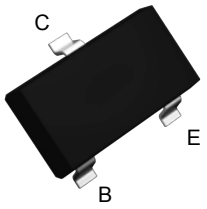
GOOD-ARK
SEMICONDUCTOR

MMBT4401
NPN Transistor

Features

- Switching transistor
- Ultra-small surface mount package
- Plastic-Encapsulate transistor



SOT-23

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter	Symbol	Max.	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current-Continuous	I_C	600	mA
Collector Power Dissipation	P_C	300	mW
Typical Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	417	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=100uA, I_E=0	60	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, I_B=0	40	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=100uA, I_C=0	6	-	V
Collector Cut-off Current	I_{CBO}	V_{CB}=50V, I_E=0	-	0.1	μA
Collector Cut-off Current	I_{CEX}	V_{CE}=35V, V_{EB}=0.4V	-	0.1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB}=5V, I_C=0	-	0.1	μA
DC Current Gain	h_{FE}^1	V_{CE}=1V, I_C=0.1mA	20	-	-
	h_{FE}^2	V_{CE}=1V, I_C=1mA	40	-	-
	h_{FE}^3	V_{CE}=1V, I_C=10mA	80	-	-
	h_{FE}^4	V_{CE}=1V, I_C=150mA	100	300	-
	h_{FE}^5	V_{CE}=2V, I_C=500mA	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	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=150mA, I_B=15mA	-	0.95	V
		I_C=500mA, I_B=50mA	-	1.2	V
Transition Frequency	f_T	V_{CE}=10V, I_C=20mA, F=100MHz	250	-	MHz
Delay Time	t_d	V_{CC}=30V, $V_{BE(off)}$=-2V, I_C=150mA , I_{B1}=15mA	-	15	nS
Rise Time	t_r		-	20	nS
Storage Time	t_s	V_{CC}=30V, I_C=150mA, I_{B1}=I_{B2}=15mA	-	225	nS
Fall Time	t_f		-	60	nS

Ratings and Characteristics Curves (T_A=25°C unless otherwise noted)

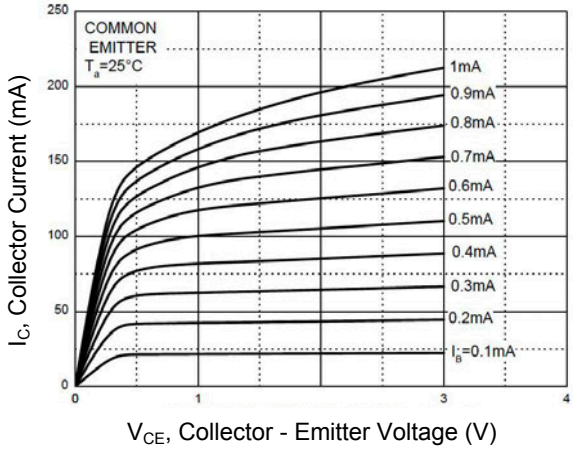


Figure 1. Static Characteristics

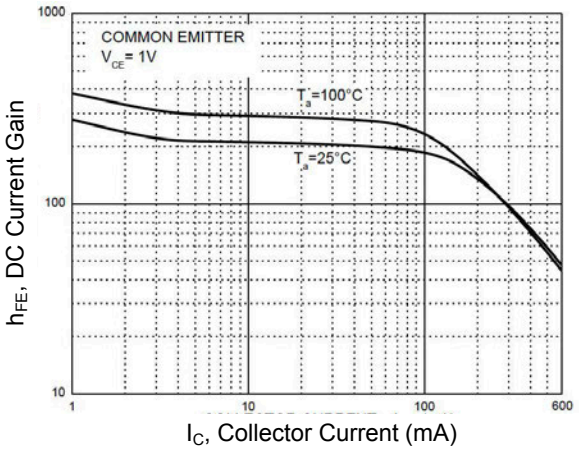


Figure 2. DC Current Gain vs. Collector Current

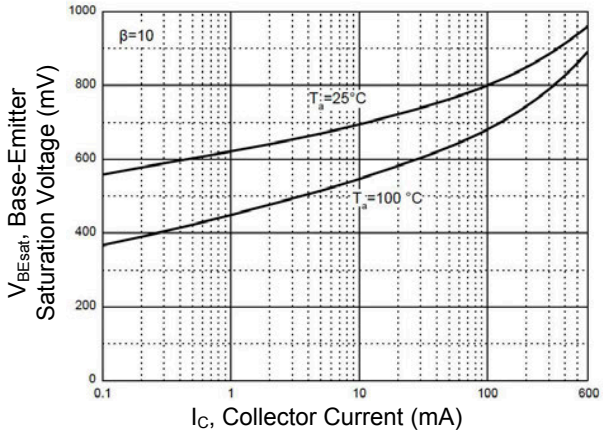


Figure 3. Base - Emitter Saturation Voltage vs. Collector Current

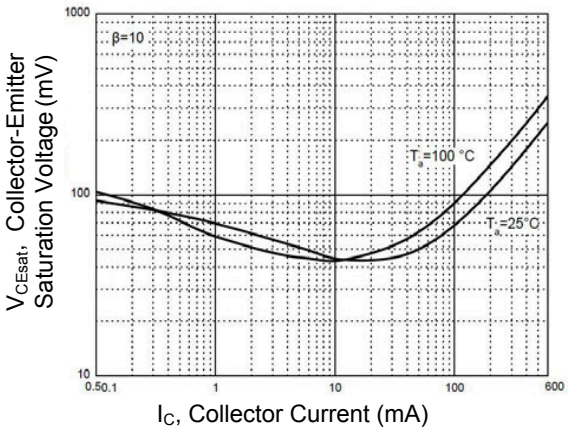


Figure 4. Collector - Emitter Saturation Voltage vs. Collector Current

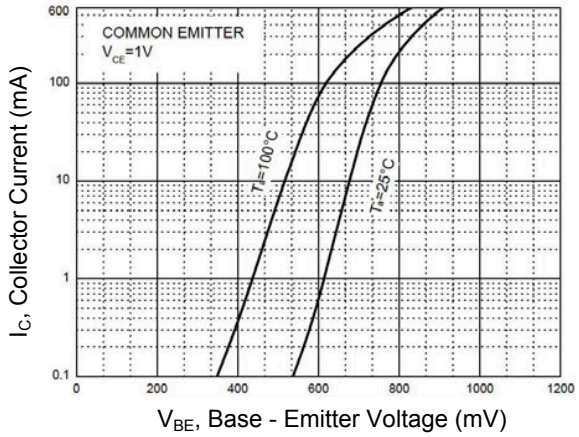


Figure 5. Collector Current vs. Base - Emitter Voltage

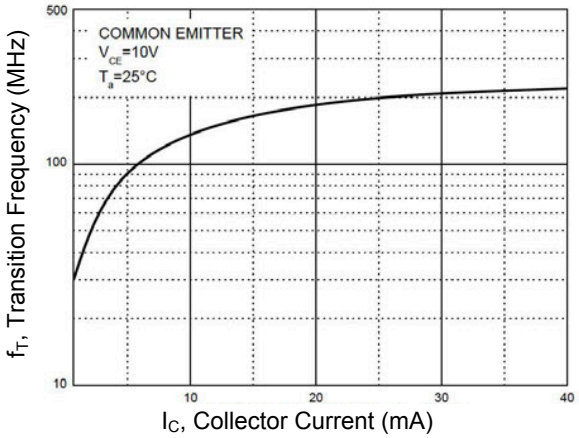


Figure 6. Transition Frequency vs. Collector Current

Ratings and Characteristics Curves (T_A=25°C unless otherwise noted)

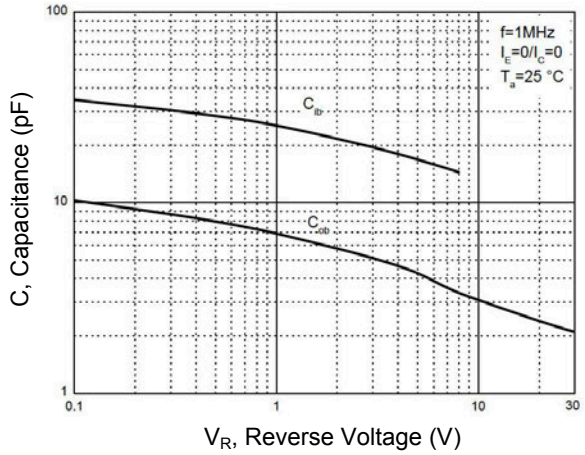


Figure 7. Capacitance Characteristics

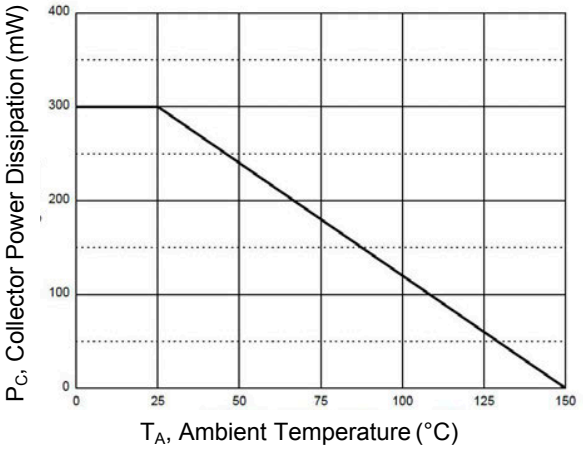
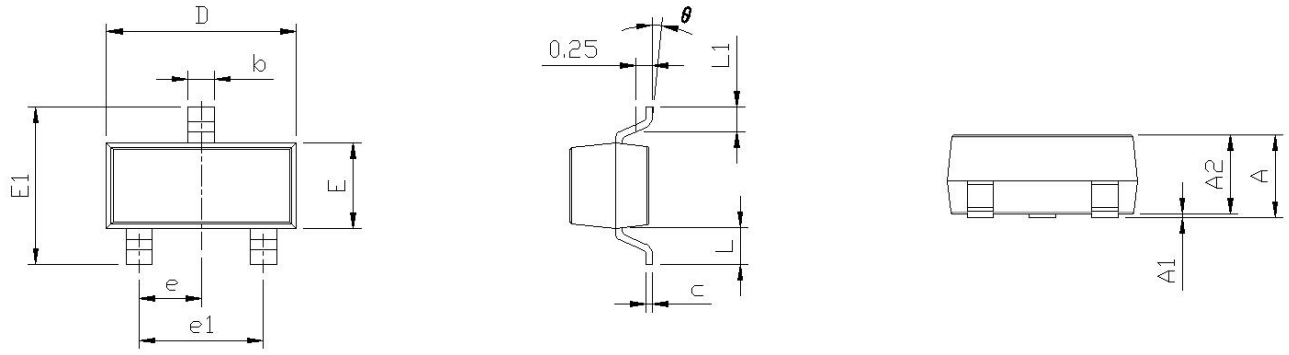


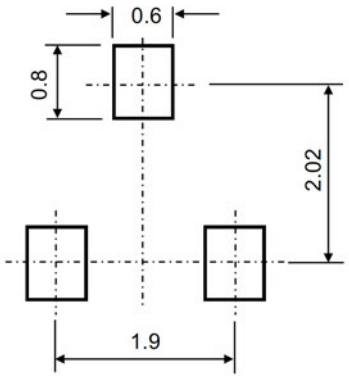
Figure 8. Power Dissipation vs Ambient Temperature

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

Ordering Information

Device	Package	Marking	Quantity	HSF Status
MMBT4401	SOT-23	2X	3,000pcs / Reel	RoHS Compliant