

FH3415N

P-Channel Enhancement Mode MOSFET

Description

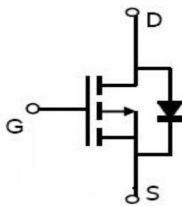
- ◆ Trench Power LV MOSFET technology
- ◆ High Power and Current handling capability
- ◆ Low Gate Charge

Application

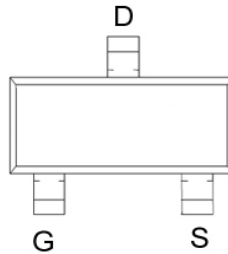
- ◆ PWM applications
- ◆ Power management
- ◆ Load switch

General Features

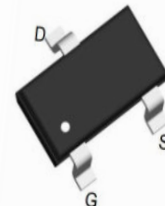
- ◆ $V_{DS} = -20V ; I_D = -3.2A$
- ◆ $R_{DS(ON)}(Typ.) = 52 m\Omega$ @ $V_{GS} = -5V$
- ◆ $R_{DS(ON)}(Typ.) = 55 m\Omega$ @ $V_{GS} = -4.5V$
- ◆ $R_{DS(ON)}(Typ.) = 69 m\Omega$ @ $V_{GS} = -2.5V$
- ◆ LogicLevelCompatible
- ◆ SMDPackage(SOT-23)
- ◆ TrenchTechnology
- ◆ FastSwitching



Schematic diagram



Marking and Pin Assignment



SOT-23 top view

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Maximum | Unit |
|---|-----------------|------------------|----------------|
| Drain-source Voltage | V_{DS} | -20 | V |
| Gate-source Voltage | V_{GS} | ± 12 | V |
| Drain Current | I_D | $T_A=25^\circ C$ | -3.2 |
| | | $T_A=70^\circ C$ | -2.55 |
| Pulsed Drain Current ^A | I_{DM} | -12.8 | A |
| Total Power Dissipation @ $T_A=25^\circ C$ | P_D | 1 | W |
| Thermal Resistance Junction-to-Ambient ^B | $R_{\theta JA}$ | 134 | $^\circ C / W$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | $^\circ C$ |

Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|--------------|---|------|-------|-----------|------------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -20 | -22 | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-20V, V_{GS}=0V, T_C=25^\circ C$ | | | -1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 12V, V_{DS}=0V$ | | | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.4 | -0.65 | -1.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=-5.0V, I_D=-1A$ | | 52 | 67 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-3A$ | | 55 | 69 | |
| | | $V_{GS}=-2.5V, I_D=-2A$ | | 69 | 88 | |
| Diode Forward Voltage | V_{SD} | $I_S=-3A, V_{GS}=0V$ | | -0.8 | -1.2 | V |
| Maximum Body-Diode Continuous Current | I_S | | | | -3.2 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-10V, V_{GS}=0V, f=1MHz$ | | 512 | | pF |
| Output Capacitance | C_{oss} | | | 82 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 57 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q_g | $V_{GS}=-4.5V, V_{DS}=-10V, I_D=-3.2A$ | | 4.0 | | nC |
| Gate Source Charge | Q_{gs} | | | 0.8 | | |
| Gate Drain Charge | Q_{gd} | | | 1.1 | | |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}=-4.5V, V_{DD}=-10V, I_D=-1A, R_{GEN}=2.5\Omega$ | | 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 $\leq 300\mu s$, Duty cycle $\leq 2\%$.
 B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Performance Characteristics

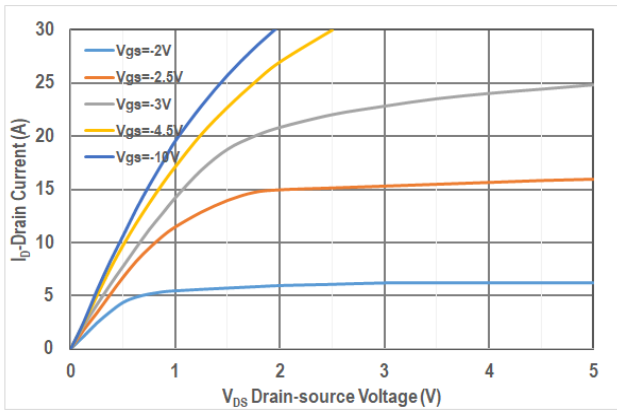


Figure1. Output Characteristics

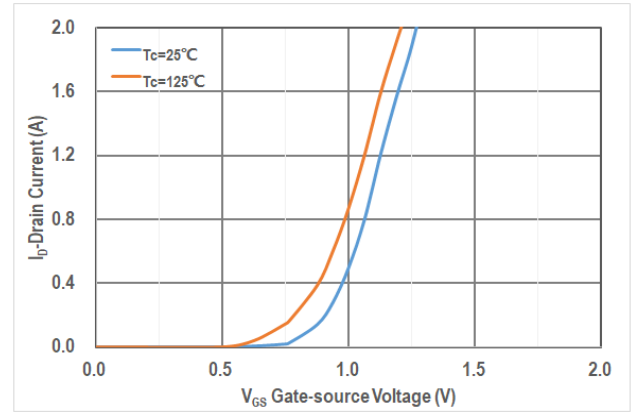


Figure2. Transfer Characteristics

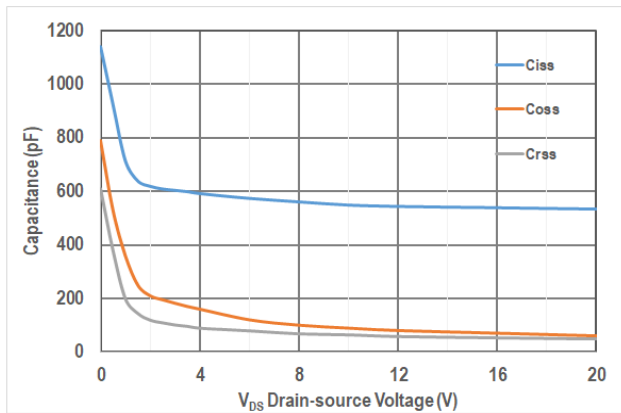


Figure3. Capacitance Characteristics

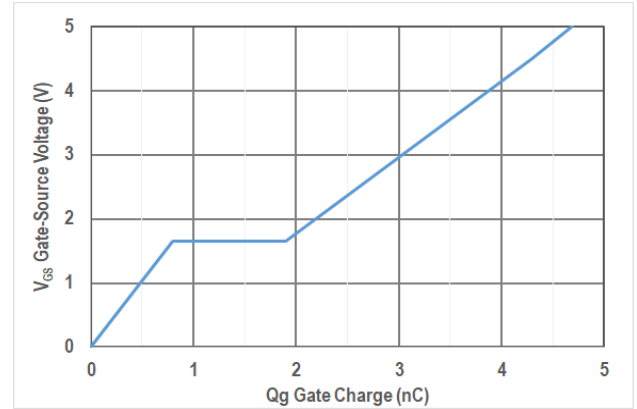


Figure4. Gate Charge

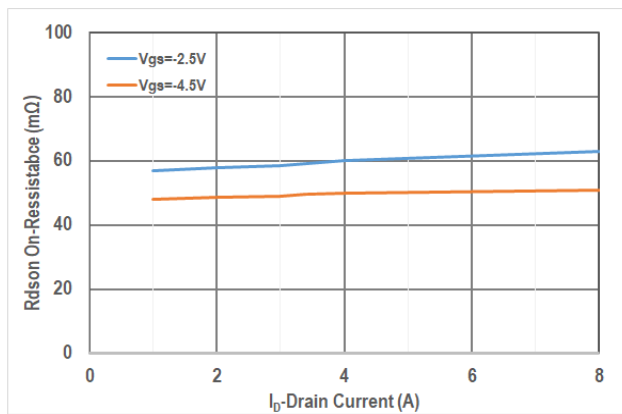


Figure5. Drain-Source on Resistance

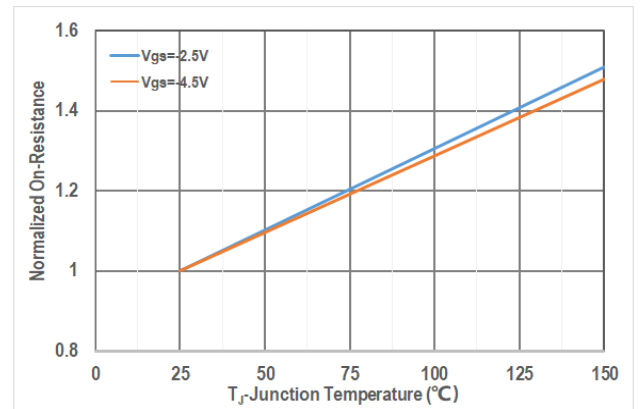


Figure6. Drain-Source on Resistance

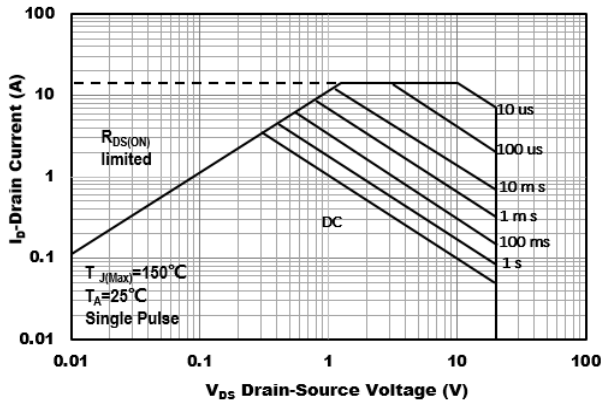


Figure7. Safe Operation Area

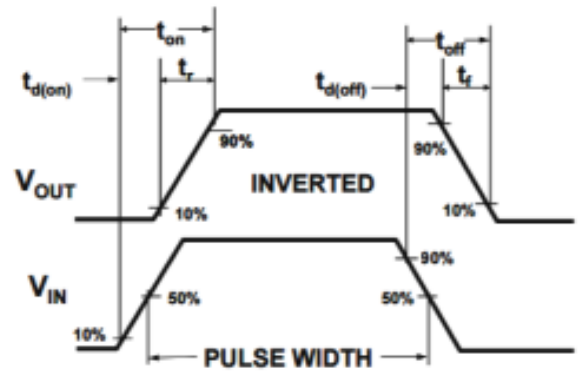
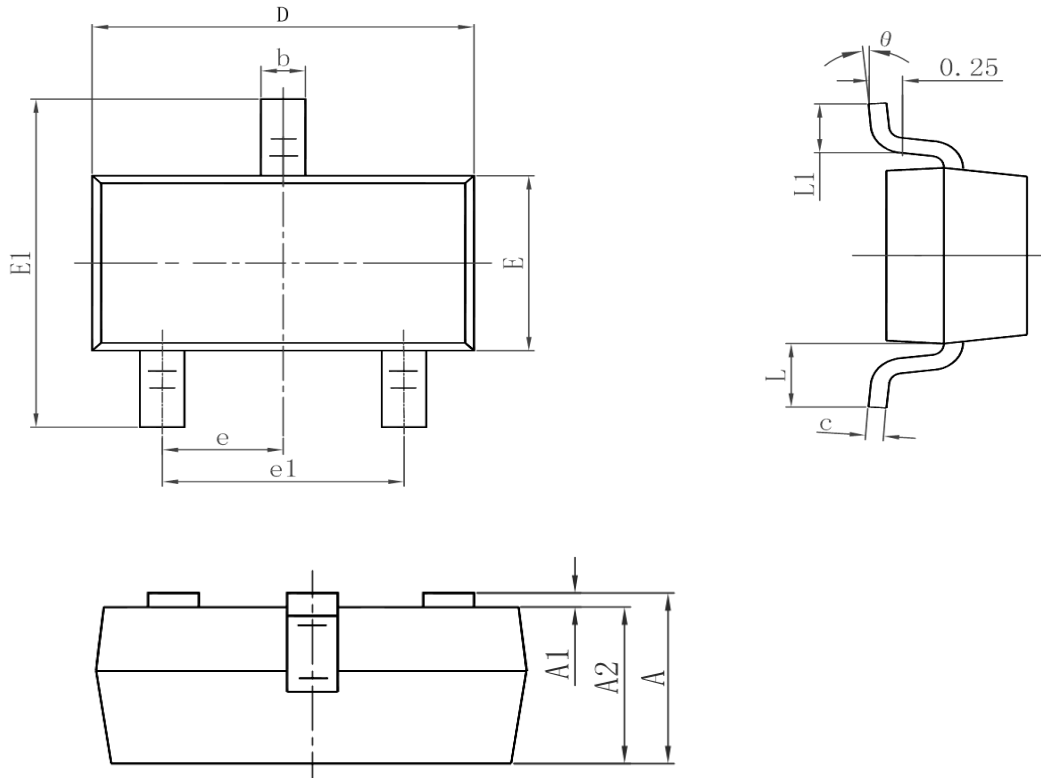


Figure8. Switching wave

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° |