

General Description

The WSD18N10DN33 is the highest performance trench 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 WSD18N10DN33 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 $C_{dv/dt}$ effect decline
- Green Device Available

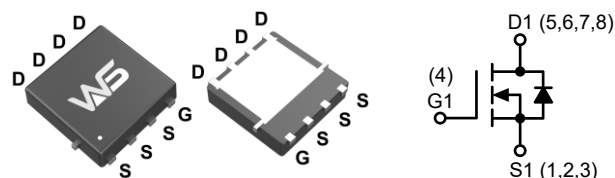
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	85mΩ	16A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch

DFN3X3-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	16	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	7	A
I_{DM}	Pulsed Drain Current ²	30	A
EAS	Single Pulse Avalanche Energy ³	9	mJ
I_{AS}	Avalanche Current	6	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ³	1.79	W
$P_D@T_A=70^\circ\text{C}$	Total Power Dissipation ³	1.14	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 ¹	---	70	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	4.5	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.098	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =3A	---	85	100	mΩ
		V _{GS} =4.5V, I _D =1.8A	---	90	120	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	2.0	3.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4.57	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =85°C	---	---	30	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A	---	13	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2	4	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =50V, V _{GS} =4.5V, I _D =3A	---	5.7	6.6	nC
Q _{gs}	Gate-Source Charge		---	0.9	---	
Q _{gd}	Gate-Drain Charge		---	1.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =6Ω I _D =1A, R _L =30Ω	---	8	15	ns
T _r	Rise Time		---	9	17	
T _{d(off)}	Turn-Off Delay Time		---	9	17	
T _f	Fall Time		---	16	29	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	---	300	390	pF
C _{oss}	Output Capacitance		---	58	---	
C _{rss}	Reverse Transfer Capacitance		---	15	---	

Diode Characteristics

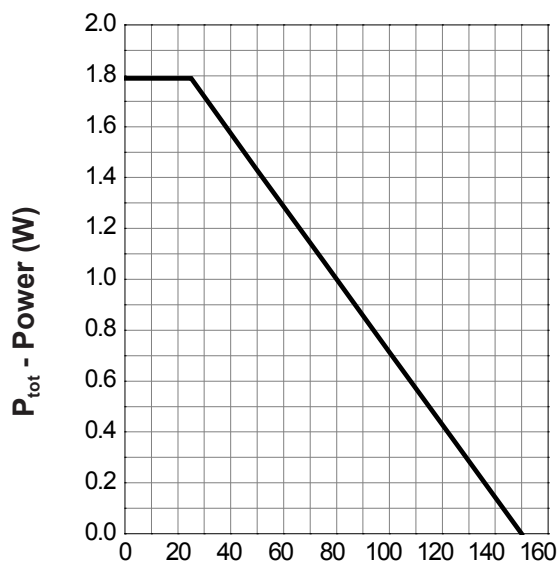
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	---	---	10	A
I _{SM}	Pulsed Source Current ^{2,6}		---	---	30	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1.5A, T _J =25°C	---	0.8	1.3	V
t _{rr}	Reverse Recovery Time	I _F =3A, di/dt=100A/μs, T _J =25°C	---	25	---	nS
Q _{rr}	Reverse Recovery Charge		---	29	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, t_l≤10sec.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The E_{AS} data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=6A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The Min. value is 100% E_{AS} tested guarantee.
- 6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

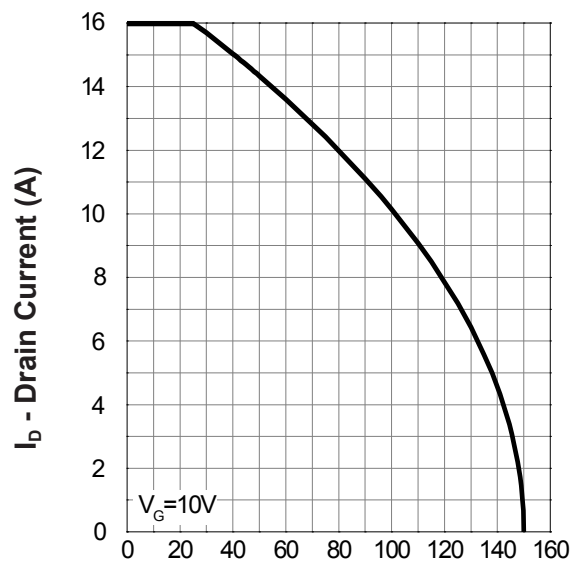
Typical Characteristics

Power Dissipation



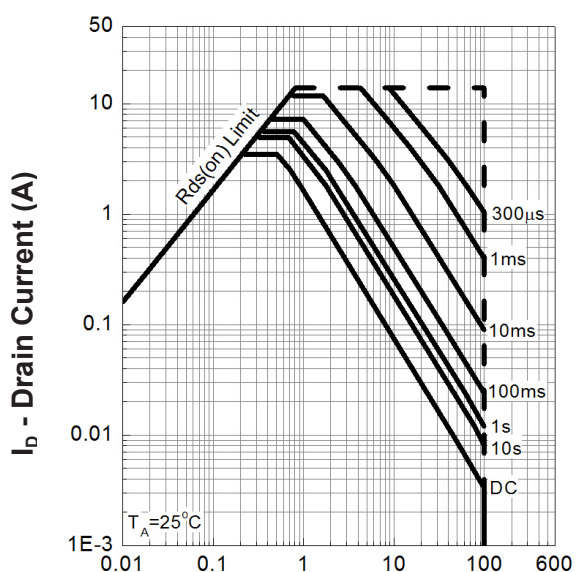
T_A - Ambient Temperature ($^{\circ}\text{C}$)

Drain Current



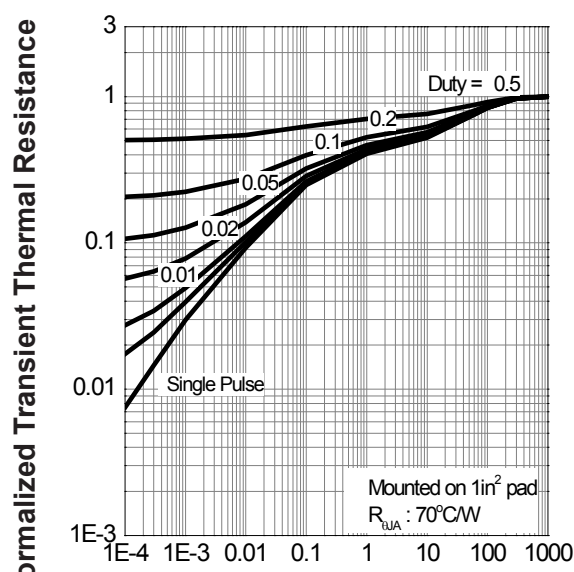
T_A - Ambient Temperature ($^{\circ}\text{C}$)

Safe Operation Area



V_{DS} - Drain - Source Voltage (V)

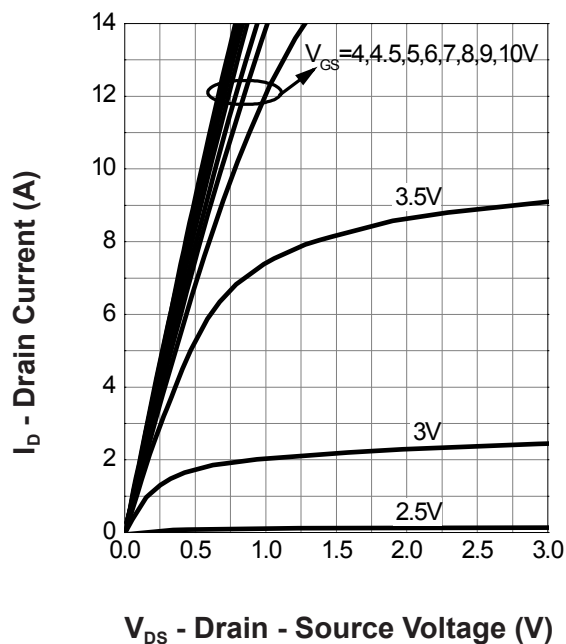
Thermal Transient Impedance



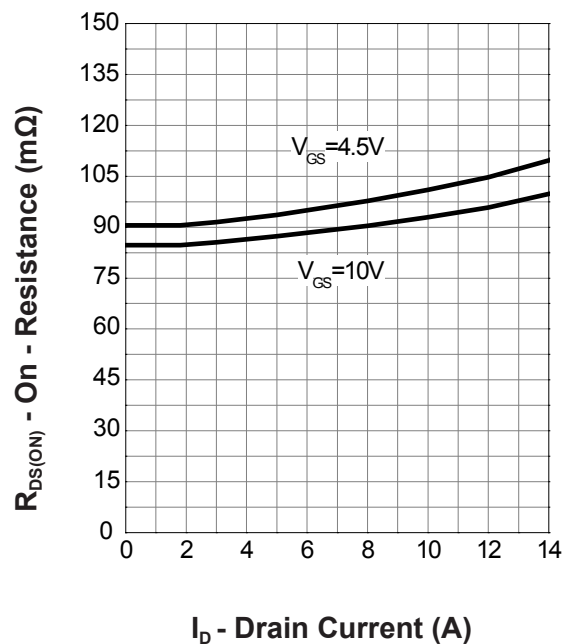
Square Wave Pulse Duration (sec)

Typical Characteristics(Cont.)

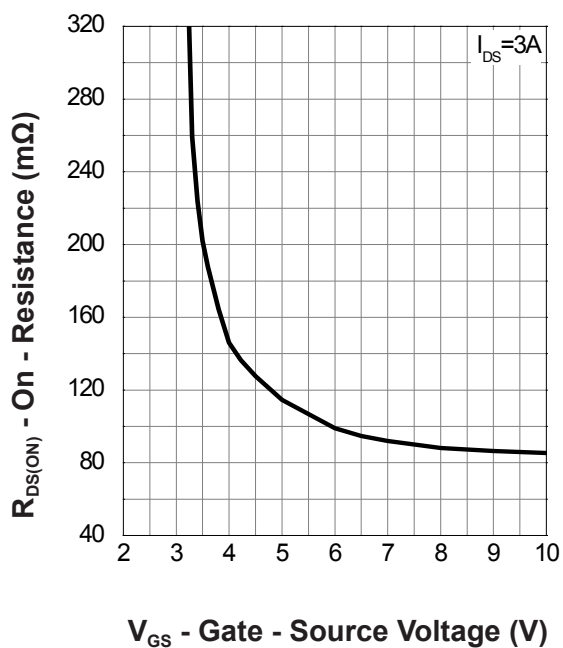
Output Characteristics



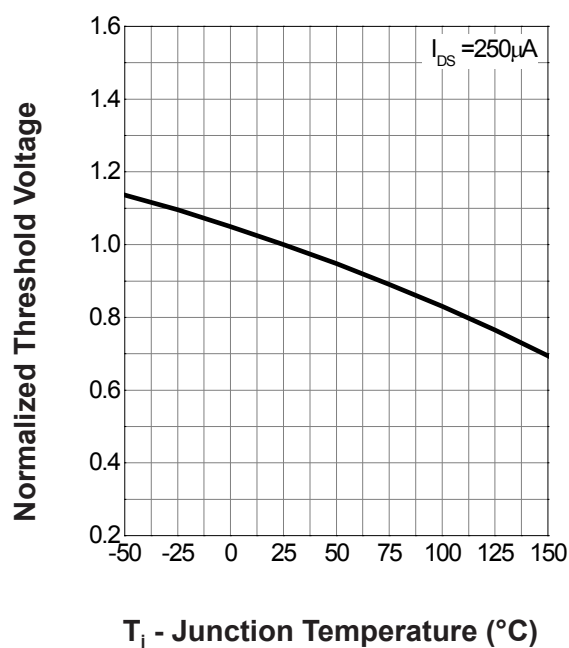
Drain-Source On Resistance

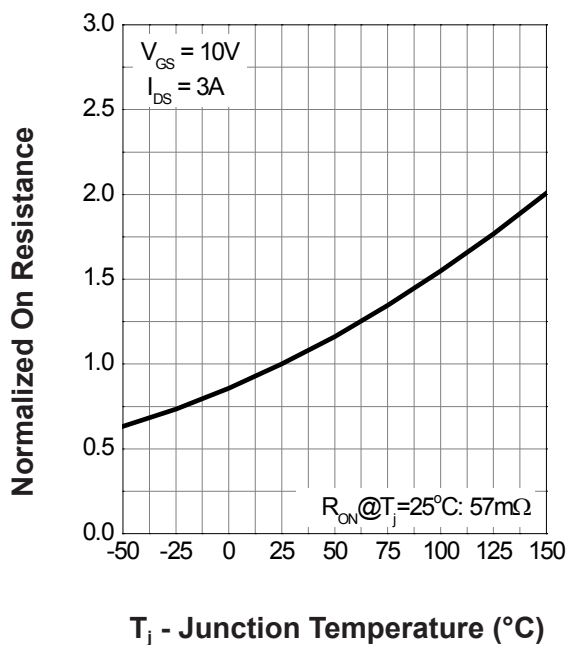
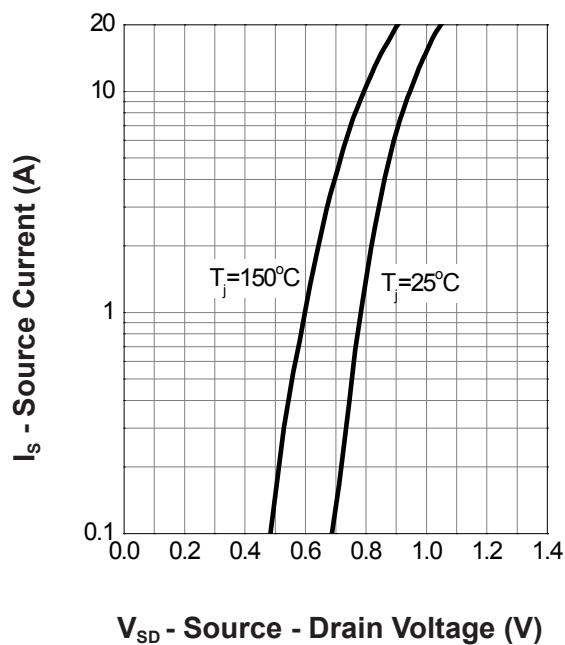
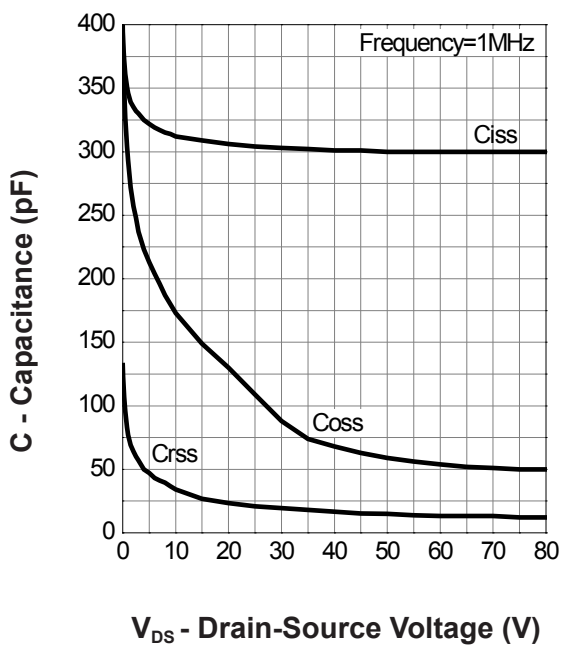
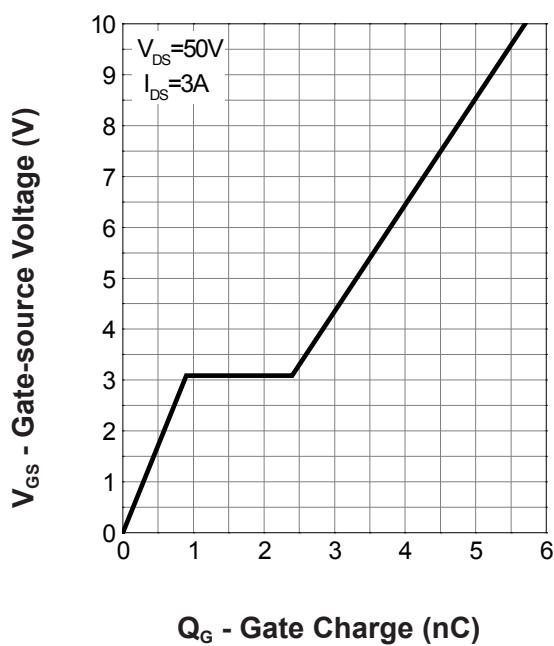


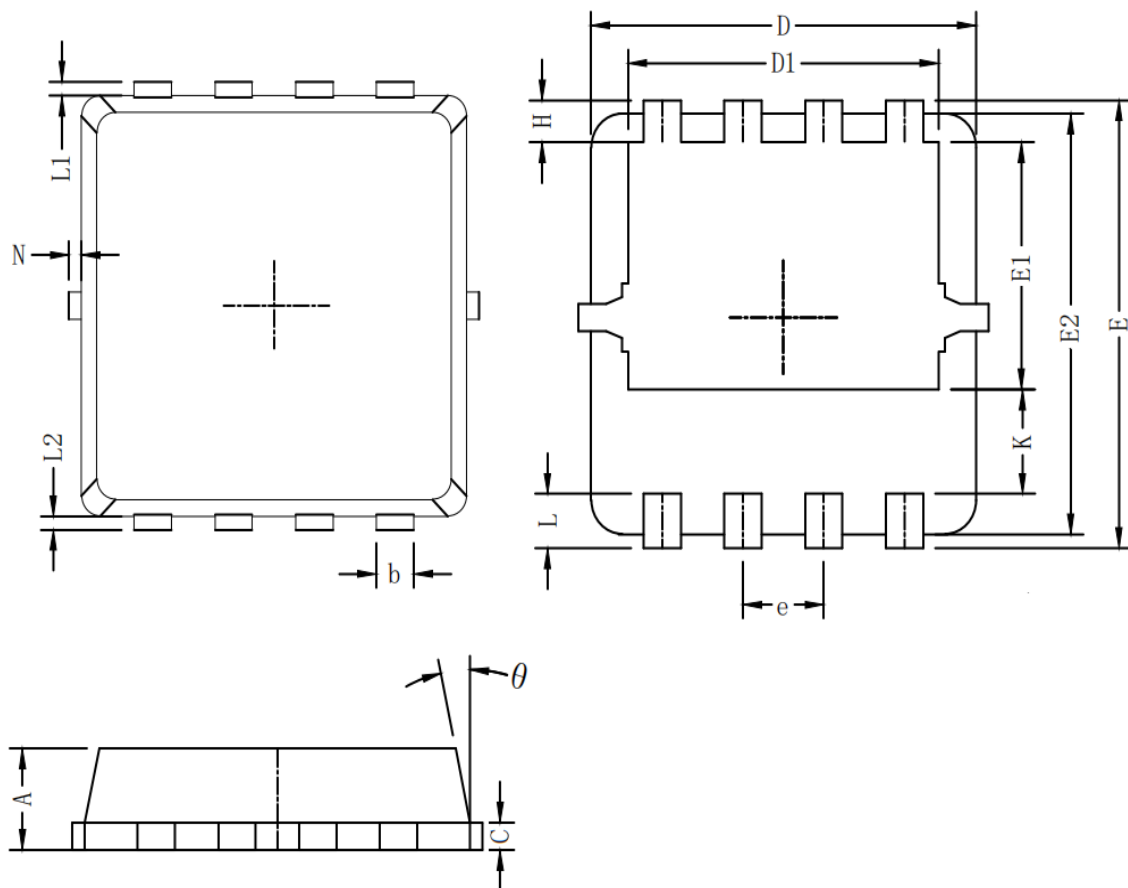
Gate-Source On Resistance



Gate Threshold Voltage



Typical Characteristics(Cont.)
Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


Packaging information


Symbol	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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