

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 battery protection or in other switching application.

Features

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

Applications

- General purpose applications
- Hard switched and high frequency circuits



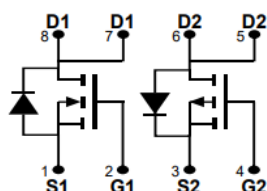
Key Performance Parameters

Parameter	Channel	Value	Unit
V_{DS}	N	30	V
V_{DS}	P	-30	V
$R_{DS(ON), max} @ V_{GS}=10V$	N	15	mΩ
$R_{DS(ON), max} @ V_{GS}=-10V$	P	36	mΩ

Marking Information

Product Name	Package	Marking
OSH03R30NCF	PDFN3.3×3.3	0330

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}	30	-30	V
Gate-source voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current	I_D	20	-18	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	80	-72	A
Power Dissipation	P_D	35.7	35.7	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	3.5	$^{\circ}\text{C/W}$
Thermal resistance, junction-to-case	$R_{\theta JC}$	P	3.5	$^{\circ}\text{C/W}$

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}	30			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	$R_{DS(ON)}$		10	15	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		16	24	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}, I_D=4\text{ A}$
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	$V_{DS}=30\text{ V}, V_{GS}=0\text{ V}$

N-CH Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		795		pF	$V_{GS}=0\text{ V}$, $V_{DS}=15\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		90		pF	
Reverse transfer capacitance	C_{rss}		78		pF	
Turn-on Delay Time	$t_{d(on)}$		30		ns	$V_{GS}=10\text{ V}$, $V_{DD}=15\text{ V}$, $R_L=0.75\ \Omega$, $R_{GEN}=3\ \Omega$
Turn-on Rise Time	t_r		20		ns	
Turn-Off Delay Time	$t_{d(off)}$		100		ns	
Turn-Off Fall Time	t_f		80		ns	

N-CH Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		30		nC	$V_{GS}=10\text{ V}$, $V_{DS}=15\text{ V}$, $I_D=20\text{ A}$
Gate-Source Charge	Q_{gs}		5		nC	
Gate-Drain Charge	Q_{gd}		5		nC	

N-CH Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			20	A	$T_A=25^\circ\text{C}$
Diode forward voltage ²⁾	V_{SD}			1.2	V	$I_S=5\text{ A}$, $V_{GS}=0\text{ V}$

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}	-30			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	36	$\text{m}\Omega$	$V_{GS}=-10\text{ V}$, $I_D=-5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		31	46	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}$, $I_D=-4\text{ A}$
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	$V_{DS}=-30\text{ V}$, $V_{GS}=0\text{ V}$

P-CH Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		740		pF	$V_{GS}=0\text{ V}$, $V_{DS}=-15\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		53		pF	
Reverse transfer capacitance	C_{rss}		43		pF	
Turn-on Delay Time	$t_{d(on)}$		13.4		ns	$V_{GS}=-15\text{ V}$, $V_{DS}=-10\text{ V}$, $R_L=3\text{ }\Omega$, $R_{GEN}=3\text{ }\Omega$
Turn-on Rise Time	t_r		3.4		ns	
Turn-Off Delay Time	$t_{d(off)}$		42		ns	
Turn-Off Fall Time	t_f		9		ns	

P-CH Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		15		nC	$V_{GS}=-10\text{ V}$, $V_{DS}=-15\text{ V}$, $I_D=-5\text{ A}$
Gate-Source Charge	Q_{gs}		4		nC	
Gate-Drain Charge	Q_{gd}		2		nC	

P-CH Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			-18	A	$T_A=25^{\circ}\text{C}$
Diode forward voltage ²⁾	V_{SD}			-1.2	V	$I_S=-5\text{ A}$, $V_{GS}=0\text{ V}$

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

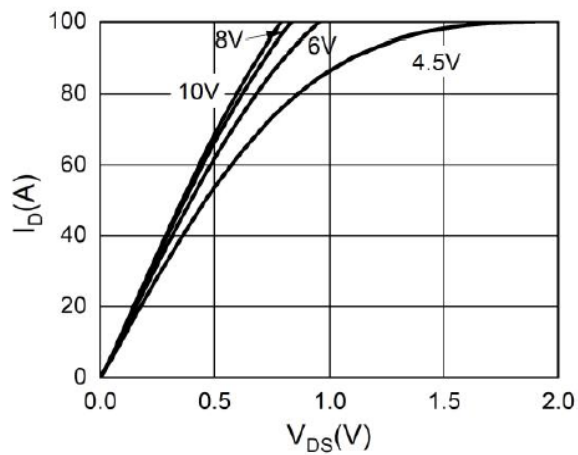


Figure 1. Typ. output characteristics

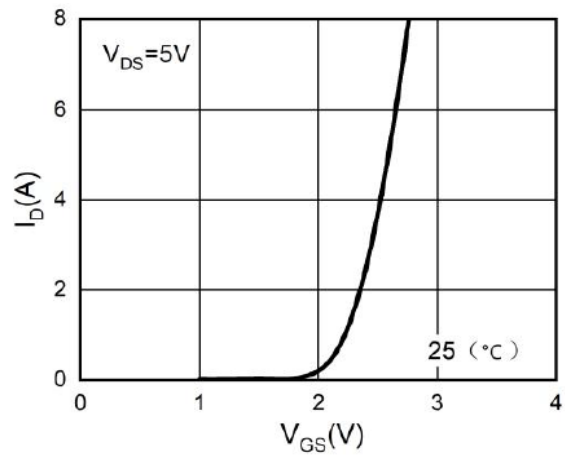


Figure 2. Typ. transfer characteristics

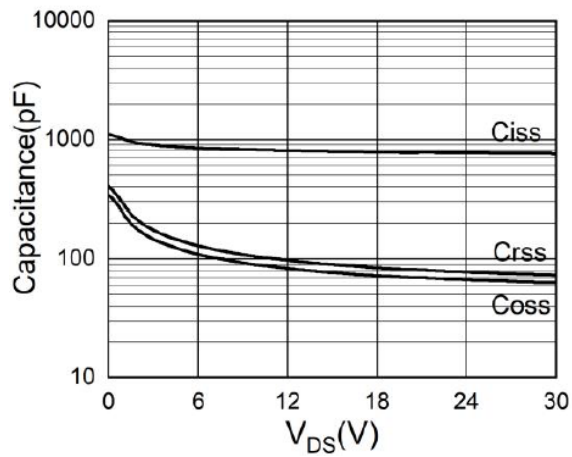


Figure 3. Typ. capacitances

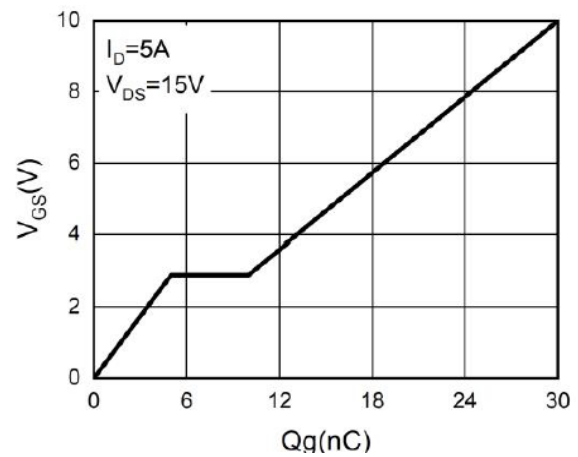


Figure 4. Gate charge

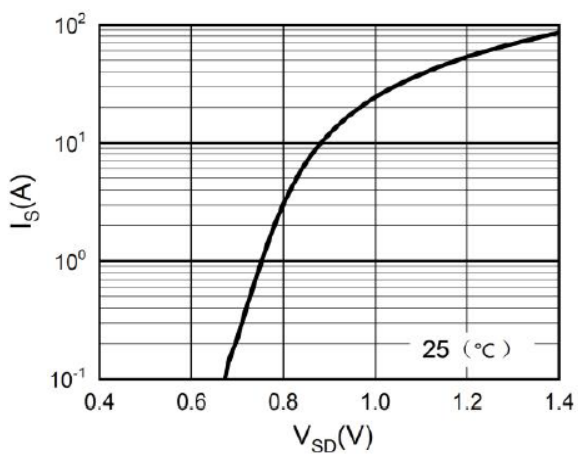


Figure 5. Body-diode characteristics

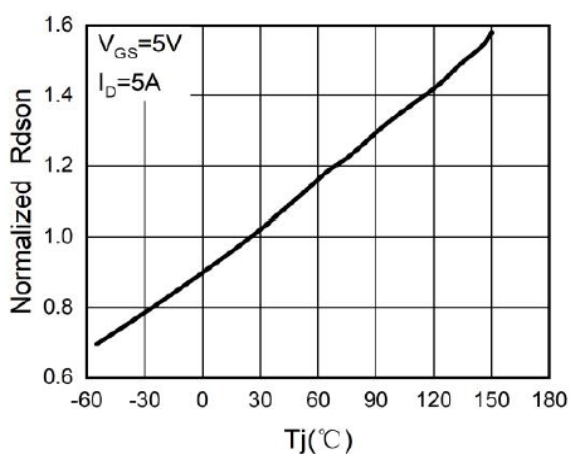


Figure 6. $R_{DS(ON)}$ vs junction temperature

P- Channel Electrical Characteristics Diagrams

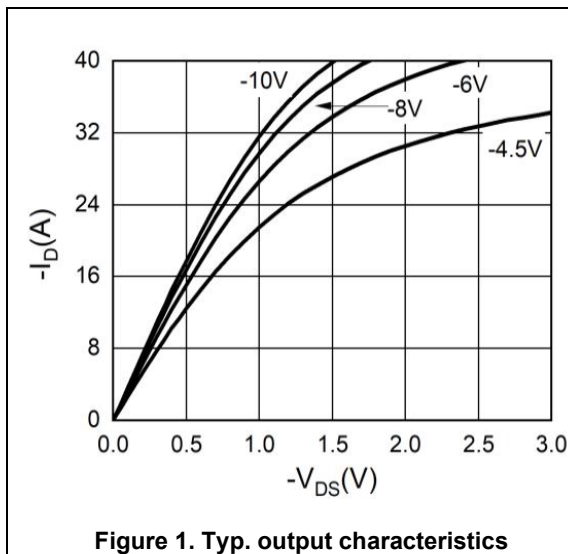


Figure 1. Typ. output characteristics

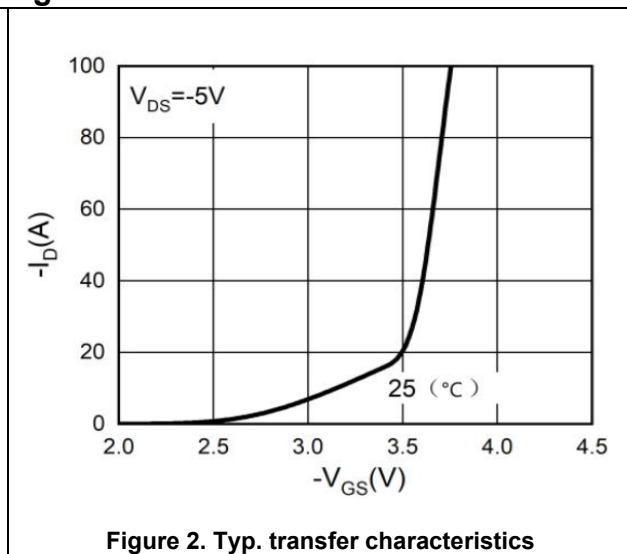


Figure 2. Typ. transfer characteristics

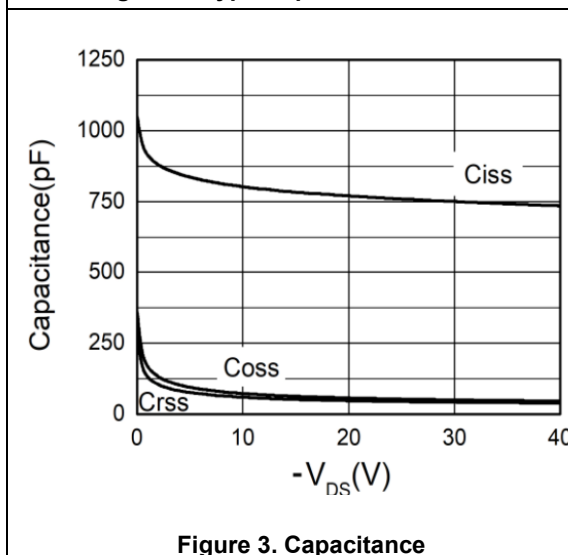


Figure 3. Capacitance

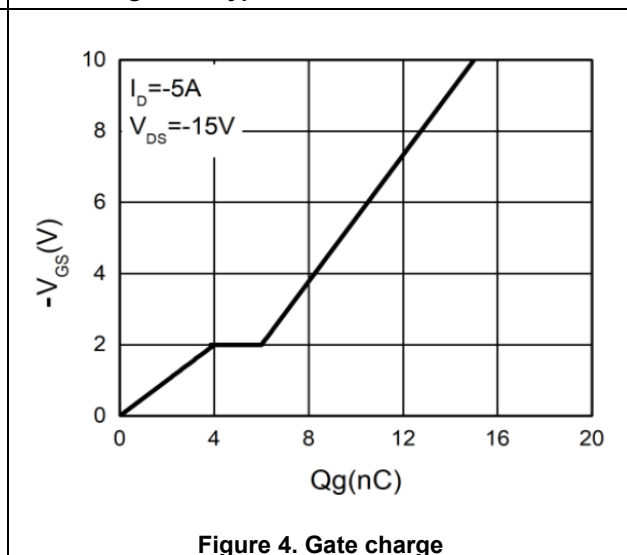


Figure 4. Gate charge

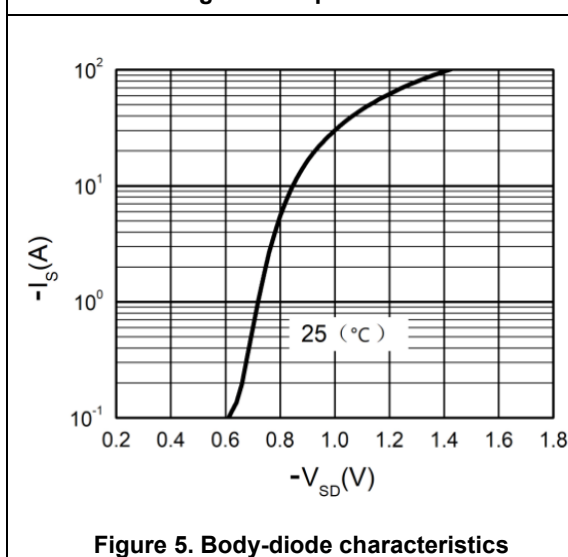


Figure 5. Body-diode characteristics

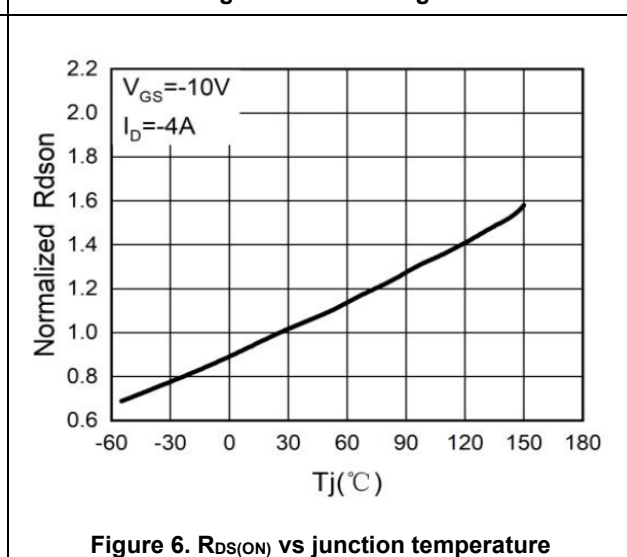
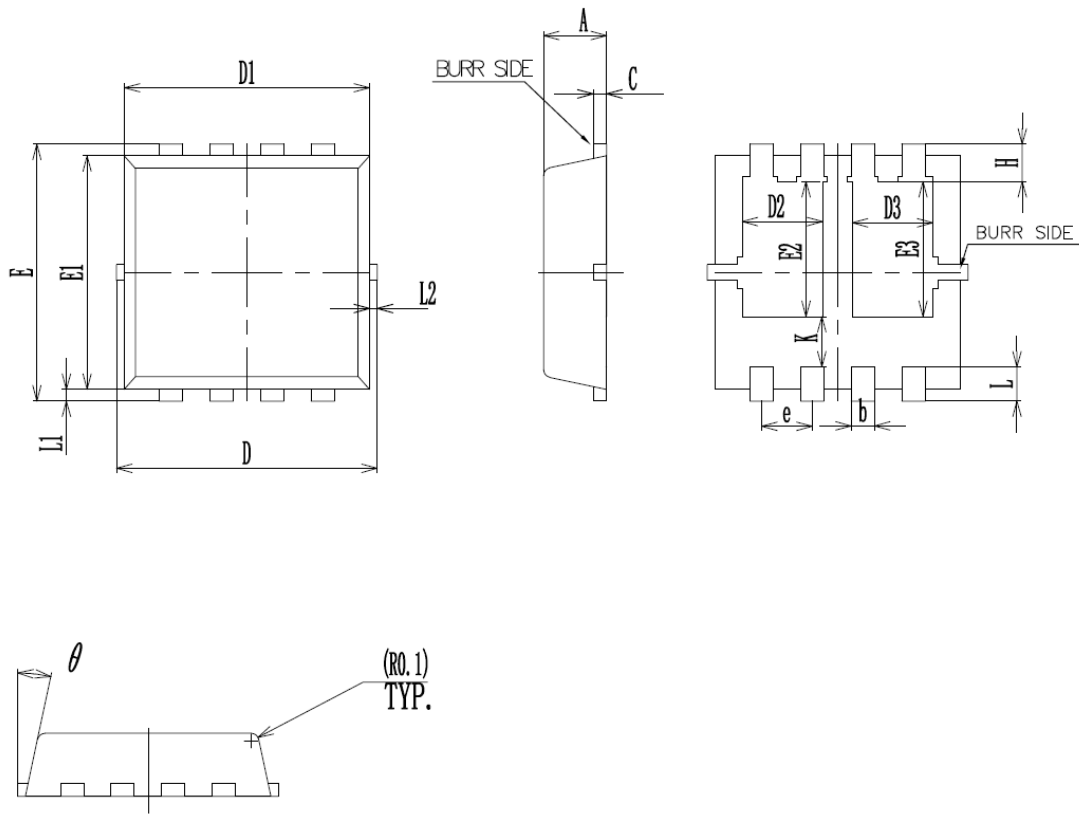


Figure 6. $R_{DS(on)}$ vs junction temperature

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	0.94	1.04	1.14
D3	0.94	1.04	1.14
e	0.65BSC		
E	3.20	3.30	3.40
E1	2.90	3.00	3.10
E2	1.64	1.74	1.84
E3	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°

Version : 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
PDFN3.3X3.3-G	5000	2	10000	6	60000

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