General Description

The WSD4046GDN is the highest performance SGT N-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSD4046GDN 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

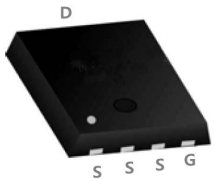
Product Summery

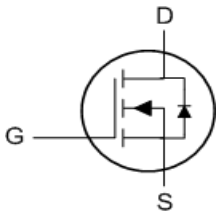
BVDSS	RDSON	ID
40V	6.7mΩ	43A

Applications

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

DFN3.3X3.3-EP Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[G]	43	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ 10V[G]	35	A
I_{DM}@T_C=25℃	Pulsed Drain Current[C]	60	A
P_D@T_A=25℃	Total Power Dissipation[A]	3.5	W
P_D@T_A=70℃	Total Power Dissipation[A]	2.1	W
T_J T_{STG}	Storage and Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [A]	---	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[A]	---	4.5	℃/W

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	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[a]	V_{GS}=10V , I_D=15A	---	6.7	8.7	mΩ
$R_{DS(ON)}$	Static Drain-Source On-Resistance[a]	V_{GS}=4.5V , I_D=8A	---	10	13	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.55	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	6	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	---	-	1	uA
		V_{DS}=40V , V_{GS}=0V , T_J=55℃	---	-	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	-	±100	nA
V_{DS}	Diode Forward Voltage	I_{SD}= 1A , V_{GS}=0V	---	---	1.2	V
I_S	Diode Forward Current *AC	T_C =25° C	---	---	43	A
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, R_L=20Ω , V_{GS}=10V, R_G=6Ω, I_D=1A.	---	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=1MHz	---	550	---	pF
C_{oss}	Output Capacitance		---	130	---	
C_{rss}	Reverse Transfer Capacitance		---	45	---	

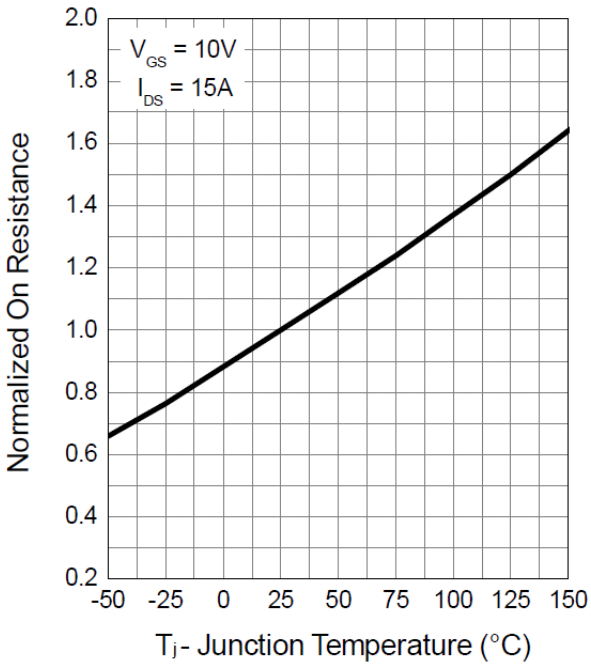
A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Pulse width limited by max, junction temperature.

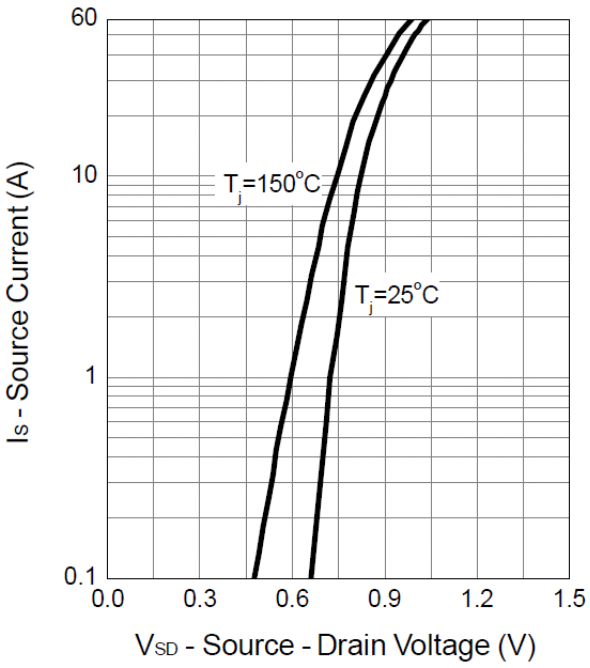
C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating

Typical Operating Characteristics

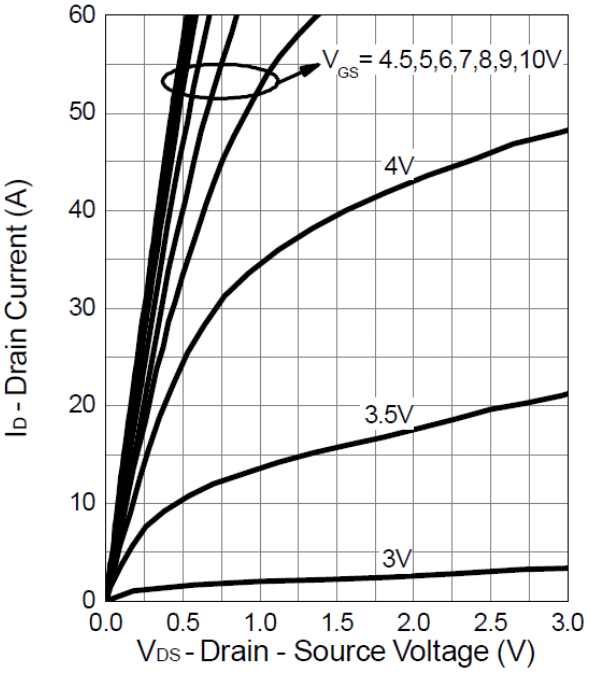
Drain-Source On Resistance



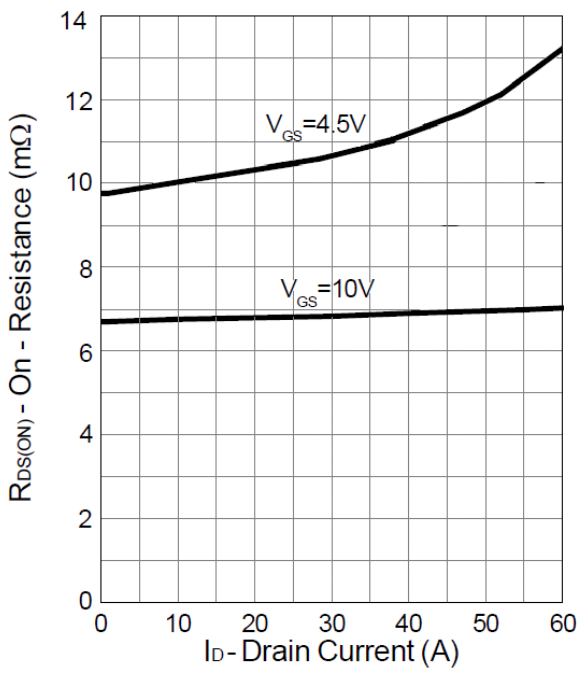
Source-Drain Diode Forward



Output Characteristics

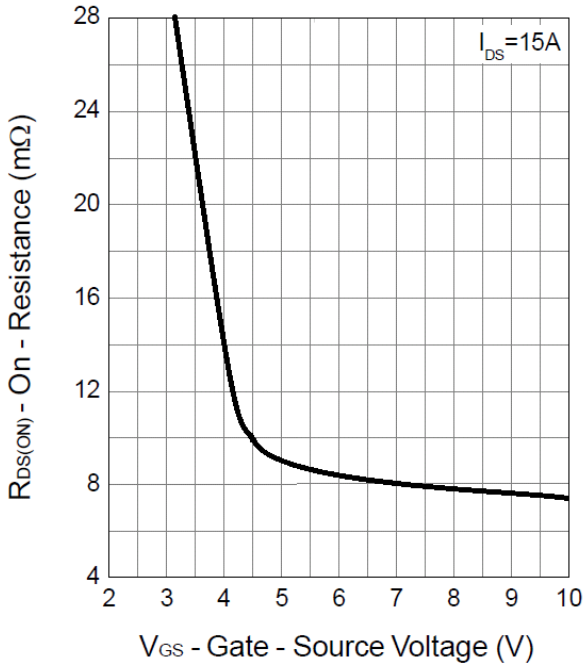


Drain-Source On Resistance

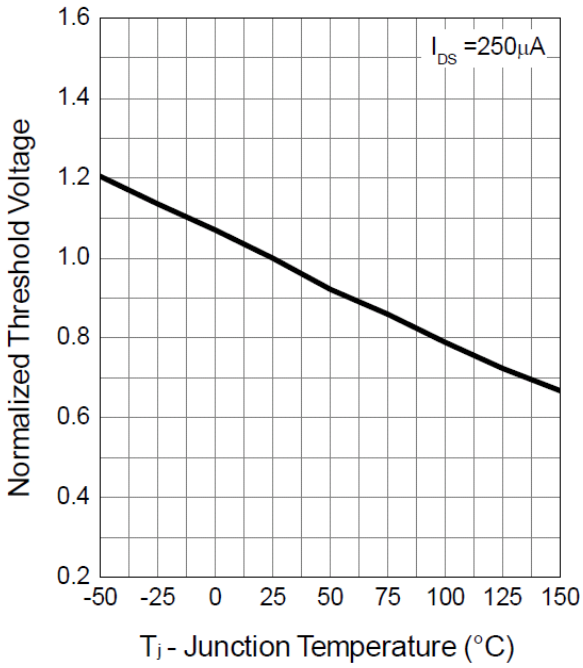


Typical Operating Characteristics (Cont.)

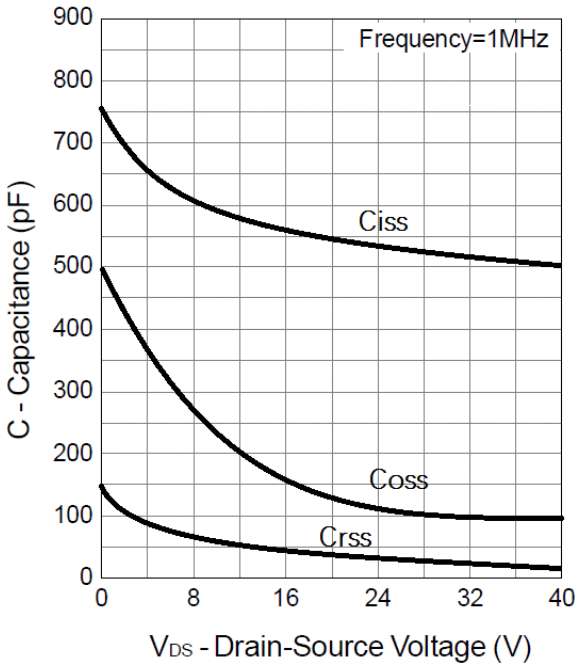
Gate-Source On Resistance



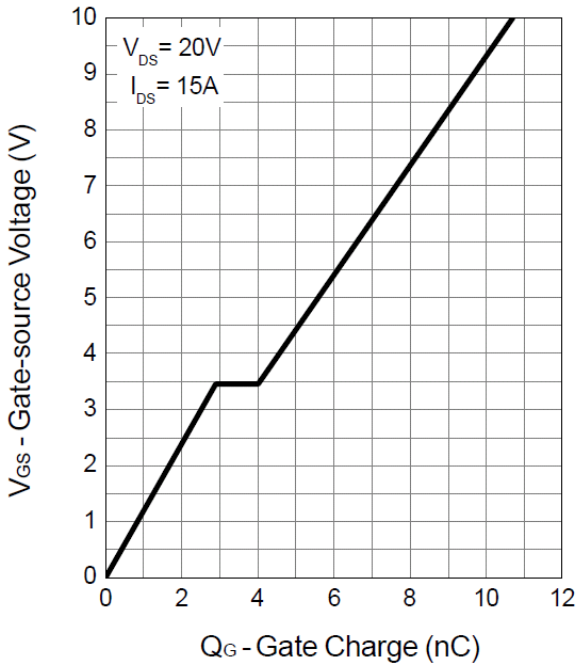
Gate Threshold Voltage



Capacitance

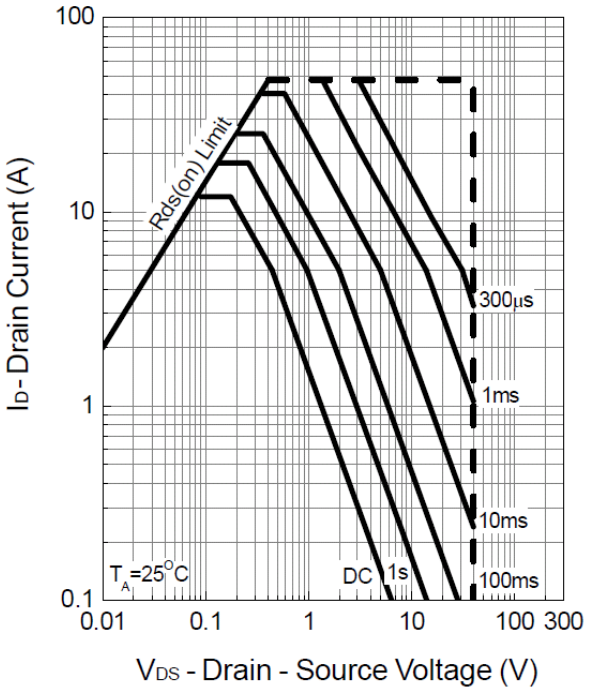


Gate Charge

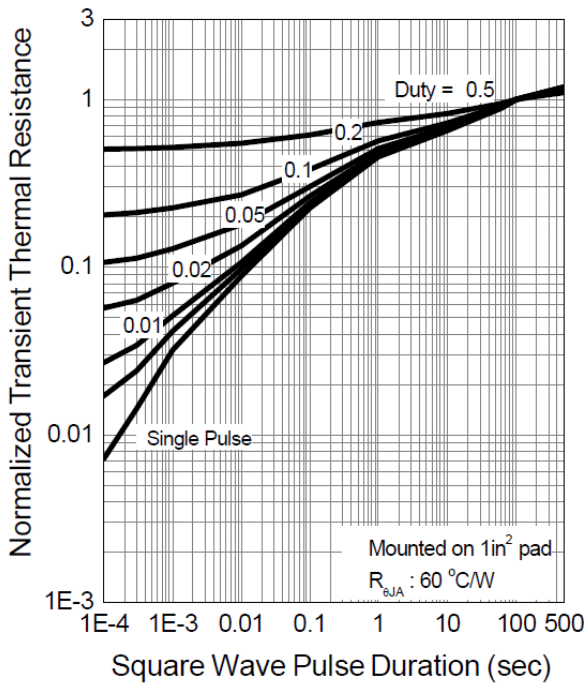


Typical Operating Characteristics (Cont.)

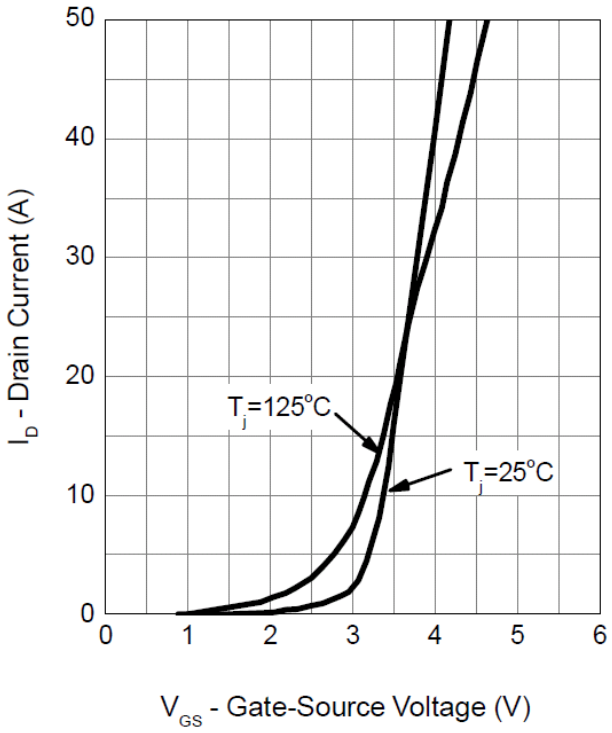
Safe Operation Area



Thermal Transient Impedance



Transfer Characteristics



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