N-Channel Enhancement-Mode MOS Transistors, Zener Gate Protected

calogic CORPORATION

VN0610L / VN10KE / VN10KM / VN10KT

FEATURES

- Available in Surface Mount SOT-23
- Zener protected
- Low $r_{DS(on)}$ <5Ω
- 60V B_V

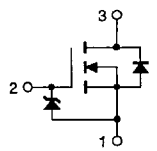
APPLICATIONS

- Switching
- Amplification

ORDERING INFORMATION

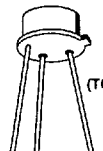
Part	Package	Temperature Range
VN0610L	Plastic TO-92	-55°C to +150°C
VN10KE	Hermetic TO-52	-55°C to +150°C
VN10KM	Plastic TO-237	-55°C to +150°C
VN10KT	Surface Mount SOT-23	-55°C to +150°C
XVN10KM	Sorted chips in carriers	-55°C to +150°C

PIN CONNECTIONS



CD6

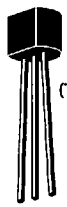
PRODUCT MARKING	
VN10KT	V10



TO-52 (TO-206AC)

BOTTOM VIEW

1 SOURCE
2 GATE
3 DRAIN & CASE



TO-92 (TO-226AA)

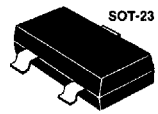
BOTTOM VIEW

1 SOURCE
2 GATE
3 DRAIN

TO-237

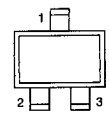
BOTTOM VIEW

1 SOURCE
2 GATE
3 TAB-DRAIN



SOT-23

TOP VIEW



1 DRAIN
2 SOURCE
3 GATE

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

SYMBOL	PARAMETERS/TEST CONDITIONS		LIMITS				UNITS
			VN0610L	VN010KE	VN10KM	VN10KT	
V_{DS}	Drain-Source Voltage		60	60	60	60	V
V_{GS}	Gate-Source Voltage[2]		15/-0.3	15/-0.3	15/-0.3	15/-0.3	
I_D	Continuous Drain Current	T_A = 25°C	0.27	0.17	0.31	0.27	A
		T_A = 100°C	0.17	0.11	0.20	0.17	
I_{DM}	Pulsed Drain Current[1]		1	1	1	1	
P_D	Power Dissipation	T_A = 25°C	0.8	1 5	1	0.8	W
		T_A = 100°C	0.32	0.12	0 4	0 32	
T_J, T_{stg}	Operating Junction & Storage Temperature Range		-55 to 150				°C
T_L	Lead Temperature (1/16" from case for 10 sec.)		300				

THERMAL RESISTANCE RATINGS

SYMBOL	THERMAL RESISTANCE	LIMITS			UNITS
		VN0610L	VN10KE	VN10KM	
R_{thJA}	Junction-to-Ambient	156	400	125	K/W

[1]Pulse width limited by maximum junction temperature.
[2]Features internal gate-source Zener diode.

SPECIFICATIONS[a]		LIMITS				
SYMBOL	PARAMETER	TYP[b]	MIN	MAX	UNIT	TEST CONDITIONS
STATIC						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	120	60		V	I_D = 100µA, V_{GS} = 0V
$V_{GS(th)}$	Gate-Threshold Voltage	1.4	0.8	2.5		V_{DS} = V_{GS}, I_D = 1mA
I_{GSS}	Gate-Body Leakage	1		100	nA	V_{GS} = 15V, V_{DS} = 0V
I_{DSS}	Zero Gate Voltage Drain Current	0.7		10	µA	V_{DS} = 48V, V_{GS} = 0V
		3		500		T_J = 125°C
$I_{D(ON)}$	On-State Drain Current	1000	750		mA	V_{DS} = 10V, V_{GS} = 10V
$r_{DS(ON)}$	Drain-Source On-Resistance[c]	4		7.5	Ω	V_{GS} = 5V, I_D = 0.2A
		3		5		V_{GS} = 10V, I_D = 0.5A
		5.6		9		T_J = 125°C
g_{FS}	Forward Transconductance[c]	300	100		mS	V_{DS} = 10V, I_D = 0.5A
g_{OS}	Common Source Output Conductance[c]	200			µS	V_{DS} = 7.5V, I_D = 50mA
DYNAMIC						
C_{iss}	Input Capacitance	38		60	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz
C_{oss}	Output Capacitance	16		25		
C_{rss}	Reverse Transfer Capacitance	2		5		
SWITCHING						
t_{ON}	Turn-On Time	7		10	ns	V_{DD} = 15V, R_L = 23Ω, I_D = 0.6A V_{GEN} = 10V, R_G = 25Ω
t_{OFF}	Turn-Off Time	9		10		(Switching time is essentially independent of operating temperature)

Notes:

a. T_A = 25°C unless otherwise noted.
b. For design aid only, not subject to production testing.
c. Pulse test; PW = ≤300µS, duty cycle ≤2%