

## Silicon Diffused Power Transistor

BUJ100AT

## GENERAL DESCRIPTION

High-voltage, high-speed planar-passivated npn power switching transistor in the SOT223 envelope intended for use in compact fluorescent lamps, low power electronic lighting ballasts and similar high frequency converters and inverters.

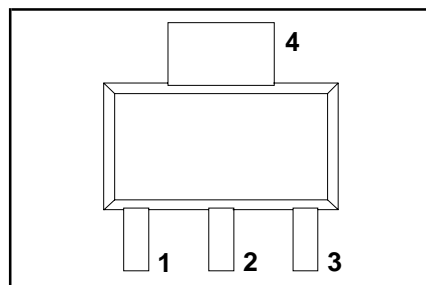
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$V_{CESM}$	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	700	V
$V_{CBO}$	Collector-Base voltage (open emitter)		-	700	V
$V_{CEO}$	Collector-emitter voltage (open base)		-	400	V
$I_C$	Collector current (DC)		-	1.0	A
$I_{CM}$	Collector current peak value		-	2.0	A
$P_{tot}$	Total power dissipation	$T_{sp} \leq 25\text{ °C}$	-	6	W
$V_{CEsat}$	Collector-emitter saturation voltage	$I_C = 0.75\text{ A}; I_B = 150\text{ mA}$	0.23	1.0	V
$h_{FE}$		$I_C = 0.75\text{ A}; V_{CE} = 5\text{ V}$	14	20	
$t_{fi}$	Fall time (Inductive)	$I_C = 1.0\text{ A}, I_{BON} = 200\text{ mA}$	50	70	ns

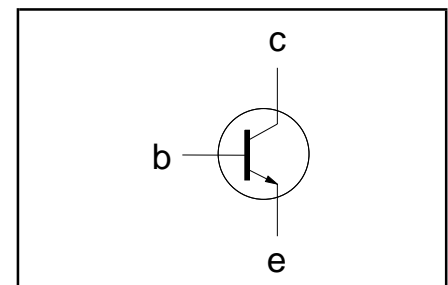
## PINNING - SOT223

PIN	DESCRIPTION
1	base
2	collector
3	emitter
4	collector (tab)

## 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 to emitter voltage	$V_{BE} = 0\text{ V}$	-	700	V
$V_{CEO}$	Collector to emitter voltage (open base)		-	400	V
$V_{CBO}$	Collector to base voltage (open emitter)		-	700	V
$I_C$	Collector current (DC)		-	1.0	A
$I_{CM}$	Collector current peak value		-	2.0	A
$I_B$	Base current (DC)		-	0.5	A
$I_{BM}$	Base current peak value		-	1.0	A
$P_{tot}$	Total power dissipation	$T_{sp} \leq 25\text{ °C}$	-	6	W
$T_{stg}$	Storage temperature		-65	150	°C
$T_j$	Junction temperature		-	150	°C

## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-sp}$	Junction to solder point		-	20	K/W
$R_{th\ j-a}$	Junction to ambient	pcb mounted pad areas as in Fig. 23)			
		pcb mounted, minimum footprint	70	-	K/W
		Mounted on 50x34x2mm aluminium PCB	30	-	K/W

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**STATIC CHARACTERISTICS** $T_{sp} = 25\text{ °C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CES}, I_{CBO}$ $I_{CES}$	Collector cut-off current <sup>1</sup>	$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$ $V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$ $T_j = 125\text{ °C}$	-	2.5 15	100 500	$\mu\text{A}$ $\mu\text{A}$
$I_{CEO}$ $I_{EBO}$ $V_{CEOsust}$	Collector cut-off current Emitter cut-off current Collector-emitter sustaining voltage	$V_{CE} = V_{CESMmax}(400\text{V})$ $V_{EB} = 9\text{ V}; I_C = 0\text{ A}$ $I_B = 0\text{ A}; I_C = 10\text{ mA};$ $L = 25\text{ mH}$	- - 400	- 0.02 -	100 100 -	$\mu\text{A}$ $\mu\text{A}$ V
$V_{CEsat}$ $V_{BEsat}$	Collector-emitter saturation voltage Base-emitter saturation voltage	$I_C = 0.75\text{ A}; I_B = 0.15\text{ mA}$ $I_C = 0.75\text{ A}; I_B = 0.15\text{ mA}$	- -	0.23 0.95	1.0 1.3	V V
$h_{FE}$ $h_{FE}$ $h_{FE}$	DC current gain	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$ $I_C = 100\text{ mA}; V_{CE} = 5\text{ V}$ $I_C = 0.75\text{ A}; V_{CE} = 5\text{ V}$	11 12.5 9	20 21 14	27 31 20	

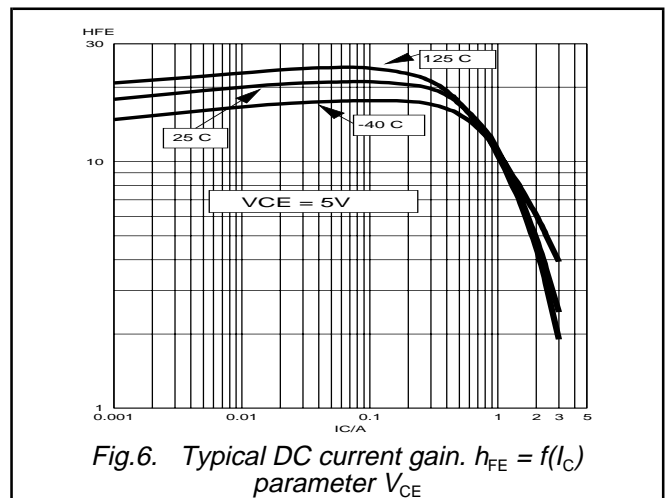
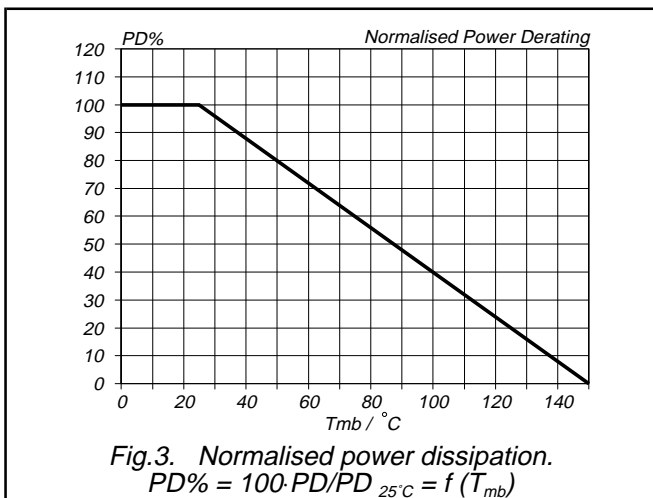
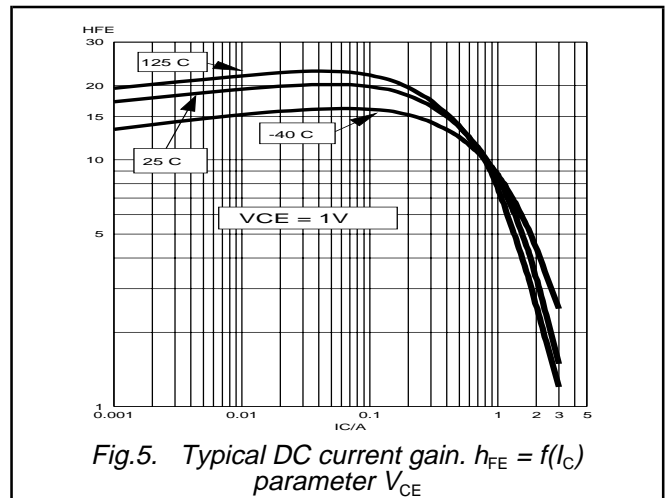
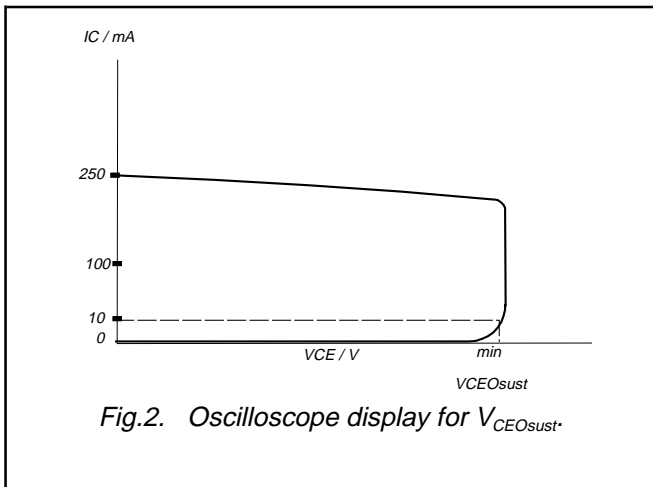
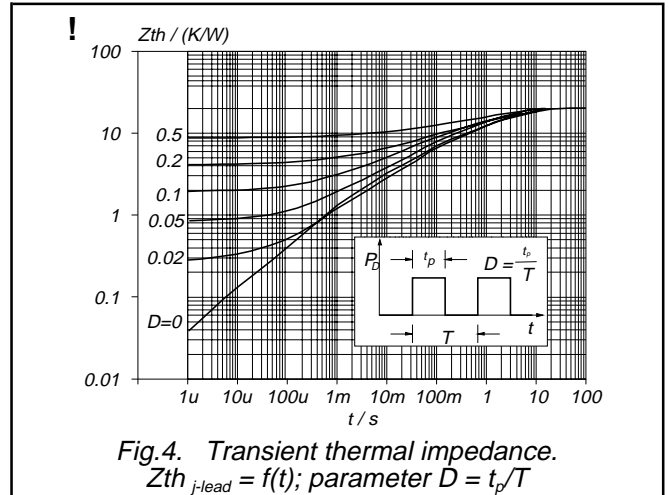
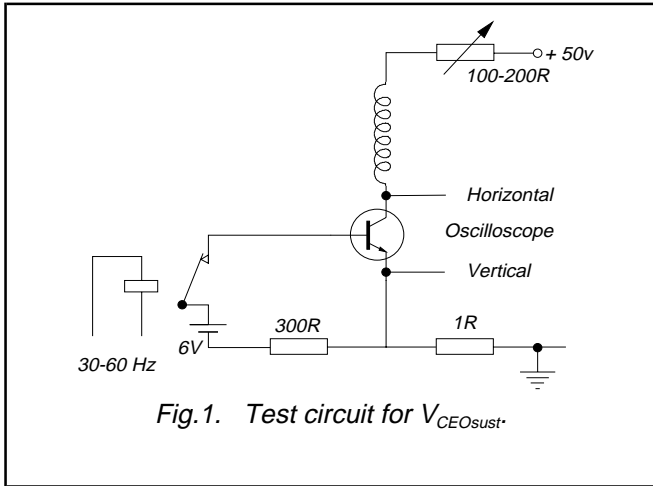
**DYNAMIC CHARACTERISTICS** $T_{sp} = 25\text{ °C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$t_{on}$ $t_s$ $t_f$	Switching times (resistive load) Turn-on time Turn-off storage time Turn-off fall time	$I_{Con} = 1.0\text{ A}; I_{Bon} = -I_{Boff} = 200\text{ mA};$ $R_L = 75\text{ ohms}; V_{BB2} = 4\text{ V};$	0.65 0.88 250	0.88 1.2 338	$\mu\text{s}$ $\mu\text{s}$ ns
$t_s$ $t_f$	Switching times (inductive load) Turn-off storage time Turn-off fall time	$I_{Con} = 1.0\text{ A}; I_{Bon} = 200\text{ mA}; L_B = 1\text{ }\mu\text{H};$ $-V_{BB} = 5\text{ V}$	0.51 50	0.7 70	$\mu\text{s}$ ns
$t_s$ $t_f$	Switching times (inductive load) Turn-off storage time Turn-off fall time	$I_{Con} = 1.0\text{ A}; I_{Bon} = 200\text{ mA}; L_B = 1\text{ }\mu\text{H};$ $-V_{BB} = 5\text{ V}; T_j = 100\text{ °C}$	- -	1.4 130	$\mu\text{s}$ ns

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

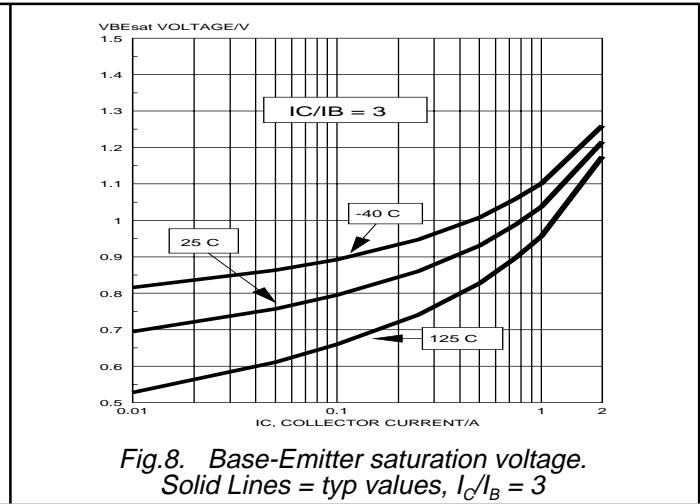
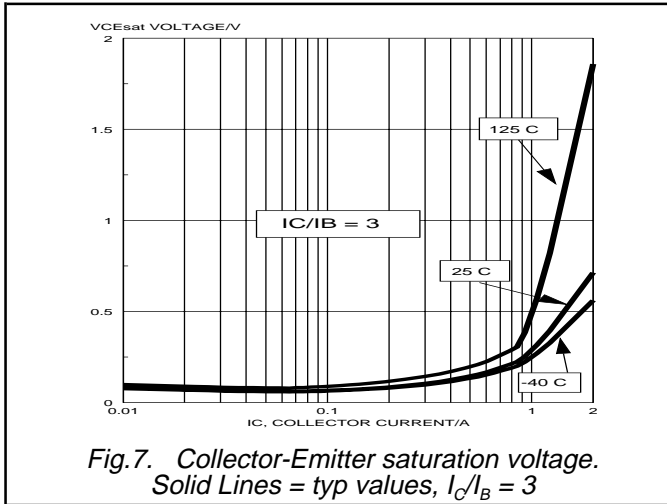
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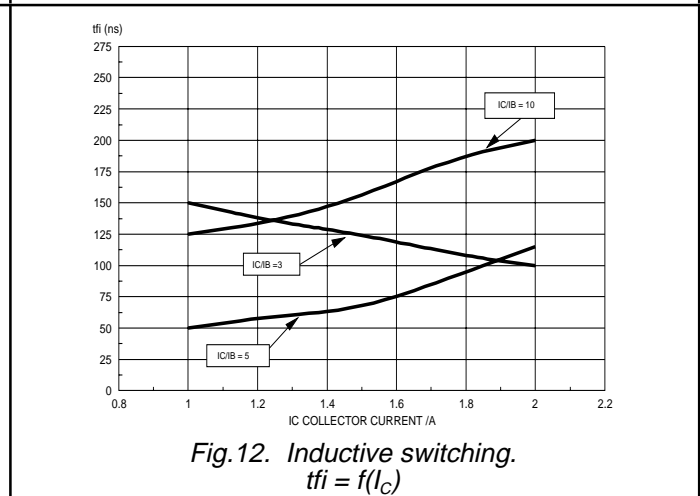
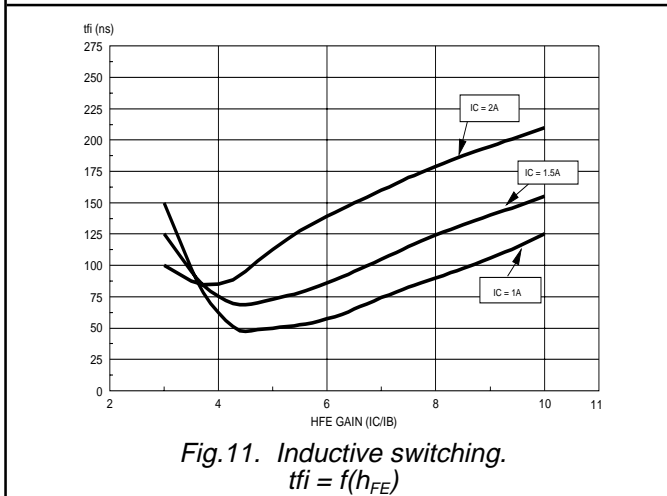
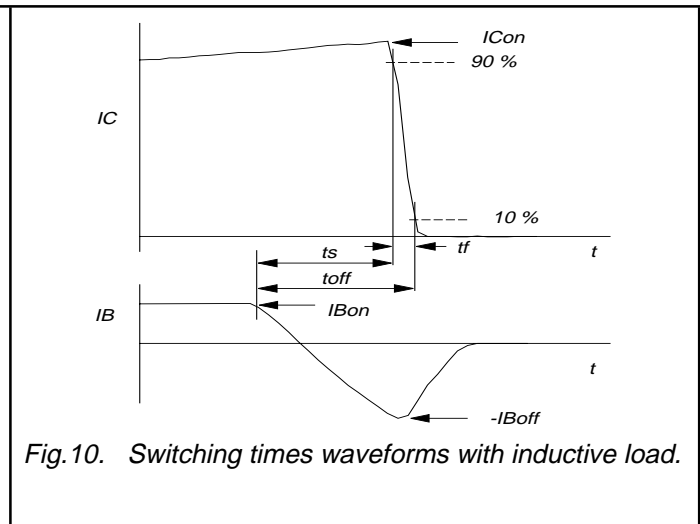
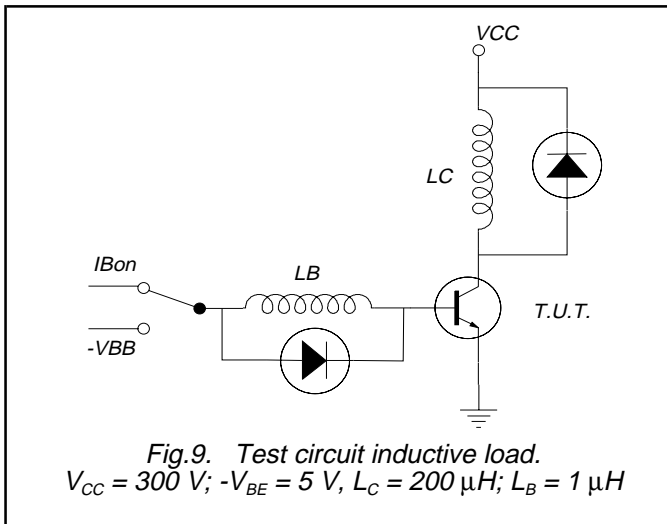


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INDUCTIVE SWITCHING



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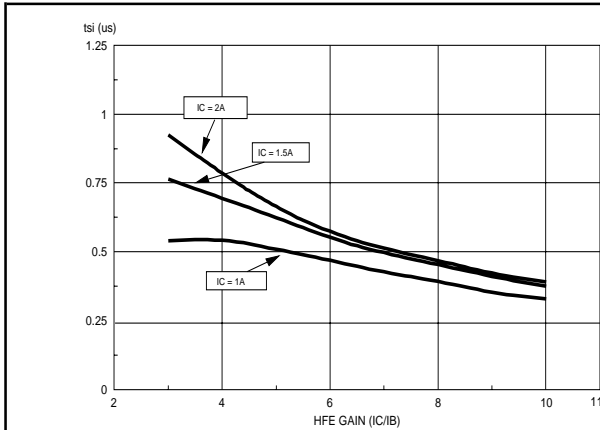


Fig.13. Inductive switching.  
 $t_{si} = f(h_{FE})$

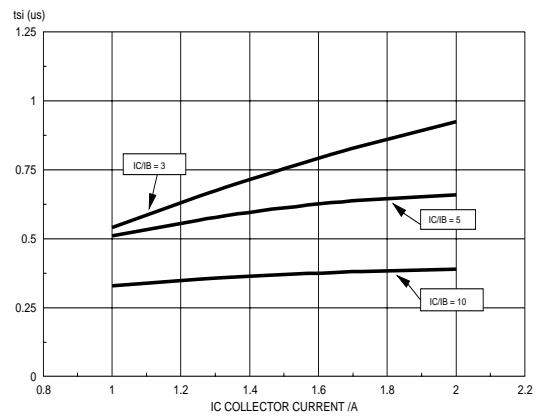


Fig.14. Inductive switching.  
 $t_{si} = f(I_C)$

RESISTIVE SWITCHING

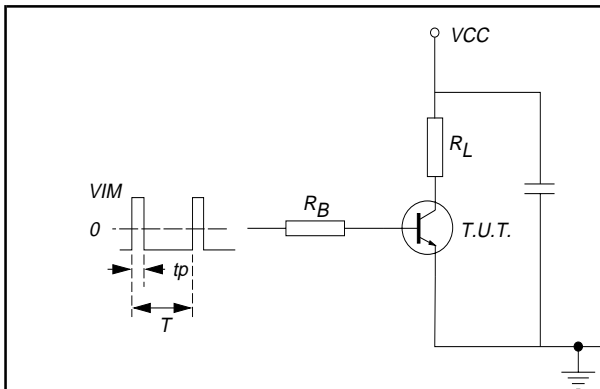


Fig.15. Test circuit resistive load.  $V_{IM} = -6$  to  $+8$  V  
 $V_{CC} = 250$  V;  $t_p = 20$   $\mu$ s;  $\delta = t_p / T = 0.01$ .  
 $R_B$  and  $R_L$  calculated from  $I_{Con}$  and  $I_{Bon}$  requirements.

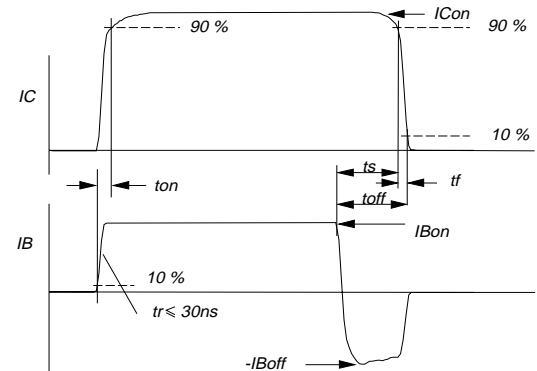


Fig.16. Switching times waveforms with resistive load.

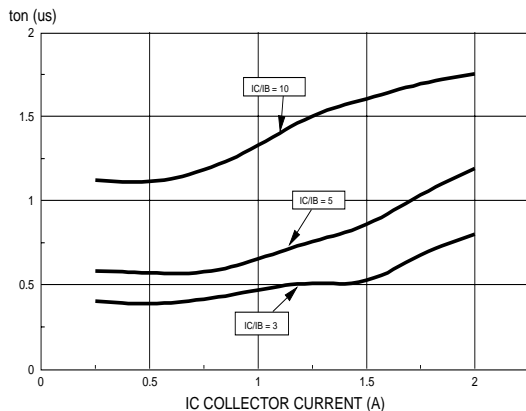


Fig.17. Resistive switching.  
 $t_{on} = f(I_C)$

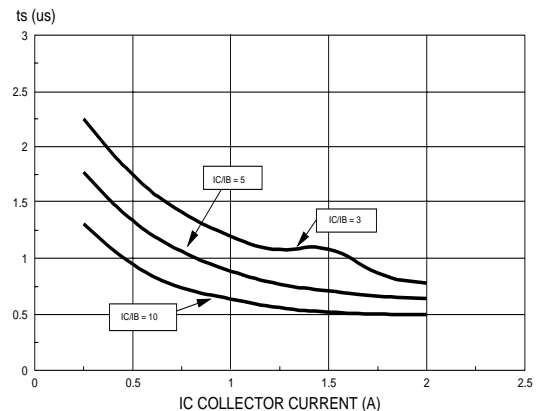
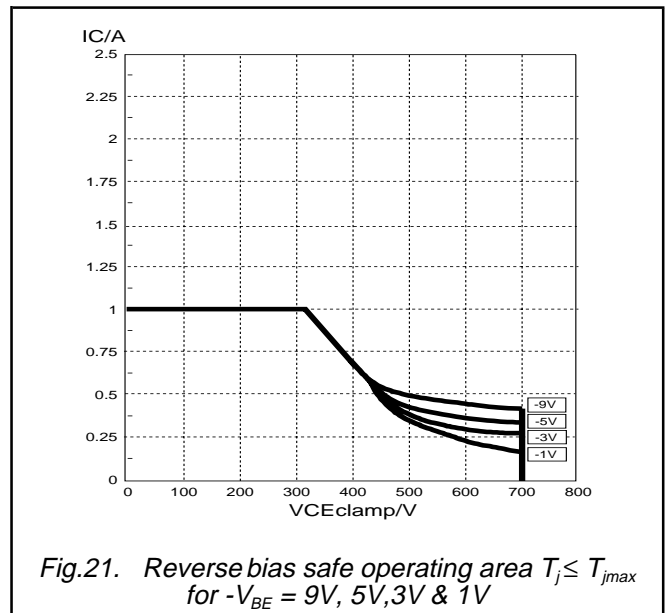
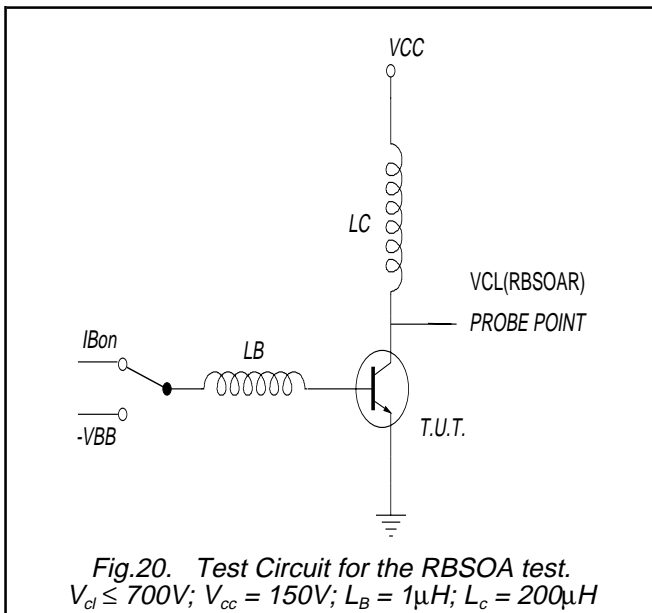
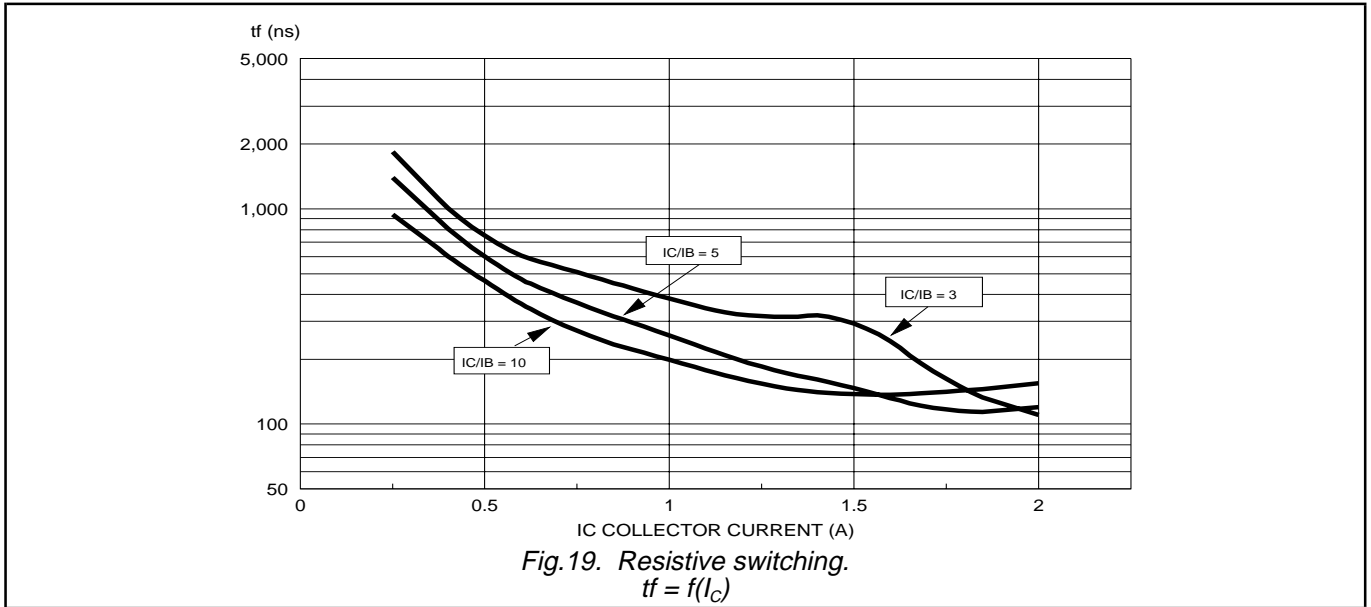


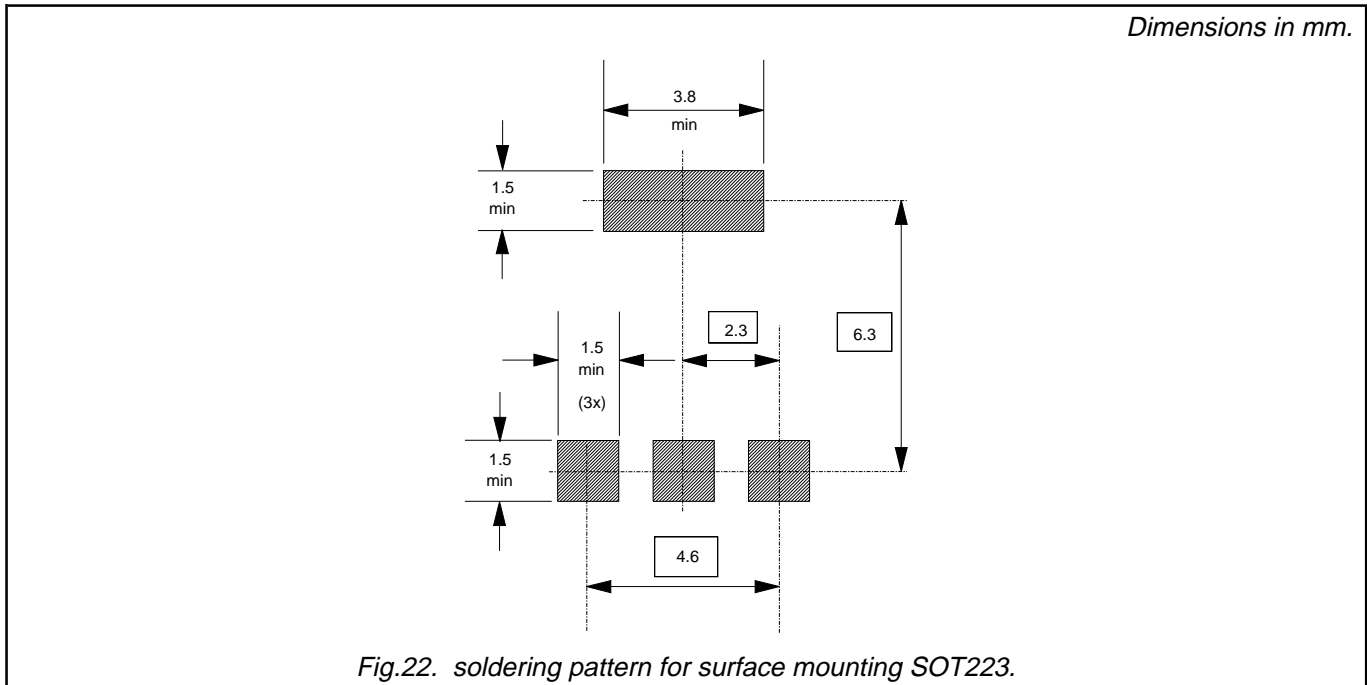
Fig.18. Resistive switching.  
 $t_s = f(I_C)$

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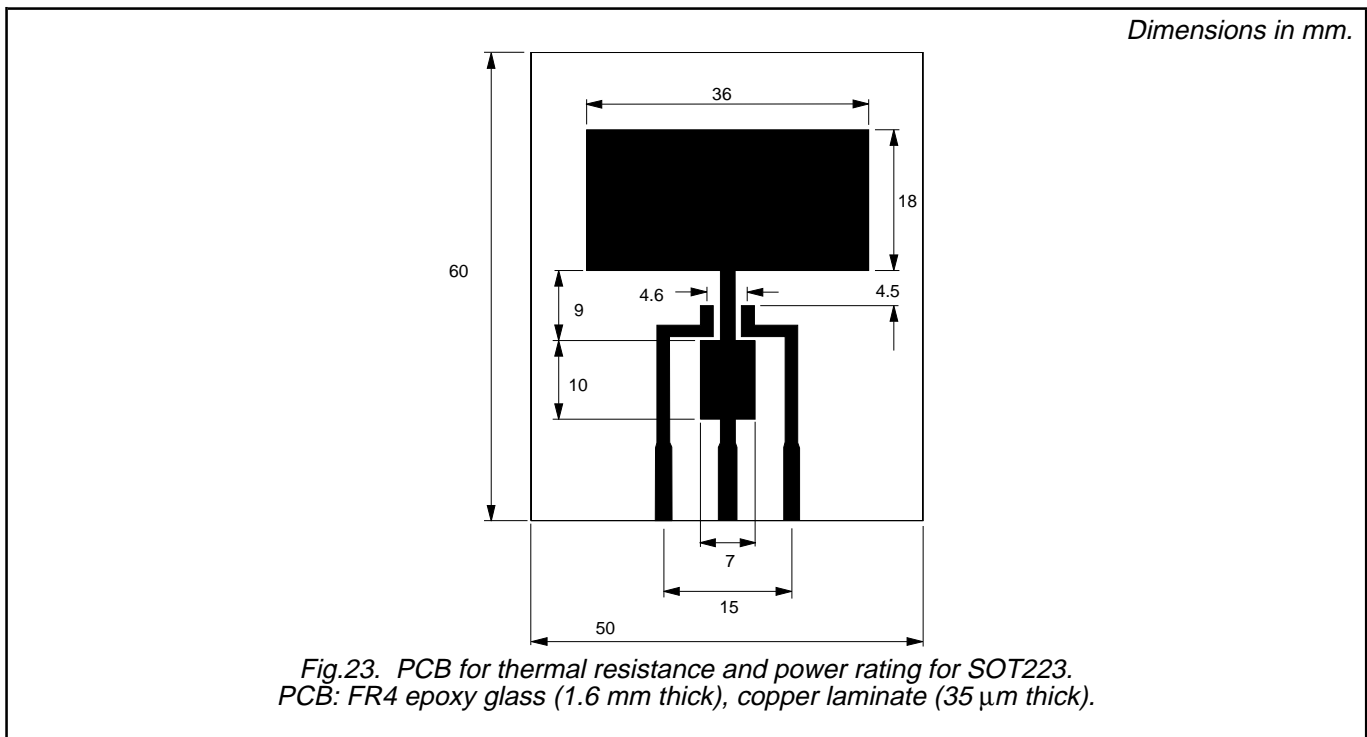
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**MOUNTING INSTRUCTIONS**



**PRINTED CIRCUIT BOARD**



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MECHANICAL DATA

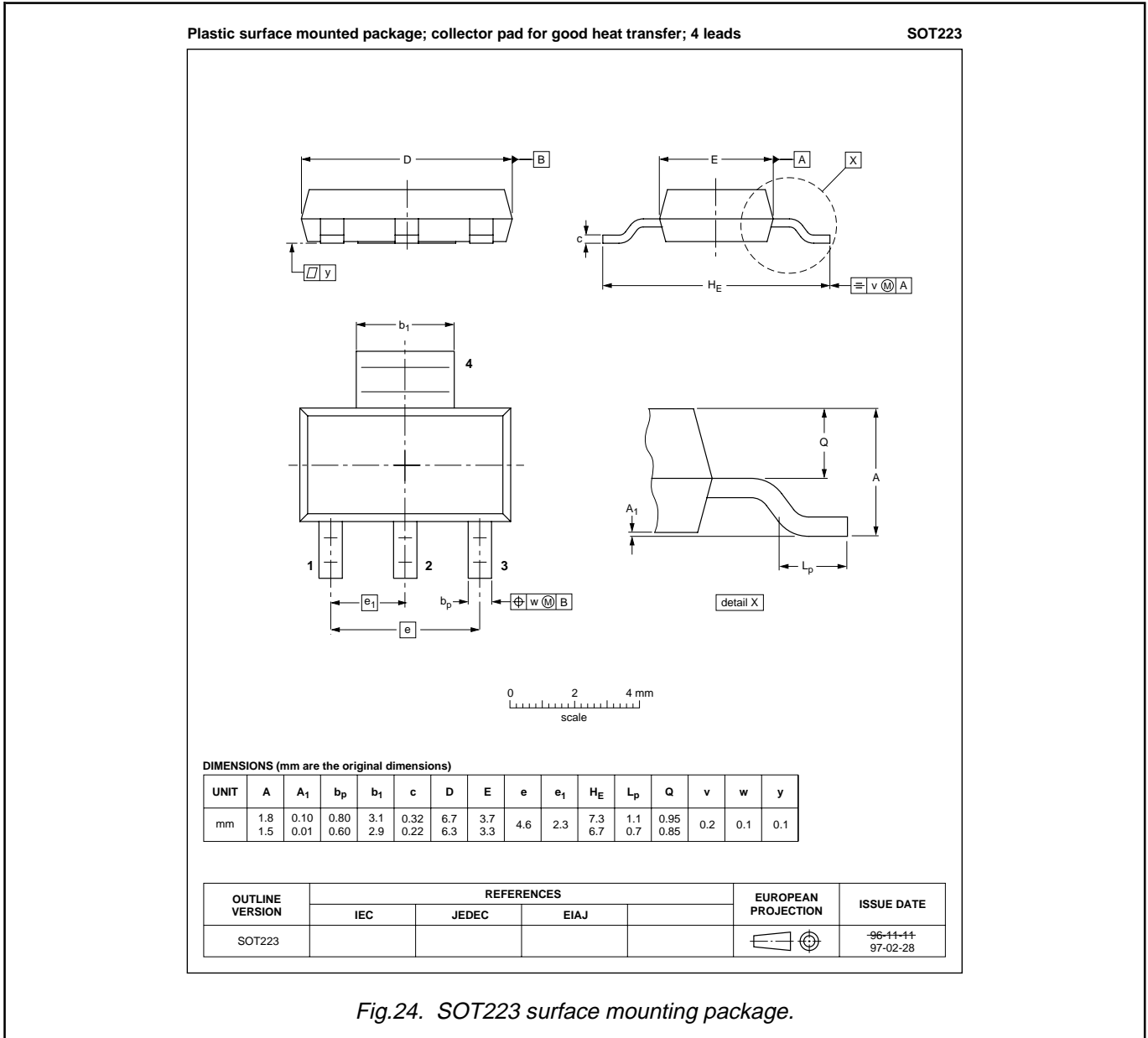


Fig.24. SOT223 surface mounting package.

Notes

1. This product is supplied in anti-static packaging. The gate-source input must be protected against static discharge during transport or handling.
2. Refer to Discrete Semiconductor Packages, Data Handbook SC18.
3. Epoxy meets UL94 V0 at 1/8".



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**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	
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