

FH3108D

N-Channel Enhancement Mode Power MOSFET

General Description

The FH3108D uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

Applications

- PWM applications
- Load switch
- Power management

Features

- $V_{DS} = 85V$, $I_D = 104A$
 $R_{DS(ON)}$ (Typ): $5\text{ m}\Omega @ V_{GS} = 10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package



Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	104	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)	$I_D(T_C=100^\circ\text{C})$	68	A
Pulsed Drain Current (Note 1)	I_{DM}	270	A
Maximum Power Dissipation	P_D	130	W
Avalanche Energy ($L=0.5\text{mH}$)	E_{AS}	625	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	1.2	$^\circ\text{C/W}$
---	-----------------	-----	--------------------

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	85	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.4	3.0	3.8	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	4.4	5	6	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=30A$	-	60	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=42.5V, V_{GS}=0V,$ $F=1.0MHz$	-	3900	-	pF
Output Capacitance	C_{oss}		-	650	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	20	-	pF
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=1.0MHz$	-	2	-	Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=40V, I_D=10A, R_L=1\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	14	-	nS
Turn-on Rise Time	t_r		-	23	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	36	-	nS
Turn-Off Fall Time	t_f		-	16	-	nS
Total Gate Charge	Q_g	$V_{DS}=40V, I_D=50A, V_{GS}=10V$	-	44	-	nC
Gate-Source Charge	Q_{gs}		-	14	-	nC
Gate-Drain Charge	Q_{gd}		-	11	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=10A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	104	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics

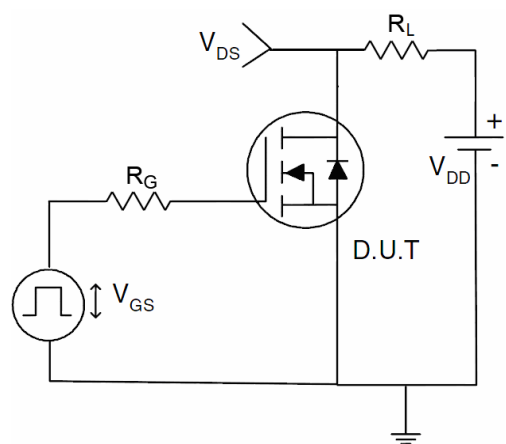


Figure 1 Switching Test Circuit

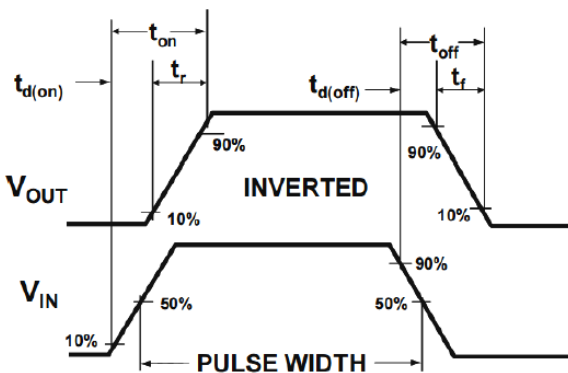


Figure 2 Switching Waveform

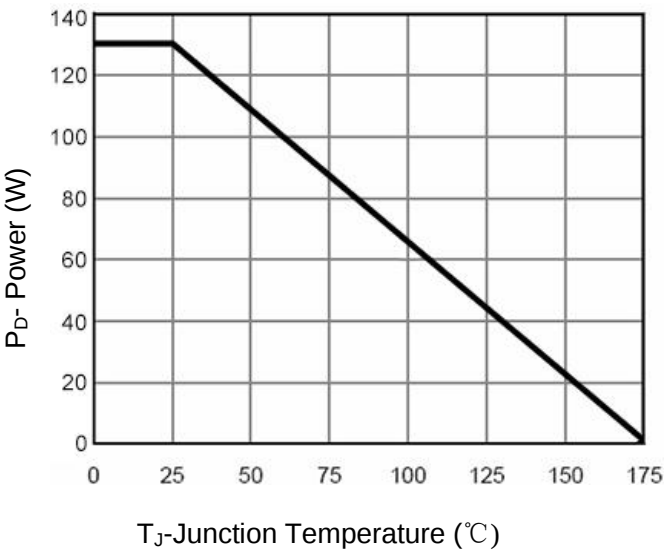


Figure 3 Power De-rating

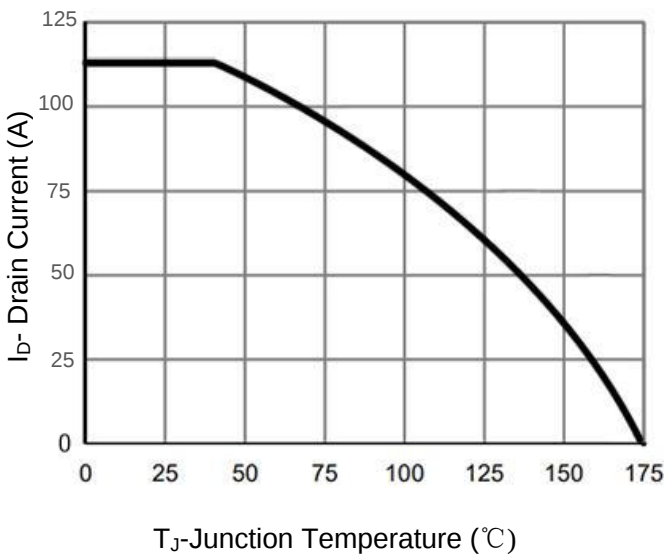


Figure 4 Drain Current

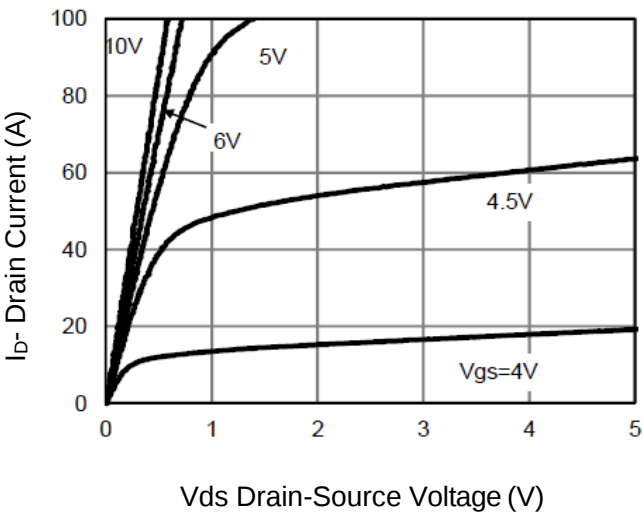


Figure 5 Output Characteristics

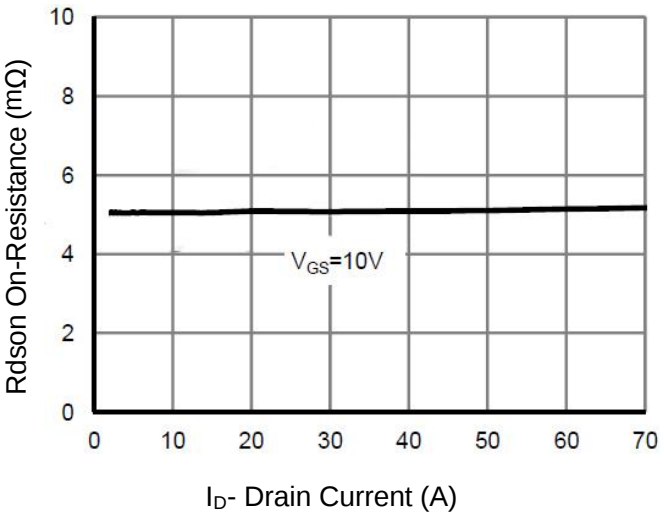


Figure 6 Rdson vs Drain Current

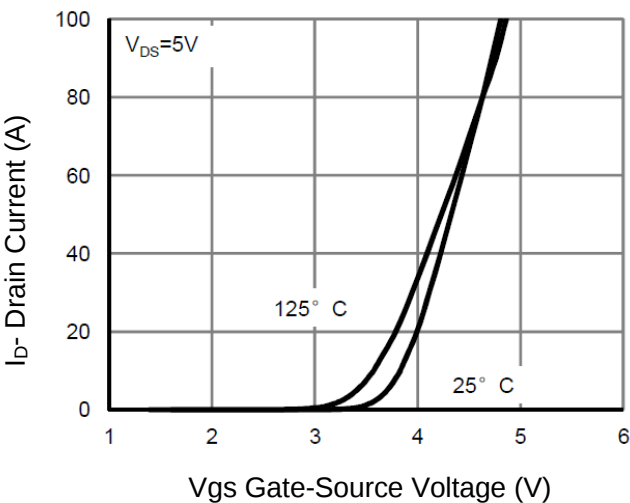


Figure 7 Transfer Characteristics

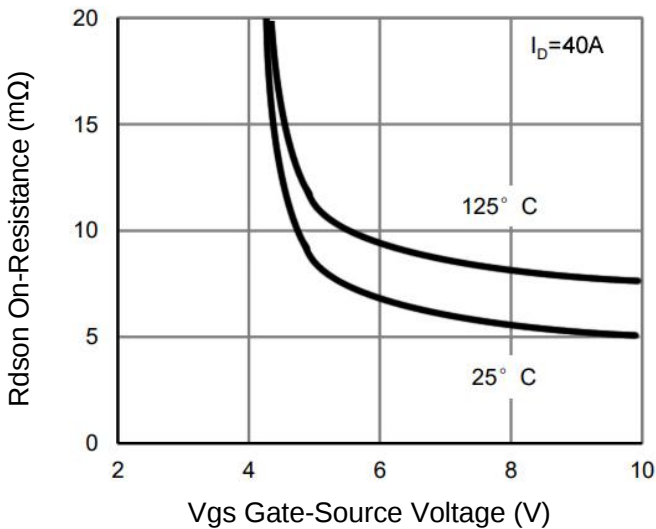


Figure 9 Rdson vs Vgs

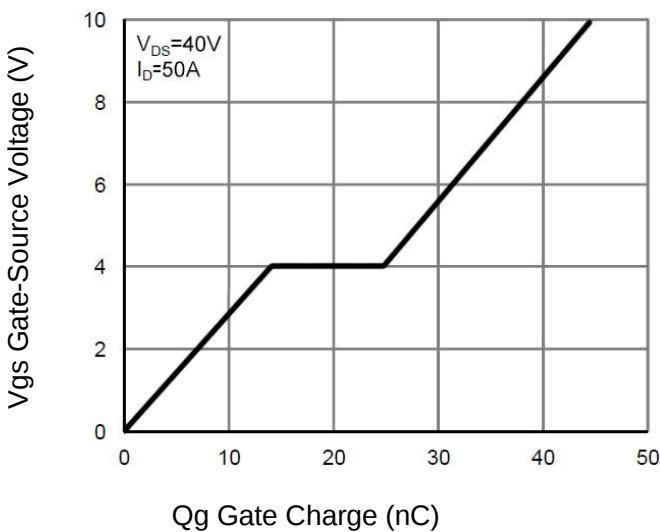


Figure 11 Gate Charge

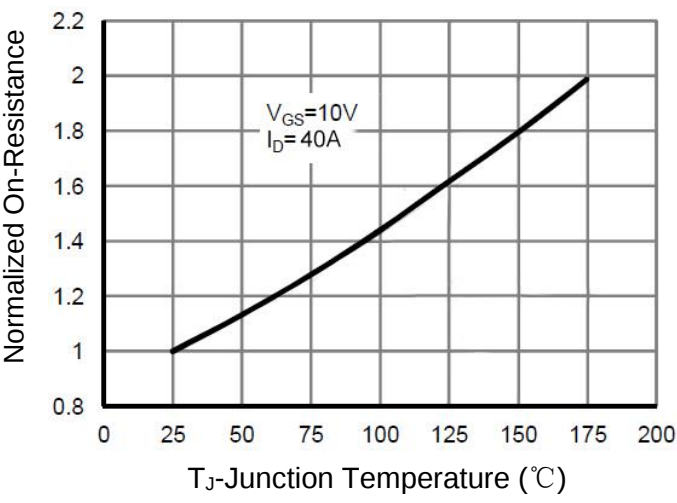


Figure 8 Rdson vs Junction Temperature

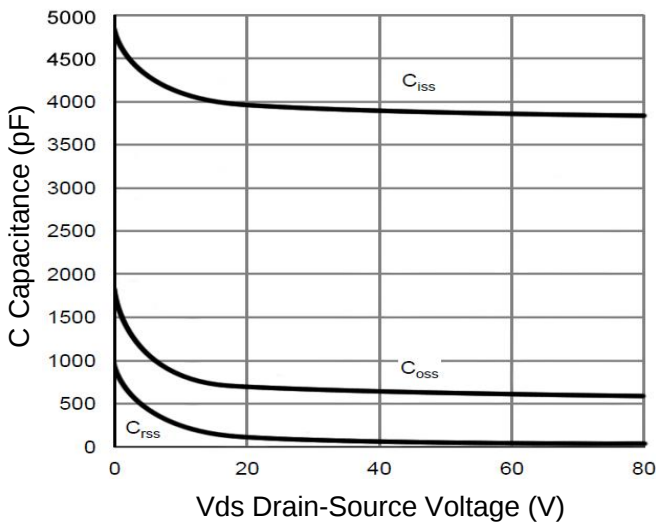


Figure 10 Capacitance vs Vds

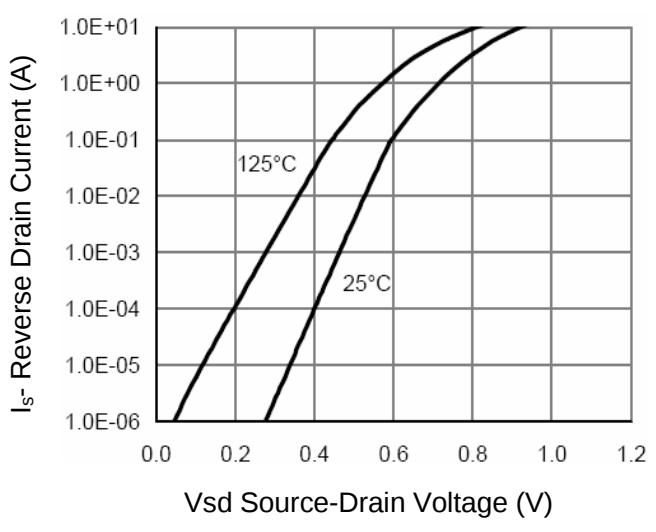


Figure 12 Source- Drain Diode Forward

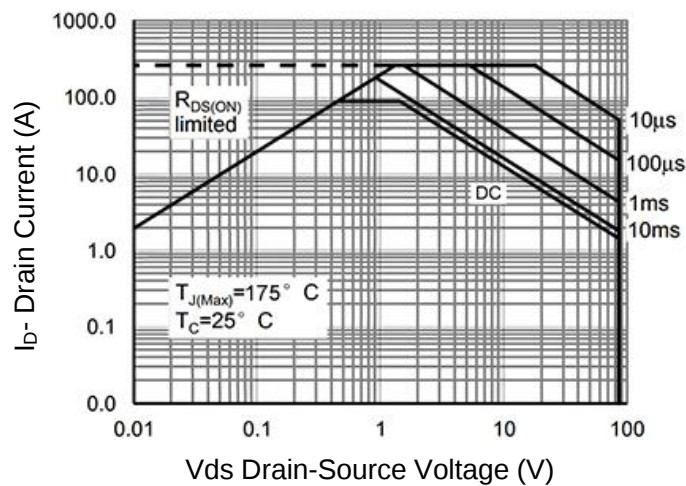


Figure 13 Safe Operation Area

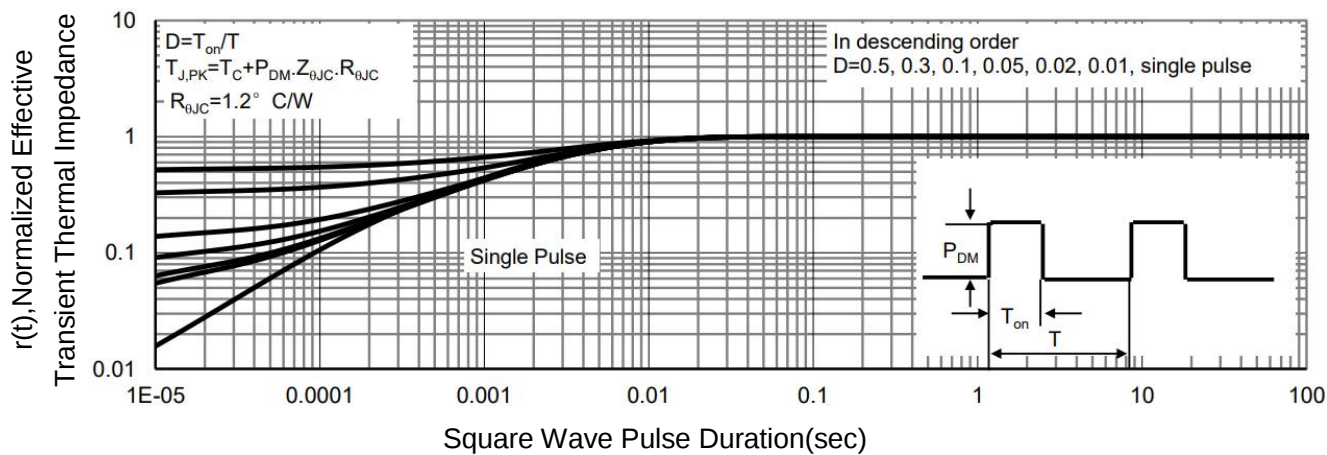
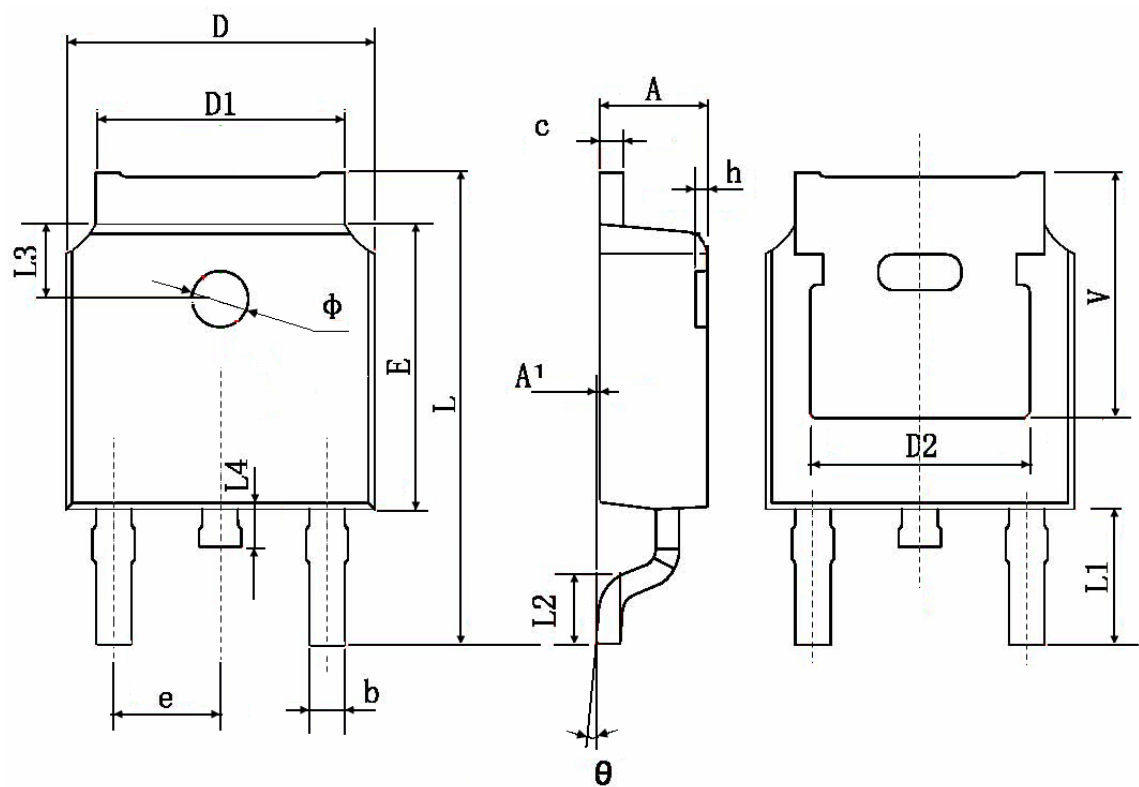


Figure 14 Normalized Maximum Transient Thermal Impedance

Package Information : TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	