



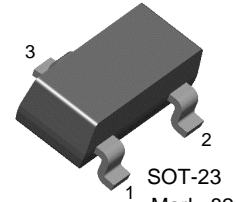
**THE DATASHEET OF
MMBT4356**



MMBT4356

PNP General Purpose Amplifier

- This device is designed for use as general purpose amplifiers and switches requiring collector currents to 500mA.
- Sourced from process 67.
- See TN4033A for characteristics.



SOT-23
Mark: 82
1. Base 2. Emitter 3. Collector

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

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	-80	V
V_{CBO}	Collector-Base Voltage	-80	V
V_{EBO}	Emitter-Base Voltage	-5.0	V
I_C	Collector current - Continuous	-800	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 ~ +150	$^\circ\text{C}$

* 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.

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

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

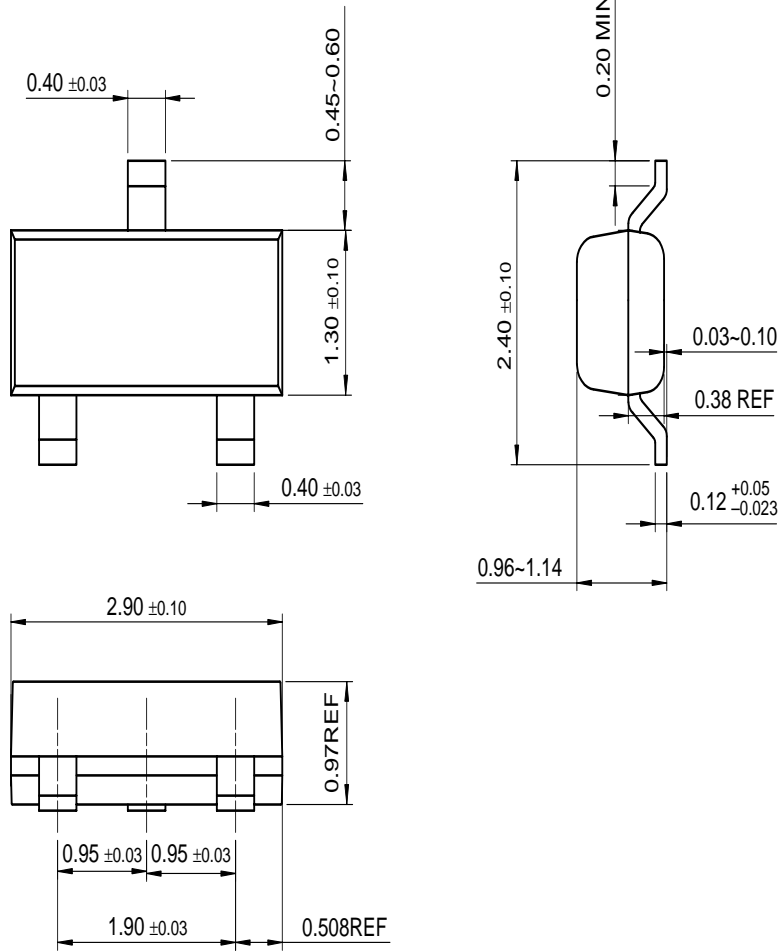
Electrical Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristics						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = -10\text{mA}, I_B = 0$	-80			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -10\mu\text{A}, I_E = 0$	-80			V
$V_{(BR)EBS}$	Emitter-Base Breakdown Voltage	$I_C = -10\mu\text{A}, I_C = 0$	-5.0			V
I_{CBO}	Collector Cutoff Current	$V_{CB} = -50\text{V}, I_E = 0$ $V_{CB} = -50\text{V}, I_E = 0, T_A = 75^\circ\text{C}$			-50 -5.0	nA μA
I_{CES}	Collector Cutoff Current	$V_{CB} = -50\text{V}, I_E = 0$			-50	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = -4.0\text{V}, I_C = 0$			-100	μA
On Characteristics						
h_{FE}	DC Current Gain	$V_{CE} = -10\text{V}, I_C = -100\mu\text{A}$ $V_{CE} = -10\text{V}, I_C = -1.0\text{mA}$ $V_{CE} = -10\text{V}, I_C = -10\text{mA}$ $V_{CE} = -10\text{V}, I_C = -100\text{mA}$ $V_{CE} = -10\text{V}, I_C = -500\text{mA}$	25 40 50 40 30		250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = -150\text{mA}, I_B = -15\text{mA}$ $I_C = -500\text{mA}, I_B = -50\text{mA}$			-0.15 -0.5	V V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = -150\text{mA}, I_B = -15\text{mA}$ $I_C = -500\text{mA}, I_B = -50\text{mA}$			-0.9 -1.1	V V
Small Signal Characteristics						
C_{ob}	Output Capacitance	$V_{CB} = -10\text{V}, f = 1\text{MHz}$			30	pF
C_{ib}	Input Capacitance	$V_{BE} = -0.5\text{V}, f = 1\text{MHz}$			110	pF
h_{fe}	Small-Signal Current Gain	$V_{CE} = -10\text{V}, I_C = -50\text{mA},$ $f = 100\text{MHz}$	1.0		5.0	
NF	Noise Figure	$V_{CE} = -10\text{V}, I_C = -100\mu\text{A}$ $R_S = 1\text{k}\Omega, f = 1\text{kHz}$ $B_W = 1\text{Hz}$			3.0	dB
Switching Characteristics						
t_{on}	Turn-On Time	$V_{CC} = -30\text{V}, I_C = -500\text{mA}$			100	ns
t_{off}	Turn-Off Time	$I_{B1} = I_{B2} = -50\text{mA}$			400	ns

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

Package Dimensions

SOT-23



Dimensions in Millimeters

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