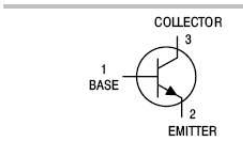
NPN SWITCHING TRANSISTOR MMBT3904

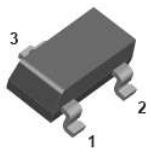
FEATURES

- Epitaxial planar die construction.
- Complementary PNP type available (MMBT3906).
- Collector Current Capability I_{CM} =200mA.
- Collector-emitter Voltage V_{CEO}=40V.
- MSL 1

Lead-free

HF





SOT-23

APPLICATIONS

- General switching and amplification

ORDERING INFORMATION

Type No.	Marking	Package Code
MMBT3904□	1AM	SOT-23

□: none is for Lead Free package;

"G" is for Halogen Free package.

MAXIMUM RATING @ Ta=25℃ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	Value	UNIT
V_{CBO}	collector-base voltage	open emitter	60	V
V_{CEO}	collector-emitter voltage	open base	40	V
V_{EBO}	emitter-base voltage	open collector	6	V
I_C	collector current (DC)		200	mA
I_{CM}	peak collector current		200	mA
I_{BM}	peak base current		100	mA
P_{tot}	total power dissipation	Tamb≤25°C	250	mW
T_{stg}	storage temperature		-65 to +150	°C
T_j	junction temperature		150	°C

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ELECTRICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current	I_E = 0; V_{CB} = 30 V	-	50	nA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = 6 V	-	50	nA
h_{FE}	DC current gain	V_{CE} = 1 V; I_C= 0.1mA I_C = 1mA I_C = 10mA I_C = 50mA I_C = 100mA	60 80 100 60 30	- - 300 - -	
$V_{CE(sat)}$	collector-emitter saturation voltage	I_C = 10mA; I_B = 1mA	-	200	mV
		I_C = 50mA; I_B = 5mA	-	300	mV
$V_{BE(sat)}$	base-emitter saturation voltage	I_C = 10mA; I_B = 1mA	650	850	mV
		I_C = 50mA; I_B = 5mA	-	950	mV
C_{obo}	Output Capacitance	I_E = I_e= 0; V_{CB}= 5V; f = 1MHz	-	4	pF
C_{ibo}	Input Capacitance	I_C = I_c = 0; V_{BE}=500mV; f =1MHz	-	8	pF
f_T	transition frequency	I_C =10mA; V_{CE} =20V; f =100MHz	300	-	MHz
F	noise figure	I_C=100mA; V_{CE} =5V; R_S =1kΩ;f =10Hz to15.7kHz	-	5	dB
Switching times (between 10% and 90% levels);					
t_d	delay time	VCC=3Vdc, VBE=–0.5Vdc	-	35	ns
t_r	rise time	IC=10mAdc, IB1=1mAdc	-	35	ns
t_s	storage time	VCC=3Vdc, IC=10mAdc	-	200	ns
t_f	fall time	IB1=IB2=1mAdc	-	50	ns

Note Pulse test: tp≤300 ms; d≤0.02.

NPN SWITCHING TRANSISTOR MMBT3904

TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

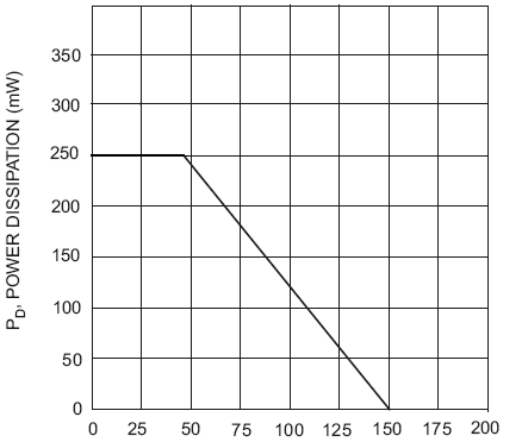


Fig. 1, Max Power Dissipation vs Ambient Temperature

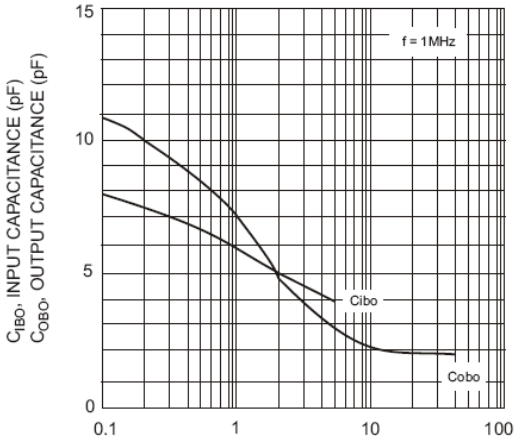


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

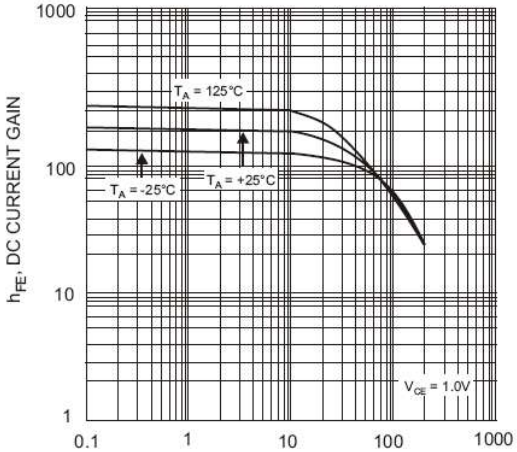


Fig. 3, Typical DC Current Gain vs Collector Current

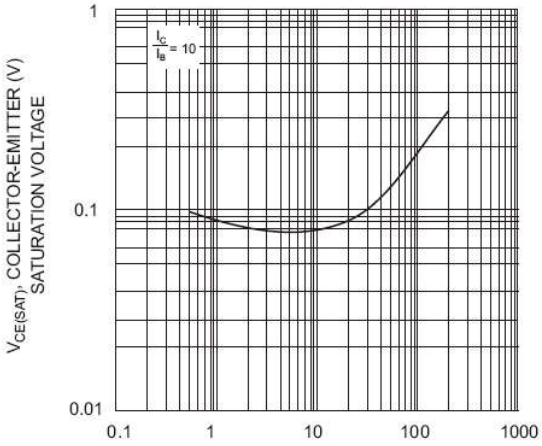


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

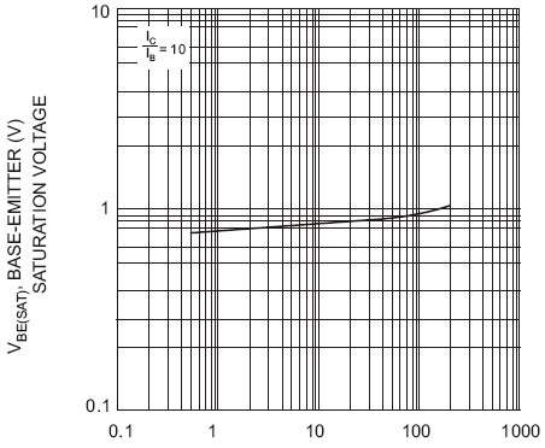
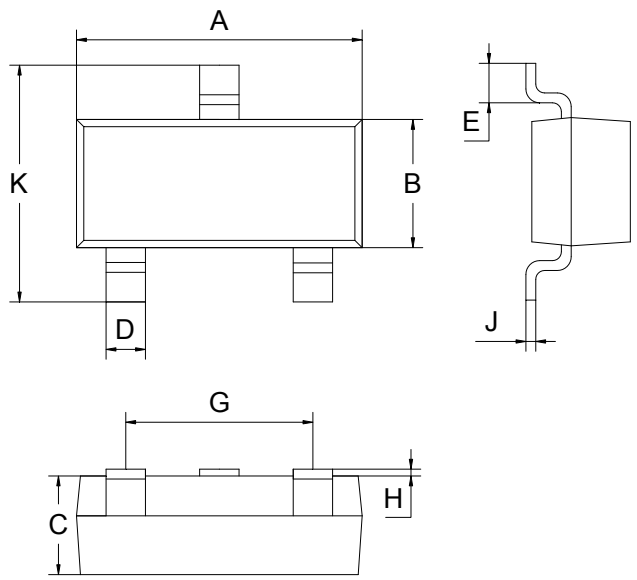


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

NPN SWITCHING TRANSISTOR MMBT3904

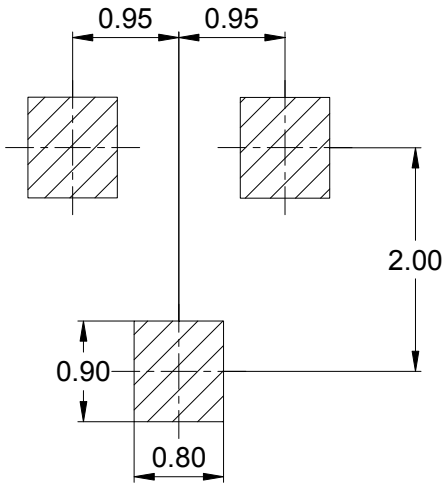
PACKAGE OUTLINE

Plastic surface mounted package SOT-23



SOT-23		
Dim	Min	Max
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60
All Dimensions in mm		

SOLDERING FOOTPRINT



Unit : mm

PACKAGE INFORMATION

Device	Package	Shipping
MMBT3904	SOT-23	3000/Tape&Reel