

20V P-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS} = -20V$; $R_{DS(ON)} = 0.60\Omega$; $I_D = -0.9A$

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
- SOT23 package

APPLICATIONS

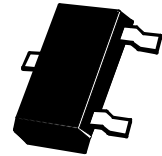
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

ORDERING INFORMATION

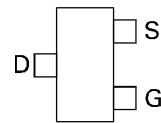
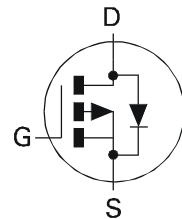
| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM61P02FTA | 7 | 8mm embossed | 3000 units |
| ZXM61P02FTC | 13 | 8mm embossed | 10000 units |

DEVICE MARKING

- P02



SOT23



Top View

ZXM61P02F

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 | -0.9 -0.7 | A |
| Pulsed Drain Current (c) | I_{DM} | -4.9 | A |
| Continuous Source Current (Body Diode)(b) | I_S | -0.9 | A |
| Pulsed Source Current (Body Diode)(c) | I_{SM} | -4.9 | A |
| Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor | P_D | 625 5 | mW mW/°C |
| Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor | P_D | 806 6.4 | mW mW/°C |
| Operating and Storage Temperature Range | T_j ; T_{stg} | -55 to +150 | °C |

THERMAL RESISTANCE

| PARAMETER | SYMBOL | VALUE | UNIT |
|-------------------------|-----------------|-------|------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 200 | °C/W |
| Junction to Ambient (b) | $R_{\theta JA}$ | 155 | °C/W |

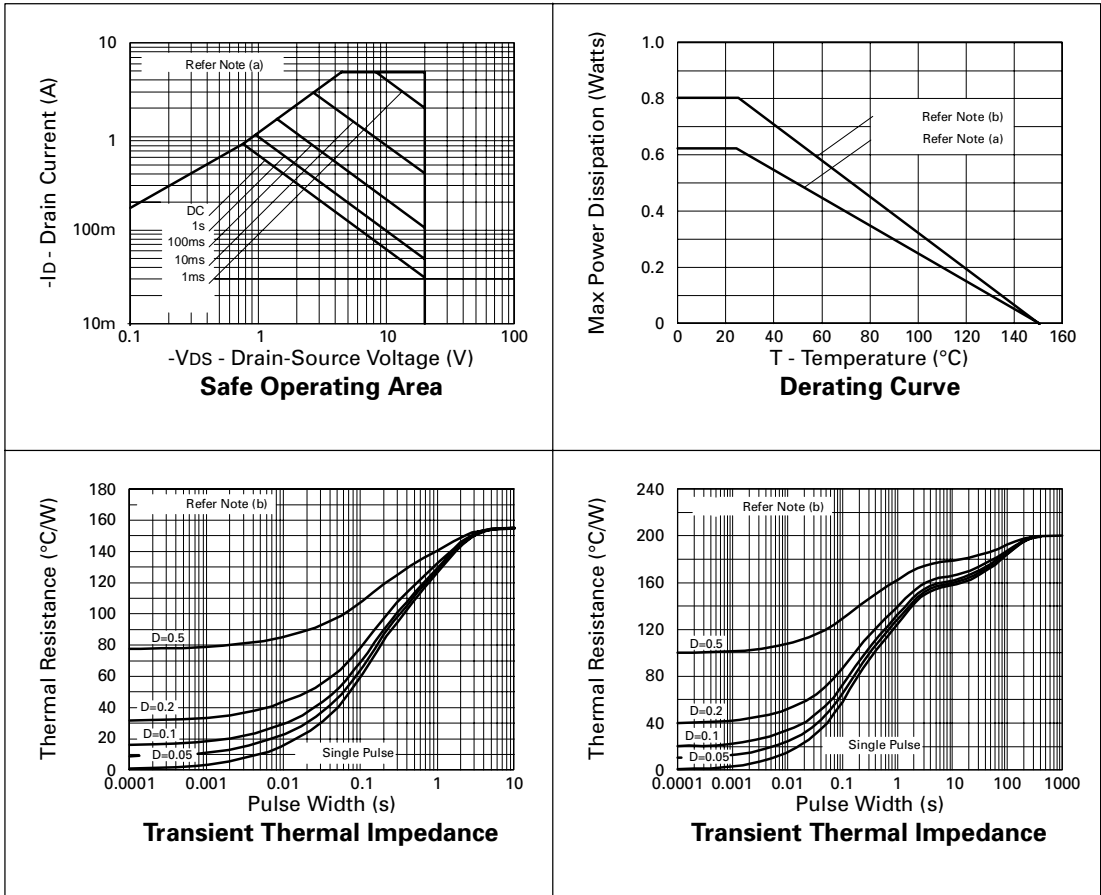
NOTES

(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.

CHARACTERISTICS



ZXM61P02F

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

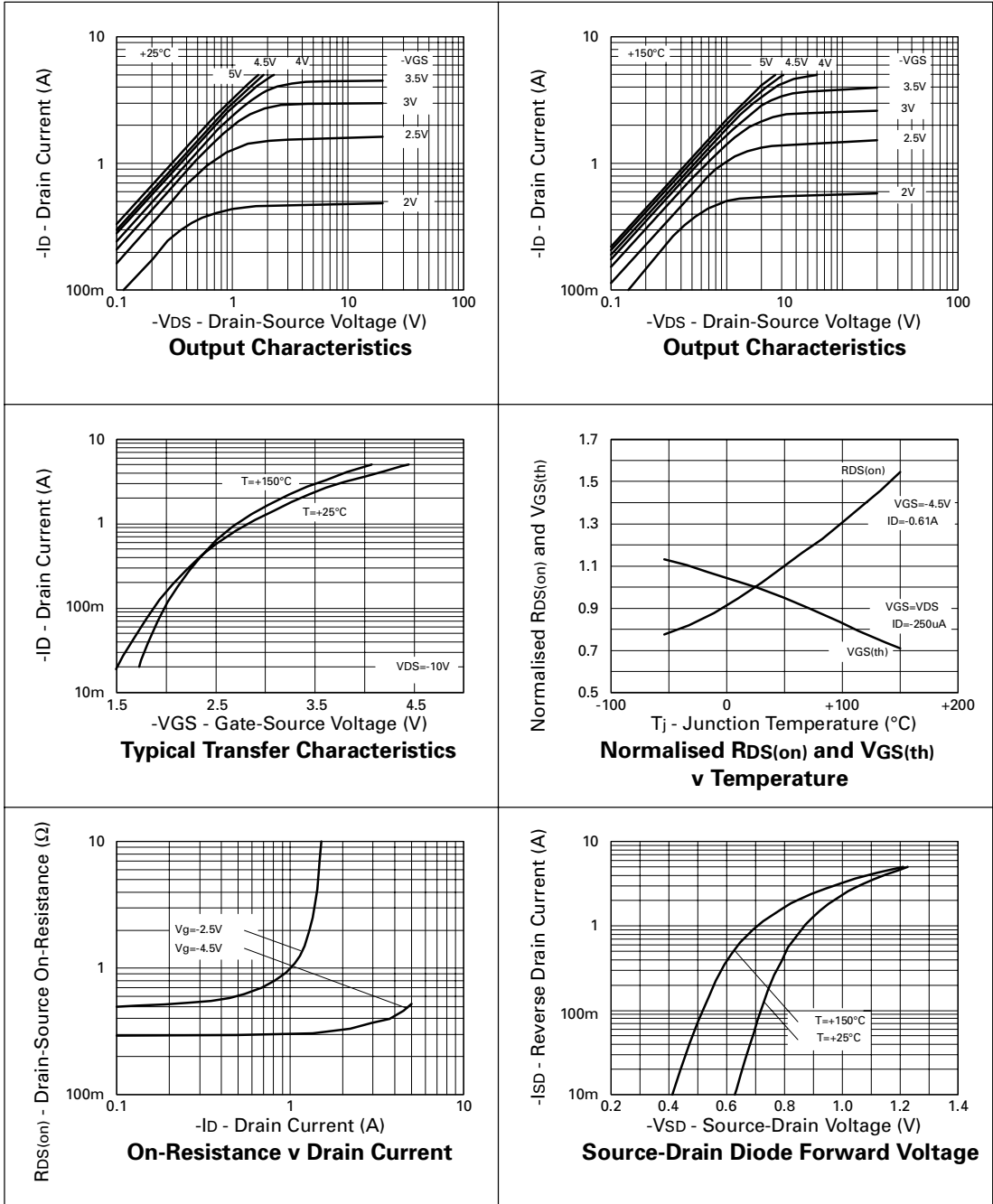
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---------------|------|------|------------|----------------------|---|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | -20 | | | V | $I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$ |
| Zero Gate Voltage Drain 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) | $R_{DS(on)}$ | | | 0.6 0.9 | Ω Ω | $V_{GS} = -4.5\text{V}$, $I_D = -0.61\text{A}$ $V_{GS} = -2.7\text{V}$, $I_D = -0.31\text{A}$ |
| Forward Transconductance (3) | g_{fs} | 0.56 | | | S | $V_{DS} = -10\text{V}$, $I_D = -0.31\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 150 | | pF | $V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 70 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 30 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 2.9 | | ns | $V_{DD} = -10\text{V}$, $I_D = -0.93\text{A}$ $R_G = 6.2\Omega$, $R_D = 11\Omega$ (Refer to test circuit) |
| Rise Time | t_r | | 6.7 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 11.2 | | ns | |
| Fall Time | t_f | | 10.1 | | ns | |
| Total Gate Charge | Q_g | | | 3.5 | nC | $V_{DS} = -16\text{V}$, $V_{GS} = -4.5\text{V}$, $I_D = -0.61\text{A}$ (Refer to test circuit) |
| Gate-Source Charge | Q_{gs} | | | 0.5 | nC | |
| Gate Drain Charge | Q_{gd} | | | 1.5 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | | -0.95 | V | $T_j = 25^{\circ}\text{C}$, $I_S = -0.61\text{A}$, $V_{GS} = 0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 14.9 | | ns | $T_j = 25^{\circ}\text{C}$, $I_F = -0.61\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge(3) | Q_{rr} | | 5.6 | | nC | |

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

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

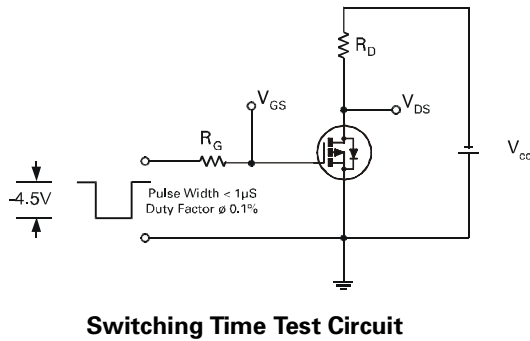
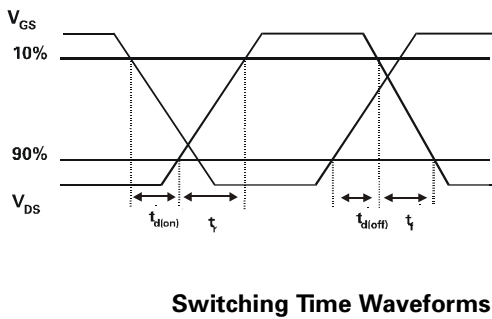
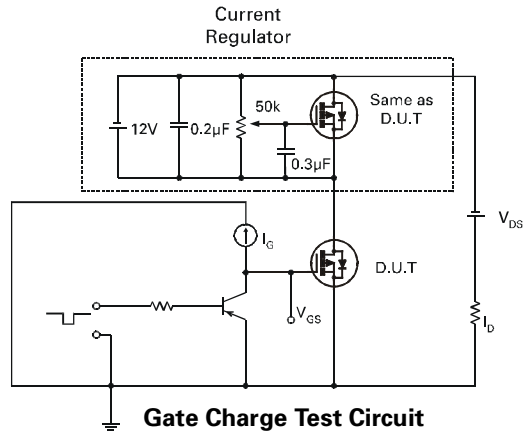
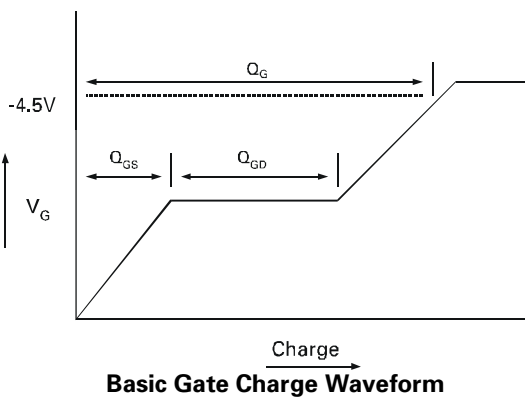
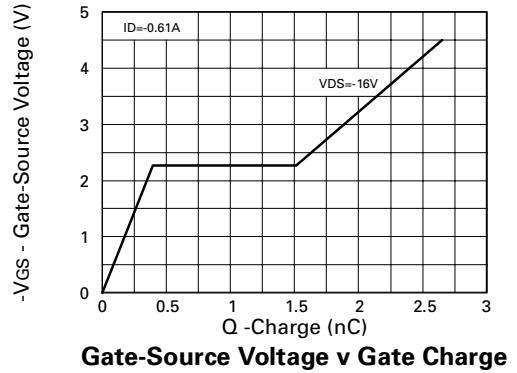
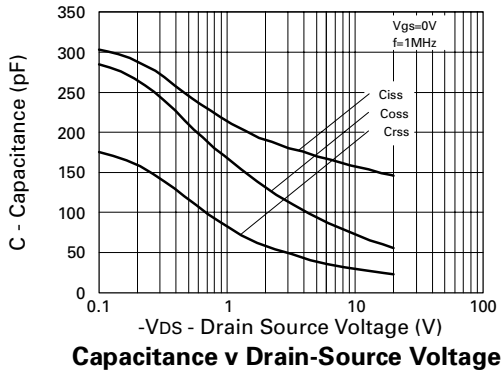
(3) For design aid only, not subject to production testing.

TYPICAL CHARACTERISTICS



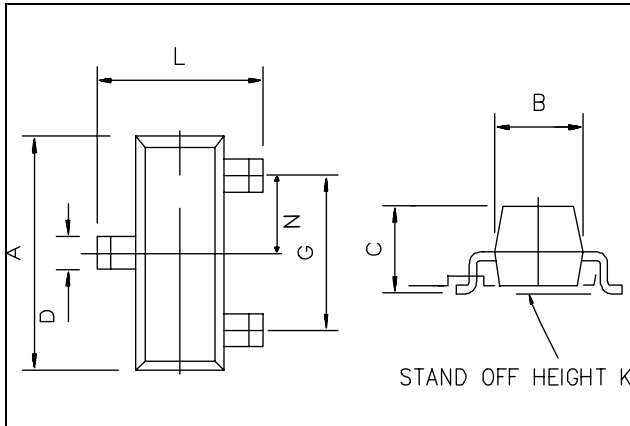
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TYPICAL CHARACTERISTICS



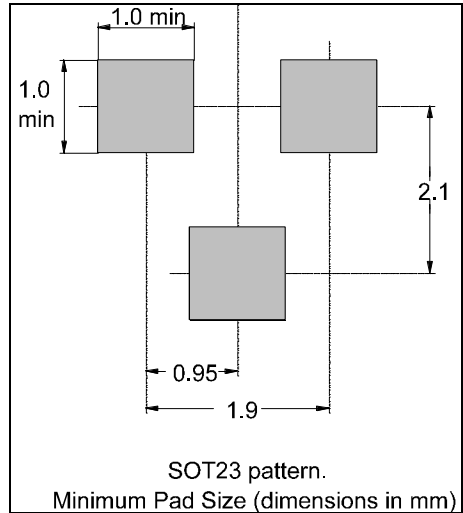
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PACKAGE DIMENSIONS



| DIM | Millimetres | | Inches | |
|-----|-------------|------|-----------|--------|
| | Min | Max | Min | Max |
| A | 2.67 | 3.05 | 0.105 | 0.120 |
| B | 1.20 | 1.40 | 0.047 | 0.055 |
| C | - | 1.10 | - | 0.043 |
| D | 0.37 | 0.53 | 0.0145 | 0.021 |
| F | 0.085 | 0.15 | 0.0033 | 0.0059 |
| G | NOM 1.9 | | NOM 0.075 | |
| K | 0.01 | 0.10 | 0.0004 | 0.004 |
| L | 2.10 | 2.50 | 0.0825 | 0.0985 |
| N | NOM 0.95 | | NOM 0.037 | |

PAD LAYOUT DETAILS



ZETEX Zetex plc.
Fields New Road, Chadderton, Oldham, OL9-8NP, United Kingdom.
Telephone: (44)161 622 4422 (Sales), (44)161 622 4444 (General Enquiries)
Fax: (44)161 622 4420

Zetex GmbH
Streitfeldstraße 19
D-81673 München
Germany
Telephone: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49

Zetex Inc.
47 Mall Drive, Unit 4
Commack NY 11725
USA
Telephone: (516) 543-7100
Fax: (516) 864-7630

Zetex (Asia) Ltd.
3510 Metroplaza, Tower 2
Hing Fong Road,
Kwai Fong, Hong Kong
Telephone: (852) 26100 611
Fax: (852) 24250 494

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