P-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

BV_{DSS} / BV_{DGS}	$R_{DS(ON)}$ (max)	$I_{D(ON)}$ (min)	Order Number / Package
			Die†
-40V	8.0Ω	-0.5A	VP1504NW
-60V	8.0Ω	-0.5A	VP1506NW
-90V	8.0Ω	-0.5A	VP1509NW

† 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

This enhancement-mode (normally-off) transistor utilizes a vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces a device 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, this device is free from thermal runaway and thermally-induced secondary breakdown.

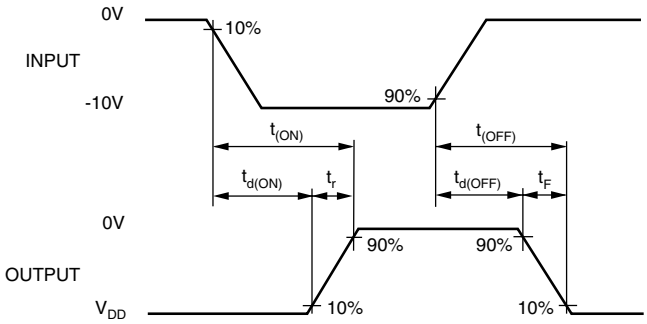
Supertex's vertical DMOS FETs are ideally suited to a wide range of switching and amplifying applications where high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

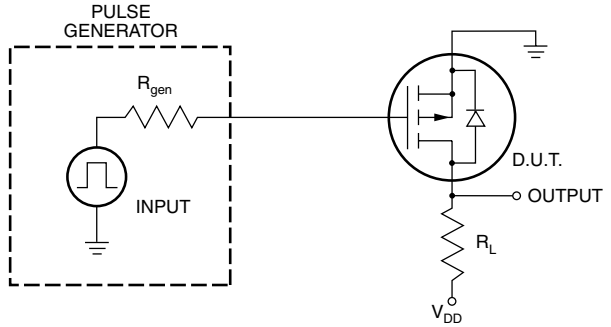
Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter		Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	VP1504	-40			V	I_D = -1.0mA, V_{GS} = 0V
		VP1506	-60				
		VP1509	-90				
$V_{GS(th)}$	Gate Threshold Voltage		-1.5		-3.5	V	V_{GS} = V_{DS}, I_D = -1.0mA
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			5.8	6.5	mV/°C	I_D = -1.0mA, V_{GS} = V_{DS}
I_{GSS}	Gate Body Leakage			-1.0	-100	nA	V_{GS} = ±20V, V_{DS} = 0V
I_{DSS}	Zero Gate Voltage Drain Current				-10	µA	V_{GS} = 0V, V_{DS} = Max Rating
					-1	mA	V_{GS} = 0V, V_{DS} = 0.8 Max Rating T_A = 125°C
$I_{D(ON)}$	ON-State Drain Current		-0.15	-0.25		A	V_{GS} = -5V, V_{DS} = -25V
			-0.50	-1.2			V_{GS} = -10V, V_{DS} = -25V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			11	15	Ω	V_{GS} = -5V, I_D = -0.1A
				6.0	8.0		V_{GS} = -10V, I_D = -0.5A
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			0.55	1.0	%/°C	V_{GS} = -10V, I_D = -0.5A
G_{FS}	Forward Transconductance		150	190		m℧	V_{DS} = -25V, I_D = -0.5A
C_{ISS}	Input Capacitance			45	60	pF	V_{GS} = 0V, V_{DS} = -25V f = 1 MHz
C_{OSS}	Common Source Output Capacitance			22	30		
C_{RSS}	Reverse Transfer Capacitance			3	8		
$t_{d(ON)}$	Turn-ON Delay Time			4	6	ns	V_{DD} = -25V I_D = -0.5A R_{GEN} = 25Ω
t_r	Rise Time			3	10		
$t_{d(OFF)}$	Turn-OFF Delay Time			8	12		
t_f	Fall Time			4	10		
V_{SD}	Diode Forward Voltage Drop			-1.2	-2.0	V	I_{SD} = -1.0A, V_{GS} = 0V
t_{rr}	Reverse Recovery Time			400		ns	I_{SD} = -1.0A, V_{GS} = 0V

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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