

**30V N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

| $V_{(BR)DSS}$ | Max $R_{DS(ON)}$        | Max $I_D$<br>$T_A = +25^\circ C$ |
|---------------|-------------------------|----------------------------------|
| 30V           | 0.050Ω @ $V_{GS} = 10V$ | 4.6A                             |

**Description and Applications**

This new generation of TRENCH MOSFET from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

- DC - DC converters
- Power Management Functions
- Disconnect Switches
- Motor Control

**Features and Benefits**

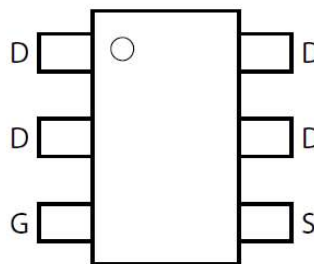
- Low On-resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

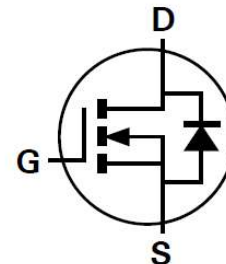
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.015 grams (Approximate)



Top View



Pinout Top-view

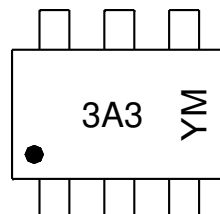


Device Symbol

**Ordering Information** (Note 4)

| Part Number  | Reel Size (inch) | Tape Width (mm) | Quantity Per Reel |
|--------------|------------------|-----------------|-------------------|
| ZXMN3A03E6TA | 7                | 8               | 3000              |
| ZXMN3A03E6TC | 13               | 8               | 10,000            |

- 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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


3A3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: C = 2015)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

## Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

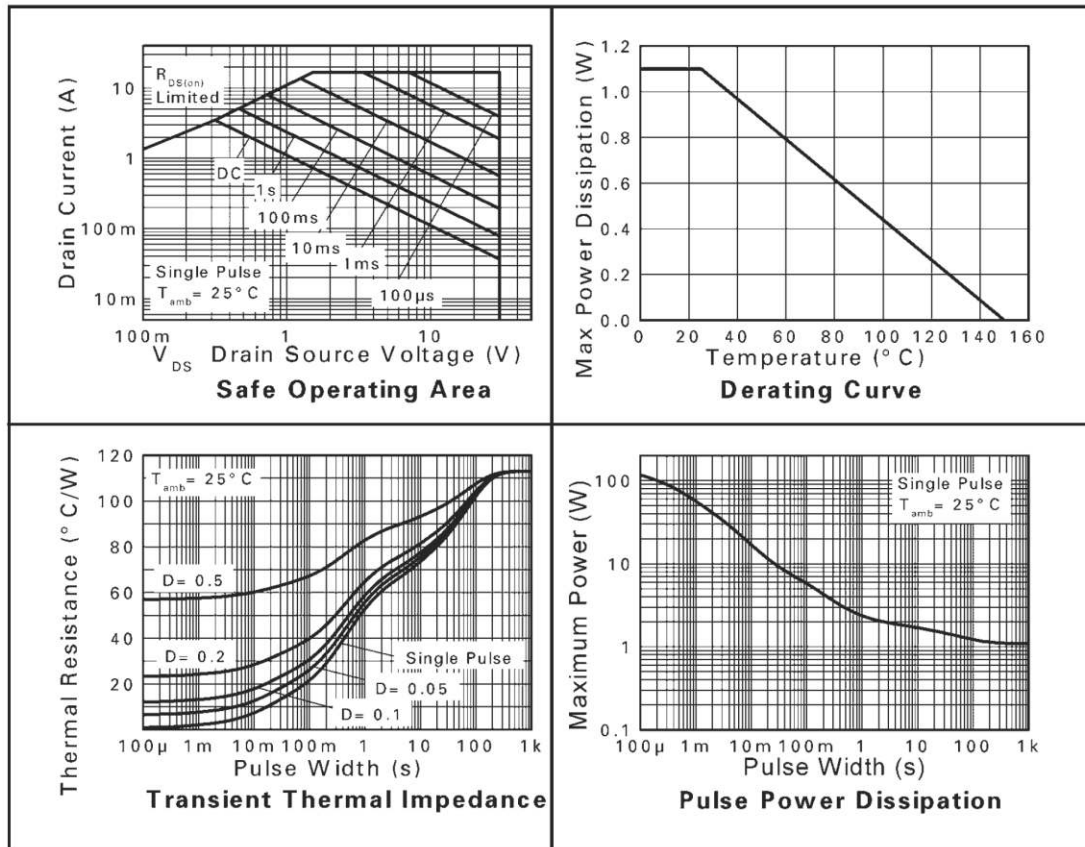
| Characteristic                                  |                       | Symbol           | Value                           | Unit |   |
|---|-----------------------|------------------|---------------------------------|------|---|
| Drain-Source Voltage                            |                       | V <sub>DSS</sub> | 30                              | V    |   |
| Gate-Source Voltage                             |                       | V <sub>GS</sub>  | ±20                             | V    |   |
| Continuous Drain Current                        | V <sub>GS</sub> = 10V | I <sub>D</sub>   | T <sub>A</sub> = +25°C (Note 6) | 4.6  | A |
|   |                       |                  | T <sub>A</sub> = +70°C (Note 6) | 3.7  |   |
|   |                       |                  | T <sub>A</sub> = +25°C (Note 5) | 3.7  |   |
| Pulsed Drain Current (Note 7)                   |                       | I <sub>DM</sub>  | 17                              | A    |   |
| Continuous Source Current (Body Diode) (Note 6) |                       | I <sub>S</sub>   | 2.6                             | A    |   |
| Pulsed Source Current (Body Diode) (Note 7)     |                       | I <sub>SM</sub>  | 17                              | A    |   |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                       | Symbol                            | Value       | Unit  |
|--|-----------------------------------|-------------|-------|
| Power Dissipation at T <sub>A</sub> = +25°C (Note 5) | P <sub>D</sub>                    | 1.1         | W     |
| Linear derating factor (Note 5)                      |                                   | 8.8         | mW/°C |
| Power Dissipation at T <sub>A</sub> = +25°C (Note 6) | P <sub>D</sub>                    | 1.7         | W     |
| Linear derating factor (Note 6)                      |                                   | 13.6        | mW/°C |
| Junction to Ambient (Note 5)                         | R <sub>θJA</sub>                  | 113         | °C/W  |
| Junction to Ambient (Note 6)                         | R <sub>θJA</sub>                  | 73          | °C/W  |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

- Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  6. For a device surface mounted on FR-4 PCB measured at t ≤ 10 secs.
  7. Repetitive rating 25mm x 25mm FR-4 PCB, D = 0.05, pulse width 10μs - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

**Thermal Characteristics**

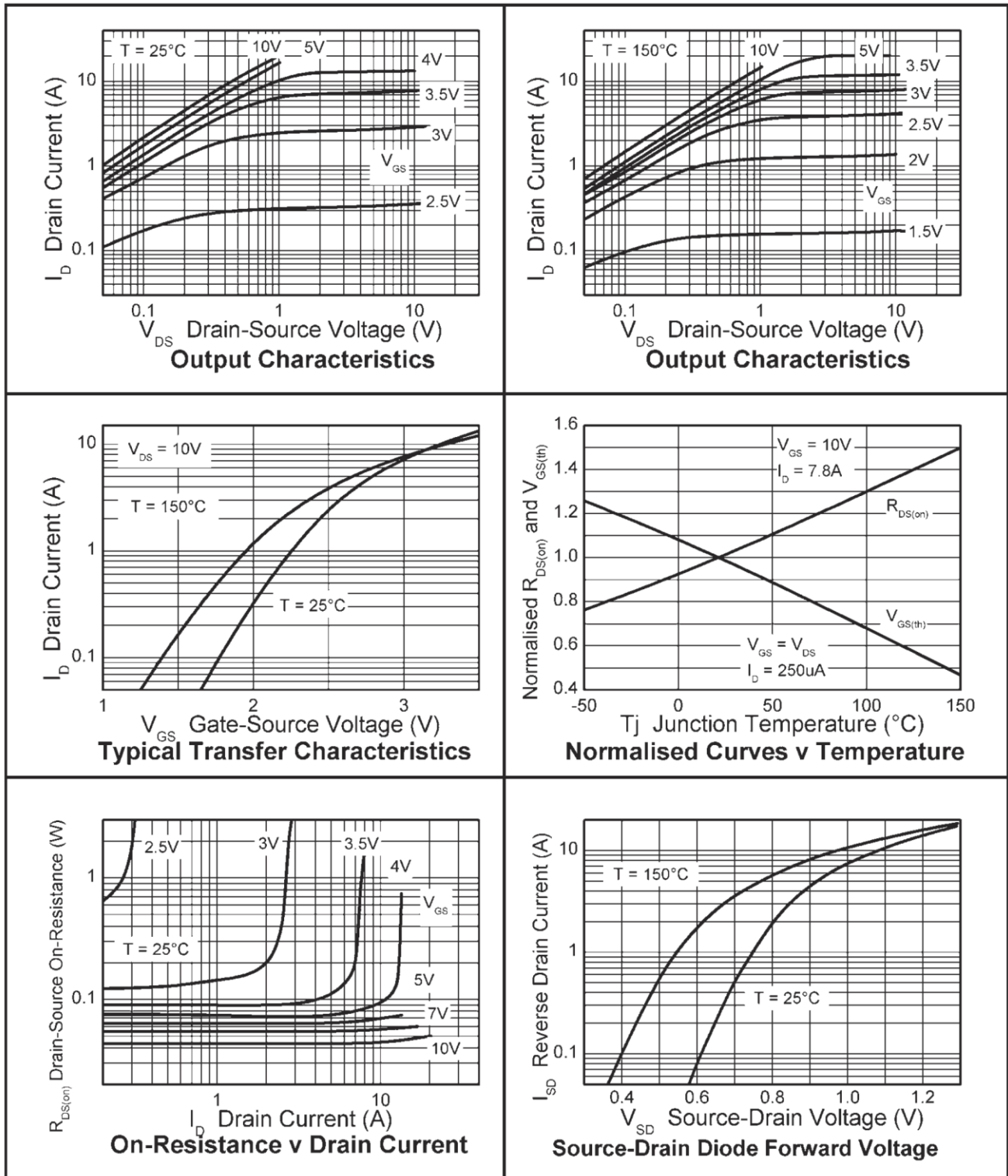


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

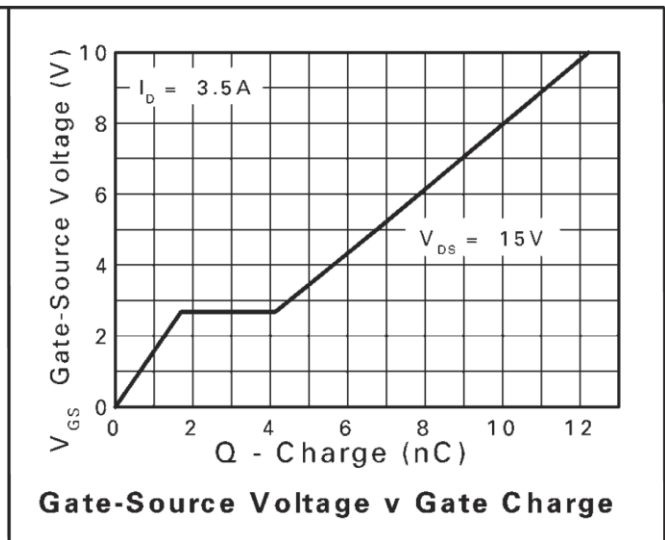
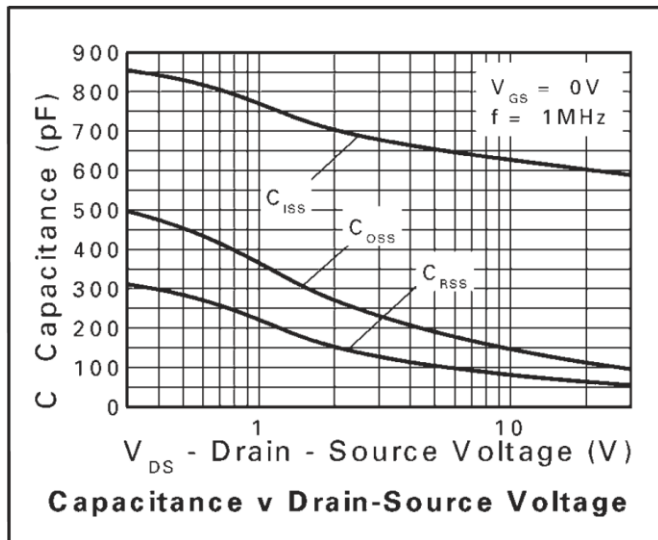
| Characteristic                                   | Symbol              | Min | Typ  | Max   | Unit | Test Condition   |
|--|---------------------|-----|------|-------|------|--|
| <b>OFF CHARACTERISTICS</b>                       |                     |     |      |       |      |  |
| Drain-source Breakdown Voltage                   | BV <sub>DSS</sub>   | 30  | —    | —     | V    | I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V   |
| Zero Gate Voltage Drain Current                  | I <sub>DSS</sub>    | —   | —    | 0.5   | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V  |
| Gate-body Leakage                                | I <sub>GSS</sub>    | —   | —    | 100   | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS</b>                        |                     |     |      |       |      |  |
| Gate-source Threshold Voltage                    | V <sub>GS(th)</sub> | 1   | —    | —     | V    | I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>                                    |
| Static Drain-source On-state Resistance (Note 8) | R <sub>DS(on)</sub> | —   | —    | 0.050 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.8A   |
|  |                     |     |      | 0.065 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.8A  |
| Forward Transconductance (Notes 8 & 10)          | g <sub>fs</sub>     | —   | 10   | —     | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 7.8A   |
| Diode Forward Voltage (Note 8)                   | V <sub>SD</sub>     | —   | 0.85 | 0.95  | V    | T <sub>J</sub> = +25°C, I <sub>S</sub> = 3.2A, V <sub>GS</sub> = 0V                          |
| <b>DYNAMIC CHARACTERISTICS</b> (Notes 9 & 10)    |                     |     |      |       |      |  |
| Input Capacitance                                | C <sub>iSS</sub>    | —   | 600  | —     | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V<br>f = 1MHz                                      |
| Output Capacitance                               | C <sub>oSS</sub>    | —   | 104  | —     | pF   |  |
| Reverse Transfer Capacitance                     | C <sub>rSS</sub>    | —   | 58.5 | —     | pF   |  |
| Gate Charge                                      | Q <sub>g</sub>      | —   | 6.9  | —     | nC   | V <sub>GS</sub> = 5V, V <sub>DS</sub> = 15V<br>I <sub>D</sub> = 3.5A                         |
| Total Gate Charge                                | Q <sub>g</sub>      | —   | 12.6 | —     | nC   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V<br>I <sub>D</sub> = 3.5A                        |
| Gate-source Charge                               | Q <sub>gs</sub>     | —   | 2.0  | —     | nC   |  |
| Gate-drain Charge                                | Q <sub>gd</sub>     | —   | 2.0  | —     | nC   |  |
| Reverse Recovery Time (Note 10)                  | t <sub>rr</sub>     | —   | 18.8 | —     | ns   | T <sub>J</sub> = +25°C, I <sub>F</sub> = 3.5A,<br>di/dt = 100A/μs                            |
| Reverse Recovery Charge (Note 10)                | Q <sub>rr</sub>     | —   | 14.1 | —     | nC   |  |
| Turn-on Delay Time                               | t <sub>d(on)</sub>  | —   | 2.9  | —     | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 3.5A, R <sub>G</sub> = 6.0Ω |
| Turn-on Rise Time                                | t <sub>r</sub>      | —   | 6.4  | —     | ns   |  |
| Turn-off Delay Time                              | t <sub>d(off)</sub> | —   | 16.0 | —     | ns   |  |
| Turn-off Fall Time                               | t <sub>f</sub>      | —   | 11.2 | —     | ns   |  |

- Notes:
8. Measured under pulsed conditions. Width=300μs. Duty cycle ≤ 2%.
  9. Switching characteristics are independent of operating junction temperature.
  10. For design aid only, not subject to production testing.

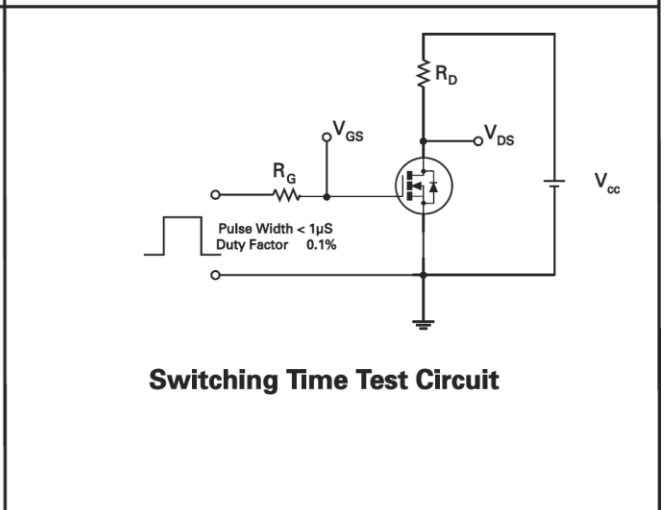
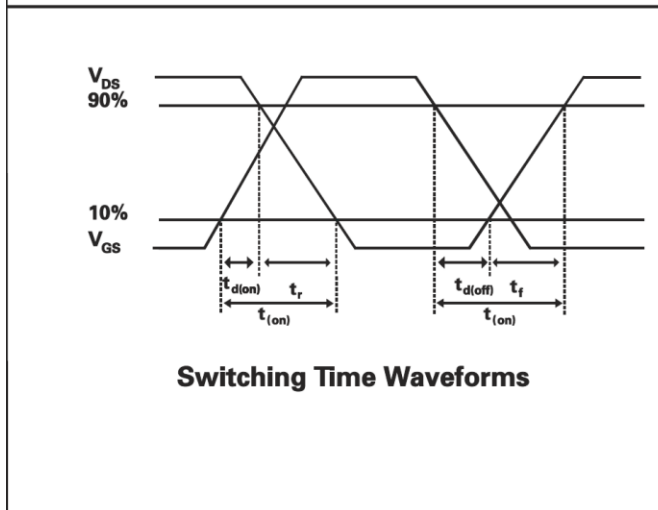
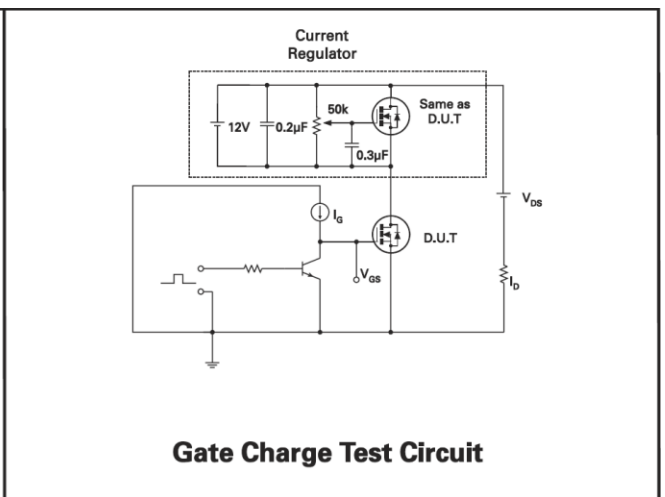
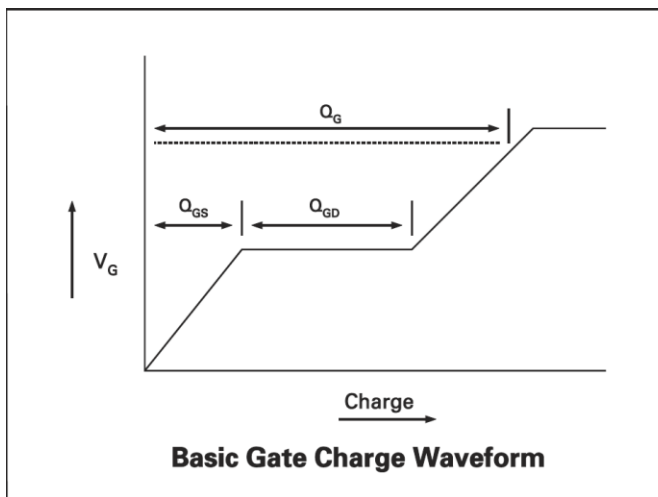
**Typical Characteristics**



**Typical Characteristics (Cont.)**

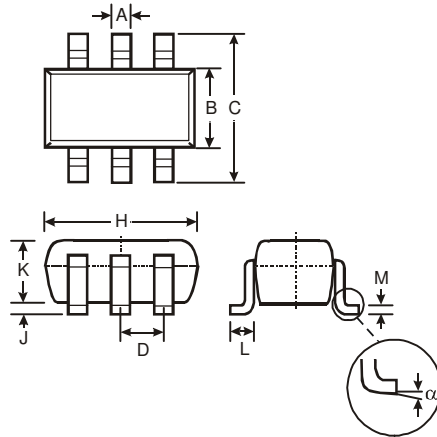


**Test Circuits**



## Package Outline Dimensions

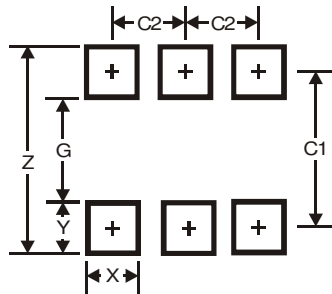
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT26                |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 0.35  | 0.50 | 0.38 |
| B                    | 1.50  | 1.70 | 1.60 |
| C                    | 2.70  | 3.00 | 2.80 |
| D                    | —     | —    | 0.95 |
| H                    | 2.90  | 3.10 | 3.00 |
| J                    | 0.013 | 0.10 | 0.05 |
| K                    | 1.00  | 1.30 | 1.10 |
| L                    | 0.35  | 0.55 | 0.40 |
| M                    | 0.10  | 0.20 | 0.15 |
| $\alpha$             | 0°    | 8°   | —    |
| All Dimensions in mm |       |      |      |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 3.20          |
| G          | 1.60          |
| X          | 0.55          |
| Y          | 0.80          |
| C1         | 2.40          |
| C2         | 0.95          |

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