General Description

The WSD6036DN33 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 WSD6036DN33 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
60V	14mΩ	50A

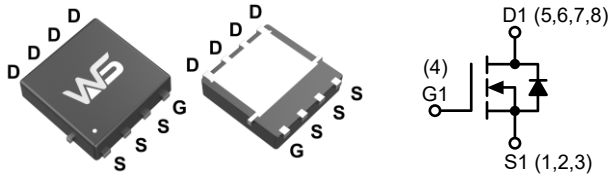
Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter
- Motor Control
- Load Switching

Features

- Lead Free and Green Devices Available (RoHS Compliant)
- 100% UIS + Rg Tested
- Reliable and Rugged
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

DFN3X3-8L Pin Configuration



Absolute Maximum Ratings (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	
I_D	Continuous Drain Current	T_C=25°C	50	A
		T_C=100°C	30	
I_{DM} [1]	Pulsed Drain Current	T_C=25°C	90	
P_D	Maximum Power Dissipation	T_C=25°C	45	W
		T_C=100°C	18	
E_{AS} [3]	Single Pulse Avalanche Energy	L=0.1mH	39.2	mJ
I_S	Diode Continuous Forward Current	T_C=25°C	50	A
T_{STG}	Storage Temperature Range		-55 to 150	°C
T_J	Operating Junction Temperature Range		150	

Thermal Data

Symbol	Parameter		Typ.	Max.	Units
$R_{\theta JA}$ [2]	Thermal Resistance Junction to ambient	Steady State	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	---	3.3	

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	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V , V_{GS}=0V	---	---	1.0	μA
		T_J=85°C	---	---	30	
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_{DS}=250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$ [4]	Drain-Source On-state Resistance	V_{GS}=10V , I_D=25A	---	14	17.5	mΩ
		V_{GS}=4.5V , I_D=20A	---	19	22	
Switching						
Q_g	Total Gate Charge	V_{DS}=30V , V_{GS}=10V , I_D=25A	---	42	---	nC
Q_{gs}	Gate-Source Charge		---	6.4	---	
Q_{gd}	Gate-Drain Charge		---	9.6	---	
$T_{d(on)}$	Turn-on Delay Time	V_{GEN}=10V , V_{DD}=30V , I_D=1A R_G=6Ω , R_L=30Ω	---	17	---	ns
T_r	Turn-on Rise Time		---	9	---	
$T_{d(off)}$	Turn-off Delay Time		---	58	---	
T_f	Turn-on Fall Time		---	14	---	
R_g	Gat resistance	V_{GS}=0V , V_{DS}=0V , f = 1.0MHz	---	1.5	---	Ω
Dynamic						
C_{iss}	Input Capacitance	V_{GS}=0V , V_{DS}=30V , f = 1.0MHz	---	2100	---	pF
C_{oss}	Output Capacitance		---	140	---	
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	---	---	18	A
I_{SM}	Pulsed Source Curren [3]		---	---	35	
V_{SD} [4]	Diode Forward Voltage	I_{SD}=20A , V_{GS}=0V	---	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{DS}=25A , dI_{SD}/dt=100A/μs	---	27	---	ns
Q_{rr}	Reverse Recovery Charge		---	33	---	nC

Note:

1. Pulse width limited by max. junction temperature.
2. Surface Mounted on 1in^2 pad area.
3. UIS tested and pulse width limited by maximum junction temperature 150°C(initial temperature T_J=25°C).
4. Pulse test ; pulse width≤300μs, duty cycle≤2%.
5. Guaranteed by design, not subject to production testing.

Typical Characteristics

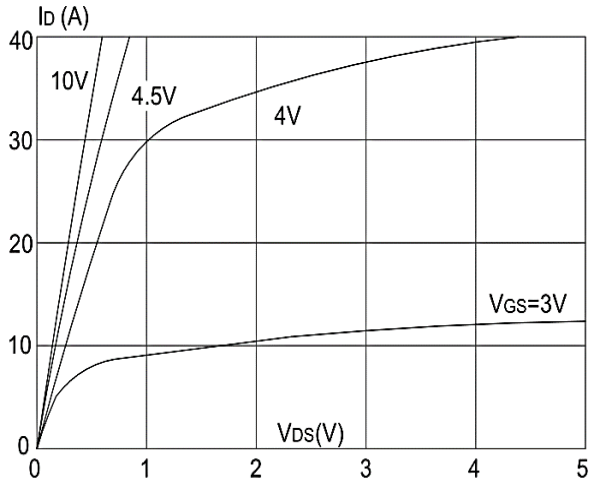


Figure1: Output Characteristics

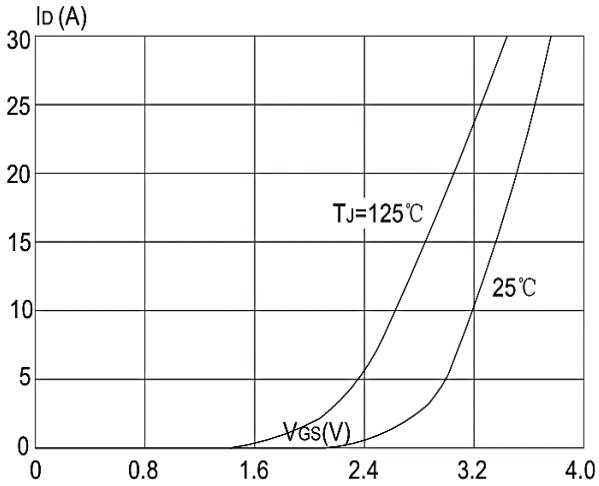


Figure 2: Typical Transfer Characteristics

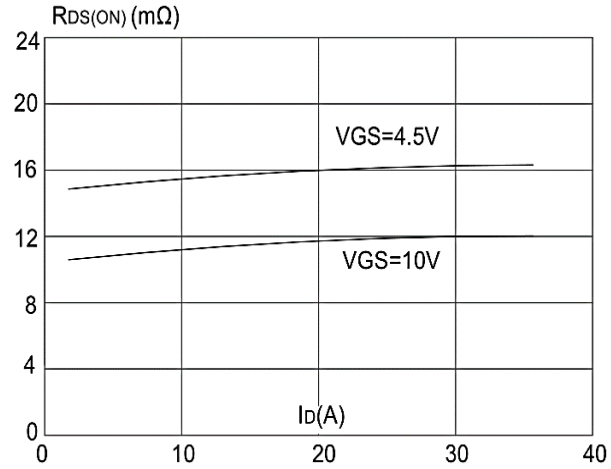


Figure 3:On-resistance vs. Drain Current

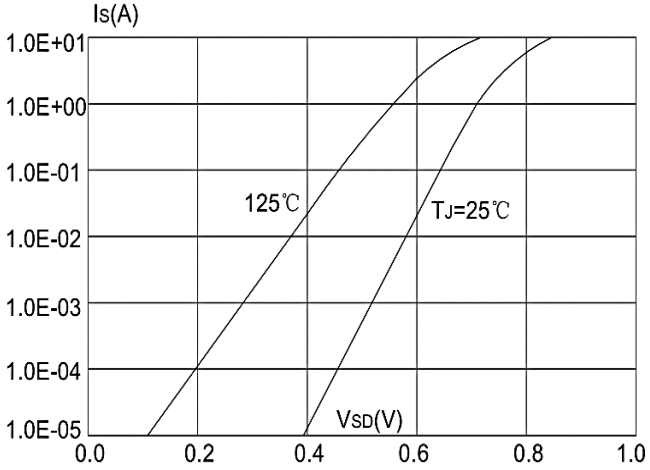


Figure 4: Body Diode Characteristics

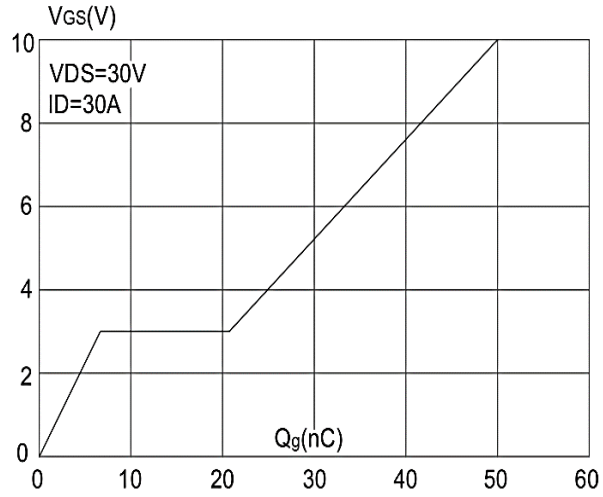


Figure 5: Gate Charge Characteristics

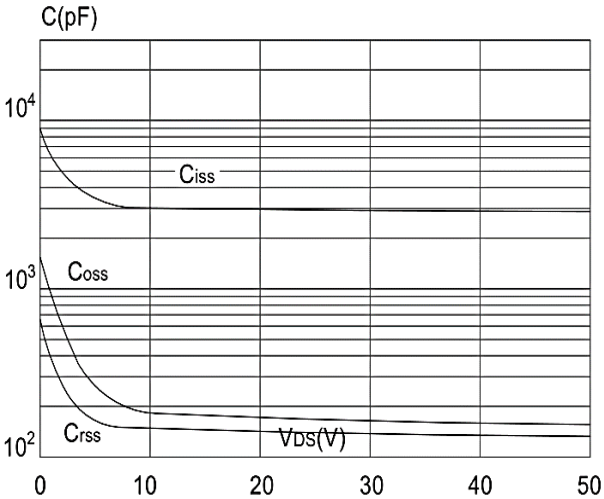


Figure 6: Capacitance Characteristics

Typical Characteristics (Cont.)

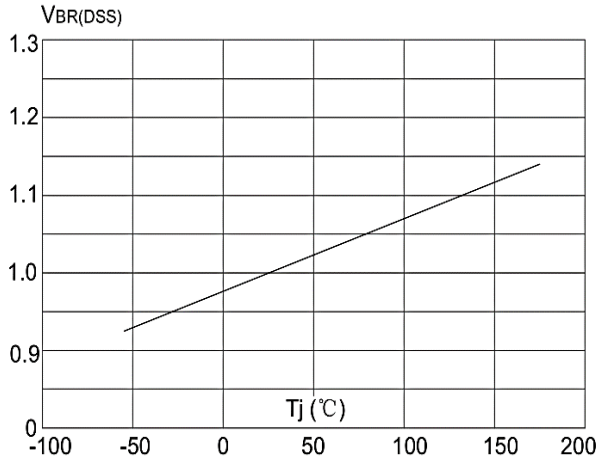


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

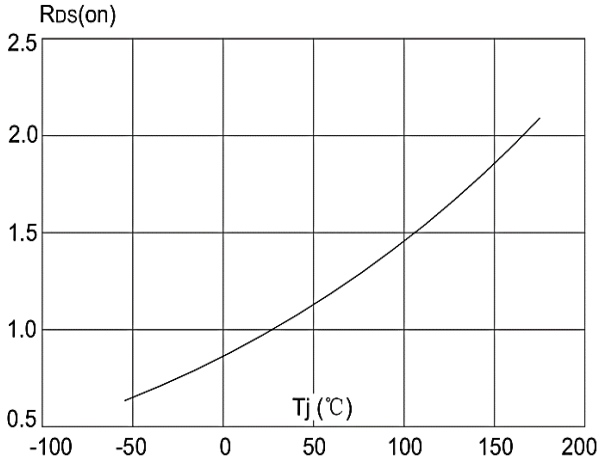


Figure 8: Normalized on Resistance vs. Junction Temperature

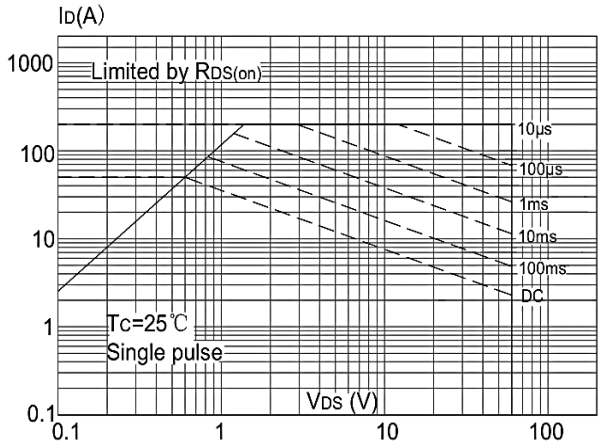


Figure 9: Maximum Safe Operating Area

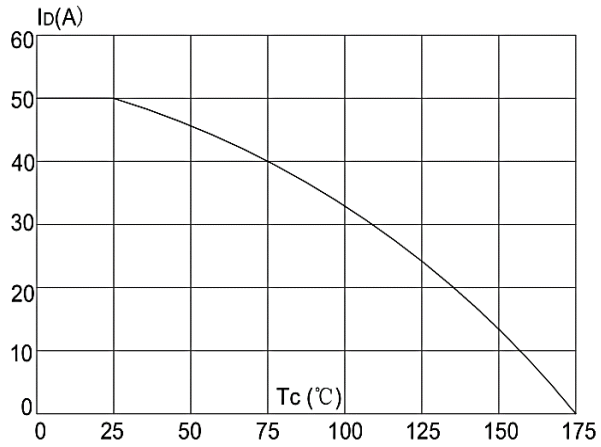


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

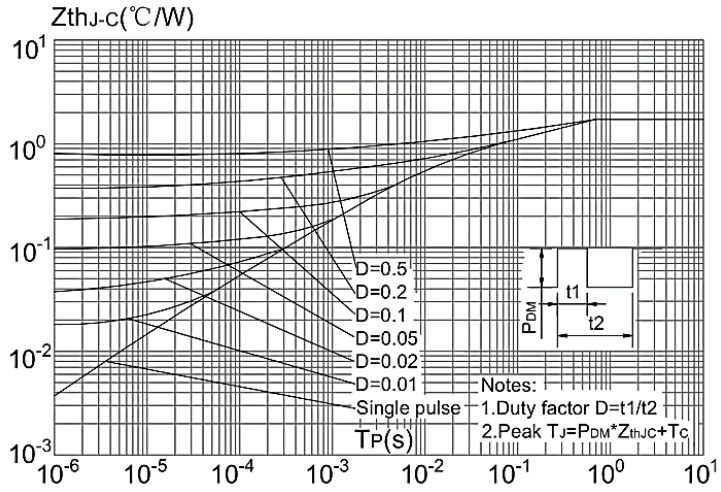
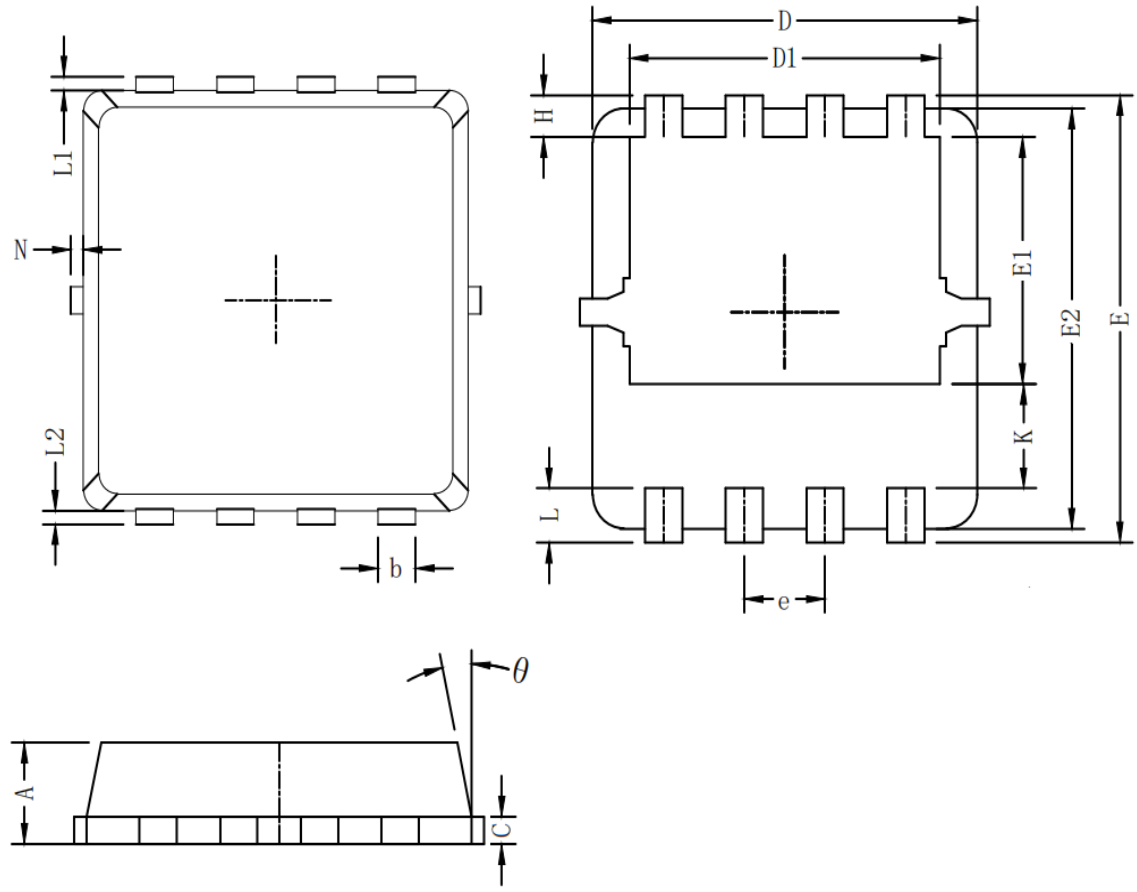


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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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