# KSW150N15S

## 150V N-Channel MOSFET

### General Description

The KSW150N15S uses advanced technology to provide excellent $R_{DS}$(ON), low gate charge and operation with gate voltages as low as 10V.

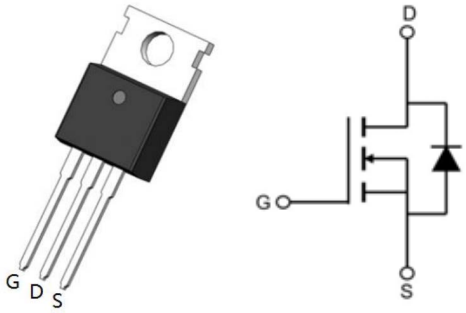
### Product Summary

| $V_{DS}$ (V) | $R_{DS(on)}$ (mΩ) | $I_D$ (A) |
|---|---|---|
| 150 | 5.4 at $V_{GS}$ = 10 V | 150 |

### Features

- Enhanced Avalanche Ruggedness
- Enhanced Body dioded dv/dt capability
- fast-switching applications

### **TO-220** Pin Configuration




### Applications

- Hard Switching and Hing Speed Circuit
- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

### Absolute Maximum Ratings **Tc=25℃ unless otherwise noted**

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 150 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Drain Current – Continuous ($T_C$=25℃) | 150 | A |
| | Drain Current – Continuous ($T_C$=100℃) | 100 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | 430 | A |
| $P_D$ | Power Dissipation ($T_C$=25℃) | 370 | W |
| | Power Dissipation ($T_C$=100℃) | 1.5 | W/℃ |
| $T_{STG}$ | Storage Temperature Range | -50 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -50 to 150 | ℃ |

### Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 61 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 0.45 | ℃/W |

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

### Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 150 | --- | --- | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=150V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=150V , $V_{GS}$=0V , $T_J$=125℃ | --- | --- | 100 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V , $I_D$=20A | --- | 5.3 | 6.4 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 2.0 | 3.0 | 4.0 | V |
| △$V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 3.0 | --- | mV/℃ |
| gfs | Forward Transconductance | $V_{DS}$=10V , $I_S$=20A | --- | 50 | --- | S |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[2,3] | $V_{DS}$=75V , $V_{GS}$=10V , $I_D$=20A | --- | 115 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge[2,3] | | --- | 24 | --- | |
| $Q_{gd}$ | Gate-Drain Charge[2,3] | | --- | 15 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time[2,3] | $V_{DS}$=75V, $I_D$=20A<br>$V_{GS}$=10V,$R_G$=10Ω | --- | 18 | --- | ns |
| $T_r$ | Rise Time[2,3] | | --- | 22 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time[2,3] | | --- | 66 | --- | |
| $T_f$ | Fall Time[2,3] | | --- | 14 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=50V , $V_{GS}$=0V , F=1MHz | --- | 6897 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 581 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 32 | --- | |

### Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | 150 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 320 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=15A , $T_J$=25℃ | --- | --- | 1.0 | V |

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristics (Curves)

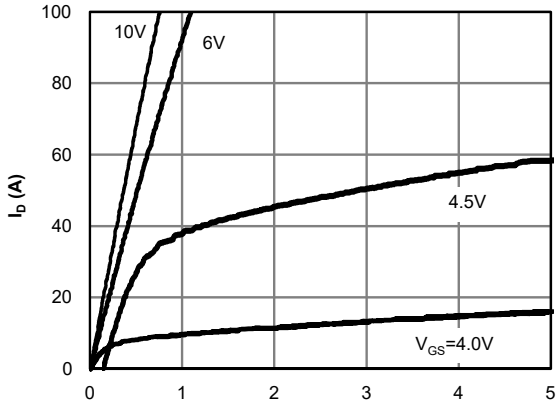



Figure 1: On-Region Characteristics

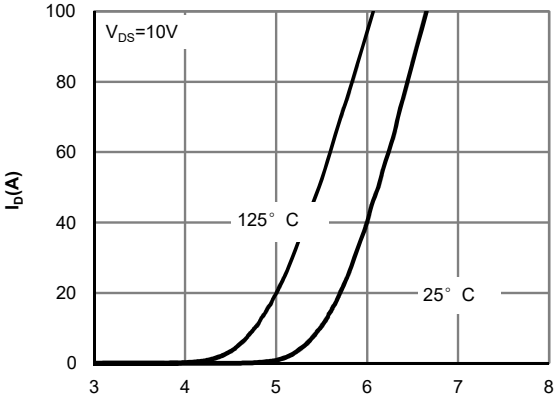



Figure 2: Transfer Characteristics

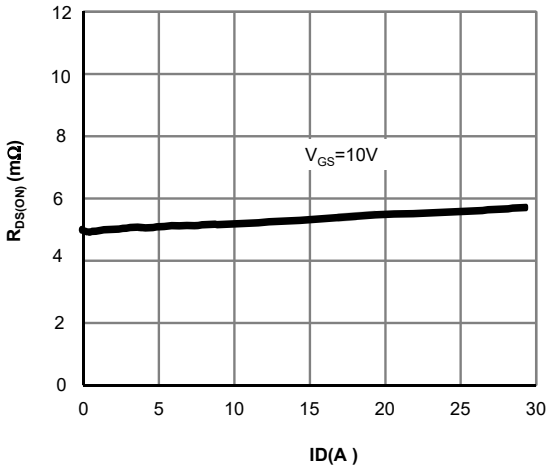



Figure3: On-Resistance vs .Drain Current and GateVoltage

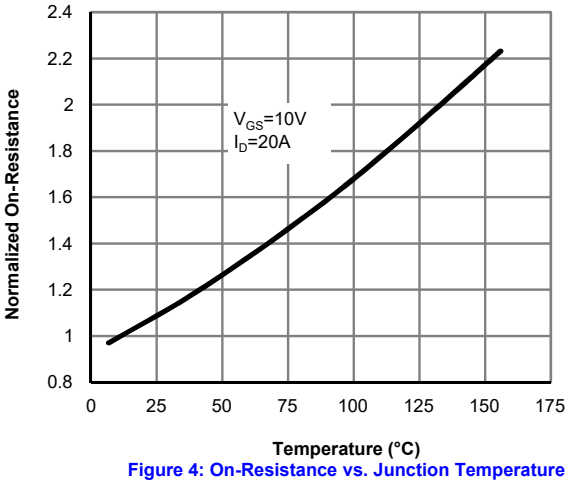



Figure 4: On-Resistance vs. Junction Temperature

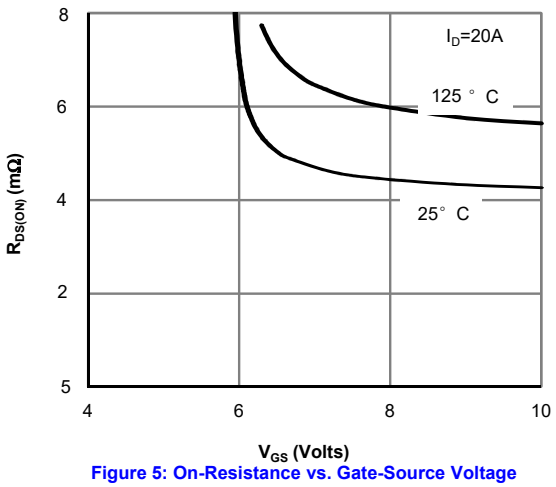



Figure 5: On-Resistance vs. Gate-Source Voltage

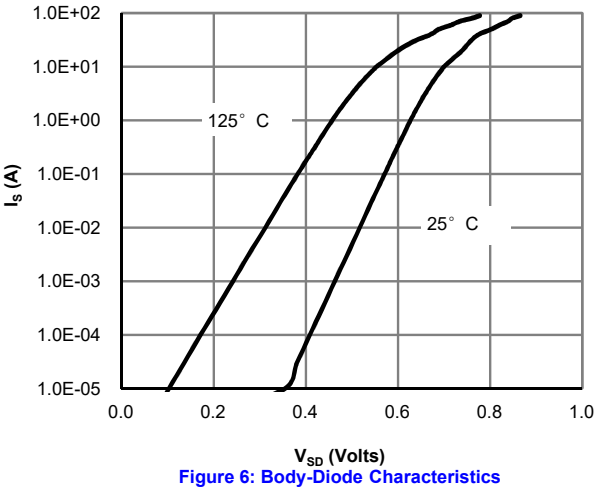



Figure 6: Body-Diode Characteristics

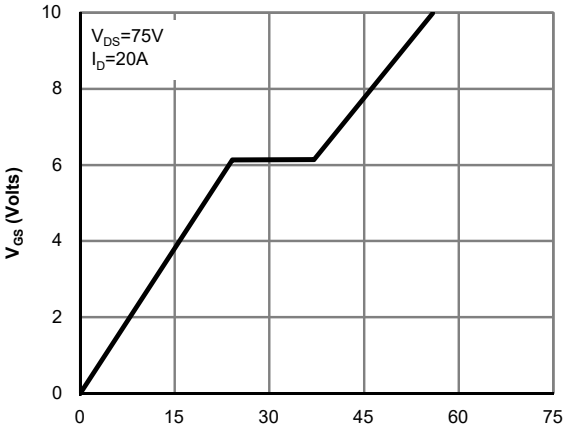



Figure 7: Gate-Charge Characteristics

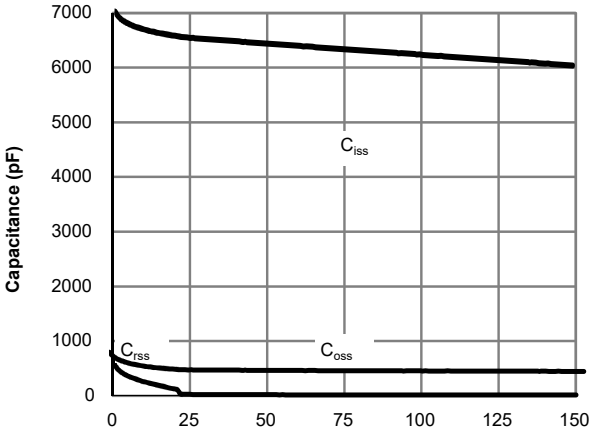



Figure 8: Capacitance Characteristics

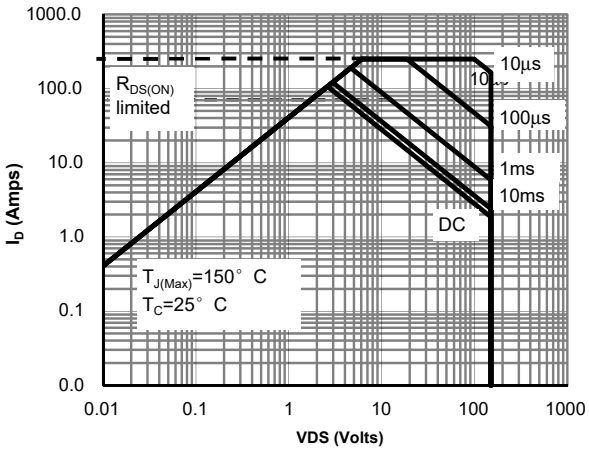



Figure 9: Maximum Forward Biased Safe Operating Area

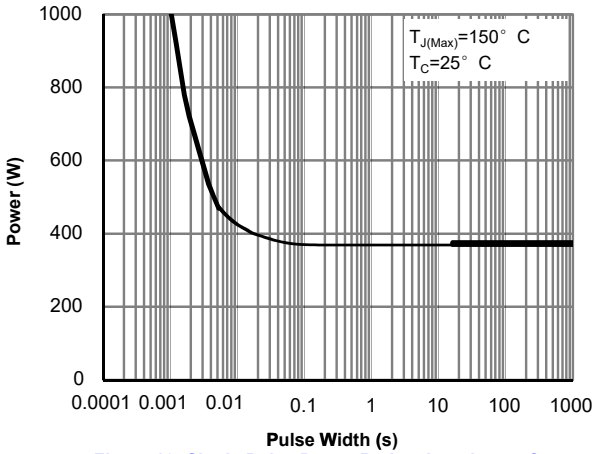



Figure 10: Single Pulse Power Rating Junction-to-Case

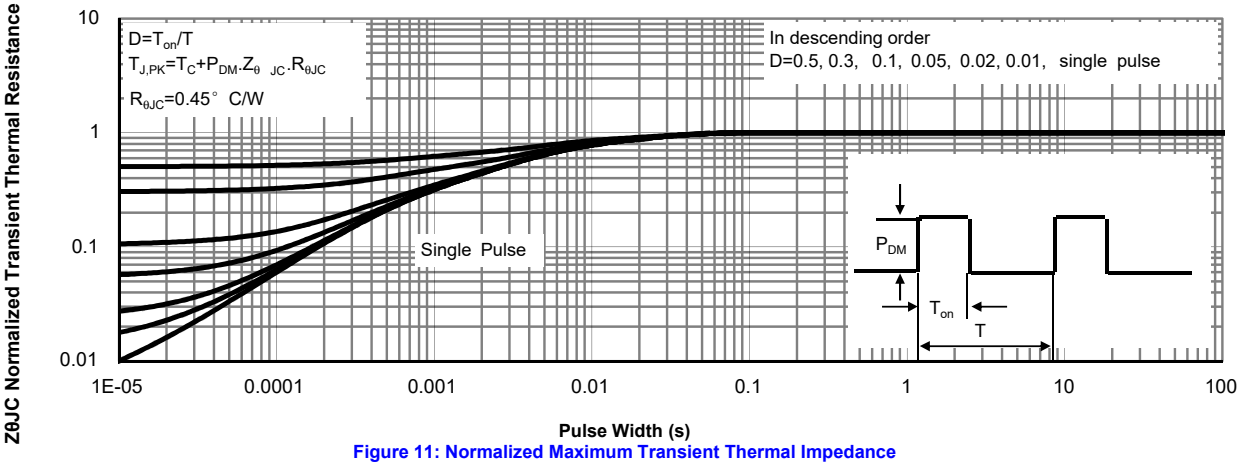



Figure 11: Normalized Maximum Transient Thermal Impedance

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