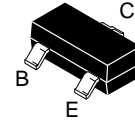


# NPN General Purpose Amplifier

## MMBT100



SOT-23 (TO-236)  
CASE 318

- This Device is Designed for General Purpose Amplifier Applications at Collector Currents to 300 mA
- Sourced from Process 10
- This Device is Pb-Free, Halide Free and is RoHS Compliant

### ABSOLUTE MAXIMUM RATINGS\* ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Unit
$V_{CEO}$	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	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

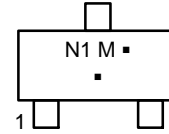
\*Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

### THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Max*	Unit
$P_D$	Total Device Dissipation Derate Above $25^\circ\text{C}$	350 2.8	MW mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C}/\text{W}$

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

### MARKING DIAGRAM



N1 = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
MMBT100	SOT-23 (TO-236) (Pb-Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MMBT100

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Max	Unit
<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

## ON CHARACTERISTICS

$h_{FE}$	DC Current Gain	$I_C = 100\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 100\text{ mA}, V_{CE} = 1.0\text{ V}^*$ $I_C = 150\text{ mA}, V_{CE} = 5.0\text{ V}^*$	80 100 100 100	- 450 - 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
$V_{BE(sat)}$	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

## SMALL SIGNAL CHARACTERISTICS

$f_T$	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	$I_C = 100\ \mu\text{A}, V_{CE} = 5.0\text{ V}$ $R_G = 2.0\text{ k}\Omega, f = 1.0\text{ kHz}$	-	5.0	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

## TYPICAL CHARACTERISTICS

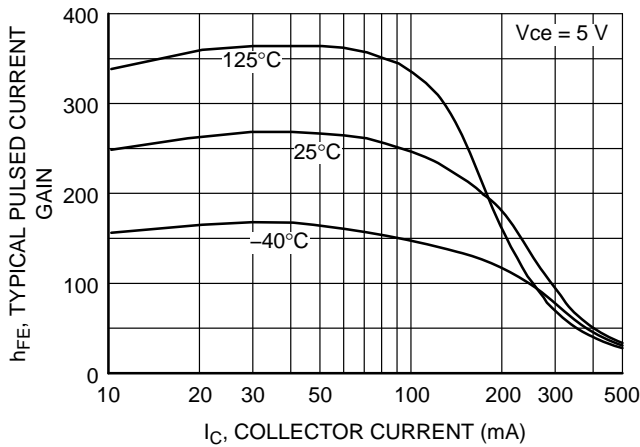


Figure 1. Typical Pulsed Current Gain vs. Collector Current

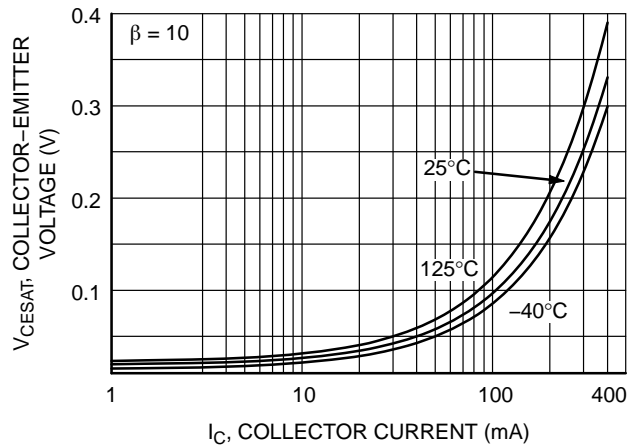
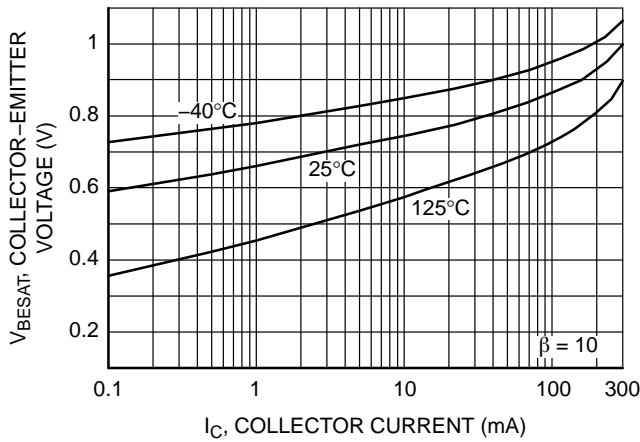


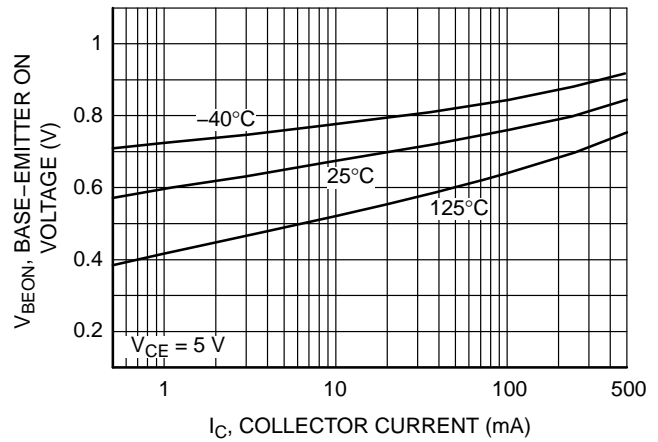
Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

# MMBT100

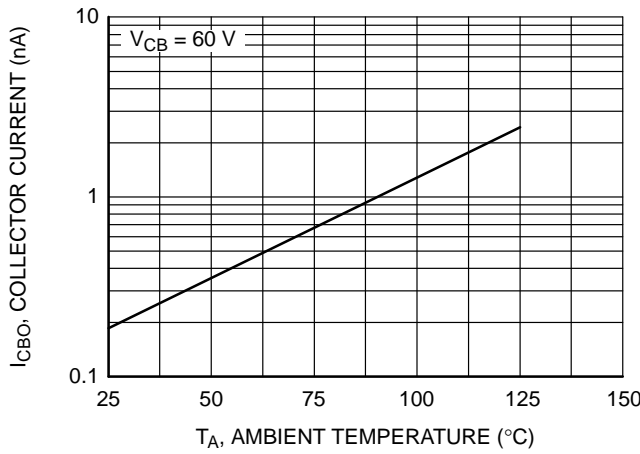
## TYPICAL CHARACTERISTICS (CONTINUED)



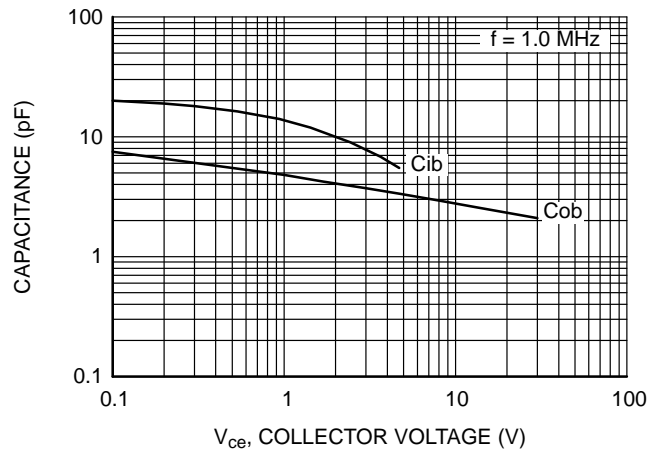
**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**



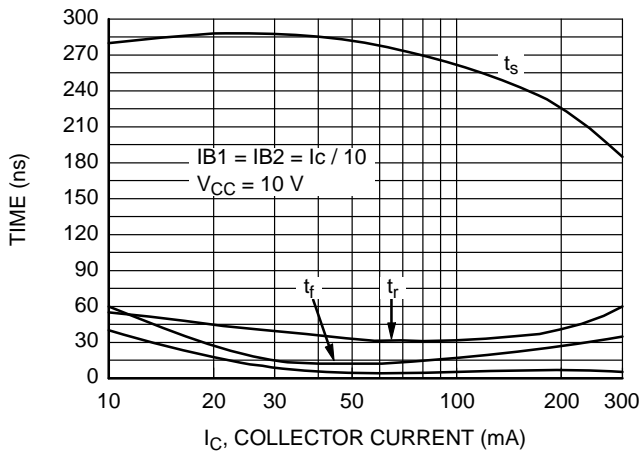
**Figure 4. Base-Emitter On Voltage vs. Collector Current**



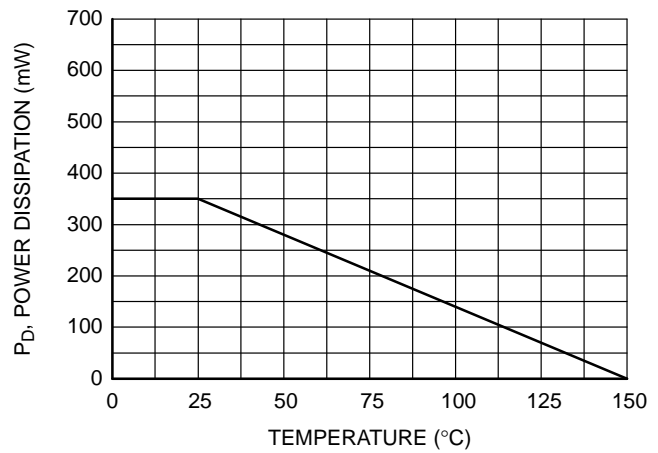
**Figure 5. Collector Cutoff Current vs. Ambient Temperature**



**Figure 6. Input and Output Capacitance vs. Reverse Voltage**



**Figure 7. Switching Times vs. Collector Current**



**Figure 8. Power Dissipation vs. Ambient Temperature**

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