

General Description

The WSD4098DN56 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 WSD4098DN56 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

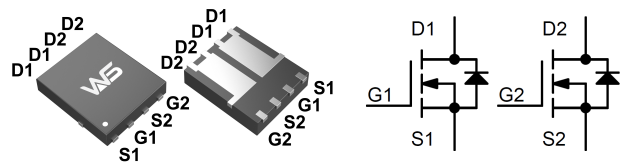
Product Summary

BVDSS	RDSON	ID
40V	7.8mΩ	22A

Applications

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

DFN5X6C-8-EP2 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings			
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
I_S	Diode Continuous Forward Current	$T_A=25^{\circ}C$ 11.4	A
I_D	Continuous Drain Current	$T_A=25^{\circ}C$ 22	A
		$T_A=70^{\circ}C$ 22	
I_{DM}^b	Pulse Drain Current Tested	$T_A=25^{\circ}C$ 88	A
P_D	Maximum Power Dissipation	$T_J=25^{\circ}C$ 25	W
		$T_C=70^{\circ}C$ 10	
$R_{\theta JL}$	Thermal Resistance-Junction to Lead	Steady State 5	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	$t \leq 10s$ 45	°C/W
		Steady State ^b 90	
I_{AS}^d	Avalanche Current, Single pulse	$L=0.5mH$ 28	A
E_{AS}^d	Avalanche Energy, Single pulse	$L=0.5mH$ 39.2	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 $t = 999s$.

Note d : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}C$).

Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

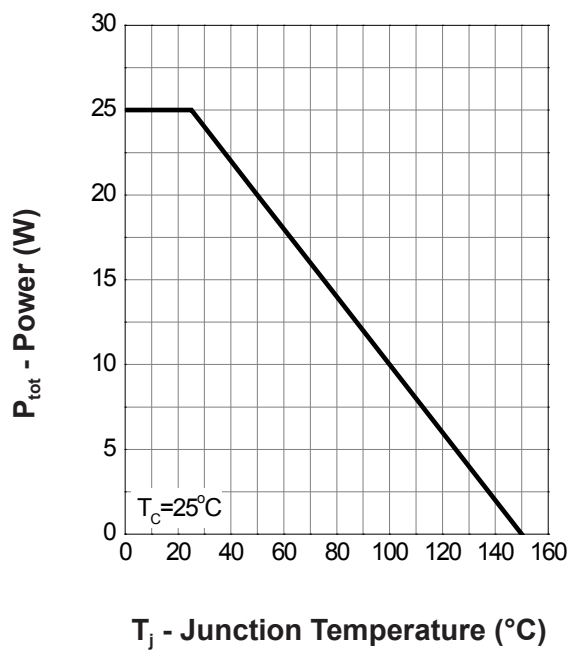
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.2	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =14A	-	6.8	7.8	m Ω
		V _{GS} =4.5V, I _{DS} =12 A	-	9.0	11	
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	-	23	-	ns
Q _{rr}	Reverse Recovery Charge		-	13	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	1370	1781	pF
C _{oss}	Output Capacitance		-	317	-	
C _{rss}	Reverse Transfer Capacitance		-	96	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	13.8	-	ns
t _r	Turn-on Rise Time		-	8	-	
t _{d(OFF)}	Turn-off Delay Time		-	30	-	
t _f	Turn-off Fall Time		-	21	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =6A	-	23	28	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =6A	-	22	-	
Q _{gth}	Threshold Gate Charge		-	2.6	-	
Q _{gs}	Gate-Source Charge		-	4.7	-	
Q _{gd}	Gate-Drain Charge		-	3	-	

Note e : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

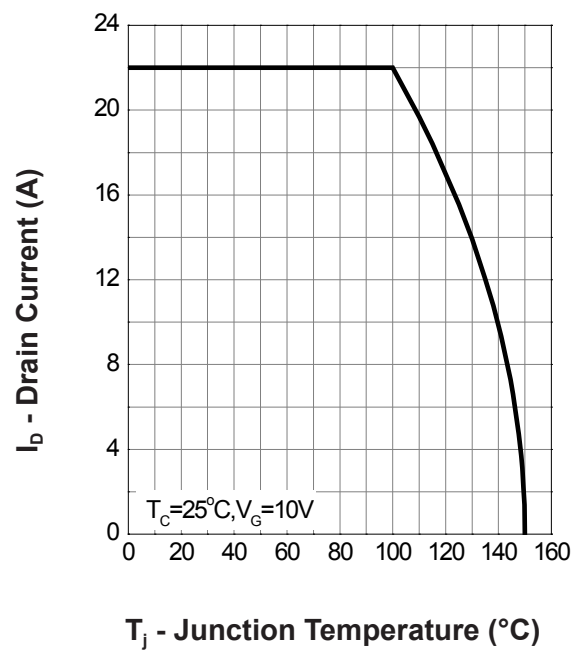
Note f : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

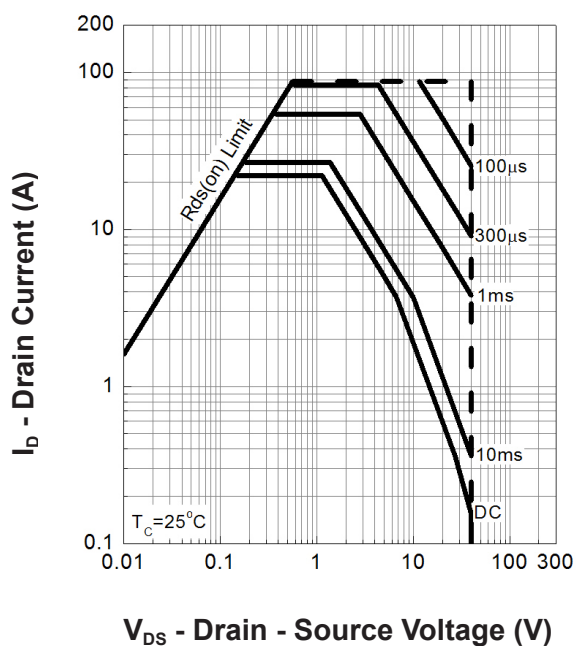
Power Dissipation



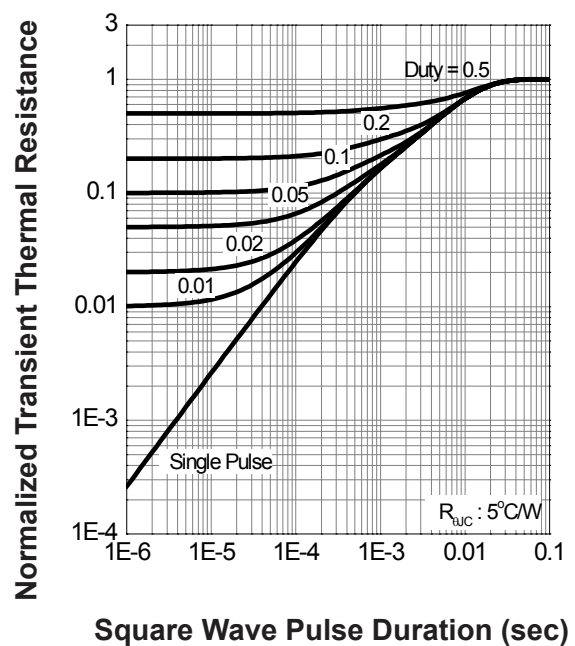
Drain Current



Safe Operation Area

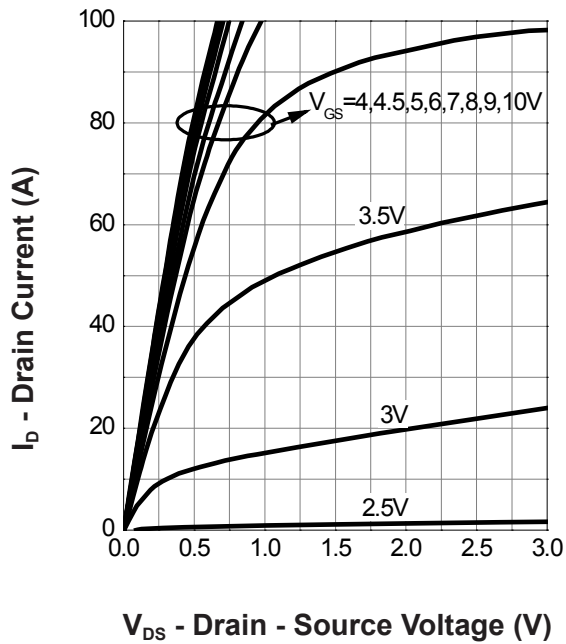


Thermal Transient Impedance

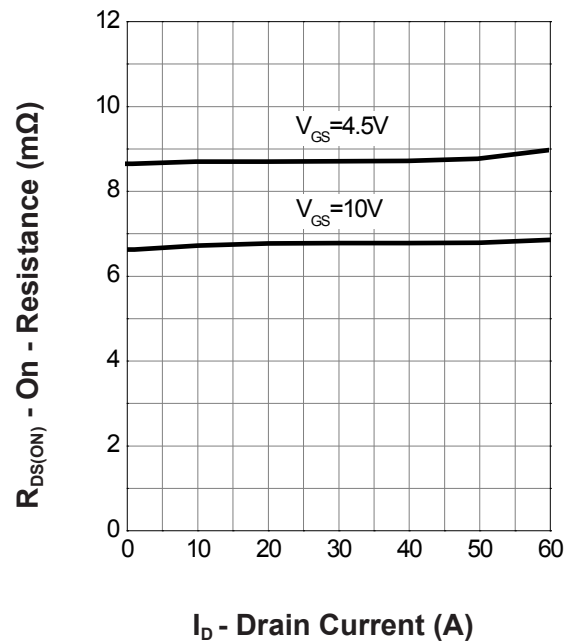


Typical Operating Characteristics(Cont.)

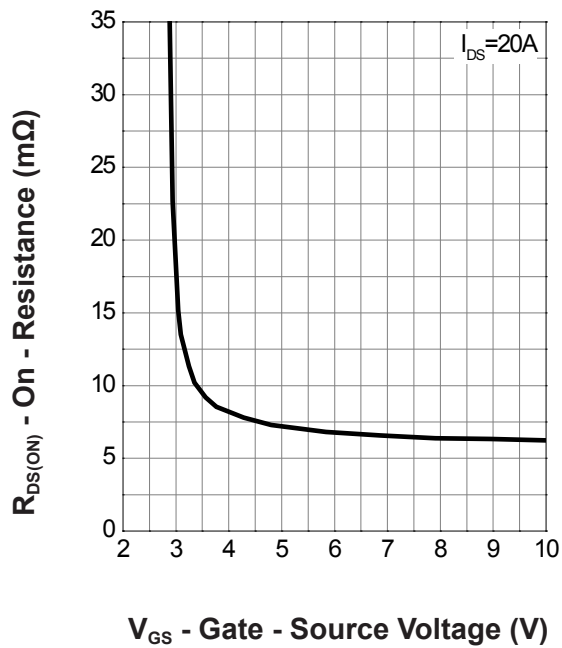
Output Characteristics



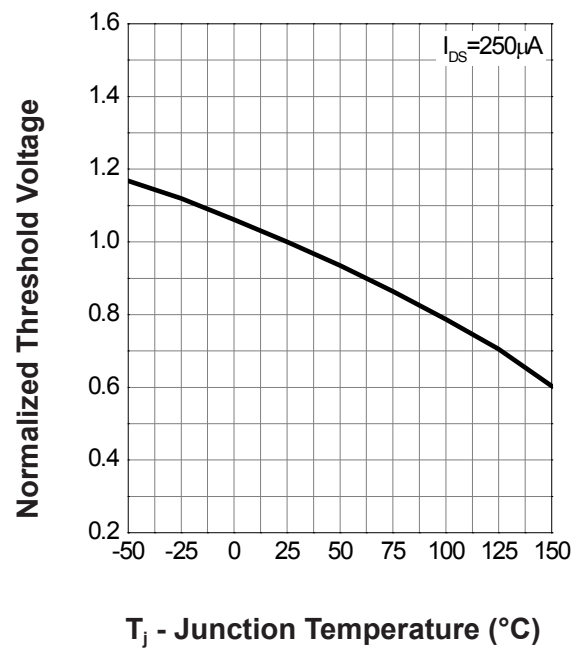
Drain-Source On Resistance



Gate-Source On Resistance

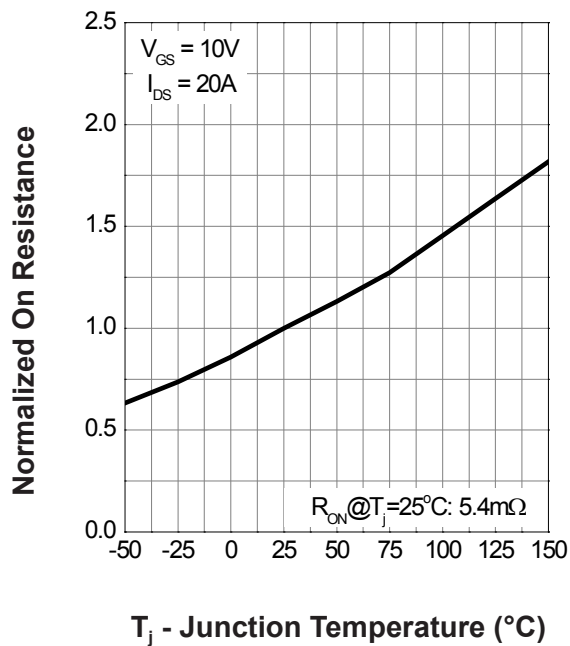


Gate Threshold Voltage

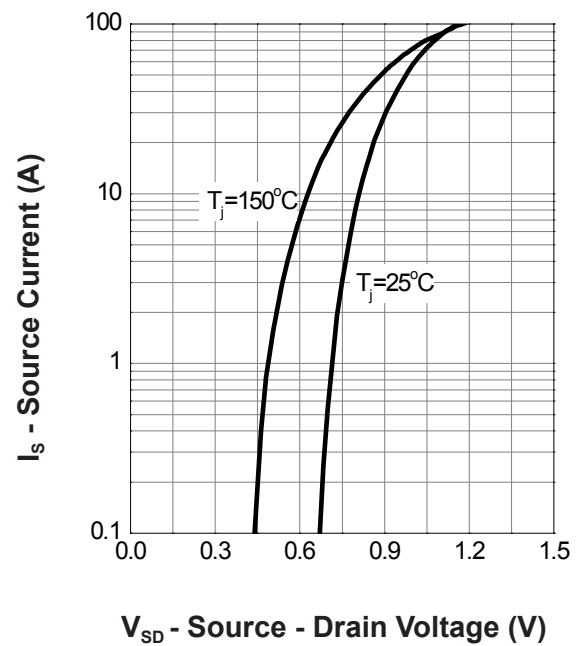


Typical Operating Characteristics(Cont.)

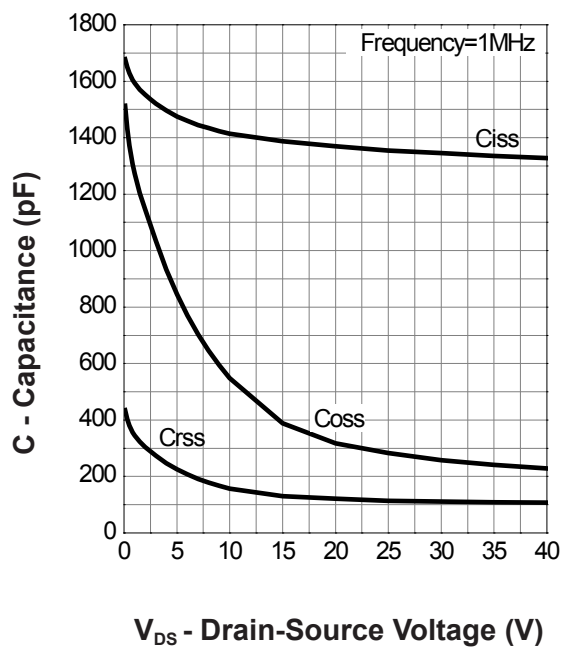
Drain-Source On Resistance



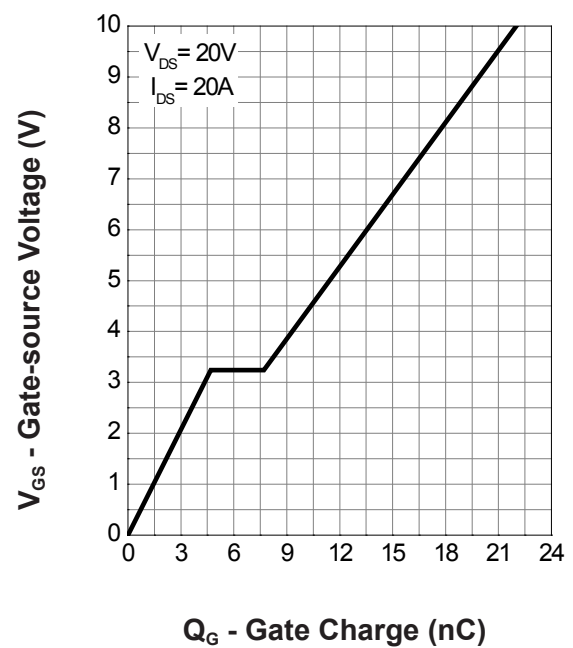
Source-Drain Diode Forward



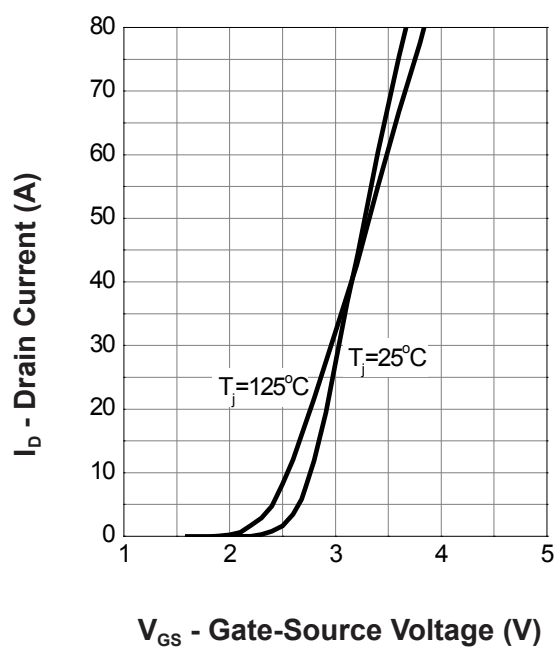
Capacitance



Gate Charge



Transfer Characteristics





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