New Jersey Semi-Conductor Products, Inc.

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SPRINGFIELD, NEW JERSEY 07081
U.S.A.

VN1304
VN1306
VN1310

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-39	TO-92
40V	8.0Ω	0.5A	—	—
60V	8.0Ω	0.5A	VN1306N2	—
100V	8.0Ω	0.5A	—	VN1310N3

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

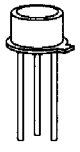
- Motor controls
- Converters
- Amplifiers
- Switches
- Power supply circuits
- Drivers (relays, hammers, solenoids, lamps, memories, displays, bipolar transistors, etc.)

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.

Package Options



TO-39
Case: DRAIN

TO-92

Note: See Package Outline section for dimensions.

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}
TO-39	0.4A	1.4A	3.0W	41	125	0.4A	1.4A
TO-92	0.25A	1.3A	1.0W	125	170	0.25A	1.3A

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

Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter		Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	VN1310	100			V	V_{GS} = 0V, I_D = 1mA
		VN1306	60				
		VN1304	40				
$V_{GS(th)}$	Gate Threshold Voltage		0.8		2.4	V	V_{GS} = V_{DS}, I_D = 1mA
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			-3.9	-5.0	mV/°C	V_{GS} = V_{DS}, I_D = 1mA
I_{GSS}	Gate Body Leakage				100	nA	V_{GS} = ±20V, V_{DS} = 0V
I_{DSS}	Zero Gate Voltage Drain Current				1	µA	V_{GS} = 0V, V_{DS} = Max Rating
					100	µA	V_{GS} = 0V, V_{DS} = 0.8 Max Rating, T_A = 125°C
$I_{D(ON)}$	ON-State Drain Current		0.25	0.6		A	V_{GS} = 5V, V_{DS} = 25V
			0.50	1.4			V_{GS} = 10V, V_{DS} = 25V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			5.0	15	Ω	V_{GS} = 5V, I_D = 50mA
				5.0	8.0		V_{GS} = 10V, I_D = 500mA
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			0.8	2	%/°C	V_{GS} = 10V, I_D = 500mA
G_{FS}	Forward Transconductance		120			m℧	V_{DS} = 25V, I_D = 500mA
C_{ISS}	Input Capacitance			27	35	pF	V_{GS} = 0V, V_{DS} = 25V, f = 1 MHz
C_{OSS}	Common Source Output Capacitance			13	15		
C_{RSS}	Reverse Transfer Capacitance			3	5		
$t_{d(ON)}$	Turn-ON Delay Time			2	5	ns	V_{DD} = 25V, I_D = 500mA, R_{GEN} = 25Ω
t_r	Rise Time			2	5		
$t_{d(OFF)}$	Turn-OFF Delay Time			2	6		
t_f	Fall Time			2	5		
V_{SD}	Diode Forward Voltage Drop			1.0	1.3	V	V_{GS} = 0V, I_{SD} = 0.5A
t_{rr}	Reverse Recovery Time			350		ns	V_{GS} = 0V, I_{SD} = 0.5A

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