

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_A = 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

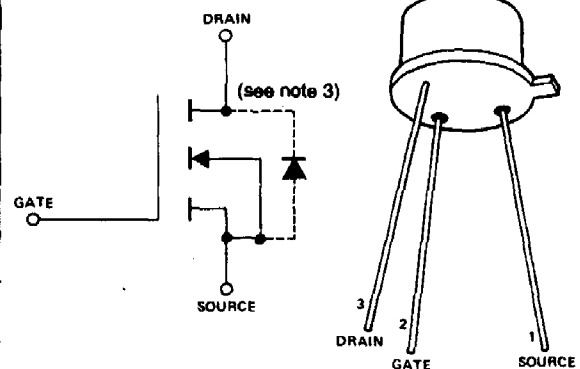
Note 1. T_C = 25°C; controlled by typical r_{DS(on)} and maximum power dissipation.

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

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

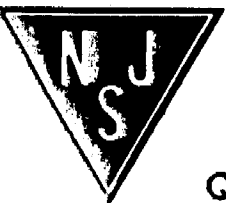
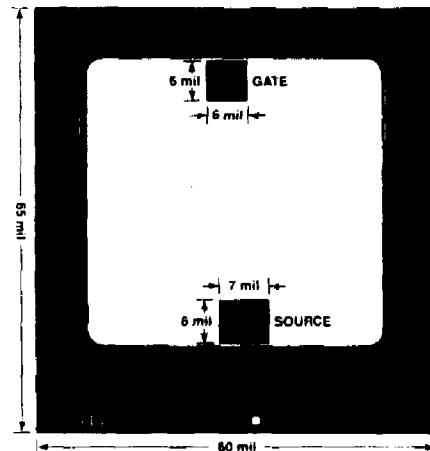
SCHEMATIC DIAGRAM

(OUTLINE DWG. TO-39)



Body internally connected to source.
 Drain common to case.

CHIP TOPOGRAPHY



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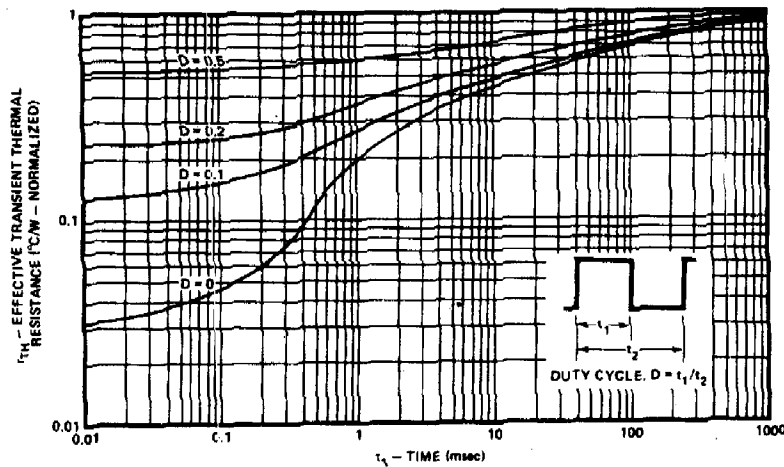
ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

CHARACTERISTIC	VN35AK			VN66AK VN67AK			VN98AK VN99AK			UNIT	TEST CONDITIONS
	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
1 BV _{DSS} Drain-Source Breakdown	35		60		90					V	V _{GS} = 0, I _D = 10μA
2 V _{GS(th)} Gate-Threshold Voltage	0.8		2.0	0.8	2.0	0.8		2.0		V	V _{DS} = V _{GS} , I _D = 1mA
3 I _{GSS} Gate-Body Leakage		0.5	100		0.5	100		0.5	100	nA	V _{GS} = 15V, V _{DS} = 0
4			500			500			500	nA	V _{GS} = 15V, V _{DS} = 0, T _A = 125°C (Note 2)
5			10			10			10	nA	V _{DS} = Max. Rating, V _{GS} = 0
6 I _{DSS} Zero Gate Voltage Drain Current			500			500			500	μA	V _{GS} = 0.8 Max. Rating, V _{DS} = 0, T _A = 125°C (Note 2)
7		100		100		100		100		nA	V _{DS} = 25V, V _{GS} = 0
8 I _{D(on)} ON-State Drain Current	1.0	2.0		1.0	2.0		1.0	2.0		A	V _{GS} = 25V, V _{DS} = 10V
9 V _{DS(on)} Drain-Source Saturation Voltage	VN66AK			VN98AK			VN99AK			V	(Note 1)
	VN98AK			VN35AK			VN67AK				
	VN67AK			VN98AK			VN99AK				
	VN99AK			VN35AK			VN66AK				
10			1.0		1.1			1.1		V	V _{GS} = 5V, I _D = 0.3A
11			2.2		3.0			2.2		V	V _{GS} = 10V, I _D = 1.0A
12		1.0		1.1		1.2		1.2		V	V _{GS} = 5V, I _D = 0.3A
13		2.2	2.5	2.2	3.5	2.2	4.5	2.2	4.5	V	V _{GS} = 10V, I _D = 1.0A
14 g _{fs} Forward Transconductance	170	250		170	250		170	250		mΩ	V _{DS} = 24V, I _D = 0.5A, f = 1KHz
15 C _{iss} Input Capacitance		40	50		40	50		40	50	pF	(Note 2)
16 C _{oss} Common Source Output Capacitance		38	45		35	40		32	40	pF	
17 C _{ras} Reverse Transfer Capacitance		7	10		8	10		5	10	pF	
18 t _{on} Turn ON Time		3	8		3	8		3	8	ns	
19 t _{off} Turn OFF Time		3	8		3	8		3	8	ns	

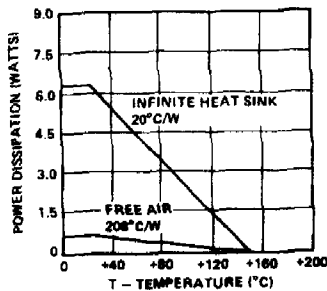
Note 1. Pulse test — 80μs pulse, 1% duty cycle.

Note 2. Sample test.

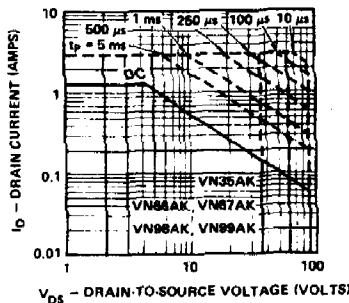
THERMAL RESPONSE



POWER DISSIPATION vs CASE OR AMBIENT TEMPERATURE



DC SAFE OPERATING REGION T_C = 25°C



BREAKDOWN VOLTAGE VARIATION WITH TEMPERATURE

