

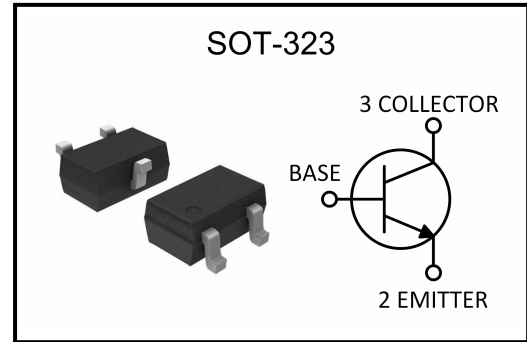
MMBT3904W

NPN Plastic-Encapsulate Transistor

Features

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

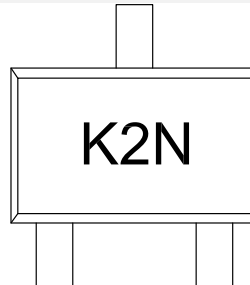
Package



Description

- As complementary type the PNP transistor MMST3906 is recommended
- High Stability and High Reliability
- SOT-323 Plastic Package.
- Amplifiers and switching

Marking



Ordering information

Order code	PacAMkage	Marking	Base qty	Delivery mode
MMBT3904W	SOT-323	K2N	3K	Tape and reel

Absolute Maximum Ratings @ $T_A=25^{\circ}C$ 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	225	mW
T_J	Junction Temperature	150	$^{\circ}C$
T_{stg}	Storage Temperature	-55 to + 150	$^{\circ}C$

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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 =100μA, 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 =100μA, I _C =0	6	—	—	
I _{CBO}	Collector cut-off current	V _{CB} =30V, I _E =0	—	—	0.1	μA
I _{EBO}	Emitter cut-off current	V _{EB} =5V, I _C =0	—	—	0.1	
h _{FE(1)}	DC current gain	V _{CE} =1V, I _C =0.1mA	40	—	—	
h _{FE(2)}		V _{CE} =1V, I _C =10mA	100	—	300	
h _{FE(3)}		V _{CE} =1V, I _C =100mA	30	—	—	
V _{CE(sat)}	Collector-emitter saturation voltage	I _C =10mA, I _B =1mA	—	—	0.2	V
		I _C =50mA, I _B =5mA	—	—	0.285	
V _{BE(sat)}	Base-emitter saturation voltage	I _C =10mA, I _B =1mA	—	—	0.85	
		I _C =50mA, I _B =5mA	—	—	0.95	
V _{BE(on)}	Base-Emitter on Voltage	V _{CE} =1V, I _C =10mA	—	—	1.00	
C _c	Collector Capacitance	V _{CB} =5V, I _E =0mA , f=100KHZ~1MHZ	—	—	5	PF
C _e	Emitter Capacitance	V _{EB} =0.5V, I _C =0mA , f=100KHZ~1MHZ	—	—	15	PF
f _T	Transition frequency	V _{CE} =20V, I _C =10mA , f=100MHZ	300	—	—	MHZ
F	Noise figure	V _{CE} =5V, I _C =100μA , R _S =1KΩ, f=10HZ~15.7KHZ	—	5	—	dB
t _{on}	Turn-ontime	I _{C(on)} =10mA, I _{B(on)} =1mA, I _{B(off)} =-1mA, V _{CC} =3V, V _{BE} =0.5V	—	—	65	nS
t _d	Delay time		—	—	35	
t _r	Rise time		—	—	35	
t _f	Fall time		—	—	50	
t _{off}	Turn-off time		—	—	240	
t _s	Storage time		—	—	200	
h _{FE(2)} Rank	A(100-300)	L(140-270)				

Note: Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2.0%



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Typical Performance Characteristics($T_J = 25^\circ\text{C}$, unless otherwise noted)

Figure 1 : I_C — V_{CE}

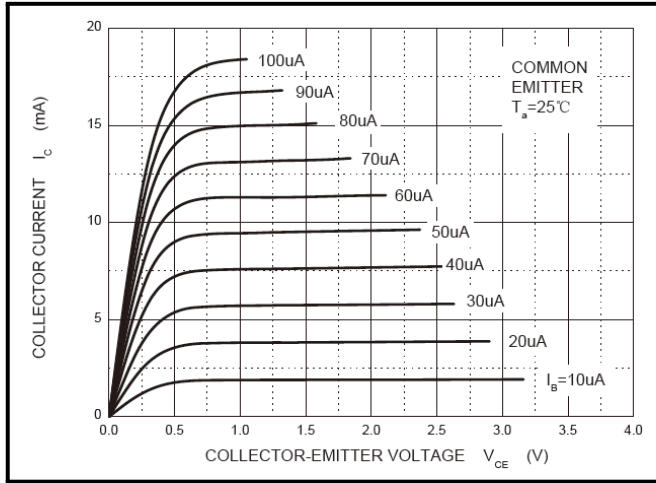


Figure 2 : $V_{BE(sat)}$ — I_C

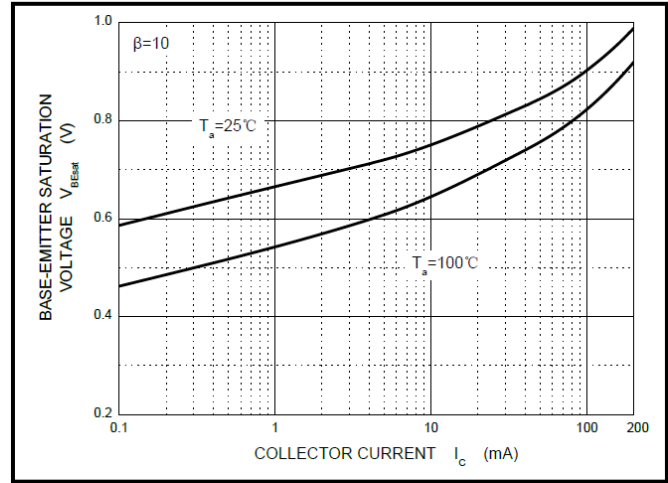


Figure 3 : $V_{CE(sat)}$ — I_C

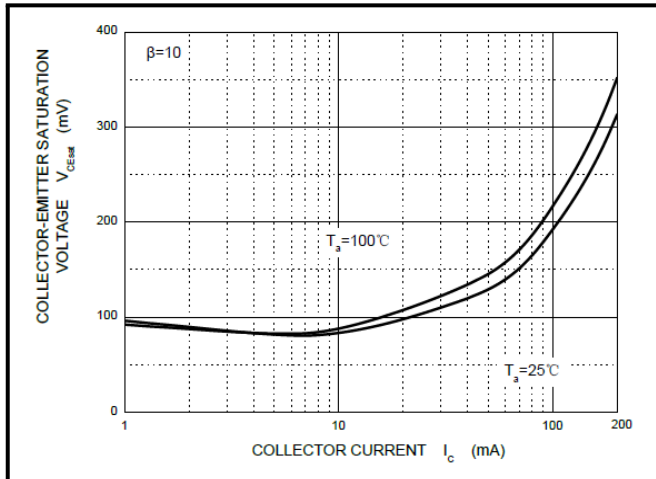


Figure 4 : h_{FE} — I_C

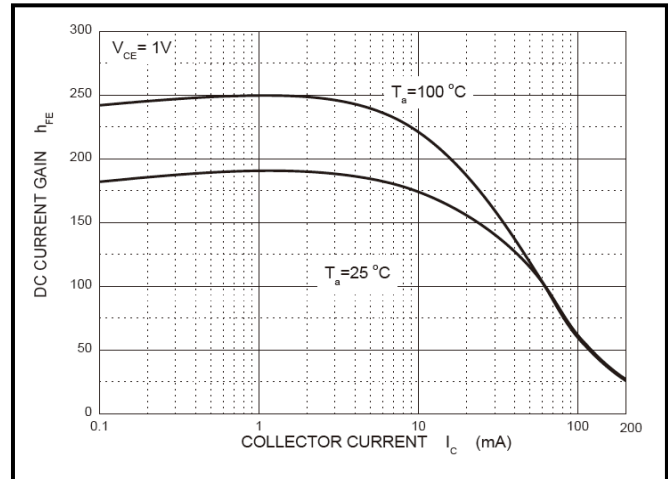


Figure 5 : I_C — V_{BE}

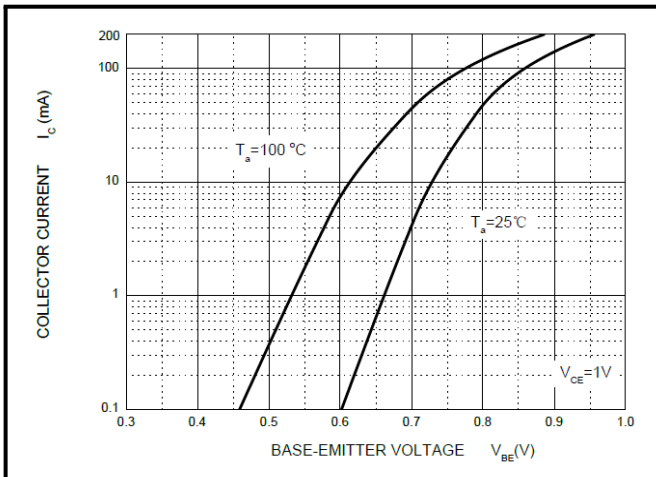
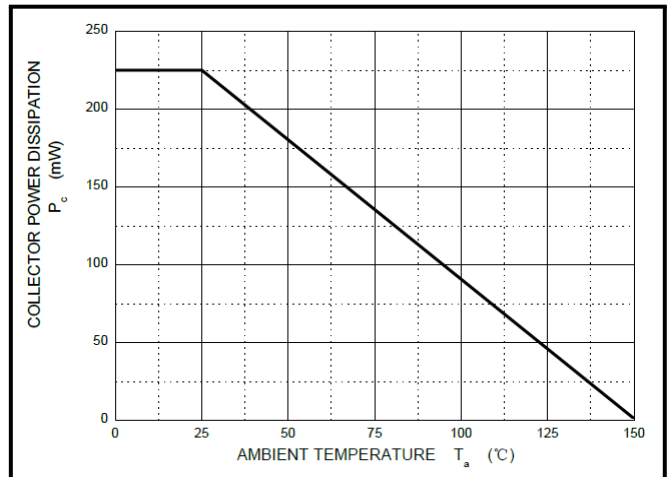


Figure 6 : P_C — T_a



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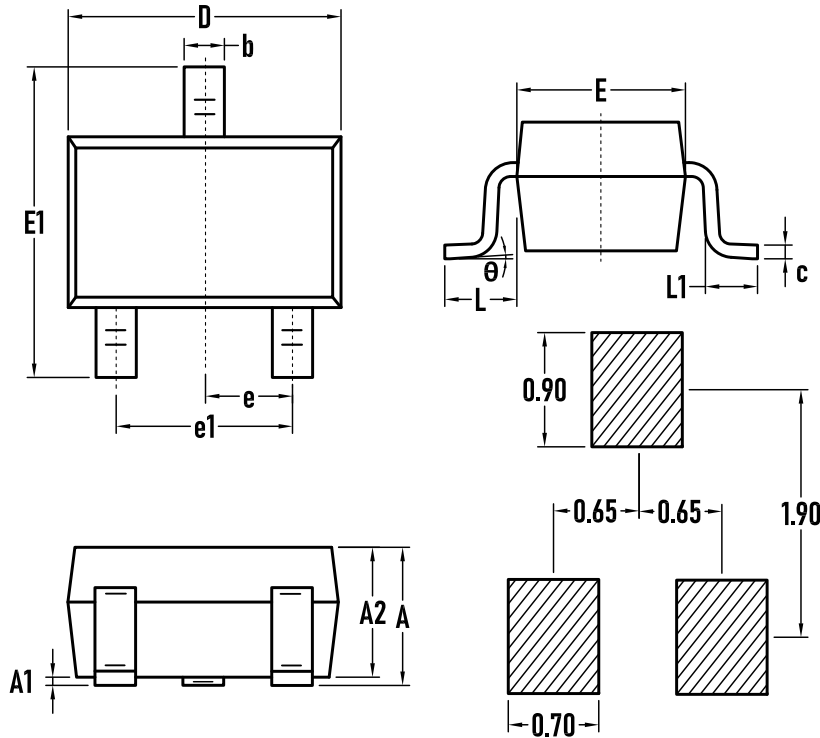
Revision: 2022-Jan-1-A



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Outline Drawing - SOT-323



SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.90	0.95	1.00
b	0.20	0.30	0.40
c	0.08	0.12	0.15
D	2.00	2.10	2.20
E1	2.15	2.30	2.45
E	1.15	1.25	1.35
e	0.650Typ.		
e1	1.20	1.30	1.40
L	0.26	0.36	0.46
θ	0	4°	8°

