# N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

# ZVN4206AV

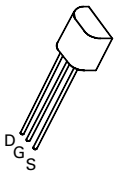
**ISSUE 3 - APRIL 1998**

FEATURES

* 60 Volt $V_{DS}$
* $R_{DS(on)}$= 1Ω
* Repetitive avalanche rating
* No transient protection required
* Characterised for 5V logic drive

APPLICATIONS

* Automotive relay drivers
* Stepper motor driver




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

## ABSOLUTE MAXIMUM RATINGS.

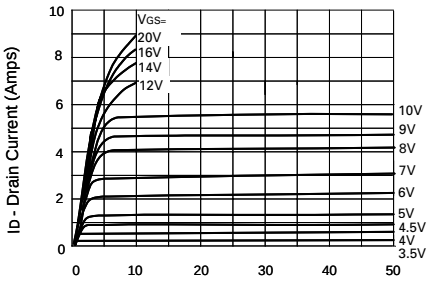
| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Continuous Drain Current at $T_{amb}$=25°C | $I_D$ | 600 | mA |
| Pulsed Drain Current | $I_{DM}$ | 8 | A |
| Gate-Source Voltage | $V_{GS}$ | ± 20 | V |
| Power Dissipation at $T_{amb}$=25°C | $P_{tot}$ | 700 | mW |
| Continuous Body Diode Current at $T_{amb}$ =25°C | $I_{SD}$ | 600 | mA |
| Avalanche Current – Repetitive | $I_{AR}$ | 600 | mA |
| Avalanche Energy – Repetitive | $E_{AR}$ | 15 | mJ |
| Operating and Storage Temperature Range | $T_j$:$T_{stg}$ | -55 to +150 | °C |

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

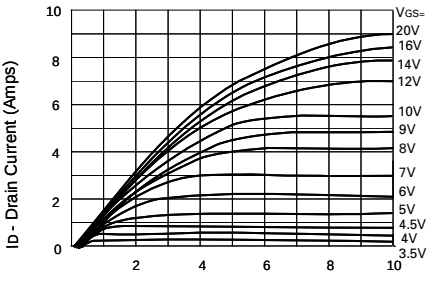
| PARAMETER | SYMBOL | MIN. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 60 | | V | $I_D$=1mA, $V_{GS}$=0V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 1.3 | 3 | V | $I_D$=1mA, $V_{DS}$= $V_{GS}$ |
| Gate-Body Leakage | $I_{GSS}$ | | 100 | nA | $V_{GS}$=± 20V, $V_{DS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | 10<br>100 | µA<br>µA | $V_{DS}$=60V, $V_{GS}$=0<br>$V_{DS}$=48V, $V_{GS}$=0V, T=125°C(2) |
| On-State Drain Current(1) | $I_{D(on)}$ | 3 | | A | $V_{DS}$=25V, $V_{GS}$=10V |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | 1<br>1.5 | Ω<br>Ω | $V_{GS}$=10V,$I_D$=1.5A<br>$V_{GS}$=5V,$I_D$=.0.5A |
| Forward Transconductance(1)(2) | $g_{fs}$ | 300 | | mS | $V_{DS}$=25V,$I_D$=1.5A |
| Input Capacitance (2) | $C_{iss}$ | | 100 | pF | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz |
| Common Source Output Capacitance (2) | $C_{oss}$ | | 60 | pF | |
| Reverse Transfer Capacitance (2) | $C_{rss}$ | | 20 | pF | |
| Turn-On Delay Time (2)(3) | $t_{d(on)}$ | | 8 | ns | $V_{DD}$≈25V, $I_D$=1.5A,$V_{GEN}$=10V |
| Rise Time (2)(3) | $t_r$ | | 12 | ns | |
| Turn-Off Delay Time (2)(3) | $t_{d(off)}$ | | 12 | ns | |
| Fall Time (2)(3) | $t_f$ | | 15 | ns | |

(1) Measured under pulsed conditions. Width=300µs. Duty cycle ≤2% (2) Sample test.
(3) Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator

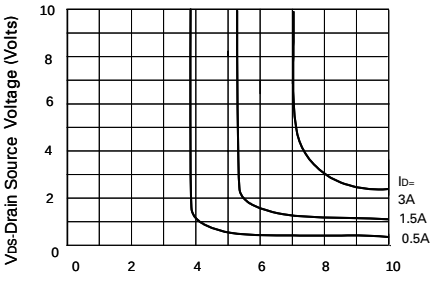
## TYPICAL CHARACTERISTICS



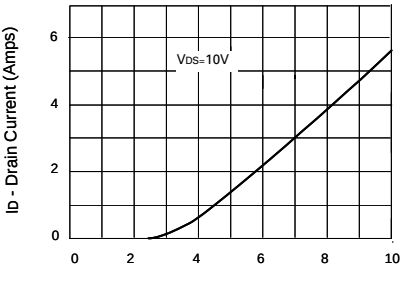

**Output Characteristics**



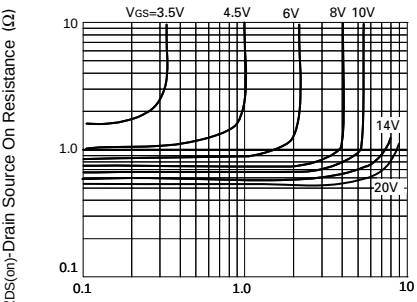

**Saturation Characteristics**



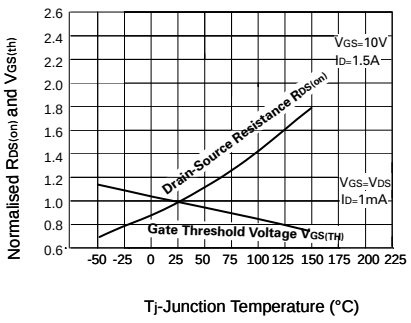

**Voltage Saturation Characteristics**




**Transfer Characteristics**



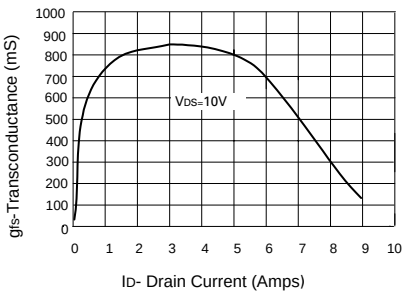

**On-resistance v drain current**



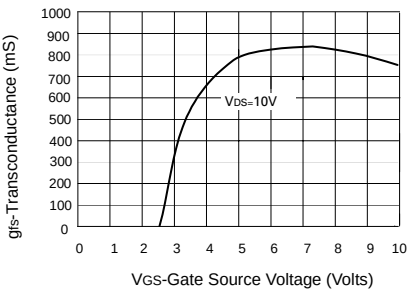

**Normalised $R_{DS(on)}$ and $V_{GS(th)}$ v Temperature**

# ZVN4206AV

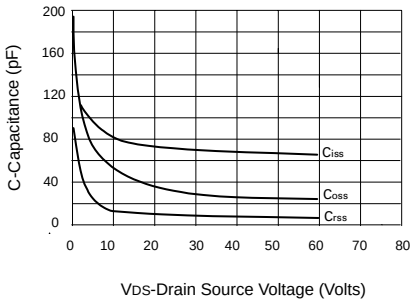
## TYPICAL CHARACTERISTICS



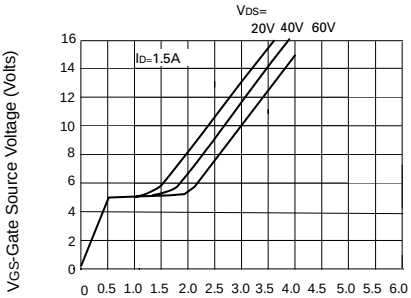

**Transconductance v drain current**



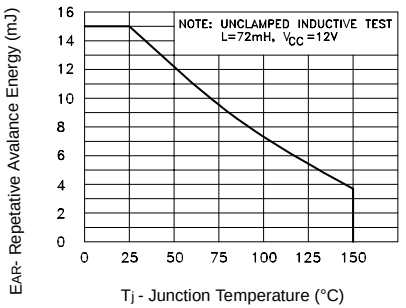

**Transconductance v gate-source voltage**



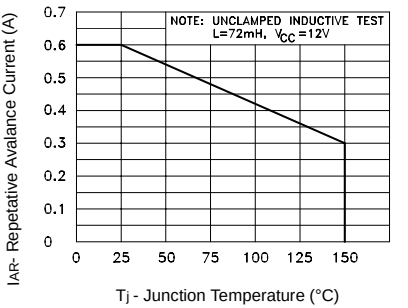

**Capacitance v drain-source voltage**




**Gate charge v gate-source voltage**




**Maximum repetative avalanche energy v Junction Temperature**




**Maximum repetative avalanche current v Junction Temperature**

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