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*WX047N02P3*

# Enhancement Mode Single N-Channel Power MOSFET

**PDFN3X3/NMOS/20V/±12V/0.85V/40A/4.7mΩ**

**Rev0.1**

# 20V, 4.7mΩ, 40A, Single N-Channel

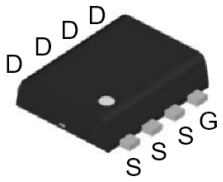
## 1.Features

- 20V MOSFET technology
- Low on-state resistance
- Fast switching
- Vgs±12V
- 100% RG Tested
- 100% UIS Tested

| $V_{DS}$ | $R_{DS(on)}$ Typ. | $I_D$ Max. |
|---|---|---|
| 20V | 4.7mΩ @ 4.5V | 40A |
| | 6.5mΩ @ 2.5V | |

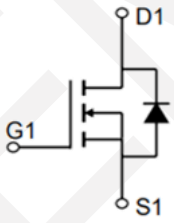
## 2.Applications

- Power Switching Application
- Load Switching




PDFN3x3

Pin Description




Schematic Diagram

## 3.Package Marking and Ordering Information

| Part no. | Marking | Package | PCS/Reel | PCS/CTN. |
|---|---|---|---|---|
| WX047N02P3 | 047N02 | PDFN3X3 | 5,000 | 50,000 |

## 4.Absolute Max Ratings at Tc=25℃ (Note1)

| Parameter | Symbol | Maximum | Units |
|---|---|---|---|
| Drain to Source Voltage | $V_{DSS}$ | 20 | V |
| Gate to Source Voltage | $V_{GSS}$ | ±12 | V |
| Drain Current (DC) | $I_D$ | 40 | A |
| Drain Current (Pulse), PW≤300μs | $I_{DP}$ | 160 | A |
| Total Dissipation | $P_D$ | 37 | W |
| Avalanche Energy, Single Pulsed | $E_{AS}$ | 64 | mJ |
| Junction Temperature | $T_j$ | 150 | ℃ |
| Storage Temperature | $T_{stg}$ | -55 to +150 | ℃ |

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## 5.Thermal Resistance Ratings (Note 2)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction to case | $R_{\theta JC}$ | 3.4 | ℃/W |
| Junction to Ambient | $R_{\theta JA}$ | 32 | ℃/W |

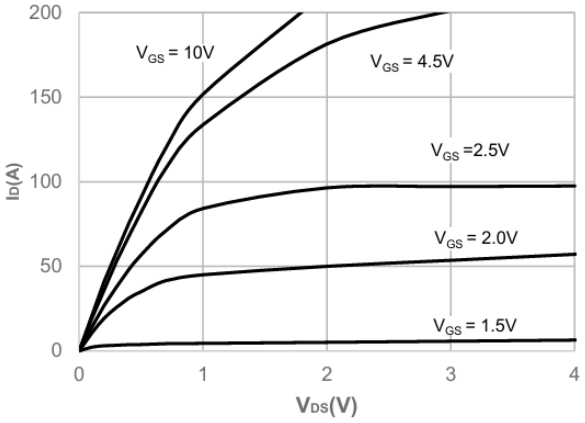
Note 2: When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

## 6.Electrical Characteristics at Ta=25℃ (Note 3)

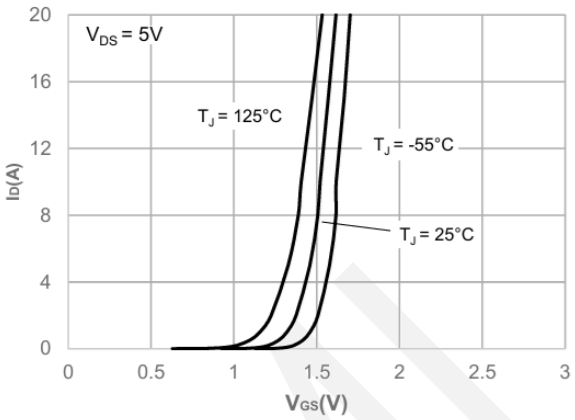
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = 250μA, $V_{GS}$ = 0V | 20 | - | - | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±12V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 0.5 | 0.85 | 1.1 | V |
| Static Drain to Source On-State Resistance | $R_{DS(on)}$ | $I_D$ = 25A, $V_{GS}$ = 4.5V | - | 4.7 | 5.8 | mΩ |
| | | $I_D$ = 15A, $V_{GS}$ = 2.5V | - | 6.5 | 9.0 | mΩ |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=10V, Frequency=1.0MHz | - | 2007 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 278 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 252 | - | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | $V_{DD}$ = 10V, $I_D$=20A, $V_{GS}$ = 4.5V, $R_G$ = 3Ω | - | 12 | - | ns |
| Rise Time | $t_r$ | | - | 33 | - | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | - | 48 | - | ns |
| Fall Time | $t_f$ | | - | 95 | - | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 10V, $V_{GS}$ = 0 to 4.5V, $I_D$ = 20A | - | 23 | - | nC |
| | $Q_{gs}$ | | - | 4 | - | nC |
| | $Q_{gd}$ | | - | 7 | - | nC |
| Diode Forward Voltage | $V_{FSD}$ | $I_S$ = 25A, $V_{GS}$ = 0 | 0.5 | - | 1.2 | V |

Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

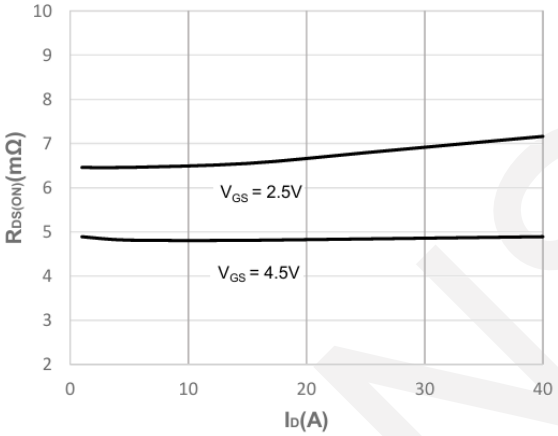
## 7.Typical electrical and thermal characteristics



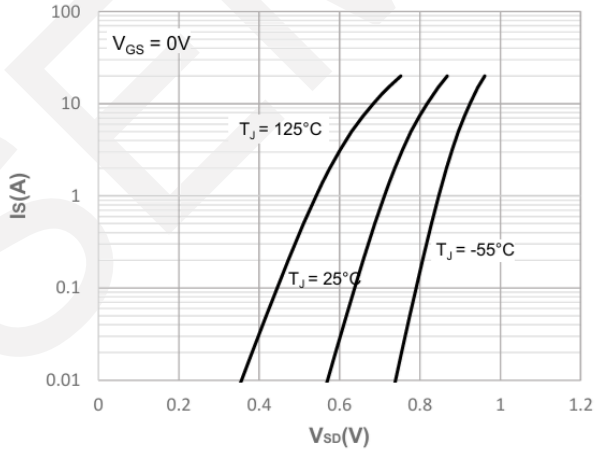

Output Characteristics



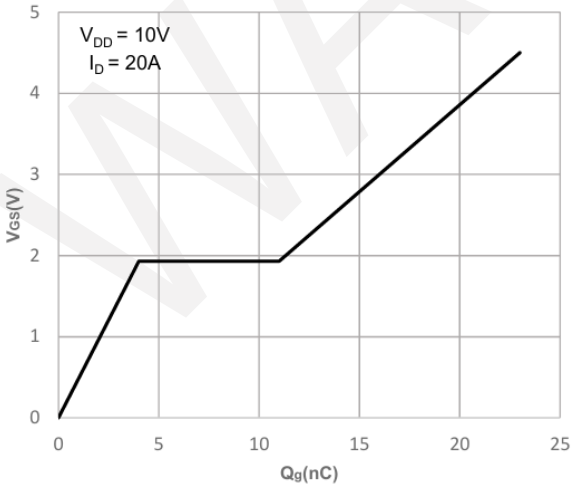

Typical Transfer Characteristics



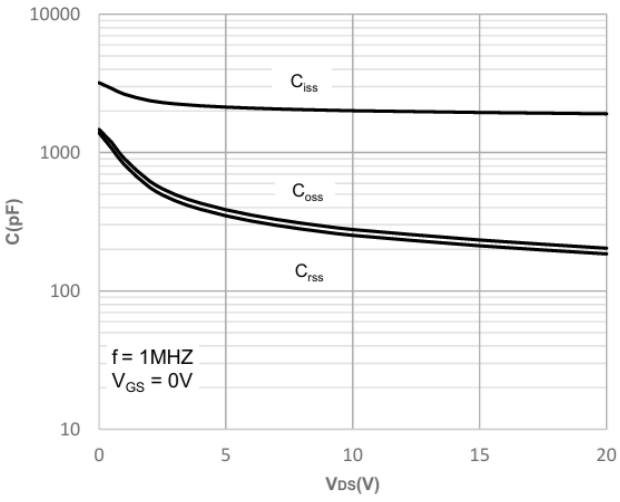

On-resistance vs. Drain Current



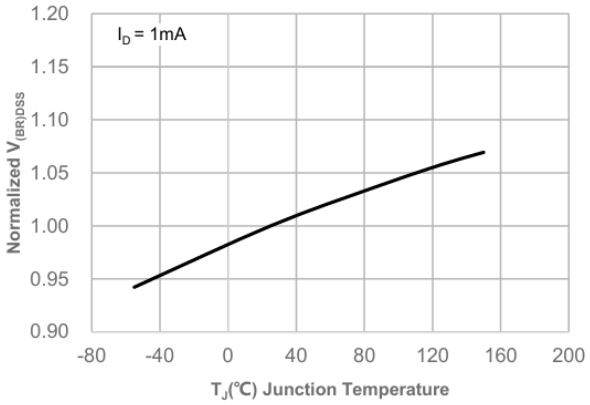

Body Diode Characteristics



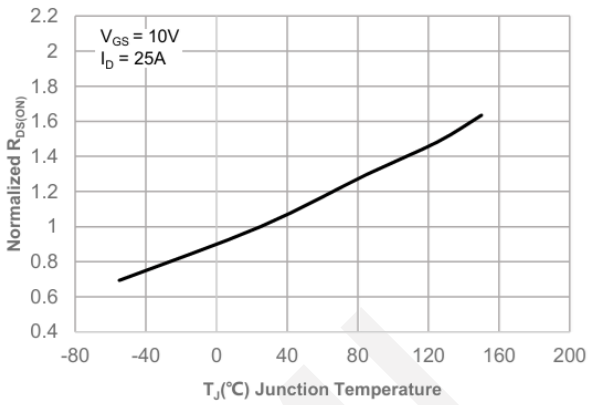

Gate Charge Characteristics



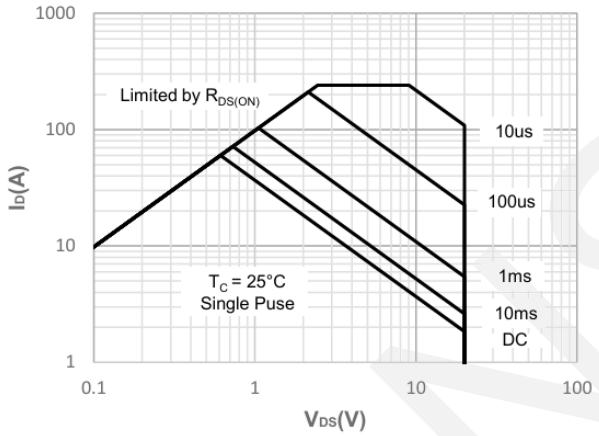

Capacitance Characteristics



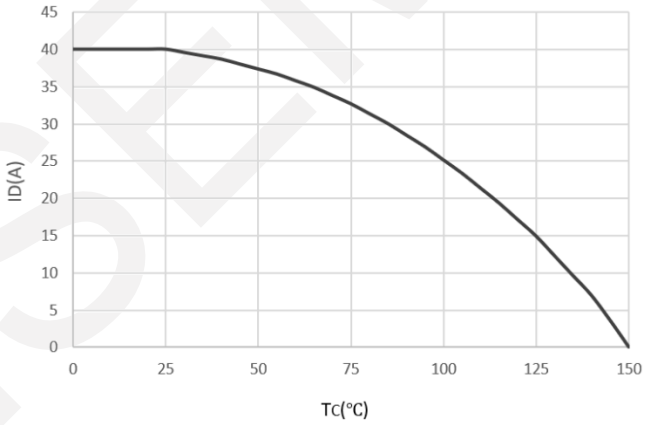

Normalized Breakdown voltage vs. Junction Temperature



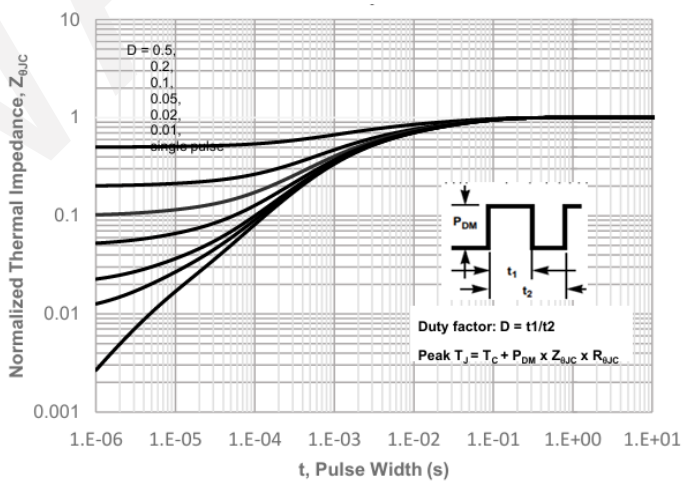

Normalized on Resistance vs. Junction Temperature




Maximum Safe Operating Area

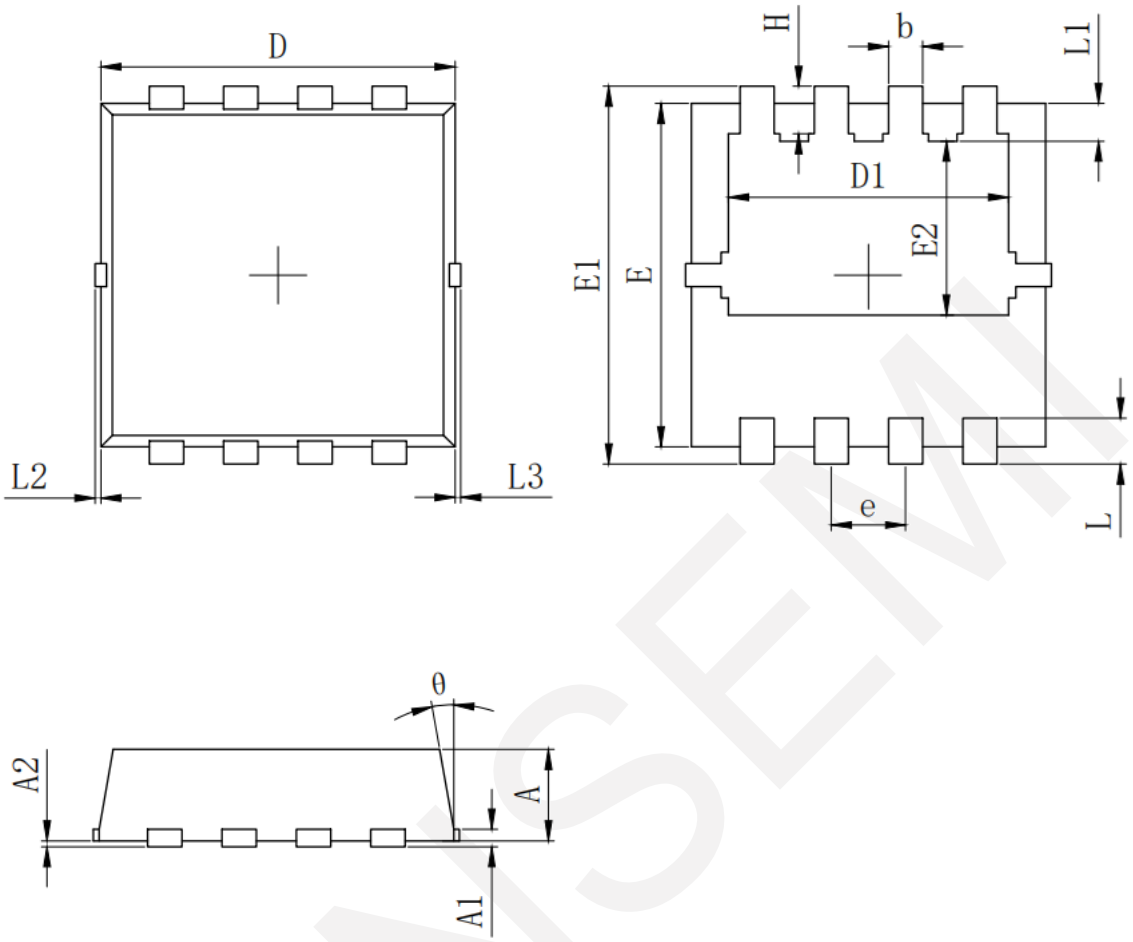



Maximum Continuous Drain Current vs. Case Temperature




Normalized Maximum Transient Thermal Impedance

## 8.Package Dimensions




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | Typ. | MAX |
| A | 0.700 | 0.800 | 0.900 |
| A1 | 0.152 REF. | | |
| A2 | 0~0.05 | | |
| D | 3.000 | 3.100 | 3.200 |
| D1 | 2.300 | 2.450 | 2.600 |
| E | 2.900 | 3.000 | 3.100 |
| E1 | 3.150 | 3.300 | 3.450 |
| E2 | 1.320 | 1.520 | 1.720 |
| b | 0.200 | 0.300 | 0.400 |
| e | 0.550 | 0.650 | 0.750 |
| L | 0.300 | 0.400 | 0.500 |
| L1 | 0.180 | 0.330 | 0.480 |
| L2 | 0~0.100 | | |
| L3 | 0~0.100 | | |
| H | 0.315 | 0.415 | 0.515 |
| θ | 8° | 10° | 12° |

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