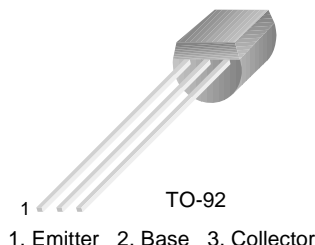


# PN930

## NPN General Purpose Amplifier

- This device is designed for low noise, high gain, general purpose applications at collector currents from 1μA to 50mA.



### Absolute Maximum Ratings\* $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	45	V
$V_{CBO}$	Collector-Base Voltage	45	V
$V_{EBO}$	Emitter-Base Voltage	5.0	V
$I_C$	Collector Current - Continuous	100	mA
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	- 55 ~ 150	$^\circ\text{C}$

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- These ratings are based on a maximum junction temperature of 150 degrees C.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations

### Electrical Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
<b>Off Characteristics</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 10\text{mA}, I_B = 0$	45		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	45		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\text{nA}, I_C = 0$	5.0		V
$I_{CEO}$	Collector Cutoff Current	$V_{CE} = 5.0\text{V}$		2.0	nA
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = 45\text{V}, I_E = 0$		10	nA
$I_{CES}$	Collector Cutoff Current	$V_{CB} = 45\text{V}, I_E = 0$ $V_{CB} = 45\text{V}, I_E = 0, T_A = 170^\circ\text{C}$		10	nA $\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 5.0\text{V}, I_C = 0$		10	nA
<b>On Characteristics</b>					
$h_{FE}$	DC Current Gain	$V_{CE} = 5.0\text{V}, I_C = 10\mu\text{A}$ $V_{CE} = 5.0\text{V}, I_C = 10\mu\text{A}, T_A = -55^\circ\text{C}$ $V_{CE} = 5.0\text{V}, I_C = 500\mu\text{A}$ $V_{CE} = 5.0\text{V}, I_C = 10\text{mA}$	10 20 150	300 600	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$		1.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$	0.6	1.0	V
<b>Small Signal Characteristics</b>					
$C_{ob}$	Output Capacitance	$V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}$		8.0	pF
$h_{fe}$	Small Signal Current Gain	$I_C = 500\mu\text{A}, V_{CE} = 5.0\text{V}, f = 20\text{MHz}$ $I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}, f = 1.0\text{KHz}$	1.5 150	600	
$h_{ib}$	Input Impedance	$I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}, f = 1.0\text{KHz}$	25	32	$\Omega$
$h_{rb}$	Voltage Feedback Ratio			600	$\times 10^{-6}$
$h_{ob}$	Output Admittance			1.0	$\mu\text{mho}$
NF	Noise Figure	$V_{CE} = 5.0\text{V}, I_C = 10\mu\text{A}$ $R_G = 10\text{K}\Omega, B_W = 15.7\text{KHz}$		3.0	dB

\* Pulse Test: Pulse Width  $\leq 300\text{ms}$ , Duty Cycle  $\leq 2.0\%$

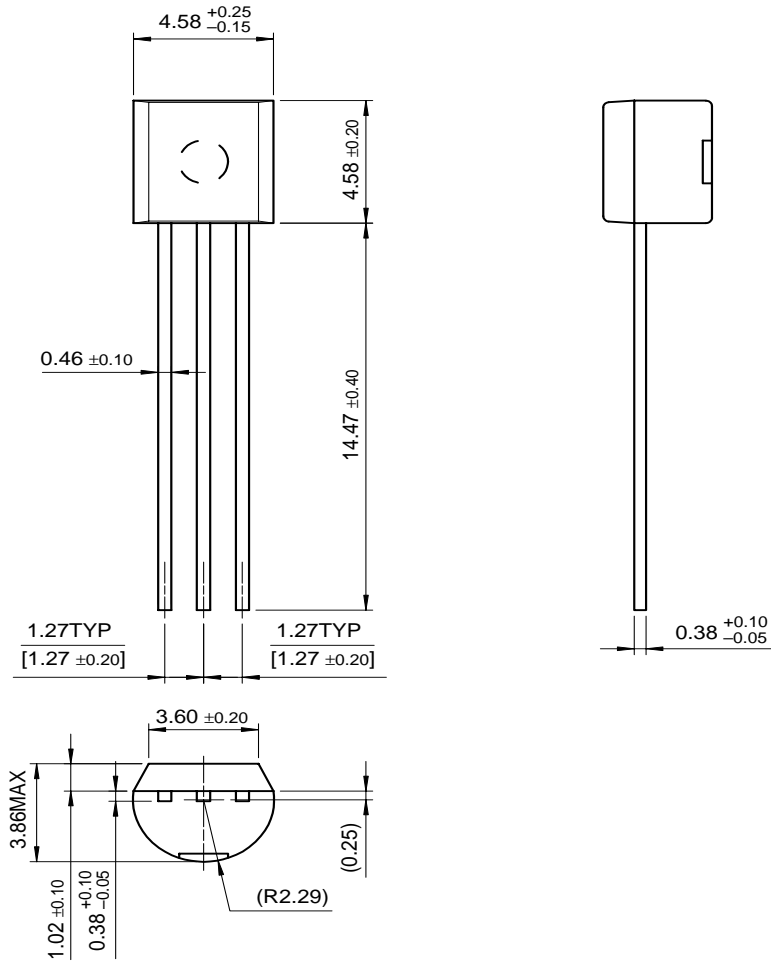
**Thermal Characteristics**  $T_A=25^{\circ}\text{C}$  unless otherwise noted

Symbol	Parameter	Max.	Units
$P_D$	Total Device Dissipation	625	mW
	Derate above $25^{\circ}\text{C}$	5.0	$\text{mW}/^{\circ}\text{C}$
$R_{\theta\text{JC}}$	Thermal Resistance, Junction to Case	83.3	$^{\circ}\text{C}/\text{W}$
$R_{\theta\text{JA}}$	Thermal Resistance, Junction to Ambient	200	$^{\circ}\text{C}/\text{W}$

# Package Dimensions

PN9330

## TO-92



Dimensions in Millimeters

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## PRODUCT STATUS DEFINITIONS

### Definition of Terms

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