NOT RECOMMENDED FOR NEW DESIGN
USE MJD32CUQ

Lead-free Green

**MJD32CQ**

**100V PNP HIGH VOLTAGE TRANSISTOR IN TO252**

## Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

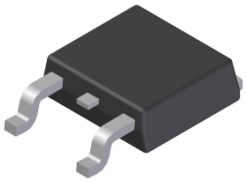
## Features

- $BV_{CEO}$ > -100V
- $I_C$ = -3A high Continuous Collector Current
- $I_{CM}$ = -5A Peak Pulse Current
- Ideal for Power Switching or Amplification Applications
- Complementary NPN Type: MJD31CQ
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

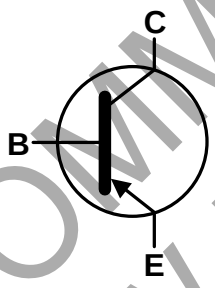
## Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.34 grams (Approximate)

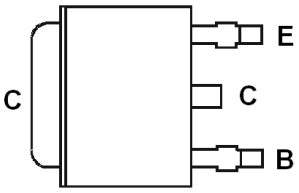
TO252 (DPAK)



Top View




Device Schematic



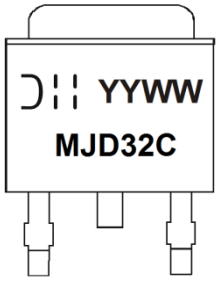

Pin Out Configuration
Top View

## Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|---|
| MJD32CQ-13 | Automotive | MJD32C | 13 | 16 | 2,500 |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information




MJD32C = Product Type Marking Code
= Manufacturers' code marking
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 16 = 2016)
WW = Week Code (01 - 53)

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## Absolute Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -100 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -100 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -6 | V |
| Continuous Collector Current | $I_C$ | -3 | A |
| Peak Pulse Collector Current | $I_{CM}$ | -5 | A |
| Continuous Base Current | $I_B$ | -1 | A |
| Power Dissipation | $P_D$ | 15 | W |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 6) | $P_D$ | 3.9 | W |
| | (Note 7) | | 2.1 | |
| | (Note 8) | | 1.6 | |
| Thermal Resistance, Junction to Ambient Air | (Note 6) | $R_{\theta JA}$ | 32 | °C/W |
| | (Note 7) | | 59 | |
| | (Note 8) | | 80 | |
| Thermal Resistance, Junction to Leads | (Note 9) | $R_{\theta JL}$ | 8.4 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 10)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

Notes:
6. For a device mounted with the exposed collector pad on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
7. Same as note (6), except mounted on 25mm x 25mm 1oz copper.
8. Same as note (6), except mounted on minimum recommended pad (MRP) layout.
9. Thermal resistance from junction to solder-point (on the exposed collector pad).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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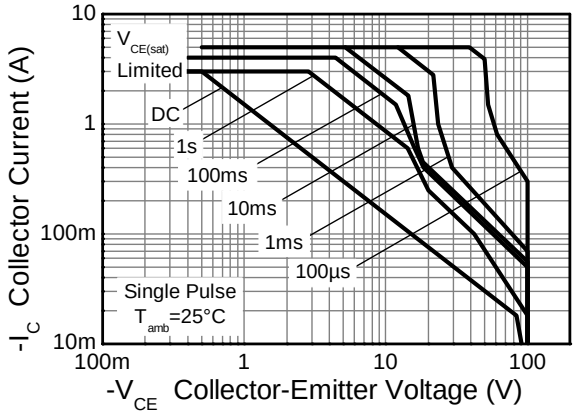
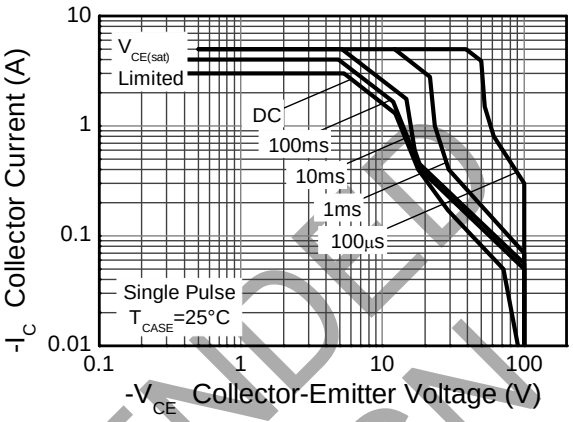
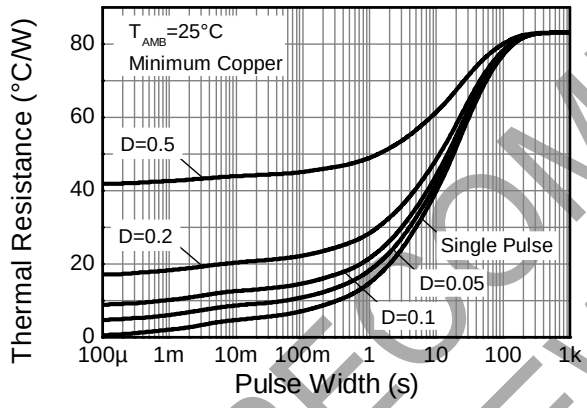
## Thermal Characteristics



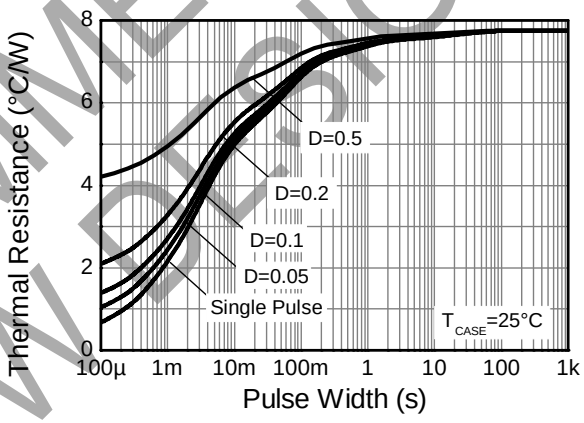

**Safe Operating Area**




**Safe Operating Area**




**Transient Thermal Impedance**




**Transient Thermal Impedance**

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## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Emitter Breakdown Voltage (Note 11) | $BV_{CEO}$ | -100 | — | — | V | $I_C$ = -30mA, $I_B$ = 0 |
| Collector Cut-off Current | $I_{CEO}$ | — | — | -1 | μA | $V_{CB}$ = -60V, $I_B$ = 0 |
| Collector Cut-off Current | $I_{CES}$ | — | — | -1 | μA | $V_{CE}$ = -100V, $V_{EB}$ = 0 |
| Emitter Cut-off Current | $I_{EBO}$ | — | — | -1 | μA | $V_{EB}$ = -5V, $I_C$ = 0 |
| Collector-Emitter Saturation Voltage (Note 11) | $V_{CE(sat)}$ | — | — | -1.2 | V | $I_C$ = -3.0A, $I_B$ = -375mA |
| Base-Emitter Turn-On Voltage (Note 11) | $V_{BE(on)}$ | — | — | -1.8 | V | $I_C$ = -3A, $V_{CE}$ = -4V |
| DC Current Gain (Note 11) | $h_{FE}$ | 25<br>10 | — | —<br>50 | — | $V_{CE}$ = -4V, $I_C$ = -1A<br>$V_{CE}$ = -4V, $I_C$ = -3A |
| Current Signal Current Gain | $H_{fe}$ | 20 | — | — | — | $V_{CE}$ = -10V, $I_C$ = -0.5A, f = 1KHz |
| Current Gain-Bandwidth Product | $f_T$ | 3.0 | — | — | MHz | $I_C$ = -500mA, $V_{CE}$ = -10V, f = 1MHz |

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

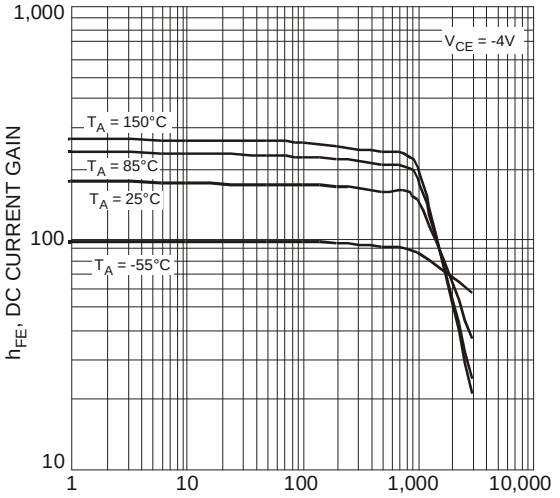


Figure 1 Typical DC Current Gain vs. Collector Current

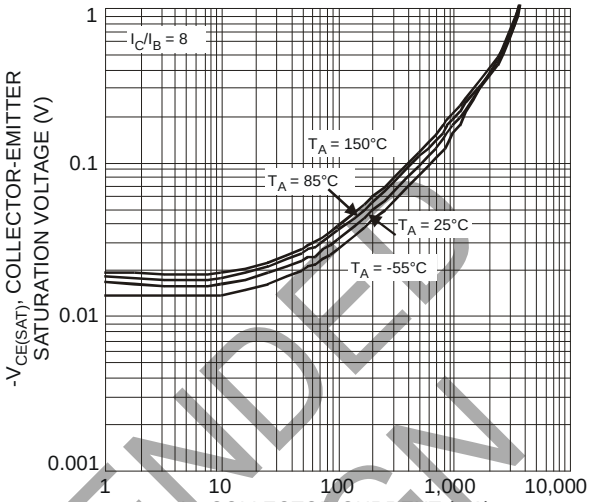


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

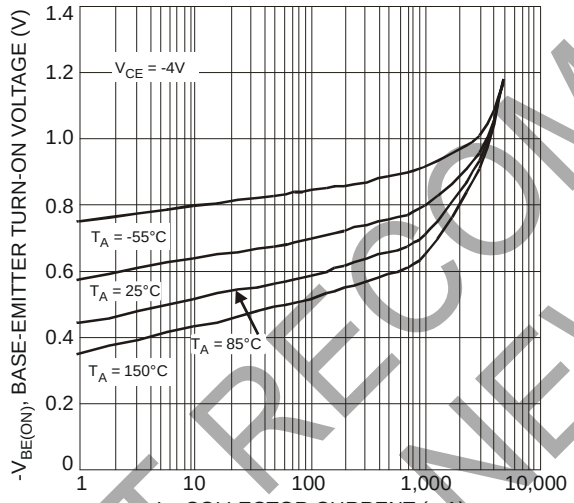


Figure 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

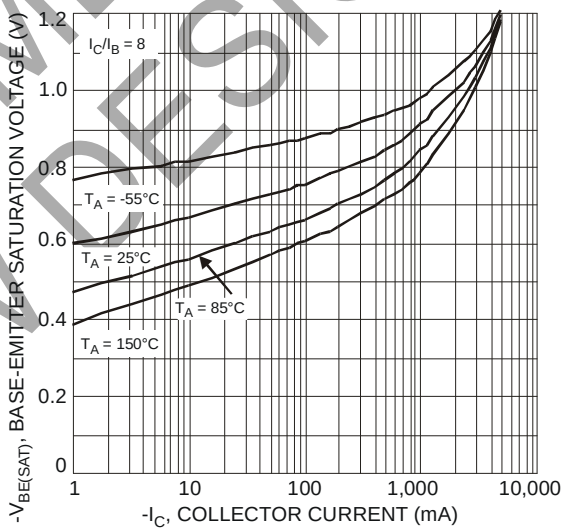


Figure 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

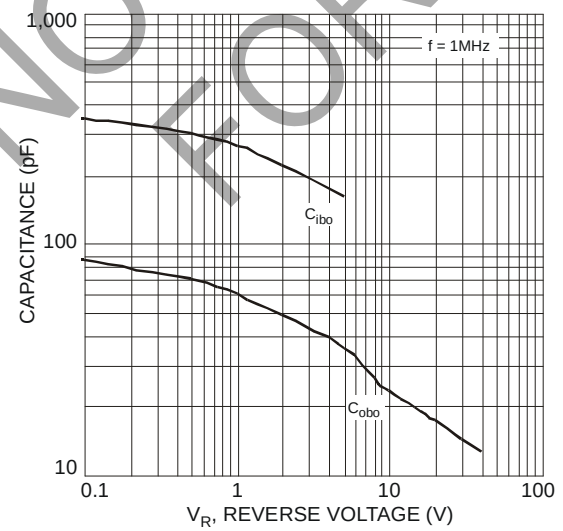


Figure 5 Typical Capacitance Characteristics

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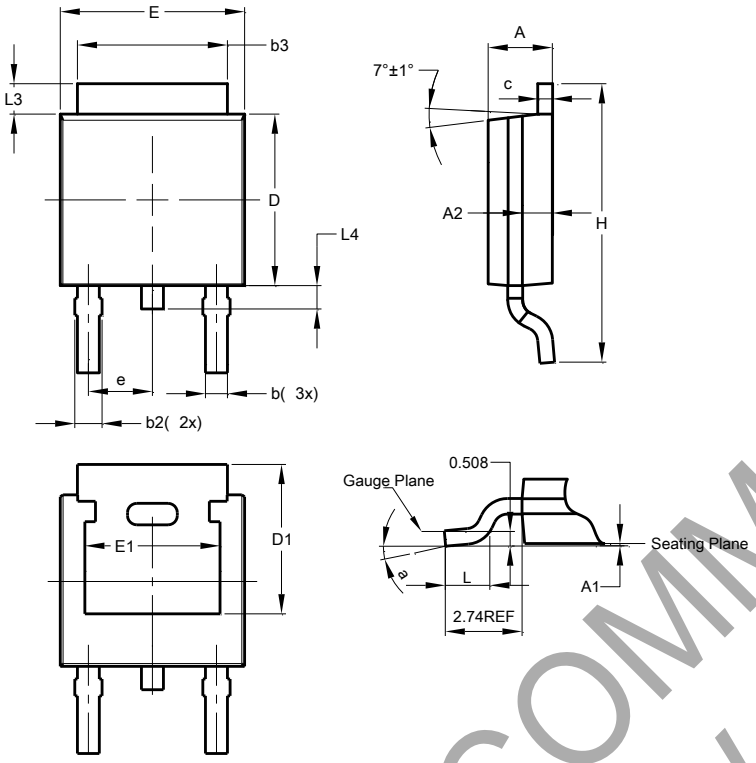
## Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.




| TO252 (DPAK) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 2.19 | 2.39 | 2.29 |
| **A1** | 0.00 | 0.13 | 0.08 |
| **A2** | 0.97 | 1.17 | 1.07 |
| **b** | 0.64 | 0.88 | 0.783 |
| **b2** | 0.76 | 1.14 | 0.95 |
| **b3** | 5.21 | 5.46 | 5.33 |
| **c** | 0.45 | 0.58 | 0.531 |
| **D** | 6.00 | 6.20 | 6.10 |
| **D1** | 5.21 | - | - |
| **e** | - | - | 2.286 |
| **E** | 6.45 | 6.70 | 6.58 |
| **E1** | 4.32 | - | - |
| **H** | 9.40 | 10.41 | 9.91 |
| **L** | 1.40 | 1.78 | 1.59 |
| **L3** | 0.88 | 1.27 | 1.08 |
| **L4** | 0.64 | 1.02 | 0.83 |
| **a** | 0° | 10° | - |
| **All Dimensions in mm** | | | |

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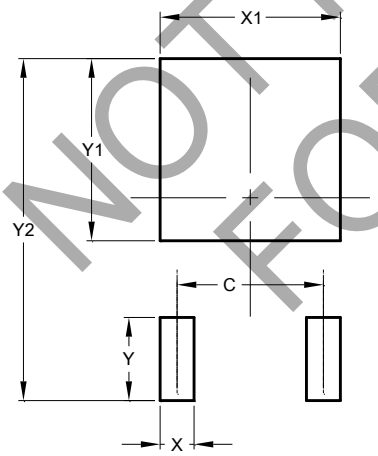
## Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.




| Dimensions | Value (in mm) |
|---|---|
| **C** | 4.572 |
| **X** | 1.060 |
| **X1** | 5.632 |
| **Y** | 2.600 |
| **Y1** | 5.700 |
| **Y2** | 10.700 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.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