# FH3415S

## P-Channel Enhancement Mode MOSFET

## Description

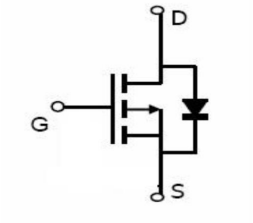
- Trench Power LV MOSFET technology
- High Power and Current handing capability
- Low Gate Charge

## Application

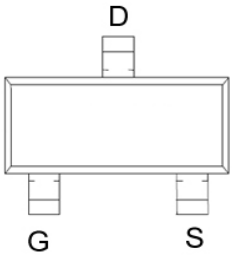
- PWM applications
- Power management
- Load switch

## General Features

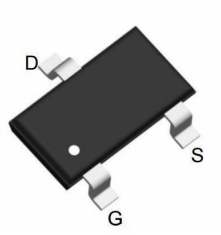
- $V_{DS}$ = -20V ; $I_D$ = -3.4A
- $R_{DS(ON)}$(Typ.)= 40 mΩ @$V_{GS}$ = -5V
- $R_{DS(ON)}$(Typ.)= 42 mΩ @$V_{GS}$ = -4.5V
- $R_{DS(ON)}$(Typ.)= 55 mΩ @$V_{GS}$ = -2.5V
- $R_{DS(ON)}$(Typ.)= 76 mΩ @$V_{GS}$ = -2.5V
- LogicLevelCompatible
- SMDPackage(SOT-23)
- TrenchTechnology
- FastSwitching




**Schematic diagram**




**Marking and Pin Assignment**




**SOT-23 top view**

## Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

| Parameter | | Symbol | Maximum | Unit |
|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | -20 | V |
| Gate-source Voltage | | $V_{GS}$ | ±10 | V |
| Drain Current | $T_A$=25℃ | $I_D$ | -3.4 | A |
| | $T_A$=70℃ | | -2.7 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | -14 | A |
| Total Power Dissipation @ $T_A$=25℃ | | $P_D$ | 1 | W |
| Thermal Resistance Junction-to-Ambient [B] | | $R_{\theta JA}$ | 125 | ℃/ W |
| Junction and Storage Temperature Range | | $T_J$ ,$T_{STG}$ | -55～+150 | ℃ |

## Electrical Characteristics (TA=25℃ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameter** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$=-250μA | -20 | -23 | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-20V,$V_{GS}$=0V,$T_C$=25℃ | | | -1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±10V, $V_{DS}$=0V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=-250μA | -0.4 | -0.62 | -1.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$= -5.0V, $I_D$=-2A | | 40 | 49 | mΩ |
| | | $V_{GS}$= -4.5V, $I_D$=-3.4A | | 42 | 51 | |
| | | $V_{GS}$= -2.5V, $I_D$=-2A | | 55 | 67 | |
| | | $V_{GS}$= -1.8V, $I_D$=-2A | | 76 | 91 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-3.4A,$V_{GS}$=0V | | -0.8 | -1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | -3.4 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-10V,$V_{GS}$=0V,f=1MHZ | | 550 | | pF |
| Output Capacitance | $C_{oss}$ | | | 89 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 65 | | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=-4.5V,$V_{DS}$=-10V,$I_D$=-3.4A | | 4.3 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 0.8 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 1.1 | | |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=-4.5V,$V_{DD}$=-10V, $I_D$=-1A, $R_{GEN}$=2.5Ω | | 12 | | ns |
| Turn-on Rise Time | $t_r$ | | | 54 | | |
| Turn-off Delay Time | $t_{D(off)}$ | | | 15 | | |
| Turn-off Fall Time | $t_f$ | | | 9 | | |

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.
B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Performance Characteristics

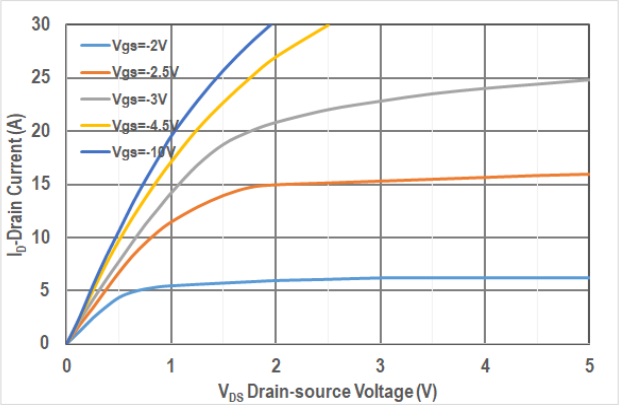



Figure1. Output Characteristics

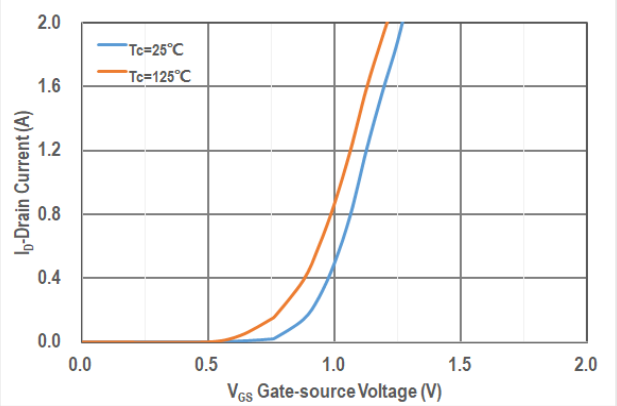



Figure2. Transfer Characteristics

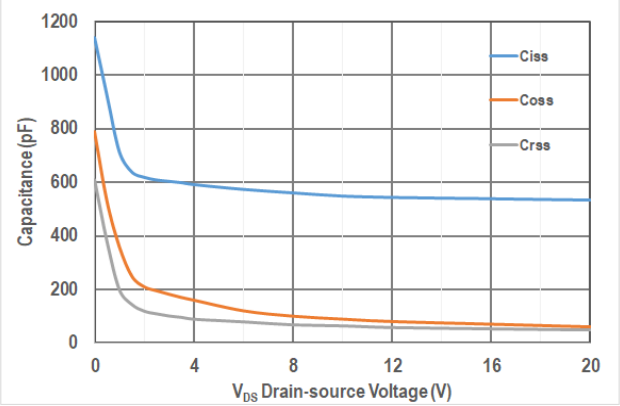



Figure3. Capacitance Characteristics

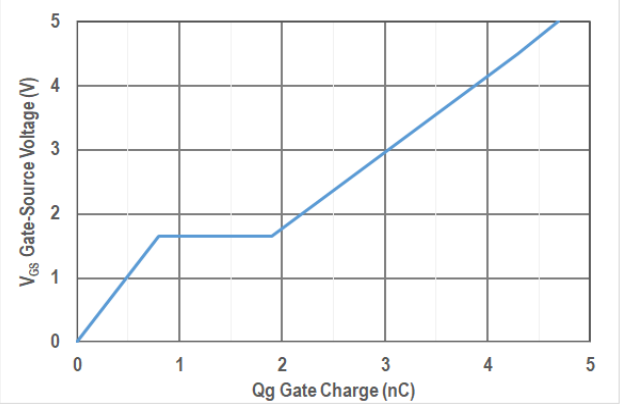



Figure4. Gate Charge

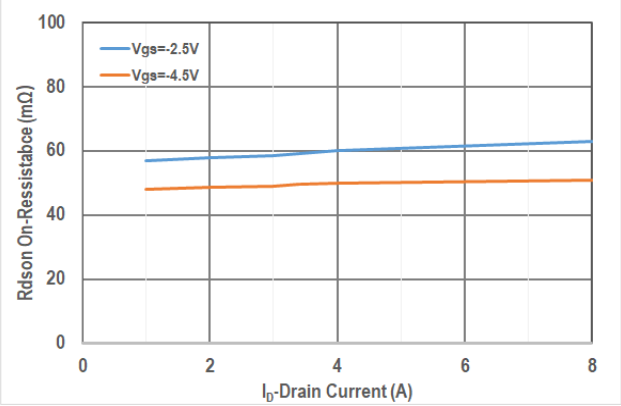



Figure5. Drain-Source on Resistance

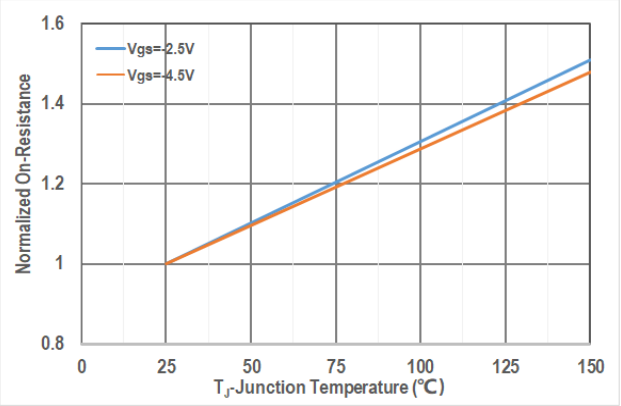



Figure6. Drain-Source on Resistance

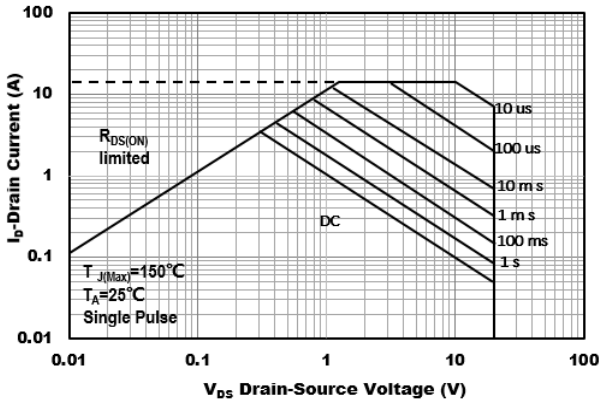



Figure7. Safe Operation Area

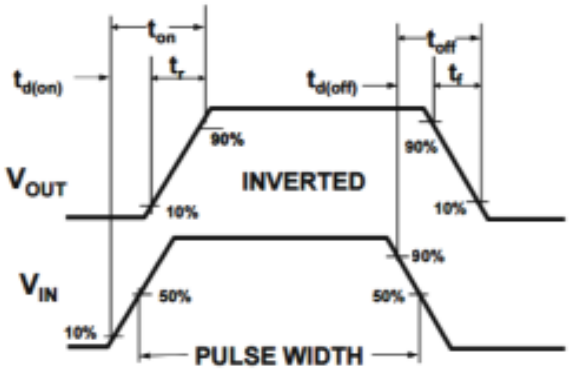
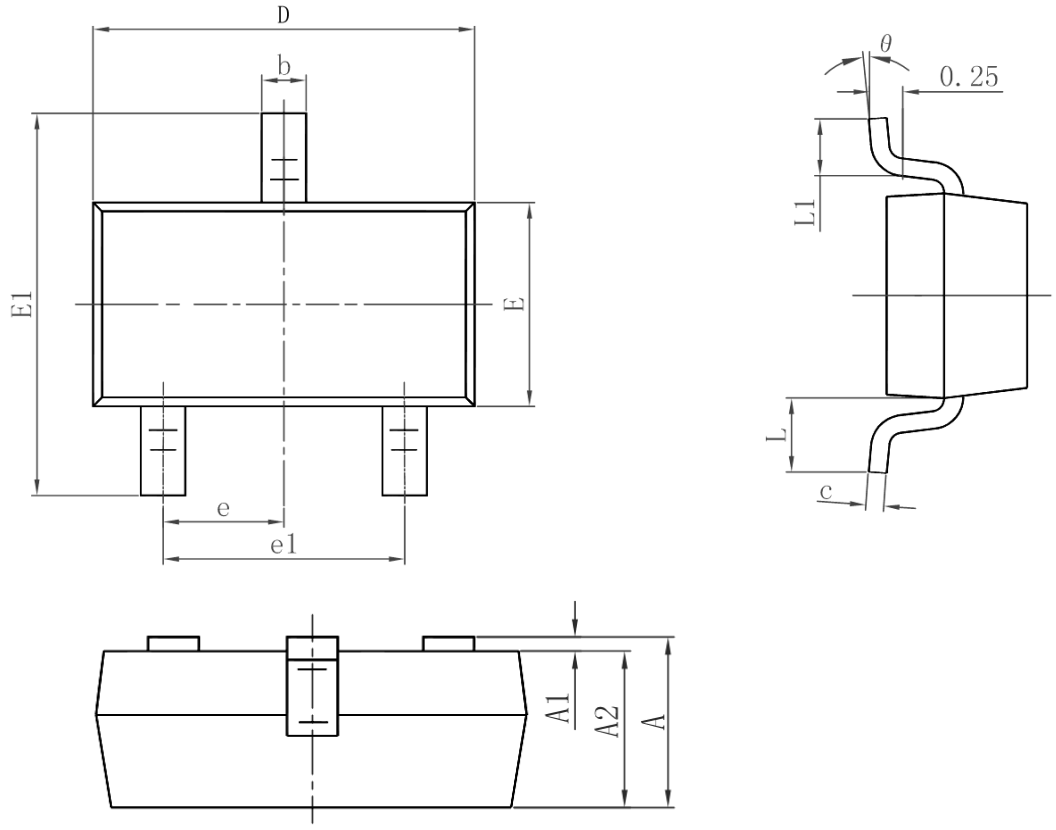



Figure8. Switching wave

## Package Information : SOT-23




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |