

General Description

The WSD100N15DN56G is the highest performance trench N-Channel MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD100N15DN56 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

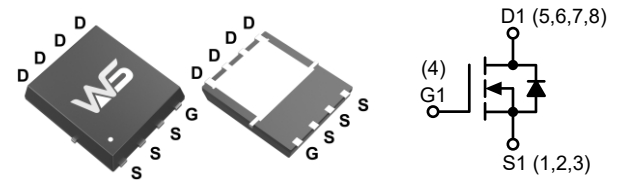
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
150V	9.0mΩ	100A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	
I_D	Continuous Drain Current, V_{GS} @ 10V($T_C=25^\circ\text{C}$)	100	A
I_{DM}	Pulsed Drain Current	360	
E_{AS}	Single pulse avalanche energy	400	mJ
P_D	Total Power Dissipation ($T_C=25^\circ\text{C}$)	160	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction-Ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction-Case	---	0.78	

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	150	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	---	9.0	12	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	2.0	3.0	4.0	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =100V, V _{GS} =0V, T _J =25°C	---	---	1.0	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Q _g	Total Gate Charge	V _{DS} =50V, V _{GS} =10V, I _D =20A	---	66	---	nC
Q _{gs}	Gate-Source Charge		---	26	---	
Q _{gd}	Gate-Drain Charge		---	18	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =50V, V _{GS} =10V, R _G =2Ω, I _D =20A	---	37	---	ns
T _r	Rise Time		---	98	---	
T _{d(off)}	Turn-Off Delay Time		---	55	---	
T _f	Fall Time		---	20	---	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1.0MHz	---	5450	---	pF
C _{oss}	Output Capacitance		---	1730	---	
C _{rss}	Reverse Transfer Capacitance		---	195	---	

Diode Characteristics

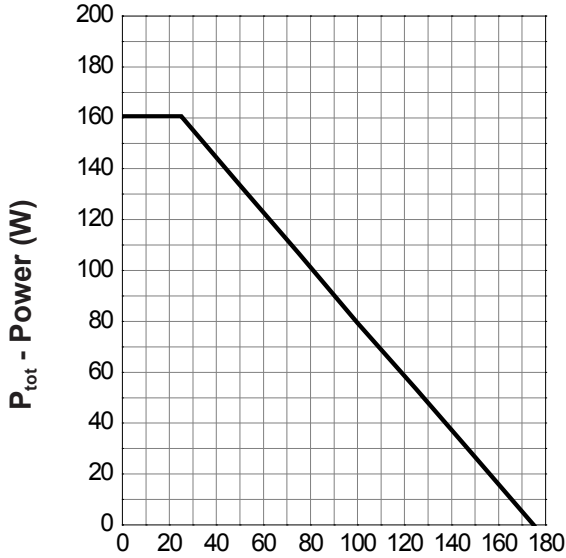
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	---	---	100	A
I _{SM}	Pulsed Source Current ^{2,6}		---	---	360	
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =20A, T _J =25°C	---	---	1.3	V

Note:

1. Repetitive rating: pulse width limited by max. junction temperature.
2. P_D is based on max. junction temperature, using junction-case thermal resistance.
3. The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.
4. V_{DD}=50V, R_G=25Ω, L=0.5mH, starting T_J=25°C.
5. Calculated continuous current based on maximum allowable junction temperature.

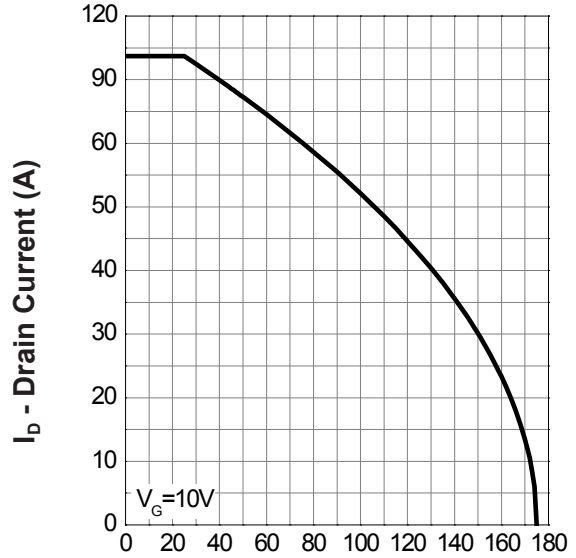
Typical Characteristics

Power Dissipation



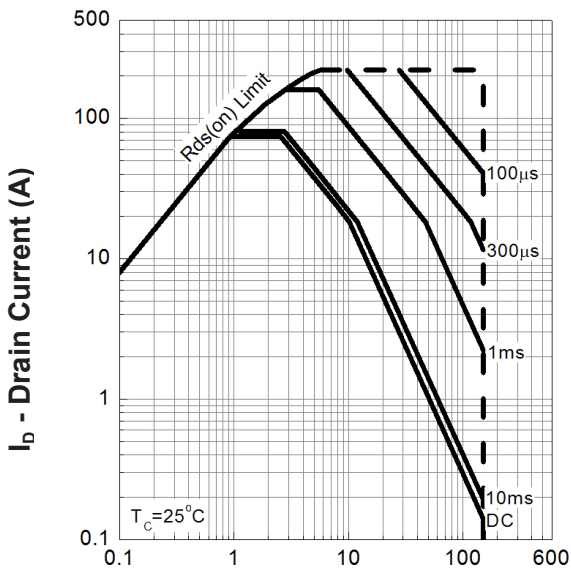
T_c - Case Temperature ($^{\circ}$ C)

Drain Current



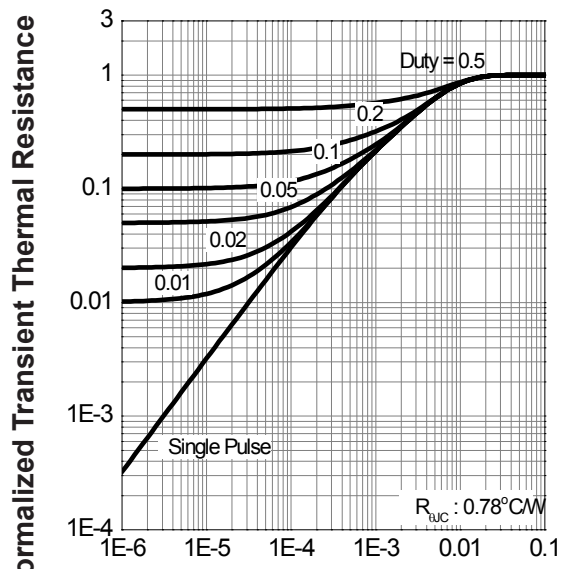
T_c - Case Temperature ($^{\circ}$ C)

Safe Operation Area



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

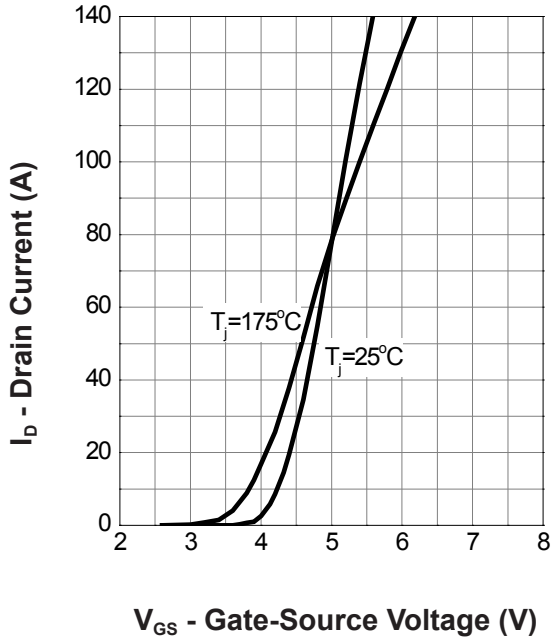
Thermal Transient Impedance



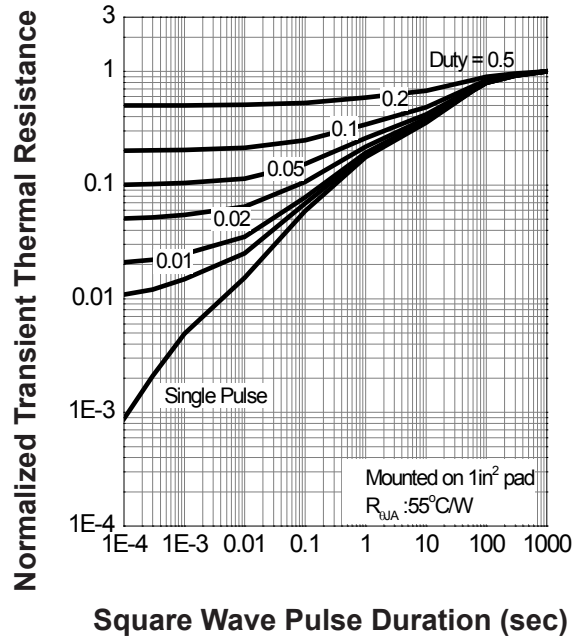
Square Wave Pulse Duration (sec)

Typical Characteristics (Cont.)

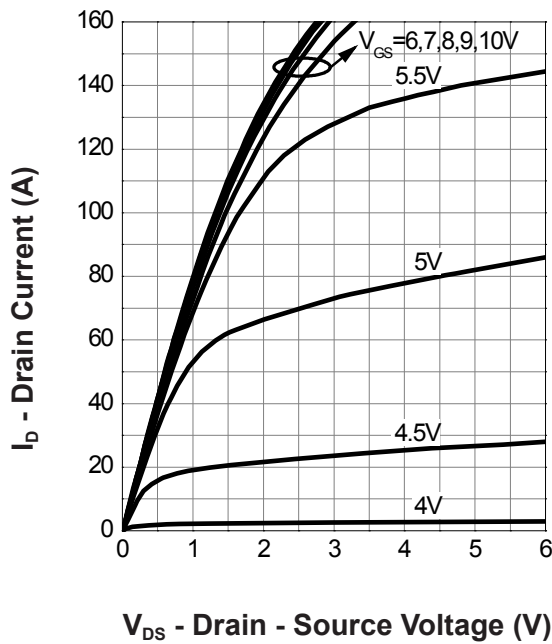
Transfer Characteristics



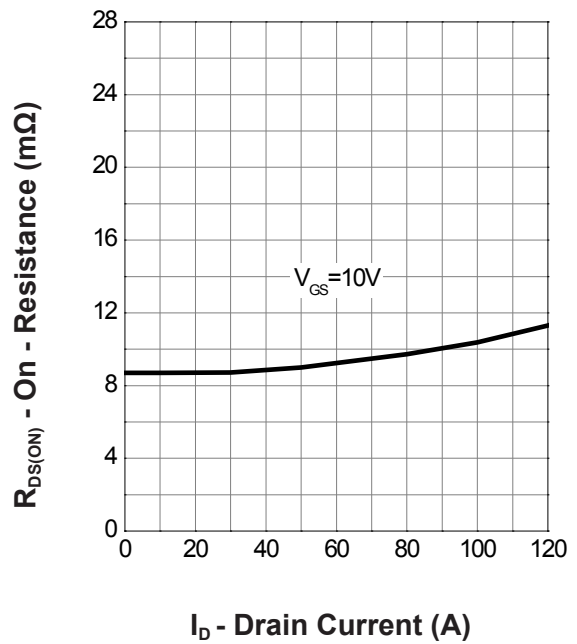
Thermal Transient Impedance



Output Characteristics

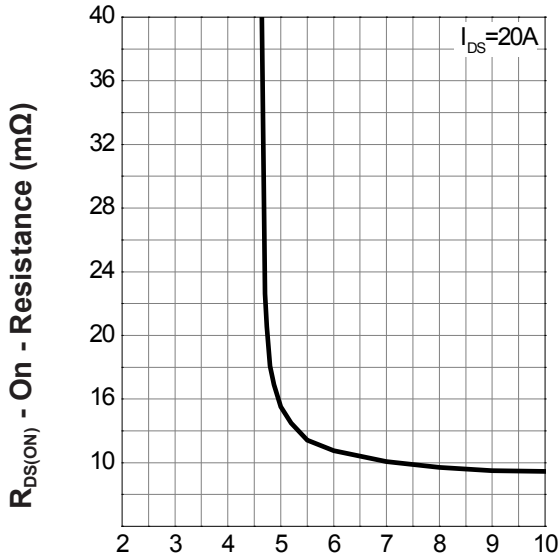


Drain-Source On Resistance



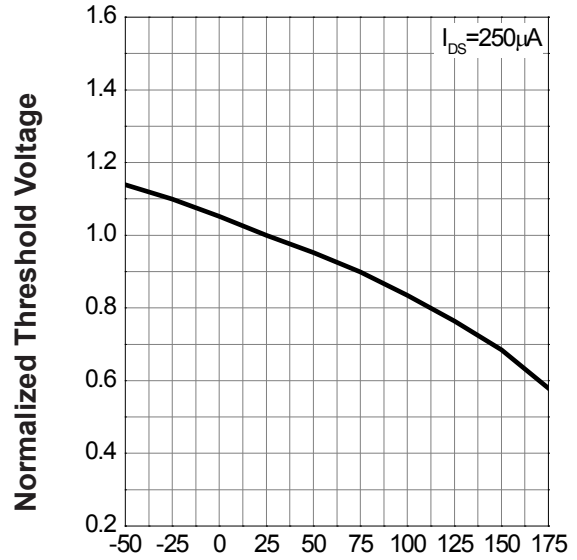
Typical Characteristics (Cont.)

Gate-Source On Resistance



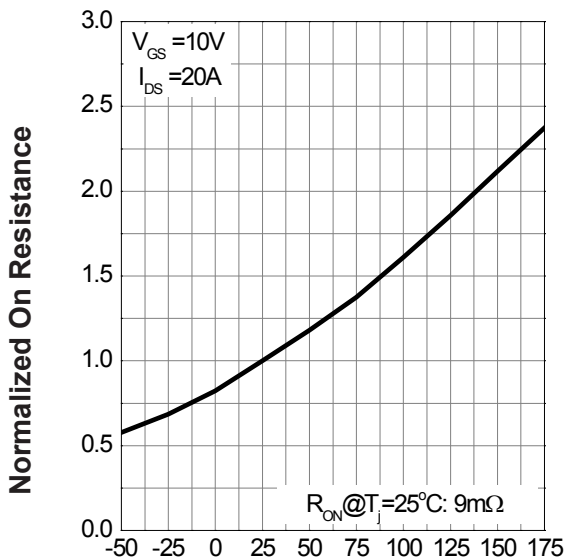
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage



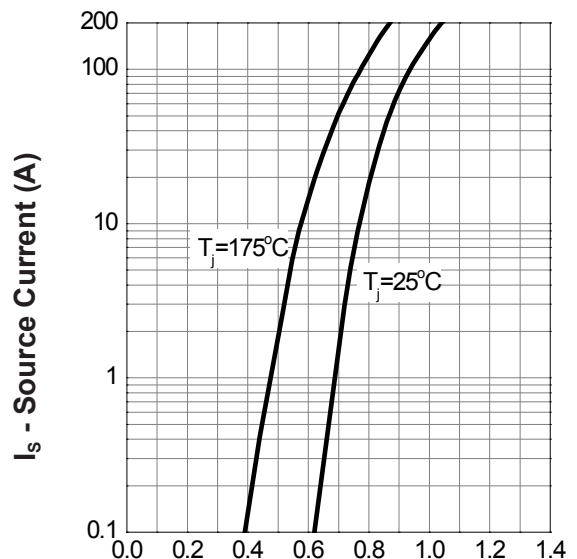
T_J - Junction Temperature (°C)

Drain-Source On Resistance



T_J - Junction Temperature (°C)

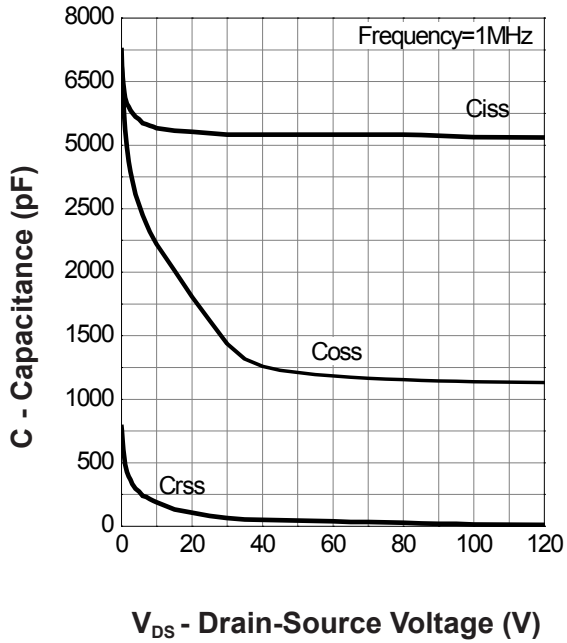
Source-Drain Diode Forward



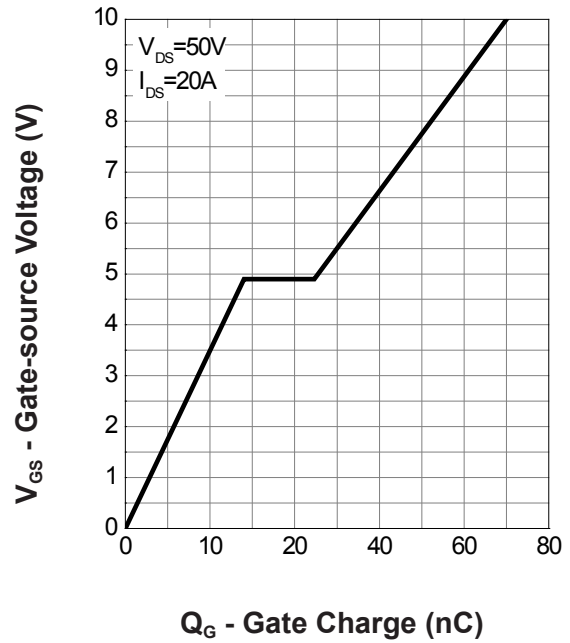
V_{SD} - Source - Drain Voltage (V)

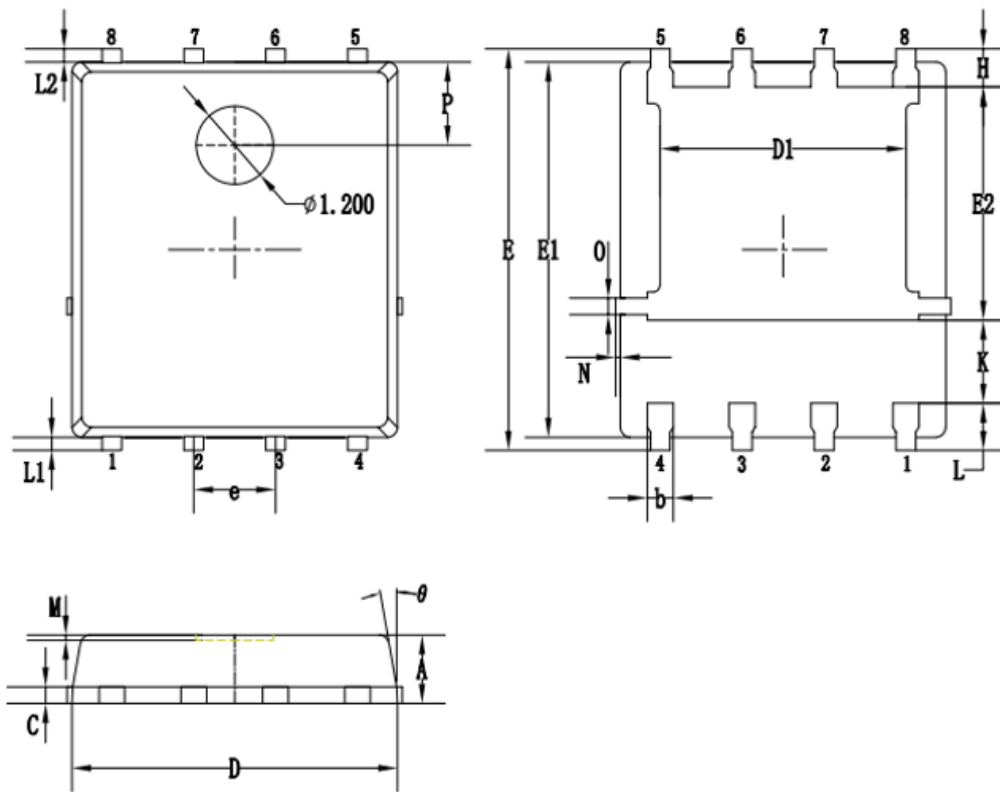
Typical Characteristics (Cont.)

Capacitance



Gate Charge



Packaging information


SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	3.92
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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