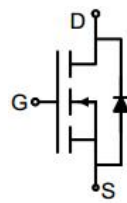
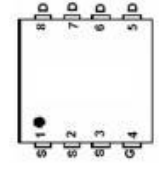
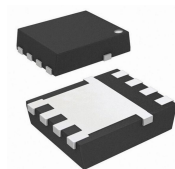


## N-Channel Enhancement Mode Power MOSFET

|  |   |
|--|---|
| <p><b>Description</b></p> <p>The G30N03D3-L uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, 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}</math> 30V</li> <li>● <math>I_D</math> (at <math>V_{GS} = 10V</math>) 28A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</math>) &lt; 7m<math>\Omega</math></li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 4.5V</math>) &lt; 10m<math>\Omega</math></li> <li>● 100% Avalanche Tested</li> <li>● RoHS Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switch</li> <li>● DC/DC converters</li> </ul> |  <p>Schematic diagram</p>  <p>pin assignment</p>  <p>DFN3X3-8L</p> |
|--|---|

### Ordering Information

| Device     | Package   | Marking | Packaging    |
|------------|-----------|---------|--------------|
| G30N03D3-L | DFN3X3-8L | G30N03L | 5000pcs/Reel |

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

| Parameter  | Symbol         | Value      | Unit             |
|--|----------------|------------|------------------|
| Drain-Source Voltage                             | $V_{DS}$       | 30         | V                |
| Continuous Drain Current                         | $I_D$          | 28         | A                |
| Pulsed Drain Current (note1)                     | $I_{DM}$       | 112        | A                |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | V                |
| Power Dissipation                                | $P_D$          | 20         | W                |
| Single pulse avalanche energy (note2)            | $E_{AS}$       | 43         | mJ               |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$ | -55 To 150 | $^\circ\text{C}$ |

### Thermal Resistance

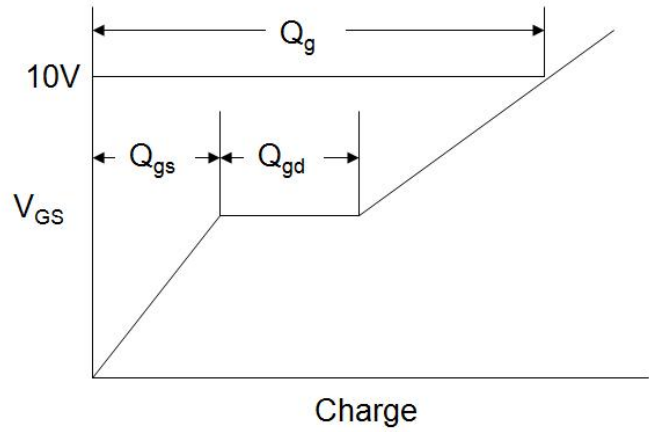
| Parameter                               | Symbol     | Value | Unit               |
|---|------------|-------|--------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 50    | $^\circ\text{C/W}$ |
| Maximum Junction-to-Case                | $R_{thJC}$ | 6.25  | $^\circ\text{C/W}$ |

| Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted |               |  |       |      |           |            |
|--|---------------|--|-------|------|-----------|------------|
| Parameter  | Symbol        | Test Conditions  | Value |      |           | Unit       |
|  |               |  | Min.  | Typ. | Max.      |            |
| <b>Static Parameters</b>   |               |  |       |      |           |            |
| Drain-Source Breakdown Voltage                                   | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                            | 30    | --   | --        | V          |
| Zero Gate Voltage Drain Current                                  | $I_{DSS}$     | $V_{DS} = 30V, V_{GS} = 0V$                              | --    | --   | 1         | $\mu A$    |
| Gate-Source Leakage  | $I_{GSS}$     | $V_{GS} = \pm 20V$                                       | --    | --   | $\pm 100$ | nA         |
| Gate-Source Threshold Voltage                                    | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                        | 1.0   | 1.7  | 2.5       | V          |
| Drain-Source On-Resistance                                       | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 20A$                                | --    | 5.7  | 7         | m $\Omega$ |
|  |               | $V_{GS} = 4.5V, I_D = 15A$                               | --    | 7.6  | 10        |            |
| Forward Transconductance   | $g_{FS}$      | $V_{GS} = 5V, I_D = 20A$                                 | --    | 45   | --        | S          |
| <b>Dynamic Parameters</b>  |               |  |       |      |           |            |
| Input Capacitance  | $C_{iss}$     | $V_{GS} = 0V,$<br>$V_{DS} = 15V,$<br>$f = 1.0\text{MHz}$ | --    | 1062 | --        | pF         |
| Output Capacitance   | $C_{oss}$     |  | --    | 182  | --        |            |
| Reverse Transfer Capacitance                                     | $C_{rss}$     |  | --    | 143  | --        |            |
| Total Gate Charge  | $Q_g$         | $V_{DD} = 15V,$<br>$I_D = 20A,$<br>$V_{GS} = 10V$        | --    | 18   | --        | nC         |
| Gate-Source Charge   | $Q_{gs}$      |  | --    | 3    | --        |            |
| Gate-Drain Charge  | $Q_{gd}$      |  | --    | 4    | --        |            |
| Turn-on Delay Time   | $t_{d(on)}$   | $V_{DD} = 15V,$<br>$I_D = 20A,$<br>$R_G = 3\Omega$       | --    | 6    | --        | ns         |
| Turn-on Rise Time  | $t_r$         |  | --    | 13   | --        |            |
| Turn-off Delay Time  | $t_{d(off)}$  |  | --    | 20   | --        |            |
| Turn-off Fall Time   | $t_f$         |  | --    | 7    | --        |            |
| <b>Drain-Source Body Diode Characteristics</b>                   |               |  |       |      |           |            |
| Continuous Body Diode Current                                    | $I_S$         | $T_C = 25^\circ\text{C}$                                 | --    | --   | 28        | A          |
| Body Diode Voltage   | $V_{SD}$      | $T_J = 25^\circ\text{C}, I_{SD} = 20A, V_{GS} = 0V$      | --    | --   | 1.2       | V          |
| Reverse Recovery Charge  | $Q_{rr}$      | $I_F = 20A, V_{GS} = 0V$<br>$di/dt=100A/\mu s$           | --    | 11   | --        | nC         |
| Reverse Recovery Time  | $T_{rr}$      |  | --    | 20   | --        | ns         |

### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition :  $T_J=25^\circ\text{C}$  ,  $V_{DD}=30V, V_{GS}=10V, L=0.5\text{mH}, R_g=25\Omega$
3. Identical low side and high side switch with identical  $R_G$

### Gate Charge Test Circuit



### Switch Time Test Circuit

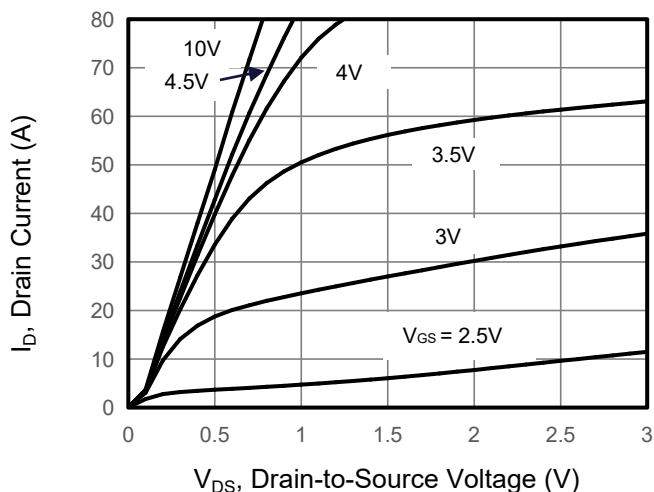


### EAS Test Circuit

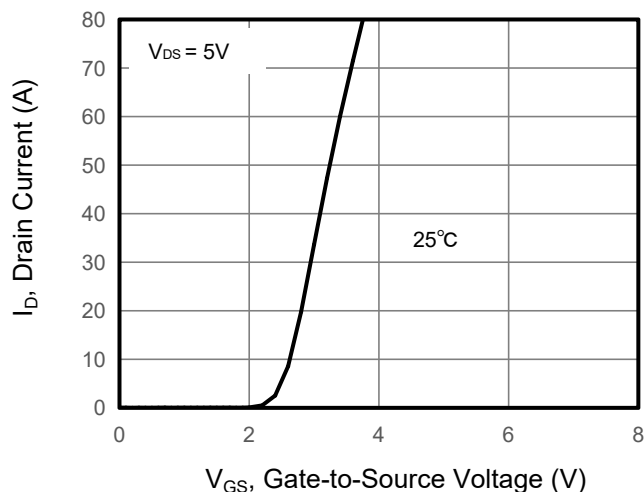


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

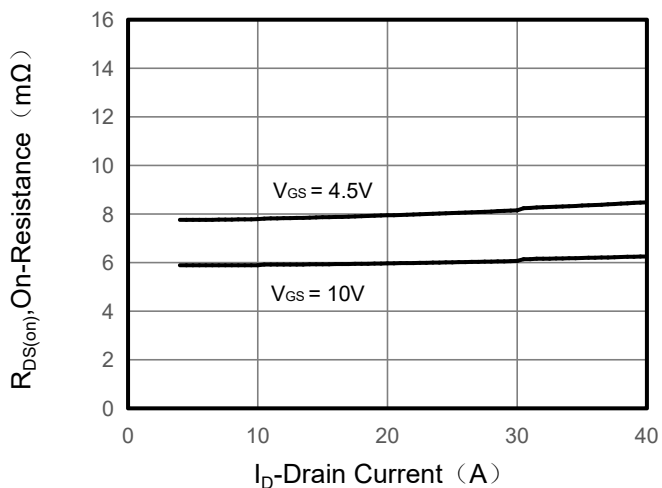
**Figure 1. Output Characteristics**



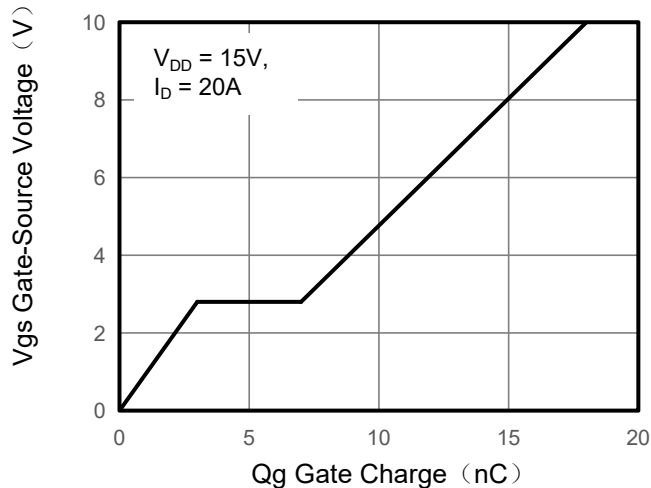
**Figure 2. Transfer Characteristics**



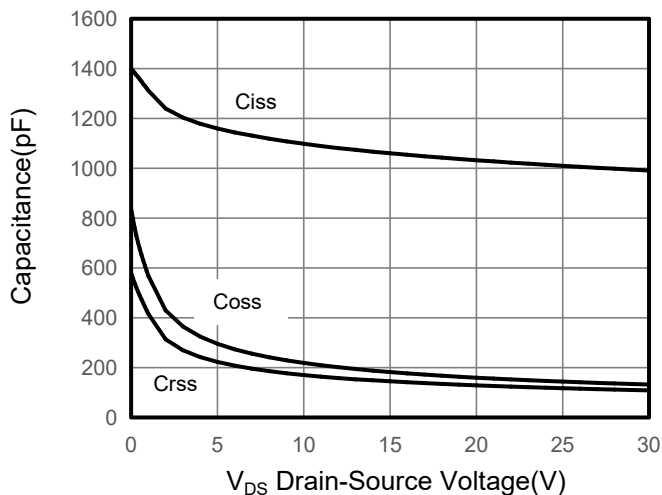
**Figure 3. Drain Source On Resistance**



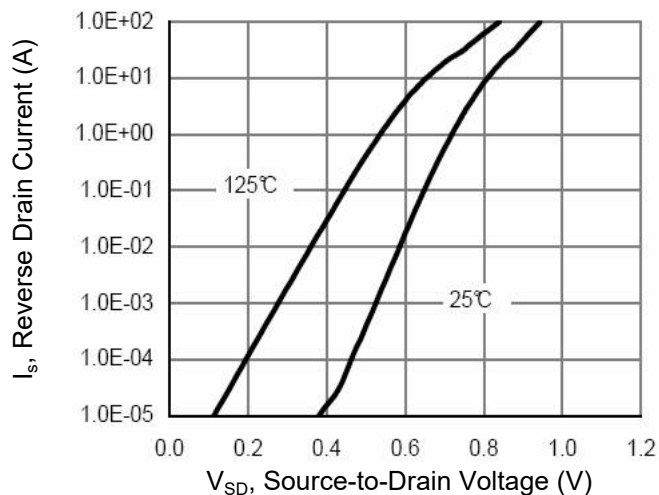
**Figure 4. Gate Charge**



**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

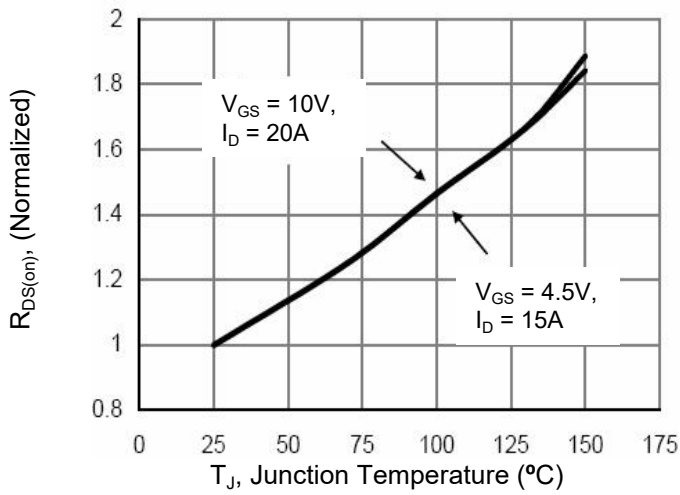


Figure 8. Safe Operation Area

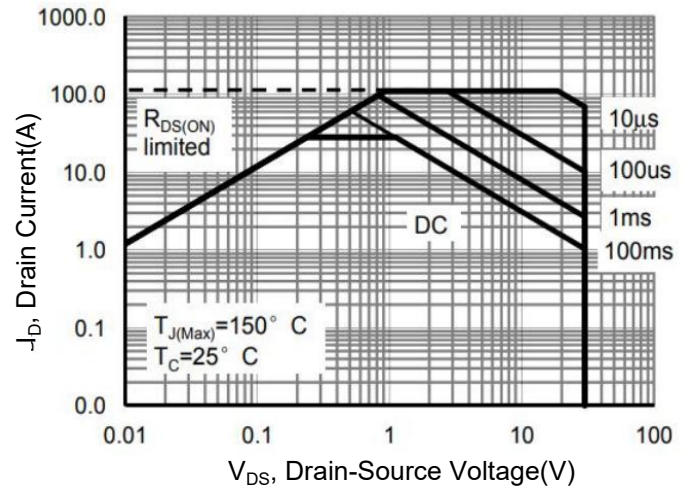
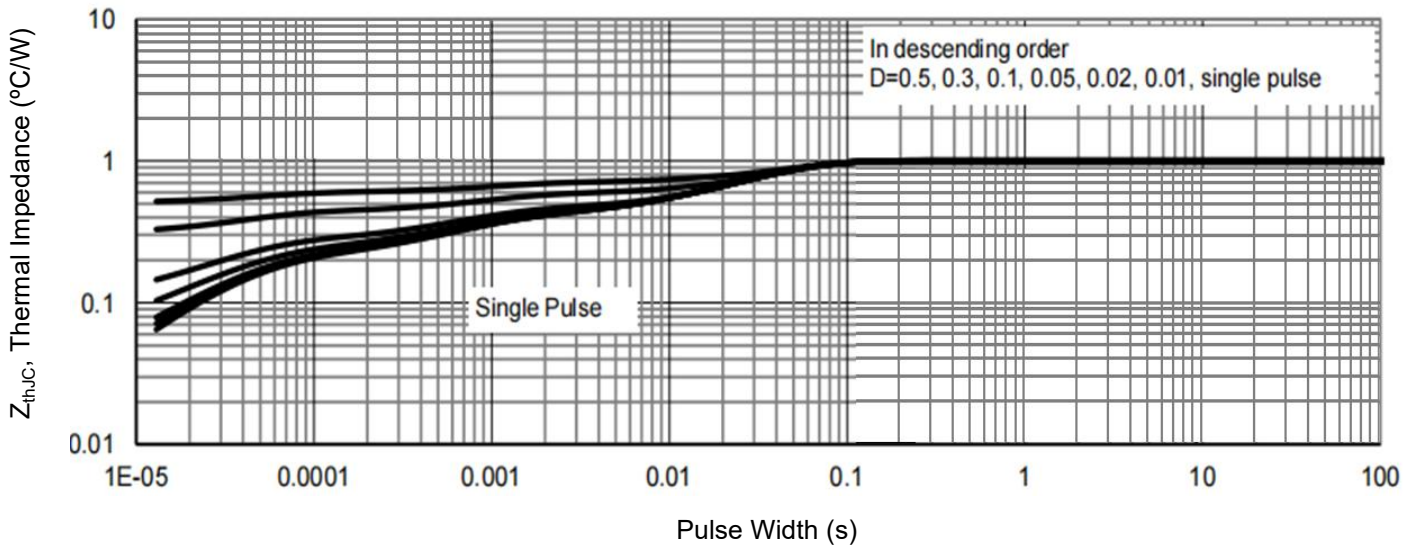
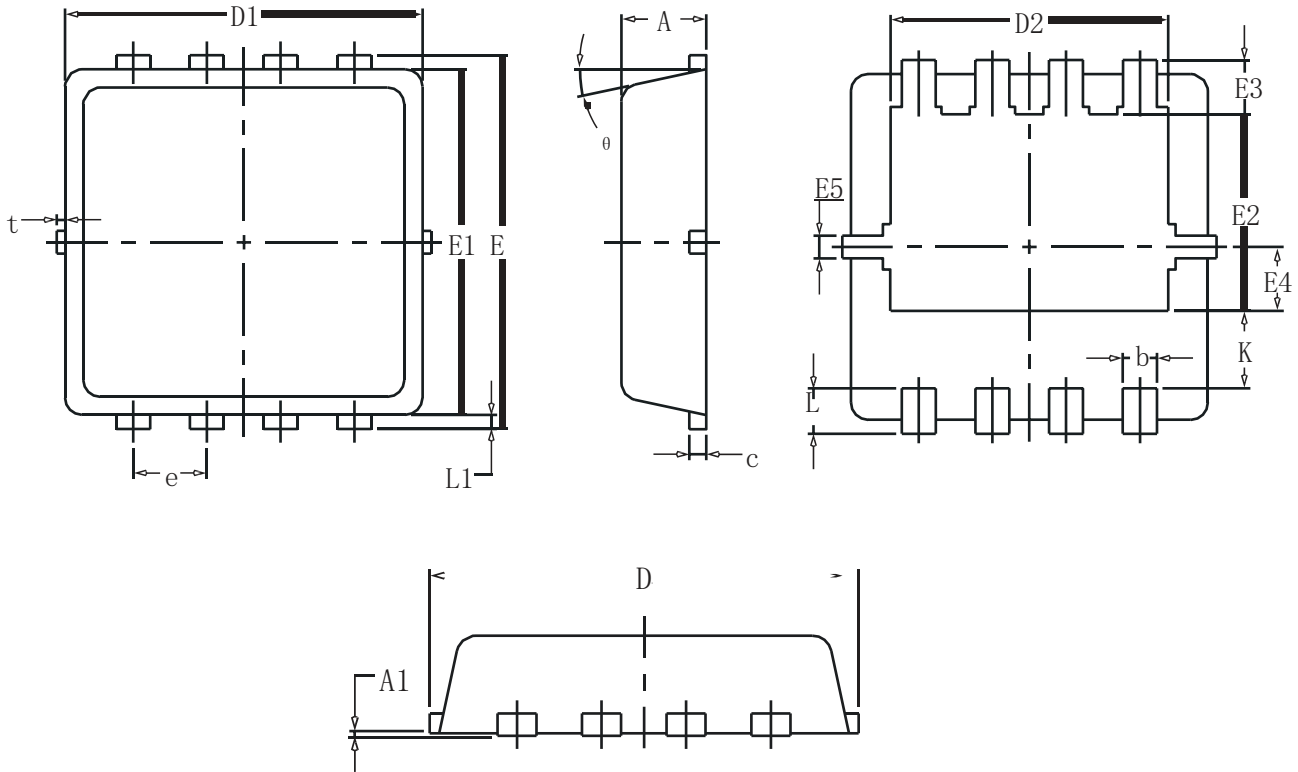


Figure 9. Normalized Maximum Transient Thermal Impedance



## DFN3x3-8L Package Information



| SYMBOL   | COMMON |       |      |
|----------|--------|-------|------|
|          | MM     |       |      |
|          | MIN    | NOM   | MAX  |
| A        | 0.70   | 0.75  | 0.85 |
| A1       | -      | -     | 0.05 |
| b        | 0.20   | 0.30  | 0.40 |
| c        | 0.10   | 0.152 | 0.25 |
| D        | 3.15   | 3.30  | 3.45 |
| D1       | 3.00   | 3.15  | 3.25 |
| D2       | 2.29   | 2.45  | 2.65 |
| E        | 3.15   | 3.30  | 3.45 |
| E1       | 2.90   | 3.05  | 3.20 |
| E2       | 1.54   | 1.74  | 1.94 |
| E3       | 0.28   | 0.48  | 0.65 |
| E4       | 0.37   | 0.57  | 0.77 |
| E5       | 0.10   | 0.20  | 0.30 |
| e        | 0.60   | 0.65  | 0.70 |
| K        | 0.59   | 0.69  | 0.89 |
| L        | 0.30   | 0.40  | 0.50 |
| L1       | 0.06   | 0.125 | 0.20 |
| t        | 0      | 0.075 | 0.13 |
| $\theta$ | 10°    | 12°   | 14°  |