

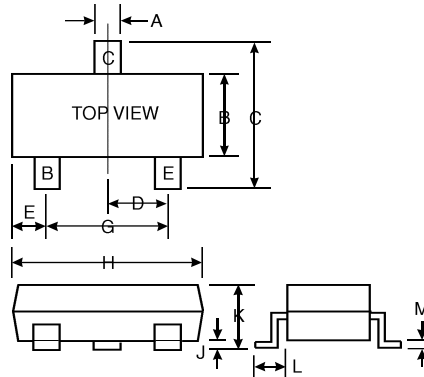


Features

Epitaxial Planar Die Construction
Complementary PNP Type Available (MMBT4403)
Ideal for Medium Power Amplification and Switching

Mechanical Data

Case: SOT-23, Molded Plastic
Terminals: Solderable per MIL-STD-202, Method 208
Terminal Connections: See Diagram
Marking: K2X, R2X
Weight: 0.008 grams (approx.)



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.19	1.40
C	2.10	2.50
D	0.89	1.05
E	0.45	0.61
G	1.78	2.05
H	2.65	3.05
J	0.013	0.15
K	0.89	1.10
L	0.45	0.61
M	0.076	0.178
All Dimensions in mm		

Maximum Ratings @ T_A = 25 C unless otherwise specified

Characteristic	Symbol	MMBT4401	Unit
Collector-Base Voltage	V _{CB0}	60	V
Collector-Emitter Voltage	V _{CE0}	40	V
Emitter-Base Voltage	V _{EB0}	6.0	V
Collector Current - Continuous (Note 1)	I _C	600	mA
Power Dissipation (Note 1)	P _d	350	mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{JA}	357	K/W
Operating and Storage and Temperature Range	T _J , T _{STG}	-55 to +150	C

- Notes:
1. Valid provided that terminals are kept at ambient temperature.
 2. Pulse test: Pulse width 300 s, duty cycle 2%.

Electrical Characteristics @ $T_A = 25\text{ C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 2)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60		V	$I_C = 100\text{ A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40		V	$I_C = 1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6.0		V	$I_E = 100\text{ A}, I_C = 0$
Collector Cutoff Current	I_{CEX}		100	nA	$V_{CE} = 35\text{V}, V_{EB(OFF)} = 0.4\text{V}$
Base Cutoff Current	I_{BL}		100	nA	$V_{CE} = 35\text{V}, V_{EB(OFF)} = 0.4\text{V}$
ON CHARACTERISTICS (Note 2)					
DC Current Gain	h_{FE}	20 40 80 100 40	300		$I_C = 100\mu\text{A}, V_{CE} = 1.0\text{V}$ $I_C = 1.0\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 150\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 500\text{mA}, V_{CE} = 2.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		0.40 0.75	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
Base- Emitter Saturation Voltage	$V_{BE(SAT)}$	0.75	0.95 1.2	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{cb}		6.5	pF	$V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	C_{eb}		30	pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$
Input Impedance	h_{ie}	1.0	15	k	$V_{CE} = 10\text{V}, I_C = 1.0\text{mA}, f = 1.0\text{kHz}$
Voltage Feedback Ratio	h_{re}	0.1	8.0	$\times 10^{-4}$	
Small Signal Current Gain	h_{fe}	40	500		
Output Admittance	h_{oe}	1.0	30	S	
Current Gain-Bandwidth Product	f_T	250		MHz	$V_{CE} = 10\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$
SWITCHING CHARACTERISTICS					
Delay Time	t_d		15	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}, V_{BE(off)} = 2.0\text{V}, I_{B1} = 15\text{mA}$
Rise Time	t_r		20	ns	
Storage Time	t_s		225	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}, I_{B1} = I_{B2} = 15\text{mA}$
Fall Time	t_f		30	ns	

- Notes: 1. Valid provided that terminals are kept at ambient temperature.
2. Pulse test: Pulse width 300 μ s, duty cycle 2%.