

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
- High power and current handing capability
- Lead free product is acquired

Applications

- Load switch
- PWM application
- Power management



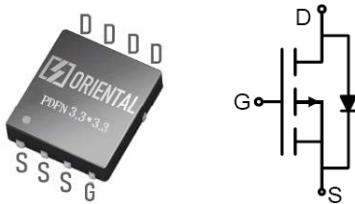
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	-30	V
$R_{DS(ON), max @ V_{GS}=-10V}$	14	m Ω

Marking Information

Product Name	Package	Marking
OSH03P13NF	PDFN3.3×3.3	0313

Package & Pin information



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-30	V
Gate-source voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	-46	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	-184	A
Power Dissipation	P_D	48	W
Single pulsed avalanche energy ²⁾	E_{AS}	80	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	2.6	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	-30			V	$V_{GS}=0\text{ V}, I_D=-250\ \mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	-1.0		-2.5	V	$V_{DS}=V_{GS}, I_D=-250\ \mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		11.5	14	$\text{m}\Omega$	$V_{GS}=-10\text{ V}, I_D=-6\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		16	20	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}, I_D=-4\text{ A}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$
				-100		$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$
Drain-source leakage current	I_{DSS}			-1	μA	$V_{DS}=-30\text{ V}, V_{GS}=0\text{ V}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		1470		pF	$V_{GS}=0\text{ V}$, $V_{DS}=-15\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		165		pF	
Reverse transfer capacitance	C_{rss}		131		pF	
Gate resistance	R_g		13		Ω	$V_{GS}=0\text{ V}$, $V_{DS}=0\text{ V}$, $f=1.0\text{ MHz}$
Turn-on Delay Time	$t_{d(on)}$		14.6		ns	$V_{GS}=-10\text{ V}$, $V_{DS}=-15\text{ V}$, $R_L=2.5\ \Omega$, $R_{GEN}=3\ \Omega$
Turn-on Rise Time	t_r		3		ns	
Turn-Off Delay Time	$t_{d(off)}$		91.2		ns	
Turn-Off Fall Time	t_f		35.6		ns	

Gate Charge Characteristics

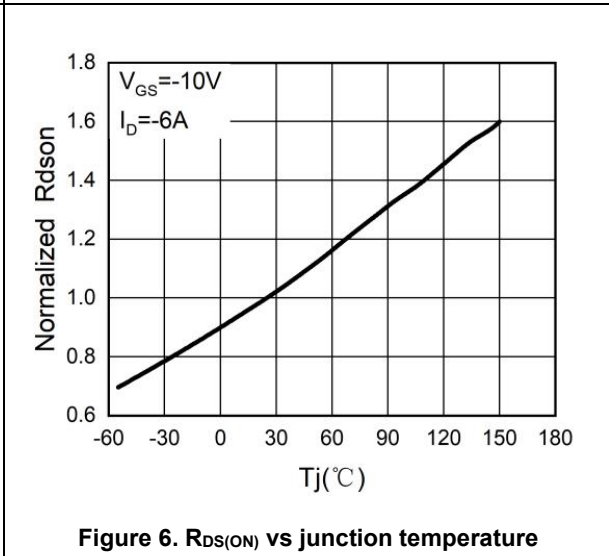
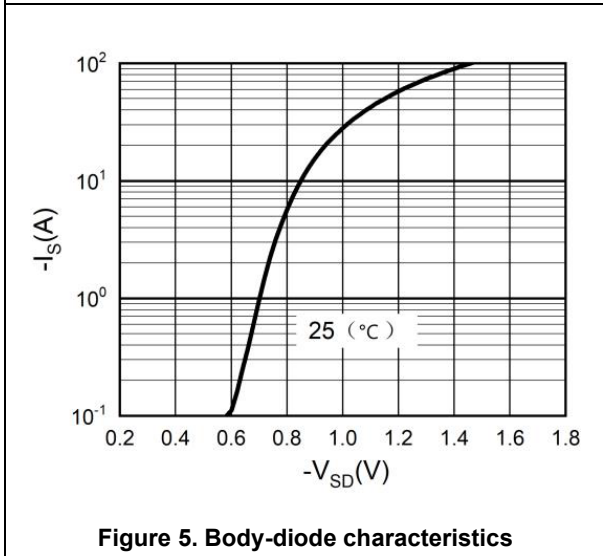
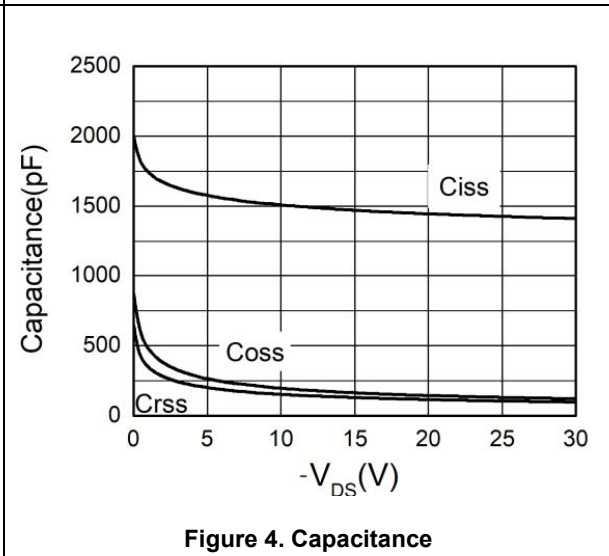
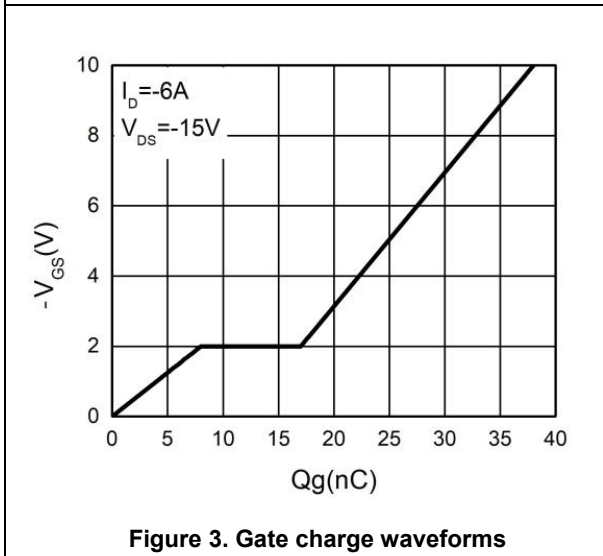
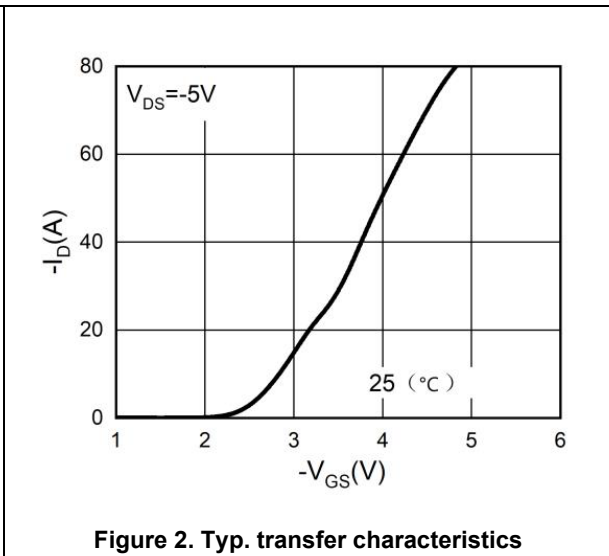
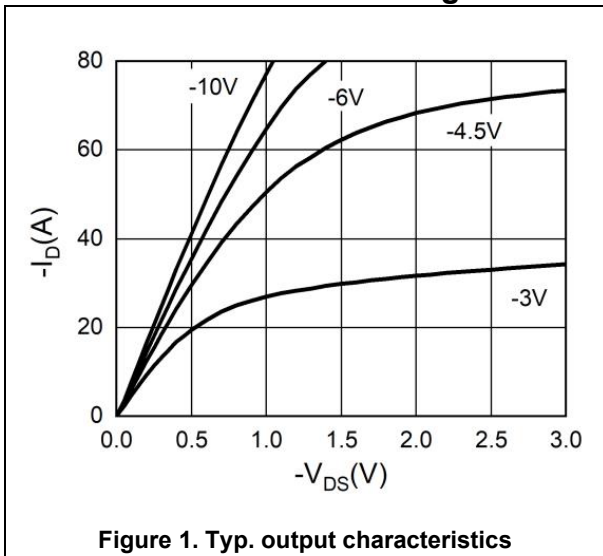
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		38		nC	$V_{GS}=-10\text{ V}$, $V_{DS}=-15\text{ V}$, $I_D=-6\text{ A}$
Gate-Source Charge	Q_{gs}		8		nC	
Gate-Drain Charge	Q_{gd}		9		nC	

Body Diode Characteristics

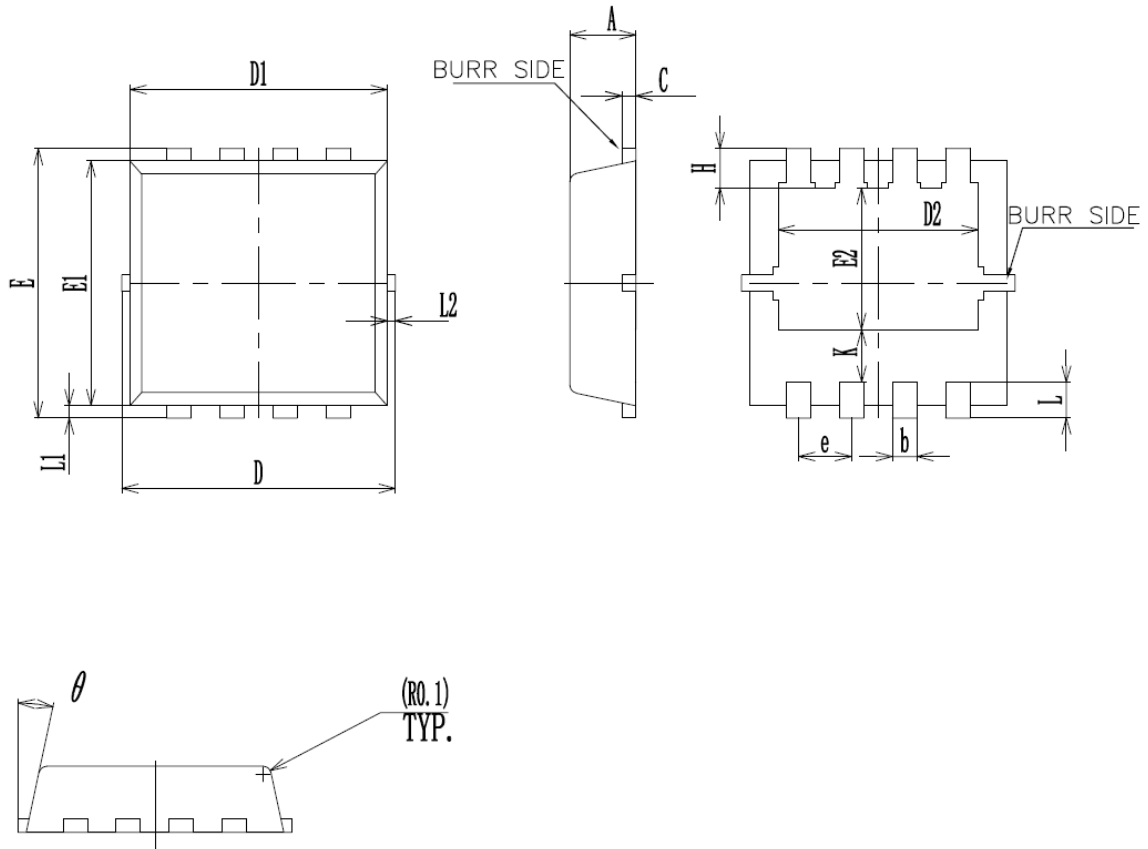
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			-46	A	$T_A=25^\circ\text{C}$
Diode forward voltage ³⁾	V_{SD}			-1.2	V	$I_S=-6\text{ A}$, $V_{GS}=0\text{ V}$
Reverse Recovery Time	t_{rr}		14.2		ns	$I_F=-3\text{ A}$, $di/dt=-100\text{ A/us}$
Reverse Recovery Charge	Q_{rr}		5		nC	

- Note:**
- 1) Pulse width limited by maximum allowable junction temperature.
 - 2) E_{AS} condition: $T_J=25^\circ\text{C}$, $V_{DD}=-30\text{ V}$, $V_G=-10\text{ V}$, $R_g=25\ \Omega$, $L=0.5\text{ mH}$.
 - 3) Repetitive Rating: Pulse width limited by maximum junction temperature.

Electrical Characteristics Diagrams



Package Information



Symbol	mm		
	Min.	Typ.	Max.
A	0.70	0.80	0.90
b	0.25	0.30	0.35
c	0.14	0.152	0.20
D	3.15	3.30	3.45
D1	3.05	3.15	3.25
D2	2.35	2.45	2.55
e	0.65BSC		
E	3.20	3.30	3.40
E1	2.90	3.00	3.10
E2	1.64	1.74	1.84
H	0.38	0.48	0.58
K	0.59	0.69	0.79
L	0.25	0.40	0.55
L1	0.10	0.15	0.20
L2	-	-	0.15
θ	8°	10°	12°

Version1: PDFN3.3x3.3-G package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
PDFN3.3×3.3-G	5000	2	10000	6	60000

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