

## 20V N-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

**$V_{(BR)DSS}=20V$ ;  $R_{DS(ON)}=0.1\Omega$ ;  $I_D=3.2A$**

### DESCRIPTION

This new generation of high density MOSFETs from Zetex utilise 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.

### FEATURES

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

### APPLICATIONS

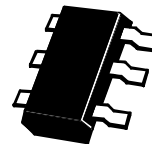
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

### ORDERING INFORMATION

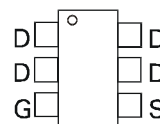
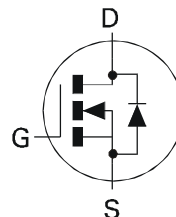
| DEVICE       | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|--------------|--------------------|-----------------|-------------------|
| ZXM62N02E6TA | 7                  | 8mm embossed    | 3000 units        |
| ZXM62N02E6TC | 13                 | 8mm embossed    | 10000 units       |

### DEVICE MARKING

- 2N02



**SOT23-6**



Top View

# ZXM62N02E6

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                                                                                     | SYMBOL    | LIMIT       | UNIT                 |
|---------------------------------------------------------------------------------------------------------------|-----------|-------------|----------------------|
| Drain-Source Voltage                                                                                          | $V_{DSS}$ | 20          | V                    |
| Gate Source Voltage                                                                                           | $V_{GS}$  | $\pm 12$    | V                    |
| Continuous Drain Current ( $V_{GS}=4.5V$ ; $T_A=25^{\circ}C$ )(b)<br>( $V_{GS}=4.5V$ ; $T_A=70^{\circ}C$ )(b) | $I_D$     | 3.2<br>2.6  | A                    |
| Pulsed Drain Current (c)                                                                                      | $I_{DM}$  | 18          | A                    |
| Continuous Source Current (Body Diode) (b)                                                                    | $I_S$     | 2.1         | A                    |
| Pulsed Source Current (Body Diode)                                                                            | $I_{SM}$  | 18          | 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/ $^{\circ}C$ |

## 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    | $^{\circ}C/W$ |

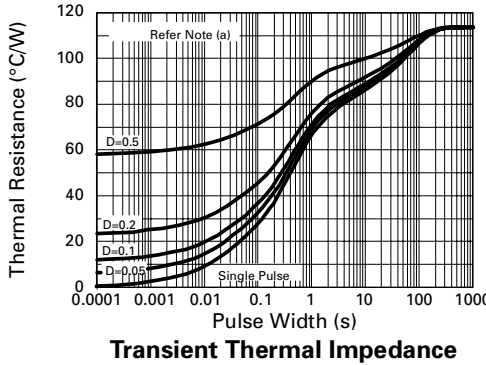
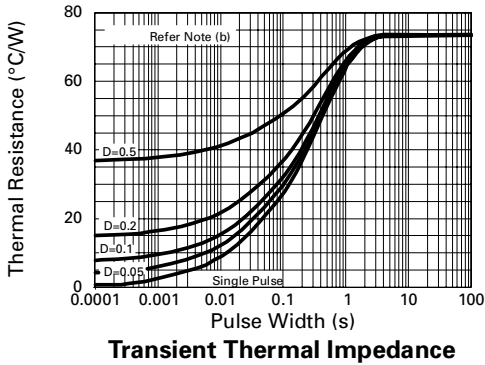
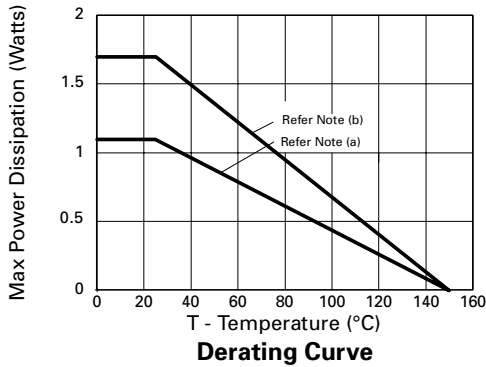
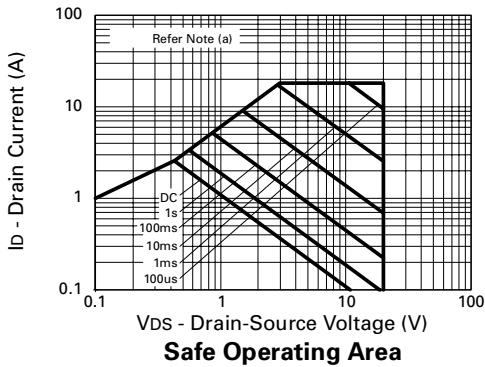
### NOTES

(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  $t \leq 5$  secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

CHARACTERISTICS



# ZXM62N02E6

## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

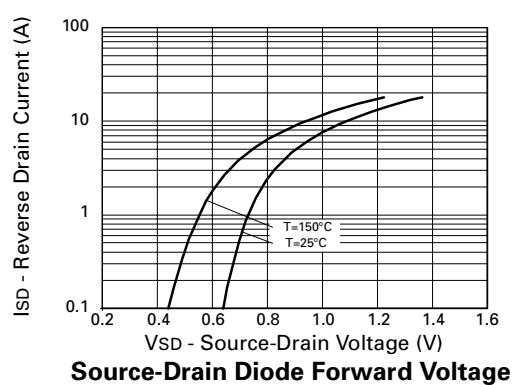
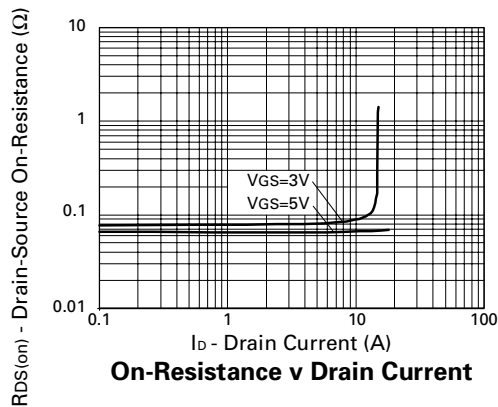
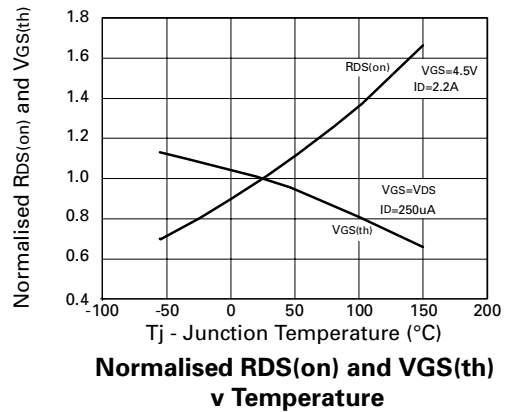
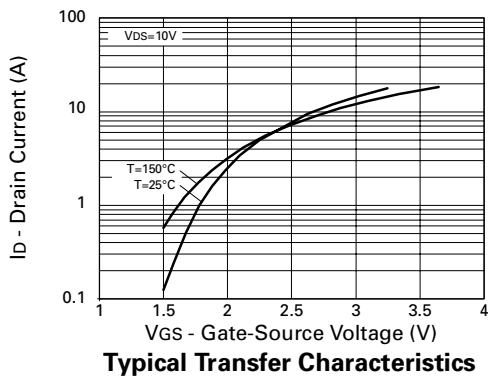
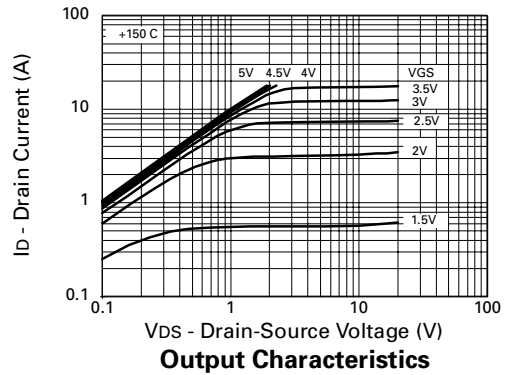
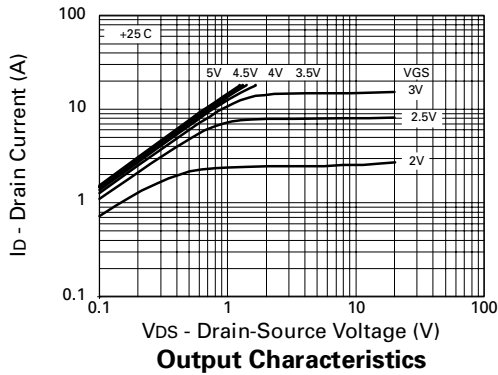
| PARAMETER                                   | SYMBOL               | MIN. | TYP. | MAX.         | UNIT   | CONDITIONS.                                                                                                         |
|---------------------------------------------|----------------------|------|------|--------------|--------|---------------------------------------------------------------------------------------------------------------------|
| STATIC                                      |                      |      |      |              |        |                                                                                                                     |
| Drain-Source Breakdown Voltage              | V <sub>(BR)DSS</sub> | 20   |      |              | V      | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                                                          |
| Zero Gate Voltage Drain Current             | I <sub>DSS</sub>     |      |      | 1            | μA     | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                                                                           |
| Gate-Body Leakage                           | I <sub>GSS</sub>     |      |      | 100          | nA     | V <sub>GS</sub> =± 12V, V <sub>DS</sub> =0V                                                                         |
| Gate-Source Threshold Voltage               | V <sub>GS(th)</sub>  | 0.7  |      |              | V      | I <sub>D</sub> =250μA, V <sub>DS</sub> = V <sub>GS</sub>                                                            |
| Static Drain-Source On-State Resistance (1) | R <sub>DS(on)</sub>  |      |      | 0.1<br>0.125 | Ω<br>Ω | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.2A<br>V <sub>GS</sub> =2.7V, I <sub>D</sub> =1.1A                          |
| Forward Transconductance                    | g <sub>fs</sub>      | 3.2  |      |              | S      | V <sub>DS</sub> =10V, I <sub>D</sub> =1.1A                                                                          |
| DYNAMIC (3)                                 |                      |      |      |              |        |                                                                                                                     |
| Input Capacitance                           | C <sub>iss</sub>     |      | 460  |              | pF     | V <sub>DS</sub> =15 V, V <sub>GS</sub> =0V,<br>f=1MHz                                                               |
| Output Capacitance                          | C <sub>oss</sub>     |      | 150  |              | pF     |                                                                                                                     |
| Reverse Transfer Capacitance                | C <sub>rss</sub>     |      | 50   |              | pF     |                                                                                                                     |
| SWITCHING(2) (3)                            |                      |      |      |              |        |                                                                                                                     |
| Turn-On Delay Time                          | t <sub>d(on)</sub>   |      | 4.0  |              | ns     | V <sub>DD</sub> =10V, I <sub>D</sub> =2.2A<br>R <sub>G</sub> =6.0Ω, R <sub>D</sub> =4.4Ω<br>(refer to test circuit) |
| Rise Time                                   | t <sub>r</sub>       |      | 10.4 |              | ns     |                                                                                                                     |
| Turn-Off Delay Time                         | t <sub>d(off)</sub>  |      | 16.9 |              | ns     |                                                                                                                     |
| Fall Time                                   | t <sub>f</sub>       |      | 8.0  |              | ns     |                                                                                                                     |
| Total Gate Charge                           | Q <sub>g</sub>       |      |      | 6.3          | nC     | V <sub>DS</sub> =16V, V <sub>GS</sub> =4.5V,<br>I <sub>D</sub> =2.2A (refer to test circuit)                        |
| Gate-Source Charge                          | Q <sub>gs</sub>      |      |      | 1.5          | nC     |                                                                                                                     |
| Gate Drain Charge                           | Q <sub>gd</sub>      |      |      | 2.5          | nC     |                                                                                                                     |
| SOURCE-DRAIN DIODE                          |                      |      |      |              |        |                                                                                                                     |
| Diode Forward Voltage (1)                   | V <sub>SD</sub>      |      |      | 0.95         | V      | T <sub>j</sub> =25°C, I <sub>S</sub> =2.2A, V <sub>GS</sub> =0V                                                     |
| Reverse Recovery Time (3)                   | t <sub>rr</sub>      |      | 17.5 |              | ns     | T <sub>j</sub> =25°C, I <sub>F</sub> =2.2A, di/dt= 100A/μs                                                          |
| Reverse Recovery Charge (3)                 | Q <sub>rr</sub>      |      | 8.6  |              | nC     |                                                                                                                     |

(1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

(2) Switching characteristics are independent of operating junction temperature.

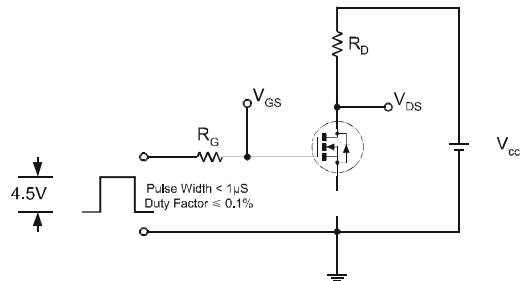
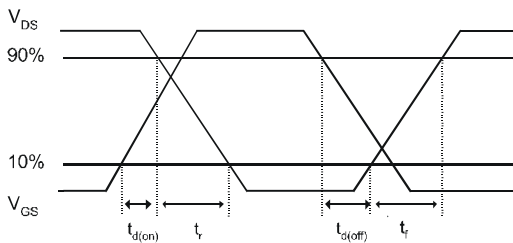
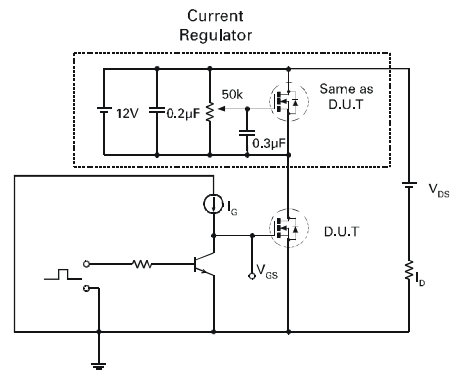
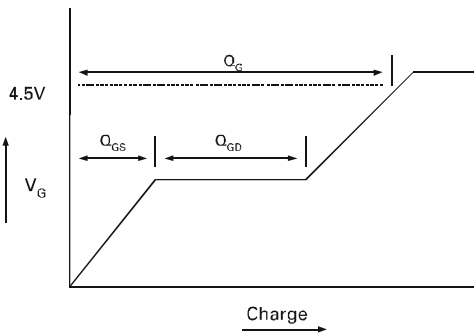
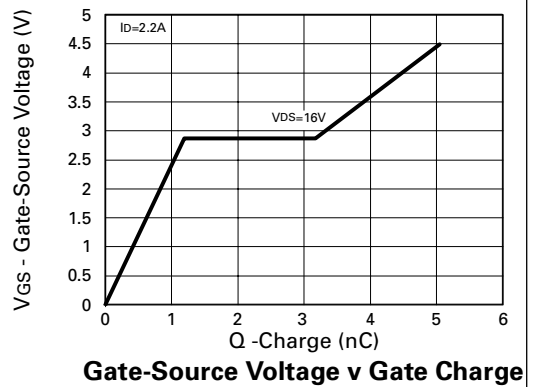
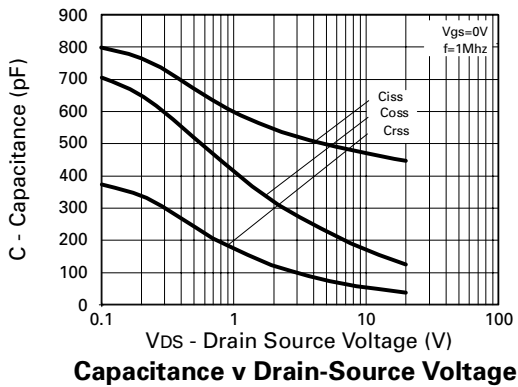
(3) For design aid only, not subject to production testing.

## TYPICAL CHARACTERISTICS



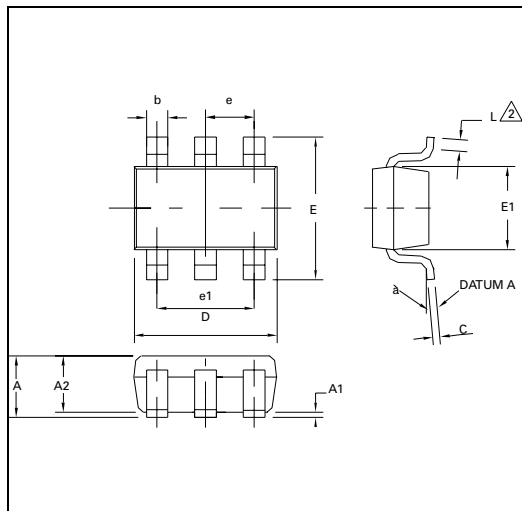
# ZXM62N02E6

## TYPICAL CHARACTERISTICS



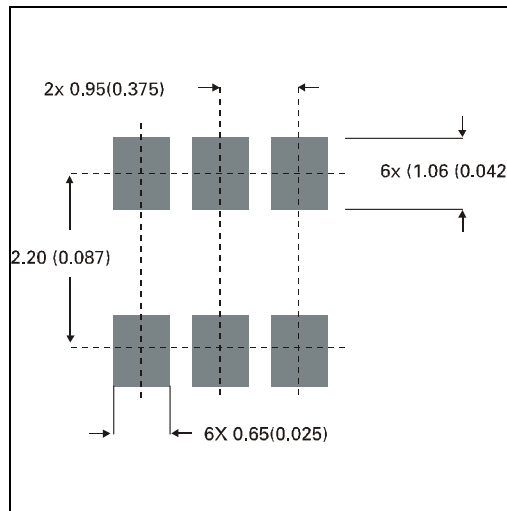
# ZXM62N02E6

## PACKAGE DIMENSIONS



| 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  | 0.002 |

## PAD LAYOUT DETAILS



**ZETEX**

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