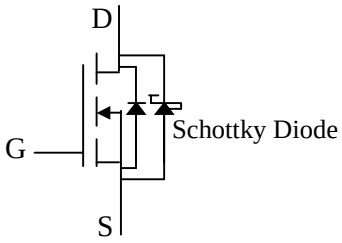
# AP4813GYT-HF

**Halogen-Free Product**

**Advanced Power Electronics Corp.**

*N-CHANNEL MOSFET WITH SCHOTTKY DIODE*

- ▼ **Simple Drive Requirement**
- ▼ **Good Recovery Time**
- ▼ **Small Size & Lower Profile**
- ▼ **RoHS Compliant & Halogen-Free**

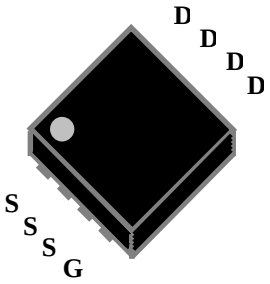



| | |
|---|---|
| $BV_{DSS}$ | 30V |
| $R_{DS(ON)}$ | 10mΩ |
| $I_D$ | 15A |

## Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The PMPAK® 3x3 package is special for DC-DC converters application and lower 1.0mm profile with backside heat sink.




**PMPAK® 3x3**

## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_A$=25℃ | Continuous Drain Current[3] | 15 | A |
| $I_D$@$T_A$=70℃ | Continuous Drain Current[3] | 12 | A |
| $I_{DM}$ | Pulsed Drain Current[1] | 60 | A |
| $V_{KA}$ | Schottky Reverse Voltage | 30 | V |
| $I_F$@$T_A$=25℃ | Continous Forward Current | 1 | A |
| $I_{FM}$ | Pulsed Diode Forward Current | 25 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation | 3.57 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| Rthj-c | Maximum Thermal Resistance, Junction-case | 5 | ℃/W |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient[3] | 35 | ℃/W |

## Electrical Characteristics@$T_j$=25°C(unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250uA | 30 | - | - | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V, $I_D$=12A | - | 7.7 | 10 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=8A | - | 12.3 | 15 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 1 | 1.4 | 3 | V |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=10V, $I_D$=8A | - | 19 | - | S |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=24V, $V_{GS}$=0V | - | - | 100 | uA |
| $I_{GSS}$ | Gate-Source Leakage | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| $Q_g$ | Total Gate Charge | $I_D$=8A | - | 13.5 | 22 | nC |
| $Q_{gs}$ | Gate-Source Charge | $V_{DS}$=15V | - | 3.5 | - | nC |
| $Q_{gd}$ | Gate-Drain ("Miller") Charge | $V_{GS}$=4.5V | - | 7.5 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}$=15V | - | 9 | - | ns |
| $t_r$ | Rise Time | $I_D$=1A | - | 7 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | $R_G$=3.3Ω | - | 27 | - | ns |
| $t_f$ | Fall Time | $V_{GS}$=10V | - | 10 | - | ns |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V | - | 1100 | 1760 | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$=15V | - | 220 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | f=1.0MHz | - | 170 | - | pF |
| $R_g$ | Gate Resistance | f=1.0MHz | - | 1.6 | 3.2 | Ω |

## Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode+Schottky Forward On Voltage[2] | $I_S$=1.0A, $V_{GS}$=0V | - | 0.48 | 0.5 | V |
| $t_{rr}$ | Body Diode+Schottky Reverse Recovery Time | $I_S$=8A, $V_{GS}$=0V, | - | 18 | - | ns |
| $Q_{rr}$ | Body Diode+Schottky Reverse Recovery Charge | dI/dt=100A/μs | - | 8 | - | nC |

### Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 $in^2$ copper pad of FR4 board, t ≤10sec, 85°C/W at steady state.

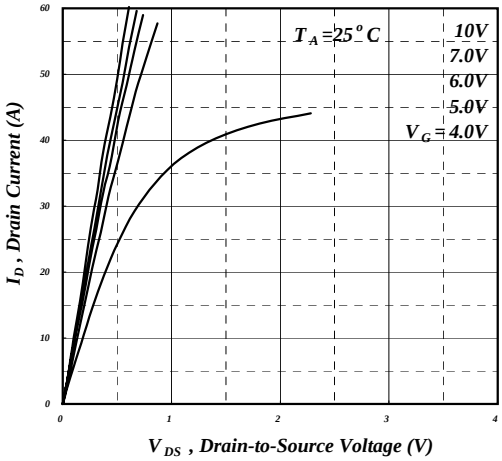



**Fig 1. Typical Output Characteristics**

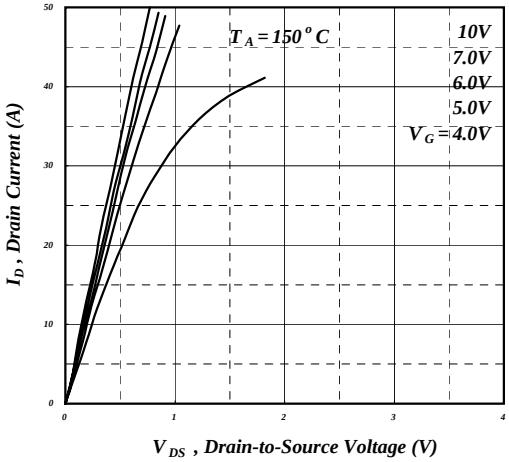



**Fig 2. Typical Output Characteristics**

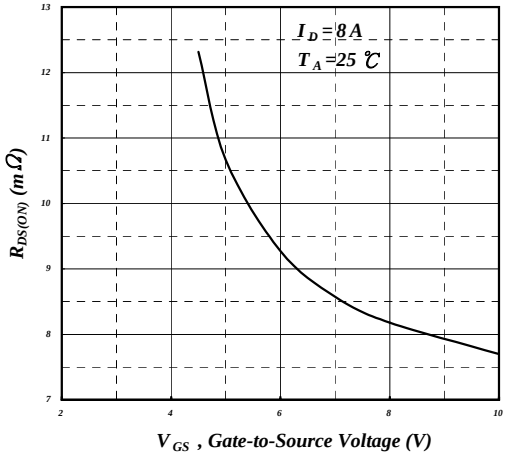



**Fig 3. On-Resistance v.s. Gate Voltage**

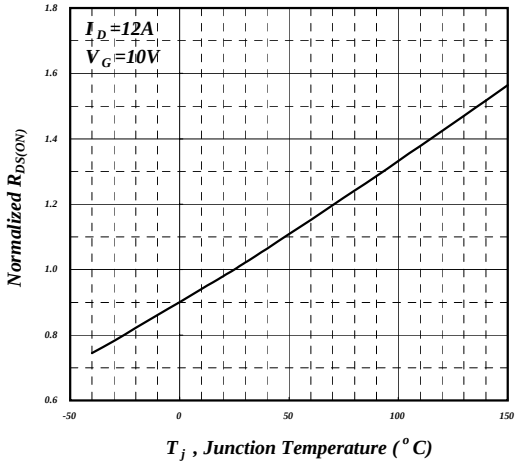



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

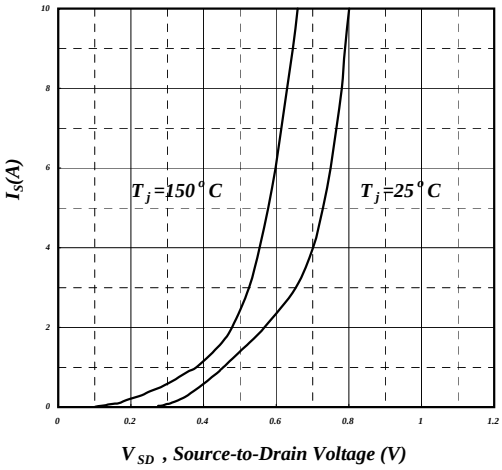



**Fig 5. Forward Characteristic of Reverse Diode**

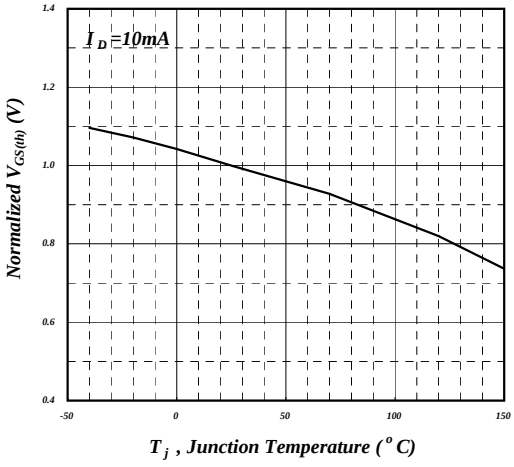



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

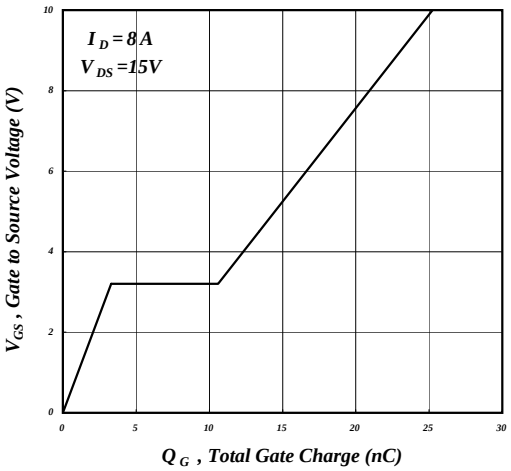



Fig 7. Gate Charge Characteristics

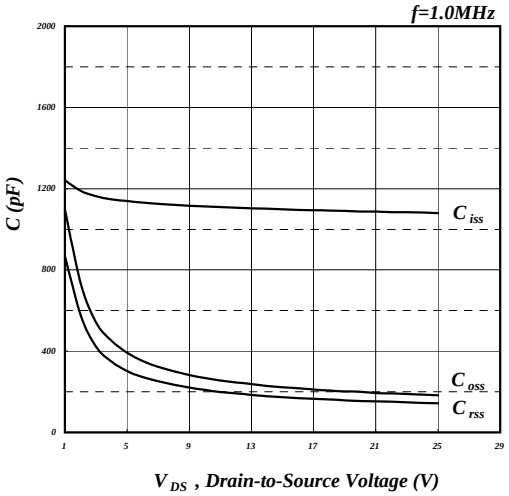



Fig 8. Typical Capacitance Characteristics

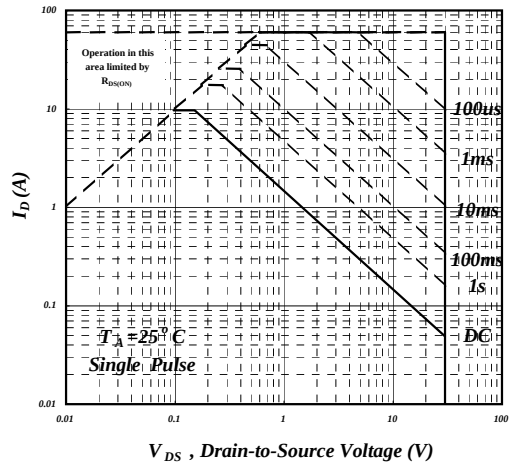



Fig 9. Maximum Safe Operating Area

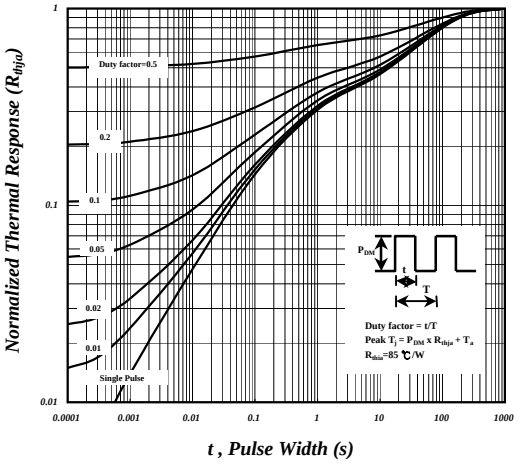



Fig 10. Effective Transient Thermal Impedance

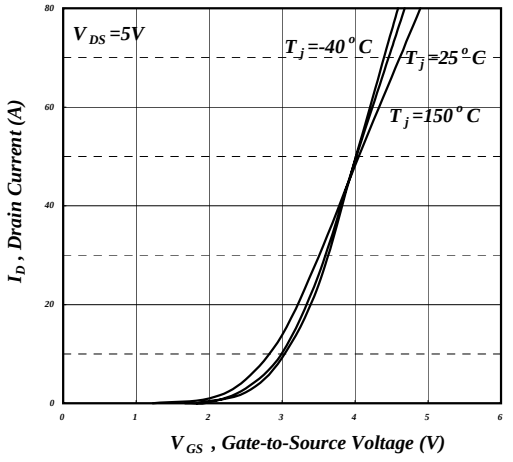



Fig 11. Transfer Characteristics

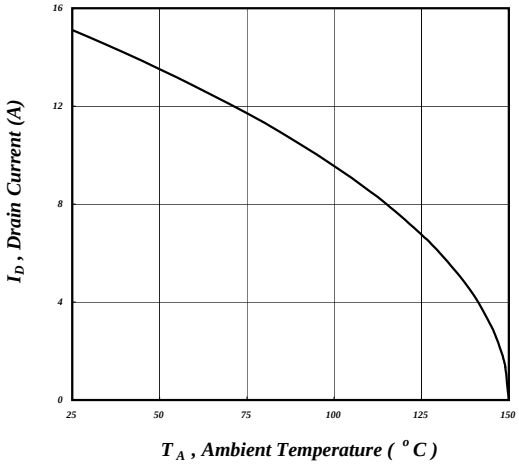



Fig 12. Maximum Continuous Drain Current v.s. Ambient Temperature