

Silicon diffused power transistors

BUT18; BUT18A

DESCRIPTION

High-voltage, high-speed, glass-passivated NPN power transistor in a TO-220AB package.

APPLICATIONS

- Converters
- Inverters
- Switching regulators
- Motor control systems.

PINNING

PIN	DESCRIPTION
1	base
2	collector; connected to mounting base
3	emitter

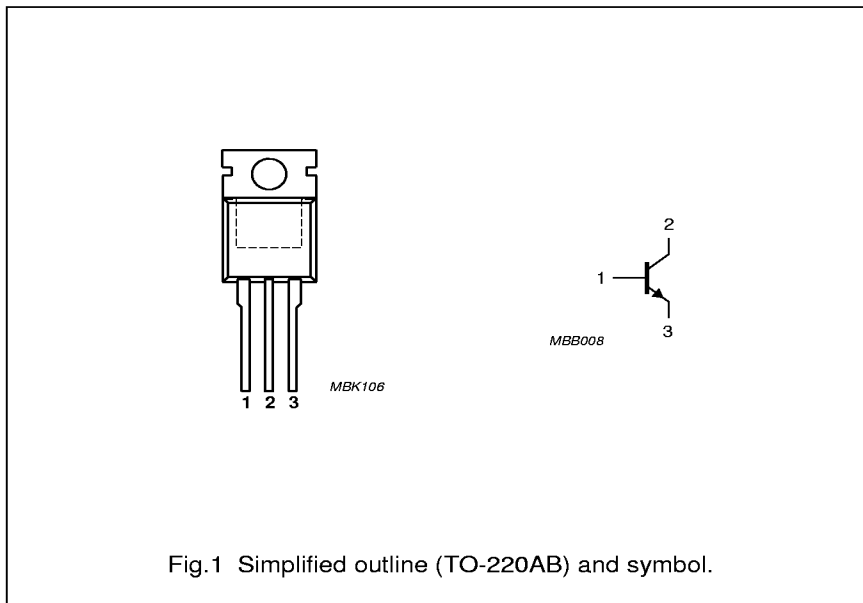


Fig.1 Simplified outline (TO-220AB) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_{CESM}	collector-emitter peak voltage	$V_{BE} = 0$	850	V
	BUT18			
	BUT18A		1000	V
V_{CEO}	collector-emitter voltage	open base	400	V
	BUT18			
	BUT18A		450	V
V_{CEsat}	collector-emitter saturation voltage	see Fig.7	1.5	V
I_{Csat}	collector saturation current		4	A
I_C	collector current (DC)	see Fig.2	6	A
I_{CM}	collector current (peak value)	see Fig.2	12	A
P_{tot}	total power dissipation	$T_{mb} \leq 25\text{ }^\circ\text{C}$; see Fig.4	110	W
t_f	fall time	resistive load; see Figs 10 and 11	0.8	μs

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting base	1.15	K/W

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LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CESM}	collector-emitter peak voltage BUT18 BUT18A	$V_{BE} = 0$	–	850	V
			–	1000	V
V_{CEO}	collector-emitter voltage BUT18 BUT18A	open base	–	400	V
			–	450	V
I_{Csat}	collector saturation current		–	4	A
I_C	collector current (DC)	see Fig.2	–	6	A
I_{CM}	collector current (peak value)	see Fig.2	–	12	A
I_B	base current (DC)		–	3	A
I_{BM}	base current (peak value)		–	6	A
P_{tot}	total power dissipation	$T_{mb} \leq 25\text{ °C}$; see Fig.4	–	110	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CEO_{sust}}$	collector-emitter sustaining voltage BUT18 BUT18A	$I_C = 0.1\text{ A}$; $I_{Boff} = 0$; $L = 25\text{ mH}$; see Figs 5 and 6	400	–	–	V
			450	–	–	V
V_{CEsat}	collector-emitter saturation voltage	$I_C = 4\text{ A}$; $I_B = 0.8\text{ A}$; see Fig.7	–	–	1.5	V
V_{BEsat}	base-emitter saturation voltage	$I_C = 4\text{ A}$; $I_B = 0.8\text{ A}$; see Fig.8	–	–	1.3	V
I_{CES}	collector-emitter cut-off current	$V_{CE} = V_{CESM_{max}}$; $V_{BE} = 0$; note 1	–	–	1	mA
		$V_{CE} = V_{CESM_{max}}$; $V_{BE} = 0$; $T_j = 125\text{ °C}$; note 1	–	–	2	mA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 9\text{ V}$; $I_C = 0$	–	–	10	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}$; $I_C = 10\text{ mA}$; see Fig.9	10	18	35	
		$V_{CE} = 5\text{ V}$; $I_C = 1\text{ A}$; see Fig.9	10	20	35	
Switching times resistive load (see Figs 10 and 11)						
t_{on}	turn-on time	$I_{Con} = 4\text{ A}$; $I_{Bon} = -I_{Boff} = 800\text{ mA}$	–	–	1	μs
t_s	storage time	$I_{Con} = 4\text{ A}$; $I_{Bon} = -I_{Boff} = 800\text{ mA}$	–	–	4	μs
t_f	fall time	$I_{Con} = 4\text{ A}$; $I_{Bon} = -I_{Boff} = 800\text{ mA}$	–	–	0.8	μs
Switching times inductive load (see Figs 10 and 13)						
t_s	storage time	$I_{Con} = 4\text{ A}$; $I_{Bon} = 800\text{ mA}$; $V_{CL} = 250\text{ V}$	–	1.6	2.5	μs
t_f	fall time	$I_{Con} = 4\text{ A}$; $I_{Bon} = 800\text{ mA}$; $V_{CL} = 250\text{ V}$	–	150	400	ns

Note

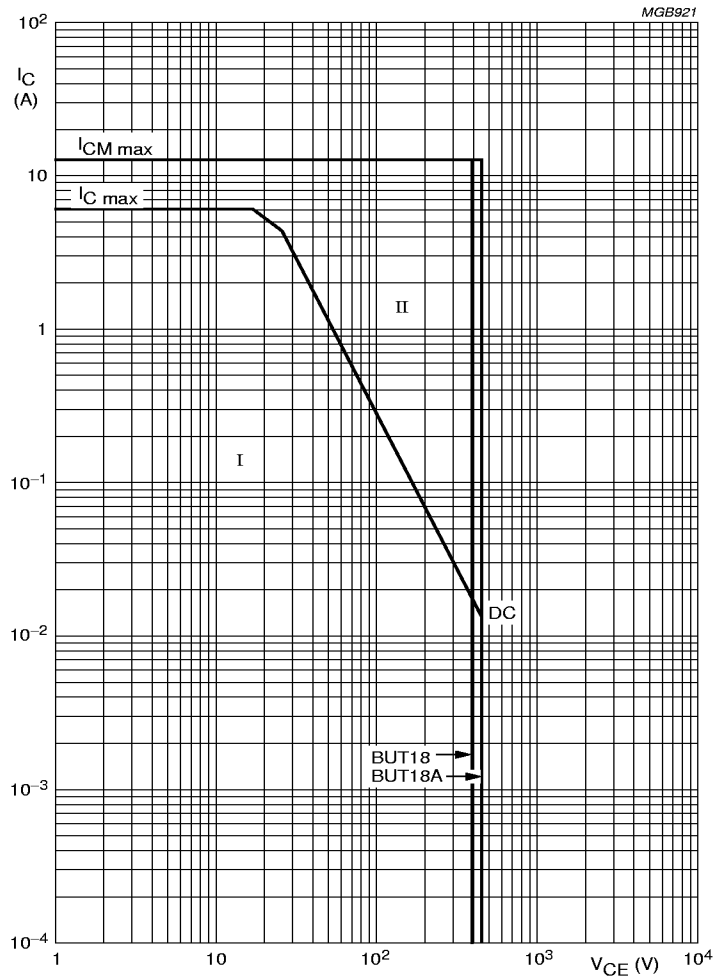
1. Measured with a half-sinewave voltage (curve tracer).

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$T_{mb} = 25\ ^\circ\text{C}$.

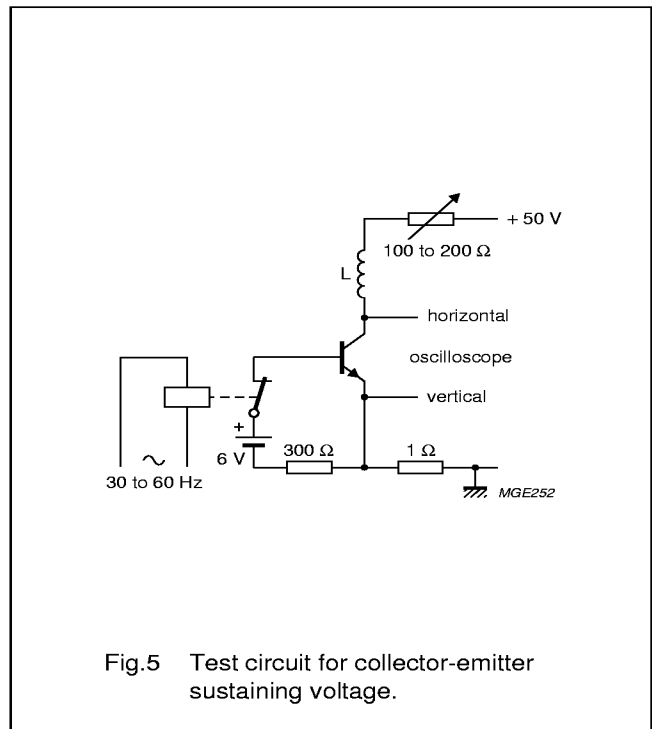
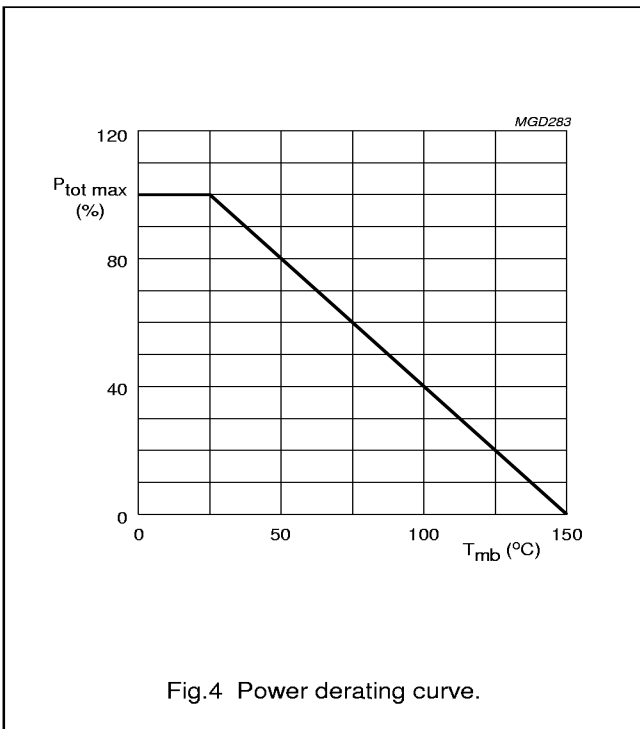
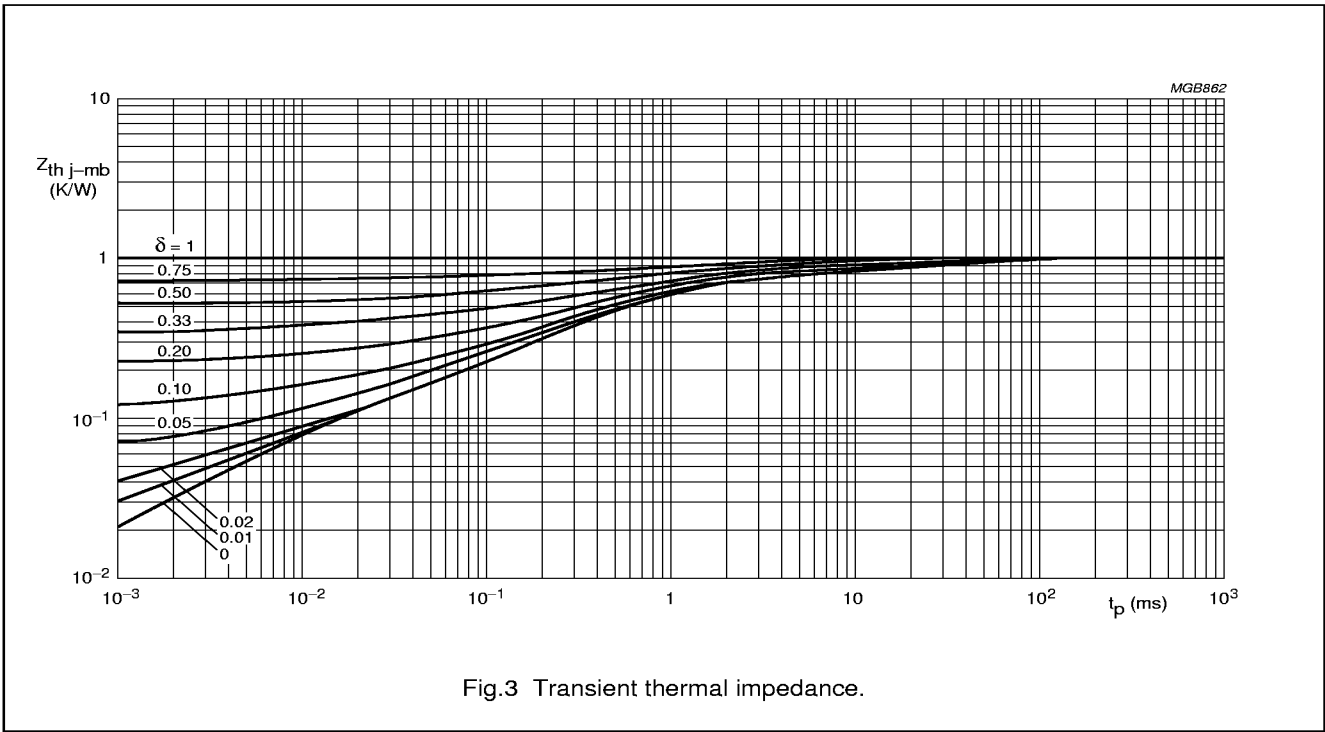
I - Region of permissible DC operation.

II - Permissible extension for repetitive pulse operation.

Fig.2 Forward bias SOAR.

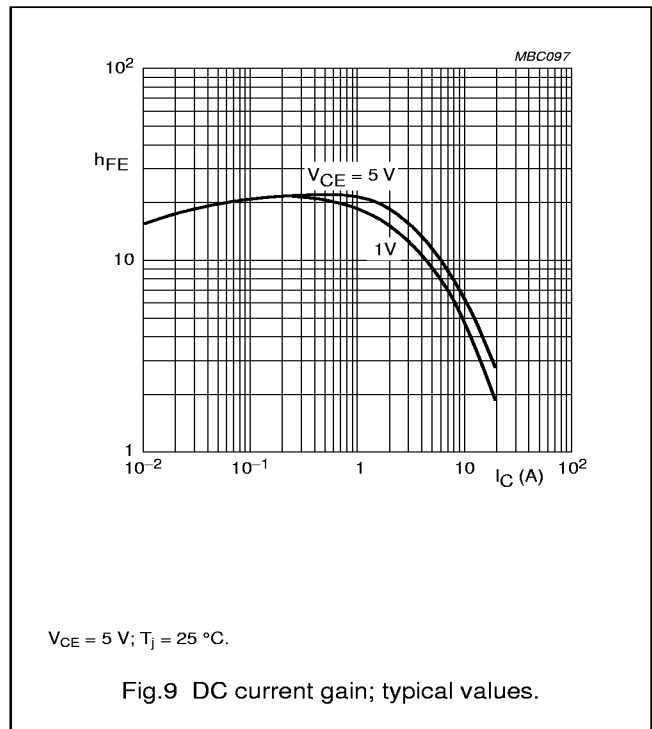
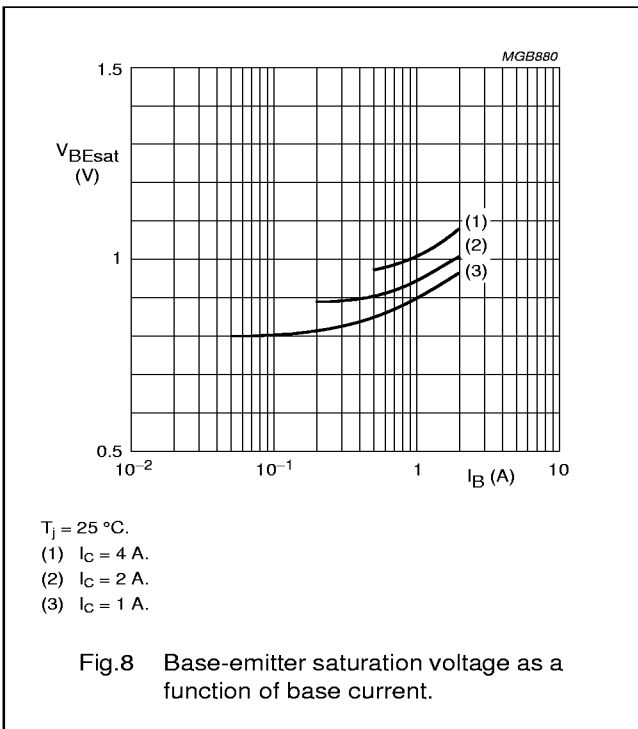
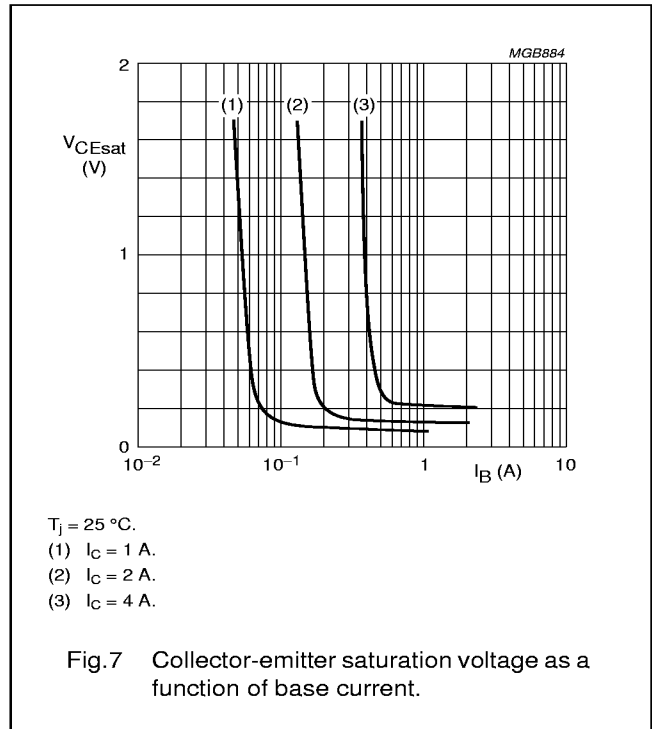
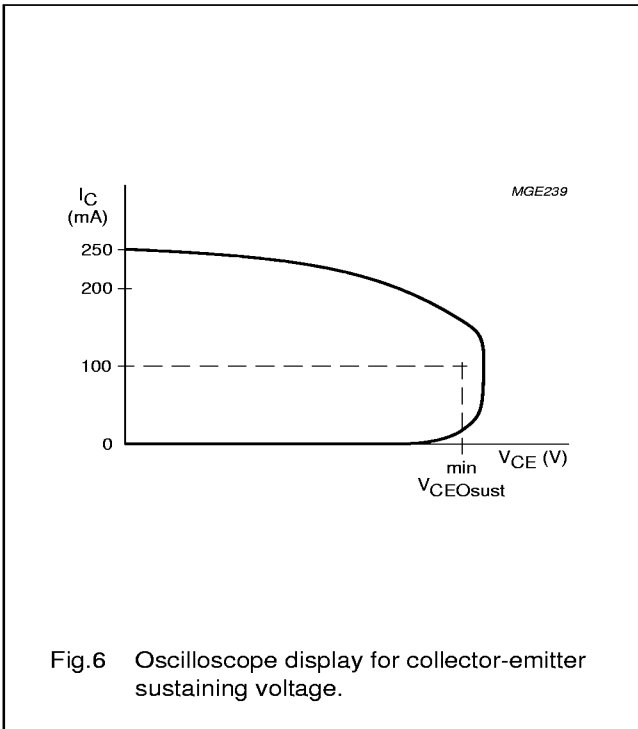
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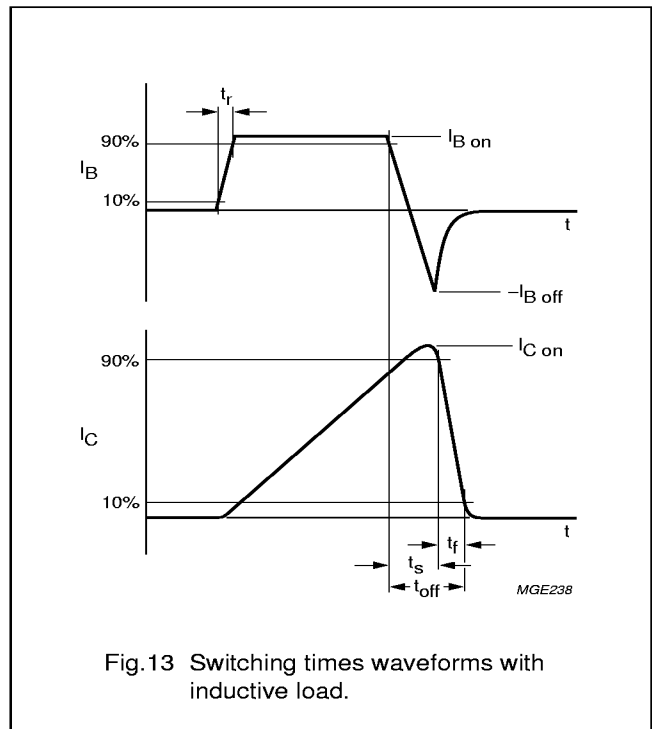
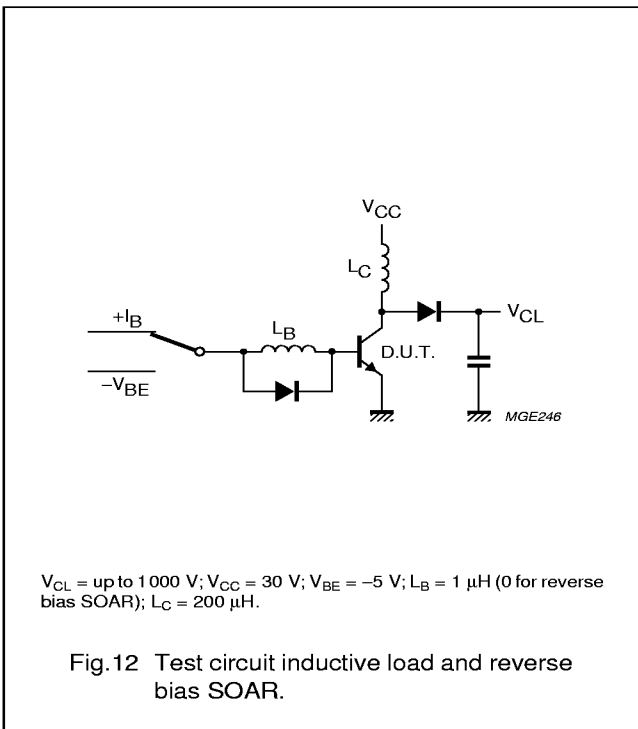
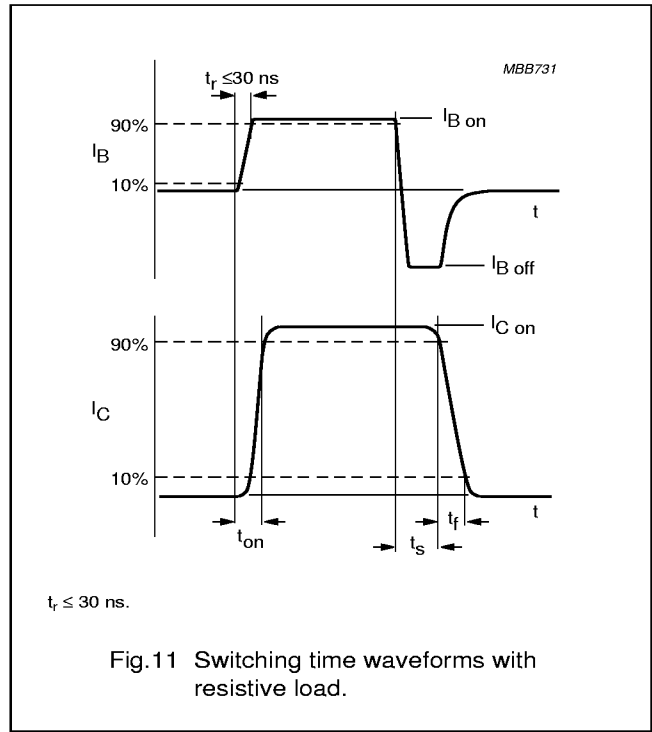
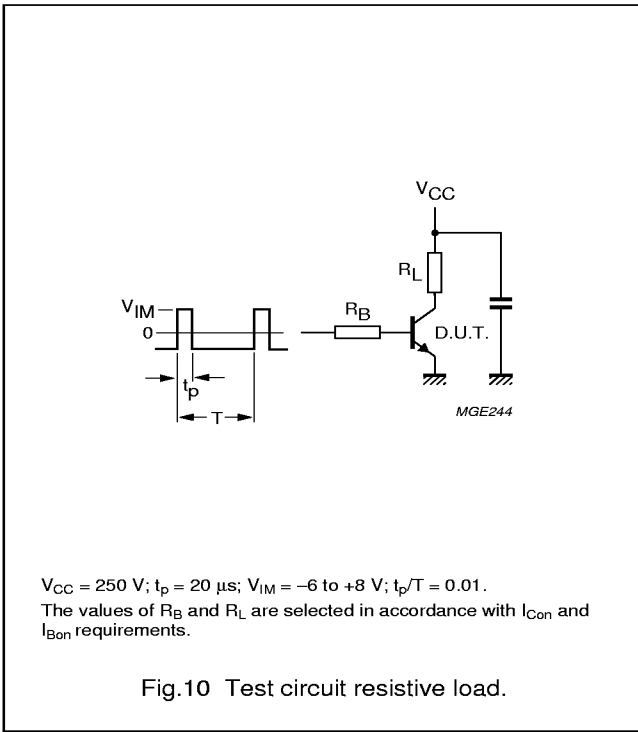
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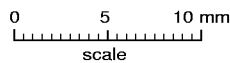
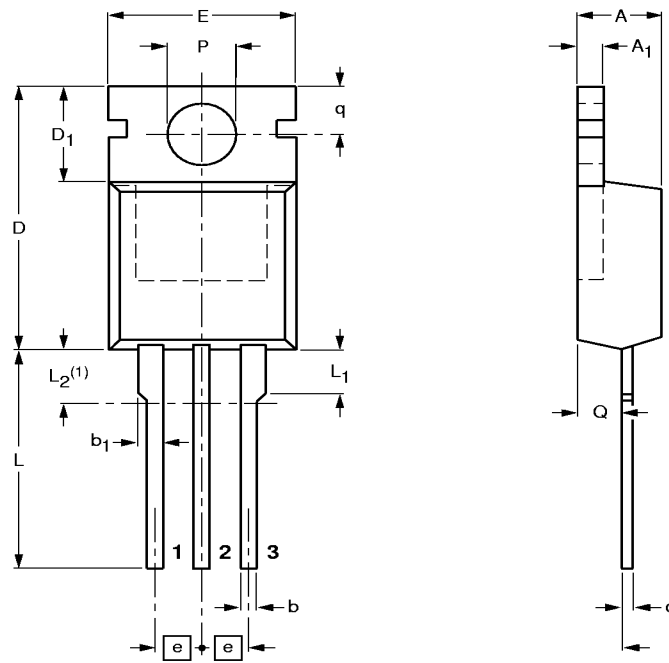
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PACKAGE OUTLINE

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁	c	D	D ₁	E	e	L	L ₁	L ₂ ⁽¹⁾ max.	P	q	Q
mm	4.5 4.1	1.39 1.27	0.9 0.7	1.3 1.0	0.7 0.4	15.8 15.2	6.4 5.9	10.3 9.7	2.54	15.0 13.5	3.30 2.79	3.0	3.8 3.6	3.0 2.7	2.6 2.2

Note

1. Terminals in this zone are not tinned.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT78		TO-220AB				97-06-11