

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 handling capability
- Lead free product is acquired

Applications

- Load switch
- PWM applications
- Power management



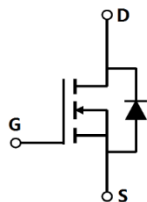
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(ON), max} @ V_{GS}=10V$	12	m Ω

Marking Information

Product Name	Package	Marking
OSH03N12BF	SOP8	OSH03N12B

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	12.5	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	50	A
Power Dissipation	P_D	3	W
Single pulsed avalanche energy ²⁾	E_{AS}	34	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-Ambient	$R_{\theta JA}$	42	$^{\circ}\text{C/W}$

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	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
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	$R_{DS(ON)}$		9	12	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		15	22	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}, I_D=4\text{ A}$
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}		733		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}		72		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	$t_{d(on)}$		4.5		ns	$V_{GS}=10\text{ V}$, $V_{DS}=15\text{ V}$, $R_L=3\text{ }\Omega$, $R_{GEN}=6\text{ }\Omega$
Turn-on Rise Time	t_r		4		ns	
Turn-Off Delay Time	$t_{d(off)}$		20		ns	
Turn-Off Fall Time	t_f		4		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		12		nC	$V_{GS}=10\text{ V}$, $V_{DS}=15\text{ V}$, $I_D=5\text{ A}$
Gate-Source Charge	Q_{gs}		2.2		nC	
Gate-Drain Charge	Q_{gd}		2.5		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			12.5	A	$T_A=25^\circ\text{C}$
Diode forward voltage ²⁾	V_{SD}			1.2	V	$I_S=5\text{ A}$, $V_{GS}=0\text{ V}$
Reverse Recovery Time	t_{rr}		5		ns	$I_F=5\text{ A}$, $di/dt=100\text{ A/us}$
Reverse Recovery Charge	Q_{rr}		6		nC	

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

2) EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=30\text{ V}$, $V_G=10\text{ V}$, $R_g=25\text{ }\Omega$, $L=0.5\text{ mH}$.

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

Electrical Characteristics Diagrams

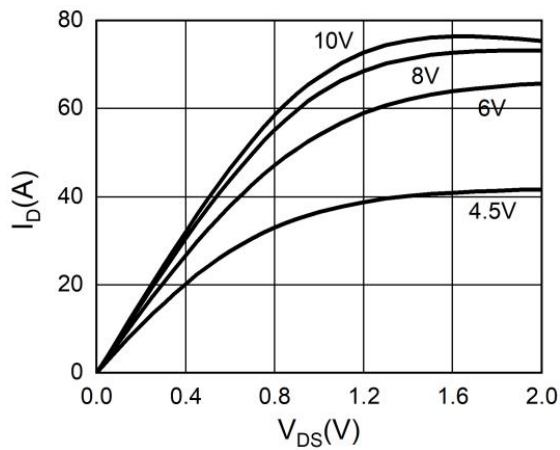


Figure 1. Typ. output characteristics

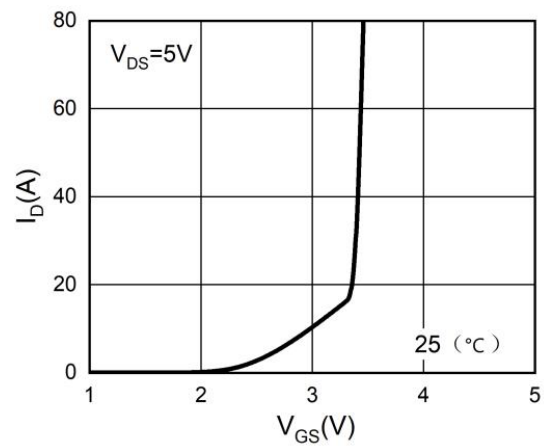


Figure 2. Typ. transfer characteristics

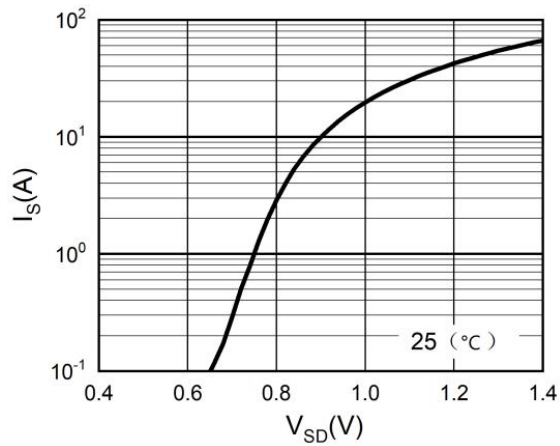


Figure 3. Body-diode characteristics

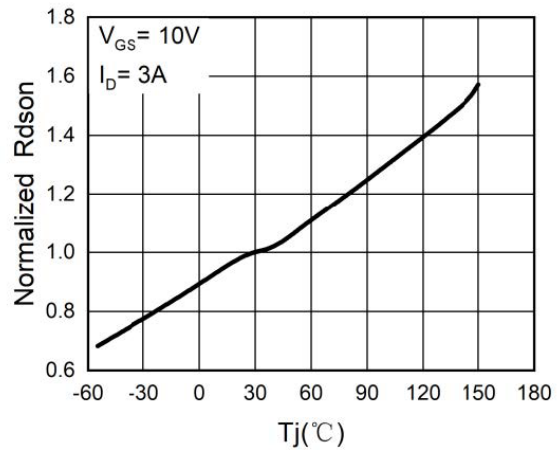


Figure 4. $R_{DS(ON)}$ vs junction temperature

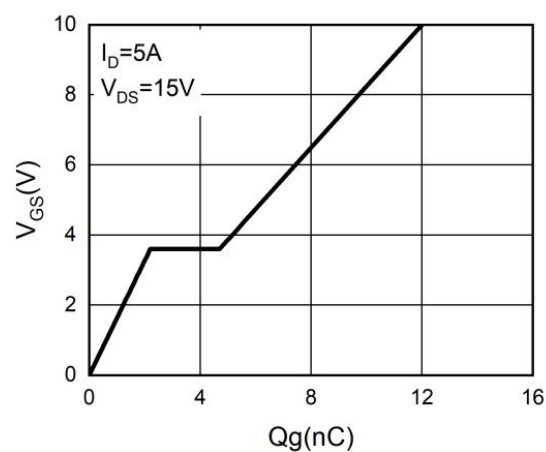


Figure 5. Gate charge waveforms

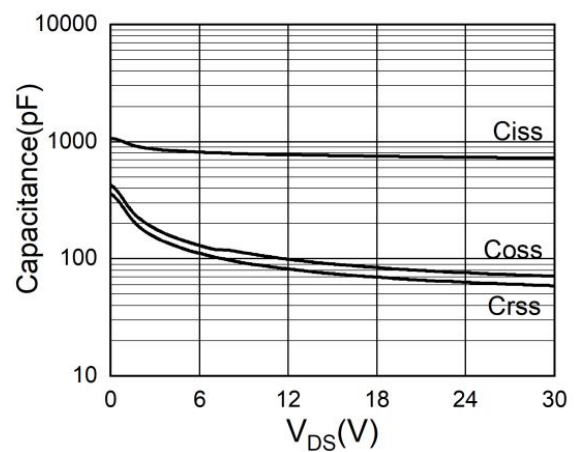
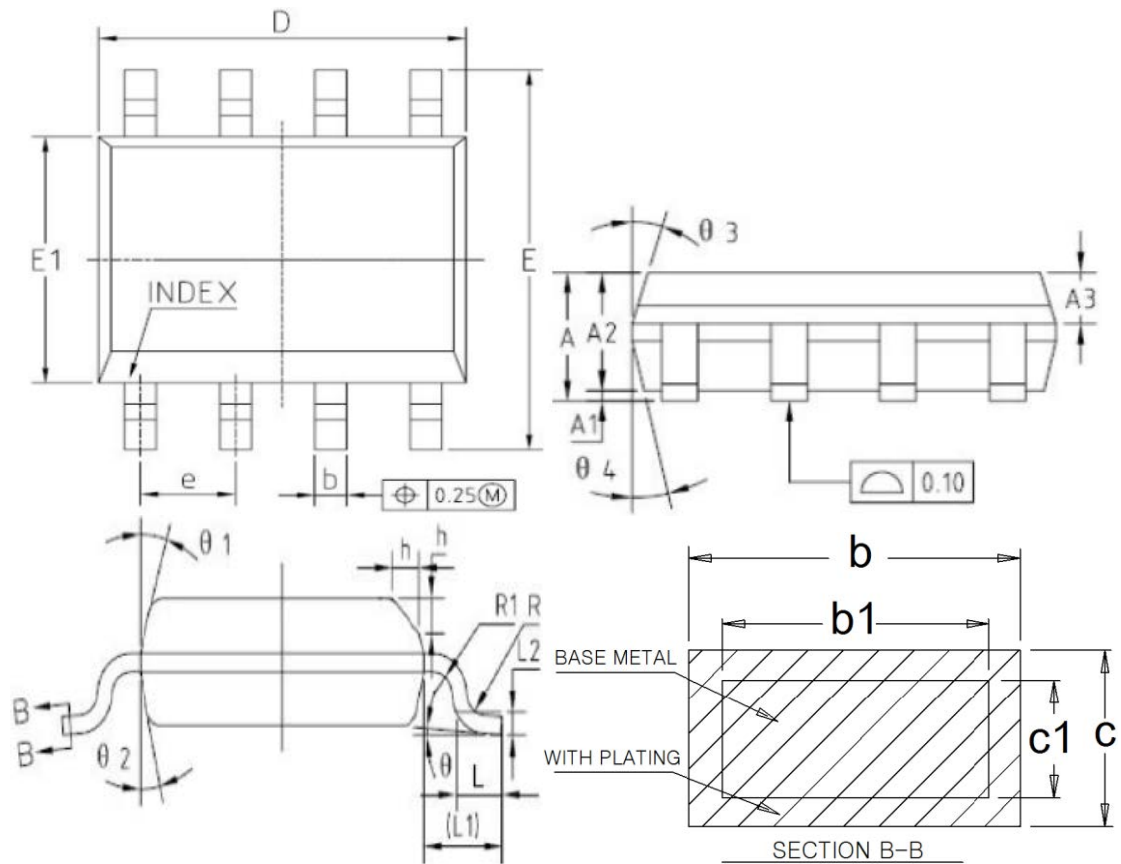


Figure 6. Capacitance

Package Information



Symbol	mm		
	Min.	Typ.	Max.
A	1.45	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	-

Version: SOP-8-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

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