

## General Description

The WSP4447 is the highest performance trench P-Ch MOSFET with extreme high cell density, which provide excellent R<sub>DS(on)</sub> and gate charge for most of the synchronous buck converter applications.

The WSP4447 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

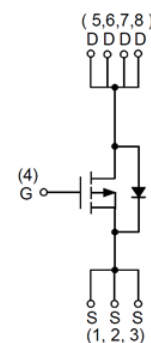
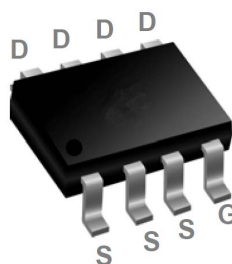
## Product Summary

BVDSS	R <sub>DS(on)</sub>	I <sub>D</sub>
-40V	13mΩ	-11A

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

## SOP-8 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-40	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-11	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-9.0	A
I <sub>DM</sub> <sup>a</sup>	300μs Pulsed Drain Current (V <sub>GS</sub> =-10V)	-44	A
E <sub>AS</sub> <sup>b</sup>	Avalanche Energy, Single pulse (L=0.1mH)	54	mJ
I <sub>AS</sub> <sup>b</sup>	Avalanche Current, Single pulse (L=0.1mH)	-33	A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	2.0	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	75	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	24	°C/W

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-40	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	---	-0.018	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-13A	---	13	16	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	---	18	26	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.4	-1.9	-2.4	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	5.04	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-32V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-32V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	-5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-10A	---	18	---	S
Q <sub>g</sub>	Total Gate Charge (-4.5V)	V <sub>DS</sub> =-20V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-11A	---	32	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5.2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	8	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-20V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =-1A, R <sub>L</sub> =20Ω	---	14	---	ns
T <sub>r</sub>	Rise Time		---	12	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	41	---	
T <sub>f</sub>	Fall Time		---	22	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz	---	1500	---	pF
C <sub>oss</sub>	Output Capacitance		---	235	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	180	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-3.0	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,6</sup>		---	---	-18	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1.1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-11A, dI/dt=100A/μs, T <sub>J</sub> =25°C	---	24	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	18	---	nC

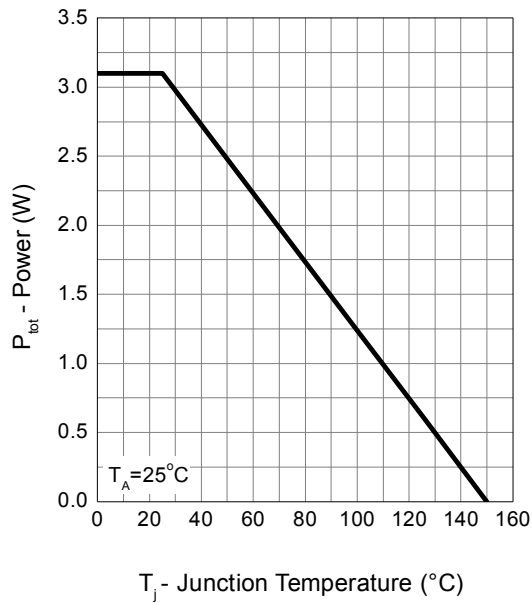
Note

1, Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%.

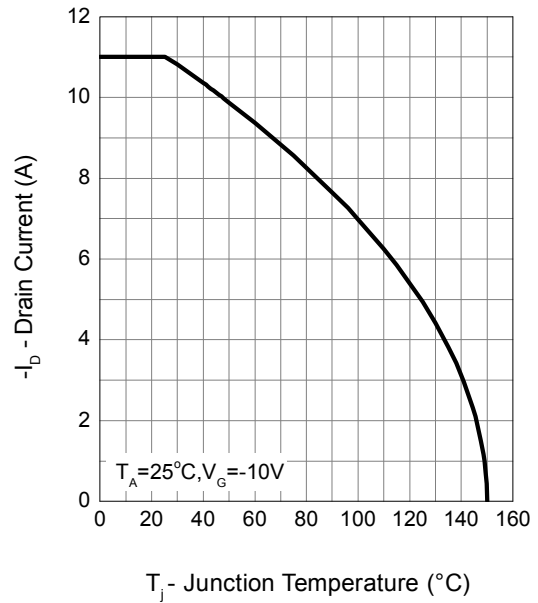
2, Guaranteed by design, not subject to production testing.

## Typical Operating Characteristics

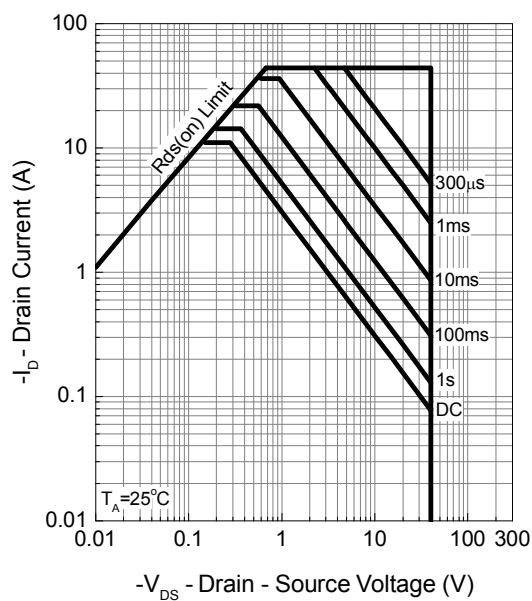
**Power Dissipation**



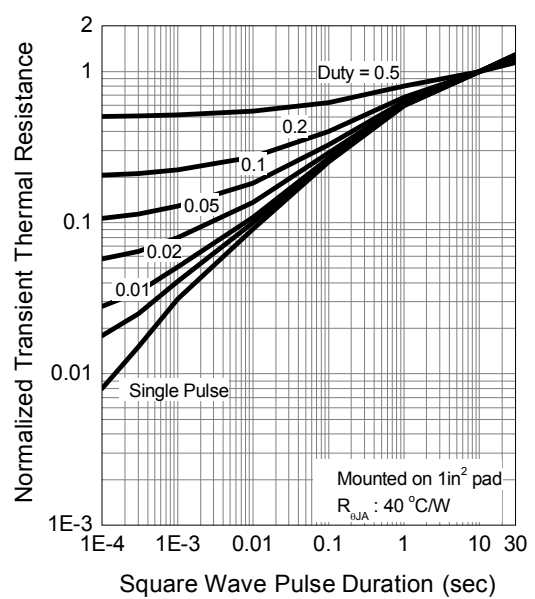
**Drain Current**



**Safe Operation Area**

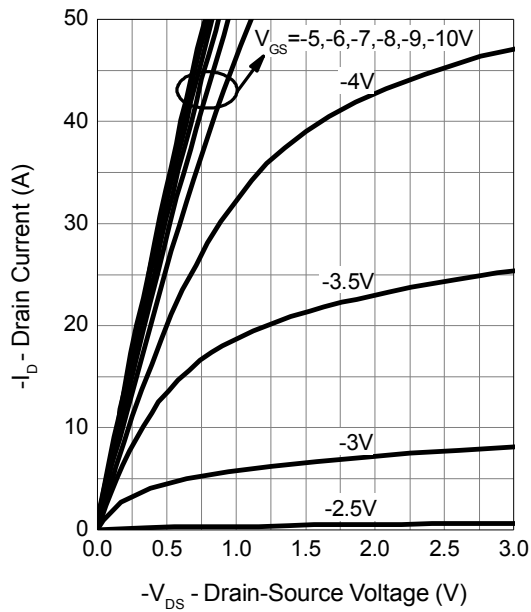


**Thermal Transient Impedance**

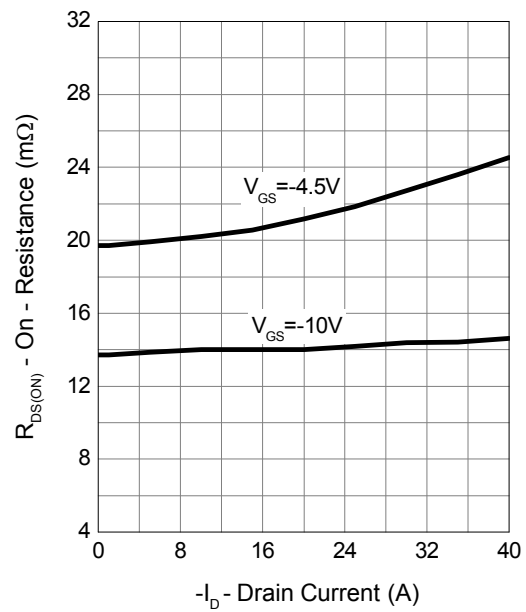


### Typical Operating Characteristics (Cont.)

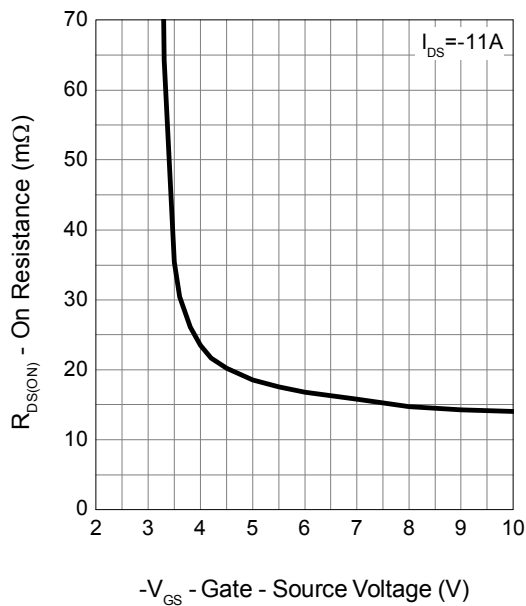
**Output Characteristics**



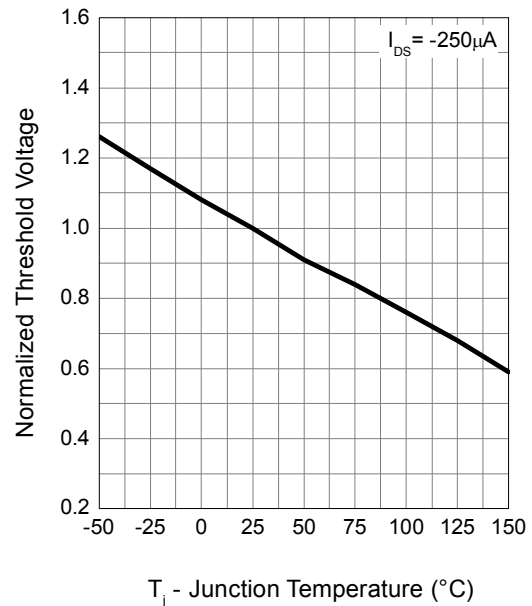
**Drain-Source On Resistance**



**Gate-Source On Resistance**

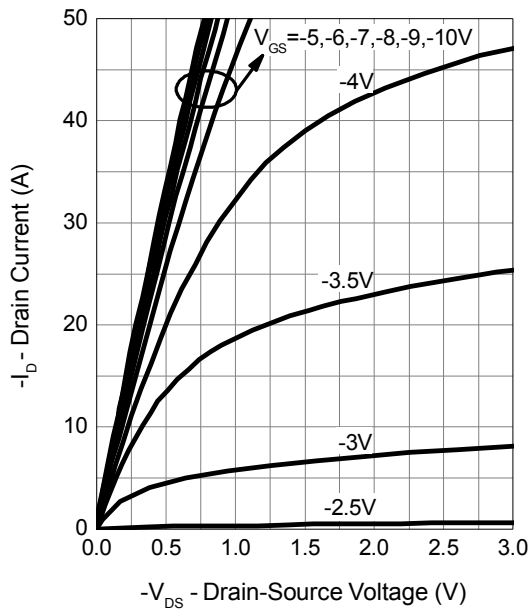


**Gate Threshold Voltage**

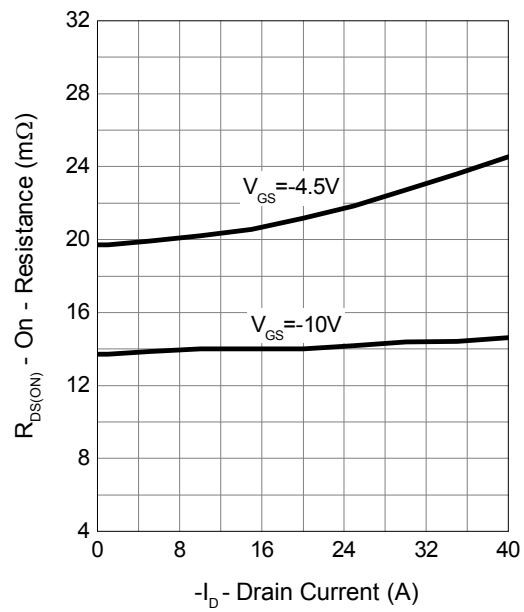


## Typical Operating Characteristics (Cont.)

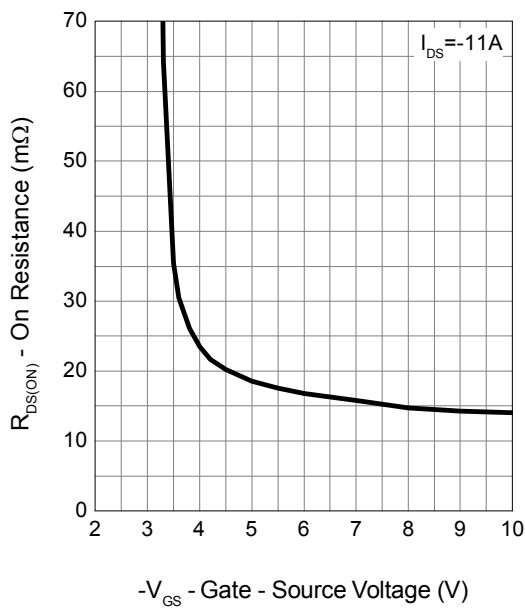
**Output Characteristics**



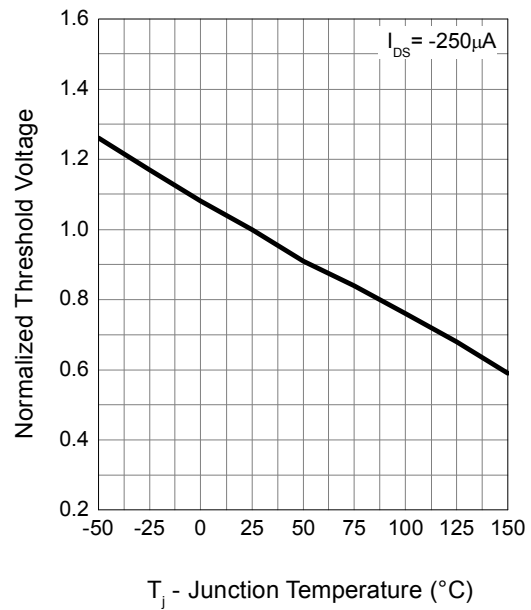
**Drain-Source On Resistance**



**Gate-Source On Resistance**

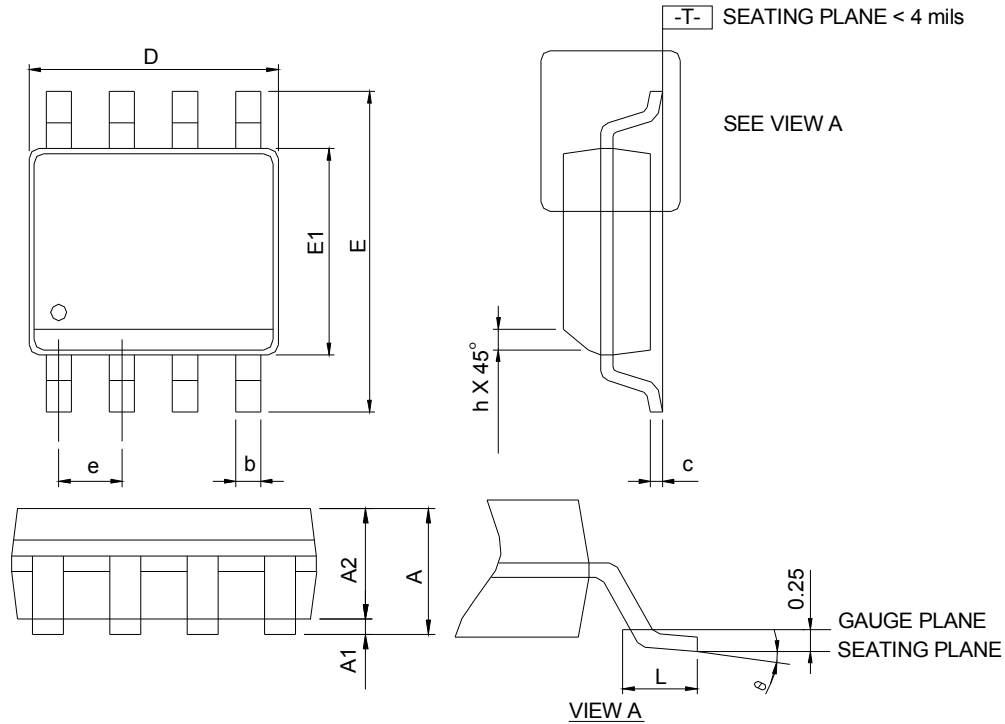


**Gate Threshold Voltage**



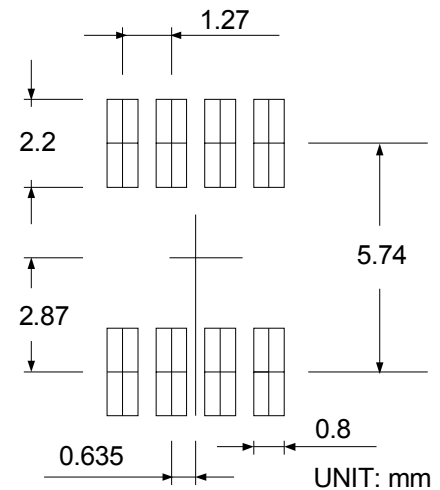
## Package Information

SOP-8



DIMENSIONS	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

### RECOMMENDED LAND PATTERN



Note: 1. Follow JEDEC MS-012 AA.

- Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
- Dimension "E" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

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