

SUPERTEX INC

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VN1206  
VN1210

7-39-05



**N-Channel Enhancement-Mode Vertical DMOS Power 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-39	TO-92	TO-220
120V	6Ω	1.0A	VN1206B	VN1206L	VN1206D
120V	10Ω	1.0A	VN1210B	VN1210L	VN1210D

**Features**

- Freedom 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) power 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 negative temperature coefficient inherent in MOS devices. Characteristic of all MOS structures, these devices are free from thermal runaway and thermally-induced secondary breakdown.

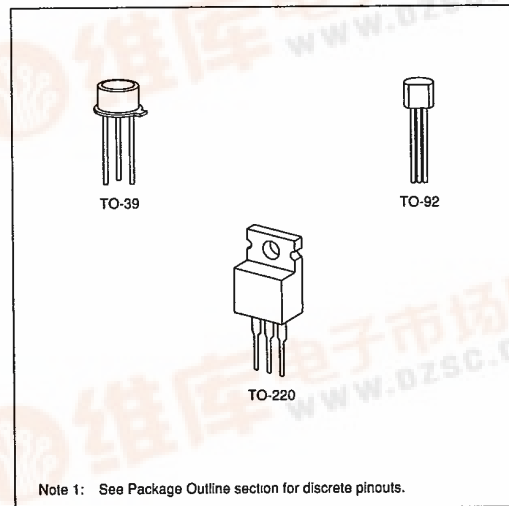
Supertex Vertical DMOS Power FETs are ideally suited to a wide range of switching and amplifying applications where high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

**Applications**

- Motor control
- Converters
- Amplifiers
- Switches
- Power supply circuits
- Drivers (Relays, Hammers, Solenoids, Lamps, Memories, Displays, Bipolar Transistors, etc.)

**Package Options**

(Note 1)



Note 1: See Package Outline section for discrete pinouts.

**Absolute Maximum Ratings**

Drain-to-Source Voltage	BV <sub>DSS</sub>
Drain-to-Gate Voltage	BV <sub>DGS</sub>
Gate-to-Source Voltage	± 40V
Operating and Storage Temperature	-55°C to +150°C
Soldering Temperature*	300°C

\*Distance of 1.6 mm from case for 10 seconds.



T-39-05

### Thermal Characteristics

Package	$I_D$ (continuous)*	$I_D$ (pulsed)	Power Dissipation	$\theta_{JA}$ °C/W	$\theta_{JC}$ °C/W
TO-39	0.7A	3.0A	6.25W	170	21
TO-92	0.1A	0.6A	.4W	312.5	21.3
TO-220	1.5A	3.0A	45W	80	6.25

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

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

(Notes 1 and 2)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	120			V	$I_D = 100\mu A, V_{GS} = 0$
$V_{GS(th)}$	Gate Threshold Voltage	0.8		2.0	V	$V_{GS} = V_{DS}, I_D = 1mA$
$I_{GSS}$	Gate Body Leakage			100	nA	$V_{GS} = \pm 15V, V_{DS} = 0$
$I_{DSS}$	Zero Gate Voltage Drain Current			10	$\mu A$	$V_{GS} = 0, V_{DS} = 120V$
				500		$V_{GS} = 0, V_{DS} = 120V$ $T_A = 125^\circ C$
$I_{D(ON)}$	ON-State Drain Current	1.0			A	$V_{GS} = 10V, V_{DS} \geq 2 V_{DS(ON)}$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance	ALL		10	$\Omega$	$V_{GS} = 2.5V, I_D = 0.1A$
		VN1206		6		$V_{GS} = 10V, I_D = 0.5A$
		VN1210		10		$I_D = 0.5A, V_{GS} = 10V$
$G_{FS}$	Forward Transconductance	300			mU	$V_{DS} \geq 2 V_{DS(ON)}, I_D = 0.5A$
$C_{ISS}$	Input Capacitance			125	pF	$V_{GS} = 0, V_{DS} = 25V$ $f = 1MHz$
$C_{OSS}$	Common Source Output Capacitance			50		
$C_{RSS}$	Reverse Transfer Capacitance			20		
$t_{(ON)}$	Turn-ON Time			16		
$t_{(OFF)}$	Turn-OFF Time			57		
$V_{SD}$	Diode Forward Voltage Drop	VN1210	-1.2		V	$I_{SD} = -.12A, V_{GS} = 0$
		VN1206	-1.2		V	$I_{SD} = -.25A, V_{GS} = 0$

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

Note 2: All A.C. parameters sample tested.

### Switching Waveforms and Test Circuit

