

SOT223 N-CHANNEL ENHANCEMENT  
MODE VERTICAL DMOS FET

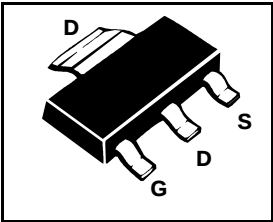
ZVN4210G

ISSUE 2 - NOVEMBER 1995

FEATURES

\* Low  $R_{DS(on)} = 1.5\Omega$

PARTMARKING DETAIL - ZVN4210



ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                         | SYMBOL         | VALUE       | UNIT        |
|---------------------------------------------------|----------------|-------------|-------------|
| Drain-Source Voltage                              | $V_{DS}$       | 100         | V           |
| Continuous Drain Current at $T_{amb}=25^{\circ}C$ | $I_D$          | 0.8         | A           |
| Pulsed Drain Current                              | $I_{DM}$       | 6           | A           |
| Gate-Source Voltage                               | $V_{GS}$       | $\pm 20$    | V           |
| Power Dissipation at $T_{amb}=25^{\circ}C$        | $P_{tot}$      | 2           | W           |
| 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. | MAX.       | UNIT                 | CONDITIONS.                                                           |
|---------------------------------------------|--------------|------|------------|----------------------|-----------------------------------------------------------------------|
| Drain-Source Breakdown Voltage              | $BV_{DSS}$   | 100  |            | V                    | $I_D=1mA, V_{GS}=0V$                                                  |
| Gate-Source Threshold Voltage               | $V_{GS(th)}$ | 0.8  | 2.4        | V                    | $I_D=1mA, V_{DS}=V_{GS}$                                              |
| Gate-Body Leakage                           | $I_{GSS}$    |      | 100        | nA                   | $V_{GS}=\pm 20V, V_{DS}=0V$                                           |
| Zero Gate Voltage Drain Current             | $I_{DSS}$    |      | 10<br>100  | $\mu A$<br>$\mu A$   | $V_{DS}=100V, V_{GS}=0$<br>$V_{DS}=80V, V_{GS}=0V, T=125^{\circ}C(2)$ |
| On-State Drain Current(1)                   | $I_{D(on)}$  | 2.5  |            | A                    | $V_{DS}=25V, V_{GS}=10V$                                              |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ |      | 1.5<br>1.8 | $\Omega$<br>$\Omega$ | $V_{GS}=10V, I_D=1.5A$<br>$V_{GS}=5V, I_D=500mA$                      |
| Forward Transconductance(1)(2)              | $g_{fs}$     | 250  |            | 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)        | $C_{oss}$    |      | 40         | pF                   |                                                                       |
| Reverse Transfer Capacitance (2)            | $C_{rss}$    |      | 12         | pF                   |                                                                       |
| Turn-On Delay Time (2)(3)                   | $t_{d(on)}$  |      | 4          | ns                   | $V_{DD}=25V, I_D=1.5A$                                                |
| Rise Time (2)(3)                            | $t_r$        |      | 8          | ns                   |                                                                       |
| Turn-Off Delay Time (2)(3)                  | $t_{d(off)}$ |      | 20         | ns                   |                                                                       |
| Fall Time (2)(3)                            | $t_f$        |      | 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  
Spice parameter data is available upon request for this device

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## DRAIN-SOURCE DIODE CHARACTERISTICS

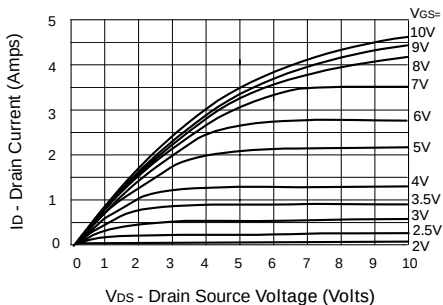
| PARAMETER                                 | SYMBOL   | MIN. | TYP  | MAX. | UNIT | CONDITIONS.                                            |
|-------------------------------------------|----------|------|------|------|------|--------------------------------------------------------|
| Diode Forward Voltage (1)                 | $V_{SD}$ | -    | 0.79 | -    | V    | $I_S=0.32A$ , $V_{GS}=0V$                              |
|                                           |          | -    | 0.89 | -    | V    | $I_S=1.0A$ , $V_{GS}=0V$                               |
| Reverse Recovery Time<br>(to $I_R=10\%$ ) | $T_{RR}$ | -    | 135  |      | ns   | $I_F=0.45A$ , $V_{GS}=0V$ ,<br>$I_R=100mA$ , $V_R=10V$ |

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

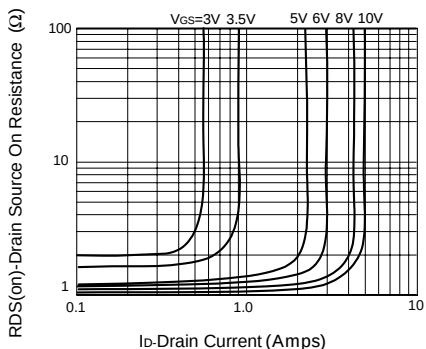
(3) Switching times measured with 50 $\Omega$  source impedance and <5ns rise time on a pulse generator  
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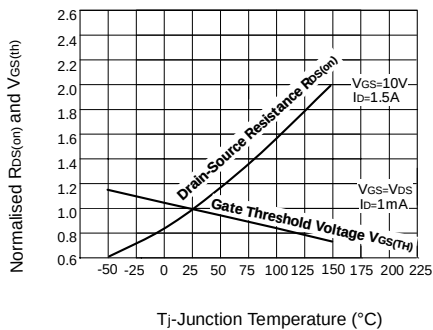
## TYPICAL CHARACTERISTICS



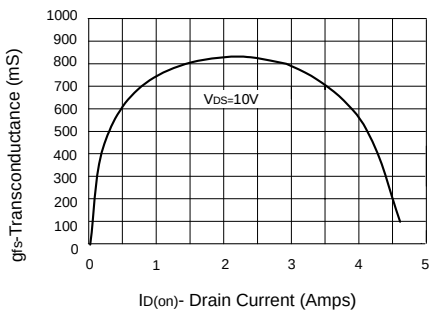
**Saturation Characteristics**



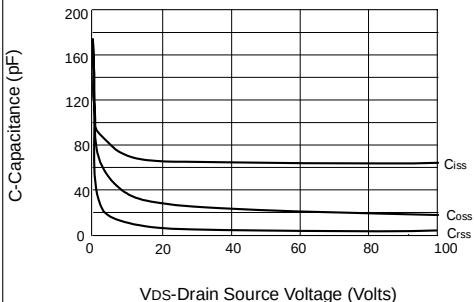
**On-resistance v drain current**



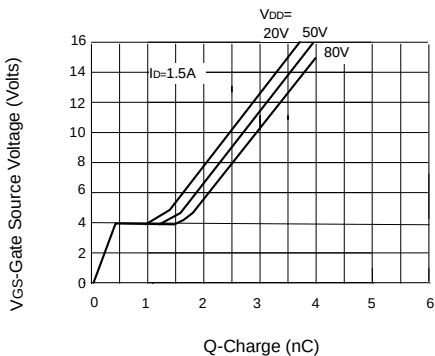
**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  v Temperature**



**Transconductance v drain current**



**Capacitance v drain-source voltage**



**Gate charge v gate-source voltage**