

SILICON EPITAXIAL-BASE POWER TRANSISTOR

PNP transistor in a SOT32 plastic envelope intended for use in audio output and general purpose amplifier applications. BD720 is equivalent to BD440. NPN complements are BD719; 721; 723 and BD724.

QUICK REFERENCE DATA

			BD720	BD722	BD724	BD726
Collector-base voltage	$-V_{CBO}$	max.	60	80	100	120 V
Collector-emitter voltage	$-V_{CEO}$	max.	60	80	100	120 V
Emitter-base voltage	$-V_{EBO}$	max.	5	5	5	5 V
Collector current (DC) (peak value)	$-I_C$	max.	4	4	4	4 A
	$-I_{CM}$	max.	7	7	7	7 A
Junction temperature	T_j	max.	150	150	150	150 °C
DC current gain $I_C = -2 \text{ A}; V_{CE} = -4 \text{ V}$	h_{FE}	min.	20	20	20	20
	Transition frequency $I_C = -0,5 \text{ A}; V_{CE} = -4 \text{ V}$	f_T	min.	3	3	3

MECHANICAL DATA

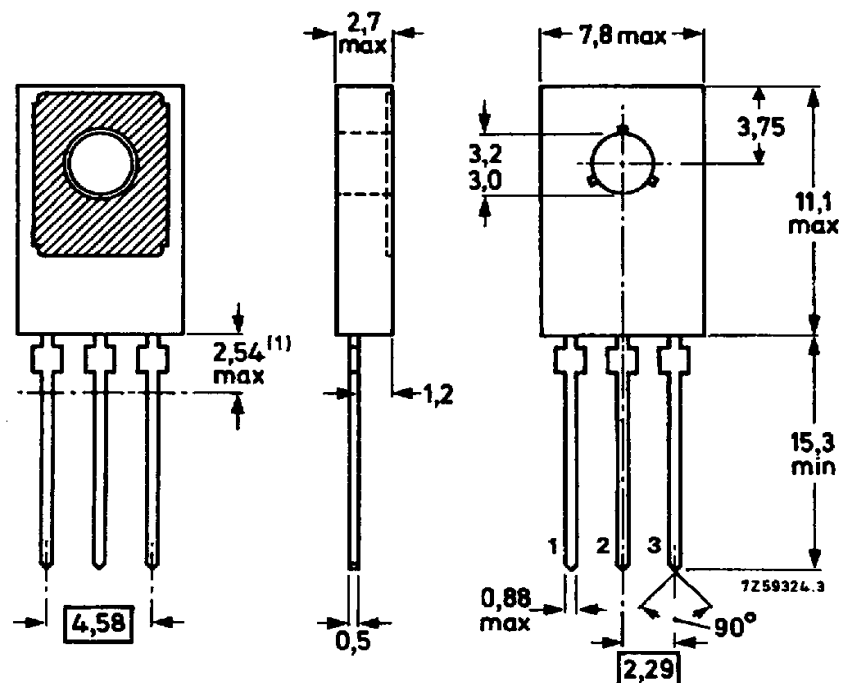
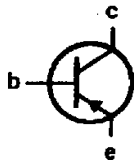
Dimensions in mm

Fig. 1 TO-126 (SOT32).

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)

			BD720	BD722	BD724	BD726
Collector-base voltage (open emitter)	$-V_{CB0}$	max.	60	80	100	120 V
Collector-emitter voltage	$-V_{CEO}$	max.	60	80	100	120 V
Emitter-base voltage	$-V_{EBO}$	max.	5	5	5	5 V
Collector current						
DC value	$-I_C$	max.		4		A
peak value	$-I_{CM}$	max.		7		A
Base current (DC)	$-I_B$	max.		1		A
Total power dissipation up to $T_{mb} = 25\text{ }^\circ\text{C}$	P_{tot}	max.		36		W
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	$R_{th\ j-a}$	max.		100		K/W
From junction to mounting base	$R_{th\ j-mb}$	max.		3.5		K/W

CHARACTERISTICS

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

			BD720	BD722	BD724	BD726
Collector cut-off current						
$I_E = 0; -V_{CB} = -V_{CB0}$	$-I_{CBO}$	max.	50	50	50	50 μA
$I_E = 0; -V_{CB} = -\frac{1}{2} V_{CB0}$	$-I_{CBO}$	max.	1	1	1	1 mA
$T_j = 150\text{ }^\circ\text{C}; I_B = 0; -V_{CE} = -\frac{1}{2} V_{CEO}$	$-I_{CEO}$	max.	0.1	0.1	0.1	0.1 mA
Emitter cut-off current						
$I_C = 0; -V_{EB} = 5\text{ V}$	$-I_{EBO}$	max.	0.2	0.2	0.2	0.2 mA
DC current gain (1)						
$-I_C = 0.5\text{ A}; -V_{CE} = 4\text{ V}$	h_{FE}	min.	40	40	40	40
$-I_C = 2\text{ A}; -V_{CE} = 4\text{ V}$	h_{FE}	min.	20	20	20	20
Base-emitter voltage (1) (2)						
$-I_C = 2\text{ A}; -V_{CE} = 4\text{ V}$	$-V_{BE}$	max.	1.4	1.4	1.4	1.4 V
Collector-emitter saturation voltage (1)						
$-I_C = 2\text{ A}; -I_B = 0.2\text{ A}$	$-V_{CEsat}$	max.	1	1	1	1 V

(1) $t_p = 300\text{ }\mu\text{s}; \delta < 2\%$.

(2) V_{BE} decreases by about 2.3 mV/K with increasing temperature.

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

$-I_C = 0.5 \text{ A}; -V_{CE} = 4 \text{ V}$

f_t min. 3 3 3 3 MHz

Switching times

$-I_{Con} = 1 \text{ A};$

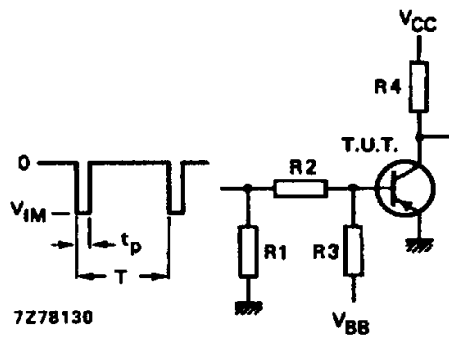
$-I_{Bon} = I_{Boff} = 0.1 \text{ A}$

Turn-on time

t_{on} typ. 0.1 0.1 0.1 0.1 μs

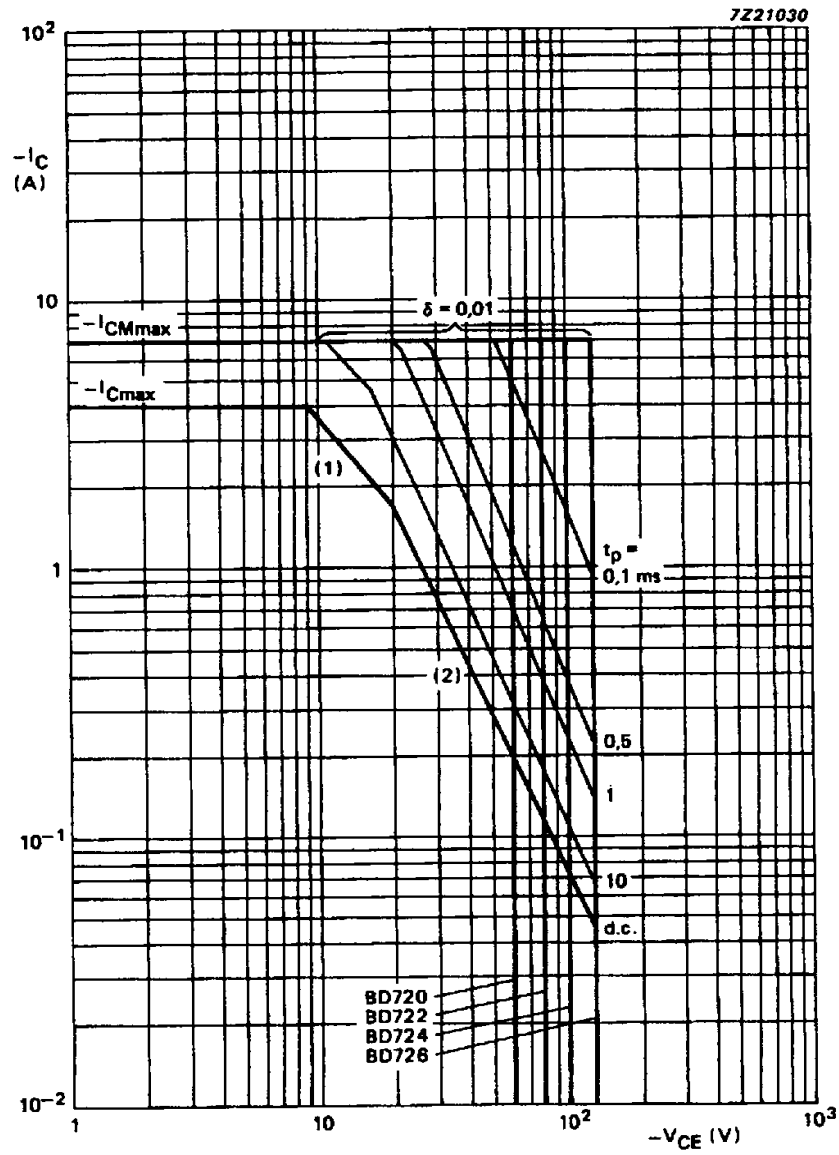
Turn-off time

t_{off} typ. 0.4 0.4 0.4 0.4 μs



- $-V_{IM} = 30 \text{ V}$
- $-V_{CC} = 20 \text{ V}$
- $+V_{BB} = 3.5 \text{ V}$
- $R1 = 82 \Omega$
- $R2 = 150 \Omega$
- $R3 = 39 \Omega$
- $R4 = 20 \Omega$
- $t_r = t_f = 15 \text{ ns}$
- $t_p = 10 \mu\text{s}$
- $T = 500 \mu\text{s}$

Fig. 2 Switching times test circuit.



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Fig. 3 Safe Operating Area, $T_{mb} = 25\text{ }^{\circ}\text{C}$.

- (1) P_{tot} max line.
- (2) Second-breakdown limits.

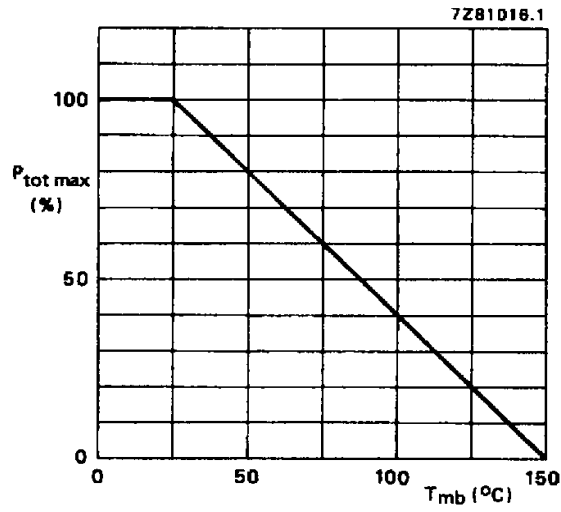


Fig. 4 Power derating curve.

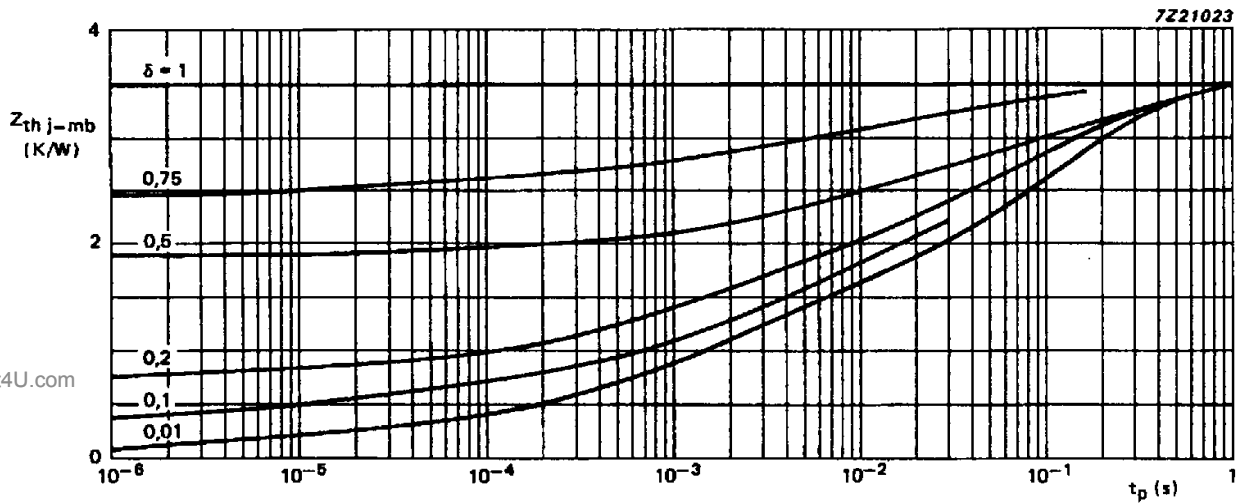


Fig. 5 Pulse power rating chart.

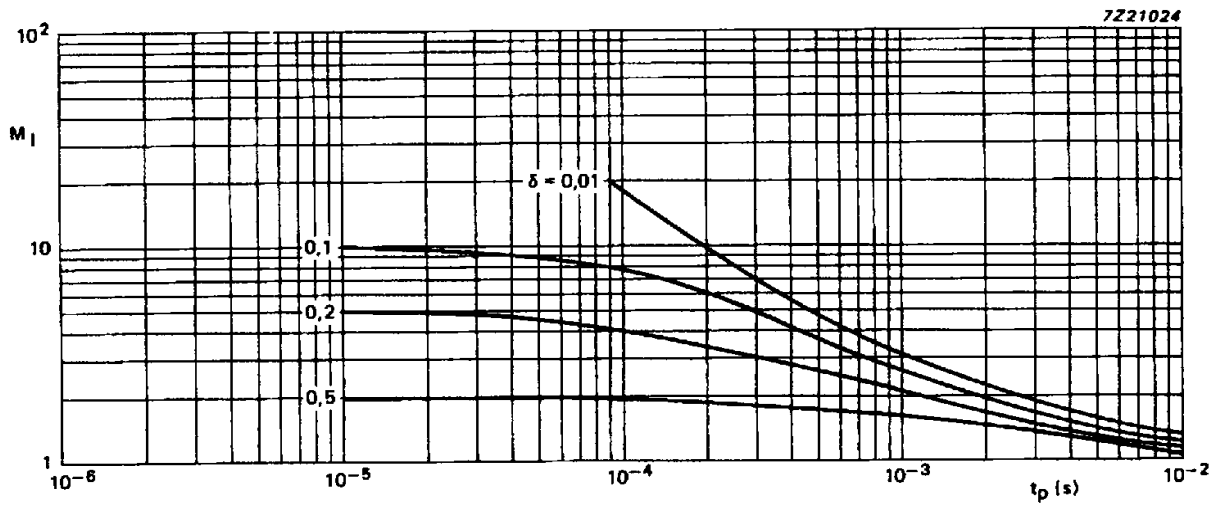


Fig. 6 Second breakdown current multiplying factor at V_{CEO} max level.

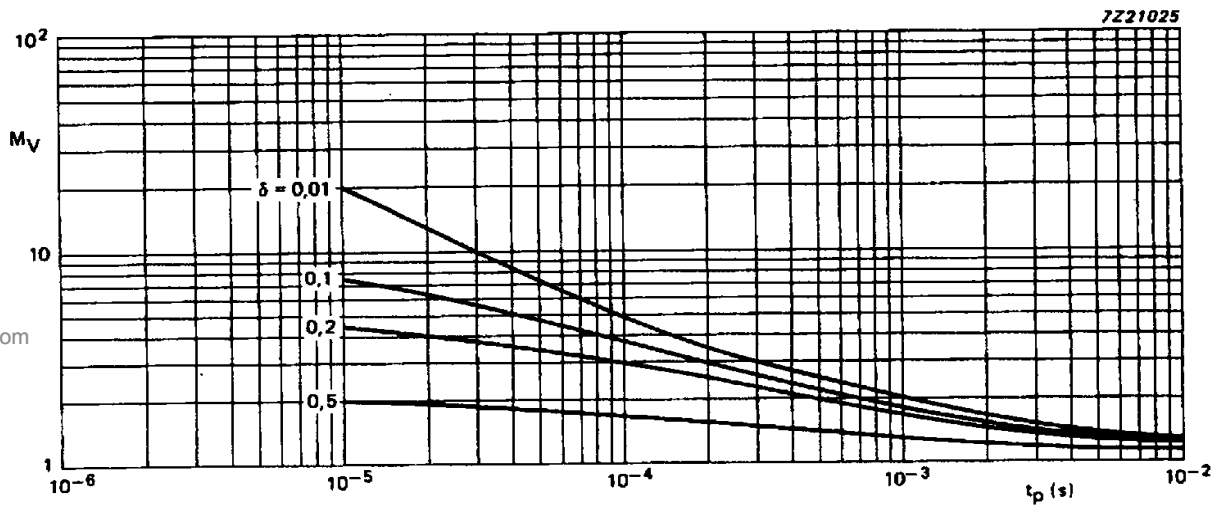


Fig. 7 Second breakdown voltage multiplying factor at I_C max level.

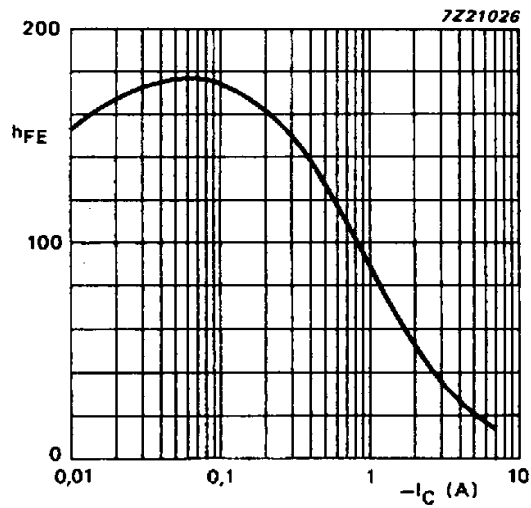


Fig. 8 Typical DC current gain. $T_j = 25\text{ }^\circ\text{C}$; $V_{CE} = 4\text{ V}$.

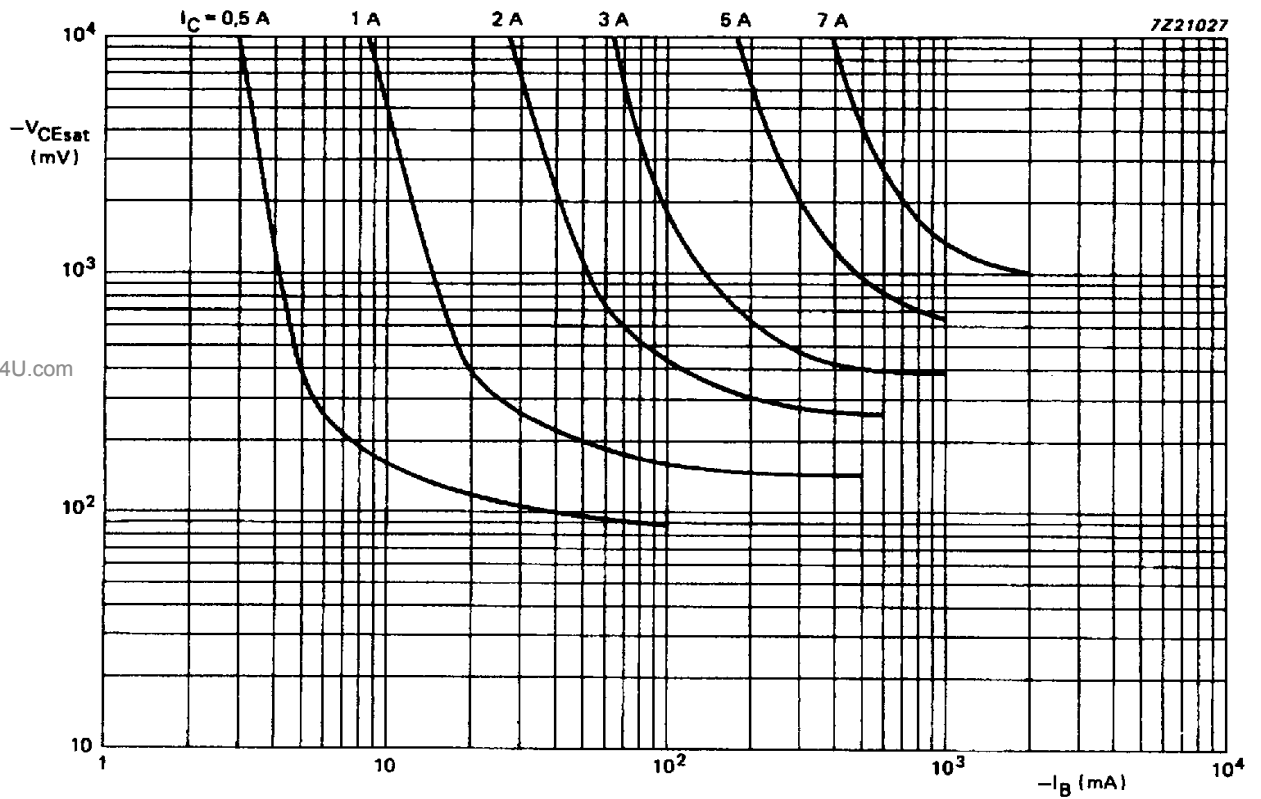


Fig. 9 Typical values collector-emitter saturation. $T_j = 25\text{ }^\circ\text{C}$.

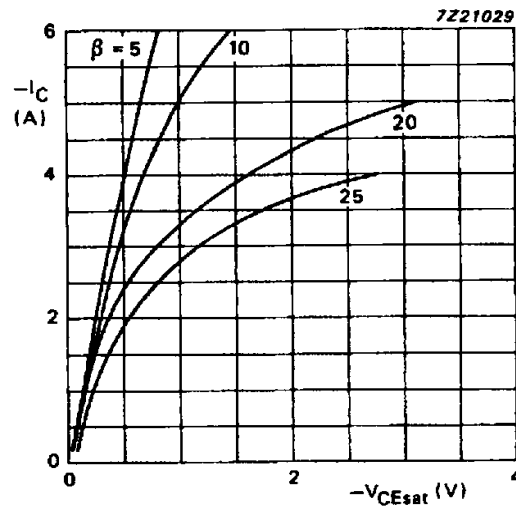


Fig. 10 Typical collector-emitter saturation voltage versus collector current (h_{FE} constant). $T_j = 25^\circ\text{C}$.

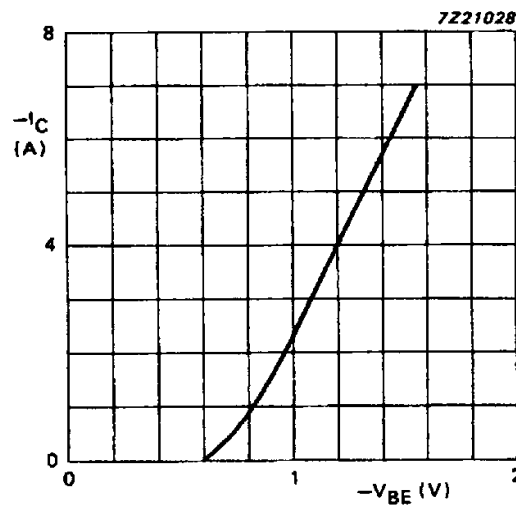


Fig. 11 Collector current. $V_{CE} = 4\text{ V}$; $T_j = 25^\circ\text{C}$.