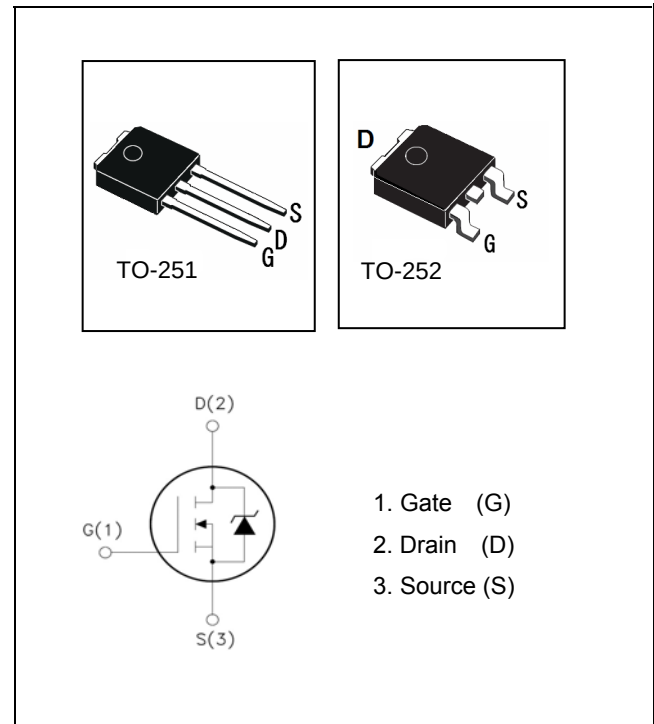


# D15N10

100V N-Channel MOSFET

## Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g = 12.5\text{nC}$  (Typ.).
- $BVDSS = 100\text{V}$ ,  $I_D = 9.6\text{A}$
- $R_{DS(on)} : 0.14\Omega$  (Max) @  $V_G = 10\text{V}$
- 100% Avalanche Tested



## Absolute Maximum Ratings\* ( $T_c = 25^\circ\text{C}$ Unless otherwise noted)

| Parameter                                             | Symbol                   | Limit      | Unit                |
|-------------------------------------------------------|--------------------------|------------|---------------------|
| Drain-Source Voltage                                  | $V_{DS}$                 | 100        | V                   |
| Gate-Source Voltage                                   | $V_{GS}$                 | $\pm 20$   | V                   |
| Drain Current-Continuous                              | $I_D$                    | 9.6        | A                   |
| Drain Current-Continuous( $T_c = 100^\circ\text{C}$ ) | $I_D(100^\circ\text{C})$ | 6.5        | A                   |
| Pulsed Drain Current                                  | $I_{DM}$                 | 58         | A                   |
| Maximum Power Dissipation                             | $P_D$                    | 30         | W                   |
| Derating factor                                       |                          | 0.24       | W/ $^\circ\text{C}$ |
| Single pulse avalanche energy (Note 5)                | $E_{AS}$                 | 150        | mJ                  |
| Operating Junction and Storage Temperature Range      | $T_J, T_{STG}$           | -55 To 150 | $^\circ\text{C}$    |

## Thermal Characteristics

|                                              |                 |      |                    |
|----------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance, Junction-to-Case(Note 2) | $R_{\theta JC}$ | 4.17 | $^\circ\text{C/W}$ |
|----------------------------------------------|-----------------|------|--------------------|

**Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise noted)**

| Parameter                          | Symbol              | Condition                                                                                                   | Min | Typ  | Max  | Unit |
|------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------|-----|------|------|------|
| Off Characteristics                |                     |                                                                                                             |     |      |      |      |
| Drain-Source Breakdown Voltage     | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =250μA                                                                   | 100 | 110  | -    | V    |
| Zero Gate Voltage Drain Current    | I <sub>DSS</sub>    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V                                                                  | -   | -    | 1    | μA   |
| Gate-Body Leakage Current          | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                                  | -   | -    | ±100 | nA   |
| On Characteristics (Note 3)        |                     |                                                                                                             |     |      |      |      |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                                    | 1.2 | 1.8  | 2.5  | V    |
| Drain-Source On-State Resistance   | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =5A                                                                    | -   | 105  | 140  | mΩ   |
| Forward Transconductance           | g <sub>FS</sub>     | V <sub>DS</sub> =25V, I <sub>D</sub> =6A                                                                    | 3.5 | -    | -    | S    |
| Dynamic Characteristics (Note4)    |                     |                                                                                                             |     |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                                      | -   | 690  | -    | PF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                                                                                             | -   | 120  | -    | PF   |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                                             | -   | 90   | -    | PF   |
| Switching Characteristics (Note 4) |                     |                                                                                                             |     |      |      |      |
| Turn-on Delay Time                 | t <sub>d(on)</sub>  | V <sub>DD</sub> =30V, I <sub>D</sub> =2A, R <sub>L</sub> =15Ω<br>V <sub>GS</sub> =10V, R <sub>G</sub> =2.5Ω | -   | 11   | -    | nS   |
| Turn-on Rise Time                  | t <sub>r</sub>      |                                                                                                             | -   | 7.4  | -    | nS   |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                                                                                             | -   | 35   | -    | nS   |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                                                                                             | -   | 9.1  | -    | nS   |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =30V, I <sub>D</sub> =3A,<br>V <sub>GS</sub> =10V                                           | -   | 15.5 |      | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                                             | -   | 3.2  | -    | nC   |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                                             | -   | 4.7  | -    | nC   |
| Drain-Source Diode Characteristics |                     |                                                                                                             |     |      |      |      |
| Diode Forward Voltage (Note 3)     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =9A                                                                     | -   | -    | 1.2  | V    |
| Diode Forward Current (Note 2)     | I <sub>S</sub>      |                                                                                                             | -   | -    | 9.6  | A    |
| Reverse Recovery Time              | t <sub>rr</sub>     | T <sub>J</sub> = 25°C, I <sub>F</sub> =6A<br>di/dt = 100A/μs(Note3)                                         | -   | 21   |      | nS   |
| Reverse Recovery Charge            | Q <sub>rr</sub>     |                                                                                                             | -   | 97   |      | nC   |
| Forward Turn-On Time               | t <sub>on</sub>     | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)                                        |     |      |      |      |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω

## Typical Characteristics

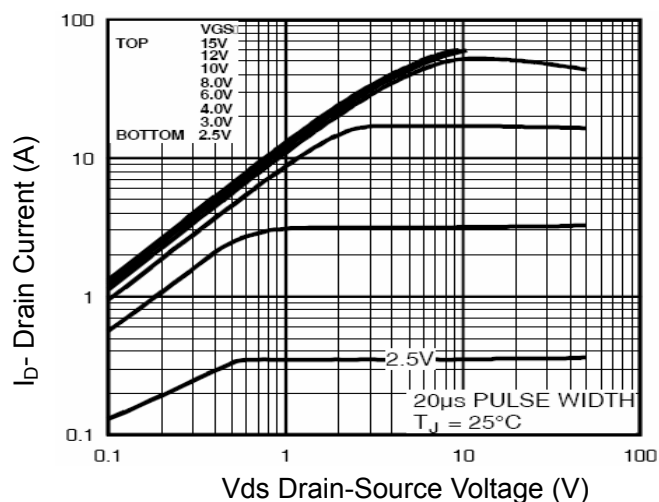


Figure 1 Output Characteristics

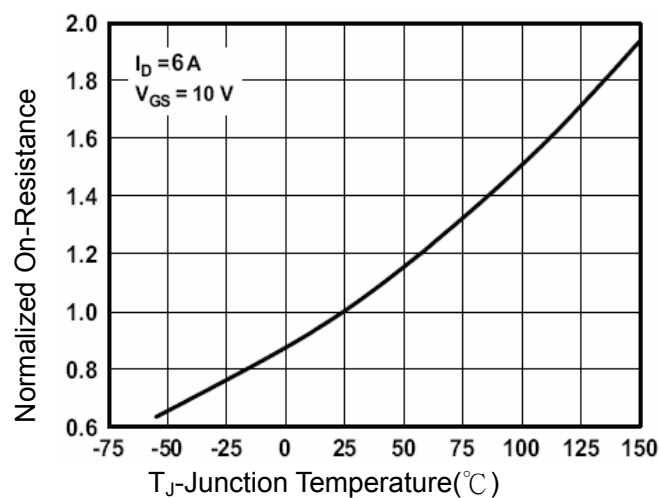


Figure 4 Rdson-Junction Temperature

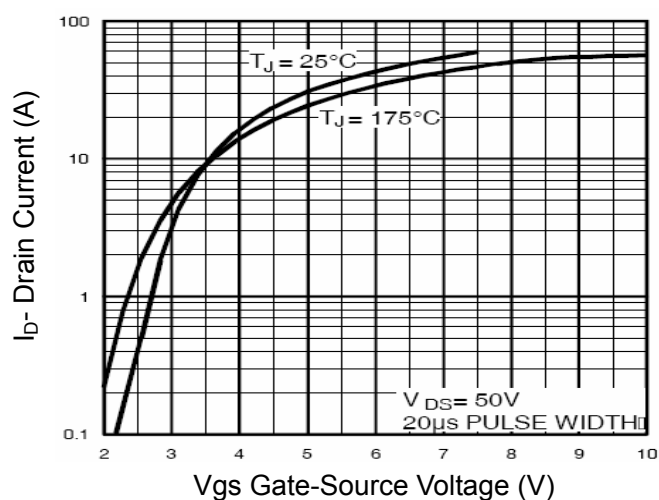


Figure 2 Transfer Characteristics

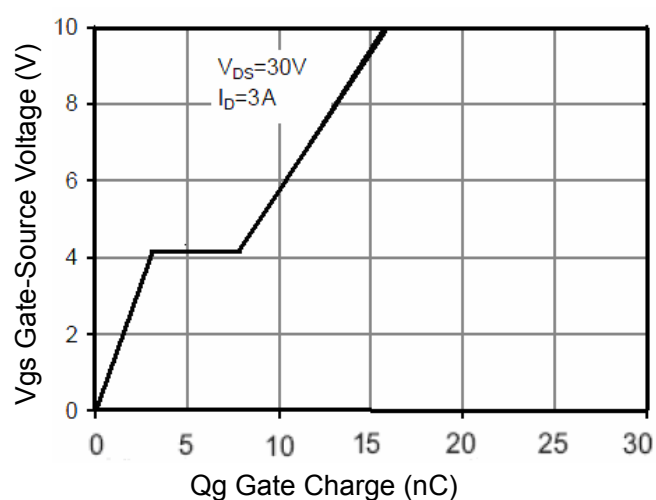


Figure 5 Gate Charge

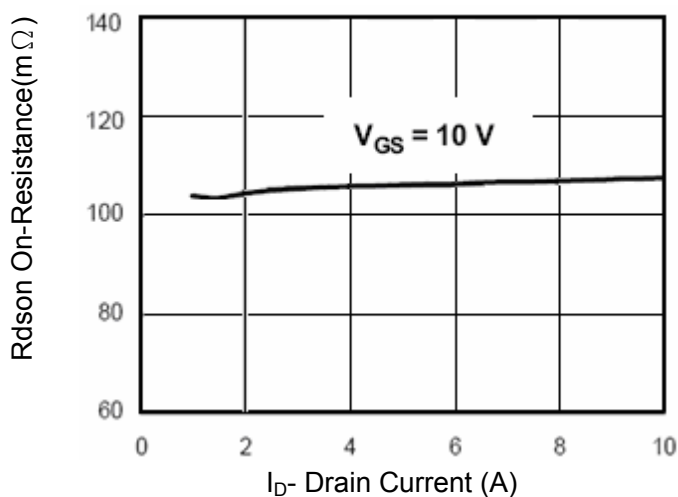


Figure 3 Rdson- Drain Current

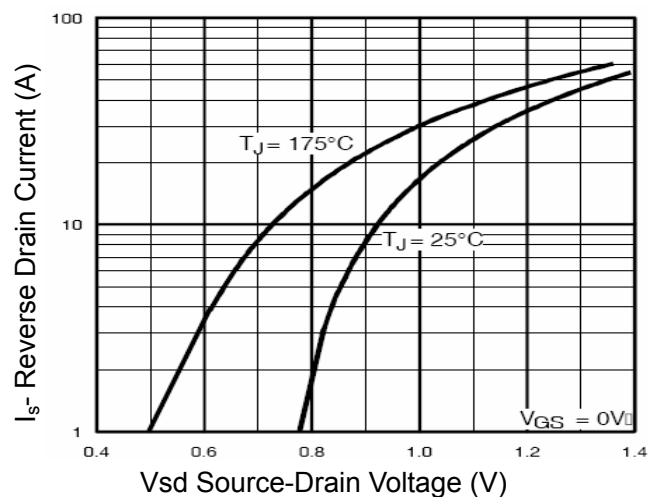


Figure 6 Source- Drain Diode Forward

## Typical Characteristics (Continued)

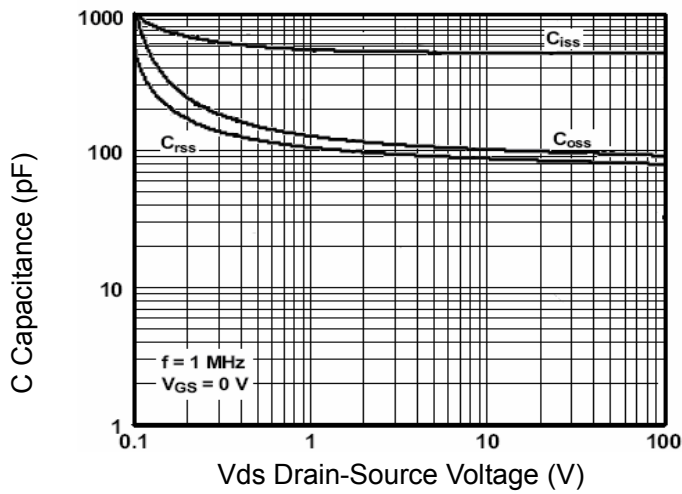


Figure 7 Capacitance vs Vds

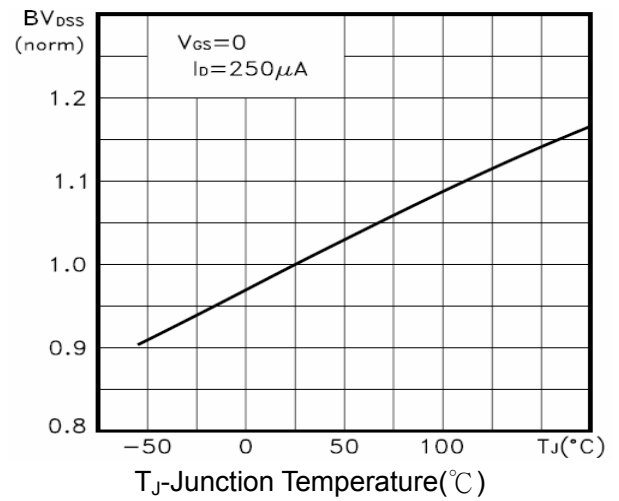
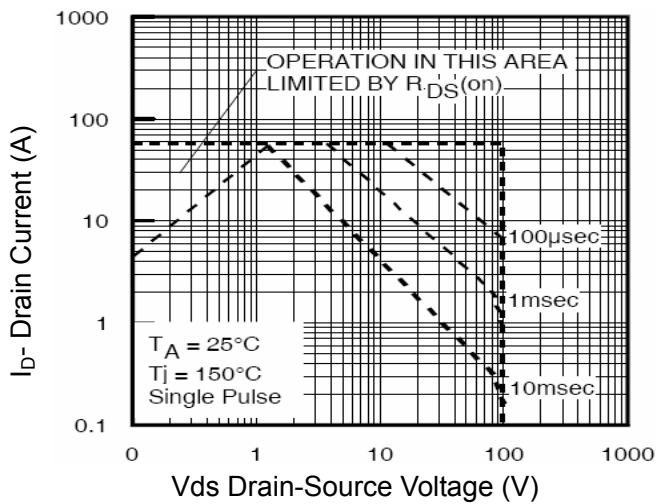
Figure 9  $BV_{DSS}$  vs Junction Temperature

Figure 8 Safe Operation Area

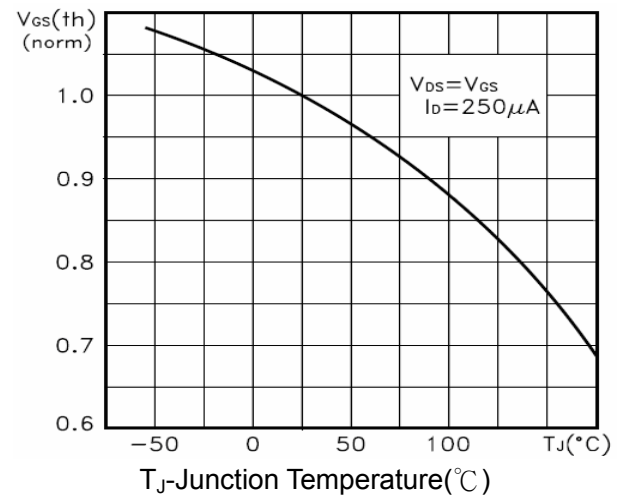
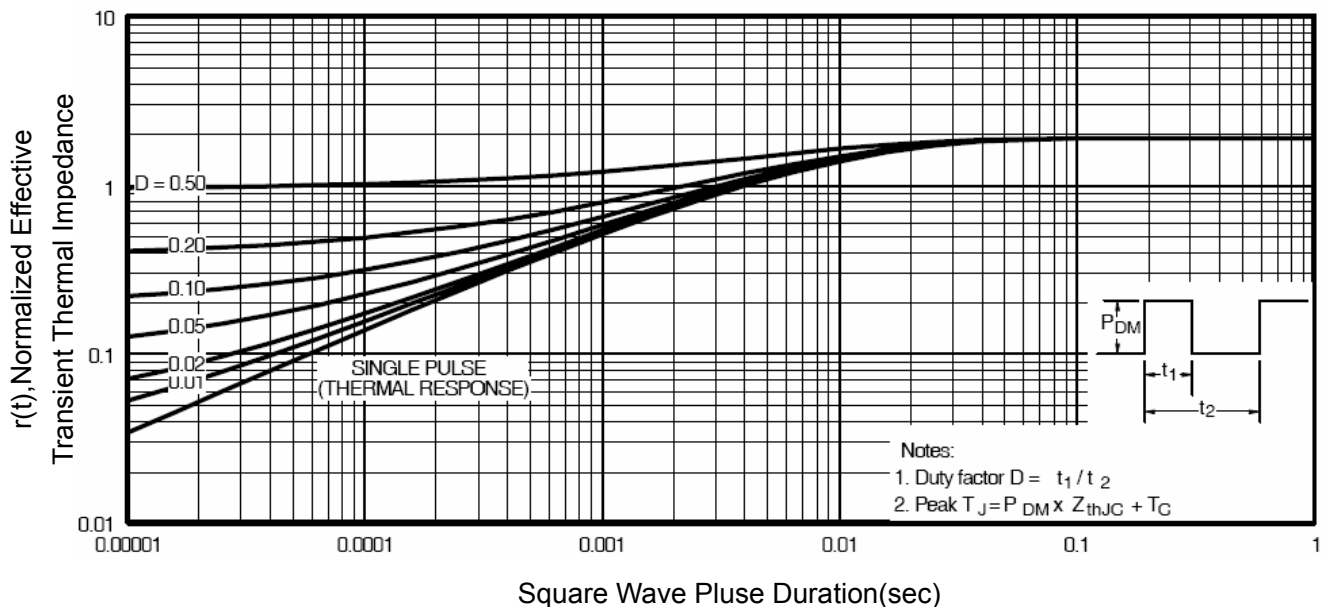
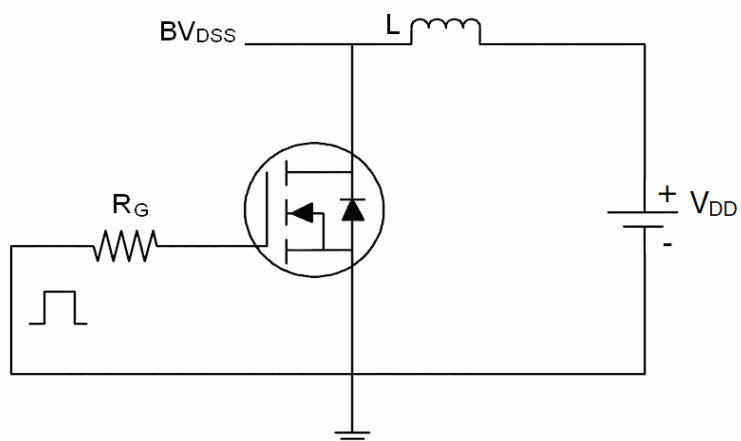
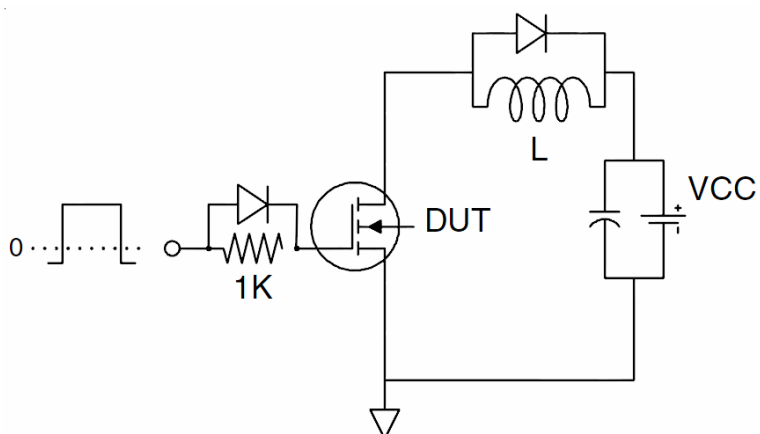
Figure 10  $V_{GS(th)}$  vs Junction Temperature

Figure 11 Normalized Maximum Transient Thermal Impedance

**Test Circuit****1)  $E_{AS}$  test Circuit****2) Gate charge test Circuit****3) Switch Time Test Circuit**