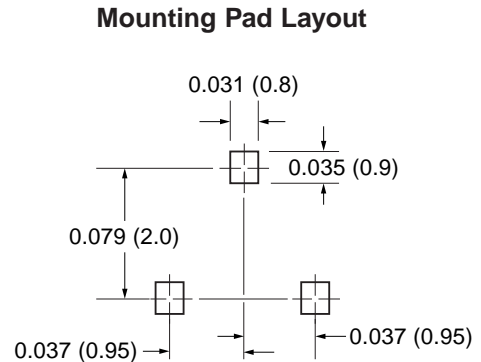
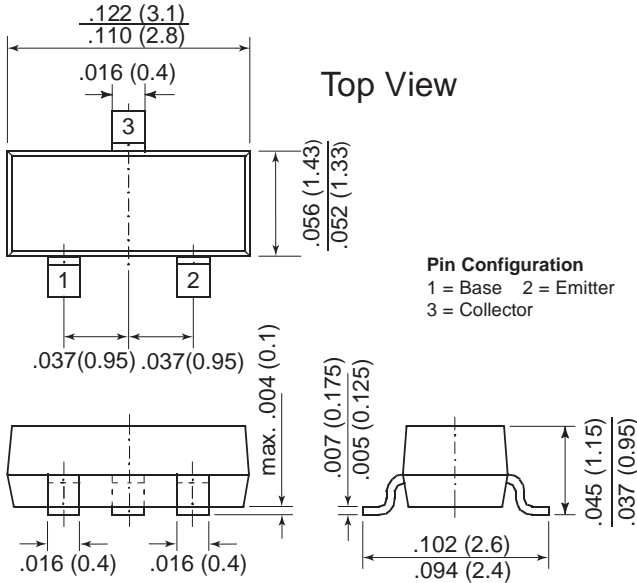




# Small Signal Transistor (PNP)

TO-236AB (SOT-23)



## 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.

## Mechanical Data

- Case:** SOT-23 Plastic Package
- Weight:** approx. 0.008g
- Marking Code:** 2F
- Packaging Codes/Options:**  
E8/10K per 13" reel (8mm tape), 30K/box  
E9/3K per 7" reel (8mm tape), 30K/box

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

Parameter	Symbol	Value	Unit	
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>	P <sub>tot</sub>	TA = 25°C Derate above 25°C	225 1.8	mW mW/°C
Power Dissipation <sup>(2)</sup>		TA = 25°C Derate above 25°C	300 2.4	mW mW/°C
Thermal Resistance Junction to Ambient Air	R <sub>θJA</sub>	FR-5 Board	556	°C/W
		Alumina Substrate	417	
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.

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

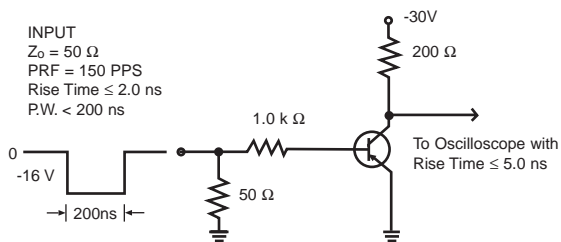
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
DC Current Gain	h <sub>FE</sub>	-V <sub>CE</sub> = 10V, -I <sub>C</sub> = 0.1mA	75	—	—	—
		-V <sub>CE</sub> = 10V, -I <sub>C</sub> = 1mA	100	—	—	
		-V <sub>CE</sub> = 10V, -I <sub>C</sub> = 10mA	100	—	—	
		-V <sub>CE</sub> = 10V, -I <sub>C</sub> = 150mA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

**Note:**

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

**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**
