

APG250N01G

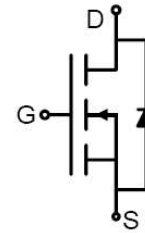
N-Channel Enhancement Mosfet

AIIPOWER

DATA SHEET

Feature

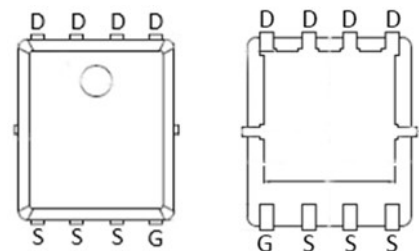
- 100V,40A
 $R_{DS(ON)} < 25m\Omega @ V_{GS}=10V$ (TYP:18m Ω)
 $R_{DS(ON)} < 38m\Omega @ V_{GS}=4.5V$ (TYP:25m Ω)
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



PDFN5X6

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity (PCS) |
|----------------|------------|----------------|-----------|------------|----------------|
| G250N01G | APG250N01G | PDFN5X6 | 13 inch | - | 5000 |

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

| Parameter | Symbol | Value | Unit |
|---|-----------------|-----------|---------------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ($T_a=25^{\circ}C$) | I_D | 40 | A |
| Continuous Drain Current ($T_a=100^{\circ}C$) | I_D | 25 | A |
| Pulsed Drain Current ⁽¹⁾ | I_{DM} | 160 | A |
| Single Pulsed Avalanche Energy ⁽²⁾ | E_{AS} | 16 | mJ |
| Power Dissipation | P_D | 45 | W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 2.5 | $^{\circ}C/W$ |
| Junction Temperature | T_J | 150 | $^{\circ}C$ |
| Storage Temperature | T_{STG} | -55~ +150 | $^{\circ}C$ |

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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 | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 100 | - | - | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 100V, V_{GS} = 0V$ | - | - | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| Gate threshold voltage ⁽³⁾ | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.2 | 1.8 | 2.8 | V |
| Drain-source on-resistance ⁽³⁾ | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 15A$ | - | 18 | 25 | $m\Omega$ |
| | | $V_{GS} = 4.5V, I_D = 10A$ | - | 25 | 38 | $m\Omega$ |
| Forward Threshold Voltage | g_{fs} | $V_{DS} = 10V, I_D = 20A$ | - | 22 | - | S |
| Gate Resistance | R_g | $V_{DS} = V_{GS} = 0V, f = 1MHz$ | - | 1.62 | - | Ω |
| Dynamic characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$ | - | 822 | - | pF |
| Output Capacitance | C_{oss} | | - | 310 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 23.5 | - | |
| Switching characteristics | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 50V, I_D = 20A,$ $V_{GS} = 10V, R_G = 3\Omega$ | - | 15 | - | ns |
| Turn-on rise time | t_r | | - | 3.2 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 30 | - | |
| Turn-off fall time | t_f | | - | 7.6 | - | |
| Total Gate Charge | Q_g | $V_{DS} = 50V, I_D = 20A,$ $V_{GS} = 10V$ | - | 22.7 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 6.2 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 5.3 | - | |
| Reverse Recovery Charge | Q_{rr} | $I_F = 20A, di/dt = 100A/\mu s$ | - | 59 | - | nC |
| Reverse Recovery Time | T_{rr} | $I_F = 20A, di/dt = 100A/\mu s$ | - | 45 | - | ns |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward voltage ⁽³⁾ | V_{DS} | $V_{GS} = 0V, I_S = 10A$ | - | - | 1.2 | V |
| Diode Forward current ⁽⁴⁾ | I_S | | - | - | 40 | 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, $t \leq 10\text{ sec}$

Typical Performance Characteristics

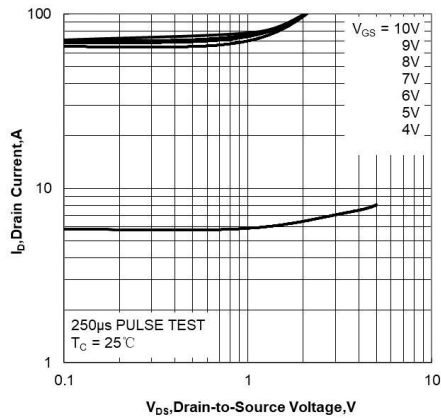


Figure 1. Output Characteristics

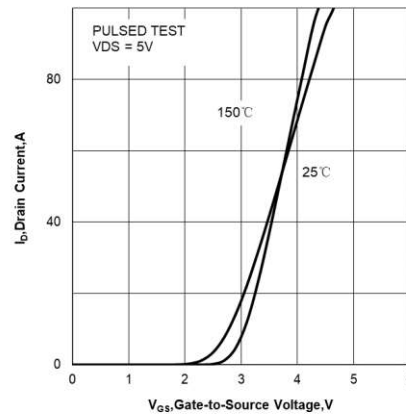


Figure 2. Transfer Characteristics

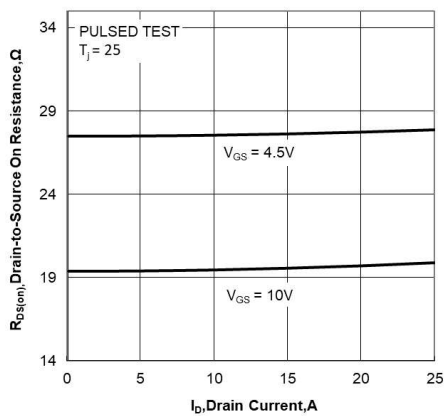


Figure 3. Drain-to-Source On Resistance vs Drain Current

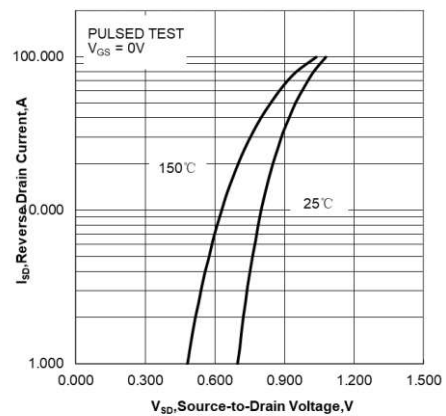


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

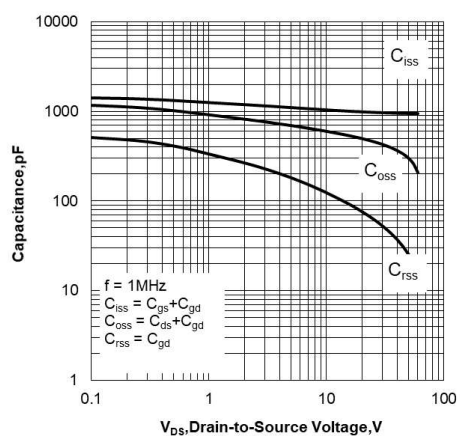


Figure 5. Capacitance Characteristics

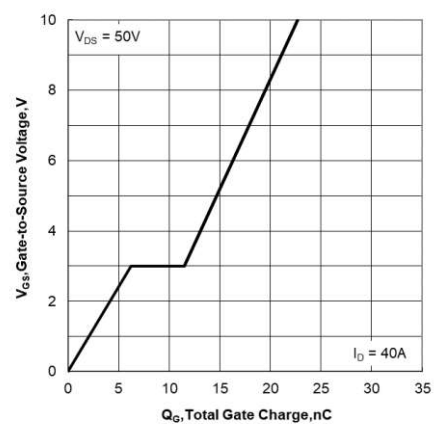


Figure 6. Gate Charge Characteristics

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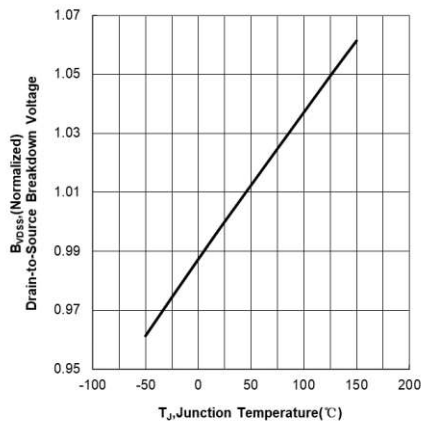


Figure 7. Normalized Breakdown Voltage vs Junction Temperature

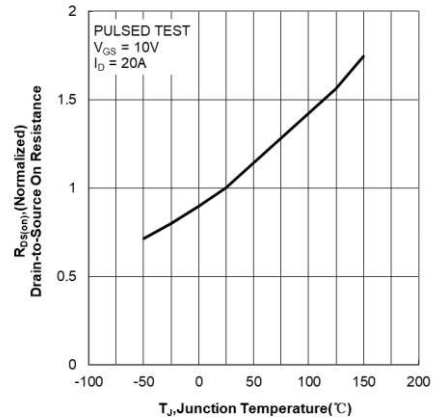


Figure 8. Normalized On Resistance vs Junction Temperature

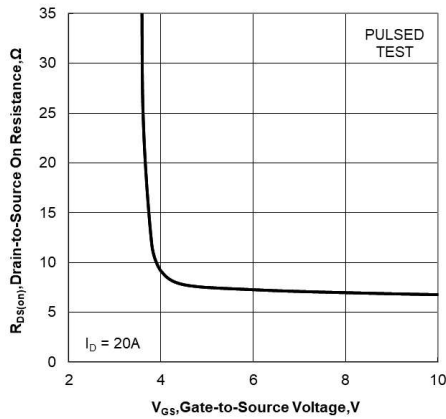


Figure 9. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

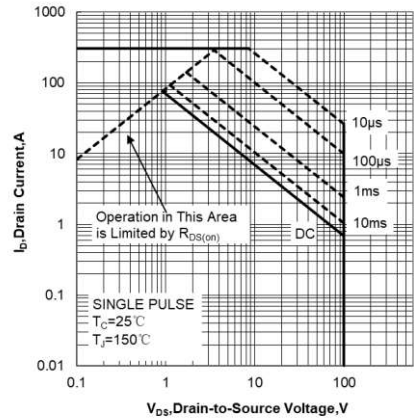


Figure 10. Maximum Safe Operating Area

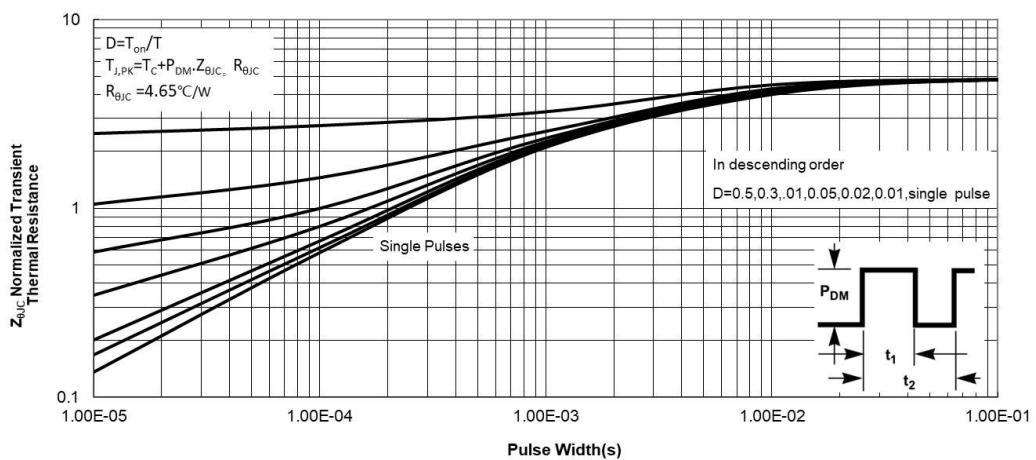
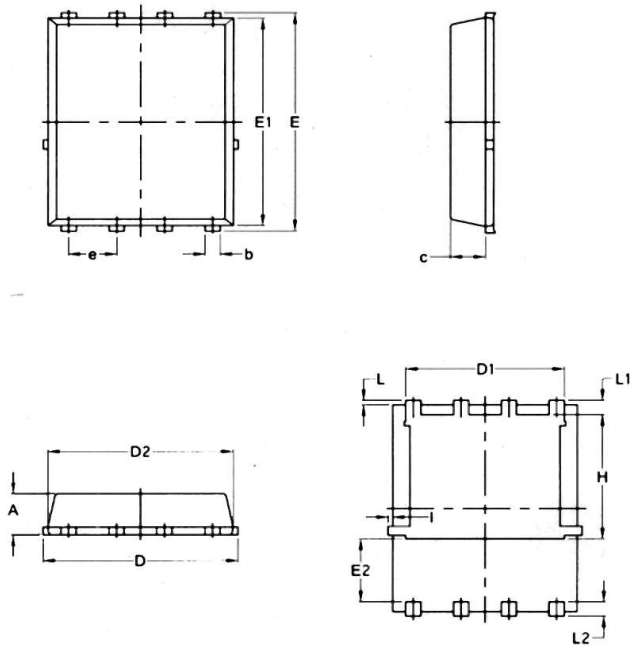


Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

PDFN5X6 Package Information



PDFN5X6

| 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 |