U6206B-EFP

Frequency Synthesizer for TV Tuner

Features

- 1.3 GHz divide-by-8 prescaler integrated (can be bypassed)
- 15 bit counter accepts input frequencies up to 170 MHz
- P-controlled by I^2C-Bus
- 5 switching outputs (open collector)
- 4 addresses selectable at Pin 8 for multituner application
- 62.5 kHz (–1.3 GHz)/ 7.8125 kHz (–170 MHz) tuning steps
- Electrostatic protection according to MILSTD 883
- SO16 small package

Package: SO16

Block Diagram

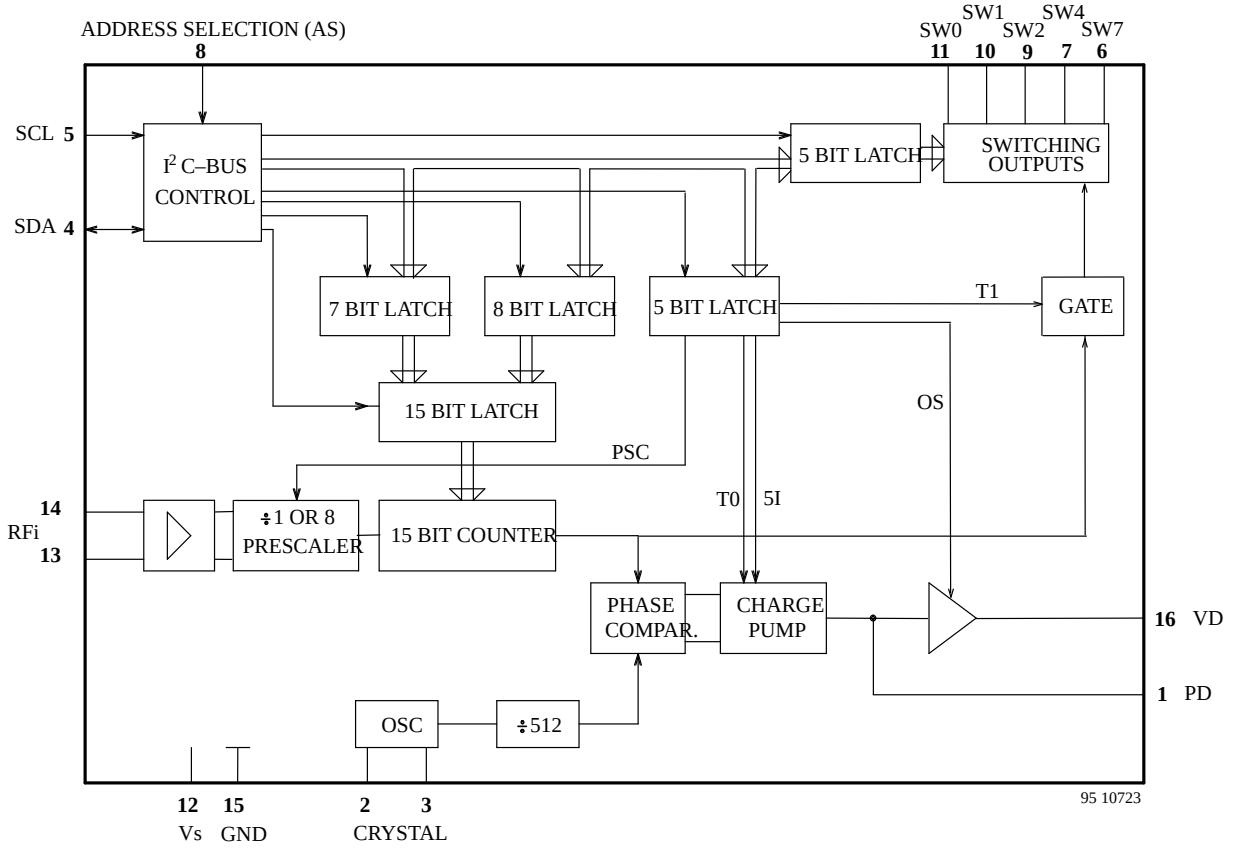
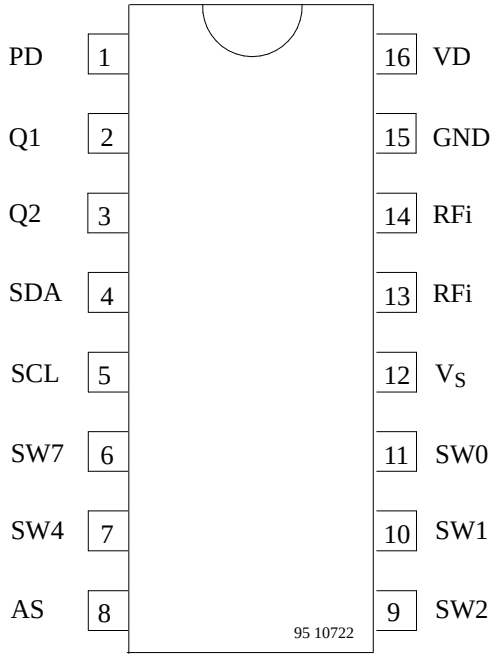


Figure 1.

U6206B-EFP

Pin Configuration



Pin	Symbol	Function
1	PD	Charge pump output
2	Q1	Crystal
3	Q2	Crystal
4	SDA	Data in/output
5	SCL	Clock
6	SW7	Switching output open collector
7	SW4	Switching output open collector
8	AS	Address select
9	SW2	Switching output open collector
10	SW1	Switching output open collector
11	SW0	Switching output open collector
12	Vs	Supply voltage
13	RFi	RF input
14	RFi	RF input
15	GND	Ground
16	VD	Active filter output

Absolute Maximum Ratings

All voltages are referred to GND (Pin 15).

Parameters			Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Pin 12		Vs	–0.3		6	V
RF input voltage	Pins 13,14		RFi	–0.3		Vs	V
Bus input/output voltage	Pin 4 Pin 5		VSDA VSCL	–0.3 –0.3		Vs Vs	V V
SDA output current	Open collector	Pin 4	ISDA	–1		5	mA
Address select voltage	Pin 8		VAS	–0.3		Vs	V
Current switching outputs	Open collector	Pin 11,10 Pins 9,7,6	SW 0,1, 2,4,7	–1		15	mA
Junction temperature			Tj	–40		125	C
Storage temperature			Tstg	–40		125	C

Operating Range

All voltages are referred to GND (Pin 15).

Parameters	Test Conditions / Pins		Symbol	Min.	Typ.	Max.	Unit
Supply voltage		Pin 12	Vs	4.5		5.5	V
Ambient temperature			T_{amb}	0		70	C
Input frequency	PSC = 1	Pins 13,14	RFi	64		1300	MHz
Input frequency	PSC = 0	Pins 13,14	RFi	1		170	MHz
Progr. divider			SF	256		32767	

Thermal Resistance

Parameters	Symbol	Value	Unit
SO16 small	RthJA	110	K/W

Electrical Characteristics

Test Conditions (unless otherwise specified) : Vs = 5V, Tamb = 25 C.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply current	SW 0,1,2,4,7 = 0 ; PSC =1 Pin 12	Is	32	42	52	mA
	SW 0,1,2,4,7 = 0 ; PSC =0 Pin 12	Is	22	28	35	mA
Input sensitivity						
fi = 80 – 1000 MHz	PSC = 1 Pin 13	Vi 1)			10	mV
fi = 1300 MHz	PSC = 1 Pin 13	Vi 1)			40	mV
fi = 10 – 170 MHz	PSC = 0 Pin 13	Vi 1)			10	mV
Maximum input signal	PSC = 0 / 1 Pin 13	Vimax 1)	315			mV
Open coll. sw. outputs	Pins 11, 10, 9, 7, 6	SW 0,1,2,4,7				
Reverse current	VH = 13.5 V	IRH			10	uA
Saturation voltage	IL = 10 mA	VSL 2)			0.5	V
Phase detector output		PD				
Charge pump current ”H”	5I = 1, VPD = 2 V	IPDH		180		uA
Charge pump current ”L”	5I = 0, VPD = 2 V	IPDL		50		uA
Charge pump leakage current	T0 = 1,VPD = 2 V	IPDTRI		5		nA
Bus inputs		SDA,SCL				
Input voltage		Vi “H” Vi “L”	3		5.5 1.5	V V
Input current	VSCL “H” =Vs VSCL “L” = 0 V	Ii “H” Ii “L”	 – 20		10	uA
Output voltage SDA (open collector)	ISDA “L” = 2 mA	VSDA“L”			0.4	V
Address selection		AS				
Input current	VAS “H” = Vs Pin 8 VAS “L” = 0 V Pin 8	IiAS “H” IiAS “L”	 – 100		10	uA
Bus timing						
Rise time SDA, SCL		tR			15	us
Fall time SDA, SCL		tF			15	us
Clock frequency SCL		fSCL	0		100	kHz
Clock “H” Pulse		tHIGH	4			us
Clock “L” Pulse		tLOW	4			us
Hold time start		tHSTA	4			us
Set–up time stop		tSSTO	4			us
Set–up time data		tSDAT	0.3			us
Hold time data		tHDAT	0			us

Notes:
1) RMS-voltage calculated from the measured available power on 50 Ω
2) Tested with one switch active

Data Formats

Description	Data Format								
	MSP							LSB	
Address byte	1	1	0	0	0	AS1	AS2	0	A
Progr. divider byte 1	0	n14	n13	n12	n11	n10	n9	n8	A
Progr. divider byte 2	n7	n6	n5	n4	n3	n2	n1	n0	A
Control byte 1	1	5I	T1	T0	X	X	PSC	OS	A
Control byte 2	SW7	X	X	SW4	X	SW2	SW1	SW0	A

A = Acknowledge ; X = not used ; Unused bits of controlbyte 2 should be 0 for lowest power consumption

n0..n14 :	Scaling factor (SF)	SF = 16384*n14 + 8192*n13 + ... + 2*n1 + n0	
PSC :	Prescaler on /off	PSC = 1 : prescaler on (PSF = 8)	
		PSC = 0 : prescaler off (PSF = 1)	
T0, T1 :	Testmode selection	T1 = 1 : divider test mode on	T1 = 0 : divider test mode off
		T0 = 1 : charge pump disable	T0 = 0 : charge pump enable
SW0,1,2,4,7:	Switching outputs	SW0, SW1, SW2, SW4, SW7 = 1 : open collector active	
5I :	Charge pump current switch	5I = 1 : high current	5I = 0 : low current
OS :	Output switch	OS = 1 : varicap drive disable	OS = 0 : varicap drive enable

AS1,AS2 : Address selection Pin 8

AS1	AS2	Address	Dec. Value	Voltage at Pin 8
0	1	1	194	open
0	0	2	192	0 to 10% Vs
1	0	3	196	40 to 60% Vs
1	1	4	198	90 to 100% Vs

Oscillator Frequency Calculation

fosc = fref * SF * PSF

fosc: Locked oscillator frequency

fref : Reference frequency 4MHz / 512 = 7.8125 kHz

SF: Scaling factor of programmable 15–bit–divider

PSF: Scaling factor of prescaler

Pulse Diagram

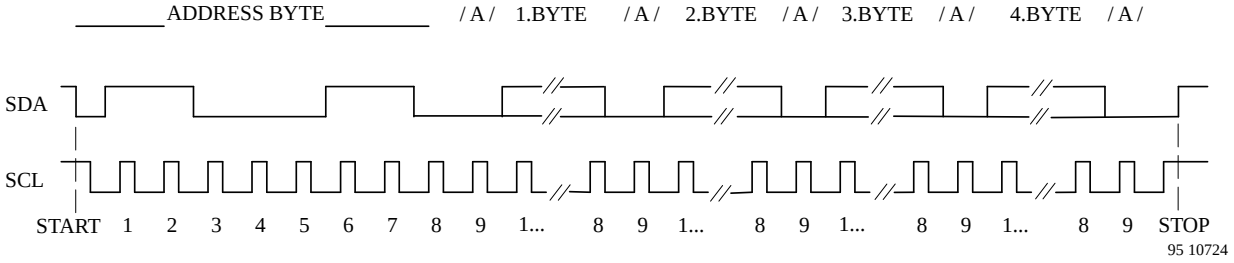


Figure 2.

Data transfer examples	Description
START – ADR – PDB1 – PDB2 – CB1 – CB2 – STOP	START= Start condition
START – ADR – CB1 – CB2 – –PDB1 – PDB2 – STOP	ADR= Address byte
START – ADR – PDB1 – PDB2 – CB1 – STOP	PDB1= Progr.divider byte 1
START – ADR – CB1 – CB2 – PDB1 – STOP	PDB2= Progr. divider byte 2
START – ADR – PDB1 – PDB2 – STOP	CB1= Control byte 1
START – ADR – CB1 – CB2 – STOP	CB2= Control byte 2
START – ADR – CB1 – STOP	STOP= Stop condition

Bus Timing

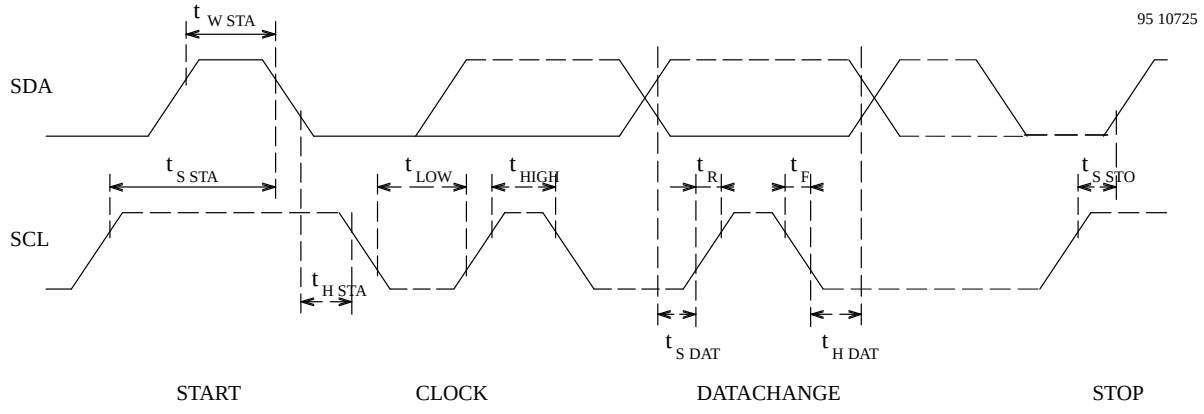


Figure 3.

tS STA	– Set – up time start
tW STA	– Waiting time start
tH STA	– Hold time start
tLOW	– ”L” – Pulse width clock
tHIGH	– ”H” – Pulse width clock
tS DAT	– Set – up time data
tH DAT	– Hold time data
tS STO	– Set – up time stop
tR	– Rise time
tF	– Fall time

Typical Prescaler Input Sensitivity (PSC = 1) :

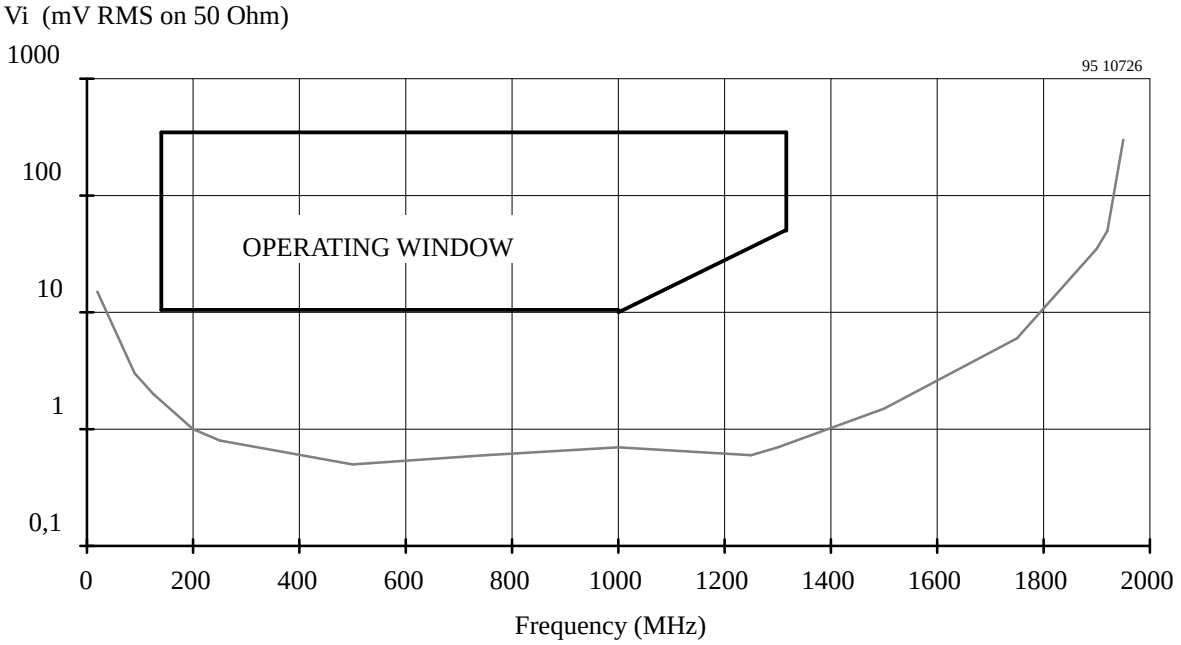


Figure 4.

Typical Prescaler Input Sensitivity (PSC = 0) :

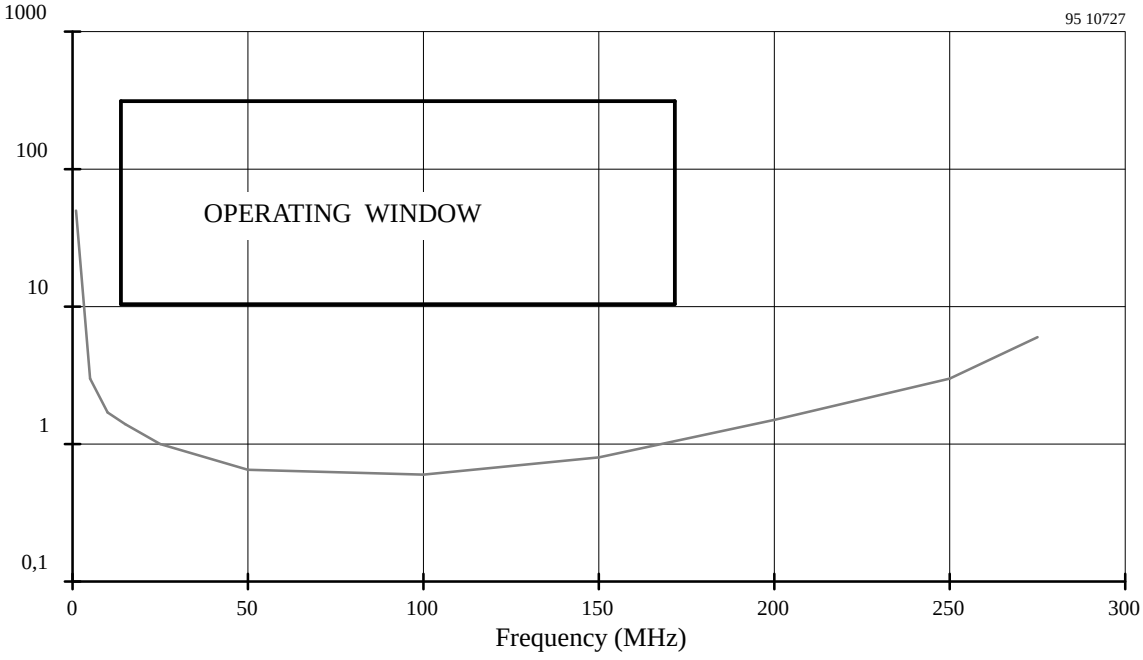


Figure 5.

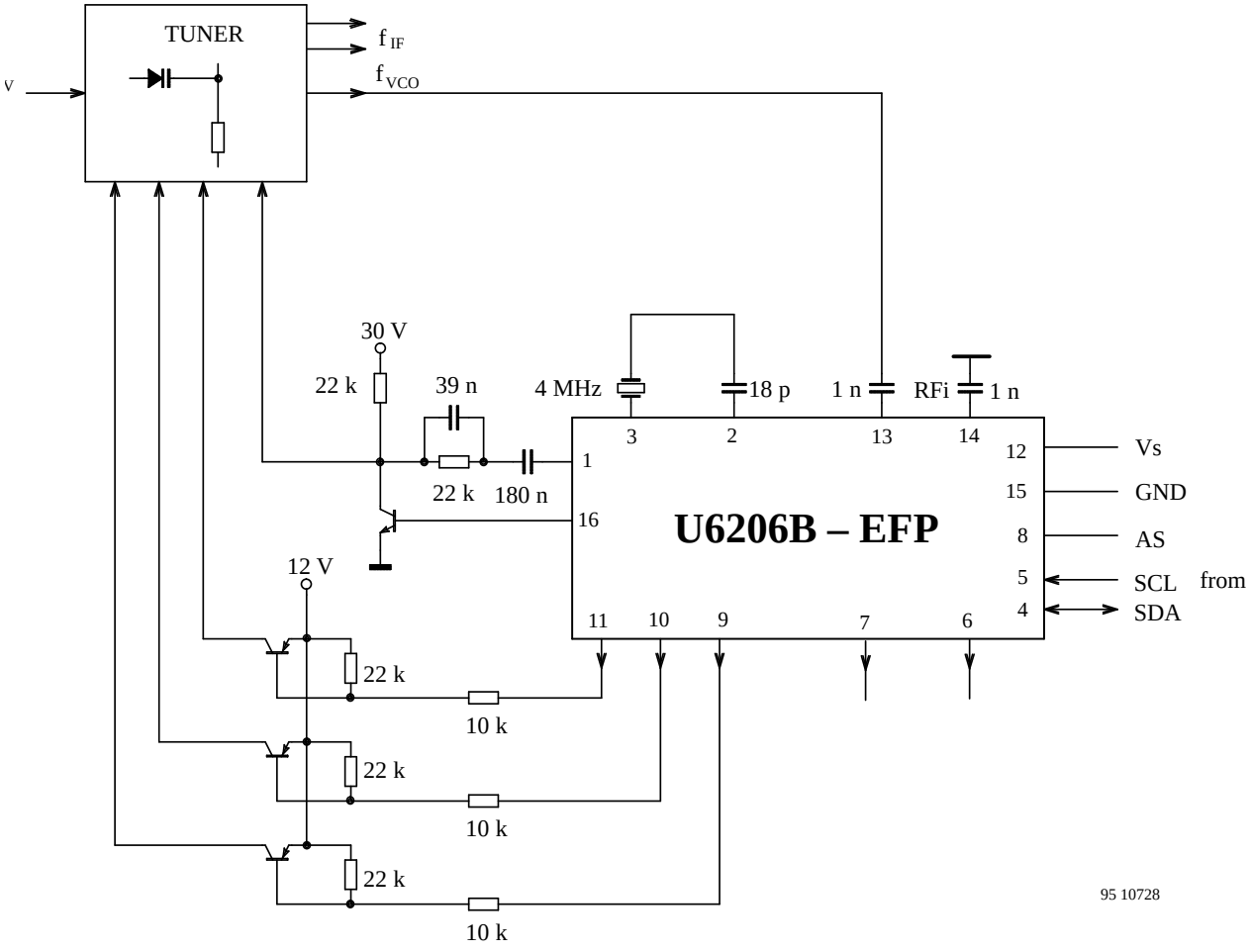
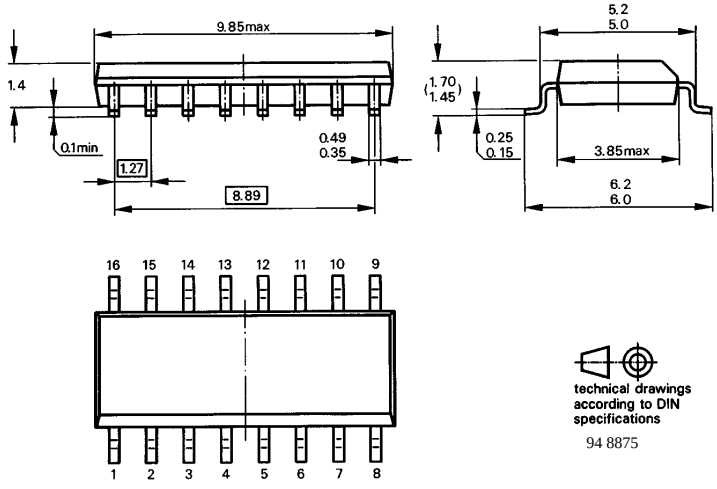


Figure 6.

Dimensions in mm

Package: SO16



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423