

# APG080N12

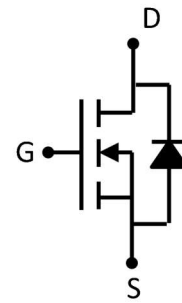
N-Channel Enhancement Mosfet

# AIPOWER

## DATA SHEET

### Feature

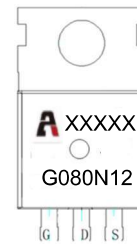
- 120V,106A  
 $R_{DS(ON)} < 8.0m\Omega @ V_{GS}=10V$  (TYP:6.5m $\Omega$ )
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



Schematic diSgram

### Application

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

### Package Marking and Ordering Information

| Device Marking | Device    | Device Package | Reel Size | Tape width | Quantity (PCS) |
|----------------|-----------|----------------|-----------|------------|----------------|
| G080N12        | APG080N12 | TO-220         | -         | -          | 1000           |

### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^{\circ}C$ unless otherwise noted)

| Parameter                                       | Symbol          | Value     | Unit          |
|---|-----------------|-----------|---------------|
| Drain-Source Voltage                            | $V_{DS}$        | 120       | V             |
| Gate-Source Voltage                             | $V_{GS}$        | $\pm 20$  | V             |
| Continuous Drain Current ( $T_a=25^{\circ}C$ )  | $I_D$           | 106       | A             |
| Continuous Drain Current ( $T_a=100^{\circ}C$ ) | $I_D$           | 67        | A             |
| Pulsed Drain Current <sup>(1)</sup>             | $I_{DM}$        | 424       | A             |
| Single Pulsed Avalanche Energy <sup>(2)</sup>   | $E_{AS}$        | 480       | mJ            |
| Power Dissipation                               | $P_D$           | 147       | W             |
| Thermal Resistance from Junction to Case        | $R_{\theta JC}$ | 0.85      | $^{\circ}C/W$ |
| Junction Temperature                            | $T_J$           | 150       | $^{\circ}C$   |
| Storage Temperature                             | $T_{STG}$       | -55~ +150 | $^{\circ}C$   |

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

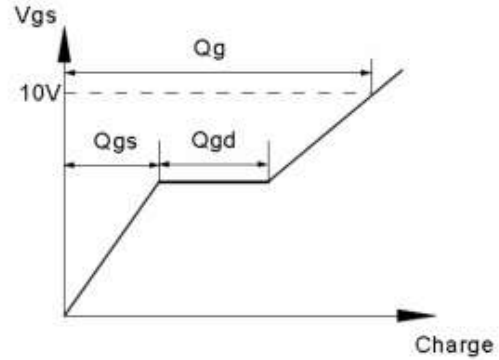
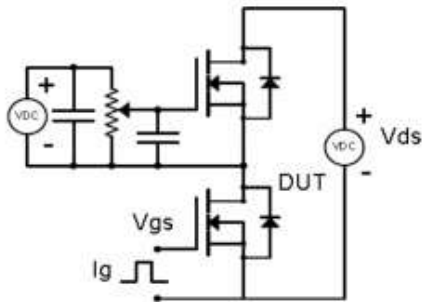
| Parameter                                 | Symbol        | Test Condition  | Min | Type | Max       | Unit       |
|---|---------------|---|-----|------|-----------|------------|
| <b>Static Characteristics</b>             |               |   |     |      |           |            |
| Drain-source breakdown voltage            | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                               | 120 | -    | -         | V          |
| Zero gate voltage drain current           | $I_{DSS}$     | $V_{DS} = 120V, V_{GS} = 0V$                                | -   | -    | 1         | $\mu A$    |
| Gate-body leakage current                 | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                             | -   | -    | $\pm 100$ | nA         |
| Gate threshold voltage <sup>(3)</sup>     | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                           | 2.0 | 3.0  | 4.0       | V          |
| Drain-source on-resistance <sup>(3)</sup> | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 40A$                                   | -   | 6.5  | 8.0       | m $\Omega$ |
| <b>Dynamic characteristics</b>            |               |   |     |      |           |            |
| Input Capacitance                         | $C_{iss}$     | $V_{DS} = 60V, V_{GS} = 0V, f = 1MHz$                       | -   | 3770 | -         | pF         |
| Output Capacitance                        | $C_{oss}$     |   | -   | 352  | -         |            |
| Reverse Transfer Capacitance              | $C_{rss}$     |   | -   | 17   | -         |            |
| <b>Switching characteristics</b>          |               |   |     |      |           |            |
| Turn-on delay time                        | $t_{d(on)}$   | $V_{DD} = 50V, I_D = 50A,$<br>$V_{GS} = 10V, R_G = 3\Omega$ | -   | 22   | -         | ns         |
| Turn-on rise time                         | $t_r$         |   | -   | 18   | -         |            |
| Turn-off delay time                       | $t_{d(off)}$  |   | -   | 49   | -         |            |
| Turn-off fall time                        | $t_f$         |   | -   | 19   | -         |            |
| Total Gate Charge                         | $Q_g$         | $V_{DS} = 50V, I_D = 50A,$<br>$V_{GS} = 10V$                | -   | 56   | -         | nC         |
| Gate-Source Charge                        | $Q_{gs}$      |   | -   | 12   | -         |            |
| Gate-Drain Charge                         | $Q_{gd}$      |   | -   | 14   | -         |            |
| Reverse Recovery Charge                   | $Q_{rr}$      | $I_F = 30A, di/dt = 100A/\mu s$                             |     | 102  |           | nC         |
| Reverse Recovery Time                     | $T_{rr}$      | $I_F = 30A, di/dt = 100A/\mu s$                             |     | 66   |           | ns         |
| <b>Source-Drain Diode characteristics</b> |               |   |     |      |           |            |
| Diode Forward voltage <sup>(3)</sup>      | $V_{DS}$      | $V_{GS} = 0V, I_S = 50A$                                    | -   | -    | 1.3       | V          |
| Diode Forward current <sup>(4)</sup>      | $I_S$         |   | -   | -    | 106       | A          |

**Notes:**

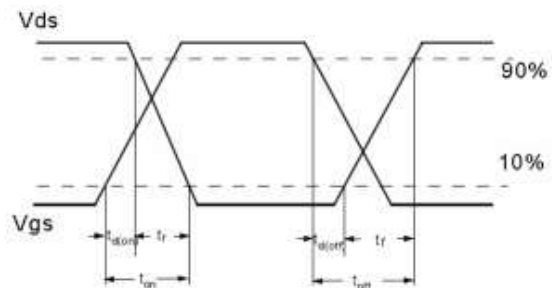
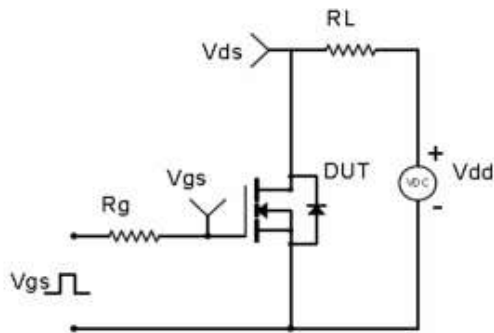
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:  $T_J = 25^\circ\text{C}, V_{DD} = 50V, R_G = 25\Omega, L = 0.5\text{Mh}$
3. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
4. Surface Mounted on FR4 Board,  $t \leq 10\text{ sec}$

**Test Circuit & Waveform**

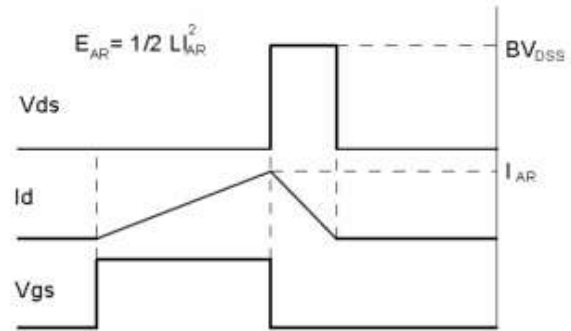
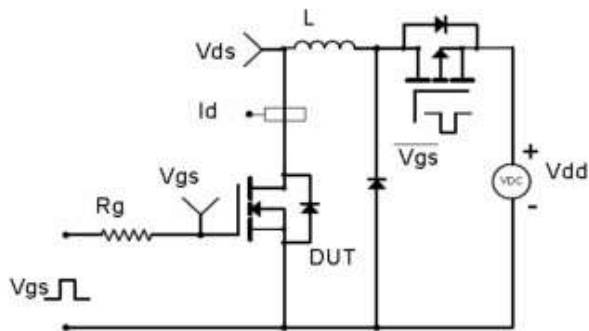
Gate Charge Test Circuit & Waveform



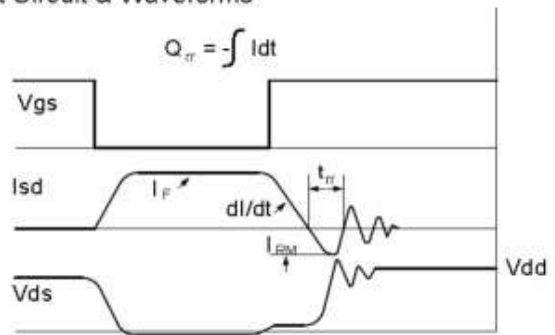
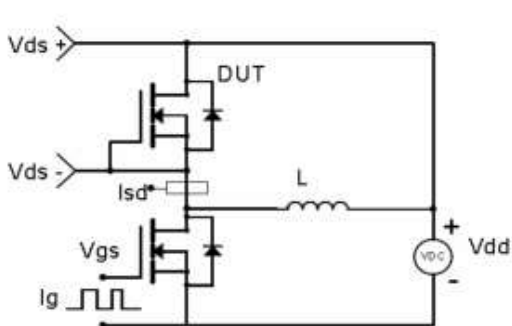
Resistive Switching Test Circuit & Waveforms



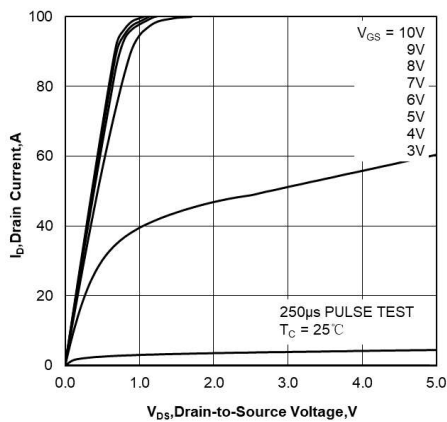
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



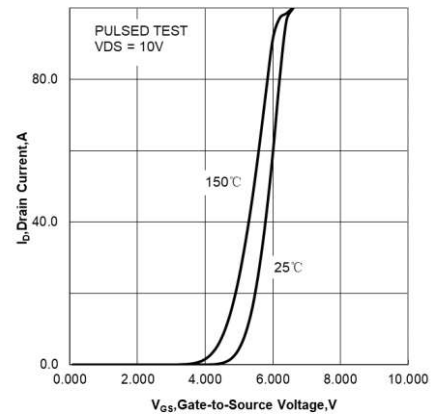
Diode Recovery Test Circuit & Waveforms



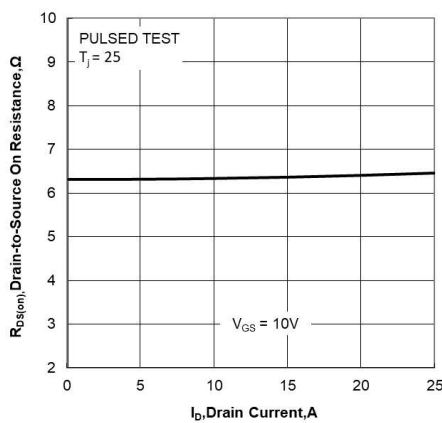
**Typical Performance Characteristics**



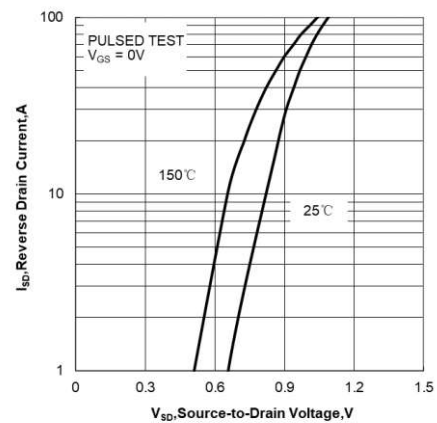
**Figure 1. Output Characteristics**



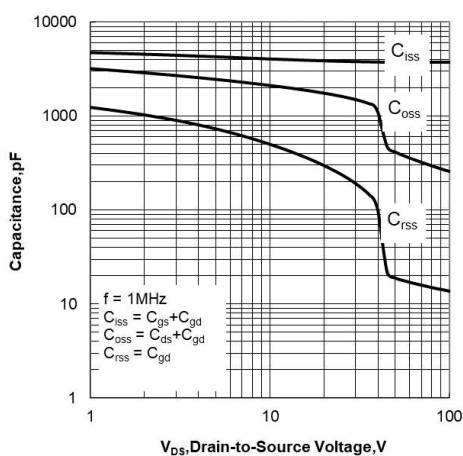
**Figure 2. Transfer Characteristics**



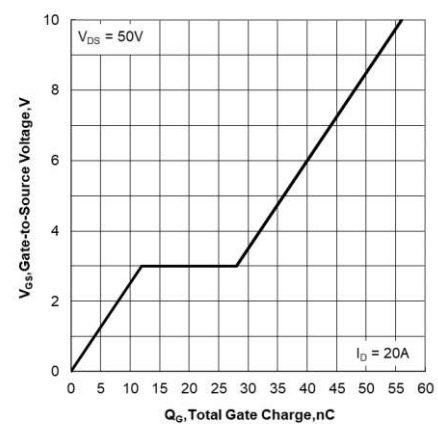
**Figure 3. Drain-to-Source On Resistance vs Drain Current**



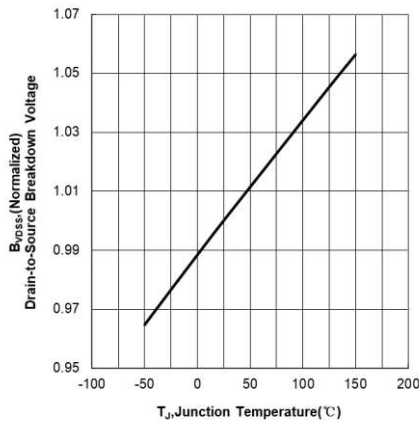
**Figure 4. Body Diode Forward Voltage vs Source Current and Temperature**



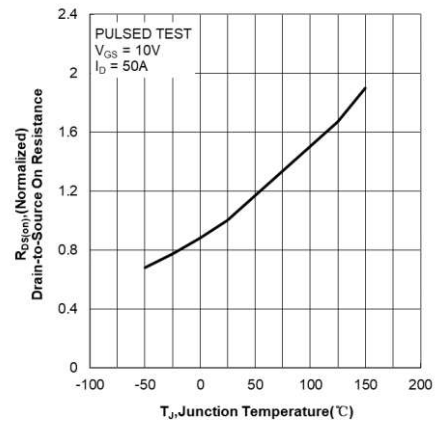
**Figure 5. Capacitance Characteristics**



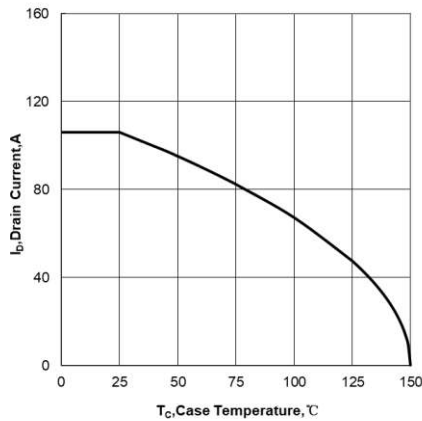
**Figure 6. Gate Charge Characteristics**



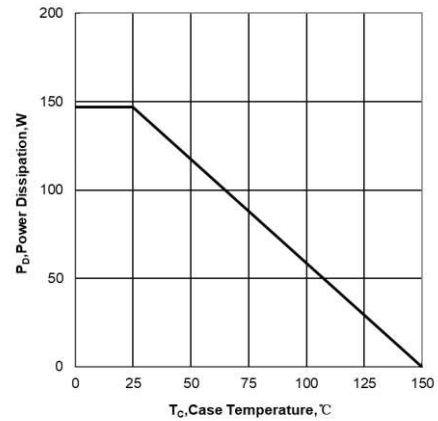
**Figure 7. Normalized Breakdown Voltage vs Junction Temperature**



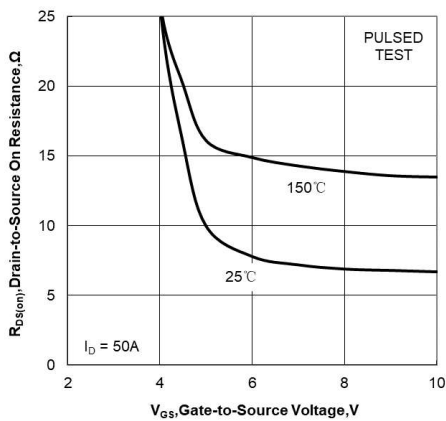
**Figure 8. Normalized On Resistance vs Junction Temperature**



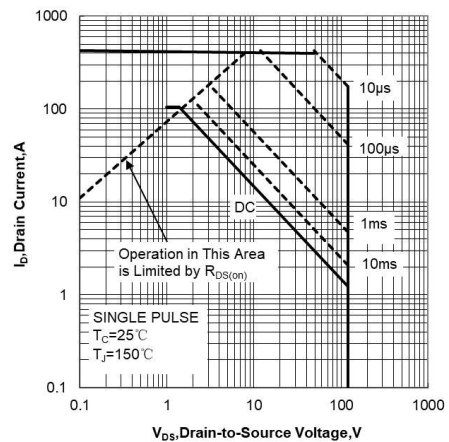
**Figure 9. Maximum Continuous Drain Current vs Case Temperature**



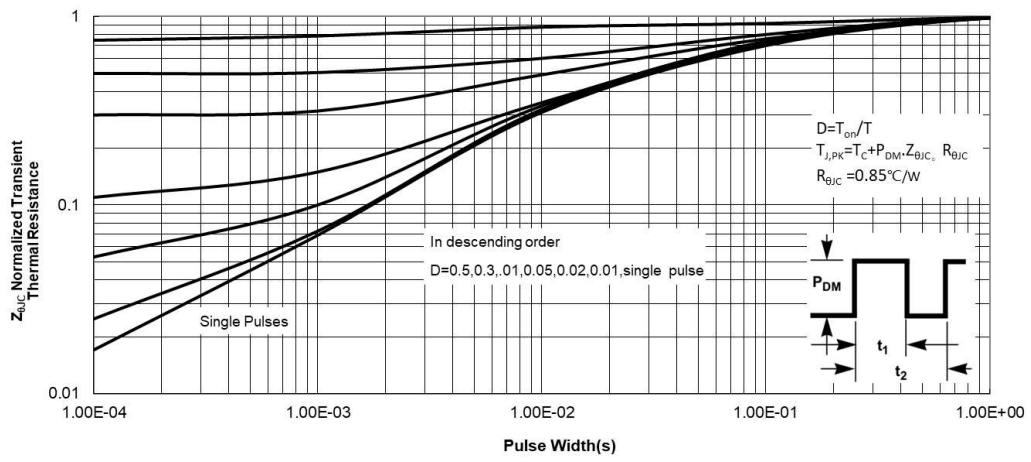
**Figure 10. Maximum Power Dissipation vs Case Temperature**



**Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current**



**Figure 12. Maximum Safe Operating Area**



**Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case**

TO-220 Package Information

