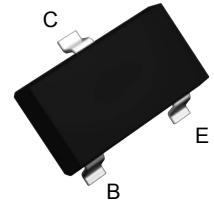


Features

- NPN transistor, complementary type MMBT3906
- High stability and high reliability
- SOT-23 small outline plastic package



SOT-23

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

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	200	mA
Collector Power Dissipation	P_C	200	mW
Typical Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}$, $I_E=0$	60	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}$, $I_B=0$	40	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}$, $I_C=0$	6	-	V
Collector Cut-off Current	I_{CBO}	$V_{CB}=60\text{V}$, $I_E=0$	-	100	nA
Collector Cut-off Current	I_{CEX}	$V_{CE}=30\text{V}$, $V_{BE(off)}=3\text{V}$	-	50	nA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=5\text{V}$, $I_C=0$	-	100	nA
DC Current Gain	h_{FE}	$V_{CE}=1\text{V}$, $I_C=10\text{mA}$	100	300	-
		$V_{CE}=1\text{V}$, $I_C=50\text{mA}$	60	-	
		$V_{CE}=1\text{V}$, $I_C=100\text{mA}$	30	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=50\text{mA}$, $I_B=5\text{mA}$	-	0.3	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=50\text{mA}$, $I_B=5\text{mA}$	-	0.95	V
Transition Frequency	f_T	$V_{CE}=20\text{V}$, $I_C=10\text{mA}$, $F=100\text{MHz}$	300	-	MHz
Delay Time	t_d	$V_{CC}=3\text{V}$, $V_{BE(off)}=-0.5\text{V}$ $I_C=10\text{mA}$, $I_{B1}=1\text{mA}$	-	35	nS
Rise Time	t_r		-	35	nS
Storage Time	t_s	$V_{CC}=3\text{V}$, $I_C=10\text{mA}$ $I_{B1}=I_{B2}=1\text{mA}$	-	200	nS
Fall Time	t_f		-	50	nS

Typical Electrical Characteristic Curves

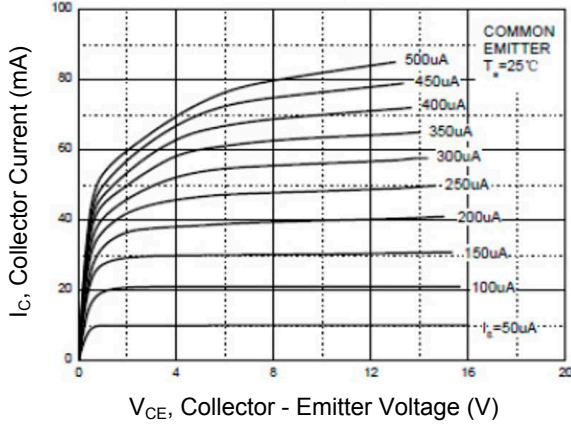


Figure 1. Static Characteristics

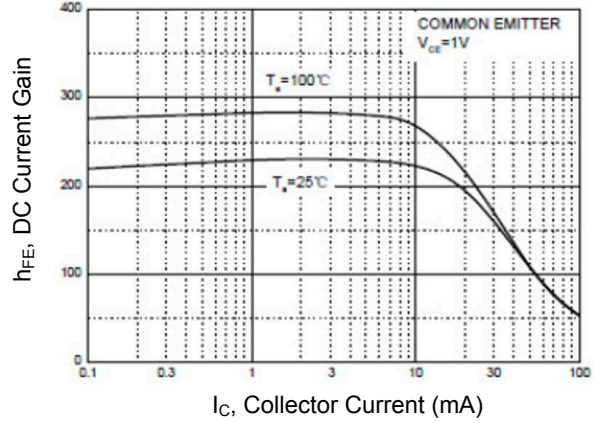


Figure 2. DC Current Gain vs. Collector Current

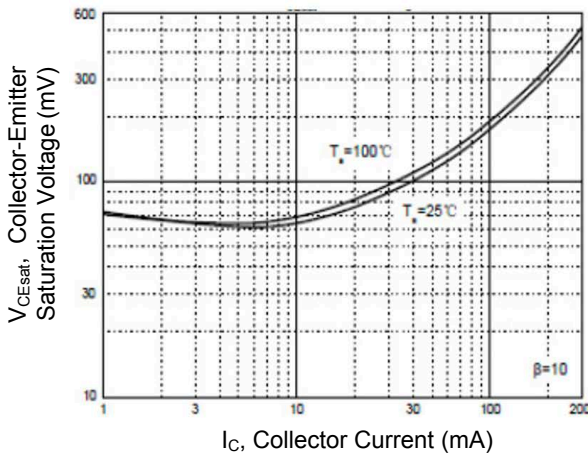


Figure 3. Collector - Emitter Saturation Voltage vs. Collector Current

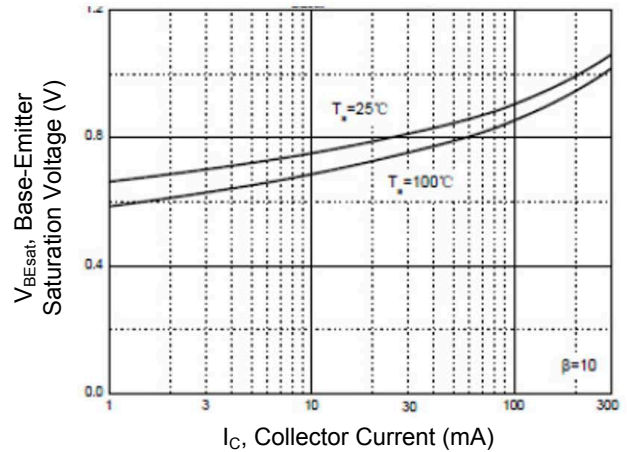


Figure 4. Base - Emitter Saturation Voltage vs. Collector Current

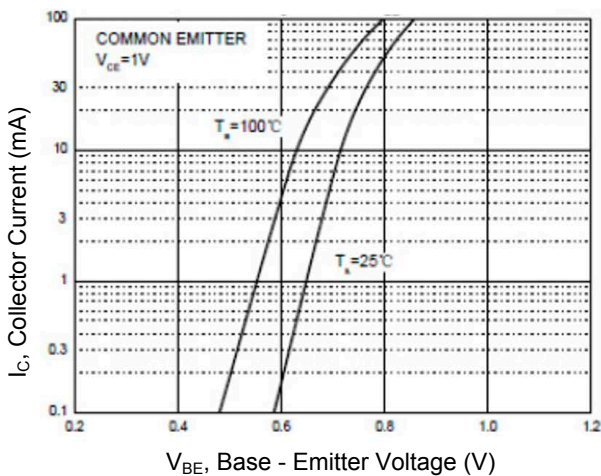


Figure 5. Collector Current vs. Base - Emitter Voltage

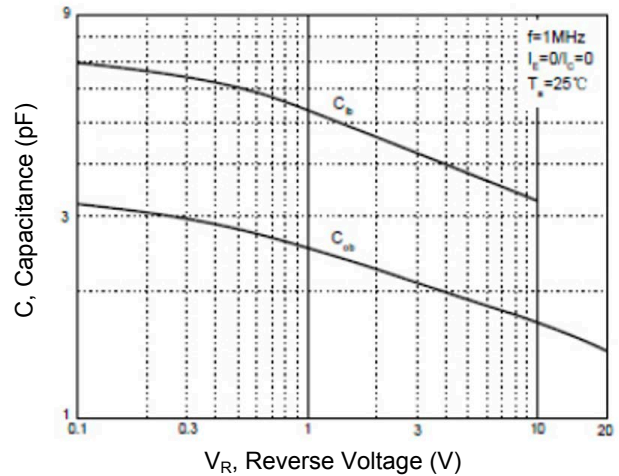


Figure 6. Capacitance Characteristics

Typical Electrical Characteristic Curves

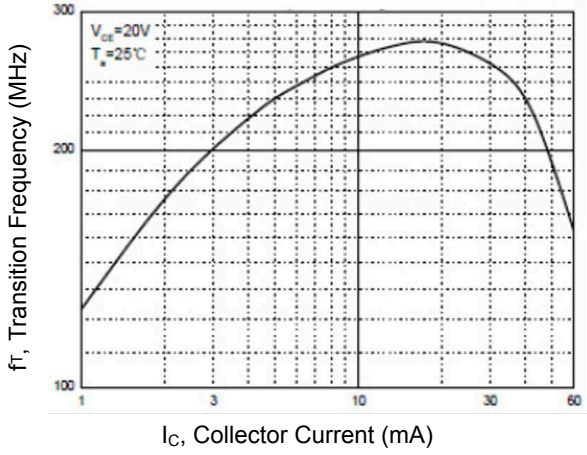


Figure 7. Transition Frequency vs. Collector Current

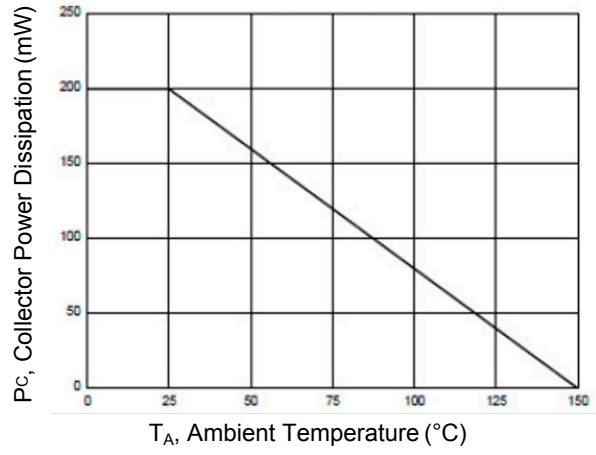
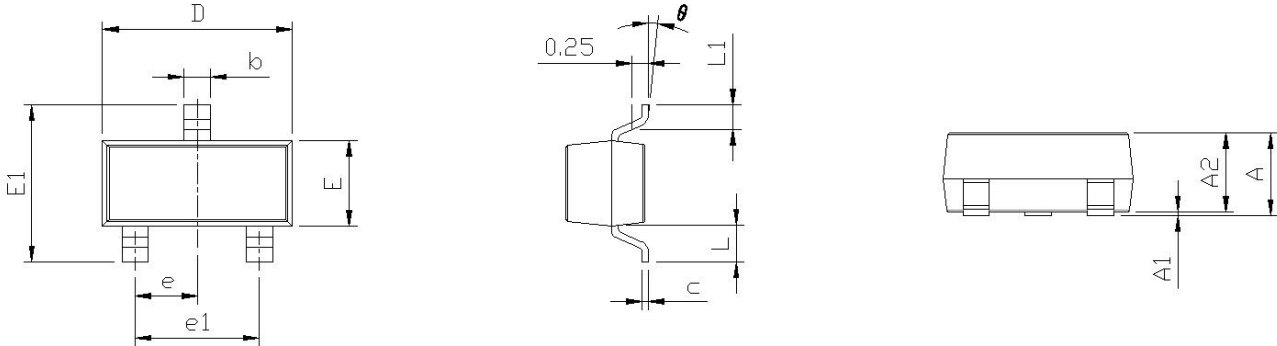


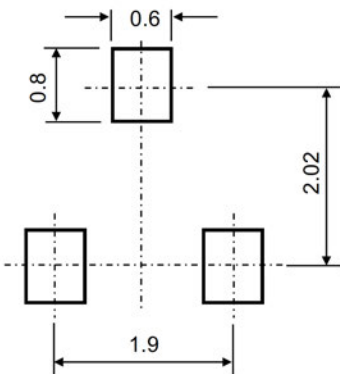
Figure 8. Power Dissipation vs Ambient Temperature

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: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

Order Information

Device	Package	Marking	Quantity	HSF Status
MMBT3904	SOT- 23	1AM	3,000pcs / Reel	RoHS Compliant