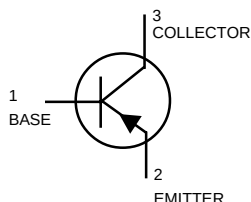
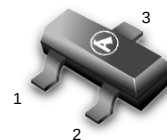


General Purpose Transistors

PNP Silicon



MMBT3906LT1



CASE 318-08, STYLE 6
SOT- 23 (TO-236AB)

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

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board(1) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

DEVICE MARKING

MMBT3906LT1 = 2A

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (3) ($I_C = -1.0\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	– 40	—	Vdc
Collector–Base Breakdown Voltage ($I_C = -10\text{ }\mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	– 40	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = -10\text{ }\mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	– 5.0	—	Vdc
Base Cutoff Current ($V_{CE} = -30\text{ Vdc}$, $V_{EB} = -3.0\text{ Vdc}$)	I_{BL}	—	– 50	nAdc
Collector Cutoff Current ($V_{CE} = -30\text{ Vdc}$, $V_{EB} = -3.0\text{ Vdc}$)	I_{CEX}	—	– 50	nAdc

- FR–5 = $1.0 \times 0.75 \times 0.062\text{ in.}$
- Alumina = $0.4 \times 0.3 \times 0.024\text{ in.}$ 99.5% alumina.
- Pulse Width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2.0\%$.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS (2)				
DC Current Gain (I _C = -0.1 mA, V _{CE} = -1.0 Vdc)	h _{FE}	60	—	—
(I _C = -1.0 mA, V _{CE} = -1.0 Vdc)		80	—	—
(I _C = -10 mA, V _{CE} = -1.0 Vdc)		100	300	—
(I _C = -50 mA, V _{CE} = -1.0 Vdc)		60	—	—
(I _C = -100 mA, V _{CE} = -1.0 Vdc)		30	—	—
Collector-Emitter Saturation Voltage (I _C = -10 mA, I _B = -1.0 mA)	V _{CE(sat)}	—	-0.25	Vdc
(I _C = -50 mA, I _B = -5.0 mA)		—	-0.4	Vdc
Base-Emitter Saturation Voltage (I _C = -10 mA, I _B = -1.0 mA)	V _{BE(sat)}	-0.65	-0.85	Vdc
(I _C = -50 mA, I _B = -5.0 mA)		—	-0.95	Vdc

SMALL-SIGNAL CHARACTERISTICS

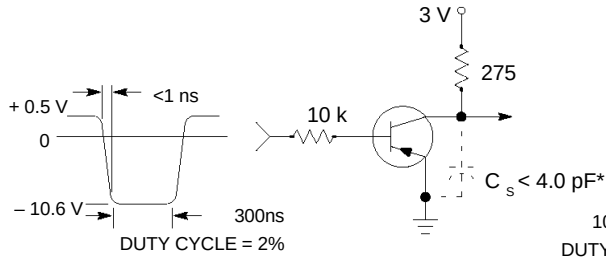
Current-Gain — Bandwidth Product (I _C = -10 mA, V _{CE} = -20 Vdc, f = 100 MHz)	f _T	250	—	MHz
Output Capacitance (V _{CB} = -5.0 Vdc, I _E = 0, f = 1.0 MHz)	C _{obo}	—	4.5	pF
Input Capacitance (V _{EB} = -0.5 Vdc, I _C = 0, f = 1.0 MHz)	C _{ibo}	—	10	pF
Input Impedance (V _{CE} = -10 Vdc, I _C = -1.0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

SWITCHING CHARACTERISTICS

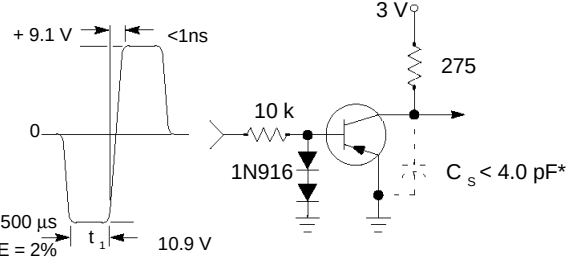
Delay Time	(V _{CC} = -3.0 Vdc, V _{BE} = 0.5 Vdc, I _C = -10 mA, I _{B1} = -1.0 mA)	t _d	—	35	ns
Rise Time		t _d	—	35	
Storage Time	(V _{CC} = -3.0 Vdc, I _C = -10 mA, I _{B1} = I _{B2} = -1.0 mA)	t _s	—	225	ns
Fall Time		t _f	—	75	

3. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

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**Figure 1. Delay and Rise Time
Equivalent Test Circuit**



*Total shunt capacitance of test jig and connectors

**Figure 2. Storage and Fall Time
Equivalent Test Circuit**

TYPICAL TRANSIENT CHARACTERISTICS

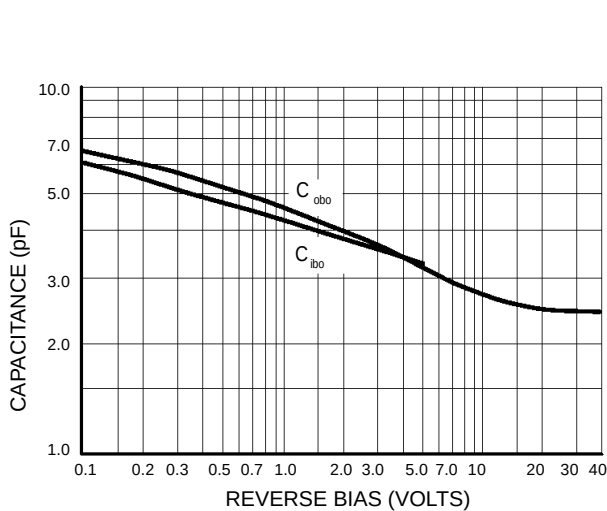


Figure 3. Capacitance

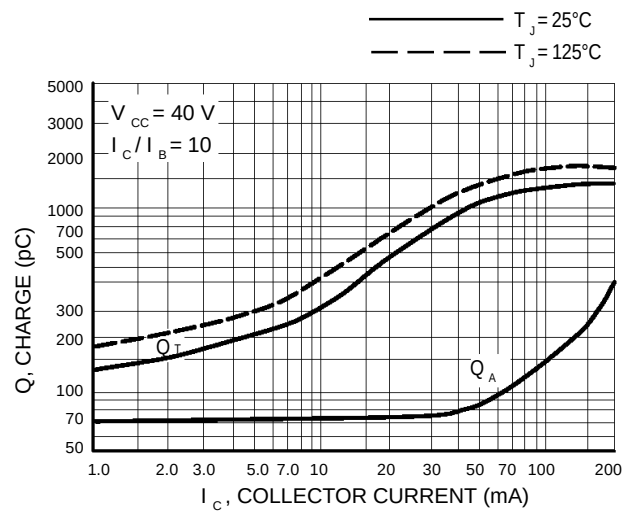


Figure 4. Charge Data

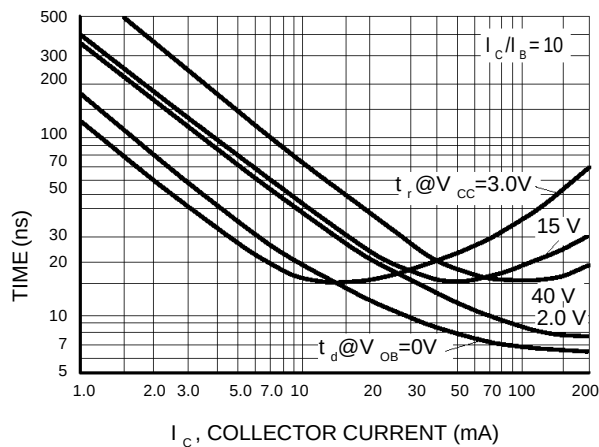


Figure 5. Turn-On Time

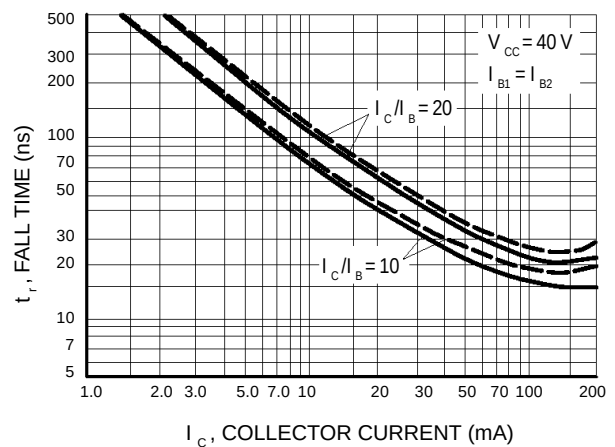


Figure 6. Fall Time

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TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE VARIATIONS

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

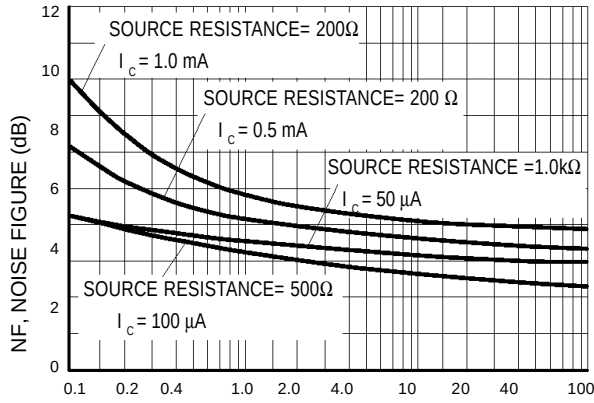


Figure 7. Noise Figure

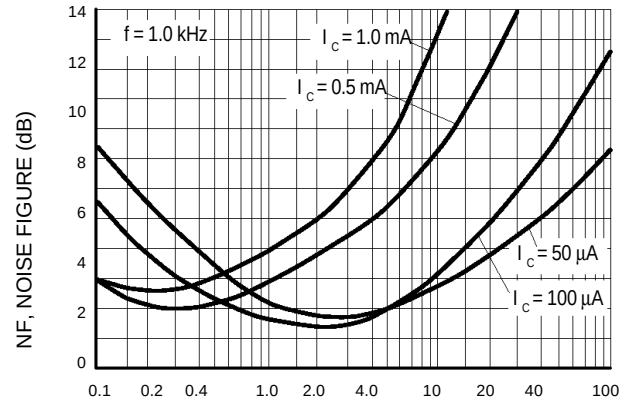


Figure 8. Noise Figure

h PARAMETERS

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

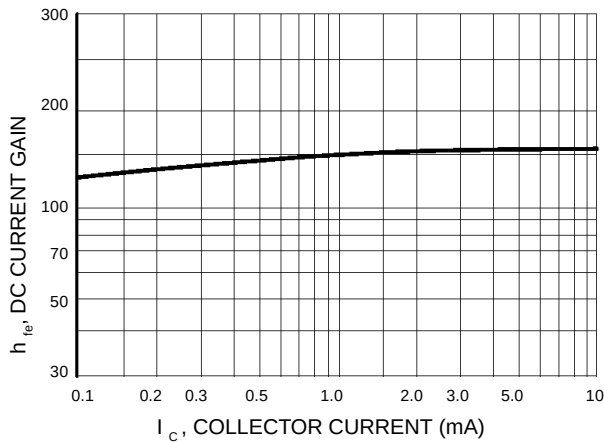


Figure 9. Current Gain

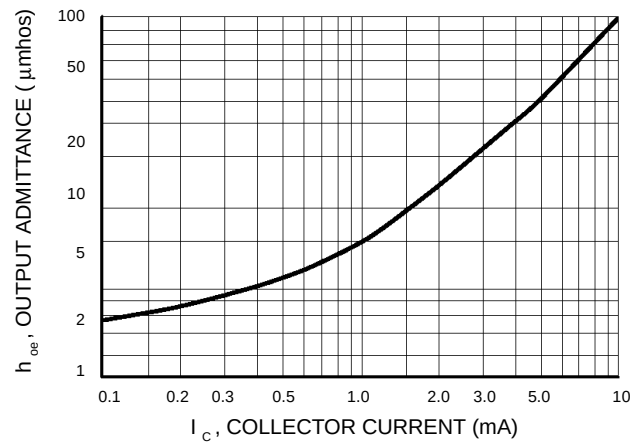


Figure 10. Output Admittance

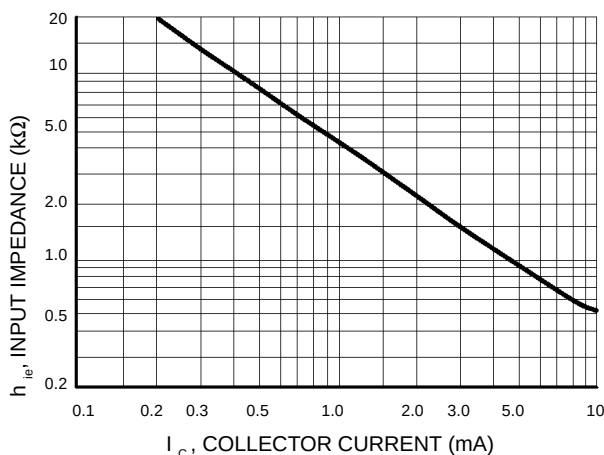


Figure 11. Input Impedance

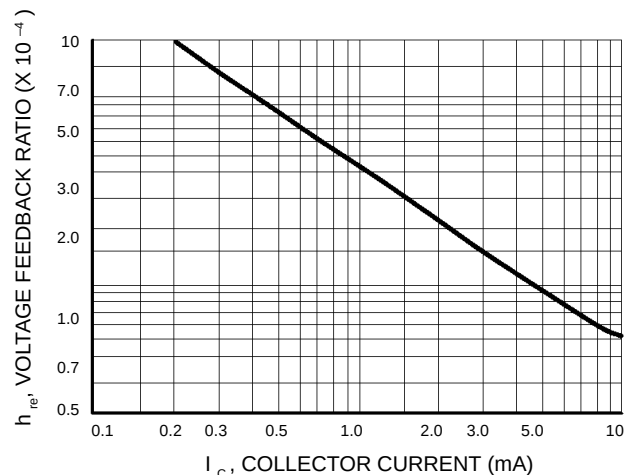


Figure 12. Voltage Feedback Ratio

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TYPICAL STATIC CHARACTERISTICS

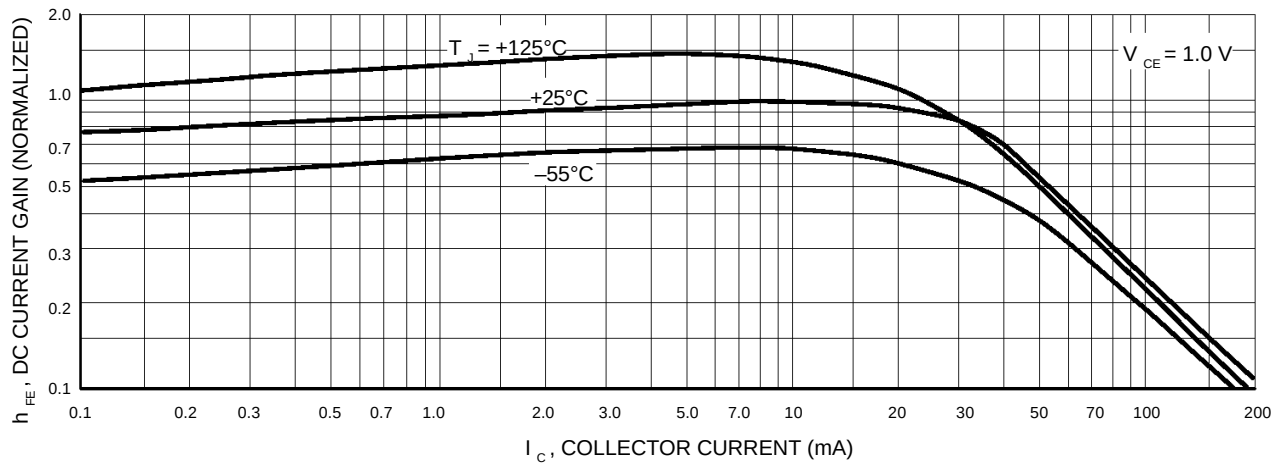


Figure 13. DC Current Gain

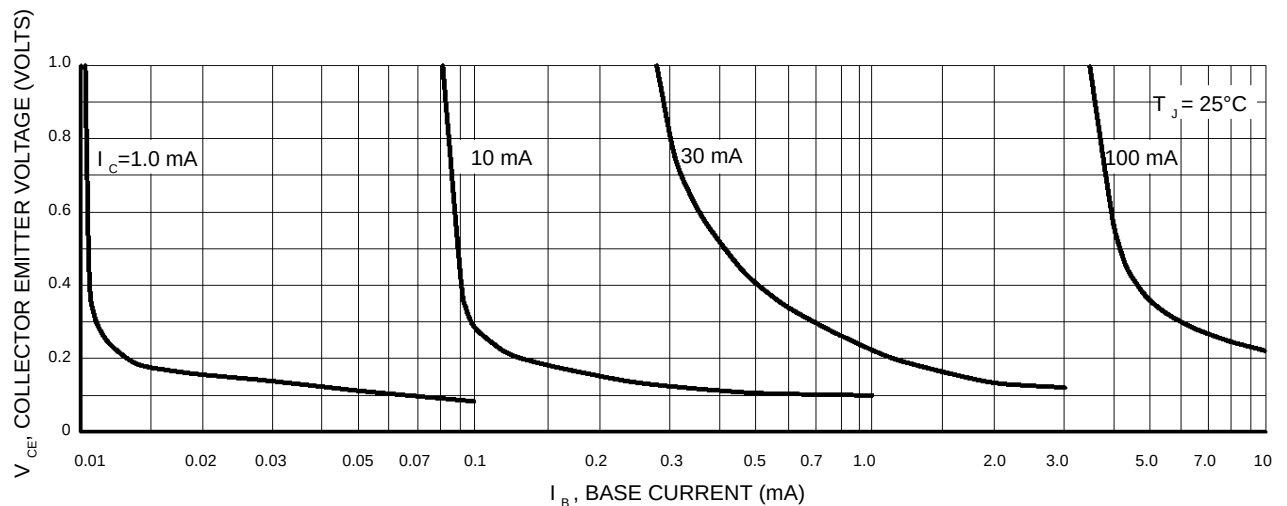


Figure 14. Collector Saturation Region

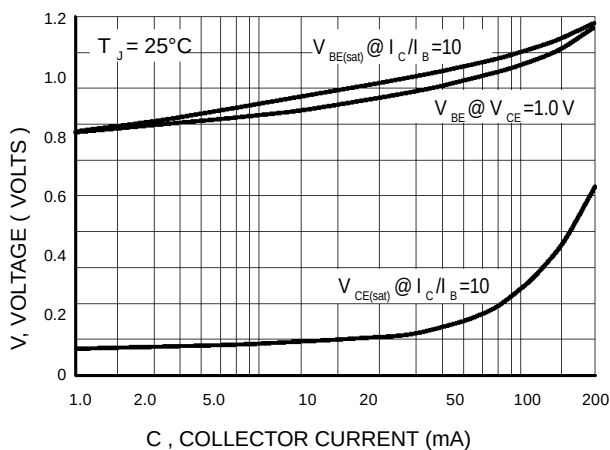


Figure 15. "ON" Voltages

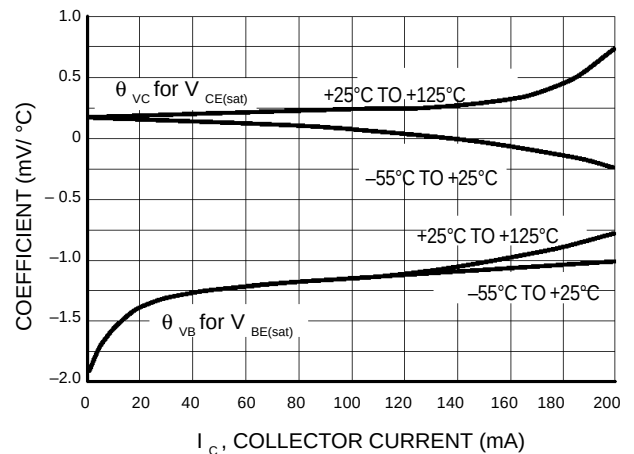


Figure 16. Temperature Coefficients