

### General Description

The WSD80120DN56 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 WSD80120DN56 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

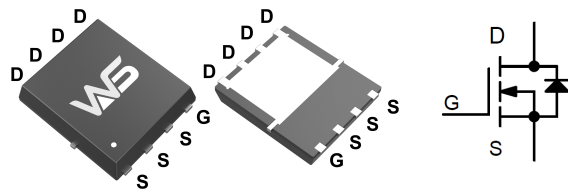
### Product Summary

$BV_{DSS}$	$R_{DSON}$	$I_D$
85V	3.7mΩ	120A

### Applications

High power DC/DC converters and switch mode power supply  
 DC Motor control and Class D Amplifier

### DFN5X6-8 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	85	V
$V_{GS}$	Gate-Source Voltage	±25	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V	120	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V	96	A
$I_{DM}$	Pulsed Drain Current $T_C=25^{\circ}C$	384	A
EAS	Avalanche Energy, Single pulse, L=0.5mH	320	mJ
$I_{AS}$	Avalanche Current, Single pulse, L=0.5mH	180	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	104	W
$P_D@T_C=100^{\circ}C$	Total Power Dissipation	53	W
$T_{STG}$	Storage Temperature Range	-55 to 175	°C
$T_J$	Operating Junction Temperature Range	175	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	---	20	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	1.2	°C/W

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	85	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.096	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =50A	---	3.7	4.8	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.0	3.0	4.0	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-5.5	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =85V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =85V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	10	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	3.2	---	Ω
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	54	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	17	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	11	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V, R <sub>G</sub> =1Ω, RL=1Ω, I <sub>DS</sub> =10A.	---	21	---	ns
T <sub>r</sub>	Rise Time		---	18	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	36	---	
T <sub>f</sub>	Fall Time		---	10	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz	---	3750	---	pF
C <sub>oss</sub>	Output Capacitance		---	395	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	180	---	

**Diode Characteristics**

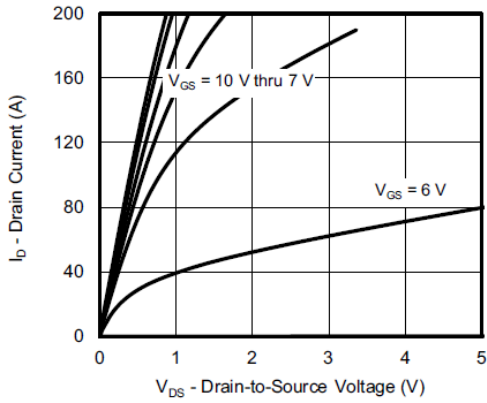
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	86.7	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =15A, T <sub>J</sub> =25°C	---	---	1.2	V

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.

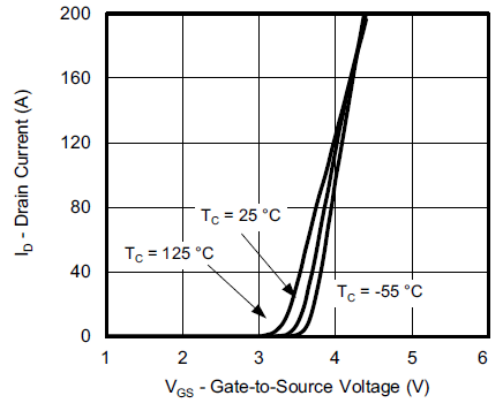
B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t<sub>s</sub> 10s junction to ambient thermal resistance rating.

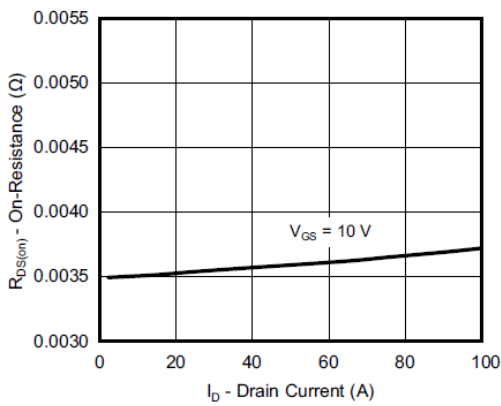
**Typical Operating Characteristics**



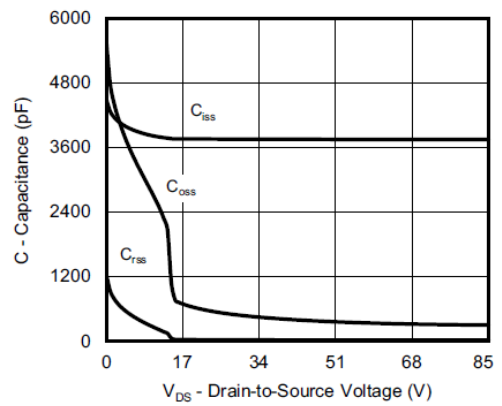
Output Characteristics



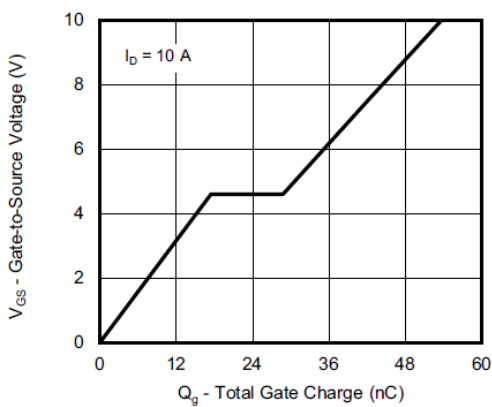
Transfer Characteristics



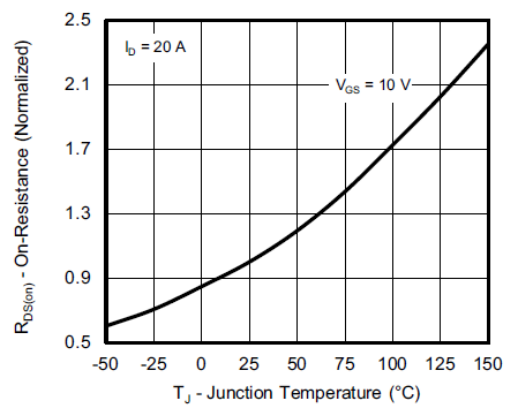
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

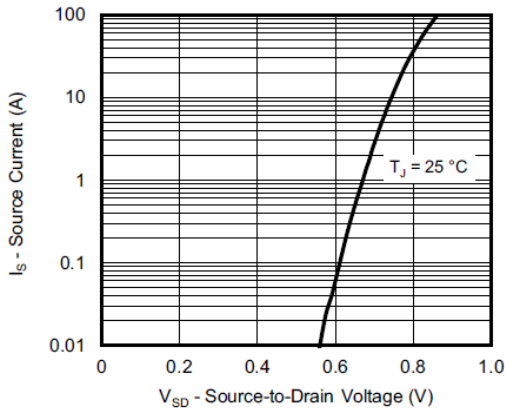


Gate Charge

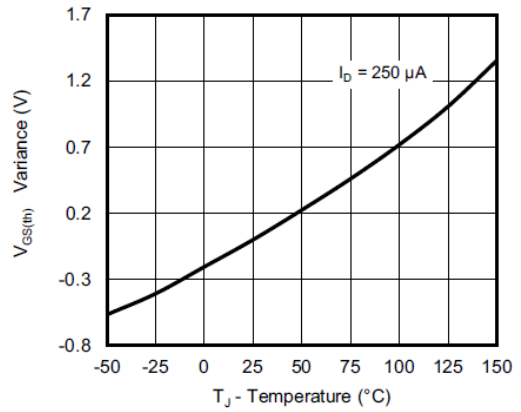


On-Resistance vs. Junction Temperature

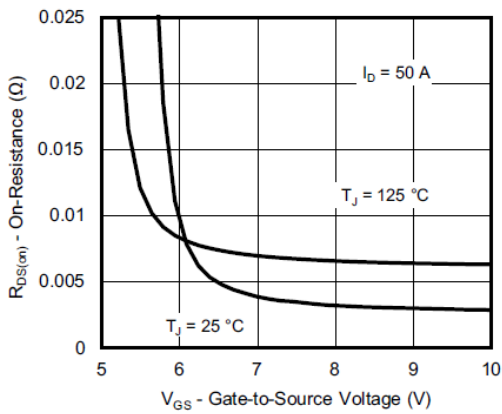
**Typical Operating Characteristics**



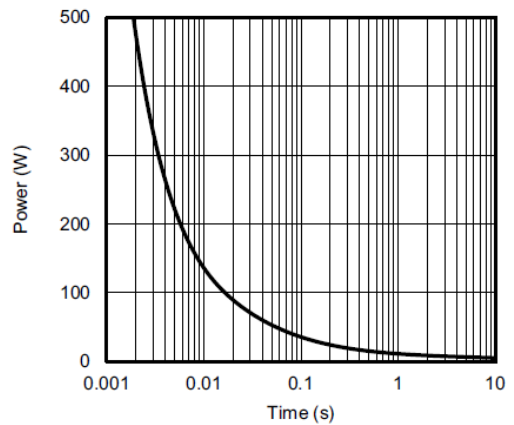
Source-Drain Diode Forward Voltage



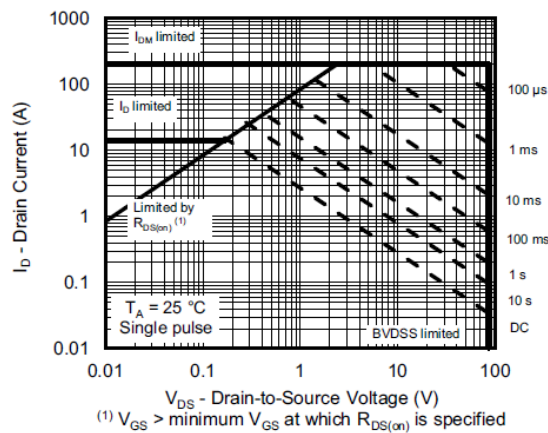
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

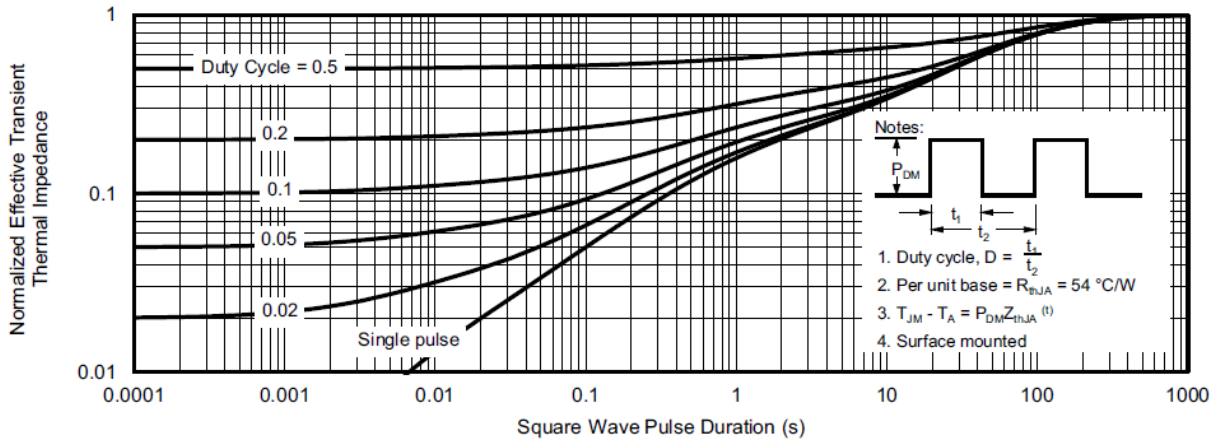


Single Pulse Power, Junction-to-Ambient

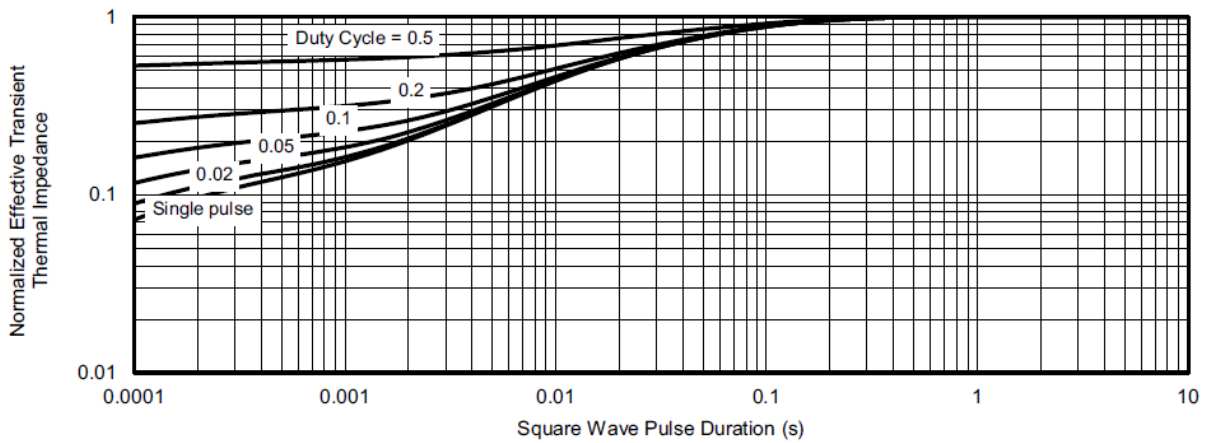


Safe Operating Area, Junction-to-Ambient

**Typical Operating Characteristics**



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case



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