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# ZXM64N03X

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## 30V N-CANNEL ENHANCEMENT MODE MOSFET

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### 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 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.

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

### APPLICATIONS

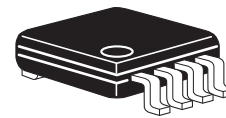
- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control

### ORDERING INFORMATION

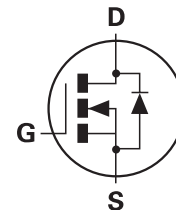
| DEVICE      | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM64N03XTA | 7                  | 12 embossed     | 1,000             |
| ZXM64N03XTC | 13                 | 12 embossed     | 4,000             |

### DEVICE MARKING

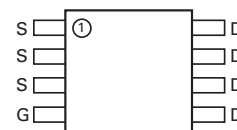
ZXM4P03



MSOP8



Pin out



Top view

# 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<br>( $V_{GS}=4.5V$ ; $T_A=25^\circ C$ )(b)<br>( $V_{GS}=4.5V$ ; $T_A=70^\circ C$ )(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

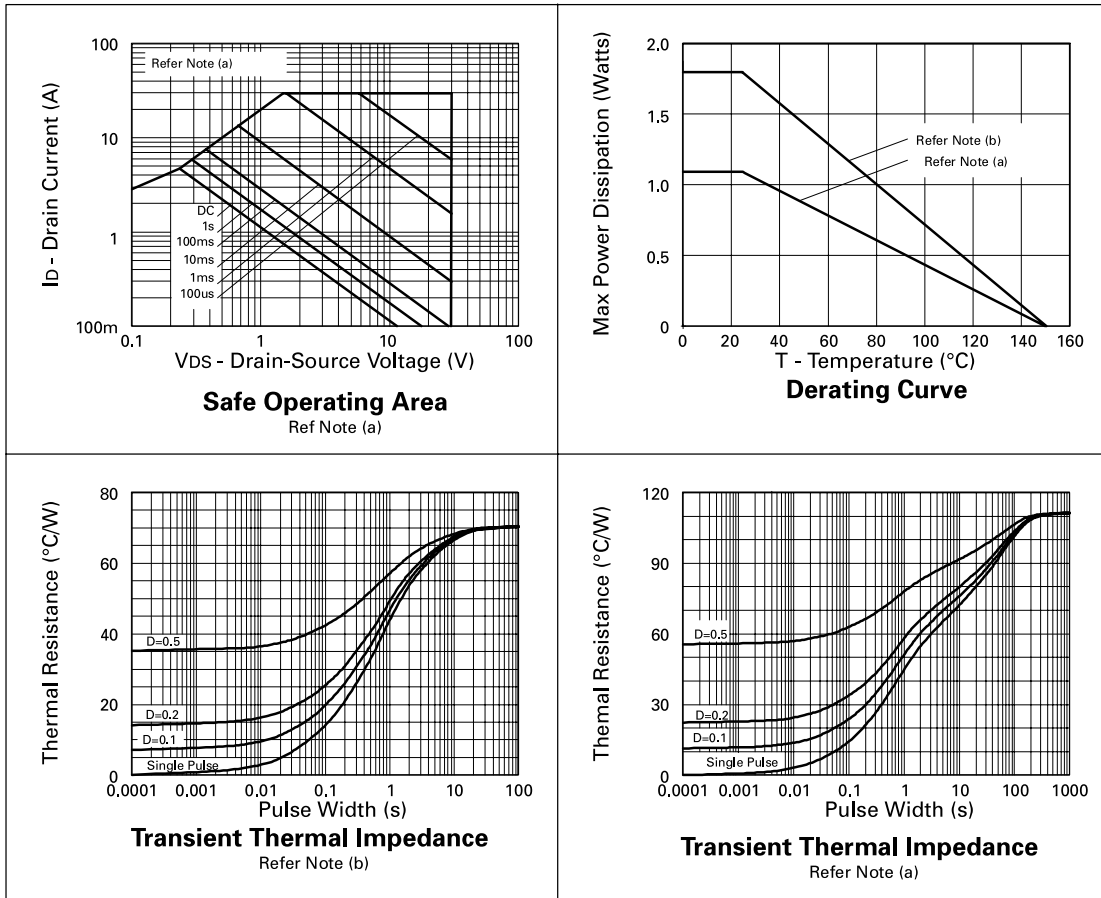
| PARAMETER               | SYMBOL          | VALUE | UNIT         |
|-------------------------|-----------------|-------|--------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 113   | $^\circ C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 70    | $^\circ C/W$ |

### 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.

# ZXM64N03X

## CHARACTERISTICS



# ZXM64N03X

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

| PARAMETER                                   | SYMBOL        | MIN. | TYP. | MAX.           | UNIT                 | CONDITIONS   |
|---|---------------|------|------|----------------|----------------------|--|
| <b>STATIC</b>                               |               |      |      |                |                      |  |
| Drain-Source Breakdown Voltage              | $V_{(BR)DSS}$ | 30   |      |                | V                    | $I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$   |
| Zero Gate Voltage Drain Current             | $I_{DSS}$     |      |      | 1              | $\mu\text{A}$        | $V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$   |
| Gate-Body Leakage                           | $I_{GSS}$     |      |      | $\pm 100$      | nA                   | $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$   |
| Gate-Source Threshold Voltage               | $V_{GS(th)}$  | 1.0  |      |                | V                    | $I_D = -250\mu\text{A}$ , $V_{DS} = V_{GS}$  |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$  |      |      | 0.045<br>0.060 | $\Omega$<br>$\Omega$ | $V_{GS} = 10\text{V}$ , $I_D = 3.7\text{A}$<br>$V_{GS} = 4.5\text{V}$ , $I_D = 1.9\text{A}$                    |
| Forward Transconductance (3)                | $g_{fs}$      | 4.3  |      |                | S                    | $V_{DS} = 10\text{V}$ , $I_D = -1.9\text{A}$   |
| <b>DYNAMIC (3)</b>                          |               |      |      |                |                      |  |
| Input Capacitance                           | $C_{iss}$     |      | 950  |                | pF                   | $V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ ,<br>$f = 1\text{MHz}$  |
| Output Capacitance                          | $C_{oss}$     |      | 200  |                | pF                   |  |
| Reverse Transfer Capacitance                | $C_{rss}$     |      | 50   |                | pF                   |  |
| <b>SWITCHING(2) (3)</b>                     |               |      |      |                |                      |  |
| Turn-On Delay Time                          | $t_{d(on)}$   |      | 4.2  |                | ns                   | $V_{DD} = 5\text{V}$ , $I_D = 3.7\text{A}$<br>$R_G = 6.2\Omega$ , $R_D = 4.0\Omega$<br>(Refer to test circuit) |
| Rise Time                                   | $t_r$         |      | 4.5  |                | ns                   |  |
| Turn-Off Delay Time                         | $t_{d(off)}$  |      | 20.5 |                | ns                   |  |
| Fall Time                                   | $t_f$         |      | 8    |                | ns                   |  |
| Total Gate Charge                           | $Q_g$         |      |      | 27             | nC                   | $V_{DS} = 24\text{V}$ , $V_{GS} = 10\text{V}$ ,<br>$I_D = 3.7\text{A}$<br>(Refer to test circuit)              |
| Gate-Source Charge                          | $Q_{gs}$      |      |      | 5              | nC                   |  |
| Gate Drain Charge                           | $Q_{gd}$      |      |      | 4.5            | nC                   |  |
| <b>SOURCE-DRAIN DIODE</b>                   |               |      |      |                |                      |  |
| Diode Forward Voltage (1)                   | $V_{SD}$      |      |      | 0.95           | V                    | $T_j = 25^{\circ}\text{C}$ , $I_S = 3.7\text{A}$ ,<br>$V_{GS} = 0\text{V}$                                     |
| Reverse Recovery Time (3)                   | $t_{rr}$      |      | 24.5 |                | ns                   | $T_j = 25^{\circ}\text{C}$ , $I_F = 3.7\text{A}$ ,<br>$di/dt = 100\text{A}/\mu\text{s}$                        |
| Reverse Recovery Charge(3)                  | $Q_{rr}$      |      | 19.1 |                | nC                   |  |

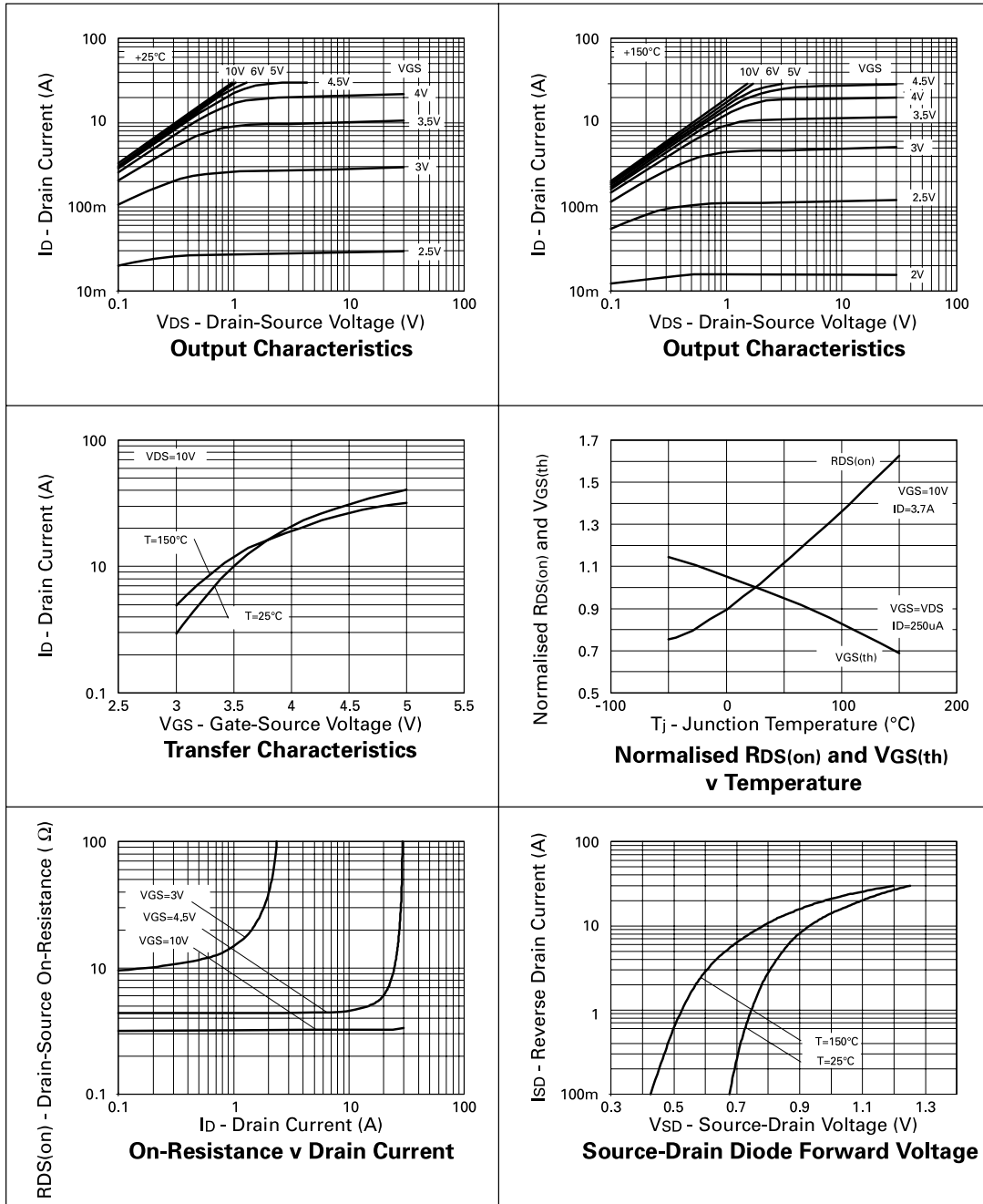
(1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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

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

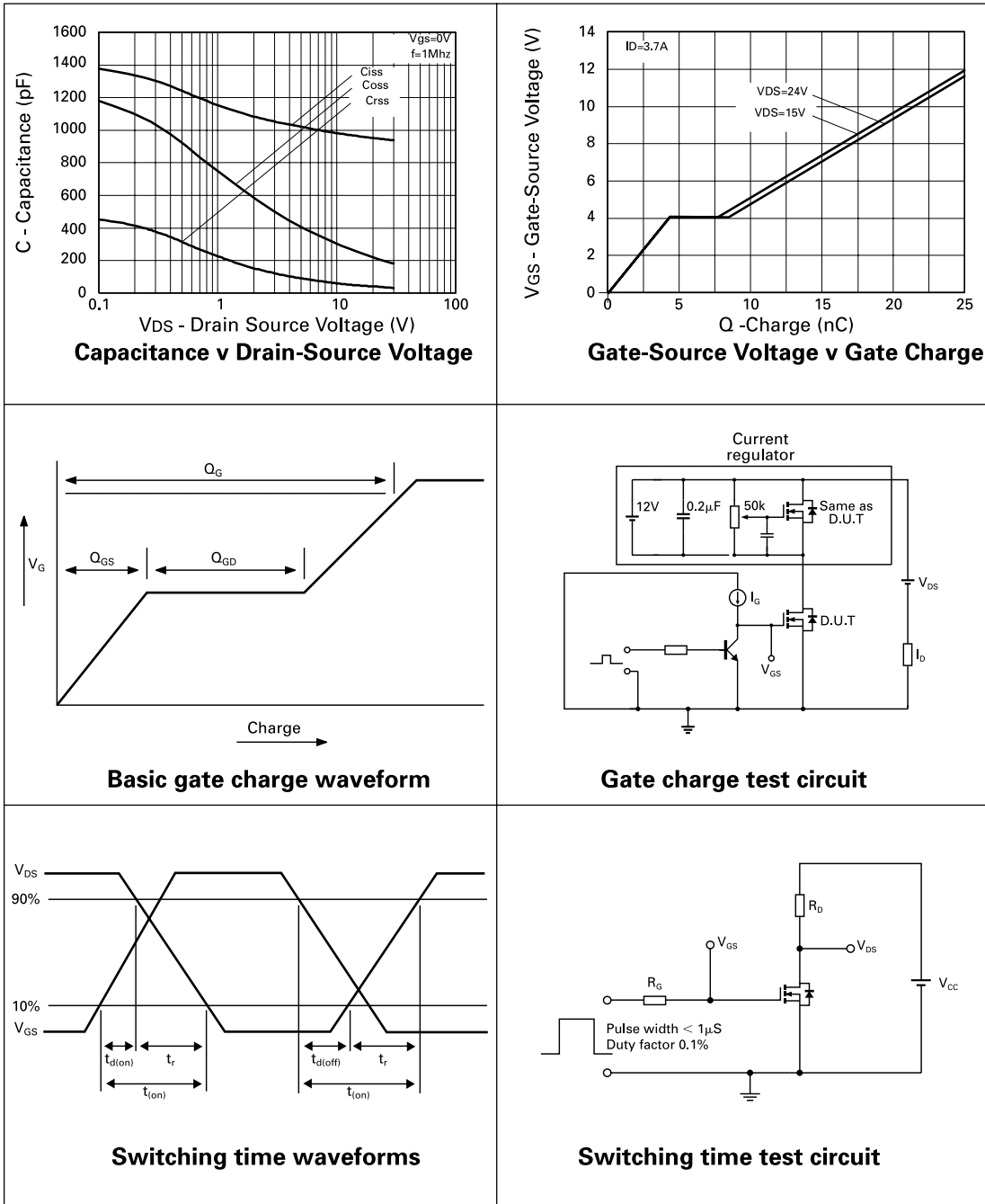
# ZXM64N03X

## TYPICAL CHARACTERISTICS



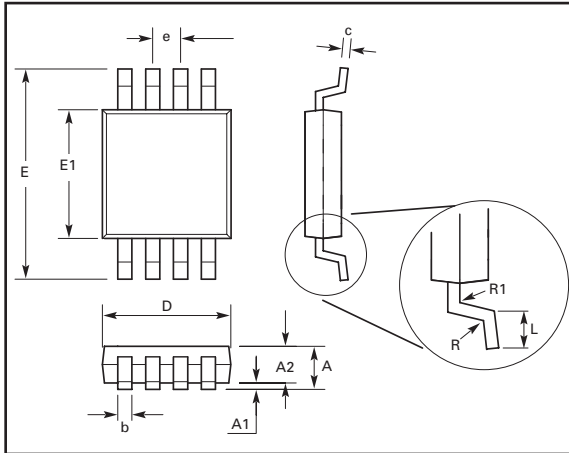
# ZXM64N03X

## TYPICAL CHARACTERISTICS

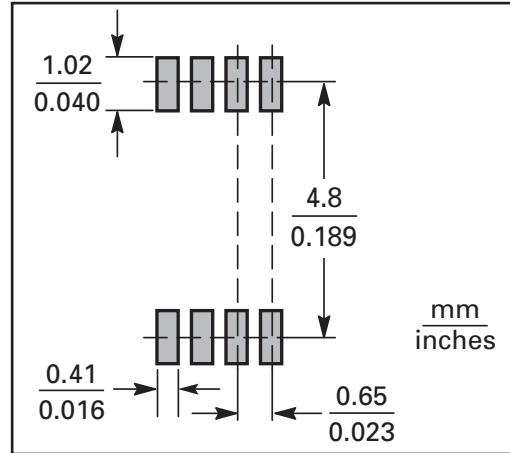


# ZXM64N03X

## PACKAGE DETAILS



## PAD LAYOUT DETAILS



## PACKAGE DIMENSIONS

| DIM | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|
|     | MIN         | MAX  | MIN    | MAX   |
| A   | 0.91        | 1.11 | 0.036  | 0.044 |
| A1  | 0.10        | 0.20 | 0.004  | 0.008 |
| B   | 0.25        | 0.36 | 0.010  | 0.014 |
| C   | 0.13        | 0.18 | 0.005  | 0.007 |
| D   | 2.95        | 3.05 | 0.116  | 0.120 |
| e   | 0.65NOM     |      | 0.0256 |       |
| e1  | 0.33NOM     |      | 0.0128 |       |
| E   | 2.95        | 3.05 | 0.116  | 0.120 |
| H   | 4.78        | 5.03 | 0.188  | 0.198 |
| L   | 0.41        | 0.66 | 0.016  | 0.026 |
| θ°  | 0°          | 6°   | 0°     | 6°    |

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