

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

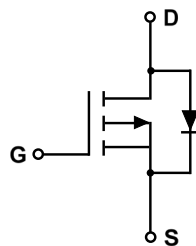
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	-40	V
$R_{DS(ON), max} @ V_{GS} = -10V$	52.3	mΩ

Marking Information

Product Name	Package	Marking
OSH40P05	SOT-23	4005

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}	-40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	-4.5	A
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	-18	A
Power Dissipation	P_D	1.8	W
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-ambient ²⁾	$R_{\theta JA}$	68	$^{\circ}\text{C/W}$

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}	-40			V	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	-2.5		-0.9	V	$V_{DS}=V_{GS}, I_D=-250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		41.8	52.3	$\text{m}\Omega$	$V_{GS}=-10\text{ V}, I_D=-5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		55.7	74.1	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}, I_D=-4\text{ A}$
Gate-source leakage current	I_{GSS}			± 100	nA	$V_{GS}=\pm 20\text{ V}, V_{DS}=0\text{ V}$
Drain-source leakage current	I_{DSS}			-1	μA	$V_{DS}=-40\text{ V}, V_{GS}=0\text{ V}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		1300		pF	$V_{GS}=0\text{ V}$, $V_{DS}=-20\text{ V}$, $f=1.0\text{ MHz}$
Output capacitance	C_{oss}		113		pF	
Reverse transfer capacitance	C_{rss}		56		pF	
Turn-on Delay Time	$t_{d(on)}$		12		ns	$V_{GS}=-10\text{ V}$, $V_{DS}=-20\text{ V}$, $R_L=4\ \Omega$, $R_{GEN}=3\ \Omega$
Turn-on Rise Time	t_r		4.5		ns	
Turn-Off Delay Time	$t_{d(off)}$		14		ns	
Turn-Off Fall Time	t_f		3.4		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		18		nC	$V_{GS}=-10\text{ V}$, $V_{DS}=-20\text{ V}$, $I_D=-5\text{ A}$
Gate-source charge	Q_{gs}		4		nC	
Gate-drain charge	Q_{gd}		5		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}		-4.5		A	$T_A=25^\circ\text{C}$
Diode forward voltage	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

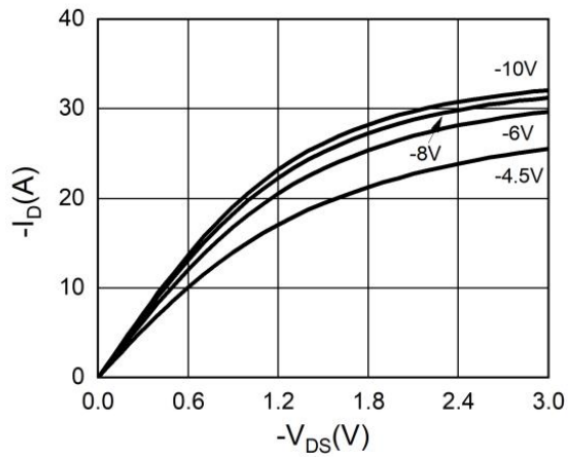


Figure 1. Typ. output characteristics

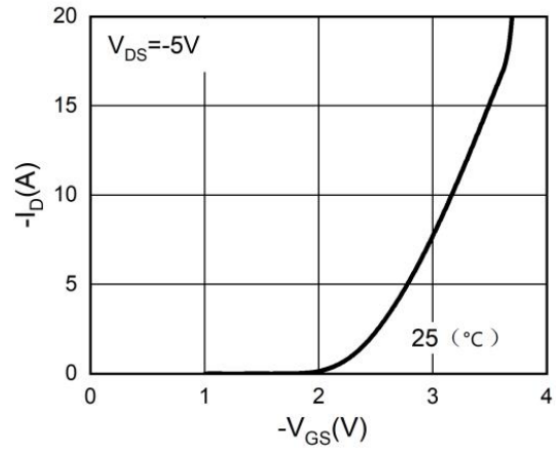


Figure 2. Typ. transfer characteristics

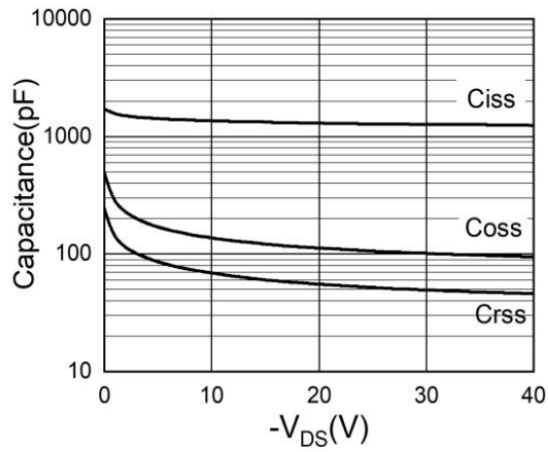


Figure 3. Capacitance

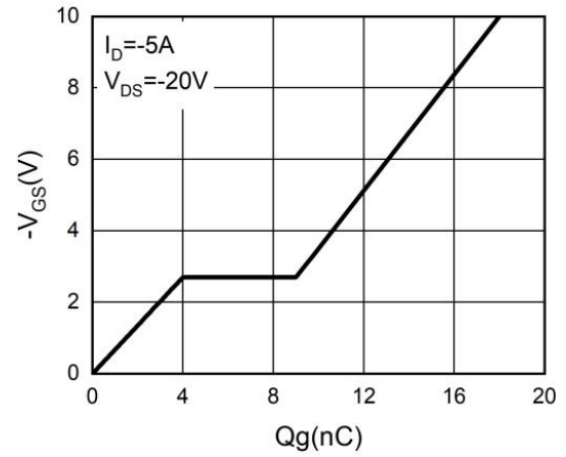


Figure 4. Gate charge

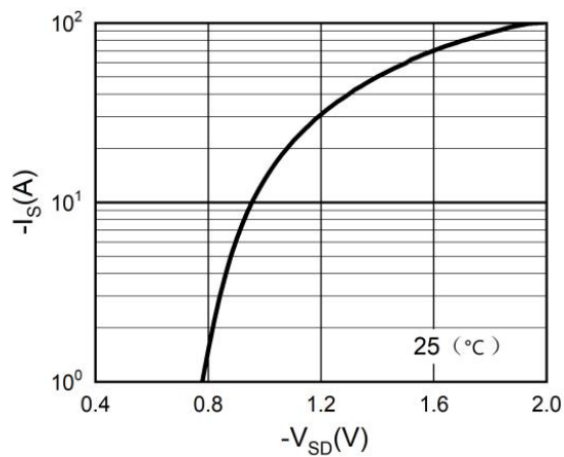


Figure 5. Body-diode characteristics

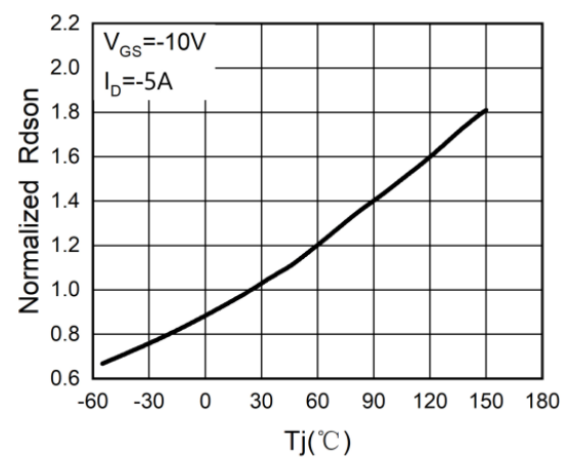
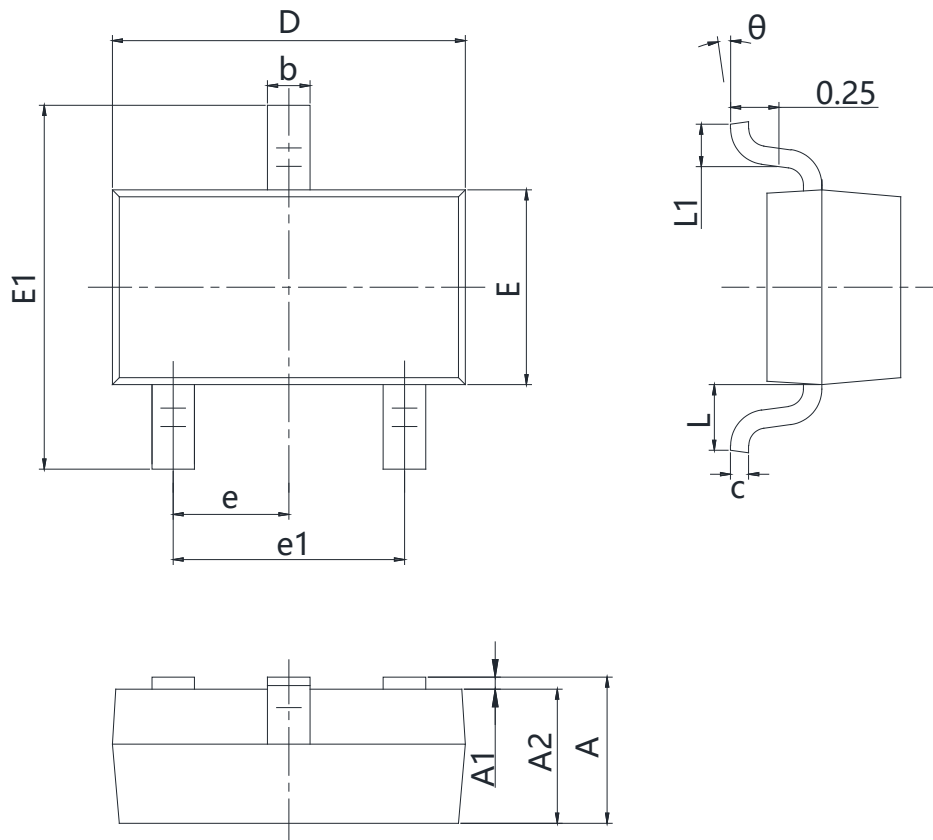


Figure 6. $R_{DS(ON)}$ vs junction temperature

Package Information



Symbol	mm	
	Min	Max
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	0.280	3.000
E	1.200	1.400
E1	2.250	2.250
e	0.950 TYP	
e1	1.800	2.000
L	0.550 REF	
L1	0.300	0.500
θ	0°	8°

Version1 : SOT-23-V package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT-23-V	3000	15	45000	4	180000

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