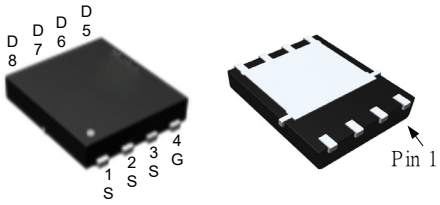
## Features

- 40V/88A
  $R_{DS(ON)}$=4mΩ(typ.)@$V_{GS}$=10V
  $R_{DS(ON)}$=5.5mΩ(typ.)@$V_{GS}$=4.5V
- 100% UIS + $R_g$ Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

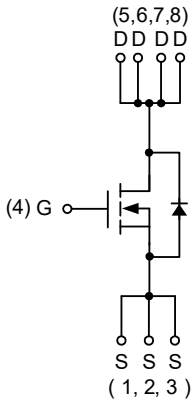
## Applications

- Power Management in Desktop Computer or DC/DC Converters.

## 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 | | 40 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | |
| $T_J$ | Maximum Junction Temperature | | 175 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 175 | °C |
| $I_S$ | Diode Continuous Forward Current | $T_C$=25°C | 88 | A |
| $I_D$ | Continuous Drain Current | $T_C$=25°C | 88 | A |
| | | $T_C$=100°C | 53 | |
| $I_{DM}$ [a] | Pulse Drain Current | $T_C$=25°C | 264 | A |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 68 | W |
| | | $T_C$=100°C | 34 | |
| $R_{\theta JC}$ | 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 | 40 | A |
| $E_{AS}$ [c] | Avalanche Energy, Single pulse | L=0.1mH | 80 | 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 (initial temperature $T_j$=25°C).

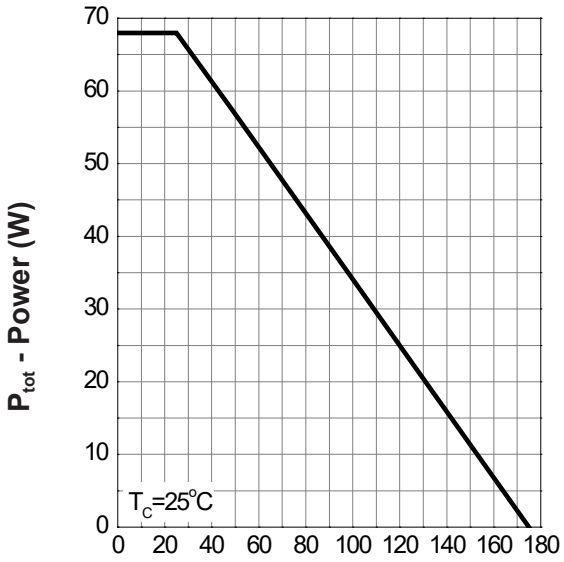
## Electrical Characteristics ($T_A$ = 25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 40 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=32V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $T_J$=85°C | - | - | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 1.4 | 1.8 | 2.5 | 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 | - | 4 | 5.3 | mΩ |
| | | $T_J$=125°C | - | 6.3 | - | |
| | | $V_{GS}$=4.5V, $I_{DS}$=15A | - | 5.5 | 7.6 | |
| Gfs | Forward Transconductance | $V_{DS}$=5V, $I_{DS}$=15A | - | 25 | - | S |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$ [d] | Diode Forward Voltage | $I_{SD}$=20A, $V_{GS}$=0V | - | 0.85 | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{DS}$=20A, $dI_{SD}$/dt=100A/μs | - | 25 | - | ns |
| $t_a$ | Charge Time | | - | 15 | - | |
| $t_b$ | Discharge Time | | - | 10 | - | |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 15 | - | 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, $V_{DS}$=20V, Frequency=1.0MHz | - | 980 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 317 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 46 | - | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=20V, $R_L$=20Ω, $I_{DS}$=1A, $V_{GEN}$=10V, $R_G$=6Ω | - | 13.3 | 24 | ns |
| $t_r$ | Turn-on Rise Time | | - | 7.9 | 15 | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 29.1 | 53 | |
| $t_f$ | Turn-off Fall Time | | - | 21 | 38 | |
| **Gate Charge Characteristics** [e] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=20V, $V_{GS}$=10V, $I_{DS}$=20A | - | 22 | 30.8 | nC |
| $Q_{gth}$ | Threshold Gate Charge | | - | 2.3 | - | |
| $Q_{gs}$ | Gate-Source Charge | | - | 4.2 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 3 | - | |

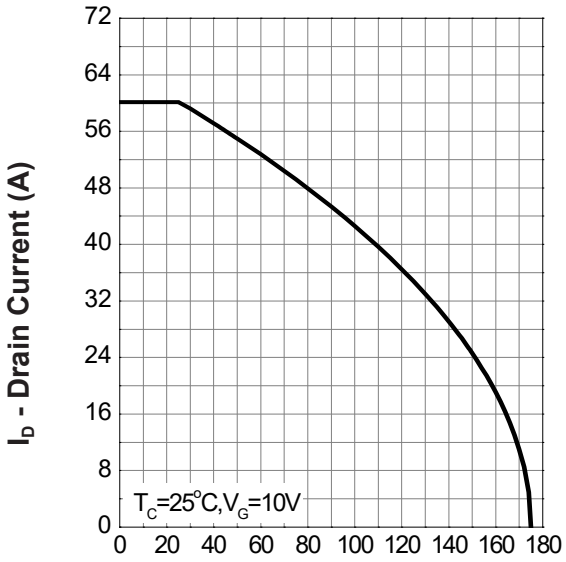
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e : Guaranteed by design, not subject to production testing.

## Typical Operating Characteristics

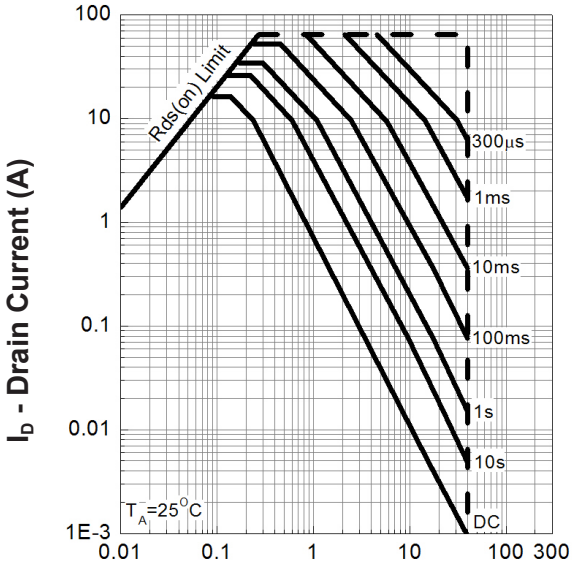
### Power Dissipation



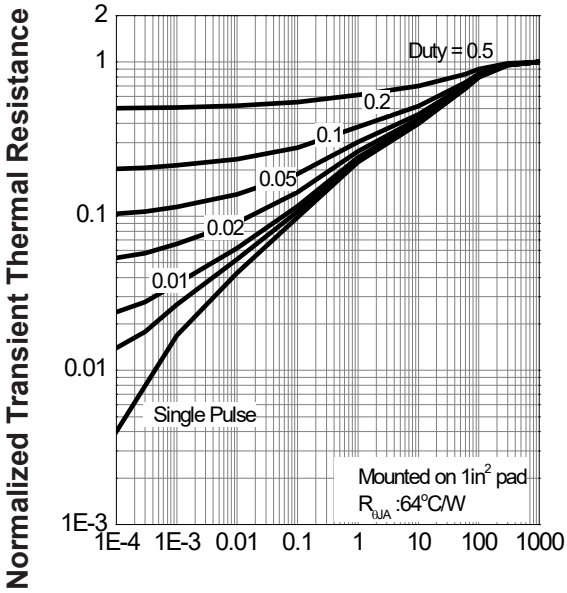

### Drain Current




### Safe Operation Area

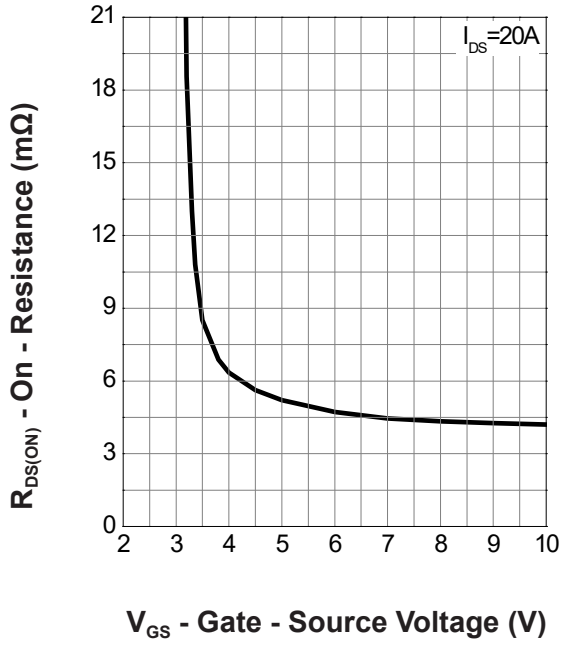



### Thermal Transient Impedance

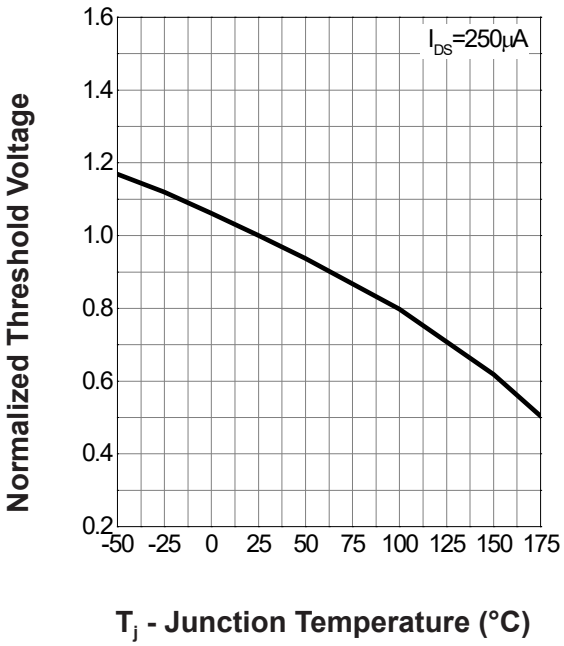


## Typical Operating Characteristics(Cont.)

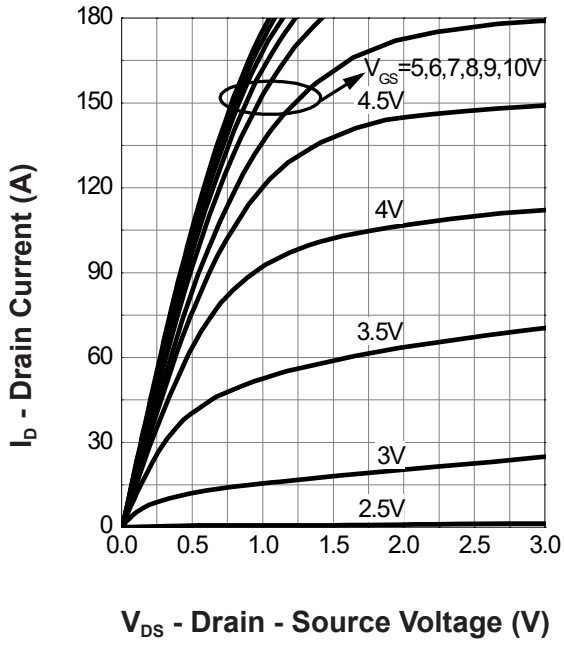
### Gate-Source On Resistance



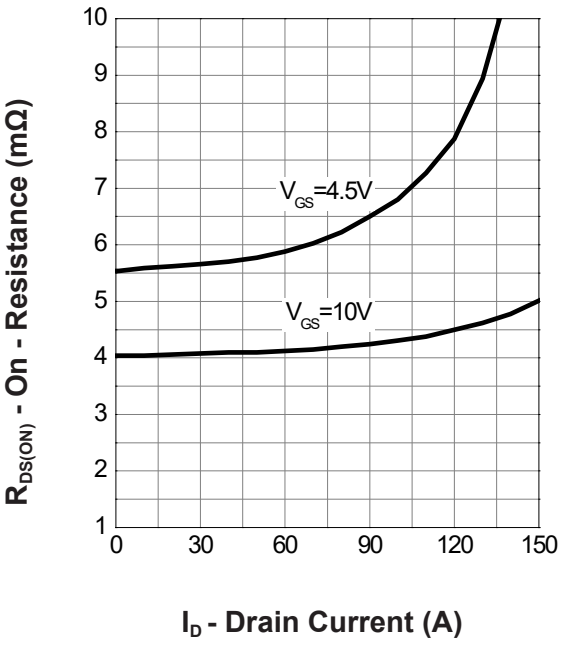

### Gate Threshold Voltage




### Output Characteristics

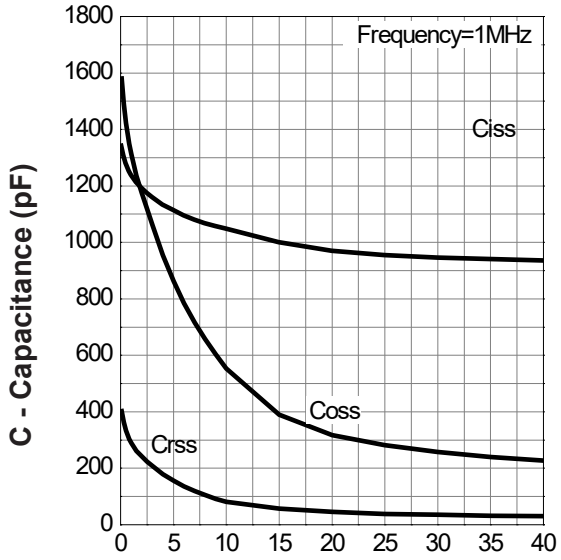



### Drain-Source On Resistance

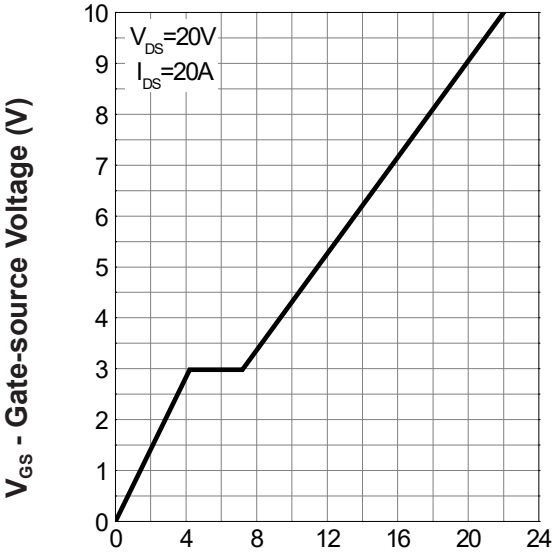


## Typical Operating Characteristics(Cont.)

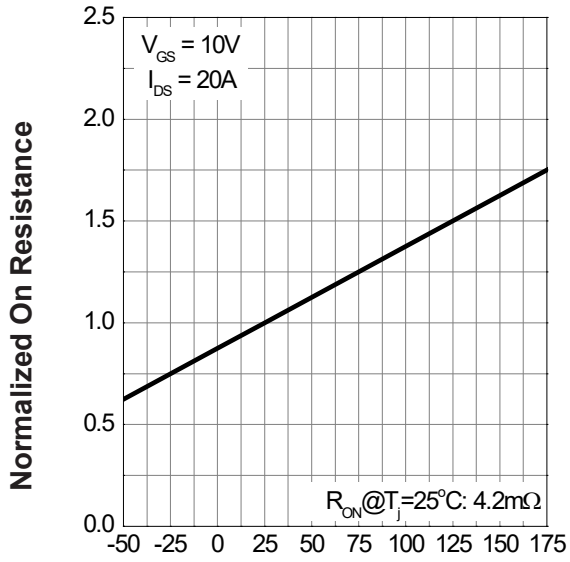
### Capacitance



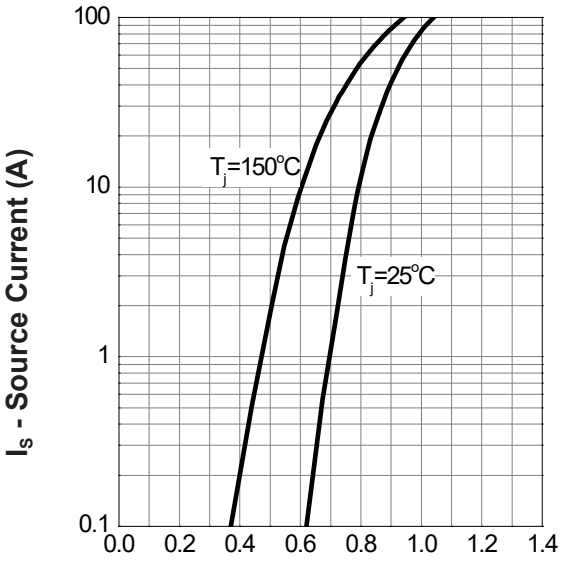

### Gate Charge



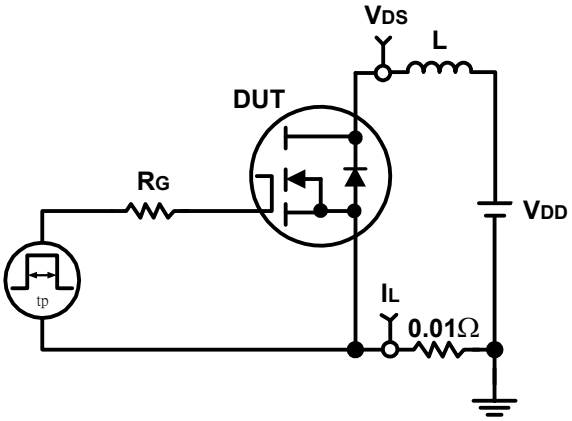

### Drain-Source On Resistance

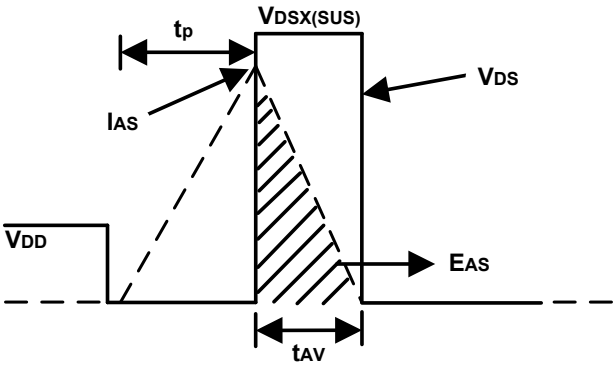



### Source-Drain Diode Forward

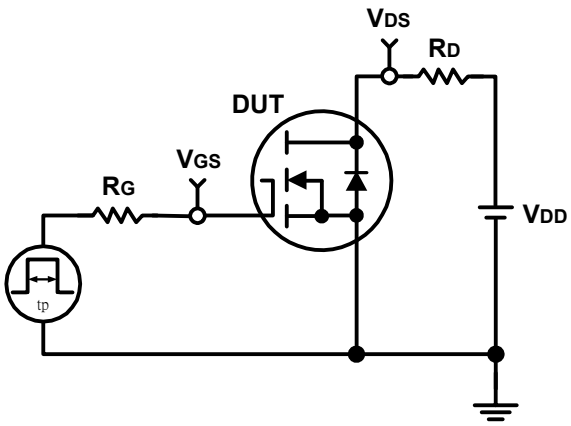


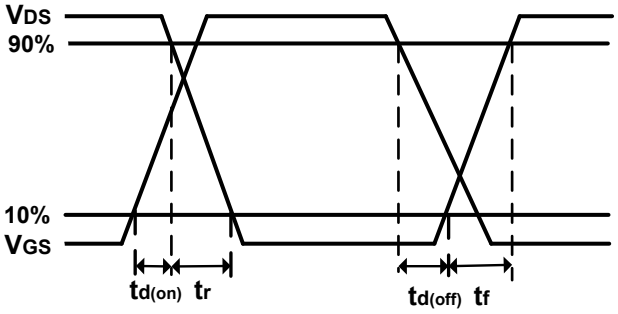
## Avalanche Test Circuit and Waveforms



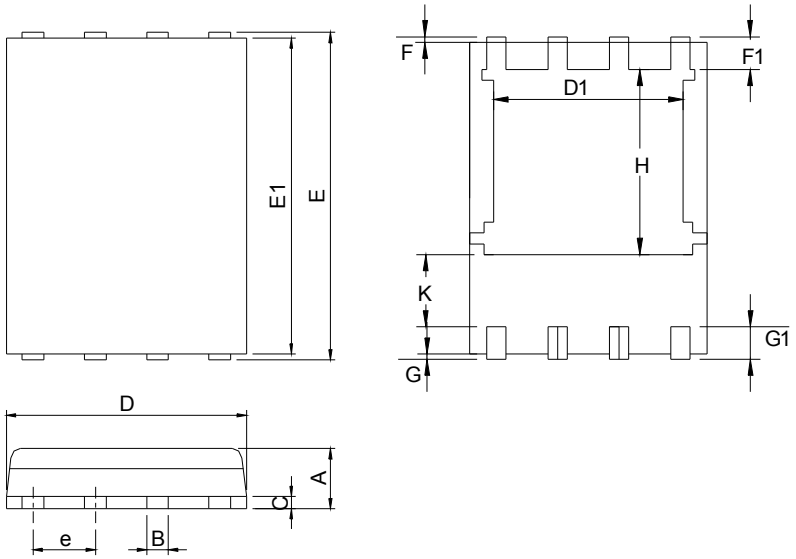

## Switching Time Test Circuit and Waveforms



# Package Information

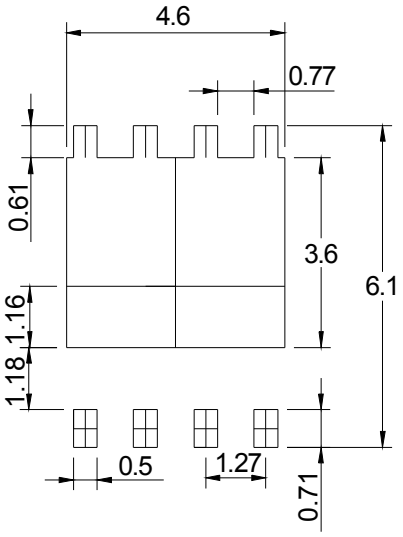
**PDFN5*6-8L**




| 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