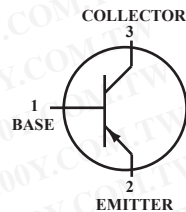


General Purpose Transistor

PNP Silicon

 Lead(Pb)-Free

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 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
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Maximum Ratings

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	-40	Vdc
Collector-Base Voltage	V _{CBO}	-40	Vdc
Emitter-Base Voltage	V _{EBO}	-5.0	Vdc
Collector Current-Continuous	I _C	-200	mAdc

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board ⁽¹⁾ TA=25°C Derate above 25°C	P _D	225	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	1.8	mW/°C
Total Device Dissipation Alumina Substrate, ⁽²⁾ TA=25°C Derate above 25°C	P _D	556	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	300	mW
Junction and Storage, Temperature	T _J , T _{stg}	2.4	mW/°C
		417	°C/W
		-55 to +150	°C

Device Marking

MMBT3906=2A

Electrical Characteristics (TA=25°C Unless Otherwise noted)

Characteristics	Symbol	Min	Max	Unit
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Off Characteristics

Collector-Emitter Breakdown Voltage ⁽³⁾ (I _C =-1.0mAdc, I _B =0)	V _{(BR)CEO}	-40	-	Vdc
Collector-Base Breakdown Voltage (I _C =-10 μAdc, I _E =0)	V _{(BR)CBO}	-40	-	Vdc
Emitter-Base Breakdown Voltage (I _E =-10 μAdc, I _C =0)	V _{(BR)EBO}	-5.0	-	Vdc
Base Cutoff Current (V _{CE} =-30 Vdc, V _{EB} =-3.0 Vdc)	I _{BL}	-	-50	nAdc
Collector Cutoff Current (V _{CE} =-30Vdc, V _{EB} =-3.0Vdc)	I _{CEX}	-	-50	nAdc

1.FR-5=1.0 x 0.75 x 0.062 in.

2.Alumina=0.4 x 0.3 x 0.024 in. 99.5% alumina.

3.Pulse Test:Pulse Width ≤ 300 μS, Duty Cycle ≤ 2.0%.

Electrical Characteristics (T_A=25°C unless otherwise noted) (Continued)

Characteristics	Symbol	Min	Max	Unit
-----------------	--------	-----	-----	------

On Characteristics (3)

DC Current Gain (I _C = -0.1 mAdc, V _{CE} = -1.0Vdc) (I _C = -1.0 mAdc, V _{CE} = -1.0 Vdc) (I _C = -10 mAdc, V _{CE} = -1.0Vdc) (I _C = -50 mAdc, V _{CE} = -1.0Vdc) (I _C = -100 mAdc, V _{CE} = -1.0Vdc)	H _{FE}	60 80 100 60 30	- - 300 - -	-
Collector-Emitter Saturation Voltage (3) (I _C = -10 mAdc, I _B = -1.0mAdc) (I _C = -50 mAdc, I _B = -5.0mAdc)	V _{CE(sat)}	- -	-0.25 -0.4	Vdc
Base-Emitter Saturation Voltage (3) (I _C = -10 mAdc, I _B = -1.0 mAdc) (I _C = -50 mAdc, I _B = -5.0 mAdc)	V _{BE(sat)}	-0.65 -	-0.85 -0.95	Vdc

Small-signal Characteristics

Current-Gain-Bandwidth Product (4) (I _C = -10 mAdc, V _{CE} = -20 Vdc, f=100MHz)	f _T	250	-	MHz
Output Capacitance (V _{CB} = -5.0 Vdc, I _E =0, f=1.0MHz)	C _{obo}	-	4.5	pF
Input Capacitance (V _{EB} = -0.5 Vdc, I _C =0, f=1.0MHz)	C _{ibo}	-	10	pF
Input Impedance (V _{CE} = -10 Vdc I _C =-1.0 mAdc, f=1.0 kHz)	h _{ie}	2.0	12	k ohms
Voltage Feedback Ratio (V _{CE} = -10Vdc I _C =1.0 mAdc, f=1.0 kHz)	h _{re}	0.1	10	x 10 ⁻⁴
Small-Signal Current Gain (V _{CE} = -10Vdc I _C =1.0 mAdc, f=1.0 kHz)	h _{fe}	100	400	-
Output Admittance (V _{CE} = -10Vdc I _C =1.0 mAdc, f=-1.0kHz)	h _{oe}	3.0	60	μmhos
Noise Figure (V _{CE} = -5.0Vdc I _C = -100 μAdc, R _S =1.0k ohms, f=1.0kHz)	NF	-	4.0	dB

Switching Characteristics

Delay Time	(V _{CC} = -3.0 Vdc, V _{BE} = 0.5 Vdc I _C = -10 mAdc, I _{B1} = -1.0 mAdc)	td	-	35	ns
Rise Time		tr	-	35	
Storage Time	(V _{CC} = -3.0 Vdc, I _C = -10 mAdc, I _{B1} =I _{B2} = -1.0 mAdc)	ts	-	225	ns
Fall Time		tf	-	75	

3.Pulse Test:Pulse Width≤300 μS, Duty Cycle≤2.0%.

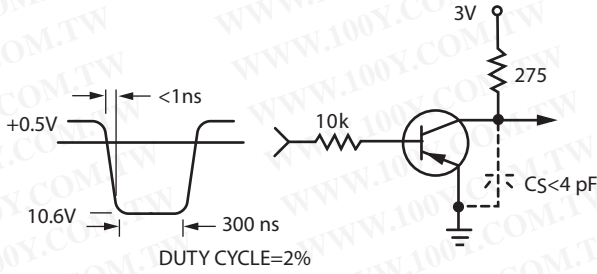


FIG.1 Delay and Rise Time
Equivalent Test Circuit

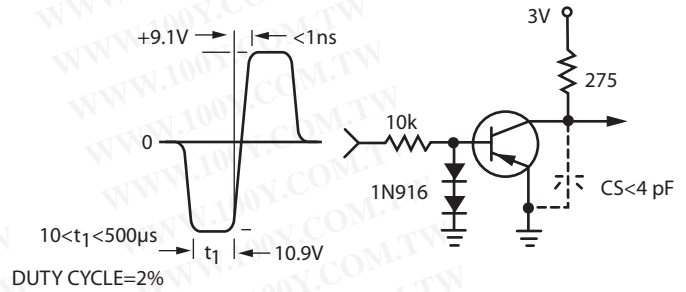


FIG.2 Storage and Fall Time
Equivalent Test Circuit

*Total shunt capacitance of test jig and connectors

TYPICAL TRANSIENT CHARACTERISTICS

—— $T_J=25^\circ\text{C}$ - - - - $T_J=125^\circ\text{C}$

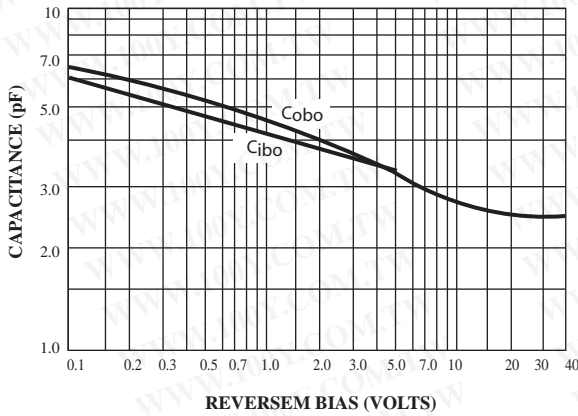


FIG.3 Capacitance

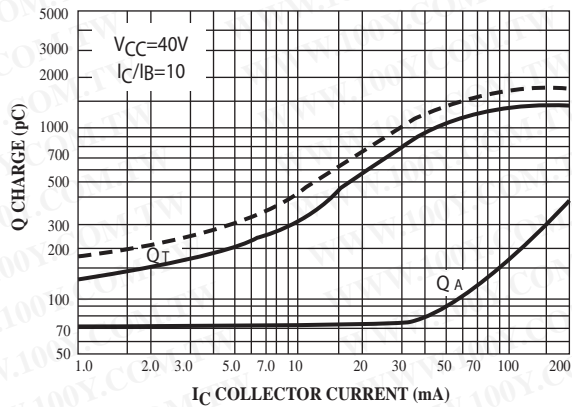


FIG.4 Charge Data

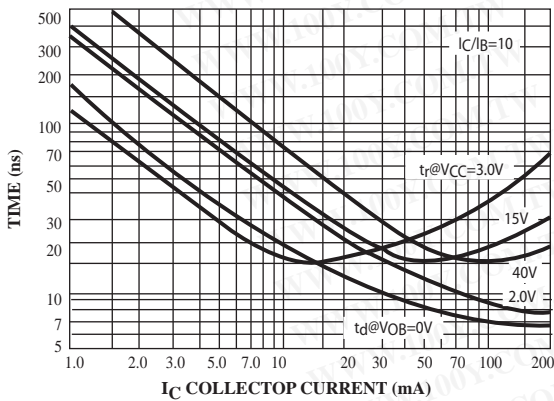


FIG.5 Turn-On Time

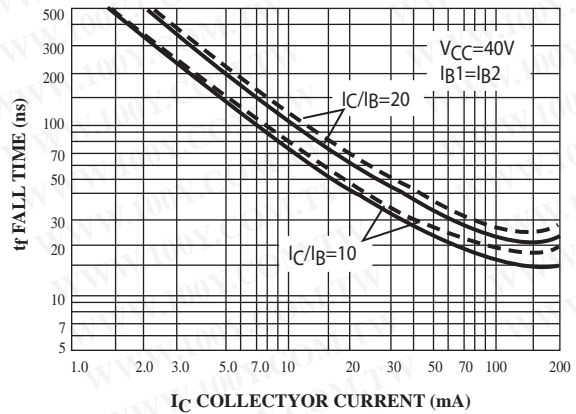


FIG.6 Fall Time

TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

($V_{CE} = -5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$, Bandwidth = 1.0Hz)

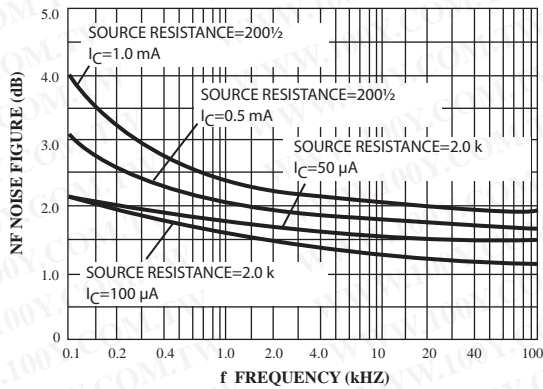


FIG.7

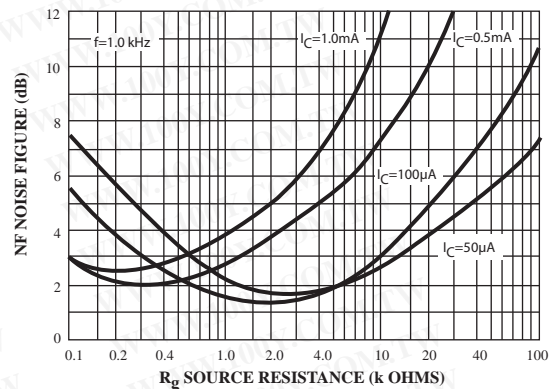


FIG.8

h PARAMETERS

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

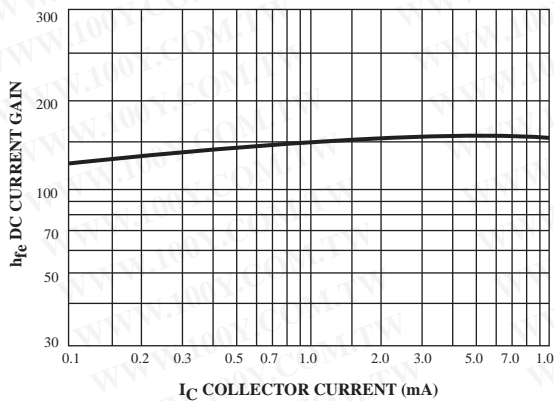


FIG.9 Current Gain

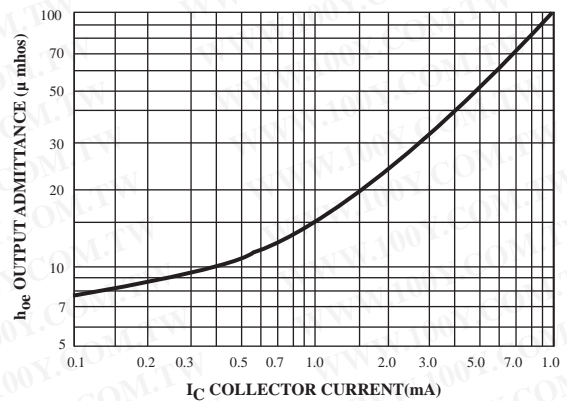


FIG.10 Input Impedance

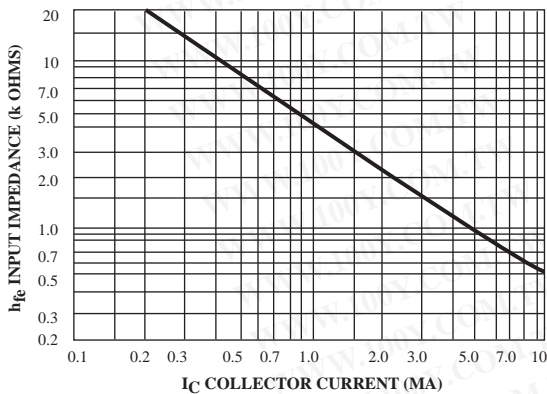


FIG.11 Input Impedance

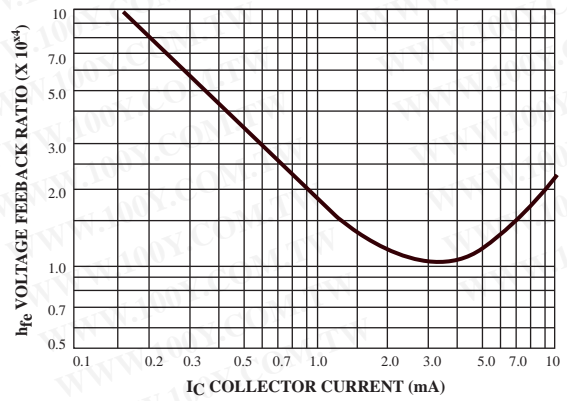


FIG.12 Votage Feaback Ratio

MMBT3906

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TYPICAL STATIC CHARACTERISTICS

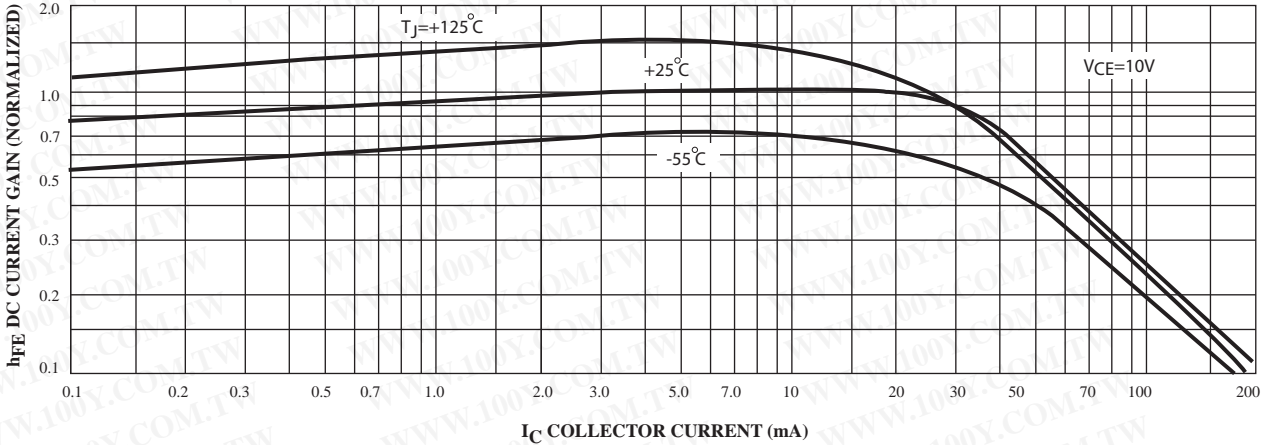


FIG.13 DC Current Gain

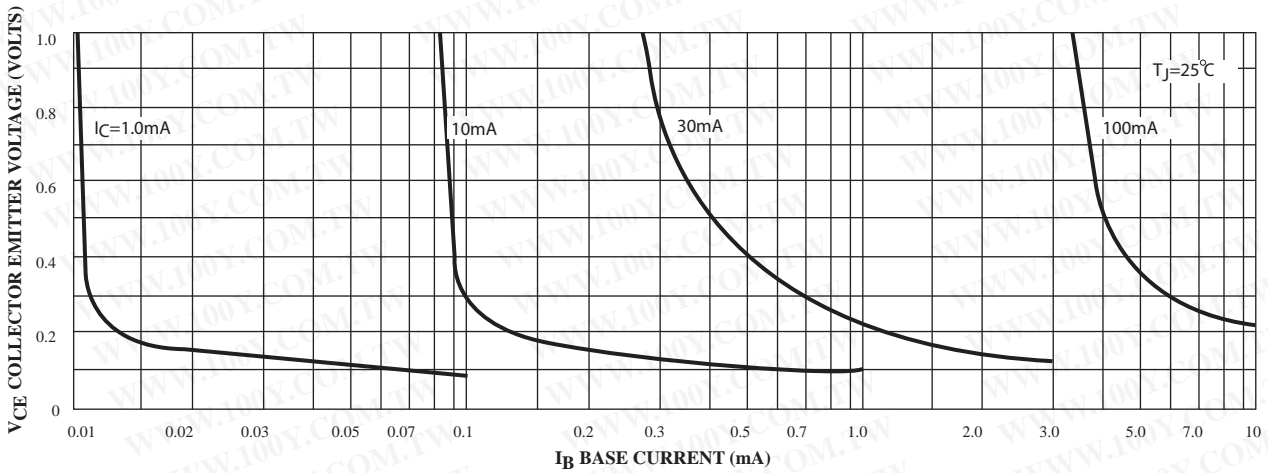


FIG.14 Collector Saturation Region

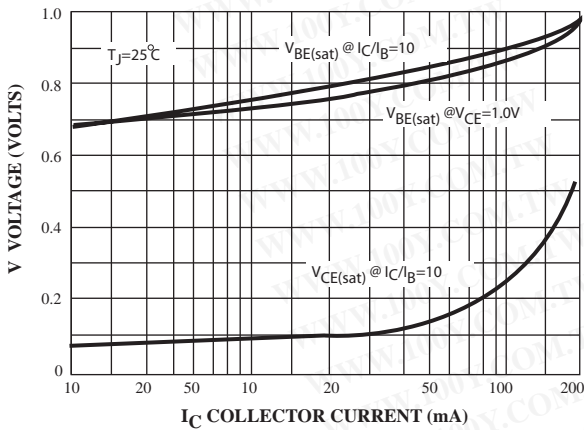


FIG.15 "ON" Voltages

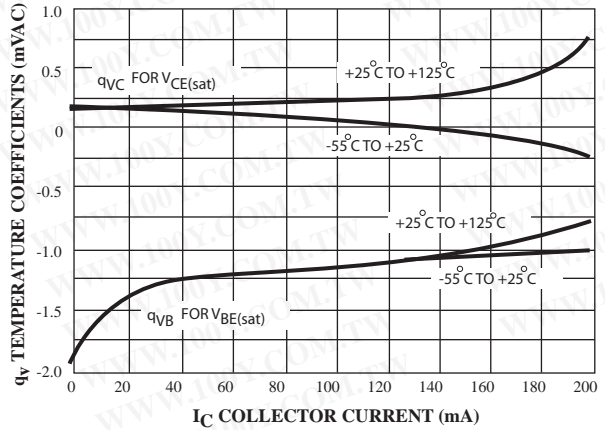


FIG.16 Temperature Coefficients

MMBT3906

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SOT-23 Package Outline Dimensions

Unit:mm

