

## Small Signal Product

## 350mW, PNP Small Signal Transistor

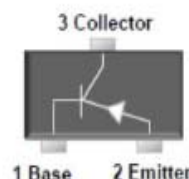
**FEATURES**

- Epitaxial planar die construction
- Surface device type mounting
- Moisture sensitivity level 1
- Matte Tin (Sn) lead finish with Nickel (Ni) underplate
- Pb free version and RoHS compliant
- Packing code with suffix "G" means green compound (halogen-free)


**SOT-23**

**MECHANICAL DATA**

- Case: SOT- 23, molded plastic
- Terminal: Matte tin plated, lead free, solderable per MIL-STD-202, Method 208 guaranteed
- High temperature soldering guaranteed: 260°C/10s
- Weight: 0.008g (approximately)
- Marking Code: 2A



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T <sub>A</sub> =25°C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Power Dissipation	P <sub>D</sub>	350	mW
Collector-Base Voltage	V <sub>CB0</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5	V
Collector Current	I <sub>C</sub>	-200	mA
Thermal Resistance Junction-Ambient	R <sub>θJA</sub>	357	°C/W
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to + 150	°C

Notes: 1. Valid provided that electrodes are kept at ambient temperature

PARAMETER	SYMBOL	MIN	MAX	UNIT
Collector-Base Breakdown Voltage I <sub>C</sub> = 10 μA I <sub>E</sub> = 0	V <sub>(BR)CBO</sub>	-40	-	V
Collector-Emitter Breakdown Voltage I <sub>C</sub> = -1 mA I <sub>B</sub> = 0	V <sub>(BR)CEO</sub>	-40	-	V
Emitter-Base Breakdown Voltage I <sub>E</sub> = -10 μA I <sub>C</sub> = 0	V <sub>(BR)EBO</sub>	-5	-	V
Collector Base Cut-off Current V <sub>CB</sub> = -40 V	I <sub>CBO</sub>	-	-100	nA
Emitter Base Cut-off Current V <sub>EB</sub> = -6 V	I <sub>EBO</sub>	-	-50	nA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = -1 V I <sub>C</sub> = -0.1 mA	60	300
		V <sub>CE</sub> = -1 V I <sub>C</sub> = -1 mA	80	
		V <sub>CE</sub> = -1 V I <sub>C</sub> = -10 mA	100	
		V <sub>CE</sub> = -1 V I <sub>C</sub> = -50 mA	60	
		V <sub>CE</sub> = -1 V I <sub>C</sub> = -100 mA	30	
Collector-Emitter Saturation Voltage I <sub>C</sub> = -10 mA I <sub>B</sub> = -1 mA I <sub>C</sub> = -50 mA I <sub>B</sub> = -5 mA	V <sub>CE(sat)</sub>	-	-0.25	V
		-	-0.4	
Base-Emitter Saturation Voltage I <sub>C</sub> = -10 mA I <sub>B</sub> = -1 mA I <sub>C</sub> = -50 mA I <sub>B</sub> = -5 mA	V <sub>BE(sat)</sub>	-0.65	-0.85	V
		-	-0.95	
Gain-Bandwidth Product V <sub>CE</sub> = -20 V I <sub>C</sub> = -10 mA f = 100MHz	f <sub>T</sub>	250	-	MHz
Output Capacitance V <sub>CB</sub> = -5 V I <sub>E</sub> = 0 f = 1MHz	C <sub>obo</sub>	-	4.5	pF
Delay time V <sub>CC</sub> = -3 V V <sub>BE</sub> = -0.5 V I <sub>C</sub> = -10 mA	t <sub>d</sub>	-	35	ns
Rise time I <sub>B1</sub> = -1.0 mA	t <sub>r</sub>	-	35	ns
Storage time V <sub>CC</sub> = -3 V I <sub>C</sub> = -10 mA	t <sub>s</sub>	-	225	ns
Fall time I <sub>B1</sub> = I <sub>B2</sub> = -1.0 mA	t <sub>f</sub>	-	75	ns

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RATINGS AND CHARACTERISTICS CURVES

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

Fig. 1 Capacitance

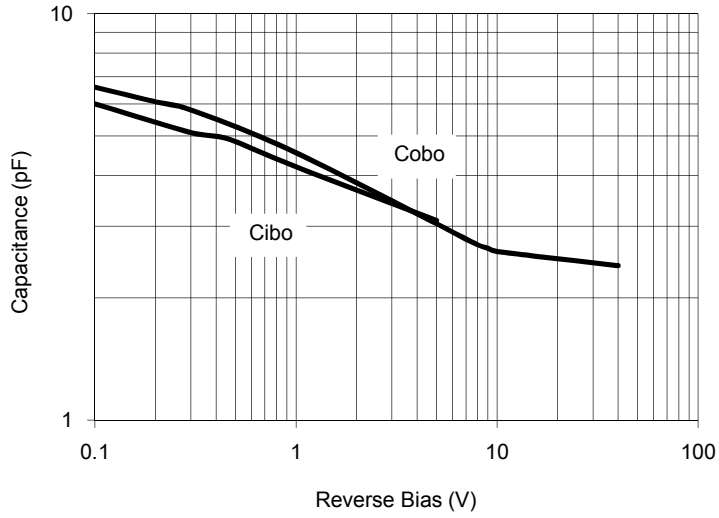


Fig. 2 Charge Data

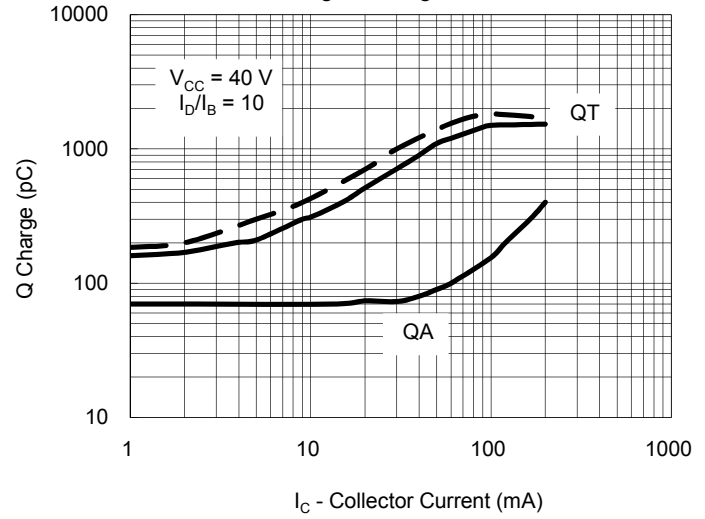


Fig. 3 Turn - On Time

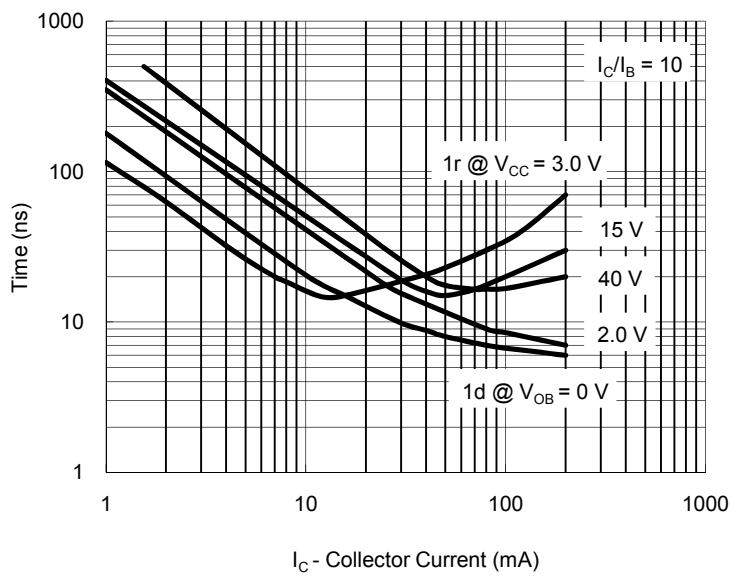


Fig. 4 Fall Time

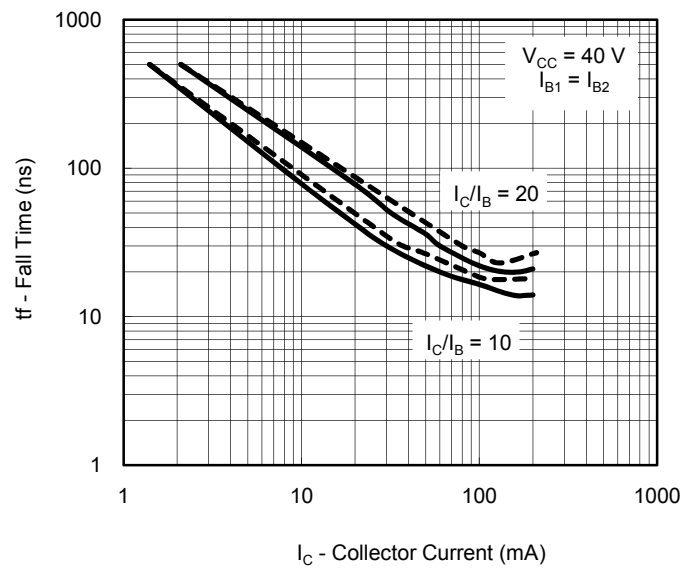


Fig. 5 Noise Figure VS. Frequency

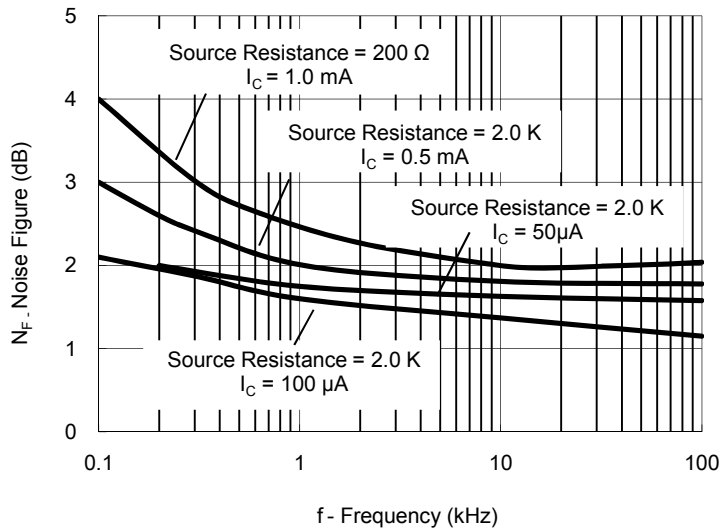
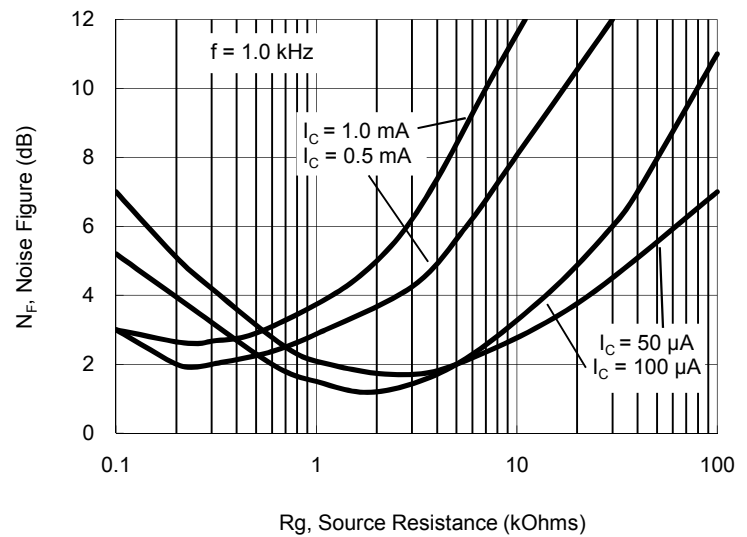


Fig. 6 Noise Figure VS. Source



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

Fig. 7 Current Gain

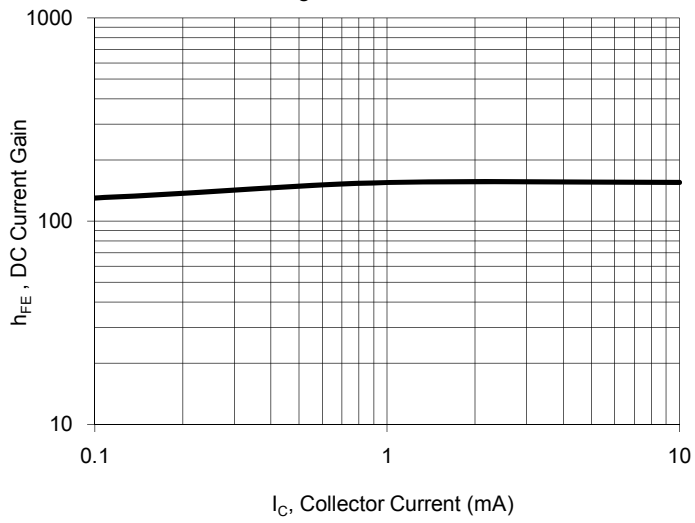


Fig. 8 Output Admittance

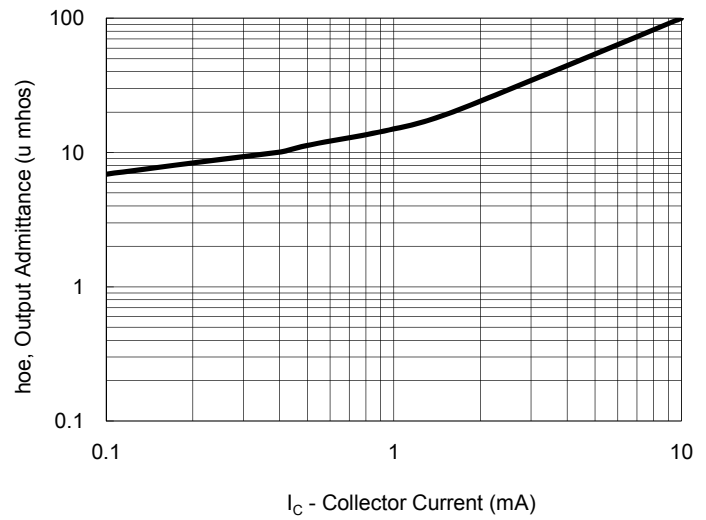


Fig. 9 Input Impedance

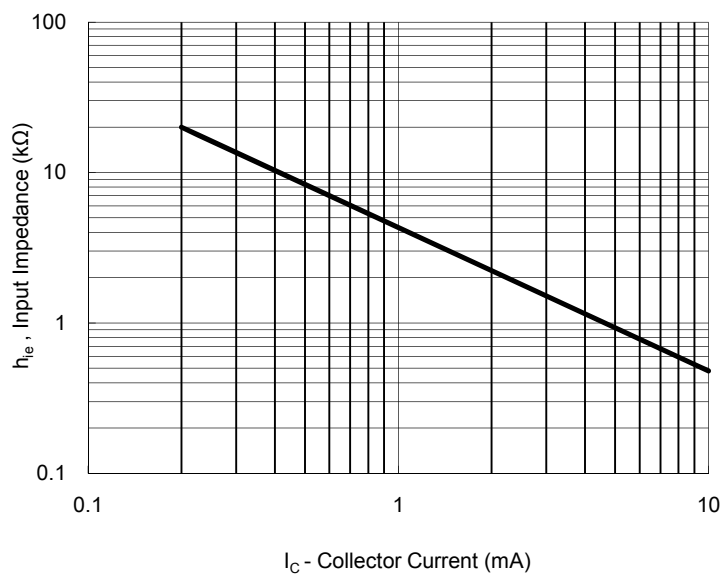


Fig. 10 Voltage Feedback Ratio

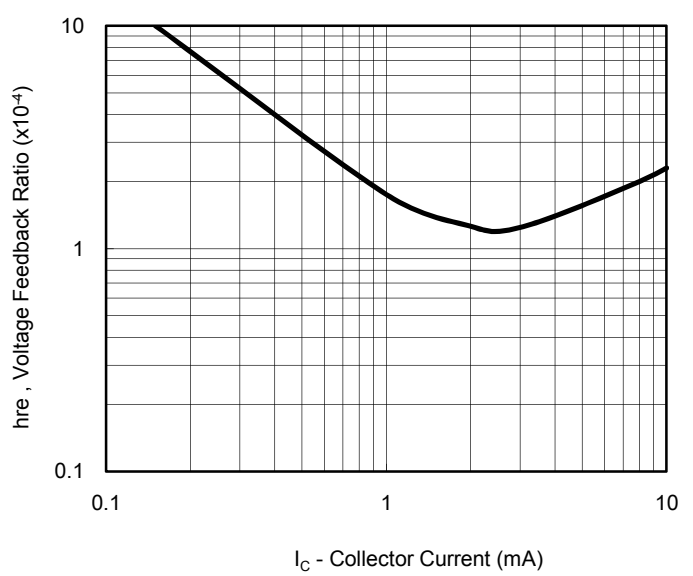


Fig. 11 "ON" Voltages

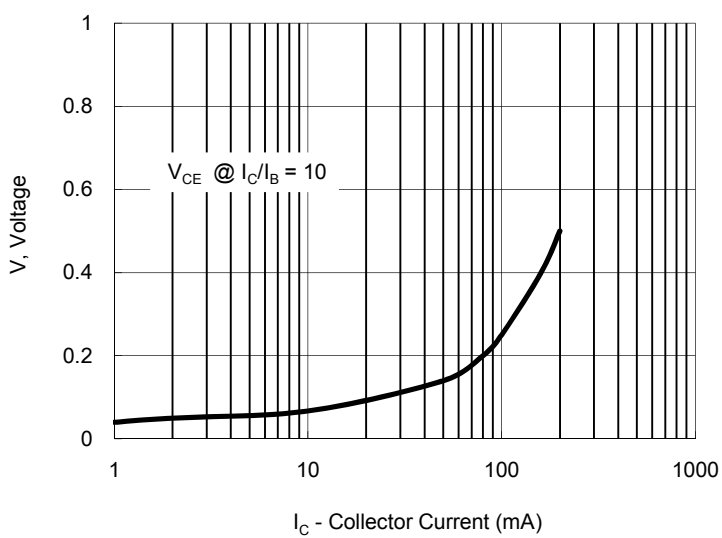
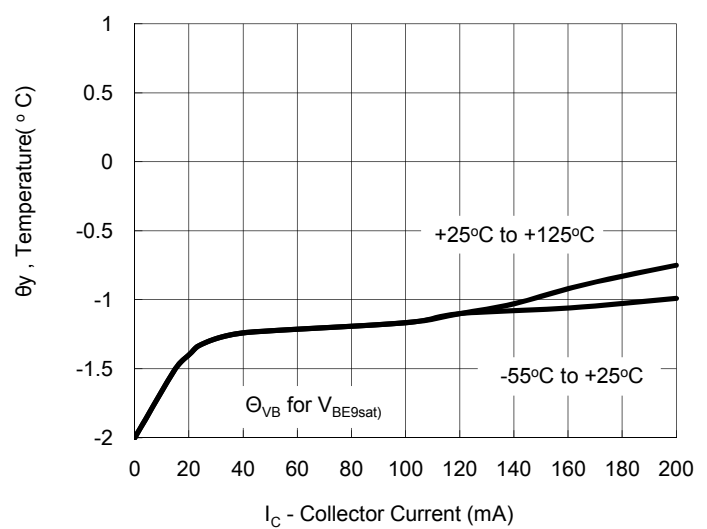


Fig. 12 Temperature Coefficients



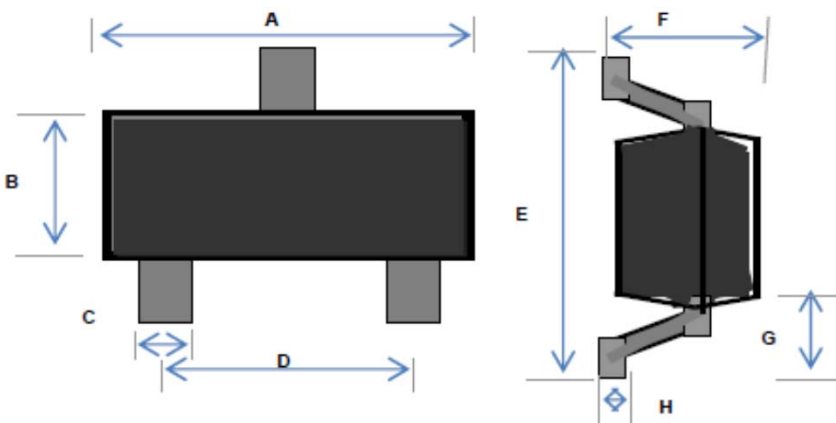
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ORDERING INFORMATION					
PART NO.	PART NO. SUFFIX (Note 1)	PACKING CODE	PACKING CODE SUFFIX	PACKAGE	PACKING
MMBT3906	-xx	RF	G	SOT-23	3K / 7" Reel
		R5			10K / 13" Reel

Note 1: Part No. Suffix „-xx “ would be used for special requirement

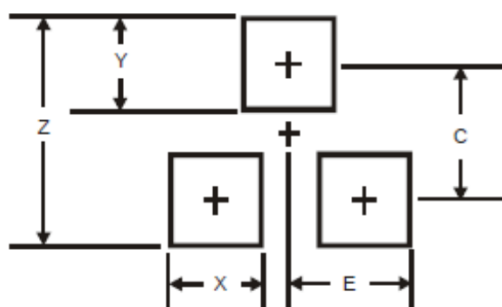
EXAMPLE					
PREFERRED P/N	PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX	DESCRIPTION
MMBT3906 RF	MMBT3906		RF		Multiple manufacture source
MMBT3906 RFG	MMBT3906		RF	G	Multiple manufacture source Green compound
MMBT3906-D0 RFG	MMBT3906	-D0	RF	G	Defined manufacture source Green compound
MMBT3906-B0 RFG	MMBT3906	-B0	RF	G	Defined manufacture source Green compound

PACKAGE OUTLINE DIMENSIONS



DIM.	Unit(mm)		Unit(inch)	
	Min	Max	Min	Max
A	2.70	3.10	0.106	0.122
B	1.10	1.50	0.043	0.059
C	0.30	0.51	0.012	0.020
D	1.78	2.04	0.070	0.080
E	2.10	2.64	0.083	0.104
F	0.89	1.30	0.035	0.051
G	0.55 REF		0.022 REF	
H	0.10 REF		0.004 REF	

SUGGEST PAD LAYOUT



DIM	Unit (mm)	Unit (inch)
	TYP	TYP
Z	2.8	0.11
X	0.7	0.03
Y	0.9	0.04
C	1.9	0.07
E	1.0	0.04

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