

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

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ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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	$50\text{mW}/^\circ\text{C}$
Operating Junction	
Temperature Range	-55 to $+150^\circ\text{C}$
Storage Temperature Range	-55 to $+150^\circ\text{C}$
Lead Temperature	
(1/16 in. from case for 10 sec)	$+300^\circ\text{C}$

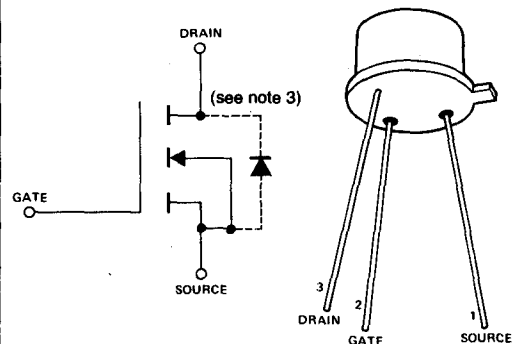
Note 1. $T_C = 25^\circ\text{C}$; controlled by typical $r_{DS(on)}$ and maximum power dissipation.

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

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

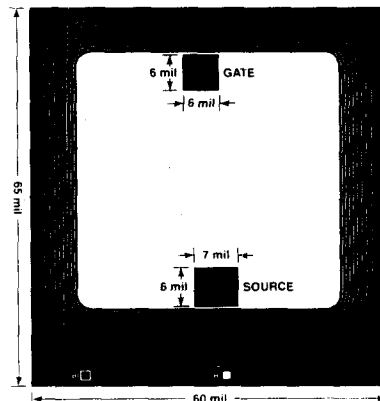
SCHEMATIC DIAGRAM

(OUTLINE DWG. TO-39)



Body internally connected to source.
Drain common to case.

CHIP TOPOGRAPHY



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INTERMIL

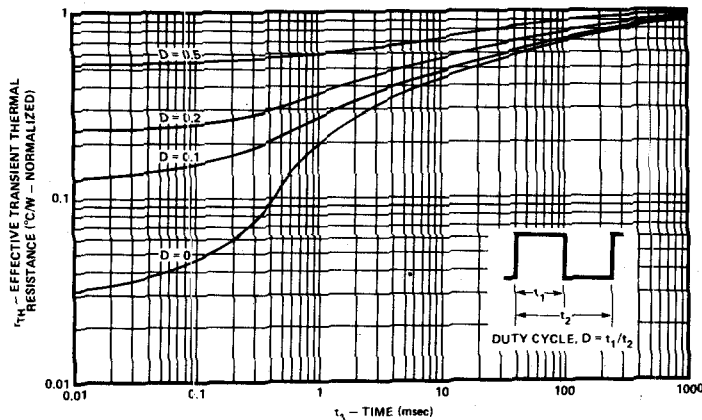
ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

CHARACTERISTIC		VN35AK			VN66AK VN67AK			VN98AK VN99AK			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
1	BV_{DS} Drain-Source Breakdown	35			60			90			V	$V_{GS} = 0, I_D = 10\mu A$
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		$V_{GS} = 15V, V_{DS} = 0, T_A = 125^\circ C$ (Note 2)
5				10			10			10		$V_{DS} = \text{Max. Rating}, V_{GS} = 0$
6	I_{DSS} Zero Gate Voltage Drain Current			500			500			500	μA	$V_{DS} = 0.8 \text{ Max. Rating}, V_{GS} = 0, T_A = 125^\circ C$ (Note 2)
7			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	$V_{DS} = 25V, V_{GS} = 10V$
9												$V_{GS} = 5V, I_D = 0.3A$
10	$V_{DS(on)}$ Drain-Source Saturation Voltage										V	$V_{GS} = 10V, I_D = 1.0A$
11			1.0			1.1			1.2			$V_{GS} = 5V, I_D = 0.3A$
12			2.2	2.5		2.2	3.5		2.2	4.5		$V_{GS} = 10V, I_D = 1.0A$
13	g_{fs} Forward Transconductance	170	250		170	250		170	250		m Ω	$V_{DS} = 24V, I_D = 0.5A, f = 1KHz$
14	C_{iss} Input Capacitance		40	50		40	50		40	50	pF	$V_{GS} = 0, V_{DS} = 24V, f = 1MHz$
15	C_{oss} Common Source Output Capacitance		38	45		35	40		32	40		
16	C_{rss} Reverse Transfer Capacitance		7	10		6	10		5	10		
17	t_{on} Turn ON Time		3	8		3	8		3	8	ns	
18	t_{off} Turn OFF Time		3	8		3	8		3	8		

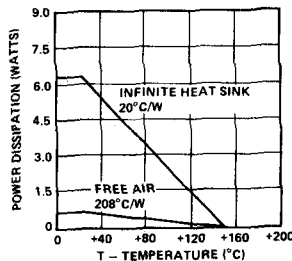
Note 1. Pulse test — 80 μs pulse, 1% duty cycle.

Note 2. Sample test.

THERMAL RESPONSE

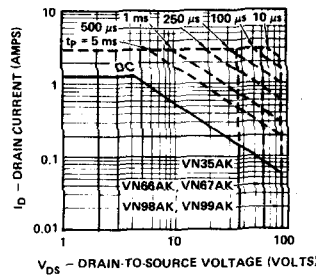


POWER DISSIPATION vs CASE OR AMBIENT TEMPERATURE



DC SAFE OPERATING REGION

$T_C = 25^\circ C$



BREAKDOWN VOLTAGE VARIATION WITH TEMPERATURE

