

MMBT4401 TRANSISTOR (NPN)

FEATURES

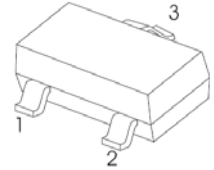
- Switching Transistor

MARKING:2X

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

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	40	V
V_{CEO}	Collector-Emitter Voltage	25	V
V_{EBO}	Emitter-Base Voltage	6	V
I_{C}	Collector Current	350	mA
P_{C}	Collector Power Dissipation	300	mW
$R_{\theta\text{JA}}$	Thermal Resistance From Junction To Ambient	417	$^{\circ}\text{C}/\text{W}$
T_{J}	Junction Temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55~+150	$^{\circ}\text{C}$

SOT - 23



1. BASE
2. EMITTER
3. COLLECTOR

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(\text{BR})\text{CBO}}$	$I_{\text{C}}=100\text{ }\mu\text{A}, I_{\text{E}}=0$	40			V
Collector-emitter breakdown voltage	$V_{(\text{BR})\text{CEO}}$	$I_{\text{C}}=1\text{mA}, I_{\text{B}}=$	25			V
Emitter-base breakdown voltage	$V_{(\text{BR})\text{EBO}}$	$I_{\text{E}}=100\text{ }\mu\text{A}, I_{\text{C}}=0$	6			V
Collector cut-off current	I_{CBO}	$V_{\text{CB}}=50\text{V}, I_{\text{E}}=0$			0.1	μA
Collector cut-off current	I_{CEX}	$V_{\text{CE}}=35\text{V}, V_{\text{EB}}=0.4\text{V}$			0.1	μA
Emitter cut-off current	I_{EBO}	$V_{\text{EB}}=5\text{V}, I_{\text{C}}=0$			0.1	μA
DC current gain	h_{FE1}	$V_{\text{CE}}=1\text{V}, I_{\text{C}}=0.1\text{mA}$	20			
	h_{FE2}	$V_{\text{CE}}=1\text{V}, I_{\text{C}}=1\text{mA}$	40			
	h_{FE3}	$V_{\text{CE}}=1\text{V}, I_{\text{C}}=10\text{mA}$	80			
	h_{FE4}	$V_{\text{CE}}=1\text{V}, I_{\text{C}}=150\text{mA}$	100		300	
	h_{FE5}	$V_{\text{CE}}=2\text{V}, I_{\text{C}}=500\text{mA}$	40			
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}}=150\text{mA}, I_{\text{B}}=15\text{mA}$			0.4	V
		$I_{\text{C}}=500\text{mA}, I_{\text{B}}=50\text{mA}$			0.75	V
Base-emitter saturation voltage	$V_{\text{BE(sat)}}$	$I_{\text{C}}=150\text{mA}, I_{\text{B}}=15\text{mA}$			0.95	V
		$I_{\text{C}}=500\text{mA}, I_{\text{B}}=50\text{mA}$			1.2	V
Transition frequency	f_{T}	$V_{\text{CE}}=10\text{V}, I_{\text{C}}=20\text{mA}, f=100\text{MHz}$	250			MHz
Delay time	t_{d}	$V_{\text{CC}}=30\text{V}, V_{\text{BE(off)}}=-2\text{V}$			15	ns
Rise time	t_{r}	$I_{\text{C}}=150\text{mA}, I_{\text{B1}}=15\text{mA}$			20	ns
Storage time	t_{s}	$V_{\text{CC}}=30\text{V}, I_{\text{C}}=150\text{mA}$			225	ns
Fall time	t_{f}	$I_{\text{B1}}=I_{\text{B2}}=15\text{mA}$			60	ns