

20V P-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS} = -20V$; $R_{DS(ON)} = 0.090\Omega$; $I_D = -3.5A$

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

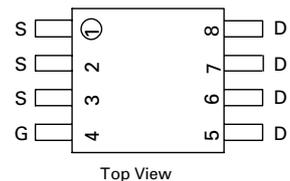
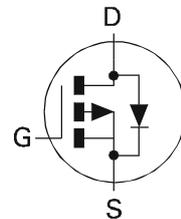
| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM64P02XTA | 7 | 12mm embossed | 1000 units |
| ZXM64P02XTC | 13 | 12mm embossed | 4000 units |

DEVICE MARKING

- ZXM64P02



MSOP8



ZXM64P02X

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|---------------|--------------|---------------------|
| Drain-Source Voltage | V_{DSS} | -20 | V |
| Gate- Source Voltage | V_{GS} | ± 12 | 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 | -3.5 -2.8 | A |
| Pulsed Drain Current (c) | I_{DM} | -19 | A |
| Continuous Source Current (Body Diode)(b) | I_S | -2.0 | A |
| Pulsed Source Current (Body Diode)(c) | I_{SM} | -19 | 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 | $^\circ C/W$ |

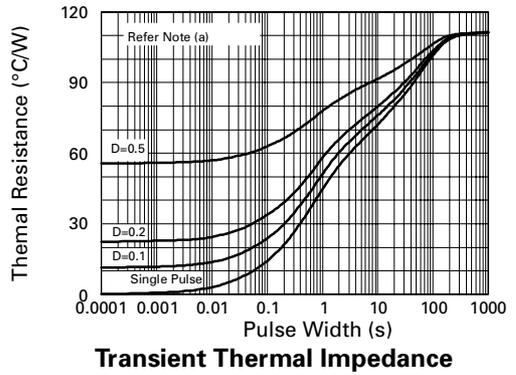
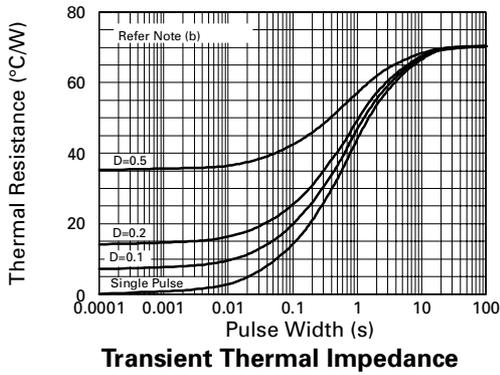
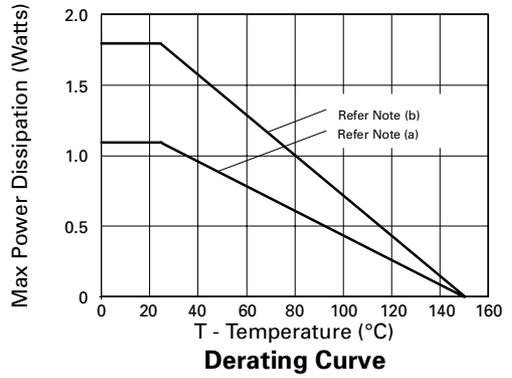
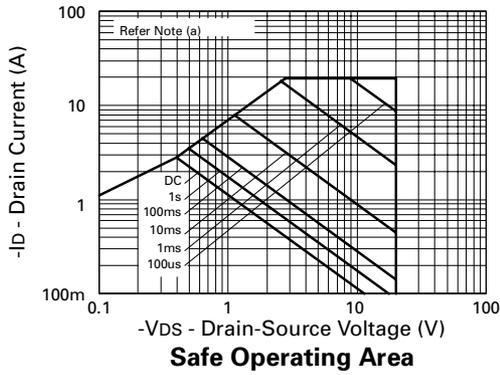
NOTES

(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.

CHARACTERISTICS



ZXM64P02X

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

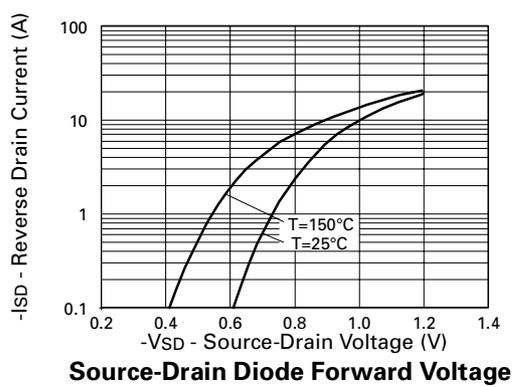
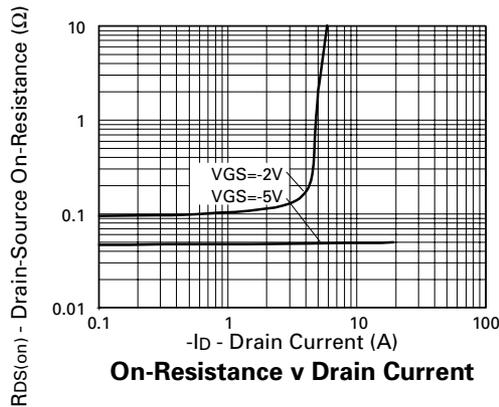
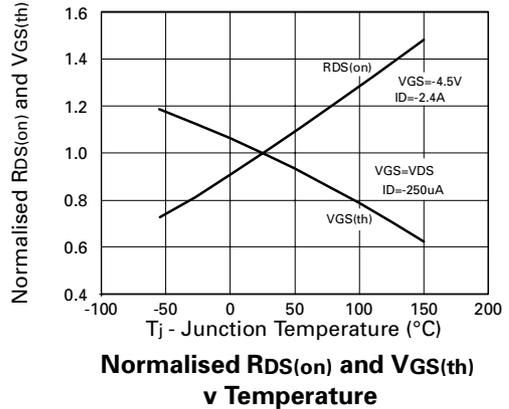
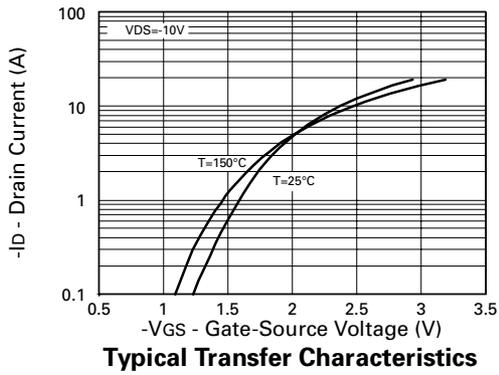
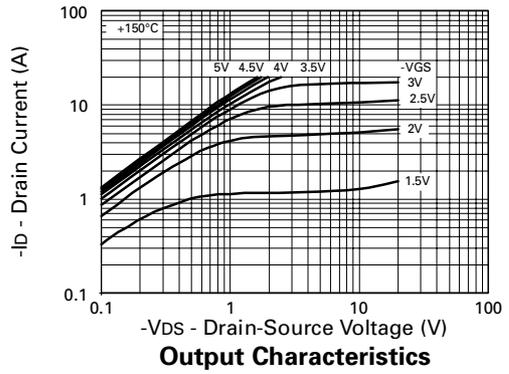
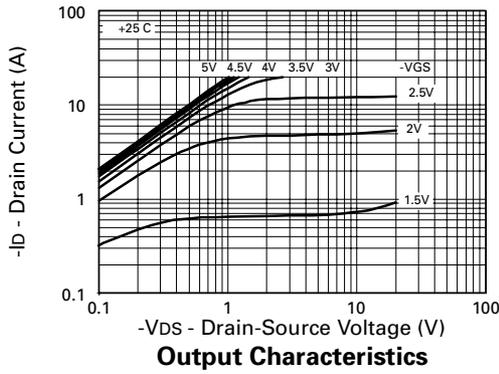
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---------------|------|------|---------------|---------------|---|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | -20 | | | V | $I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | | -1 | μA | $V_{DS} = -20\text{V}$, $V_{GS} = 0\text{V}$ |
| Gate-Body Leakage | I_{GSS} | | | ± 100 | nA | $V_{GS} = \pm 12\text{V}$, $V_{DS} = 0\text{V}$ |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | -0.7 | | | V | $I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | | 0.090 0.13 | Ω | $V_{GS} = -4.5\text{V}$, $I_D = -2.4\text{A}$ $V_{GS} = -2.7\text{V}$, $I_D = -1.2\text{A}$ |
| Forward Transconductance (3) | g_{fs} | 2.6 | | | S | $V_{DS} = -10\text{V}$, $I_D = -1.2\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 900 | | pF | $V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 350 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 150 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 5.6 | | ns | $V_{DD} = -10\text{V}$, $I_D = -2.4\text{A}$ $R_G = 6.0\Omega$, $R_D = 4.0\Omega$ (Refer to test circuit) |
| Rise Time | t_r | | 12.3 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 45.5 | | ns | |
| Fall Time | t_f | | 40.0 | | ns | $V_{DS} = -16\text{V}$, $V_{GS} = -4.5\text{V}$, $I_D = -2.4\text{A}$ (Refer to test circuit) |
| Total Gate Charge | Q_g | | | 6.9 | nC | |
| Gate-Source Charge | Q_{gs} | | | 1.3 | nC | |
| Gate Drain Charge | Q_{gd} | | | 2.5 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | | -0.95 | V | $T_j = 25^{\circ}\text{C}$, $I_S = -2.4\text{A}$, $V_{GS} = 0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 46.0 | | ns | $T_j = 25^{\circ}\text{C}$, $I_F = -2.4\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge(3) | Q_{rr} | | 35.0 | | nC | |

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

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

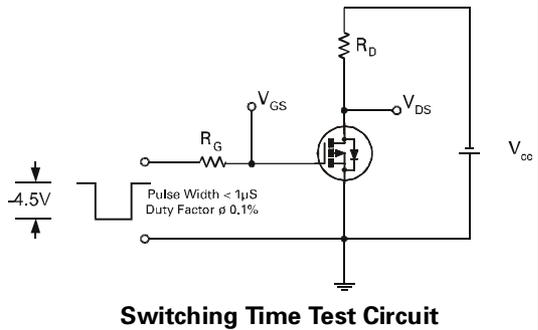
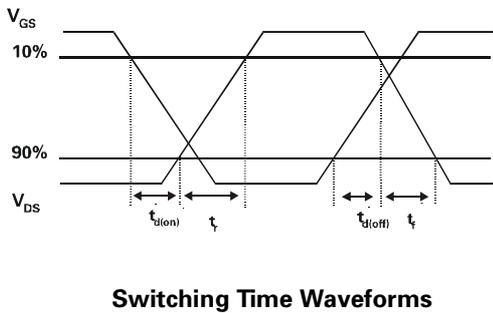
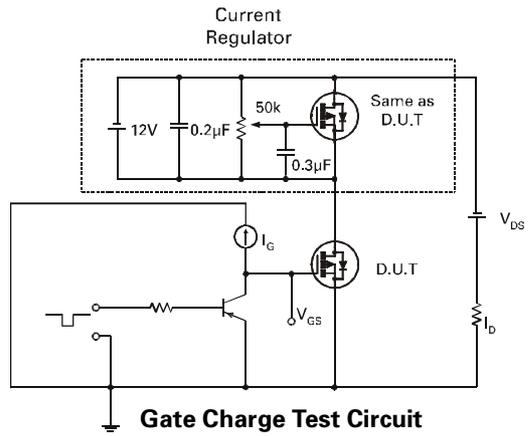
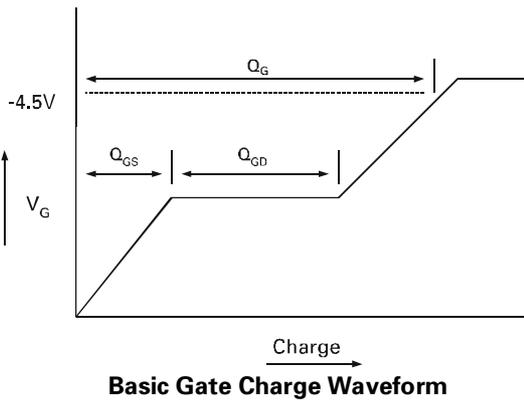
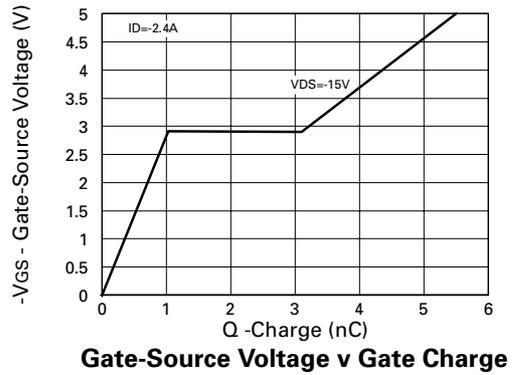
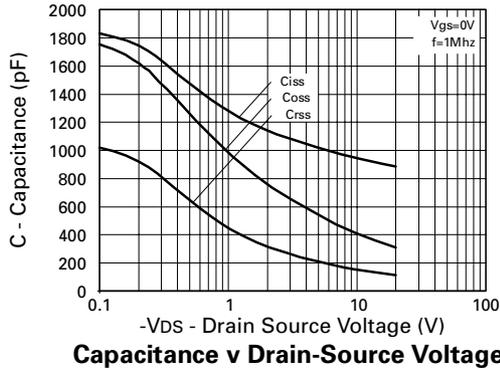
(3) For design aid only, not subject to production testing.

TYPICAL CHARACTERISTICS



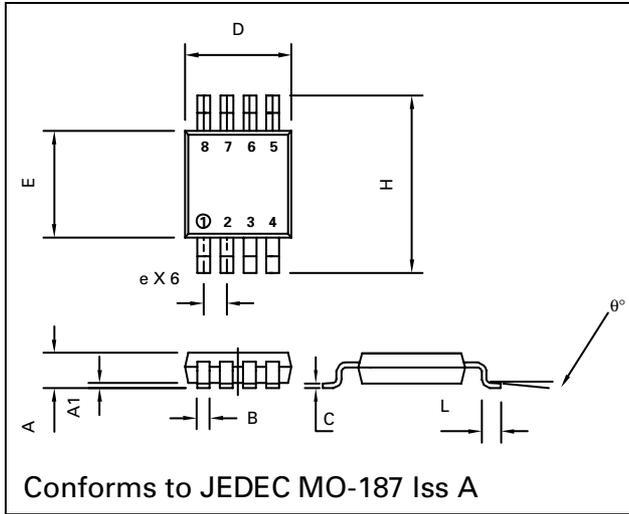
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TYPICAL CHARACTERISTICS



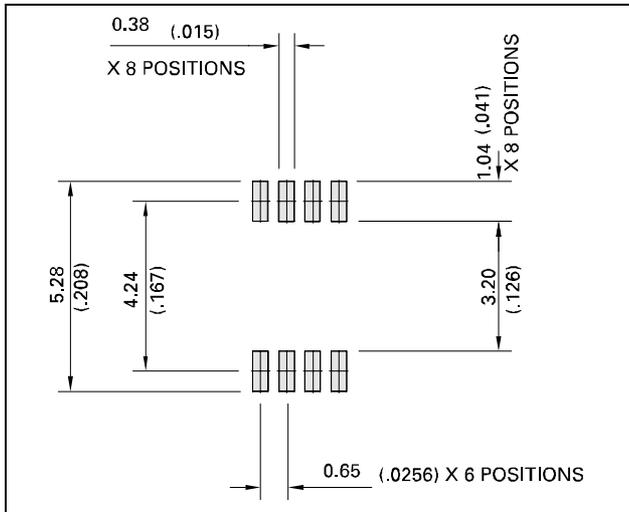
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PACKAGE DIMENSIONS



| 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



ZETEX Zetex plc.
 Chadderton Technology Park, Chadderton, Oldham, OL9-9LL, United Kingdom.
 Telephone: (44)161 622 4422 (Sales), (44)161 622 4444 (General Enquiries)
 Fax: (44)161 622 4420

Zetex GmbH
 tKustermann-park
 D-81541 München
 Germany
 Telefon: (49) 89 45 49 49 0
 Fax: (49) 89 45 49 49 49

Zetex Inc.
 700 Veteran Mem. Highway
 Hauppauge, NY, 11788
 USA
 Telephone: (516) 543-7100
 Fax: (516) 864-7630

Zetex (Asia) Ltd.
 Metroplaza, Tower 1
 Hing Fong Road,
 Kwai Fong, Hong Kong
 Telephone: (852) 26100 611
 Fax: (852) 24250 494

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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.