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.

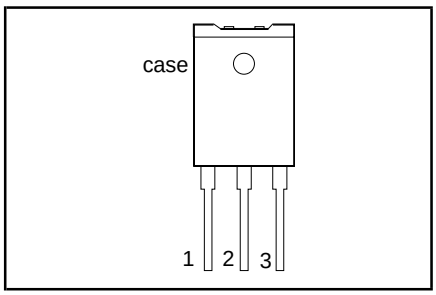
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	V_{BE} = 0 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	$T_{hs} \leq 25$ ˚C	-	34	W
V_{CEsat}	Collector-emitter saturation voltage	I_C = 4.5 A; I_B = 1.6 A	-	1.0	V
I_{Csat}	Collector saturation current	f = 16kHz	4.5	-	A
V_F	Diode forward voltage	I_F = 4.5 A	1.6	2.0	V
t_f	Fall time	I_{Csat} = 4.5 A; f = 16kHz	0.7	-	µs

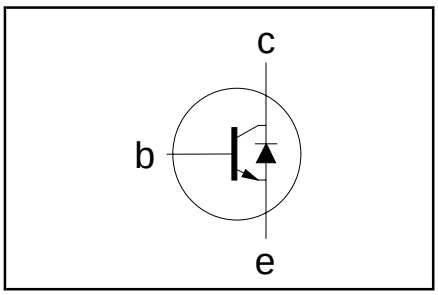
PINNING - SOT199

PIN	DESCRIPTION
1	base
2	collector
3	emitter
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum Rating 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)		-	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 ˚C	-	34	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

ISOLATION LIMITING VALUE & CHARACTERISTIC

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

DYNAMIC CHARACTERISTICS

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
f_T	Transition frequency at f = 5 MHz	I_C = 0.1 A;V_{CE} = 5 V	7	-	MHz
C_C	Collector capacitance at f = 1MHz	V_{CB} = 10 V	125	-	pF
	Switching times (16 kHz line deflection circuit)	I_{Csat} = 4.5 A;L_c 1 mH;C_{fb} = 4 nF $I_{B(end)}$ = 1.4 A; L_B = 6 µH; -V_{BB} = -4 V; -I_{BM} = 2.25 A			
t_s	Turn-off storage time		6.5	-	µs
t_f	Turn-off fall time		0.7	-	µs

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

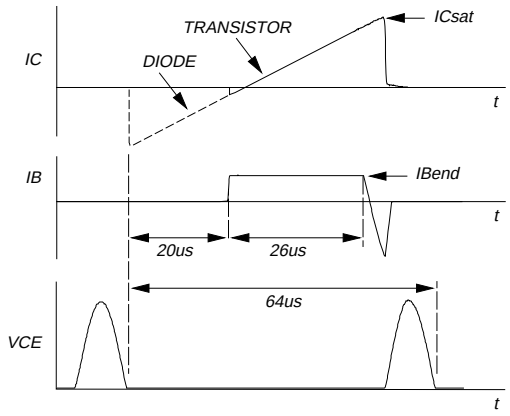


Fig.1. Switching times waveforms.

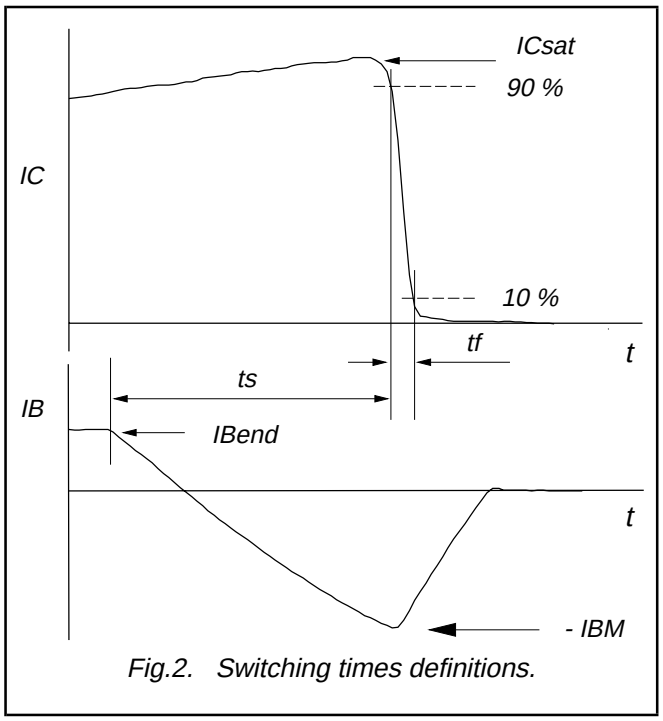


Fig.2. Switching times definitions.

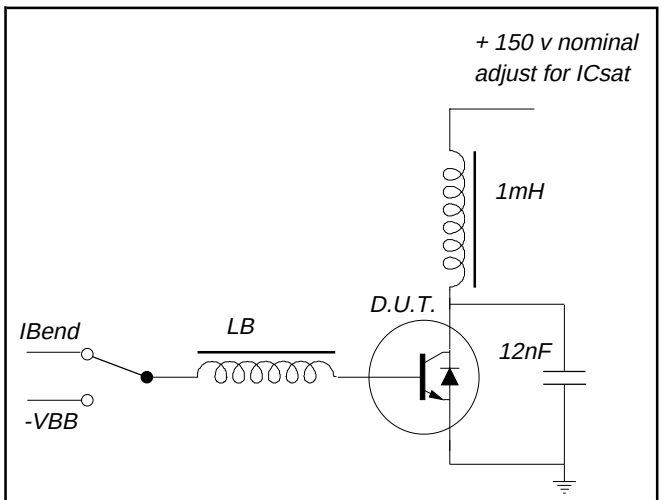


Fig.3. Switching times test circuit

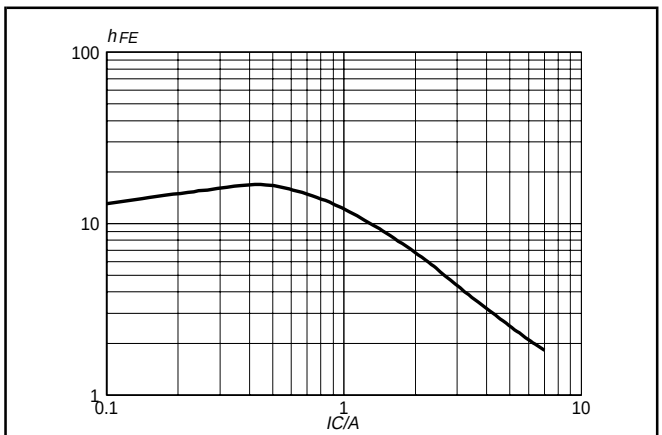


Fig.4. Typical DC current gain. $h_{FE} = f(I_C)$ parameter V_{CE}

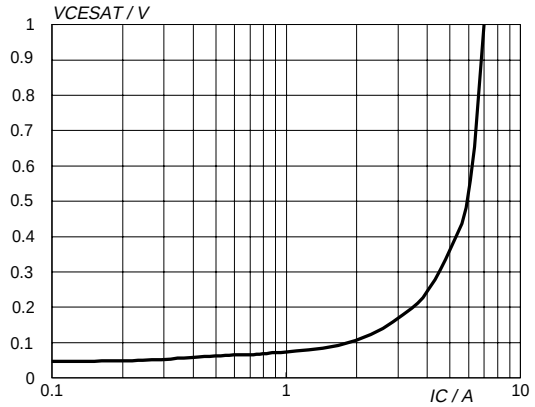


Fig.5. Typical collector-emitter saturation voltage. $V_{CE}sat = f(I_C)$; parameter I_C/I_B

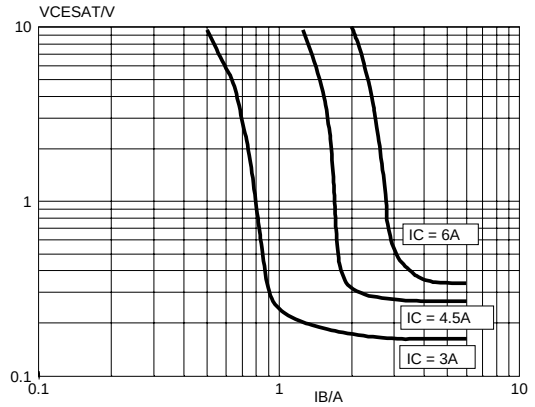


Fig.7. Typical collector-emitter saturation voltage. $V_{CE}sat = f(I_B)$; parameter I_C

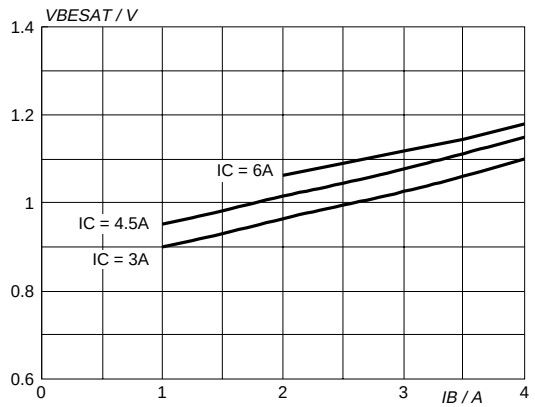


Fig.6. Typical base-emitter saturation voltage. $V_{BE}sat = f(I_B)$; parameter I_C

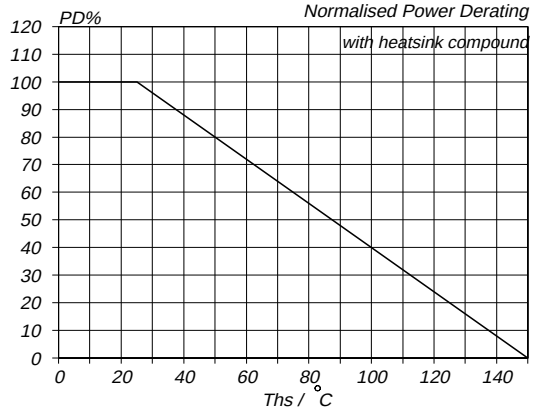


Fig.8. Normalised power dissipation. $PD\% = 100 \cdot P_D/P_{D\ 25^\circ C} = f(T_{hs})$

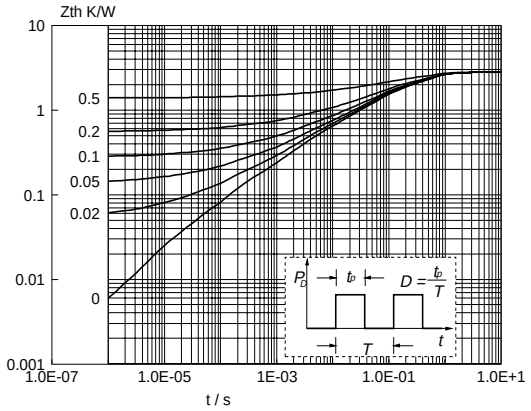


Fig.9. Transient thermal impedance.
$Z_{th\ j\text{-}hs}$ = f(t); parameter D = t_p/T

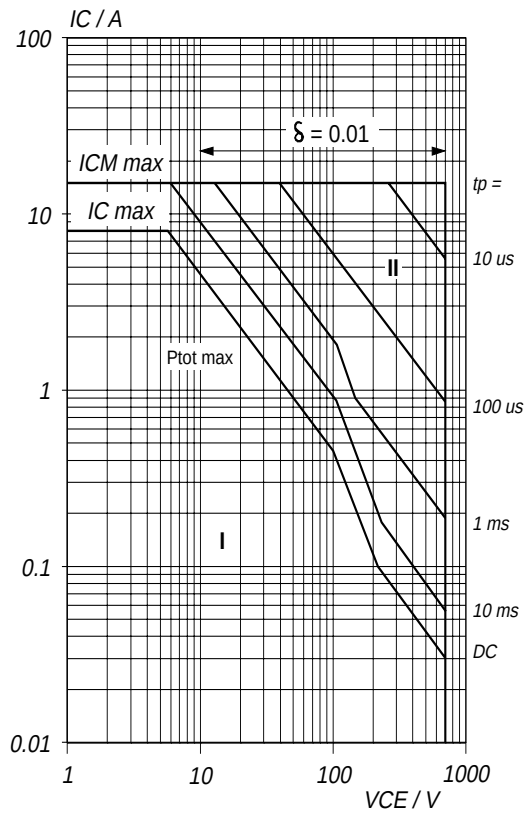


Fig.10. Forward bias safe operating area. T_{hs} = 25˚C
I *Region of permissible DC operation.*
II *Extension for repetitive pulse operation.*

NB: *Mounted with heatsink compound and 30 ± 5 newton force on the centre of the envelope.*

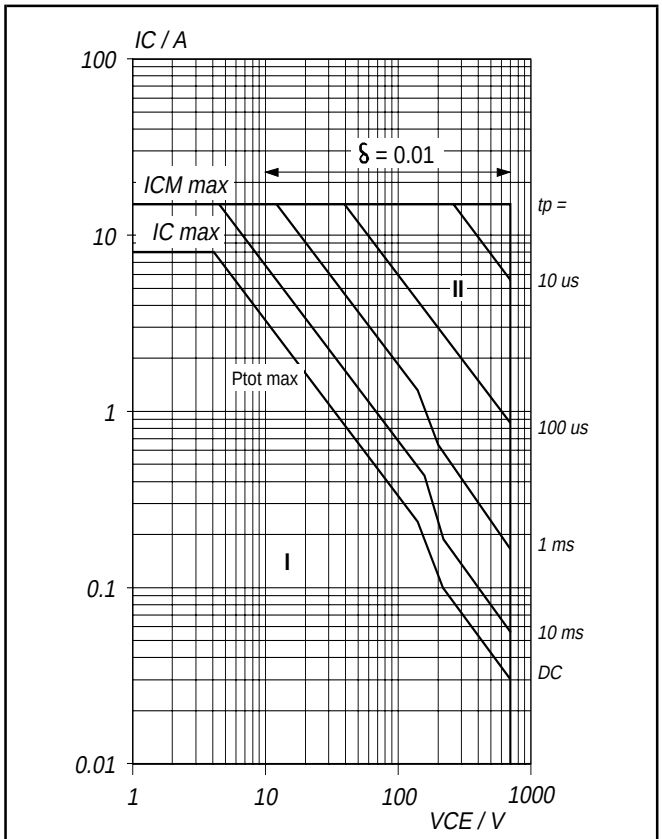


Fig.11. Forward bias safe operating area. T_{hs} = 25˚C
I *Region of permissible DC operation.*
II *Extension for repetitive pulse operation.*

NB: *Mounted without heatsink compound and 30 ± 5 newton force on the centre of the envelope.*

MECHANICAL DATA

Dimensions in mm

Net Mass: 5.5 g

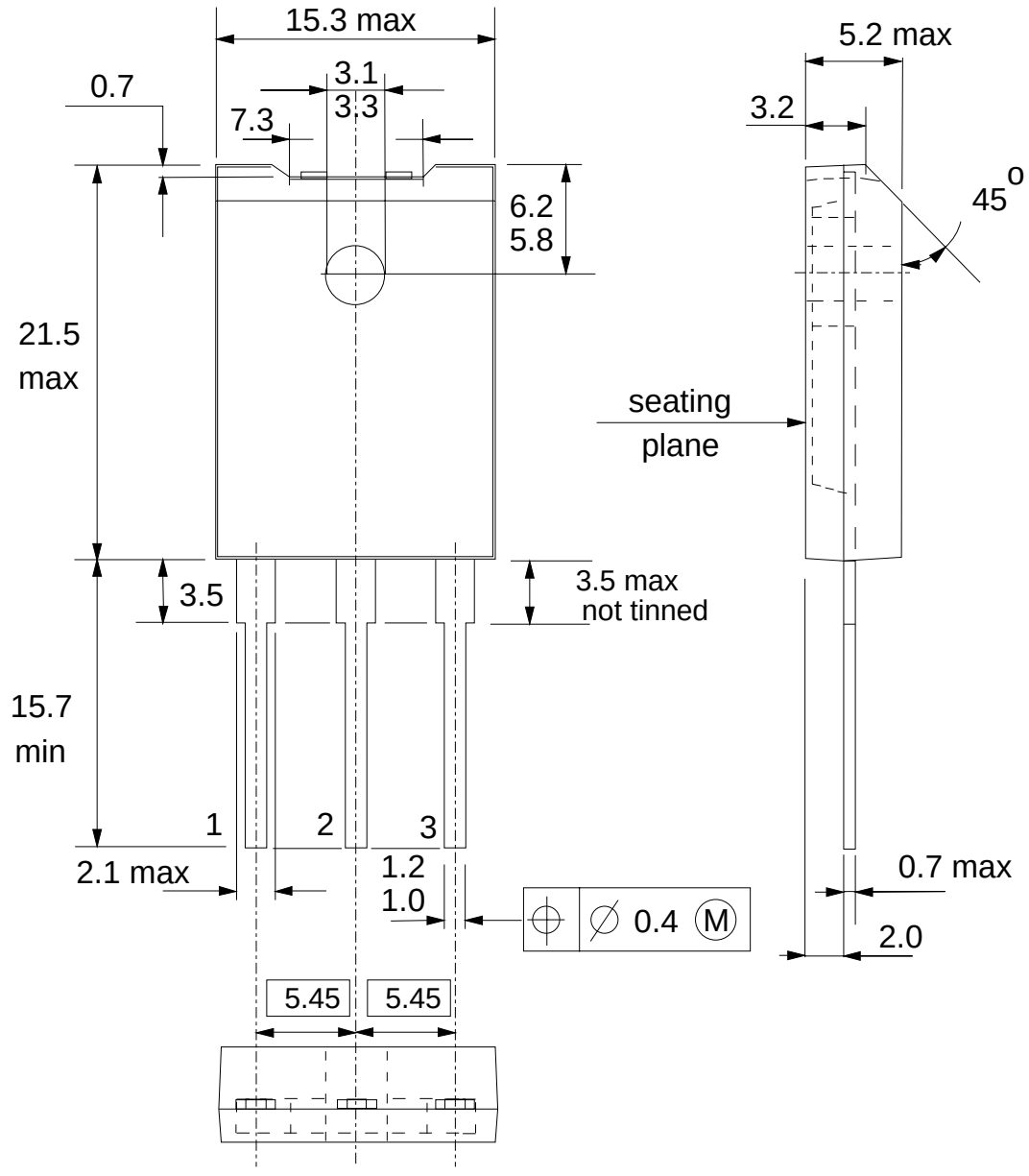


Fig.12. SOT199; The seating plane is electrically isolated from all terminals.

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