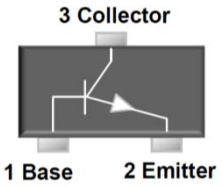
Small Signal Product

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



Pb-Free

RoHS COMPLIANT

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℃ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Power Dissipation	P_D	300	mW
Collector-Base Voltage	V_{CBO}	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_C = 10 μA	I_E = 0	$V_{(BR)CBO}$	60	-	V
Collector-Emitter Breakdown Voltage		I_C = 1 mA	I_B = 0	$V_{(BR)CEO}$	40	-	V
Emitter-Base Breakdown Voltage		I_E = 10 μA	I_C = 0	$V_{(BR)EBO}$	6	-	V
Collector Cut-off Current		V_{CB} = 60 V	I_E = 0	I_{CBO}	-	0.1	μA
Collector Cut-off Current		V_{CE} = 30 V	$V_{BE(OFF)}$ = 3 V	I_{CEO}	-	50	nA
Emitter Cut-off Current		V_{EB} = 5 V	I_C = 0	I_{EBO}	-	0.1	μA
DC Current Gain		V_{CE} = 1 V	I_C = 10 mA	h_{FE}	100	400	
		V_{CE} = 1 V	I_C = 50 mA		60	-	
		V_{CE} = 1 V	I_C = 100 mA		30	-	
Collector-Emitter Saturation Voltage		I_C = 50 mA	I_B = 5 mA	$V_{CE(sat)}$	-	0.3	V
Base-Emitter Saturation Voltage		I_C = 50 mA	I_B = 5 mA	$V_{BE(sat)}$	-	0.95	V
Transition frequency	V_{CE} = 20 V	I_C = 10 mA	f= 100MHz	f_T	250	-	MHz
Delay time	V_{CC} = 3 V	V_{BE} = 0.5 V	I_C = 10 mA	t_d	-	35	ns
Rise time			I_{B1} = 1.0 mA	t_r	-	35	ns
Storage time		V_{CC} = 3 V	I_C = 10 mA	t_s	-	200	ns
Fall time		I_{B1} = I_{B2} = 1.0 mA		t_f	-	50	ns

RATINGS AND CHARACTERISTICS CURVES

(T_A=25°C unless otherwise noted)

Fig.1 Typical Pulsed Current Gain vs. Collector Current

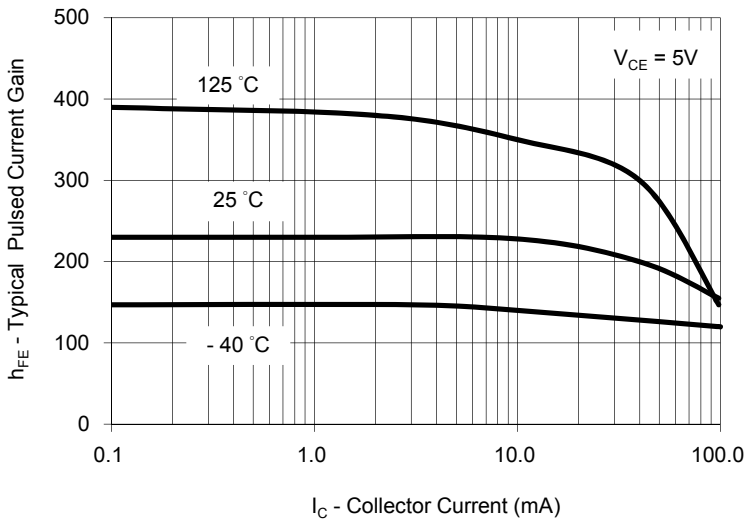


Fig. 2 Collector-Emitter Saturation Voltage vs. Collector Current

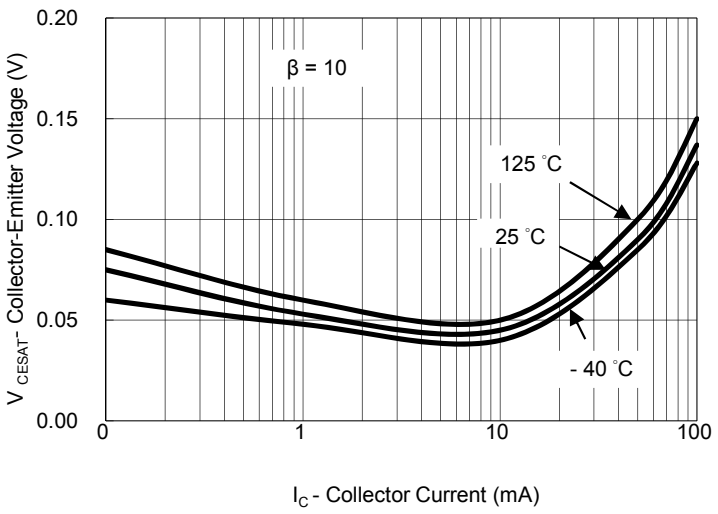


Fig. 3 Base-Emitter Saturation Voltage vs. Collector Current

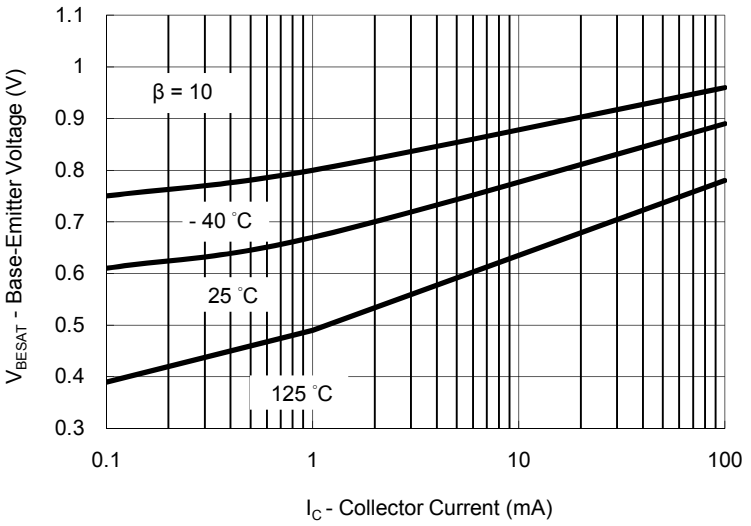


Fig. 4 Base-Emitter On Voltage vs. Collector Current

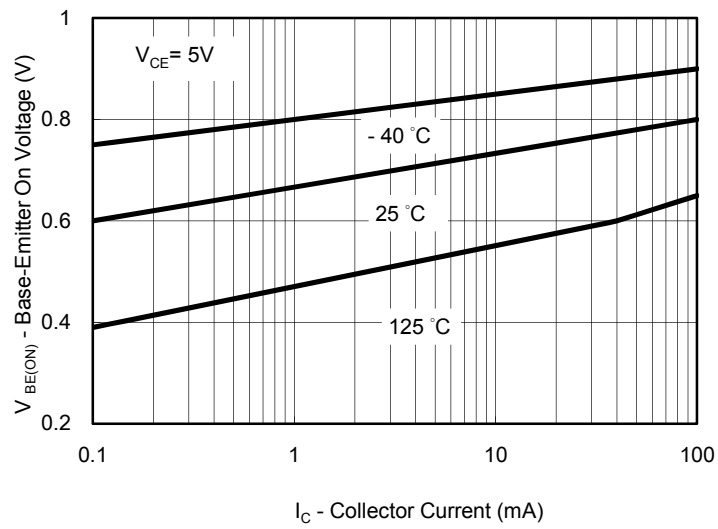


Fig. 5 Collector-Cutoff Current vs. Ambient Temperature

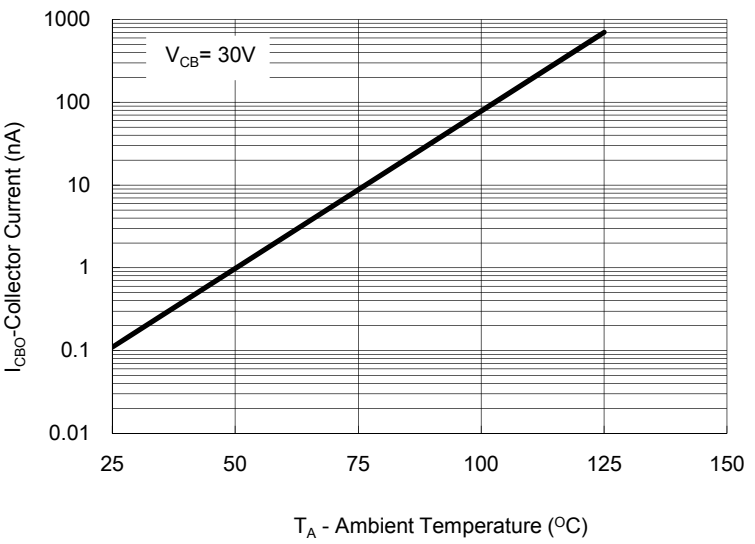
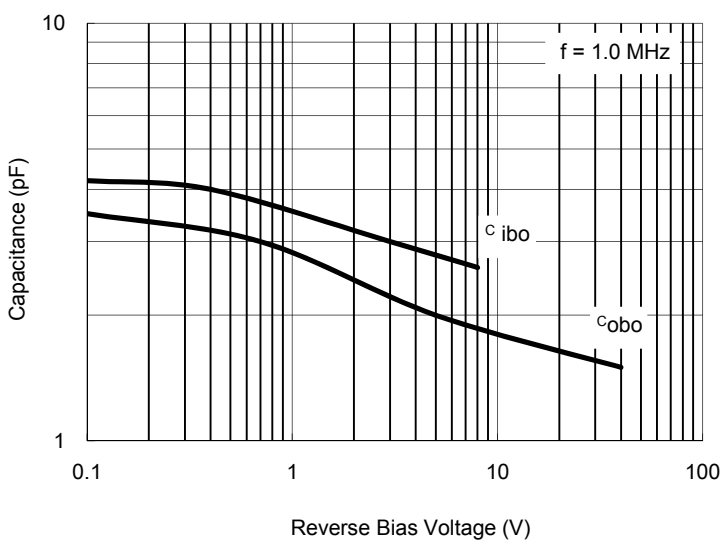


Fig. 6 Capacitance vs. Reverse Bias Voltage



Small Signal Product

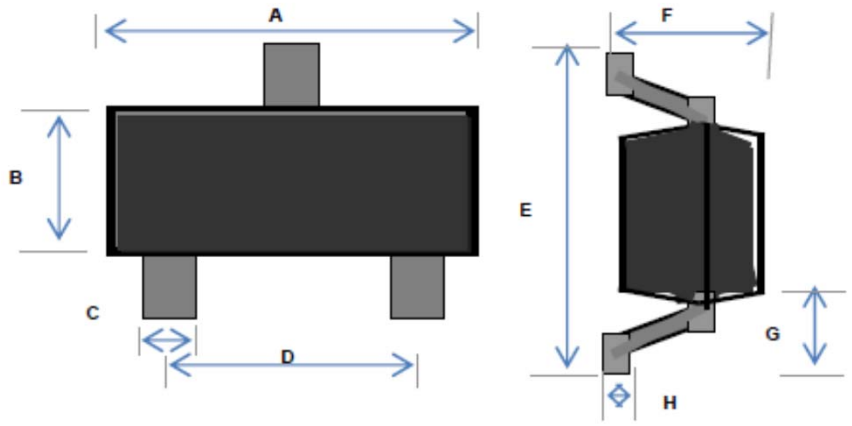
ORDER INFORMATION (EXAMPLE)

MMBT3904L RFG

- RFG → Green compound code
- R → Packing code
- MMBT3904L → Part no.

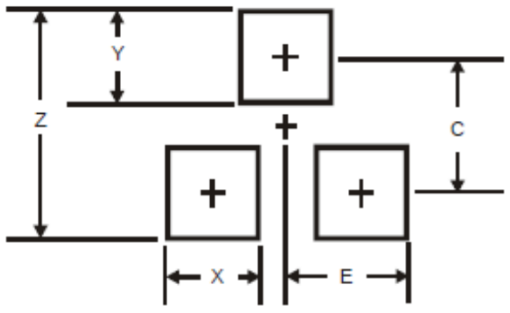
PACKAGE OUTLINE DIMENSIONS

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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