

# 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 $25^\circ\text{C}$	$P_D$	20 0.16	W W/ $^\circ\text{C}$
Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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.



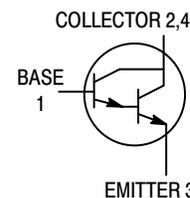
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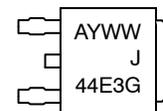
## NPN DARLINGTON SILICON POWER TRANSISTORS 10 AMPERES 80 VOLTS, 20 WATTS



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	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	71.4	$^{\circ}C/W$
Lead Temperature for Soldering	$T_L$	260	$^{\circ}C$

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

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

### 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 ( $V_{CB} = 10 \text{ Vdc}, f_{test} = 1 \text{ MHz}$ )	$C_{cb}$	-	-	130	pF
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### SWITCHING TIMES

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

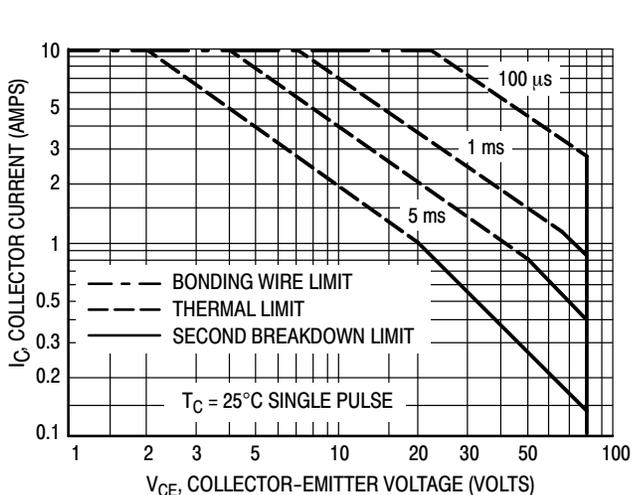


Figure 1. Maximum Forward Bias Safe Operating Area

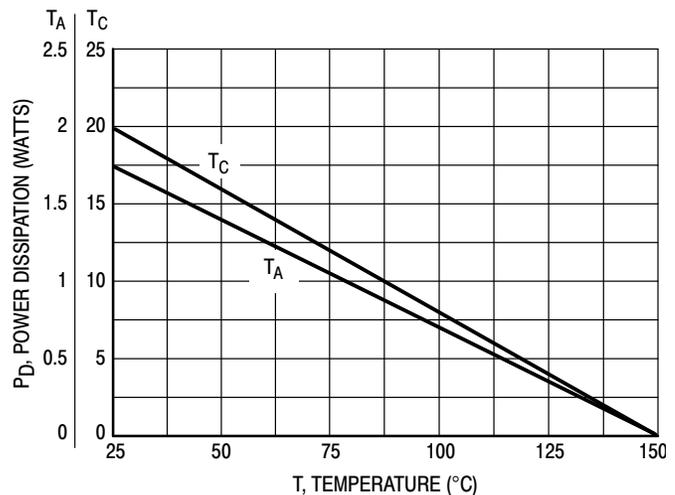
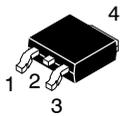


Figure 2. Power Derating

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



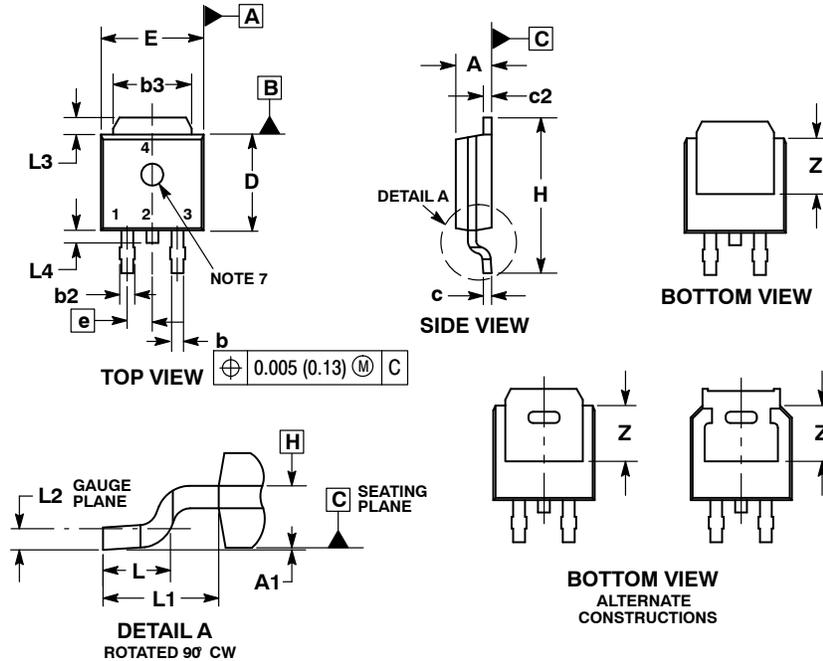
SCALE 1:1

### DPAK (SINGLE GAUGE)

#### CASE 369C

#### ISSUE F

DATE 21 JUL 2015

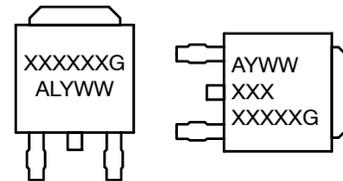


NOTES:

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\*



IC

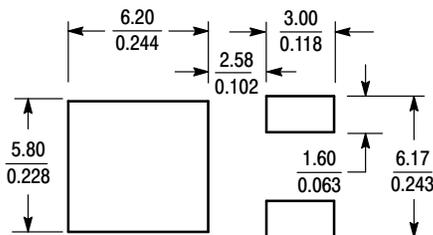
Discrete

- 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.

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

### 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.

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