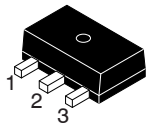
Bipolar Transistor

(–)50 V, (–)2 A, Low VCE(sat), (PNP)NPN Single PCP

2SB1123/2SD1623



1: Base
2: Collector
3: Emitter

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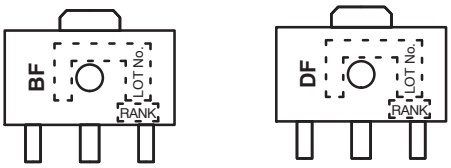
Features

- Adoption of FBET, MBIT Processes
- Large Current Capacity and Wide ASO
- The Ultraminiature Package Facilitates Higher−density Mounting, Thus Allows the Applied Hybrid IC's Further Miniaturization
- Low Collector−to−Emitter Saturation Voltage
- Fast Switching Speed
- These are Pb−Free Devices

Applications

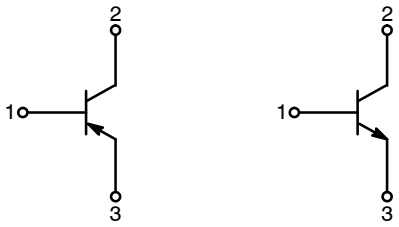
- Voltage Regulators, Relay Drivers, Lamp Drivers, Electrical Equipment

MARKING DIAGRAMS



2SB1123 2SD1623

ELECTRICAL CONNECTION



2SB1123 2SD1623

ABSOLUTE MAXIMUM RATINGS (at Ta = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Collector−to−Base Voltage	V_{CBO}		(–)60	V
Collector−to−Emitter Voltage	V_{CEO}		(–)50	V
Emitter−to−Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)2	A
Collector Current (Pulse)	I_{CP}		(–)4	A
Collector Dissipation	P_C		0.5	W
		When mounted on ceramic substrate (250 mm^2 x 0.8 mm)	1.3	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
NOTE: Specifications ( ): 2SB1123

ORDERING INFORMATION

Device	Package	Shipping†
2SB1123S−TD−E	PCP (Pb−Free)	1,000 / Tape & Reel
2SB1123T−TD−E	PCP (Pb−Free)	1,000 / Tape & Reel
2SD1623S−TD−E	PCP (Pb−Free)	1,000 / Tape & Reel
2SD1623T−TD−E	PCP (Pb−Free)	1,000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS (at Ta = 25°C)

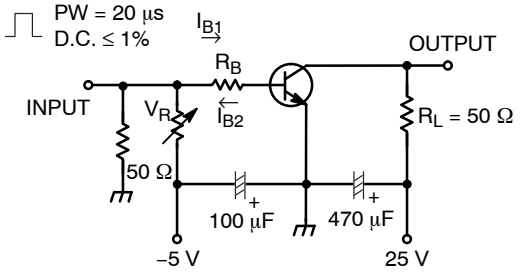
Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	V_{CB} = (–)50 V, I_E = 0 A	–	–	(–)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB} = (–)4 V, I_C = 0 A	–	–	(–)100	nA
DC Current Gain	$h_{FE}1$	V_{CE} = (–)2 V, I_C = (–)100 mA	100*	–	560*	–
	$h_{FE}2$	V_{CE} = (–)2 V, I_C = (–)1.5 A	40	–	–	–
Gain–Bandwidth Product	f_T	V_{CE} = (–)10 V, I_C = (–)50 mA	–	150	–	MHz
Output Capacitance	Cob	V_{CB} = (–)10 V, f = 1 MHz	–	(22)12	–	pF
Collector–to–Emitter Saturation Voltage	V_{CE}(sat)	I_C = (–)1 A, I_B = (–)50 mA	–	(–0.3)0.15	(–0.7)0.4	V
Base–to–Emitter Saturation Voltage	V_{BE}(sat)	I_C = (–)1 A, I_B = (–)50 mA	–	(–)0.9	(–)1.2	V
Collector–to–Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = (–)10 μA, I_E = 0 A	(–)60	–	–	V
Collector–to–Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = (–)1 mA, R_{BE} = ∞	(–)50	–	–	V
Emitter–to–Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = (–)10 μA, I_C = 0 A	(–)6	–	–	V
Turn–ON Time	t_{on}	See specified Test Circuit.	–	(60)60	–	ns
Storage Time	t_{stg}		–	(450)550	–	ns
Fall Time	t_f		–	(30)30	–	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
NOTE: Specifications ( ): 2SB1123
*The 2SB1123/2SD1623 are classified by 100 mA h_{FE} as follows :

Table 1.

Rank	R	S	T	U
h_{FE}	100 to 200	140 to 280	200 to 400	280 to 560

Switching Time Test Circuit



I_C = 10 I_{B1} = –10 I_{B2} = 500 mA
(For PNP, the polarity is reversed)

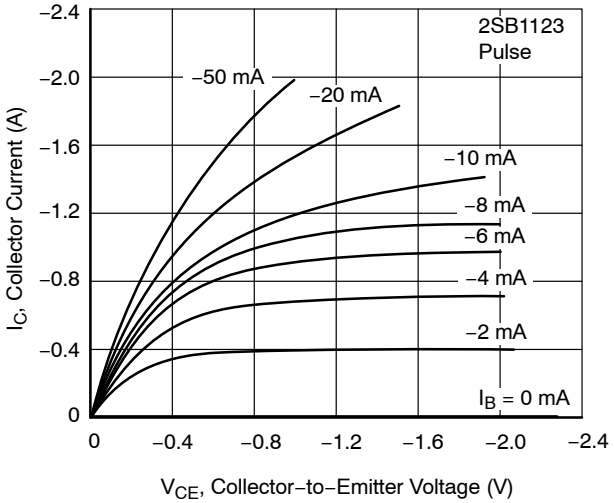


Figure 1. I_C – V_{CE}

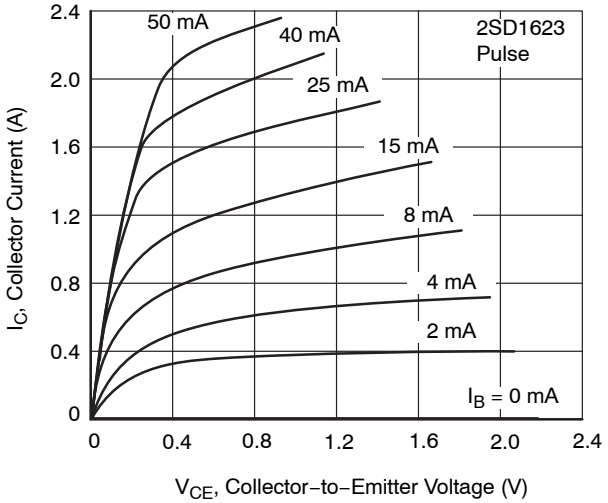


Figure 2. I_C – V_{CE}

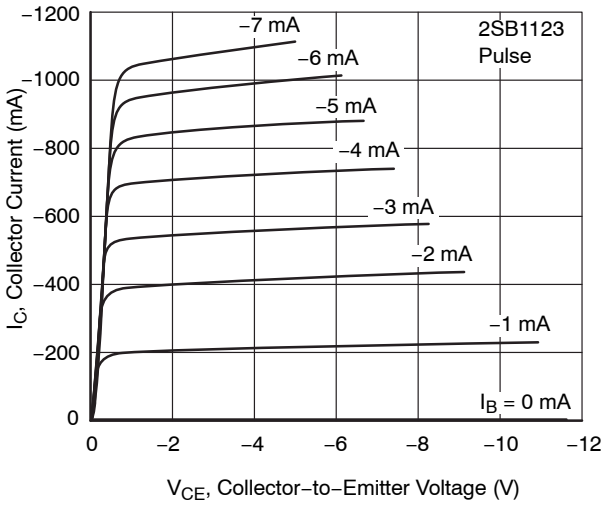


Figure 3. I_C – V_{CE}

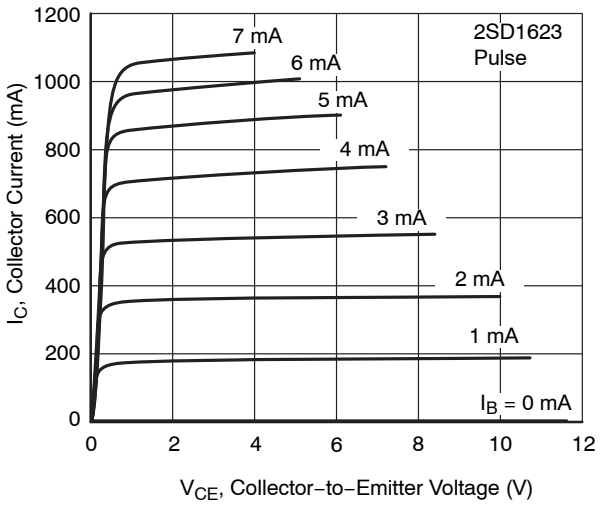


Figure 4. I_C – V_{CE}

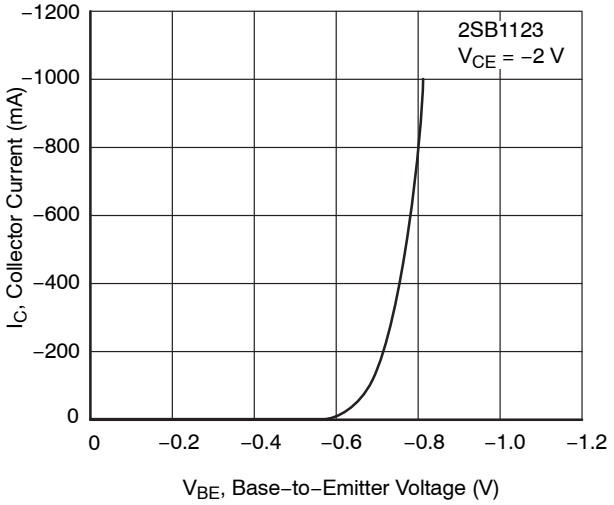


Figure 5. I_C – V_{BE}

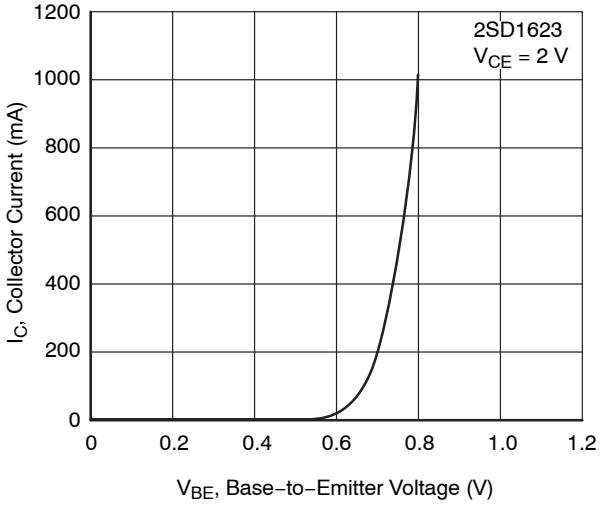


Figure 6. I_C – V_{BE}

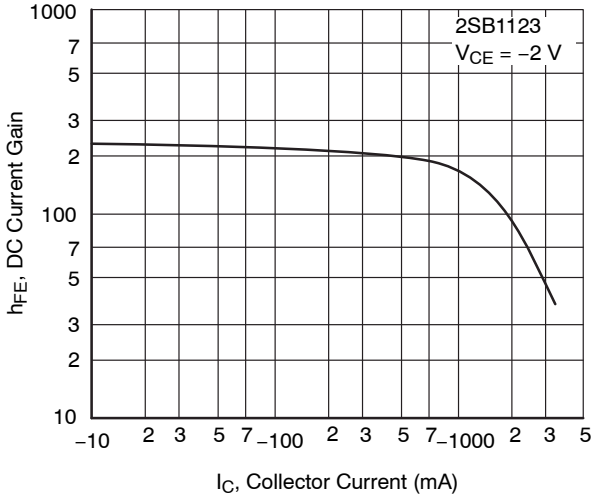


Figure 7. h_{FE} – I_C

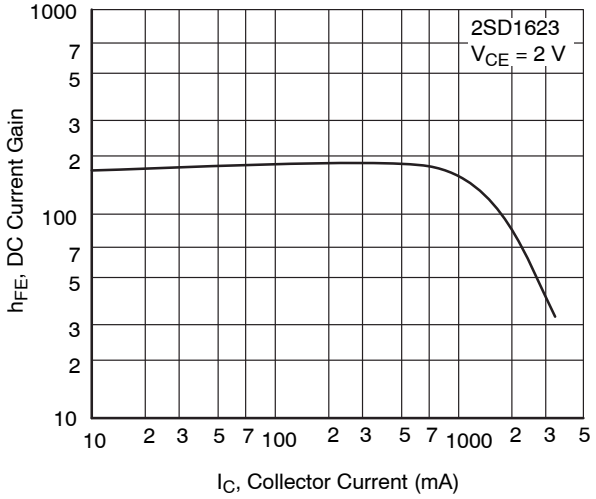


Figure 8. h_{FE} – I_C

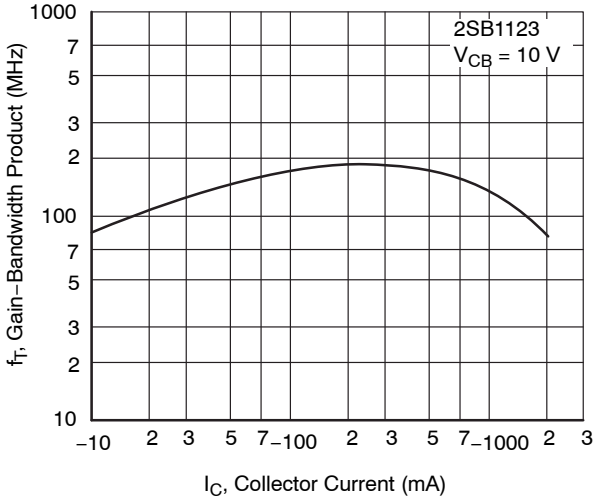


Figure 9. f_T – I_C

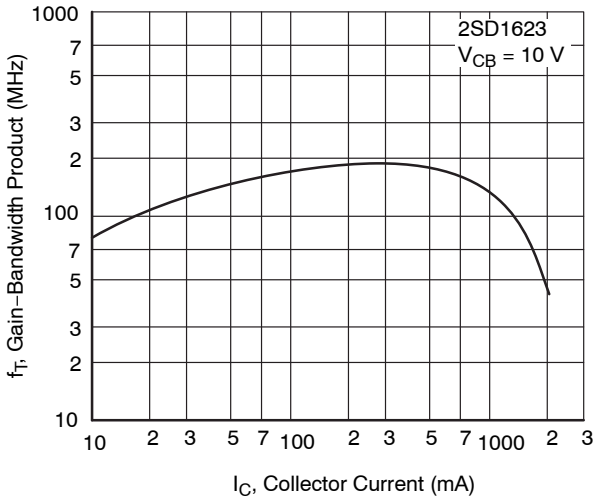


Figure 10. f_T – I_C

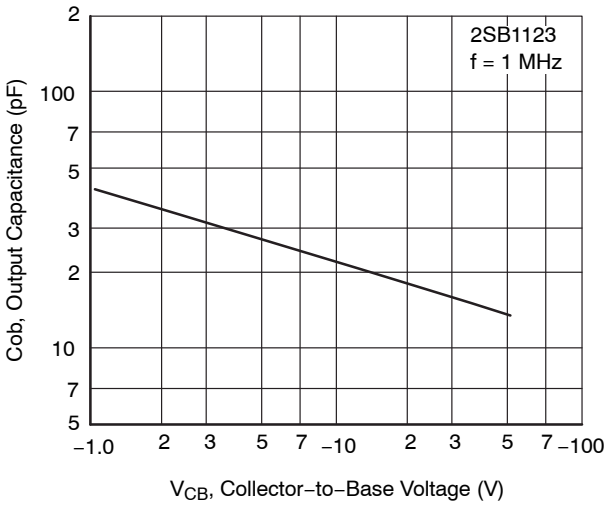


Figure 11. Cob – V_{CB}

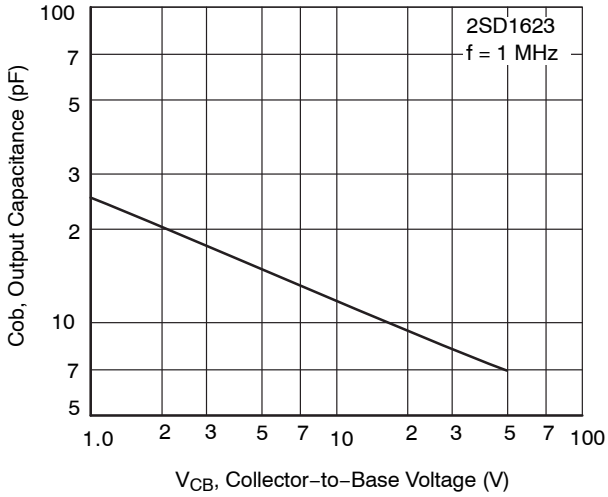


Figure 12. Cob – V_{CB}

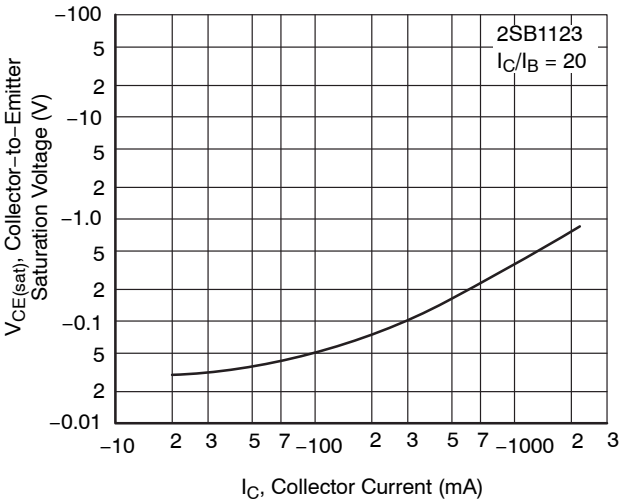


Figure 13. $V_{CE(sat)}$ − I_C

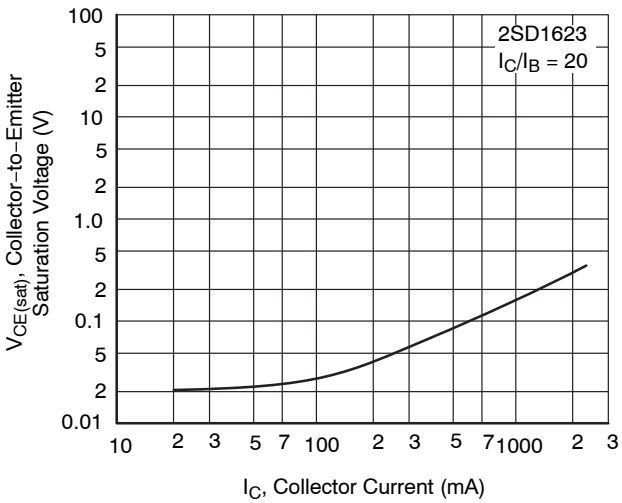


Figure 14. $V_{CE(Sat)}$ − I_C

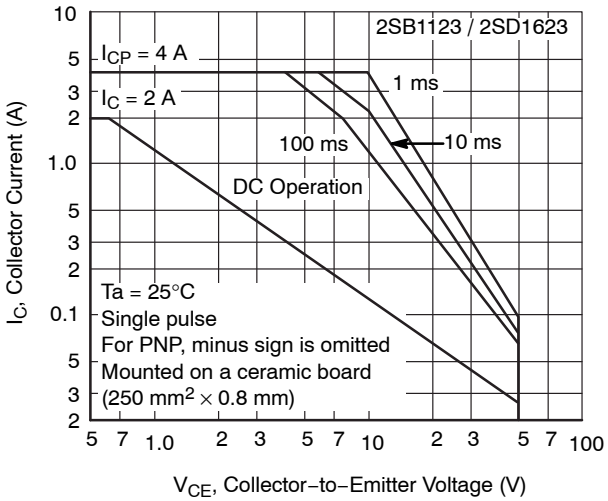


Figure 15. ASO

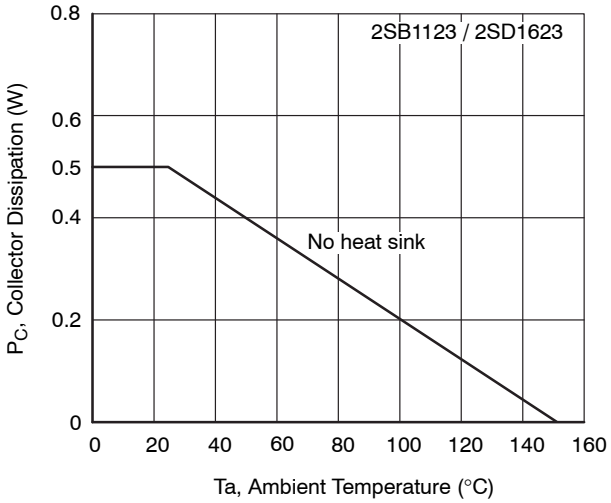


Figure 16. P_C − Ta

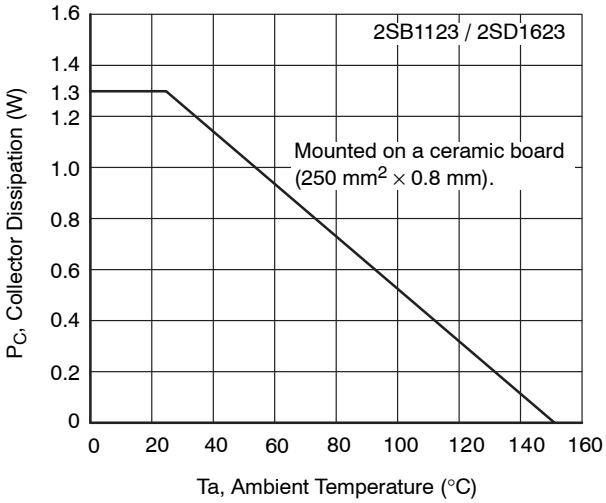


Figure 17. P_C − Ta

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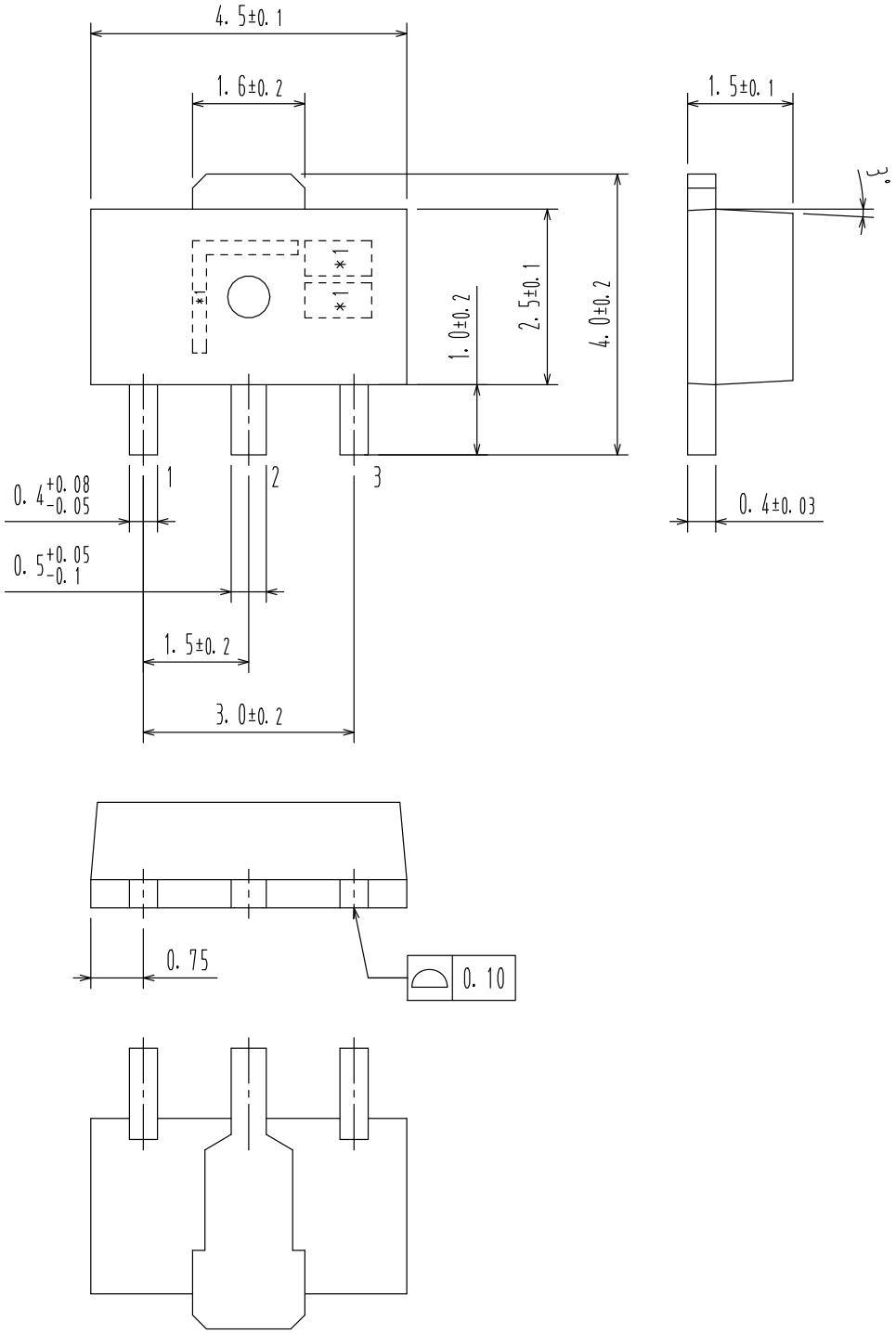

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