

# MMJT350T1

## 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

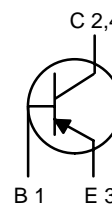
- High Collector–Emitter Sustaining Voltage –  
 $V_{CEO(sus)} = 300 \text{ Vdc @ } I_C = 1.0 \text{ mAdc}$
- Excellent DC Current Gain –  
 $h_{FE} = 30\text{--}240 @ I_C = 50 \text{ mAdc}$
- Epoxy Meets UL 94 V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B; > 8000 V  
Machine Model, C; > 400 V
- Pb-Free Package is Available



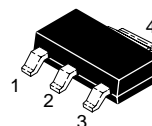
**ON Semiconductor®**

<http://onsemi.com>

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

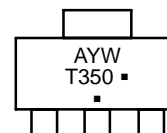


Schematic



**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†
MMJT350T1	SOT-223	1000 / Tape & Reel
MMJT350T1G	SOT-223 (Pb-Free)	1000 / Tape & Reel

†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.

# MMJT350T1

## MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	300	Vdc
Collector–Base Voltage	$V_{CB}$	300	Vdc
Emitter–Base Voltage	$V_{EB}$	3.0	Vdc
Collector Current – Continuous – Peak	$I_C$	0.5 0.75	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ Total $P_D$ @ $T_A = 25^\circ\text{C}$ mounted on 1" sq. (645 sq. mm) Collector pad on FR–4 bd material Total $P_D$ @ $T_A = 25^\circ\text{C}$ mounted on 0.012" sq. (7.6 sq. mm) Collector pad on FR–4 bd material	$P_D$	2.75 22 1.40 0.65	W mW/ $^\circ\text{C}$ W W
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

## 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	$R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$	45 85 190	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	$T_L$	260	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage ( $I_C = 1.0$ mAdc, $I_B = 0$ Adc)	$V_{CEO(SUS)}$	300	–	Vdc
Collector–Base Current ( $V_{CB} = \text{Rated } V_{CBO}, V_{EB} = 0$ )	$I_{CBO}$	–	100	$\mu\text{Adc}$
Emitter Cut–off Current ( $V_{BE} = 5.0$ Vdc)	$I_{EBO}$	–	100	$\mu\text{Adc}$

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 50$ mAdc, $V_{CE} = 10$ Vdc) ( $I_C = 100$ mAdc, $V_{CE} = 10$ Vdc)	$h_{FE}$	30 20	240 –	–
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# MMJT350T1

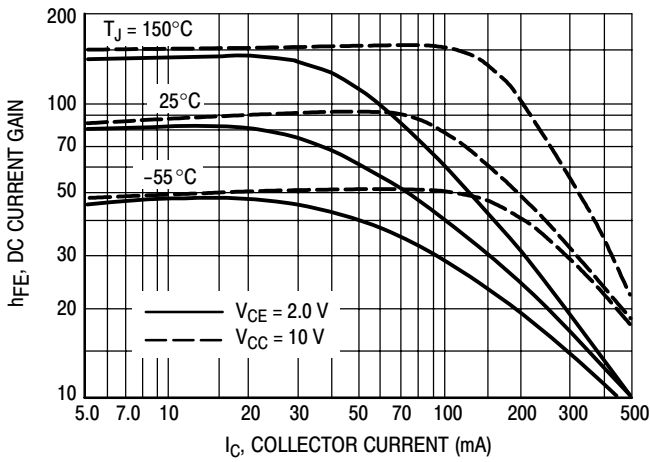


Figure 1. DC Current Gain

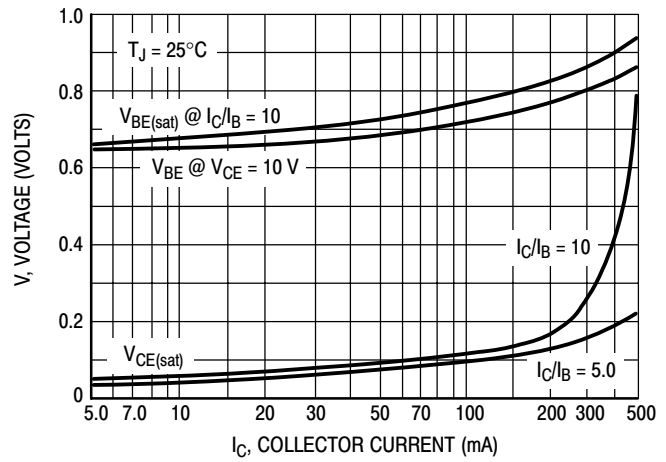


Figure 2. "On" Voltages

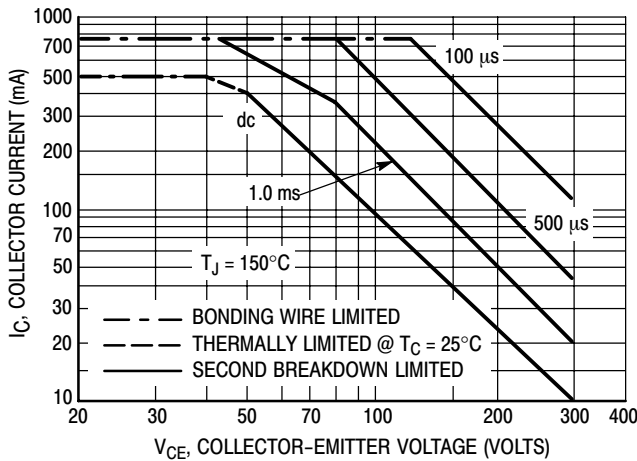


Figure 3. Active-Region Safe Operating Area

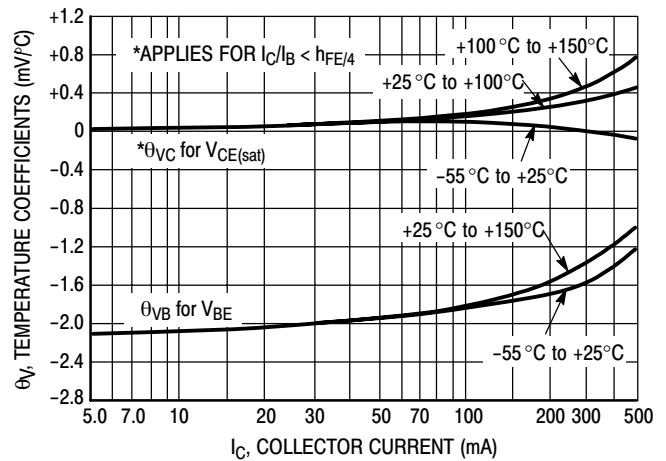


Figure 4. Temperature Coefficients

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.

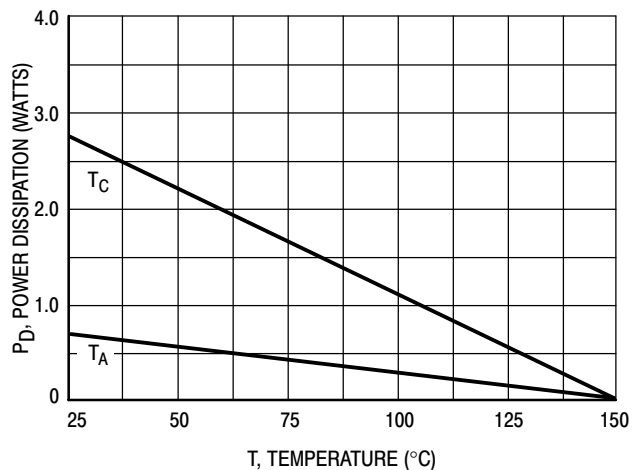
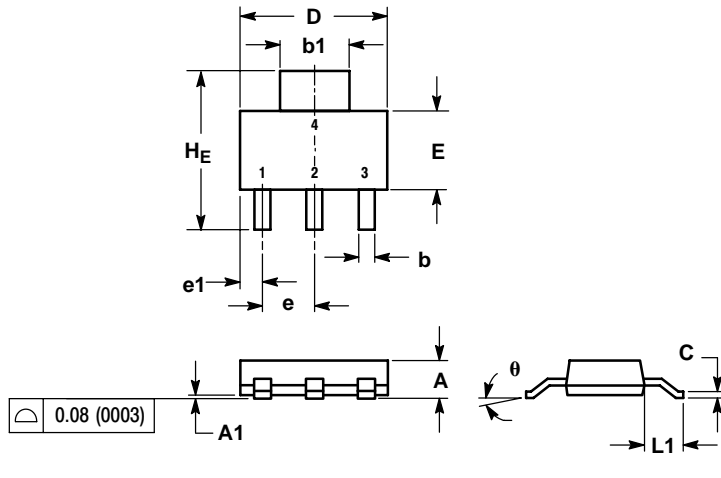


Figure 5. Power Derating

# MMJT350T1

## PACKAGE DIMENSIONS

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

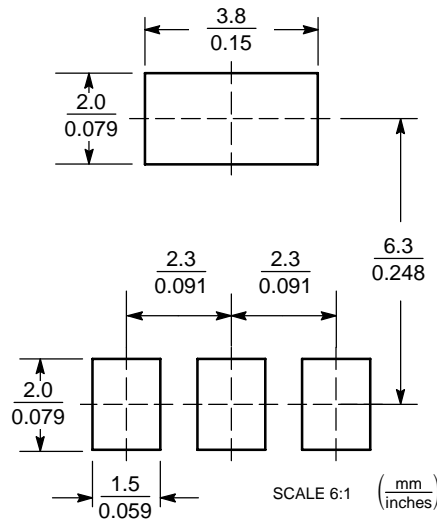


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

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
L1	1.50	1.75	2.00	0.060	0.069	0.078
H	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.

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MMJT350T1/D