FH13P04G6

P-Channel Enhancement Mode MOSFET

General Description

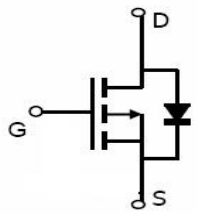
The FH13P04G6 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as -4.5V.This device is suitable for use as a widevariety of applications.

Features

- VDS = -40V, ID = -30A
  RDS(ON) (Typ) :9.0 mΩ @ VGS = -10V
  RDS(ON) (Typ) :13 mΩ @ VGS = -4.5V
- High Power and current handing capability
- Lead free product is acquired

Applications

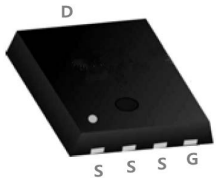
- Load switch
- Power Management
- PWM Applications



Schematic diagram



Marking and pin Assignment



PDFN3.3x3.3-8L top view

Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	-40	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	±20	V
I_D*	Drain Current	T_C = 25 ℃, V_{GS} = -10 V	-	-30	A
		T_C = 100 ℃, V_{GS} = -10 V	-	-19	A
I_{DM}*,**	Pulsed Source Current	T_C = 25 ℃, V_{GS} = -10 V	-	-120	A
P_{tot}*	Total Power Dissipation	T_C = 25 ℃	-	20	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	-30	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= -40 V , L= 1 mH	-	210	mJ
$R_{\theta JC}$*	Thermal Resistance- Junction to Ambient		-	6	℃ / W

Notes：

* Surface Mounted on 1 in^2 pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

*** limited by bonding wire

Electrical Characteristics (T_C = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = -250 μA	-40	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = -250 μA	-1	-	-3	V
I_{DSS}	Zero Gate Voltage Source Current	V_{DS} = -32 V, V_{GS} = 0 V	-	-	-1	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	nA
$R_{DS(ON)}$[a]	Drain-Source On-State Resistance	V_{GS} = -10 V, I_D = -15A	-	9	12	mΩ
		V_{GS} = -4.5 V, I_D = -10 A	-	13	16	mΩ
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = -15 A, V_{GS} = 0 V	-	-	-1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = -15 A, dI_{SD}/dt = 100 A/μs	-	17	-	nS
Q_{rr}	Reverse Recovery Charge		-	12	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = -20 V Frequency = 1 MHz	-	3433	-	pF
C_{oss}	Output Capacitance		-	230	-	
C_{rss}	Reverse Transfer Capacitance		-	181	-	
t_d(on)	Turn-on Delay Time	V_{DS} = -20 V, V_{GEN} = -10 V, R_G = 3.9 Ω, R_L = 1.33 Ω, I_D = -15 A	-	8	-	nS
t_r	Turn-on Rise Time		-	41	-	
t_d(off)	Turn-off Delay Time		-	71	-	
t_f	Turn-off Fall Time		-	33	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = -20 V, VGS = -10 V, I_{DS} = -15 A	-	55	-	nC
Q_{gs}	Gate-Source Charge		-	14	-	
Q_{gd}	Gate-Drain Charge		-	7	-	

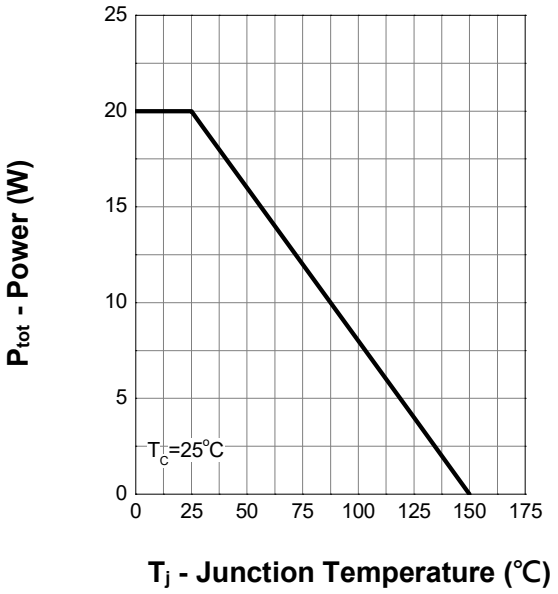
Notes：

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

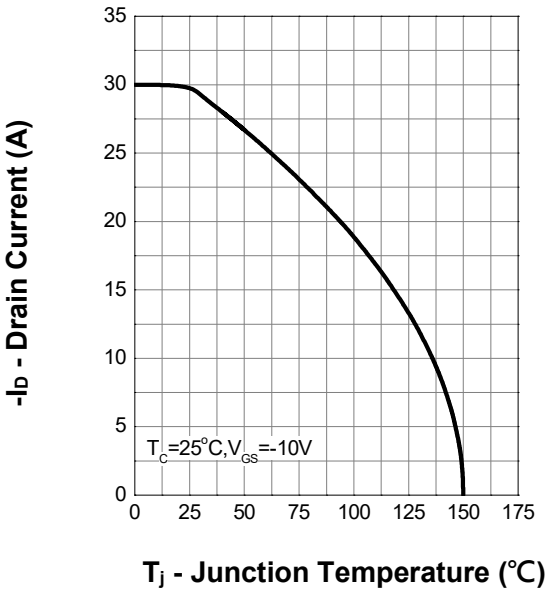
b : Guaranteed by design, not subject to production testing

Typical Characteristics

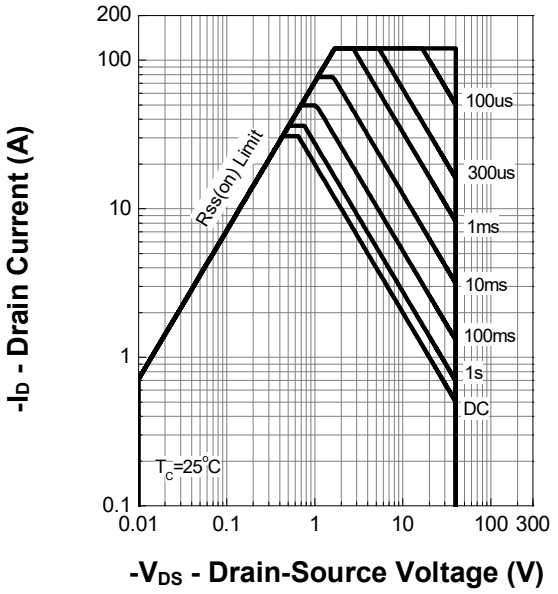
Power Capability



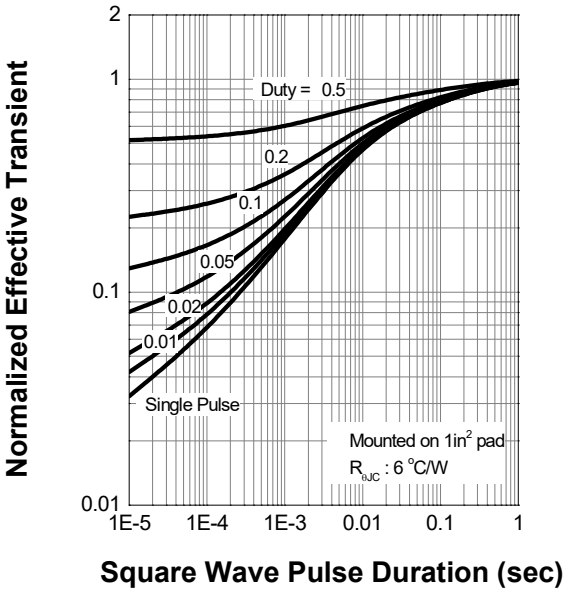
Current Capability



Safe Operation Area

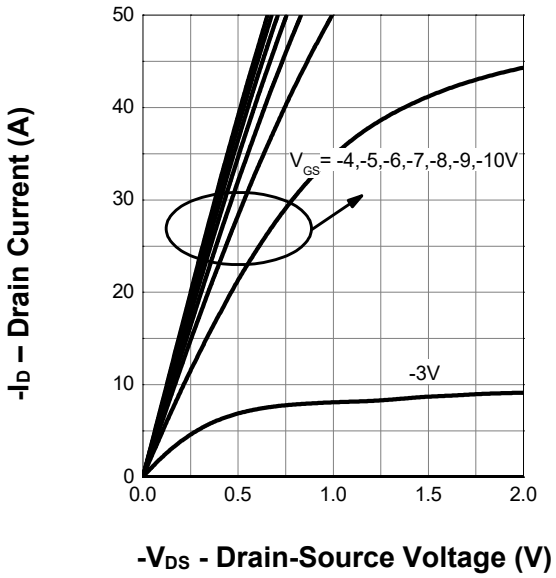


Thermal Transient Impedance

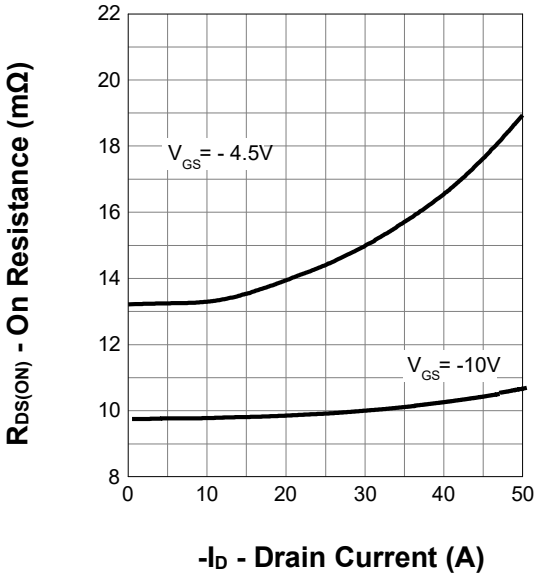


Typical Characteristics (cont.)

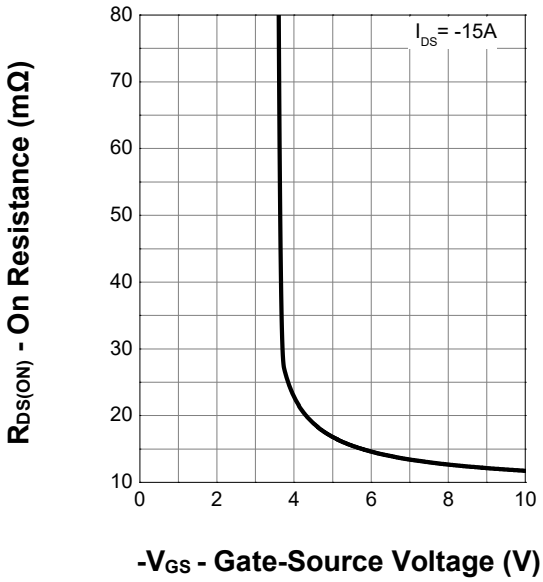
Output Characteristics



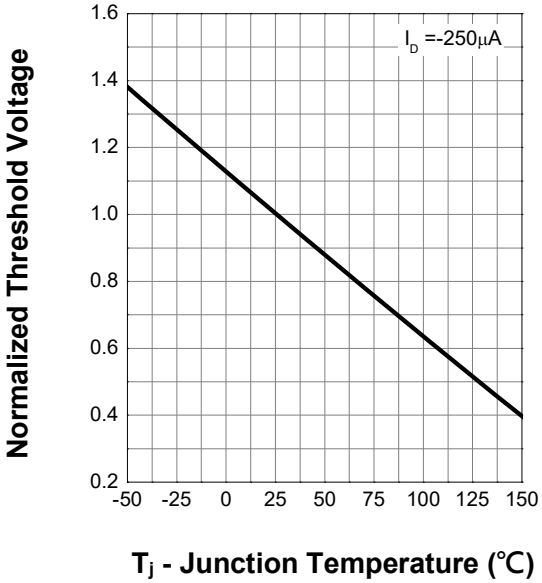
Drain-Source On Resistance



Transfer Characteristics

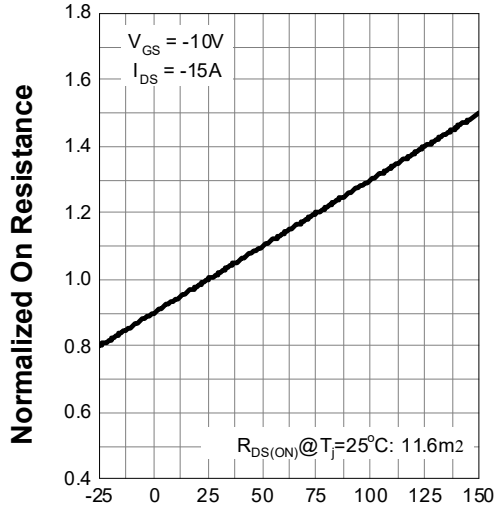


Gate Threshold Voltage

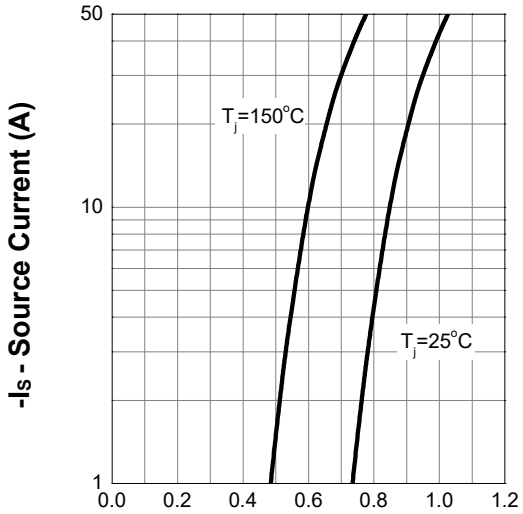


Typical Characteristics (cont.)

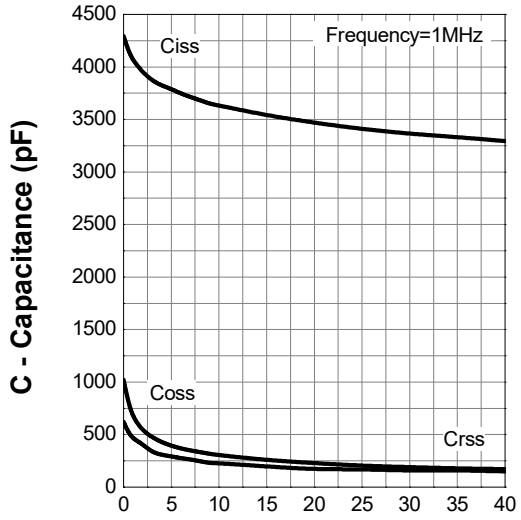
Drain-Source On Resistance



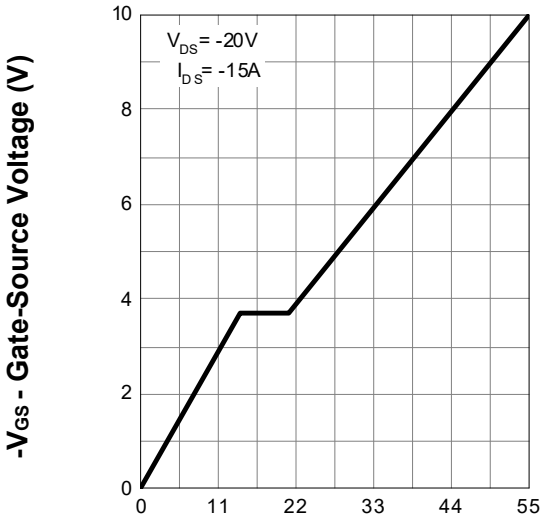
Body Diode Characteristics



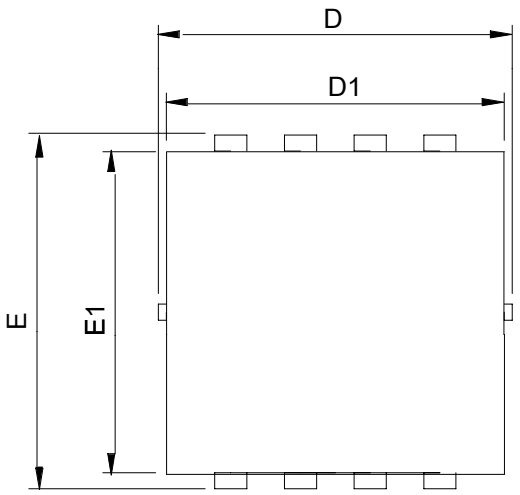
Capacitance



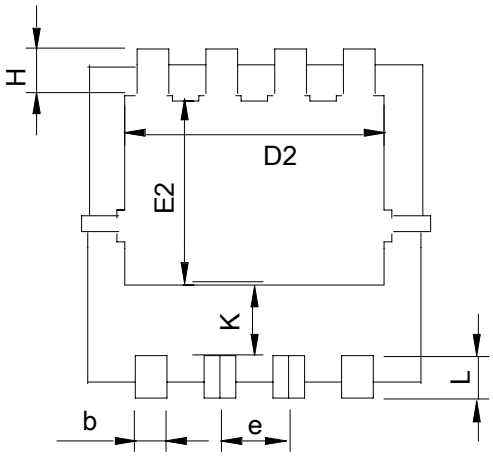
Gate Charge



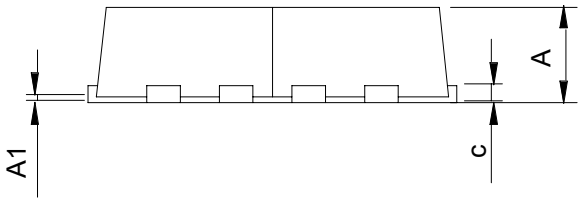
Package Information : PDFN3.3x3.3-8L



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