

## PNP SILICON POWER TRANSISTORS 2SA1009, 2SA1009A

**DESCRIPTION** The 2SA1009, 2SA1009A are PNP triple diffused transistors designed for switching regulator, DC-DC converter and high frequency power amplifier application.

- FEATURES**
- Low Collector Saturation Voltage.
  - High Speed Switching.
  - Wide Reverse Bias Safe Operating Area.

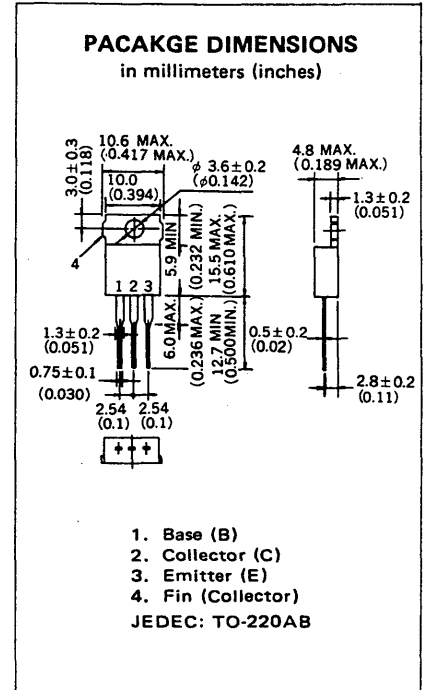
**ABSOLUTE MAXIMUM RATINGS**

Maximum Temperatures  
 Storage Temperature . . . . . -55 to +150 °C  
 Junction Temperature . . . . . 150 °C Maximum  
 Maximum Power Dissipation (T<sub>c</sub> = 25 °C)  
 Total Power Dissipation . . . . . 15 W  
 Maximum Voltages and Currents (T<sub>a</sub> = 25 °C)

2SA1009/2SA1009A

V <sub>CB0</sub>	Collector to Base Voltage . . . .	-350/ -400	V
V <sub>CEO</sub>	Collector to Emitter Voltage . .	-350/ -400	V
V <sub>EBO</sub>	Emitter to Base Voltage . . . . .	-7.0	V
I <sub>C(DC)</sub>	Collector Current (DC) . . . . .	-2.0	A
I <sub>C(pulse)</sub>	Collector Current (pulse)* . . . . .	-4.0	A
I <sub>B(DC)</sub>	Base Current (DC) . . . . .	-1.0	A

\* PW ≤ 300 μs, Duty Cycle ≤ 10 %



**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT.	TEST CONDITIONS
t <sub>on</sub>	Turn-on Time			1.0	μs	(I <sub>C</sub> = -0.3 A, I <sub>B1</sub> = -I <sub>B2</sub> = -60 mA R <sub>L</sub> = 500 Ω, V <sub>CC</sub> = -150 V)
t <sub>stg</sub>	Storage Time			2.5	μs	
t <sub>f</sub>	Fall Time			1.0	μs	
h <sub>FE1</sub>	DC Current Gain**	20		200	-	V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -0.1 A
h <sub>FE2</sub>	DC Current Gain**	10			-	V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -0.3 A
V <sub>CE(sat)</sub>	Collector Saturation Voltage**			-1.0	V	I <sub>C</sub> = -0.3 A, I <sub>B</sub> = -60 mA
V <sub>BE(sat)</sub>	Base Saturation Voltage**			-1.2	V	I <sub>C</sub> = -0.3 A, I <sub>B</sub> = -60 mA
V <sub>CEO(SUS)</sub>	Collector to Emitter Sustaining Voltage	-350/-400			V	I <sub>C</sub> = -0.3 A, I <sub>B</sub> = -60 mA, L = 1 mH
V <sub>CEX(SUS)1</sub>	Collector to Emitter Sustaining Voltage	-350/-400			V	I <sub>C</sub> = -0.3 A, I <sub>B1</sub> = -I <sub>B2</sub> = -60 mA, L = 180 μH, Clamped
V <sub>CEX(SUS)2</sub>	Collector to Emitter Sustaining Voltage	-350/-400			V	I <sub>C</sub> = -0.6 A, I <sub>B1</sub> = -0.2 A, -I <sub>B2</sub> = 60 mA, L = 180 μH, Clamped
I <sub>CB0</sub>	Collector Cutoff Current			-10	μA	V <sub>CB</sub> = -350/-400 V, I <sub>E</sub> = 0
I <sub>CER</sub>	Collector Cutoff Current			-1.0	mA	V <sub>CE</sub> = -350/-400 V, R <sub>BE</sub> = 51 Ω, T <sub>a</sub> = 125 °C
I <sub>CEX1</sub>	Collector Cutoff Current			-10	μA	V <sub>CE</sub> = -350/-400 V, V <sub>BE(OFF)</sub> = 1.5 V
I <sub>CEX2</sub>	Collector Cutoff Current			-1.0	mA	V <sub>CE</sub> = -350/-400 V, V <sub>BE(OFF)</sub> = 1.5 V, T <sub>a</sub> = 125 °C
I <sub>EBO</sub>	Emitter Cutoff Current			-10	μA	V <sub>EB</sub> = -5.0 V, I <sub>C</sub> = 0

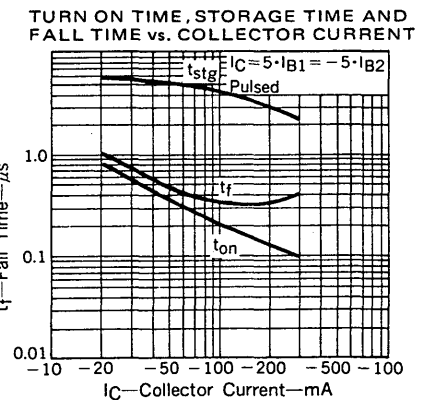
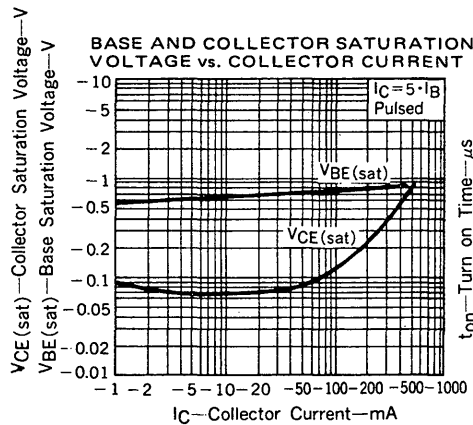
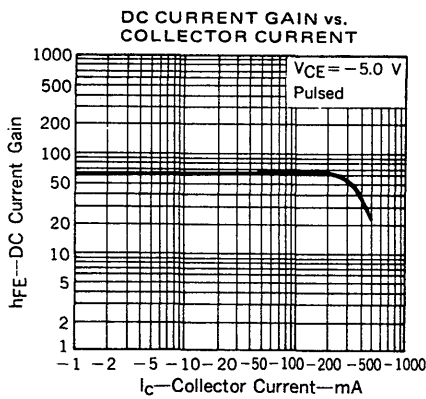
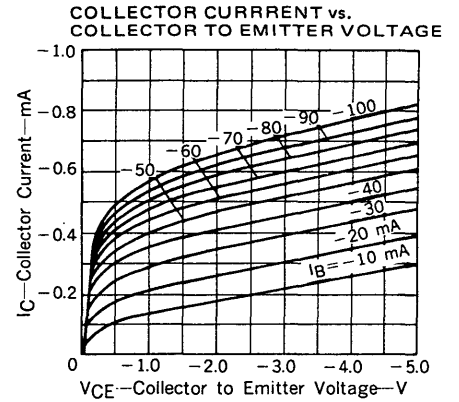
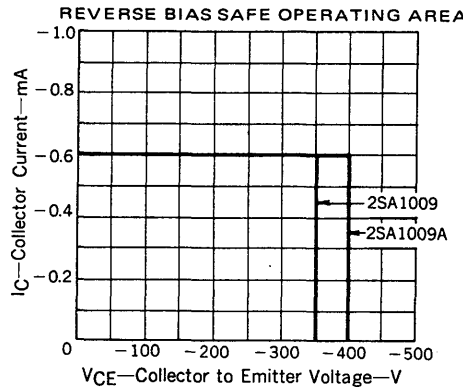
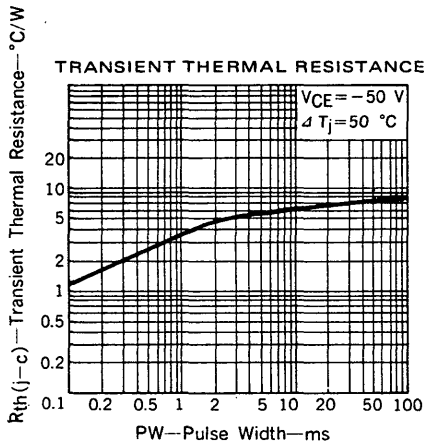
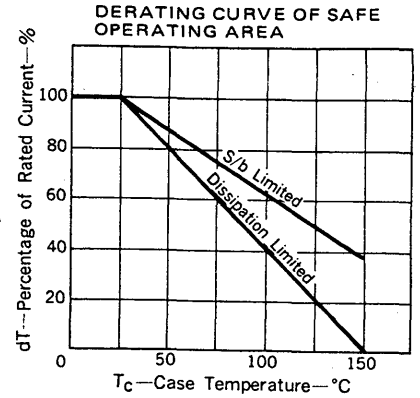
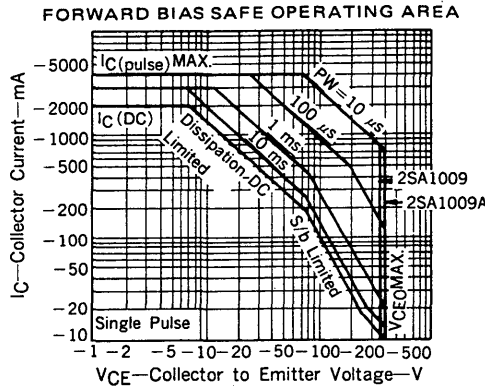
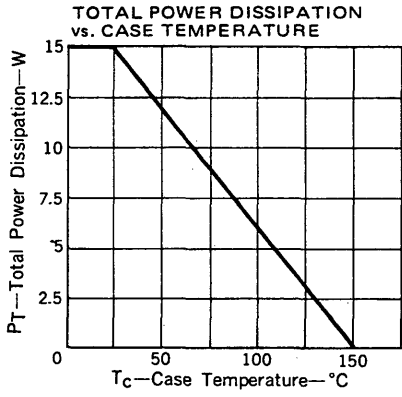
\*\*PW ≤ 350 μs, Duty Cycle ≤ 2 %

**Classification of h<sub>FE1</sub>**

Rank	M	L	K	J	H
Range	20 to 40	30 to 60	40 to 80	60 to 120	100 to 200

Test Conditions: V<sub>CE</sub> = -5.0 V, I<sub>C</sub> = -0.1 A

TYPICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ )



SWITCHING TIME ( $t_{on}$ ,  $t_{stg}$ ,  $t_f$ ) TEST CIRCUIT

