

## N-Channel Enhancement Mode Power MOSFET

## Description

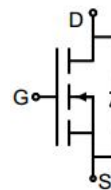
The GT105N10D5 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.

## General Features

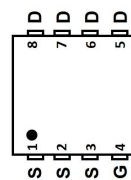
- $V_{DS}$  100V
- $I_D$  (at  $V_{GS} = 10V$ ) 63A
- $R_{DS(ON)}$  (at  $V_{GS} = 10V$ ) < 10.5m $\Omega$
- 100% Avalanche Tested
- RoHS Compliant

## Application

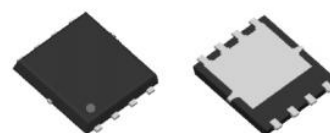
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6-8L

## Ordering Information

| Device     | Package   | Marking  | Packaging    |
|------------|-----------|----------|--------------|
| GT105N10D5 | DFN5*6-8L | GT105N10 | 5000pcs/Reel |

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

| Parameter                                        | Symbol         | Value      | Unit             |
|--------------------------------------------------|----------------|------------|------------------|
| Drain-Source Voltage                             | $V_{DS}$       | 100        | V                |
| Continuous Drain Current                         | $I_D$          | 63         | A                |
|                                                  |                | 40         |                  |
| Pulsed Drain Current (note1)                     | $I_{DM}$       | 252        | A                |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | V                |
| Power Dissipation                                | $P_D$          | 80         | W                |
| Single pulse avalanche energy (note2)            | $E_{AS}$       | 73         | mJ               |
| 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 | $R_{thJA}$ | 50    | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case    | $R_{thJC}$ | 1.56  | $^\circ\text{C/W}$ |

| 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                             | 100   | --   | --   | V    |
| Zero Gate Voltage Drain Current                              | I <sub>DSS</sub>     | V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V                             | --    | --   | 1    | μA   |
| Gate-Source Leakage                                          | I <sub>GSS</sub>     | V <sub>GS</sub> = ±20V                                                   | --    | --   | ±100 | nA   |
| Gate-Source Threshold Voltage                                | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA               | 2.0   | 3.1  | 4.0  | V    |
| Drain-Source On-Resistance                                   | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A                              | --    | 8.5  | 10.5 | mΩ   |
| Forward Transconductance                                     | g <sub>FS</sub>      | V <sub>GS</sub> = 5V, I <sub>D</sub> = 20A                               | --    | 49   | --   | S    |
| Dynamic Parameters                                           |                      |                                                                          |       |      |      |      |
| Input Capacitance                                            | C <sub>iss</sub>     | V <sub>GS</sub> = 0V,<br>V <sub>DS</sub> = 50V,<br>f = 1.0MHz            | --    | 1600 | --   | pF   |
| Output Capacitance                                           | C <sub>oss</sub>     |                                                                          | --    | 650  | --   |      |
| Reverse Transfer Capacitance                                 | C <sub>rss</sub>     |                                                                          | --    | 8    | --   |      |
| Total Gate Charge                                            | Q <sub>g</sub>       | V <sub>DD</sub> = 50V,<br>I <sub>D</sub> = 20A,<br>V <sub>GS</sub> = 10V | --    | 38   | --   | nC   |
| Gate-Source Charge                                           | Q <sub>gs</sub>      |                                                                          | --    | 13   | --   |      |
| Gate-Drain Charge                                            | Q <sub>gd</sub>      |                                                                          | --    | 7    | --   |      |
| Turn-on Delay Time                                           | t <sub>d(on)</sub>   | V <sub>DD</sub> = 50V,<br>I <sub>D</sub> = 20A,<br>R <sub>G</sub> = 1Ω   | --    | 4    | --   | ns   |
| Turn-on Rise Time                                            | t <sub>r</sub>       |                                                                          | --    | 6    | --   |      |
| Turn-off Delay Time                                          | t <sub>d(off)</sub>  |                                                                          | --    | 10   | --   |      |
| Turn-off Fall Time                                           | t <sub>f</sub>       |                                                                          | --    | 3    | --   |      |
| Drain-Source Body Diode Characteristics                      |                      |                                                                          |       |      |      |      |
| Continuous Body Diode Current                                | I <sub>S</sub>       | T <sub>C</sub> = 25°C                                                    | --    | --   | 63   | A    |
| Body Diode Voltage                                           | V <sub>SD</sub>      | T <sub>J</sub> = 25°C, I <sub>SD</sub> = 20A, V <sub>GS</sub> = 0V       | --    | --   | 1.2  | V    |
| Reverse Recovery Charge                                      | Q <sub>rr</sub>      | I <sub>F</sub> = 20A, V <sub>GS</sub> = 0V<br>di/dt=100A/us              | --    | 66   | --   | nC   |
| Reverse Recovery Time                                        | T <sub>rr</sub>      |                                                                          | --    | 48   | --   | ns   |

## Notes

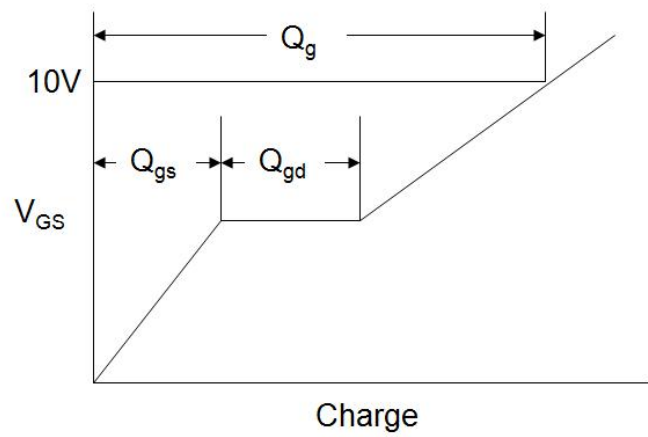
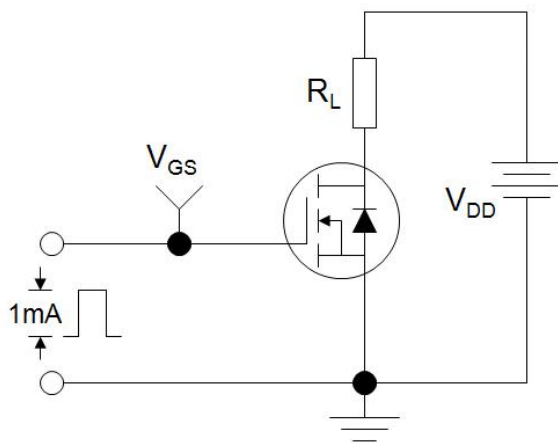
1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition :  $T_J = 25^{\circ}\text{C}, V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, R_g = 25\Omega$

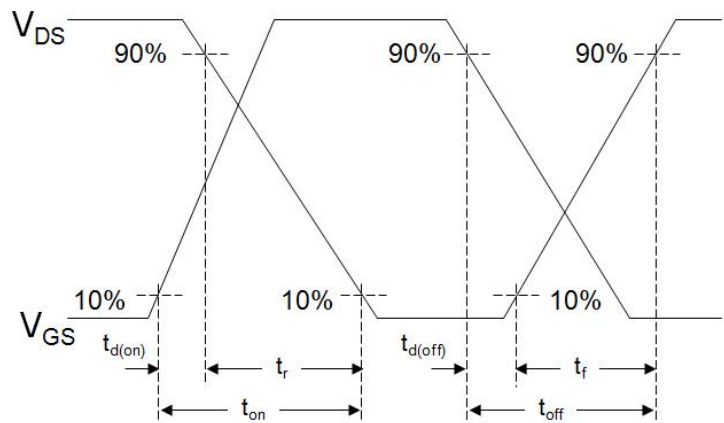
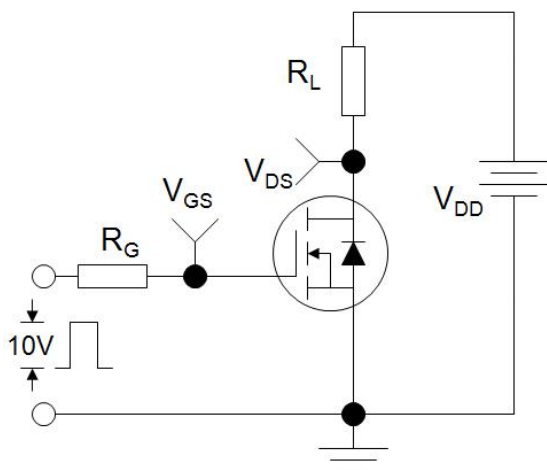
The table shows the minimum avalanche energy, which is 196mJ when the device is tested until failure

3. Identical low side and high side switch with identical  $R_G$

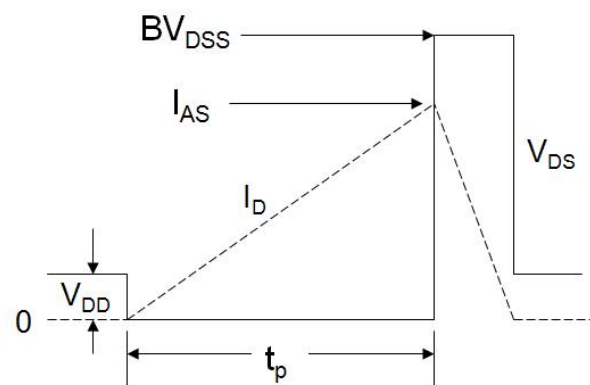
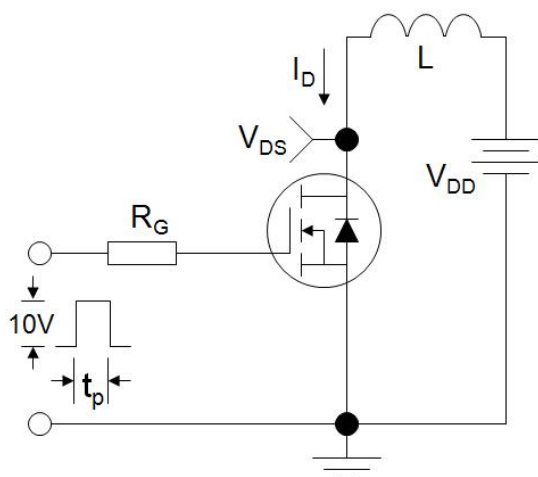
### Gate Charge Test Circuit



### Switch Time Test Circuit

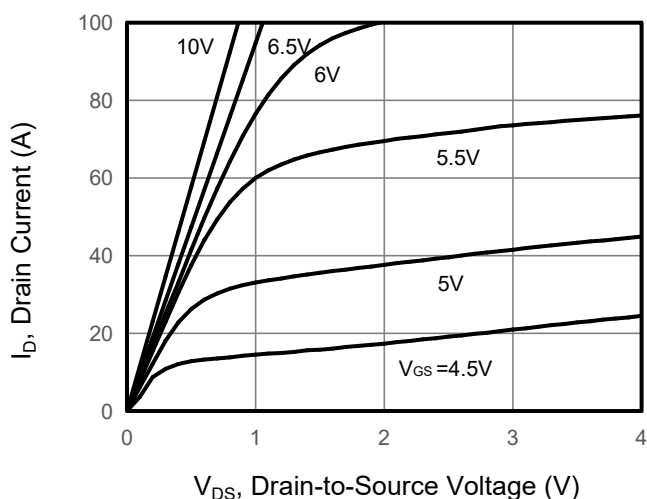


### EAS Test Circuit

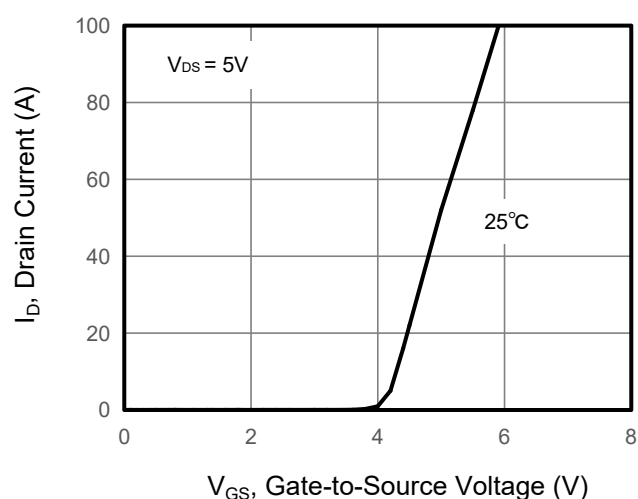


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

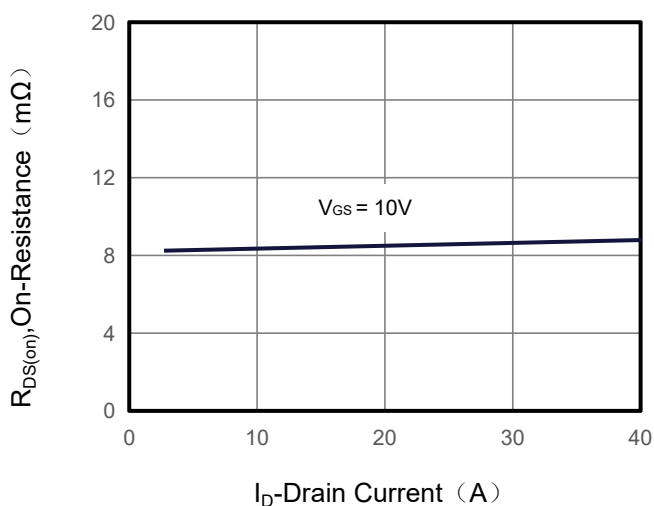
**Figure 1. Output Characteristics**



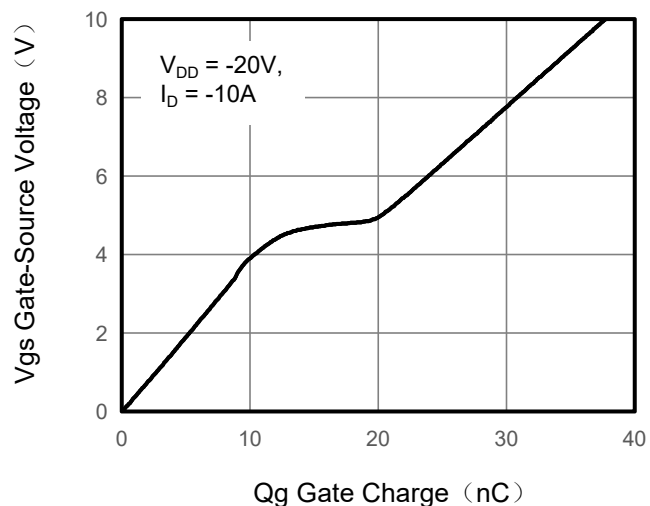
**Figure 2. Transfer Characteristics**



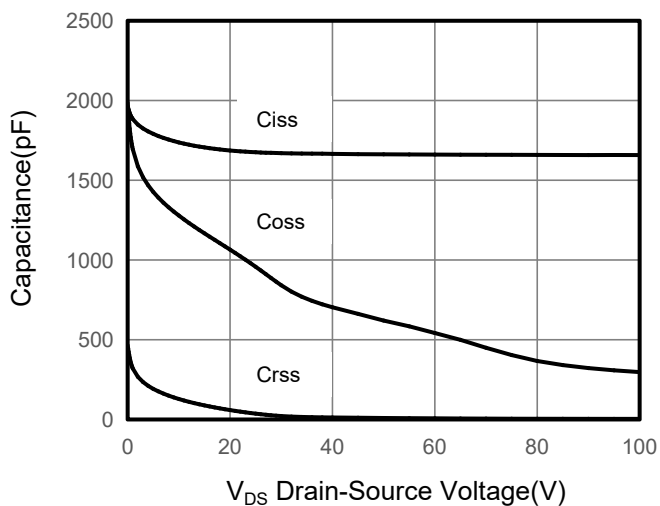
**Figure 3. Drain Source On Resistance**



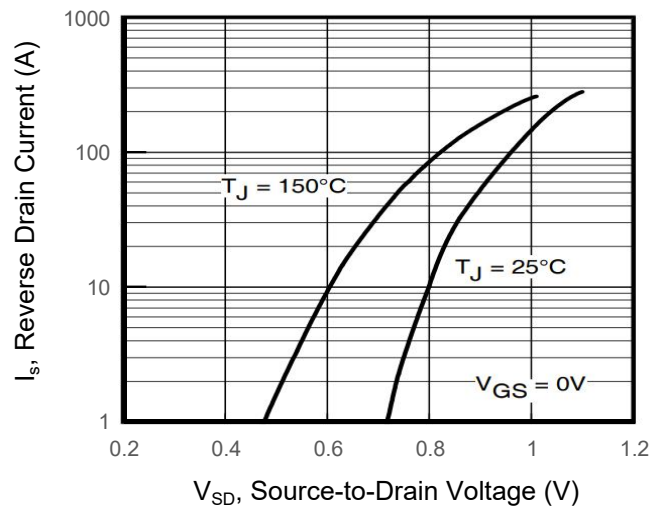
**Figure 4. Gate Charge**



**Figure 5. Capacitance**

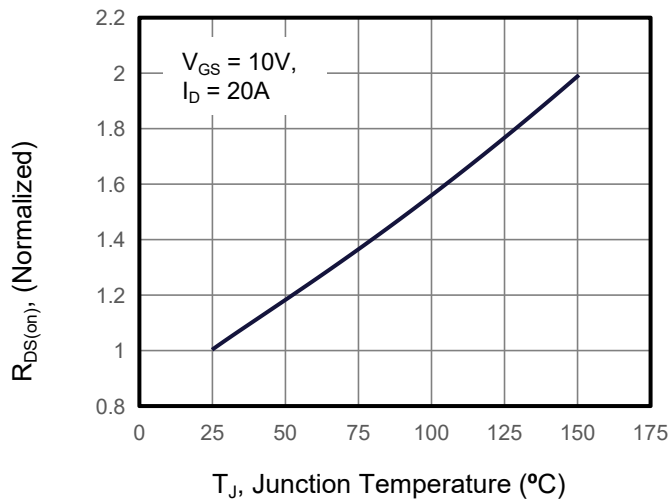


**Figure 6. Source-Drain Diode Forward**

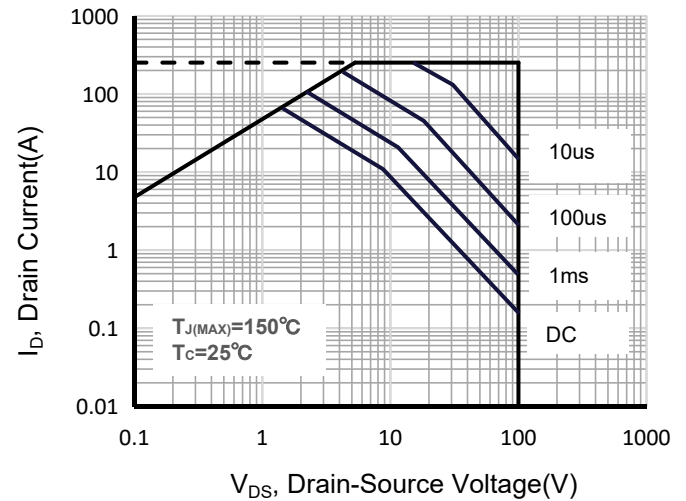


## Typical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted

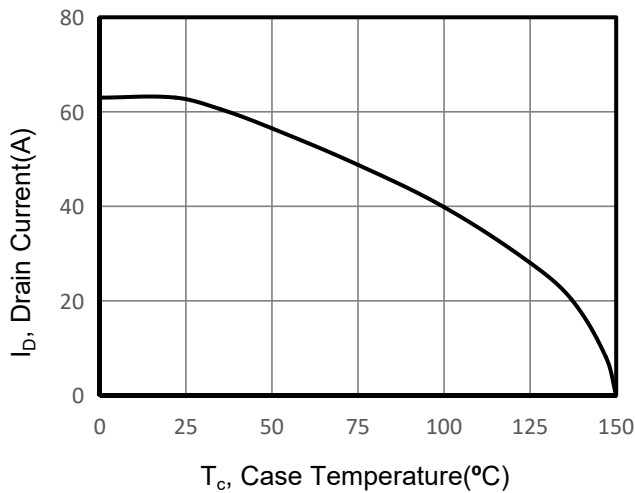
**Figure 7. Drain-Source On-Resistance**



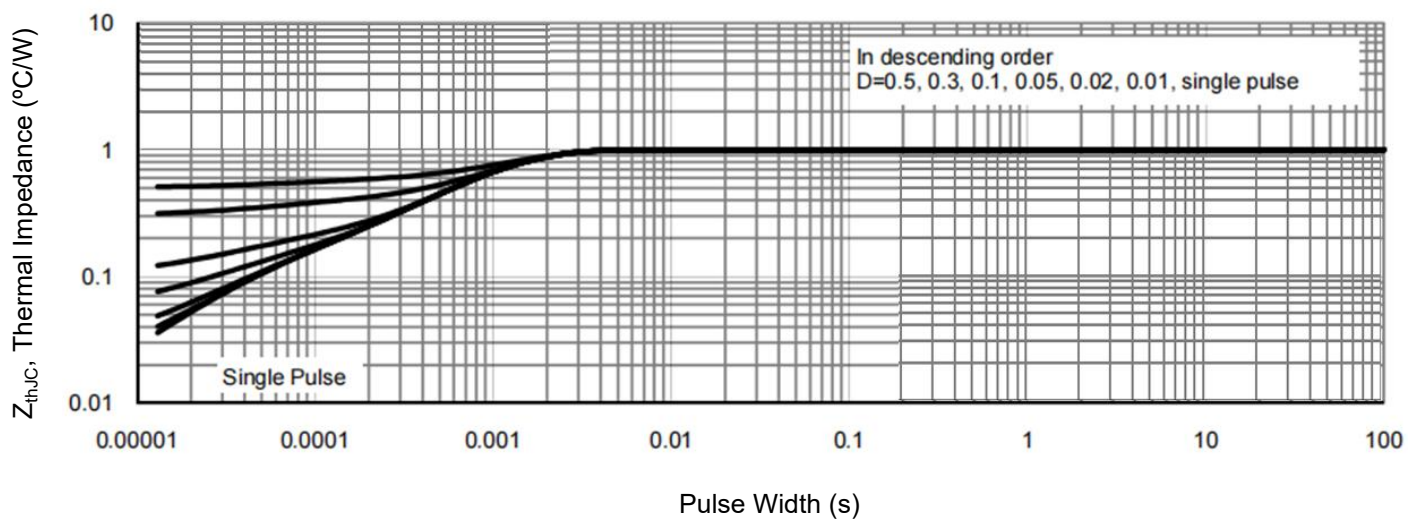
**Figure 8. Safe Operation Area**



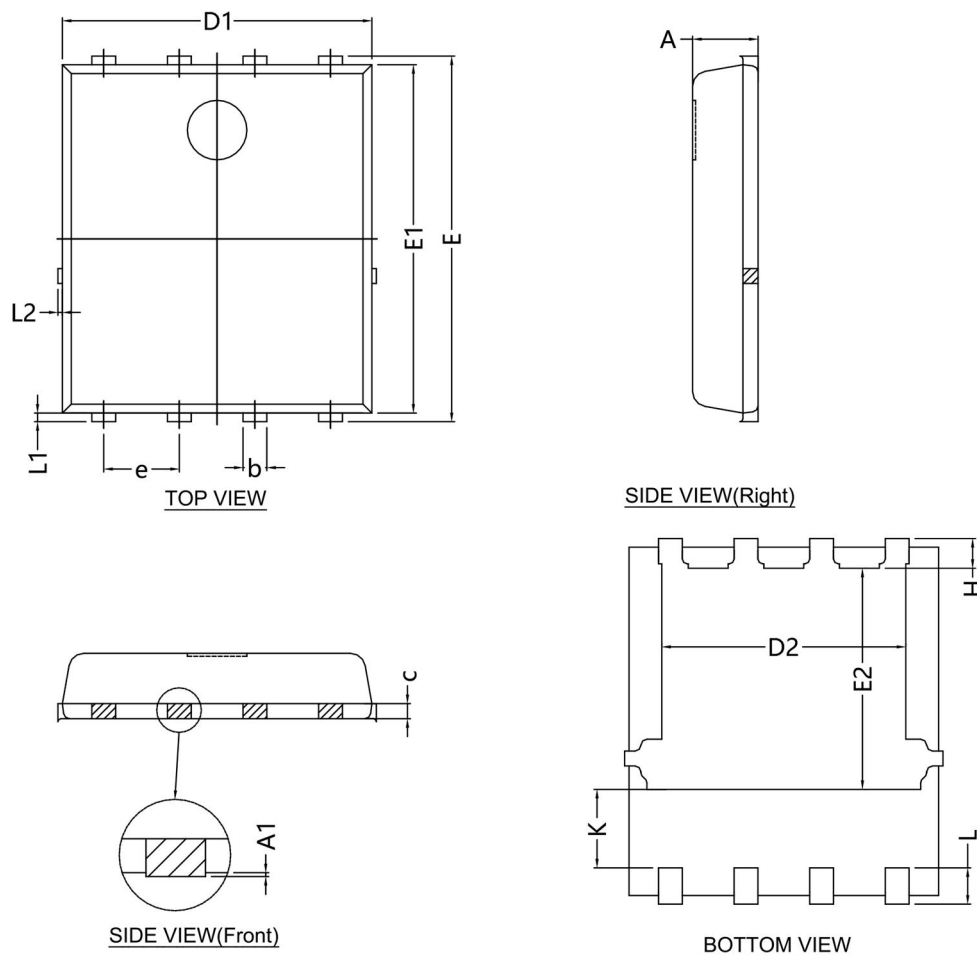
**Figure 9. Maximum Continuous Drain Current vs Case Temperature**



**Figure 10. Normalized Maximum Transient Thermal Impedance**



## DFN5\*6-8L Package Information



| DIM.<br>SYMBOL | MILLIMETERS |      |      |
|----------------|-------------|------|------|
|                | MIN.        | NOM. | MAX. |
| A              | 1.00        | 1.10 | 1.20 |
| A1             | 0           | ---  | 0.05 |
| b              | 0.30        | 0.40 | 0.50 |
| c              | 0.20        | 0.25 | 0.30 |
| D1             | 5.10        | 5.20 | 5.30 |
| D2             | 3.90        | 4.10 | 4.25 |
| E              | 6.00        | 6.15 | 6.30 |
| E1             | 5.76        | 5.86 | 5.96 |
| E2             | 3.52        | 3.72 | 3.92 |
| e              | 1.27 BSC    |      |      |
| H              | 0.40        | 0.50 | 0.60 |
| L              | 0.50        | 0.61 | 0.71 |
| L1             | 0.05        | 0.15 | 0.25 |
| L2             | 0.02        | 0.08 | 0.15 |
| K              | 1.10        | ---  | ---  |