

# PN2907 / MMBT2907

## PNP General-Purpose Transistor

### Description

This device is designed for use with general-purpose amplifiers and switches requiring collector currents to 500 mA. Sourced from process 63.



### Ordering Information

Part Number	Top Mark	Package	Packing Method
PN2907BU	PN2907	TO-92 3L	Bulk
MMBT2907_D87Z	2B	SOT-23 3L	Tape and Reel

## Absolute Maximum Ratings<sup>(1),(2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	-40	V
$V_{CBO}$	Collector-Base Voltage	-60	V
$V_{EBO}$	Emitter-Base Voltage	-5.0	V
$I_C$	Collector Current - Continuous	-800	mA
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

### Notes:

- These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
- These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.

## Thermal Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Max.		Unit
		PN2907 <sup>(3)</sup>	MMBT2907 <sup>(4)</sup>	
$P_D$	Total Device Dissipation	625	350	mW
	Derate Above $25^\circ\text{C}$	5.0	2.8	mW/ $^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3		$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	$^\circ\text{C}/\text{W}$

### Notes:

- PCB size: FR-4 76 x 114 x 1.57 mm<sup>3</sup> (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.
- Device mounted on FR-4 PCB 1.6 inch x 1.6 inch x 0.06 inch.

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

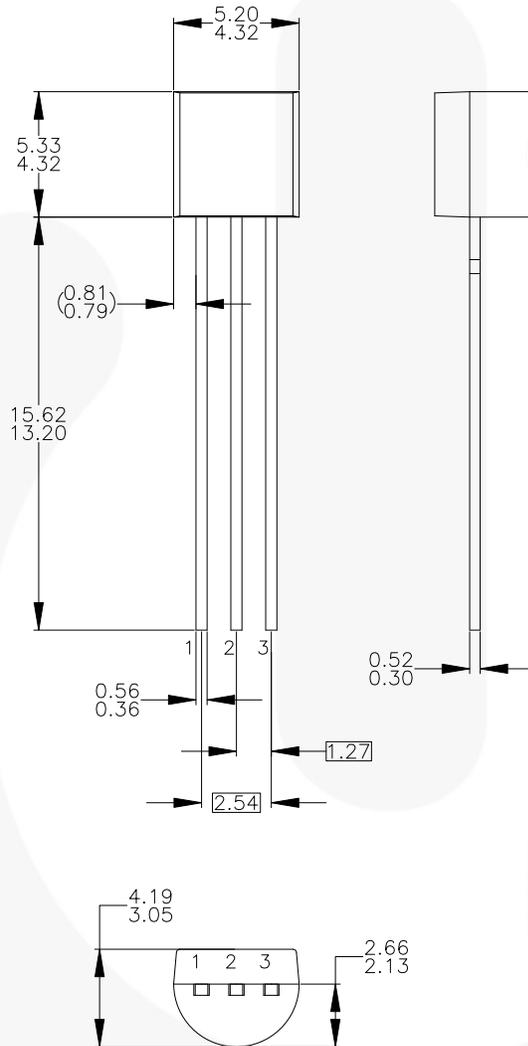
Symbol	Parameter	Conditions	Min.	Max.	Unit
<b>Off Characteristics</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage <sup>(5)</sup>	$I_C = -10\text{ mA}, I_B = 0$	-40		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -10\text{ }\mu\text{A}, I_E = 0$	-60		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\text{ }\mu\text{A}, I_C = 0$	-5.0		V
$I_{CEX}$	Collector Cut-Off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$		-50	nA
$I_{BL}$	Base Cut-Off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$		-50	nA
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = -50\text{ V}, I_E = 0$		-20	nA
		$V_{CB} = -50\text{ V}, I_E = 0, T_A = 150^\circ\text{C}$		-20	$\mu\text{A}$
<b>On Characteristics<sup>(5)</sup></b>					
$h_{FE}$	DC Current Gain	$V_{CE} = -10\text{ V}, I_C = -0.1\text{ mA}$	35		
		$V_{CE} = -10\text{ V}, I_C = -1.0\text{ mA}$	50		
		$V_{CE} = -10\text{ V}, I_C = -10\text{ mA}$	70		
		$V_{CE} = -10\text{ V}, I_C = -150\text{ mA}$	100	300	
		$V_{CE} = -10\text{ V}, I_C = -500\text{ mA}$	30		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$		-0.4	V
		$I_C = -500\text{ mA}, I_B = -50\text{ mA}$		-1.6	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$		-1.3	V
		$I_C = -500\text{ mA}, I_B = -50\text{ mA}$		-2.6	
<b>Small Signal Characteristics</b>					
$C_{ob}$	Output Capacitance	$V_{CB} = -10\text{ V}, f = 1.0\text{ MHz}$		8	pF
$C_{ib}$	Input Capacitance	$V_{EB} = -2.0\text{ V}, f = 1.0\text{ MHz}$		30	pF
$h_{fe}$	Small-Signal Current Gain	$I_C = -50\text{ mA}, V_{CE} = -20\text{ V}, f = 100\text{ MHz}$	2		
<b>Switching Characteristics</b>					
$t_{on}$	Turn-On Time	$V_{CC} = -30\text{ V}, I_C = -150\text{ mA}, I_{B1} = -15\text{ mA}$		45	ns
$t_d$	Delay Time			10	ns
$t_r$	Rise Time			40	ns
$t_{off}$	Turn-Off Time	$V_{CC} = -6.0\text{ V}, I_C = -150\text{ mA}, I_{B1} = I_{B2} = -15\text{ mA}$		100	ns
$t_s$	Storage Time			80	ns
$t_f$	Fall Time			30	ns

### Note:

5. Pulse test: pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

Physical Dimensions

TO-92 (Bulk)



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994.
- D) TO-92 (92,94,96,97,98) PIN CONFIGURATION:

PIN	92			94			96			97			98		
	P	F	M	P	F	M	B	F	M	P	F	M	P	F	M
1	E	S	S	E	S	S	B	D	G	C	G	D	C	G	D
2	B	D	G	C	G	D	E	S	S	B	D	G	E	S	S
3	C	G	D	B	D	G	C	G	D	E	S	S	B	D	G

LEGEND:

- P - BIPOLAR
- F - JFET
- M - DMOS
- E - EMITTER
- B - BASE
- C - COLLECTOR
- D - DRAIN
- S - SOURCE
- G - GATE

- E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEABLE AT JFET "F" OPTION.
- F) DRAWING FILENAME: MKT-ZA03DREV3.

Figure 1. 3-LEAD, TO92, JEDEC TO-92 COMPLIANT STRAIGHT LEAD CONFIGURATION (OLD TO92AM3)

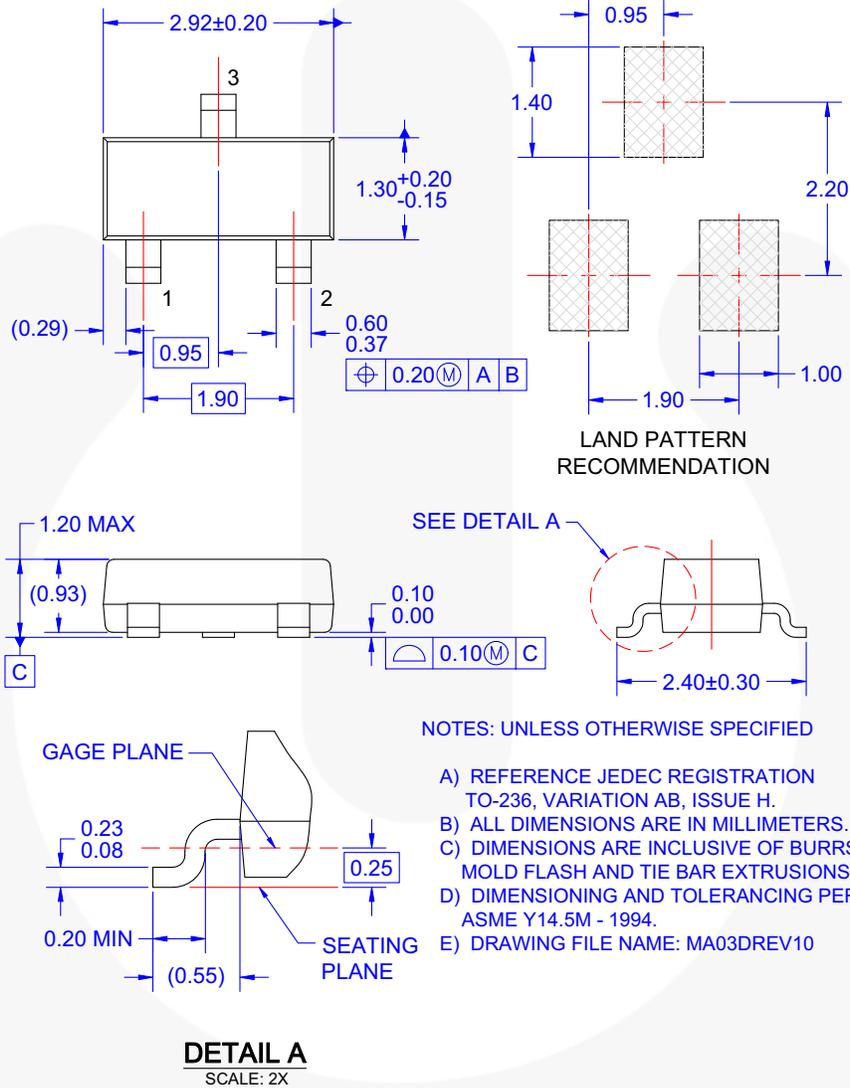
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**Physical Dimensions** (Continued)

**SOT-23**



**Figure 2. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE (ACTIVE)**

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