

# General Purpose Transistor



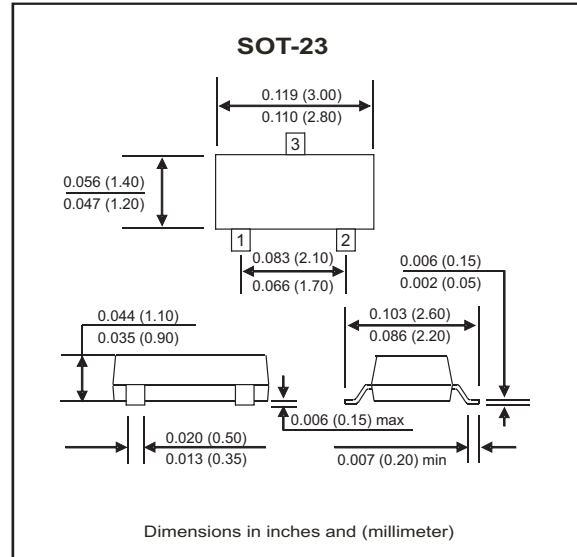
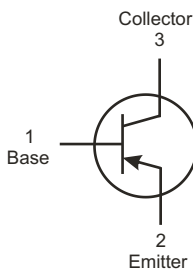
SMD Diodes Specialist

## MMBT3906-HF (PNP) RoHS Device



### Features

- Halogen Free
- Epitaxial planar die construction
- As complementary type, the NPN transistor MMBT3906-HF is recommended



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

Parameter	Symbol	Min	Typ	Max	Unit
Collector-Base voltage	V <sub>CB0</sub>			-40	V
Collector-Emitter voltage	V <sub>CE0</sub>			-40	V
Emitter-Base voltage	V <sub>EBO</sub>			-5	V
Collector current-Continuous	I <sub>c</sub>			-0.2	A
Collector dissipation	P <sub>c</sub>			0.3	W
Storage temperature and junction temperature	T <sub>STG</sub> , T <sub>J</sub>	-55		+150	°C

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

Parameter	Conditions	Symbol	Min	Max	Unit
Collector-Base breakdown voltage	I <sub>c</sub> = -100μA , I <sub>E</sub> = 0	V <sub>(BR)CB0</sub>	-40		V
Collector-Emitter breakdown voltage	I <sub>c</sub> = -1mA , I <sub>B</sub> = 0	V <sub>(BR)CE0</sub>	-40		V
Emitter-Base breakdown voltage	I <sub>E</sub> = -100μA , I <sub>c</sub> = 0	V <sub>(BR)EBO</sub>	-5		V
Collector cut-off current	V <sub>CB</sub> = -40V , I <sub>E</sub> = 0	I <sub>cBO</sub>		-0.1	μA
Collector cut-off current	V <sub>CE</sub> = -40V , I <sub>B</sub> = 0	I <sub>CE0</sub>		-0.1	μA
Emitter cut-off current	V <sub>EB</sub> = -5V , I <sub>c</sub> = 0	I <sub>EBO</sub>		-0.1	μA
DC current gain	V <sub>CE</sub> = -1V , I <sub>c</sub> = -10mA	h <sub>FE(1)</sub>	100	300	
	V <sub>CE</sub> = -1V , I <sub>c</sub> = -50mA	h <sub>FE(2)</sub>	60		
Collector-Emitter saturation voltage	I <sub>c</sub> = -50mA , I <sub>B</sub> = -5mA	V <sub>CE(sat)</sub>		-0.3	V
Base-Emitter saturation voltage	I <sub>c</sub> = -50mA , I <sub>B</sub> = -5mA	V <sub>BE(sat)</sub>		-0.95	V
Transition frequency	V <sub>CE</sub> = -20V , I <sub>c</sub> = -10mA f = 100MHz	f <sub>T</sub>	250		Mhz
Delay time	V <sub>CC</sub> = -3.0V , V <sub>BE</sub> = -0.5V	t <sub>d</sub>		35	nS
Rise time	I <sub>c</sub> = -10mA , I <sub>B1</sub> = -1.0mA	t <sub>r</sub>		35	nS
Storage time	V <sub>CC</sub> = -3.0V <sub>dc</sub> , I <sub>c</sub> = -10mA	t <sub>s</sub>		225	nS
Fall time	I <sub>B1</sub> = I <sub>B2</sub> = -1.0mA	t <sub>f</sub>		75	nS

## RATING AND CHARACTERISTIC CURVES (MMBT3906-HF)

Fig.1 Capacitance

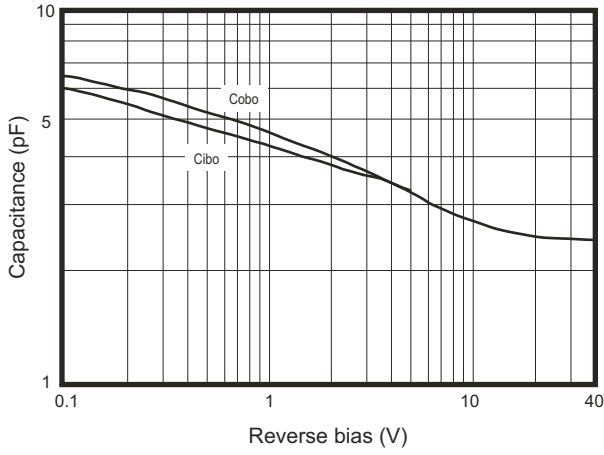


Fig. 2 - Charge data

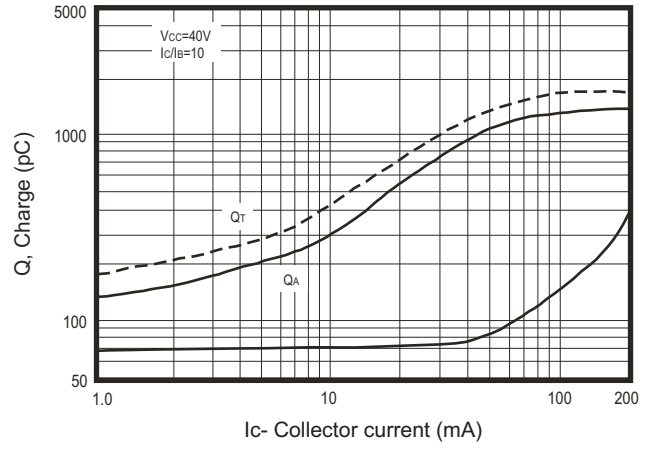


Fig. 3 - Turn-On Time

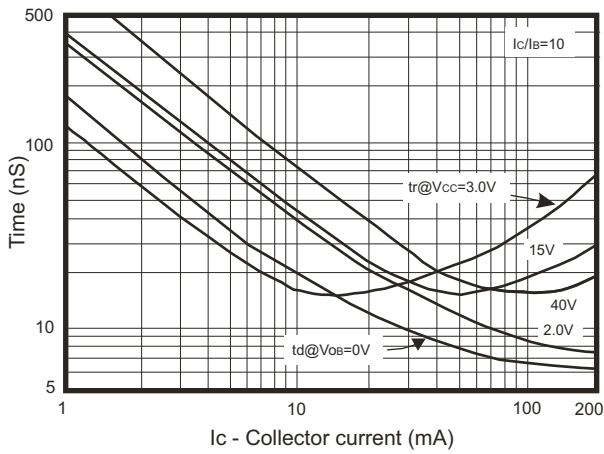


Fig. 4 - Fall time

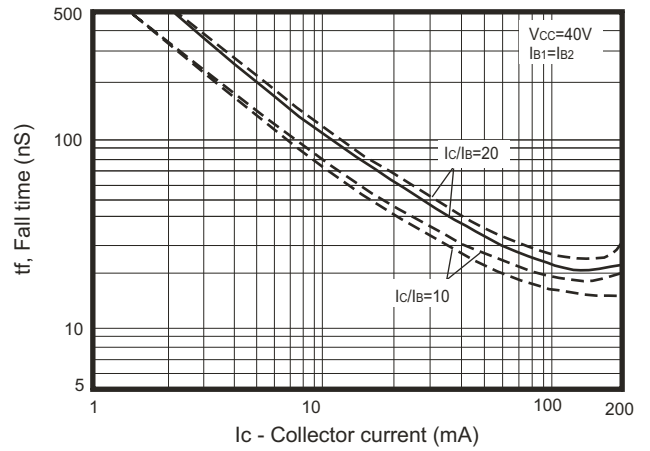


Figure 5

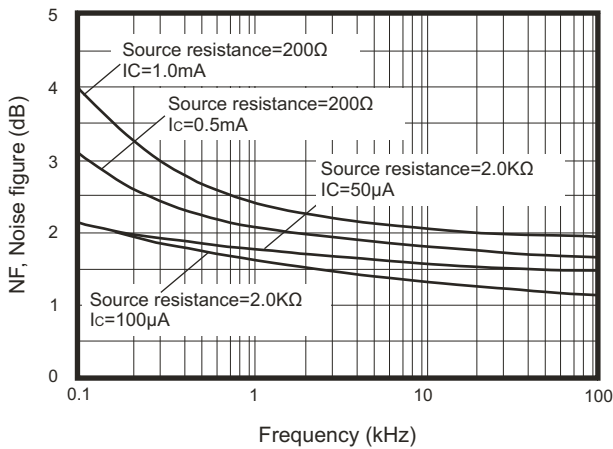
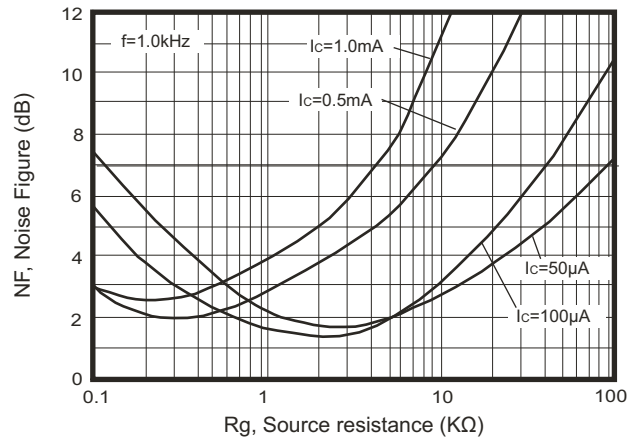


Figure 6



h Parameters ( $V_{CE}=-10V_{dc}$ ,  $f=1.0kHz$ ,  $T_A=25^{\circ}C$ )

Fig.7 Current gain

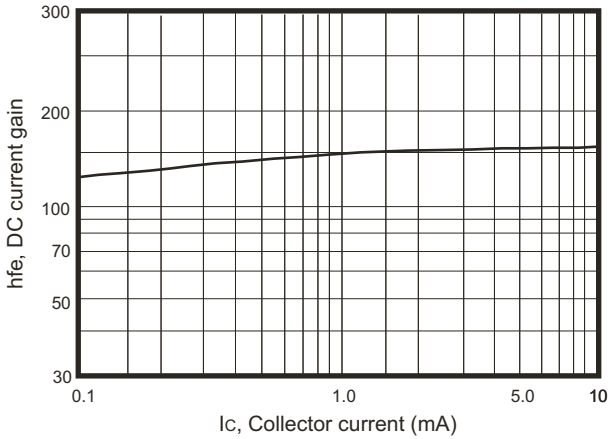


Fig. 8 - Output Admittance

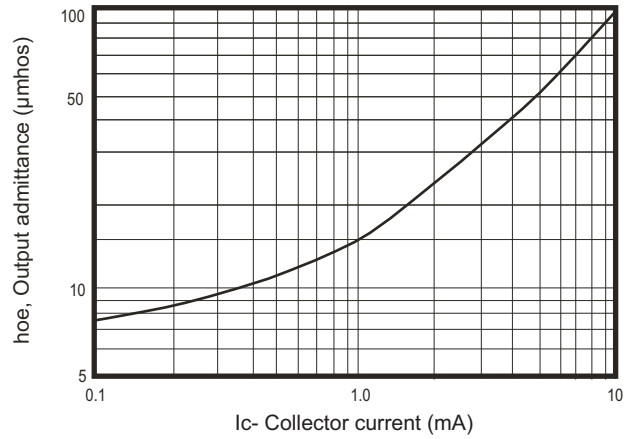


Fig. 9- Input impedance

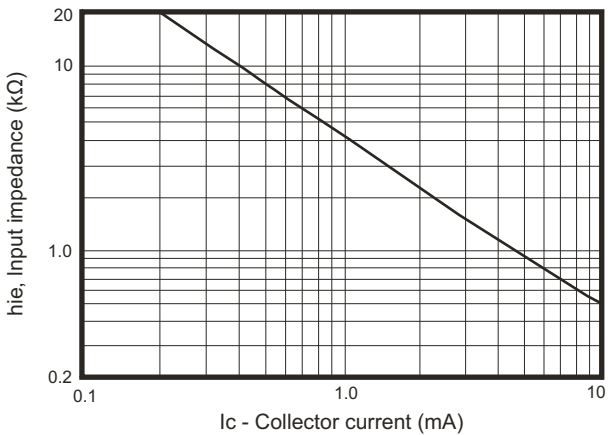


Fig. 10- Voltage feedback ratio

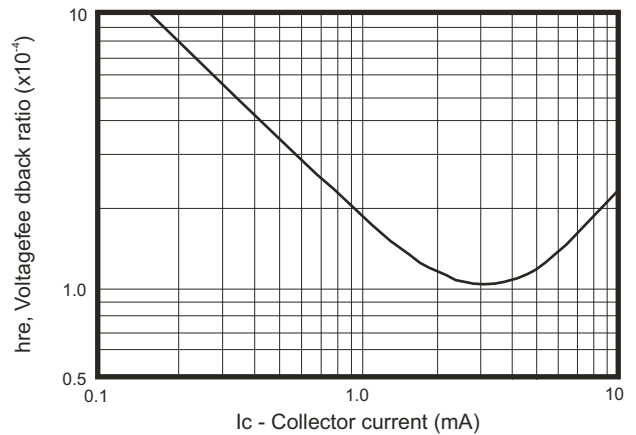


Fig. 11- "ON" voltages

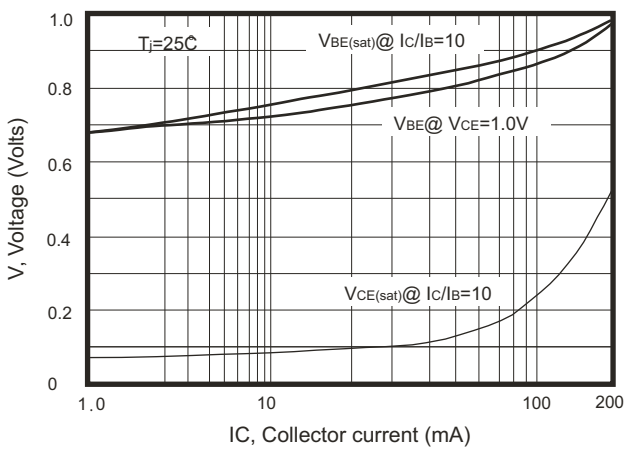
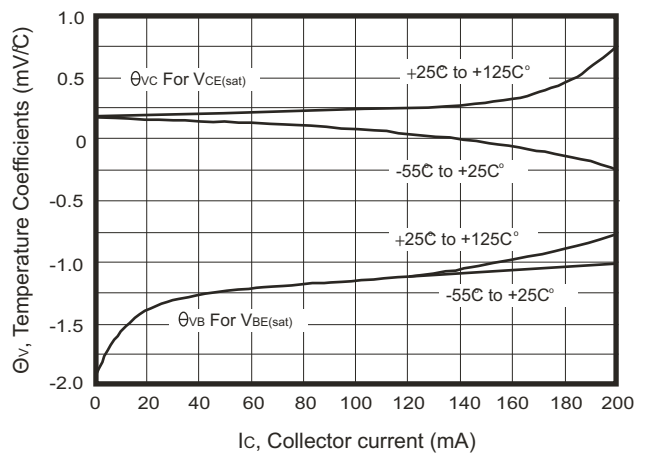
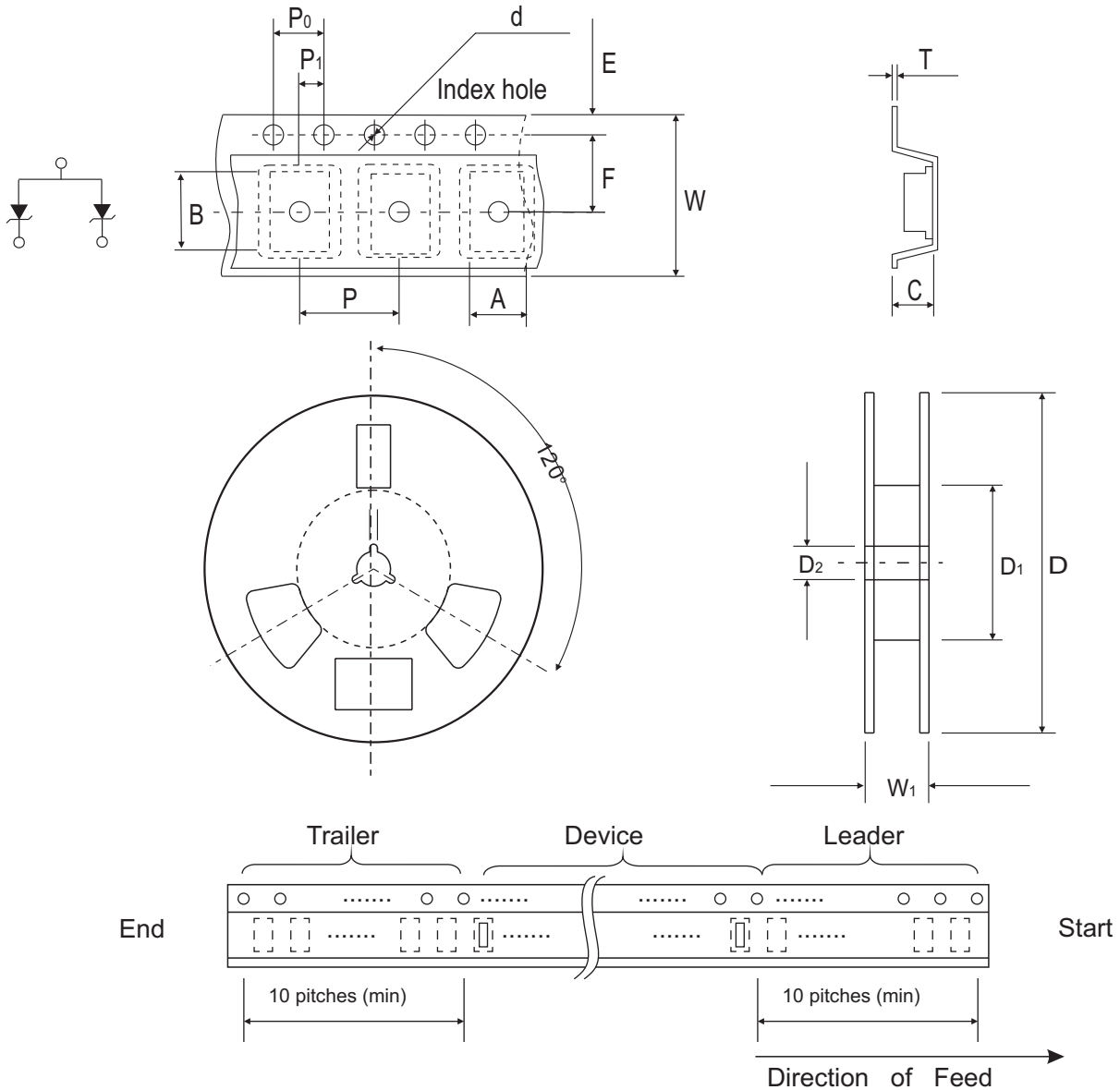


Fig. 12-Temperature coefficients



## Reel Taping Specification

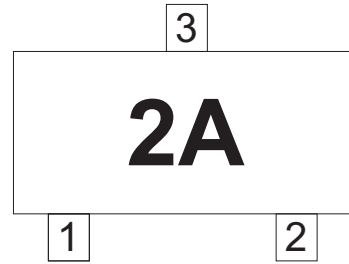


SOT-23	SYMBOL	A	B	C	d	D	D <sub>1</sub>	D <sub>2</sub>
	(mm)	3.10 ± 0.10	2.85 ± 0.10	1.40 ± 0.10	1.55 ± 0.10	178 ± 1	50.0 MIN.	13.0 ± 0.20
	(inch)	0.122 ± 0.004	0.112 ± 0.004	0.035 ± 0.004	0.061 ± 0.004	7.008 ± 0.040	1.969 MIN.	0.512 ± 0.008

SOT-23	SYMBOL	E	F	P	P <sub>0</sub>	P <sub>1</sub>	W	W <sub>1</sub>
	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 ± 0.30	14.4 MAX.
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.315 ± 0.012	0.567 MAX

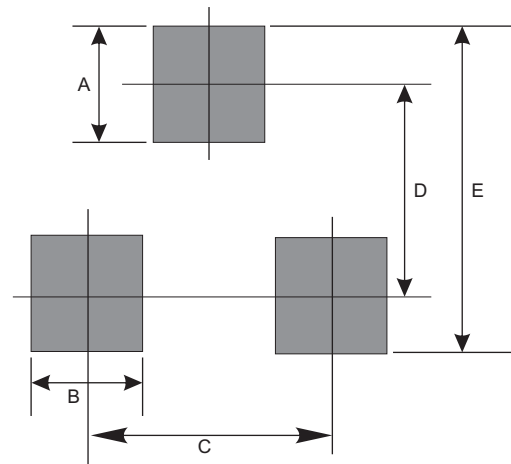
## Marking Code

Park Number	Marking Code
MMBT3906-HF	2A



## Suggested PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.80	0.031
B	0.65	0.025
C	1.90	0.075
D	2.02	0.080
E	3.03	0.120



## Standard Package

Case Type	Qty per Reel	Reel Size
	(Pcs)	(inch)
SOT-23	3000	7