

N-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

BV _{DSS} /	R _{DS(ON)}	Order Number / Package				
BV _{DGS}	(max)	TO-92	TO-236AB*	Die [†]		
60V	4.0Ω	VN2106N3	_	_		
100V	4.0Ω	_	VN2110K1	VN2110ND		

[†]MIL visual screening available

*Same as SOT-23. All units shipped on 3,000 piece carrier tape reels.

Features

- Commercial and Military versions available
- □ Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- □ Low C_{ISS} and fast switching speeds
- □ High input impedance and high gain

Applications

- Motor controls
- Amplifiers
- Power supply circuits
- Converters
- Switches
- 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.

11/12/01

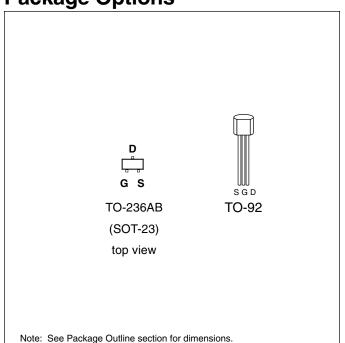
Product marking for SOT-23:					
	N1A*				
where $* = 2$ -week alpha date code					

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 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



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.

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-92	0.3A	1.0A	1.0W	125	170	0.3A	1.0A
TO-236AB	0.2A	0.8A	0.36W (T _A = 25°C)	200	350	0.2A	0.8A

 $^{\dagger}I_{D}$ (continuous) is limited by max rated T_{j} .

* Total for package.

Electrical Characteristics (@ 25°C unless otherwise specified)

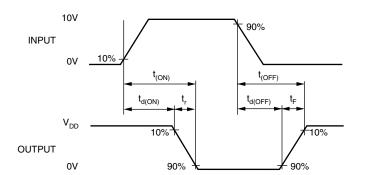
Symbol	Parameter		Min	Тур	Max	Unit	Conditions	
BV_{DSS}	Drain-to-Source	VN2110	100			v	$I_{D} = 1 \text{mA}, V_{GS} = 0 \text{V}$	
200	Breakdown Voltage	VN2106	60					
V _{GS(th)}	Gate Threshold Voltage		0.8		2.4	V	$V_{GS} = V_{DS}, I_D = 1mA$	
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			-3.8	-5.5	mV/°C	$V_{GS} = V_{DS}, I_{D} = 1mA$	
I _{GSS}	Gate Body Leakage			0.1	100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
I _{DSS}	Zero Gate Voltage Drain Curr				1	μA	$V_{GS} = 0V, V_{DS} = Max Rating$	
					100	μΑ	$V_{GS} = 0V, V_{DS} = 0.8 \text{ Max Rating}$ $T_A = 125^{\circ}\text{C}$	
I _{D(ON)}	ON-State Drain Current		0.6			А	$V_{GS} = 10V, V_{DS} = 25V$	
R _{DS(ON)}	Static Drain-to-Source			4.5	6.0	Ω	$V_{GS} = 5V, I_{D} = 75mA$	
	ON-State Resistance			3.0	4.0	Ω	$V_{GS} = 10V, I_{D} = 500mA$	
$\Delta R_{DS(ON)}$	Change in R _{DS(ON)} with Temperature			0.70	1.0	%/°C	$V_{GS} = 10V, I_{D} = 500mA$	
G _{FS}	Forward Transconductance		150	400		mប	$V_{DS} = 25V, I_{D} = 0.5A$	
C _{ISS}	Input Capacitance			35	50			
C _{OSS}	Common Source Output Capacitance			13	25	pF	V _{GS} = 0V, V _{DS} = 25V, f = 1MH:	
C _{RSS}	Reverse Transfer Capacitanc	e		4	5			
t _{d(ON)}	Turn-ON Delay Time Rise Time			3	5	ns	$V_{DD} = 25V$ $I_D = 0.6A$	
t _r				5	8			
t _{d(OFF)}	Turn-OFF Delay Time			6	9		$R_{GEN} = 25\Omega$	
t _f	Fall Time			5	8			
V _{SD}	Diode Forward Voltage Drop			1.2	1.8	V	$I_{SD} = 0.6A, V_{GS} = 0V$	
t _{rr}	Reverse Recovery Time			400		ns	I _{SD} = 0.6A, V _{GS} = 0V	

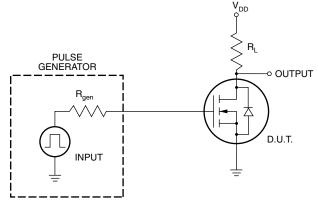
Notes:

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

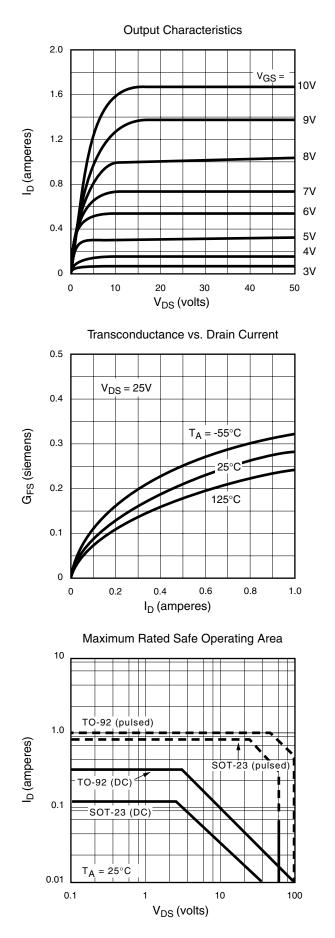
2. All A.C. parameters sample tested.

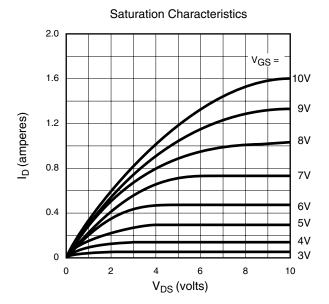




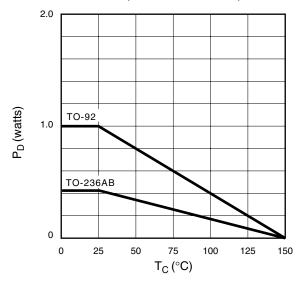


Typical Performance Curves

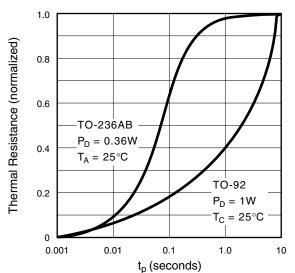




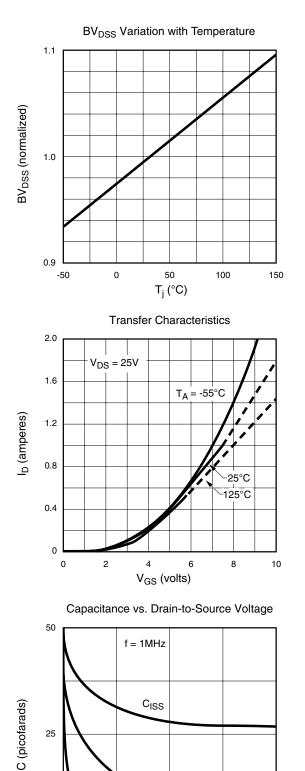
Power Dissipation vs. Case Temperature



Thermal Response Characteristics



Typical Performance Curves

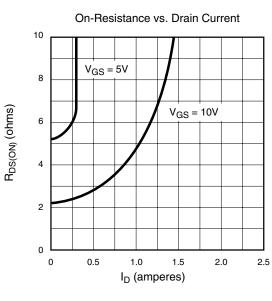




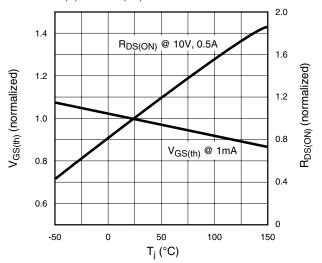
10

0

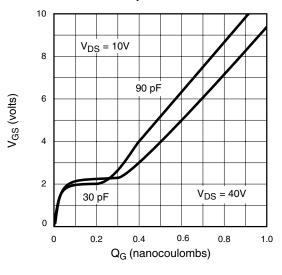
0



 $V_{GS(th)}$ and $R_{DS(ON)}$ Variation with Temperature



Gate Drive Dynamic Characteristics



11/12/01

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

©2001 Supertex Inc. All rights reserved. Unauthorized use or reproduction prohibited.

C_{OSS}

C_{RSS}

20

V_{DS} (volts)

40

30

This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.