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ZXMP6A17E6

60V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on) Max}$ | $I_D Max$ $T_A = +25^\circ C$ (Note 6) |
|---------------|----------------------------------|--|
| -60V | 125m Ω @ $V_{GS} = -10V$ | -3.0 A |
| | 190m Ω @ $V_{GS} = -4.5V$ | -2.4 A |

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

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

Features and Benefits

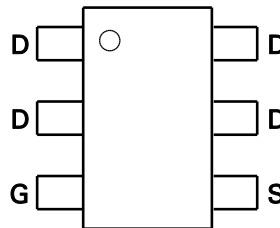
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

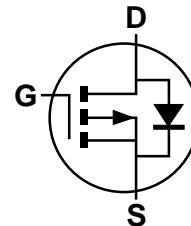
- Case: SOT-26
- Case Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208
- Weight: 0.018 grams (Approximate)



Top View



Pin Out - Top View



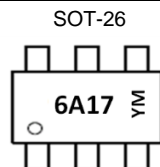
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Compliance | Case | Quantity per reel |
|--------------|------------|--------|-------------------|
| ZXMP6A17E6TA | Standard | SOT-26 | 3,000 |

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

Marking Information



6A17 = 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 | 2026 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | C | D | E | F | G | H | I | J | K | L | M | N |

| 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_A = +25°C, unless otherwise specified.)

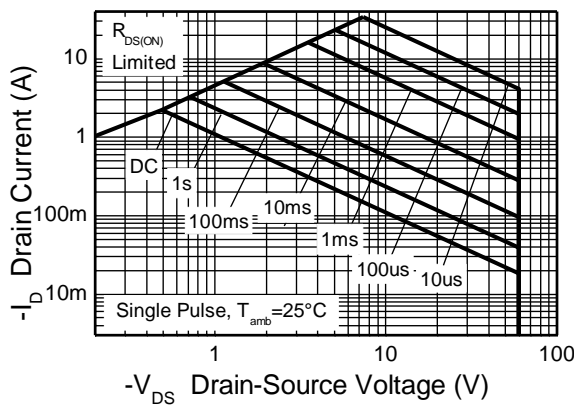
| Characteristic | | Symbol | Value | Unit | |
|--|------------------------|------------------|---------------------------------|------|---|
| Drain-Source Voltage | | V _{DSS} | -60 | V | |
| Gate-Source Voltage | | V _{GS} | ±20 | V | |
| Continuous Drain Current | V _{GS} = -10V | I _D | (Note 6) | -3 | A |
| | | | T _A = +70°C (Note 6) | -2.4 | |
| | | | (Note 5) | -2.3 | |
| Pulsed Drain Current | V _{GS} = -10V | I _{DM} | -13.6 | A | |
| Continuous Source Current (Body Diode) | | I _S | -2.5 | A | |
| Pulsed Source Current (Body Diode) | | I _{SM} | -13.6 | A | |

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

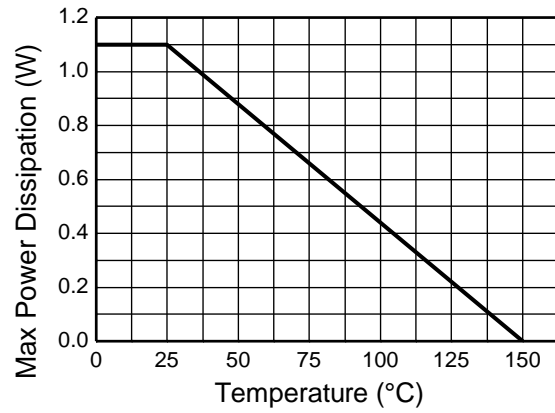
| Characteristic | | Symbol | Value | Unit |
|---|----------|-----------------------------------|-------------|-------|
| Power Dissipation | (Note 5) | P _D | 1.1 | W |
| | | | 8.8 | |
| Linear Derating Factor | (Note 6) | | 1.92 | mW/°C |
| | | | 15.4 | |
| Thermal Resistance, Junction to Ambient | (Note 5) | R _{θJA} | 113 | °C/W |
| | (Note 6) | | 65 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

- Notes: 5. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 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 = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.

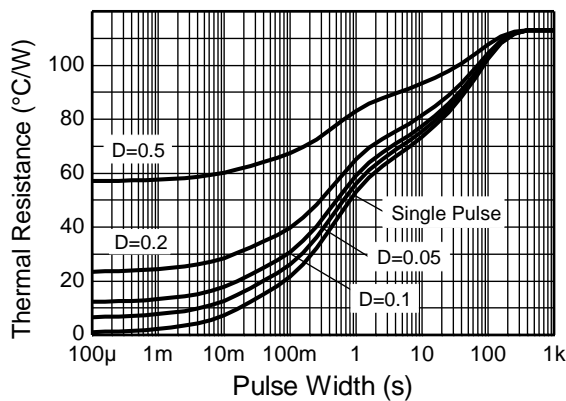
Thermal Characteristics



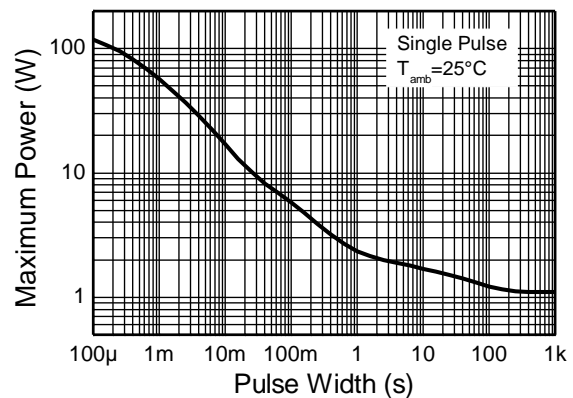
P-channel Safe Operating Area



Derating Curve



Transient Thermal Impedance



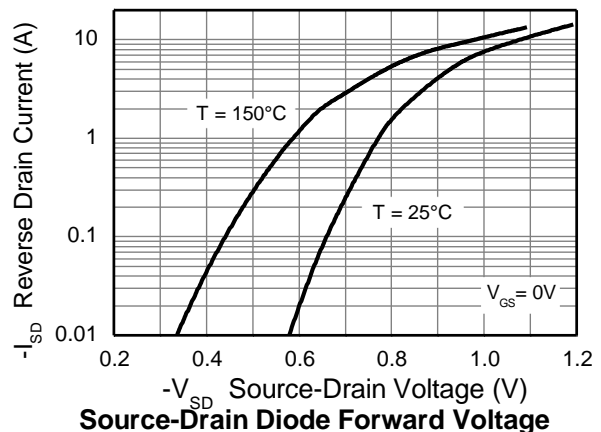
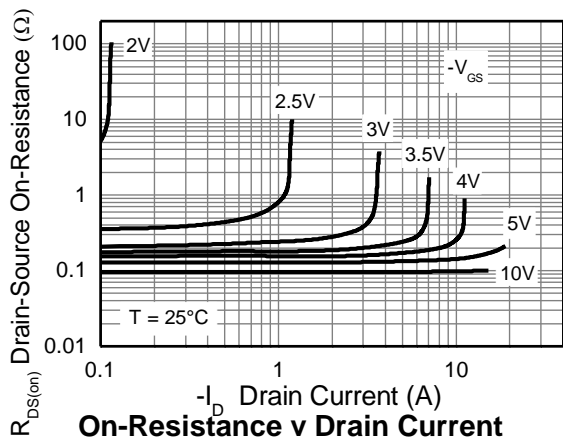
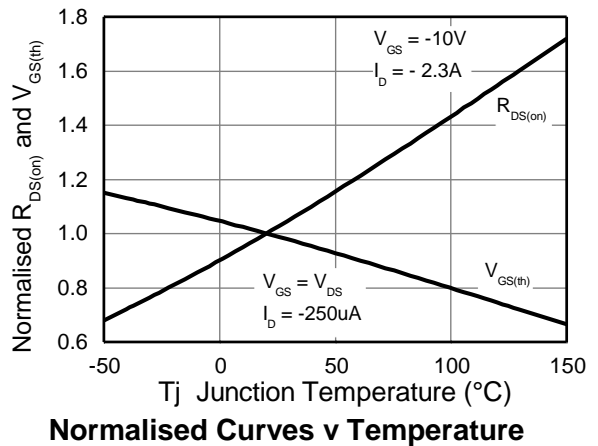
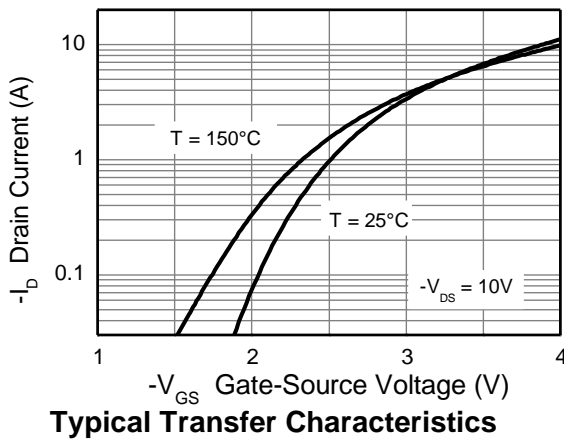
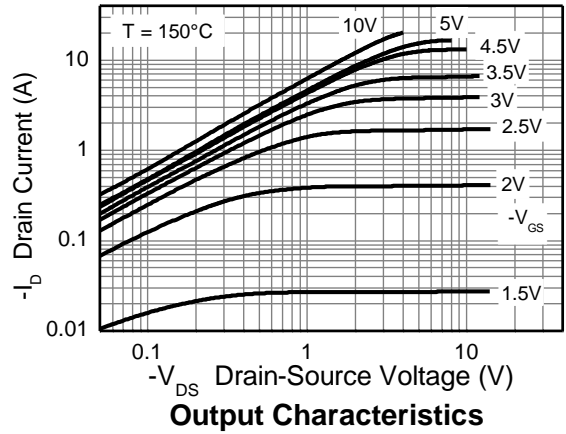
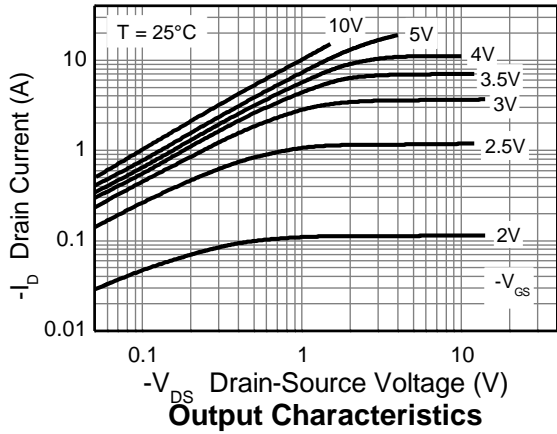
Pulse Power Dissipation

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

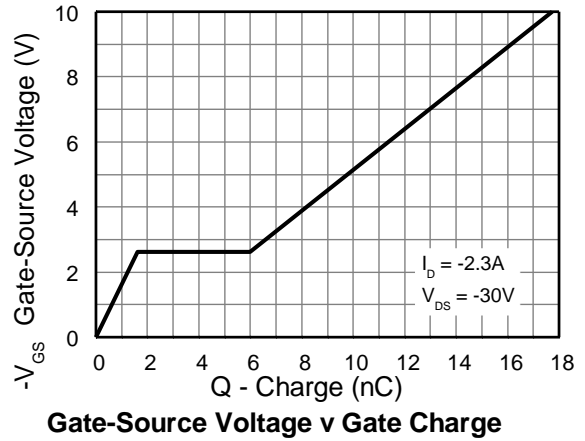
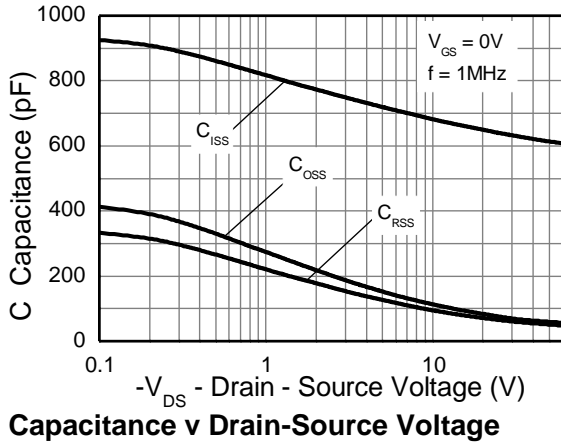
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|-------|-------|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -60 | — | — | V | I _D = -250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1 | μA | V _{DS} = -60V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -1 | — | -3 | V | I _D = -250μA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 8) | R _{DS(on)} | — | 0.100 | 0.125 | Ω | V _{GS} = -10V, I _D = -2.3A |
| | | | 0.130 | 0.190 | | V _{GS} = -4.5V, I _D = -1.9A |
| Forward Transconductance (Notes 8 & 9) | g _{fs} | — | 4.7 | — | S | V _{DS} = -15V, I _D = -2.3A |
| Diode Forward Voltage (Note 8) | V _{SD} | — | -0.85 | -0.95 | V | I _S = -2A, V _{GS} = 0V |
| Reverse Recovery Time (Note 9) | t _{rr} | — | 25.1 | — | ns | I _F = -1.7A, di/dt = 100A/μs |
| Reverse Recovery Charge (Note 9) | Q _{rr} | — | 27.2 | — | nC | |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 637 | — | pF | V _{DS} = -30V, V _{GS} = 0V f = 1MHz |
| Output Capacitance | C _{oss} | — | 70 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 53 | — | pF | |
| Total Gate Charge (Note 10) | Q _g | — | 9.8 | — | nC | V _{GS} = -5V |
| Total Gate Charge (Note 10) | Q _g | — | 17.7 | — | nC | V _{GS} = -10V |
| Gate-Source Charge (Note 10) | Q _{gs} | — | 1.6 | — | nC | |
| Gate-Drain Charge (Note 10) | Q _{gd} | — | 4.4 | — | nC | |
| Turn-On Delay Time (Note 10) | t _{D(on)} | — | 2.6 | — | ns | V _{DD} = -30V, V _{GS} = -10V I _D = -1A, R _G ≅ 6Ω |
| Turn-On Rise Time (Note 10) | t _r | — | 3.4 | — | ns | |
| Turn-Off Delay Time (Note 10) | t _{D(off)} | — | 26.2 | — | ns | |
| Turn-Off Fall Time (Note 10) | t _f | — | 11.3 | — | ns | |
| Turn-Off Fall Time (Note 10) | t _f | — | 11.3 | — | ns | |

- Notes:
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.

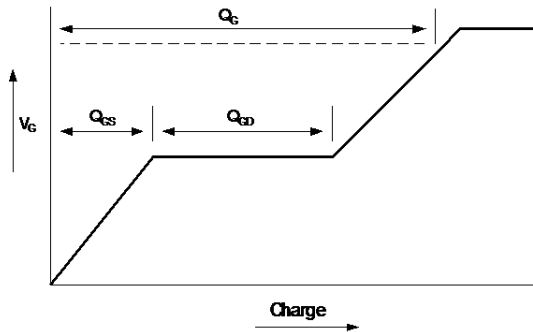
Typical Characteristics



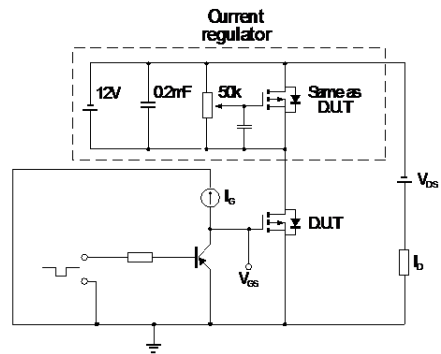
Typical Characteristics (cont.)



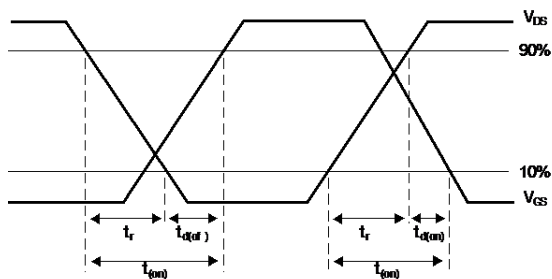
Test Circuits



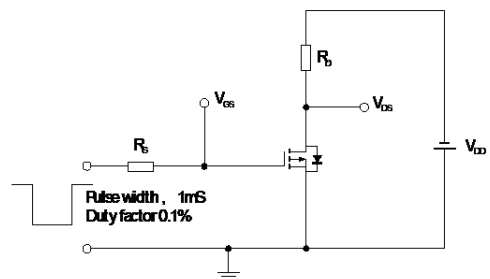
Basic gate charge waveform



Gate charge test circuit



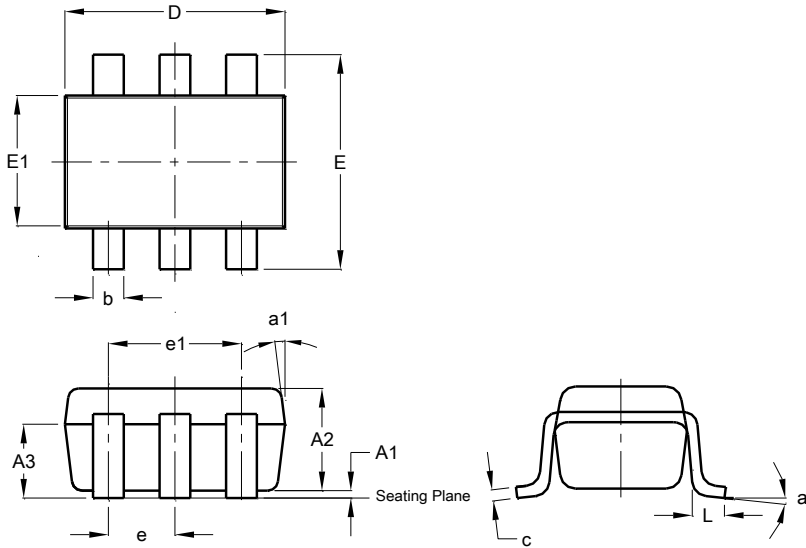
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

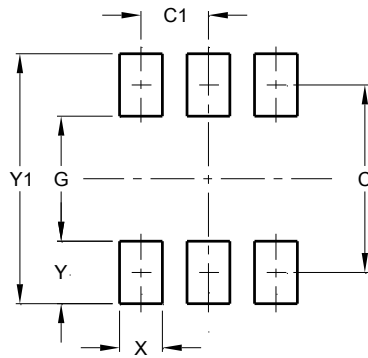
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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



| 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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