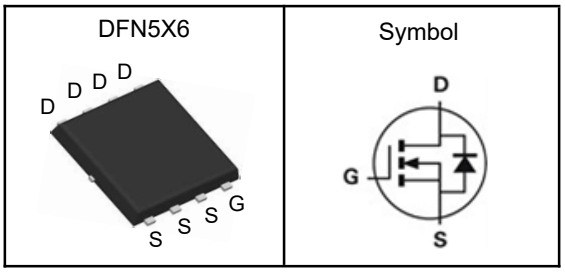
# N-Channel Enhancement Mode MOSFET

## Features

- High Speed Power Switching
- Reliable and Rugged
- ROHS Compliant
- 100% Avalanche Tested

## Pin Description




## Applications

- Power Management in Desktop Computer
- DC/DC Converters

| | | |
|---|---|---|
| $V_{DSS}$ | 40 | V |
| $R_{DS(ON)-Typ}$ | 4.2 | mΩ |
| $I_D$ | 75 | A |

## Absolute Maximum Ratings ($T_C$=25℃, Unless Otherwise Noted)

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | 40 | V |
| $V_{GSS}$ | Gate-Source Voltage | ±20 | V |
| $T_J$ | Maximum Junction Temperature | -55 to 150 | ℃ |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $I_{DM}$ ① | Pulse Drain Current Tested | 225 | A |
| $I_D$ | Continuous Drain Current | 75 | A |
| $P_D$ | Maximum Power Dissipation | 54 | W |
| $E_{AS}$ | Avalanche Energy, Single pulse | 320 | mJ |

## Thermal Characteristics

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | 50 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 2.3 | ℃/W |

Note ①: Max. current is limited by bonding wire.

Note ②: UIS tested and pulse width are limited by maximum junction temperature 150℃.

Note ③: Surface Mounted on 1in$^2$ FR-4 board with 1oz.

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## Electrical Characteristics ($T_J$=25℃, Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250uA | 40 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=32V, $V_{GS}$=0V | --- | --- | 1 | uA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$ , $I_D$=250uA | 1.0 | --- | 2.5 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | --- | --- | ±100 | nA |
| $R_{DS(ON)}$ | Drain-Source On-state Resistance | $V_{GS}$=10V, $I_D$=40A | --- | 4.2 | 5.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=35A | --- | 5.2 | 6.5 | mΩ |
| **Dynamic Characteristics**⑤ | | | | | | |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 1 | --- | Ω |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=20V, $V_{GS}$=0V, Freq.=1MHz | --- | 2366 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 1035 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 58 | --- | |
| $T_{d(on)}$ | Turn-on Delay Time | $V_{DD}$=20V,$V_{GS}$=10V , $I_D$=1A,$R_G$=6Ω | --- | 14.3 | --- | nS |
| $T_r$ | Turn-on Rise Time | | --- | 7.7 | --- | |
| $T_{d(off)}$ | Turn-off Delay Time | | --- | 32.6 | --- | |
| $T_f$ | Turn-off Fall Time | | --- | 26.6 | --- | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=20V,$V_{GS}$=10V , $I_D$=20A | --- | 25 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 5 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 2.6 | --- | |
| **Source-Drain Characteristics** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=20A, $V_{GS}$=0V | --- | --- | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=20A, $dI_F/dt$=100A/us | --- | 28 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 20 | --- | nC |

Note ④： Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

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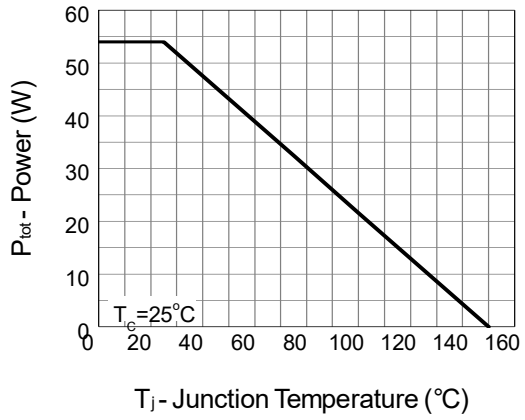
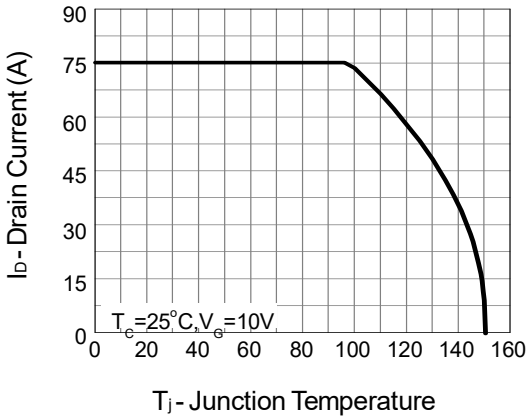
## Typical Characteristics

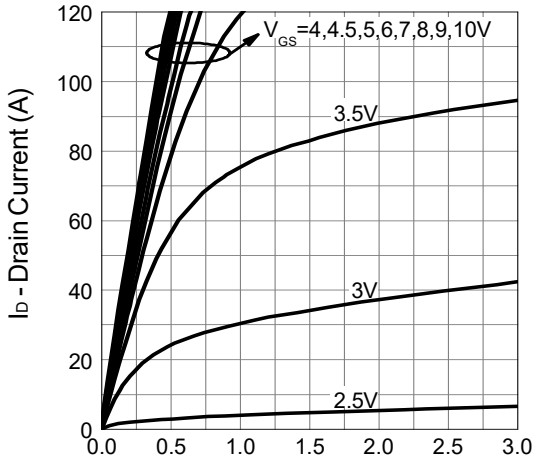
### Power Dissipation



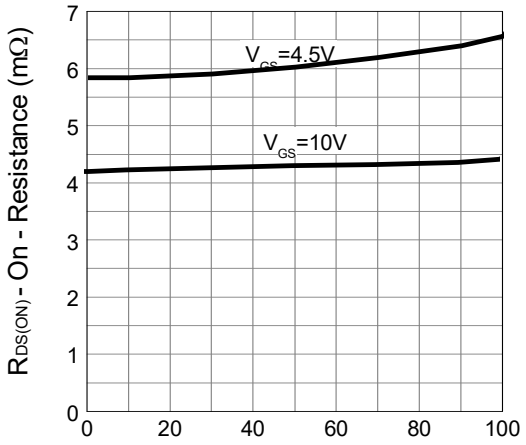

### Drain Current



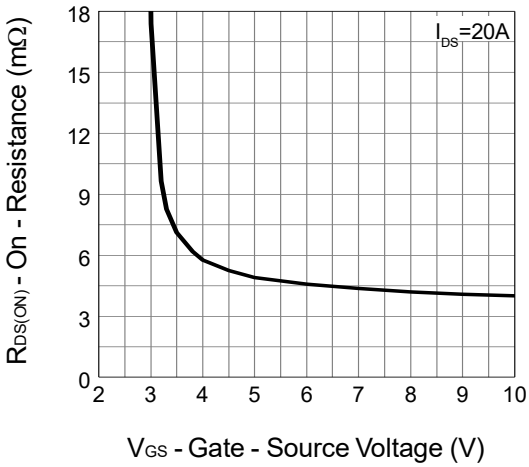

### Output Characteristics



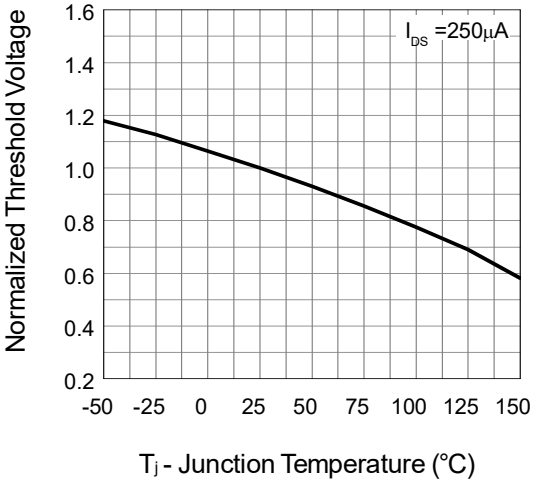

### Drain-Source On Resistance




### Gate-Source On Resistance




### Gate Threshold Voltage



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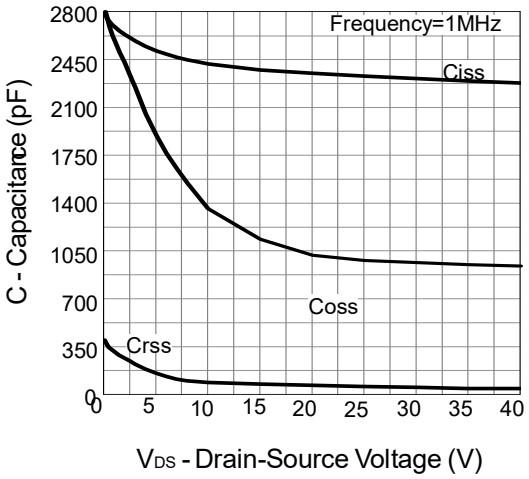
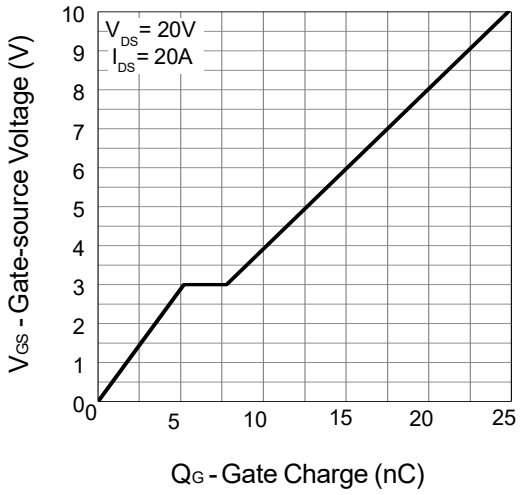
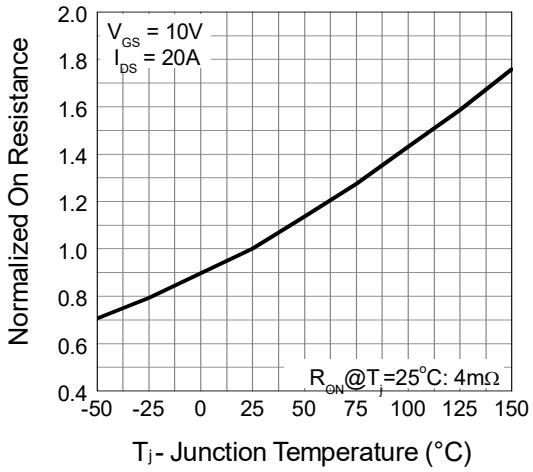
### Capacitance



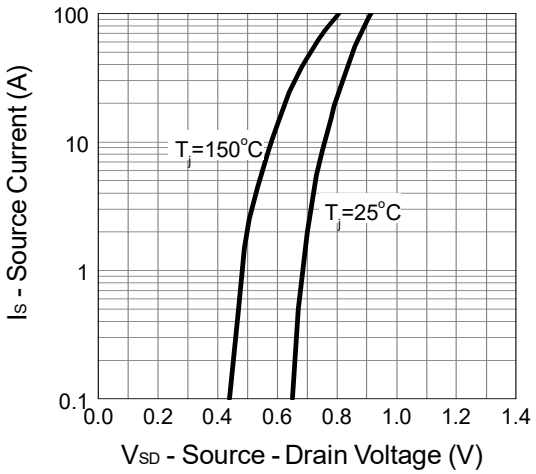

### Gate Charge



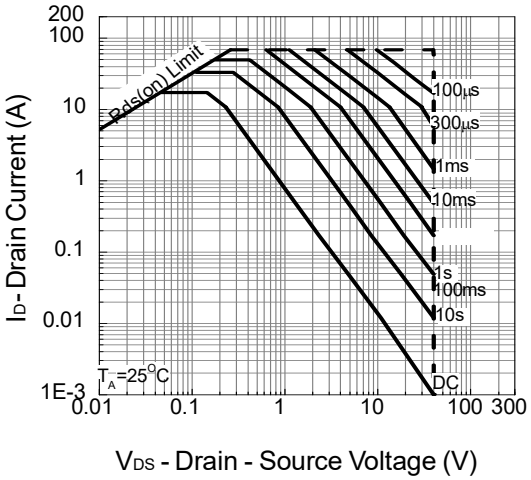

### Drain-Source On Resistance



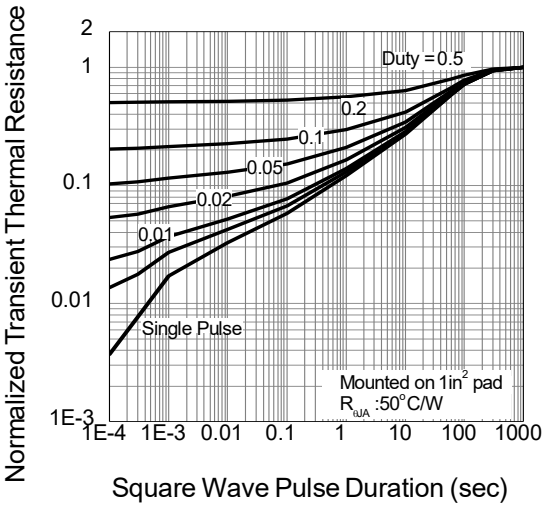

### Source-Drain Diode Forward



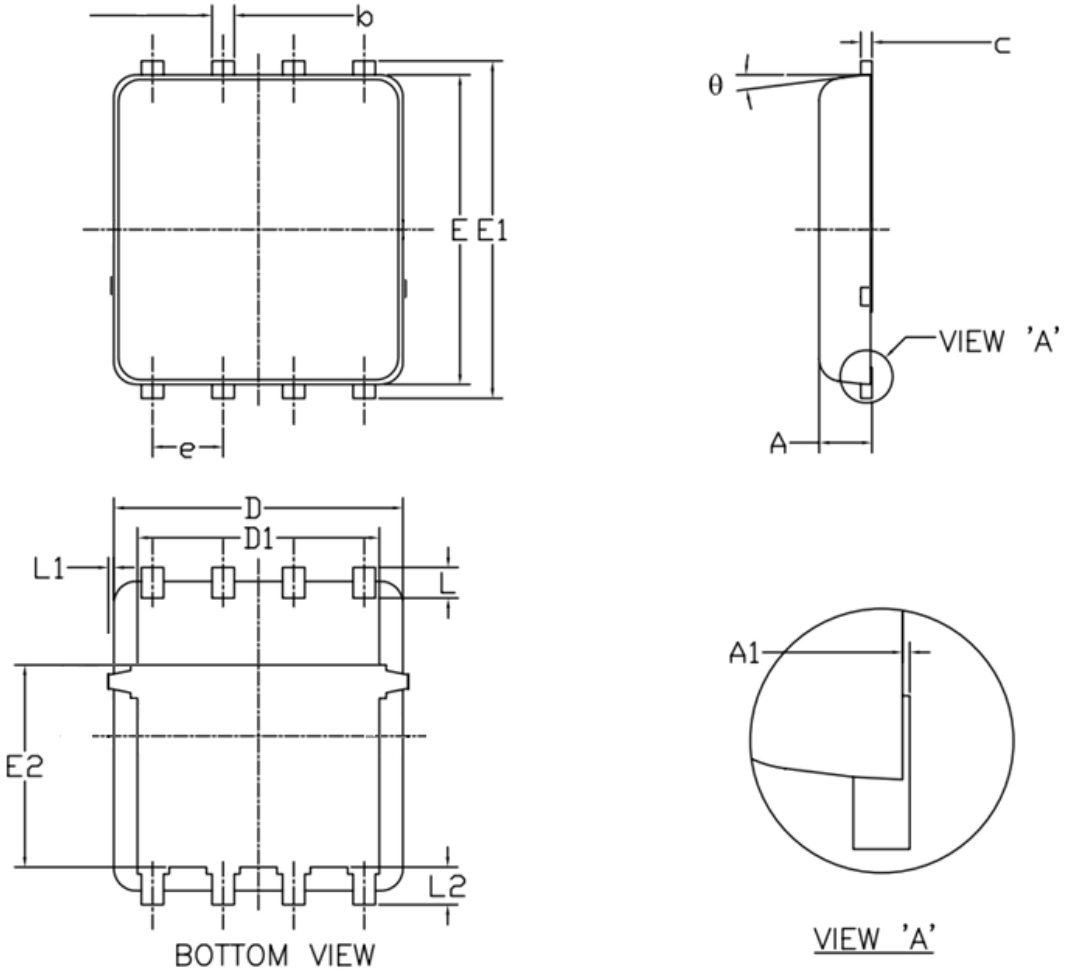

### Safe Operation Area




### Thermal Transient Impedance



## DFN5X6-8L Package Outline Dimensions




| Symbol | Dimensions (unit:mm) | | | Symbol | Dimensions (unit:mm) | | |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Max | | Min | Typ | Max |
| **A** | 0.90 | 1.00 | 1.20 | **E1** | 5.90 | 6.10 | 6.35 |
| **A1** | 0.00 | -- | 0.05 | **E2** | 3.38 | 3.58 | 3.92 |
| **b** | 0.30 | 0.40 | 0.51 | **e** | 1.27 BSC | | |
| **c** | 0.20 | 0.25 | 0.33 | **L** | 0.51 | 0.61 | 0.71 |
| **D** | 4.80 | 4.90 | 5.40 | **L1** | -- | -- | 0.15 |
| **D1** | 3.61 | 4.00 | 4.25 | **L2** | 0.41 | 0.51 | 0.61 |
| **E** | 5.65 | 5.80 | 6.06 | **θ** | 0° | -- | 12° |