General Description

The WSD46N10DN56 is the highest performance SGT 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 WSD46N10DN56 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
- Green Device Available

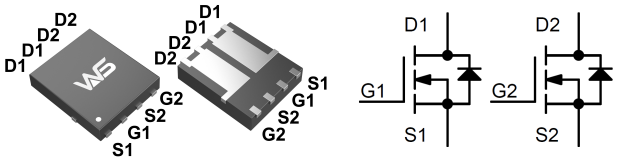
Product Summery

BVDSS	RDSON	ID
100V	14mΩ	40A

Applications

- DC-DC Converter.
- Motor Control.

DFN5X6C-8-EP2 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	40	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	33	A
I_{DM}[a]	Pulsed Drain Current	120	A
E_{AS}[b]	Single Pulse Avalanche Energy	57	mJ
I_{AS}[b]	Avalanche Current	26	A
P_D@T_C=25℃	Total Power Dissipation	71	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$[c]	Thermal Resistance Junction-ambient	---	25	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	1.7	℃/W

Note a：Pulse width limited by max. junction temperature.
Note b：UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_j=25°C).
Note c：Surface Mounted on 1in^2 pad area.

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	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.098	---	V/℃
$R_{DS(ON)}$[d]	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=10A	---	14	20	mΩ
$R_{DS(ON)}$[d]	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=7A	---	18	30	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.52	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=55℃	---	---	30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g[e]	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.2	---	Ω
Q_g[e]	Total Gate Charge (10V)	V_{DS}=50V , V_{GS}=10V , I_D=5A	---	17	---	nC
Q_{gs}[e]	Gate-Source Charge		---	2.8	---	
Q_{gd}[e]	Gate-Drain Charge		---	4.1	---	
$T_{d(on)}$[e]	Turn-On Delay Time	V_{DD}=30V , V_{GEN}=10V , R_G=6Ω I_D=1A ,RL=30Ω	---	16	---	ns
T_r[e]	Rise Time		---	3.8	---	
$T_{d(off)}$[e]	Turn-Off Delay Time		---	75	---	
T_f[e]	Fall Time		---	46	---	
C_{iss}[e]	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	1010	---	pF
C_{oss}[e]	Output Capacitance		---	185	---	
C_{rss}[e]	Reverse Transfer Capacitance		---	12	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	30	A
V_{SD}[d]	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	Is=1A,dI/dt=100A/μs	---	49	---	nS
Q_{rr}	Reverse Recovery Charge		---	62	---	nC

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

Typical Characteristics

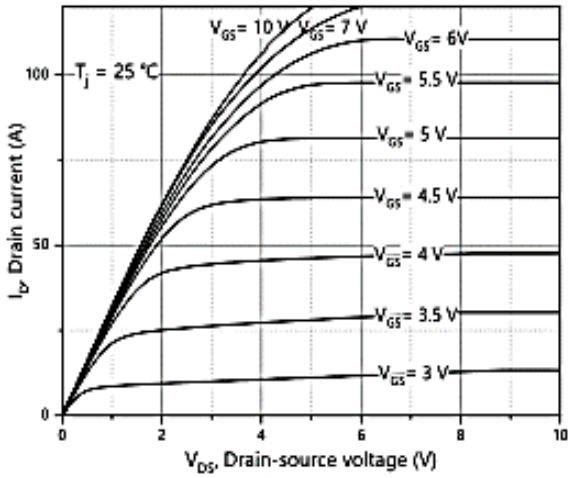


Figure 1, Typ. output characteristics

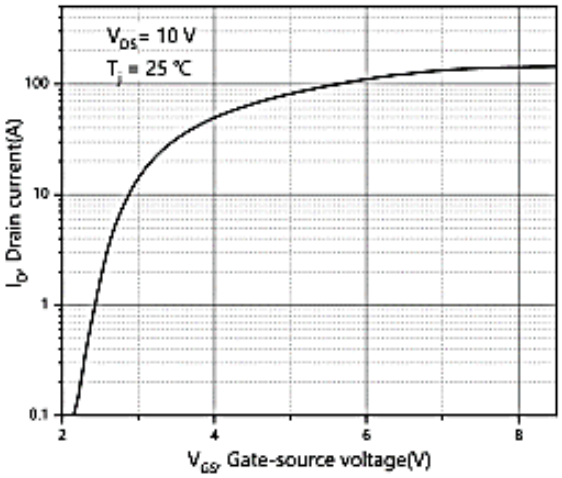


Figure 2, Typ. transfer characteristics

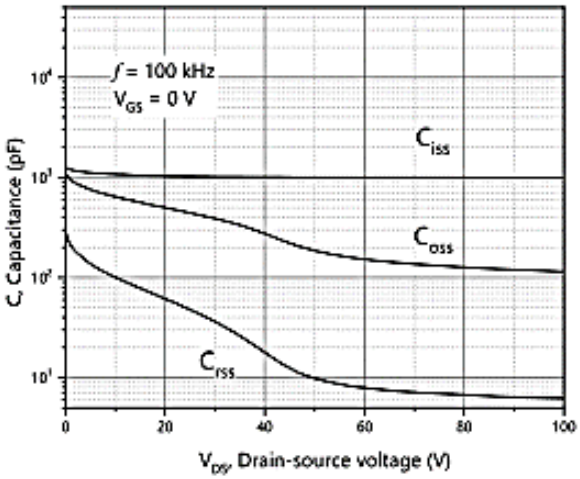


Figure 3, Typ. capacitances

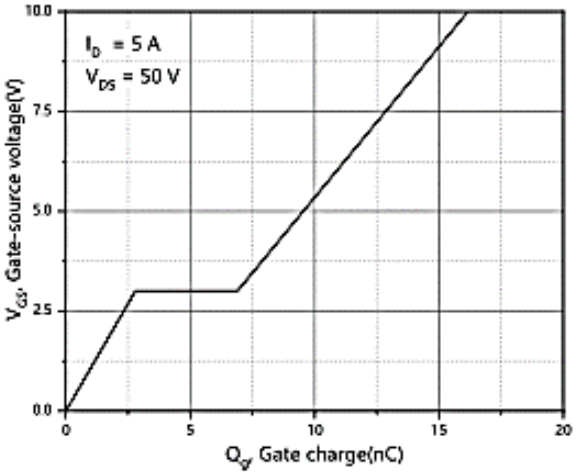


Figure 4, Typ. gate charge

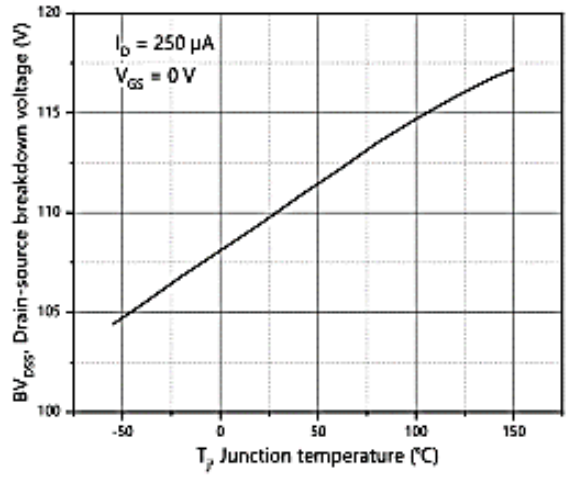


Figure 5, Drain-source breakdown voltage

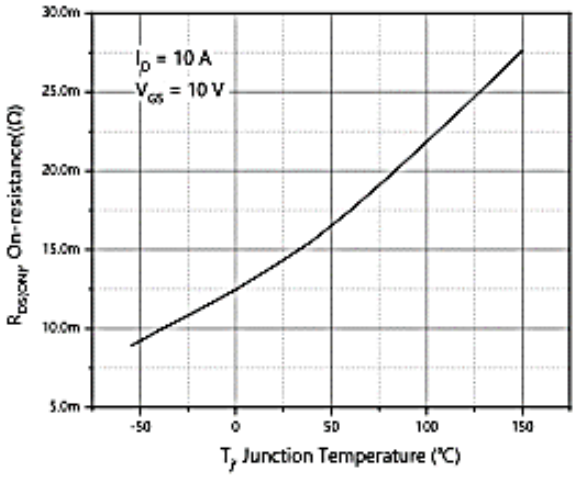


Figure 6, Drain-source on-state resistance

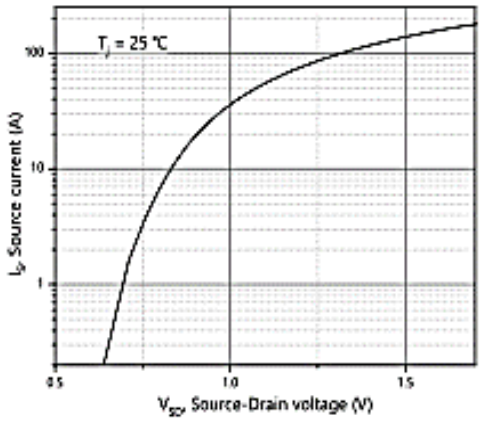


Figure 7, Forward characteristic of body diode

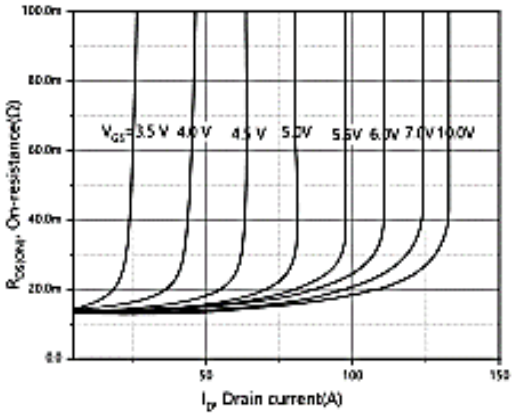


Figure 8, Drain-source on-state resistance

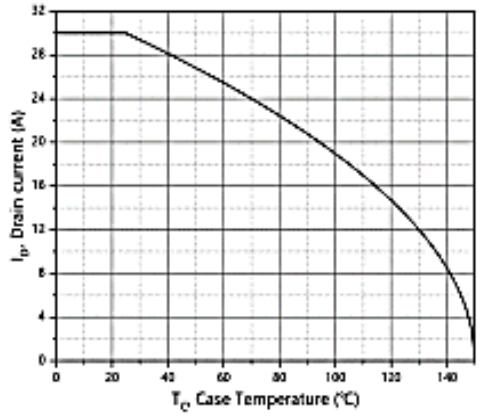


Figure 9, Drain current

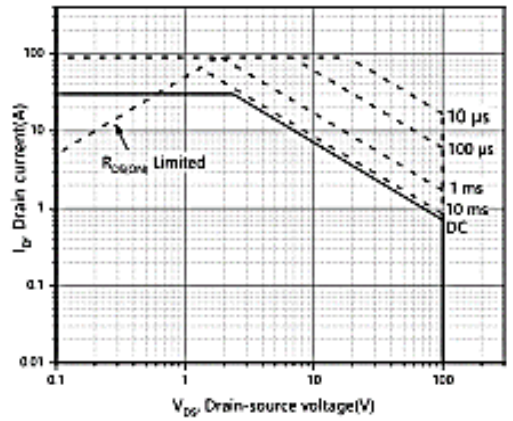
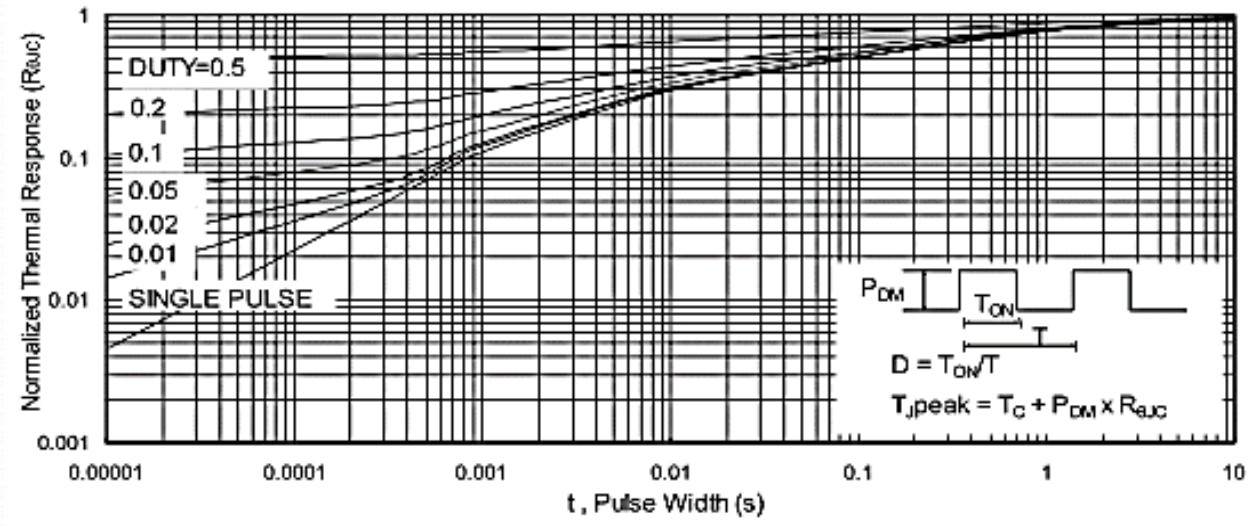


Figure 10, Safe operation area T_C=25 °C



Figu11. Normalized Maximum Transient Thermal Impedance

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