

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | I_D |
|---------------|--------------------|-------|
| 40V | 1.6m Ω @10V | 120A |

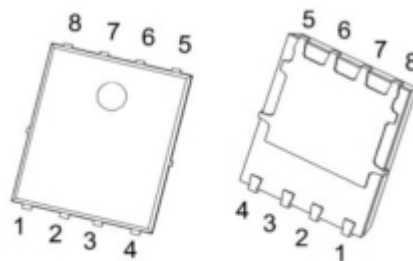
Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

Application

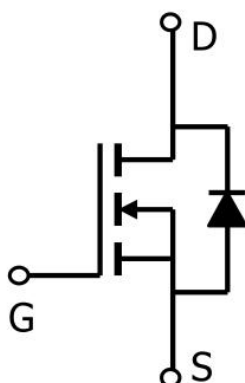
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

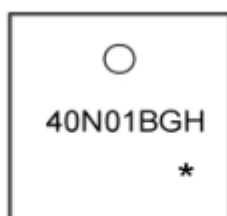


PDFNWB5X6-8L

Circuit diagram



Marking



40N01BGH
*

=Device Code
=Month Code

Absolute maximum ratings

($T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|------------|-----------------------------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ¹ ($T_C=25^{\circ}\text{C}$) | I_D | 120 | A |
| Pulsed Drain Current ² | I_{DM} | 520 | A |
| Single Pulse Avalanche Energy ³ | E_{AS} | 529 | mJ |
| Total Power Dissipation ⁴ ($T_C=25^{\circ}\text{C}$) | P_D | 120 | W |
| Thermal Resistance Junction-Case ¹ | $R_{\theta JC}$ | 1.04 | $^{\circ}\text{C}/\text{W}$ |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^{\circ}\text{C}$ |
| Operating Junction Temperature Range | T_J | -55 to 150 | $^{\circ}\text{C}$ |

Electrical characteristics

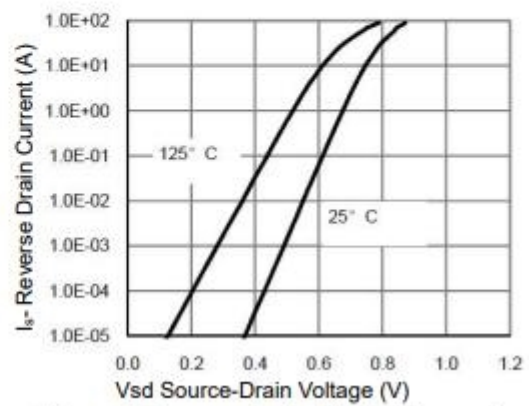
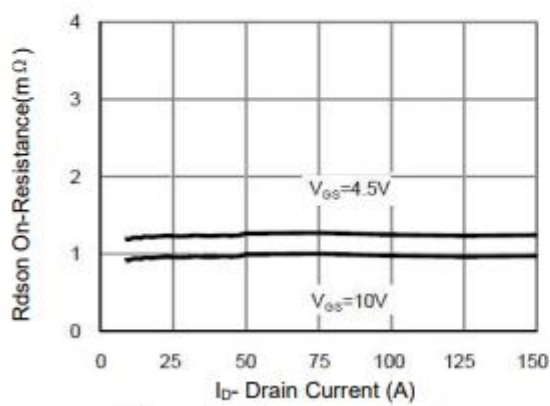
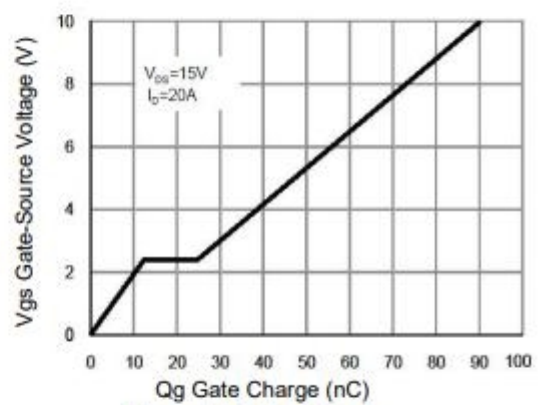
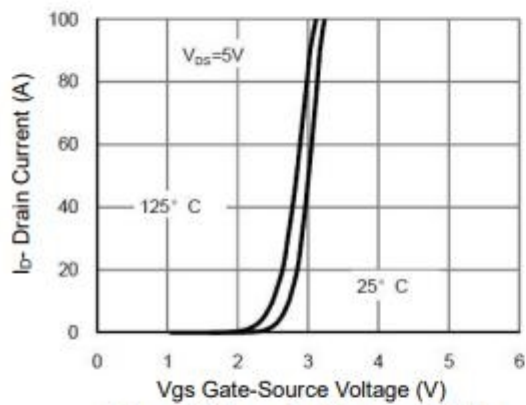
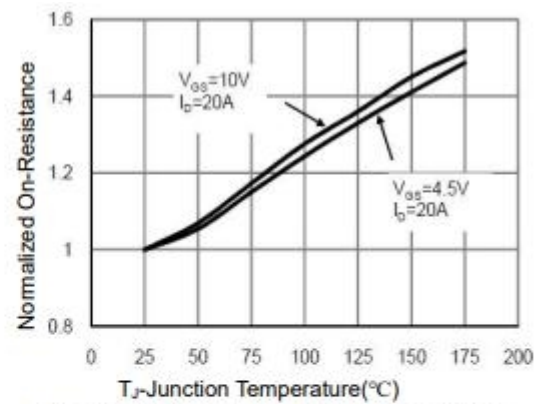
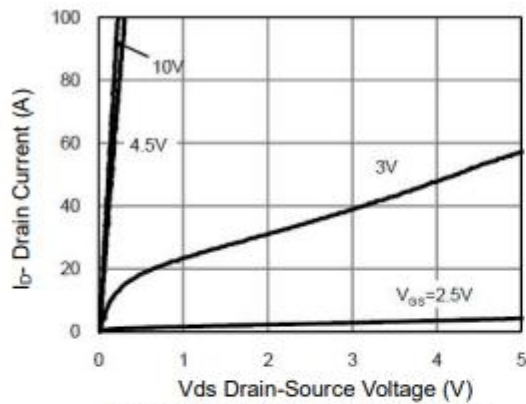
($T_A=25^{\circ}\text{C}$, unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|--|----------------|--|------|------|-----------|------------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | $BV_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 40 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS} = 32V, V_{GS} = 0V, T_J = 25^{\circ}C$ | | | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 100 | μA |
| Gate-source threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2 | 3 | 4 | V |
| Static Drain-Source On-Resistance ² | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 30A$ | | 1.6 | 2.5 | m Ω |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$ | | 3485 | | pF |
| Output Capacitance | C_{oss} | | | 1208 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 59 | | |
| Switching Characteristics | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 20V, V_{DS} = 10V, I_D = 65A$ | | 57 | | pF |
| Gate-Source Charge | Q_{gs} | | | 9.5 | | |
| Gate-Drain Charge | Q_{gd} | | | 11 | | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DD} = 20V, V_{GS} = 10V, R_G = 1.6\Omega, I_D = 65A$ | | 10 | | nS |
| Rise Time | T_r | | | 3 | | |
| Turn-Off Delay Time | $T_{d(off)}$ | | | 35 | | |
| Fall Time | T_f | | | 4 | | |
| Diode Characteristics | | | | | | |
| Diode Forward Voltage ² | V_{SD} | $V_{GS} = 0V, I_S = 20A, T_J = 25^{\circ}C$ | | | 1.2 | V |

Note:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $V_{DD} = 15V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$

Typical Characteristics



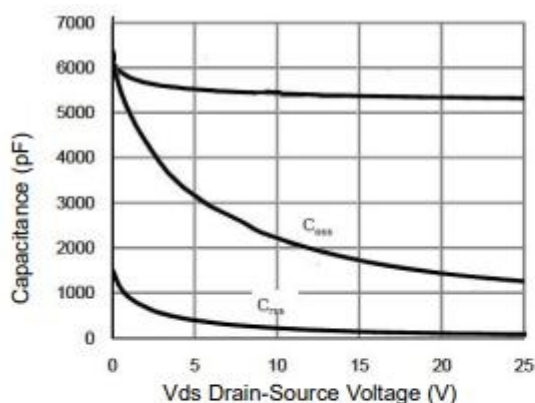


Figure 7 Capacitance vs Vds

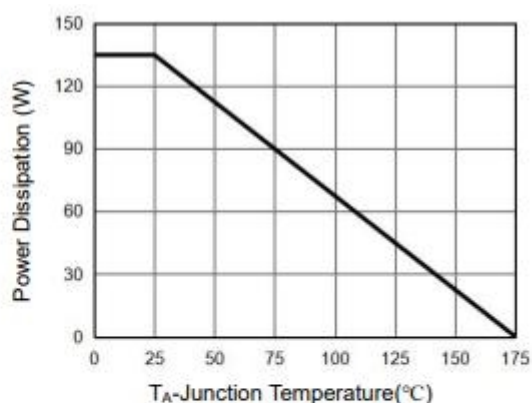


Figure 9 Power De-rating

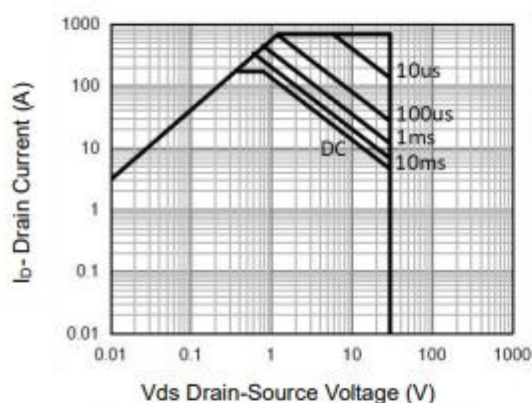


Figure 8 Safe Operation Area (Note3)

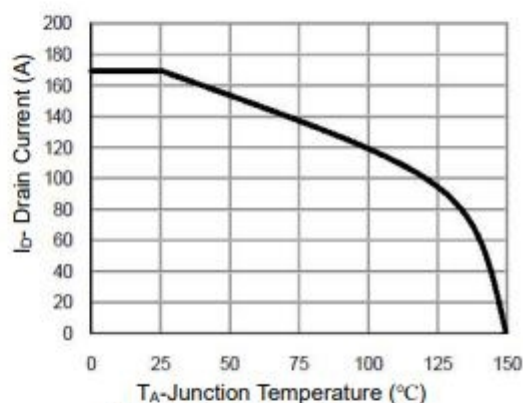


Figure 10 Current De-rating

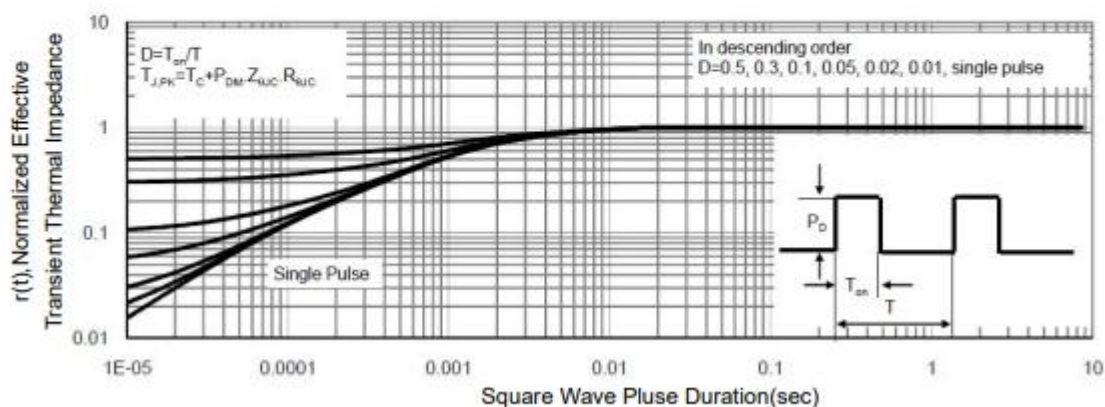
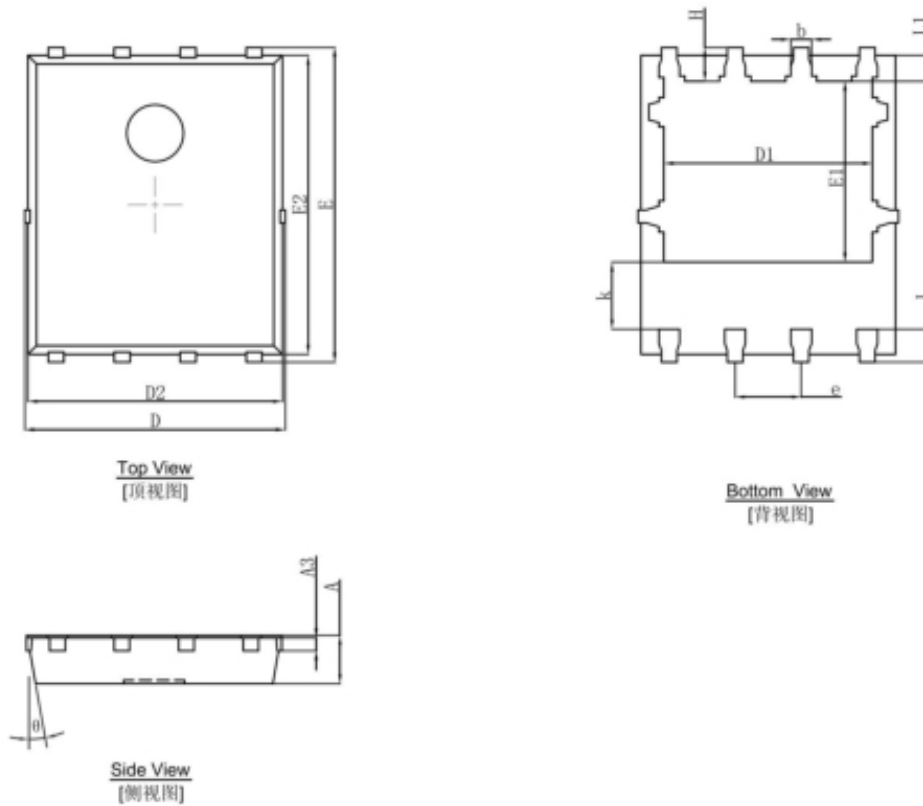


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFNWB5X6-8L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.000 | 0.035 | 0.039 |
| A3 | 0.254REF. | | 0.010REF. | |
| D | 4.944 | 5.096 | 0.195 | 0.201 |
| E | 5.974 | 6.126 | 0.235 | 0.241 |
| D1 | 3.910 | 4.110 | 0.154 | 0.162 |
| E1 | 3.375 | 3.575 | 0.133 | 0.141 |
| D2 | 4.824 | 4.976 | 0.190 | 0.196 |
| E2 | 5.674 | 5.826 | 0.223 | 0.229 |
| k | 1.190 | 1.390 | 0.047 | 0.055 |
| b | 0.350 | 0.450 | 0.014 | 0.018 |
| e | 1.270TYP. | | 0.050TYP. | |
| L | 0.559 | 0.711 | 0.022 | 0.028 |
| L1 | 0.424 | 0.576 | 0.017 | 0.023 |
| H | 0.574 | 0.726 | 0.023 | 0.029 |
| θ | 10° | 12° | 10° | 12° |