

Silicon Diffused Power Transistor

BU2520D

GENERAL DESCRIPTION

New generation, high-voltage, high-speed switching npn transistor with an integrated damper diode in a plastic envelope intended for use in horizontal deflection circuits of large screen colour television receivers.

QUICK REFERENCE DATA

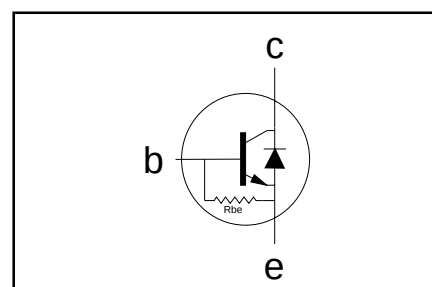
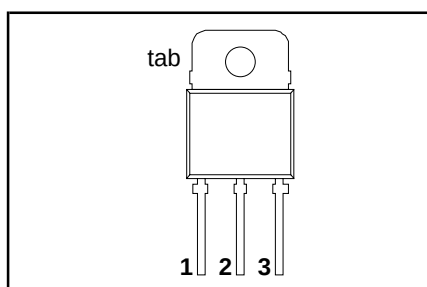
SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	10	A
I_{CM}	Collector current peak value		-	25	A
P_{tot}	Total power dissipation	$T_{mb} \leq 25\text{ °C}$	-	125	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	-	A
V_F	Diode forward voltage	$I_F = 6.0\text{ A}$	-	2.2	V
t_f	Fall time	$I_{CM} = 6.0\text{ A}; I_{B(end)} = 1.0\text{ A}$	0.35	0.5	μs

PINNING - SOT93

PIN CONFIGURATION

SYMBOL

PIN	DESCRIPTION
1	base
2	collector
3	emitter
tab	collector



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	$T_{mb} \leq 25\text{ °C}$	-	125	W
T_{stg}	Storage temperature		-65	150	°C
T_j	Junction temperature		-	150	°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Junction to mounting base	-	-	1.0	K/W
$R_{th\ j-a}$	Junction to ambient	in free air	45	-	K/W

¹ Turn-off current.

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STATIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CES}	Collector cut-off current ²	V _{BE} = 0 V; V _{CE} = V _{CESMmax}	-	-	1.0	mA
I _{CES}		V _{BE} = 0 V; V _{CE} = V _{CESMmax} T _j = 125 °C	-	-	2.0	mA
I _{EBO}	Emitter cut-off current	V _{EB} = 7.5 V; I _C = 0 A	100	-	300	mA
BV _{EBO}	Emitter-base breakdown voltage	I _B = 600 mA	7.5	13.5	-	V
R _{be}	Base-emitter resistance	V _{EB} = 7.5 V	-	50	-	Ω
V _{CEOsust}	Collector-emitter sustaining voltage	I _B = 0 A; I _C = 100 mA; L = 25 mH	800	-	-	V
V _{CEsat}	Collector-emitter saturation voltage	I _C = 6.0 A; I _B = 1.2 A	-	-	5.0	V
V _{BESat}	Base-emitter saturation voltage	I _C = 6.0 A; I _B = 1.2 A	-	-	1.3	V
h _{FE}	DC current gain	I _C = 1.0 A; V _{CE} = 5 V	-	-	23	
h _{FE}	Diode forward voltage	I _C = 6 A; V _{CE} = 5 V	5	7	10	
V _F		I _F = 6 A	-	-	2.2	V

DYNAMIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C _c	Collector capacitance	I _E = 0 A; V _{CB} = 10 V; f = 1 MHz	115	-	pF
	Switching times (16 kHz line deflection circuit)	I _{CM} = 6.0 A; L _C = 650 μH; C _{fb} = 19 nF; I _{B(end)} = 1.0 A; L _B = 5.3 μH; -V _{BB} = 4 V; (-di _B /dt = 0.8 A / μs)			
t _s	Turn-off storage time		4.5	5.5	μs
t _f	Turn-off fall time		0.35	0.5	μs

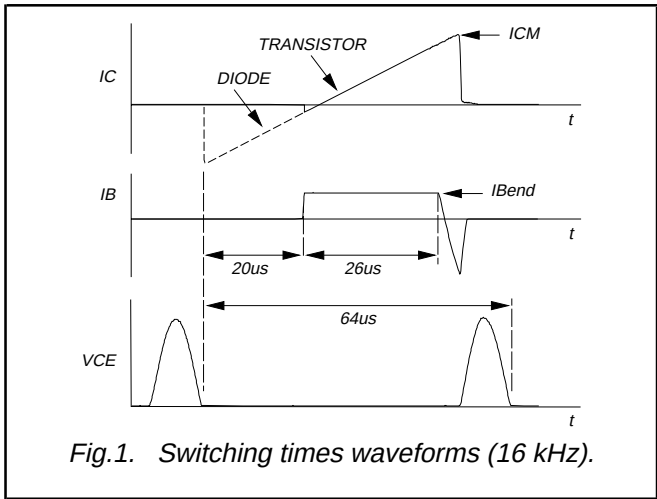


Fig.1. Switching times waveforms (16 kHz).

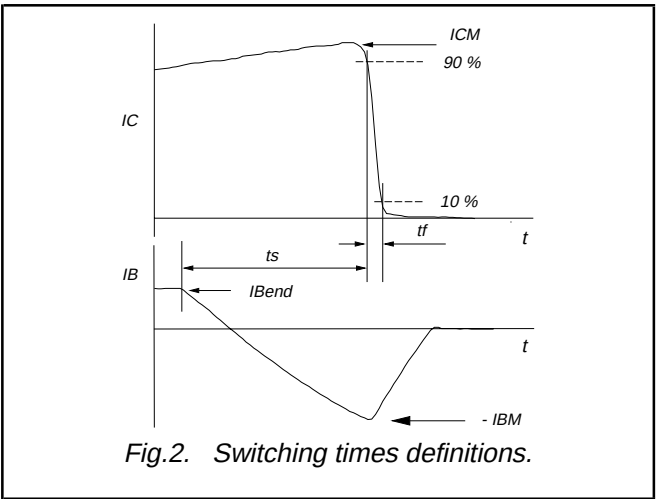
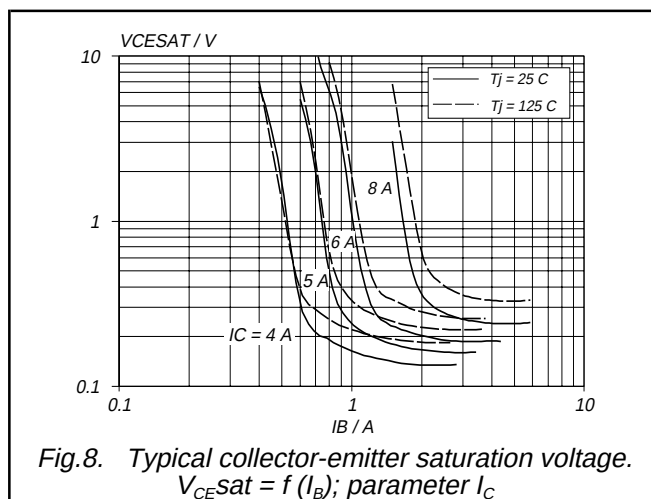
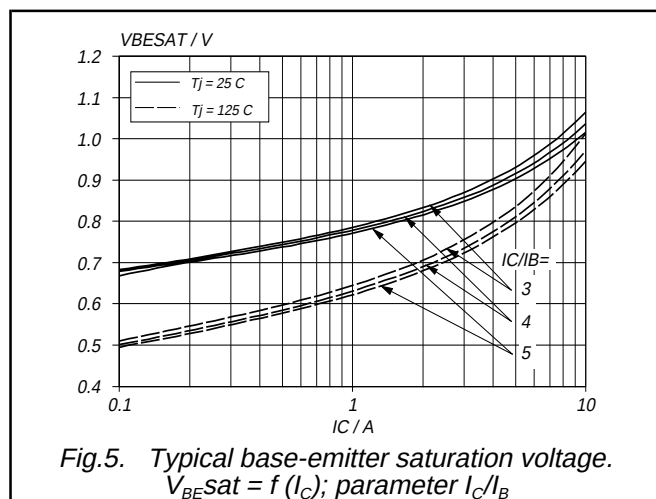
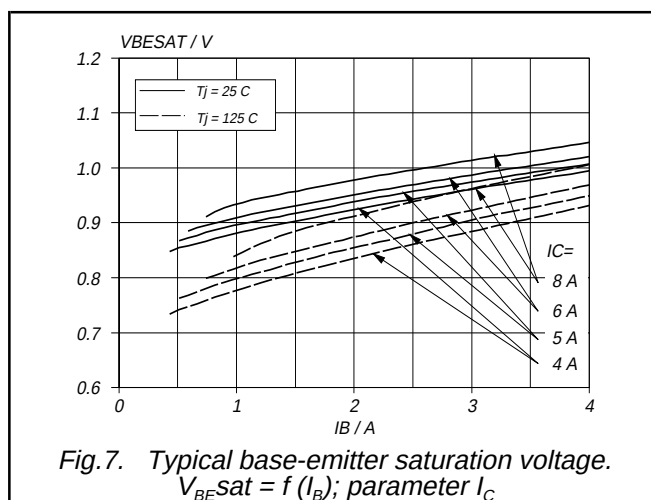
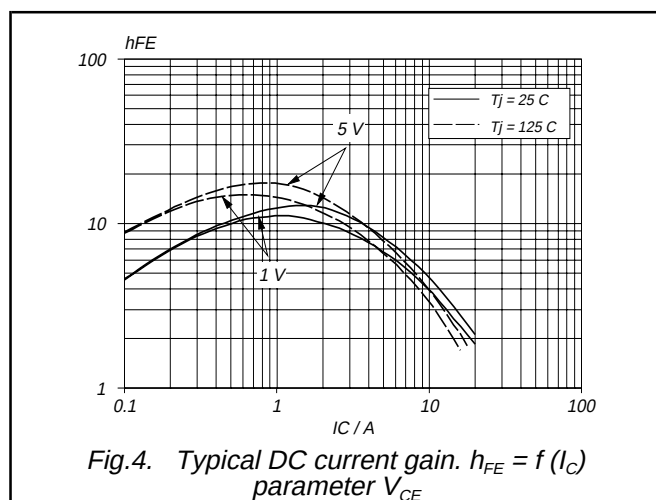
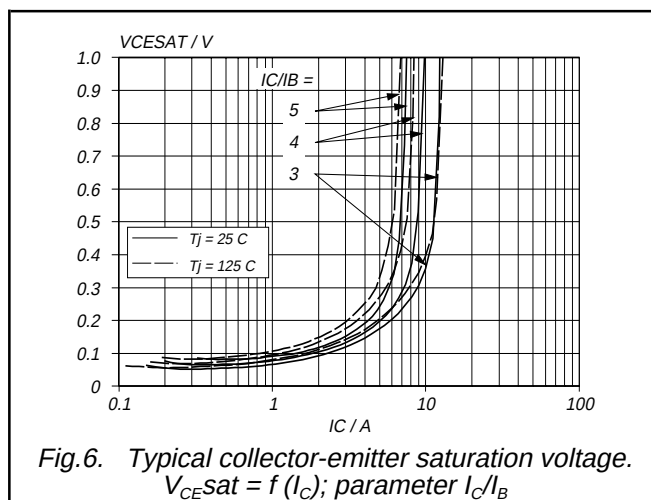
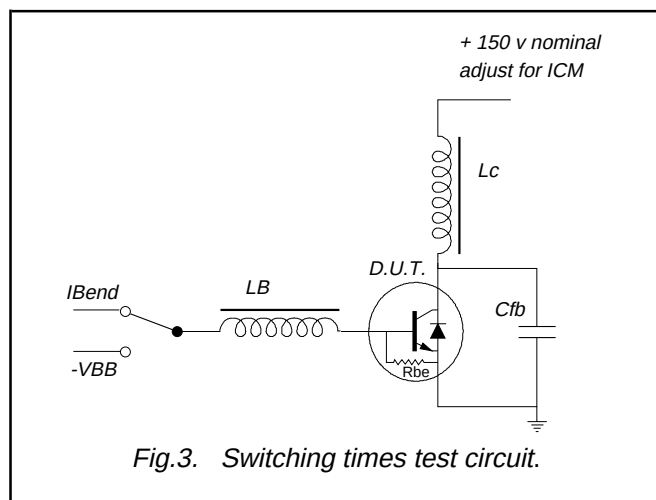


Fig.2. Switching times definitions.

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

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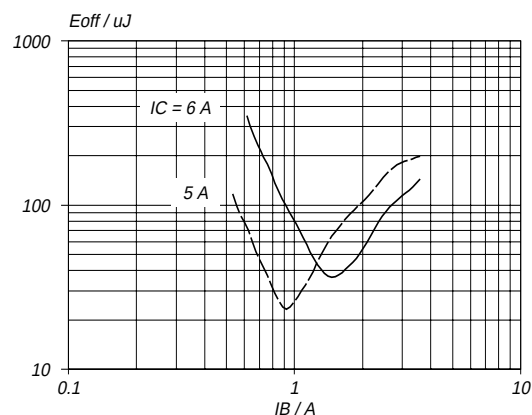


Fig.9. Typical turn-off losses. $T_j = 85^\circ\text{C}$
 $E_{\text{off}} = f(I_B)$; parameter I_C ; parameter frequency

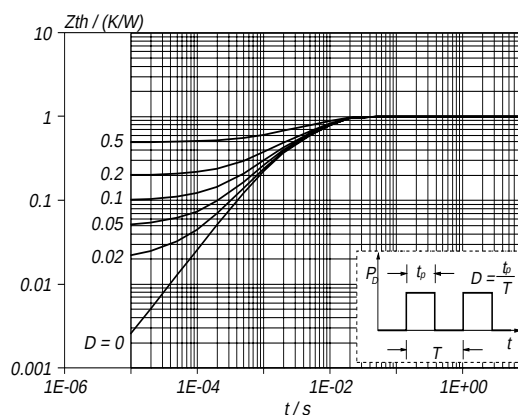


Fig.12. Transient thermal impedance.
 $Z_{\text{th } j\text{-mb}} = f(t)$; parameter $D = t_p/T$

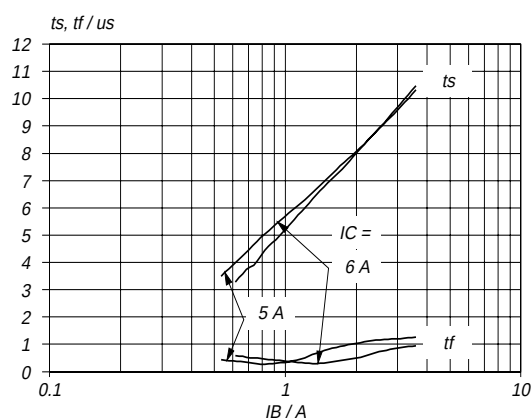


Fig.10. Typical collector storage and fall time.
 $t_s = f(I_B)$; $t_f = f(I_B)$; parameter I_C ; $T_j = 85^\circ\text{C}$; $f = 16\text{ kHz}$

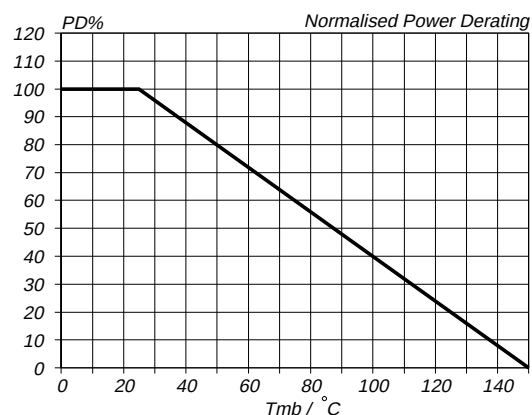


Fig.11. Normalised power dissipation.
 $PD\% = 100 \cdot P_D / P_{D 25^\circ\text{C}} = f(T_{mb})$

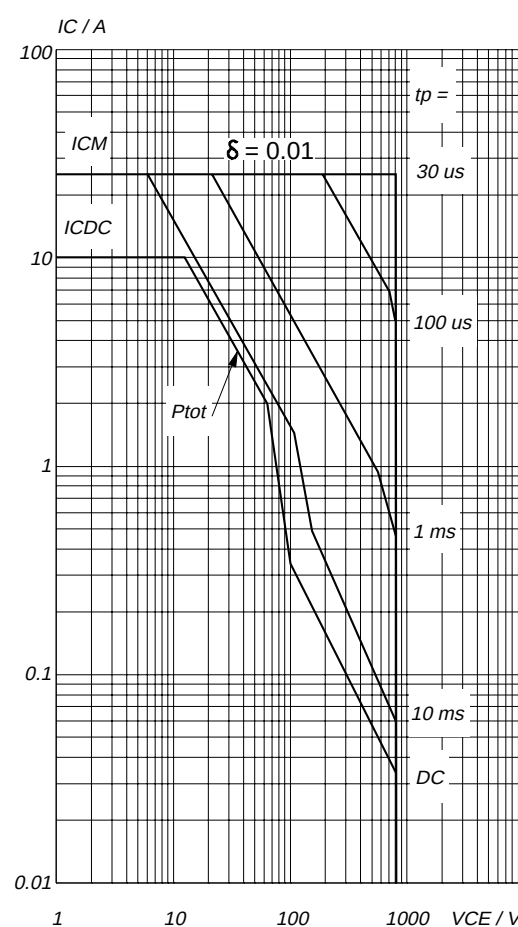


Fig.13. Forward bias safe operating area. $T_{mb} = 25^\circ\text{C}$
 $I_{\text{CDC}} \& I_{\text{CM}} = f(V_{\text{CE}})$; I_{CM} single pulse; parameter t_p
 Second-breakdown limits independent of temperature.

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MECHANICAL DATA

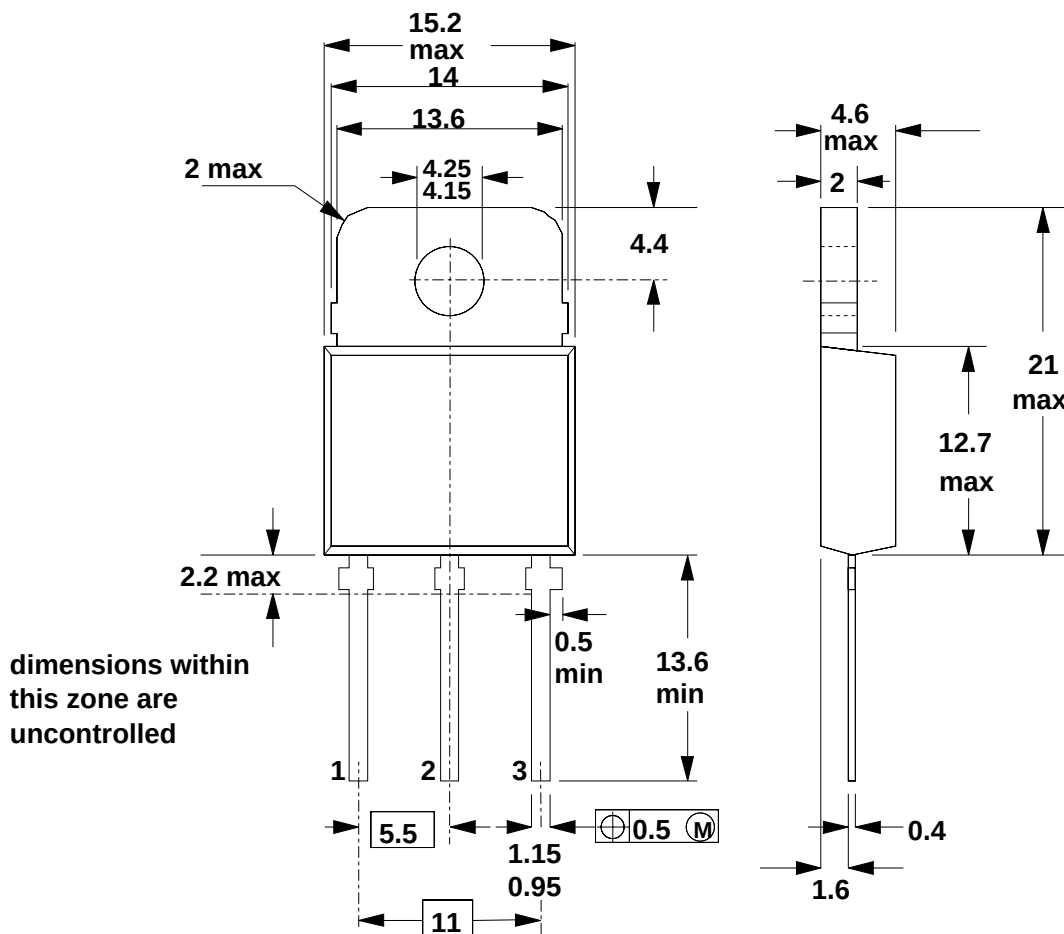
*Dimensions in mm**Net Mass: 5 g*

Fig.14. SOT93; pin 2 connected to mounting base.

Notes

1. Refer to mounting instructions for SOT93 envelope.
2. Epoxy meets UL94 V0 at 1/8".

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DEFINITIONS

Data sheet status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
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