

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

Applications

- DC/DC converter
- Ideal for high-frequency switching and synchronous rectification



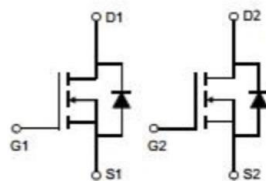
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(ON), max} @ V_{GS}=10V$	14.1	$m\Omega$

Marking Information

Product Name	Package	Marking
OSH06N12GCF	PDFN5×6	OSH06N12GC

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}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	44	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	176	A
Power Dissipation	P_D	57	W
Single pulsed avalanche energy ²⁾	E_{AS}	135.2	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	$R_{\theta JC}$	2.2	$^{\circ}\text{C/W}$

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}	60			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.0		2.5	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		11.8	14.1	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=20\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		14.2	17	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}, I_D=15\text{ A}$
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	$V_{DS}=60\text{ V}, V_{GS}=0\text{ V}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		2411		pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		124		pF	
Reverse transfer capacitance	C_{rss}		116		pF	
Gate resistance	R_g		1.4		Ω	$V_{GS}=0\text{ V}$, $V_{DS}=0\text{ V}$, $f=1.0\text{ MHz}$
Turn-on Delay Time	$t_{d(on)}$		4.3		ns	$V_{GS}=10\text{ V}$, $V_{DS}=30\text{ V}$, $R_L=1.5\ \Omega$, $R_{GEN}=6\ \Omega$
Turn-on Rise Time	t_r		16		ns	
Turn-Off Delay Time	$t_{d(off)}$		6.5		ns	
Turn-Off Fall Time	t_f		24		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		47.5		nC	$V_{GS}=10\text{ V}$, $V_{DS}=30\text{ V}$, $I_D=20\text{ A}$
Gate-Source Charge	Q_{gs}		14.5		nC	
Gate-Drain Charge	Q_{gd}		12.7		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			44	A	$T_A=25^\circ\text{C}$
Diode forward voltage ³⁾	V_{SD}			0.99	V	$I_S=20\text{ A}$, $V_{GS}=0\text{ V}$
Reverse Recovery Time	t_{rr}		24		ns	$I_F=20\text{ A}$, $di/dt=100\text{ A/us}$
Reverse Recovery Charge	Q_{rr}		9.3		nC	

Note: 1) Pulse width limited by maximum allowable junction temperature.
 2) EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=40\text{ V}$, $V_G=10\text{ V}$, $R_g=25\ \Omega$, $L=0.5\text{ mH}$.
 3) Repetitive Rating: Pulse width limited by maximum junction temperature.

Electrical Characteristics Diagrams

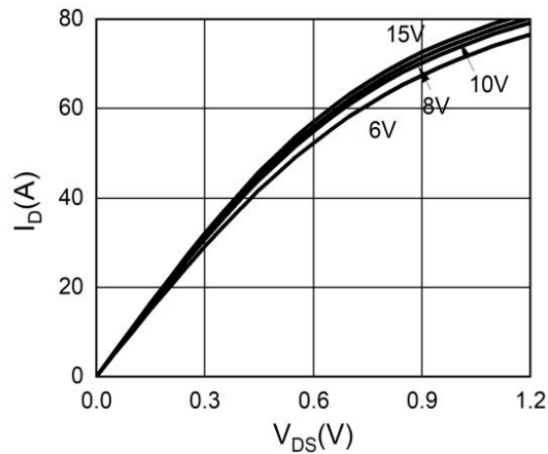


Figure 1. Typ. output characteristics

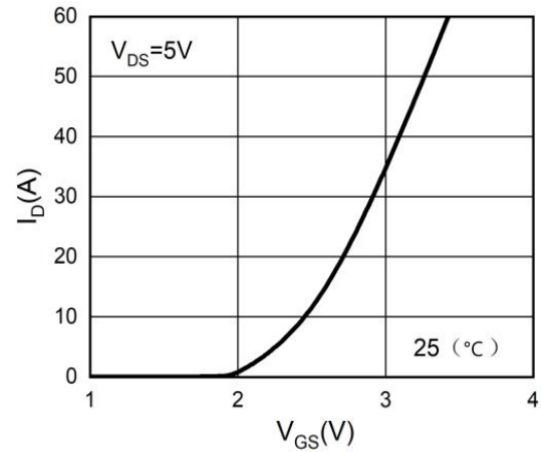


Figure 2. Typ. transfer characteristics

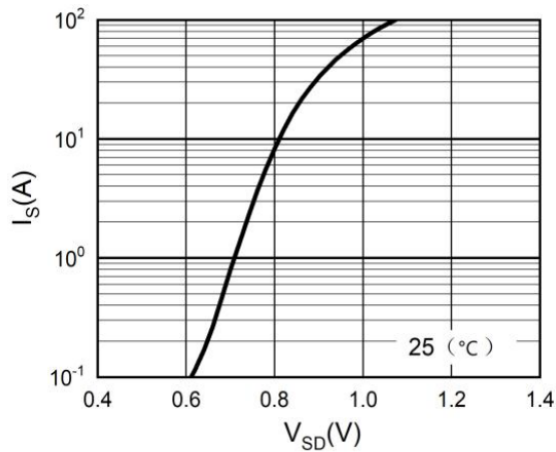


Figure 3. Body-diode characteristics

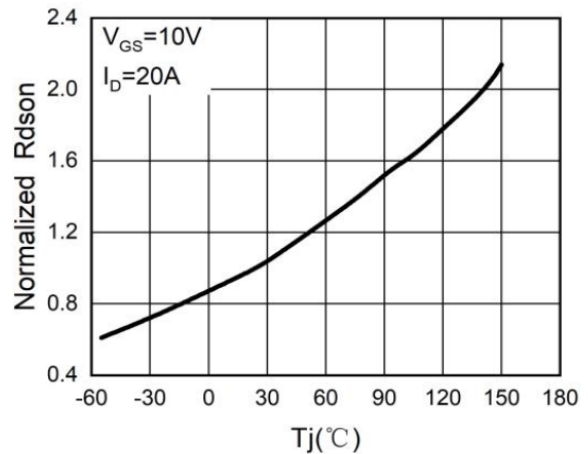


Figure 4. $R_{DS(ON)}$ vs junction temperature

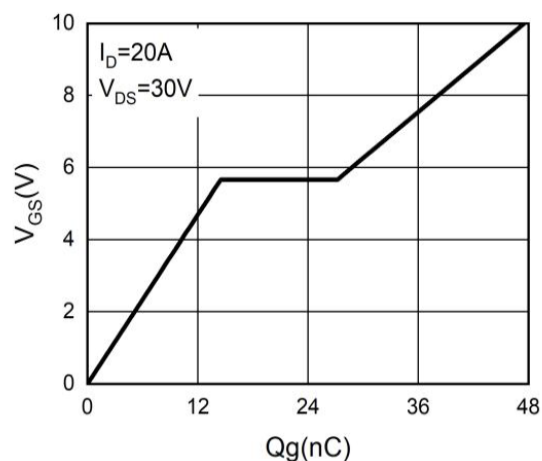


Figure 5. Gate charge waveforms

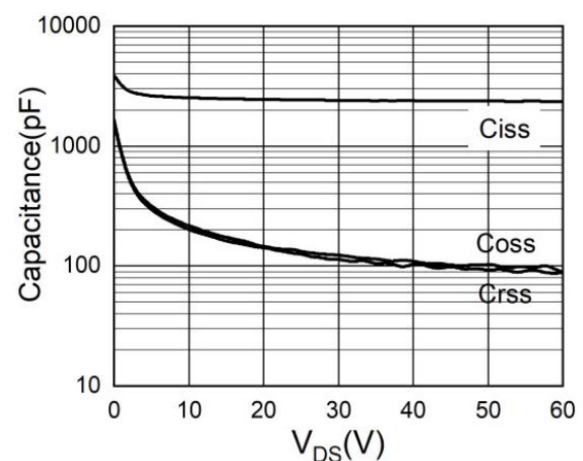
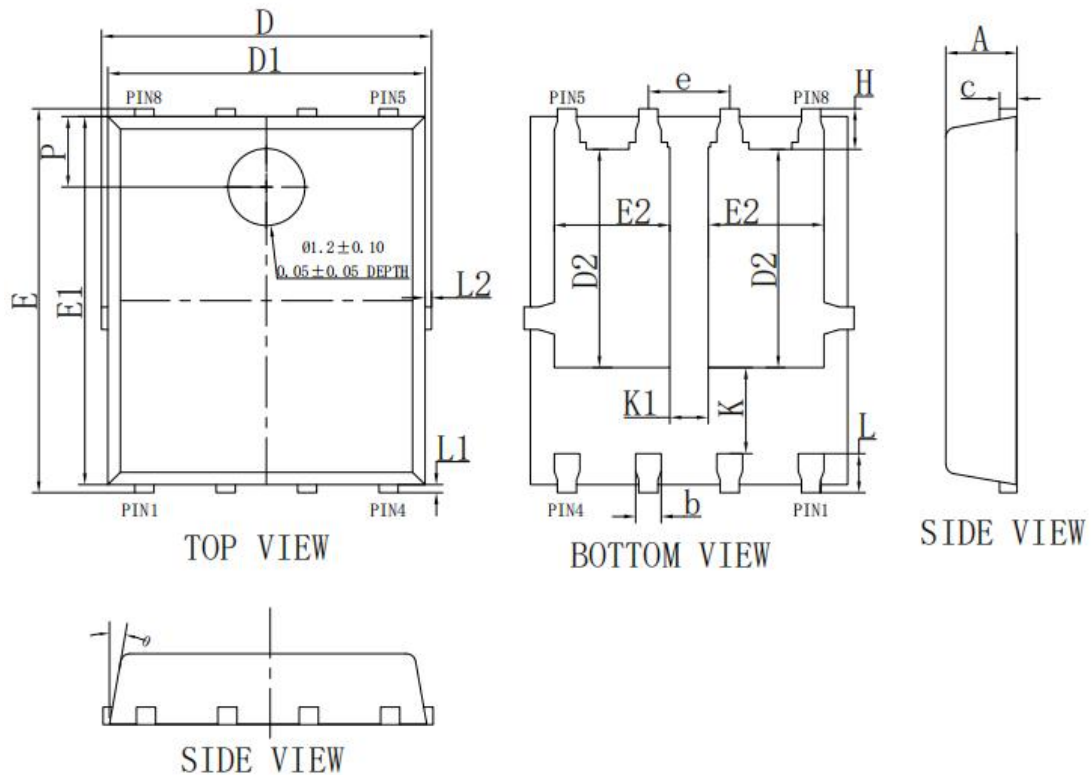


Figure 6. Capacitance

Package Information



Symbol	mm		
	Min.	Typ.	Max.
A	1.00	1.10	1.20
D	-	-	5.10
D1	4.90	4.95	5.00
D2	3.31	3.41	3.51
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	1.71	1.81	1.91
H	0.51	0.61	0.71
b	0.35	0.40	0.45
c	0.21	0.25	0.34
e	1.17	1.27	1.37
K	1.50	1.55	1.65
K1	0.50	0.60	0.70
L	0.35	0.40	0.50
L1	0.06	0.13	0.20
L2	-	-	0.15
P	1.00	1.10	1.20
θ	8°	10°	12°

Version: PDFN5×6-G package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
PDFN5×6-G	5000	2	10000	6	60000

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