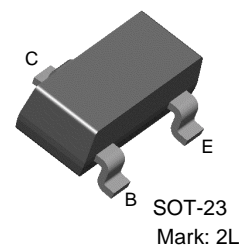


# MMBT5401

## PNP General Purpose Amplifier

- This device is designed as a general purpose amplifier and switch for applications requiring high voltage.



## PNP Epitaxial Silicon Transistor

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

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	-150	V
$V_{CBO}$	Collector-Base Voltage	-160	V
$V_{EBO}$	Emitter-Base Voltage	-5.0	V
$I_C$	Collector Current - Continuous	-600	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:

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

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

Symbol	Parameter	Test Condition	Min.	Max.	Units
<b>Off Characteristics</b>					
$BV_{CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = -1.0\text{mA}, I_B = 0$	-150		V
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = -100\mu\text{A}, I_E = 0$	-160		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\mu\text{A}, I_C = 0$	-5.0		V
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = -120\text{V}, I_E = 0$ $V_{CB} = -120\text{V}, I_E = 0, T_a = 100^\circ\text{C}$		-50	nA $\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = -3.0\text{V}, I_C = 0$		-50	nA
<b>On Characteristics *</b>					
$h_{FE}$	DC Current Gain	$I_C = -1.0\text{mA}, V_{CE} = -5.0\text{V}$ $I_C = -10\text{mA}, V_{CE} = -5.0\text{V}$ $I_C = -50\text{mA}, V_{CE} = -5.0\text{V}$	50 60 50	240	
$V_{CE}(\text{sat})$	Collector-Emitter Saturation Voltage	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$		-0.2 -0.5	V V
$V_{BE}(\text{sat})$	Base-Emitter Saturation Voltage	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$		-1.0 -1.0	V V
<b>Small Signal Characteristics</b>					
$f_T$	Current Gain Bandwidth Product	$I_C = -10\text{mA}, V_{CE} = -10\text{V},$ $f = 100\text{MHz}$	100	300	MHz
$C_{ob}$	Output Capacitance	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$		6.0	pF
$N_F$	Noise Figure	$I_C = -250\mu\text{A}, V_{CE} = -5.0\text{V}, R_S = 1.0\text{K}\Omega$ $f = 10\text{Hz to } 15.7\text{KHz}$		8.0	dB

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

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

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

# Typical Characteristics

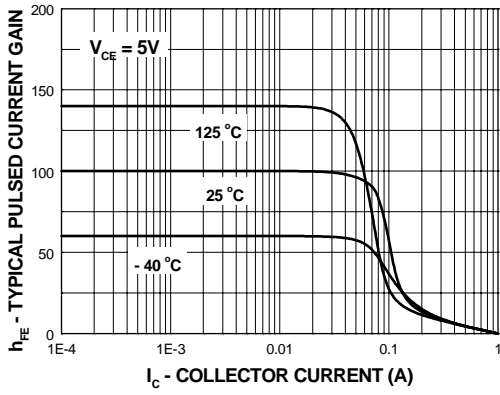


Figure 1. Typical Pulsed Current Gain vs Collector Current

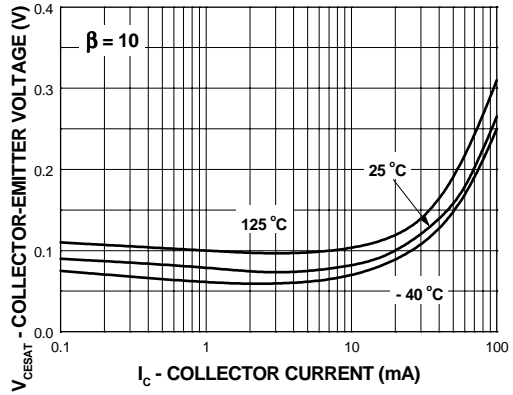


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

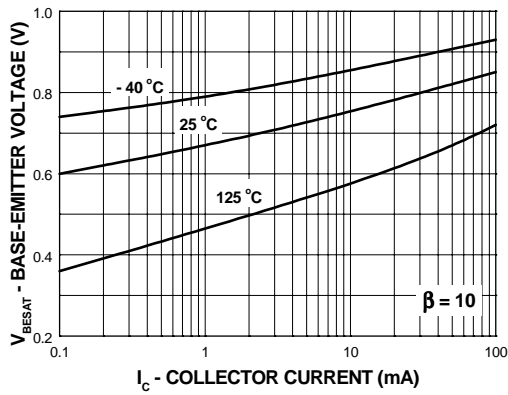


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

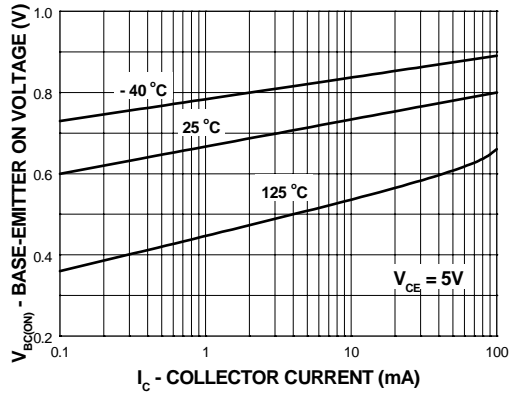


Figure 4. Base-Emitter On Voltage vs Collector Current

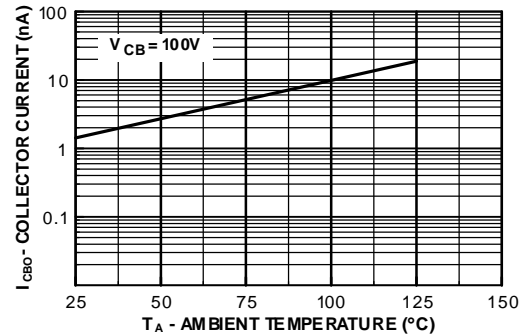


Figure 5. Collector-Cutoff Current vs Ambient Temperature

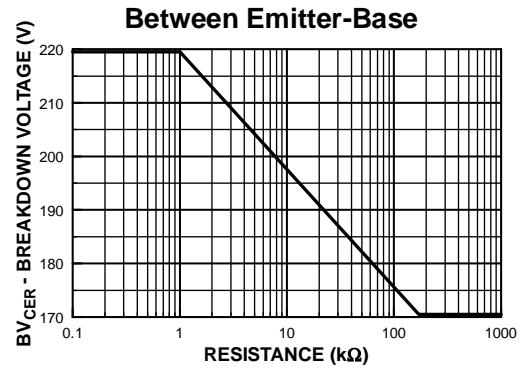


Figure 6. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base

Typical Characteristics (Continued)

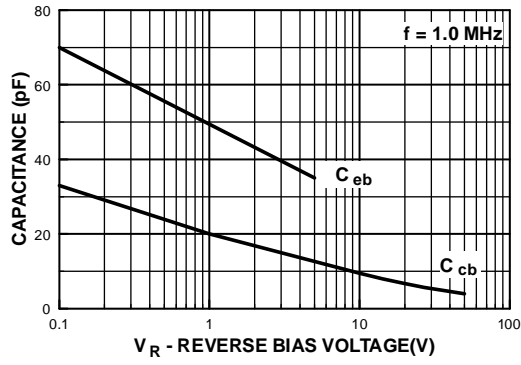


Figure 7. Input and Output Capacitance vs Reverse Voltage

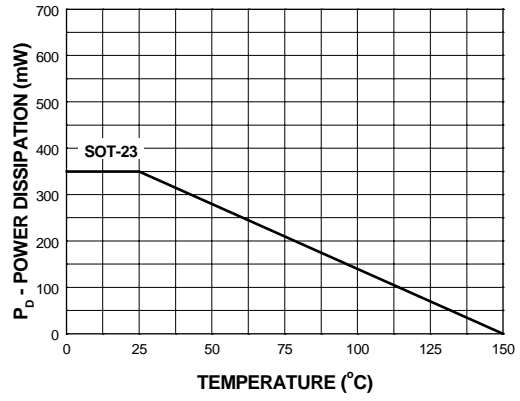
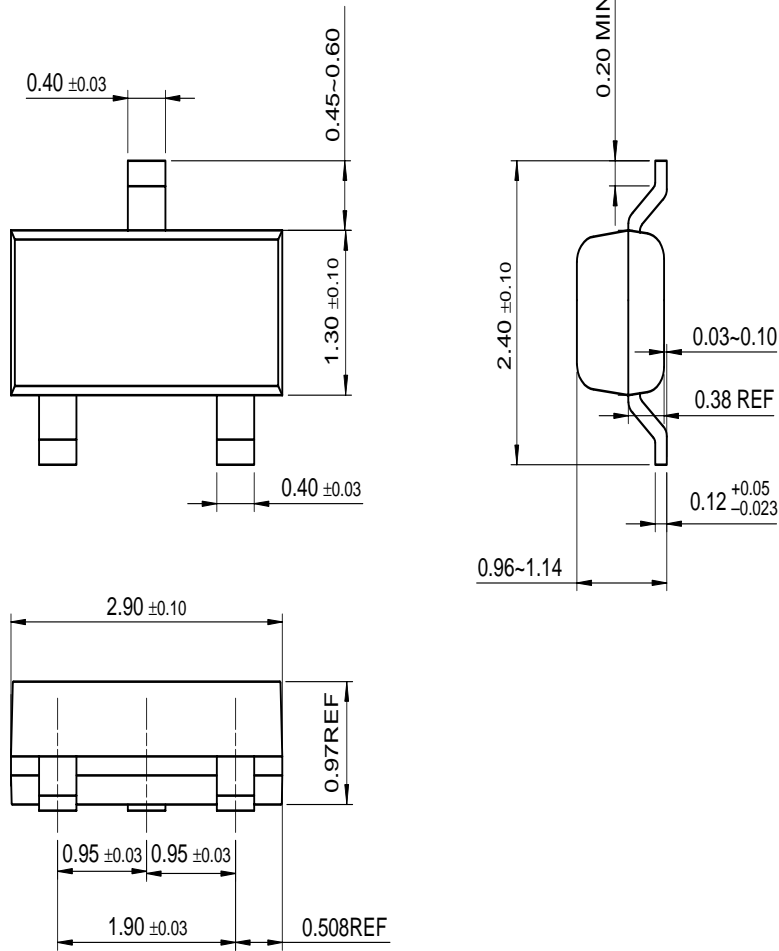


Figure 8. Power Dissipation vs Ambient Temperature

# Package Dimensions

## SOT-23



Dimensions in Millimeters

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