

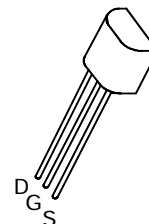
# N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

## ZVN1409A

ISSUE 2 – MARCH 94

### FEATURES

- \* 90 Volt  $V_{DS}$
- \* Low input capacitance
- \* Fast switching



E-Line  
TO92 Compatible

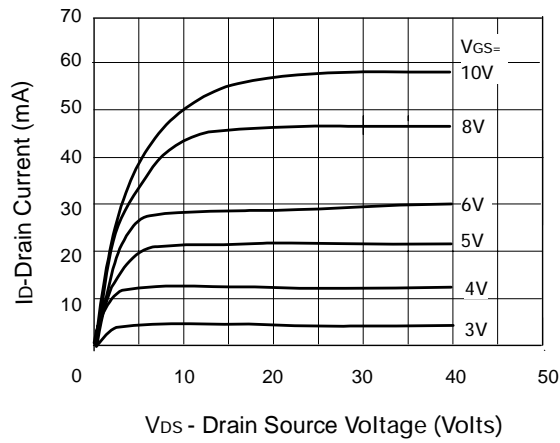
### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source Voltage	$V_{DS}$	90	V
Continuous Drain Current	$I_D$	10	mA
Pulsed Drain Current	$I_{DM}$	40	mA
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation at $T_{amb}=25^\circ\text{C}$	$P_{tot}$	625	mW
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	$^\circ\text{C}$

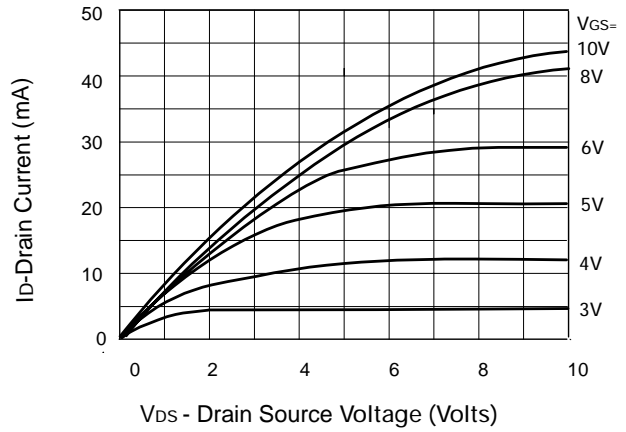
### ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^\circ\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	CONDITIONS.
Drain-Source Breakdown Voltage	$BV_{DSS}$	90		V	$I_D=0.1\text{mA}, V_{GS}=0\text{V}$
Gate-Source Breakdown Voltage	$V_{GS(th)}$	0.8	2.4	V	$I_D=0.1\text{mA}, V_{DS}=V_{GS}$
Gate Body Leakage	$I_{GSS}$		100	nA	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$		1 100 (2)	$\mu\text{A}$	$V_{DS}=90\text{V}, V_{GS}=0\text{V}$ $V_{DS}=72\text{V}, V_{GS}=0\text{V},$ $T=125^\circ\text{C}$
On State Drain Current (1)	$I_{D(on)}$	10		mA	$V_{DS}=25\text{V}, V_{GS}=10\text{V}$
Static Drain Source On State Resistance (1)	$R_{DS(on)}$		250	$\Omega$	$V_{GS}=10\text{V}, I_D=5\text{mA}$
Forward Transconductance (1)(2)	$g_{fs}$	2		mS	$V_{DS}=25\text{V}, I_D=10\text{mA}$
Input Capacitance (2)	$C_{iss}$		6.5	pF	$V_{DS}=25\text{V}, V_{GS}=0\text{V}$ $f=1\text{MHz}$
Common Source Output Capacitance (2)	$C_{oss}$		3	pF	
Reverse Transfer Capacitance (2)	$C_{rss}$		0.65	pF	
Turn-On Delay Time (2)(3)(4)	$t_{d(on)}$		0.3	ns	$V_{DD}\approx 25\text{V}, I_D=5\text{mA}$
Rise Time (2)(3)(4)	$t_r$		0.5	ns	
Turn-Off Delay Time (2)(3)(4)	$t_{d(off)}$		0.35	ns	
Fall Time (2)(3)(4)	$t_f$		0.5	ns	

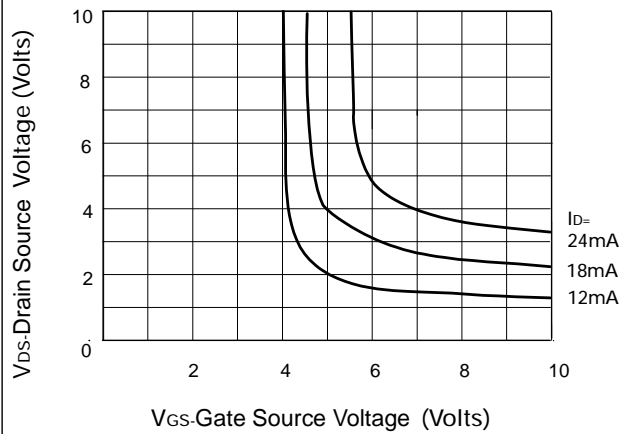
## TYPICAL CHARACTERISTICS



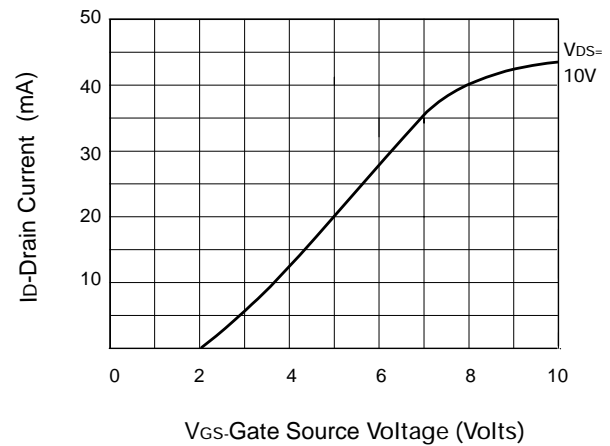
**Output Characteristics**



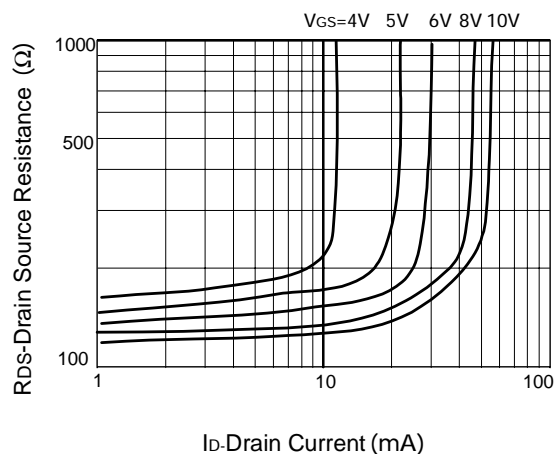
**Saturation Characteristics**



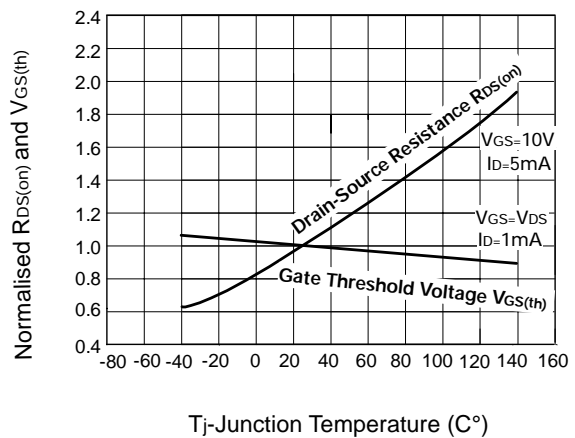
**Voltage Saturation Characteristics**



**Transfer Characteristics**



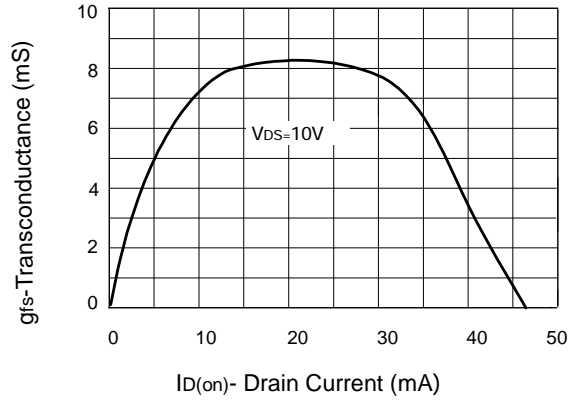
**On-resistance v drain current**



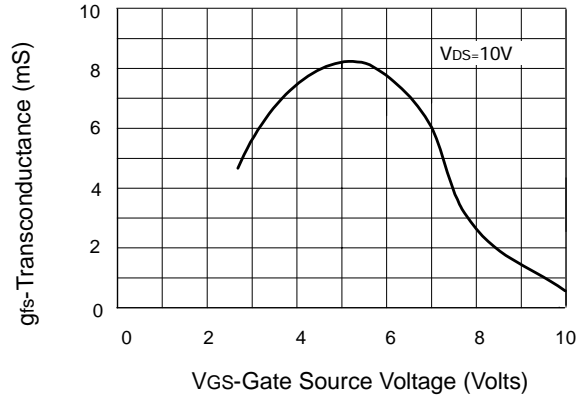
**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  vs Temperature**

# ZVN1409A

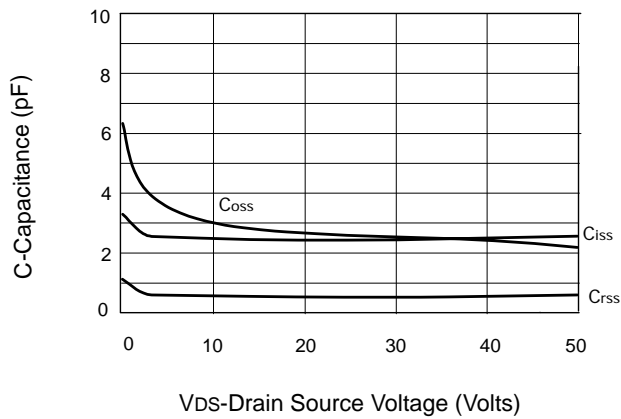
## TYPICAL CHARACTERISTICS



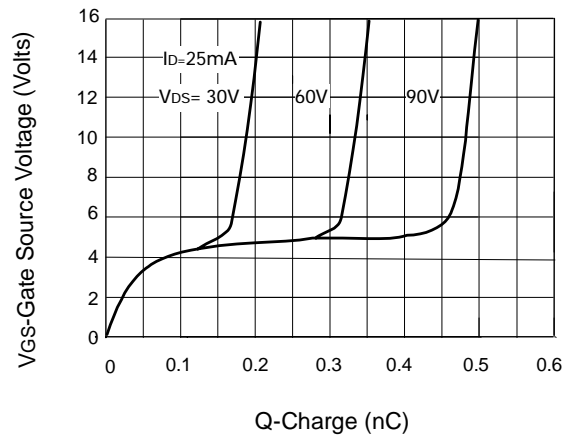
**Transconductance v drain current**



**Transconductance v gate-source voltage**



**Capacitance v drain-source voltage**



**Gate charge v gate-source voltage**