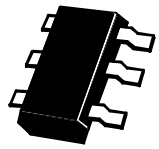
# 20V P-CHANNEL ENHANCEMENT MODE MOSFET

## SUMMARY

**$V_{(BR)DSS}$=-20V; $R_{DS(ON)}$=0.20Ω; $I_D$=-2.3A**



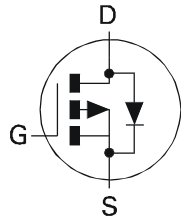
**SOT23-6**

### 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.

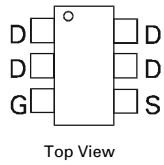
### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23-6 package




### APPLICATIONS

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




### ORDERING INFORMATION

| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|---|---|---|---|
| ZXM62P02E6TA | 7 | 8mm embossed | 3000 units |
| ZXM62P02E6TC | 13 | 8mm embossed | 10000 units |

### DEVICE MARKING

- 2P02

## 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°C)(b)<br>($V_{GS}$=-4.5V; $T_A$=70°C)(b) | $I_D$ | -2.3<br>-1.7 | A |
| Pulsed Drain Current (c) | $I_{DM}$ | -13 | A |
| Continuous Source Current (Body Diode)(b) | $I_S$ | -1.9 | A |
| Pulsed Source Current (Body Diode)(c) | $I_{SM}$ | -13 | A |
| Power Dissipation at $T_A$=25°C (a)<br>Linear Derating Factor | $P_D$ | 1.1<br>8.8 | W<br>mW/°C |
| Power Dissipation at $T_A$=25°C (b)<br>Linear Derating Factor | $P_D$ | 1.7<br>13.6 | W<br>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) | $R_{\theta JA}$ | 113 | °C/W |
| Junction to Ambient (b) | $R_{\theta JA}$ | 73 | °C/W |

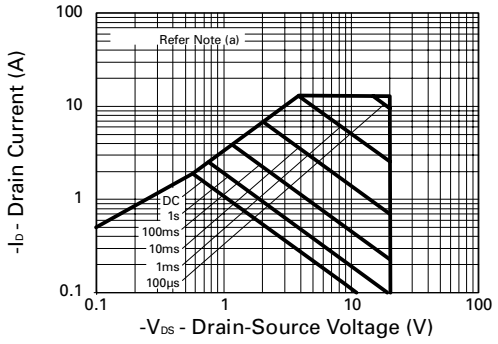
NOTES

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

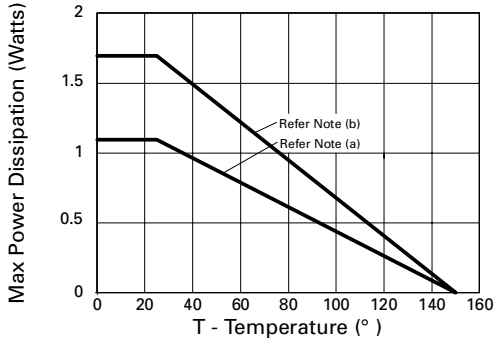
(b) For a device surface mounted on FR4 PCB measured at t≤5 secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

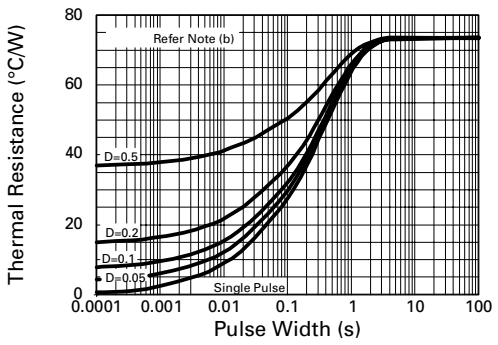
## CHARACTERISTICS



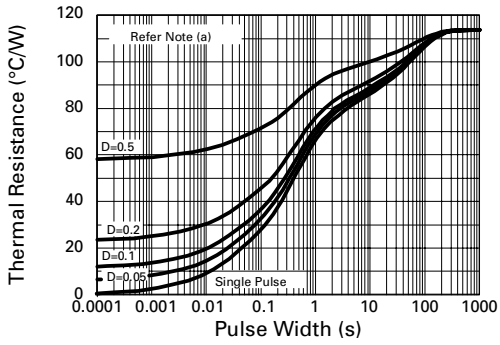

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**



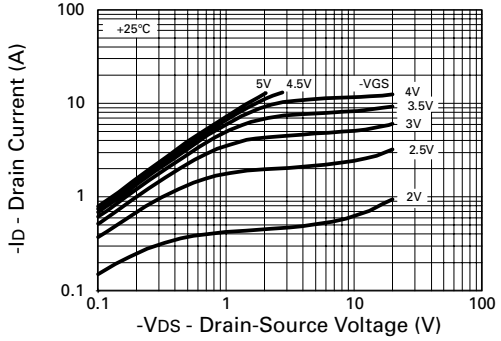

**Transient Thermal Impedance**

## ELECTRICAL CHARACTERISTICS (at $T_{amb}$ = 25°C unless otherwise stated).

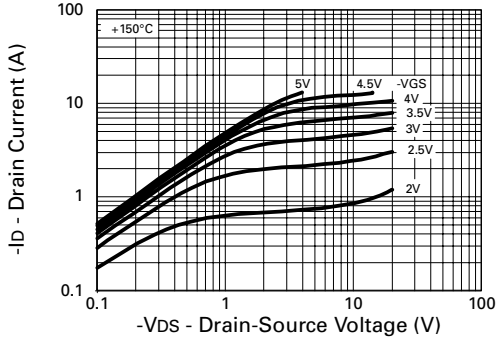
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | -20 | | | V | $I_D$=-250µA, $V_{GS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | | -1 | µA | $V_{DS}$=-20V, $V_{GS}$=0V |
| Gate-Body Leakage | $I_{GSS}$ | | | ±100 | nA | $V_{GS}$=± 12V, $V_{DS}$=0V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | -0.7 | | | V | $I_D$=-250µA, $V_{DS}$= $V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | | 0.2<br>0.375 | Ω<br>Ω | $V_{GS}$=-4.5V, $I_D$=-1.6A<br>$V_{GS}$=-2.7V, $I_D$=-0.8A |
| Forward Transconductance (3) | $g_{fs}$ | 1.5 | | | S | $V_{DS}$=-10V,$I_D$=-0.8A |
| **DYNAMIC** (3) | | | | | | |
| Input Capacitance | $C_{iss}$ | | 320 | | pF | $V_{DS}$=-15 V, $V_{GS}$=0V, f=1MHz |
| Output Capacitance | $C_{oss}$ | | 150 | | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | | 75 | | pF | |
| **SWITCHING**(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 4.1 | | ns | $V_{DD}$=-10V, $I_D$=-1.6A<br>$R_G$=6.0Ω, $R_D$=6.1Ω<br>(Refer to test circuit) |
| Rise Time | $t_r$ | | 15.4 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 12.0 | | ns | |
| Fall Time | $t_f$ | | 19.2 | | ns | |
| Total Gate Charge | $Q_g$ | | | 5.8 | nC | $V_{DS}$=-16V,$V_{GS}$=-4.5V,<br>$I_D$=-1.6A<br>(Refer to test circuit) |
| Gate-Source Charge | $Q_{gs}$ | | | 1.25 | nC | |
| Gate Drain Charge | $Q_{gd}$ | | | 2.8 | nC | |
| **SOURCE-DRAIN DIODE** | | | | | | |
| Diode Forward Voltage (1) | $V_{SD}$ | | | -0.95 | V | $T_j$=25°C, $I_S$=-1.6A, $V_{GS}$=0V |
| Reverse Recovery Time (3) | $t_{rr}$ | | 22.5 | | ns | $T_j$=25°C, $I_F$=-1.6A, di/dt= 100A/µs |
| Reverse Recovery Charge(3) | $Q_{rr}$ | | 10.4 | | nC | |

(1) Measured under pulsed conditions. Width=300µs. Duty cycle ≤2% .
(2) Switching characteristics are independent of operating junction temperature.
(3) For design aid only, not subject to production testing.

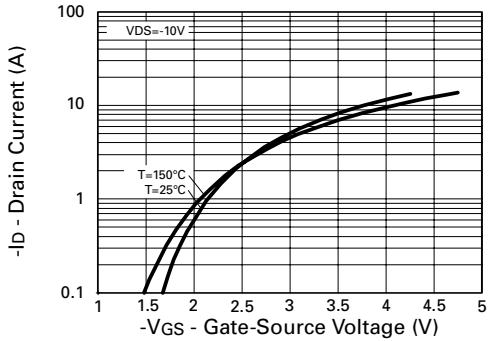
## TYPICAL CHARACTERISTICS



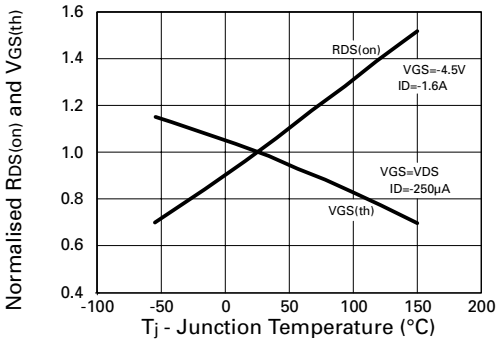

**Output Characteristics**



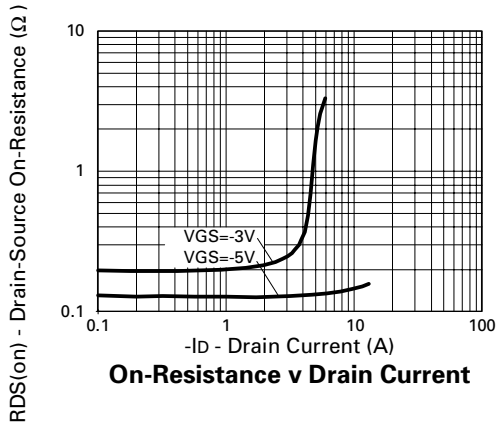

**Output Characteristics**



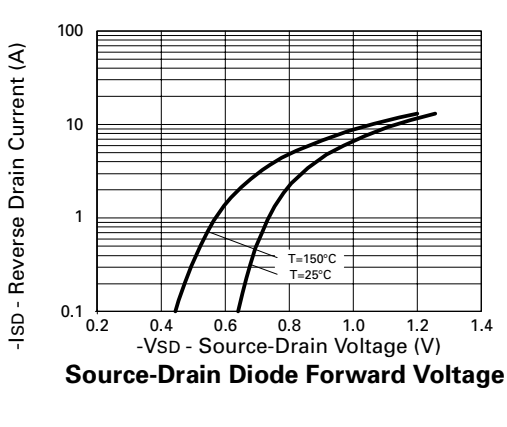

**Typical Transfer Characteristics**




**Normalised RDS(on) and VGS(th) v Temperature**

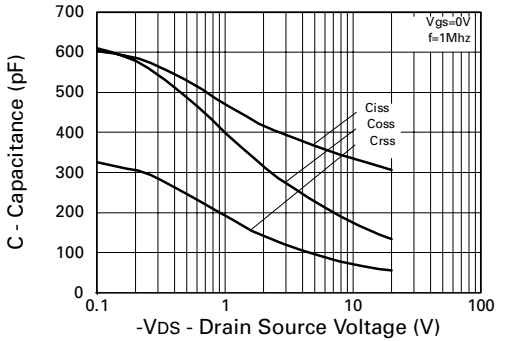



**On-Resistance v Drain Current**

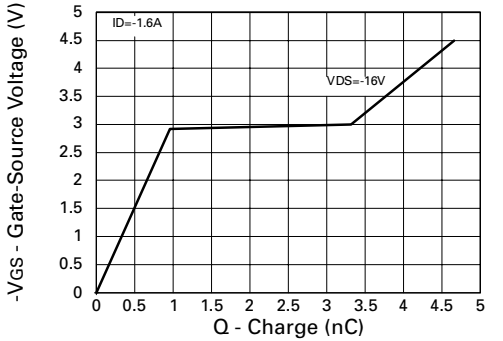



**Source-Drain Diode Forward Voltage**

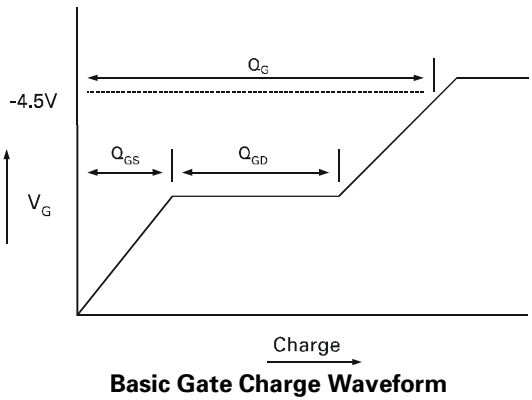
## TYPICAL CHARACTERISTICS



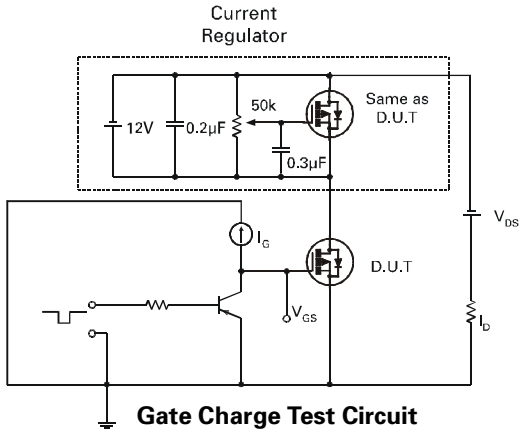

**Capacitance v Drain-Source Voltage**



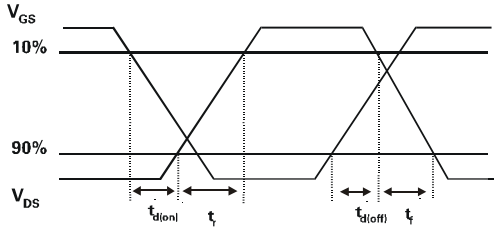

**Gate-Source Voltage v Gate Charge**



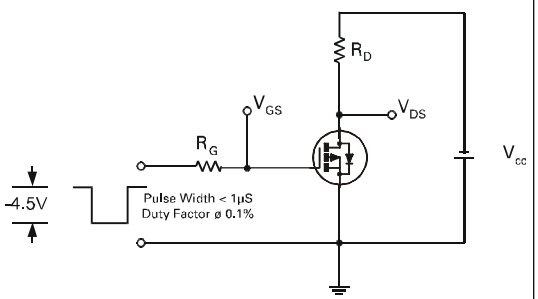

**Basic Gate Charge Waveform**




**Gate Charge Test Circuit**



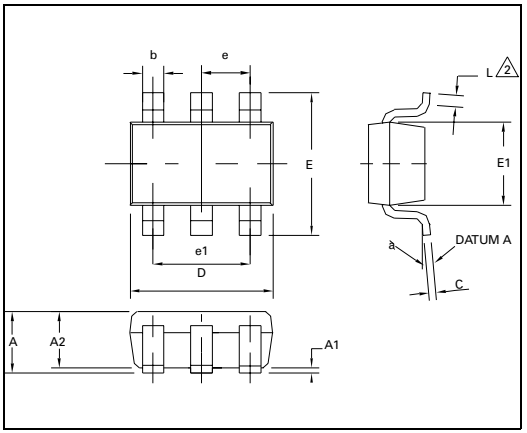

**Switching Time Waveforms**



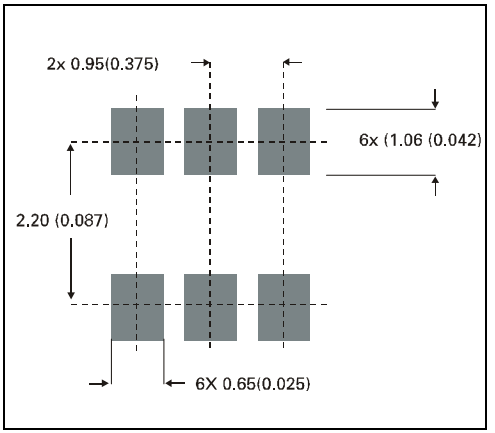

**Switching Time Test Circuit**

# ZXM62P02E6

## PACKAGE DIMENSIONS




## PAD LAYOUT DETAILS




| DIM | Millimetres | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.90 | 1.45 | 0.35 | 0.057 |
| A1 | 0.00 | 0.15 | 0 | 0.006 |
| A2 | 0.90 | 1.30 | 0.035 | 0.051 |
| b | 0.35 | 0.50 | 0.014 | 0.019 |
| C | 0.09 | 0.20 | 0.0035 | 0.008 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 2.60 | 3.00 | 0.102 | 0.118 |
| E1 | 1.50 | 1.75 | 0.059 | 0.069 |
| L | 0.10 | 0.60 | 0.004 | 0.002 |
| e | 0.95 REF | | 0.037 REF | |
| e1 | 1.90 REF | | 0.074 REF | |
| L | 0° | 10° | 0° | 10° |


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
Telefon: (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


These are supported by
agents and distributors in
major countries world-wide


**Internet:http://www.zetex.com**



ISSUE 1 - JUNE 2004

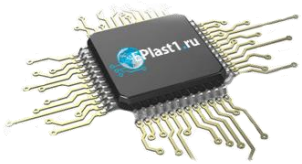
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**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.