

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 handing capability
- Lead free product is acquired

Applications

- Load switch
- PWM application
- Power management



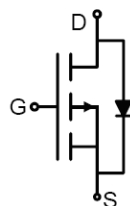
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	-30	V
$R_{DS(ON), max} @ V_{GS} = -10V$	14.4	m Ω

Marking Information

Product Name	Package	Marking
OSH03P13DF	TO252	OSH03P13D

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	-46	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	-184	A
Power Dissipation	P_D	48	W
Single pulsed avalanche energy ²⁾	E_{AS}	80	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	$R_{\theta JC}$	2.6	$^{\circ}\text{C/W}$

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	$R_{DS(ON)}$		12	14.4	$\text{m}\Omega$	$V_{GS}=-10\text{ V}, I_D=-20\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		16	20	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}, I_D=-20\text{ A}$
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}		1470		pF	$V_{GS}=0\text{ V}$, $V_{DS}=-15\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		165		pF	
Reverse transfer capacitance	C_{rss}		131		pF	
Gate resistance	R_g		13		Ω	$V_{GS}=0\text{ V}$, $V_{DS}=0\text{ V}$, $f=1.0\text{ MHz}$
Turn-on Delay Time	$t_{d(on)}$		14.6		ns	$V_{GS}=-10\text{ V}$, $V_{DS}=-15\text{ V}$, $R_L=2.5\text{ }\Omega$, $R_{GEN}=3\text{ }\Omega$
Turn-on Rise Time	t_r		3		ns	
Turn-Off Delay Time	$t_{d(off)}$		91.2		ns	
Turn-Off Fall Time	t_f		35.6		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		38		nC	$V_{GS}=-10\text{ V}$, $V_{DS}=-15\text{ V}$, $I_D=-6\text{ A}$
Gate-Source Charge	Q_{gs}		8		nC	
Gate-Drain Charge	Q_{gd}		9		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			-46	A	$T_A=25^\circ\text{C}$
Diode forward voltage ³⁾	V_{SD}			-1.2	V	$I_S=-20\text{ A}$, $V_{GS}=0\text{ V}$
Reverse Recovery Time	t_{rr}		14.2		ns	$I_F=-3\text{ A}$, $di/dt=-100\text{ A/us}$
Reverse Recovery Charge	Q_{rr}		5		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

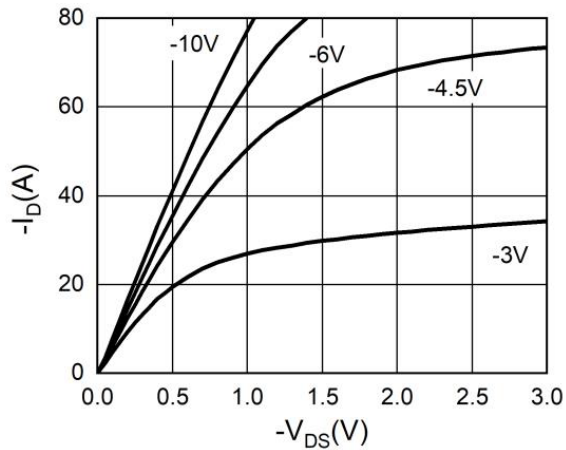


Figure 1. Typ. output characteristics

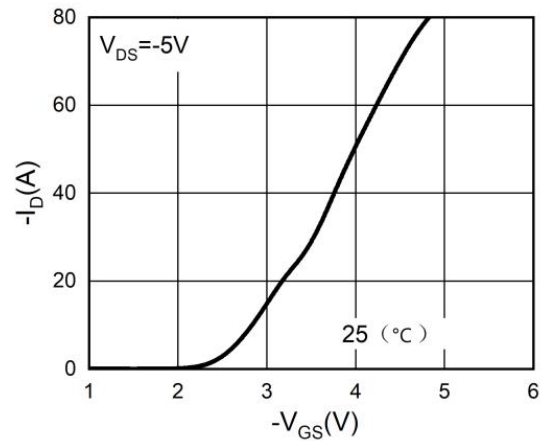


Figure 2. Typ. transfer characteristics

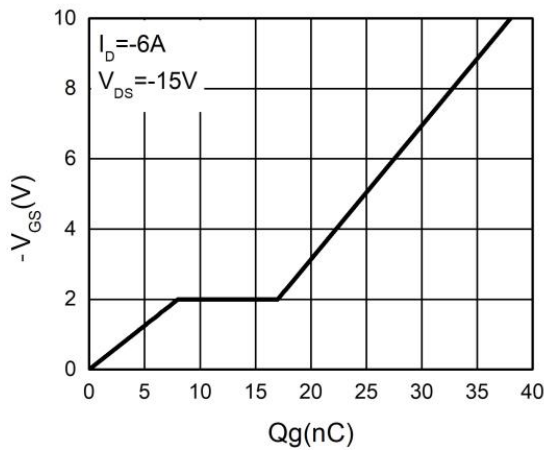


Figure 3. Gate charge waveforms

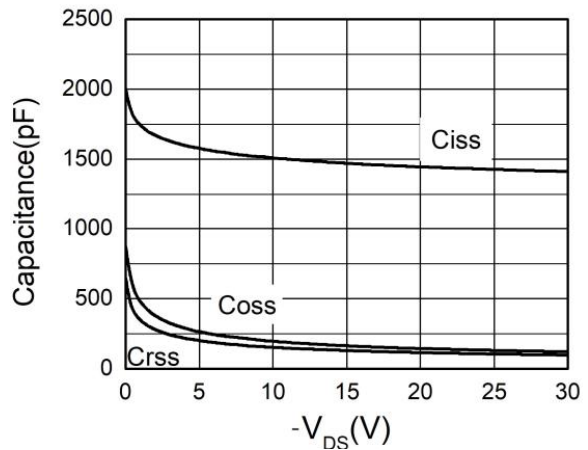


Figure 4. Capacitance

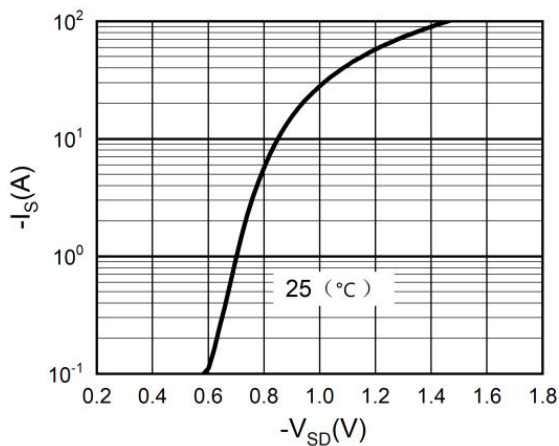


Figure 5. Body-diode characteristics

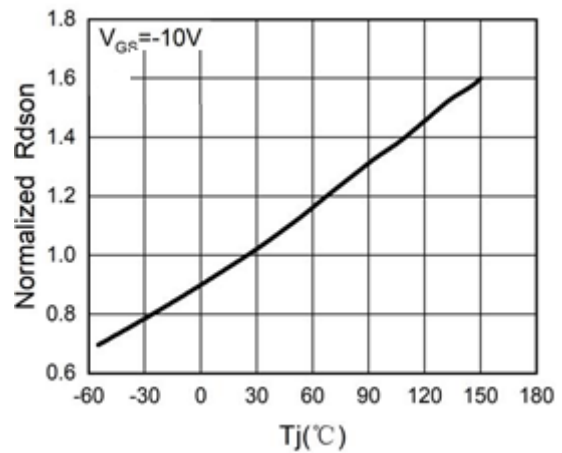
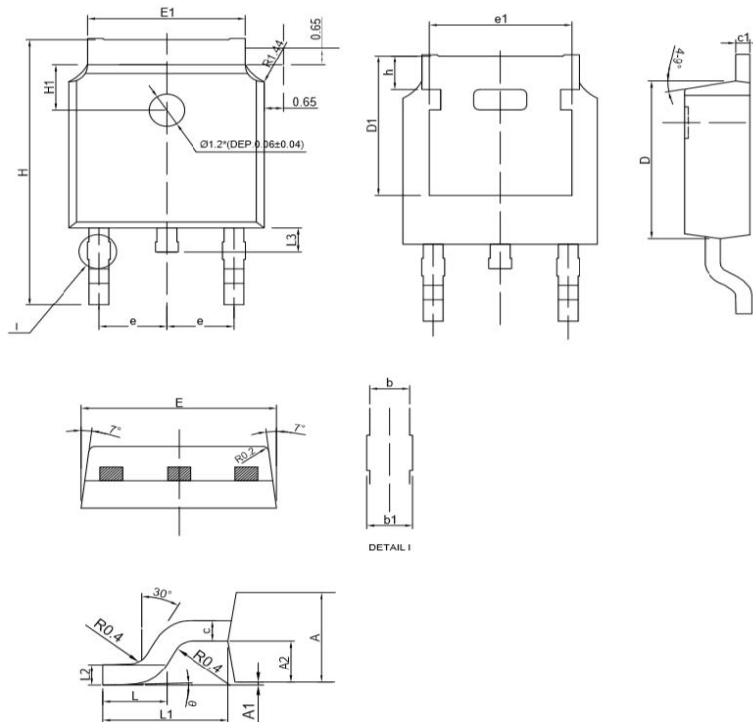


Figure 6. $R_{DS(on)}$ vs junction temperature

Package Information



Symbol	mm		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000	0.075	0.15
A2	0.97	1.02	1.07
b	0.60	0.67	0.74
b1	0.65	-	1.15
c	0.508	0.528	0.548
c1	0.478	0.508	0.538
D	6.0	6.1	6.2
D1	5.15	5.25	5.35
E	6.5	6.6	6.7
E1	5.184	5.334	5.484
e	2.286BSC		
e1	4.806	4.826	4.846
H	9.8	10.0	10.2
H1	1.5	1.6	1.7
h	1.15	1.25	1.35
L	1.4	1.5	1.6
L1	2.888REF		
L2	0.51BSC		
L3	0.8	0.9	1.0
θ	0°	-	10°

Version1: TO252-G package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO252-G	2500	1	2500	6	15000

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