

60V, NPN General-Purpose Transistor

FEATURES

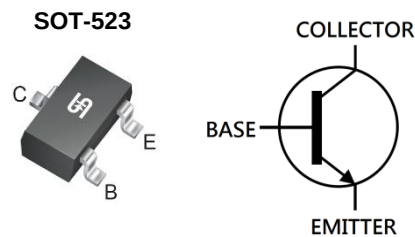
- Complementary PNP Type: MMBT3906T
- Epitaxial Planar Type
- $V_{CEO} > 40V$
- $I_C = 200mA$ Collector Current
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

KEY PERFORMANCE PARAMETERS

PARAMETER		VALUE	UNIT
V_{CBO}		60	V
V_{CEO}		40	V
I_C		200	mA
$V_{CE(sat)}$	$I_C = 10mA, I_B = 1mA$	0.2	V

APPLICATION

- Consumer electronics
- Low frequency amplifier
- Driver



Notes: MSL 1 (Moisture Sensitivity Level) per J-STD-020

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

PARAMETER	SYMBOL	VALUE	UNIT
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
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	$R_{\theta JA}$	397	$^\circ C/W$

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}	60	-	-	V
Emitter-Base Breakdown Voltage	I _E = 10μA, I _C = 0A	V _{(BR)EBO}	6	-	-	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)}	-	-	0.2	V
	I _C = 50mA, I _B = 5.0mA		-	-	0.3	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	pF
Input Capacitance	V _{EB} = 0.5V, I _C = 0, f = 1MHz	C _{ibo}	-	-	8	pF
DC Current Gain	I _C = 0.1mA, V _{CE} = 1.0V	h _{FE}	40	-	-	-
	I _C = 1.0mA, V _{CE} = 1.0V		70	-	-	
	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	300	-	-	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	-	-	200	ns
Fail Tome		t _f	-	-	50	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
MMBT3904T 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

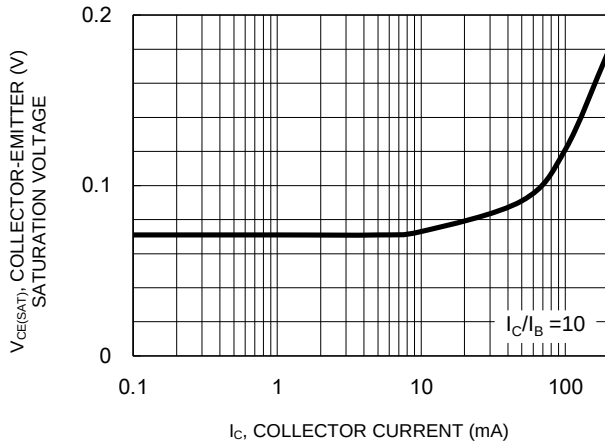


Fig.2 Base-Emitter Saturation Voltage vs. Collector Current

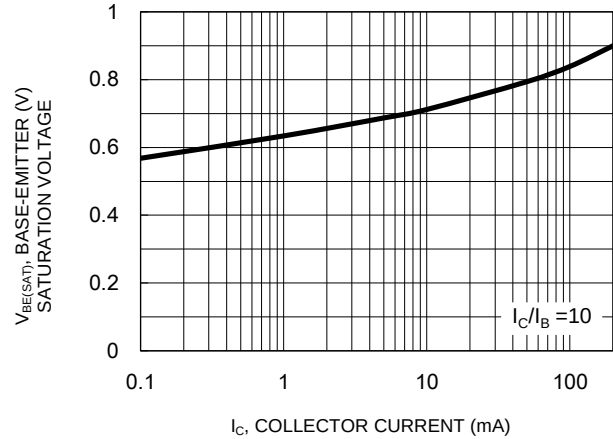


Fig.3 DC Current Gain vs. Collector Current

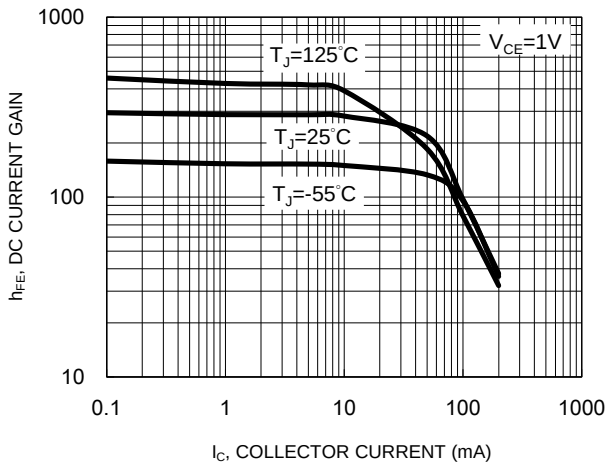


Fig.4 Input and Output Capacitance vs. Bias Voltage

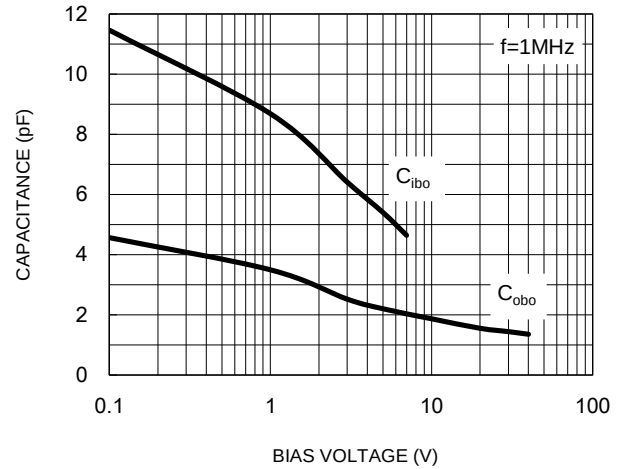
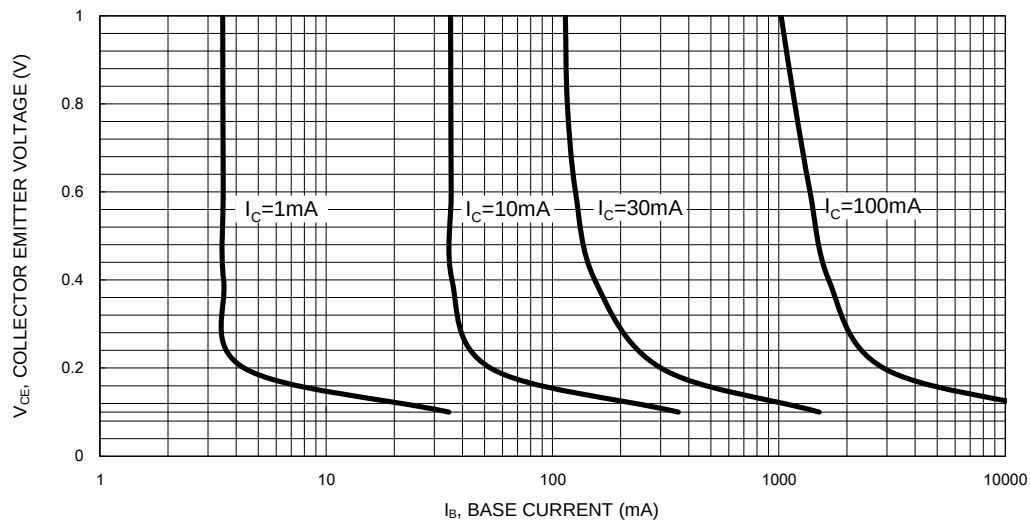
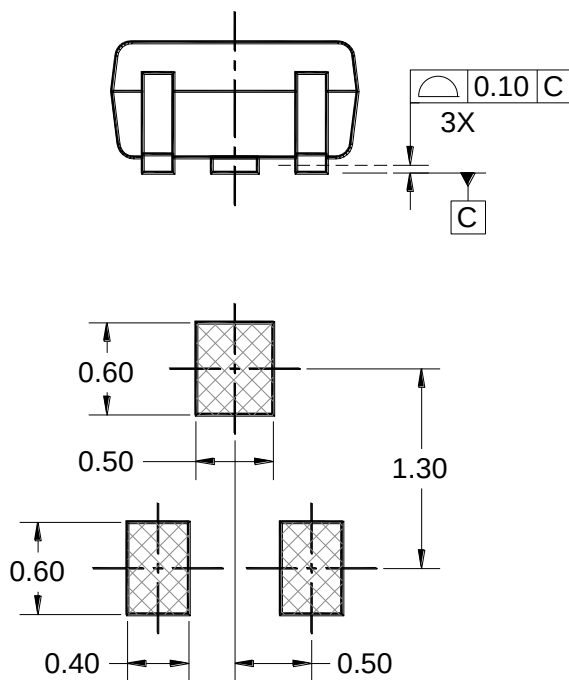
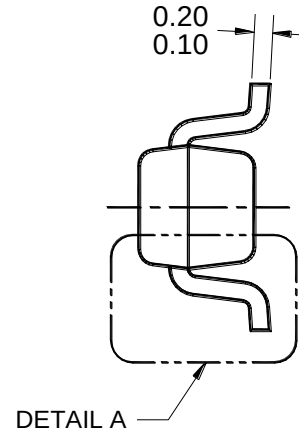
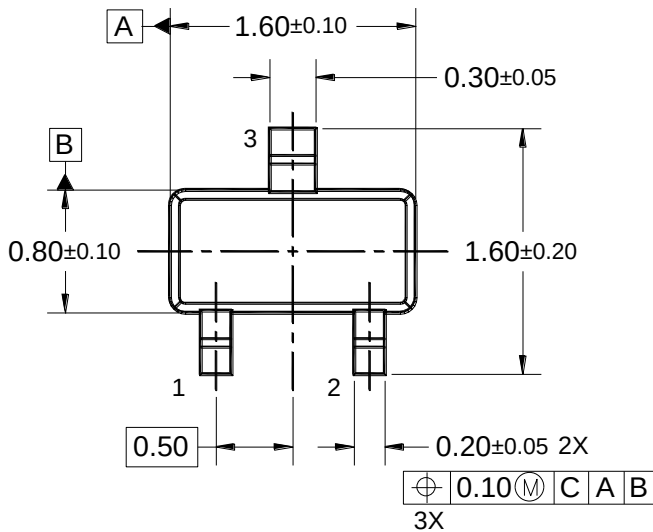


Fig.5 Collector Saturation Region

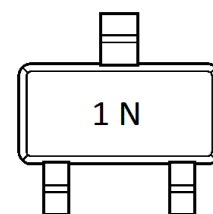
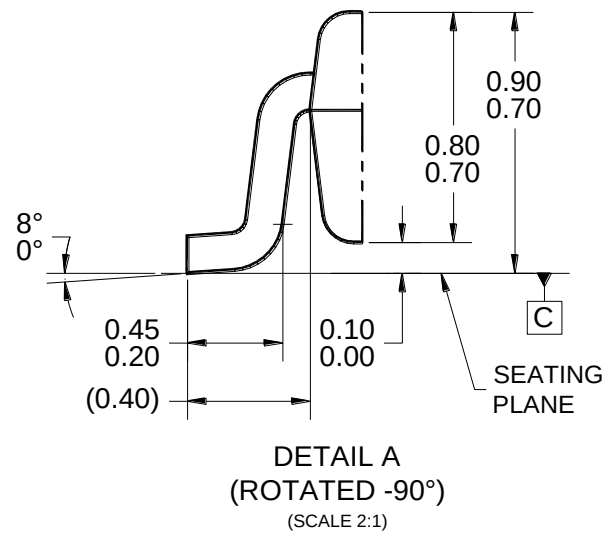


PACKAGE OUTLINE DIMENSIONS

SOT-523



SUGGESTED PAD LAYOUT



MARKING DIAGRAM

1N = MARKING CODE

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.

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