



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Features

- $BV_{CEO} > -40V$
- $I_C = -200mA$ Collector Current
- Epitaxial Planar Die Construction
- Ultra-Small Surface Mount Package
- Complementary NPN Type: MMBT3904T
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

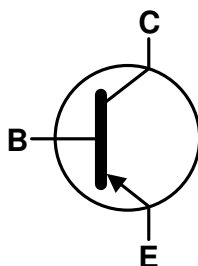
Mechanical Data

- Case: SOT523
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.002 grams (Approximate)

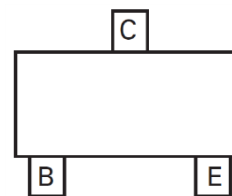
SOT523



Top View



Device Symbol



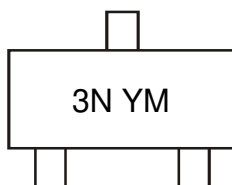
Pin-out Top View

Ordering Information (Note 4)

Product	Status	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
MMBT3906T-7-F	Active	AEC-Q101	3N	7	8	3,000
MMBT3906T-13-F	Active	AEC-Q101	3N	13	8	10,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



3N = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: D = 2016)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	C	D	E	F	G	H	I	J	K	L	M

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	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

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	150	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	833	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes: 5. For a device mounted with the collector lead on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

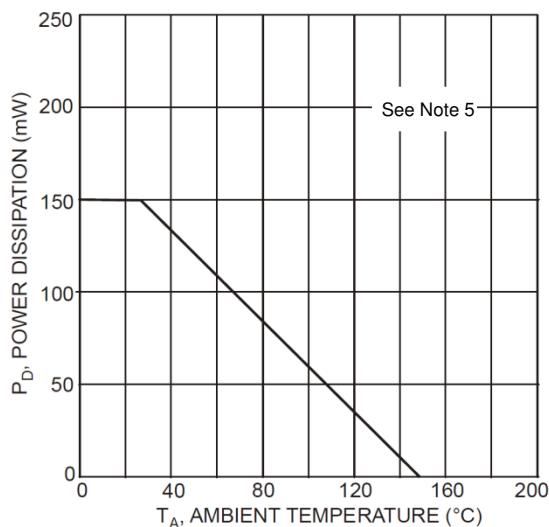
Thermal Characteristics and Derating Information


Fig. 1 Power Derating Curve

Electrical Characteristics (@T_A = +25°C unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)					
Collector-Base Breakdown Voltage	BV _{CBO}	-40	—	V	I _C = -10μA, I _E = 0
Collector-Emitter Breakdown Voltage	BV _{CEO}	-40	—	V	I _C = -1mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	-5	—	V	I _E = -10μA, I _C = 0
Collector Cutoff Current	I _{CEX}	—	-50	nA	V _{CE} = -30V, V _{EB(OFF)} = -3V
Base Cutoff Current	I _{BL}	—	-50	nA	V _{CE} = -30V, V _{EB(OFF)} = -3V
ON CHARACTERISTICS (Note 7)					
DC Current Gain	h _{FE}	60 80 100 60 30	— — 300 — —	—	I _C = -100μA, V _{CE} = -1V I _C = -1mA, V _{CE} = -1V I _C = -10mA, V _{CE} = -1V I _C = -50mA, V _{CE} = -1V I _C = -100mA, V _{CE} = -1V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	-0.25 -0.40	V	I _C = -10mA, I _B = -1mA I _C = -50mA, I _B = -5mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	-0.65 —	-0.85 -0.95	V	I _C = -10mA, I _B = -1mA I _C = -50mA, I _B = -5mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C _{obo}	—	4.5	pF	V _{CB} = -5V, f = 1.0MHz, I _E = 0
Input Capacitance	C _{ibo}	—	10	pF	V _{EB} = -0.5V, f = 1.0MHz, I _C = 0
Input Impedance	h _{ie}	2	12	kΩ	V _{CE} = -10V, I _C = -10mA, f = 1.0MHz
Voltage Feedback Ratio	h _{re}	0.1	10	x 10 ⁻⁴	
Small Signal Current Gain	h _{fe}	100	400	—	
Output Admittance	h _{oe}	3	60	μS	
Current Gain-Bandwidth Product	f _T	250	—	MHz	V _{CE} = -20V, I _C = -10mA, f = 100MHz
Noise Figure	NF	—	5	dB	V _{CC} = 5V, I _C = 100μA, R _S = 1kΩ, f = 1MHz
SWITCHING CHARACTERISTICS					
Delay Time	t _D	—	35	ns	V _{CC} = -3V, I _C = -10mA,
Rise Time	t _R	—	35	ns	V _{BE(OFF)} = -0.5V, I _{B1} = -1mA
Storage Time	t _S	—	225	ns	V _{CC} = -3.0V, I _C = -10mA
Fall Time	t _F	—	75	ns	I _{B1} = -I _{B2} = -1.0mA

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

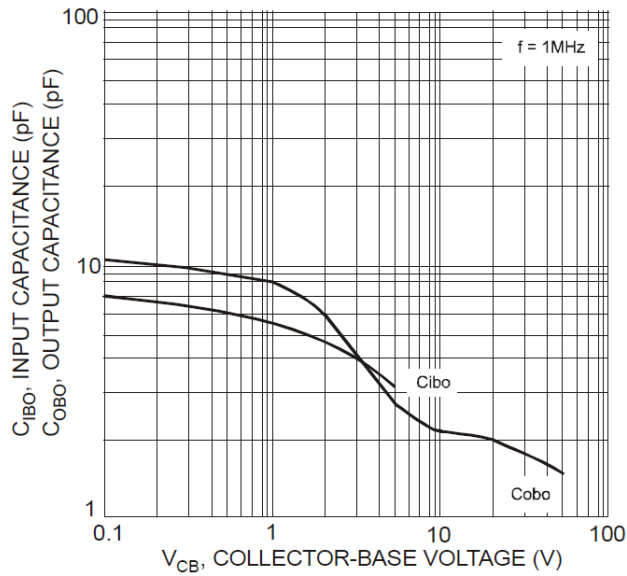


Fig. 2 Typical Input and Output Capacitance vs. Collector-Base Voltage

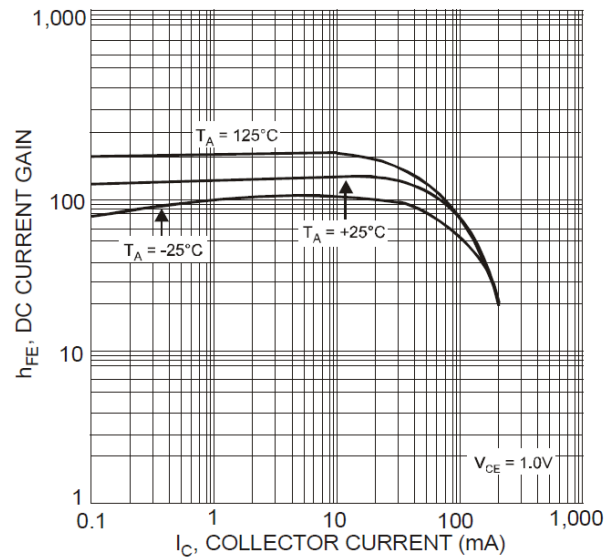


Fig. 3 Typical DC Current Gain vs. Collector Current

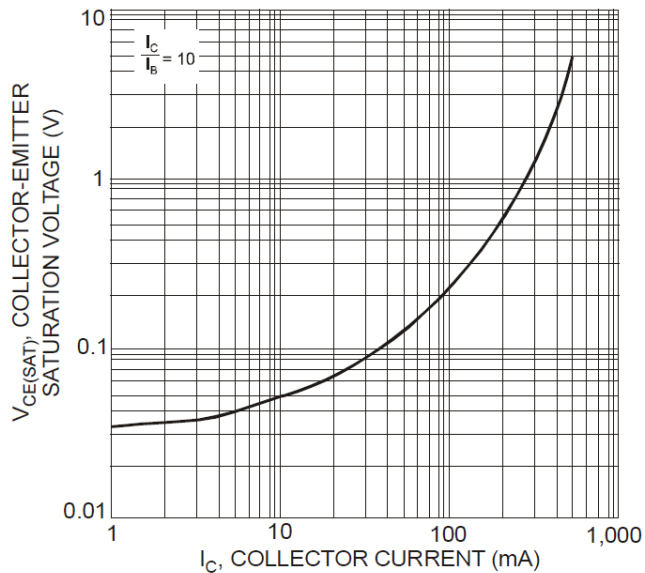


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

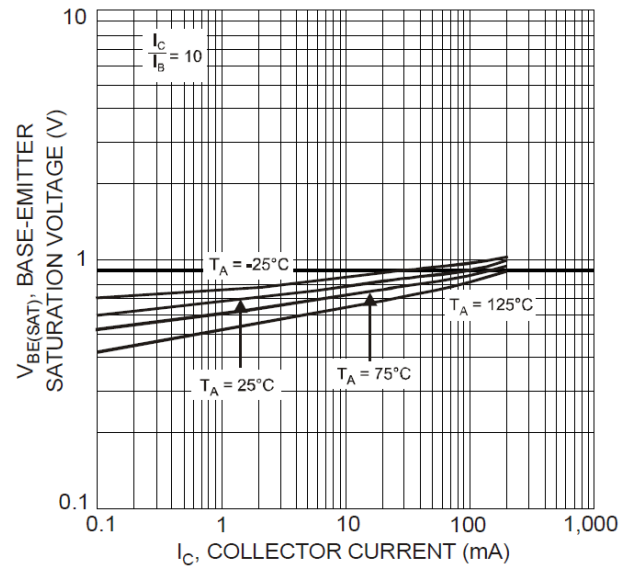
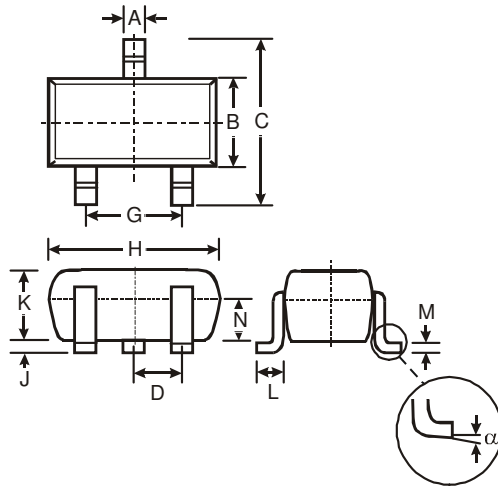


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

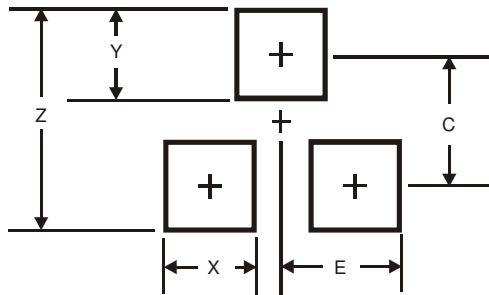
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



Dimensions	Value (in mm)
Z	1.8
X	0.4
Y	0.51
C	1.3
E	0.7

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