

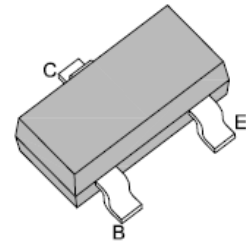
## SMD General Purpose Transistor (NPN)

### Features

- NPN Silicon Epitaxial Planar Transistor for Switching and Amplifier Applications

### Mechanical Data

<b>Case:</b>	SOT-23, Plastic Package
<b>Terminals:</b>	Solderable per MIL-STD-202G, Method 208
<b>Weight:</b>	0.008 gram



SOT-23



### Maximum Ratings *(T<sub>Ambient</sub>=25°C unless noted otherwise)*

Symbol	Description	MMBT4401	Unit	Conditions
	Marking Code	2X		
<b>V<sub>CB0</sub></b>	Collector-Base Voltage	60	V	
<b>V<sub>CEO</sub></b>	Collector-Emitter Voltage	40	V	
<b>V<sub>EB0</sub></b>	Emitter-Base Voltage	6.0	V	
<b>I<sub>C</sub></b>	Collector Current	0.6	A	
<b>P<sub>tot</sub></b>	Power Dissipation above 25°C	250	mW	
<b>R<sub>θJA</sub></b>	Thermal Resistance, Junction to Ambient	357	° C / W	Note 1
<b>T<sub>J</sub></b>	Junction Temperature	150	° C	
<b>T<sub>STG</sub></b>	Storage Temperature Range	-55 to +150	° C	

**Note:** (1) Device mounted on FR-4 PCB 1.6" x 1.6" x 0.06"

# SMD General Purpose Transistor (NPN)

## MMBT4401

### Electrical Characteristics ( $T_{Ambient}=25^{\circ}C$ unless noted otherwise)

Symbol	Description	Min.	Max.	Unit	Conditions
<b>hFE</b>	D.C. Current Gain	20	-		$V_{CE}=1V, I_C=0.1mA$
		40	-		$V_{CE}=1V, I_C=1mA$
		80	-		$V_{CE}=1V, I_C=10mA$
		100	300		$V_{CE}=1V, I_C=150mA$
		40	-		$V_{CE}=2V, I_C=500mA$
<b>V(BR)CBO</b>	Collector-Base Breakdown Voltage	60	-	V	$I_C=0.1mA, I_E=0$
<b>V(BR)CEO</b>	Collector-Emitter Breakdown Voltage*	40	-	V	$I_C=1mA, I_B=0$
<b>V(BR)EBO</b>	Emitter-Base Breakdown Voltage	6.0	-	V	$I_E=0.1mA, I_C=0$
<b>VCEsat</b>	Collector-Emitter Saturation Voltage	-	0.40	V	$I_C=150mA, I_B=15mA$
		-	0.75		$I_C=500mA, I_B=50mA$
<b>VBEsat</b>	Base-Emitter Saturation Voltage	0.75	0.95	V	$I_C=150mA, I_B=15mA$
		-	1.20		$I_C=500mA, I_B=50mA$
<b>ICEV</b>	Collector Cut-off Current	-	0.1	$\mu A$	$V_{EB}=0.4V, V_{CE}=35V$
<b>IBEV</b>	Base Cut-off Current	-	0.1	$\mu A$	$V_{EB}=0.4V, V_{CE}=35V$
<b>hie</b>	Input Impedance	1.0	15	k $\Omega$	$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>hre</b>	Voltage Feedback Ratio	0.1	8.0	$\times 10^{-4}$	$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>hoe</b>	Output Admittance	1.0	30	$\mu S$	$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>hfe</b>	Small Signal Current Gain	40	500		$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>fr</b>	Current Gain-Bandwidth Product	250	-	MHz	$V_{CE}=10V, I_C=20mA,$ $f=100MHz$
<b>CcBO</b>	Output Capacitance	-	6.5	pF	$V_{CB}=5V, f=1.0MHz,$ $I_E=0$
<b>CeBO</b>	Input Capacitance	-	30	pF	$V_{EB}=0.5V, f=1.0MHz,$ $I_C=0$
<b>td</b>	Delay Time	-	15	nS	$I_{B1}=15mA$ $I_C=150mA$ $V_{CC}=30V$ $V_{EB}=2V$
<b>tr</b>	Rise Time	-	20		
<b>ts</b>	Storage Time	-	225		
<b>tf</b>	Fall Time	-	30		

\*Pulse Test Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$

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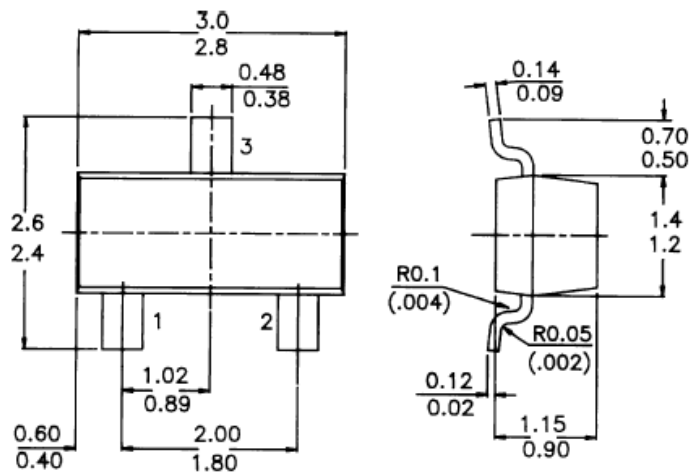
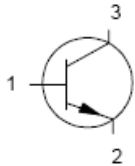
## MMBT4401

Dimensions in mm

### SOT-23

**Pin configuration**

- 1 = BASE
- 2 = EMITTER
- 3 = COLLECTOR



How to contact us:

#### US HEADQUARTERS

28040 WEST HARRISON PARKWAY, VALENCIA, CA 91355-4162

Tel: (800) TAITRON (800) 824-8766 (661) 257-6060

Fax: (800) TAITFAX (800) 824-8329 (661) 257-6415

Email: [taitron@taitroncomponents.com](mailto:taitron@taitroncomponents.com)

Http://[www.taitroncomponents.com](http://www.taitroncomponents.com)

#### TAITRON COMPONENTS MEXICO, S.A .DE C.V.

BOULEVARD CENTRAL 5000 INTERIOR 5 PARQUE INDUSTRIAL ATITALAQUIA, HIDALGO C.P.  
42970 MEXICO

Tel: +52-55-5560-1519

Fax: +52-55-5560-2190

#### TAITRON COMPONENTS INCORPORATED REPRESENTAÇÕES DO BRASIL LTDA

RUA DOMINGOS DE MORAIS, 2777, 2.ANDAR, SALA 24 SAÚDE - SÃO PAULO-SP 04035-001 BRAZIL

Tel: +55-11-5574-7949

Fax: +55-11-5572-0052

#### TAITRON COMPONENTS INCORPORATED, SHANGHAI REPRESENTATIVE OFFICE

METROBANK PLAZA, 1160 WEST YAN' AN ROAD, SUITE 1503, SHANGHAI, 200052, CHINA

Tel: +86-21-5424-9942

Fax: +86-21-5424-9931