

General Description

The WSD4084DN33 is the highest performance trench Dual N- 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 WSD4084DN33 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Features

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

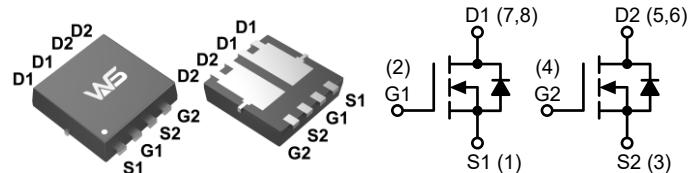
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
40V	13.5mΩ	35A

Applications

- POL Applications
- MB / VGA / Vcore
- Load Switch
- SMPS 2nd SR

DFN3X3-8L Pin Configuration



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current (Continuous) ^{1,3}	$T_C=25^\circ C$	A
		$T_C=100^\circ C$	
I_{DM}	Drain Current (Pulse) ²	55	
P_D	Power Dissipation	$T_C=25^\circ C$	W
E_{AS}	Single Pulse Avalanche Energy	35	mJ
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	---	62	$^\circ C/W$
	Thermal Resistance, Junction-to-Case	---	8	

Electrical Characteristics (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Static						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V	---	---	1.0	μA
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V	---	---	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(ON)}	Drain-Source On-state Resistance	V _{GS} =10V, I _D =15A	---	13.5	14.5	mΩ
		V _{GS} =4.5V, I _D =15A	---	17.5	18.5	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A	---	33	---	S
Switching						
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f = 1.0MHz	---	3.0	---	Ω
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =5A	---	11	---	nC
Q _{gs}	Gate-Source Charge		---	3.4	---	
Q _{gd}	Gate-Drain Charge		---	4.5	---	
T _{d(on)}	Turn-On Delay Time		---	8.8	---	ns
T _r	Rise Time	V _{GS} =10V, V _{DD} =15V, I _D =1A, R _G =6Ω	---	3.6	---	
T _{d(off)}	Turn-Off Delay Time		---	25	---	
T _f	Fall Time		---	2.5	---	
Dynamic						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f = 1.0MHz	---	1440	---	pF
C _{oss}	Output Capacitance		---	125	---	
C _{rss}	Reverse Transfer Capacitance		---	100	---	
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	9	A
I _{SM}	Pulsed Source Current ³		---	---	35	
V _{SD}	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	---	---	1.2	V

Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=16A, R_G=25, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

Typical Characteristics

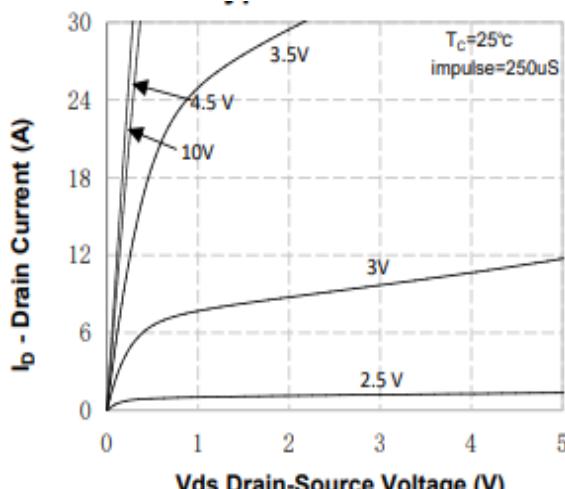


Figure 1. On-Region Characteristics

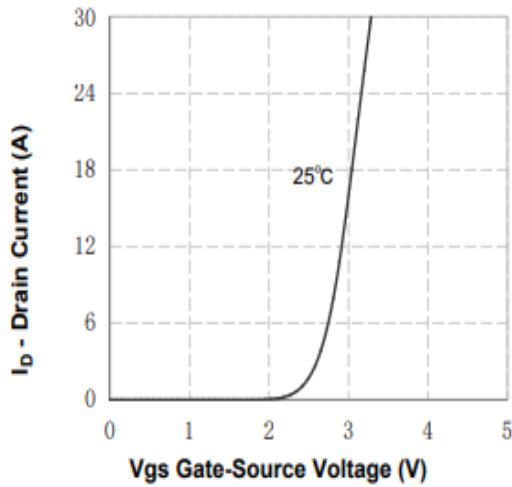


Figure 2. Transfer Characteristics

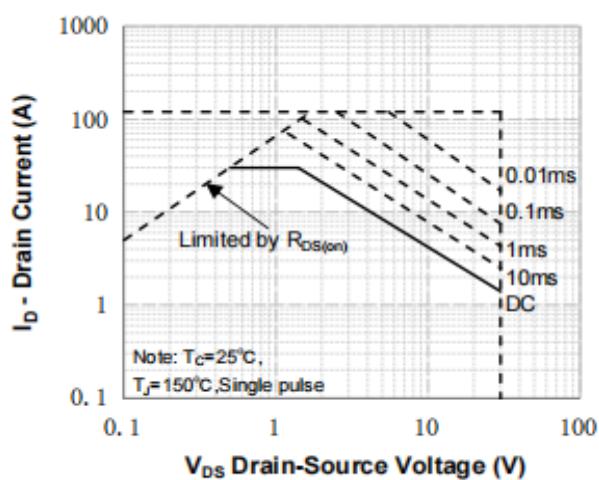


Figure 3. Maximum Safe Operating Area

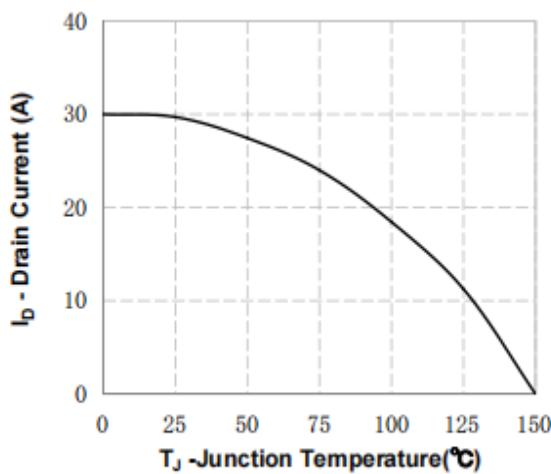


Figure 4. Maximum Continuous Drain Current vs Temperature

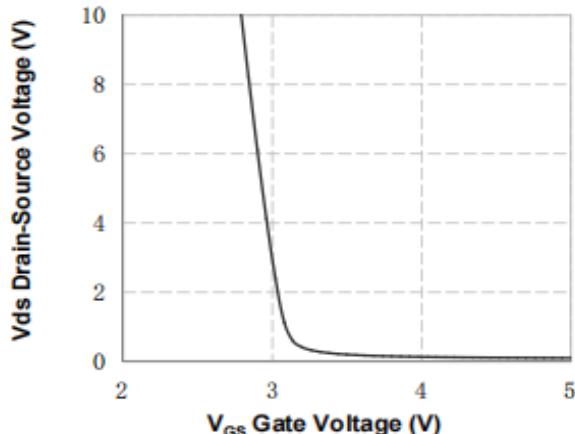


Figure 5. Vds Drain-Source Voltage vs Gate Voltage

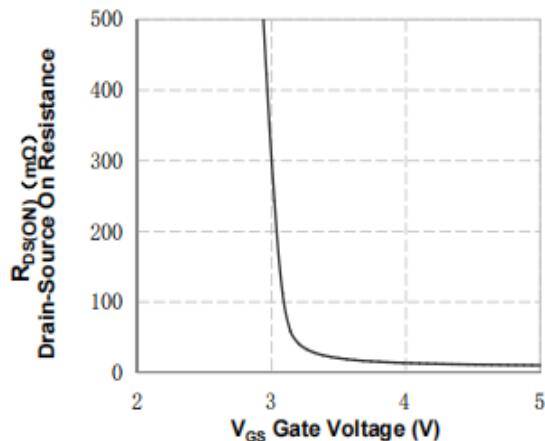


Figure 6. On-Resistance vs Gate Voltage

Typical Characteristics (Cont.)

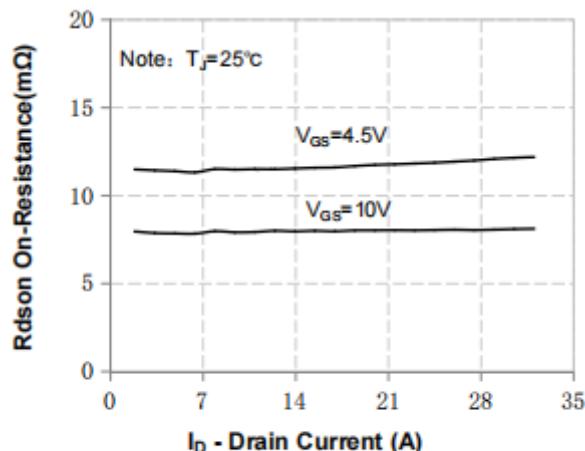


Figure 7. On-Resistance Variation vs Drain Current and Gate Voltage

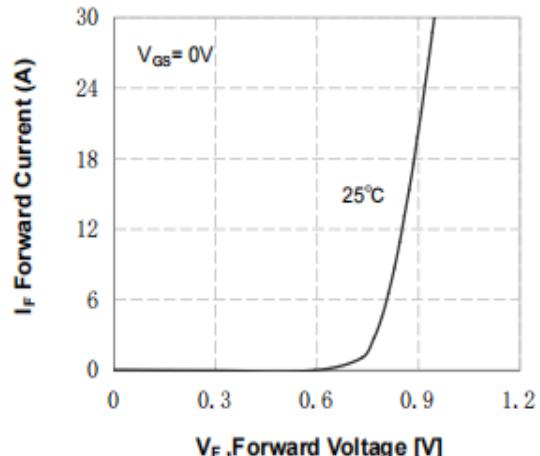


Figure 8. Body Diode Forward Voltage Variation vs Source Current

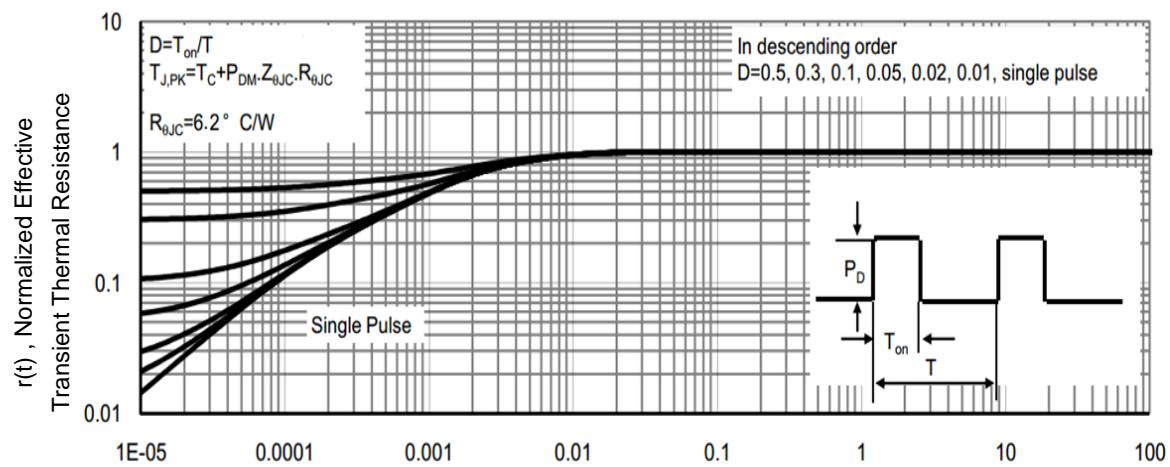


Figure 9. T_1 , Transient Thermal Response Curve

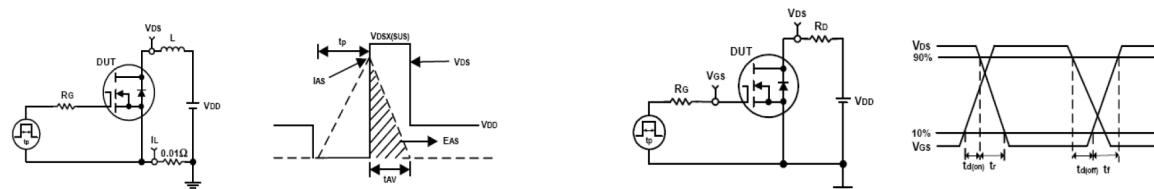
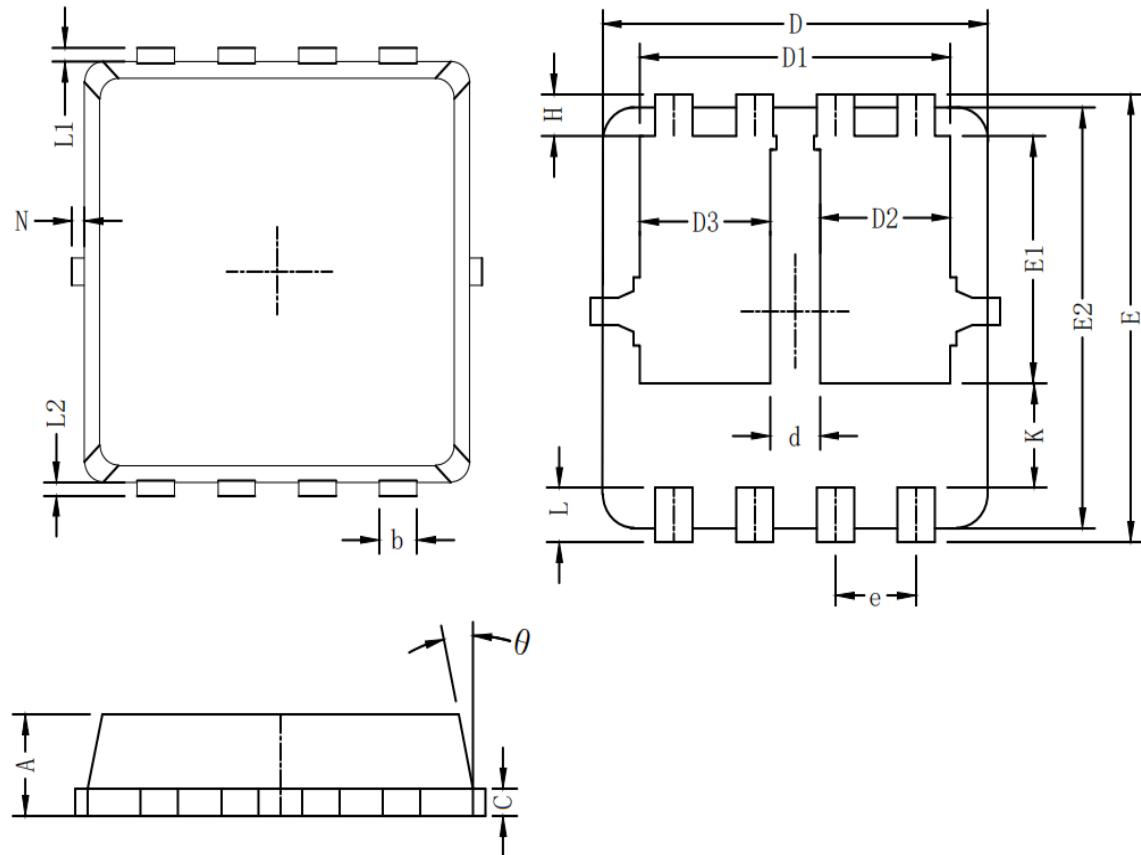


Figure 10. Unclamped Inductive Test Circuit and waveforms

Figure 11. Switching Time Test Circuit and waveforms

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
D2/D3	0.8	1	1.2
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
d	0.3	0.4	0.5



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