

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

Applications

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



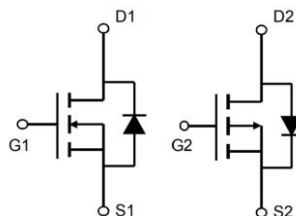
Key Performance Parameters

Parameter	Channel	Value	Unit
V_{DS}	N	40	V
V_{DS}	P	-40	V
$R_{DS(ON), max} @ V_{GS}=10V$	N	12.6	mΩ
$R_{DS(ON), max} @ V_{GS}=-10V$	P	31.6	mΩ

Marking Information

Product Name	Package	Marking
OSH04R30GCF	PDFN5×6	OSH04R30GC

Package & Pin information



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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-source voltage	V_{DS}	40	-40	V
Gate-source voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current	I_D	34	-21	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	136	-84	A
Power Dissipation	P_D	25	23	W
Operation and storage temperature	T_{stg}, T_j	-55 to 150	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Channel	Value	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	N	5.1	$^{\circ}\text{C/W}$
Thermal resistance, junction-to-case	$R_{\theta JC}$	P	5.4	$^{\circ}\text{C/W}$

N-CH 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}	40			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.0		2.0	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		9.7	12.6	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=8\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		13.3	17.7	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}, I_D=4\text{ A}$
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	$V_{DS}=40\text{ V}, V_{GS}=0\text{ V}$

N-CH Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		1160		pF	$V_{GS}=0\text{ V}$, $V_{DS}=20\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		84		pF	
Reverse transfer capacitance	C_{rss}		70		pF	
Turn-on Delay Time	$t_{d(on)}$		4.6		ns	$V_{GS}=10\text{ V}$, $V_{DD}=20\text{ V}$, $R_L=1.3\ \Omega$, $R_{GEN}=3\ \Omega$
Turn-on Rise Time	t_r		12		ns	
Turn-Off Delay Time	$t_{d(off)}$		18.8		ns	
Turn-Off Fall Time	t_f		6		ns	

N-CH Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		24.5		nC	$V_{GS}=10\text{ V}$, $V_{DS}=20\text{ V}$, $I_D=15\text{ A}$
Gate-Source Charge	Q_{gs}		3.7		nC	
Gate-Drain Charge	Q_{gd}		6.3		nC	

N-CH Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			34	A	$T_A=25^\circ\text{C}$
Diode forward voltage ²⁾	V_{SD}			1.2	V	$I_S=8\text{ A}$, $V_{GS}=0\text{ V}$

P-CH 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}	-40			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	$R_{DS(ON)}$		24.3	31.6	$\text{m}\Omega$	$V_{GS}=-10\text{ V}$, $I_D=-7\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		31.2	41.5	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}$, $I_D=-4\text{ A}$
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	$V_{DS}=-40\text{ V}$, $V_{GS}=0\text{ V}$

P-CH Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		1010		pF	$V_{GS}=0\text{ V}$, $V_{DS}=-20\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		96		pF	
Reverse transfer capacitance	C_{rss}		83		pF	
Turn-on Delay Time	$t_{d(on)}$		10		ns	$V_{GS}=-10\text{ V}$, $V_{DS}=-20\text{ V}$, $R_L=6.7\text{ }\Omega$, $R_{GEN}=3\text{ }\Omega$
Turn-on Rise Time	t_r		15		ns	
Turn-Off Delay Time	$t_{d(off)}$		38		ns	
Turn-Off Fall Time	t_f		16.4		ns	

P-CH Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		60		nC	$V_{GS}=-10\text{ V}$, $V_{DS}=-20\text{ V}$, $I_D=-3\text{ A}$
Gate-Source Charge	Q_{gs}		8.5		nC	
Gate-Drain Charge	Q_{gd}		13		nC	

P-CH Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			-21	A	$T_A=25^{\circ}\text{C}$
Diode forward voltage ²⁾	V_{SD}			-1.2	V	$I_S=-7\text{ A}$, $V_{GS}=0\text{ V}$

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

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

N- Channel Electrical Characteristics Diagrams

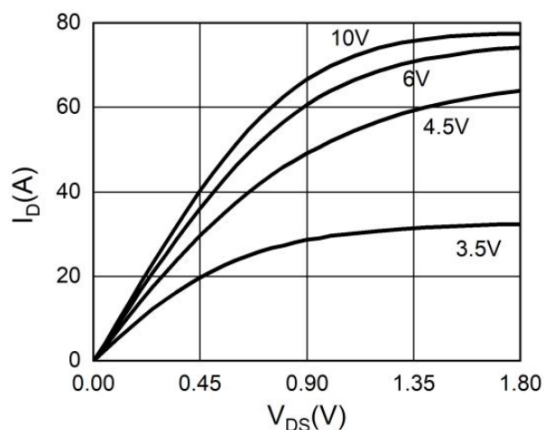


Figure 1. Typ. output characteristics

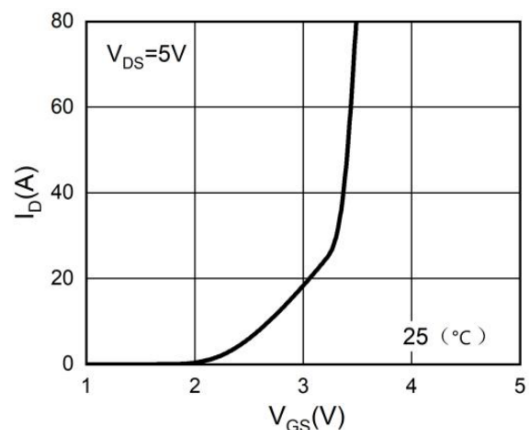


Figure 2. Typ. transfer characteristics

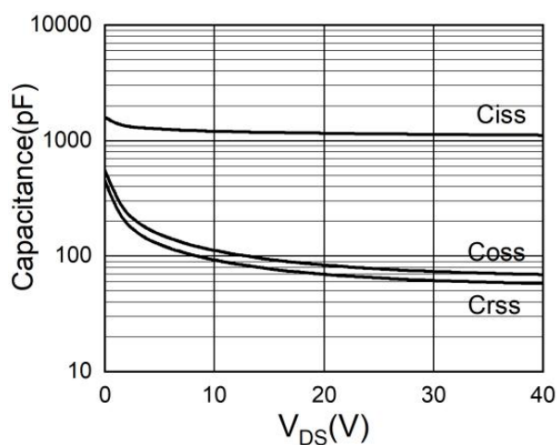


Figure 3. Typ. capacitances

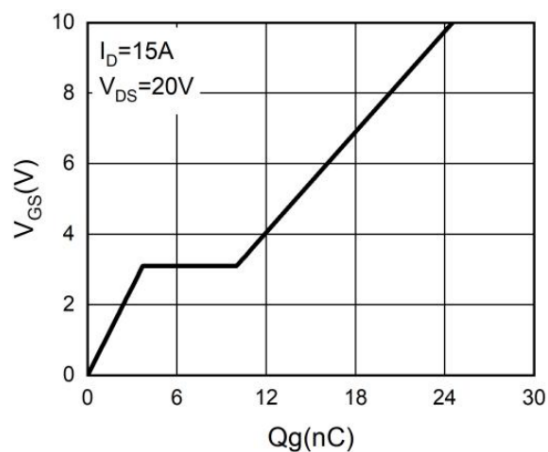


Figure 4. Gate charge

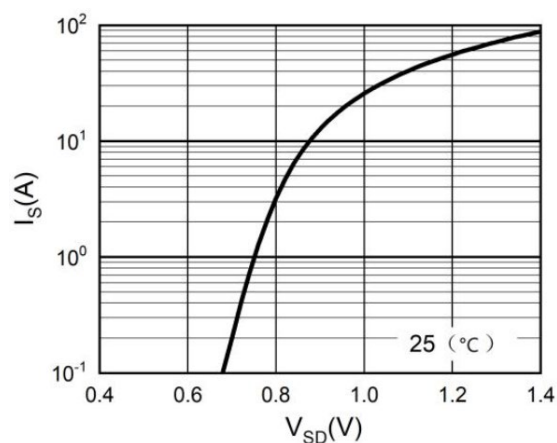


Figure 5. Body-diode characteristics

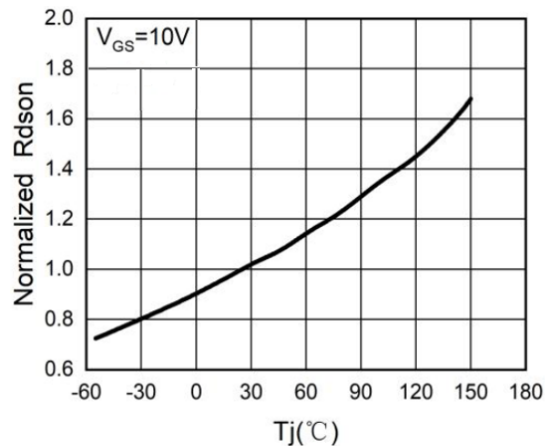


Figure 6. $R_{DS(on)}$ vs junction temperature

P- Channel Electrical Characteristics Diagrams

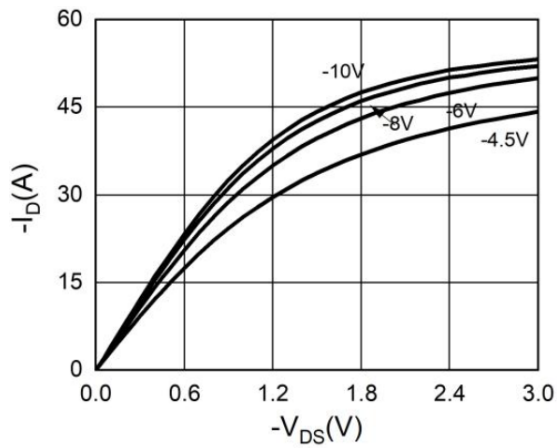


Figure 1. Typ. output characteristics

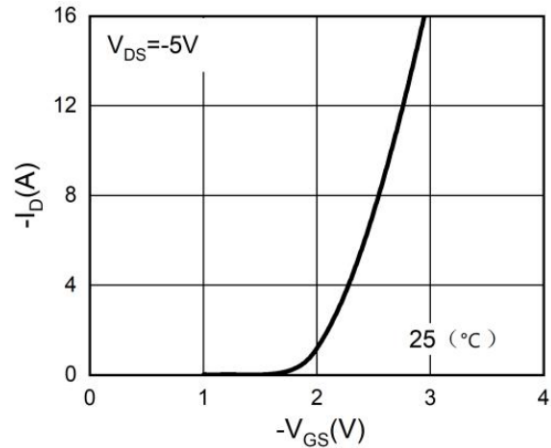


Figure 2. Typ. transfer characteristics

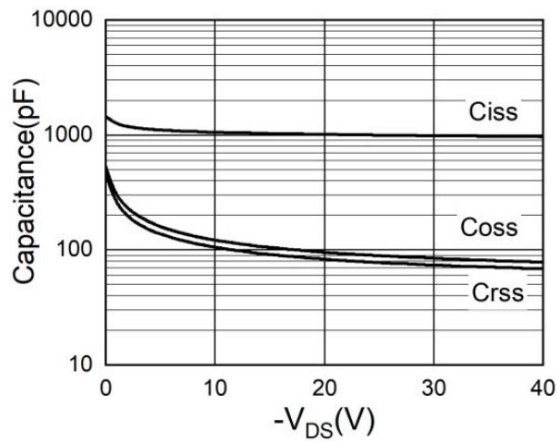


Figure 3. Capacitance

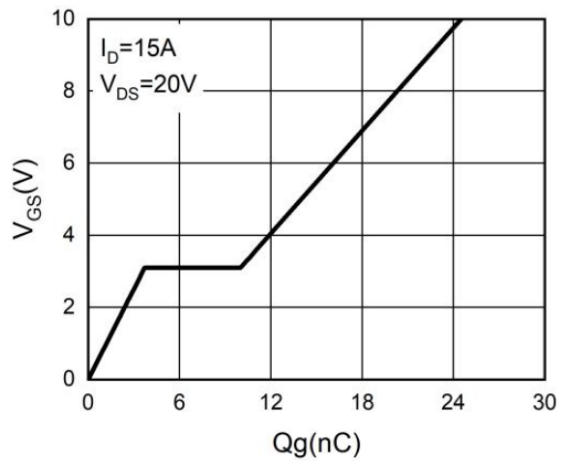


Figure 4. Gate charge

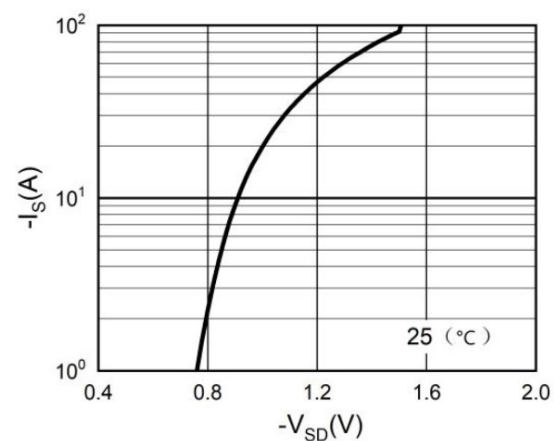


Figure 5. Body-diode characteristics

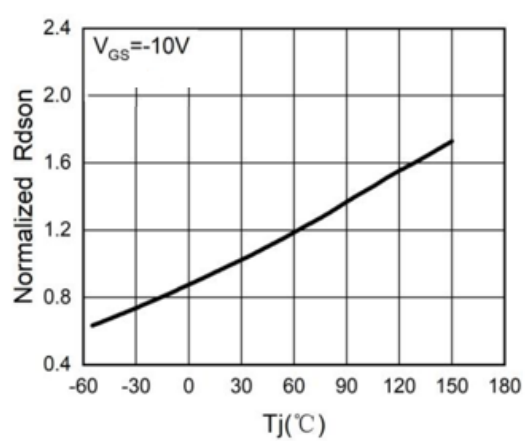
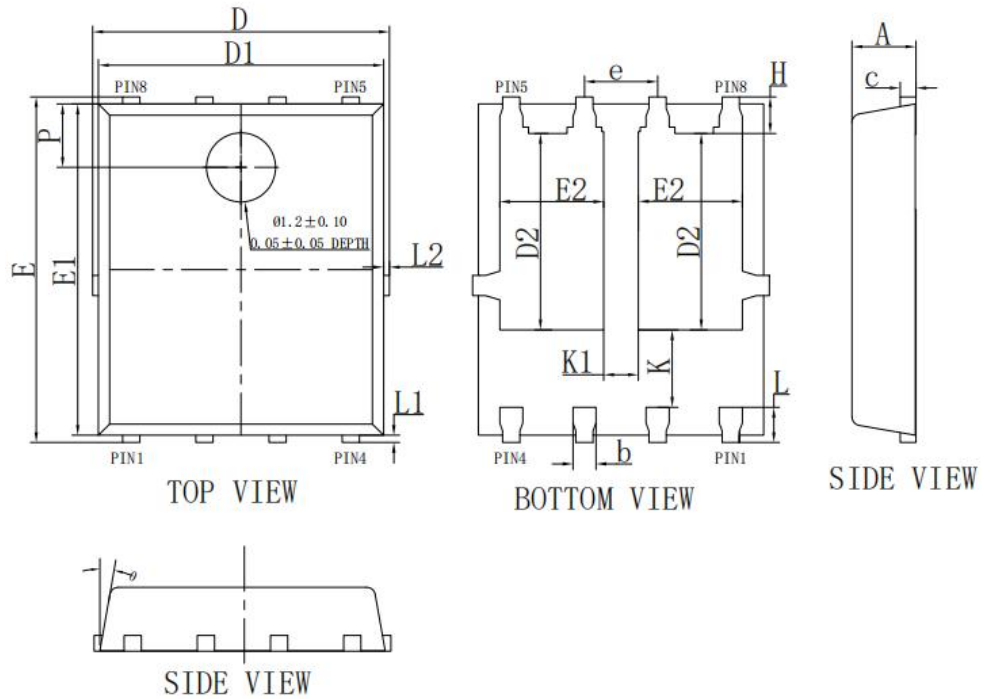


Figure 6. $R_{DS(ON)}$ vs junction temperature



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

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Oriental Semiconductor hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

For further information on technology, delivery terms and conditions and prices, please contact the Oriental Semiconductor sales representatives (www.orientalsemi.com).

© Oriental Semiconductor Co.,Ltd. All Rights Reserved 