

N-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

| BV _{DSS} / | R _{DS(ON)} | V _{GS(th)} | I _{D(ON)} | Order Number / Package | | | |
|---------------------|---------------------|---------------------|--------------------|------------------------|--|--|--|
| BV _{DGS} | (max) | (max) | (min) | TO-92 | | | |
| 350V | 15Ω | 1.8V | 0.15A | VN3515L | | | |
| 400V | 12Ω | 1.8V | 0.15A | VN4012L | | | |

Features

- □ Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- $\hfill\square$ 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
- Telecom Switching
- Dever 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 |
| | |

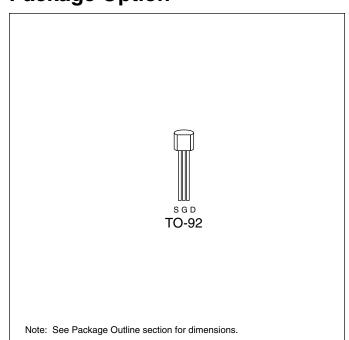
* Distance of 1.6 mm from case for 10 seconds.

Advanced DMOS Technology

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.

Package Option



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Thermal Characteristics

| Package | I _D (continuous)* | I _D (pulsed) | Power Dissipation @ T _C = 25°C | θ _{jc} °C/W | θ _{ja} °C/W | I _{DR} * | I _{DRM} |
|-----------------|------------------------------|-------------------------|--|-------------------------|-------------------------|-------------------|------------------|
| VN3515L (TO-92) | 150mA | 600mA | 1W | 125 | 170 | 150mA | 600mA |
| VN4012L (TO-92) | 160mA | 650mA | 1W | 125 | 170 | 160mA | 650mA |

* I_D (continuous) is limited by max rated T_i.

Electrical Characteristics (@ 25°C unless otherwise specified)

| Symbol | Parameter | | Min | Тур | Max | Unit | Conditions | |
|---------------------|---|--------|------|-----|-----|------|--|--|
| BV _{DSS} | Drain-to-Source | VN3515 | 350 | | | V | $V_{GS} = 0V, I_D = 100\mu A$ | |
| | Breakdown Voltage | VN4012 | 400 | | | , v | | |
| V _{GS(th)} | Gate Threshold Voltage | | 0.6 | | 1.8 | V | $V_{GS} = V_{DS}, I_D = 1mA$ | |
| I _{GSS} | Gate Body Leakage | | | | 10 | nA | $V_{GS} = \pm 20V, V_{DS} = 0V$ | |
| I _{DSS} | Zero Gate Voltage Drain Current | | | | 1 | μΑ | $V_{GS} = 0V, V_{DS} = 0.8$ Max Rating | |
| | | | | | 100 | | $V_{GS} = 0V, V_{DS} = 0.8$ Max Rating T _A = 125°C | |
| I _{D(ON)} | ON-State Drain Current | | 0.15 | 0.3 | | A | $V_{DS} = 10V, V_{GS} = 4.5V$ | |
| | Static Drain-to-Source ON-State Resistance | VN3515 | | 9.5 | 15 | Ω | $V_{GS} = 4.5V, I_{D} = 100mA$ | |
| R _{DS(ON)} | | | | 17 | 35 | | $V_{GS} = 4.5V, I_{D} = 100mA, TA = 125^{\circ}C$ | |
| | | VN4012 | | 9.5 | 12 | | $V_{GS} = 4.5V, I_{D} = 100mA$ | |
| | | | | 17 | 30 | | $V_{GS} = 4.5V, I_{D} = 100mA, TA = 125^{\circ}C$ | |
| G _{FS} | Forward Transconductance | | 125 | 350 | | mછ | V _{DS} =15V, I _D = 100mA | |
| C _{ISS} | Input Capacitance | | | | 110 | pF | $V_{DS} = 25V, V_{GS} = 0V$ f = 1MHz | |
| C _{OSS} | Common Source Output Capacitance | | | | 30 | | | |
| C _{RSS} | Reverse Transfer Capacitance | | | | 10 | | | |
| t _{d(ON)} | Turn-ON Delay Time | | | | 20 | | | |
| t _r | Rise Time | | | | 20 | - ns | $V_{DD} = 25V$ $I_{D} = 100mA$ $R_{GEN} = 25\Omega$ | |
| t _{d(OFF)} | Turn-OFF Delay Time | | | | 65 | | | |
| t _f | Fall Time | | | | 65 | | | |
| V _{SD} | Diode Forward Voltage Drop | | | | 1.2 | V | $V_{GS} = 0V, I_{SD} = 160mA$ | |

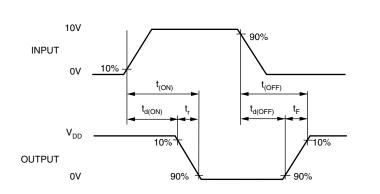
Notes:

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

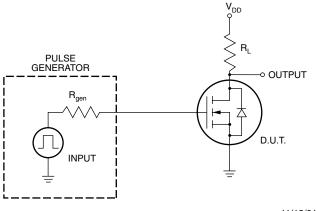
2. All A.C. parameters sample tested.

3. See TN2540 data sheet for characteristic curves.

Switching Waveforms and Test Circuit







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1235 Bordeaux Drive, Sunnyvale, CA 94089 TEL: (408) 744-0100 • FAX: (408) 222-4895 www.supertex.com

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