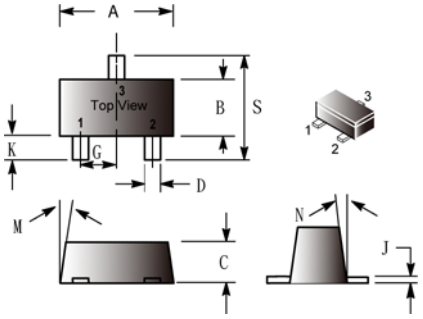
Elektronische Bauelemente

MMBT3906T

PNP Silicon
General Purpose Transistors

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

SOT-523



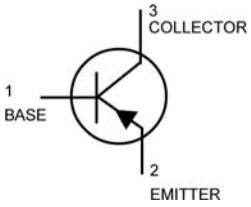
REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.50	1.70	K	0.30	0.50
B	0.75	0.95	M	---	10°
C	0.60	0.80	N	---	10°
D	0.23	0.33	S	1.50	1.70
G	0.50BSC				
J	0.10	0.20			

FEATURES

- Simplifies Circuit Design.
- We Declare that the material of product compliance with RoHS requirements.

ORDERING INFORMATION

Device	Marking	Shipping
MMBT3906T	2A	3000/Tape&Reel



MAXIMUM RATINGS (at T_a = 25°C unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	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
Total Device Dissapation FR-4 Board(1) T_A=25℃, Derate above 25℃	P_D	200	mW
		1.6	mW/℃
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	600	℃ / W
Total Device Dissapation FR-4 Board(2) T_A=25℃, Derate above 25℃	P_D	300	mW
		2.4	mW/℃
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	400	℃ / W
Junction & Storage Temperature	T_J, T_{STG}	-55 ~ 150	℃

1. FR-4 Minimum Pad.
2. FR-4 1.0 X 1.0 Inch Pad.
3. Pulse Test：Pulse Width ≦ 300 μs, Duty Cycle ≦ 2.0%.

DEVICE MARKING

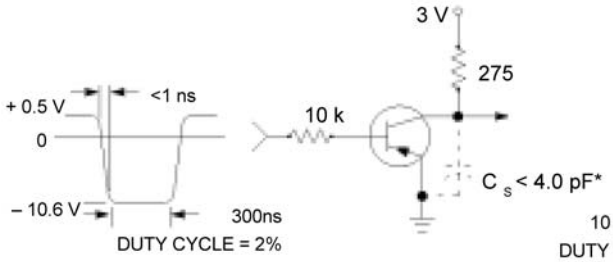
MMBT3906T = 2A

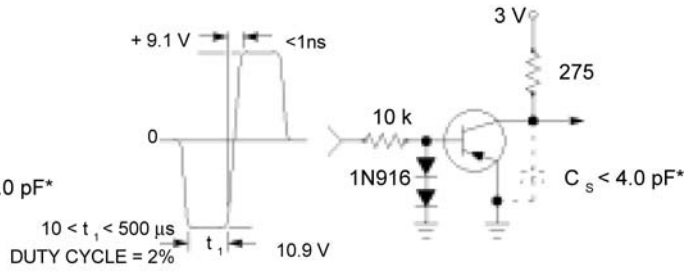
ELECTRICAL CHARACTERISTICS (at T_a = 25°C unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT	TEST CONDITIONS
Off Characteristics					
Collector-Emitter Breakdown Voltage[3]	$V_{(BR)CEO}$	-40	-	Vdc	I_C = -1.0 mAdc, I_B = 0
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	-	Vdc	I_C = -10 μAdc, I_E = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0	-	Vdc	I_E = -10 μAdc, I_C = 0
Collector Cut-Off Current	I_{BL}	-	-50	nAdc	V_{CE} = -30 Vdc, V_{EB} = -3.0 Vdc
Emitter Cut-Off Current	I_{CEX}	-	-50	nAdc	V_{CE} = -30 Vdc, V_{BE} = -3.0 Vdc
On Characteristics[3]					
DC Current Gain[1]	h_{FE}	60	-	-	I_C = -0.1 mAdc, V_{CE} = -1.0 Vdc
		80	-		I_C = -1.0 mAdc, V_{CE} = -1.0 Vdc
		100	300		I_C = -10 mAdc, V_{CE} = -1.0 Vdc
		60	-		I_C = -50 mAdc, V_{CE} = -1.0 Vdc
		30	-		I_C = -100 mAdc, V_{CE} = -1.0 Vdc
Collector-Emitter Saturation Voltage[3]	$V_{CE(sat)}$	-	-0.25	Vdc	I_C = -10 mAdc, I_B = -1.0 mAdc
		-	-0.4		I_C = -50 mAdc, I_B = -5.0 mAdc
Base-Emitter Saturation Voltage[3]	$V_{BE(sat)}$	-0.65	-0.85	Vdc	I_C = -10 mAdc, I_B = -1.0 mAdc
		-	-0.95		I_C = -50 mAdc, I_B = -5.0 mAdc
Small-Signal Characteristics					
Curren-Gain-Bandwidth Product	f_T	250	-	MHz	V_{CE} = -20 Vdc, I_C = -10 mAdc, f = 100 MHz
Output Capacitance	C_{obo}	-	4.5	pF	V_{CB} = -5.0 Vdc, I_E = 0, f = 1.0 MHz
Input Capacitance	C_{ibo}	-	10	pF	V_{BE} = -0.5 Vdc, I_E = 0, f = 1.0 MHz
Input Impedancen	h_{ie}	2.0	12	pF	V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz
Voltage Feedback Ratio	h_{re}	0.1	10	$X10^{-4}$	V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz
Small-Signal Current Gain	h_{fe}	100	400	-	V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz
Output Admittance	$*h_{oe}$	3.0	60	μmhos	V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz
Noise Figure	NF	-	4.0	dB	V_{CE} = -5.0 Vdc, I_C = -100 μAdc, R_S = 1.0k Ω, f = 1.0 kHz
Switching Characteristics					
Delay Time	T_d	-	35	nS	V_{CC} = -3.0 Vdc, V_{BE} = 0.5 Vdc, I_C = -10 mAdc, I_{B1} = -1.0 mAdc
Rise Time	T_r	-	35	nS	
Storage Time	T_S	-	225	nS	V_{CC} = -3.0 Vdc, I_C = -10 mAdc, I_{B1} = I_{B2} = -1.0 mAdc
Fall Time	T_F	-	75	nS	

3. Pulse Test：Pulse Width ≦ 300 μs, Duty Cycle≦ 2.0%.

CHARACTERISTIC CURVES





*Total shunt capacitance of test jig and connectors

Figure 1. Delay and Rise Time Equivalent Test Circuit

Figure 2. Storage and Fall Time Equivalent Test Circuit

TYPICAL TRANSIENT CHARACTERISTICS

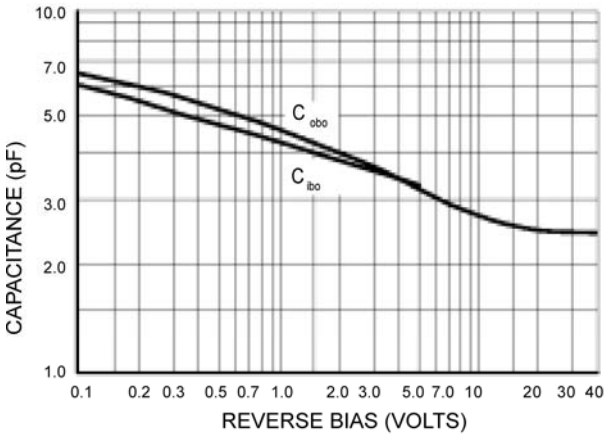


Figure 3. Capacitance

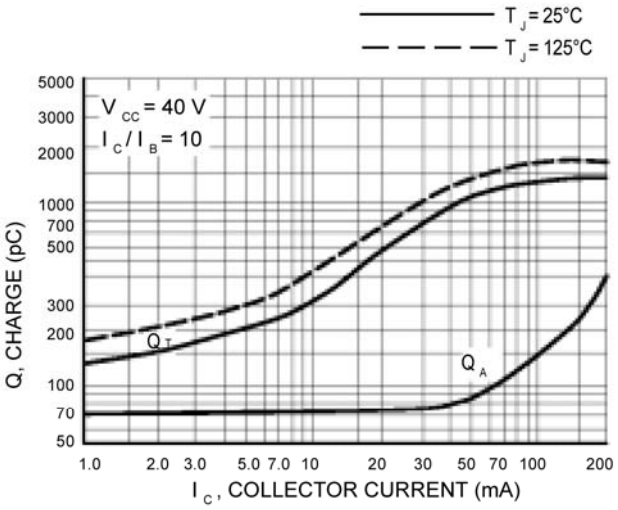


Figure 4. Charge Data

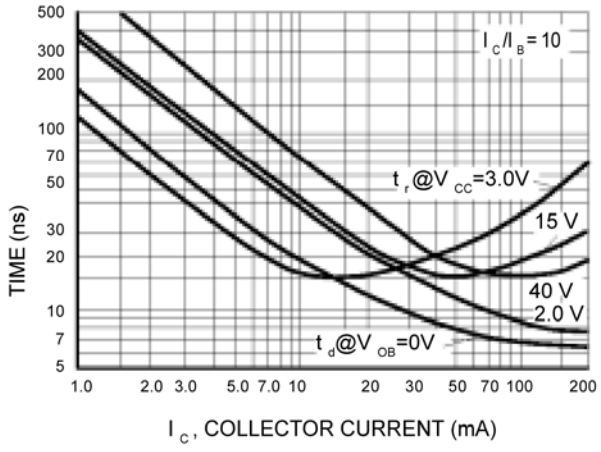


Figure 5. Turn–On Time

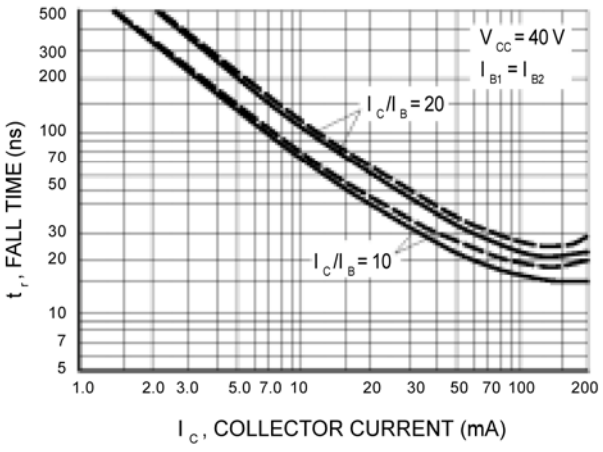


Figure 6. Fall Time

CHARACTERISTIC CURVES

TYPICAL AUDIO SMALL–SIGNAL CHARACTERISTICS
NOISE FIGURE VARIATIONS

(V_{CE} = – 5.0 Vdc, T_A = 25°C, Bandwidth = 1.0 Hz)

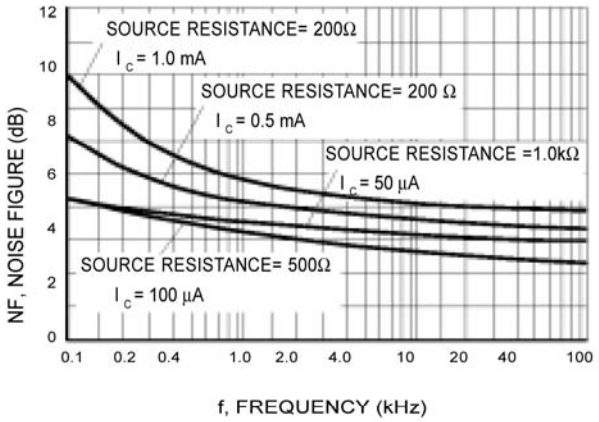


Figure 7. Noise Figure

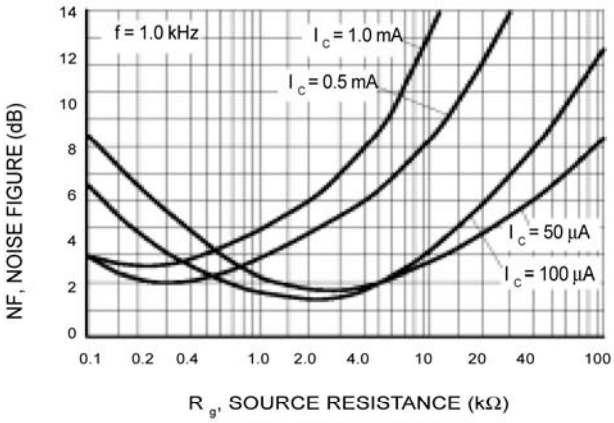


Figure 8. Noise Figure

h PARAMETERS

(V_{CE} = 10 Vdc, f = 1.0 kHz, T_A = 25°C)

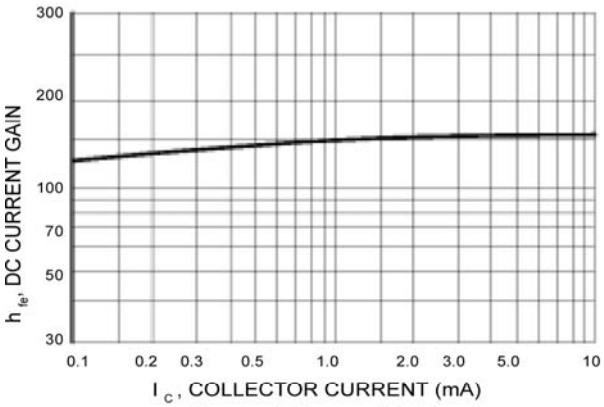


Figure 9. Current Gain

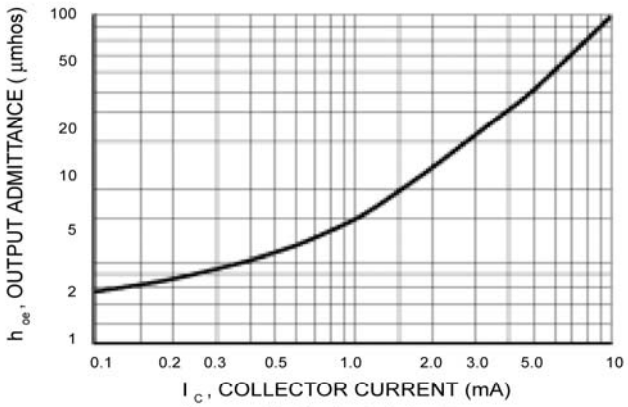


Figure 10. Output Admittance

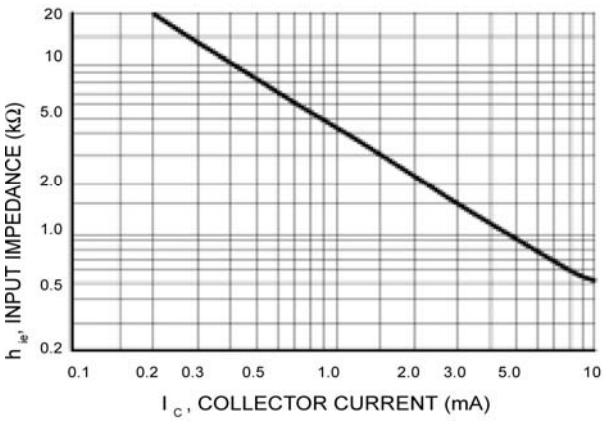


Figure 11. Input Impedance

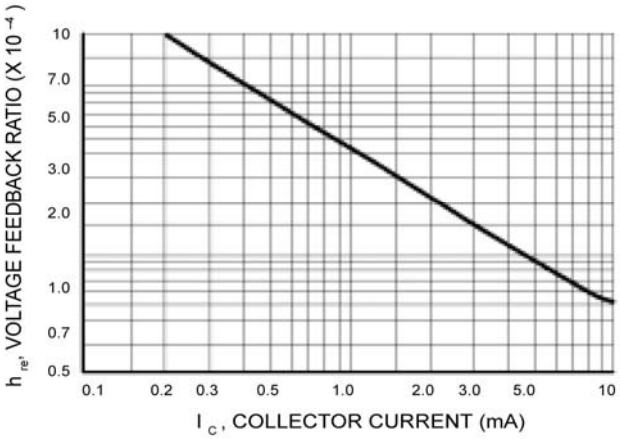


Figure 12. Voltage Feedback Ratio

CHARACTERISTIC CURVES

TYPICAL STATIC CHARACTERISTICS

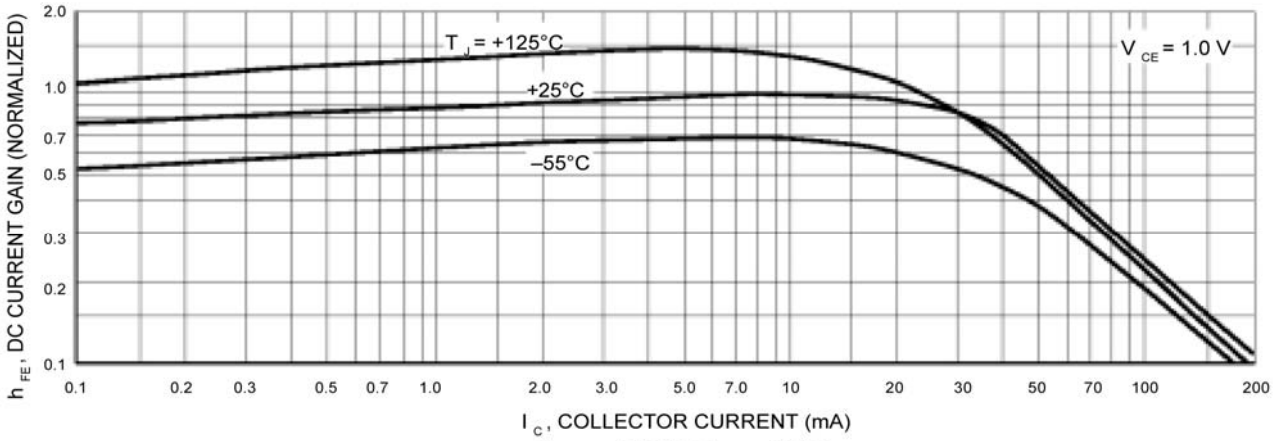


Figure 13. DC Current Gain

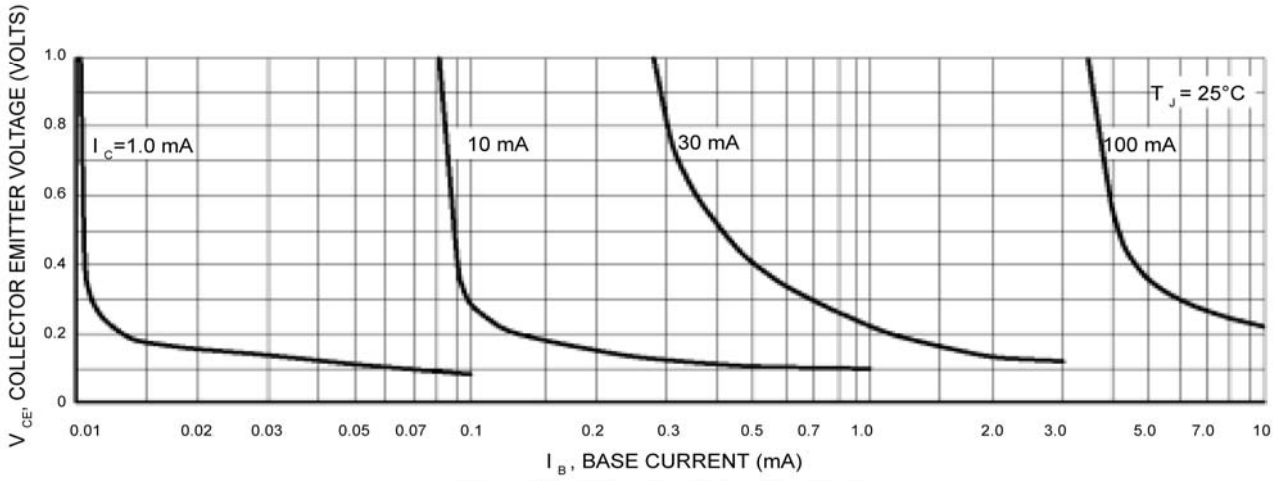


Figure 14. Collector Saturation Region

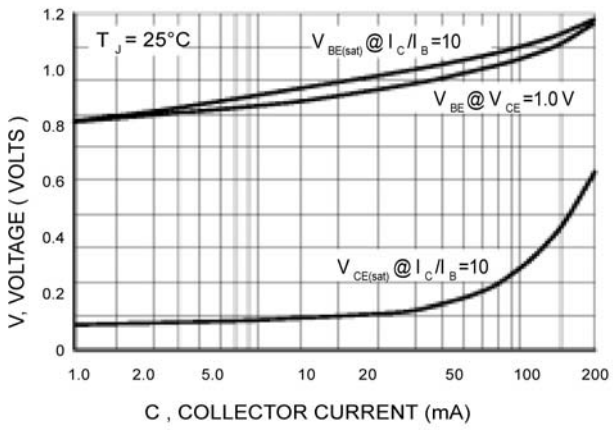


Figure 15. "ON" Voltages

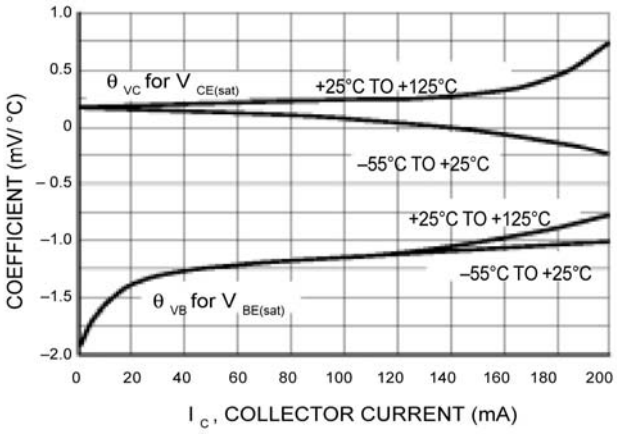


Figure 16. Temperature Coefficients