

# P-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

## ZVP4424A

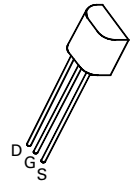
ISSUE 2 – SEPTEMBER 94

### FEATURES

- \* 240 Volt  $V_{DS}$
- \*  $R_{DS(on)}=9\Omega$
- \* Low threshold

### APPLICATIONS

- \* Electronic Hook Switch



E-Line  
TO92 Compatible

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER   | SYMBOL         | VALUE       | UNIT        |
|---|----------------|-------------|-------------|
| Drain-Source Voltage                              | $V_{DS}$       | -240        | V           |
| Continuous Drain Current at $T_{amb}=25^{\circ}C$ | $I_D$          | -200        | mA          |
| Pulsed Drain Current                              | $I_{DM}$       | -1          | A           |
| Gate Source Voltage                               | $V_{GS}$       | $\pm 40$    | 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 | $^{\circ}C$ |

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

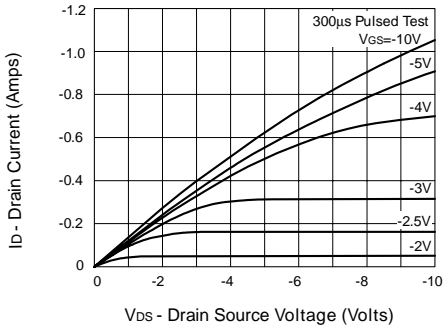
| PARAMETER                               | SYMBOL       | MIN.  | TYP        | MAX.        | UNIT                 | CONDITIONS.  |
|---|--------------|-------|------------|-------------|----------------------|--|
| Drain-Source Breakdown Voltage          | $BV_{DSS}$   | -240  |            |             | V                    | $I_D=-1mA, V_{GS}=0V$  |
| Gate-Source Threshold Voltage           | $V_{GS(th)}$ | -0.7  | -1.4       | -2.0        | V                    | $I_D=-1mA, V_{DS}=V_{GS}$  |
| Gate-Body Leakage                       | $I_{GSS}$    |       |            | 100         | nA                   | $V_{GS}=\pm 40V, V_{DS}=0V$  |
| Zero Gate Voltage Drain Current         | $I_{DSS}$    |       |            | -10<br>-100 | $\mu A$<br>$\mu A$   | $V_{DS}=-240V, V_{GS}=0V$<br>$V_{DS}=-190V, V_{GS}=0V, T=125^{\circ}C$ |
| On-State Drain Current                  | $I_{D(on)}$  | -0.75 | -1.0       |             | A                    | $V_{DS}=-10V, V_{GS}=-10V$   |
| Static Drain-Source On-State Resistance | $R_{DS(on)}$ |       | 7.1<br>8.8 | 9<br>11     | $\Omega$<br>$\Omega$ | $V_{GS}=-10V, I_D=-200mA$<br>$V_{GS}=-3.5V, I_D=-100mA$                |
| Forward Transconductance (1) (2)        | $g_{fs}$     | 125   |            |             | mS                   | $V_{DS}=-10V, I_D=-0.2A$   |
| Input Capacitance (2)                   | $C_{iss}$    |       | 100        | 200         | pF                   | $V_{DS}=-25V, V_{GS}=0V, f=1MHz$                                       |
| Common Source Output Capacitance (2)    | $C_{oss}$    |       | 18         | 25          | pF                   |  |
| Reverse Transfer Capacitance (2)        | $C_{rss}$    |       | 5          | 15          | pF                   |  |
| Turn-On Delay Time (2)(3)               | $t_{d(on)}$  |       | 8          | 15          | ns                   | $V_{DD} \approx -50V, I_D = -0.25A,$<br>$V_{GEN} = -10V$               |
| Rise Time (2)(3)                        | $t_r$        |       | 8          | 15          | ns                   |  |
| Turn-Off Delay Time (2)(3)              | $t_{d(off)}$ |       | 26         | 40          | ns                   |  |
| Fall Time (2)(3)                        | $t_f$        |       | 20         | 30          | ns                   |  |

(1) Measured under pulsed conditions. Width=300 $\mu s$ . Duty cycle  $\leq 2\%$  (2) Sample test.

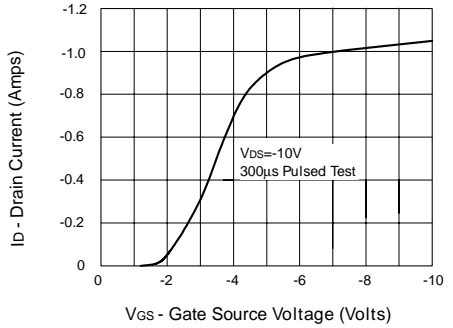
(3) Switching times measured with 50 $\Omega$  source impedance and <5ns rise time on a pulse generator

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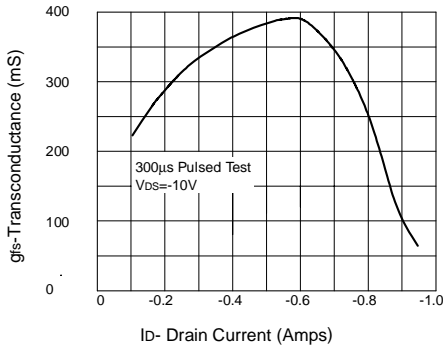
## TYPICAL CHARACTERISTICS



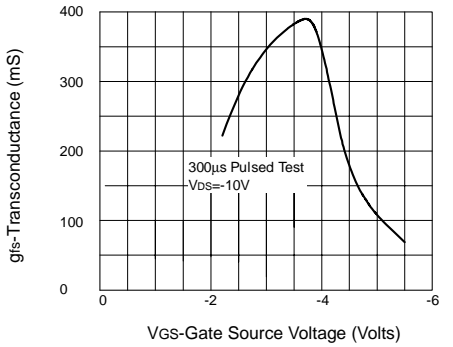
**Saturation Characteristics**



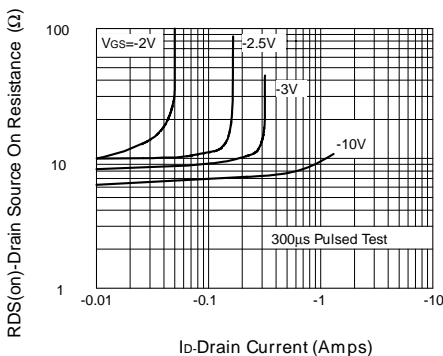
**Transfer Characteristics**



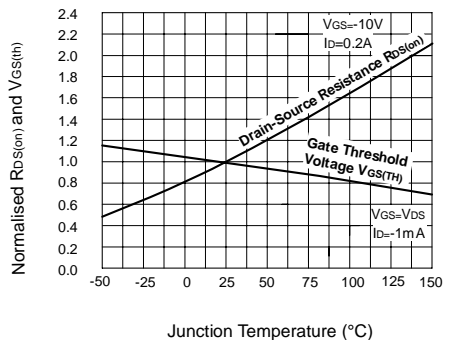
**Transconductance v drain current**



**Transconductance v gate-source voltage**



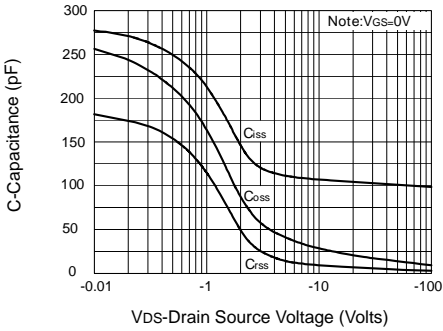
**On-resistance vs Drain Current**



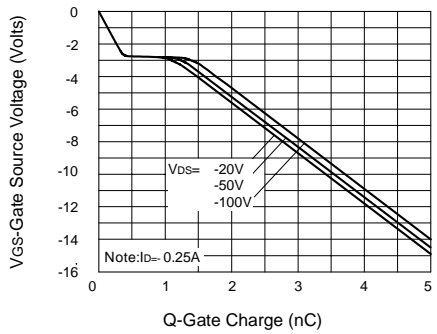
**Normalised R<sub>DS(on)</sub> and V<sub>GS(th)</sub> vs Temperature**

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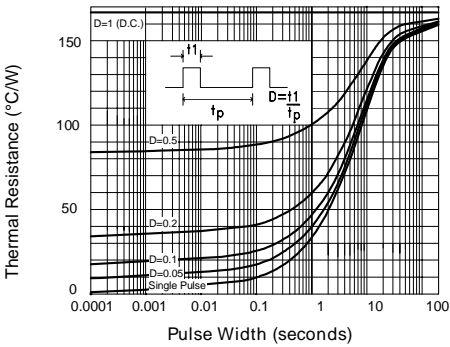
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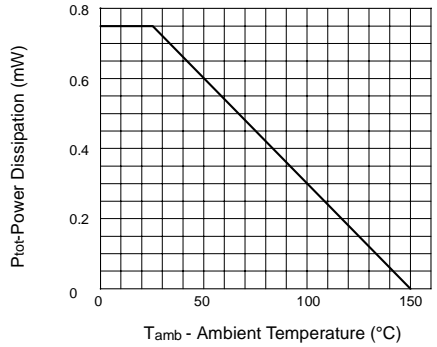
**Capacitance v drain-source voltage**



**Gate charge v gate-source voltage**



**Maximum transient thermal impedance**



**Derating Curve**