



## N-Channel Enhancement-Mode Vertical DMOS FETs

### Ordering Information

BV <sub>DSS</sub> / BV <sub>DGS</sub>	R <sub>DS(ON)</sub> (max)	I <sub>D(ON)</sub> (min)	Order Number / Package
			TO-92
240V	6.0Ω	1.0A	VN2406L
240V	10Ω	1.0A	VN2410L

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### Features

- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C<sub>ISS</sub> and fast switching speeds
- Excellent thermal stability
- Integral Source-Drain diode
- High input impedance and high gain
- Complementary N- and P-channel devices

### Advanced DMOS Technology

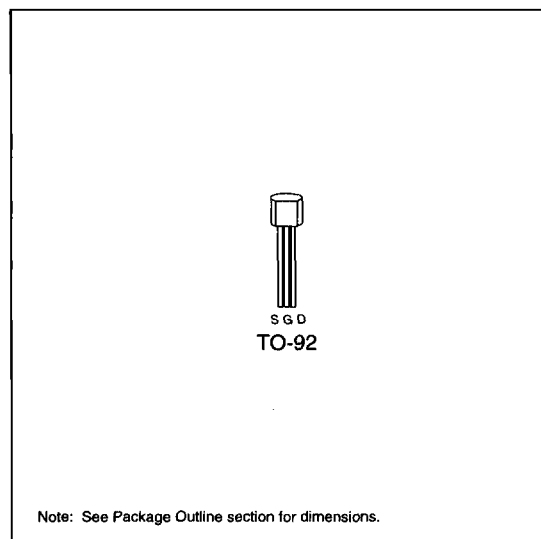
These enhancement-mode (normally-off) transistors utilize a vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces devices with the power handling capabilities of bipolar transistors and with the high input impedance and positive temperature coefficient 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.

### Applications

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

### Package Options



### Absolute Maximum Ratings

Drain-to-Source Voltage	BV <sub>DSS</sub>
Drain-to-Gate Voltage	BV <sub>DGS</sub>
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.

## Thermal Characteristics

Package	$I_D$ (continuous)*	$I_D$ (pulsed)	Power Dissipation @ $T_C = 25^\circ\text{C}$	$\theta_{jC}$ $^\circ\text{C/W}$	$\theta_{jA}$ $^\circ\text{C/W}$	$I_{DR}^*$	$I_{DRM}$
TO-92	0.9A	5.0A	1.0W	125	170	0.18A	1.7A

\*  $I_D$  (continuous) is limited by max rated  $T_j$ .

## Electrical Characteristics (@ $25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	240			V	$V_{GS} = 0V, I_D = 0.1mA$
$V_{GS(th)}$	Gate Threshold Voltage	0.8		2	V	$V_{GS} = V_{DS}, I_D = 1mA$
$I_{GSS}$	Gate Body Leakage			100	nA	$V_{GS} = 20V, V_{DS} = 0V$
$I_{DSS}$	Zero Gate Voltage Drain Current			10	$\mu\text{A}$	$V_{GS} = 0V, V_{DS} = 120V$
				500		$V_{GS} = 0V, V_{DS} = 120V$ $T_A = 125^\circ\text{C}$
$I_{D(ON)}$	ON-State Drain Current	1.0			A	$V_{GS} = -10V, V_{DS} = 15V$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance	All		10	$\Omega$	$V_{GS} = 2.5V, I_D = 0.1A$
		VN2410		10		$V_{GS} = 10V, I_D = 0.5A$
		VN2406		6		$V_{GS} = 10V, I_D = 0.5A$
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature		1.0	1.4	$\%/^\circ\text{C}$	$V_{GS} = 10V, I_D = 0.55A$
$G_{FS}$	Forward Transconductance	300			$m\Omega$	$V_{DS} = 10V, I_D = 0.5A$
$C_{ISS}$	Input Capacitance			125	pF	$V_{GS} = 0V, V_{DS} = 25V$ $f = 1\text{ MHz}$
$C_{OSS}$	Common Source Output Capacitance			50		
$C_{RSS}$	Reverse Transfer Capacitance			20		
$t_{d(ON)}$	Turn-ON Delay Time			8	ns	$V_{DD} = 60V$ $I_D = 0.4A$ $R_{GEN} = 25\Omega$
$t_r$	Rise Time			8		
$t_{d(OFF)}$	Turn-OFF Delay Time			23		
$t_f$	Fall Time			24		
$V_{SD}$	Diode Forward Voltage Drop	VN2410	1.2			
		VN2406	1.2		V	$V_{GS} = 0V, I_{SD} = 0.8A$

### Notes:

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

## Switching Waveforms and Test Circuit

