General Description

The WSD6036DN is the highest performance trench N-Ch MOSFET with extreme high cell density,which provide excellent R_{DSON} and gate charge for most of the synchronous buck converter applications .

The WSD6040DN56 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

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)

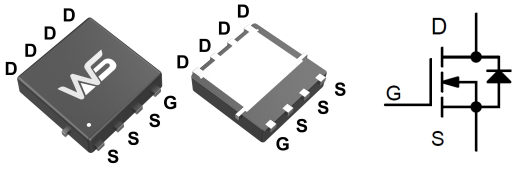
Product Summery

B_{VDSS}	R_{DSON}	I_D
60V	12mΩ	50A

Applications

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

DFN3x3-8_EP1 Pin Configuration



Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25°C	50	A
		T_C=100°C	30	
I_{DM} [a]	Pulsed Drain Current	T_C=25°C	90	A
P_D	Maximum Power Dissipation	T_C=25°C	45	W
		T_C=100°C	18	
E_{AS} [c]	Single Pulse Avalanche Energy	L=0.1mH	39.2	mJ
I_S	Diode Continuous Forward Current	T_C=25°C	50	A
T_J	Maximum Junction Temperature		150	℃
T_{STG}	Storage Temperature Range		-55 to 150	℃
$R_{\theta JA}$ [b]	Thermal Resistance Junction to ambient	Steady State	62	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	3.3	℃/W

Note a：Pulse width limited by max. junction temperature.
Note b：Surface Mounted on 1in2 pad area.
Note c：UIS tested and pulse width limited by maximum junction temperature 150℃(initial temperature Tj=25℃).

Electrical Characteristics @T_A=25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48 V, V_{GS} = 0V			1	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	1.6	2.5	V
$R_{DS(on)}$ [d]	Drain-Source On-state Resistance	V_{GS} = 10V, I_D = 25A		14	17.5	mΩ
		V_{GS} = 4.5V, I_D = 20A		19	22	mΩ
Switching						
Qg	Total Gate Charge	V_{DS}=30V V_{GS}=10V I_D=25A		42		nC
Qgs	Gate-Sour Charge			6.4		nC
Qgd	Gate-Drain Charge			9.6		nC
td (on)	Turn-on Delay Time	V_{GEN}=10V V_{DD}=30V I_D=1A R_G=6Ω RL=30Ω		17		ns
tr	Turn-on Rise Time			9		ns
td(off)	Turn-off Delay Time			58		ns
tf	Turn-off Fall Time			14		ns
Rg	Gat resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.5		Ω
Dynamic						
Ciss	In Capacitance	V_{GS}=0V V_{DS}=30V f=1MHz		2100		pF
Coss	Out Capacitance			140		pF
Crss	Reverse Transfer Capacitance			100		pF
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 Current3				35	A
V_{SD} [d]	Diode Forward Voltage	I_{SD} = 20A , V_{GS}=0V		0.8	1.3	V
trr	Reverse Recovery Time	I_{SD}=25A, dI_{SD}/dt=100A/μs		27		ns
Qrr	Reverse Recovery Charge			33		nC

Note d: Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e: Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

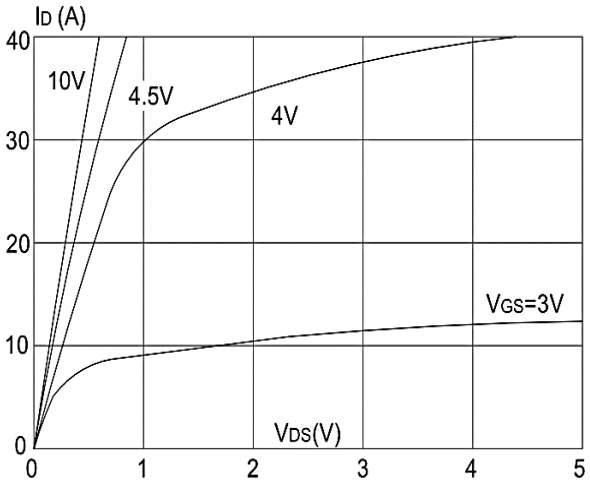


Figure1: Output Characteristics

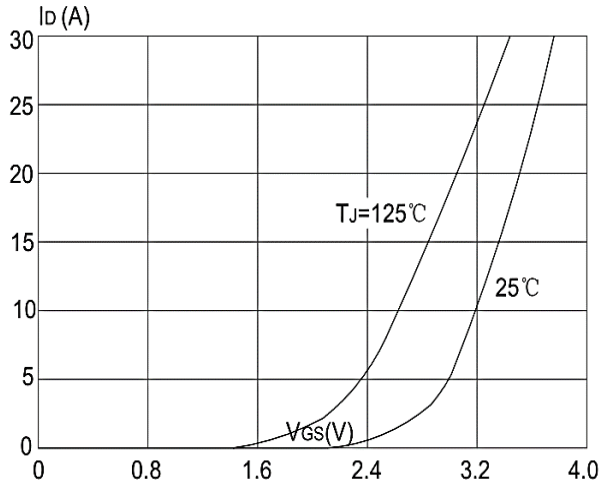


Figure 2: Typical Transfer Characteristics

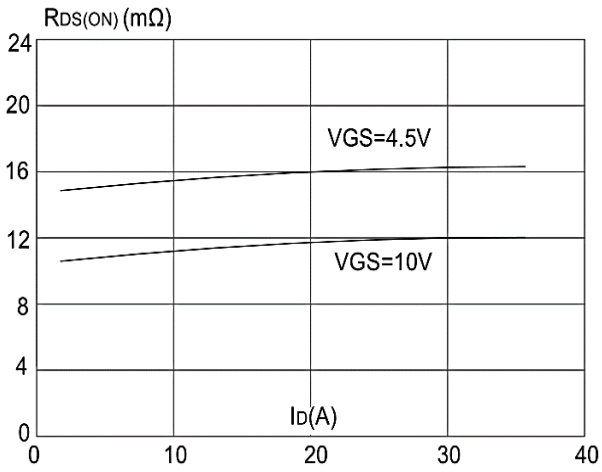


Figure 3:On-resistance vs. Drain Current

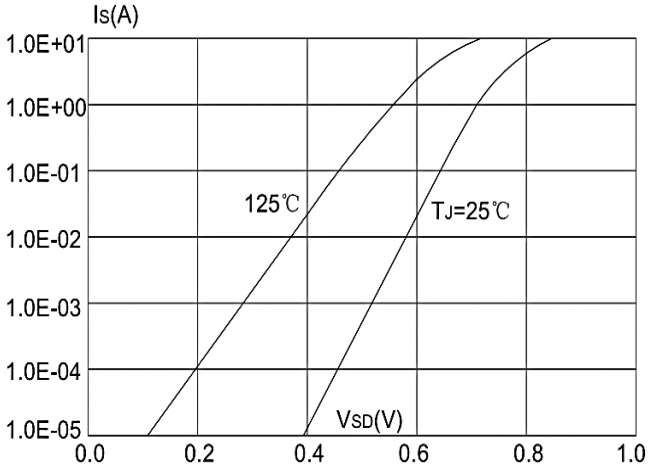


Figure 4: Body Diode Characteristics

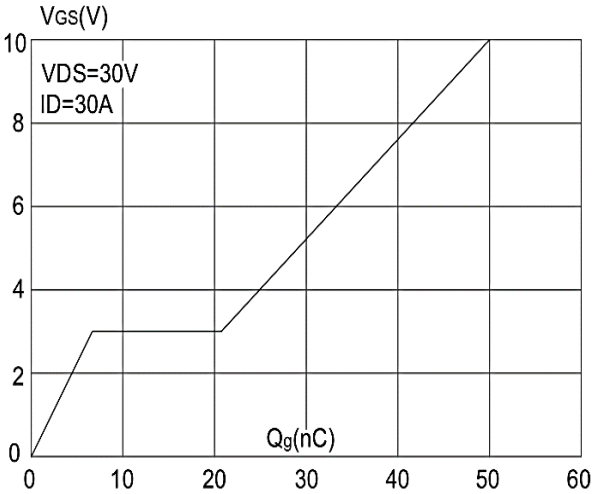


Figure 5: Gate Charge Characteristics

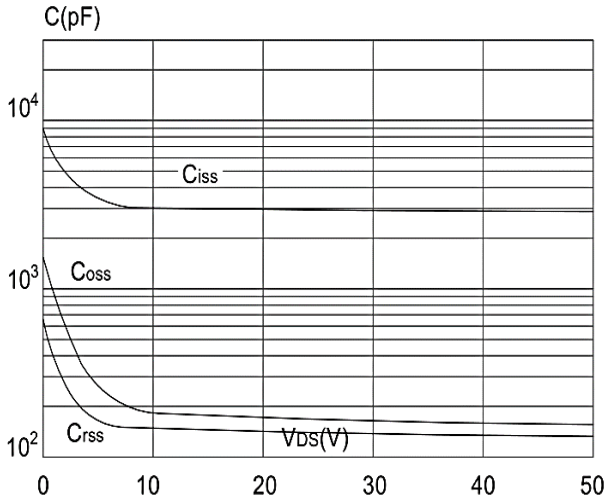


Figure 6: Capacitance Characteristics

Typical Operating Characteristics

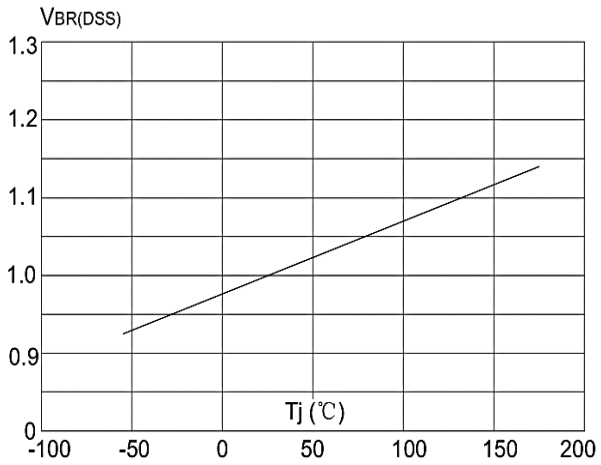


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

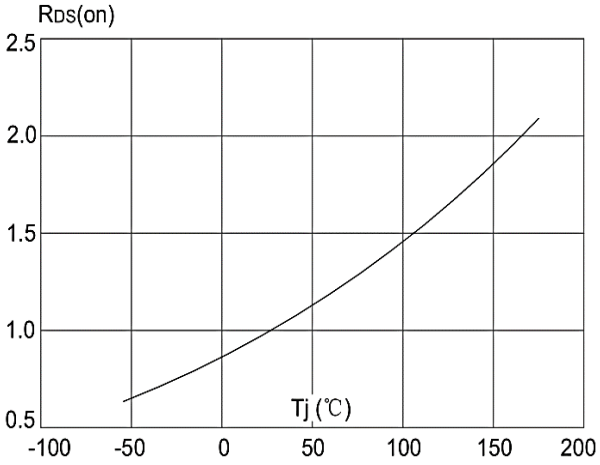


Figure 8: Normalized on Resistance vs. Junction Temperature

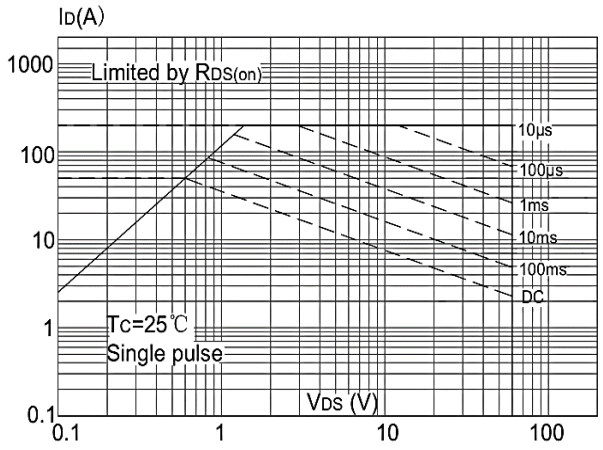


Figure 9: Maximum Safe Operating Area

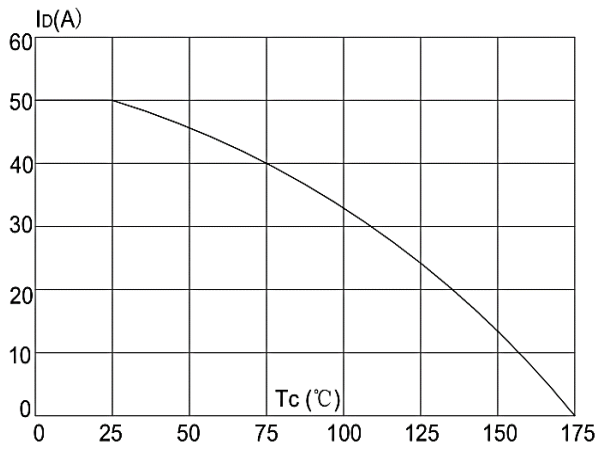


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

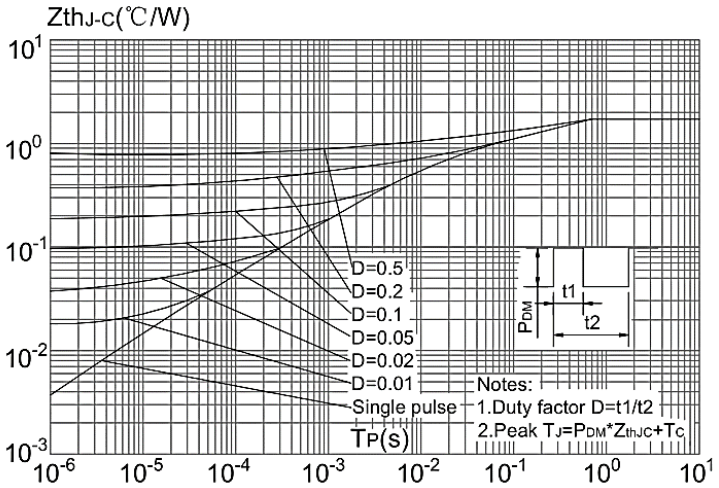


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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