

General Description

The WSD3066DN33 is the highest performance trench N-Channel MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3066DN33 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

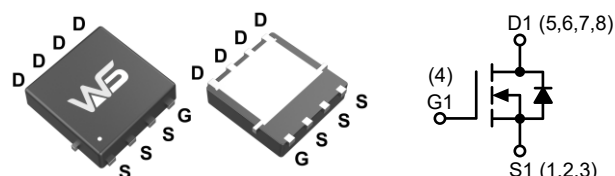
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
30V	4.7m Ω	66A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- 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	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ¹	66	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ¹	40	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ¹	15	
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ¹	10	
$I_{DM} @ T_C = 25^\circ C$	Pulsed Drain Current ²	150	
E_{AS}	Avalanche Energy, Single Pulse ($L=0.1mH$) ³	125	mJ
I_{AS}	Avalanche Current, Single pulse ($L=0.1mH$) ³	50	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	45	W
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ⁴	1.78	
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 ¹	---	70	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case ¹	---	2.7	

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.028	---	$\text{V}/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=40A$	---	4.7	5.7	m Ω
		$V_{GS}=4.5V$, $I_D=20A$	---	5.8	7.6	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.5	1.8	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.06	---	$\text{mV}/^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1.0	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	30	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=20A$	---	44	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1.0\text{MHz}$	---	1.0	1.1	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=20A$	---	27.5	38.5	nC
Q_{gs}	Gate-Source Charge		---	9.6	13.4	
Q_{gd}	Gate-Drain Charge		---	9.4	13.7	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$, $V_{GEN}=10V$, $R_G=6\Omega$, $I_D=1A$, $R_L=15\Omega$	---	18.5	34	ns
T_r	Rise Time		---	11.3	21	
$T_{d(off)}$	Turn-Off Delay Time		---	62.5	114	
T_f	Fall Time		---	23.5	43	
C_{iss}	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1.0\text{MHz}$	---	1320	1420	pF
C_{oss}	Output Capacitance		---	610	640	
C_{rss}	Reverse Transfer Capacitance		---	112	150	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ⁵	$V_{DD}=25V$, $L=0.5\text{mH}$, $I_{AS}=20A$	---	125	---	mJ

Diode Characteristics

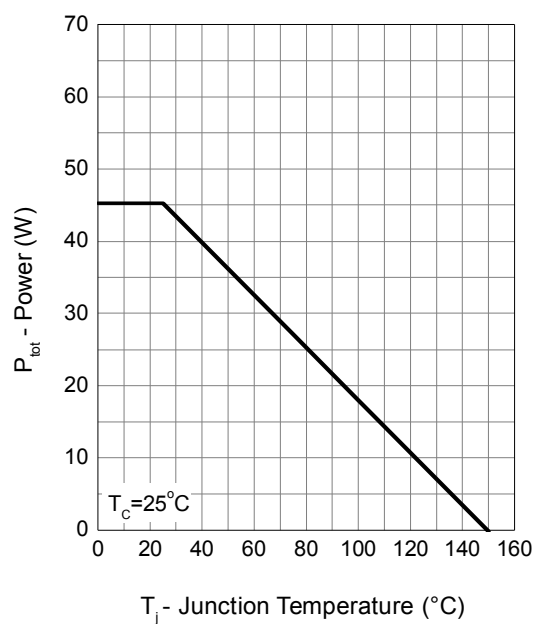
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	15	A
I_{SM}	Pulsed Source Current ^{2,6}		---	---	45	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^{\circ}\text{C}$	---	---	1.0	V
t_{rr}	Reverse Recovery Time	$I_F=40A$, $dI/dt=100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	23	---	ns
Q_{rr}	Reverse Recovery Charge		---	7	---	nC

Note:

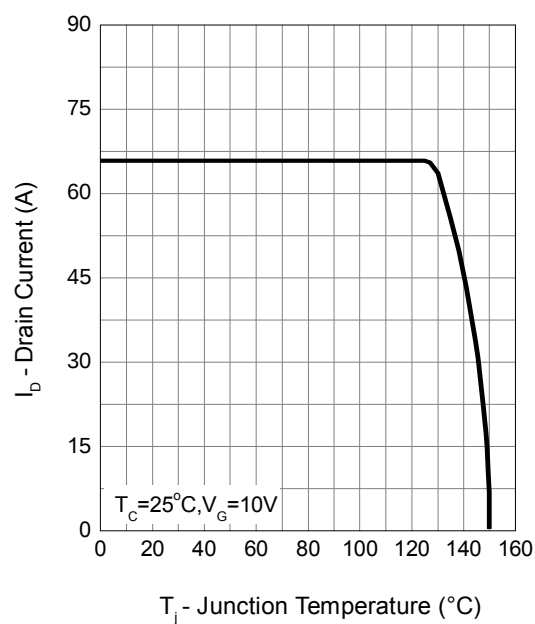
- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, $t<10\text{sec}$.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.5\text{mH}$, $I_{AS}=20A$
- The power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

Typical Characteristics

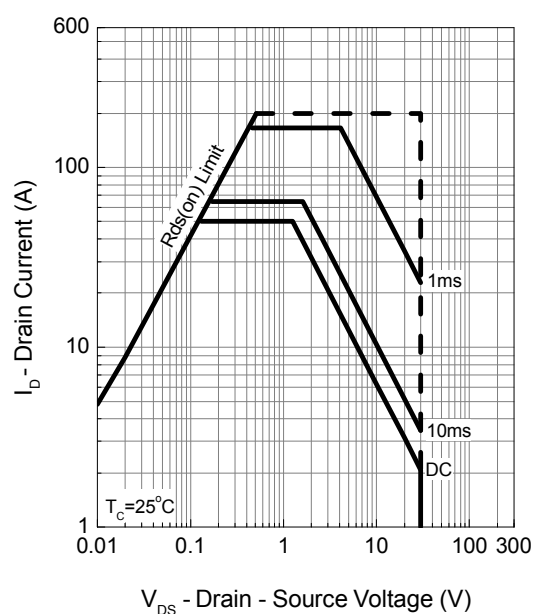
Power Dissipation



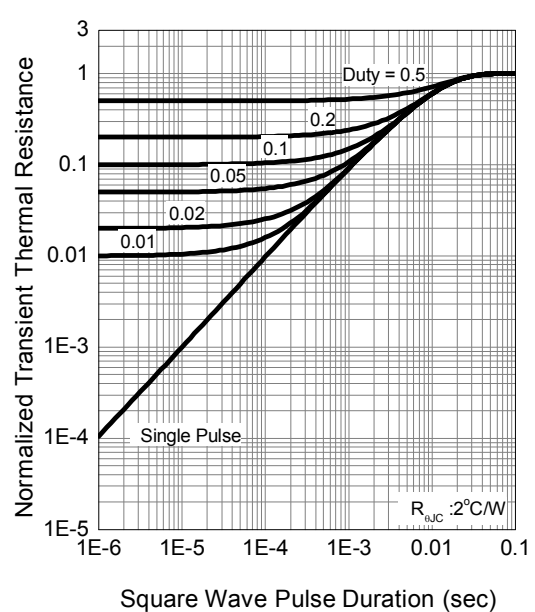
Drain Current

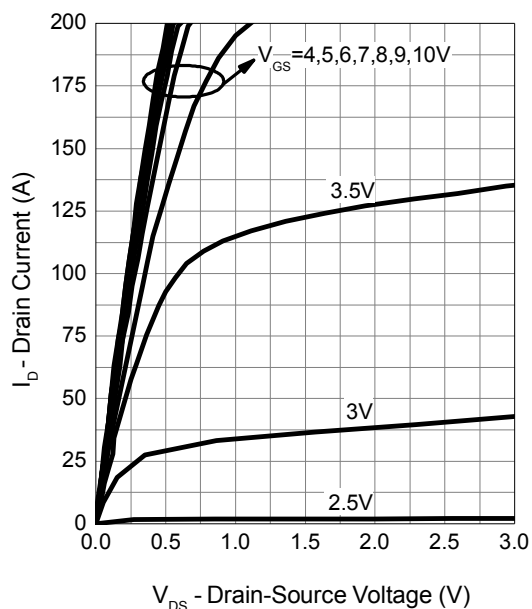
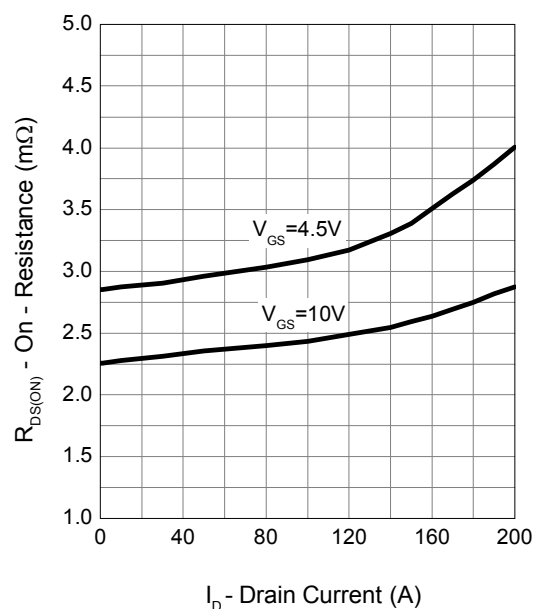
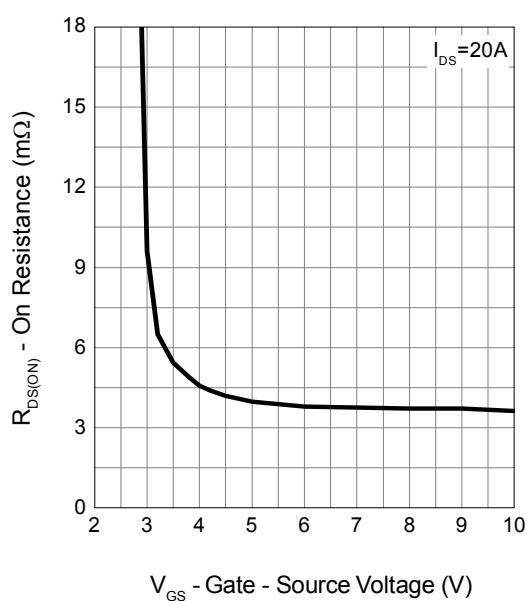
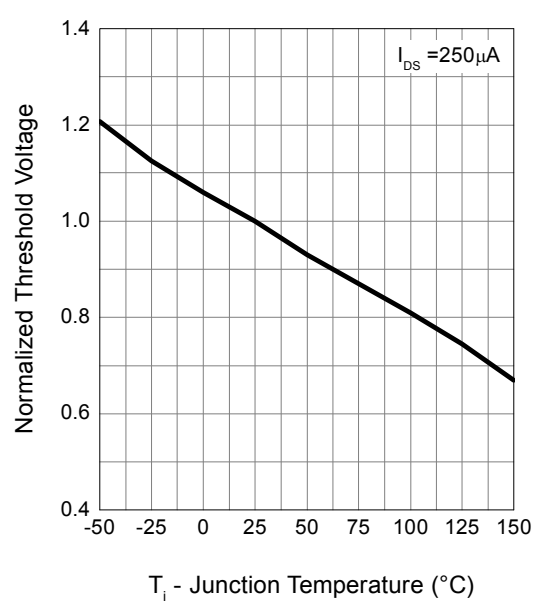


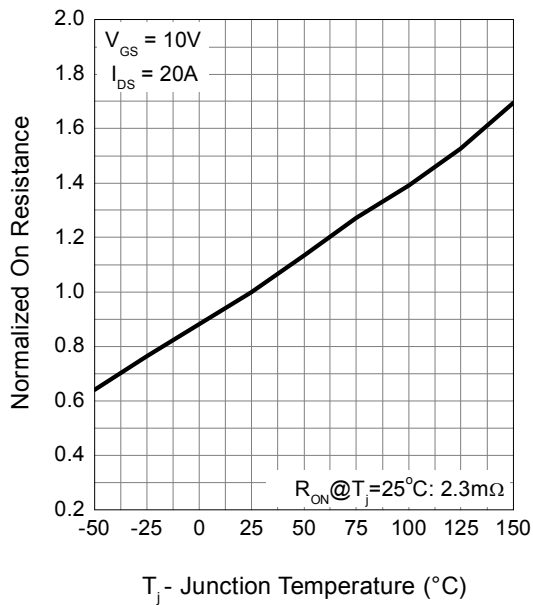
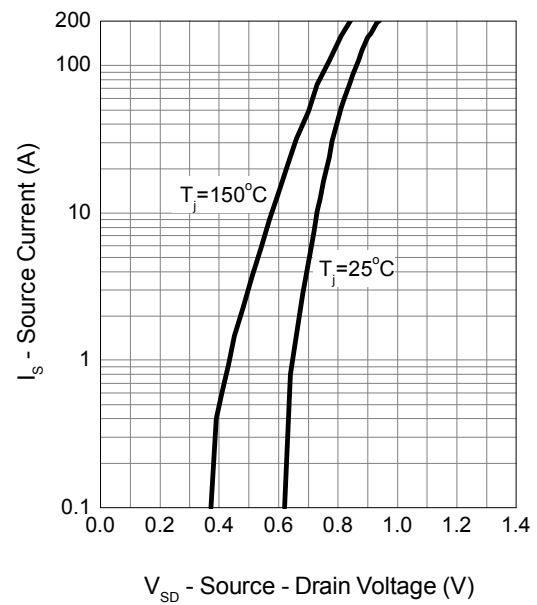
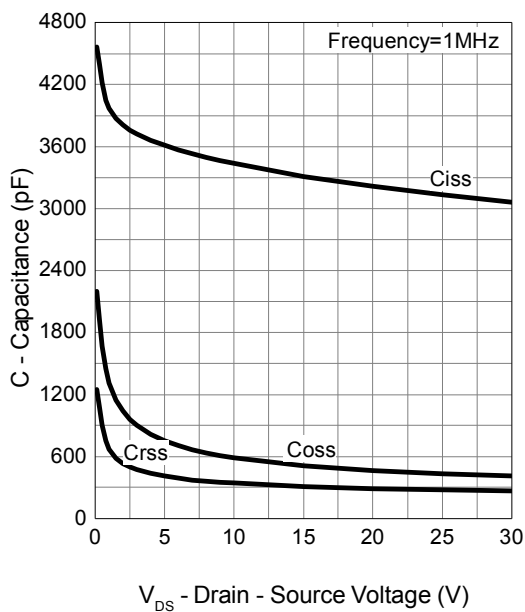
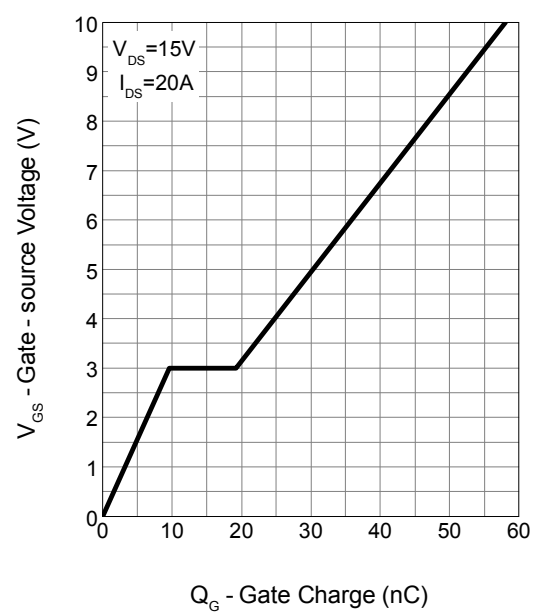
Safe Operation Area



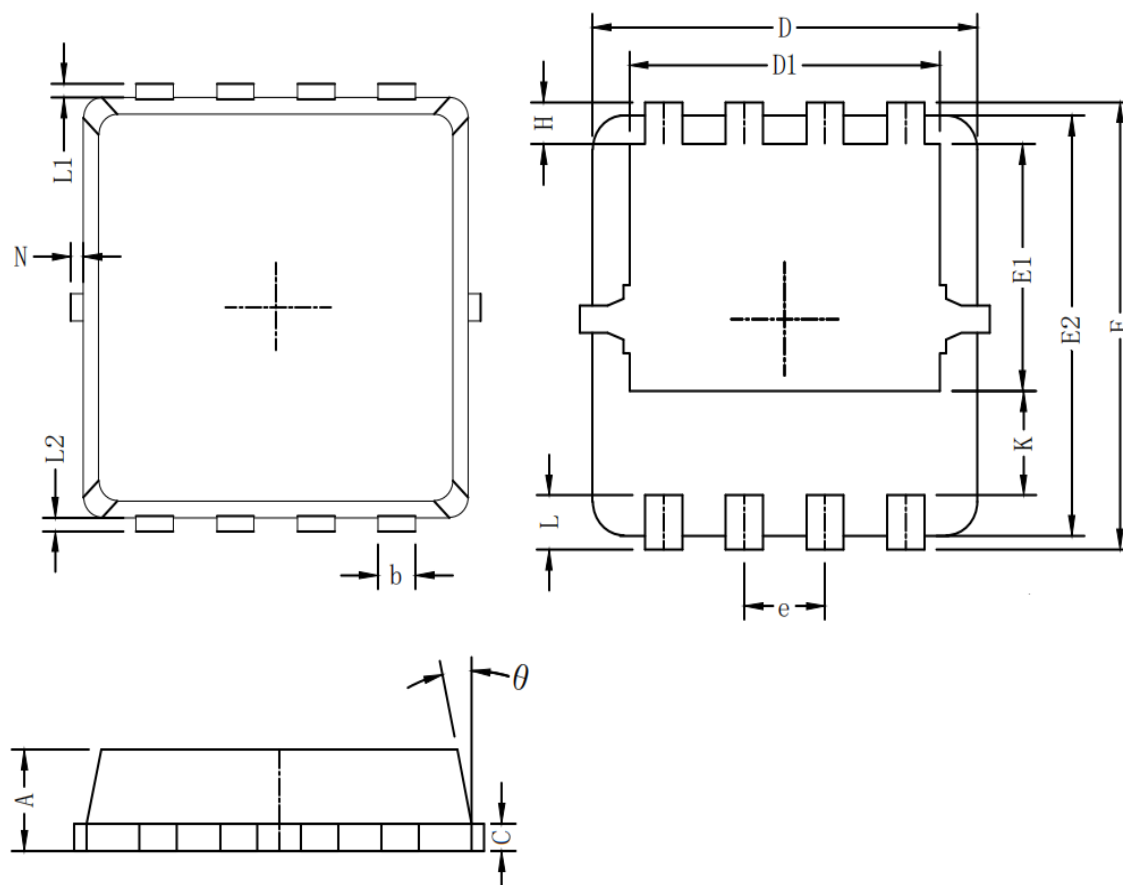
Thermal Transient Impedance



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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