

AP80N06G

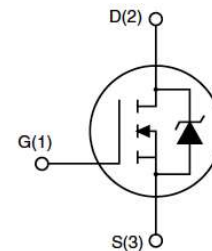
N-Channel Enhancement Mosfet

AIIPOWER

DATA SHEET

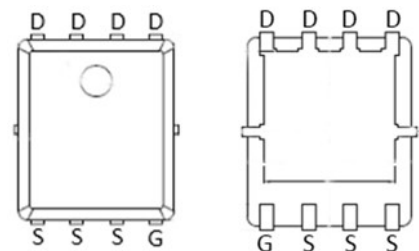
Feature

- 60V,55A
 $R_{DS(on)} < 10m\Omega @ V_{GS}=10V$
 $R_{DS(on)} < 14m\Omega @ V_{GS}=4.5V$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge



Application

- PWM applications
- Load Switch
- Power management



PDFN5X6-8L

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity (PCS) |
|----------------|----------|----------------|-----------|------------|----------------|
| 80N06G | AP80N06G | PDFN5X6-8L | 13 inch | - | 5000 |

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

| Parameter | Symbol | Value | Unit |
|--|-----------------|-----------|---------------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ($T_a = 25^\circ\text{C}$) | I_D | 55 | A |
| Continuous Drain Current ($T_a = 100^\circ\text{C}$) | I_D | 36 | A |
| Pulsed Drain Current ⁽¹⁾ | I_{DM} | 220 | A |
| Singel Pulsed Avalanche Energy ⁽²⁾ | E_{AS} | 81 | mJ |
| Power Dissipation | P_D | 53 | W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 2.4 | $^\circ\text{C}/\text{W}$ |
| Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55~ +150 | $^\circ\text{C}$ |

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

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---------------|---|-----|------|-----------|------------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$ | 60 | - | - | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 60V, V_{GS} = 0V$ | - | - | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| Gate threshold voltage ⁽³⁾ | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | 1.7 | 2.5 | V |
| Drain-source on-resistance ⁽³⁾ | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 30A$ | - | 7.5 | 10 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 20A$ | - | 10 | 14 | |
| Forward tranconductance ⁽³⁾ | g_{FS} | $V_{DS} = 10V, I_D = 30A$ | 20 | - | - | S |
| Dynamic characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$ | - | 4400 | - | pF |
| Output Capacitance | C_{oss} | | - | 210 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 190 | - | |
| Switching characteristics | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 30V, I_D = 30A, R_L = 1\Omega$ $V_{GS} = 10V, R_G = 3\Omega$ | - | 7.1 | - | ns |
| Turn-on rise time | t_r | | - | 5.3 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 27.2 | - | |
| Turn-off fall time | t_f | | - | 6.2 | - | |
| Total Gate Charge | Q_g | $V_{DS} = 30V, I_D = 30A,$ $V_{GS} = 10V$ | - | 77 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 9 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 23 | - | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward voltage ⁽³⁾ | V_{DS} | $V_{GS} = 0V, I_S = 30A$ | - | - | 1.2 | V |
| Diode Forward current ⁽⁴⁾ | I_S | | - | - | 55 | A |
| Body Diode Reverse Recovery Time | t_{rr} | $T_J = 25^{\circ}, I_F = 30A, di/dt = 100A/us$ | | 29 | | ns |
| Body Diode Reverse Recovery Charge | Q_{rr} | $T_J = 25^{\circ}, I_F = 30A, di/dt = 100A/us$ | | 45 | | nc |

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, R_G = 25\Omega, L = 0.5mH, I_{AS} = 18A$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 0.5\%$
4. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit

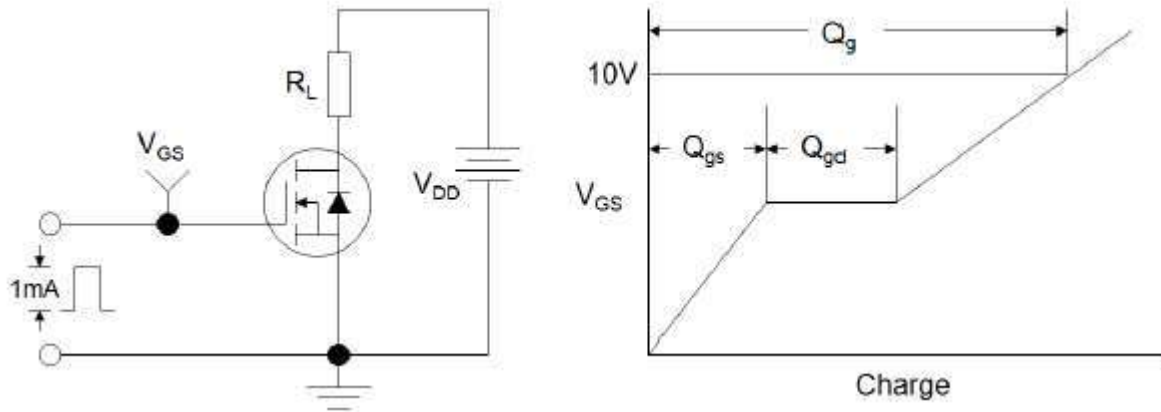


Figure1:Gate Charge Test Circuit & Waveform

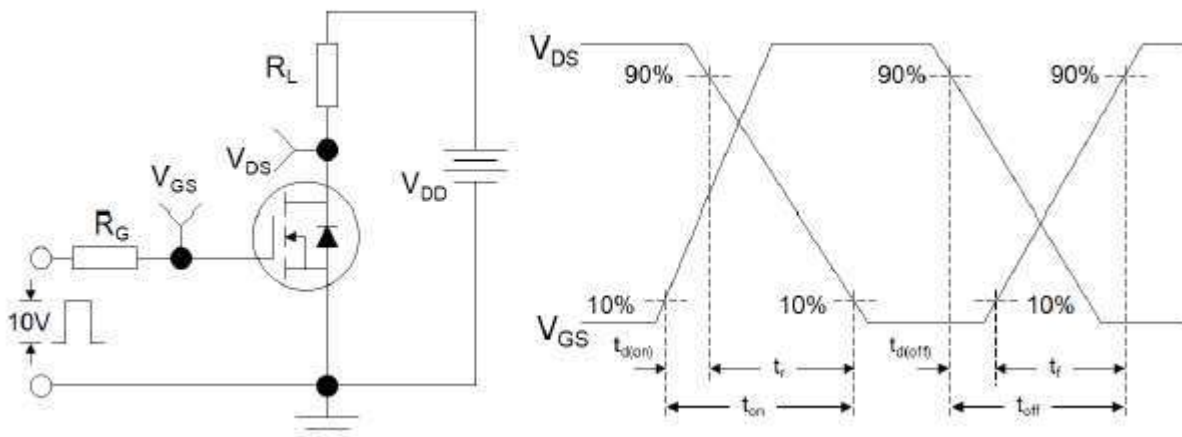


Figure 2: Resistive Switching Test Circuit & Waveforms

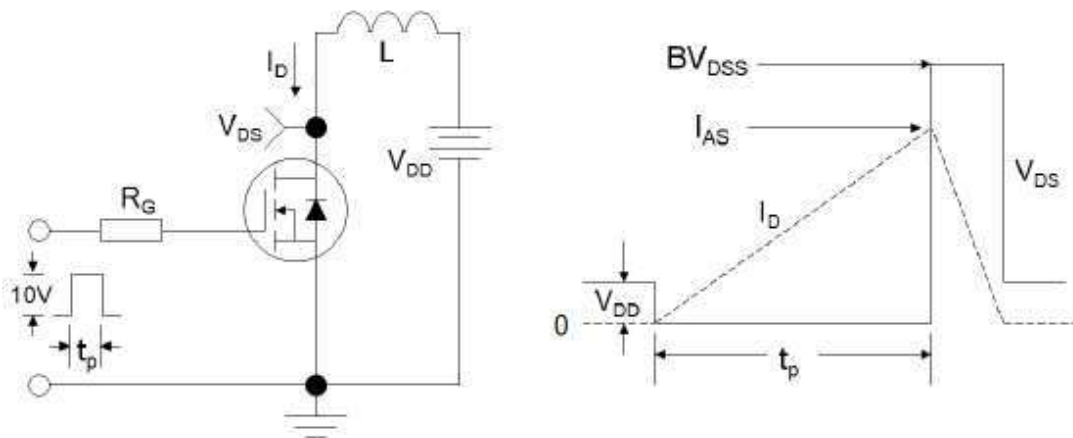


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics

Figure 1: Output Characteristics

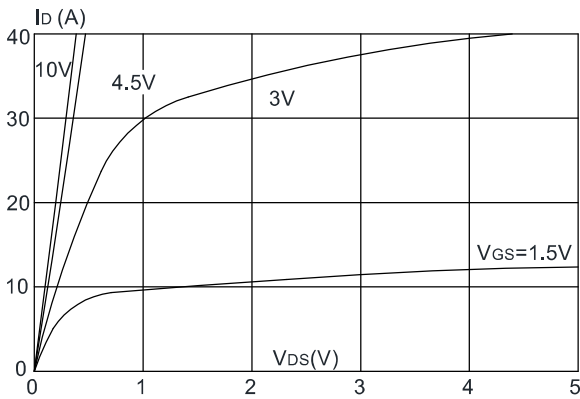


Figure 2: Typical Transfer Characteristics

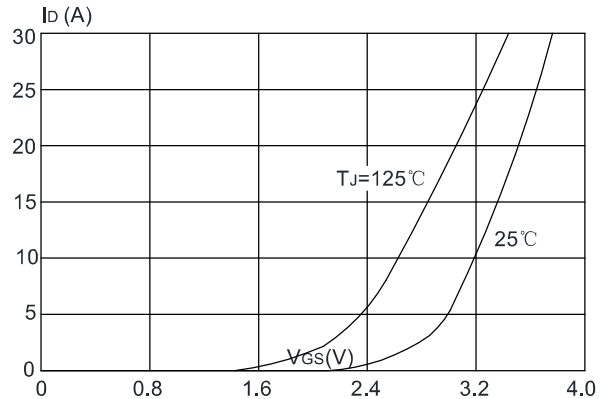


Figure 3: On-resistance vs. Drain Current

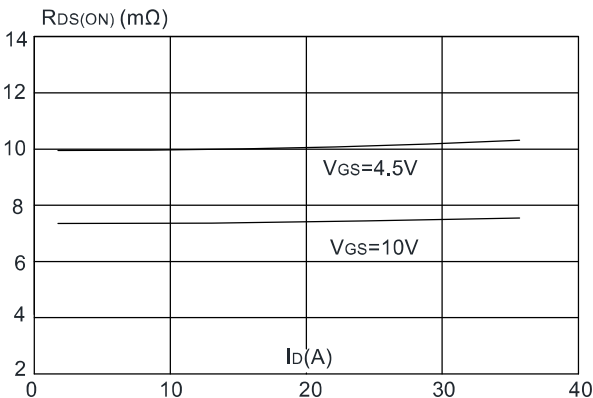


Figure 4: Body Diode Characteristics

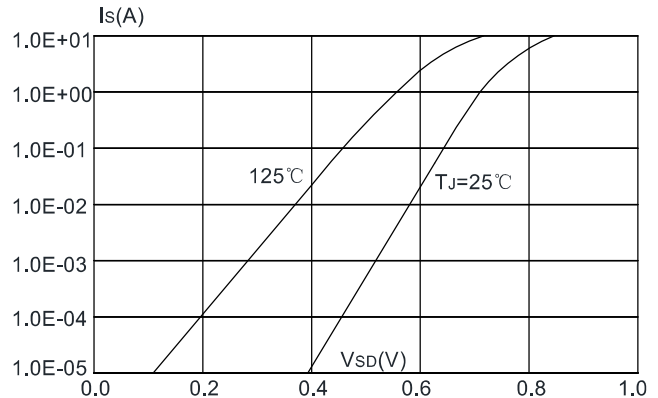


Figure 5: Gate Charge Characteristics

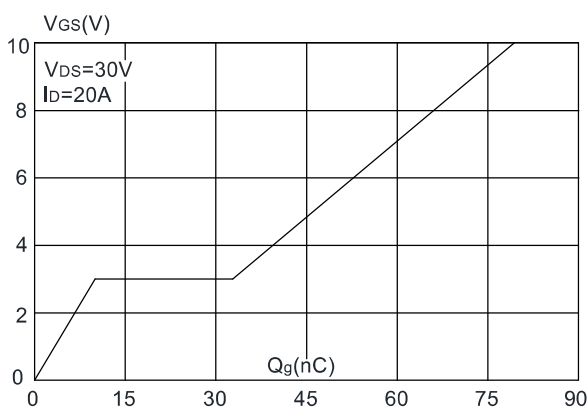


Figure 6: Capacitance Characteristics

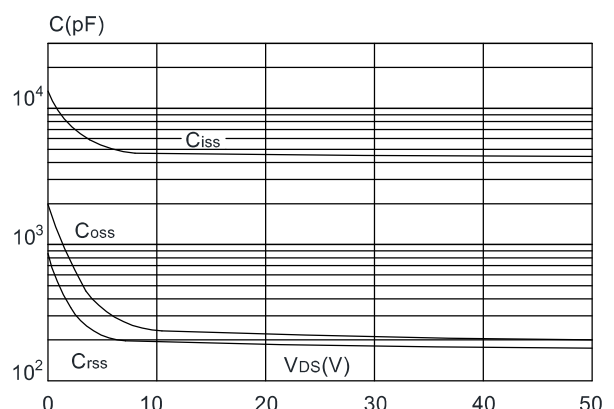


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

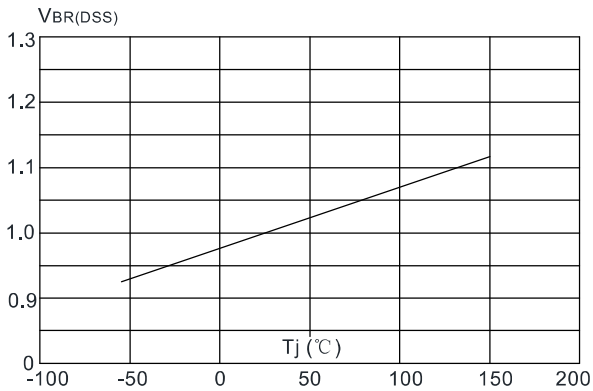


Figure 8: Normalized on Resistance vs. Junction Temperature

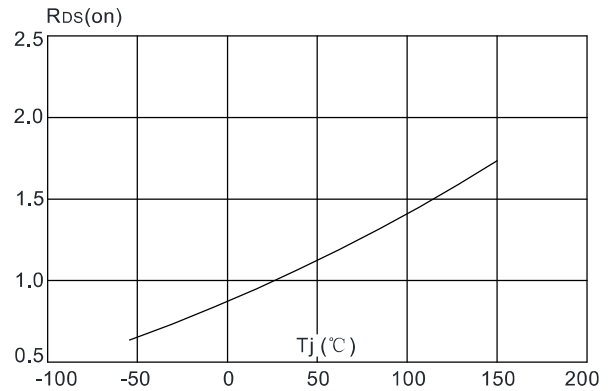


Figure 9: Maximum Safe Operating Area

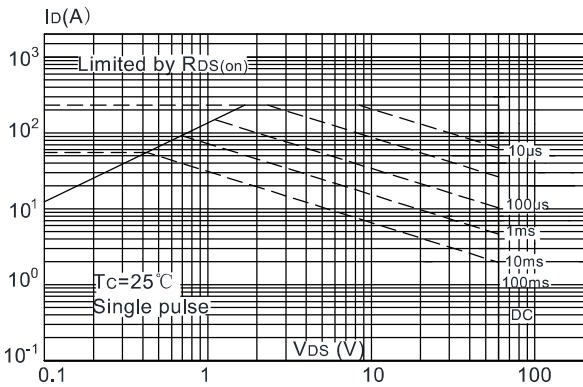
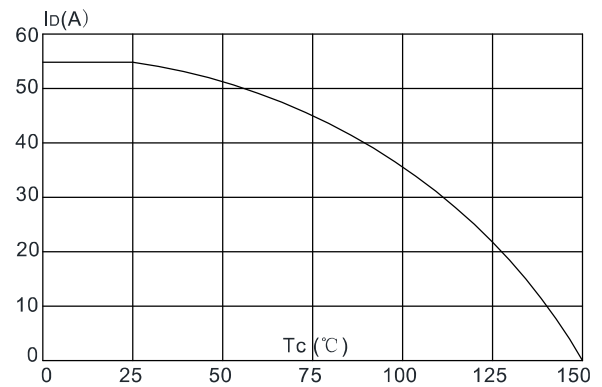
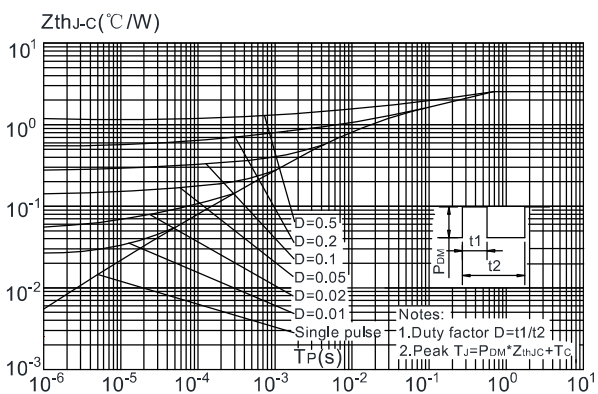


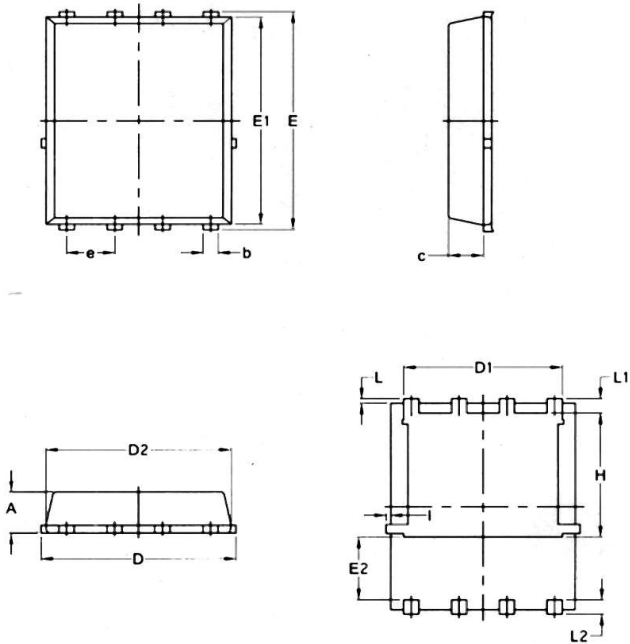
Figure 10: Maximum Continuous Drain Current vs. Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case



PDFN5X6-8L Package Information



PDFN5X6-8L

| SYMBOL | COMMON | | | |
|--------|----------|-------|----------|--------|
| | MM | | INCH | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.970 | 0.0324 | 0.0382 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | — | 0.0630 | — |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | — | 0.18 | — | 0.0070 |