INTERSIL

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°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

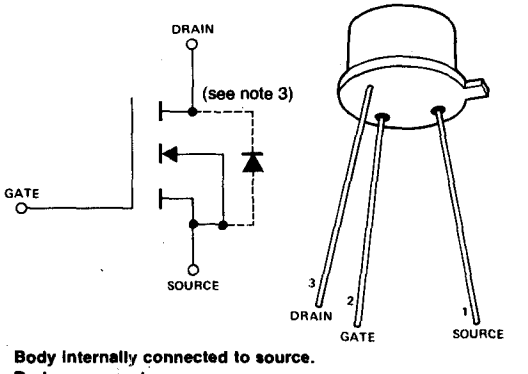
Storage Temperature Range ..... −55 to +150°C
Lead Temperature
- (1/16 in. from case for 10 sec) ..... +300°C

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%.

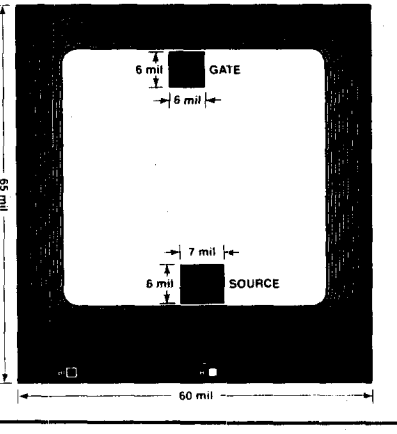
Note 3. The Drain-source diode is an integral part of the MOSFET structure.

SCHEMATIC DIAGRAM (OUTLINE DWG. TO-39)



Body internally connected to source.
Drain common to case.

CHIP TOPOGRAPHY

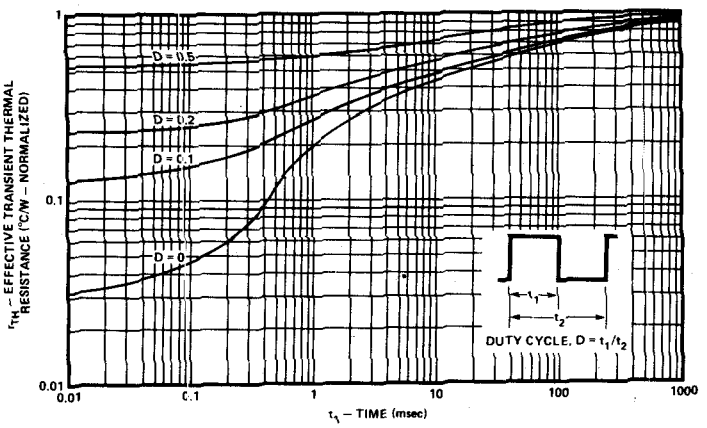


ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

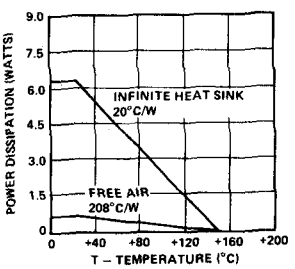
		CHARACTERISTIC		VN35AK			VN66AK VN67AK			VN98AK VN99AK			UNIT	TEST CONDITIONS	
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX			
1	STATIC	BV_{DSS}	Drain-Source Breakdown	35			60			90			V	V_{GS} = 0, I_D = 10μA	
2		$V_{GS(th)}$	Gate-Threshold Voltage	0.8		2.0	0.8		2.0	0.8		2.0	V	V_{DS} = V_{GS}, I_D = 1mA	
3		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		V_{GS} = 15V, V_{DS} = 0, T_A = 125°C (Note 2)	
5		I_{DSS}	Zero Gate Voltage Drain Current			10			10			10	μA	V_{DS} = Max. Rating, V_{GS} = 0	
6						500			500			500		V_{DS} = 0.8 Max. Rating, V_{GS} = 0, T_A = 125°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		$V_{DS(on)}$	Drain-Source Saturation Voltage VN66AK					1.0			1.1		V	V_{GS} = 5V, I_D = 0.3A	(Note 1)
10			VN98AK					2.2	3.0		2.2	4.0		V_{GS} = 10V, I_D = 1.0A	
11			VN35AK VN67AK		1.0			1.1			1.2			V_{GS} = 5V, I_D = 0.3A	
12			VN99AK		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		mΩ	V_{DS} = 24V, I_D = 0.5A, f = 1KHz	
14	DYNAMIC	C_{iss}	Input Capacitance		40	50		40	50		40	50	pF	V_{GS} = 0, V_{DS} = 24V, f = 1MHz	(Note 2)
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 — 80μs pulse, 1% duty cycle. **Note 2.** Sample test.

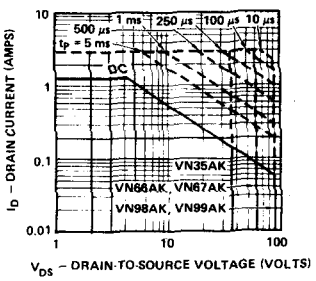
THERMAL RESPONSE



POWER DISSIPATION vs CASE OR AMBIENT TEMPERATURE



DC SAFE OPERATING REGION Tc = 25°C



BREAKDOWN VOLTAGE VARIATION WITH TEMPERATURE