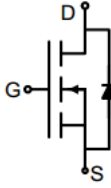
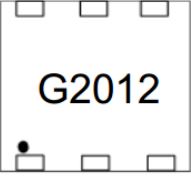
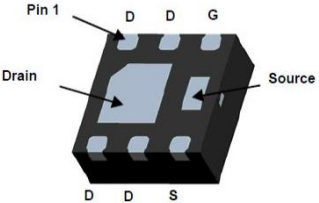


## N-Channel Enhancement Mode Power MOSFET

|                                                                                                                                                                                                                                                                                                                                                                                                                             |                |                                                                                                                   |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Description</b><br><br>The G2012 uses advanced trench technology to provide excellent $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.                                                                                                                                                                                                                                                  |                | <br>Schematic diagram          |                  |
| <b>General Features</b> <ul style="list-style-type: none"> <li>• <math>V_{DS}</math> 20V</li> <li>• <math>I_D</math> (at <math>V_{GS} = 10V</math>) 12A</li> <li>• <math>R_{DS(ON)}</math> (at <math>V_{GS} = 4.5V</math>) &lt; 12m<math>\Omega</math></li> <li>• <math>R_{DS(ON)}</math> (at <math>V_{GS} = 2.5V</math>) &lt; 18m<math>\Omega</math></li> <li>• 100% Avalanche Tested</li> <li>• RoHS Compliant</li> </ul> |                | <br>Marking and pin assignment |                  |
| <b>Application</b> <ul style="list-style-type: none"> <li>• Power switch</li> <li>• DC/DC converters</li> </ul>                                                                                                                                                                                                                                                                                                             |                | <br>DFN2*2-6L                 |                  |
| <b>Device</b>                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Package</b> | <b>Marking</b>                                                                                                    | <b>Packaging</b> |
| G2012                                                                                                                                                                                                                                                                                                                                                                                                                       | DFN2*2-6L      | G2012                                                                                                             | 3000pcs/Reel     |

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted

| Parameter                                        | Symbol         | Value      | Unit             |
|--------------------------------------------------|----------------|------------|------------------|
| Drain-Source Voltage                             | $V_{DSS}$      | 20         | V                |
| Continuous Drain Current                         | $I_D$          | 12         | A                |
| Pulsed Drain Current (note1)                     | $I_{DM}$       | 40         | A                |
| Gate-Source Voltage                              | $V_{GSS}$      | $\pm 10$   | V                |
| Power Dissipation                                | $P_D$          | 1.5        | W                |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$ | -55 To 150 | $^\circ\text{C}$ |

### Thermal Resistance

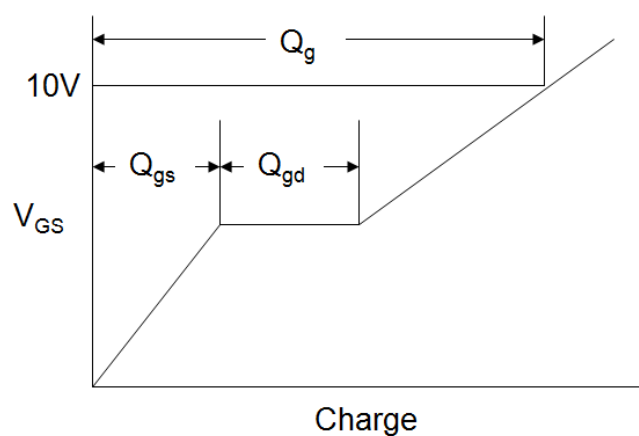
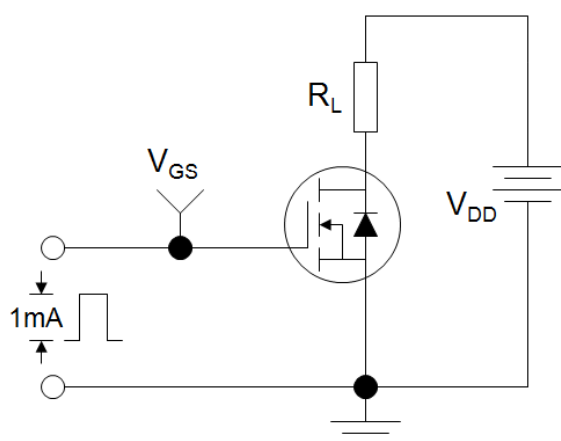
| Parameter                               | Symbol     | Value | Unit               |
|-----------------------------------------|------------|-------|--------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 83    | $^\circ\text{C/W}$ |

| Specifications T <sub>j</sub> = 25°C, unless otherwise noted |                      |                                                                          |       |      |      |      |
|--------------------------------------------------------------|----------------------|--------------------------------------------------------------------------|-------|------|------|------|
| Parameter                                                    | Symbol               | Test Conditions                                                          | Value |      |      | Unit |
|                                                              |                      |                                                                          | Min.  | Typ. | Max. |      |
| Static Parameters                                            |                      |                                                                          |       |      |      |      |
| Drain-Source Breakdown Voltage                               | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                             | 20    | --   | --   | V    |
| Zero Gate Voltage Drain Current                              | I <sub>DSS</sub>     | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, T <sub>j</sub> = 25°C       | --    | --   | 1    | μA   |
| Gate-Source Leakage                                          | I <sub>GSS</sub>     | V <sub>GS</sub> = ±10V                                                   | --    | --   | ±100 | nA   |
| Gate-Source Threshold Voltage                                | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA               | 0.35  | 0.7  | 1    | V    |
| Drain-Source On-Resistance                                   | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A                              | --    | 7.3  | 12   | mΩ   |
|                                                              |                      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5A                              | --    | 8.8  | 18   |      |
| Forward Transconductance                                     | g <sub>FS</sub>      | VDS=10V,ID=5A                                                            | --    | 5    | --   | S    |
| Dynamic Parameters                                           |                      |                                                                          |       |      |      |      |
| Input Capacitance                                            | C <sub>iss</sub>     | V <sub>GS</sub> = 0V,<br>V <sub>DS</sub> = 10V,<br>f = 1.0MHz            | --    | 1255 | --   | pF   |
| Output Capacitance                                           | C <sub>oss</sub>     |                                                                          | --    | 220  | --   |      |
| Reverse Transfer Capacitance                                 | C <sub>rss</sub>     |                                                                          | --    | 180  | --   |      |
| Total Gate Charge                                            | Q <sub>g</sub>       | V <sub>DD</sub> = 10V,<br>I <sub>D</sub> = 10A,<br>V <sub>GS</sub> = 10V | --    | 29   | --   | nC   |
| Gate-Source Charge                                           | Q <sub>gs</sub>      |                                                                          | --    | 5.2  | --   |      |
| Gate-Drain Charge                                            | Q <sub>gd</sub>      |                                                                          | --    | 6.3  | --   |      |
| Turn-on Delay Time                                           | t <sub>d(on)</sub>   | V <sub>DD</sub> = 10V,<br>I <sub>D</sub> = 5A,<br>R <sub>G</sub> = 50Ω   | --    | 300  | --   | ns   |
| Turn-on Rise Time                                            | t <sub>r</sub>       |                                                                          | --    | 1000 | --   |      |
| Turn-off Delay Time                                          | t <sub>d(off)</sub>  |                                                                          | --    | 4000 | --   |      |
| Turn-off Fall Time                                           | t <sub>f</sub>       |                                                                          | --    | 2500 | --   |      |
| Drain-Source Body Diode Characteristics                      |                      |                                                                          |       |      |      |      |
| Continuous Body Diode Current                                | I <sub>S</sub>       | T <sub>C</sub> = 25°C                                                    | --    | --   | 12   | A    |
| Body Diode Voltage                                           | V <sub>SD</sub>      | T <sub>J</sub> = 25°C, I <sub>SD</sub> = 10A, V <sub>GS</sub> = 0V       | --    | --   | 1.2  | V    |

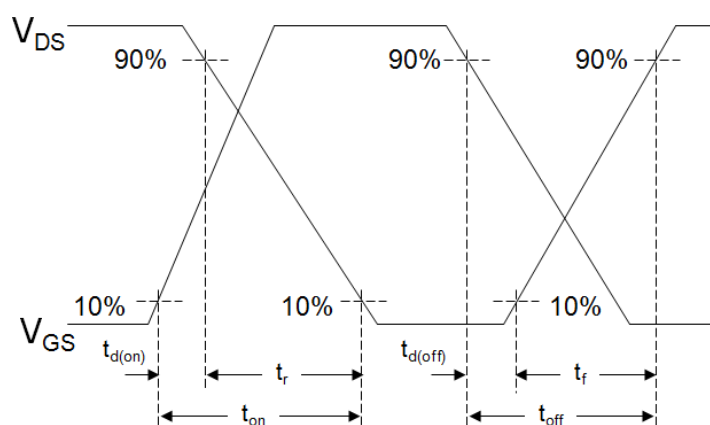
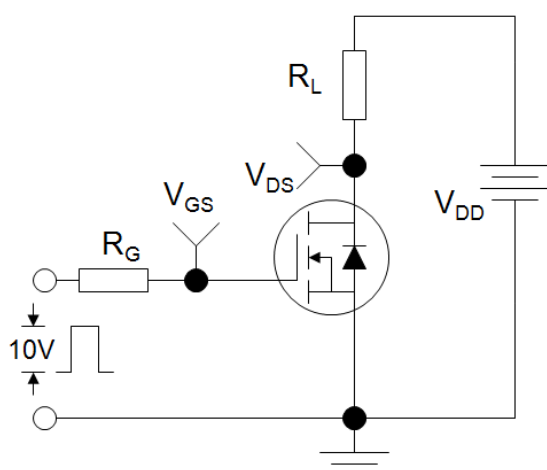
**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$

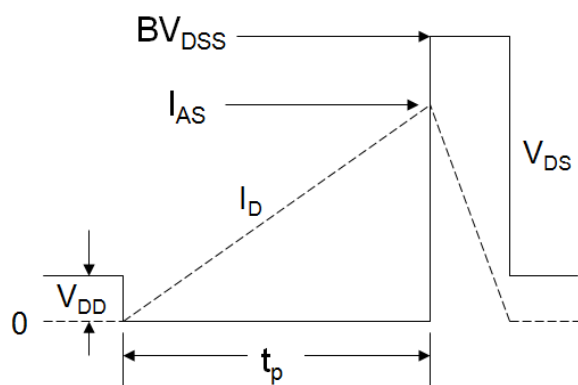
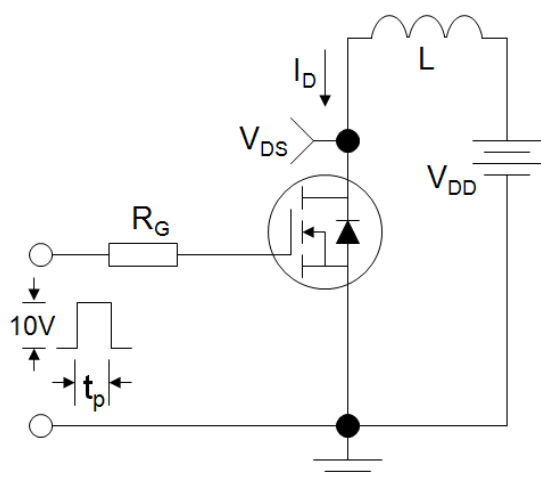
Gate Charge Test Circuit



EAS Test Circuit



Switch Time Test Circuit



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

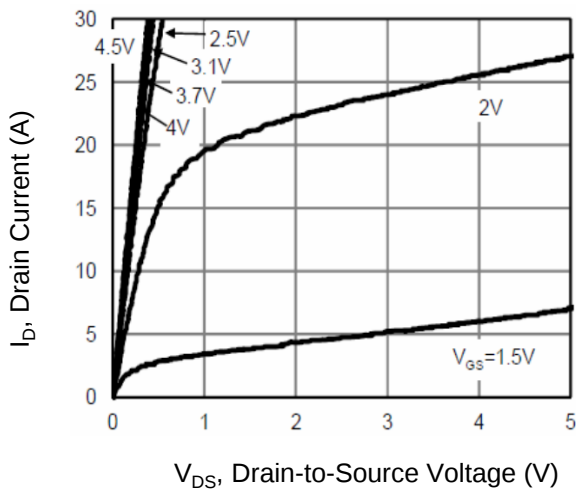


Figure 2. Transfer Characteristics

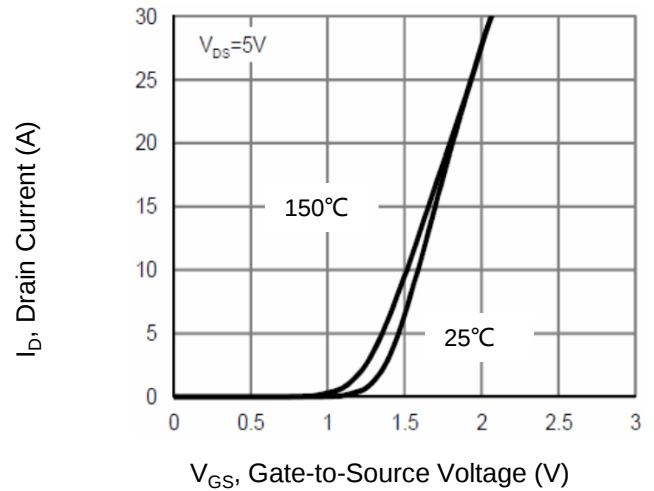


Figure 3.  $R_{DS(on)}$ -Drain Current

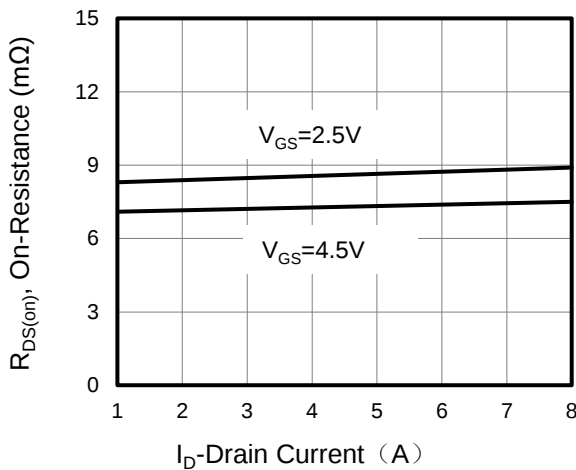


Figure 4. Gate Charge

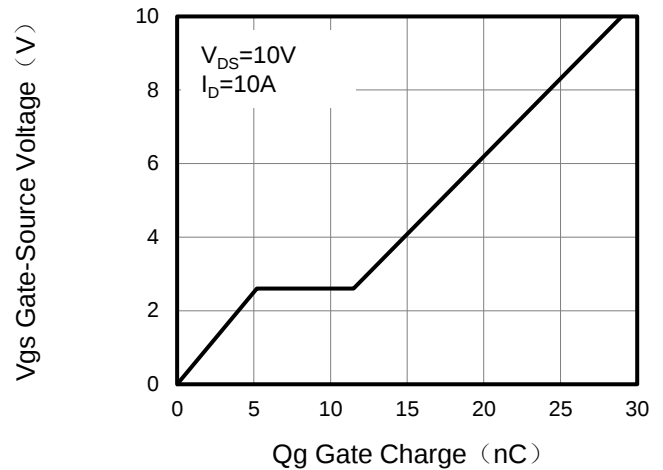


Figure 5. Capacitance vs  $V_{ds}$

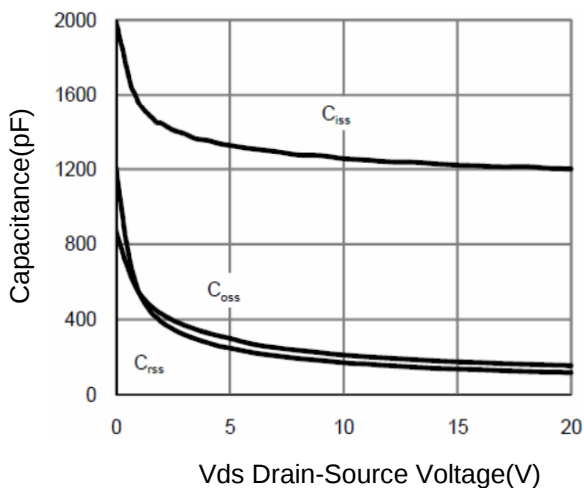
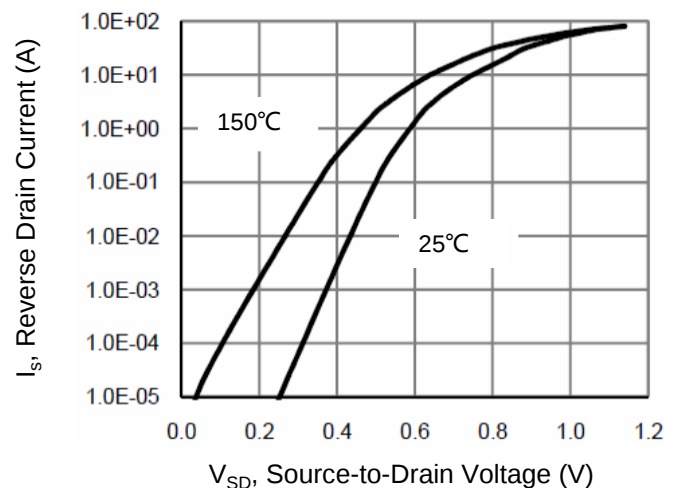


Figure 6. Source-Drain Diode Forward



# Typical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. Drain-Source On-Resistance

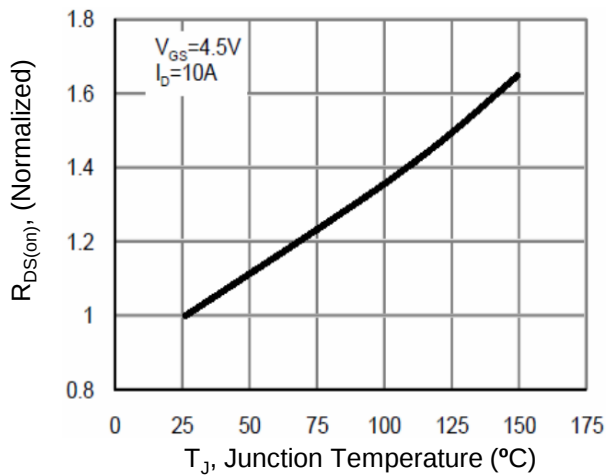


Figure 8. Safe Operation Area

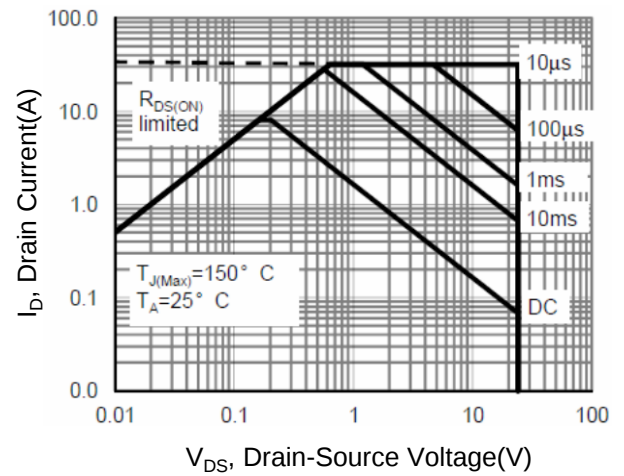
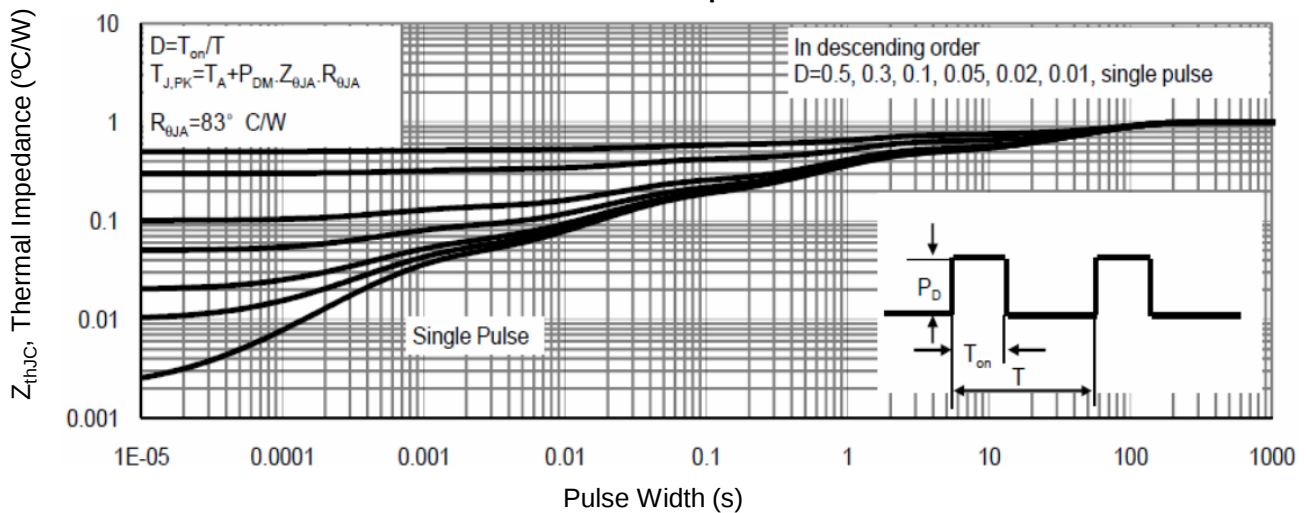
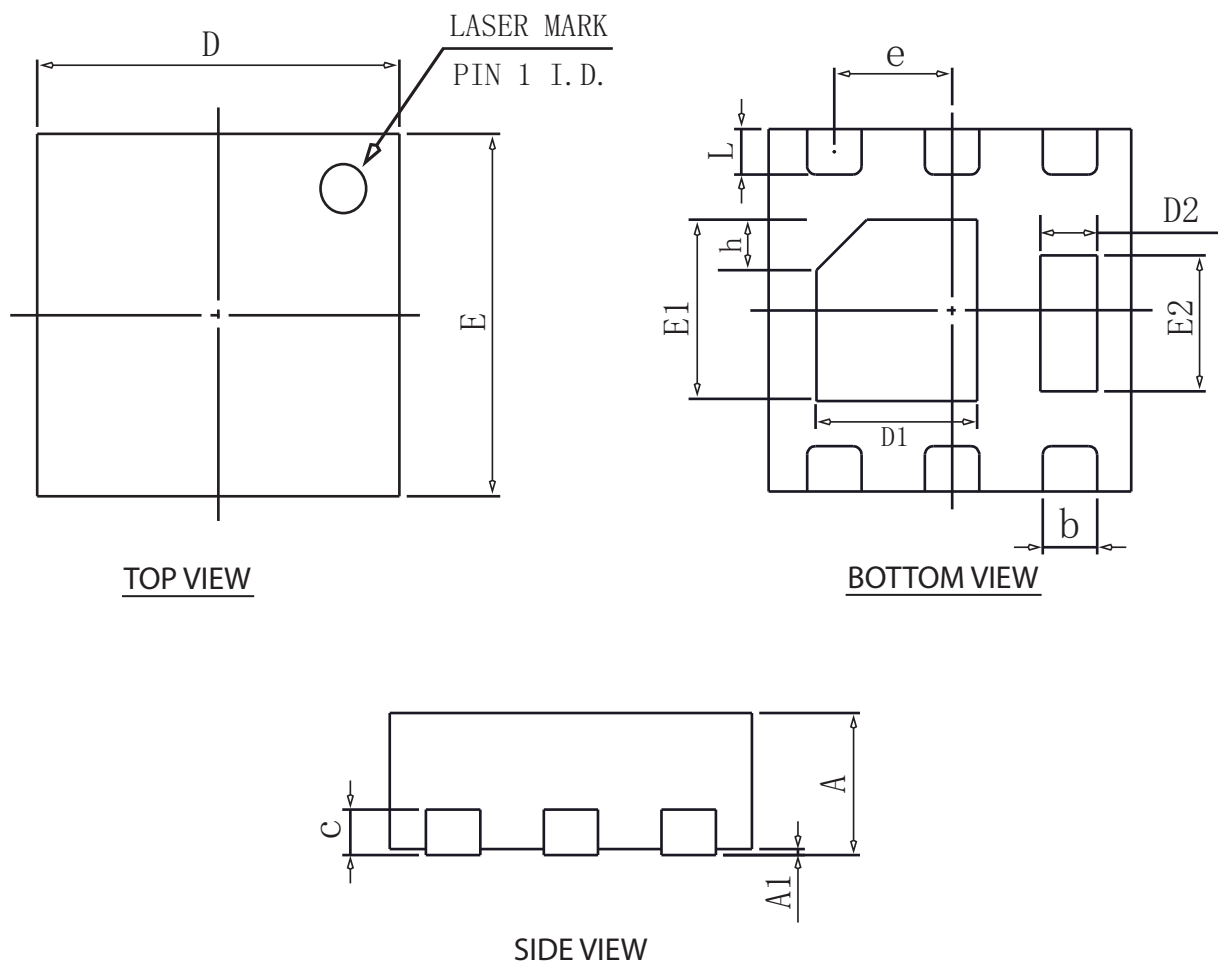


Figure 9. Normalized Maximum Transient Thermal Impedance



## DFN2×2-6L Package Information



## COMMON DIMENSIONS

| SYMBOL | mm      |      |      |
|--------|---------|------|------|
|        | MIN     | NOM  | MAX  |
| A      | 0.70    | 0.75 | 0.80 |
| A1     | NA      | 0.02 | 0.05 |
| b      | 0.20    | 0.27 | 0.34 |
| c      | 0.18    | 0.20 | 0.25 |
| D      | 1.95    | 2.00 | 2.07 |
| E      | 1.95    | 2.00 | 2.07 |
| D1     | 0.80    | 0.90 | 1.00 |
| E1     | 0.90    | 1.00 | 1.10 |
| D2     | 0.20    | 0.30 | 0.40 |
| E2     | 0.65    | 0.75 | 0.85 |
| L      | 0.20    | 0.25 | 0.35 |
| h      | 0.20    | 0.25 | 0.30 |
| e      | 0.65BSC |      |      |