

General Description

The WSD6068DN56 is the highest performance trench Dual N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSD6068DN56 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

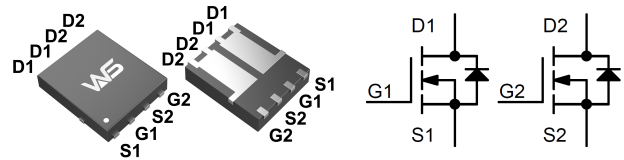
Product Summary

BVDSS	RDSON	ID
60V	12mΩ	25A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Fast switching
- Load Switch

DFN5X6C-8-EP2 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings			
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 175	°C
I_S	Diode Continuous Forward Current	$T_c=25^\circ\text{C}$ 25	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$ 25	A
		$T_c=70^\circ\text{C}$ 18.5	
I_{DM}^b	Pulse Drain Current Tested	$T_c=25^\circ\text{C}$ 95	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$ 37	W
		$T_c=70^\circ\text{C}$ 25	
$R_{\theta JL}$	Thermal Resistance-Junction to Lead	Steady State 5	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	$t \leq 10\text{s}$ 25	°C/W
		Steady State ^b 90	
I_{AS}^d	Avalanche Current, Single pulse	$L=0.5\text{mH}$ 9	A
E_{AS}^d	Avalanche Energy, Single pulse	$L=0.5\text{mH}$ 40.5	mJ

Note a : Max. continuous current is limited by bonding wire.

Note b : Pulse width limited by max. junction temperature.

Note c : Surface mounted on 1in² pad area, steady state $t = 999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 175°C (initial temperature $T_J=25^\circ\text{C}$).

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

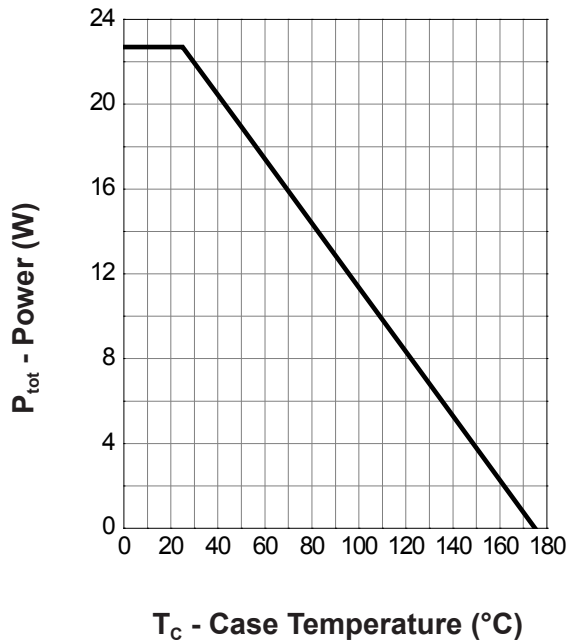
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.2	1.8	3.1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ³	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =10A	-	12	16	mΩ
		V _{GS} =4.5V, I _{DS} =7A	-	15	22	
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.75	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	-	26	-	ns
Q _{rr}	Reverse Recovery Charge		-	30	-	nC
Dynamic Characteristics ^{3,4}						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	0.9	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, F=1.0MHz Ω	-	440	570	pF
C _{oss}	Output Capacitance		-	198	-	
C _{riss}	Reverse Transfer Capacitance		-	57	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, I _{DS} =1A, V _{GEN} =10V, R _G =3.3Ω.	-	10	-	ns
t _r	Turn-on Rise Time		-	14.5	-	
t _{d(OFF)}	Turn-off Delay Time		-	19	-	
t _f	Turn-off Fall Time		-	28	-	
Gate Charge Characteristics ^{3,4}						
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V, I _{DS} =20A	-	8.6	-	nC
Q _{gs}	Gate-Source Charge		-	2.7	-	
Q _{gd}	Gate-Drain Charge		-	6.3	-	

Note :

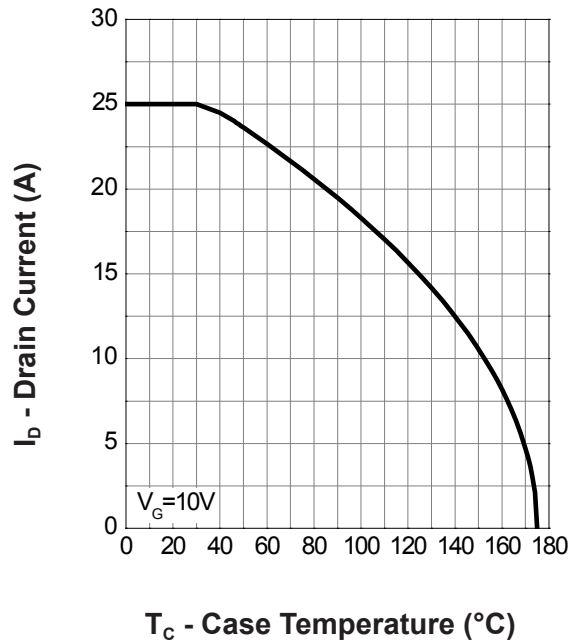
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=30V, V_{GS}=10V, L=0.1mH, I_{AS}=9A., R_G=25Ω Starting T_J=25
3. The data tested by pulsed , pulse width<=300us , duty cycle<=2%.
4. Essentially independent of operating temperature.

Typical Operating Characteristics

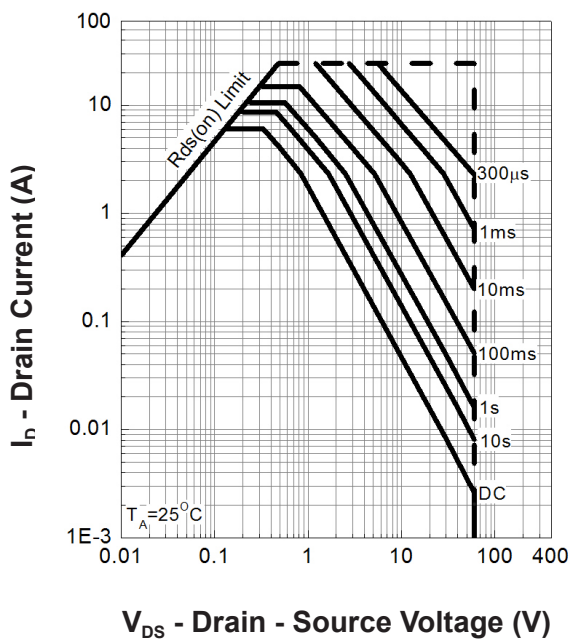
Power Dissipation



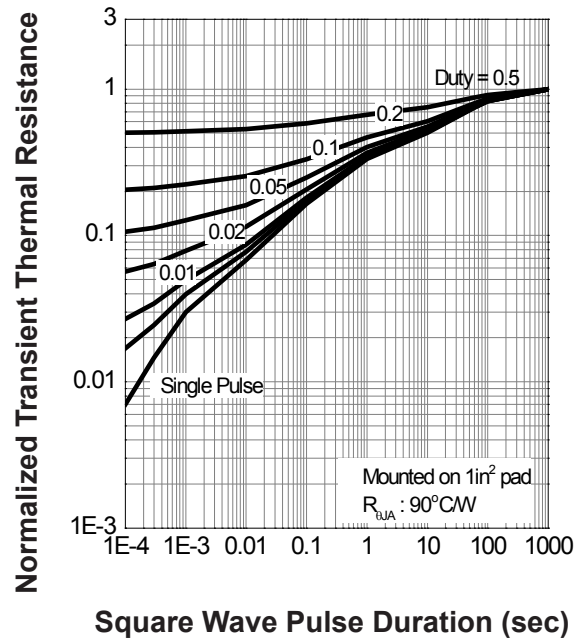
Drain Current



Safe Operation Area

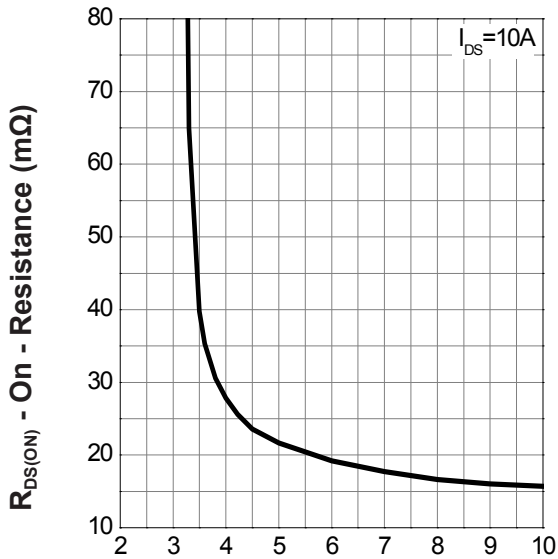


Thermal Transient Impedance



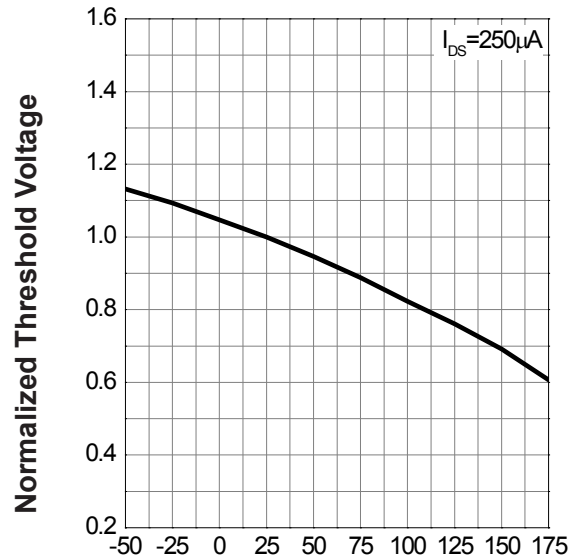
Typical Operating Characteristics(Cont.)

Gate-Source On Resistance



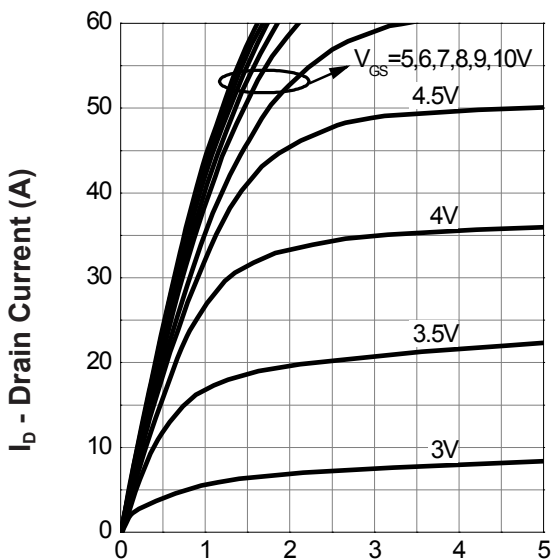
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage



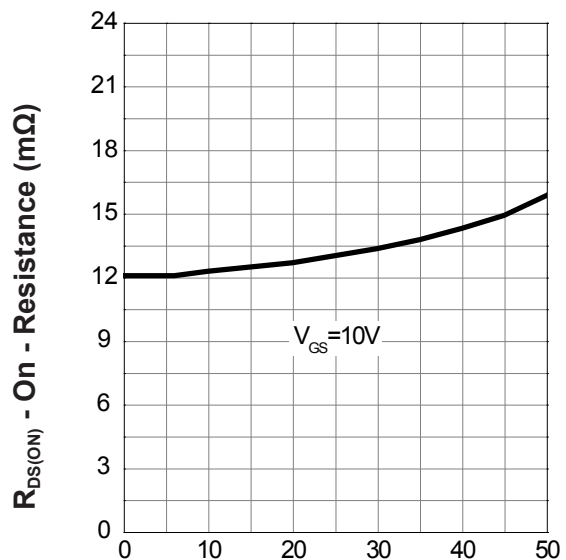
T_j - Junction Temperature (°C)

Output Characteristics



V_{DS} - Drain - Source Voltage (V)

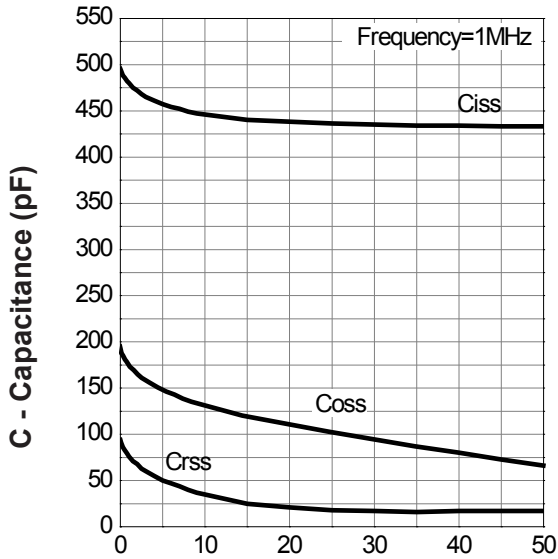
Drain-Source On Resistance



I_D - Drain Current (A)

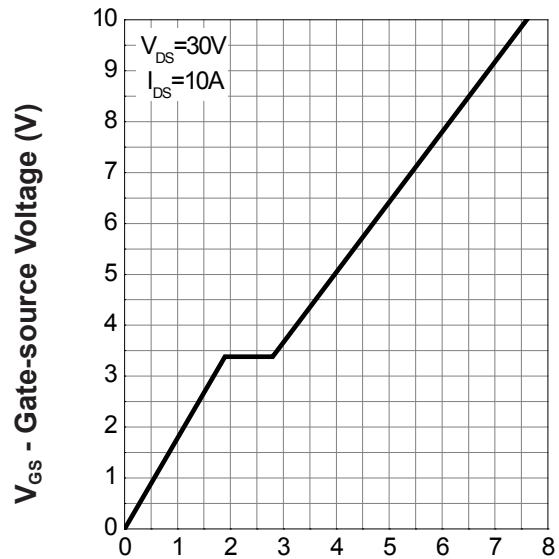
Typical Operating Characteristics(Cont.)

Capacitance



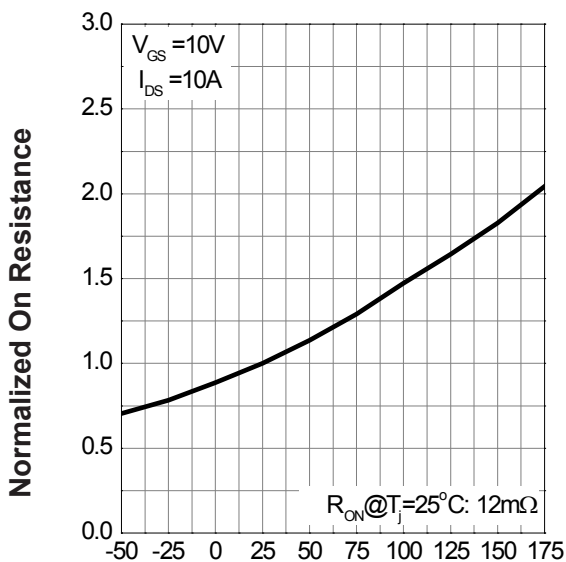
V_{DS} - Drain-Source Voltage (V)

Gate Charge



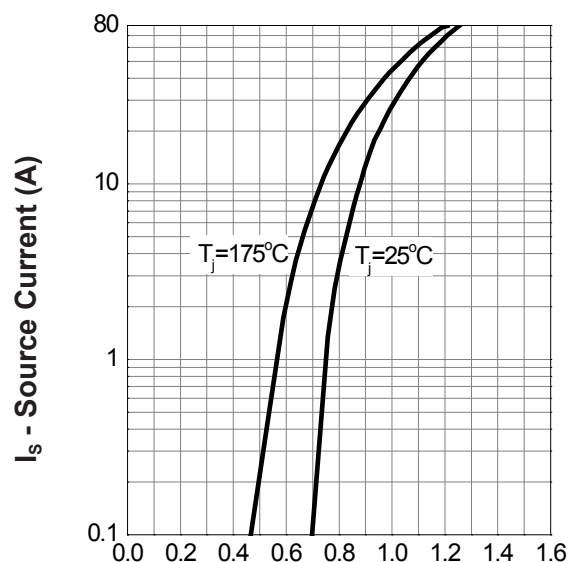
Q_G - Gate Charge (nC)

Drain-Source On Resistance



T_j - Junction Temperature ($^\circ C$)

Source-Drain Diode Forward



V_{SD} - Source - Drain Voltage (V)



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