

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)

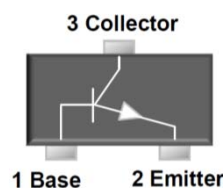


SOT-23



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: 8 mg (approximately)
- Marking Code: 1E.



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T _A =25°C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Power Dissipation	P _D	300	mW
Collector-Base Voltage	V _{CB0}	60	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	I _C	200	mA
Junction and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: Valid provided that electrodes are kept at ambient temperature

PARAMETER	SYMBOL	MIN	MAX	UNIT	
Collector-Base Breakdown Voltage <i>I_C = 10 μA I_E = 0</i>	V _{(BR)CBO}	60	-	V	
Collector-Emitter Breakdown Voltage <i>I_C = 1 mA I_B = 0</i>	V _{(BR)CEO}	40	-	V	
Emitter-Base Breakdown Voltage <i>I_E = 10 μA I_C = 0</i>	V _{(BR)EBO}	6	-	V	
Collector Cut-off Current <i>V_{CB} = 60 V I_E = 0</i>	I _{CBO}	-	0.1	μA	
Collector Cut-off Current <i>V_{CE} = 30 V V_{BE(OFF)} = 3 V</i>	I _{CEO}	-	50	nA	
Emitter Cut-off Current <i>V_{EB} = 5 V I_C = 0</i>	I _{EBO}	-	0.1	μA	
DC Current Gain	h _{FE}	<i>V_{CE} = 1 V I_C = 10 mA</i>	100	400	
		<i>V_{CE} = 1 V I_C = 50 mA</i>	60	-	
		<i>V_{CE} = 1 V I_C = 100 mA</i>	30	-	
Collector-Emitter Saturation Voltage <i>I_C = 50 mA I_B = 5 mA</i>	V _{CE(sat)}	-	0.3	V	
Base-Emitter Saturation Voltage <i>I_C = 50 mA I_B = 5 mA</i>	V _{BE(sat)}	-	0.95	V	
Transition frequency <i>V_{CE} = 20 V I_C = 10 mA f = 100MHz</i>	f _T	250	-	MHz	
Delay time	t _d	V _{CC} = 3 V V _{BE} = 0.5 V I _C = 10 mA	-	35	ns
Rise time			t _r	-	35
Storage time	t _s	V _{CC} = 3 V I _C = 10 mA	-	200	ns
Fall time			t _f	-	50

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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

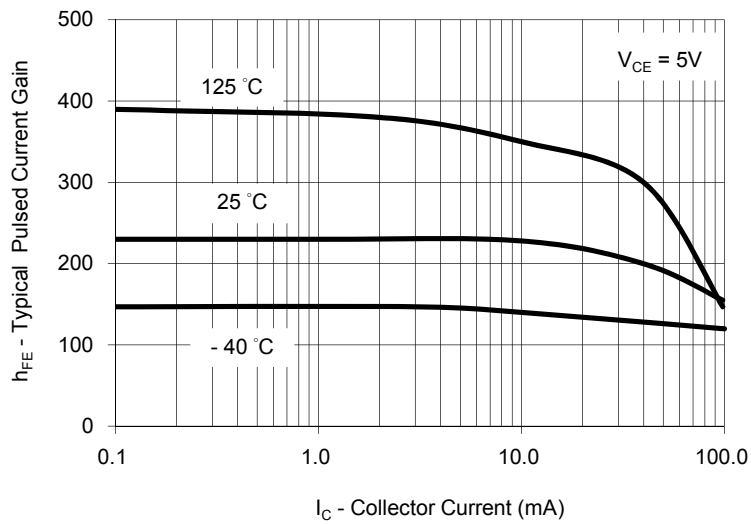


Fig. 2 Collector-Emitter Saturation Voltage vs. Collector Current

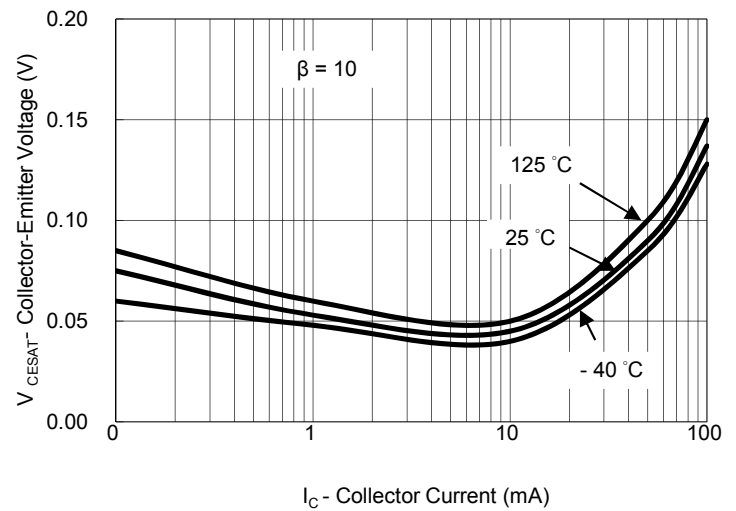


Fig. 3 Base-Emitter Saturation Voltage vs. Collector Current

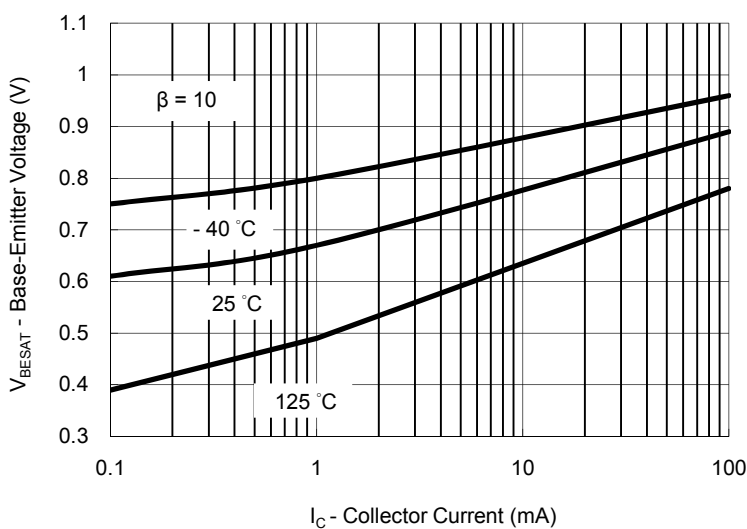


Fig. 4 Base-Emitter On Voltage vs. Collector Current

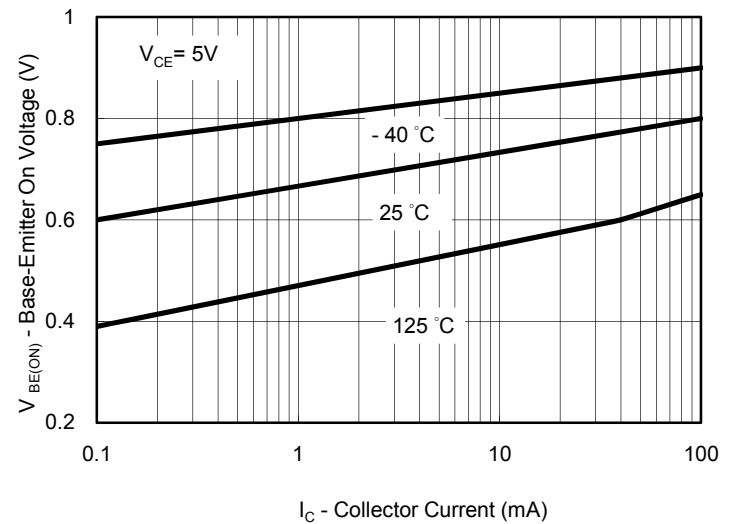


Fig. 5 Collector-Cutoff Current vs. Ambient Temperature

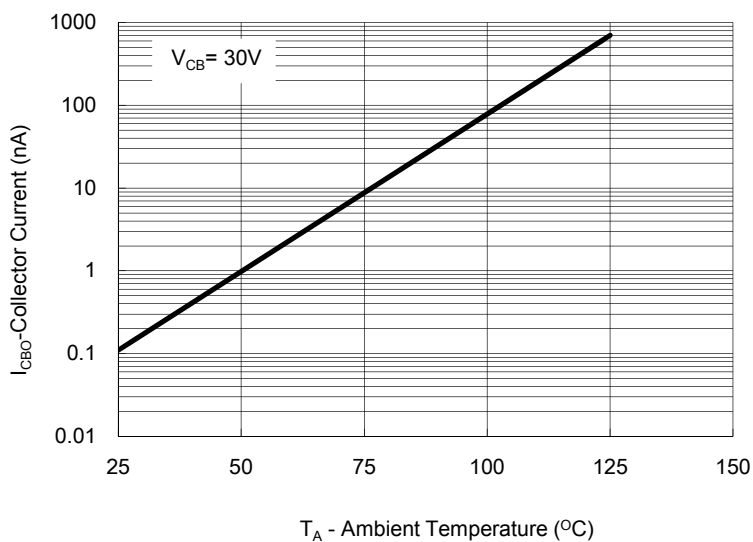
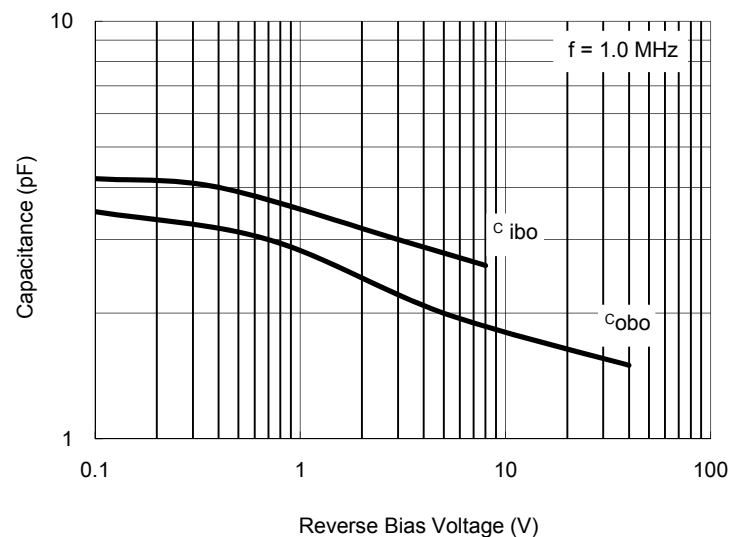


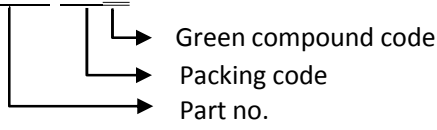
Fig. 6 Capacitance vs. Reverse Bias Voltage



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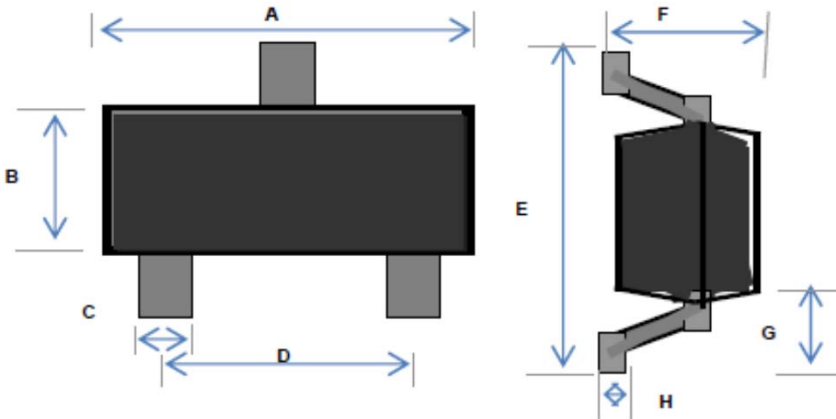
ORDER INFORMATION (EXAMPLE)

MMBT3904L RFG



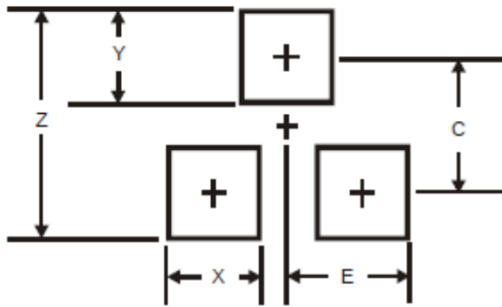
PACKAGE OUTLINE DIMENSIONS

SOT-23



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	2.90	0.114
X	0.80	0.031
Y	0.90	0.035
C	2.00	0.079
E	1.35	0.053

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