

**Silicon Diffused Power Transistor**

**BU508DF**

**GENERAL DESCRIPTION**

High voltage, high-speed switching npn transistors in a fully isolated SOT199 envelope with integrated efficiency diode, primarily for use in horizontal deflection circuits of colour television receivers.

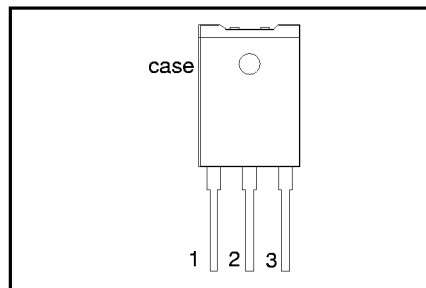
**QUICK REFERENCE DATA**

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)		-	700	V
$I_C$	Collector current (DC)		-	8	A
$I_{CM}$	Collector current peak value		-	15	A
$P_{tot}$	Total power dissipation	$T_{hs} \leq 25\text{ }^\circ\text{C}$	-	34	W
$V_{CESat}$	Collector-emitter saturation voltage	$I_C = 4.5\text{ A}; I_B = 1.6\text{ A}$	-	1.0	V
$I_{Csat}$	Collector saturation current	$f = 16\text{ kHz}$	4.5	-	A
$V_F$	Diode forward voltage	$I_F = 4.5\text{ A}$	1.6	2.0	V
$t_f$	Fall time	$I_{Csat} = 4.5\text{ A}; f = 16\text{ kHz}$	0.7	-	$\mu\text{s}$

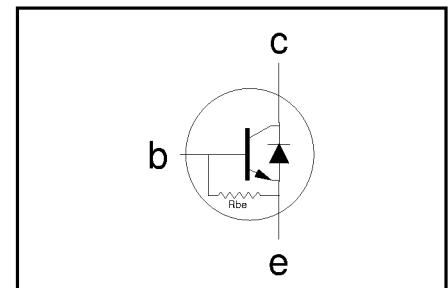
**PINNING - SOT199**

PIN	DESCRIPTION
1	base
2	collector
3	emitter
case	isolated

**PIN CONFIGURATION**



**SYMBOL**



**LIMITING VALUES**

Limiting values in accordance with the Absolute Maximum 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)		-	700	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
$P_{tot}$	Total power dissipation	$T_{hs} \leq 25\text{ }^\circ\text{C}$	-	34	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	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

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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	-	$\mu\text{F}$

**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 <sup>1</sup>	$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$	-	-	1.0	mA
$I_{CES}$		$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$	-	-	2.0	mA
$V_{CEOsust}$	Collector-emitter sustaining voltage	$T_j = 125\text{ }^{\circ}\text{C}$ $I_B = 0\text{ A}; I_C = 100\text{ mA};$ $L = 25\text{ mH}$	700	-	-	V
$V_{CEsat}$	Collector-emitter saturation voltages	$I_C = 4.5\text{ A}; I_B = 1.6\text{ A}$	-	-	1.0	V
$V_{BEsat}$	Base-emitter saturation voltage	$I_C = 4.5\text{ A}; I_B = 2.0\text{ A}$	-	-	1.1	V
$h_{FE}$	DC current gain	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V}$	6	13	30	
$V_F$	Diode forward voltage	$I_F = 4.5\text{ A}$	-	1.6	2.0	V

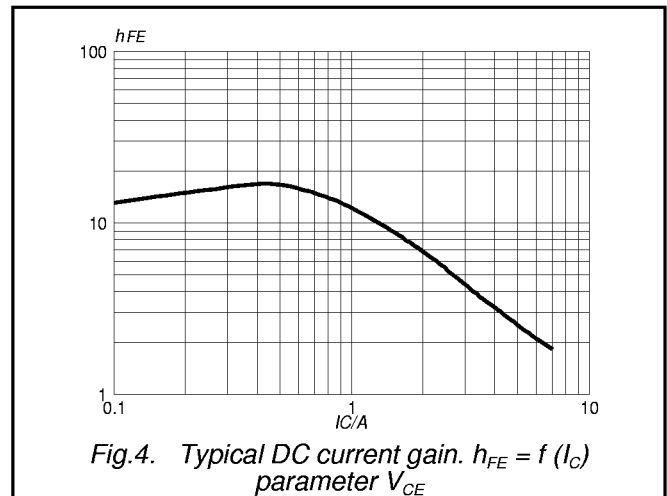
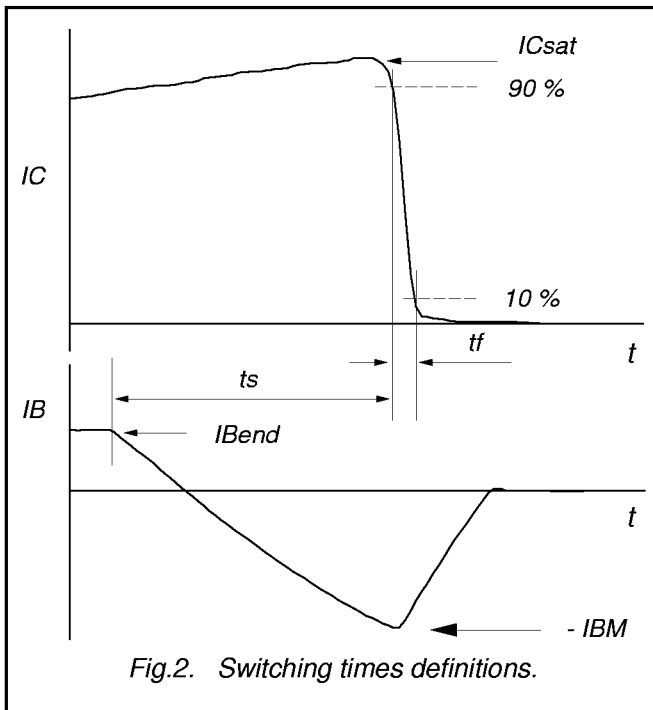
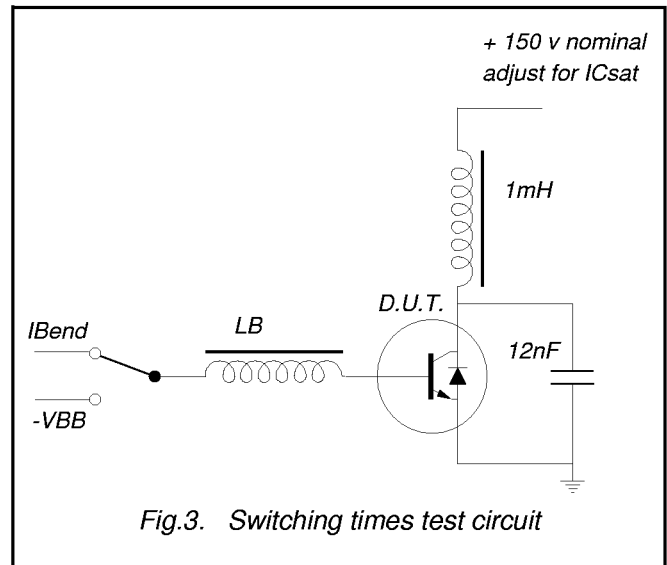
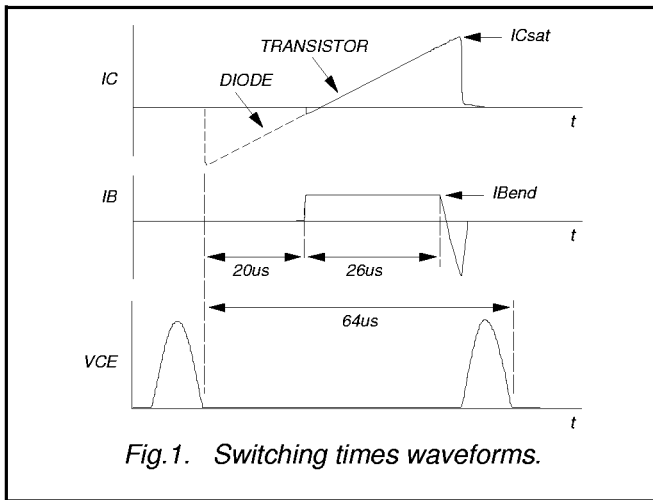
**DYNAMIC CHARACTERISTICS** $T_{hs} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$f_T$	Transition frequency at $f = 5\text{ MHz}$	$I_C = 0.1\text{ A}; V_{CE} = 5\text{ V}$	7	-	MHz
$C_C$	Collector capacitance at $f = 1\text{ MHz}$	$V_{CB} = 10\text{ V}$	125	-	$\mu\text{F}$
$t_s$ $t_f$	Switching times (16 kHz line deflection circuit)	$I_{Csat} = 4.5\text{ A}; L_C = 1\text{ mH}; C_{fb} = 4\text{ nF}$ $I_{B(end)} = 1.4\text{ A}; L_B = 6\text{ }\mu\text{H}; -V_{BB} = -4\text{ V};$ $-I_{BM} = 2.25\text{ A}$	6.5 0.7	- -	$\mu\text{s}$ $\mu\text{s}$

<sup>1</sup> Measured with half sine-wave voltage (curve tracer).

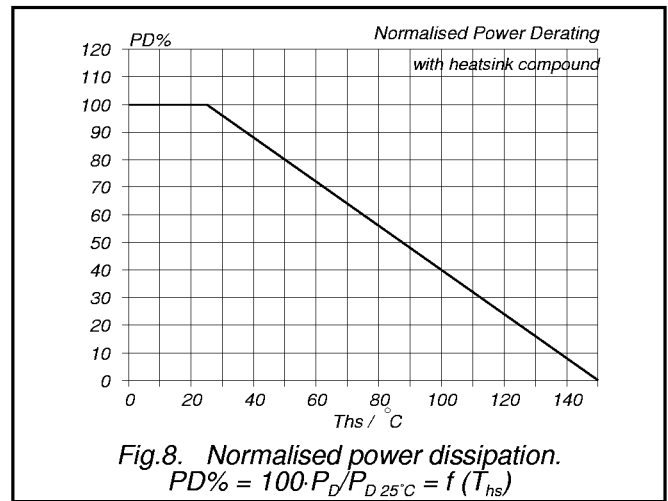
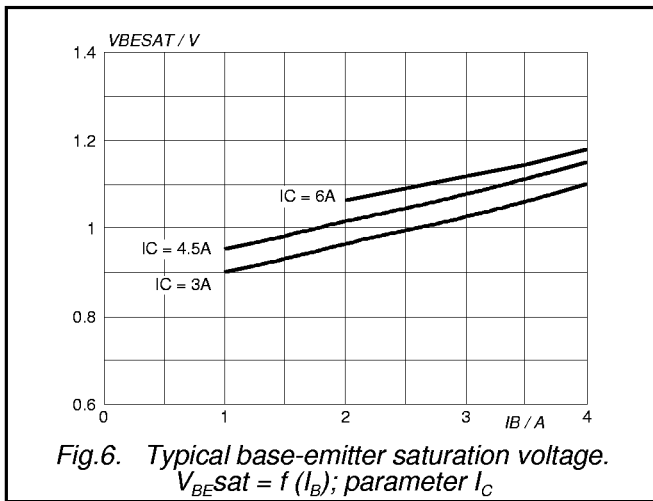
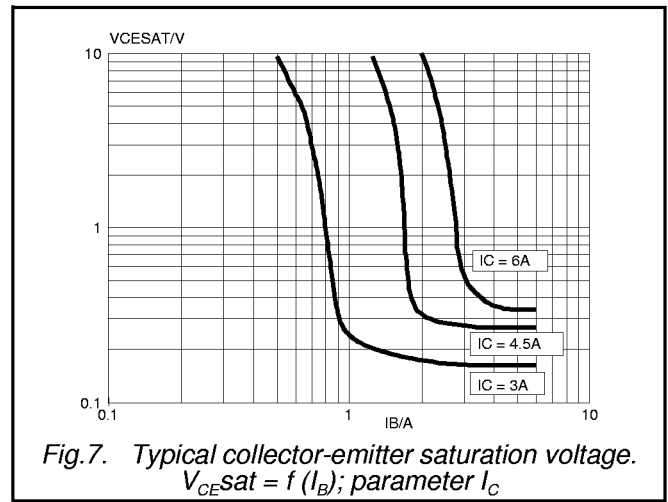
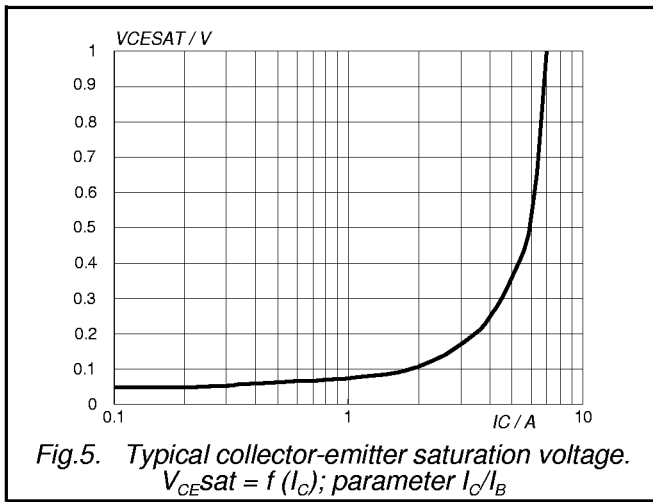
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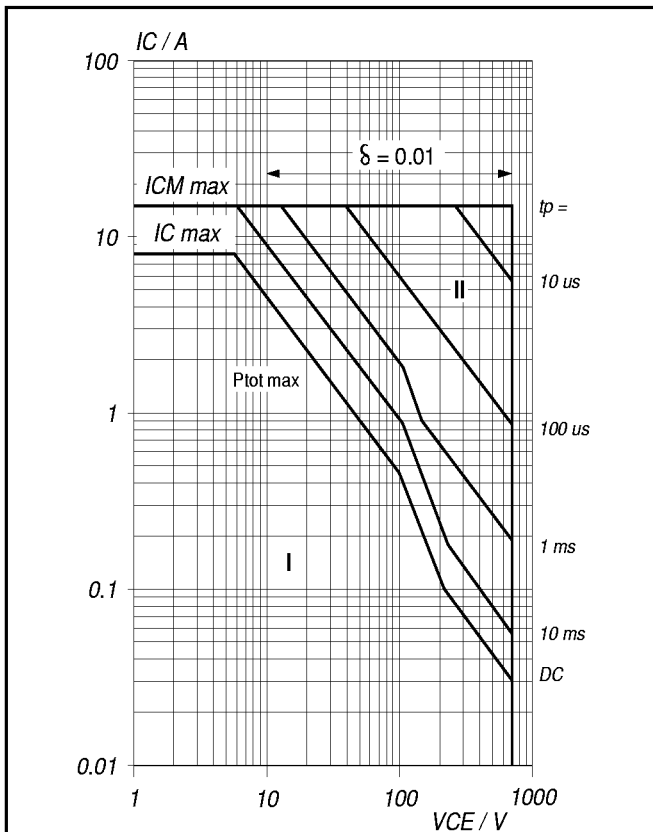


Fig.9. Forward bias safe operating area.  $T_{hs} = 25^{\circ}C$

- I Region of permissible DC operation.
- II Extension for repetitive pulse operation.

NB: Mounted with heatsink compound and  $30 \pm 5$  newton force on the centre of the envelope.

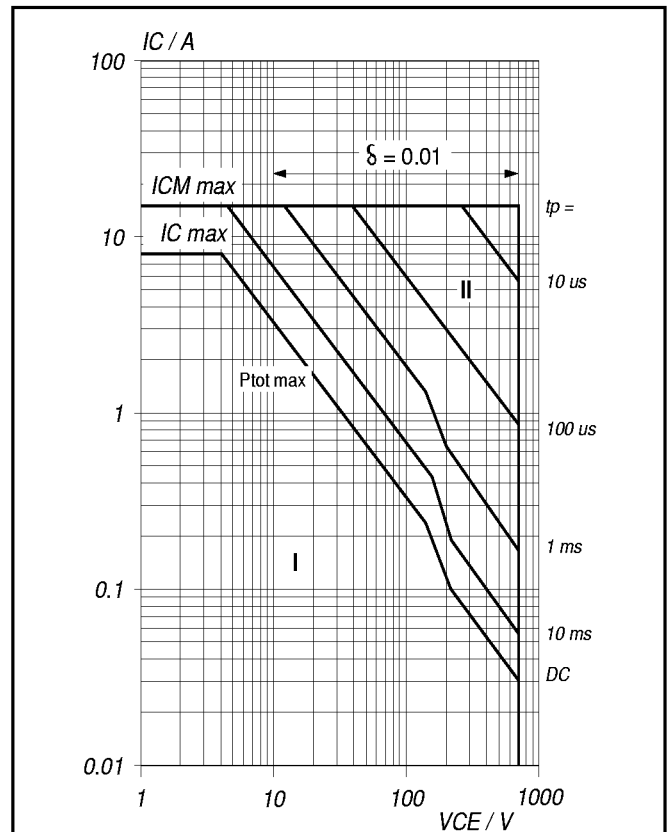


Fig.10. Forward bias safe operating area.  $T_{hs} = 25^{\circ}C$

- I Region of permissible DC operation.
- II Extension for repetitive pulse operation.

NB: Mounted without heatsink compound and  $30 \pm 5$  newton force on the centre of the envelope.

