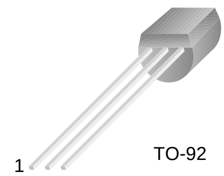
FAIRCHILD
SEMICONDUCTOR®

PN100/PN100A/MMBT100/MMBT100A

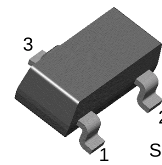
NPN General Purpose Amplifier

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



TO-92

1. Emitter 2. Base 3. Collector
Mark: PN100/PN100A



SOT-23

1. Base 2. Emitter 3. Collector
Mark: N1/N1A

Absolute Maximum Ratings* T_C=25°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	°C

* 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.

Electrical Characteristics T_C=25°C unless otherwise noted

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

* Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

Thermal Characteristics T_A=25°C unless otherwise noted

Symbol	Parameter	Max.		Units
		PN100 PN100A	*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" × 1.6" × 0.06."

Typical Characteristics

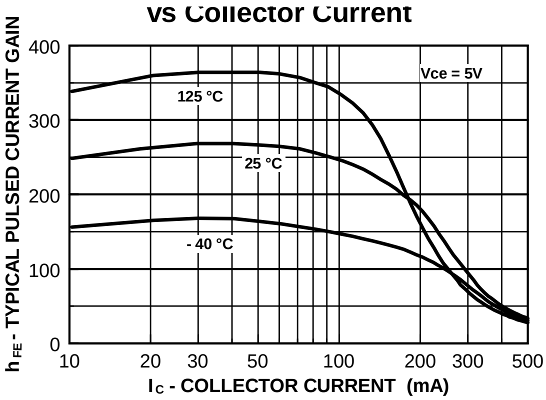


Figure 1. Typical Pulsed Current Gain vs Collector Current

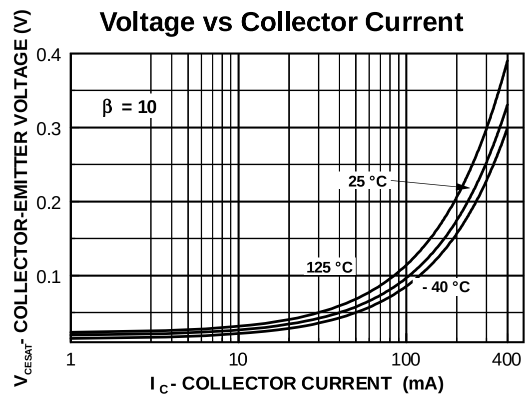


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

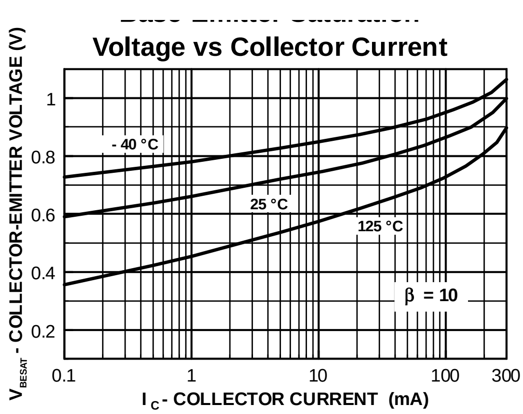


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

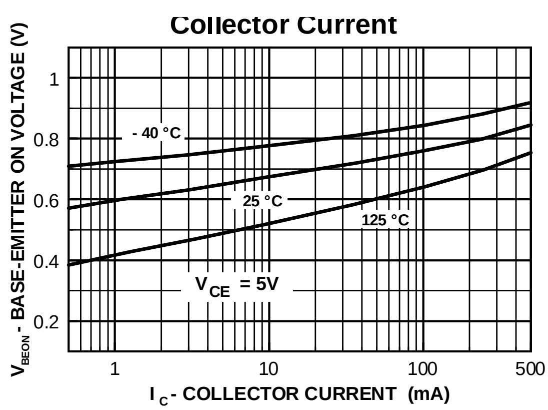


Figure 4. Base-Emitter On Voltage vs Collector Current

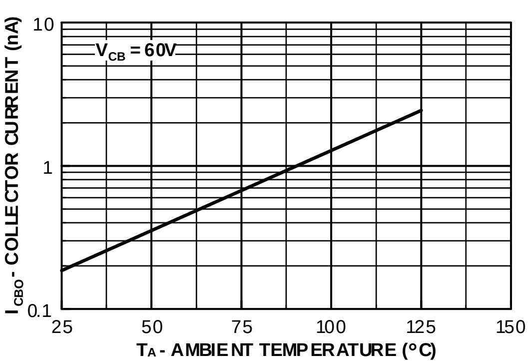


Figure 5. Collector Cutoff Current vs Ambient Temperature

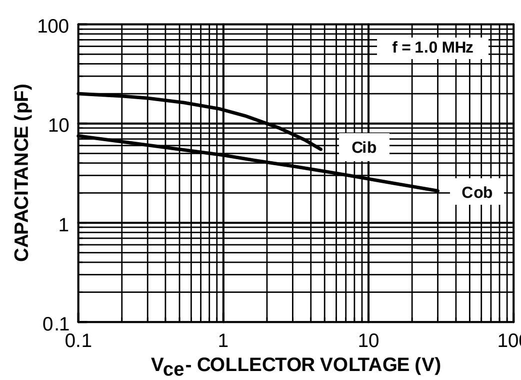


Figure 6. Input and Output Capacitance vs Reverse Voltag

Typical Characteristics (Continued)

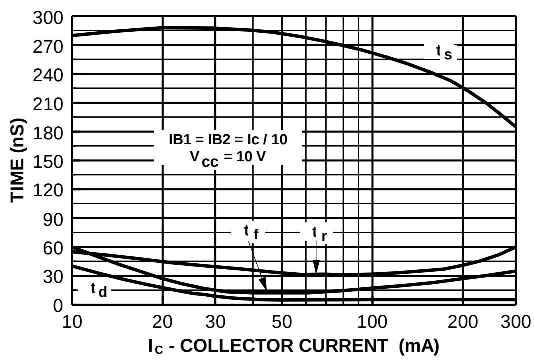


Figure 7. Switching Times vs Collector Current

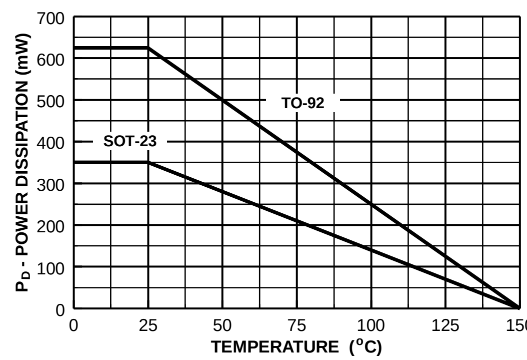
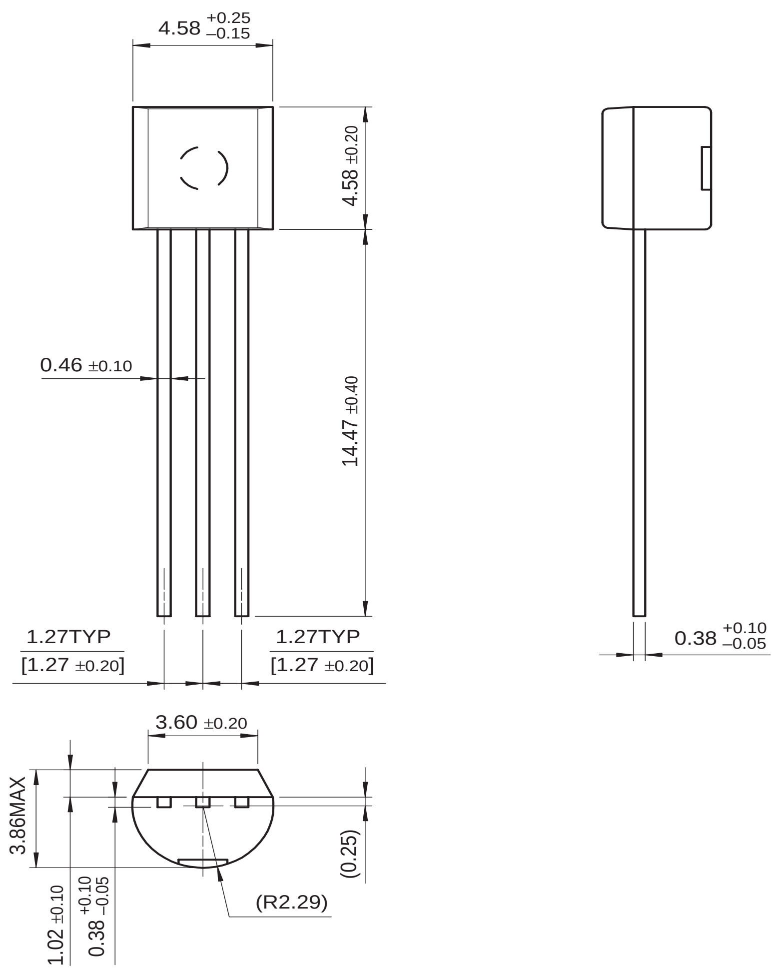


Figure 8. Power Dissipation vs Ambient Temperature

Package Dimensions

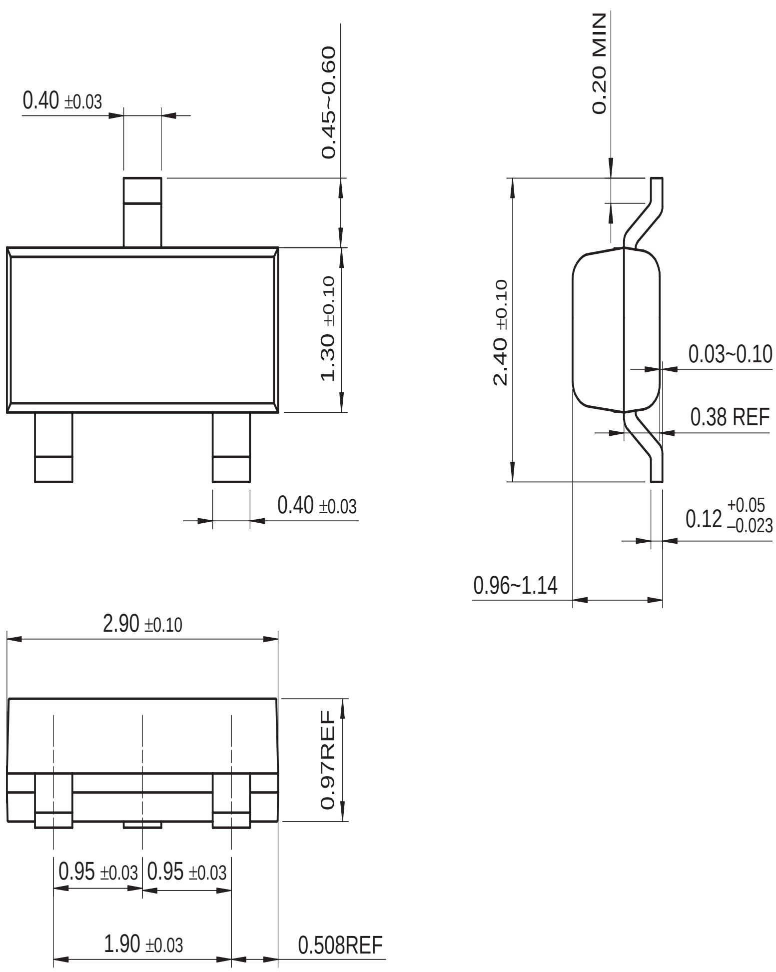
TO-92



Dimensions in Millimeters

Package Dimensions (Continued)

SOT-23



Dimensions in Millimeters

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.