

ZXM64N03X

30V N-CANNEL 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 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

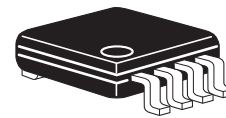
- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control

ORDERING INFORMATION

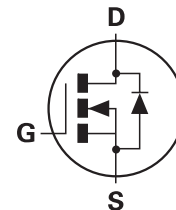
| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM64N03XTA | 7 | 12 embossed | 1,000 |
| ZXM64N03XTC | 13 | 12 embossed | 4,000 |

DEVICE MARKING

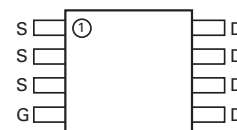
ZXM4P03



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} | ± 20 | V |
| Continuous Drain Current ($V_{GS}=4.5V$; $T_A=25^\circ C$)(b) ($V_{GS}=4.5V$; $T_A=70^\circ C$)(b) | I_D | 5.0 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) Linear Derating Factor | P_D | 1.1 8.8 | W mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor | P_D | 1.8 14.4 | W mW/ $^\circ C$ |
| Operating and Storage Temperature Range | T_j ; T_{stg} | -55 to +150 | $^\circ C$ |

THERMAL RESISTANCE

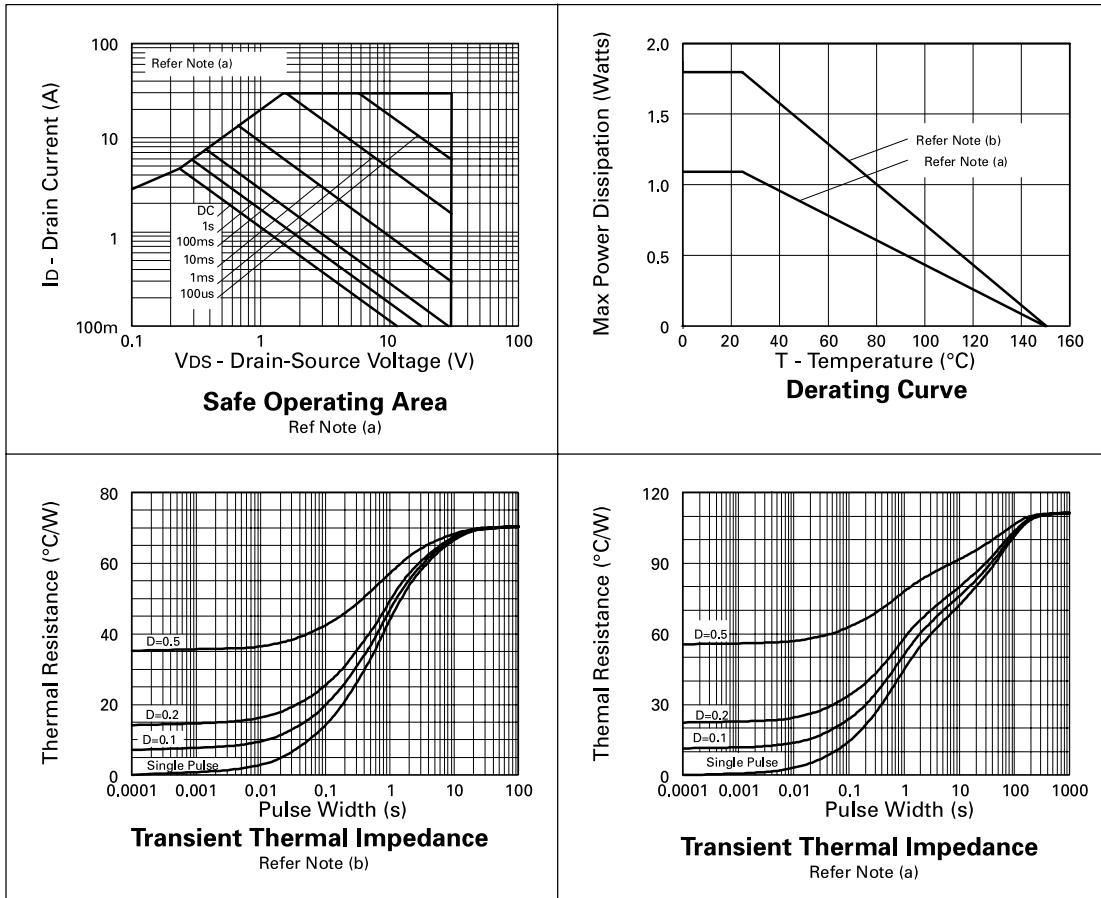
| PARAMETER | SYMBOL | VALUE | UNIT |
|-------------------------|-----------------|-------|--------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 113 | $^\circ C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 70 | $^\circ C/W$ |

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.

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CHARACTERISTICS



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

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

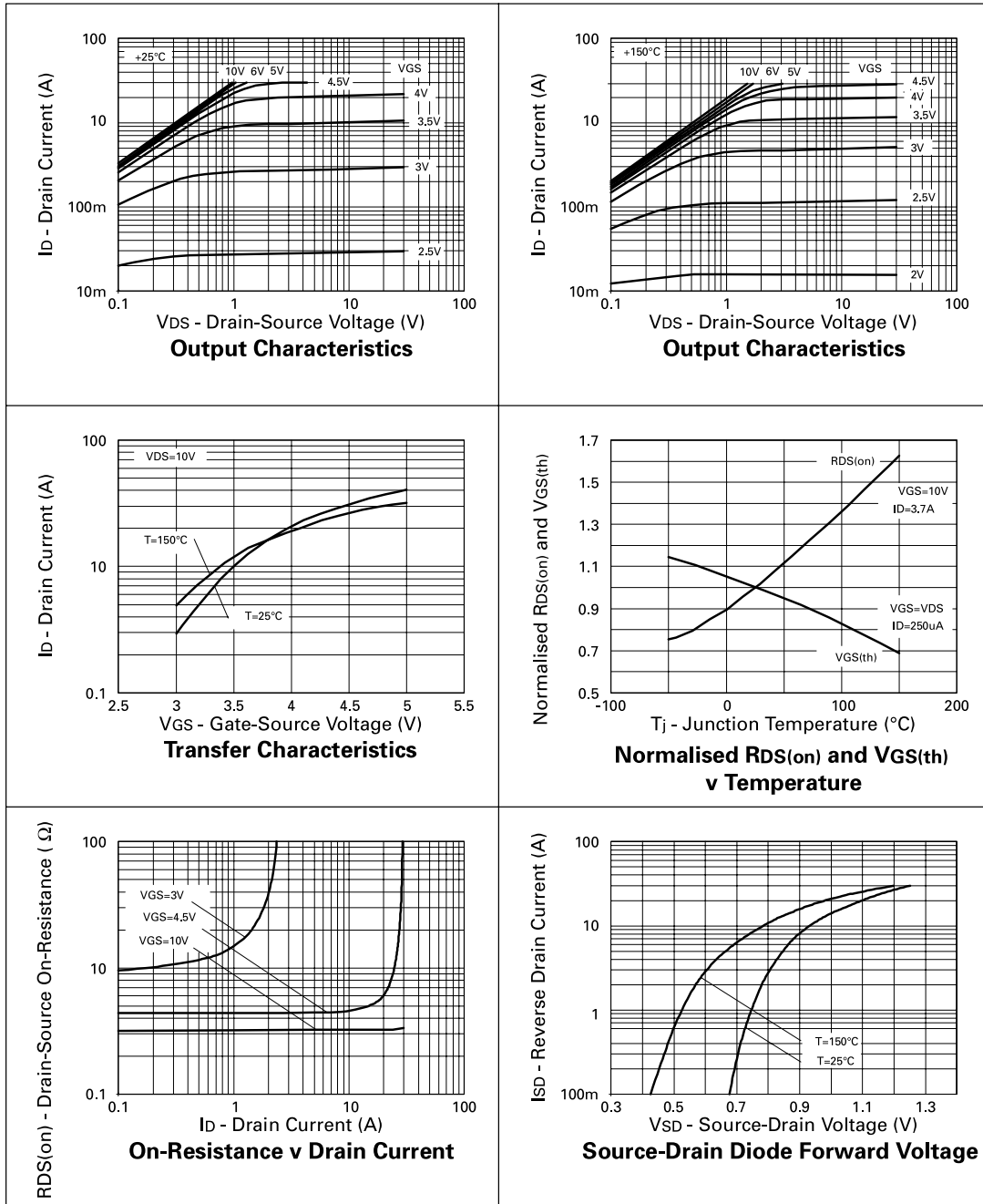
(1) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.

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

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

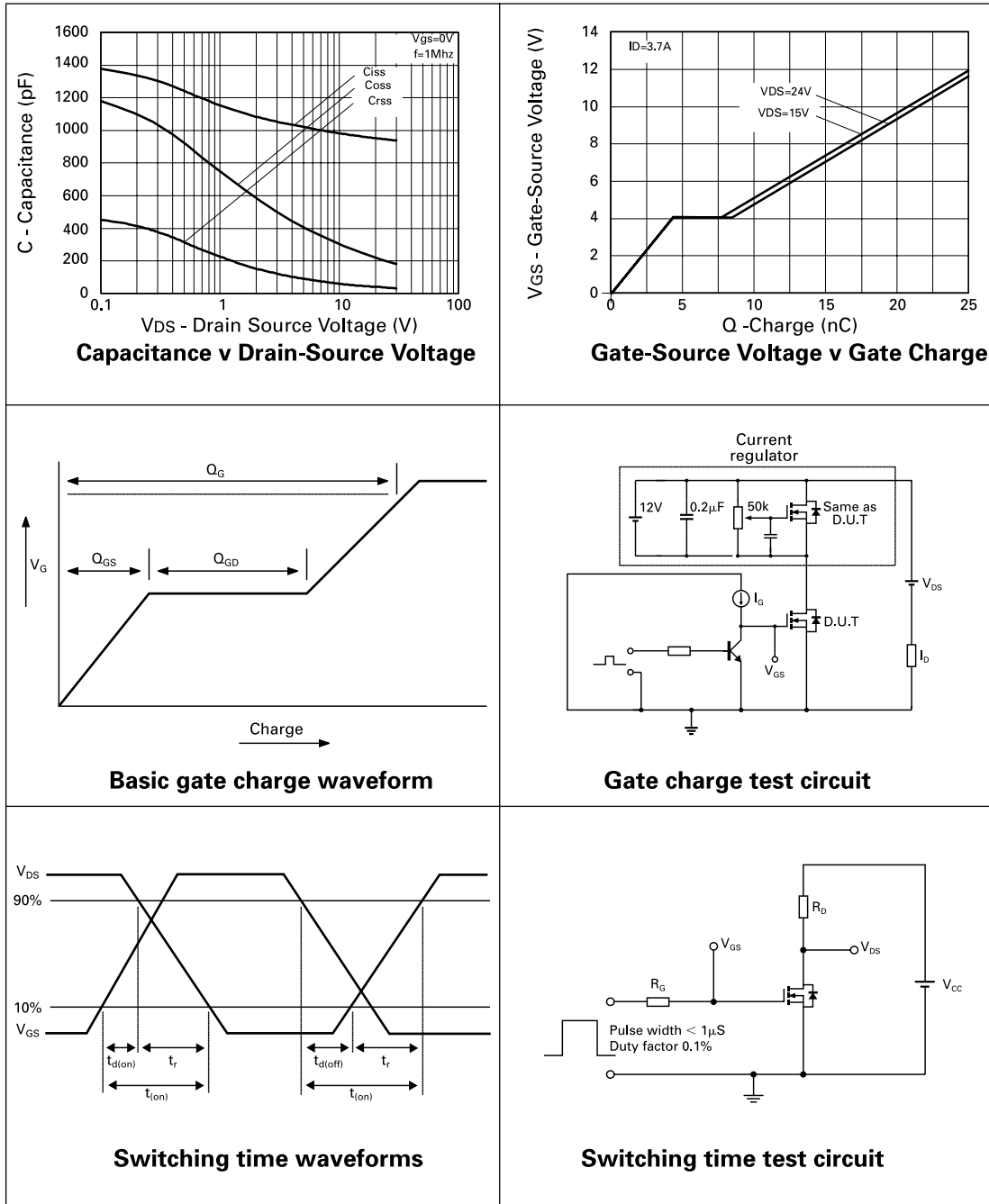
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TYPICAL CHARACTERISTICS



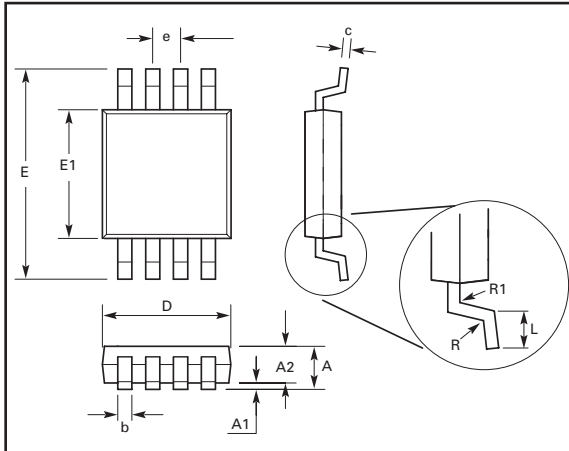
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TYPICAL CHARACTERISTICS

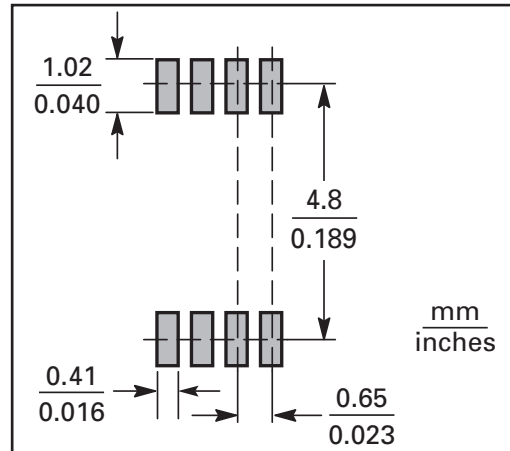


ZXM64N03X

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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