



MMBT3904

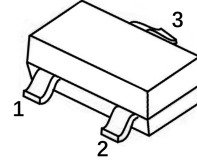
NPN Plastic-Encapsulate Transistors

Product data sheet

1. General description

Small Signal NPN Transistor encapsulated in a small SOT-23 Surface- Mounted Device (SMD) plastic package.

SOT-23



2.Features

- Complementary to MMBT3906
- Collector Current: $I_C=0.2A$

3. Applications

- Surface Mount Package Ideally Suited for Automatic Insertion
- For General Purpose Switching Applications

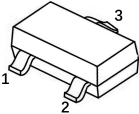
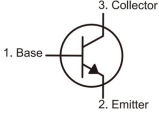
4. Quick referencedata

Table 1. Quick reference data
 $T_a=25^{\circ}C$

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current	200	mA
P_C	Collector Power Dissipation	200	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	25	$^{\circ}C/W$

5. Pinning information

Table 2. Pinning information

Pin	Name	SOT-23 Simplified outline	Graphic symbol
1	Base		
2	Emitter		
3	Collector		

6. Ordering information

Table 3. Ordering information

Part number	Package	Material	Packing	Quantity per reel	Flammability rating	Reel size
MMBT3904	SOT-23	halogen free	tape & reel	3,000pcs	UL 94V-0	7 inches

7. Marking

Table 4. Marking codes

Part number	Marking code
MMBT3904	1AM

8. MAXIMUM RATINGS (Ta=25℃ unless otherwise noted)

Table 5. Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current	200	mA
P_C	Collector Power Dissipation	200	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	625	℃/W
T_J, T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	℃

9. ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

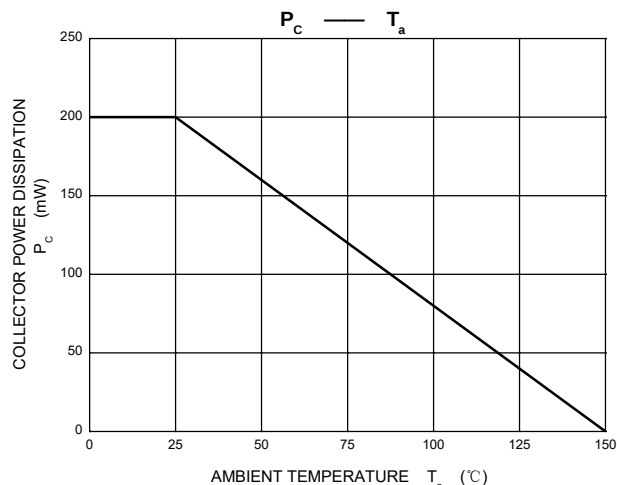
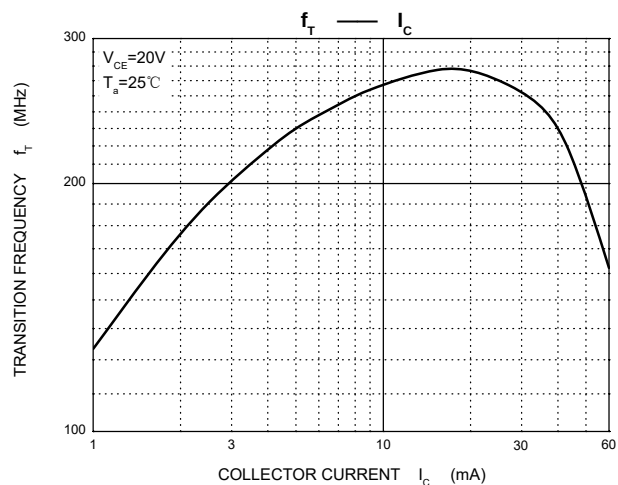
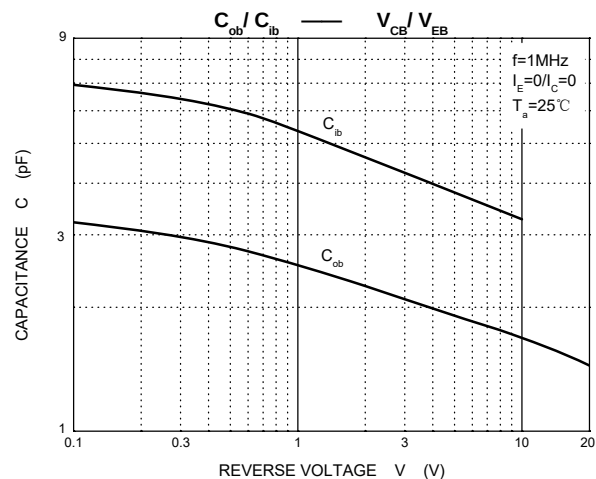
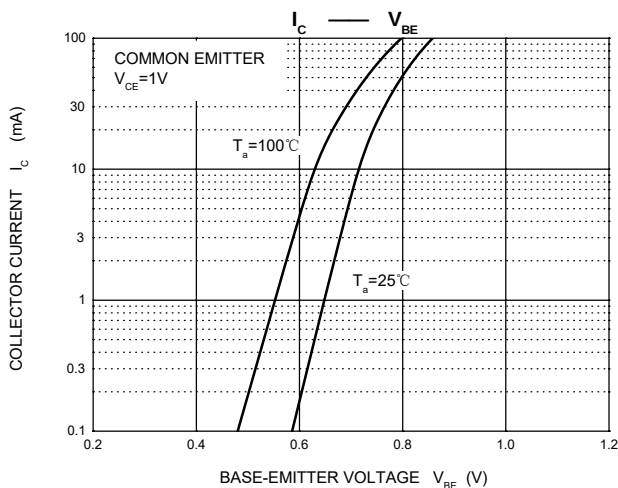
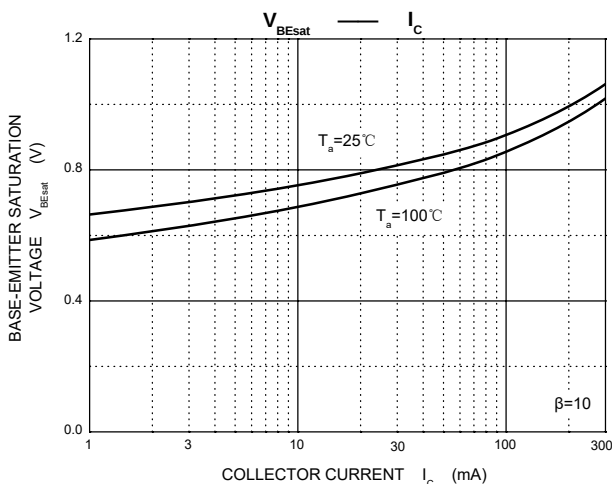
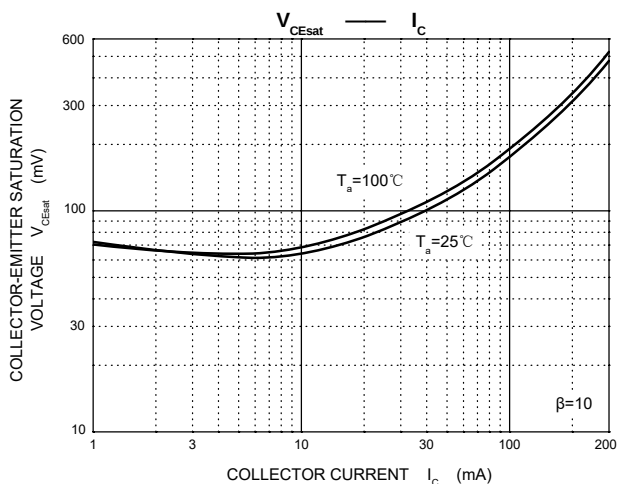
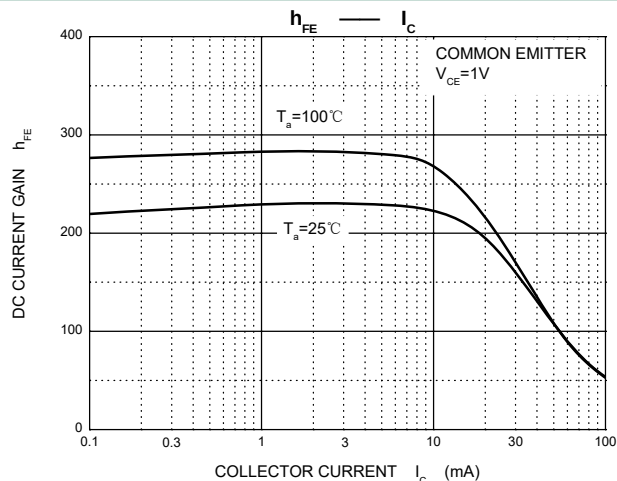
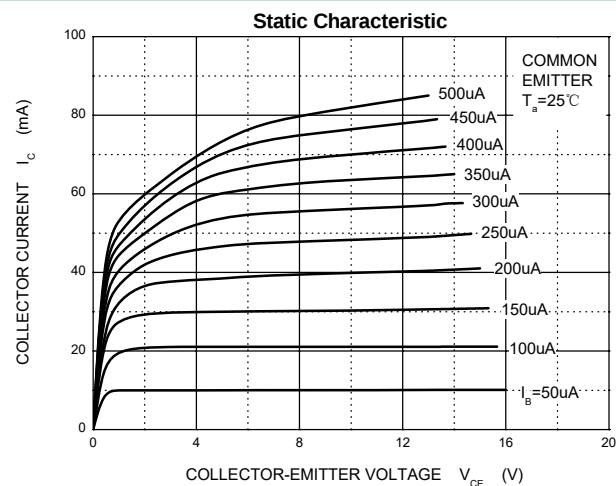
Table 6. Electrical Characteristics

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 10\mu A, I_E = 0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1mA, I_B = 0$	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 10\mu A, I_C = 0$	6			V
Collector cut-off current	I_{CBO}	$V_{CE} = 60V, I_E = 0V$			0.1	μA
Collector cut-off current	I_{CEX}	$V_{CE} = 30V, V_{EB(off)} = 3V$			0.05	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 5V, I_C = 0V$			0.1	μA
DC current gain	$h_{FE(1)}$	$V_{CE} = 1V, I_C = 10mA$	100		300	
	$h_{FE(2)}$	$V_{CE} = 1V, I_C = 50mA$	60			
	$h_{FE(3)}$	$V_{CE} = 1V, I_C = 100mA$	30			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 50mA, I_B = 5mA$			0.3	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 50mA, I_B = 5mA$			0.95	V
Transition frequency	f_T	$V_{CE} = 20V, I_C = 10mA, f = 100MHz$	300			MHz

Table 7. CLASSIFICATION OF h_{FE}

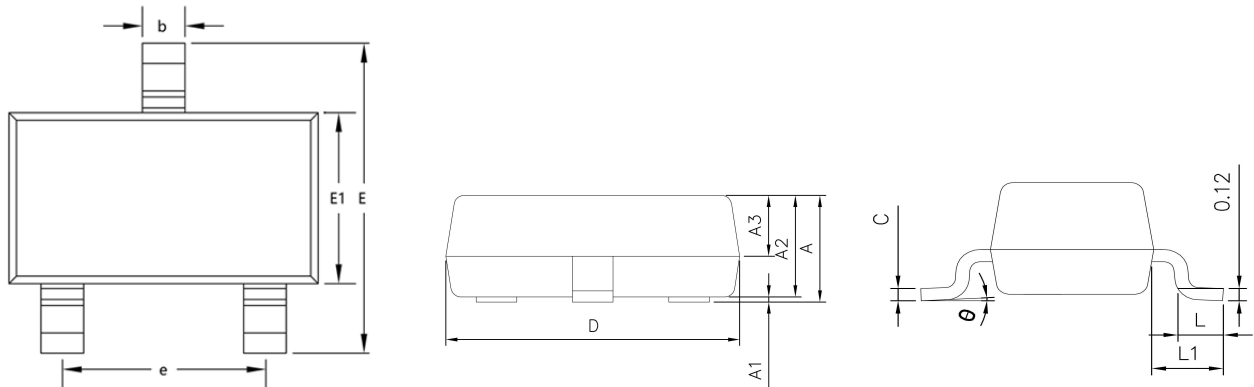
Rank	L	H
Range	100-200	200-300

10. Typical characteristics



11.Package outline

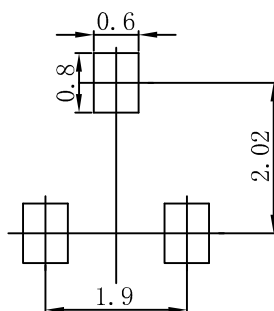
Table 8. SOT-23 Package outline



Symbol	Dimension in millimeter		
	Min	Nom	Max
A	0.9	1.05	1.2
A1	0.0	0.05	0.1
A2	0.9	1.00	1.10
A3	0.55	0.60	0.65
b	0.30	0.40	0.50
c	0.10	0.11	0.12
D	2.80	2.90	3.0
E	2.25	2.40	2.55
E1	1.20	1.30	1.40
e	1.8	1.9	2.0
L	0.30	0.40	0.50
L1	0.475	0.55	0.625
θ	0°	3°	6°

12.Suggested pad layout

Table 9. 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

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