General Description

This MOSFET 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.

Features

- Low gate charge
- 100% UIS tested, 100% DVDS tested
- High power and current handing capability
- Lead free product is acquired

RoHS compliant

Applications

- Load switch
- DC/DC converter for LCD display

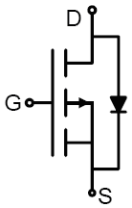
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	-40	V
$R_{DS(ON),\ max}$ @ V_{GS}=-10V	13	mΩ

Marking Information

Product Name	Package	Marking
OSH04P13GF	PDFN5X6-8L	OSH04P13G

Package & Pin information



Absolute Maximum Ratings at T_j=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-40	V
Gate-source voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	-40	A
Pulsed Drain Current [1)]	$I_{D,pulse}$	-160	A
Power Dissipation	P_D	35	W
Single pulsed avalanche energy [2)]	E_{AS}	272	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	3.5	°C/W

Electrical Characteristics at T_j=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	-40			V	V_{GS}=0 V, I_D=-250 μA
Gate threshold voltage	$V_{GS(th)}$	-1.0		-2.5	V	V_{DS}=V_{GS}, I_D=-250 μA
Drain-source on-state resistance	$R_{DS(ON)}$		10.8	13	mΩ	V_{GS}=-10 V, I_D=-20 A
Drain-source on-state resistance	$R_{DS(ON)}$		14.6	18	mΩ	V_{GS}=-4.5 V, I_D=-20 A
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=20 V, V_{DS}=0 V
				-100		V_{GS}=-20 V, V_{DS}=0 V
Drain-source leakage current	I_{DSS}			-1	μA	V_{DS}=-40 V, V_{GS}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		3241		pF	V_{GS}=0 V, V_{DS}=-20 V, f=1.0 MHz
Output capacitance	C_{oss}		228		pF	
Reverse transfer capacitance	C_{rss}		205		pF	
Gate resistance	R_g		4.5		Ω	V_{GS}=0 V, V_{DS}=0 V, f=1.0 MHz
Turn-on Delay Time	$t_{d(on)}$		18		ns	V_{GS}=-10 V, V_{DS}=-20 V, R_L=1 Ω, R_{GEN}=3 Ω
Turn-on Rise Time	t_r		4.8		ns	
Turn-Off Delay Time	$t_{d(off)}$		88.8		ns	
Turn-Off Fall Time	t_f		26.4		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		60		nC	V_{GS}=-10 V, V_{DS}=-20 V, I_D=-20 A
Gate-Source Charge	Q_{gs}		8.6		nC	
Gate-Drain Charge	Q_{gd}		13.9		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			-51	A	T_A=25°C
Diode forward voltage [3]	V_{SD}			-1.2	V	I_S=-20 A, V_{GS}=0 V
Reverse Recovery Time	trr		17.3		ns	I_F=-10 A, di/dt=100 A/us
Reverse Recovery Charge	Qrr		9.5		nC	

Note: 1) Pulse width limited by maximum allowable junction temperature.

2) E_{AS} condition: T_J=25℃,V_{DD}=-40V,V_G=-10V, Rg=25Ω, L=0.5mH.

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

Electrical Characteristics Diagrams

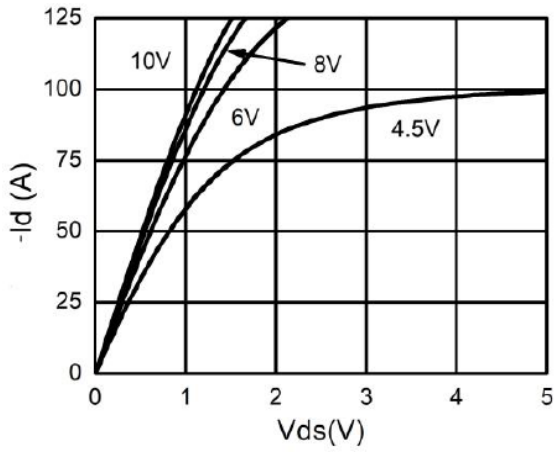


Figure 1. Typ. output characteristics

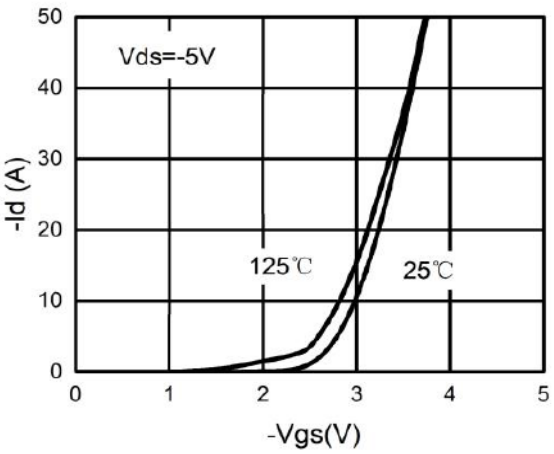


Figure 2. Typ. transfer characteristics

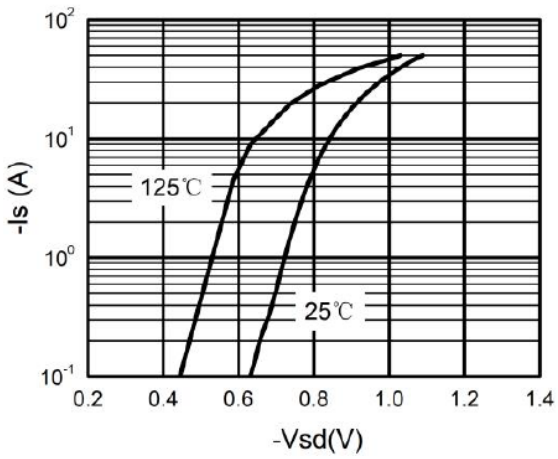


Figure 3. Body-diode characteristics

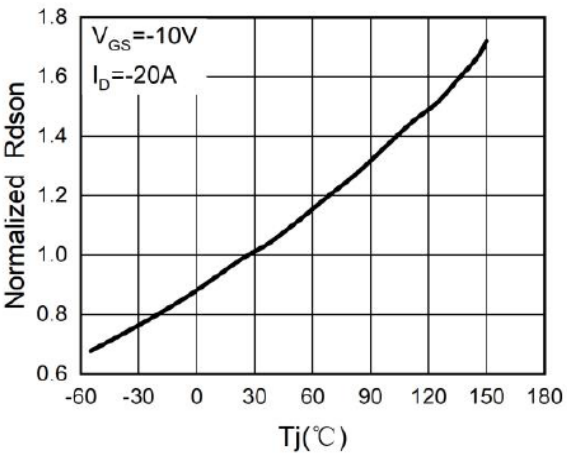


Figure 4. $R_{DS(ON)}$ vs junction temperature

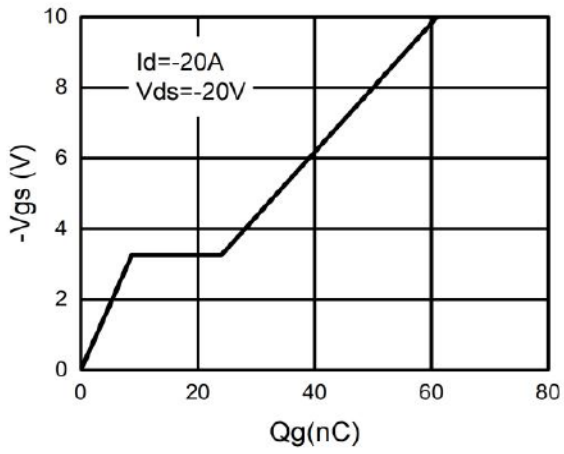


Figure 5. Gate charge waveforms

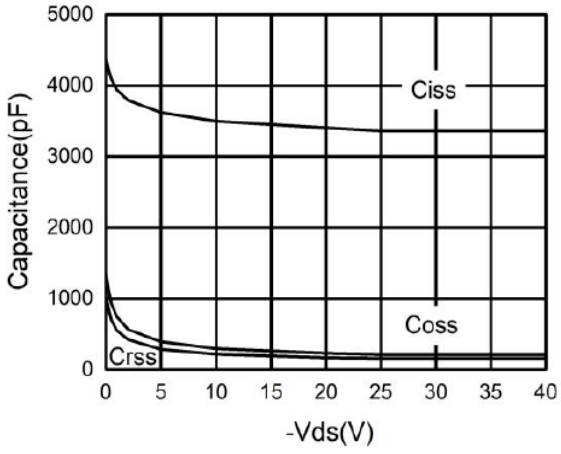
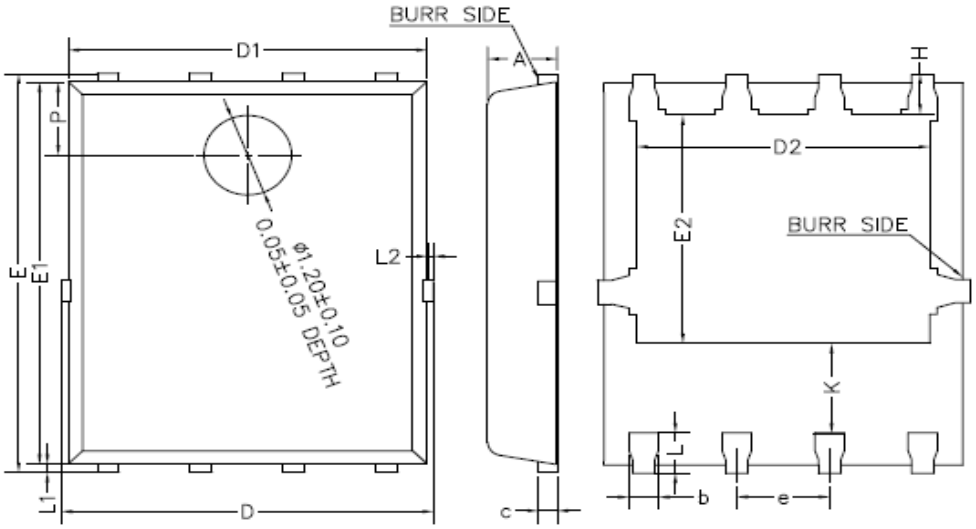
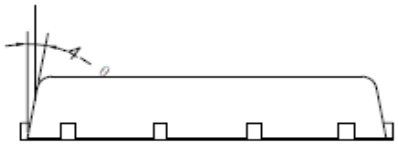


Figure 6. Capacitance

Package Information





Symbol	mm		
	Min.	Typ.	Max.
A	1.000	1.100	1.200
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	-	-	5.100
D1	4.900	4.950	5.000
D2	3.910	4.010	4.110
e	1.17	1.27	1.37
E	5.900	6.000	6.100
E1	5.700	5.750	5.800
E2	3.340	3.440	3.540
H	0.510	0.610	0.710
K	1.100	-	-
L	0.510	0.610	0.710
L1	0.060	0.130	0.200
L2	-	-	0.150
P	1.00	1.10	1.20
θ	8°	10°	12°

Version1: PDFN5X6-G package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
PDFN5X6-G	5000	2	10000	6	60000

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