

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 handing capability

Applications

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



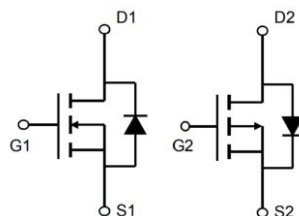
Key Performance Parameters

Parameter	Channel	Value	Unit
V_{DS}	N	40	V
V_{DS}	P	-40	V
$R_{DS(ON), max} @ V_{GS}=4.5V$	N	20.2	m Ω
$R_{DS(ON), max} @ V_{GS}=-4.5V$	P	44	m Ω

Marking Information

Product Name	Package	Marking
OSH04R30BCF	SOP8	OSH04R30BC

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	10	-6.4	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	40	-37.6	A
Power Dissipation	P_D	3.9	3.1	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-ambient	$R_{\theta JA}$	N	32	$^{\circ}\text{C/W}$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	P	40	$^{\circ}\text{C/W}$

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	$R_{DS(ON)}$		15.5	20.2	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=10\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		17.6	22.9	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}, I_D=8\text{ A}$
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}		1314		pF	$V_{GS}=0\text{ V}$, $V_{DS}=20\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		95.4		pF	
Reverse transfer capacitance	C_{rss}		78.5		pF	
Turn-on Delay Time	$t_{d(on)}$		12.6		ns	$V_{GS}=10\text{ V}$, $V_{DD}=20\text{ V}$, $R_L=2\ \Omega$, $R_{GEN}=3\ \Omega$
Turn-on Rise Time	t_r		3.6		ns	
Turn-Off Delay Time	$t_{d(off)}$		30.8		ns	
Turn-Off Fall Time	t_f		3.2		ns	

N-CH Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		24.5		nC	$V_{GS}=10\text{ V}$, $V_{DS}=20\text{ V}$, $I_D=10\text{ A}$
Gate-Source Charge	Q_{gs}		3.7		nC	
Gate-Drain Charge	Q_{gd}		6.2		nC	

N-CH Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			10	A	$T_A=25^\circ\text{C}$
Diode forward voltage ²⁾	V_{SD}			1.2	V	$I_S=10\text{ A}$, $V_{GS}=0\text{ V}$

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	$R_{DS(ON)}$		33.8	44.0	$\text{m}\Omega$	$V_{GS}=-10\text{ V}$, $I_D=-5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		45.2	58.8	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}$, $I_D=-4\text{ A}$
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}		3241		pF	$V_{GS}=0\text{ V}$, $V_{DS}=-20\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		228		pF	
Reverse transfer capacitance	C_{rss}		205		pF	
Turn-on Delay Time	$t_{d(on)}$		18		ns	$V_{GS}=-10\text{ V}$, $V_{DS}=-20\text{ V}$, $R_L=4\text{ }\Omega$, $R_{GEN}=3\text{ }\Omega$
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	

P-CH Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		60		nC	$V_{GS}=-10\text{ V}$, $V_{DS}=-20\text{ V}$, $I_D=-5\text{ A}$
Gate-Source Charge	Q_{gs}		8.6		nC	
Gate-Drain Charge	Q_{gd}		13.9		nC	

P-CH Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			-6.4	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

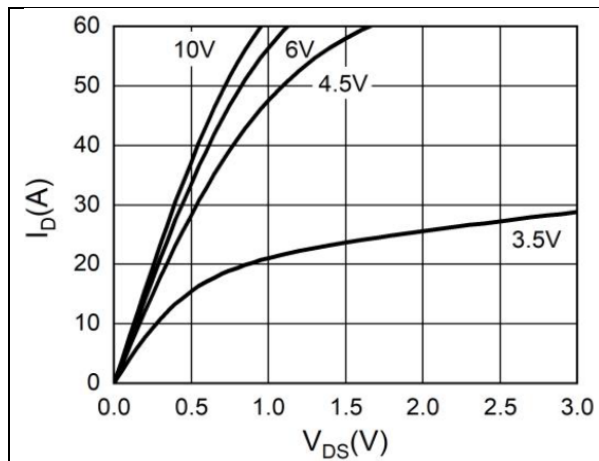


Figure 1. Typ. output characteristics

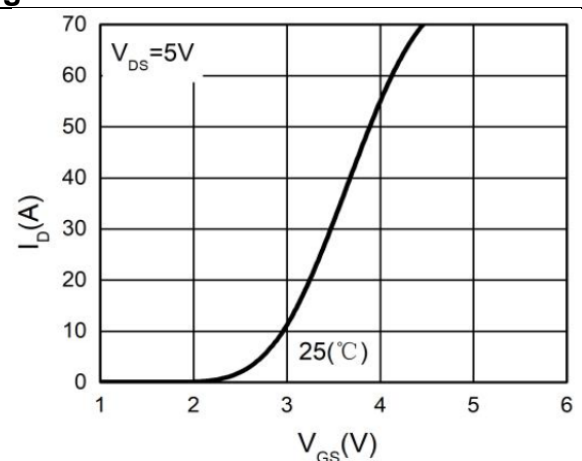


Figure 2. Typ. transfer characteristics

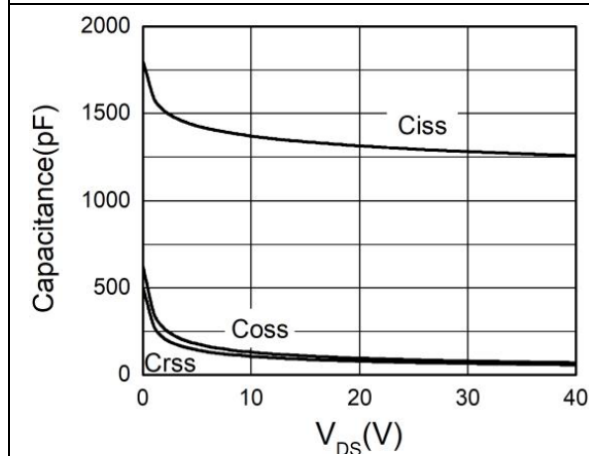


Figure 3. Typ. capacitances

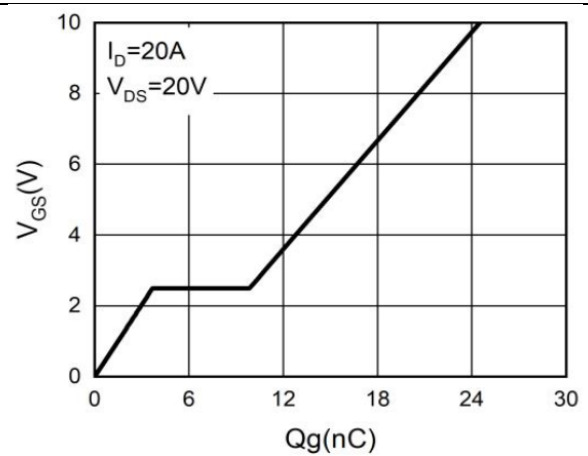


Figure 4. Gate charge

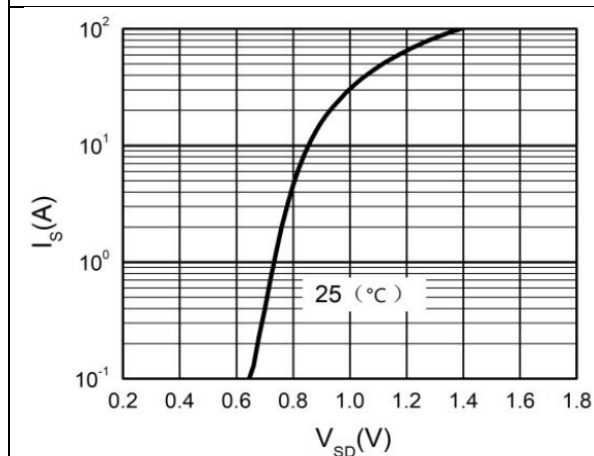


Figure 5. Body-diode characteristics

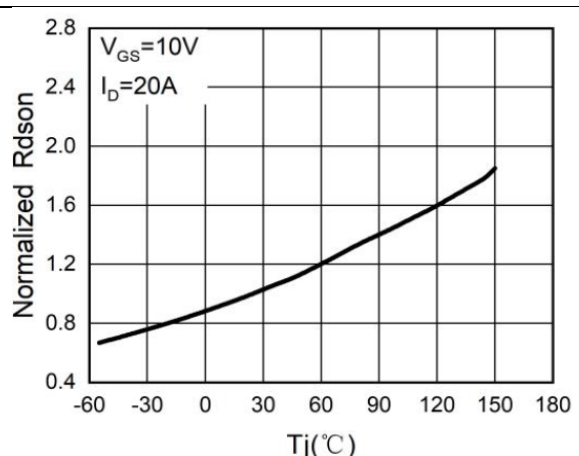


Figure 6. $R_{DS(ON)}$ vs junction temperature

P- Channel Electrical Characteristics Diagrams

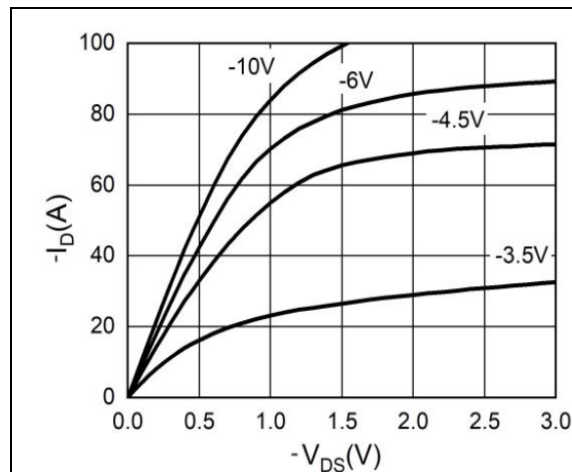


Figure 1. Typ. output characteristics

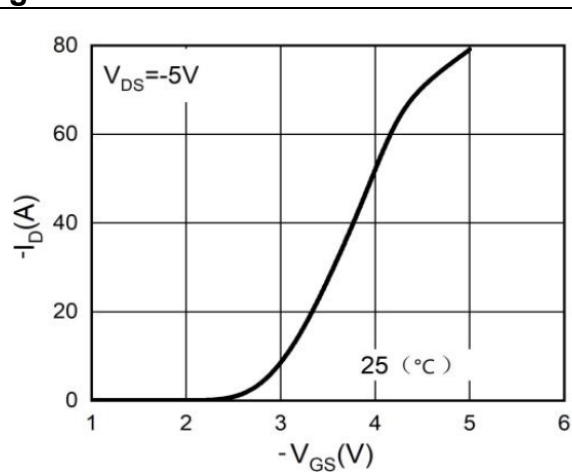


Figure 2. Typ. transfer characteristics

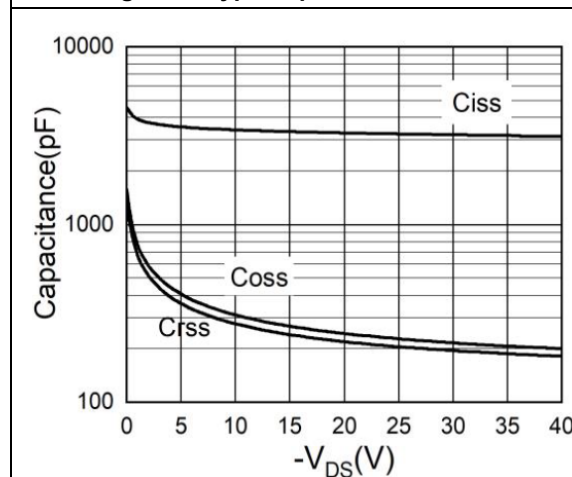


Figure 3. Capacitance

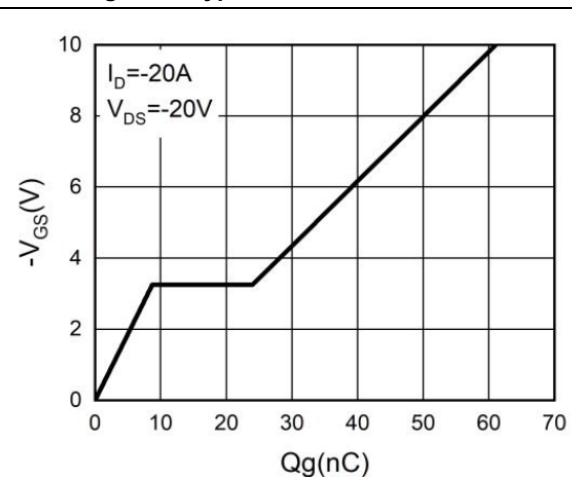


Figure 4. Gate charge

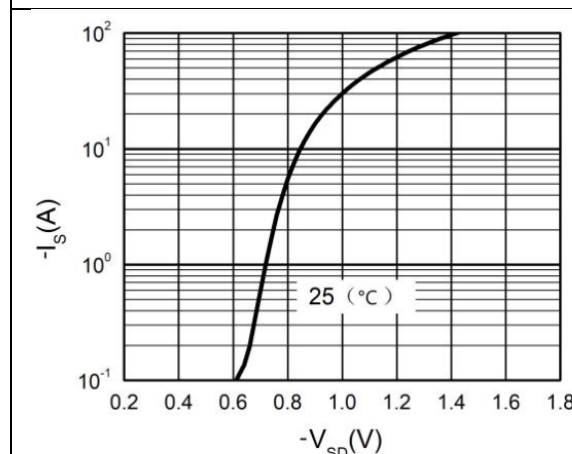


Figure 5. Body-diode characteristics

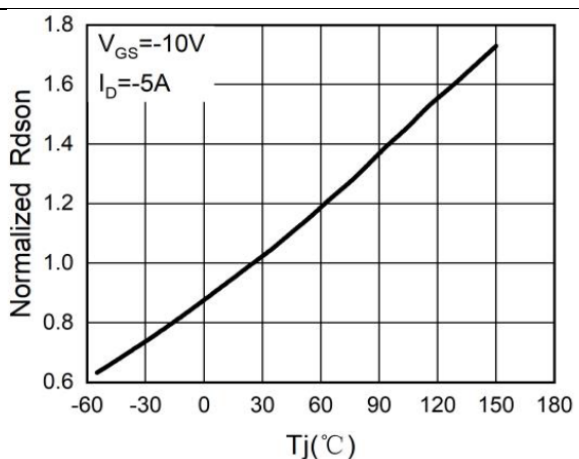
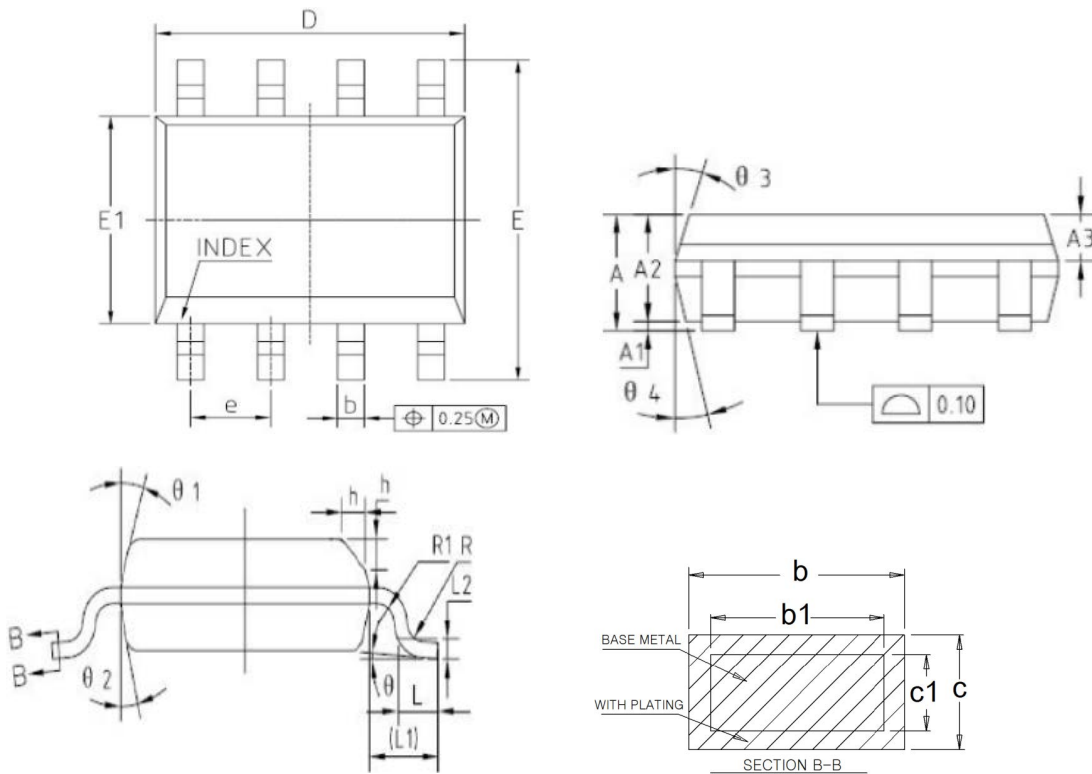


Figure 6. $R_{DS(on)}$ vs junction temperature

Package Information



Symbol	mm		
	Min.	Typ.	Max.
A	1.45	1.55	1.65
A1	0.10	0.15	0.20
A2	1.353	1.40	1.453
A3	0.55	0.60	0.65
b	0.38	-	0.51
b1	0.37	0.42	0.47
c	0.17	-	0.25
c1	0.17	0.20	0.23
D	4.85	4.90	4.95
E	5.85	6.00	6.15
E1	3.85	3.90	3.95
e	1.245	1.27	1.295
L	0.45	0.60	0.75
L1	-	1.040REF	-
L2	-	0.250BSC	-
θ1-θ4	12° REF		
h	0.40 REF		
R	0.15° REF		
R1	0.15° REF		

Version: SOP8-G package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOP8-G	4000	2	8000	6	48000

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 