MMBT4401

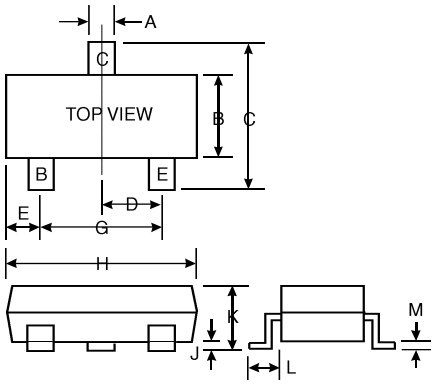
NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

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

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