

SILICON EPITAXIAL-BASE POWER TRANSISTORS T-33-19

P-N-P transistors in a SOT-32 plastic envelope intended for use in television and audio amplifier circuits where high peak powers can occur. N-P-N complements are BD233, BD235 and BD237. Matched pairs can be supplied.

QUICK REFERENCE DATA

			BD234	BD236	BD238	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	45	60	100	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	45	60	80	V
Collector-emitter voltage ($R_{BE} = 1 \text{ k}\Omega$)	$-V_{CER}$	max.	45	60	100	V
Collector current (d.c.)	$-I_C$	max.	2		A	
Total power dissipation up to $T_{mb} = 25 \text{ }^\circ\text{C}$	P_{tot}	max.	25		W	
Junction temperature	T_j	max.	150		$^\circ\text{C}$	
D.C. current gain $-I_C = 1 \text{ A}; -V_{CE} = 2 \text{ V}$	h_{FE}	>	25			
Transition frequency $-I_C = 250 \text{ mA}; -V_{CE} = 10 \text{ V}$	f_T	>	3		MHz	

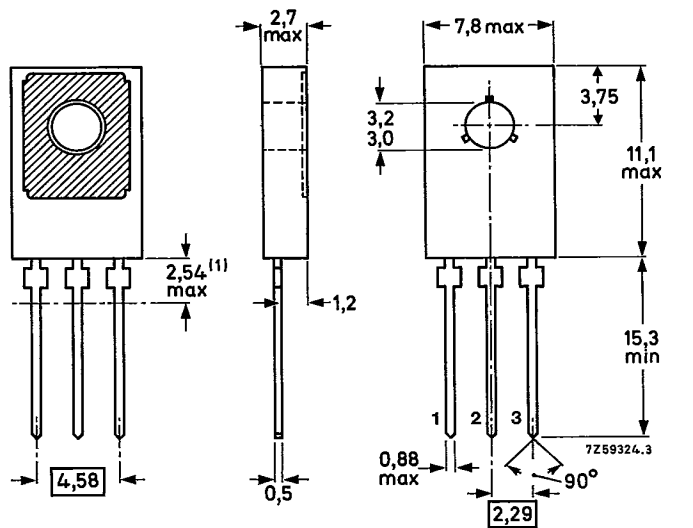
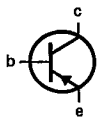
MECHANICAL DATA

Fig. 1 TO-126 (SOT-32)

Collector connected to metal part of mounting surface

Pinning

- 1 = emitter
- 2 = collector
- 3 = base



1) Within this region the cross-section of the leads is uncontrolled.

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

			BD234	BD236	BD238	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	45	60	100	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	45	60	80	V
Collector-emitter voltage ($R_{BE} = 1 \text{ k}\Omega$)	$-V_{CER}$	max.	45	60	100	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	5	V

Collector current (d. c.)	$-I_C$	max.	2			A
Collector current (peak value)	$-I_{CM}$	max.	6			A

Total power dissipation up to $T_{mb} = 25 \text{ }^\circ\text{C}$	P_{tot}	max.	25			W
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Storage temperature	T_{stg}		-65 to +150			$^\circ\text{C}$
Junction temperature	T_j	max.	150			$^\circ\text{C}$

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th \text{ j-a}}$	=	100			K/W
From junction to mounting base	$R_{th \text{ j-mb}}$	=	5			K/W

CHARACTERISTICS

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

Collector cut-off current						
$I_E = 0; -V_{CB} = -V_{CBOmax}$	$-I_{CBO}$	<	50			μA
$I_E = 0; -V_{CB} = -V_{CBOmax}; T_j = 150 \text{ }^\circ\text{C}$	$-I_{CBO}$	<	1			mA
Emitter cut-off current						
$I_C = 0; -V_{EB} = 5 \text{ V}$	$-I_{EBO}$	<	0,2			mA

CHARACTERISTICS (continued)

$T_j = 25\text{ }^\circ\text{C}$

Base-emitter voltage

$-I_C = 1\text{ A}; -V_{CE} = 2\text{ V}$

$-V_{BE} < 1,3\text{ V}$

Saturation voltage

$-I_C = 1\text{ A}; -I_B = 0,1\text{ A}$

$-V_{CEsat} < 0,6\text{ V}$

D.C. current gain

$-I_C = 150\text{ mA}; -V_{CE} = 2\text{ V}$

$h_{FE} \quad 40\text{ to }250$

$-I_C = 1\text{ A}; -V_{CE} = 2\text{ V}$

$h_{FE} > 25$

Transition frequency at $f = 1\text{ MHz}$

$-I_C = 250\text{ mA}; -V_{CE} = 10\text{ V}$

$f_T > 3\text{ MHz}$

D.C. current gain ratio of matched pairs

BD233/BD234; BD235/BD236; BD237/BD238

$|I_C| = 150\text{ mA}; |V_{CE}| = 2\text{ V}$

$h_{FE1}/h_{FE2} < 1,6$

Switching times

$-I_{Con} = 1\text{ A}; -I_{Bon} = I_{Boff} = 0,1\text{ A}$

turn-on time

$t_{on} \quad \text{typ} \quad 0,3\text{ }\mu\text{s}$

turn-off time

$t_{off} \quad \text{typ} \quad 0,7\text{ }\mu\text{s}$

T-33-19

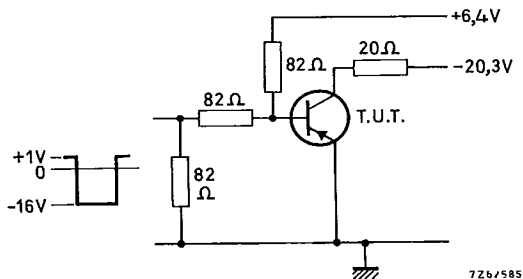


Fig. 2 Switching times test circuit.

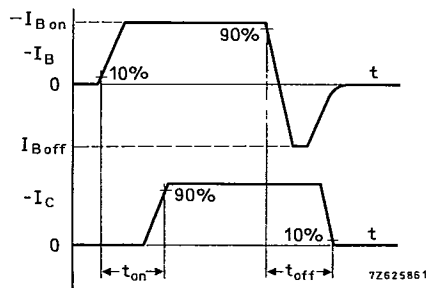


Fig. 3 Switching times waveforms.

Input pulse:

$t_r = t_f = 15\text{ ns}$

$t_p = 10\text{ }\mu\text{s}$

$T = 500\text{ }\mu\text{s}$

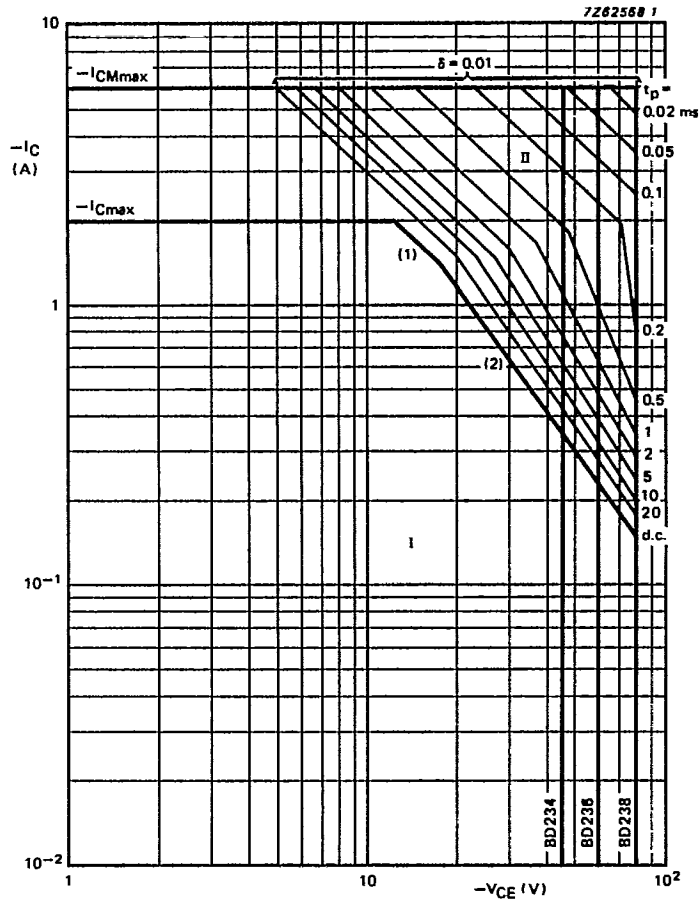
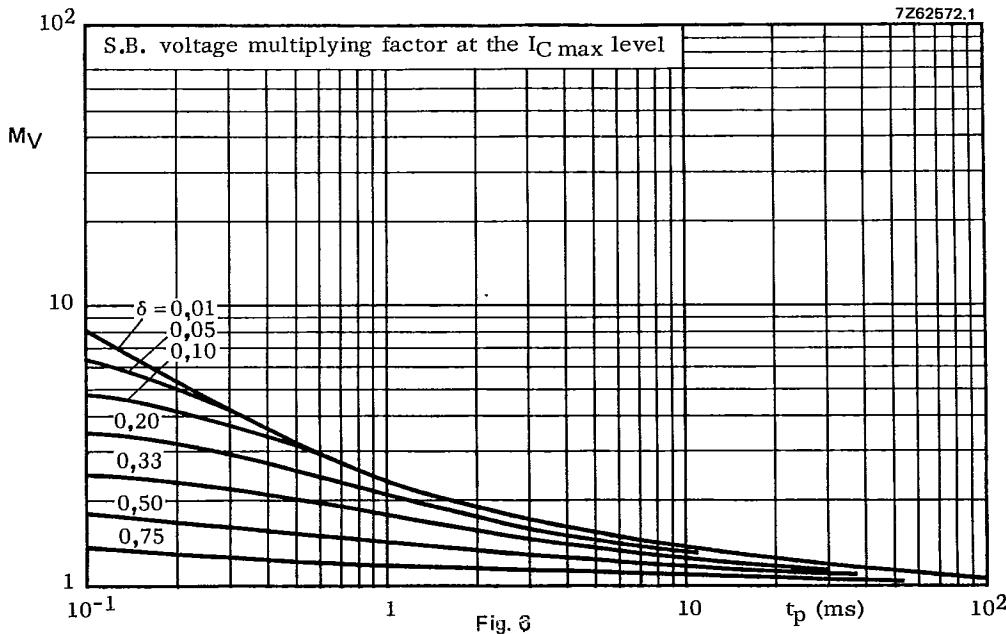
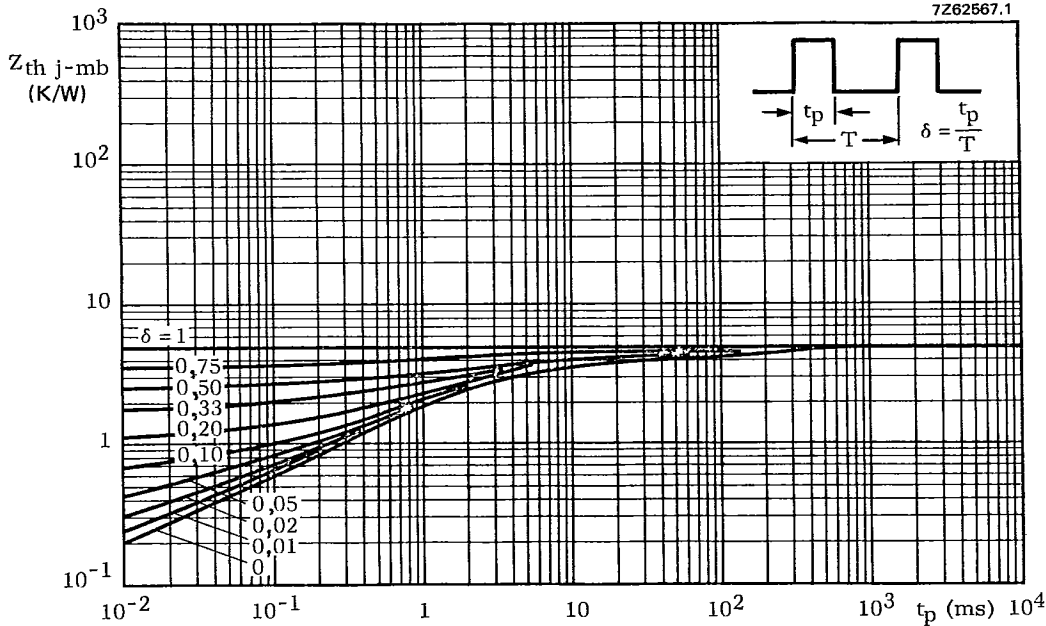


Fig. 4 Safe Operating Area; $T_{mb} = 25\text{ }^{\circ}\text{C}$.

- 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.



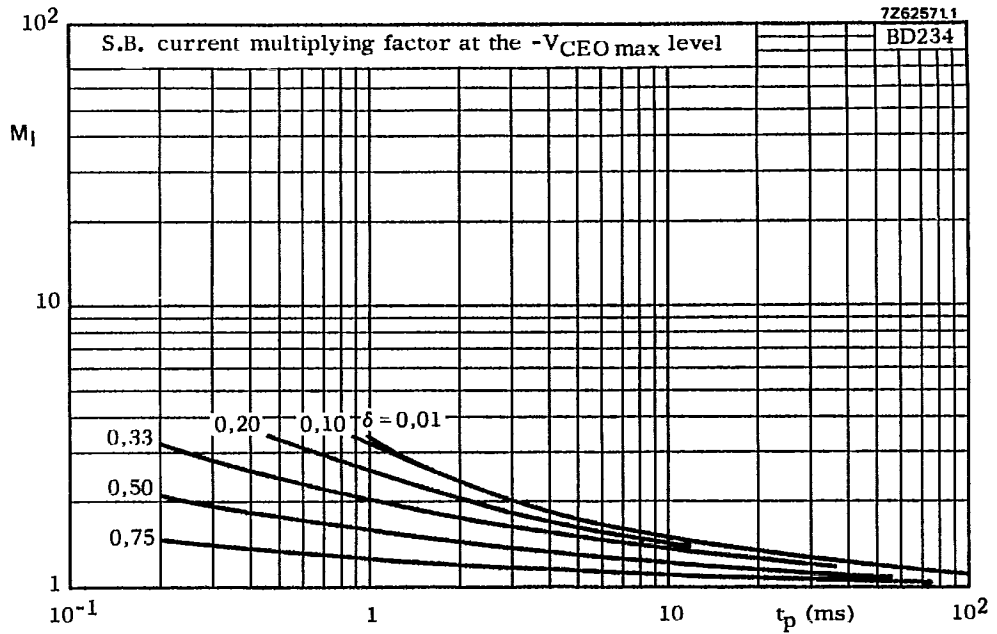


Fig. 7

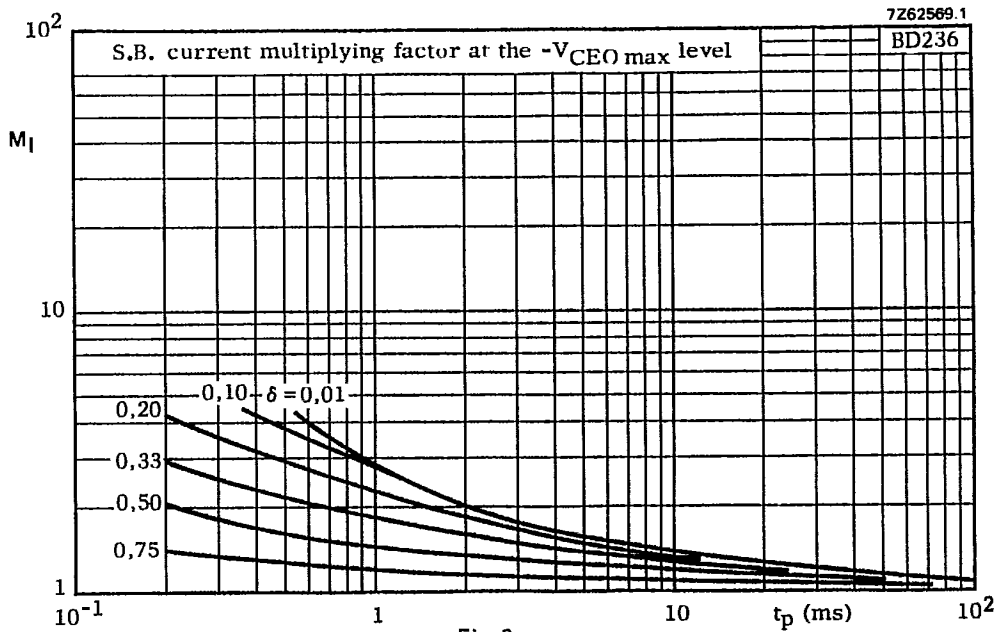
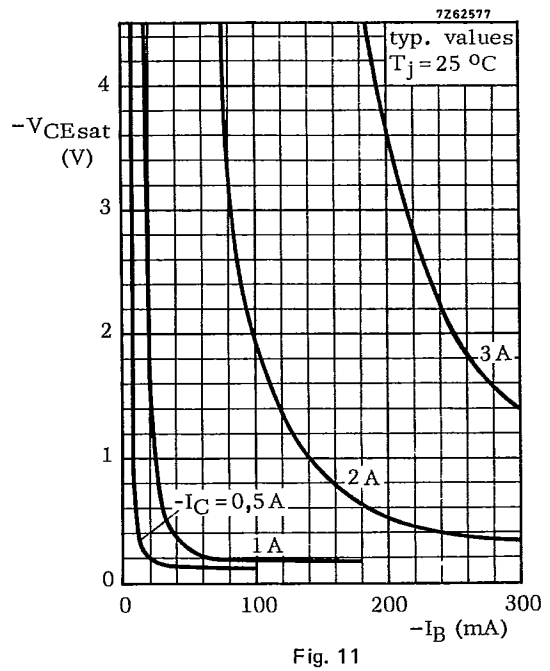
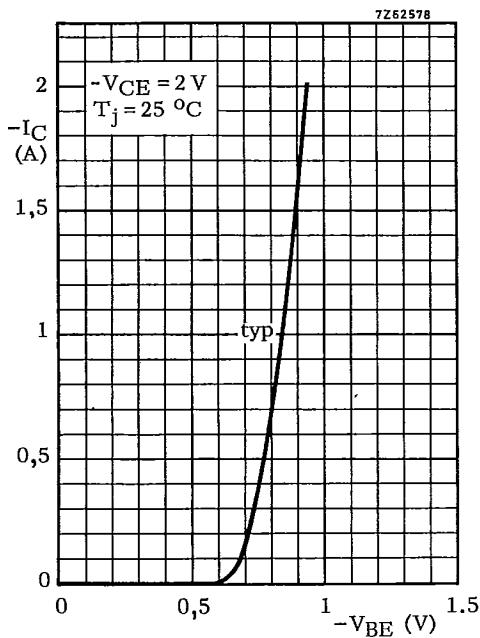
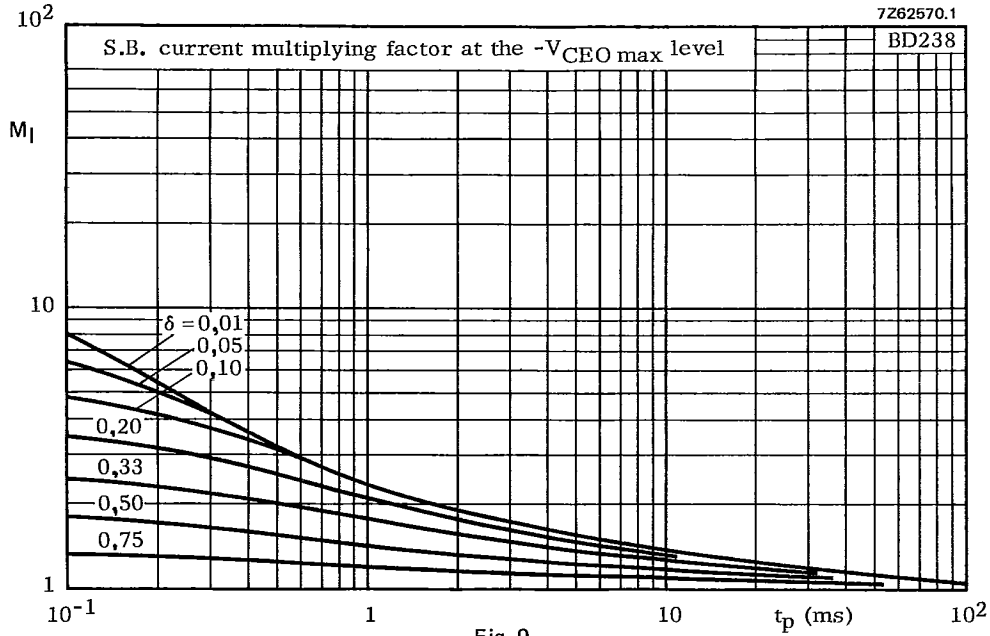


Fig. 8



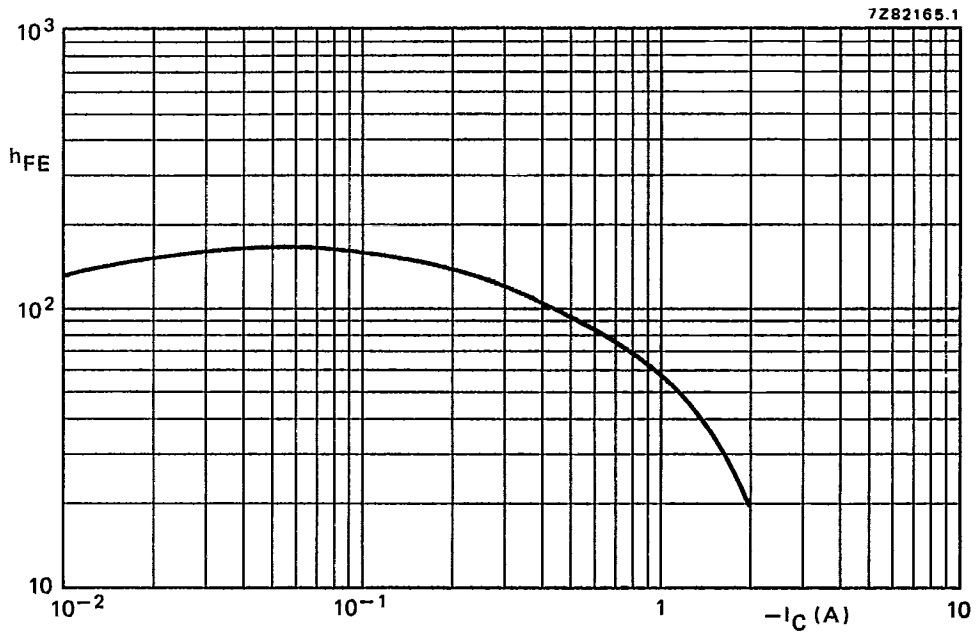


Fig. 12 Typical static forward current transfer ratio as a function of the collector current.
 $-V_{CE} = 2 \text{ V}; T_j \leq 25 \text{ }^\circ\text{C}.$