

Small Signal Product

## 300mW, NPN 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)

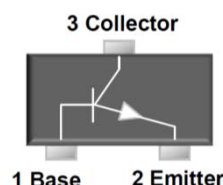


**SOT-23**



**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: 1AM



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T <sub>A</sub> =25°C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Power Dissipation	P <sub>D</sub>	300	mW
Collector-Base Voltage	V <sub>CB0</sub>	60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Collector Current	I <sub>C</sub>	200	mA
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>I<sub>C</sub> = 10 μA, I<sub>E</sub> = 0</i>	V <sub>(BR)CBO</sub>	60	-	V
Collector-Emitter Breakdown Voltage <i>I<sub>C</sub> = 1 mA, I<sub>B</sub> = 0</i>	V <sub>(BR)CEO</sub>	40	-	V
Emitter-Base Breakdown Voltage <i>I<sub>E</sub> = 10 μA, I<sub>C</sub> = 0</i>	V <sub>(BR)EBO</sub>	6	-	V
Collector Cut-off Current <i>V<sub>CE</sub> = 60 V, I<sub>E</sub> = 0</i>	I <sub>CBO</sub>	-	0.1	μA
Collector Cut-off Current <i>V<sub>CE</sub> = 30 V, V<sub>BE(OFF)</sub> = 3 V</i>	I <sub>CEO</sub>	-	50	nA
Emitter Cut-off Current <i>V<sub>EB</sub> = 5 V, I<sub>C</sub> = 0</i>	I <sub>EBO</sub>	-	0.1	μA
DC Current Gain	h <sub>FE</sub>	<i>V<sub>CE</sub> = 1 V, I<sub>C</sub> = 10 mA</i>	100	400
		<i>V<sub>CE</sub> = 1 V, I<sub>C</sub> = 50 mA</i>	60	-
		<i>V<sub>CE</sub> = 1 V, I<sub>C</sub> = 100 mA</i>	30	-
Collector-Emitter Saturation Voltage <i>I<sub>C</sub> = 50 mA, I<sub>B</sub> = 5 mA</i>	V <sub>CE(sat)</sub>	-	0.3	V
Base-Emitter Saturation Voltage <i>I<sub>C</sub> = 50 mA, I<sub>B</sub> = 5 mA</i>	V <sub>BE(sat)</sub>	-	0.95	V
Transition frequency <i>V<sub>CE</sub> = 20 V, I<sub>C</sub> = 10 mA, f = 100MHz</i>	f <sub>T</sub>	250	-	MHz
Delay time	t <sub>d</sub>	-	35	ns
Rise time				
Storage time	t <sub>s</sub>	-	200	ns
Fall time				

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RATINGS AND CHARACTERISTICS CURVES

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

Fig.1 Typical Pulsed Current Gain VS. Collector Current

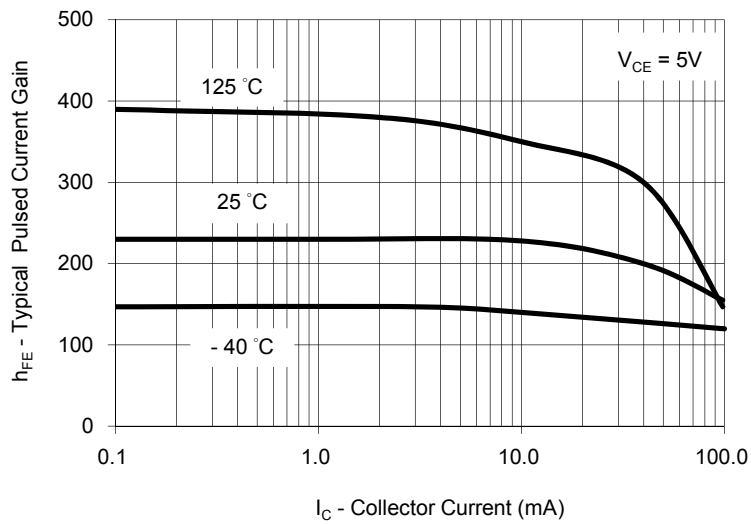


Fig. 2 Collector-Emitter Saturation Voltage VS. Collector Current

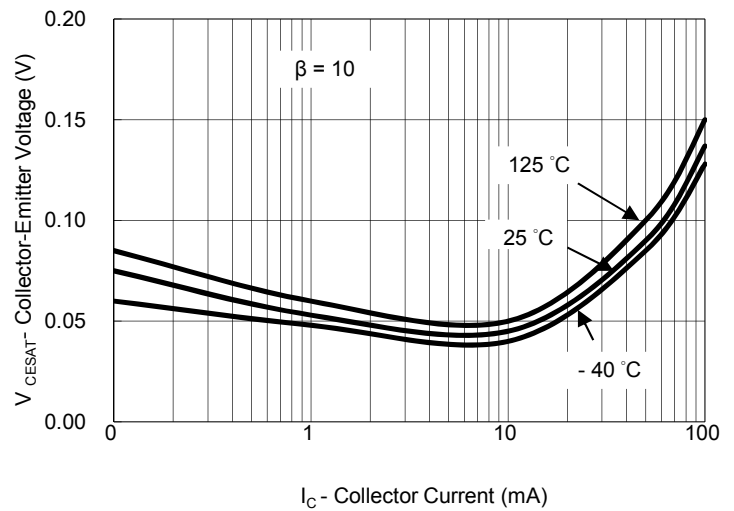


Fig. 3 Base-Emitter Saturation Voltage VS. Collector Current

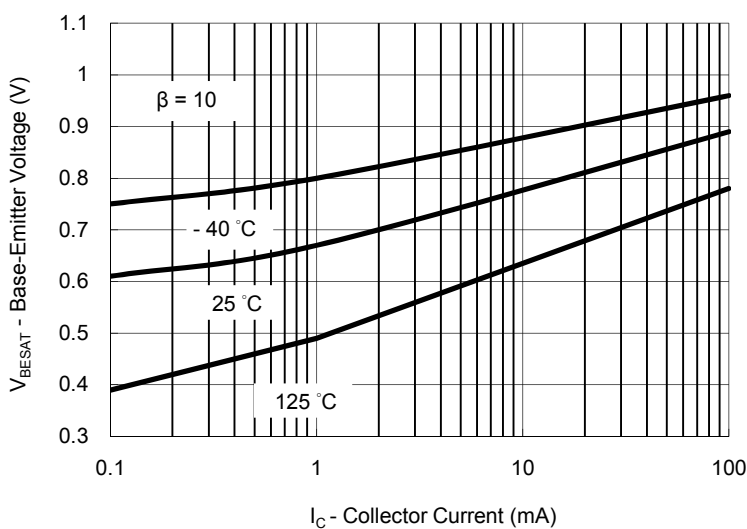


Fig. 4 Base-Emitter On Voltage VS. Collector Current

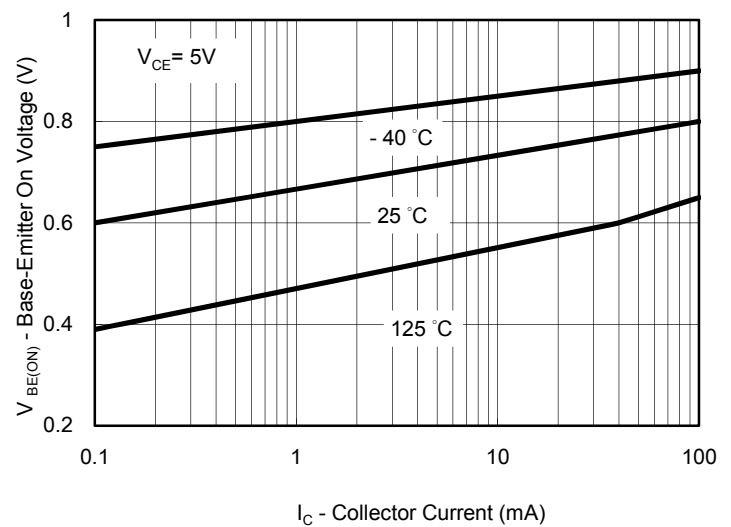


Fig. 5 Collector-Cutoff Current VS. Ambient Temperature

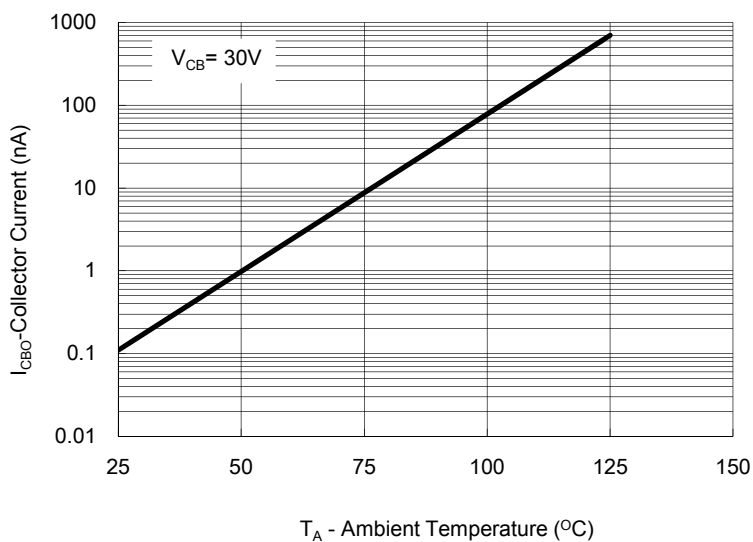
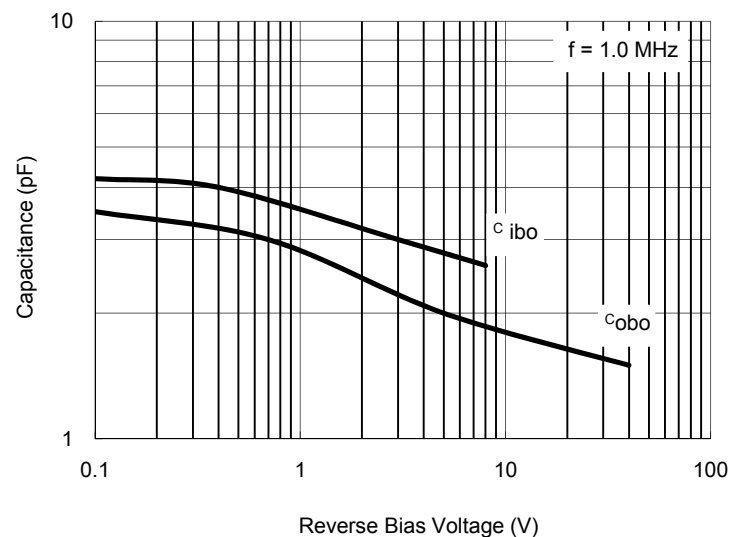


Fig. 6 Capacitance VS. Reverse Bias Voltage



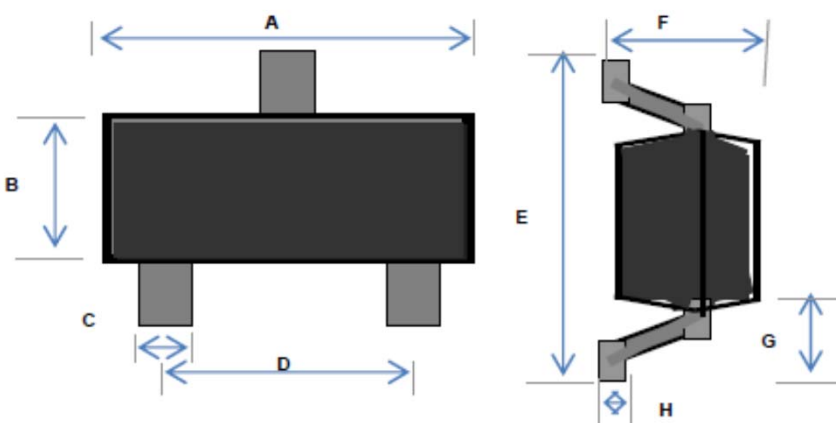
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ORDERING INFORMATION					
PART NO.	PART NO. SUFFIX (Note 1)	PACKING CODE	PACKING CODE SUFFIX	PACKAGE	PACKING
MMBT3904	-xx	RF	G	SOT-23	3K / 7" Reel
		R5			10K / 13" Reel

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

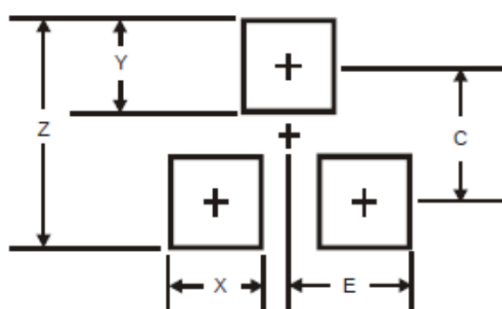
EXAMPLE					
PREFERRED P/N	PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX	DESCRIPTION
MMBT3904 RF	MMBT3904		RF		Multiple manufacture source
MMBT3904 RFG	MMBT3904		RF	G	Multiple manufacture source Green compound
MMBT3904-D0 RFG	MMBT3904	-D0	RF	G	Defined manufacture source Green compound
MMBT3904-B0 RFG	MMBT3904	-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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