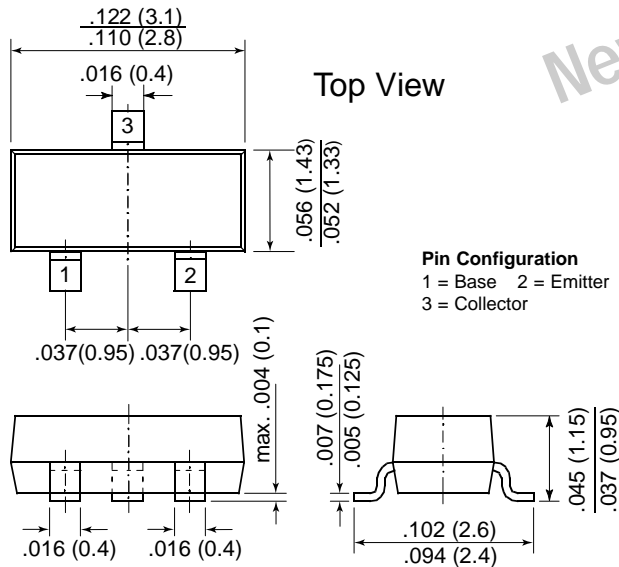


## Small Signal Transistor (PNP)

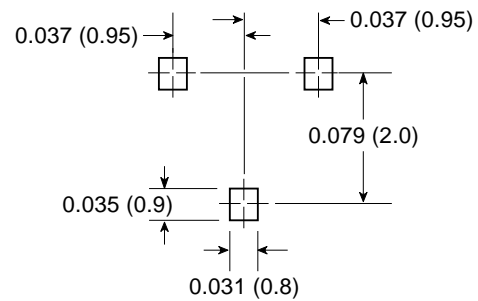


### TO-236AB (SOT-23)



New Product

### Mounting Pad Layout



## Mechanical Data

**Case:** SOT-23 Plastic Package

**Weight:** approx. 0.008g

**Marking Code:** 2F

**Packaging Codes/Options:**

E8/10K per 13" reel (8mm tape)

E9/3K per 7" reel (8mm tape)

## Features

- PNP Silicon Epitaxial Planar Transistor for switching and amplifier applications.
- This transistor is also available in the TO-92 case with the type designation MPS2907A.

## Maximum Ratings & Thermal Characteristics Ratings at 25°C ambient temperature unless otherwise specified.

Parameters	Symbols	Value	Units
Collector-Emitter Voltage	-V <sub>CEO</sub>	60	V
Collector-Base Voltage	-V <sub>CB0</sub>	60	V
Emitter-Base Voltage	-V <sub>EB0</sub>	5.0	V
Collector Current	-I <sub>C</sub>	600	mA
Power Dissipation <sup>(1)</sup>	T <sub>A</sub> = 25°C Derate above 25°C	225 1.8	mW mW/°C
Power Dissipation <sup>(2)</sup>	T <sub>A</sub> = 25°C Derate above 25°C	300 2.4	mW mW/°C
Thermal Resistance Junction to Ambient Air	FR-5 Board Alumina Substrate	556 417	°C/W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature Range	T <sub>s</sub>	- 55 to +150	°C

**Notes:**

(1) FR-5 Board = 1.0 x 0.75 x 0.062 in.

(2) Alumina Substrate = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

## Small Signal Transistor (PNP)

### Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
DC Current Gain	h <sub>FE</sub>	-V <sub>CE</sub> = 10 V, -I <sub>C</sub> = 0.1 mA	75	—	—	—
		-V <sub>CE</sub> = 10 V, -I <sub>C</sub> = 1 mA	100	—	—	
		-V <sub>CE</sub> = 10 V, -I <sub>C</sub> = 10 mA	100	—	—	
		-V <sub>CE</sub> = 10 V, -I <sub>C</sub> = 150 mA <sup>(1)</sup>	100	—	300	
		-V <sub>CE</sub> = 10 V, -I <sub>C</sub> = 500 mA <sup>(1)</sup>	50	—	—	
Collector Cutoff Current	-I <sub>CEX</sub>	-V <sub>EB</sub> = 0.5 V, -V <sub>CE</sub> = 30 V	—	—	50	nA
Collector Cutoff Current	-I <sub>CB0</sub>	-V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0 -V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0, T <sub>A</sub> = 125°C	—	—	0.01 10	μA
Emitter-Base Cutoff Current	-I <sub>BL</sub>	-V <sub>EB</sub> = 0.5 V, -V <sub>CE</sub> = 30 V	—	—	50	nA
Collector-Emitter Saturation Voltage <sup>(1)</sup>	-V <sub>CEsat</sub>	-I <sub>C</sub> = 150 mA, -I <sub>B</sub> = 15 mA -I <sub>C</sub> = 500 mA, -I <sub>B</sub> = 50 mA	—	—	0.4 1.6	V
Base-Emitter Saturation Voltage <sup>(1)</sup>	-V <sub>BEsat</sub>	-I <sub>C</sub> = 150 mA, -I <sub>B</sub> = 15 mA -I <sub>C</sub> = 500 mA, -I <sub>B</sub> = 50 mA	—	—	1.3 2.6	V
Collector-Emitter Breakdown Voltage <sup>(1)</sup>	-V <sub>(BR)CEO</sub>	-I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0	60	—	—	V
Collector-Base Breakdown Voltage	-V <sub>(BR)CBO</sub>	-I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0	60	—	—	V
Emitter-Base Breakdown Voltage	-V <sub>(BR)EBO</sub>	-I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0	5.0	—	—	V
Current Gain-Bandwidth Product	f <sub>T</sub>	-V <sub>CE</sub> = 20 V, -I <sub>C</sub> = 50 mA f = 100 MHz	200	—	—	MHz
Output Capacitance	C <sub>obo</sub>	-V <sub>CB</sub> = 10 V, f = 1.0 MHz I <sub>E</sub> = 0	—	—	8	pF
Input Capacitance	C <sub>ibo</sub>	-V <sub>EB</sub> = 2.0 V, f = 1.0 MHz I <sub>C</sub> = 0	—	—	30	pF

**Notes:**

(1) Pulse test: Pulse width ≤ 300 μs, duty cycle ≤ 2.0%

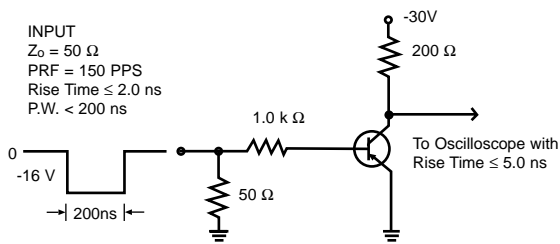
**Small Signal Transistor (PNP)**

**Electrical Characteristics** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Turn-ON Time	$t_{on}$	$-I_{B1} = 15\text{ mA}, -I_C = 150\text{ mA}$ $-V_{CC} = 30\text{ V}$	—	—	45	ns
Delay Time	$t_d$	$-I_{B1} = 15\text{ mA}, -I_C = 150\text{ mA}$ $-V_{CC} = 30\text{ V}$	—	—	10	ns
Rise Time	$t_r$	$-I_{B1} = 15\text{ mA}, -I_C = 150\text{ mA},$ $-V_{CC} = 30\text{ V}$	—	—	40	ns
Turn-OFF Time	$t_{off}$	$-I_{B1} = 15\text{ mA}, -I_C = 150\text{ mA}$ $-V_{CC} = 6.0\text{ V}$	—	—	100	ns
Storage Time	$t_s$	$-I_{B1} = -I_{B2} = 15\text{ mA},$ $-I_C = 150\text{ mA}, -V_{CC} = 6.0\text{ V}$	—	—	80	ns
Fall Time	$t_f$	$-I_{B1} = -I_{B2} = 15\text{ mA},$ $-I_C = 150\text{ mA}, -V_{CC} = 6\text{ V}$	—	—	30	ns

**Switching Time Equivalent Test Circuit**

**Figure 1 - Delay and Rise Time Test Circuit**



**Figure 2 - Storage and Fall Time Test Circuit**

