SILICON POWER TRANSISTOR

N-P-N epitaxial-base power transistor in a plastic SOT-93 envelope for use in audio output stages and general amplifier and switching applications. P-N-P complement is TIP2955.

QUICK REFERENCE DATA

Collector-base voltage (open emitter)	V_{CBO}	max.	100 V
Collector-emitter voltage ($R_{BE} \leqslant 100\ \Omega$)	V_{CER}	max.	70 V
Collector current (d.c.)	I_C	max.	15 A
Total power dissipation up to $T_{mb} = 25\ ^oC$	P_{tot}	max.	100 W
D.C. current gain			
$V_{CE} = 4$ V; $I_C = 4$ A	h_{FE}		20 to 70
Collector-emitter saturation voltage			
$I_C = 4$ A; $I_B = 0{,}4$ A	V_{CEsat}	<	1,1 V
Transition frequency			
$V_{CE} = 10$ V; $I_C = 0{,}5$ A; f = 1 MHz	f_T	>	3 MHz

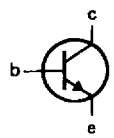
MECHANICAL DATA

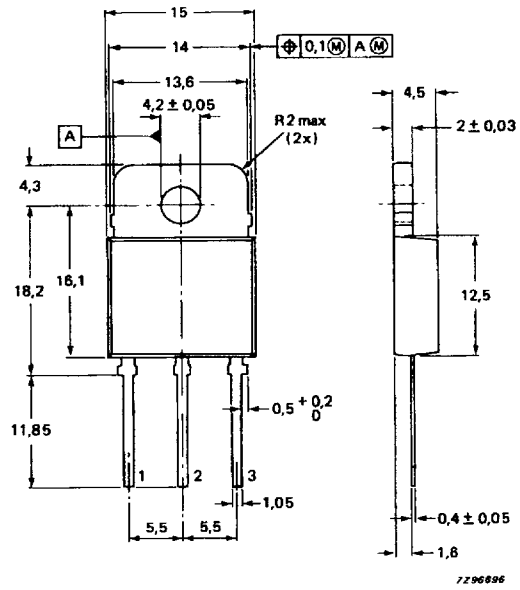
Dimensions in mm

Fig. 1 SOT-93.

Collector connected to mounting base.

Pinning
1 = base
2 = collector
3 = emitter





RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134).

Collector-base voltage (I_E = 0)	V_{CBO}	max.	100	V
Collector-emitter voltage ($R_{BE} \leqslant 100\ \Omega$)	V_{CER}	max.	70	V
Collector-emitter voltage (I_B = 0)	V_{CEO}	max.	60	V
Emitter-base voltage (I_C = 0)	V_{EBO}	max.	7	V
Collector current (d.c.)	I_C	max.	15	A
Base current (d.c.)	I_B	max.	7	A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.	100	W
Total power dissipation in free air	P_{tot}	max.	3,5	W
Storage temperature	T_{stg}	−65 to +	150	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,25	K/W
From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	35,7	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off currents				
V_{CE} = 100 V; $-V_{BE}$ = 1,5 V	I_{CEX}	<	5	mA
V_{CE} = 30 V; I_B = 0	I_{CEO}	<	0,7	mA
Emitter cut-off current				
V_{EB} = 7 V; I_C = 0	I_{EBO}	<	5	mA
Collector-emitter sustaining voltage				
I_C = 30 mA; I_B = 0	$V_{CEOsust}$	>	60	V
D.C. current gain				
V_{CE} = 4 V; I_C = 4 A	h_{FE}		20 to 70	
V_{CE} = 4 V; I_C = 10 A	h_{FE}	>	5	
Base-emitter voltage				
V_{CE} = 4 V; I_C = 4 A	V_{BE}	<	1,8	V
Collector-emitter saturation voltage				
I_C = 4 A; I_B = 0,4 A	V_{CEsat}	<	1,1	V
I_C = 10 A; I_B = 3,3 A	V_{CEsat}	<	3,0	V
Small-signal current gain				
V_{CE} = 10 V; I_C = 0,5 A; f = 1 kHz	h_{fe}	>	20	
Transition frequency				
V_{CE} = 10 V; I_C = 0,5 A; f = 1 MHz	f_T	>	3	MHz

Unclamped inductive load energy

$L = 20$ mH; $I_C = 2{,}5$ A

$E_{(BR)}$ > 62,5 mJ

Switching times (see Figs 2 and 3)

$I_C = 6$ A; $I_{Bon} = -I_{Boff} = 0{,}6$ A; $V_{CC} = 30$ V

turn-on time t_{on} typ. 0,6 μs

turn-off time t_{off} typ. 1,0 μs

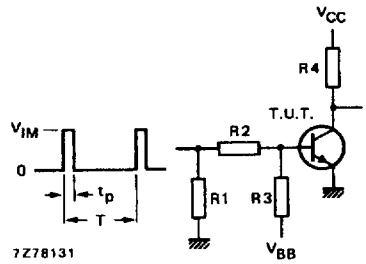


Fig. 2 Switching times test circuit.

V_{CC} = 30 V
V_{IM} = 24 V
V_{BB} = −4 V
R1 = 56 Ω
R2 = 24 Ω
R3 = 10 Ω
R4 = 5 Ω
$t_r = t_f$ = 15 ns
t_p = 10 μs
T = 500 μs

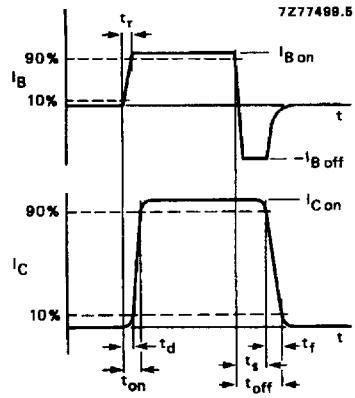


Fig. 3 Switching times waveforms.

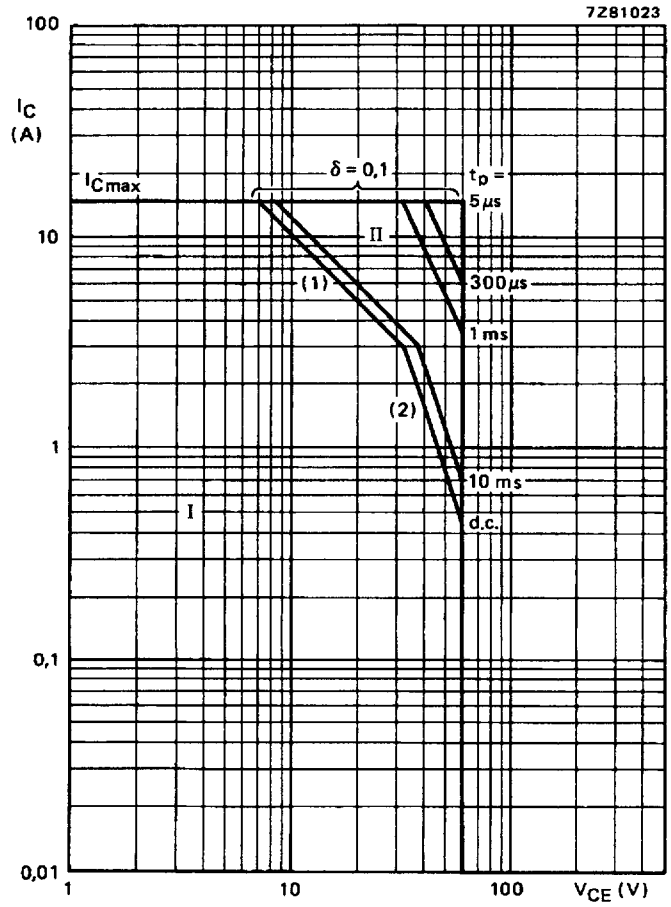


Fig. 4 Safe Operating Area ; T_{mb} = 25 °C.

I Region of permissible d.c. operation.
II Permissible extension for repetitive pulse operation.

(1) $P_{tot\ max}$ and $P_{peak\ max}$ lines.
(2) Second breakdown limits

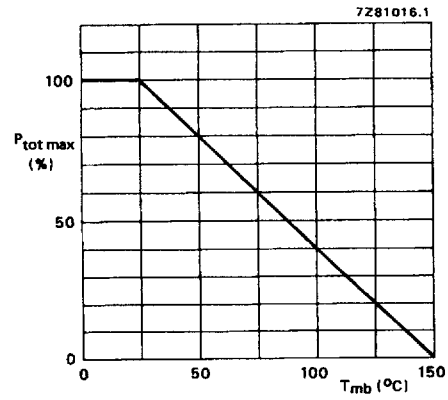


Fig. 5 Power derating curve.

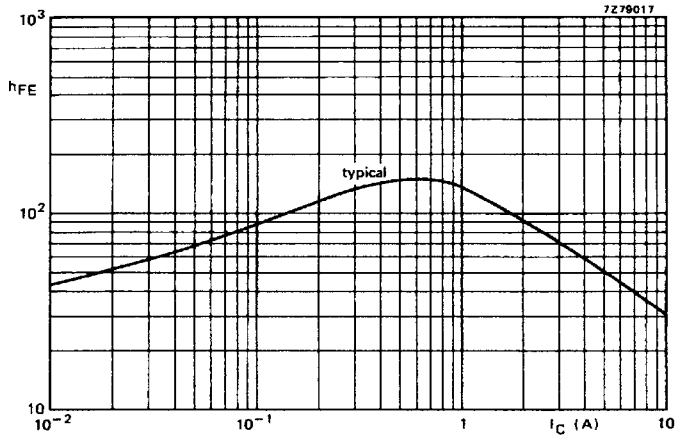


Fig. 6 V_{CE} = 4 V; T_j = 25 °C.