

# VN35AK, VN66AK, VN67AK, VN98AK, VN99AK n-Channel Enhancement-mode Vertical Power MOSFET

## FEATURES

- High speed, high current switching
- High gain-bandwidth product
- Inherently temperature stable
- Extended safe operating area
- Simple DC biasing
- Requires almost zero current drive

## APPLICATIONS

- High current analog switches
- RF power amplifiers
- Laser diode pulsers
- Line drivers
- Logic buffers
- Pulse amplifiers

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)

Drain-source Voltage	
VN35AK .....	35V
VN66AK, VN67AK .....	60V
VN98AK, VN99AK .....	90V
Drain-gate Voltage	
VN35AK .....	35V
VN66AK, VN67AK .....	60V
VN98AK, VN99AK .....	90V
Continuous Drain Current (see note 1) .....	1.2A
Peak Drain Current (see note 2) .....	3.0A
Gate-source Forward Voltage .....	+30V
Gate-source Reverse Voltage .....	-30V
Thermal Resistance, Junction to Case .....	20°C/W
Continuous Device Dissipation at (or below)	
25°C Case Temperature .....	6.25W
Linear Derating Factor .....	50mW/°C
Operating Junction	
Temperature Range .....	-55 to +150°C
Storage Temperature Range .....	-55 to +150°C
Lead Temperature	
(1/16 in. from case for 10 sec) .....	+300°C

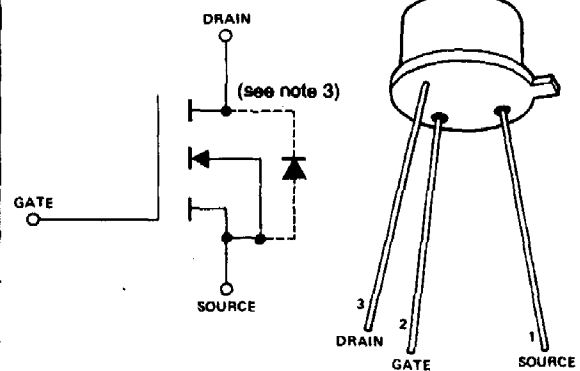
**Note 1.** T<sub>C</sub> = 25°C; controlled by typical r<sub>DS(on)</sub> and maximum power dissipation.

**Note 2.** Pulse width 80μsec, duty cycle 1.0%.

**Note 3.** The Drain-source diode is an integral part of the MOSFET structure.

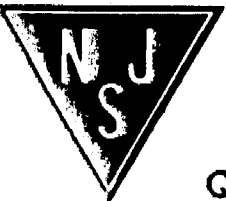
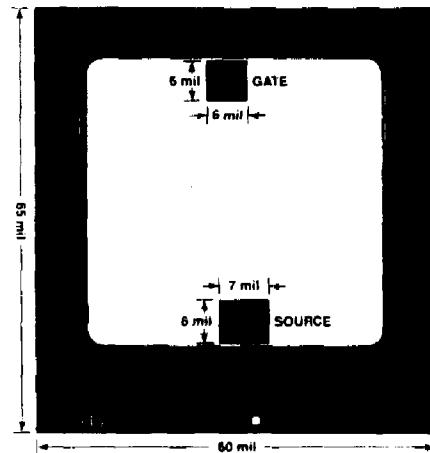
## SCHEMATIC DIAGRAM

(OUTLINE DWG. TO-39)



Body internally connected to source.  
 Drain common to case.

## CHIP TOPOGRAPHY



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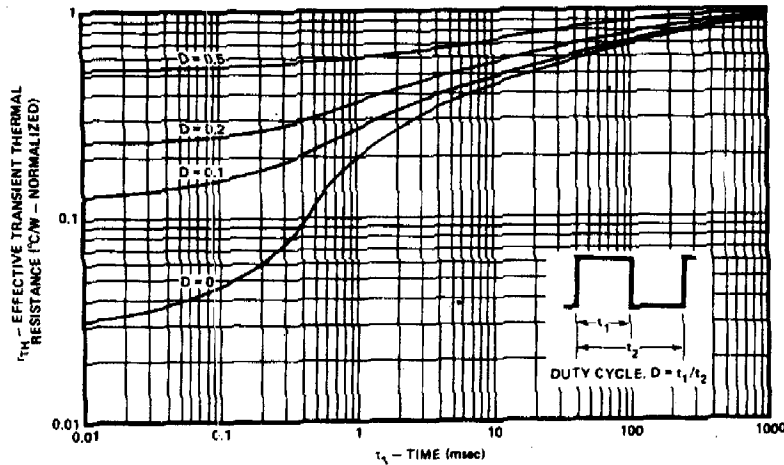
## ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

	CHARACTERISTIC	VN35AK			VN66AK VN67AK			VN98AK VN99AK			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
S T A T I C	BV <sub>DSS</sub> Drain-Source Breakdown	35			60			90			V	V <sub>GS</sub> = 0, I <sub>D</sub> = 10μA
	V <sub>GS(th)</sub> Gate-Threshold Voltage	0.8		2.0	0.8		2.0	0.8		2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA
	I <sub>GSS</sub> Gate-Body Leakage		0.5	100		0.5	100		0.5	100	nA	V <sub>GS</sub> = 15V, V <sub>DS</sub> = 0
				500			500			500	nA	V <sub>GS</sub> = 15V, V <sub>DS</sub> = 0, T <sub>A</sub> = 125°C (Note 2)
				10			10			10	nA	V <sub>DS</sub> = Max. Rating, V <sub>GS</sub> = 0
	I <sub>DSS</sub> Zero Gate Voltage Drain Current			500			500			500	μA	V <sub>GS</sub> = 0.8 Max. Rating, V <sub>DS</sub> = 0, T <sub>A</sub> = 125°C (Note 2)
				100			100			100	nA	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0
	I <sub>D(on)</sub> ON-State Drain Current		1.0	2.0		1.0	2.0		1.0	2.0	A	V <sub>GS</sub> = 25V, V <sub>DS</sub> = 10V
D Y N A M I C	V <sub>DS(on)</sub> Drain-Source Saturation Voltage	VN66AK				1.0			1.1		V	V <sub>GS</sub> = 5V, I <sub>D</sub> = 0.3A
		VN98AK				2.2	3.0		2.2	4.0	V	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.0A
		VN35AK		1.0			1.1			1.2	V	V <sub>GS</sub> = 5V, I <sub>D</sub> = 0.3A
		VN67AK VN99AK		2.2	2.5		2.2	3.5		2.2	4.5	V
g <sub>fs</sub> Forward Transconductance	170	250		170	250		170	250		mΩ	V <sub>DS</sub> = 24V, I <sub>D</sub> = 0.5A, f = 1KHz	
C <sub>iss</sub> Input Capacitance		40	50		40	50		40	50	pF	V <sub>GS</sub> = 0, V <sub>DS</sub> = 24V, f = 1MHz (Note 2)	
C <sub>oss</sub> Common Source Output Capacitance		38	45		35	40		32	40	pF		
C <sub>ras</sub> Reverse Transfer Capacitance		7	10		8	10		5	10	pF		
t <sub>on</sub> Turn ON Time		3	8		3	8		3	8	ns		
t <sub>off</sub> Turn OFF Time		3	8		3	8		3	8	ns		

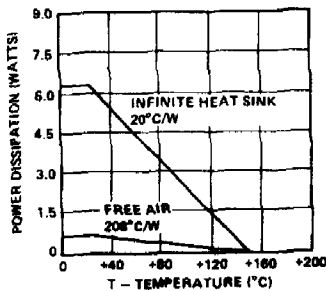
Note 1. Pulse test — 80μs pulse, 1% duty cycle.

Note 2. Sample test.

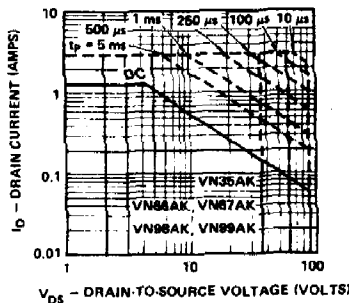
### THERMAL RESPONSE



### POWER DISSIPATION vs CASE OR AMBIENT TEMPERATURE



### DC SAFE OPERATING REGION T<sub>C</sub> = 25°C



### BREAKDOWN VOLTAGE VARIATION WITH TEMPERATURE

