

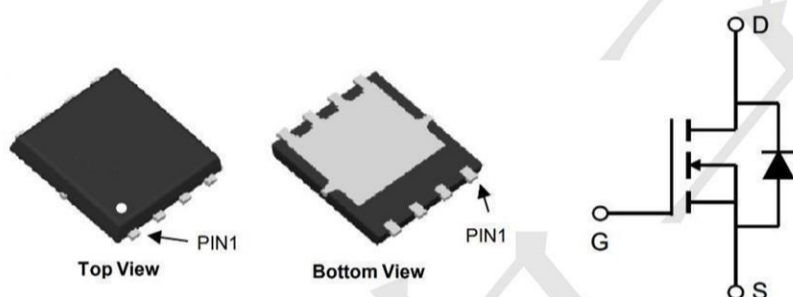
### Features

- Advanced trench cell design
- Low Thermal Resistance
- Low Gate Charge

### Application

- Motor/Body Load Control
- Load Switch
- PWM Application
- DC-DC converters and Off-line UPS

### PDFN5X6 -8L Pin Configuration



### Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                        |                           | Symbol         | Value          | Unit             |
|--------------------------------------------------|---------------------------|----------------|----------------|------------------|
| Drain-Source Voltage                             |                           | $V_{DS}$       | 85             | V                |
| Gate-Source Voltage                              |                           | $V_{GS}$       | $\pm 20$       | V                |
| Continuous Drain Current                         | $T_c = 25^\circ\text{C}$  | $I_D$          | 85             | A                |
|                                                  | $T_c = 100^\circ\text{C}$ |                | 56             |                  |
| Peak Drain Current, Pulsed <sup>1)</sup>         |                           | $I_{DM}$       | 200            | A                |
| Avalanche Current                                |                           | $I_{AS}$       | 53             | A                |
| Single Pulse Avalanche Energy <sup>2)</sup>      |                           | $E_{AS}$       | 140            | mJ               |
| Power Dissipation $T_c = 25^\circ\text{C}$       |                           | $P_{tot}$      | 83             | W                |
| Operating Junction and Storage Temperature Range |                           | $T_J, T_{stg}$ | $-55 \sim 150$ | $^\circ\text{C}$ |

### Thermal Characteristics

| Parameter                                              | Symbol          | Max. | Unit               |
|--------------------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance from Junction to Case <sup>3)</sup> | $R_{\theta JC}$ | 1.5  | $^\circ\text{C/W}$ |
| Thermal Resistance from Junction to Ambient            | $R_{\theta JA}$ | 55   | $^\circ\text{C/W}$ |

**Characteristics at Ta = 25°C unless otherwise specified**

| Parameter                                                                                         | Symbol       | Min. | Type. | Max.      | Unit       |
|---------------------------------------------------------------------------------------------------|--------------|------|-------|-----------|------------|
| <b>STATIC PARAMETERS</b>                                                                          |              |      |       |           |            |
| Drain-Source Breakdown Voltage<br>at $I_D = 250\mu A$                                             | $BV_{DSS}$   | 85   |       |           | V          |
| Drain-Source Leakage Current<br>at $V_{DS} = 80 V$                                                | $I_{DSS}$    |      |       | 1         | $\mu A$    |
| Gate Leakage Current<br>at $V_{GS} = \pm 20 V$                                                    | $I_{GSS}$    |      |       | $\pm 100$ | nA         |
| Gate-Source Threshold Voltage<br>at $V_{DS} = V_{GS}$ , $I_D = 250 \mu A$                         | $V_{GS(th)}$ | 2    | 3     | 4         | V          |
| Drain-Source On-State Resistance<br>at $V_{GS} = 10 V$ , $I_D = 30 A$                             | $R_{DS(on)}$ |      | 4.5   | 5         | m $\Omega$ |
| <b>DYNAMIC PARAMETERS</b>                                                                         |              |      |       |           |            |
| Gate resistance<br>at $V_{DS} = 0 V$ , $f = 1 MHz$                                                | $R_g$        |      | 1.35  | 2.1       | $\Omega$   |
| Forward Transconductance<br>at $V_{DS} = 5 V$ , $I_D = 20 A$                                      | $g_{fs}$     |      | 70    |           | S          |
| Input Capacitance<br>at $V_{GS} = 0 V$ , $V_{DS} = 40 V$ , $f = 1 MHz$                            | $C_{iss}$    |      | 4194  |           | pF         |
| Output Capacitance<br>at $V_{GS} = 0 V$ , $V_{DS} = 40 V$ , $f = 1 MHz$                           | $C_{oss}$    |      | 665   |           | pF         |
| Reverse Transfer Capacitance<br>at $V_{GS} = 0 V$ , $V_{DS} = 40 V$ , $f = 1 MHz$                 | $C_{rss}$    |      | 31    |           | pF         |
| Gate charge total<br>at $V_{DS} = 40 V$ , $I_D = 20 A$ , $V_{GS} = 10 V$                          | $Q_g$        |      | 36.5  | 51        | nC         |
| Gate to Source Charge<br>at $V_{DS} = 40 V$ , $I_D = 20 A$ , $V_{GS} = 10 V$                      | $Q_{gs}$     |      | 11    |           | nC         |
| Gate to Drain Charge<br>at $V_{DS} = 40 V$ , $I_D = 20 A$ , $V_{GS} = 10 V$                       | $Q_{gd}$     |      | 6     |           | nC         |
| Turn-On Delay Time<br>at $V_{GS} = 10 V$ , $V_{DS} = 40 V$ , $R_L = 2 \Omega$ , $R_g = 3 \Omega$  | $t_{d(on)}$  |      | 11    |           | nS         |
| Turn-On Rise Time<br>at $V_{GS} = 10 V$ , $V_{DS} = 40 V$ , $R_L = 2 \Omega$ , $R_g = 3 \Omega$   | $t_r$        |      | 5     |           | nS         |
| Turn-Off Delay Time<br>at $V_{GS} = 10 V$ , $V_{DS} = 40 V$ , $R_L = 2 \Omega$ , $R_g = 3 \Omega$ | $t_{d(off)}$ |      | 25    |           | nS         |
| Turn-Off Fall Time<br>at $V_{GS} = 10 V$ , $V_{DS} = 40 V$ , $R_L = 2 \Omega$ , $R_g = 3 \Omega$  | $t_f$        |      | 6     |           | nS         |
| <b>Body-Diode PARAMETERS</b>                                                                      |              |      |       |           |            |
| Drain-Source Diode Forward Voltage<br>at $I_S = 1 A$ , $V_{GS} = 0 V$                             | $V_{SD}$     |      | 0.71  | 1         | V          |
| Body Diode Reverse Recovery Time<br>at $I_F = 20 A$ , $di/dt = 500 A / \mu s$                     | $t_{rr}$     |      | 30    |           | nS         |
| Body Diode Reverse Recovery Charge<br>at $I_F = 20 A$ , $di/dt = 500 A / \mu s$                   | $Q_{rr}$     |      | 126   |           | nC         |

## Typical Characteristics

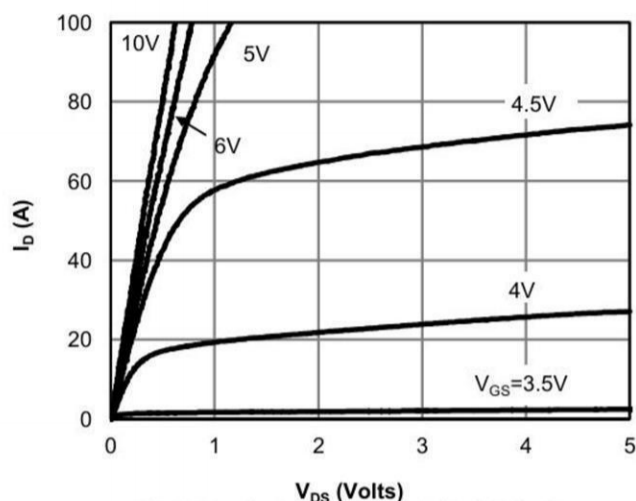


Fig 1: On-Region Characteristics (Note E)

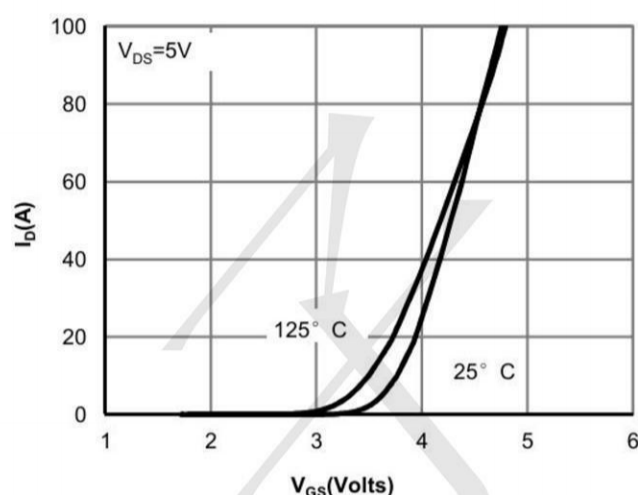


Figure 2: Transfer Characteristics (Note E)

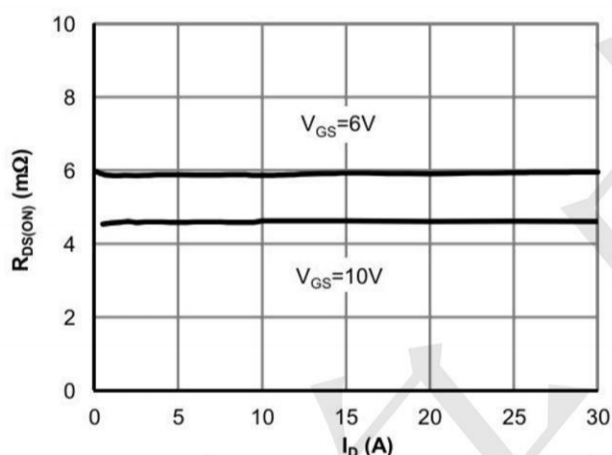


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

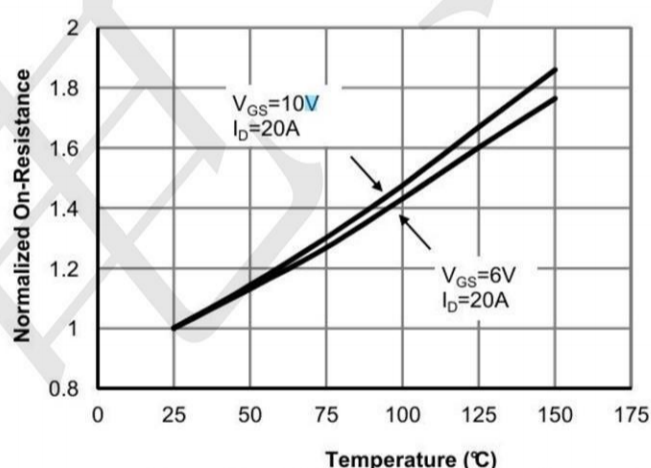


Figure 4: On-Resistance vs. Junction Temperature (Note E)

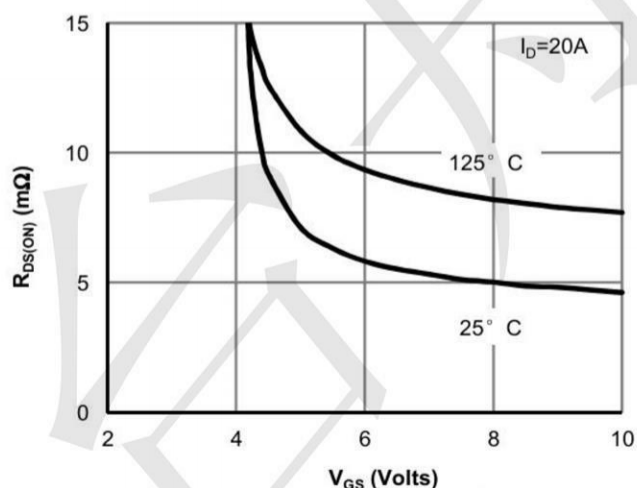


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

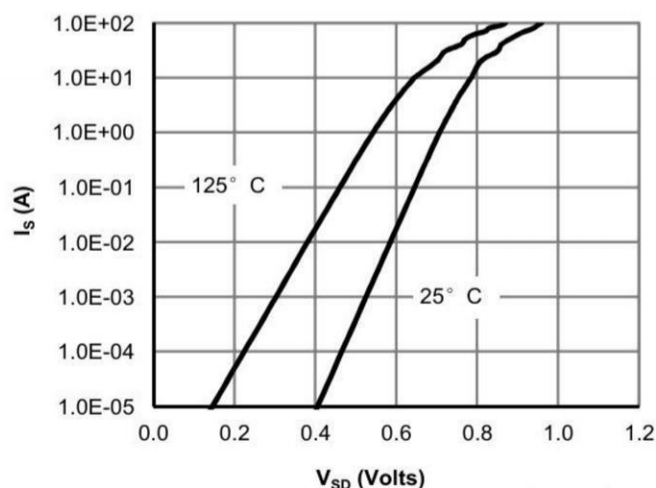


Figure 6: Body-Diode Characteristics (Note E)

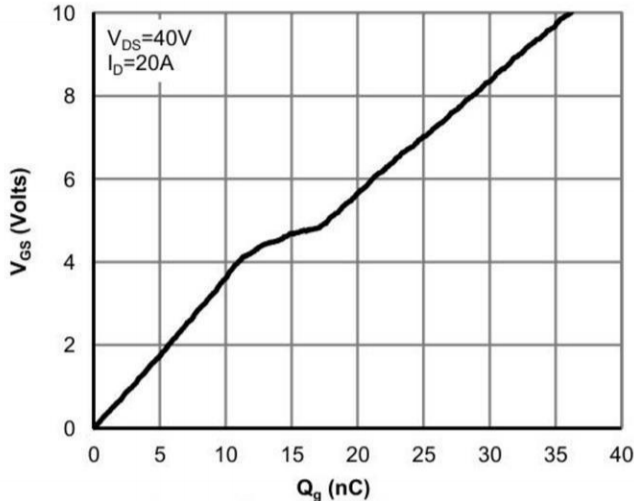


Figure 7: Gate-Charge Characteristics

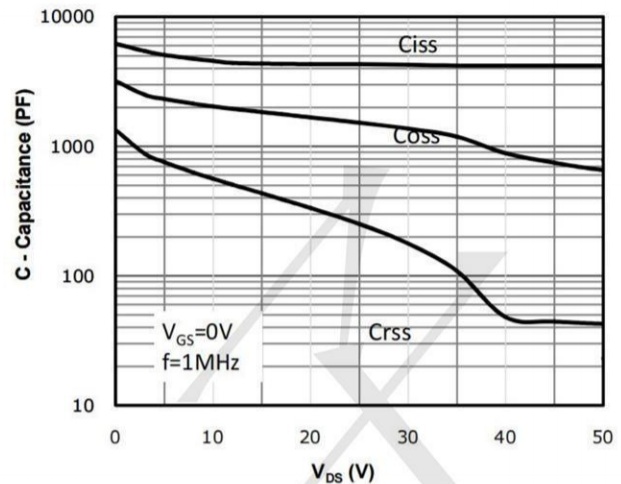


Figure 8: Capacitance Characteristics

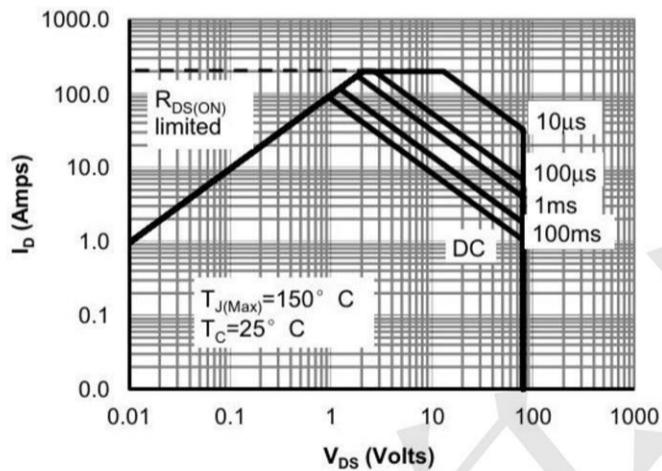


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

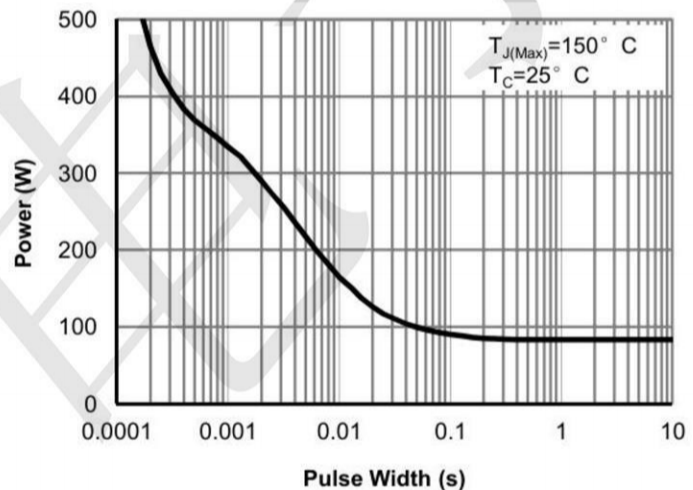


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

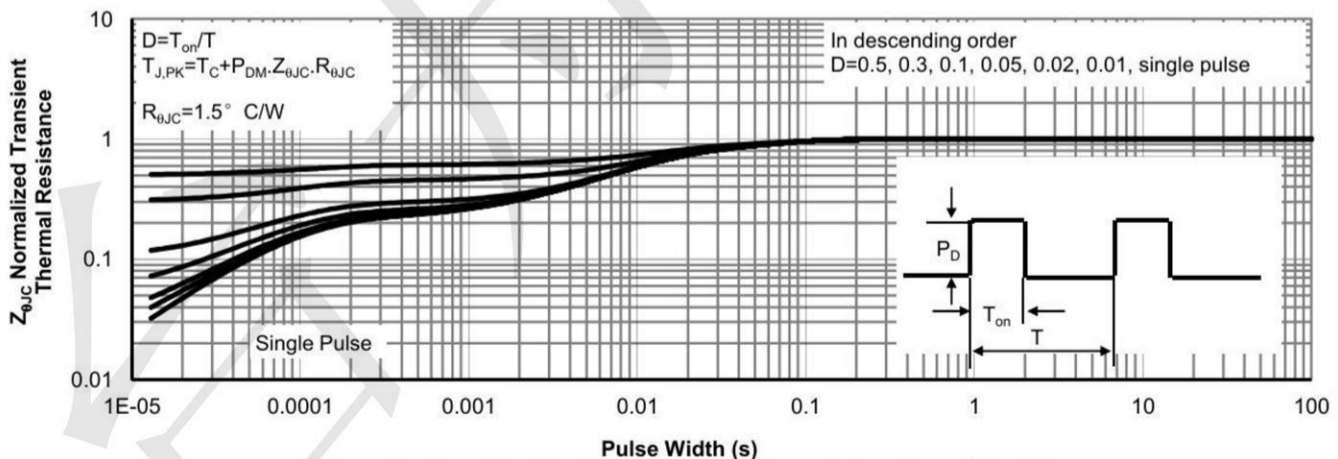


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)



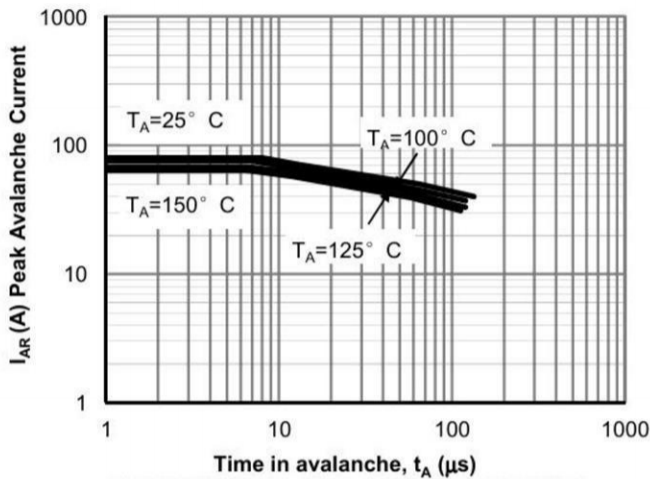


Figure 12: Single Pulse Avalanche capability (Note C)

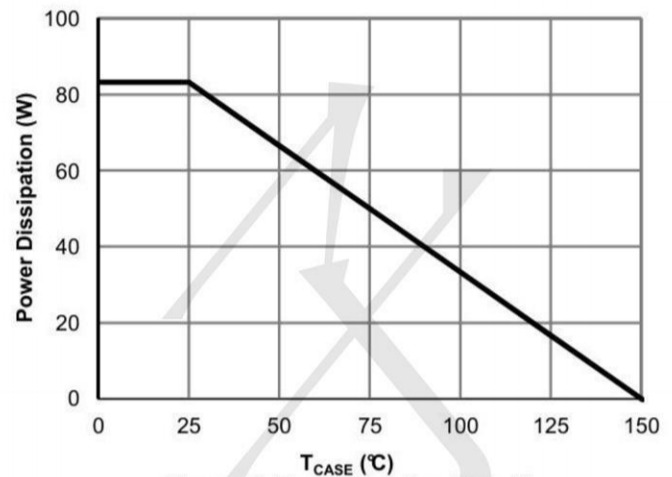


Figure 13: Power De-rating (Note F)

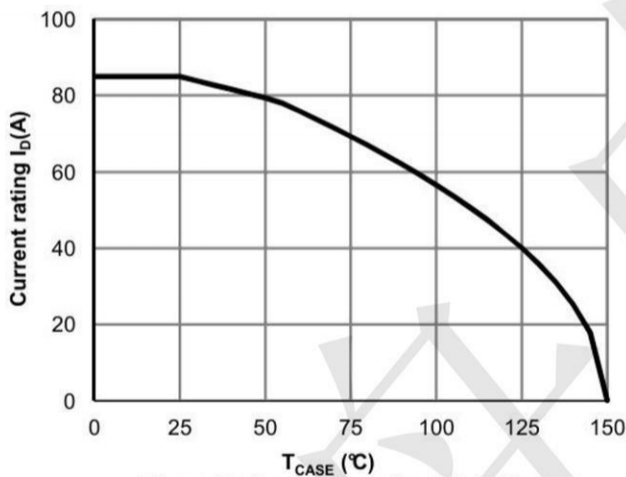


Figure 14: Current De-rating (Note F)

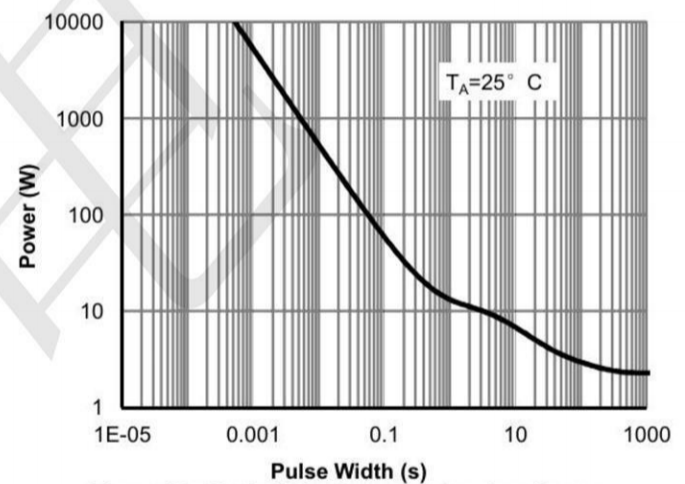


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

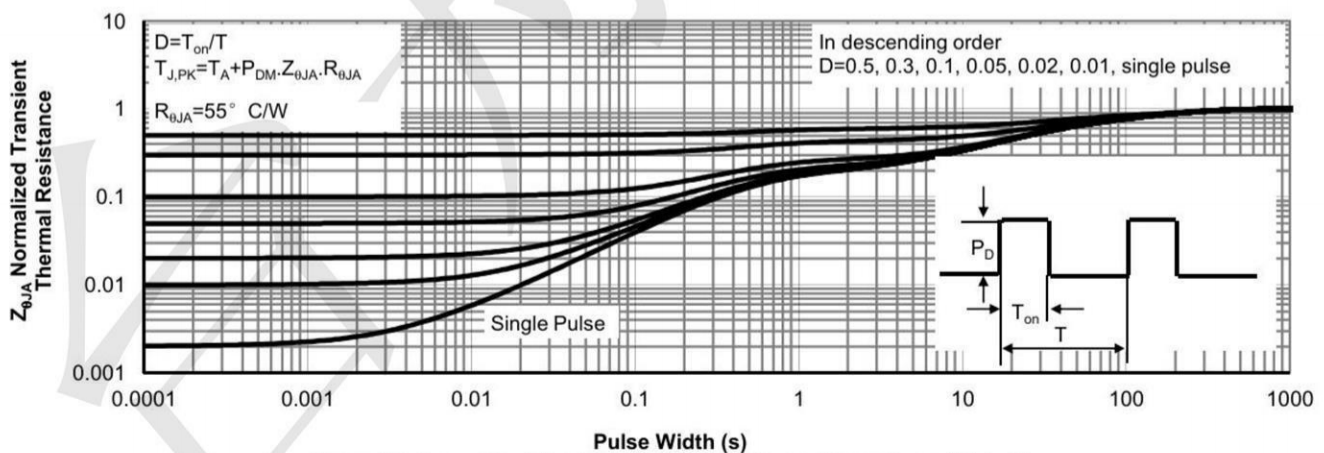
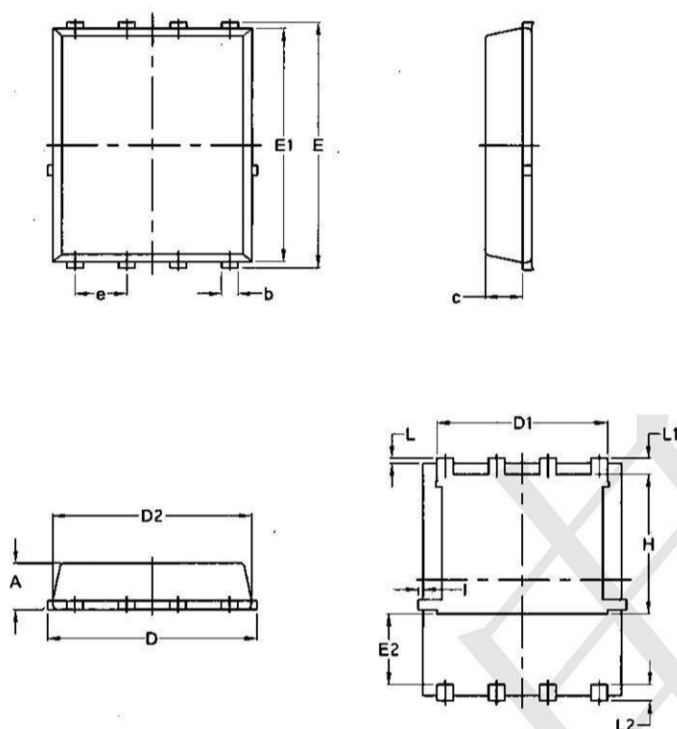


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

**Package Outline Dimensions PDFN5\*6-8L**



| Symbol | Common   |        |          |        |
|--------|----------|--------|----------|--------|
|        | mm       |        | Inch     |        |
|        | Min      | Max    | Min      | Max    |
| A      | 1.03     | 1.17   | 0.0406   | 0.0461 |
| b      | 0.34     | 0.48   | 0.0134   | 0.0189 |
| c      | 0.824    | 0.0970 | 0.0324   | 0.082  |
| D      | 4.80     | 5.40   | 0.1890   | 0.2126 |
| D1     | 4.11     | 4.31   | 0.1618   | 0.1697 |
| D2     | 4.80     | 5.00   | 0.1890   | 0.1969 |
| E      | 5.95     | 6.15   | 0.2343   | 0.2421 |
| E1     | 5.65     | 5.85   | 0.2224   | 0.2303 |
| E2     | 1.60     | /      | 0.0630   | /      |
| e      | 1.27 BSC |        | 0.05 BSC |        |
| L      | 0.05     | 0.25   | 0.0020   | 0.0098 |
| L1     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| L2     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| H      | 3.30     | 3.50   | 0.1299   | 0.1378 |
| I      | /        | 0.18   | /        | 0.0070 |