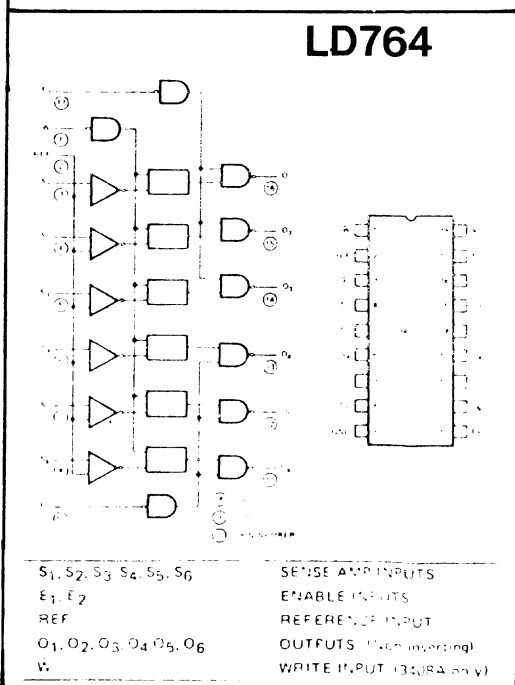


Pin configuration

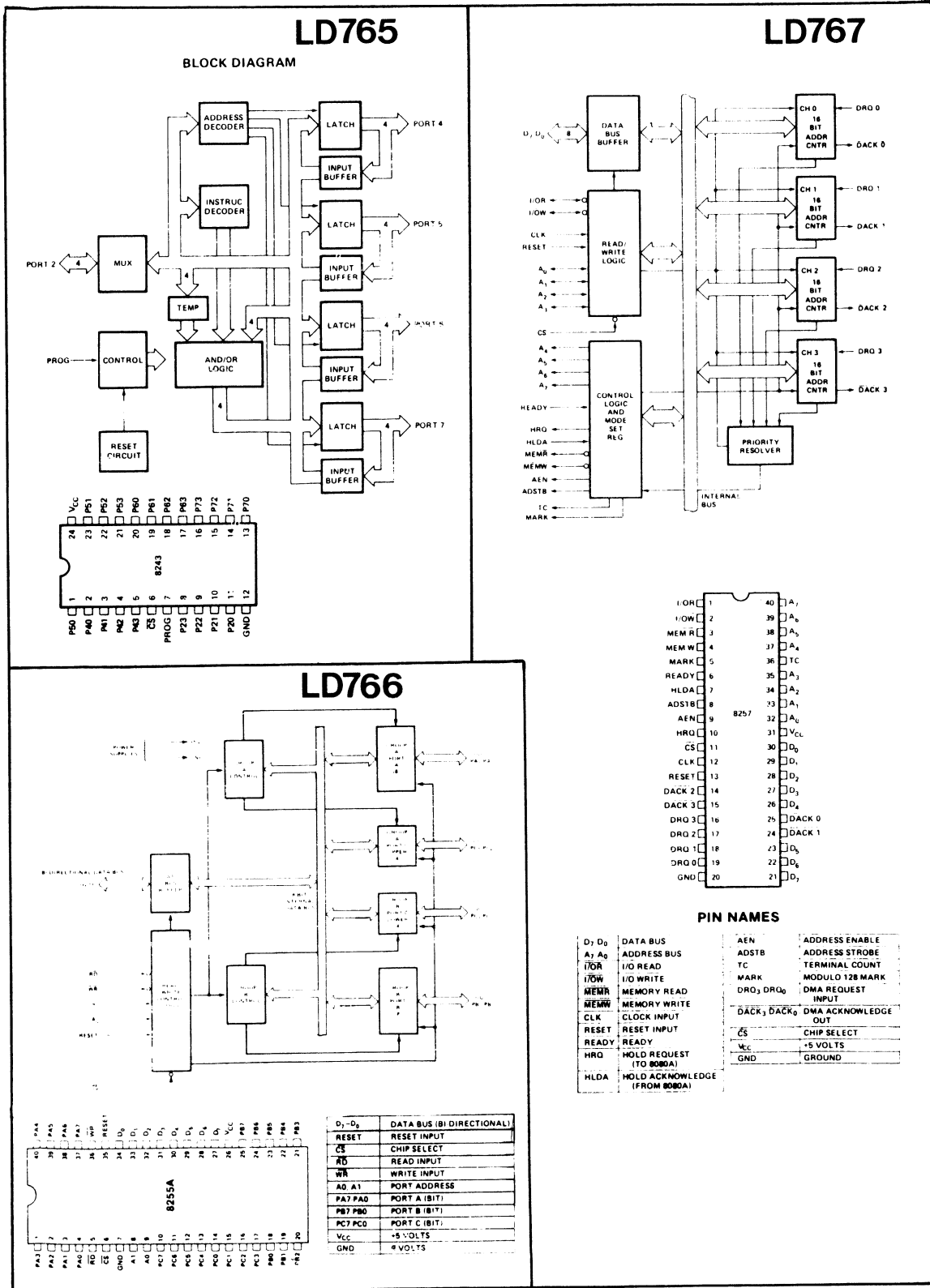


Pin names

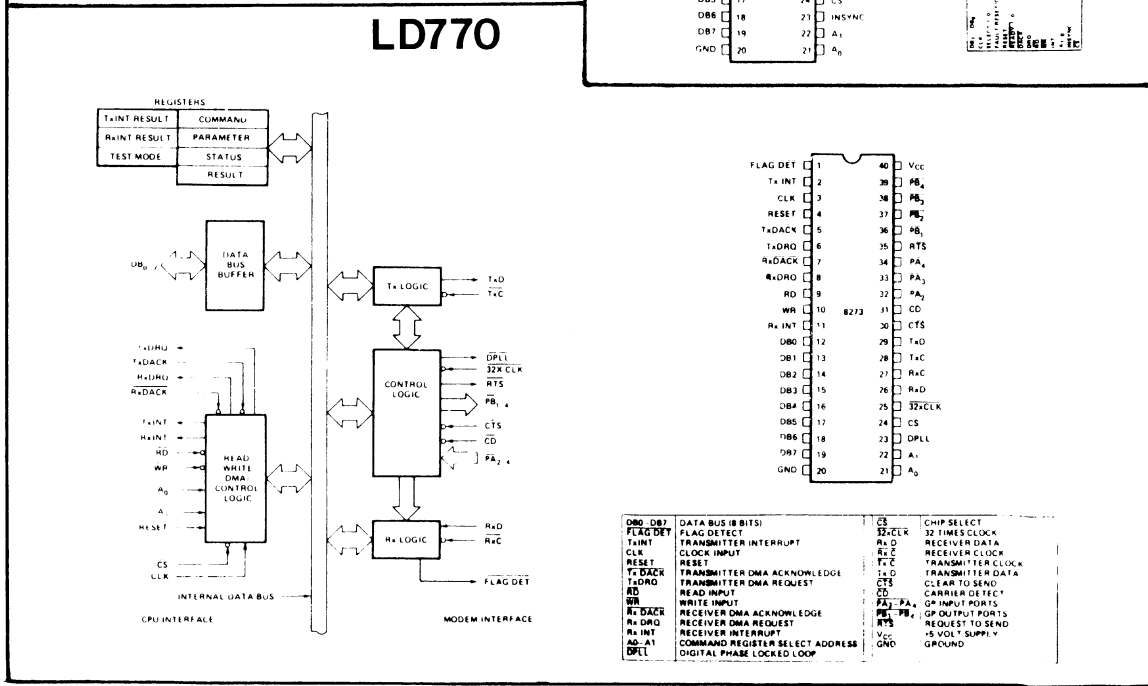
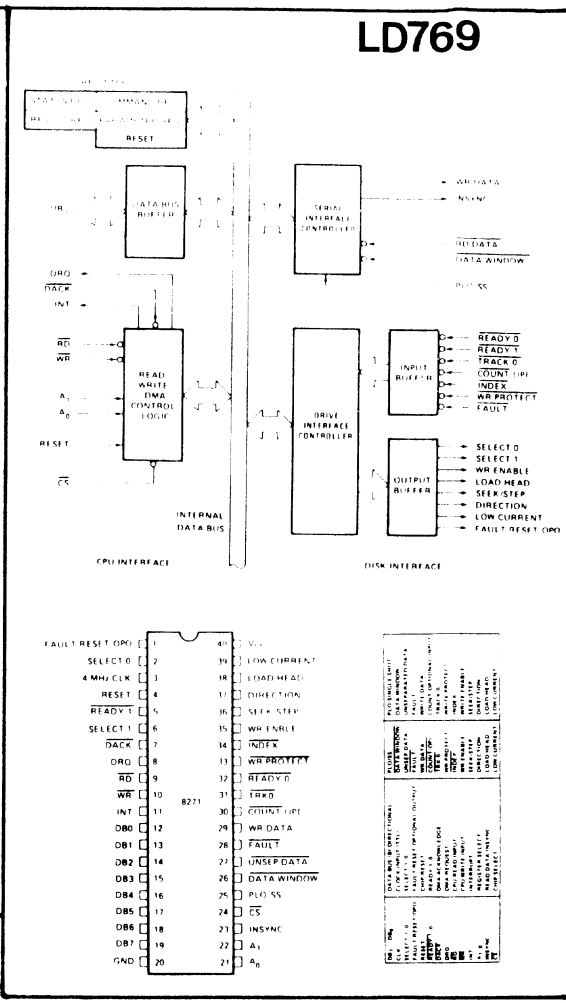
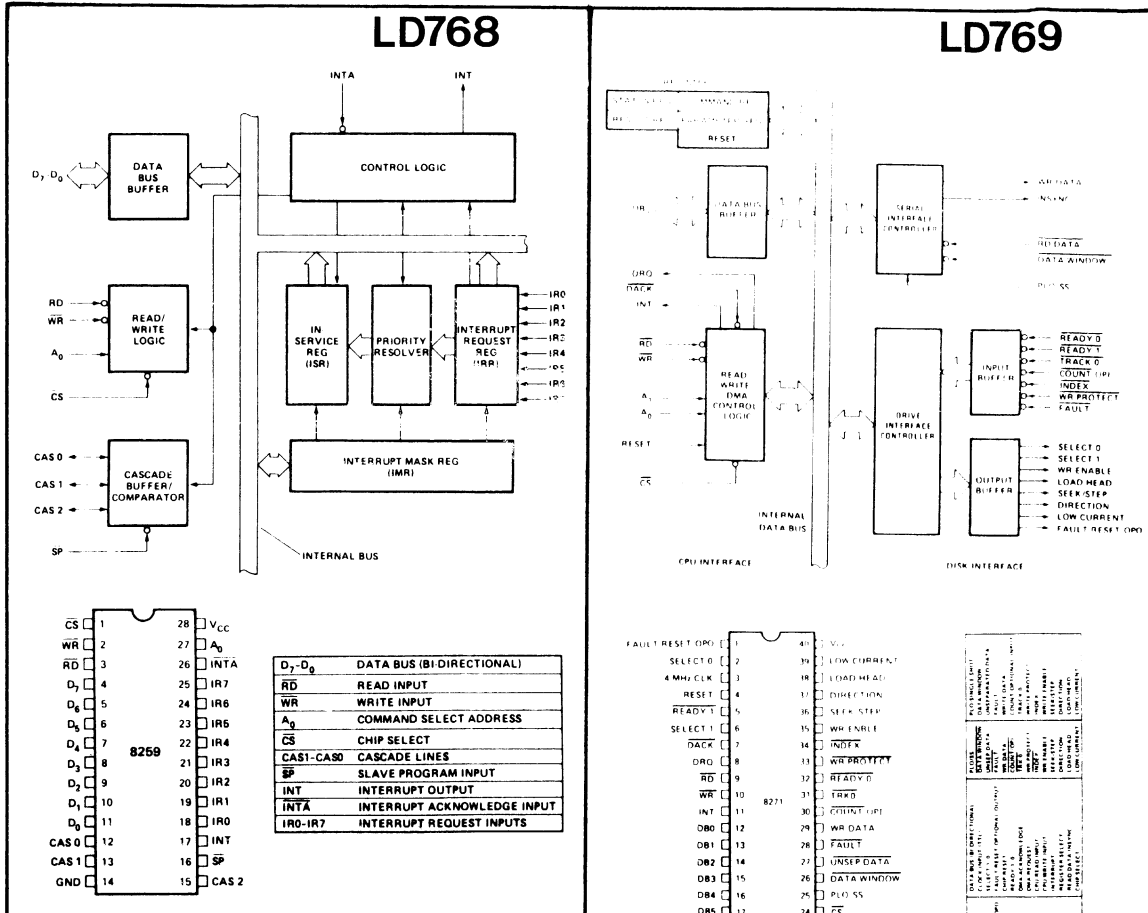
$A_0 - A_{10}$	Address inputs
$O_1 - O_8$	Data outputs
$CS_1 - CS_3$	Programmable chip select inputs
V_{CC}	Power (+5 V)
GND	Ground (0 V)



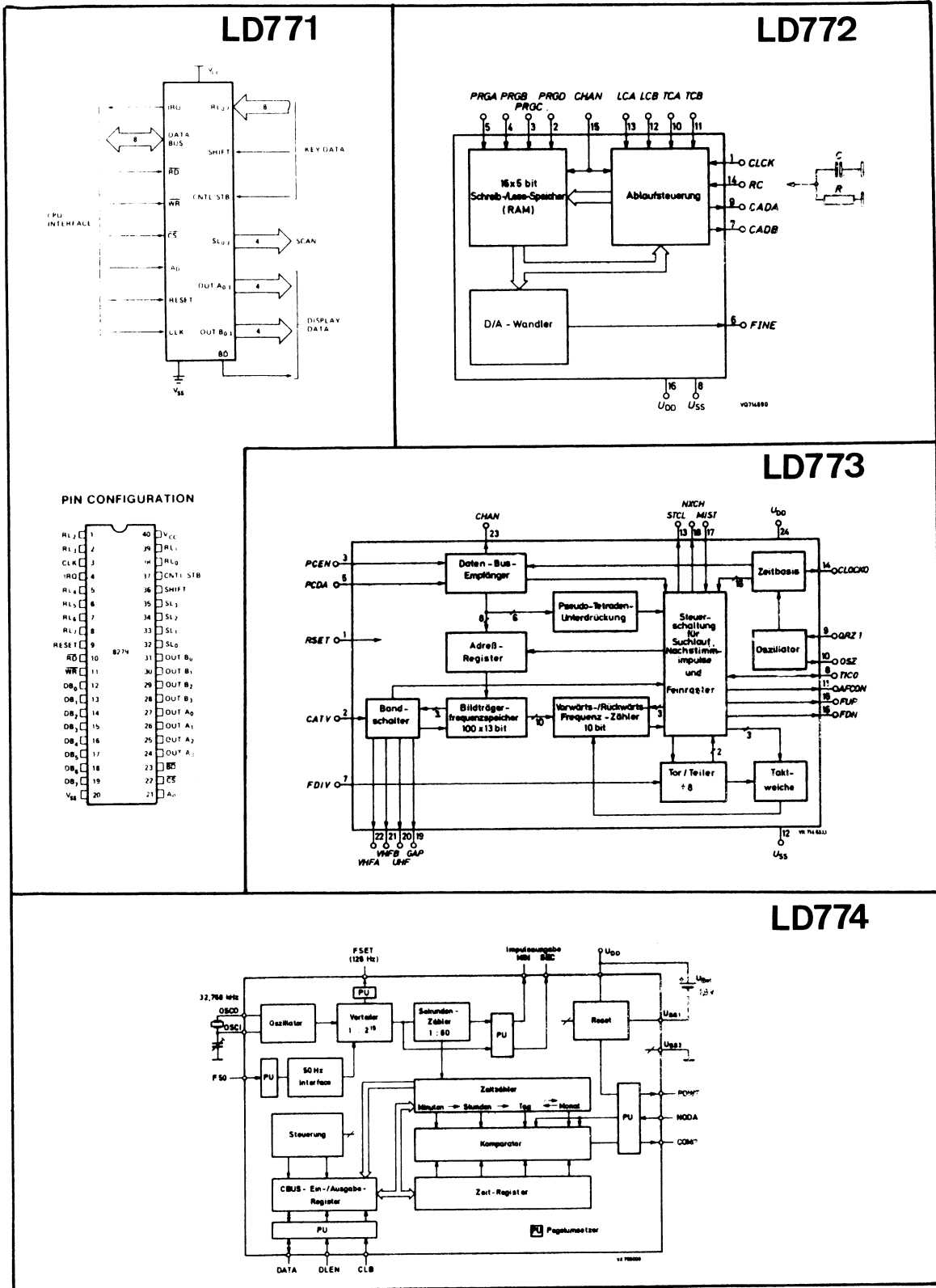
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

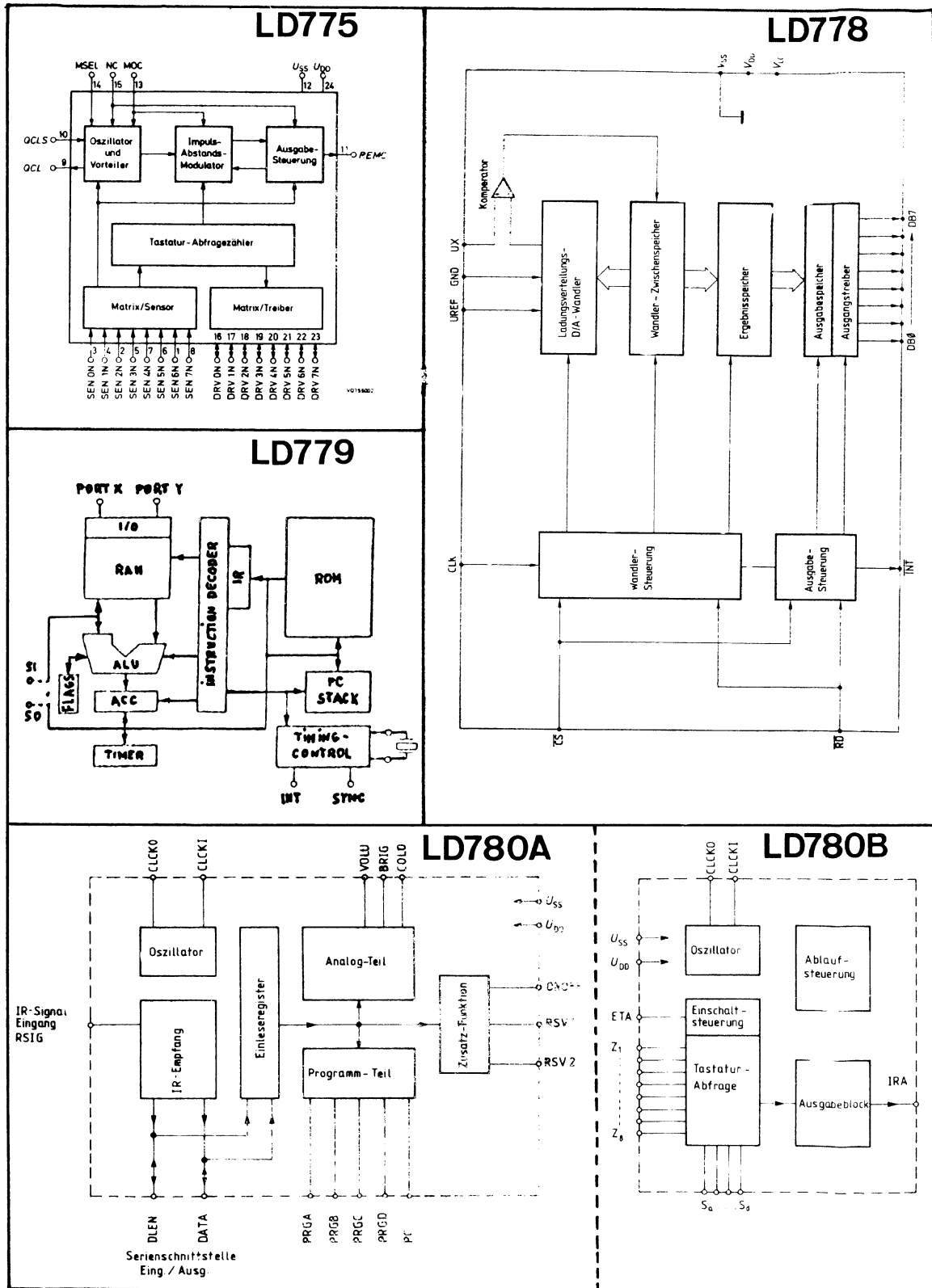


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

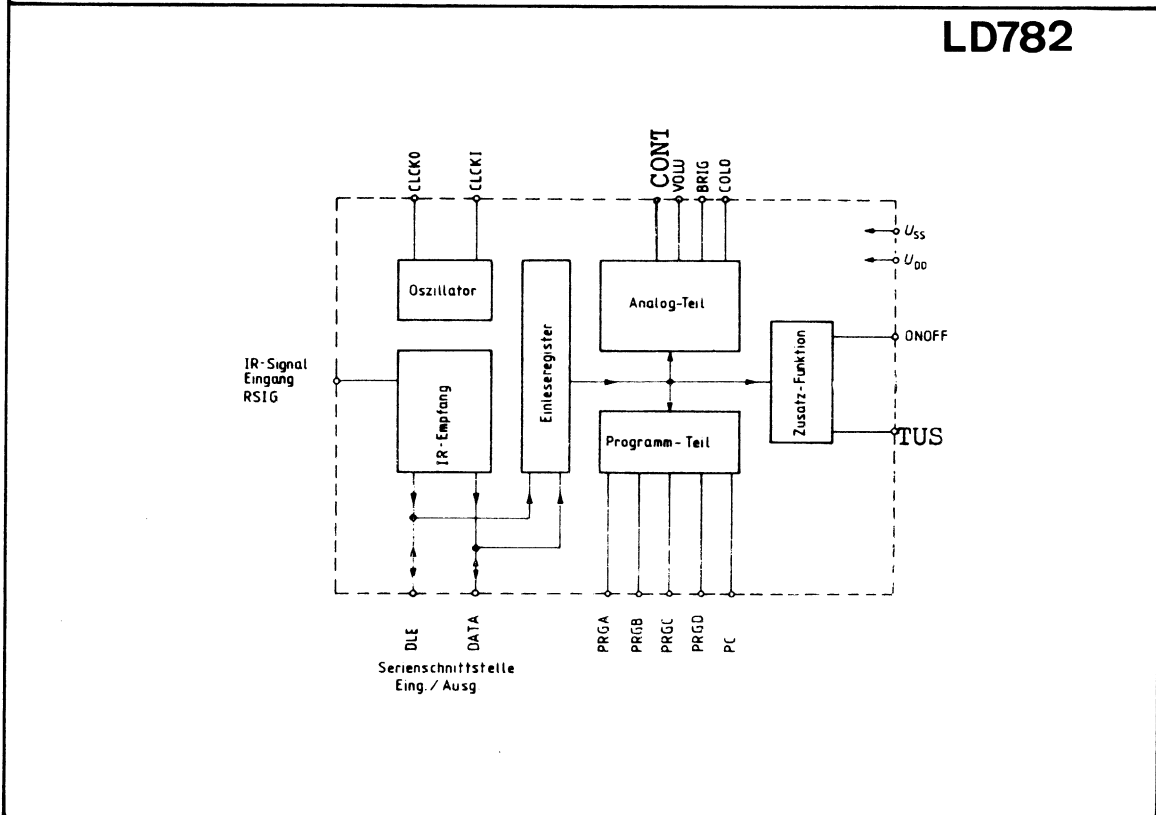
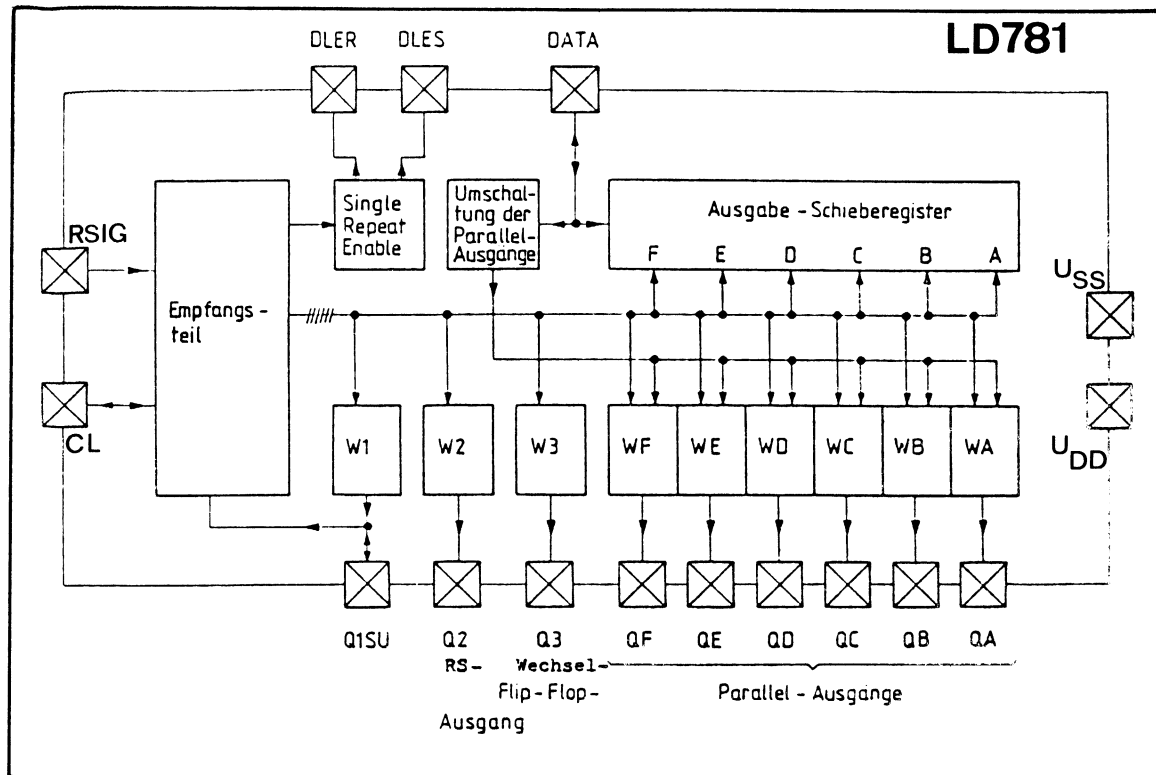


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

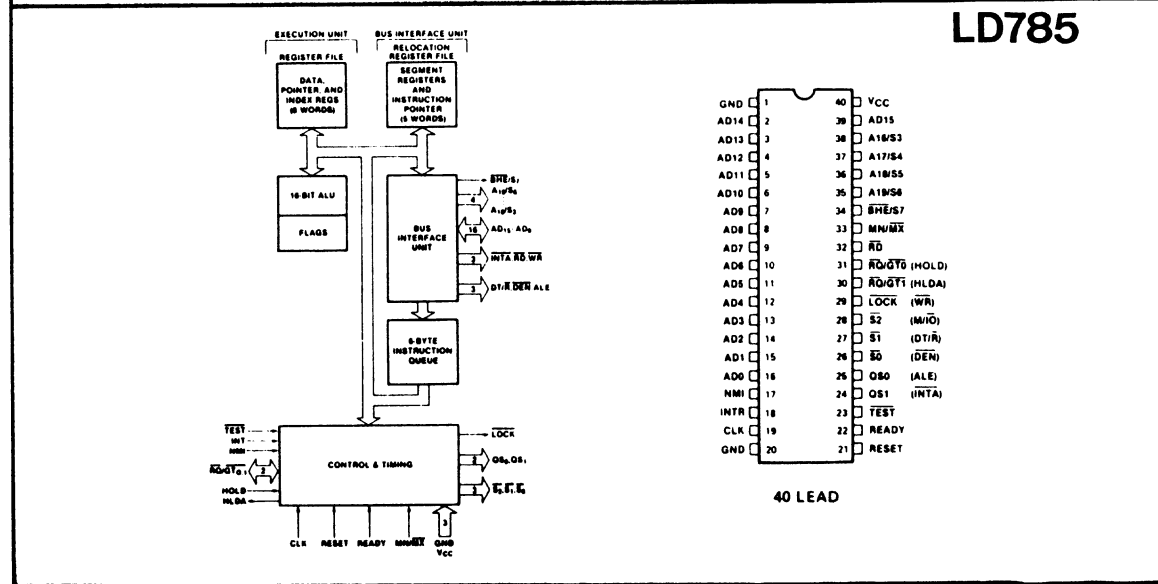
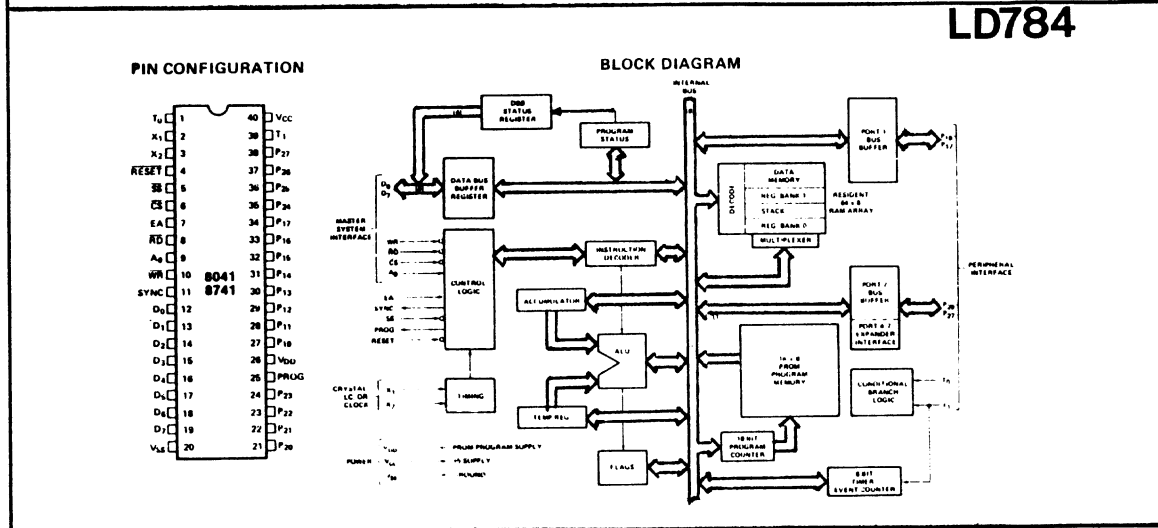
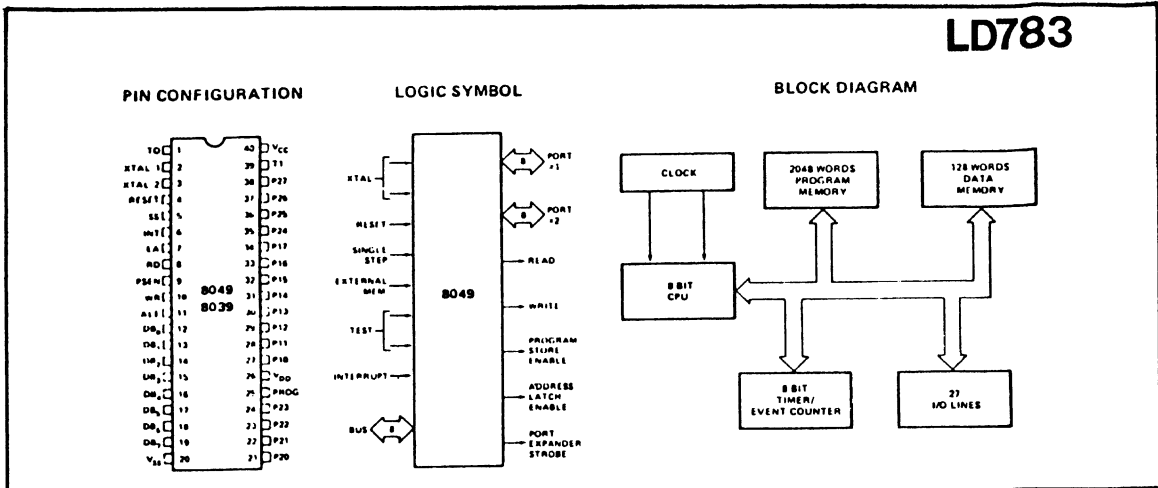


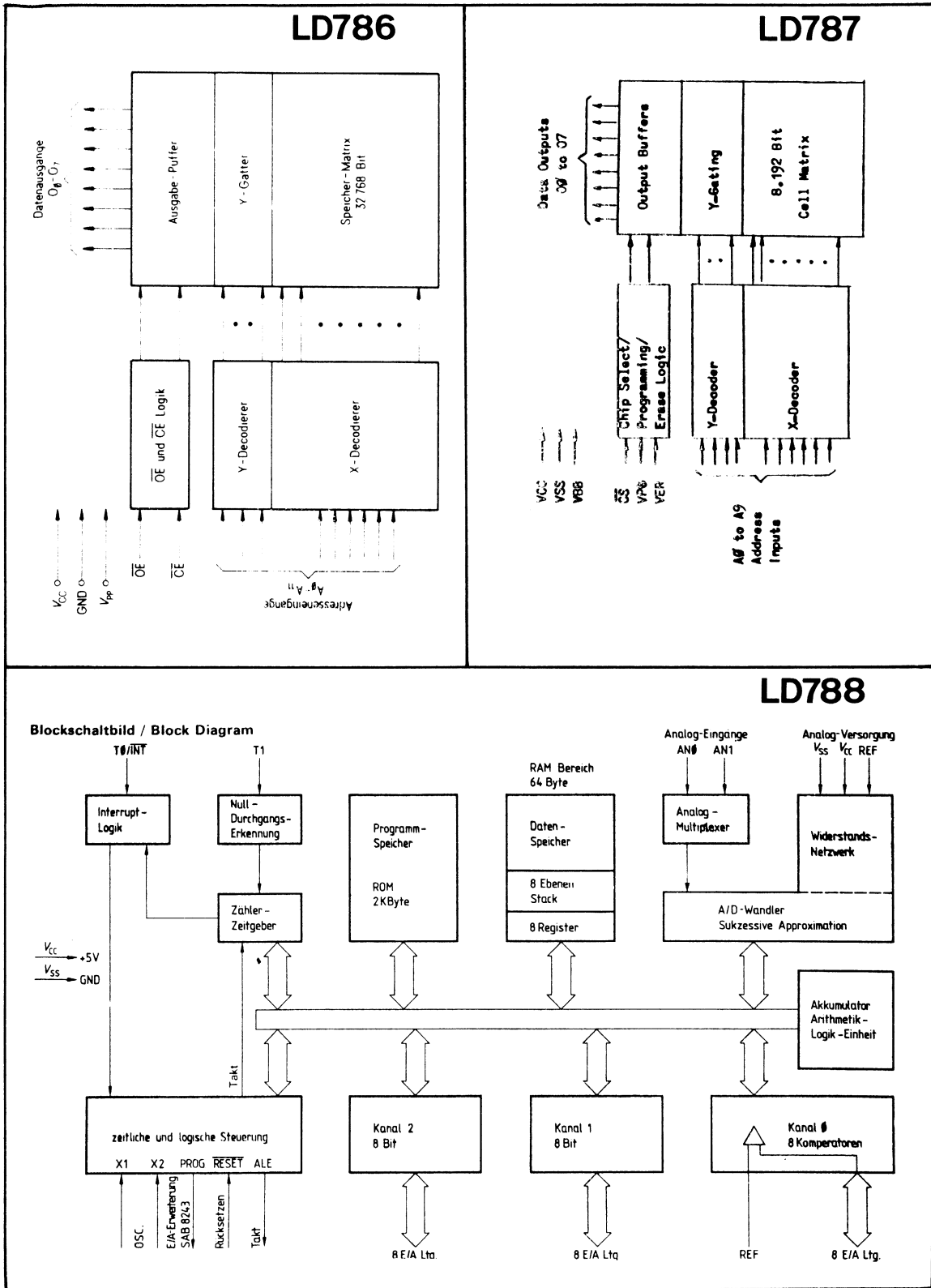


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

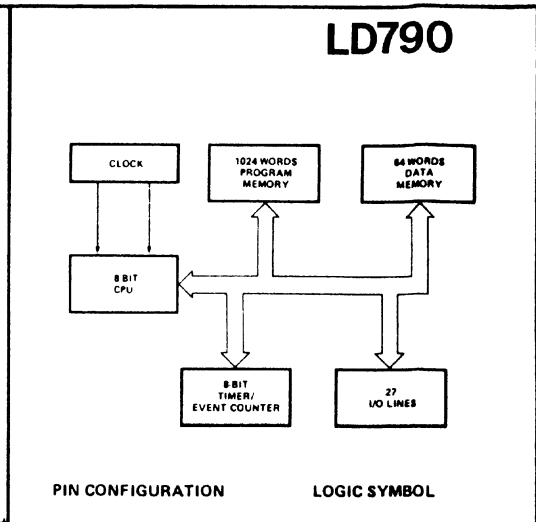
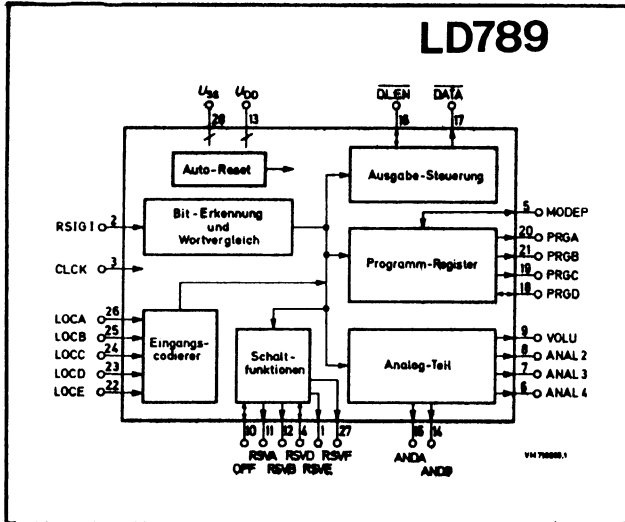


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE



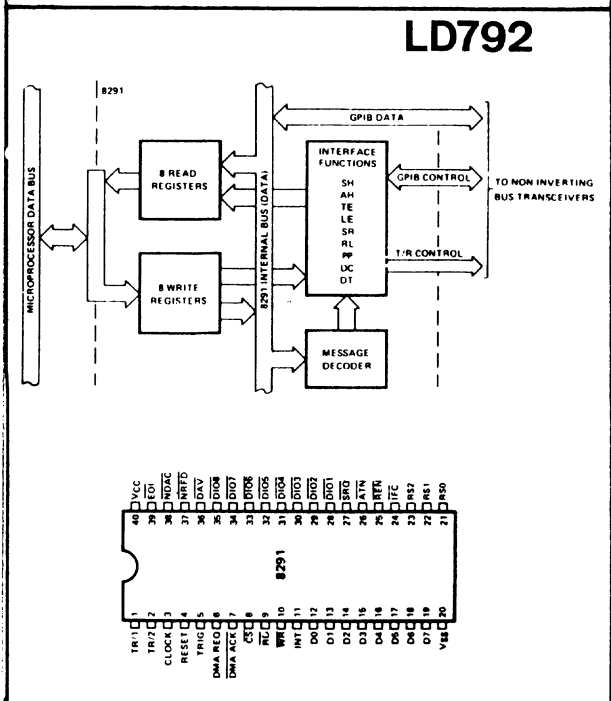
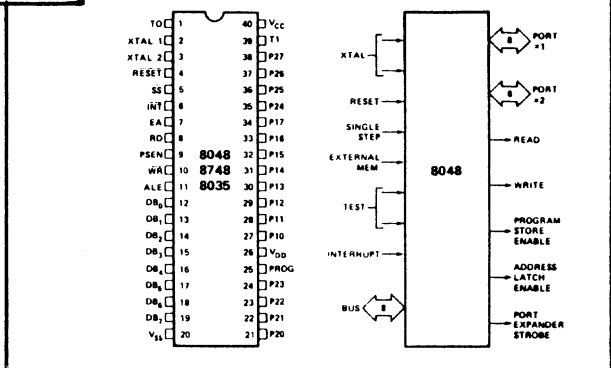
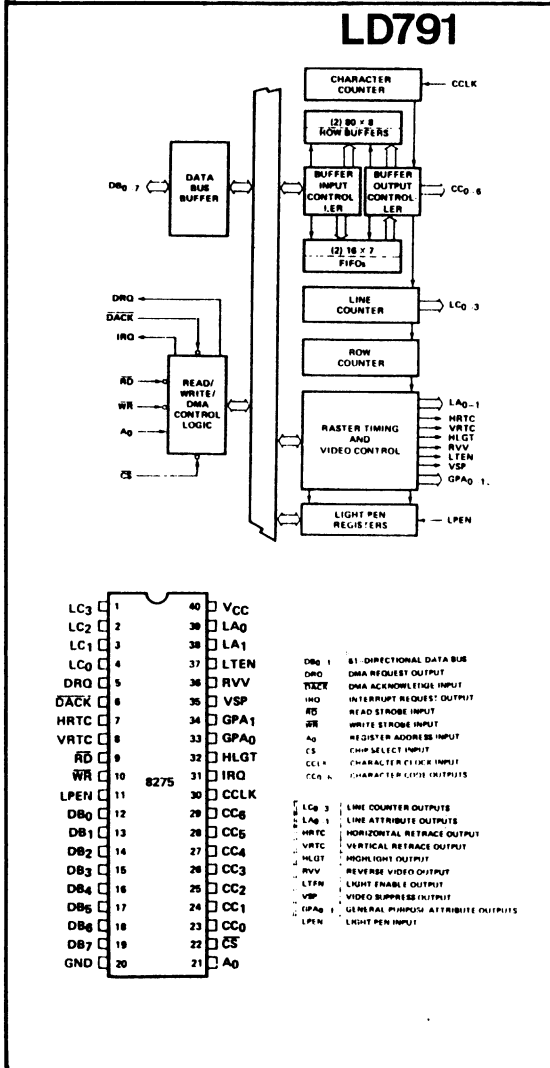


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

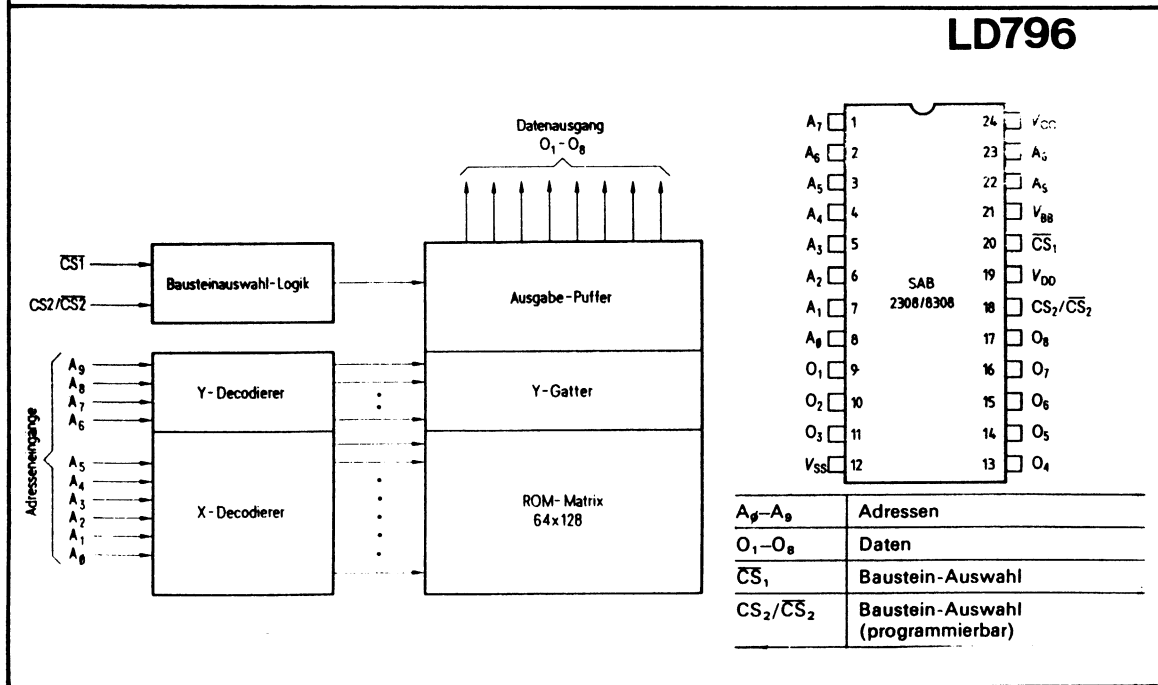
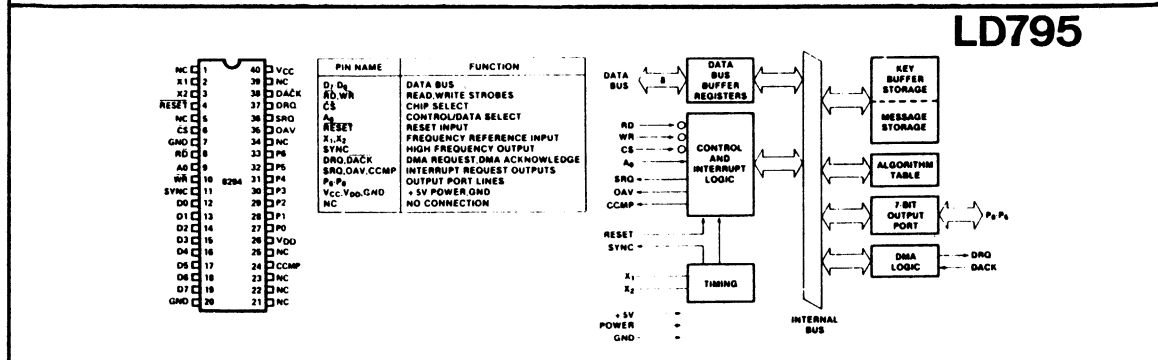
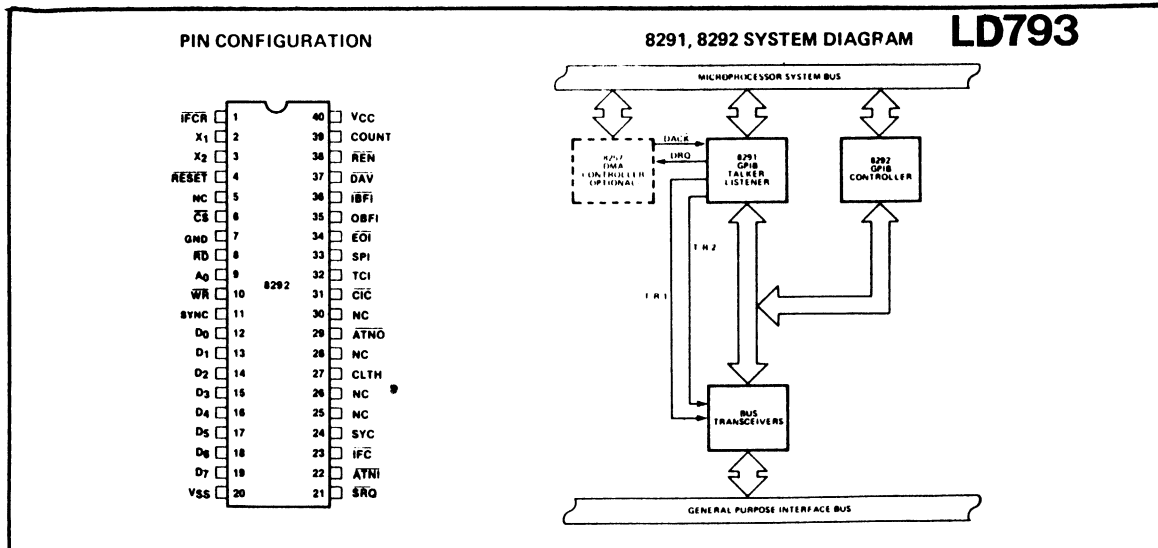


PIN CONFIGURATION

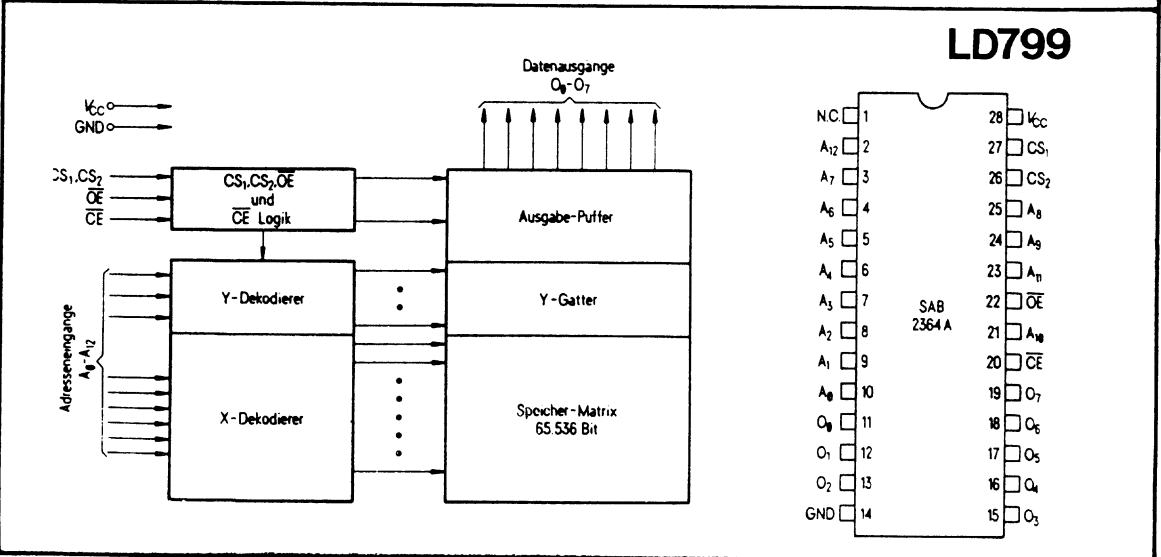
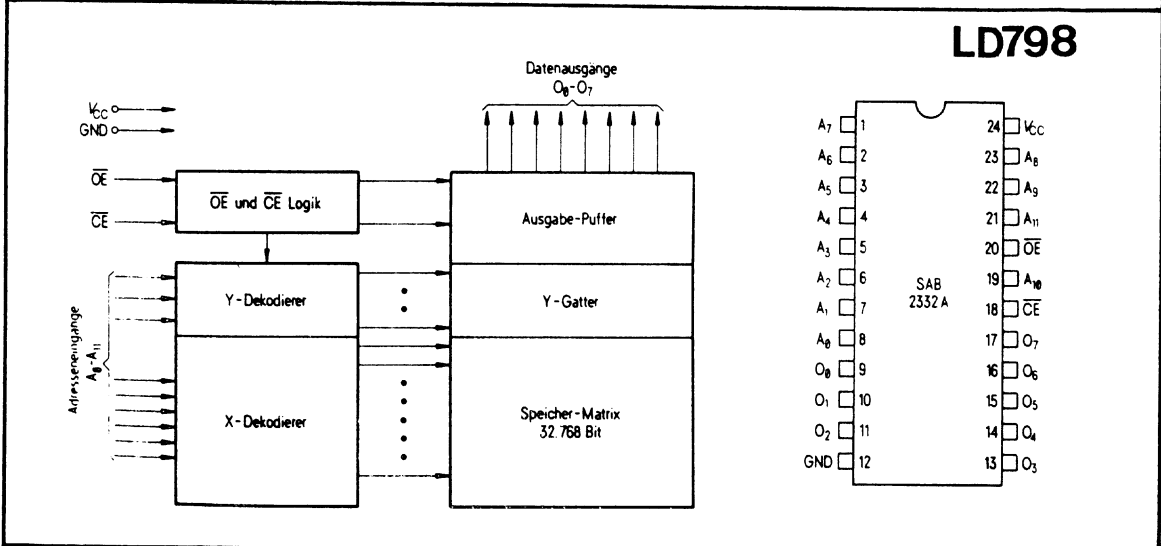
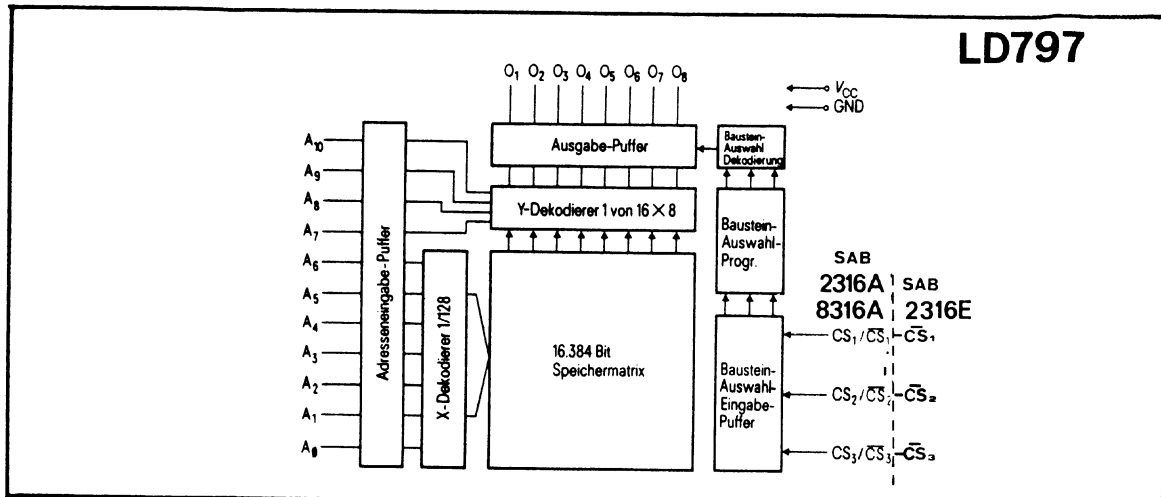
LOGIC SYMBOL

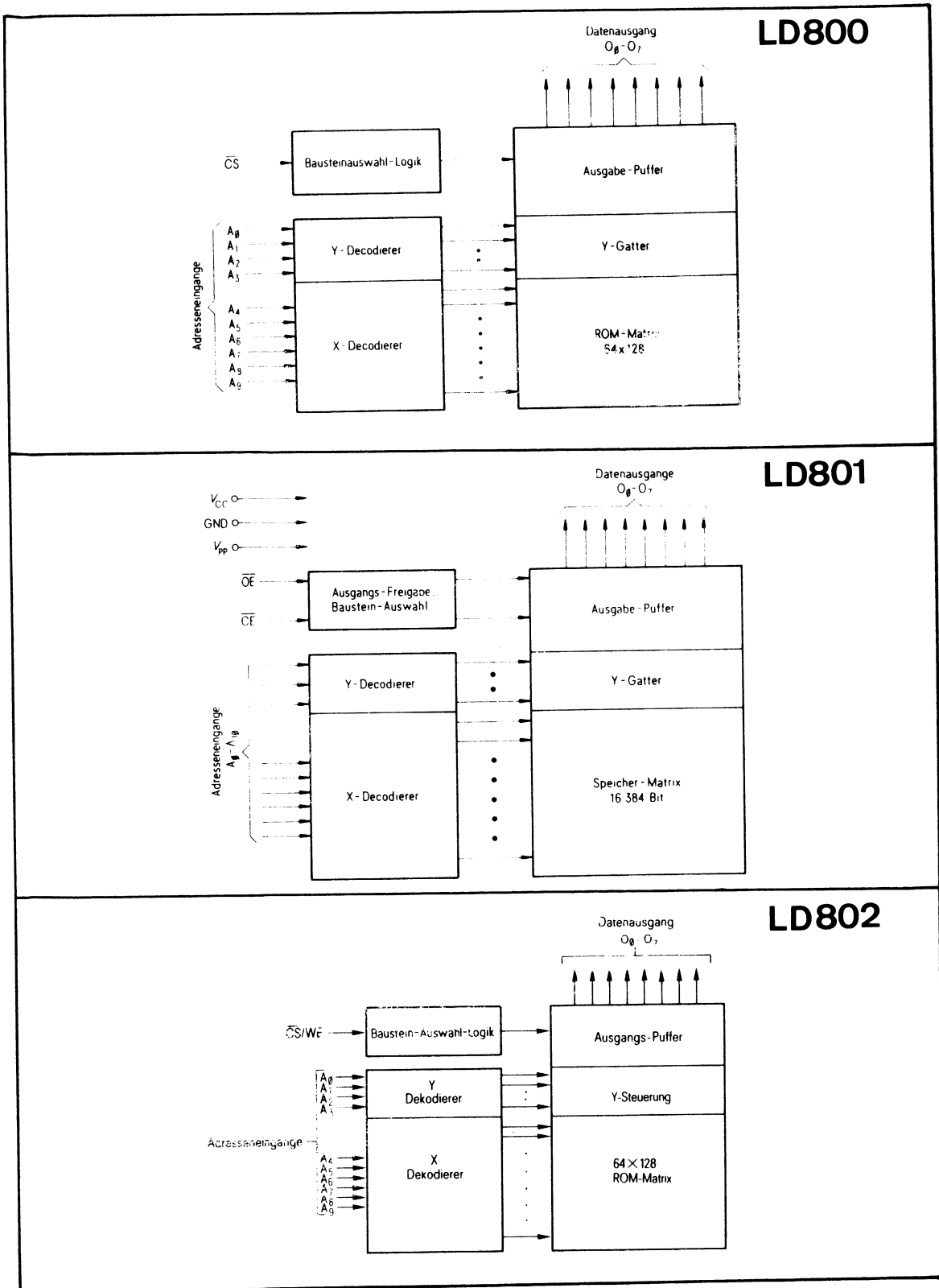


LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

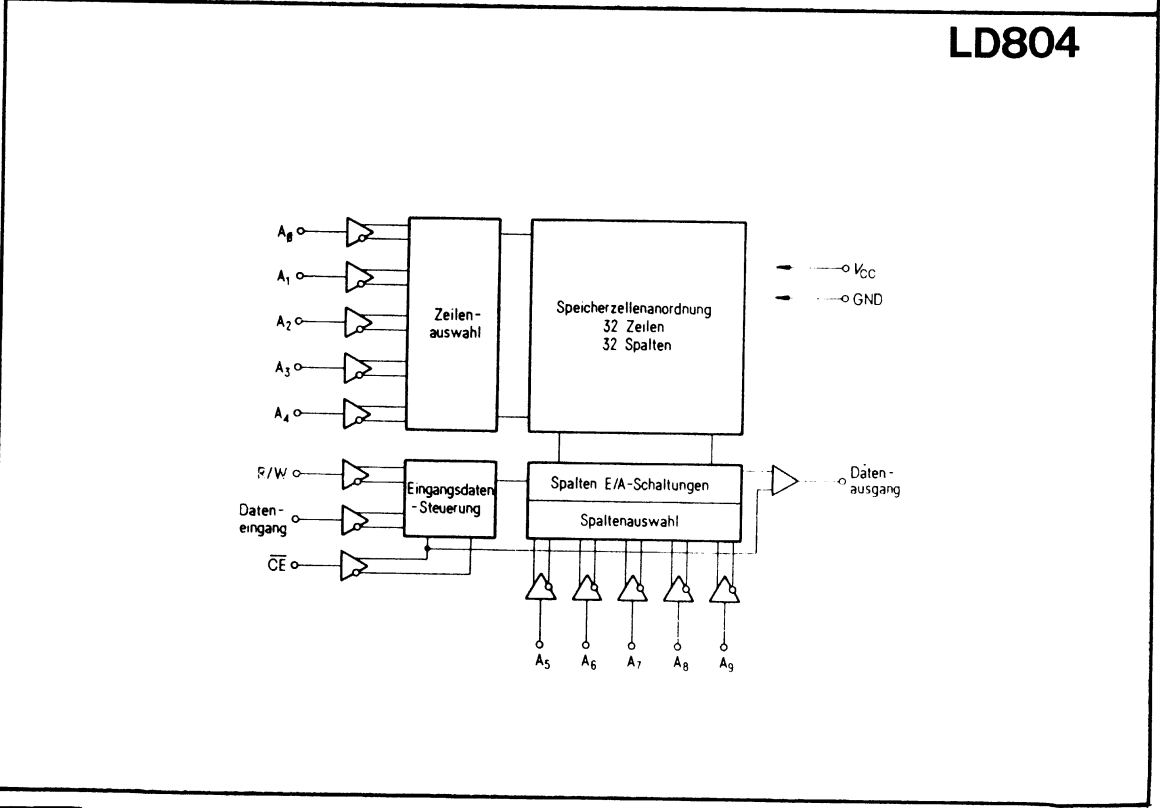
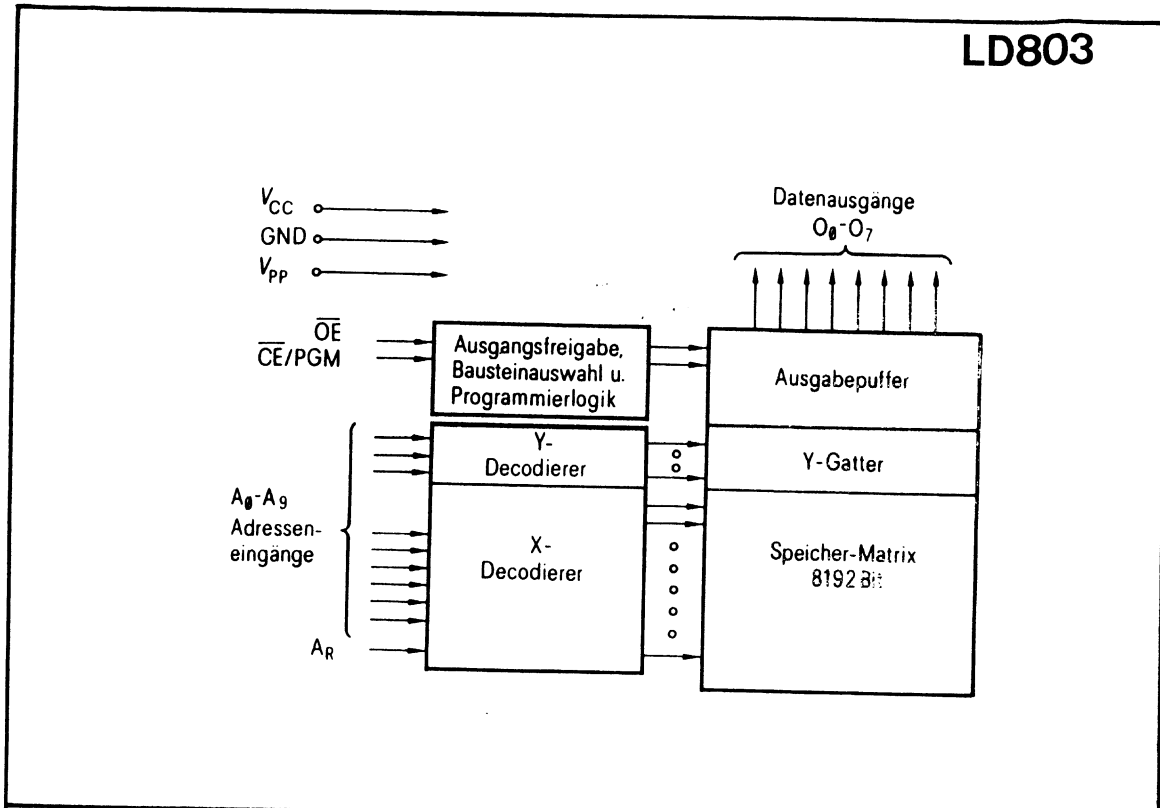


LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

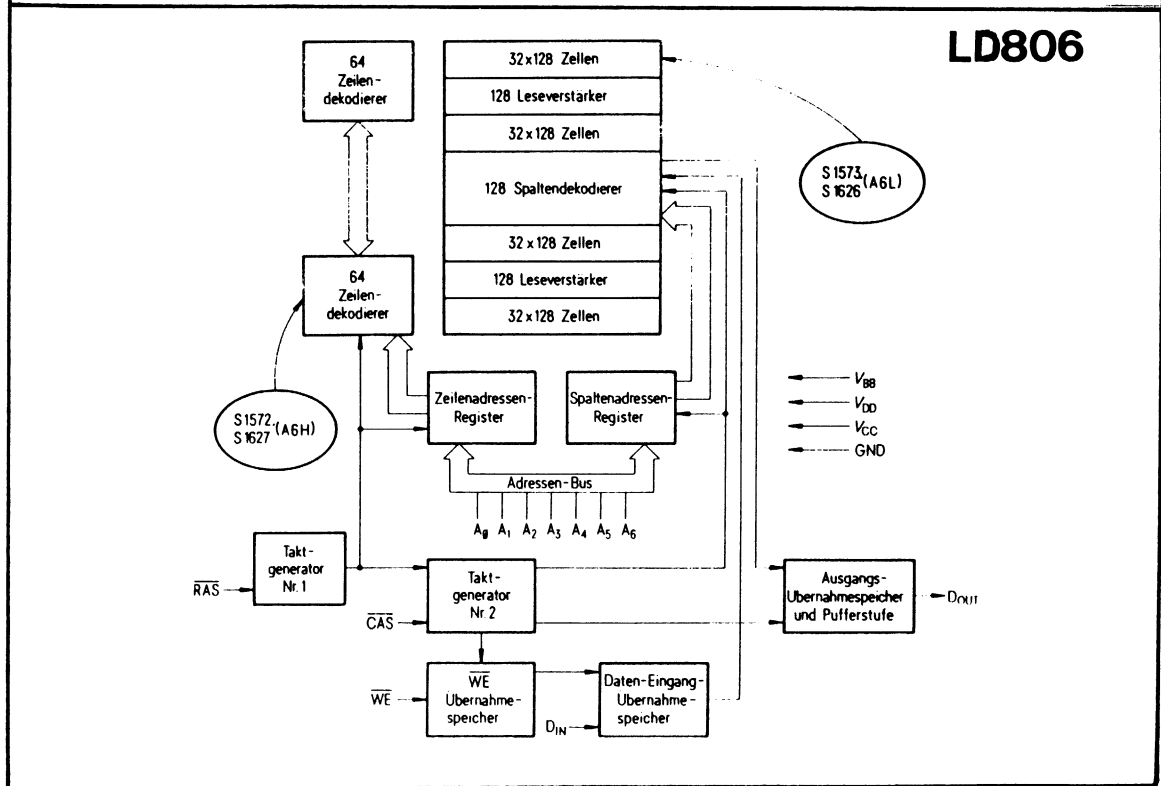
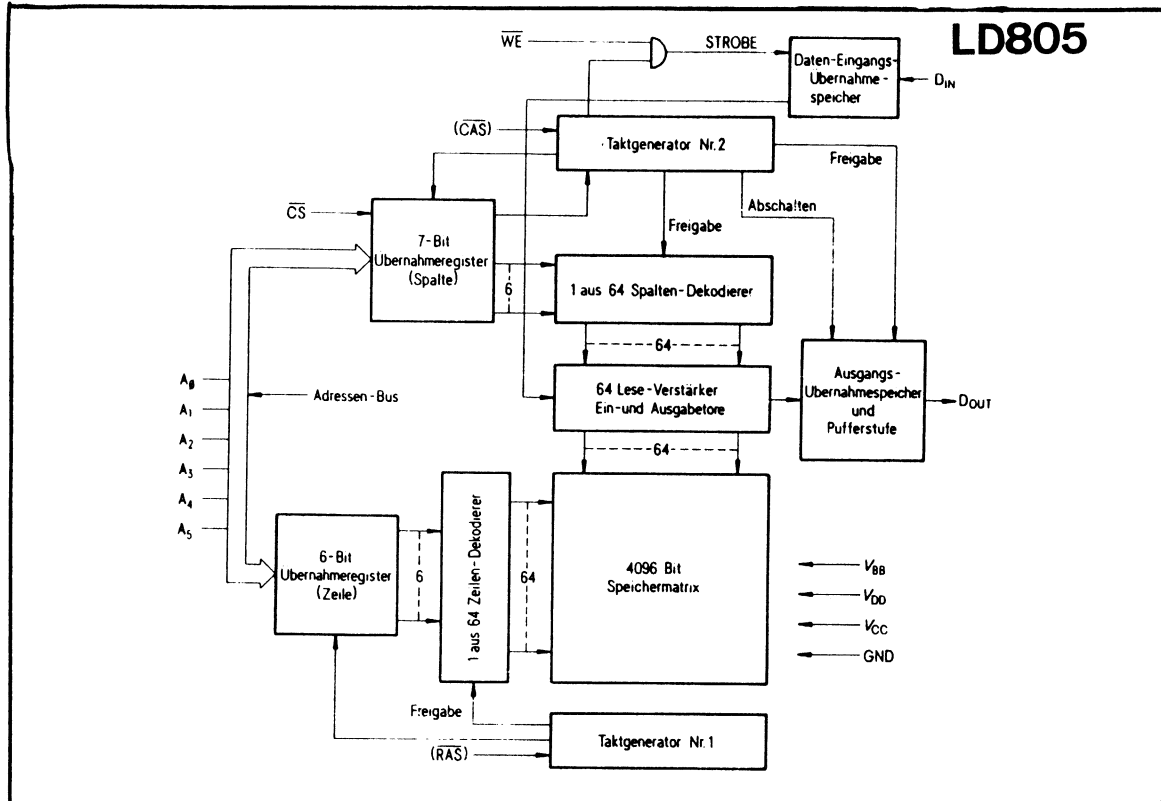


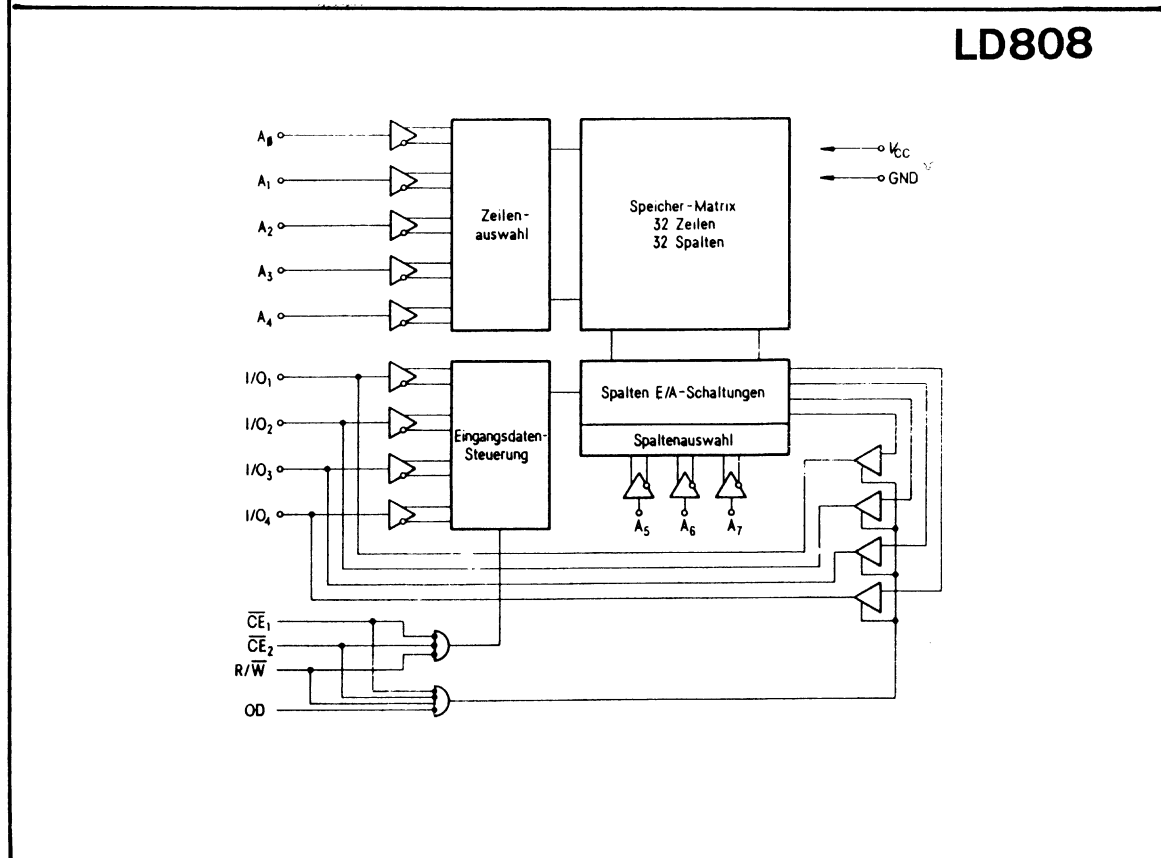
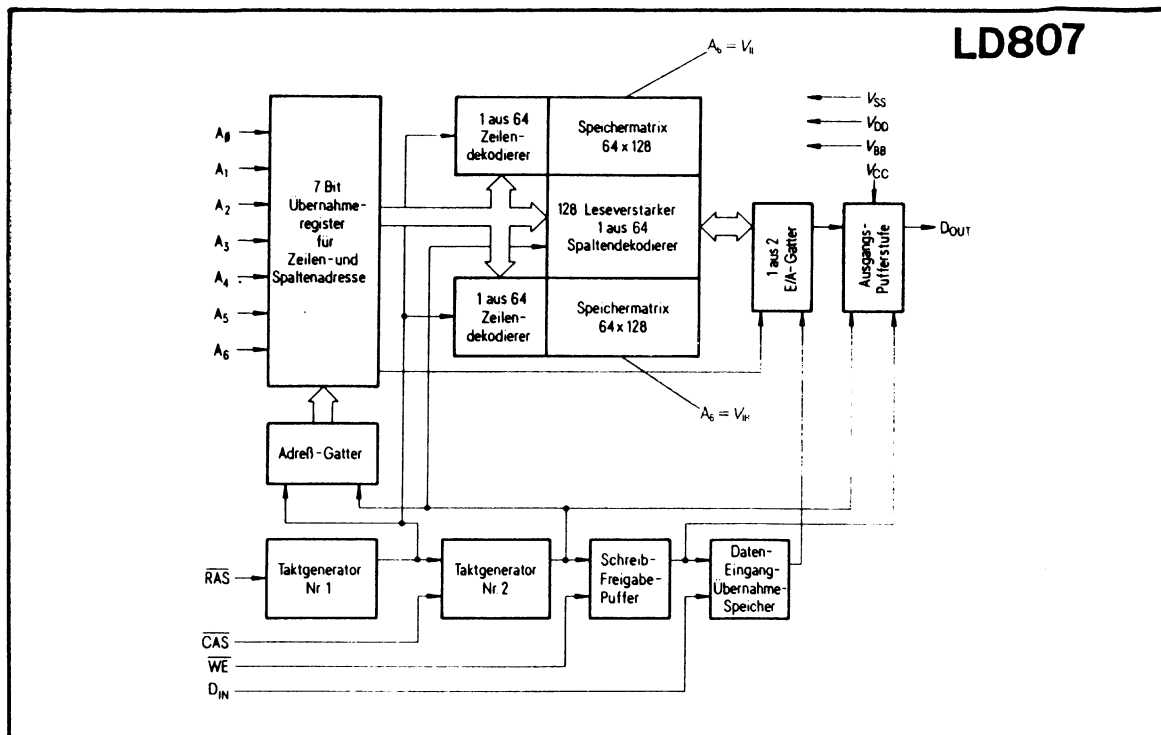


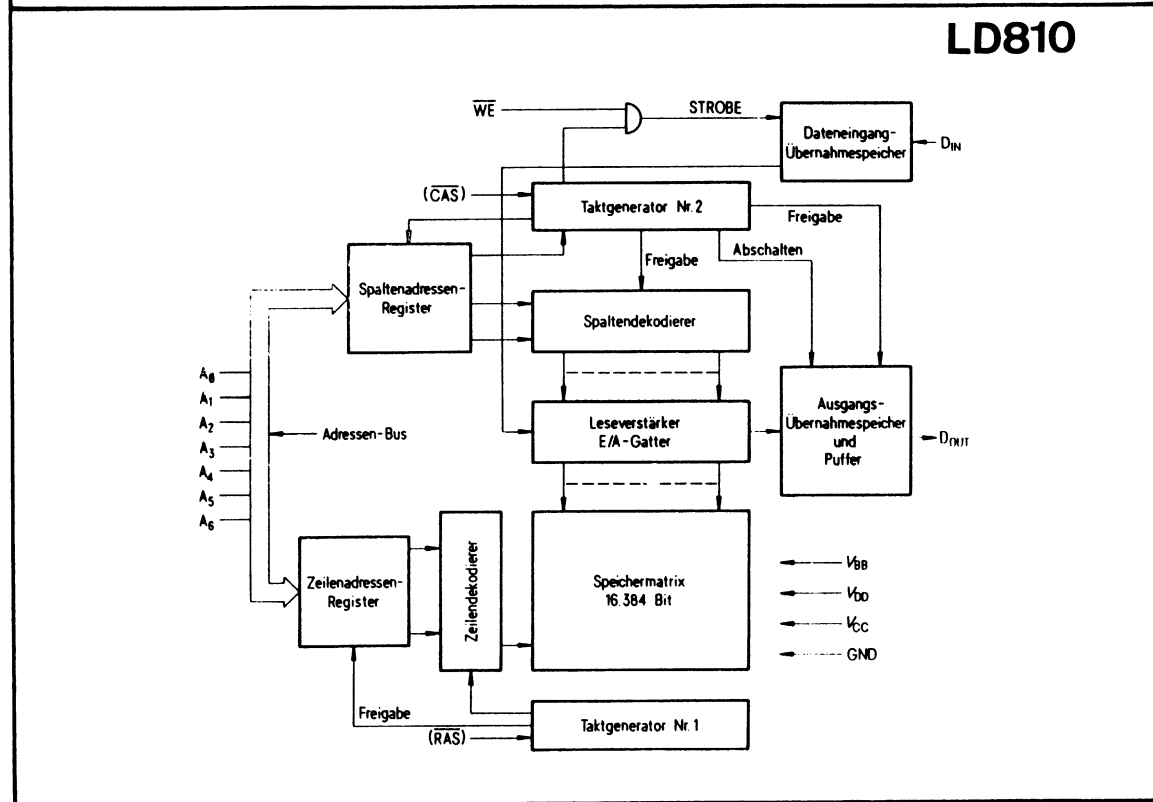
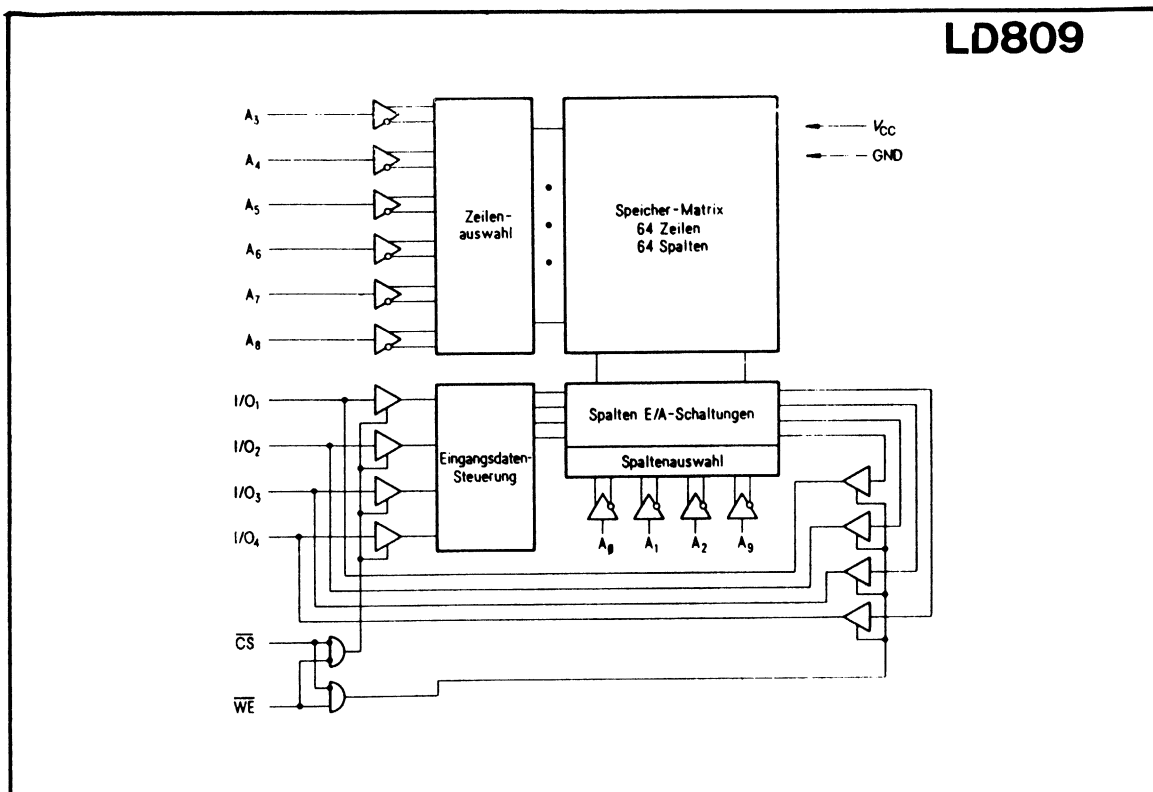
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE



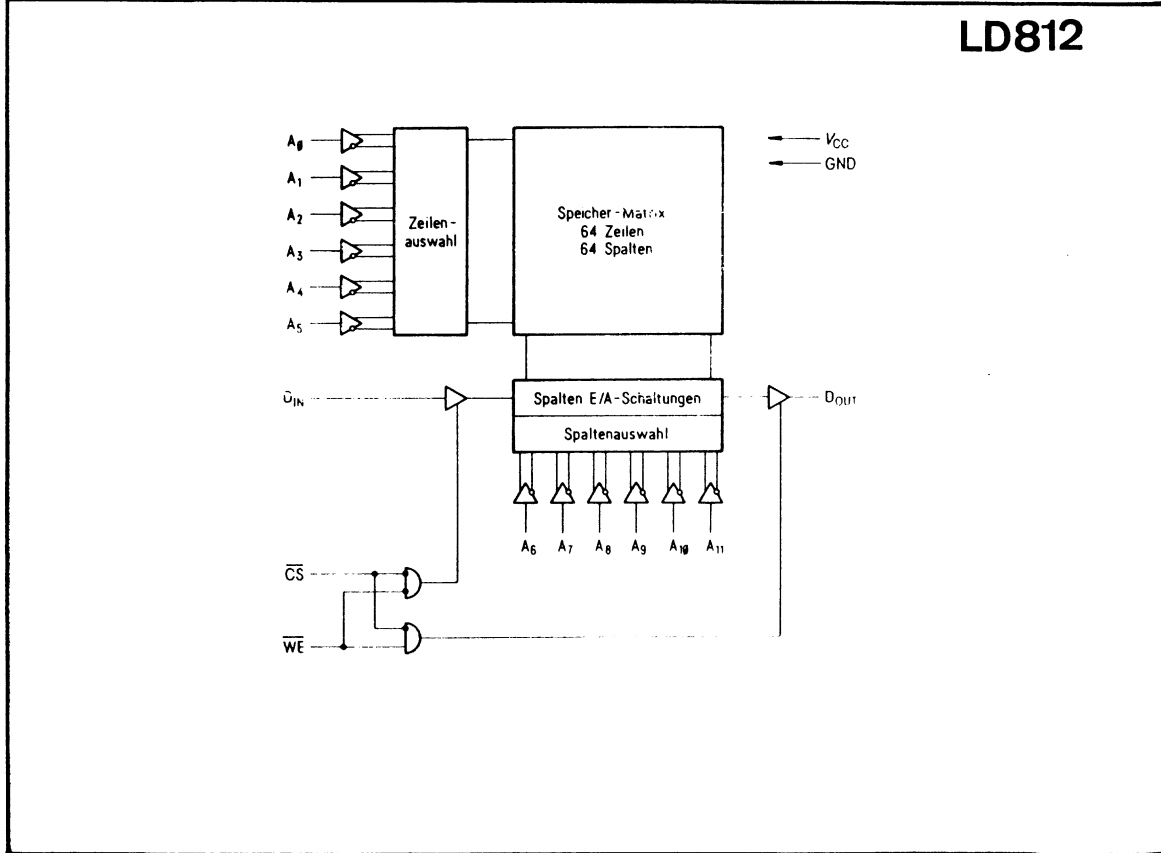
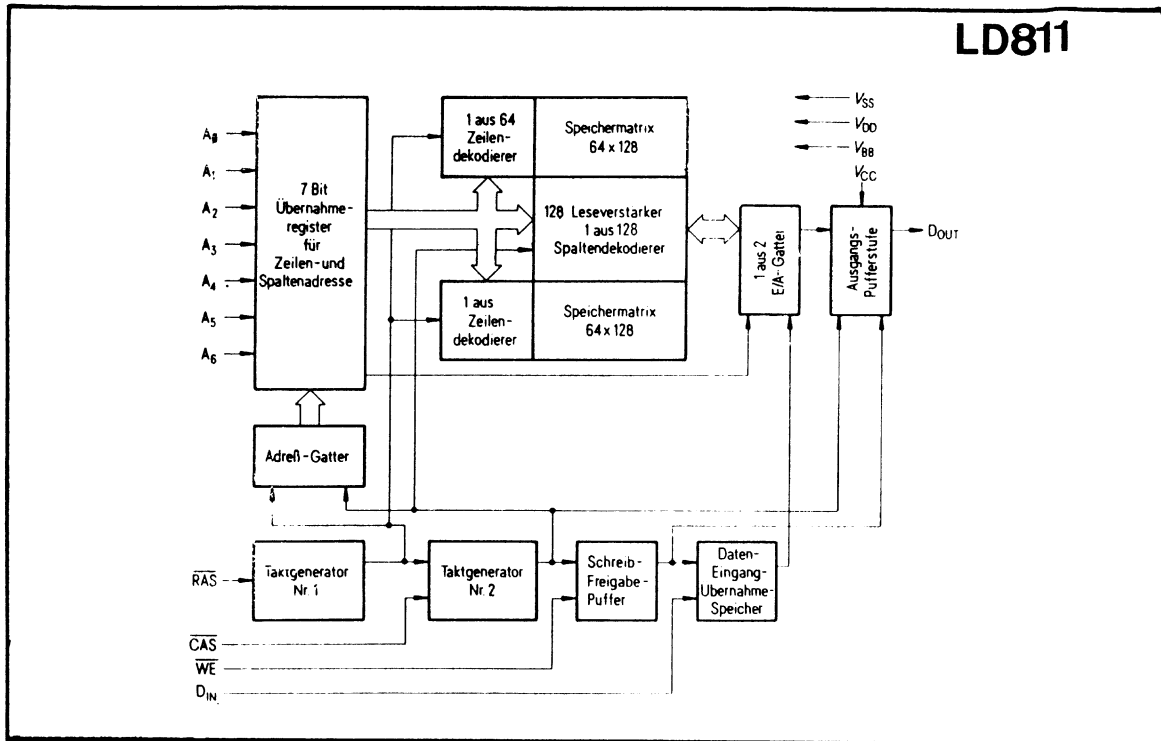
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE

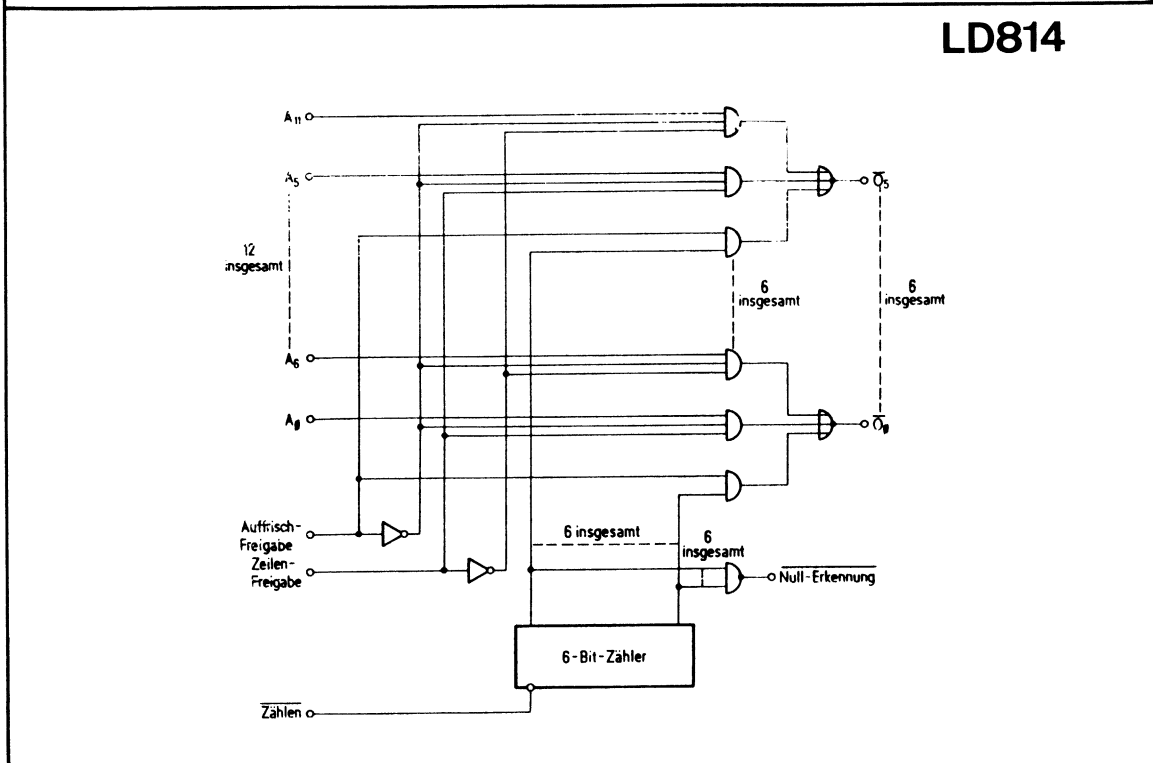
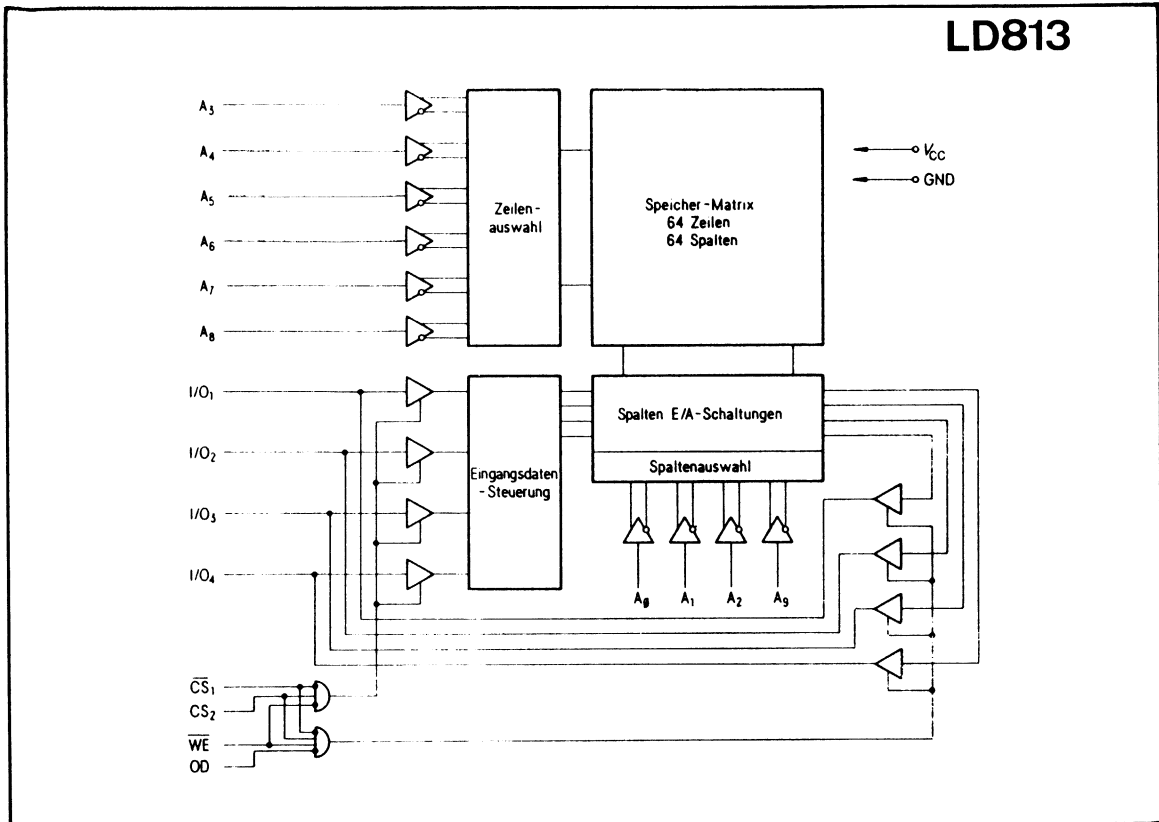


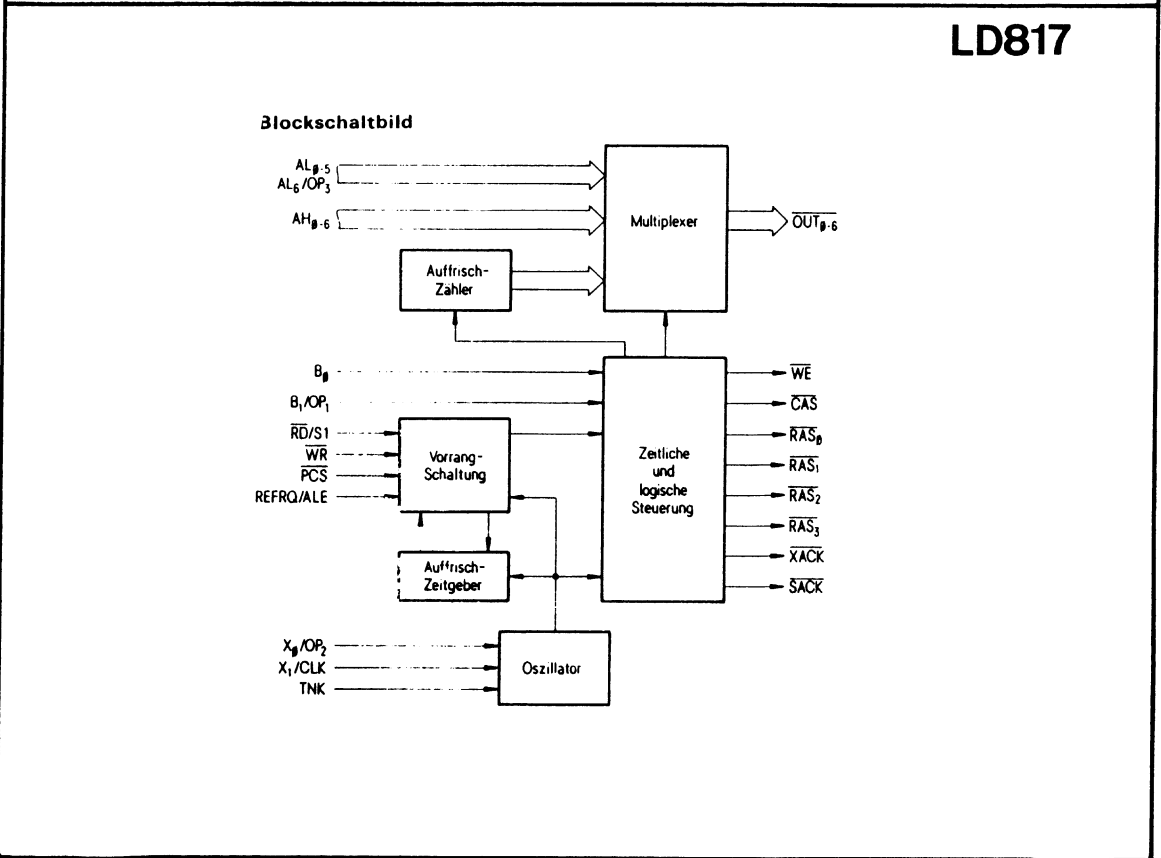
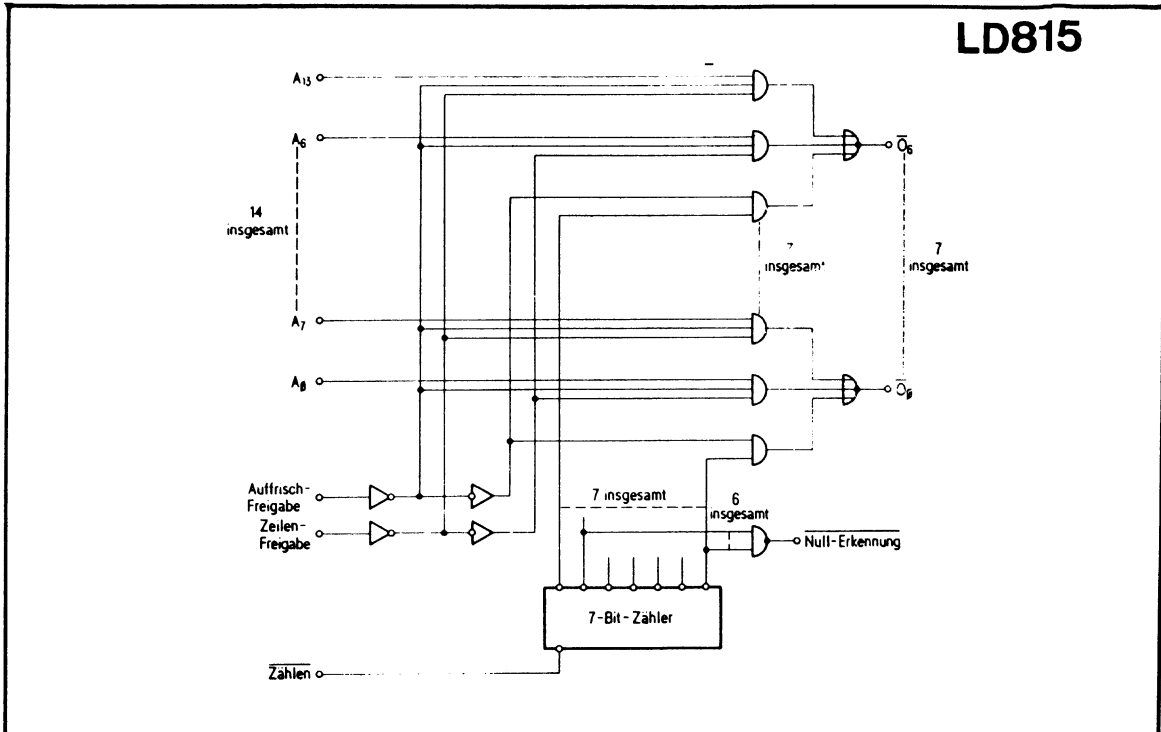




LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

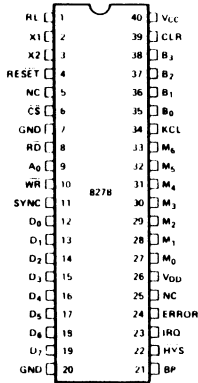






LD818

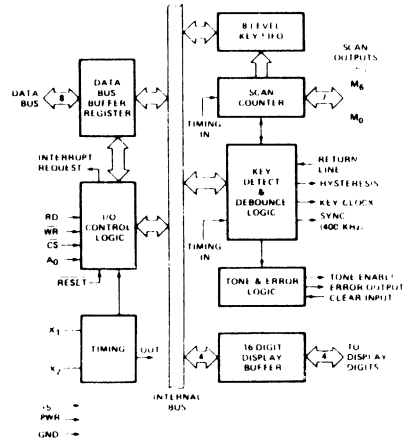
PIN CONFIGURATION



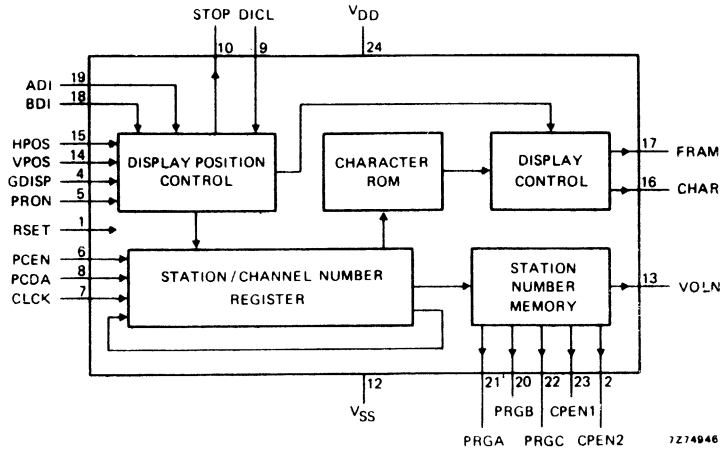
PIN NAMES

D ₇ D ₀	DATA BUS
RD WR	READ WRITE STROBES
CS	CHIP SELECT
A ₀	CONTROL/DATA SELECT
RESET	RESET INPUT
FREQ	FREQ REFERENCE INPUT
X ₁ X ₂	HIGH FREQUENCY OUTPUT
CLK	CLOCK
RL	KEYBOARD RETURN LINE
CLR	CLEAR ERROR
KCL	KEY CLOCK
M ₆ M ₀	MATRIX SCAN LINES
B ₃ B ₀	DISPLAY OUTPUTS
ERR	ERROR SIGNAL
IRQ	INTERRUPT REQUEST
HYS	HYSTERESIS
BP	-tone ENABLE

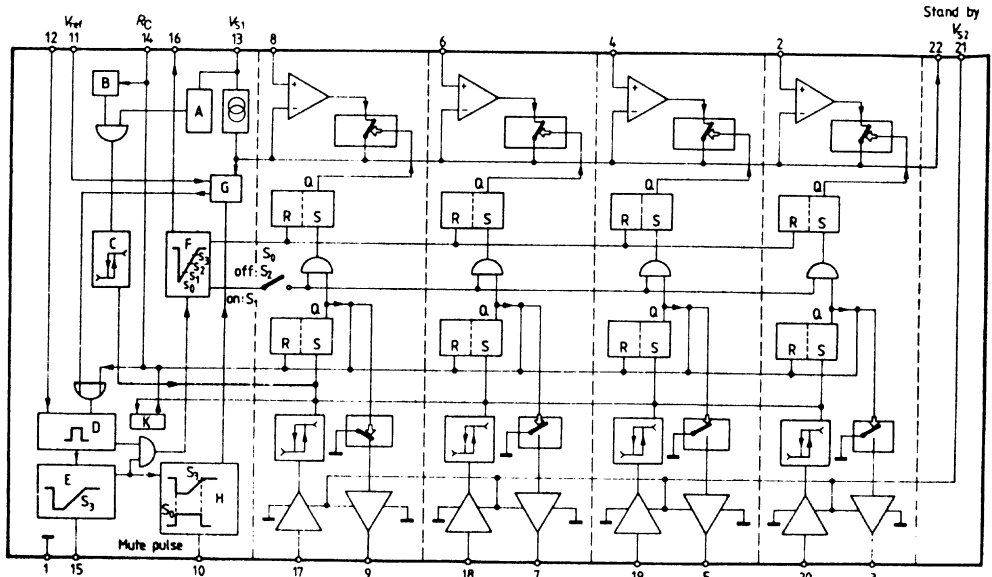
BLOCK DIAGRAM



LD819

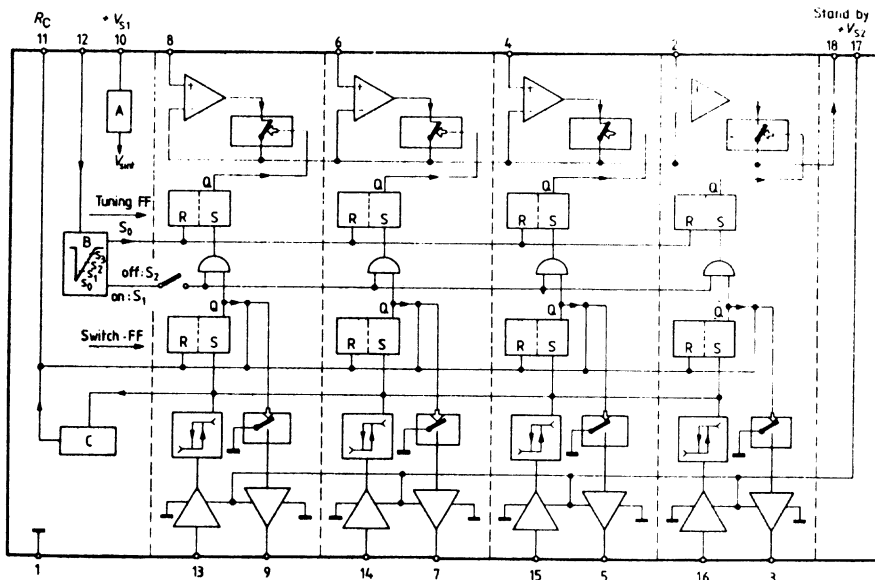


LD820

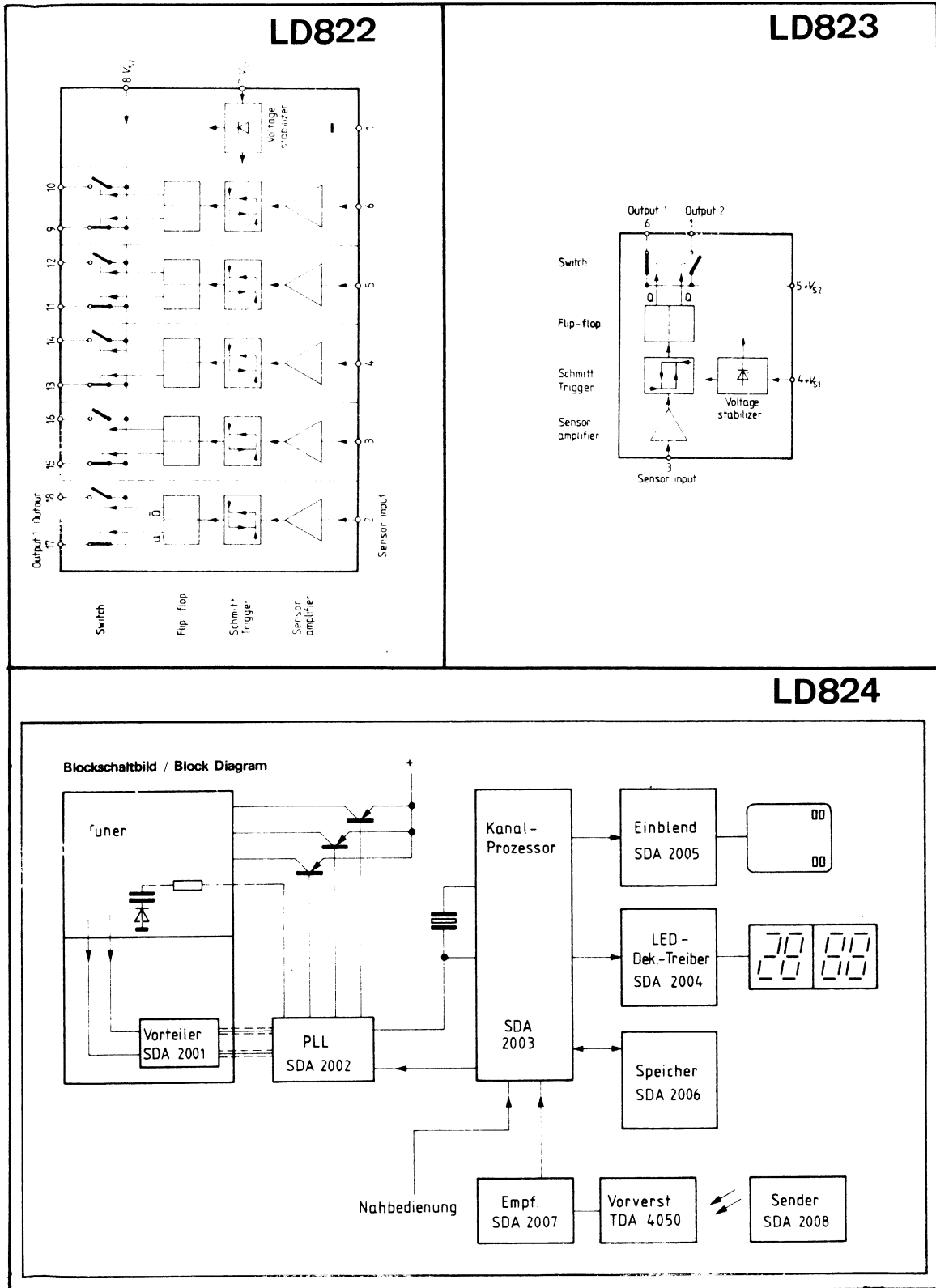


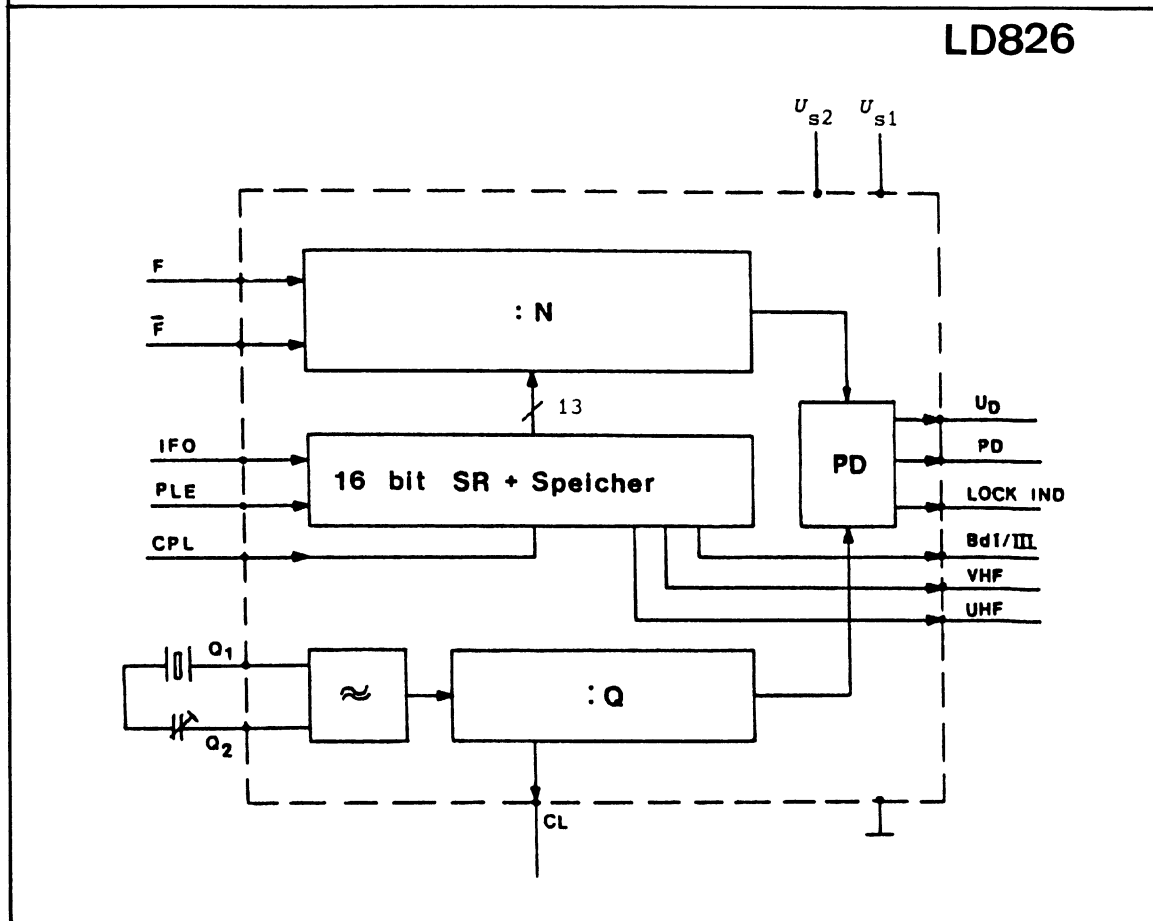
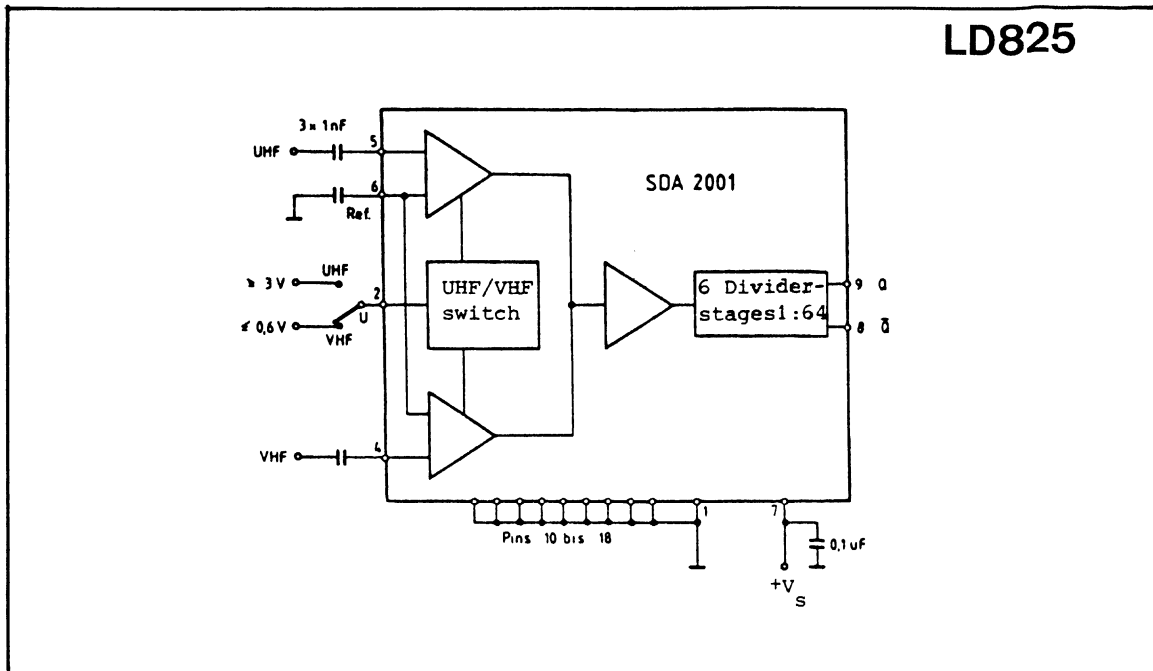
- A Stabilizing of internal supply voltage V_{int}
- B $V_{RC} = 0$; voltage at coupling resistor when applying V_s or V_{int} is still zero
- C When, after switching on, V_{int} has attained its full extent and $V_{RC} = 0$, then the 1. stage is set via the Schmitt trigger
- D Switching stage for switching pulse generation
- E Sawtooth generation
- F Gating the pulse D and E results in obtaining the delayed sawtooth
- G New sawtooth start, if no correct tuning voltage transfer $V_{tun} = V_{ref} + V_{BE}$
- H Muting pulse generation. Duration is determined by start and threshold of sawtooth
- K Recognition whether finger still on key

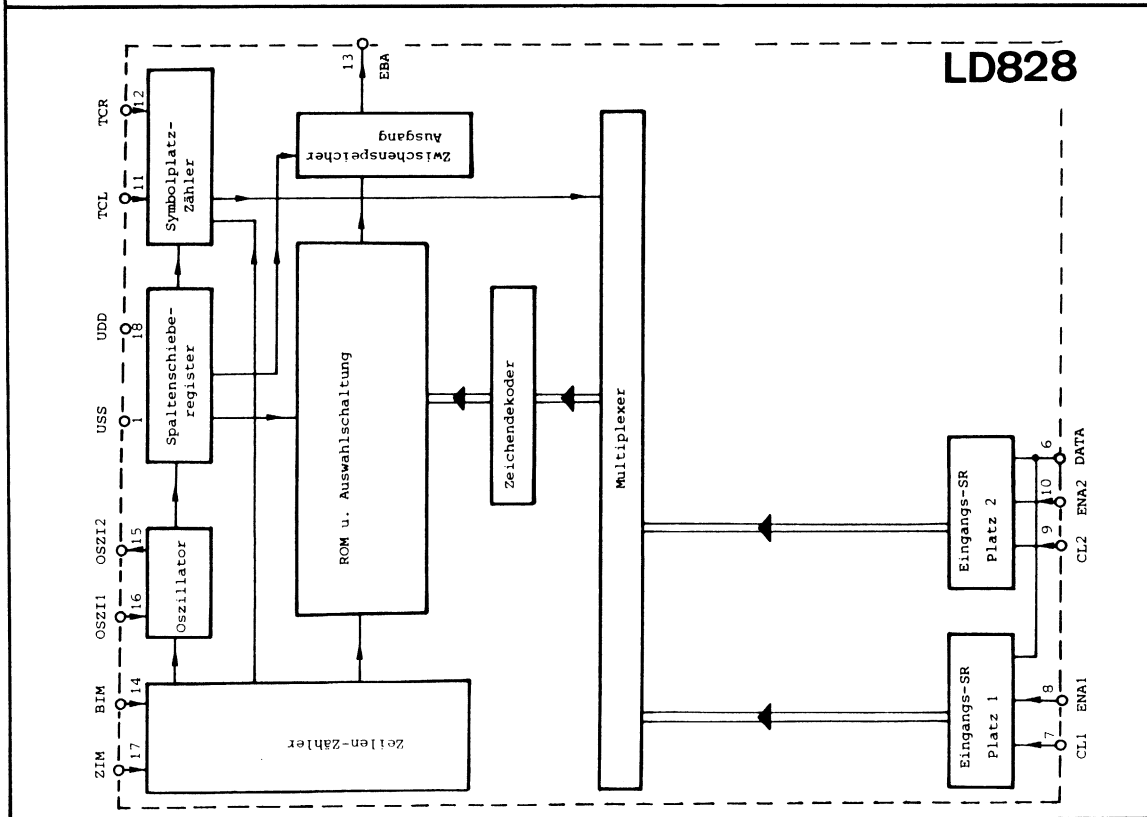
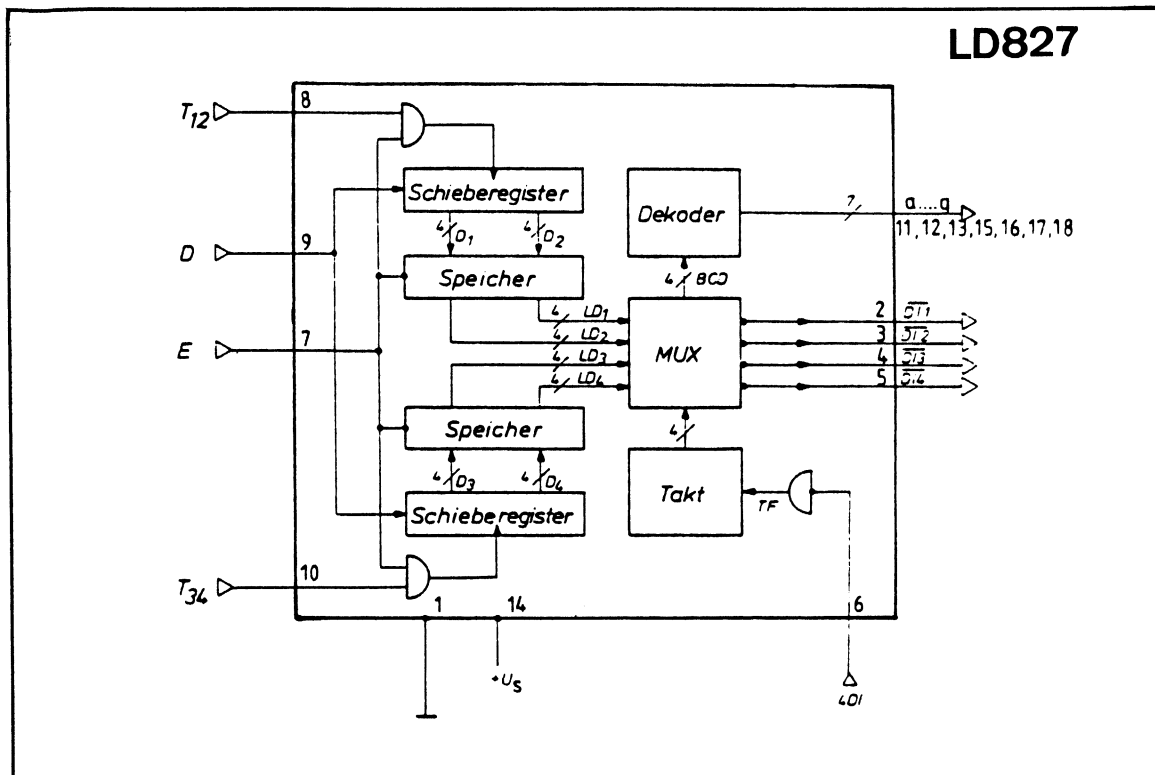
LD821



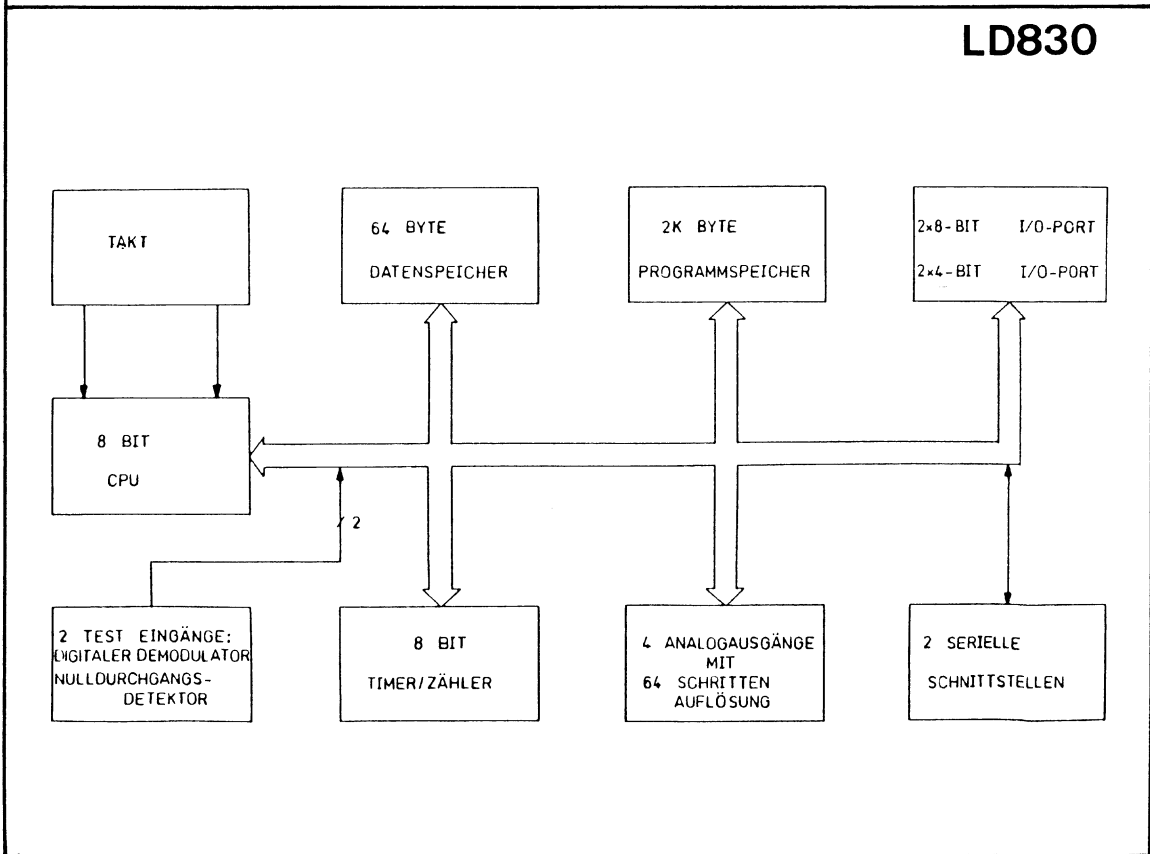
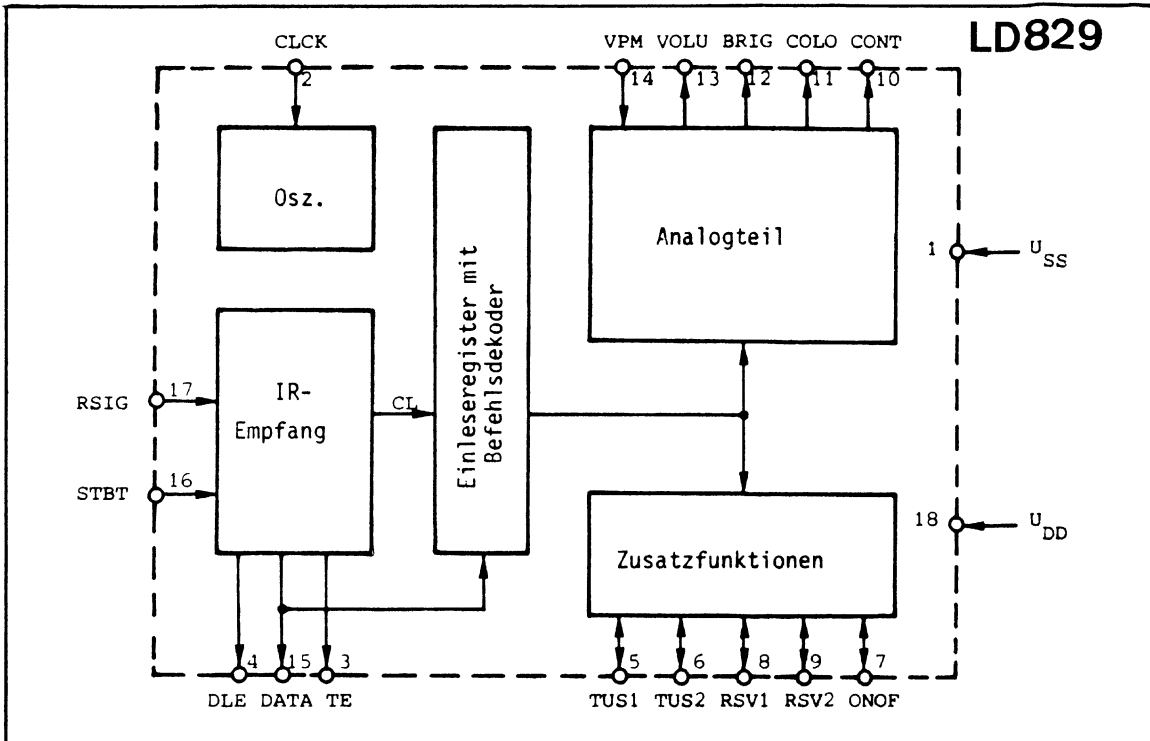
- A Stabilizing of the internal supply voltage V_{int}
- B Delayed sawtooth from SAS 5800. S_2 = End of muting pulse from SAS 5800
- C Recognition whether finger still presses key



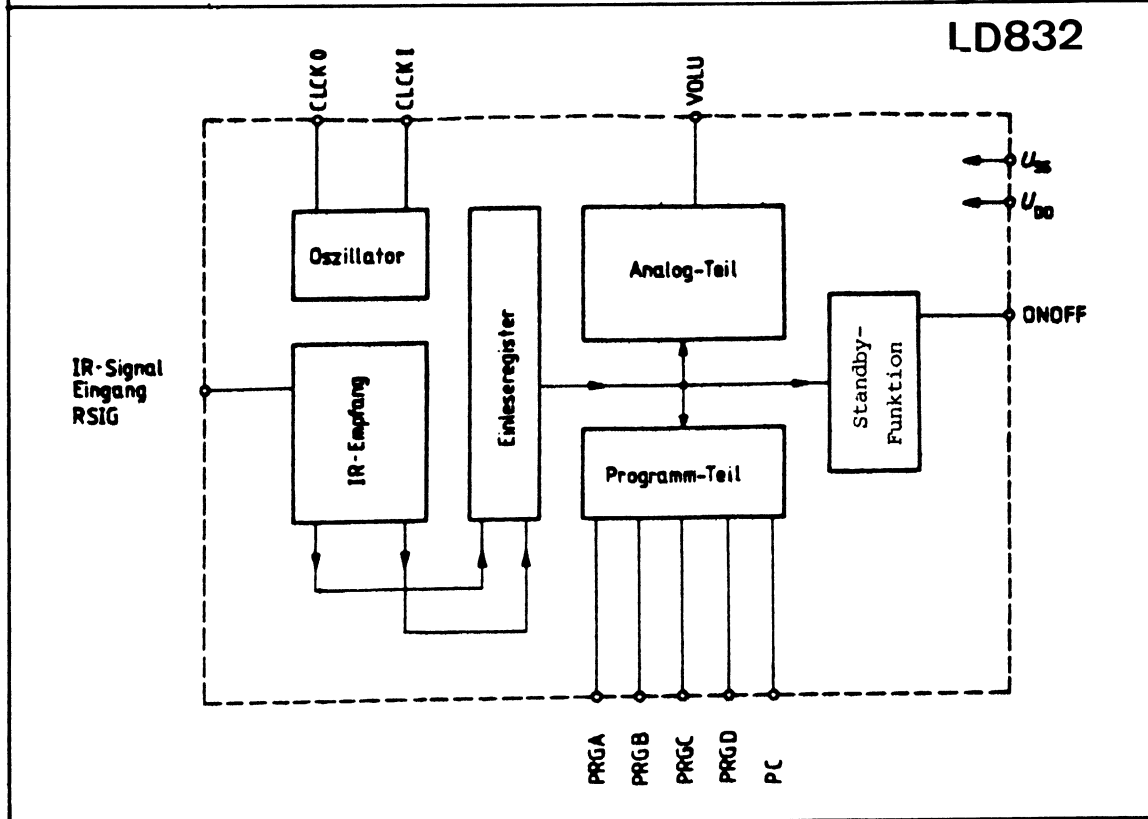
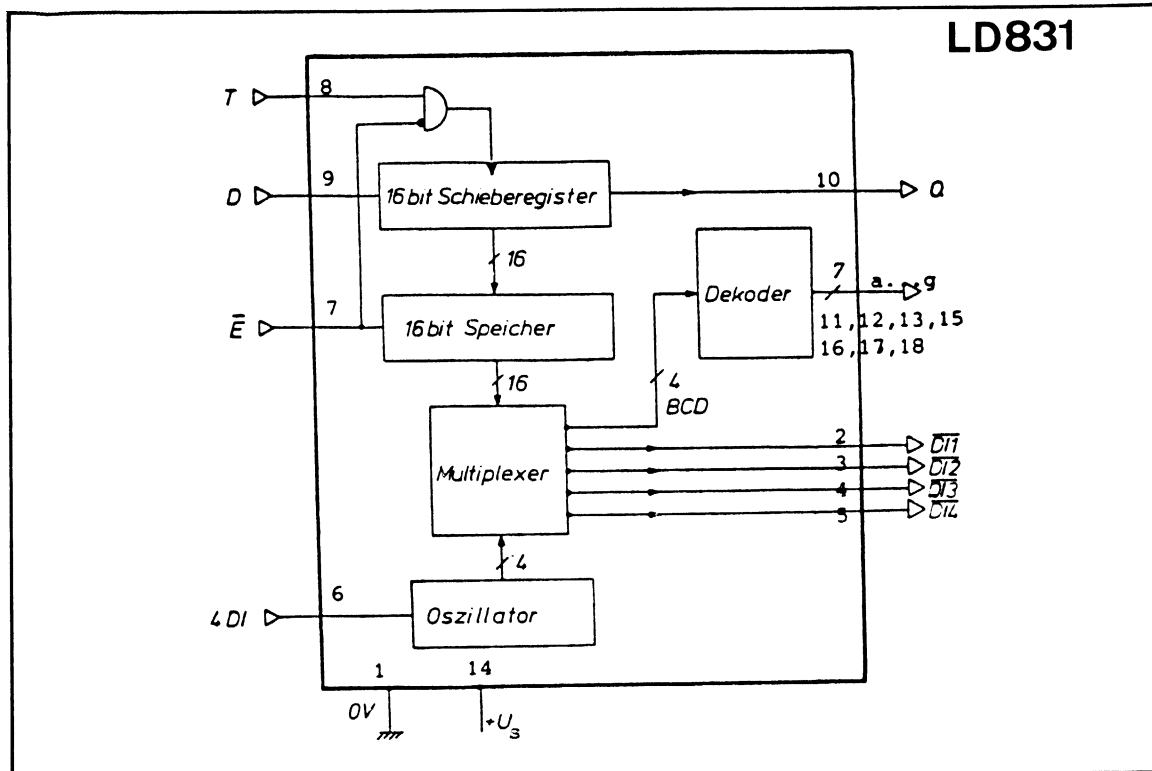


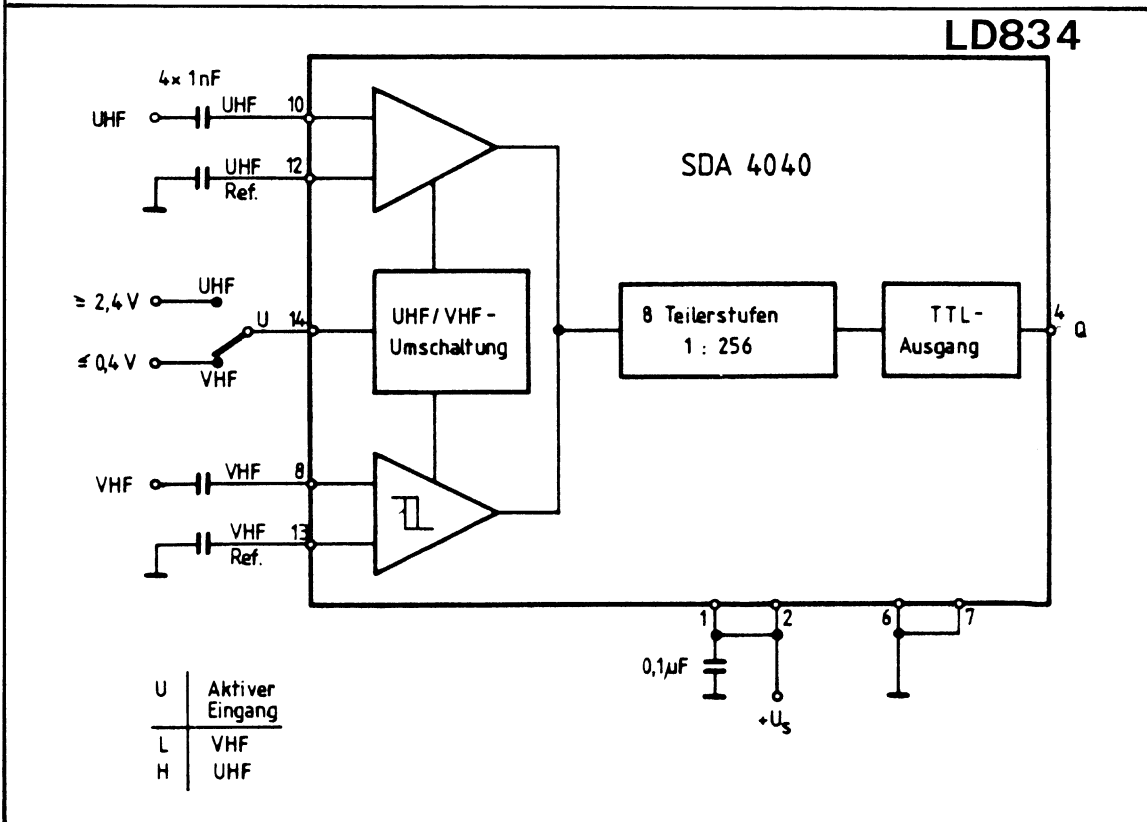
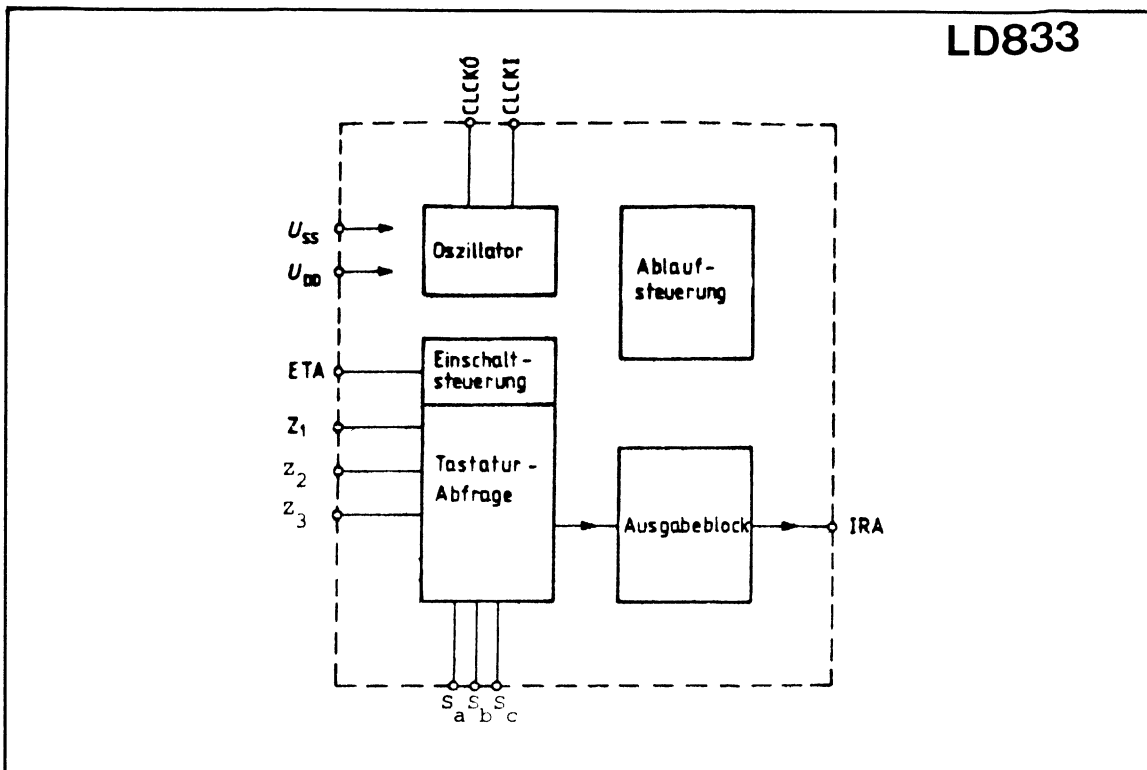


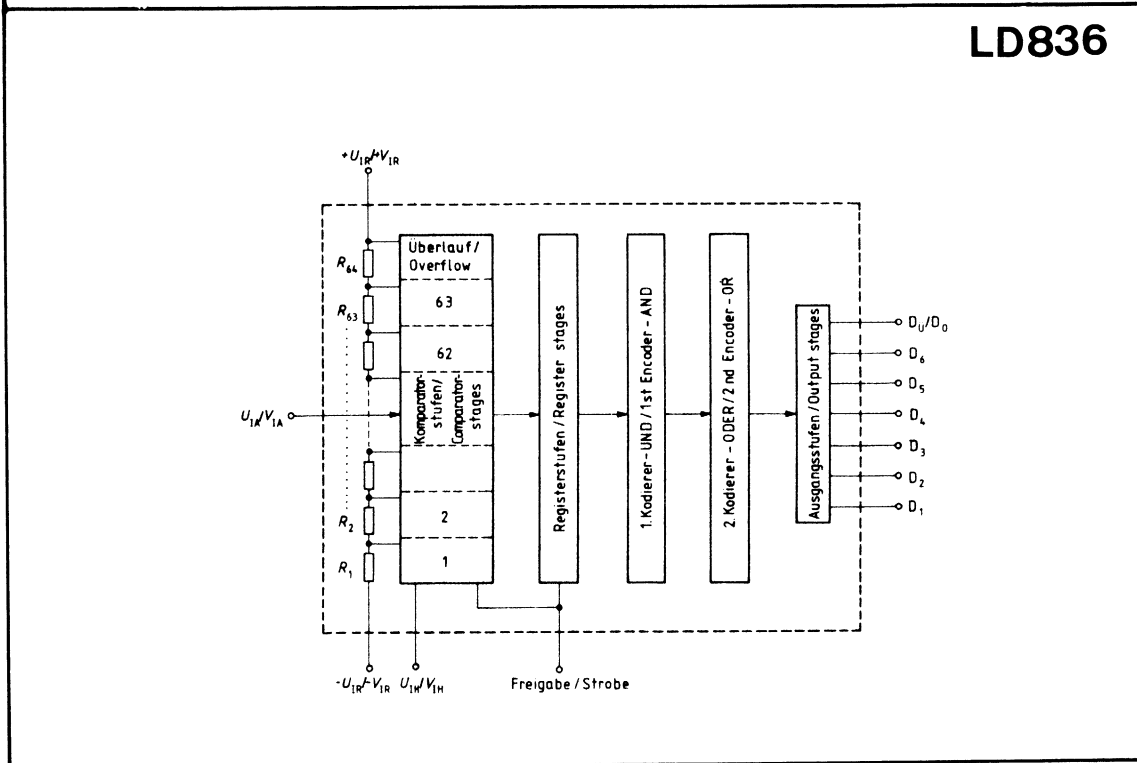
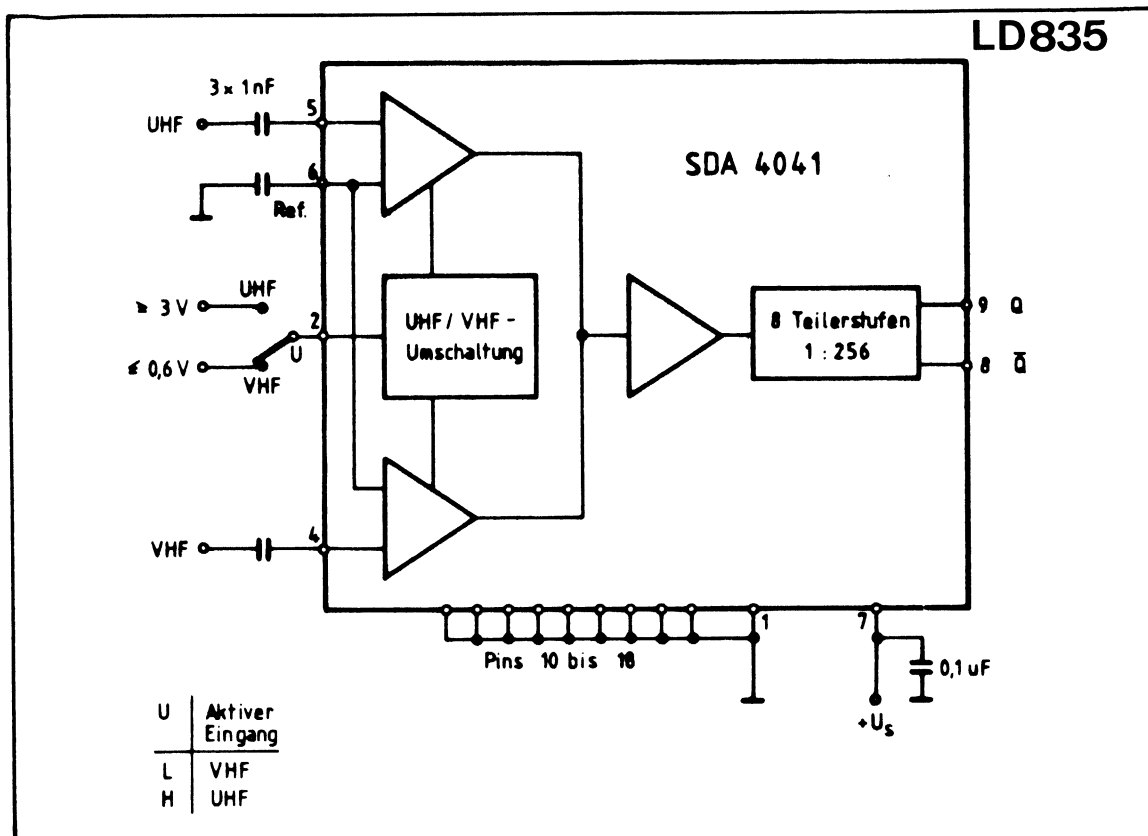
LOGIC DIAGRAMS - SCHÉMAS LOGIQUES - LOGIK-SCHALTPLÄNE

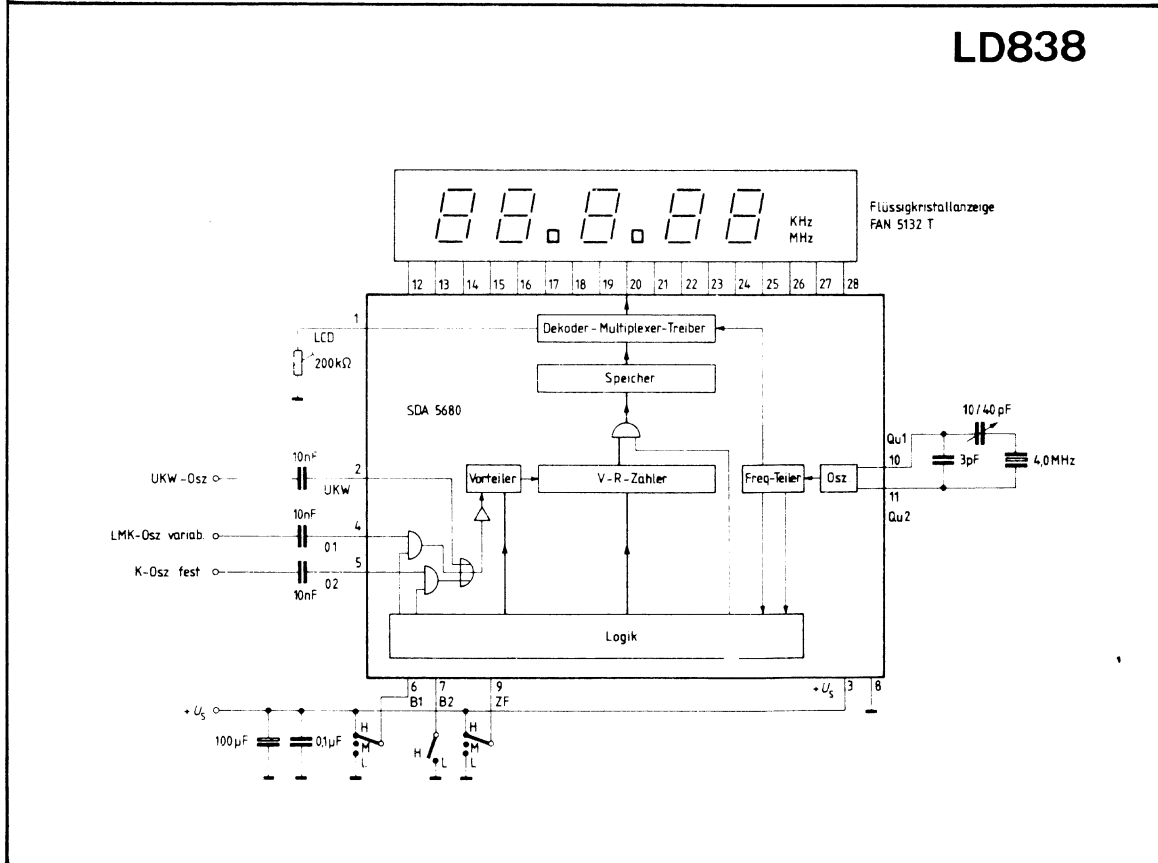
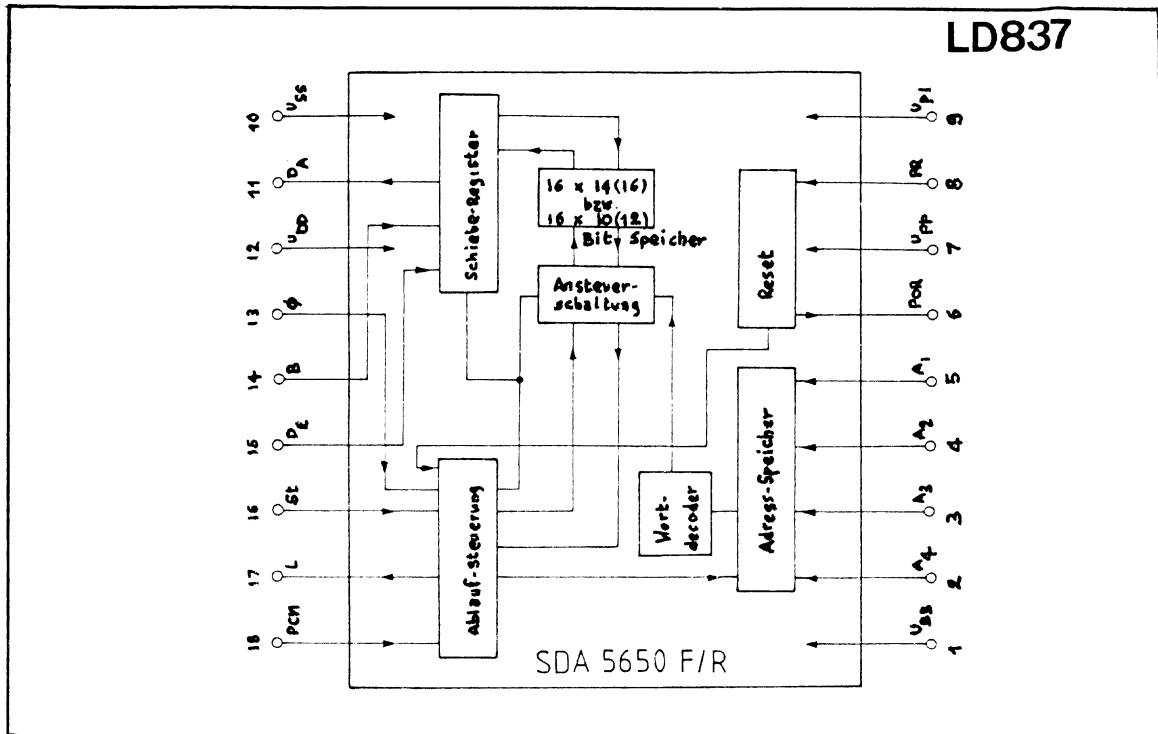


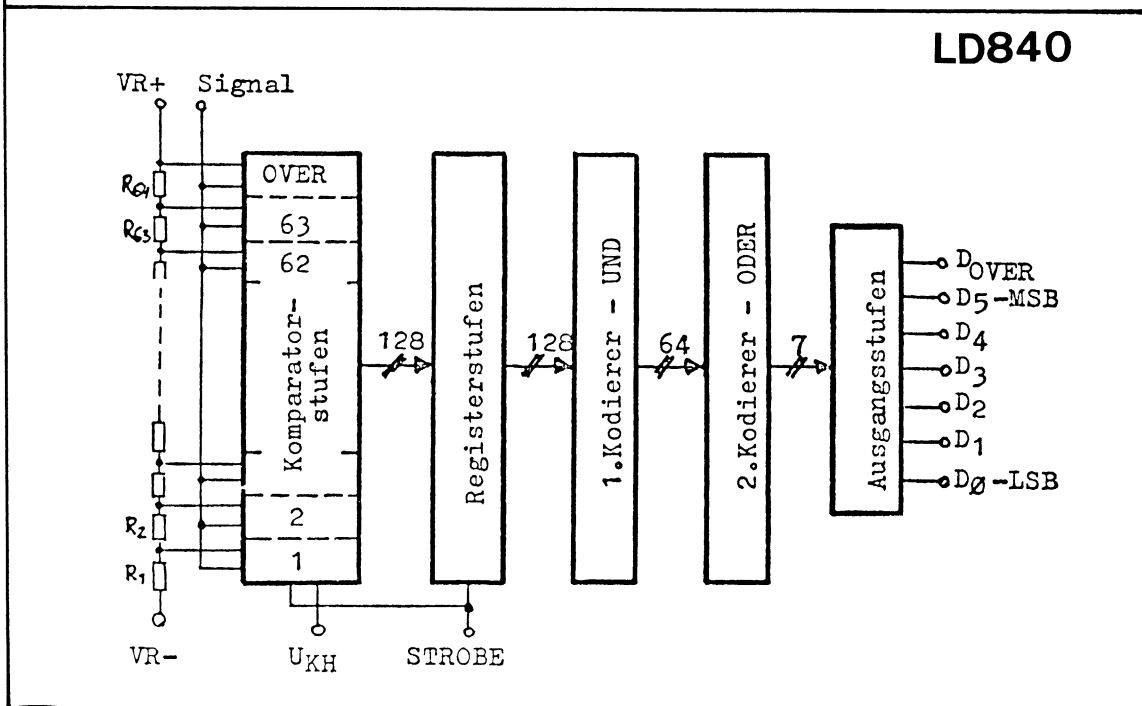
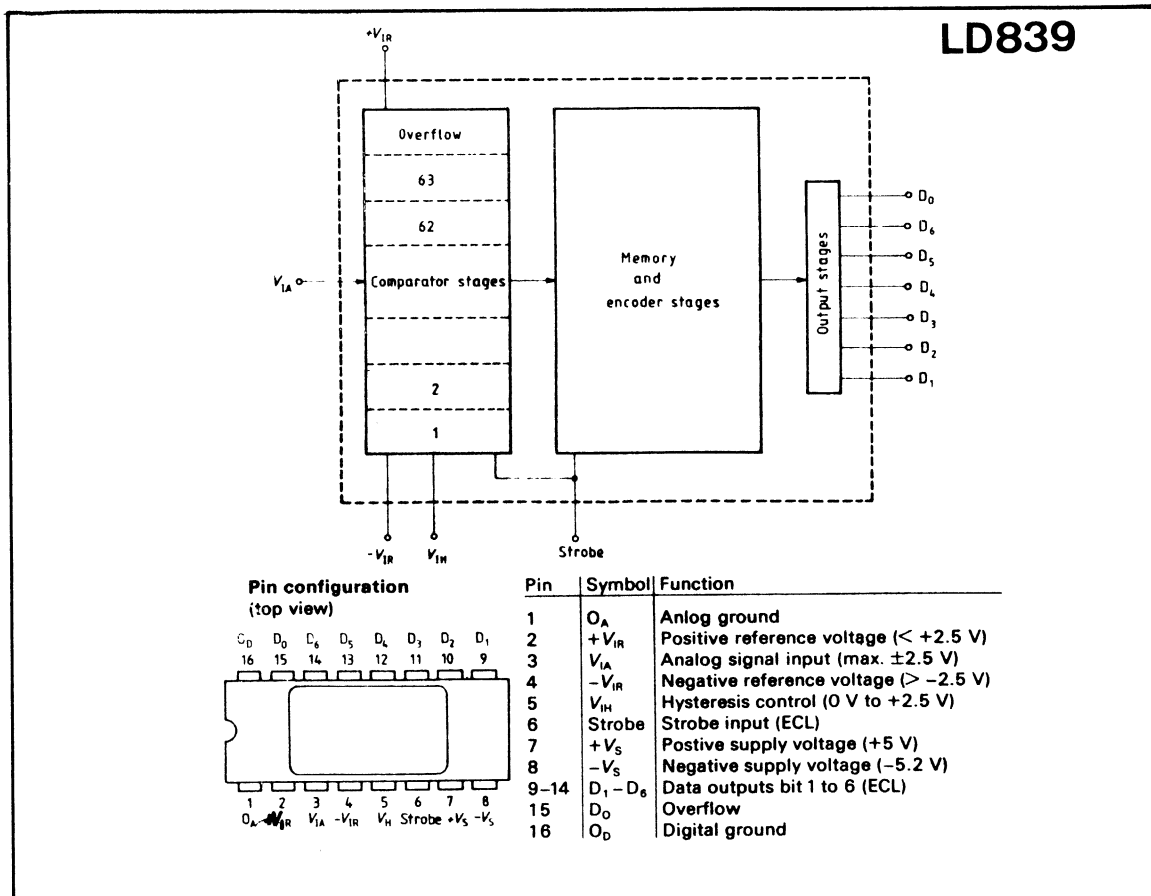
LOGIC DIAGRAMS - SCHEMAS LOGIQUES - LOGIK-SCHALTPLÄNE











OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

DESIGNATION OF OUTLINE DRAWING NUMBERS

COMPOSITION :

2 LETTERS, 1 NUMBER/SERIAL NUMBER

Exemples : DP14/1
QP16/3

DESIGNATION :

FIRST LETTER : GENERAL SHAPE (see Type Nomenclature page 15)

SECOND LETTER : MATERIAL (see Type Nomenclature page 15)

FIRST NUMBER : NUMBER OF LEADS

SERIAL NUMBER (separated from the "leads number" by a stroke)

DESIGNATION DES DESSINS D'ENCOMBREMENTS

COMPOSITION :

2 LETTRES, 1 NUMERO/NUMERO DE SERIE

Exemples : DP14/1
QP16/3

SIGNIFICATION :

PREMIERE LETTRE : FORME GENERALE (voir Code de Désignation page 16)

DEUXIEME LETTRE : MATERIAU (voir Code de Désignation page 16)

PREMIER NUMERO : NOMBRE DE SORTIES

NUMERO DE SERIE (séparé du "numéro du nombre de conducteurs" par un trait oblique)

BEDEUTUNG DER GEHÄUSEABMESSUNGENBEZEICHNUNGEN

ZUSAMMENSTELLUNG :

2 BUCHSTABEN, EINE NUMMER/SERIENNUMMER

Beispiele : DP14/1
QP16/3

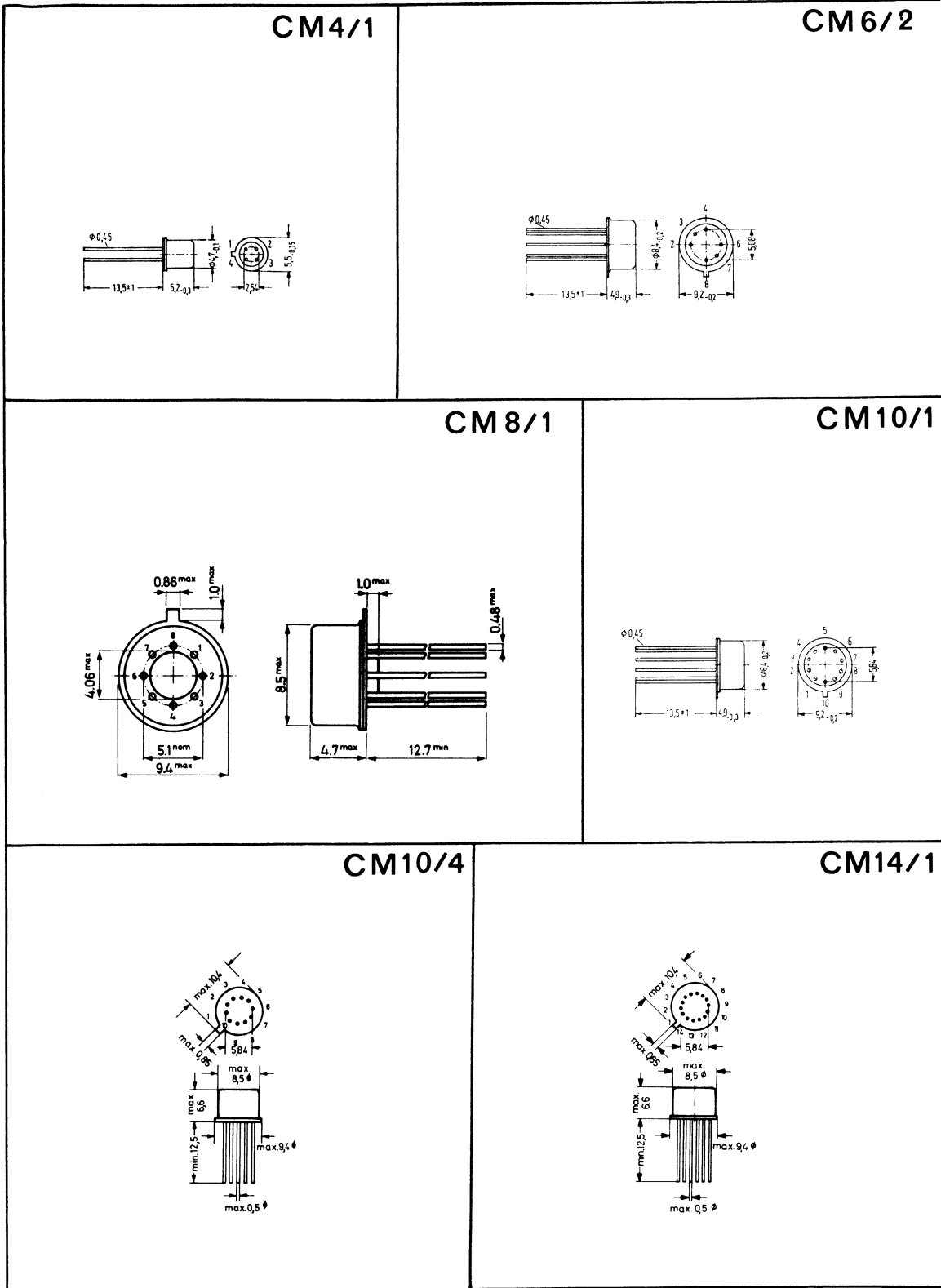
BEDEUTUNG :

ERSTE BUCHSTABE : ALLGEMEINE FORM (siehe Typenbezeichnung Seite 17)

ZWEITE BUCHSTABE : MATERIAL (siehe Typenbezeichnung Seite 17)

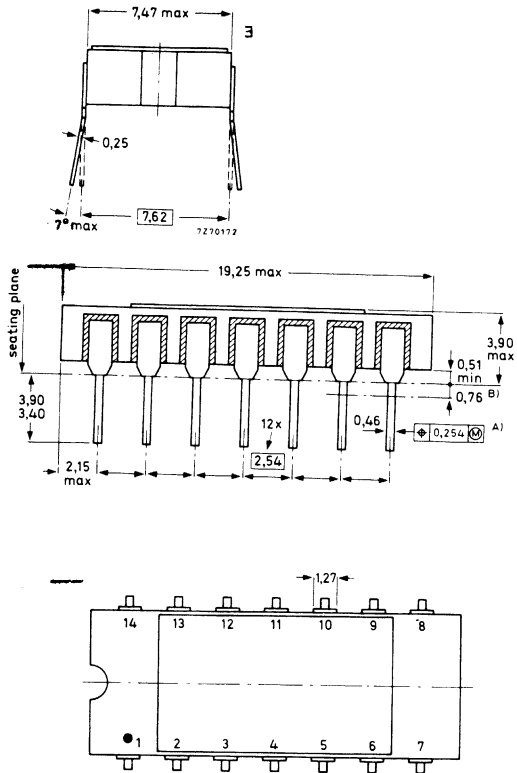
ERSTE NUMMER : ZAHL DER ANSCHLUSSE

SERIENNUMMER (getrennt von "Anschlusenummer" durch einen Strich)

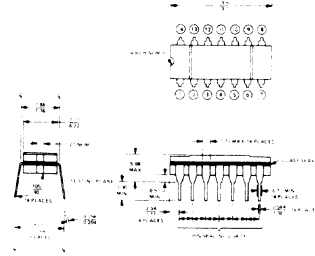


OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

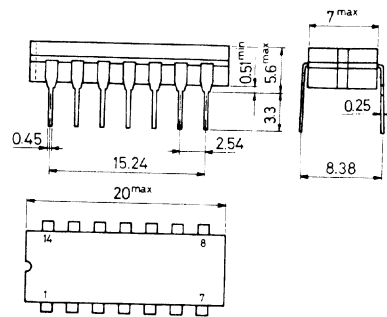
DC14/1



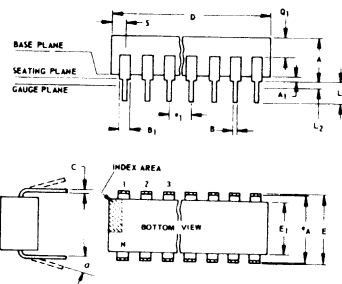
DC14/2



DC14/6



DC14/7



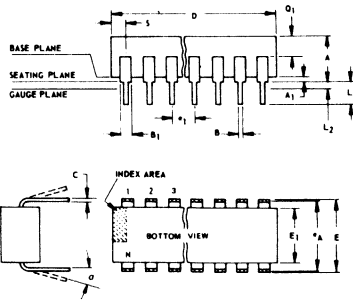
NOTES

1. Refer to Rules for Dimensioning (JEDEC Publication No. 13) for Axial Lead Product Outlines.
2. Leads within 0.006" (0.12 mm) radius of True Position (TP) at gauge plane with maximum material condition and unit installed.
3. α_A applies in zone L₂ when unit installed.
4. α applies to spread leads prior to installation.
5. N is the maximum quantity of lead positions.
6. N₁ is the quantity of allowable missing leads.
7. B₁ applies to all leads except the four end leads which have one-half the normal width (B₁ min. = 0.025 in.)

JEDEC MO-001-AB
14-Lead

SYMBOL	INCHES		NOTE	MILLIMETERS	
	MIN.	MAX.		MIN.	MAX.
A	0.155	0.200		3.94	5.08
A ₁	0.020	0.060		0.51	1.27
B	0.014	0.020		0.356	0.508
B ₁	0.050	0.066		1.27	1.65
C	0.008	0.012		0.204	0.304
D	0.745	0.770		18.93	19.55
E	0.300	0.325		7.62	8.25
E ₁	0.240	0.260		6.10	6.60
#1	0.100 TP		2	2.54 TP	
#A	0.300 TP		2, 3	7.62 TP	
L	0.125	0.150		3.18	3.81
L ₂	0.000	0.030		0.000	0.76
α	0°	15°	4	0°	15°
N	14		5	14	
N ₁	0		6	0	
Q ₁	0.040	0.075		1.02	1.90
S	0.065	0.090		1.66	2.28

DC14/8

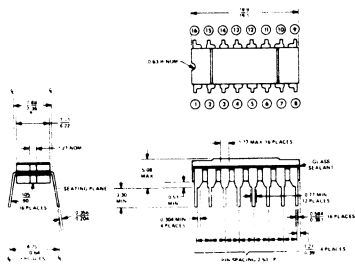


JEDEC MO-001-AD
14-Lead Welded-Seal

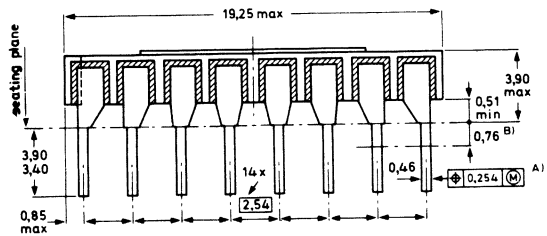
SYMBOL	INCHES		NOTE	MILLIMETERS	
	MIN.	MAX.		MIN.	MAX.
A	0.120	0.180		3.05	4.06
A ₁	0.020	0.085		0.51	1.65
B	0.014	0.020		0.356	0.508
B ₁	0.050	0.085		1.27	1.65
C	0.008	0.012		0.204	0.304
D	0.745	0.770		18.93	19.55
E	0.300	0.325		7.62	8.25
E ₁	0.240	0.280		6.10	6.80
*1	0.100 TP		2	2.54 TP	
*A	0.300 TP		2, 3	7.62 TP	
L	0.125	0.150		3.18	3.81
L ₂	0.000	0.030		0.000	0.76
a	0°	15°	4	0°	15°
N	14		5	14	
N ₁	0		6	0	
Q1	0.050	0.085		1.27	2.15
S	0.085	0.090		1.66	2.28

- NOTES:
1. Refer to Rules for Dimensioning (JEDEC Publication No. 13) for Axial Lead Product Outlines.
 2. Leads within 0.005" (0.12 mm) radius of True Position (TP) at gauge plane with maximum material condition and unit installed.
 3. e_A applies in zone L₂ when unit installed.
 4. a applies to spread leads prior to installation.
 5. N is the maximum quantity of lead positions.
 6. N₁ is the quantity of allowable missing leads.

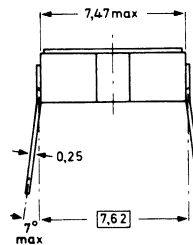
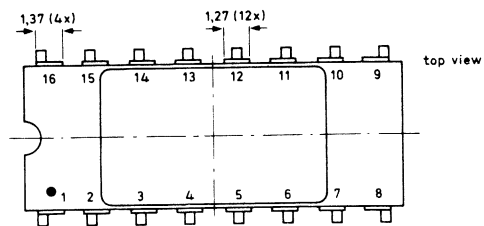
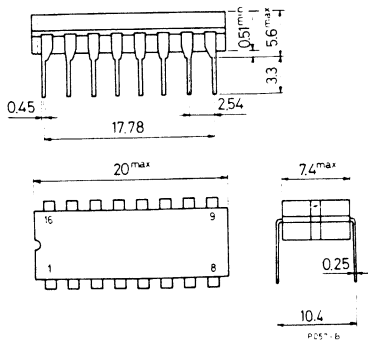
DC16/2



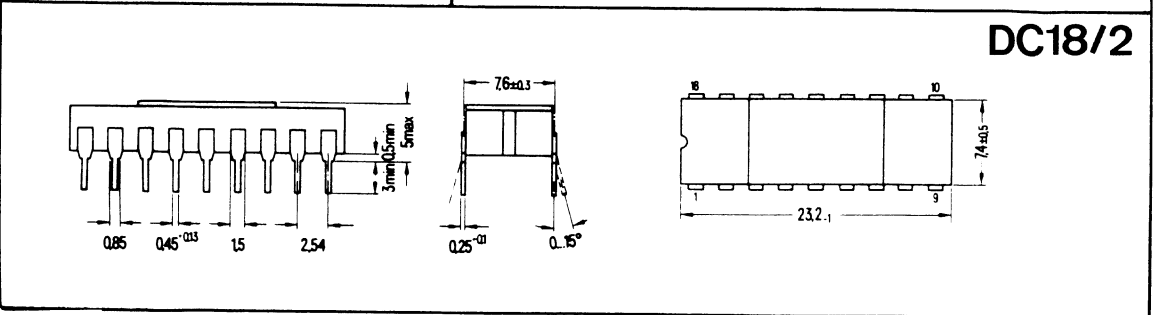
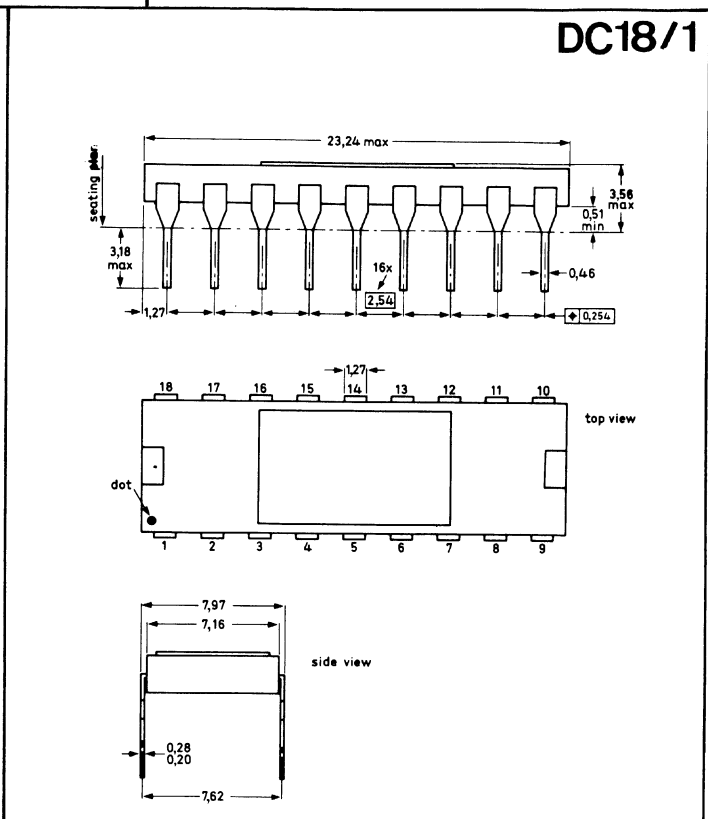
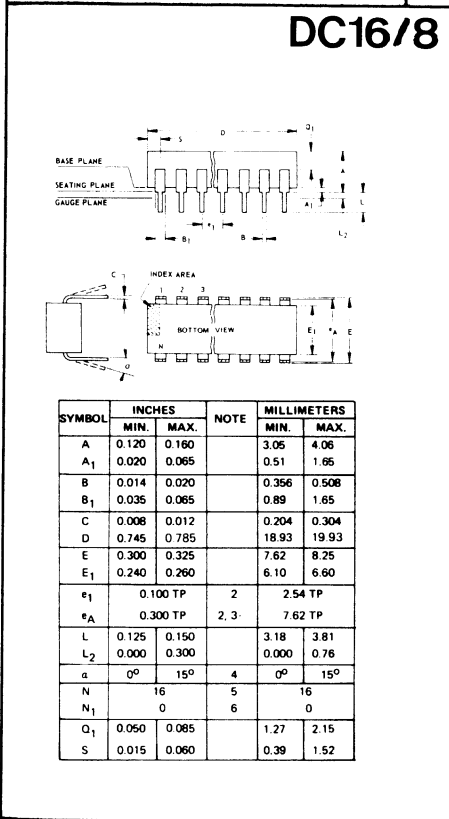
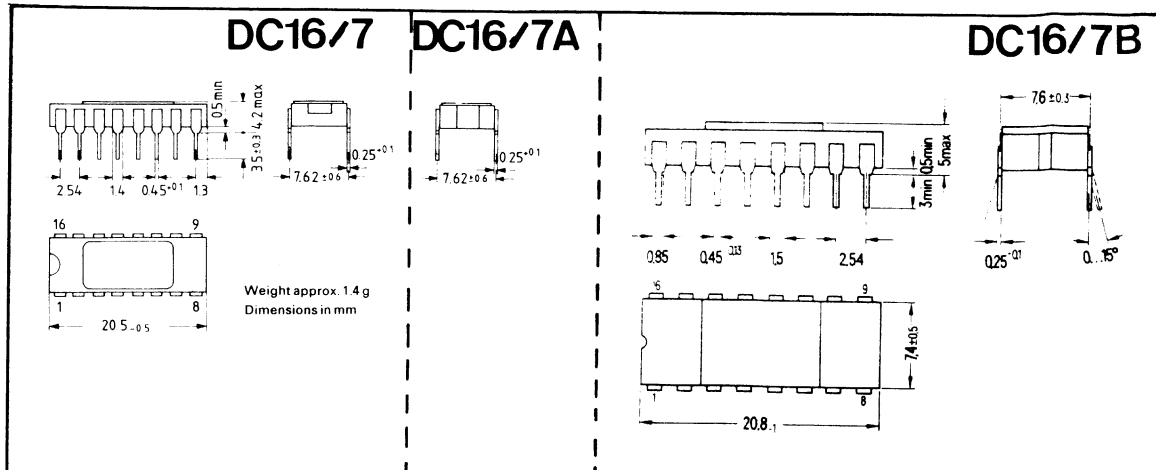
DC16/4

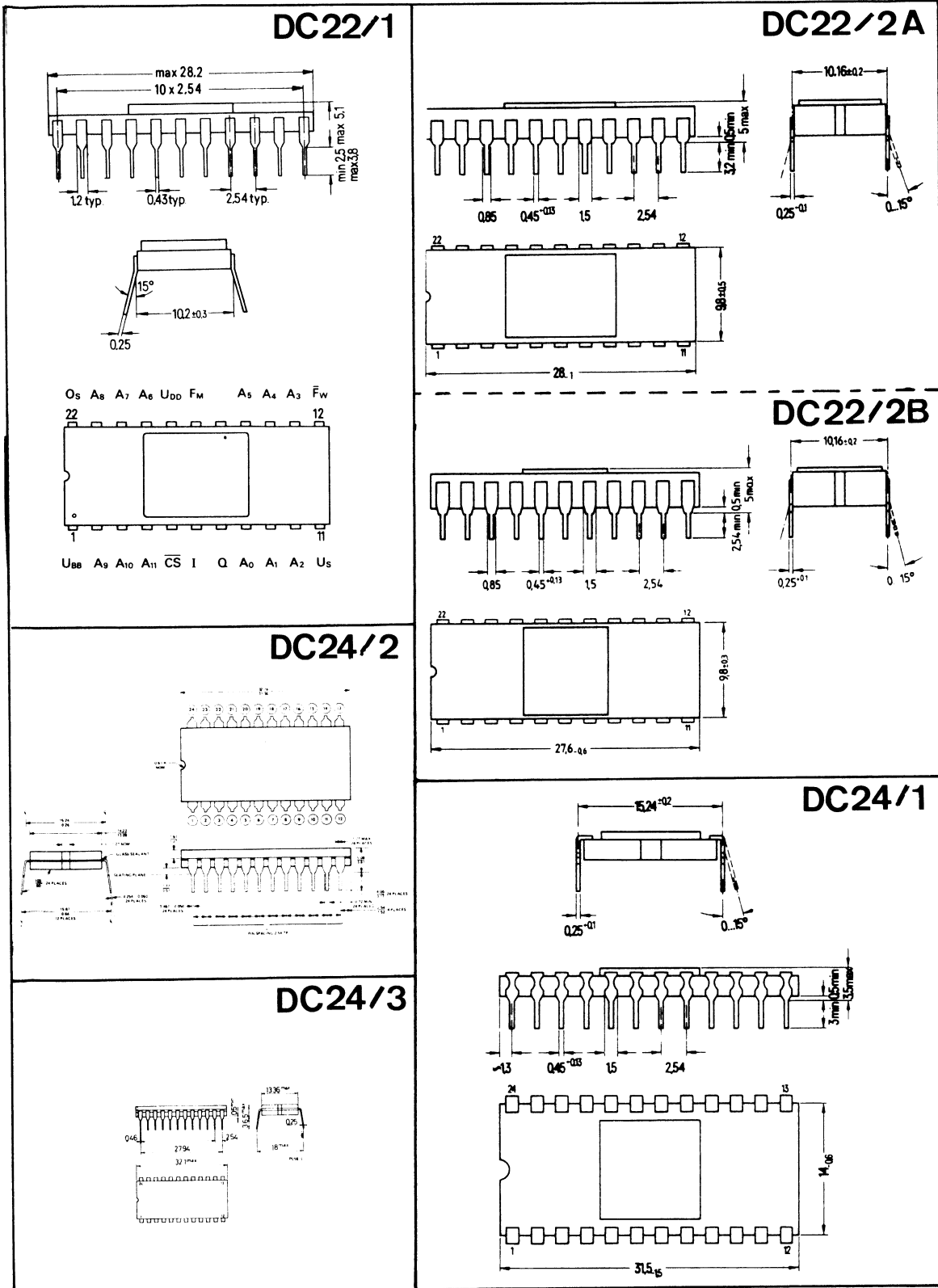


DC16/6



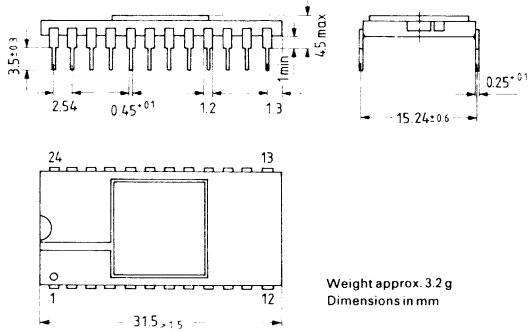
OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN



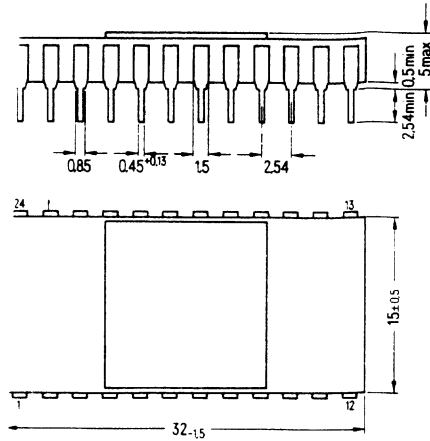


DC24/4

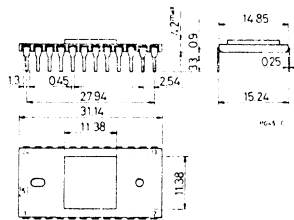
Ceramic package with UV transparent window
24 pins



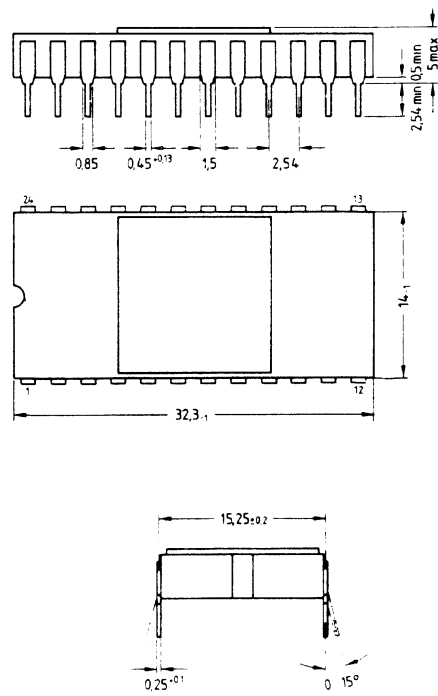
DC24/5A



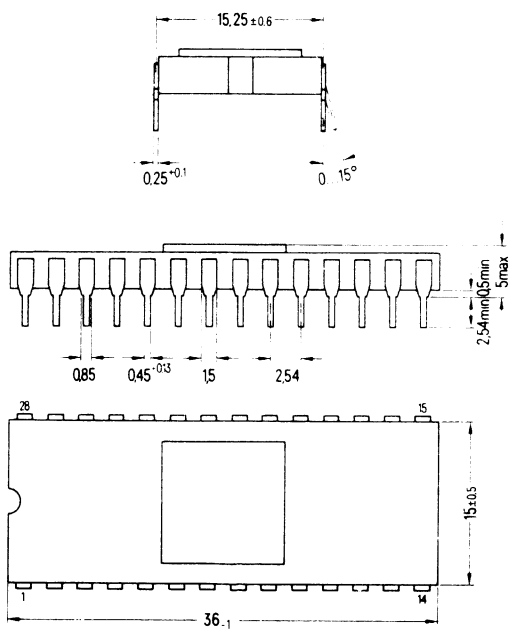
DC24/6



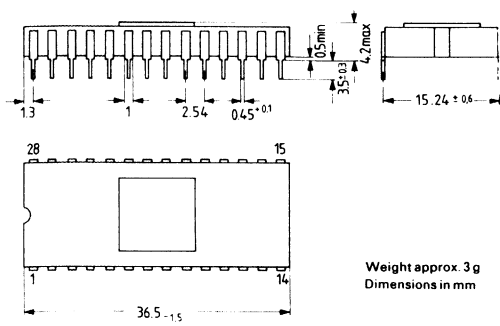
DC24/5B



DC28/1

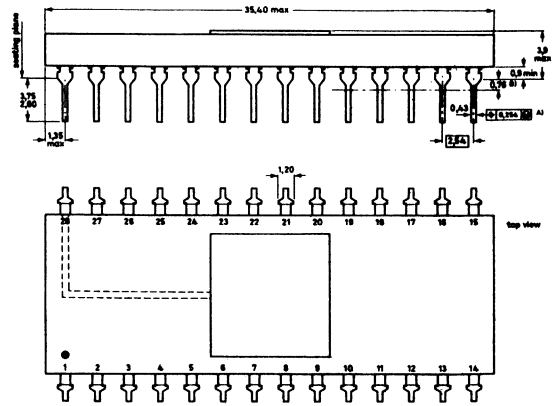


DC28/2



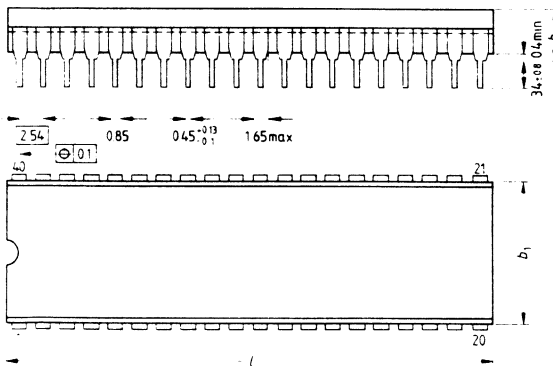
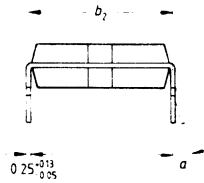
Weight approx. 3 g
Dimensions in mm

DC28/6



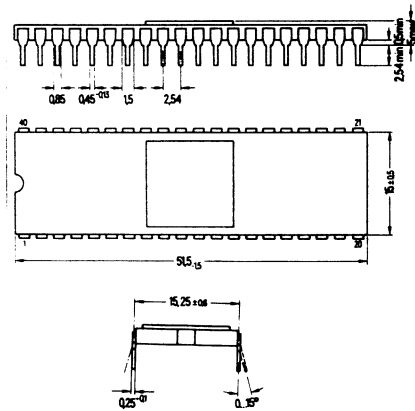
A) Centre-lines of all leads are within ± 0,127 mm of the nominal positions shown; in the worst case, the spacing between any two leads may deviate from nominal by ± 0,254 mm.
B) Lead spacing tolerances apply from seating plane to the line indicated

DC40/1

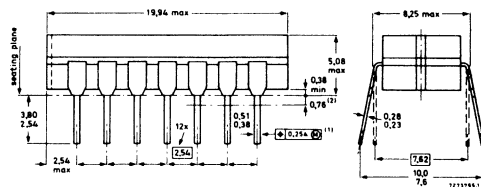


b_1	b_2	h max.	l	a
15.3 ₁	15.25 ± 0.5	5	51.5 _{1.5}	0°

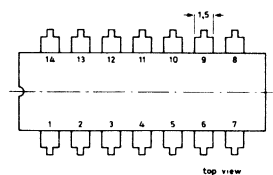
DC40/2



(SOT-73)



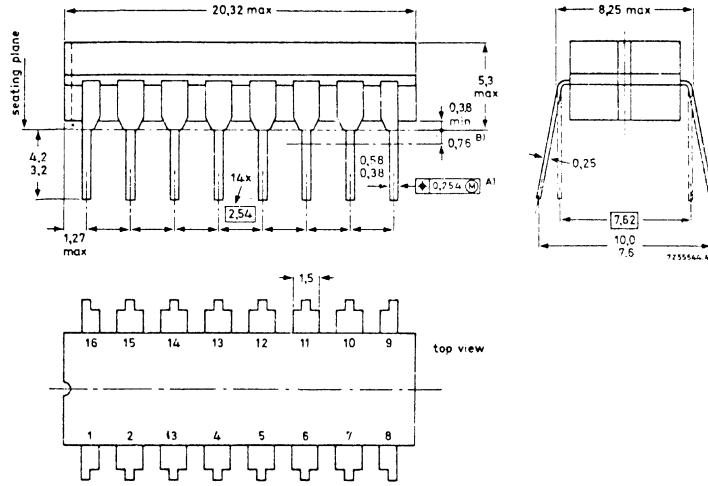
DG14/3



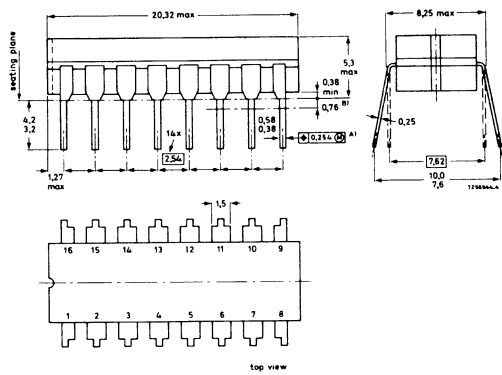
Dimensions in mm

OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

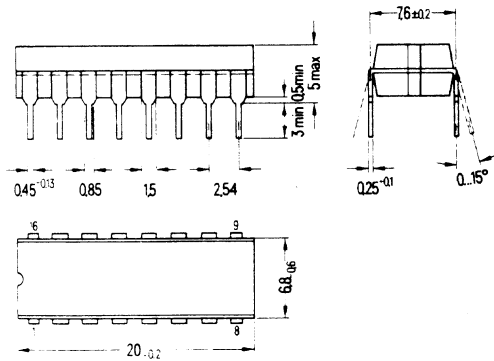
DG16/1



DG16/2

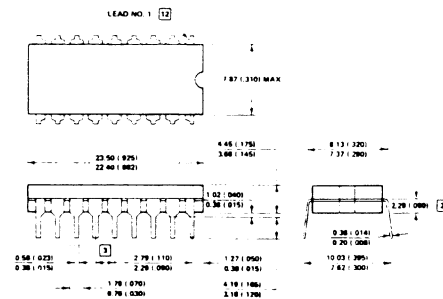


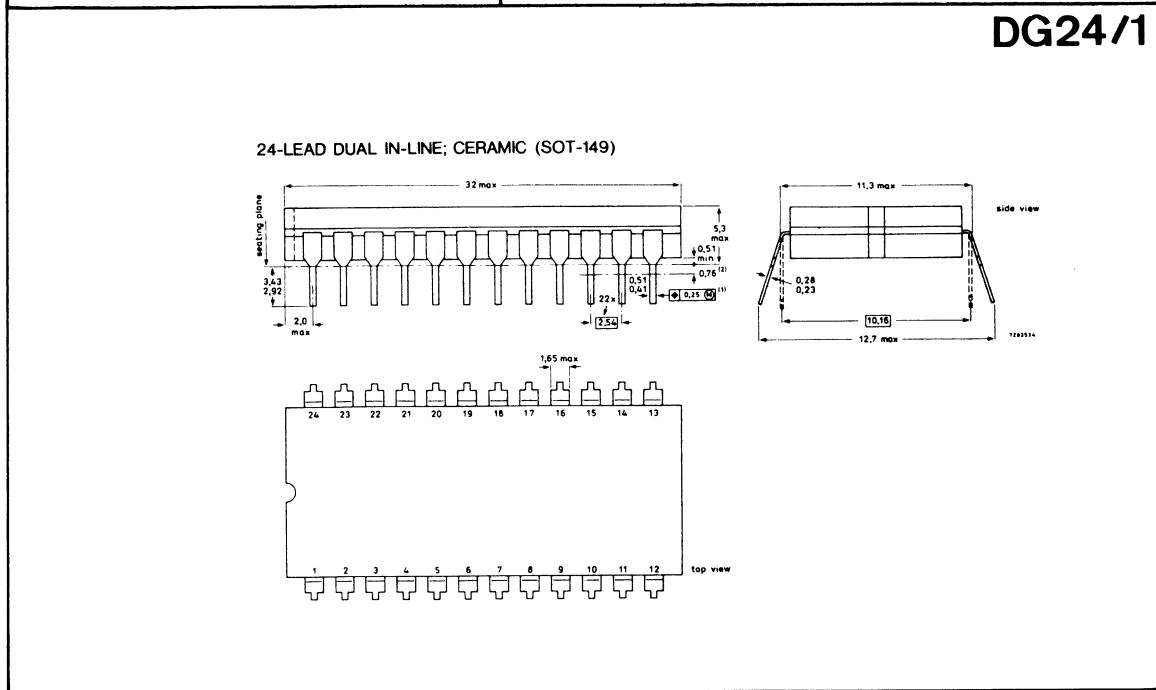
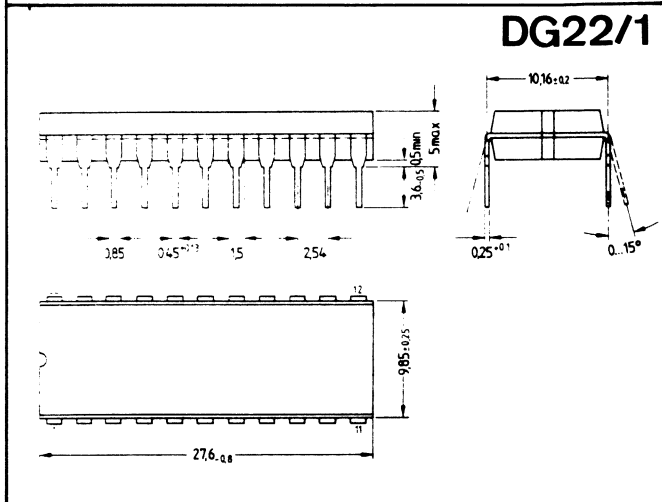
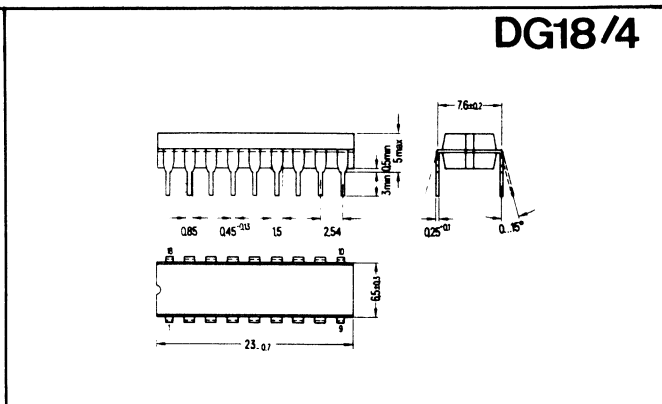
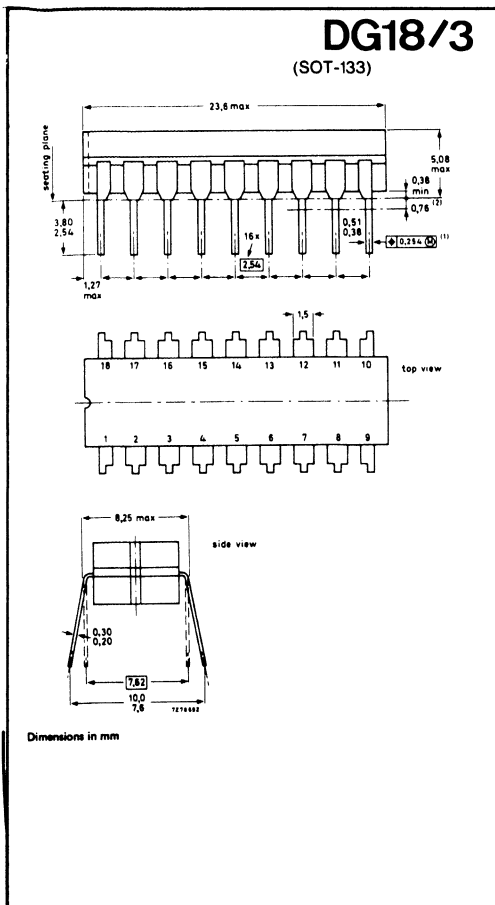
DG16/3



DG18/2

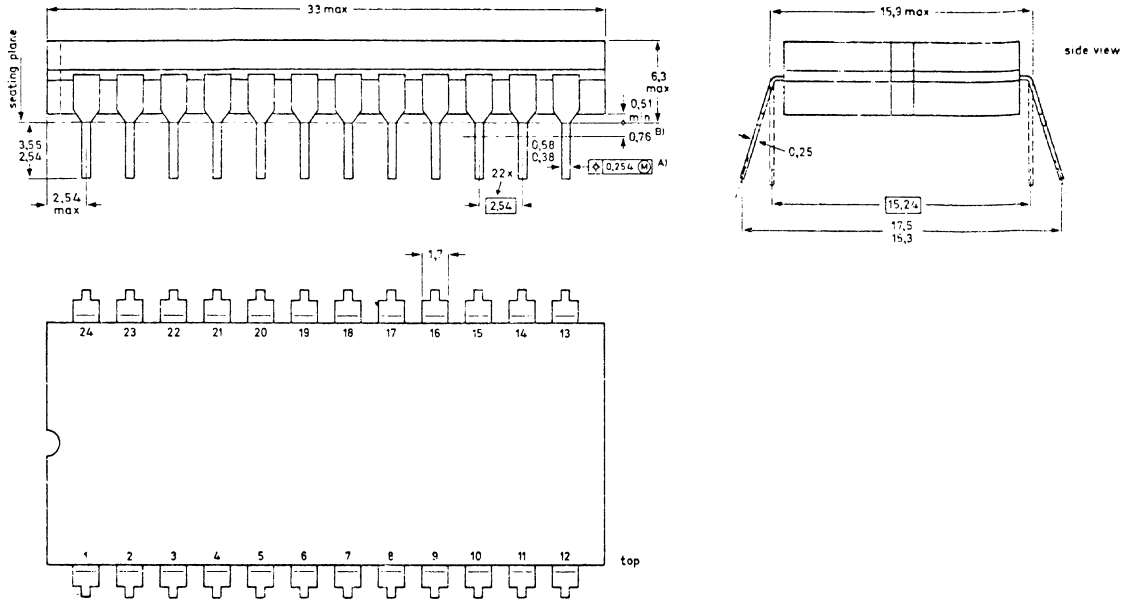
FK Package



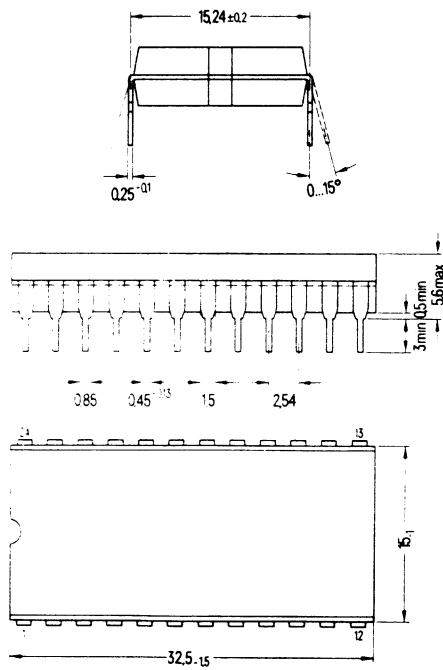


OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

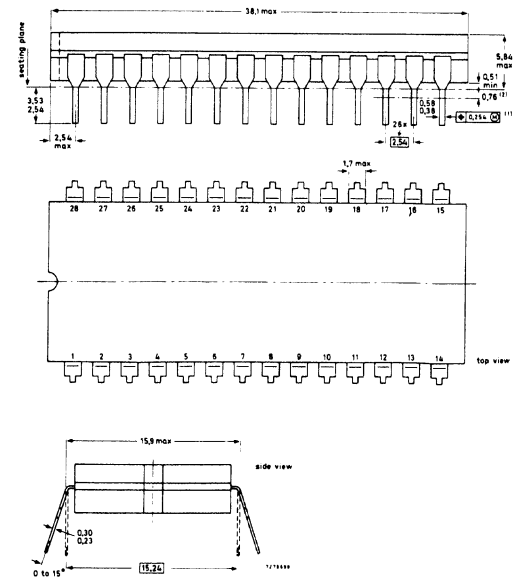
DG24/2



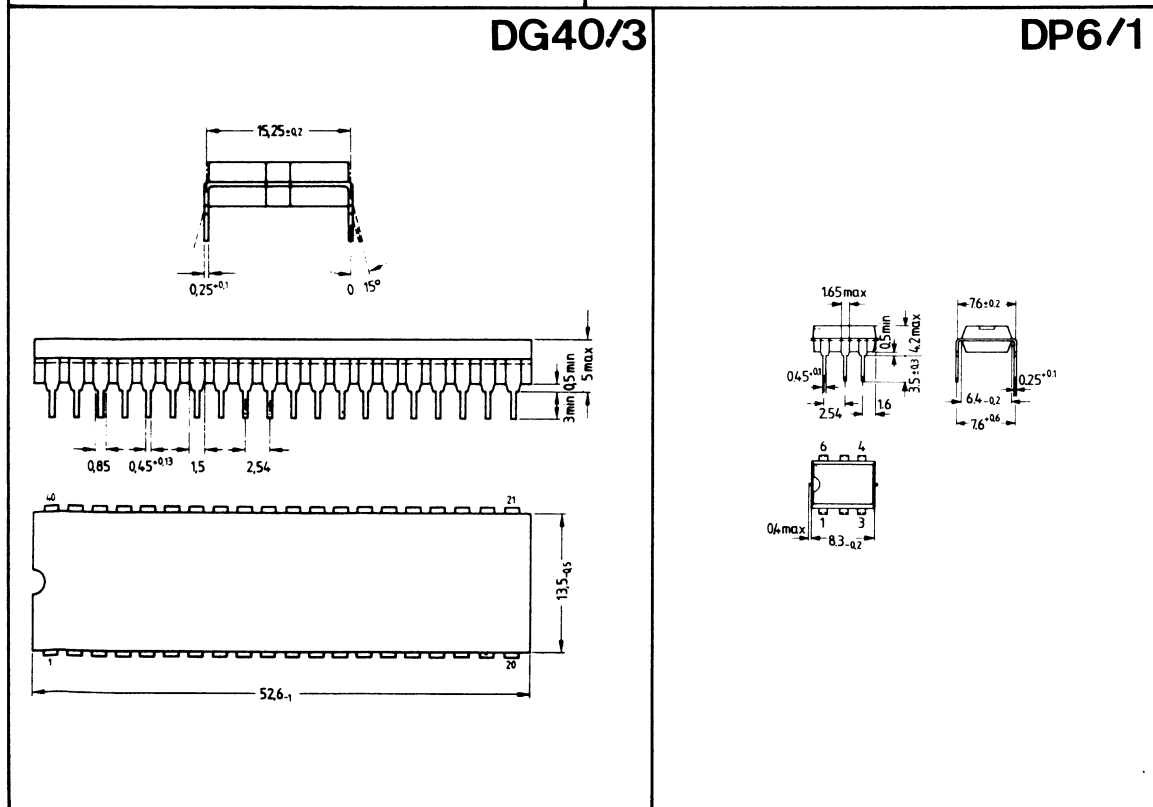
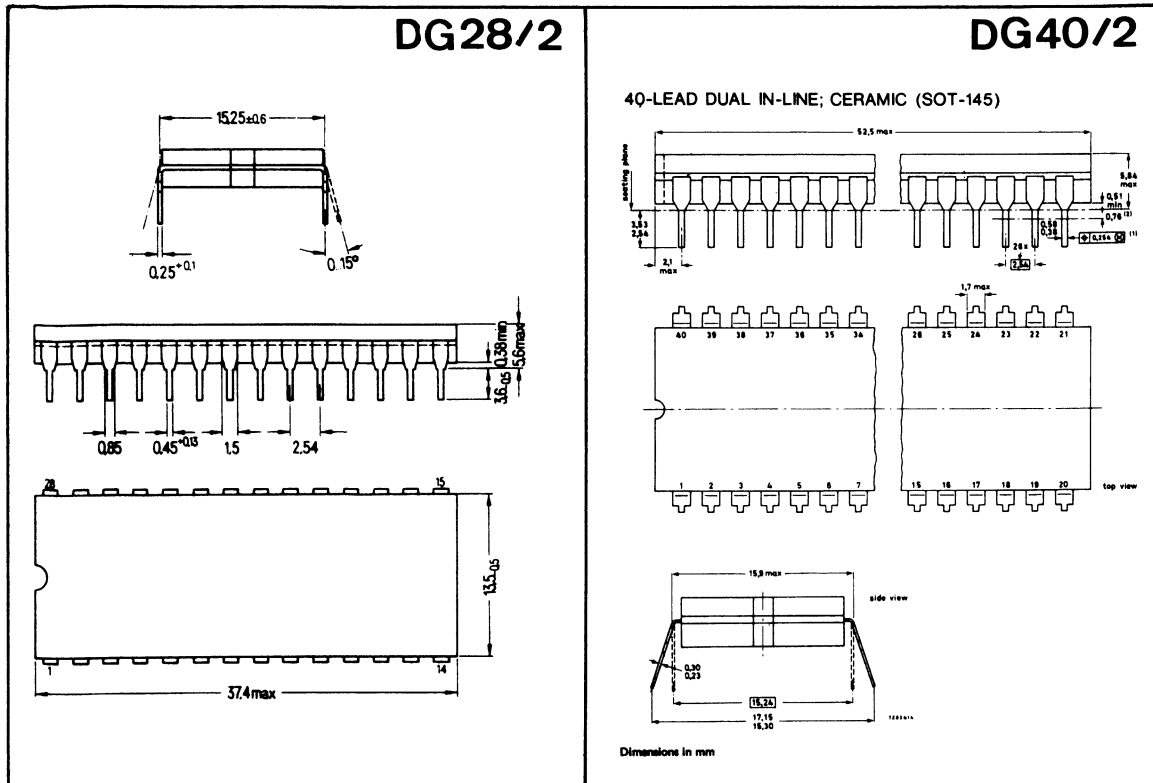
DG24/3

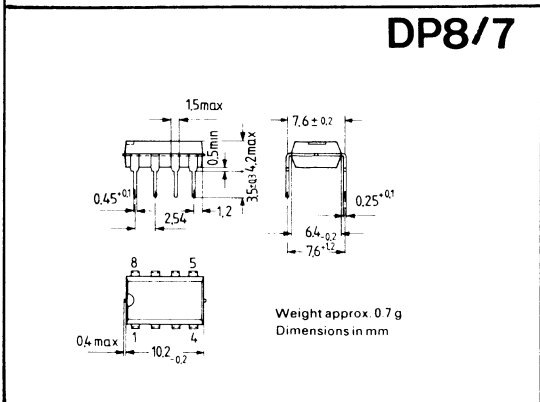
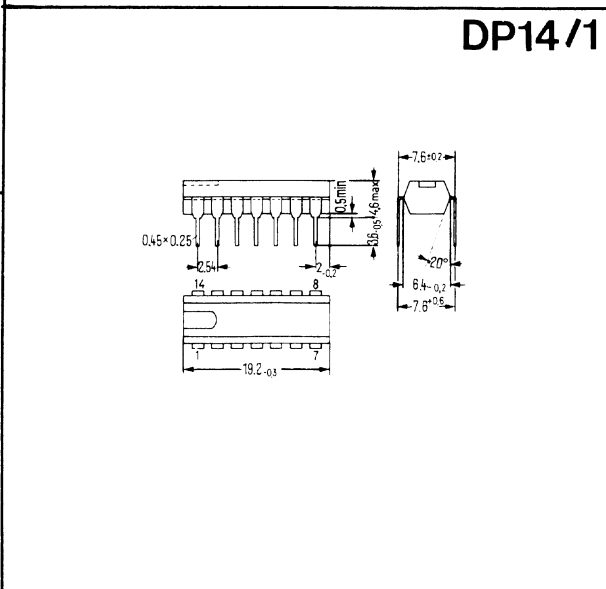
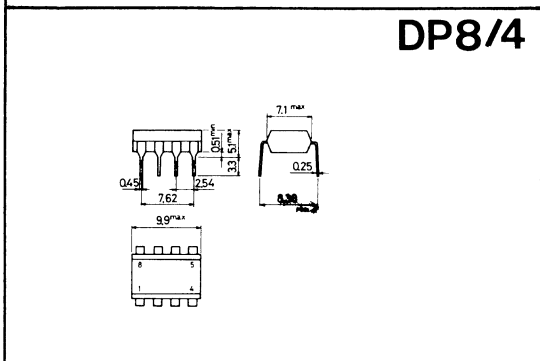
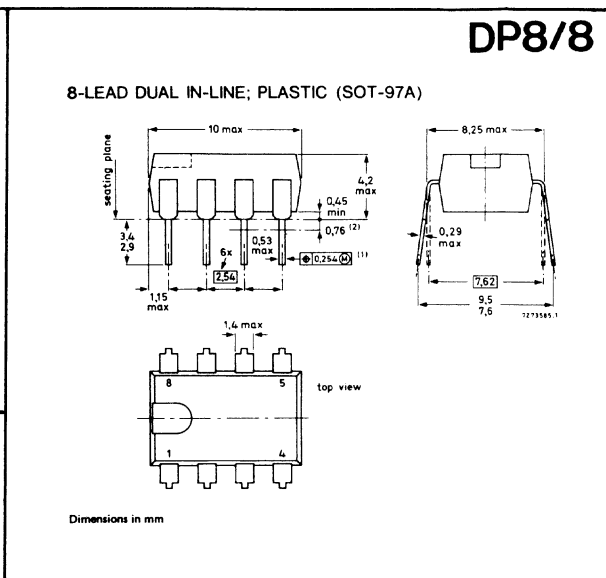
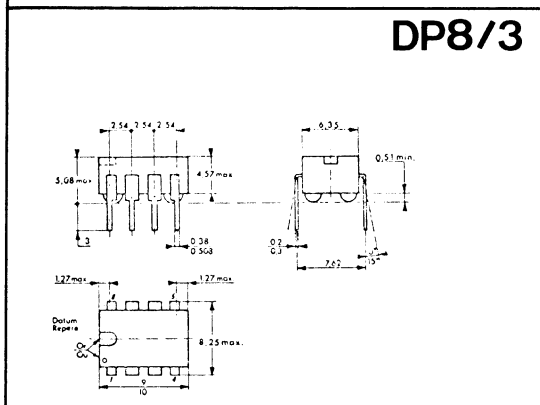
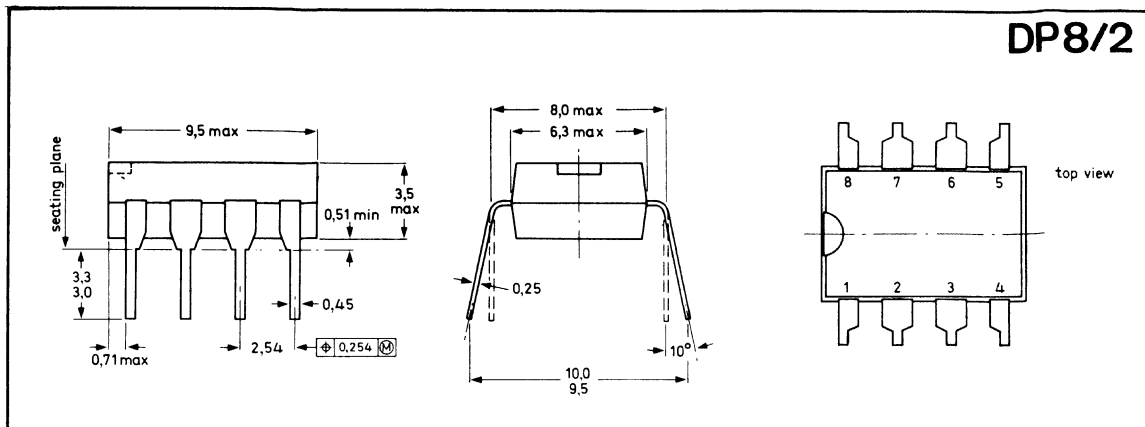


DG28/1

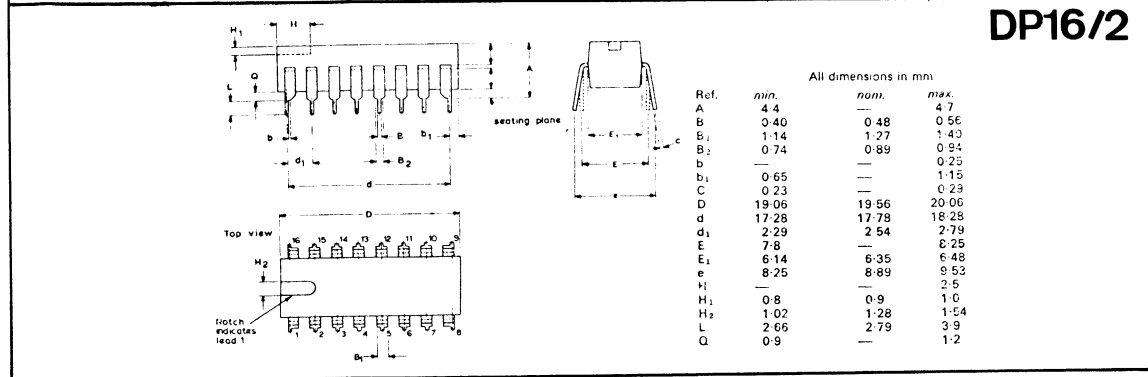
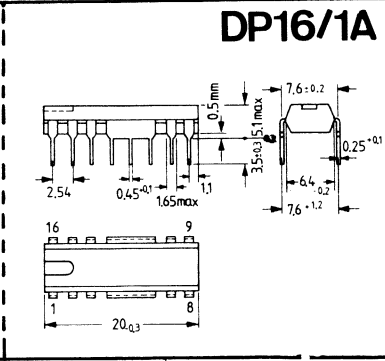
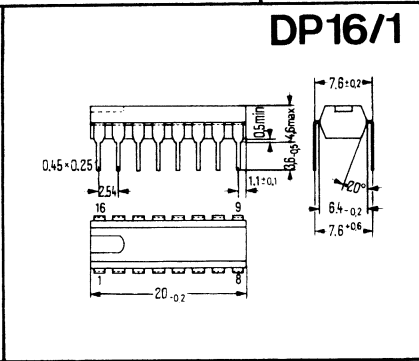
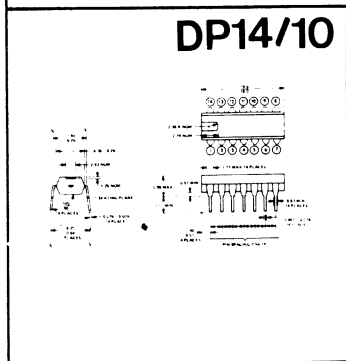
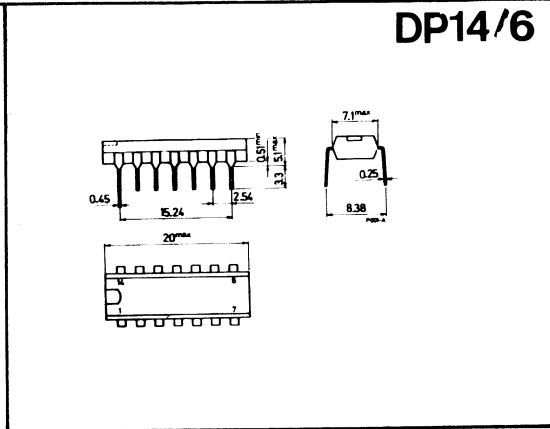
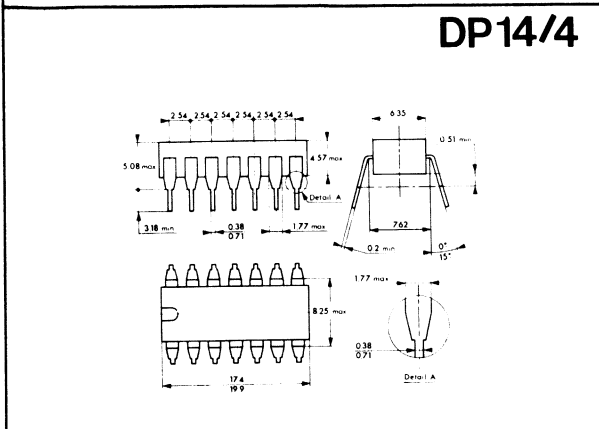
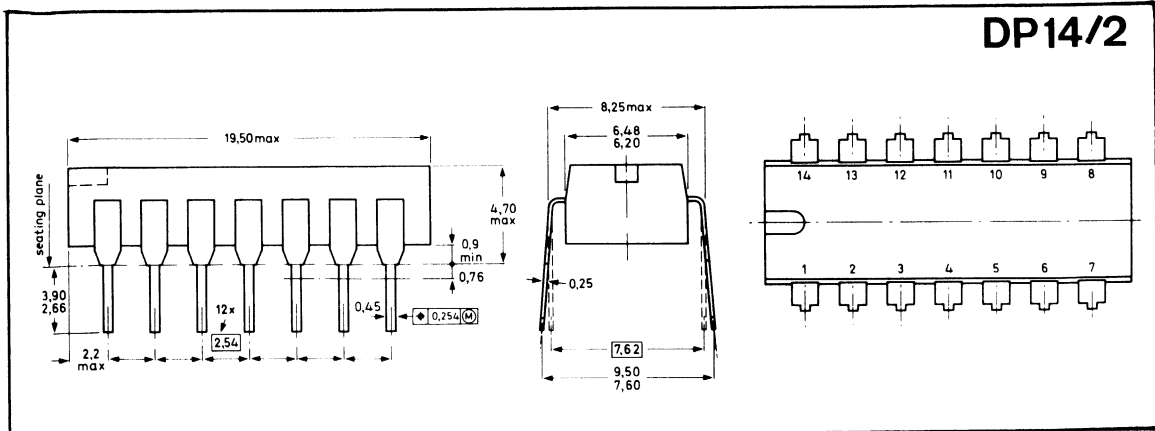


Dimensions in mm



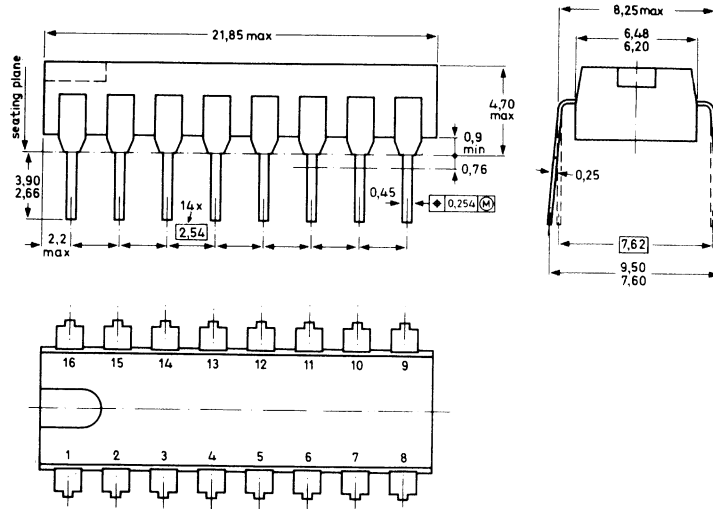


OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

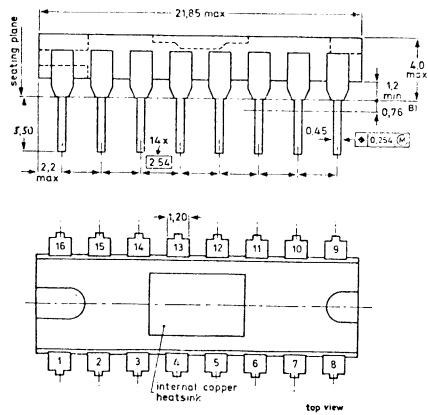


OUTLINES - DESSINS D'ENCREMBREMENT - GEHAUSEABMESSUNGEN

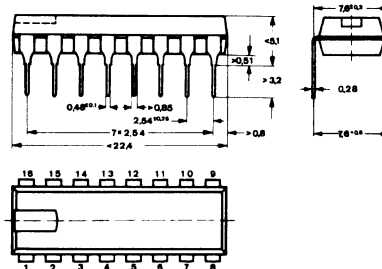
DP16/3



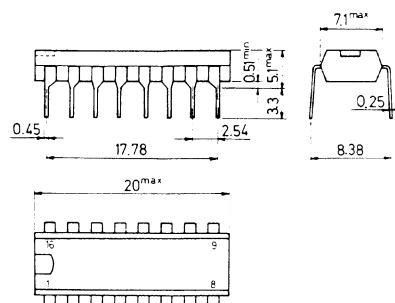
DP16/4



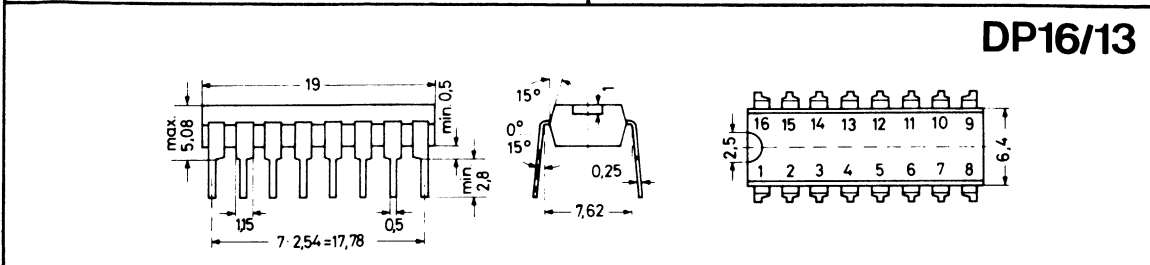
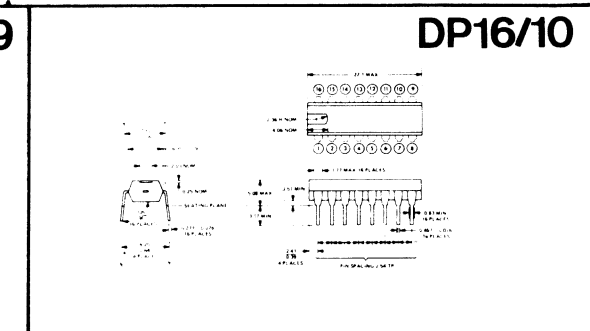
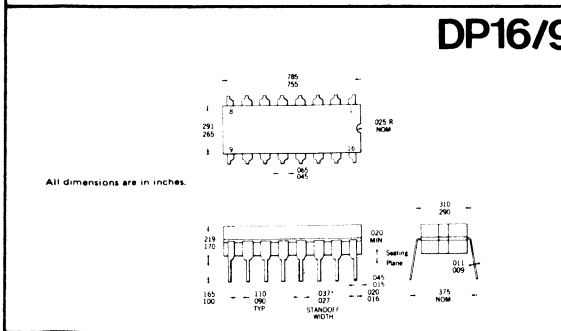
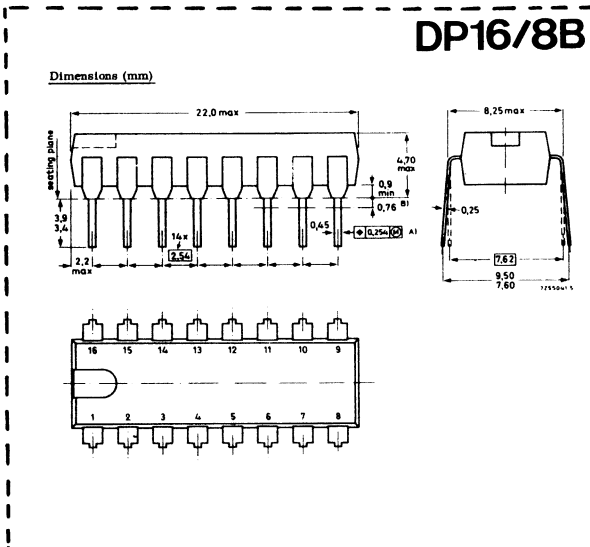
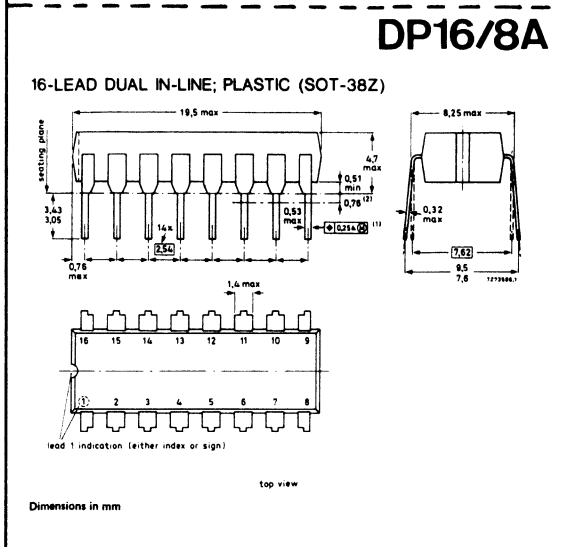
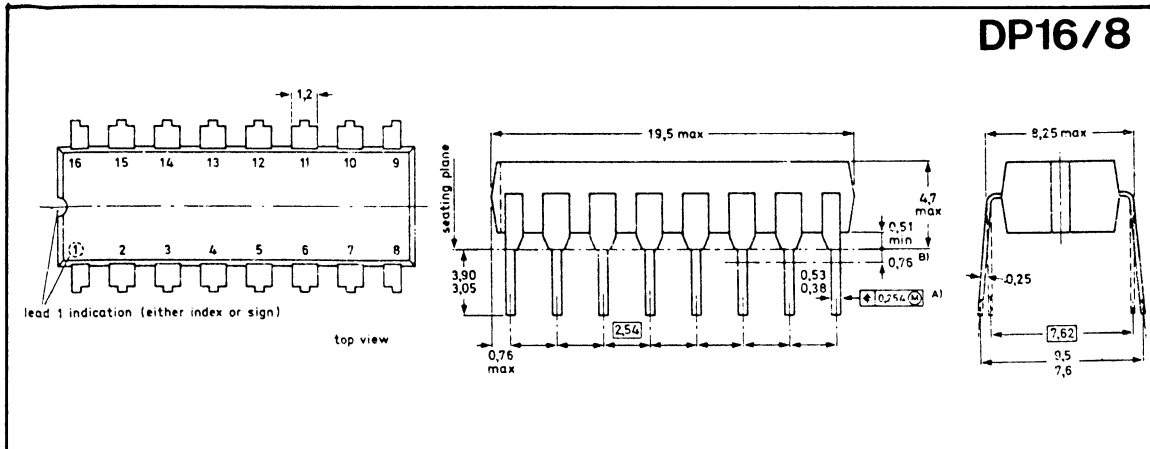
DP16/5



DP16/6



OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN



OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

DP16/15

SYMBOL	INCHES		NOTE	MILLIMETERS	
	MIN.	MAX.		MIN.	MAX.
A	0.155	0.200		3.94	5.08
A ₁	0.020	0.050		0.51	1.27
B	0.014	0.020		0.356	0.508
B ₁	0.025	0.065		0.89	1.65
C	0.008	0.012		0.204	0.304
D	0.245	0.285		18.93	19.93
E	0.300	0.325		7.62	8.25
E ₁	0.240	0.260		6.10	6.60
*1	0.100 TP		2	2.54 TP	
*A	0.300 TP		2, 3	7.62 TP	
L	0.125	0.150		3.18	3.81
L ₂	0.000	0.030		0.000	0.76
α	0°	15°	4	0°	15°
N	16	0	5	16	0
N ₁	0	6	6	0	0
O ₁	0.040	0.075		1.02	1.90
S	0.015	0.060		0.39	1.52

DP16/16

DP16/17

**P SUFFIX
PLASTIC PACKAGE
CASE 648**

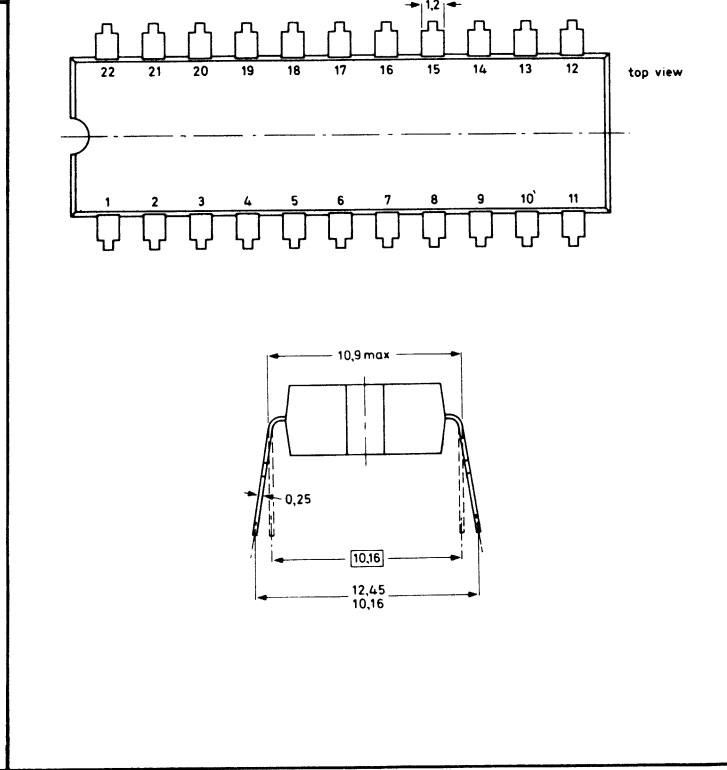
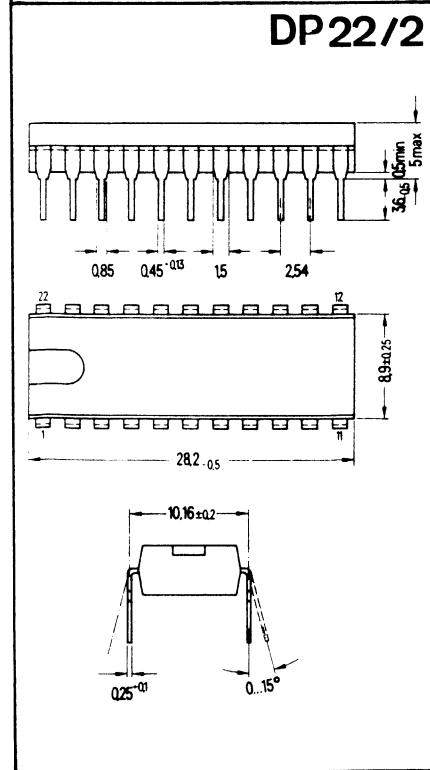
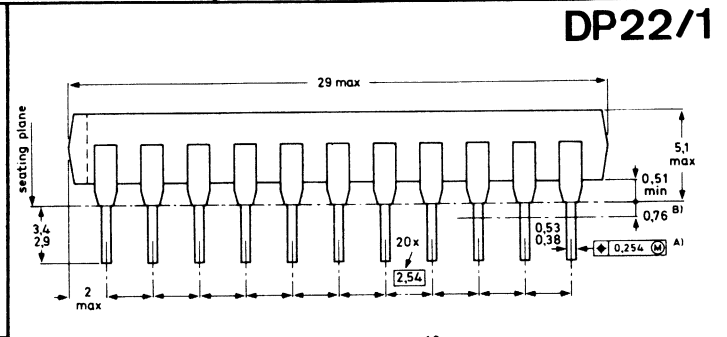
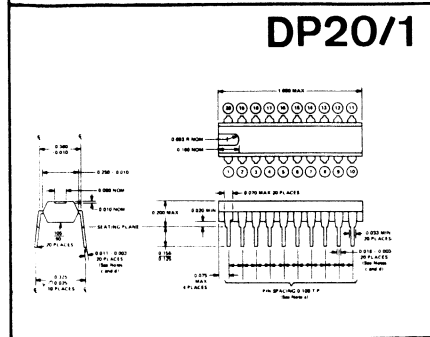
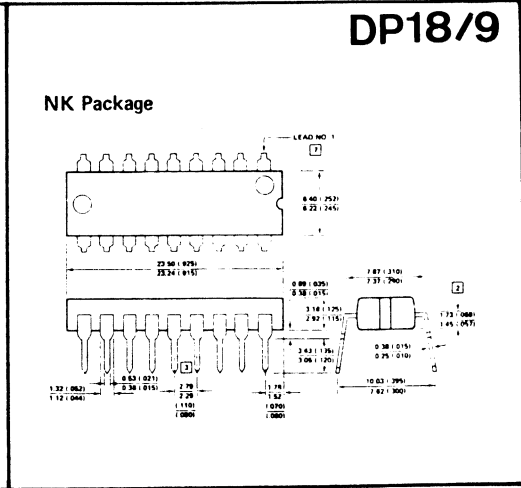
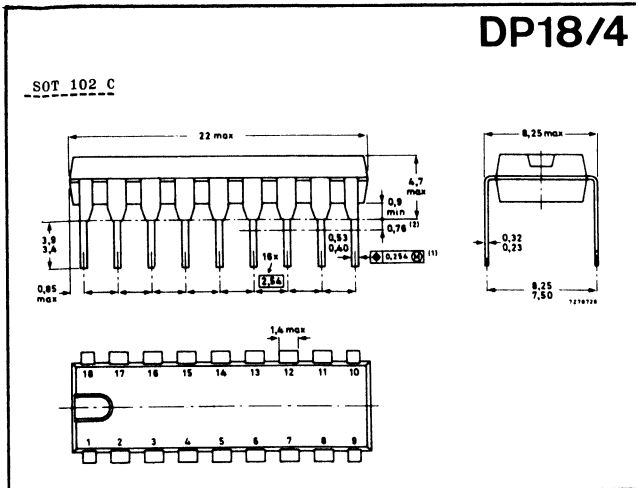
NOTES:
 1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
 2. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	20.70	21.34	0.815	0.840
B	6.10	6.60	0.240	0.260
C	4.06	4.57	0.160	0.180
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
M	1.32	1.83	0.052	0.072
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	-	10°	-	10°
N	0.51	1.02	0.020	0.040
P	0.13	0.38	0.005	0.015
Q	3.51	0.76	0.020	0.030

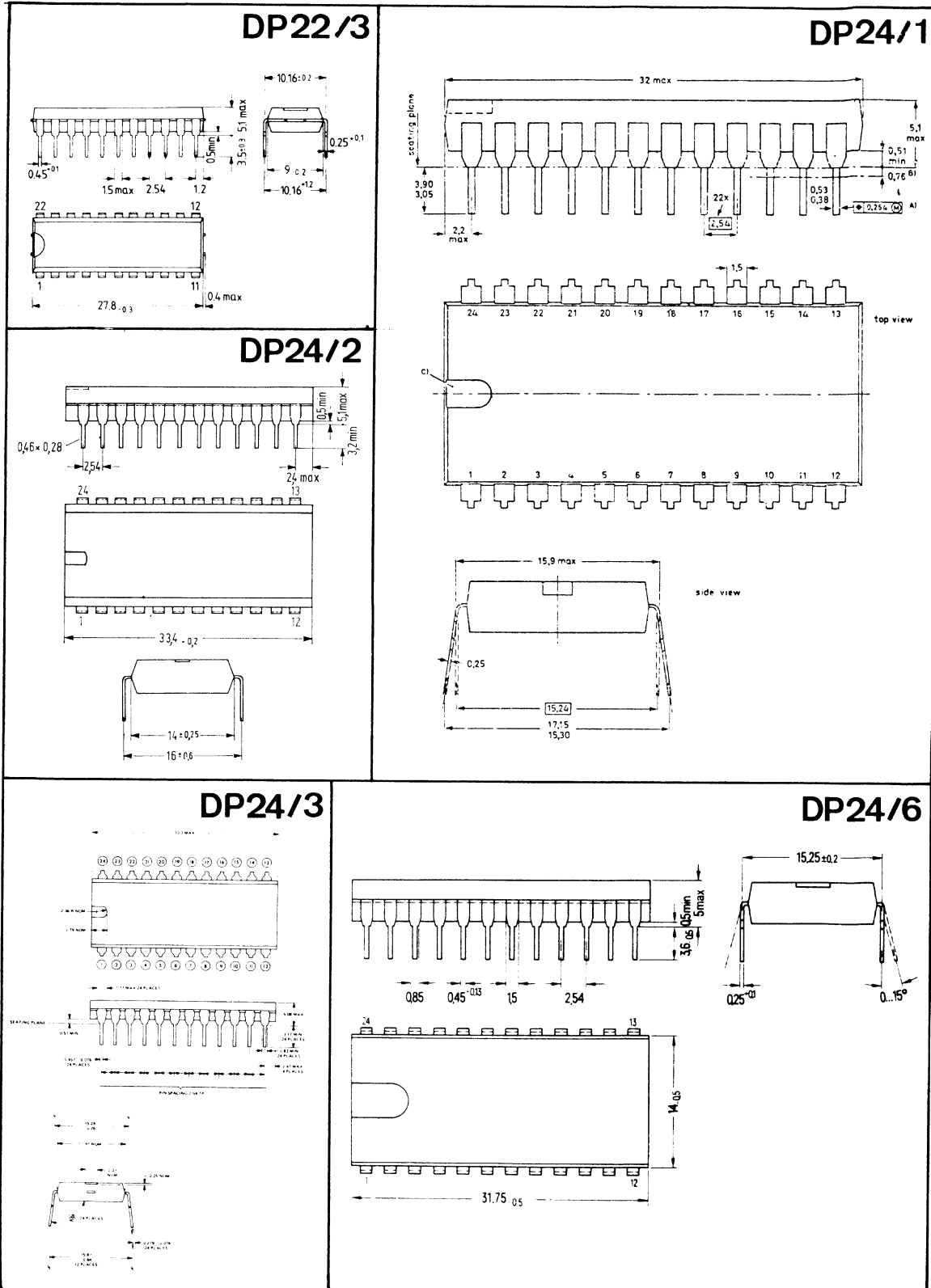
DP18/1

DP18/2

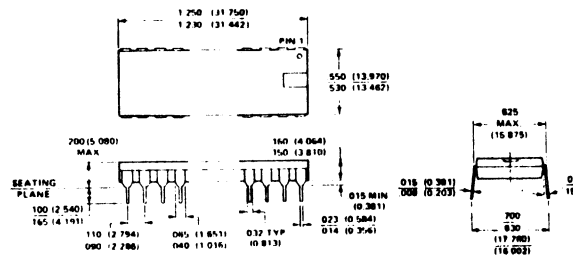
DP18/3



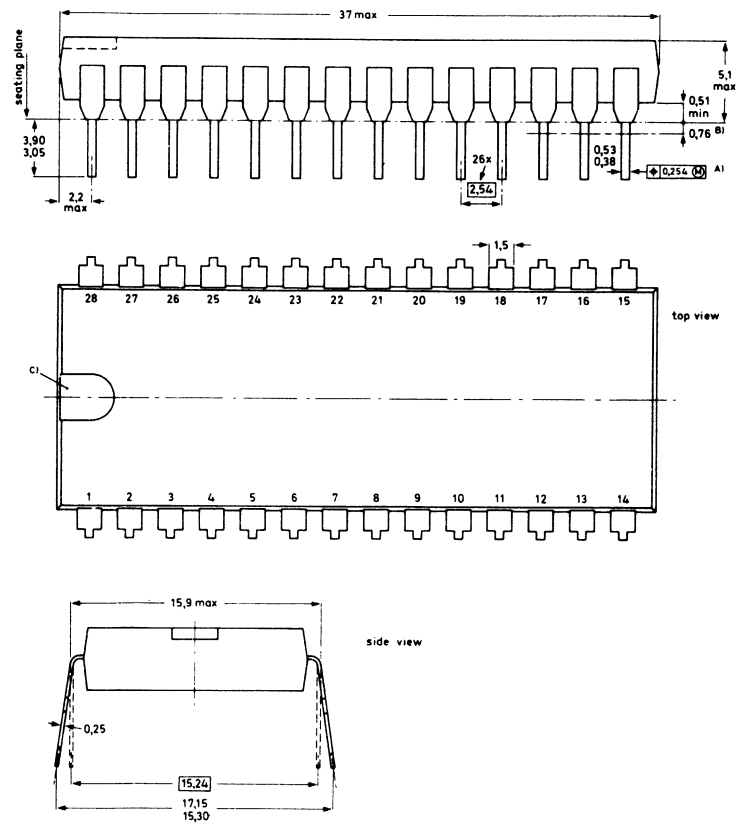
OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN



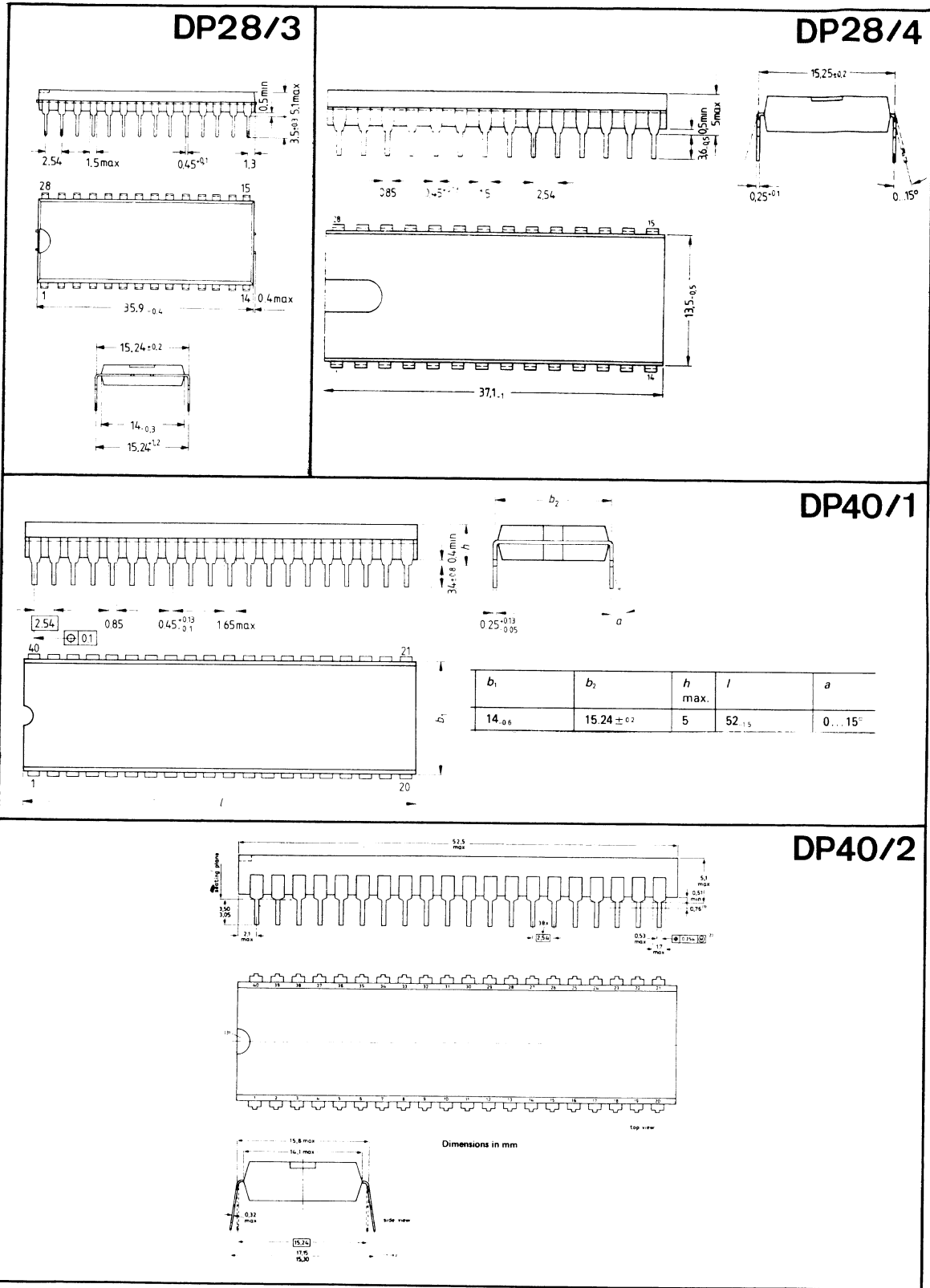
DP24/7

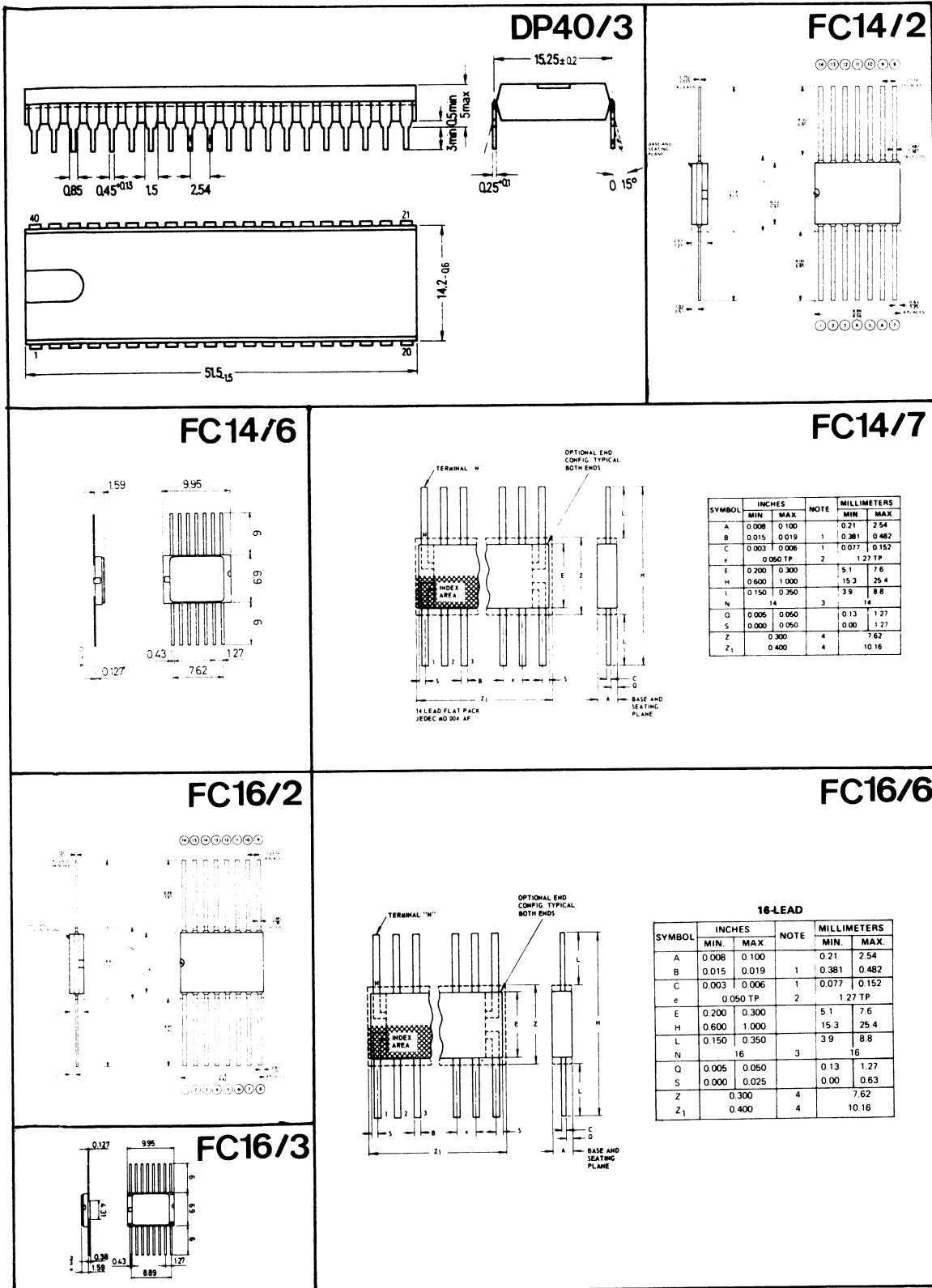


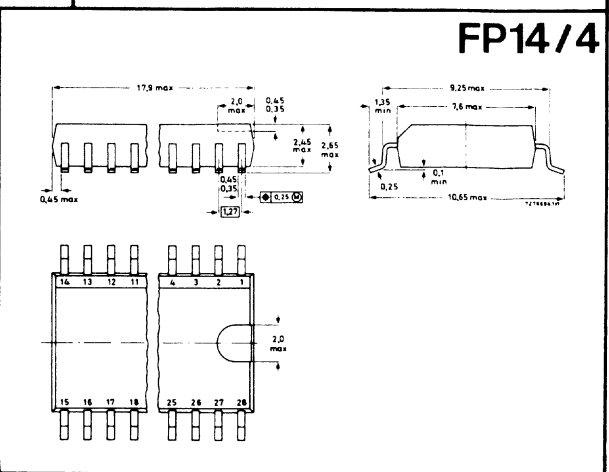
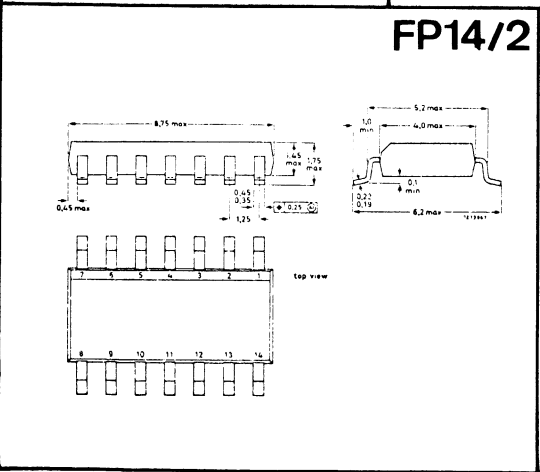
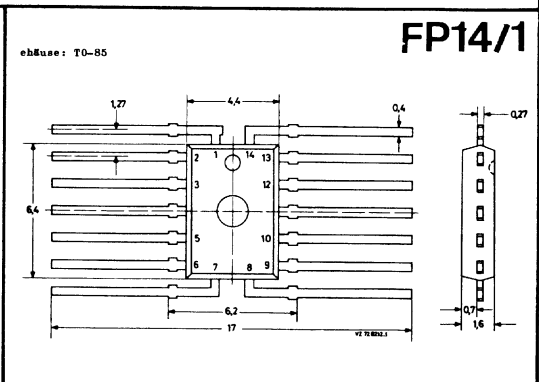
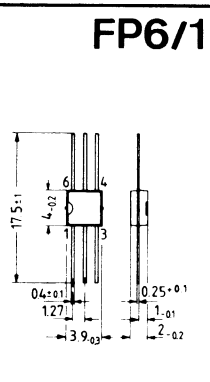
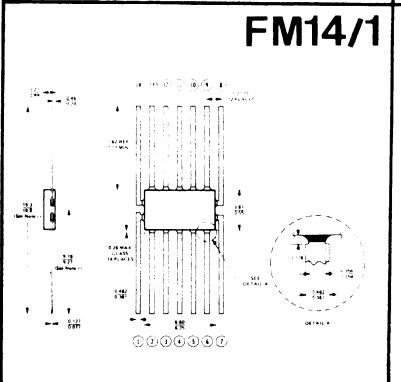
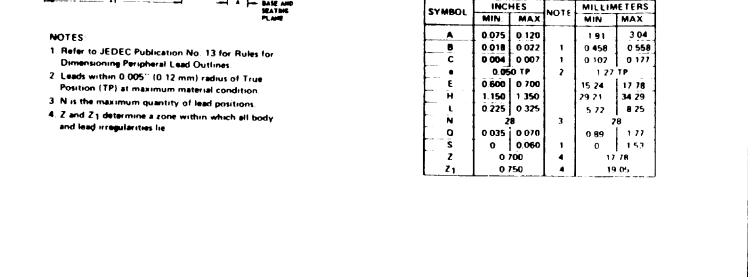
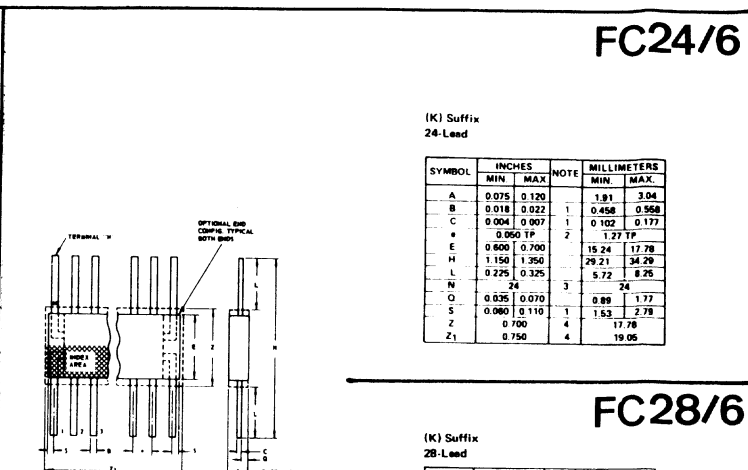
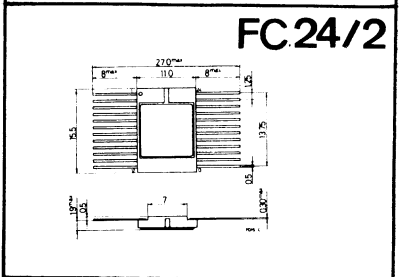
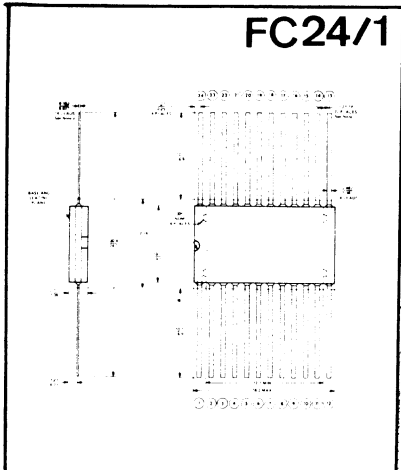
DP28/1



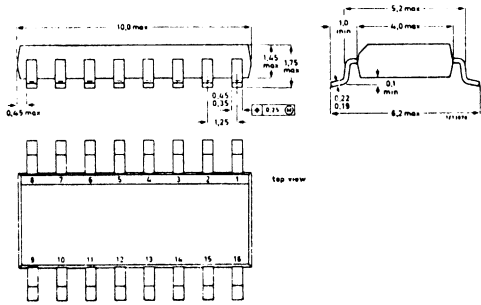
OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN



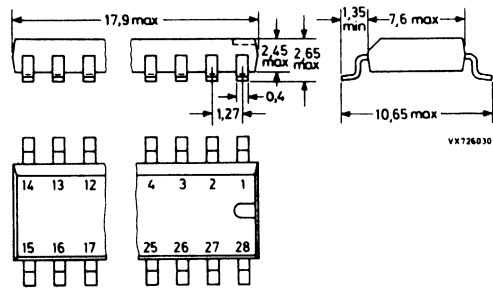




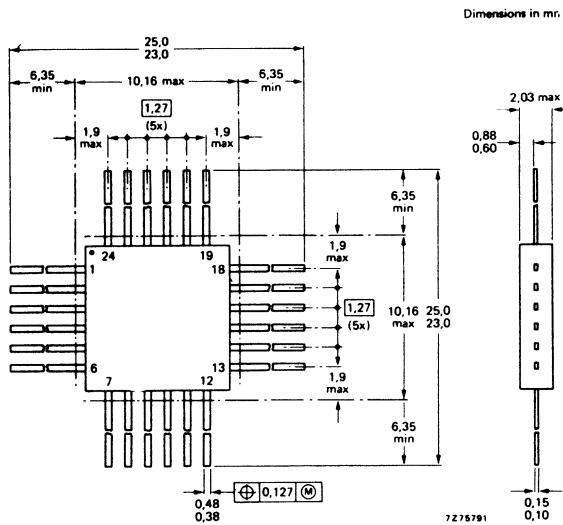
FP16/2



FP28/2



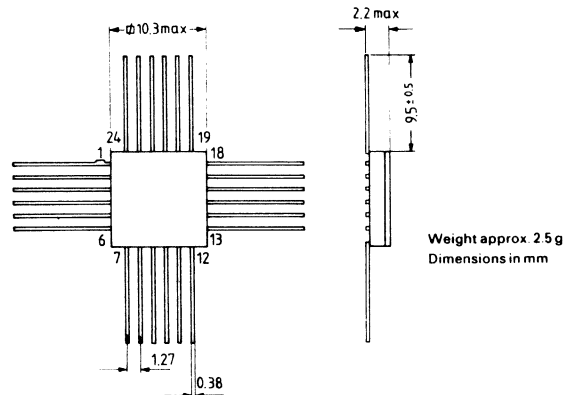
GG24/1



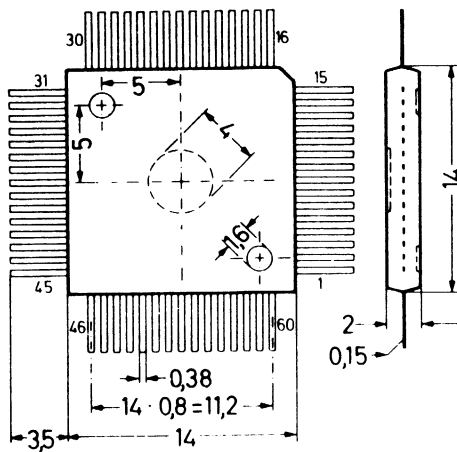
Pins are tin-plated nickel alloy.
Base is Al₂O₃ or BeO (toxic material).
Mass = 0,8 g.

⊕ Positional accuracy.
Ⓜ Maximum Material Condition.

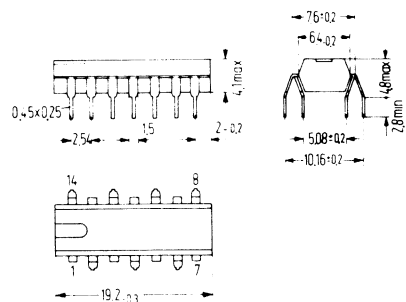
GP24/1



GP60/1



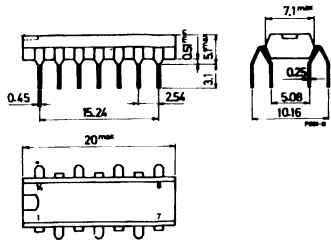
QP14/1



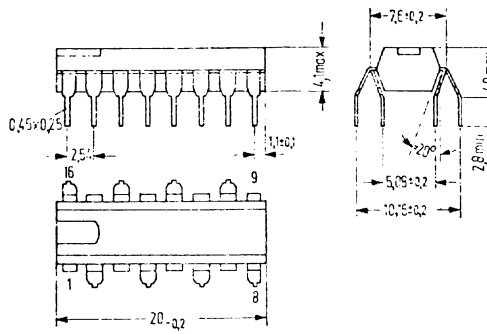
Plastic plug in package similar to 20 A 14 DIN 41866 (14 pins QIL)
Weight approx. 1.1 g

OUTLINES - DESSINS D'ENCOMBREMENT - GEHAUSEABMESSUNGEN

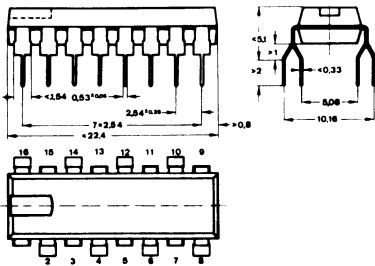
QP14/6



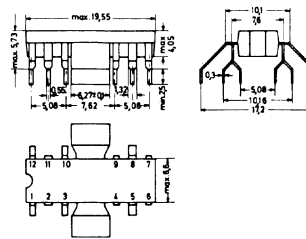
QP16/1



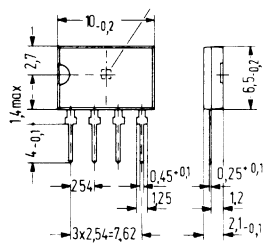
QP16/6



RP12/6

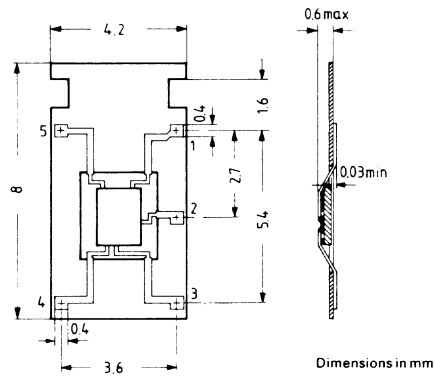


SP4/1



μ5/1

Micropack



ADDRESSES OF SUPPLIERS

ADRESSES DES FOURNISSEURS

ADRESSEN DER LIEFERANTEN

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

FERR

GREAT BRITAIN

FERRANTI ELECTRONICS Ltd
Fields New Road,
GB - CHADDERTON, OLDHAM (Lancashire)

Tel 061 624 0515 ; Tlx 668038

GERMANY

FERRANTI GmbH
Widenmayer Strasse, 5
D - 8000 MÜNCHEN 22

Tel (089) 293871 ; Tlx 523980

ITT

FRANCE

ITT Composants et Instruments
Division Semiconducteurs
INTERMETALL
157, rue des Blains
F - 92220 BAGNEUX
Tél (1) 5478181 ; Tlx 260712

GERMANY

INTERMETALL
Halbleiterwerk der
Deutsche ITT Industries GmbH
Postfach 840
D - 7800 FREIBURG

Tel (0761) 5170 ; Tlx (07) 72 715

ITT (cont.)

ITALY

ITT Standard,
Via XXV Aprile
I - 20097 S. DONATO MILANESE

Tel (2) 5174240 ; Tlx 311351

GREAT BRITAIN

ITT SEMICONDUCTORS
Maidstone Road

GB - SIDCUP DA 14 5HT, Kent

Tel (01)300 3339; Tlx 21836

MBLE

BELGIUM

M.B.L.E. s.a.
7, rue du Pavillon
B - 1030 BRUXELLES

Tél (02) 242 74 00 ; Tlx 61 511

MTLA

GERMANY

MOTOROLA SEMICONDUCTEURS S.A.
Munchner Strasse 18
D - 8043 UNTERFOHRING

Tel (49)8992481

SWITZERLAND

MOTOROLA SEMICONDUCTOR PRODUCTS Inc.
European Operations, Headquarters,
Chemin de la Voie Creuse, 16
P.O. Box 8
CH - 1211 GENEVE-MONTBRILLANT 20

Tel (022) 99 11 11 ; Tlx 23905

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

MULL

MULLARD Ltd
Mullard House
Torrington Place
GB - LONDON WC1E 7HD
Tel (01) 580 6633 ; Tlx 264341

PHIN

ARGENTINA

FAPESA I.y.c.
Av. Crovara 2550
BUENOS AIRES
Tel 652-7438/7478

AUSTRALIA

PHILIPS INDUSTRIES Ltd
Elcoma Division
Mars Road, 67-71
LANE COVE, 2066, N.S.W.
Tel 427 0888

AUSTRIA

OESTERREICHISCHE PHILIPS BAUELEMENTE
INDUSTRIE GmbH
Triesterstrasse 64
A - 1101 VIENNA
Tel 64 55 11

BELGIUM

M.B.L.E. s.a.
7, rue du Pavillon
B - 1030 BRUXELLES
Tél (02) 215 18 90 ; Tlx 61 511

BRAZIL

IBRAPE ELETRONICA LTDA.
Caixa Postal 7383
Av. Brigadeiro Faria Lima 1735
SAO PAULO, SP.
Tel (011) 211 2600

PHIN (cont.)

CANADA

PHILIPS ELECTRON DEVICES
601 Milner Ave
SCARBOROUGH ONTARIO M1B 1M8
Tel 292 - 5161

CHILE

PHILIPS CHILENA S.A.
Av. Santa Maria 0760
SANTIAGO
Tel 770038

COLOMBIA

SADAPE S.A.
P.O. Box 9805
Calle 13 N° 51+39
BOGOTA D.E.1.
Tel 2600-600

DENMARK

MINIWATT A/S
Emdrupvej 115A
DK - 2400 KOBENHAVN NV
Tel (01) 69 16 22

FINLAND

Oy PHILIPS AB
Elcoma Division
Kaivokatu 8
SF - 00100 HELSINKI 10
Tel 1 72 71

FRANCE

R.T.C.-LA RADIOTECHNIQUE-COMPELEC
130, avenue Ledru-Rollin
F - 75540 PARIS Cedex 11
Tél (1) 355 44 99 ; Tlx 680495

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

PHIN (cont.)

GERMANY

VALVO UB Bauelemente der Philips GmbH
Valvo Haus
Burchardstrasse 19
D - 2000 HAMBURG 1

Te1 (040) 3296-1 ; T1x 21540164

GREECE

PHILIPS HELLENIQUE
Elcoma Division
Av. Syngrou, 54
GR - ATHENS

Te1 921311

HONG KONG

PHILIPS HONG KONG Ltd
Elcoma Div.
15/F Philips Bldg.
24-28 Kung Yip St.,
KWAI CHUNG

Te1 K 427232

INDONESIA

P.T. PHILIPS - RALIN ELECTRONICS
Panin Bank Bldg 2nd floor
JL. Jen Sudirman
Postbox 223
JAKARTA

Te1 585286 +716131

INDIA

PEICO ELECTRONICS & ELECTR.Ltd
Ramon house
169 Backbay Reclamation
BOMBAY 400020

Te1 295144

PHIN (cont.)

IRELAND

PHILIPS ELECTRICAL (IRELAND) Ltd
Newstead, Clonskeagh
IRL - DUBLIN 14

Te1 69 33 55

ITALY

PHILIPS SpA
Sezione Elcoma
Piazza IV Novembre 3
I - 20124 MILANO

Te1 (2) 6994

JAPAN

NIHON PHILIPS CORP.
Shuwa Shinagawa Bldg.9th floor
26-33 Takanawa 3-chome,
Minato-ku
TOKYO 108

Te1 448-5611

KOREA

PHILIPS ELECTRONICS (KOREA) Ltd
Elcoma Div., Philips House
260-199 Itaewon-dong
Yongsan-ku
C.P.O. Box 3680
SEOUL

Te1 794 4202 + 5097

MALAYSIA

PHILIPS MALAYSIA SDN. BERHAD,
Lot 2, Jalan 222, Section 14,
Petaling Jaya,
P.O.B. 2163,
KUALA LUMPUR, Selangor

Te1 77 44 11

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

PHIN (cont.)

MEXICO

ELECTRONICA S.A. de C.V.
Varsovia No. 36
MEXICO 6, D.F.

Te1 533 11 80

NETHERLANDS

PHILIPS NEDERLAND B.V.
Afd. Elonco,
Boschdijk 525
NL 5600 PB EINDHOVEN

Te1 040-793333

NEW ZEALAND

PHILIPS ELECTRICAL INDUST. OF NEW ZEALAND Ltd
P.O. Box 41-021, St. Lukes
AUCKLAND

Te1 867-110

NORWAY

ELECTRONICA A.S.
Sorkedalsveien 6
P.O. Box 5040
Majorstuen
OSLO 3

Te1 463890

PERU

CADESA
Rocca de Vergallo 247
Apartado 5612
LIMA 17

Te1 619287

PHILIPPINES

PHILIPS INDUSTRIAL DEV. INC.
Makati Comm. Centre
MAKATI RIZAL 3116

Te1 86-89-51 to 59

PHIN (cont.)

PORTUGAL

PHILIPS PORTUGUESA S.A.R.L.
Av. Eng. Duharte Pacheco, 6
P - LISBOA 1

Te1 68 31 21

SINGAPORE

PHILIPS SINGAPORE PRIVATE Ltd.
ELcoma Div.
Lorong, 1 Toa Payoh
P.O. Box 340
SINGAPORE 12
Tel 2538811

SOUTH AFRICA

EDAC (Pty.) Ltd
3rd floor Rainerhouse
Upper Railway RD+OVE St.
New Doornfontein
JOHANNESBURG 2001

Te1 614 2362/9

SPAIN

MINIWATT S.A.
Balmes 22
BARCELONA 7

Te1 3016312

SWEDEN

A.B. ELCOMA
Livingövägen 50
S - 11584 STOCKHOLM 27

Te1 08/67 97 80

SWITZERLAND

PHILIPS A.G.
Elcoma Dept.
Allmendstrasse 140-142
CH - 8027 ZUERICH

Te1 01/432211

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

PHIN (cont.)

TAIWAN

PHILIPS TAIWAN Ltd
3rd Floor San Min Bldg.
57-1, Chung San N. Rd.
Section 2
P.O. Box 22978
TAIPEI

Tel 5631717

THAILAND

PHILIPS ELECTRICAL CO. OF THAILAND Ltd
283 Silom Road,
P.O. Box 961,
BANGKOK

Tel 233-6330-9

TURKEY

TUERK PHILIPS TICARET A.S.
Emet Dept.
Inonu Cad No. 78-80
ISTANBUL

Tel. 435910

UNITED KINGDOM

MULLARD Ltd
Mullard House
Torrington Place

GB - LONDON WC1E 7HD

Tel 580 66 33

URUGUAY

LUZILECTRON S.A.
Rondeau 1567, piso 5
MONTEVIDEO

Tel 9 43 21

PHIN (cont.)

U.S.A.

AMPEREX SALES CORP.
Providence Pike
SLATERSVILLE
R.I. 02876

Tel (401) 762-9000

VENEZUELA

IND. VENEZOLANAS PHILIPS S.A.
Elcoma Dept.
Av. Principal De Los Ruices
Edif. Centro Colgate Apdo 1167
CARACAS

Tel 2392222

PLSB

PLESSEY SEMICONDUCTORS Ltd
Kembrey Park
GB - SWINDON (Wiltshire SN2 6BA)

Tel (0793) 694994 ; Tlx 449637

RTC

FRANCE

RTC-LA RADIOTECHNIQUE COMPELEC
130, avenue Ledru-Rollin
F - 75540 PARIS Cedex 11

Tél (1)355 44 99 ; Tlx 680495

SGAI

BENELUX

SGS-ATES COMPONENTI ELETTRONICI SpA
Benelux Sales Office
Avenue Winston Churchill, 122
B - 1180 BRUXELLES

Tél (02) 343 24 39 ; Tlx 24149

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

SGAI (cont.)

DENMARK

SGS-ATES SCANDINAVIA AB
Sales Office
Herlev Torv 4
DK - 2730 HERLEV

Tel 02-948533 ; Tlx 35411

FINLAND

SGS-ATES Scandinavia AB
Kääntöpiiri 2
SF 02210 ESBO 21

Tel 90-881395/6 ; Tlx 123643

FRANCE

SGS-ATES FRANCE S.A.
Résidence "Le Palatino"
17, avenue de Choisy
F - 75643 PARIS Cedex 13

Tél (1) 584 2730 ; Tlx 250938

GERMANY

SGS-ATES DEUTSCHLAND
HALBLEITER-BAUELEMENTE GmbH
Haidling 17
D 8018 GRAFING BEI MUENCHEN

Tel 08092-691 ; Tlx 05 27378

SGS-ATES DEUTSCHLAND
HALBLEITER-BAUELEMENTE GmbH
Hubertusstrasse, 7
D 3012 LANGENHAGEN

Tel 0511-772075/7 ; Tlx 09 23195

SGS-ATES DEUTSCHLAND
HALBLEITER-BAUELEMENTE GmbH
Tegernseer Landstrasse, 146
D 8000 MUENCHEN 90

Tel 089-6925100 ; Tlx

SGAI (cont.)

SGS-ATES DEUTSCHLAND
HALBLEITER-BAUELEMENTE GmbH
Parsifalstrasse, 10
D - 8500 NUERNBERG 15

Tel 0911-49645/6 ; Tlx 0626243

SGS-ATES DEUTSCHLAND
HALBLEITER-BAUELEMENTE GmbH
Kalifenweg, 45
D - 7000 STUTTGART 80

Tel 0711-713091/2 ; Tlx 07 255545

HONG KONG

SGS-ATES Singapore (Pte)Ltd
Canton Road, Kowloon
1329 OCEAN CENTRE

Tel 3-662625 ; Tlx ESGIE HK 63906

GREAT BRITAIN

SGS-ATES UNITED KINGDOM Ltd
Planar House, Walton Street
GB - AYLESBURY, (Bucks.)

Tel 296-5977 ; Tlx 041-83245

ITALY

(International Headquarters)
SGS-ATES COMPONENTI ELETTRONICI SpA
Via C. Olivetti, 2
I - 20041 AGRATE BRIANZA

Tel 039-65551 ; Tlx 330131 - 330141

SGS-ATES Componenti Elettronici SpA
Direzione Commerciale Italia
Via Correggio, 1/3
I - 20149 MILANO

Tel 02-4695651

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

SGAI (cont.)

SGS-ATES Componenti Elettronici SpA
Direzione Commerciale Italia
Piazza Gondar, 11
I - 00199 ROMA

Tel 06-8392848/8312777

SINGAPORE

SGS-ATES Singapore (Pte)Ltd
Lorong 4 & 6 - Toa Payoh
SINGAPORE 1231

Tel 253411 ; Tlx ESGIES RS 21412

SWEDEN

SGS-ATES SCANDINAVIA AB
Box 144
S - 19501 MARSTA

Tel 40120 ; Tlx 10932

SWITZERLAND

SGS-ATES Componenti Elettronici SpA
Swiss Sales Offices
Oberneuhofstrasse 2
CH - 6340 BAAR

Tel 042-315955 ; Tlx 864915

SGS-ATES Componenti Elettronici SpA
Swiss Sales Offices
Chemin François-Lehmann 22
CH - 1218 GRAND-SACONNEX (GENEVE)

Tel 022-986462/3 ; Tlx 28895

U.S.A.

SGS-ATES Semiconductor Corporation
7070 East 3rd Avenue
USA - SCOTTSDALE, AZ 85251

Tel (602)990-9553 ; Tlx SGS ATES SCOT 165808

SGAI (cont.)

SGS-ATES Semiconductor Corporation
240, Bear Hill Road
USA - WALTHAM, MA 02154

Tel (617)890-6688 ; Tlx 923495 WHA

SGS-ATES Semiconductor Corporation
2340 Des Plaines Ave Suite 309
USA - DES PLAINES, IL 60018

Tel (312)296-4035 ; Tlx 282547

SGS-ATES Semiconductor Corporation
2700, Augustine Drive
USA - SANTA CLARA, CA 95051

Tel (408)727-3404 ; Tlx 346402

SGS-ATES Semiconductor Corporation
6355, Topanga Canyon Boulevard
Suite 220
USA - WOODLAND HILLS, CA 91367

Tel (213)716-6600 ; Tlx 182863

SGS-ATES Semiconductor Corporation
1309, South Semoran Blvd.
Lakeview, 436 Office Park
USA - ORLANDO, FL 32792

Tel (305)671-8599

SIE

AUSTRIA

SIEMENS AKTIENGESELLSCHAFT ÖSTERREICH
Apostelgasse 12
(A-1031 Wien, P.O.B. 326)
A - 1030 WIEN

Tel (0222) 72930 ; Tlx 11866

BELGIUM

SIEMENS S.A.
Chaussée de Charleroi, 116
B - 1060 BRUXELLES

Tel (02) 537 31 00 ; Tlx 21347, 23587

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

S I E (cont.)

DENMARK

SIEMENS Aktieselskab
Borupvang 3
DK - 2750 BALLERUP

Te1 (01) 656565 ; T1x 35313

FINLAND

SUOMEN SIEMENS Osakeyhtiö
Mikonkatu 8, (Postilokero 8)
SF - 00101 HELSINKI 10

Te1 16261 ; T1x 12465

FRANCE

SIEMENS S.A.
39, Boulevard Ornano
F - 93200 SAINT-DENIS

Té1 (1) 820 61 20 ; T1x 620853

GERMANY

SIEMENS A.G.
Unternehmensbereich Bauelemente
Balanstrasse 73
D - 8000 MÜNCHEN 80

Te1 (089) 4144-1 ; T1x 522961

GREAT BRITAIN

SIEMENS Ltd, Siemens House
Windmill Road
GB - SUNBURY-ON-THAMES
(Middlesex TW16 7HS)

Te1 (01) 85691 ; T1x 8951091

GREECE

SIEMENS HELLAS E.A.E.
Voulis 7, (P.O.B. 601)
GR - ATHINE 125

Te1 (6021) 3293-1 ; T1x 216291, 216292

S I E (cont.)

IRELAND

SIEMENS Ltd
8, Raglan Road
IRL - DUBLIN 4

Te1 68 47 27 ; T1x 5341

ITALY

SIEMENS ELETTRA SpA
Via Fabio Filzi, 29
(Casella Postale 4183)
I - 20124 MILANO

Te1 (02) 6992 ; T1x 36261

LUXEMBURG

SIEMENS S.A.
17, Rue Glesener, (B.P. 1701)
L - LUXEMBOURG

Te1 49711-1 ; T1x 3430

NETHERLANDS

SIEMENS NEDERLAND N.V.
Wilhelmina van Pruisenweg, 26
Postbus 16068
NL - 2595 AN DEN HAAG

Te1 (070) 782782 ; T1x 31373

NORWAY

SIEMENS Aksjeselskap
Ostre Aker Vei 90,
Postboks 10, Veitvet
N - OSLO 5

Te1 (02) 15 30 90 ; T1x 18477

PORTUGAL

SIEMENS S.A.R.L.
Avenida Almirante Reis, 65
(Apartado 1380)
P - LISBOA 1

Te1 538805 ; T1x 12563, 16743

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

SIE (cont.)

SPAIN

SIEMENS S.A.
Oronse 2, (Apartado 155)
E - MADRID 20

Tel (01)4552500-4556500 ; Tlx 27769

SWEDEN

SIEMENS Aktiebolag
Norra Stationsgatan 63-65
(Fack, S-10435 Stockholm 23)
S - STOCKHOLM

Tel (08)229680 ; Tlx 19880, 19881

SWITZERLAND

SIEMENS-Albis AG
Albisriederstrasse 245
CH - 8047 ZÜRICH

Tel (01)2473111 ; Tlx 54554

TFKH

AUSTRIA

Oesterreichische AEG-TELEFUNKEN GmbH
Brünnerstrasse, 52
A - 1211 WIEN

Tel 38 15 11 - 38 36 01 ; Tlx 74889

BELGIUM

Société Anonyme Belge AEG-TELEFUNKEN
Rue Souveraine 40
B - 1050 BRUXELLES

Tél (02) 513 39 70 ; Tlx 21 359
(02) 512 79 40

DENMARK

AEG DANSK
Elektricitets Aktieselskab
Roskildevej, 8-10
DK - 2620 ALBERTSLUND

Tel 64 85 22 ; Tlx 33122

TFKH (cont.)

FINLAND

SÄHKÖLIIKKEIDEN OY
P.O.B. 88
SF - 01301 VANTAA 30

Tel 8381 ; Tlx 12431

FRANCE

AEG-TELEFUNKEN FRANCE S.A.
Départements Composants Electroniques
6, bd du Général-Leclerc
Bureau 612
F - 92115 CLICHY

Tél (1) 739 33 10 ; Tlx 620827

GERMANY

AEG-TELEFUNKEN
Serienprodukte
Geschäftsbereich Halbleiter
Export P.O.B. 1109
D - 7100 HEILBRONN

Tel 8821 ; Tlx 728746

GREAT BRITAIN

AEG-TELEFUNKEN (U.K.) Ltd
Bath Road
GB - SLOUGH SL1 4AW, (Berk.)

Tel 87 21 01 ; Tlx 847541

ITALY

AEG-TELEFUNKEN Società Italiana per Azioni
Viale Brianza, 20
Casella Postale 47
I - 20092 CINISELLO BALSAMO/MILANO

Tel (2) 927 98 ; Tlx 31473

NETHERLANDS

AEG-TELEFUNKEN Nederland N.V.
Postbus 1816
Aletta Jacobslaan 1-7
NL - 1000 BV AMSTERDAM

Tel 5116333 ; Tlx 11234

Addresses of suppliers

Adresses des fournisseurs - Adressen der Lieferanten

TFKH (cont.)

SPANIEN

AEG Iberica de Electricidad S.A
General Mola 112-114
Apartado 235
E - MADRID 2

Te1 2627600 ; T1x 27635

SWEDEN

SATTCO AB
Salvägen 10
S - 17191 SOLNA

Te1 830280 ; T1x 11588

SWITZERLAND

ELEKTRON AG
Riedhofstrasse 11
CH - 8804 AU ZH

Te1 751722 ; T1x 75755

TURKEY

SERVER ATAMAN
Istiklal Caddesi, 378/4
P.K. Beyoglu 366
BEYOGLU, ISTANBUL

Te1 44 21 68

THCF

FRANCE

THOMSON-EFCIS
Division Circuits Intégrés
45, avenue de l'Europe

F - 78140 VELIZY-VILLACOUBLAY

Té1 (3) 946 97 19 ; T1x 698866

VAD

GERMANY

VALVO
Valvo Haus
Burchardstrasse 19
D - 2000 HAMBURG 1

Te1 (040) 3296-1 ; T1x 21540164
21540156

