
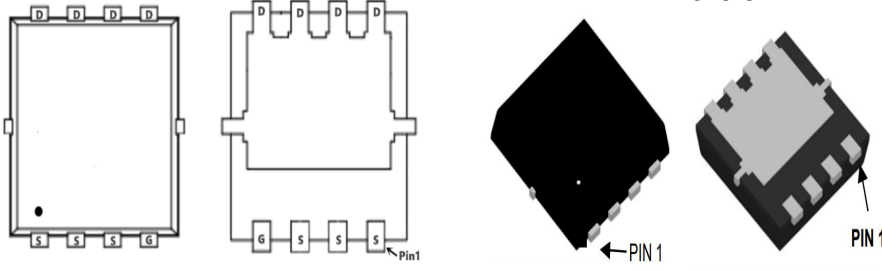


**TM100N04NF**

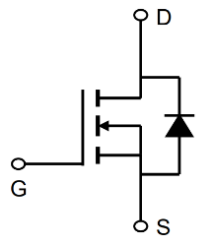
**N-Channel Enhancement Mosfet**

|  |  |
|--|--|
| <p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul> | <p><b>General Features</b></p> <p><math>V_{DS} = 40V</math> <math>I_D = 100A</math><br/> <math>R_{DS(ON)} = 4.2m\Omega (typ.) @ V_{GS} = 10V</math></p> <p>100% UIS Tested<br/>                 100% <math>R_g</math> Tested</p>  |
|--|--|

NF:DFN5x6-8L



Marking: 100N04



**Absolute Maximum Ratings:** ( $T_C = 25^\circ C$  unless otherwise noted)

| Symbol         | Parameter  | Ratings     | Units      |
|----------------|--|-------------|------------|
| $V_{DS}$       | Drain-Source Voltage                             | 40          | V          |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$    | V          |
| $I_D$          | Continuous Drain Current- $T_C = 25^\circ C$     | 100         | A          |
|                | Continuous Drain Current- $T_C = 100^\circ C$    | 57          |            |
|                | Pulsed Drain Current                             | 360         |            |
| $E_{AS}$       | Single Pulse Avalanche Energy                    | 59          | mJ         |
| $P_D$          | Power Dissipation                                | 83          | W          |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ C$ |

**Thermal Characteristics:**

| Symbol          | Parameter   | Max | Units        |
|-----------------|---|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case <sup>2</sup> | 1.5 | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to mbient             | 62  | $^\circ C/W$ |

TM100N04NF

N-Channel Enhancement Mosfet

Electrical Characteristics: ( $T_c=25^\circ\text{C}$  unless otherwise noted)

| Symbol                                       | Parameter                                       | Conditions  | Min | Typ  | Max       | Units      |
|--|---|---|-----|------|-----------|------------|
| <b>Off Characteristics</b>                   |   |   |     |      |           |            |
| $BV_{DSS}$                                   | Drain-Source Breakdown Voltage                  | $V_{GS}=0V, I_D=250\ \mu A$                         | 40  | ---  | ---       | V          |
| $I_{DSS}$                                    | Zero Gate Voltage Drain Current                 | $V_{GS}=0V, V_{DS}=40V$                             | --- | ---  | 1         | $\mu A$    |
| $I_{GSS}$                                    | Gate-Source Leakage Current                     | $V_{GS}=\pm 20V, V_{DS}=0A$                         | --- | ---  | $\pm 100$ | nA         |
| <b>On Characteristics<sup>3</sup></b>        |   |   |     |      |           |            |
| $V_{GS(th)}$                                 | GATE-Source Threshold Voltage                   | $V_{GS}=V_{DS}, I_D=250\ \mu A$                     | 1.2 | 1.6  | 2.5       | V          |
| $R_{DS(on)}$                                 | Drain-Source On Resistance <sup>2</sup>         | $V_{GS}=10V, I_D=20A$                               | --- | 4.2  | 5.5       | m $\Omega$ |
|  |   | $V_{GS}=4.5V, I_D=10A$                              | --- | 5.3  | 7         |            |
| $G_{FS}$                                     | Forward Transconductance                        | $V_{DS}=10V, I_D=2A$                                | --- | 16.5 | ---       | S          |
| <b>Dynamic Characteristics<sup>4</sup></b>   |   |   |     |      |           |            |
| $C_{iss}$                                    | Input Capacitance                               | $V_{DS}=25V, V_{GS}=0V, f=1MHz$                     | --- | 2400 | 3580      | pF         |
| $C_{oss}$                                    | Output Capacitance                              |   | --- | 220  | 380       |            |
| $C_{rss}$                                    | Reverse Transfer Capacitance                    |   | --- | 150  | 220       |            |
| <b>Switching Characteristics<sup>4</sup></b> |   |   |     |      |           |            |
| $t_{d(on)}$                                  | Turn-On Delay Time 3, 4                         | $V_{DD}=15V, I_D=1A, R_G=3.3\Omega$<br>$V_{GS}=10V$ | --- | 14.2 | 28        | ns         |
| $t_r$  | Rise Time 3, 4                                  |   | --- | 18.3 | 36        | ns         |
| $t_{d(off)}$                                 | Turn-Off Delay Time 3, 4                        |   | --- | 38.8 | 76        | ns         |
| $t_f$  | Fall Time 3, 4                                  |   | --- | 13.9 | 28        | ns         |
| $Q_g$  | Total Gate Charge 3, 4                          | $V_{GS}=4.5V, V_{DS}=32V,$<br>$I_D=10A$             | --- | 25   | 50        | nC         |
| $Q_{gs}$                                     | Gate-Source Charge 3, 4 3, 4                    |   | --- | 6.4  | 13        | nC         |
| $Q_{gd}$                                     | Gate-Drain "Miller" Charge 3, 4                 |   | --- | 12.1 | 24        | nC         |
| <b>Drain-Source Diode Characteristics</b>    |   |   |     |      |           |            |
| Symbol                                       | Parameter                                       | Conditions  | Min | Typ  | Max       | Units      |
| $V_{SD}$                                     | Source-Drain Diode Forward Voltage <sup>3</sup> | $V_{GS}=0V, I_S=1A$                                 | --- | ---  | 1         | V          |
| LS   | Continuous Source Current                       | $V_G=V_D=0V$ , Force Current                        | --- | ---  | 100       | A          |
| LSM  | Pulsed Source Current                           |   | --- | ---  | 180       | A          |

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

TM100N04NF

N-Channel Enhancement Mosfet

Typical Characteristics: ( $T_C=25^\circ\text{C}$  unless otherwise noted)

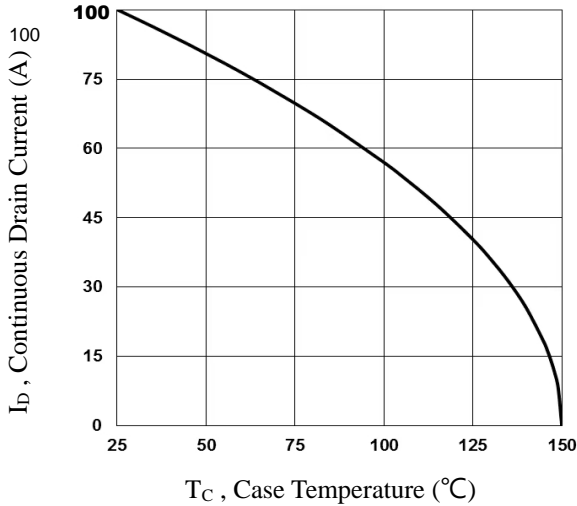


Fig.1 Continuous Drain Current vs.  $T_C$

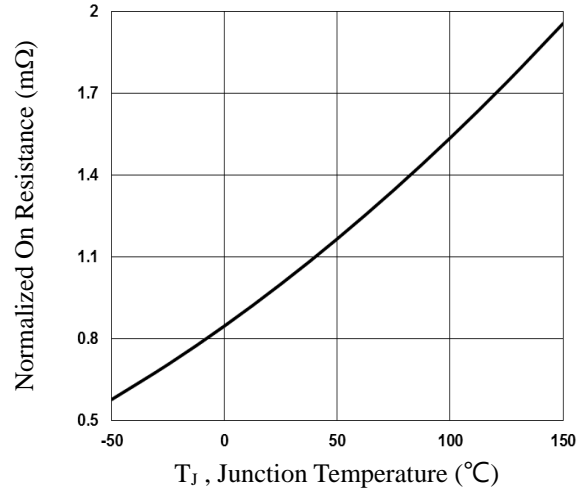


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

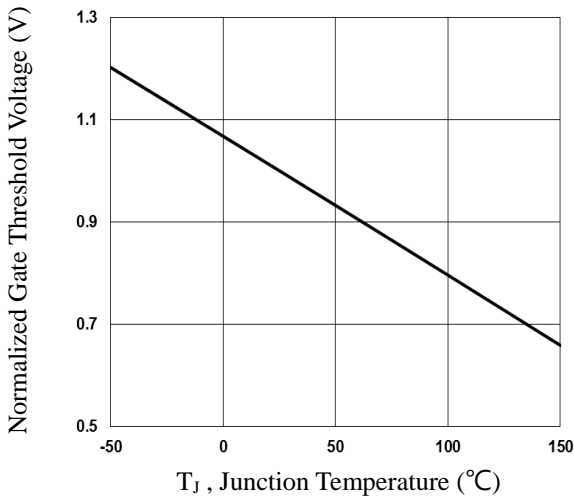


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

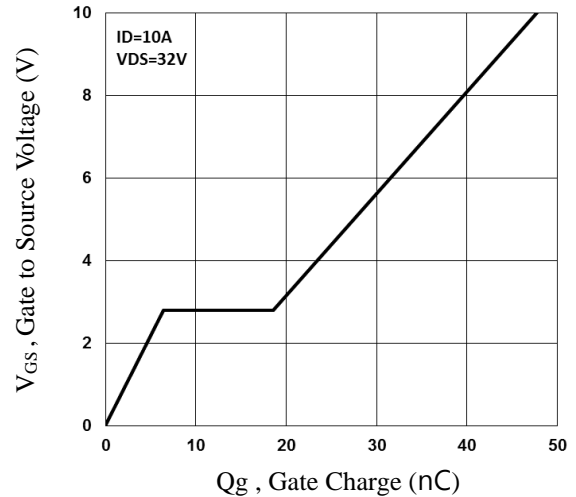


Fig.4 Gate Charge Waveform

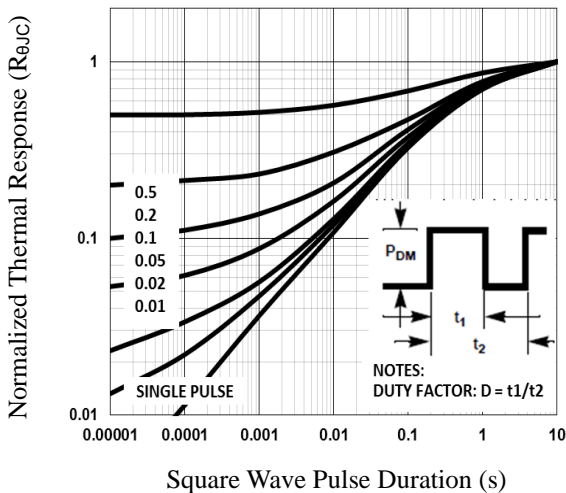


Fig.5 Normalized Transient Impedance

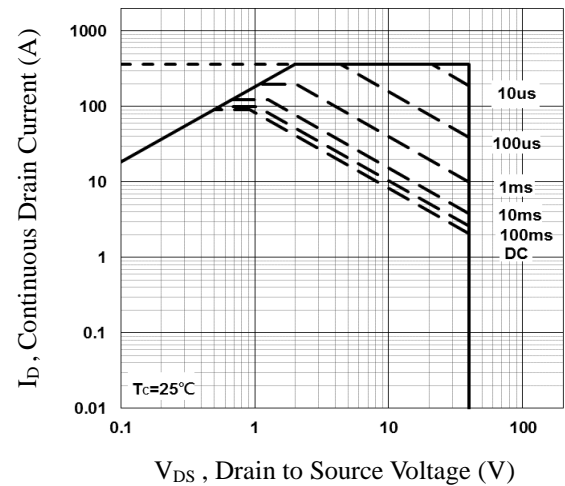


Fig.6 Maximum Safe Operation Area



TM100N04NF

N-Channel Enhancement Mosfet

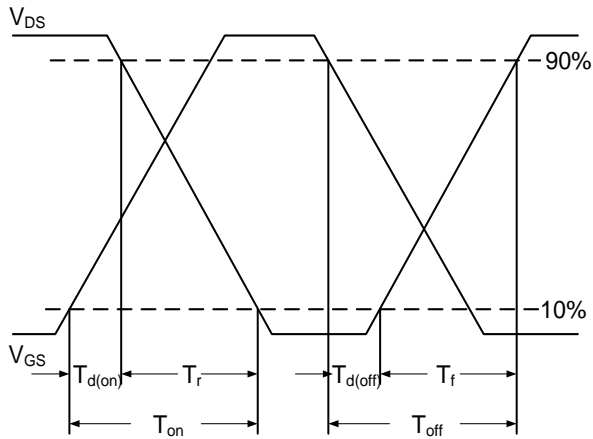


Fig.7 Switching Time Waveform

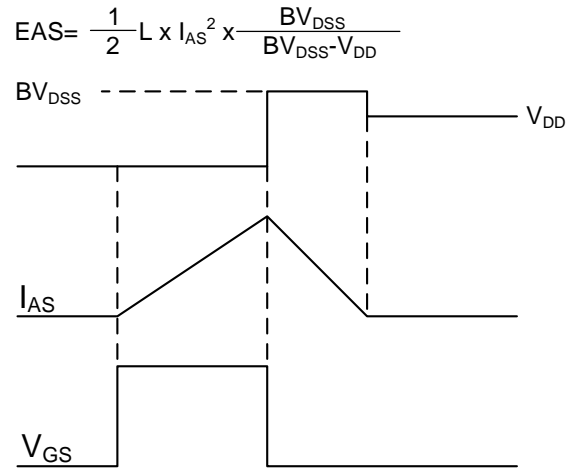
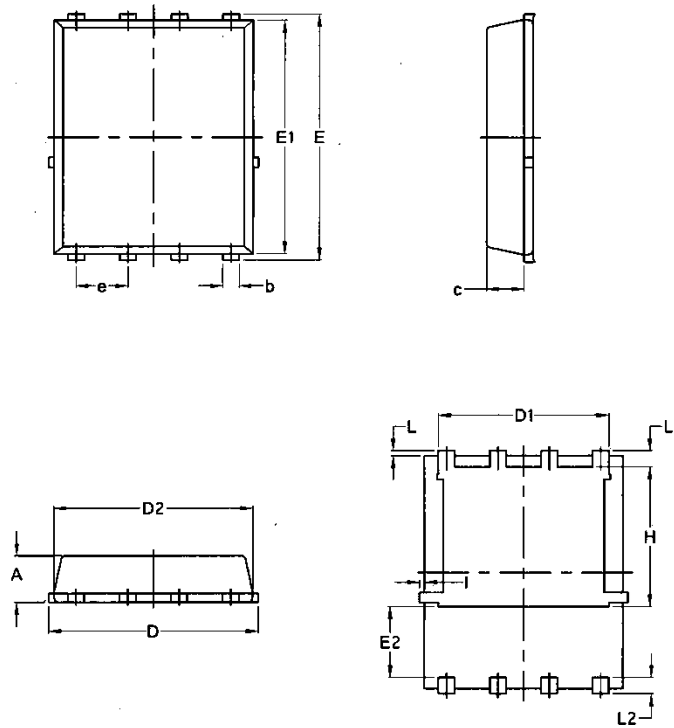


Fig.8 EAS Waveform

## Package Mechanical Data:DFN5x6-8L



| Symbol | Common   |        |          |        |
|--------|----------|--------|----------|--------|
|        | mm       |        | Inch     |        |
|        | Min      | Max    | Min      | Max    |
| A      | 1.03     | 1.17   | 0.0406   | 0.0461 |
| b      | 0.34     | 0.48   | 0.0134   | 0.0189 |
| c      | 0.824    | 0.0970 | 0.0324   | 0.082  |
| D      | 4.80     | 5.40   | 0.1890   | 0.2126 |
| D1     | 4.11     | 4.31   | 0.1618   | 0.1697 |
| D2     | 4.80     | 5.00   | 0.1890   | 0.1969 |
| E      | 5.95     | 6.15   | 0.2343   | 0.2421 |
| E1     | 5.65     | 5.85   | 0.2224   | 0.2303 |
| E2     | 1.60     | /      | 0.0630   | /      |
| e      | 1.27 BSC |        | 0.05 BSC |        |
| L      | 0.05     | 0.25   | 0.0020   | 0.0098 |
| L1     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| L2     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| H      | 3.30     | 3.50   | 0.1299   | 0.1378 |
| I      | /        | 0.18   | /        | 0.0070 |

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