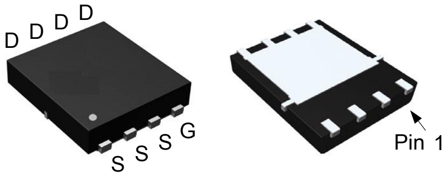
## Features

- 30V/100A
  $R_{DS(ON)}$=3mΩ(typ.)@$V_{GS}$=10V
  $R_{DS(ON)}$=4mΩ(typ.)@$V_{GS}$=4.5V
- 100% UIS + $R_g$ Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

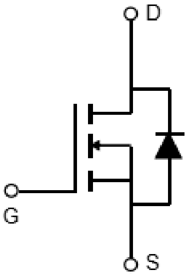
## Applications

- Power Management in Desktop Computer or DC/DC Converters.
- Power Load Switch.
- Notebook Battery Management.

## Pin Description



PDFN5*6-8L



N-Channel MOSFET

## Absolute Maximum Ratings (${T_A}$=25°C Unless Otherwise Noted)

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings** | | | | |
| $V_{DSS}$ | Drain-Source Voltage | | 30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_S$ | Diode Continuous Forward Current | $T_C$=25°C | 100 | A |
| $I_D$ | Continuous Drain Current | $T_C$=25°C | 100 | A |
| | | $T_C$=100°C | 75 | |
| $I_{DM}$ [a] | Pulse Drain Current | $T_C$=25°C | 300 | A |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 120 | W |
| | | $T_C$=100°C | 80 | |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | Steady State | 2.2 | °C/W |
| $R_{\theta JA}$ [b] | Thermal Resistance-Junction to Ambient | t ≤ 10s | 25 | °C/W |
| | | Steady State | 64 | |
| $I_{AS}$ [c] | Avalanche Current, Single pulse | L=0.1mH | 62 | A |
| $E_{AS}$ [c] | Avalanche Energy, Single pulse | L=0.1mH | 192 | mJ |

Note a：Pulse width is limited by max. junction temperature.
Note b：Surface mounted on 1in$^2$ pad area, steady state t = 999s.
Note c：UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_j$=25°C).

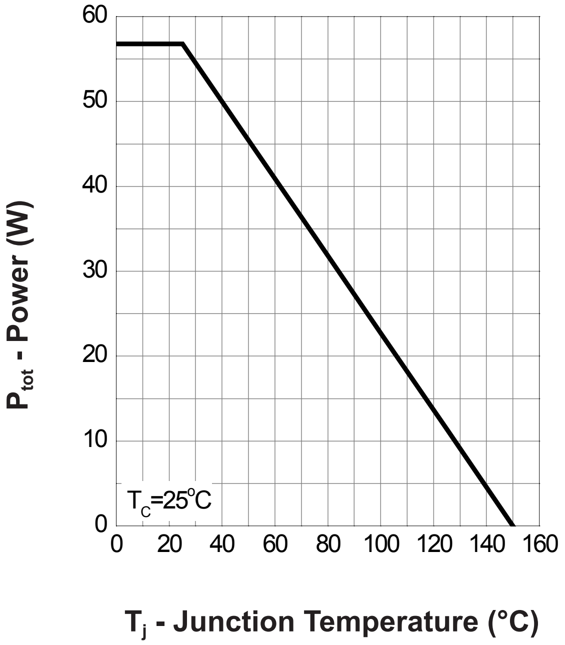
## Electrical Characteristics ($T_A$ = 25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 30 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=24V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $T_J$=85°C | - | - | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 1.3 | 1.8 | 2.2 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| $R_{DS(ON)}$[d] | Drain-Source On-state Resistance | $V_{GS}$=10V, $I_{DS}$=20A | - | 3 | 3.5 | mΩ |
| | | $T_J$=125°C | - | 3.8 | - | |
| | | $V_{GS}$=4.5V, $I_{DS}$=15A | - | 4 | 4.8 | |
| Gfs | Forward Transconductance | $V_{DS}$=5V, $I_{DS}$=10A | - | 24.6 | - | S |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$[d] | Diode Forward Voltage | $I_{SD}$=20A, $V_{GS}$=0V | - | 0.8 | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{DS}$=20A, $dI_{SD}/dt$=100A/μs | - | 35.6 | - | ns |
| $t_a$ | Charge Time | | - | 19.3 | - | |
| $t_b$ | Discharge Time | | - | 16.3 | - | |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 26 | - | nC |
| **Dynamic Characteristics**[e] | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,F=1MHz | - | 1 | 2 | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V,<br>$V_{DS}$=15V,<br>Frequency=1.0MHz | - | 1350 | 1855 | pF |
| $C_{oss}$ | Output Capacitance | | - | 326 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 160 | - | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=15V, $R_L$=15Ω,<br>$I_{DS}$=1A, $V_{GEN}$=10V,<br>$R_G$=6Ω | - | 12.4 | 23 | ns |
| $t_r$ | Turn-on Rise Time | | - | 9.5 | 18 | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 27.2 | 49 | |
| $t_f$ | Turn-off Fall Time | | - | 35.2 | 64 | |
| **Gate Charge Characteristics**[e] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=15V, $V_{GS}$=10V,<br>$I_{DS}$=20A | - | 20.6 | 28.8 | nC |
| $Q_g$ | Total Gate Charge | $V_{DS}$=15V, $V_{GS}$=4.5V,<br>$I_{DS}$=20A | - | 9.8 | - | |
| $Q_{gth}$ | Threshold Gate Charge | | - | 1.8 | - | |
| $Q_{gs}$ | Gate-Source Charge | | - | 3.8 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 3.7 | - | |

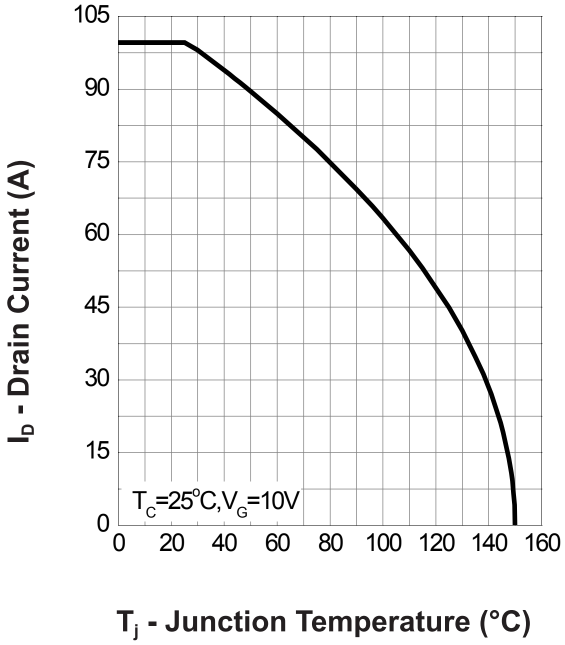
Note d：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e：Guaranteed by design, not subject to production testing.

## Typical Operating Characteristics

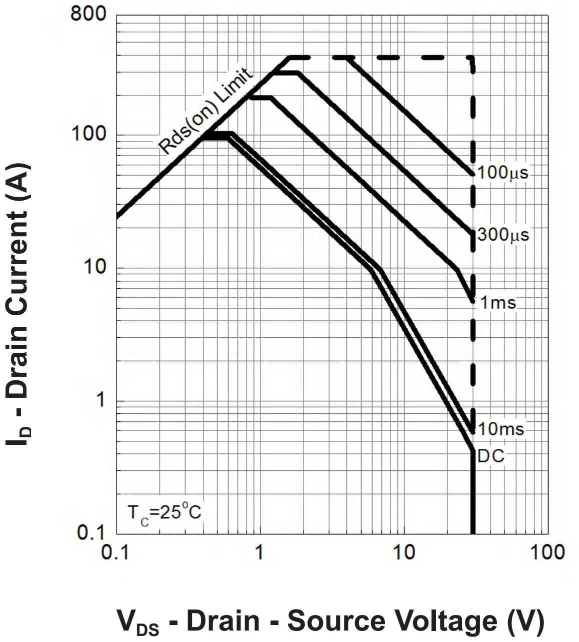
**Power Dissipation**



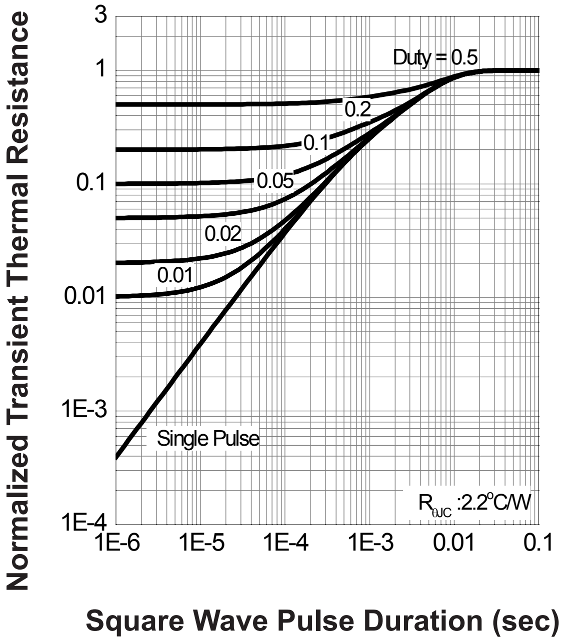
**Drain Current**



**Safe Operation Area**

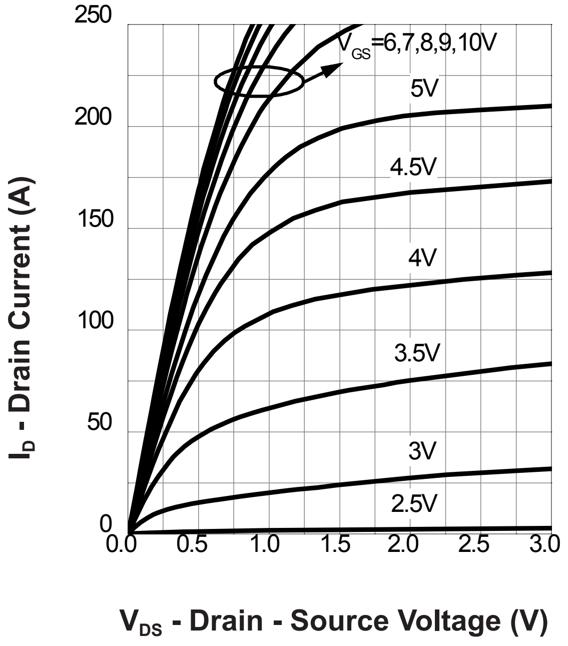


**Thermal Transient Impedance**

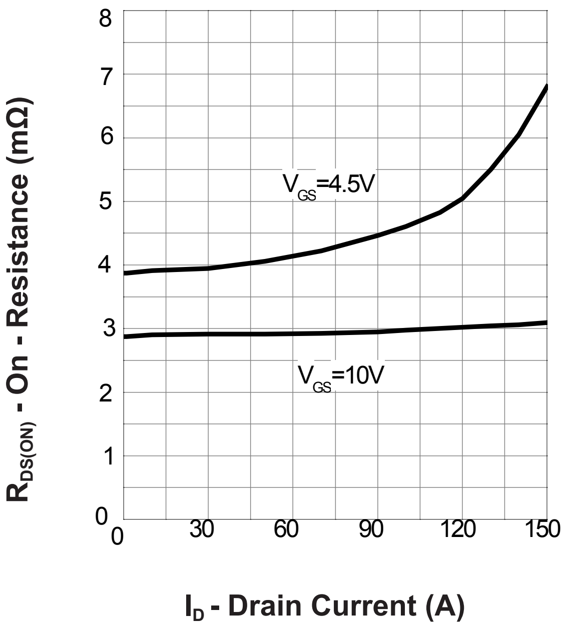


## Typical Operating Characteristics(Cont.)

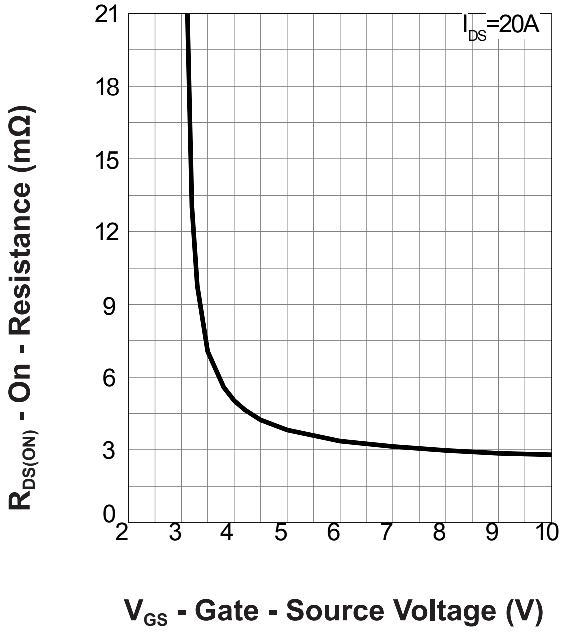
**Output Characteristics**



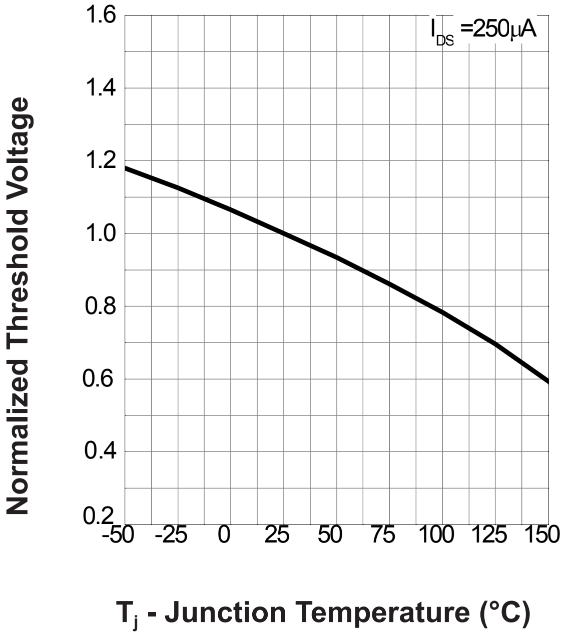
**Drain-Source On Resistance**



**Gate-Source On Resistance**

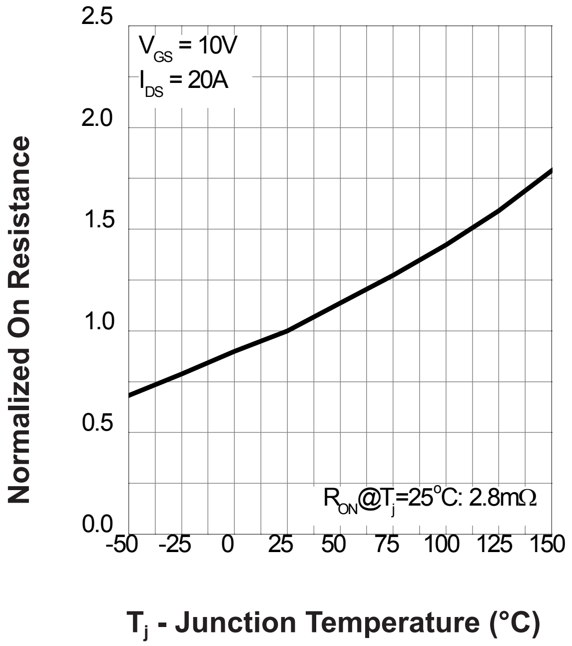


**Gate Threshold Voltage**

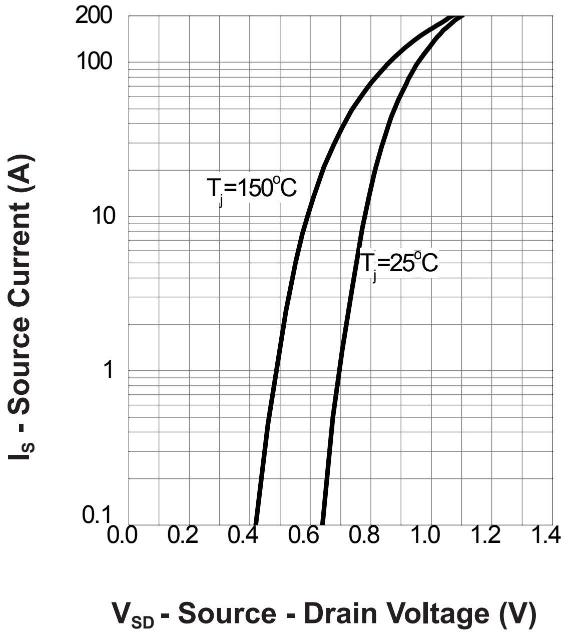


## Typical Operating Characteristics(Cont.)

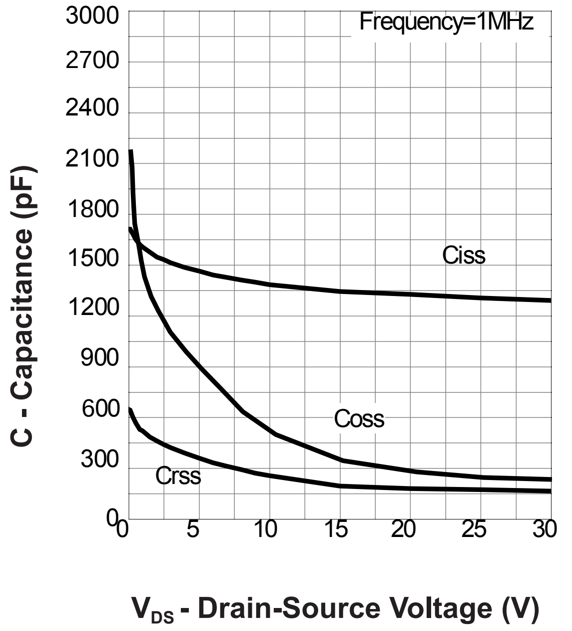
**Drain-Source On Resistance**



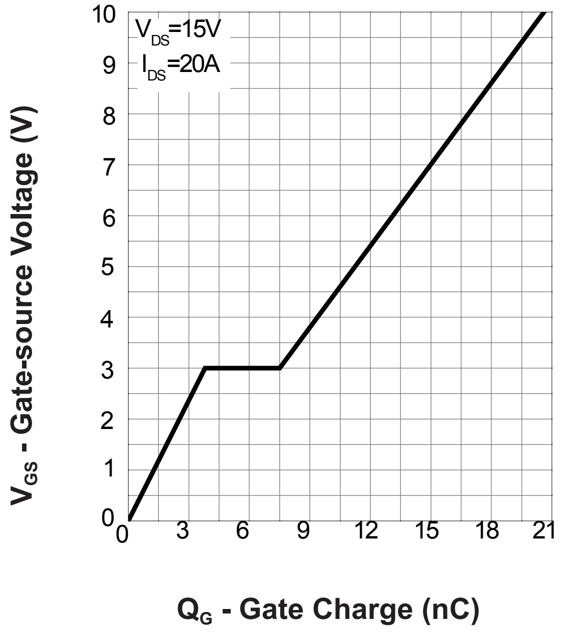
**Source-Drain Diode Forward**



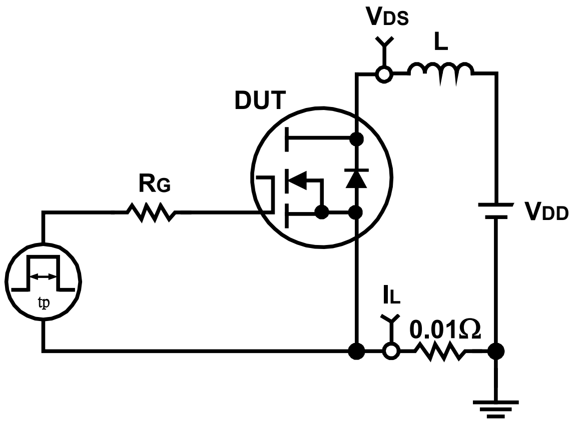
**Capacitance**

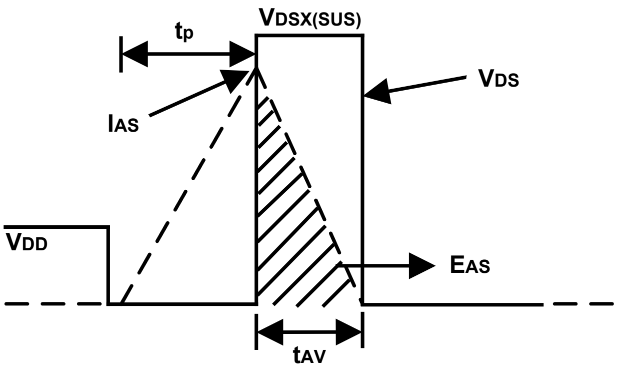


**Gate Charge**

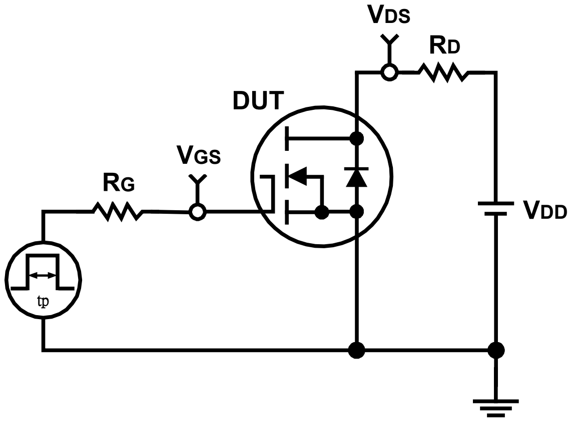


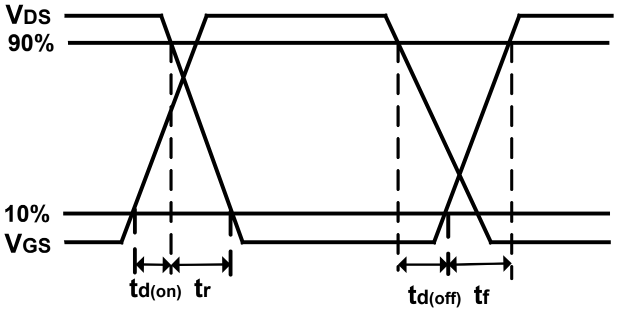
## Avalanche Test Circuit and Waveforms





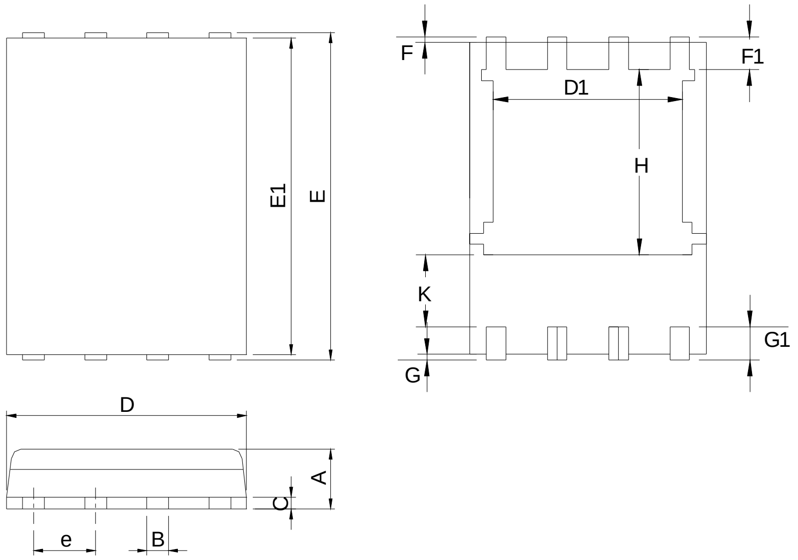
## Switching Time Test Circuit and Waveforms





## Package Information

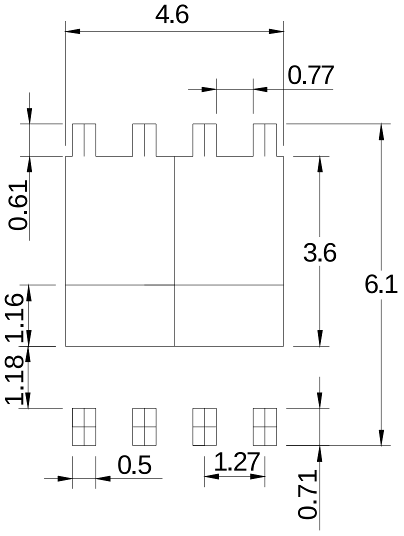
PDFN5*6-8L



| SYMBOL | PDFN5*6-8L | | | |
|---|---|---|---|---|
| | **MILLIMETERS** | | **INCHES** | |
| | **MIN.** | **MAX.** | **MIN.** | **MAX.** |
| A | 0.90 | 1.20 | 0.035 | 0.047 |
| B | 0.3 | 0.51 | 0.012 | 0.020 |
| C | 0.19 | 0.25 | 0.007 | 0.010 |
| D | 4.80 | 5.30 | 0.189 | 0.209 |
| D1 | 4.00 | 4.40 | 0.157 | 0.173 |
| E | 5.90 | 6.20 | 0.232 | 0.244 |
| E1 | 5.50 | 5.80 | 0.217 | 0.228 |
| e | 1.27 BSC | | 0.050 BSC | |
| F | 0.05 | 0.30 | 0.002 | 0.012 |
| F1 | 0.35 | 0.75 | 0.014 | 0.030 |
| G | 0.05 | 0.30 | 0.002 | 0.012 |
| G1 | 0.35 | 0.75 | 0.014 | 0.030 |
| H | 3.34 | 3.9 | 0.131 | 0.154 |
| K | 0.762 | - | 0.03 | - |

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

**RECOMMENDED LAND PATTERN**



UNIT: mm