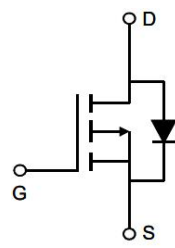
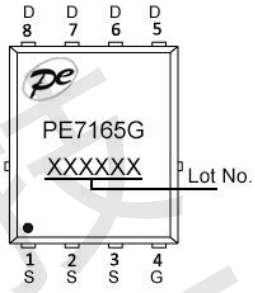
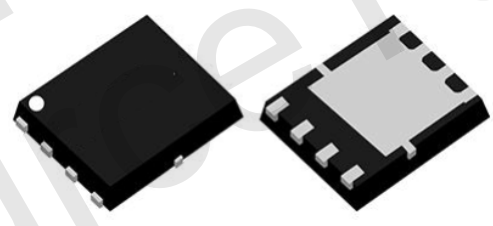




**P-Channel Enhancement Mode Power MOSFET**

|  |   |
|--|---|
| <p><b>Description</b><br/>The PE7165G uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math> and low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li><math>V_{DS} = -18V, I_D = -65A</math></li> <li><math>R_{DS(ON)} &lt; 4m\Omega @ V_{GS} = -4.5V</math></li> <li><math>R_{DS(ON)} &lt; 5.6m\Omega @ V_{GS} = -2.5V</math></li> <li>High Power and current handing capability</li> <li>Lead free product is acquired</li> <li>Surface Mount Package</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>PWM applications</li> <li>Load switch</li> <li>Power management</li> </ul> |  <p><b>Schematic diagram</b></p>  <p><b>Marking and pin assignment</b></p>  <p><b>DFN5x6-8L</b></p> |
|--|---|

**Absolute Maximum Ratings (TC=25°C unless otherwise noted)**

| Parameter  | Symbol         | Rating     | Unit |
|--|----------------|------------|------|
| Drain-Source Voltage                             | $V_{DS}$       | -18        | V    |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 12$   | V    |
| Drain Current-Continuous (TC=25°C)               | $I_D$          | -65        | A    |
| Drain Current-Continuous (TC=100°C)              | $I_D$          | -52        | A    |
| Pulsed Drain Current (Note 1)                    | $I_{DM}$       | -260       | A    |
| Maximum Power Dissipation                        | $P_D$          | 156        | W    |
| Avalanche Current                                | $I_{AS}$       | 68         | A    |
| Avalanche Energy (L=0.1mH)                       | $E_{AS}$       | 231        | mJ   |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 To 150 | °C   |

**Thermal Characteristic**

|                                      |                 |     |      |
|--------------------------------------|-----------------|-----|------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 0.8 | °C/W |
|--------------------------------------|-----------------|-----|------|



**Electrical Characteristics (TC=25°C unless otherwise noted)**

| Parameter                                 | Symbol       | Condition   | Min   | Typ  | Max       | Unit       |
|---|--------------|---|-------|------|-----------|------------|
| <b>Off Characteristics</b>                |              |   |       |      |           |            |
| Drain-Source Breakdown Voltage            | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$                                | -     | -18  | -         | V          |
| Zero Gate Voltage Drain Current           | $I_{DSS}$    | $V_{DS}=-12V, V_{GS}=0V$                                  | -     | -    | -1        | $\mu A$    |
| Gate-Body Leakage Current                 | $I_{GSS}$    | $V_{GS}=\pm 10V, V_{DS}=0V$                               | -     | -    | $\pm 100$ | nA         |
| <b>On Characteristics (Note 3)</b>        |              |   |       |      |           |            |
| Gate Threshold Voltage                    | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                            | -0.45 | -0.7 | -1        | V          |
| Drain-Source On-State Resistance          | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-20A$                                  | -     | 3    | 4         | m $\Omega$ |
|   |              | $V_{GS}=-2.5V, I_D=-15A$                                  | -     | 3.8  | 5.6       | m $\Omega$ |
| Forward Transconductance                  | $g_{FS}$     | $V_{DS}=-5V, I_D=-15A$                                    | -     | 105  | -         | S          |
| <b>Dynamic Characteristics (Note 4)</b>   |              |   |       |      |           |            |
| Input Capacitance                         | $C_{iss}$    | $V_{DS}=-10V, V_{GS}=0V,$<br>$F=1.0MHz$                   | -     | 8100 | -         | pF         |
| Output Capacitance                        | $C_{oss}$    |   | -     | 2150 | -         | pF         |
| Reverse Transfer Capacitance (Note 4)     | $C_{rss}$    |   | -     | 1160 | -         | pF         |
| <b>Switching Characteristics</b>          |              |   |       |      |           |            |
| Turn-on Delay Time                        | $t_{d(on)}$  | $V_{DD}=-10V, R_L=1\Omega,$<br>$V_{GS}=-10V, R_G=3\Omega$ | -     | 9    | -         | nS         |
| Turn-on Rise Time                         | $t_r$        |   | -     | 18   | -         | nS         |
| Turn-Off Delay Time                       | $t_{d(off)}$ |   | -     | 285  | -         | nS         |
| Turn-Off Fall Time                        | $t_f$        |   | -     | 90   | -         | nS         |
| Total Gate Charge                         | $Q_g$        | $V_{DS}=-10V, I_D=-20A,$<br>$V_{GS}=-10V$                 | -     | 187  | -         | nC         |
| Gate-Source Charge                        | $Q_{gs}$     |   | -     | 17   | -         | nC         |
| Gate-Drain Charge                         | $Q_{gd}$     |   | -     | 28   | -         | nC         |
| <b>Drain-Source Diode Characteristics</b> |              |   |       |      |           |            |
| Diode Forward Voltage (Note 3)            | $V_{SD}$     | $V_{GS}=0V, I_S=-1A$                                      | -     | -    | -1        | V          |
| Diode Forward Current (Note 2)            | $I_S$        |   | -     | -    | -70       | A          |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to product.



### Typical Electrical and Thermal Characteristics

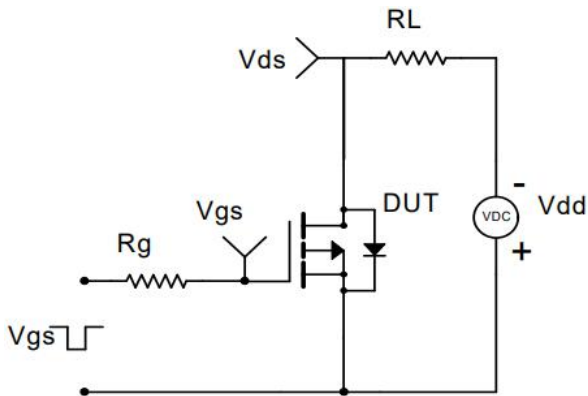


Figure 1 Switching Test Circuit



Figure 2 Switching Waveform

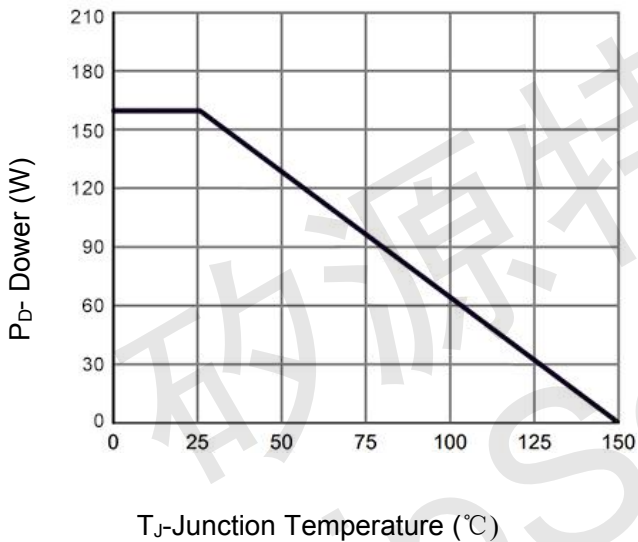


Figure 3 Power De-rating

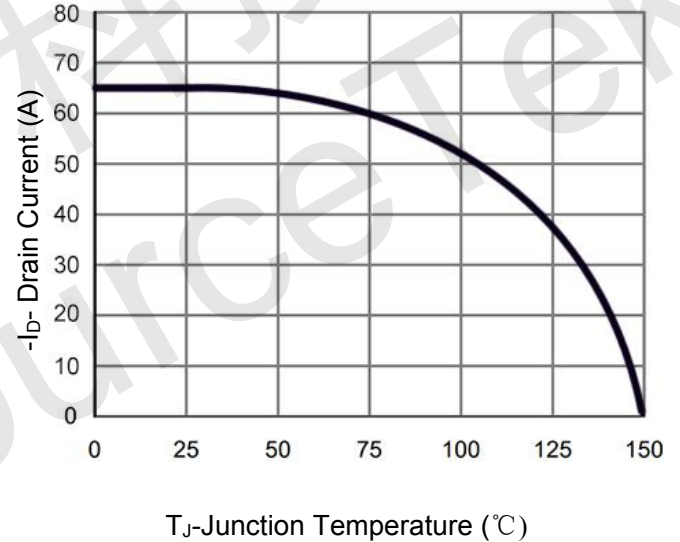


Figure 4 Drain Current

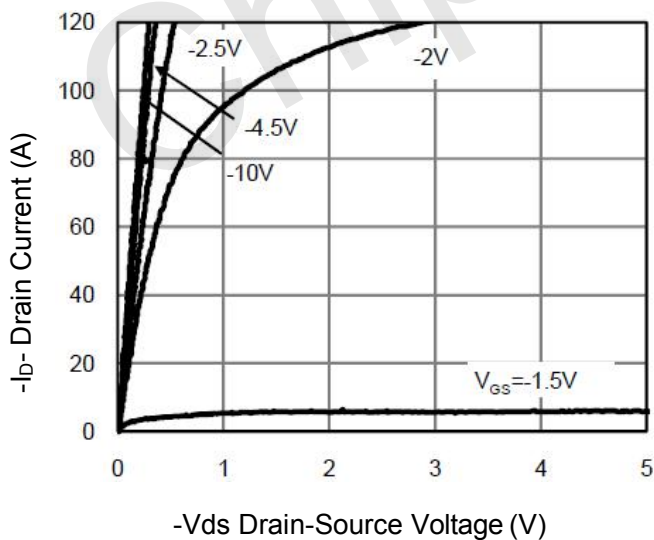


Figure 5 Output Characteristics

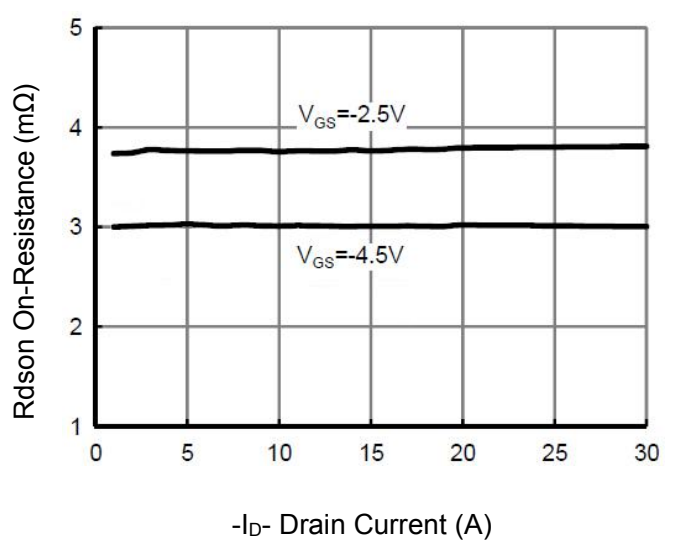


Figure 6 Rdson vs Drain Current

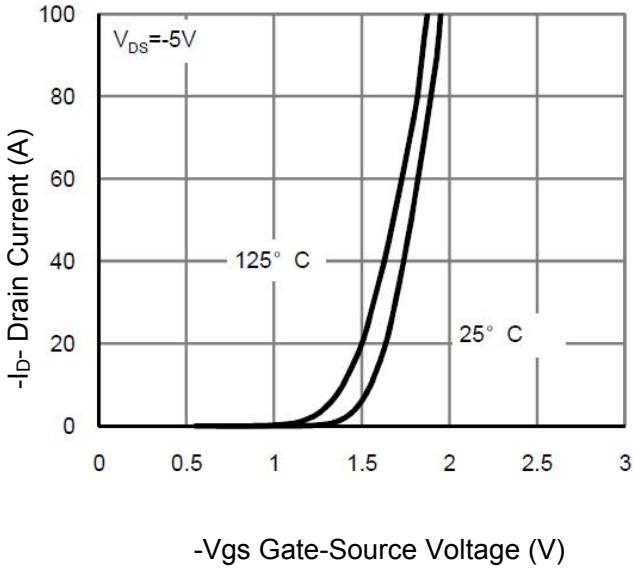


Figure 7 Transfer Characteristics

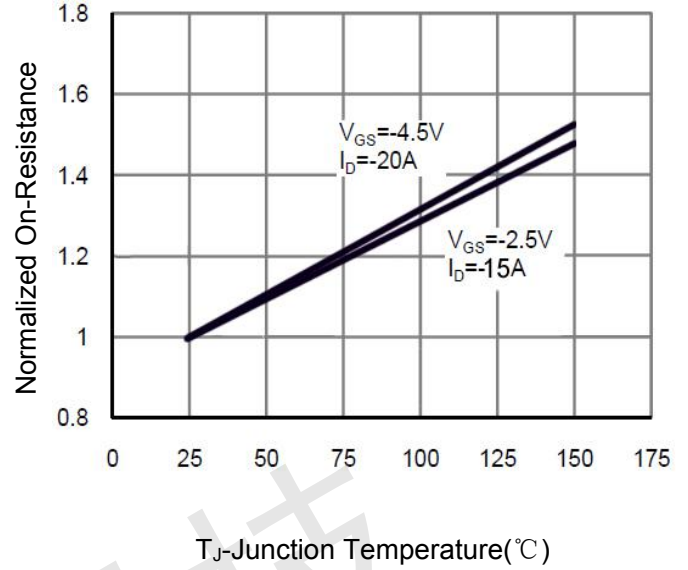


Figure 8 Rdson vs Junction Temperature

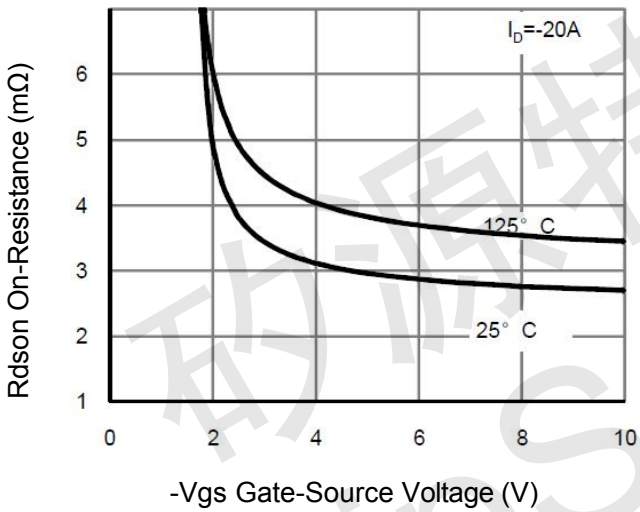


Figure 9 Rdson vs Vgs

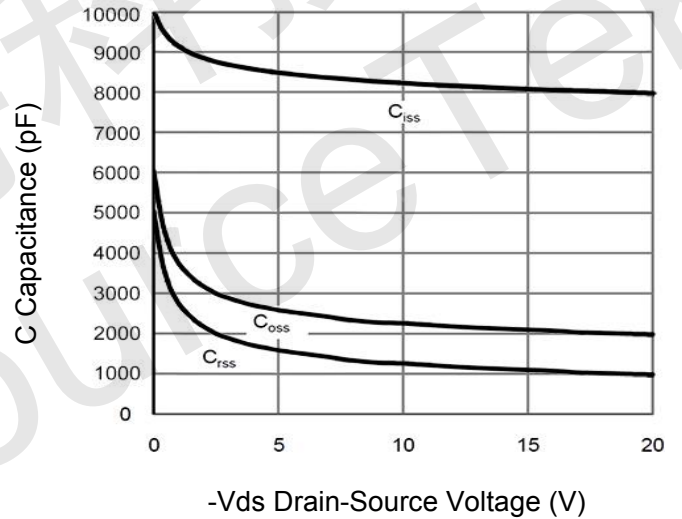


Figure 10 Capacitance vs Vds

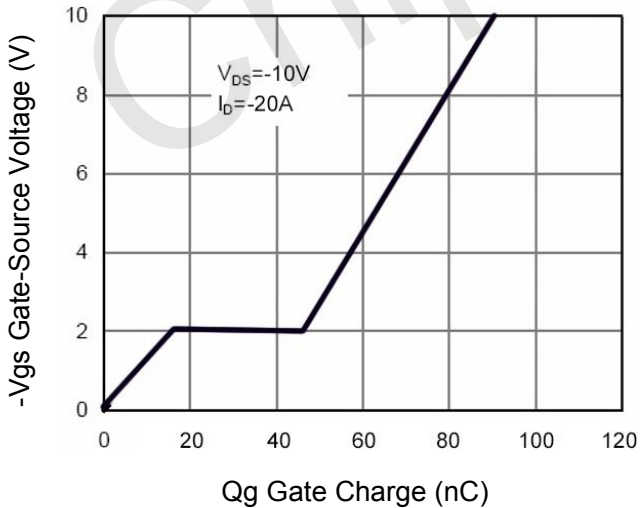


Figure 11 Gate Charge

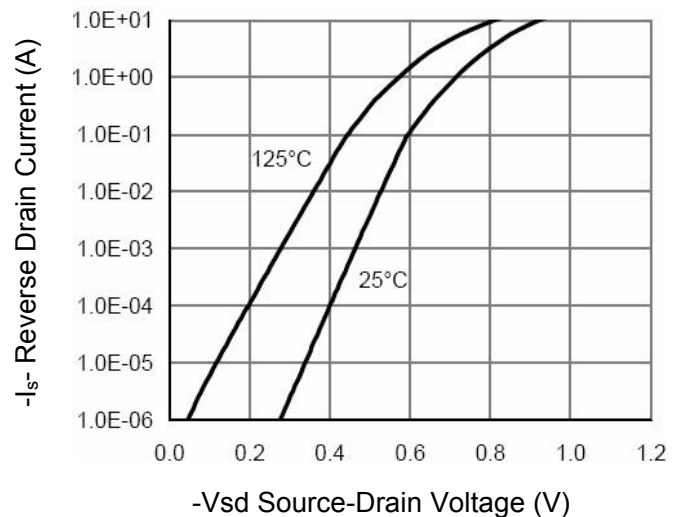


Figure 12 Source- Drain Diode Forward

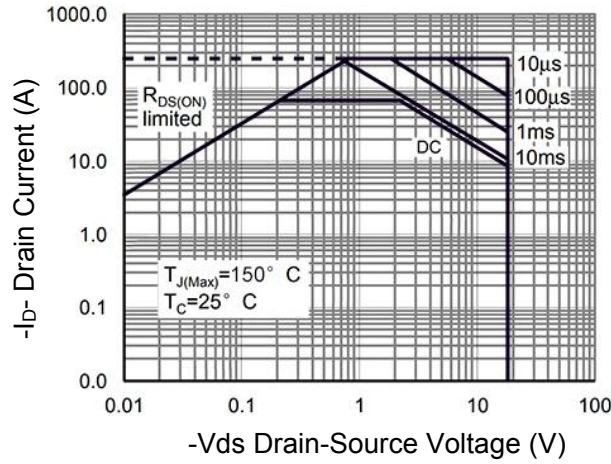


Figure 13 Safe Operation Area

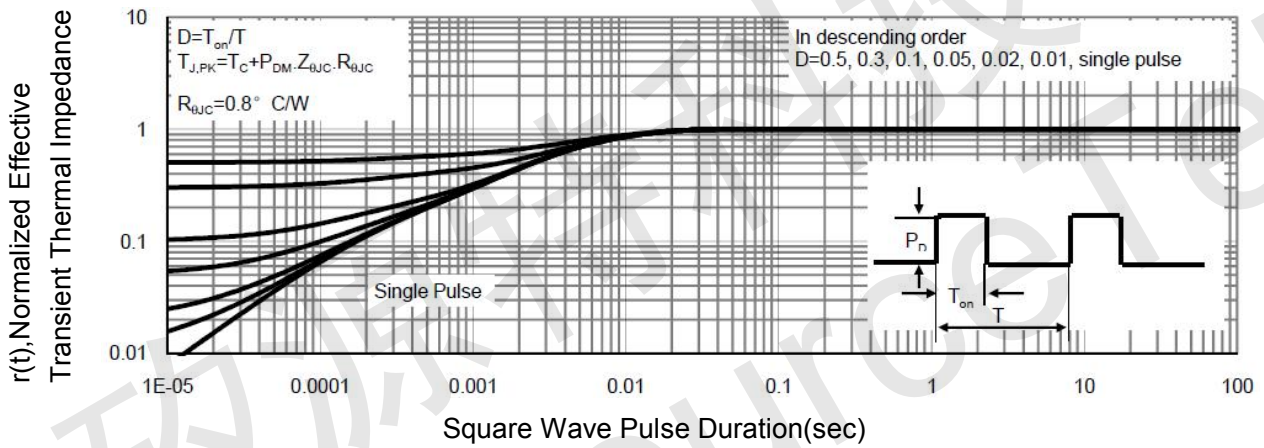
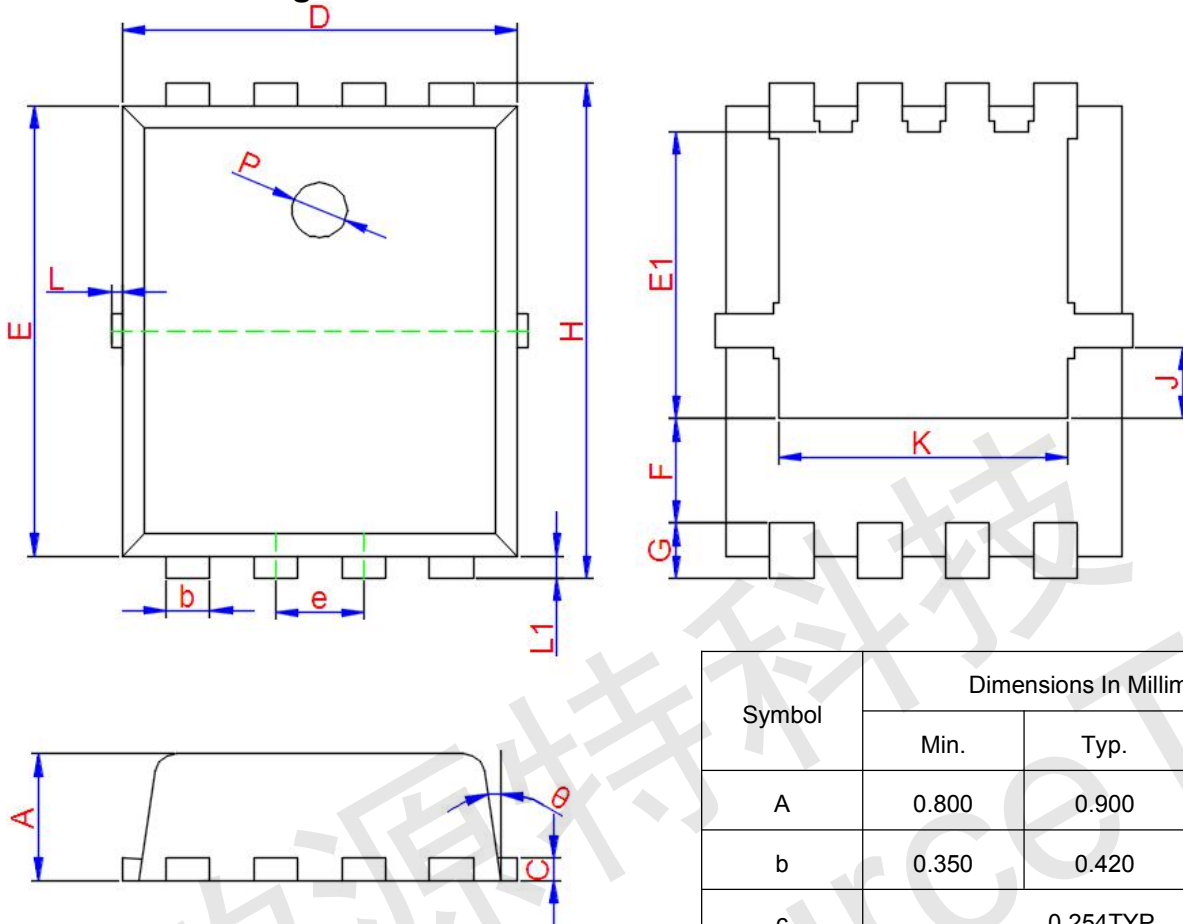


Figure 14 Normalized Maximum Transient Thermal Impedance





**DFN5x6-8L Package Information**



| Symbol | Dimensions In Millimeters |       |       |
|--------|---------------------------|-------|-------|
|        | Min.                      | Typ.  | Max.  |
| A      | 0.800                     | 0.900 | 1.000 |
| b      | 0.350                     | 0.420 | 0.490 |
| c      | 0.254TYP.                 |       |       |
| D      | 4.900                     | 5.000 | 5.100 |
| e      | 1.270TYP.                 |       |       |
| E      | 5.700                     | 5.800 | 5.900 |
| E1     | 3.400TYP.                 |       |       |
| F      | 1.400TYP.                 |       |       |
| G      | 0.600TYP.                 |       |       |
| H      | 5.950                     | 6.080 | 6.200 |
| J      | 0.950TYP.                 |       |       |
| K      | 4.000TYP.                 |       |       |
| L      | -                         | -     | 0.150 |
| L1     | 0.100                     | 0.140 | 0.180 |
| P      | 1.000TYP.                 |       |       |
| θ      | 6°                        | 10°   | 14°   |