General Description

The WSD2050DN is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSD2050DN 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 CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

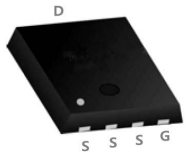
Product Summery

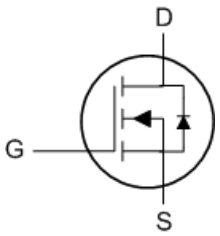
BVDSS	RDSON	ID
20V	8.2mΩ	40A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

DFN3.3x3.3-8_EP1 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	40	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	28	A
I_{DM}	Pulsed Drain Current[2]	85	A
I_{AS}	Avalanche Current	14	A
P_D@T_C=25℃	Total Power Dissipation[4]	28	W
T_J T_{STG}	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	70	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	4.7	℃/W

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Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.0	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=7A	---	8.2	14	mΩ
		V_{GS}=4.5V , I_D=6A	---	9.5	16	
		V_{GS}=2.5V , I_D=5A	---	12.5	20	mΩ
		V_{GS}=1.8V , I_D=2A	---	18	28	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.4	0.6	1.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=20V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	orward Transconductance	V_{DS}=5V , I_D=7A	20	---	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.0	1.5	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_D=7A	---	10	12	nC
Q_{gs}	Gate-Source Charge		---	3.5	4.1	
Q_{gd}	Gate-Drain Charge		---	4.2	4.7	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=1A ,R_L=15Ω	---	9	17	ns
T_r	Rise Time		---	11	23	
$T_{d(off)}$	Turn-Off Delay Time		---	29	52	
T_f	Fall Time		---	7	12	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1200	---	pF
C_{oss}	Output Capacitance		---	185	---	
C_{rss}	Reverse Transfer Capacitance		---	113	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	20	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=2A , T_J=25℃	---	---	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t<10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=20A
4.The power dissipation is limited by 150℃ junction temperature
5.The Min. value is 100% EAS 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.

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Typical Characteristics

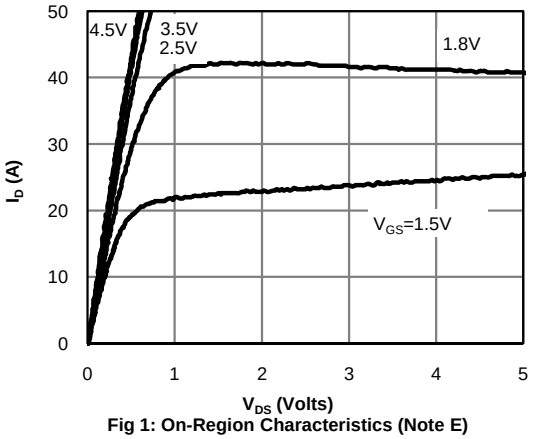

Fig 1: On-Region Characteristics (Note E)

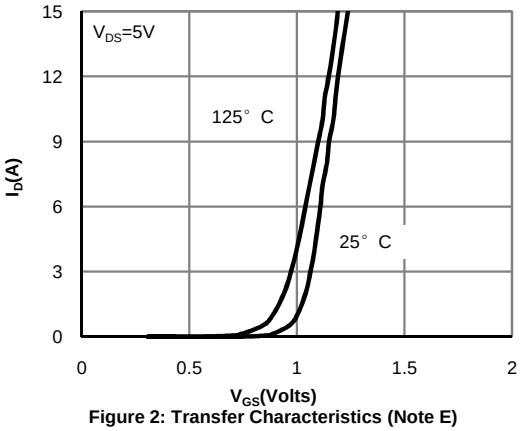

Figure 2: Transfer Characteristics (Note E)

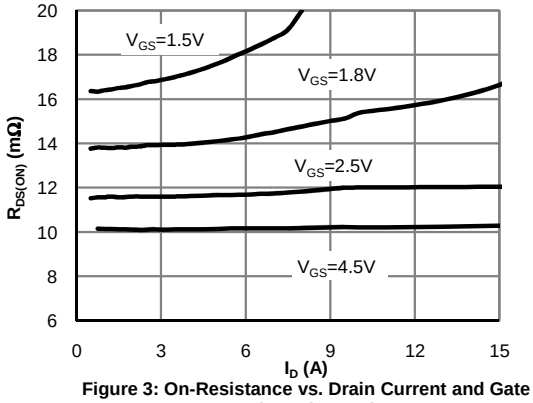

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

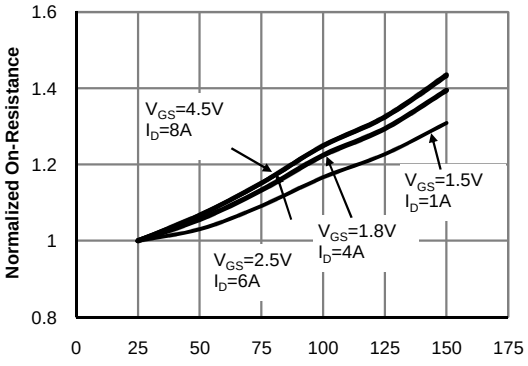

Figure 4: On-Resistance vs. Junction Temperature (Note E)

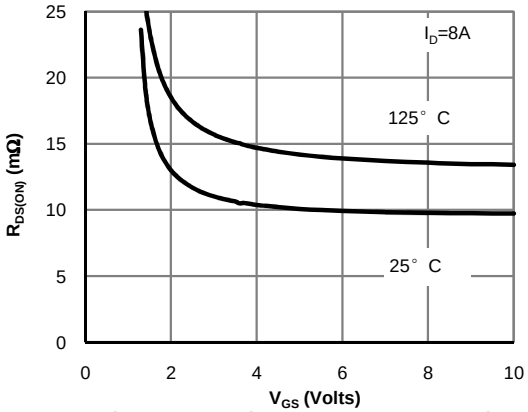

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

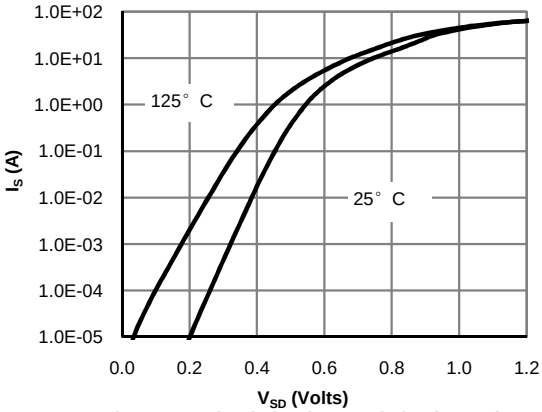

Figure 6: Body-Diode Characteristics (Note E)

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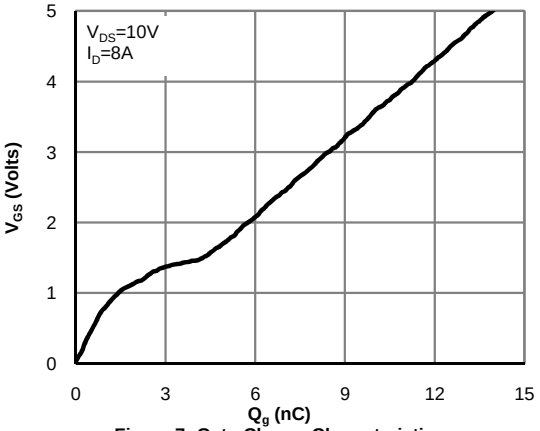

Figure 7: Gate-Charge Characteristics

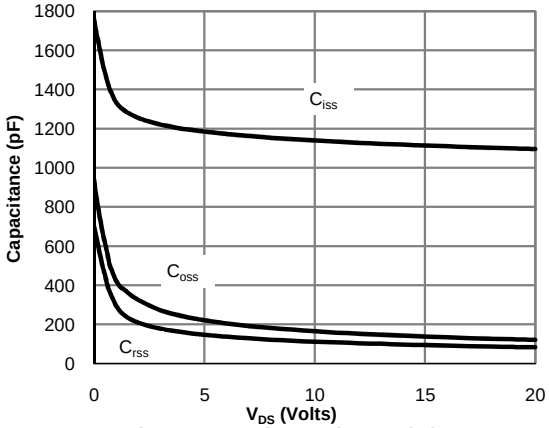

Figure 8: Capacitance Characteristics

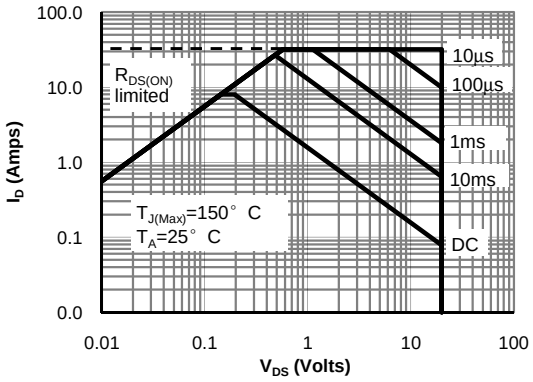

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

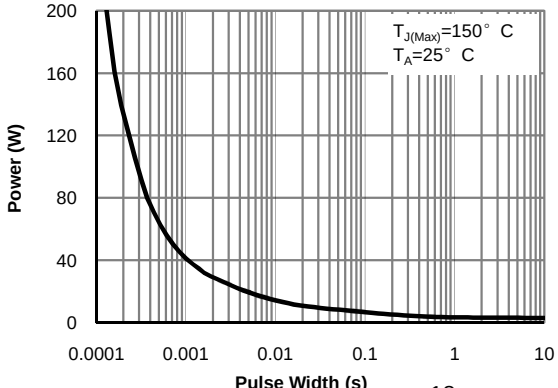

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

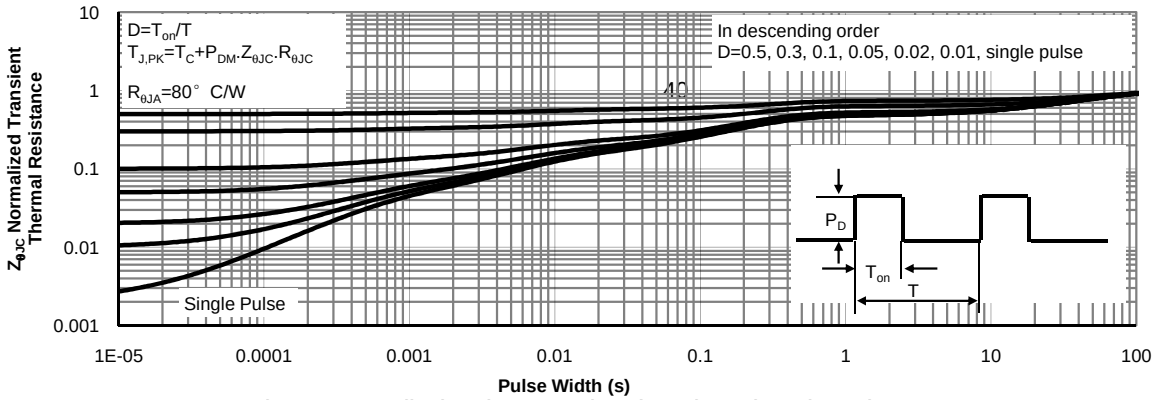

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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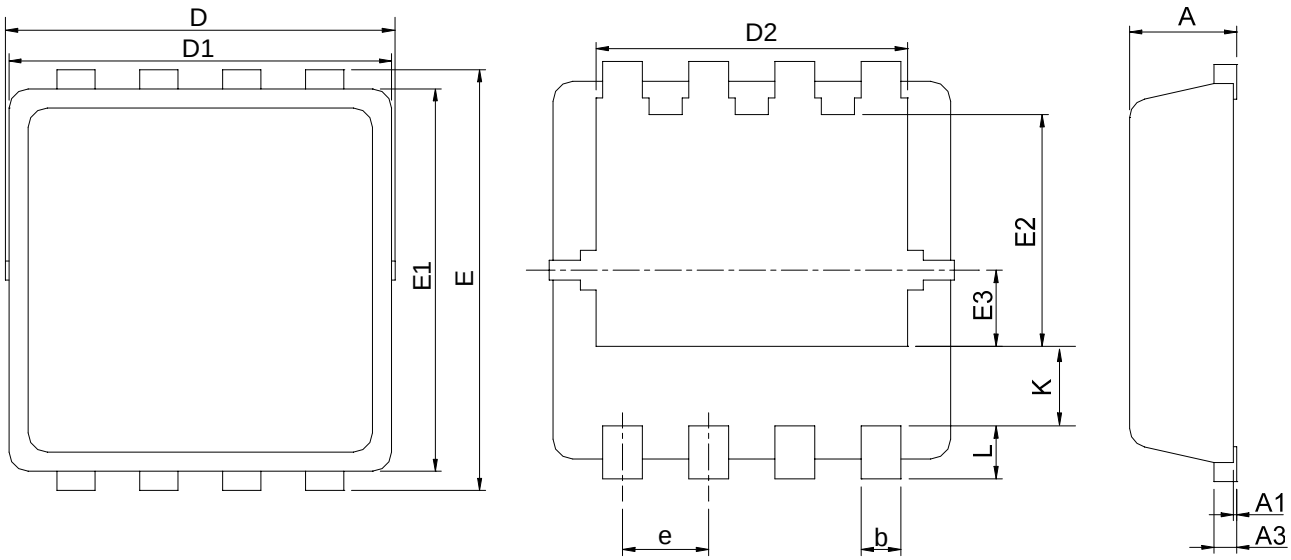
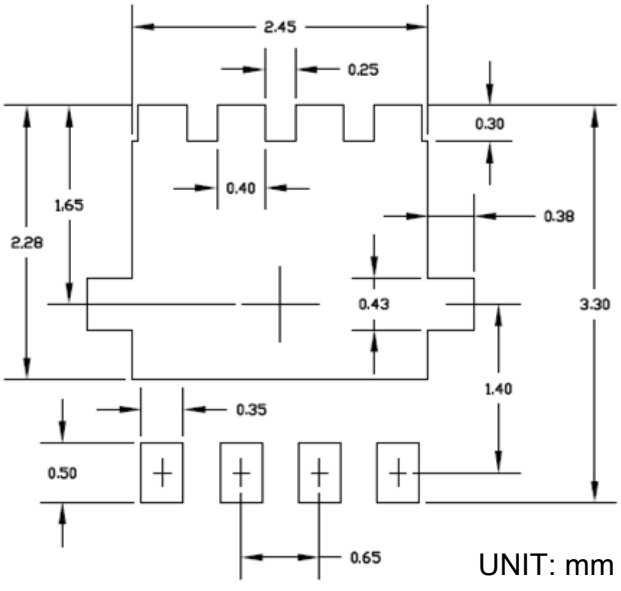
DFN3x3A-8_EP1



SYMBOL	DFN3x3A-8_EP1_P			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.25	0.004	0.010
b	0.24	0.35	0.009	0.014
D	2.90	3.30	0.114	0.130
D1	2.90	3.10	0.114	0.122
D2	2.25	2.45	0.089	0.096
E	3.10	3.30	0.122	0.130
E1	2.90	3.10	0.114	0.122
E2	1.65	1.85	0.065	0.073
E3	0.56	0.58	0.022	0.023
e	0.65 BSC		0.026 BSC	
K	0.475	0.775	0.019	0.031
L	0.30	0.50	0.012	0.020

RECOMMENDED LAND PATTERN



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