

## General Description

The WSP6069 is the highest performance trench P-Channel MOSFET with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the synchronous buck converter applications.

The WSP6069 meet the RoHS and Green Product requirement, 100%  $E_{AS}$  guaranteed with full function reliability approved.

## Features

- 100% UIS +  $R_g$  Tested.
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

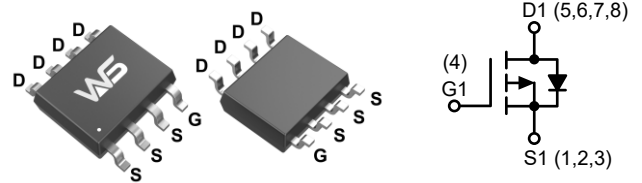
## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-60V	32m $\Omega$	-7A

## Applications

- DC/DC Converter.
- Power Management.
- Load Switch.
- For Motor Drive Application.

## SOP-8L Pin Configuration



## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Rating	Units	
$V_{DS}$	Drain-Source Voltage	-60	V	
$V_{GS}$	Gate-Source Voltage	$\pm 20$		
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	-7	A
		$T_A=70^\circ\text{C}$	-5.3	
$I_{DM}^1$	Pulse Drain Current	$T_C=25^\circ\text{C}$	-21	A
$P_D$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	1.56	W
		$T_A=70^\circ\text{C}$	1.0	
$I_{AS}^3$	Avalanche Current, Single pulse	$L=0.5\text{mH}$	-17	A
$E_{AS}^3$	Avalanche Energy, Single pulse	$L=0.5\text{mH}$	72	mJ
$T_{STG}$	Storage Temperature Range		-55 to 150	$^\circ\text{C}$
$T_J$	Maximum Junction Temperature		150	
$R_{\theta JA}^2$	Thermal Resistance-Junction to Ambient		80	$^\circ\text{C/W}$

**Electrical Characteristics ( $T_A=25^\circ\text{C}$ , Unless Otherwise Noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-60	---	---	V
$R_{DS(ON)}^4$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_{DS}=-4A$	---	32	39	m $\Omega$
		$V_{GS}=-4.5V, I_{DS}=-3A$	---	45	51	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-1.3	-1.8	-2.3	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-48V, V_{GS}=0V$	---	---	-1.0	$\mu A$
		$T_J=85^\circ\text{C}$	---	---	-30	
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1.0\text{MHz}$	---	8.0	16	$\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=-30V, V_{GS}=-4.5V, I_{DS}=-4A$	---	15.6	---	nC
$Q_g$	Total Gate Charge	$V_{DS}=-30V, V_{GS}=-10V, I_{DS}=-4A$	---	32	45	
$Q_{gs}$	Gate-Source Charge		---	5.2	---	
$Q_{gd}$	Gate-Drain Charge		---	6.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-30V, R_L=30\Omega, I_{DS}=-1A,$ $V_{GEN}=-10V, R_G=6\Omega$	---	10	18	ns
$T_r$	Turn-On Rise Time		---	9	16	
$T_{d(off)}$	Turn-Off Delay Time		---	88	158	
$T_f$	Turn-Off Fall Time		---	42	76	
$C_{ISS}$	Input Capacitance	$V_{GS}=0V, V_{DS}=-30V, f=1.0\text{MHz}$	---	2016	2587	pF
$C_{OSS}$	Output Capacitance		---	142	---	
$C_{RSS}$	Reverse Transfer Capacitance		---	85	---	

**Diode Characteristics**

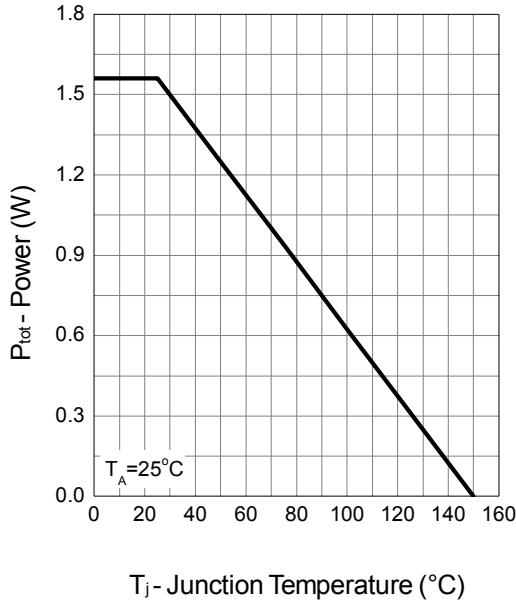
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current	$T_A=25^\circ\text{C}$	---	---	-7	A
$V_{SD}^4$	Diode Forward Voltage	$I_{SD}=-1A, V_{GS}=0V$	---	-0.7	-1.1	V
$t_{rr}$	Reverse Recovery Time	$I_{DS}=-4A, di_{SD}/dt=100A/\mu s$	---	26	---	ns
$Q_{rr}$	Reverse Recovery Charge		---	33	---	nC

**Note:**

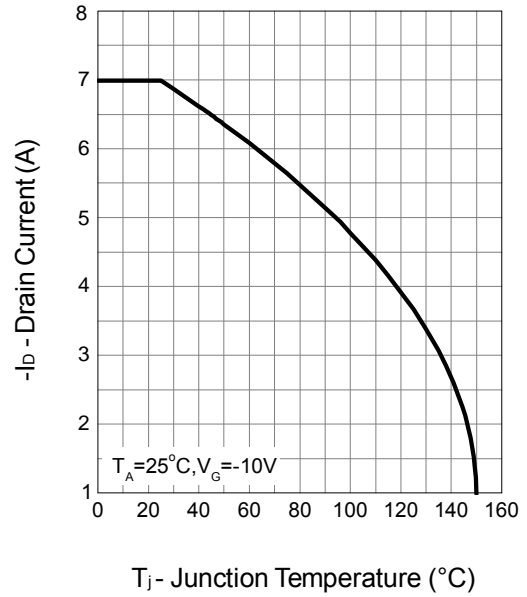
- Pulse width is limited by max. junction temperature.
- Surface Mounted on 1in<sup>2</sup> pad area.
- UIS tested and pulse width limited by maximum junction temperature 150 $^\circ\text{C}$  (initial temperature  $T_J=25^\circ\text{C}$ ).
- Pulse test; pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

**Typical Characteristics**

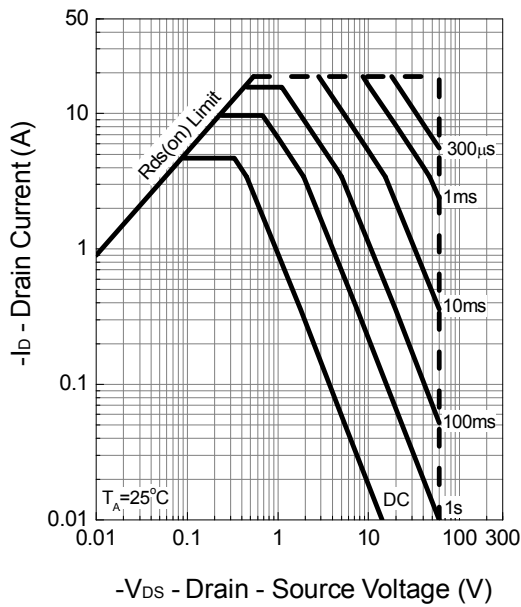
**Power Dissipation**



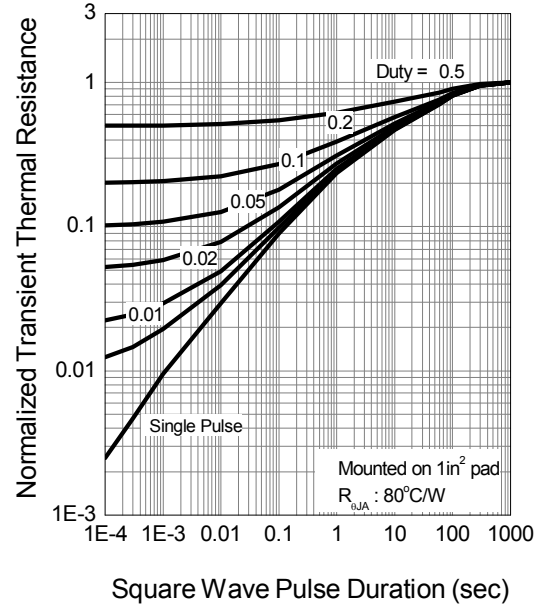
**Drain Current**



**Safe Operation Area**

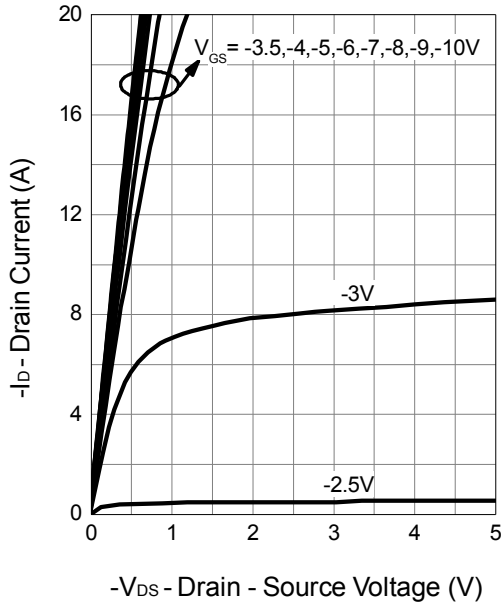


**Thermal Transient Impedance**

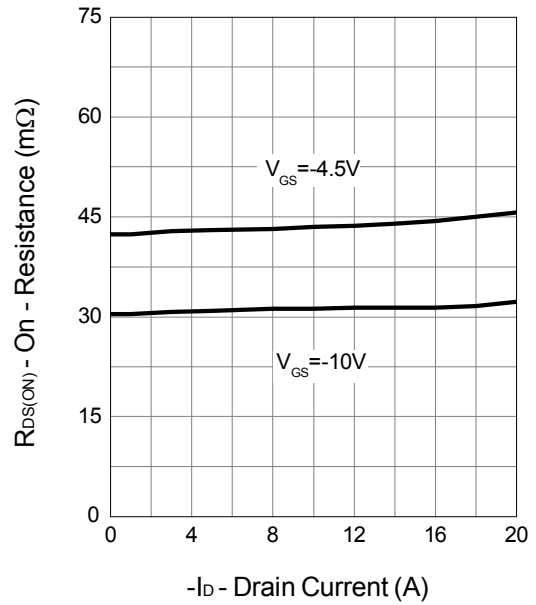


Typical Characteristics (Cont.)

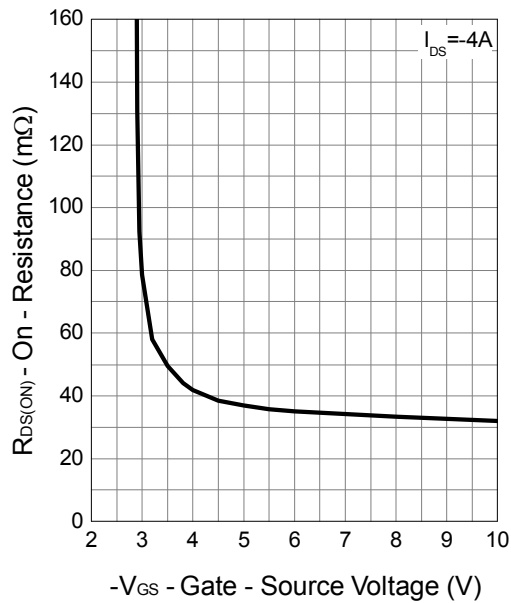
Output Characteristics



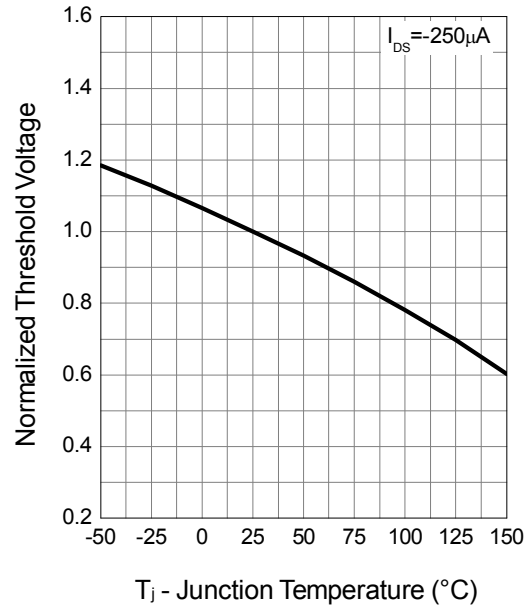
Drain-Source On Resistance



Gate-Source On Resistance

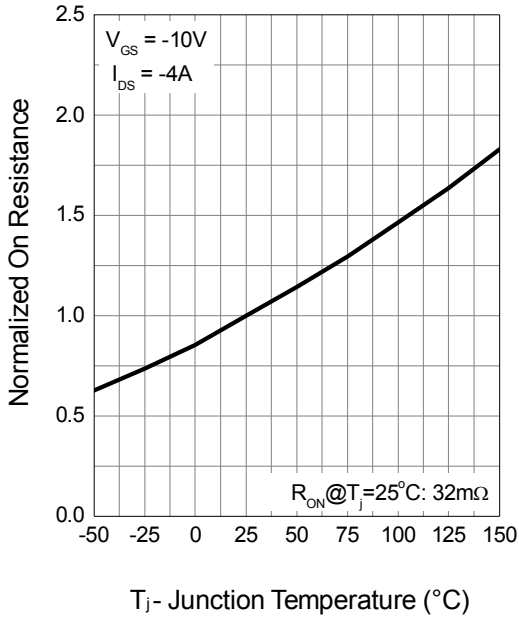


Gate Threshold Voltage

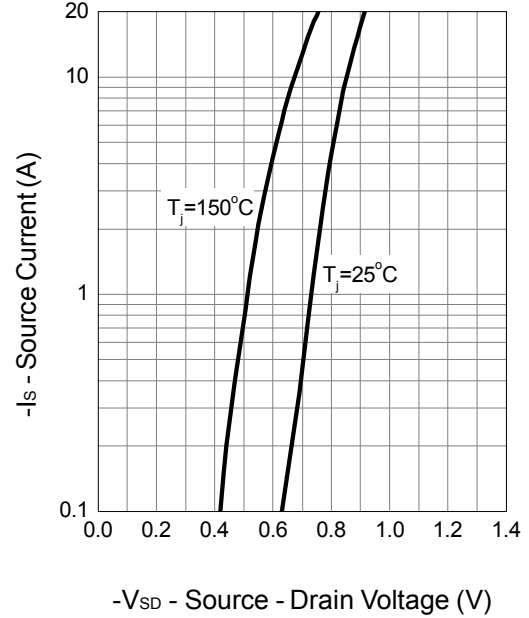


Typical Characteristics (Cont.)

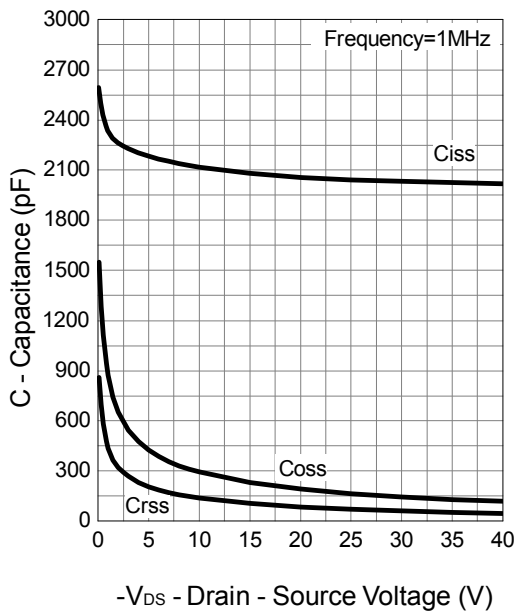
Drain-Source On Resistance



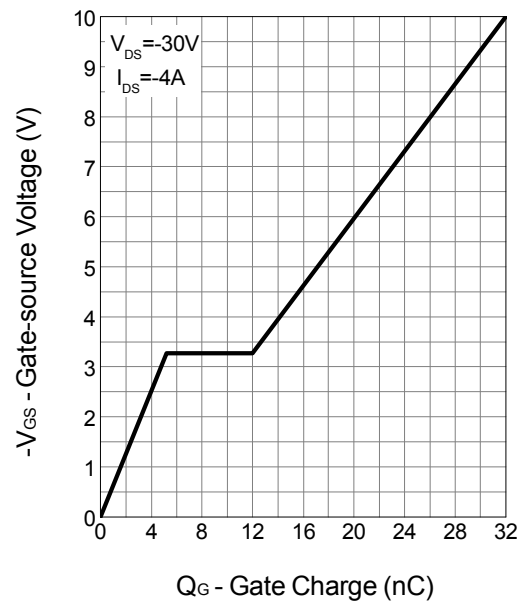
Source-Drain Diode Forward

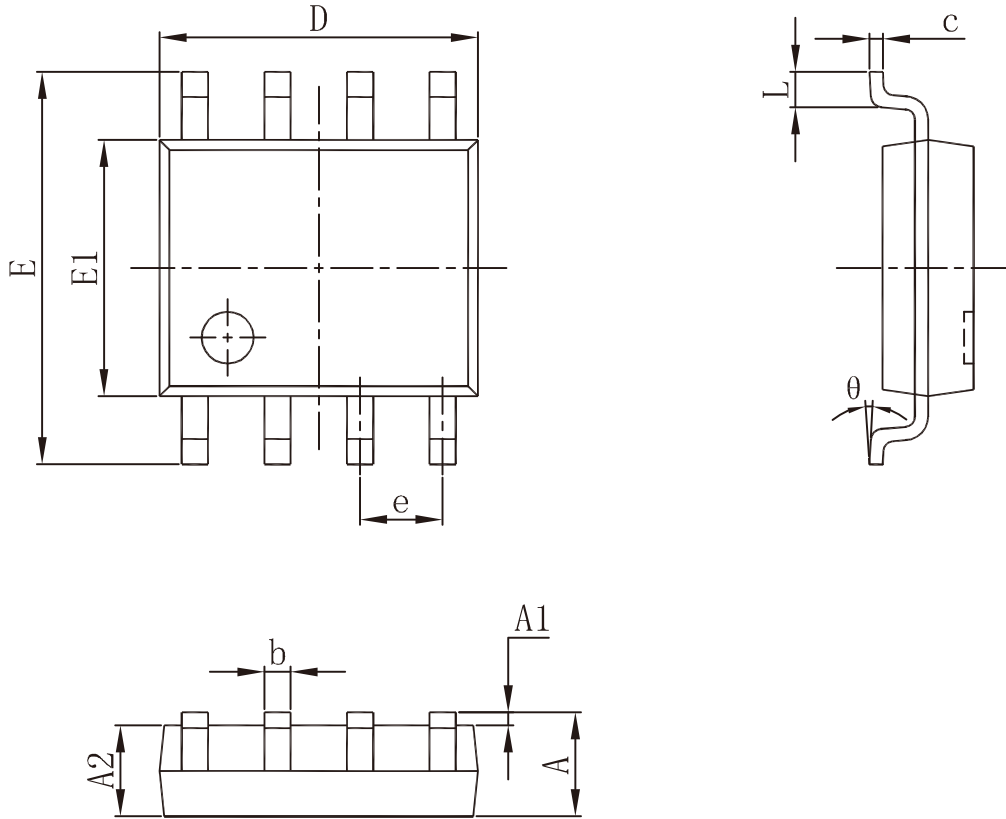


Capacitance



Gate Charge



**Packaging information**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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