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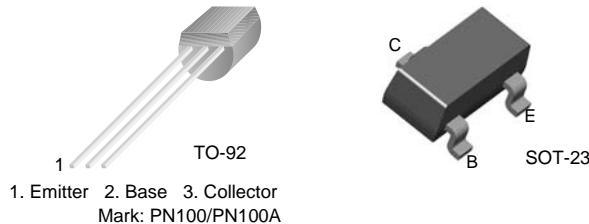
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## PN100/PN100A/MMBT100/MMBT100A

### 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\* $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{CEO}$	Collector-Emitter Voltage	45	
$V_{CBO}$	Collector-Base Voltage	75	
$V_{EBO}$	Emitter-Base Voltage	6.0	
$I_C$	Collector current	- Continuous	500
$T_J, T_{stg}$	Junction and Storage Temperature	-55 ~ +150	

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

#### NOTES:

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

\* Pulse Test: Pulse Width $\leq$ 300 $\mu\text{s}$ , Duty Cycle $\leq$ 2%

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

Symbol	Parameter	Max.		Units
		PN100	*MMBT100 *MMBT100A	
$P_D$	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	°C/W

\* Device mounted on FR-4 PCB 1.6" x 1.6" x 0.06."

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

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

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

## Typical Characteristics

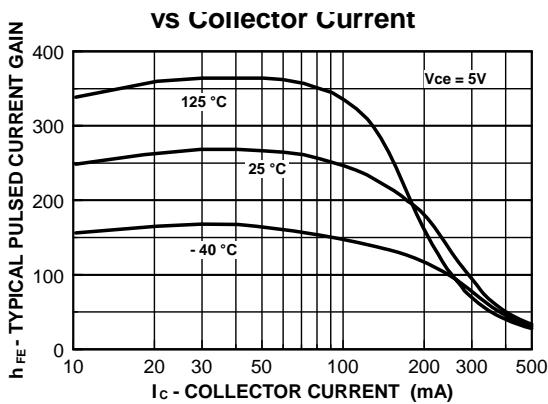


Figure 1. Typical Pulsed Current Gain vs Collector Current

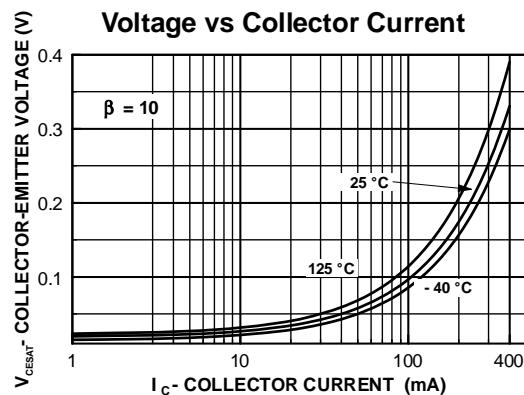


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

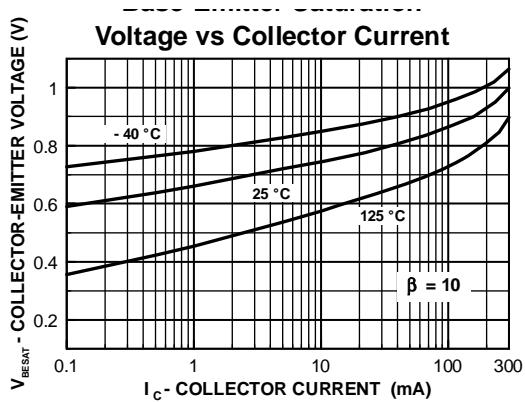


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

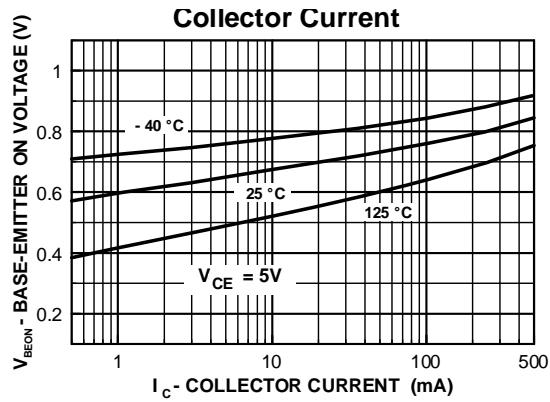


Figure 4. Base-Emitter On Voltage vs Collector Current

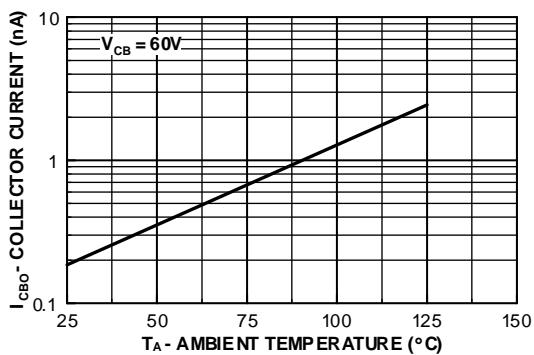


Figure 5. Collector Cutoff Current vs Ambient Temperature

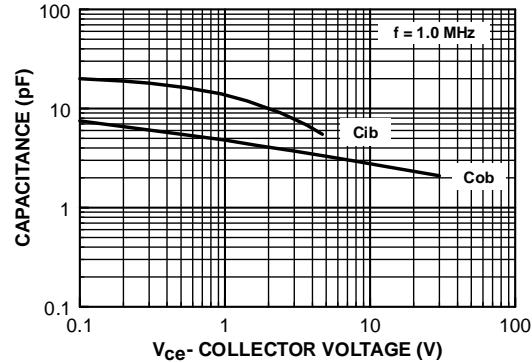


Figure 6. Input and Output Capacitance vs Reverse Voltag

## Typical Characteristics (Continued)

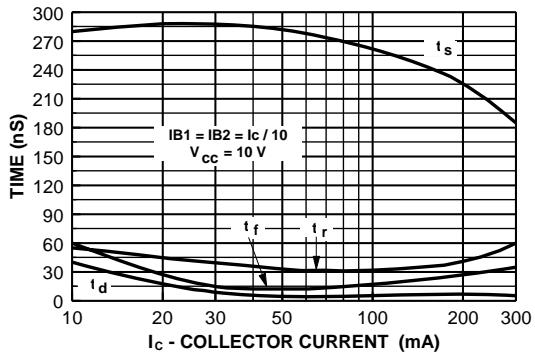


Figure 7. Switching Times vs  
Collector Current

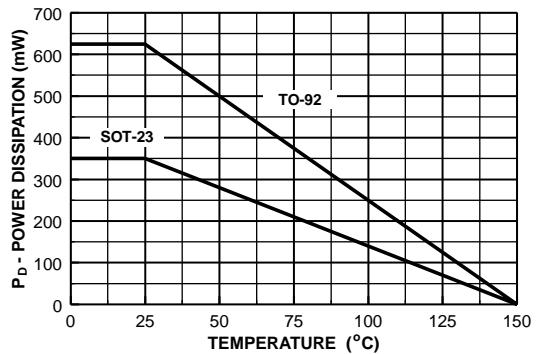
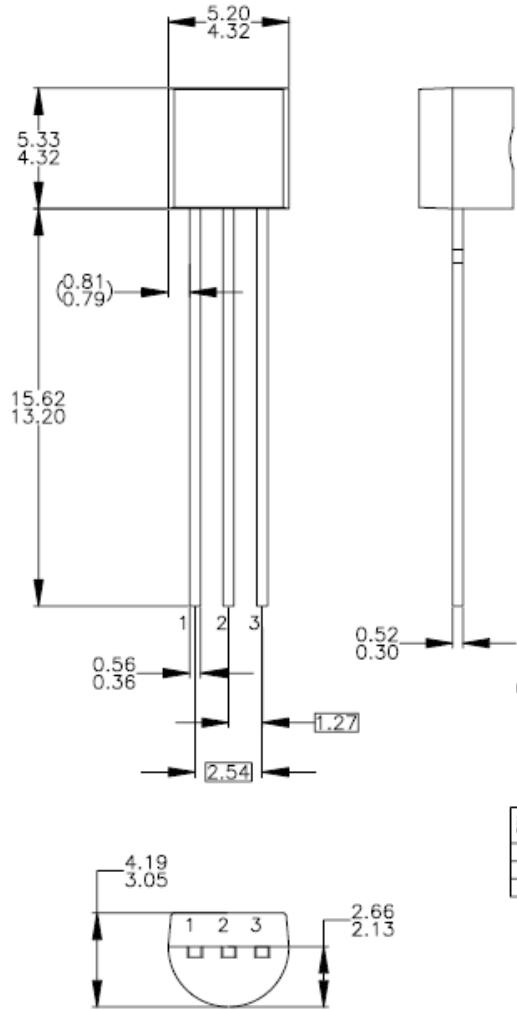


Figure 8. Power Dissipation vs  
Ambient Temperature

## Package Dimension (TO92)



NOTES: UNLESS OTHERWISE SPECIFIED

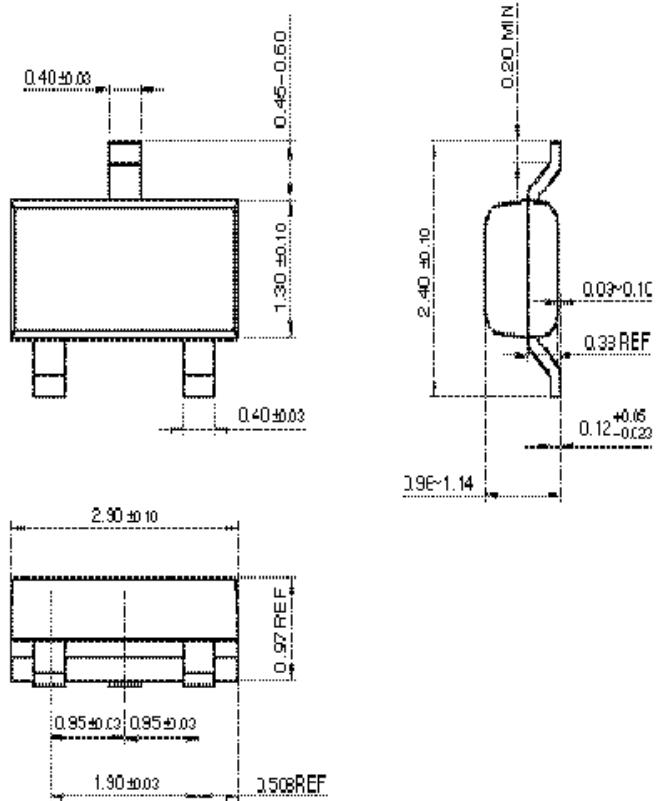
- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994.
- D) TO-92 (92, 94, 96, 97, 98) PIN CONFIGURATION:

No.	92		94		96		97		98			
	P	F	M	P	F	M	P	F	M	P	F	M
1	E	S	S	E	S	S	B	D	G	C	G	D
2	B	D	G	C	G	D	E	S	S	B	D	G
3	C	G	D	B	D	G	C	G	D	E	S	S

LEGEND:  
 P — BIPOLAR      E — Emitter      D — Drain  
 F — JFET      B — Base      S — Source  
 M — DMOS      C — Collector      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.

## Package Dimension (SOT23)





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