

# N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

## ZVN4306AV

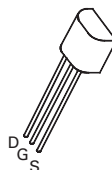
ISSUE 1 – FEBRUARY 95

### FEATURES

- \* 60 Volt  $V_{DS}$
- \*  $R_{DS(on)} = 0.33\Omega$
- \* Repetitive Avalanche Rating

### APPLICATIONS

- \* Solenoids / relay drivers for automotive
- \* Stepper Motor Drivers
- \* DC-DC convertors



E-Line  
TO92 Compatible

### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source Voltage	$V_{DS}$	60	V
Continuous Drain Current at $T_{amb}=25^{\circ}C$	$I_D$	1.1	A
Practical Continuous Drain Current at $T_{amb}=25^{\circ}C$	$I_{DP}$	1.3	A
Pulsed Drain Current	$I_{DM}$	15	A
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation at $T_{amb}=25^{\circ}C$	$P_{tot}$	850	mW
Practical Power Dissipation at $T_{amb}=25^{\circ}C$ *	$P_{totp}$	1.13	W
Avalanche Current-Repetitive	$I_{AR}$	1	A
Avalanche Energy-Repetitive	$E_{AR}$	25	mJ
Operating and Storage Temperature Range	$T_j:T_{stg}$	-55 to +150	$^{\circ}C$

\*The power which can be dissipated assuming the device is mounted in a typical manner on a P.C.B. with copper equal to 1 inch square minimum

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

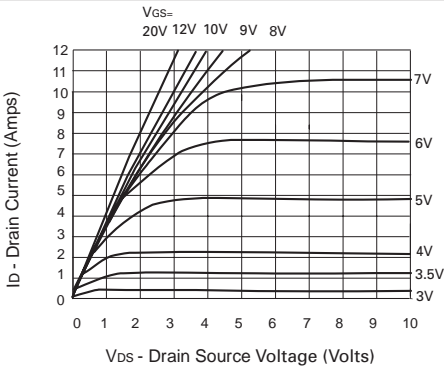
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Drain-Source Breakdown Voltage	$BV_{DSS}$	60			V	$I_D=1\text{mA}, V_{GS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.3		3	V	$I_D=1\text{mA}, V_{DS}=V_{GS}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			10 100	$\mu\text{A}$ $\mu\text{A}$	$V_{DS}=60\text{V}, V_{GS}=0$ $V_{DS}=48\text{V}, V_{GS}=0\text{V}, T=125^{\circ}\text{C}(2)$
On-State Drain Current(1)	$I_{D(on)}$	12			A	$V_{DS}=10\text{V}, V_{GS}=10\text{V}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$		0.22 0.32	0.33 0.45	$\Omega$ $\Omega$	$V_{GS}=10\text{V}, I_D=3\text{A}$ $V_{GS}=5\text{V}, I_D=1.5\text{A}$
Forward Transconductance (1)(2)	$g_{fs}$	700			mS	$V_{DS}=25\text{V}, I_D=3\text{A}$
Input Capacitance (2)	$C_{iss}$			350	pF	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$
Common Source Output Capacitance (2)	$C_{oss}$			140	pF	
Reverse Transfer Capacitance (2)	$C_{rss}$			30	pF	
Turn-On Delay Time (2)(3)	$t_{d(on)}$			8	ns	$V_{DD}\approx 25\text{V}, V_{GEN}=10\text{V}, I_D=3\text{A}$
Rise Time (2)(3)	$t_r$			25	ns	
Turn-Off Delay Time (2)(3)	$t_{d(off)}$			30	ns	
Fall Time (2)(3)	$t_f$			16	ns	

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

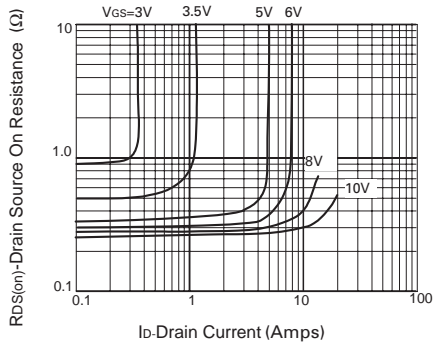
(2) Sample test.

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

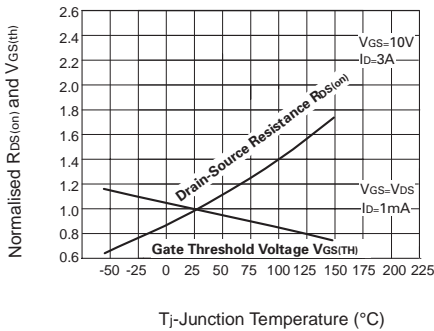
## TYPICAL CHARACTERISTICS



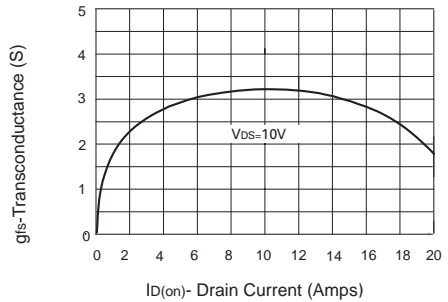
**Saturation Characteristics**



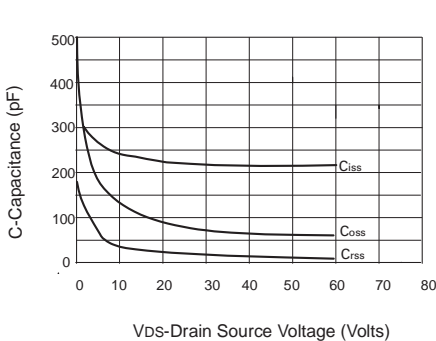
**On-resistance v drain current**



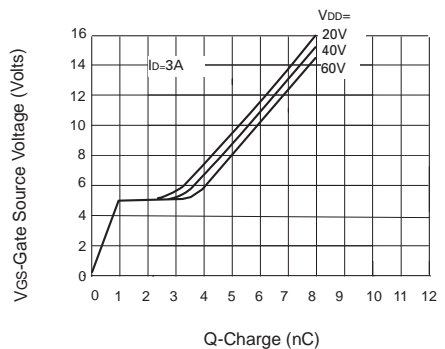
**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  v Temperature**



**Transconductance v drain current**



**Capacitance v drain-source voltage**

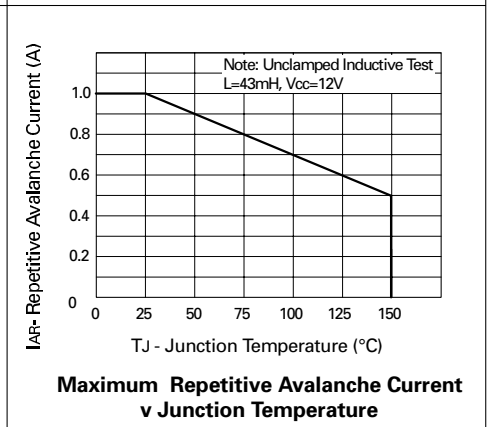
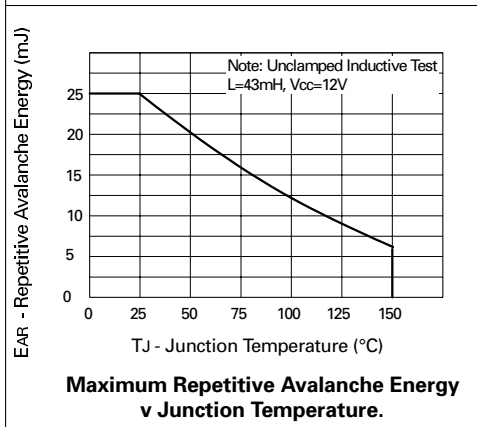
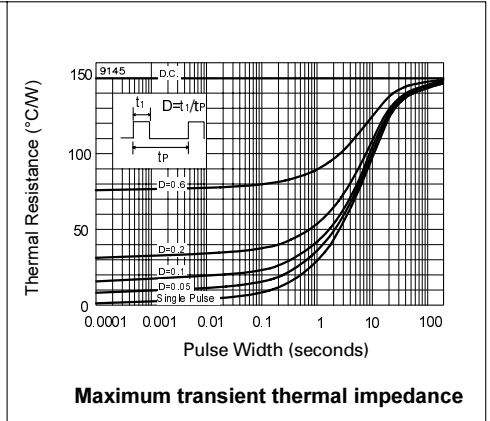
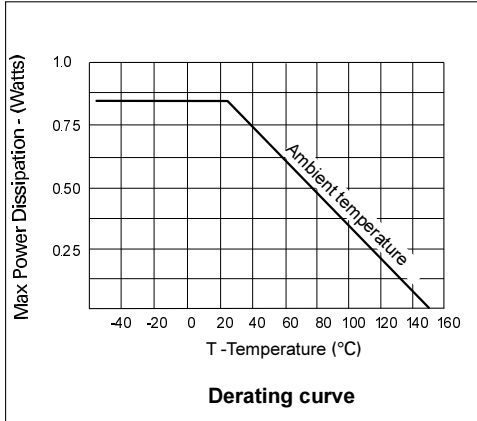


**Gate charge v gate-source voltage**

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## THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance: Junction to Ambient	$R_{th(j-amb)}$	150	$^{\circ}\text{C}/\text{W}$
Junction to Case	$R_{th(j-case)}$	50	$^{\circ}\text{C}/\text{W}$



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