Silicon diffused power transistor BU2522AF

GENERAL DESCRIPTION

New generation, high-voltage, high-speed switching npn transistor in a plastic full-pack 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.

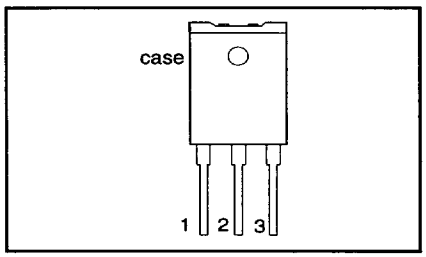
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	V_{BE} = 0 V	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	10	A
I_{CM}	Collector current peak value		-	25	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25$ °C	-	45	W
V_{CEsat}	Collector-emitter saturation voltage	I_C = 6.0 A; I_B = 1.76 A	-	5.0	V
I_{Csat}	Collector saturation current		6.0	-	A
t_s	Storage time	I_{CM} = 6.0 A; $I_{B(on)}$ = 0.7 A	1.7	2.0	µs

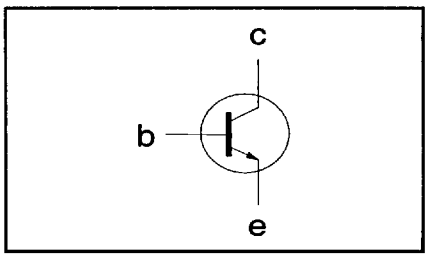
PINNING - SOT199

PIN	DESCRIPTION
1	base
2	collector
3	emitter
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	V_{BE} = 0 V	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	10	A
I_{CM}	Collector current peak value		-	25	A
I_B	Base current (DC)		-	6	A
I_{BM}	Base current peak value		-	9	A
$-I_{B(AV)}$	Reverse base current	average over any 20 ms period	-	150	mA
$-I_{BM}$	Reverse base current peak value [1]		-	6	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25$ °C	-	45	W
T_{stg}	Storage temperature		-65	150	°C
T_j	Junction temperature		-	150	°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Junction to heatsink	without heatsink compound	-	3.7	K/W
$R_{th\ j\text{-}hs}$	Junction to heatsink	with heatsink compound	-	2.8	K/W
$R_{th\ j\text{-}a}$	Junction to ambient	in free air	35	-	K/W

1 Turn-off current.

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ISOLATION

T_{hs} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65 % ; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	22	-	pF

STATIC CHARACTERISTICS

T_{hs} = 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
$V_{CEOsust}$	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 = 1.76 A	-	-	5.0	V
V_{BEsat}	Base-emitter saturation voltage	I_C = 6.0 A; I_B = 1.76 A	-	-	1.3	V
h_{FE}	DC current gain	I_C = 1 A; V_{CE} = 5 V	8	10	21	
h_{FE}		I_C = 6 A; V_{CE} = 5 V	5	7	8	

DYNAMIC CHARACTERISTICS

T_{hs} = 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	115	-	pF
	Switching times (64 kHz line deflection circuit)	I_{CM} = 6.0 A; L_C = 170 µH; C_{fb} = 5.4 nF; $I_{B(end)}$ = 0.7 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		0.12	0.25	µs

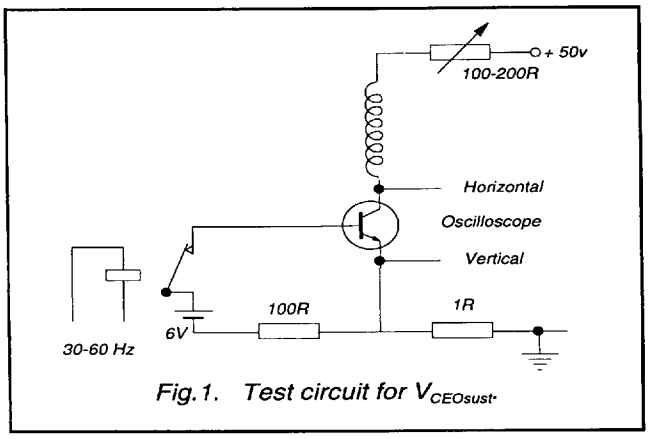

Fig.1. Test circuit for $V_{CEOsust}$.

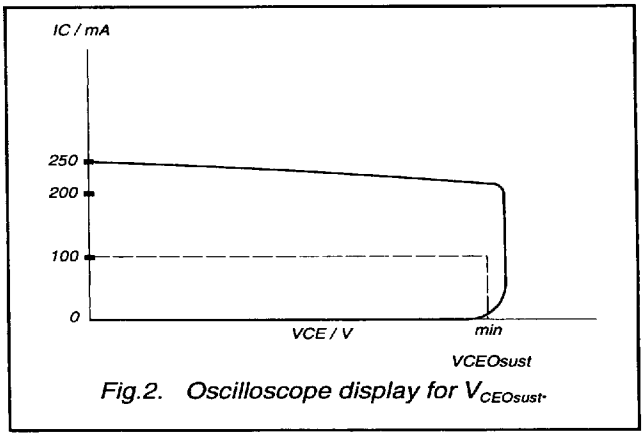

Fig.2. Oscilloscope display for $V_{CEOsust}$.

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

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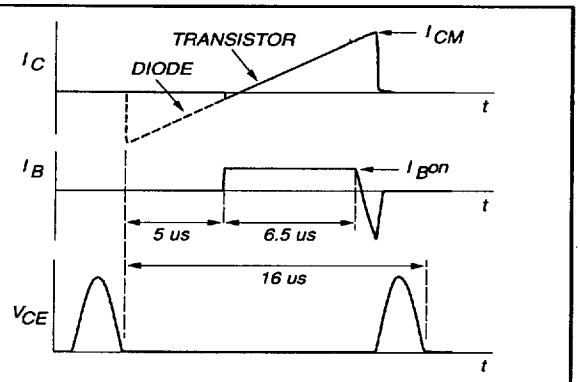

Fig.3. Switching times waveforms (64 kHz)

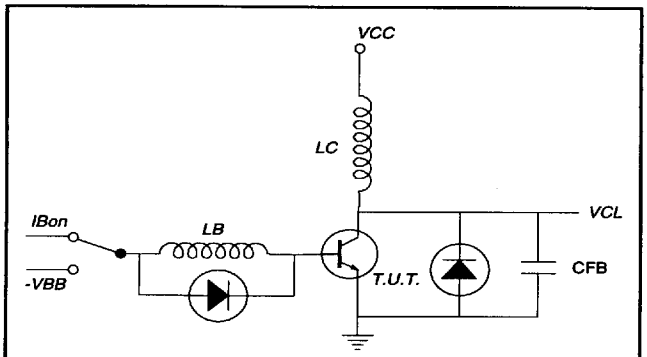

Fig.6. Test Circuit RBSOA. V_{CC} = 140 V; $-V_{BB}$ = 4 V; L_C = 100 - 400 µH; $V_{CL} \leq$ 1500 V; L_B = 3 µH; C_{FB} = 1 - 2.2 nF; I_B(on) = 1.6 - 2 A

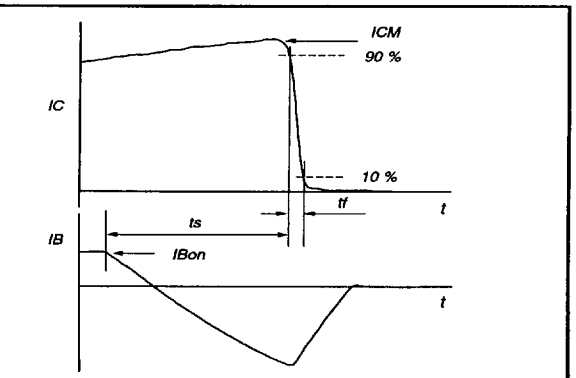

Fig.4. Switching times definitions

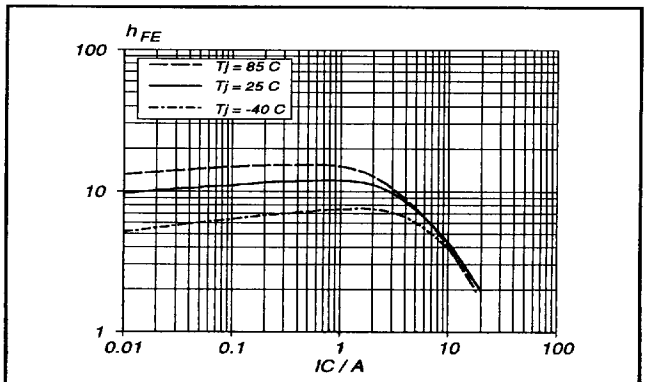

Fig.7. Typical DC current gain. $h_{FE} = f(I_C)$ V_{CE} = 5 V

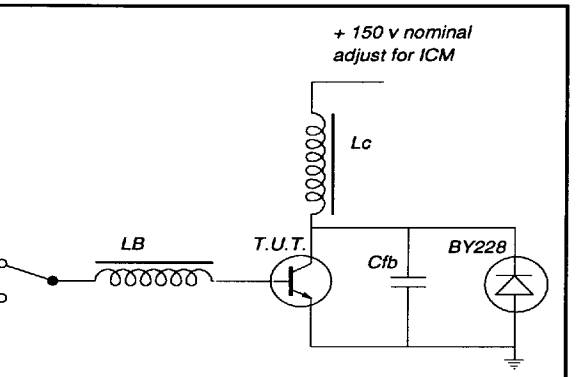

Fig.5. Switching times test circuit

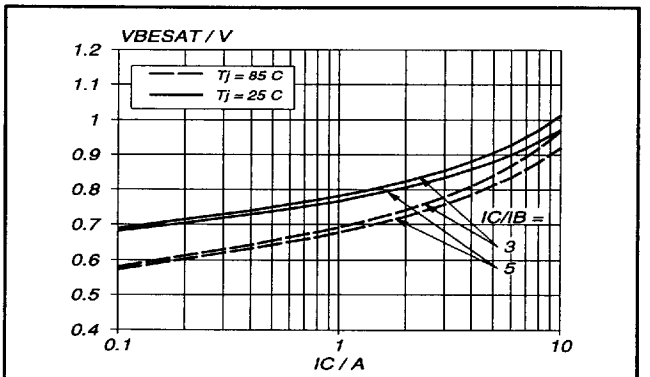

Fig.8. Typical base-emitter saturation voltage. V_{BE}sat = f (I_C); parameter I_C/I_B

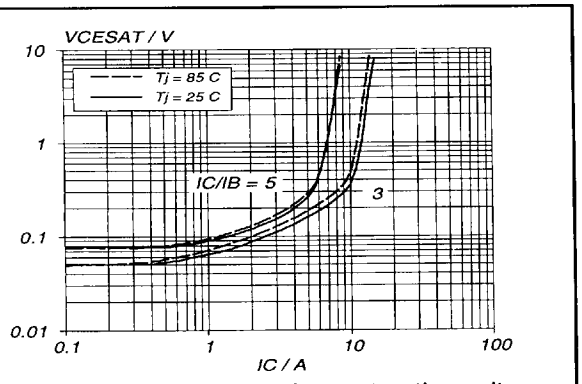

Fig.9. Typical collector-emitter saturation voltage. $V_{CE}sat = f(I_C)$; parameter I_C/I_B

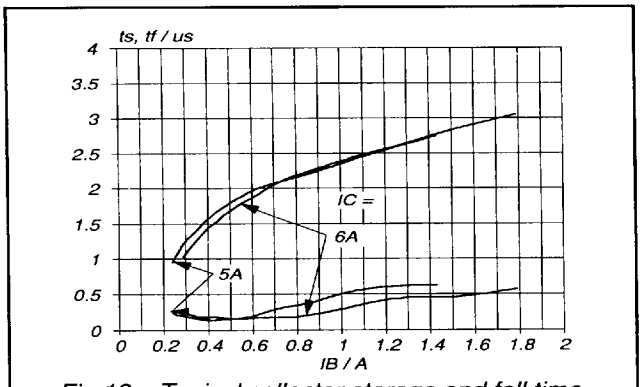

Fig.12. Typical collector storage and fall time. $ts = f(I_B)$; $tf = f(I_B)$; parameter I_C; $T_j = 85°C$; $f = 64$ kHz

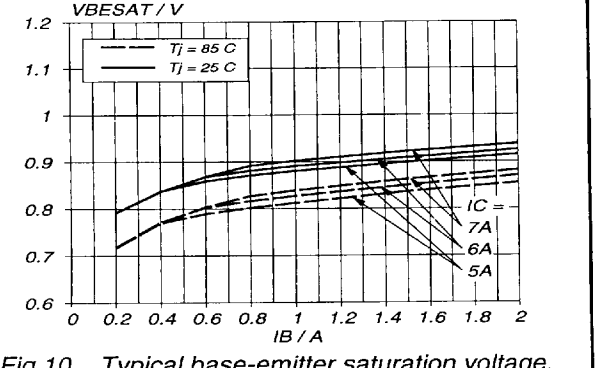

Fig.10. Typical base-emitter saturation voltage. $V_{BE}sat = f(I_B)$; parameter I_C

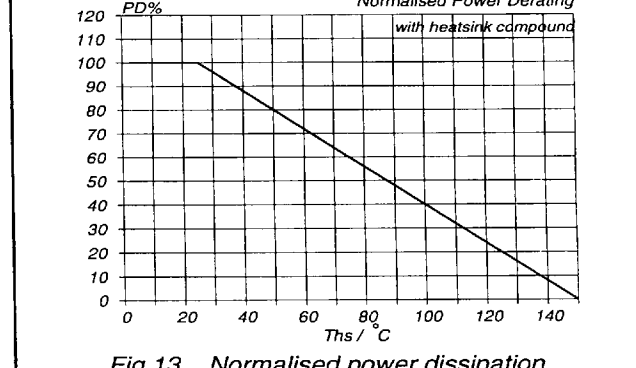

Fig.13. Normalised power dissipation. $PD\% = 100 \cdot P_D/P_{D\,25°C} = f(T_{hs})$

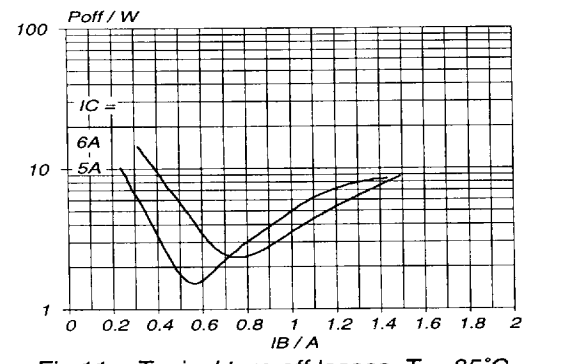

Fig.11. Typical turn-off losses. $T_j = 85°C$ $Poff = f(I_B)$; parameter I_C; $f = 64$ kHz

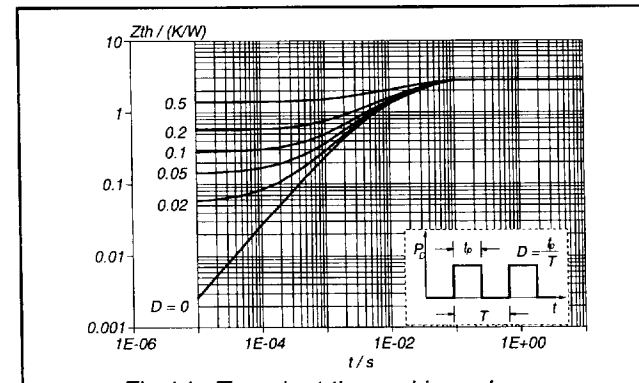

Fig.14. Transient thermal impedance. $Z_{th\,j\text{-}hs} = f(t)$; parameter $D = t_p/T$

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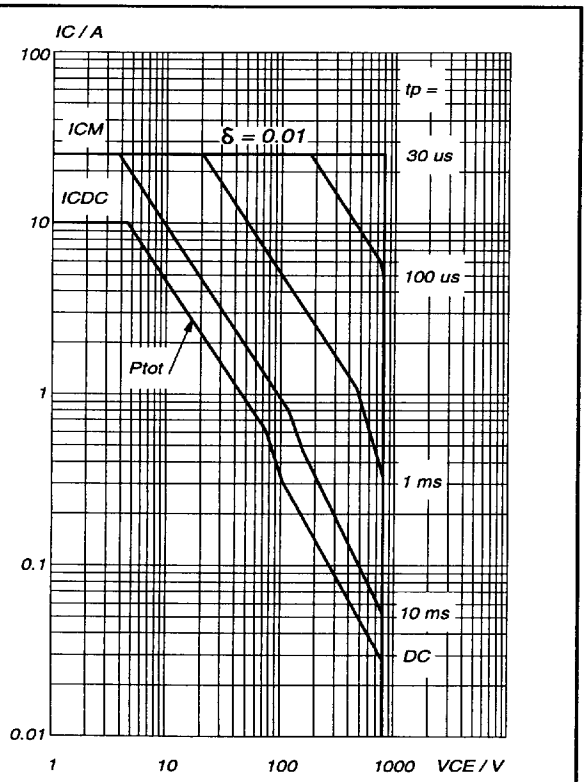

Fig.15. Forward bias safe operating area. T_{hs} = 25 °C I_{CDC} & I_{CM} = f(V_{CE}); I_{CM} single pulse; parameter t_p. Second-breakdown limits independant of temperature. Mounted with heatsink compound.

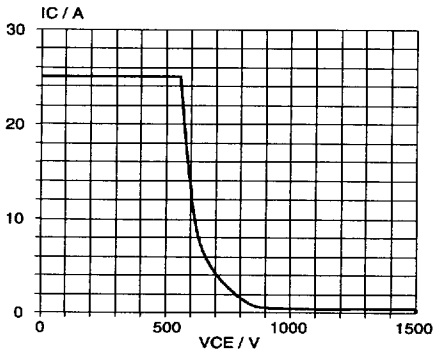

Fig.16. Reverse bias safe operating area. $T_j \leq T_{jmax}$

MECHANICAL DATA

Dimensions in mm

Net Mass: 5.5 g

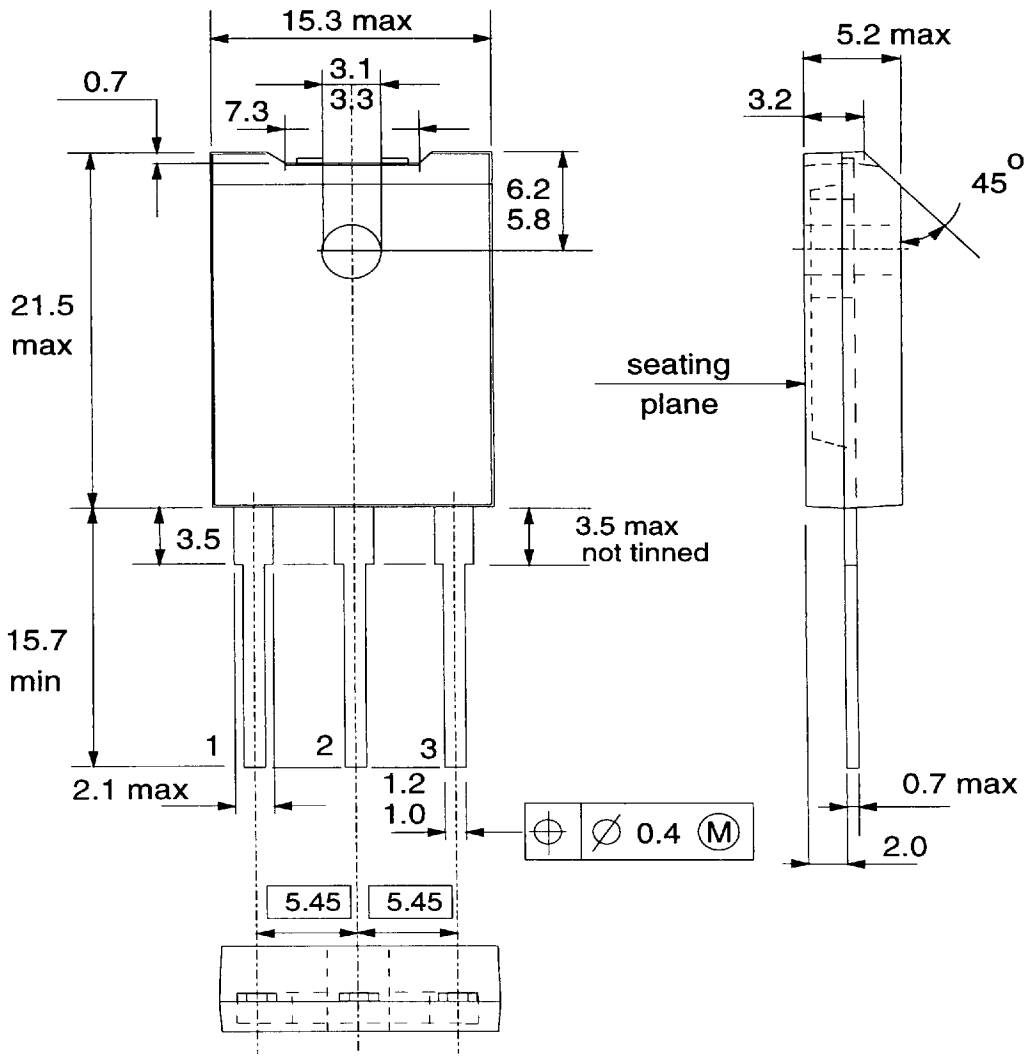

Fig.17. SOT199; The seating plane is electrically isolated from all terminals.

Notes

1. Accessories supplied on request: refer to mounting instructions for F-pack envelopes.

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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 given are 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 the 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.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be 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.