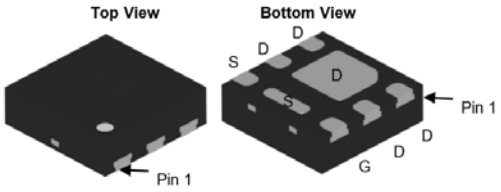
## Features

- 18V, 8A
  $R_{DS(ON)}$ ***TYP*** = 12mΩ @ $V_{GS}$ = 4.5V
  $R_{DS(ON)}$ ***TYP*** = 15mΩ @ $V_{GS}$ = 2.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

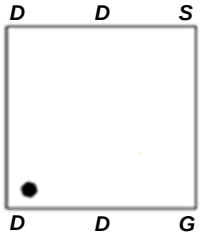



**DFN2020-6L**

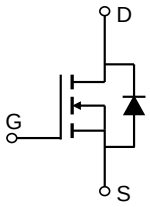
## Applications

- Load Switch
- PWM Application
- Power Management

*100% UIS TESTED!*
*100% ΔVds TESTED!*




**Pin Assignment**




**Schematic Diagram**

**Absolute Maximum Ratings** (@ $T_A$ = 25°C unless otherwise specified)

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-to-Source Voltage | | 18 | V |
| $V_{GS}$ | Gate-to-Source Voltage | | ±12 | V |
| $I_D$ | Continuous Drain Current | $T_A$ = 25°C | 8 | A |
| | | $T_A$ = 100°C | 5 | |
| $I_{DM}$ | Pulsed Drain Current [1] | | 32 | A |
| $E_{AS}$ | Single Pulsed Avalanche Energy [2] | | 36 | mJ |
| $P_D$ | Power Dissipation | $T_A$ = 25°C | 2.7 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient [3] | | 46 | °C/W |
| $T_J$, $T_{STG}$ | Junction & Storage Temperature Range | | -55 to 150 | °C |

**Electrical Characteristics** ($T_J$ = 25°C unless otherwise specified)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $I_D$ = 250μA, $V_{GS}$ = 0V | 12 | 18 | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 12V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{DS}$ = 0V, $V_{GS}$ = ±12V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 0.5 | 0.75 | 1.0 | V |
| $R_{DS(ON)}$ | Static Drain-Source ON-Resistance(4) | $V_{GS}$ = 4.5V, $I_D$ = 7A | - | 12 | 16 | mΩ |
| | | $V_{GS}$ = 2.5V, $I_D$ = 5A | - | 15 | 21 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 6V, f = 1MHz | - | 665 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 90 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 80 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 0 to 4.5V $V_{DD}$ = 6V, $I_D$ = 2A | - | 7.8 | - | nC |
| $Q_{gs}$ | Gate Source Charge | | - | 1.6 | - | nC |
| $Q_{gd}$ | Gate Drain("Miller") Charge | | - | 1.5 | - | nC |
| | | | | | | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On DelayTime | $V_{GS}$ = 4.5V, $V_{DD}$ = 6V $I_D$= 2A, $R_{GEN}$ = 3Ω | - | 43 | - | ns |
| $t_r$ | Turn-On Rise Time | | - | 235 | - | ns |
| $t_{d(off)}$ | Turn-Off DelayTime | | - | 677 | - | ns |
| $t_f$ | Turn-Off Fall Time | | - | 423 | - | ns |
| **Drain-Source Diode Characteristics and Max Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 8 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 32 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = 3A | - | - | 1.2 | V |

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. $E_{AS}$ condition: Starting $T_J$=25C, $V_{DD}$=10V, $V_G$=10V, $R_G$=25ohm, L=0.5mH, $I_{AS}$=12A
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch$^2$ pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

## Test Circuit

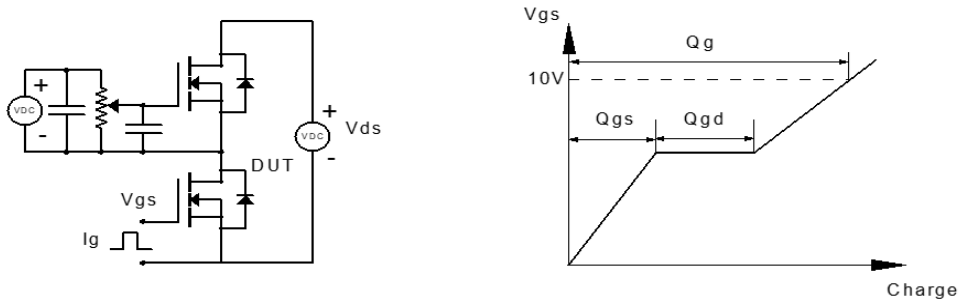



**Figure 1: Gate Charge Test Circuit & Waveform**

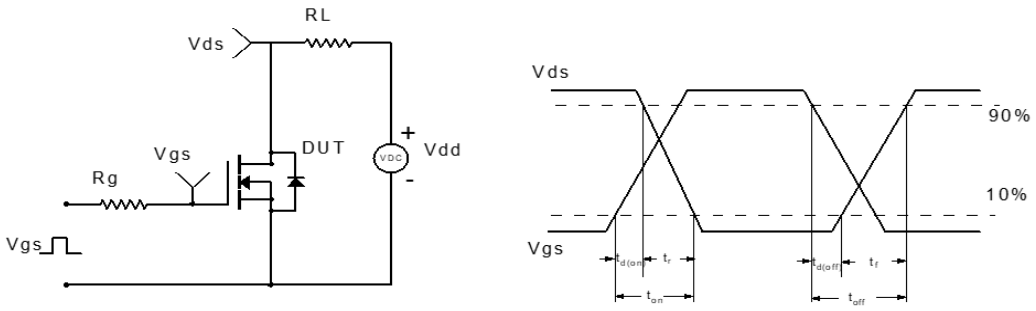



**Figure 2: Resistive Switching Test Circuit & Waveform**

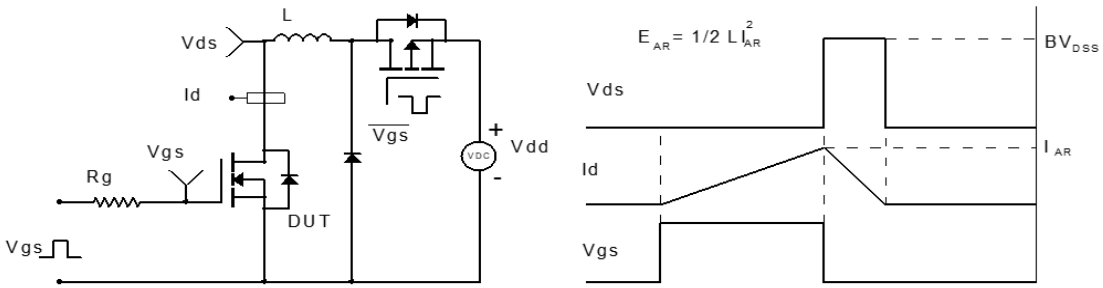



**Figure 3: Unclamped Inductive Switching Test Circuit& Waveform**

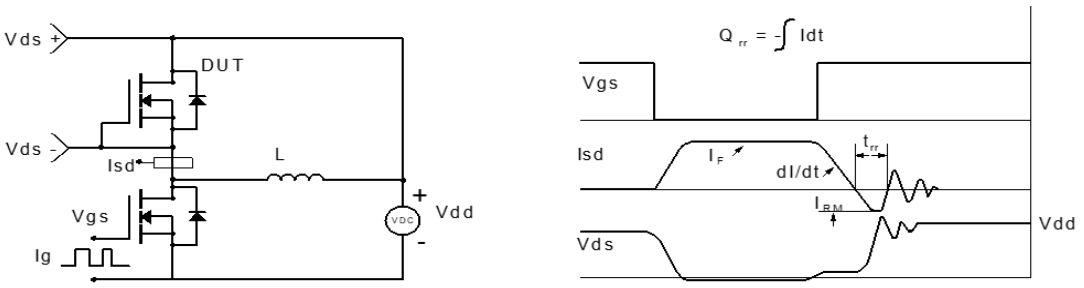
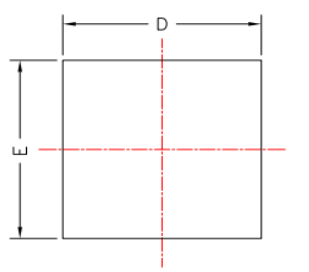
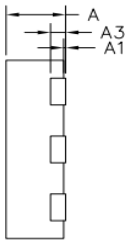



**Figure 4: Diode Recovery Test Circuit & Waveform**

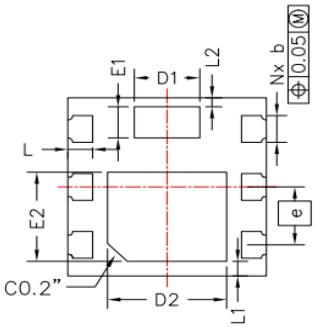
## Package Mechanical Data(DFN2020-6L)




Top View




Side View




Bottom View

| SYMBOLS | DIMENSION IN MM | | | DIMENSION IN INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.700 | 0.750 | 0.800 | 0.028 | 0.030 | 0.031 |
| A1 | --- | --- | 0.050 | ---- | ---- | 0.002 |
| A3 | 0.195 | 0.203 | 0.211 | 0.008 | 0.008 | 0.008 |
| b | 0.250 | 0.300 | 0.350 | 0.010 | 0.012 | 0.014 |
| e | 0.65BSC | | | 0.026 BSC | | |
| D | 1.900 | 2.000 | 2.100 | 0.075 | 0.079 | 0.083 |
| E | 1.900 | 2.000 | 2.100 | 0.075 | 0.079 | 0.083 |
| D1 | 0.560 | 0.660 | 0.760 | 0.022 | 0.026 | 0.030 |
| E1 | 0.250 | 0.350 | 0.450 | 0.010 | 0.014 | 0.018 |
| D2 | 1.100 | 1.200 | 1.300 | 0.043 | 0.047 | 0.051 |
| E2 | 0.900 | 1.000 | 1.100 | 0.035 | 0.039 | 0.043 |
| L | 0.150 | 0.250 | 0.350 | 0.006 | 0.010 | 0.014 |
| L1 | 0.065 | 0.165 | 0.265 | 0.003 | 0.006 | 0.010 |
| L2 | 0.000 | 0.100 | 0.200 | 0.000 | 0.004 | 0.008 |