

MJD44E3, NJVMJD44E3T4G

Darlington Power Transistor DPAK For Surface Mount Applications

Designed for general purpose power and switching output or driver stages in applications such as switching regulators, converters, and power amplifiers.

Features

- Electrically Similar to Popular D44E3 Device
- High DC Gain – 1000 Min @ 5.0 Adc
- Low Sat. Voltage – 1.5 V @ 5.0 Adc
- Compatible With Existing Automatic Pick and Place Equipment
- Epoxy Meets UL 94 V-0 @ 0.125 in
- ESD Ratings:
 - ♦ Human Body Model, 3B > 8000 V
 - ♦ Machine Model, C > 400 V
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free Packages*

MAXIMUM RATINGS

| Rating | Symbol | Max | Unit |
|---|----------------|---------------|--------------------------|
| Collector-Emitter Voltage | V_{CEO} | 80 | Vdc |
| Emitter-Base Voltage | V_{EB} | 7 | Vdc |
| Collector Current – Continuous | I_C | 10 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 20 0.16 | W W/ $^\circ\text{C}$ |
| Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.75 0.014 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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.

1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

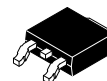
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



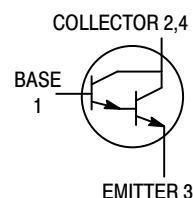
ON Semiconductor®

<http://onsemi.com>

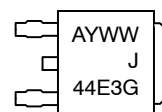
NPN DARLINGTON SILICON POWER TRANSISTORS 10 AMPERES 80 VOLTS, 20 WATTS



DPAK
CASE 369C
STYLE 1



MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
J44E3 = Device Code
G = Pb-Free Package

ORDERING INFORMATION

| Device | Package | Shipping† |
|---------------|-------------------|------------------------|
| MJD44E3T4G | DPAK (Pb-Free) | 2,500 / Tape & Reel |
| NJVMJD44E3T4G | DPAK (Pb-Free) | 2,500 / 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.

MJD44E3, NJVMJD44E3T4G

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|----------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 6.25 | $^{\circ}\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 71.4 | $^{\circ}\text{C/W}$ |
| Lead Temperature for Soldering | T_L | 260 | $^{\circ}\text{C}$ |

2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|-----------|---|---|----|---------------|
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE} = 0$) | I_{CES} | – | – | 10 | μA |
| Emitter Cutoff Current ($V_{EB} = 7 \text{ Vdc}$) | I_{EBO} | – | – | 1 | μA |

ON CHARACTERISTICS

| | | | | | |
|---|---------------|--------|--------|----------|-----|
| Collector-Emitter Saturation Voltage ($I_C = 5 \text{ Adc}$, $I_B = 10 \text{ mAdc}$) ($I_C = 10 \text{ Adc}$, $I_B = 20 \text{ mAdc}$) | $V_{CE(sat)}$ | – – | – – | 1.5 2 | Vdc |
| Base-Emitter Saturation Voltage ($I_C = 5 \text{ Adc}$, $I_B = 10 \text{ mAdc}$) | $V_{BE(sat)}$ | – | – | 2.5 | Vdc |
| DC Current Gain ($V_{CE} = 5 \text{ Vdc}$, $I_C = 5 \text{ Adc}$) | h_{FE} | 1000 | – | – | – |

DYNAMIC CHARACTERISTICS

| | | | | | |
|--|----------|---|---|-----|----|
| Collector Capacitance ($V_{CB} = 10 \text{ Vdc}$, $f_{\text{test}} = 1 \text{ MHz}$) | C_{cb} | – | – | 130 | pF |
|--|----------|---|---|-----|----|

SWITCHING TIMES

| | | | | | |
|--|-------------|---|-----|---|---------------|
| Delay and Rise Times ($I_C = 10 \text{ Adc}$, $I_{B1} = 20 \text{ mAdc}$) | $t_d + t_r$ | – | 0.6 | – | μs |
| Storage Time ($I_C = 10 \text{ Adc}$, $I_{B1} = I_{B2} = 20 \text{ mAdc}$) | t_s | – | 2 | – | μs |
| Fall Time ($I_C = 10 \text{ Adc}$, $I_{B1} = I_{B2} = 20 \text{ mAdc}$) | t_f | – | 0.5 | – | μs |

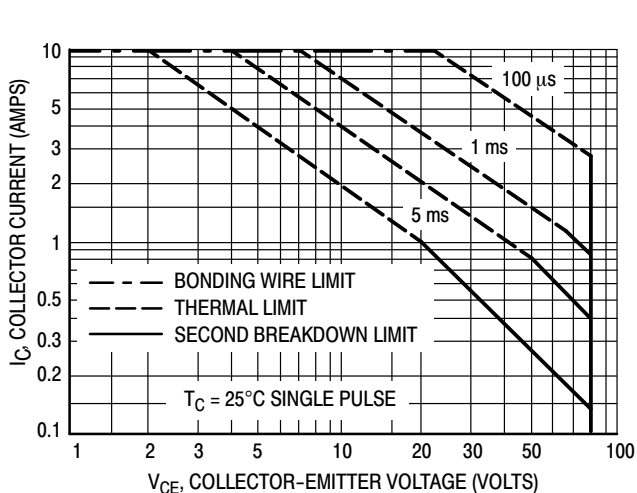


Figure 1. Maximum Forward Bias Safe Operating Area

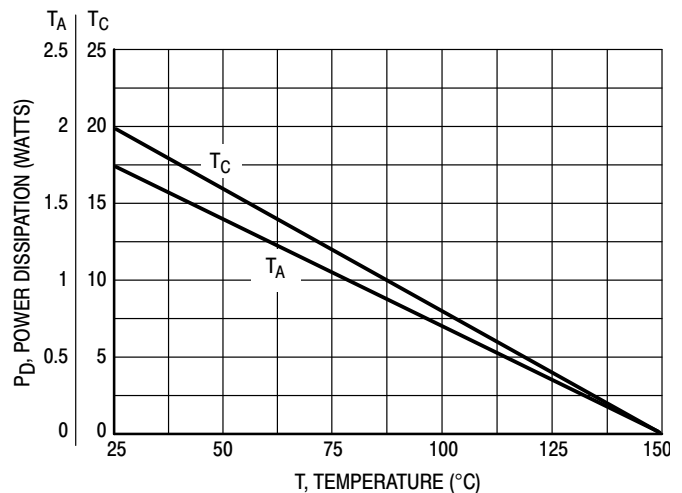


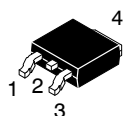
Figure 2. Power Derating

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®

ON



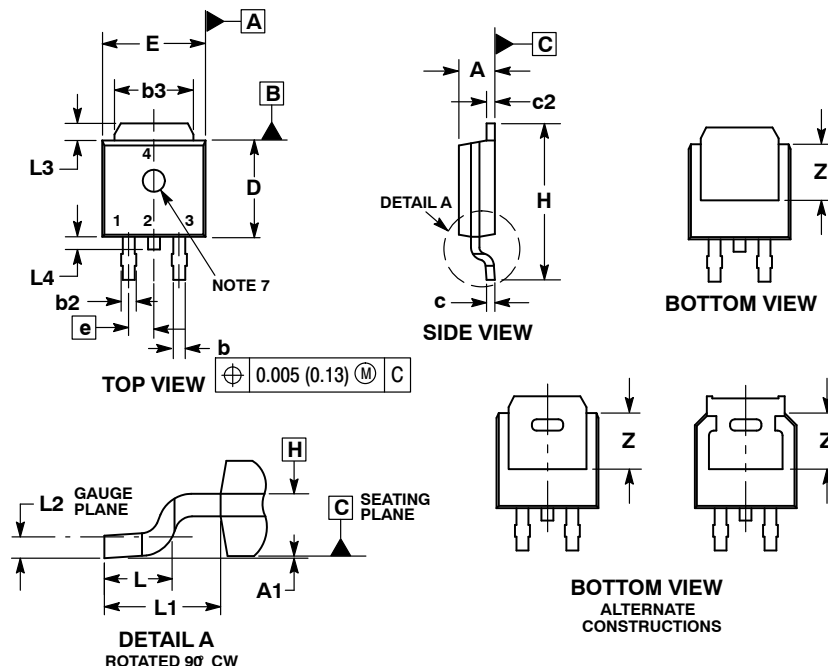
SCALE 1:1

DPAK (SINGLE GAUGE)

CASE 369C

ISSUE F

DATE 21 JUL 2015

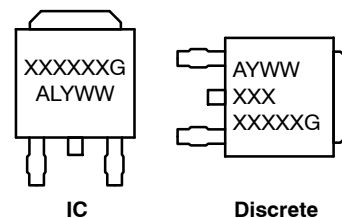


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.086 | 0.094 | 2.18 | 2.38 |
| A1 | 0.000 | 0.005 | 0.00 | 0.13 |
| b | 0.025 | 0.035 | 0.63 | 0.89 |
| b2 | 0.028 | 0.045 | 0.72 | 1.14 |
| b3 | 0.180 | 0.215 | 4.57 | 5.46 |
| c | 0.018 | 0.024 | 0.46 | 0.61 |
| c2 | 0.018 | 0.024 | 0.46 | 0.61 |
| D | 0.235 | 0.245 | 5.97 | 6.22 |
| E | 0.250 | 0.265 | 6.35 | 6.73 |
| e | 0.090 BSC | | 2.29 BSC | |
| H | 0.370 | 0.410 | 9.40 | 10.41 |
| L | 0.055 | 0.070 | 1.40 | 1.78 |
| L1 | 0.114 REF | | 2.90 REF | |
| L2 | 0.020 BSC | | 0.51 BSC | |
| L3 | 0.035 | 0.050 | 0.89 | 1.27 |
| L4 | --- | 0.040 | --- | 1.01 |
| Z | 0.155 | --- | 3.93 | --- |

GENERIC MARKING DIAGRAM*

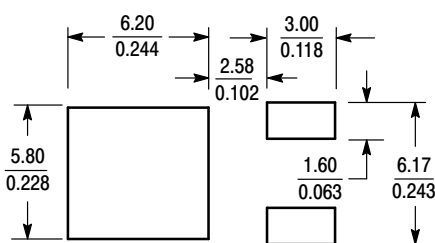


XXXXXX = Device Code
 A = Assembly Location
 L = Wafer Lot
 Y = Year
 WW = Work Week
 G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking.

- STYLE 1:**
 PIN 1. BASE
 2. COLLECTOR
 3. EMITTER
 4. COLLECTOR
- STYLE 2:**
 PIN 1. GATE
 2. DRAIN
 3. SOURCE
 4. DRAIN
- STYLE 3:**
 PIN 1. ANODE
 2. CATHODE
 3. ANODE
 4. CATHODE
- STYLE 4:**
 PIN 1. CATHODE
 2. ANODE
 3. GATE
 4. ANODE
- STYLE 5:**
 PIN 1. GATE
 2. ANODE
 3. CATHODE
 4. ANODE
- STYLE 6:**
 PIN 1. MT1
 2. MT2
 3. GATE
 4. MT2
- STYLE 7:**
 PIN 1. GATE
 2. COLLECTOR
 3. EMITTER
 4. COLLECTOR
- STYLE 8:**
 PIN 1. N/C
 2. CATHODE
 3. ANODE
 4. CATHODE
- STYLE 9:**
 PIN 1. ANODE
 2. CATHODE
 3. RESISTOR ADJUST
 4. CATHODE
- STYLE 10:**
 PIN 1. CATHODE
 2. ANODE
 3. CATHODE
 4. ANODE

SOLDERING FOOTPRINT*



SCALE 3:1 (mm inches)

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

| | | |
|-------------------------|----------------------------|---|
| DOCUMENT NUMBER: | 98AON10527D | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION: | DPAK (SINGLE GAUGE) | PAGE 1 OF 1 |

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor 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:

Email Requests to: orderlit@onsemi.com

ON Semiconductor Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative