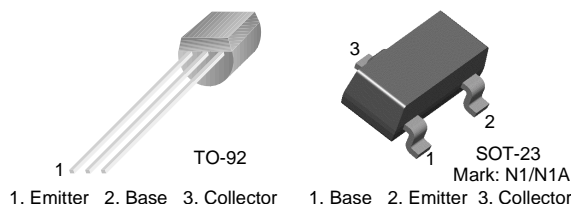


# PN100/PN100A/MMBT100/MMBT100A

## NPN General Purpose Amplifier

- This device is designed for general purpose amplifier applications at collector currents to 300mA.
- Sourced from process 10.



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

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	45	V
$V_{CBO}$	Collector-Base Voltage	75	V
$V_{EBO}$	Emitter-Base Voltage	6.0	V
$I_C$	Collector current - Continuous	500	mA
$T_J, T_{stg}$	Junction and Storage Temperature	-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 $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
<b>Off Characteristics</b>					
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_B = 0$	75		V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 1\text{mA}, I_E = 0$	45		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_C = 0$	6.0		V
$I_{CBO}$	Emitter Cutoff Current	$V_{CB} = 60\text{V}$		50	nA
$I_{CES}$	Collector Cutoff Current	$V_{CE} = 40\text{V}$		50	nA
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 4\text{V}$		50	nA
<b>On Characteristics</b>					
$h_{FE}$	DC Current Gain	$I_C = 100\mu\text{A}, V_{CE} = 1.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}, V_{CE} = 1.0\text{V}^*$ $I_C = 150\text{mA}, V_{CE} = 5.0\text{V}^*$	100 100 100 100 100A 100A	80 240 100 300 100 100 100	 450 600 350
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 200\text{mA}, I_B = 20\text{mA}$		0.2 0.4	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 200\text{mA}, I_B = 20\text{mA}$		0.85 1.0	V V
<b>Small Signal Characteristics</b>					
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 20\text{V}, I_C = 20\text{mA}$	250		MHz
$C_{obo}$	Output Capacitance	$V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}$		4.5	pF
NF	Noise Figure	$I_C = 100\mu\text{A}, V_{CE} = 5.0\text{V}$ $R_G = 2.0\text{k}\Omega, f = 1.0\text{KHz}$	100 100A	5.0 4.0	dB dB

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

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

Symbol	Parameter	Max.		Units
		PN100 PN100A	*MMBT100 *MMBT100A	
$P_D$	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	$^{\circ}\text{C}/\text{W}$

\* Device mounted on FR-4 PCB  $1.6'' \times 1.6'' \times 0.06''$

## Typical Characteristics

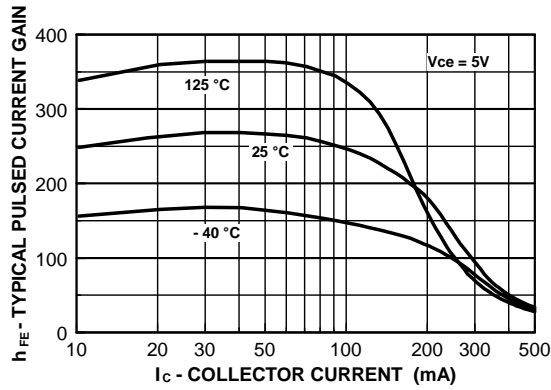


Figure 1. Typical Pulsed Current Gain vs Collector Current

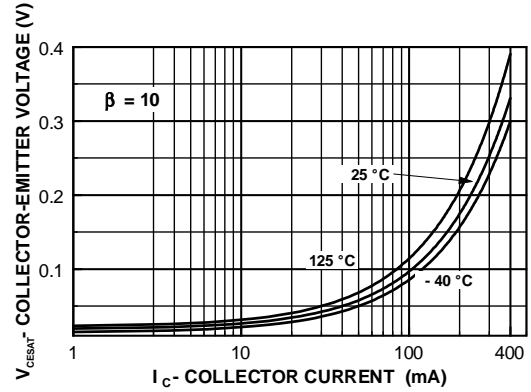


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

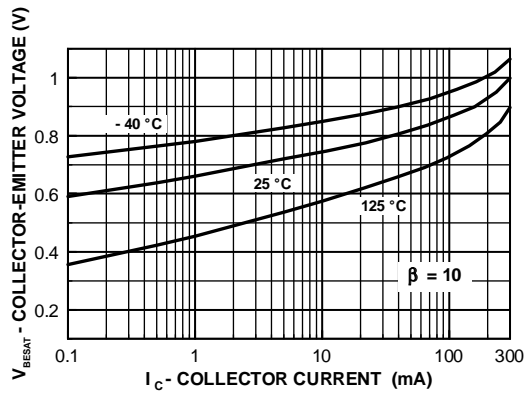


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

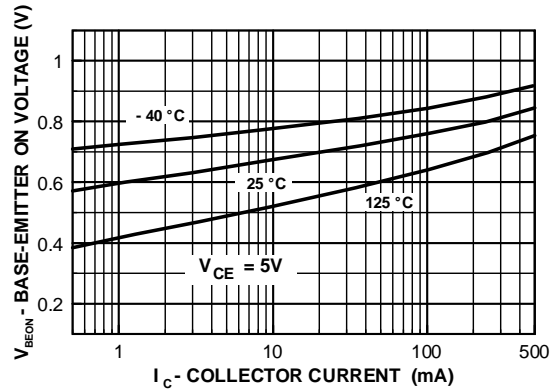


Figure 4. Base-Emitter On Voltage vs Collector Current

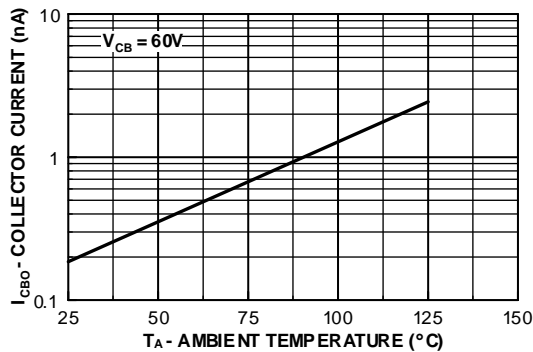


Figure 5. Collector Cutoff Current vs Ambient Temperature

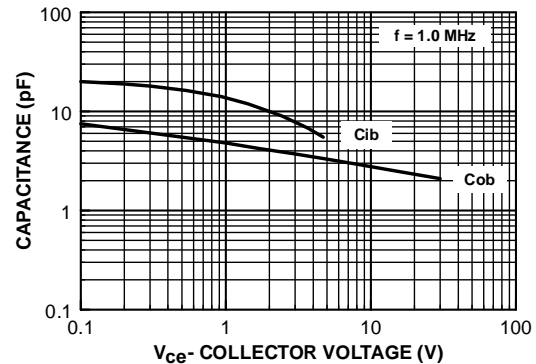


Figure 6. Input and Output Capacitance vs Reverse Voltage

## Typical Characteristics (Continued)

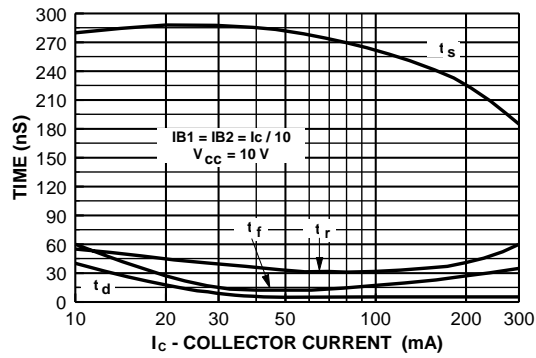


Figure 7. Switching Times vs Collector Current

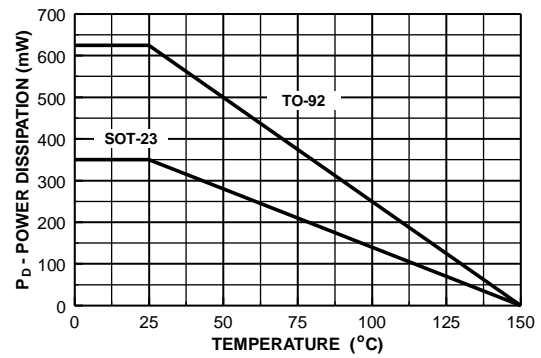
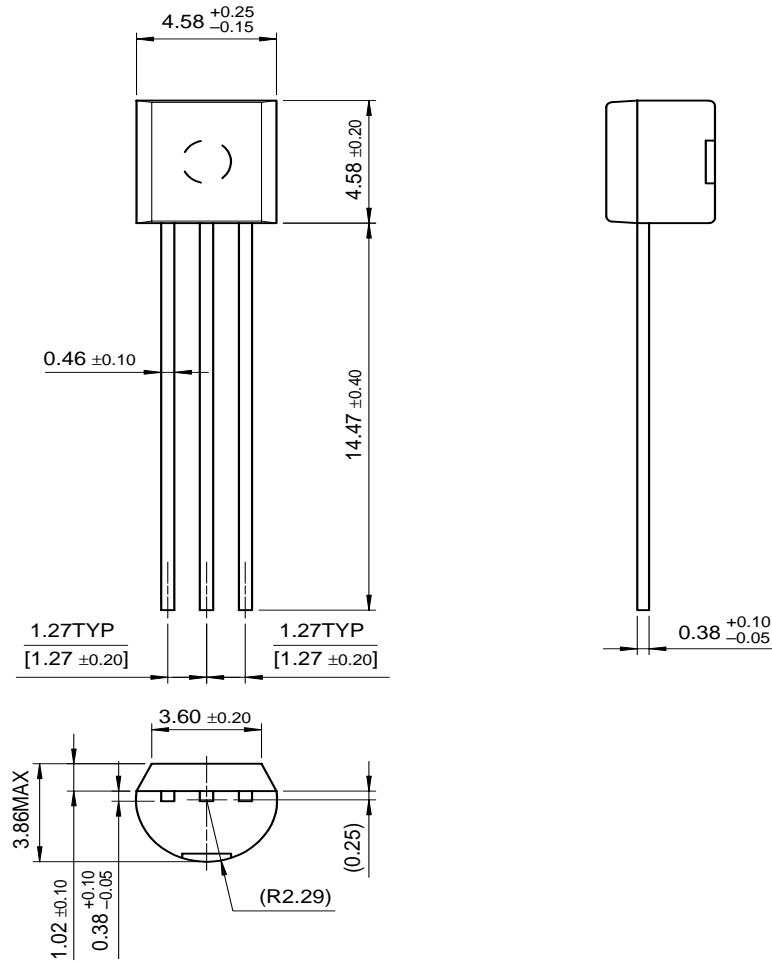


Figure 8. Power Dissipation vs Ambient Temperature

## Package Dimensions

TO-92

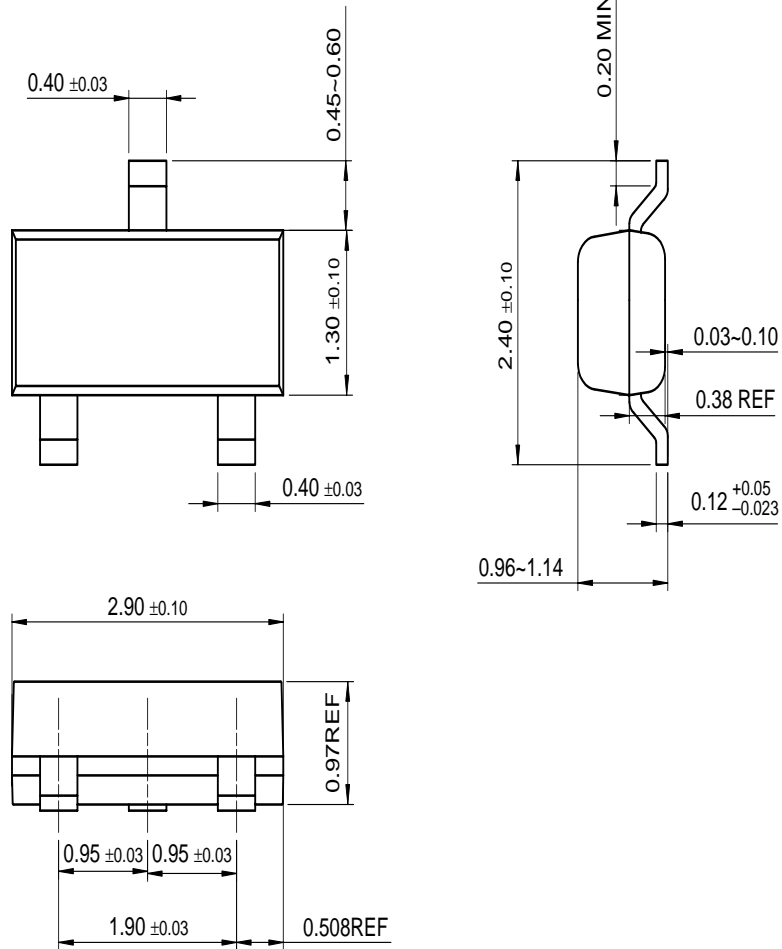


Dimensions in Millimeters

PN100/PN100A/MMBT100/MMBT100A

# Package Dimensions (Continued)

## SOT-23



Dimensions in Millimeters

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