

General Description

The WSD3090DN is the highest performance trench N-Channel MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSD3090DN 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

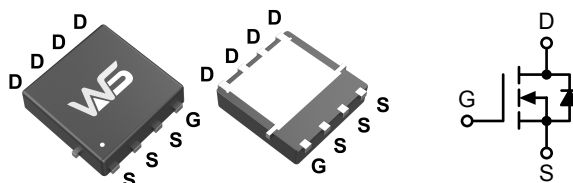
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
30V	1.7mΩ	90A

Applications

- DC/DC power supplies
- Synchronous rectification
- Battery and load switch

DFN3X3-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	90	A
$I_D @ T_C = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	50	A
I_{DM}	Pulsed Drain Current	190	A
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation	52	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	---	33	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	2.4	$^\circ\text{C/W}$

Electrical Characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 20A$	---	1.7	2.2	$m\Omega$
		$V_{GS} = 4.5V, I_D = 20A$	---	2	2.6	
		$V_{GS} = 2.5V, I_D = 10A$	---	2.8	3.6	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	0.5	---	1.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 24V, V_{GS} = 0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 12V, V_{DS} = 0V$	---	---	± 100	nA
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=15V, I_D=10A$	---	52	---	nC
Q_{gs}	Gate-Source Charge		---	8.6	---	
Q_{gd}	Gate-Drain Charge		---	4	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS} = 15V, V_{GEN} = 10V,$ $R_G = 1\Omega, R_L = 1.5\Omega,$ $I_{DS} = 10A$	---	14	---	ns
T_r	Rise Time		---	28	---	
$T_{d(off)}$	Turn-Off Delay Time		---	12	---	
T_f	Fall Time		---	26	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1.0MHz$	---	2350	---	pF
C_{oss}	Output Capacitance		---	1260	---	
C_{rss}	Reverse Transfer Capacitance		---	55	---	

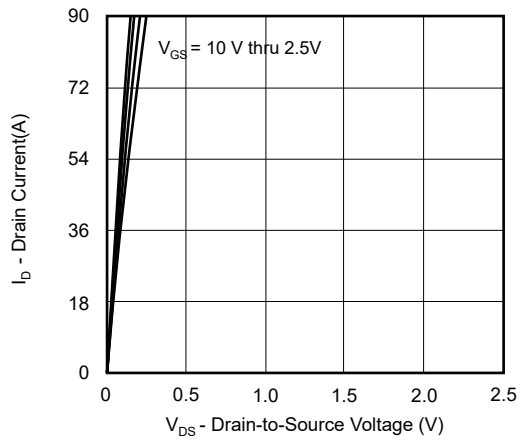
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$T_C = 25^\circ\text{C}$	---	---	40	A
V_{SD}	Diode Forward Voltage	$I_{SD} = 1A, V_{GS} = 0V$	---	-	1.2	V

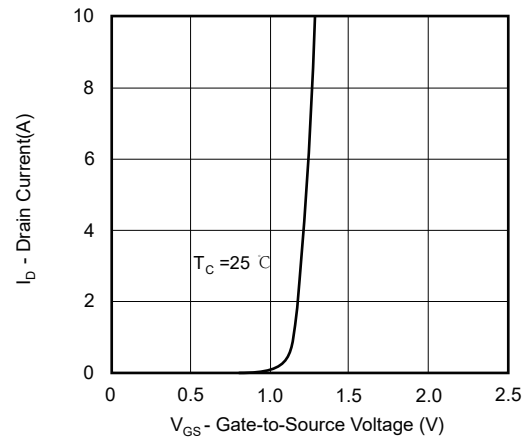
Note :

1. The value of $R_{\theta JA}$ is measured with the device mounted on $1in^2$ 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.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Repetitive rating, pulse width limited by junction temperature.
4. The current rating is based on the $t \leq 10s$ junction to ambient thermal resistance rating.

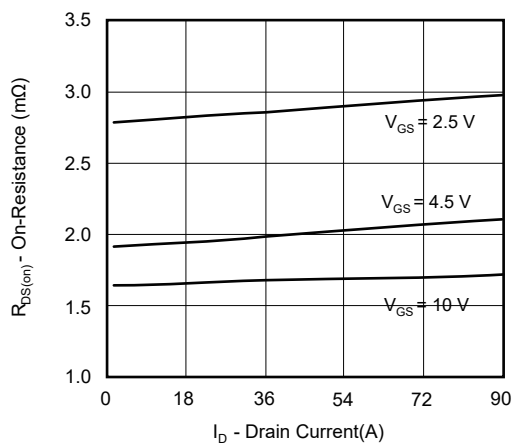
Typical Characteristics



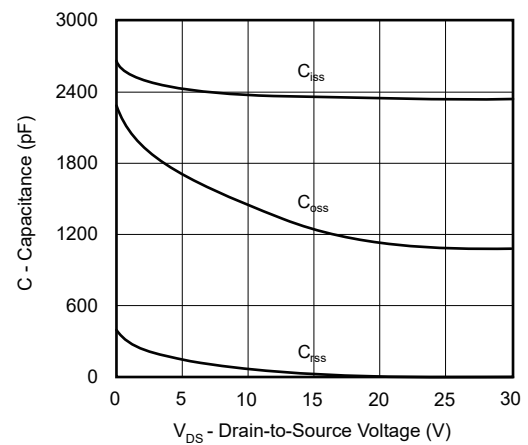
Output Characteristics



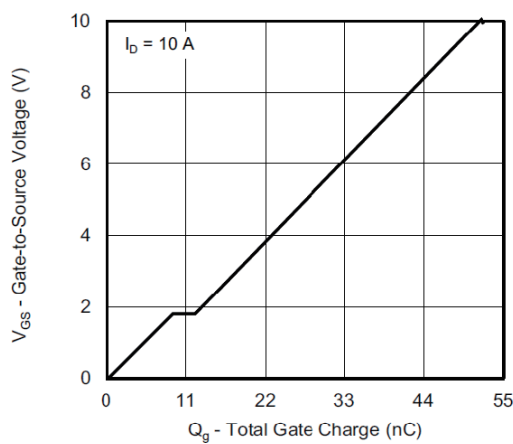
Transfer Characteristics



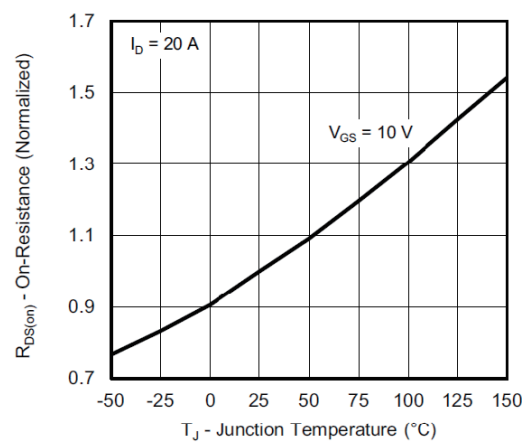
On-Resistance vs. Drain Current and Gate Voltage



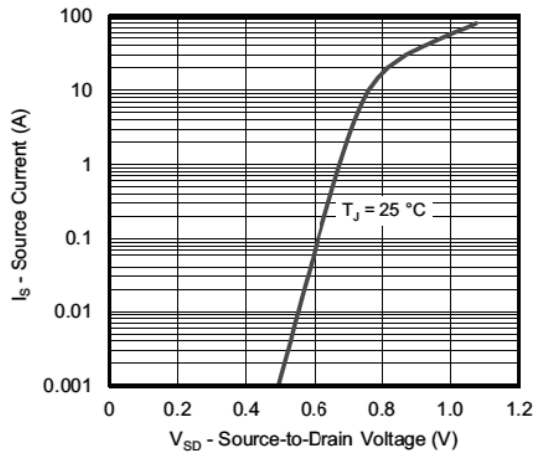
Capacitance



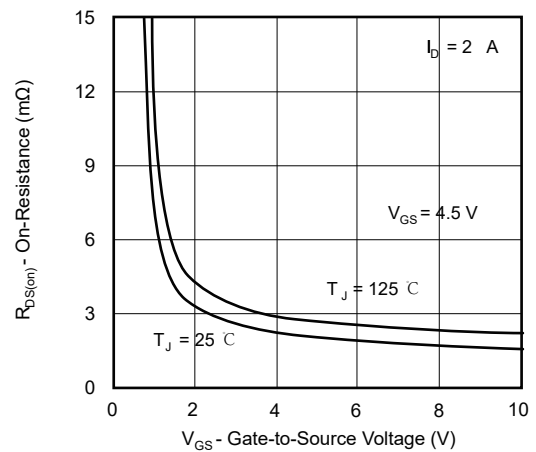
Gate Charge



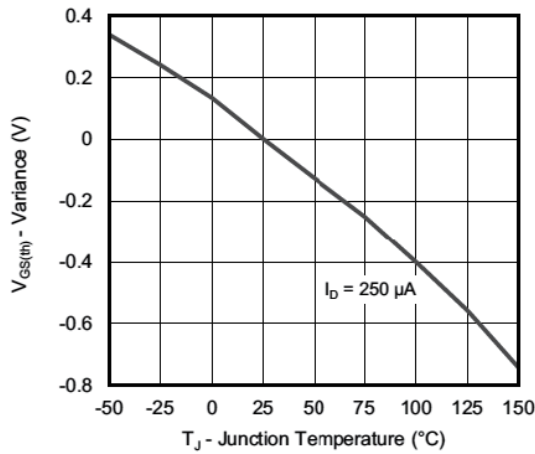
On-Resistance vs. Junction Temperature



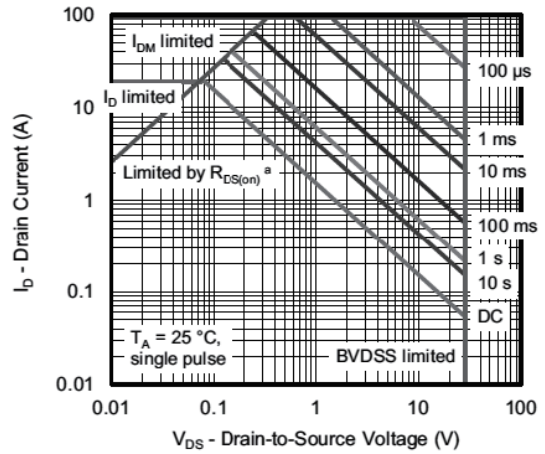
Source-Drain Diode Forward Voltage



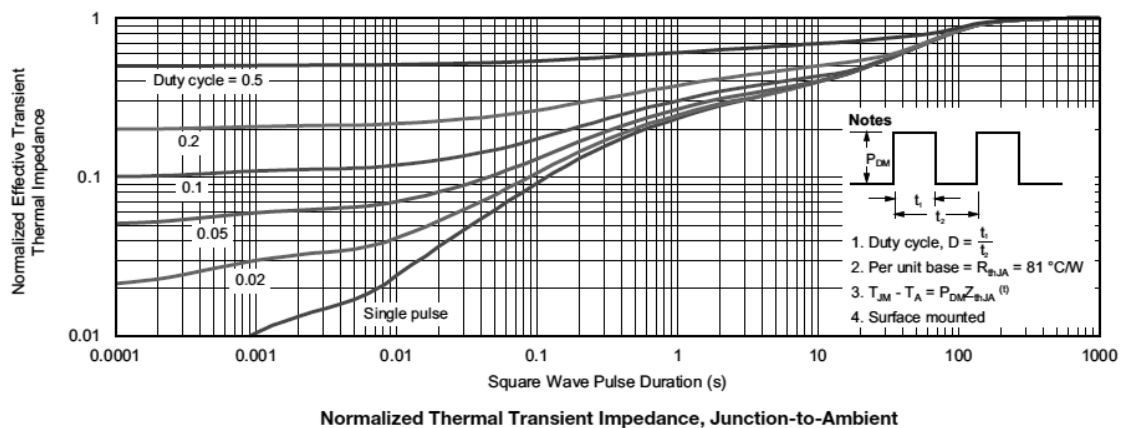
On-Resistance vs. Gate-to-Source Voltage



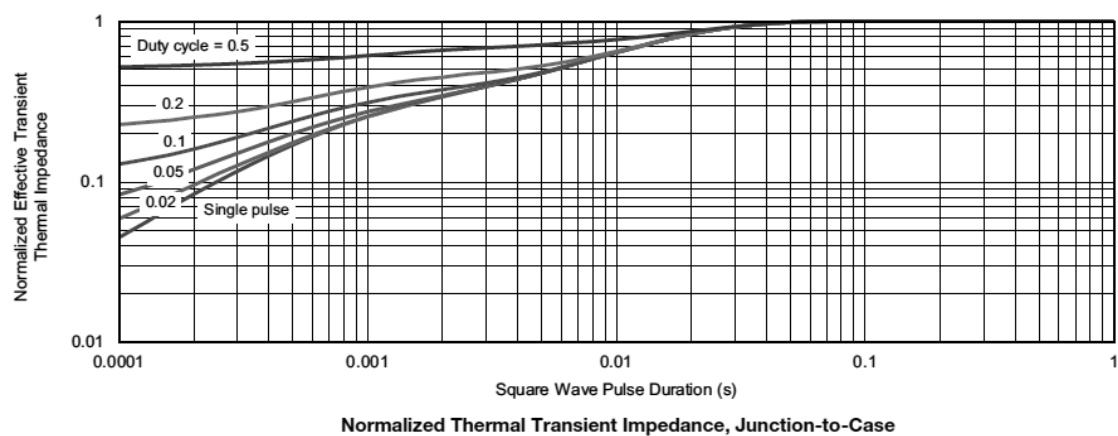
Threshold Voltage



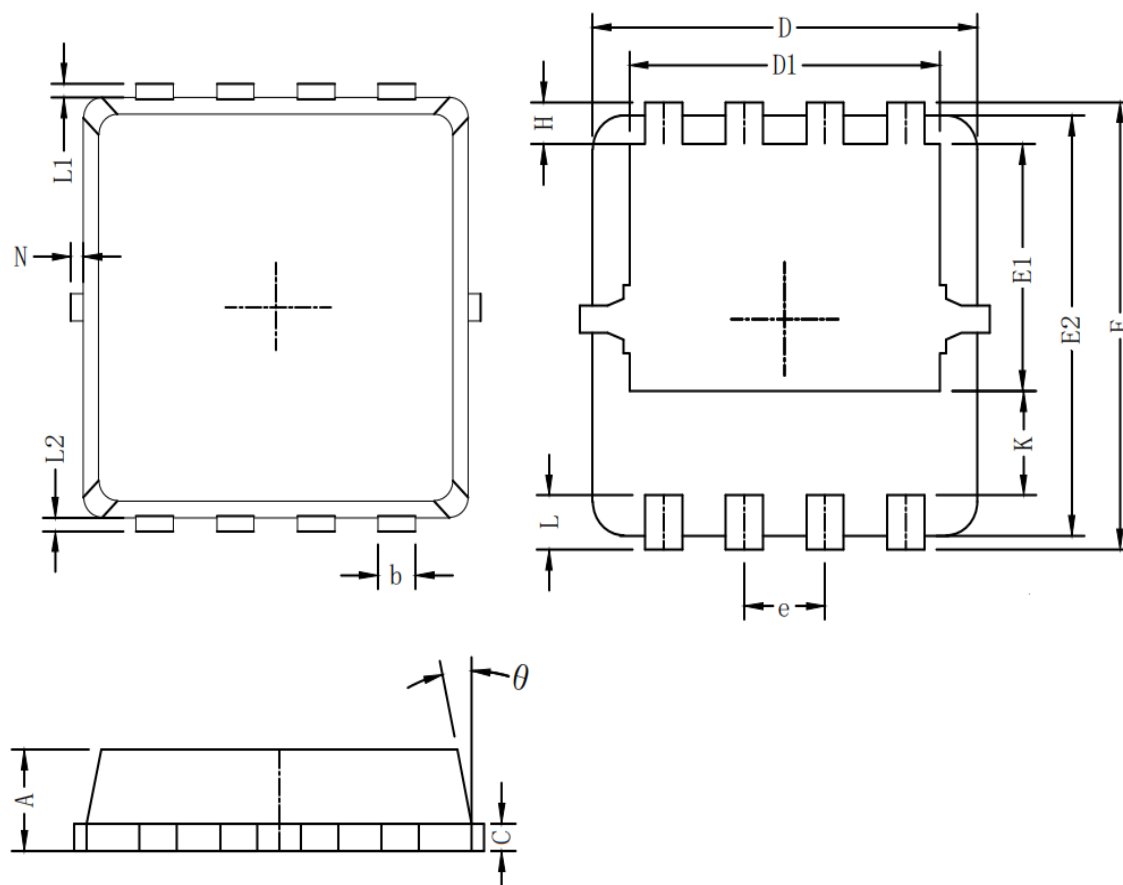
Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



Packaging information



Symbol	Dim in mm		
	min	typ	max
A	0.6	0.75	0.9
b	0.2	0.3	0.4
C	0.15	0.2	0.25
D	3	3.1	3.2
D1	2.3	2.45	2.6
E	3.15	3.3	3.45
E1	1.43	1.73	1.93
E2	2.9	3.05	3.2
e	0.65BSC		
H	0.2	0.35	0.5
K	0.57	0.77	0.87
L	0.3	0.4	0.5
L1/L2	0.1REF		
θ	8°	10°	13°
N	0		0.15

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