## General Description

The G15N10C combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for power switching application and LED backlighting.

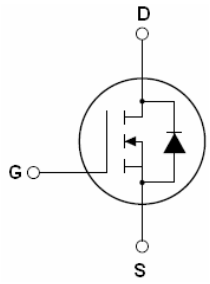
## Features

| VDSS | RDS(ON) @10V (typ) | ID |
|---|---|---|
| 100V | 70mΩ | 15A |

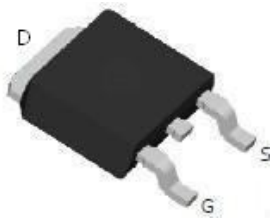
- Ultra Low On-Resistance
- High UIS and UIS 100% Test

## Application

- Power switching application
- LED backlighting




**Schematic Diagram**




**To-252**

**Table 1. Absolute Maximum Ratings (TA=25℃)**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage ($V_{GS}$=0V) | 100 | V |
| $V_{GS}$ | Gate-Source Voltage ($V_{DS}$=0V) | ±20 | V |
| $I_{D\ (DC)}$ | Drain Current (DC) at Tc=25℃ | 15 | A |
| $I_{D\ (DC)}$ | Drain Current (DC) at Tc=100℃ | 8.5 | A |
| $I_{DM\ (pluse)}$ | Drain Current-Continuous@ Current-Pulsed **(Note 1)** | 56 | A |
| $P_D$ | Maximum Power Dissipation(Tc=25℃) | 28 | W |
| $E_{AS}$ | Single Pulse Avalanche Energy **(Note 2)** | 16 | mJ |
| $T_J$,$T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 175 | ℃ |

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

2.$E_{AS}$ condition:$T_J$=25℃,$V_{DD}$=50V,$V_G$=10V, $R_G$=25Ω

**Table 2. Thermal Characteristic**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance,Junction-to-Case | 3.3 | ℃/W |

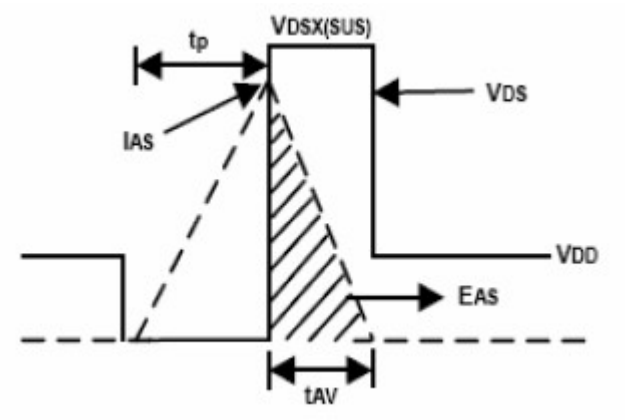
**Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)**

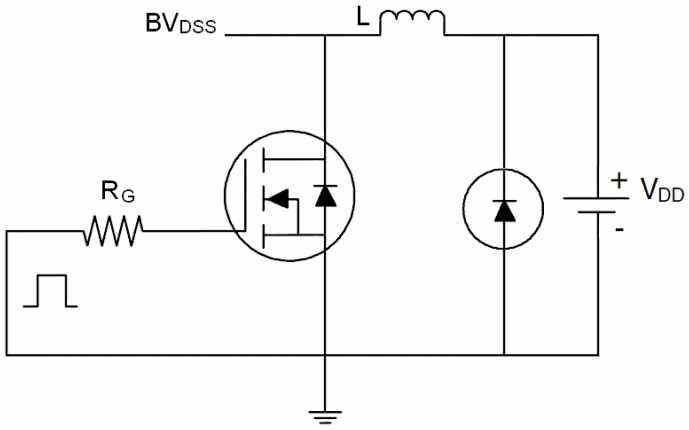
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **On/Off States** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=250μA | 100 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current(Tc=25℃) | $V_{DS}$=100V,$V_{GS}$=0V | | | 1 | μA |
| $I_{DSS}$ | Zero Gate Voltage Drain Current(Tc=100℃) | $V_{DS}$=100V,$V_{GS}$=0V | | | 5 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±20V,$V_{DS}$=0V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1.5 | 2.0 | 2.6 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V, $I_D$=4.5A | | 70 | 85 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V,$I_D$=4.5A | 5 | | | S |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=50V,$V_{GS}$=0V f=1.0MHz | | 612 | | PF |
| $C_{oss}$ | Output Capacitance | | | 120 | | PF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 91 | | PF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=50V,$I_D$=4.5A $V_{GS}$=10V | | 11 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 1.9 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 2.8 | | nC |
| **Switching Times** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}$=50V,$R_L$=8.6Ω $V_{GS}$=10V,$R_G$=3Ω | | 8 | | nS |
| $t_r$ | Turn-on Rise Time | | | 3 | | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 17 | | nS |
| $t_f$ | Turn-Off Fall Time | | | 4.5 | | nS |
| **Source-Drain Diode Characteristics** | | | | | | |
| $I_{SD}$ | Source-Drain Current(Body Diode) | | | 14 | | A |
| $I_{SDM}$ | Pulsed Source-Drain Current(Body Diode) | | | 56 | | A |
| $V_{SD}$ | Forward On Voltage**(Note 1)** | $T_J$=25℃,$I_{SD}$=1A,$V_{GS}$=0V | | 0.74 | 1 | V |
| $t_{rr}$ | Reverse Recovery Time**(Note 1)** | $T_J$=25℃,$I_F$=4.5A di/dt=500A/μs | | 21 | | nS |
| $Q_{rr}$ | Reverse Recovery Charge**(Note 1)** | | | 97 | | nC |
| $t_{on}$ | Forward Turn-on Time | Intrinsic turn-on time is negligible(turn-on is dominated by $L_S$+$L_D$) | | | | |

Notes 1.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, Starting $T_J$=25℃

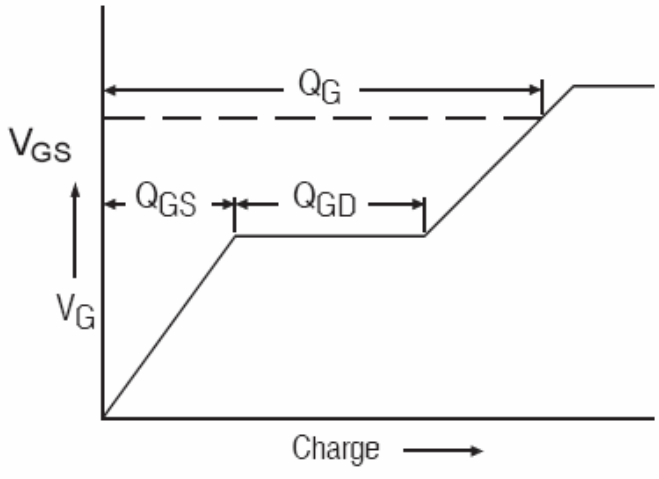
## Test Circuit

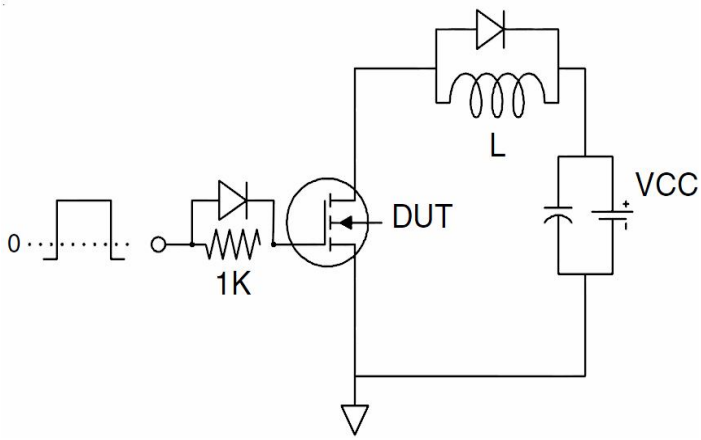
1) $E_{AS}$ Test Circuits



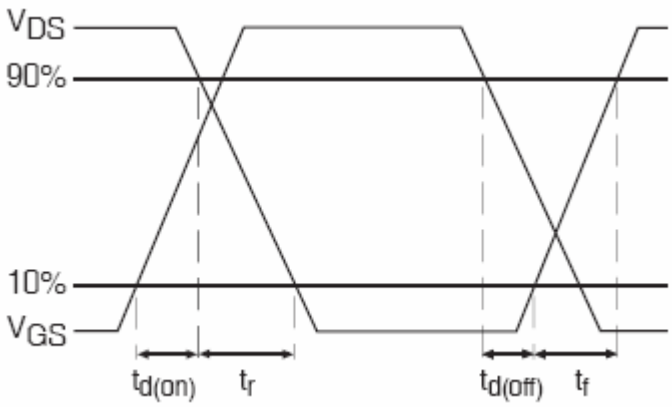



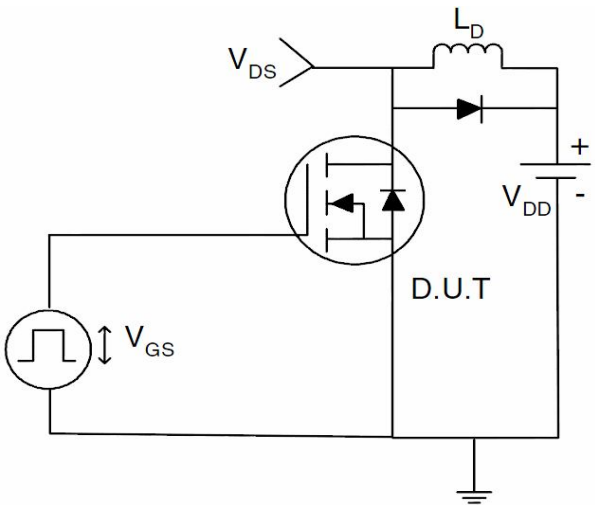

2) Gate Charge Test Circuit:




3) Switch Time Test Circuit:



## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

**Figure1. On-Region Characteristics**

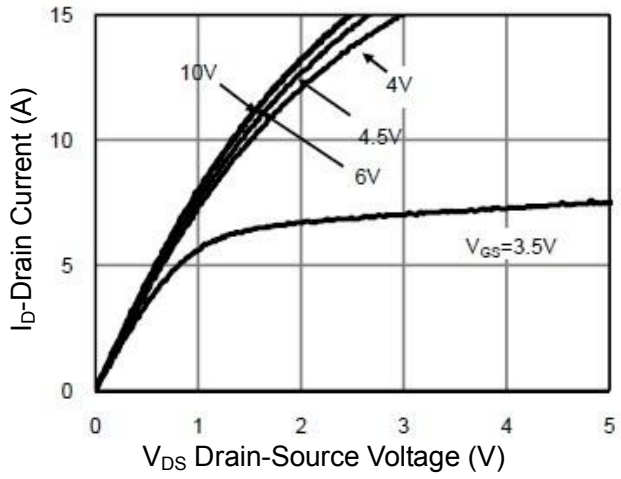



**Figure 2: Transfer Characteristics**

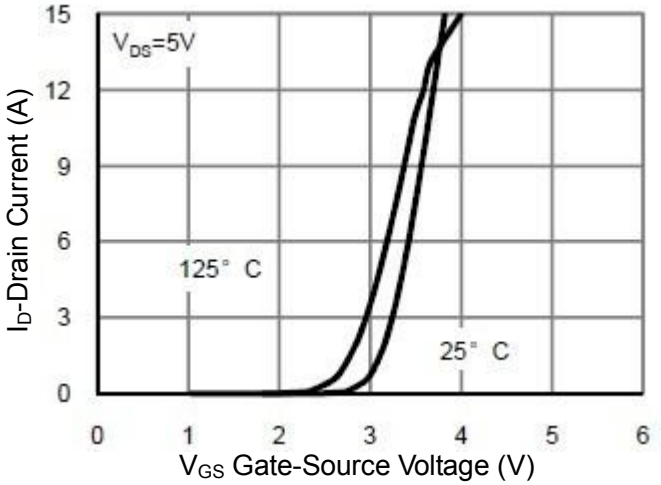



**Figure3. On-Resistance vs. Drain Current and Gate Voltage**

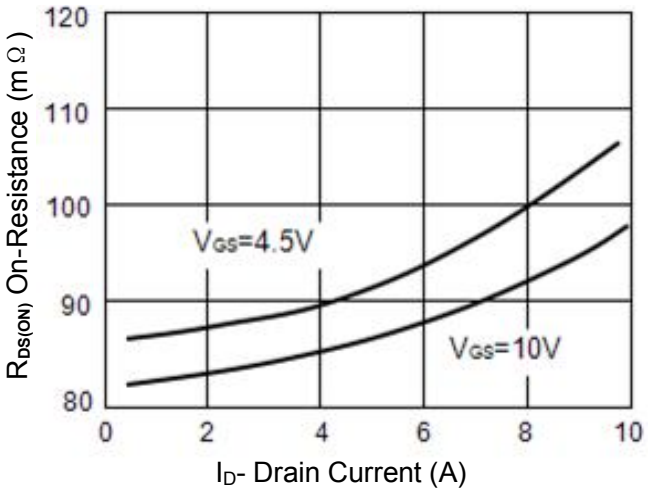



**Figure4. On-Resistance vs. Junction Temperature**

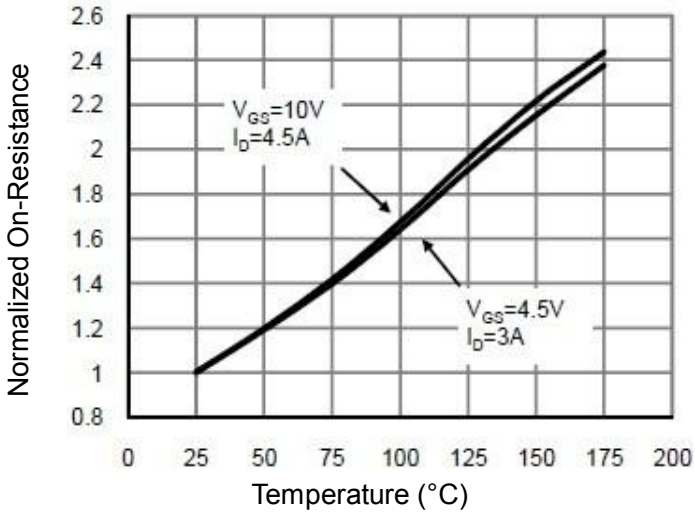



**Figure5. On-Resistance vs. Gate-Source Voltage**

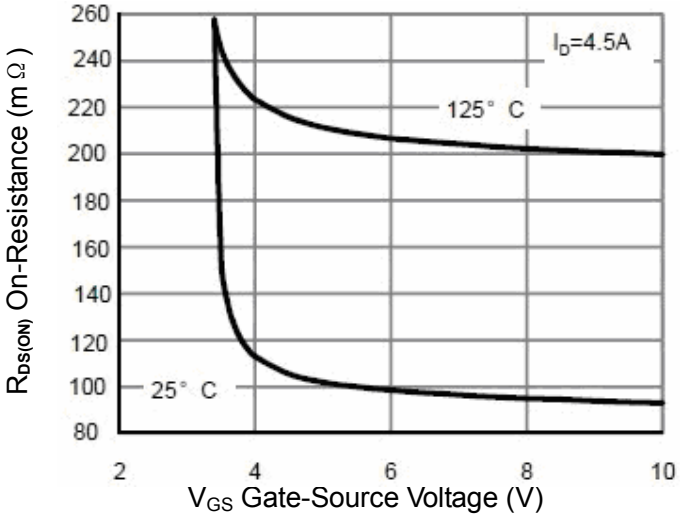



**Figure6. Body-Diode Characteristics**

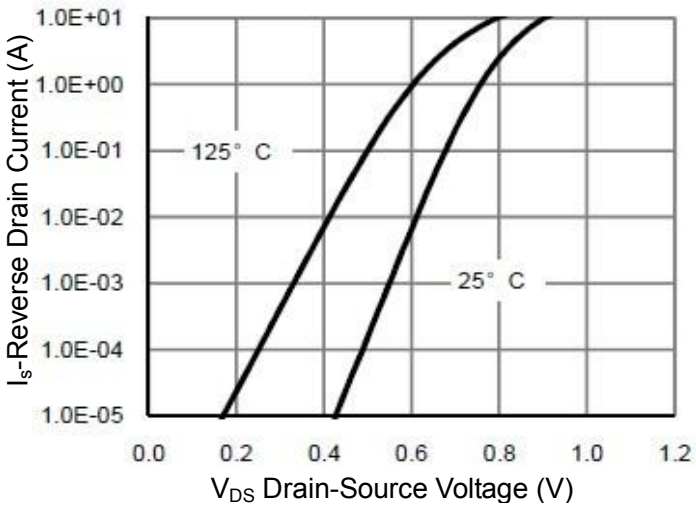


**Figure7. Gate-Charge Characteristics**

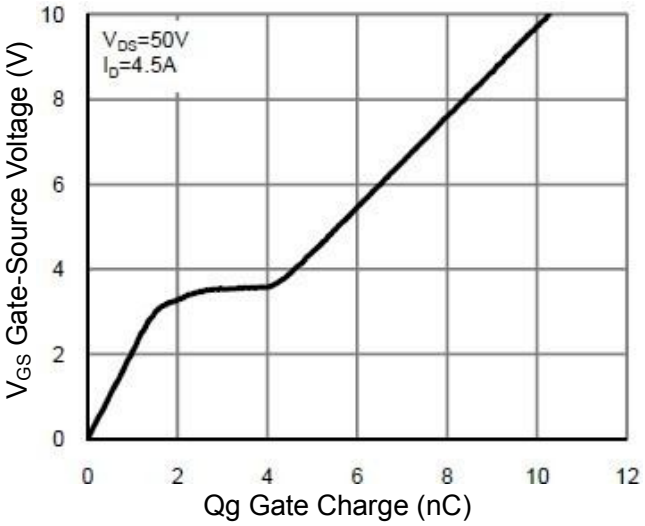



**Figure 8. Capacitance Characteristics**

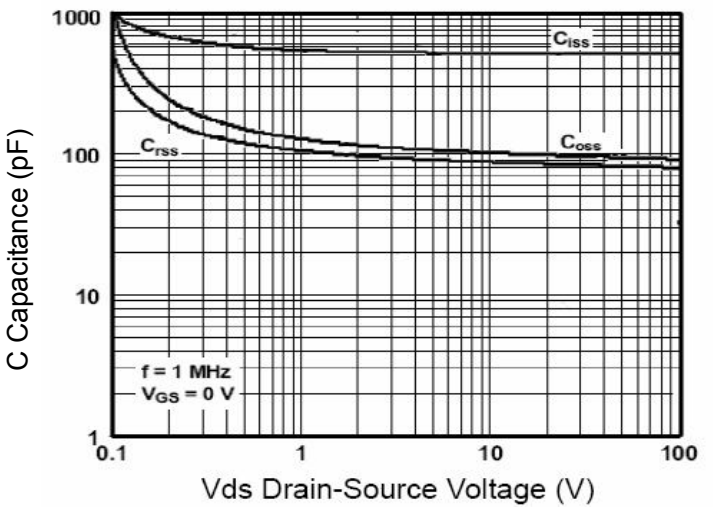



**Figure 9. Maximum Forward Biased Safe Operating Area**

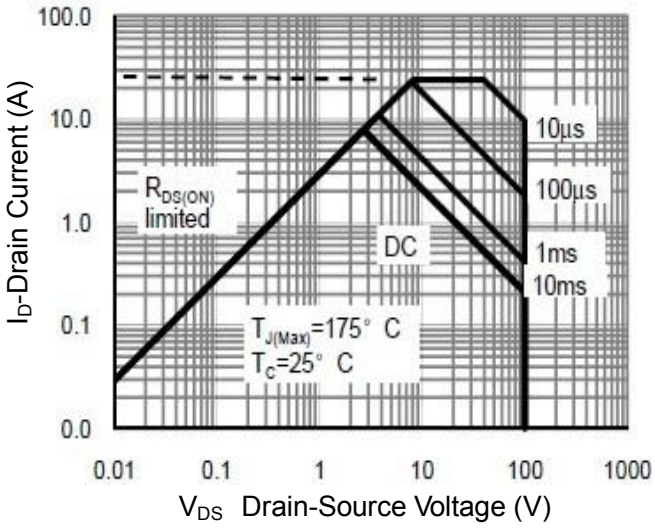



**Figure10. Single Pulse Power Rating Junction-to-Case**

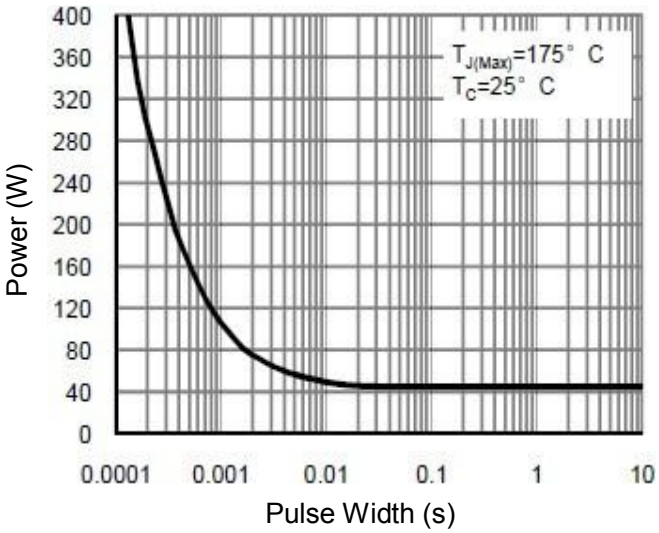



**Figure11. Normalized Maximum Transient Thermal Impedance**