



PE01P40G P-Channel Enhancement Mode Power MOSFET

PE01P40G Description

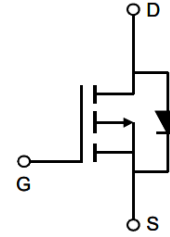
The PE01P40G uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE01P40G General Features

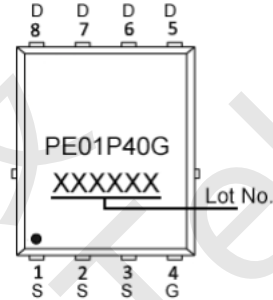
- $V_{DS} = -100V$, $I_D = -34A$
- $R_{DS(ON)} < 38m\Omega @ V_{GS}=-10V$
- $R_{DS(ON)} < 45m\Omega @ V_{GS}=-4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

PE01P40G Application

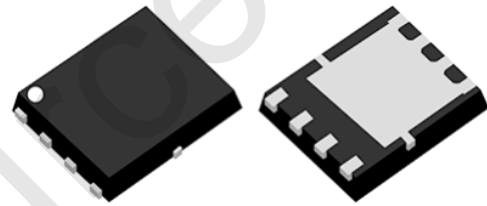
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



DFN5x6-8L

PE01P40G Absolute Maximum Ratings (TC=25°C unless otherwise noted)

| Parameter | Symbol | Rating | Unit |
|--|----------------|------------|------|
| Drain-Source Voltage | V_{DS} | -100 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | -34 | A |
| Drain Current-Continuous (TC=100°C) | I_D | -22 | A |
| Pulsed Drain Current (Note 1) | I_{DM} | -136 | A |
| Maximum Power Dissipation | P_D | 96 | W |
| Single Pulsed Avalanche Energy (L=0.1mH) | E_{AS} | 218 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | °C |

PE01P40G Thermal Characteristic

| | | | |
|--------------------------------------|-----------------|-----|------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.3 | °C/W |
|--------------------------------------|-----------------|-----|------|



PE01P40G Electrical Characteristics (TC=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|--|------|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -100 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-90V, V_{GS}=0V$ | - | - | -1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.2 | -2 | -2.5 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-18A$ | - | 32 | 38 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-10A$ | - | 36 | 45 | m Ω |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-50V, V_{GS}=0V,$ $F=1.0MHz$ | - | 5612 | - | pF |
| Output Capacitance | C_{oss} | | - | 180 | - | pF |
| Reverse Transfer Capacitance (Note 4) | C_{rss} | | - | 80 | - | pF |
| Gate Resistance | R_g | $V_{DS}=0V, V_{GS}=0V, F=1.0MHz$ | - | 4.3 | - | Ω |
| Switching Characteristics | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-50V, I_D=-22A,$ $V_{GS}=-10V, R_G=3\Omega$ | - | 15 | - | nS |
| Turn-on Rise Time | t_r | | - | 38 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 86 | - | nS |
| Turn-Off Fall Time | t_f | | - | 68 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-50V, I_D=-22A,$ $V_{GS}=-10V$ | - | 102 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 25 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 19 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-1A$ | - | - | -1.2 | V |
| Maximum Body-Diode Current | I_S | | | | -34 | A |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F=-18A, dI/dt=100A/\mu s$ | - | 36 | - | nS |
| Body Diode Reverse Recovery Charge | Q_{rr} | | - | 62 | - | nC |

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.



PE01P40G Typical Electrical and Thermal Characteristics

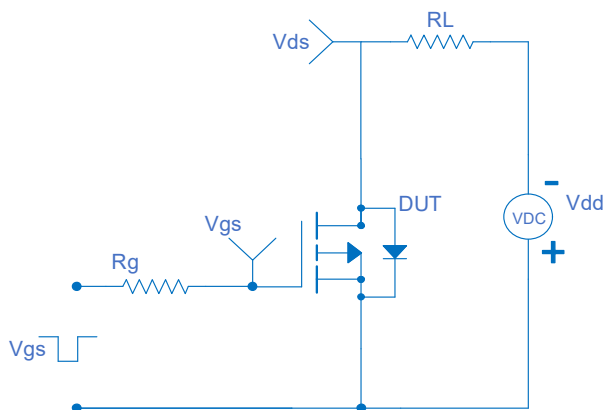


Figure 1 Switching Test Circuit

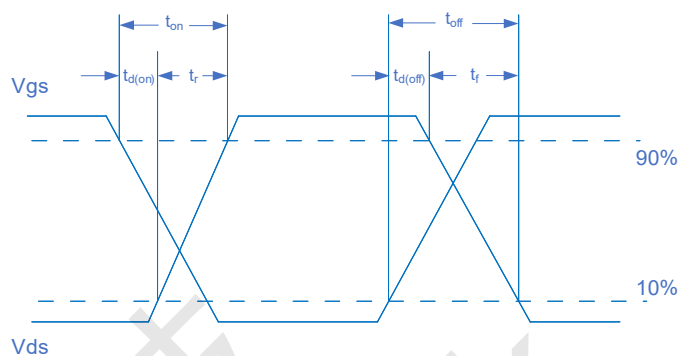


Figure 2 Switching Waveform

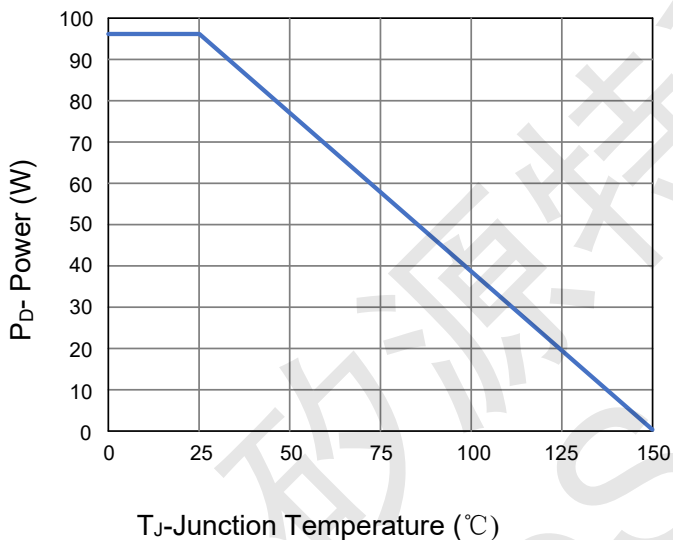


Figure 3 Power De-rating

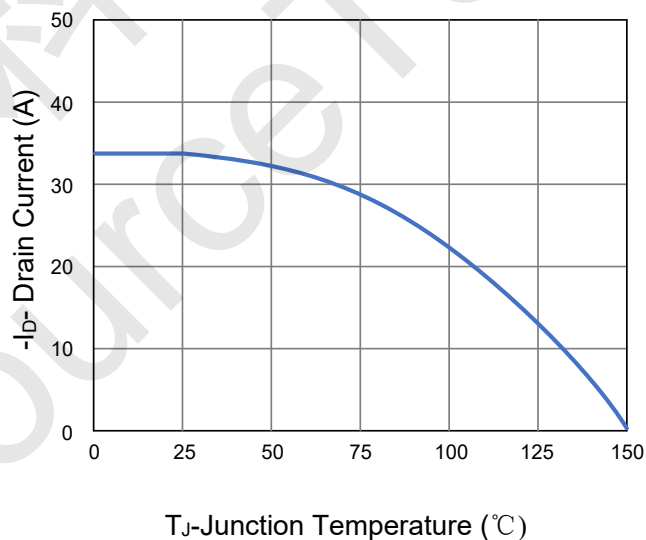


Figure 4 Drain Current

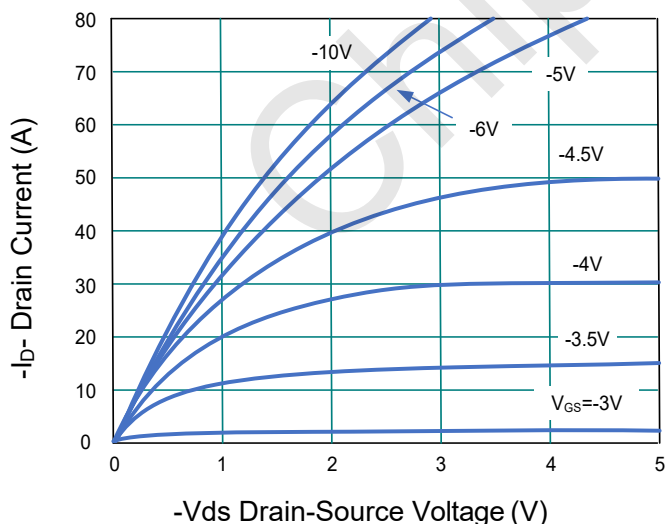


Figure 5 Output Characteristics

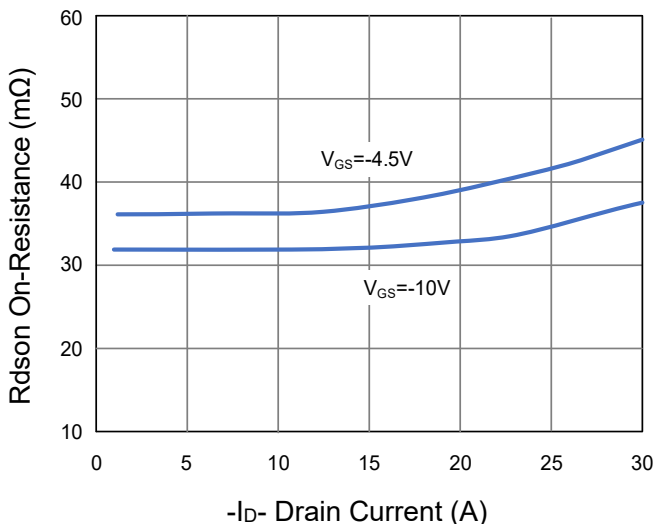


Figure 6 Rds(on) vs Drain Current

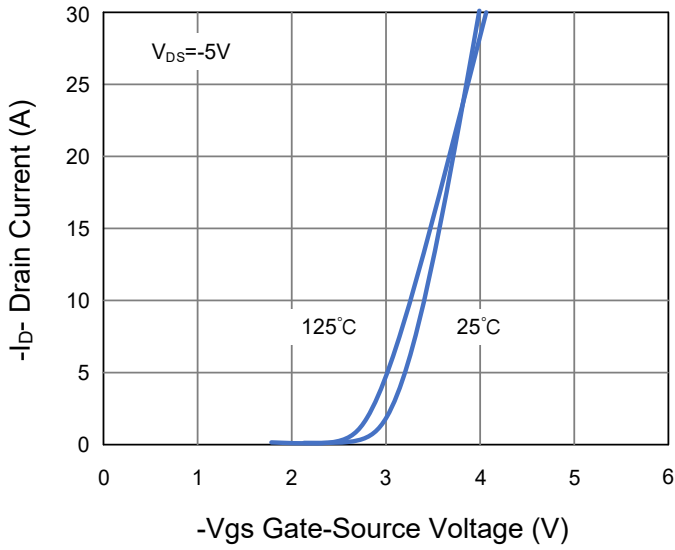


Figure 7 Transfer Characteristics

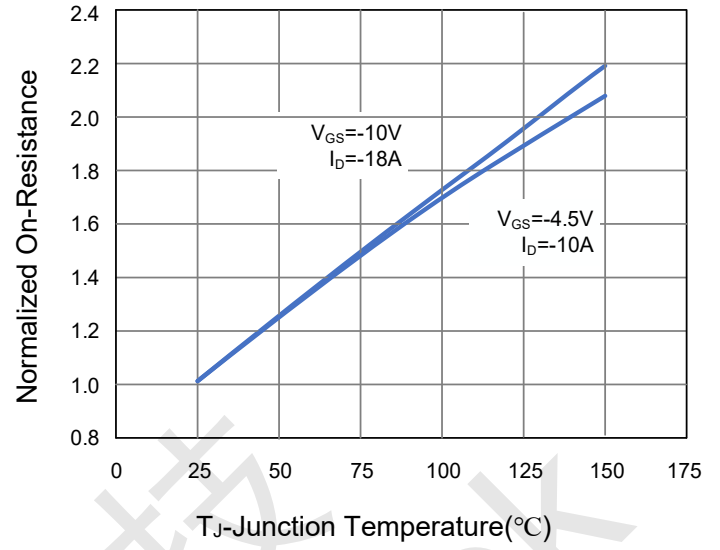


Figure 8 Rdson vs Junction Temperature

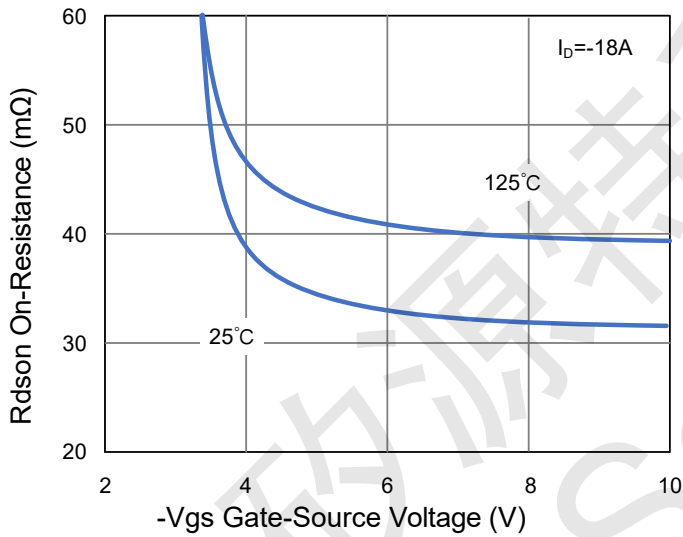


Figure 9 Rdson vs Vgs

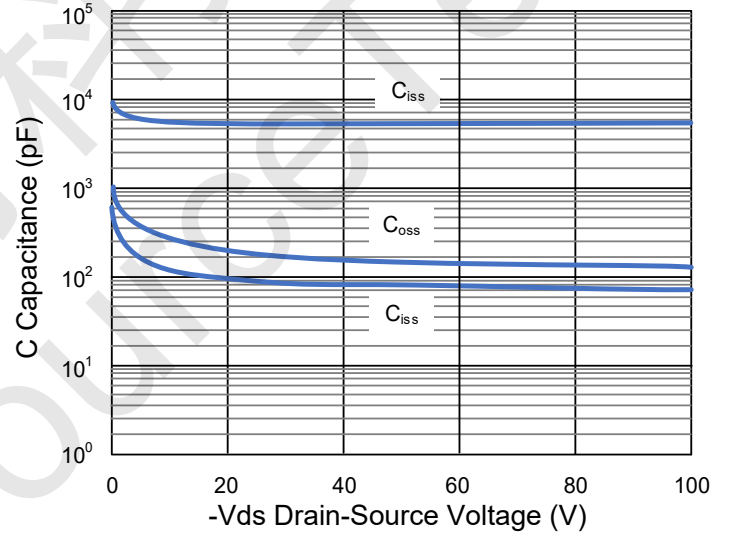


Figure 10 Capacitance vs Vds

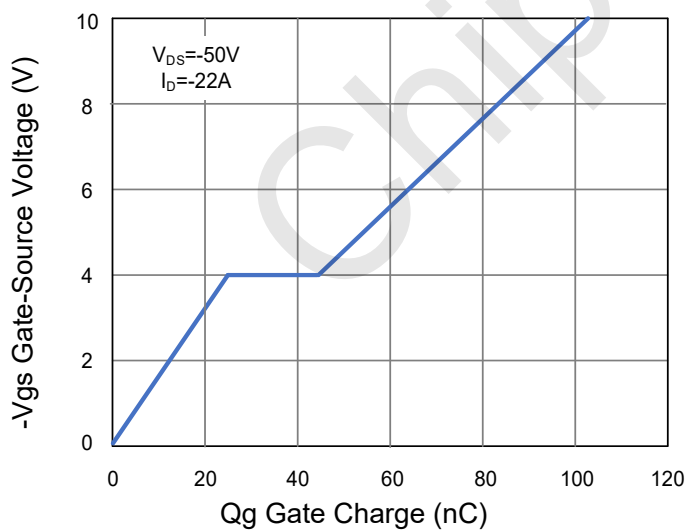


Figure 11 Gate Charge

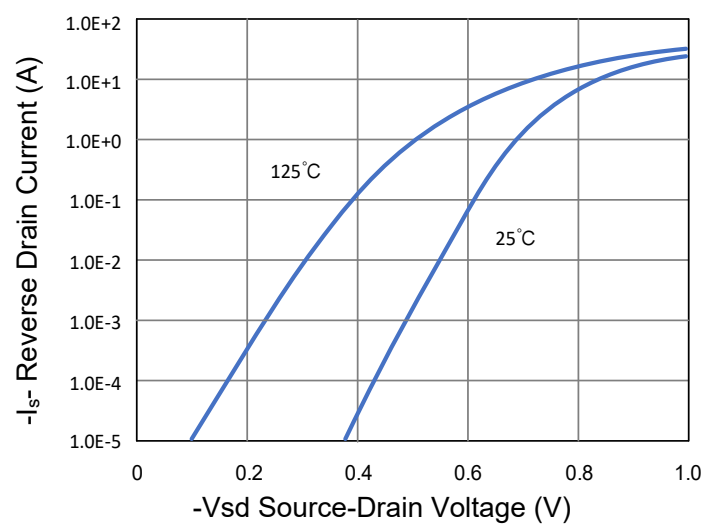


Figure 12 Source- Drain Diode Forward

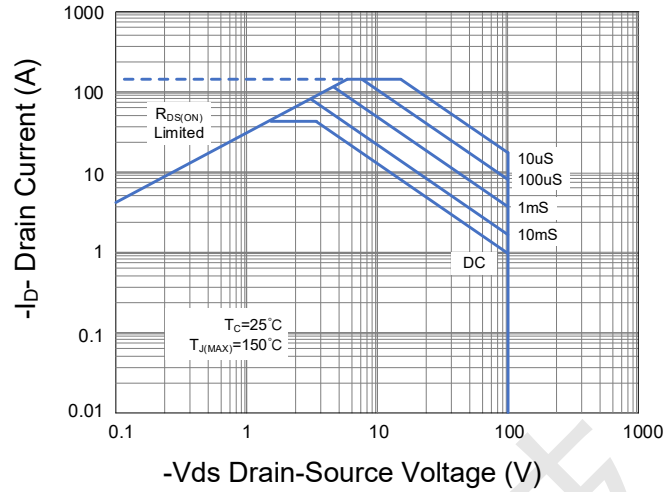


Figure 13 Safe Operation Area

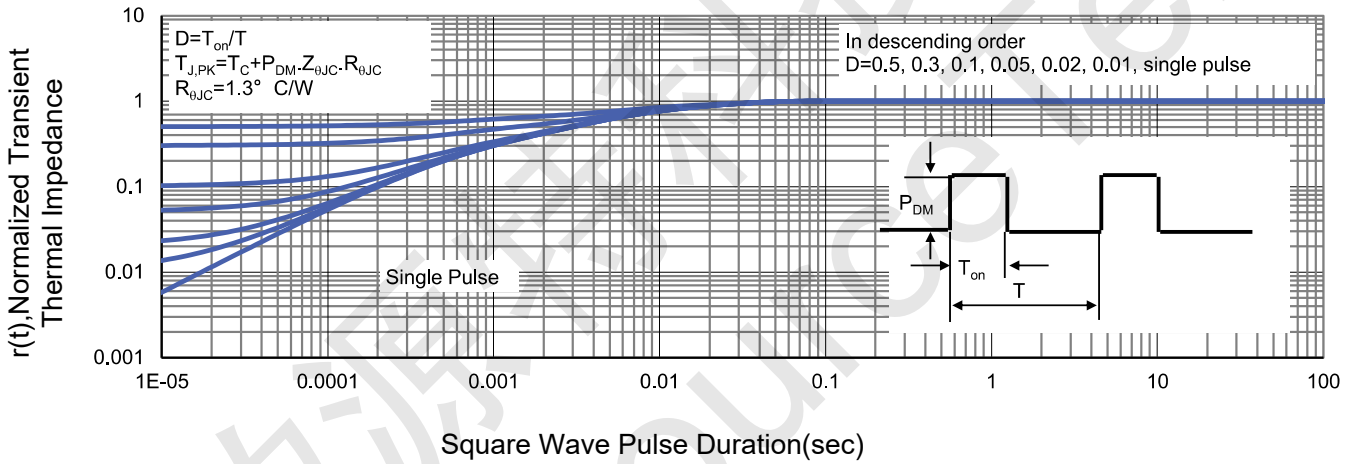
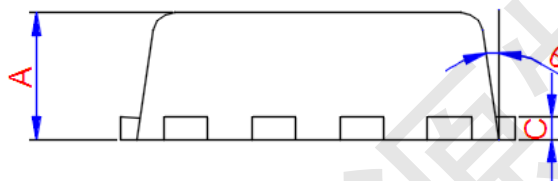
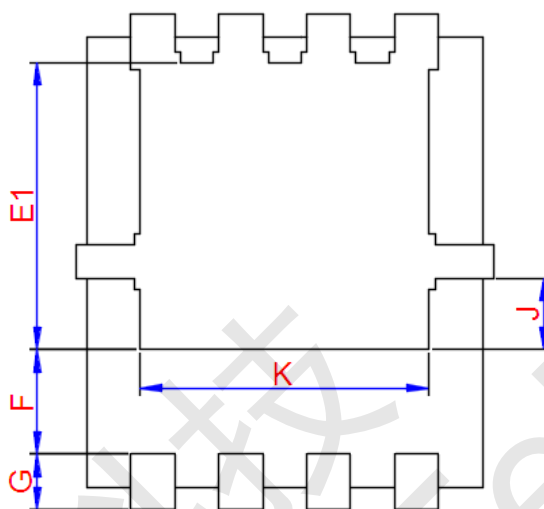
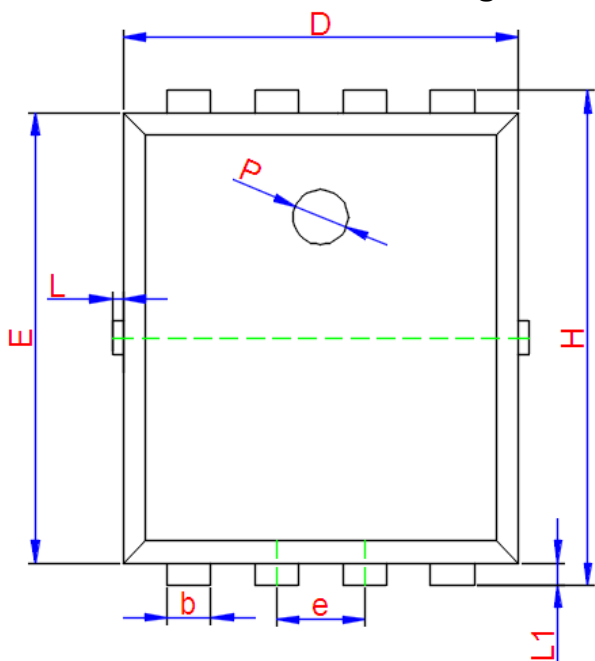


Figure 14 Normalized Maximum Transient Thermal Impedance



PE01P40G DFN5x6-8L Package Information



| Symbol | Dimensions In Millimeters | | |
|--------|---------------------------|-------|-------|
| | Min. | Typ. | Max. |
| A | 0.800 | 1.050 | 1.200 |
| b | 0.250 | 0.350 | 0.490 |
| c | 0.254TYP. | | |
| D | 4.800 | 5.000 | 5.100 |
| e | 1.270TYP. | | |
| E | 5.650 | 5.800 | 5.900 |
| E1 | 3.400TYP. | | |
| F | 1.300TYP. | | |
| 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 | 1.180TYP. | | |
| θ | 6° | 10° | 14° |