### VN10KM VN2222KM

# **B** Siliconix

Package

T0-237

T0-237

# N-Channel Enhancement Mode MOSPOWER

#### **APPLICATIONS**

- Switching Regulators
- Converters
- Motor Drivers



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

T0-237

# For Additional Curves See Section 5: VNMK06

rDS(ON)

(ohms)

5

7.5

**PRODUCT SUMMARY** 

Part

Number

VN10KM

VN2222KM

 ${}^{\rm BV}{}_{\rm DSS}$ 

Volts

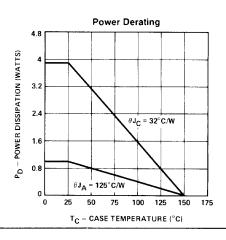
60

## ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25°C unless otherwise noted)

| Parameter                                |  | VN10KM      | VN2222KM    | Units          |  |
|--|--|-------------|-------------|----------------|--|
| V <sub>DS</sub>                          | Drain-Source Voltage                     | 60          | 60          | V              |  |
| V <sub>DGR</sub>                         | Drain-Gate Voltage (RGS = 1 M $\Omega$ ) | 60          | 60          | V              |  |
| I <sub>D</sub> @ T <sub>C</sub> = 25° C  | Continuous Drain Current                 | ±0.3        | ±0,25       | А              |  |
| I <sub>D</sub> @ T <sub>C</sub> = 100° C | Continuous Drain Current                 | ±0.2        | ±0.16       | А              |  |
| I <sub>DM</sub>                          | Pulsed Drain Current <sup>1</sup>        | ±1          | ±1          | A V            |  |
| V <sub>GS</sub>                          | Gate-Source Voltage                      | +15, -0,3   | +15, -0.3   |                |  |
| PD                                       | Max Continuous Power Dissipation         | 1           | 1           |                |  |
| PD                                       | Max Pulse <sup>2</sup> Power Dissipation | 3,9         | 3,9         | w              |  |
| Junction to Case                         | Linear Derating Factor                   | 0,031       | 0,031       | W/° C          |  |
| Junction to<br>Ambient                   | Linear Derating Factor                   | 0,008       | 0.008       | w/° c          |  |
| TJ                                       | Operating and                            | FF T        | 55 T- 1450  | <sup>°</sup> c |  |
| Tstg                                     | Storage Temperature Range                | -55 To +150 | -55 To +150 | C              |  |
| Lead Temperature                         | (1/16" from case for 10 secs.)           | 300         | 300         | °C             |  |

<sup>1</sup> Pulse Test: Pulsewidth  $\leq 300 \mu sec$ , Duty Cycle  $\leq 2\%$ 

<sup>2 1</sup> Sec Continuous Power Single Pulse



Siliconix

1-109

|                     | Parameter   | Туре               | Min.       | Тур.       | Max.        | Units | Test Conditions  |  |
|---------------------|---|--------------------|------------|------------|-------------|-------|--|--|
|                     |   | All                | 60         | 120        |             | V     | V <sub>GS</sub> = 0  |  |
| ³∨D\$\$             | Drain-Source Breakdown<br>Voltage                       |                    |            |            |             |       | 1 <sub>D</sub> = 100 μA  |  |
| /GS(th)             | Gate-Threshold Voltage                                  | VN10KM<br>VN2222KM | 0.8<br>0.6 | 1,5<br>1,5 | 2.5<br>2.5  | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA                      |  |
| GSSF                | Gate-Body Leakage Forward                               | All                |            | 1          | 100         | nA    | V <sub>GS</sub> = 15V, V <sub>DS</sub> = 0                                     |  |
|                     |   |                    |            |            |             |       |  |  |
| DSS                 | Zero Gate Voltage Drain<br>Current                      | All                |            | 0.1        | 10          | μΑ    | V <sub>DS</sub> = 45V , V <sub>GS</sub> - 0                                    |  |
| D(on)               | On-State Drain Current <sup>1</sup>                     | All                | 0.75       | 1,5        |             | Α     | $V_{DS} \ge 2V_{DS\{ON\}}$ , $V_{GS} = 10V$                                    |  |
|                     |   | All                |            | 1.2        | 1.5         | V     | V <sub>GS</sub> = 5V , I <sub>D</sub> = <b>0.2</b> A                           |  |
| VDS(on)             | Static Drain-Source On-State Voltage1                   | VN10KM<br>VN2222KM |            | 2          | 2.5<br>3.75 | V     | V <sub>GS</sub> = 10V , I <sub>D</sub> = 0.5A                                  |  |
| RDS(on)             | Static Drain-Source On-State                            | All                |            | 6          | 7,5         | Ω     | V <sub>GS</sub> = 5V , I <sub>D</sub> = 0.2A                                   |  |
| 103(011)            | Resistance <sup>1</sup>                                 | VN10KM<br>VN2222KM |            | 4<br>6     | 5<br>7.5    | Ω     | VGS = 10V , I <sub>D</sub> = 0.5A  |  |
| R <sub>DS(on)</sub> | Static Drain-Source On-State<br>Resistance <sup>1</sup> | VN10KM             |            | 7.2        | 9           | Ω     | $V_{GS} = 10V$ , $I_D = 0.5A$ , $T_C = 125^\circ$                              |  |
|                     |   | VN2222KM           |            | 10,8       | 13.5        | Ω     | V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A, T <sub>C</sub> =125°               |  |
| DYNAN               | IIC   |                    |            |            |             |       |  |  |
| 9fs                 | Forward Transductance <sup>1</sup>                      | All                | 100        | 200        |             | mS    | $V_{DS} \ge 2V_{DS(ON)}$ , $I_D = 0.5A$  |  |
| Ciss                | Input Capacitance                                       | All                |            | 40         | 60          | pF    | V <sub>GS</sub> = 0 ,V <sub>DS</sub> = 25V<br>f = 1 MHz                        |  |
| Coss                | Output Capacitance                                      | All                |            | 17         | 25          | pF    |  |  |
| Crss                | Reverse Transfer Capacitance                            | All                |            | 3          | 5           | ρF    |  |  |
| tON                 | Turn-On Time ime  | All                | -          | 7          | 10          | ns    | $V_{DD} = 15V$ , $I_{D} \cong 0.6A$<br>$R_{0} = 25\Omega$ , $R_{L} = 23\Omega$ |  |
| torr                | Turn-Off Time Time                                      | All                |            | 7          | 7 10        | ns    | (MOSFET switching times are  |  |
| <sup>t</sup> OFF    | Tarrow Time   |                    |            |            |             | ns    | essentially independent of operating temperature.)                             |  |
| THERM               | IAL RESISTANCE  |                    |            |            |             |       |  |  |
| RthJC               | Junction-to-Case  | All                |            | 26         | 32          | °C/W  |  |  |
| R <sub>thJA</sub>   | Junction-to-Ambient                                     | All                |            |            | 125         | °C/W  | Free Air Operation   |  |
| BODY-               | DRAIN DIODE RATINGS                                     | AND CHAP           | RACTER     | RISTICS    |             |       |  |  |
| Is                  | Continuous Source Current<br>(Body Diode)               | VN10KM             |            |            | -0,3        | А     | Modified MOSPOWER symbol<br>showing the integral P-N<br>Junction rectifier     |  |
|                     |   | VN2222KM           |            |            | -0.25       | А     | □  |  |
| Ism                 | Source Current <sup>1</sup><br>(Body Diode)             | All                |            |            | -1          | А     |  |  |
| V <sub>SD</sub>     |   | VN10KM             |            | -0.85      | 1           | V     | T <sub>C</sub> =25°C, I <sub>S</sub> =-0.3A, V <sub>GS</sub> = 0               |  |
|                     | Diode Forward Voltage <sup>1</sup>                      | VN2222KM           | 1          | -0,85      |             | V     | T <sub>C</sub> =25°C, I <sub>S</sub> =-0.25A, V <sub>GS</sub> =                |  |

1-110 Siliconix