

# 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.



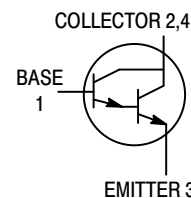
ON Semiconductor®

<http://onsemi.com>

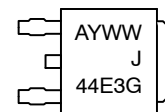
## NPN DARLINGTON SILICON POWER TRANSISTORS 10 AMPERES 80 VOLTS, 20 WATTS



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	$^{\circ}C/W$
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
----------------	--------	-----	-----	-----	------

### 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
--	----------	---	---	-----	----

### 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	-	$\mu s$

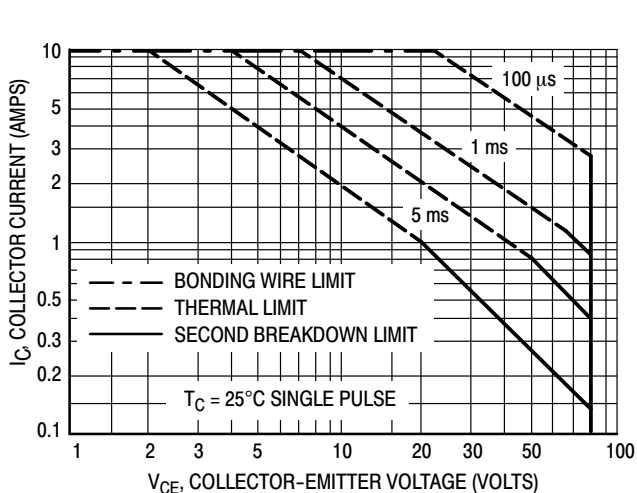


Figure 1. Maximum Forward Bias Safe Operating Area

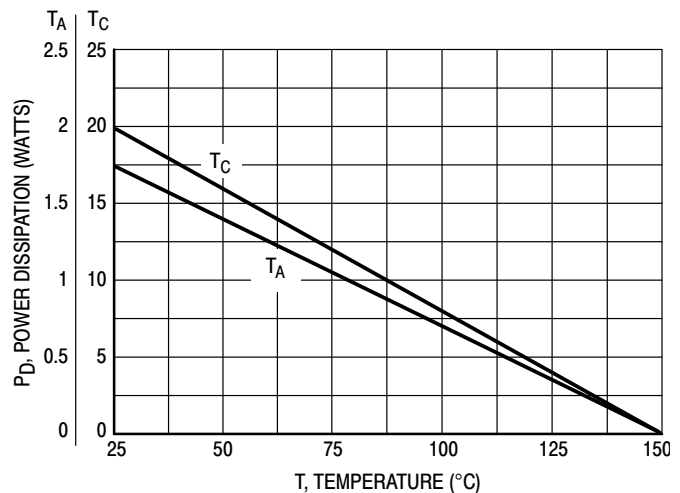
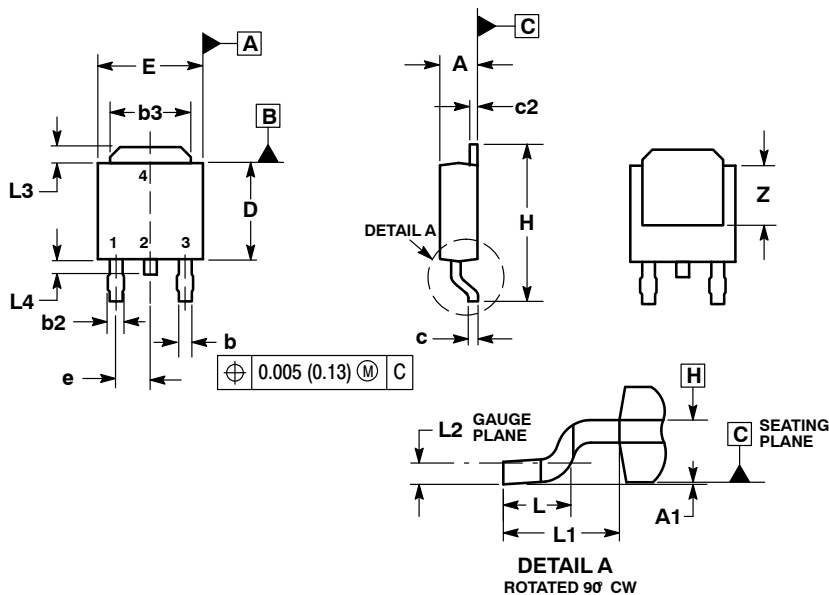


Figure 2. Power Derating

# MJD44E3, NJVMJD44E3T4G

## PACKAGE DIMENSIONS

DPAK  
CASE 369C-01  
ISSUE D

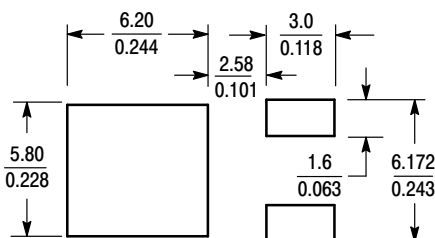


NOTES:

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.

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	0.030	0.045	0.76	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	0.108	REF	2.74	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	---

### SOLDERING FOOTPRINT\*



SCALE 3:1 (mm/inches)

STYLE 1:

- PIN 1. BASE
- COLLECTOR
- EMITTER
- COLLECTOR

\*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 and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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:**  
Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** orderlit@onsemi.com

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative