

FH0306

N-Channel Enhancement Mode MOSFET

Description

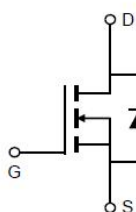
The FH0306 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for used as a load switch or in Pulse width modulation applications.

Application

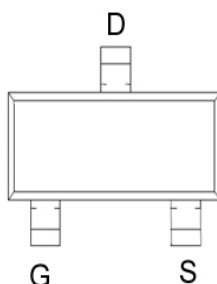
- Load Switch
- PWM Application
- Power management

Features

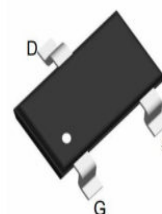
- 60V, 3A
 $R_{DS(ON)}(Typ.)=80m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.)=90m\Omega$ @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired



Schematic diagram



Marking and Pin Assignment



SOT-23 top view

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	3 A
		$T_A = 100^\circ\text{C}$	2 A
I_{DM}	Pulsed Drain Current <small>note1</small>	12	A
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$	1.5 W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	83	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.4	2.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=10V, I_D=3A$	-	80	100	m Ω
		$V_{GS}=4.5V, I_D=2A$	-	90	110	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	350	-	pF
C_{oss}	Output Capacitance		-	29	-	pF
C_{riss}	Reverse Transfer Capacitance		-	23	-	pF
Q_g	Total Gate Charge	$V_{DS}=30V, I_D=3A,$ $V_{GS}=10V$	-	9	-	nC
Q_{gs}	Gate-Source Charge		-	1.5	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=30V, I_D=2A,$ $R_{GEN}=3\Omega, V_{GS}=10V$	-	5	-	ns
t_r	Turn-on Rise Time		-	7	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	37	-	ns
t_f	Turn-off Fall Time		-	22	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	3	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	12	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S=3A$	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

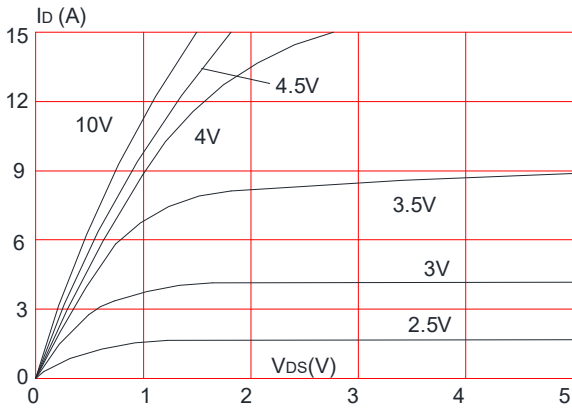


Figure 2: Typical Transfer Characteristics

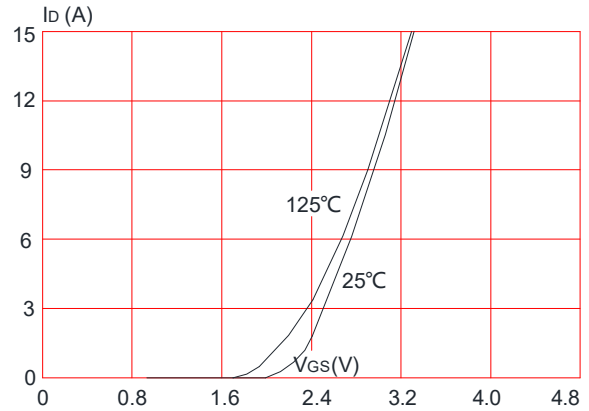


Figure 3: On-resistance vs. Drain Current

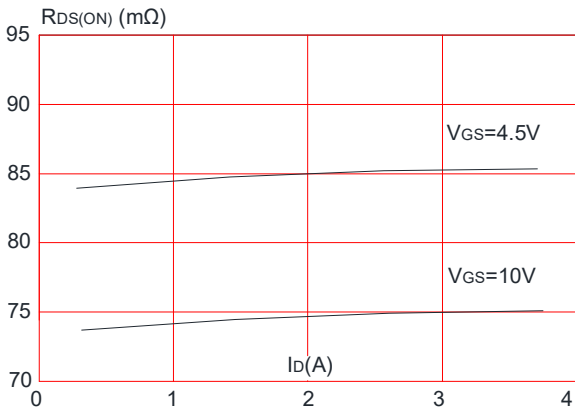


Figure 4: Body Diode Characteristics

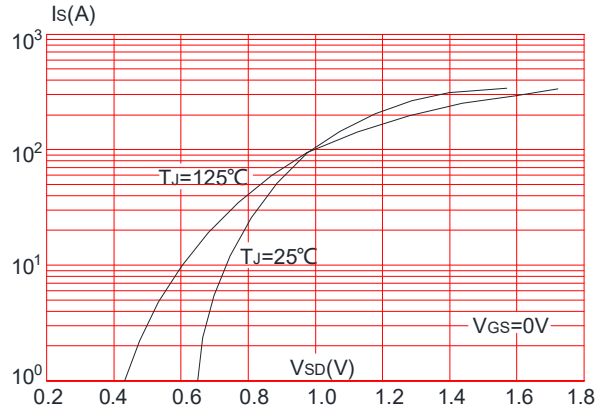


Figure 5: Gate Charge Characteristics

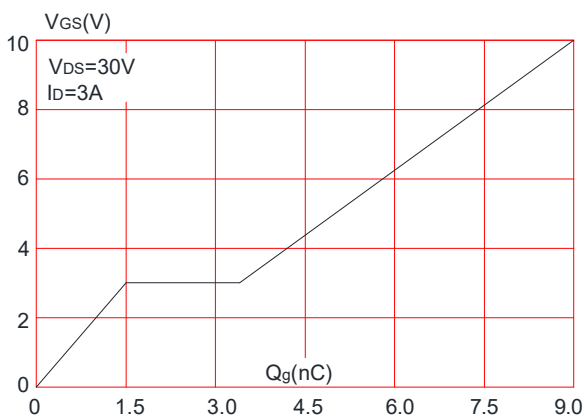


Figure 6: Capacitance Characteristics

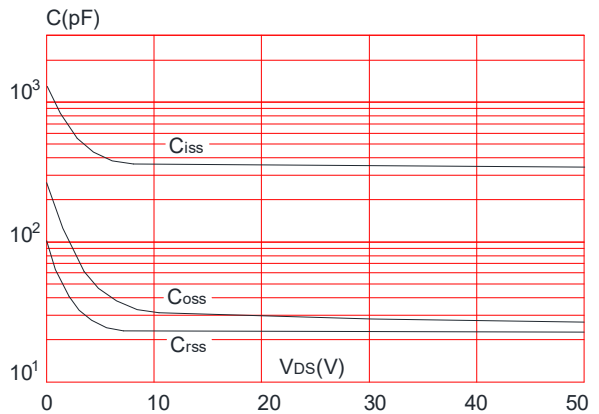


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

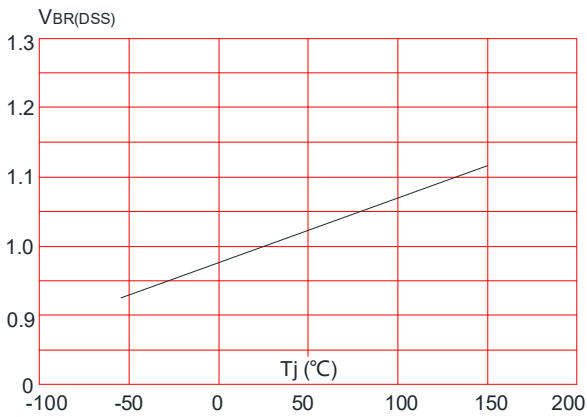


Figure 8: Normalized on Resistance vs. Junction Temperature

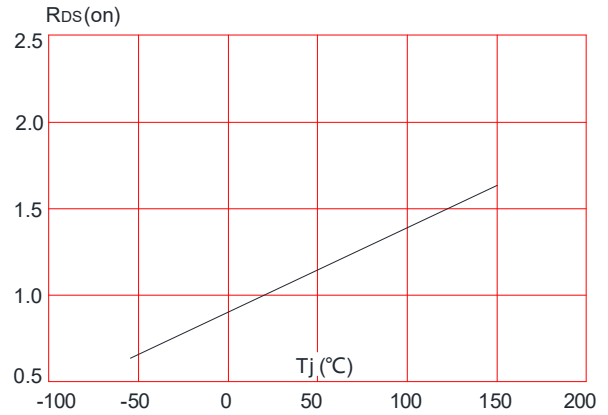


Figure 9: Maximum Safe Operating Area

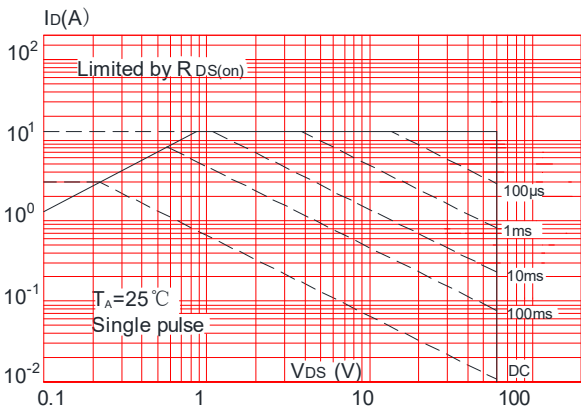


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

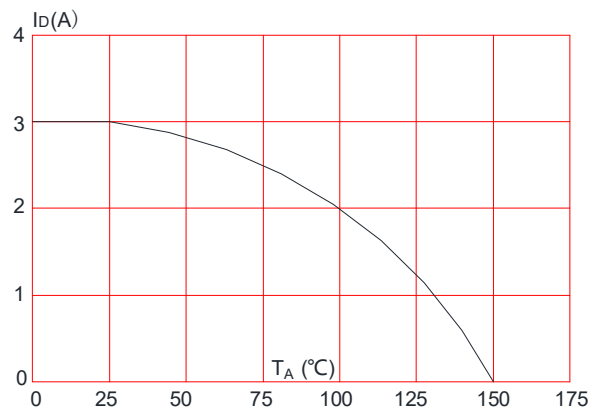
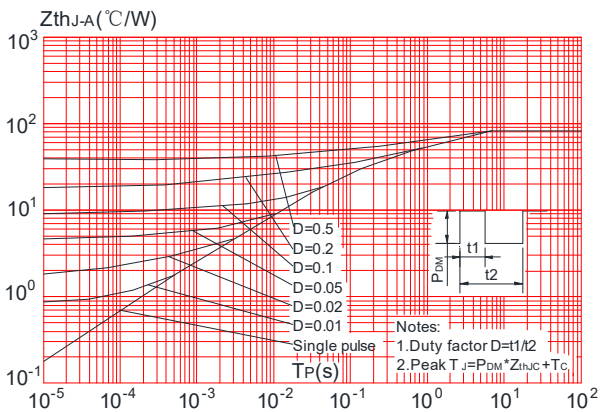


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

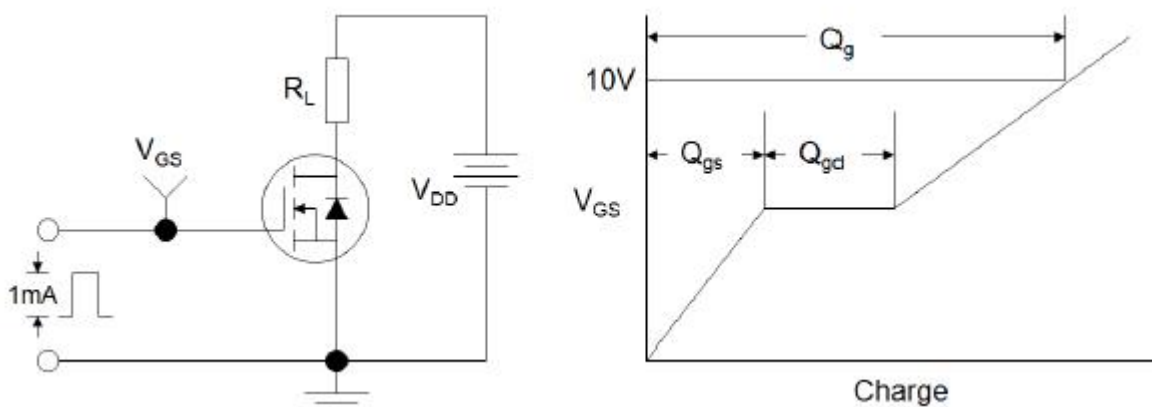


Figure1:Gate Charge Test Circuit & Waveform

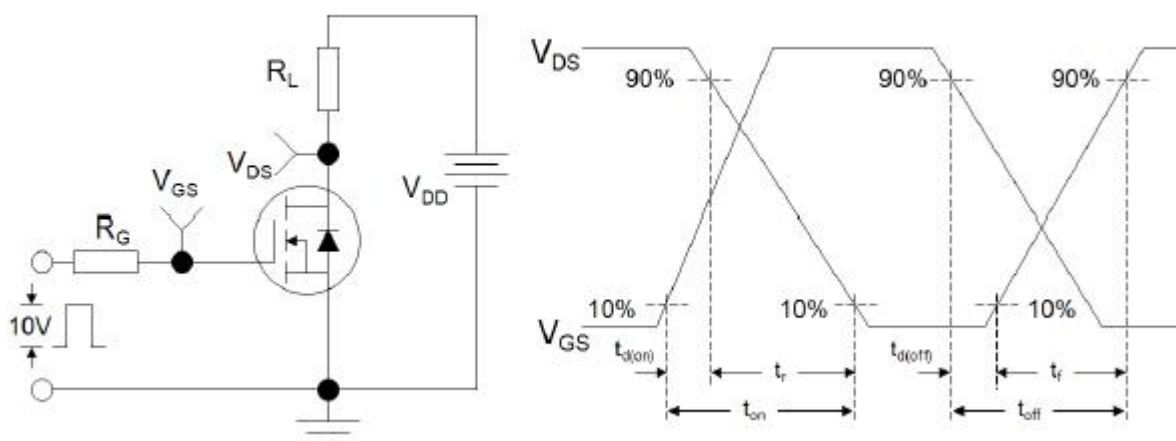


Figure 2: Resistive Switching Test Circuit & Waveforms

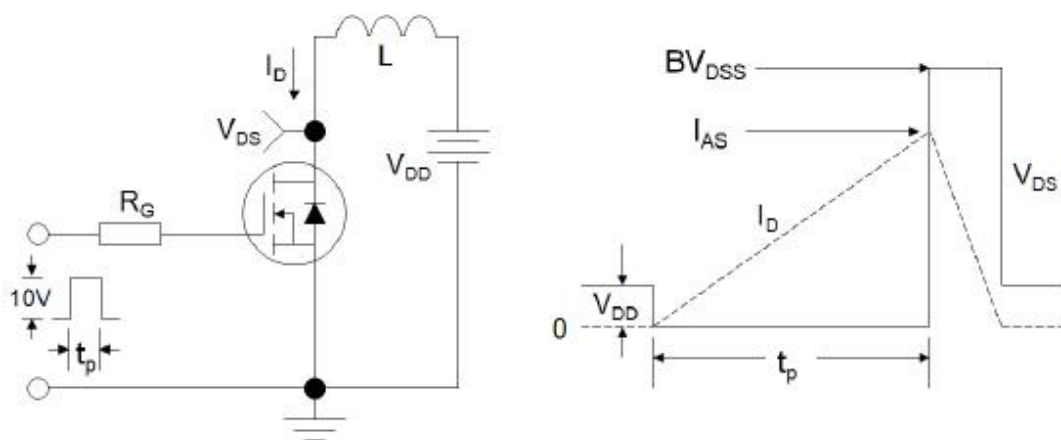
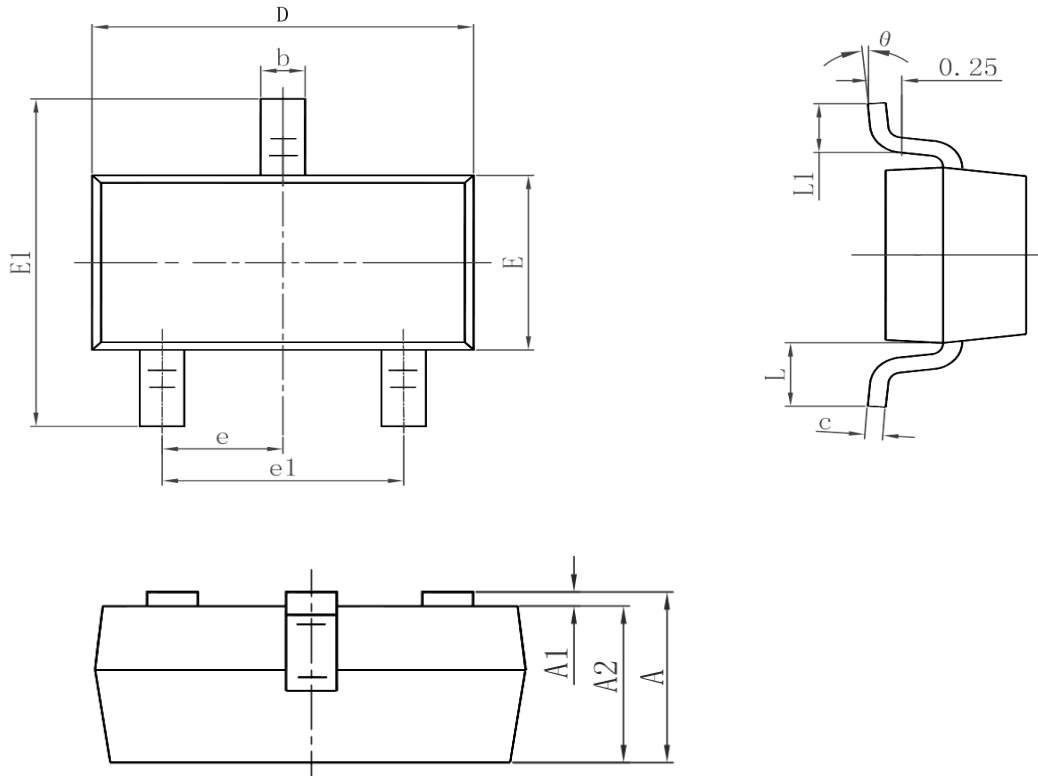


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

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°