# 100V P-CHANNEL ENHANCEMENT MODE MOSFET

## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ | $I_D$ $T_A$ = +25°C |
|---|---|---|
| -100V | 350mΩ @ $V_{GS}$= -10V | -1.6A |
| | 450mΩ @ $V_{GS}$= -6.0V | -1.4A |

## Description

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

## Features and Benefits

- Fast Switching Speed
- Low Gate Drive
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZXMP10A17E6Q is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.**

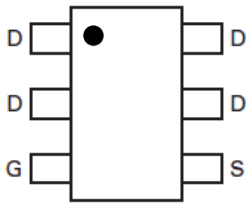
## Mechanical Data

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.018 grams (Approximate)

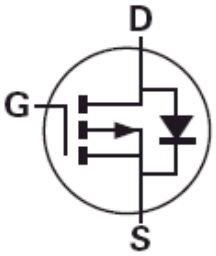
SOT26



Top View




Pin Out - Top View




Equivalent Circuit

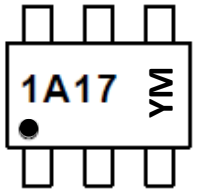
## Ordering Information (Note 4)

| Part Number | Qualification | Case | Packaging |
|---|---|---|---|
| ZXMP10A17E6QTA | Automotive | SOT26 | 3,000/Tape & Reel |
| ZXMP10A17E6QTAR | Automotive | SOT26 | 3,000/Tape & Reel |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information

SOT26




1A17 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2015 | … | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | C | … | G | H | I | J | K | L | M | N | O |

| 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 |


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

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -100 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current | $V_{GS}$ = 10V | (Note 6) | $I_D$ | -1.6 | A |
| | | $T_A$ = +70°C (Note 6) | | -1.3 | |
| | | (Note 5) | | -1.3 | |
| Pulsed Drain Current | $V_{GS}$= 10V | (Note 7) | $I_{DM}$ | -7.7 | A |
| Continuous Source Current (Body Diode) | | (Note 6) | $I_S$ | -2.1 | A |
| Pulsed Source Current (Body Diode) | | (Note 7) | $I_{SM}$ | -7.7 | A |

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

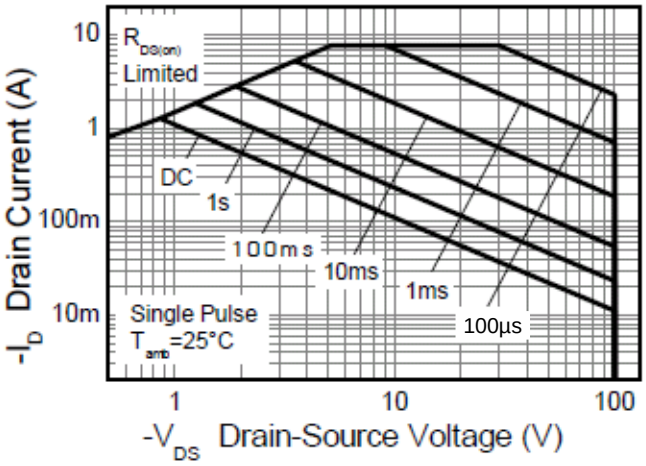
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 1.1 | W |
| Linear Derating Factor | | | 8.8 | mW/°C |
| | (Note 6) | | 1.7 | W |
| | | | 13.7 | mW/°C |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 113 | °C/W |
| | (Note 6) | | 73 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

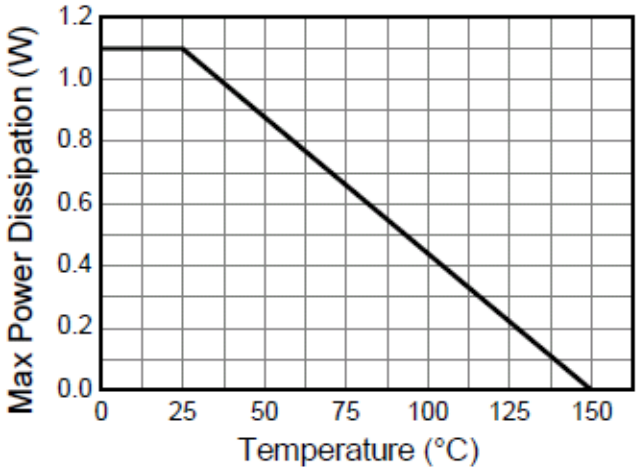
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -100 | — | — | V | $I_D$ = -250µA, $V_{GS}$ = 0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | -0.5 | µA | $V_{DS}$ = -100V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -2.0 | — | -4.0 | V | $I_D$ = -250µA, $V_{DS}$ = $V_{GS}$ |
| Static Drain-Source On-Resistance (Note 8) | $R_{DS(ON)}$ | — | — | 0.350 | Ω | $V_{GS}$ = -10V, $I_D$ = -1.4A |
| | | | | 0.450 | | $V_{GS}$ = -6V, $I_D$ = -1.2A |
| Forward Transconductance (Notes 8 & 9) | $g_{fs}$ | — | 2.8 | — | S | $V_{DS}$ = -15V, $I_D$ = -1.4A |
| Diode Forward Voltage (Note 8) | $V_{SD}$ | — | -0.85 | -0.95 | V | $I_S$ = -1.7A, $V_{GS}$ = 0V |
| Reverse Recovery Time (Note 9) | $t_{RR}$ | — | 33 | — | ns | $I_S$ = -1.5A, di/dt = 100A/µs |
| Reverse Recovery Charge (Note 9) | $Q_{RR}$ | — | 48 | — | nC | |
| **DYNAMIC CHARACTERISTICS** (Note 9) | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 424 | — | pF | $V_{DS}$ = -50V, $V_{GS}$ = 0V<br>f = 1MHz |
| Output Capacitance | $C_{oss}$ | — | 36.6 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 29.8 | — | pF | |
| Total Gate Charge (Note 10) | $Q_g$ | — | 7.1 | — | nC | $V_{GS}$ = -6V<br>$V_{DS}$ = -50V<br>$I_D$ = -1.4A |
| Total Gate Charge (Note 10) | $Q_g$ | — | 10.7 | — | nC | $V_{GS}$ = -10V |
| Gate-Source Charge (Note 10) | $Q_{gs}$ | — | 1.7 | — | nC | |
| Gate-Drain Charge (Note 10) | $Q_{gd}$ | — | 3.8 | — | nC | |
| Turn-On Delay Time (Note 10) | $t_{D(ON)}$ | — | 3 | — | ns | $V_{DD}$ = -50V, $V_{GS}$ = -10V<br>$I_D$ = -1A, $R_G \cong$ 6.0Ω |
| Turn-On Rise Time (Note 10) | $t_R$ | — | 3.5 | — | ns | |
| Turn-Off Delay Time (Note 10) | $t_{D(OFF)}$ | — | 13.4 | — | ns | |
| Turn-Off Fall Time (Note 10) | $t_F$ | — | 7.2 | — | ns | |

Notes:
5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. Same as Note 5, except the device is measured at t ≤ 5 sec.
7. Same as Note 5, except the device is pulsed with D = 0.05 and pulse width 10µs. The pulse current is limited by the maximum junction temperature.
8. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
9. For design aid only, not subject to production testing.
10. Switching characteristics are independent of operating junction temperatures.

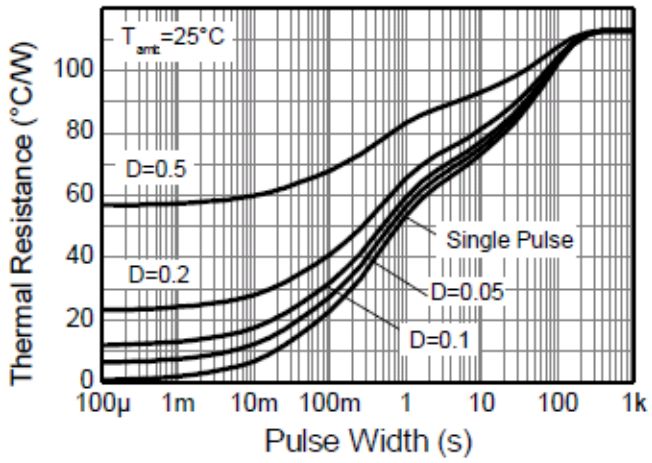

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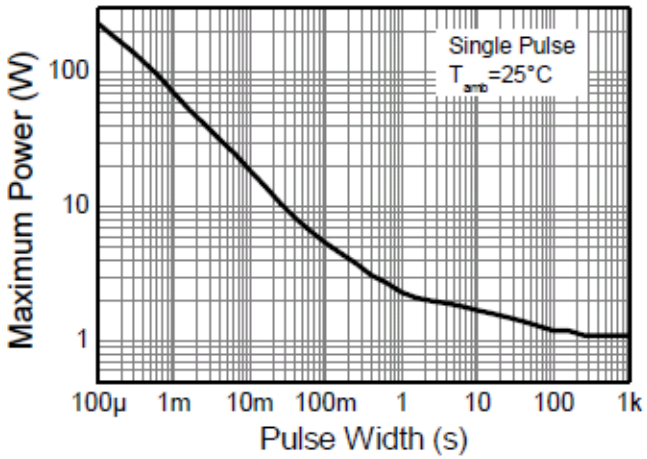

**Safe Operating Area**



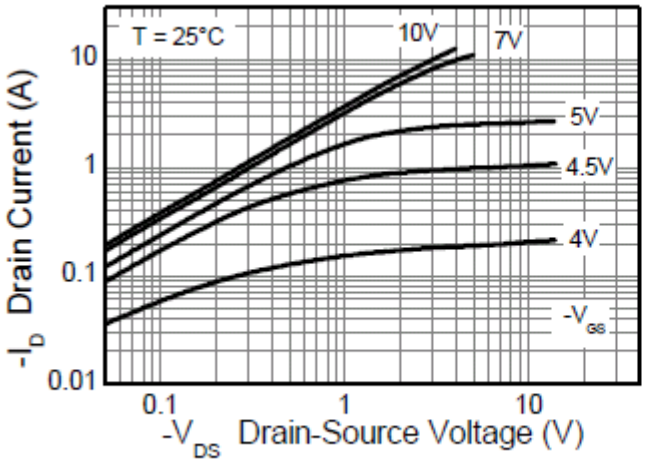

**Derating Curve**



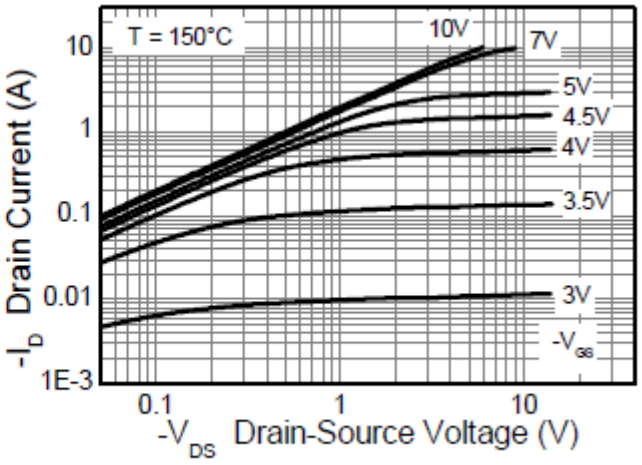

**Transient Thermal Impedance**




**Pulse Power Dissipation**

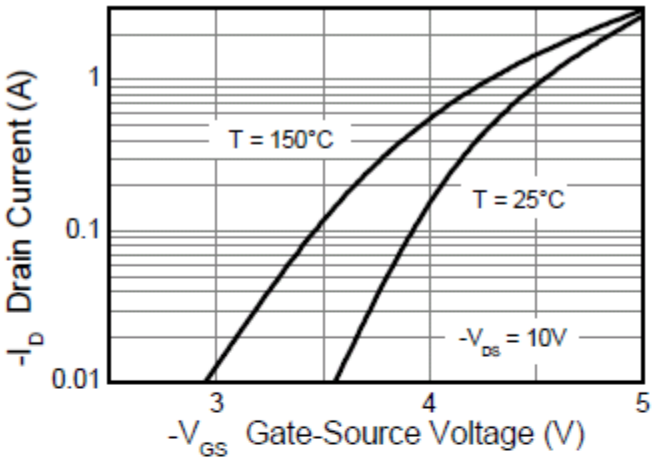



**Output Characteristics**

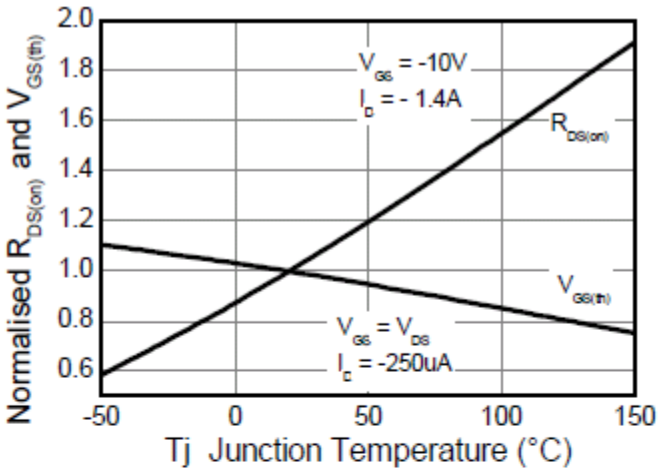



**Output Characteristics**

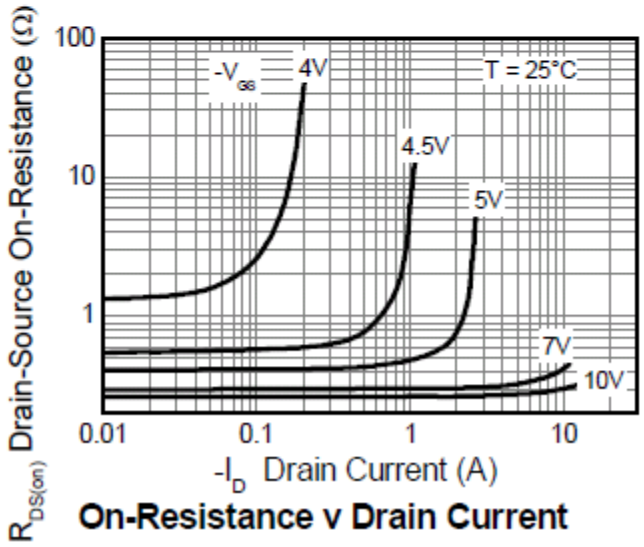

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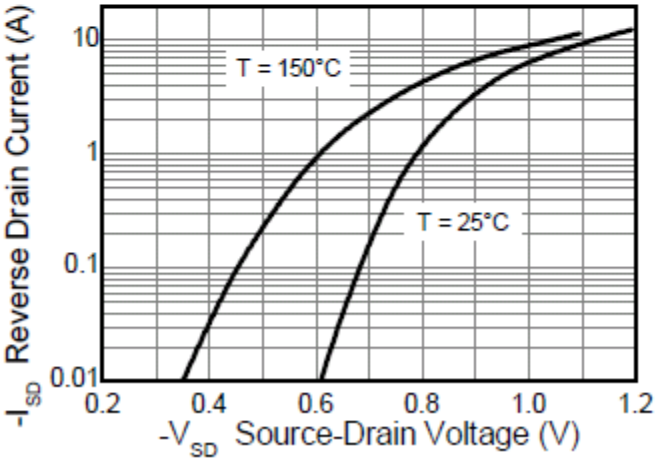

**Typical Transfer Characteristics**



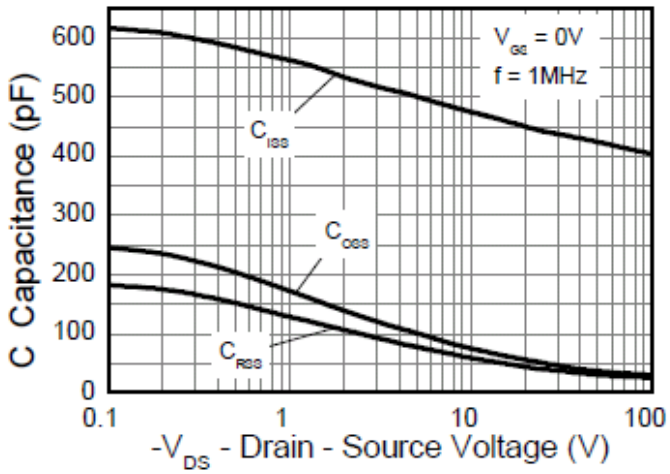

**Normalised Curves v Temperature**



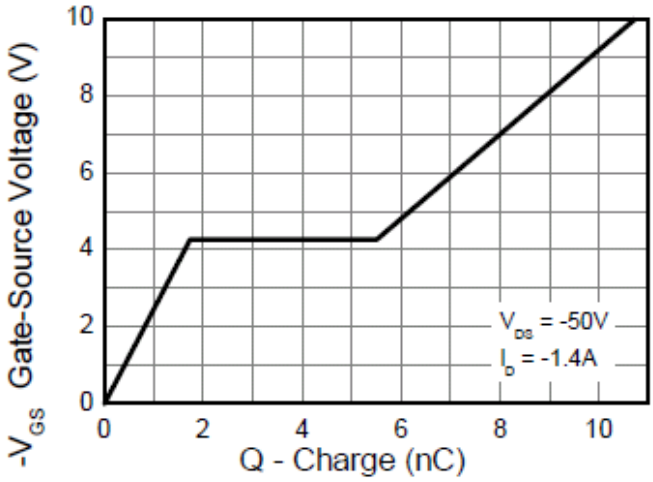

**On-Resistance v Drain Current**




**Source-Drain Diode Forward Voltage**



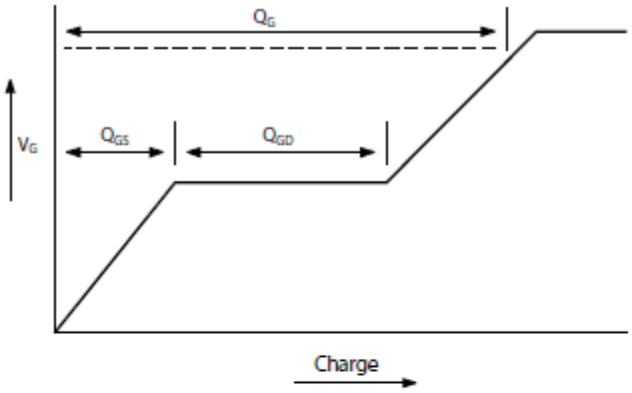

**Capacitance v Drain-Source Voltage**



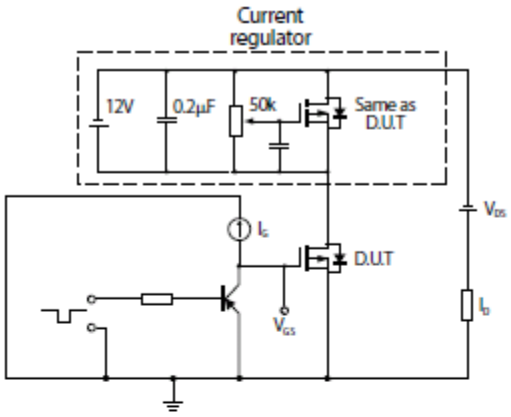

**Gate-Source Voltage v Gate Charge**


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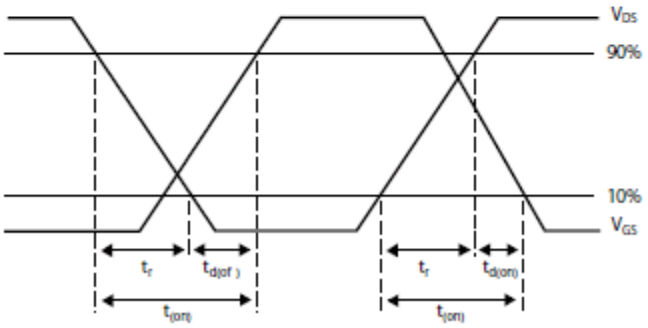
## Test Circuits



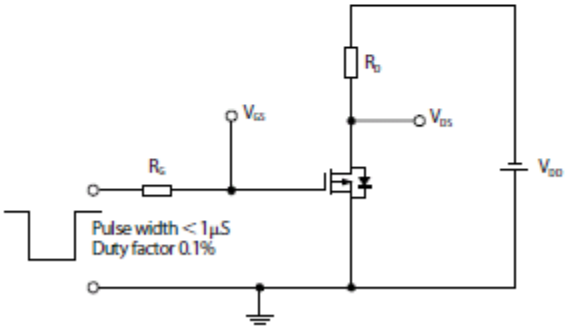

Basic gate charge waveform




Gate charge test circuit




Switching time waveforms



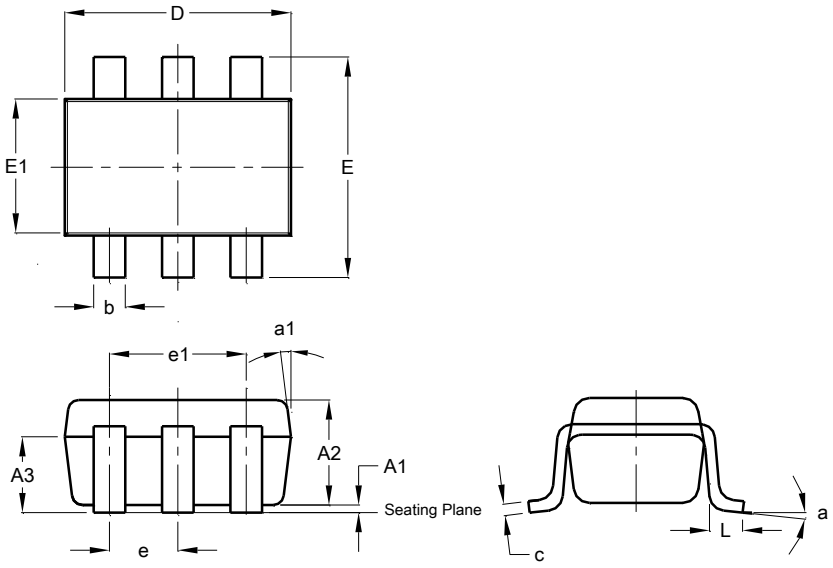

Switching time test circuit


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## Package Outline Dimensions

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

**SOT26**

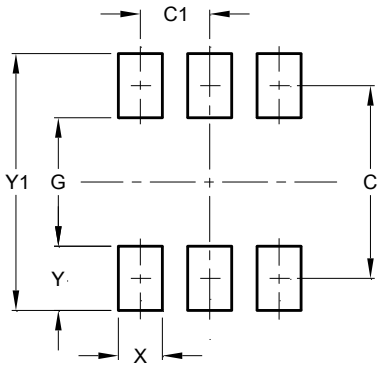



| SOT26 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A1** | 0.013 | 0.10 | 0.05 |
| **A2** | 1.00 | 1.30 | 1.10 |
| **A3** | 0.70 | 0.80 | 0.75 |
| **b** | 0.35 | 0.50 | 0.38 |
| **c** | 0.10 | 0.20 | 0.15 |
| **D** | 2.90 | 3.10 | 3.00 |
| **e** | - | - | 0.95 |
| **e1** | - | - | 1.90 |
| **E** | 2.70 | 3.00 | 2.80 |
| **E1** | 1.50 | 1.70 | 1.60 |
| **L** | 0.35 | 0.55 | 0.40 |
| **a** | - | - | 8° |
| **a1** | - | - | 7° |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**SOT26**



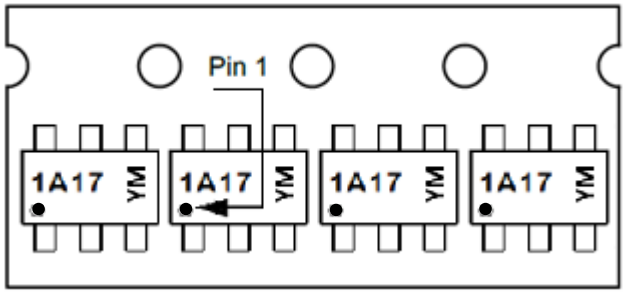

| Dimensions | Value (in mm) |
|---|---|
| **C** | 2.40 |
| **C1** | 0.95 |
| **G** | 1.60 |
| **X** | 0.55 |
| **Y** | 0.80 |
| **Y1** | 3.20 |


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## Tape and Reel Information

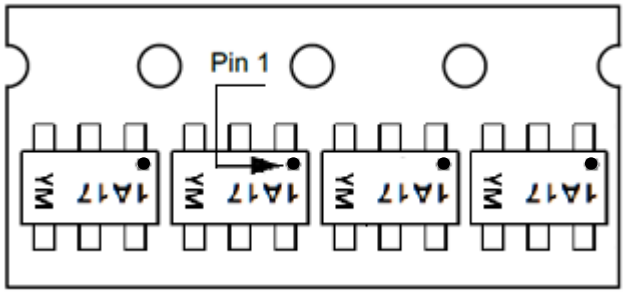
Please see https://www.diodes.com/assets/Packaging-Support-Docs/Ap02007.pdf for the latest version.

**ZXMP10A17E6QTA**




**ZXMP10A17E6QTAR**

Rotate 180 degree of Pin 1 orientation in the carrier tape.





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