

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

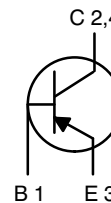
- High Collector-Emitter Sustaining Voltage -
 $V_{CEO(sus)} = 300 \text{ Vdc @ } I_C$
 $= 1.0 \text{ mAdc}$
- Excellent DC Current Gain -
 $h_{FE} = 30 - 240 @ I_C$
 $= 50 \text{ mAdc}$
- Epoxy Meets UL 94 V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B; > 8000 V
Machine Model, C; > 400 V
- Pb-Free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



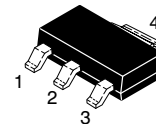
ON Semiconductor®

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

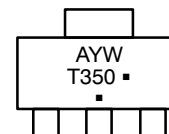


Schematic



**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}	5.0	Vdc
Collector Current - Continuous - Peak	I_C	0.5 0.75	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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	$^\circ\text{C}$

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.

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	nAdc
Emitter Cut-off Current ($V_{BE} = 5.0$ Vdc)	I_{EBO}	-	100	nAdc

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

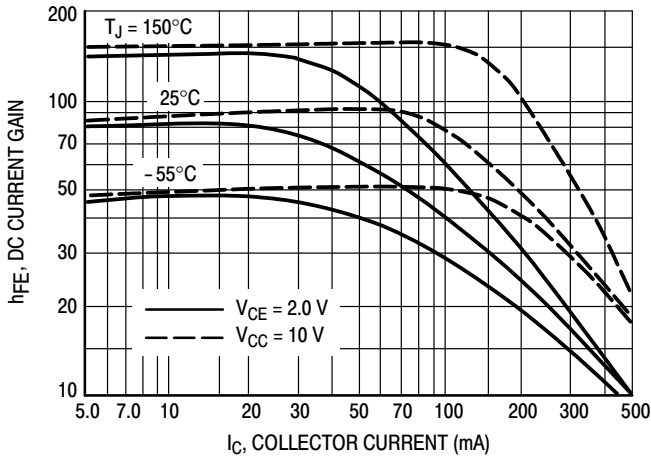


Figure 1. DC Current Gain

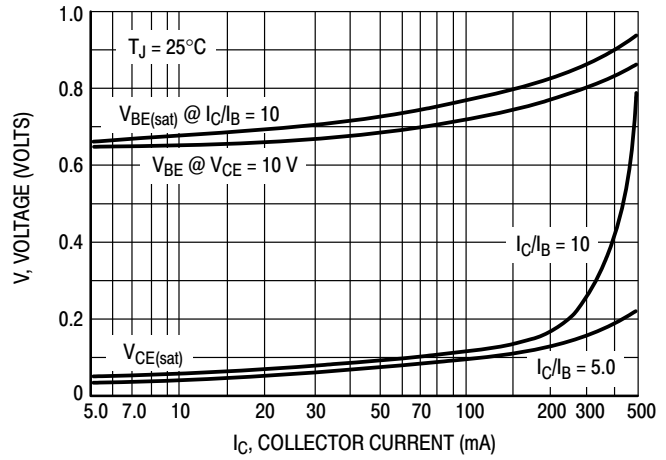


Figure 2. "On" Voltages

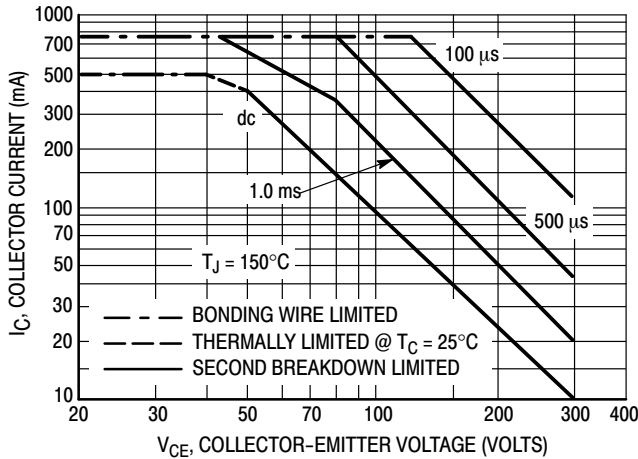


Figure 3. Active-Region Safe Operating Area

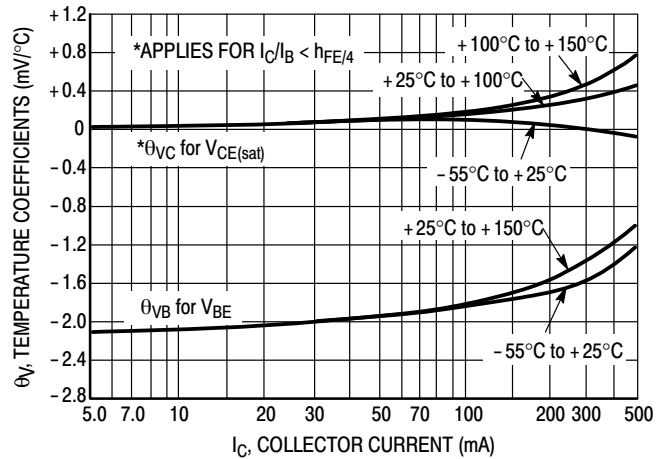


Figure 4. Temperature Coefficients

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.

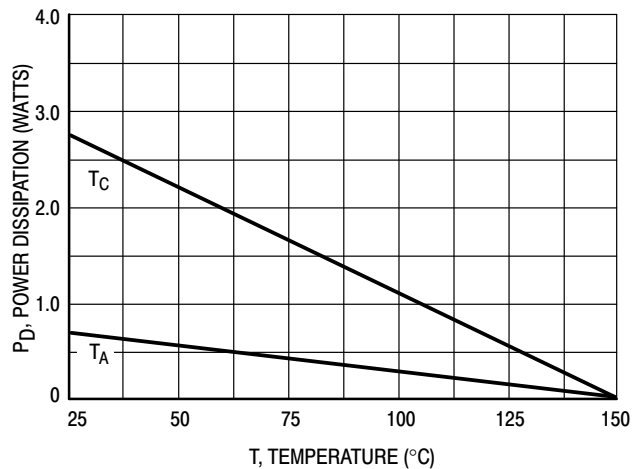
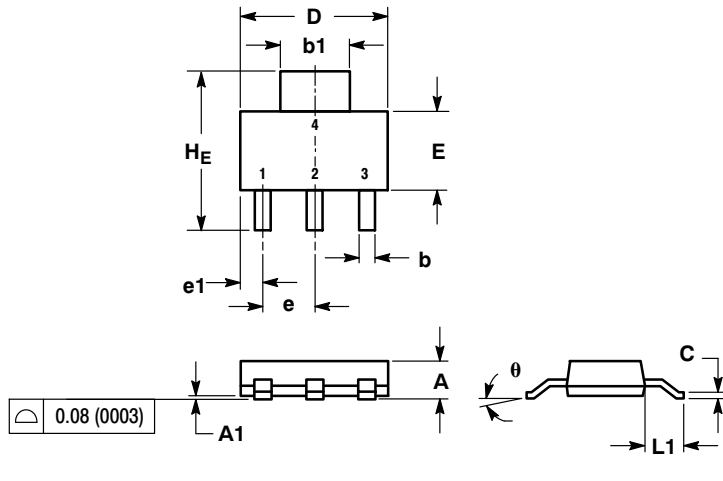


Figure 5. Power Derating

MMJT350T1

PACKAGE DIMENSIONS

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

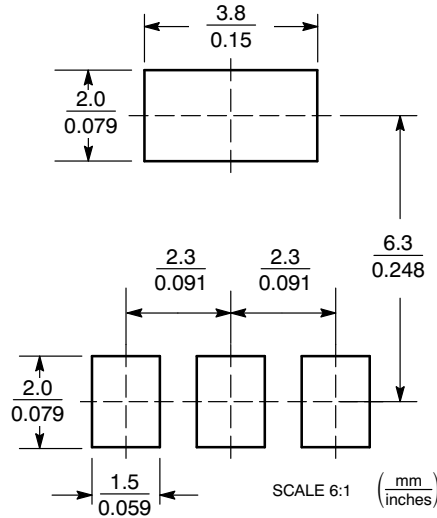


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

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:
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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