

General Description

The WSD4046GDN33 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 WSD4046GDN33 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

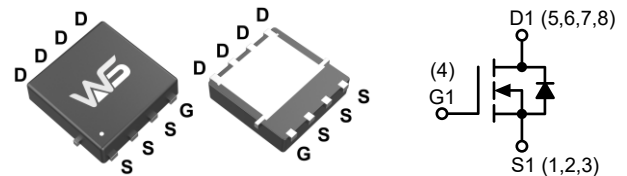
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
40V	6.7m Ω	43A

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	40	V
V_{GS}	Gate-Source Voltage	± 20	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	43	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	35	
$I_{DM} @ T_C = 25^\circ C$	Pulsed Drain Current ^C	60	
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ^A	3.5	W
$P_D @ T_A = 70^\circ C$	Total Power Dissipation ^A	2.1	
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 ^A	---	40	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case ^A	---	4.5	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ^A	V _{GS} =10V, I _D =15A	---	6.7	8.7	mΩ
		V _{GS} =4.5V, I _D =8A	---	10	13	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	1.0	1.55	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-6.94	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =40V, V _{GS} =0V, T _J =25°C	---	---	1.0	μA
		V _{DS} =40V, V _{GS} =0V, T _J =55°C	---	---	10	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Q _g	Total Gate Charge (10V)	V _{DS} =20V, V _{GS} =10V, I _{DS} =15A	---	5.1	---	nC
Q _{gs}	Gate-Source Charge		---	2.9	---	
Q _{gd}	Gate-Drain Charge		---	1.1	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =20V, V _{GS} =10V, R _G =6Ω, I _D =1A, R _L =20Ω	---	10	---	ns
T _r	Rise Time		---	6.6	---	
T _{d(off)}	Turn-Off Delay Time		---	18	---	
T _f	Fall Time		---	12	---	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f = 1.0MHz	---	550	---	pF
C _{oss}	Output Capacitance		---	130	---	
C _{rss}	Reverse Transfer Capacitance		---	45	---	

Diode Characteristics

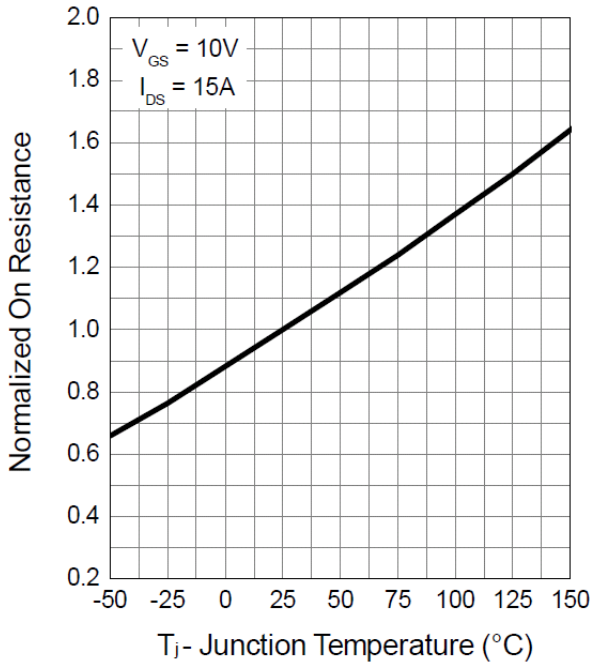
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I _S	Diode Forward Current ^{A,C}	T _J =25°C	---	---	43	A
V _{SD}	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	---	---	1.2	V

Note:

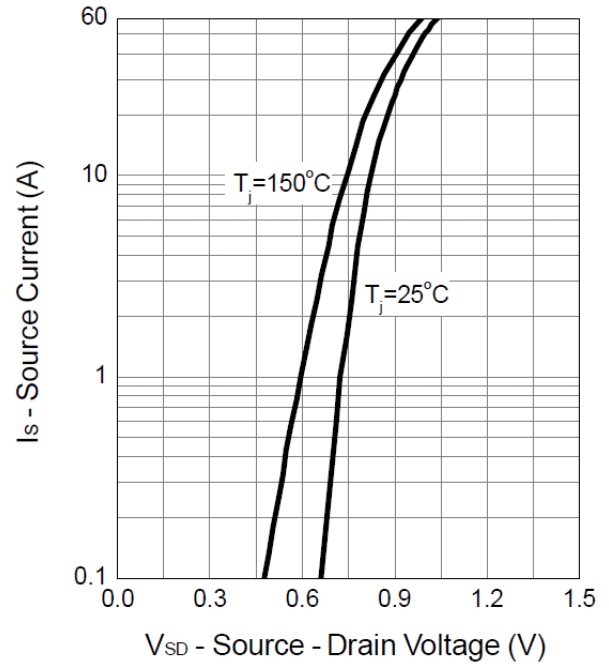
- A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_J=25°C. The value in any given application depends on the user's specific board design.
- B. Pulse width limited by max. junction temperature.
- C. The current rating is based on the t_s ≤ 10s junction to ambient thermal resistance rating.

Typical Characteristics

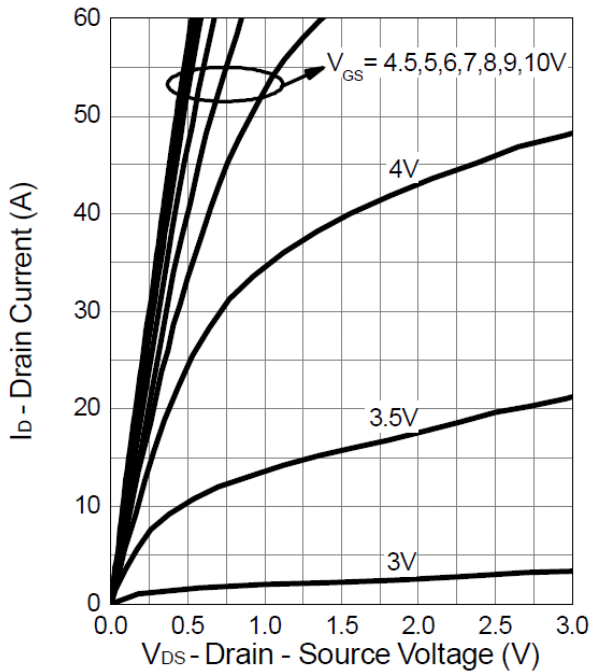
Drain-Source On Resistance



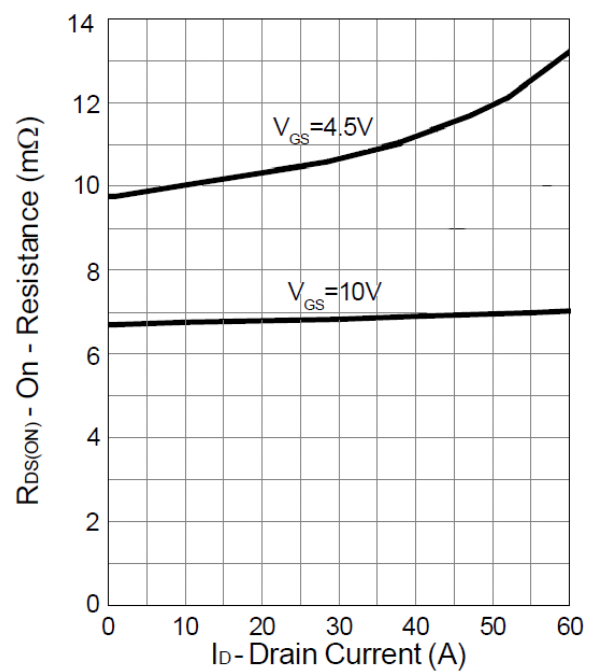
Source-Drain Diode Forward



Output Characteristics

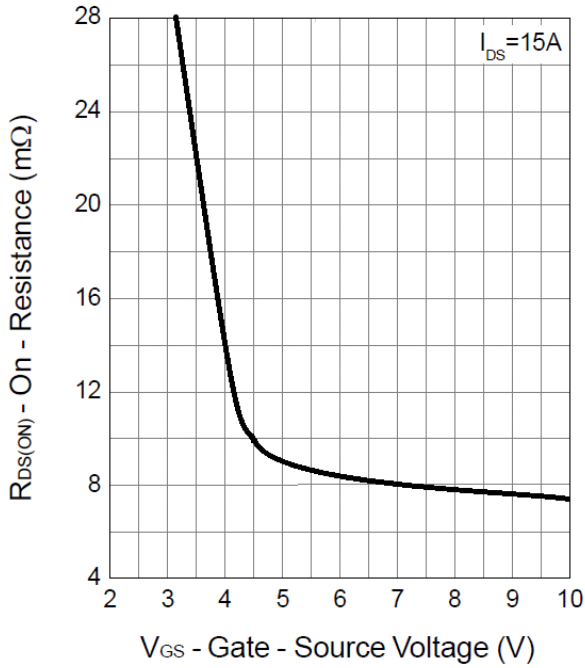


Drain-Source On Resistance

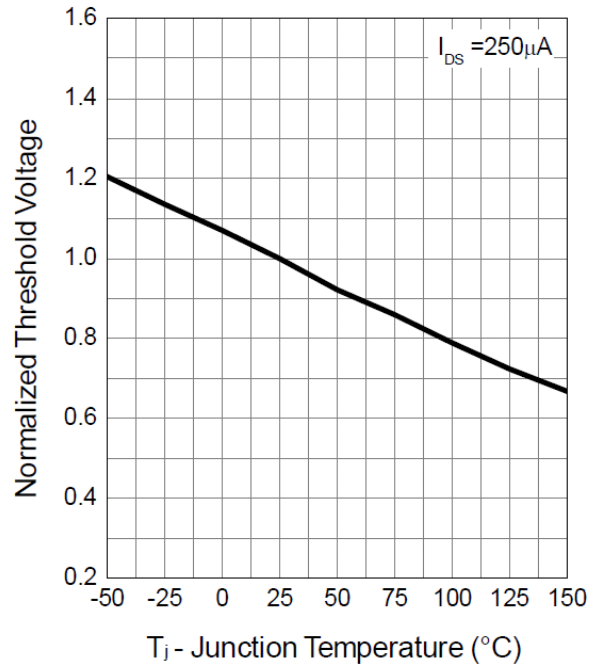


Typical Characteristics (Cont.)

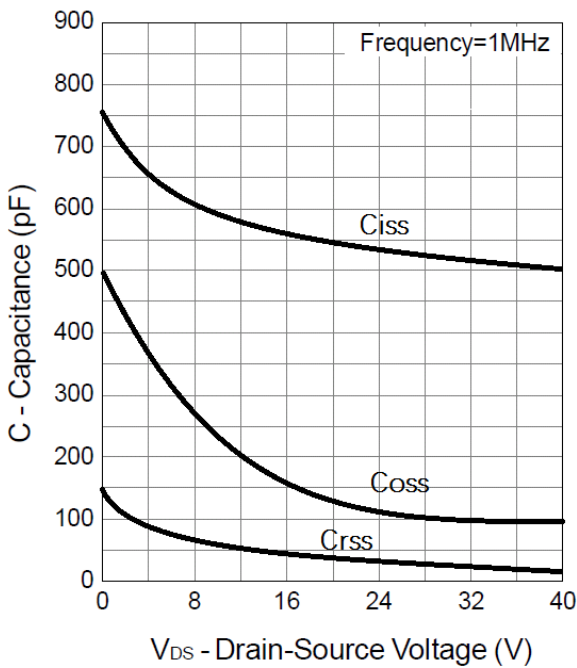
Gate-Source On Resistance



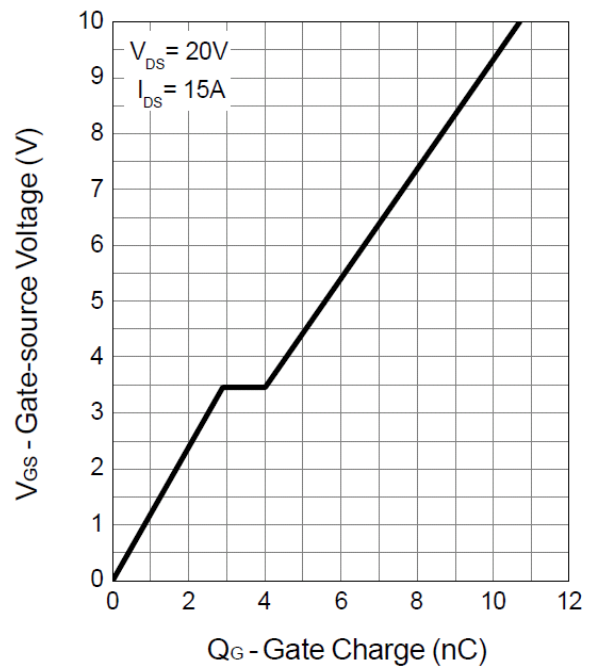
Gate Threshold Voltage



Capacitance

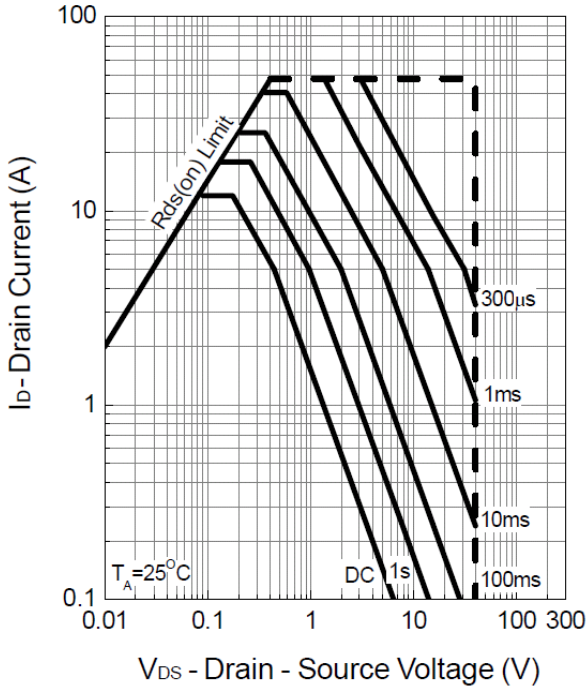


Gate Charge

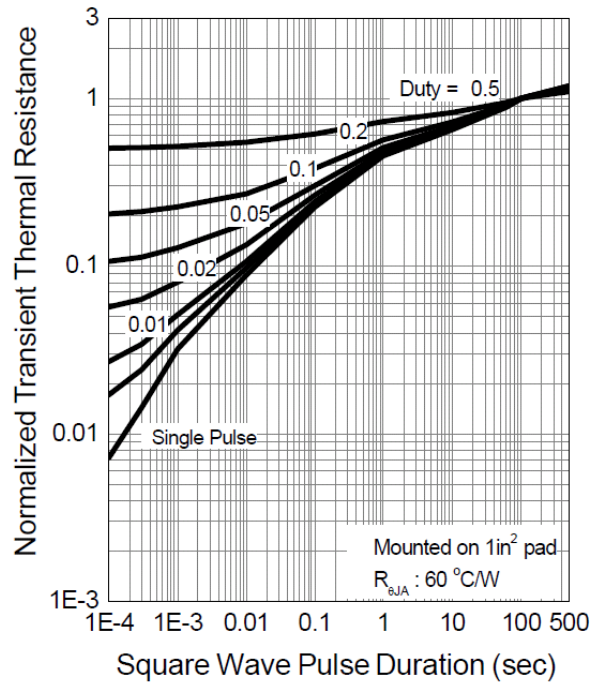


Typical Characteristics (Cont.)

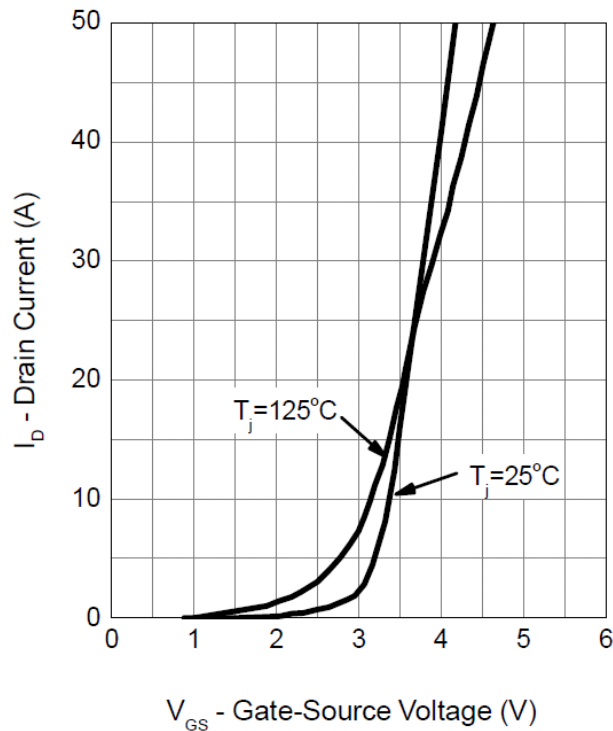
Safe Operation Area

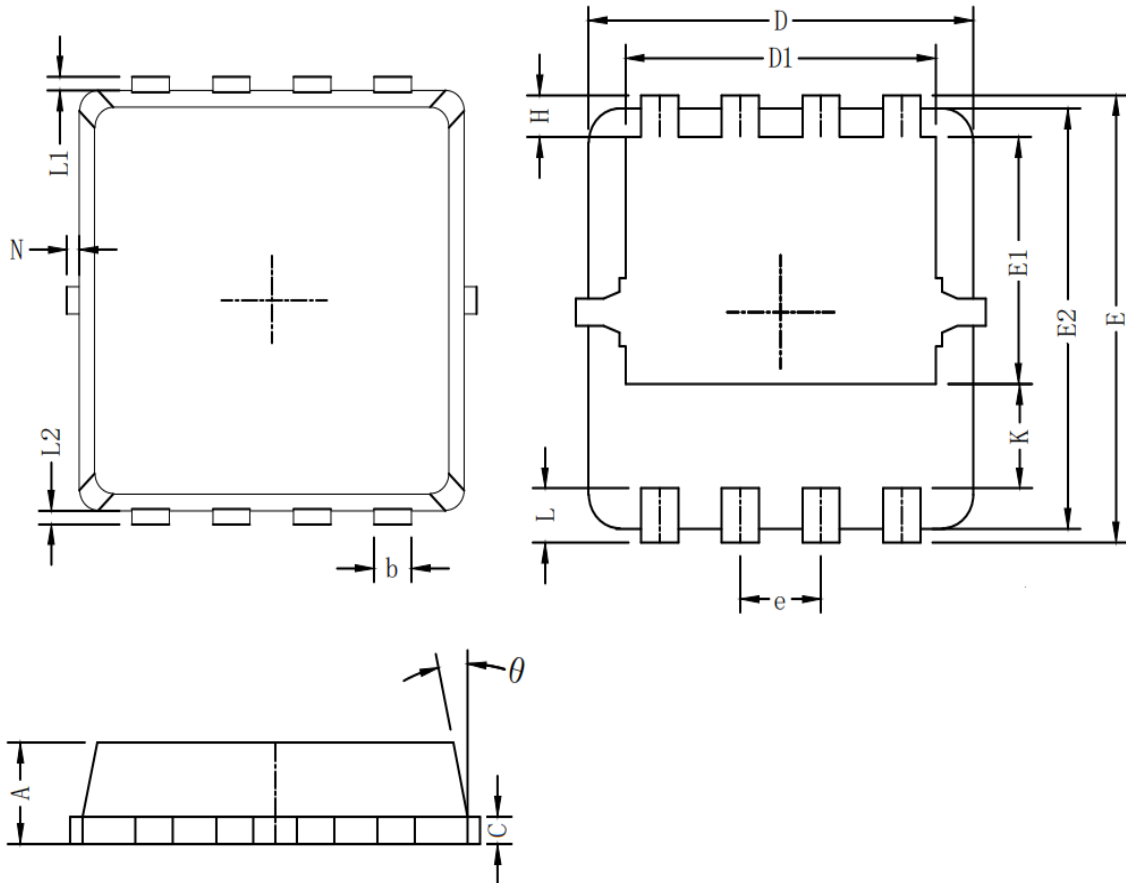


Thermal Transient Impedance



Transfer Characteristics



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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