

## General Description

The WSD4064DN is the highest performance trench Dual N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSD4064DN 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

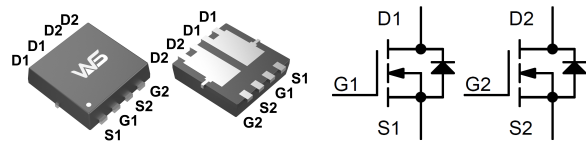
## Product Summary

BVDSS	RDSON	ID
40V	19mΩ	13A

## Applications

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

## DFN3x3-8-EP Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b>				
$V_{DSS}$	Drain-Source Voltage	40	V	
$V_{GSS}$	Gate-Source Voltage	±20	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$I_S$	Diode Continuous Forward Current	$T_A=25^{\circ}C$	4	A
$I_D$	Continuous Drain Current	$T_A=25^{\circ}C$	13	A
		$T_A=70^{\circ}C$	9.5	
$I_{DM}^a$	Pulse Drain Current Tested	$T_A=25^{\circ}C$	25	A
$P_D$	Maximum Power Dissipation	$T_A=25^{\circ}C$	2.5	W
		$T_A=70^{\circ}C$	1.68	
$R_{\theta JL}$	Thermal Resistance-Junction to Lead	Steady State	10	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	$t \leq 10s$	42.5	°C/W
		Steady State <sup>b</sup>	50	
$I_{AS}^c$	Avalanche Current, Single pulse	L=0.5mH	10	A
$E_{AS}^c$	Avalanche Energy, Single pulse	L=0.5mH	25	mJ

Note a : Pulse width limited by max. junction temperature.

Note b : Surface Mounted on 1in<sup>2</sup> pad area, t =999sec.

Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T<sub>j</sub>=25°C).

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

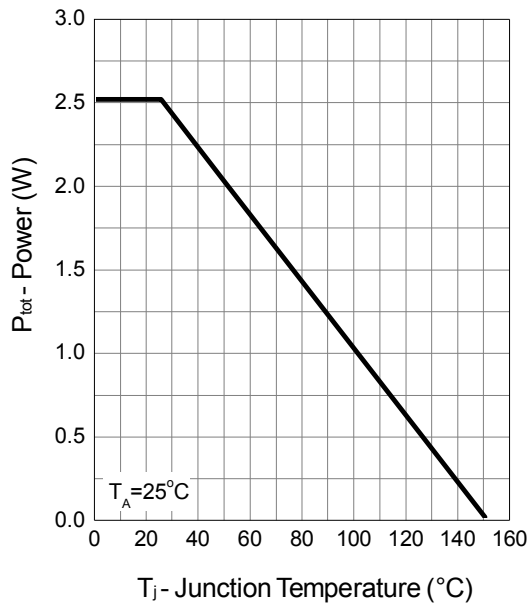
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =32V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =85°C	-	-	30	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1.0	1.5	2.0	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>c</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =6A	-	19	25	m Ω
		V <sub>GS</sub> =4.5V, I <sub>DS</sub> =5A	-	25	35	
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>c</sup>	Diode Forward Voltage	I <sub>SD</sub> =1A, V <sub>GS</sub> =0V	-	0.75	1.1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>DS</sub> =6A, dI <sub>SD</sub> /dt=100A/μs	-	12	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	8.5	-	nC
<b>Dynamic Characteristics<sup>d</sup></b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	2.4	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, Frequency=1.0MHz	-	800	-	pF
C <sub>oss</sub>	Output Capacitance		-	90	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	55	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, RL=20Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, RG=6 Ω	-	7.2	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	6.5	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	24	-	
t <sub>f</sub>	Turn-off Fall Time		-	4.5	-	
<b>Gate Charge Characteristics<sup>d</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>DS</sub> =6A	-	15	21	nC
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, V <sub>GS</sub> =4.5V, I <sub>DS</sub> =6A	-	8.2	10	
Q <sub>gth</sub>	Threshold Gate Charge		-	1.7	-	
Q <sub>gs</sub>	Gate-Source Charge		-	3.1	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	2.5	-	

Note c : Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%.

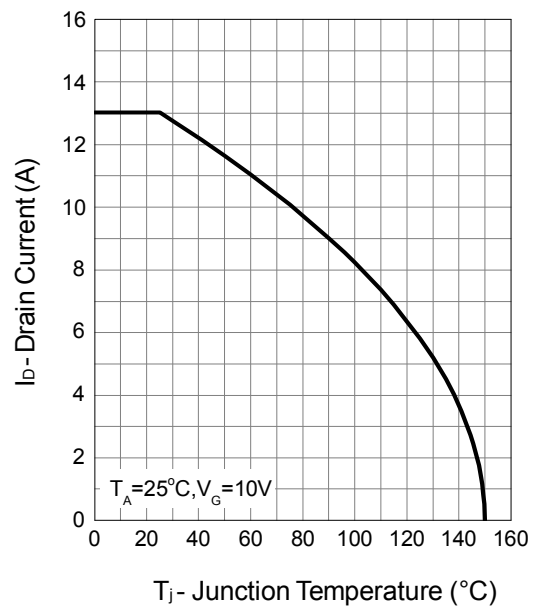
Note d : Guaranteed by design, not subject to production testing.

## Typical Operating Characteristics

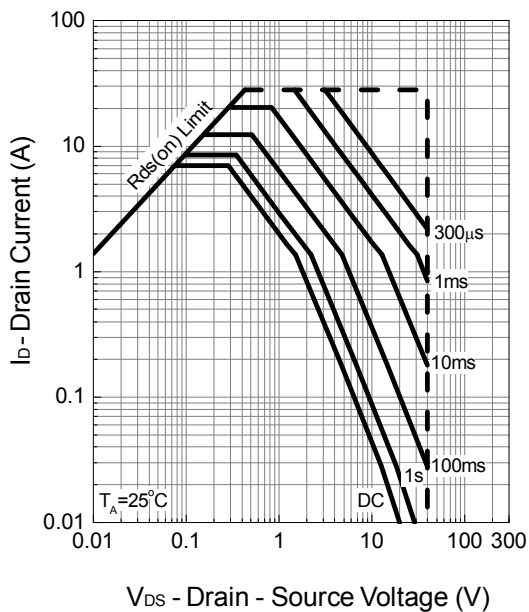
**Power Dissipation**



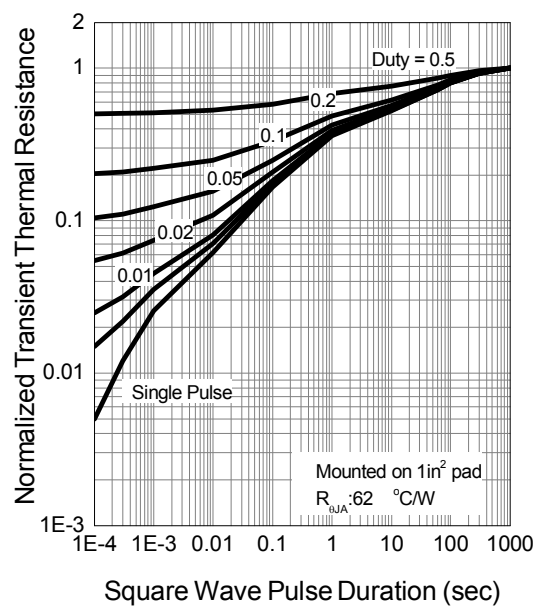
**Drain Current**



**Safe Operation Area**

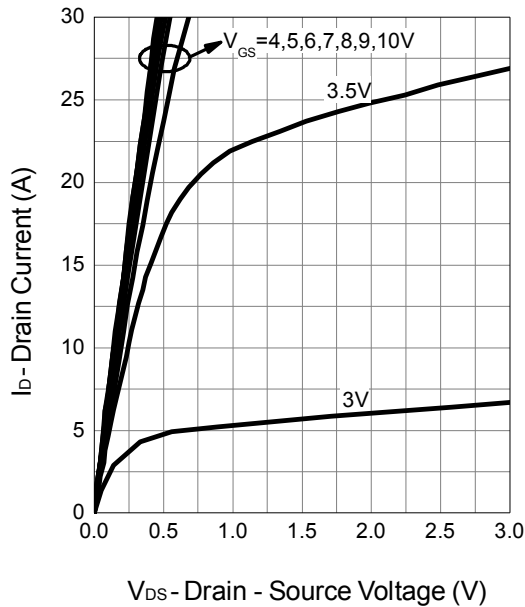


**Thermal Transient Impedance**

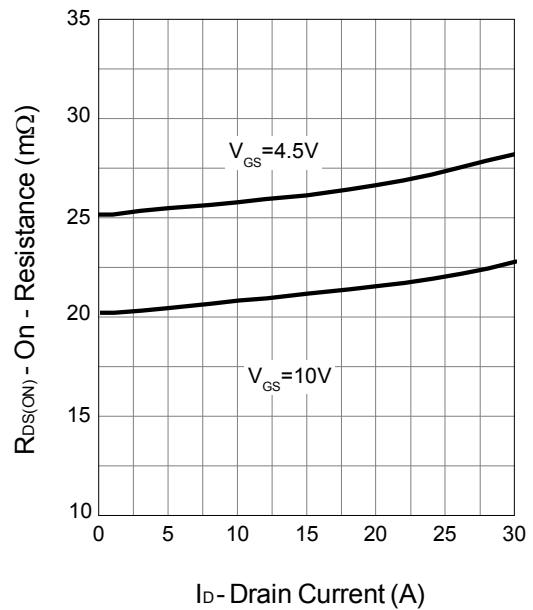


## Typical Operating Characteristics (Cont.)

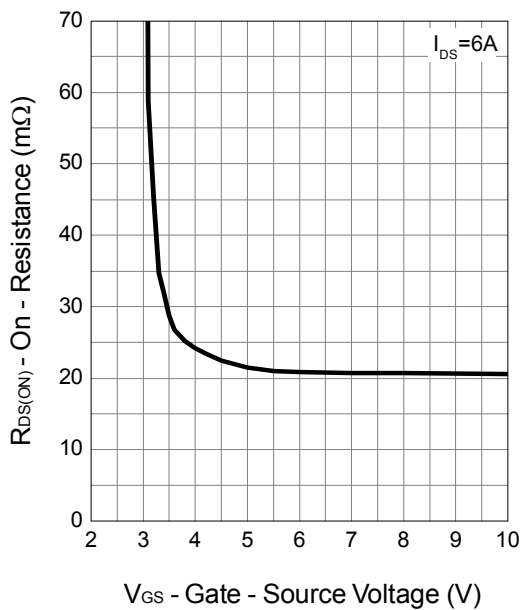
**Output Characteristics**



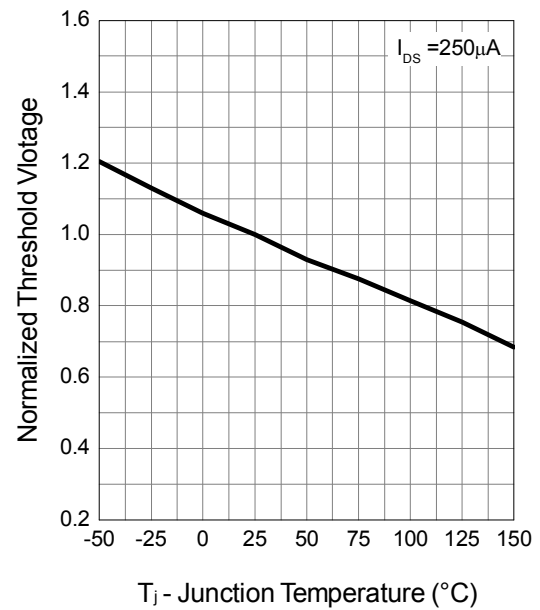
**Drain-Source On Resistance**



**Gate-Source On Resistance**

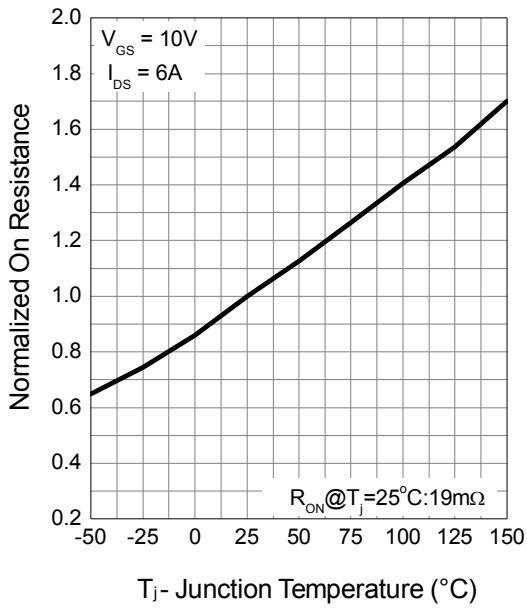


**Gate Threshold Voltage**

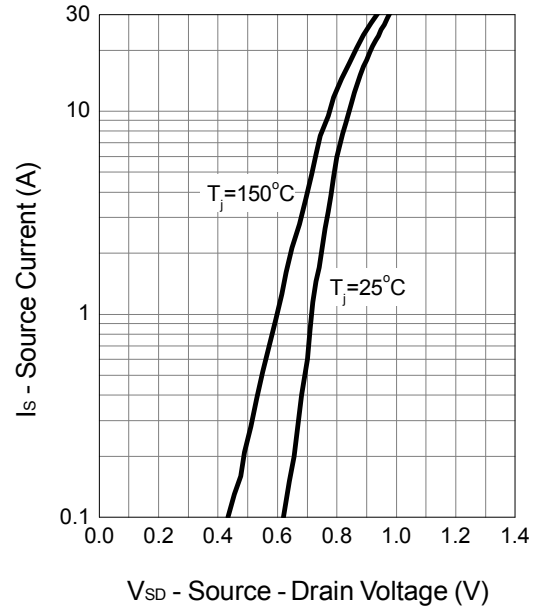


**Typical Operating Characteristics (Cont.)**

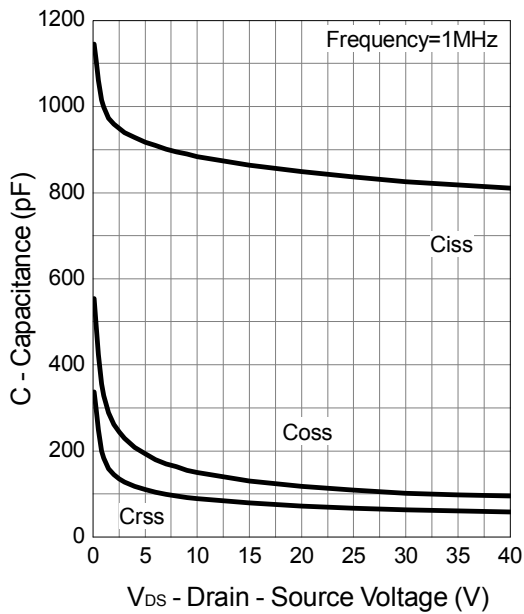
**Drain-Source On Resistance**



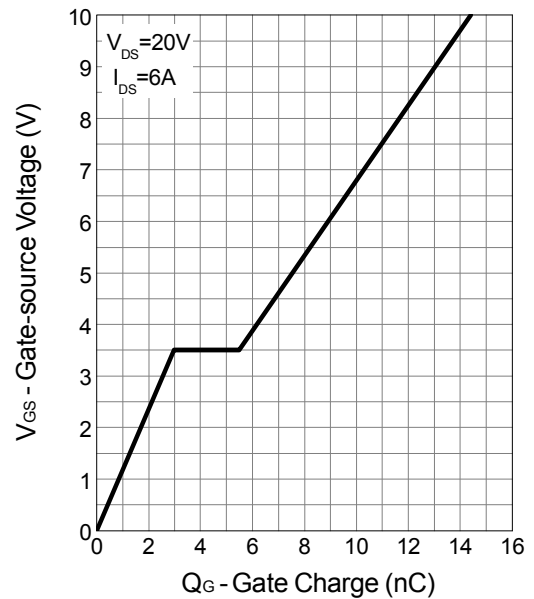
**Source-Drain Diode Forward**



**Capacitance**



**Gate Charge**





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