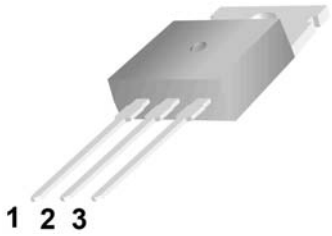
# XXW230N04

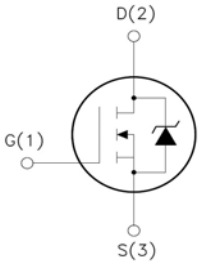
## Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 190nC (Typ.).
- ☐ BVDSS=40V,$I_D$=230A
- ☐ $R_{DS}$(on) : 2.3mΩ (Typ.) @$V_G$=10V
- ☐ 100% Avalanche Tested

TO-220

RoHS COMPLIANT




1.Gate (G)
2.Drain (D)
3.Source (S)

## Absolute Maximum Ratings ($T_A$=25°C unless otherwise noted)

| Symbol | Parameter | | Maximum | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | | 40 | V |
| $V_{GSS}$ | Gate-to-Source Voltage | | ±20 | V |
| $I_D$[3] | Continuous Drain Current | $T_C$=25°C | 230 | A |
| | | $T_C$=100°C | 162 | |
| $I_{DP}$[4] | Pulsed Drain Current | $T_C$=25°C | 800 | |
| IAS[5] | Avalanche Current | | 33 | |
| EAS[5] | Avalanche energy | | 1.5 | J |
| PD | Maximum Power Dissipation | $T_C$=25°C | 285 | W |
| | | $T_C$=100°C | 145 | |
| $T_J$, $T_{STG}$ | Junction & Storage Temperature Range | | -55~175 | °C |

## Thermal Characteristics

| Symbol | Parameter | Typical | Unit |
|---|---|---|---|
| Rθjc | Thermal Resistance-Junction to Case | 0.52 | ℃/W |
| Rθja | Thermal Resistance-Junction to Ambient | 62.5 | |

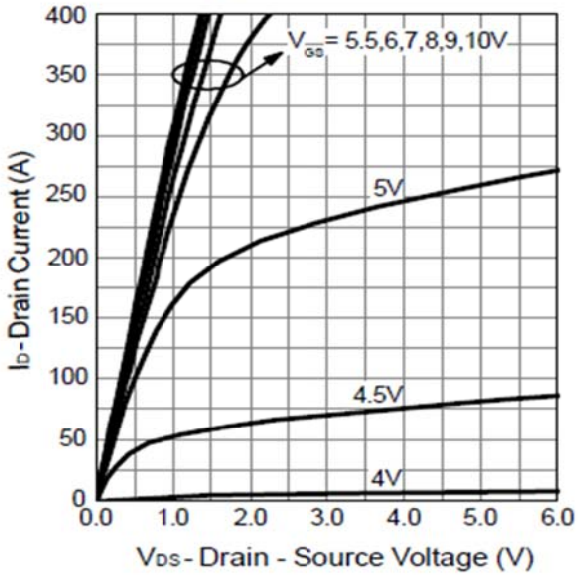
## Electrical Characteristics (TA=25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V,$I_D$=250uA | 40 | — | — | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=32V,$V_{GS}$=0V | — | — | 1 | uA |
| | | $T_J$=125°C | — | — | 10 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 2 | 3 | 4 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | — | — | ±100 | nA |
| $R_{DS(on)}$[1] | Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=60A | | 2.3 | 4 | mΩ |
| | | | — | — | — | |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$[1] | Diode Forward Voltage | $I_{SD}$=60A,$V_{GS}$=0V | — | — | 1.3 | V |
| $I_S$[3] | Diode Continuous Forward Current | | — | — | 250 | A |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=60A, dI/dt=100A/us | — | 37 | — | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | — | 62 | — | nC |
| **Dynamic Characteristics**[2] | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V, $V_{DS}$=0V, Frequency=1MHz | — | 1 | — | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=25V Frequency=1MHz | — | 7000 | — | pF |
| $C_{oss}$ | Output Capacitance | | — | 1850 | — | |
| $C_{rss}$ | Reverse Transfer Capacitance | | — | 675 | — | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=30V,$I_D$=60A, $V_{GS}$=10V,$R_G$=6Ω | — | 35 | — | nS |
| $t_r$ | Turn-On Rise Time | | — | 20 | — | |
| $t_{d(off)}$ | Turn-Off Delay Time | | — | 45 | — | |
| $t_f$ | Turn-Off Fall Time | | — | 62 | — | |
| **Gate Charge Characteristics**[2] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=32V,$V_{GS}$=10V $I_D$=60A | — | 190 | — | nC |
| $Q_{gs}$ | Gate-to-Source Charge | | — | 30 | — | |
| $Q_{gd}$ | Gate-to-Drain Charge | | — | 80 | — | |

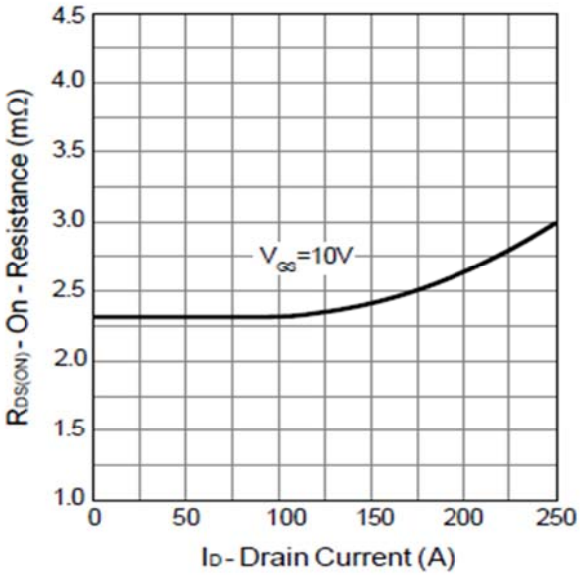
Note: 1: Pulse test; pulse width ≦ 300us, duty cycle ≦ 2%.
2: Guaranteed by design, not subject to production testing.
3: Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 55A.
4: Repetitive rating, pulse width limited by max junction temperature.
5: Starting TJ = 25°C,L = 1mH

## Typical Characteristics

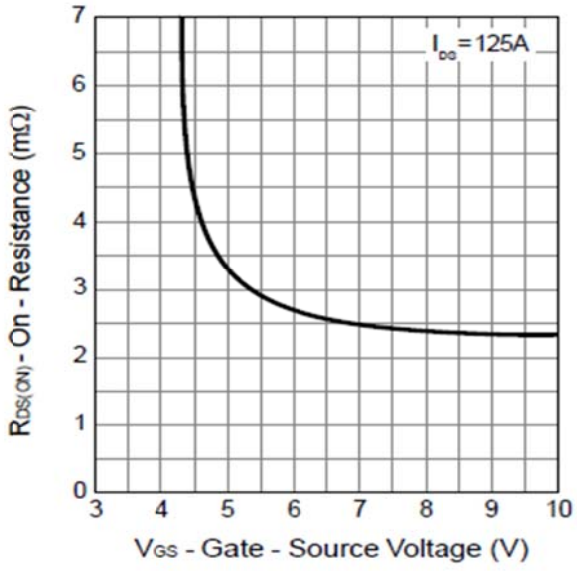
**Output Characteristics**



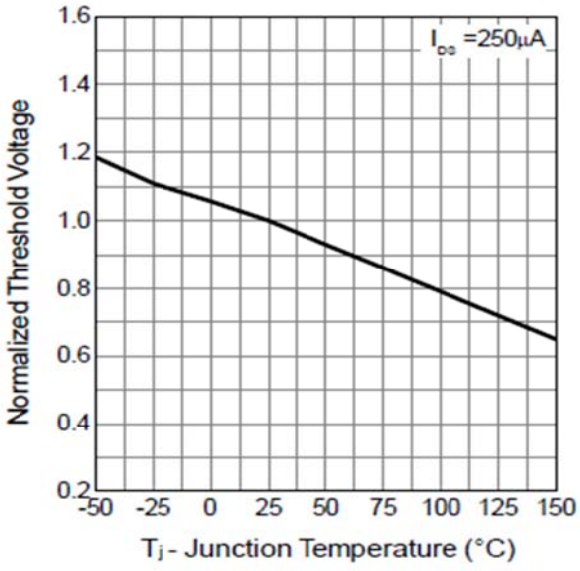

**Drain-Source On Resistance**




**Gate-Source On Resistance**

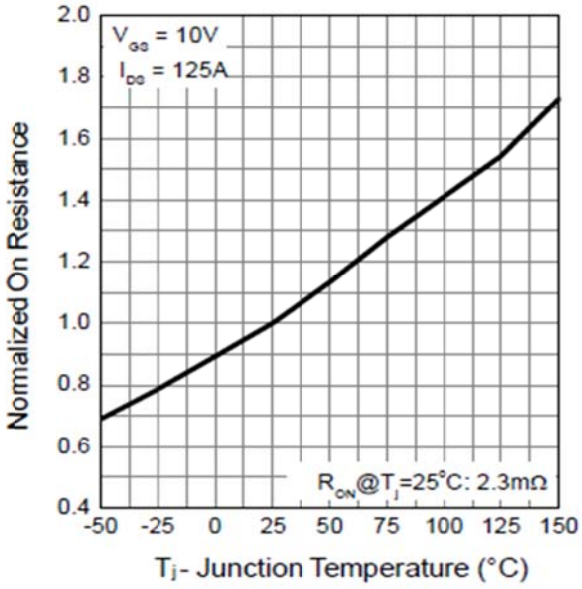



**Gate Threshold Voltage**

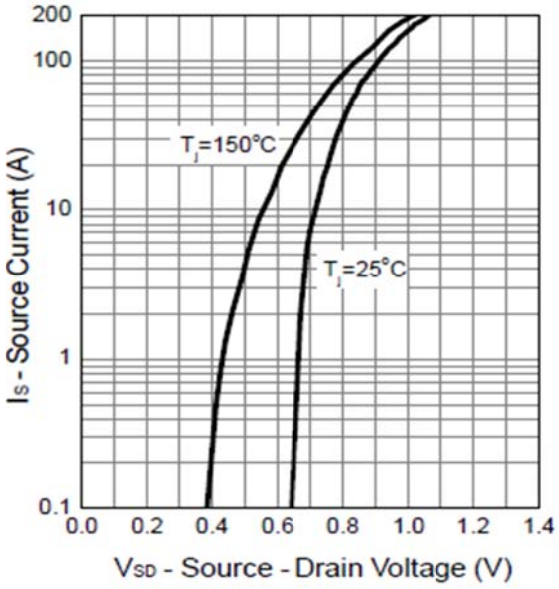


## Typical Characteristics (Continued)

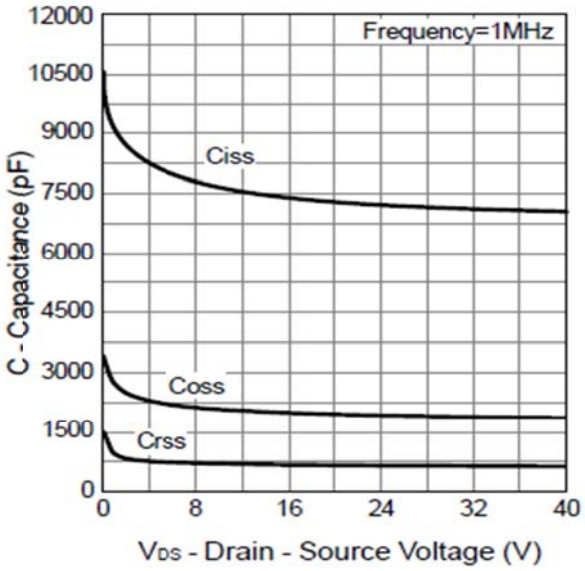
**Drain-Source On Resistance**



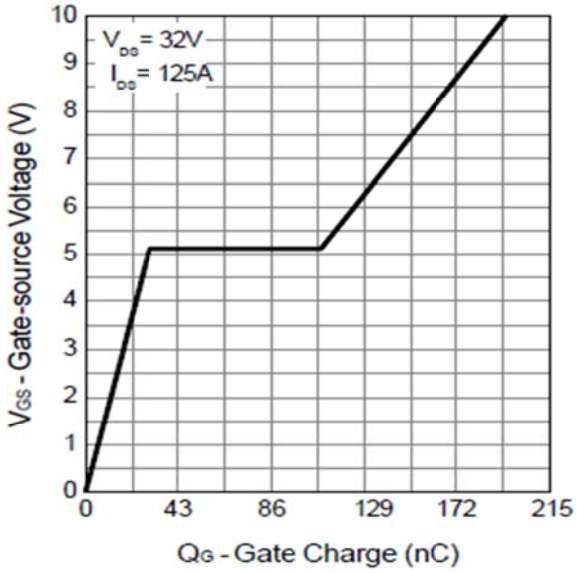

**Source-Drain Diode Forward**



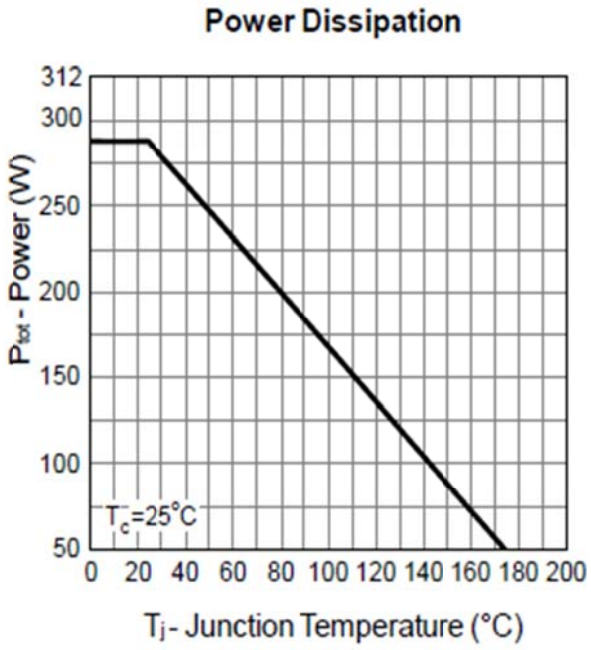

**Capacitance**

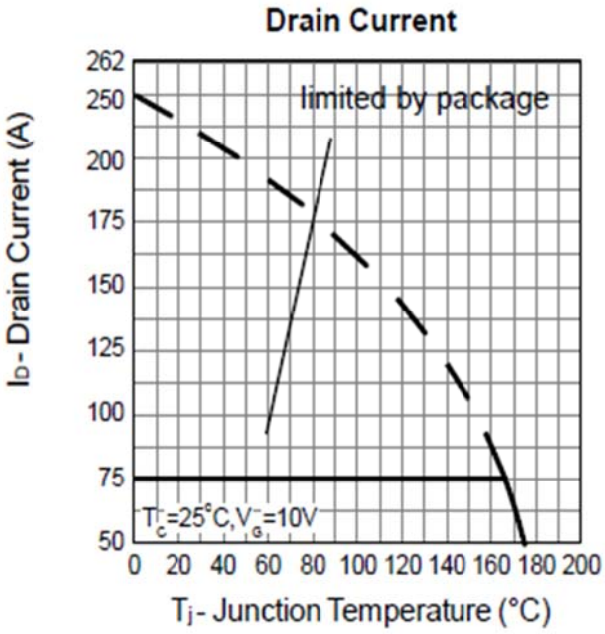


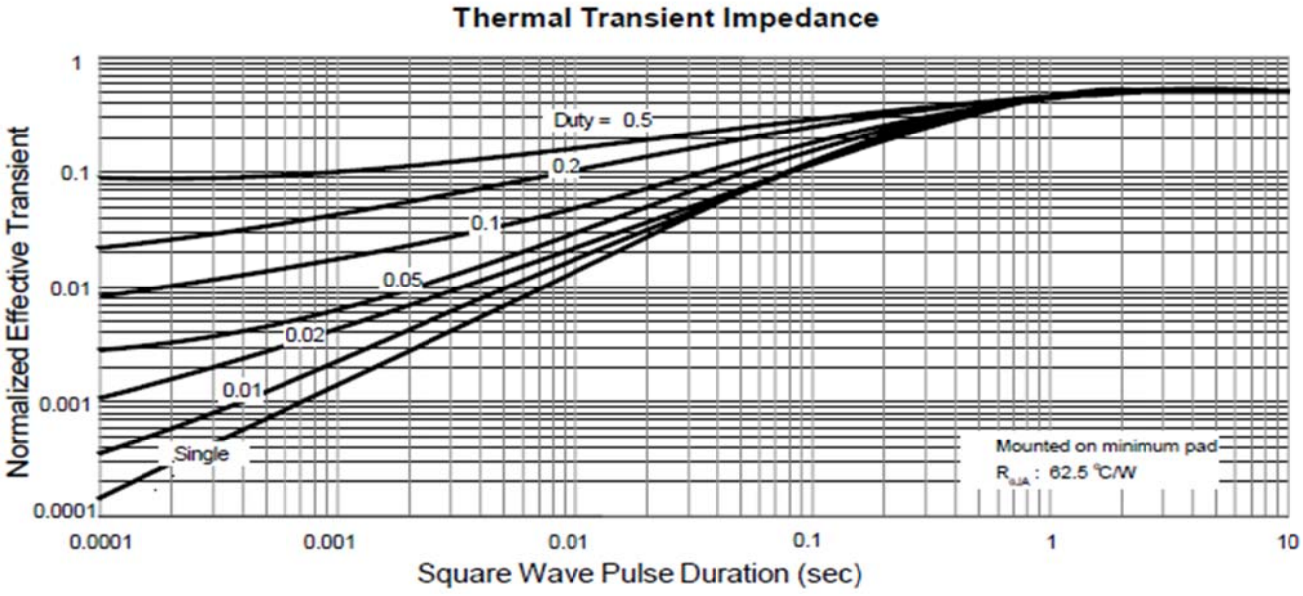

**Gate Charge**



## Typical Characteristics (Continued)



## Package Dimension

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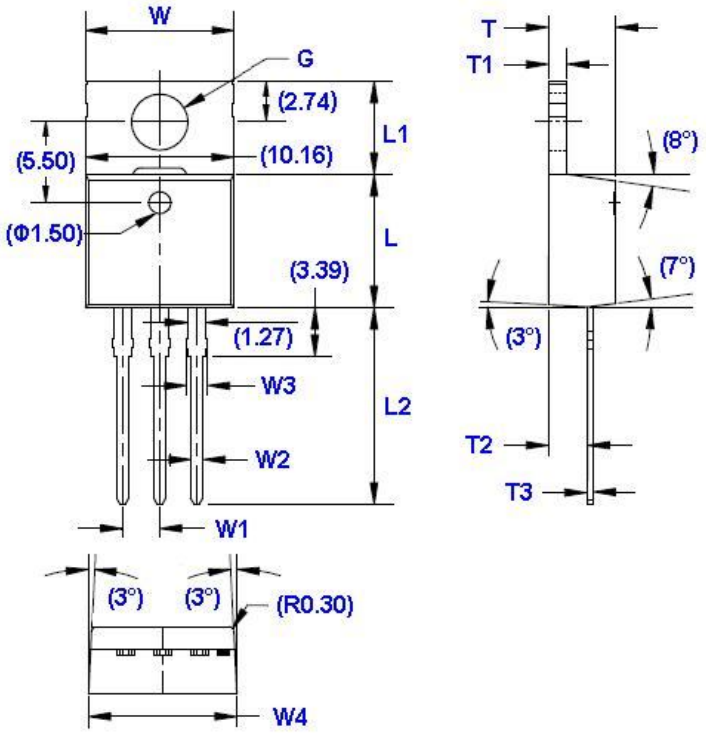
Unit: mm




| Symbol | Size | | Symbol | Size | | Symbol | Size | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | | Min | Max | | Min | Max |
| W | 10.00 | 10.40 | L | 8.86 | 9.26 | T2 | 2.46 | 2.86 |
| W1 | 2.54 (TYP) | | L1 | 6.09 | 6.49 | T3 | 0.28 | 0.48 |
| W2 | 0.71 | 0.91 | L2 | 13.25 | 13.65 | G (Φ) | 3.73 | 3.93 |
| W3 | 1.14 | 1.54 | T | 4.40 | 4.80 | | | |
| W4 | 9.96 | 10.36 | T1 | 1.14 | 1.40 | | | |