

N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

ZVN4424A/C

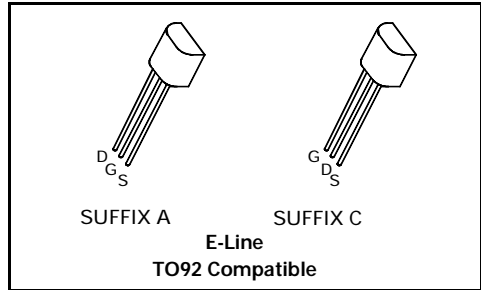
ISSUE 3 – August 1994

FEATURES

- * Compact E-LINE (TO92 style) package
- * 240 Volt BV_{DS}
- * $R_{DS(on)}=4.3\Omega$ Typical at $V_{GS}=2.5V$
- * Low threshold
- * Fast switching

APPLICATIONS

- * Earth recall and dialling switches
- * Electronic hook switches
- * Battery powered equipment
- * Telecoms and high voltage dc-dc converters



ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---------------|-------------|-------------|
| Drain-Source Voltage | V_{DS} | 240 | V |
| Continuous Drain Current at $T_{amb}=25^{\circ}C$ | I_D | 260 | mA |
| Pulsed Drain Current | I_{DM} | 1.5 | A |
| Gate Source Voltage | V_{GS} | ± 40 | V |
| Power Dissipation at $T_{amb}=25^{\circ}C$ | P_{tot} | 750 | mW |
| Operating and Storage Temperature Range | $T_j:T_{stg}$ | -55 to +150 | $^{\circ}C$ |

TYPICAL CHARACTERISTICS

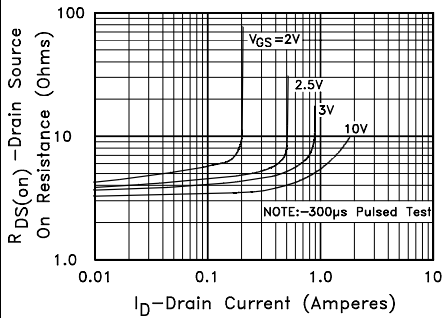


FIG. 3 Typical On Resistance vs. Drain Current

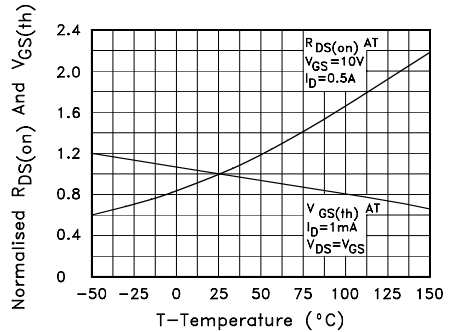


FIG. 4 Normalised $R_{DS(on)}$ And $V_{GS(th)}$ vs. Temperature

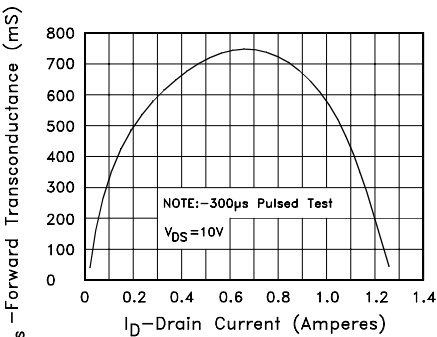


FIG. 5 Typical Transconductance vs. Drain Current

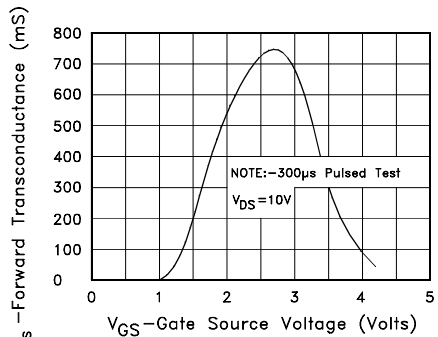


FIG. 6 Typical Transconductance vs. Gate-Source Voltage

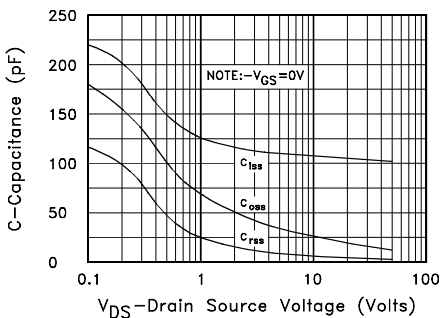


FIG. 7 Typical Capacitance vs. Drain-Source Voltage

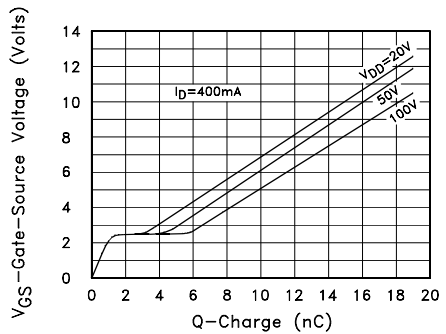


FIG. 8 Typical Gate Charge vs. Gate-Source Voltage

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

| PARAMETER | SYMBOL | MIN. | TYP | MAX. | UNIT | CONDITIONS. |
|---|--------------|------|----------|-----------|--------------------------------|---|
| Drain-Source Breakdown Voltage | BV_{DSS} | 240 | | | V | $I_D=1\text{mA}$, $V_{GS}=0\text{V}$ |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 0.8 | 1.3 | 1.8 | V | $I_D=1\text{mA}$, $V_{DS}=V_{GS}$ |
| Gate-Body Leakage | I_{GSS} | | | 100 | nA | $V_{GS}=\pm 40\text{V}$, $V_{DS}=0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | | 10 100 | μA μA | $V_{DS}=240\text{V}$, $V_{GS}=0$ $V_{DS}=190\text{V}$, $V_{GS}=0\text{V}$, $T=125^{\circ}\text{C}$ |
| On-State Drain Current | $I_{D(on)}$ | 0.8 | 1.4 | | A | $V_{DS}=10\text{V}$, $V_{GS}=10\text{V}$ |
| Static Drain-Source On-State Resistance | $R_{DS(on)}$ | | 4 4.3 | 5.5 6 | Ω Ω | $V_{GS}=10\text{V}$, $I_D=500\text{mA}$ $V_{GS}=2.5\text{V}$, $I_D=100\text{mA}$ |
| Forward Transconductance (1) (2) | g_{fs} | 0.4 | 0.75 | | S | $V_{DS}=10\text{V}$, $I_D=0.5\text{A}$ |
| Input Capacitance (2) | C_{iss} | | 110 | 200 | pF | $V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$ |
| Common Source Output Capacitance (2) | C_{oss} | | 15 | 25 | pF | |
| Reverse Transfer Capacitance (2) | C_{rss} | | 3.5 | 15 | pF | |
| Turn-On Delay Time (2)(3) | $t_{d(on)}$ | | 2.5 | 5 | ns | $V_{DD}\approx 50\text{V}$, $I_D=0.25\text{A}$, $V_{GEN}=10\text{V}$ |
| Rise Time (2)(3) | t_r | | 5 | 8 | ns | |
| Turn-Off Delay Time (2)(3) | $t_{d(off)}$ | | 40 | 60 | ns | |
| Fall Time (2)(3) | t_f | | 16 | 25 | ns | |

- (1)*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$ (2)Sample Test
 (3) Switching times measured with 50 Ω source impedance and >5ns rise time on pulse generator

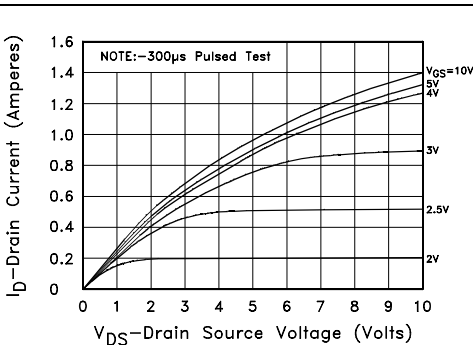


FIG. 1 Typical Saturation Characteristics

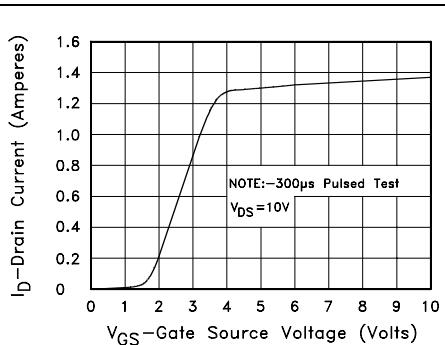


FIG. 2 Typical Transfer Characteristics

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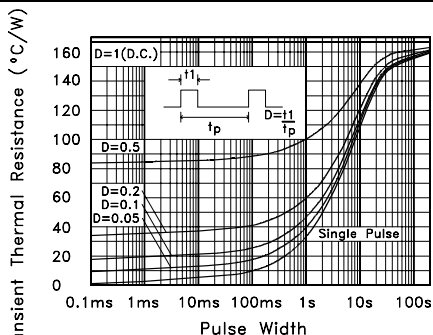


FIG. 9 Transient Thermal Resistance

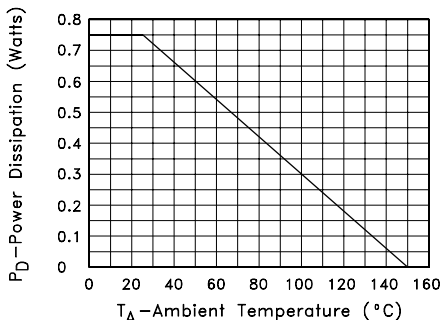


FIG. 10 Power vs. Temperature Derating Curve (Ambient)

SPICE PARAMETERS

* ZVN4424 MODEL LAST REVISION 1/94

*

.SUBCKT ZVN4424 30 40 50

* NODES: DRAIN GATE SOURCE

M1 30 20 50 50 MOD1 L=1 W=1

RG 40 20 200

RL 30 50 240E6

D1 50 30 DIODE1

.MODEL MOD1 NMOS VT0=1.25 RS=2.34 RD=1.634 IS=1E-15 KP=5.319

+CGS0=101P CGD0=4P CBD=66.2P PB=1

.MODEL DIODE1 D IS=5.516E-13 RS=0.2084 N=1.0078

.ENDS ZVN4424

For clarification of the above or for technical enquires generally please contact the Applications Dept. at Zetex plc.

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Zetex plc.

Fields New Road, Chadderton, Oldham, OL9-8NP, United Kingdom.

Telephone: (44)161-627 5105 (Sales), (44)161-627 4963 (General Enquiries)

Fax: (44)161-627 5467

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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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.