MMBT4401
Surface-Mount NPN Transistor

FEATURES AND BENEFITS

Product Summary		
I_C	600mA	@25 °C
BV_{CBO}	60V	@I_C=100μA
BV_{CEO}	40V	@I_C=1mA
BV_{EBO}	6V	@I_E=100μA

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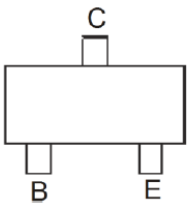
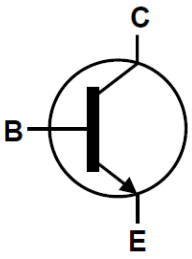




- For General Purpose NPN Amplifier
- RoHS Compliant / Green EMC UL Flammability Classification Rating 94V-0
- Matte Tin (Sn) Lead finish Solderable per MIL-STD-202, Method 208
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.008 grams (Approximate)

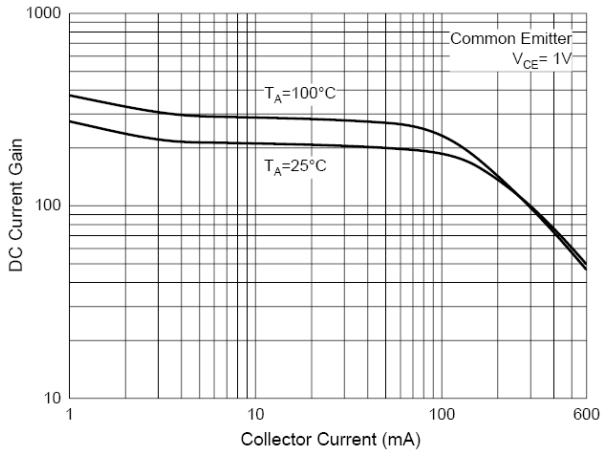
Maximum Ratings (TA = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Collector Power Dissipation	P_T	300	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 to +150	°C

THERMAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Thermal Resistance from Junction to Ambient*	$R_{\theta JA}$	417	°C/W

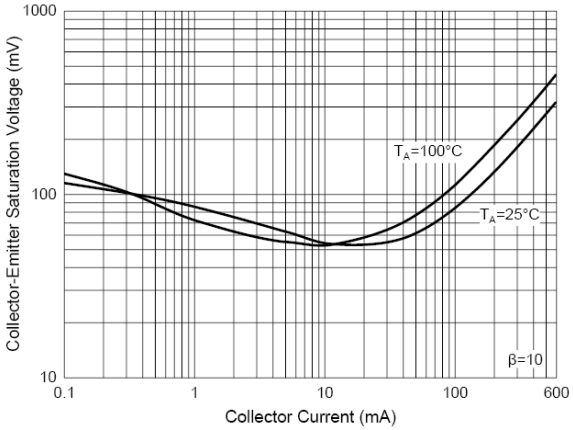
* Device mounted on 1"x1" FR4 PCB

ELECTRICAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	CONDITION	MIN	MAX	UNIT
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1mA, I_B=0	40		V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 100μA, I_E=0	60		V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 100μA, I_C=0	6		V
Collector Cutoff Current	I_{CBO}	V_{CB}=50V, I_E=0		100	nA
Collector Cutoff Current	I_{CEX}	V_{CE}=35V, V_{BE}=0.4V		100	nA
Emitter-Base Cutoff current	I_{EBO}	V_{EB}=5V, I_C=0		100	
DC Current Gain	h_{FE}	I_C=0.1mA, V_{CE}=1V	20		
		I_C=1mA, V_{CE}=1V	40		
		I_C=10mA, V_{CE}=1V	80		
		I_C=150mA, V_{CE}=1V	100	300	
		I_C=500mA, V_{CE}=2V	40		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=150mA, I_B=15mA		0.4	V
		I_C=500mA, I_B=50mA		0.75	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=150mA, I_B=15mA		0.95	V
		I_C=500mA, I_B=50mA		1.2	
Transition Frequency	f_T	I_C=20mA, V_{CE} =10V, f=100MHz	250		MHz
Output Capacitance	C_{obo}	V_{CB}=5V, I_E=0, f=1MHz		6.5	pF
Input Capacitance	C_{ibo}	V_{BE}=0.5V, I_C=0, f=1MHz		30	pF
Delay Time	td	V_{CC}=30V, V_{BE}=0.2V		15	ns
Rise Time	tr	I_C=150mA, I_{B1}=15mA		20	
Storage Time	ts	V_{CC}=30V, I_C=150mA		225	
Fall Time	tf	I_{B1}=I_{B2}=15mA		30	

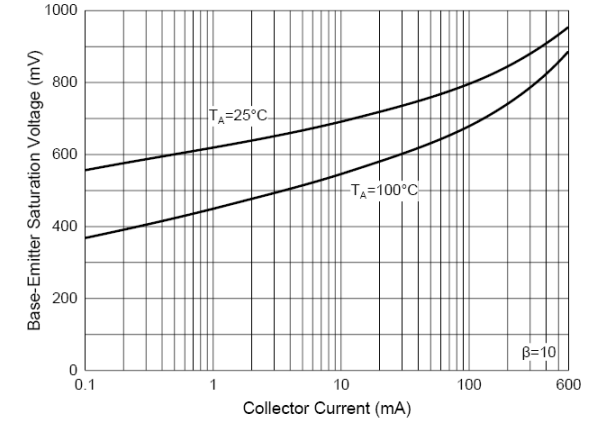
RATING AND CHARACTEERISTICS CURVES



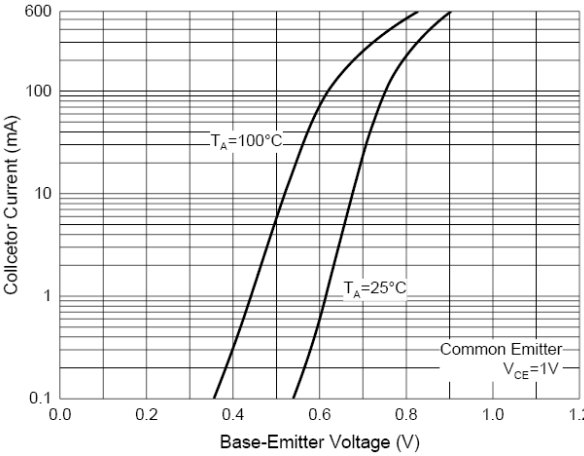
DC Current Gain (h_{FE}) vs Collector Current (I_C)



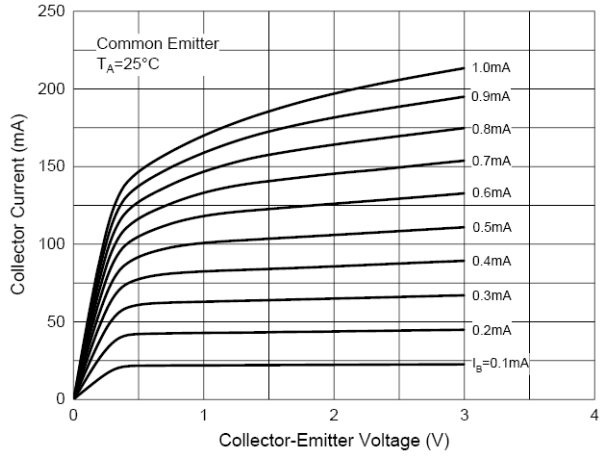
Collector-Emitter Saturation Voltage vs. Collector Current (I_C)



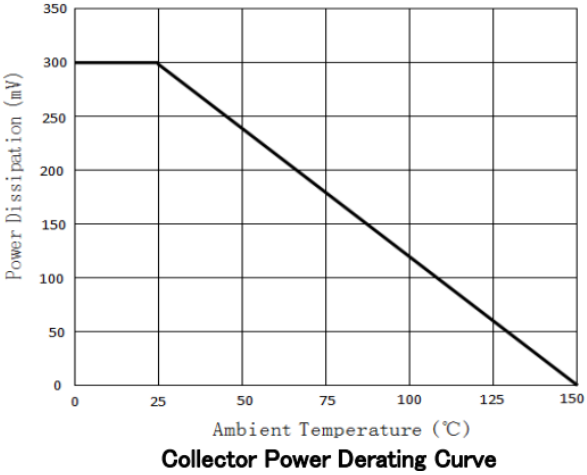
Base-Emitter Saturation Voltage vs. Collector Current (I_C)



Base-Emitter Voltage Characteristics



Static Characteristics



Collector Power Derating Curve

Power Derating Curve

PACKAGE OUTLINE DIMESEIONS

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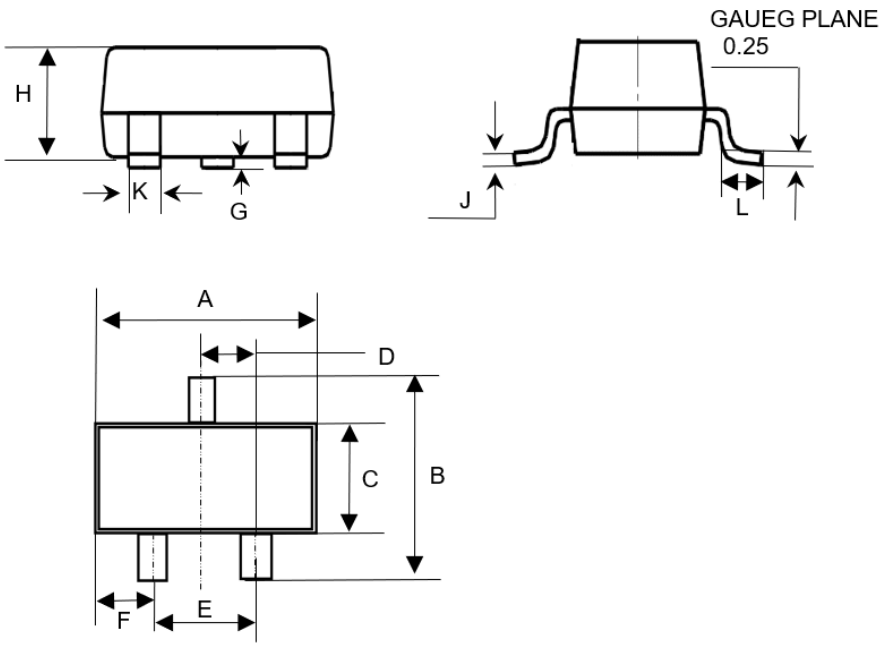
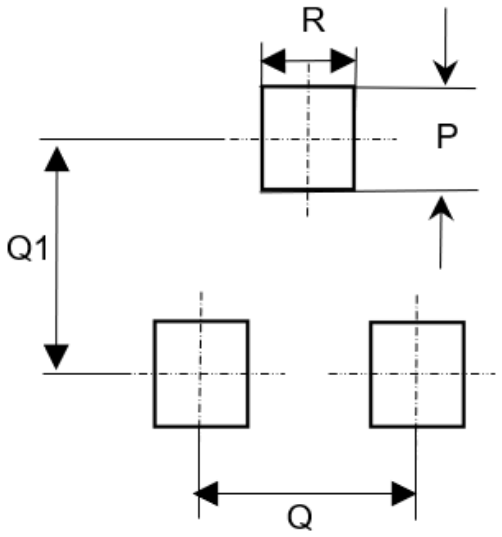


Symbol	MIN	MAX
A	2.800	3.040
B	2.100	2.640
C	1.200	1.400
D	0.890	1.030
E	1.780	2.050
F	0.450	0.600
G	0.013	0.100
H	0.900	1.110
J	0.085	0.180
K	0.370	0.510
L	0.300	0.500
		Unit: mm

SUGGESTED PAD LAYOUT



Land Pattern Recommendation

Symbol	Type
Q	1.900
Q1	2.000
P	0.900
R	0.800
	Unit: mm

DEVICE MARKING AND ORDERING INFORMATION

DEVICE	Marking	Quantity	Packing
MMBT4401	2X	3000/Reel	Tape & Reel