

2SB1202/2SD1802

Bipolar Transistor

(-)50 V, (-)3 A, Low $V_{CE(sat)}$ (PNP)NPN
Single TP/TP-FA

Features

- Adoption of FBET and MBIT Processes
- Large Current Capacitance and Wide ASO
- Low Collector to Emitter Saturation Voltage
- Fast Switching Speed
- Small and Slim Package Making it Easy to Make
2SB1202/2SD1802-used Sets Smaller
- These Devices are Pb-Free and are RoHS Compliant

Applications

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

ABSOLUTE MAXIMUM RATINGS at $T_A = 25^\circ\text{C}$

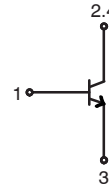
Parameter	Symbol	Conditions	Ratings	Unit
Collector to Base Voltage	V_{CBO}		(-)60	V
Collector to Emitter Voltage	V_{CEO}		(-)50	V
Emitter to Base Voltage	V_{EBO}		(-)6	V
Collector Current	I_C		(-)3	A
Collector Current (Pulse)	I_{CP}		(-)6	A
Collector Dissipation	P_C		1	W
		$T_C = 25^\circ\text{C}$	15	W
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{STG}		- 55 to +150	$^\circ\text{C}$

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.

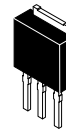


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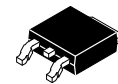
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(For PNP, the polarity is reversed.)

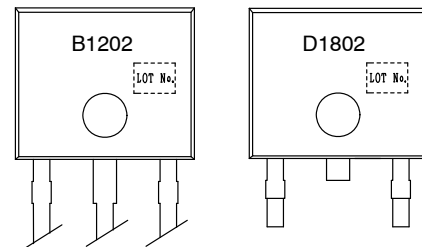


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CASE 369AJ



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CASE 369AH

MARKING DIAGRAM



ORDERING INFORMATION

See detailed ordering and shipping information on page 8 of this data sheet.

2SB1202/2SD1802

ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$

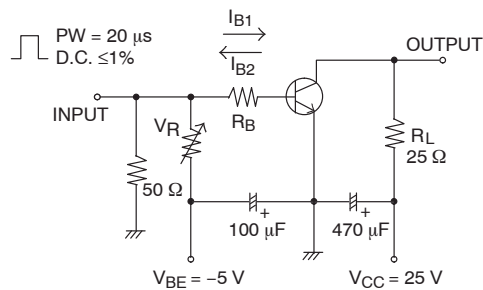
Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	$V_{CB} = (-)40\text{ V}, I_E = 0\text{ A}$			(-1)	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = (-)4\text{ V}, I_C = 0\text{ A}$			(-1)	μA
DC Current Gain	h_{FE1}	$V_{CE} = (-)2\text{ V}, I_C = (-)100\text{ mA}$	100*		560*	
	h_{FE2}	$V_{CE} = (-)2\text{ V}, I_C = (-)3\text{ A}$	35			
Gain-Bandwidth Product	f_T	$V_{CE} = (-)10\text{ V}, I_C = (-)50\text{ mA}$		150		MHz
Output Capacitance	C_{ob}	$V_{CB} = (-)10\text{ V}, f = 1\text{ MHz}$		(39)25		pF
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)2\text{ A}, I_B = (-)100\text{ mA}$		(-0.35)0.19	(-0.7)0.5	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	$V_{CE} = (-)2\text{ V}, I_C = (-)100\text{ mA}$		(-)0.94	(-)1.2	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = (-)10\text{ }\mu\text{A}, I_E = 0\text{ A}$	(-)60			V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = (-)1\text{ mA}, R_{BE} = \Omega$	(-)50			V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = (-)10\text{ }\mu\text{A}, I_C = 0\text{ A}$	(-)6			V
Turn-On Time	t_{on}	See specified Test Circuit		70		ns
Storage Time	t_{stg}			(450)650		ns
Fall Time	t_f			35		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.

*The 2SB1202/2SD1802 are classified by 100 mA h_{FE} as follows :

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

Switching Time Test Circuit



$I_C = 10\text{ A}, I_{B1} = -10\text{ A}, I_{B2} = 1\text{ A}$
For PNP, the polarity is reversed.

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TYPICAL CHARACTERISTICS

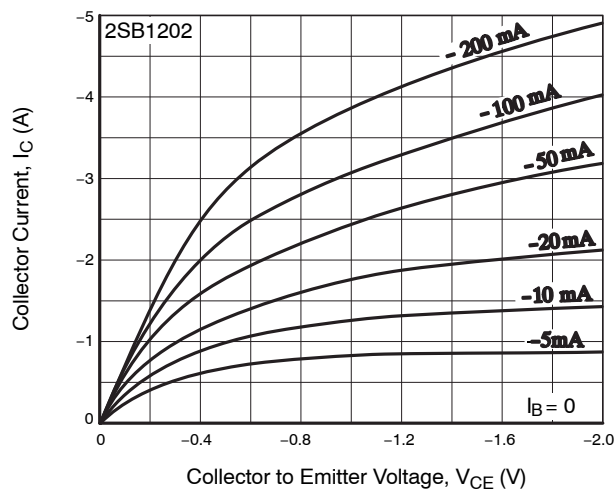


Figure 1. $I_C - V_{CE}$

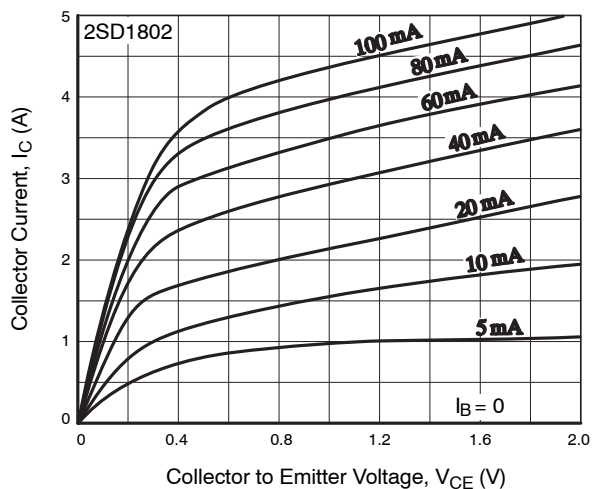


Figure 2. $I_C - V_{CE}$

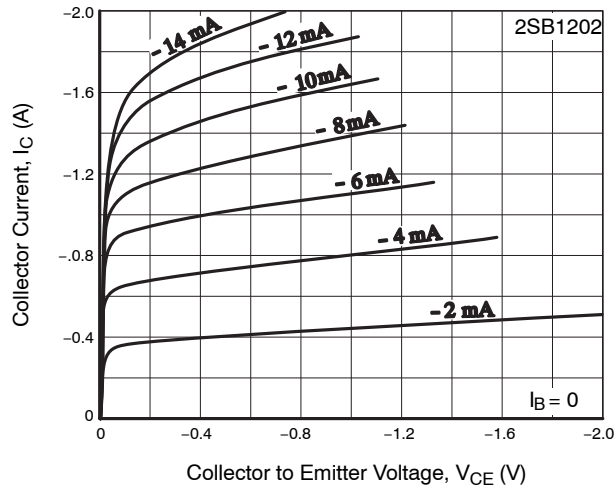


Figure 3. $I_C - V_{CE}$

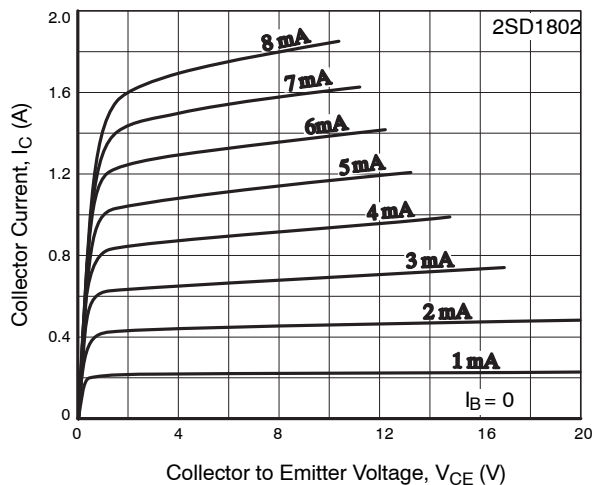


Figure 4. $I_C - V_{CE}$

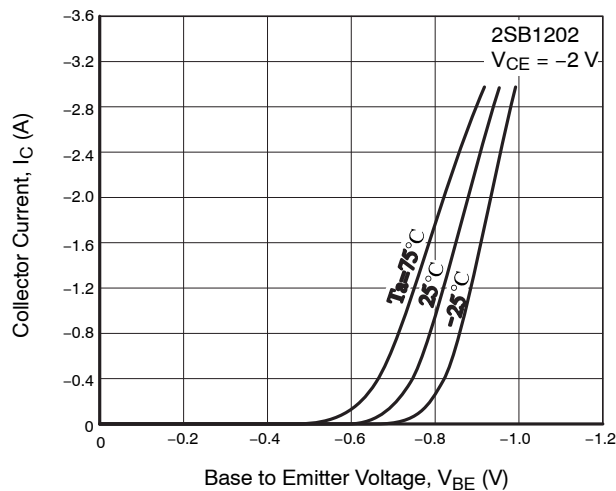


Figure 5. $I_C - V_{BE}$

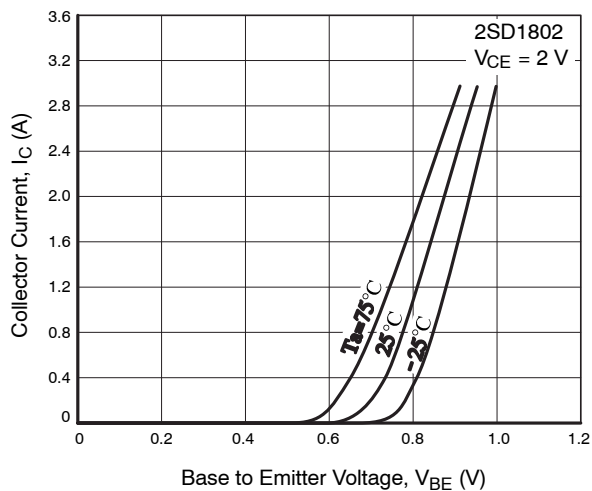


Figure 6. $I_C - V_{BE}$

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TYPICAL CHARACTERISTICS (continued)

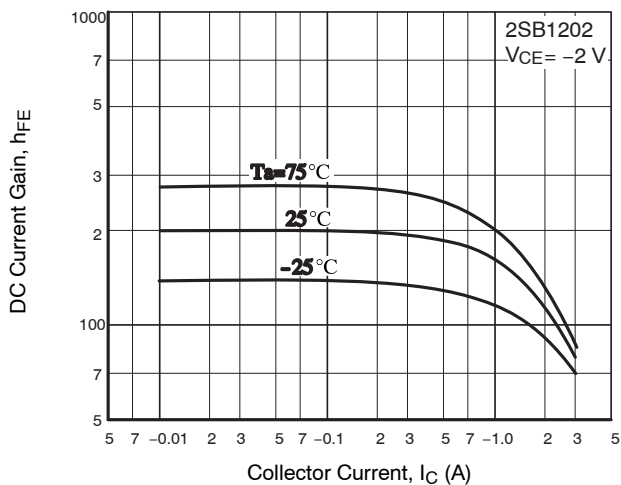


Figure 7. $h_{FE} - I_C$

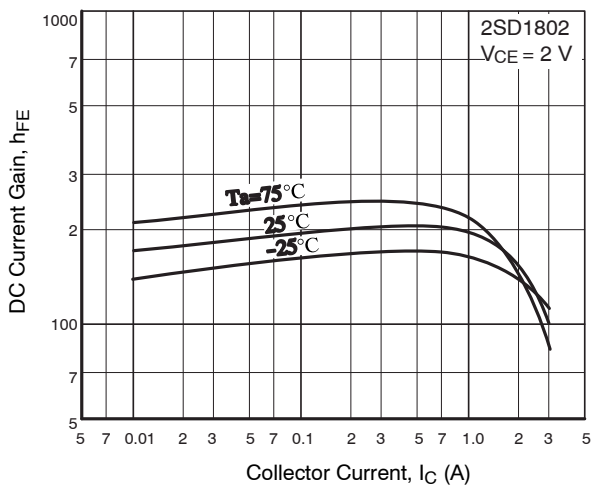


Figure 8. $h_{FE} - I_C$

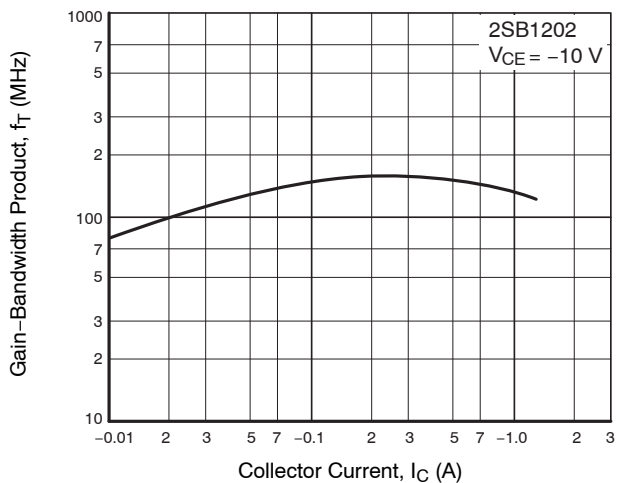


Figure 9. $f_T - I_C$

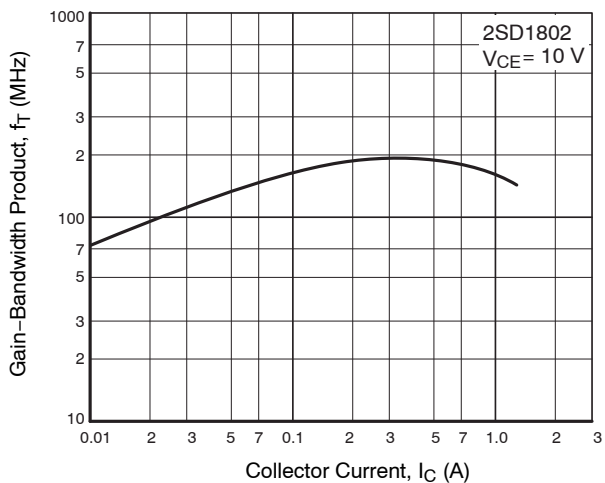


Figure 10. $f_T - I_C$

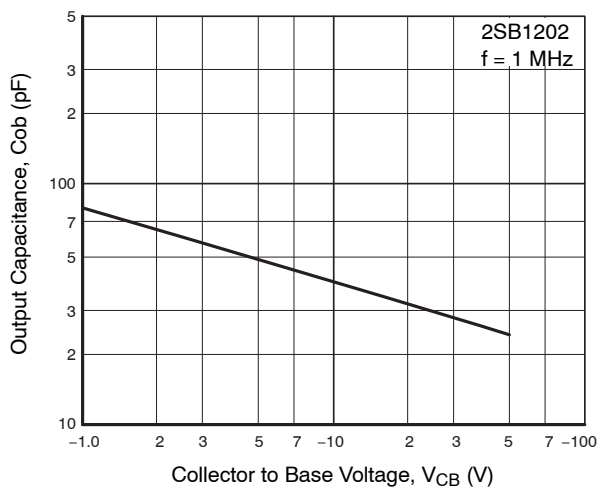


Figure 11. $C_{ob} - V_{CB}$

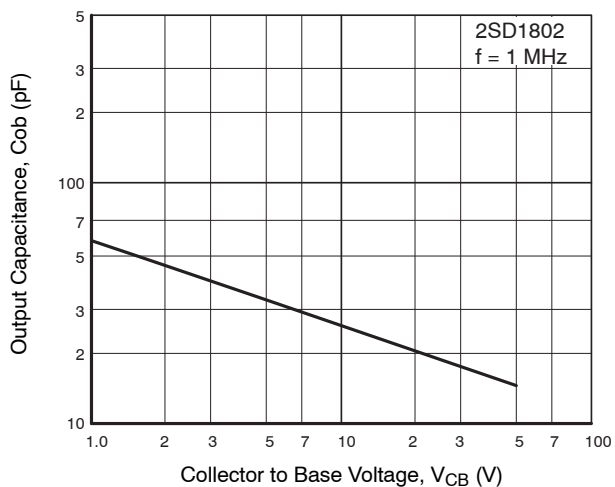


Figure 12. $C_{ob} - V_{CB}$

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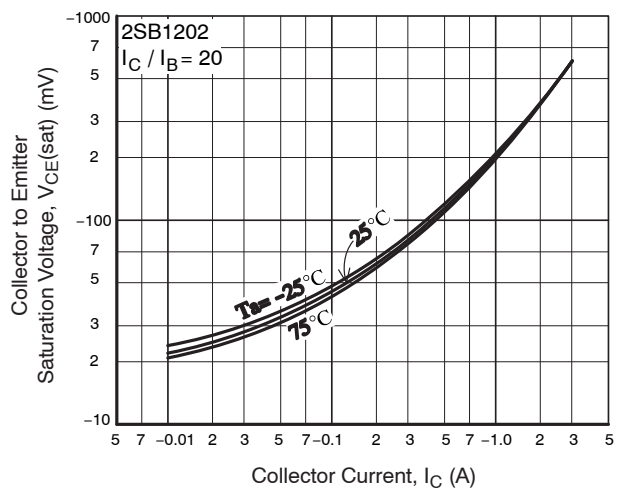


Figure 13. $V_{CE}(sat) - I_C$

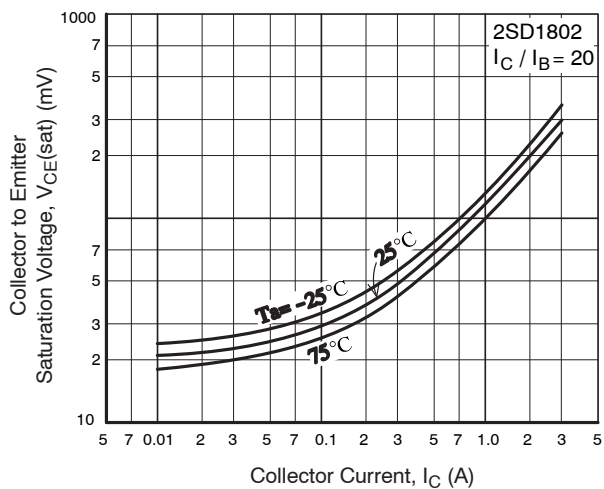


Figure 14. $V_{CE}(sat) - I_C$

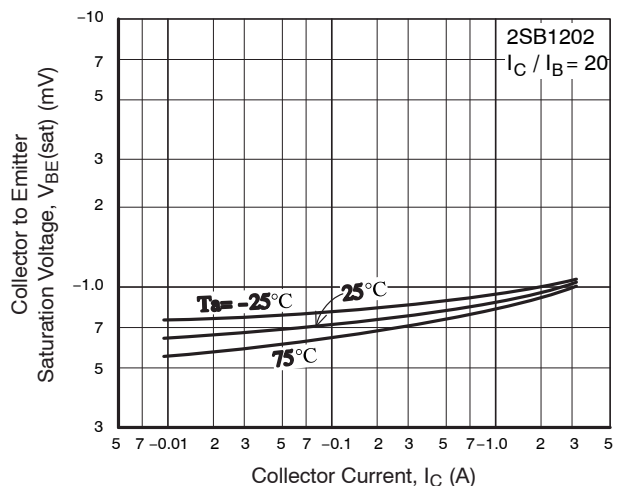


Figure 15. $V_{BE}(sat) - I_C$

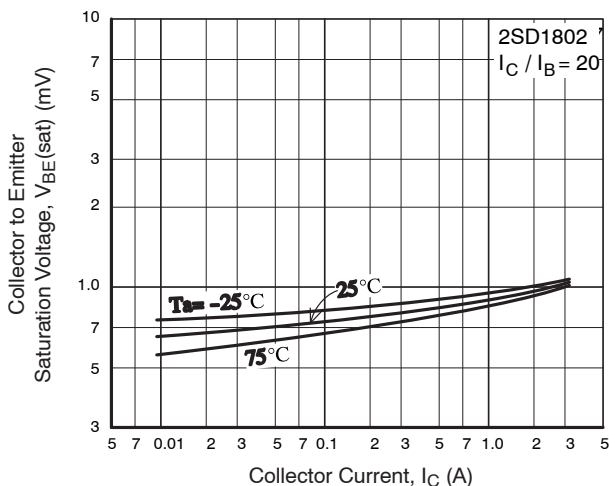


Figure 16. $V_{BE}(sat) - I_C$

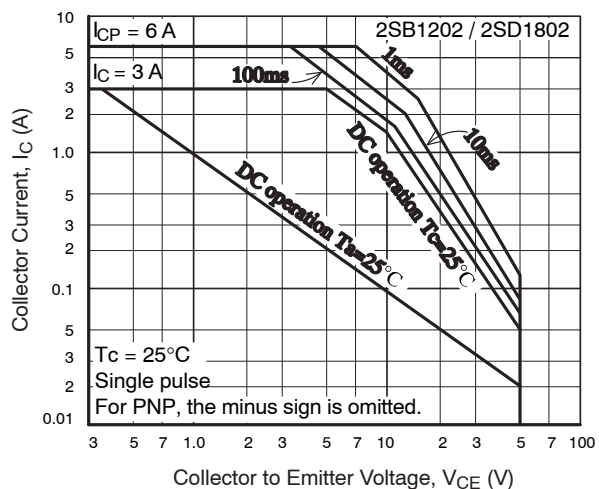


Figure 17. ASO

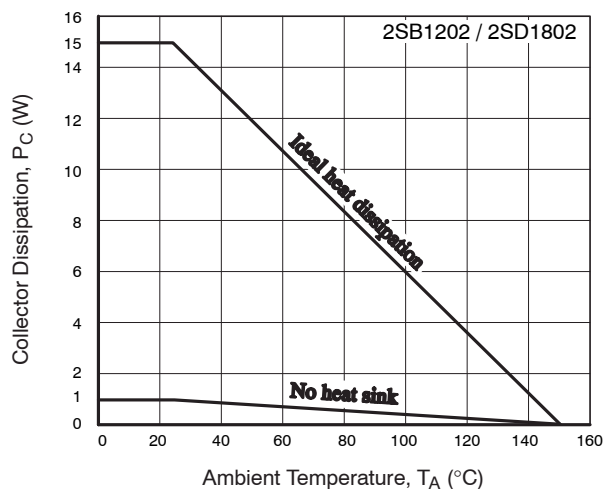


Figure 18. $P_C - T_A$

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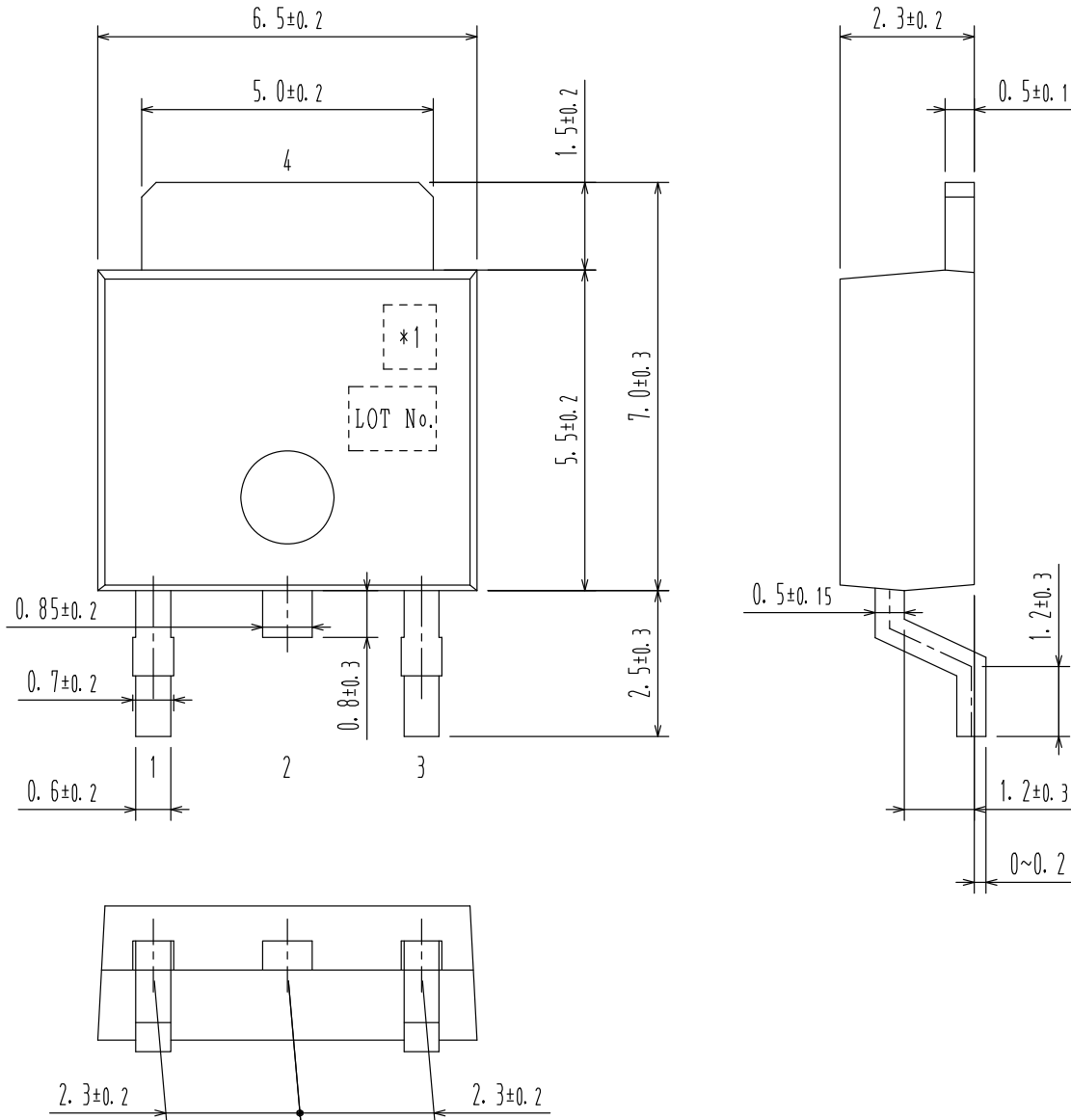
ORDERING INFORMATION

Device	Package	Shipping†	memo
2SB1202S-E	TP	500pcs./bag	Pb-Free
2SB1202T-E	TP	500pcs./bag	
2SD1802S-E	TP	500pcs./bag	
2SD1802T-E	TP	500pcs./bag	
2SB1202S-TL-E	TP-FA	700pcs./reel	
2SB1202T-TL-E	TP-FA	700pcs./reel	
2SD1802S-TL-E	TP-FA	700pcs./reel	
2SD1802T-TL-E	TP-FA	700pcs./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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Pin 2 is idle pin with electrical designation only carried.

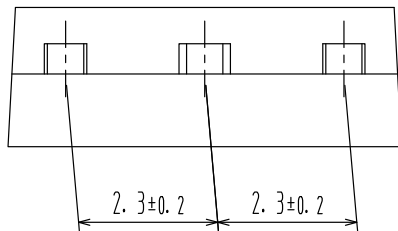
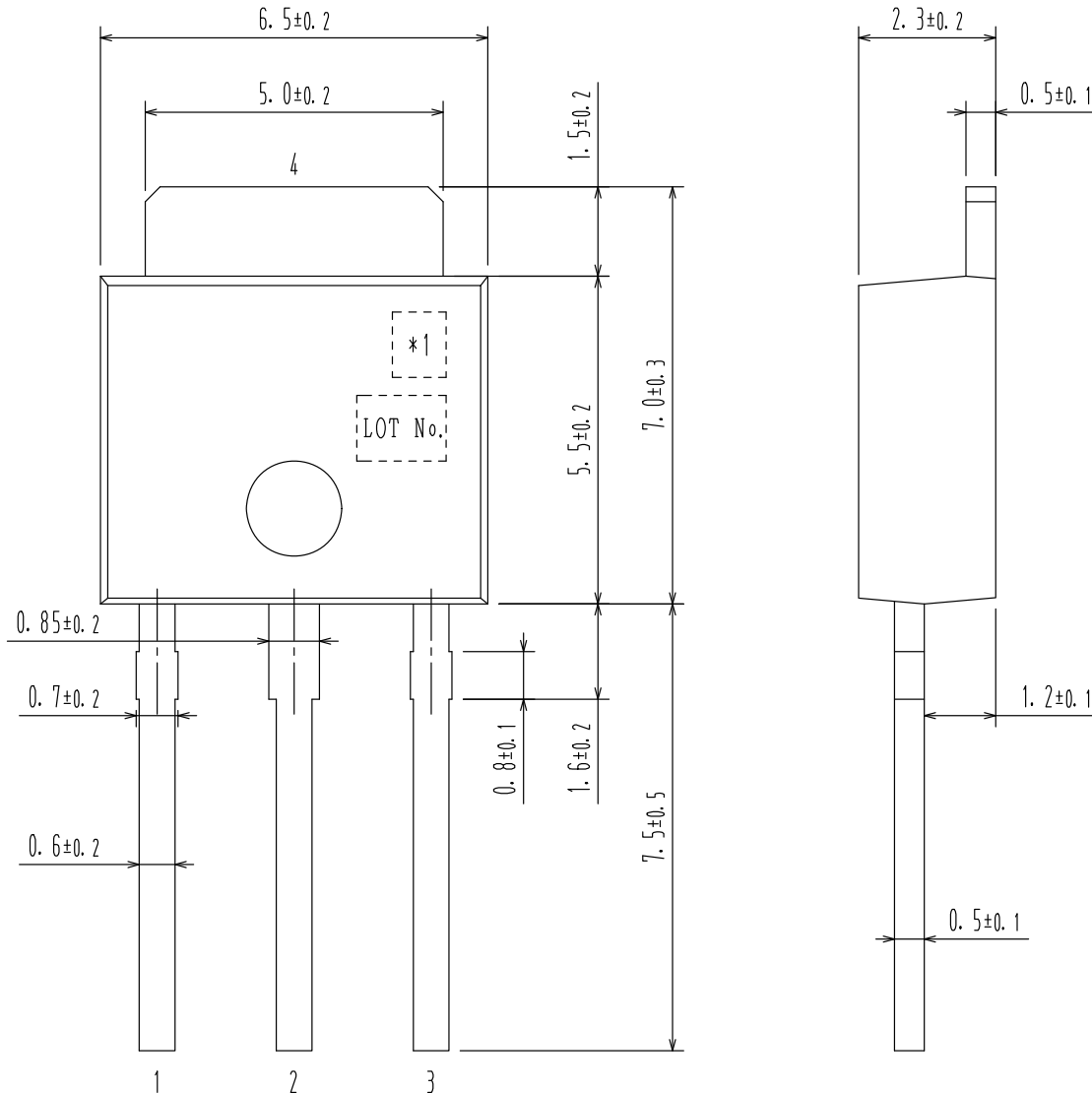
- 1:
- 2:
- 3:
- *1: Lot indication 4:

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- 1:
- 2:
- 3:
- 4:

*1: Lot indication

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