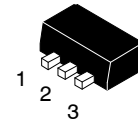


Bipolar Transistor

-20 V, -5 A, Low $V_{CE(sat)}$, PNP Single PCP

2SB1302



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Features

- Adoption of FBET, MBIT Processes
- Large Current Capacity
- Ultrasmall Size Making it Easy to Provide High-Density Small-Sized Hybrid IC's
- Low Collector to Emitter Saturation Voltage
- Fast Switching Speed
- These Devices are Pb-Free and are RoHS Compliant

Applications

- DC-DC Converters, Motor Drivers, Relay Drivers, Lamp Drivers

SPECIFICATIONS

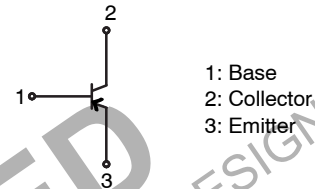
ABSOLUTE MAXIMUM RATINGS at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Value	Unit
Collector to Base Voltage	V_{CBO}	-25	V
Collector to Emitter Voltage	V_{CEO}	-20	V
Emitter to Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-5	A
Collector Current (Pulse)	I_{CP}	-8	A
Collector Dissipation (Note 1)	P_C	1.3	W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^\circ\text{C}$

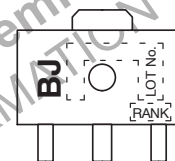
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on ceramic substrate (250 mm² x 0.8 mm).

ELECTRICAL CONNECTION



MARKING DIAGRAM



ORDERING INFORMATION

Device	Package	Shipping [†]
2SB1302S-TD-E	PCP (Pb-Free)	1000 / Tape & Reel
2SB1302T-TD-E	PCP (Pb-Free)	1000 / 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](#).

2SB1302

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

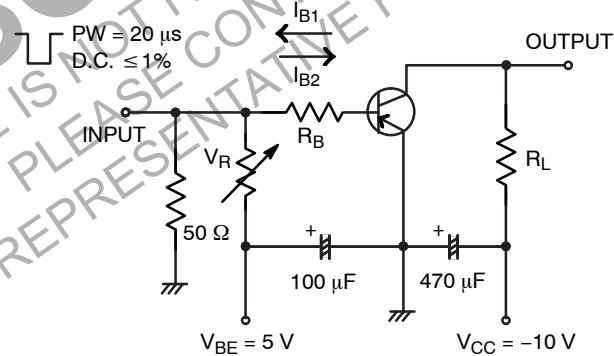
Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	$V_{CB} = -20\text{ V}, I_E = 0\text{ A}$			-500	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = -4\text{ V}, I_C = 0\text{ A}$			-500	nA
DC Current Gain	h_{FE1}	$V_{CE} = -2\text{ V}, I_C = -500\text{ mA}$	140*		400*	
	h_{FE2}	$V_{CE} = -2\text{ V}, I_C = -4\text{ A}$	60			
Gain-Bandwidth Product	f_T	$V_{CE} = -5\text{ V}, I_C = -200\text{ mA}$		320		MHz
Output Capacitance	C_{ob}	$V_{CB} = -10\text{ V}, f = 1\text{ MHz}$		60		pF
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -3\text{ A}, I_B = -60\text{ mA}$		-250	-500	mV
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = -3\text{ A}, I_B = -60\text{ mA}$		-1.0	-1.3	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -10\text{ }\mu\text{A}, I_E = 0\text{ A}$	-25			V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -1\text{ mA}, R_{BE} = \infty$	-20			V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -10\text{ }\mu\text{A}, I_C = 0\text{ A}$	-5			V
Turn-On Time	t_{on}	See specified Test Circuit		40		ns
Storage Time	t_{stg}			200		ns
Fall Time	t_f			10		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.

*2SB1302 is classified by 500 mA h_{FE} as follows :

Rank	S	T
h_{FE}	140 to 280	200 to 400

Switching Time Test Circuit



$$I_C = 10 \quad I_{B1} = -10 \quad I_{B2} = -2\text{ A}$$

TYPICAL CHARACTERISTICS

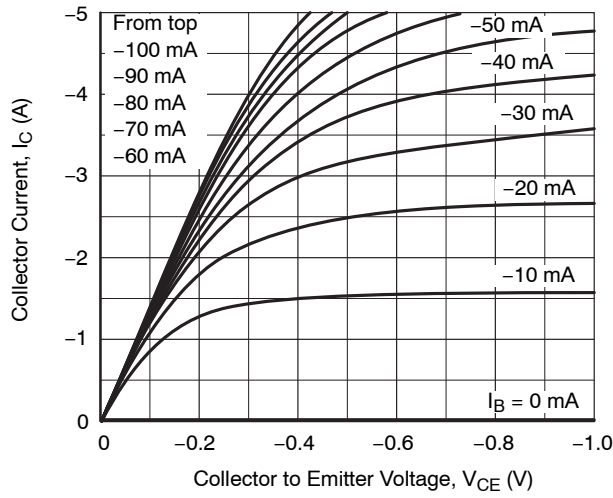


Figure 1. $I_C - V_{CE}$

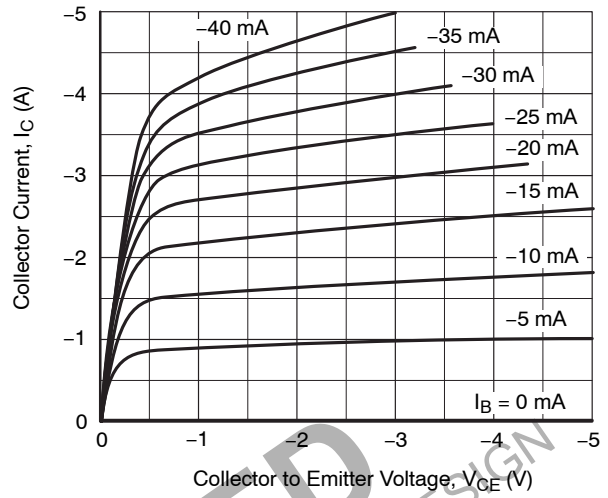


Figure 2. $I_C - V_{CE}$

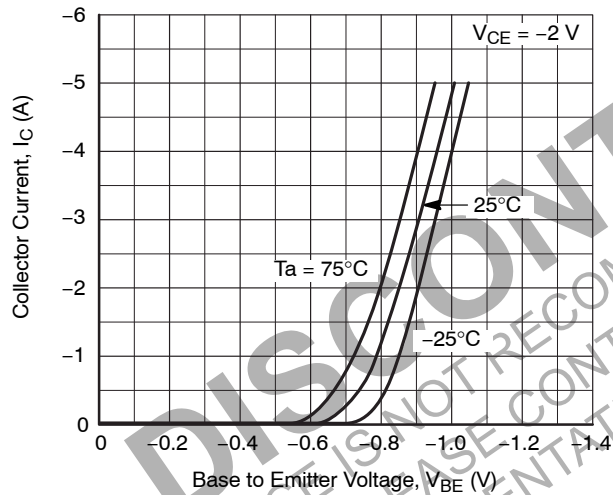


Figure 3. $I_C - V_{BE}$

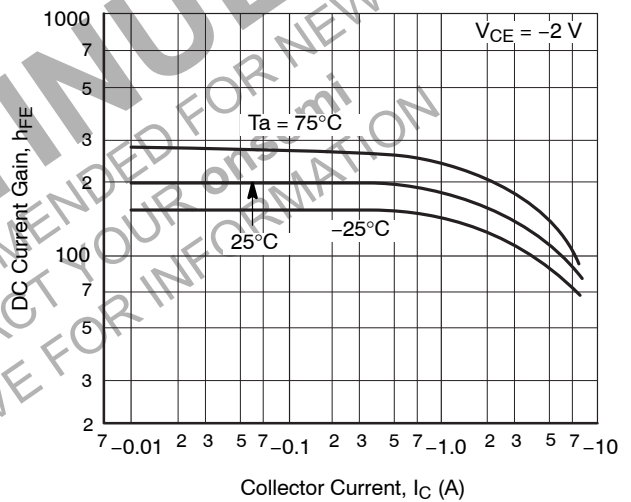


Figure 4. $h_{FE} - I_C$

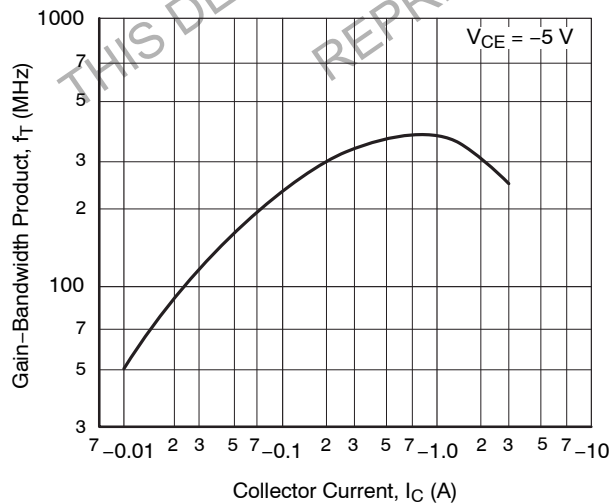


Figure 5. $f_T - I_C$

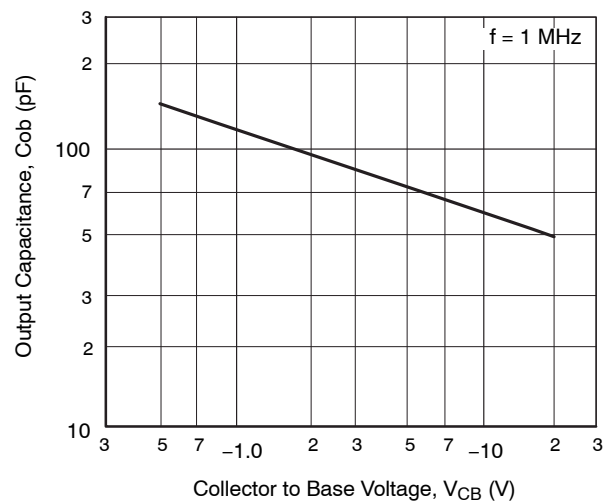


Figure 6. $C_{ob} - V_{CB}$

TYPICAL CHARACTERISTICS (continued)

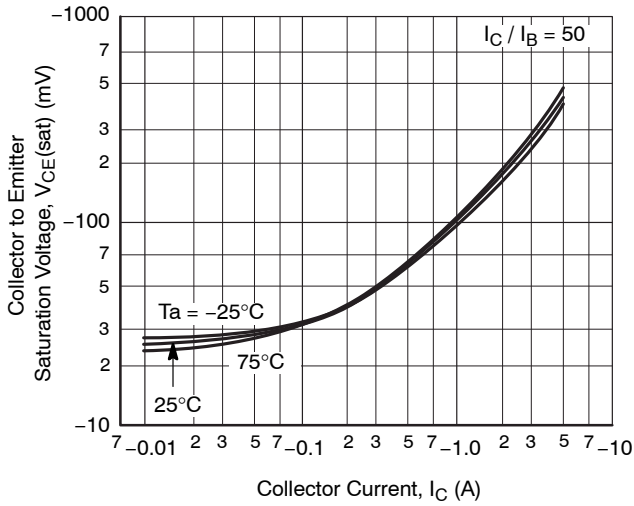


Figure 7. $V_{CE(sat)} - I_C$

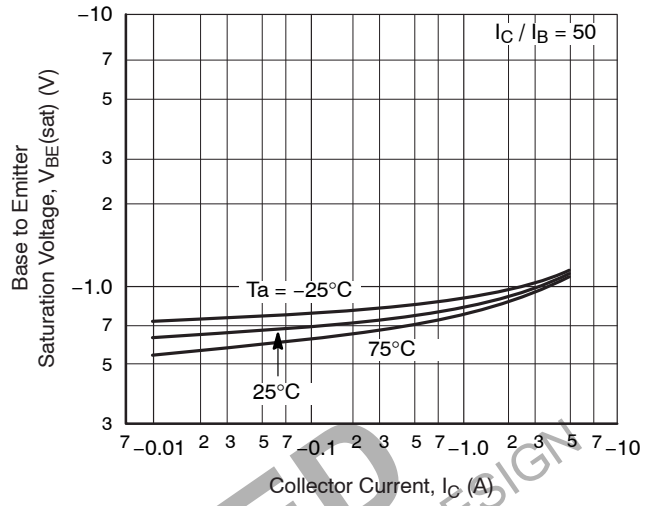


Figure 8. $V_{BE(sat)} - I_C$

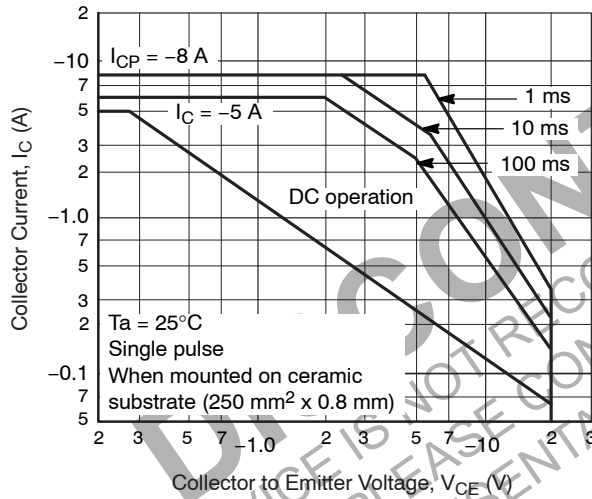


Figure 9. SOA

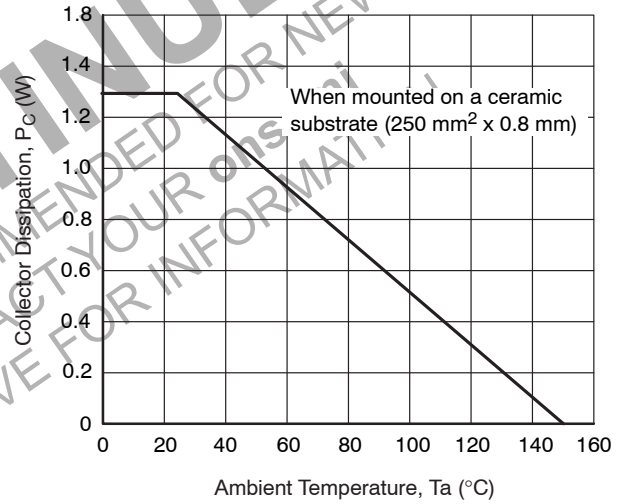
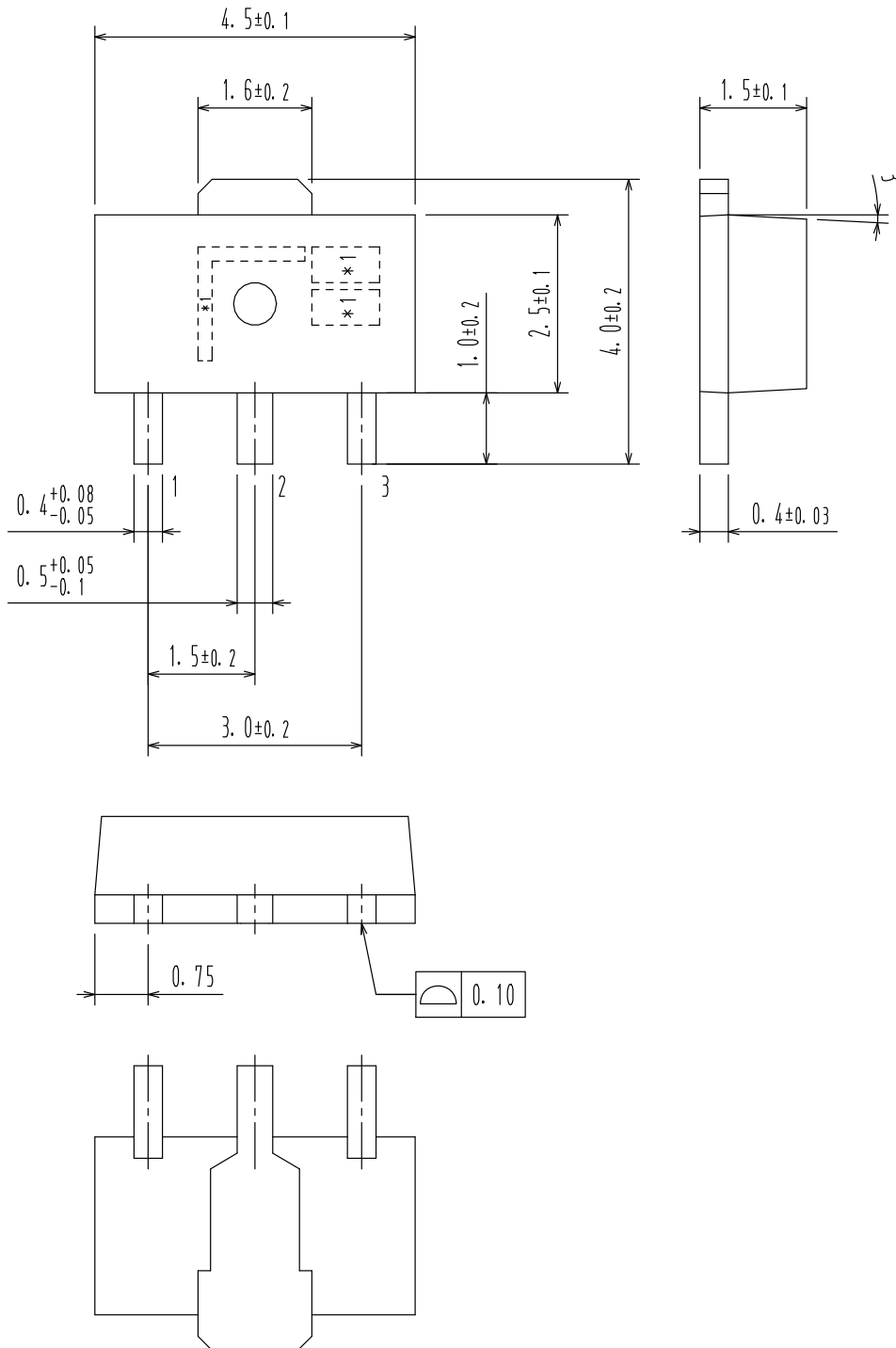


Figure 10. $P_C - T_a$

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DATE 30 APR 2012



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