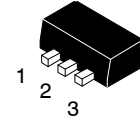


# Bipolar Transistor

50 V, 2 A, Low  $V_{CE(sat)}$ , NPN Single

## 2SC5994



SOT-89 / PCP-1  
CASE 419AU

### Features

- Adoption of MBIT Process
- Low Collector to Emitter Saturation Voltage
- Large Current Capacity
- High Speed Switching

### Applications

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

### SPECIFICATIONS

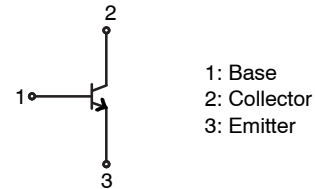
**ABSOLUTE MAXIMUM RATINGS** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Value	Unit
Collector to Base Voltage	$V_{CBO}$	100	V
Collector to Emitter Voltage	$V_{CES}$	100	V
	$V_{CEO}$	50	V
Emitter to Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	2	A
Collector Current (Pulse)	$I_{CP}$	4	A
Base Current	$I_B$	400	mA
Collector Dissipation (Note 1) $T_C = 25^\circ\text{C}$	$P_C$	1.3	W
		3.5	
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 to +150	$^\circ\text{C}$

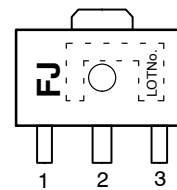
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on ceramic substrate (450 mm<sup>2</sup> x 0.8 mm).

### ELECTRICAL CONNECTION



### MARKING DIAGRAM



FJ = Specific Device Code

### ORDERING INFORMATION

Device	Package	Shipping†
2SC5994-TD-E	SOT-89 / PCP-1	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](#).

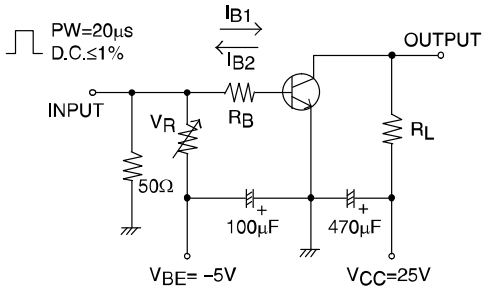
# 2SC5994

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

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 50\text{ V}, I_E = 0\text{ A}$			1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 4\text{ V}, I_C = 0\text{ A}$			1	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE} = 2\text{ V}, I_C = 100\text{ mA}$	200		560	
	$h_{FE2}$	$V_{CE} = 2\text{ V}, I_C = 1.5\text{ A}$	40			
Gain-Bandwidth Product	$f_T$	$V_{CE} = 10\text{ V}, I_C = 300\text{ mA}$		420		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$		9		pF
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 50\text{ mA}$		135	300	mV
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 50\text{ mA}$		0.9	1.2	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\text{ }\mu\text{A}, I_E = 0\text{ A}$	100			V
Collector to Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C = 100\text{ }\mu\text{A}, R_{BE} = 0\text{ }\Omega$	100			V
	$V_{(BR)CEO}$	$I_C = 1\text{ mA}, R_{BE} = \infty$	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		30		ns
Storage Time	$t_{stg}$			330		ns
Fall Time	$t_f$			40		ns

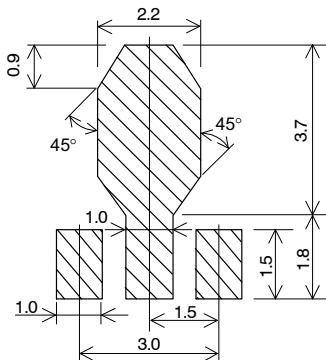
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

### Switching Time Test Circuit



$$I_C = 10\text{ mA}, I_{B1} = -10\text{ mA}, I_{B2} = 700\text{ mA}$$

### Recommended Soldering Footprint



TYPICAL CHARACTERISTICS

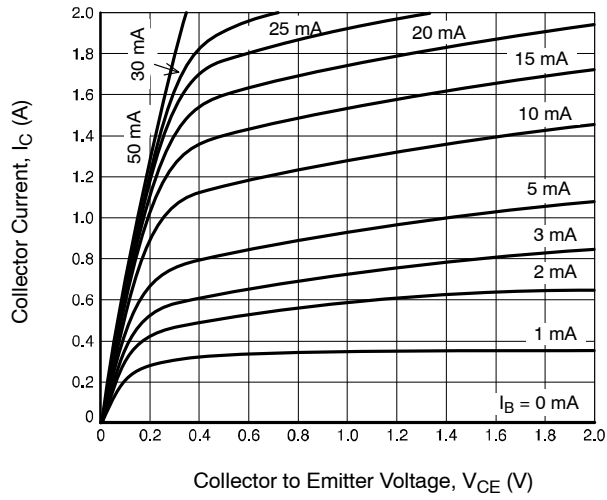


Figure 1.  $I_C - V_{CE}$

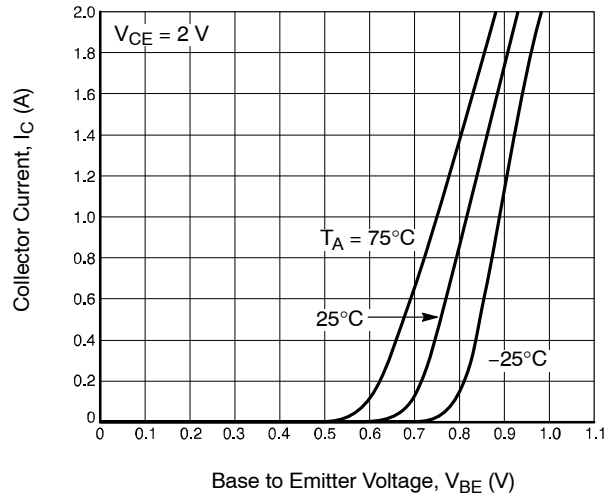


Figure 2.  $I_C - V_{BE}$

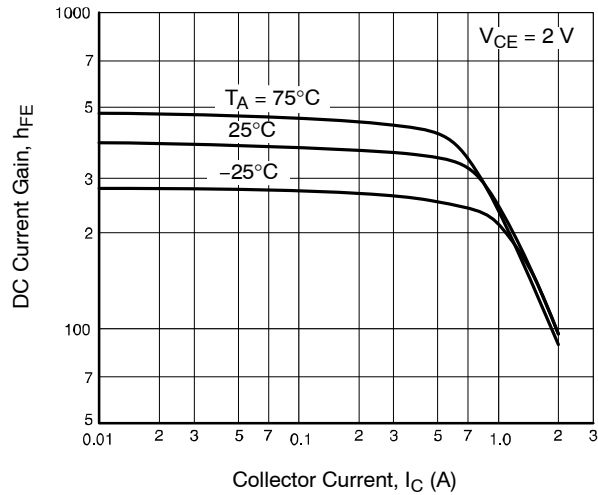


Figure 3.  $h_{FE} - I_C$

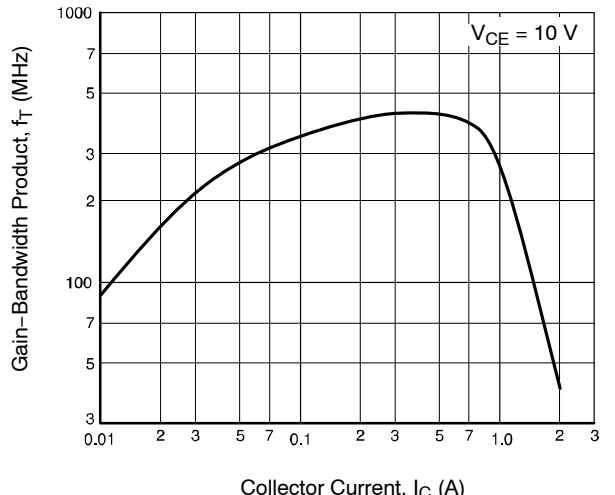


Figure 4.  $f_T - I_C$

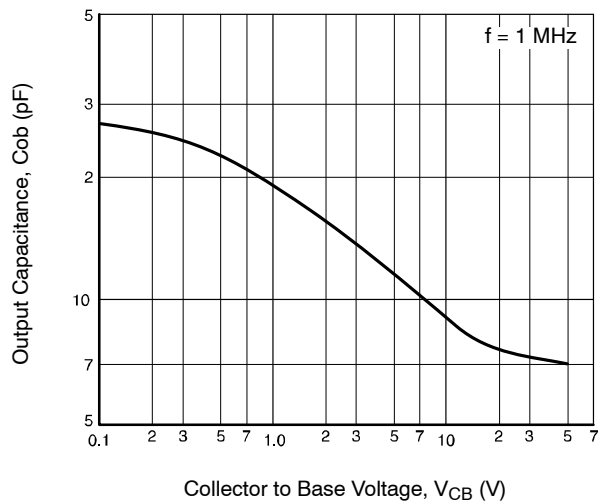


Figure 5.  $C_{ob} - V_{CB}$

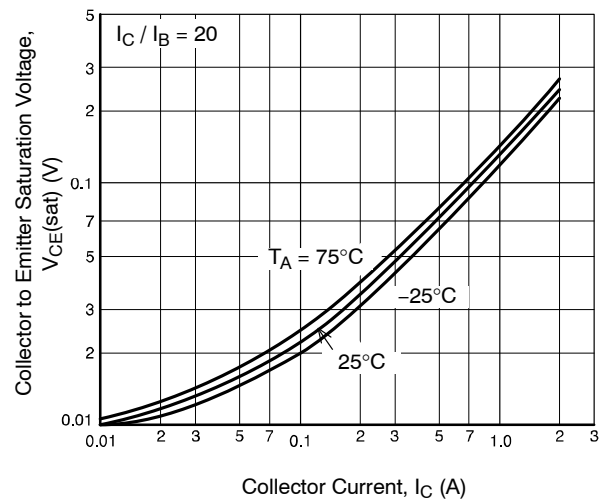


Figure 6.  $V_{CE(sat)} - I_C$

TYPICAL CHARACTERISTICS (continued)

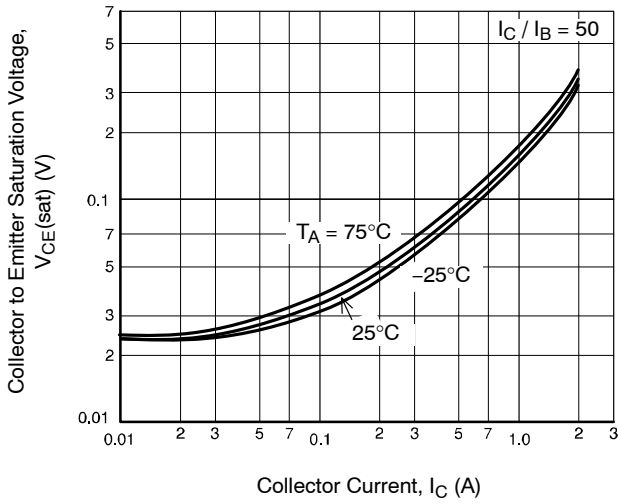


Figure 7.  $V_{CE(sat)} - I_C$

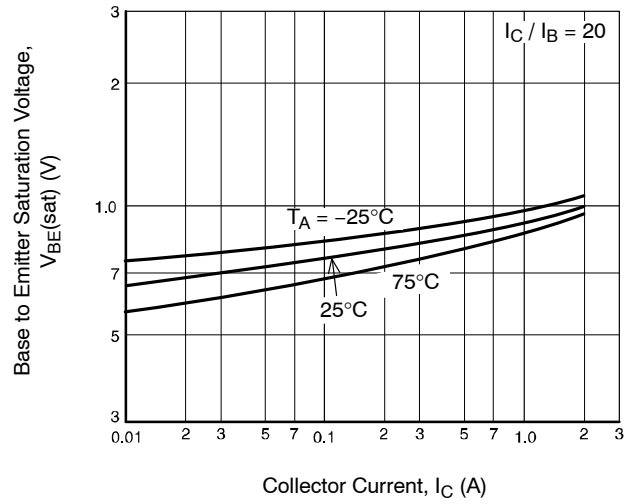


Figure 8.  $V_{BE(sat)} - I_C$

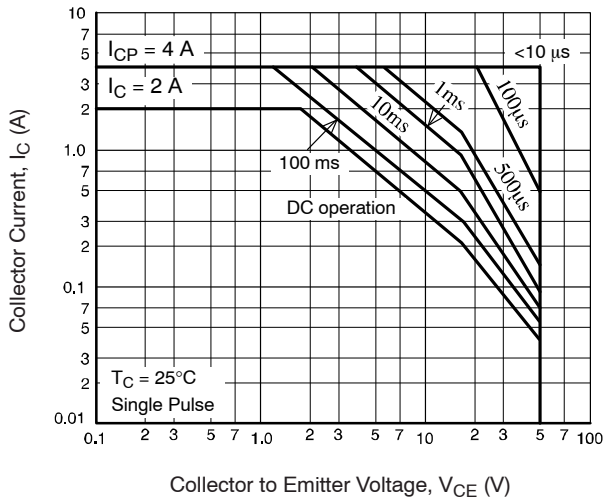


Figure 9. ASO

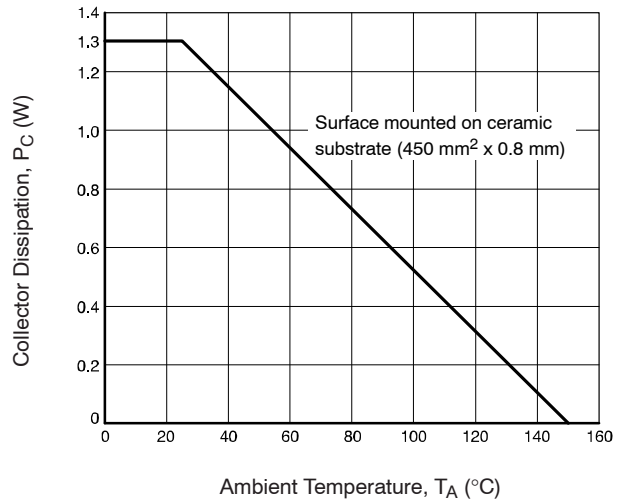


Figure 10.  $P_C - T_A$

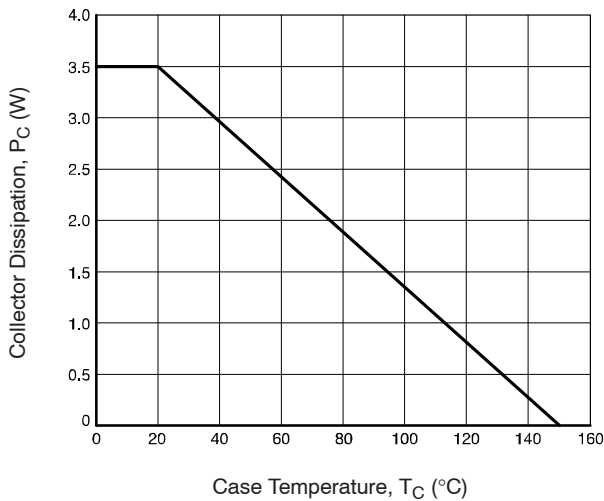
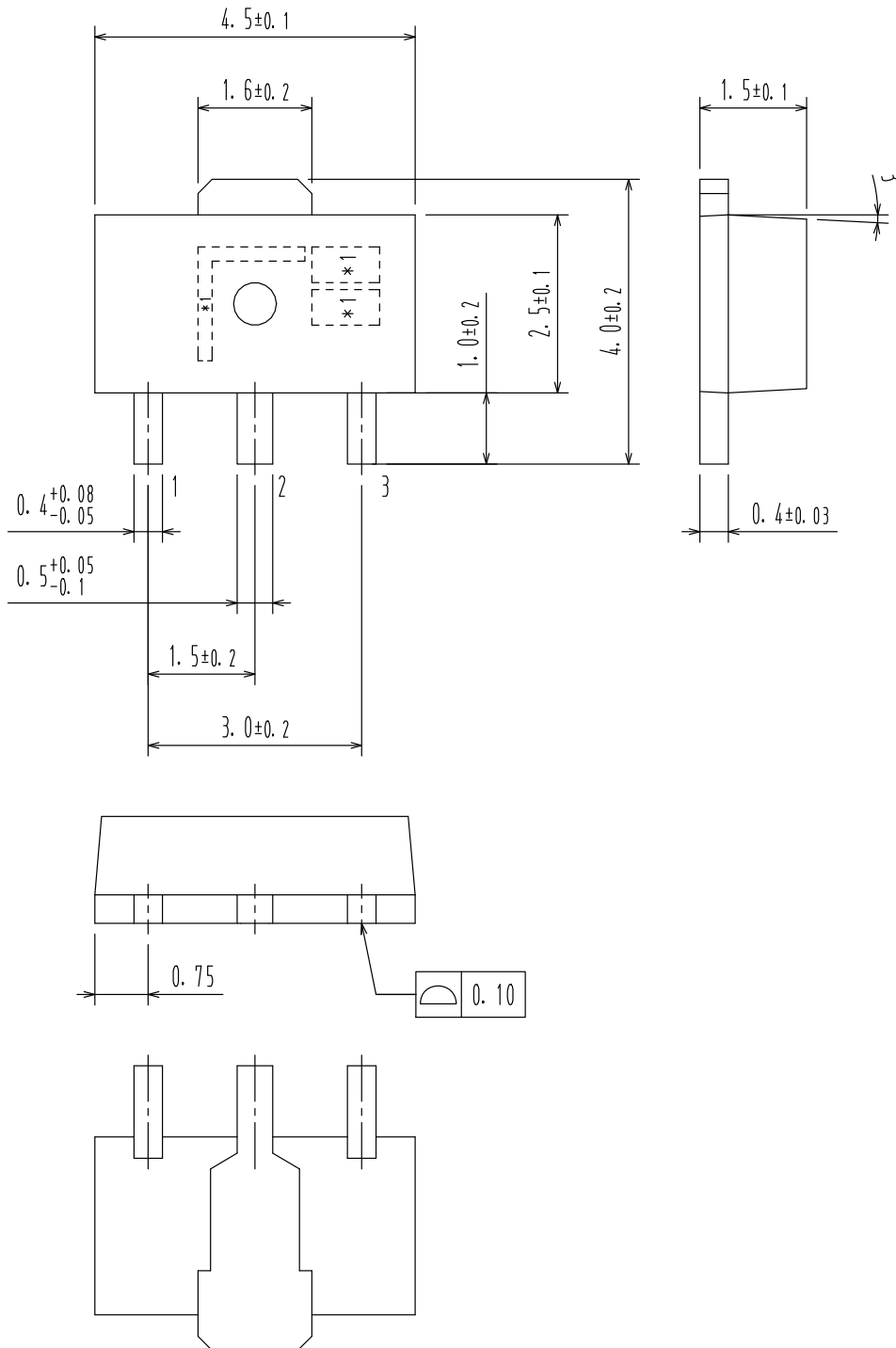


Figure 11.  $P_C - T_C$

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

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