



ZXMN6A08E6

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ | I_D $T_A = 25^\circ C$ |
|---------------|-------------------------------|-----------------------------|
| 100V | 80m Ω @ $V_{GS}=10V$ | 3.5A |
| | 150m Ω @ $V_{GS}=4.5V$ | 2.5A |

Description and Applications

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

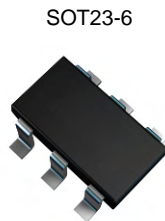
- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control

Features and Benefits

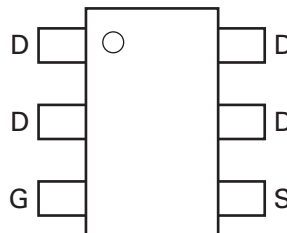
- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- **“Green” component and RoHS compliant (Note 1)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

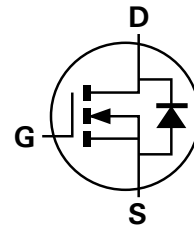
- Case: SOT23-6
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.018 grams (approximate)



Top View



Pin Out - Top View



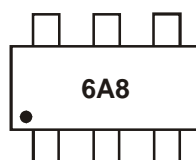
Equivalent Circuit

Ordering Information (Note 1)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|-----------|--------------------|-----------------|-------------------|
| ZXMN6A08E6TA | See below | 7 | 8 | 3,000 |

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

Marking Information



6A8 = Product Type Marking Code

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

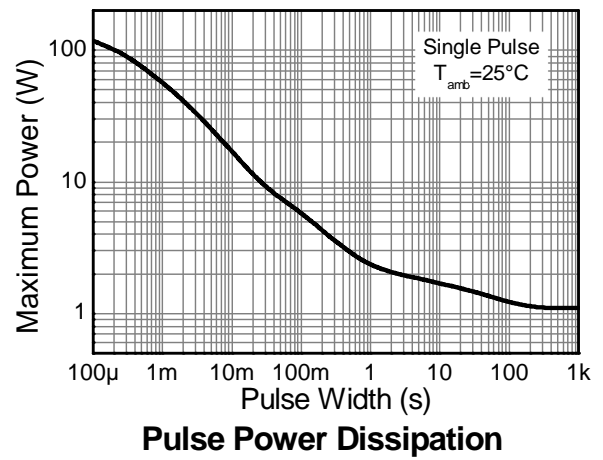
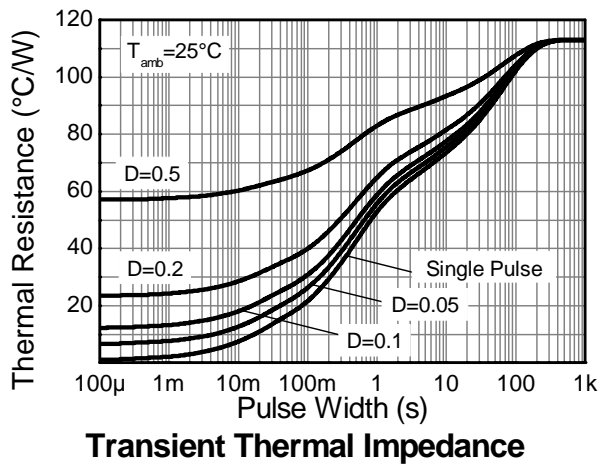
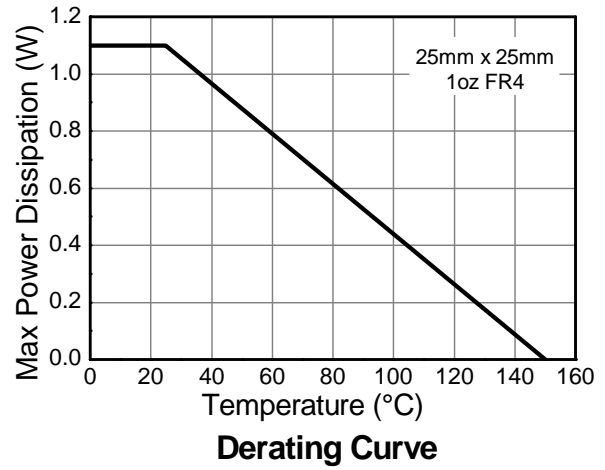
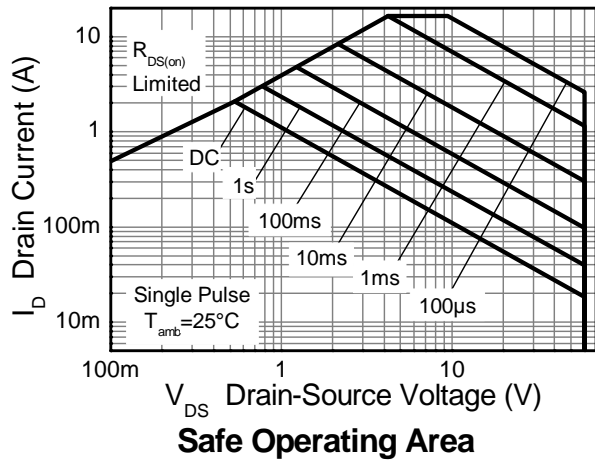
| Characteristic | | | Symbol | Value | Unit | |
|--|-----------------------|-----------------------------------|-----------|----------|------|---|
| Drain-Source voltage | | | V_{DSS} | 60 | V | |
| Gate-Source voltage | | | V_{GS} | ± 20 | V | |
| Continuous Drain current | $V_{GS} = 10\text{V}$ | (Note 3) | I_D | 3.5 | A | |
| | | $T_A = 70^\circ\text{C}$ (Note 3) | | 2.8 | | |
| | | (Note 2) | | 2.8 | | |
| Pulsed Drain current | $V_{GS} = 10\text{V}$ | (Note 4) | I_{DM} | 16 | A | |
| Continuous Source current (Body diode) | | | (Note 3) | I_S | 2.6 | A |
| Pulsed Source current (Body diode) | | | (Note 4) | I_{SM} | 16 | A |

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | | | Symbol | Value | Unit |
|---|------------------------|-----------------|----------------|---------------------------|------------------|
| Power dissipation | Linear derating factor | (Note 2) | P_D | 1.1 | W |
| | | (Note 3) | | 8.8 | |
| | | (Note 3) | | 1.7 | |
| Thermal Resistance, Junction to Ambient | (Note 1) | $R_{\theta JA}$ | 113 | $^\circ\text{C}/\text{W}$ | |
| | (Note 3) | | 73 | | |
| Operating and storage temperature range | | | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

- Notes:
2. 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.
 3. Same as note (2), except the device is measured at $t \leq 10$ sec.
 4. Same as note (2), except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.

Thermal Characteristics

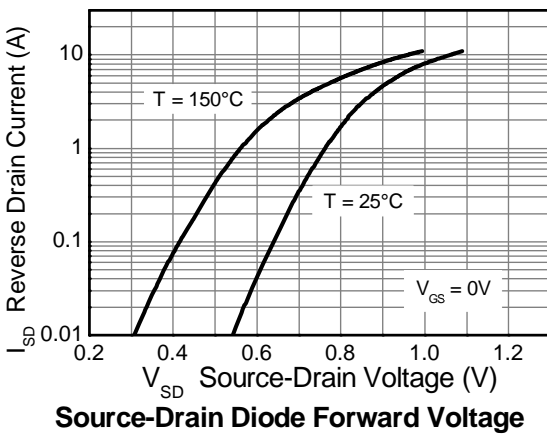
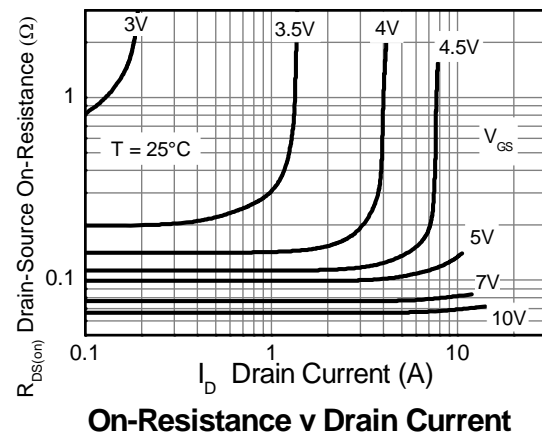
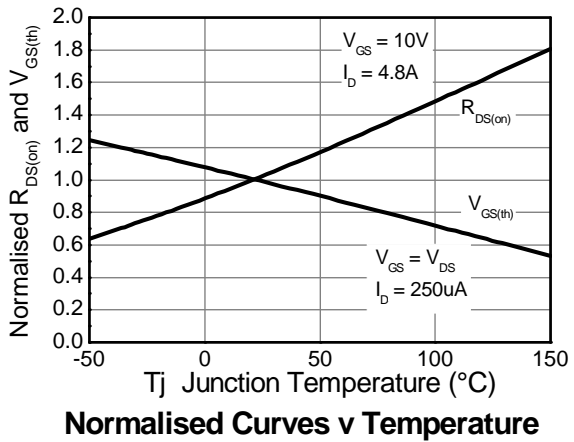
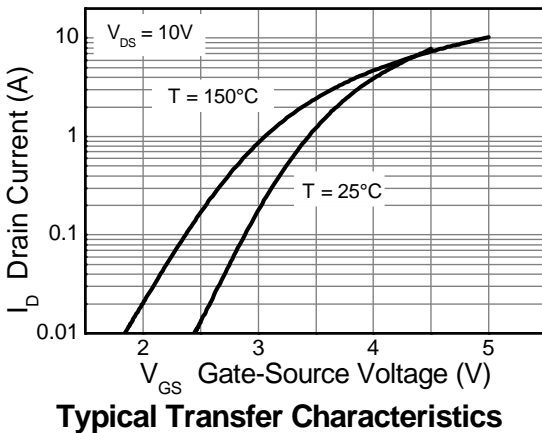
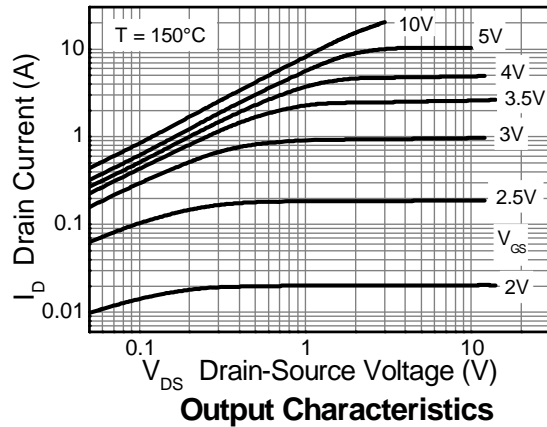
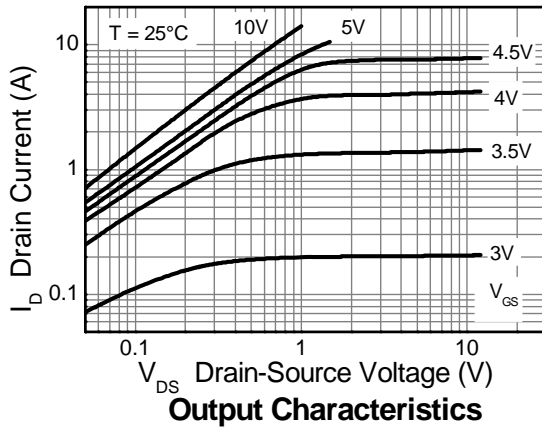


Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

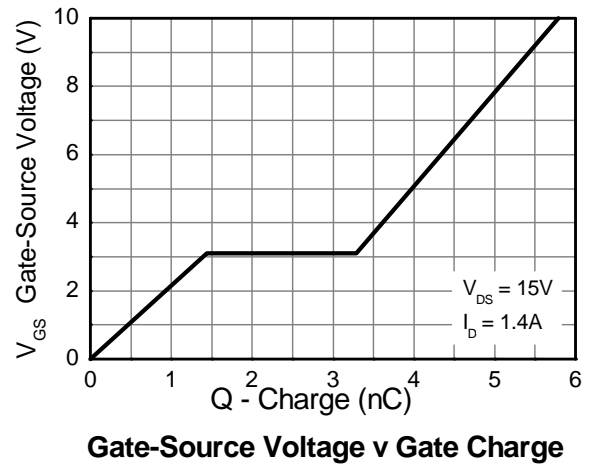
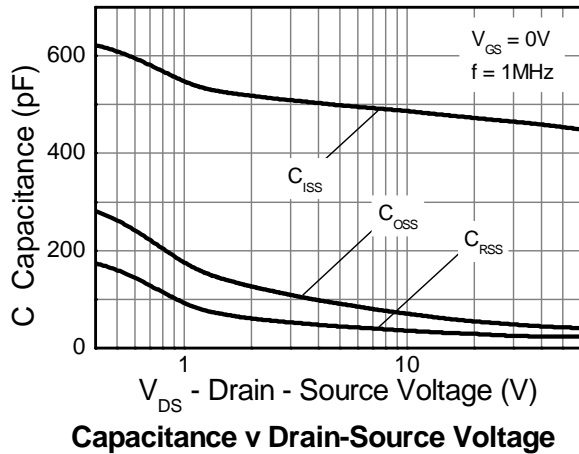
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|-----|-------|-----------|---------------|--|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 60 | — | — | V | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 0.5 | μA | $V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | — | — | V | $I_D = 250\mu\text{A}, V_{DS} = V_{GS}$ |
| Static Drain-Source On-Resistance (Note 5) | $R_{DS(on)}$ | — | 0.067 | 0.080 | Ω | $V_{GS} = 10\text{V}, I_D = 4.8\text{A}$ |
| | | | 0.100 | 0.150 | | $V_{GS} = 4.5\text{V}, I_D = 4.2\text{A}$ |
| Forward Transconductance (Notes 5 & 6) | g_{fs} | — | 6.6 | — | S | $V_{DS} = 15\text{V}, I_D = 4.8\text{A}$ |
| Diode Forward Voltage (Note 5) | V_{SD} | — | 0.88 | 1.2 | V | $I_S = 4\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$ |
| Reverse recovery time (Note 6) | t_{rr} | — | 19.2 | — | ns | $I_F = 1.4\text{A}, di/dt = 100\text{A}/\mu\text{s}, T_J = 25^\circ\text{C}$ |
| Reverse recovery charge (Note 6) | Q_{rr} | — | 30.3 | — | nC | |
| DYNAMIC CHARACTERISTICS (Note 6) | | | | | | |
| Input Capacitance | C_{iss} | — | 459 | — | pF | $V_{DS} = 40\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 44.2 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | — | 24.1 | — | pF | |
| Total Gate Charge (Note 7) | Q_g | — | 3.7 | — | nC | $V_{GS} = 4.5\text{V}$ |
| Total Gate Charge (Note 7) | Q_g | — | 5.8 | — | nC | $V_{GS} = 10\text{V}$ |
| Gate-Source Charge (Note 7) | Q_{gs} | — | 1.4 | — | nC | |
| Gate-Drain Charge (Note 7) | Q_{gd} | — | 1.9 | — | nC | |
| Turn-On Delay Time (Note 7) | $t_{D(on)}$ | — | 2.6 | — | ns | $V_{DD} = 30\text{V}, V_{GS} = 10\text{V}$ $I_D = 1.5\text{A}, R_G \cong 6.0\Omega$ |
| Turn-On Rise Time (Note 7) | t_r | — | 2.1 | — | ns | |
| Turn-Off Delay Time (Note 7) | $t_{D(off)}$ | — | 12.3 | — | ns | |
| Turn-Off Fall Time (Note 7) | t_f | — | 4.6 | — | ns | |

- Notes:
5. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$
 6. For design aid only, not subject to production testing.
 7. Switching characteristics are independent of operating junction temperatures.

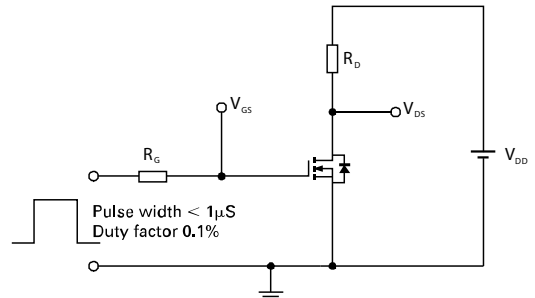
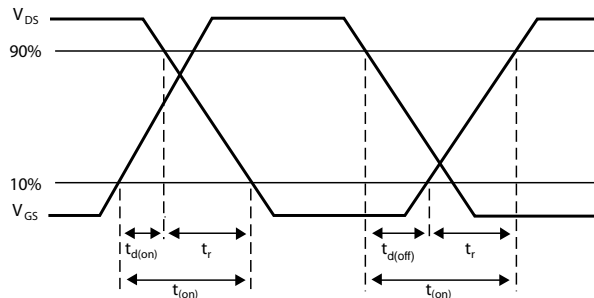
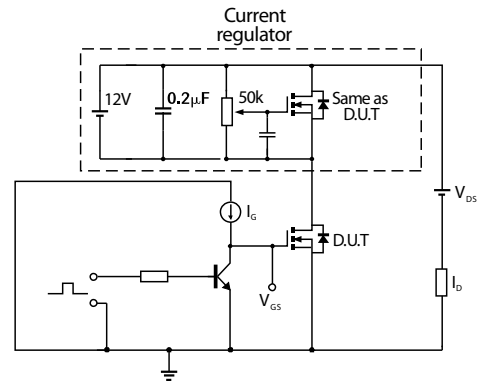
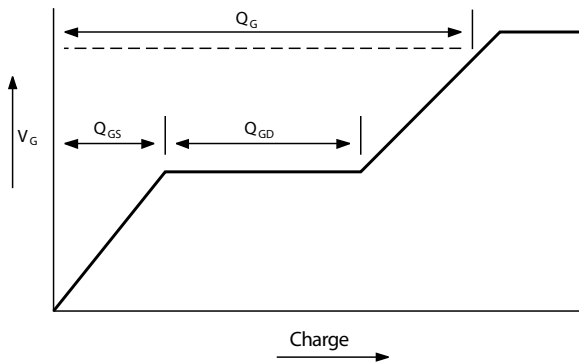
Typical Characteristics



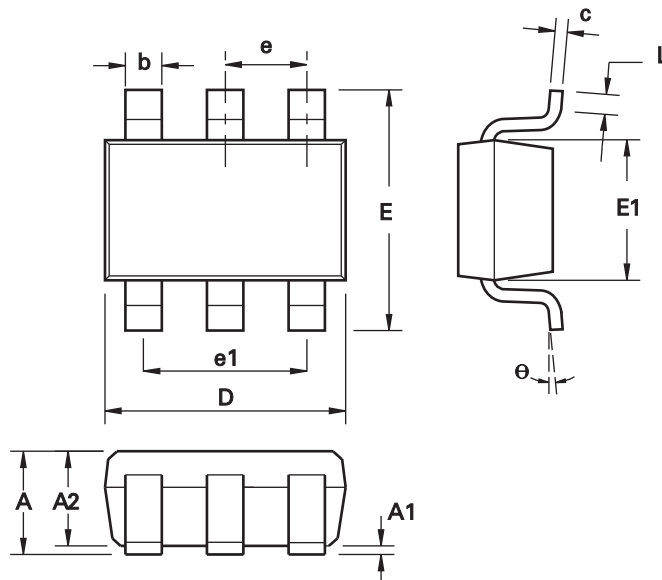
Typical Characteristics – continued



Test Circuits

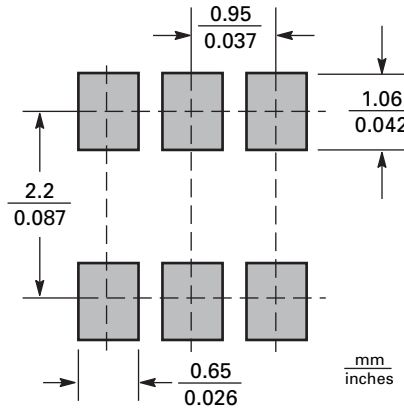


Package Outline Dimensions



| DIM | Millimeters | | Inches | |
|-----|-------------|------|------------|--------|
| | Min | Max | Min | Max |
| A | 0.90 | 1.45 | 0.354 | 0.0570 |
| A1 | 0.00 | 0.15 | 0.00 | 0.0059 |
| A2 | 0.90 | 1.30 | 0.0354 | 0.0511 |
| b | 0.20 | 0.50 | 0.0078 | 0.0196 |
| C | 0.09 | 0.26 | 0.0035 | 0.0102 |
| D | 2.70 | 3.10 | 0.1062 | 0.1220 |
| E | 2.20 | 3.20 | 0.0866 | 0.1181 |
| E1 | 1.30 | 1.80 | 0.0511 | 0.0708 |
| L | 0.10 | 0.60 | 0.0039 | 0.0236 |
| e | 0.95 REF | | 0.0374 REF | |
| e1 | 1.90 REF | | 0.0748 REF | |
| θ | 0° | 30° | 0° | 30° |

Suggested Pad Layout



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