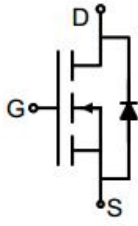
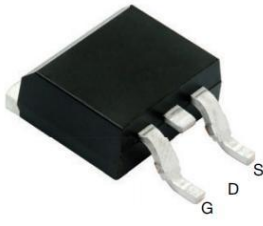


## N-Channel Enhancement Mode Power MOSFET

|  |  |
|--|--|
| <p><b>Description</b></p> <p>The GT100N12M 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> 120V</li> <li>● <math>I_D</math> (at <math>V_{GS} = 10V</math>) 70A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</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>TO-263</p> |
|--|--|

### Ordering Information

| Device    | Package | Marking  | Packaging   |
|-----------|---------|----------|-------------|
| GT100N12M | TO-263  | GT100N12 | 800pcs/Reel |

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

| Parameter  | Symbol         | Value      | Unit             |
|--|----------------|------------|------------------|
| Drain-Source Voltage                             | $V_{DS}$       | 120        | V                |
| Continuous Drain Current                         | $I_D$          | 70         | A                |
| Pulsed Drain Current (note1)                     | $I_{DM}$       | 280        | A                |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | V                |
| Power Dissipation                                | $P_D$          | 100        | W                |
| Single pulse avalanche energy (note2)            | $E_{AS}$       | 156        | mJ               |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$ | -55 To 150 | $^\circ\text{C}$ |

### Thermal Resistance

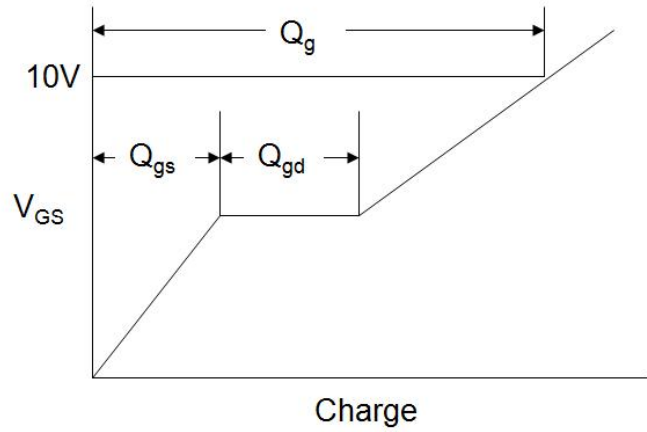
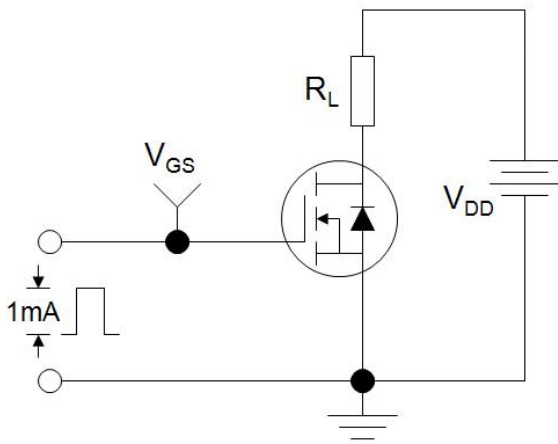
| Parameter                               | Symbol     | Value | Unit               |
|---|------------|-------|--------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 50    | $^\circ\text{C/W}$ |
| Maximum Junction-to-Case                | $R_{thJC}$ | 1.25  | $^\circ\text{C/W}$ |

| 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                                   | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                            | 120   | --   | --        | V          |
| Zero Gate Voltage Drain Current                                  | $I_{DSS}$     | $V_{DS} = 120V, V_{GS} = 0V$                             | --    | --   | 1         | $\mu A$    |
| Gate-Source Leakage  | $I_{GSS}$     | $V_{GS} = \pm 20V$                                       | --    | --   | $\pm 100$ | nA         |
| Gate-Source Threshold Voltage                                    | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                        | 2     | 3    | 4         | V          |
| Drain-Source On-Resistance                                       | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 20A$                                | --    | 7.5  | 10        | m $\Omega$ |
| Forward Transconductance   | $g_{FS}$      | $V_{GS} = 5V, I_D = 20A$                                 | --    | 25   | --        | S          |
| <b>Dynamic Parameters</b>  |               |  |       |      |           |            |
| Input Capacitance  | $C_{iss}$     | $V_{GS} = 0V,$<br>$V_{DS} = 60V,$<br>$f = 1.0\text{MHz}$ | --    | 2887 | --        | pF         |
| Output Capacitance   | $C_{oss}$     |  | --    | 324  | --        |            |
| Reverse Transfer Capacitance                                     | $C_{rss}$     |  | --    | 7    | --        |            |
| Total Gate Charge  | $Q_g$         | $V_{DD} = 60V,$<br>$I_D = 20A,$<br>$V_{GS} = 10V$        | --    | 50   | --        | nC         |
| Gate-Source Charge   | $Q_{gs}$      |  | --    | 17   | --        |            |
| Gate-Drain Charge  | $Q_{gd}$      |  | --    | 15   | --        |            |
| Turn-on Delay Time   | $t_{d(on)}$   | $V_{DD} = 60V,$<br>$I_D = 20A,$<br>$R_G = 1.6\Omega$     | --    | 15   | --        | ns         |
| Turn-on Rise Time  | $t_r$         |  | --    | 10   | --        |            |
| Turn-off Delay Time  | $t_{d(off)}$  |  | --    | 34   | --        |            |
| Turn-off Fall Time   | $t_f$         |  | --    | 8    | --        |            |
| <b>Drain-Source Body Diode Characteristics</b>                   |               |  |       |      |           |            |
| Continuous Body Diode Current                                    | $I_S$         | $T_C = 25^\circ\text{C}$                                 | --    | --   | 70        | 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>$di/dt = 100A/\mu s$         | --    | 106  | --        | nC         |
| Reverse Recovery Time  | $T_{rr}$      |  | --    | 60   | --        | ns         |

### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition :  $T_J = 25^\circ\text{C}, V_{DD} = 50V, V_{GS} = 10V, L = 0.5\text{mH}, R_G = 25\Omega$
3. Identical low side and high side switch with identical  $R_G$

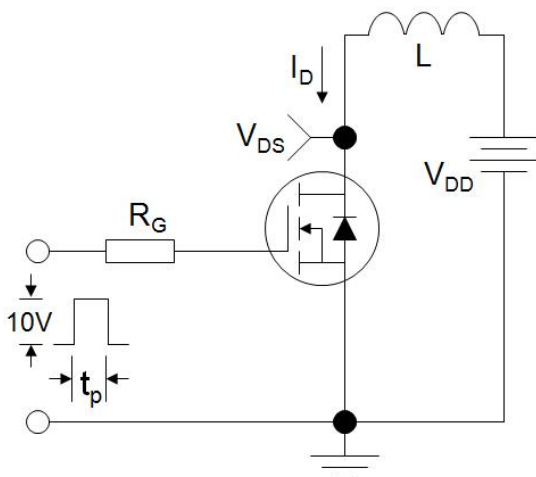
### Gate Charge Test Circuit



### Switch Time Test Circuit

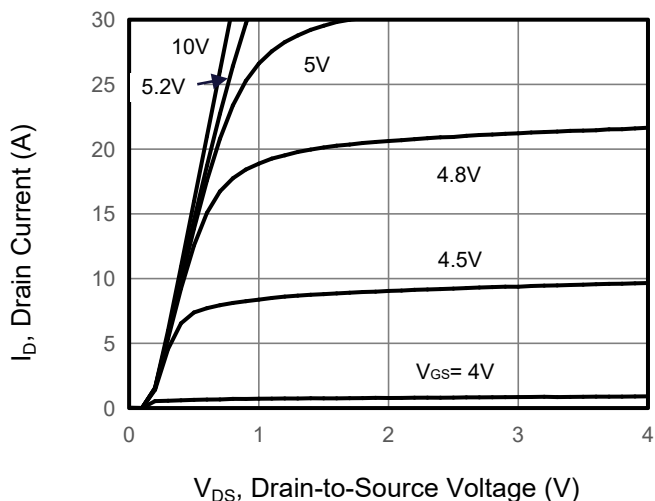


### EAS Test Circuit

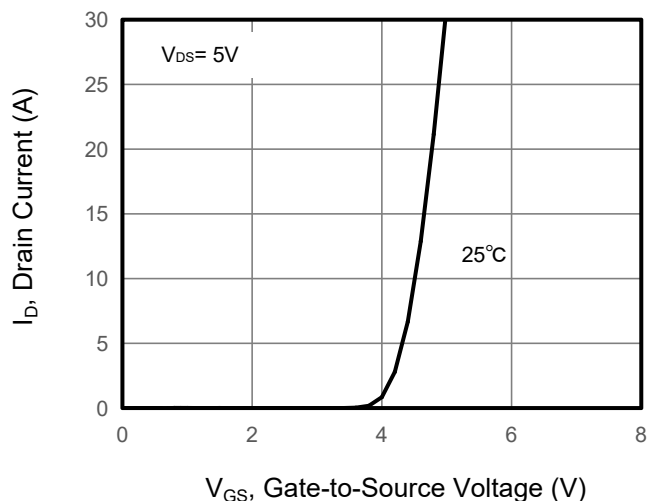


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

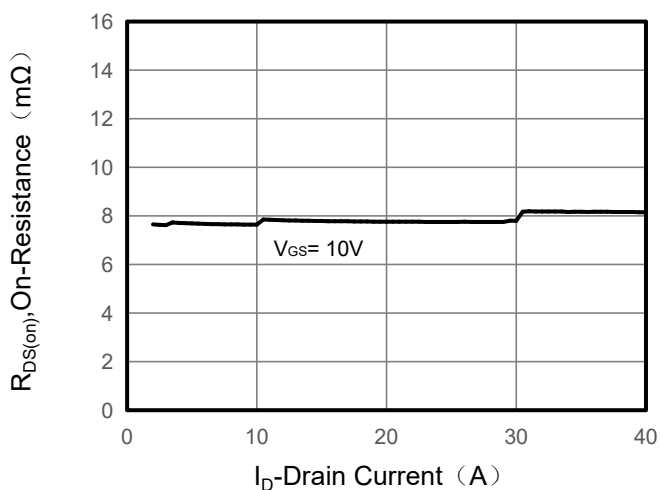
**Figure 1. Output Characteristics**



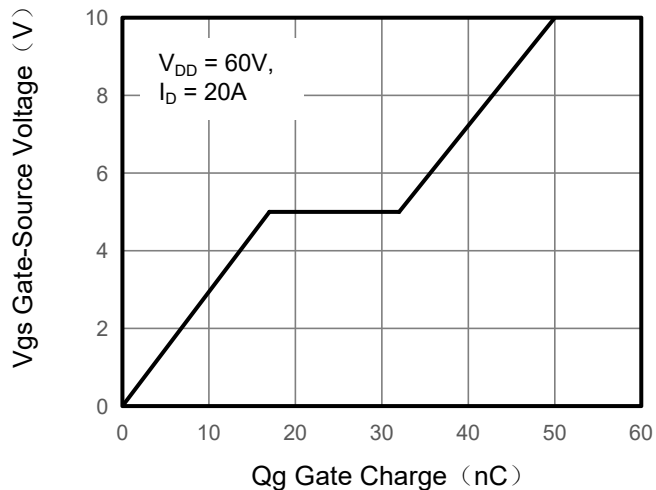
**Figure 2. Transfer Characteristics**



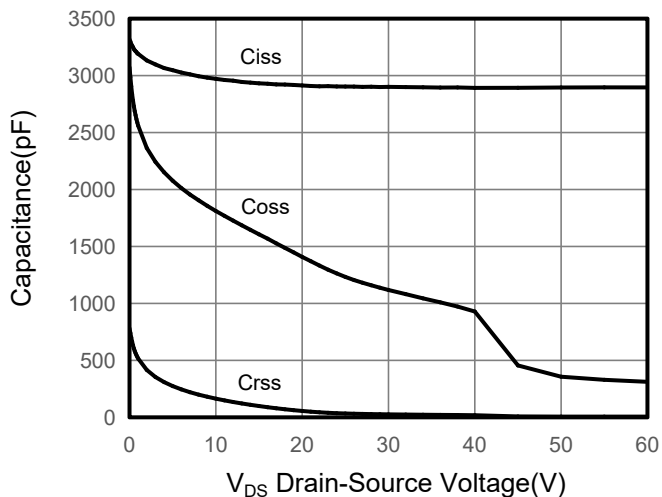
**Figure 3. Drain Source On Resistance**



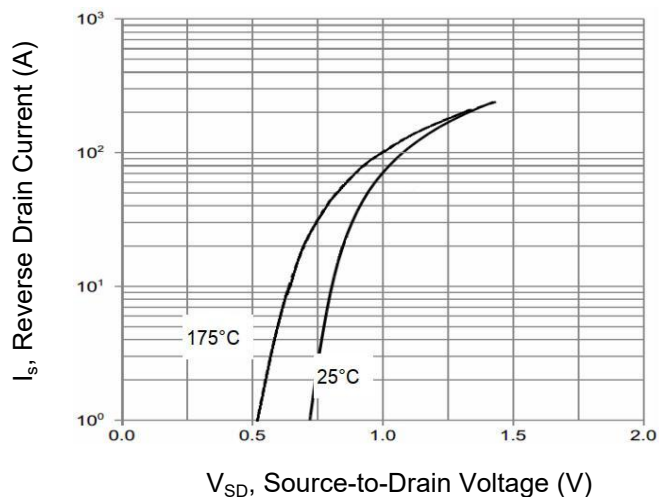
**Figure 4. Gate Charge**



**Figure 5. Capacitance**

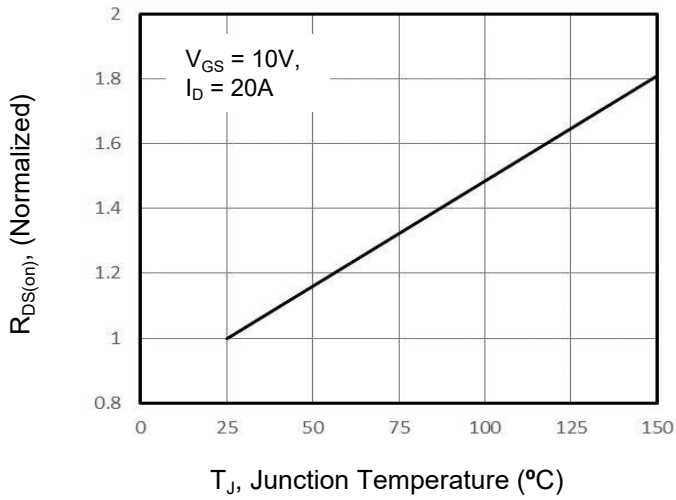


**Figure 6. Source-Drain Diode Forward**

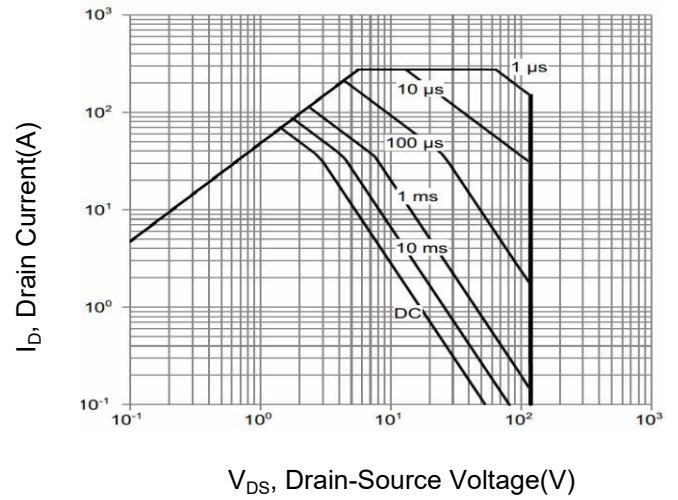


## Typical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted

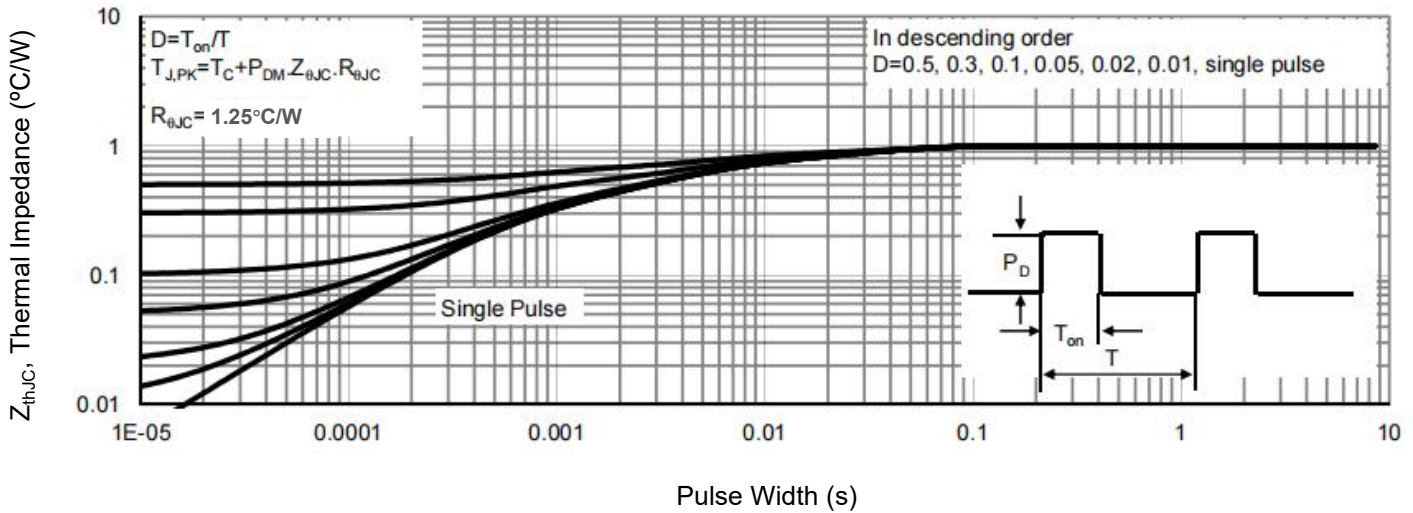
**Figure 7. Drain-Source On-Resistance**



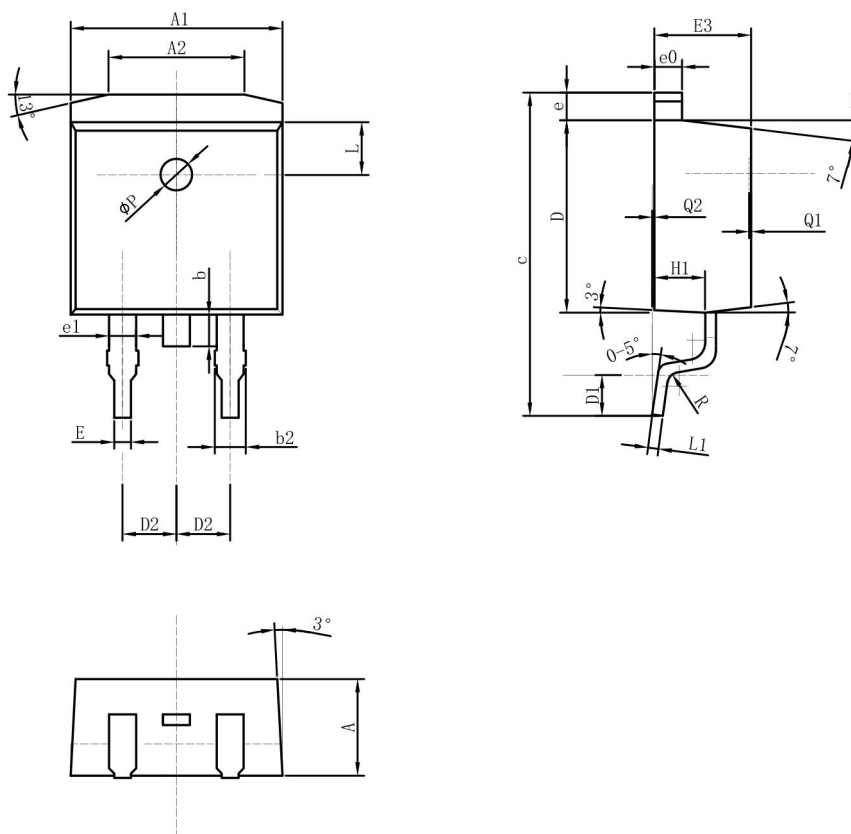
**Figure 8. Safe Operation Area**



**Figure 9. Normalized Maximum Transient Thermal Impedance**



## TO-263 Package Information



### COMMON DIMENSIONS

| SYMB     | mm    |       |       |
|----------|-------|-------|-------|
|          | MIN   | NOM   | MAX   |
| A        | 4.52  | 4.57  | 4.62  |
| A1       | 9.95  | 10.00 | 10.05 |
| A2       | 6.30  | 6.40  | 6.50  |
| b        | 1.30  | 1.50  | 1.70  |
| b2       | 1.17  | 1.27  | 1.37  |
| c        | 14.80 | 15.00 | 15.20 |
| D        | 9.05  | 9.10  | 9.15  |
| D1       | 1.90  | 2.10  | 2.30  |
| D2       | -     | 2.54  | -     |
| E        | -     | 0.80  | -     |
| E3       | -     | 4.57  | -     |
| e        | -     | 1.30  | -     |
| e0       | -     | 1.30  | -     |
| e1       | 1.73  | 3     | -     |
| H1       | -     | 2.40  | -     |
| L        | -     | 2.50  | -     |
| L1       | -     | 0.50  | -     |
| $\phi P$ | -     | 1.50  | -     |
| R        | -     | 0.50  | -     |
| Q1       | 0.10  | -     | 0.15  |
| Q2       | 0     | -     | 0.02  |