



## N-Channel Depletion-Mode Vertical DMOS FETs

### Ordering Information

BV <sub>DSX</sub> / BV <sub>DGX</sub>	R <sub>DS(ON)</sub> (max)	I <sub>DSS</sub> (min)	Order Number / Package
			Die*
250V	20Ω	200mA	DN3125NW

\* Die in wafer form.

### Features

- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on resistance
- Free from secondary breakdown
- Low input and output leakage

### Applications

- Normally-on switches
- Solid state relays
- Converters
- Linear amplifiers
- Constant current sources
- Power supply circuits
- Telecom

### Absolute Maximum Ratings

Drain-to-Source Voltage	BV <sub>DSX</sub>
Drain-to-Gate Voltage	BV <sub>DGX</sub>
Gate-to-Source Voltage	± 20V
Operating and Storage Temperature	-55°C to +150°C

03/03/99

Supertex Inc. does not recommend the use of its products in life support applications and will not knowingly sell its products for use in such applications unless it receives an adequate "products liability indemnification insurance agreement." Supertex does not assume responsibility for use of devices described and limits its liability to the replacement of devices determined to be defective due to workmanship. No responsibility is assumed for possible omissions or inaccuracies. Circuitry and specifications are subject to change without notice. For complete liability information covering this and other Supertex products, refer to the Supertex 1998 Databook.

### Advanced DMOS Technology

These low threshold depletion-mode (normally-on) transistors utilize an advanced 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.

## Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
$BV_{DSX}$	Drain-to-Source Breakdown Voltage	250			V	$V_{GS} = -5.0V, I_D = 100\mu A$
$V_{GS(OFF)}$	Gate-to-Source OFF Voltage	-1.5		-3.5	V	$V_{DS} = 15V, I_D = 10\mu A$
$\Delta V_{GS(OFF)}$	Change in $V_{GS(OFF)}$ with Temperature			4.5	mV/°C	$V_{DS} = 15V, I_D = 10\mu A$
$I_{GSS}$	Gate Body Leakage Current			100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
$I_{D(OFF)}$	Drain-to-Source Leakage Current			1.0	$\mu A$	$V_{GS} = -5.0V, V_{DS} = \text{Max Rating}$
				1.0	mA	$V_{GS} = -5.0V, V_{DS} = 0.8 \text{ Max Rating}$ $T_A = 125^\circ C$
$I_{DSS}$	Saturated Drain-to-Source Current	200			mA	$V_{GS} = 0V, V_{DS} = 15V$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			20	$\Omega$	$V_{GS} = 0V, I_D = 150mA$
				20		$V_{GS} = -0.8V, I_D = 50mA$
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.1	%/°C	$V_{GS} = 0V, I_D = 150mA$
$G_{FS}$	Forward Transconductance	150			m $\mathcal{S}$	$I_D = 100mA, V_{DS} = 10V$
$C_{ISS}$	Input Capacitance		60	120	pF	$V_{GS} = -5.0V, V_{DS} = 25V,$ $f = 1.0MHz$
$C_{OSS}$	Common Source Output Capacitance		6.0	15		
$C_{RSS}$	Reverse Transfer Capacitance		3.0	10		
$t_{d(ON)}$	Turn-ON Delay Time			10	ns	$V_{DD} = 25V,$ $I_D = 150mA,$ $R_{GEN} = 25\Omega,$ $V_{GS} = 0V \text{ to } -10V$
$t_r$	Rise Time			15		
$t_{d(OFF)}$	Turn-OFF Delay Time			15		
$t_f$	Fall Time			20		
$V_{SD}$	Diode Forward Voltage Drop			1.8	V	$V_{GS} = -5.0V, I_{SD} = 150mA$
$t_{rr}$	Reverse Recovery Time		800		ns	$V_{GS} = -5.0V, I_{SD} = 150mA$

### Notes:

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

## Switching Waveforms and Test Circuit

