

General Description

The WSD30N10DN56T 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

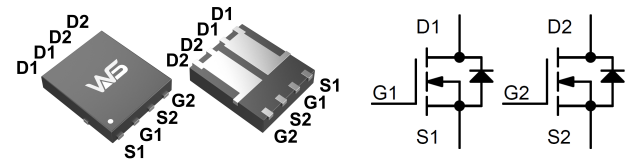
Product Summary

BVDSS	RDSON	ID
100V	70mΩ	12A

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
$I_D@T_c=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	12	A
$I_D@T_c=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	7	A
I_{DM}^a	Pulsed Drain Current	48	A
E_{AS}^b	Single Pulse Avalanche Energy	12	mJ
I_{AS}^b	Avalanche Current	7	A
$P_D@T_c=25^\circ\text{C}$	Total Power Dissipation	31	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}^c$	Thermal Resistance Junction-ambient	---	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}^c$	Thermal Resistance-Junction to Case	---	4.0	$^\circ\text{C}/\text{W}$

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 $T_J=25^\circ\text{C}$).

Note c : Surface Mounted on 1in^2 pad area.

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.098	---	V/°C
R _{DS(ON)} ^d	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =6A	---	70	95	mΩ
R _{DS(ON)} ^d	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =4A	---	85	100	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.52	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C	---	---	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	---	2.5	---	Ω
Q _g ^e	Total Gate Charge (10V)	V _{DS} =30V, V _{GS} =10V, I _D =5A	---	16	---	nC
Q _{gs} ^e	Gate-Source Charge		---	2.8	---	
Q _{gd} ^e	Gate-Drain Charge		---	3.5	---	
T _{d(on)} ^e	Turn-On Delay Time	V _{DD} =30V, V _{GEN} =10V, R _G =6Ω I _D =1A, RL=30Ω	---	11	---	ns
T _r ^e	Rise Time		---	7	---	
T _{d(off)} ^e	Turn-Off Delay Time		---	28	---	
T _f ^e	Fall Time		---	8	---	
C _{iss} ^e	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	780	---	pF
C _{oss} ^e	Output Capacitance		---	45	---	
C _{riss} ^e	Reverse Transfer Capacitance		---	30	---	

Diode Characteristics

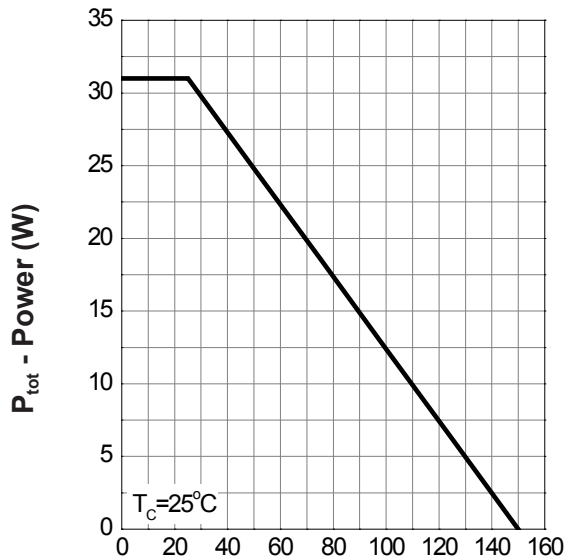
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	6	A
V _{SD} ^d	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _S =1A, dI/dt=100A/μs	---	30	---	nS
Q _{rr}	Reverse Recovery Charge		---	41	---	nC

Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

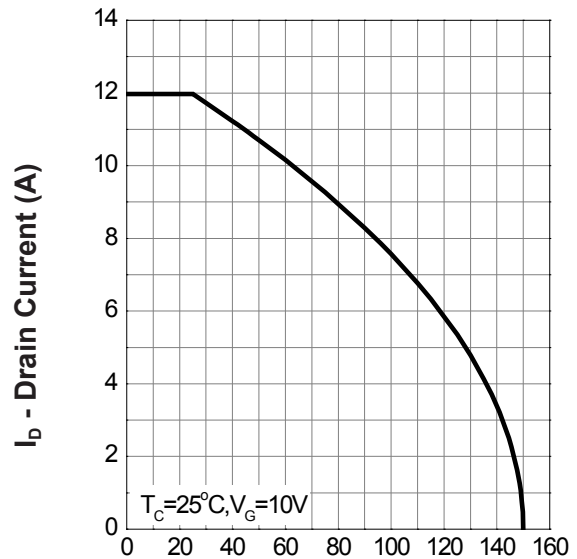
Typical Operating Characteristics

Power Dissipation



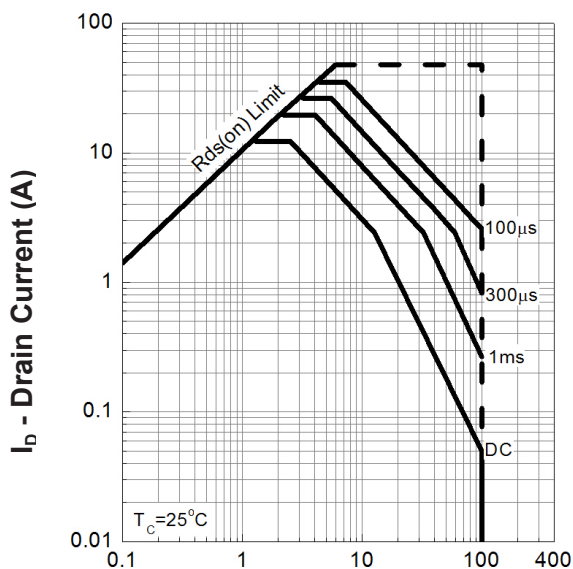
T_j - Junction Temperature ($^\circ\text{C}$)

Drain Current



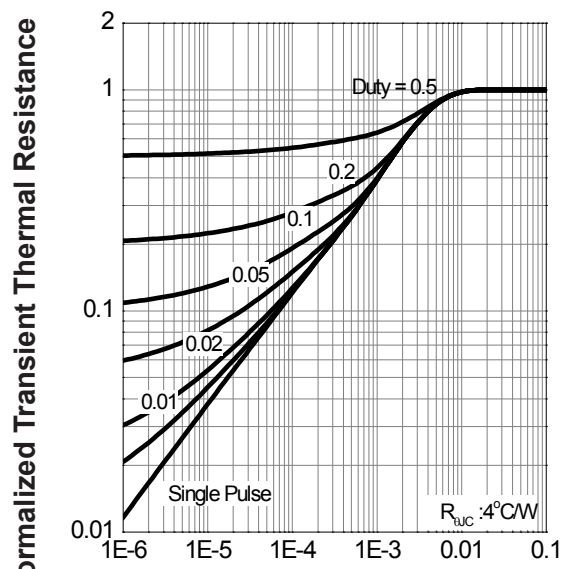
T_j - Junction Temperature ($^\circ\text{C}$)

Safe Operation Area



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

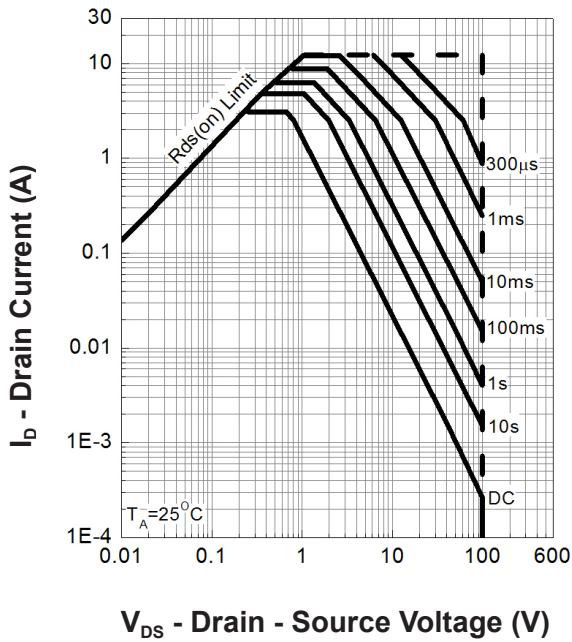
Thermal Transient Impedance



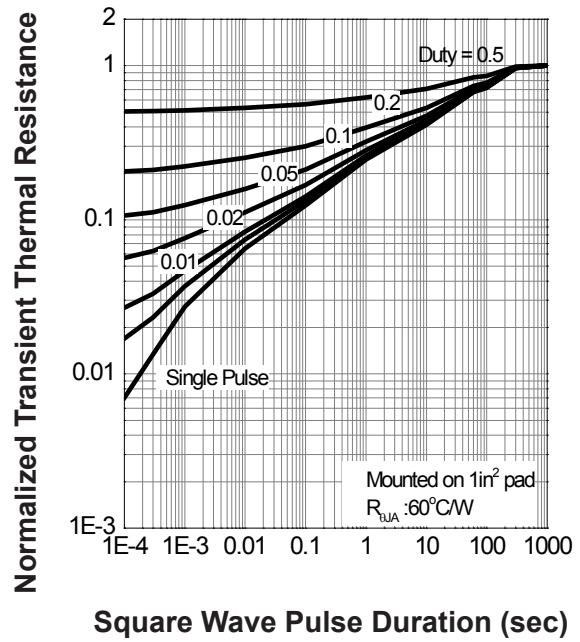
Square Wave Pulse Duration (sec)

Typical Operating Characteristics

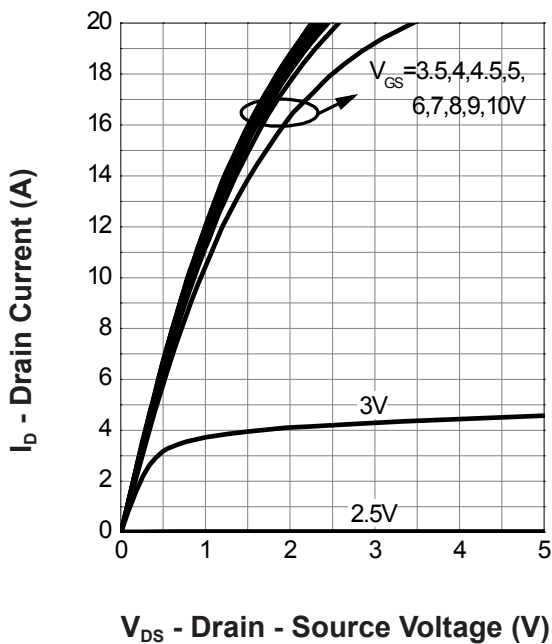
Safe Operation Area



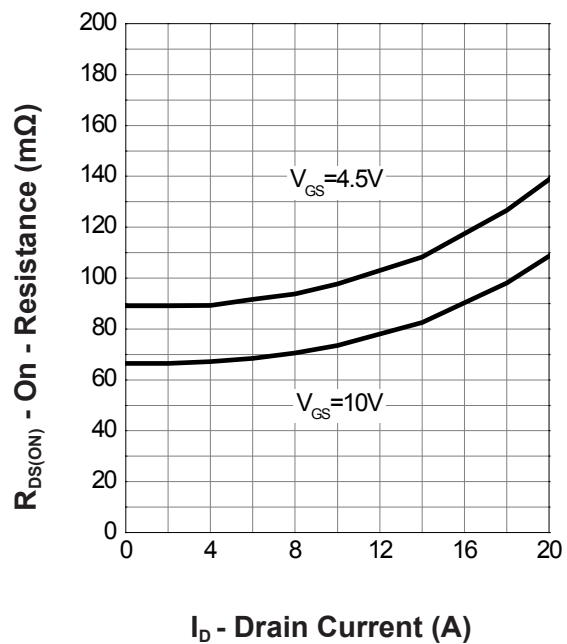
Thermal Transient Impedance



Output Characteristics

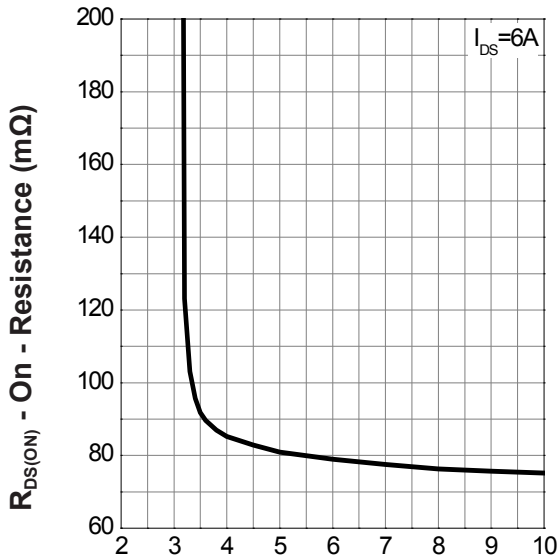


Drain-Source On Resistance



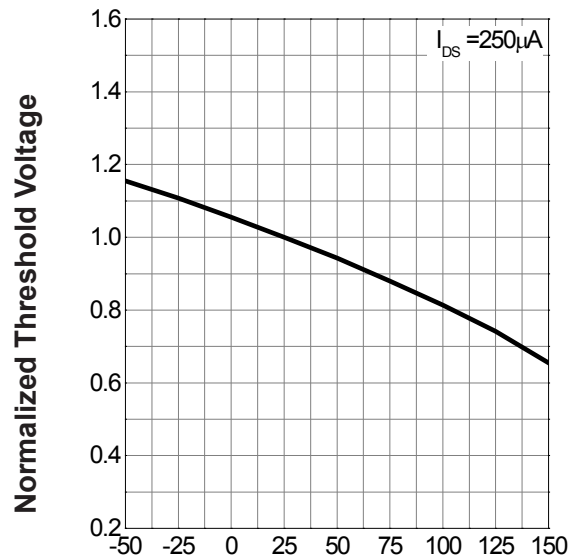
Typical Operating Characteristics

Gate-Source On Resistance



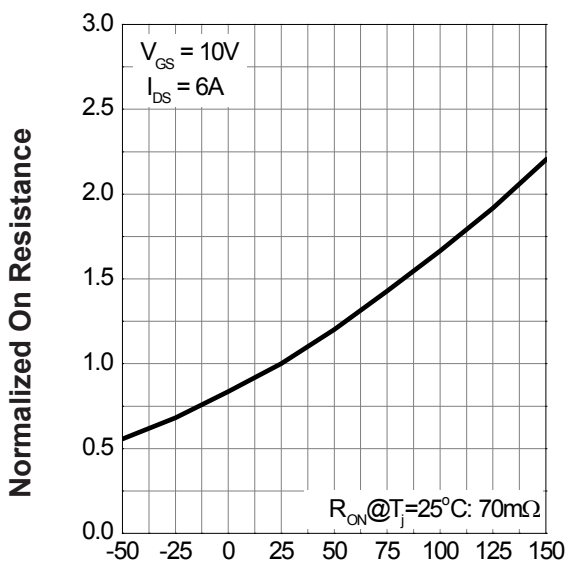
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage



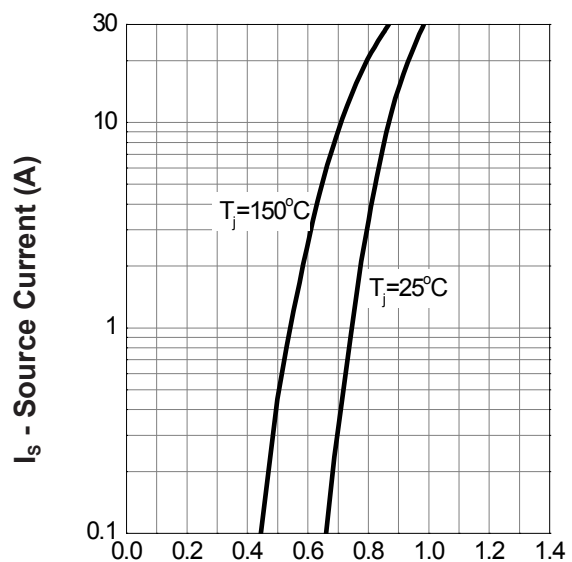
T_J - Junction Temperature (°C)

Drain-Source On Resistance



T_J - Junction Temperature (°C)

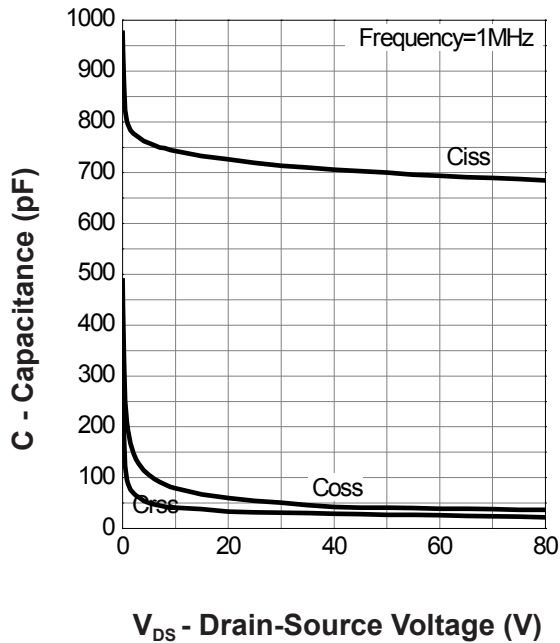
Source-Drain Diode Forward



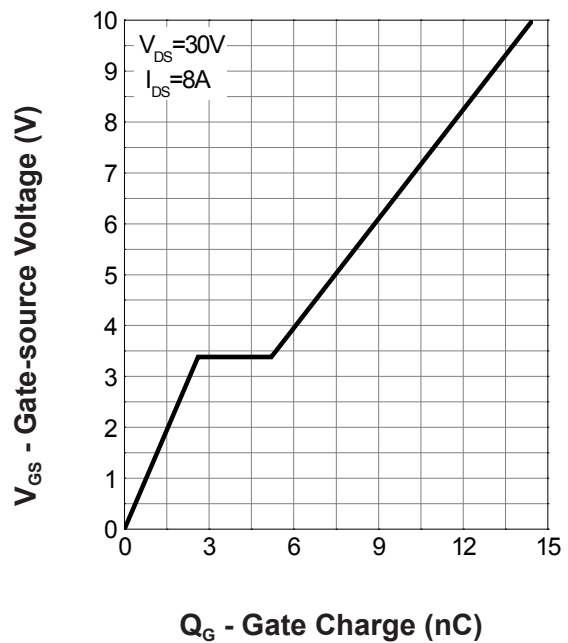
V_{SD} - Source - Drain Voltage (V)

Typical Operating Characteristics

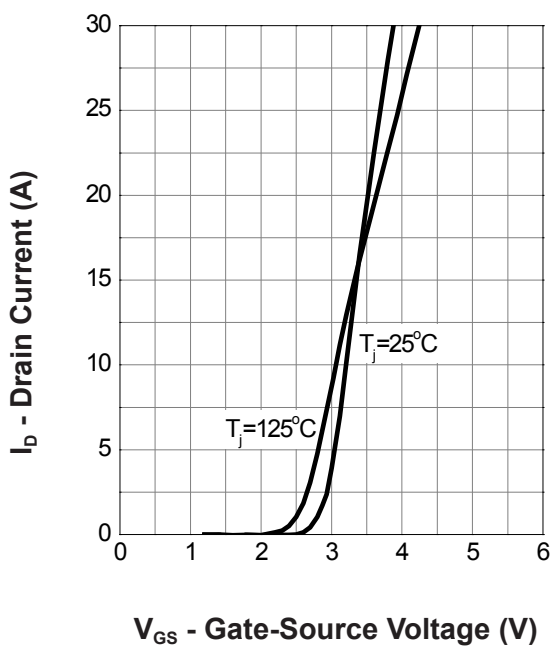
Capacitance



Gate Charge



Transfer Characteristics





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