

DATA SHEET

BUJ100

Silicon Diffused Power Transistor

Product specification

September 1999



Silicon Diffused Power Transistor

BUJ100

GENERAL DESCRIPTION

High-voltage, high-speed planar-passivated npn power switching transistor in the TO92 envelope intended for use in compact fluorescent lamps and low power electronic lighting ballasts, converters and inverters, etc.

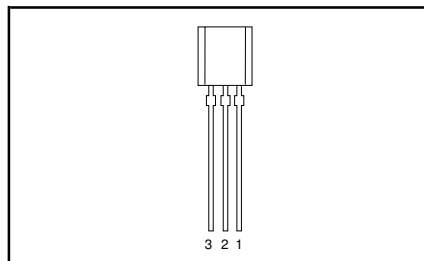
QUICK REFERENCE DATA

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	$T_{lead} \leq 25\text{ }^{\circ}\text{C}$	-	2	W
V_{CEsat}	Collector-emitter saturation voltage	$I_C = 0.75\text{ A}; I_B = 150\text{ mA}$	0.24	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

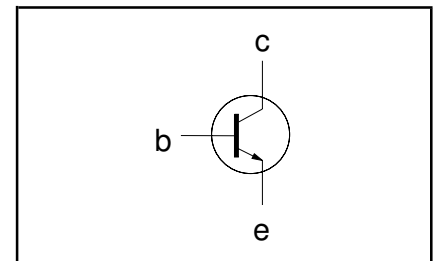
PINNING - TO92

PIN	DESCRIPTION
1	Emitter
2	Collector
3	Base

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	$T_{lead} \leq 25\text{ }^{\circ}\text{C}$	-	2	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
$R_{th\ j-lead}$	Thermal resistance junction to lead		-	60	K/W
$R_{th\ j-a}$	Thermal resistance Junction to ambient	pcb mounted; lead length = 4mm	150	-	K/W

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STATIC CHARACTERISTICS

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

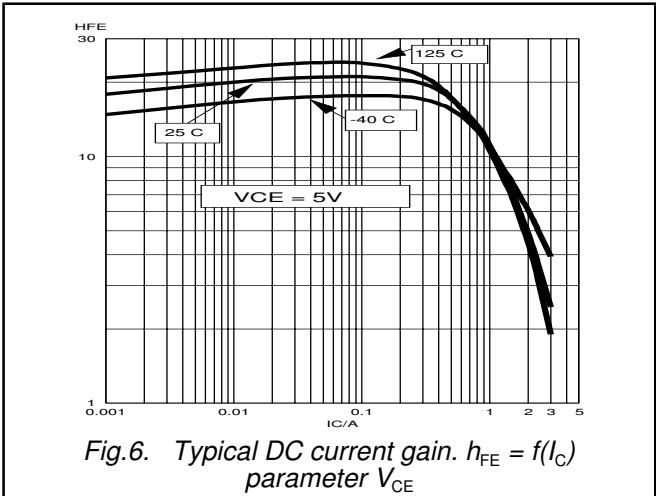
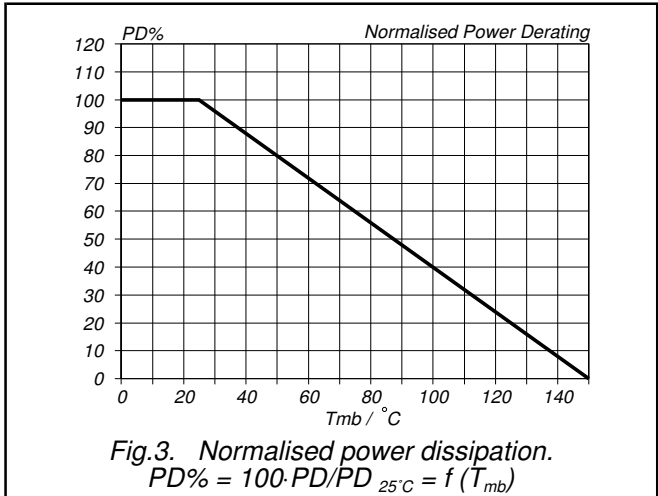
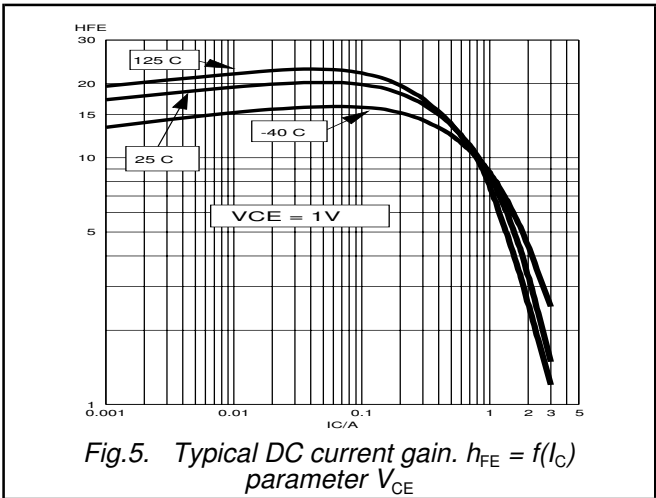
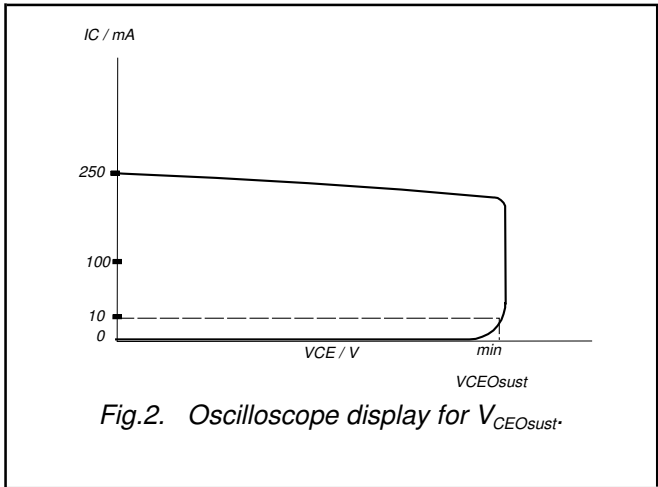
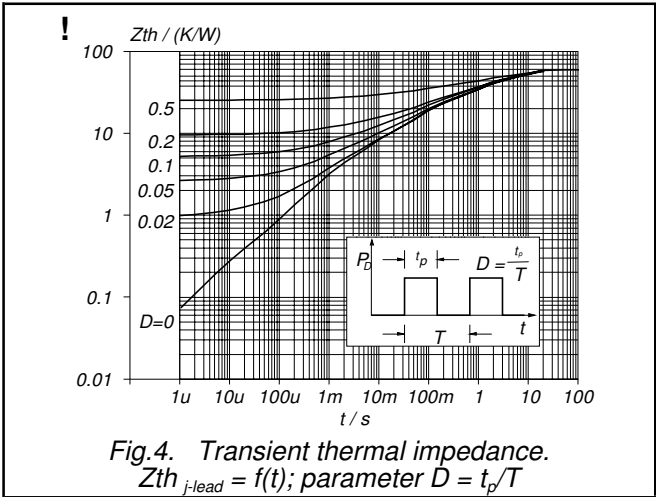
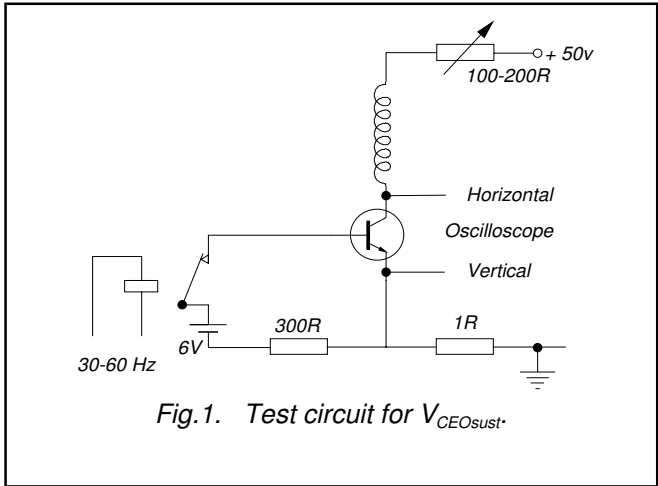
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{\text{CES}}, I_{\text{CBO}}$ I_{CES}	Collector cut-off current ¹	$V_{\text{BE}} = 0\text{ V}; V_{\text{CE}} = V_{\text{CESMmax}}$ $V_{\text{BE}} = 0\text{ V}; V_{\text{CE}} = V_{\text{CESMmax}}$ $T_j = 125\text{ }^{\circ}\text{C}$	-	0.8 2.0	100 500	μA μA
I_{CEO}	Collector cut-off current	$V_{\text{CEO}} = V_{\text{CEOMmax}} (400\text{V})$	-	-	100	μA
I_{EBO}	Emitter cut-off current	$V_{\text{EB}} = 9\text{ V}; I_{\text{C}} = 0\text{ A}$	-	0.05	100	μA
V_{CEOsust}	Collector-emitter sustaining voltage	$I_{\text{B}} = 0\text{ A}; I_{\text{C}} = 10\text{mA};$ $L = 25\text{ mH}$	400	-	-	V
V_{CEsat}	Collector-emitter saturation voltage	$I_{\text{C}} = 0.75\text{ A}; I_{\text{B}} = 0.15\text{ A}$	-	0.24	1.0	V
V_{BEsat}	Base-emitter saturation voltage	$I_{\text{C}} = 0.75\text{ A}; I_{\text{B}} = 0.15\text{ A}$	-	0.93	1.3	V
h_{FE}	DC current gain	$I_{\text{C}} = 10\text{mA}; V_{\text{CE}} = 5\text{ V}$	11	20	27	
h_{FE}		$I_{\text{C}} = 100\text{mA}; V_{\text{CE}} = 5\text{ V}$	12.5	21	31	
h_{FE}		$I_{\text{C}} = 0.75\text{ A}; V_{\text{CE}} = 5\text{ V}$	9	14	20	

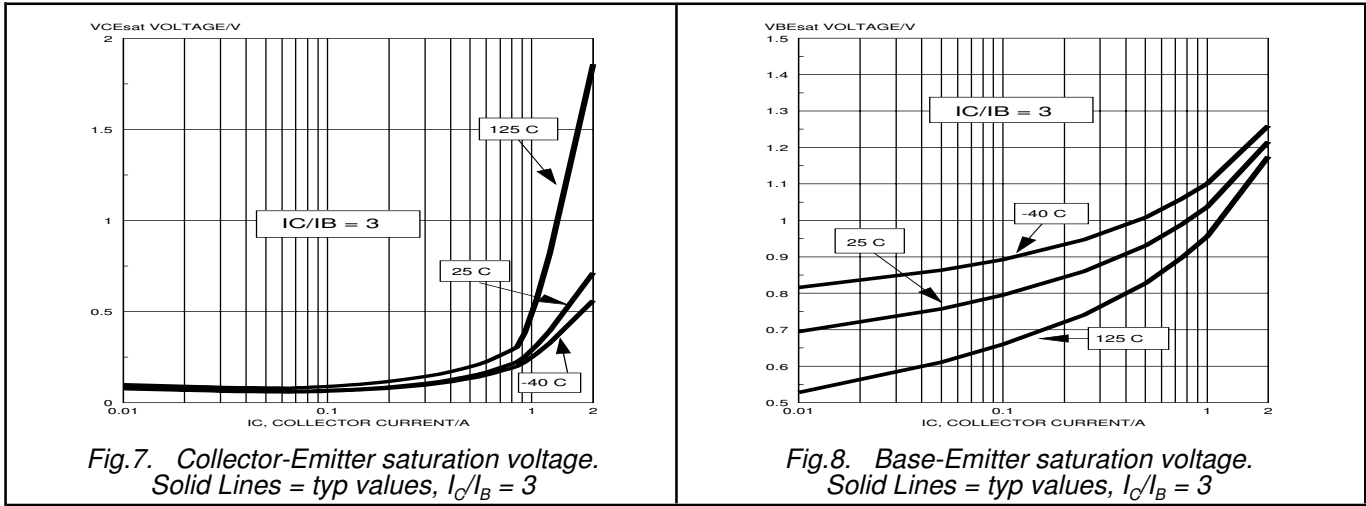
DYNAMIC CHARACTERISTICS

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

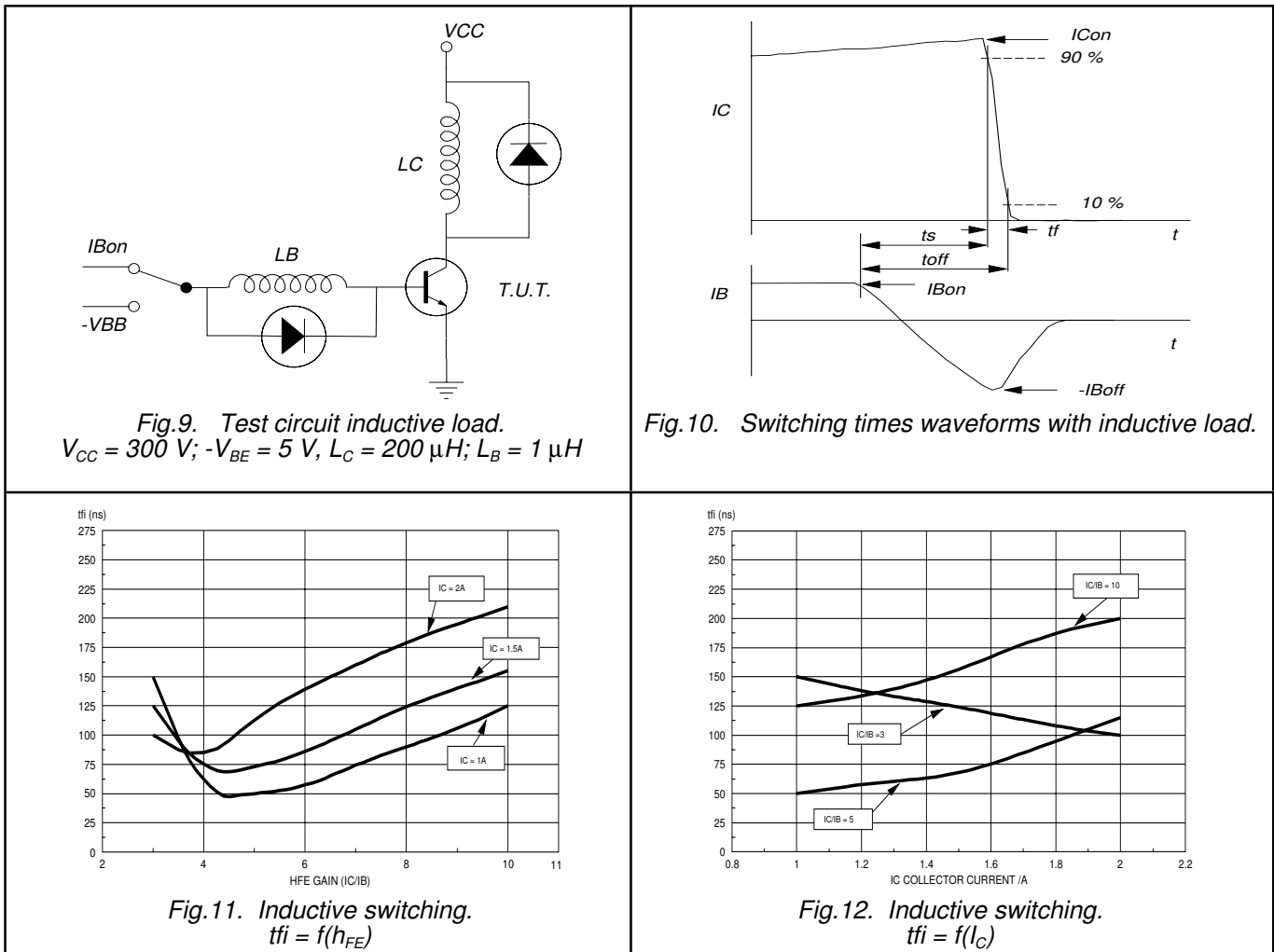
SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
	Switching times (resistive load)	$I_{\text{Con}} = 1.0\text{ A}; I_{\text{Bon}} = -I_{\text{Boff}} = 200\text{mA};$ $R_{\text{L}} = 75\text{ ohms}; V_{\text{BB2}} = 4\text{ V};$			
t_{on}	Turn-on time		0.65	0.88	μs
t_{s}	Turn-off storage time		0.88	1.2	μs
t_{f}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

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





INDUCTIVE SWITCHING



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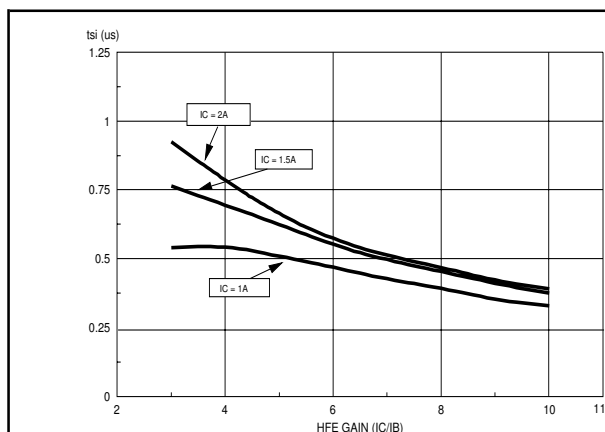


Fig. 13. Inductive switching.
 $t_{si} = f(h_{FE})$

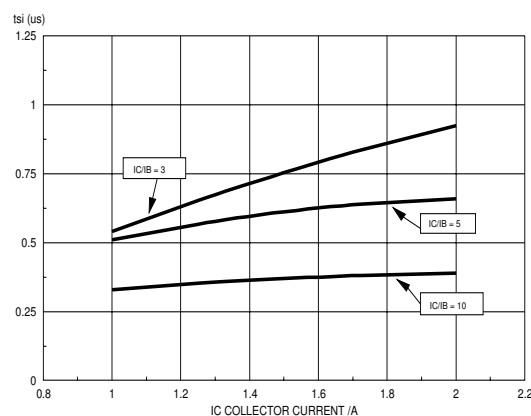


Fig. 14. Inductive switching.
 $t_{si} = f(I_C)$

RESISTIVE SWITCHING

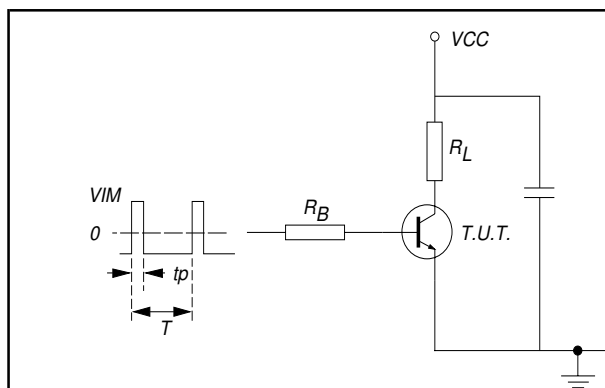


Fig. 15. Test circuit resistive load. $V_{IM} = -6$ to $+8$ V
 $V_{CC} = 250$ V; $t_p = 20$ μ s; $\delta = t_p / T = 0.01$.
 R_B and R_L calculated from I_{Con} and I_{Bon} requirements.

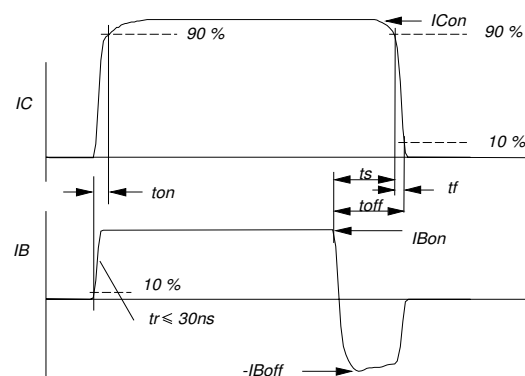


Fig. 16. Switching times waveforms with resistive load.

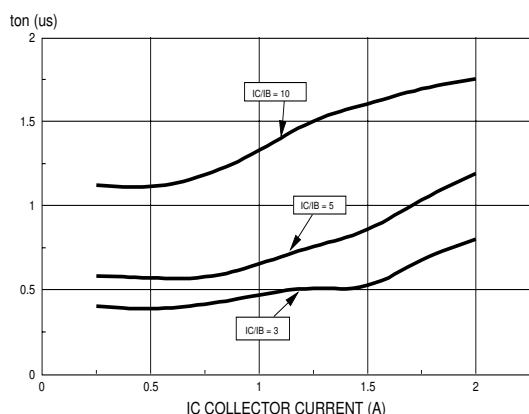


Fig. 17. Resistive switching.
 $t_{on} = f(I_C)$

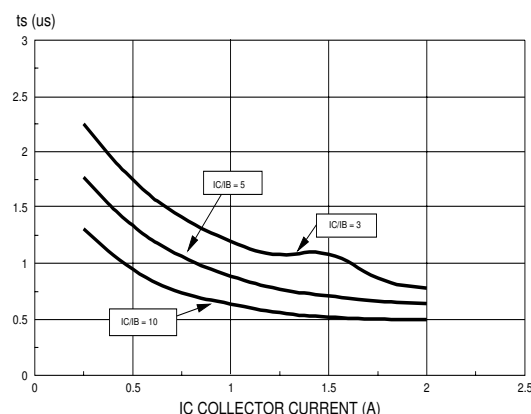
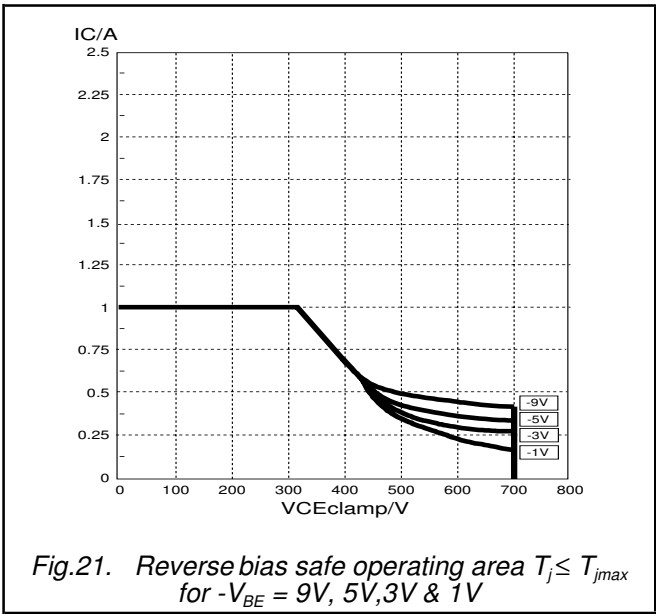
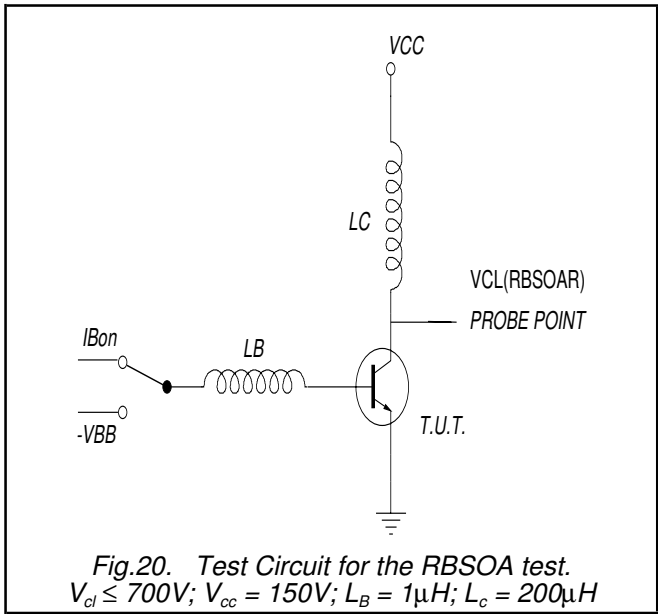
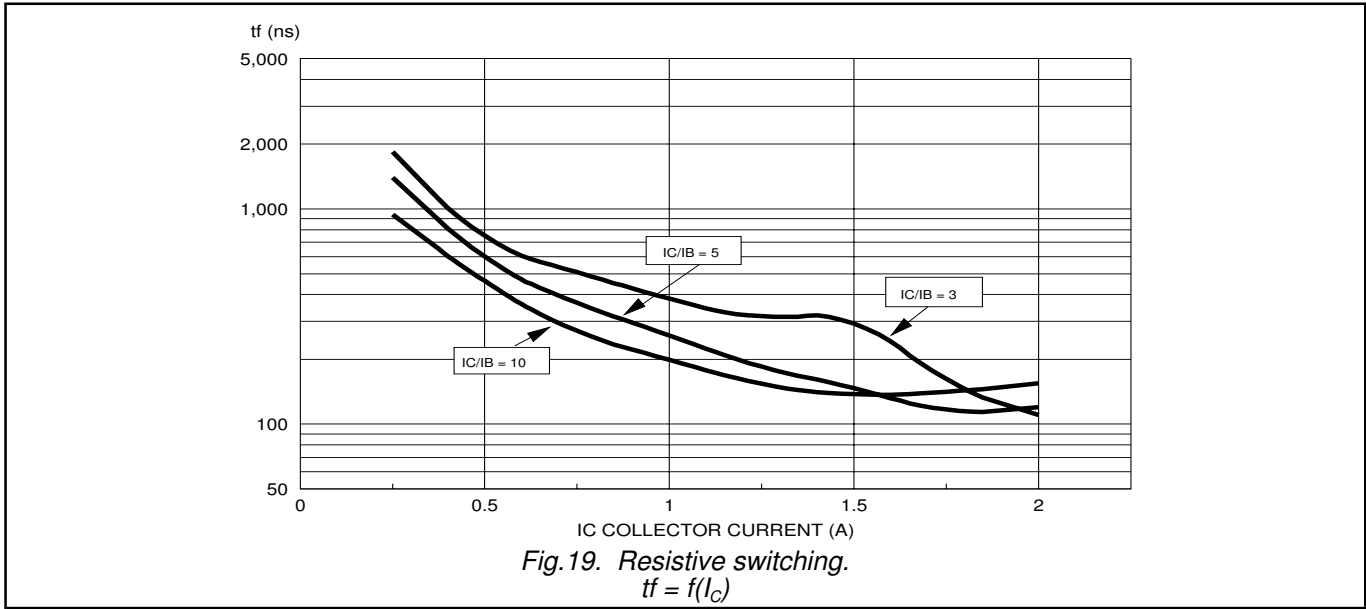
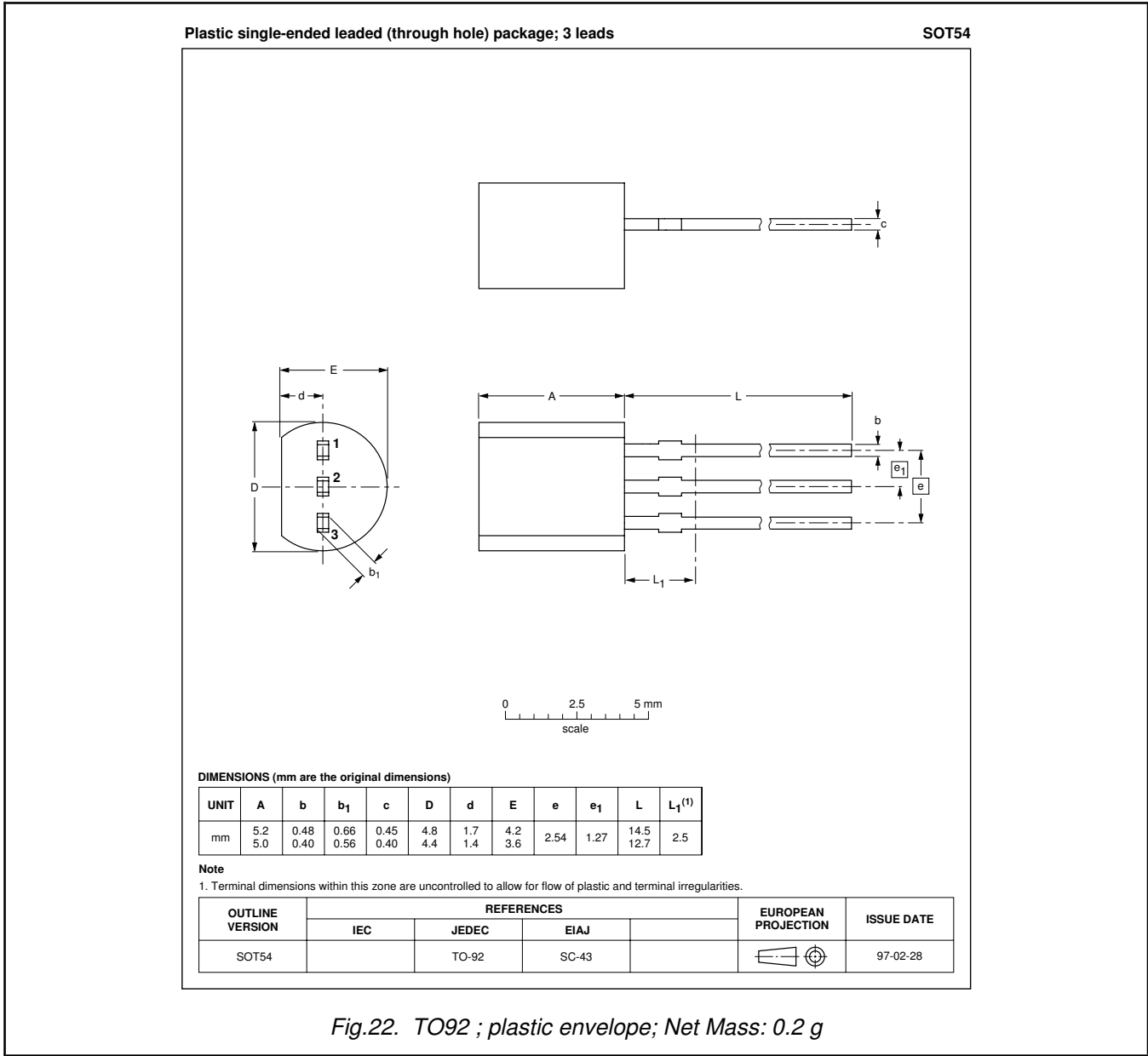


Fig. 18. Resistive switching.
 $t_s = f(I_C)$



MECHANICAL DATA



Notes
1. Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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