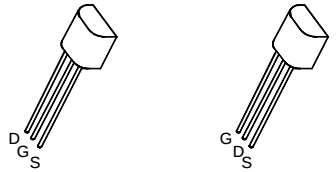
# N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

# ZVN4424A/C

**ISSUE 3 – August 1994**

FEATURES

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




SUFFIX A SUFFIX C

**E-Line**
**TO92 Compatible**

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°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°C | $P_{tot}$ | 750 | mW |
| Operating and Storage Temperature Range | $T_j$:$T_{stg}$ | -55 to +150 | °C |

ZETEX

# TYPICAL CHARACTERISTICS

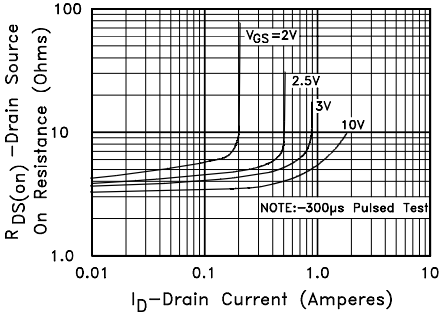



FIG. 3 Typical On Resistance vs. Drain Current

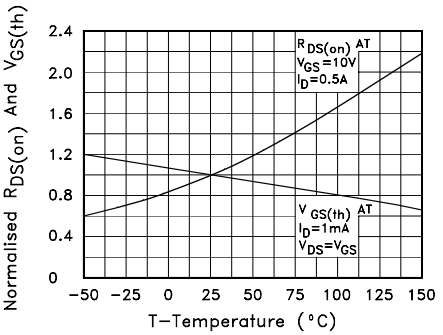



FIG. 4 Normalised $R_{DS(on)}$ And $V_{GS(th)}$ vs. Temperature

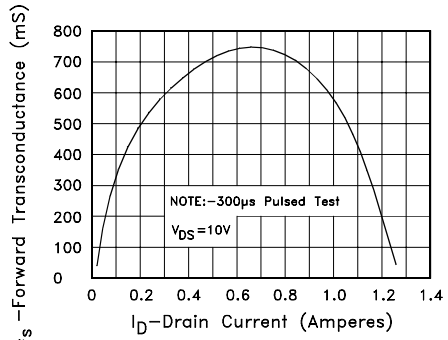



FIG. 5 Typical Transconductance vs. Drain Current

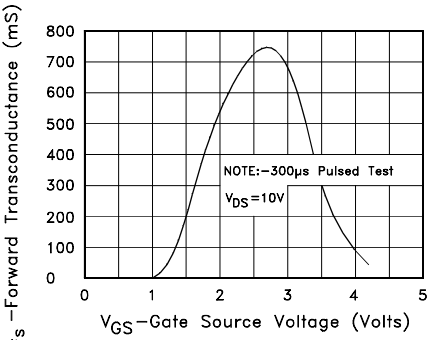



FIG. 6 Typical Transconductance vs. Gate–Source Voltage

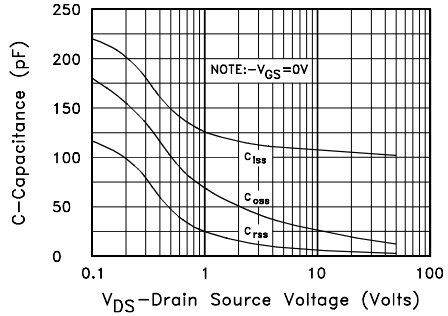



FIG. 7 Typical Capacitance vs. Drain–Source Voltage

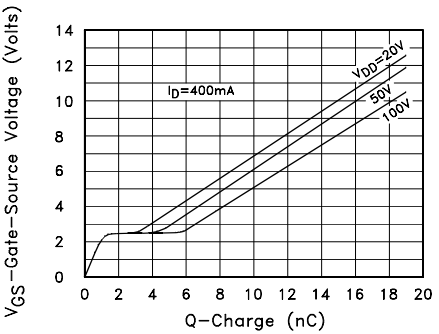



FIG. 8 Typical Gate Charge vs. Gate–Source Voltage

# ZVN4424A/C

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

| PARAMETER | SYMBOL | MIN. | TYP | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 240 | | | V | $I_D$=1mA, $V_{GS}$=0V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 0.8 | 1.3 | 1.8 | V | $I_D$=1mA, $V_{DS}$= $V_{GS}$ |
| Gate-Body Leakage | $I_{GSS}$ | | | 100 | nA | $V_{GS}$=± 40V, $V_{DS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | | 10<br>100 | µA<br>µA | $V_{DS}$=240 V, $V_{GS}$=0<br>$V_{DS}$=190 V,<br>$V_{GS}$=0V, T=125°C |
| On-State Drain Current | $I_{D(on)}$ | 0.8 | 1.4 | | A | $V_{DS}$=10 V, $V_{GS}$=10V |
| Static Drain-Source On-State Resistance | $R_{DS(on)}$ | | 4<br>4.3 | 5.5<br>6 | Ω<br>Ω | $V_{GS}$=10V,$I_D$=500mA<br>$V_{GS}$=2.5V,$I_D$=100mA |
| Forward Transconductance (1) (2) | $g_{fs}$ | 0.4 | 0.75 | | S | $V_{DS}$=10V,$I_D$=0.5A |
| Input Capacitance (2) | $C_{iss}$ | | 110 | 200 | pF | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz |
| 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 | $V_{DD}$ ≈50V, $I_D$ =0.25A, $V_{GEN}$=10V |
| 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=300µs. Duty cycle ≤2% (2)Sample Test

(3) Switching times measured with 50Ω source impedance and >5ns rise time on pulse generator

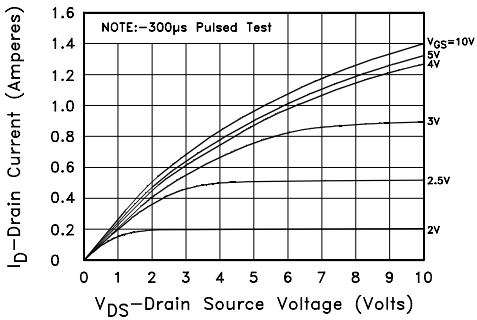



FIG. 1 Typical Saturation Characteristics

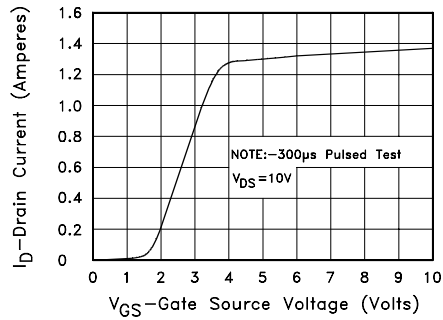



FIG. 2 Typical Transfer Characteristics

# ZVN4424A/C

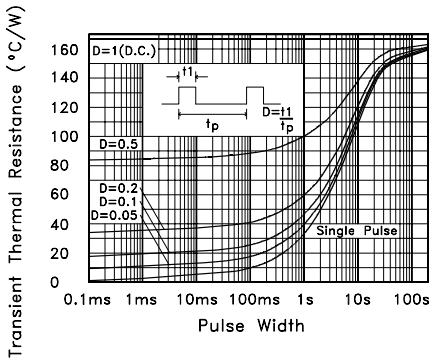



FIG. 9 Transient Thermal Resistance

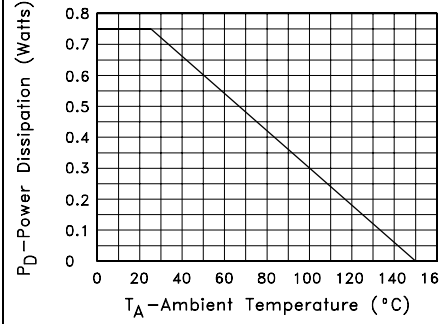



FIG. 10 Power vs. Temperature Derating Curve (Ambient)

## 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.

**©1992 ZETEX plc**
The copyright in this model and the design embodied belonging to Zetex plc ("Zetex"). It is supplied free of charge by Zetex for the purpose of research and design and may be used or copied intact (including this notice) for that purpose only. All other rights are reserved. The model is believed accurate but no condition or warranty as to its merchantability or fitness for the purpose is given and no liability in respect of any use is accepted by Zetex plc, its distributors or agents.

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
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
©Zetex plc 1997
**Internet:**
**http://www.zetex.com**

This publication is issued to provide outline information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned. The Company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.

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.