

-40V, PNP General-Purpose Transistor

FEATURES

- Complementary NPN Type: MMBT3904T
- Epitaxial Planar Type
- $V_{CEO} > -40V$
- $I_C = -200mA$ Collector Current
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free

KEY PERFORMANCE PARAMETERS

PARAMETER		VALUE	UNIT
V_{CBO}		-40	V
V_{CEO}		-40	V
I_C		-200	mA
$V_{CE(sat)}$	$I_C = 10mA, I_B = 1mA$	-0.25	V

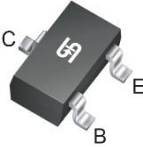
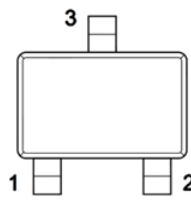
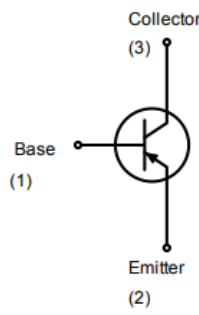
APPLICATION

- Consumer electronics
- Low frequency amplifier
- Driver

MECHANICAL DATA

- Case: SOT-523
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 1A whisker test
- Weight: 2.00mg (approximately)



PACKAGE: SOT-523	PIN CONFIGURATION	CIRCUIT DIAGRAM
		

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-200	mA
Power Dissipation	P_D	150	mW
Junction temperature	T_J	-55 to +150	$^\circ C$
Storage temperature	T_{STG}	-55 to +150	$^\circ C$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	TYP	UNIT
Junction-to-ambient thermal resistance	$R_{\theta JA}$	403	°C/W

Thermal Performance Note: Units mounted on PCB (10mm x 5mm Cu pad test board)

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

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static ⁽¹⁾						
Collector-Emitter Breakdown Voltage	I _C = -1.0mA, I _B = 0A	V _{(BR)CEO}	-40	-	-	V
Collector-Base Breakdown Voltage	I _C = -10μA, I _E = 0A	V _{(BR)CBO}	-40	-	-	V
Emitter-Base Breakdown Voltage	I _E = -10μA, I _C = 0A	V _{(BR)EBO}	-5	-	-	V
Emitter Cut-Off Current	V _{CB} = -30V, I _E = 0A	I _{CBO}	-	-	-50	nA
Collector Cut-Off Current	V _{EB} = -5V, I _E = 0A	I _{EBO}	-	-	-50	nA
Collector-Emitter Saturation Voltage	I _C = -10mA, I _B = -1.0mA	V _{CE(sat)}			-0.25	V
	I _C = -50mA, I _B = -5.0mA				-0.4	V
Base-Emitter Saturation Voltage	I _C = -10mA, I _B = -1.0mA	V _{BE(sat)}	-0.65	-	-0.85	V
	I _C = -50mA, I _B = -5.0mA		-	-	-0.95	V
Output Capacitance	V _{CB} = -5.0V, I _E = 0, f = 1MHz	C _{obo}	-	-	4.5	pF
Input Capacitance	V _{EB} = -0.5V, I _C = 0, f = 1MHz	C _{ibo}	-	-	10	pF
DC Current Gain	I _C = -0.1mA, V _{CE} = -1.0V	h _{FE}	60	-	-	-
	I _C = -1.0mA, V _{CE} = -1.0V		80	-	-	
	I _C = -10mA, V _{CE} = -1.0V		100	-	300	
	I _C = -50mA, V _{CE} = -1.0V		60	-	-	
	I _C = -100mA, V _{CE} = -1.0V		30	-	-	
Dynamic ⁽²⁾						
Transition Frequency	I _C = -10mA, V _{CE} = -20V, f = 100MHz	f _T	250	-	-	MHz
Delay Time	V _{CC} = -3.0V, V _{BE(OFF)} = -0.5V I _C = -10mA, I _{B1} = -1.0mA	t _d	-	-	35	ns
Rise Time		t _r	-	-	35	ns
Storage Time	V _{CC} = -3.0V, I _C = -10mA I _{B1} = I _{B2} = -1.0mA	t _s	-	-	225	ns
Fail Tome		t _f	-	-	75	ns

Notes:

1. Pulse test: $\leq 380\mu\text{s}$, duty cycle $\leq 2\%$
2. For DESIGN AID ONLY, not subject to production testing

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
MMBT3906T RSG	SOT-523	3,000 / 7" Tape & Reel

CHARACTERISTICS CURVES

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

Fig.1 Collector-Emitter Saturation Voltage vs. Collector Current

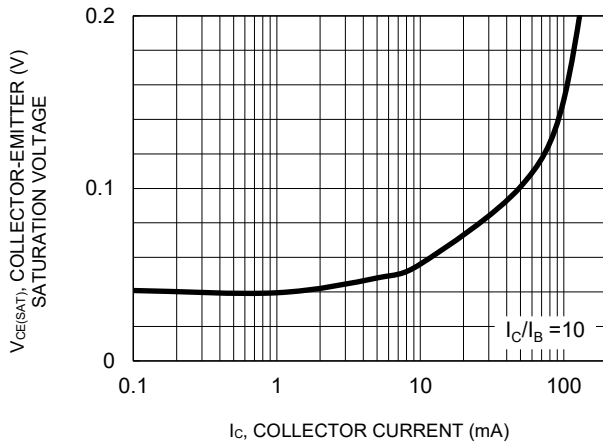


Fig.2 Base-Emitter Saturation Voltage vs. Collector Current

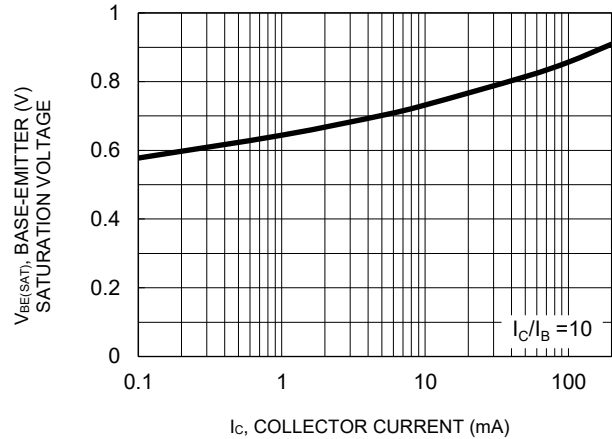


Fig.3 DC Current Gain vs. Collector Current

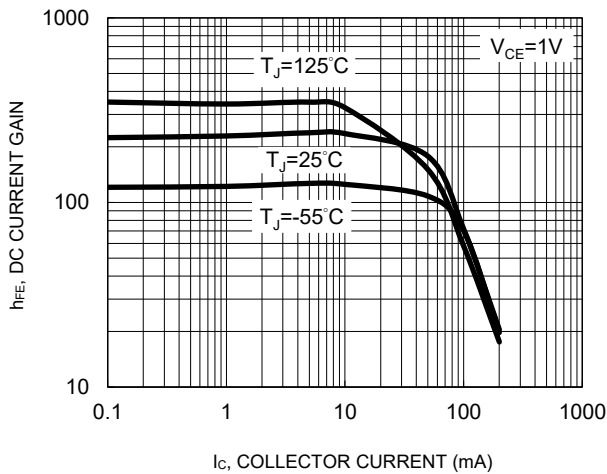


Fig.4 Collector-Base Capacitance vs. Bias Voltage

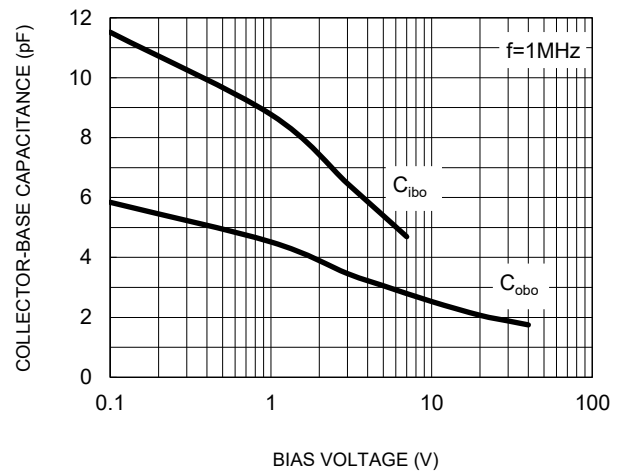
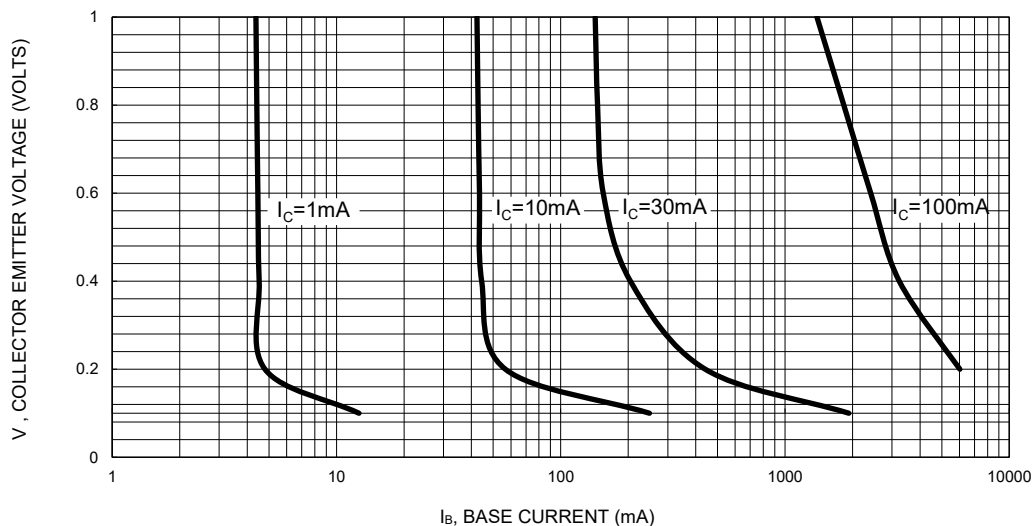
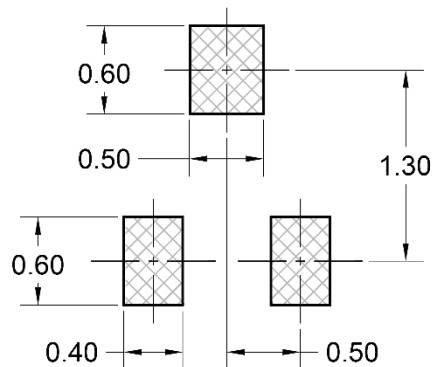
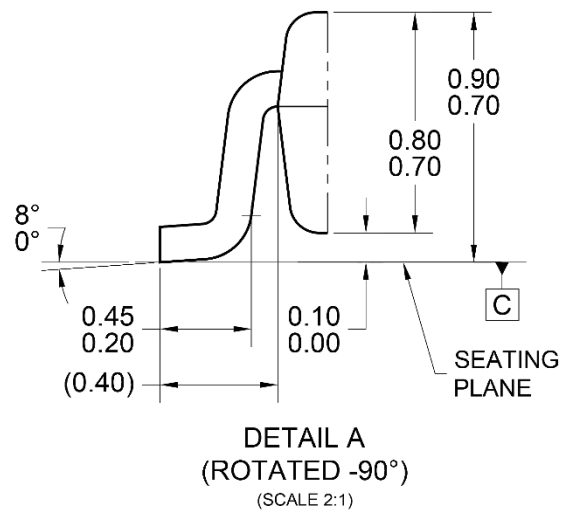
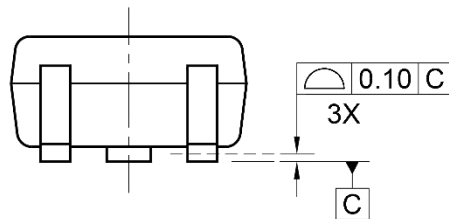
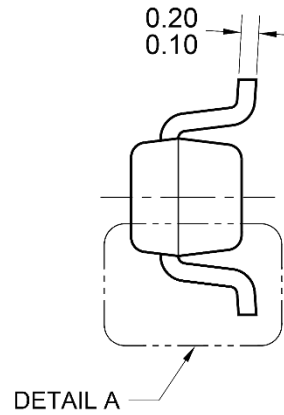
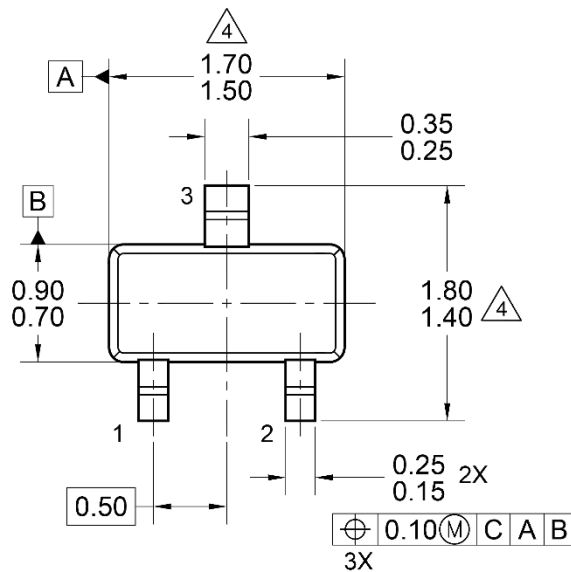


Fig.5 Collector Saturation Region



PACKAGE OUTLINE DIMENSIONS

SOT-523



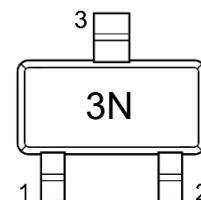
SUGGESTED PAD LAYOUT

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: EIAJ ED-7500A, SC-75.

4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

5. DWG NO. REF: HQ2SD07-SOT523-029 REV A.



MARKING DIAGRAM

3N = Device marking

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