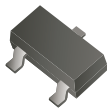
General Purpose Transistor

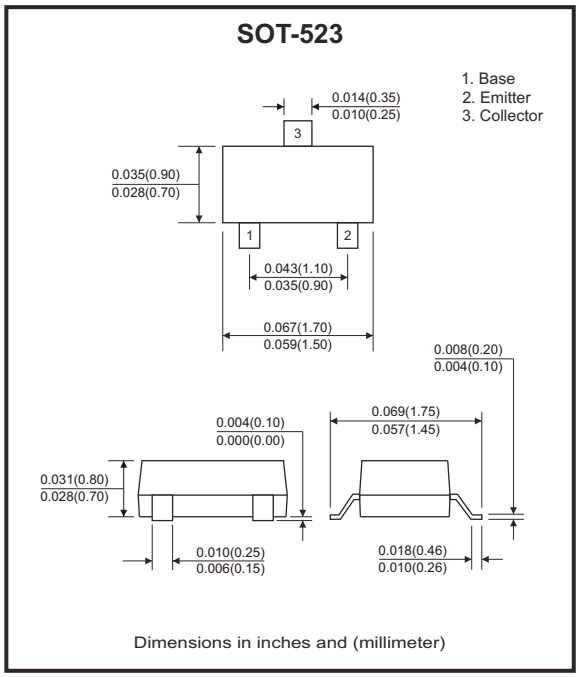
MMBT3906T-HF (PNP)

RoHS Device
Halogen Free



Features

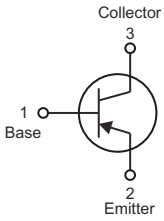
- Power dissipation of 150mW.
- High stability and high reliability.



Mechanical data

- Case: SOT-523 small outline plastic package.
- Epoxy UL: 94V-0.
- Mounting position: Any.

Circuit Diagram



Maximum Ratings (at T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-base voltage	V_{CBO}	-40	V
Collector-emitter voltage	V_{CEO}	-40	V
Emitter-base voltage	V_{EBO}	-5	V
Collector current-continuous	I_C	-200	mA
Collector power dissipation	P_C	150	mW
Thermal resistance from junction to ambient	$R_{\theta JA}$	833	°C/W
Junction temperature	T_J	150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical Characteristics (at Ta=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Collector-base breakdown voltage	I_C = -10μA, I_E = 0	$V_{(BR)CBO}$	-40			V
Collector-emitter breakdown voltage	I_C = -1mA, I_B = 0	$V_{(BR)CEO}$	-40			V
Emitter-base breakdown voltage	I_E = -10μA, I_C = 0	$V_{(BR)EBO}$	-5			V
Collector cut-off current	V_{CB} = -40V, I_E = 0	I_{CBO}			-100	nA
Emitter cut-off current	V_{EB} = -5V, I_C = 0	I_{EBO}			-100	nA
Collector cut-off current	V_{CE} = -30V, $V_{EB(off)}$ = -3V	I_{CEX}			-50	nA
DC current gain	V_{CE} = -1V, I_C = -0.1mA	$h_{FE(1)}$	60			
	V_{CE} = -1V, I_C = -1mA	$h_{FE(2)}$	80			
	V_{CE} = -1V, I_C = -10mA	$h_{FE(3)}$	100		300	
	V_{CE} = -1V, I_C = -50mA	$h_{FE(4)}$	60			
	V_{CE} = -2V, I_C = -100mA	$h_{FE(5)}$	30			
Collector-emitter saturation voltage	I_C = -10mA, I_B = -1mA	$V_{CE(sat)}$			-0.25	V
	I_C = -50mA, I_B = -5mA				-0.40	
Base-emitter saturation voltage	I_C = -10mA, I_B = -1mA	$V_{BE(sat)}$	-0.65		-0.85	V
	I_C = -50mA, I_B = -5mA				-0.95	
Transition frequency	V_{CE} = -20V, I_C = -10mA, f = 100MHz	f_T	250			MHz
Collector output capacitance	V_{CB} = -5V, I_E = 0, f = 1MHz	C_{ob}			4.5	pF
Input capacitance	V_{EB} = -5V, I_E = 0, f = 1MHz	C_{ib}			10	pF
Noise figure	V_{CE} = -5V, I_C = -0.1mA	NF			4	dB
Delay time	V_{CC} = -3V, $V_{BE(off)}$ = -0.5V I_C = -10mA, I_{B1} = -1mA	t_d			35	ns
Rise time		t_r			35	
Storage time	V_{CC} = -3V, I_C = -10mA I_{B1} = I_{B2} = -1mA	t_s			225	ns
Fall time		t_f			75	

Note: Pulse width ≤ 300μs, duty cycle ≤ 2%.

Typical Rating and Characteristic Curves (MMBT3906T-HF)

Fig.1 - Static Characteristic

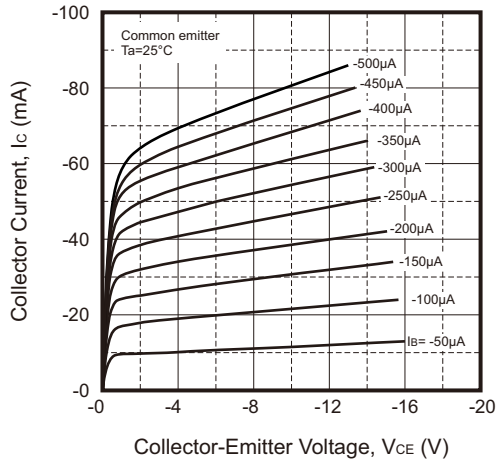
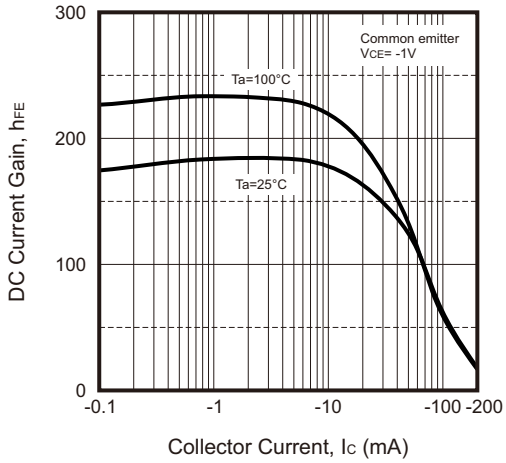


Fig.2 - h_{FE} — I_C



REV:A

Typical Rating and Characteristic Curves (MMBT3906T-HF)

Fig.3 - V_{CEsat} — I_C

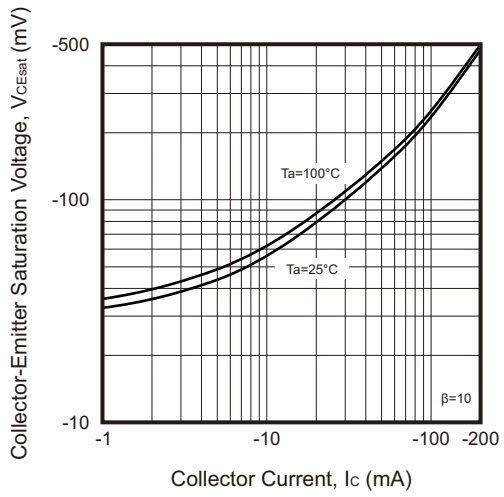


Fig.4 - V_{BEsat} — I_C

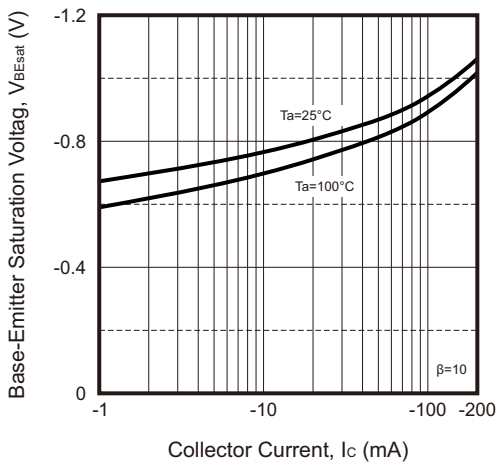


Fig.5 - I_C — V_{BE}

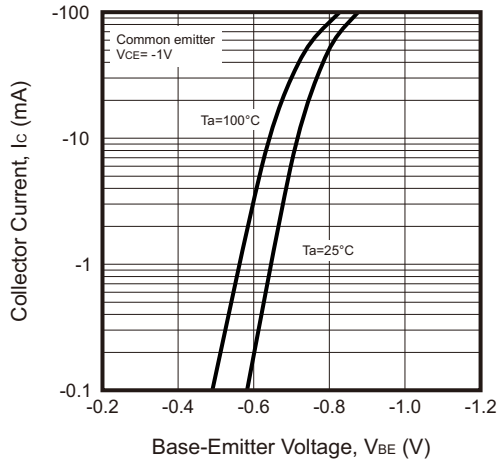


Fig.6 - Cob/Cib — V_{CB}/V_{EB}

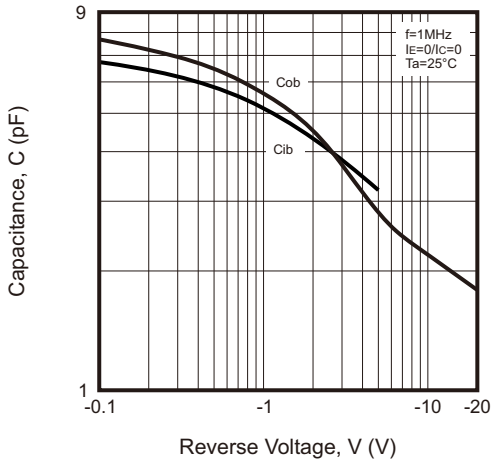


Fig.7 - f_T — I_C

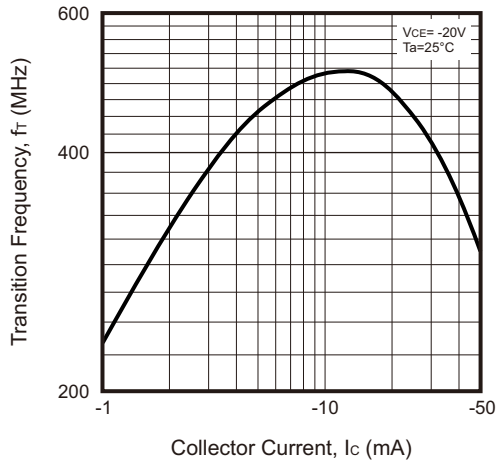
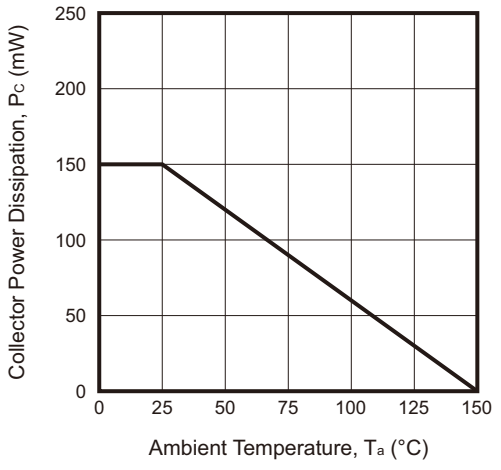
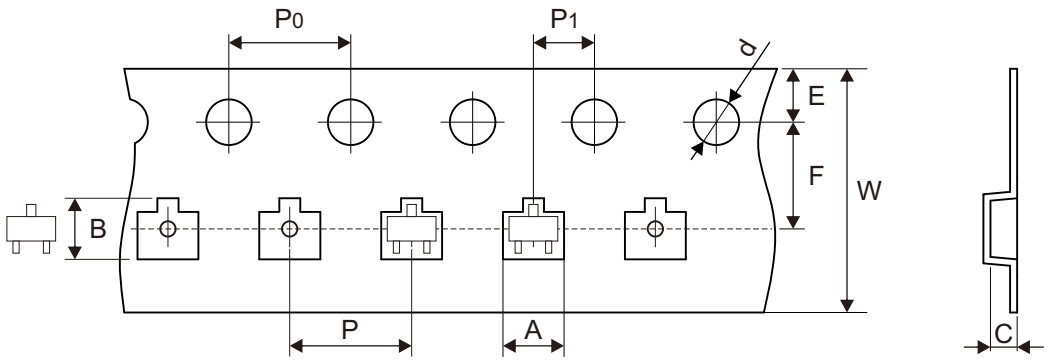
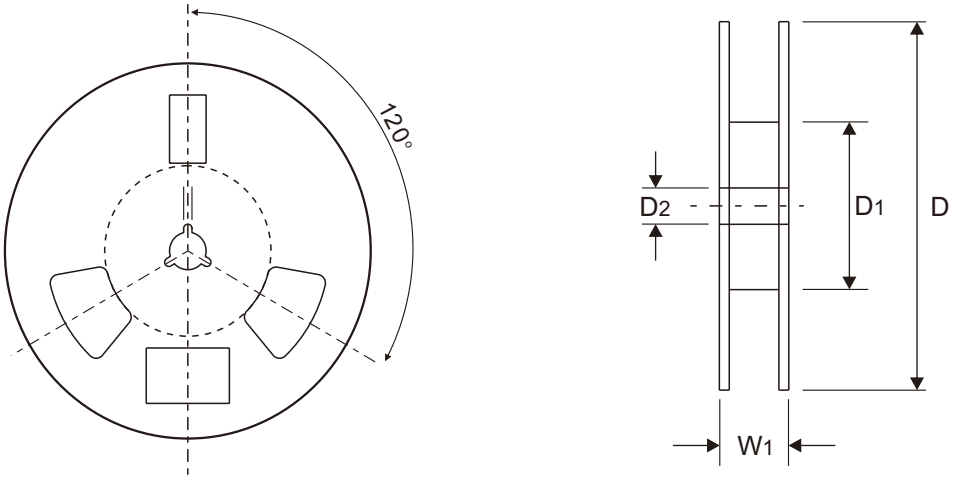


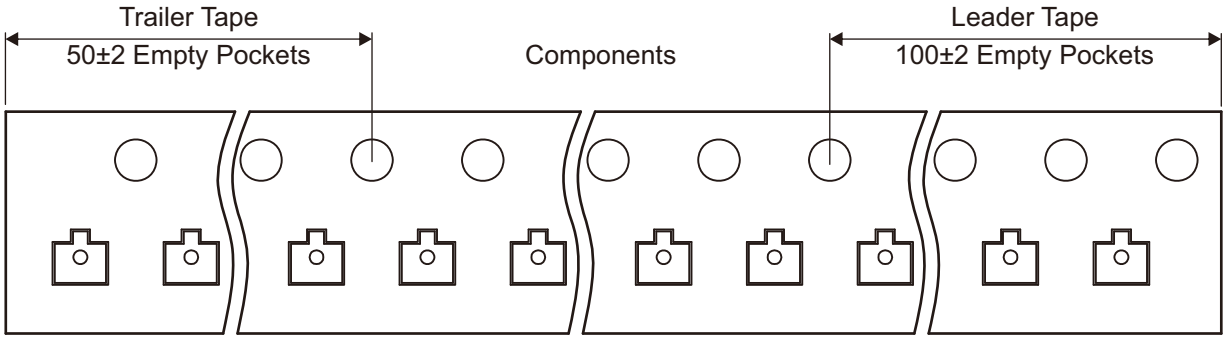
Fig.8 - P_C — T_a



Reel Taping Specification





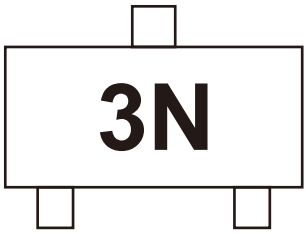


	SYMBOL	A	B	C	d	D	D1	D2
SOT-523	(mm)	1.85 ± 0.05	1.85 ± 0.05	0.875 ± 0.05	1.50 + 0.60	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.073 ± 0.002	0.073 ± 0.002	0.034 ± 0.002	0.059 + 0.024	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

	SYMBOL	E	F	P	P0	P1	W	W1
SOT-523	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 + 0.30 - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.315 + 0.012 - 0.004	0.484 ± 0.039

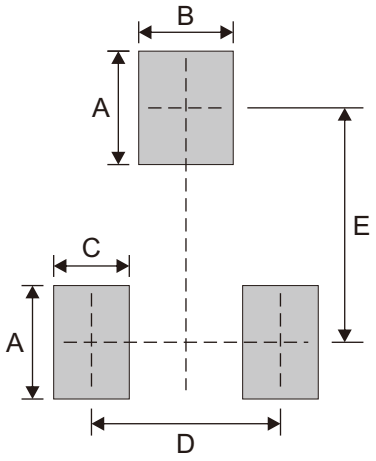
Marking Code

Part Number	Marking Code
MMBT3906T-HF	3N



Suggested P.C.B. PAD Layout

SIZE	SOT-523	
	(mm)	(inch)
A	0.60	0.024
B	0.50	0.020
C	0.40	0.016
D	1.00	0.039
E	1.24	0.049



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-523	3,000	7