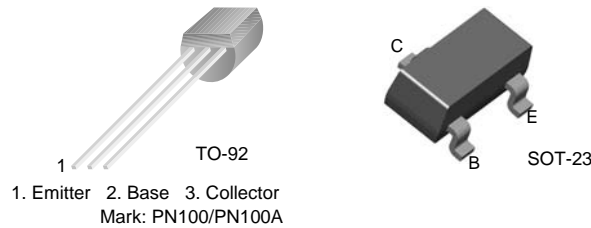


# PN100/PN100A/MMBT100/MMBT100A

## 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 $\mu$ s, Duty Cycle $\leq$ 2%

### 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°C	5.0	2.8	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>					
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	75		V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 1\text{mA}, I_B = 0$	45		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	6.0		V
$I_{CBO}$	Collector-Base Cutoff Current	$V_{CB} = 60\text{V}$		50	nA
$I_{CES}$	Collector-Emitter 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 100A 100 100A 100 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  $\leq 2.0\%$

# Typical Characteristics

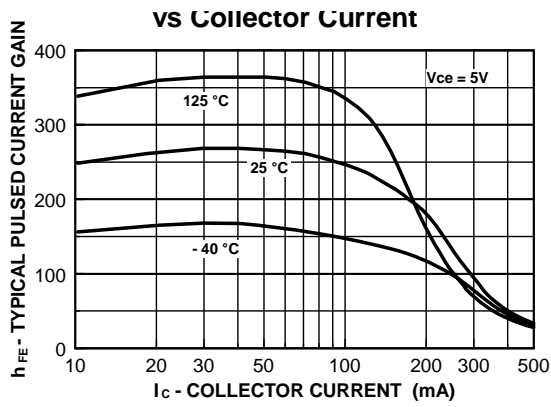


Figure 1. Typical Pulsed Current Gain vs Collector Current

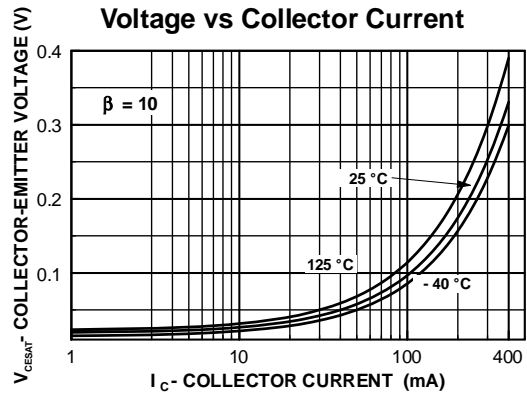


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

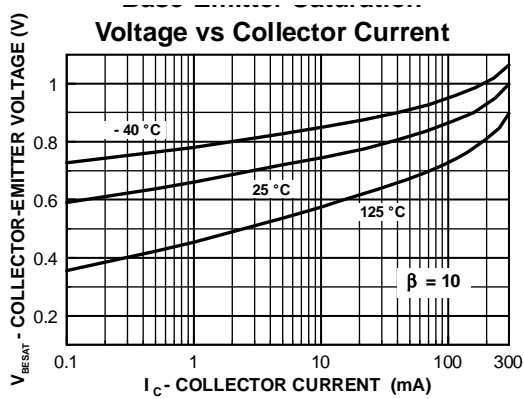


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

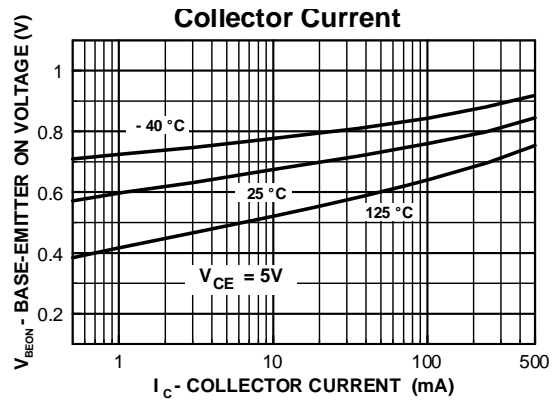


Figure 4. Base-Emitter On Voltage vs Collector Current

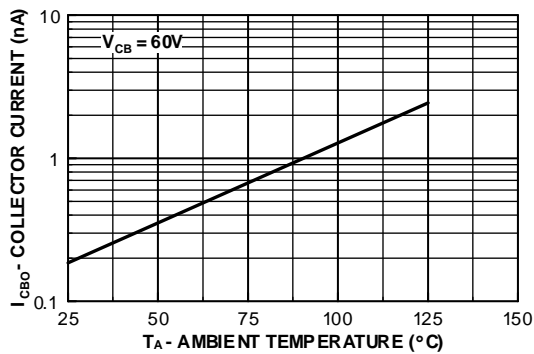


Figure 5. Collector Cutoff Current vs Ambient Temperature

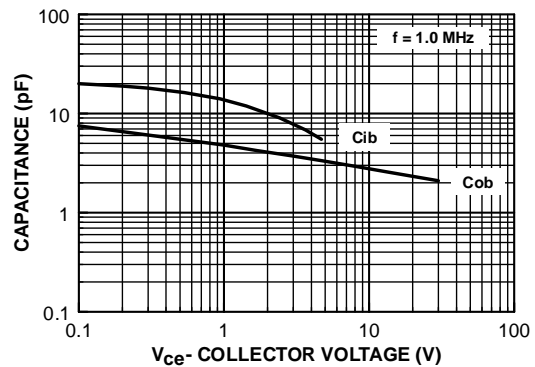


Figure 6. Input and Output Capacitance vs Reverse Voltag

Typical Characteristics (Continued)

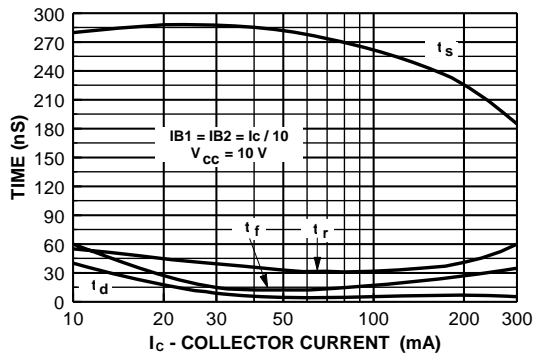


Figure 7. Switching Times vs Collector Current

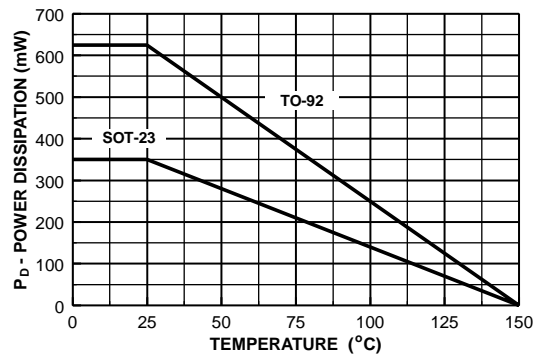
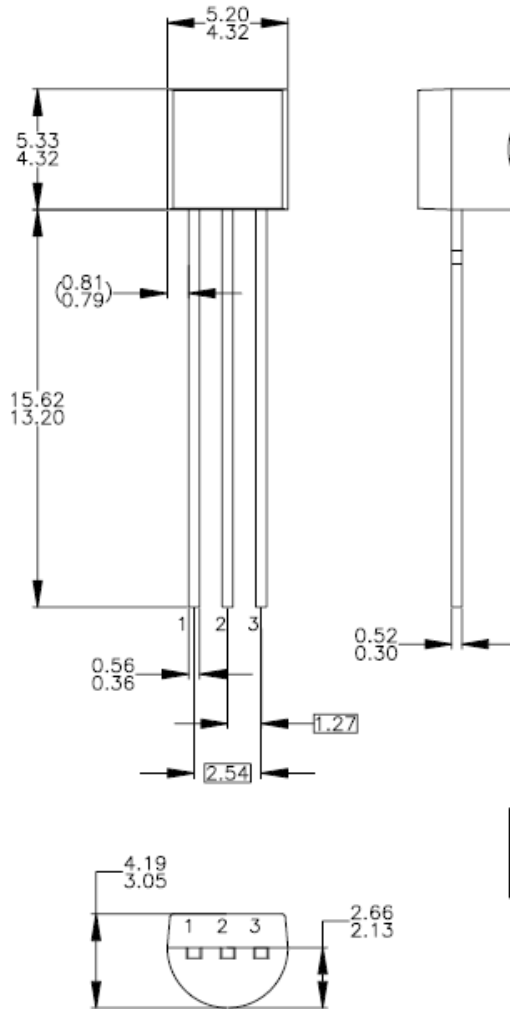


Figure 8. Power Dissipation vs Ambient Temperature

### 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:

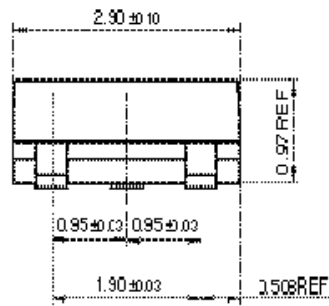
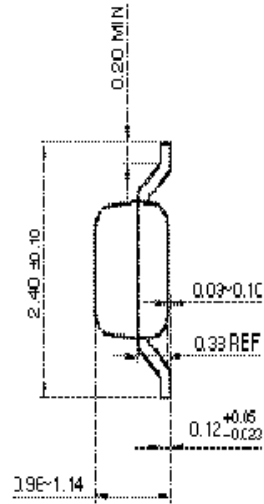
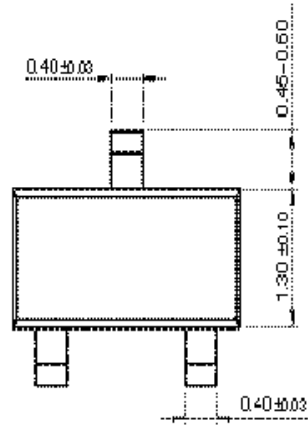
Pin	92			94			96			97			98		
	P	F	M	P	F	M	B	F	M	P	F	M	P	F	M
1	E	S	S	E	S	S	B	D	G	C	G	D	C	G	D
2	B	D	G	C	G	D	E	S	S	B	D	G	E	S	S
3	C	G	D	B	D	G	C	G	D	E	S	S	B	D	G

LEGEND:

P - BIPOLAR      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-2A03DREV3.




### Package Dimension (SOT23)





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- |                                                                                              |                                                                                     |                            |                                                                                     |
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| Build it Now™                                                                                | Green FPS™ e-Series™                                                                | POWEREDGE®                 | SyncFET™                                                                            |
| CorePLUS™                                                                                    | GTO™                                                                                | Power-SPM™                 | The Power Franchise®                                                                |
| CROSSVOLT™                                                                                   | i-Lo™                                                                               | PowerTrench®               |  |
| CTL™                                                                                         | IntelliMAX™                                                                         | Programmable Active Droop™ | TinyBoost™                                                                          |
| Current Transfer Logic™                                                                      | ISOPLANAR™                                                                          | QFET®                      | TinyBuck™                                                                           |
| EcoSPARK®                                                                                    | MegaBuck™                                                                           | QS™                        | TinyLogic®                                                                          |
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| FACT®                                                                                        | MillerDrive™                                                                        | SMART START™               | TinyWire™                                                                           |
| FAST®                                                                                        | Motion-SPM™                                                                         | SPM®                       | μSerDes™                                                                            |
| FastvCore™                                                                                   | OPTOLOGIC®                                                                          | STEALTH™                   | UHC®                                                                                |
| FPSTM                                                                                        | OPTOPLANAR®                                                                         | SuperFET™                  | UniFET™                                                                             |
| FRFET®                                                                                       |  ® | SuperSOT™-3                | VCX™                                                                                |
| Global Power Resource <sup>SM</sup>                                                          | PDP-SPM™                                                                            | SuperSOT™-6                |                                                                                     |
|                                                                                              | Power220®                                                                           |                            |                                                                                     |

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