

N-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

BV _{DSS} / R _{DS(ON)} BV _{DGS} (max)	R _{DS(ON)}	I _{D(ON)}	Order Number / Package		
	` '	(min)	TO-39	TO-92	
100V	0.35Ω	8A	VN2210N2	VN2210N3	

[†] MIL visual screening available

Features

- ☐ Free from secondary breakdown
- □ Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral Source-Drain diode
- High input impedance and high gain
- Complementary N- and P-channel devices

Applications

- Motor controls
- Converters
- Amplifiers
- Switches
- Power supply circuits
- Drivers (relays, hammers, solenoids, lamps, memories, displays, bipolar transistors, etc.)

Absolute Maximum Ratings

Drain-to-Source Voltage	BV _{DSS}
Drain-to-Gate Voltage	BV _{DGS}
Gate-to-Source Voltage	± 20V
Operating and Storage Temperature	-55°C to +150°C
Soldering Temperature*	300°C

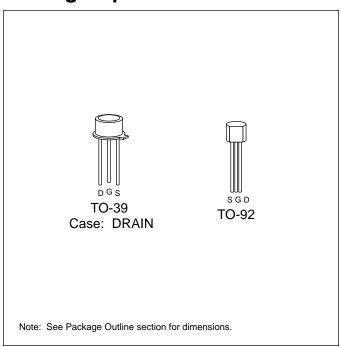
^{*} Distance of 1.6 mm from case for 10 seconds.

Advanced DMOS Technology

These enhancement-mode (normally-off) transistors utilize a vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces devices with the power handling capabilities of bipolar transistors and with the high input impedance and positive temperature coefficient inherent in MOS devices. Characteristic of all MOS structures, these devices are free from thermal runaway and thermally-induced secondary breakdown.

Supertex's vertical DMOS FETs are ideally suited to a wide range of switching and amplifying applications where high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

Package Options



07/08/02

Thermal Characteristics

Package	I _D (continuous)*	I _D (pulsed)	Power Dissipation @ T _C = 25°C	$^{ heta_{ m jc}}$ $^{\circ}$ C/W	θ _{ja} °C/W	I _{DR} *	I _{DRM}
TO-92	1.2A	8.0A	1.0W	125	170	1.2A	8.0A
TO-39	1.7A	10.0A	6.0W	21	125	1.7A	10.0A

^{*} I_D (continuous) is limited by max rated T_D.

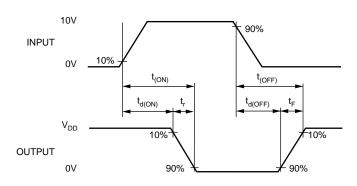
Electrical Characteristics (@ 25°C unless otherwise specified)

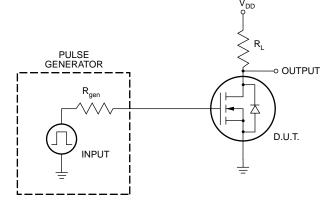
Symbol	Parameter	Min	Тур	Max	Unit	Conditions	
BV _{DSS}	Drain-to-Source Breakdown Voltage	100			V	V _{GS} = 0V, I _D = 10mA	
V _{GS(th)}	Gate Threshold Voltage	0.8		2.4	V	$V_{GS} = V_{DS}$, $I_D = 10$ mA	
$\Delta V_{GS(th)}$	Change in V _{GS(th)} with Temperature		-4.3	-5.5	mV/°C	$V_{GS} = V_{DS}$, $I_D = 10mA$	
I _{GSS}	Gate Body Leakage		1	100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
I _{DSS}	Zero Gate Voltage Drain Current			50	μΑ	$V_{GS} = 0V$, $V_{DS} = Max$ Rating	
				10	mA	$V_{GS} = 0V$, $V_{DS} = 0.8$ Max Rating $T_A = 125$ °C	
I _{D(ON)}	ON-State Drain Current	3	4.5		А	$V_{GS} = 5V, V_{DS} = 25V$	
		8	17			$V_{GS} = 10V, V_{DS} = 25V$	
R _{DS(ON)}	Static Drain-to-Source ON-State Resistance		0.4	0.5	Ω	$V_{GS} = 5V, I_{D} = 1A$	
			0.27	0.35		V _{GS} = 10V, I _D = 4A	
$\Delta R_{DS(ON)}$	Change in R _{DS(ON)} with Temperature		0.85	1.2	%/°C	$V_{GS} = 10V, I_{D} = 4A$	
G _{FS}	Forward Transconductance	1.2			Ö	$V_{DS} = 25V, I_{D} = 2A$	
C _{ISS}	Input Capacitance		300	500		V 0V V 25V	
C _{OSS}	Common Source Output Capacitance		125	200	pF	$V_{GS} = 0V, V_{DS} = 25V$ f = 1 MHz	
C _{RSS}	Reverse Transfer Capacitance		50	65			
t _{d(ON)}	Turn-ON Delay Time		10	15		$V_{DD} = 25V$ $I_D = 2A$ $R_{GEN} = 10\Omega$	
t _r	Rise Time		10	15	ns		
t _{d(OFF)}	Turn-OFF Delay Time		50	65			
t _f	Fall Time		30	50			
V _{SD}	Diode Forward Voltage Drop		1.0	1.6	V	$V_{GS} = 0V$, $I_{SD} = 4A$	
t _{rr}	Reverse Recovery Time		500		ns	V _{GS} = 0V, I _{SD} = 1A	

Notes:

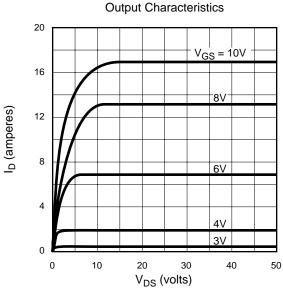
- 1. All D.C. parameters 100% tested at 25°C unless otherwise stated. (Pulse test: $300\mu s$ pulse, 2% duty cycle.)
- 2. All A.C. parameters sample tested.

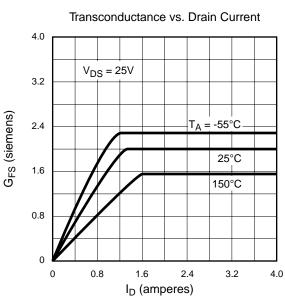
Switching Waveforms and Test Circuit

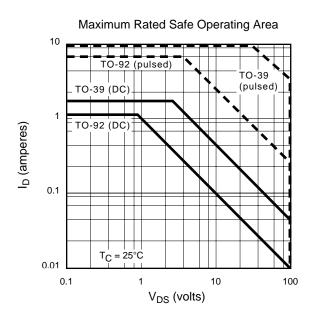


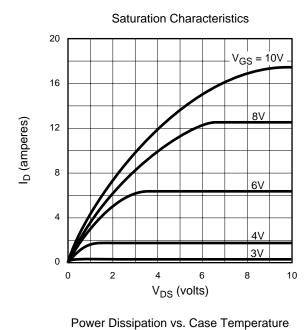


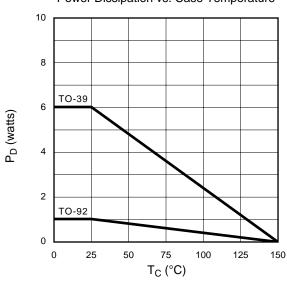
Typical Performance Curves

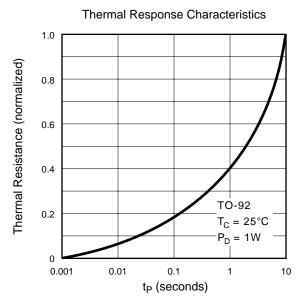




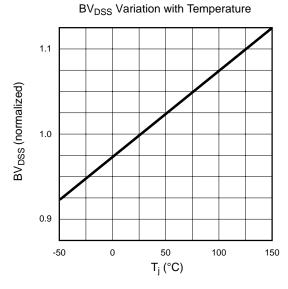


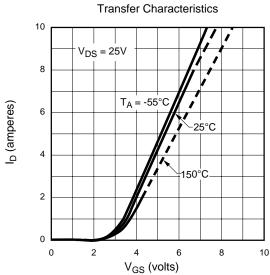


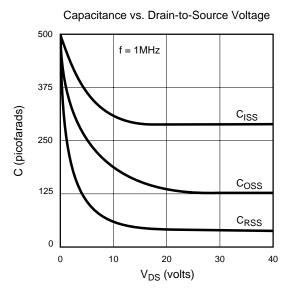


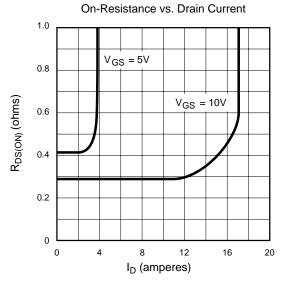


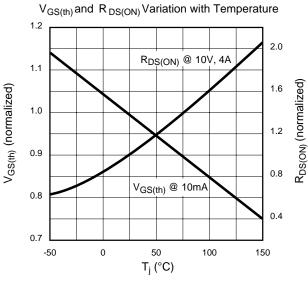
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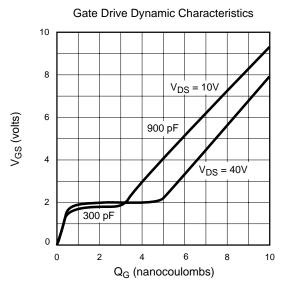












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