BORN SEMICONDUCTOR

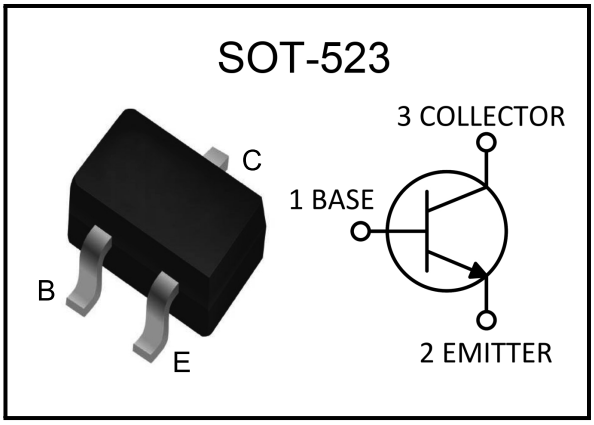
MMBT3904T

NPN Plastic-Encapsulate Transistor

Features

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

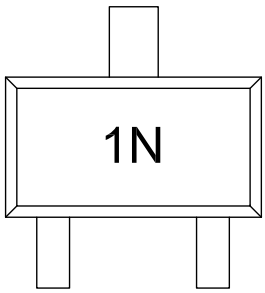
Package



Description

- As complementary type the PNP transistor MMBT3906T is recommended
- Epitaxial planar die construction
- SOT-523 Plastic Package.

Marking



Ordering information

Order code	Package	Marking	Base qty	Delivery mode
MMBT3904T	SOT-523	1N	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	150	mW
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	833	°C/W
T_J	Junction Temperature	150	°C
T_{stg}	Storage Temperature Range	-55 to +150	°C

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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_{CEX}	Collector cut-off current	V_{CE}=30V,V_{EB}(off)=3V	–	–	50	nA
I_{EBO}	Emitter cut-off current	V_{EB}=5V, I_C=0mA	–	–	100	nA
$h_{FE(1)}$	DC current gain	V_{CE}=1V,I_C=0.1mA	40	–	–	–
$h_{FE(2)}$		V_{CE}=1V,I_C=1mA	70	–	–	
$h_{FE(3)}$		V_{CE}=1V,I_C=10mA	100	–	300	
$h_{FE(4)}$		V_{CE}=1V,I_C=50mA	60	–	–	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=10mA,I_B=1mA	–	–	0.2	V
		I_C=50mA,I_B=5mA	–	–	0.3	
$V_{BE(sat)}$	Base-emitter saturation voltage	I_C=10mA,I_B=1mA	0.65	–	0.85	
		I_C=50mA,I_B=5mA	–	–	0.95	
t_d	Delay time	V_{CC}=3V, $V_{BE(off)}$=-0.5V, I_C=10mA,I_{B1}=1mA	–	–	35	nS
t_r	Rise time		–	–	35	
t_s	Storage time	V_{CC}=3V, I_C=10mA,I_{B1}=I_{B2}=1mA	–	–	200	
t_f	Fall time		–	–	50	
f_T	Transition frequency	V_{CE}=20V,I_C=10mA ,f=100MHZ	300	–	–	MHZ
C_{ob}	Output Capacitance	V_{CB}=5V,I_E=0 ,f=1MHZ	–	–	4	pF
C_{ib}	Input Capacitance	V_{EB}=0.5V,I_C=0 ,f=1MHZ	–	–	8	pF

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NPN Plastic-Encapsulate Transistor

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

Figure 1 : Static Characteristic

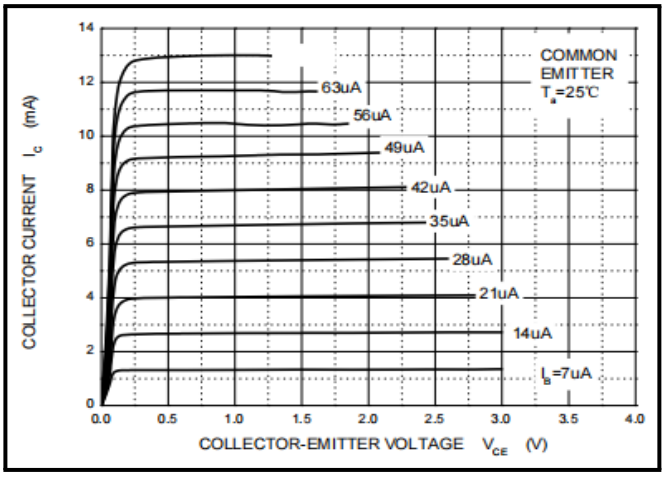


Figure 2 :h_{FE}——I_C

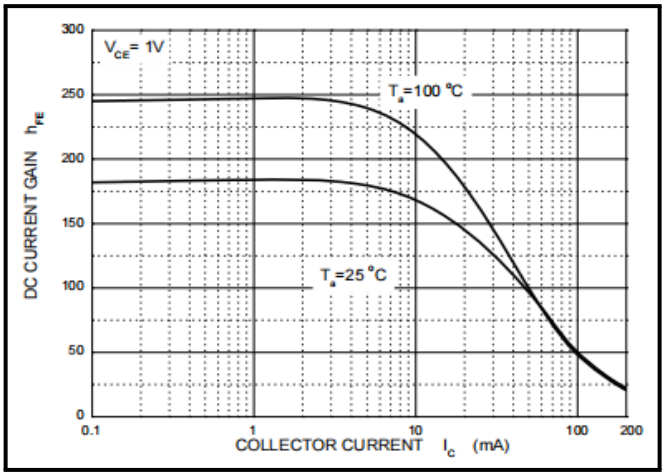


Figure 3 :$V_{BE(sat)}$——I_C

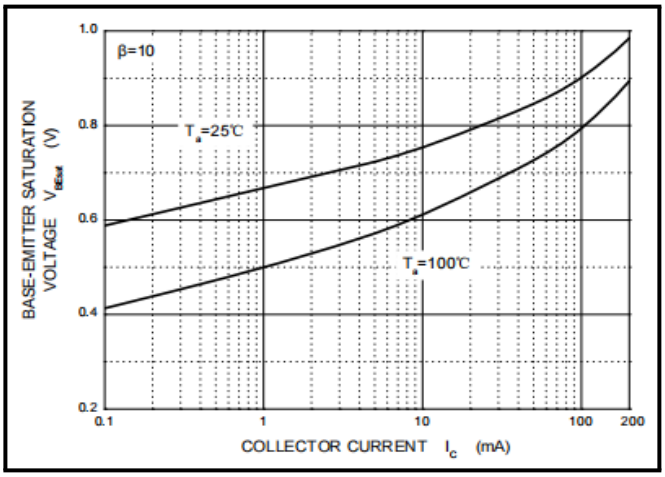


Figure 4 : $V_{CE(sat)}$—— I_C

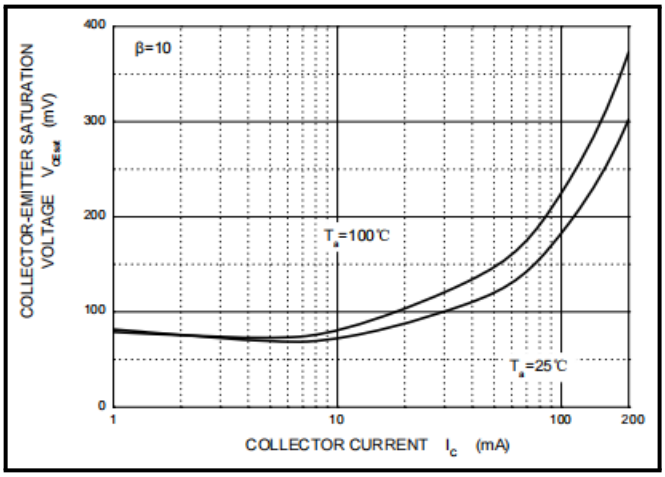


Figure 5 :I_C——V_{BE}

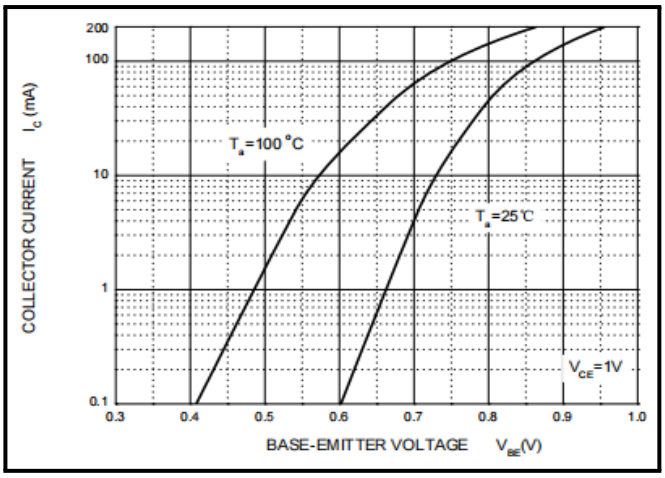
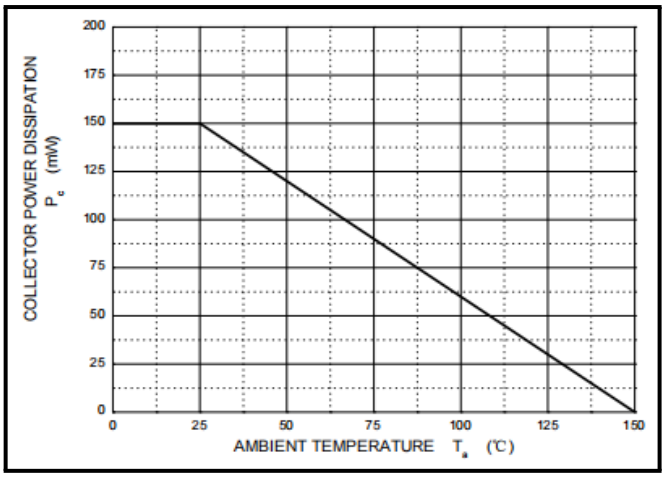


Figure 6 :P_C—— T_A



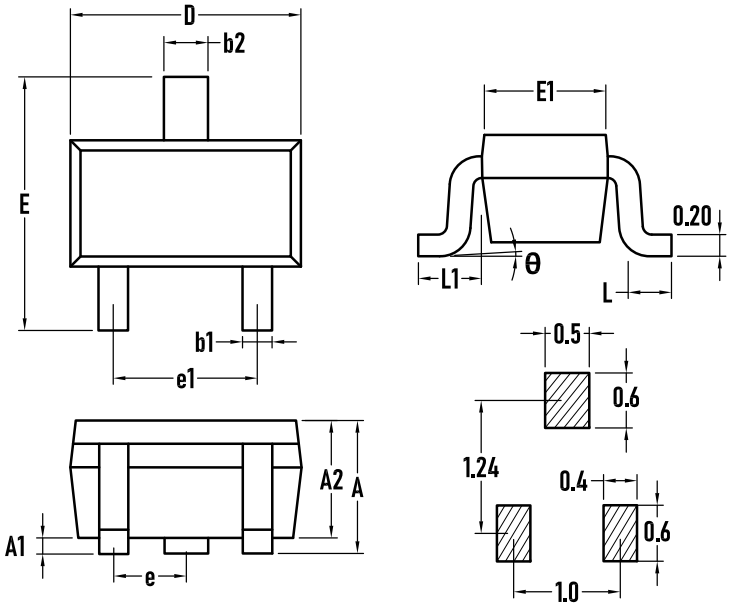
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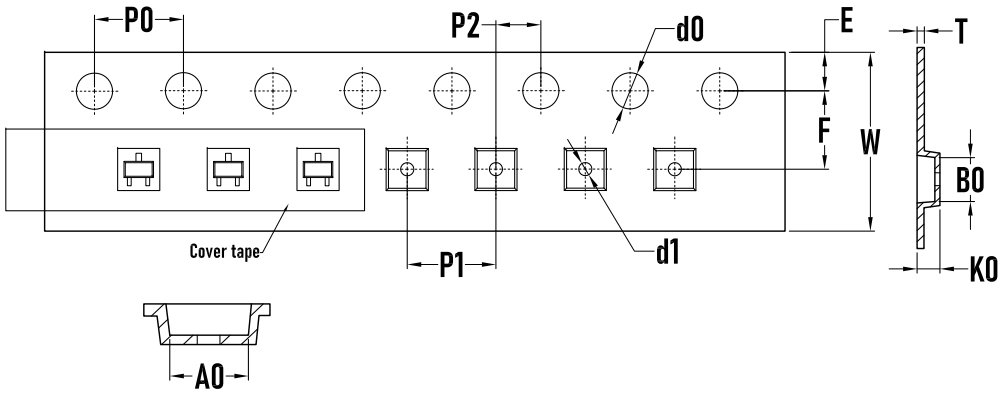
NPN Plastic-Encapsulate Transistor

Outline Drawing – SOT-523



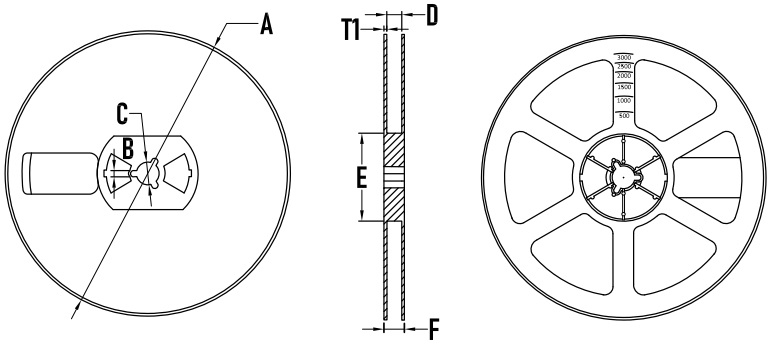
SYMBOL	MILLIMETER		
	MIN	TYP	MAX
A	0.70	0.80	0.90
A1	0.00	0.05	0.10
A2	0.70	0.75	0.80
b1	0.15	0.22	0.29
b2	0.25	0.32	0.39
D	1.50	1.60	1.70
E	1.45	1.60	1.75
E1	0.70	0.80	0.90
e	0.50(TPY.)		
e1	0.90	1.00	1.10
L	0.26	0.36	0.46
L1	0.40(REF)		
θ	0°	4°	8°

Packaging Tape - SOT-523



SYMBOL	MILLIMETER
A0	1.78±0.05
B0	1.78±0.05
d0	1.50+0.10
d1	0.50±0.10
E	1.75±0.10
F	3.50±0.05
K0	0.69±0.05
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
W	8.00±0.20
T	0.20±0.02

Packaging Reel



SYMBOL	MILLIMETER
A	177.8±0.2
B	2.7±0.2
C	13.5±0.2
D	9.6±0.3
E	54.5±0.2
F	12.3±0.3
T1	1.0±0.2
Quantity	3000PCS

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