PHILIPS INTERNATIONAL 56E D 7110826 0043512 410 PHIN
T-33-19

SILICON POWER TRANSISTORS

P-N-P epitaxial-base power transistors in the plastic SOT-93 envelope. These transistors are intended for use in audio output stages and general amplifier and switching applications. N-P-N complements are TIP33, TIP33A, TIP33B and TIP33C.

QUICK REFERENCE DATA

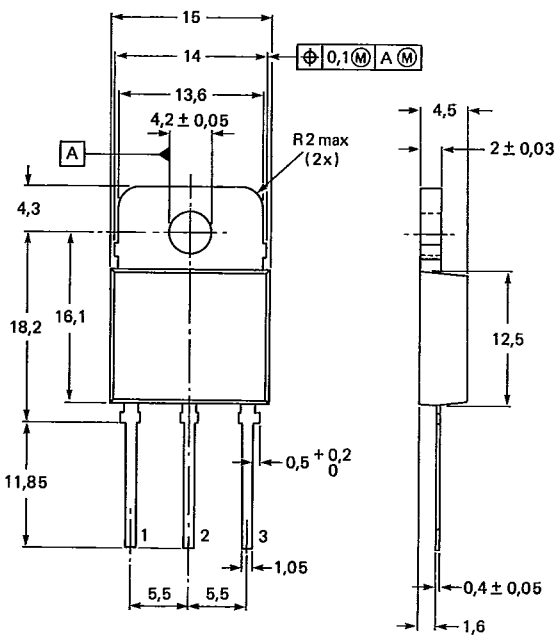
			TIP34	34A	34B	34C	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	80	100	120	140	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	40	60	80	100	V
Collector current (d.c.)	$-I_C$	max.		10			A
Collector current (peak value); $t_p \leqslant 0{,}3$ ms	$-I_{CM}$	max.		15			A
Power dissipation up to $T_{mb} = 25\ ^oC$	P_{tot}	max.		80			W
D.C. current gain							
$-V_{CE} = 4$ V; $-I_C = 3$ A	h_{FE}			20 to 100			
Collector-emitter saturation voltage							
$-I_C = 3$ A; $-I_B = 0{,}3$ A	$-V_{CEsat}$	<		1			V

MECHANICAL DATA

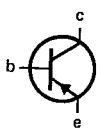
Dimensions in mm

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).

			TIP34	34A	34B	34C	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	80	100	120	140	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	40	60	80	100	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	5	5	V
Collector current (d.c.)	$-I_C$	max.			10		A
Collector current (peak value); $t_p \leq 0{,}3$ ms	$-I_{CM}$	max.			15		A
Base current (d.c.)	$-I_B$	max.			3		A
Total power dissipation up to $T_{mb} = 25$ °C	P_{tot}	max.			80		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

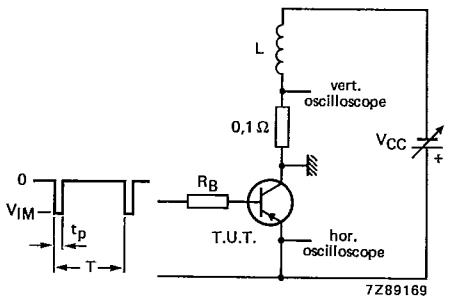
From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,56	K/W
From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	35,7	K/W

CHARACTERISTICS

$T_j = 25$ °C unless otherwise specified

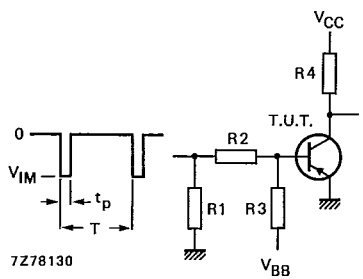
Collector cut-off currents					
$-V_{CE} = -V_{CBOmax}$; $V_{BE} = 0$		$-I_{CES}$	<	0,4	mA
$-V_{CE} = 30$ V; $I_B = 0$	TIP34	$-I_{CEO}$	<	0,2	mA
	TIP34A	$-I_{CEO}$	<	0,2	mA
$-V_{CE} = 60$ V; $I_B = 0$	TIP34B	$-I_{CEO}$	<	0,2	mA
	TIP34C	$-I_{CEO}$	<	0,2	mA
Emitter cut-off current					
$-V_{EB} = 5$ V; $I_C = 0$		$-I_{EBO}$	<	0,1	mA
Collector-emitter sustaining voltage					
$-I_C = 30$ mA; $I_B = 0$	TIP34	$-V_{CEOsust}$	>	40	V
	TIP34A	$-V_{CEOsust}$	>	60	V
	TIP34B	$-V_{CEOsust}$	>	80	V
	TIP34C	$-V_{CEOsust}$	>	100	V
D.C. current gain					
$-V_{CE} = 4$ V; $-I_C = 1$ A		h_{FE}	>	40	
$-V_{CE} = 4$ V; $-I_C = 3$ A		h_{FE}		20 to 100	
Base-emitter voltage					
$-V_{CE} = 4$ V; $-I_C = 3$ A		$-V_{BE}$	<	1,6	V
$-V_{CE} = 4$ V; $-I_C = 10$ A		$-V_{BE}$	<	3	V

Collector-emitter saturation voltage				
$-I_C$ = 3 A; $-I_B$ = 0,3 A	$-V_{CEsat}$	<	1	V
$-I_C$ = 10 A; $-I_B$ = 2,5 A	$-V_{CEsat}$	<	4	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
Turn-off breakdown energy (see Fig. 2)				
L = 20 mH; $-I_C$ = 2,5 A	$E_{(BR)}$	>	62,5	mJ
Switching times (see Figs 3 and 4)				
$-I_C$ = 6 A; $-I_{Bon}$ = + I_{Boff} = 0,6 A; $-V_{CC}$ = 30 V				
turn-on time	t_{on}	typ.	0,4	μs
turn-off time	t_{off}	typ.	0,7	μs



$-V_{IM}$ = 12 V
R_B = 270 Ω
L = 20 mH
$-I_{CC}$ = 2,5 A
t_p = 1 ms
δ = 1 %

Fig. 2 Test circuit for turn-off breakdown energy.



$-V_{IM}$ = 47 V
$-V_{CC}$ = 30 V
V_{BB} = 4 V
R1 = 56 Ω
R2 = 39 Ω
R3 = 10 Ω
R4 = 5 Ω
$t_r = t_f$ = 15 ns
t_p = 10 μs
T = 500 μs

Fig. 3 Switching times test circuit.

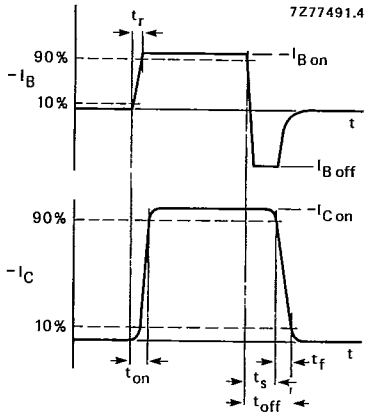


Fig. 4 Switching times waveforms.

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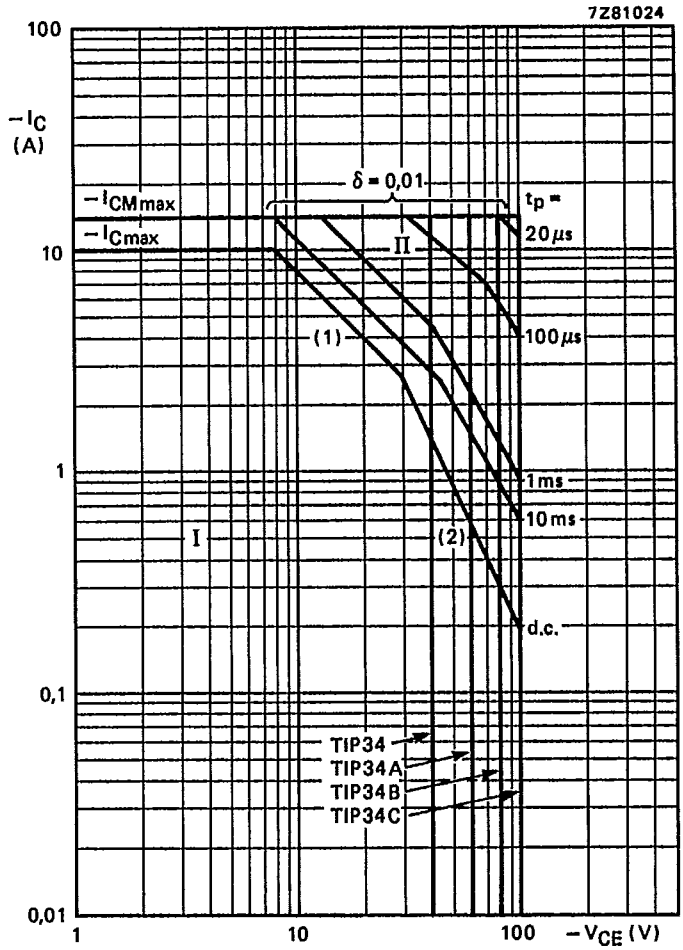

Fig. 5 Safe Operating Area at T_{mb} = 25 °C.

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

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

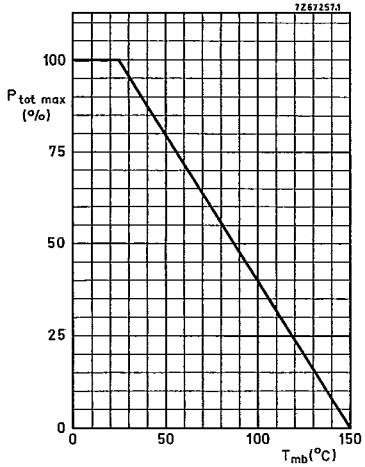

Fig. 6 Power derating curve.

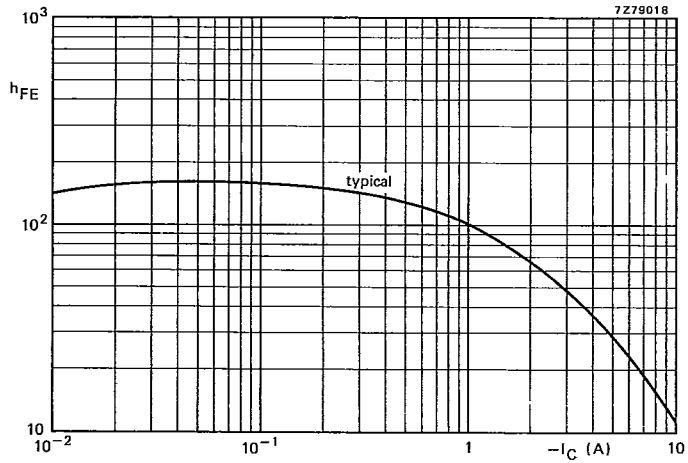

Fig. 7 $-V_{CE}$ = 4 V; T_j = 25 °C.

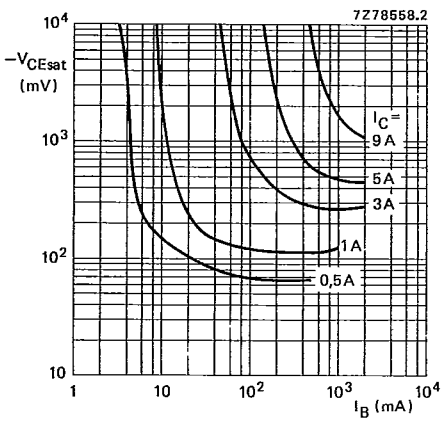

Fig. 8 Typical collector-emitter saturation voltage. T_j = 25 °C.