Supertex inc.



#### P-Channel Enhancement-Mode Vertical DMOS FETs

#### **Ordering Information**

BV <sub>DSS</sub>	/ R <sub>DS(ON)</sub>	I <sub>D(ON)</sub>	Order Number / Package		
BV <sub>DGS</sub>	· · ·	(min)	Die*		
-500\	/ 125Ω	-100mA	VP1550NW		

\* Die in wafer form.

#### 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

# **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 <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.

# 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.

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 the latest product specifications, refer to the Supertex website: http://www.supertex.com. For complete liability information on all Supertex products, refer to the most current databook or to the Legal/Disclaimer page on the Supertex website.

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

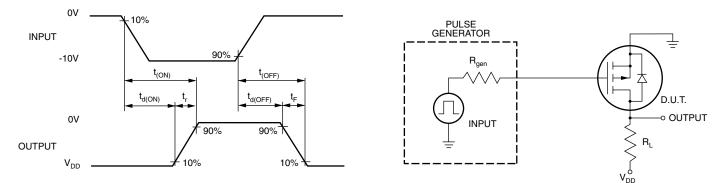
Symbol	Parameter	Min	Тур	Max	Unit	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	-500			V	$V_{GS} = 0V, I_D = -1mA$
V <sub>GS(th)</sub>	Gate Threshold Voltage	-2.0		-4.5	V	$V_{GS} = V_{DS}, I_D = -1mA$
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature		3.5	6	mV/°C	$V_{GS} = V_{DS}, I_D = -1mA$
I <sub>GSS</sub>	Gate Body Leakage			-100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
I <sub>DSS</sub>	Zero Gate Voltage Drain Current			-10		$V_{GS} = 0V, V_{DS} = Max Rating$
				-1000	μΑ	$V_{GS} = 0V, V_{DS} = 0.8 \text{ Max Rating}$ $T_A = 125^{\circ}\text{C}$
I <sub>D(ON)</sub>	ON-State Drain Current		-90		mA	V <sub>GS</sub> = -5V, V <sub>DS</sub> = -25V
		-100	-240			V <sub>GS</sub> = -10V, V <sub>DS</sub> = -25V
R <sub>DS(ON)</sub>	Static Drain-to-Source		85		Ω	V <sub>GS</sub> = -5V, I <sub>D</sub> = -5mA
	ON-State Resistance		80	125		V <sub>GS</sub> = -10V, I <sub>D</sub> = -10mA
$\Delta R_{DS(ON)}$	Change in R <sub>DS(ON)</sub> with Temperature		0.85		%/°C	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10mA
G <sub>FS</sub>	Forward Transconductance	25	40		mប	V <sub>DS</sub> = -25V, I <sub>D</sub> = -10mA
C <sub>ISS</sub>	Input Capacitance		40	70		
C <sub>OSS</sub>	Common Source Output Capacitance		10	20	pF	$V_{GS} = 0V, V_{DS} = -25V$ f = 1 MHz
C <sub>RSS</sub>	Reverse Transfer Capacitance		3	10		
t <sub>d(ON)</sub>	Turn-ON Delay Time		5	10		V <sub>DD</sub> = -25V
t <sub>r</sub>	Rise Time		8	10	ns	I <sub>D</sub> = -100mA R <sub>GEN</sub> = 25Ω
t <sub>d(OFF)</sub>	Turn-OFF Delay Time		8	15		
t <sub>f</sub>	Fall Time	151	5	16	J.C	om
$V_{\rm SD}$	Diode Forward Voltage Drop		-0.8	-1.5	V	V <sub>GS</sub> = 0V, I <sub>SD</sub> = -0.1A
t <sub>rr</sub>	Reverse Recovery Time		200		ns	V <sub>GS</sub> = 0V, I <sub>SD</sub> = -0.1A

Notes:

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

2. All A.C. parameters sample tested.

# **Switching Waveforms and Test Circuit**



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