

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

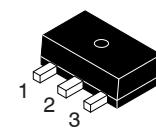
Specifications

(): 2SA2125

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

Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector to Base Voltage	–	(-50)100	V
V_{CES}	Collector to Emitter Voltage	–	(-50)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 ² 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

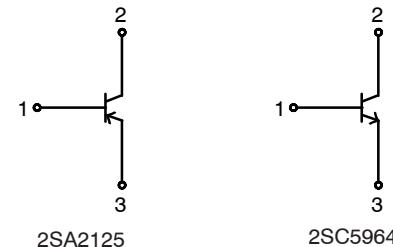
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



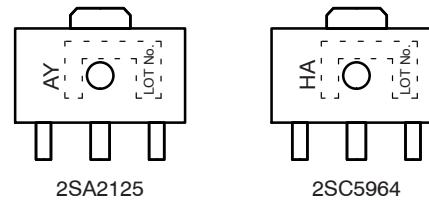
1. Base
2. Collector
3. Emitter

SOT-89 / PCP-1
CASE 419AU

ELECTRICAL CONNECTIONS



MARKING DIAGRAMS



AY/HA = Specific Device Code

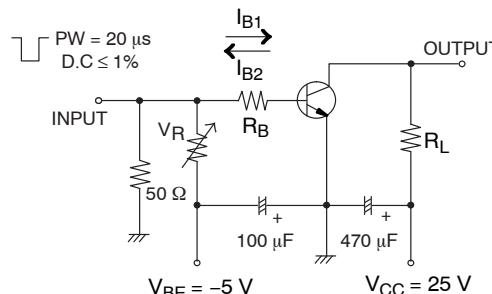
ORDERING INFORMATION

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

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

Symbol	Parameter	Conditions	Ratings			Unit
			Min	Typ	Max	
I_{CBO}	Collector Cutoff Current	$V_{CB} = (-)40\text{ V}$, $I_E = 0\text{ A}$	—	—	(-)1	μA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = (-)4\text{ V}$, $I_C = 0\text{ A}$	—	—	(-)1	μA
h_{FE1}	DC Current Gain	$V_{CE} = (-)2\text{ V}$, $I_C = (-)100\text{ mA}$	200	—	560	
f_T	Gain-Bandwidth Product	$V_{CE} = (-)10\text{ V}$, $I_C = (-)500\text{ mA}$	—	(390)380	—	MHz
C_{ob}	Output Capacitance	$V_{CB} = (-)10\text{ V}$, $f = 1\text{ MHz}$	—	(24)13	—	pF
$V_{CE(\text{sat})1}$	Collector to Emitter Saturation Voltage	$I_C = (-)1\text{ A}$, $I_B = (-)50\text{ mA}$	—	(-125)100	(-230)150	mV
$V_{CE(\text{sat})2}$		$I_C = (-)2\text{ A}$, $I_B = (-)100\text{ mA}$	—	(-250)190	(-500)290	mV
$V_{BE(\text{sat})}$	Base to Emitter Saturation Voltage	$I_C = (-)2\text{ A}$, $I_B = (-)100\text{ mA}$	—	(-)0.94	(-)1.2	V
$V_{(\text{BR})CBO}$	Collector to Base Breakdown Voltage	$I_C = (-)10\text{ }\mu\text{A}$, $I_E = 0\text{ A}$	(-50)100	—	—	V
$V_{(\text{BR})CES}$	Collector to Emitter Breakdown Voltage	$I_C = (-)100\text{ }\mu\text{A}$, $R_{BE} = 0\text{ }\Omega$	(-50)100	—	—	V
$V_{(\text{BR})CEO}$		$I_C = (-)1\text{ mA}$, $R_{BE} = \infty$	(-)50	—	—	V
$V_{(\text{BR})EBO}$	Emitter to Base Breakdown Voltage	$I_E = (-)10\text{ }\mu\text{A}$, $I_C = 0\text{ A}$	(-)6	—	—	V
t_{on}	Turn-ON Time	See specified Test Circuit	—	(30)35	—	ns
t_{stg}	Storage Time		—	(230)300	—	ns
t_f	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.



$$I_C = 10 I_{B1} = -10 I_{B2} = 1\text{ A}$$

For PNP, the polarity is reversed.

Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

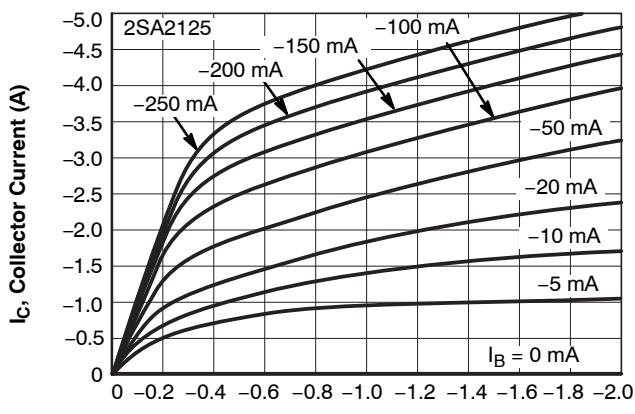


Figure 2. I_C – V_{CE}

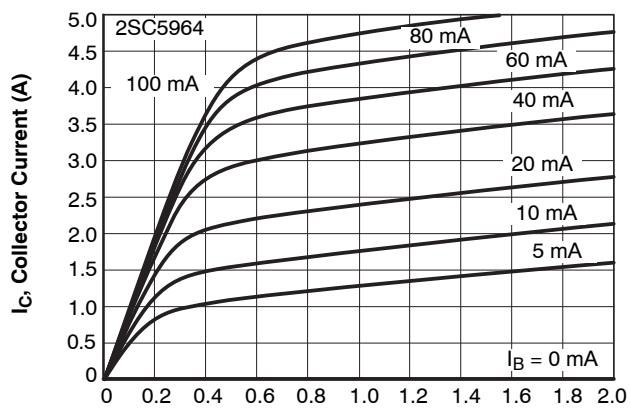


Figure 3. I_C – V_{CE}

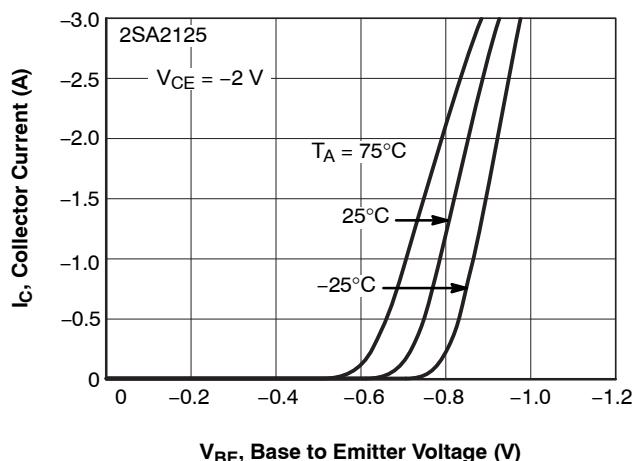


Figure 4. I_C – V_{BE}

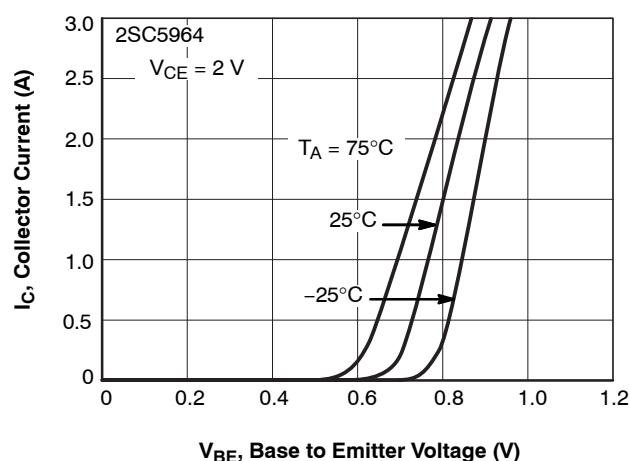


Figure 5. I_C – V_{BE}

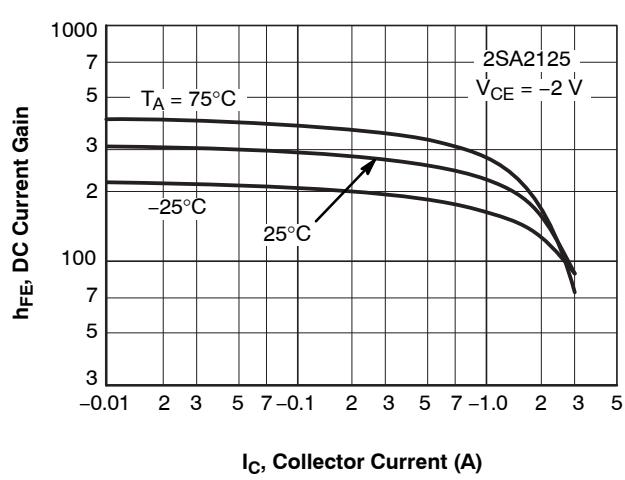


Figure 6. h_{FE} – I_C

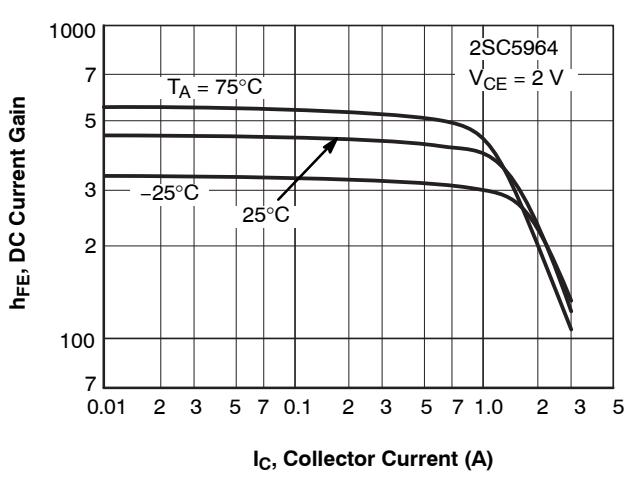


Figure 7. h_{FE} – I_C

2SA2125, 2SC5964

TYPICAL CHARACTERISTICS (continued)

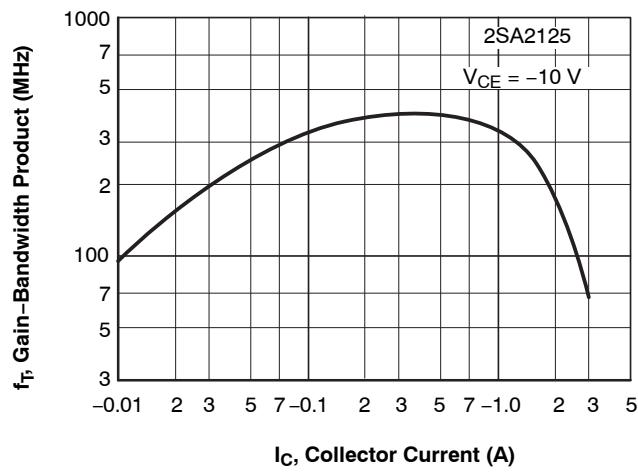


Figure 8. $f_T - I_C$

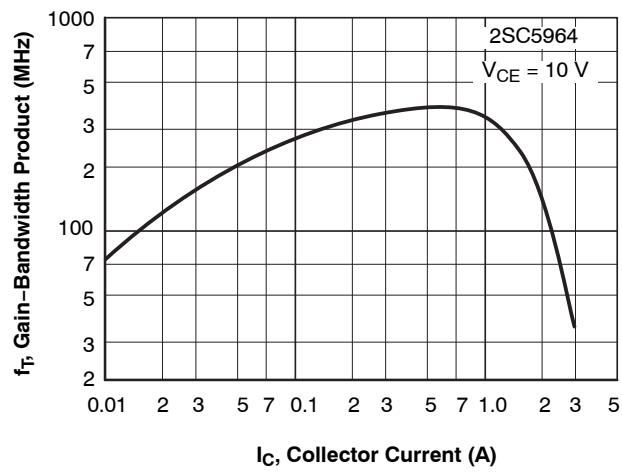


Figure 9. $f_T - I_C$

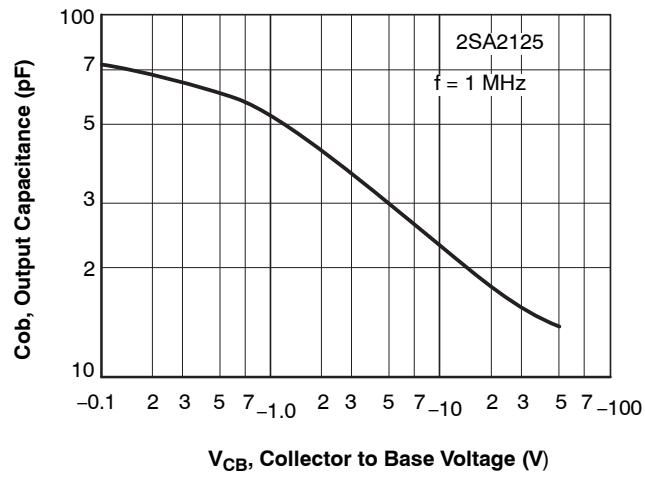


Figure 10. $C_{0b} - V_{CB}$

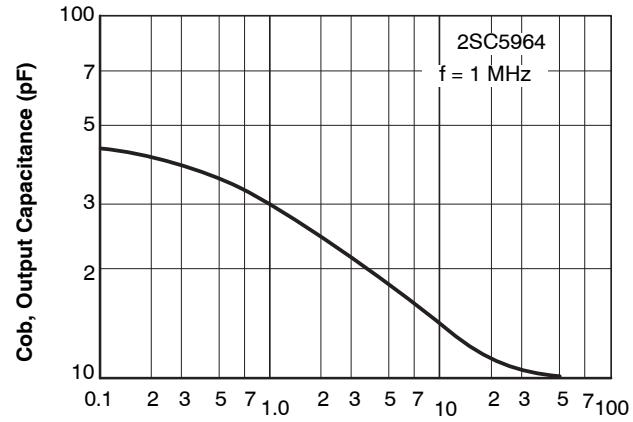


Figure 11. $C_{0b} - V_{CB}$

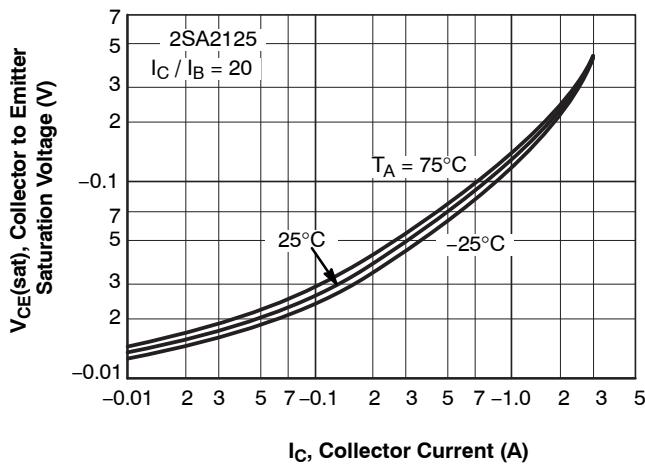


Figure 12. $V_{CE(sat)} - I_C$

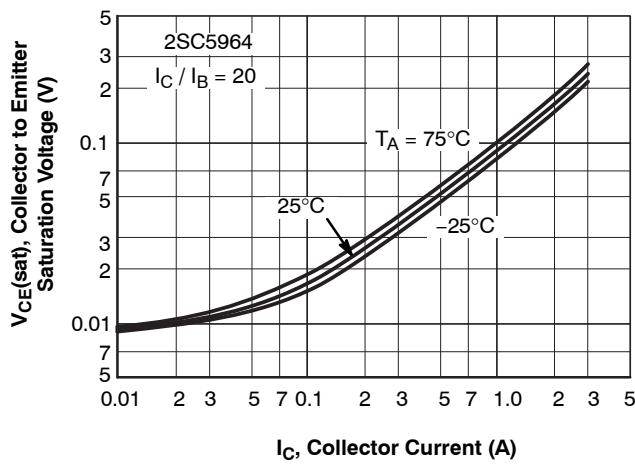


Figure 13. $V_{CE(sat)} - I_C$

TYPICAL CHARACTERISTICS (continued)

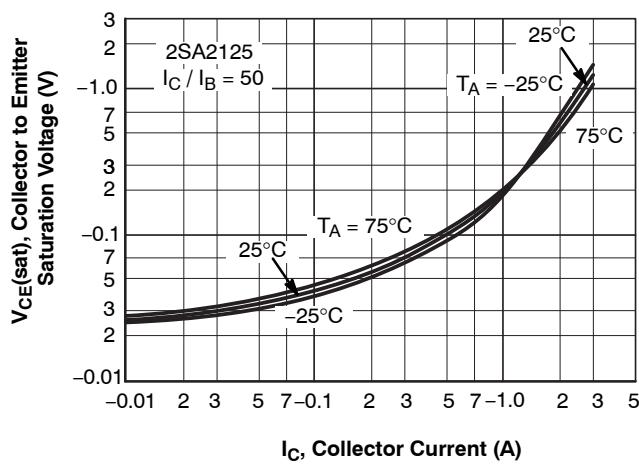


Figure 14. $V_{CE(sat)}$ – I_C

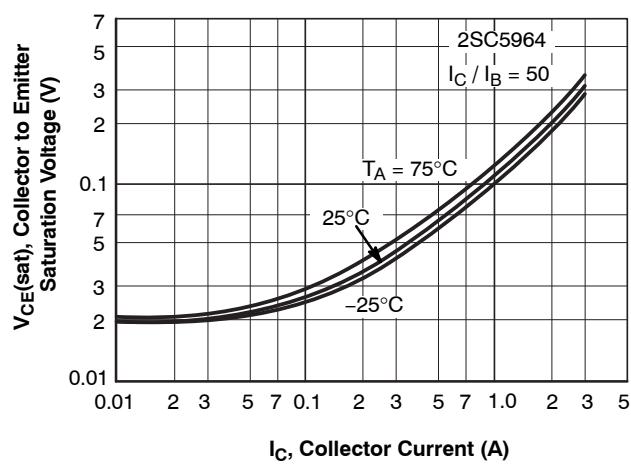


Figure 15. $V_{CE(sat)}$ – I_C

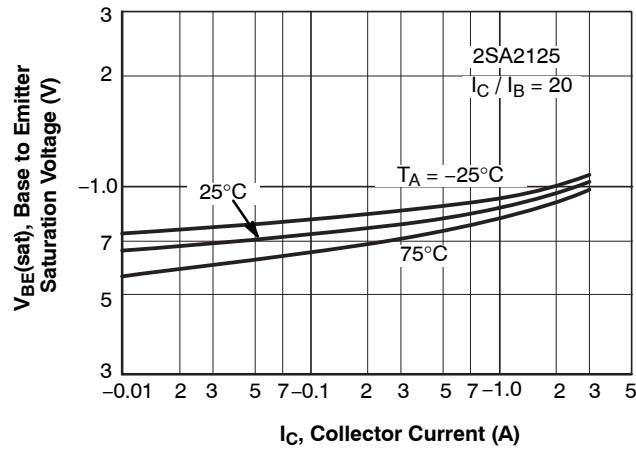


Figure 16. $V_{BE(sat)}$ – I_C

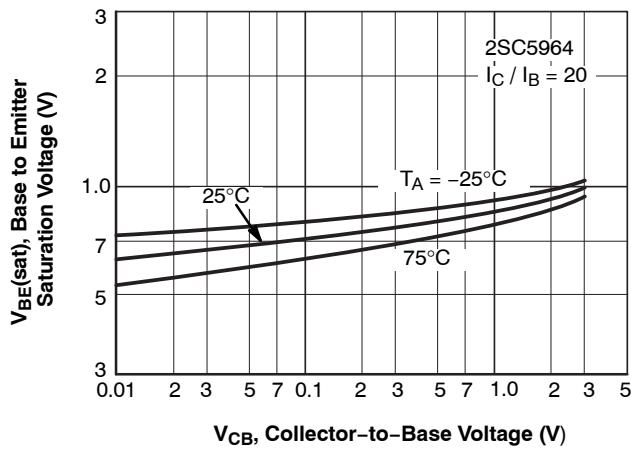


Figure 17. $V_{BE(sat)}$ – I_C

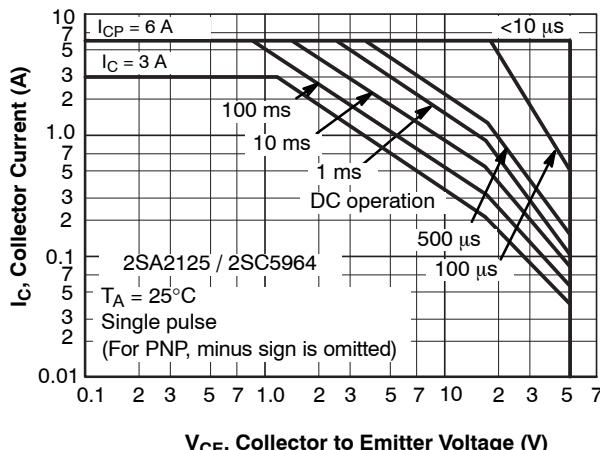


Figure 18. SOA

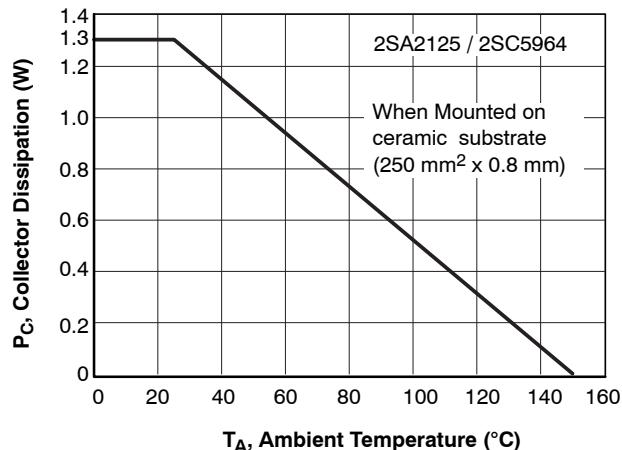


Figure 19. P_C – T_A

2SA2125, 2SC5964

TYPICAL CHARACTERISTICS (continued)

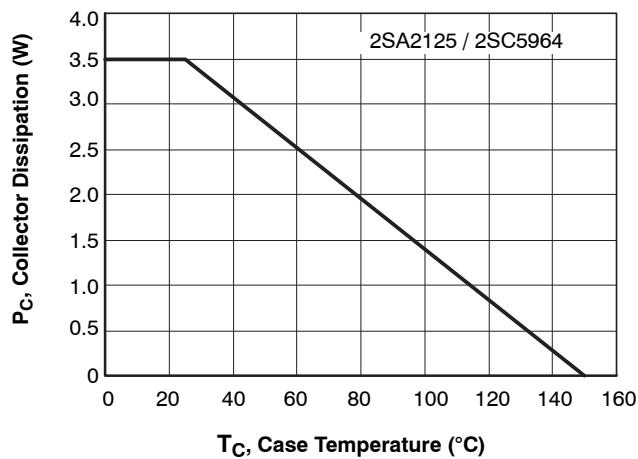
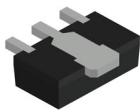


Figure 20. P_C – T_C

ORDERING INFORMATION

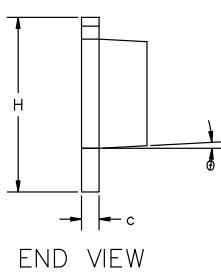
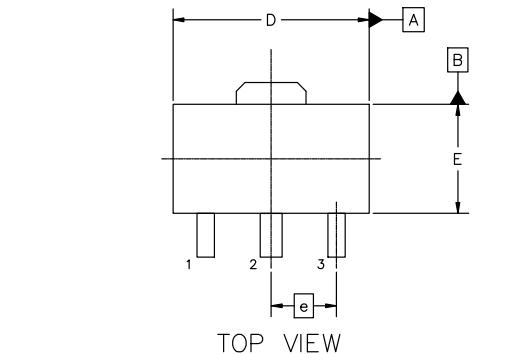
Device	Package	Shipping [†]
2SA2125-TD-E	SOT-89 / PCP-1 (Pb-Free)	1000 / Tape & Reel
2SA2125-TD-H	SOT-89 / PCP-1 (Pb-Free & Halogen Free)	1000 / Tape & Reel
2SC5964-TD-E	SOT-89 / PCP-1 (Pb-Free)	1000 / Tape & Reel
2SC5964-TD-H	SOT-89 / PCP-1 (Pb-Free & Halogen Free)	1000 / Tape & Reel

[†]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](#).



SOT-89 4.50x2.50x1.50 1.50P
CASE 419AU
ISSUE A

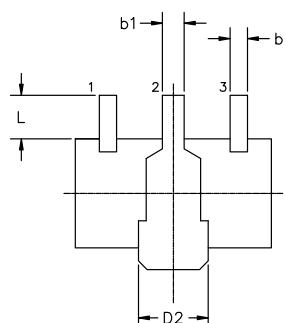
DATE 21 MAY 2025



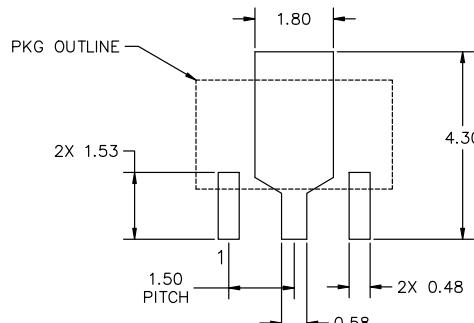
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS INCLUDES LEAD FINISH.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

MILLIMETERS			
DIM	MIN	NOM	MAX
A	1.40	1.50	1.60
b	0.35	0.40	0.48
b1	0.40	0.50	0.55
c	0.37	0.40	0.43
D	4.40	4.50	4.60
D2	1.40	1.60	1.80
E	2.40	2.50	2.60
e	1.50 BSC		
H	3.80	4.00	4.20
L	0.80	1.00	1.20
Ø	0°	---	3°



BOTTOM VIEW



RECOMMENDED MOUNTING FOOTPRINT

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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DESCRIPTION:	SOT-89 4.50x2.50x1.50 1.50P	PAGE 1 OF 1

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