

# MMJT350T1

## Bipolar Power Transistors

### PNP Silicon

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

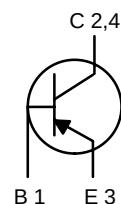
- High Collector-Emitter Sustaining Voltage –  
 $V_{CEO(sus)} = 300 \text{ Vdc @ } I_C$   
 $= 1.0 \text{ mAdc}$
- Excellent DC Current Gain –  
 $h_{FE} = 30-240 @ I_C$   
 $= 50 \text{ mAdc}$
- Epoxy Meets UL94, V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B; > 8000 V  
Machine Model, C; > 400 V



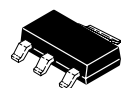
**ON Semiconductor®**

<http://onsemi.com>

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

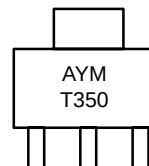


Schematic

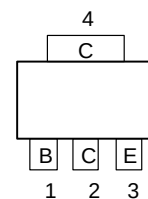


**SOT-223  
CASE 318E**  
Style 1

#### MARKING DIAGRAM



T350 = Specific Device Code  
A = Assembly Location  
Y = Last Digit of Year  
M = Month Code



Top View Pinout

#### ORDERING INFORMATION

| Device    | Package | Shipping           |
|-----------|---------|--------------------|
| MMJT350T1 | SOT-223 | 1000 / Tape & Reel |

# MMJT350T1

## 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>                   | 3.0                        | Vdc                  |
| Collector Current<br>– Continuous<br>– Peak                                                                                                                                                                                                                                                                | I <sub>C</sub>                    | 0.5<br>0.75                | Adc                  |
| Total Power Dissipation @ T <sub>C</sub> = 25°C<br>Derate above 25°C<br>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<br>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<br>22<br>1.40<br>0.65 | W<br>mW/°C<br>W<br>W |
| Operating and Storage Junction Temperature Range                                                                                                                                                                                                                                                           | T <sub>J</sub> , T <sub>stg</sub> | –55 to<br>+150             | °C                   |

## THERMAL CHARACTERISTICS

| Characteristic                                                                                                                                                                                                | Symbol                                                   | Max             | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------|------|
| Thermal Resistance – Junction to Case<br>– Junction-to–Ambient on 1" sq. (645 sq. mm) Collector pad on FR–4 bd material<br>– Junction-to–Ambient on 0.012" sq. (7.6 sq. mm) Collector pad on FR–4 bd material | R <sub>θJC</sub><br>R <sub>θJA</sub><br>R <sub>θJA</sub> | 45<br>85<br>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<br>(I <sub>C</sub> = 1.0 mAdc, I <sub>B</sub> = 0 Adc) | V <sub>CEO(SUS)</sub> | 300 | –   | Vdc  |
| Collector–Base Current<br>(V <sub>CB</sub> = Rated V <sub>CBO</sub> , V <sub>EB</sub> = 0)  | I <sub>CBO</sub>      | –   | 100 | μAdc |
| Emitter Cut–off Current<br>(V <sub>BE</sub> = 5.0 Vdc)                                      | I <sub>EBO</sub>      | –   | 100 | μAdc |

### ON CHARACTERISTICS (Note )

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

# MMJT350T1

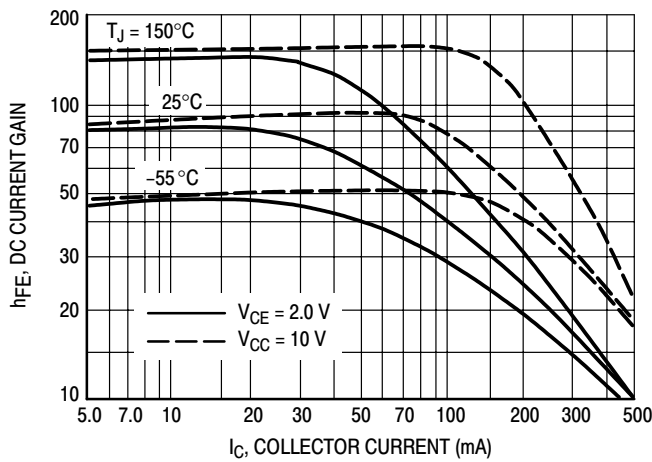


Figure 1. DC Current Gain

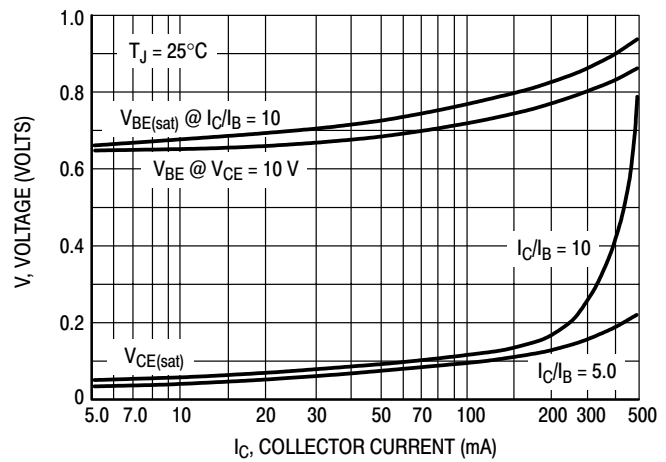


Figure 2. "On" Voltages

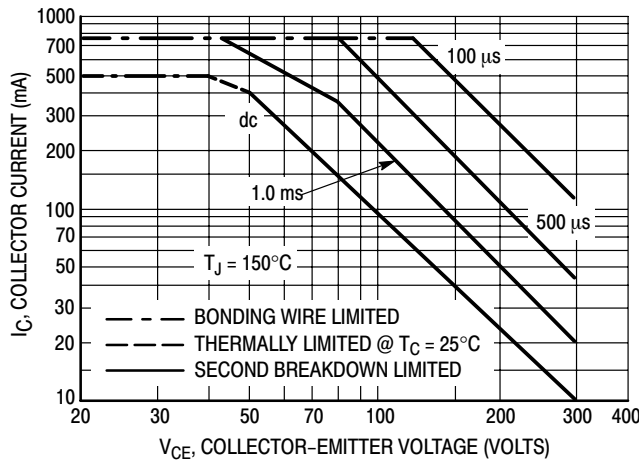


Figure 3. Active-Region Safe Operating Area

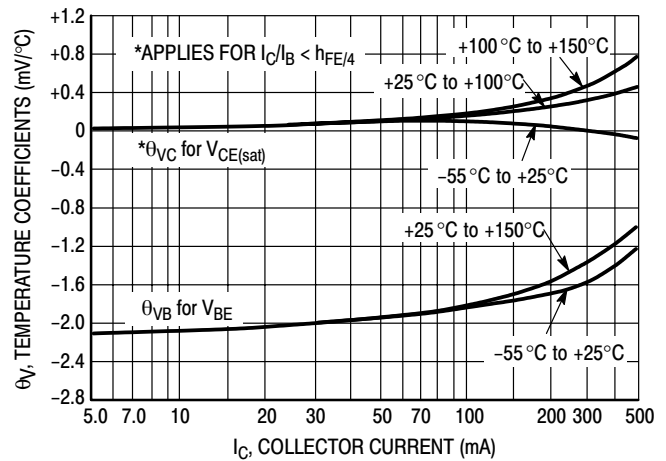


Figure 4. Temperature Coefficients

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.

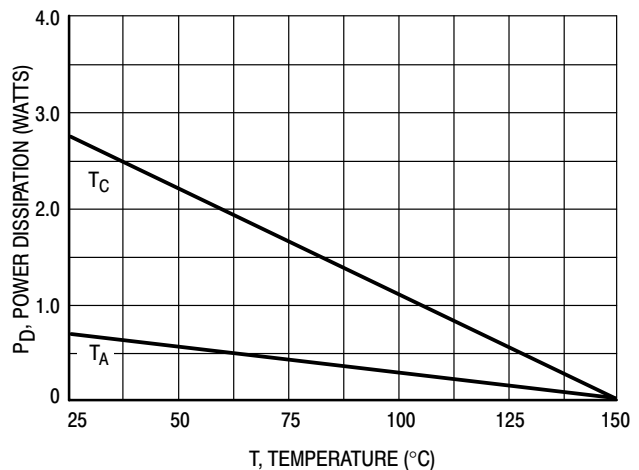
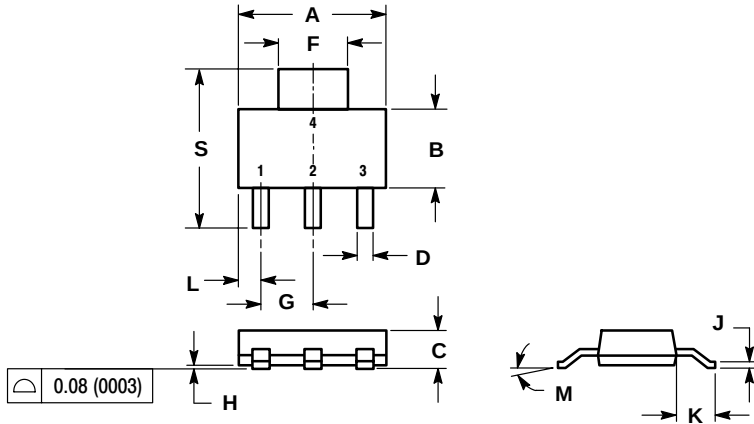


Figure 5. Power Derating

# MMJT350T1

## PACKAGE DIMENSIONS

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



### NOTES:

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

| DIM | INCHES |        | MILLIMETERS |       |
|-----|--------|--------|-------------|-------|
|     | MIN    | MAX    | MIN         | MAX   |
| A   | 0.249  | 0.263  | 6.30        | 6.70  |
| B   | 0.130  | 0.145  | 3.30        | 3.70  |
| C   | 0.060  | 0.068  | 1.50        | 1.75  |
| D   | 0.024  | 0.035  | 0.60        | 0.89  |
| F   | 0.115  | 0.126  | 2.90        | 3.20  |
| G   | 0.087  | 0.094  | 2.20        | 2.40  |
| H   | 0.0008 | 0.0040 | 0.020       | 0.100 |
| J   | 0.009  | 0.014  | 0.24        | 0.35  |
| K   | 0.060  | 0.078  | 1.50        | 2.00  |
| L   | 0.033  | 0.041  | 0.85        | 1.05  |
| M   | 0°     | 10°    | 0°          | 10°   |
| S   | 0.264  | 0.287  | 6.70        | 7.30  |

### STYLE 1:

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

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