## General Description

The WSR150N15 is the highest performance trench N-ch MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSR150N15 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

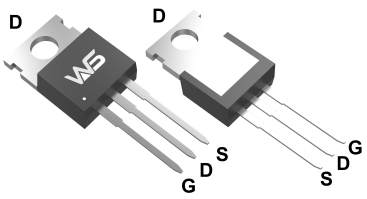
## Product Summery

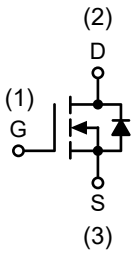
| $B_{VDSS}$ | $R_{DSON}$ | $I_D$ |
|---|---|---|
| 150V | 6.6mΩ | 150A |

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System

## TO-220-3L Pin Configuration




## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 150 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Continuous Drain Current, $V_{GS}$ @ 10V($T_C$=25℃) | 150 | A |
| $I_{DM}$ | Pulsed Drain Current | 550 | A |
| EAS | Single Pulse Avalanche Energy | 506 | mJ |
| $P_D$ | Total Power Dissipation... $T_C$=25℃) | 210 | W |
| RθJA | Thermal resistance, junction-ambient | 62 | ℃/W |
| RθJC | Thermal resistance, junction-case | 0.84 | ℃/W |
| $T_{STG}$ | Storage Temperature Range | -55 to 155 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 155 | ℃ |

## Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 150 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=30A | --- | 6.6 | 7.5 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 2.0 | 2.9 | 4.0 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=100V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| $Q_g$ | Total Gate Charge | $V_{DS}$=50V , $V_{GS}$=10V , $I_D$=20A | --- | 72 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 18 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 10 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=50V , $V_{GS}$=10V $R_G$=3Ω, $I_D$=20A | --- | 22 | --- | ns |
| $T_r$ | Rise Time | | --- | 115 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 44 | --- | |
| $T_f$ | Fall Time | | --- | 105 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=50V , $V_{GS}$=0V , f=1MHz | --- | 5240 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 412 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 30 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,6] | $V_G$=$V_D$=0V , Force Current | --- | --- | 150 | A |
| $I_{SM}$ | Pulsed Source Current[2,6] | | --- | --- | 500 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=20A , $T_J$=25℃ | --- | --- | 1.3 | V |

## ■ Note

1 ) Repetitive rating; pulse width limited by max. junction temperature.
2 ) Pd is based on max. junction temperature, using junction-case thermal resistance.
3 ) The value of RθJA is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25 ℃.
4 ) VDD=50 V, RG=50 Ω, L=0.5 mH, starting $T_J$=25 ℃.
5 ) Calculated continuous current based on maximum allowable junction temperature.

## Typical Characteristics

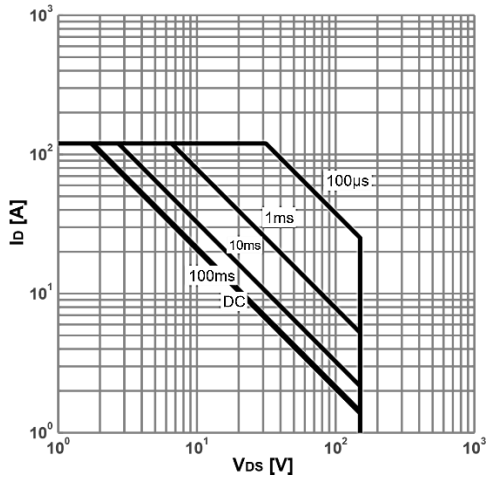



Figure 1. Power dissipation

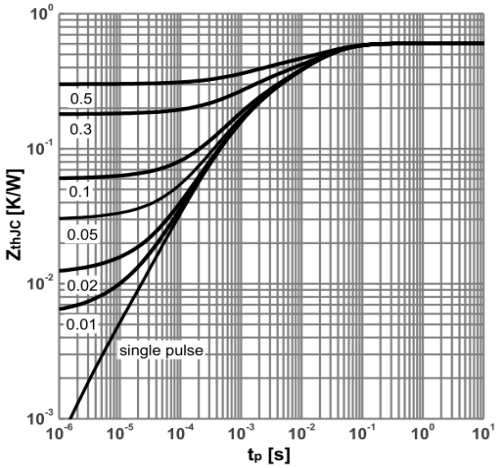



Figure 2. Max. transient thermal impedance

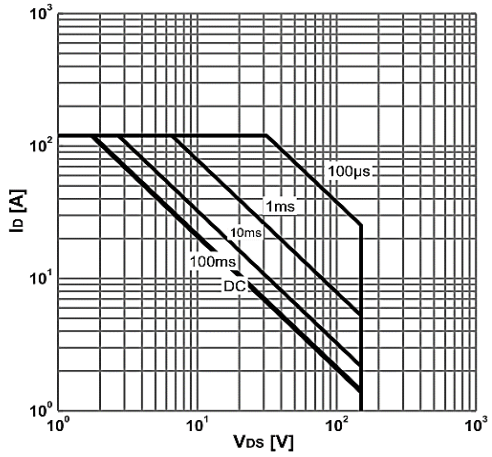



Figure 3. Safe operating area

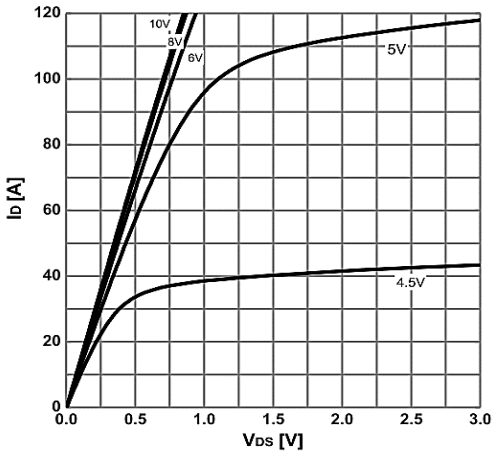



Figure 4. Typ. output characteristics

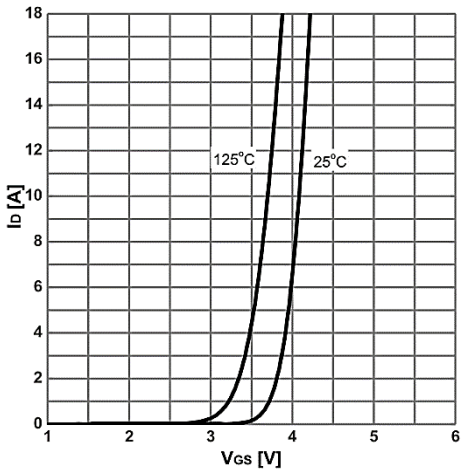



Figure 5. Typ. transfer characteristics

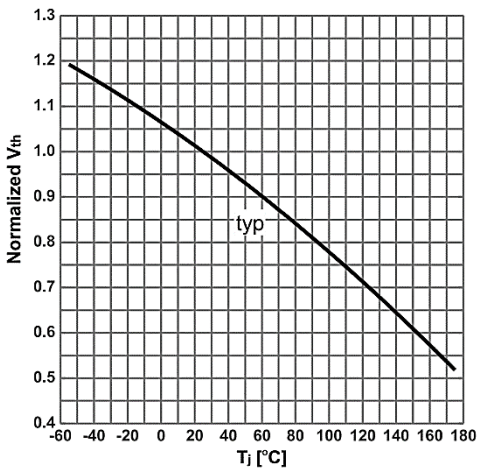



Figure 6. Gate threshold voltage vs. Junction Temperature

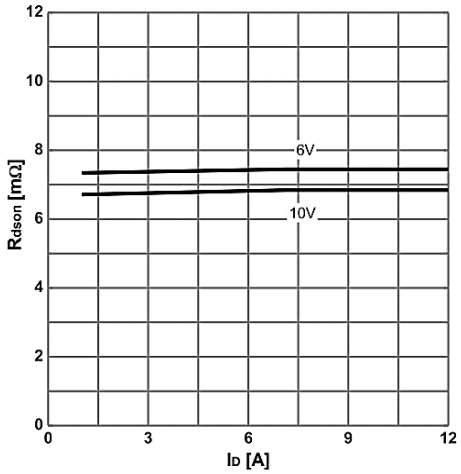



Figure 7. On-state resistance vs. Drain current

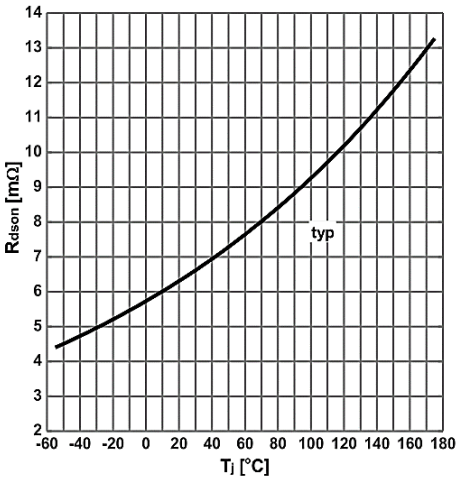



Figure 8. On-state resistance vs. Junction temperature

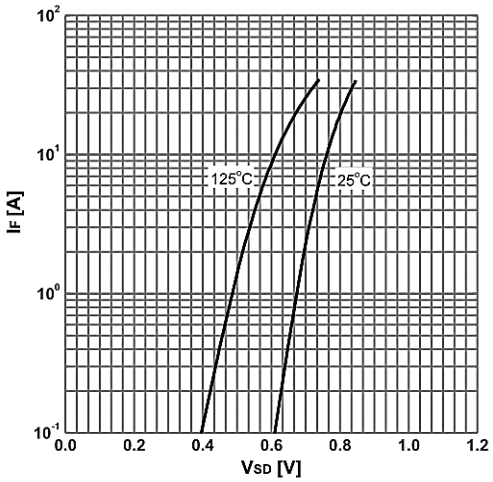



Figure 9. Forward characteristics of reverse diode

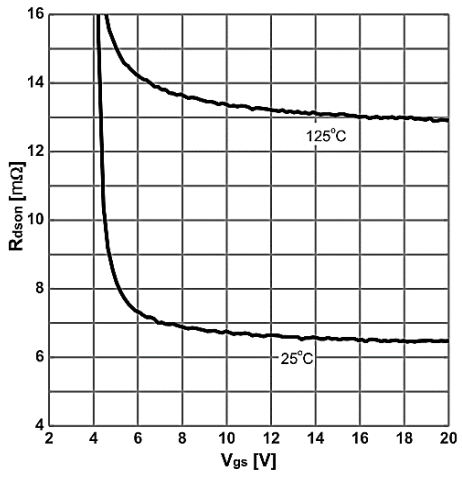



Figure10. On-state resistance vs. Vgs characteristics

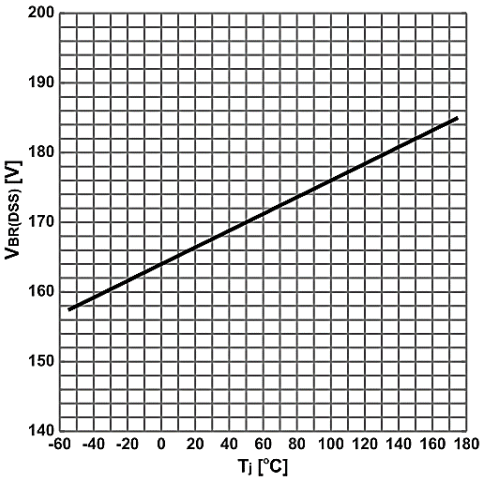



Figure 10：Breakdown Voltage Variation vs. Temperature

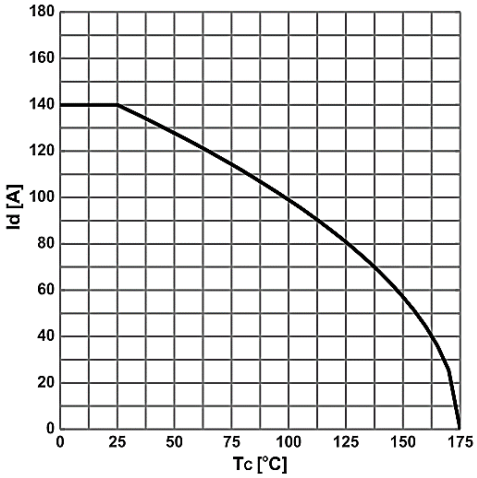
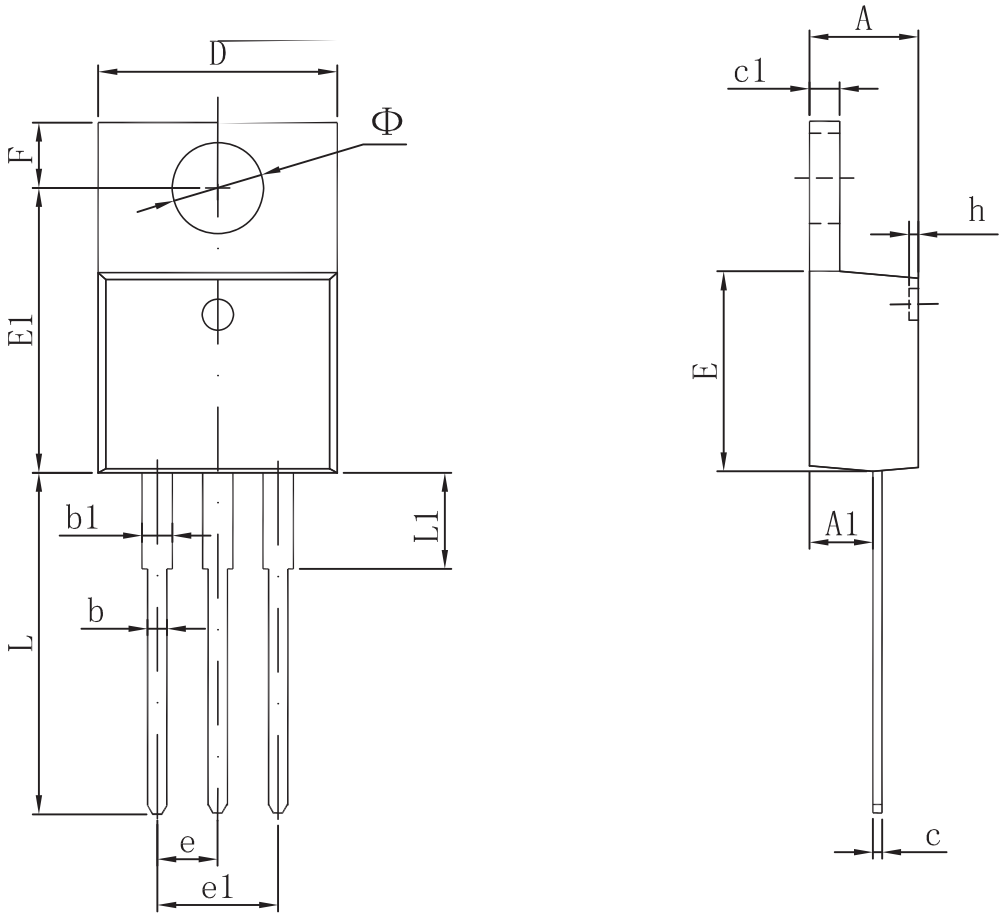



Figure 11：Maximum Drain Current

## Packaging information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 4.470 | 4.670 | 0.176 | 0.184 |
| A1 | 2.520 | 2.820 | 0.099 | 0.111 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.310 | 0.530 | 0.012 | 0.021 |
| c1 | 1.170 | 1.370 | 0.046 | 0.054 |
| D | 10.010 | 10.310 | 0.394 | 0.406 |
| E | 8.500 | 8.900 | 0.335 | 0.350 |
| E1 | 12.060 | 12.460 | 0.475 | 0.491 |
| e | 2.540 TYP | | 0.100 TYP | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.590 | 2.890 | 0.102 | 0.114 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 13.400 | 13.800 | 0.528 | 0.543 |
| L1 | 3.560 | 3.960 | 0.140 | 0.156 |
| Φ | 3.735 | 3.935 | 0.147 | 0.155 |

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