

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

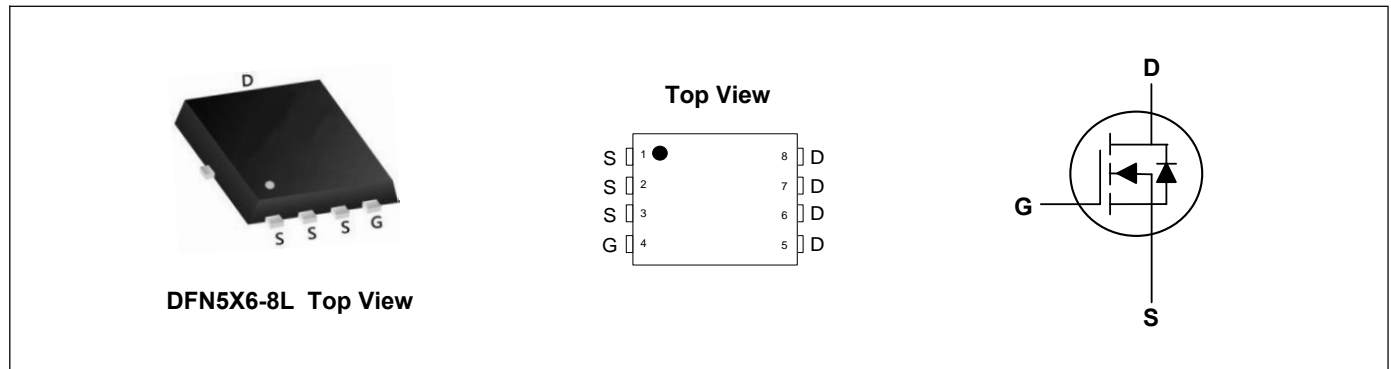
Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- LCD/LED Back Light

Product Summary



| | | |
|----------------------------------|-----|------------|
| V_{DS} | 60 | V |
| I_D | 116 | A |
| $R_{DS(ON)}$ (at $V_{GS}=10V$) | 5.2 | m Ω |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$) | 7 | m Ω |



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

| Parameter | Symbol | Rating | Units |
|-------------------------------------------------------|-----------------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current, V_{GS} @ 10V ¹ | $I_D@T_C=25^\circ C$ | 116 | A |
| Continuous Drain Current, V_{GS} @ 10V ¹ | $I_D@T_C=100^\circ C$ | 74 | A |
| Pulsed Drain Current ² | I_{DM} | 250 | A |
| Single Pulse Avalanche Energy ³ | EAS | 125 | mJ |
| Avalanche Current | I_{AS} | 50 | A |
| Total Power Dissipation ⁴ | $P_D@T_C=25^\circ C$ | 113 | W |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^\circ C$ |
| Operating Junction Temperature Range | T_J | -55 to 150 | $^\circ C$ |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Unit |
|--------------------------------------------------|-----------------|-----|-----|--------------|
| Thermal Resistance Junction-Ambient ¹ | $R_{\theta JA}$ | --- | 62 | $^\circ C/W$ |
| Thermal Resistance Junction-Case ¹ | $R_{\theta JC}$ | --- | 1.1 | $^\circ C/W$ |

Electrical Characteristics (T_J=25°C, unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------------------------|---------------------|---------------------------------------------------------------------------------------|-----|------|------|------|
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 60 | --- | --- | V |
| Static Drain-Source On-Resistance ² | R _{DS(ON)} | V _{GS} =10V, I _D =15A | --- | 4.3 | 5.2 | mΩ |
| | | V _{GS} =4.5V, I _D =10A | --- | 6 | 7 | mΩ |
| Gate Threshold Voltage | V _{GS(th)} | V _{GS} =V _{DS} , I _D =250μA | 1.2 | --- | 2.5 | V |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =48V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | μA |
| | | V _{DS} =48V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| Gate-Source Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| Forward Transconductance | g _{fs} | V _{DS} =10V, I _D =30A | --- | 75 | --- | S |
| Gate Resistance | R _g | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 0.7 | --- | Ω |
| Total Gate Charge (10V) | Q _g | V _{DS} =48V, V _{GS} =10V, I _D =25A | --- | 75 | --- | nC |
| Gate-Source Charge | Q _{gs} | | --- | 15.5 | --- | |
| Gate-Drain Charge | Q _{gd} | | --- | 20.3 | --- | |
| Turn-On Delay Time | T _{d(on)} | V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =30A | --- | 18.5 | --- | ns |
| Rise Time | T _r | | --- | 8.8 | --- | |
| Turn-Off Delay Time | T _{d(off)} | | --- | 58.8 | --- | |
| Fall Time | T _f | | --- | 15.8 | --- | |
| Input Capacitance | C _{iss} | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 4706 | --- | pF |
| Output Capacitance | C _{oss} | | --- | 325 | --- | |
| Reverse Transfer Capacitance | C _{rss} | | --- | 245 | --- | |

Drain-Source Diode Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------------------|-----------------|---------------------------------------------------------------|-----|------|-----|------|
| Continuous Source Current ^{1,5} | I _S | V _G =V _D =0V, Force Current | --- | --- | 116 | A |
| Pulsed Source Current ^{2,5} | I _{SM} | | --- | --- | 250 | A |
| Diode Forward Voltage ² | V _{SD} | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |
| Reverse Recovery Time | t _{rr} | I _F =30A, di/dt=100A/μs, T _J =25°C | --- | 22.9 | --- | nS |
| Reverse Recovery Charge | Q _{rr} | | --- | 11.6 | --- | nC |

Note:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=50A
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

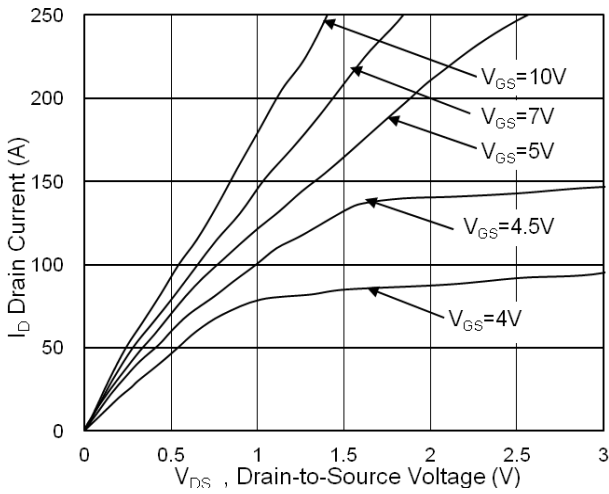


Fig.1 Typical Output Characteristics

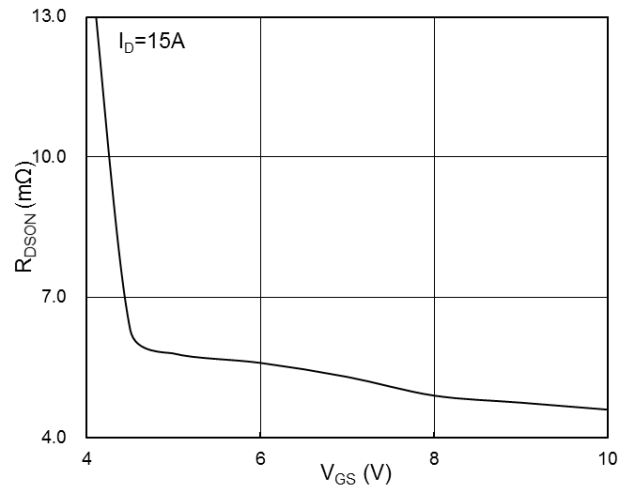


Fig.2 On-Resistance vs. G-S Voltage

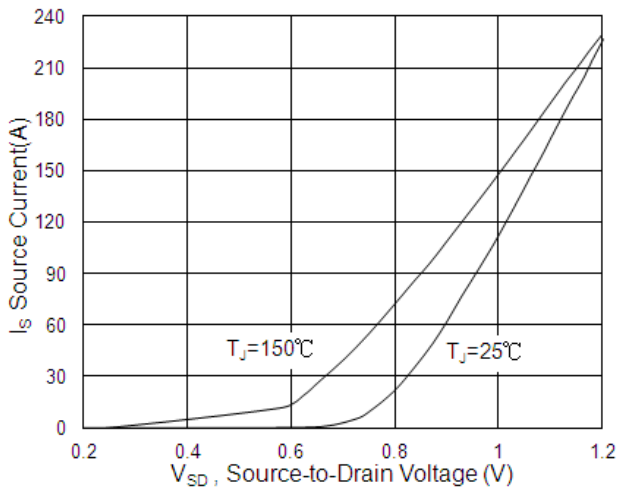


Fig.3 Diode Forward Voltage vs. Current

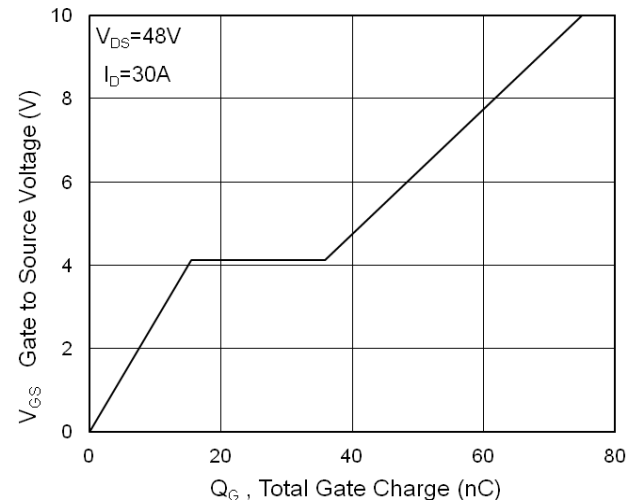


Fig.4 Gate-Charge Characteristics

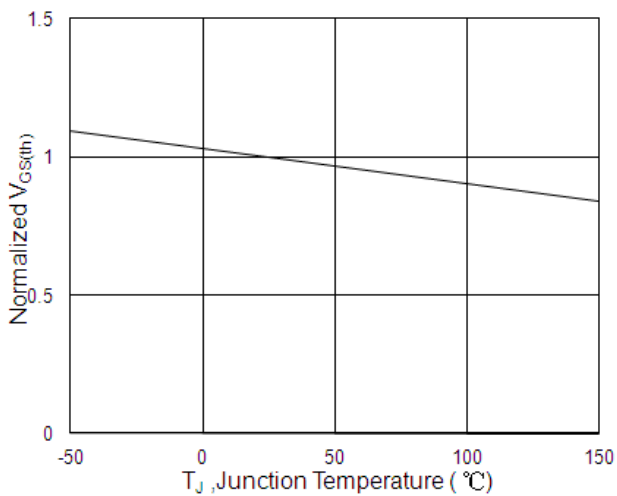


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

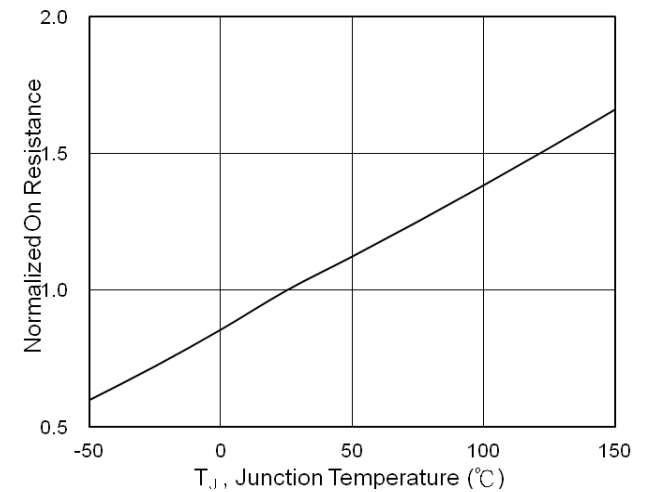


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

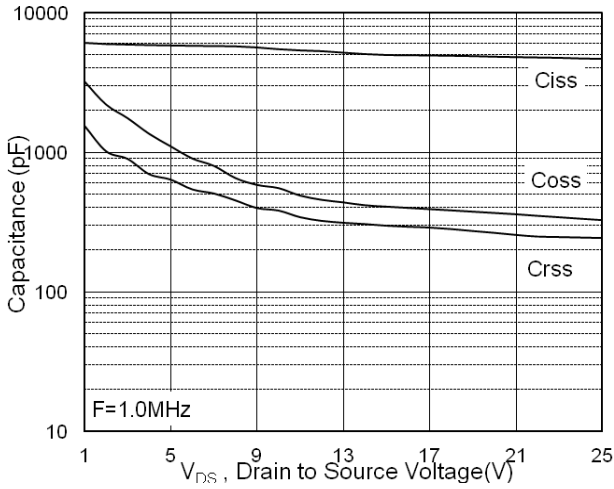


Fig.7 Capacitance

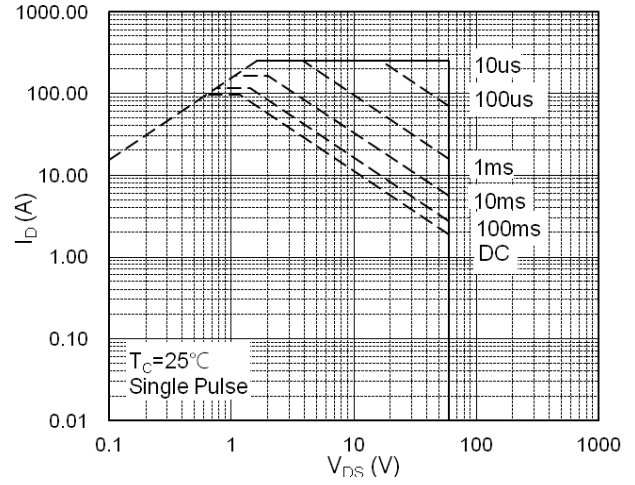


Fig.8 Safe Operating Area

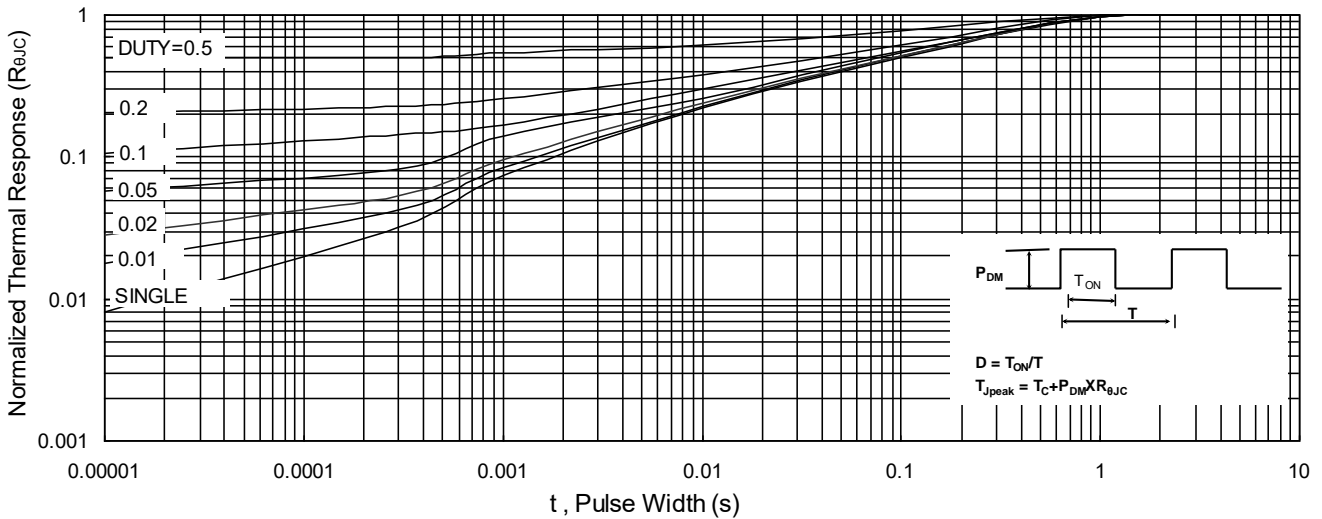


Fig.9 Normalized Maximum Transient Thermal Impedance

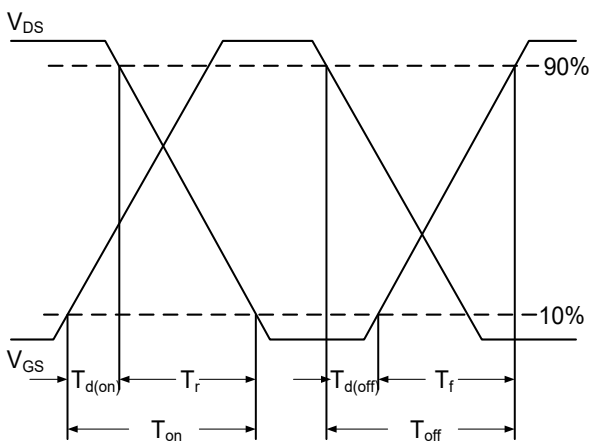


Fig.10 Switching Time Waveform

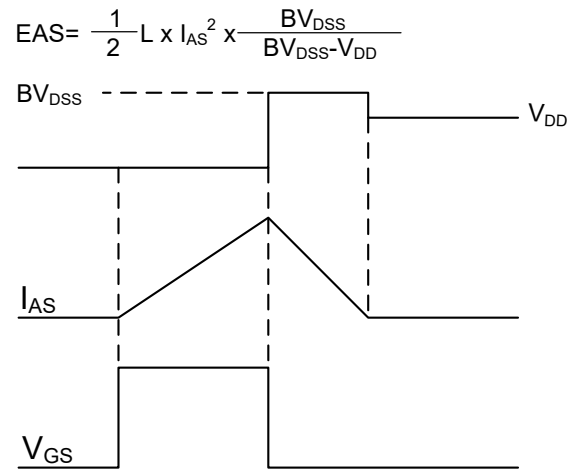
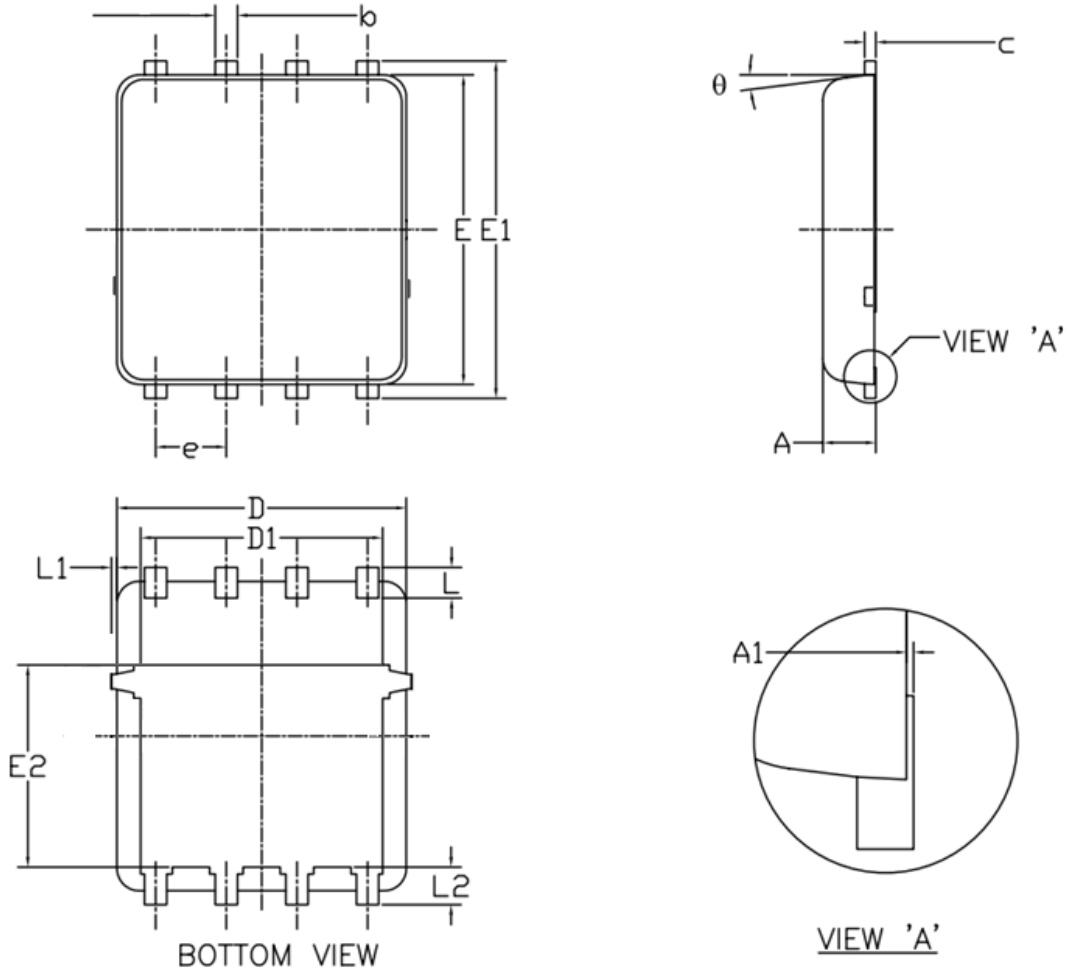


Fig.11 Unclamped Inductive Switching Waveform

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° |