

FH8812A

N-Channel Enhancement Mode MOSFET

Description

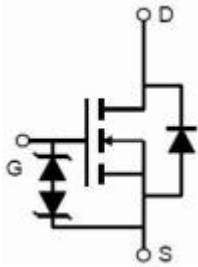
The FH8812A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and high density cell Design for ultra low on resistance. This device is suitable for use as a load switch or in PWM applications.

Application

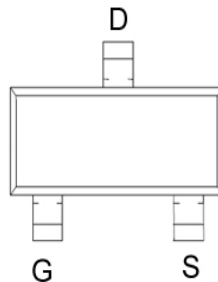
- ◆ PWM applications
- ◆ Load switch

General Features

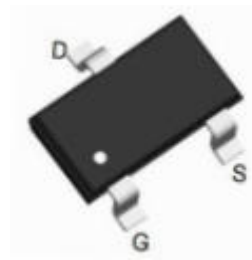
- ◆ $V_{DS} = 20V$, $I_D = 8.2A$
 - $R_{DS(ON)}$ (Typ.)=9.4 m Ω @ $V_{GS} = 4.5V$
 - $R_{DS(ON)}$ (Typ.)=10 m Ω @ $V_{GS} = 3.8V$
 - $R_{DS(ON)}$ (Typ.)=11 m Ω @ $V_{GS} = 3.1V$
 - $R_{DS(ON)}$ (Typ.)=12 m Ω @ $V_{GS} = 2.5V$
- ◆ High power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface mount package
- ◆ Fast Switching
- ◆ ESD Rating : 2000V HBM



Schematic diagram



Marking and Pin Assignment



SOT-23-3L top view

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

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	8.2	A
Pulsed Drain Current (Note 3)	I_{DM}	33	A
Drain-source Diode forward current (Note 1)	I_S	3	A
Maximum power dissipation	P_D	1.25	W
Operating junction Temperature range	T_j	-55 – 150	$^\circ C$

Thermal Characteristics

Thermal Resistance junction-to ambient (Note 3)	$R_{th JA}$	100	$^\circ C/W$
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■ **Electrical Characteristics** ($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.4	0.7	1.0	V
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 12V$			± 10	μA
Gate-Body Leakage Current 1	I_{GSS1}	$V_{DS} = 0V, V_{GS} = \pm 8V$			± 2	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 18V, V_{GS} = 0V$			1	μA
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 5.0A$		9.4	12	m Ω
		$V_{GS} = 3.8V, I_D = 4.0A$		10	12.5	
		$V_{GS} = 3.1V, I_D = 4.0A$		11	13.5	
		$V_{GS} = 2.5V, I_D = 3.0A$		12	15	
Forward Transconductance	g_{FS}	$V_{DS} = 5V, I_D = 5.0A$		10		S
Diode Forward Voltage (Note 2)	V_{SD}	$V_{GS} = 0V, I_S = 3A$			1.2	V
Diode Forward Current (Note 1)	I_S				3	A
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 3A$		13.0		nC
Gate-Source Charge	Q_{gs}			1.5		
Gate-Drain Charge	Q_{gd}			17		
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$		1180		pF
Output Capacitance	C_{oss}			192		
Reverse Transfer Capacitance	C_{rss}			123		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 10V, R_L = 5\Omega, V_{GS} = 4.5V, R_{GEN} = 6\Omega, I_D = 1A$		13		nS
Rise Time	t_r			3.3		
Turn-Off Delay Time	$t_{d(off)}$			29.3		
Fall-Time	t_f			3.4		

- Note:**
1. Mounted on FR4 board, $t \leq 10\text{sec}$.
 2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
 3. Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Performance Characteristics

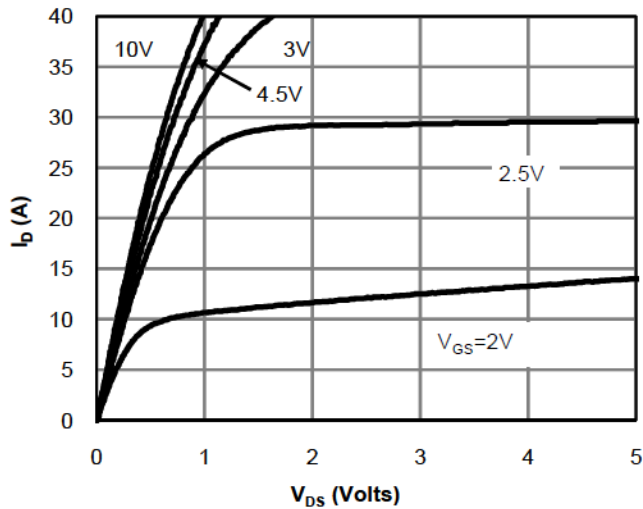


Fig 1: On-Region Characteristics (Note E)

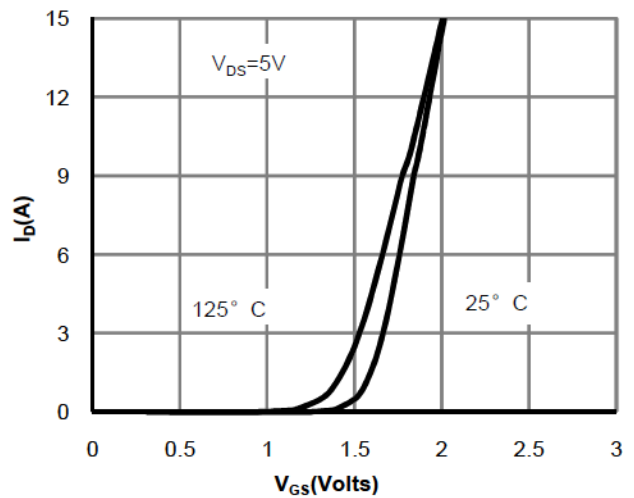


Figure 2: Transfer Characteristics (Note E)

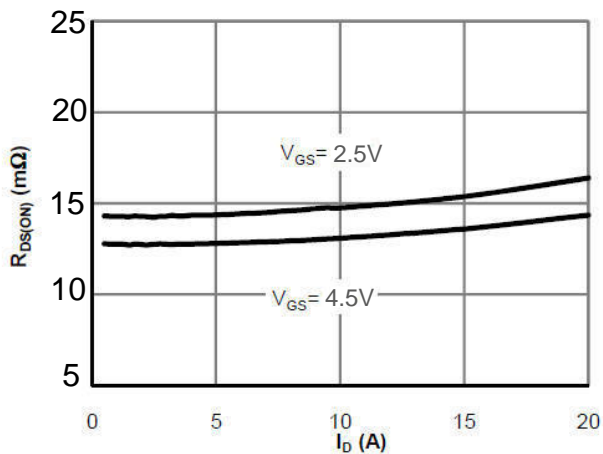


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

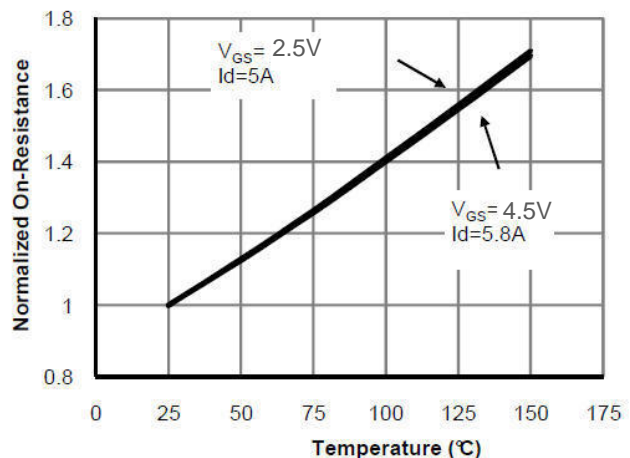


Figure 4: On-Resistance vs. Junction Temperature (Note E)

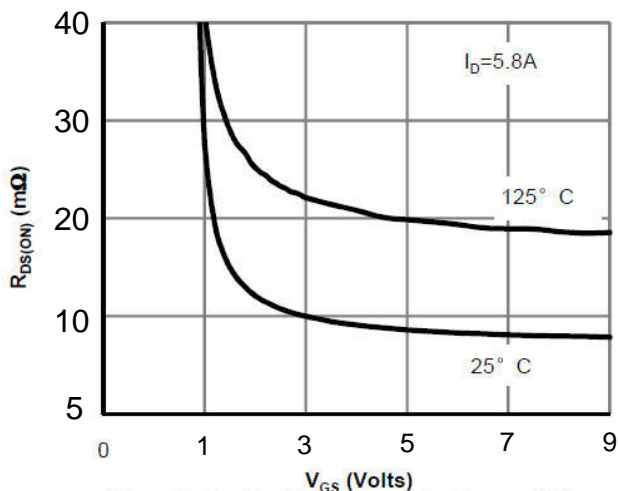


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

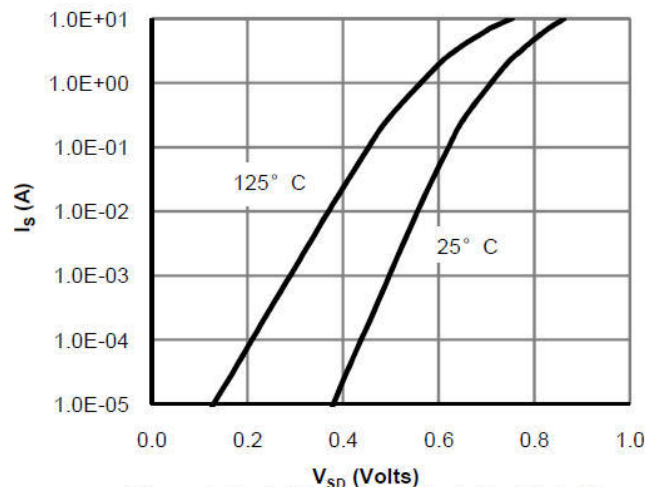


Figure 6: Body-Diode Characteristics (Note E)

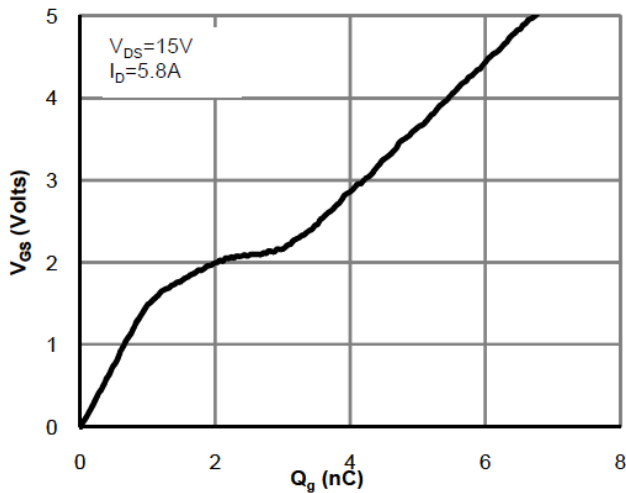


Figure 7: Gate-Charge Characteristics

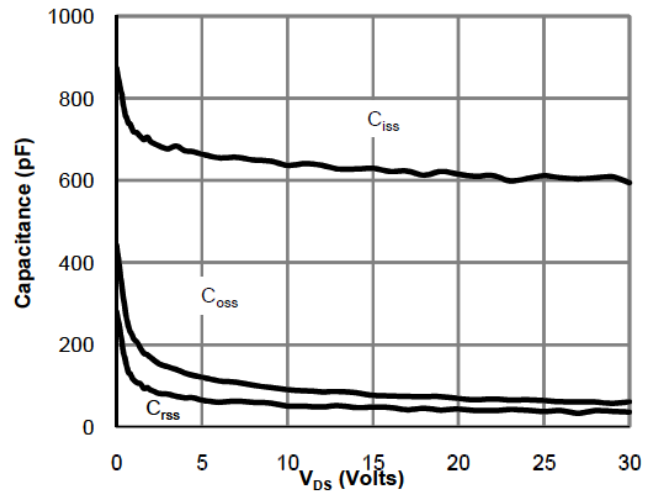


Figure 8: Capacitance Characteristics

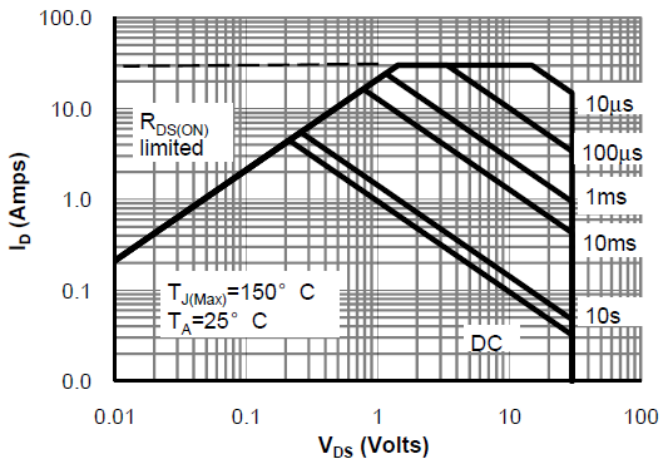


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

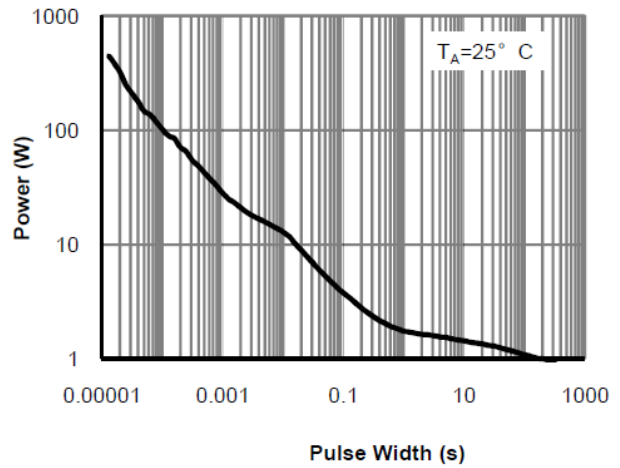


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

■ Typical Electrical and Thermal Characteristics

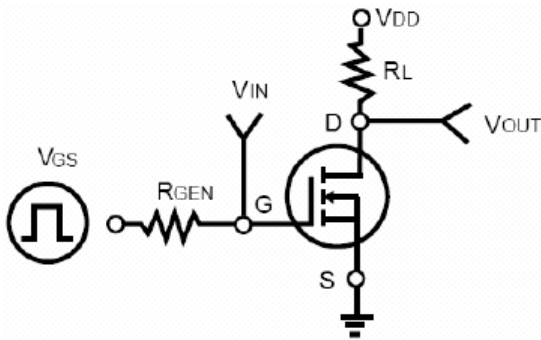


Figure 1: Switching Test Circuit

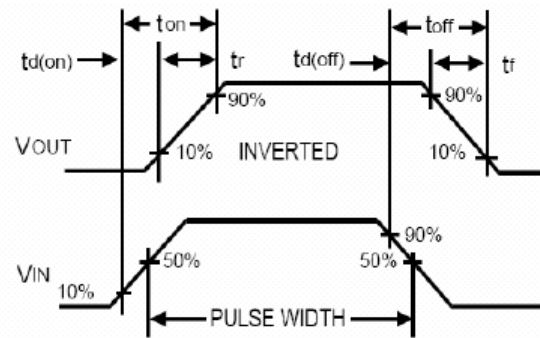


Figure 2: Switching Waveforms

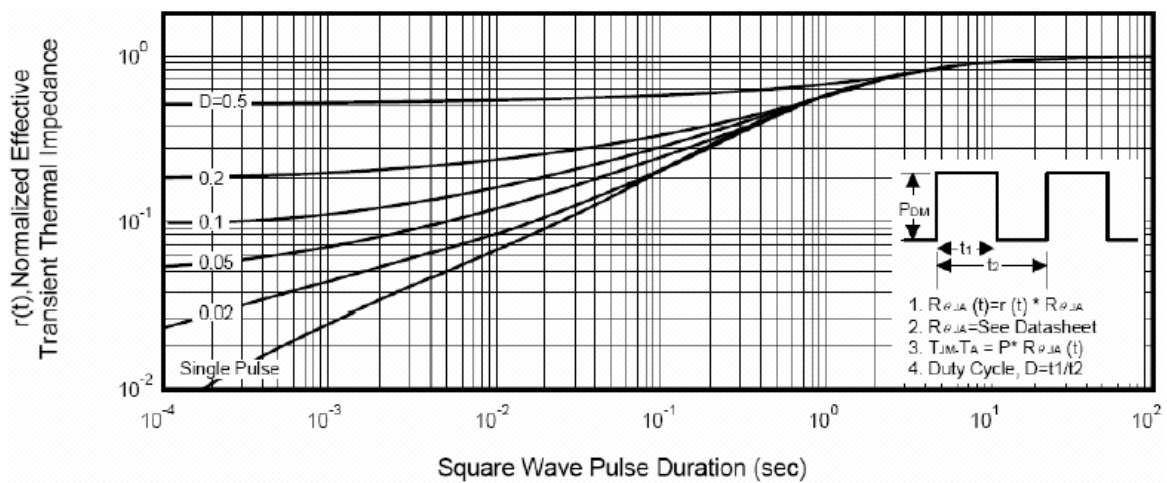
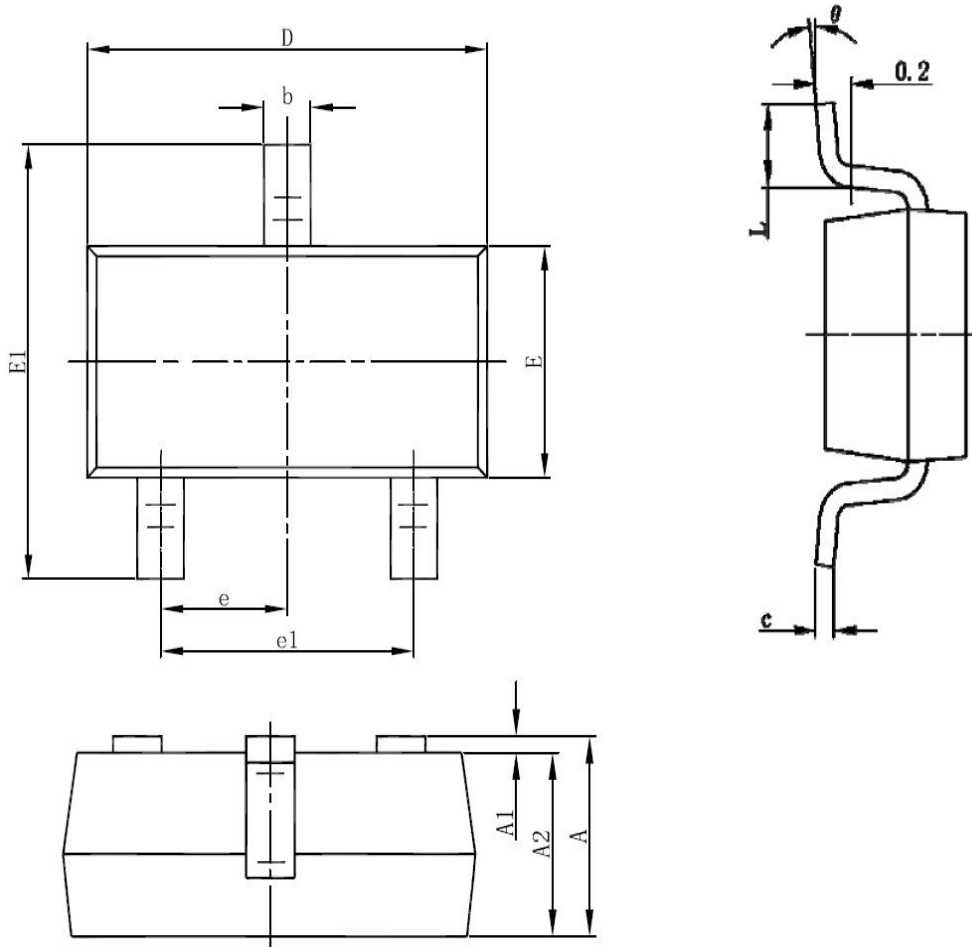


Figure 3: Normalized Maximum Transient Thermal Impedance

■ Package Dimensions : SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°