

## 30V N-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

**$V_{(BR)DSS}=30V$ ;  $R_{DS(ON)}=0.045\Omega$ ;  $I_D=5.0A$**

### DESCRIPTION

This new generation of high density MOSFETs from Zetex utilises 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
- Low profile SOIC package

### APPLICATIONS

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

### ORDERING INFORMATION

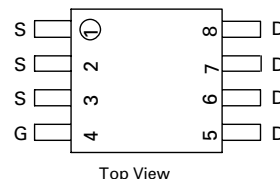
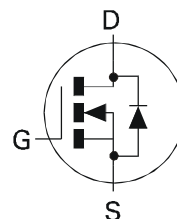
| DEVICE      | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM64N03XTA | 7                  | 12mm embossed   | 1000 units        |
| ZXM64N03XTC | 13                 | 12mm embossed   | 4000 units        |

### DEVICE MARKING

- ZXM4N03



**MSOP8**



# ZXM64N03X

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                                                                                   | SYMBOL        | LIMIT       | UNIT                 |
|-------------------------------------------------------------------------------------------------------------|---------------|-------------|----------------------|
| Drain-Source Voltage                                                                                        | $V_{DSS}$     | 30          | 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) | $I_D$         | 5.0<br>4.0  | A                    |
| Pulsed Drain Current (c)                                                                                    | $I_{DM}$      | 30          | A                    |
| Continuous Source Current (Body Diode)(b)                                                                   | $I_S$         | 2.4         | A                    |
| Pulsed Source Current (Body Diode)(c)                                                                       | $I_{SM}$      | 30          | 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                                        | $P_D$         | 1.8<br>14.4 | 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) | $R_{\theta JA}$ | 70    | $^{\circ}C/W$ |

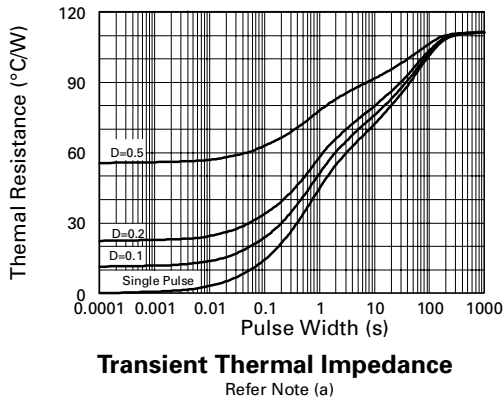
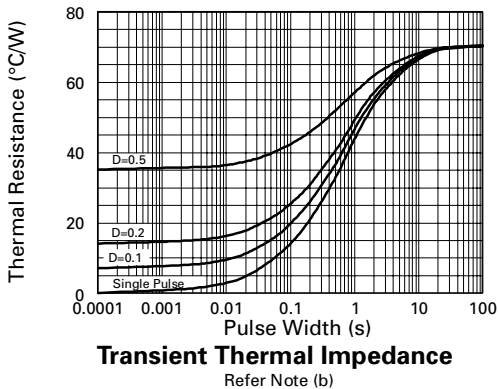
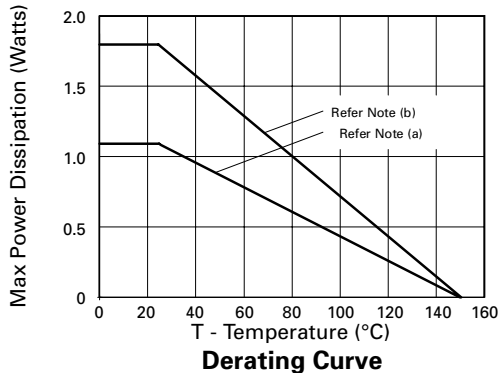
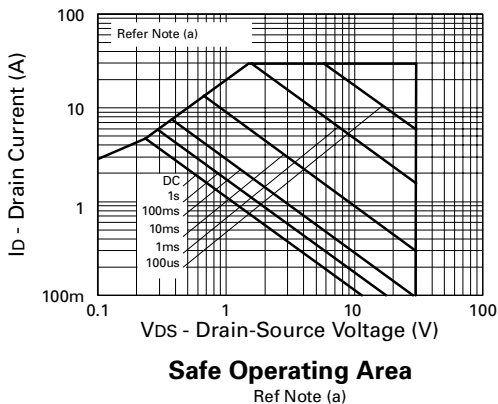
### NOTES

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

CHARACTERISTICS



# ZXM64N03X

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

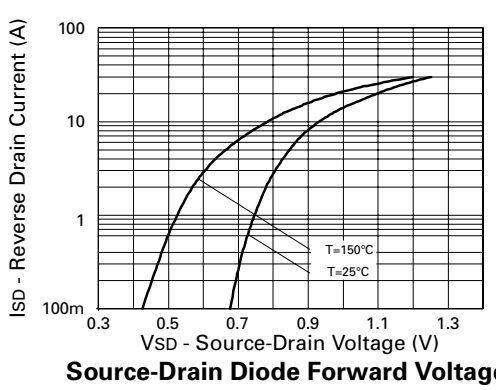
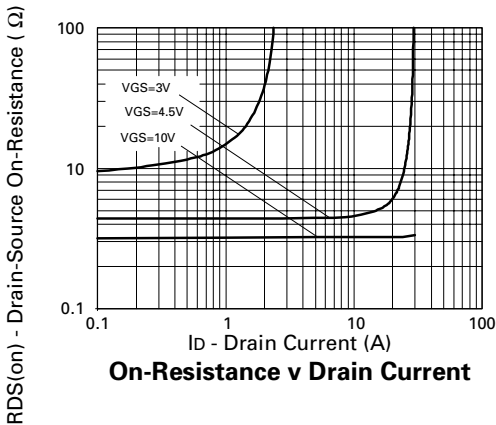
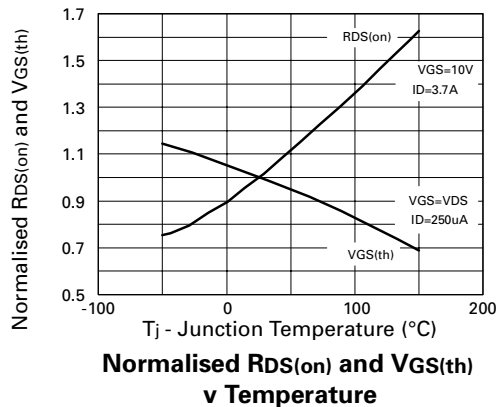
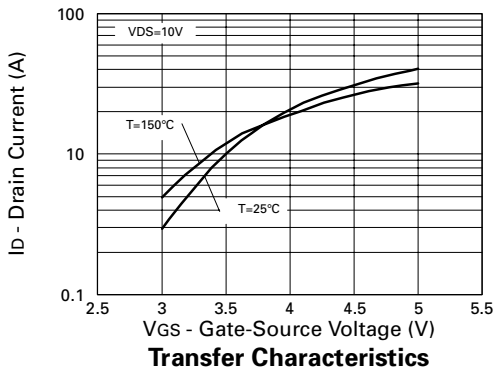
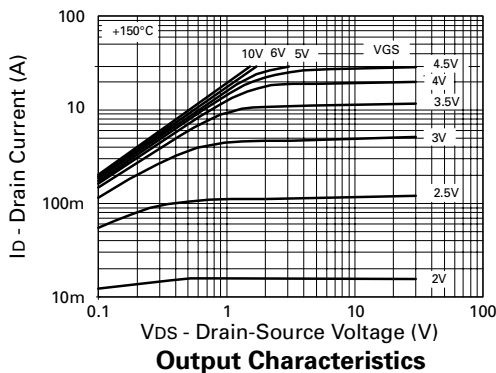
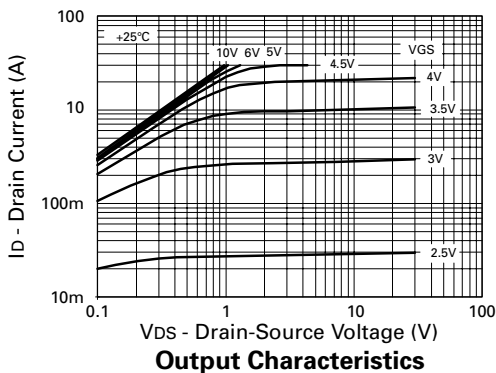
| PARAMETER                                   | SYMBOL               | MIN. | TYP. | MAX.           | UNIT   | CONDITIONS.                                                                                                        |
|---------------------------------------------|----------------------|------|------|----------------|--------|--------------------------------------------------------------------------------------------------------------------|
| STATIC                                      |                      |      |      |                |        |                                                                                                                    |
| Drain-Source Breakdown Voltage              | V <sub>(BR)DSS</sub> | 30   |      |                | 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> =30V, V <sub>GS</sub> =0V                                                                          |
| Gate-Body Leakage                           | I <sub>GSS</sub>     |      |      | 100            | nA     | V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0V                                                                        |
| Gate-Source Threshold Voltage               | V <sub>GS(th)</sub>  | 1.0  |      |                | 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>  |      |      | 0.045<br>0.060 | Ω<br>Ω | V <sub>GS</sub> =10V, I <sub>D</sub> =3.7A<br>V <sub>GS</sub> =4.5V, I <sub>D</sub> =1.9A                          |
| Forward Transconductance (3)                | g <sub>fs</sub>      | 4.3  |      |                | S      | V <sub>DS</sub> =10V, I <sub>D</sub> =1.9A                                                                         |
| DYNAMIC (3)                                 |                      |      |      |                |        |                                                                                                                    |
| Input Capacitance                           | C <sub>iss</sub>     |      | 950  |                | pF     | V <sub>DS</sub> =25 V, V <sub>GS</sub> =0V,<br>f=1MHz                                                              |
| Output Capacitance                          | C <sub>oss</sub>     |      | 200  |                | pF     |                                                                                                                    |
| Reverse Transfer Capacitance                | C <sub>rss</sub>     |      | 50   |                | pF     |                                                                                                                    |
| SWITCHING(2) (3)                            |                      |      |      |                |        |                                                                                                                    |
| Turn-On Delay Time                          | t <sub>d(on)</sub>   |      | 4.2  |                | ns     | V <sub>DD</sub> =5V, I <sub>D</sub> =3.7A<br>R <sub>G</sub> =6.2Ω, R <sub>D</sub> =4.0Ω<br>(Refer to test circuit) |
| Rise Time                                   | t <sub>r</sub>       |      | 4.5  |                | ns     |                                                                                                                    |
| Turn-Off Delay Time                         | t <sub>d(off)</sub>  |      | 20.5 |                | ns     |                                                                                                                    |
| Fall Time                                   | t <sub>f</sub>       |      | 8    |                | ns     |                                                                                                                    |
| Total Gate Charge                           | Q <sub>g</sub>       |      |      | 27             | nC     | V <sub>DS</sub> =24V, V <sub>GS</sub> =10V,<br>I <sub>D</sub> =3.7A<br>(Refer to test circuit)                     |
| Gate-Source Charge                          | Q <sub>gs</sub>      |      |      | 5              | nC     |                                                                                                                    |
| Gate Drain Charge                           | Q <sub>gd</sub>      |      |      | 4.5            | 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> =3.7A,<br>V <sub>GS</sub> =0V                                                 |
| Reverse Recovery Time (3)                   | t <sub>rr</sub>      |      | 24.5 |                | ns     | T <sub>j</sub> =25°C, I <sub>F</sub> =3.7A,<br>di/dt= 100A/μs                                                      |
| Reverse Recovery Charge(3)                  | Q <sub>rr</sub>      |      | 19.1 |                | nC     |                                                                                                                    |

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

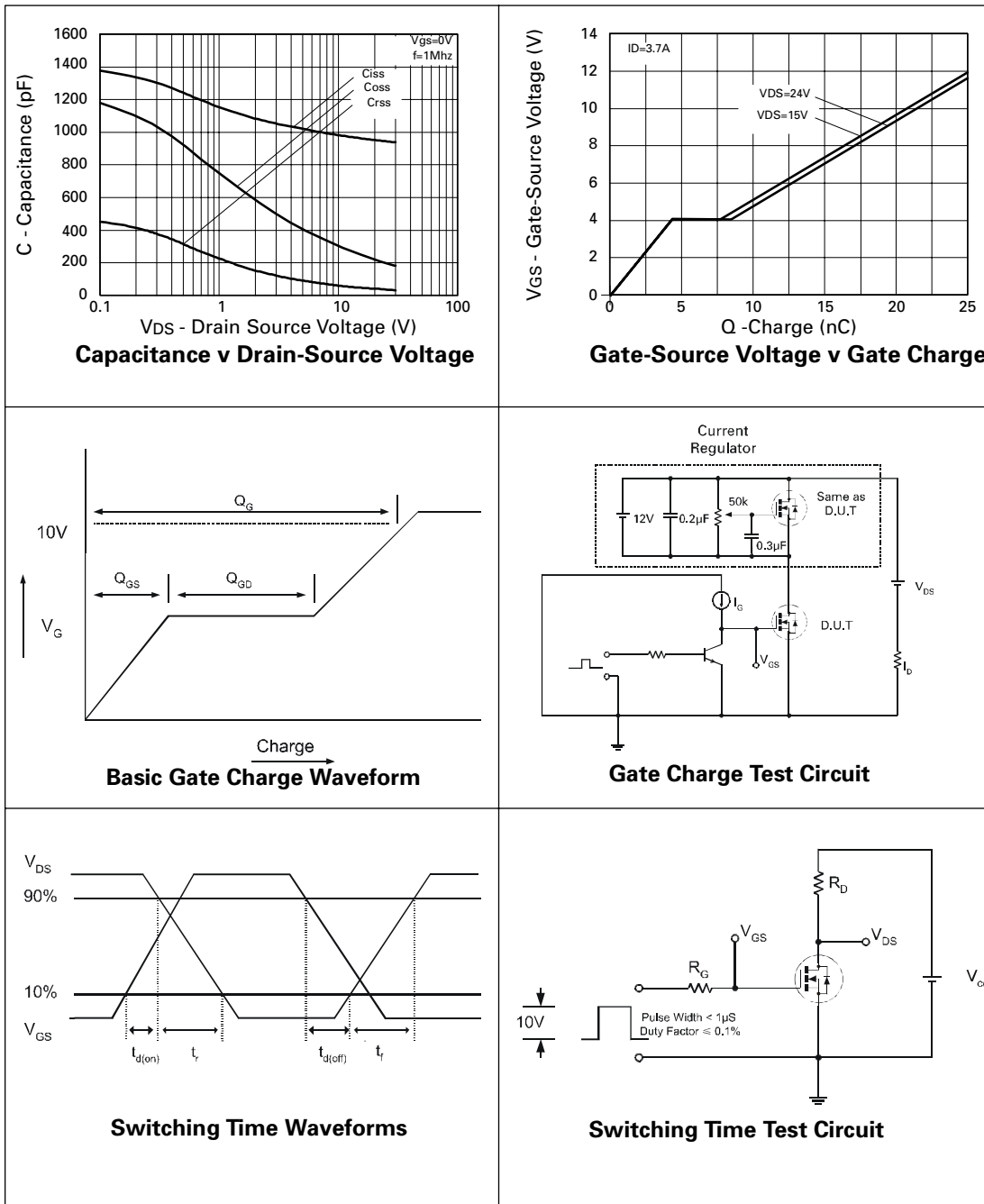
(2) Switching characteristics are independent of operating junction temperature.

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

TYPICAL CHARACTERISTICS

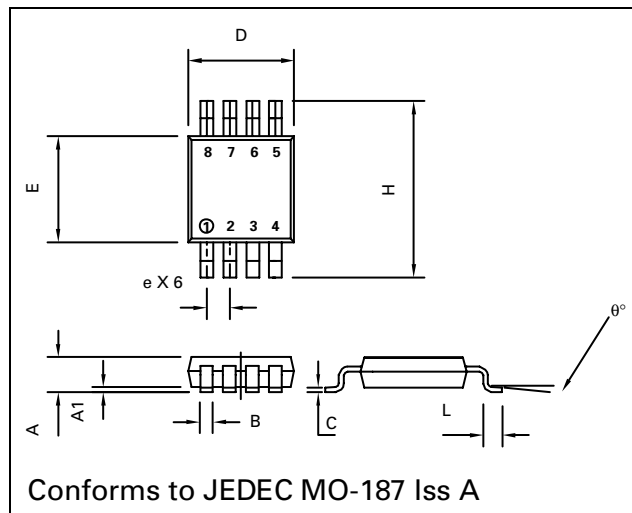


## TYPICAL CHARACTERISTICS



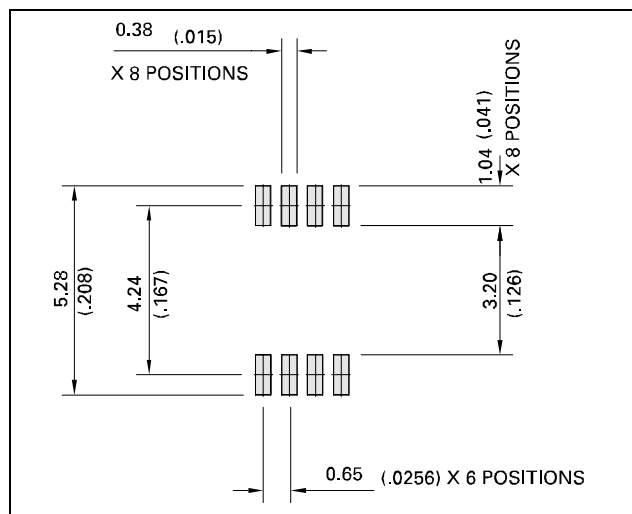
# ZXM64N03X

## PACKAGE DIMENSIONS



| DIM | Millimetres |      | Inches |       |
|-----|-------------|------|--------|-------|
|     | MIN         | MAX  | MIN    | MAX   |
| A   |             | 1.10 |        | 0.043 |
| A1  | 0.05        | 0.15 | 0.002  | 0.006 |
| B   | 0.25        | 0.40 | 0.010  | 0.016 |
| C   | 0.13        | 0.23 | 0.005  | 0.009 |
| D   | 2.90        | 3.10 | 0.114  | 0.122 |
| e   | 0.65        | BSC  | 0.0256 | BSC   |
| E   | 2.90        | 3.10 | 0.114  | 0.122 |
| H   | 4.90        | BSC  | 0.193  | BSC   |
| L   | 0.40        | 0.70 | 0.016  | 0.028 |
| q°  | 0°          | 6°   | 0°     | 6°    |

## PAD LAYOUT DETAILS



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