

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

- High dense design
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- Ultra low on resistance
- Reliable and rugged

Applications

- DC/DC converter
- Synchronous rectification



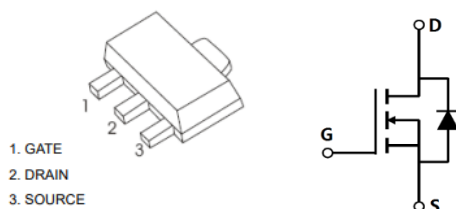
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(ON), \max} @ V_{GS}=10V$	30	m Ω

Marking Information

Product Name	Package	Marking
OSH06N40XF	SOT-89-3L	0640

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}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	5	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	24	A
Power Dissipation	P_D	2	W
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	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$

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}	60			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.1	1.7	2.3	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		21	30	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		25	38	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}, I_D=4\text{ A}$
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	$V_{DS}=60\text{ V}, V_{GS}=0\text{ V}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		979		pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		120		pF	
Reverse transfer capacitance	C_{rss}		100		pF	
Turn-on Delay Time	$t_{d(on)}$		10		ns	$V_{GS}=10\text{ V}$, $V_{DS}=30\text{ V}$, $R_L=6.7\ \Omega$, $R_G=3\ \Omega$
Turn-on Rise Time	t_r		3		ns	
Turn-Off Delay Time	$t_{d(off)}$		21		ns	
Turn-Off Fall Time	t_f		5		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		29		nC	$V_{GS}=10\text{ V}$, $V_{DS}=30\text{ V}$, $I_D=5\text{ A}$
Gate-Source Charge	Q_{gs}		3.3		nC	
Gate-Drain Charge	Q_{gd}		5.2		nC	

Body Diode Characteristics

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

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

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

Electrical Characteristics Diagrams

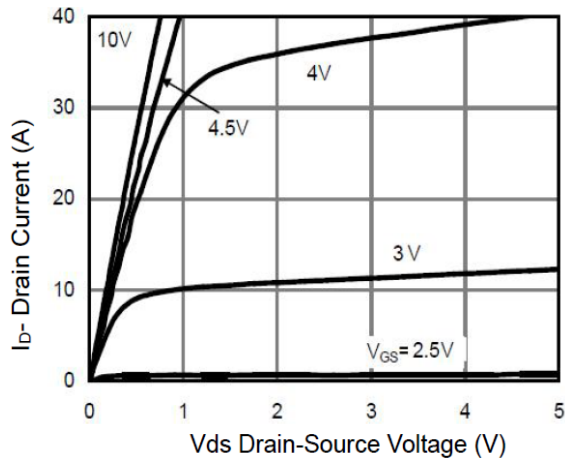


Figure 1. Typ. output characteristics

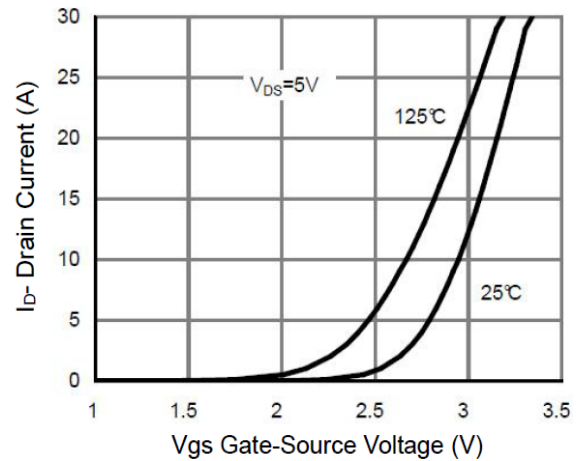


Figure 2. Typ. transfer characteristics

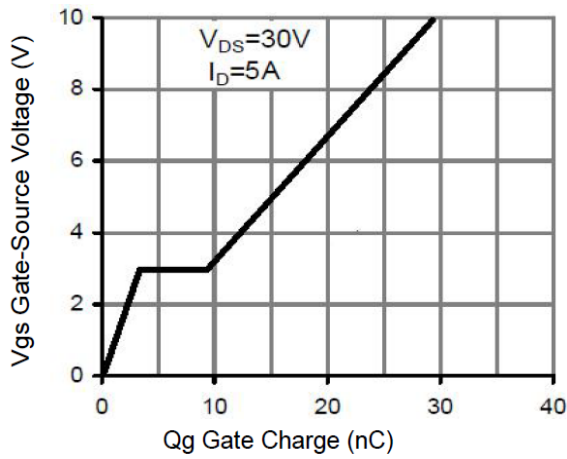


Figure 3. Gate charge waveforms

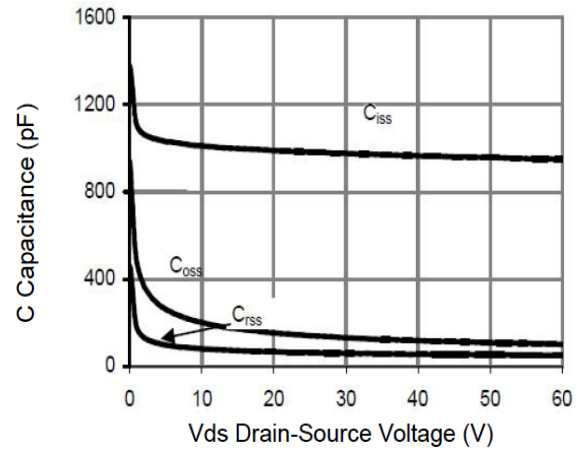


Figure 4. Capacitance

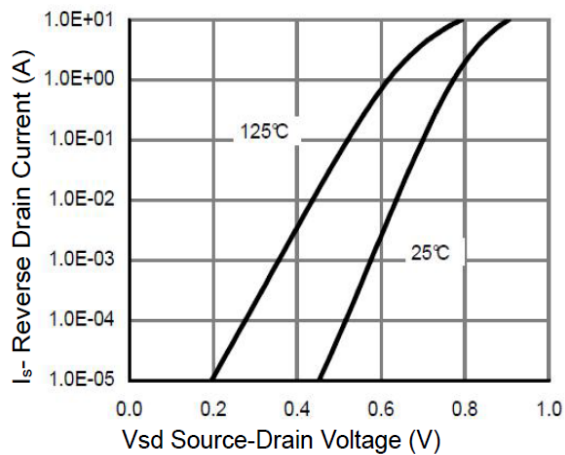


Figure 5. Body-diode characteristics

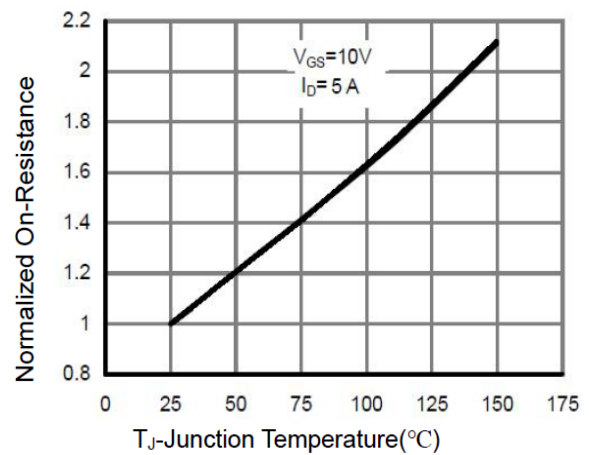
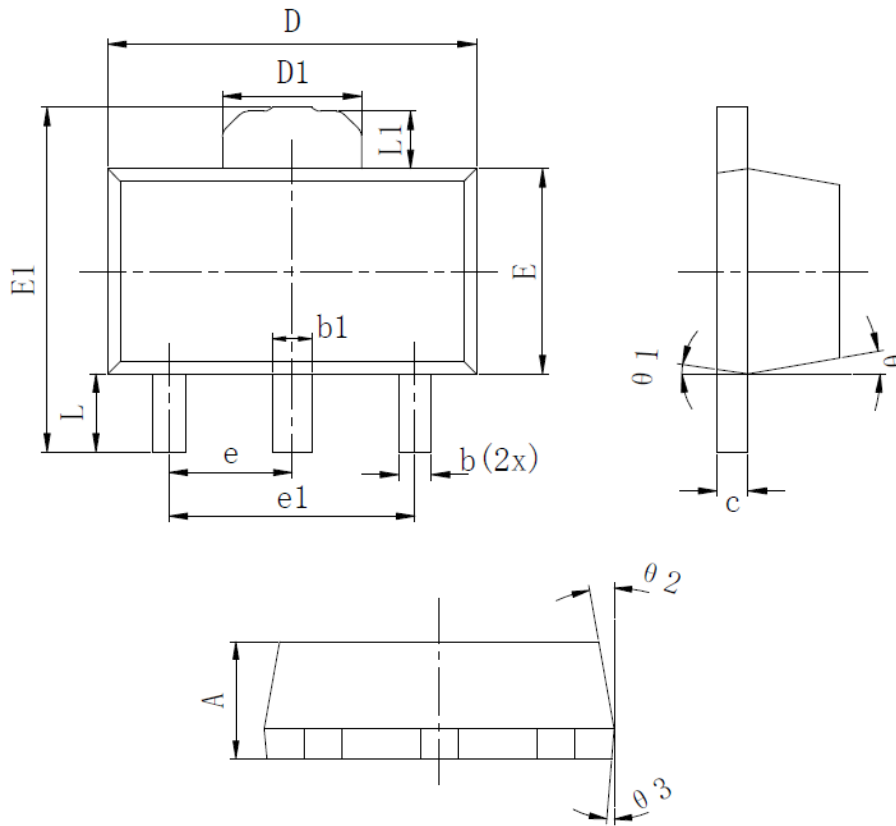


Figure 6. $R_{DS(ON)}$ vs junction temperature

Package Information



Symbol	mm		
	Min	TYP	Max
A	1.400	1.500	1.600
b	0.320	0.400	0.520
b1	0.400	0.480	0.580
c	0.350	0.381	0.440
D	4.400	4.500	4.600
D1	1.700REF		
E	2.400	2.500	2.600
E1	4.050	4.200	4.350
e	1.500TYP.		
e1	3.000TYP.		
L	0.800	0.950	1.200
L1	0.700REF		
θ	10° REF		
$\theta 1$	8° REF		
$\theta 2$	10° REF		
$\theta 3$	5° REF		

Version : SOT-89-3L-V package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT-89-3L	1000	10	10000	4	40000

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