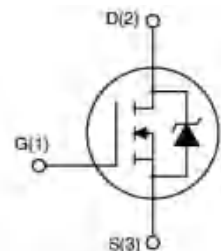


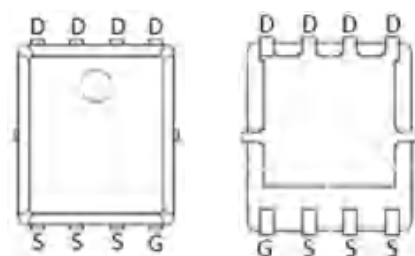
## Feature

- 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                                    | $V_{GS}$        | $\pm 20$  | 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 <sup>(1)</sup>                    | $I_{DM}$        | 220       | A                    |
| Singel Pulsed Avalanche Energy <sup>(2)</sup>          | $E_{AS}$        | 81        | mJ                   |
| Power Dissipation                                      | $P_D$           | 53        | W                    |
| Thermal Resistance from Junction to Case               | $R_{\theta JC}$ | 2.4       | $^{\circ}\text{C/W}$ |
| Junction Temperature                                   | $T_J$           | 150       | $^{\circ}\text{C}$   |
| Storage Temperature                                    | $T_{STG}$       | -55~ +150 | $^{\circ}\text{C}$   |

# AP80N06G

## N-Channel Enhancement Mosfet



### 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 <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA                                                              | 60  | -    | -    | V    |
| Zero gate voltage drain current           | I <sub>DSS</sub>     | V <sub>DS</sub> =60V, V <sub>GS</sub> = 0V                                                                | -   | -    | 1    | μA   |
| Gate-body leakage current                 | I <sub>GSS</sub>     | V <sub>GS</sub> = ± 20V, V <sub>DS</sub> = 0V                                                             | -   | -    | ±100 | nA   |
| Gate threshold voltage <sup>(3)</sup>     | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                                  | 1   | 1.7  | 2.5  | V    |
| Drain-source on-resistance <sup>(3)</sup> | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                                                                 | -   | 7.5  | 10   | mΩ   |
|                                           |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A                                                                | -   | 10   | 14   |      |
| Forward tranconductance <sup>(3)</sup>    | g <sub>FS</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =30A                                                                 | 20  | -    | -    | S    |
| Dynamic characteristics                   |                      |                                                                                                           |     |      |      |      |
| Input Capacitance                         | C <sub>iss</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz                                                        | -   | 4400 | -    | pF   |
| Output Capacitance                        | C <sub>oss</sub>     |                                                                                                           | -   | 210  | -    |      |
| Reverse Transfer Capacitance              | C <sub>rss</sub>     |                                                                                                           | -   | 190  | -    |      |
| Switching characteristics                 |                      |                                                                                                           |     |      |      |      |
| Turn-on delay time                        | t <sub>d(on)</sub>   | V <sub>DD</sub> =30V, I <sub>D</sub> =30A, R <sub>L</sub> =1Ω<br>V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω | -   | 7.1  | -    | ns   |
| Turn-on rise time                         | t <sub>r</sub>       |                                                                                                           | -   | 5.3  | -    |      |
| Turn-off delay time                       | t <sub>d(off)</sub>  |                                                                                                           | -   | 27.2 | -    |      |
| Turn-off fall time                        | t <sub>f</sub>       |                                                                                                           | -   | 6.2  | -    |      |
| Total Gate Charge                         | Q <sub>g</sub>       | V <sub>D</sub> S=30V, I <sub>D</sub> =30A,<br>V <sub>G</sub> S=10V                                        | -   | 77   | -    | nC   |
| Gate-Source Charge                        | Q <sub>gs</sub>      |                                                                                                           | -   | 9    | -    |      |
| Gate-Drain Charge                         | Q <sub>gd</sub>      |                                                                                                           | -   | 23   | -    |      |
| Source-Drain Diode characteristics        |                      |                                                                                                           |     |      |      |      |
| Diode Forward voltage <sup>(3)</sup>      | V <sub>DS</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =30A                                                                  | -   | -    | 1.2  | V    |
| Diode Forward current <sup>(4)</sup>      | I <sub>S</sub>       |                                                                                                           | -   | -    | 55   | A    |
| Body Diode Reverse Recovery Time          | trr                  | T <sub>J</sub> =25° , IF=30A,di/dt=100A/us                                                                |     | 29   |      | ns   |
| Body Diode Reverse Recovery Charge        | Qrr                  | T <sub>J</sub> =25° , IF=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

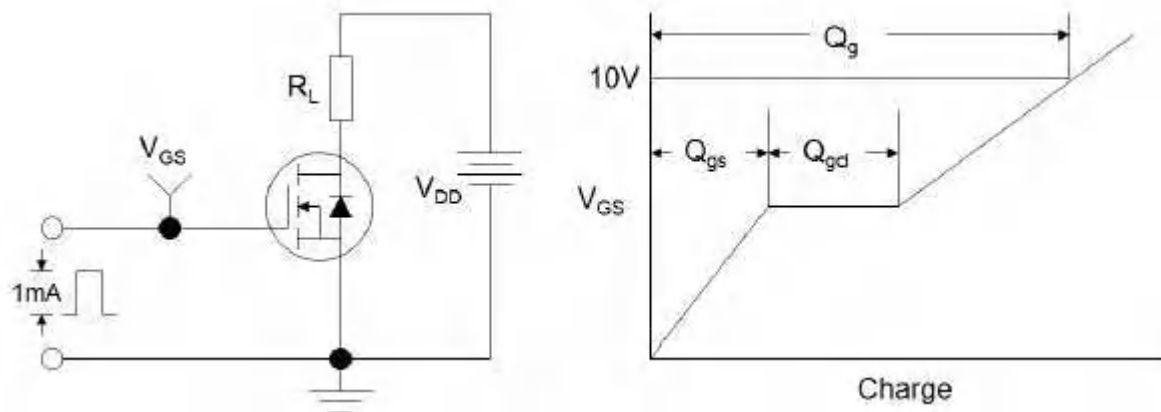


Figure1:Gate Charge Test Circuit & Waveform

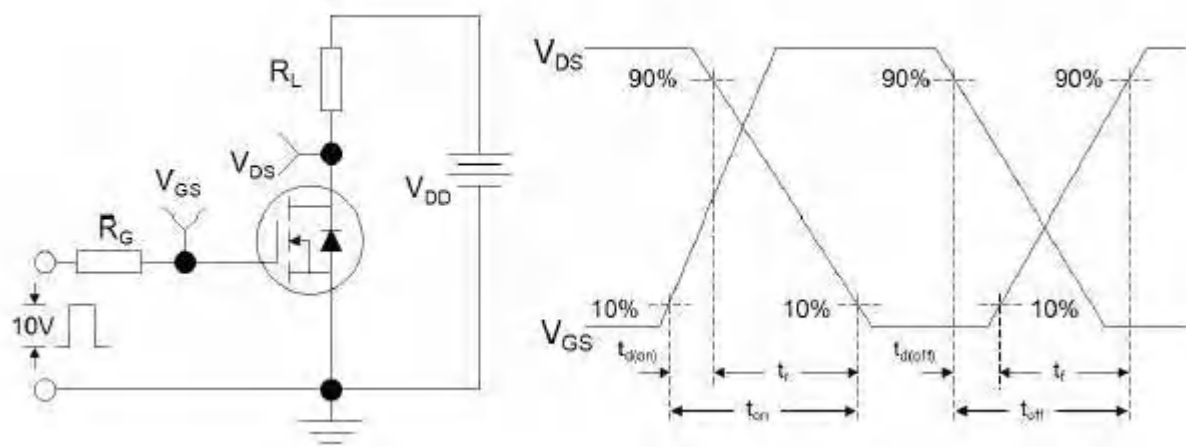


Figure 2: Resistive Switching Test Circuit & Waveforms

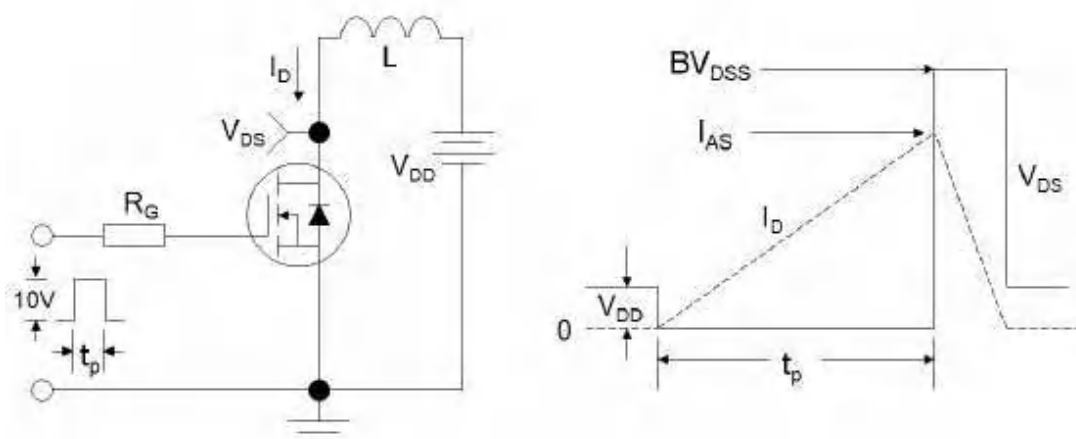
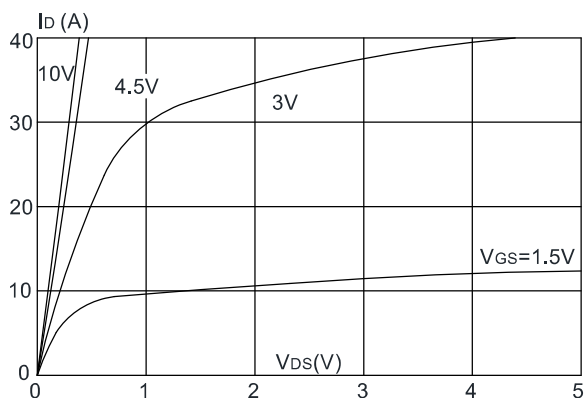


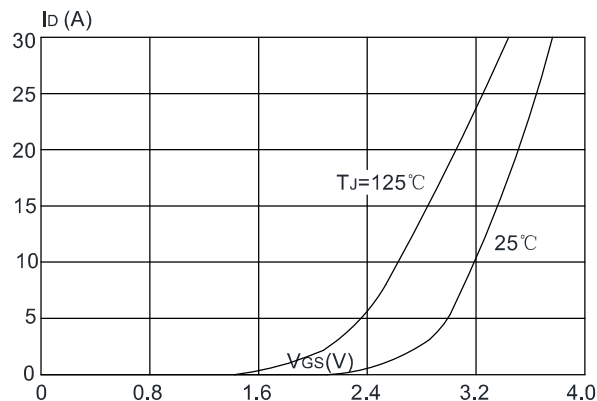
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

## Typical Performance Characteristics

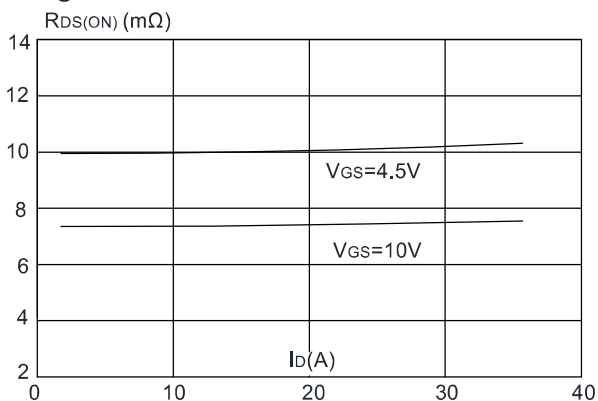
**Figure1:** Output Characteristics



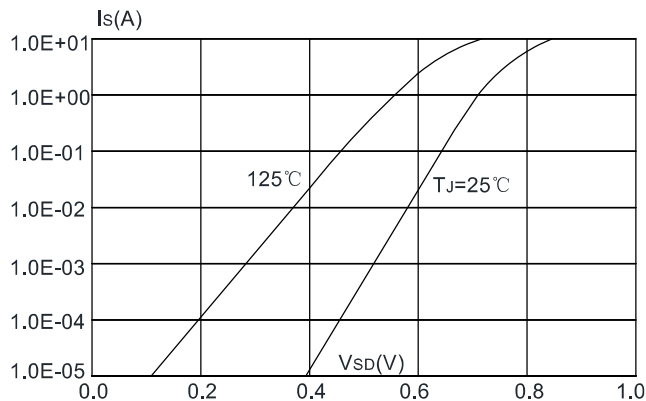
**Figure 2:** Typical Transfer Characteristics



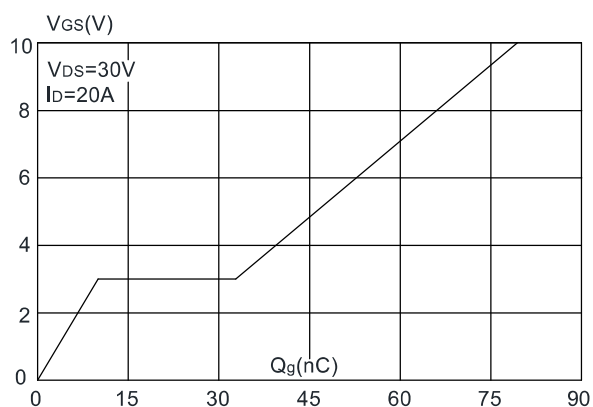
**Figure 3:** On-resistance vs. Drain Current



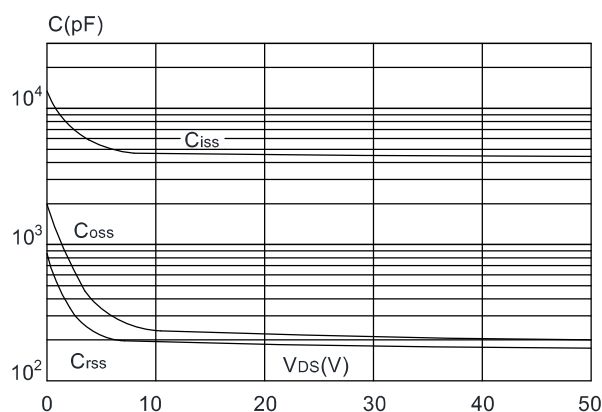
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics



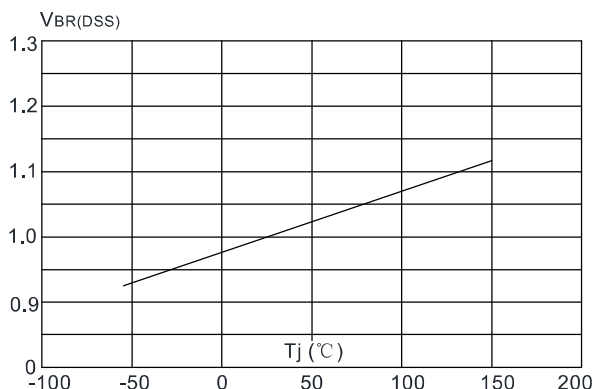
**Figure 6:** Capacitance Characteristics



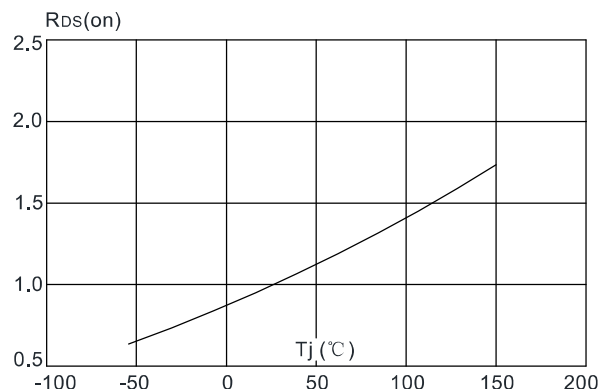
# AP80N06G

## N-Channel Enhancement Mosfet

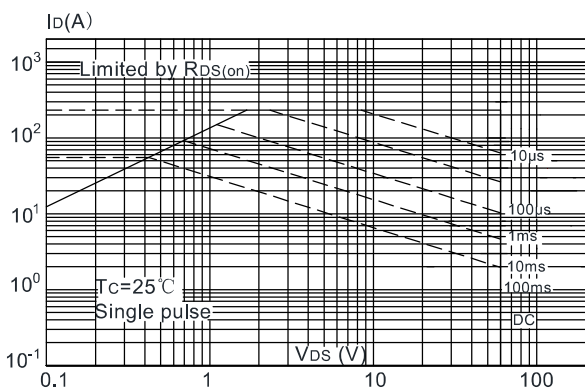
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



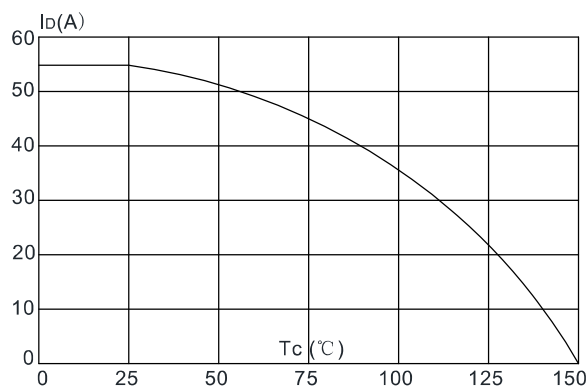
**Figure 8:** Normalized on Resistance vs. Junction Temperature



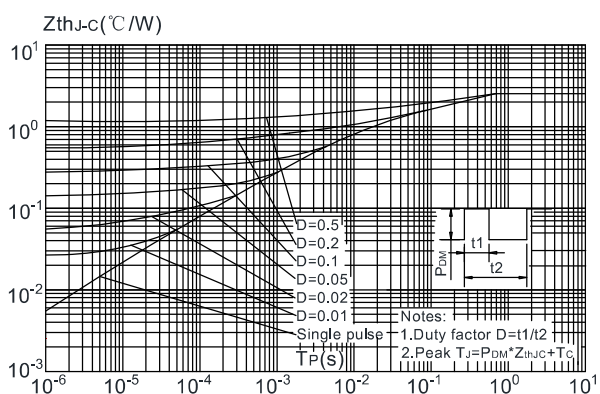
**Figure 9:** Maximum Safe Operating Area



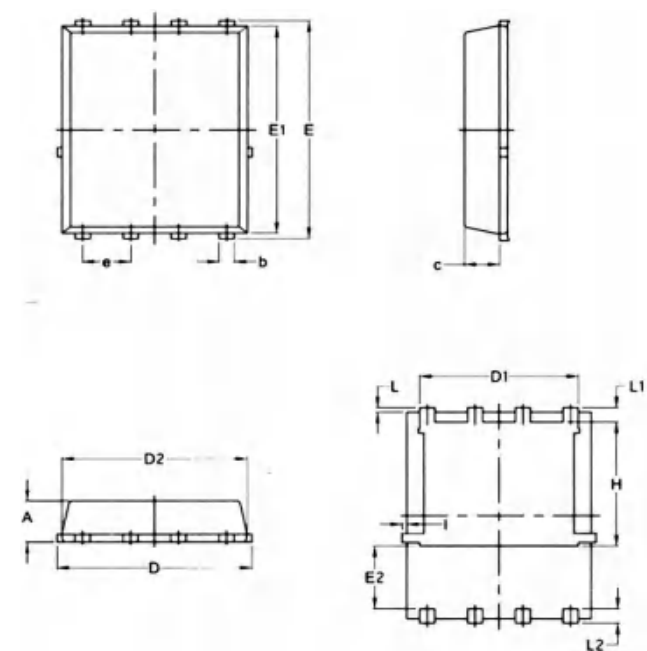
**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**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 |