



**THE DATASHEET OF
ZXMN2069FTA**



60V N-CANNEL ENHANCEMENT MODE MOSFET
Product Summary

| $V_{(BR)DSS}$ | Max $R_{DS(ON)}$ | Max I_D $T_A = +25^\circ C$ (Note 7) |
|---------------|---------------------------------|--|
| 60V | 250m Ω @ $V_{GS} = 10V$ | 1.4A |
| | 350m Ω @ $V_{GS} = 4.5V$ | 1.2A |

Description

This MOSFET utilizes a unique structure that combines the benefits of low on-resistance with a fast switching speed, making it ideal for high-efficiency power management applications.

Applications

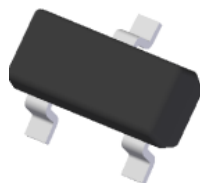
- DC-DC Converters
- Power Management Functions
- Relay And Solenoid Driving
- Motor Control

Features

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Charge
- **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)**

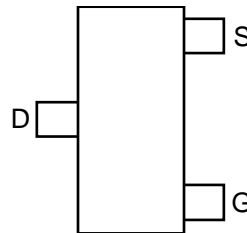
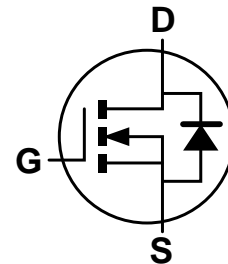
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish e3
- Weight: 0.008 grams (Approximate)



Top View

SOT23

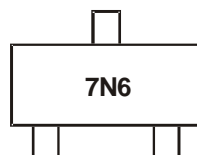

 Top View
Pin Out


Equivalent Circuit

Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|------------|---------|--------------------|-----------------|-------------------|
| ZXMN6A07FTA | AEC-Q101 | 7N6 | 7 | 8 | 3,000 |
| ZXMN6A07FQTA | Automotive | 7N6 | 7 | 8 | 3,000 |

- 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> 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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


7N6 = Product Type Marking Code

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

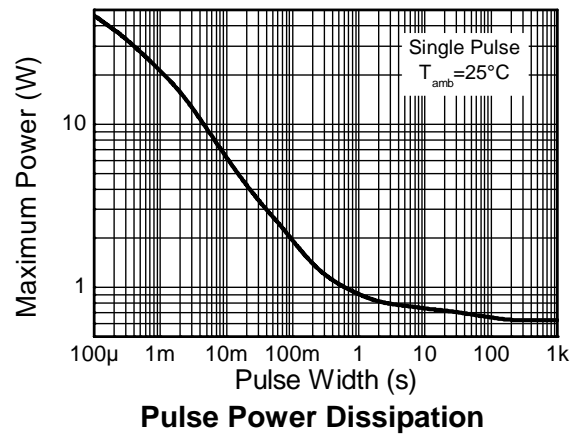
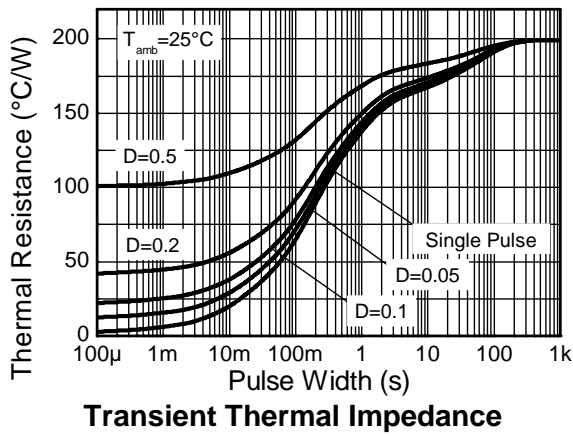
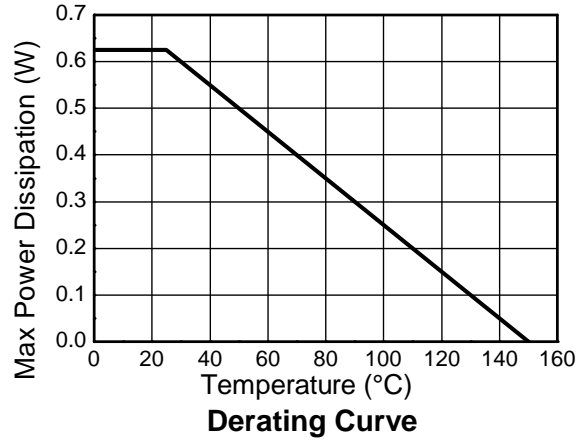
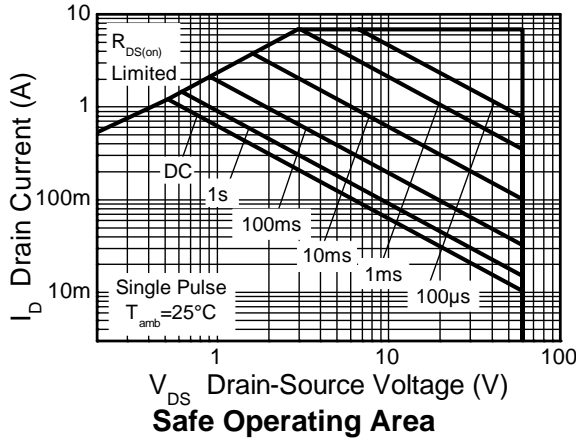
| Characteristic | | | Symbol | Value | Units |
|---|-----------------------|---------------------------------|------------------|-------|-------|
| Drain-Source Voltage | | | V _{DSS} | 60 | V |
| Gate-Source Voltage | | | V _{GS} | ±20 | V |
| Continuous Drain Current | V _{GS} = 10V | T _A = +25°C (Note 7) | I _D | 1.4 | A |
| | | T _A = +70°C (Note 7) | | 1.1 | |
| | | T _A = +25°C (Note 6) | | 1.2 | |
| Pulsed Drain Current (Note 8) | | | I _{DM} | 6.9 | A |
| Continuous Source Current (Body Diode) (Note 7) | | | I _S | 1 | A |
| Pulsed Source Current (Body Diode) (Note 8) | | | I _{SM} | 6.9 | A |

Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|--|----------|-----------------------------------|-------------|-------|
| Power Dissipation (Note 6) | | P _D | 625 | mW |
| Linear Derating Factor | | | 5 | mW/°C |
| Power Dissipation (Note 7) | | P _D | 806 | mW |
| Linear Derating Factor | | | 6.4 | mW/°C |
| Thermal Resistance, Junction to Ambient | (Note 6) | R _{θJA} | 200 | °C/W |
| | (Note 7) | | 155 | |
| Thermal Resistance, Junction to Ambient (Note 9) | | R _{θJL} | 194 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

- Notes:
6. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 7. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
 8. Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300μs - pulse current limited by maximum junction temperature.
 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics (continued)

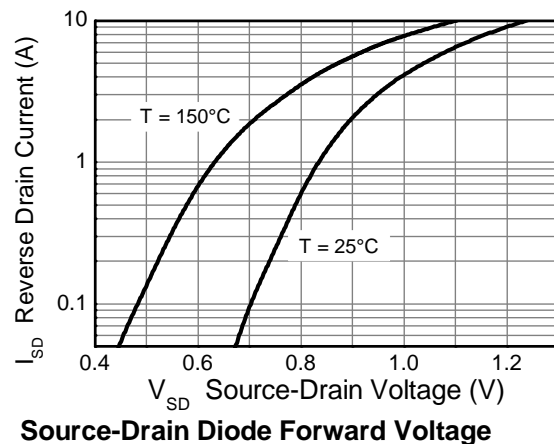
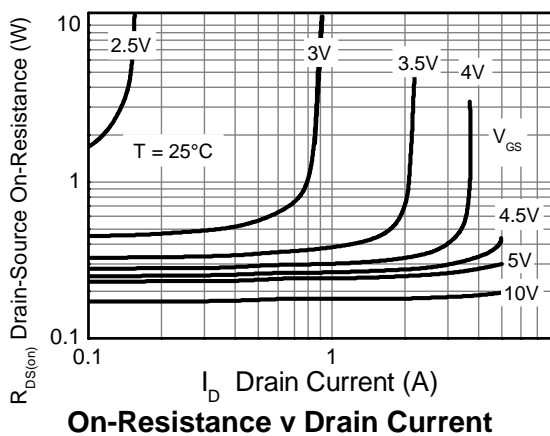
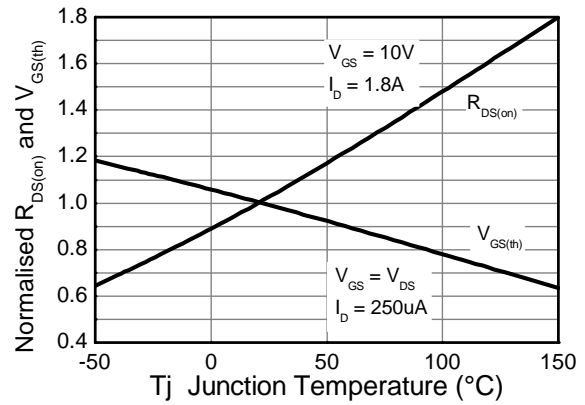
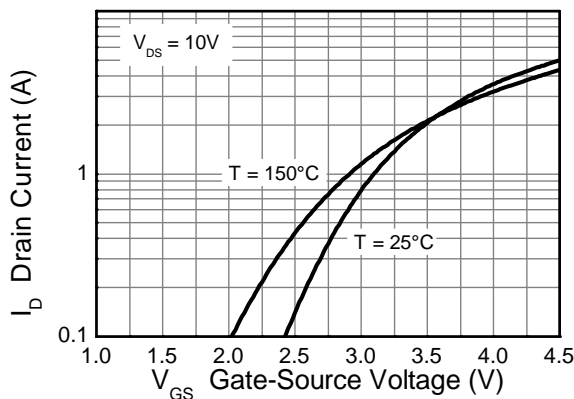
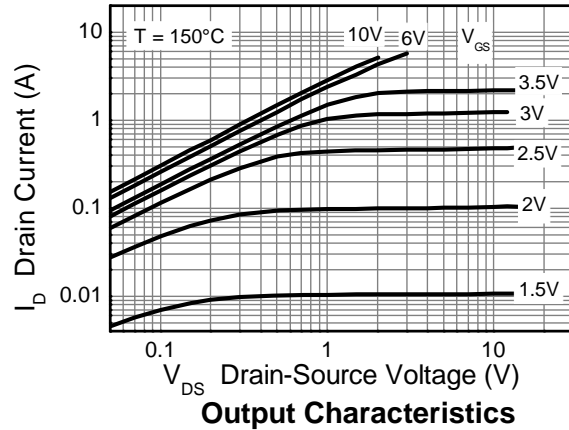
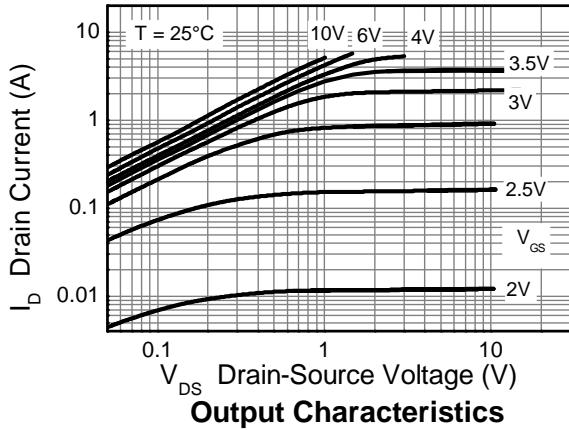


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

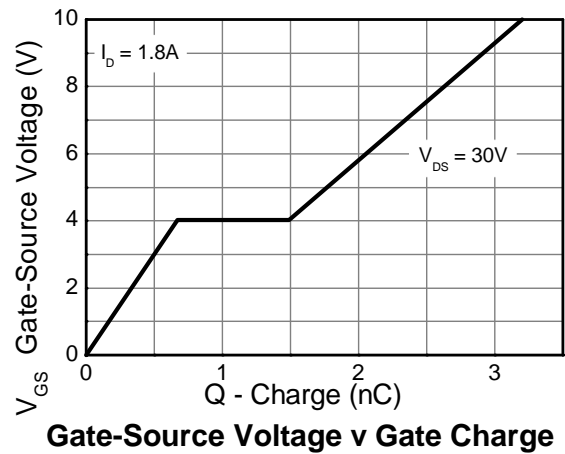
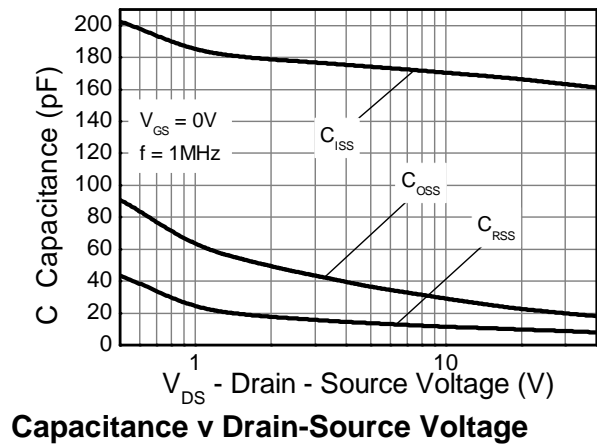
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------------|-----|------|-------|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | — | — | V | I _D = 250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 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)} | 1.0 | — | 3.0 | V | I _D = 250μA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 10) | R _{DS(ON)} | — | — | 0.250 | Ω | V _{GS} = 10V, I _D = 1.8A |
| | | | | 0.350 | | V _{GS} = 4.5V, I _D = 1.3A |
| Forward Transconductance (Notes 10 and 12) | g _{fs} | — | 2.3 | — | S | V _{DS} = 15V, I _D = 1.8A |
| Diode Forward Voltage (Note 10) | V _{SD} | — | 0.8 | 0.95 | V | T _J = +25°C, I _S = 0.45A, V _{GS} = 0V |
| Reverse Recovery Time (Note 12) | t _{rr} | — | 20.5 | — | ns | T _J = +25°C, I _F = 1.8A, |
| Reverse Recovery Charge (Note 12) | Q _{rr} | — | 21.3 | — | nC | di/dt = 100A/μs |
| DYNAMIC CHARACTERISTICS (Note 12) | | | | | | |
| Input Capacitance | C _{iss} | — | 166 | — | pF | V _{DD} = 40V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 19.5 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 8.7 | — | | |
| Turn-On Delay Time (Note 11) | t _{D(on)} | — | 1.8 | — | ns | V _{DD} = 30V, I _D = 1.8A, R _G ≅ 6.0Ω, V _{GS} = 10V |
| Turn-On Rise Time (Note 11) | t _r | — | 1.4 | — | | |
| Turn-Off Delay Time (Note 11) | t _{D(off)} | — | 4.9 | — | | |
| Turn-Off Fall Time (Note 11) | t _f | — | 2.0 | — | | |
| Total Gate Charge (Note 11) | Q _g | — | 1.65 | — | nC | V _{DS} = 30V, V _{GS} = 5V, I _D = 1.8A |
| Total Gate Charge (Note 11) | Q _g | — | 3.2 | — | nC | V _{DS} = 30V, V _{GS} = 10V, I _D = 1.8A |
| Gate-Source Charge (Note 11) | Q _{gs} | — | 0.67 | — | | |
| Gate-Drain Charge (Note 11) | Q _{gd} | — | 0.82 | — | | |

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

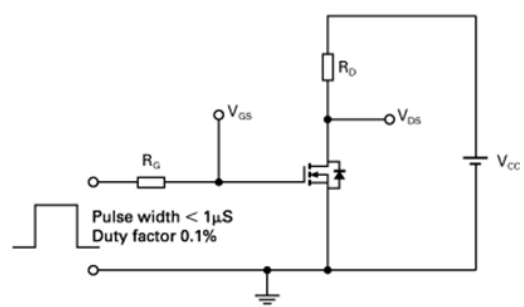
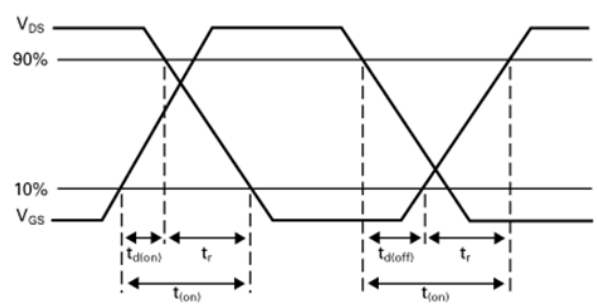
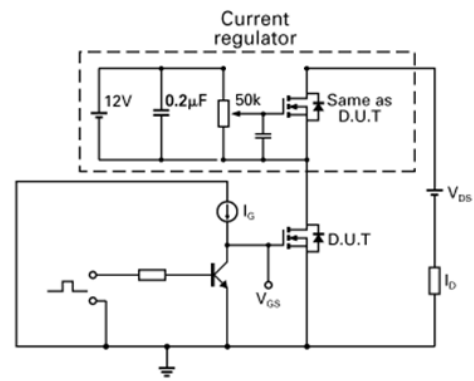
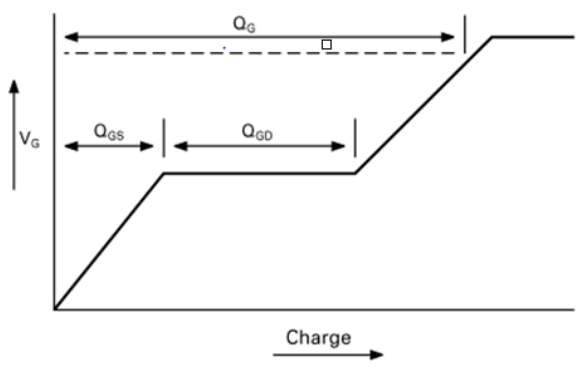
Typical Characteristics



Typical Characteristics (continued)



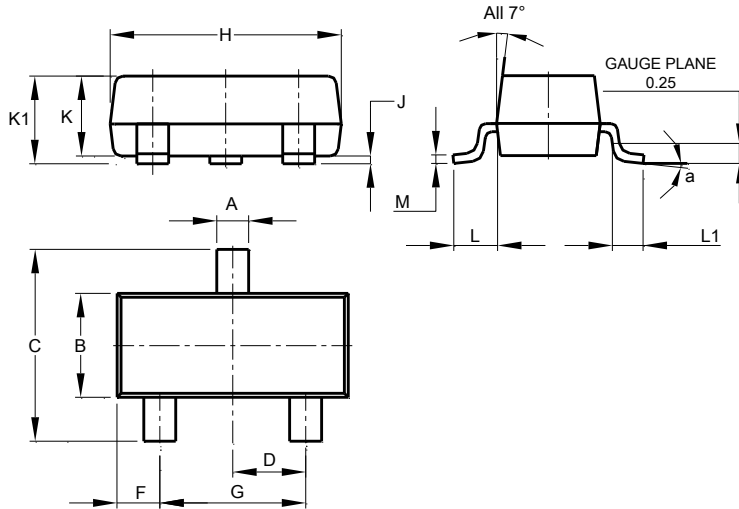
Test Circuits



Package Outline Dimensions

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

SOT23

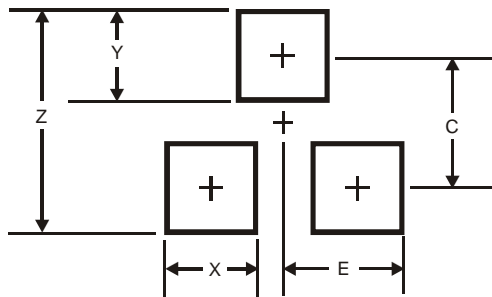


| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.890 | 1.00 | 0.975 |
| K1 | 0.903 | 1.10 | 1.025 |
| L | 0.45 | 0.61 | 0.55 |
| L1 | 0.25 | 0.55 | 0.40 |
| M | 0.085 | 0.150 | 0.110 |
| a | 8° | | |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.9 |
| X | 0.8 |
| Y | 0.9 |
| C | 2.0 |
| E | 1.35 |

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