

# ZXMN6A08E6

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## 60V N-CANNEL ENHANCEMENT MODE MOSFET

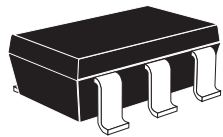
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### SUMMARY

$V_{(BR)DSS} = 60V$ ;  $R_{DS(ON)} = 0.100\Omega$   $I_D = 3.0A$

### DESCRIPTION

This new generation of TRENCH MOSFETs 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.



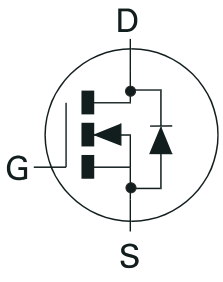
SOT23-6

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23-6 package

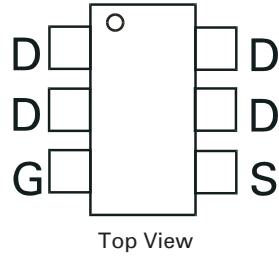
### APPLICATIONS

- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control



### ORDERING INFORMATION

| DEVICE       | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|--------------|-----------|------------|-------------------|
| ZXMN6A08E6TA | 7"        | 8mm        | 3000 units        |
| ZXMN6A08E6TC | 13"       | 8mm        | 10000 units       |



### DEVICE MARKING

- 6A8

# ZXMN6A08E6

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER  | SYMBOL        | LIMIT             | UNIT                |
|--|---------------|-------------------|---------------------|
| Drain-Source Voltage   | $V_{DSS}$     | 60                | V                   |
| Gate Source Voltage  | $V_{GS}$      | $\pm 20$          | V                   |
| Continuous Drain Current $V_{GS}=10V$ ; $T_A=25^\circ C$ (b)<br>$V_{GS}=10V$ ; $T_A=70^\circ C$ (b)<br>$V_{GS}=10V$ ; $T_A=25^\circ C$ (a) | $I_D$         | 3.0<br>2.4<br>2.4 | A                   |
| Pulsed Drain Current (c)   | $I_{DM}$      | 4.0               | A                   |
| Continuous Source Current (Body Diode) (b)   | $I_S$         | 2.6               | A                   |
| Pulsed Source Current (Body Diode) (c)   | $I_{SM}$      | 6.4               | A                   |
| Power Dissipation at $T_A=25^\circ C$ (a)<br>Linear Derating Factor  | $P_D$         | 1.1<br>8.8        | W<br>mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (b)<br>Linear Derating Factor  | $P_D$         | 1.7<br>13.6       | W<br>mW/ $^\circ C$ |
| Operating and Storage Temperature Range  | $T_j:T_{stg}$ | -55 to +150       | $^\circ C$          |

## THERMAL RESISTANCE

| PARAMETER               | SYMBOL          | VALUE | UNIT         |
|-------------------------|-----------------|-------|--------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 113   | $^\circ C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 73    | $^\circ C/W$ |

### NOTES

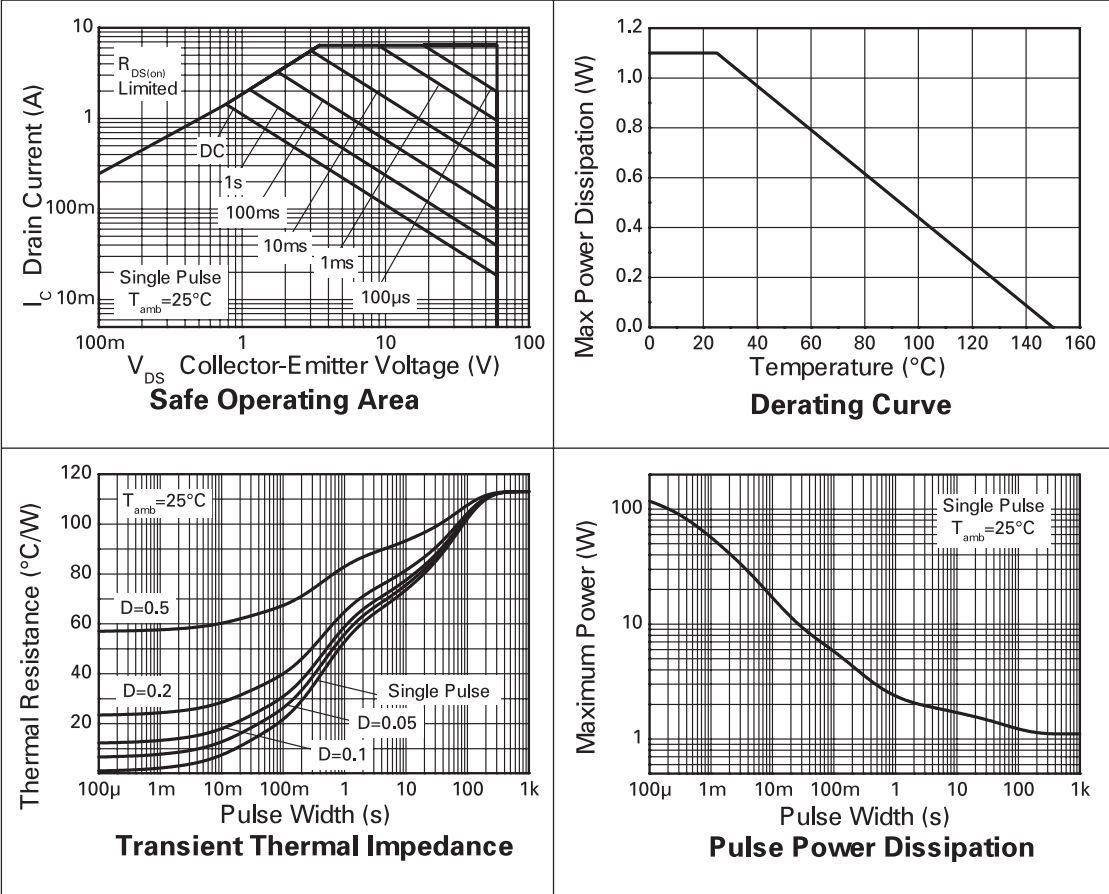
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  secs.

(c) Repetitive rating 25mm x 25mm FR4 PCB,  $D = 0.05$ , pulse width 10 $\mu s$  - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

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## CHARACTERISTICS



# ZXMN6A08E6

**ELECTRICAL CHARACTERISTICS** (at  $T_A = 25^\circ\text{C}$  unless otherwise stated).

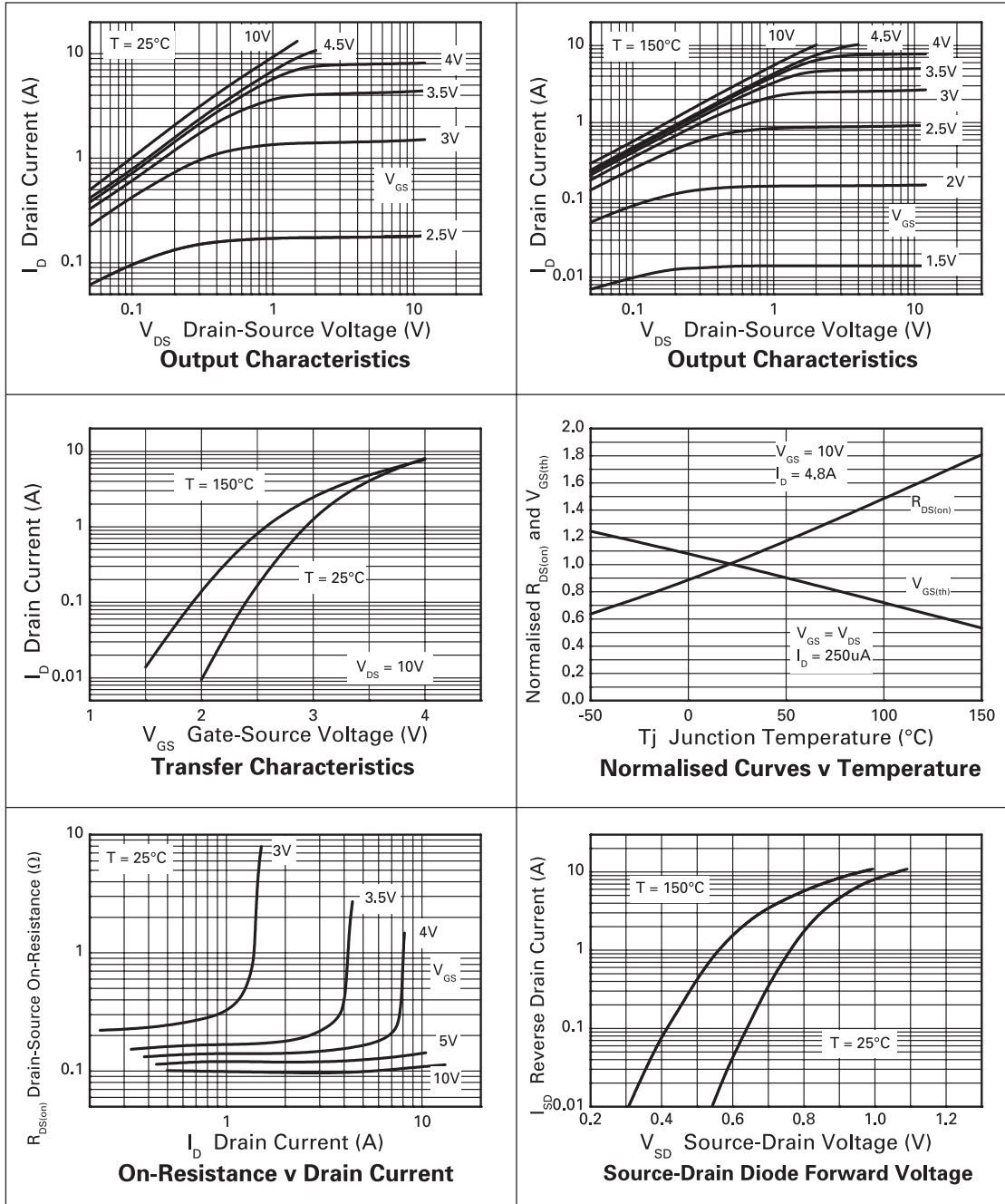
| PARAMETER                                   | SYMBOL        | MIN. | TYP. | MAX.           | UNIT          | CONDITIONS.   |
|---|---------------|------|------|----------------|---------------|---|
| <b>STATIC</b>                               |               |      |      |                |               |   |
| Drain-Source Breakdown Voltage              | $V_{(BR)DSS}$ | 60   |      |                | V             | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$  |
| Zero Gate Voltage Drain Current             | $I_{DSS}$     |      |      | 0.5            | $\mu\text{A}$ | $V_{DS}=60\text{V}, V_{GS}=0\text{V}$   |
| Gate-Body Leakage                           | $I_{GSS}$     |      |      | 100            | nA            | $V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$                                     |
| Gate-Source Threshold Voltage               | $V_{GS(th)}$  | 1    |      |                | V             | $I_D=250\mu\text{A}, V_{DS}=V_{GS}$   |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$  |      |      | 0.100<br>0.180 | $\Omega$      | $V_{GS}=10\text{V}, I_D=4.8\text{A}$<br>$V_{GS}=4.5\text{V}, I_D=4.2\text{A}$ |
| Forward Transconductance (1)(3)             | $g_{fs}$      |      | 6.6  |                | S             | $V_{DS}=15\text{V}, I_D=4.8\text{A}$  |
| <b>DYNAMIC (3)</b>                          |               |      |      |                |               |   |
| Input Capacitance                           | $C_{iss}$     |      | 459  |                | pF            | $V_{DS}=40\text{V}, V_{GS}=0\text{V},$<br>$f=1\text{MHz}$                     |
| Output Capacitance                          | $C_{oss}$     |      | 44.2 |                | pF            |   |
| Reverse Transfer Capacitance                | $C_{rss}$     |      | 24.1 |                | pF            |   |
| <b>SWITCHING(2) (3)</b>                     |               |      |      |                |               |   |
| Turn-On Delay Time                          | $t_{d(on)}$   |      | 2.6  |                | ns            | $V_{DD}=30\text{V}, I_D=1.5\text{A}$<br>$R_G=6.0\Omega, V_{GS}=10\text{V}$    |
| Rise Time                                   | $t_r$         |      | 2.1  |                | ns            |   |
| Turn-Off Delay Time                         | $t_{d(off)}$  |      | 12.3 |                | ns            |   |
| Fall Time                                   | $t_f$         |      | 4.6  |                | ns            |   |
| Gate Charge                                 | $Q_g$         |      | 4.0  |                | nC            | $V_{DS}=30\text{V}, V_{GS}=5\text{V},$<br>$I_D=1.4\text{A}$                   |
| Total Gate Charge                           | $Q_g$         |      | 5.8  |                | nC            | $V_{DS}=30\text{V}, V_{GS}=10\text{V},$<br>$I_D=1.4\text{A}$                  |
| Gate-Source Charge                          | $Q_{gs}$      |      | 1.4  |                | nC            |   |
| Gate-Drain Charge                           | $Q_{gd}$      |      | 1.9  |                | nC            |   |
| <b>SOURCE-DRAIN DIODE</b>                   |               |      |      |                |               |   |
| Diode Forward Voltage (1)                   | $V_{SD}$      |      | 0.88 | 1.2            | V             | $T_J=25^\circ\text{C}, I_S=4\text{A},$<br>$V_{GS}=0\text{V}$                  |
| Reverse Recovery Time (3)                   | $t_{rr}$      |      | 19.2 |                | ns            | $T_J=25^\circ\text{C}, I_F=1.4\text{A},$<br>$di/dt=100\text{A}/\mu\text{s}$   |
| Reverse Recovery Charge (3)                 | $Q_{rr}$      |      | 30.3 |                | nC            |   |

## NOTES

- (1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

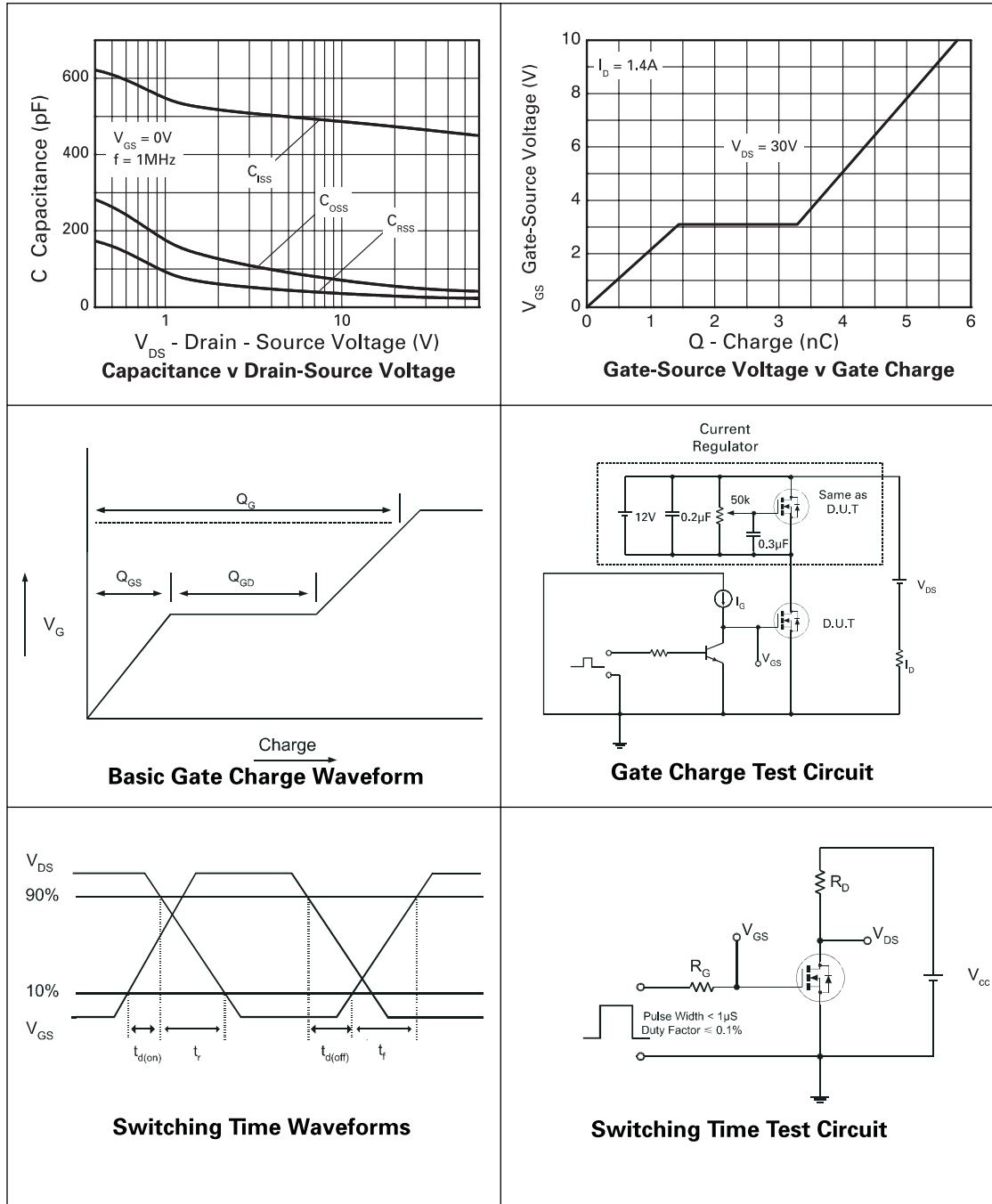
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## TYPICAL CHARACTERISTICS



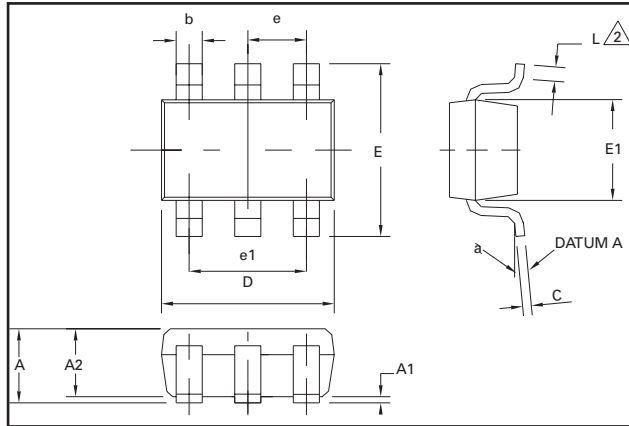
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## TYPICAL CHARACTERISTICS

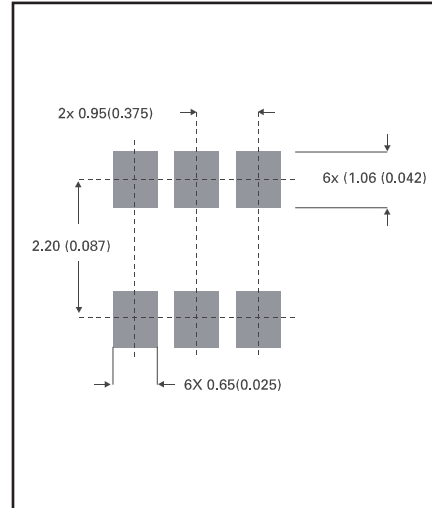


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## PACKAGE DIMENSIONS



## PAD LAYOUT DETAILS



| DIM | Millimetres |      | Inches    |       |
|-----|-------------|------|-----------|-------|
|     | Min         | Max  | Min       | Max   |
| A   | 0.90        | 1.45 | 0.35      | 0.057 |
| A1  | 0.00        | 0.15 | 0         | 0.006 |
| A2  | 0.90        | 1.30 | 0.035     | 0.051 |
| b   | 0.35        | 0.50 | 0.014     | 0.019 |
| C   | 0.09        | 0.20 | 0.0035    | 0.008 |
| D   | 2.80        | 3.00 | 0.110     | 0.118 |
| E   | 2.60        | 3.00 | 0.102     | 0.118 |
| E1  | 1.50        | 1.75 | 0.059     | 0.069 |
| L   | 0.10        | 0.60 | 0.004     | 0.024 |
| e   | 0.95 REF    |      | 0.037 REF |       |
| e1  | 1.90 REF    |      | 0.074 REF |       |
| L   | 0°          | 10°  | 0°        | 10°   |

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