

General Description

The WSF30P06 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications.

The WSF30P06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

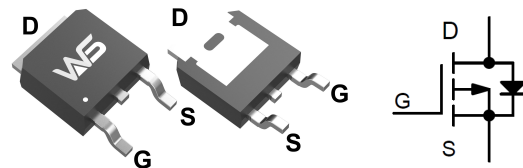
Product Summary

BVDSS	R _{DS(on)}	I _D
-60V	38mΩ	-23.5A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- CCFL Back-light Inverter

TO-252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current	-23.5	A
I _D @T _C =70°C	Continuous Drain Current	-18.7	A
I _{DP}	Pulsed Drain Current	-80	A
P _D @T _C =25°C	Total Power Dissipation	30	W
T _J /T _{STG}	Operating/Storage Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case	---	4	°C/W

P-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.012	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-10A$	---	38	48	m Ω
		$V_{GS}=-4.5V, I_D=-5A$	---	50	62	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.65	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-32V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge (-4.5V)	$V_{GS}=-10V, V_{DS}=-30V, I_D=-20A$	---	45	---	nC
Q_{gs}	Gate-Source Charge		---	8	---	
Q_{gd}	Gate-Drain Charge		---	10	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=-10V, V_{DS}=-30V, R_L=1.5\Omega, R_{GEN}=3\Omega$	---	13	---	ns
T_r	Rise Time		---	15	---	
$T_{d(off)}$	Turn-Off Delay Time		---	37	---	
T_f	Fall Time		---	15	---	
C_{iss}	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, f=1.0\text{MHz}$	---	2980	---	μF
C_{oss}	Output Capacitance		---	245	---	
C_{rss}	Reverse Transfer Capacitance		---	155	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-23.5	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the $t_s \leq 10s$ junction to ambient thermal resistance rating.

P-Channel Typical Characteristics

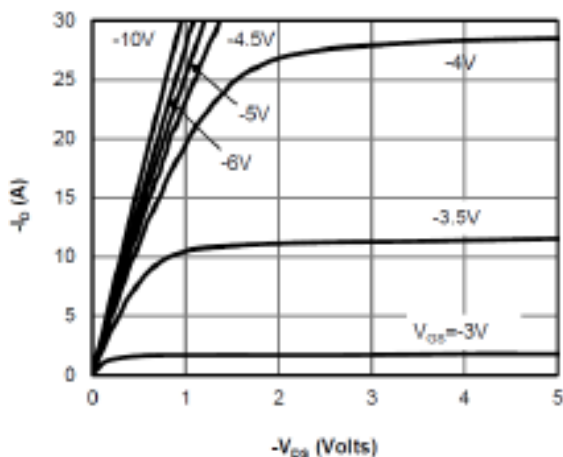


Figure 1: On-Region Characteristics

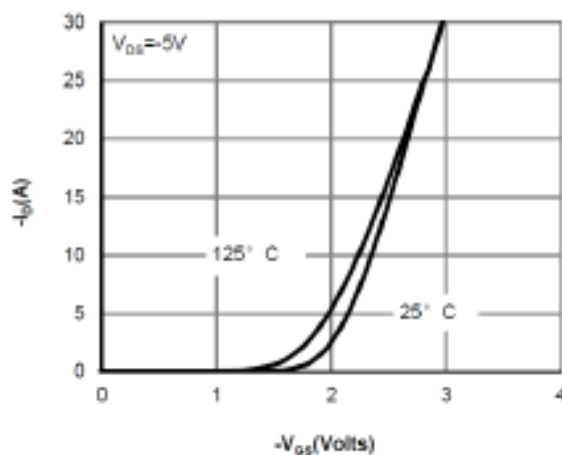


Figure 2: Transfer Characteristics

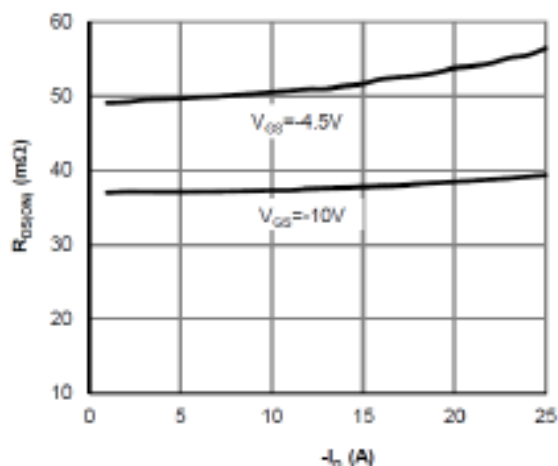


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

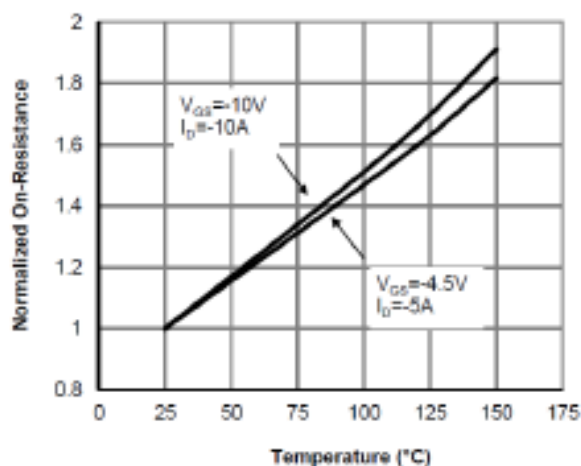


Figure 4: On-Resistance vs. Junction Temperature

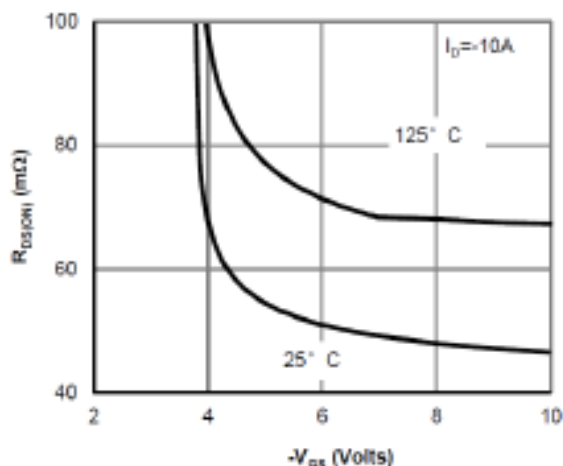


Figure 5: On-Resistance vs. Gate-Source Voltage

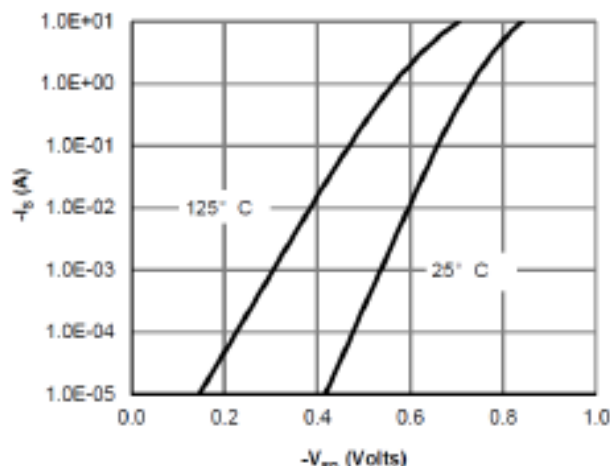


Figure 6: Body-Diode Characteristics

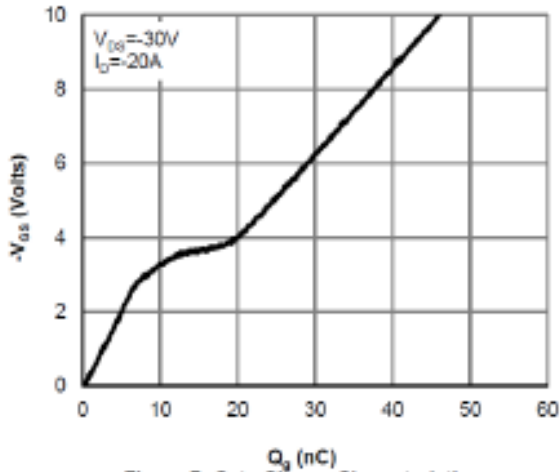


Figure 7: Gate-Charge Characteristics

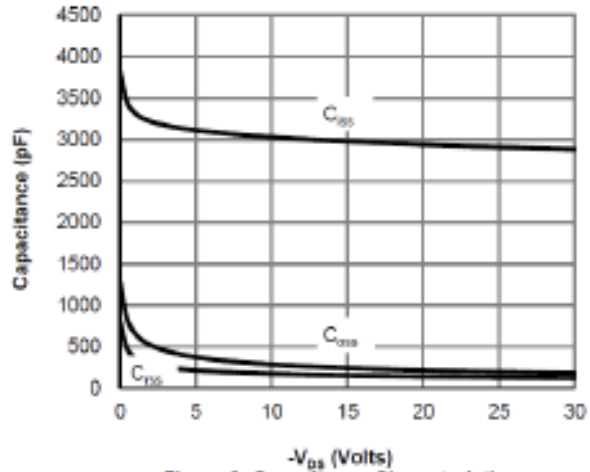


Figure 8: Capacitance Characteristics

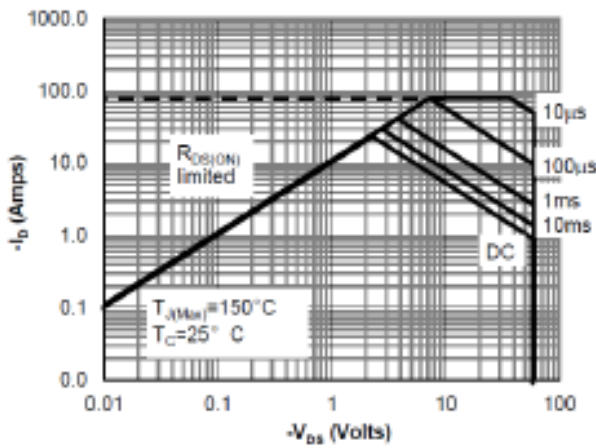


Figure 9: Maximum Forward Biased Safe Operating Area

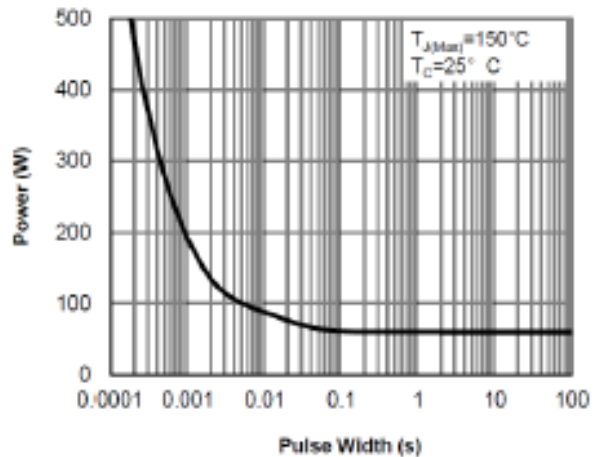


Figure 10: Single Pulse Power Rating Junction-to-Case

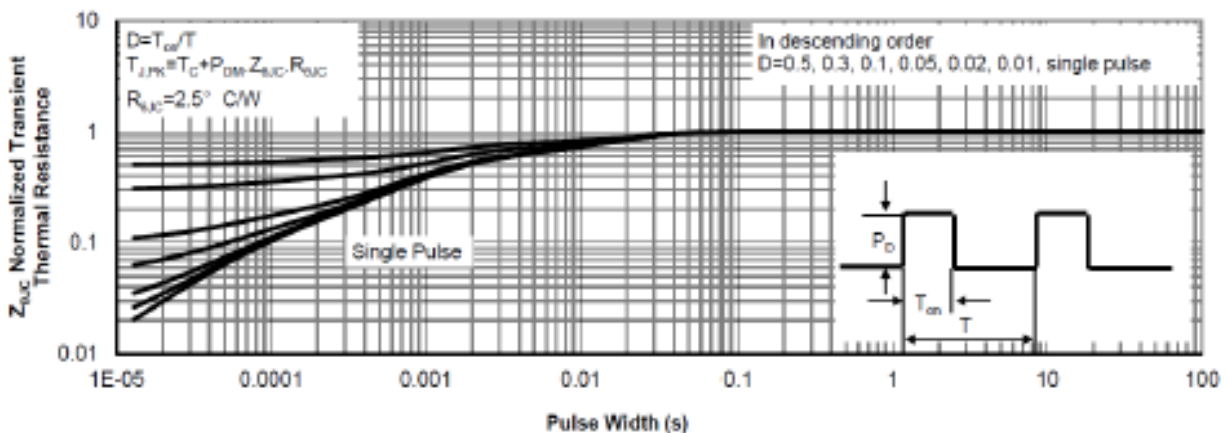


Figure 11: Normalized Maximum Transient Thermal Impedance

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