BORN SEMICONDUCTOR

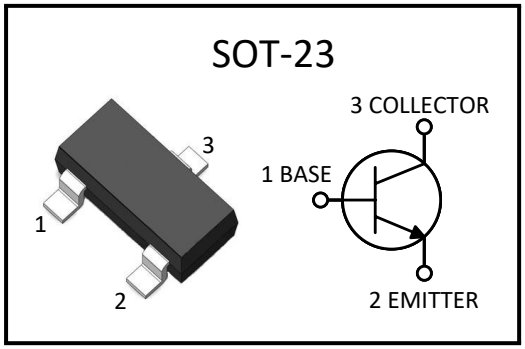
MMBT3904

NPN Plastic-Encapsulate Transistor

Features

- V_{CE}=40V
- I_C=0.2A
- f_T=300MHZ @V_{CE}=20V, I_C=10mA,f=100MHz

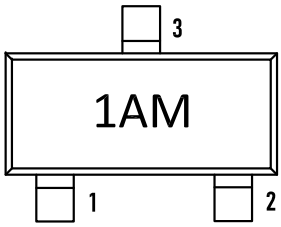
Package



Description

- As complementary type the PNP transistor MMBT3906 is recommended
- Epitaxial planar die construction
- SOT-23 Plastic Package.

Marking



Ordering information

Order code	PacAMkage	Marking	Base qty	Delivery mode
MMBT3904	SOT-23	1AM	3K	Tape and reel

Absolute Maximum Ratings @T_A=25°C unless otherwise noted

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	0.2	A
P_C	Collector Power Dissipation	200	mW
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	625	°C/W
T_J	Junction Temperature	150	°C
T_{stg}	Storage Temperature	-55 to + 150	°C

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MMBT3904

NPN Plastic-Encapsulate Transistor

Electrical Characteristics (T_A=+25°C, unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C=10μA, I_E=0	60	–	–	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C=1mA,I_B=0	40	–	–	
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_E=10μA,I_C=0	6	–	–	
I_{CBO}	Collector cut-off current	V_{CB}=60V,I_E=0	–	–	0.1	uA
I_{CEX}	Collector cut-off current	V_{CE}=30V,V_{EB}=3V	–	–	0.05	
I_{EBO}	Emitter cut-off current	V_{EB}=5V, I_C=0mA	–	–	0.1	
$h_{FE(1)}$	DC current gain	V_{CE}=1V,I_C=10mA	100	–	300	
$h_{FE(2)}$	DC current gain	V_{CE}=1V,I_C=50mA	60	–	–	
$h_{FE(3)}$	DC current gain	V_{CE}=1V,I_C=100mA	30	–	–	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=50mA,I_B=5mA	–	–	0.3	V
$V_{BE(sat)}$	Base-emitter saturation voltage	I_C=50mA,I_B=5mA	–	–	0.95	
t_d	Delay time	V_{CC}=3V, V_{BE}=-0.5V,	–	–	35	nS
t_r	Rise time	I_C=10mA,I_{B1}=-I_{B2}=1mA	–	–	35	
t_s	Storage time	V_{CC}=3V,I_C=10mA,	–	–	200	
t_f	Fall time	I_{B1}=-I_{B2}=1mA	–	–	50	
f_T	Transition frequency	V_{CE}=20V,I_C=10mA ,f=100MHZ	300	–	–	MHZ

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Typical Performance Characteristics(T_J = 25 °C, unless otherwise noted)

Figure 1 : I_C —V_{CE}

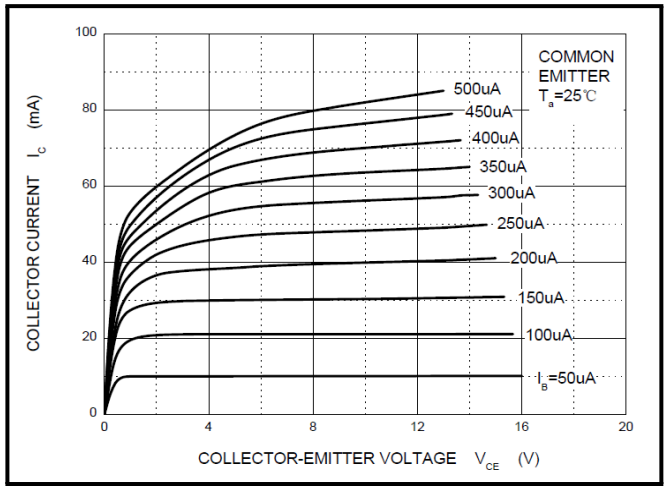


Figure 2 :$V_{BE(sat)}$ —I_C

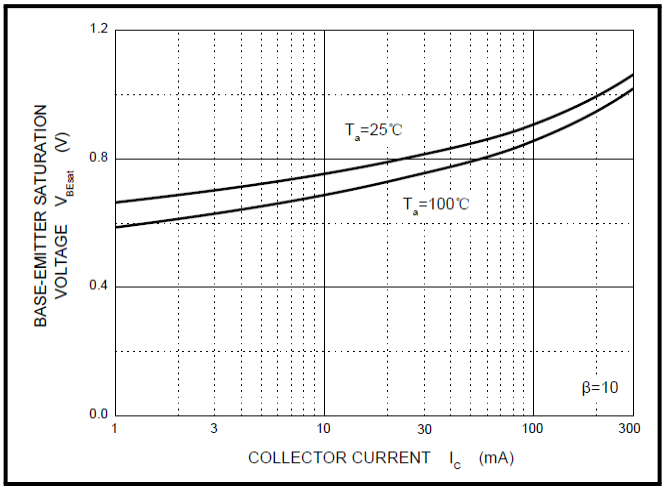


Figure 3 : $V_{CE(sat)}$— I_C

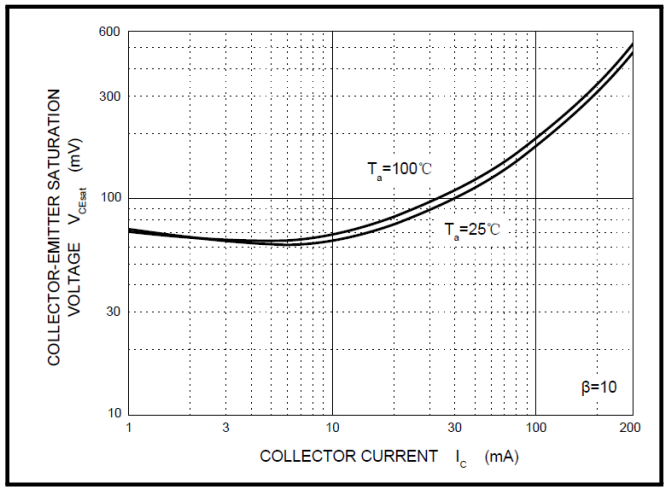


Figure 4 :H_{FE}—I_C

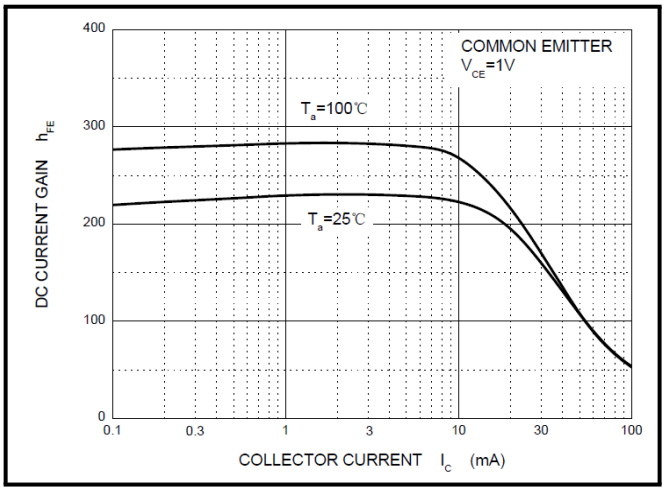


Figure 5 : I_C—V_{BE}

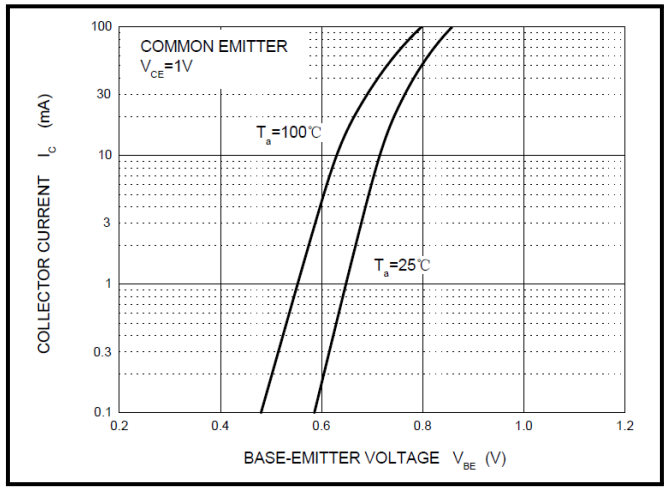
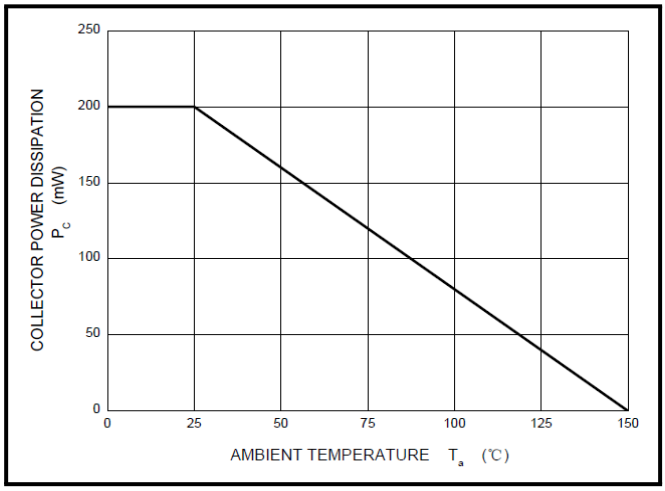


Figure 6 : P_C—T_a

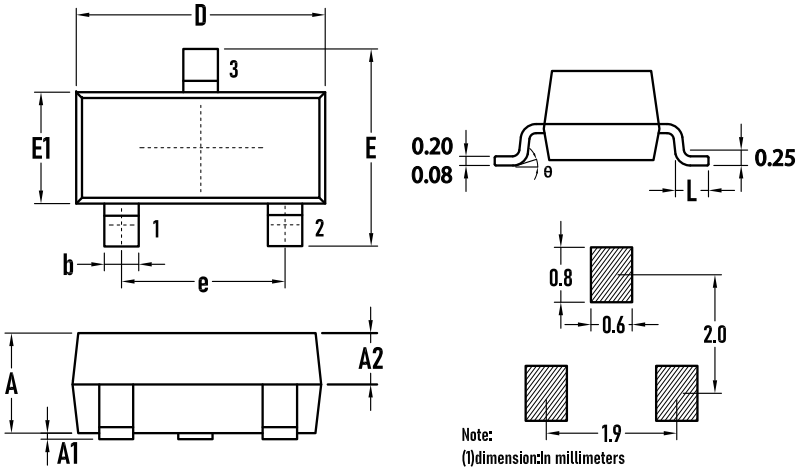


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MMBT3904

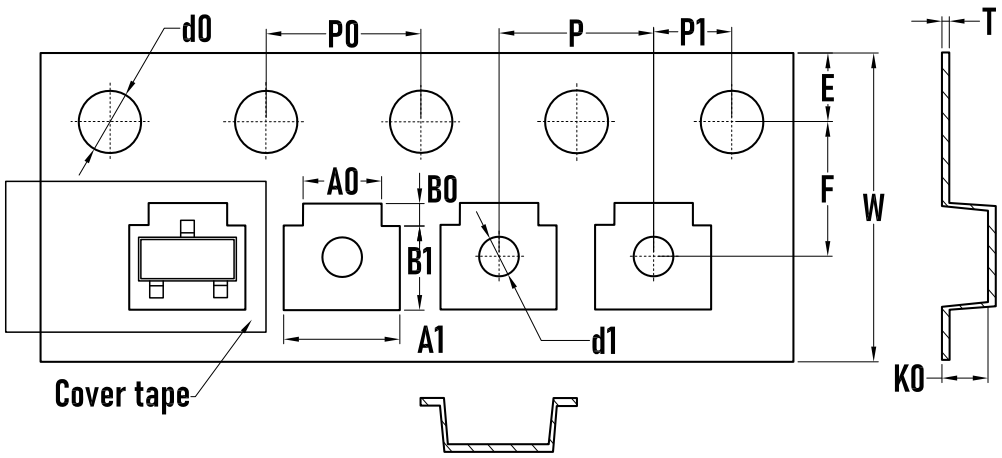
NPN Plastic-Encapsulate Transistor

Outline Drawing - SOT-23



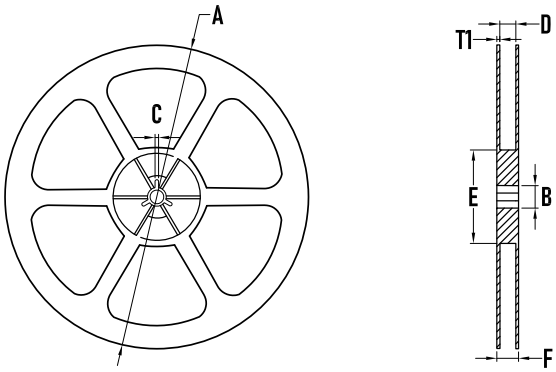
SYMBOL	MILLIMETER		
	MIN.	Typ	MAX
A	0.90	1.00	1.10
A1	0.01	–	0.10
A2	0.50	0.60	0.70
D	2.80	2.90	3.00
b	0.25	0.35	0.45
E	2.10	2.30	2.50
E1	1.20	1.30	1.40
e	1.80	1.90	2.00
L	0.25	0.35	0.45
θ	0	–	8°

Packaging Tape - SOT-23



SYMBOL	MILLIMETER
A0	2.10±0.10
A1	3.10±0.10
B0	0.65±0.10
B1	2.75±0.10
d0	1.55±0.10
d1	1.00±0.05
E	1.75±0.10
F	3.50±0.10
K0	1.10±0.10
P	4.00±0.10
P0	4.00±0.10
P1	2.00±0.10
W	8.00±0.30
T	0.20 ±0.05

Packaging Reel



SYMBOL	MILLIMETER
A	177.8±0.2
B	3.1
C	13.50
D	9.6±0.3
E	75±0.2
F	12.3±0.3
T1	1.0±0.2
Quantity	3000PCS

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