

ZXMN2A14F

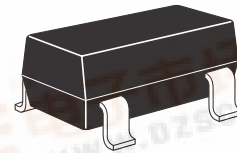
20V N-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS}=20V$; $R_{DS(on)}=0.06\Omega$; $I_D=4.1A$

DESCRIPTION

This new generation of Trench 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.



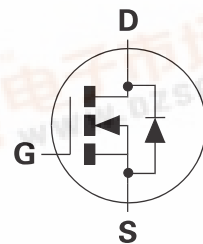
SOT23

FEATURES

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

APPLICATIONS

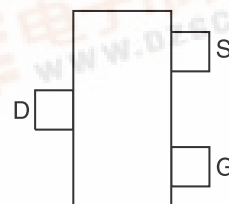
- DC-DC Converters
- Power Management functions
- Disconnect switches
- Motor control



ORDERING INFORMATION

| DEVICE | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXMN2A14FTA | 7" | 8mm | 3000 units |
| ZXMN2A14FTC | 13" | 8mm | 10000 units |

PINOUT



DEVICE MARKING

- 214



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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) | I_D | 4.1 | A |
| @ $V_{GS}=4.5V$; $T_A=70^\circ C$ ^(b) | | 3.3 | A |
| @ $V_{GS}=4.5V$; $T_A=25^\circ C$ ^(a) | | 3.4 | A |
| Pulsed Drain Current ^(c) | I_{DM} | 19 | A |
| Continuous Source Current (Body Diode) ^(b) | I_S | 1.7 | A |
| Pulsed Source Current (Body Diode) ^(c) | I_{SM} | 19 | A |
| Power Dissipation at $T_A=25^\circ C$ ^(a) | P_D | 1 | W |
| Linear Derating Factor | | 8 | mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ ^(b) | P_D | 1.5 | W |
| Linear Derating Factor | | 12 | mW/ $^\circ C$ |
| Operating and Storage Temperature Range | T_j, T_{stg} | -55 to +150 | $^\circ C$ |

THERMAL RESISTANCE

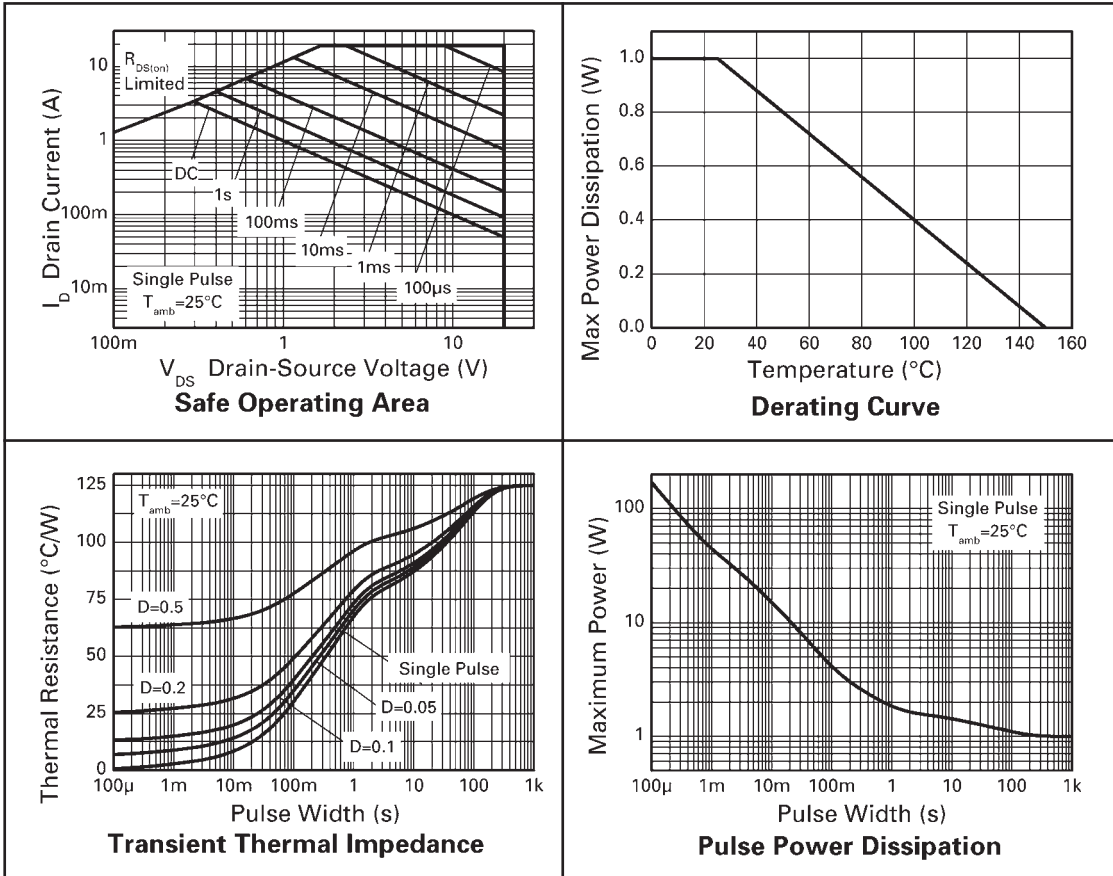
| PARAMETER | SYMBOL | VALUE | UNIT |
|------------------------------------|-----------------|-------|--------------|
| Junction to Ambient ^(a) | $R_{\theta JA}$ | 125 | $^\circ C/W$ |
| Junction to Ambient ^(b) | $R_{\theta JA}$ | 82 | $^\circ C/W$ |

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 $t \leq 5$ sec.
 (c) Repetitive rating - 25mm x 25mm FR4 PCB, $D=0.02$, pulse width 300 μs - pulse width limited by maximum junction temperature.

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CHARACTERISTICS



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

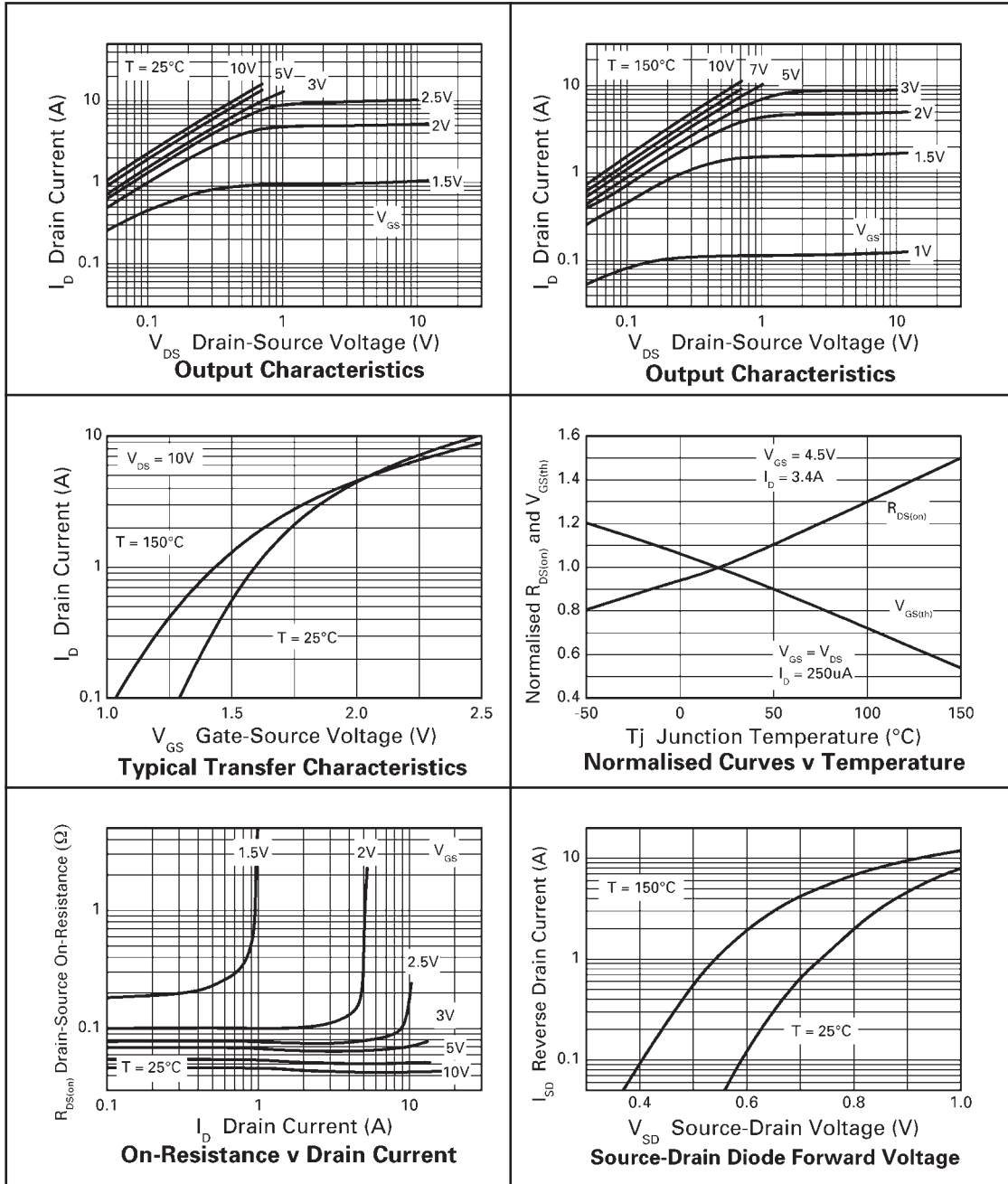
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS |
|--|---------------|------|------|-------|---------------|---|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 30 | | | V | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | | 1 | μA | $V_{DS}=20\text{V}, V_{GS}=0\text{V}$ |
| 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⁾ | $R_{DS(on)}$ | | | 0.060 | Ω | $V_{GS}=4.5\text{V}, I_D=3.4\text{A}$ |
| | | | | 0.110 | Ω | $V_{GS}=2.5\text{V}, I_D=2.5\text{A}$ |
| Forward Transconductance ^{(1) (3)} | g_{fs} | | 9.4 | | S | $V_{DS}=10\text{V}, I_D=3.4\text{A}$ |
| DYNAMIC ⁽³⁾ | | | | | | |
| Input Capacitance | C_{iss} | | 544 | | pF | $V_{DS}=10\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 132 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 85 | | pF | |
| SWITCHING ^{(2) (3)} | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 4.0 | | ns | $V_{DD}=10\text{V}, V_{GS}=4.5\text{V}$ $I_D=1\text{A}$ $R_G \cong 6.0\Omega$ |
| Rise Time | t_r | | 5.3 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 16.6 | | ns | |
| Fall Time | t_f | | 9.5 | | ns | |
| Total Gate Charge | Q_g | | 6.6 | | nC | $V_{DS}=10\text{V}, V_{GS}=4.5\text{V},$ $I_D=3.4\text{A}$ |
| Gate-Source Charge | Q_{gs} | | 1.2 | | nC | |
| Gate-Drain Charge | Q_{gd} | | 2.1 | | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage ⁽¹⁾ | V_{SD} | | 0.85 | 0.95 | V | $T_J=25^{\circ}\text{C}, I_S=(3.3)\text{A},$ $V_{GS}=0\text{V}$ |
| Reverse Recovery Time ⁽³⁾ | t_{rr} | | 11.4 | | ns | $T_J=25^{\circ}\text{C}, I_F=(1.7)\text{A},$ |
| Reverse Recovery Charge ⁽³⁾ | Q_{rr} | | 4.6 | | nC | $di/dt=100\text{A}/\mu\text{s}$ |

NOTES

- (1) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

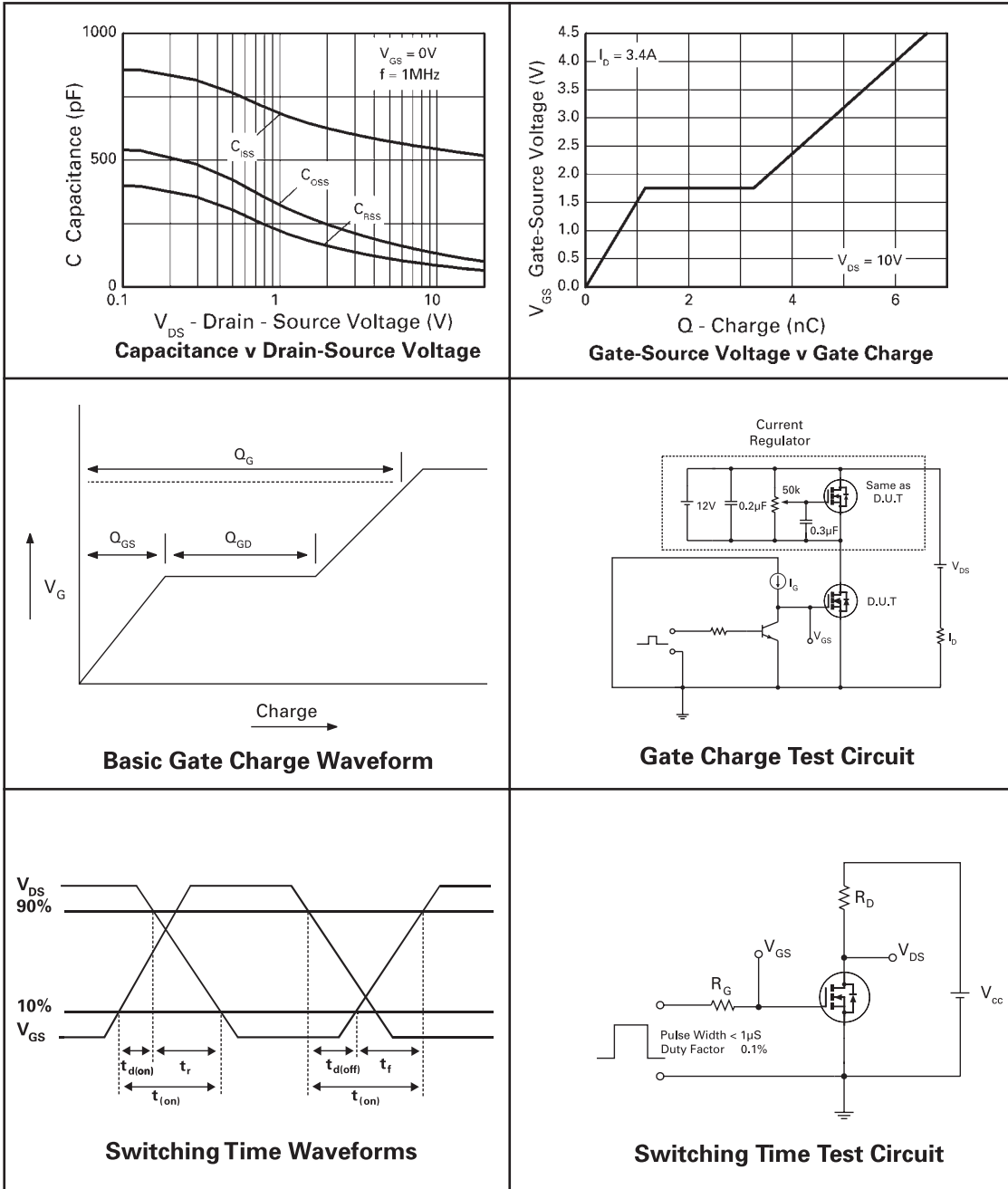
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TYPICAL CHARACTERISTICS



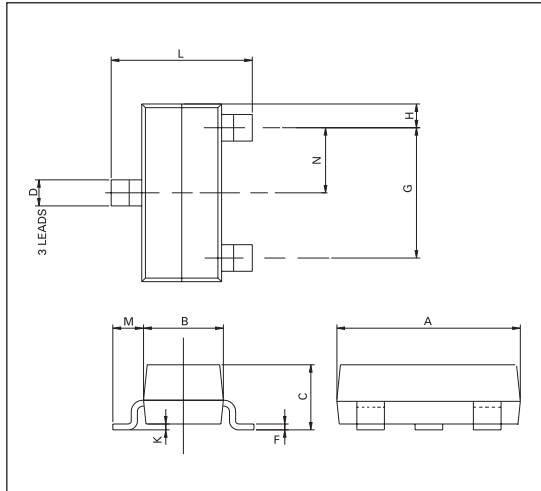
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TYPICAL CHARACTERISTICS

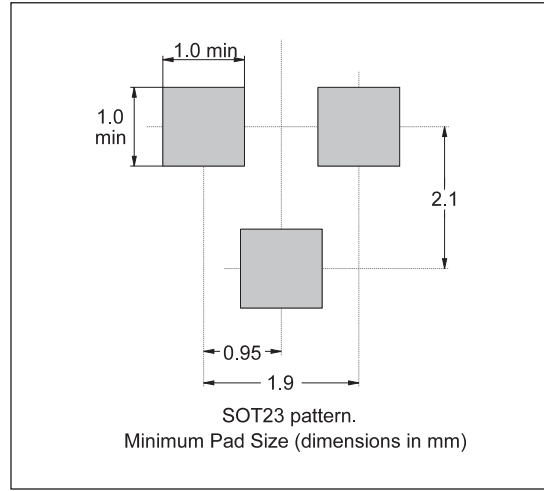


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PACKAGE OUTLINE



PAD LAYOUT



Controlling dimensions are in millimetres. Approximate conversions are given in inches

PACKAGE DIMENSIONS

| DIM | MILLIMETRES | | INCHES | | DIM | MILLIMETRES | | INCHES | |
|-----|-------------|------|-----------|--------|-----|-------------|------|------------|--------|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | 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 | | Θ | 10° TYP | | 10° TYP | |

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