

## Features

- Advanced Shield Gate Trench technology
- Super Low Gate Charge
- High-Speed Switching
- 100% EAS Guaranteed
- Green Device Available

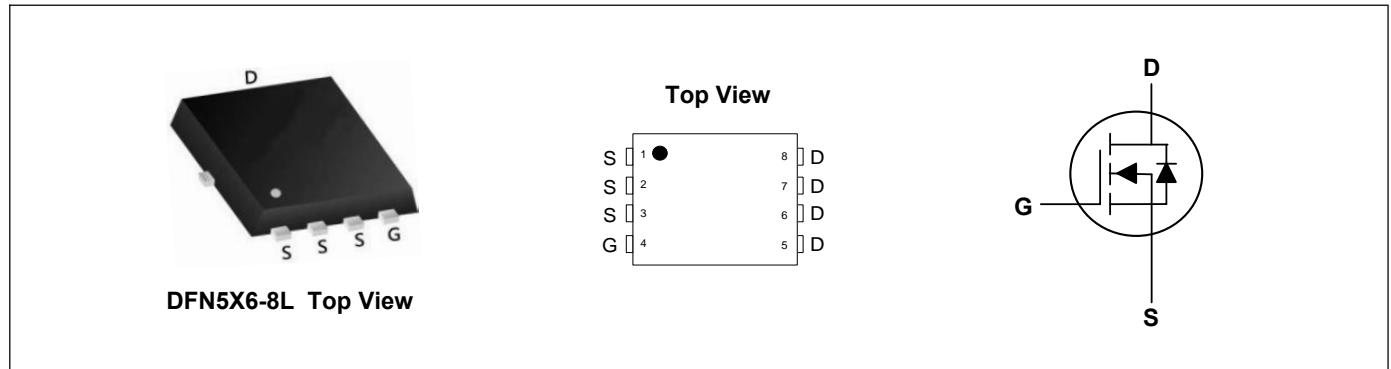
## Applications

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch

## Product Summary



|                                  |     |            |
|----------------------------------|-----|------------|
| $V_{DS}$                         | 150 | V          |
| $I_D$                            | 88  | A          |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )  | 7.5 | m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) | 8.8 | m $\Omega$ |



## Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ , unless otherwise noted)

| Parameter                                  | Symbol    | Rating     | Units            |
|--|-----------|------------|------------------|
| Drain-Source Voltage                       | $V_{DS}$  | 150        | V                |
| Gate-Source Voltage                        | $V_{GS}$  | $\pm 20$   | V                |
| Continuous Drain Current <sup>1</sup>      | $I_D$     | 88         | A                |
| Continuous Drain Current <sup>1</sup>      | $I_D$     | 55         | A                |
| $T_C=100^\circ\text{C}$                    |           |            |                  |
| Pulsed Drain Current <sup>2</sup>          | $I_{DM}$  | 350        | A                |
| Single Pulse Avalanche Energy <sup>3</sup> | $E_{AS}$  | 320        | mJ               |
| Total Power Dissipation <sup>4</sup>       | $P_D$     | 140        | W                |
| Storage Temperature Range                  | $T_{STG}$ | -55 to 150 | $^\circ\text{C}$ |
| Operating Junction Temperature Range       | $T_J$     | -55 to 150 | $^\circ\text{C}$ |

## Thermal Characteristics

| Parameter  | Symbol          | Typ | Max | Unit               |
|--|-----------------|-----|-----|--------------------|
| Thermal Resistance Junction-Ambient <sup>1</sup> | $R_{\theta JA}$ | --- | 55  | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-Case <sup>1</sup>    | $R_{\theta JC}$ | --- | 0.9 | $^\circ\text{C/W}$ |

**Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)**

| Parameter                         | Symbol       | Conditions                                     | Min | Typ  | Max       | Unit      |
|-----------------------------------|--------------|--|-----|------|-----------|-----------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                      | 150 | ---  | ---       | V         |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=20A$                          | --- | 7.5  | 8.8       | $m\Omega$ |
|                                   |              | $V_{GS}=4.5V, I_D=20A$                         | --- | 8.8  | 11        | $m\Omega$ |
| Gate Threshold Voltage            | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$                  | 1.0 | 2.0  | 3.0       | V         |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS}=150V, V_{GS}=0V$                       | --- | ---  | 1         | $\mu A$   |
| Gate-Source Leakage Current       | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                    | --- | ---  | $\pm 100$ | nA        |
| Forward Transconductance          | $g_{fs}$     | $V_{DS}=5V, I_D=20A$                           | --- | 85   | ---       | S         |
| Total Gate Charge                 | $Q_g$        | $V_{DD}=75V, V_{GS}=10V, I_D=20A$              | --- | 62   | ---       | nC        |
| Gate-Source Charge                | $Q_{gs}$     |  | --- | 14   | ---       |           |
| Gate-Drain Charge                 | $Q_{gd}$     |  | --- | 6    | ---       |           |
| Turn-On Delay Time                | $T_{d(on)}$  | $V_{DD}=75V, V_{GS}=10V, R_G=3\Omega, I_D=20A$ | --- | 21   | ---       | ns        |
| Rise Time                         | $T_r$        |  | --- | 9    | ---       |           |
| Turn-Off Delay Time               | $T_{d(off)}$ |  | --- | 32   | ---       |           |
| Fall Time                         | $T_f$        |  | --- | 12   | ---       |           |
| Input Capacitance                 | $C_{iss}$    | $V_{DS}=75V, V_{GS}=0V, f=1MHz$                | --- | 4750 | ---       | pF        |
| Output Capacitance                | $C_{oss}$    |  | --- | 320  | ---       |           |
| Reverse Transfer Capacitance      | $C_{rss}$    |  | --- | 10   | ---       |           |

**Drain-Source Diode Characteristics**

| Parameter                          | Symbol   | Conditions  | Min | Typ | Max | Unit |
|------------------------------------|----------|---|-----|-----|-----|------|
| Diode Forward Voltage <sup>2</sup> | $V_{SD}$ | $V_{GS}=0V, I_F=20A, T_J=25^{\circ}\text{C}$            | --- | --- | 1.2 | V    |
| Reverse Recovery Time              | $t_{rr}$ | $I_F=20A$<br>$di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$ | --- | 70  | --- | nS   |
| Reverse Recovery Charge            | $Q_{rr}$ |   | --- | 150 | --- | nC   |

**Note:**

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=50V, R_G=25\Omega, L=0.4mH$
- 4.The power dissipation is limited by 150°C junction temperature

**Typical Characteristics**

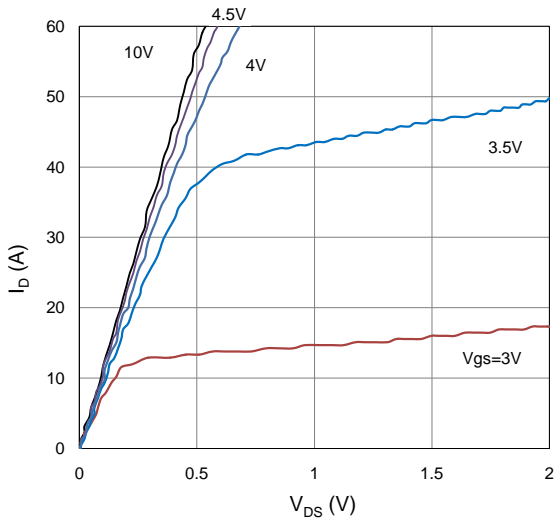


Fig 1. Typical Output Characteristics

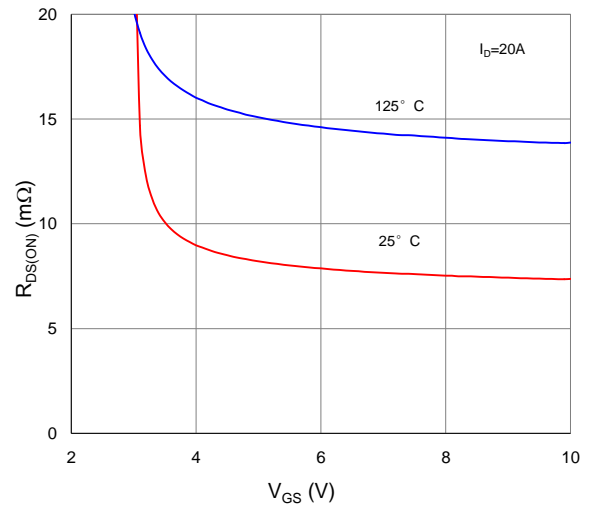


Figure 2. On-Resistance vs. Gate-Source Voltage

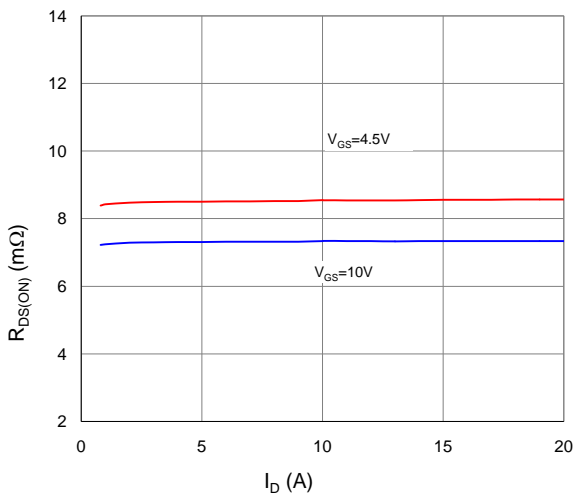


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

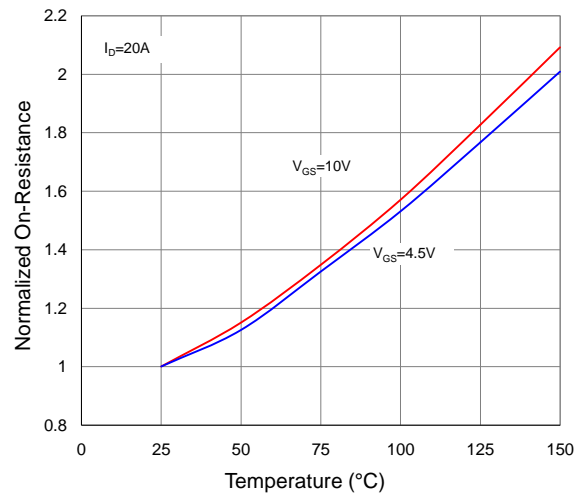


Figure 4. Normalized On-Resistance vs. Junction Temperature

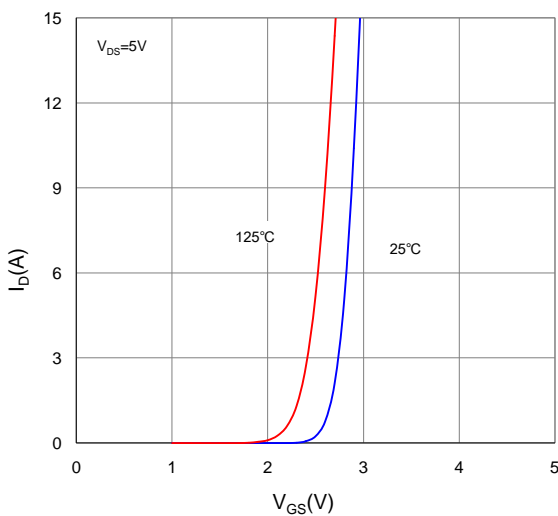


Figure 5. Typical Transfer Characteristics

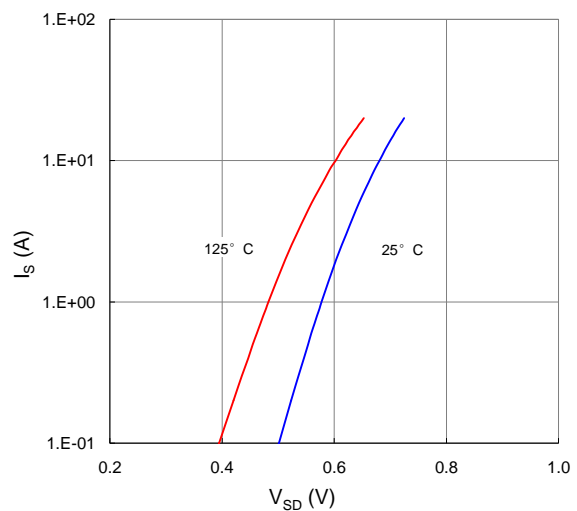


Figure 6. Typical Source-Drain Diode Forward Voltage

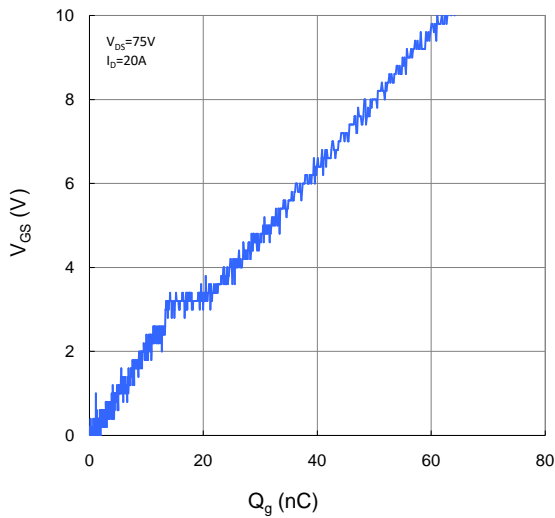


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

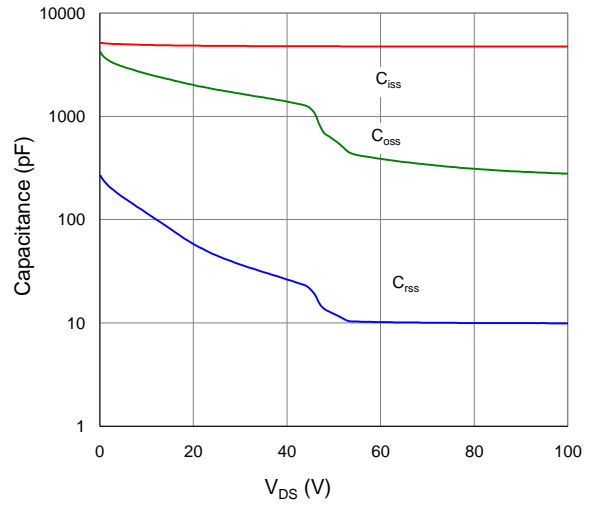


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

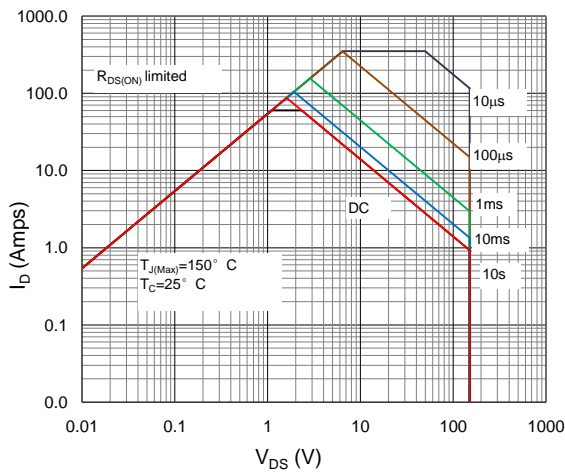


Figure 9. Maximum Safe Operating Area

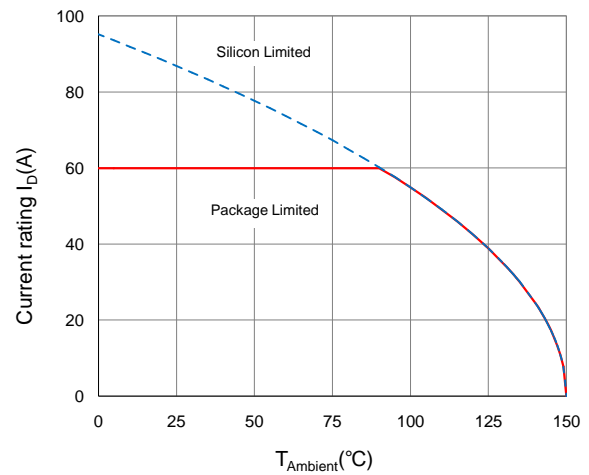


Figure 10. Maximum Drain Current vs. Case Temperature

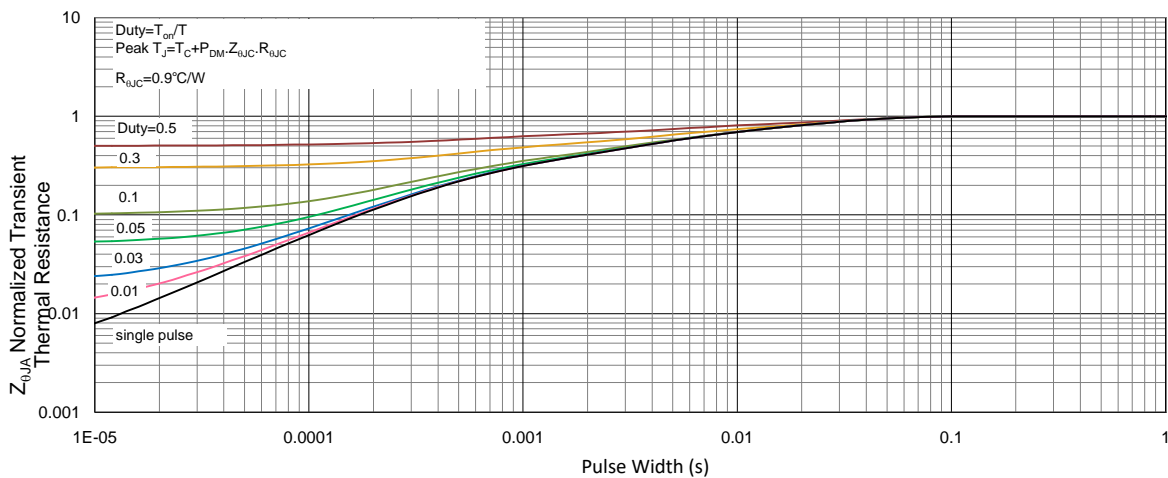
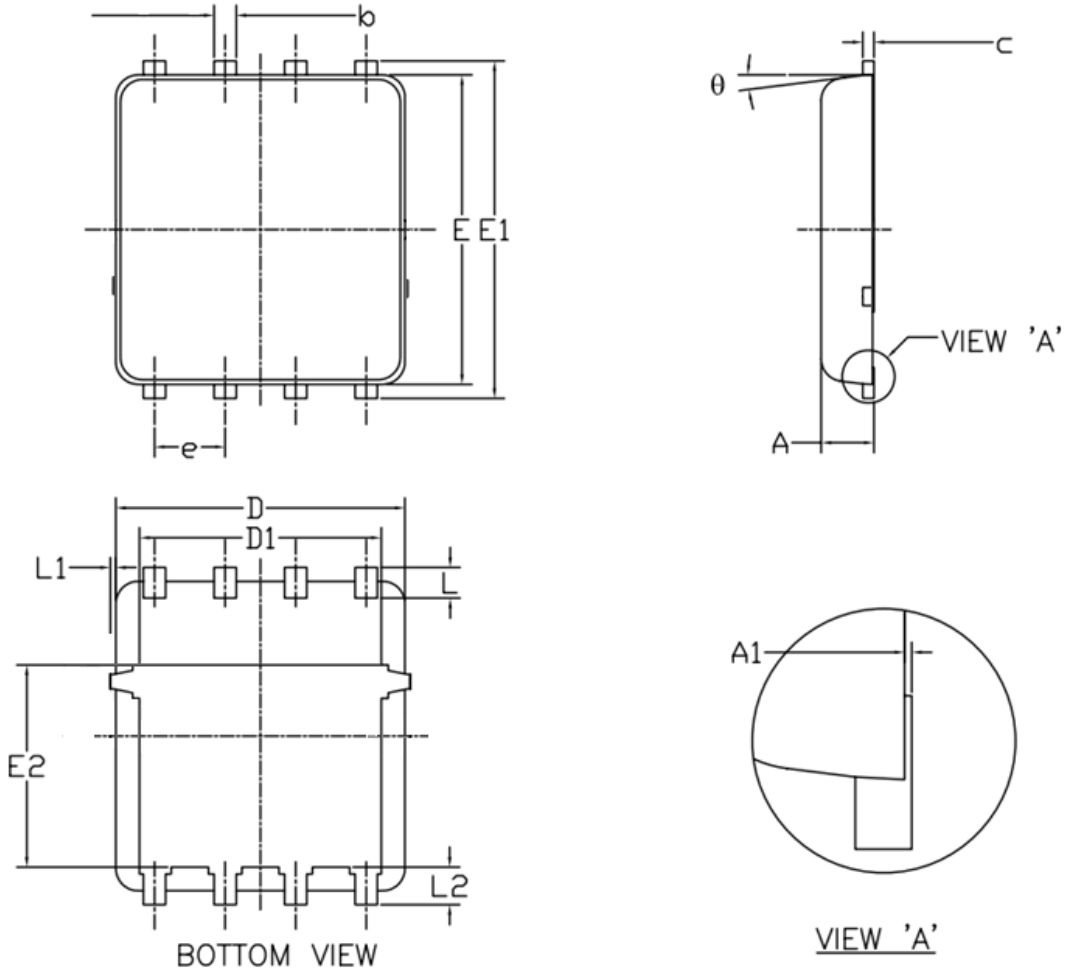


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

**DFN5X6-8L Package Outline Dimensions**



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