

FH1606GS6

N-Channel Trench Power MOSFET

Description

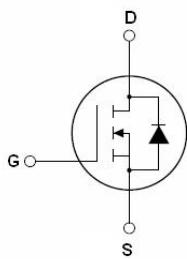
These NChannel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

General Features

- ◆ $V_{DSS}=60V$, $I_D=60A$
 $R_{DS(ON)}=5.8m\Omega$ (Typ) @ $V_{GS}=10V$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green device available

Applications

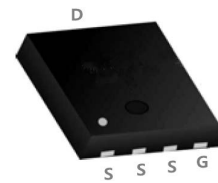
- ◆ Motor Drives
- ◆ UPS
- ◆ DC-DC Converter



Schematic diagram



Marking and pin Assignment



PDFN3.3x3.3-8L top and bottom view

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Continuous drain current ($T_C = 25^\circ C$)	I_D	60	A
Continuous drain current ($T_C = 100^\circ C$)		39	A
Pulsed drain current ¹⁾	I_{DM}	240	A
Gate Source voltage	V_{GSS}	± 20	V
Avalanche energy ²⁾	E_{AS}	110	mJ
Power Dissipation ($T_C = 25^\circ C$)	P_D	37	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.38	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.7	°C/W

Electrical Characteristics T_J = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain source breakdown voltage	BV _{DSS}	V _{GS} =0 V, I _D =250μA	60			V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	---	4.0	V
Drain-source leakage current	I _{DSS}	V _{DS} =40 V, V _{GS} =0 V, T _J = 25°C	---	---	1	μA
		V _{DS} =30 V, V _{GS} =0 V, T _J = 125°C	---	---	10	μA
Gate leakage current, Forward	I _{GSSF}	V _{GS} =20 V, V _{DS} =0 V	---	---	100	nA
Gate leakage current, Reverse	I _{GSSR}	V _{GS} = 20 V, V _{DS} =0 V			100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =15 A	---	5.8	7.6	mΩ
Forward transconductance	g _{fs}	V _{DS} =5 V, I _D =10 A	---	45	---	S
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, F = 1MHz	---	1870	---	pF
Output capacitance	C _{oss}		---	206	---	
Reverse transfer capacitance	C _{rss}		---	132	---	
Turn-on delay time	t _{d(on)}	V _{DD} = 30V, V _{GS} =10V, I _D = 10 A	---	6.6	---	ns
Rise time	t _r		---	110.6	---	
Turn off delay time	t _{d(off)}		---	285.4	---	
Fall time	t _f		---	121.1	---	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.7	---	Ω
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DS} =30 V, I _D =10A, V _{GS} = 10 V	---	15	---	nC
Gate to drain charge	Q _{gd}		---	11.6	---	
Gate charge total	Q _g		---	51.2	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I _S		---	---	60	A
Pulsed Source Current ³⁾	I _{SM}		---	---	240	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =10A, T _J =25°C	---	---	1.2	V
Reverse Recovery Time	t _{rr}	I _S =20A, di/dt=100A/us, T _J =25 °C	---	22.4	---	ns
Reverse Recovery Charge	Q _{rr}				10.5	nC

Notes:

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

2: V_{DD}=30V, V_{GS}=10V, L=0.5mH, I_{AS}=21A, R_G=25Ω, Starting T_J=25°C

3: Pulse Test: Pulse Width ≤300 μ s, Duty Cycle≤2%

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

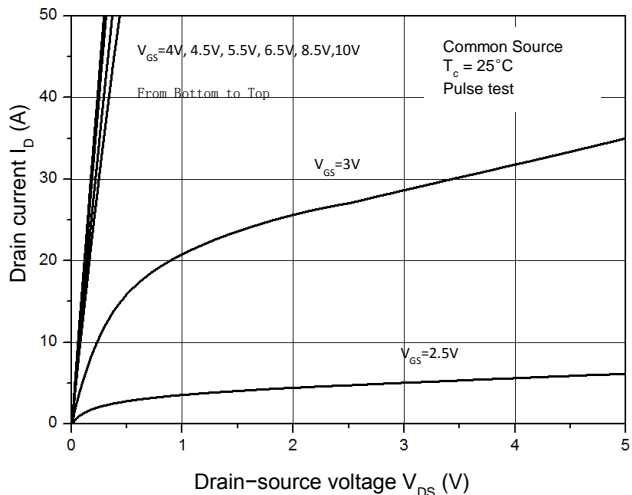


Figure 2. Transfer Characteristics

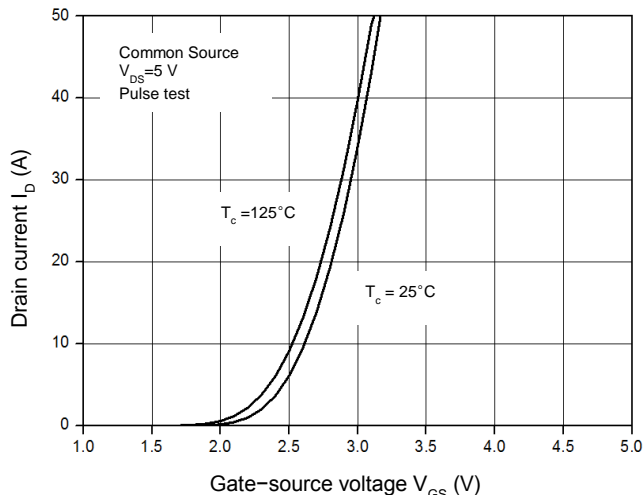


Figure 3. Capacitance Characteristics

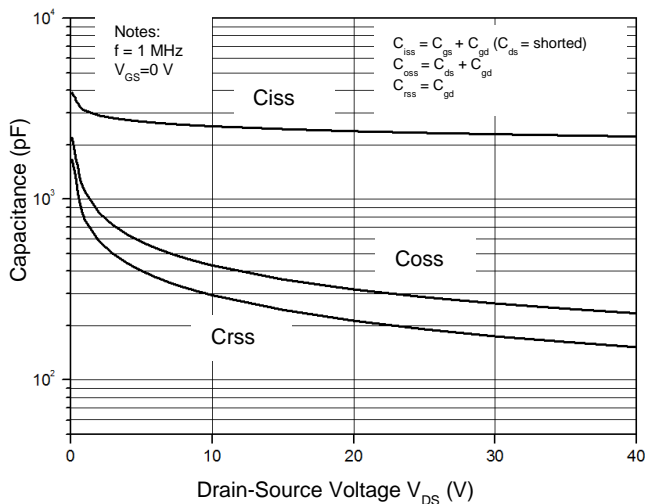


Figure 4. Gate Charge Waveform

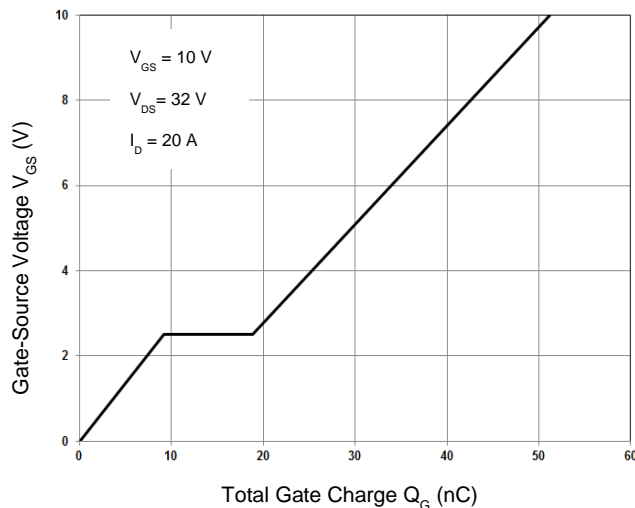


Figure 5. Body-Diode Characteristics

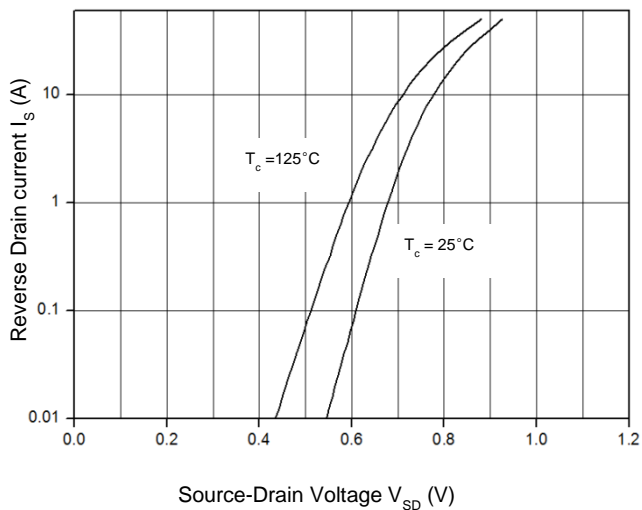


Figure 6. Rdson-Drain Current

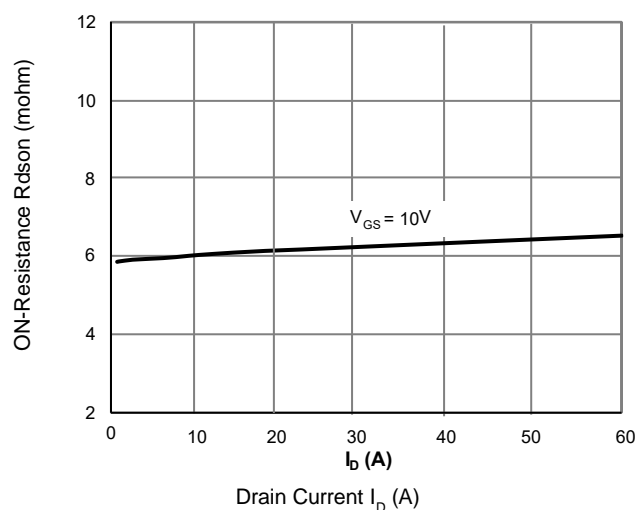


Figure 7. Rdson-Junction Temperature(°C)

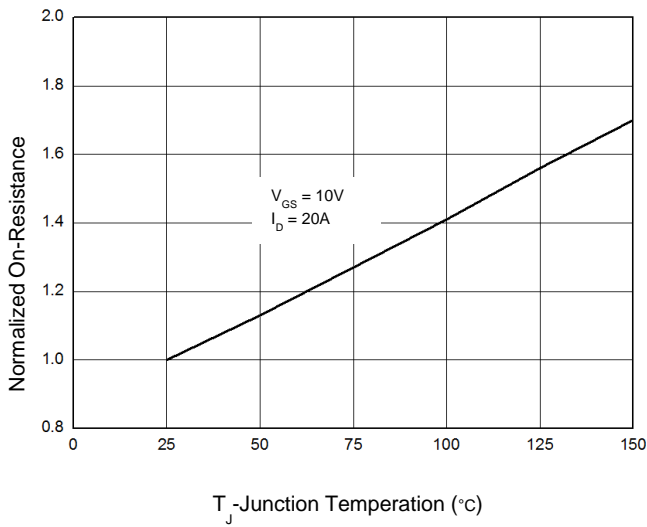


Figure 8. Maximum Safe Operating Area

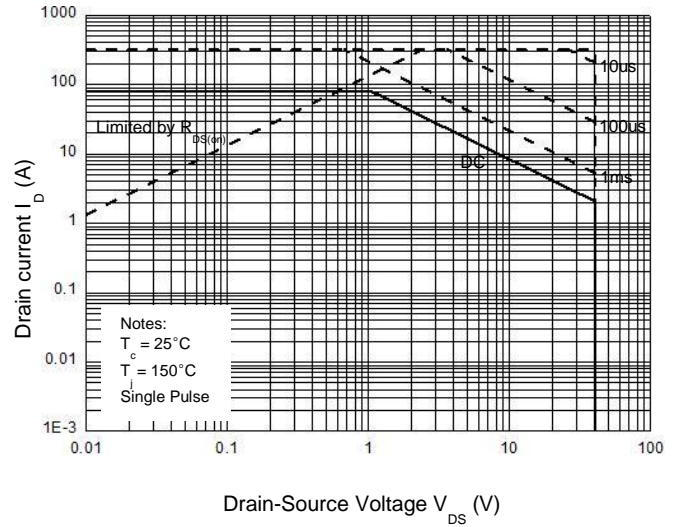
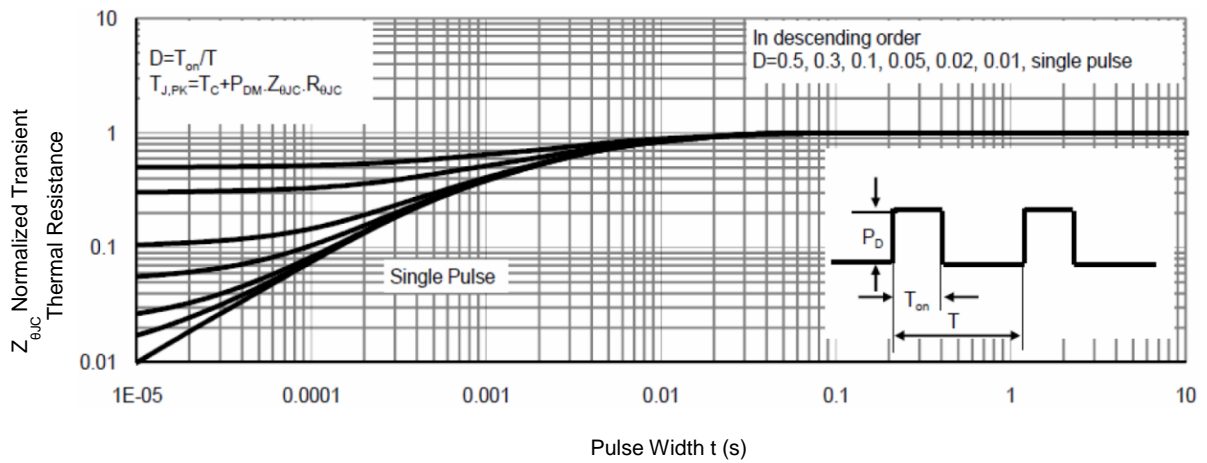


Figure 9. Normalized Maximum Transient Thermal Impedance (RthJC)



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

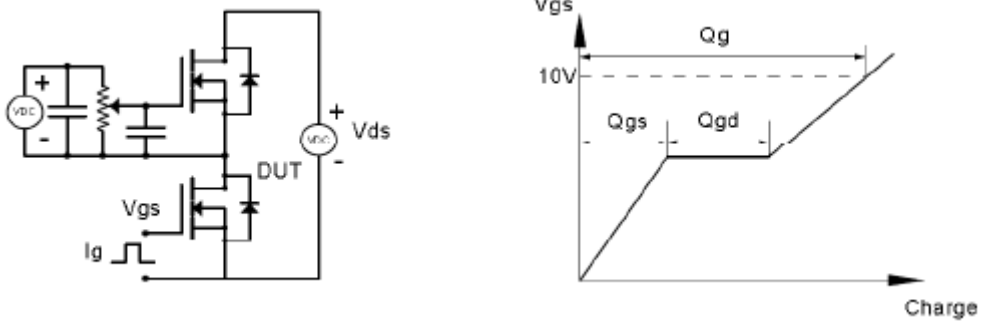


Figure 9. Resistive Switching Test Circuit & Waveforms

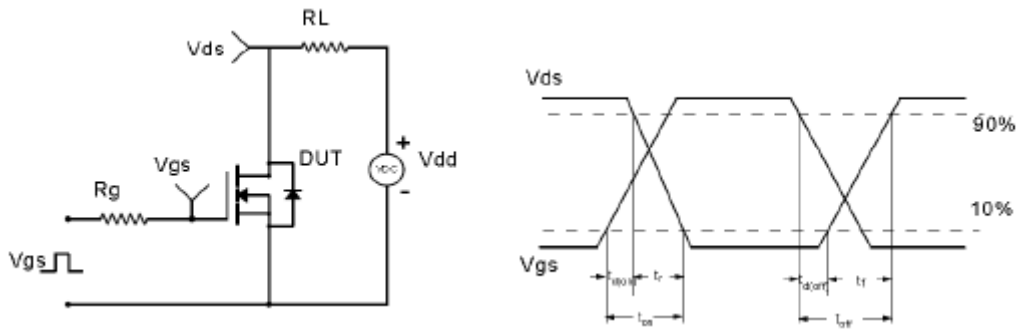


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

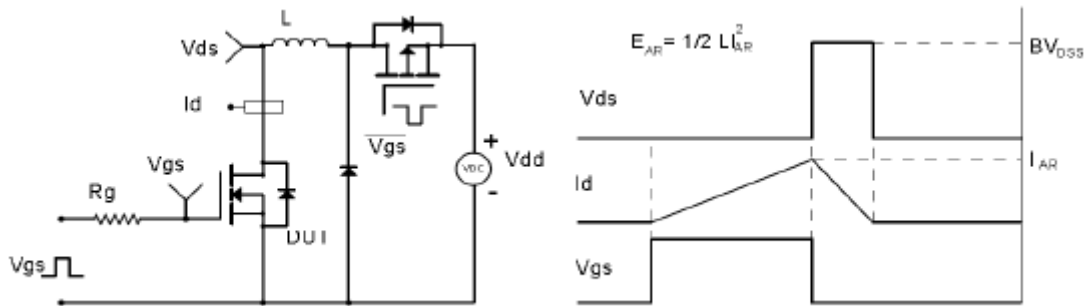
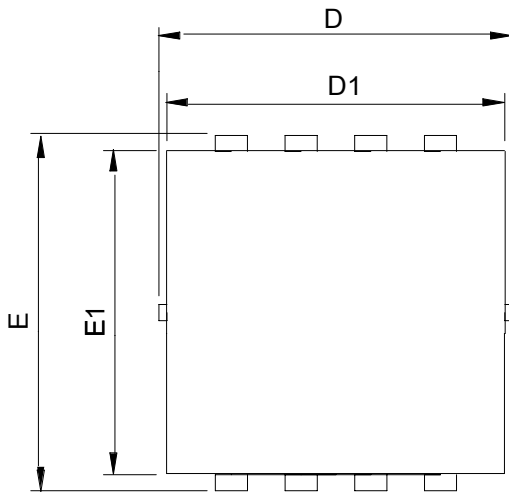


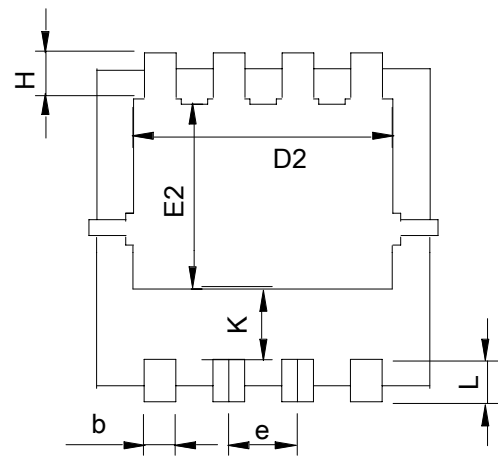
Figure 11. Diode Recovery Circuit & Waveform



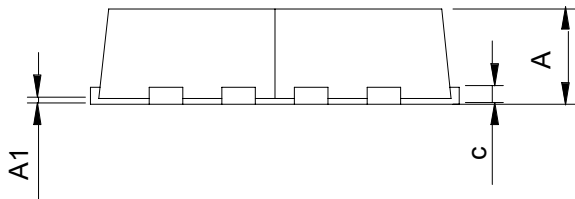
Package Information : PDFN3.3x3.3-8L



Top View



Bottom View



SYMBOL	PDFN3.3x3.3-8L			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022