



# FH3019P

## P-Channel Enhancement Mode Power MOSFET

### Description

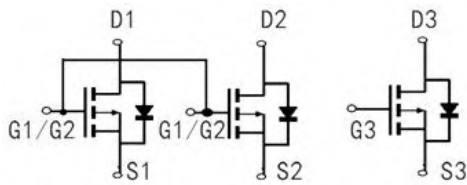
- ◆ Trench Power LV MOSFET technology
- ◆ High Power and Current handing capability
- ◆ Low Gate Charge

### Application

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

### General Features

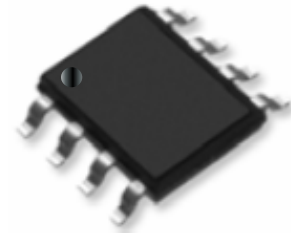
- ◆  $V_{DS} = -20V ; I_D = -5.0A$
- ◆  $R_{DS(ON)}(Typ.) = 45 m\Omega @ V_{GS} = -5V$
- ◆  $R_{DS(ON)}(Typ.) = 46 m\Omega @ V_{GS} = -4.5V$
- ◆  $R_{DS(ON)}(Typ.) = 60 m\Omega @ V_{GS} = -2.5V$
- ◆ LogicLevelCompatible
- ◆ SMDPackage ( SO-8 )
- ◆ TrenchTechnology
- ◆ FastSwitching



Schematic diagram



Marking and Pin Assignment



SO-8 top view

### Absolute Maximum Ratings (TA=25°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	$I_D$	$T_A=25^\circ C$	-5.0
		$T_A=70^\circ C$	-3.9
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	-20	A
Total Power Dissipation @ $T_A=25^\circ C$	$P_D$	2.5	W
Thermal Resistance Junction-to-Ambient <sup>B</sup>	$R_{\theta JA}$	94	$^\circ C / W$
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	-23		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	$R_{DS(on)}$	$V_{GS}=-5.0V, I_D=-1A$		45	58	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$		46	59	
		$V_{GS}=-2.5V, I_D=-2A$		60	78	
Diode Forward Voltage	$V_{SD}$	$I_S=-3A, V_{GS}=0V$		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	$I_S$				-5.0	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		534		pF
Output Capacitance	$C_{oss}$			84		
Reverse Transfer Capacitance	$C_{rss}$			59		
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=-4.5V, V_{DS}=-10V, I_D=-4.0A$		4.1		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

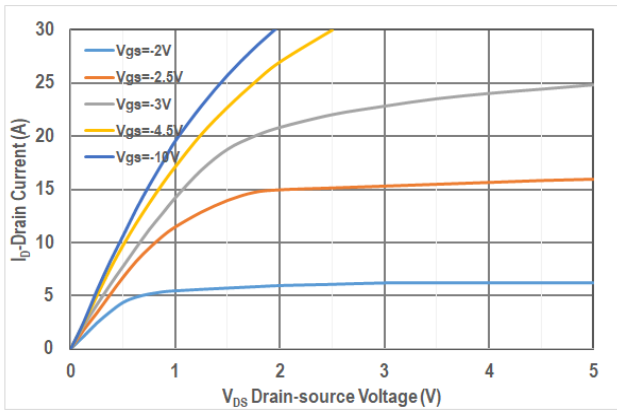


Figure1. Output Characteristics

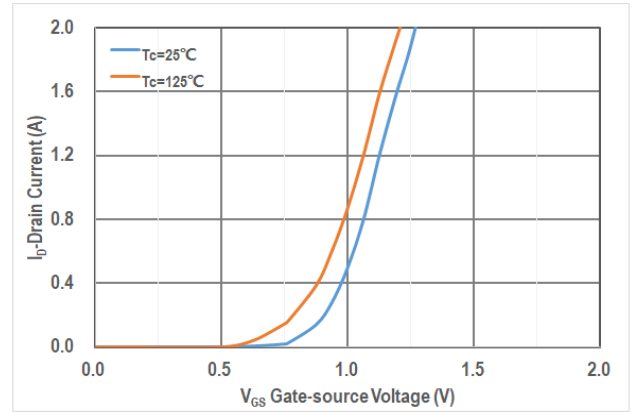


Figure2. Transfer Characteristics

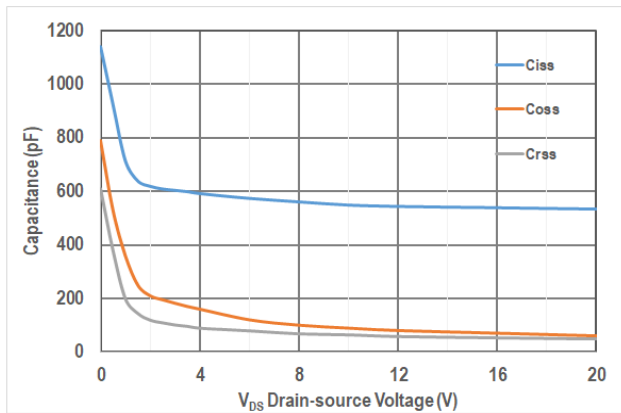


Figure3. Capacitance Characteristics

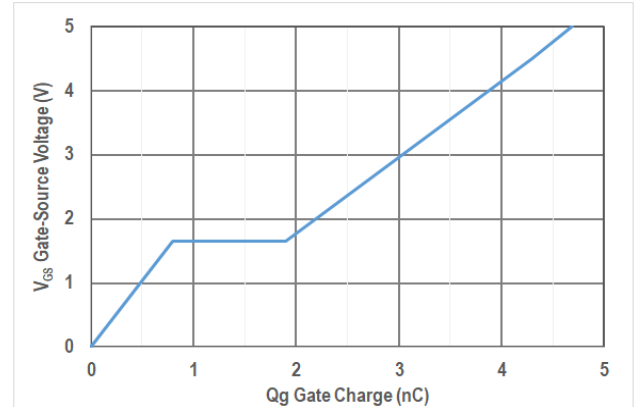


Figure4. Gate Charge

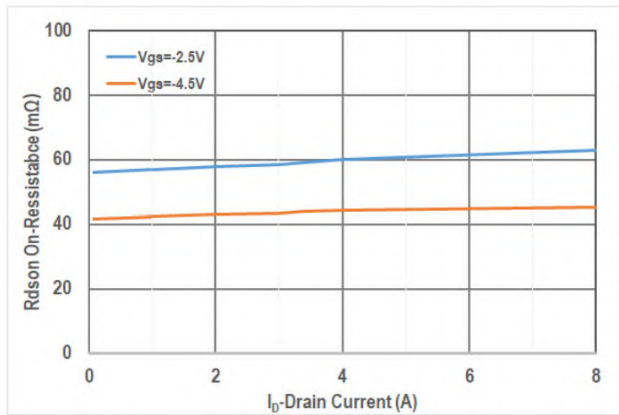


Figure5. Drain-Source on Resistance

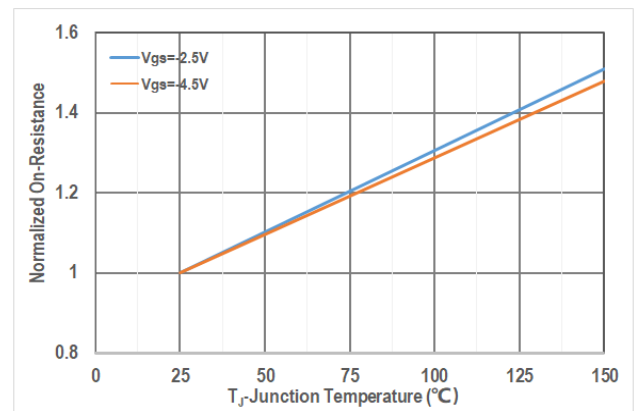


Figure6. Drain-Source on Resistance

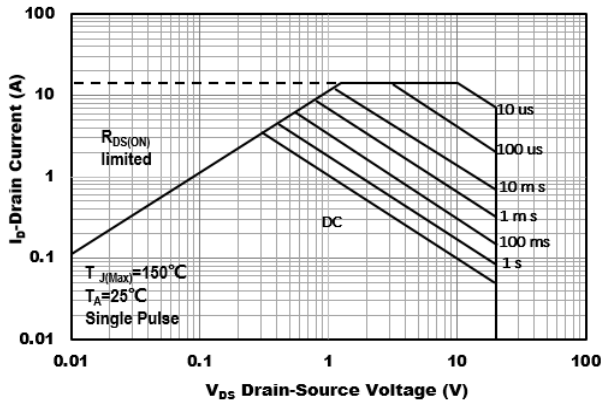


Figure7. Safe Operation Area

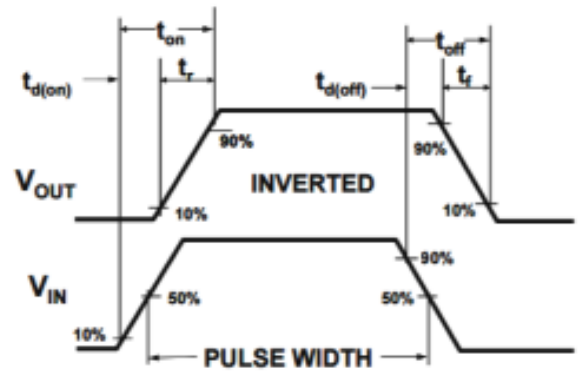
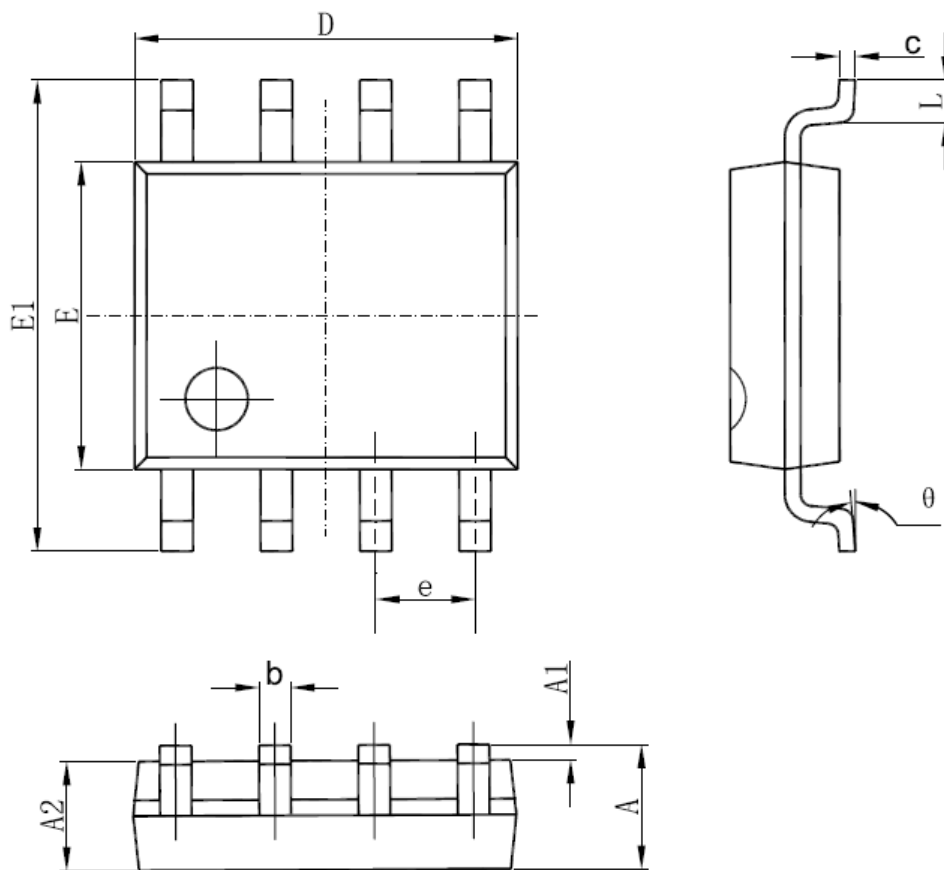


Figure8. Switching wave

## ■ Package Dimensions : SO-8



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069	E	3.800	4.000	0.150	0.157
A1	0.100	0.250	0.004	0.010	E1	5.800	6.200	0.228	0.244
A2	1.350	1.550	0.053	0.061	e	1.270 (BSC)		0.050 (BSC)	
b	0.330	0.510	0.013	0.020	L	0.400	1.270	0.016	0.050
c	0.170	0.250	0.006	0.010	$\theta$	0°	8°	0°	8°
D	4.700	5.100	0.185	0.200					