

### General Description

The WSD3046DN33 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 WSD3046DN33 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

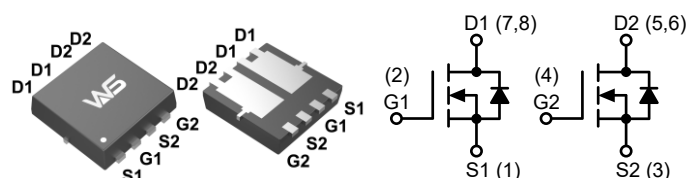
### Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
30V	9m $\Omega$	32A

### Applications

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

### DFN3X3-8L Pin Configuration



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

Symbol	Parameter		Rating	Units
$V_{DS}$	Drain-Source Voltage		30	V
$V_{GS}$	Gate-Source Voltage		$\pm 20$	
$I_D$	Drain Current (Continuous) <sup>1,3</sup>	$T_C=25^{\circ}\text{C}$	32	A
		$T_C=100^{\circ}\text{C}$	20	
$I_{DM}$	Drain Current (Pulse) <sup>2</sup>		135	
$P_D$	Power Dissipation	$T_C=25^{\circ}\text{C}$	26	W
$E_{AS}$	Single Pulse Avalanche Energy		12	mJ
$T_{STG}$	Storage Temperature Range		-55 to 150	$^{\circ}\text{C}$
$T_J$	Operating Junction Temperature Range		-55 to 150	

### Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	---	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	---	3.6	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Static						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250μA	30	---	---	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V , V <sub>GS</sub> =0V	---	---	1.0	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V , V <sub>GS</sub> =±20V	---	---	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>DS</sub> =250μA	1.0	1.5	2.5	V
R <sub>DS(ON)</sub>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =15A	---	9	11	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A	---	13	15	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =5A	---	6	---	S
Switching						
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f = 1.0MHz	---	3.0	---	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =10V , V <sub>DS</sub> =15V , I <sub>D</sub> =5A	---	22	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	4	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	6	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V , V <sub>DD</sub> =15V , I <sub>D</sub> =1A , R <sub>G</sub> =6Ω	---	5	---	ns
T <sub>r</sub>	Rise Time		---	3	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	14	---	
T <sub>f</sub>	Fall Time		---	8	---	
Dynamic						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V , V <sub>DS</sub> =15V , f = 1.0MHz	---	1050	---	pF
C <sub>Oss</sub>	Output Capacitance		---	125	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	100	---	
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	32	A
I <sub>SM</sub>	Pulsed Source Curren <sup>3</sup>		---	---	90	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>SD</sub> =1A , V <sub>GS</sub> =0V	---	---	1.2	V

**Note:**

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

## Typical Characteristics

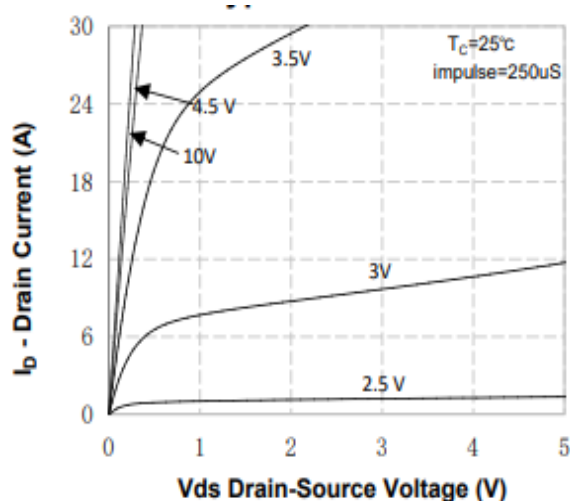


Figure 1. On-Region Characteristics

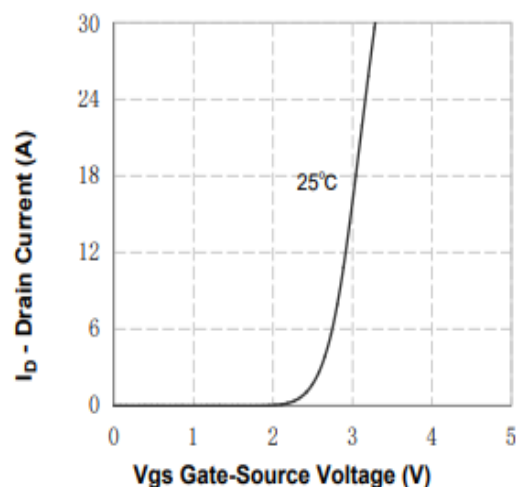


Figure 2. Transfer Characteristics

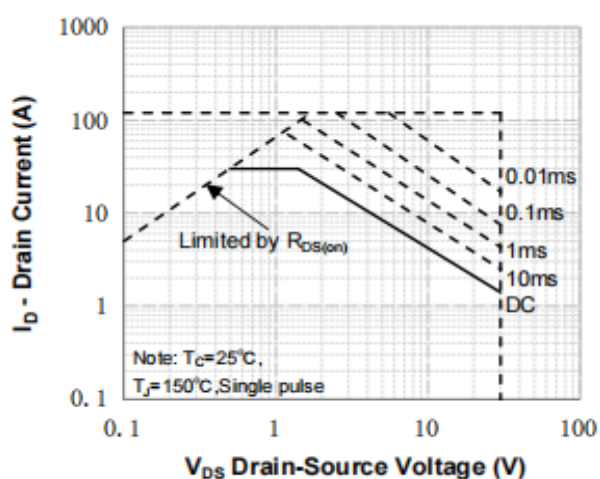


Figure 3. Maximum Safe Operating Area

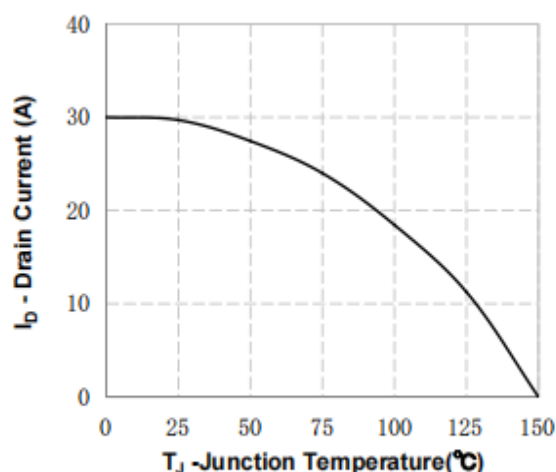


Figure 4. Maximum Continuous Drain Current vs Temperature

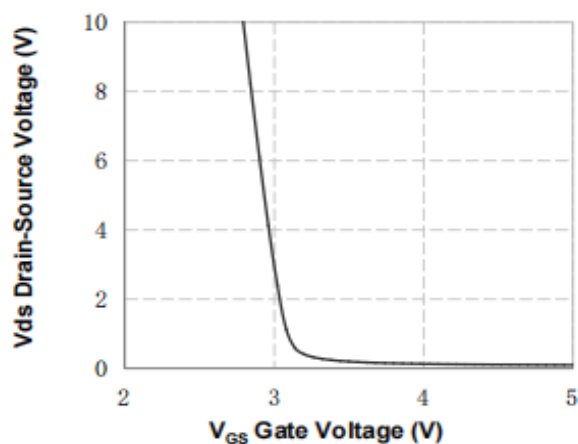


Figure 5. V\_DS Drain-Source Voltage vs Gate Voltage

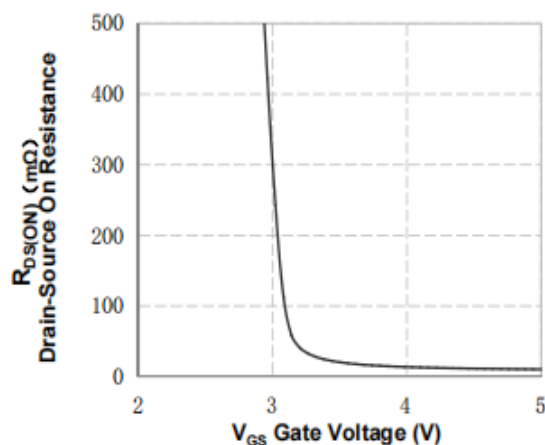


Figure 6. On-Resistance vs Gate Voltage

Typical Characteristics (Cont.)

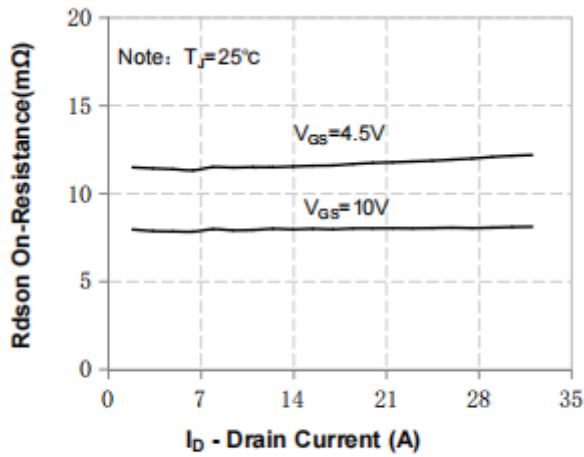


Figure 7. On-Resistance Variation vs Drain Current and Gate Voltage

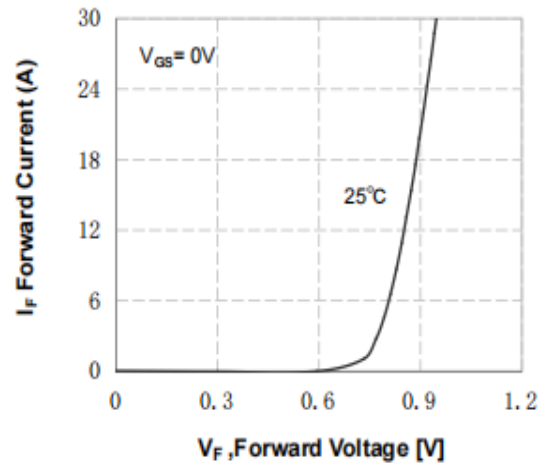


Figure 8. Body Diode Forward Voltage Variation vs Source Current

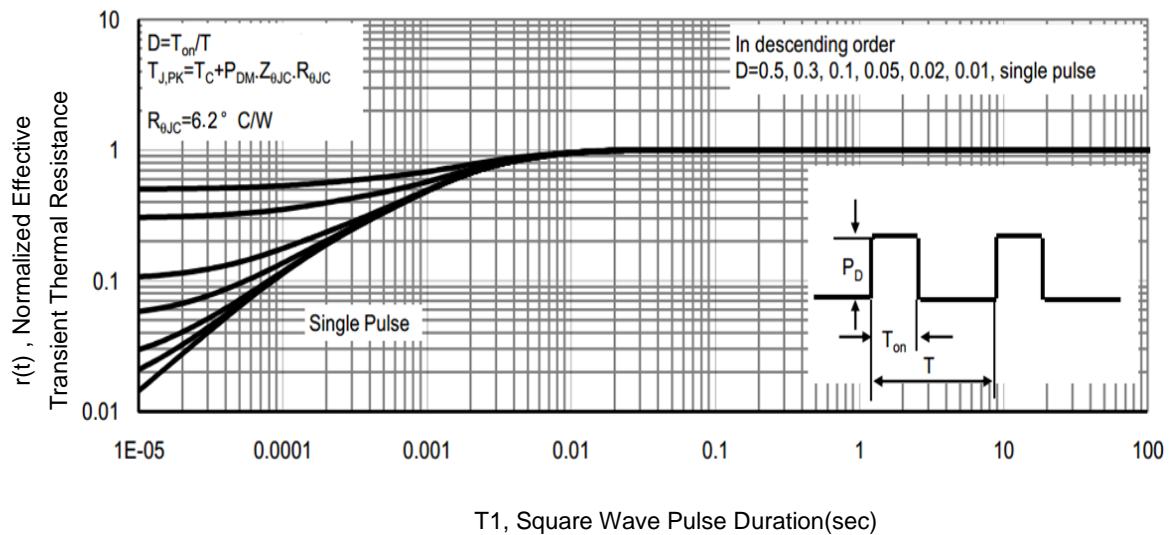


Fig9. T1 ,Transient Thermal Response Curve

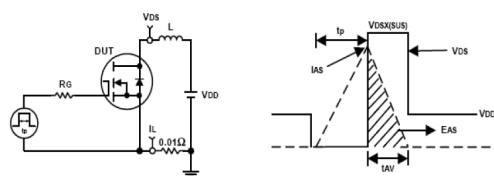


Fig10. Unclamped Inductive Test Circuit and waveforms

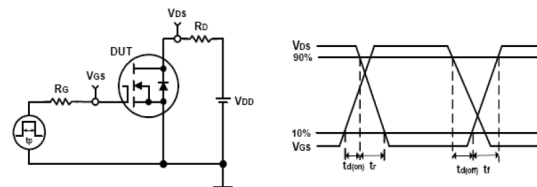
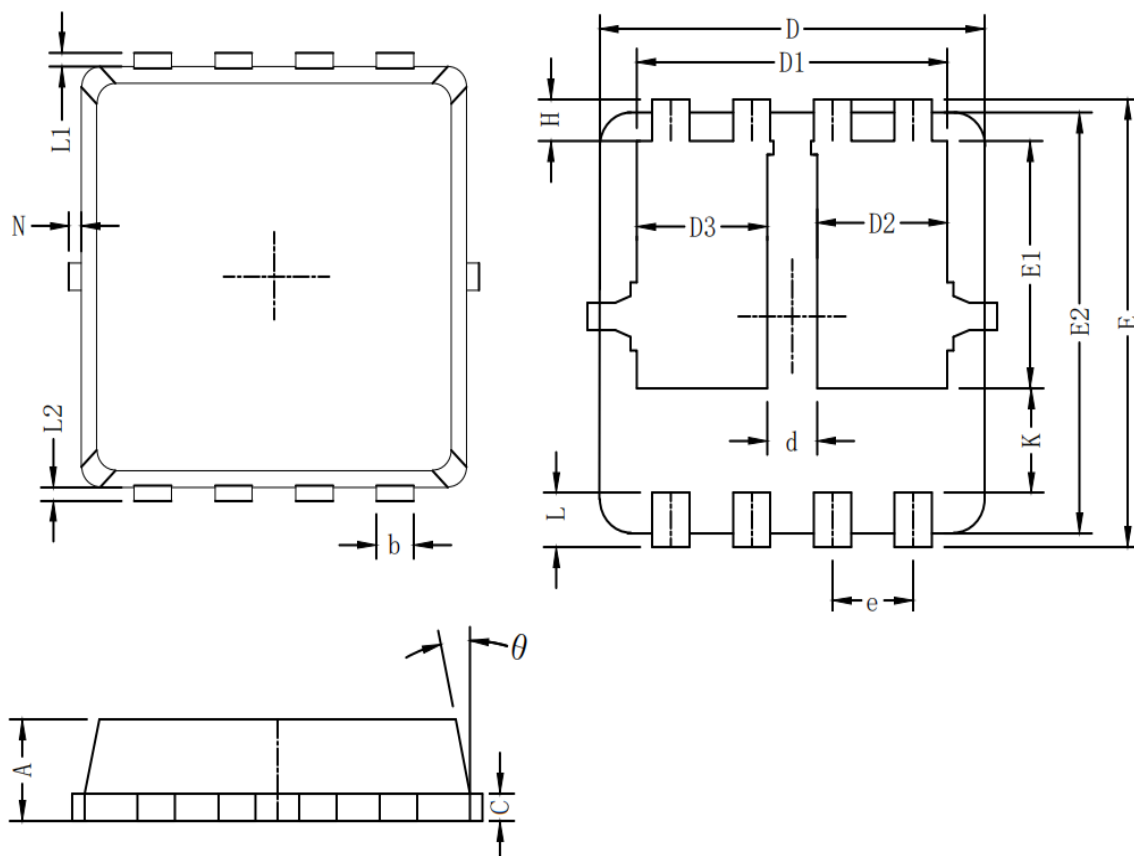


Fig11. Switching Time Test Circuit and waveforms

## 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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