



**THE DATASHEET OF  
ZXMN2A04DN8TA**



# ZXMN2A04DN8

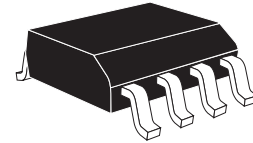
## DUAL 20V N-CANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS} = 20V$ ;  $R_{DS(ON)} = 0.025\Omega$ ;  $I_D = 7.7A$

### 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.



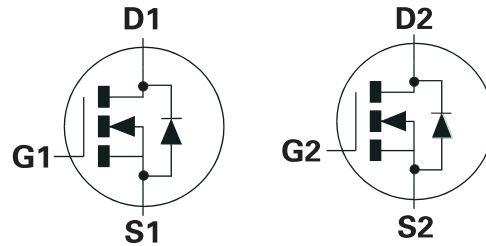
SO8

### 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



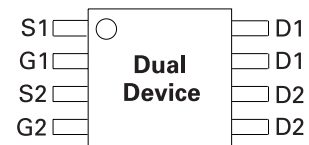
### ORDERING INFORMATION

| DEVICE        | REEL | TAPE WIDTH | QUANTITY PER REEL |
|---------------|------|------------|-------------------|
| ZXMN2A04DN8TA | 7"   | 12mm       | 500 units         |
| ZXMN2A04DN8TC | 13"  | 12mm       | 2500 units        |

### DEVICE MARKING

ZXMN  
2A04D

### PINOUT



Top view

# ZXMN2A04DN8

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER   | SYMBOL         | LIMIT       | UNIT           |
|---|----------------|-------------|----------------|
| Drain-Source Voltage  | $V_{DSS}$      | 20          | V              |
| Gate Source Voltage   | $V_{GS}$       | $\pm 12$    | V              |
| Continuous Drain Current ( $V_{GS}=10V$ ; $T_A=25^\circ C$ ) <sup>(b) (d)</sup><br>( $V_{GS}=10V$ ; $T_A=70^\circ C$ ) <sup>(b) (d)</sup><br>( $V_{GS}=10V$ ; $T_A=25^\circ C$ ) <sup>(a) (d)</sup> | $I_D$          | 7.7         | A              |
|   |                | 6.2         | A              |
|   |                | 5.9         | A              |
| Pulsed Drain Current <sup>(c)</sup>   | $I_{DM}$       | 38          | A              |
| Continuous Source Current (Body Diode) <sup>(b)</sup>   | $I_S$          | 2.9         | A              |
| Pulsed Source Current (Body Diode) <sup>(c)</sup>   | $I_{SM}$       | 38          | A              |
| Power Dissipation at $T_A=25^\circ C$ <sup>(a) (d)</sup>  | $P_D$          | 1.25        | W              |
| Linear Derating Factor  |                | 10          | mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ <sup>(a) (e)</sup>  | $P_D$          | 1.8         | W              |
| Linear Derating Factor  |                | 14          | mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ <sup>(b) (d)</sup>  | $P_D$          | 2.1         | W              |
| Linear Derating Factor  |                | 17          | mW/ $^\circ C$ |
| Operating and Storage Temperature Range   | $T_j; T_{stg}$ | -55 to +150 | $^\circ C$     |

## THERMAL RESISTANCE

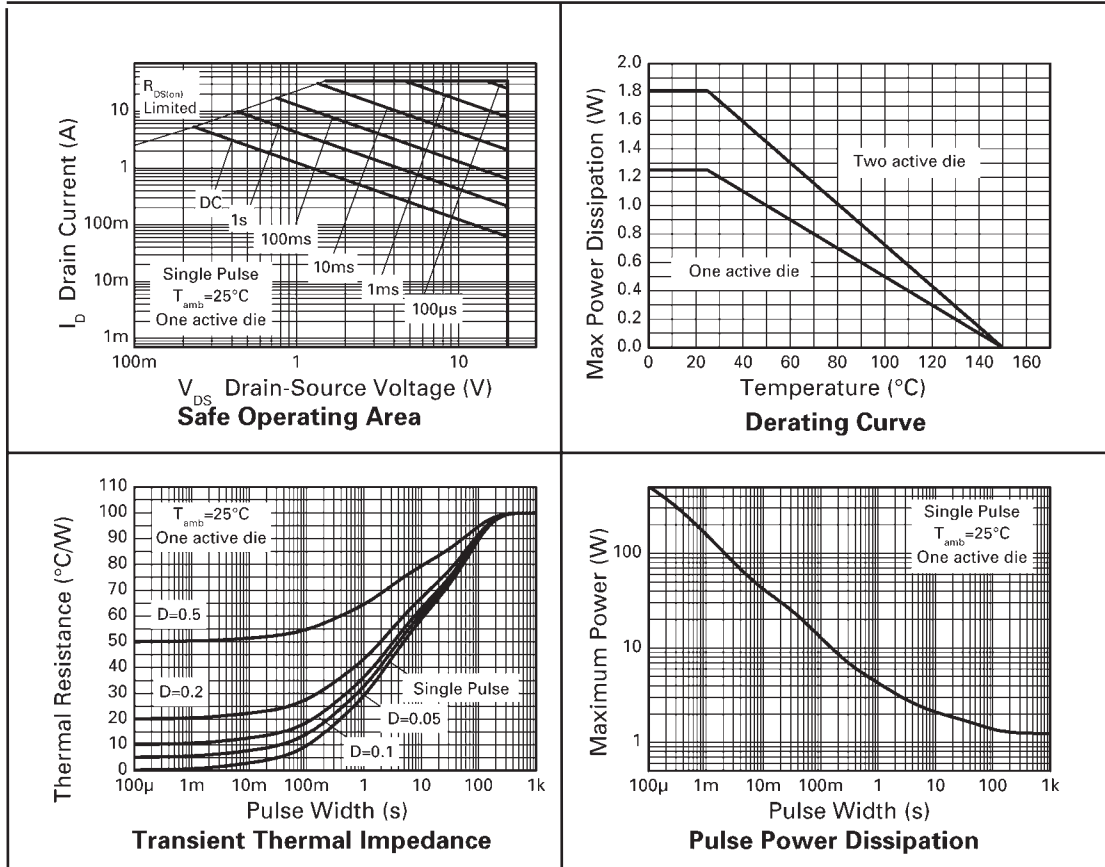
| PARAMETER                              | SYMBOL          | VALUE | UNIT         |
|--|-----------------|-------|--------------|
| Junction to Ambient <sup>(a) (d)</sup> | $R_{\theta JA}$ | 100   | $^\circ C/W$ |
| Junction to Ambient <sup>(b) (e)</sup> | $R_{\theta JA}$ | 70    | $^\circ C/W$ |
| Junction to Ambient <sup>(b) (d)</sup> | $R_{\theta JA}$ | 60    | $^\circ C/W$ |

### NOTES:

- (a) For a dual device surface mounted on 25mm x 25mm FR4 PCB with coverage of single sided 1oz copper in still air conditions.
- (b) For a dual device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.
- (c) Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.02$  pulse width=300 $\mu s$  - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance Graph.
- (d) For a dual device with one active die.
- (e) For dual device with 2 active die running at equal power.

# ZXMN2A04DN8

## CHARACTERISTICS



# ZXMN2A04DN8

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

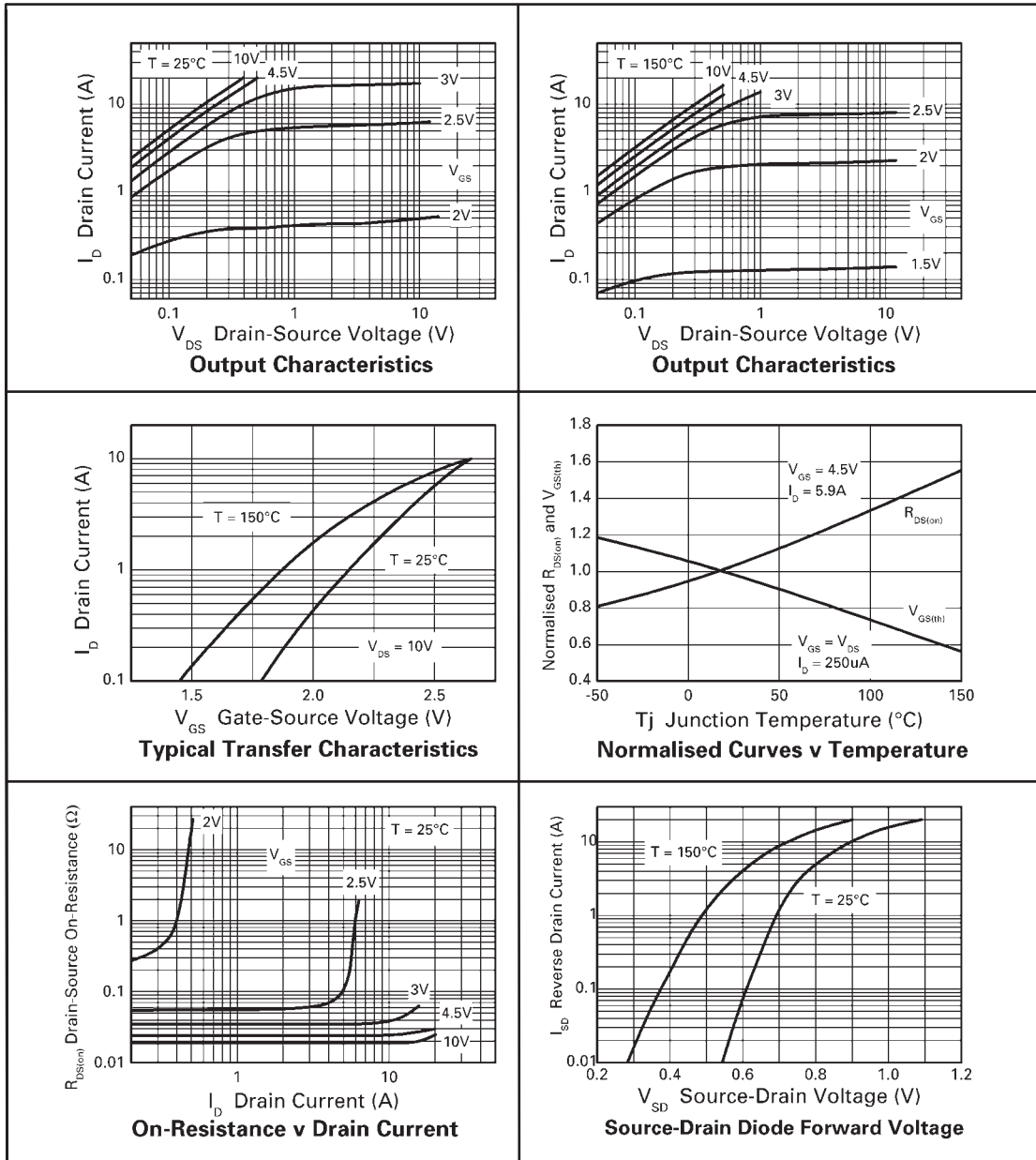
| PARAMETER  | SYMBOL        | MIN. | TYP. | MAX.  | UNIT          | CONDITIONS  |
|--|---------------|------|------|-------|---------------|---|
| <b>STATIC</b>  |               |      |      |       |               |   |
| Drain-Source Breakdown Voltage                         | $V_{(BR)DSS}$ | 20   |      |       | V             | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$                                |
| Zero Gate Voltage Drain Current                        | $I_{DSS}$     |      |      | 0.5   | $\mu\text{A}$ | $V_{DS}=20\text{V}, V_{GS}=0\text{V}$                                 |
| 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 <sup>(1)</sup> | $R_{DS(on)}$  |      |      | 0.025 | $\Omega$      | $V_{GS}=4.5\text{V}, I_D=5.9\text{A}$                                 |
|  |               |      |      | 0.035 | $\Omega$      | $V_{GS}=2.5\text{V}, I_D=5\text{A}$                                   |
| Forward Transconductance <sup>(3)</sup>                | $g_{fs}$      |      | 40   |       | S             | $V_{DS}=10\text{V}, I_D=5.9\text{A}$                                  |
| <b>DYNAMIC</b> <sup>(3)</sup>                          |               |      |      |       |               |   |
| Input Capacitance                                      | $C_{ISS}$     |      | 1880 |       | pF            | $V_{DS}=10\text{V}, V_{GS}=0\text{V},$<br>$f=1\text{MHz}$             |
| Output Capacitance                                     | $C_{OSS}$     |      | 506  |       | pF            |   |
| Reverse Transfer Capacitance                           | $C_{RSS}$     |      | 386  |       | pF            |   |
| <b>SWITCHING</b> <sup>(2) (3)</sup>                    |               |      |      |       |               |   |
| Turn-On Delay Time                                     | $t_{d(on)}$   |      | 7.9  |       | ns            | $V_{DD}=10\text{V}, I_D=1\text{A}$<br>$R_G=6\Omega, V_{GS}=5\text{V}$ |
| Rise Time  | $t_r$         |      | 14.8 |       | ns            |   |
| Turn-Off Delay Time                                    | $t_{d(off)}$  |      | 50.5 |       | ns            |   |
| Fall Time  | $t_f$         |      | 30.6 |       | ns            |   |
| Gate Charge  | $Q_g$         |      | 22.1 |       | nC            | $V_{DS}=15\text{V}, V_{GS}=5\text{V},$<br>$I_D=3.5\text{A}$           |
| Total Gate Charge                                      | $Q_g$         |      | 40.5 |       | nC            | $V_{DS}=10\text{V}, V_{GS}=4.5\text{V},$<br>$I_D=5.9\text{A}$         |
| Gate-Source Charge                                     | $Q_{gs}$      |      | 5.6  |       | nC            |   |
| Gate-Drain Charge                                      | $Q_{gd}$      |      | 8.0  |       | nC            |   |
| <b>SOURCE-DRAIN DIODE</b>                              |               |      |      |       |               |   |
| Diode Forward Voltage <sup>(1)</sup>                   | $V_{SD}$      |      | 0.85 | 0.95  | V             | $T_J=25^\circ\text{C}, I_S=5.1\text{A},$<br>$V_{GS}=0\text{V}$        |
| Reverse Recovery Time <sup>(3)</sup>                   | $t_{rr}$      |      | 18.0 |       | ns            | $T_J=25^\circ\text{C}, I_F=1.9\text{A},$                              |
| Reverse Recovery Charge <sup>(3)</sup>                 | $Q_{rr}$      |      | 8.9  |       | nC            | $di/dt= 100\text{A}/\mu\text{s}$                                      |

### NOTES:

- (1) Measured under pulsed conditions. Width=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.

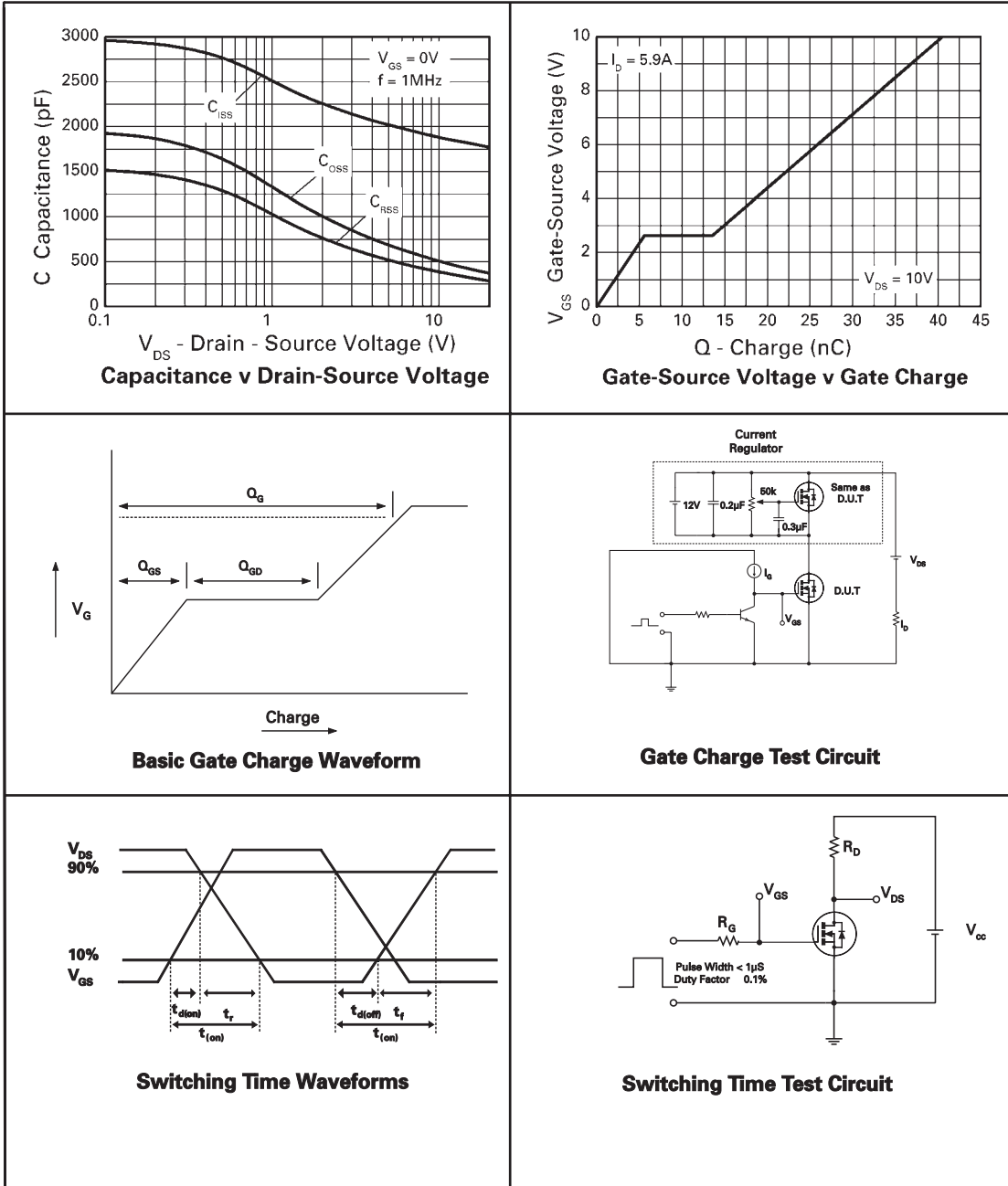
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## TYPICAL CHARACTERISTICS



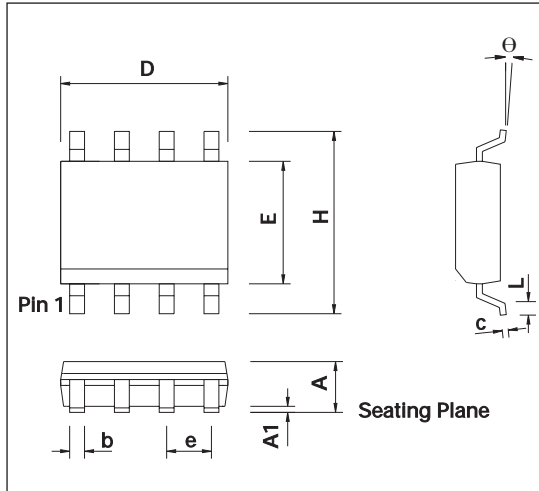
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## TYPICAL CHARACTERISTICS



# ZXMN2A04DN8

## PACKAGE OUTLINE



CONTROLLING DIMENSIONS ARE IN INCHES  
APPROX IN MILLIMETRES

## PACKAGE DIMENSIONS

| DIM   | INCHES    |       | MILLIMETERS |      |
|-------|-----------|-------|-------------|------|
|       | MIN       | MAX   | MIN         | MAX  |
| A     | 0.053     | 0.069 | 1.35        | 1.75 |
| A1    | 0.004     | 0.010 | 0.10        | 0.25 |
| D     | 0.189     | 0.197 | 4.80        | 5.00 |
| H     | 0.228     | 0.244 | 5.80        | 6.20 |
| E     | 0.150     | 0.157 | 3.80        | 4.00 |
| L     | 0.016     | 0.050 | 0.40        | 1.27 |
| e     | 0.050 BSC |       | 1.27 BSC    |      |
| b     | 0.013     | 0.020 | 0.33        | 0.51 |
| c     | 0.008     | 0.010 | 0.19        | 0.25 |
| theta | 0°        | 8°    | 0°          | 8°   |
| h     | 0.010     | 0.020 | 0.25        | 0.50 |

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| Europe  | Americas   | Asia Pacific   | Corporate Headquarters  |
|---|--|--|---|
| Zetex GmbH<br>Streitfeldstraße 19<br>D-81673 München<br>Germany   | Zetex Inc<br>700 Veterans Memorial Hwy<br>Hauppauge, NY 11788<br>USA   | Zetex (Asia) Ltd<br>3701-04 Metroplaza Tower 1<br>Hing Fong Road, Kwai Fong<br>Hong Kong                             | Zetex plc<br>Lansdowne Road, Chadderton<br>Oldham, OL9 9TY<br>United Kingdom                            |
| Telephone: (49) 89 45 49 49 0<br>Fax: (49) 89 45 49 49 49<br><a href="mailto:europa.sales@zetex.com">europa.sales@zetex.com</a> | Telephone: (1) 631 360 2222<br>Fax: (1) 631 360 8222<br><a href="mailto:usa.sales@zetex.com">usa.sales@zetex.com</a> | Telephone: (852) 26100 611<br>Fax: (852) 24250 494<br><a href="mailto:asia.sales@zetex.com">asia.sales@zetex.com</a> | Telephone (44) 161 622 4444<br>Fax: (44) 161 622 4446<br><a href="mailto:hq@zetex.com">hq@zetex.com</a> |

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