

SOT-23 Plastic-Encapsulate Transistors

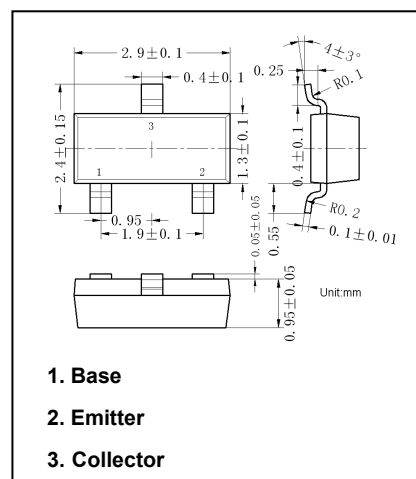
MMBT4401

NPN Transistor

Features

- Switching transistor

Marking: 2X



Maximum Ratings ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector emitter voltage	60	V
V_{CBO}	Collector base voltage	40	V
V_{EBO}	Emitter base voltage	6	V
I_c	Collector current(DC)	0.6	A
P_c	Collector power dissipation	0.3	W
T_j	Junction temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage temperature	- 55 to +150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	417	$^{\circ}\text{C/W}$

Electrical Characteristics ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Max	Unit
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_C = 1\text{mA}, I_B = 0$	40		V
$V_{(BR)CBO}$	Collector-base breakdown voltage	$I_C = 100\mu\text{A}, I_E = 0$	60		V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	$I_E = 100\mu\text{A}, I_C = 0$	6		V
I_{CBO}	Collector cut off current	$V_{CB} = 50\text{V}, I_E = 0$		100	nA
I_{CEX}	Collector cut off current	$V_{CE} = 35\text{V}, V_{EB} = 0.4\text{V}$		100	nA
I_{EBO}	Emitter cut off current	$V_{EB} = 5\text{V}, I_C = 0$		100	nA
h_{FE}	Dc current gain	$V_{CE} = 5\text{V}, I_C = 1\text{mA}$	200		
		$V_{CE} = 2\text{V}, I_C = 500\text{mA}$	40		
		$V_{CE} = 1\text{V}, I_C = 0.1\text{mA}$	20		
		$V_{CE} = 1\text{V}, I_C = 1\text{mA}$	40		
		$V_{CE} = 1\text{V}, I_C = 10\text{mA}$	80		
		$V_{CE} = 1\text{V}, I_C = 150\text{mA}$	200	300	
$V_{CE(sat)}$	Collector emitter saturation voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$		0.4	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}$		0.75	V
$V_{BE(sat)}$	Base-emitter saturation voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$		0.95	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}$		1.2	V
f_T	Transition frequency	$V_{CE} = 10\text{V}, I_C = 20\text{mA}$ $f = 100\text{MHz}$	250		MHz
t_d	Delay time	$V_{CC} = 30\text{V}, V_{BE(off)} = -2\text{V}$ $I_C = 150\text{mA}, I_{B1} = 15\text{mA}$		15	ns
t_r	Rise time			20	ns
t_s	Storage time	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$ $I_{B1} = I_{B2} = 15\text{mA}$		225	ns
t_f	Fall time			60	ns

Typical Characteristics

Static Characteristic

