

MJD44E3

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
- 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 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 6.25 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 71.4 | $^\circ\text{C}/\text{W}$ |
| Lead Temperature for Soldering | 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.

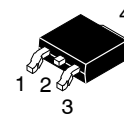
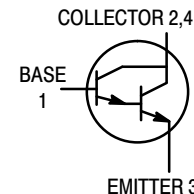
1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.



ON Semiconductor®

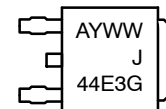
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NPN DARLINGTON SILICON POWER TRANSISTORS 10 AMPERES 80 VOLTS, 20 WATTS



**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) | 2500/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

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 ($I_C = 5 \text{ Adc}, I_B = 10 \text{ mAdc}$) ($I_C = 10 \text{ Adc}, I_B = 20 \text{ mAdc}$) | $V_{CE(\text{sat})}$ | - | - | 1.5 2 | Vdc |
| Base-Emitter Saturation Voltage ($I_C = 5 \text{ Adc}, I_B = 10 \text{ mAdc}$) | $V_{BE(\text{sat})}$ | - | - | 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 |

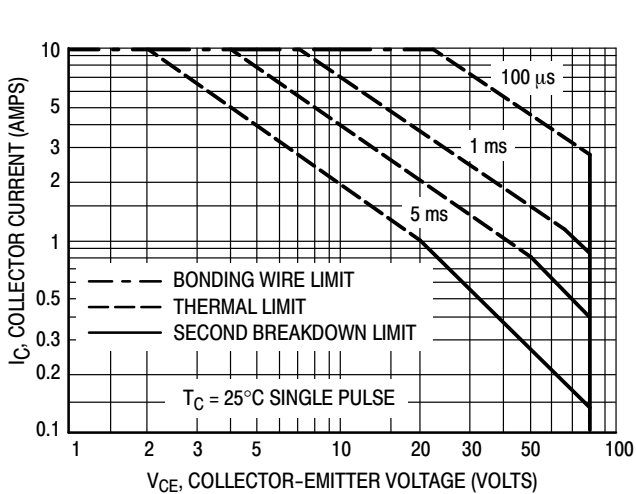


Figure 1. Maximum Forward Bias Safe Operating Area

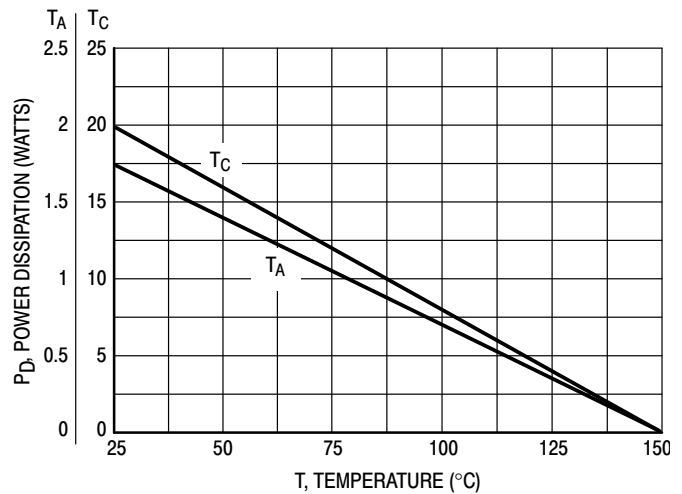
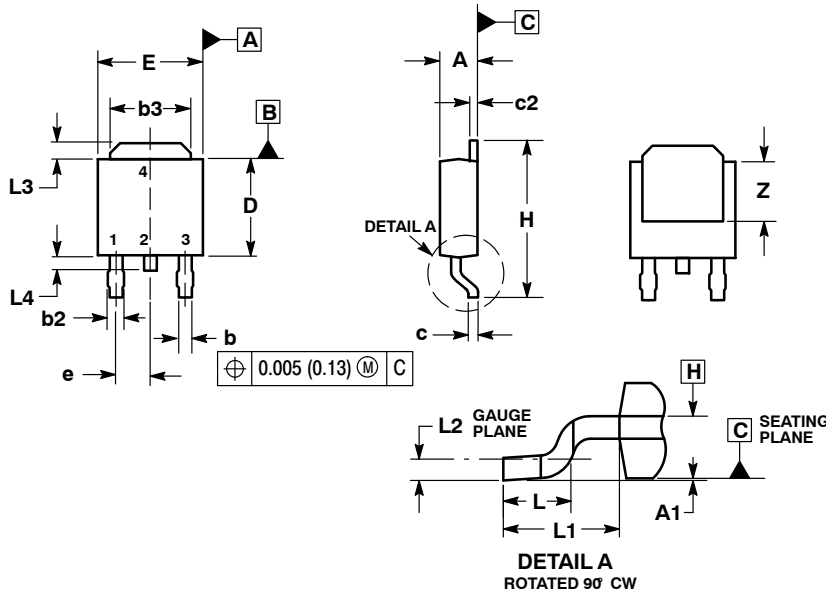


Figure 2. Power Derating

MJD44E3

PACKAGE DIMENSIONS

DPAK
CASE 369C-01
ISSUE D

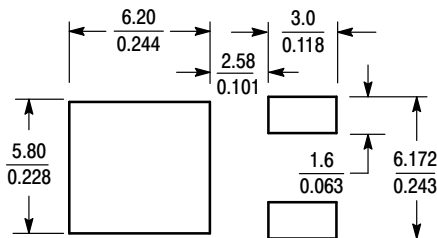


NOTES:

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 $\left(\frac{\text{mm}}{\text{inches}}\right)$

STYLE 1:

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

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