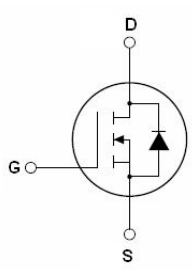



FH1904G

N-Channel Trench Power MOSFET

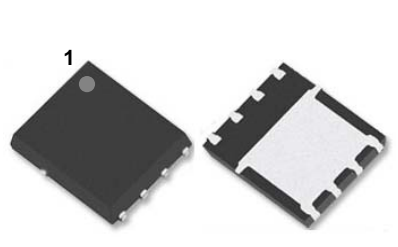
<p>Description</p> <p>The FH1904G uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.</p> <p>Applications</p> <ul style="list-style-type: none"> ◆ Load switch ◆ Uninterruptible power supply ◆ Hard switched and high frequency circuits 	<p>General Features</p> <ul style="list-style-type: none"> ◆ $V_{DS} = 40V$, $I_D = 90A$ $R_{DS(ON)} = 2.3m\Omega$ (Typ) @ $V_{GS} = 10V$ $R_{DS(ON)} = 3.4m\Omega$ (Typ) @ $V_{GS} = 4.5V$ ◆ High Power and current handling capability ◆ Lead free product is acquired ◆ 100% EAS Guaranteed
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Schematic diagram



Marking and pin Assignment



PDFN5X6-8L top and bottom view

Absolute Maximum Ratings (T_c=25°C unless otherwise specified)

Symbol	Parameter	Limit	Unit
V _{DS}	Drain-Source Voltage (V _{GS} =0V)	40	V
V _{GS}	Gate-Source Voltage (V _{DS} =0V)	±20	V
I _D	Drain Current-Continuous(T _c =25°C)	90	A
	Drain Current-Continuous(T _c =100°C)	55	A
I _{DM (pluse)}	Drain Current-Continuous@ Current-Pulsed (Note 1)	360	A
P _D	Maximum Power Dissipation(T _c =25°C)	36	W
	Maximum Power Dissipation(T _c =100°C)	21	W
E _{AS}	Avalanche energy (Note 2)	576	mJ
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 To 150	°C
R _{θJC}	Thermal Resistance, Junction-to-Case	3.3	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.7	2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		38		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A		2.3	2.9	mΩ
		V _{GS} =4.5V, I _D =15A		3.4	3.9	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1.0MHz		6860		pF
C _{oss}	Output Capacitance			455		pF
C _{rss}	Reverse Transfer Capacitance			276		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		0.67		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, R _L =1Ω, R _{GEN} =3Ω		18		nS
t _r	Turn-on Rise Time			4.4		nS
t _{d(off)}	Turn-Off Delay Time			67		nS
t _f	Turn-Off Fall Time			9.5		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A		112		nC
Q _{gs}	Gate-Source Charge			16.7		nC
Q _{gd}	Gate-Drain Charge			26.5		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				90	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =20A			1.2	V
t _{rr}	Reverse Recovery Time	I _F =20A, di/dt=500A/μs		6		ns
Q _{rr}	Reverse Recovery Charge	I _F =20A, di/dt=500A/μs		14		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2. E_{AS} condition: T_J=25°C, V_{DD}=20V, V_G=10V, R_g=25Ω, L=0.5mH.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

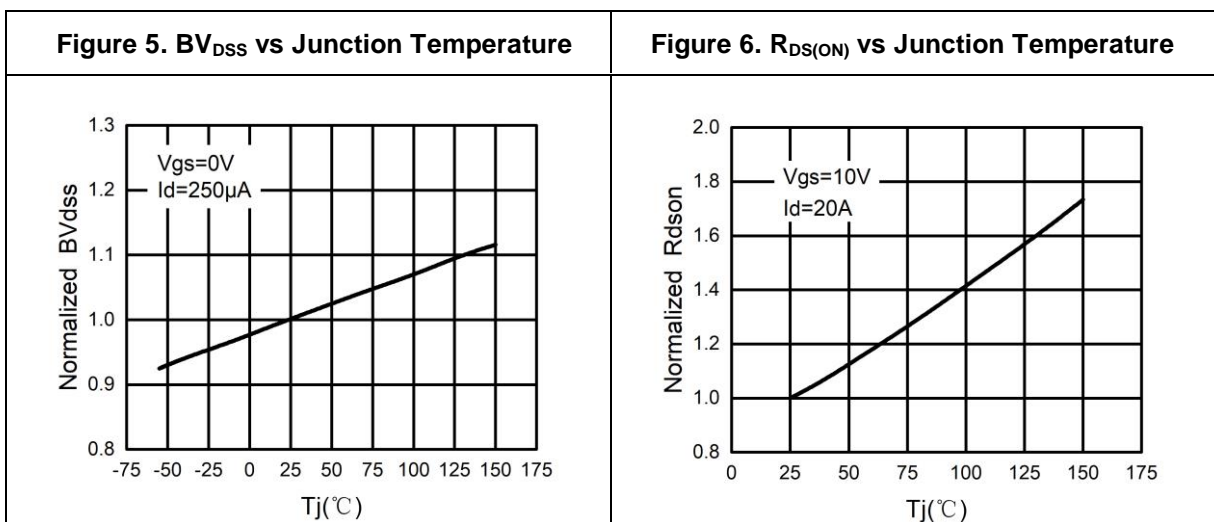
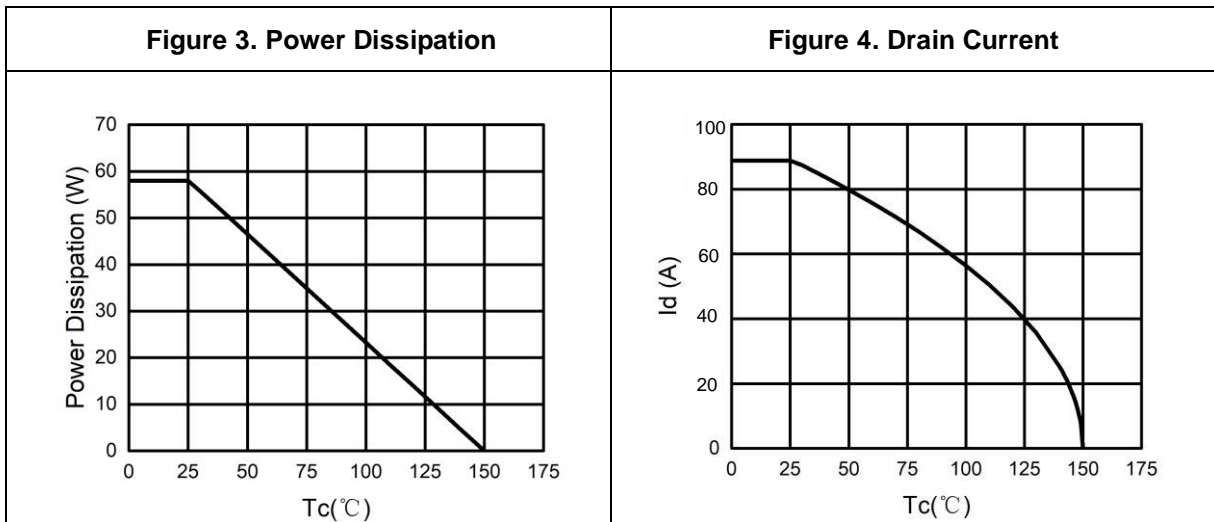
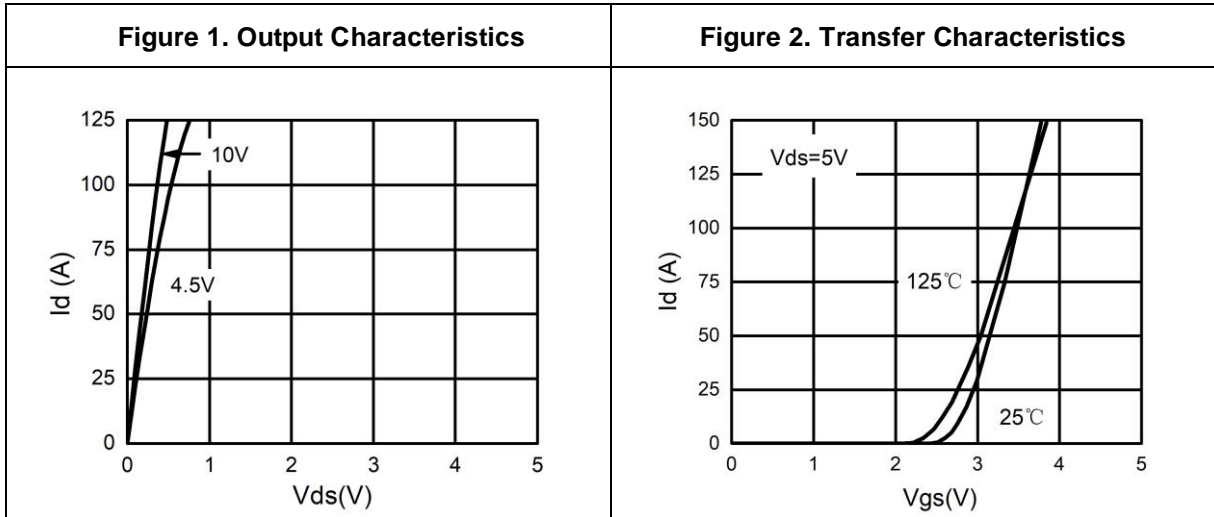


Figure 7. Gate Charge Waveforms

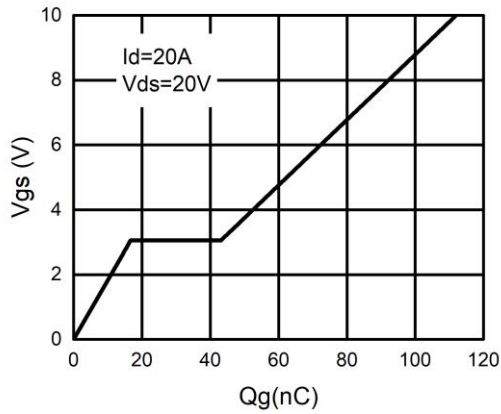


Figure 8. Capacitance

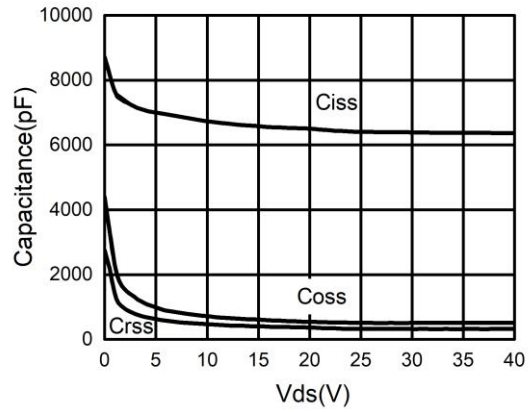


Figure 9. Body-Diode Characteristics

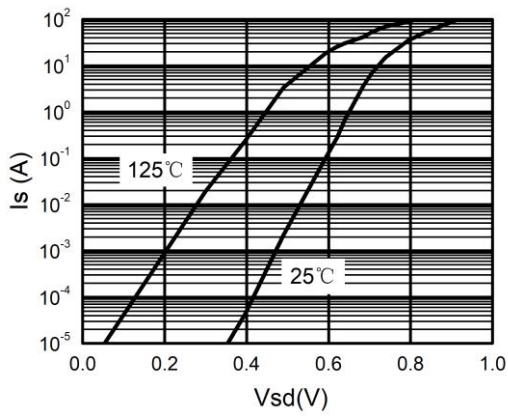
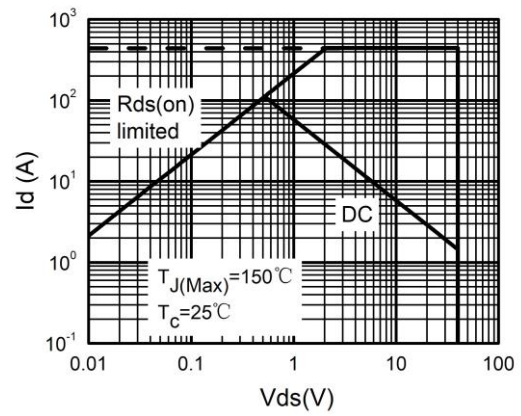
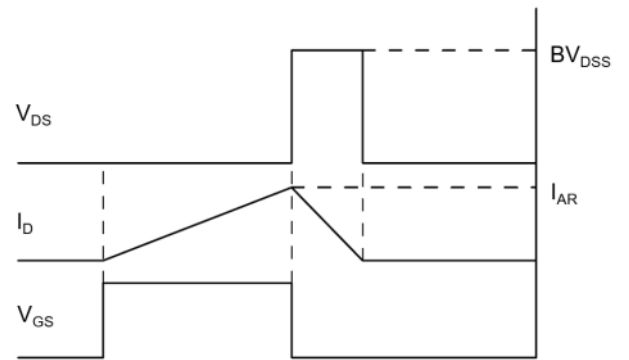
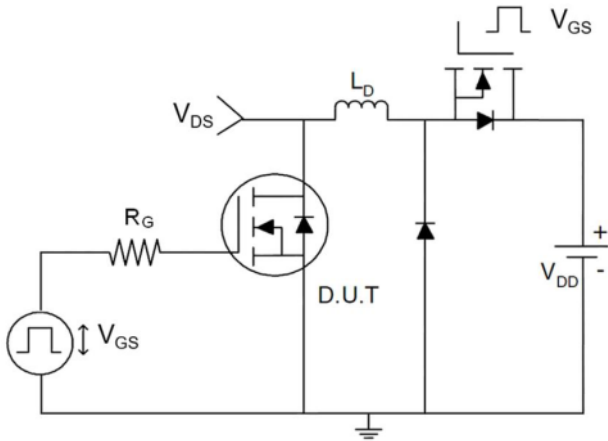


Figure 10. Maximum Safe Operating Area

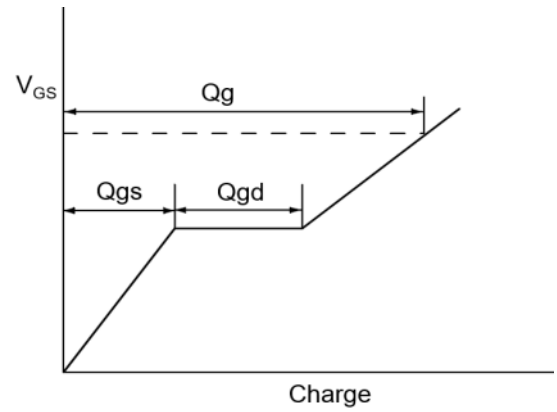
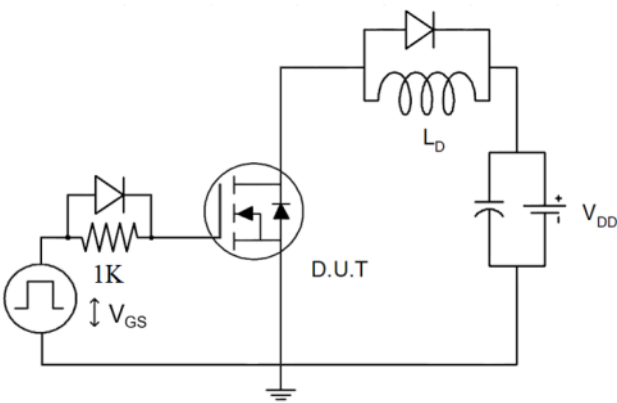


Test Circuit

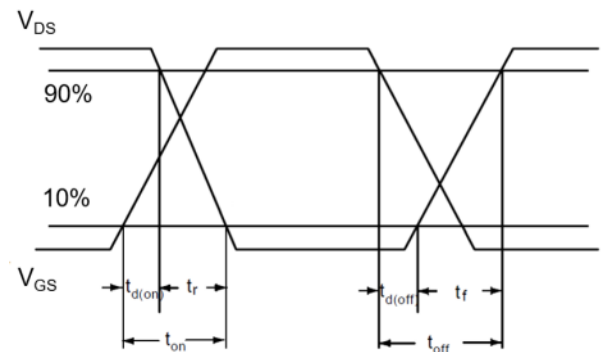
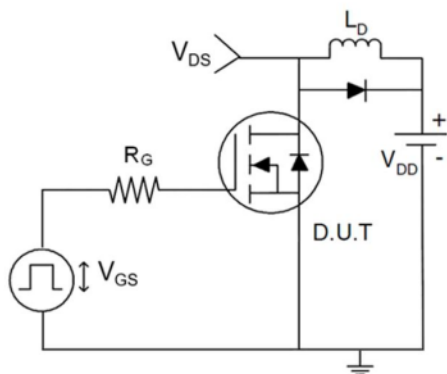
1) E_{AS} Test Circuits



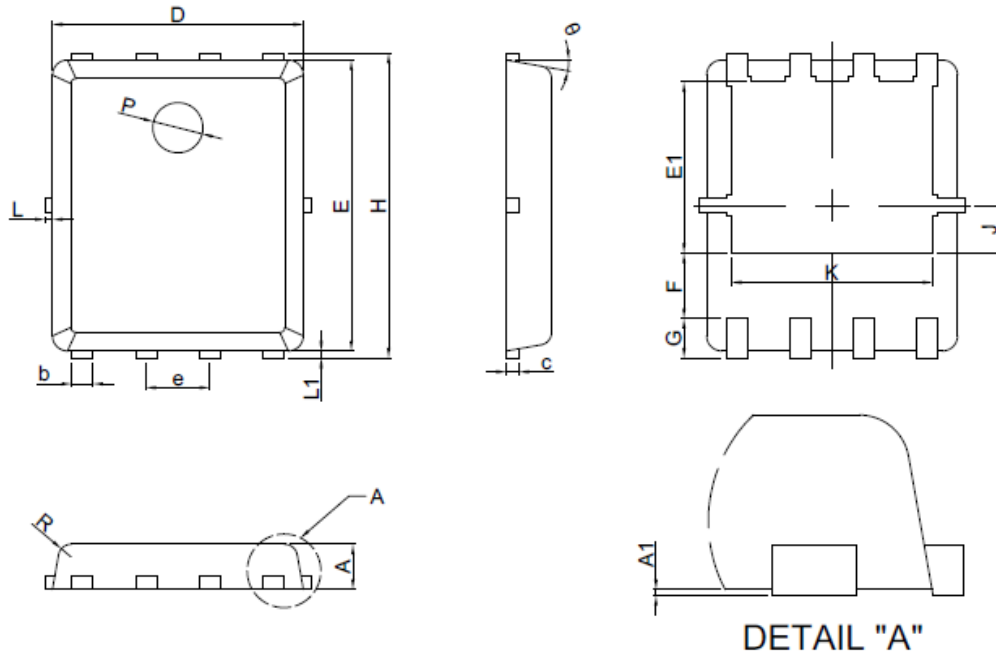
2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Package Information : PDFN5x6-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.80	1.00
A1	0.00	0.05
b	0.35	0.49
c	0.254REF	
D	4.90	5.10
F	1.40REF	
E	5.70	5.90
e	1.27BSC	
H	5.95	6.20
L1	0.10	0.18
G	0.60REF	
K	4.00REF	
L	-	0.15
J	0.95BSC	
P	1.00REF	
E1	3.40REF	
θ	6°	14°
R	0.25REF	