

Silicon Diffused Power Transistor

BU2725DX

GENERAL DESCRIPTION

High voltage, high-speed switching npn transistor in a plastic full-pack envelope intended for use in horizontal deflection circuits of colour television receivers. Designed to withstand V_{CES} pulses up to 1700V.

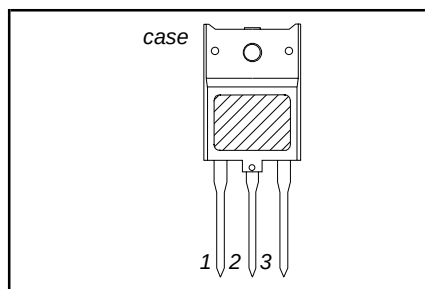
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	1700	V
I_C	Collector current (DC)		-	12	A
I_{CM}	Collector current peak value		-	30	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25\text{ }^{\circ}\text{C}$	-	45	W
V_{CESat}	Collector-emitter saturation voltage	$I_C = 7.0\text{ A}; I_B = 1.75\text{ A}$	-	1.0	V
I_{Csat}	Collector saturation current	$f = 16\text{ kHz}$	7.0	-	A
t_s	Storage time	$I_{Csat} = 7.0\text{ A}; f = 16\text{ kHz}$	5.8	6.5	μs

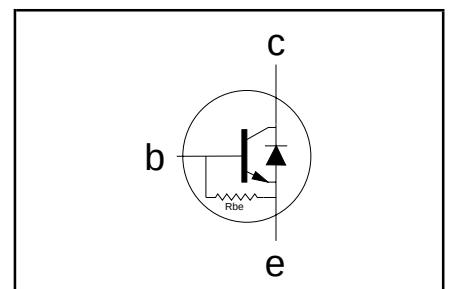
PINNING - SOT399

PIN	DESCRIPTION
1	base
2	collector
3	emitter
case	isolated

PIN CONFIGURATION



SYMBOL



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	$V_{BE} = 0\text{ V}$	-	1700	V
I_C	Collector current (DC)		-	12	A
I_{CM}	Collector current peak value		-	30	A
I_B	Base current (DC)		-	12	A
I_{BM}	Base current peak value		-	20	A
$-I_{B(AV)}$	Reverse base current	average over any 20 ms period	-	200	mA
$-I_{BM}$	Reverse base current peak value ¹		-	9	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25\text{ }^{\circ}\text{C}$	-	45	W
T_{stg}	Storage temperature		-65	150	$^{\circ}\text{C}$
T_j	Junction temperature		-	150	$^{\circ}\text{C}$

ESD LIMITING VALUES

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model (250 pF, 1.5 k Ω)	-	10	kV

¹ Turn-off current.

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THERMAL RESISTANCES

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

ISOLATION LIMITING VALUE & CHARACTERISTIC

 $T_{hs} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

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

STATIC CHARACTERISTICS

 $T_{hs} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	Collector cut-off current ²	$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$	-	-	1.0	mA
I_{CES}		$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}; T_j = 125\text{ }^{\circ}\text{C}$	-	-	2.0	mA
I_{EBO}	Emitter cut-off current	$V_{EB} = 7.5\text{ V}; I_C = 0\text{ A}$	-	110	-	mA
B_{VEBO}	Emitter-base breakdown voltage	$I_B = 1\text{ mA}$	7.5	13.5	-	V
R_{EB}	Base-emitter resistance	$V_{EB} = 7.5\text{ V}$	-	70	-	Ω
V_{CESat}	Collector-emitter saturation voltage	$I_C = 7.0\text{ A}; I_B = 1.75\text{ A}$	-	-	1.0	V
V_{BESat}	Base-emitter saturation voltage	$I_C = 7.0\text{ A}; I_B = 1.75\text{ A}$	0.78	0.86	0.95	V
V_F	Diode forward voltage	$I_F = 7\text{ A}$	-	1.4	2.2	V
h_{FE}	DC current gain	$I_C = 1\text{ A}; V_{CE} = 5\text{ V}$	-	19	-	
h_{FE}		$I_C = 7\text{ A}; V_{CE} = 1\text{ V}$	3.8	5.8	7.8	

DYNAMIC CHARACTERISTICS

 $T_{hs} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
	Switching times (16 kHz line deflection circuit)	$I_{Csat} = 7.0\text{ A}; L_C = 650\text{ }\mu\text{H}; C_{fb} = 18\text{ nF}; V_{CC} = 162\text{ V}; I_{B(end)} = 1.5\text{ A}; L_B = 2\text{ }\mu\text{H}; -V_{BB} = 4\text{ V}$			
t_s	Turn-off storage time		5.8	6.5	μs
t_f	Turn-off fall time		0.6	0.8	μs

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

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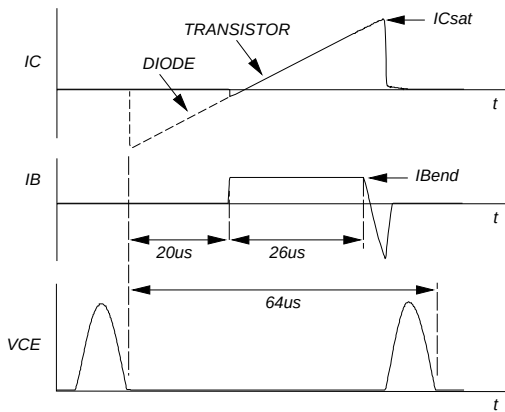


Fig.1. Switching times waveforms (16 kHz).

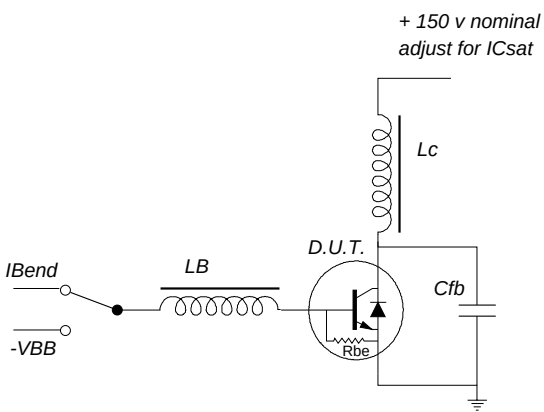


Fig.3. Switching times test circuit.

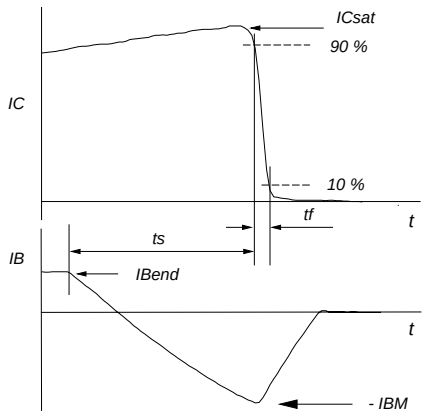


Fig.2. Switching times definitions.

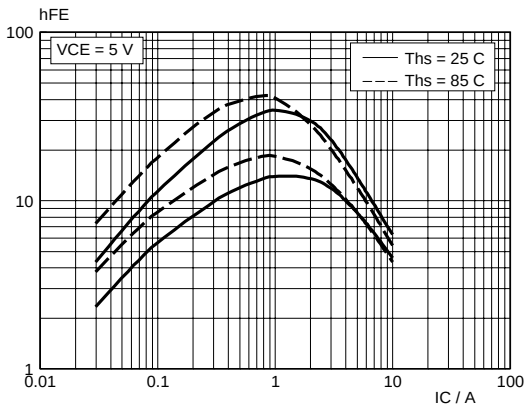


Fig.4. DC current gain. $h_{FE} = f(I_C)$
Parameter T_{hs}
(Low and high gain)

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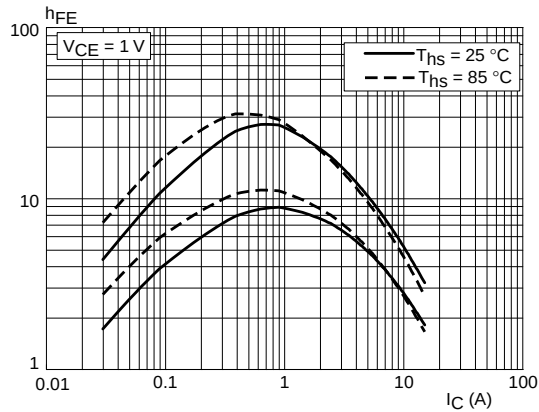


Fig. 5. DC current gain, $h_{FE} = f(I_C)$
Parameter T_{HS}
(Low and high gain)

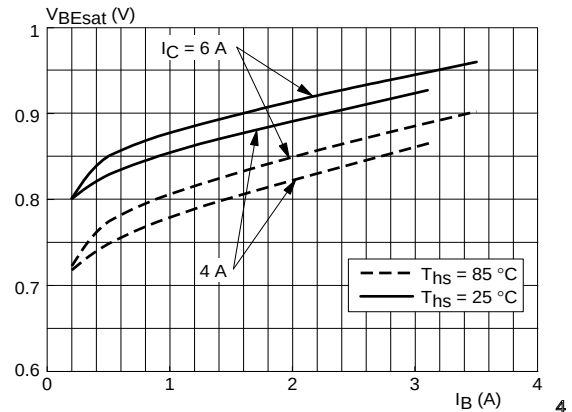


Fig. 7. Typical base-emitter saturation voltage.
 $V_{BEsat} = f(I_B)$; parameter I_C

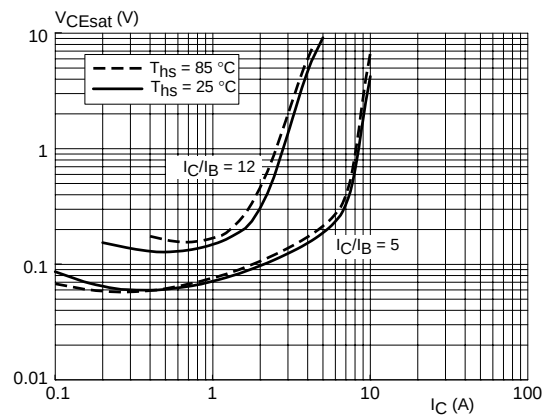


Fig. 6. Typical collector-emitter saturation voltage.
 $V_{CEsat} = f(I_C)$; parameter I_C/I_B

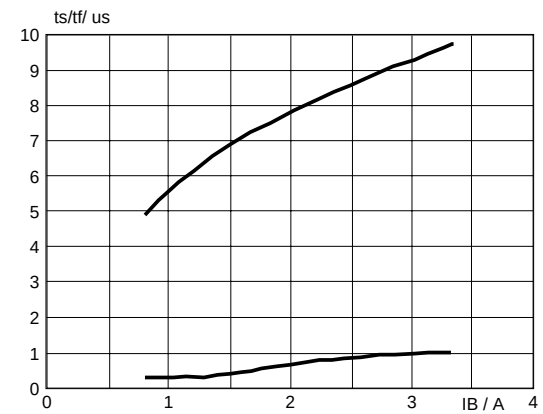


Fig. 8. Limit storage and fall time.
 $t_s = f(I_B)$; $t_f = f(I_B)$; $T_{HS} = 85^\circ\text{C}$; $f = 16\text{ kHz}$

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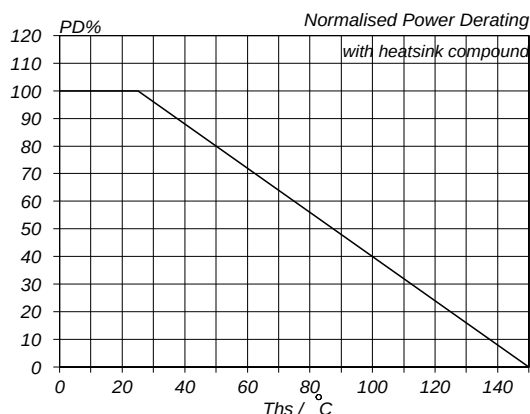


Fig.9. Normalised power dissipation.
 $PD\% = 100 \cdot PD / PD_{25^\circ C} = f(T_{hs})$

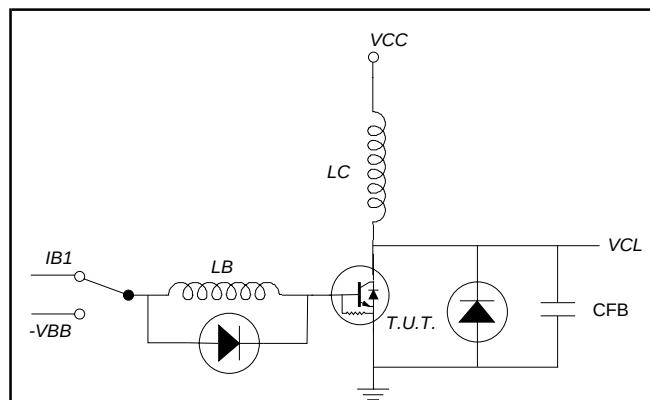


Fig.11. Test Circuit RBSOA.
 $V_{CC} = 150 \text{ V}$; $-V_{BB} = 1 - 4 \text{ V}$;
 $L_C = 1 \text{ mH}$; $V_{CL} = 1500 \text{ V}$; $L_B = 0.5 - 2 \mu\text{H}$;
 $C_{FB} = 1 - 3 \text{ nF}$; $I_{B(end)} = 0.8 - 4 \text{ A}$

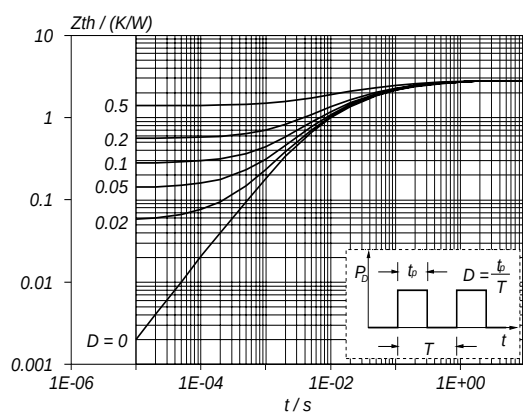


Fig.10. Transient thermal impedance.
 $Z_{th \text{ j-hs}} = f(t)$; parameter $D = t_p / T$

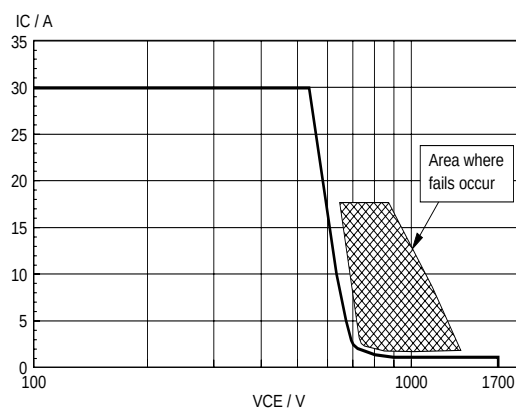
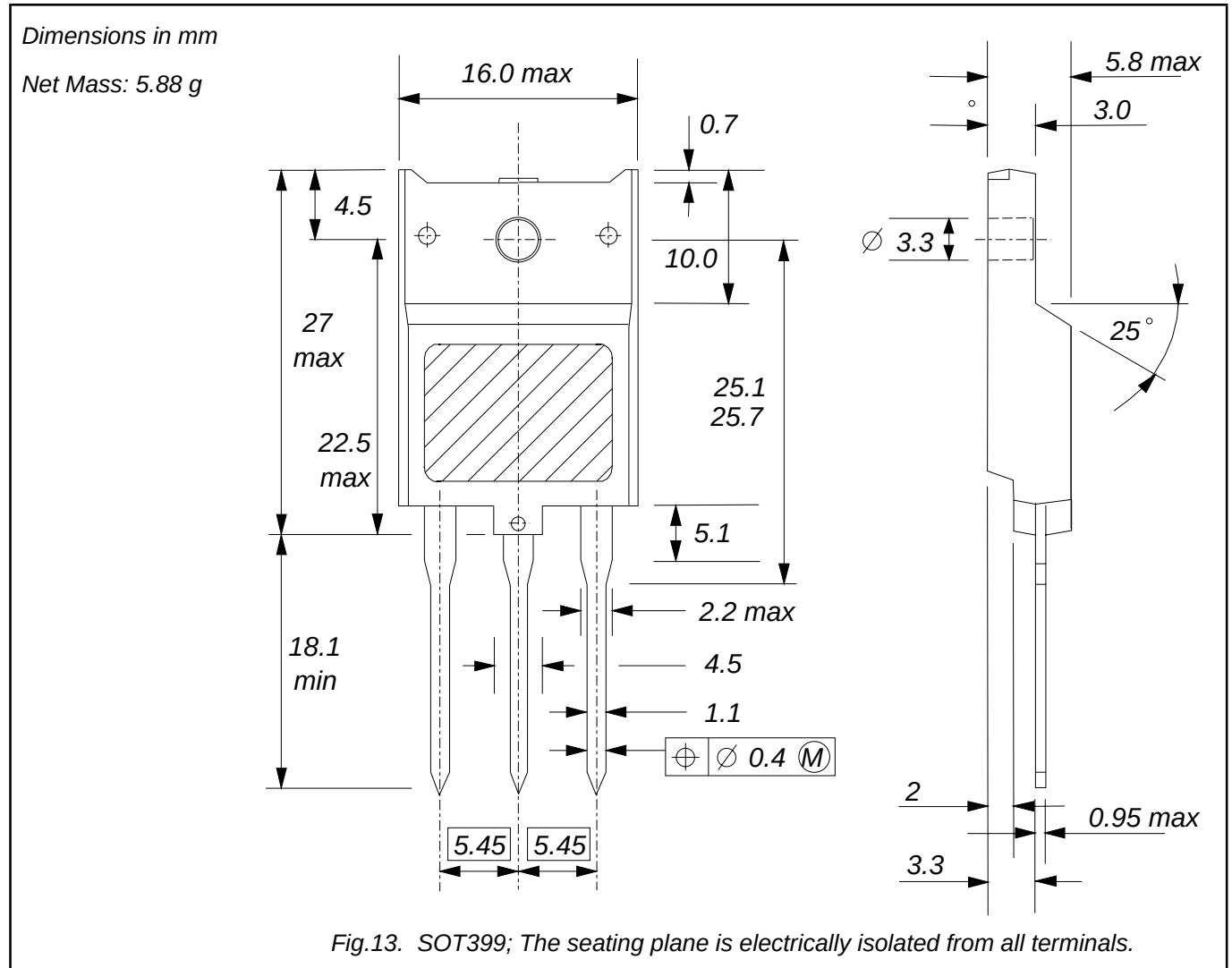


Fig.12. Reverse bias safe operating area. $T_j \leq T_{jmax}$

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MECHANICAL DATA



Notes

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

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DEFINITIONS

DATA SHEET STATUS		
DATA SHEET STATUS ³	PRODUCT STATUS ⁴	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A
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.		
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