

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 ($T_c = 25$ °C)

Total Power Dissipation 15 W

Maximum Voltages and Currents ($T_a = 25$ °C)

2SA1009/2SA1009A

V_{CBO} Collector to Base Voltage $-350/ -400$ V

V_{CEO} Collector to Emitter Voltage . . $-350/ -400$ V

V_{EBO} Emitter to Base Voltage -7.0 V

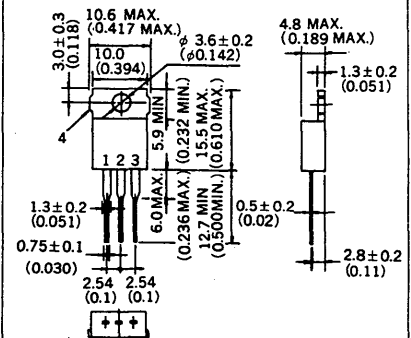
$I_C(DC)$ Collector Current (DC) -2.0 A

$I_C(pulse)$ Collector Current (pulse)* -4.0 A

$I_B(DC)$ Base Current (DC) -1.0 A

* $PW \leq 300 \mu s$, Duty Cycle $\leq 10\%$

PACKAGE DIMENSIONS in millimeters (inches)



1. Base (B)
 2. Collector (C)
 3. Emitter (E)
 4. Fin (Collector)
- JEDEC: TO-220AB

ELECTRICAL CHARACTERISTICS ($T_a = 25$ °C)

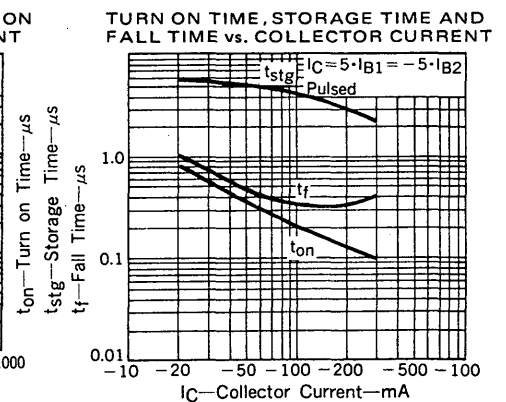
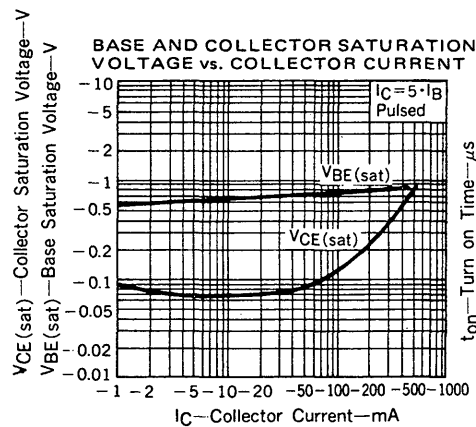
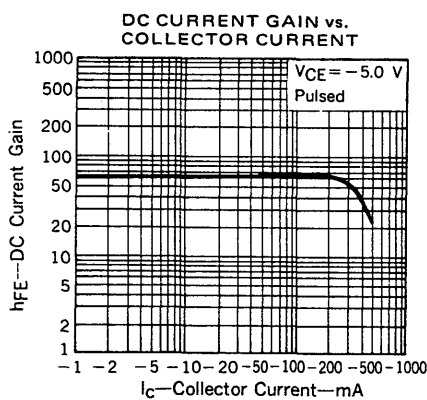
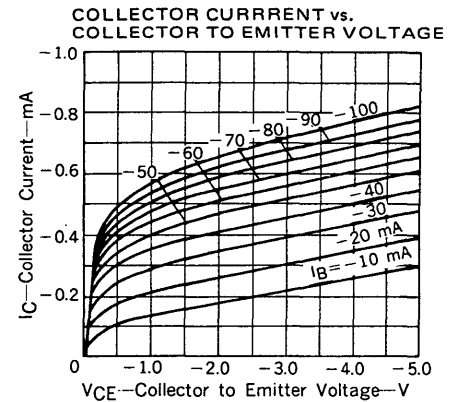
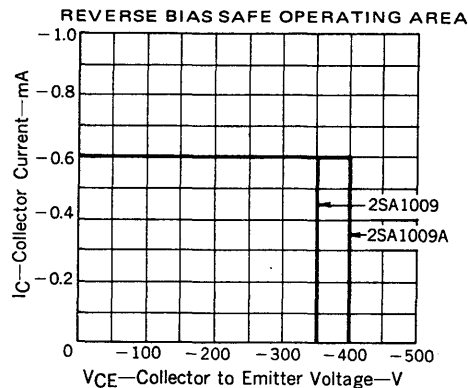
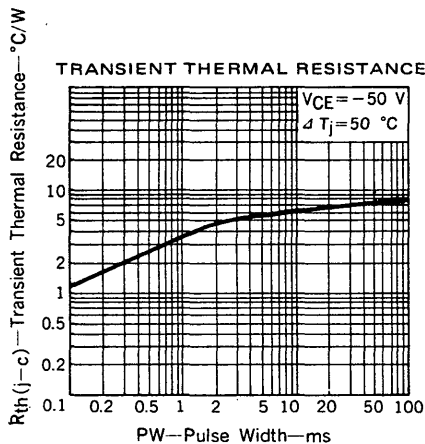
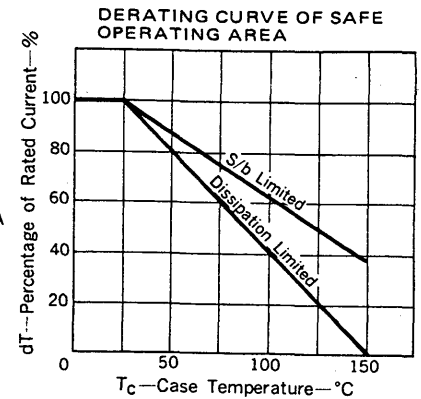
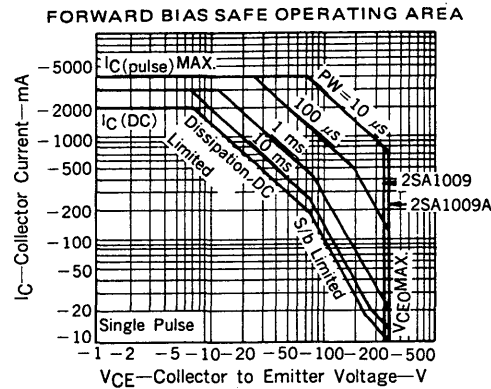
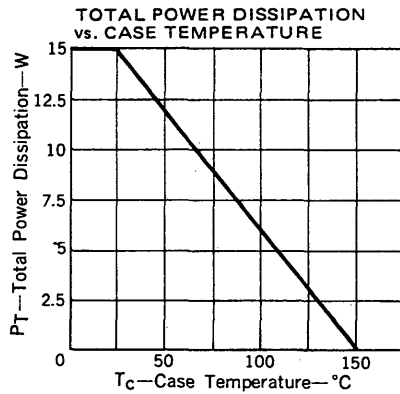
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT.	TEST CONDITIONS
t_{on}	Turn-on Time			1.0	μs	$I_C = -0.3$ A, $I_{B1} = -I_{B2} = -60$ mA $R_L = 500 \Omega$, $V_{CC} = -150$ V
t_{stg}	Storage Time			2.5	μs	
t_f	Fall Time			1.0	μs	
h_{FE1}	DC Current Gain**	20		200	—	$V_{CE} = -5.0$ V, $I_C = -0.1$ A
h_{FE2}	DC Current Gain**	10			—	$V_{CE} = -5.0$ V, $I_C = -0.3$ A
$V_{CE(sat)}$	Collector Saturation Voltage**			-1.0	V	$I_C = -0.3$ A, $I_B = -60$ mA
$V_{BE(sat)}$	Base Saturation Voltage**			-1.2	V	$I_C = -0.3$ A, $I_B = -60$ mA
$V_{CEO(SUS)}$	Collector to Emitter Sustaining Voltage	-350/-400			V	$I_C = -0.3$ A, $I_B = -60$ mA, $L = 1$ mH
$V_{CEX(SUS)1}$	Collector to Emitter Sustaining Voltage	-350/-400			V	$I_C = -0.3$ A, $I_{B1} = -I_{B2} = -60$ mA, $L = 180 \mu H$, Clamped
$V_{CEX(SUS)2}$	Collector to Emitter Sustaining Voltage	-350/-400			V	$I_C = -0.6$ A, $I_{B1} = -0.2$ A, $-I_{B2} = 60$ mA, $L = 180 \mu H$, Clamped
I_{CBO}	Collector Cutoff Current			-10	μA	$V_{CB} = -350/-400$ V, $I_E = 0$
I_{CER}	Collector Cutoff Current			-1.0	mA	$V_{CE} = -350/-400$ V, $R_{BE} = 51 \Omega$, $T_a = 125$ °C
I_{CEX1}	Collector Cutoff Current			-10	μA	$V_{CE} = -350/-400$ V, $V_{BE(OFF)} = 1.5$ V
I_{CEX2}	Collector Cutoff Current			-1.0	mA	$V_{CE} = -350/-400$ V, $V_{BE(OFF)} = 1.5$ V, $T_a = 125$ °C
I_{EBO}	Emitter Cutoff Current			-10	μA	$V_{EB} = -5.0$ V, $I_C = 0$

** $PW \leq 350 \mu s$, Duty Cycle $\leq 2\%$

Classification of h_{FE1}

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

Test Conditions: $V_{CE} = -5.0$ V, $I_C = -0.1$ A

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

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

