General Description

The WSD100N15DN56G is the highest performance trench N-ch MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSD100N15DN56 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

- Super Low Gate Charge
- Excellent CdV/dt effect decline
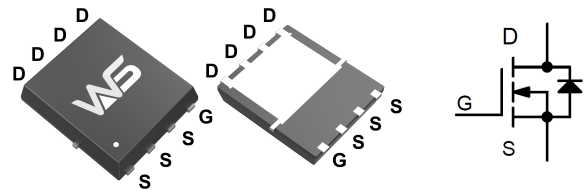- 100% EAS Guaranteed
- Green Device Available

Product Summery

BVDSS	RDSON	ID
150V	9mΩ	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	$\pm$20	V
I_D	Continuous Drain Current, V_{GS} @ 10V(T_C=25℃)	100	A
I_{DM}	Pulsed Drain Current	360	A
EAS	Single Pulse Avalanche Energy	400	mJ
P_D	Total Power Dissipation... $_C$=25℃)	160	W
RθJA	Thermal resistance, junction-ambient	62	℃/W
RθJC	Thermal resistance, junction-case	0.78	℃/W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

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	150	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	9	12	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	3.0	4.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	---	1	uA
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_{DD}=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=1MHz	---	5450	---	pF
C_{oss}	Output Capacitance		---	1730	---	
C_{rss}	Reverse Transfer Capacitance		---	195	---	

Diode Characteristics

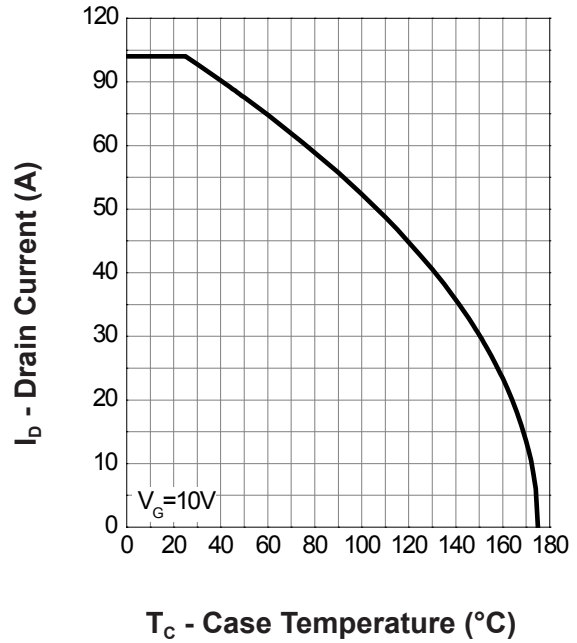| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	100	A
I_{SM}	Pulsed Source Current[2,6]		---	---	360	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=20A , T_J=25℃	---	---	1.3	V

■ Note

[1]) Repetitive rating; pulse width limited by max. junction temperature.

[2]) Pd is based on max. junction temperature, using junction-case thermal resistance.

[3]) The value of RθJA is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 ℃.

[4]) V_{DD}=50 V, R_G=25Ω, L=0.5 mH, starting T_j=25 ℃.

[5]) Calculated continuous current based on maximum allowable junction temperature.
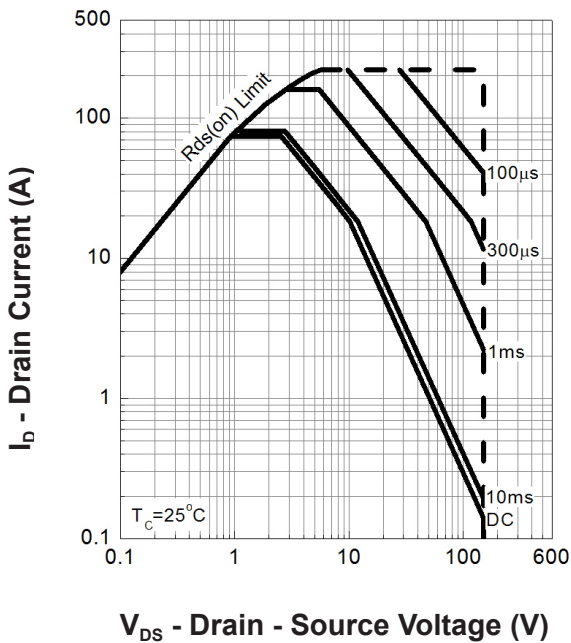
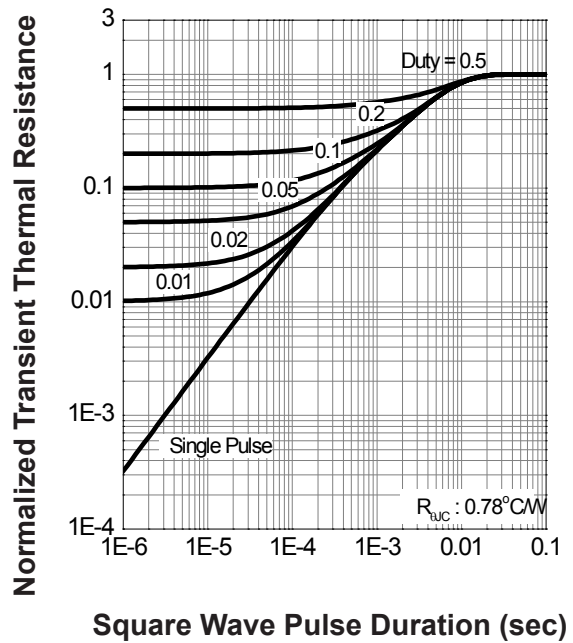## Typical Operating Characteristics

Power Dissipation
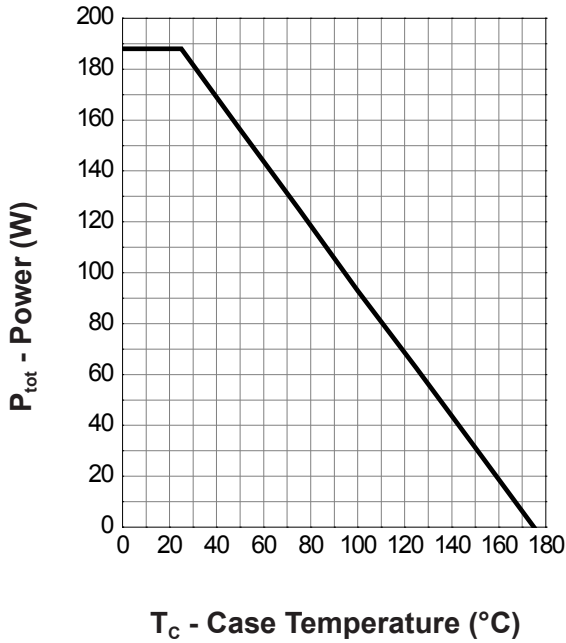
P_{tot} - Power (W)
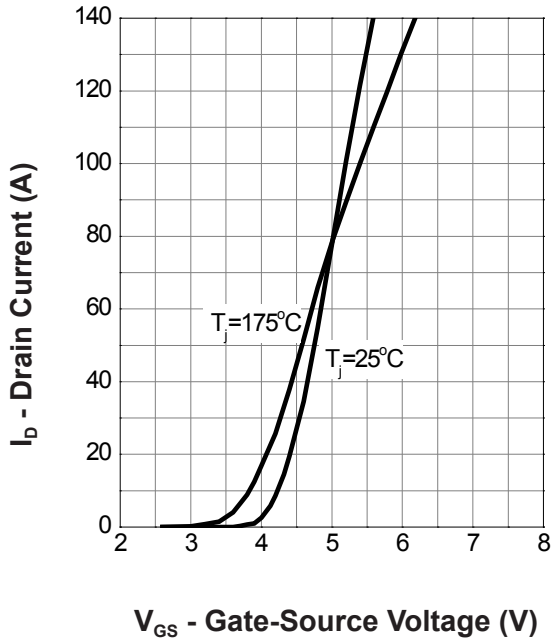
T_C - Case Temperature (°C)

Drain Current

I_D - Drain Current (A)

$V_G=10V$

T_C - Case Temperature (°C)

Safe Operation Area

I_D - Drain Current (A)

Rds(on) Limit

100µs

300µs

1ms

10ms
DC

$T_C=25^oC$

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

Thermal Transient Impedance

Normalized Transient Thermal Resistance

Duty = 0.5

0.2

0.1

0.05

0.02

0.01

Single Pulse

$R_{θJC}$: 0.78°C/W

Square Wave Pulse Duration (sec)

![WINSOK SEMICONDUCTOR logo]

Typical Operating Characteristics

Transfer Characteristics

$T_j=175^{o}C$

$T_j=25^{o}C$

I_D - Drain Current (A)

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

Thermal Transient Impedance

Duty = 0.5

0.2

0.1

0.05

0.02

0.01

Single Pulse

Mounted on $1in^2$ pad
$R_{\theta JA}$:55°C/W

Normalized Transient Thermal Resistance

Square Wave Pulse Duration (sec)
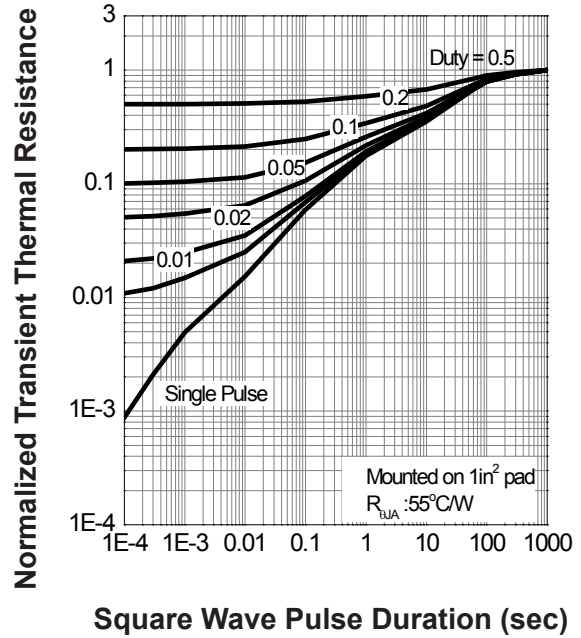
Output Characteristics

V_{GS}=6,7,8,9,10V

5.5V

5V

4.5V

4V

I_D - Drain Current (A)

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

Drain-Source On Resistance

V_{GS}=10V

$R_{DS(ON)}$ - On - Resistance (mΩ)

I_D - Drain Current (A)
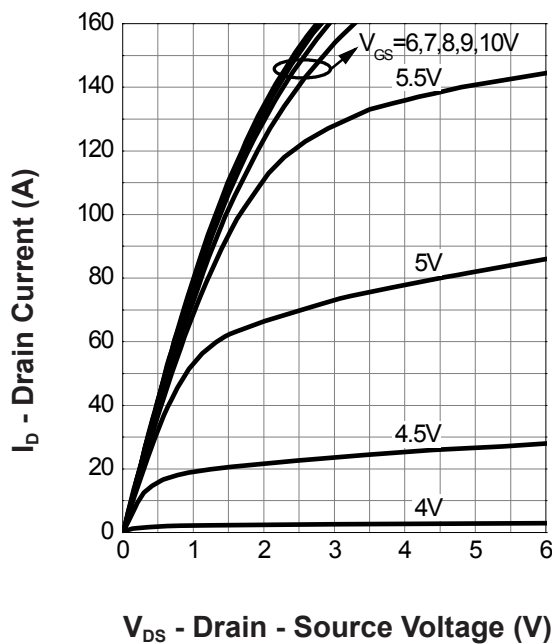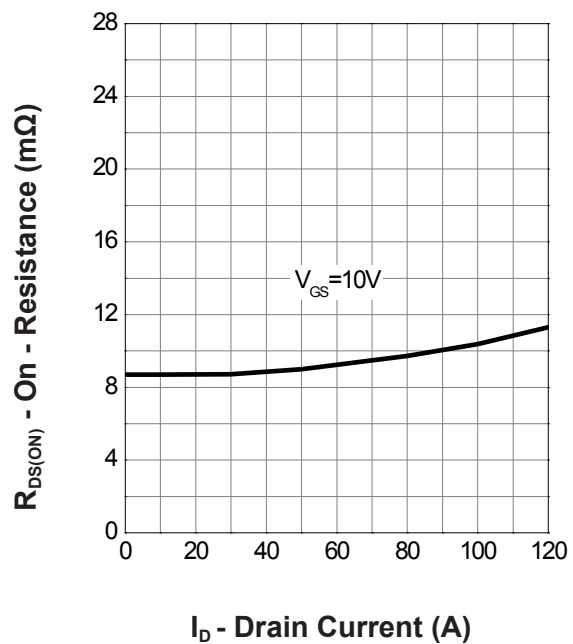
Typical Operating Characteristics

Gate-Source On Resistance

I_{DS}=20A

$R_{DS(ON)}$ - On - Resistance (mΩ)

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

Gate Threshold Voltage

I_{DS}=250μA

Normalized Threshold Voltage

T_j - Junction Temperature (°C)

Drain-Source On Resistance

V_{GS} =10V
I_{DS} =20A

Normalized On Resistance

R_{ON}@T_j=25°C: 9mΩ

T_j - Junction Temperature (°C)
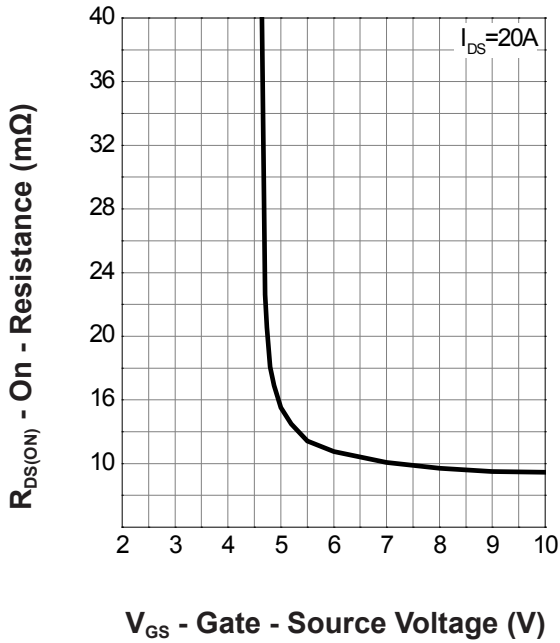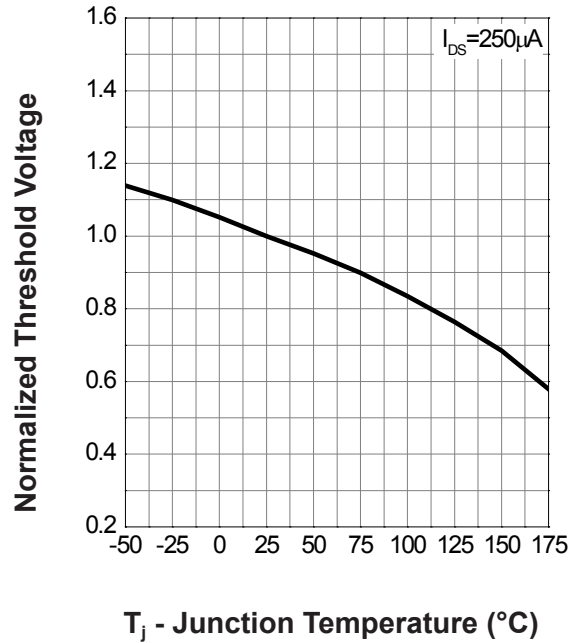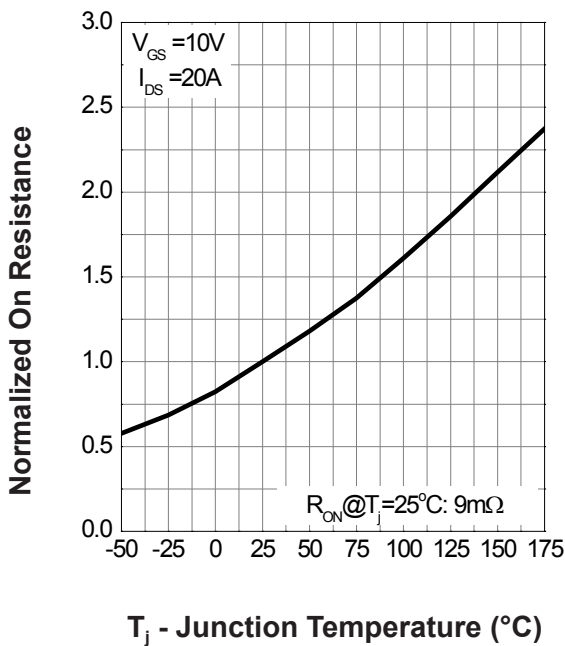
Source-Drain Diode Forward

I_S - Source Current (A)
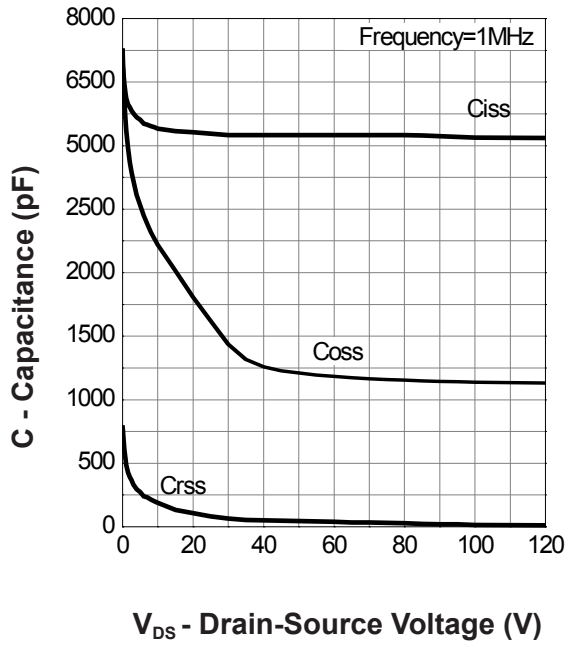
T_j=175°C

T_j=25°C

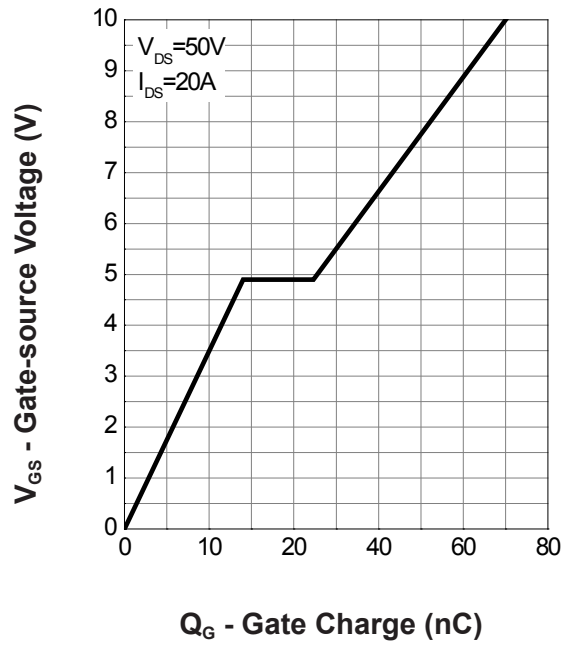V_{SD} - Source - Drain Voltage (V)
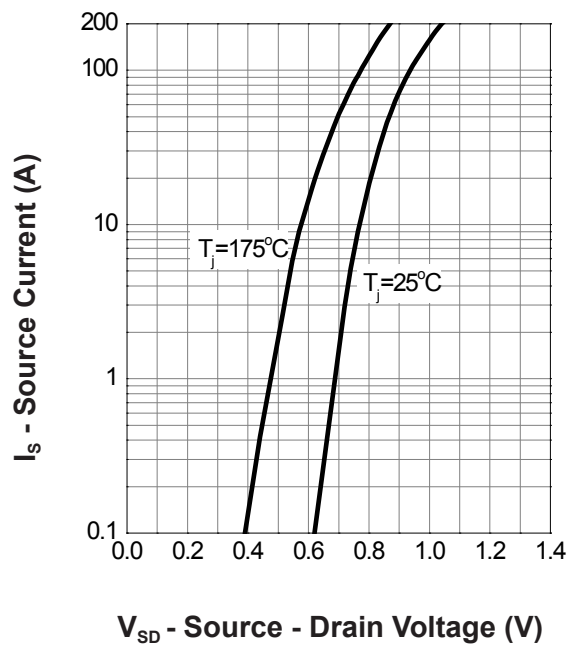
Typical Operating Characteristics

Capacitance

Gate Charge

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