

# MMJT350T1G

## Bipolar Power Transistors

### PNP Silicon

Bipolar power transistors are designed for use in line-operated applications such as low power, line-operated series pass and switching regulators requiring PNP capability.

#### Features

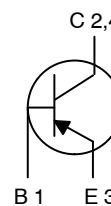
- High Collector–Emitter Sustaining Voltage
- Excellent DC Current Gain
- Epoxy Meets UL 94 V–0 @ 0.125 in
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant\*



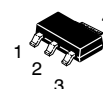
**ON Semiconductor®**

<http://onsemi.com>

**0.5 AMPERE  
POWER TRANSISTOR  
PNP SILICON  
300 VOLTS, 2.75 WATTS**

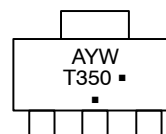


**Schematic**



**SOT–223  
CASE 318E  
STYLE 1**

#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
W = Work Week  
■ = Pb–Free Package  
T350 = Device Code

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MMJT350T1G	SOT–223 (Pb–Free)	1,000 / Tape & Reel
SMMJT350T1G	SOT–223 (Pb–Free)	1,000 / Tape & Reel

\*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MMJT350T1G

## MAXIMUM RATINGS (T<sub>C</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	300	Vdc
Collector–Base Voltage	V <sub>CB</sub>	300	Vdc
Emitter–Base Voltage	V <sub>EB</sub>	5.0	Vdc
Collector Current – Continuous	I <sub>C</sub>	0.5	Adc
Collector Current – Peak	I <sub>CM</sub>	0.75	Adc
Total Power Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C Total P <sub>D</sub> @ T <sub>A</sub> = 25°C mounted on 1" sq. (645 sq. mm) Collector pad on FR–4 bd material Total P <sub>D</sub> @ T <sub>A</sub> = 25°C mounted on 0.012" sq. (7.6 sq. mm) Collector pad on FR–4 bd material	P <sub>D</sub>	2.75 22 1.40 0.65	W mW/°C W W
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	–55 to +150	°C
ESD – Human Body Model	HBM	3B	V
ESD – Machine Model	MM	C	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction–to–Case Junction–to–Ambient on 1" sq. (645 sq. mm) Collector pad on FR–4 bd material Junction–to–Ambient on 0.012" sq. (7.6 sq. mm) Collector pad on FR–4 bd material	R <sub>θJC</sub> R <sub>θJA</sub> R <sub>θJA</sub>	45 85 190	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T <sub>L</sub>	260	°C

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

### OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage (I <sub>C</sub> = 1.0 mAdc, I <sub>B</sub> = 0 Adc)	V <sub>CEO(SUS)</sub>	300	–	Vdc
Collector–Base Current (V <sub>CB</sub> = Rated V <sub>CBO</sub> , V <sub>EB</sub> = 0)	I <sub>CBO</sub>	–	100	nAdc
Emitter Cut–off Current (V <sub>BE</sub> = 5.0 Vdc)	I <sub>EBO</sub>	–	100	nAdc

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 10 Vdc)	h <sub>FE</sub>	30 20	240 –	–
----------------------------------------------------------------------------------------------------------------------------------	-----------------	----------	----------	---

# MMJT350T1G

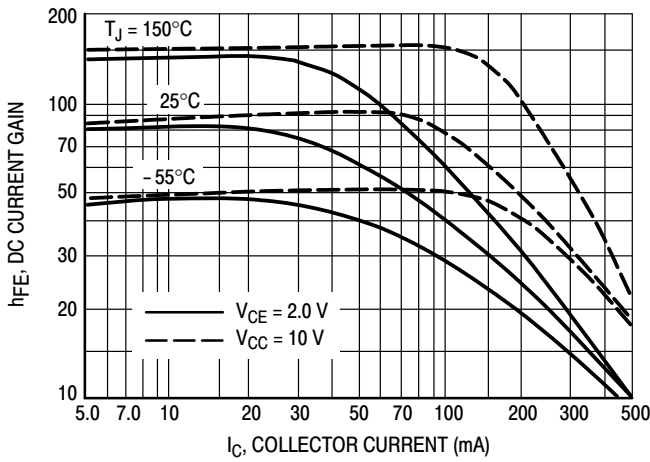


Figure 1. DC Current Gain

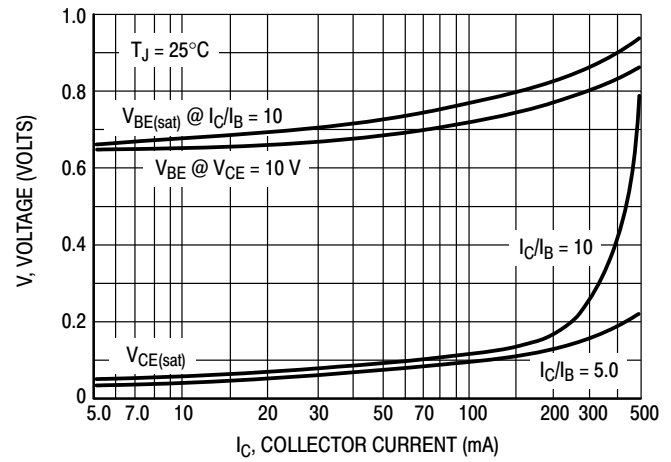


Figure 2. "On" Voltages

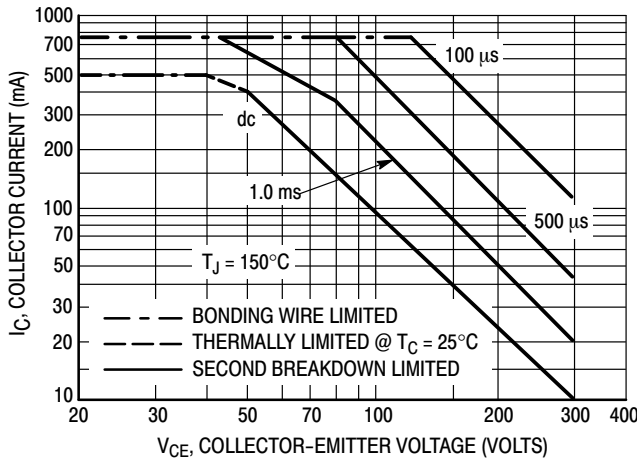


Figure 3. Active-Region Safe Operating Area

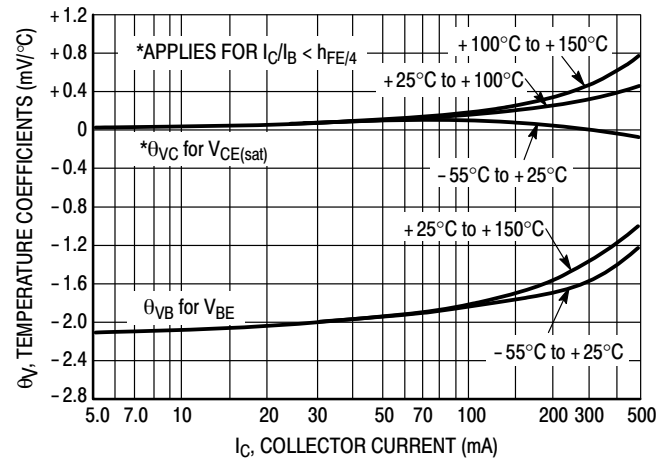


Figure 4. Temperature Coefficients

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 3 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

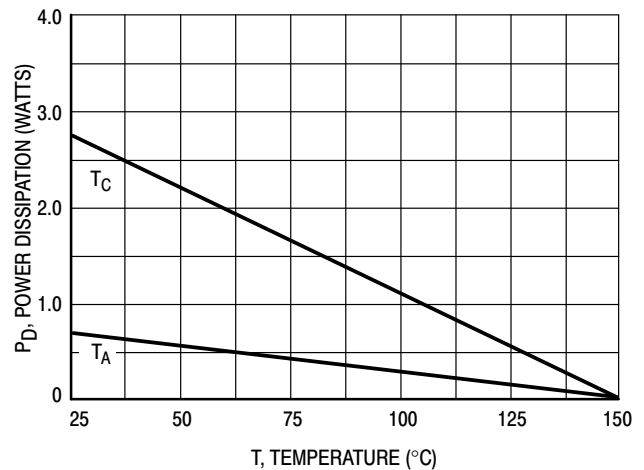
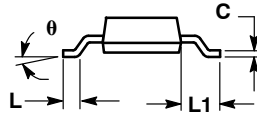
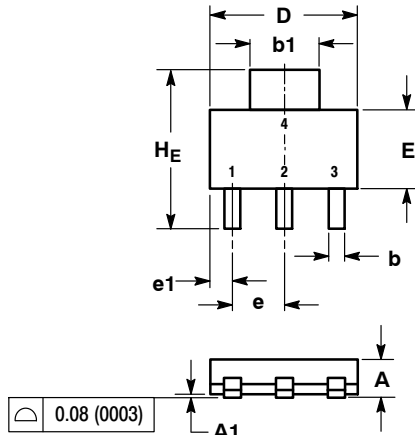


Figure 5. Power Derating

# MMJT350T1G

## PACKAGE DIMENSIONS

SOT-223 (TO-261)  
CASE 318E-04  
ISSUE N



### NOTES:

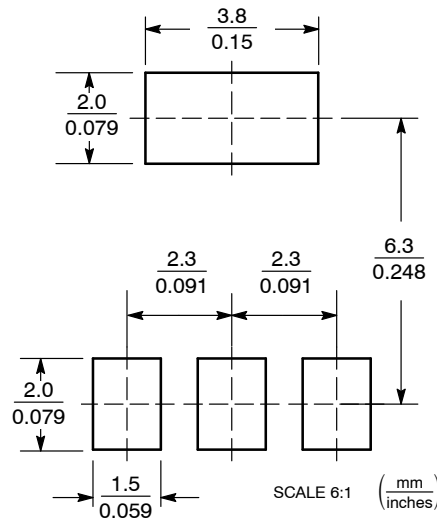
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L	0.20	---	---	0.008	---	---
L1	1.50	1.75	2.00	0.060	0.069	0.078
H_E	6.70	7.00	7.30	0.264	0.276	0.287
θ	0°	—	10°	0°	—	10°

### STYLE 1:

- PIN 1: BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

#### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada  
Europe, Middle East and Africa Technical Support:  
Phone: 421 33 790 2910  
Japan Customer Focus Center  
Phone: 81-3-5817-1050

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

MMJT350T1/D