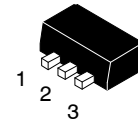


# Bipolar Transistor

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

## 2SB1302



SOT-89 / PCP-1  
CASE 419AU

### 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

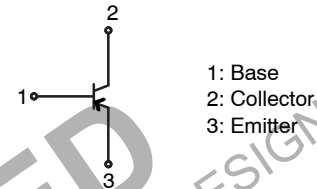
**ABSOLUTE MAXIMUM RATINGS** at  $T_a = 25^\circ\text{C}$

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	$^\circ\text{C}$

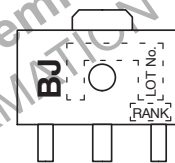
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on ceramic substrate (250 mm<sup>2</sup> x 0.8 mm).

### ELECTRICAL CONNECTION



### MARKING DIAGRAM



### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
2SB1302S-TD-E	PCP (Pb-Free)	1000 / Tape & Reel
2SB1302T-TD-E	PCP (Pb-Free)	1000 / Tape & Reel

<sup>†</sup>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 $T_A = 25^\circ\text{C}$

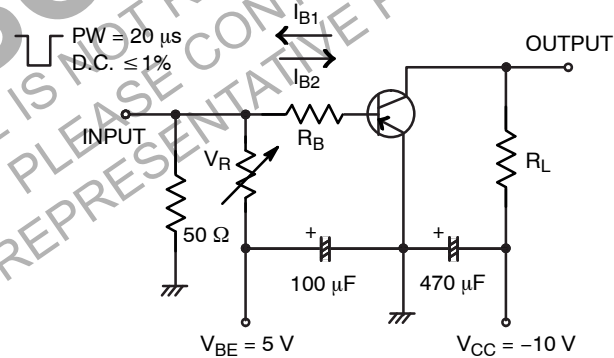
Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = -20\text{ V}, I_E = 0\text{ A}$			-500	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = -4\text{ V}, I_C = 0\text{ A}$			-500	nA
DC Current Gain	$h_{FE1}$	$V_{CE} = -2\text{ V}, I_C = -500\text{ mA}$	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

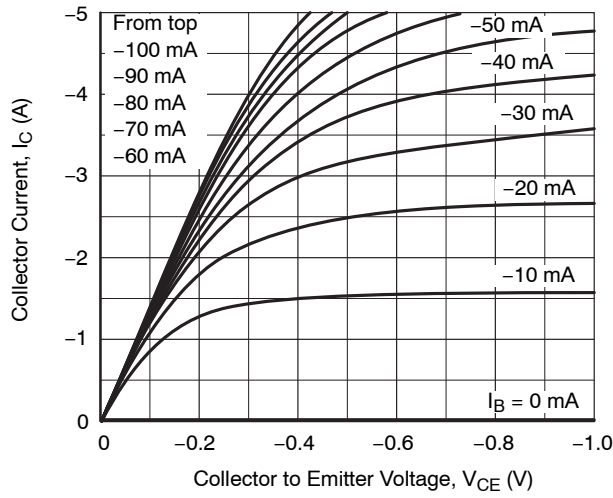


Figure 1.  $I_C - V_{CE}$

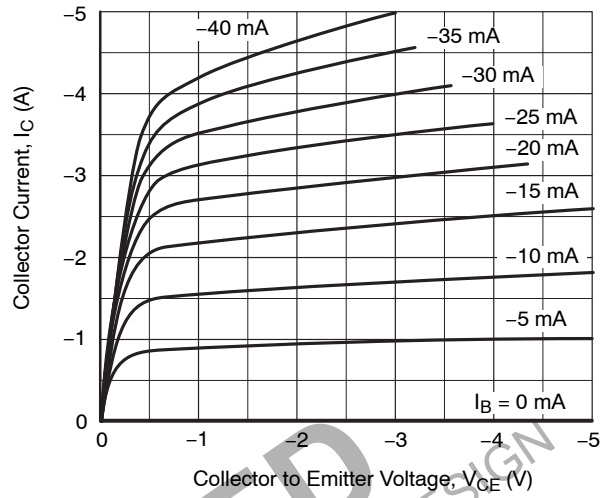


Figure 2.  $I_C - V_{CE}$

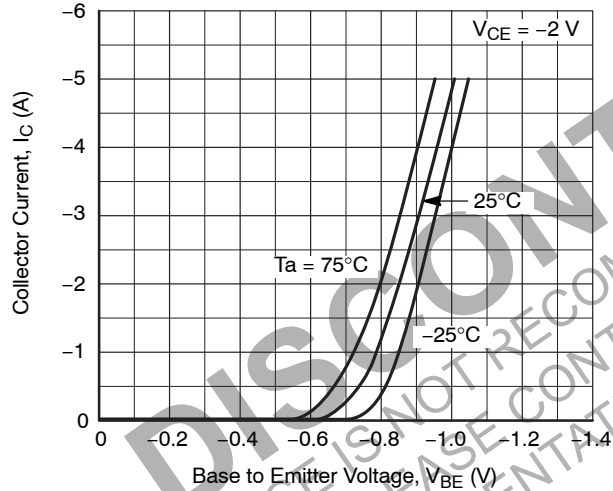


Figure 3.  $I_C - V_{BE}$

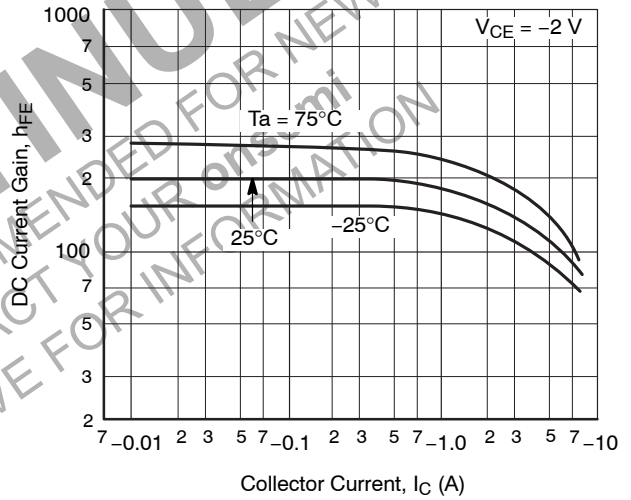


Figure 4.  $h_{FE} - I_C$

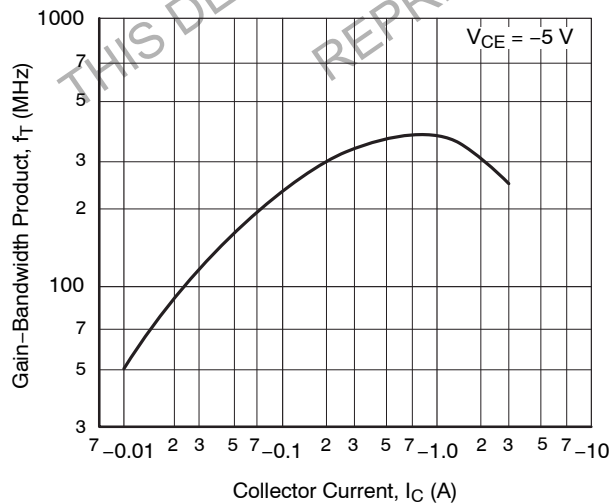


Figure 5.  $f_T - I_C$

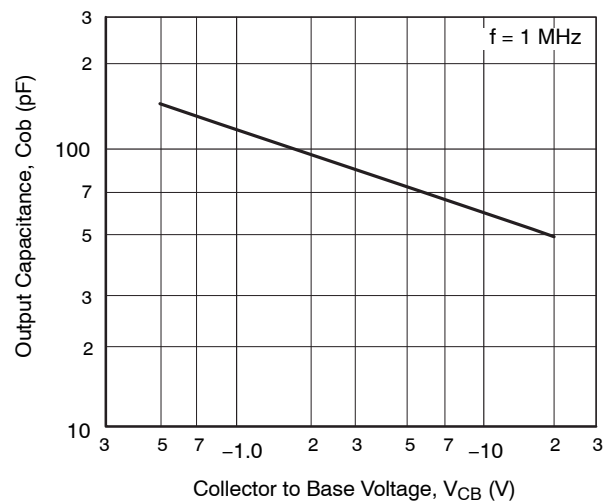


Figure 6.  $C_{ob} - V_{CB}$

TYPICAL CHARACTERISTICS (continued)

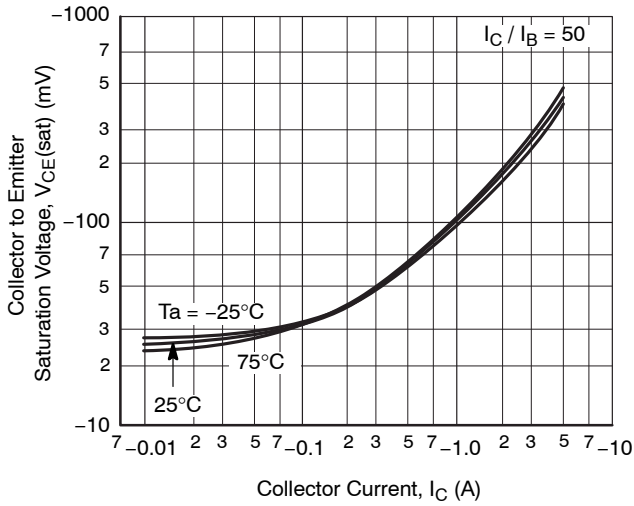


Figure 7.  $V_{CE(sat)} - I_C$

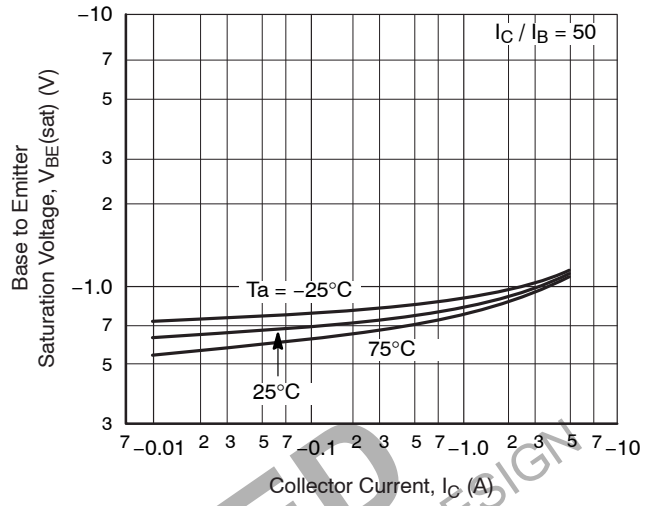


Figure 8.  $V_{BE(sat)} - I_C$

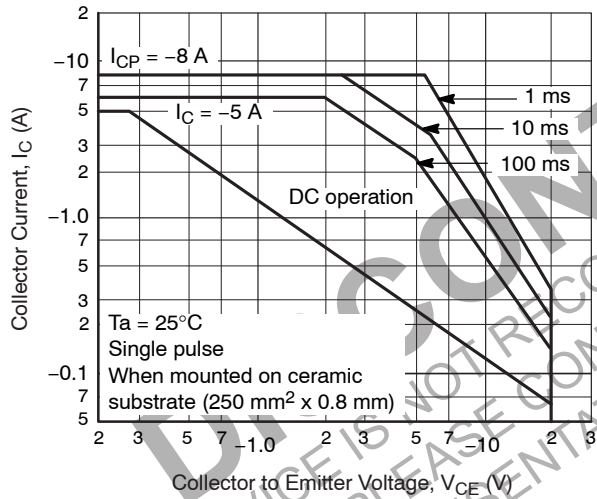


Figure 9. SOA

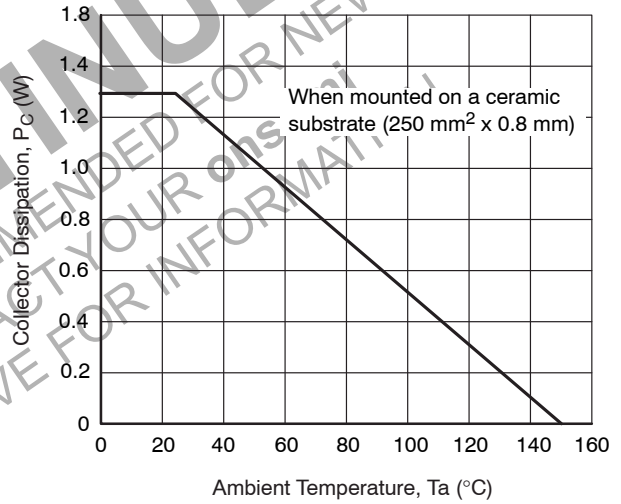
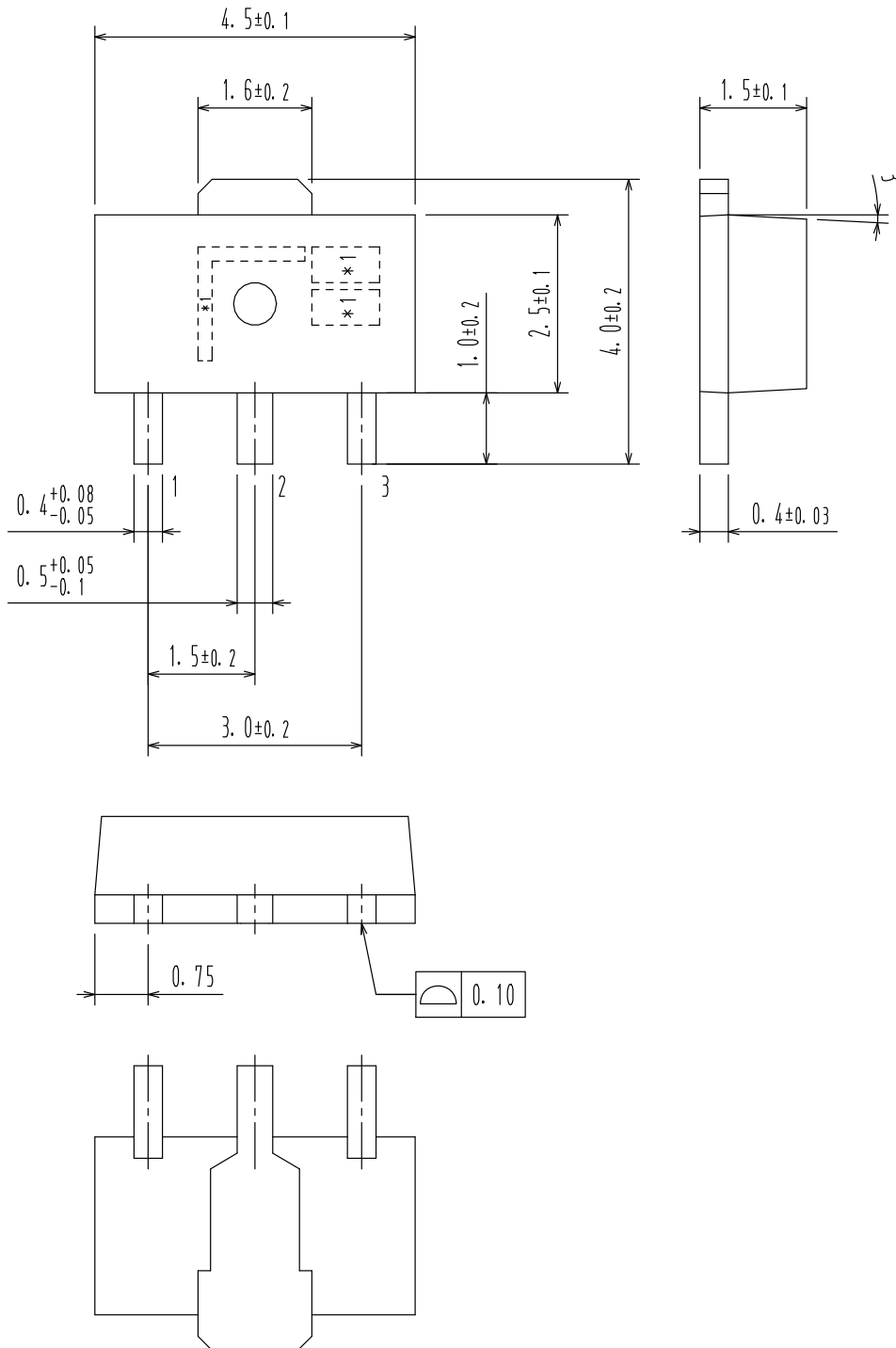


Figure 10.  $P_C - T_a$

**SOT-89 / PCP-1**  
**CASE 419AU**  
**ISSUE 0**

DATE 30 APR 2012



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