

# Bipolar Transistor

**(-)50 V, (-)3 A, Low  $V_{CE(sat)}$ ,  
(PNP) NPN Single PCP**

**2SA2125, 2SC5964**

## Features

- Adoption of MBIT Processes
- Low Collector to Emitter Saturation Voltage
- Large Current Capacity
- High-Speed Switching
- Halogen Free Compliance

## Applications

- DC-DC Converter, Relay Drivers, Lamp Drivers, Motor Drivers, Flash

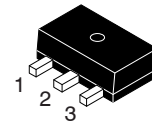
## Specifications

( ): 2SA2125

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CBO}$	Collector to Base Voltage	–	(–)100	V
$V_{CES}$	Collector to Emitter Voltage	–	(–)100	V
$V_{CEO}$	Collector to Emitter Voltage	–	(–)50	V
$V_{EBO}$	Emitter to Base Voltage	–	(–)6	V
$I_C$	Collector Current	–	(–)3	A
$I_{CP}$	Collector Current (Pulse)	–	(–)6	A
$I_B$	Base Current	–	(–)600	mA
$P_C$	Collector Dissipation	When mounted on ceramic substrate (250 mm <sup>2</sup> x 0.8 mm)	1.3	W
		$T_C = 25^\circ\text{C}$	3.5	W
$T_j$	Junction Temperature	–	150	°C
$T_{stg}$	Storage Temperature	–	–55 to +150	°C

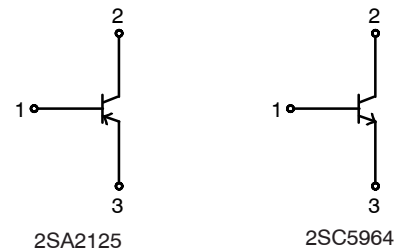
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



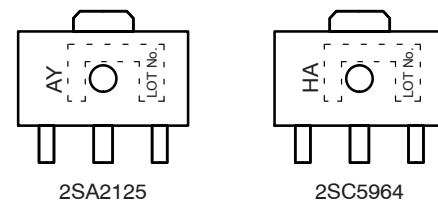
1. Base
2. Collector
3. Emitter

SOT-89 / PCP-1  
CASE 419AU

## ELECTRICAL CONNECTIONS



## MARKING DIAGRAMS



AY/HA = Specific Device Code

## ORDERING INFORMATION

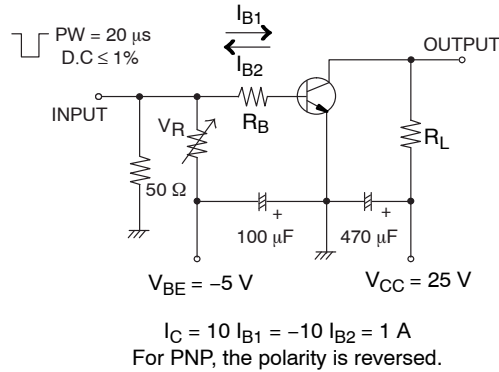
See detailed ordering and shipping information on page 6 of this data sheet.

# 2SA2125, 2SC5964

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

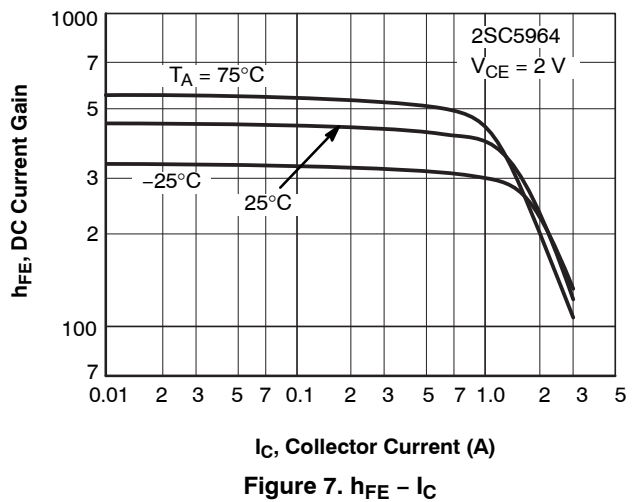
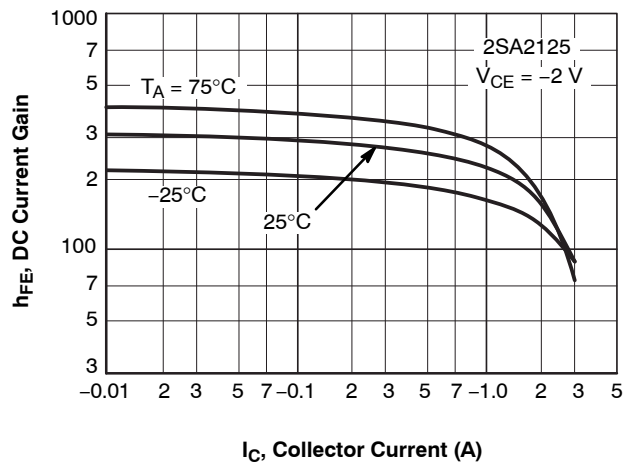
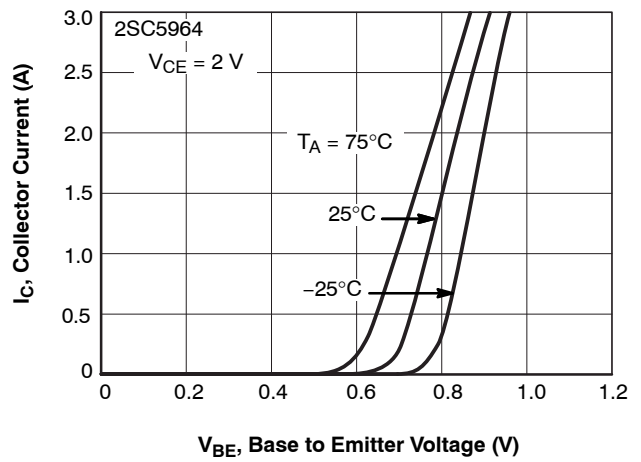
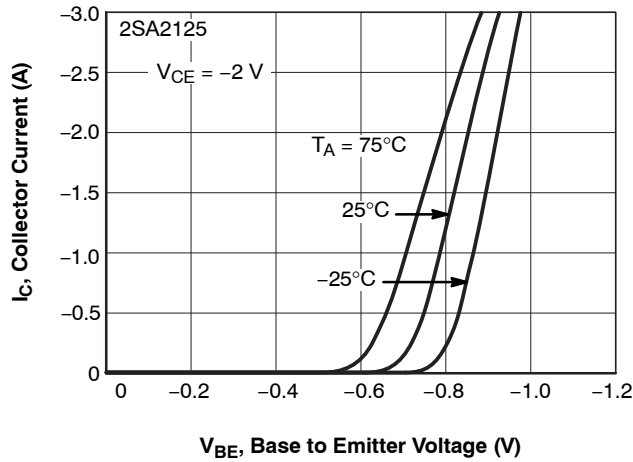
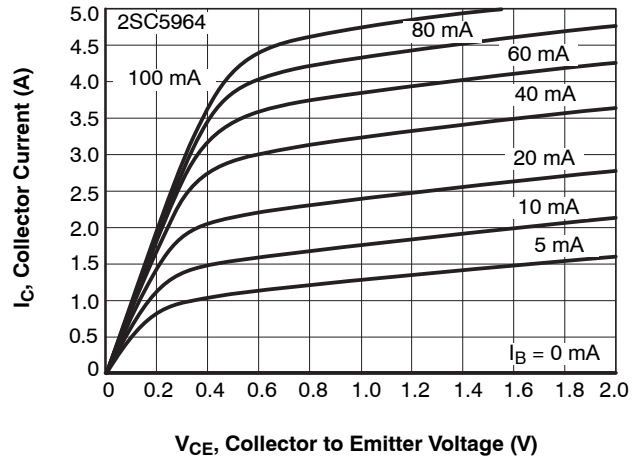
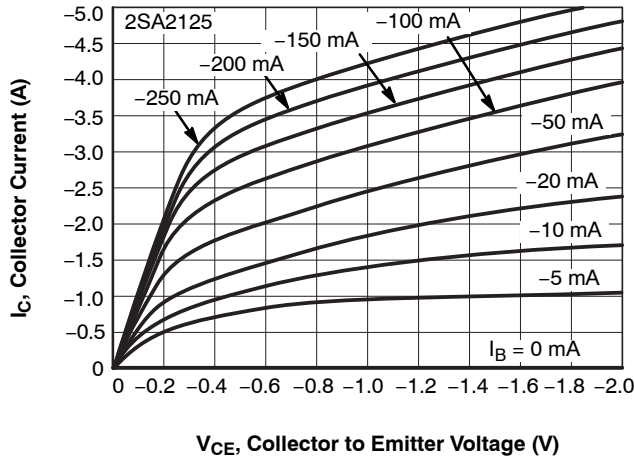
Symbol	Parameter	Conditions	Ratings			Unit
			Min	Typ	Max	
I <sub>CBO</sub>	Collector Cutoff Current	V <sub>CB</sub> = (-)40 V, I <sub>E</sub> = 0 A	-	-	(-)1	μA
I <sub>EBO</sub>	Emitter Cutoff Current	V <sub>EB</sub> = (-)4 V, I <sub>C</sub> = 0 A	-	-	(-)1	μA
h <sub>FE1</sub>	DC Current Gain	V <sub>CE</sub> = (-)2 V, I <sub>C</sub> = (-)100 mA	200	-	560	
f <sub>T</sub>	Gain-Bandwidth Product	V <sub>CE</sub> = (-)10 V, I <sub>C</sub> = (-)500 mA	-	(390)380	-	MHz
C <sub>ob</sub>	Output Capacitance	V <sub>CB</sub> = (-)10 V, f = 1 MHz	-	(24)13	-	pF
V <sub>CE(sat)1</sub>	Collector to Emitter Saturation Voltage	I <sub>C</sub> = (-)1 A, I <sub>B</sub> = (-)50 mA	-	(-125)100	(-230)150	mV
V <sub>CE(sat)2</sub>		I <sub>C</sub> = (-)2 A, I <sub>B</sub> = (-)100 mA	-	(-250)190	(-500)290	mV
V <sub>BE(sat)</sub>	Base to Emitter Saturation Voltage	I <sub>C</sub> = (-)2 A, I <sub>B</sub> = (-)100 mA	-	(-)0.94	(-)1.2	V
V <sub>(BR)CBO</sub>	Collector to Base Breakdown Voltage	I <sub>C</sub> = (-)10 μA, I <sub>E</sub> = 0 A	(-50)100	-	-	V
V <sub>(BR)CES</sub>	Collector to Emitter Breakdown Voltage	I <sub>C</sub> = (-)100 μA, R <sub>BE</sub> = 0 Ω	(-50)100	-	-	V
V <sub>(BR)CEO</sub>		I <sub>C</sub> = (-)1 mA, R <sub>BE</sub> = ∞	(-)50	-	-	V
V <sub>(BR)EBO</sub>	Emitter to Base Breakdown Voltage	I <sub>E</sub> = (-)10 μA, I <sub>C</sub> = 0 A	(-)6	-	-	V
t <sub>on</sub>	Turn-ON Time	See specified Test Circuit	-	(30)35	-	ns
t <sub>stg</sub>	Storage Time		-	(230)300	-	ns
t <sub>f</sub>	Fall Time		-	(18)25	-	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.



**Figure 1. Switching Time Test Circuit**

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (continued)

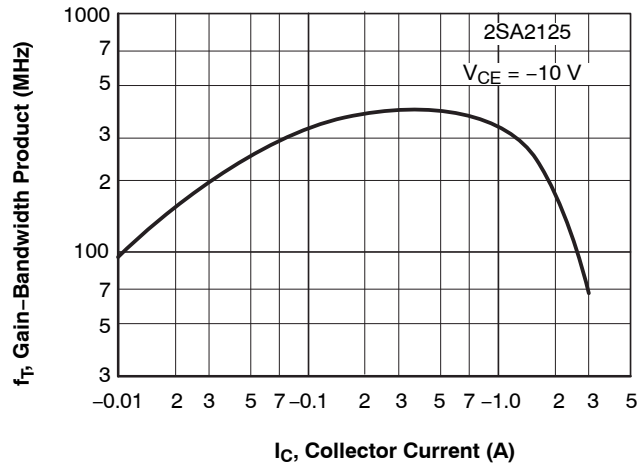


Figure 8.  $f_T - I_C$

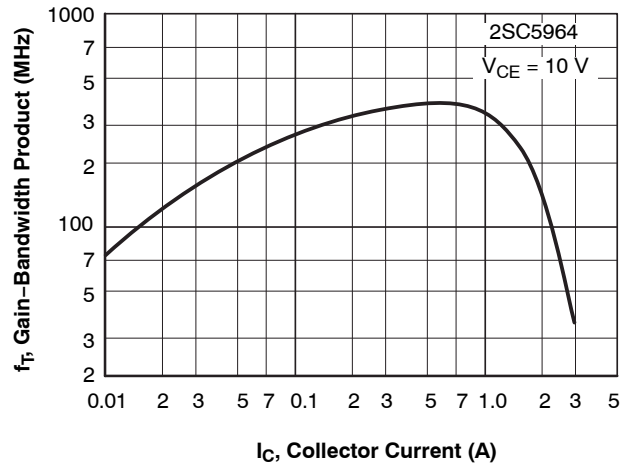


Figure 9.  $f_T - I_C$

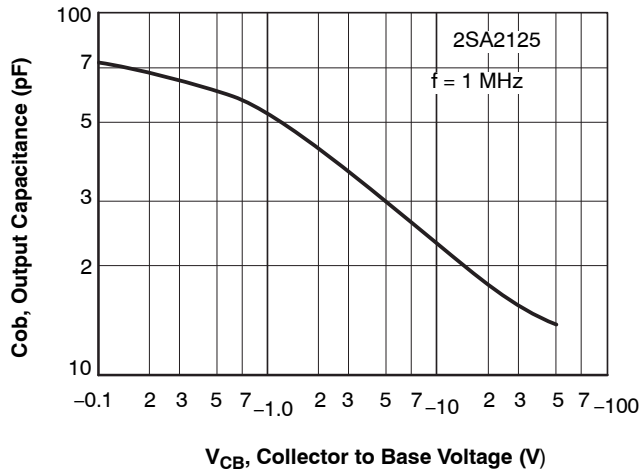


Figure 10.  $C_{ob} - V_{CB}$

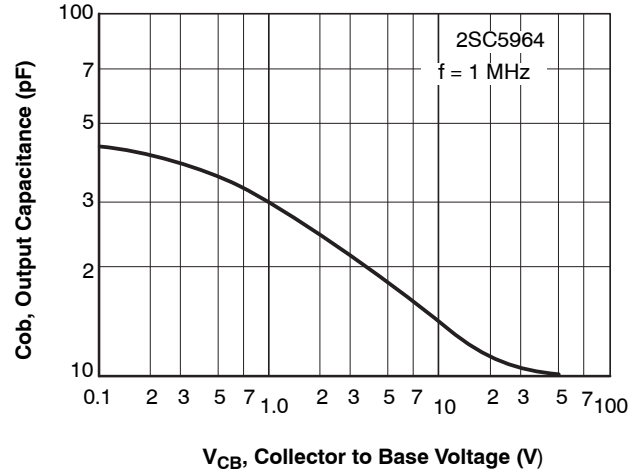


Figure 11.  $C_{ob} - V_{CB}$

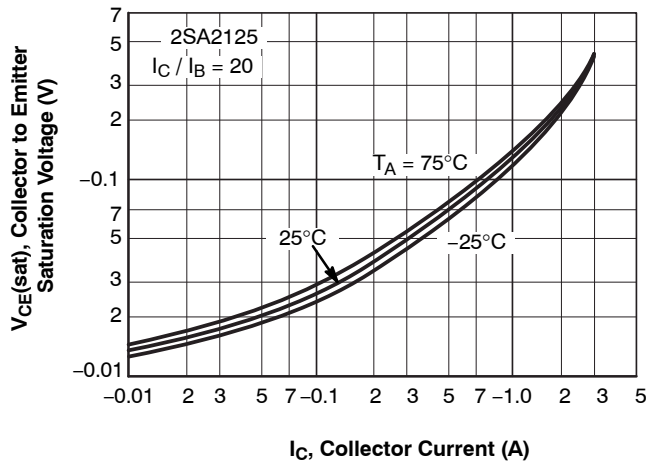


Figure 12.  $V_{CE(sat)} - I_C$

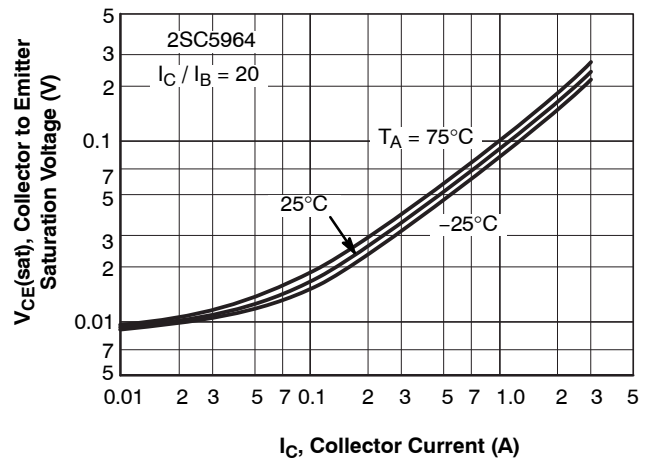


Figure 13.  $V_{CE(sat)} - I_C$

TYPICAL CHARACTERISTICS (continued)

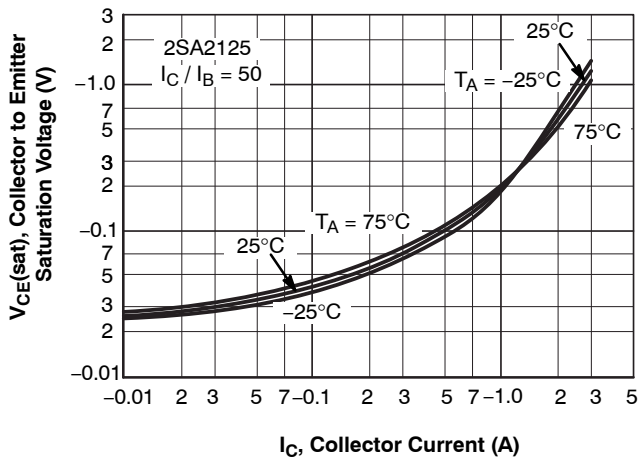


Figure 14.  $V_{CE(sat)} - I_C$

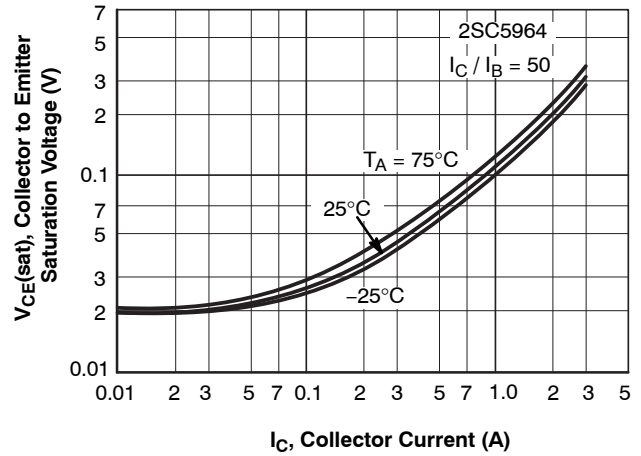


Figure 15.  $V_{CE(sat)} - I_C$

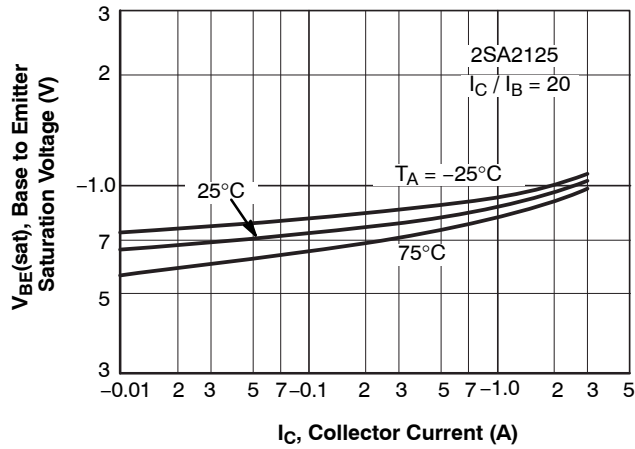


Figure 16.  $V_{BE(sat)} - I_C$

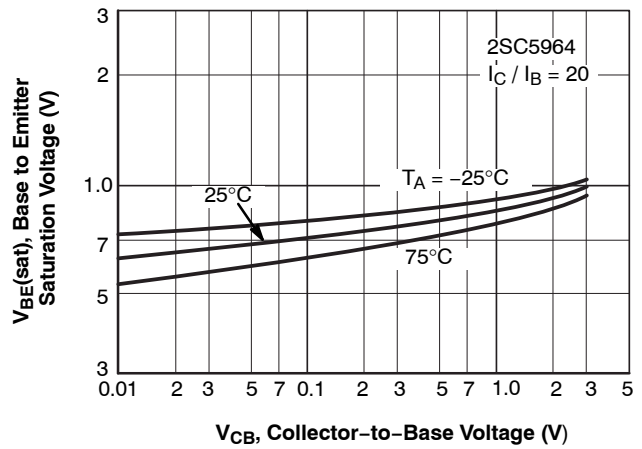


Figure 17.  $V_{BE(sat)} - I_C$

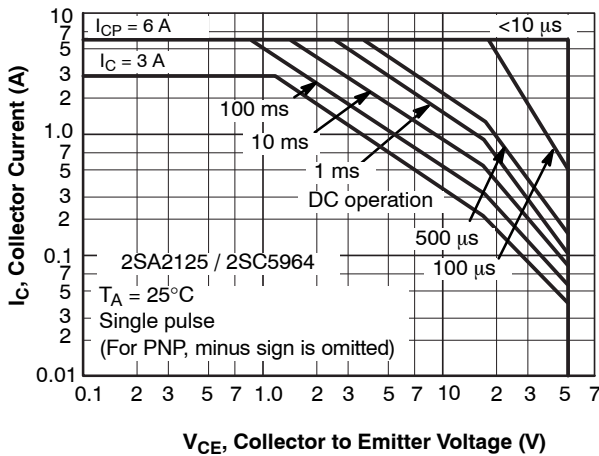


Figure 18. SOA

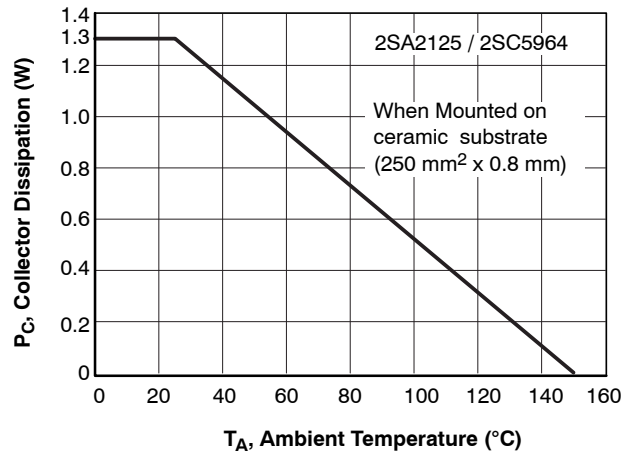


Figure 19.  $P_C - T_A$

## 2SA2125, 2SC5964

### TYPICAL CHARACTERISTICS (continued)

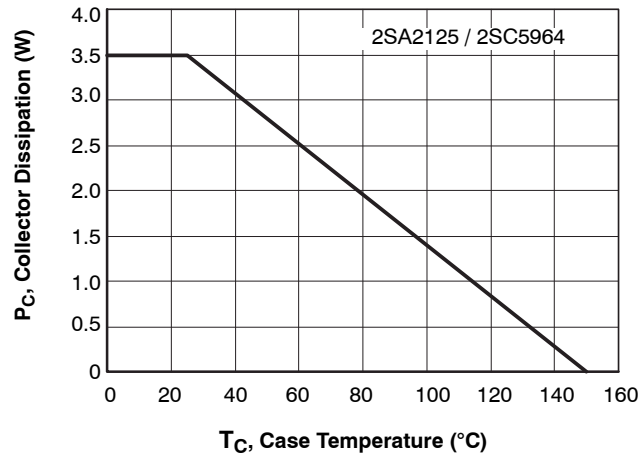


Figure 20.  $P_C - T_C$

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
2SA2125-TD-E	SOT-89 / PCP-1 (Pb-Free)	1000 / Tape & Reel
2SA2125-TD-H	SOT-89 / PCP-1 (Pb-Free & Halogen Free)	1000 / Tape & Reel
2SC5964-TD-E	SOT-89 / PCP-1 (Pb-Free)	1000 / Tape & Reel
2SC5964-TD-H	SOT-89 / PCP-1 (Pb-Free & Halogen 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](#).

# MECHANICAL CASE OUTLINE

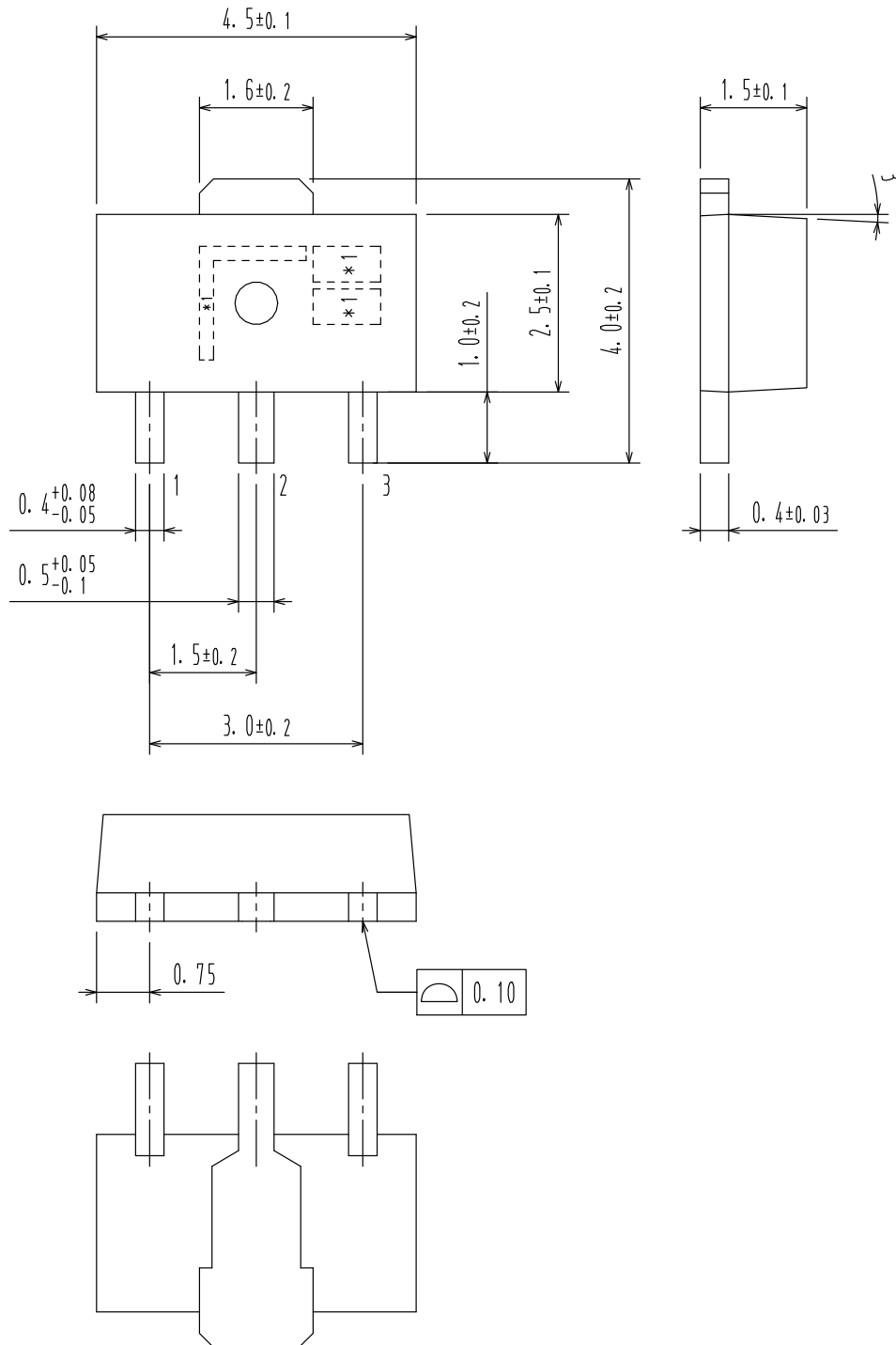
## PACKAGE DIMENSIONS

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### SOT-89 / PCP-1 CASE 419AU ISSUE O

DATE 30 APR 2012



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