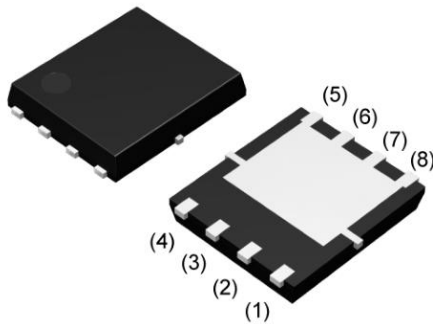


Description
40V N-CHANNEL ENHANCEMENT MODE POWER MOSFET
Features

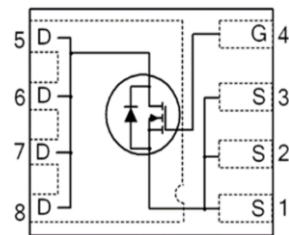
- Device Rating $V_{DS} = 40V$, $I_D = 191A$
- $R_{DS(ON)} = 2.6m\Omega$ (typ.) @ $V_{GS} = 10V$, $I_D = 20A$
- Proprietary High Density Trench Technology
- RoHS Compliant & Halogen-Free

Application

- High performance DC/DC
- SR
- Motor Driving

Package


DFN 5*6-8L
JFG191N40L


Absolute Maximum Ratings $T_C=25^\circ C$ unless otherwise specified

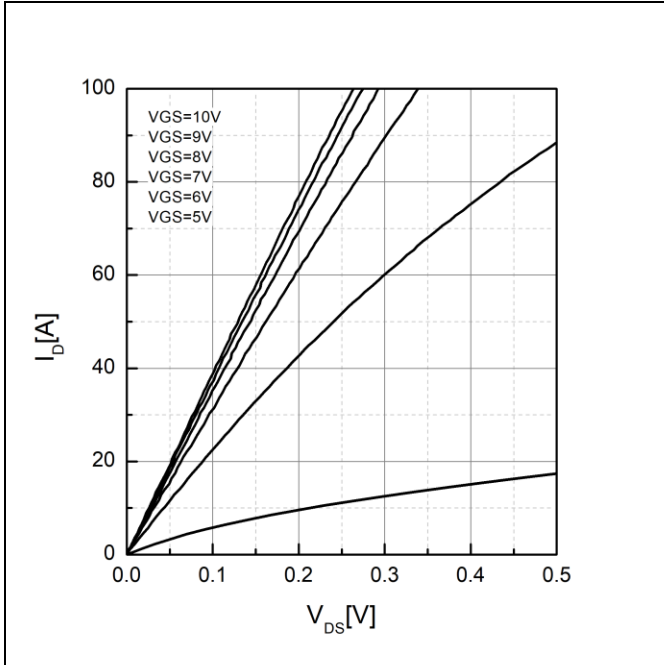
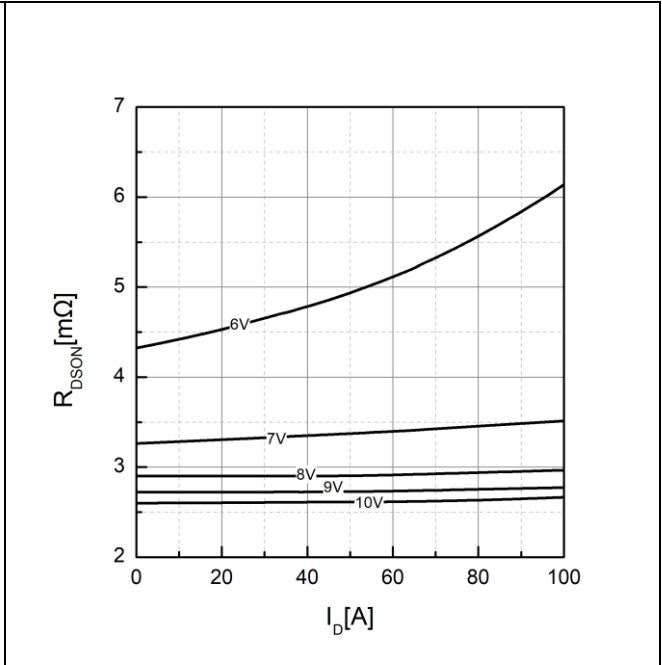
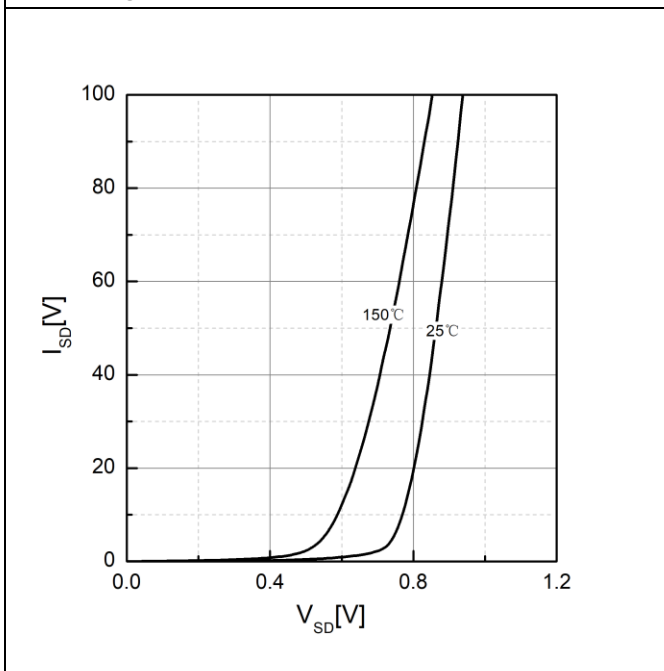
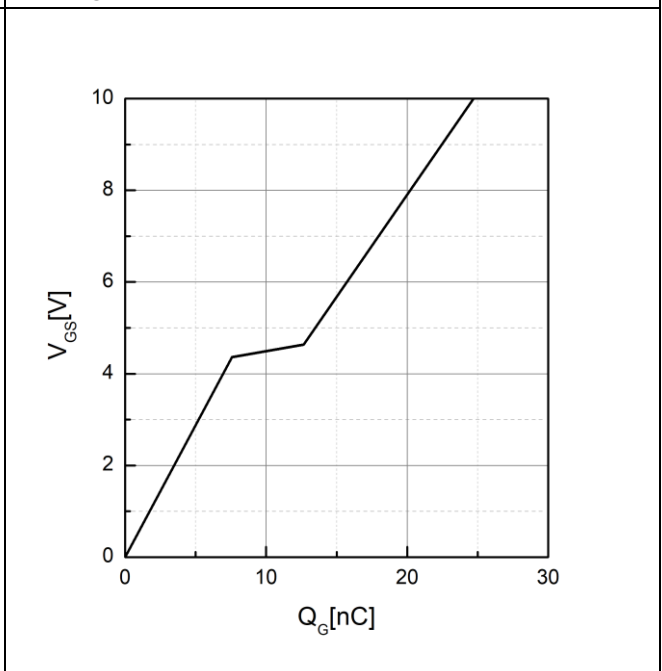
| Symbol | Parameter | Max. | Units | |
|-----------------|---|---------------------|--------------|---|
| V_{DS} | Drain-Source Voltage | 40 | V | |
| V_{GS} | Gate-Source Voltage | ± 20 | V | |
| I_D | Continuous Drain Current, $V_{GS} @ 10V$ ^{note1} | $T_C = 25^\circ C$ | 191 | A |
| | | $T_C = 100^\circ C$ | 121 | A |
| I_{DM} | Pulsed Drain Current ^{note2} | 764 | A | |
| P_D | Power Dissipation ^{note4} | $T_C = 25^\circ C$ | 178 | W |
| | Power Dissipation | $T_A = 25^\circ C$ | 2.08 | W |
| E_{AS} | Single Pulsed Avalanche Energy ^{note3} | 143 | mJ | |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case ^{note1} | 0.7 | $^\circ C/W$ | |
| $R_{\theta JA}$ | Junction to Ambient (mounted on 1 inch square PCB) | 60 | $^\circ C/W$ | |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to +150 | $^\circ C$ | |

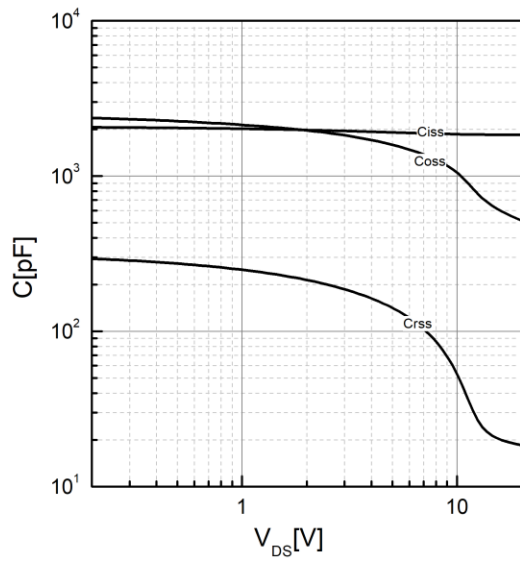
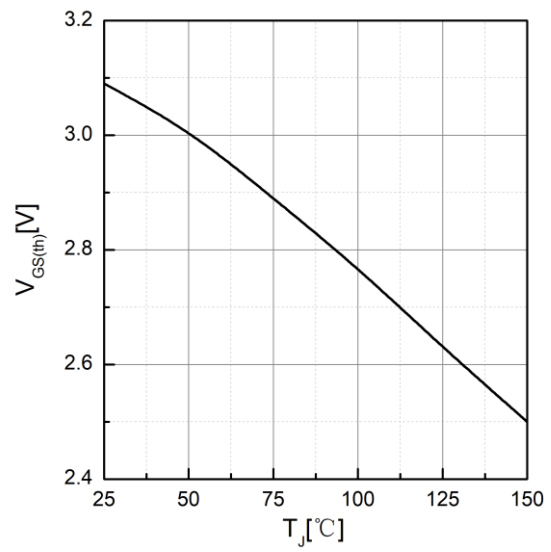
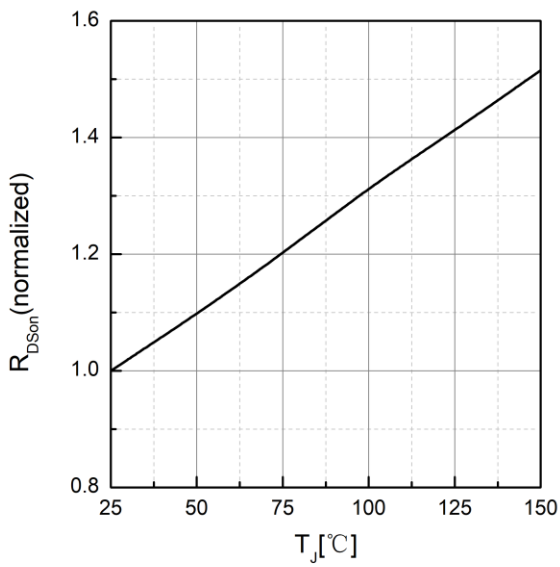
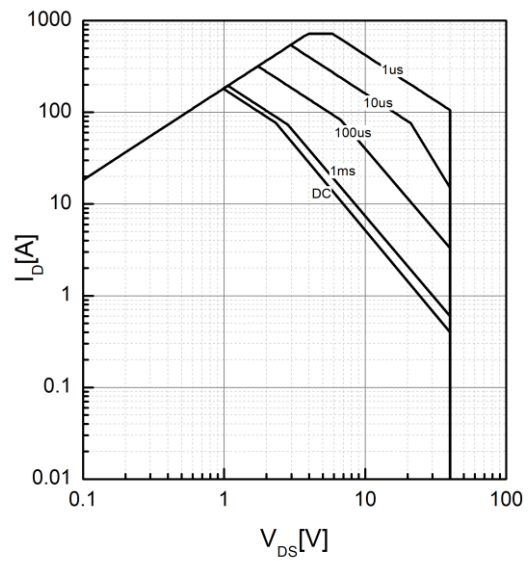
Electrical Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise specified

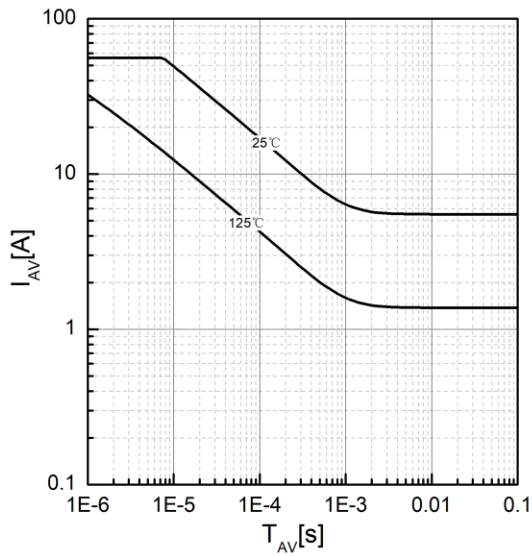
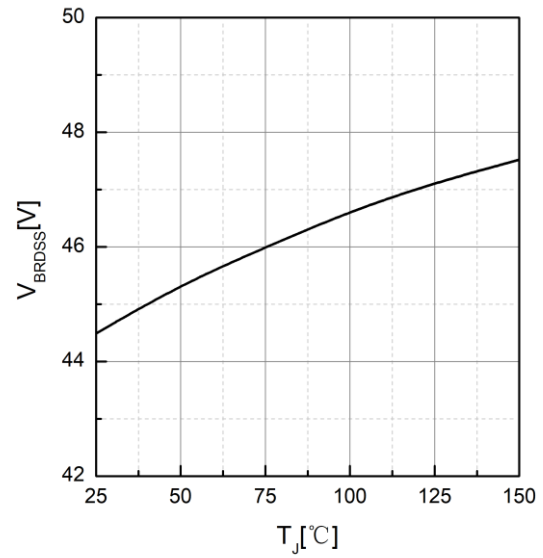
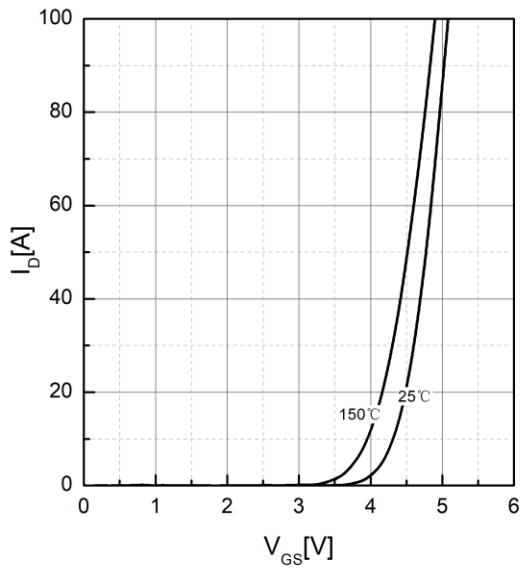
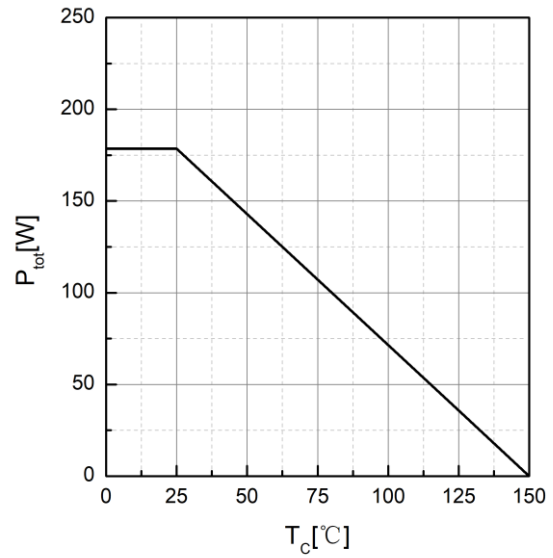
| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|--|------|------|------|------------|
| Off Characteristic | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 250\mu A$ | 40 | - | - | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=40V, V_{GS}= 0V, T_C = 25^{\circ}\text{C}$ | - | - | 1 | μA |
| | | $V_{DS}=40V, V_{GS}= 0V, T_C = 55^{\circ}\text{C}$ | - | - | 10 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{DS} = 0V, V_{GS} = \pm 20V$ | -100 | - | 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2 | - | 4 | V |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance <small>note2</small> | $V_{GS} = 10V, I_D = 20A$ | - | 2.6 | 3.2 | m Ω |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance <small>note2</small> | $V_{GS} = 7V, I_D = 20A$ | - | 3.3 | 4 | m Ω |
| g_{FS} | Forward Transconductance | $V_{DS} = 5V, I_D = 20A$ | - | 77 | - | S |
| Dynamic Characteristics | | | | | | |
| R_g | Gate Resistance | | - | 1.0 | - | Ω |
| C_{iss} | Input Capacitance | $V_{DS} = 20V, V_{GS} = 0V,$ $f = 1\text{MHz}$ | - | 1840 | - | pF |
| C_{oss} | Output Capacitance | | - | 516 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 18 | - | pF |
| Q_g | Total Gate Charge | $V_{DS} = 20V, I_D = 20A,$ $V_{GS} = 10V$ | - | 25 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 7.5 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 5.1 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD} = 20V, I_D = 20A,$ $R_G = 1\Omega, V_{GS} = 10V$ | - | 10 | - | ns |
| t_r | Turn-On Rise Time | | - | 4 | - | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 94 | - | ns |
| t_f | Turn-Off Fall Time | | - | 7 | - | ns |
| Source-Drain Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Diode Forward Current <small>note1,5</small> | | - | - | 148 | A |
| I_{SM} | Maximum Pulsed Diode Forward Current <small>note2,5</small> | | - | - | 720 | A |
| t_{rr} | Reverse Recovery Time | $T_J=25^{\circ}\text{C}, I_S=20A, V_{GS}= 0V,$ $di/dt = 150A/\mu s$ | - | 35 | - | ns |
| Q_{rr} | Reverse Recovery Charge | | - | 25 | - | nC |
| V_{SD} <small>note2</small> | Source to Drain Diode Forward Voltage | $T_J = 25^{\circ}\text{C}, I_S = 20A, V_{GS} = 0V$ | - | 0.8 | - | V |

Note :

- 1.The data tested by surface mounted on one inch² FR-4 board with 2OZ 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 $L=0.1\text{mH}$, $I_{AS}= 53.4\text{A}$.
- 4.The power dissipation is limited by 150°C junction temperature.
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Performance Characteristics

Figure 1. Output Characteristics, $T_J=25^\circ\text{C}$

Figure 2. Drain-source on resistance , $T_J=25^\circ\text{C}$

Figure 3. Forward characteristics of body diode

Figure 4. Gate Charge Characteristics


Figure 5. Capacitance Characteristics

Figure 6. Threshold Voltage Vs. Temperature

Figure 7. Drain-source on-state resistance

Figure 8. Maximum Safe Operating Area


Figure 9. Avalanche characteristics

Figure 10. Drain-source breakdown voltage

Figure 11. Transfer characteristics

Figure 12. Power dissipation

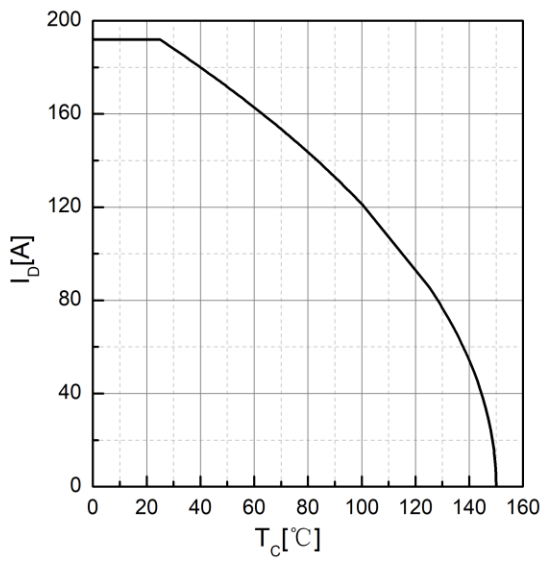


Figure 13. Drain current

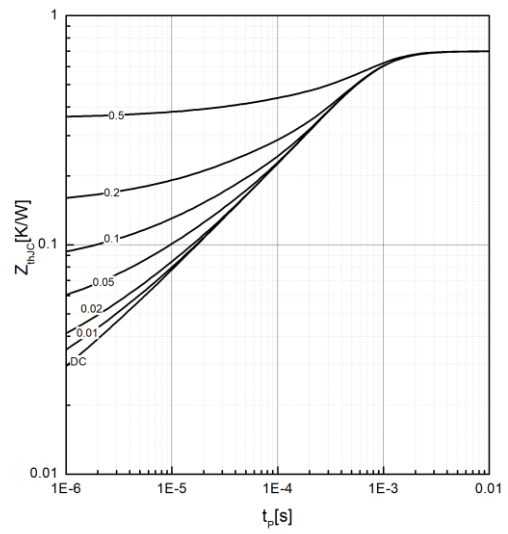


Figure 14. Effective Transient Thermal Impedance

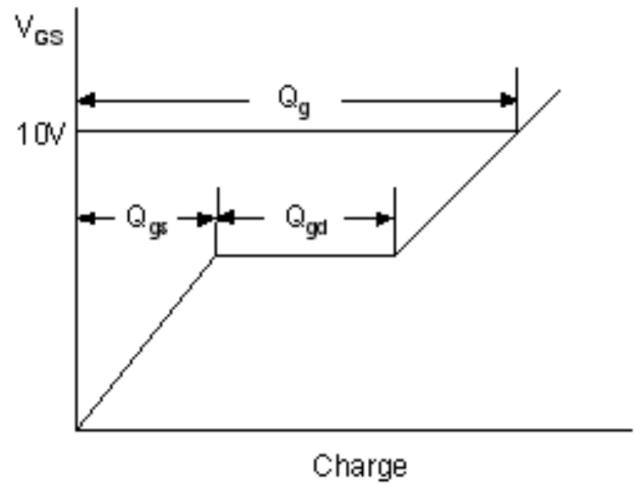
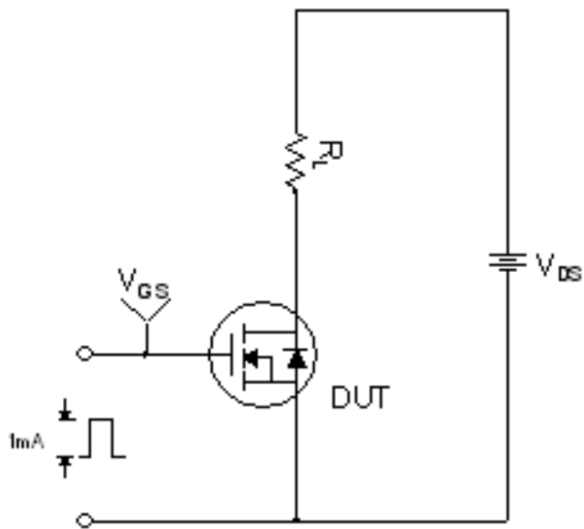


Figure 15. Gate Charge Test Circuit & Waveform

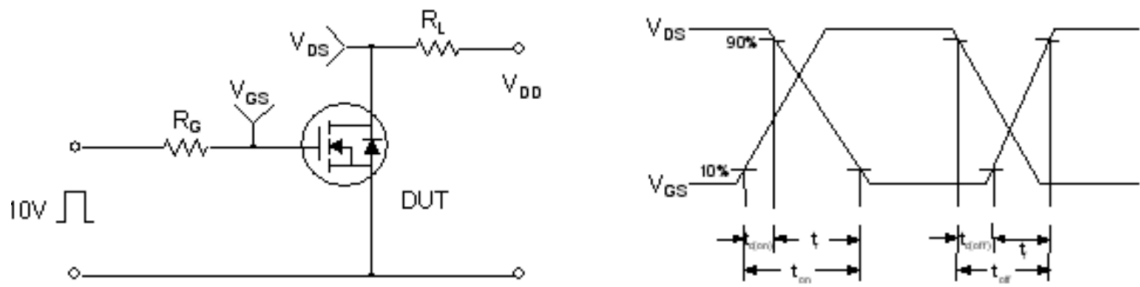


Figure 16. Resistive Switching Test Circuit & Waveforms

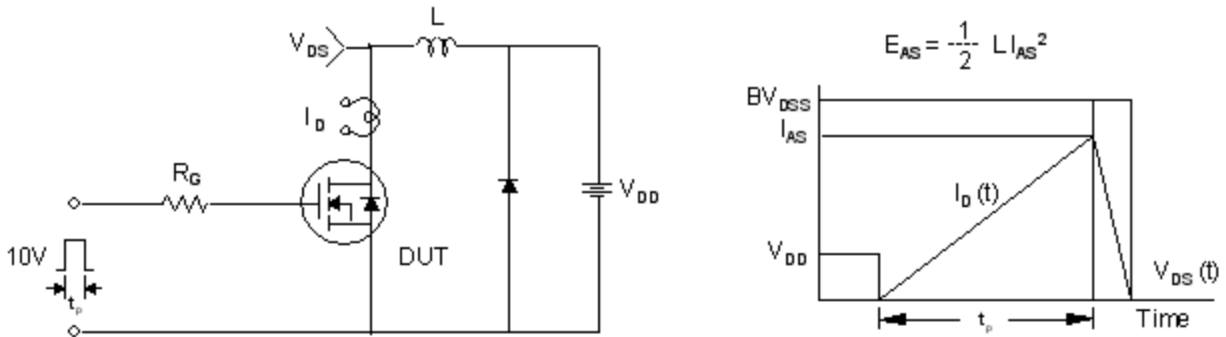


Figure 17. Unclamped Inductive Switching Test Circuit & Waveforms

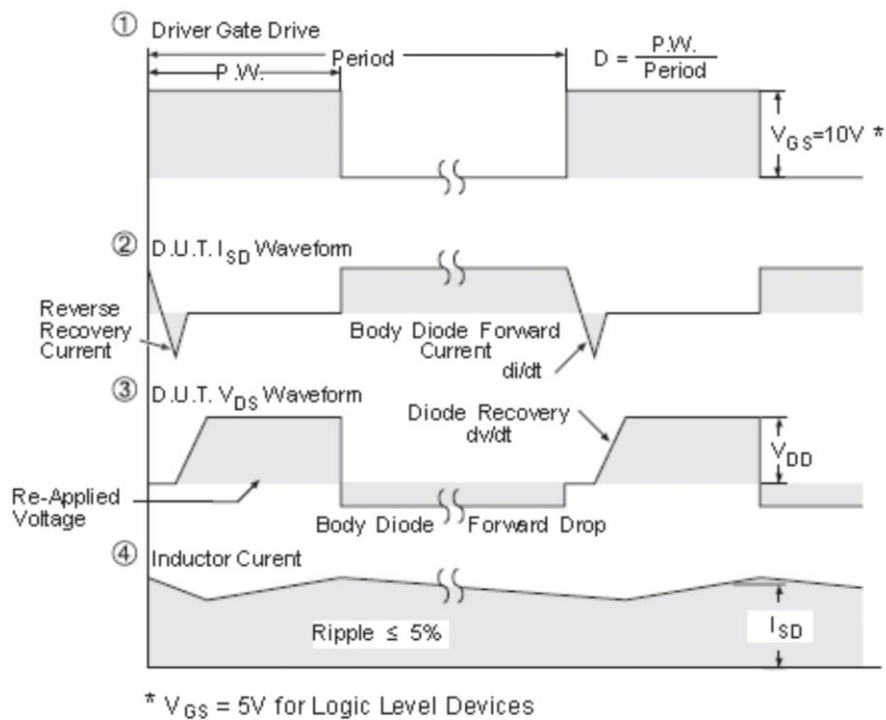
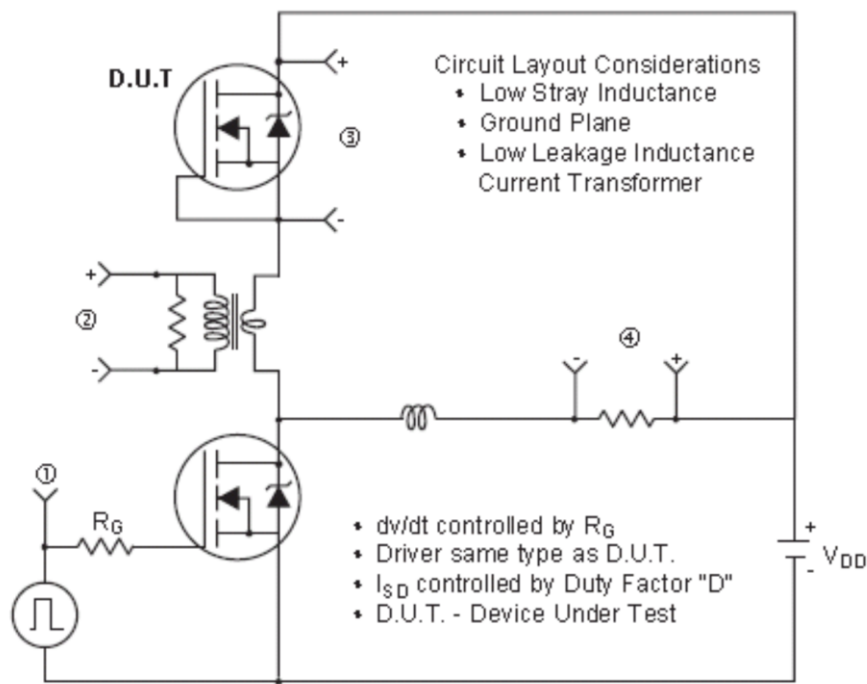
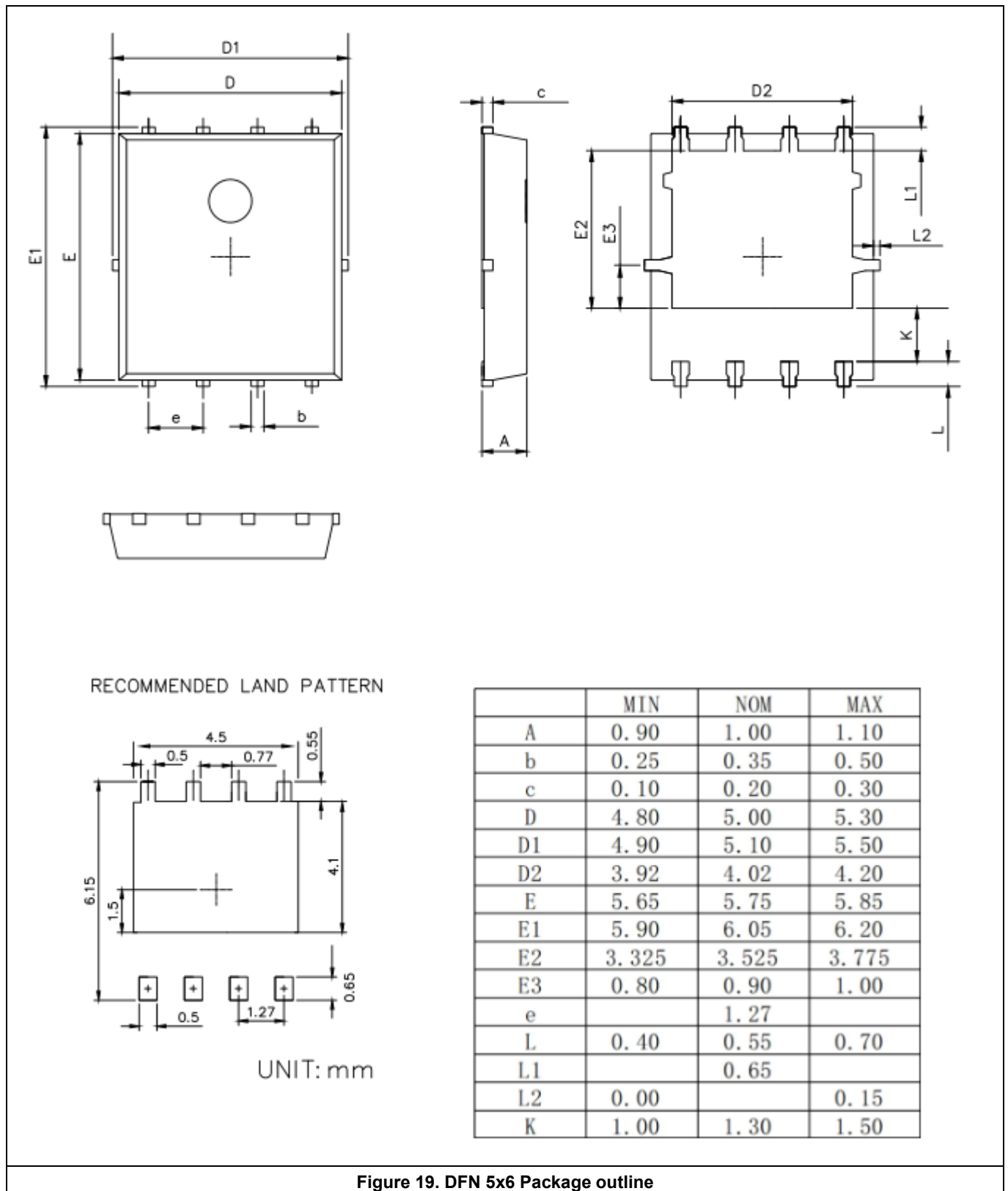


Figure 18. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package outline


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