Supertex inc. VN22A

T-35-25

N-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

BV_{DSS} / BV_{DGS}	$R_{DS(ON)}$ (max)	$I_{D(ON)}$ (min)	Order Number / Package	
			TO-92	Dice†
40V	0.35Ω	8A	VN2204N3	VN2204ND
60V	0.35Ω	8A	VN2206N3	VN2206ND
100V	0.35Ω	8A	VN2210N3	VN2210ND

† 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 control
- ☐ 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

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

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Supertex 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 Options (Note 1)



TO-92

Note 1: See Package Outline section for discrete pinouts.

Thermal Characteristics

Package	I_D (continuous)*	I_D (pulsed)	Power Dissipation @ T_C = 25°C	θ_{ja} °C/W	θ_{jc} °C/W	I_{DR}*	I_{DRM}
TO-92	1.2A	8.0A	1.0W	170	125	1.2A	8.0A

* 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	VN2204	40			V	V_{GS} = 0, I_D = 10mA
		VN2206	60				
		VN2210	100				
$V_{GS(th)}$	Gate Threshold Voltage		0.8		2.4	V	V_{GS} = V_{DS}, I_D = 10mA
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			-4.3	-5.5	mV/°C	V_{GS} = V_{DS}, I_D = 10mA
I_{GSS}	Gate Body Leakage			1	100	nA	V_{GS} = ± 20V, V_{DS} = 0
I_{DSS}	Zero Gate Voltage Drain Current				50	µA	V_{GS} = 0, V_{DS} = Max Rating
					10	mA	V_{GS} = 0, V_{DS} = 0.8 Max Rating, T_A = 125°C
$I_{D(ON)}$	ON-State Drain Current		3	4.5		A	V_{GS} = 5V, V_{DS} = 25V
			8				V_{GS} = 10V, V_{DS} = 25V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			0.4	0.5	Ω	V_{GS} = 5V, I_D = 1A
				0.27	0.35		V_{GS} = 10V, I_D = 4A
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			0.85	1.2	%/°C	V_{GS} = 10V, I_D = 4A
G_{FS}	Forward Transconductance		1.5	2.0		℧	V_{DS} = 25V, I_D = 2A
C_{ISS}	Input Capacitance				500	pF	V_{GS} = 0, V_{DS} = 25V, f = 1 MHz
C_{OSS}	Common Source Output Capacitance				200		
C_{RSS}	Reverse Transfer Capacitance				65		
$t_{d(ON)}$	Turn-ON Delay Time			10	15	ns	V_{DD} = 25V, I_D = 4A, R_S = 50Ω
t_r	Rise Time			10	15		
$t_{d(OFF)}$	Turn-OFF Delay Time			30	50		
t_f	Fall Time			30	50		
V_{SD}	Diode Forward Voltage Drop			1.0	1.6	V	V_{GS} = 0, I_{SD} = 4A
t_{rr}	Reverse Recovery Time			500		ns	V_{GS} = 0, I_{SD} = 1A

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

Switching Waveforms and Test Circuit



