

Silicon Diffused Power Transistor

BU4508DX

GENERAL DESCRIPTION

Enhanced performance, new generation, high-voltage, high-speed switching npn transistor with an integrated damper diode in a plastic full-pack envelope intended for use in horizontal deflection circuits of colour television receivers. Features exceptional tolerance to base drive and collector current load variations resulting in a very low worst case dissipation.

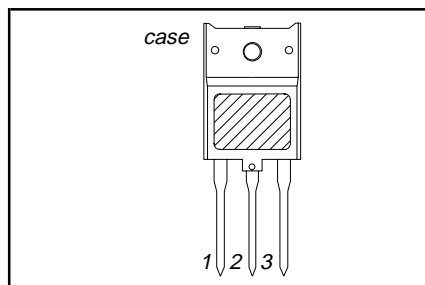
QUICK REFERENCE DATA

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)		-	8	A
I_{CM}	Collector current peak value		-	15	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25 \text{ }^\circ\text{C}$	-	45	W
V_{CESat}	Collector-emitter saturation voltage	$I_C = 5.0 \text{ A}; I_B = 1.25 \text{ A}$	-	3.0	V
I_{Csat}	Collector saturation current	$f = 16\text{kHz}$	5.0	-	A
V_F	Diode forward voltage	$I_F = 5 \text{ A}$	1.85	2.2	V
t_f	Fall time	$I_{Csat} = 5\text{A}; f = 16\text{kHz}$	300	400	ns

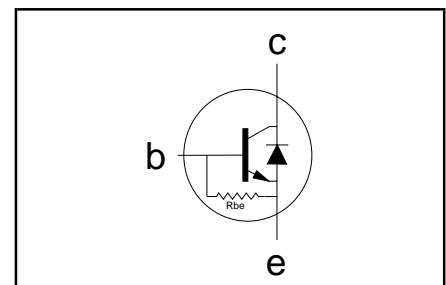
PINNING - SOT399

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	$V_{BE} = 0 \text{ V}$	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	8	A
I_{CM}	Collector current peak value		-	15	A
I_B	Base current (DC)		-	4	A
I_{BM}	Base current peak value		-	6	A
$-I_{BM}$	Reverse base current peak value ¹		-	5	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	$^\circ\text{C}$

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Junction to heatsink	with heatsink compound	-	2.8	K/W
$R_{th\ j-a}$	Junction to ambient	in free air	35	-	K/W

¹ Turn-off current.

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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
BV_{EBO}	Emitter-base breakdown voltage	$I_B = 600\text{ mA}$	7.5	13.5	-	V
R_{be}	Base-emitter resistance	$V_{EB} = 6\text{ V}$	-	25	-	Ω
$V_{CEOsust}$	Collector-emitter sustaining voltage	$I_B = 0\text{ A}; I_C = 100\text{ mA};$ $L = 25\text{ mH}$	800	-	-	V
V_{CEsat}	Collector-emitter saturation voltages	$I_C = 5.0\text{ A}; I_B = 1.25\text{ A}$	-	-	3.0	V
V_{BEsat}	Base-emitter saturation voltage	$I_C = 5.0\text{ A}; I_B = 1.25\text{ A}$	0.85	0.94	1.03	V
h_{FE}	DC current gain	$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}$	-	7	-	
h_{FE}		$I_C = 5.0\text{ A}; V_{CE} = 5\text{ V}$	4.2	5.7	7.3	
V_F	Diode forward voltage	$I_F = 5\text{ A}$	-	1.85	2.2	V

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

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
t_s	Switching times (16 kHz line deflection circuit) Turn-off storage time	$I_{Csat} = 5.0\text{ A}; I_{B1} = 1.0\text{ A}; (I_{B2} = -2.5\text{ A})$	2.75	3.75	μs
t_f	Turn-off fall time		300	400	ns
V_{fr}	Anti-parallel diode forward recovery voltage	$I_F = 4\text{ A}; dl_F/dt = 50\text{ A}/\mu\text{s}$	19	-	V
t_{fr}	Anti-parallel diode forward recovery time	$V_F = 5\text{ V}$	500	-	ns

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

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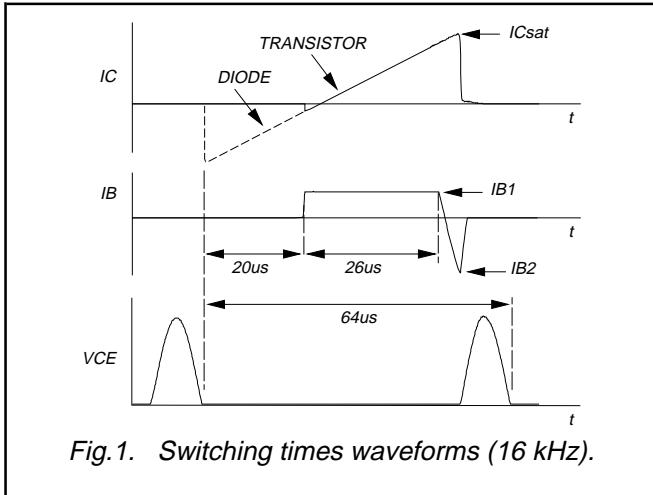


Fig.1. Switching times waveforms (16 kHz).

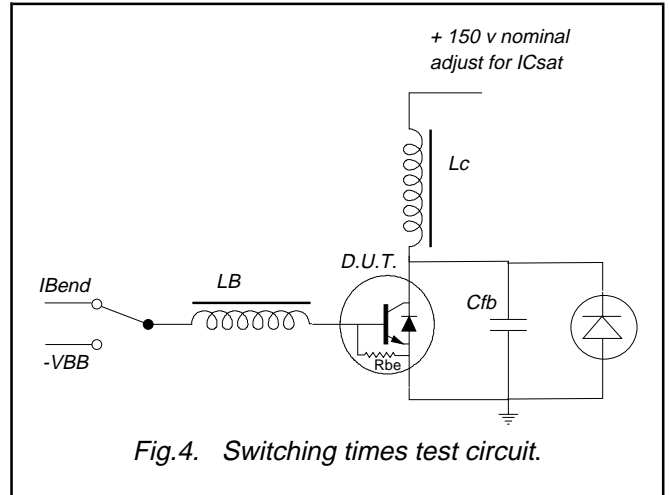


Fig.4. Switching times test circuit.

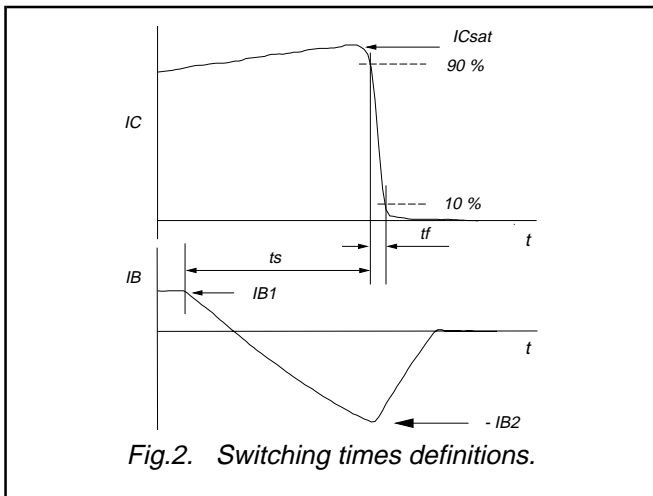


Fig.2. Switching times definitions.

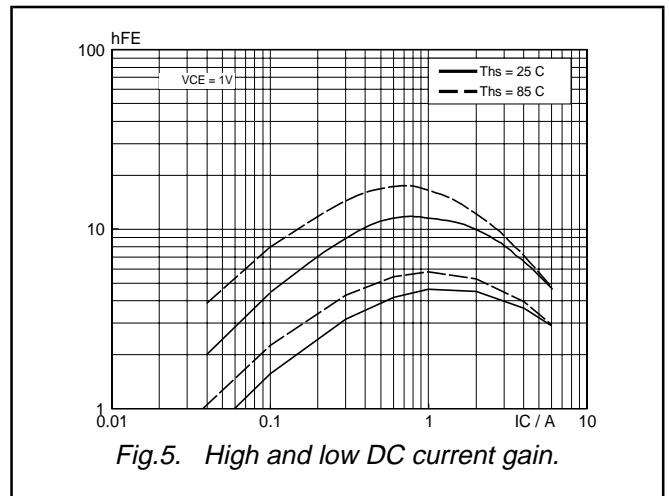


Fig.5. High and low DC current gain.

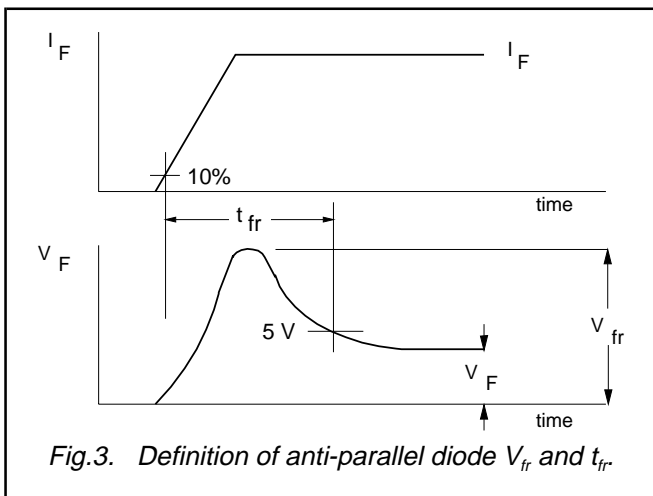


Fig.3. Definition of anti-parallel diode Vfr and tfr.

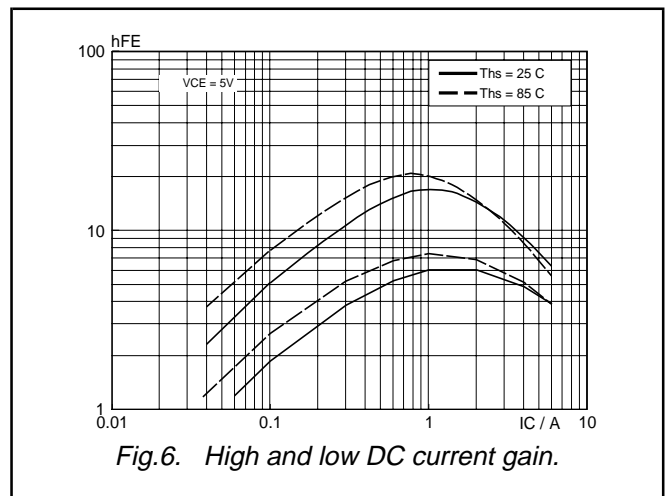
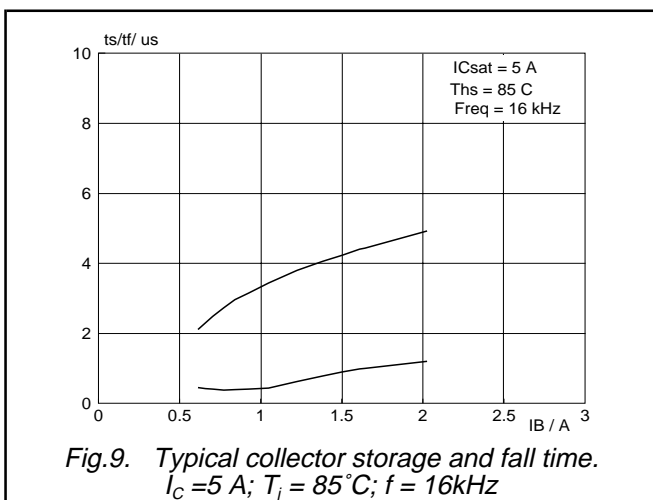
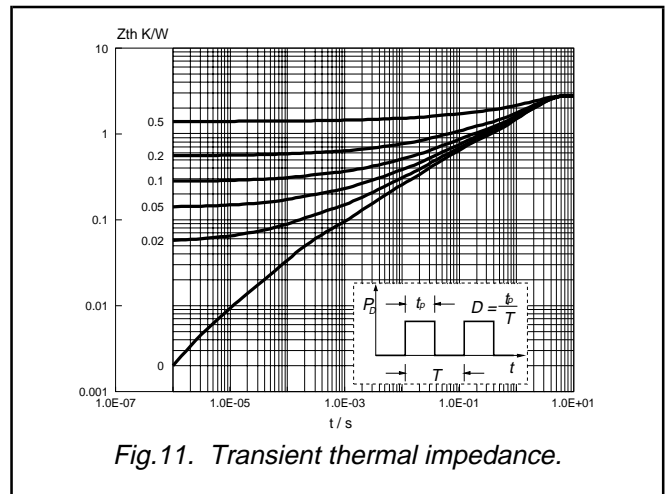
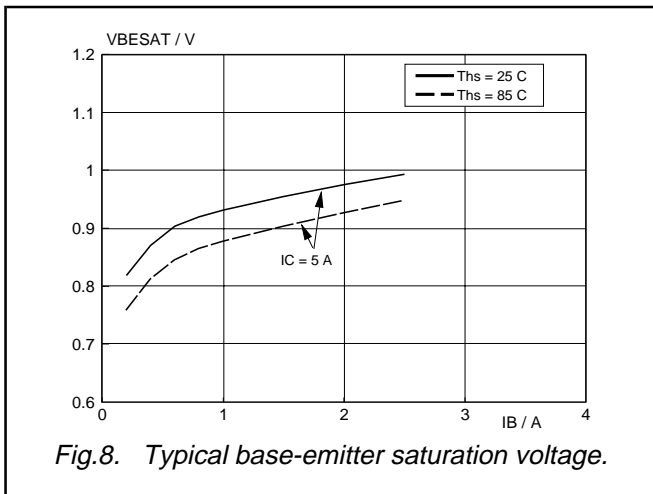
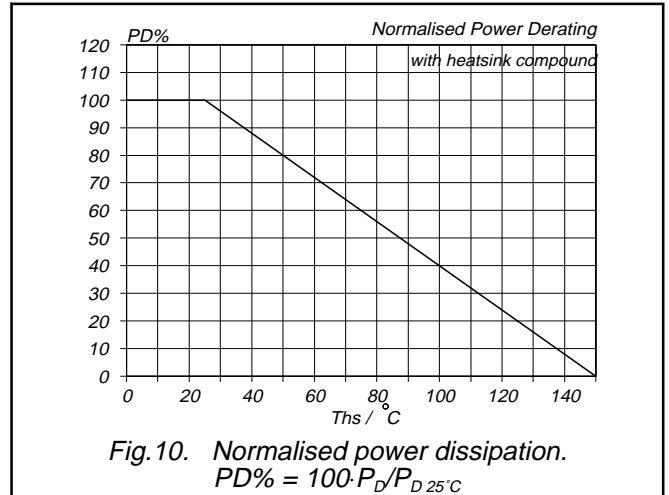
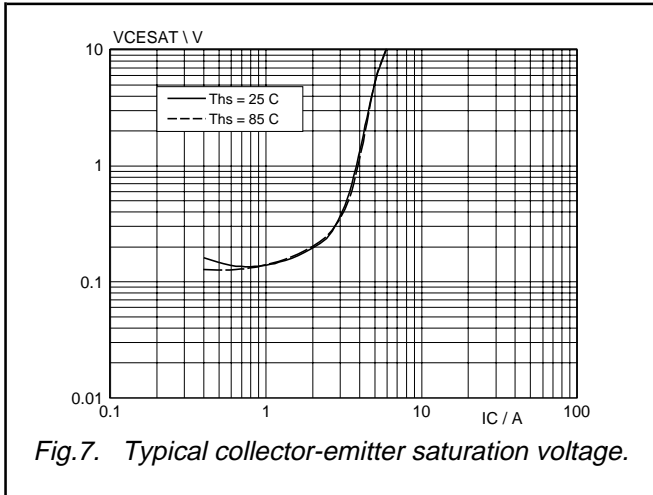


Fig.6. High and low DC current gain.

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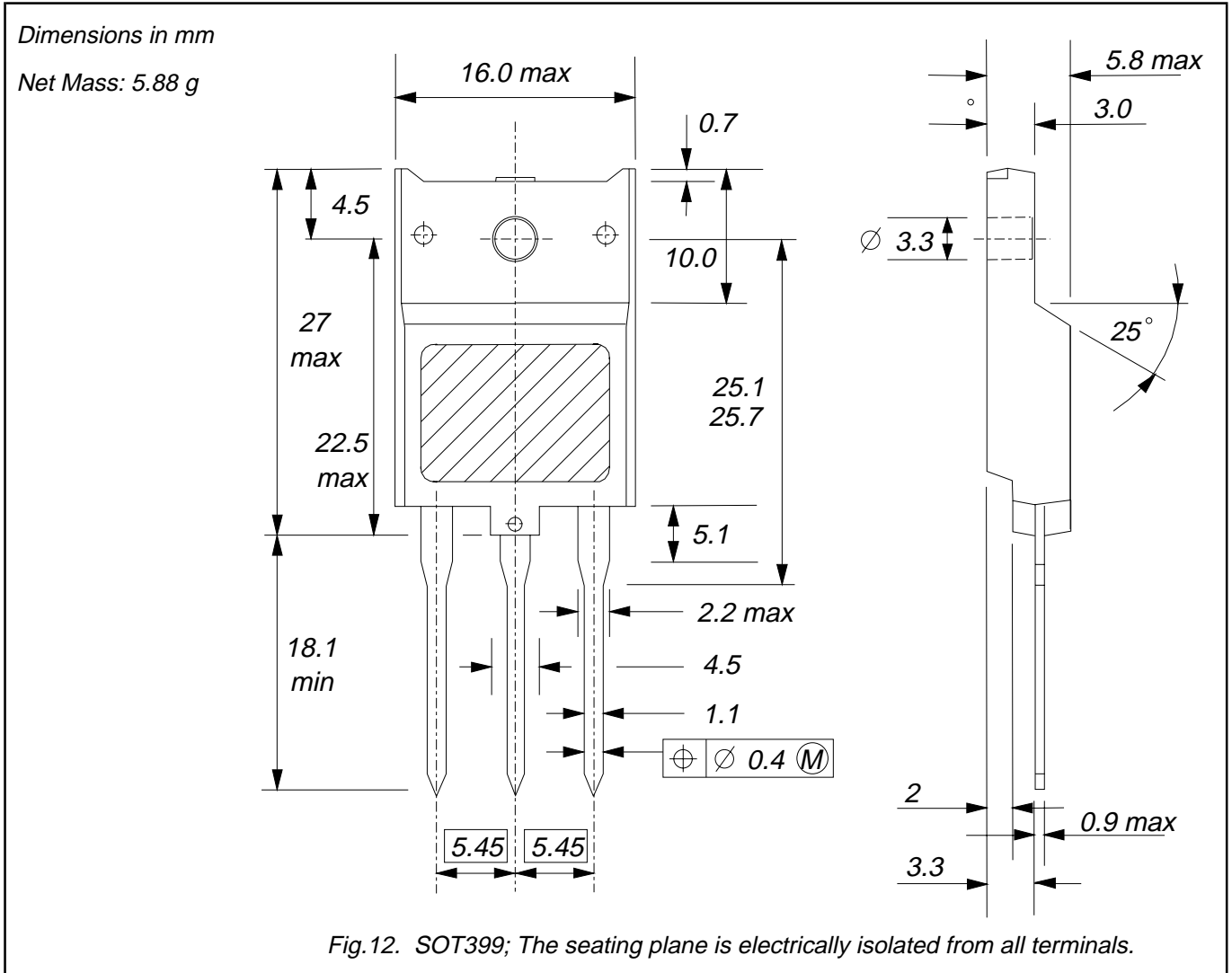
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MECHANICAL DATA



Notes

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