

Silicon Diffused Power Transistor

BU2520AX

GENERAL DESCRIPTION

New generation, high-voltage, high-speed switching npn transistor in a plastic full-pack envelope intended for use in horizontal deflection circuits of large screen colour television receivers up to 32 kHz.

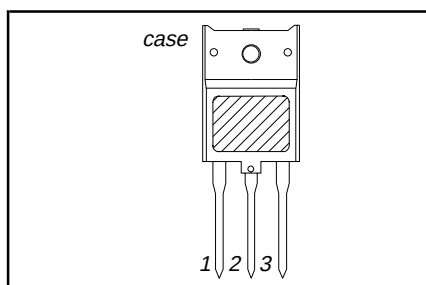
QUICK REFERENCE DATA

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)		-	10	A
I_{CM}	Collector current peak value		-	25	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25^\circ\text{C}$	-	45	W
V_{CESat}	Collector-emitter saturation voltage	$I_C = 6.0 \text{ A}; I_B = 1.2 \text{ A}$	-	5.0	V
I_{Csat}	Collector saturation current		6.0	-	A
t_f	Fall time	$I_{Csat} = 6.0 \text{ A}; I_{B(end)} = 0.85 \text{ A}$	0.2	0.35	μs

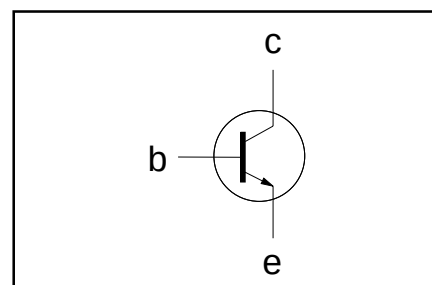
PINNING - SOT399

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	$V_{BE} = 0 \text{ V}$	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	10	A
I_{CM}	Collector current peak value		-	25	A
I_B	Base current (DC)		-	6	A
I_{BM}	Base current peak value		-	9	A
$-I_{B(AV)}$	Reverse base current	average over any 20 ms period	-	150	mA
$-I_{BM}$	Reverse base current peak value ¹		-	6	A
P_{tot}	Total power dissipation	$T_{hs} \leq 25^\circ\text{C}$	-	45	W
T_{stg}	Storage temperature		-55	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

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
I_{EBO}	Emitter cut-off current	$V_{EB} = 7.5\text{ V}; I_C = 0\text{ A}$	-	-	1.0	mA
BV_{EBO}	Emitter-base breakdown voltage	$I_B = 1\text{ mA}$	7.5	13.5	-	V
$V_{CEOsust}$	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 voltage	$I_C = 6.0\text{ A}; I_B = 1.2\text{ A}$	-	-	5.0	V
V_{BEsat}	Base-emitter saturation voltage	$I_C = 6.0\text{ A}; I_B = 1.2\text{ A}$	-	-	1.1	V
h_{FE}	DC current gain	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V}$	-	13	-	
h_{FE}		$I_C = 6\text{ A}; V_{CE} = 5\text{ V}$	5	7	9.5	

DYNAMIC CHARACTERISTICS

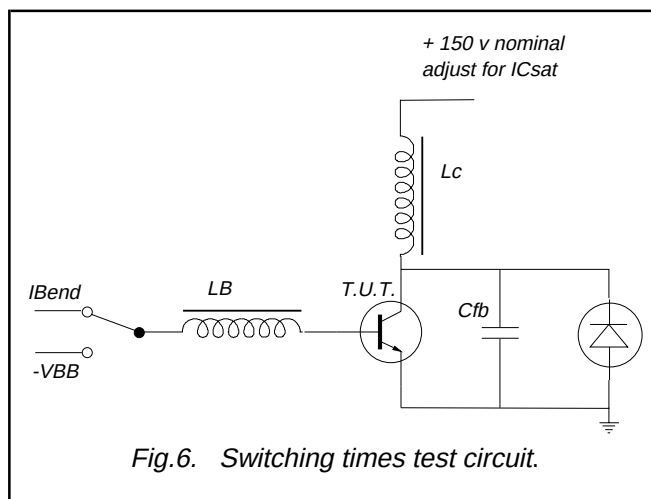
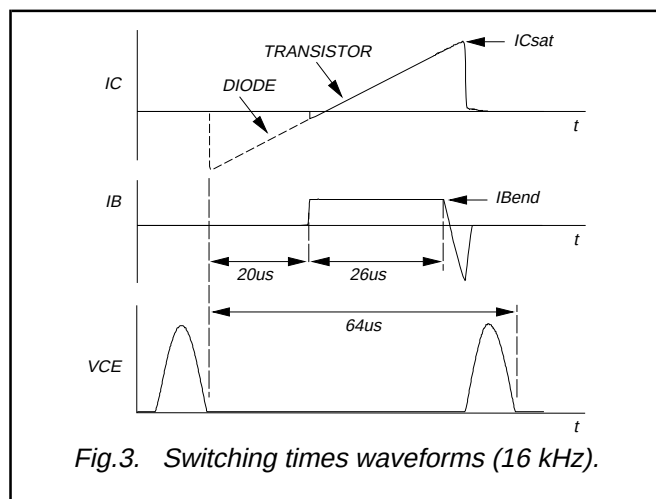
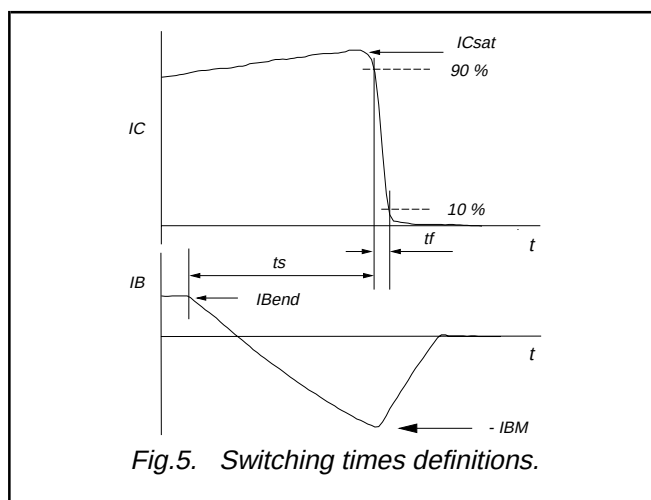
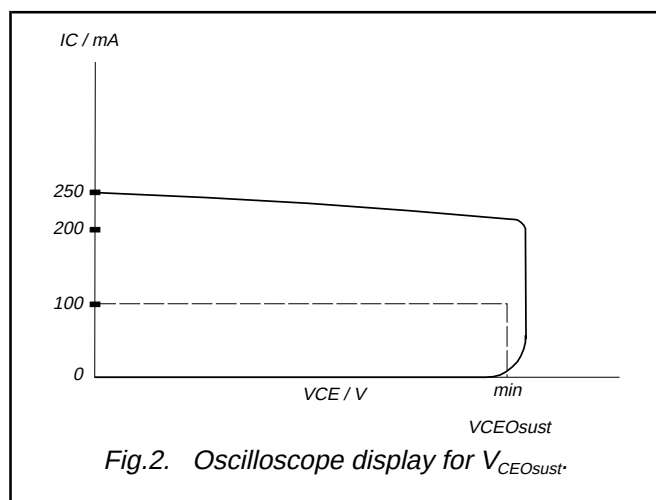
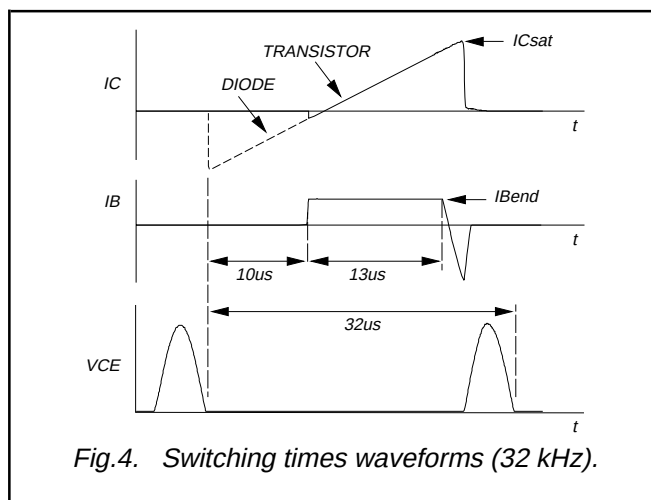
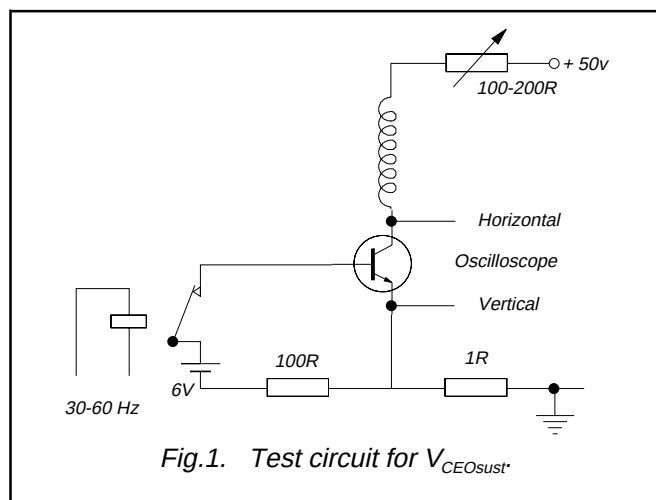
 $T_{hs} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C_c	Collector capacitance	$I_E = 0\text{ A}; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	115	-	pF
	Switching times (32 kHz line deflection circuit)	$I_{Csat} = 6.0\text{ A}; L_C = 330\text{ }\mu\text{H}; C_{fb} = 9\text{ nF};$ $I_{B(end)} = 0.85\text{ A}; L_B = 3.45\text{ }\mu\text{H};$ $-V_{BB} = 4\text{ V}; (-dI_B/dt = 1.2\text{ A} / \mu\text{s})$			
t_s	Turn-off storage time		3.0	4.0	μs
t_f	Turn-off fall time		0.2	0.35	μs
	Switching times (16 kHz line deflection circuit)	$I_{Csat} = 6.0\text{ A}; L_C = 650\text{ }\mu\text{H}; C_{fb} = 19\text{ nF};$ $I_{B(end)} = 1.0\text{ A}; L_B = 5.3\text{ }\mu\text{H}; -V_{BB} = 4\text{ V};$ $(-dI_B/dt = 0.8\text{ A} / \mu\text{s})$			
t_s	Turn-off storage time		4.5	5.5	μs
t_f	Turn-off fall time		0.35	0.5	μs

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

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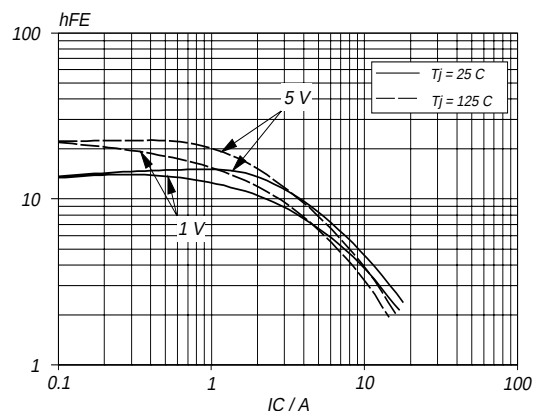


Fig. 7. Typical DC current gain. $h_{FE} = f(I_C)$
parameter V_{CE}

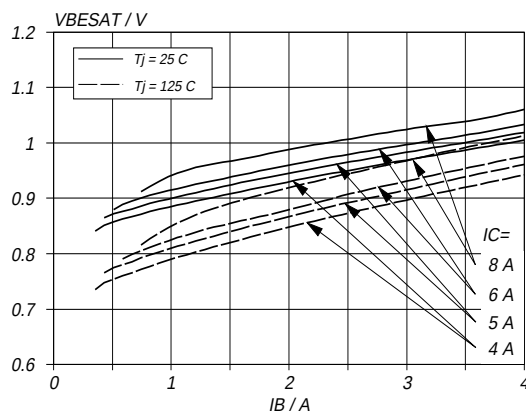


Fig. 10. Typical base-emitter saturation voltage.
 $V_{BEsat} = f(I_B)$; parameter I_C

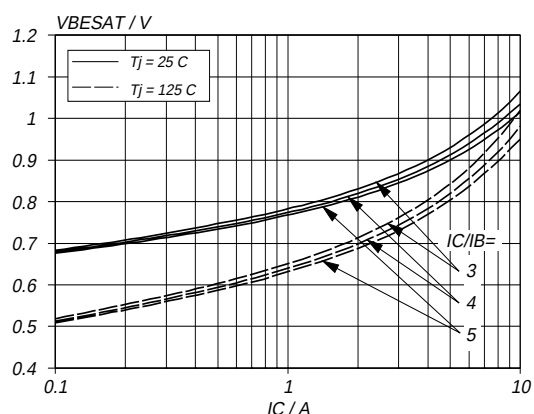


Fig. 8. Typical base-emitter saturation voltage.
 $V_{BEsat} = f(I_C)$; parameter I_C/I_B

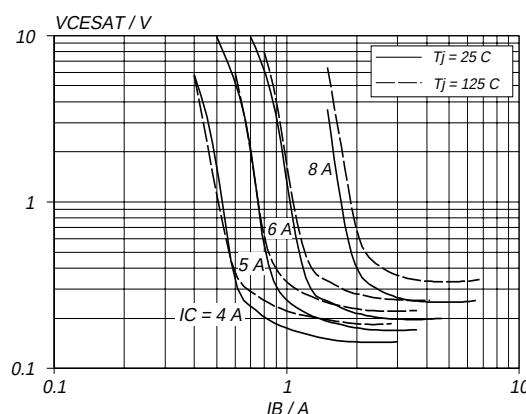


Fig. 11. Typical collector-emitter saturation voltage.
 $V_{CEsat} = f(I_B)$; parameter I_C

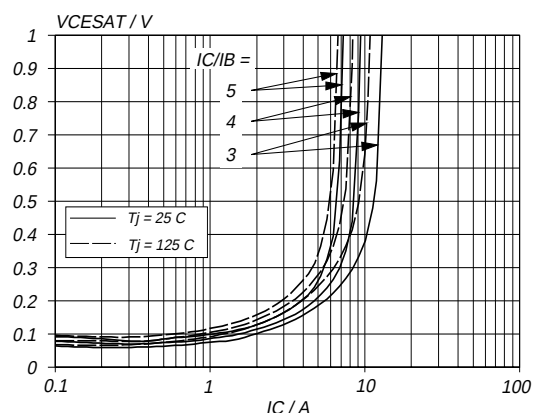


Fig. 9. Typical collector-emitter saturation voltage.
 $V_{CEsat} = f(I_C)$; parameter I_C/I_B

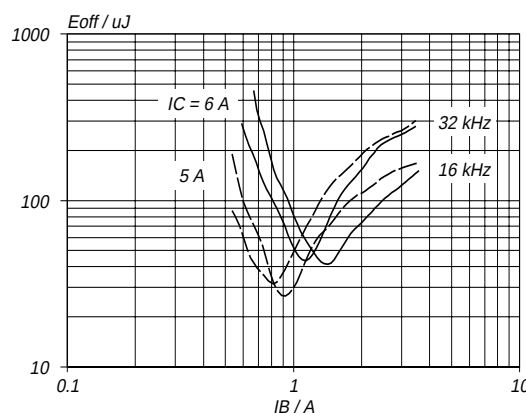


Fig. 12. Typical turn-off losses. $T_J = 85^\circ\text{C}$
 $E_{off} = f(I_B)$; parameter I_C ; parameter frequency

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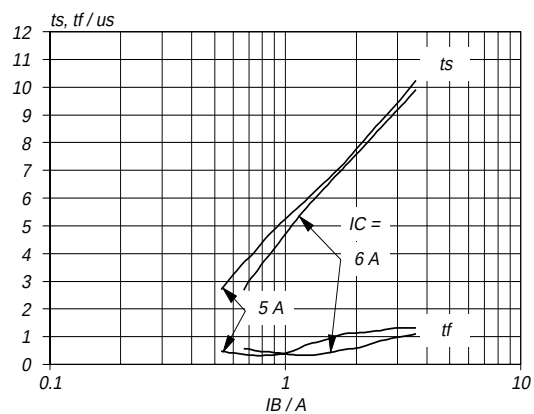


Fig.13. Typical collector storage and fall time.
 $t_s = f(I_B)$; $t_f = f(I_B)$; parameter I_C ; $T_j = 85^\circ\text{C}$; $f = 16\text{ kHz}$

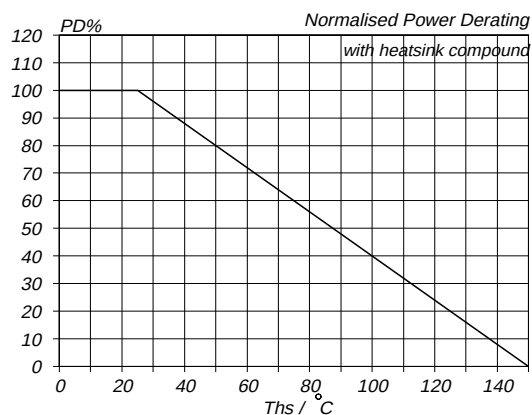


Fig.15. Normalised power dissipation.
 $PD\% = 100 \cdot P_D / P_{D\ 25^\circ\text{C}} = f(T_{hs})$

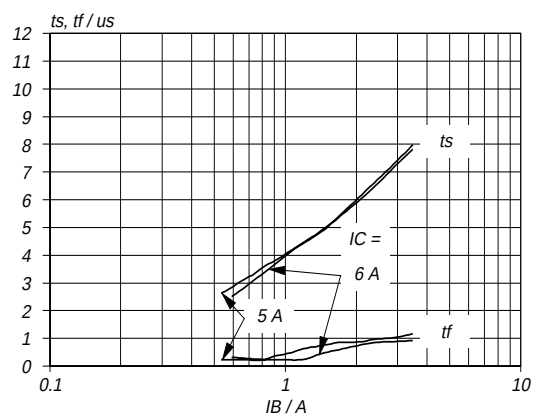


Fig.14. Typical collector storage and fall time.
 $t_s = f(I_B)$; $t_f = f(I_B)$; parameter I_C ; $T_j = 85^\circ\text{C}$; $f = 32\text{ kHz}$

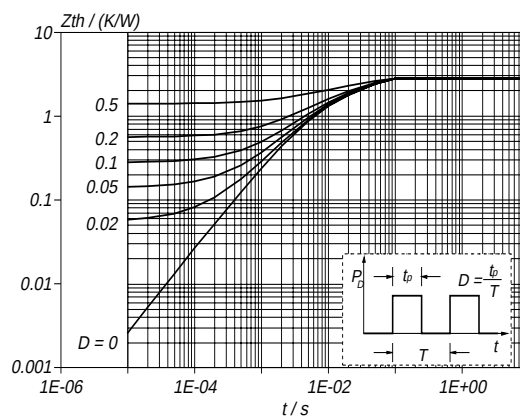
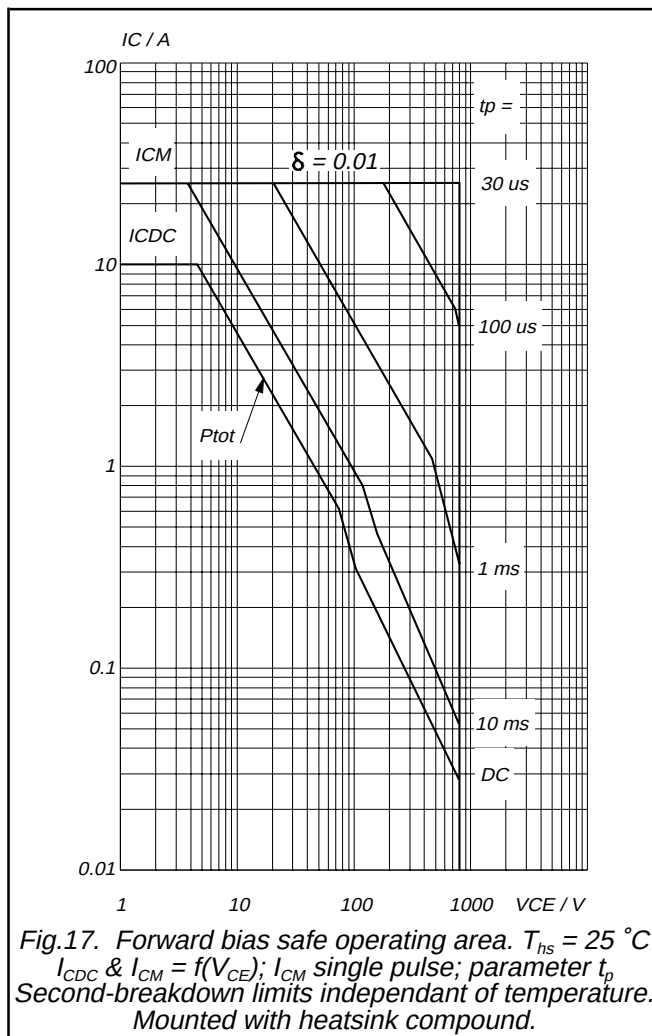


Fig.16. Transient thermal impedance.
 $Z_{th-j-hs} = f(t)$; parameter $D = t_p / T$

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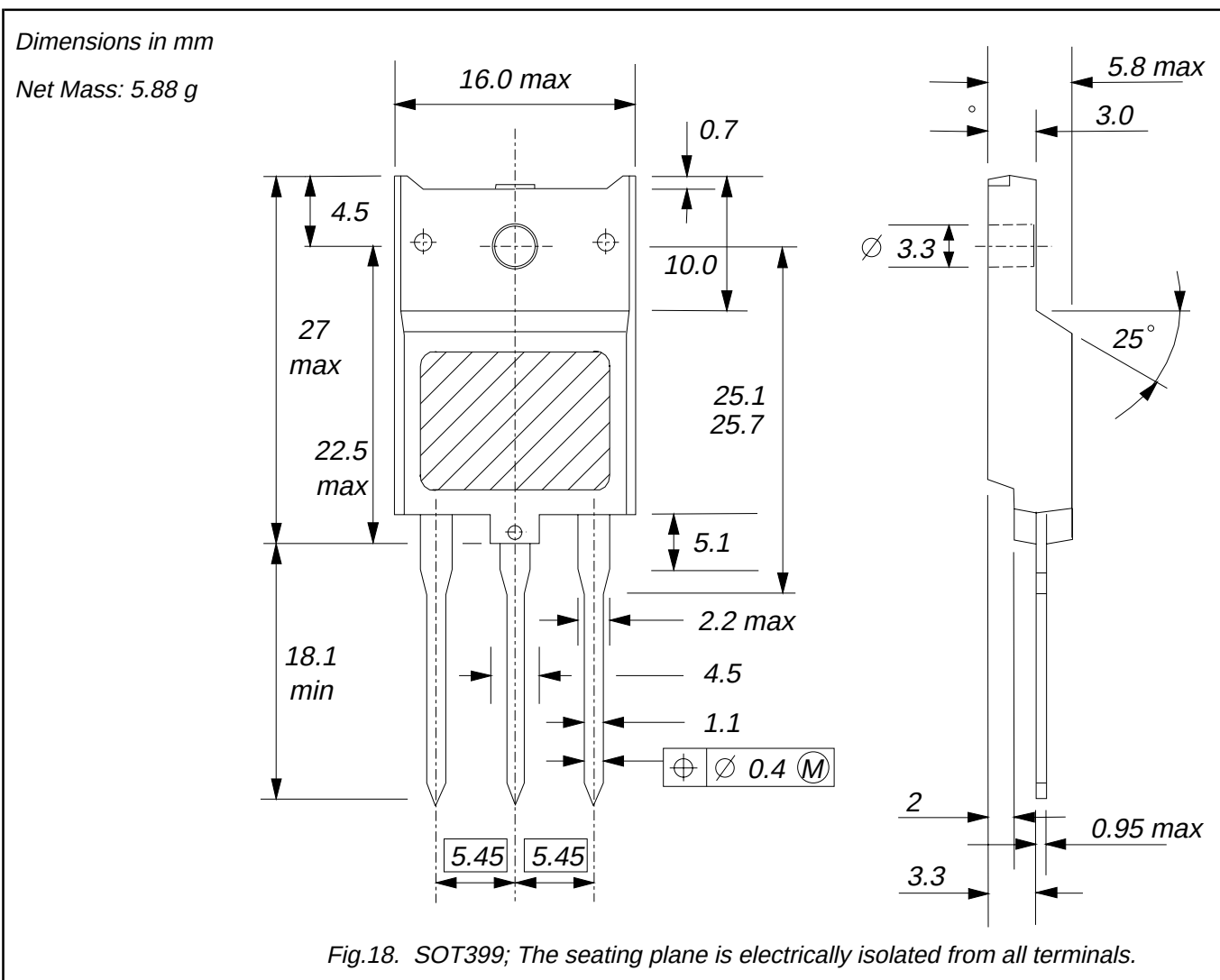
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MECHANICAL DATA



Notes

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