

## General Description

The WSF20N20G is N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching .

performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency..

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

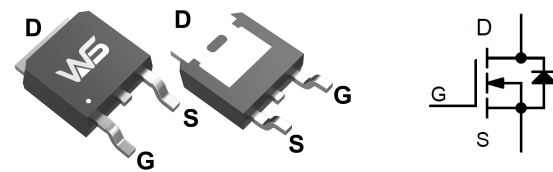
## Product Summary

BVDSS	RDSON	ID
200V	120mΩ	18A

## Applications

- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

## TO-252 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	200	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	18	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	10	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	72	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	340	mJ
$I_{AS}$	Avalanche Current	15	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>3</sup>	104	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	1.2	$^\circ C/W$

**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	200	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.25	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A	---	0.12	0.16	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.0	3.5	4.0	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4.63	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =160V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	10	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±30V, 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	---	0.12	---	Ω
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =160V, V <sub>GS</sub> =10V, I <sub>D</sub> =18A	---	40	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5.2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	18	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =100V, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω, I <sub>D</sub> =18A	---	24	---	ns
T <sub>r</sub>	Rise Time		---	45	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	101	---	
T <sub>f</sub>	Fall Time		---	95	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	1317	---	pF
C <sub>oss</sub>	Output Capacitance		---	181	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	76	---	

**Guaranteed Avalanche Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy <sup>5</sup>	V <sub>DD</sub> =25V, L=0.1mH, I <sub>AS</sub> =15A	250	---	---	mJ

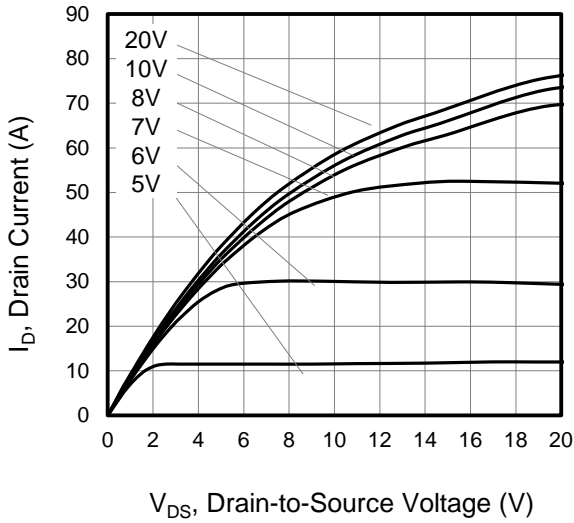
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	18	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,6</sup>		---	---	72	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =18A, T <sub>J</sub> =25°C	---	---	1.4	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =15A, dI/dt=100A/μs, T <sub>J</sub> =25°C	---	230	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	1.8	---	uC

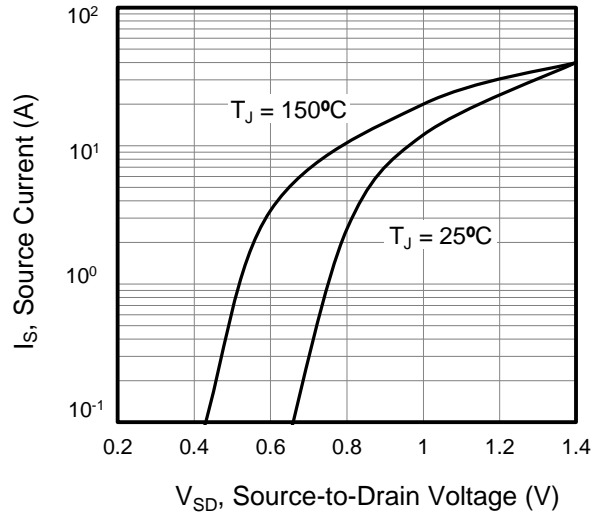
Note :

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, t<10sec.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=15A
- The power dissipation is limited by 150°C junction temperature
- The Min. value is 100% EAS tested guarantee.
- The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

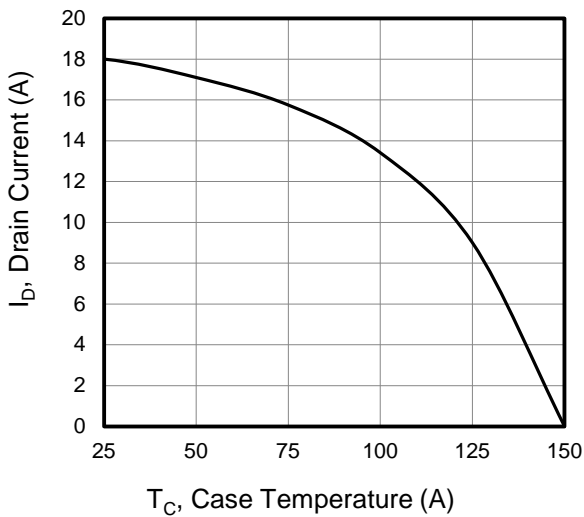
**Typical Characteristics**



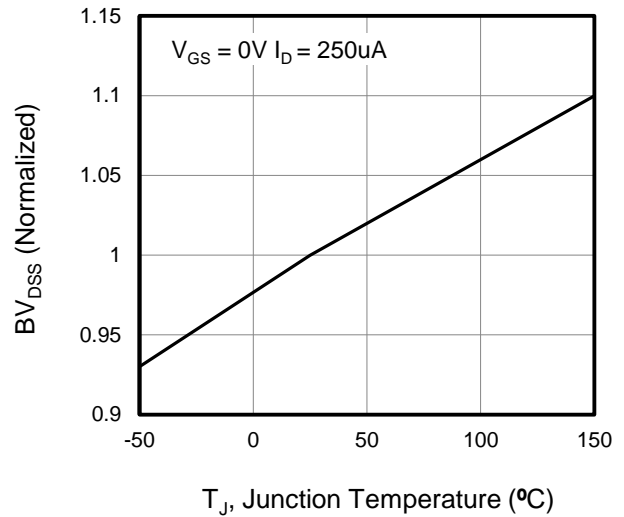
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



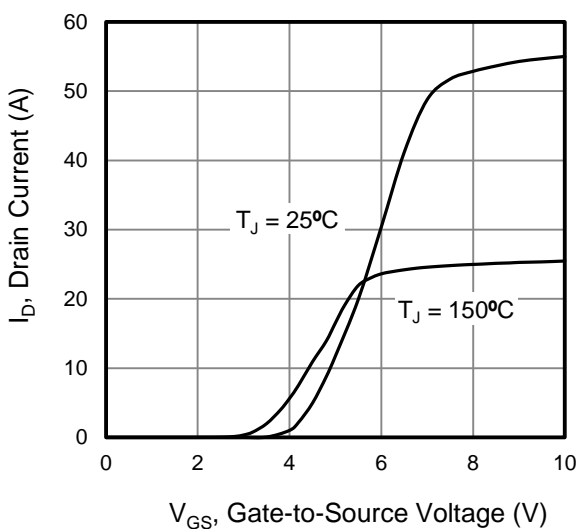
**Figure 2. Body Diode Forward Voltage**



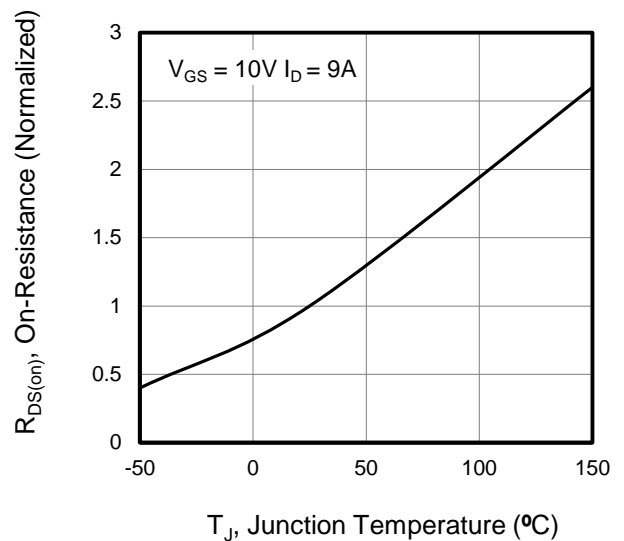
**Figure 3. Drain Current vs. Temperature**



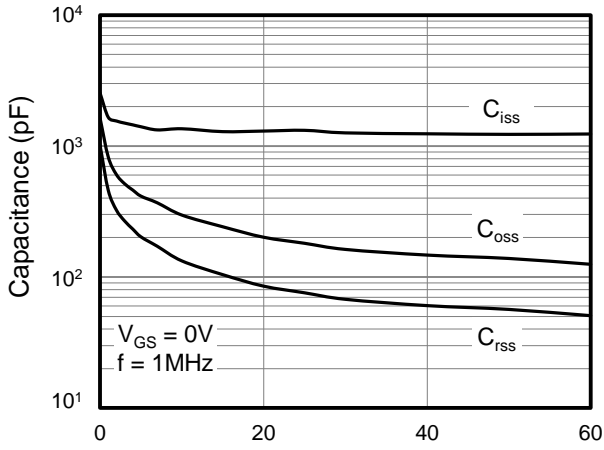
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



**Figure 5. Transfer Characteristics**

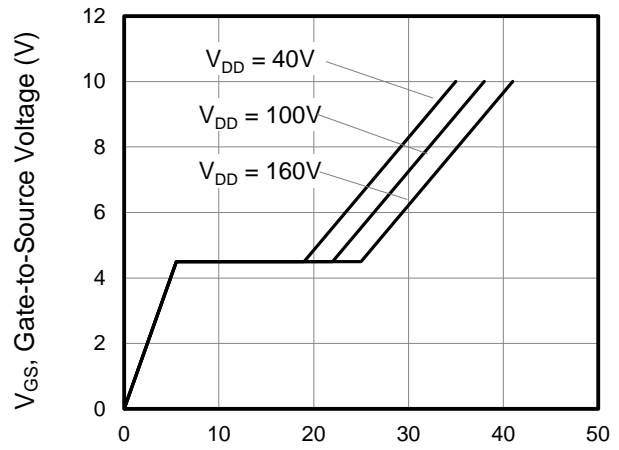


**Figure 6. On-Resistance vs. Temperature**



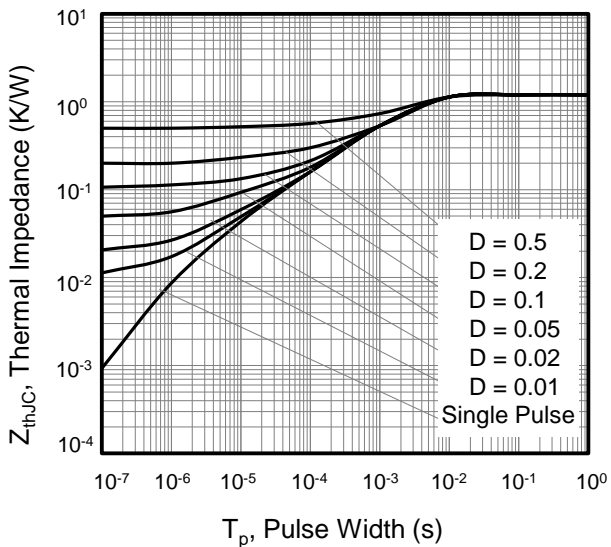
$V_{DS}$ , Drain-to-Source Voltage (V)

**Figure 7. Capacitance**



$Q_g$ , Total Gate Charge (nC)

**Figure 8. Gate Charge**



$T_p$ , Pulse Width (s)

**Figure 10. Transient Thermal Impedance**



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