

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.

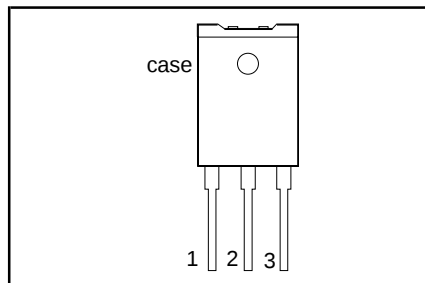
QUICK REFERENCE DATA

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	$T_{hs} \leq 25\text{ °C}$	-	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	-	μs

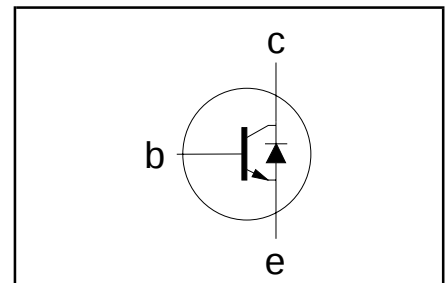
PINNING - SOT199

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	$V_{BE} = 0\text{ V}$	-	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	$T_{hs} \leq 25\text{ °C}$	-	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	-	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 ¹	$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$	-	-	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

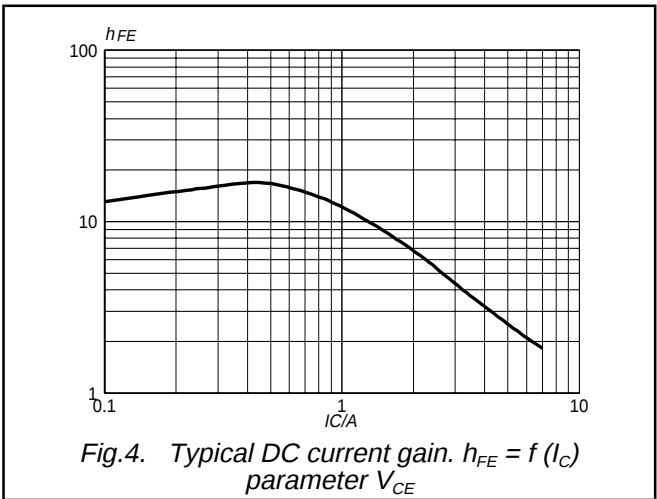
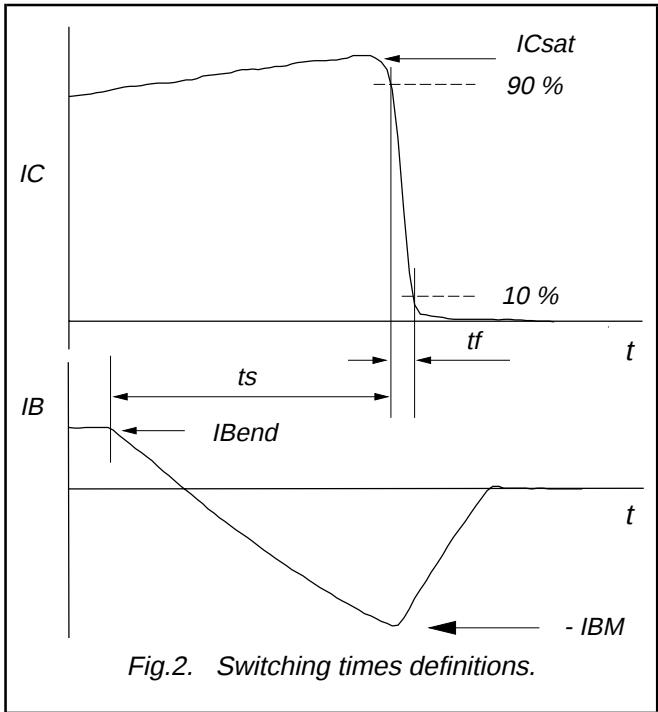
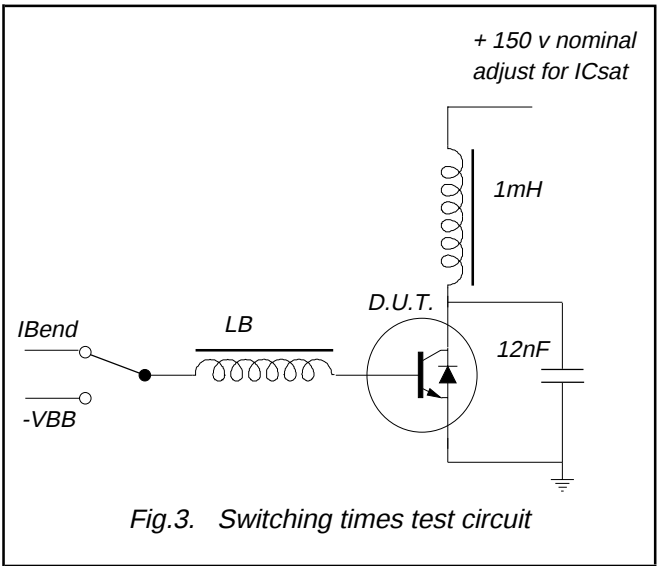
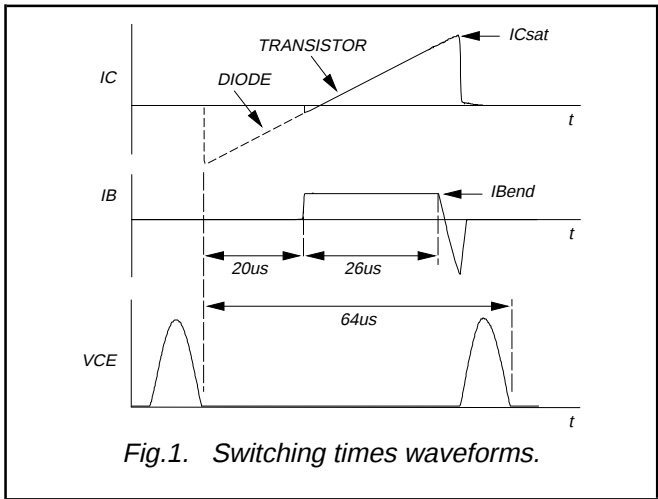
 $T_{hs} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

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	-	pF
	Switching times (16 kHz line deflection circuit)	$I_{Csat} = 4.5\text{ A}; L_C = 1\text{ mH}; C_{fb} = 4\text{ nF}$ $I_{B(end)} = 1.4\text{ A}; L_B = 6\text{ }\mu\text{H}; -V_{BB} = -4\text{ V};$ $-I_{BM} = 2.25\text{ A}$			
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).

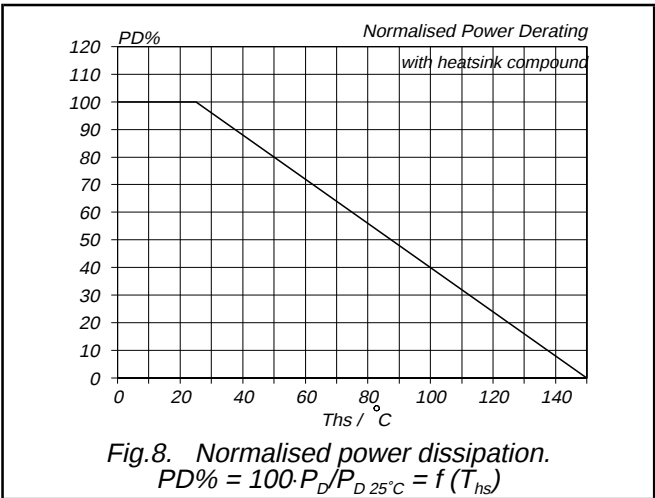
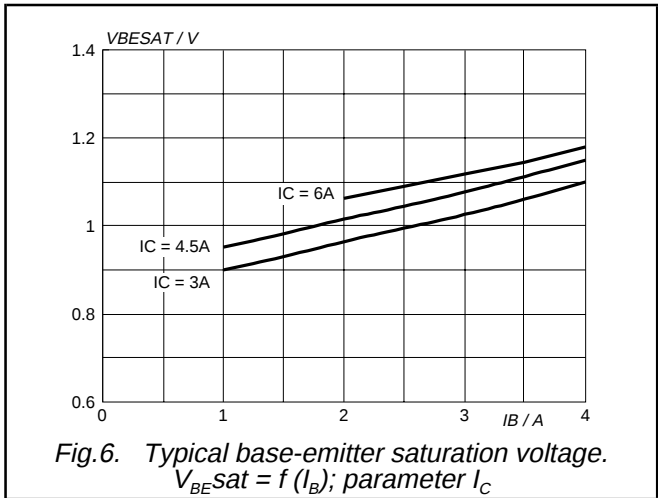
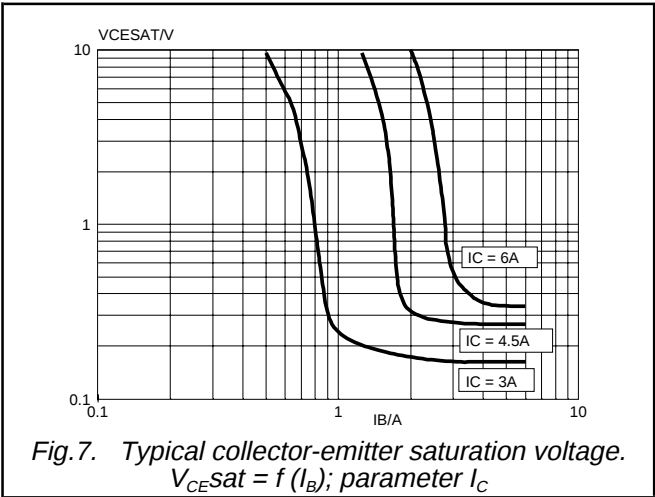
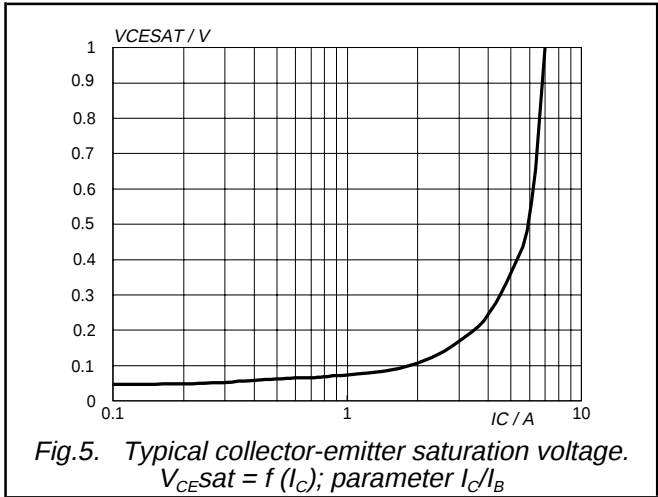
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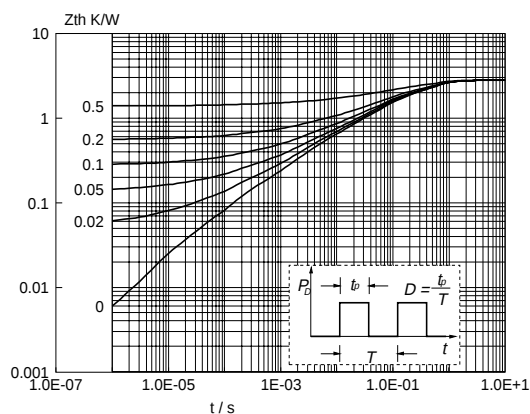


Fig.9. Transient thermal impedance.
 $Z_{th\ j-hs} = f(t)$; parameter $D = t_p/T$

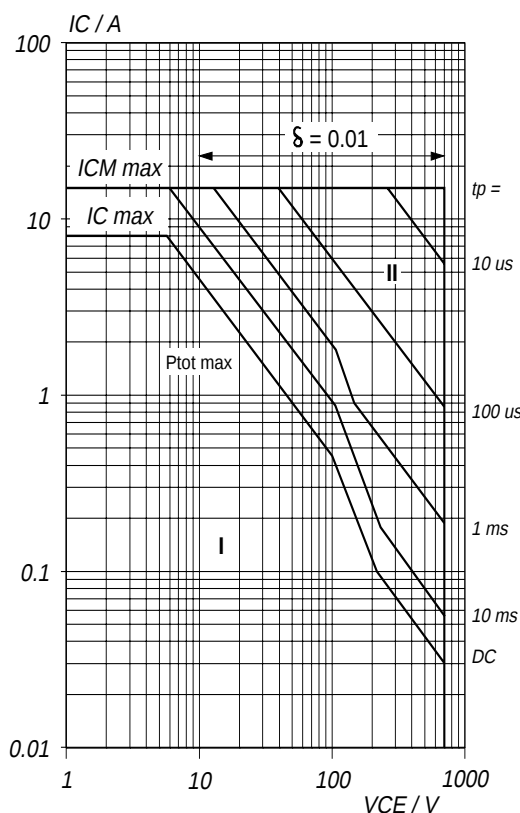


Fig.10. Forward bias safe operating area. $T_{hs} = 25^\circ\text{C}$
 I Region of permissible DC operation.
 II Extension for repetitive pulse operation.

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

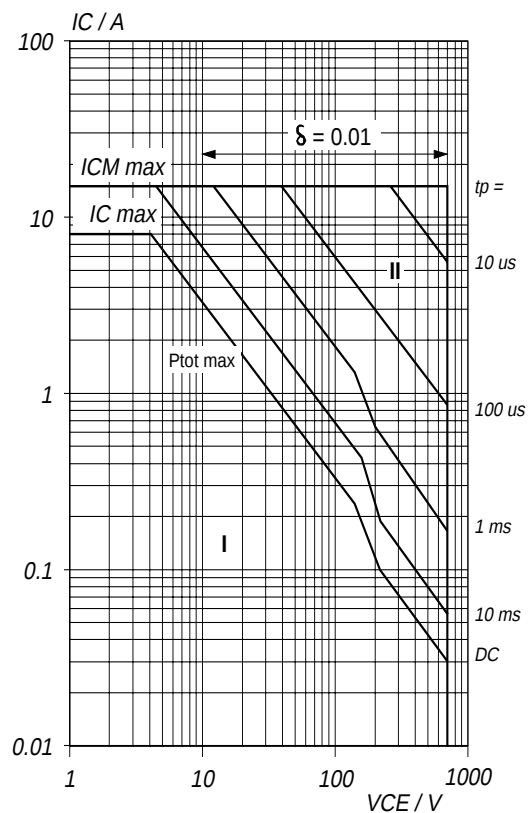


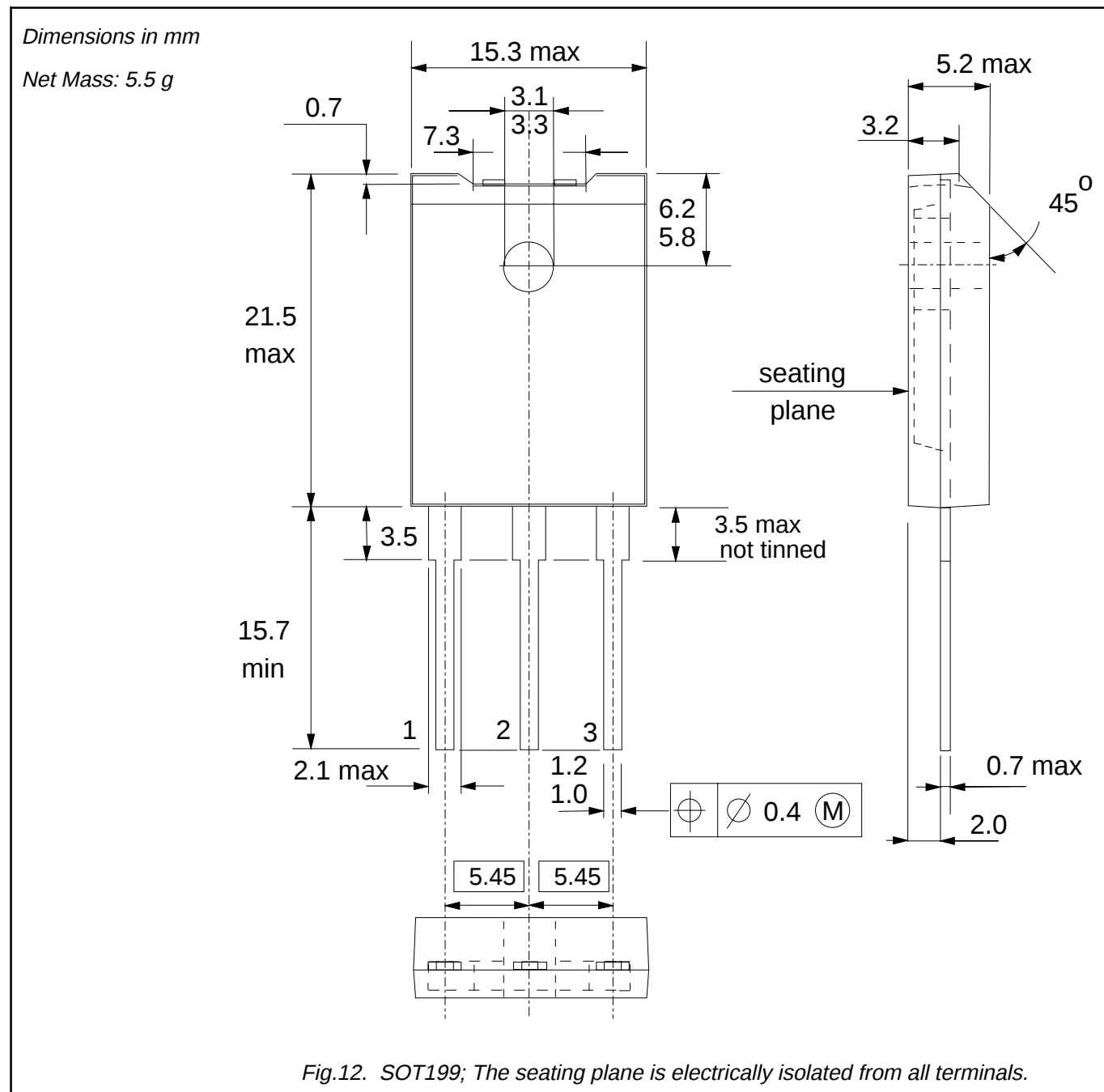
Fig.11. Forward bias safe operating area. $T_{hs} = 25^\circ\text{C}$
 I Region of permissible DC operation.
 II Extension for repetitive pulse operation.

NB: Mounted without heatsink compound and
 30 ± 5 newton force on the centre of
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MECHANICAL DATA



Notes

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