

ZXM61P03F

30V P-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS} = -30V$; $R_{DS(ON)} = 0.35\Omega$; $I_D = -1.1A$

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
- SOT23 package

APPLICATIONS

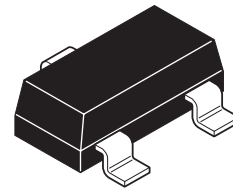
- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control

ORDERING INFORMATION

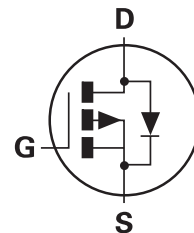
| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM61P03FTA | 7 | 8 embossed | 3,000 |
| ZXM61P03FTC | 13 | 8 embossed | 10,000 |

DEVICE MARKING

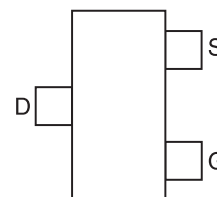
P03



SOT23



Pin out



Top view

ZXM61P03F

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | LIMIT | UNIT |
|--|-------------------|--------------|-----------------------|
| Drain-Source Voltage | V_{DSS} | -30 | V |
| Gate- Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ($V_{GS}=-10V$; $T_A=25^{\circ}C$)(b) ($V_{GS}=-10V$; $T_A=70^{\circ}C$)(b) | I_D | -1.1 -0.9 | A |
| Pulsed Drain Current (c) | I_{DM} | -4.3 | A |
| Continuous Source Current (Body Diode)(b) | I_S | -0.88 | A |
| Pulsed Source Current (Body Diode)(c) | I_{SM} | -4.3 | A |
| Power Dissipation at $T_A=25^{\circ}C$ (a) Linear Derating Factor | P_D | 625 5 | mW mW/ $^{\circ}C$ |
| Power Dissipation at $T_A=25^{\circ}C$ (b) Linear Derating Factor | P_D | 806 6.4 | mW 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) | $R_{\theta JA}$ | 200 | $^{\circ}C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 155 | $^{\circ}C/W$ |

NOTES:

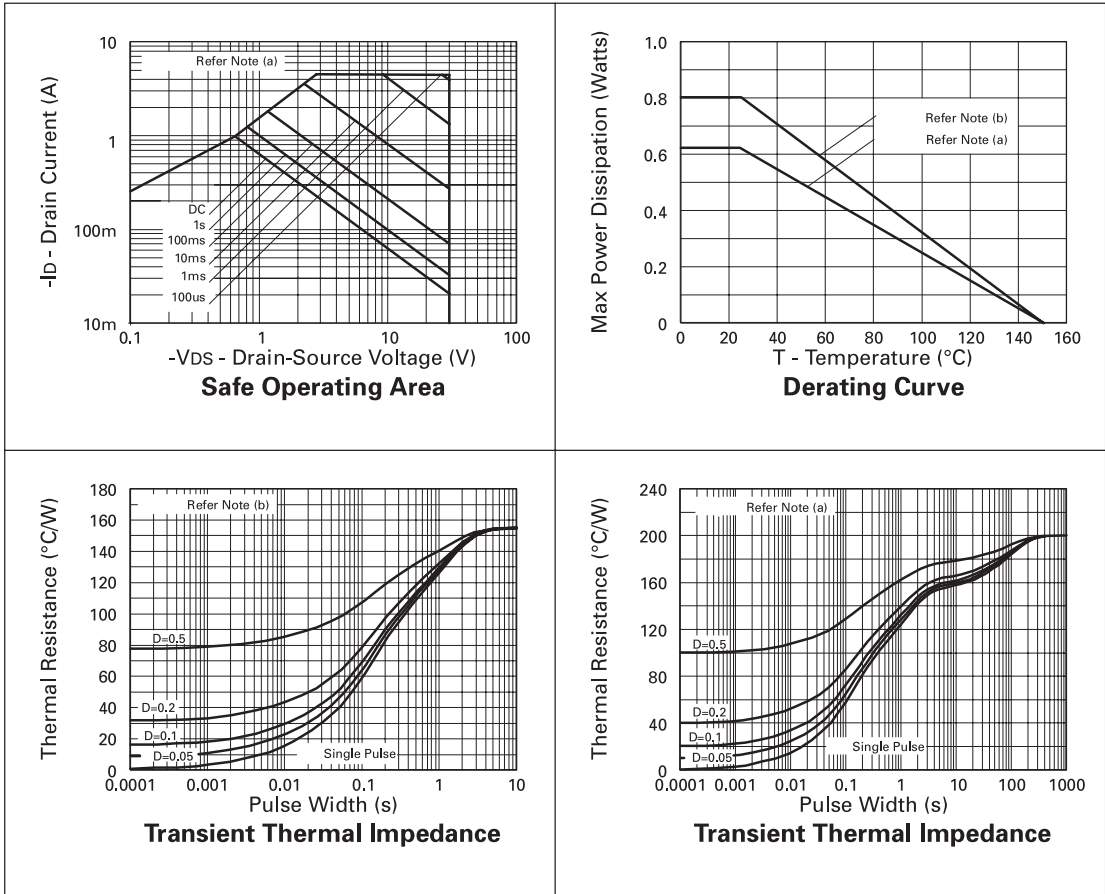
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(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.

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CHARACTERISTICS



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

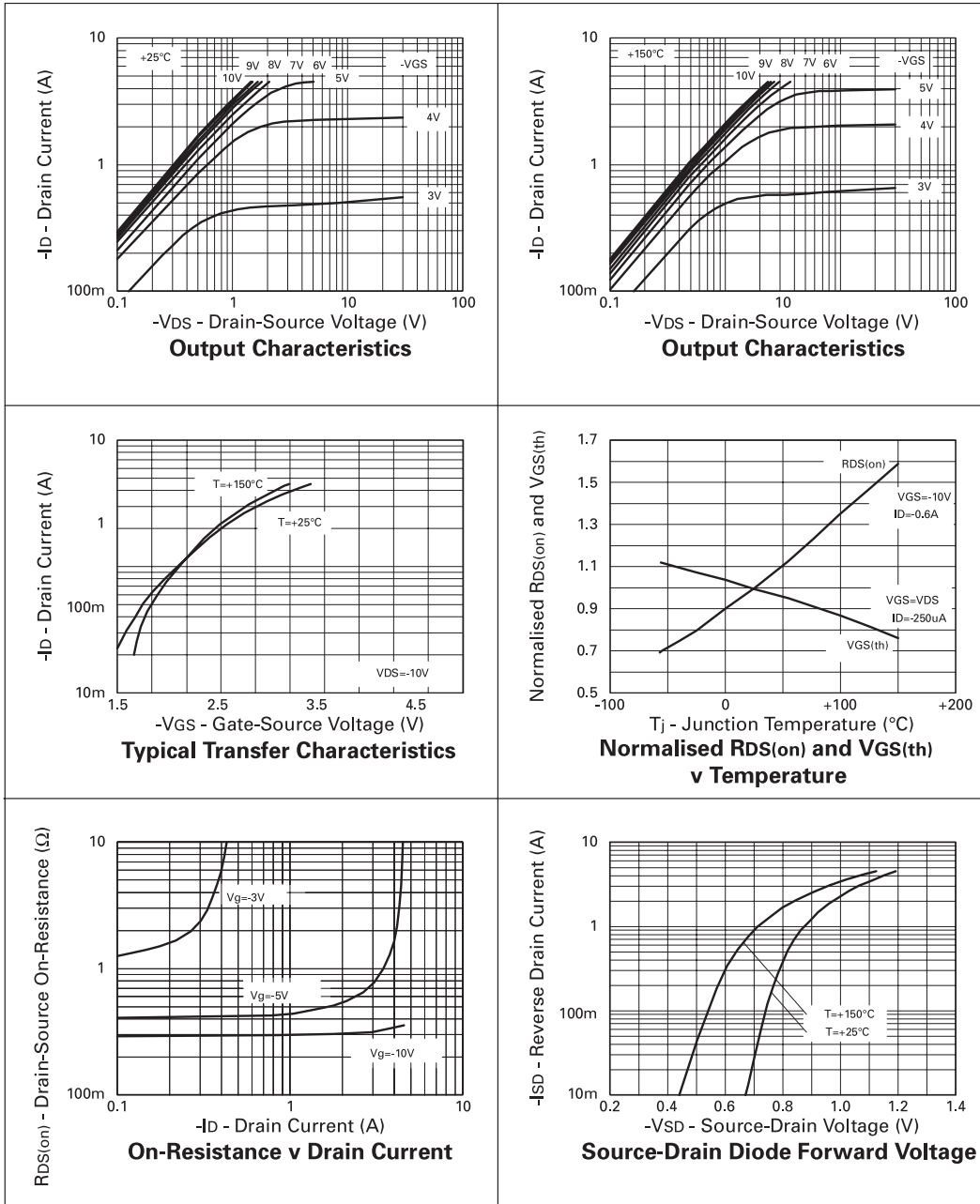
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---------------|------|------|--------------|----------------------|--|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | -30 | | | V | $I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$ |
| Zero Gate Voltage Drain 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) | $R_{DS(on)}$ | | | 0.35 0.55 | Ω Ω | $V_{GS} = -10\text{V}$, $I_D = -0.6\text{A}$ $V_{GS} = -4.5\text{V}$, $I_D = -0.3\text{A}$ |
| Forward Transconductance (3) | g_{fs} | 0.44 | | | S | $V_{DS} = -10\text{V}$, $I_D = -0.3\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 140 | | pF | $V_{DS} = -25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 45 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 20 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 1.9 | | ns | $V_{DD} = -15\text{V}$, $I_D = -0.6\text{A}$ $R_G = 6.2\Omega$, $R_D = 25\Omega$ (Refer to test circuit) |
| Rise Time | t_r | | 2.9 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 8.9 | | ns | |
| Fall Time | t_f | | 5.0 | | ns | |
| Total Gate Charge | Q_g | | | 4.8 | nC | $V_{DS} = -24\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -0.6\text{A}$ (Refer to test circuit) |
| Gate-Source Charge | Q_{gs} | | | 0.62 | nC | |
| Gate Drain Charge | Q_{gd} | | | 1.3 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | | -0.95 | V | $T_j = 25^{\circ}\text{C}$, $I_S = -0.6\text{A}$, $V_{GS} = 0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 14.8 | | ns | $T_j = 25^{\circ}\text{C}$, $I_F = -0.6\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge(3) | Q_{rr} | | 7.7 | | nC | |

NOTES:

- (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.

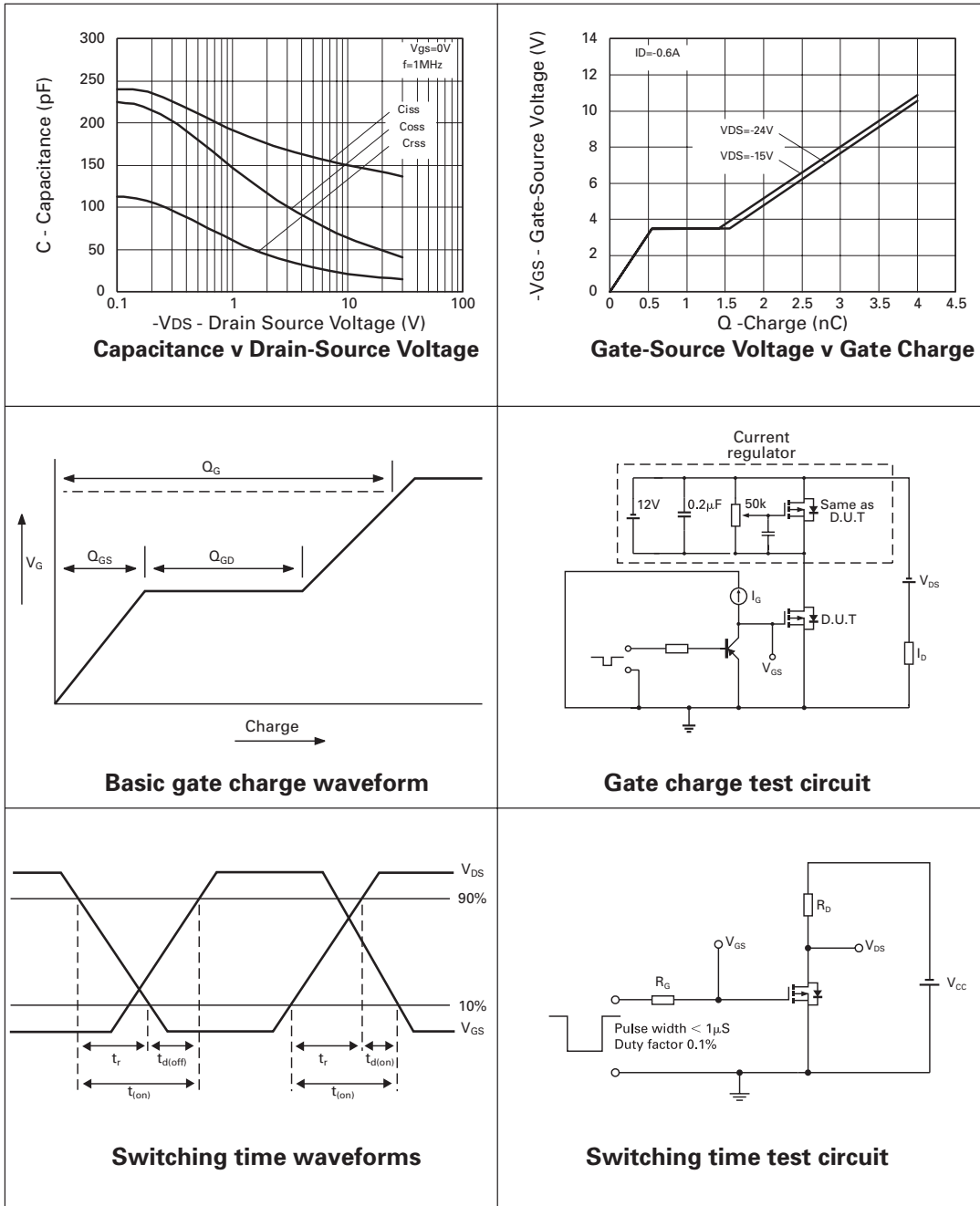
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TYPICAL CHARACTERISTICS



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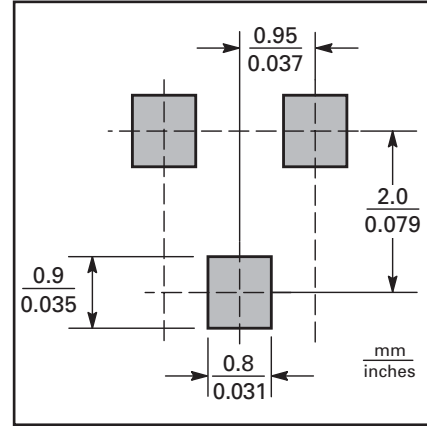
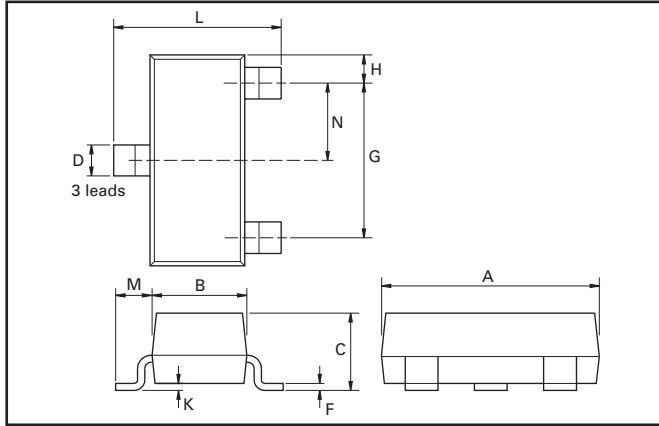
TYPICAL CHARACTERISTICS



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PACKAGE DETAILS

PAD LAYOUT DETAILS



PACKAGE DIMENSIONS

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|-----|-------------|------|-----------|--------|-----|-------------|------|------------|--------|
| | Min | Max | Min | Max | | Min | Max | Max | Max |
| A | 2.67 | 3.05 | 0.105 | 0.120 | H | 0.33 | 0.51 | 0.013 | 0.020 |
| B | 1.20 | 1.40 | 0.047 | 0.055 | K | 0.01 | 0.10 | 0.0004 | 0.004 |
| C | — | 1.10 | — | 0.043 | L | 2.10 | 2.50 | 0.083 | 0.0985 |
| D | 0.37 | 0.53 | 0.015 | 0.021 | M | 0.45 | 0.64 | 0.018 | 0.025 |
| F | 0.085 | 0.15 | 0.0034 | 0.0059 | N | 0.95 NOM | | 0.0375 NOM | |
| G | 1.90 NOM | | 0.075 NOM | | — | — | | — | |

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