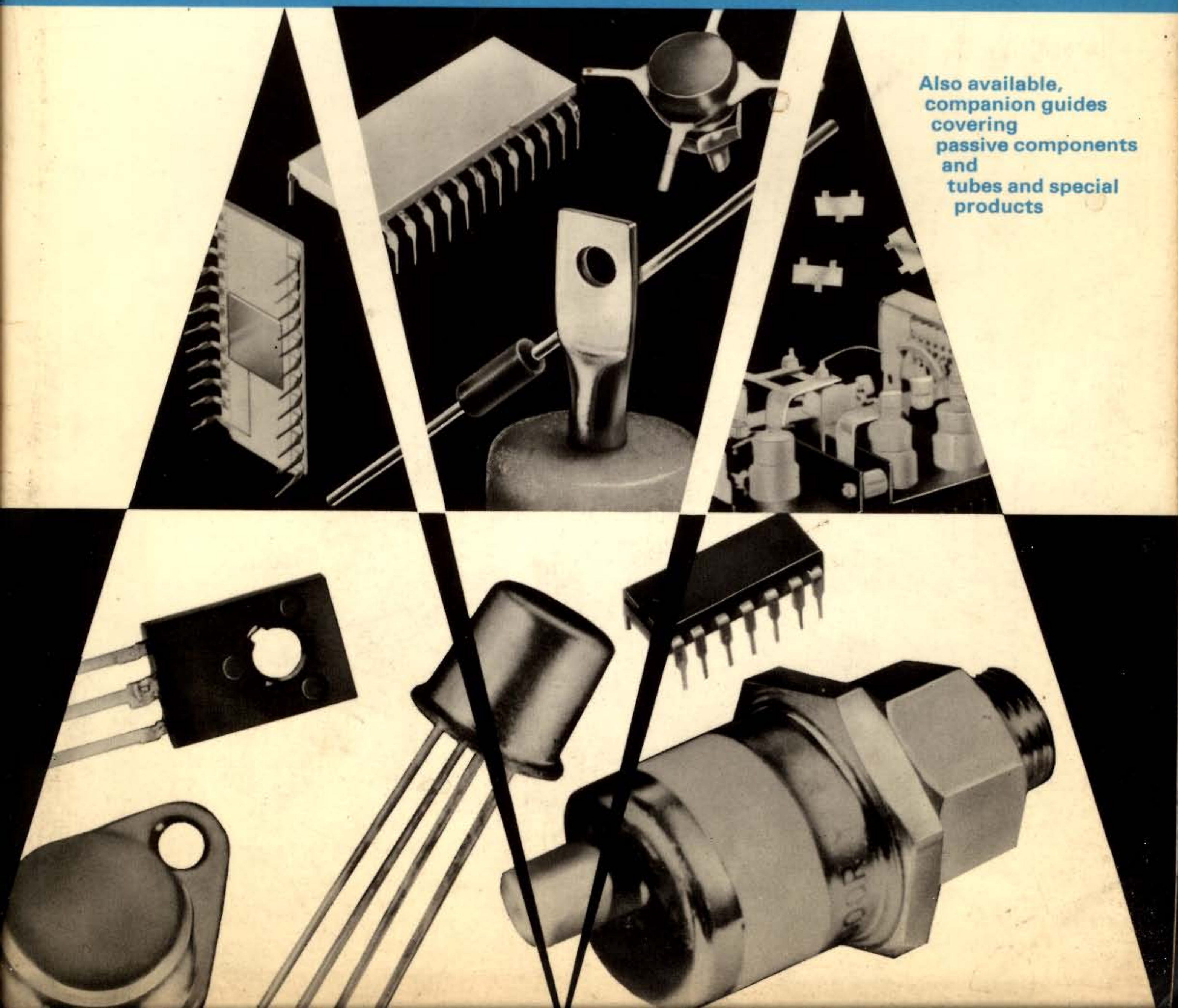
Mullard semiconductors

quick reference guide **1972-73**



Also available, companion guides covering passive components and tubes and special products

contents

Semiconductors quick reference guide 1972/73

This guide presents quick reference data on Mullard semiconductors.

Product information is deliberately abbreviated to give a rapid appreciation of salient characteristics, and to enable the performance of similar types to be compared quickly.

Outline drawings showing dimensions and details of the international encapsulations to which the devices comply are included at the back of the guide.

Full technical data on individual products, and details of the Mullard Technical Handbook, may be obtained from Mullard Ltd.

For the convenience of Handbook users, the relevant book and part number is indicated at the top of each data table in this guide; data sheets for some new types may still be in preparation.

Mullard technical information service

Quick Reference Information
The most important characteristics of the current ranges of Mullard semiconductors are given in this guide.

Full Technical Data
Individual data sheets giving full technical data on each product are readily available, and may be obtained by quoting the relevant type number.
In addition, laboratory reports, applications reports and technical publications of many kinds are regularly issued.

Technical Handbook System
The new Mullard Technical Handbook system of data is made up of three sets of Books, each comprising several parts.
The three sets of books, easily identifiable by the colours of their covers, are as follows:

Book 1	(blue)	Semiconductor Devices and Integrated Circuits
Book 2	(orange)	Valves and Tubes
Book 3	(green)	Passive Components and Materials

New editions are issued at approximately yearly intervals.

New Product Information
As a further part of the information service, advance details of each new product or technique are published in the Mullard Bulletin, which is sent automatically to people who have asked to be kept informed of new introductions.

Mullard Limited, Mullard House, Torrington Place, London WC1E 7HD Tel: 01–580 6633 Telex: 264341

Index of data pages and status codes

Status codes
All of the semiconductor devices on which data is given in this book are Design or Current types. Maintenance and Obsolete types are listed below, and suggested alternatives are shown.

D Design Type. Recommended for *new equipment designs.*

C Current Type. Available for equipment production and for use in existing equipment installations. No longer recommended for new equipment designs.

M Maintenance Type. Available for the maintenance of existing equipments only. No longer recommended for equipment production.

O Obsolete Type. No longer generally available, though in some cases limited stocks may exist.

Type No.	Status Code	Page No. or Suggested Alternatives
AA119	D	52
AAY11	M	*
AAY12	O	AAY30
AAY30	D	52
AAY32–33	C	52
AAY34	D	50
AAY39–39A	D	50
AAY40	M	AAY50
AAY42	O	*
AAY50–51–52	D	50
AAY50R–51R–52R	D	50
AAY59	D	50
AAZ12	O	BAV10
AAZ13	D	52
AAZ15	D	52
AAZ17	D	52
AC127	D	33
AC128	D	32
AC176	D	33
AC187	D	33
AC188	D	32
ACY17 to 22	C	32
ACY39–40–41	C	32
ACY44	C	32
AD149	D	33
AD161	D	34
AD162	D	33
ADY26	M	*
ADZ11–12	M	*
AEY13–15–16	D	49
AEY17	D	49
AEY23–28	M	*
AEY29	D	49
AEY31–31A	D	49
AFY19	M	BFX88
AFZ11–12	M	*
ASY26–27	C	32
ASY28–29	C	33
ASY67	O	BCY70
ASY74	C	33
ASZ20	O	BCY70
ASZ21	M	*
ASZ23	O	BCY70
AUY10	O	*
B20–200B1P1F	D	68
B25–B1P1F Series	D	68
B25–NB1P1F Series	D	68
B42–B1P1F Series	D	68
B42–NB1P1F Series	D	68
BA102	D	54
BA145	D	53
BA148	D	53
BAV10	D	53
BAV22–22R	D	50
BAV40–41–42	C	53
BAV44	D	53
BAV45	D	53
BAV46	D	49
BAV70	D	44
BAV75	D	49–50
BAW56	D	44
BAW62	D	53
BAW95D–E–F	D	50
BAX12–13	D	52
BAX16–17	D	52
BAX78	M	BAV10
BAY38	M	BAW62
BAY39	O	BAV10
BAY66	M	*
BAY96	D	51
BB105	D	54
BB110	D	54
BB113	D	54
BC107 to 109	D	34
BC147 to 149	D	34
BC157 to 159	D	40
BC237 to 239	D	34
BC307 to 309	D	40
BC327–328	D	41
BC337–338	D	36
BCW29R–30R	D	43
BCW31R to 33R	D	43
BCW69R–70R	D	43
BCW71R–72R	D	43
BCY30 to 34	C	40
BCY38–39–40	C	40
BCY49	M	BCY72
BCY54	C	40
BCY55	D	39
BCY70–71–72	D	40
BCY87–88–89	D	39
BCZ11	C	40
BD121	M	*
BD123	M	*
BD124	C	37
BD131	D	37
BD132	D	41
BD133	D	37
BD135	D	36
BD136	D	41
BD137	D	36
BD138	D	41
BD139	D	36
BD140	D	41
BD160	D	37
BD181 to 184	D	37
BD201	D	37
BD202	D	42
BD203	D	37
BD204	D	42
BD232	D	36
BD233–235–237	D	37
BD234–236–238	D	42
BDY10–11	C	37
BDY20	D	37
BDY38	D	38
BDY60–61–62	D	38
BDY90 to 98	D	38
BF115	C	35
BF167	C	35
BF173	C	35
BF180–181	C	35
BF194–195	D	35
BF196–197	C	34
BF200	C	34
BF336 to 338	D	36
BF362–363	D	35
BFR29	D	42
BFR30–31	D	44
BFR90–91	D	35
BFR92–93	D	43
BFS17R	D	43
BFS18R–19R	*	
BFS20R	D	43
BFS21–21A	D	43
BFS28	D	42
BFS92 to 95	D	41
BFW10–11	D	42
BFW16	*	
BFW16A	D	38
BFW17	*	
BFW17A	D	38
BFW30	D	35
BFW45	C	*
BFW57 to 60	D	34
BFW61	D	42
BFW87 to 91	C	40
BFW96	M	*
BFW98G	M	BLX65
BFX12–13	M	*
BFX29–30	D	41
BFX29–30	D	41
BFX34	D	36
BFX37	C	40
BFX63	M	*
BFX84–85–86	D	36
BFX87–88	D	41
BFX89	D	35
BFY10–11	O	BFY50 Series
BFY50 to 53	D	36
BFY90	D	35
BFZ10	O	BCZ11
BLX13–14	D	38
BLX65–66–67	D	38
BLX69	D	38
BLX94	D	38
BLY17–17A	O	*
BLY33–36	D	38
BLY38	O	BLX67
BLY53A	D	38
BLY55	C	39
BLY83–84–85	D	38
BLY89A	D	39
BLY90	D	39
BLY93A	D	39
BLY94	D	39
BLY97–98	D	39
BPX25–25A	D	45
BPX29–29A	D	45
BPX40–41–42	D	45
BPX66	D	45
BPX70 to 72	D	45
BPY10	D	45
BPY13–13A	D	45
BPY68–69	D	45
BPY77	D	45
BR101	D	43
BRY39	D	43
BSS27 to 29	D	36
BSV22	M	*
BSV52R	D	43
BSV64	D	64
BSV68	D	40
BSV78–79–80	D	42
BSV81	D	42
BSW41	D	35
BSW66–67–68	D	36
BSW69	D	34
BSW70	M	BSX21
BSX12–12A	D	37
BSX19–20–21	D	35
BSX44	*	
BSX59–60–61	D	37
BSX82	M	BSV81
BSY10–11	O	BFY50 Series
BSY38–39	D	35
BSY40–41	M	*
BSY95A	D	35
BT100A	D	68
BT101–102	D	69
BT107 to 109	D	69
BT110	D	71
BTW22 Series	O	*
BTW23 Series	D	70
BTW24 Series	D	69
BTW26 Series	D	71

*Consult Mullard Ltd.

Type No.	Status Code	Page No. or Suggested Alternatives
BTW30 Series	D	70
BTW31 Series	D	70
BTW32 Series	D	70
BTW33 Series	D	70
BTW34 Series	D	71
BTW35	D	70
BTW47 Series	D	69
BTW92 Series	D	69
BTX18 Series	D	68
BTX47 Series	M	BTW47 Series
BTX49 Series	M	BTW23 Series
BTX50 Series	M	BTW23 Series
BTX75 Series	C	*
BTX76 Series	C	*
BTX81 Series	D	69
BTX82 Series	D	69
BTX85 Series	C	*
BTX86 Series	C	*
BTX92 Series	M	BTW92 Series
BTX94 Series	D	71
BTX95 Series	D	70
BTY34 Series	C	*
BTY79 Series	D	68
BTY87 Series	D	69
BTY91 Series	D	69
BU105	D	38
BU108	D	38
BU126	D	38
BXY27–28–29	D	51
BZX32	D	51
BXY35 to 41	D	51
BY114	C	BYX22 Series
BY126–127	D	66
BY176	D	66
BY185	D	66
BYX10	D	66
BYX13–13R Series	M	BYX25 Series
BYX14–14R Series	M	BYX33 Series
BYX20–200	D	66
BYX20–200R	D	66
BYX22 Series	D	66
BYX25–25R Series	D	65
BYX26 Series	D	54
BYX29 Series	D	66
BYX30–30R Series	D	65
BYX32–32R Series	D	66
BYX33–33R Series	D	66
BYX34 Series	D	65
BYX35	D	66
BYX36 Series	D	54
BYX38–38R Series	D	66
BYX39–39R Series	D	65
BYX40–40R Series	D	65
BYX42–42R Series	D	66
BYX45 Series	D	65
BYX46–46R Series	D	65
BYX48–48R Series	D	66
BYX49 Series	D	66
BYX50–50R Series	D	65
BYX52–52R Series	D	66
BYX55 Series	D	65
BYX56–56R Series	D	65
BYX70 Series	D	53
BYX71–71R Series	D	65
BYX72–72R Series	D	66
BZW10 to 14	D	54
BZW70 Series	D	62
BZW86 Series	D	64
BZW91 Series	D	63
BZW93 Series	D	63
BZW95 Series	D	62
BZW96 Series	D	61
BZX47 to 50	M	BZX90 to 94
BZX61 Series	D	57
BZX70 Series	D	58
BZX79 Series	D	56
BZX84 Series	D	44
BZX86	C	BZW86
BZX90 to 94	D	54
BZY78–78P	D	54
BZY88 Series	D	56
BZY91 Series	D	60
BZY93 Series	D	59
BZY94 Series	O	BZX61 Series
BZY95 Series	D	58
BZY96 Series	D	58
BZZ10–13	O	BZY88 Series
CAY10	D	51
CAY11	O	*
CAY17	D	49–50
CQY11–B–C	D	46
CQ12B	D	46
CQY13	D	46
CQY23–24	D	46
CXY10	D	51
CXY11A–B–C	D	49
CXY12	D	51
CXY19–20	D	49
FCH101	D	16
FCH111	D	16
FCH121	D	16

Type No.	Status Code	Page No. or Suggested Alternatives
FCH131	D	16
FCH141	D	16
FCH151	D	16
FCH161	D	16
FCH171	D	16
FCH181	D	16
FCH191	D	16
FCH201	D	16
FCH211	D	16
FCH221	D	16
FCH231	D	16
FCJ101	D	16
FCJ111	D	16
FCJ121	D	16
FCJ201	D	16
FCK111	D	16
FCL101	D	16
FCY101	D	16
FDN106	D	17
FDN116	D	17
FDN126	D	17
FDN136	D	17
FDN146–146A	D	17
FDN156–156A	D	17
FDN166A	D	17
FDN186	D	18
FDN196A	D	18
FDN206–206A	D	18
FDN506	D	18
FDN516A	D	18
FDN526A	D	18
FDN536A	D	18
FDQ106	D	18
FDR116Z	D	19
FDR116Z1	D	20
FDR126Z	D	19
FDR126Z1	D	20
FDR131Z	D	19
FDR131Z1	D	20
FDR146Z	D	19
FDR146Z1	D	20
FDY Series	D	20
FEJ271	D	20
FEJ291	D	20
FEY101	D	20
FJ..1 Series	D	9
FJ..2 Series	D	9
FJ..6 Series	D	9
FJH101–7430N	D	9
FJH111–7420N	D	9
FJH121–7410N	D	9
FJH131–7400N	D	9
FJH141–7440N	D	9
FJH151–7450N	D	9
FJH161–7451N	D	9
FJH171–7453N	D	9
FJH181–7454N	D	9
FJH191–7480N	D	12
FJH201–7482N	D	12
FJH211–7483N	D	12
FJH221–7402N	D	10
FJH231–7401N	D	10
FJH241–7404N	D	10
FJH251–7405N	D	10
FJH261–7442N	D	14
FJH271–7486N	D	10
FJH281–74180N	D	14
FJH291–7403N	D	10
FJH301–7426N	D	10
FJH311–7410AN	D	10
FJH321–7405AN	D	10
FJJ101–7470N	D	10
FJJ111–7472N	D	10
FJJ121–7473N	D	11
FJJ131–7474N	D	11
FJJ141–7490N	D	12
FJJ151–7491AN	D	13
FJJ181–7475N	D	11
FJJ191–7476N	D	11
FJJ211–7493N	D	12
FJJ231–7495N	D	13
FJJ241–7496N	D	13
FJJ251–7492N	D	12
FJJ261–74107N	D	11
FJJ271	D	13
FJJ291–74118N	D	11
FJJ301–74119N	D	11
FJJ321–9300	D	13
FJJ401–7419N	D	13
FJJ411–74193N	D	13
FJK101–74121N	D	10
FJL131–7413N	D	10
FJL151–74141N	D	14
FJQ101–74170N	D	14
FJQ111–7489N	D	14
FJR101–7488N	D	14
FJY101–7460N	D	10
GEM1 to 4	D	50
GEXM66	M	AAZ13
GEX71	M	AAZ13
GEX540	M	GEX541

Type No.	Status Code	Page No. or Suggested Alternatives
GEX541–542	C	66
GJH101–74H30N	D	15
GJH111–74H20N	D	15
GJH121–74H10N	D	15
GJH131–74H00N	D	15
GJH141–74H40N	D	15
GJH161–74H51N	D	15
GJH181–74H54N	D	15
GJH231–74H01N	D	15
GJH241–74H04N	D	15
GJH251–74H05N	D	15
GJJ131–74H74N	D	15
GKY102	D	21
GRL101	D	21
GRL111	D	21
GRS141–7524N	D	21
GRS151–7525N	D	21
GTH111–74S20	D	15
GTJ701–74S112	D	15
GYQ101	D	19
LDA400–401	*	
LDA402–406	*	
LDA450–453	*	
LDD10–50	*	
LDS200–201	*	
LDZ70 Series	*	
MY5000 Series	D	71
OA5–6–7	M	*
OA10	M	*
OA47	D	52
OA70	O	OA90
OA73	O	OA90
OA79	O	AA119
OA81	O	OA91
OA85	O	OA95
OA90–91	D	52
OA95	D	52
OA200	D	53
OA202	D	53
OA210–211	C	*
OA214	O	BYX22 Series
OAP12	D	45
OAZ200–213	M	BZY88 Series
OAZ222–237	C	BZY93 Series
OAZ240–247	C	BZY88 Series
OAZ268–273	M	BZY88 Series
OAZ290–292	O	BZY93 Series
OC20	C	33
OC22–23–24	M	*
OC25	C	33
OC28–29	C	33
OC35–36	C	33
OC41–45	M	ASY26–27
OC70–71–72	M	ACY20–21
OC75–76–77	M	ACY17–20–21
OC83–84	O	ACY17
OC122–123	O	BFX87
OC139–141	M	ASY74
OC200 to 203	C	40
OC204 to 207	C	41
OCP71	C	BPX25
OM200	D	22
OMY Series	M	FC Family
ORP10	D	40
ORP13	D	47
ORP52	D	48
ORP60 to 62	D	48
ORP 69	D	48
ORP 90	D	48
ORP93	D	48
OSH007	D	67
OSH01–01A Series	D	67
OSH02A Series	D	67
OSH03 Series	D	67
OSH05 Series	D	67
OSH07 Series	D	67
OSH10 Series	D	67
OSH10A Series	D	67
OSH30 Series	D	68
OSH64 Series	D	68
OSH110 Series	D	68
OSH300 Series	D	68
OSK40 Series	D	68
OSK90 Series	D	68
OSK150 Series	D	68
OSK400 Series	D	68
OSM9510–12	D	66
OSS6700B	D	66
OSS9110 Series	D	67
OSS9210 Series	D	67
OSS9310 Series	D	67
OSS9410 Series	D	67
OTH10–608L	D	72
OTH10–1008L	D	72
OTH11–609L	D	73
OTH12–608L	D	72
OTH16–608L	D	72
OTH20–608A	D	72
OTH22–609	D	73
OTH22–1208A	D	72
OTH22–1209	D	73

*Consult Mullard Ltd.

Index of data pages and status codes (cont.)

Type No.	Status Code	Page No. or Suggested Alternatives
OTH25–605	D	73
OTH25–1205	D	73
OTH28–608A	D	72
OTH28–1209	D	73
OTH29–1208A	D	72
OTH32–609	D	73
OTH36–1209	D	73
OTH40–608A	D	72
OTH44–609	D	73
OTH50–608A	D	72
OTH57–609	D	73
OTH75–608A	D	72
OTH75–1208A	D	72
OTH94–608A	D	72
OTH94–1208A	D	72
OTH95–608	D	72
OTH95–1208	D	72
OTH105–609	D	73
OTH105–1209	D	73
OTH115–608	D	72
OTH115–1208	D	72
OTH127–609	D	73
OTH127–1209	D	73
OTH800 Series	D	71
OTH1200 Series	D	71
OTK11–1009L	D	73
OTK21–1209	D	73
OTK23–1208	D	72
OTK27–1209	D	73
OTK30–1208	D	72
OTK35–1209	D	73
OTK42–1208	D	72
OTK93–1209	D	73
OTK110–1209B	D	73
OTK120–1208C	D	72
OTK130–1209A	D	73
OTK160–1208A	D	72
RPY18 to 20	D	48
RPY31	D	47
RPY33	D	47
RPY35 to 37	D	47
RPY40	D	47
RPY43	D	47
RPY51-52	D	47
RPY54–55	D	48
RPY56–57	D	47
RPY58	D	48
RPY71	D	48
RPY75–75A	D	47
RPY76–76A	D	47
RPY77 to 80	D	47
SIM2–5	D	50
SIM8–9	C	AAY34
TAA241–242	D	22
TAA263	D	22
TAA293	D	22
TAA300	D	22
TAA310	D	22
TAA320	D	23
TAA350	M	TBA480
TAA370	D	22
TAA435	M	•
TAA521–522	D	22
TAA550	D	24
TAA960	D	22
TAA970	D	22
TAB101	M	TBA673
TAD100	D	23
TAD110	D	23
TBA221–222	D	22
TBA281	D	24
TBA480–490	D	23
TBA500 to 520	D	23
TBA530 to 560	D	24
TBA570	D	23
TBA570Q	D	23
TBA673	D	24
TBA690	D	23
TBA700	D	23
TBA720	D	24
TBA750	D	24
TBA915	D	22
TBA920	D	24
TBA990	D	24
TCA160	D	22
TCA210	D	23
TCA220	D	22
TCA270	D	24
IN748A–759A	D	13
IN914	D	53
IN916	D	53
IN4001 to 4007	D	54
IN4009	C	53
IN4148–4149	D	52
IN4154	D	52
IN4446 to 4449	D	52
IN4885	D	51
IN5152–5153	D	51
IN5155	D	51
IN5157	D	51
2N696–697	D	36
2N706–706A	C	34
2N708	C	34
2N718	C	•
2N743–744	•	
2N753	•	
2N914	•	
2N918	D	35
2N919–920	•	
2N929–930	D	34
2N987	C	32
2N1100	M	•
2N1131–1132	C	41
2N1302–4–6–8	C	33
2N1303–5–7–9	C	32
2N1420	D	37
2N1613	D	36
2N1711	D	36
2N1893	D	37
2N2217	D	37
2N2218–2218A	D	37
2N2219–2219A	D	37
2N2220	•	
2N2221	•	
2N2221A	C	•
2N2222	•	
2N2222A	C	•
2N2297	D	36
2N2303	D	41
2N2368	D	35
2N2369–2369A	D	35
2N2410	D	37
2N2475	M	•
2N2483–2484	D	34
2N2904–2904A	D	41
22N2905–2905A	D	41
2N2906–2906A	D	41
2N2907–2907A	D	41
2N3053	D	36
2N3055	D	38
2N3133–3134	D	41
2N3135–3136	C	•
2N3303	D	37
2N3375	C	39
2N3426	D	37
2N3442	D	38
2N3553	C	39
2N3570 to 3572	O	BFY90
2N3632	C	39
2N3771	D	38
2N3772	D	38
2N3823	D	42
2N3866	D	39
2N3924–6–7	O	•
2N4036	D	41
2N4347	D	38
2N4427	D	39
3N83	see BRY39	
3N140–141	D	42
61 Series	D	71
380BGY	D	39
381BGY	D	39
379BLY	D	38
542BLY	D	39
810BLY	D	39
802CPY	D	46
825CPY	D	46
174CQY	D	46
183CQY	D	46
61–62SV	D	47

•Consult Mullard Ltd.

The semiconductors listed below are offered against the CV specifications indicated. Qualification Approval has been obtained for all CV7000 series devices eligible for conversion to BS9300 Appendix C and these are indicated in the list by means of a dagger, e.g. CV7130† to BS9300–C130. Qualification Approvals to the BS9000 scheme (including CV) are regularly listed in BS9002. However for information on new or replacement types, please contact Mullard Ltd.

Mullard CN and CV List

C.N. No.	Comparable Type
CN77DP	FJH132
CN78DP	FJH131
CN79DP	FJH122
CN80DP	FJH121
CN81DP	FJH112
CN82DP	FJH111
CN83DP	FJH102
CN84DP	FJH101
CN85DP	FJH232
CN86DP	FJH231
CN89DP	FJH142
CN90DP	FJH141

C.V. No.	Comparable Type
CV448	OA81
CV2154	SIM2
CV2155	SIM5
CV5711	CV7007
CV5712	CV7005
CV5713	CV7006
CV7001	AC128
CV7002	AC128
CV7003	OC44
CV7004	OC45
CV7005	AC128
CV7006	AC128
CV7026	BYX22–200
CV7027	BYX22–200
CV7028	BYX22–400
CV7029	BYX22–600
CV7030	BYX22–800
CV7040	OA202
CV7041	OA95
CV7042	OC42
CV7043	OC200
CV7044	OC201
CV7047	OA5
CV7048	OA5(D)
CV7049	OA10
CV7054	OC23
CV7075	BCZ11
CV7076	OA47
CV7083	OC29
CV7084	OC35
CV7085	OC28
CV7086	OC36
CV7087	OC43
CV7089	OC170
CV7093	CV7160
CV7094	CV7162
CV7095	CV7164
CV7096	CV7166
CV7097	CV7168
CV7098	CV7421
CV7099	BZY88C4V7
CV7100	BZY88C5V1
CV7101	BZY88C5V6
CV7102	BZY88C6V2
CV7103	BZY88C6V8
CV7104	BZY88C7V5
CV7105	BZY88C8V2
CV7106	BZY88C15
CV7108	GEM3
CV7109	GEM4
CV7113	OA210
CV7114	OA211
CV7117	OC203
CV7118	CV7006
CV7122	GEX541
CV7123	GEX542
CV7129	OCP71
CV7130†	OA91
CV7138	BZY88C3V3
CV7139	BZY88C3V6
CV7140	BZY88C3V9
CV7141	BZY88C4V3
CV7142	BZY88C9V1
CV7143	BZY88C10
CV7144	BZY88C11
CV7145	BZY88C12

C.V. No.	Comparable Type
CV7146	BZY88C13
CV7152	BCY30
CV7158†	BZY96C4V7
CV7159†	BZY96C5V1
CV7160†	BZY96C5V6
CV7161†	BZY96C6V2
CV7162†	BZY96C6V8
CV7163†	BZY96C7V5
CV7164†	BZY96C8V2
CV7165†	BZY96C9V1
CV7166†	BZY95C10
CV7167†	BZY95C11
CV7168†	BZY95C12
CV7171	BZY96C4V7
CV7172	BZY96C5V1
CV7173	BZY96C5V6
CV7174	BZY96C6V2
CV7175	BZY96C6V8
CV7176	BZY96C8V2
CV7177	BZY96C9V1
CV7188	OC205
CV7189	2/CV2154
CV7200	BZY93C7V5R
CV7201†	BZY93C8V2R
CV7202†	BZY93C9V1R
CV7203†	BZY93C10R
CV7204†	BZY93C11R
CV7205†	BZY93C12R
CV7206†	BZY93C13R
CV7207†	BZY93C15R
CV7208†	BZY93C16R
CV7209†	BZY93C18R
CV7210†	BZY93C20R
CV7211†	BZY93C22R
CV7212†	BZY93C24R
CV7213†	BZY93C27R
CV7214†	BZY93C30R
CV7215†	BZY93C33R
CV7216†	BZY93C36R
CV7217†	BZY93C39R
CV7218†	BZY93C43R
CV7219†	BZY93C47R
CV7220†	BZY93C51R
CV7221†	BZY93C56R
CV7222†	BZY93C62R
CV7223†	BZY93C68R
CV7224†	BZY93C75R
CV7241	BZY93C6V8
CV7242	BZY93C7V5
CV7243†	BZY93C8V2
CV7244†	BZY93C9V1
CV7245†	BZY93C10
CV7246†	BZY93C11
CV7247†	BZY93C12
CV7248†	BZY93C13
CV7249†	BZY93C15
CV7250†	BZY93C16
CV7251†	BZY93C18
CV7252†	BZY93C20
CV7253†	BZY93C22
CV7254†	BZY93C24
CV7255†	BZY93C27
CV7256†	BZY93C30
CV7257†	BZY93C33
CV7258†	BZY93C36
CV7259†	BZY93C39
CV7260†	BZY93C43
CV7261†	BZY93C47
CV7262†	BZY93C51
CV7263†	BZY93C56
CV7264†	BZY93C62
CV7265†	BZY93C68
CV7266†	BZY93C75
CV7311	BYX38–300
CV7312	BYX38–300
CV7313	BYX38–600
CV7314	BYX38–900
CV7315	BYX38–900
CV7316	BYX38–300R
CV7317	BYX38–300R
CV7318	BYX38–600R
CV7319	BYX38–900R
CV7320	BYX38–900R

C.V. No.	Comparable Type
CV7321	2/OC72
CV7326	CV7436
CV7327	CV7439
CV7329†	BTY91–100R
CV7330†	BTY91–200R
CV7331†	BTY91–400R
CV7332	OA202
CV7335	AFZ12
CV7341	BCY33
CV7342	BCY34
CV7343	CV7346
CV7344	BCY30
CV7345	BCY31
CV7346	BCY32
CV7347	OC202
CV7348	2N1302
CV7349	2N1304
CV7350	2N1306
CV7351	2N1308
CV7352	2N1303
CV7353	2N1305
CV7354	2N1307
CV7355	2N1309
CV7363	BCZ11
CV7365	CV7438
CV7367	IN914
CV7368	IN916
CV7369†	OA91
CV7376†	ACY17
CV7379†	BYX42–300R
CV7380†	BYX42–600R
CV7381†	BYX42–900R
CV7382†	BYX42–900R
CV7383	BYX42–1200R
CV7384†	BYX42–300
CV7385†	BYX42–600
CV7386†	BYX42–900
CV7387†	BYX42–900
CV7388	BYX42–1200
CV7409†	BZY96C4V7
CV7410†	BZY96C5V1
CV7411†	BZY96C5V6
CV7412†	BZY96C6V2
CV7413†	BZY96C6V8
CV7414†	BZY96C7V5
CV7415†	BZY96C8V2
CV7416†	BZY96C9V1
CV7417†	BZY95C10
CV7418†	BZY95C11
CV7419†	BZY95C12
CV7420†	BZY95C13
CV7421†	BZY95C15
CV7422†	BZY95C10
CV7423†	BZY95C18
CV7424†	BZY95C20
CV7425†	BZY95C22
CV7426	BZY95C24
CV7427	BZY95C27
CV7428	BZY95C30
CV7429†	BZY95C33
CV7430	BSY26
CV7431	BSY27
CV7436†	ACY18
CV7437†	ACY19
CV7438†	ACY20
CV7439†	ACY21
CV7476†	BYX45
CV7494	OC20
CV7495†	2N696
CV7496†	2N697
CV7580†	2N1131
CV7581†	2N1132
CV7582	BTY79–100R
CV7583†	BTY79–200R
CV7584†	BTY79–400R
CV7644†	2N718
CV7648	BSY95A
CV7649†	BTY91–100R
CV7650†	BTY91–200R
CV7651†	BTY91–400R
CV7652†	BTY91–600R
CV7653†	BTY91–800R
CV7667†	BYX25–1000R

Mullard CN and CV List (cont.)

C.V. No.	Comparable Type
CV7668†	BYX25–1000
CV7669†	2N2904
CV7670†	2N2905
CV7671†	2N2904A
CV7672†	2N2905A
CV7673†	2N2906
CV7674†	2N2907
CV7675†	2N2906A
CV7676†	2N2907A
CV7678†	BZY91C10
CV7679†	BZY91C11
CV7680†	BZY91C12
CV7681†	BZY91C13
CV7682†	BZY91C15
CV7683†	BZY91C16
CV7684†	BZY91C18
CV7685†	BZY91C20
CV7686†	BZY91C22
CV7687†	BZY91C24
CV7688†	BZY91C27
CV7689†	BZY91C30
CV7690†	BZY91C33
CV7691†	BZY91C36
CV7692†	BZY91C39
CV7693†	BZY91C43
CV7694†	BZY91C47
CV7695†	BZY91C51
CV7696†	BZY91C56
CV7697†	BZY91C62
CV7698†	BZY91C68
CV7699†	BZY91C75
CV7700†	BZY91C10R
CV7701†	BZY91C11R
CV7702†	BZY91C12R
CV7703†	BZY91C13R
CV7704†	BZY91C15R
CV7705†	BZY91C16R
CV7706†	BZY91C18R
CV7707†	BZY91C20R
CV7708†	BZY91C22R
CV7709†	BZY91C24R
CV7710†	BZY91C27R
CV7711†	BZY91C30R
CV7712†	BZY91C33R
CV7713†	BZY91C36R
CV7714†	BZY91C39R
CV7715†	BZY91C43R
CV7716†	BZY91C47R
CV7717†	BZY91C51R
CV7718†	BZY91C56R
CV7719†	BZY91C62R
CV7720†	BZY91C68R
CV7721†	BZY91C75R
CV7722†	BFY50
CV7723†	BFY51
CV7724†	BFY52
CV7725†	BFY50
CV7726†	BFY51
CV7727†	BFY52
CV7740†	ACY44
CV7746	BCY39
CV7747	BCY40
CV7762†	AAY39
CV7771†	AAY56
CV7772†	AAY56R
CV7776†	AAY51
CV7777†	AAY51R
CV7778†	CV7776/7
CV7780†	BZY93C6V8R
CV7781†	BZY93C7V5R
CB7782†	BZY93C8V2R
CV7783†	BZY93C9V1R
CV7784†	BZY93C10R
CV7785†	BZY93C11R
CV7786†	BZY93C12R
CV7787†	LZY93C13R
CV7788†	BZY93C15R
CV7789†	BZY93C16R
CV7790†	BZY93C18R
CV7791†	BZY93C20R
CV7792†	BZY93C22R
CV7793†	BZY93C24R
CV7794†	BZY93C27R
CV7795†	BZY93C30R
CV7796†	BZY93C33R
CV7797†	BZY93C36R
CV7798†	BZY93C39R
CV7799†	BZY93C43R
CV7800†	BZY93C47R
CV7801†	BZY93C51R
CV7802†	BZY93C56R
CV7803†	BZY93C62R
CV7804†	BZY93C68R
CV7805†	BZY93C75R
CV7806†	BZY93C6V8
CV7807†	BZY93C7V5
CV7808†	BZY93C8V2
CV7809†	BZY93C9V1
CV7810†	BZY93C10
CV7811†	BZY93C11
CV7812†	BZY93C12
CV7813†	BZY93C13
CV7814†	BZY93C15
CV7815†	BZY93C16
CV7816†	BZY93C18
CV7817†	BZY93C20
CV7818†	BZY93C22
CV7819†	BZY93C24
CV7820†	BZY93C27
CV7821†	BZY93C30
CV7822†	BZY93C33
CV7823†	BZY93C36
CV7824†	BZY93C39
CV7825†	BZY93C43
CV7826†	BZY93C47
CV7827†	BZY93C51
CV7828†	BZY93C56
CV7829†	BZY93C62
CV7830†	BZY93C68
CV7831†	BZY93C75
CV7841†	BZY95C36
CV7842†	BZY95C39
CV7843†	BZY95C43
CV7844†	BZY95C47
CV7845†	BZY95C51
CV7846†	BZY95C56
CV7847†	BZY95C62
CV7848†	BZY95C68
CV7849†	BZY95C75
CV7875	OA202
CV8308	BYX26–60
CV8475	BZY88C5V6
CV8510	BZY88C7V5
CV8615	BSX76
CV8616	BSX77
CV8617	BAX13
CV8760	BCY31
CV8790	BAX16
CV8805	BYX26–150
CV8841	BCY34
CV8842	BCY31
CV8986	BZY88C6V2
CV9023	BCY72
CV9068	OC71
CV9084	BZY88C20
CV9259	AC128
CV9297	BTX18–200
CV9507	BFX30
CV9543	BCY72
CV9637	BAX13
CV9638	BAV10
CV9790	BFX29
CV9919	BYX30–200
CV10253	BFX85
CV10254	BFX85
CV10440	BC107
CV10806	BC109
CV10807	BFX30
CV10814	BCY71
CV10887	BZY88C18
CV10889	2/BZY88C4V7
CV11080	ACY22
CV11123	ACY22

BS9000 Approved Devices

The following devices have been approved and are available to British Standards type specifications.

TRANSISTORS

Type No.	B.S. Spec. No.
BCY70	BS9365–F009
BCY71	BS9365–F009
BCY72	BS9365–F009
BFX29	BS9365–F010
BFX30	BS9365–F011
BFY50	BS9365–F012
BFY51	BS9365–F012
BFY52	BS9365–F012
BC107	BS9365–F112
BC108	BS9365–F112
BC109	BS9365–F112

THYRISTORS

Type No.	B.S. Spec. No.
BTY79–100R	BS9341–F001
BTY79–200R	BS9341–F002
BTY79–300R	BS9341–F003
BTY79–400R	BS9341–F004
BTY79–500R	BS9341–F005
BTY79–600R	BS9341–F006
BTY79–700R	BS9341–F007
BTY79–800R	BS9341–F008
BTY79–1000R	BS9341–F009

DIODES

Type No.	B.S. Spec. No.
BZY88C3V3 to C30	BS9305–F039 BS9305–F040 BS9305–N041

Integrated circuits
FJ family of TTL integrated circuits book 1 part 6

Supply voltage (nominal)	+5·0V
Typ. noise immunity at 25°C	1·0V
Fan-out at 25°C	10

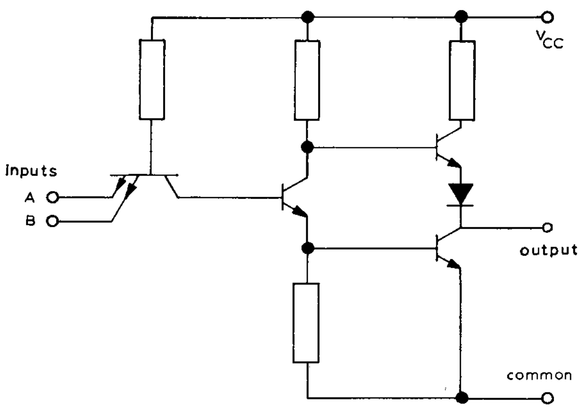
Information tabulated on popular plastic dual-in-line **FJ..1/74N** series, operating range 0 to +70°C. (AU construction). Variations in packaging are also available for most types, as follows:

Code	Construction	Operating temperature range
FJ..1/74N series	Plastic dual-in-line	0 to +70°C
FJ..2/54N series	Plastic dual-in-line	−55 to +125°C
FJ..6/64N series	Plastic dual-in-line	−40 to +85°C

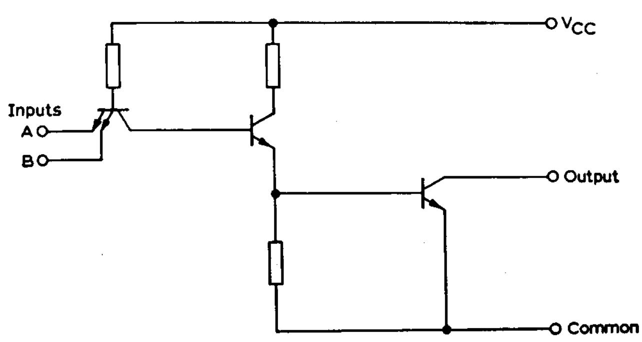
Suffix 'A' is added to the Proelectron number to indicate hermetic in plastic construction, likewise suffix C indicates a ceramic package.

GATES

Typical equivalent circuit.



Typical equivalent circuit of gate with single-ended open-collector output transistor.



Note. Clamping diodes will be introduced on most devices during the course of 1972.

Type No.	Description	Propagation Delay (Typ.) (ns)	Av. Power Dissipation (per Gate, 25°C) •(50% Duty Cycle) (mW)
FJH101/7430N	Single 8-input NAND gate	13	10
FJH111/7420N	Dual 4-input NAND gate	13	10
FJH121/7410N	Triple 3-input NAND gate	13	10
FJH131/7400N	Quadruple 2-input NAND gate	13	10
FJH141/7440N	Dual 4-input NAND buffer gate	13	26·5
FJH151/7450N	Dual AND/OR/NOT 2-level logic circuit	13	14·2
FJH161/7451N	Dual AND/OR/NOT 2-level logic circuit	13	14·2
FJH171/7453N	8-input AND/OR/NOT 2-level logic circuit	13	28·5
FJH181/7454N	4-wide 2-input AND/OR/NOT gate	13	28·5

Integrated circuits

FJ family of TTL integrated circuits (cont.)

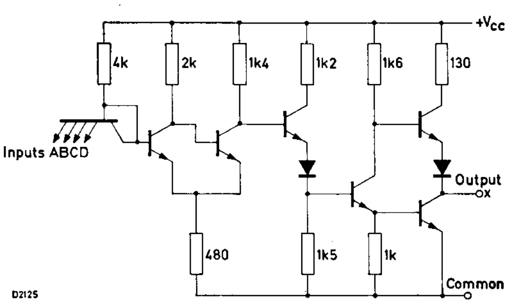
Type No.	Description	Propagation Delay (Typ.) (ns)	Av. Power Dissipation (per Gate, 25°C) (50% Duty Cycle) (mW)
FJH221/7402N	Quadruple 2-input positive NOR gate	13	14·2
FJH231/7401N	Quadruple 2-input positive NAND gate with wired-OR capability	30	10
FJH241/7404N	Sextuple single-input inverter gate	13	10
FJH251/7405N	Sextuple single-input inverter gate open collector output transistor	30	10
FJH271/7486N	Quadruple 2-input EXCLUSIVE-OR gate	12	37·5
FJH291/7403N	Quadruple 2-input NAND gate with open collector output transistor	30	10
FJH301/7426N	Quadruple 4-input NAND gate with open collector output transistor rated at 15V	30	10
FJH311/7401AN	Quadruple 4-input NAND gate with open collector output transistor rated at 15V	30	10
FJH321/7405AN	Sextuple single-input inverter gate with open collector output transistor rated at 15V	30	10
FJY101/7460N	Dual 4-input expanders	15*	4·0

*When used with **FJH151** or **FJH171**

NAND SCHMITT TRIGGER

FJL131/7413N

Dual 4-input NAND schmitt trigger circuits.

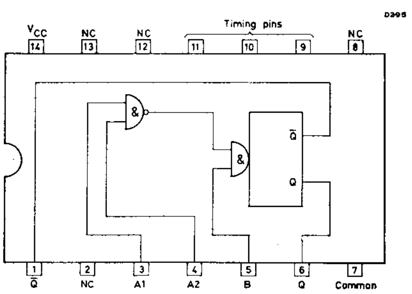


Input hysteresis voltage	800mV typ.
Typ. propagation delay	17ns
Av. power dissipation	85mW

MONOSTABLE

FJK101/74121N

Monostable circuit d.c. triggered from positive or gated negative going inputs with inhibit facilities

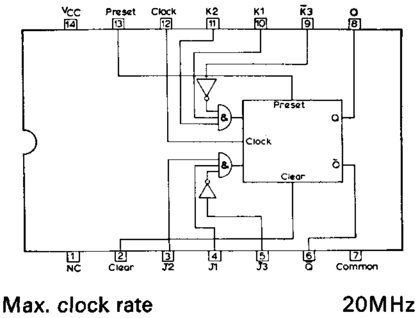


Av. power dissipation	90mW

BISTABLES

FJJ101/7470N

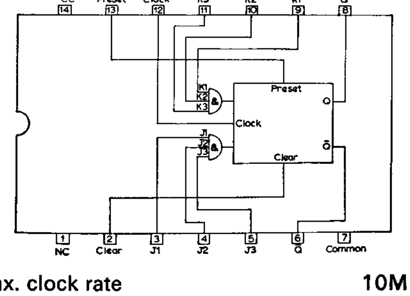
Edge-triggered JK flip-flop with two J, K and one $\overline{J}$, $\overline{K}$ inputs.



Max. clock rate	20MHz
Av. power dissipation	70mW

FJJ111/7472N

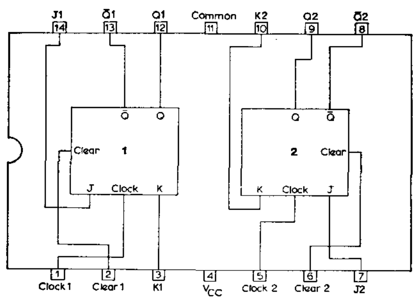
Master-slave JK flip-flop with triple J and K inputs.



Max. clock rate	10MHz
Av. power dissipation	40mW

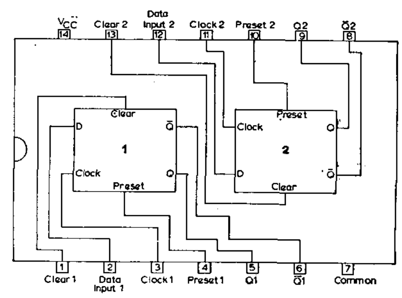
Integrated circuits
FJ family of TTL integrated circuits (cont.)
BISTABLES (cont.)

FJJ121/7473N
Dual master-slave JK flip-flop with single J and K inputs



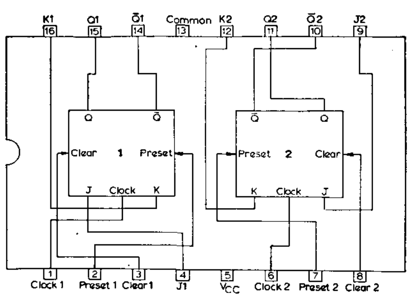
Max. clock rate	10MHz
Av. power dissipation	40mW

FJJ131/7474N
Edge-triggered dual D-type flip-flop with direct, clear and preset inputs, complementary Q and $\overline{Q}$ outputs.



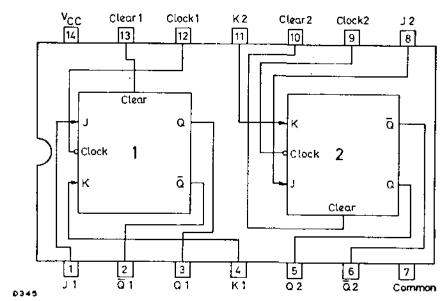
Max. clock rate	15MHz
Av. power dissipation	42·5mW

FJJ191/7476N
Dual master-slave JK flip-flop with single J, K, preset and clear inputs (16-lead DIL)



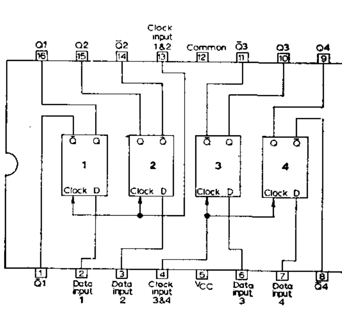
Max. clock rate	10MHz
Av. power dissipation	40mW

FJJ261/74107N
Dual master-slave JK flip-flop with single J and K inputs.



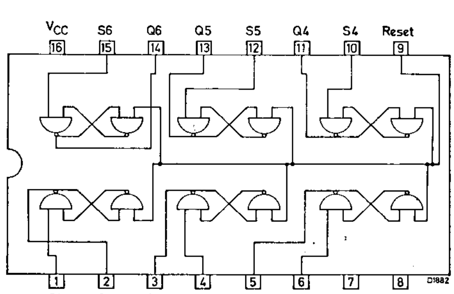
Max. clock rate	10MHz
Av. power dissipation	40mW

FJJ181/7475N
Quadruple bistable latching circuits with Q and $\overline{Q}$ outputs for use as temporary storage of binary information or as dual master-slave flip-flop with two-phase clocking (16-lead DIL)



Av. power dissipation (total) 160mW

FJJ291/74118N
Sextuple set-reset latching circuits. Each latch has a set input and TTL output and unbuffered common reset line (16-lead DIL).



Av. power dissipation (per latch) 30mW

FJJ301/74119N
Sextuple set-reset latching circuits. Each latch has a set input, a TTL output and independent unbuffered reset line. (24-lead DIL)

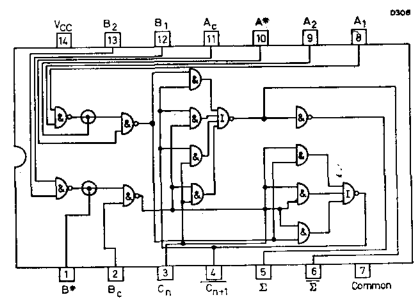
Integrated circuits
FJ family of TTL integrated circuits (cont.)

ADDERS

Designed for medium and high speed, multiple-bit, parallel-add/serial-carry applications, the circuits utilise high speed, high fan-out transistor-transistor logic (TTL) but are entirely compatible with both DTL and TTL logic families. The implementation of a single-inversion, high speed Darlington-connected serial-carry circuit minimises the necessity for extensive "look-ahead" and carry-cascading circuits. The power dissipation level has been maintained considerably below that attainable with equivalent standard integrated circuits connected to perform full-adder functions.

FJH191/7480N

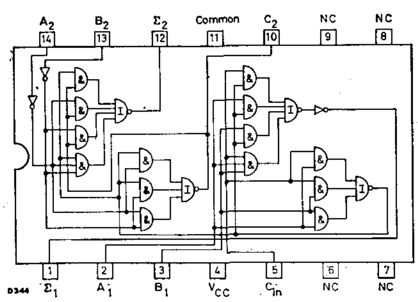
Single-bit binary full adder with gated complementary inputs, complementary summation outputs and inverted carry output



Typ. add delay time	52ns
Typ. carry delay time	8ns
Av. power dissipation	105mW

FJH201/7482N

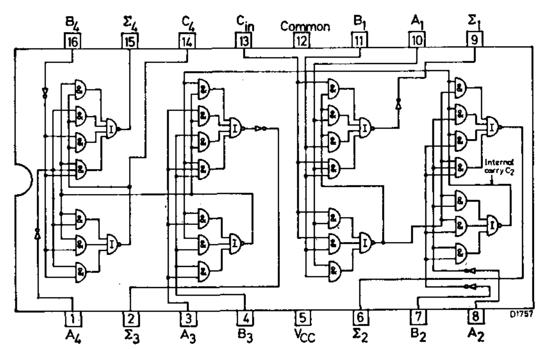
2-bit binary full adder with summation outputs provided for each bit and the resultant carry obtained from the second bit



Typ. add delay time	40ns
Typ. carry delay time	8ns
Av. power dissipation	175mW

FJH211/7483N

4-bit binary full adder with summation outputs provided for each bit and the resultant carry obtained from the fourth bit (16-lead DIL)

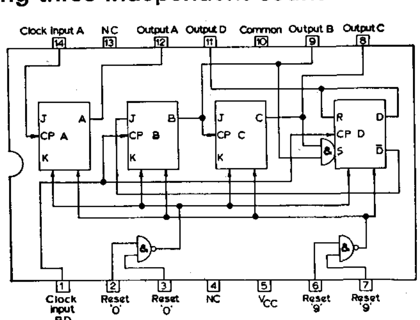


Typ. add delay time	40ns
Typ. carry delay time	8ns
Av. power dissipation	390mW

COUNTERS

FJJ141/7490N

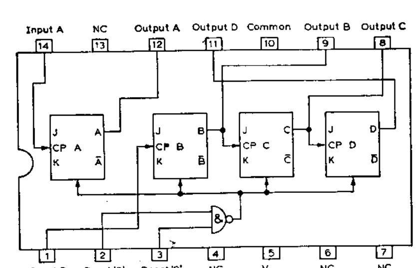
High speed decade counter consisting of four master slave flip-flops permitting three independent count modes



Max. clock rate	10MHz
Av. power dissipation	160mW

FJJ211/7493N

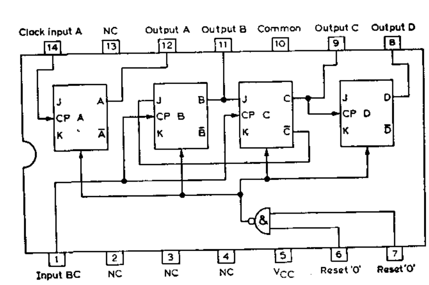
4-bit binary counter consisting of four master-slave flip-flops internally connected to provide a divide-by-two and divide-by-five counters



Max. count frequency	10MHz
Av. power dissipation	128mW

FJJ251/7492N

4-bit binary counter consisting of four master-slave flip-flops internally connected to provide a divide-by-two and divide-by-six counters



Max. count frequency	10MHz
Av. power dissipation	155mW

Integrated circuits
FJ family of TTL integrated circuits (cont.)
COUNTERS (cont.)

FJJ401/74191N

Cascadable up/down binary counter with single clock line, and down/up mode control.

Max. count freq. (typ.)	25MHz
Typical power dissipation	325mW
16-lead DIL (AU2)	

Pin No.		Pin No.	
1	data B	9	data D
2	B output	10	data C
3	A output	11	load
4	enable	12	ripple output, max./min.
5	count/up	13	ripple output, count enable
6	C output	14	count
7	D output	15	data A
8	common	16	V_{cc}

FJJ411/74193N

Cascadable up/down binary counter with dual clock line with clear

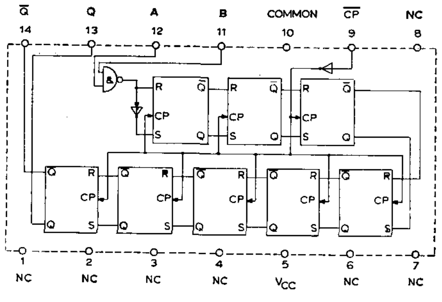
Max. count freq. (typ.)	32MHz
Typical power dissipation	325mW
16-lead DIL (AU2)	

Pin No.		Pin No.	
1	data B	9	data D
2	B output	10	data C
3	A output	11	load
4	count down	12	output borrow
5	count up	13	output carry
6	C output	14	clear input
7	D output	15	data A
8	common	16	V_{cc}

SHIFT REGISTERS

FJJ151/7491AN and *FJJ271

8-bit shift register consisting of eight R-S master-slave flip-flops with input gating and clock driver

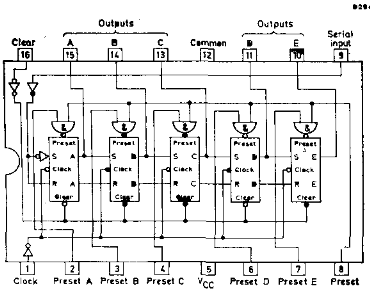


Max. shift frequency	10MHz
Power dissipation	175mW

*Identical to FJJ151 but with supply pins on 7 and 14 and no inverted output Q̄.

FJJ241/7496N

5-bit shift register consisting of five R-S master-slave flip-flops connected to perform parallel-to-serial or serial-to-parallel conversion of binary date (16-lead DIL)



Max. shift frequency	10MHz
Power dissipation	240mW

FJJ231/7495N

4-bit right-left shift register

Maximum shift frequency	36MHz
Power dissipation (typ.)	195mW
14-lead DIL (AU1)	

Pin No.		Pin No.	
1	serial input	8	clock 2, left shift
2	input A	9	clock 1, right shift
3	input B	10	output D
4	input C	11	output C
5	input D	12	output B
6	mode control	13	output A
7	common	14	V_{cc}

FJJ321/9300

4-bit parallel in/parallel out shift register

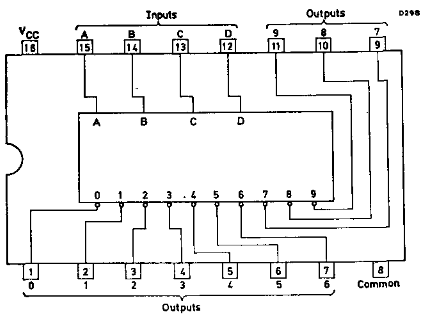
Maximum shift frequency	15MHz
Power dissipation (typ.)	300MW
16-lead DIL (AU2)	

Pin No.		Pin No.	
1	input MR	9	input P_E
2	input J	10	clock input
3	input K	11	output 4
4	input P_O	12	output 3
5	input P_1	13	output 2
6	input P_2	14	output 1
7	input P_3	15	output 0
8	common	16	V_{cc}

Integrated circuits
FJ family of TTL integrated circuits (cont.)

DECODERS

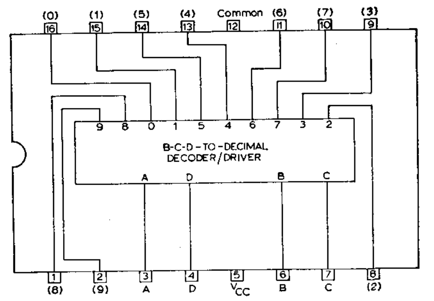
FJH261/7442N
BCD-to-decimal decoder consisting of eight inverters and ten 4-input NAND gates (16-lead DIL)



Typ. propagation delay	22ns
Power dissipation	140mW

*FJL151/74141N FJB 9330 £1-44
BCD-to-decimal decoder driver incorporating ten high performance output transistors for indicator tube driver applications or as relay drivers (16-lead DIL)

VIEW LOOKING DOWN ON DEVICE



Max. output voltage	65V
Nom. supply current	23mA

*This device replaces the **FJL101**

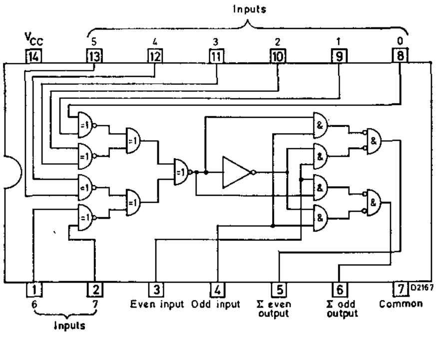
OTHER MSI FUNCTIONS

FJQ101/74107N
4 by 4 register file.

16-lead DIL (AU2)

Pin No.		Pin No.	
1	data input	9	data output
2	data input	10	data output
3	data input	11	read output
4	read output	12	write input
5	read output	13	write input
6	data output	14	write input
7	data output	15	data input
8	common	16	V_{cc}

FJH281/74180N
8-bit parity generator/checker with odd/even outputs and control inputs for operation in either odd- or even-parity applications



Propagation delay	
Data to output (typ.)	40ns
Control to output (max.)	10ns
Av. power dissipation	170mW

MEMORIES
A-00

FJQ111/7489N
64-bit read/write memory (16 words of 4 bits each).

Typical access time	33ns
Power dissipation (typ.)	375mW
16-lead DIL (AU2)	

Pin No.		Pin No.	
1	address input A	9	sense output 3
2	memory enable	10	write input 3
3	write enable	11	sense output 4
4	write input 1	12	write input 4
5	sense output 1	13	address input D
6	write input 2	14	address input C
7	sense output 2	15	address input B
8	common	16	V_{cc}

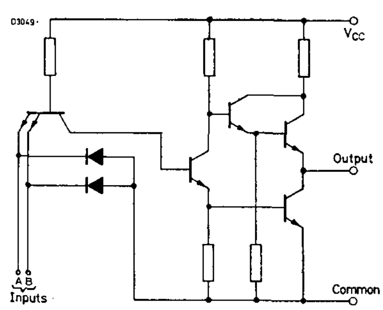
FJR101-AA/7488N
256-bit read only memory (32 words of 8 bits each).

Typical access time	25ns
Power dissipation (typ.)	285mW
16-lead DIL (AU2)	

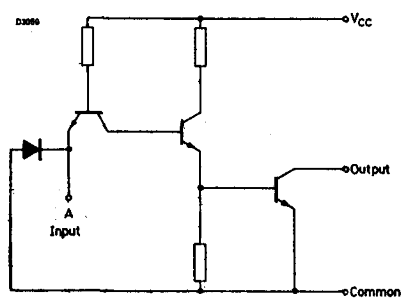
Pin No.		Pin No.	
1	output 1	9	output 8
2	output 2	10	address input A
3	output 3	11	address input B
4	output 4	12	address input C
5	output 5	13	address input D
6	output 6	14	address input E
7	output 7	15	enable
8	common	16	V_{cc}

Integrated circuits
GJ family of TTL high speed integrated circuits

Type No.	Description	Propagation Delay (Typ.) (ns)	Av. Power Dissipation (per Gate, 25°C) (50% Duty Cycle) (mW)
GJH101/74H30N	Single 8-input NAND gate	7·8	22·5
GJH111/74H20N	Dual 4-input NAND gate	6·5	22·5
GJH121/74H10N	Triple 3-input NAND gate	6·1	22·5
GJH131/74H00N	Quadruple 2-input NAND gate	6·0	22·5
GJH141/74H40N	Dual 4-input NAND buffer gate	7·5	44·25
GJH161/74H51N	Dual AND/OR/NOT 2-level logic circuit	6·5	29·25
GJH181/74H54N	4-wide 2-input AND/OR/NOT gate	6·6	30
GJH231/74H01N	Quadruple 2-input positive NAND gate with wired-OR capability	8·25	20·5
GJH241/74H04N	Sextuple single-input inverter gate	7.75	23·3
GJH251/74H05N	Sextuple single-input inverter gate open collector output transistor	11·5	23·3
GJJ131/74H74N	Edge-triggered dual 'D' type flip-flop	11	75



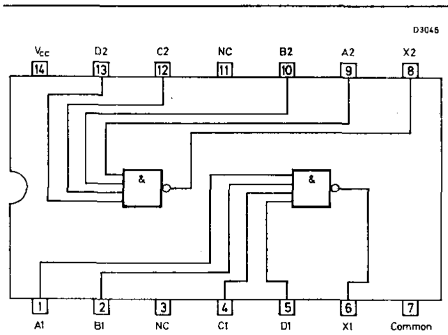
Typical gate



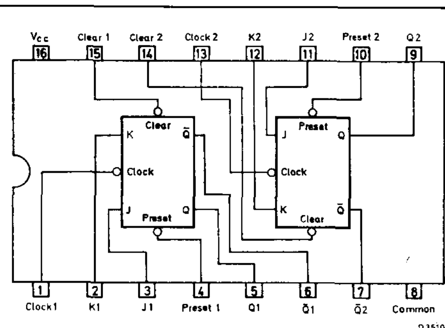
Open collector inverter gate

GT family of TTL Schottky clamped integrated circuits

Type No.	Description	Propagation Delay (Typ.) (ns)	Av. Power Dissipation (50% Duty Cycle) (mW)
GTH111/74S20	Dual 4-input NAND gate	3	38
GTJ701/74S112	Dual master-slave JK flip flop	4·5	150



GTH111/74S20



GTJ701/74S112

FC family of DTL integrated circuits

Supply voltage (nominal)	+6·0V
Typ. noise immunity at 25°C	1·1V
Operating temperature range	0 to +75°C
14-lead dual-in-line package (AU1 construction)	

GATES

Type No.	Description	Propagation Delay (typ.) (ns)	Fan-out at 25°C	Av. Power Dissipation (per Gate) 25°C (50% Duty Cycle) (mW)
FCH101	8 input NAND/NOR gate with nodes	31	8	7
FCH111	8 input NAND/NOR gate with nodes and collector resistor	31	8	11
FCH121	Dual 4-input NAND/NOR gate with nodes	31	8	7
FCH131	Dual 4-input NAND/NOR gate with nodes and collector resistors	31	8	11
FCH141	Triple 3-input NAND/NOR gate with node input on gate 1	31	8	7
FCH151	Triple 3-input NAND/NOR gate	131	8	7
FCH161	Triple 3-input NAND/NOR gate with collector resistors and node on gate 1	31	8	11
FCH171	Triple 3-input NAND/NOR gate with collector resistors	31	8	11
FCH181	Quadruple 2-input NAND/NOR gate	31	8	7
FCH191	Quadruple 2-input NAND/NOR gate with collector resistors	31	8	11
FCH201	Hextuple Inverter gate	31	8	7
FCH211	Hextuple Inverter gate with collector resistors	31	8	11
FCH221	Dual 3-input line driving NAND/NOR gate	93	14	11
FCH231	NAND/NOR dual line driving gate	35	20	11
FCY101	Gate input expander — Reverse breakdown voltage 10V; Max. forward current 30mA; Reverse recovery time 11ns			

BISTABLES

Type No.	Description	Max. Clock Rate (MHz)	Fan-out at 25°C	Av. Power Dissipation (mW)
FCJ101	Edge-triggered JK flip-flop with 3J, 3K and SET inputs	5	8	36
FCJ111	Direct-coupled master-slave JK flip-flop	5	8	67
FCJ121	Dual direct-coupled JK flip-flop with common SET input	7	8	50
FCJ201	Direct-coupled master-slave JK flip-flop with 3J and 3K inputs	3	8	73

MONOSTABLE MULTIVIBRATOR

		Max. Repetition Rate		
FCK111	Threshold-triggered monostable circuit and independent expandable inverter	2·5	14	60

LEVEL DETECTOR

FCL101	Non-inverting Schmitt-trigger circuit Tripping levels set by external resistor or zener diode	1	3	19

2-36

MOS Integrated circuits
FD and FE family

A series of complex monolithic integrated circuits using MOS P-channel enhancement mode technology.

D.C. noise margin (min.)		1·0V
Operating temperature range	FD family	−55 to −85°C
	FE family	0 to +75°C

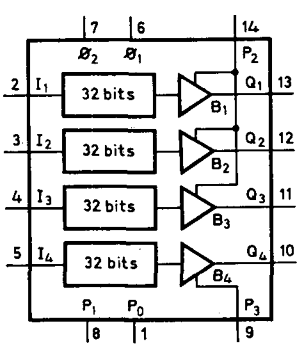
SHIFT REGISTERS

Clock rate (single phase units)	0·01 to 1MHz
(two phase units)	0·01 to 3MHz
Power dissipation (max.)	300mW
Packaging	
type number without suffix	14-lead dual-in-line
suffix A after type number	multi-lead TO5

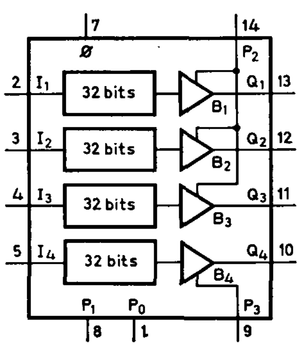
Dynamic types

FDN106 (2-phase) **FDN116** (single phase)
Quadruple 32-bit dynamic shift registers.

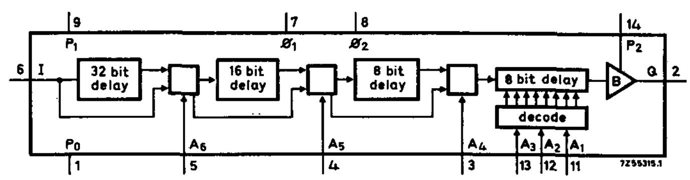
FDN106

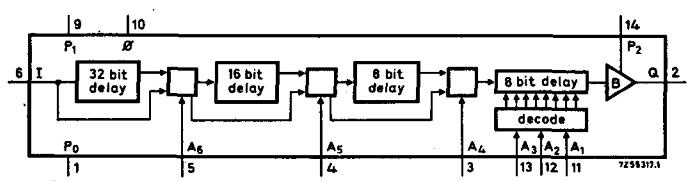


FDN116

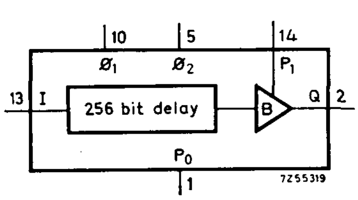


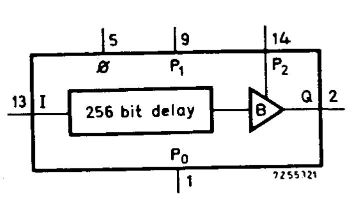
FDN126 (2-phase) **FDN136** (single phase)
Variable length 1 to 64-bit dynamic shift registers



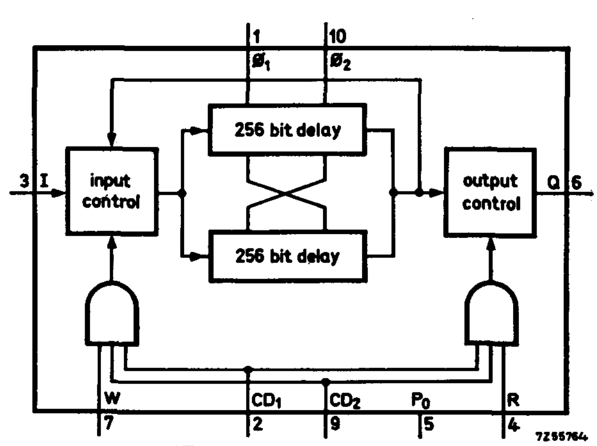


FDN146/146A (2-phase) **FDN156/156A** single (phase)
256-bit dynamic shift registers.





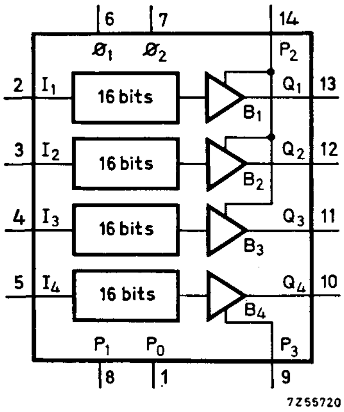
FDN166A
512-bit recirculating dynamic serial memory (2-phase).



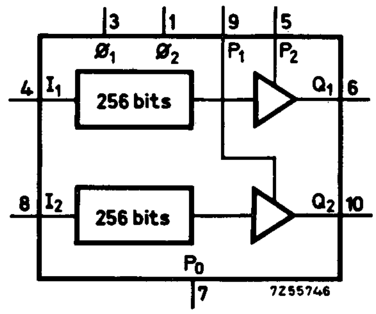
MOS Integrated circuits
FD and FE family (cont.)

SHIFT REGISTERS (cont.)

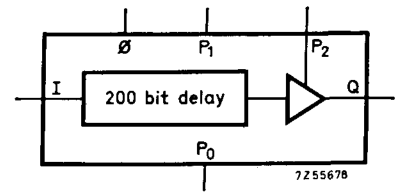
FDN186
Quadruple 16-bit dynamic shift registers (2-phase)



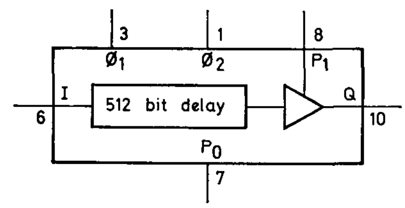
FDN196A
Dual 256-bit dynamic shift registers (2-phase)



FDN206-206A
200-bit dynamic shift register (single phase)



FDN216A
512-bit dynamic shift register (2-phase)

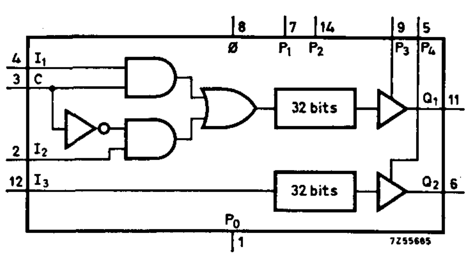


Static types

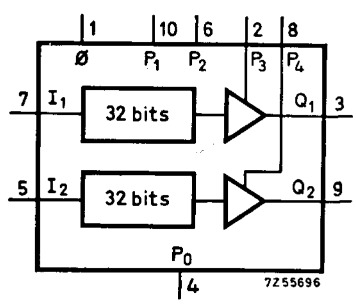
FDN506, FDN516A Dual 32-bit static registers (single phase).
FDN506 has gated input on one register for selection of two independent data streams

FDN526A (2-phase), **FDN536A** (single phase)
Dual 100-bit static shift registers.

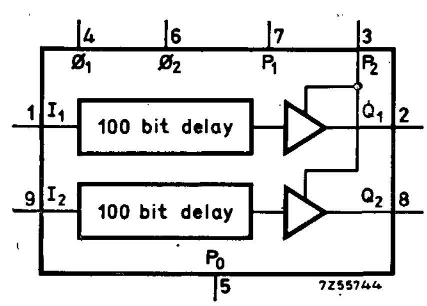
FDN506



FDN516A



FDN526A



READ/WRITE RANDOM ACCESS MEMORIES

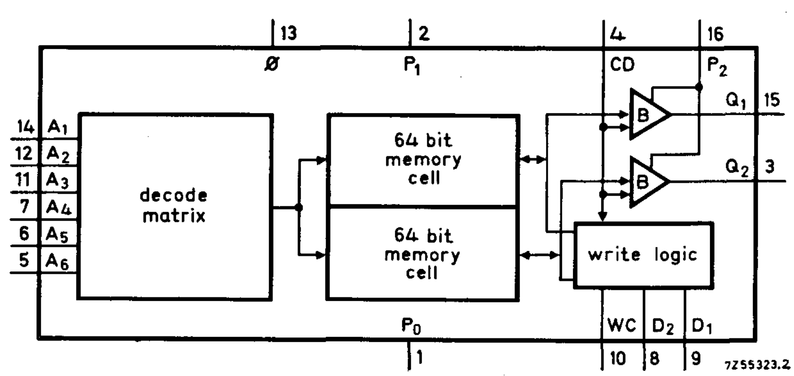
Dynamic type

FDQ106

Read/write random access memory
128-bit, 64-word, 2 bits per word

Supply voltage	−27V
Stand-by dissipation per bit	3µW
Data read rate (max.)	1 MHz
Data write rate (max.)	1 MHz
Read access time (max.)	1µs

16-lead dual-in-line package.



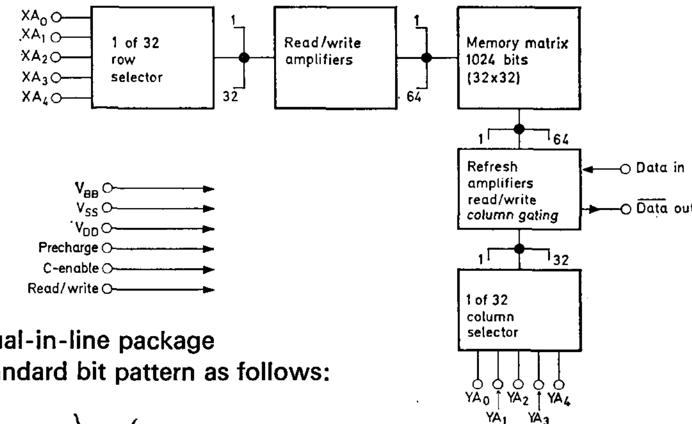
MOS Integrated circuits
FD and FE family (cont).

GYQ101

1024-bit read/write random access memory

Supply voltages V_{SS}	16V
$V_{BB}-V_{SS}$	3–4V
Cycle time (min.)	500ns
Access time	300ns
Stand by power	3·0μW/bit

18-lead dual-in-line package.

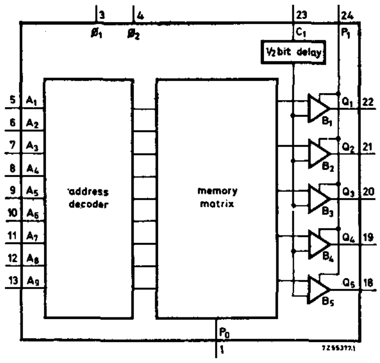


READ ONLY MEMORIES

Power dissipation (f = 1MHz): 90mW   24-lead ceramic dual-in-line package
These memories are available with either an optional or a standard bit pattern as follows:

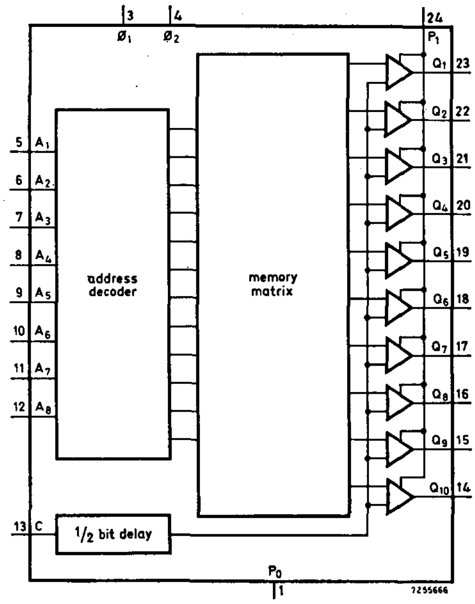
Optional bit pattern

FDR116Z
Read only memory, 512-word, 5 bits per word



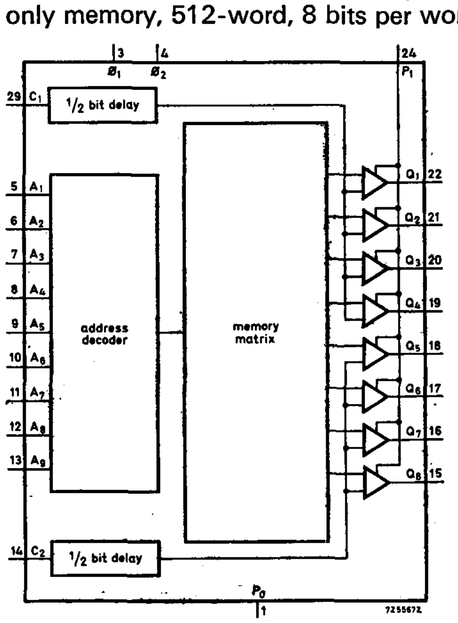
Read access time (max.)	850ns
Clock rate (max.)	1z·2MH

FDR126Z
Read only memory, 256-word, 10 bits per word.



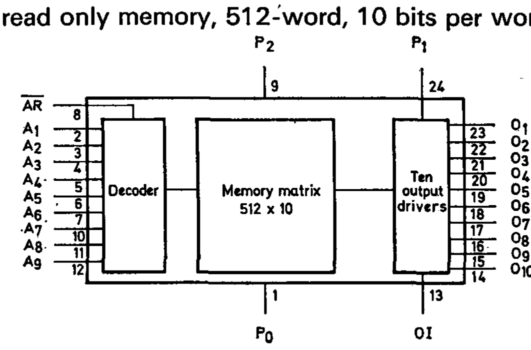
Read access time (max.)	1μs
Clock rate (max.)	1MHz

FDR131Z
Read only memory, 512-word, 8 bits per word.



Read access time (max.)	1·5μs
Clock rate (max.)	0·66MHz

FDR146Z
Static read only memory, 512-word, 10 bits per word.



MOS Integrated circuits
FD and FE family (cont.)

READ ONLY MEMORIES (cont.)

Set bit pattern

The following read-only-memories are available as standard product in pre-programmed version where the bit pattern is fixed to perform the selected function and also to serve for preliminary investigations by the customer before the final bit pattern is established.

FDR116Z1

Identical to FDR116Z but with fixed bit pattern for dot code matrix ASCII character generator (row scan).

FDR126Z1

Identical to FDR126Z but with fixed bit pattern to convert from both ASCII to selectric line code and selectric line code to ASCII

FDR131Z1

Identical to FDR131Z but with fixed bit pattern to convert from both 7-bit ASCII to 8-bit EBCDIC and from 8-bit EBCDIC to 7-bit ASCII. Either odd or even parity ASCII can be used as inputs to the R.O.M

FDR146Z1

Identical to FDR146Z but with fixed bit pattern for character generation. The memory contains 64 ASCII encoded symbols. Each high resolution character is a 7 × 9 matrix organised for column scanning

Desk calculators

FDY Series

The FDY Series provides the basic circuitry for all calculator functions. The series is made up of thirteen units and these can be incorporated into larger systems. The range is primarily designed for desk calculators and application notes are available.
The circuits are provided in 24 pin dual-in-line hermetic packages.

Decade counters

FEJ271 Quad decade counter/store

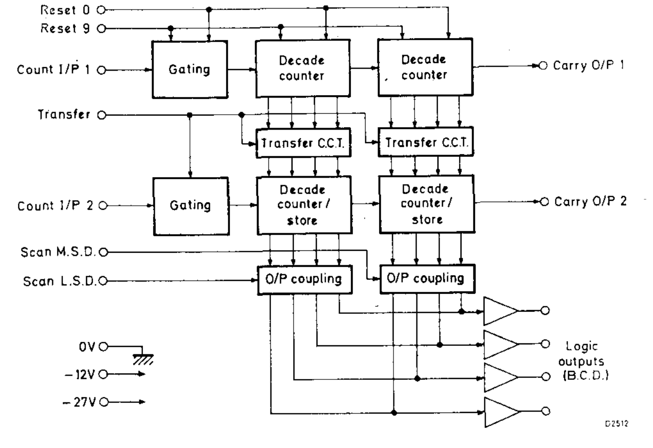
FEJ271 is an MOS/LSI counting module for use in low speed counting applications. It consists of 4-decade counting stages with a carry output

Maximum counting speed 1 MHz
16-lead dual-in-line package.

FEJ291—2 stage decade counter

The FEJ291 consists of 2 decade counters and 2 decade counter/stores with gating, transfer and coupling circuits for BCD output to read-out circuits

Maximum counting speed 2MHz
16-lead dual-in-line package.



Analogue to Digital Converter

FEY101

The FEY101 contains the logic section of an integrating type A-D converter designed for use in economic digital voltmeter systems. It is intended to be used with an FEJ271 quad-decade counter, an operational amplifier and decoder driver and a few discrete components to form a complete voltmeter.

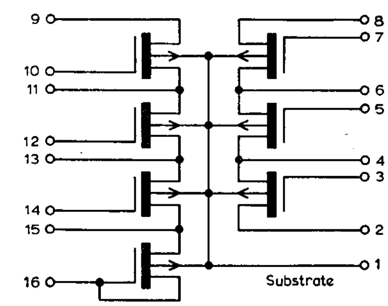
Measuring range is ±2000 divisions.
16-lead dual-in-line package.

Integrated circuits multiple transistor array

GKY102

The GKY102 is a monolithic integrated p-channel enhancement MOS circuit comprising seven identical interdigitated MOS transistors with their drains and sources connected internally as shown in the circuit diagram.

It is ideally suited for breadboarding 4-phase logic circuits and other ratio-less type dynamic circuits as well as for general switching applications since each transistor has a typical ON resistance of 300 ohms. All external gate input connections have a protection device incorporated to prevent damage by electrostatic charges during normal handling



Max. clock voltage	−30V
'ON' resistance at $-V_{GS}$ = 25V	170–540Ω
Operating temperature range	−55 to +125°C

16-lead hermetic-in-plastic dual-in-line package.

interface devices

GRL101 GRL111

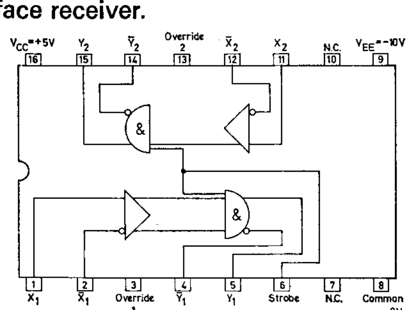
Monolithic TTL interface receiver and transmitter, to be used connected together by means of a balanced pair cable. The combination is designed to provide a high noise immunity TTL compatible interconnection between two independent logic systems, for example:—between the central processor unit and the peripherals of a computer.

Supply voltage	+5 and −10V
Common mode voltage immunity between transmitter and receiver (min.)	±6V
Operating temperature range	0 to +70°C

16-lead plastic dual-in-line package.

GRL101

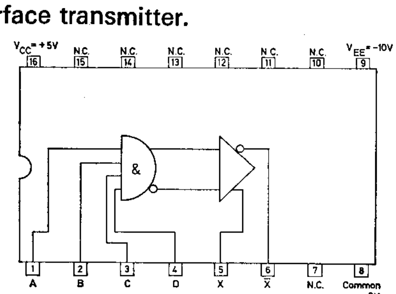
Dual interface receiver.



Typ. propagation delay	25ns
Power dissipation	140mW

GRL111

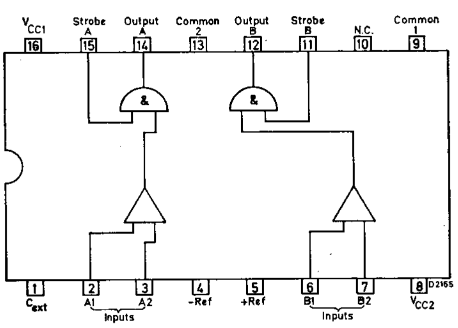
Single interface transmitter.



Typ. propagation delay	14ns
Fan-in	4
Power dissipation	300mW

GRS141/7524N
GRS151/7525N

High speed sense amplifiers designed for use in high speed memory systems for detecting the bi-polar differential input signals from the memory and providing the necessary interface between the memory and its associated logic section. The output logic levels are compatible with TTL and DTL



Supply voltages (nominal)	+5·0V
Fan-out (max.)	10
Common mode noise immunity (typ.)	3·0V
Differential input threshold voltage GRS141	15mV
GRS151	40mV
Operating temperature range	0 to +70°C
Propagation delay (typ.)	22·5ns
Average power dissipation	200mW

16-lead plastic dual-in-line package.

Integrated circuits
linear integrated circuits book 1 part 7
OPERATIONAL AMPLIFIERS

Type No.	Description and Construction		Nominal Supply Voltage (V)	Output Voltage (V)	Input Impedance (kΩ)	Output Impedance (Ω)	Input Offset Voltage (mV)	Gain (Typ.)	Operating Temperature Range (°C)
TAA241	Operational amplifier	AP1	+12 −6	±5·3	32	200	1·5	3400	0 to +70
TAA242	Operational amplifier	AP1	+12 −6	±5·3	40	200	0·5	3600	−55 to +125
TAA521	Operational amplifier	AP1	+15 −15	±14	250	150	2·0	45000	0 to +70
TAA522	Operational amplifier	AP1	+15 −15	±14	400	150	1	45000	−55 to +125
TBA221	Operational amplifier	AP1	+15 −15	±14	1000	—	2	100000	0 to +70
TBA222	Operational amplifier	AP1	+15 −15	±14	1000	—	1	200000	−55 to +125
TCA220	Triple operational amplifier	AU2	+6 −6	+3·5 −6	25	—	2	4000	−55 to +125

AUDIO AMPLIFIERS

Type No.	Description and Construction		Nominal Supply Voltage (V)	Input Impedance (kΩ)	Load Impedance (Ω)	Output Power (mW)	Noise Figure	Gain (Typ.)	Operating Temperature Range (°C)
OM200	Hearing aid amplifier	P	5	—	—	0·2	<6dB	80dB	−20 to +80
TAA263	Linear A.F. amplifier	J8*	6	—	150	10	5dB	77dB	−20 to +100
TAA293	General purpose medium frequency amplifier	AP2	6	—	150	10	6dB	80dB	0 to +70
TAA300	Linear A.F. amplifier	AP2	9	15	8	1W	⩽20nW	V_{in} = 8·5mV	−55 to +150
TAA310	Low-noise A.F. amplifier	AP2	7	20	—	Output Voltage 2·0V_{rms}	(30Hz to 15kHz) 2·5dB	100dB	−20 to +75
TAA370	Hearing aid amplifier	AT	1·3	—	—	1·5	3dB	90dB	−55 to +85
TAA960	Triple amplifiers for active filters	AP2	+6	(each amplifier) 25	output impedance 9 or 0.5KΩ	—	—	(each amplifier) 39dB	−55 to +65
TAA970	Microphone amplifier for use in telephone systems	AP2	Supply Current ±10 to 100mA	—	80 or 115Ω	—	1mV	180	−35 to +75
TBA915	Low current drain A.F. amplifier	AP2	18	9	20	500	—	V_{in}= 10mV	−30 to +70
TCA160	A.F. amplifier	AU2**	12	15	8	2·1W	—	V_{in}= 10mV	−25 to +125

*J8 connections are as follows: 1 Input, 2 Positive supply, 3 Output, 4 Common and negative supply

**Dual-in-line with heatsink.

Integrated circuits
linear integrated circuits (cont.)

AUDIO AMPLIFIERS (cont.)

Type No.	Description and Construction		Supply Current (mA)	Input Impedance (kΩ)	Output Impedance (Ω)	Output Voltage (mV)	Noise Figure	Gain	Operating Temperature Range (°C)
TCA210	Pre-amplifier	AU2	12	0·5	800	2·5	6dB	10000	−30 to +60
	and output amplifier			17	15	800	—	500	

Type No.	Description		V_{GSO} max. (V)	V_{DS} max. (V)	I_D max. (mA)	gm (mA/V)	r_{sg} min. (GΩ)
TAA320	MOST L.F. Pre-amplifier	G3	−20	−20	25	40	100

RADIO CIRCUITS

Type No.	Description and Construction		Supply Voltage (V)	Output power (W)	A.G.C. Range (dB)	Sensitivity (μV)	Distortion (%)	Operating Temperature Range (°C)
TAD100	A.M. receiver circuit for 1·5 watt output stage	AU1	6 to 9	1·5	62	4	<2	−10 to +55
TAD110	Mixer, oscillator, I.F. amplifier detector, A.F. amplifier/limiter for use in A.M. or F.M. communication receivers up to 30 MHz	AU1	9	—	56	12	—	−30 to +70
TBA480	F.M.—I.F. amplifier and demodulator	AU2	5 to 12	—	—	—	4	−20 to +60
TBA490	F.M. Stereo decoder	AU2	16	—	—	2V	1	−25 to +80
TBA570 **TBA570Q**	AM/FM receiver circuit	AU2 CD	3·6 to 12	1	65	16 15	1	−20 to +65
TBA690	AM/FM receiver circuit	AU2	2·7 to 11·4	0·6	60	4	1	−20 to +45
TBA700	AM/FM receiver circuit	AU2	9	1	60	15	1	−20 to +45

TELEVISION CIRCUITS

Nominal Supply Voltage : 12V
Operating Temperature Range: −20 to +60°C

Type No.	Description and Construction		Functions
TBA500 **TBA500Q**	Luminance combination	AU2 CD	Delay line matching stage. Gated black level clamp. D.C. contrast control. Beam current limiter.
TBA510 **TBA510Q**	Chrominance combination	AU2 CD	Variable gain A.G.C. chroma amplifier. D.C. control for saturation. Chroma blanking and burst gate function. Burst output stage. Colour killer and PAL delay line driver stage.
TBA520 **TBA520Q**	Colour demodulator	AU2 CD	Dual active synchronous demodulator for R-Y and B-Y chrominance signals matrix. PAL phase switch and flip-flop.

Integrated circuits
linear integrated circuits (cont.)

TELEVISION CIRCUITS (cont.)

Type No.	Description and Construction		Functions
TBA530 TBA530Q	R-G-B matrix amplifier	AU2 CD	R-G-B- matrix pre-amplifier with low thermal drift.
TBA540 TBA540Q	Reference combination	AU2 CD	Phase and amplitude controlled reference oscillator using quartz crystal. Synchronous demodulator circuit. A.C.C., colour killer and identification signal generator.
TBA550 TBA550Q	Television signal processing circuit	AU2 CD	Video pre-amplifier. A.G.C. for r.f. and i.f. stages. Noise protection circuits. Sync. separator, phase detector. Blanking for video amplifier.
TBA560 TBA560Q	Luminance & chrominance combination	AU2 CD	Combines the functions of TBA500/Q and TBA510/Q
TBA720	Line oscillator	AU2	Line oscillator with D.C. controls and square-wave output.
TBA750	Limiter amplifier	AU2	Limiter amplifier, f.m. detector, d.c. volume control and a.f. amplifier.
TBA920	Line oscillator circuit	AU2	Sync. pulse separator, noise gate. Line oscillator, phase control. Line driver output stage.
TBA990 TBA990Q	Colour demodulator	AU2 CD	As TBA520 but suitable for d.c. drive to picture tube when used with TBA530 and R.G.B. output stages.
TCA270	Synchronous demodulator	AU2	Video amplifier with buffer stage. Noise inverter. A.G.C. detector and output stage for tuners and i.f. amplifiers. A.F.C. demodulator with buffer output stage.

OTHER CIRCUITS

Type No.	Description and Construction		Stabilised Voltage (V)	Nom. Operating Current (mA)	Differential Resistance (Ω)	Temperature Coefficient (mV/°C)	Operating Temperature Range (°C)
TAA550	Voltage stabiliser for varicap diodes supply available in 3 voltage groups	AP2	31–32 (red) 32–34 (yellow) 34–35 (green)	5	10	−0·13	−20 to +150

Type No.	Description and Construction		Line Regulation $\%/V_{out}$	Load Regulation $\%/V_{out}$	Short-circuit Current Limit (mA)	Input Voltage Range (V)	Output Voltage Range (V)	Operating Temperature Range (°C)
TBA281	Voltage regulation circuit	AP1	0·1	0·2	65	9·5–40	2–37	0 to +70

Type No.	Description and Construction		V_{CBO} (max.) (V)	Carrier Leakage Power (nW)	f_T (typ.) (MHz)	Operating Temperature Range (°C)	Gain (Typ.) (dB)
TBA673	4-transistor bridge for modulation/demodulation	AP2	+30	3 (typ.)	250	−25 to +100	−0·75

Integrated circuits
list of comparable types
DIGITAL CIRCUITS

DTL range

Comparable types	*Mullard types*
RC206	FCH141
RC210	FCH221
RC216	FCH151
RC224	FCH101
RC225	FCJ101
RC226	FCH161
RC227	FCY101
RC231	FCH121
RC234	FCH111
RC236	FCH171
RC246	FCH181
RC261	FCH131
RC266	FCH191
RC286	FCH201
RC296	FCH211

Most of the devices in the TTL range are also available in the 54N series (type No. FJ . . . 2) and 64N series (type No. FJ . . . 6)

TTL range

Comparable types	*Mullard types*
7400N	FJH131
7401N	FJH231
7401AN	FJH311
7402N	FJH221
7403N	FJH291
7403AN	FJH301
7404N	FJH241
7405N	FJH251
7405AN	FJH321
7410N	FJH121
7413N	FJL131
7420N	FJH111
7426N	FJH301
7430N	FJH101
7440N	FJH141
7441N	FJL101
7442N	FJH261
7450N	FJH151
7451N	FJH161
7453N	FJH171
7454N	FJH181
7460N	FJY101
7470N	FJJ101
7472N	FJJ111
7473N	FJJ121
7474N	FJJ131
7475N	FJJ181
7476N	FJJ191
7480N	FJH191
7482N	FJH201
7483N	FJH211
7486N	FJH271
7488N	FJR101
7489N	FJQ111
7490N	FJJ141

Comparable types	*Mullard types*
7491AN	FJJ151
7492N	FJJ251
7493N	FJJ211
7495N	FJJ231
7496N	FJJ241
74107N	FJJ261
74118N	FJJ291
74119N	FJJ301
74121N	FJK101
74141N	FJL151
74170N	FJQ101
74180N	FJH281
74191N	FJJ401
74193N	FJJ411
74H00N	GJH131
74H01N	GJH231
74H04N	GJH241
74H05N	GJH251
74H10N	GJH121
74H20N	GJH111
74H30N	GJH101
74H40N	GJH141
74H51N	GJH161
74H54N	GJH181
74H74N	GJJ131
74S10	GTH121
74S20	GTH111
74S40	GTH141
74S64	GTH701
74S112	GTJ701
74S151	GTH441
74S153	GTH401
9300	FJJ321

OPERATIONAL AMPLIFIERS

Comparable types	*Mullard types*
702C	TAA241
702	TAA242
709	TAA522
709C	TAA521
741C	TBA221
741	TBA222
723C	TBA281

Transistors—quick find transistor charts

The three charts which follow are included to enable a quick choice of transistor to be made based on one of three major parameters.

These are the Collector voltage
Total dissipation
Cut-off frequency

The current gain is also quoted in the tables, but fuller data is included in the pages indicated against each type number.

selection by voltage

V_{CB} max. (V)	P_{tot} max. (mW) (T = 25°C)	f_T, f_1 or fα min. (MHz)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
15	250	1·4	†45 to 120	1·0	*OC202	40
20	260	1·0 (typ)	30 to 300	300	*ACY22	32
	180	5000 (typ)	25 to 150	10	BFR90	35
	180	5000 (typ)	25 to 150	25	BFR91	35
	250	1600 (typ)	>25	50	BFW30	35
	300	100	>40	150	*BFW91	40
	300	350 (typ)	30 to 60	10	BSY38	35
	300	350 (typ)	40 to 120	10	BSY39	35
	300	200	50 to 200	10	BSY95A	35
25	1·0W	5·0 (typ)	100 to 500	300	AC187	33
	1·0W	1·5 (typ)	100 to 500	300	*AC188	32
	150	6·0	50 to 150	20	*ASY27	32
	150	10	50 to 150	20	ASY29	33
	300	130 (typ)	†125 to 500	2·0	*BC159	40
	300	150 (typ)	†125 to 500	2·0	*BC309	40
	350	200	>50	10	*BCY72	40
	3·0W	450	>30	100	BSX12	37
	3·0W	450	30 to 120	300	BSX12A	37
	250	2·0	†20 to 80	1·0	*OC201	40
	300	200	>20	10	2N706	34
	300	200	20 to 60	10	2N706A	34
	150	3·0	>20	10	2N1302	33
	150	5·0	40 to 100	10	2N1304	33
	150	10	60 to 200	10	2N1306	33
	150	15	80 to 300	10	2N1308	33
	3·0W	450	30 to 120	300	2N3303	37
	3·0W	450	30 to 120	300	2N3426	37
30	150	4·0	30 to 80	20	*ASY26	32
	150	4·0	30 to 80	20	ASY28	33
	140	6·0	>35	200	ASY74	33
	300	300 (typ)	†125 to 500	2·0	BC108	34
	300	300 (typ)	†240 to 900	2·0	BC109	34
	300	300 (typ)	†110 to 450	2·0	BC148	34
	300	300 (typ)	†200 to 800	2·0	BC149	34
	300	130 (typ)	†75 to 260	2·0	*BC158	40
	300	300 (typ)	110 to 800	2·0	BC238	34
	300	300 (typ)	200 to 800	2·0	BC239	34
	300	150 (typ)	†75 to 500	2·0	*BC308	40
	625	100 (typ)	100 to 600	100	*BC328	41
	625	200 (typ)	100 to 600	100	BC338	36
	250	0·9	†25 to 60	1·0	*BCZ11	40
	150	675 (typ)	—	—	BF180	35
	150	600 (typ)	—	—	BF181	35
	220	260 (typ)	115 (typ)	1·0	BF194	35
	220	200 (typ)	67 (typ)	1·0	BF195	35
	150	270	>15	3·0	BF200	34
	200	1200	25 to 150	2·0	*BFX89	35
	200	1000	25 to 150	2·0	BFY90	35
	250	0·45	†15 to 60	1·0	*OC200	40
	200	900	>20	3·0	2N918	35
	150	3·0	>20	10	*2N1303	32
	150	5·0	40 to 100	10	*2N1305	32
	150	10	60 to 200	10	*2N1307	32
	150	15	80 to 300	10	*2N1309	32
32	340	2·5 (typ)	100 (typ)	20	AC127	33
	1·0W	1·5 (typ)	55 to 175	50	*AC128	32
	700	1·0	52 to 180	500	AC176	33
	260	0·8 (typ)	30 to 70	300	*ACY40	32
	260	0·6 (typ)	50 to 250	300	*ACY41	32
	4·0W	3·0 (typ)	80 to 320	500	AD161	34
	6·0W	1·5 (typ)	80 to 320	500	*AD162	33
	250	0·4	10 to 35	20	*BCY33	40
	250	0·6	15 to 60	20	*BCY34	40
	410	0·45	10 to 30	150	*BCY38	40
	410	0·85	15 to 120	150	*BCY40	40
	310	0·45	10 to 30	150	*OC204	41
	310	0·85	16 to 120	150	*OC206	41

*p-n-p types, VCB max. negative

V_{CB} max. (V)	P_{tot} max. (mW) (T = 25°C)	f_T, f_1 or fα min. (MHz)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
36	88W	300 (typ)	15 to 100	1·4A	BLX14	38
	3·0W	1400 (typ)	>10	100	BLX65	38
	4·0W	1400 (typ)	>10	100	BLX66	38
	4·5W	1400 (typ)	>10	100	BLX67	38
	50W	1000 (typ)	30 (typ)	1·0A	BLX69	38
	8W	1300 (typ)	>10	500	BLY53A	38
	70W	650 (typ)	10 to 120	1·0A	BLY89A	39
	130W	550 (typ)	>10	1·0A	BLY90	39
40	260	1·0 (typ)	50 to 145	50	*ACY20	32
	260	1·3 (typ)	90 to 250	50	*ACY21	32
	130	350 (typ)	—	—	BF167	35
	260	550 (typ)	—	—	BF173	35
	250	400 (typ)	>27	4·0	BF196	34
	250	550 (typ)	>38	7·0	BF197	34
	5·0W	70 (typ)	>70	150	*BFS95	41
	300	80	80 to 240	100	BFW59	34
	300	80	50 to 150	100	BFW60	34
	300	100	80 to 320	150	*BFW89	40
	300	100	40 to 120	150	*BFW90	40
	800	50	>70	150	BFX86	36
	600	100	>40	10	*BFX88	41
	800	50	>60	150	BFY52	36
	800	50	>30	150	BFY53	36
	5W	250	>10	200	BLY34	38
	12W	250	>10	1·0A	BLY36	38
	1·5W	1200 (typ)	>25	150	BFW16A	38
	1·5W	1100 (typ)	>25	150	BFW17A	38
	10W	250	60 (typ)	200	BLY55	39
	12W	250	>10	1·0A	BLY84	39
	10W	250	>10	200	BLY85	39
	360	250	>30	10	BSW41	35
	360	400	20 to 60	10	BSX19	35
					(2N2368)	35
	360	500	40 to 120	10	BSX20	35
					(2N2369)	35
	22·5W	0·25 (typ)	15 to 80	1·0A	*OC25	33
	360	300	30 to 120	10	2N708	34
	86	100 (typ)	†40 to 250	1·0	*2N987	32
	360	500	40 to 120	10	2N2369A	35
	3·5W	700 (typ)	10 to 200	100	2N4427	39
45	350	200	100 to 600	10	*BCY71	40
	11W	60	>40	500	*BD132	41
	6·5W	250 (typ)	40 to 250	150	BD135	36
	6·5W	75 (typ)	40 to 250	150	*BD136	41
	25W	3·0	>25	1·0A	BD233	37
	25W	3·0	>25	1·0A	*BD234	42
	300	50	100 to 350	10	2N929	34
	300	50	200 to 600	10	*2N930	34
50	260	1·0 (typ)	40 to 120	300	*ACY18	32
	260	1·3 (typ)	80 to 250	300	*ACY19	32
	260	1·0 (typ)	40 to 120	300	*ACY44	32
	22·5W	0·5 (typ)	30 to 100	1·0A	*AD149	33
	300	300 (typ)	†125 to 500	2·0	BC107	34
	300	300 (typ)	†110 to 450	2·0	BC147	34
	300	130 (typ)	†75 to 260	2·0	*BC157	40
	300	300 (typ)	110 to 450	2·0	BC237	34
	300	150 (typ)	75 to 260	2·0	*BC307	40
	625	100 (typ)	100 to 600	100	*BC327	41
	625	200 (typ)	100 to 600	100	BC337	36
	410	0·45	12 to 70	150	*BCY54	40
	350	250	>50	10	*BCY70	40
	150W	1·0	10 to 50	2A	BDY10	37
	115W	1·0 (typ)	>30	2A	BDY38	38
	145	230 (typ)	>40	20	BF115	35
	600	100	>40	10	*BFX87	41
	800	400 (typ)	>30	500	BSS28	36
	800	400 (typ)	>20	500	BSS29	36
	310	0·45	12 to 70	150	*OC207	41
	600	50	20 to 45	150	*2N1131	41
	600	60	30 to 90	150	*2N1132	41
	600	60	75 to 200	150	*2N2303	41

selection by voltage

V_{CB} max. (V)	P_{tot} max. (mW) (T = 25°C)	f_T, f_1 or fα min. (MHz)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
50	600	200	40 to 120	150	***2N3133**	41
	600	200	100 to 300	150	***2N3134**	41
	150W	—	15 to 60	15A	**2N3771**	38
55	78W	—	20 to 70	3·0A	**BD181**	37
	8W	800 (typ)	>10	500	**BLY98**	39
	22·5W	300 (typ)	20 to 100	1·0A	**810BLY**	39
	5W	700 (typ)	10 to 200	50	**2N3866**	39
60	6·5W	250 (typ)	40 to 160	150	**BD137**	36
	6·5W	75 (typ)	40 to 160	150	***BD138**	41
	55W	3·0	>30	3·0A	**BD201**	37
	55W	3·0	>30	3·0A	***BD202**	42
	55W	3·0	>30	2·0A	**BD203**	37
	55W	3·0	>30	2·0A	***BD204**	42
	25W	3·0	>25	1·0A	**BD235**	37
	25W	3·0	>25	1·0A	***BD236**	42
	15W	100 (typ)	>45	500	**BDY62**	38
	300	100	80 to 320	150	***BFW87**	40
	300	100	40 to 120	150	***BFW88**	40
	600	100	>50	10	***BFX29**	41
	360	40	70 to 300	0·01	***BFX37**	40
	800	50	>40	150	**BFY51**	36
	30W	0·25 (typ)	45 to 130	1·0A	***OC29**	33
	30W	0·25 (typ)	25 to 75	1·0A	***OC35**	33
	250	0·3	†10 to 60	1·0	***OC203**	40
	310	0·45	10 to 50	150	***OC205**	41
	600	40	20 to 60	150	**2N696**	36
	600	50	40 to 120	150	**2N697**	36
	600	50	100 to 300	150	**2N1420**	37
	800	250	20 to 60	150	**2N2217**	37
	800	250	40 to 120	150	**2N2218**	37
	800	250	100 to 300	150	**2N2219**	37
	800	200	30 to 120	150	**2N2410**	37
	360	60	>175	1·0	**2N2483**	34
	360	60	>250	1·0	**2N2484**	34
	600	200	40 to 120	150	***2N2904**	41
	600	200	40 to 120	150	***2N2904A**	41
	600	200	100 to 300	150	***2N2905**	41
	600	200	100 to 300	150	***2N2905A**	41
	400	200	40 to 120	150	***2N2906**	41
	400	200	40 to 120	150	***2N2906A**	41
	400	200	100 to 300	150	***2N2907**	41
	400	200	100 to 300	150	***2N2907A**	41
	5·0W	100	50 to 250	150	**2N3053**	36
64	250	0·25	10 to 35	20	***BCY30**	40
	250	0·25	15 to 60	20	***BCY31**	40
	250	0·25	20 to 70	20	***BCY32**	40
	410	0·45	10 to 50	150	***BCY39**	40
65	600	—	50 to 200	10	***BFX30**	41
	50W	1000 (typ)	10 to 100	1·0A	**BLX94**	38
	5W	250	>10	200	**BLY33**	38
	12W	250	>10	1·0A	**BLY35**	38
	12W	250	10 to 220	1·0A	**BLY83**	39
	10W	250	>10	200	**BLY97**	39
	20W	300 (typ)	>5	500	**BLY93A**	39
	11·6W	500 (typ)	10 to 100	250	**2N3375**	39
	7·0W	500 (typ)	10 to 100	250	**2N3553**	39
	23W	400 (typ)	10 to 150	250	**2N3632**	39
70	260	1·0 (typ)	50 to 150	300	***ACY17**	32
	15W	60	35 to 150	500	**BD124**	37
	11W	60	>40	500	**BD131**	37
	117W	—	20 to 70	4·0A	**BD182**	37
	800	400 (typ)	>25	500	**BSS27**	36
	800	250	>25	500	**BSX59**	37
	800	250	30 to 90	500	**BSX60**	37
	800	250	>30	500	**BSX61**	37
75	800	60 (typ)	40 to 120	150	**2N1613**	36
	800	70	100 to 300	150	**2N1711**	36
	800	250	40 to 120	150	**2N2218A**	37
	800	300	100 to 300	150	**2N2219A**	37
80	40W	70 (typ)	30 to 120	5·0A	**BDY92**	38
	5·0W	70 (typ)	>40	150	***BFS94**	41
	300	80	80 to 240	100	**BFW57**	34
	300	80	50 to 150	100	**BFW58**	34
	800	60	>30	150	**BFY50**	36
	30W	0·25 (typ)	20 to 55	1·0A	***OC28**	33
	30W	0·25 (typ)	30 to 110	1·0A	***OC36**	33
	800	60	40 to 120	150	**2N2297**	36
85	117W	—	20 to 70	3·0A	**BD183**	37
90	11W	60	>40	500	**BD133**	37
	7·0	60	40 to 140	150	***2N4036**	41
95	117W	—	20 to 70	4·0A	**BD184**	37
100	6·5W	250 (typ)	40 to 160	150	**BD139**	36
	6·5W	75 (typ)	40 to 160	150	***BD140**	41
	25W	3·0	>25	1·0A	**BD237**	37
	25W	3·0	>25	1·0A	***BD238**	42
	150W	1·0	10 to 50	2·0A	**BDY11**	37
	115W	1·0	20 to 70	4·0A	**BDY20**	37
	115W	100 (typ)	>45	500	**BDY61**	38
	40W	70 (typ)	30 to 120	5·0A	**BDY91**	38
	5·0W	70 (typ)	>30	150	***BFS92**	41
	5·0W	70 (typ)	>70	150	***BFS93**	41
	800	50	>30	150	**BFX84**	36
	800	50	>70	150	**BFX85**	36
	870	100 (typ)	>40	2·0A	**BSV64**	36
	800	80 (typ)	>40	100	**BSW66**	36
	30W	0·25 (typ)	25 to 75	1·0A	***OC20**	33
	115W	0·8	20 to 70	4·0A	**2N3055**	38
	150W	—	15 to 60	10A	**2N3772**	38
110	260	1·0 (typ)	50 to 150	300	***ACY39**	32
	250	50	>30	25	***BSV68**	40
120	15W	100 (typ)	>45	500	**BDY60**	38
	40W	70 (typ)	30 to 120	5·0A	**BDY90**	38
	870	70	40 to 150	2·0A	**BFX34**	36
	800	80 (typ)	>40	100	**BSW67**	36
	300	60	>20	4·0	**BSX21**	35
	3W	50	40 to 120	150	**2N1893**	37
140	100W	1·0 (typ)	20 to 70	2·0 A	**2N4347**	38
150	800	80 (typ)	>40	100	**BSW68**	36
	125	130 (typ)	>30	4·0	**BSW69**	34
160	117W	1·0 (typ)	20 to 70	3·0A	**2N3442**	38
185	3·0W	80	>20	30	**BF336**	36
250	10W	—	—	—	**BD160**	37
	3·0W	80	>20	30	**BF337**	36
300	3·0W	80	>20	30	**BF338**	36
400	30W	12 (typ)	15 to 60	1·0A	**BDY95**	38
	40W	10 (typ)	15 to 60	2·0A	**BDY98**	38
500	7·0W	15 (typ)	25 to 175	50	**BD232**	36
600	30W	12 (typ)	15 to 60	1·0A	**BDY94**	38
	40W	10 (typ)	15 to 60	2·0A	**BDY97**	38
750	30W	12 (typ)	15 to 60	1·0A	**BDY93**	38
	40W	10 (typ)	15 to 60	2·0A	**BDY96**	38
	30W	8·0 (typ)	15 to 60	1·0A	**BU126**	38
1500 (peak)	10W	7·5 (typ)	—	—	**BU105**	38
	12·5W	7·0 (typ)	—	—	**BU108**	38

*p-n-p types, V_{CB} max. negative

Transistors

selection by total dissipation

P_{tot} max. (T = 25°C)	V_{CB} max. (V)	f_T, f_1 or f_α (MHz) min.	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
86mW	−40	100 (typ)	†40 to 250	1·0	*2N987	32
120mW	+30	800 (typ)	>20	3·0	BF362	35
	+30	600	>20	3·0	BF363	35
125mW	+150	130 (typ)	>30	4·0	BSW69	34
130mW	+40	350 (typ)	—	—	BF167	35
	+36	550 (typ)	>10	1·0A	BLY90	39
140mW	+30	6·0	>35	200	ASY74	33
145mW	+50	230 (typ)	>40	20	BF115	35
150mW	−30	4·0	30 to 80	20	*ASY26	32
	−25	6·0	50 to 150	20	*ASY27	32
	+30	4·0	30 to 80	20	ASY28	33
	+25	10	50 to 150	20	ASY29	33
	+30	675 (typ)	—	—	BF180	35
	+30	600 (typ)	—	—	BF181	35
	+30	270	>15	3·0	BF200	34
	+25	3·0	>20	10	2N1302	33
	−30	3·0	>20	10	*2N1303	32
	+25	5·0	40 to 100	10	2N1304	33
	−30	5·0	40 to 100	10	*2N1305	32
	+25	10	60 to 200	10	2N1306	33
	−30	10	60 to 200	10	*2N1307	32
	+25	15	80 to 300	10	2N1308	33
	−30	15	80 to 300	10	*2N1309	32
180mW	+20	5000 (typ)	25 to 150	10	BFR90	35
	+20	5000 (typ)	25 to 150	25	BFR91	35
200mW	+30	1200	25 to 150	2·0	BFX89	35
	+30	1000	25 to 125	2·0	BFY90	35
	+30	900	>20	3·0	2N918	35
220mW	+30	260 (typ)	115 (typ)	1·0	BF194	35
	+30	200 (typ)	67 (typ)	1·0	BF195	35
250mW	−64	0·25	10 to 35	20	*BCY30	40
	−64	0·25	15 to 60	20	*BCY31	40
	−64	0·25	20 to 70	20	*BCY32	40
	−32	0·4	10 to 35	20	*BCY33	40
	−32	0·6	15 to 60	20	*BCY34	44
	−30	0·9	†25 to 60	1·0	*BCZ11	40
	+40	400 (typ)	>27	4·0	BF196	34
	+40	550 (typ)	>38	7·0	BF197	34
	+20	1600 (typ)	>25	50	BFW30	35
	−110	50	>30	25	*BSV68	40
	−30	0·45	†15 to 60	1·0	*OC200	40
	−25	2·0	†20 to 80	1·0	*OC201	40
	−15	1·4	†45 to 120	1·0	*OC202	40
	−60	0·3	†>10	1·0	*OC203	40
260mW	−70	1·0 (typ)	50 to 150	300	*ACY17	32
	−50	1·0 (typ)	40 to 120	300	*ACY18	32
	−50	1·3 (typ)	80 to 250	300	*ACY19	32
	−40	1·0 (typ)	50 to 145	50	*ACY20	32
	−40	1·3 (typ)	90 to 250	50	*ACY21	32
	−20	1·0 (typ)	30 to 300	300	*ACY22	32
	−110	1·0 (typ)	50 to 150	300	*ACY39	32
	−32	0·8 (typ)	30 to 70	300	*ACY40	32
	−32	0·6 (typ)	50 to 250	300	*ACY41	32
	−50	1·0 (typ)	40 to 120	300	*ACY44	32
	+40	550 (typ)	—	—	BF173	35
300mW	+50	300 (typ)	†125 to 500	2·0	BC107	34
	+30	300 (typ)	†125 to 500	2·0	BC108	34
	+30	300 (typ)	†240 to 900	2·0	BC109	34
	+50	300 (typ)	†110 to 450	2·0	BC147	34
	+30	300 (typ)	†110 to 450	2·0	BC148	34
	+30	300 (typ)	†200 to 800	2·0	BC149	34
	−50	130 (typ)	†75 to 260	2·0	*BC157	40
	−30	130 (typ)	†75 to 260	2·0	*BC158	40
	−25	130 (typ)	†125 to 500	2·0	*BC159	40
	50	300 (typ)	110 to 450	2·0	BC237	34
	30	300 (typ)	110 to 800	2·0	BC238	34
	30	300 (typ)	200 to 800	2·0	BC239	34
	−50	150 (typ)	†75 to 260	2·0	*BC307	40
300mW	−30	150 (typ)	†75 to 500	2·0	*BC308	40
	−25	150 (typ)	†125 to 500	2·0	*BC309	40
	+80	80	80 to 240	100	BFW57	34
	+80	80	50 to 150	100	BFW58	34
	+40	80	80 to 140	100	BFW59	34
	+40	80	50 to 150	100	BFW60	34
	−60	100	80 to 320	150	*BFW87	40
	−60	100	40 to 120	150	*BFW88	40
	−40	100	80 to 320	150	*BFW89	40
	−40	100	40 to 120	150	*BFW90	40
	−20	100	>40	150	*BFW91	40
	+120	60	>20	4·0	BSX21	35
	+20	350 (typ)	30 to 60	10	BSY38	35
	+20	350 (typ)	40 to 120	10	BSY39	35
	+20	200	50 to 200	10	BSY95A	35
	+25	200	>20	10	2N706	34
	+25	200	20 to 60	10	2N706A	34
	+45	50	100 to 350	10	2N929	34
	+45	50	200 to 600	10	2N930	34
310mW	−32	0·45	10 to 30	150	*OC204	41
	−60	0·45	10 to 50	150	*OC205	41
	−32	0·85	16 to 120	150	*OC206	41
	−50	0·45	12 to 70	150	*OC207	41
340mW	+32	2·5 (typ)	100 (typ)	20	AC127	33
350mW	−50	250	>50	10	*BCY70	40
	−45	200	100 to 600	10	*BCY71	40
	−25	200	>50	10	*BCY72	40
360mW	−60	40	70 to 300	0·01	*BFX37	40
	+40	250	>30	10	BSW41	35
	+40	300	30 to 120	10	2N708	34
	+40	400	20 to 60	10	BSX19 2N2368	35 35
	+40	500	40 to 120	10	BSX20 2N2369	35 35
	+40	500	40 to 120	10	2N2369A	35
	+60	60	>175	1·0	2N2483	34
	+60	60	>250	1·0	2N2484	34
400mW	−60	200	40 to 120	150	*2N2906	41
	−60	200	40 to 120	150	*2N2906A	41
	−60	200	100 to 300	150	*2N2907	41
	−60	200	100 to 300	150	*2N2907A	41
410mW	−32	0·45	10 to 30	150	*BCY38	40
	−64	0·45	10 to 50	150	*BCY39	40
	−32	0·85	15 to 120	150	*BCY40	40
	−50	0·45	12 to 70	150	*BCY54	40
600mW	−60	100	>50	10	*BFX29	41
	−65	—	50 to 200	10	*BFX30	41
	−50	100	>40	10	*BFX87	41
	−40	100	>40	10	*BFX88	41
	+60	40	20 to 60	150	2N696	36
	+60	50	40 to 120	150	2N697	36
	−50	50	20 to 45	150	*2N1131	41
	−50	60	30 to 90	150	*2N1132	41
	+60	50	100 to 300	150	2N1420	37
	−50	60	75 to 200	150	*2N2303	41
	−60	200	40 to 120	150	*2N2904	41
	−60	200	40 to 120	150	*2N2904A	41
	−60	200	100 to 300	150	*2N2905	41
	−60	200	100 to 300	150	*2N2905A	41
	−50	200	40 to 120	150	*2N3133	41
	−50	200	100 to 300	150	2N3134	41
625mW	−50	100 (typ)	100 to 600	100	*BC327	41
	−30	100 (typ)	100 to 600	100	*BC328	41
	+50	200 (typ)	100 to 600	100	BC337	36
	+30	200 (typ)	100 to 600	100	BC338	36
700mW	+32	1·0	52 to 180	500	AC176	33

*p-n-p types, V_{CB} max. negative

selection by total dissipation

P_{tot} max (T = 25°C)	V_{CB} max. (V)	f_T, f_1 or fα (MHz) min.	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
800mW	+100	50	>30	150	BFX84	36
	+100	50	>70	150	BFX85	36
	+40	50	>70	150	BFX86	36
	+80	60	>30	150	BFY50	36
	+60	50	>40	150	BFY51	36
	+40	50	>60	150	BFY52	36
	+40	50	>30	150	BFY53	36
	+70	400 (typ)	>25	500	BSS27	36
	+50	400 (typ)	>30	500	BSS28	36
	+50	400 (typ)	>20	500	BSS29	36
	+100	80 (typ)	>40	100	BSW66	36
	+120	80 (typ)	>40	100	BSW67	36
	+150	80 (typ)	>40	100	BSW68	36
	+70	250	>25	500	BSX59	37
	+70	250	30 to 90	500	BSX60	37
	+70	250	>30	500	BSX61	37
	+75	60 (typ)	40 to 120	150	2N1613	36
	+75	70	100 to 300	150	2N1711	36
	+60	250	20 to 60	150	2N2217	37
	+60	250	40 to 120	150	2N2218	37
	+75	250	40 to 120	150	2N2218A	37
	+60	250	100 to 300	150	2N2219	37
	+75	300	100 to 300	150	2N2219A	37
	+80	60	40 to 120	150	2N2297	36
	−60	200	30 to 120	150	*2N2410	37
870mW	+120	70	40 to 150	2A	BFX34	36
	+100	100 (typ)	>40	2A	BSV64	36
1·0W	−32	1·5 (typ)	55 to 175	50	*AC128	32
	+25	5·0 (typ)	100 to 500	300	AC187	33
	−25	1·5 (typ)	100 to 500	300	*AC188	32
1·5W	+40	1200 (typ)	>25	150	BFW16A	38
	>40	1100 (typ)	>25	150	BFW17A	38
3·0W	+185	80	>20	30	BF336	36
	+250	80	>20	30	BF337	36
	+300	80	>20	30	BF338	36
	+36	1400 (typ)	>10	100	BLX65	38
	+25	450	>30	100	BSX12	37
	+25	450	30 to 120	300	BSX12A	37
	+120	50	40 to 120	150	2N1893	37
	+25	450	30 to 120	300	2N3303	37
	+25	450	30 to 120	300	2N3426	37
3·5W	+40	700 (typ)	10 to 200	100	2N4427	39
4·0W	+32	3·0 (typ)	80 to 320	500	AD161	34
	+36	1400 (typ)	>10	100	BLX66	38
4·5W	+36	1400 (typ)	>10	100	BLX67	38
5·0W	−100	70 (typ)	>30	150	*BFS92	41
	−100	70 (typ)	>70	150	*BFS93	41
	−80	70 (typ)	>40	150	*BFS94	41
	−40	70 (typ)	>70	150	*BFS95	41
	+65	250	>10	200	BLY33	38
	+40	250	>10	200	BLY34	38
	+60	100	50 to 250	150	2N3053	36
	+55	700 (typ)	110 to 200	50	2N3866	39
6·0W	−32	1·5 (typ)	80 to 320	500	*AD162	33
6·5W	+45	250 (typ)	40 to 250	150	BD135	36
	−45	75 (typ)	40 to 250	150	*BD136	41
	+60	250 (typ)	40 to 160	150	BD137	36
	−60	75 (typ)	40 to 160	150	*BD138	41
	+100	250 (typ)	40 to 160	150	BD139	36
	−100	75 (typ)	40 to 160	150	*BD140	41
7·0W	+500	15 (typ)	25 to 175	50	BD232	36
	+65	500 (typ)	10 to 100	250	2N3553	39
	−90	60	40 to 140	150	*2N4036	41
8W	+36	1300 (typ)	>10	500	BLY53A	38
	+55	800 (typ)	>10	500	BLY98	39
10W	+250	—			BD160	37
	+40	250	60 (typ)	200	BLY56	39
	+40	250	>10	200	BLY85	39

P_{tot} max. (T = 25°C)	V_{CB} max. (V)	f_T, f_1 or fα (MHz) min.	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
10W	+66	250	>10	200	BLY97	39
	+1500 (peak)	7·5 (typ)	—	—	BU105	38
11W	+70	60	>40	500	BD131	37
	−45	60	>40	500	*BD132	41
	+90	60	>40	500	BD133	37
11·6W	+65	500 (typ)	10 to 100	250	2N3375	39
12W	+65	250	>10	1·0A	BLY35	38
	+40	250	>10	1·0A	BLY36	38
	+65	250	10 to 220	1·0A	BLY83	39
	+40	250	>10	1·0A	BLY84	39
12·5W	1500	7·0 (typ)	—	—	BU108	38
15W	+70	60	35 to 150	500	BD124	37
	+120	100 (typ)	>45	500	BDY60	38
	+100	100 (typ)	>45	500	BDY61	38
	+60	100 (typ)	>45	500	BDY62	38
20W	+65	300 (typ)	>5	500	BLY93A	39
22·5W	−50	0·5 (typ)	30 to 100	1·0A	*AD149	33
	−40	—	15 to 80	1·0A	*OC26	33
	+55	300 (typ)	20 to 100	1·0A	810BLY	39
23W	+65	400 (typ)	10 to 150	250	2N3632	39
25W	+45	3·0	>25	1·0A	BD233	37
	−45	3·0	>25	1·0A	*BD234	42
	+60	3·0	>25	1·0A	BD235	37
	−60	3·0	>25	1·0A	*BD236	42
	+100	3·0	>25	1·0A	BD237	37
	−100	3·0	>25	1·0A	*BD238	42
30W	+750	12 (typ)	15 to 60	1·0A	BDY93	38
	+600	12 (typ)	15 to 60	1·0A	BDY94	38
	+400	12 (typ)	15 to 60	1·0A	BDY95	38
	+750	8·0 (typ)	15 to 60	1·0A	BU126	38
	−100	0·25 (typ)	25 to 75	1·0A	*OC20	33
	−80	0·25 (typ)	20 to 55	1·0A	*OC28	33
	−60	0·25 (typ)	45 to 130	1·0A	*OC29	33
	−60	0·25 (typ)	25 to 75	1·0A	*OC35	33
	−80	0·25 (typ)	30 to 110	1·0A	*OC36	33
40W	+120	70 (typ)	30 to 120	5·0A	BYD90	38
	+100	70 (typ)	30 to 120	5·0A	BDY91	38
	+80	70 (typ)	30 to 120	5·0A	BDY92	38
	+750	10 (typ)	15 to 60	2·0A	BDY96	38
	+600	10 (typ)	15 to 60	2·0A	BDY97	38
	+400	10 (typ)	15 to 60	2·0A	BDY98	38
50W	+36	1000 (typ)	30 (typ)	1·0A	BLX69	38
	+65	1000 (typ)	10 to 100	1·0A	BLX94	38
55W	+60	3·0	>30	3·0A	BD201	37
	−60	3·0	>30	3·0A	*BD202	42
	+60	3·0	>30	2·0A	BD203	37
	−60	3·0	>30	2·0A	*BD204	42
70W	+36	650 (typ)	10 to 120	1·0A	BLY89A	39
78W	+55	—	20 to 70	3·0A	BD181	37
88W	+140	300 (typ)	15 to 100	1·4A	BLX14	38
100W	+36	1·0 (typ)	20 to 70	2·0A	2N4347	38
115W	+100	1·0	20 to 70	4·0A	BDY20	37
	+50	1·0 (typ)	>30	2·0A	BDY38	38
	+100	0·8	20 to 70	4·0A	2N3055	38
117W	+70	—	20 to 70	4·0A	BD182	37
	+85	—	20 to 70	3·0A	BD183	37
	+95	—	20 to 70	4·0A	BD184	37
	+160	1·0 (typ)	20 to 70	3·0A	2N3442	38
130W	+36	550 (typ)	>10	1·0A	BLY90	39
150W	+50	1·0	10 to 50	2·0A	BDY10	37
	+100	1·0	10 to 50	2·0A	BDY11	37
	+50	—	15 to 60	15A	2N3771	38
	+100	—	15 to 60	10A	2N3772	38

*p-n-p types, V_{CB} max. negative

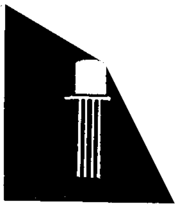
Transistors

selection by cut-off frequency

f_T, f_1 or $f\alpha$ (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
0·25	250	−64	10 to 35	20	*BCY30	40
	250	−64	15 to 60	20	*BCY31	40
	250	−64	20 to 70	20	*BCY32	40
	30W	−100	25 to 75	1·0A	*OC20	33
	22·5W	−40	15 to 80	1·0A	*OC25	33
	30W	−80	20 to 55	1·0A	*OC28	33
	30W	−60	45 to 130	1·0A	*OC29	33
	30W	−60	25 to 75	1·0A	*OC35	33
	30W	−80	30 to 110	1·0A	*OC36	33
0·3	250	−60	†>10	1·0	*OC203	40
0·4	250	−32	10 to 35	20	*BCY33	40
0·45	410	−32	10 to 30	150	*BCY38	40
	410	−64	10 to 50	150	*BCY39	40
	410	−50	12 to 70	150	*BCY54	40
	250	−30	†15 to 60	1·0	*OC200	40
	310	−32	10 to 30	150	*OC204	41
	310	−60	10 to 50	150	*OC205	41
	310	−50	12 to 70	150	*OC207	41
0·5 (typ.)	22·5W	−50	30 to 100	1·0A	*AD149	33
0·6	250	−32	50 to 250	300	*ACY41	32
	250	−32	15 to 60	20	*BCY34	40
0·8	260	−32	30 to 70	300	*ACY40	32
	115W	−100	20 to 70	4·0A	*2N3055	38
0·85	410	−32	15 to 120	150	*BCY40	40
	310	−32	16 to 120	150	*OC206	41
0·9	250	−30	†25 to 60	1·0	*BCZ11	40
1·0 (typ)	117W	+160	20 to 70	3·0A	3N3442	38
	100W	+140	20 to 70	2·0A	2N4347	38
1·0	700	+32	52 to 180	500	AC176	33
	260	−70	50 to 150	300	*ACY17	32
	260	−50	40 to 120	300	*ACY18	32
	260	−40	50 to 145	50	*ACY20	32
	260	−20	30 to 300	300	*ACY22	32
	260	−110	50 to 150	300	*ACY39	32
	260	−50	40 to 120	300	*ACY44	32
	150W	+50	10 to 50	2A	BDY10	37
	150W	+100	10 to 50	2A	BDY11	37
	115W	+100	20 to 70	4A	BDY20	37
	115W	+50	>30	2A	BDY38	38
1·3 (typ)	260	−50	80 to 250	300	*ACY19	32
	260	−40	90 to 250	50	*ACY21	32
1·4	250	−15	†45 to 120	1·0	*OC202	40
1·5 (typ)	1·0W	−32	55 to 175	50	*AC128	32
	1·0W	−25	100 to 500	300	*AC188	32
	6·0W	−32	80 to 320	500	*AD162	33
2·0	250	−25	†20 to 80	1·0	*OC201	40
2·5 (typ)	340	+32	100 (typ)	20	AC127	33
3·0 (typ)	4·0W	+32	80 to 320	500	AD161	34
3·0	55W	+60	>30	3·0A	BD201	37
	55W	−60	>30	3·0A	*BD202	42
	55W	+60	>30	2·0A	BD203	37
	55W	−60	>30	2·0A	*BD204	42
	25W	+45	>25	1·0A	BD233	37
	25W	−45	>25	1·0A	*BD234	42
	25W	−60	>25	1·0A	BD235	37
	25W	−60	>25	1·0A	*BD236	42
	25W	+100	>25	1·0A	BD237	37
	25W	−100	>25	1·0A	*BD238	42
	150	+25	>20	10	2N1302	33
	150	−30	>20	10	*2N1303	32
4·0	150	−30	30 to 80	20	*ASY26	32
	150	+30	30 to 80	20	ASY28	33
5·0 (typ)	1·0W	+25	100 to 500	300	AC187	33
5·0	150	+25	40 to 100	10	2N1304	33
	150	−30	40 to 100	10	*2N1305	32

f_T, f_1 or $f\alpha$ (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
6·0	150	−25	50 to 150	20	*ASY27	32
	140	−30	>35	200	ASY74	33
7·0 (typ)	12·5W	+1500 (peak)	—	—	BU108	38
7·5 (typ)	10W	+1500 (Peak)	—	—	BU105	38
8·0 (typ)	30W	+750	15 to 60	1·0A	BU126	38
10 (typ)	40W	+750	15 to 60	2·0A	BDY96	38
	40W	+600	15 to 60	2·0A	BDY97	38
	40W	+400	15 to 60	2·0A	BDY98	38
10	150	+25	50 to 150	20	ASY29	33
	150	+25	60 to 200	10	2N1306	33
	150	−30	60 to 200	10	*2N1307	32
12 (typ)	30W	+750	15 to 60	1·0A	BDY93	38
	30W	+600	15 to 60	1·0A	BDY94	38
	30W	+400	15 to 60	1·0A	BDY95	38
15 (typ)	7·0W	+500	25 to 175	50	BD232	36
15	150	+25	80 to 300	10	2N1308	33
	150	−30	80 to 300	10	*2N1309	32
40	360	−60	70 to 300	0·01	*BFX37	40
	600	+60	20 to 60	150	2N696	36
50	800	+100	>30	150	BFX84	36
	800	+100	>70	150	BFX85	36
	800	+40	>70	150	BFX86	36
	800	+60	>40	150	BFY51	36
	800	+40	>60	150	BFY52	36
	800	+40	>30	150	BFY53	36
	250	−110	>30	25	*BSV68	40
	600	+60	40 to 120	150	2N697	36
	300	+45	100 to 350	10	2N929	34
	300	+45	200 to 600	10	2N930	34
	600	−50	20 to 45	150	*2N1131	41
	600	+60	100 to 300	150	2N1420	37
	3W	+120	40 to 120	150	2N1893	37
60	15W	+70	35 to 150	500	BD124	37
	11W	+70	>40	500	BD131	37
	11W	−45	>40	500	*BD132	41
	11W	+90	>40	500	BD133	37
	800	+80	>30	150	BFY50	36
	300	+120	>20	4·0	BSX21	35
	600	−50	30 to 90	150	*2N1132	41
	800	+75	40 to 120	150	2N1613	36
	800	+80	40 to 120	150	2N2297	36
	600	−50	75 to 200	150	*2N2303	41
	360	+60	>175	1·0	2N2483	34
	360	+60	>250	1·0	2N2484	34
	7·0W	−90	40 to 140	150	*2N4036	41
70 (typ)	40W	+120	30 to 120	5·0A	BDY90	38
	40W	+100	30 to 120	5·0A	BDY91	38
	40W	+80	30 to 120	5·0A	BDY92	38
	5·0W	−100	>30	150	*BFS92	41
	5·0W	−100	>70	150	*BFS93	41
	5·0W	−80	>40	150	*BFS94	41
	5·0W	−40	>70	150	*BFS95	41
70	870	+120	40 to 150	2·0A	BFX34	36
	800	+75	100 to 300	150	2N1711	36
75 (typ)	6·5W	−45	40 to 250	150	*BD136	41
	6·5W	−60	40 to 160	150	*BD138	41
	6·5W	−100	40 to 160	150	*BD140	41
80 (typ)	800	+100	>40	100	BSW66	36
	800	+120	>40	100	BSW67	36
	800	+150	>40	100	BSW68	36
80	3·0W	+185	>20	30	BF336	36
	3·0W	+250	>20	30	BF337	36

*p–n–p types, V_{CB} max. negative



selection by cut-off frequency

f_T, f_1 or fα (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
80	3·0W	+300	>20	30	BF338	36
	300	+80	80 to 240	100	BFW57	34
	300	+80	50 to 150	100	BFW58	34
	300	+40	80 to 240	100	BFW59	34
	300	+40	50 to 150	100	BFW60	34
100 (typ)	625	−50	100 to 600	100	*BC327	41
	625	−30	100 to 600	100	*BC328	41
	15W	+120	>45	500	BDY60	38
	15W	+100	>45	500	BDY61	38
	15W	+60	>45	500	BDY62	38
	870	+100	>40	2A	BSV64	36
100	300	−60	80 to 320	150	*BFW87	40
	300	−60	40 to 120	150	*BFW88	40
	300	−40	80 to 320	150	*BFW89	40
	300	−40	40 to 120	150	*BFW90	40
	300	−20	>40	150	*BFW91	40
	600	−60	>50	10	*BFX29	41
	600	−50	>40	10	*BFX87	41
	600	−40	>40	10	*BFX88	41
	86	−40	†40 to 250	1·0	2N987	32
	5·0W	+60	50 to 250	150	2N3053	36
130 (typ)	300	−50	†75 to 260	2·0	*BC157	40
	300	−30	†75 to 260	2·0	*BC158	40
	300	−25	†125 to 500	2·0	*BC159	40
	125	+150	>30	4·0	BSW69	34
150	300	−50	†75 to 260	2·0	BC307	40
	300	−30	†75 to 500	2·0	*BC308	40
	300	−25	†125 to 500	2·0	*BC309	40
200 (typ)	625	+50	100 to 600	100	BC337	36
	625	+30	100 to 600	100	BC338	36
	220	+30	115 (typ)	1·0	BF195	35
200	350	−45	100 to 600	10	*BCY71	40
	350	−25	>50	10	*BCY72	40
	300	+20	50 to 200	10	BSY95A	35
	300	+25	>20	10	2N706	34
	300	+25	20 to 60	10	2N706A	34
	800	−60	30 to 120	150	*2N2410	37
	600	−60	40 to 120	150	*2N2904	41
	600	−60	40 to 120	150	*2N2904A	41
	600	−60	100 to 300	150	*2N2905	41
	600	−60	100 to 300	150	*2N2905A	41
	400	−60	40 to 120	150	*2N2906	41
	400	−60	40 to 120	150	*2N2906A	41
	400	−60	100 to 300	150	*2N2907	41
	400	−60	100 to 300	150	*2N2907A	41
	600	−50	40 to 120	150	*2N3133	41
	600	−50	100 to 300	150	*2N3134	41
230 (typ)	140	+50	>40	20	BF115	35
250 (typ)	6·5W	+45	40 to 250	150	BD135	36
	6·5W	+60	40 to 160	150	BD137	36
	6·5W	+100	40 to 160	150	BD139	36
250	350	−50	>50	10	*BCY70	40
	5W	+65	>10	200	BLY33	38
	5W	+40	>10	200	BLY34	38
	12W	+65	>10	1·0A	BLY35	38
	12W	+40	>10	1·0A	BLY36	38
	10W	+40	60 (typ)	200	BLY55	39
	12W	+65	>10	1·0A	BLY83	39
	12W	+40	>10	1·0A	BLY84	39
	10W	+40	>10	200	BLY85	39
	10W	+66	>10	200	BLY97	39
	360	+40	>30	10	BSW41	35
	800	+70	>25	500	BSX59	37
	800	+70	30 to 90	500	BSX60	37
	800	+70	>30	500	BSX61	37
	800	+60	20 to 60	150	2N2217	37
	800	+60	40 to 120	150	2N2218	37
	800	+75	40 to 120	150	2N2218A	37
	800	+60	100 to 300	150	2N2219	37

f_T, f_1 or fα (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
260 (typ)	220	+30	115 (typ)	1·0	BF194	35
270	150	+30	>15	3·0	BF200	34
300 (typ)	300	+50	†125 to 500	2·0	BC107	34
	300	+30	†125 to 500	2·0	BC108	34
	300	+30	†240 to 900	2·0	BC109	34
	300	+50	†110 to 450	2·0	BC147	34
	300	+30	†110 to 450	2·0	BC148	34
	300	+30	†200 to 800	2·0	BC149	34
	300	+50	110 to 450	2·0	BC237	34
	300	+30	110 to 800	2·0	BC238	34
	300	+30	200 to 800	2·0	BC239	34
	88W	+36	15 to 100	1·4A	BLX14	38
	20W	+65	>5	500	BLY93A	39
	22·5W	+55	20 to 100	1·0A	810BLY	39
300	360	+40	30 to 120	10	2N708	34
	800	+75	100 to 300	150	2N2219A	37
350 (typ)	130	+40	—	—	BF167	35
	300	+20	30 to 60	10	BSY38	35
	300	+20	40 to 120	10	BSY39	35
400 (typ)	250	+40	>27	4·0	BF196	34
	23W	+65	10 to 150	250	2N3632	39
400	800	+70	>25	500	BSS27	36
	800	+50	>30	500	BSS28	36
	800	+50	>20	500	BSS29	36
	360	+40	20 to 60	10	{BSX19 2N2368	35 35
450	3·0W	+25	>30	100	BSX12	37
	3·0W	+25	30 to 120	300	BSX12A	37
	3·0W	+25	30 to 120	300	2N3303	37
	3·0W	+25	30 to 120	300	2N3426	37
500 (typ)	11·6W	+65	10 to 100	250	2N3375	39
	7·0W	+65	10 to 100	250	2N3553	39
500	360	+40	40 to 120	10	{BSX20 2N2369	35 35
	360	+40	40 to 120	10	2N2369A	35
550 (typ)	250	+40	—	—	BF173	35
	250	+40	>38	7·0	BF197	34
	130W	+36	>10	1·0A	BLY90	39
600 (typ)	150	+30	—	—	BF181	35
600	120	+30	>20	3·0	BF363	35
650 (typ)	70W	+36	10 to 120	1·0A	BLY89A	39
675 (typ)	150	+30	—	—	BF180	35
700 (typ)	5W	+55	10 to 200	50	2N3866	39
	3·5W	+40	10 to 200	100	2N4427	39
800 (typ)	120	+30	>20	3·0	BF362	36
	8W	+55	>10	500	BLY98	39
900	200	+30	>20	3·0	2N918	35
1000 (typ)	50W	+36	30 (typ)	1·0A	BLX69	38
	50W	+65	10 to 100	1·0A	BLX94	38
1000	200	+30	25 to 125	2·0	BFY90	35
1100	1·5W	+40	>25	150	BFW17A	38
1200 (typ)	1·5W	+40	>25	150	BFW16A	38
	200	+30	25 to 150	2·0	BFX89	35
1300 (typ)	8W	+36	>10	500	BLY53A	38
1400 (typ)	3W	+36	>10	100	BLX65	38
	4·0W	+36	>10	100	BLX66	38
	4·5W	+36	>10	100	BLX67	38
1600 (typ)	250	+20	>25	50	BFW30	35
5000 (typ)	180	+20	25 to 150	10	BFR90	35
	180	+20	25 to 150	25	BFR91	35

*p–n–p types, V_{CB} max. negative

Transistors

germanium p-n-p low power transistors book 1 parts 1 and 2

In the transistor data tables the manufacturing technique is indicated thus:——

A Alloy
AD Alloy-diffused
D Diffused
EB Epitaxial base
P Planar
PE Planar epitaxial

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features		
GENERAL PURPOSE																		
2N987	J1	AD	−40	−40	10	—	75	86	40†	250	—	100*	—	—	—	V.H.F. application		
SWITCHING																t_{on} (ns)	t_{off} (ns)	at I_C (mA)
ASY26	H1	A	−30	−15	300	200	85	150	30	80	20	4·0	−0·2	10	0·4	340	975	10
ASY27	H1	A	−25	−15	300	200	85	150	50	150	20	6·0	−0·2	10	0·4	250	1000	10
2N1303	H1	A	−30	−25	300	200	85	150	20	—	10	3·0	−0·2	10	0·5	360	1300	10
2N1305	H1	A	−30	−20	300	200	85	150	40	100	10	5·0	−0·2	10	0·25	255	1150	10
2N1307	H1	A	−30	−15	300	200	85	150	60	200	10	10	−0·2	10	0·17	230	1050	10
2N1309	H1	A	−30	−15	300	200	85	150	60	200	10	15	−0·2	10	0·13	200	1050	10

*Typical value †h_{fe}

germanium p-n-p medium power transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T typ (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features
GENERAL PURPOSE																
AC128	K	A	−32	−16	2000	1000	90	1000	55	175	50	1·5	—	—	—	Complementary to AC127
AC188	K	A	−25	−15	2000	1000	90	1000	100	500	300	1·5	—	—	—	Complementary to AC187
OC84 **ACY17**	H1	A	−70	−32	2000	500	90	260	50	150	300	1·0	−0·3	300	15	A.F. application
ACY18	H1	A	−50	−30	2000	500	90	260	40	120	300	1·0	−0·3	300	15	A.F. application
ACY19	H1	A	−50	−30	2000	500	90	260	80	250	300	1·3	−0·3	300	15	A.F. application
ACY20	H1	A	−40	−20	2000	500	90	260	50	145	50	1·0	−0·2	50	1·3	A.F. application
ACY21	H1	A	−40	−20	2000	500	90	260	90	250	50	1·3	−0·2	50	1·3	A.F. application
ACY22	H1	A	−20	−15	2000	500	90	260	30	300	300	1·0	−0·3	300	15	A.F. application
ACY39	H1	A	−110	−40	2000	500	90	260	50	150	300	1·0	−0·3	300	15	A.F. application
ACY40	H1	A	−32	−18	2000	500	90	260	30	170	300	0·8	−0·3	300	15	A.F. application
ACY41	H1	A	−32	−18	2000	500	90	260	50	250	300	0·6	−0·3	300	15	A.F. application
ACY44	H1	A	−50	−30	2000	500	90	260	40	120	300	1·0	−0·2	50	1.3	N < 5dB at 1kHz

Transistors

germanium p-n-p high power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb}45°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T typ (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (A)	Special Features
GENERAL PURPOSE																
†AD149	F1	A	−50	−30	3·5	3·5	100	22·5	30	100	1·0	0·5	—	—	—	
AD162	F3	A	−32	−20	3·0	1·0	90	6·0	80	320	0·5	1·5	—	—	—	Complementary to AD161
OC20	F1	A	−100	−75	10	8·0	90	30	25	75	1·0	0·25	—	—	—	
OC25	F1	A	−40	−40	4·0	4·0	90	22·5	15	80	1·0	0·25	—	—	—	
†OC28	F1	A	−80	−60	10	8·0	90	30	20	55	1·0	0·25	—	—	—	
†OC29	F1	A	−60	−32	10	8·0	90	30	45	130	1·0	0·25	—	—	—	
†OC35	F1	A	−60	−32	10	8·0	90	30	25	75	1·0	0·25	—	—	—	
†OC36	F1	A	−80	−32	10	8·0	90	30	30	110	1·0	0·25	—	—	—	

†Available in matched pairs

germanium n-p-n low power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features t_{on} (ns)	t_{off} (ns)	at I_C (mA)
SWITCHING																		
ASY28	H1	A	30	15	300	200	85	150	30	80	20	4·0	0·2	10	0·33	225	775	10
ASY29	H1	A	25	15	300	200	85	150	50	150	20	10	0·2	10	0·2	185	800	10
ASY74	H1	A	30	15	400	400	75	140	35	—	200	6·0	0·22	50	1·25	—	—	—
2N1302	H1	A	25	25	300	200	85	150	20	—	10	3·0	0·2	10	0·5	285	865	10
2N1304	H1	A	25	20	300	200	85	150	40	100	10	5·0	0·2	10	0·25	270	850	10
2N1306	H1	A	25	15	200	200	85	150	60	200	10	10	0·2	10	0·17	225	815	10
2N1308	H1	A	25	15	300	200	85	150	80	300	10	15	0·2	10	0·13	220	790	10

germanium n-p-n medium power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T typ (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features
GENERAL PURPOSE																
AC127	K	A	32	12	500	500	90	340	100(typ.)		20	2·5	—	—	—	Complementary to AC128
AC176	K	A	32	20	1000	350	90	700	52	180	500	1·0(min.)	—	—	—	
AC187	K	A	25	15	2000	1000	90	1000	100	500	300	5·0	—	—	—	Complementary to AC188

Transistors

germanium n-p-n high power transistor

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb}45°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T typ (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	I_B (A)	Special Features
GENERAL PURPOSE																
AD161	F3	A	32	20	3·0	1·0	90	4·0	80	320	0·5	3·0	—	—	—	Complementary to AD162

Transistors

silicon n-p-n low power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features t_{on} (ns)	t_{off} (ns)	at I_C (mA)
GENERAL PURPOSE																		
BC107	G1	PE	50	45	200	100	175	300	125	500	2·0	300*	0·25	10	0·5	100	500	10
BC108	G1	PE	30	20	200	100	175	300	125	500	2·0	300*	0·25	10	0·5	100	500	10
BC109	G1	PE	30	20	200	100	175	300	240	900	2·0	300*	0·25	10	0·5	N <4dB at f = 30 Hz to 15 kHz		
BC147	D	PE	50	45	200	100	125	300	110	450	2·0	300*	0·25	10	0·5	N=2dB typ. at f=1kHz		
BC148	D	PE	30	20	200	100	125	300	110	450	2·0	300*	0·25	10	0·5	N=2dB typ. at f=1kHz		
BC149	D	PE	30	20	200	100	125	300	200	800	2·0	300*	0·25	10	0·5	N <4 dB at f = 30 Hz to 15 kHz		
BC237	BD	PE	50	45	200	100	125	300	125	500	2·0	300*	0·25	10	0·5	N = 2dB typ. at f = 1kHz		
BC238	BD	PE	30	20	200	100	125	300	125	900	2·0	300*	0·25	10	0·5	N = 2dB typ. at f = 1kHz		
BC239	BD	PE	30	20	200	100	125	300	240	900	2·0	300*	0·25	10	0·5	N = 1·2dB typ. at f = 1kHz		
BF196	D1	P	40	30	25	25	125	250	27	—	4·0	400*	—	—	—	Typ. gain control range = 60dB		
BF197	D1	P	40	25	25	25	125	250	38	—	7·0	550*	—	—	—	Typ. Gum at 45MHz = 41dB		
BF200	J2	P	30	20	20	20	175	150	15	—	3·0	270	—	—	—	Typ. Gum at 200 MHz = 22dB		
BFW57	D	PE	80	80	1·0A	500	125	300	80	240	100	80	0·2	100	10	100	420	100
BFW58	D	PE	80	60	1·0A	500	125	300	50	150	100	80	0·2	100	10	100	420	100
BFW59	D	PE	40	35	1·0A	500	125	300	80	240	100	80	0·2	100	10	100	420	100
BFW60	D	PE	40	35	1·0A	500	125	300	50	150	100	80	0·2	100	10	100	420	100
BSW69	BP	PE	150	150	—	50	125	125	30	—	4·0	130*	4·0	20	1·0	Numerical indicator tube driver		
2N706	G1	PE	25	20	—	—	175	300	20	—	10	200	0·60	10	1·0			
2N706A	G1	PE	25	15	—	—	175	300	20	—	10	200	0·60	10	1·0			
2N708	G1	PE	40	15	500	—	200	360	30	120	10	300	0·40	10	1·0			
2N929	G1	PE	45	45	60	30	175	300	100	350	10	50	1·0	10	0·5	N <4dB at f = 10Hz to 15·7 kHz		
2N930	G1	PE	45	45	60	30	175	300	200	600	10	50	1·0	10	0·5	N <3dB at f = 10 Hz to 15·7 kHz		
2N2483	G1	PE	60	60	50	—	200	360	175	—	1·0	60	0·35	1·0	0·1	N <3dB at 10 kHz		
2N2484	G1	PE	60	60	50	—	200	360	250	—	1·0	60	0·35	1·0	0·1	N <2dB at 10kHz		

Transistors
silicon n-p-n low power transistors (cont.)

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features
			Maximum Ratings													
R.F. AMPLIFIERS (cont).																
BF115	J1	PE	50	30	30	30	175	145	40	—	20	230*	—	—	—	
BF167	J1	PE	40	30	25	25	175	130	—	—	—	350*	—	—	—	Typ. gain control range = 60dB
BF173	J1	PE	40	25	25	25	175	260	—	—	—	550*	—	—	—	Typ. C_{re} = 0·23pF
BF180 *Typical	J2	PE	30	20	20	20	175	150	—	—	—	675*	—	—	—	N<9·5dB at 800HMz
BF181	J2	PE	30	20	20	20	175	150	—	—	—	600*	—	—	—	N = 6·8 dB typ. at 900MHz
BF194	D1	PE	30	20	30	30	125	220	115*	—	1·0	260*	—	—	—	N = 4dB typ. at 100MHz
BF195	D1	PE	30	20	30	30	125	220	67*	—	1·0	200*	—	—	—	N = 4dB typ. at 100MHz
BF362 BF262	CH	P	30	20	20	20	125	120	20	—	3·0	800*	—	—	—	N = 5dB typ. at 800MHz
BF363 BF263	CH	P	30	20	20	20	125	120	20	—	3·0	600	—	—	—	N = 5dB typ. at 800MHz
BFR90	CG	PE	20	15	25	25	150	180	25	150	10	5000*	—	—	—	N = 3dB typ. at 500MHz
BFR91	CG	PE	20	15	35	35	150	180	25	150	25	5000*	—	—	—	N = 3dB typ. at 500MHz
BFW30	J2	P	20	10	100	50	200	250	25	—	5·0	1600*	—	—	—	N < 5·0dB at 500MHz
BFX89	J2	PE	30	15	50	25	200	200	25	150	2·0	1100	—	—	—	N = 7dB at 800MHz
BFY90	J2	PE	30	15	50	25	200	200	25	150	2·0	1000	—	—	—	N < 3·5dB at 200MHz
2N918	J2	PE	30	15	50	50	200	200	20	—	3·0	900	0·4	10	1·0	

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
SWITCHING																		
BSW41	G1	PE	40	25	500	300	200	360	30	—	10	250	0·5	150	15	50	100	300
BSX19	G1	PE	40	15	500	—	200	360	20	60	10	400	0·3	10	0·6	12	15	10
BSX20	G1	PE	40	15	500	—	200	360	40	120	10	500	0·3	10	0·3	12	18	10
BSX21	G1	M	120	80	50	50	175	300	20	—	4·0	60	1·8*	10	1·0	Numerical indicator tube driver		
BSY38	G1	PE	20	15	200	100	175	300	30	60	10	350*	0·25	10	1·0	14	45	100
BSY39	G1	PE	20	15	200	100	175	300	40	120	10	350*	0·25	10	1·0	14	45	100
BSY95A	G1	PE	20	15	200	100	175	300	50	200	10	200	0·35	10	0·2	t_s <50 ns at 10mA		
2N2368	G1	PE	40	15	500	—	200	360	20	60	10	400	0·25	10	1·0	12	15	10
2N2369	G1	PE	40	15	500	—	200	360	40	120	10	500	0·25	10	1·0	12	18	10
2N2369A	G1	PE	40	15	500	—	200	360	40	120	10	500	0·2	10	1·0	12	18	10

*Typical

Transistors
silicon n-p-n medium power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	Maximum Ratings I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features
GENERAL PURPOSE																
BC337	BC	PE	50	45	1·0A	500	150	625	100	600	100	200*	0·7	500	50	
BC338	BC	PE	30	25	1·0A	500	150	625	100	600	100	200*	0·7	500	50	
BD135	BY	PE	45	45	1·5A	500	125	6·5W	40	250	150	250*	0·5	500	50	
BD137	BY	PE	60	60	1·5A	500	125	6·5W	40	160	150	250*	0·5	500	50	
BD139	BY	PE	100	80	1·5A	500	125	6·5W	40	160	150	250*	0·5	500	50	
BD232	BY	D	500	250	500	250	150	7·0W	25	175	50	15*	—	—	—	Line-driver in t.v. receivers
BF336	H3	P	185	180	100	100	200	3·0W	20	—	30	80	—	—	—	$-C_{re}$=3·5 pF max. at 0·5 MHz
BF337	H3	P	250	200	100	100	200	3·0W	20	—	30	80	—	—	—	$-C_{re}$=3·5 pF max. at 0·5 MHz
BF338	H3	P	300	225	100	100	200	3·0W	20	—	30	80	—	—	—	$-C_{re}$=3·5 pF max. at 0·5 MHz
BFX84	H3	PE	100	60	1·0A	1·0A	200	800	30	—	150	50	0·35	150	15	
BFX85	H3	PE	100	60	1·0A	1·0A	200	800	70	—	150	50	0·35	150	15	
BFX86	H3	PE	40	35	1·0A	1·0A	200	800	70	—	150	50	0·35	150	15	
BFY50†	H3	PE	80	35	1·0A	1·0A	200	800	30	—	150	60	0·2	150	15	
BFY51†	H3	PE	60	30	1·0A	1·0A	200	800	40	—	150	50	0·35	150	15	
BFY52†	H3	PE	40	20	1·0A	1·0A	200	800	60	—	150	50	0·35	150	15	
BFY53	H3	PE	40	20	1·0A	1·0A	200	800	30	—	150	50	0·35	150	15	
2N696	H3	PE	60	40	500	—	175	600	20	60	150	40	1·5	150	15	
2N697	H3	PE	60	40	500	—	175	600	120	150	150	40	1·5	150	15	
2N1613	H3	PE	75	30	500	—	200	800	40	120	150	60*	1·5	150	15	
2N1711	H3	PE	75	30	1·0A	—	200	800	100	300	150	70*	1·5	150	15	
2N2297	H3	PE	80	35	—	1·0A	200	800	40	120	150	60*	0·2	150	15	
2N3053	H3	PE	60	40	—	700	200	5·0W	50	250	150	100	1·4	150	15	

† Also available to BS9365-F012 specification

SWITCHING	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
BFX34	H3	PE	120	60	5·0A	2·0A	200	870	40	150	2A	70	1·0	5A	500	600	1200	5A
BSS27	H3	PE	70	45	1·0A	1·0A	200	800	25	—	500	400*	0·4	500	35	25	40	500
BSS28	H3	PE	50	30	1·0A	1·0A	200	800	30	—	500	400*	0·4	500	35	25	45	500
BSS29	H3	PE	50	30	1·0A	1·0A	200	800	20	—	500	400*	0·5	500	35	30	50	500
BSV64	H3	PE	100	60	5·0A	2·0A	200	870	40	—	2A	100*	1·0	5A	500	600	1200	5A
BSW66	H3	PE	100	100	2·0A	1·0A	200	800	40	—	100	80*	0·4	500	50	For relays and other highly inductive load switching applications		
BSW67	H3	PE	120	120	2·0A	1·0A	200	800	40	—	100	80*	0·4	500	50			
BSW68	H3	PE	150	150	2·0A	1·0A	200	800	40	—	100	80*	0·5	500	50			

*Typical

Transistors
silicon n-p-n medium power transistors (cont.)

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
SWITCHING (cont.)																		
BSX12	H3‡	PE	25	12	1·0	1·0A	200	3·0W†	30	120	300	450	0·33	300	30	15	25	1·0A
BSX12A	H3‡	PE	25	15	1·0	1·0A	200	3·0W†	30	120	300	450	0·33	300	30	15	25	1·0A
BSX59	H3	PE	70	45	—	1·0A	200	800	25	—	500	250	0·3	150	15	35	60	500
BSX60	H3	PE	70	30	—	1·0A	200	800	30	90	500	250	0·3	150	15	40	70	500
BSX61	H3	PE	70	45	—	1·0A	200	800	25	—	500	250	0·5	150	15	50	100	500
2N1420	H3	PE	60	30	1·0	—	175	600	100	300	150	50	1·5	150	15			
2N1893	H3	PE	120	80	—	500	200	3·0W†	40	120	150	50	1·2	50	5·0			
2N2217	H3	PE	60	30	—	800	175	800	20	60	150	250	0·4	150	15			
2N2218	H3	PE	60	30	—	800	175	800	40	120	150	250	0·4	150	15			
2N2218A	H3	PE	75	40	—	800	175	800	40	120	150	250	0·3	150	15	t_s<225 ns at 150 mA		
2N2219	H3	PE	60	30	—	800	175	800	100	300	150	250	0·4	150	15			
2N2219A	H3	PE	75	40	—	800	175	800	100	300	150	300	0·3	150	15	t_s<225 ns at 150 mA		
2N2410	H3	PE	60	30	—	800	200	800	30	120	150	200	0·45	150	15	65	65	500
2N3303	H3‡	PE	25	12	—	1·0A	200	3·0W†	30	120	300	450	0·33	300	30	15	25	1·0A
2N3426	H3‡	PE	25	12	—	1·0A	200	3·0W†	30	120	300	450	0·33	300	30	15	25	1·0A

*Typical **V_{CER} at R_b = 10 Ω †$_{Case}$ = 25°C ‡ TO 5, reduced height 3·4m/m max.

silicon n-p-n high power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	I_B (mA)	Special Features
GENERAL PURPOSE																
BD124	F3	PE	70	45	4·0	2·0	175	15	35	—	0·5	60	0·9	2·0	200	
BD131	BY	PE	70	45	6·0	3·0	125	11	40	—	0·5	60	0·9	2·0	200	
BD133	BY	PE	90	60	6·0	3·0	125	11	40	—	0·5	60	0·9	2·0	200	
BD160	F1	D	250	—	7·0	5·0	150	10	—	—	—	—	1·6	5·0	1·0A	For line deflection and E-W pincushion correction circuits
BD181	F2	D	55	45	15	10	200	78	20	70	3·0	—	—	—	—	—
BD182	F2	D	70	60	15	15	200	117	20	70	4·0	—	—	—	—	—For use in high quality
BD183	F2	D	85	80	15	15	200	117	20	70	3·0	—	—	—	—	—audio amplifiers.
BD184	F2	D	95	90	15	15	200	117	20	70	4·0	—	—	—	—	—
BD201	BZ	EB	60	45	12	8·0	150	55	30	—	3·0	3·0	1·0	3·0	300	Complementary to BD202
BD203	BZ	EB	60	60	12	8·0	150	55	30	—	2·0	3·0	1·0	3·0	300	Complementary to BD204
BD233	BY	EB	45	45	6·0	2·0	150	25	25	—	1·0	3·0	0·6	1·0	100	
BD235	BY	EB	60	60	6·0	2·0	150	25	25	—	1·0	3·0	0·6	1·0	100	
BD237	BY	EB	100	80	6·0	2·0	150	25	25	—	1·0	3·0	0·6	1·0	100	
BDY10	F2	AD	50	40	4·0	2·0	175	150	10	50	2·0	1·0	0·7	2·0	400	
BDY11	F2	AD	100	70	4·0	2·0	175	150	10	50	2·0	1·0	0·7	2·0	400	
BDY20	F2	D	100	60	15	15	200	115	20	70	4·0	1·0*	1·1	4·0	400	

Transistors
silicon n-p-n high power transistors (cont.)

Type No.	Construction	Technique	Max. Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	I_B (mA)	Special Features
GENERAL PURPOSE (cont.)																
BDY38	F2	D	50	40	6·0	6·0	200	115	30	—	2·0	1·0*	0·7	2·0	200	
BDY60	F2	PE	120	60	10	5·0	175	15	45	450	0·5	100*	0·7	5·0	500	
BDY61	F2	PE	100	60	10	5·0	175	15	45	450	0·5	100*	0·9	5·0	500	
BDY62	F2	PE	60	30	10	5·0	175	15	45	450	0·5	100*	0·9	5·0	500	
BDY90	F1	D	120	100	15	10	175	40	30	120	5·0	70*	0·5	5·0	500	
BDY91	F1	D	100	80	15	10	175	40	30	120	5·0	70*	0·5	5·0	500	
BDY92	F1	D	80	60	15	10	175	40	30	120	5·0	70*	0·5	5·0	500	
BDY93	F1	D	750	350	5·0	2·5	150	30	15	60	1·0	12*	1·0	1·0	100	For use in converters, inverters, switching and motor control systems.
BDY94	F1	D	600	300	5·0	2·5	150	30	15	60	1·0	12*	1·0	1·0	100	
BDY95	F1	D	400	250	5·0	2·5	150	30	15	60	1·0	12*	1·0	1·0	100	
BDY96	F1	D	750	350	10	5·0	150	40	15	60	2·0	10*	1·0	2·0	200	
BDY97	F1	D	600	300	10	5·0	150	40	15	60	2·0	10*	1·0	2·0	200	
BDY98	F1	D	400	250	10	5·0	150	40	15	60	2·0	10*	1·0	2·0	200	
BU105	F1	D	1500†	—	2·5	2·5	115	10	—	—	—	7·5*	5·0	2·5	1·5A	For line deflection ccts. in t.v. receivers.
BU108	F1	D	1500†	—	7·5	5·0	115	12·5	—	—	—	7·0*	5·0	4·5	2·0A	
BU126	F1	D	750	300	6·0	3·0	125	30	15	60	1·0	8·0*	10	2·5	250	For use in switch mode power supplies of colour t.v. receivers.
2N3055	F2	D	100	60	—	15	200	115	20	70	4·0	0·8	1·1	4·0	400	
2N3442	F2	D	160	140	15	10	200	117	20	70	3·0	1·0*	5·0	10	2·0A	
2N3771	F2	D	50	40	30	30	200	150	15	60	15	—	2·0	15	1·5A	
2N3772	F2	D	100	60	30	20	200	150	15	60	10	—	1·4	10	1·0A	
2N4347	F2	D	140	120	10	5·0	200	100	20	70	4·0	1·0*	5·0	5·0	1·0A	

*Typical †Peak value

R.F. power transistors

Type No.	Constr.	Tech.	V_{CBO}	V_{CEO}	I_{CM}	$I_{C(AV)}$	T_j	P_{tot}	h_{FE} min.	h_{FE} max.	at I_C	f_T min.	$V_{CE(sat)}$ max.	at I_C	I_B	P_O typ. (W)	G_a typ. (dB)	at f (MHz)	at V_{CC} (V)
BFW16A	H3	PE	40	25	300	150	200	1·5	25	—	150	1200*	—	—	—	90	6·5	800	18
BFW17A	H3	PE	40	25	300	150	200	1·5	25	—	150	1100*	—	—	—	150	16	200	18
BLX13	BT	P	65	36	6·0	3·0	200	70	10	120	1·0	500*	—	—	—	25§	>18	28	28
BLX14	BU	P	85	36	12	4·0	200	88	15	100	1·4	250*	1·0	0·7	140	50	>7·5	70	28
BLX65	H3	P	36	18	2·0	0·7	150	3·0**	10	—	0·1	1400*	0·1*	0·1	20	2·0	—	470	13·8
BLX66	BS	P	36	18	2·0	0·7	150	4·0**	10	—	0·1	1400*	0·1*	0·1	20	2·5	—	470	13·8
BLX67	V	P	36	18	2·0	0·7	150	4·5**	10	—	0·1	1400*	0·1*	0·1	20	3·0	—	470	13·8
BLX69	W	P	36	18	10	3·5	200	50	30*	—	1·0	1000*	0·5	0·7	140	20	>4	470	13·5
BLX94 (379BLY)	W	PE	65	36	6·0	2·0	200	50	10	100	1·0	1000*	—	—	—	20	>6	470	28
BLY33	H3	P	66‡	33	1·5	0·5	150	5	10	—	0·2	250	—	—	—	2·0†	8	175	13·8
BLY34	H3	P	40‡	20	1·5	0·5	150	5	10	—	0·2	250	—	—	—	3·0	8	175	13·8
BLY35	AG	P	66‡	33	7·5	2·5	150	12**	10	220	1·0	250	—	—	—	7††	—	175	13·8
BLY36	AG	P	40‡	20	7·5	2·5	150	12**	10	—	1·0	250	—	—	—	>13	>5	175	13·8
BLY53A	V	P	36	18	4·0	1·0	150	8**	10	—	0·5	1300*	0·2	0·5	100	>7·0	5·4	470	13·8

* Typical ** at T_{mb}=90°C † a.m. operation ‡ V_{CES} (f. >1·0 MHz) § P.E.P. class AB with d3= −35dB

Transistors

R.F. power transistors (cont).

Type	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	Tj (°C)	P_{tot} T_{mb}=25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	I_B (mA)	P_O typ. (W)	G_a typ. (dB)	at f (MHz)	at V_{CC} (V)
BLY55	AG	P	40‡	20	3·0	1·0	150	10	60*	—	0·2	250	—	—	—	4·0	10	175	13·8
BLY83	V	P	66‡	33	7·5	2·5	150	12**	10	220	1·0	250	—	—	—	7††	—	175	13·8
BLY84	V	P	40‡	20	7·5	2·5	150	12**	10	—	1·0	250	—	—	—	13	>5	175	13·8
BLY85	V	P	40‡	20	3·0	1·0	150	10	10	—	0·2	250	—	—	—	>4	10	175	13·8
BLY89A	BT	P	36	18	10	5·0	200	70	10	120	1·0	650*	—	—	—	25	>6	175	13·5
BLY90	BU	P	36	18	20	8·0	200	30	10	—	1·0	550*	—	—	—	50	>4	175	12·5
BLY93A	BT	P	65	36	9·0	3·0	200	70	10	120	1·0	500*	—	—	—	25	>9	175	28
BLY94	BU	P	65	36	12	6·0	200	130	10	120	1·0	500*	—	—	—	50	>7	175	28
BLY97	V	P	66‡	33	3·0	1·0	150	10	10	—	0·2	250	—	—	—	>4	20	175	24
BLY98	V	P	60	33	3·0	1·0	150	8**	10	—	0·5	800*	0·2	0·5	100	7	8	470	28
542BLY	BT	P	65	36	—	—	—	87·5	50*	—	1·4	1000	—	—	—	40	5·2	470	20
810BLY/A	AG	P	55	35	9·0	3·0	—	22·5	20	100	1·0	300*	1·0	1·0	200	>20	>10	70	28
2N3375	AG	P	65	40	1·5	0·5	200	11·6	10	100	0·25	500*	1·0	0·50	100	>3·0	—	400	28
2N3553	H3	P	65	40	1·0	0·35	200	7·0	10	100	0·25	500*	1·0	0·25	50	>2·5	—	175	28
2N3632	AG	P	65	40	3·0	1·0	200	23	10	150	0·25	400*	1·0	1·0	200	13·5	—	175	28
2N3866	H3	PE	55	30	0·4	0·4	200	5·0†	10	200	0·05	700*	1·0	0·1	20	1000	>10	400	28
2N4427	H3	PE	40	20	0·4	0·4	200	3·5†	10	200	0·1	700*	0·5	0·1	20	1000	>10	175	12

*Typical ‡V_{CES} (f.>1·0 MHz) **at T_{mb}=90°C † a.m. operation

†† a.m. operation in 2-stage amplifier incorporating BLY33 for a typical input power to BLY33 of 350 mW and envelope distortion less than 5% at 80% modulation

broad band R.F. power modules

Type No.	Description	Frequency Range (MHz)	Supply Voltage (V)	Min. Power Output (W)	at P_{DR} (W)	Efficiency Typ. (%)
380BGY	U.H.F. amplifier modules designed for mobile	380–512	13·5	2·5	0·05	45
381BGY	communications equipments	380–512	13·5	7	2·5	60

silicon planar n-p-n differential amplifiers

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features I_{C1}/I_{C2} ratio at equal V_{BE} min.	max.
BCY55	BF	PE	45	45	30	125	300	200	600	10	50	1·0	10	0·5	0·85	1·0
BCY87	BG	PE	45	40	30	175	150	100	450	0·05	50	—	—	—	0·9	1·11
BCY88	BG	PE	45	40	30	175	150	120	600	0·5	50	—	—	—	0·8	1·25
BCY89	BG	PE	45	40	30	175	150	100	600	10	50	—	—	—	0·67	1·5

Transistors
silicon p-n-p low power transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features
GENERAL PURPOSE																
BC157	D	PE	−50	−45	200	100	125	300	75†	260	−2·0	130*	−0·3*	100	5	N <10dB at f = 1kHz
BC158	D	PE	−30	−25	200	100	125	300	75†	260	−2·0	130*	−0·3*	100	5	N <10dB at f = 1kHz
BC159	D	PE	−25	−20	200	100	125	300	125†	500	−2·0	130*	−0·3*	100	5	N <4dB at f = 30Hz to 15kHz
BC307	BD	PE	−50	−45	200	100	125	300	75†	250	2·0	150*	−0·3	10	0·5	N <10dB at f = 1kHz
BC308	BD	PE	−30	−25	200	100	125	300	75†	500	2·0	150*	−0·3	10	0·5	N <10dB at f = 1kHz
BC309	BD	PE	−25	−20	200	100	125	300	125†	500	2·0	150*	−0·3	10	0·5	N <4dB at f = 1kHz
BCY30	H2	A	−64	−50	100	50	150	250	10	35	20	0·25	−0·55	20	3·0	
BCY31	H2	A	−64	−50	100	50	150	250	15	60	20	0·25	−0·55	20	3·0	
BCY32	H2	A	−64	−50	100	50	150	250	20	70	20	0·25	−0·55	20	3·0	
BCY33	H2	A	−32	−25	100	50	150	250	10	35	20	0·4	−0·55	20	3·0	
BCY34	H2	A	−32	−25	100	50	150	250	15	60	20	0·6	−0·55	20	3·0	
BCY38	H1	A	−32	−24	500	250	150	410	10	30	150	0·45	−1·1	150	15	
BCY39	H1	A	−64	−60	500	250	150	410	10	50	150	0·45	−1·1	150	15	
BCY40	H1	A	−32	−24	500	250	150	410	15	120	150	0·85	−1·1	150	15	
BCY54	H1	A	−50	−50	500	250	150	410	12	70	150	0·45	−1·1	150	15	
BCY70‡	G1	PE	−50	−40	200	200	200	350	50	—	10	250	−0·25	10	1·0	
BCY71‡	G1	PE	−45	−45	200	200	200	350	100	600	10	200	−0·25	10	1·0	N <2dB at f = 10Hz to 10kHz
BCY72‡	G1	PE	−25	−25	200	200	200	350	50	—	10	200	−0·25	10	1·0	
BCZ11	L	A	−30	−25	100	50	150	250	25†	60	1·0	0·9	−0·55	20	3·0	
BFW87	D	PE	−60	−60	500	500	125	300	80	320	150	100	−0·40	150	15	
BFW88	D	PE	−60	−60	500	500	125	300	40	120	150	100	−0·40	150	15	
BFW89	D	PE	−40	−40	500	500	125	300	80	320	150	100	−0·40	150	15	
BFW90	D	PE	−40	−40	500	500	125	300	40	120	150	100	−0·40	150	15	
BFW91	D	PE	−20	−20	500	500	125	300	40	—	150	100	−0·40	150	15	
BFX37	G1	PE	−60	−60	—	50	200	360	70	300	0·01	40	−0·40	50	5·0	N <3dB at f = 10Hz to 10kHz
BSV68	G1	PE	−110	−100	100	100	150	250	30	—	25	50	−0·25	25	2·5	Numerical indicator tube driver
OC200	L	A	−30	−25	100	50	150	250	15†	60	1·0	0·45	−0·55	20	3·0	
OC201	L	A	−25	−20	100	50	150	250	20†	80	1·0	2·0	−0·55	20	3·0	
OC202	L	A	−15	−10	100	50	150	250	40†	120	1·0	1·4	−0·55	20	3·0	
OC203	L	A	−60	−50	100	50	150	250	10	60	1·0	0·3	−0·55	20	3·0	

*Typical †h_{fe} ‡also available to BS9365–F009 specification

Transistors
silicon p-n-p medium power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	Maximum Ratings I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	Special Features
GENERAL PURPOSE																
BC327	BC	PE	−50	−45	1·0A	500	150	625	100	600	100	100*	−0·7	500	50	Complementary to BC337
BC328	BC	PE	−30	−25	1·0A	500	150	625	100	600	100	100*	−0·7	500	50	Complementary to BC338
BD132	BY	PE	−45	−45	6·0A	3·0A	125	11W	40	—	500	60	−0·4	500	50	Complementary to BD132
BD136	BY	PE	−45	−45	1·5A	500	125	6·5W	40	250	150	75*	−0·5	500	50	Complementary to BD135
BD138	BY	PE	−60	−60	1·5A	500	125	6·5W	40	160	150	75*	−0·5	500	50	Complementary to BD137
BD140	BY	PE	−100	−80	1·5A	500	125	6·5W	40	160	150	75*	−0·5	500	50	Complementary to BD139
BFS92	H3	PE	−100	−60	1·0A	1·0A	200	5·0W	30	—	150	70*	−1·0	500	50	
BFS93	H3	PE	−100	−60	1·0A	1·0A	200	5·0W	70	—	150	70*	−1·0	500	50	
BFS94	H3	PE	−80	−40	1·0A	1·0A	200	5·0W	40	—	150	70*	−0·7	500	50	
BFS95	H3	PE	−40	−35	1·0A	1·0A	200	5·0W	70	—	150	70*	−0·7	500	50	
BFX29‡	H3	PE	−60	−60	600	600	200	600	50	—	10	100	−0·4	150	15	
BFX30§	H3	PE	−65	−65	600	600	200	600	50	—	10	—	—	—	—	t_s <250ns at 100mA
BFX87	H3	PE	−50	−50	600	600	200	600	40	—	10	100	−0·4	150	15	
BFX88	H3	PE	−40	−40	600	600	200	600	40	—	10	100	−0·4	150	15	
OC204	L	A	−32	−24	500	250	150	310	10	30	150	0·45	−0·56	125	17	
OC205	L	A	−60	−60	500	250	150	310	10	50	150	0·45	−0·56	125	17	
OC206	L	A	−32	−24	500	250	150	310	16	120	150	0·85	−0·55	125	17	
OC207	L	A	−50	−50	500	250	150	310	12	70	150	0·45	−0·56	150	17	

*Typical ‡ also available to BS9365–F010 specification § also available to BS9365–F011 specification

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	I_B (mA)	t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
SWITCHING																		
2N1131	H3	PE	−50	−35	—	600	175	600	20	45	150	50	−1·5	150	15			
2N1132	H3	PE	−50	−35	—	600	175	600	30	90	150	60	−1·5	150	15			
2N2303	H3	PE	−50	−35	—	500	175	600	75	200	150	60	−1·5	150	15			
2N2904	H3	PE	−60	−40	—	600	200	600	40	120	150	200	−0·4	150	15	45	100	150
2N2904A	H3	PE	−60	−60	—	600	200	600	40	120	150	200	−0·4	150	15	45	100	150
2N2905	H3	PE	−60	−40	—	600	200	600	100	300	150	200	−0·4	150	15	45	100	150
2N2905A	H3	PE	−60	−60	—	600	200	600	100	300	150	200	−0·4	150	15	45	100	150
2N2906	G1	PE	−60	−40	—	600	200	400	40	120	150	200	−0·4	150	15	45	100	150
2N2906A	G1	PE	−60	−60	—	600	200	400	40	120	150	200	−0·4	150	15	45	100	150
2N2907	G1	PE	−60	−40	—	600	200	400	100	300	150	200	−0·4	150	15	45	100	150
2N2907A	G1	PE	−60	−60	—	600	200	400	100	300	150	200	−0·4	150	15	45	100	150
2N3133	H3	PE	−50	−35	—	600	200	600	40	120	150	200	−0·6	150	15	75	150	150
2N3134	H3	PE	−50	−35	—	600	200	600	100	300	150	200	−0·6	150	15	75	150	150
2N4036	H3	PE	−90	−65	—	1·0A	200	7·0W†	40	140	150	60	−0·6	150	15	110	700	150

‡ at $T_{case} \leqslant 25°C$

Transistors

silicon p-n-p high power transistors

Type No.	Construction	Technique	V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	I_B (mA)	Special Features
GENERAL PURPOSE																
BD202	BZ	EB	−60	−45	12	8·0	150	55	30	—	3·0	3·0	−1·0	3·0	300	Complementary to BD201
BD204	BZ	EB	−60	−60	12	8·0	150	55	30	—	2·0	3·0	−1·0	3·0	300	Complementary to BD203
BD234	BY	EB	−45	−45	6·0	2·0	150	25	25	—	1·0	3·0	−0·6	1·0	100	
BD236	BY	EB	−60	−60	6·0	2·0	150	25	25	—	1·0	3·0	−0·6	1·0	100	
BD238	BY	EB	−100	−80	6·0	2·0	150	25	25	—	1·0	3·0	−0·6	1·0	100	

silicon n channel field effect transistors

Type No.	Construction	Technique	V_{DB} (V)	V_{SB} (V)	$\pm V_{GBM}$ (V)	I_{DM} max. (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$r_{DS(on)}$ (Ω)	$r_{DS(off)}$ (Ω)	Special Features
INSULATED GATE FET (MOST)											
BFR29	J5	PE	30	30	10	50	125	200	—	—	For linear applications in the audio as well as the i.f. and v.h.f. frequency region
BSV81	J5	PE	30	30	10	50	125	200	<50	$>1\times10^{10}$	For switching and particularly for chopping applications

DUAL INSULATED GATE FET ('Tetrode' MOST)

Type No.	Construction	Technique	V_{DS} max. (V)	V_{GS} max. (V)	I_D max. (mA)	T_j (°C)	P_{tot} at 25°C (mW)	I_{GSS} max. (nA)	$-C_{rss}$ max. (fF)	G min. (dB)	N max. (dB)	Measured at f (MHz)
BFS28	J4	PE	20	8	20	135	200	1	25*	18*	4	200
3N140	J4	PE	20	8	50	175	400	1	30	16	4·5	200
3N141	J4	PE	20	8	50	175	400	1	30	13	4·5	200

*Typical

JUNCTION FET

Type No.	Construction	Technique	V_{DGM} (V)	V_{GSM} (V)	V_{DSM} (V)	I_{GM} (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$V_{(R)GS}$ max. (V)	at I_D (nA)	I_{GSS} max. (nA)	I_{DSS} (V_{GS} = 0) min. (mA)	I_{DSS} max. (mA)	at V_{DS} (V)	Special Features
BFW10	J3	PE	30	−30	30	10	200	300	8·0	0·5	0·5	8	20	15	N < 2·5dB at 100MHz; Noise Voltage < 75nV/√Hz at 10Hz
BFW11	J3	PE	30	−30	30	10	200	300	6·0	0·5	0·5	4	10	15	N < 2·5dB at 100MHz; Noise Voltage < 75nV/√Hz at 10Hz
BFW61	J3	PE	25	−25	25	10	200	300	8·0	1·0	1·0	2	20	15	
BSV78	G2	PE	40	−40	40	50	175	350	11	1·0	0·25	50	—	15	$r_{DS(on)} < 25\Omega$
BSV79	G2	PE	40	−40	40	50	175	350	7·0	1·0	0·25	20	—	15	$r_{DS(on)} < 40\Omega$
BSV80	G2	PE	40	−40	40	50	175	350	5·0	1·0	0·25	10	—	15	$r_{DS(on)} < 60\Omega$
2N3823	J3	PE	30	−30	30	10	200	300	8·0	0·5	0·5	4	20	15	N < 2·5dB at 100MHz

Transistors
silicon n channel field effect transistors (cont.)

Type No.	Construction	Technique	Maximum Ratings V_{DGM} (V)	V_{GSM} (V)	V_{DSM} (V)	I_{GM} (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$V_{(R)GS}$ max. (V)	at I_D (nA)	I_{GSS} max. (nA)	I_{DSS} ($V_{GS}=0$) min. (mA)	I_{DSS} ($V_{GS}=0$) max. (mA)	at V_{DS} (V)	Special Features
Matched Pairs															
BFS21	J3†	PE	30	30	30	10	125	250	6·0	0·5	0·5	4	10	15	$V_{G1S1}-V_{G2S2}<20mV$ I_{D1}/I_{D2} = 0·95 to 1 N<75nV/√Hz at 10Hz
BFS21A	J3†	PE	30	30	30	10	125	250	6·0	0·5	0·5	4	10	15	$V_{G1S1}-V_{G2S2}<10mV$ I_{D1}/I_{D2} = 0·95 to 1 N<75nV/√Hz at 10Hz

† The devices are supplied in matched pairs, mounted in a heat conducting S-clip.

silicon planar p-n-p-n switch

Type No.	Description		Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{EM} (mA)	$I_{E(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	V_F (V)	I_H (mA)
BRY39	Integrated p-n-p-n transistor pair Applications include controlled switch, programmable unijunction transistor and thyristor tetrode.	J6	70	−70	2500	175	150	275	<1·4	<1·0

Microminiature devices
primarily intended for hybrid, thin and thick film circuits
n-p-n transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Nearest type in TO–18 envelope
BCW31R **BCW33R** **BCW33R**	Y1	PE	30	20	50	125	150	110 200 420	220 450 800	2·0	300*	0·25	10	0·5	BC108A BC108B BC108C
BCW71R **BCW72R**	Y1	PE	50	45	50	125	150	110 200	220 450	2·0	300*	0·25	10	0·5	BC107A BC107A
BFR92	Y1	PE	20	15	25	150	180	25	—	14	5000*	—	—	—	BFR90
BFR93	Y1	PE	18	10	35	150	180	25	—	30	5000*	—	—	—	BFR91
BFS17R	Y1	PE	30	15	25	125	150	25	150	2·0	1200*	—	—	—	BFY90
BFS20R	Y1	PE	30	20	25	125	150	40	—	7·0	250	—	—	—	BF173
BSV52R	Y1	PE	20	12	50	125	150	40	120	10	400	0·25	10	1·0	BSX20

p-n-p transistors

BCW29R **BCW30R**	Y1	PE	−30	−20	50	125	150	120 215	260 500	2·0	130	0·1*	10	0·5	BC178A BC178B
BCW69R **BCW70R**	Y1	PE	−50	−45	50	125	150	120 215	260 500	2·0	150*	0·3	10	0·5	BC177A BC177B

Microminiature devices

n channel junction field effect transistors

Type No.	Construction	Technique	V_{DGO} (V)	V_{GSO} (V)	Maximum Ratings $\pm V_{DS}$ (V)	I_G (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$V_{(P)GS}$ max. (V)	at I_D (nA)	$-I_{GSS}$ max. (nA)	I_{DSS} ($V_{GS}=0$) min. (mA)	max. (mA)	at V_{DS} (V)
BFR30	Y2	PE	25	−25	25	5·0	125	150	−5·0	0·5	0·2	4·0	10	10
BFR31	Y2	PE	25	−25	25	5·0	125	150	−2·5	0·5	0·2	1·0	5·0	10

diodes

Type No.	Construction	Technique	Description	V_{RRM} (V)	I_{FM} (mA)	$I_{F(AV)}$ (mA)	Max. Reverse Recovery Time, t_{rr} (ns)	Measured at: I_F (mA)	I_R (mA)	R_A (Ω)	Nearest type
BAV70	Y4	PE	Common cathode double diode	50	100	50	6·0	10	1	100	2 × BAX13
BAW56	Y5	PE	Common anode double diode								

* Typical

silicon planar voltage reference diodes

150mW (T_{amb} = 25°C) ± 5% voltage tolerance, Construction Y3

Type No.	Nom. Zener Voltage	Measured at Test I_Z Min. Voltage	Max. Voltage	Max. Slope Resistance	Typ. Temp. Coefficient	Test I_Z	Max. I_R	at V_R
BZX84	(V)	(V)	(V)	(Ω)	(mV/°C)	(mA)	(μA)	(V)
—C5V6	5·6	5·3	6·0	40	+1·2	5·0	2·0	2·0
—C6V2	6·2	5·8	6·6	20	+2·0	5·0	0·5	2·0
—C6V8	6·8	6·4	7·2	20	+3·0	5·0	0·1	3·0
—C7V5	7·5	7·1	7·9	20	+4·0	5·0	0·1	3·0
—C8V2	8·2	7·8	8·7	20	+5·0	5·0	0·1	3·0
—C9V1	9·1	8·6	9·6	20	+6·0	5·0	0·1	5·0
—C10	10	9·4	10·6	25	+7·0	5·0	0·1	7·0
—C11	11	10·4	11·6	30	+8·0	5·0	0·1	7·0
—C12	12	11·4	12·6	30	+9·0	5·0	0·1	8·0

Photodevices

phototransistors book 1 part 3

Type No.	Spectral Response Peak (µm)	Spectral Response Cut-off (µm)	Description and Construction		Max. Dark Current (µA)	Sensitivity min. (µA/lux)	Cut-off Frequency (kHz)	Tj max. (°C)	V_{CE} max. (V)	I_{CM} max. (mA)
BPX25	0·8	1·1	Silicon n-p-n general purpose photo-transistor with lensed window	J2	1·0	2·5	200	150	32	50
BPX29			Silicon n-p-n general purpose photo-transistor with plane window			0·25	150			
BPX25A	0·8	1·1	Silicon n-p-n "Darlington-pair" photo-transistor with lensed window.	J2	0·25	50	—	175	30	100
BPX29A			Silicon n-p-n "Darlington-pair" photo-transistor with plane window			2	—			
BPX70	0·8	1·1	Silicon n-p-n photo-transistors in modified TO-18 encapsulation with plastic window.	G1	0·1	0·1	—	125	30	25
BPX72						0·5	—			
BPX71	0·8	1·1	Silicon n-p-n photo-transistor in sub-miniature encapsulation to JEDEC DO–31.	CB	0·025	1	—	150	50	20

photosilicon controlled switch

Type No.	Peak Spectral Response (µm)	Description and Construction		V_{RE} max. (V)	I_E max. (mA)	I_{ERM} (A)	E_{on} (mW/cm^2)	E_{off} (mW/cm^2)
BPX66	0·8	Silicon planar p-n-p-n light activated SCS capable of switching 10A.	J7	70	100	10	1·5	0·5

photodiodes

Type No.	Spectral Response Peak (µm)	Spectral Response Cut-off (µm)	Description and Construction		Max. Dark Current (µA)	Sensitivity min. (µA/lux)	Cut-off Frequency (kHz)	Tj max. (°C)	V_R max. (V)	I_R max. (mA)
BPX40	0·8	1·1		AX	0·5 at 15V	0·0105 10^{-3}	—	125	18	2
BPX41	0·8	1·1	Unencapsulated silicon planar photo-diodes for general purpose applications.	AX	1·0 at 15V	0·031	—	125	18	5
BPX42	0·8	1·1		AY	5·0 at 10V	0·120	—	125	12	20
BPY10	0·8	1·1	Silicon photodiode for use in either photoconductive or voltaic‡ modes	AJ	10	0·015	—	100	1·0	—
BPY13	0·9	1·1	Silicon photodiode for high-speed applications	[d]H6	1·0	0·25[a] µA/µW	10 MHz	—	50	—
BPY13A	0·9	1·1	Silicon photodiode for ultra high speed applications	[d]H6	2·0	0·25[a] µA/µW	300 MHz	—	100[b]	—
BPY68 / **BPY69**	0·9	1·1	Silicon n-p-n duo-photodiodes for use in photoconductive mode	AK1 / AK2	0·05	0·2	—	125	60	10
BPY77	0·8	1·1	Silicon photodiode for ultra high speed applications	G5	0·002 at 10V	0·035 typ	—	200	100	40
OAP12	1·55	1·8	Germanium photodiode for use in photoconductive† mode	AK1	15	0·05[c]	50	60	30	3·0

[a]With monochromatic light, at 0·9µm. Measured with a gallium arsenide diode type CQY11 †i.e. Reverse biased

[b]Typical operating voltage (depletion voltage) ‡i.e. No bias voltage

[c]AT 25°C, V_R = 10V and 800 lux from 2700K source [d]H6 is 2-lead TO–5 with end window.

For information on cadmium sulphide (CdS) photoconductive devices and radiation detectors see the Mullard publication "Industrial tubes and special products" reference guide

Photodevices
electroluminescent diodes

Ga As diodes emitting near infrared radiation for use in optical transmission of information, optoelectronic couplings and monochromatic sources

Type No.	Peak Spectral Response (μm)	Description and Construction		I_{FM} max. (mA)	I_F max. (mA)	P/I min. (mW/A)	t_r typ. (ns)	T_j Temperature Range (°C)
CQY11B	0·875	Ga As diode in modified TO–18 encapsulation with plane window	G4	200	30	3·0	100	−55 +150
CQY11C	0·875	Ga As diode in modified TO–18 encapsulation with lensed window	G4	200	30	3·0	100	−55 +150
CQY12B	0·875	Ga As diode in modified TO–5 encapsulation with plane window	BK	5000	300	2·0	1·0	−196 +150

visible (red) electroluminescent diode

Type No.	Peak Spectral Response (μm)	Description and Construction		I_F max. (mA)	V_F max. (V)	Luminance (at 20mA) (cd/m²)	T_j max. (°C)
CQY24 (183CQY)	0·65	Plastic encapsulated GaAsP light emitting diode for general use i.e. panel warning light, logic-state indicator	CA	50	2	170	100

Solid-state photo-relays

Type No.	Description		I_C/I_F typ.	I_F (max.) (mA)	Minimum Isolation Voltage (V)	t_r (typ.) (μs)	t_f (typ.) (μs)	Operating Temperature Range (°C)
CQY13	Solid-state photo-relays consisting of a GaAs electro-luminescent diode and a silicon n-p-n photo-transistor	T	0·2 (I_c = 2mA)	30	420	3	2	−55 to +125
CQY23 (174CQY)		BN	1·0 (I_F = 10mA)	20	2000	3	1	−55 to +125

pyro-electric detectors

Type No.	Specification No.	Typ. Noise Equivalent Power (500K, 90, 1) (W)	Typical Detectivity D* (λpk, 800, 1) cm(Hz)½/W	Wavelength Range (μm)	Typical Responsivity (V/W)	Frequency Range	Sensitive Area (mm)
802CPY	F362	5×10^{-10}	$1{\cdot}2\times10^{8}$	2–25	7×10^{3}	10Hz–100kHz	0·7 diam.
	F363	$1{\cdot}5\times10^{-9}$	$1{\cdot}2\times10^{8}$	2–25	1×10^{3}	10Hz–100kHz	2·0 diam.
	F364	$1{\cdot}4\times10^{-9}$	$1{\cdot}2\times10^{8}$	2-25	$1{\cdot}1\times10^{3}$	10Hz–100kHz	3×1
	F365	$3{\cdot}0\times10^{-9}$	$1{\cdot}2\times10^{8}$	2–25	$2{\cdot}5\times10^{3}$	10Hz–100kHz	6×2·5
825CPY		(500K, 10, 1) 3×10^{-10}	D* (500K, 10, 1) 6×10^{8}	2–25	2×10^{5}	5Hz–50Hz	3×1

Note: Mullard have in development Mercury Cadmium Telluride detectors for operation in the 8μm to 14μm band at 77K and also in the 3μm to 5·5μm at 295K. Additionally the following materials HgCdTe, InSb and PbSe are available mounted on thermo-electric coolers for enhanced performance. Please write for further information.

Photodevices

infrared photoconductive detectors book 2 part 2

Type No.	Spectral Response Peak (μm)	Spectral Response Cut-off (μm)	Description		Typical Detectivity D*(λpk,800,1) cm(Hz)½/W	Typical Monochromatic Responsivity (V/W)	Typical Time Constant (μs)	Sensitive Area (mm)	Element Resistance (kΩ)
RPY75 **RPY75A**	1·5 to 2·1	2·6	Lead sulphide detectors for room temperature operation RPY75A incorporates a germanium filter to cut off visible radiations	AL	$2{\cdot}0\times10^{10}$	5×10^{5}	250	1·0×1·0	> 200
RPY76 **RPY76A**	1·5 to 2·1	2·6	Lead sulphide detectors for room temperature operation RPY76A incorporates a germanium filter to cut off visible radiations	[a]H5	$2{\cdot}0\times10^{10}$	5×10^{5}	250	1·0×1·0	> 200
61SV	2·2	3·5	Lead sulphide detector for room temperature operation	AM	$4{\cdot}0\times10^{10}$	8×10^{4}	100	6·0×6·0	1 to 4MΩ
62SV	2·5	3·5	Lead sulphide detector for room temperature operation	AM	$6{\cdot}0\times10^{10}$	$1{\cdot}2\times10^{5}$	175	6·0×6·0	1 to 4MΩ
RPY57	2 to 2·3	3·5	Lead sulphide detector for room temperature operation	[b]AM	$5{\cdot}0\times10^{10}$	$1{\cdot}0\times10^{5}$	200	5 inside 8 outside (annular)	200 to 800
ORP13	5·3	5·6	Indium antimonide detector for liquid N_2 temperature 77K operation	AN	$5{\cdot}5\times10^{10}$	$3{\cdot}5\times10^{4}$	5	6·0×0·5	20 to 60
RPY31	5·3	5·6	Indium antimonide detector for liquid N_2 temperature 77K operation	AN	$4{\cdot}0\times10^{10}$	$2{\cdot}6\times10^{3}$	5	4·0×4·0	1 to 5
RPY35	5·3	5·6	Indium antimonide detector for liquid N_2 or miniature Joule-Thompson coolers	BA	$4{\cdot}0\times10^{10}$	$2{\cdot}6\times10^{3}$	5	4·0×4·0	1 to 5
RPY36	5·3	5·6	Indium antimonide detector for liquid N_2 temperature 77K operation	AN	$2{\cdot}0\times10^{10}$	5×10^{3}	<2·0	6·0×0·5	8 to 20
RPY51 **RPY52**	5·3	5·6	Indium antimonide detectors for 77K operation using liquid N_2 or miniature Joule-Thompson coole rs	BA	$9{\cdot}0\times10^{10}$ $5{\cdot}0\times10^{10}$	$4{\cdot}5\times10^{4}$	2·5	0·5×0·5	1·2 to 3·5
RPY56	5·3	5·6	Indium antimonide detector for 77K operation using liquid N_2 or miniature Joule-Thompson coolers	AS	$4{\cdot}0\times10^{9}$ (500K,800,1)	60	5	5 inside 8 outside (annular)	130 to 350Ω
ORP10	6 to 6·3	7·5	Indium antimonide detector for room temperature operation	AO	$2{\cdot}0\times10^{8}$	1·0	0·1	6·0×0·5	30 to 120Ω
RPY77	6 to 6·3	7·5	Indium antimonide labyrinth detector for room temperature operation	BB	$>1\times10^{8}$	5·0	< 0·1	2×2	0·5 to 1·5
RPY78	6 to 6·3	7·0†		BB	$>9{\cdot}5\times10^{7}$	5·0	< 0·1	2×2	0·5 to 1·5
RPY79	6 to 6·3	7·5		BB	$>1\times10^{8}$	5·0	< 0·1	1×1	100 to 300Ω
RPY80	6 to 6·3	7·0†		BB	$>9{\cdot}5\times10^{7}$	5·0	< 0·1	1×1	100 to 300Ω
RPY37	15	25	Copper doped germanium detector for liquid Helium temperature 4·2K operation		$>1{\cdot}0\times10^{10}$‡	750 at 500K	< 1·0	6·0×1·0	5 to 300
RPY40	15	25	Copper doped germanium detector for liquid Helium temperature 4·2K operation		$>1{\cdot}0\times10^{10}$‡	500 at 500K	< 1·0	4·0×4·0	5 to 50

[a] H5 (TO–5 with end window) connections as follows: 1 and 2 Cell connections 3 Metal case

[b] But with annular sensitive area.

† Limited spectral response due to sapphire window

‡ Can be increased by fitting windows other than the standard bloomed Ge.

Photodevices
cadmium sulphide photoconductive cells book 2 part 2

All types: Spectral response range 0·3 to 0·9μm

Type No.	Incidence of Illumination	Max. Dissipation (mW)	at (°C)	Max. Cell Voltage (d.c. or pk.) (V)	Nominal* Cell Resistance (kΩ)	Ambient Temperature Limits (°C)	Base
ORP52	Side-on and End-on	400	25	200	1·2	−40 to +70	Wired-in
ORP60	End-on	70	25	350	60	−40 to +70	Wired-in
ORP61	Side-on	70 20	25 70	350	60	−40 to +70	Wired-in
ORP62	Side-on	100	25	350	45	−40 to +70	Wired-in
ORP69	Side-on and End-on	100	25	350	30	−40 to +70	Wired-in
ORP90	Side-on	1000 300	25 70	350	1·0	−40 to +70	B7G
ORP93	Side-on	1000 350	25 70	400	1·7	−40 to +70	B7G
RPY18	Side-on	500	25	100	0·5	−40 to +70	Wired-in
RPY19	Side-on	500	25	400	3·0	−40 to +70	Wired-in
RPY20	Side-on	1000	25	400	1·5	−40 to +70	Wired-in
RPY33	End-on (Cadmium sulpho-selenide)	75	25	50	2·5 (at 25 lux)	−40 to +60	Wired-in
RPY43	Side-on	750	25	400	1·5	−40 to +70	Wired-in
RPY54	Side-on	500	25	200	1·5	−40 to +70	Wired-in
RPY55	End-on	1000	25	200	0·42	−40 to +70	Wired-in
RPY58	Side-on (Monograin)	100	40	50	0·6	−40 to +60	Wired-in
RPY71	Side-on (Linear monograin)	50	25	50	3·0 to 6·0 (at 10 lux)	−40 to +70	Wired-in

*Measured at 50 lux and with lamp of colour temperature 2700K.

Microwave semiconductors book 1 part 3
microwave tunnel diodes

Type No.	Description		Cut-off Frequency f_{ro} min. (GHz)	I_p typ (mA)	$I_p/I_{v\ min}$	Noise Measure N_s
AEY13			6·0			
AEY15	Low noise microwave amplifier in S band	AR	8·0	2·0	6·0	1·3
AEY16			10			

microwave detector diodes

Type No.	Description		Frequency Range (GHz)	Typical Tangential Sensitivity (dbm)	Min. Figure of Merit	Typical Video Impedance (Ω)
AEY17	Germanium bonded backward diode for use at X band	AH	1–18	−53	120*	300
AEY29	Germanium bonded backward diode for use at J band	AZ	12–18	−53	50†	300
AEY31	Subminiature germanium bonded backward diodes for use up to J band	AV	1–18	−53	120*	300
AEY31A			1–18	−50	50*	300
BAV46	Schottky barrier diode for use in X band doppler radar systems	BO	1–12	−52	—	850
BAV75	Schottky barrier diode for low level detector applications	C	1–18	−52	—	—
CAY17	Schottky barrier diode for use in X band	BE	1–12	−50*	—	220

*Measured at 9·375GHz. †Measured at 16·5GHz in JAN 201 holder.

gunn effect devices

Type No.	Description	Construction	Operating Voltage (V)	Operating Frequency	P_{out} typ. (mW)	P_{tot} max. (25°C) (W)
CXY11A		C			5·0	
CXY11B		C	7·0	X-Band	10·0	1·0
CXY11C	Ga As bulk effect devices employing the Gunn Effect to produce C.W. oscillations at microwave frequency	C			15·0	
CXY19		C	8·0 to 15	X-Band	65	3·0
CXY20		Z				

Microwave semiconductors
microwave mixer diodes

Type No.	Description		Maximum Operating Frequency (GHz)	Typical Noise Figure (dB)	Leakage Current at $V_R = 0{\cdot}5V$ (μA)	Forward Current at $V_F = 0{\cdot}5V$ (mA)	Typical Impedance z_{IF} (Ω)	Operating Temperature (°C)
AAY34	Germanium sub-miniature diode for use in Q band	AH	40	8·5	10	2·0	750	−65 to +150
AAY39(CV7762) **AAY39A**	Germanium sub-miniature diode for use in X band	AH	18	6·0 7·0	3·0	5·0	350	−65 to +150
AAY50(CV7838)	Germanium diode	X	12	6·2	3·0	9·0	400	−55 to +100
AAY50R* (CV7839)	for use in X band							
AAY51 (CV7776)	Germanium diode	AZ	18	7·0	3·0	9·0	270	−55 to +100
AAY51R* (CV7777)	for use in J band							
AAY52	Germanium diode	AZ	18	8·0	3·0	9·0	270	−55 to +100
AAY52R*	for use in J band							
AAY59	Subminiature Germanium point contact diode for use at Q band	AH	40	8·5	2·0	2·0	1000	−55 to +100
BAV22 **BAV22R***	Co-axial Schottky barrier diode for use in S and X band low noise mixers	X	12	6·0	—	—	400	−55 to +150
BAW95D **BAW95E** **BAW95F**	Schottky barrier diode for use in X band	BO	12	7·8 7·2 6·8	—	—	300	−65 to +150
CAY17	Schottky barrier diode for use in X band	BE	12	6·0	1·0 at 5·0V	0·05 at 0·6V	300	−55 to +150

Type No.	Construction	Max. Op. Frequency (GHz)	Operating Bands	Typical Noise Factor (dB)	Typical I.F. Impedance (Ω)
GEM1*/GEM2	X	12	X	7·5	170
GEM3/GEM4* (CV7108) (CV7109)	X	12	X, S, L	8·5	350
SIM2/SIM5* (CV2154) (CV2155)	X	12	X, S, L	9·5	350

*Reverse polarity version

Microwave semiconductors varactor diodes

Type No.	Description and Construction		Capacitance at V_R (pF)	(V)	V_R max. (V)	Cj typical (pF)	Typical Cut-off Frequency (GHz)
BAY96	Silicon planar diode for use in high efficiency multiplier circuits, input powers up to 30W	E1	16 35	40 6	120	32	25
BXY27	Silicon planar epitaxial varactor diode for use in multipliers up to S band and input powers up to 10W	C	4·5	6	55	4·5	70
BXY28	Silicon planar epitaxial varactor diode for use in high efficiency multipliers in the 2–4 GHz range	C	1·5	6	45	1·5	100 min.
BXY29	Silicon planar epitaxial varactor diode for use in frequency multiplier circuits in the 4–8 GHz range	C	1·0	6	25	1·0	120
BXY32	Silicon planar step recovery diode for high order frequency multipliers with outputs in X band	C	0·75	6	—	0·75	150
BXY35	Silicon planar epitaxial varactor diodes for frequency multipliers up to 18GHz, available in a variety of outlines. (BXY35–BXY41)	E1, AW	9	6	100	9	25
BXY36		C, AW, Z	5	6	70	5	75
BXY37		C, AW, Z	3	6	70	3	100
BXY38		C, AW, Z, CC	1·6	6	50	1·6	120
BXY39		C, AW, Z, CC	1·0	6	40	1·0	150
BXY40		C, AW, Z, CC	0·65	6	25	0·65	180
BXY41		C. AW, Z, CC	0·4	6	25	0·4	200
CAY10	Gallium arsenide diode, diffused mesa type, for use in microwave parametric amplifiers, frequency multipliers and switches	C	0·4	0	6·0	0·4	250
CXY10	Gallium arsenide diode with a high cut-off frequency for use in parametric amplifiers, frequency multipliers and switches	AR	0·2	0	6·0	0·2	400
CXY12	Gallium arsenide diode with a high cut-off frequency for use in frequency multipliers up to Q-Band	AR	0·25	6	10	0·25	500
1N4885	Silicon varactor diode for use in high efficiency multiplier circuits	E1	35	6	150	35	25
1N5152 **1N5153**	Silicon planar epitaxial varactor diodes for use in multipliers up to S band	C AW	6 6	6 6	75 75	6 6	100 100
1N5155	Silicon planar epitaxial varactor diode for use in multipliers up to C band	C	2	6	35	2	120
1N5157	Silicon planar epitaxial varactor diode for use in multipliers up to X band	C	0·8	6	20	0·8	200

Diodes

germanium point contact diodes book 1 part 3

Abridged data applying at 25°C T_{amb}

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	Typical V_F at I_F (V)	(mA)	Typical I_R at V_R (µA)	(V)	T_{amb} max. (°C)
OA90	Subminiature high frequency detector diode	A1	30	45	10	2·0	30	300	30	75
AA119	Detector diode	A1	45	100	35	2·6	30	170	45	60
OA91	Subminiature general purpose diode	A1	115	150	50	2·1	30	75	100	75
OA95	Subminiature general purpose diode	A1	115	150	50	1·85	30	80	100	75

germanium gold bonded diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FM} (mA)	Typical V_F at I_F (V)	(mA)	Typical I_R at V_{RRM} (µA)	Typical Recovered Charge (pC)	Measured at: I_F (mA)	V_R (V)	R_T (Ω)
AAZ13		A1	8	100	0·6	30	30	20	10	5	500
AAY33	High speed switching	A1	12	240	0·5†	30	15	60	10	10	1000
AAY32		A1	30	150	0·60†	30	11	100	10	10	1000
OA47	General purpose	A1	30	150	0·54	30	10	280	10	10	1000
AAY30	High speed switching	A1	50	400	0·88	150	8·0*	250	10	10	1000
AAZ17	General purpose	A1	75	250	0·7	250	150	300	10	10	1000
AAZ15	High voltage	A1	100	250	0·7	250	10	750	10	10	1000

*At $V_R = 30V$ †max.

silicon whiskerless diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	C_d (pF)	V_F max at I_F (V)	(mA)	t_{rr} (ns)	Max. Reverse Recovery Time Measured at: I_F (mA)	V_R (V)	R_L (Ω)	I_R (mA)
BAX12	Controlled avalanche diode avalanche voltage 120–175V at 1mA	AQ1	90	800	400		1·0	200	60	30	3	100	1·0
BAX13	High speed diode intended for logic application	AQ1	50	150	75		1·0	20	4	10	6	100	1·0
BAX16	Intended for general purpose industrial applications	AQ1	150	300	200		1·3	100	120	30	3	100	1·0
BAX17	Intended for general purpose industrial applications	AQ1	200	300	200		1·2	200	120	30	3	100	1·0
1N4154		B1	35	—	—	—	—	—	4	10	6	100	1·0
1N4148		B1	100	225	75	4	1·0	10	4	11	6	100	1·0
1N4149		B1	100	225	75	2	1·0	10	4	10	6	100	1·0
1N4446	High speed diodes for computer and other applications	B1	100	225	75	4	1·0	20	4	10	6	100	1·0
1N4447		B1	100	225	75	2	1·0	20	4	10	6	100	1·0
1N4448		B1	100	225	75	4	1·0	100	4	10	6	100	1·0
1N4449		B1	100	225	75	2	1·0	30	4	10	6	100	1·0

Diodes
silicon junction diodes

Abridged data applying at 25°C T_{amb}

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	V_F max. (V)	at I_F (mA)	Typical I_R at max. V_{RRM} (µA)
OA200	General purpose diode	A1	50	250	80	1·15	30	0·02
OA202	General purpose diode	A1	150	250	40	0·8	30	0·01

silicon epitaxial planar diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	C_d (pF)	V_F max. (V)	at I_F (mA)	t_{rr}: (ns)	Max. Reverse Recovery Time Measured at: I_F (mA)	V_R (V)	R_L (Ω)	I_R (mA)
BAV10	High speed diode for core gating applications in very fast memories	B1	60	600	300	2·5	1·0	200	6·0	400	—	100	40
BAV44	High speed, high current diode for servo-amplifiers, digital voltmeters and oscilloscopes	AO2	65	3·5A	1A	7·5	0·9	100	20	1A	—	50	1A
BAV45	Extremely low leakage and low capacitance diode (I_R = 10pA at V_{RRM})	G5	20	100	50	1·3	1·0	10	250	10	—	—	10
BAW62	High speed diode for fast logic applications	B1	75	225	100	2·0	1·0	100	4·0	10	1·0	100	1·0
1N914	High speed diodes for computer	AO1	100	225	75	4·0	1·0	10	4·0	10	6·0	100	1·0
1N916	High speed diodes for computer and other applications	AO1	100	225	75	2·0	1·0	10	4·0	10	6·0	100	1·0
1N4009	Ultra high speed diode	AO1	25	75	75	4·0	1·0	30	2·0	10	6·0	100	1·0

Abridged data applying at 25°C T_{amb}

multiple diode arrays

Each array consists of 8 silicon planar epitaxial diodes and are intended for core gating in very fast memories

Type No.	Description and Construction		V_{RRM} (V)	Each diode I_{FRM} (mA)	Each diode $I_{F(AV)}$ (mA)	Total device I_{FRM} (mA)	Total device $I_{F(AV)}$ (mA)	C_d (pF)	t_{rr} (ns)	Max. Reverse Recovery Time measured at: I_F (mA)	V_R (V)	R_L (Ω)	I_R (mA)
BAV40 **BAV41** **BAV42**	Series/parallel array Common anode CF Common cathode array	CF	60	900	300	2700	1000	3	6	400	—	100	400

fast recovery low power rectifier diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FSM} (A)	$I_{F(AV)}$ (mA)	V_F max. (V)	at I_F (A)	Q_S max. (nC)	Max. recovered charge Measured at: I_F (mA)	V_R (V)	$-di/dt$ (mA/µs)
BA145	High speed diode	A3	350	1·0	10	1·0	0·1	0·4	10	2·0	5·0
BA148	Fast general purpose diode	A3	350	15	400	1·5	2·0	0·8	10	2·0	5·0
BYX70–100 **–300** **–500**	High speed diodes for use in inverters and similar applications	B2	100 300 500	30	1·0	1·2	1·0	0·9	10	2·0	5·0

Diodes

low power silicon rectifier diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FSM} (A)	$I_{F(AV)}$ (A)	V_F max. (V)	at I_F (A)	I_R max. at V_{RRM} (µA)
BYX26–60 **(CV8308)**	Controlled avalanche rectifier diodes	A2	60	7·0	0·25	0·9	0·25	1·0
BYX26–150 **(CV8805)**	Controlled avalanche rectifier diodes	A2	150	7·0	0·25	0·9	0·25	1·0
BYX36–150 **–300** **–600**	Intended for general purpose industrial applications	A2	150 300 600	30	1	1·2	1	1·0
1N4001 **to** **1N4007**	General purpose rectifier diodes	B2	50 to 1000	30	1	1·1	1	10

variable capacitance diodes

Type No.	Description and Construction		V_R max. (V)	I_R max. (µA)	C_d (pF) min.	C_d (pF) max.	at V_R (V)	Capacitance Ratio min.	Capacitance Ratio max.
BA102	Intended for a.f.c. control in TV receivers	A1	20	5	20 (4 groups)	45	4·0	—	0·7
BB105B	Intended for u.h.f. and v.h.f. tuners	BV	28	0·1	2·0	2·3	25	4·5	6·0
BB105G	Intended for u.h.f. and v.h.f. tuners	BV	28	0·1	1·8	2·8	25	4·0	6·0
BB110	Silicon planar variable capacitance diode for tuning in band II f.m. and for r.f. and interstage circuits	BV	30	0·02	27 (2 groups)	33	3·0	2·65 typ.	
BB113	Silicon planar variable capacitance. triple diode for tuning in LW, MW and SW-bands of a.m. radio receivers	BW	32	0·05	230	280	1·0	13pF max. at 30V	

silicon voltage reference diodes

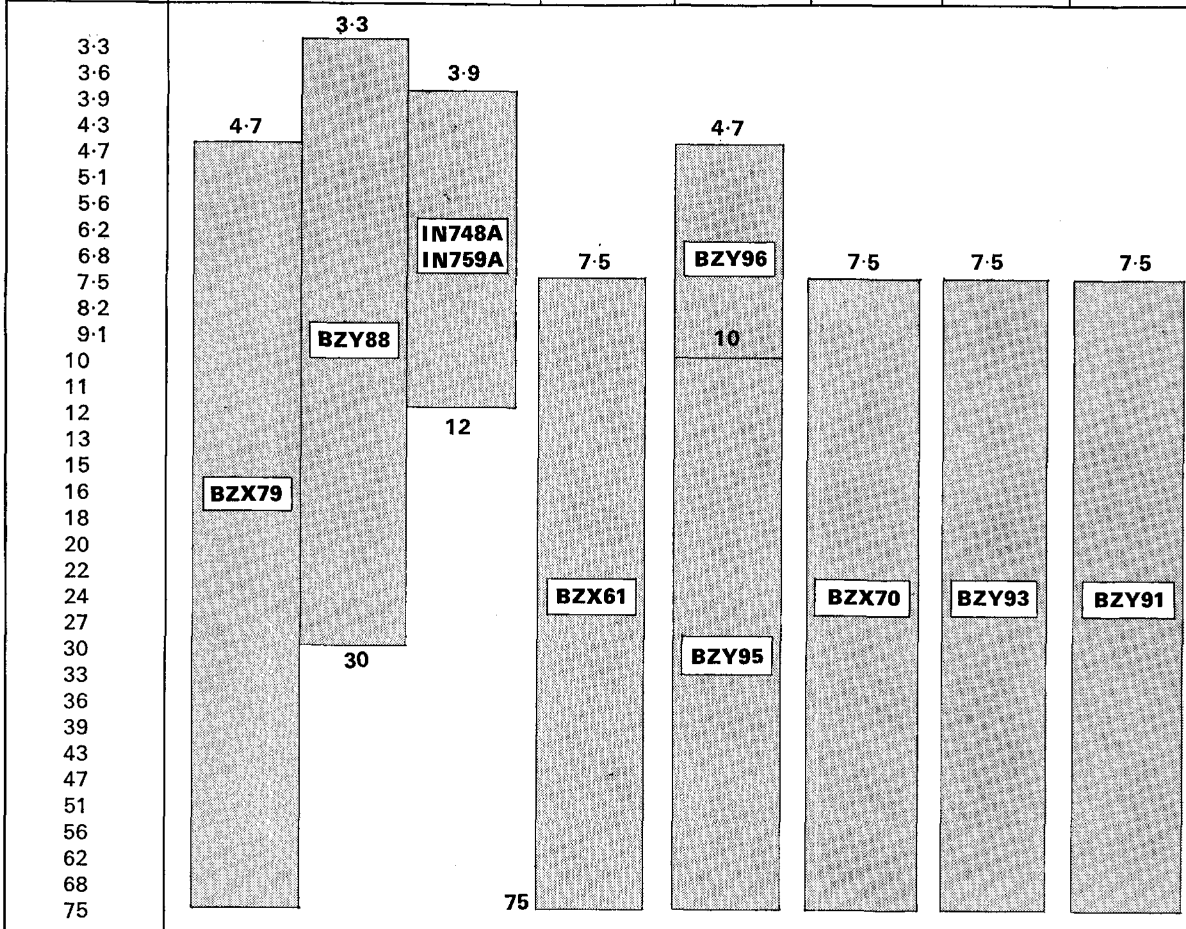
Type No.	Construction	Zener Voltage (at test I_Z) (V) Min.	Max.	Typical Temperature Coefficient (%/°C)	Ambient Temperature Range (°C) Min.	Max.	Max. Dynamic Resistance (at test I_Z) (Ω)	Test I_Z (mA)	I_{ZM} max. (mA)	P_{tot} max. (mW)
BZW10 **BZW11** **BZW12** **BZW13** **BZW14**	B1	—	—	±0·01 ±0·005 ±0·002 ±0·001 ±0·0005	−55	+100	—	2	50	400
BZX90 **BZX91** **BZX92** **BZX93** **BZX94**	B1	6·2	6·8	±0·01 ±0·005 ±0·002 ±0·001 ±0·0005	−55	+100	15	7·5	50	400
BZY78	A1	5·1	5·6	+0·006 −0·004	−40 +25	+25 +100	20	11·5	25	280
BZY78P	A1	5·1	5·6	±0·01	0	+80	20	11·5	25	280

Diodes

silicon voltage regulator diodes

selector chart

Voltage Regulator Diodes Selector Chart



	Max. dissipation						
Reference voltage	400 mW		1W	1·5W	2·5W	20W	75W
Encapsulation	DO-35	DO-7	DO-7	DO-1	SO-15	DO-4	DO-5
Polarity	Norm.	Norm.	Norm.	Norm.	Norm.	Both	Both
Rated diss. at Temp.	25°C amb.	50°C amb.	25°C amb.	25°C amb.	25°C amb.	75°C stud	65°C stud

SO-SWIFT SERVICE

This service is applicable to the BZY88 and BZX61 ranges.

The following parameters can be specially selected:—

V_Z At any specified current within the rating of the device as specified in the main data. This voltage can be chosen between 3.3 and 30V for the BZY88 range, between 7.5 and 75V for the BZX61 range. The voltage tolerance can be selected down to ±1%.

r_Z At any specified current within the rating of the device as specified in the main data. The slope resistance value can be specified down to 50% of the maximum value quoted for the standard device.

I_R At any specified voltage up to 95% of the nominal V_Z for the device measured at 5mA.

V_F To customers' requirements.

The scope of this, and obviously all other parameters is determined by the overall capabilities of the product.

Markings Any form of marking and types of colour banding can be supplied.

Diodes

silicon voltage regulator diodes (cont.)

400mW (T_{amb} = 25°C) ± 5% voltage tolerance, construction B1

Type No.	Nom. Zener Voltage	Measured at Test I_Z Min. Voltage	Max. Voltage	Max. Slope Resistance	Typ. Temp. Coefficient	Test I_Z	Max. I_R at V_R	
BZX79 (cont)	(V)	(V)	(V)	(Ω)	(mV/°C)	(mA)	(µA)	(V)
—C4V7	4·7	4·4	5·0	80	−1·40	5·0	3·0	2·0
—C5V1	5·1	4·8	5·4	60	−0·8	5·0	2·0	2·0
—C5V6	5·6	5·3	6·0	25	+1·2	5·0	1·0	2·0
—C6V2	6·2	5·8	6·6	10	+2·3	5·0	0·5	2·0
—C6V8	6·8	6·4	7·2	15	+3·0	5·0	0·1	3·0
—C7V5	7·5	7·1	7·9	15	+4·0	5·0	0·1	3·0
—C8V2	8·2	7·8	8·7	15	+5·0	5·0	0·1	3·0
—C9V1	9·1	8·6	9·6	15	+6·0	5·0	0·1	5·0
—C10	10	9·4	10·6	20	+7·0	5·0	0·1	6·5
—C11	11	10·4	11·6	20	+8·0	5·0	0·1	7·0
—C12	12	11·4	12·6	25	+9·0	5·0	0·1	8·0
—C13	13	12·4	14·1	30	+10·5	5·0	0·05	9·0
—C15	15	13·9	15·6	30	+12·5	5·0	0·05	10
—C16	16	15·4	17·1	40	+13	5·0	0·05	11
—C18	18	16·9	19·1	45	+15	5·0	0·05	12
—C20	20	18·9	21·2	55	+17	5·0	0·05	13
—C22	22	20·8	23·3	55	+19	5·0	0·05	15
—C24	24	22·7	25·9	70	+21	5·0	0·05	16
—C27	27	25·1	28·9	80	+23·5	5·0	0·05	18
—C30	30	28	32	80	+26	5·0	0·05	20
—C33	33	31	35	80	+29	5·0	0·05	22
—C36	36	34	38	90	+31	5·0	0·05	24
—C39	39	37	41	130	+34	2·0	0·05	26
—C43	43	40	45	150	+37	2·0	0·05	28
—C47	47	44	50	170	+40	2·0	0·05	32
—C51	51	48	54	180	+44	2·0	0·05	34
—C56	56	53	60	200	+47	2·0	0·05	38
—C62	62	58	66	215	+51	2·0	0·05	41
—C68	68	64	72	240	+56	2·0	0·05	45
—C75	75	71	79	255	+60	2·0	0·05	50

400mW (T_{amb} = 50°C) ±5% voltage tolerance, construction A1

‡BZY88								
—C1V3*	1·3	1·25	1·4	20	−4·0	5·0	—	—
—C3V3	3·3	3·1	3·5	110	−2·3	5·0	3·0	1·0
—C3V6	3·6	3·4	3·8	105	−2·0	5·0	3·0	1·0
—C3V9	3·9	3·7	4·1	100	−2·05	5·0	3·0	1·0
—C4V3	4·3	4·0	4·5	90	−1·8	5·0	3·0	1·0
—C4V7	4·7	4·4	5·0	85	−1·55	5·0	3·0	2·0
—C5V1	5·1	4·8	5·4	75	−1·2	5·0	1·0	2·0
—C5V6	5·6	5·3	6·0	55	−0·2	5·0	1·0	2·0
—C6V2	6·2	5·8	6·6	27	+2·0	5·0	0·5	2·0
—C6V8	6·8	6·4	7·2	15	+3·2	5·0	0·5	3·0
—C7V5	7·5	7·1	7·9	15	+4·2	5·0	0·5	3·0

‡ available to BS9305–FO40, BS9305–FO39 and BS9305–NO41. *Forward voltage regulator diode.

Diodes
silicon voltage regulator diodes (cont.)

400mW (T_{amb} = 50°C) ±5% voltage tolerance, construction A1

Type No. ‡**BZY88** (cont)	Nom. Zener Voltage (V)	Min. Voltage (V) (Measured at Test I_Z)	Max. Voltage (V) (Measured at Test I_Z)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R (μA)	at V_R (V)
—C8V2	8·2	7·8	8·7	20	+5·0	5·0	0·4	3·0
—C9V1	9·1	8·6	9·6	25	+6·0	5·0	0·4	5·0
—C10	10	9·4	10·6	25	+7·0	5·0	2·5	7·0
—C11	11	10·4	11·6	25	+8·7	5·0	2·5	7·0
—C12	12	11·4	12·6	35	+9·0	5·0	2·5	8·0
—C13	13	12·4	14·1	35	+10·5	5·0	2·5	9·0
—C15	15	13·9	15·6	35	+12·5	5·0	2·5	10
—C16	16	15·4	17·1	40	+13	5·0	2·5	11
—C18	18	16·9	19·1	45	+15	5·0	2·5	13
—C20	20	18·9	21·2	50	+17	5·0	2·5	14
—C22	22	20·8	23·3	60	+19	5·0	2·5	15
—C24	24	22·7	25·9	75	+21	5·0	2·5	17
—C27	27	25·1	28·9	85	+23·5	5·0	2·5	19
—C30	30	28	32	95	+26	5·0	2·5	21

‡also available to BS9305–FO40

1N748A to 1N759A are also available

1W (T_{amb} = 25°C) ±5% voltage tolerance, construction A2

Type No. **BZX61**	Nom. Zener Voltage (V)	Min. Voltage (V) (Measured at Test I_Z)	Max. Voltage (V) (Measured at Test I_Z)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (%/°C)	Test I_Z (mA)	Max. I_R (μA)	at V_R (V)
—C7V5	7·5	7·1	7·9	6·0	+0·04	20	10	3·0
—C8V2	8·2	7·7	8·7	7·5	+0·04	20	10	3·0
—C9V1	9·1	8·6	9·6	8·0	+0·05	20	5·0	5·0
—C10	10	9·4	10·6	8·5	+0·05	20	5·0	7·0
—C11	11	10·4	11·6	9·0	+0·05	20	5·0	7·0
—C12	12	11·4	12·6	9·0	+0·05	20	5·0	8·0
—C13	13	12·4	14·1	10	+0·05	20	5·0	9·0
—C15	15	13·9	15·6	14	+0·06	20	5·0	10
—C16	16	15·4	17·1	16	+0·06	10	5·0	11
—C18	18	16·9	19·1	20	+0·06	10	5·0	13
—C20	20	18·9	21·2	22	+0·06	10	5·0	14
—C22	22	20·8	23·3	23	+0·06	10	5·0	15
—C24	24	22·7	25·9	25	+0·06	10	5·0	17
—C27	27	25·1	28·9	35	+0·06	10	5·0	19
—C30	30	28	32	40	+0·07	10	5·0	21
—C33	33	31	35	45	+0·07	10	5·0	23
—C36	36	34	38	50	+0·07	10	5·0	25
—C39	39	37	41	60	+0·07	5	5·0	27
—C43	43	40	45	70	+0·07	5	5·0	30
—C47	47	44	50	80	+0·08	5	5·0	33
—C51	51	48	54	95	+0·08	5	5·0	36
—C56	56	53	60	105	+0·08	5	5·0	39
—C62	62	58	66	110	+0·08	5	5·0	43
—C68	68	64	72	120	+0·08	5	5·0	48
—C75	75	71	79	135	+0·08	5	5·0	52

Diodes
silicon voltage regulator diodes (cont.)

1·5W (T_{amb} = 25°C) ±5% voltage tolerance, construction Q2

Type No.	Nom. Zener Voltage (V)	Measured at Test I_Z: Min. Voltage (V)	Measured at Test I_Z: Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (µA)	Max. I_R at V_R (V)
BZY96								
—C4V7	4·7	4·4	5·1	10	−0·6	100	20	1·0
—C5V1	5·1	4·8	5·4	5·0	−0·4	100	20	1·0
—C5V6	5·6	5·3	6·0	4·0	+1·0	100	20	1·0
—C6V2	6·2	5·8	6·6	3·0	+2·0	100	20	2·0
—C6V8	6·8	6·4	7·2	3·0	+3·0	100	20	2·0
—C7V5	7·5	7·1	7·9	3·5	+4·0	50	20	3·0
—C8V2	8·2	7·7	8·7	3·5	+5·0	50	20	5·6
—C9V1	9·1	8·6	9·6	4·5	+6·4	50	20	6·2
—C10	10	9·4	10·6	5·0	+8·0	50	20	6·8

Type No.	Nom. Zener Voltage (V)	Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R (µA)	at V_R (V)
BZY95								
—C10	10	9·4	10·6	4·0	+7·0	50	10	6·8
—C11	11	10·4	11·6	4·5	+7·5	50	10	7·5
—C12	12	11·4	12·6	5·0	+8·0	50	10	8·2
—C13	13	12·4	14·1	6·0	+8·5	50	10	9·1
C15	15	13·9	15·6	8·0	+10	50	10	10
—C16	16	15·4	17·1	9·0	+11	20	10	11
—C18	18	16·9	19·1	11	+12	20	10	12
—C20	20	18·9	21·2	12	+14	20	10	13
—C22	22	20·8	23·3	13	+16	20	10	15
—C24	24	22·7	25·9	14	+18	20	10	16
—C27	27	25·1	28·9	18	+20	20	10	18
—C30	30	28	32	22	+25	20	10	20
—C33	33	31	35	25	+30	20	10	22
—C36	36	34	38	30	+32	20	10	24
—C39	39	37	41	35	+35	10	10	27
—C43	43	40	45	40	+40	10	10	30
—C47	47	44	50	50	+45	10	10	33
—C51	51	48	54	55	+50	10	10	36
—C56	56	53	60	63	+55	10	10	39
—C62	62	58	66	75	+60	10	10	43
—C68	68	64	72	90	+65	10	10	47
—C75	75	71	79	100	+70	10	10	51

2·5W (T_{amb} = 25°) ±5% voltage tolerance, construction A4

Type No.	Nom. Zener Voltage (V)	Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R (µA)	at V_R (V)
BZX70								
—C7V5	7·5	7·1	7·9	3·5	+3·0	50	50	5·6
—C8V2	8·2	7·7	8·7	3·5	+4·0	50	20	6·2
—C9V1	9·1	8·6	9·6	4·0	+5·0	50	10	6·8
—C10	10	9·4	10·6	4·0	+7·0	50	10	6·8
—C11	11	10·4	11·6	4·5	+7·5	50	10	7·5
—C12	12	11·4	12·6	5·0	+8·0	50	10	8·2

Diodes
silicon voltage regulator diodes (cont.)

2·5W (T_{amb} = 25°C) ±5% voltage tolerance, construction A4

Type No. BZX70	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	(V)
—C13	13	12·4	14·1	6·0	+8·5	50	10	9·1
—C15	15	13·9	15·6	8·0	+10	50	10	10
—C16	16	15·4	17·1	9·0	+11	20	10	11
—C18	18	16·9	19·1	11	+12	20	10	12
—C20	20	18·9	21·2	12	+14	20	10	13
—C22	22	20·8	23·3	13	+16	20	10	15
—C24	24	22·7	25·9	14	+18	20	10	16
—C27	27	25·1	28·9	18	+20	20	10	18
—C30	30	28	32	22	+25	20	10	20
—C33	33	31	35	25	+30	20	10	22
—C36	36	34	38	30	+32	20	10	24
—C39	39	37	41	35	+35	10	10	27
—C43	43	40	45	40	+40	10	10	30
—C47	47	44	50	50	+45	10	10	33
—C51	51	48	54	55	+50	10	10	36
—C56	56	53	60	63	+55	10	10	39
—C62	62	58	66	75	+60	10	10	43
—C68	68	64	72	90	+65	10	10	47
—C75	75	71	79	100	+70	10	10	51

20W (T_{mb} = 75°C) ±5% voltage tolerance, construction E1

‡BZY93								
—C7V5	7·5	7·1	7·9	0·3	+3·0	2·0	100	2·0
—C8V2	8·2	7·7	8·7	0·3	+4·0	2·0	100	5·6
—C9V1	9·1	8·6	9·6	0·5	+5·0	1·0	50	6·2
—C10	10	9·4	10·6	0·5	+7·0	1·0	50	6·8
—C11	11	10·4	11·6	1·0	+7·5	1·0	50	7·5
—C12	12	11·4	12·6	1·0	+8·0	1·0	50	8·2
—C13	13	12·4	14·1	1·0	+8·5	1·0	50	9·1
—C15	15	13·9	15·6	1·2	+10	1·0	50	10
—C16	16	15·4	17·1	1·2	+11	0·5	50	11
—C18	18	16·9	19·1	1·5	+12	0·5	50	12
—C20	20	18·9	21·2	1·5	+14	0·5	50	13
—C22	22	20·8	23·3	1·8	+16	0·5	50	15
—C24	24	22·7	25·9	2·0	+18	0·5	50	16
—C27	27	25·1	28·9	2·0	+21	0·5	50	18
—C30	30	28	32	2·5	+25	0·5	50	20
—C33	33	31	35	3·0	+30	0·5	50	22
—C36	36	34	38	4·0	+32	0·2	50	24
—C39	39	37	41	5·0	+35	0·2	50	27
—C43	43	40	45	6·5	+40	0·2	50	30
—C47	47	44	50	7·0	+45	0·2	50	33
—C51	51	48	54	7·5	+50	0·2	50	36

‡Reverse polarity types (stud-anode) are available and are denoted by 'R' at the end of the type number, e.g. BZY93—C10R.

Diodes

silicon voltage regulator diodes (cont.)

20W (T_{mb} = 75°C) ± 5% voltage tolerance, construction E1

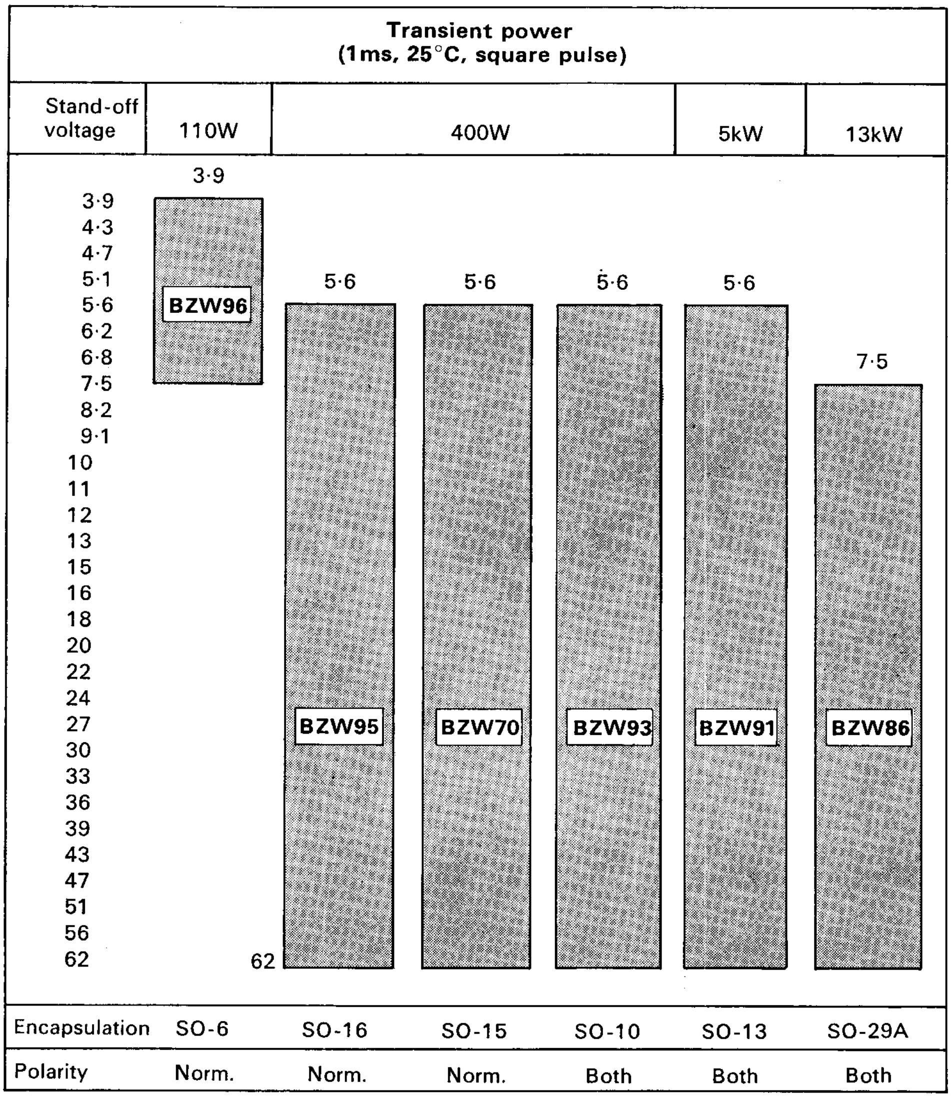
		Measured at Test I_Z						
Type No. ‡BZY93 (cont.)	Nom. Zener Voltage (V)	Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (A)	Max. I_R at V_R (µA)	(V)
—C56	56	53	60	8·0	+55	0·2	50	39
—C62	62	58	66	9·0	+60	0·2	50	43
—C68	68	64	72	10	+65	0·2	50	47
—C75	75	71	79	10·5	+70	0·2	50	51

75W (T_{mb} = 65°C) ±5% voltage tolerance, construction AF

		Measured at Test I_Z						
Type No. ‡BZY91	Nom. Zener Voltage (V)	Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (%/°C)	Test I_Z (A)	Max. I_R at V_R (mA)	(V)
—C7V5	7·5	7·0	7·9	0·2	+0·1	5·0	5·0	2·0
—C8V2	8·2	7·7	8·7	0·3	+0·1	5·0	5·0	5·6
—C9V1	9·1	8·5	9·6	0·4	+0·09	2·0	5·0	6·2
—C10	10	9·4	10·6	0·4	+0·09	2·0	1·0	6·8
—C11	11	10·4	11·6	0·4	+0·09	2·0	1·0	7·5
—C12	12	11·4	12·7	0·5	+0·09	2·0	1·0	8·2
—C13	13	12·4	14·1	0·5	+0·09	2·0	1·0	9·1
—C15	15	13·8	15·6	0·6	+0·09	2·0	1·0	10
—C16	16	15·3	17·1	0·6	+0·09	2·0	1·0	11
—C18	18	16·8	19·1	0·7	+0·09	2·0	1·0	12
—C20	20	18·8	21·2	0·8	+0·075	1·0	1·0	13
—C22	22	20·8	23·3	0·8	+0·075	1·0	1·0	15
—C24	24	22·7	25·9	0·9	+0·080	1·0	1·0	16
—C27	27	25·1	28·9	1·0	+0·082	1·0	1·0	18
—C30	30	28	32	1·1	+0·085	1·0	1·0	20
—C33	33	31	35	1·2	+0·088	1·0	1·0	22
—C36	36	34	38	1·3	+0·090	1·0	1·0	24
—C39	39	37	41	1·4	+0·090	0·5	1·0	27
—C43	43	40	46	1·5	+0·092	0·5	1·0	30
—C47	47	44	50	1·7	+0·093	0·5	1·0	33
—C51	51	48	54	1·8	+0·093	0·5	1·0	36
—C56	56	52	60	2·0	+0·094	0·5	1·0	39
—C62	62	58	66	2·2	+0·094	0·5	1·0	43
—C68	68	64	72	2·4	+0·094	0·5	1·0	47
—C75	75	70	79	2·6	+0·095	0·5	1·0	51

‡Reverse polarity types (stud-anode) are available and are denoted by 'R' at the end of the type number, e.g. BZY91—C10R.

Silicon surge suppressor diodes selector chart



110W pulse power rating (t_p=1ms) Construction Q2

Type No. **BZW96**	Max. Stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) Typ.	Max.	Measured at I_{RSM} (t_p = 500μs) (A)	Max. I_{RSM} (t_p = 1ms) (A)
—3V9	3·9	2·0	6·5	8·2	10	12
—4V3	4·3	0·2	7·5	8·8	10	11
—4V7	4·7	0·2	8·0	9·4	10	10
—5V1	5·1	0·2	8·5	10	10	9
—5V6	5·6	0·2	9·5	11	10	8·5
—6V2	6·2	0·1	11	13	10	8
—6V8	6·8	0·1	13	15	10	7·5
—7V5	7·5	0·1	14	15	10	7

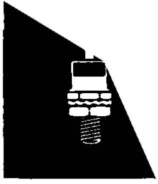
Silicon surge suppressor diodes

0.4kW pulse power rating (t_p = 1ms) Construction Q2

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V)		Measured at I_{RSM} (t_p = 500μs) (A)	Max. I_{RSM} (t_p = 1ms) (A)
BZW95			typ.	max.		
—5V6	5·6	0·5	9	10	20	40
—6V2	6·2	0·5	10	11·2	20	37
—6V8	6·8	0·5	11	12·5	20	34
—7V5	7·5	0·1	12	14	20	31
—8V2	8·2	0·1	13·5	15·5	20	28
—9V1	9·1	0·1	15	17·5	20	25
—10	10	0·1	17	19	20	22
—11	11	0·1	19	21	20	19
—12	12	0·1	21	23	20	17
—13	13	0·1	22	26	20	15
—15	15	0·1	23	26	10	15
—16	16	0·1	25	29	10	13
—18	18	0·1	28	33	10	12
—20	20	0·1	32	38	10	10
—22	22	0·1	36	43	10	9
—24	24	0·1	41	48	10	8
—27	27	0·1	47	54	10	7
—30	30	0·1	44	52	5	7
—33	33	0·1	49	58	5	6·5
—36	36	0·1	56	65	5	6
—39	39	0·1	63	72	5	5
—43	43	0·1	71	82	5	5
—47	47	0·1	80	93	5	4·5
—51	51	0·1	89	104	5	4
—56	56	0·1	98	116	5	3·5
—62	62	0·1	104	116	5	3

0.4kW pulse power rating (t_p = 1ms) Construction A4

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage typ. (V)	Clamping Voltage max. (V)	Measured at I_{RSM} (t_p = 500μs) (A)	Max. I_{RSM} (t_p = 1ms) (A)
BZW70						
—5V6	5·6	0·5	9	10		40
—6V2	6·2	0·5	10	11·2		37
—6V8	6·8	0·5	11	12·5	20A	34
—7V5	7·5	0·1	12	14		31
—8V2	8·2	0·1	13·5	15·5		28
—9V1	9·1	0·1	15	17·5		25
—10	10	0·1	17	19		22
—11	11	0·1	19	21	20A	19
—12	12	0·1	21	23		17
—13	13	0·1	23	26		15
—15	15	0·1	22	26		15
—16	16	0·1	25	29		13
—18	18	0·1	28	33	10A	12
—19	20	0·1	32	38		10
—22	22	0·1	36	43		9
—24	24	0·1	41	48		8
—27	27	0·1	47	54		7



Silicon surge suppressor diodes

0.4kW pulse power rating (t_p = 1ms) Construction A4

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) typ.	max.	Measured at I_{RSM} (t_p = 500μs) (A)	max. I_{RSM} (t_p = 1ms) (A)
BZW70 (cont.)						
—30	30	0·1	44	52		7
—33	33	0·1	49	58		6·5
—36	36	0·1	56	65		6
—39	39	0·1	63	72		5
—43	43	0·1	71	82	5A	5
—47	47	0·1	80	93		4·5
—51	51	0·1	89	104		4
—56	56	0·1	98	116		3·5
—62	62	0·1	104	116		3

0.4kW pulse power rating (t_p = 1ms) Construction E

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage typ. (V)	Clamping Voltage max. (V)	Measured at I_{RSM} (A)	max. I_{RSM} (A)
***BZW93**						
—5V6	5·6	0·5	9	10		40
6V2	6·2	0·5	10	11·2	20	37
—6V8	6·8	0·5	11	12·5	20	34
—7V5	7·5	0·1	12	14	20	31
—8V2	8·2	0·1	13·5	15·5	20	28
—9V1	9·1	0·1	15	17·5	20	25
—10	10	0·1	17	19	20	22
—11	11	0·1	19	21	20	19
—12	12	0·1	21	23	20	17
—13	13	0·1	23	26	20	15
—15	15	0·1	22	26	10	15
—16	16	0·1	25	29	10	13
—18	18	0·1	28	33	10	12
—20	20	0·1	32	38	10	10
—22	22	0·1	36	43	10	9
—24	24	0·1	41	48	10	8
—27	27	0·1	47	54	10	7
—30	30	0·1	44	52	5	7
—33	33	0·1	49	58	5	6·5
—36	36	0·1	56	65	5	6
—39	39	0·1	63	72	5	5·5
—43	43	0·1	71	82	5	5
—47	47	0·1	80	93	5	5
—51	51	0·1	89	104	5	4
—56	56	0·1	98	116	5	3·5
—62	62	0·1	104	116	5	3

*Reverse polarity types (stud-anode) are available and are denoted by suffix 'R' e.g. BZW93—9V1R

5kW pulse power rating (t_p = 1ms) Construction AF

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage typ. (V)	Clamping Voltage max. (V)	Measured at I_{RSM} (A)	max. I_{RSM} (A)
***BZW91**						
—5V6	5·6	60	8·5	9·5	150	250
—6V2	6·2	60	9·5	10·5	150	250
—6V8	6·8	60	10	11·5	150	250
—7V5	7·5	5	11	12·5	150	250
—8V2	8·2	5	12	13·5	150	250
—9V1	9·1	5	13	15	150	250
—10	10	5	14·5	17	150	250

*Reverse polarity types (stud-cathode) are available and are denoted by suffix 'R' e.g. BZW91–9V1R

Silicon surge suppressor diodes

5kW pulse power rating ($t_p = 1ms$) Construction AF

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) typ.	max.	Measured at I_{RSM} ($t_p = 500\mu s$) (A)	Max. I_{RSM} ($t_p = 1ms$) (A)
***BZW91 (cont.)**						
—11	11	5	16	19	150	250
—12	12	5	17·5	22	150	250
—13	13	5	19	26	150	250
—15	15	5	22	28	100	150
—16	16	5	24	31	100	150
—18	18	5	26	34	100	150
—20	20	5	28	37	100	150
—22	22	5	31	40	100	150
—24	24	5	34	44	100	150
—27	27	5	38	48	100	150
—30	30	5	40	52	50	70
—33	33	10	44	56	50	70
—36	36	10	49	61	50	70
—39	39	10	54	66	50	70
—43	43	10	60	72	50	70
—47	47	10	66	79	50	50
—51	51	10	72	87	50	50
—56	56	10	79	97	50	50
—62	62	10	86	97	50	50

*Reverse polarity types (stud-cathode) are available and are denoted by suffix 'R' e.g. BZW91–9U1R

13kW pulse power rating ($t_p = 1ms$) Construction N1

***BZW86**						
—7V5	7·5	2	12	14	1000	1000
—8V2	8·2	2	13	15·5	1000	930
—9V1	9·1	2	14	17	1000	860
—10	10	2	15·5	18·5	1000	800
—11	11	2	17	20	1000	740
—12	12	2	18·5	22	1000	680
—13	13	2	20	24	1000	620
—15	15	2	23	27	1000	560
—16	16	2	27	32	500	500
—18	18	2	31	36	500	450
—20	20	2	34	40	500	400
—22	22	2	37	43	500	350
—24	24	2	40	47	500	300
—27	27	2	44	52	500	250
—30	30	2	47	55	250	250
—33	33	2	51	60	250	230
—36	36	2	55	65	250	210
—39	39	2	60	70	250	190
—43	43	2	66	77	250	170
—47	47	2	72	84	250	170
—51	51	2	78	92	250	155
—56	56	2	85	102	250	140
—62	62	2	92	102	250	130

*Reverse polarity types (stud-anode) are available and are denoted by suffix 'R' e.g. BZW86—9V1R

Rectifier diodes & stacks

silicon avalanche rectifier diodes book 1 part 4

$I_{F(AV)}$ max. $T_{mb} = 125°C$ (A)	Type No.	V_{RWM} max. (V)	I_{FRM} max. (A)	I_{FSM} max. (10ms) (A)	Construction
1·5 ($T_{amb} = 55°C$)	**BYX45– 600R**	600	15	40	O1
	– 800R	800			
	–1000R	1000			
6	†**BYX39– 600**	600	100	100	E1
	– 800	800			
	–1000	1000			
12	†**BYX40– 600**	600	250	200	E1
	– 800	800			
	–1000	1000			
20	†**BYX25– 600**	600	440	360	E1
	– 800	800			
	–1000	1000			
40	†**BYX56– 600**	600	450	800	AF1
	– 800	800			
	–1000	1000			

†Reverse polarity types (stud-anode) are also available. These are denoted by the final letter R, e.g. BYX39–600R.

fast recovery silicon rectifier diodes

$I_{F(AV)}$ max. $T_{mb} = 125°C$ (A)	Type No.	V_{RWM} max. (V)	t_{rr} max. (ns)	Q_s max. (nC)	Special features	Construction
1·2 ($T_{amb} = 55°C$)	**BYX55–350**	300	—	150		A4
	–600	500				
4	†**BYX50–200**	200	200	250		E1
	–300	300				
	–400	400				
	–500	500				
	–600	600				
6 (T_{mb}=75°C)	†**BYX71–350**	350	—	—		BQ
	–600	600	—	—		
7·5	†**BYX30–200**	200	350	700	These devices have avalanche characteristics and can be used in a series string for high voltage applications	E1
	–300	300				
	–400	400				
	–500	500				
	–600	500				
15	†**BYX46–200**	200	350	700		E1
	–300	300				
	–400	400				
	–500	500				
	–600	600				
45	**BYX34–200**	200	600	7·5μC		O1
	–300	300				
	–400	400				
	–500	500				

†Reverse polarity types (stud-anode) are also available. These are denoted by the final letter R, e.g. BYX50–200R.

Rectifier diodes & stacks
rectifier diodes

$I_{F(AV)}$ max. $T_{mb} = 125°C$ (A)	Type No.	V_{RRM} max. (V)	Construction
0·36 ($T_{amb} = 40°C$)	**BYX10**	1600	A3
1·0	**BY126**		A4
1·0	**BY127**		A4
	BYX22–200	300*	
	–400	600*	
1·4	**–600**	900*	Q2
($T_{amb} = 30°C$)	**–800**	1200*	
	†**BYX49–300**	300	
	–600	600	
2·5	**–900**	900	BQ
	–1200	1200	
	†**BYX38–300**	300	
	–600	600	
2·5	**–900**	900	E1
	–1200	1200	
	†**BYX48–300**	300	
	–600	600	
6·0	**–900**	900	E1
	–1200	1200	

*V_{RSM}

†Reverse polarity type (stud anode) are also available. They are denoted by the final letter R e.g. BYX48–600R.

‡Low V_F germanium rectifier diodes.

$I_{F(AV)}$ max. $T_{mb} = 125°C$ (A)	Type No.	V_{RRM} max. (V)	Construction
	†**BYX42–300**	300	
	–600	600	
10	**–900**	900	E1
	–1200	1200	
10	†**BYX72–150**	150	
(T_{mb}=75°C)	**–300**	300	BQ
	–500	500	
10	‡**GEX541**	80	AB
(T_{mb}=41°C)	**GEX542**	160	
25	†**BYX20–200**	200	R1
	†**BYX52–300**	300	
	–600	600	
40	**–900**	900	AF1
	–1200	1200	
	†**BYX32–400**	400	
	–800	800	
100	**–1200**	1200	N2
	–1600	1600	
	†**BYX33–400**	400	
	–800	800	
250	**–1200**	1200	AC1
	–1600	1600	

high voltage devices

$I_{F(AV)}$ max. $T_{amb} = 35°C$ (A)	$T_{oil} = 90°C$ (A)	Type No.	V_{RWM} max. (kV)	Description
2·5mA	—	**BY176**	15	Silicon e.h.t. rectifiers in plastic envelopes.
2·5mA	—	**BY185**	35	
		BYX29–		
	50mA	**75000**	75	Silicon avalanche diodes in ceramic envelopes with metal connectors. Intended for oil cooling.
		100000	100	
		125000	125	
		150000	150	
—	50mA	**BYX35**	25	Silicon diode in a ceramic tube. Intended for oil cooling.
0·5	—	**OSS6700B**	4	Resin-potted, modular construction. Intended for natural convection cooling. A medium four-pin valve base with bayonet catch and connector plate is available.
1·5	—	**OSM9510-12**	12	Resin-potted, modular construction with centre-tap. Intended for natural convection cooling.

Rectifier diodes & stacks
high voltage devices (cont.)

$I_{F(AV)}$ max. $T_{amb} = 35°C$ (A)	$T_{oil} = 90°C$ (A)	Type No.	V_{RWM} max. (kV)	Description
3·5	6·0	**OSS9110–3**	3	The stacks consist of three to thirty rectifier diodes connected in series mounted on standard valve bases or ¼" UNF studs at each end. Intended for natural convection or oil cooling.
		–30	30	
4·0	12 ($T_{oil} = 65°C$)	**OSS9310–3**	3	
		–30	30	
5·0	20 ($T_{oil} = 35°C$)	**OSS9210–3**	3	
		–30	30	
10	30 ($T_{oil} = 35°C$)	**OSS9410–3**	3	
		–30	30	

encapsulated silicon diode bridge modules
Single-phase

Maximum Average Output Current $T_{amb} \leqslant 35°C$ (A)	$T_{chassis} \leqslant 35°C$ (A)	Type No.	Construction	Maximum a.c. Input Voltages r.m.s. (V)	Repetitive Peak (V)	Maximum Av. Output Voltage (V)
0·7†	—	**OSH007**	BH1	570	1600	510
1·0	—	**OSH01–100**	BJ	70	150	63
		OSH01–200		140	300	125
		OSH01–400		280	600	250
1·0	—	**OSH01A–100**	BH1	70	150	63
		OSH01A–200		140	300	125
		OSH01A–400		280	600	250
2·0	—	**OSH02A–200**	BH2	140	350	125
		OSH02A–400		280	650	250
		OSH02A–600		420	950	375
		OSH02A–800		560	1250	510
3·0	—	**OSH03–200**	BL	140	200	125
		OSH03–400		280	400	250
		OSH03–600		420	600	375
		OSH03–800		560	800	510
5·0	—	**OSH05–200**	BK	140	300	125
		OSH05–400		280	600	250
		OSH05–600		420	900	375
		OSH05–800		570	1200	510
7·0	—	**OSH07–600**	BK	420	600	375
		OSH07–800		570	800	510
		OSH07–1000		710	1000	635
10	16	**OSH10–600**	BK	420	600	375
		OSH10–800		570	800	510
		OSH10–1000		710	1000	635
10	—	**OSH10A–200**	BK	140	300	125
		OSH10A–400		280	600	250
		OSH10A–600		420	900	375
		OSH10A–800		570	1200	510

†$T_{amb} = 45°C$

Rectifier diodes & stacks

bridge-connected rectifier diode stacks

SINGLE PHASE BRIDGES

I_O d.c. max. at 35°C (A)	Type Number	V_I r.m.s. max. (V)	V_{IRM} max. (V)	V_O d.c. max. (V)
20	**B42–300RB1P1F**	140	300	125
	–600RB1P1F	280	600	250
	–900RB1P1F	420	900	375
	–1200RB1P1F	560	1200	500
21	**B25–600RB1P1F**	420	600	375
	–800RB1P1F	570	800	510
	–1000RB1P1F	710	1200	635
26	**B20–200B1P1F**	60	200	54
30	**OSH30–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500
64	**OSH64–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500
110	**OSH110–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500
300	**OSH300–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500

Larger sizes built to customer's requirements.

THREE PHASE BRIDGES

I_O d.c. max. at 35°C (A)	Type Number	V_I r.m.s. max. (V)	V_{IRM} max. (V)	V_O d.c. max. (V)
25	**B42–300RNB1P1F**	140	300	190
	–600RNB1P1F	280	600	380
	–900RNB1P1F	420	900	570
	–1200RNB1P1F	560	1200	760
28	**B25–600RNB1P1F**	420	600	570
	–800RNB1P1F	560	800	760
	–1000RNB1P1F	700	1000	935
40	**OSK40–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760
90	**OSK90–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760
150	**OSK150–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760
460	**OSK400–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760

Larger sizes built to customer's requirements.

Thyristors & stacks

thyristors book 1 part 5

$I_{T(AV)}$ max. at $T_{mb} = 85$°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	I_{TSM} max. (10ms) (A)	I_{GT} min. (mA)	V_{GT} min. (V)	Special features	Construction
1·0 ($T_{case} = 105$°C)	**BTX18– 100**	120	10	5·0	2·0		H4
	– 200	240					
	– 300	350					
	– 400	500					
	– 500	600					
2·0	**BT100A– 300R**	300	40	10	2·0		AE
	– 500R	500					
6·4	**BTY79– 100R**	100	80	30	3·0	Also available to BS9341 —F001 to F009	S
	– 200R	200					
	– 300R	300					
	– 400R	400					
	– 500R	500					
	– 600R	600					
	– 800R	800					
	–1000R	1000					

Thyristors & stacks
thyristors (cont.)

$I_{T(AV)}$ max. at T_{mb} = 85°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	I_{TSM} max. (10ms) (A)	I_{GT} min. (mA)	V_{GT} min. (V)	Special features	Construction
6·5	**BT101–300R**	300	55	10	2·0		S
	–500R	500					
6·5	**BT102–300R**	300	55	50	2·5		S
	–500R	500					
6·5	**BT107**	500	70	10	2·0		S
6·5	**BT108**	500	70	50	2·5		S
6·5	**BT109**	500	50	10	2·0		BRI
	BTY87–100R	100					
	–200R	200					
	–300R	300					
10	**–400R**	400	140	65	3·5		AD
	–500R	500					
	–600R	600					
	–800R	800					
	BTY91–100R	100					
	–200R	200					
	–300R	300					
14	**–400R**	400	200	40	3·0		AD
	–500R	500					
	–600R	600					
	–800R	800					
	BTW47–500RM	600					
	–800RM	800					AD
	–1000RM	1000					but with M6
14	**–1200RM**	1200	220	150	3·5		metric thread
	–1400RM	1400					(see note 1)
	–1600RM	1600					
	BTW92– 600RM	600					
	– 800RM	800				$\frac{dv}{dt}$ max. = 300V/μs	AD
20	**–1000RM**	1000					but with M6
	–1200RM	1200	320	150	3·5	$\frac{di}{dt}$ max. = 300A/μs	metric thread
	–1400RM	1400					(see note 1)
	–1600RM	1600					
	BTX81–100R	100					
	–200R	200					
	–300R	300					
20	**–400R**	400	450	80	3·5		AD
	–500R	500					
	–600R	600					
	–800R	800					
	BTX82–100R	100					
	–200R	200					
	–300R	300					
26	**–400R**	400	600	80	3·5		AD
	–500R	500					
	–600R	600					
	–800R	800					
	BTW24– 600RM	600					
	– 800RM	800					
30	**–1000RM**	1000	600	150	3·5		M
	–1200RM	1200					*metric thread*
	–1400RM	1400					(see note 1)
	–1600RM	1600					

Thyristors & stacks
thyristors (cont.)

$I_{T(AV)}$ max. at T_{mb} = 85°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	I_{TSM} max. (A)	I_{GT} min. (mA)	V_{GT} min. (V)	Special features	Construction
	BTW23– 600RM	600					
	– 800RM	800					U
70	**–1000RM**	1000	1500	200	3·5		metric thread
	–1200RM	1200					(see note 1)
	–1400RM	1400					
	–1600RM	1600					

Note 1: Types with UNF thread are available on request. These are indicated by the suffix RU e.g. BTW24-600RU.
Flying leads or tags are available when required as alternative to the standard outline. Consult Mullard Ltd. before ordering.
Types with dv/dt of 1000V/µs are available on request. Add suffix 09 to the type number when ordering e.g. BTW23–800RM–09.

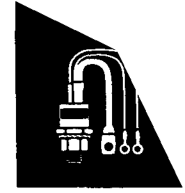
inverter type thyristors

$I_{T(AV)}$ max. at T_{mb} = 85°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	t_q max. (µs)	$\frac{dV_D}{dt}$ max. (V/µs)	Construction
	BTW30– 300RM	300			
	– 400RM	400	6	200	
	– 500RM	500			
12	**– 600RM**	600			AD
					but with M6
	– 800RM	800			metric thread
	–1000RM	1000	12	200	(see note 1)
	–1200RM	1200			
	BTW31– 300RM	300			
	– 400RM	400	12	200	
	– 500RM	500			
16	**– 600RM**	600			AD
					but with M6
	– 800RM	800			metric thread
	–1000RM	1000	20	200	(see note 1)
	–1200RM	1200			
	BTW32– 800RM	800			M
	–1000RM	1000	25	200	metric thread
26	**–1200RM**	1200			(see note 1)
	BTW33– 800RM	800			U
	–1000RM	1000	25	200	metric thread
65	**–1200RM**	1200			(see note 1)

Note 1: Types with UNF thread are available on request. These are indicated by the suffix RU e.g. BTW32–800RU.

pulse modulator thyristors

$I_{T(RMS)}$ max. (A)	Type No.	V_{DWM} max. (V)	V_{RWM} max. (V)	I_{TRM} max. ½ sine wave t ≤ 2µs (A)	$\frac{di}{dt}$ max. (A/µs)	Construction
5	**BTW35**	500	300	100	1000	S
	BTX95–500R	500	250			
15	**–600R**	600	300			
	–700R	700	350	200	1000	S
	–800R	800	400			



Thyristors & stacks welding ignistors

Water-cooled inverse parallel thyristors suitable for welding applications.

$I_{T(RMS)}$ max. at $T_{water} = 40°C$ (4l/min.) (A)	I_{TSM} max. (A)	Type No.	V_{DWM} max. V	V_{DRM} max. V
		OTH800– 800	600	800
800	5000	**–1000**	700	1000
		–1200	800	1200
		–1400	1000	1400
		OTH1200– 800	600	800
1200	7000	**–1000**	700	1000
		–1200	800	1200
		–1400	1000	1400

triacs

$I_{T(RMS)}$ max. (A)	Type No.	$\pm V_{DRM}$ max. (V)	I_{GT} min. (mA)	V_{GT} min. (V)	Construction
6 ($T_{mb} = 75°C$)	**BT110**	500	35	1·5	BR
	BTW26– 300	300			
12 ($T_{mb} = 65°C$)	**– 400**	400	35	1·5	BR
	– 500	500			
	BTX94– 100M	100			
	– 200M	200			
	– 300M	300			
25	**– 400M**	400	150	3·0	AD
($T_{mb} = 85°C$)	**– 500M**	500			but with M6
	– 600M	600			(metric thread)
	– 800M	800			(see note 1)
	–1000M	1000			
	–1200M	1200			
	BTW34– 600M	600			
50	**– 800M**	800	200	2·5	M
(T_{amb} 80= °C)	**–1000M**	1000			(metric thread)
	–1200M	1200			(see note 1)

Note 1: Types with UNF thread are available on request. These are indicated by the suffix U, e.g. BTW34–600U.

thyristor trigger & control modules

61 series

Type number	Description	Function
TT61	Trigger transformer	Interface, giving two isolated outputs for use between thyristor or triac gates and control sections
UPA61	Universal power amplifier	(a) Pulse generator for driving TT61 (b) D.C. driver (c) Other circuit functions
RSA61	Rectifier and synchroniser	Provides power supplies and synchronising signals
DOA61	Differential operational amplifier	For use in closed loop control systems
2NOR61	Twin NOR	For logic functions

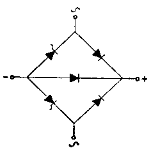
MY5000 series

The following trigger modules and accessories are capable of triggering Mullard thyristors over their full temperature range. Suitable for both single phase or three phase operation, control is achieved by means of an external variable resistor or from an external voltage or current source. In addition, feedback may be applied where automatic control is required.

Type	Firing Angle Control Range	Equivalent Range of Power Control in Resistive Load	T_{amb}
MY5011	5°—167°	99·9% to 0·25%	−20°C, + 65°C
MY5201	Transformer to drive MY5011.		

Thyristors & stacks
bridge-connected thyristor stacks
Single-phase

Circuit Diagram

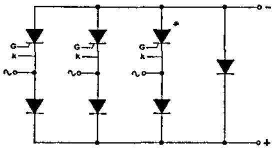


Max. mean output current 180° conduction of each thyristor $T_{amb} \leqslant 35°C$ — Natural convection cooling	Forced air cooling 500ft/min	Repetitive peak output current	250V r.m.s.	440V r.m.s.
10A	—	40A	**OTH10–608L**	**OTH10–1008L**
12A	—	120A	**OTH12–608L**	
16A	—	200A	**OTH16–608L**	
20A	32A	140A	**OTH20–608L**	
22A	30A	160A		**OTH22–1208A**
28A	32A*	200A	**OTH28–608A**	
29A	32A	200A		**OTH29–1208A**
40A	40A†	200A	**OTH40–608A**	
50A	52A*	200A	**OTH50–608A**	
75A	95A	450A	**OTH75–608A**	**OTH75–1208A**
94A	120A	800A	**OTH94–608A**	**OTH94–1208A**
95A	95A‡	450A	**OTH95–608**	**OTH95–1208**
115A	140A	800A	**OTH115–608**	**OTH115–1208**

†At $T_{amb} \leqslant 60°C$ *At $T_{amb} \leqslant 55°C$ ‡At $T_{amb} \leqslant 90°C$

Three-phase

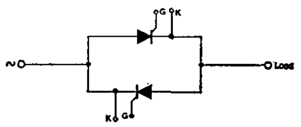
Circuit Diagram



Maximum mean output current 120° conduction of each thyristor $T_{amb} \leqslant 35°C$ — Natural convection cooling	Forced air cooling 500 ft/min	Repetitive peak output current	
23A	30A	160A	**OTK23–1208**
30A	37A	160A	**OTK30–1208**
42A	42A at $T_{amb} \leqslant 50°C$	200A	**OTK42–1208**
120A	120A at $T_{amb} \leqslant 70°C$	450A	**OTK120–1208C**
160A	170A at $T_{amb} \leqslant 55°C$	500A	**OTK160–1208A**
240A			Built to customers requirements
370A			Built to customers requirements
500A			Built to customers requirements

Thyristors & stacks
a.c. controller thyristors stacks
Single-phase

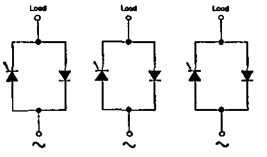
Maximum r.m.s. current 180° conduction of each thyristor $T_{amb} \leq 35°C$		Controlled power Resistive load				Circuit Diagram	
		240Vr.m.s.		440Vr.m.s.			
Natural convection cooling	Forced air cooling 500 ft/min	Natural cooling	Forced air cooling	Natural cooling	Forced air cooling	250Vr.m.s.	440Vr.m.s.
11A	14A	2·6kW	3·3kW			**OTH11–609L**	
22A	26A	5·3kW	6·2kW			**OTH22–609**	
22A	28A			9·6kW	12·3kW		**OTH22–1209**
25A	25A*	6kW	6kW*			**OTH25–605**†	
25A	25A*			12kW	12kW*		**OTH25–1205**†
28A	35A			12·3kW	15·4kW		**OTH28–1209**
32A	35A	7·6kW	8·4kW			**OTH32–609**	
36A	36A			16kW	16kW		**OTH36–1209**
44A	44A*	10kW	10kW			**OTH44–609**	
57A	57A*	14kW	14kW			**OTH57–609**	
105A	140A	25kW	33kW			**OTH105–609**	
105A	140A			46kW	61kW		**OTH105–1209**
127A	155A	30kW	37kW			**OTH127–609**	
127A	155A			56kW	68kW		**OTH127–1209**



*At $T_{amb} \leq 60°C$ †Incorporates TRIAC BTX94

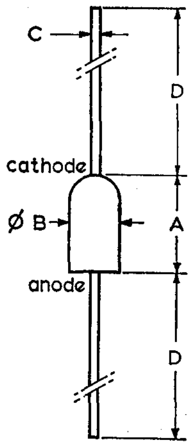
Three-phase

Maximum r.m.s. current per phase, 180° conduction of each thyristor $T_{amb} \leq 35°C$		Controlled power Resistive load at 440Vr.m.s.		Circuit Diagram
Natural convection cooling	Forced air cooling 500 ft/min	Natural cooling	Forced air cooling	
11A	—	8·3kW	—	**OTK11–1009L**
21A	28A	15kW	21kW	**OTK21–1209**
27A	32A	19kW	24kW	**OTK27–1209**
35A	35A at $T_{amb} \leq 55°C$	25kW	26kW	**OTK35–1209**
93A	93A at $T_{amb} \leq 55°C$	67kW	67kW	**OTK93–1209**
110A	150A	79kW	107kW	**OTK110–1209B**
130A	150A at $T_{amb} \leq 45°C$	93kW	107kW	**OTK130–1209A**
150A		Built to customer requirements		
175A				
200A				



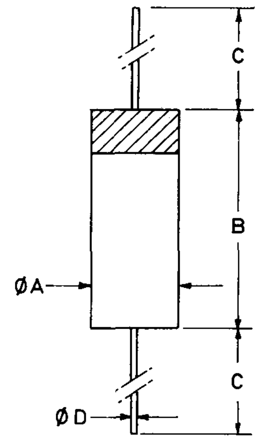
CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)

A



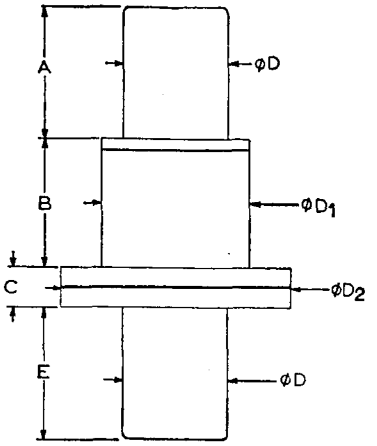
	A1	A2	A3	A4
	DO–7	DO–15 SO–6	DO–14 SO–8	SO–15
A max.	7·6	7·6	7·0	12·5
B max.	2·5	2·7	3·2	6·5
C nom.	0·52	0·8	0·5	1·05
D min.	25	25	25	25

B



	B1 DO–35	B2
ϕA max.	1·85	2·70
B max.	4·5	5·85
C min.	24	28
ϕD max.	0·56	0·86

C



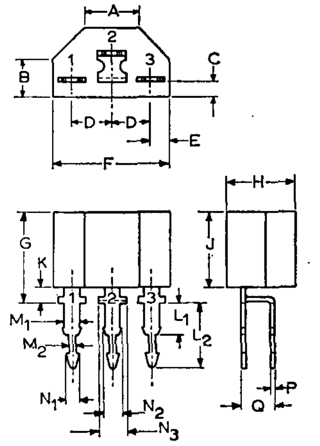
	Nom.
A	1·57
B	1·70
C	0·55
ϕD	1·56
ϕD_1	2·00
ϕD_2	3·05
E	1·57

D

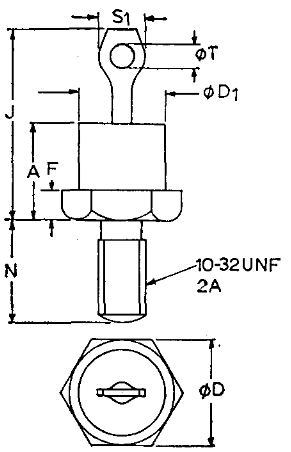
A	3·5 nom.	L_1	2·15
B	2·5	L_2	4·15
C	1·1 max.	M_1	0·8max.
D	2·54	M_2	0·6 max.
E	1·2	N_1	0·75
F	7·5	N_2	1·2
G	6·2	N_3	1·75 min.
H	4·5	P	0·25max.
J	5·0	Q	2·0 max.
K	1·3 max.		

Connections

	1	2	3
D	e	b	c
D1	b	e	c



E



SO-10,
DO-4

A	10·28
D	11·1 max.
ϕD_1	9·3 max.
F	3.2
J	20·3 max.
N	11·1
S_1	4·7 max.
ϕT	2·3 min.

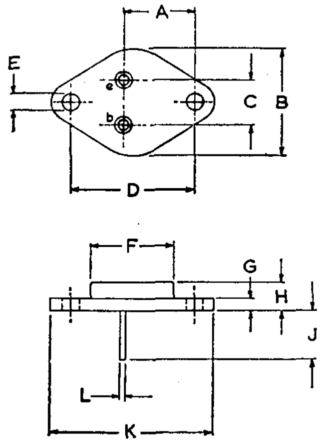
Connections

	Stud	Eyelet
E1	k	a
E2	a	k

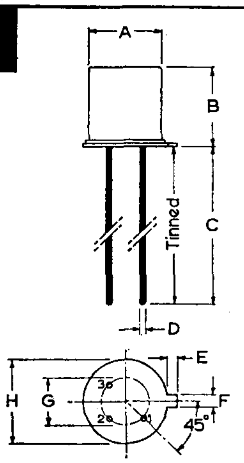
F

F1, F2: SO-5B/SB2-2 TO-3
F3: SO-55/SB2-5

	F_1	F_2	F_3
A		16·9	13·1
B		26·2 max.	19·0 max.
C		10·9	6·0
D		30·1	23·0
E		4·2 max.	4·0
F		20·3 max.	14·6
G	3·15	0·9	2·8
H		9·5 max.	8·9 max.
J		12·0	9·0 min.
K		39·5 max.	31·4 max.
L		1·0	1·0



G



G1,2,3,4,5
SO-12A/SB3-6A
TO-18

A	4·8 max.
B	5·3 max.
C	12·7 min.
D	0·43
E	1·0
F	1·05
G	2·54
H	5·55

Connections

	1	2	3
G1	e	b	c + envelope
G2	s	d	g + envelope
G3	d	g	s + envelope
G4	A	A	K
G5	A	–	K

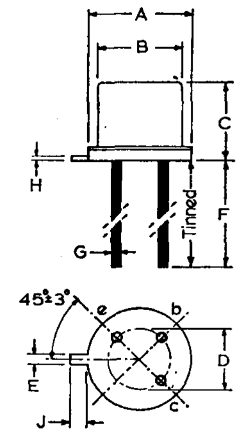
H

H1,2,3,4,5
SO-3/SB3-3A
TO-5

A	8·9
B	8·15
C	6·35
D	5·08
E	0·79
F	12·7 min.
G	0·48 max.
H	0·4
J	0·85

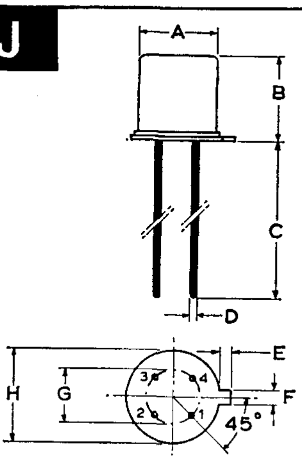
H1 b+case
H2 case isolated
H3 c+case

H4 e cathode
b gate
c anode+case



These drawings give limited information for quick reference purposes. For equipment design more complete information should be obtained from individual data sheets in the Technical Handbook or from standard B.S. or JEDEC outline drawings.

J



J1,2,3,4,5,6, SO-12A/SB4-3 TO-72

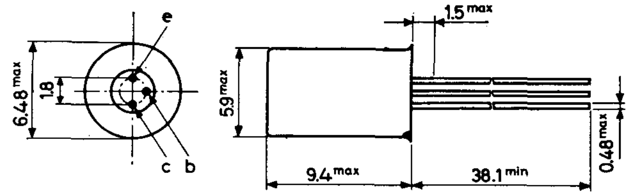
A	4·8 max.
B	5·3 max.
C	12·7 min.
D	0·43
E	1·0
F	1·05
G	2·54
H	5·55

Connections

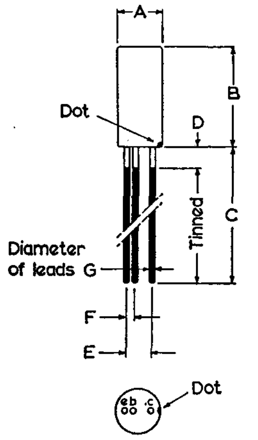
	1	2	3	4
J1	b	e	c	s+envelope
J2	e	b	c	s+envelope
J3	s	d	g	screen+envelope
J4	d	g	g	s+envelope
J5	d	s	g	b+envelope
J6	K	G_K	G_A	A

K

SO-21/SB3-10 TO-1



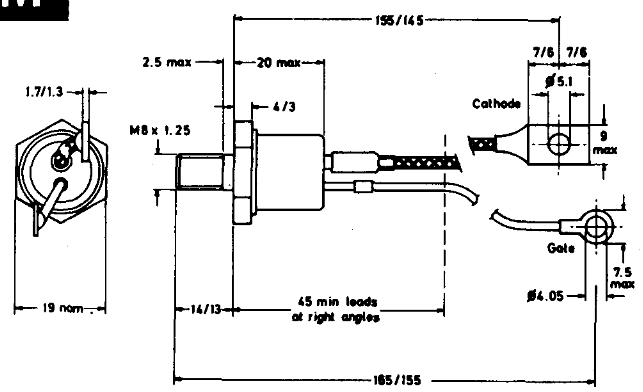
L



SO-2/SB3-2

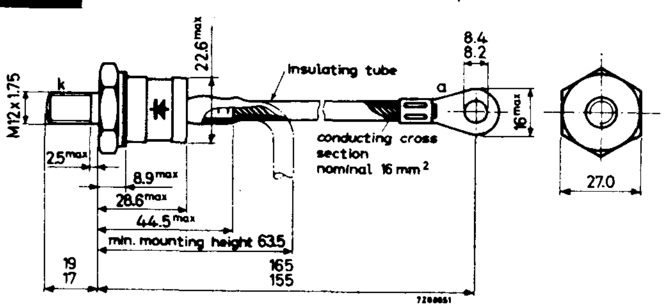
A	5·8
B	15·7 max.
C	37 min.
D	1·5 max.
E	2·1
F	0·85
G	0·43

M



N

SO-29A/B



	Stud thread
N1	½"–20 UNF (SO29A)
N2	M12×1·75 (SO29B)

O

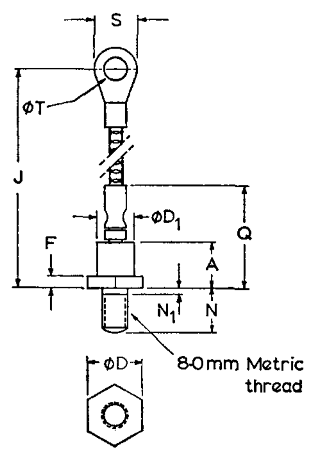
SO-32B

Max.

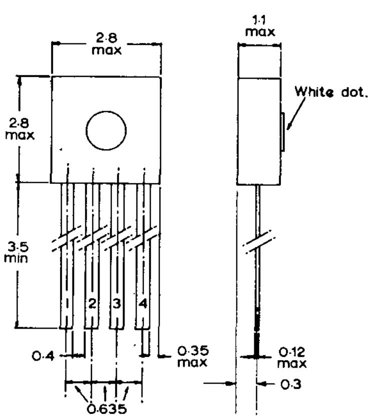
A	18
ϕD	17
$ϕD_1$	15
F	7·1
J	116 nom.
N	13·5
N_1	2·25
Q	33
S	12·8
ϕT	6·9

Connections

	Stud	Eyelet
O1	k	a
O2	a	k

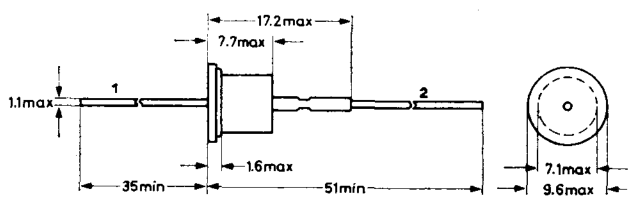


P



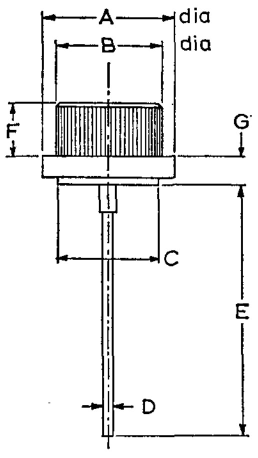
Q

SO-16 DO-1, 2, 3



CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

R



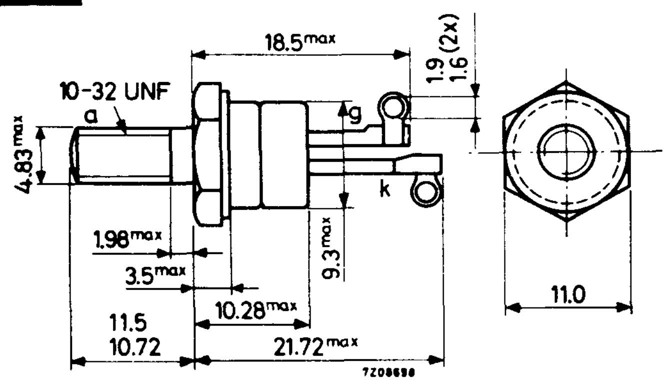
A	16·1 max.
B	12·77
C	12·8 max.
D	1·3 nom.
E	35 min.
F	6·5 max.
G	3·4 max.

Connections

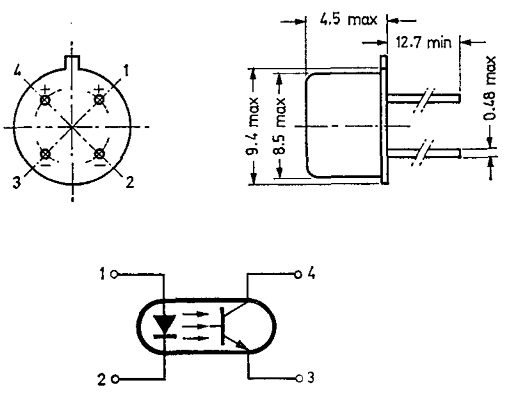
	Body	Wire
R1	k	a
R2	a	k

S

SO-35A



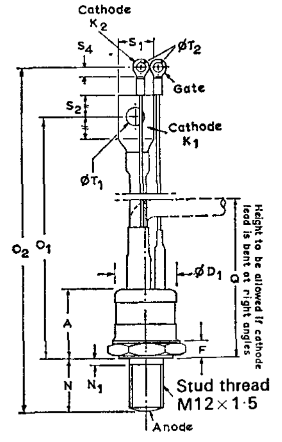
T



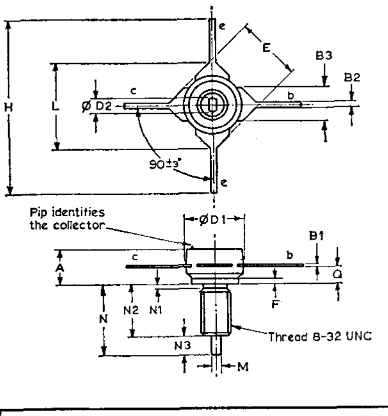
U

SO-30C
TO-94

A	28·5 max.
ϕD_1	24·1 max.
F	8·9 max.
N	21·0 max.
N_1	3·0 max.
O_1	158 max.
O_2	190 max.
Q	63·5 max.
S_1	16·5 max.
S_2	9·6 min.
S_4	3·8 min.
ϕT_1	8·3 max.
ϕT_2	4·2 max.

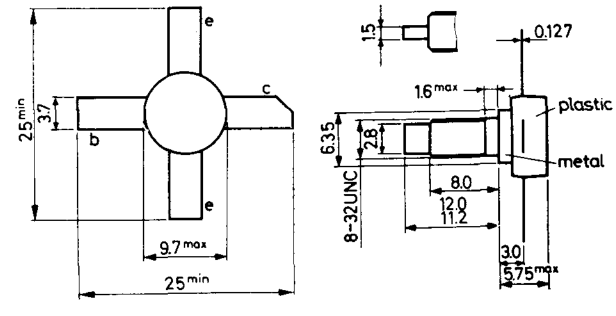


V

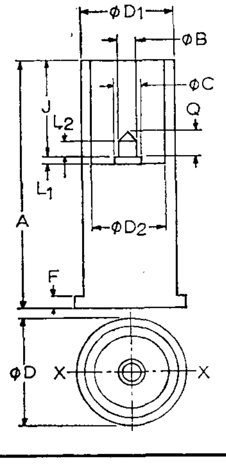


	Nom.
A	5·5
B_1	0·12
B_2	0·9
B_3	5·7
ϕD_1	9·3
ϕD_2	2·8
E	10·6
F	1·25
H	27·0
L	14
M	1·5
N	11·6
N_1	1·6 max.
N_2	8·0
N_3	3·68 max.
Q	3·0 max.

W



X



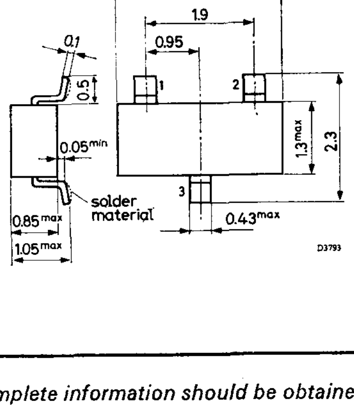
SO-26

	Max.
A	19·3
ϕB	1·32
ϕC	2·387
ϕD	9·52
ϕD_1	8·737
ϕD_2	7·264
F	1·39
J	6·477
L_1	0·762
L_2	1·27
Q	2·10

Y

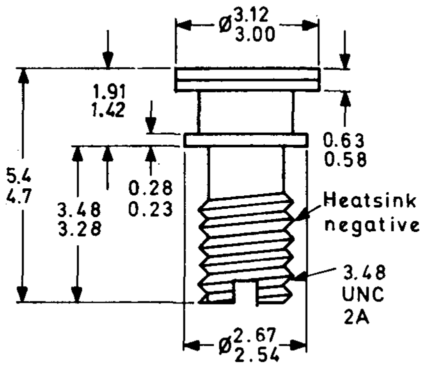
Connections

	1	2	3
Y1	b	e	c
Y2	s	d	g
Y3	nc	a	k
Y4	a	a	k
Y5	k	k	a



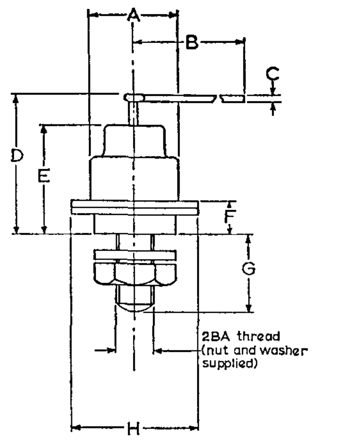
These drawings give limited information for quick reference purposes. For equipment design more complete information should be obtained from individual data sheets in the Technical Handbook or from standard B.S. or JEDEC outline drawings.

Z

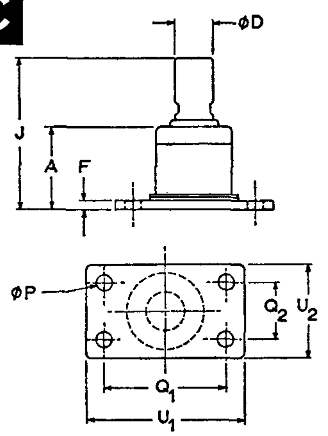


AB

A	11·30 max.
B	76·2
C	1·5
D	20·83 max.
E	14·22 max.
F	4·44 max.
G	8·48 min.
H	17·02 max.



AC



A	35·0
ϕD	16·0
F	5·0
J	70·0 max.
ϕP	6·6 max.
Q_1	50·0
Q_2	25·0
U_1	65·3 max.
U_2	40·3 max.

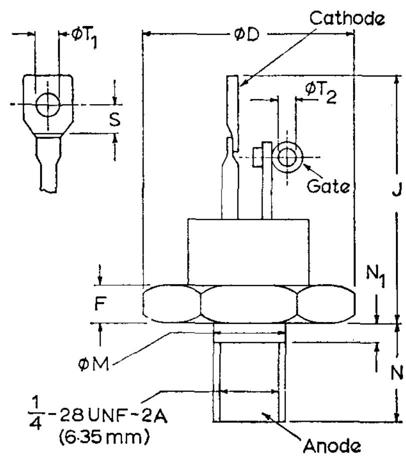
Connections

	Top	Mounting base
AC1	a	k
AC2	k	a

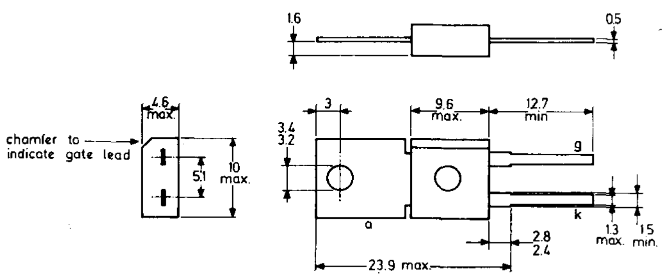
AD

SO-36, TO-48

ϕD	16·51 max.
F	5·5 max.
J	30·48 max.
ϕM	6·35 max.
N	11·50 max.
N_1	2·26 max.
S	3·05 min.
$ϕT_1$	3·18 min.
$ϕT_2$	1·53 min.

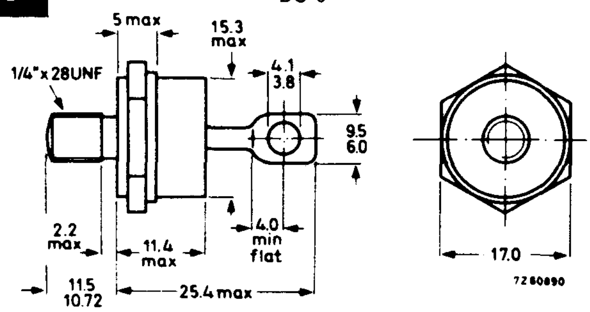


AE



AF

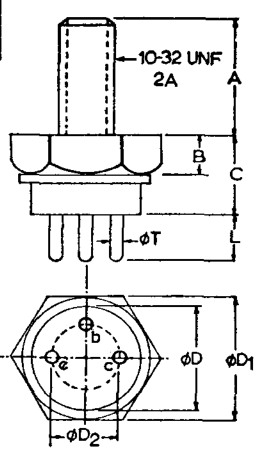
SO-13
DO-5



Connections

	Stud	Eyelet
AF1	k	a
AF2	a	k

AG



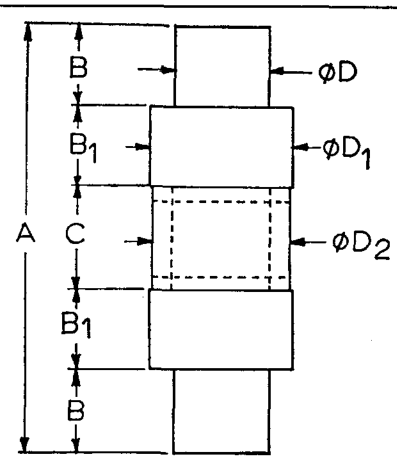
TO-60

	Max.
A	11·50
B	3·10
C	7·62
ϕD	8·6
$ϕD_1$	11·10
$ϕD_2$	5·08 nom.
L	4·70
ϕT	1·10

Emitter connected to envelope

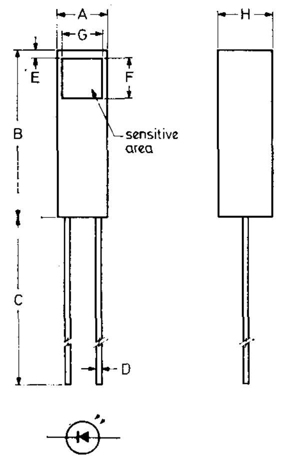
AH

	Max.
A	7·16
B	1·42
B_1	1·32
C	1·80
ϕD	1·75
$ϕD_1$	2·565
$ϕD_2$	2·51



CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

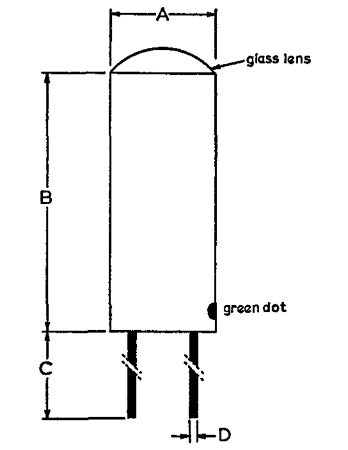
AJ



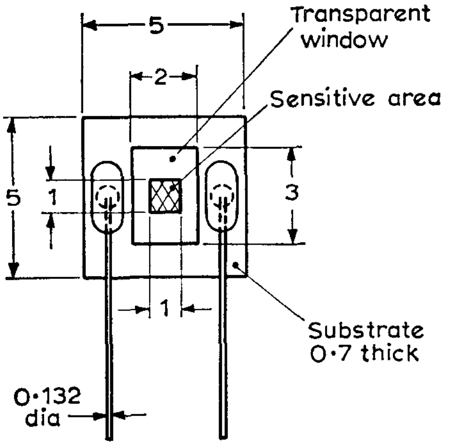
	Nom.
A	2·18
B	6·8
C	37 min.
D	0·25
E	0·29
F	1·7
G	1·7
H	2·24

AK

	AK1 Nom.	AK2 Nom.
A	2·8	2·0
B	8·0	8·0
C	33	33
D	0·34	0·34



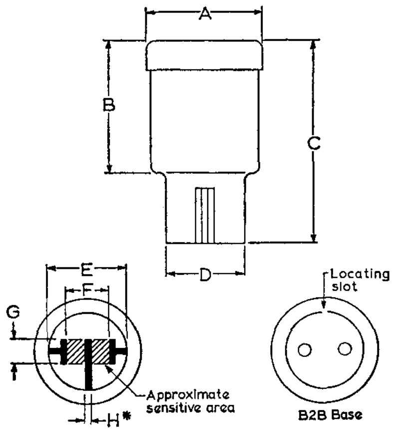
AL



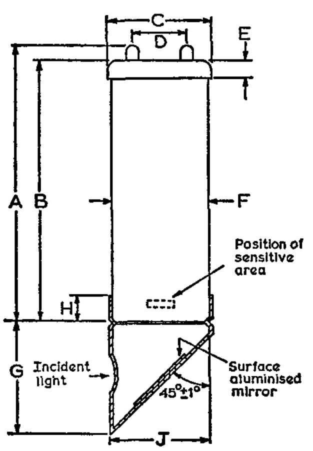
AM

A	22 max.
B	28·5
C	41 max.
D	13.8
E	11
F and G	6·0
*H	0·5

*Electrode not present on 62SV



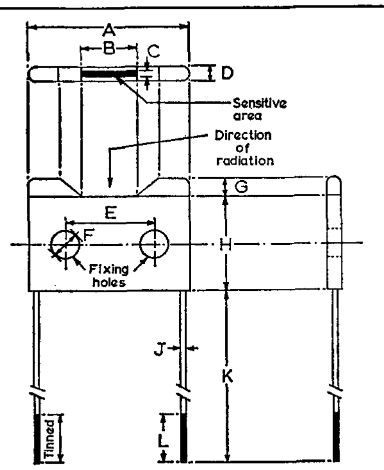
AN



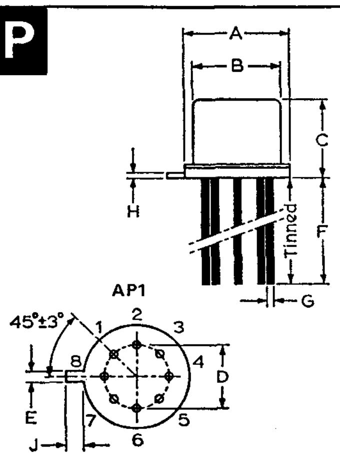
A	134 max.
B	127 max.
C	36·2
D	25
E	5·0
F	35·45 dia
G	42
H	15
J	37 dia.

AO

	Nom.
A	17
B	6·0
C	0·5
D	1·5
E	9·5
F	3·0 dia.
G	2·0
H	10
J	0·5
K	37 min.
L	5·0 min.

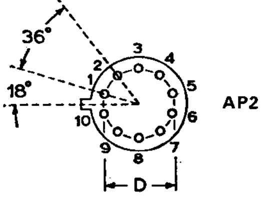


AP



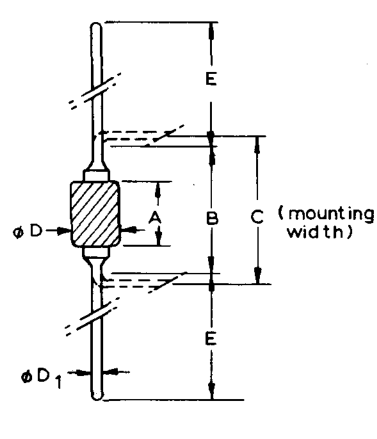
AP1 : SO44B-SB8-1
TO-99
AP2: SO44B-SB10-1
TO-74

	Nom.
A	8·90
B	8·15
C	4·7 max.
D	5·08
E	0·79
F	12·7 min.
G	0·45
H	0·40
J	0·85



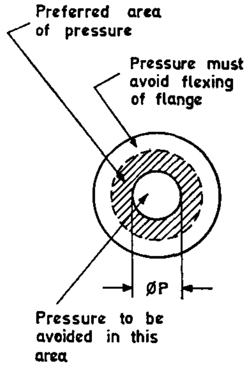
AQ

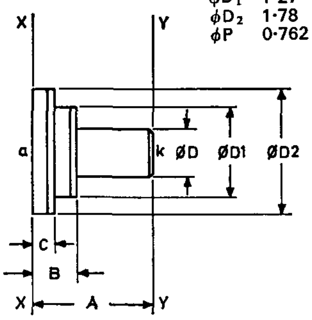
	AQ1	AQ2
A	3·4 max.	3·1 max.
B	6·35 max.	6·0
C	7·6 min.	9·0 min.
ϕD	2·4 max.	2·8 max.
ϕD_1	0·56 max.	1·1 max.
E	25·4 min.	29



These drawings give limited information for quick reference purposes. For equipment design more complete information should be obtained from individual data sheets in the Technical Handbook or from standard B.S. or JEDEC outline drawings.

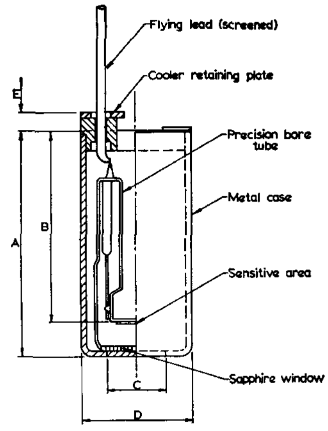
AR





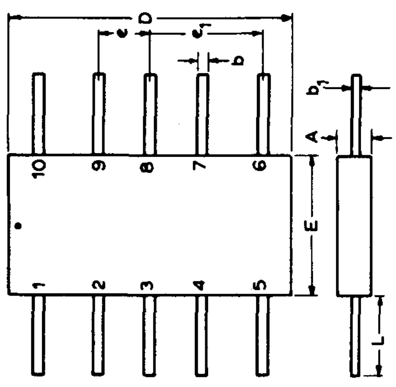
	Nom.
A	1·52
B	0·75
C	0·30
φD	0·625
ϕD_1	1·27
ϕD_2	1·78
φP	0·762

AS



A	48·0
B	42·0
C	14·0 dia.
D	23·0 dia.
E	4·0

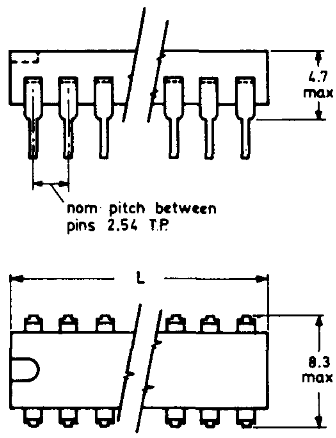
AT



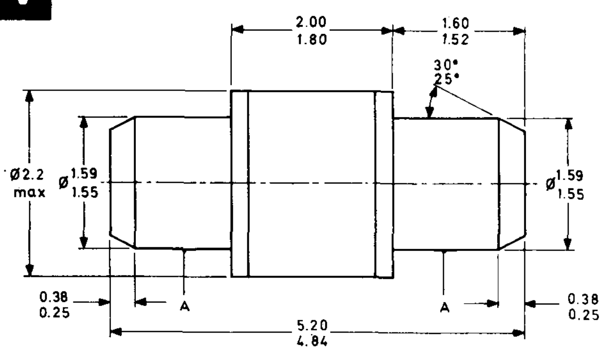
	TO–89
A	1·75 max
D	6·6 max
E	3·4
L	4·4
b	0·34
b_1	0·11
e	1·27
e_1	2·54

AU

	Number of Leads	L max.
AU1	14	19·5
AU2	16	22

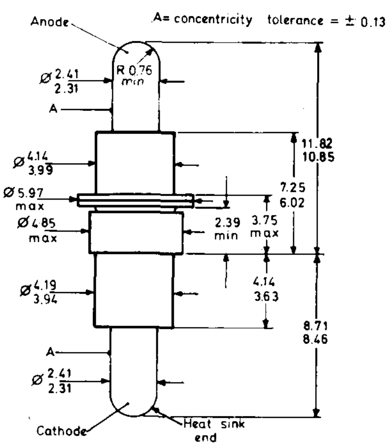


AV

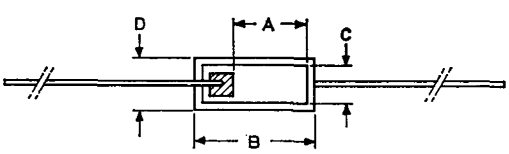


A = concentricity tolerance = ±0.15

AW



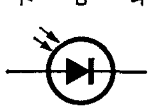
AX

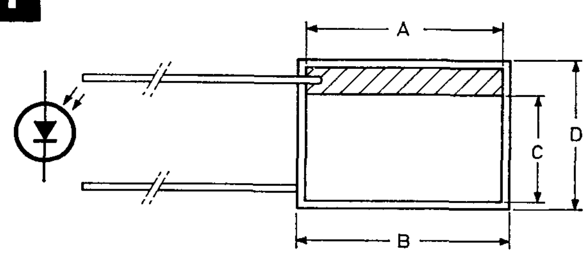


	BPX40 Nom.	BPX41 Nom.
A	2·2	3·55
B	3·35	4·7
C	0·95	1·85
D	1·25	2·15

Lead length	30
Lead diameter	0·15

AY

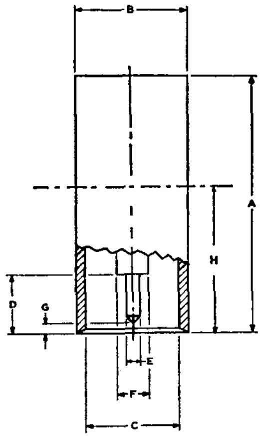




	Nom.
A	6·7
B	7·0
C	3·7
D	5·0

Lead length	30
Lead diameter	0·15

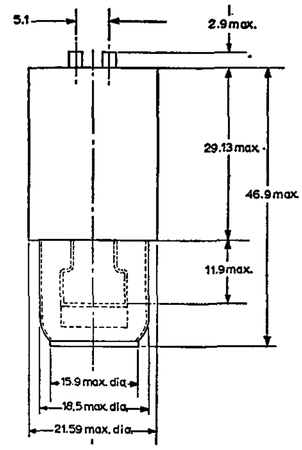
AZ



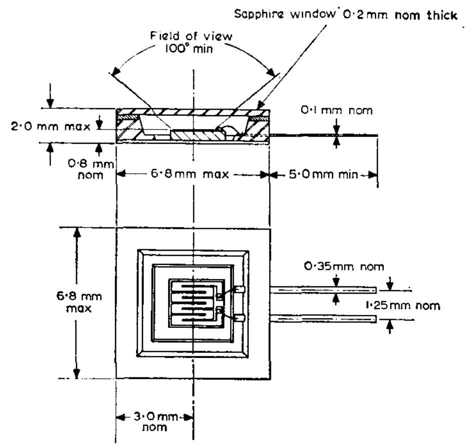
	Max.
A	19·43
B dia.*	5·59
C dia.	4·80
D	3·73 min.
E dia.	0·86
F dia.	1·60 nom.
G	0·71
H	10·32 nom.

*These tolerances apply only over H

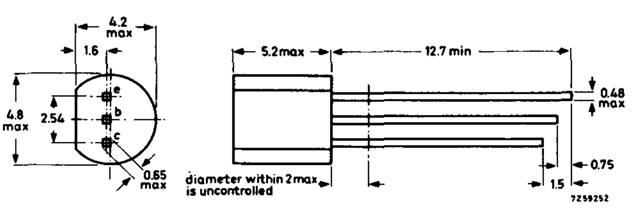
BA



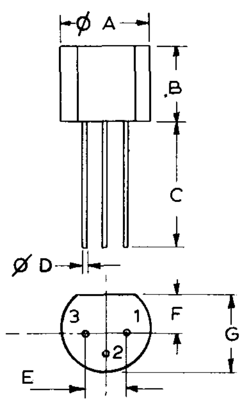
BB



BC



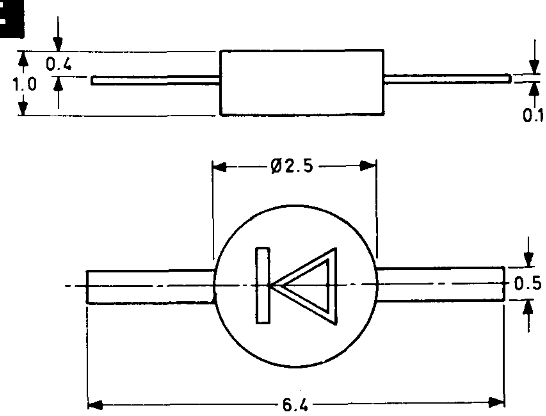
BD



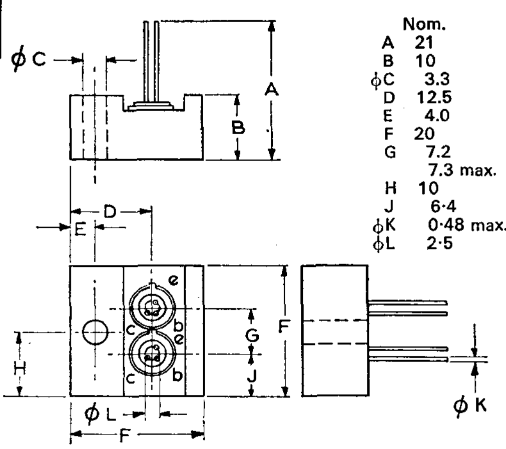
Viewed from underside
Connections: 1. Emitter 2. Base 3. Collector

	Nom.
ϕA	5·1
B	5·1
C	12·7 min.
ϕD	0·45
E	2·54
F	1·58
G	4·0

BE



BF

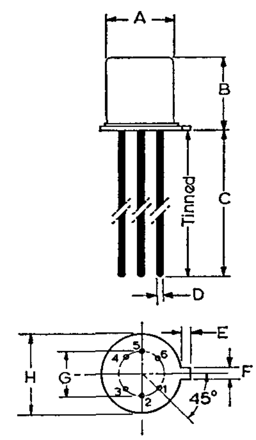


	Nom.
A	21
B	10
ϕC	3.3
D	12.5
E	4.0
F	20
G	7.2 7.3 max.
H	10
J	6·4
ϕK	0·48 max.
ϕL	2·5

BG

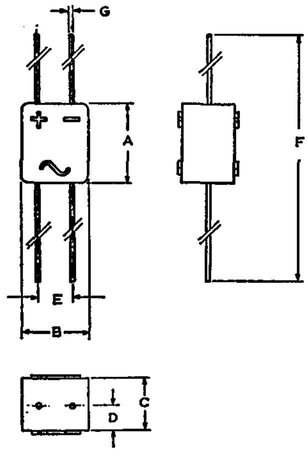
TO-71

A	4·8 max.
B	5·3 max.
C	12·7 min
D	0·43
E	1·0
F	1·05
G	2·54
H	5·55



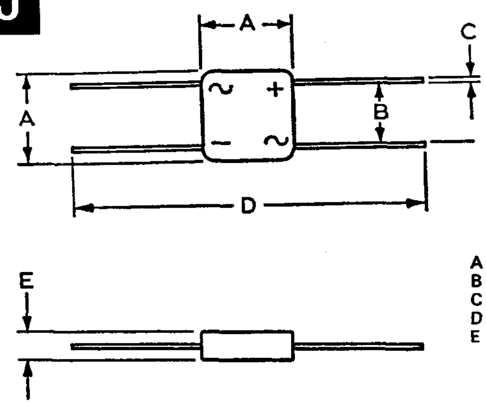
These drawings give limited information for quick reference purposes. For equipment design more complete information should be obtained from individual data sheets in the Technical Handbook or from standard B.S. or JEDEC outline drawings.

BH



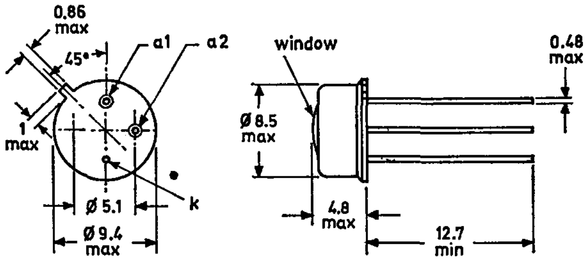
	BH1	BH2
A	12	20
B	10	19
C	8	15
D	4	7·5
E	5	10
F	58	60
G	0·75	1·0

BJ



	Nom.
A	15
B	10·2
C	0·75
D	58·4
E	5·8

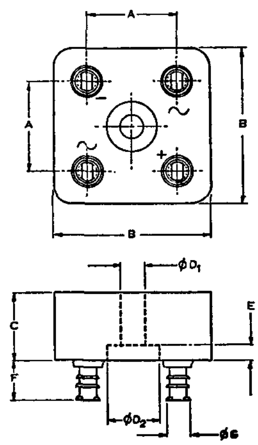
BK



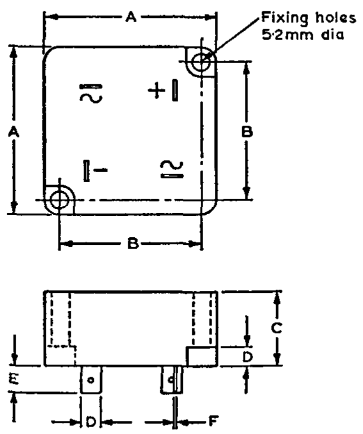
BL

SO-67

	Min.	Max.
A	20	21
B	–	34·6
C	–	15·2
ϕD1	–	5·05
ϕD2	–	11
E	–	3·7
F	–	9·0
ϕG	–	4·8

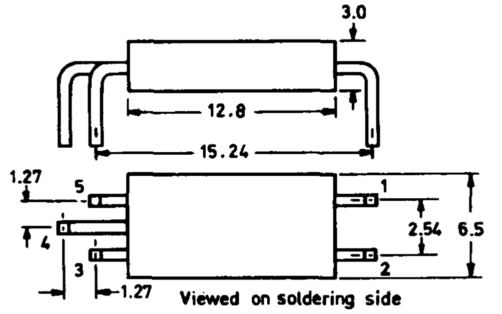


BM



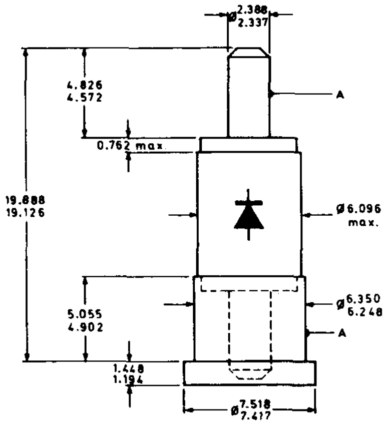
	Nom.
A	57·1
B	47·6
C	25·4
D	6·4
E	9·0
F	0·8

BN



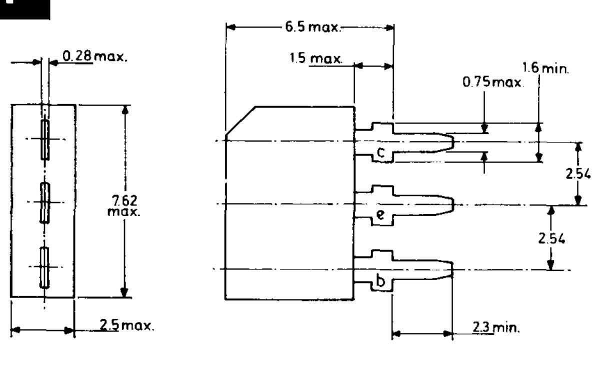
1 +diode
2 −diode
3 emitter
4 collector
5 base

BO



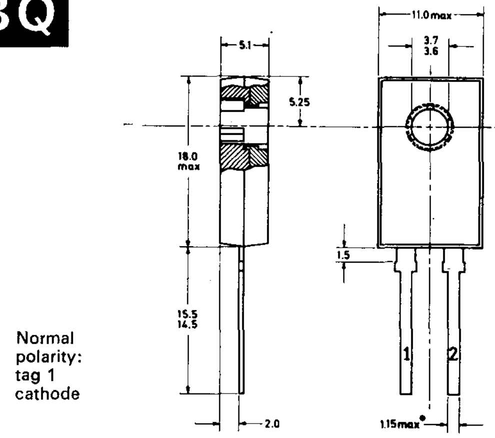
A = concentricity tolerance = ±0.18

BP

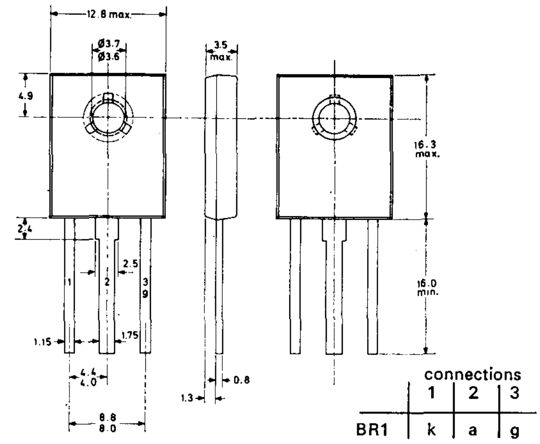


CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

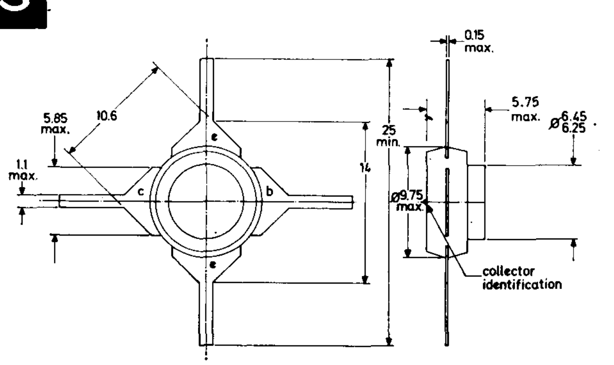
BQ



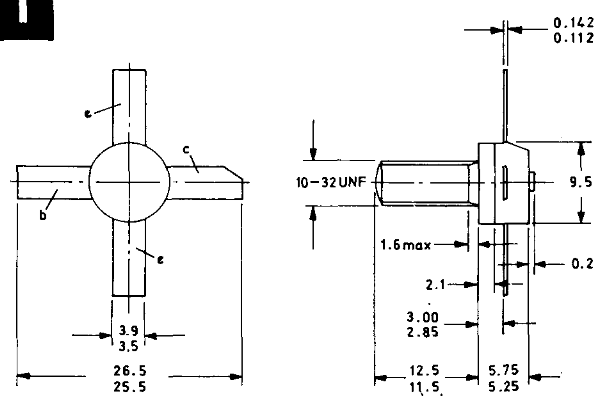
BR



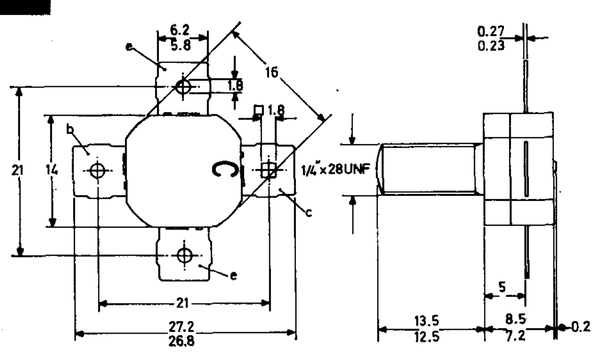
BS



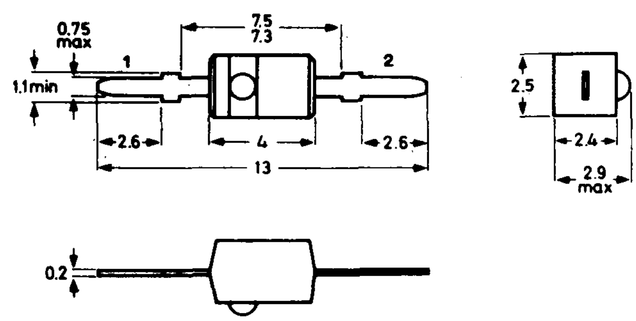
BT



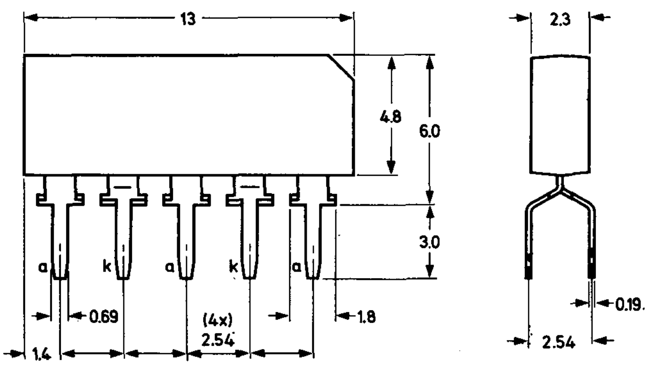
BU



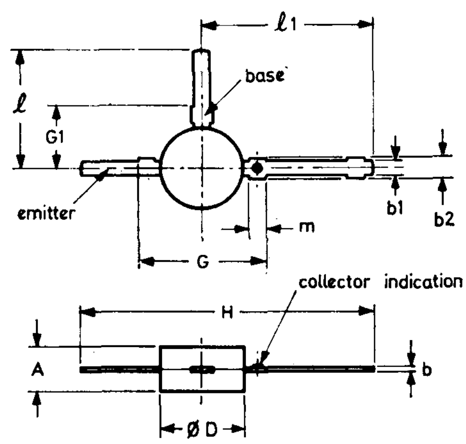
BV



BW

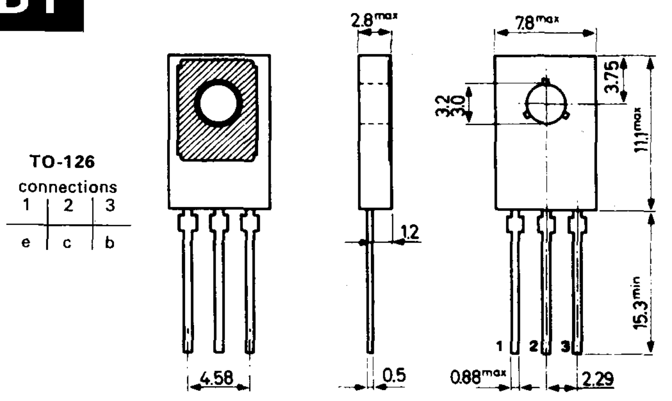


BX

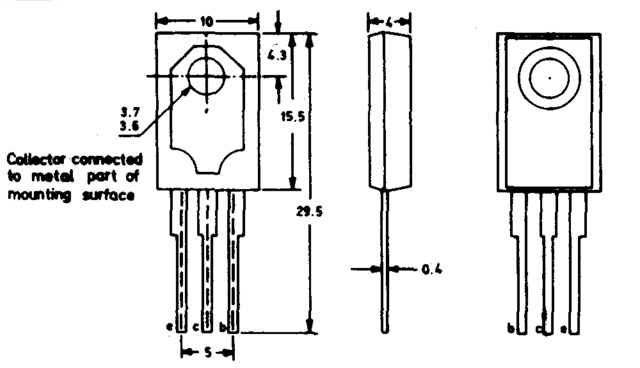


These drawings give limited information for quick reference purposes. For equipment design more complete information should be obtained from individual data sheets in the Technical Handbook or from standard B.S. or JEDEC outline drawings.

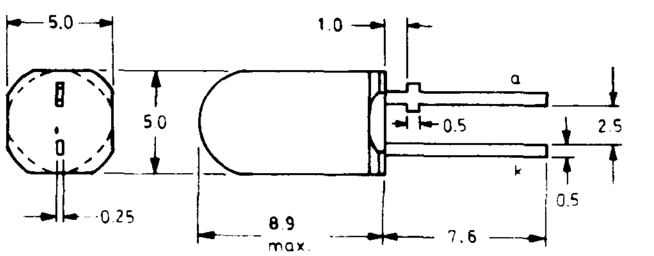
BY



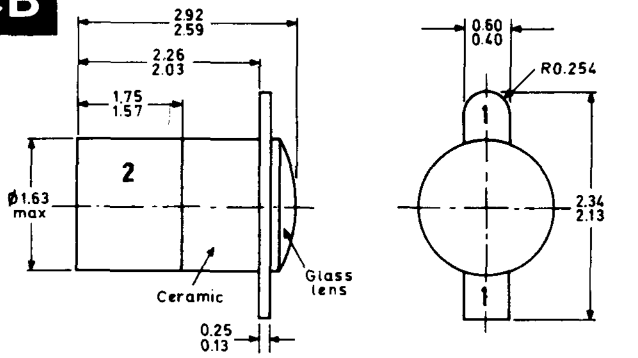
BZ



CA

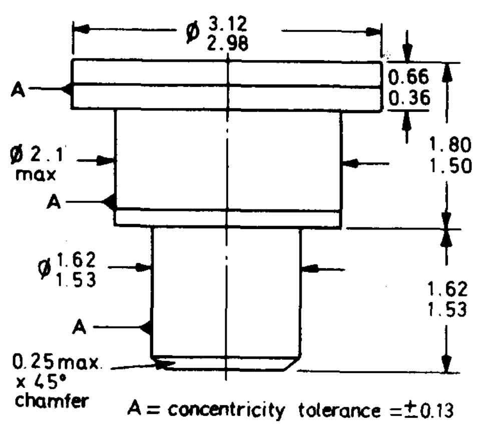


CB

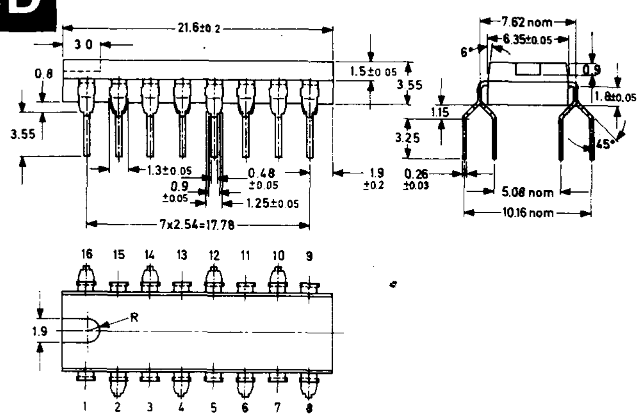


DO-31
1—emitter
2—collector

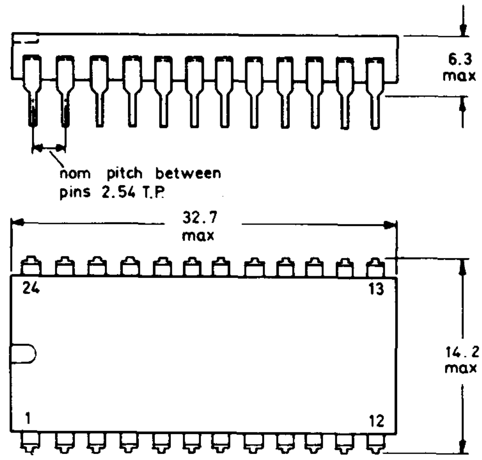
CC



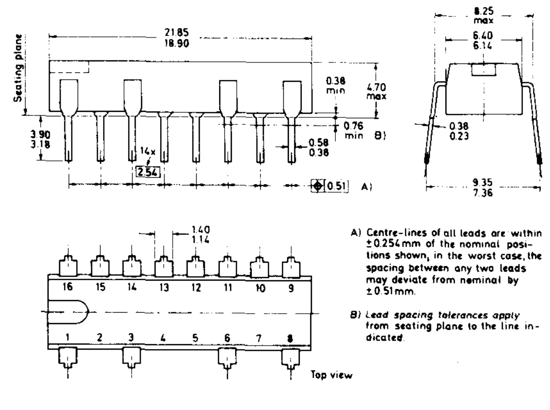
CD



CE

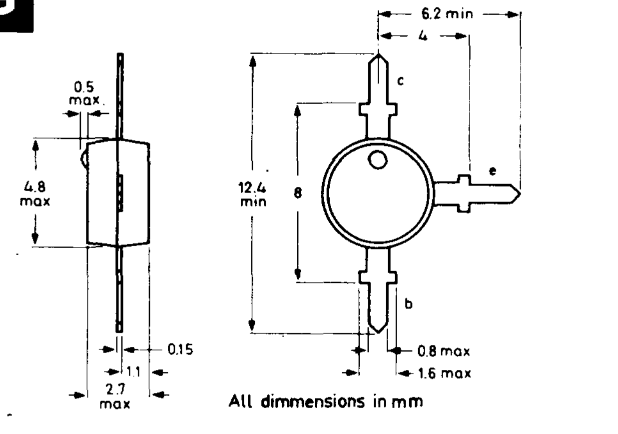


CF



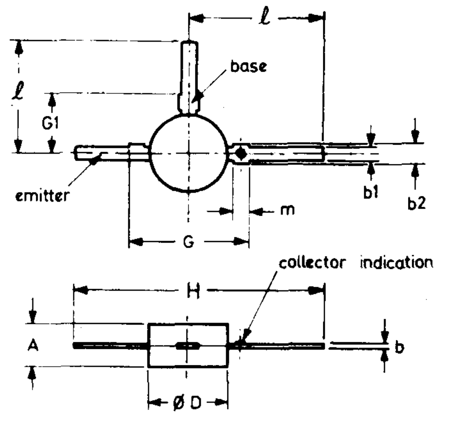
CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

CG



CH

CH	
A	2·7 max
B	0·19 max
b1	1·15 max
b2	1·55 max
ϕD	4·8 max
G	7·7 max
G1	3·9 max
H	14 min
ℓ	7·0 min
m	1·1 max



These drawings give limited information for quick reference purposes. For equipment design more complete information should be obtained from individual data sheets in the Technical Handbook or from standard B.S or JEDEC outline drawings.

Mullard

Mullard Limited
Mullard House
Torrington Place
London WC1E 7HD
Tel: 01-580 6633

Mullard Industrial Distributor Service

Birmingham 021-236 5060: Gothic Electronic Components Ltd., Beacon House, Hampton St., Birm. 19
Birmingham 021-359 4301: Hawnt & Co. Ltd., 112/114 Pritchett Street, Birmingham B6 4EN
Bristol 294313: Wirelect Electronics Ltd., 'Wirelect House', 122/123 St. Thomas St., Bristol BS1 6JW
Crawley 28700: SASCO Ltd., P.O. Box 2000, Gatwick Road, Crawley, Sussex
Glasgow 041-445 3347/3991: Harper Robertson Electronics Ltd., 82 Loanbank Quadrant, Glas., SW1
Leeds 0532 636311: Farnell Electronic Components Ltd., Canal Road, Leeds LS12 2TU
Leicester 768561: Townsend-Coates Ltd., Coleman Road, Leicester LE5 4LP
London 01-237 0404/8 Edmundsons Electronics Ltd., Cowley House, 30-50 Ossory Road, London SE1
Reading 0734 582211: Celdis Ltd., 37/39 Loverock Road, Reading RG3 1ED
Rochdale 47411: Swift Hardman Ltd., P.O. Box 23, Hardale House, Baillie Street, Rochdale, Lancs.
Sheffield 27161: Needham Engineering Co. Ltd., P.O. Box 23, Hill Street, Sheffield S2 4SZ

Printed in England 5450/24M/472