

# FH3415J

## P-Channel Enhancement Mode MOSFET

### Description

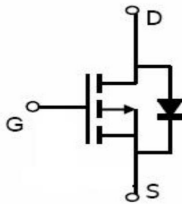
- ◆ Trench Power LV MOSFET technology
- ◆ High Power and Current handling capability
- ◆ Low Gate Charge

### Application

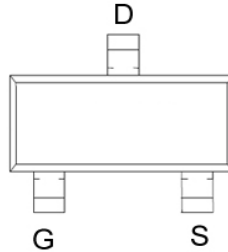
- ◆ PWM applications
- ◆ Power management
- ◆ Load switch

### General Features

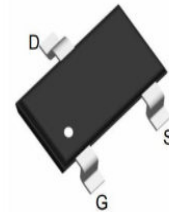
- ◆  $V_{DS} = -20V ; I_D = -3.1A$
- ◆  $R_{DS(ON)}(Typ.) = 55 m\Omega$  @  $V_{GS} = -5V$
- ◆  $R_{DS(ON)}(Typ.) = 60 m\Omega$  @  $V_{GS} = -4.5V$
- ◆  $R_{DS(ON)}(Typ.) = 77 m\Omega$  @  $V_{GS} = -2.5V$
- ◆ LogicLevelCompatible
- ◆ SMDPackage(SOT-23)
- ◆ TrenchTechnology
- ◆ FastSwitching



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	$V_{GS}$	$\pm 12$	V	
Drain Current	$I_D$	$T_A=25^\circ C$	-3.1	A
		$T_A=70^\circ C$	-2.5	
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	-12.5	A	
Total Power Dissipation @ $T_A=25^\circ C$	$P_D$	1	W	
Thermal Resistance Junction-to-Ambient <sup>B</sup>	$R_{\theta JA}$	138	$^\circ C / W$	
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
<b>Static Parameter</b>						
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	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 100$	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	$R_{DS(on)}$	$V_{GS}=-5.0V, I_D=-1A$		55	77	m $\Omega$
		$V_{GS}=-4.5V, I_D=-3A$		60	80	
		$V_{GS}=-2.5V, I_D=-2A$		77	105	
Diode Forward Voltage	$V_{SD}$	$I_S=-3A, V_{GS}=0V$		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	$I_S$				-3.1	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		497		pF
Output Capacitance	$C_{oss}$			81		
Reverse Transfer Capacitance	$C_{rss}$			55		
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=-4.5V, V_{DS}=-10V, I_D=-3.1A$		3.9		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

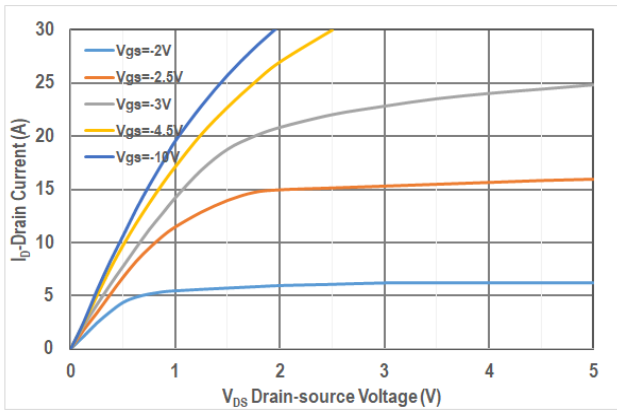


Figure1. Output Characteristics

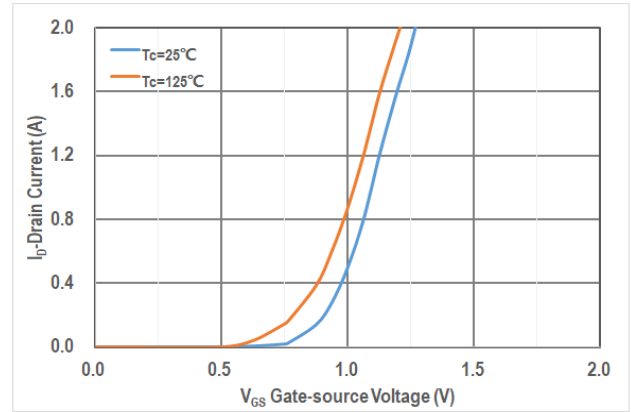


Figure2. Transfer Characteristics

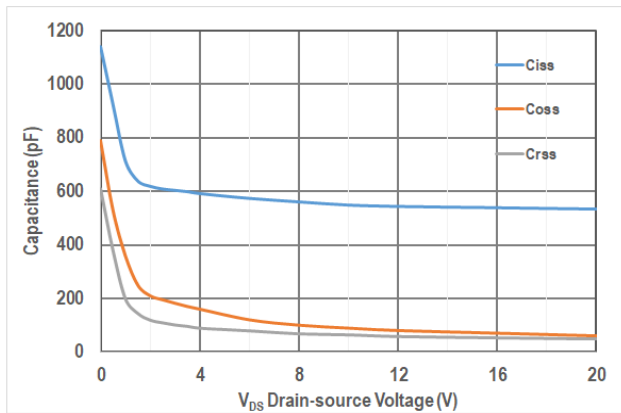


Figure3. Capacitance Characteristics

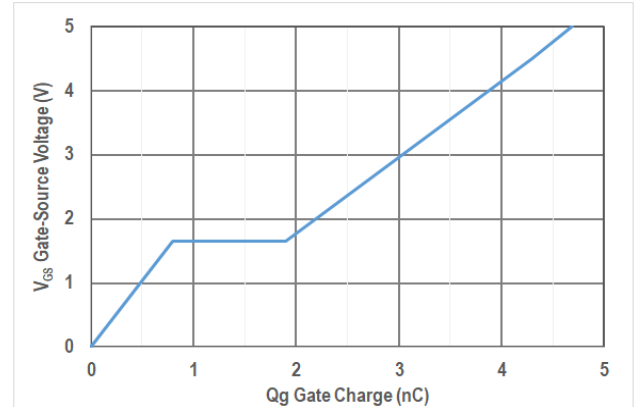


Figure4. Gate Charge

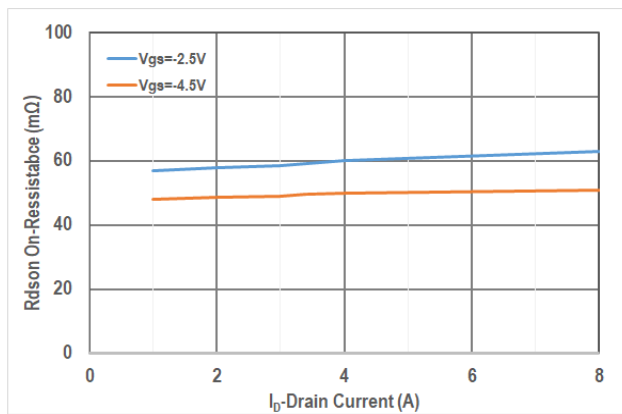


Figure5. Drain-Source on Resistance

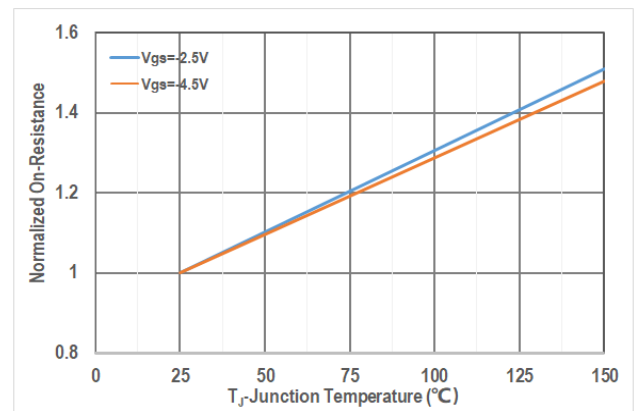


Figure6. Drain-Source on Resistance

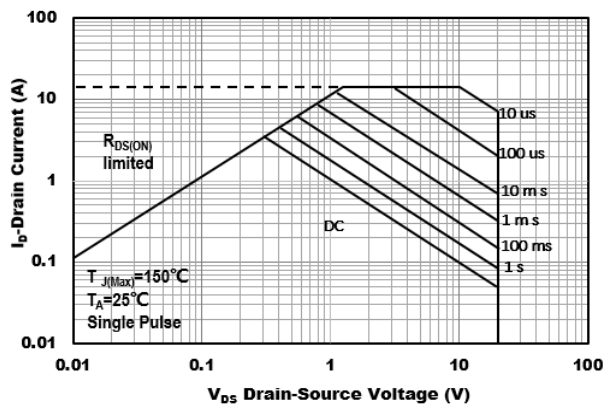


Figure7. Safe Operation Area

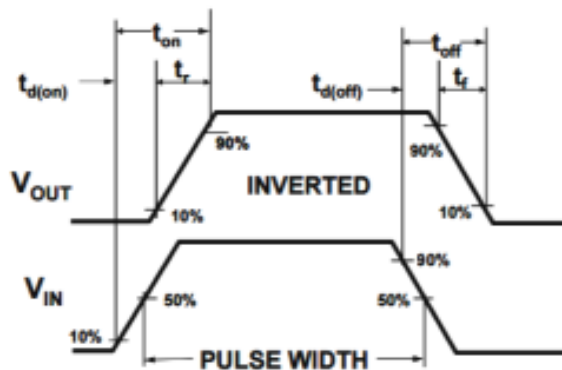
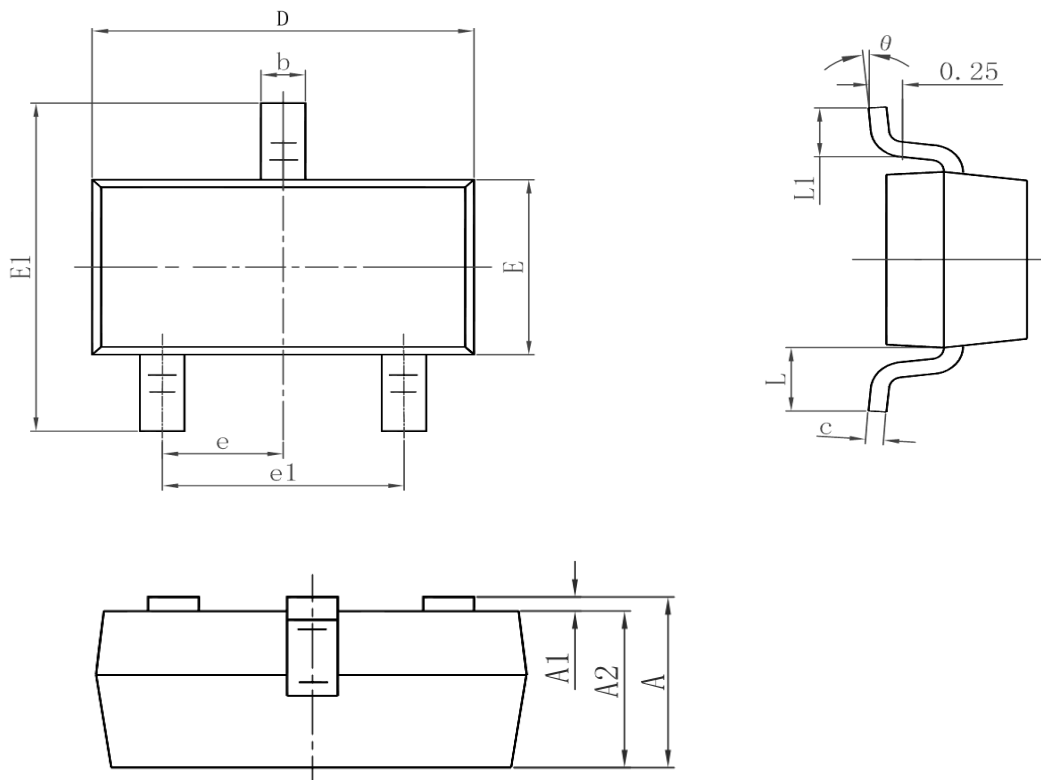


Figure8. Switching wave

## 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
$\theta$	0°	8°	0°	8°