

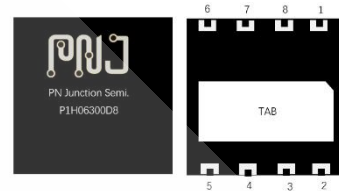


GaN HEMT P1H06300D8

650V GaN Enhancement Mode Power Transistor

Features

- Ultra Fast Switching
- No Reverse-Recovery Charge
- Capable of Reverse Conduction
- Low Gate Charge, Low Output Charge



Standards Benefits

- Improves System Efficiency
- Improves Power Density
- Enable Higher Operating Frequency
- System Cost Reduction Savings

| | |
|--------|--------------|
| Gate | 5 |
| Source | 2, 3, 4, TAB |
| Drain | 1, 6, 7, 8 |

Application

- Consumer SMPS
- High Density Chargers Based on the Half-Bridge Topology
- Totem Pole PFC, High Frequency LLC and Flyback



Order Information

| Part number | Package | Marking |
|-------------|-----------|------------|
| P1H06300D8 | DFN 8 X 8 | P1H06300D8 |



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PNJ Preliminary

1. Maximum Ratings

At $T_J=25\text{ }^\circ\text{C}$, unless specified otherwise

| Parameter | Symbol | Value | Unit | Test Conditions |
|---------------------------------|-------------|-------------|------------------|--|
| Drain - Source Voltage | V_{DSmax} | 650 | V | $V_{GS}= 0\text{ V}$ |
| Gate - Source Voltage (Dynamic) | V_{GSmax} | -20 / +10 | V | AC (F > 1 Hz) |
| Gate - Source Voltage (Static) | V_{GSop} | -8/ +6 | V | Static |
| Continuous Drain Current | I_D | 10 | A | $V_{GS}= 6\text{ V}$, $T_C= 25\text{ }^\circ\text{C}$ |
| | | 6 | | $V_{GS}= 6\text{ V}$, $T_C= 100\text{ }^\circ\text{C}$ |
| Power Dissipation | P_{tot} | 55.5 | W | $T_C=25^\circ\text{C}$ |
| Operating Junction Temperature | T_J | -55 To +150 | $^\circ\text{C}$ | |
| Storage Temperature | T_{stg} | -55 To +150 | $^\circ\text{C}$ | |

2. Thermal Characteristics

| Parameter | Symbol | Value | | Unit | Test Conditions |
|--|-----------------|-------|------|---------------------------|-----------------|
| | | Typ. | Max. | | |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | / | 2.25 | $^\circ\text{C}/\text{W}$ | |
| Thermal Resistance from Junction to Case | $R_{\theta JA}$ | / | 60 | | |

3. Electrical Characteristics

At $T_J=25^\circ\text{C}$, unless specified otherwise

| Parameter | Symbol | Values | | | Unit | Test condition |
|----------------------------------|--------------|--------|------|------|------------|--|
| | | Min. | Typ. | Max. | | |
| Breakdown Voltage | V_{BV} | 650 | / | / | V | $V_{GS}=0V$ |
| Threshold Voltage | V_{TH} | / | 1.3 | / | V | $V_{DS}=5V, I_{DS}=1mA$ |
| On-state Resistance | $R_{DS(on)}$ | 230 | 240 | 300 | m Ω | $V_{GS}=6V, I_{DS}=5A$ |
| Drain-Source leakage current | I_{DSS} | / | 15 | 200 | nA | $V_{GS}=0V, V_{DS}=650V$ |
| Gate leakage current | I_{GSS} | / | 4.9 | 16.9 | μA | $V_{GS}=6V, V_{DS}=0V$ |
| Input Capacitance | C_{ISS} | / | 66.8 | / | pF | $V_{DS} = 400 V$ $V_{GS} = 0 V, f = 1MHz$ |
| Output Capacitance | C_{OSS} | / | 27.3 | / | pF | |
| Reverse Transfer Capacitance | C_{RSS} | / | 0.7 | / | pF | |
| Total Gate Charge | Q_G | / | 3.1 | / | nC | $V_{DS} = 400 V$ $V_{GS} = 6V$ |
| Gate-to-Source Charge | Q_{GS} | / | 0.46 | / | nC | |
| Gate-to-Drain Charge | Q_{GD} | / | 1.7 | / | nC | |
| Output Charge | Q_{OSS} | / | 3.1 | / | nC | $V_{DS} = 400 V$ $V_{GS} = 6V, f = 1MHz$ |
| Reverse Recovery Charge | Q_{RR} | / | 0 | / | | |
| Output Capacitance Stored Energy | E_{OSS} | / | 0.44 | / | μJ | $V_{DS} = 400 V$ $V_{GS} = 0 V, f = 1MHz$ |

4. Typical Performance

At $T_J=25^\circ\text{C}$, unless specified otherwise

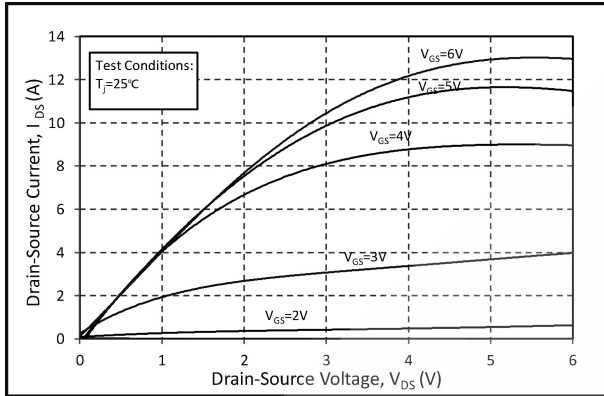


Fig.1 Output Characteristics $T_J= 25^\circ\text{C}$

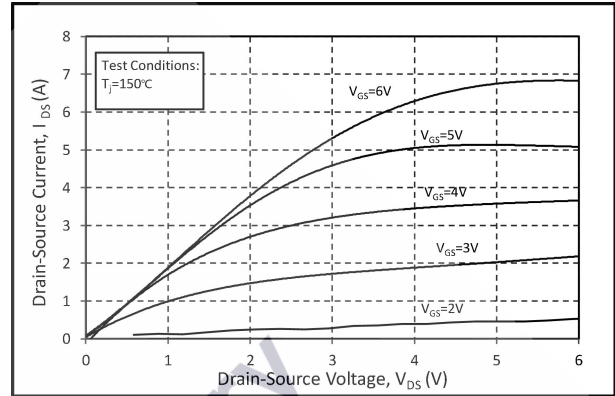


Fig.2 Output Characteristics $T_J= 150^\circ\text{C}$

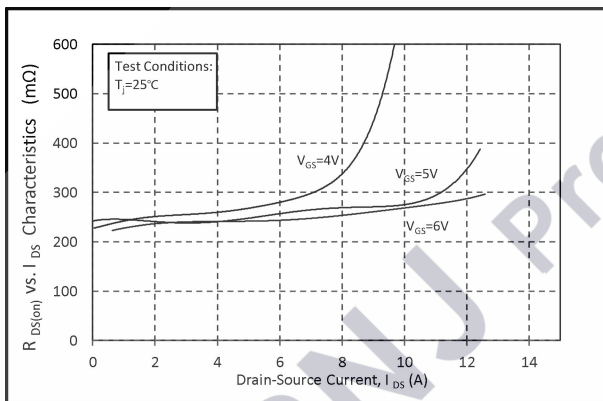


Fig.3 On-Resistance For Various Gate Voltage

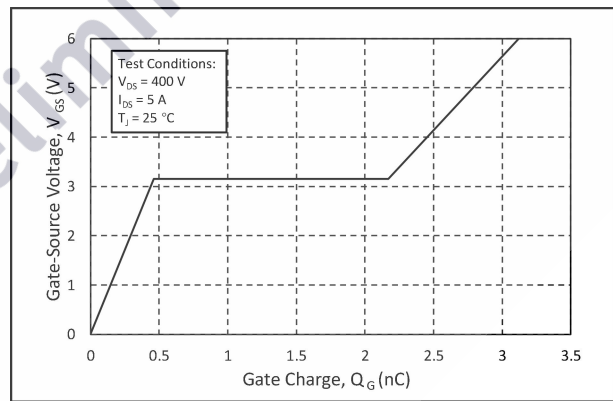


Fig.4 Gate Charge Characteristics

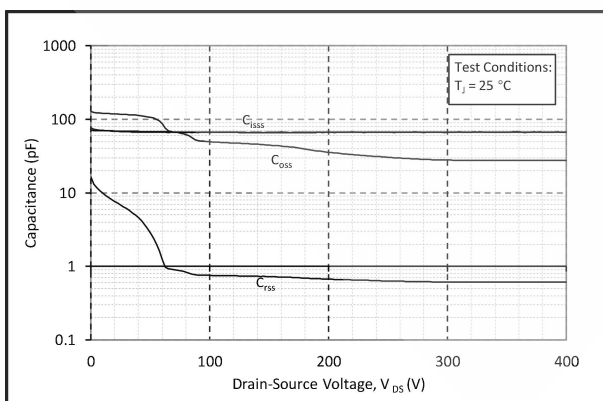


Fig.5 Capacitances vs. Drain-Source Voltage

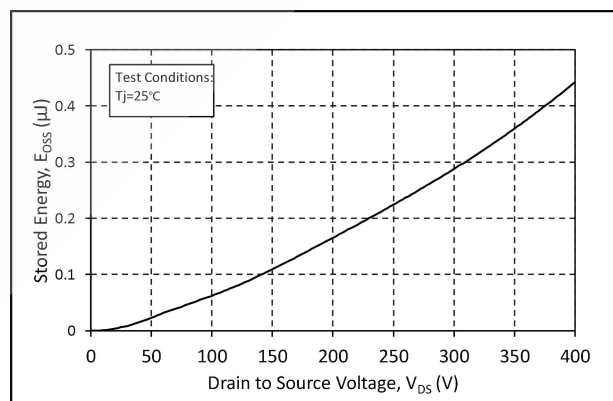


Fig.6 Output Capacitor Stored Energy

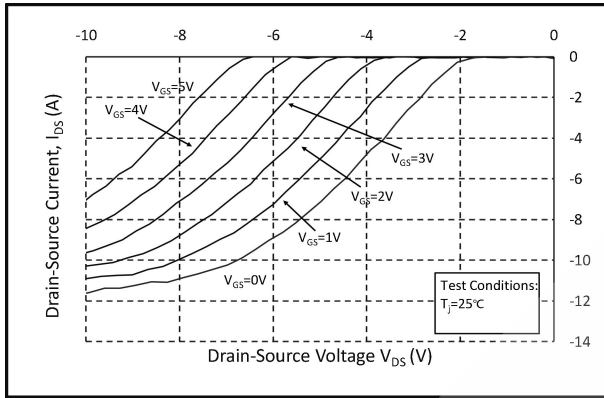


Fig.7 Reverse Conduction Characteristics

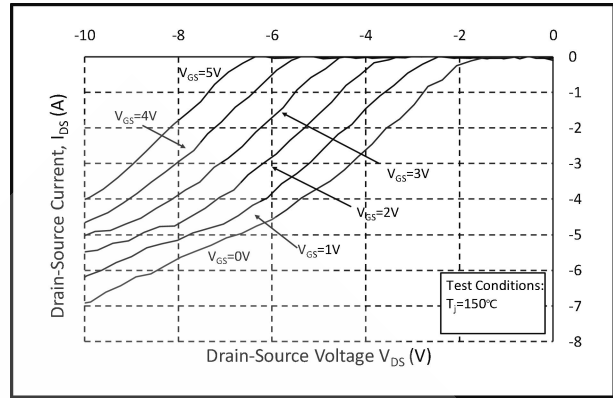


Fig.8 Reverse Conduction Characteristics

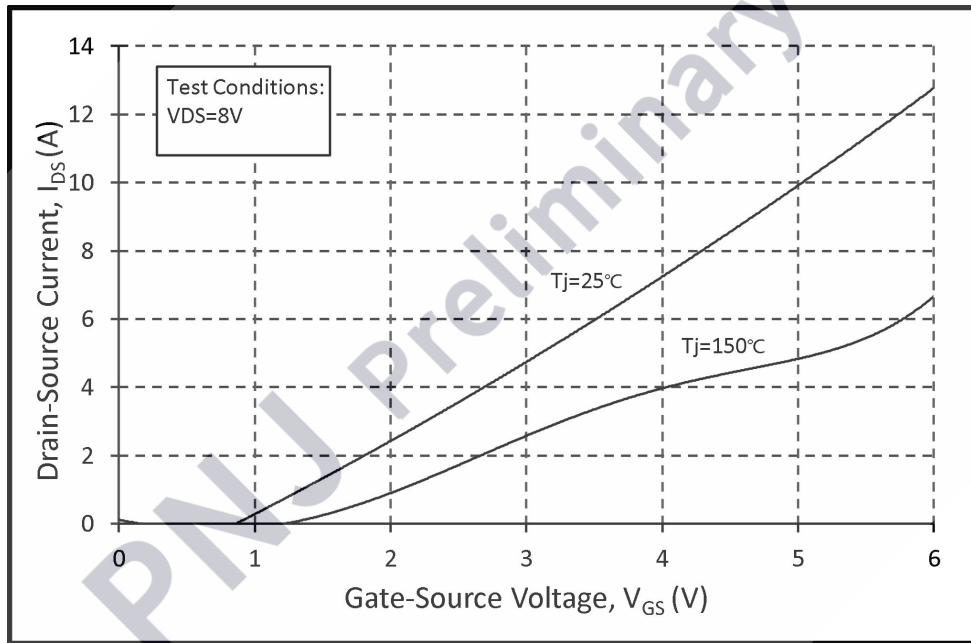


Fig.9 Transfer Characteristic for Various Junction Temperatures

