

General Description

The WSG02N20 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the small power switching and load switch applications.

The WSG02N20 meet the RoHS and Green Product requirement with full function reliability approved.

Features

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

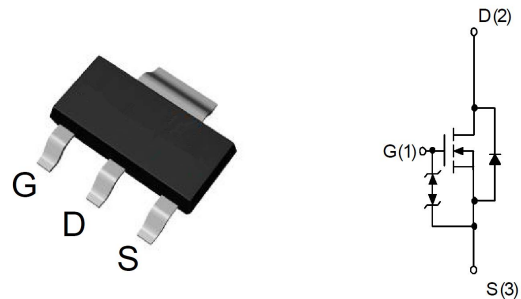
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
200V	410mΩ	2A

Applications

Power Management in TV Inverter.

SOT-223 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.0	A
$I_D@T_c=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	1.5	A
I_{DM}	Pulsed Drain Current ²	10	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ³	18	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 ¹	---	70	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	30	$^\circ C/W$

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	200	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.098	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =2A	---	410	610	mΩ
		V _{GS} =6V, I _D =1A	---	614	920	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	2.8	4.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4.57	---	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	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =2A	---	15	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.5	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =30V, V _{GS} =10V, I _D =2A	---	51.7	---	nC
Q _{gs}	Gate-Source Charge		---	12.7	---	
Q _{gd}	Gate-Drain Charge		---	16.3	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GEN} =10V, R _G =4.7Ω, I _D =1A, R _L =17.7Ω	---	32	50	ns
T _r	Rise Time		---	32.1	51	
T _{d(off)}	Turn-Off Delay Time		---	60.9	79	
T _f	Fall Time		---	5.2	10	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	---	645	---	pF
C _{oss}	Output Capacitance		---	68	---	
C _{riss}	Reverse Transfer Capacitance		---	21	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	2	A
I _{SM}	Pulsed Source Current ^{2,4}		---	---	10	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.15	V
t _{rr}	Reverse Recovery Time	I _F =2A, di/dt=100A/μs, T _J =25°C	---	38	---	nS
Q _{rr}	Reverse Recovery Charge		---	56	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch²FR-4 board with 2OZ copper, t_≤10sec.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

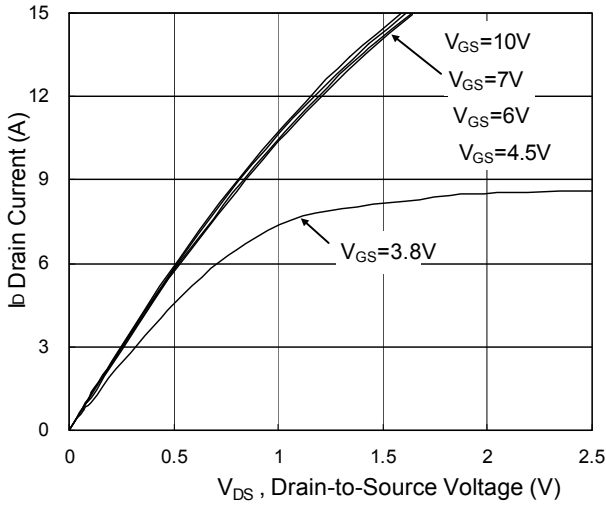


Fig.1 Typical Output Characteristics

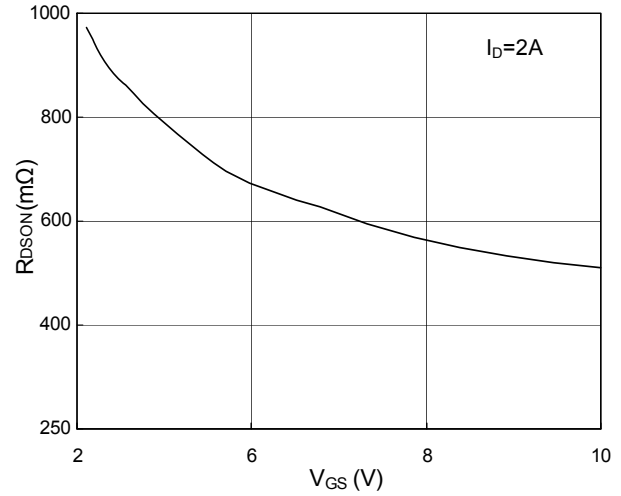


Fig.2 On-Resistance vs. Gate-Source

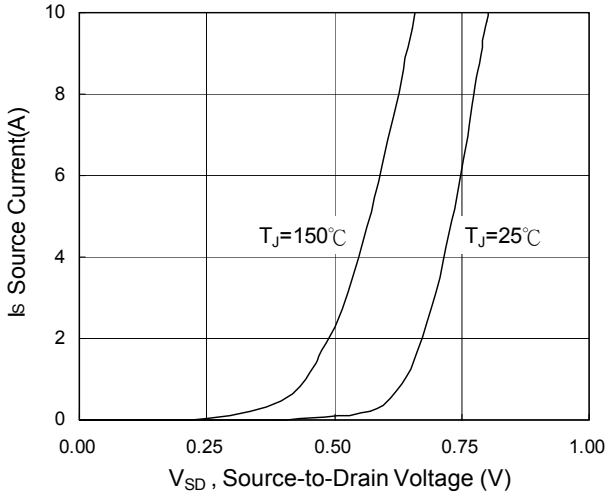


Fig.3 Forward Characteristics Of Reverse

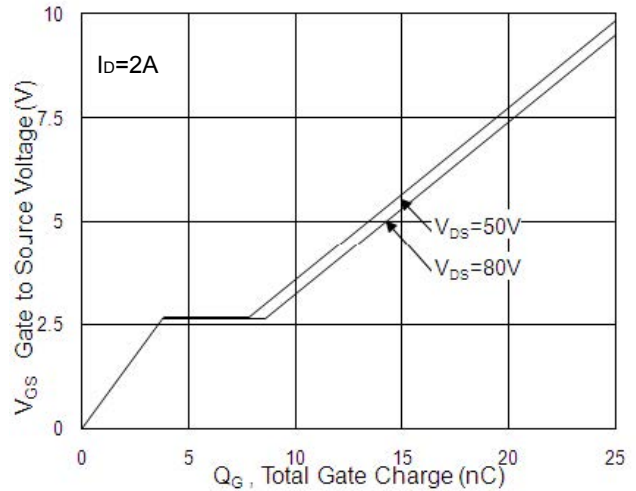


Fig.4 Gate-Charge Characteristics

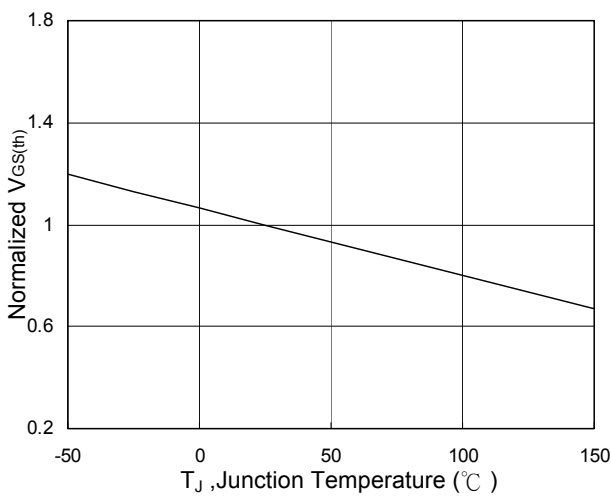


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

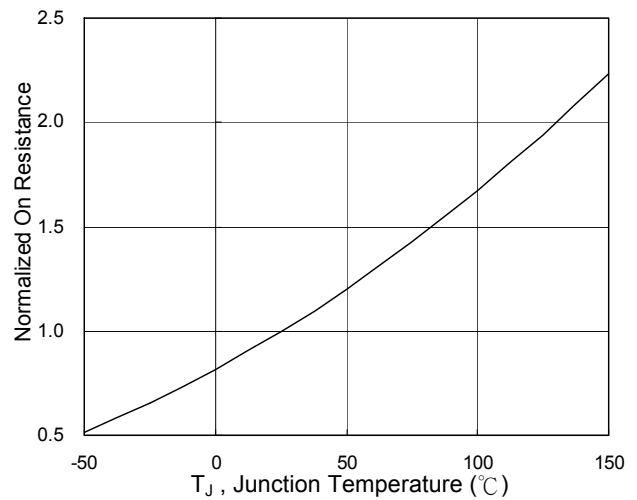


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

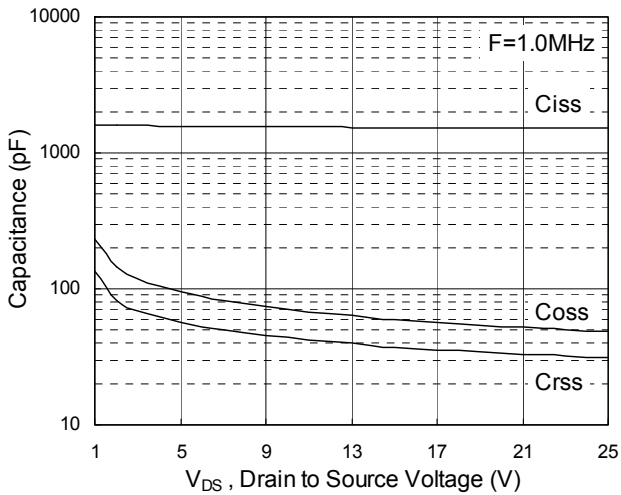


Fig.7 Capacitance

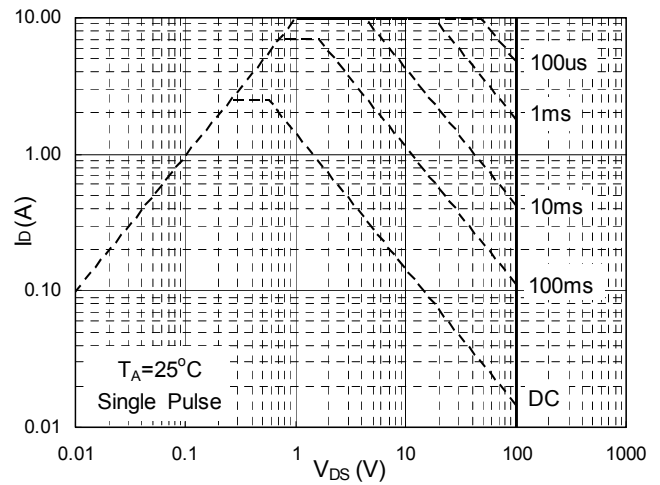


Fig.8 Safe Operating Area

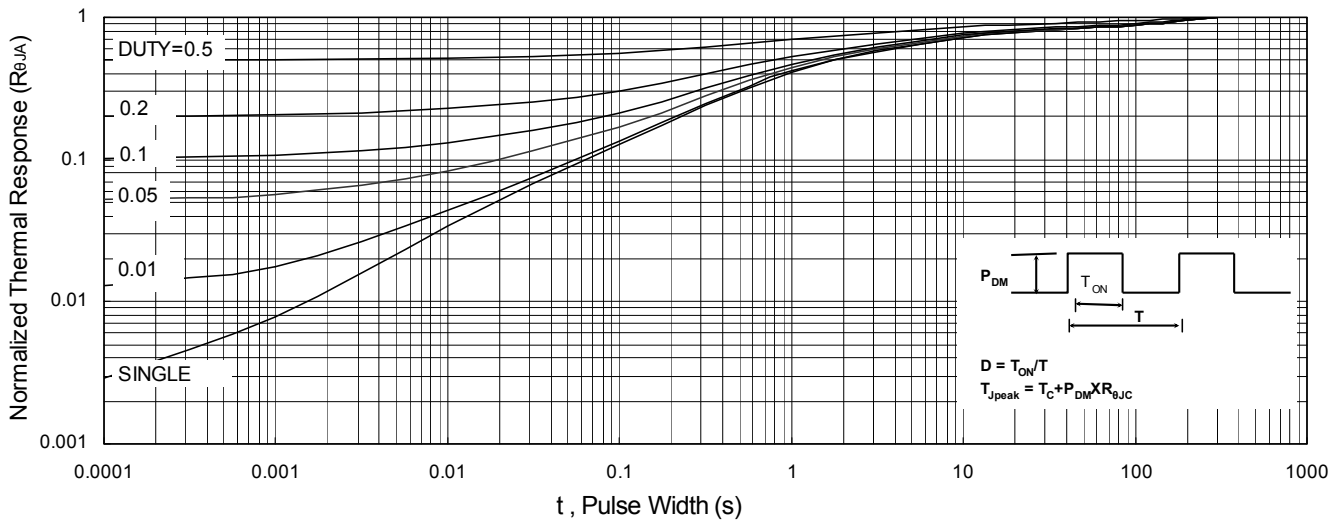


Fig.9 Normalized Maximum Transient Thermal Impedance

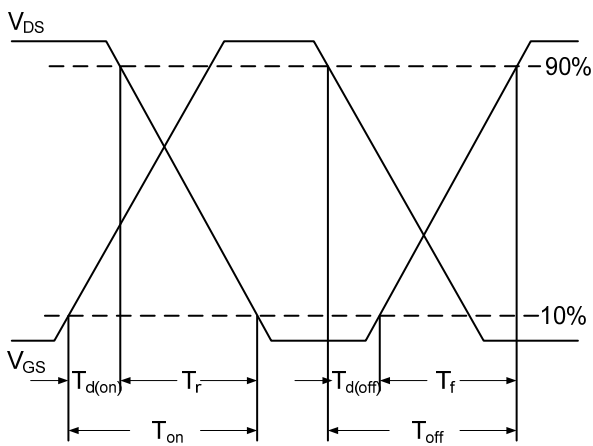


Fig.10 Switching Time Waveform

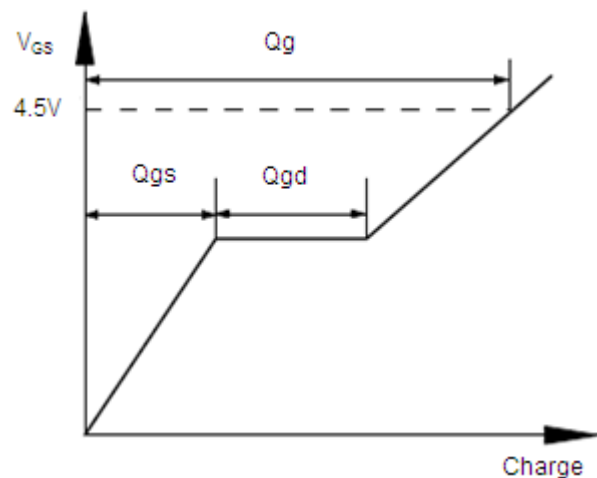


Fig.11 Gate Charge Waveform



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