# FH18P04G

## P-Channel Enhancement Mode MOSFET

### General Description

The FH18P04G uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as -4.5V.This device is suitable for use as a widevariety of applications.

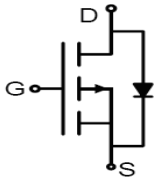
***100% UIS TESTED!***
***100% ΔVds TESTED!***

### Features

- VDS = -40V, ID = -80A
  $R_{DS(ON)}$ (Typ) :4.3 mΩ @ VGS = -10V
  $R_{DS(ON)}$ (Typ) :5.9 mΩ @ VGS = -4.5V
- High Power and current handing capability
- Lead free product is acquired

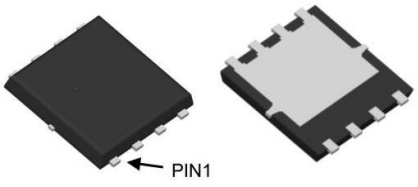
### Applications

- Load switch
- Power Management
- PWM Applications




Schematic Diagram


Marking and pin Assignment




PDFN5X6-8L top&bottom view

### Table 1. Absolute Maximum Ratings ($T_A$=25℃ unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage ($V_{GS}$=0V) | -40 | V |
| $V_{GS}$ | Gate-Source Voltage ($V_{DS}$=0V) | ±20 | V |
| $I_D$ | Drain Current-Continuous($T_C$=25℃) | -80 | A |
| | Drain Current-Continuous($T_C$=100℃) | -51 | A |
| $I_{DM\ (pluse)}$ | Drain Current-Continuous@ Current-Pulsed (Note 1) | -320 | A |
| $P_D$ | Maximum Power Dissipation($T_C$=25℃) | 58 | W |
| | Maximum Power Dissipation($T_C$=100℃) | 23 | W |
| $E_{AS}$ | Avalanche energy (Note 2) | 576 | mJ |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |

### Table 2. Thermal Characteristic

| Symbol | Parameter | Typ | Max | Unit |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | | 2.15 | ℃/W |

## Table 3. Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **On/Off States** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=-250μA | -40 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-40V, $V_{GS}$=0V | | | -1 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -1 | -1.7 | -2.5 | V |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=-5V, $I_D$=-20A | | 63 | | S |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=-10V, $I_D$=-20A | | 4.3 | 5.3 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-20A | | 5.9 | 7.6 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-20V, $V_{GS}$=0V, f=1.0MHz | | 6638 | | pF |
| $C_{oss}$ | Output Capacitance | | | 545 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 345 | | pF |
| Rg | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1.0MHz | | 2.2 | | Ω |
| **Switching Parameters** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS}$=-10V, $V_{DS}$=-20V, $R_L$=1Ω, $R_{GEN}$=3Ω | | 16 | | nS |
| $t_r$ | Turn-on Rise Time | | | 17 | | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 68 | | nS |
| $t_f$ | Turn-Off Fall Time | | | 31 | | nS |
| $Q_g$ | Total Gate Charge | $V_{GS}$=-10V, $V_{DS}$=-20V, $I_D$=-20A | | 118 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 13 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 22 | | nC |
| **Source-Drain Diode Characteristics** | | | | | | |
| $I_{SD}$ | Source-Drain Current (Body Diode) | | | | -80 | A |
| $V_{SD}$ | Forward on Voltage (Note 3) | $V_{GS}$=0V, $I_S$=-20A | | | -1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=-20A, di/dt=500A/μs | | 24 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $I_F$=-20A, di/dt=500A/μs | | 140 | | nC |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.$E_{AS}$ condition: $T_J$=25℃,$V_{DD}$=15V,$V_G$=-10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

## Typical Electrical And Thermal Characteristics (Curves)

**Figure 1. Output Characteristics**

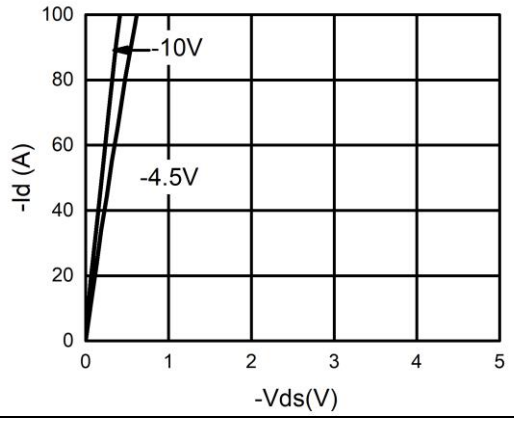



**Figure 2. Transfer Characteristics**

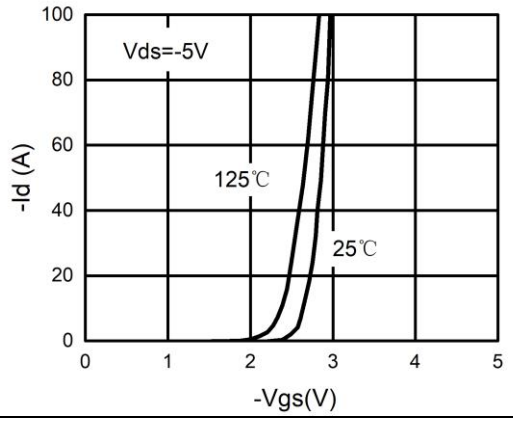



**Figure 3. Power Dissipation**

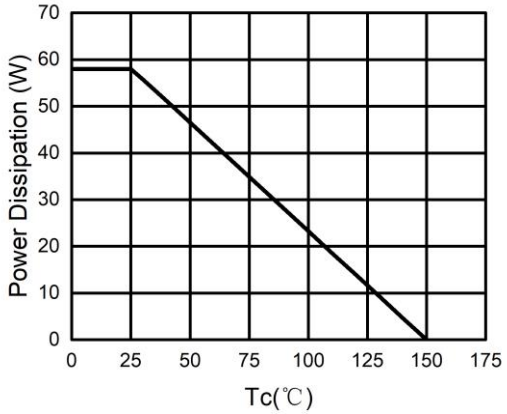



**Figure 4. Drain Current**

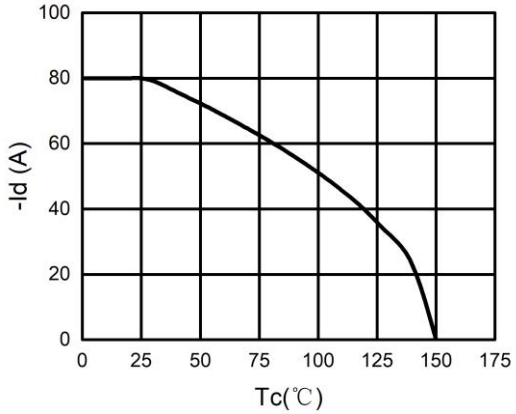



**Figure 5. $BV_{DSS}$ vs Junction Temperature**

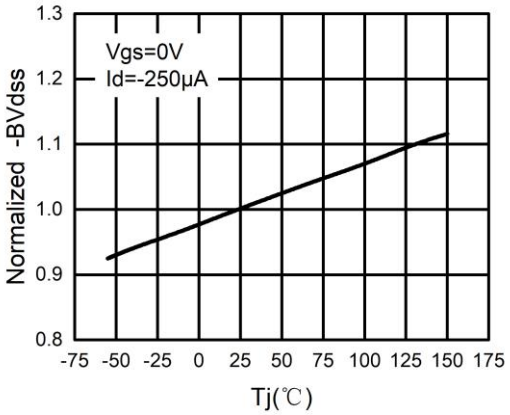



**Figure 6. $R_{DS(ON)}$ vs Junction Temperature**

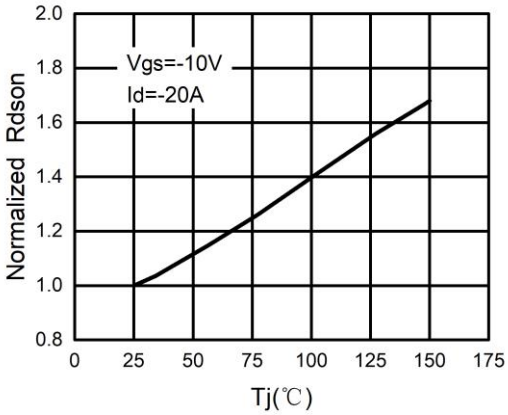


**Figure 7. Gate Charge Waveforms**

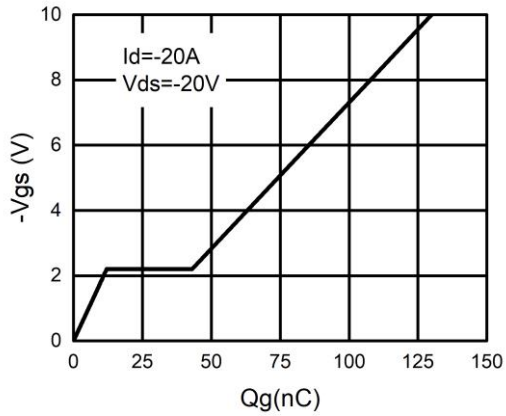



**Figure 8. Capacitance**

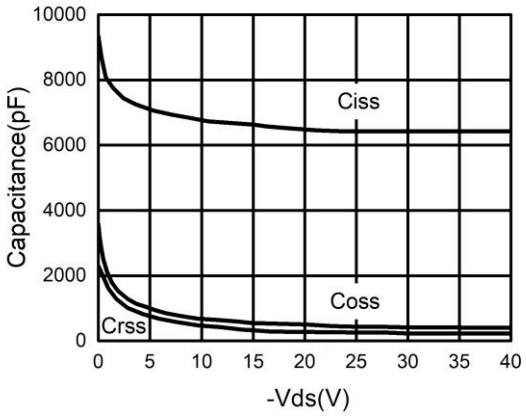



**Figure 9. Body-Diode Characteristics**

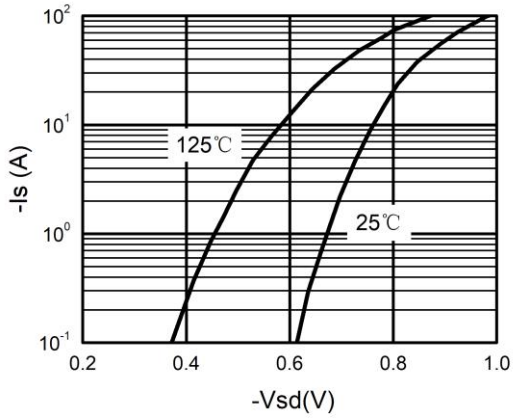
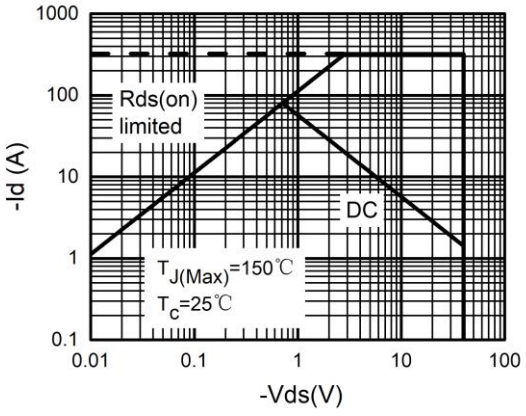
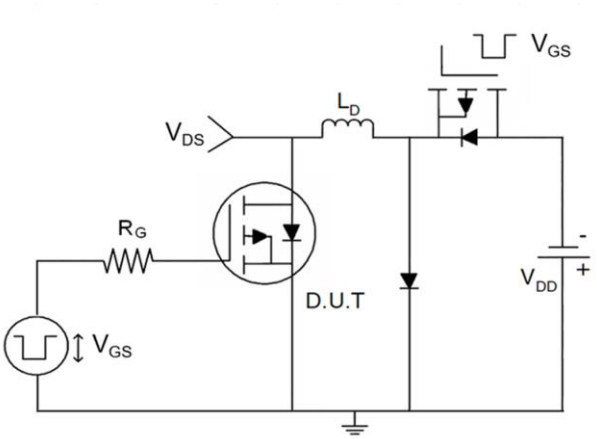


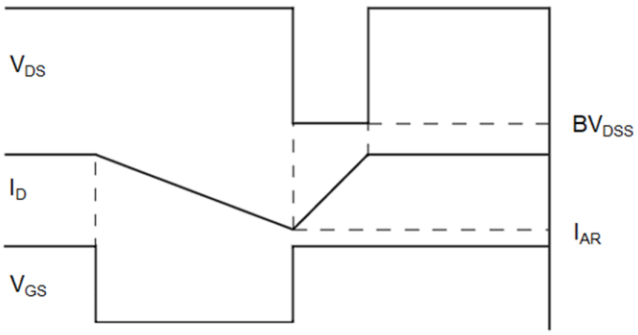

**Figure 10. Maximum Safe Operating Area**



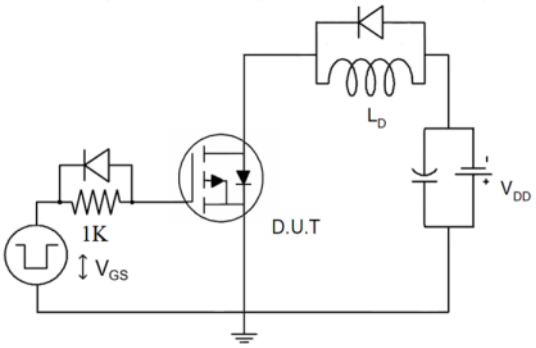
## Test Circuit

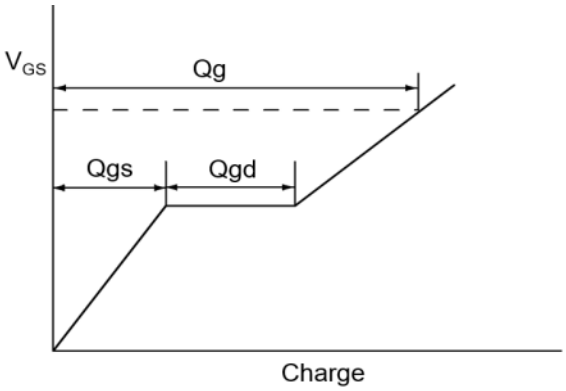
### 1) $E_{AS}$ Test Circuits



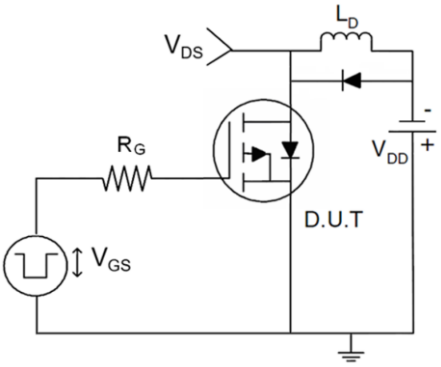



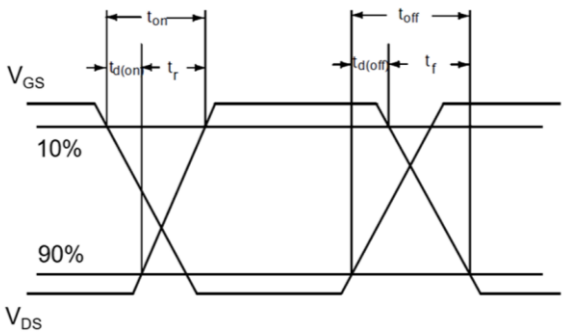

### 2) Gate Charge Test Circuit



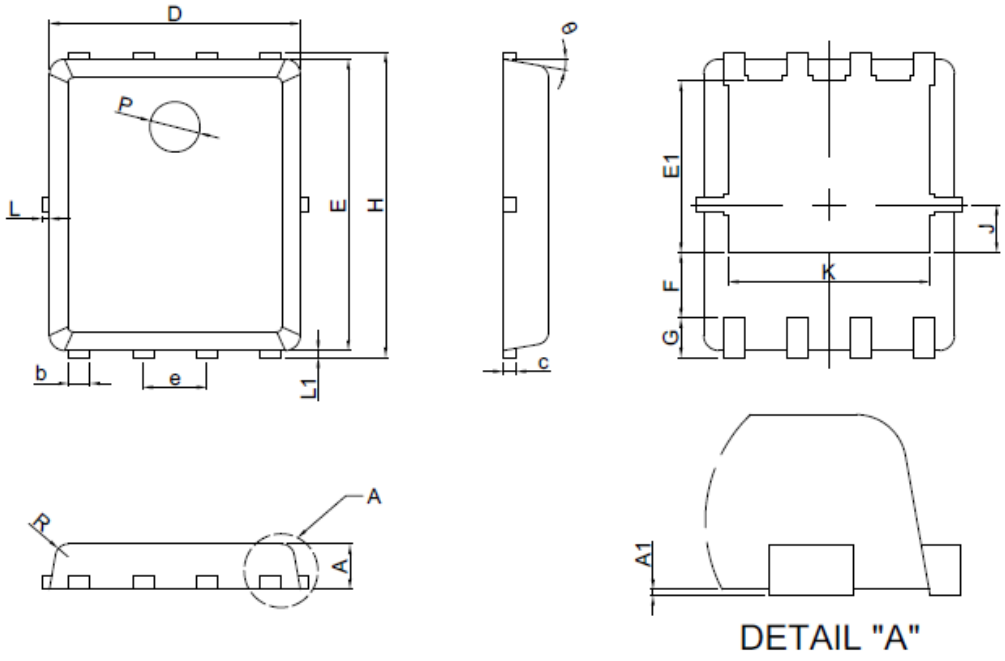




### 3) Switch Time Test Circuit



## Package Information ：PDFN5x6-8L




| Symbol | Dimensions In Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 0.80 | 1.00 |
| A1 | 0.00 | 0.05 |
| b | 0.35 | 0.49 |
| c | 0.254REF | |
| D | 4.80 | 5.20 |
| F | 1.40REF | |
| E | 5.60 | 5.90 |
| e | 1.27BSC | |
| H | 5.80 | 6.20 |
| L1 | 0.10 | 0.18 |
| G | 0.60REF | |
| K | 4.00REF | |
| L | - | 0.15 |
| J | 0.95BSC | |
| P | 1.00REF | |
| E1 | 3.40REF | |
| θ | 6° | 14° |
| R | 0.25REF | |