

Silicon Diffused Power Transistor

BU2527A

GENERAL DESCRIPTION

New generation, high-voltage, high-speed switching npn transistor in a plastic envelope intended for use in horizontal deflection circuits of high resolution monitors. Features improved RBSOA performance and is suitable for operation up to 64 kHz.

QUICK REFERENCE DATA

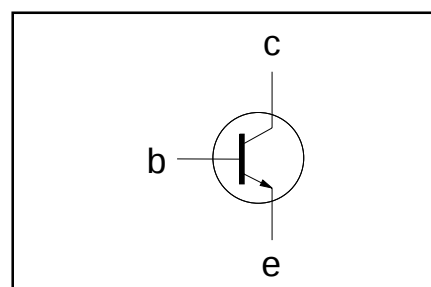
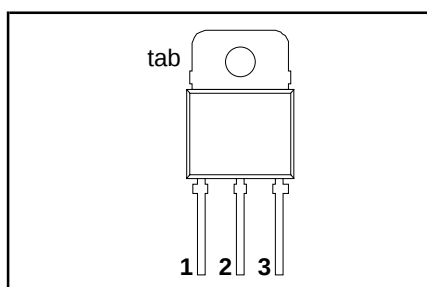
SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	12	A
I_{CM}	Collector current peak value		-	30	A
P_{tot}	Total power dissipation	$T_{mb} \leq 25\text{ °C}$	-	125	W
V_{CESat}	Collector-emitter saturation voltage	$I_C = 6.0\text{ A}; I_B = 1.2\text{ A}$	-	5.0	V
I_{CSat}	Collector saturation current		6.0	-	A
t_s	Storage time	$I_{CM} = 6.0\text{ A}; I_{B(end)} = 0.55\text{ A}$	1.7	2.0	μs

PINNING - SOT93

PIN CONFIGURATION

SYMBOL

PIN	DESCRIPTION
1	base
2	collector
3	emitter
tab	collector



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum Rating System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	12	A
I_{CM}	Collector current peak value		-	30	A
I_B	Base current (DC)		-	8	A
I_{BM}	Base current peak value		-	12	A
$-I_{B(AV)}$	Reverse base current	average over any 20 ms period	-	200	mA
$-I_{BM}$	Reverse base current peak value ¹		-	7	A
P_{tot}	Total power dissipation	$T_{mb} \leq 25\text{ °C}$	-	125	W
T_{stg}	Storage temperature		-65	150	°C
T_j	Junction temperature		-	150	°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Junction to mounting base		-	1.0	K/W
$R_{th\ j-a}$	Junction to ambient	in free air	45	-	K/W

¹ Turn-off current.

Silicon Diffused Power Transistor

BU2527A

STATIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CES}	Collector cut-off current ²	V _{BE} = 0 V; V _{CE} = V _{CESMmax}	-	-	0.25	mA
I _{CES}		V _{BE} = 0 V; V _{CE} = V _{CESMmax} T _J = 125 °C	-	-	2.0	mA
I _{EBO}	Emitter cut-off current	V _{EB} = 7.5 V; I _C = 0 A	-	-	0.25	mA
BV _{EBO}	Emitter-base breakdown voltage	I _B = 1 mA	7.5	13.5	-	V
V _{CEOsust}	Collector-emitter sustaining voltage	I _B = 0 A; I _C = 100 mA; L = 25 mH	800	-	-	V
V _{CEsat}	Collector-emitter saturation voltage	I _C = 6.0 A; I _B = 1.2 A	-	-	5.0	V
V _{BEsat}	Base-emitter saturation voltage	I _C = 6.0 A; I _B = 1.2 A	-	-	1.3	V
h _{FE}	DC current gain	I _C = 1 A; V _{CE} = 5 V	6	10	21	
h _{FE}		I _C = 6 A; V _{CE} = 5 V	5	7	9	

DYNAMIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C _c	Collector capacitance	I _E = 0 A; V _{CB} = 10 V; f = 1 MHz	145	-	pF
	Switching times (64 kHz line deflection circuit)	I _{CM} = 6.0 A; L _C = 170 µH; C _{fb} = 5.4 nF; I _{B(end)} = 0.55 A; L _B = 0.6 µH; -V _{BB} = 2 V; (-dI _B /dt = 3.33 A/µs)			
t _s	Turn-off storage time		1.7	2.0	µs
t _f	Turn-off fall time		0.1	0.2	µs

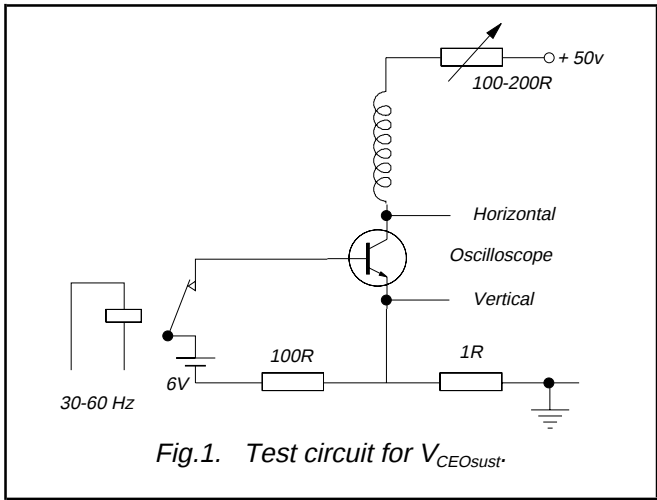


Fig.1. Test circuit for V_{CEOsust}.

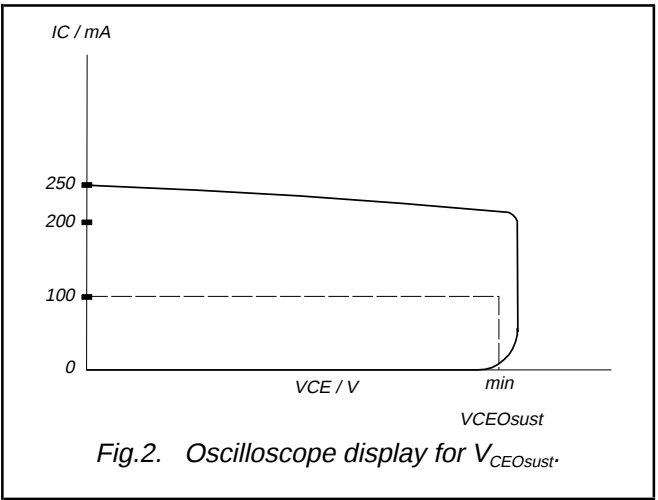


Fig.2. Oscilloscope display for V_{CEOsust}.

2 Measured with half sine-wave voltage (curve tracer).

Silicon Diffused Power Transistor

BU2527A

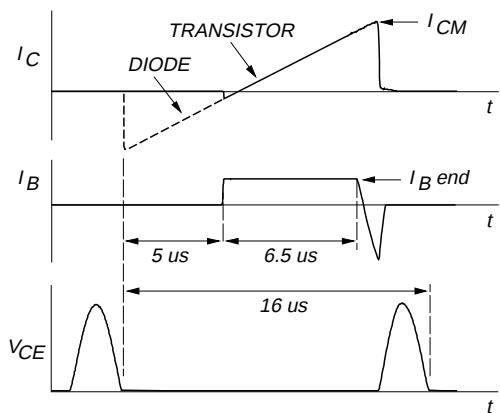


Fig.3. Switching times waveforms.

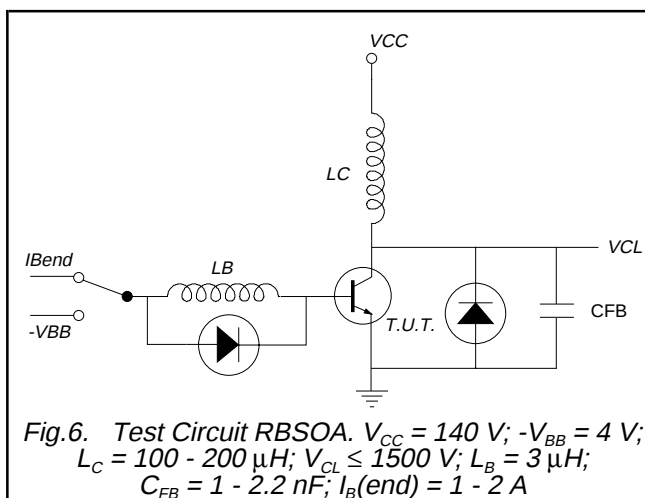


Fig.6. Test Circuit RBSOA. $V_{CC} = 140 \text{ V}$; $-V_{BB} = 4 \text{ V}$;
 $L_C = 100 - 200 \mu\text{H}$; $V_{CL} \leq 1500 \text{ V}$; $L_B = 3 \mu\text{H}$;
 $C_{FB} = 1 - 2.2 \text{ nF}$; $I_{B(\text{end})} = 1 - 2 \text{ A}$

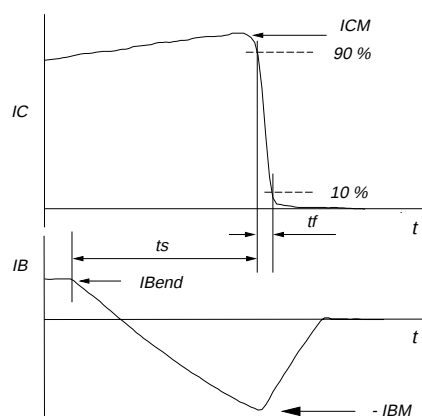


Fig.4. Switching times definitions.

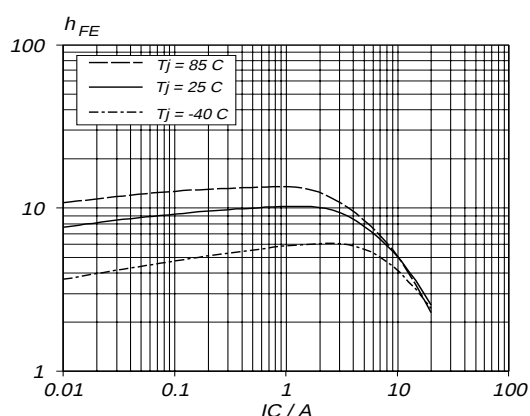


Fig.7. Typical DC current gain. $h_{FE} = f(I_C)$
 $V_{CE} = 5 \text{ V}$

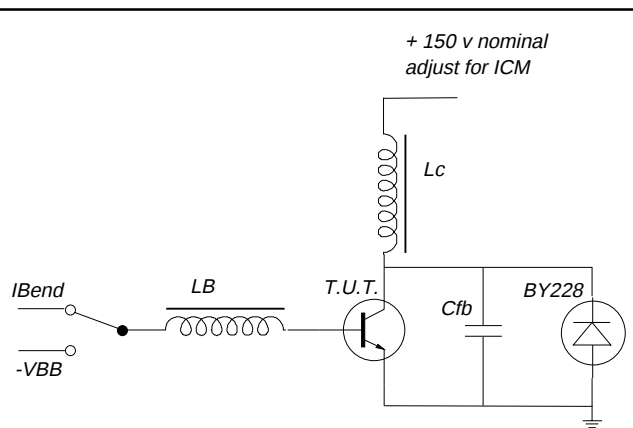


Fig.5. Switching times test circuit.

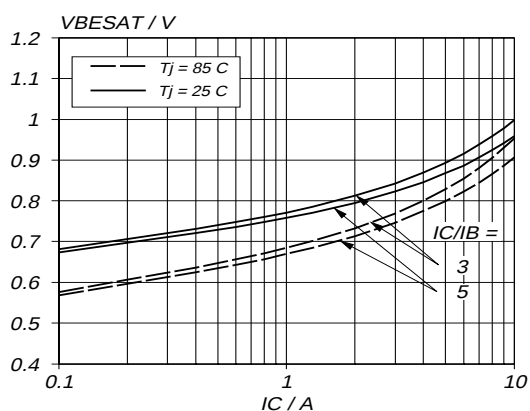


Fig.8. Typical base-emitter saturation voltage.
 $V_{BE(\text{sat})} = f(I_C)$; parameter I_C/I_B

Silicon Diffused Power Transistor

BU2527A

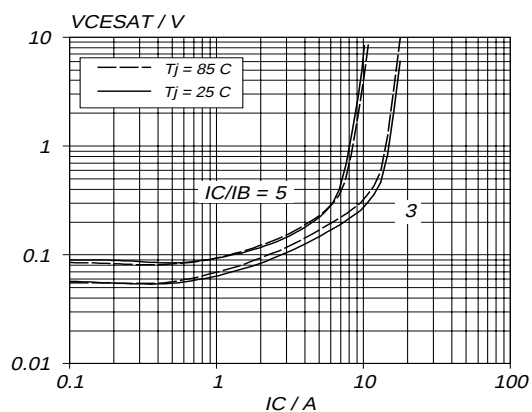


Fig.9. Typical collector-emitter saturation voltage.
 $V_{CEsat} = f(I_C)$; parameter I_C/I_B

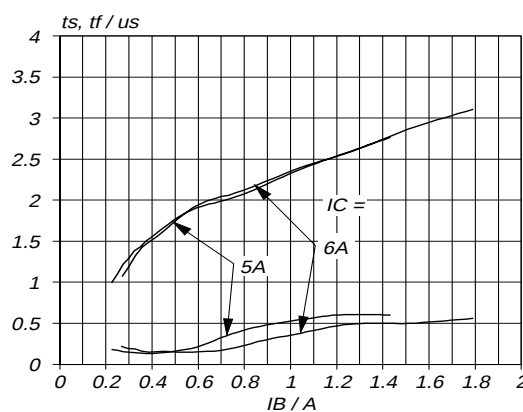


Fig.12. Typical collector storage and fall time.
 $t_s = f(I_B)$; $t_f = f(I_B)$; parameter I_C ; $T_j = 85^\circ\text{C}$; $f = 64\text{ kHz}$

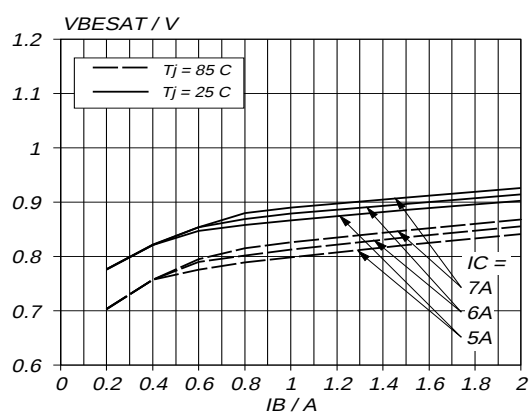


Fig.10. Typical base-emitter saturation voltage.
 $V_{BEsat} = f(I_B)$; parameter I_C

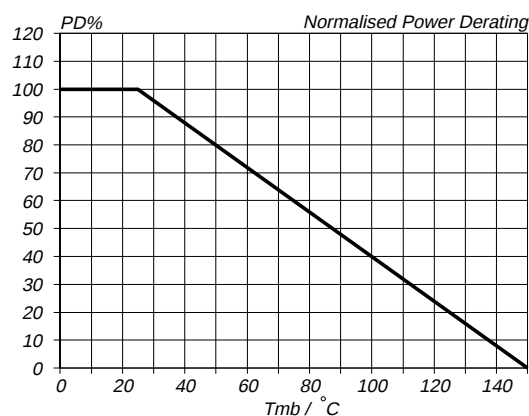


Fig.13. Normalised power dissipation.
 $PD\% = 100 \cdot P_D / P_{D, 25^\circ\text{C}} = f(T_{mb})$

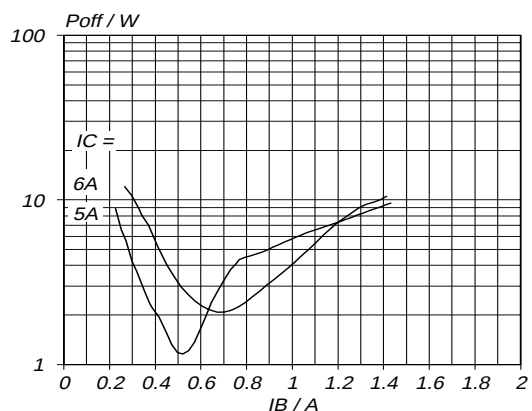


Fig.11. Typical turn-off losses. $T_j = 85^\circ\text{C}$
 $P_{off} = f(I_B)$; parameter I_C ; $f = 64\text{ kHz}$

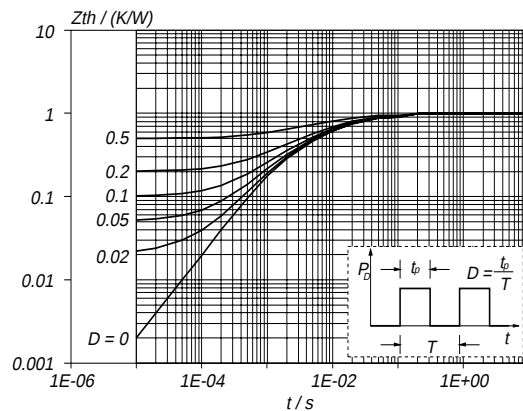


Fig.14. Transient thermal impedance.
 $Z_{thj-mb} = f(t)$; parameter $D = t_p/T$

Silicon Diffused Power Transistor

BU2527A

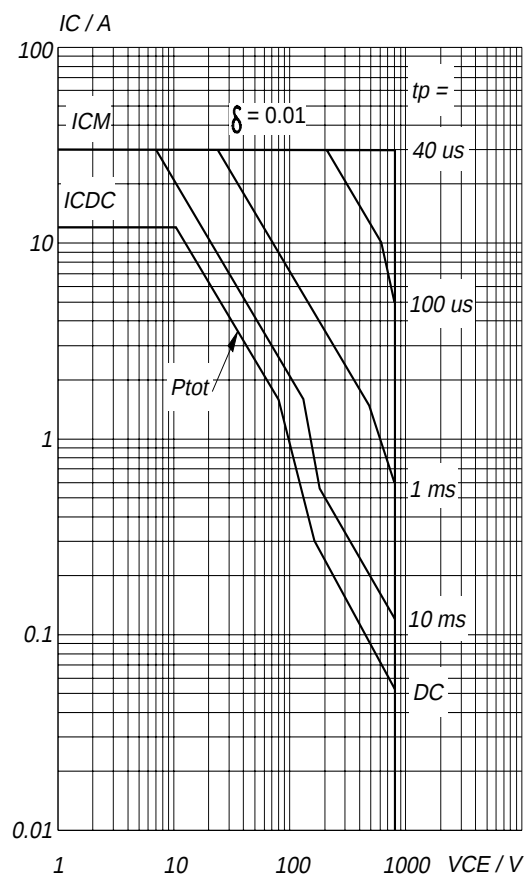


Fig.15. Forward bias safe operating area. $T_{mb} = 25^\circ\text{C}$
 I_{CDC} & $I_{CM} = f(V_{CE})$; I_{CM} single pulse; parameter t_p
 Second-breakdown limits independent of temperature.

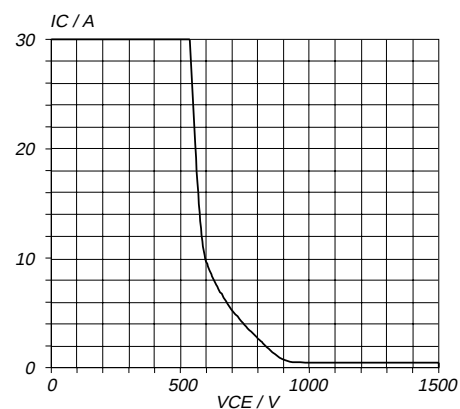


Fig.16. Reverse bias safe operating area. $T_j \leq T_{jmax}$

Silicon Diffused Power Transistor

BU2527A

MECHANICAL DATA

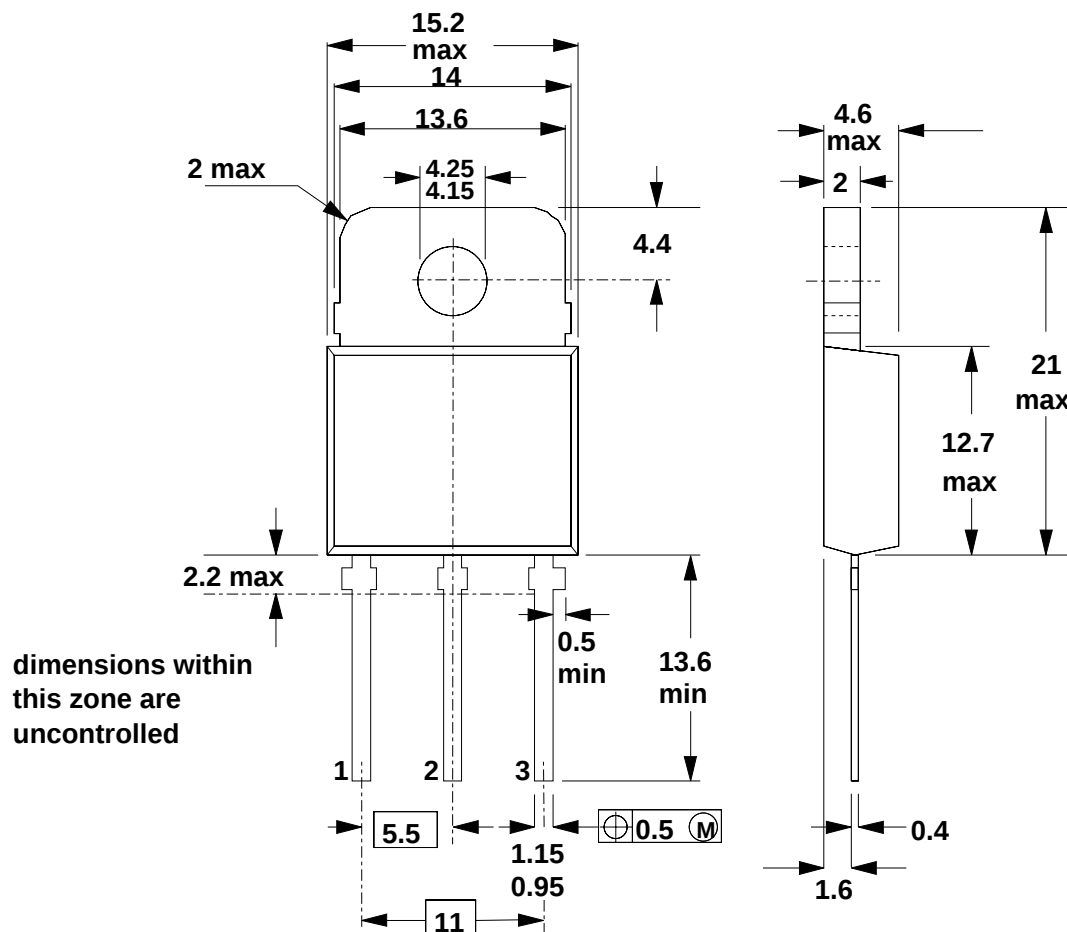
*Dimensions in mm**Net Mass: 5 g*

Fig.17. SOT93; pin 2 connected to mounting base.

Notes

1. Refer to mounting instructions for SOT93 envelope.
2. Epoxy meets UL94 V0 at 1/8".

Silicon Diffused Power Transistor

BU2527A

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
© Philips Electronics N.V. 1995	
All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.	
The information presented in this document does not form part of any quotation or contract, it is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent or other industrial or intellectual property rights.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.