N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

ZVN4306AV

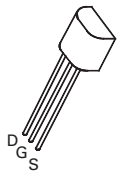
ISSUE 1 – FEBRUARY 95

FEATURES

* 60 Volt V_{DS}
* $R_{DS(on)}$= 0.33Ω
* 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°C	I_D	1.1	A
Practical Continuous Drain Current at T_{amb}=25°C	I_{DP}	1.3	A
Pulsed Drain Current	I_{DM}	15	A
Gate Source Voltage	V_{GS}	± 20	V
Power Dissipation at T_{amb}=25°C	P_{tot}	850	mW
Practical Power Dissipation at T_{amb}=25°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	°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°C unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	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}			10 100	µA µA	V_{DS}=60V, V_{GS}=0 V_{DS}=48V, V_{GS}=0V, T=125°C(2)
On-State Drain Current(1)	$I_{D(on)}$	12			A	V_{DS}=10V, V_{GS}=10V
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$		0.22 0.32	0.33 0.45	Ω Ω	V_{GS}=10V,I_D=3A V_{GS}=5V, I_D=1.5A
Forward Transconductance (1)(2)	g_{fs}	700			mS	V_{DS}=25V,I_D=3A
Input Capacitance (2)	C_{iss}			350	pF	V_{DS}=25 V, V_{GS}=0V, f=1MHz
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}≈25V, V_{GEN}=10V, I_D=3A
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=300µs. Duty cycle ≤2%

(2) Sample test.

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

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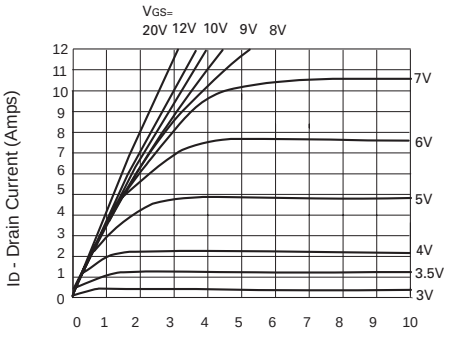
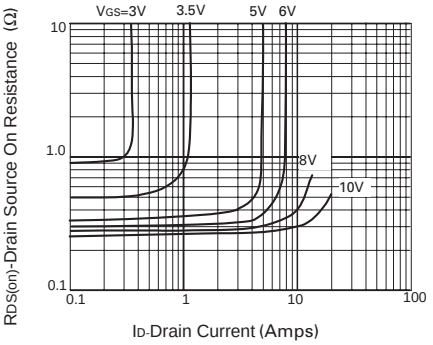
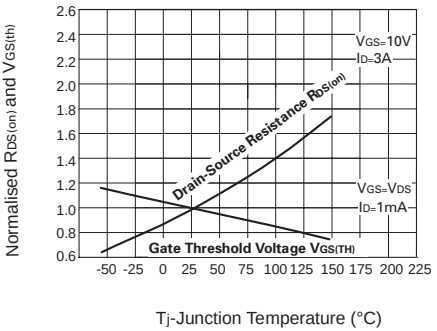
TYPICAL CHARACTERISTICS



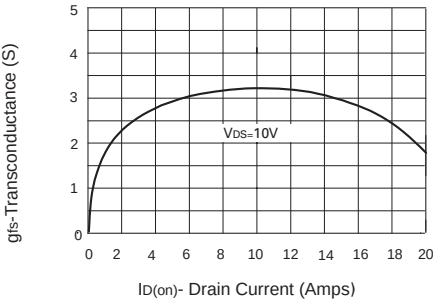
Saturation Characteristics



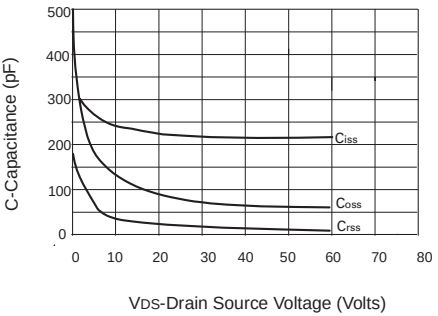
On-resistance v drain current



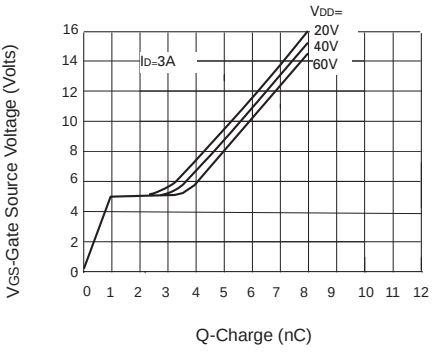
Normalised $R_{DS(on)}$ and $V_{GS(th)}$ v Temperature



Transconductance v drain current



Capacitance v drain-source voltage



Gate charge v gate-source voltage

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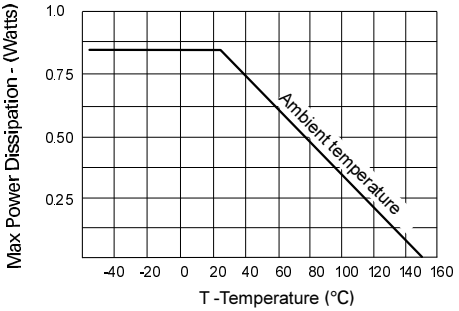
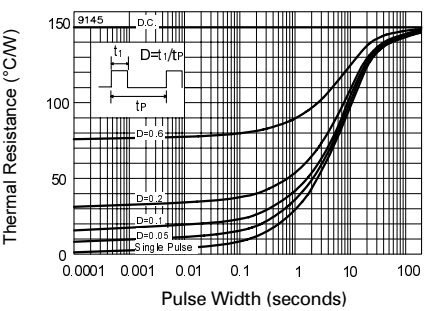
THERMAL CHARACTERISTICS

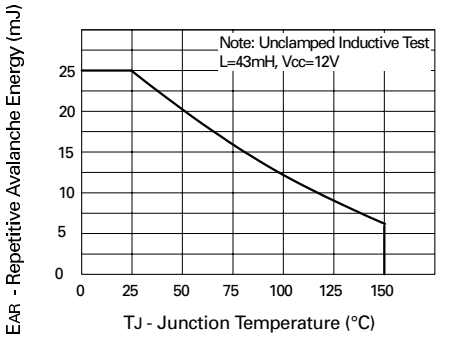
PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance:Junction to Ambient Junction to Case	$R_{th(j\text{-}amb)}$ $R_{th(j\text{-}case)}$	150 50	°C/W °C/W



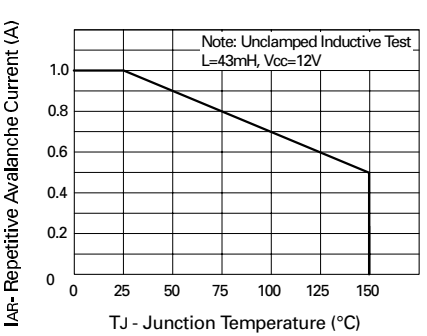
Derating curve



Maximum transient thermal impedance



Maximum Repetitive Avalanche Energy v Junction Temperature.



Maximum Repetitive Avalanche Current v Junction Temperature

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