

VN10KM ■ VN2222KM



N-Channel Enhancement Mode MOSPOWER

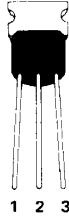
APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PRODUCT SUMMARY

| Part Number | BV_{DSS} Volts | $r_{DS(ON)}$ (ohms) | Package |
|-------------|---------------------|------------------------|---------|
| VN10KM | 60 | 5 | T0-237 |
| VN2222KM | 60 | 7.5 | T0-237 |

PIN 1 – Source
PIN 2 – Gate
PIN 3 & TAB – Drain



T0-237

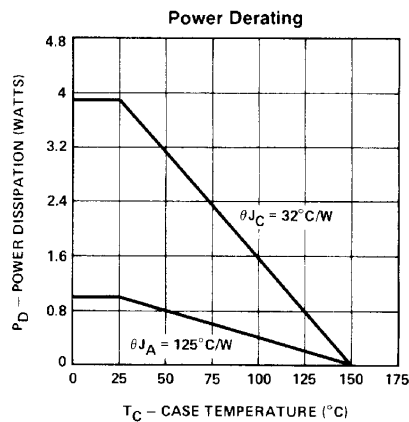
For Additional Curves
See Section 5: VNMK06

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | VN10KM | VN2222KM | Units |
|--|-------------|-------------|--------------------|
| V_{DS} Drain-Source Voltage | 60 | 60 | V |
| V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$) | 60 | 60 | V |
| $I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current | ± 0.3 | ± 0.25 | A |
| $I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current | ± 0.2 | ± 0.16 | A |
| I_{DM} Pulsed Drain Current ¹ | ± 1 | ± 1 | A |
| V_{GS} Gate-Source Voltage | +15, -0.3 | +15, -0.3 | V |
| P_D Max Continuous Power Dissipation | 1 | 1 | W |
| P_D Max Pulse ² Power Dissipation | 3.9 | 3.9 | W |
| Junction to Case Linear Derating Factor | 0.031 | 0.031 | $W/^\circ\text{C}$ |
| Junction to Ambient Linear Derating Factor | 0.008 | 0.008 | $W/^\circ\text{C}$ |
| T_J Operating and Storage Temperature Range | -55 To +150 | -55 To +150 | $^\circ\text{C}$ |
| Lead Temperature (1/16" from case for 10 secs.) | 300 | 300 | $^\circ\text{C}$ |

¹ Pulse Test: Pulsewidth $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$

² 1 Sec Continuous Power Single Pulse



ELECTRICAL CHARACTERISTICS (T_C = 25° C unless otherwise noted)
STATIC

| Parameter | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---------------------|--|--------------------|------------|------------|-------------|--|
| BV _{DSS} | Drain-Source Breakdown Voltage | All | 60 | 120 | | V V _{GS} = 0 I _D = 100 μA |
| V _{GS(th)} | Gate-Threshold Voltage | VN10KM VN2222KM | 0.8 0.6 | 1.5 1.5 | 2.5 2.5 | V V _{DS} = V _{GS} , I _D = 1 mA |
| I _{GSSF} | Gate-Body Leakage Forward | All | | 1 | 100 | nA V _{GS} = 15V, V _{DS} = 0 |
| I _{DSS} | Zero Gate Voltage Drain Current | All | | 0.1 | 10 | μA V _{DS} = 45V, V _{GS} = 0 |
| I _{D(on)} | On-State Drain Current ¹ | All | 0.75 | 1.5 | | A V _{DS} = 2V _{DS(ON)} , V _{GS} = 10V |
| V _{DS(on)} | Static Drain-Source On-State Voltage ¹ | All | | 1.2 | 1.5 | V V _{GS} = 5V, I _D = 0.2A |
| | | VN10KM VN2222KM | | 2 3 | 2.5 3.75 | V V _{GS} = 10V, I _D = 0.5A |
| R _{DS(on)} | Static Drain-Source On-State Resistance ¹ | All | | 6 | 7.5 | Ω V _{GS} = 5V, I _D = 0.2A |
| | | VN10KM VN2222KM | | 4 6 | 5 7.5 | Ω V _{GS} = 10V, I _D = 0.5A |
| R _{DS(on)} | Static Drain-Source On-State Resistance ¹ | VN10KM | | 7.2 | 9 | Ω V _{GS} = 10V, I _D = 0.5A, T _C = 125° C |
| | | VN2222KM | | 10.8 | 13.5 | Ω V _{GS} = 10V, I _D = 0.5A, T _C = 125° C |

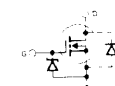
DYNAMIC

| | | | | | | |
|------------------|---------------------------------------|-----|-----|-----|----|--|
| g _{fs} | Forward Transconductance ¹ | All | 100 | 200 | | mS V _{DS} ≥ 2V _{DS(ON)} , I _D = 0.5A |
| C _{iss} | Input Capacitance | All | | 40 | 60 | pF V _{GS} = 0, V _{DS} = 25V |
| C _{oss} | Output Capacitance | All | | 17 | 25 | pF f = 1 MHz |
| C _{rss} | Reverse Transfer Capacitance | All | | 3 | 5 | pF |
| t _{ON} | Turn-On Time | All | | 7 | 10 | ns V _{DD} = 15V, I _D = 0.6A R _g = 25Ω, R _L = 23Ω |
| t _{OFF} | Turn-Off Time | All | | 7 | 10 | ns (MOSFET switching times are essentially independent of operating temperature.) |

THERMAL RESISTANCE

| | | | | | | |
|-------------------|---------------------|-----|--|----|-----|----------------------------|
| R _{thJC} | Junction-to-Case | All | | 26 | 32 | °C/W |
| R _{thJA} | Junction-to-Ambient | All | | | 125 | °C/W Free Air Operation |

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

| | | | | | | | |
|-----------------|--|----------|--|--|-------|---|---|
| I _S | Continuous Source Current (Body Diode) | VN10KM | | | -0.3 | A | Modified MOSPOWER symbol showing the integral P-N Junction rectifier  |
| | | VN2222KM | | | -0.25 | A | |
| I _{SM} | Source Current ¹ (Body Diode) | All | | | -1 | A | |
| V _{SD} | Diode Forward Voltage ¹ | VN10KM | | | -0.85 | V | T _C = 25° C, I _S = -0.3A, V _{GS} = 0 |
| | | VN2222KM | | | -0.85 | V | T _C = 25° C, I _S = -0.25A, V _{GS} = 0 |

¹ Pulse Test: Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%

Data Sheet Curves: VNMMK06