General Description

The WSC5N20A 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 WSC5N20A meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Product Summery

BVDSS	RDSON	ID
200V	0.6Ω	5A

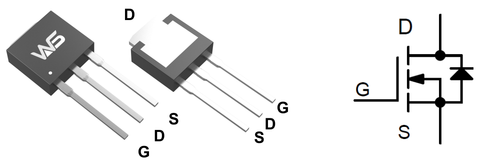
Applications

- Telecom 48V input Forward Converters

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

TO-251/ I-Pak 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	Continuous Drain Current	5	A
I_{DM}	Pulsed Drain Current	20	A
P_D	Total Power Dissipation	43	W
TJ,T_{STG}	Operating Junction and storage Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State)[1]	---	50	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	35	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.5	℃/W

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	200	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.23	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	0.52	0.6	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.16	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=200V , V_{GS}=0V , T_J=25℃	---	---	25	uA
		V_{DS}=160V , V_{GS}=0V , T_J=55℃	---	---	200	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA

Dynamic @ TJ = 25°C (unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
gfs	Forward Transconductance	V_{DS}=50V , I_D=2.9A	2.6	---	---	S
Q_g	Total Gate Charge (4.5V)	V_{DS}=160V , V_{GS}=10V , I_D=2.9A	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	2.4	---	
Q_{gd}	Gate-Drain Charge		---	6.1	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=100V	---	6.4	---	ns
T_r	Rise Time	V_{GS}=10V	---	11	---	
$T_{d(off)}$	Turn-Off Delay Time	R_G=24Ω	---	20	---	
T_f	Fall Time	I_D=2.9A	---	12	---	
C_{iss}	Input Capacitance	V_{DS}=25V	---	300	---	pF
C_{oss}	Output Capacitance	V_{GS}=0V	---	53	---	
C_{rss}	Reverse Transfer Capacitance	f=1MHz	---	15	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	5	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=2.9A , T_J=25℃	---	---	1.2	V

Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
E_{AS}	Single Pulse Avalanche Energy	VGS=10V,L=0.1mH,IAS=2.9A	---	---	46	mJ
E_{AR}	Repetitive Avalanche Energy	VGS=10V,L=0.1mH,IAS=2.9A	---	---	4.3	mJ

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t<10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=100V,V_{GS}=10V,L=0.1mH,I_{AS}=2.9A
4.The power dissipation is limited by 175℃ junction temperature
5.The Min. value is 100% EAS tested guarantee.
6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

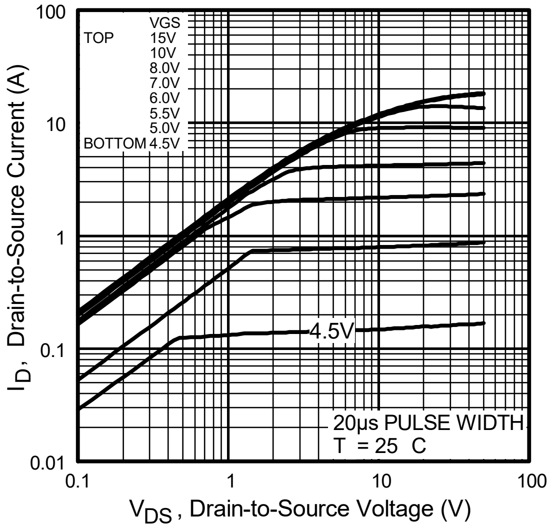


Fig 1. Typical Output Characteristics

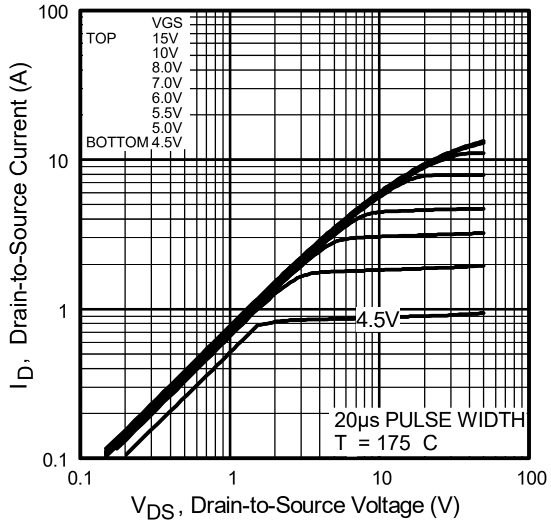


Fig 2. Typical Output Characteristics

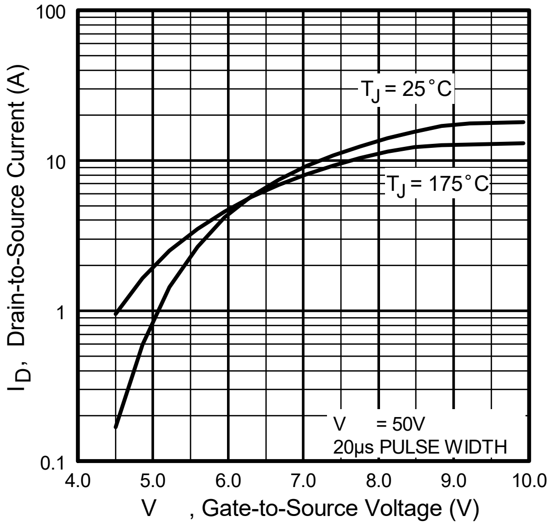


Fig 3. Typical Transfer Characteristics

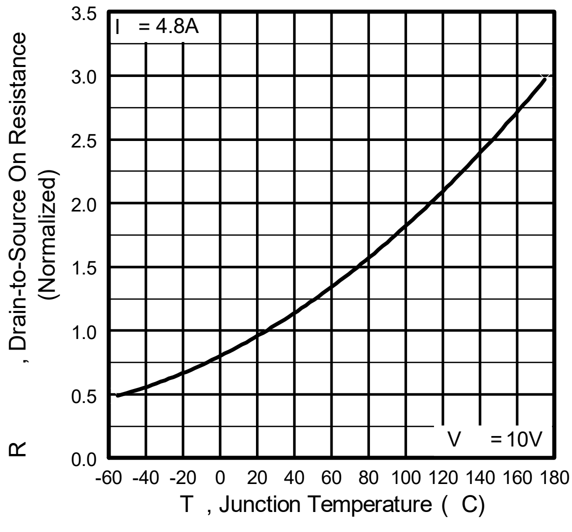


Fig 4. Normalized On-Resistance Vs. Temperature

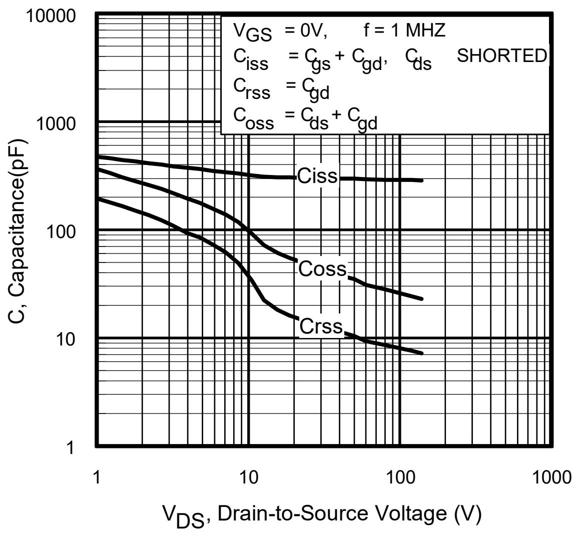


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

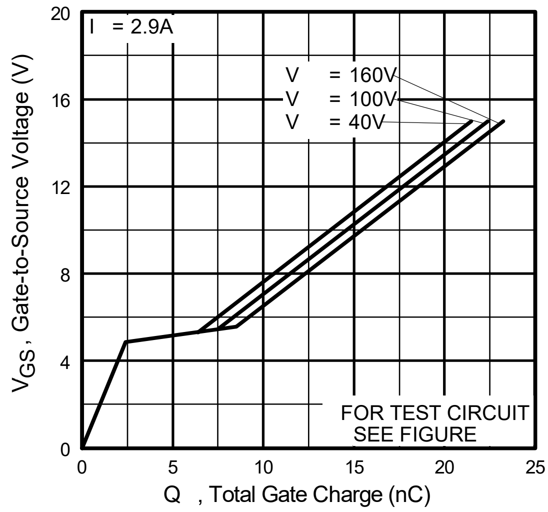


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

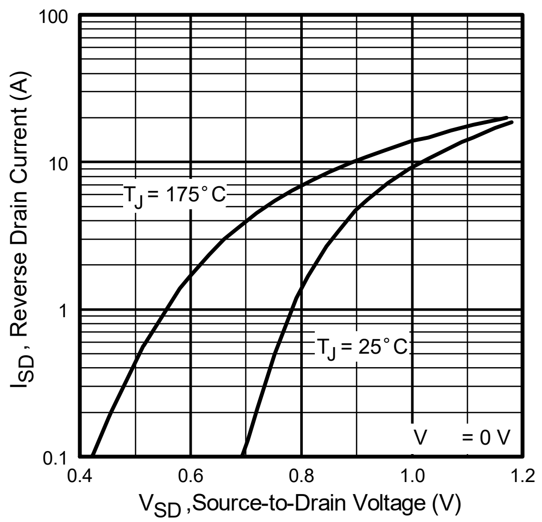


Fig 7. Typical Source-Drain Diode Forward Voltage

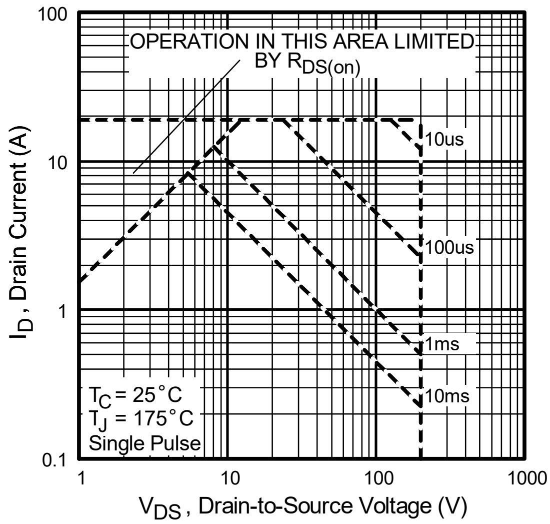


Fig 8. Maximum Safe Operating Area

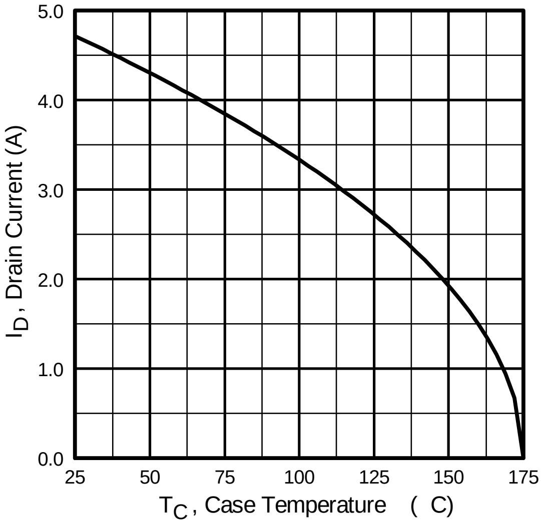


Fig 9. Maximum Drain Current Vs. Case Temperature

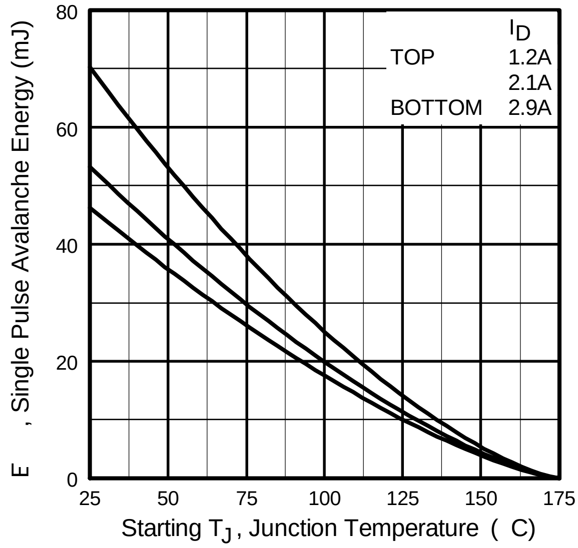


Fig 10. Maximum Avalanche Energy Vs. Drain Current

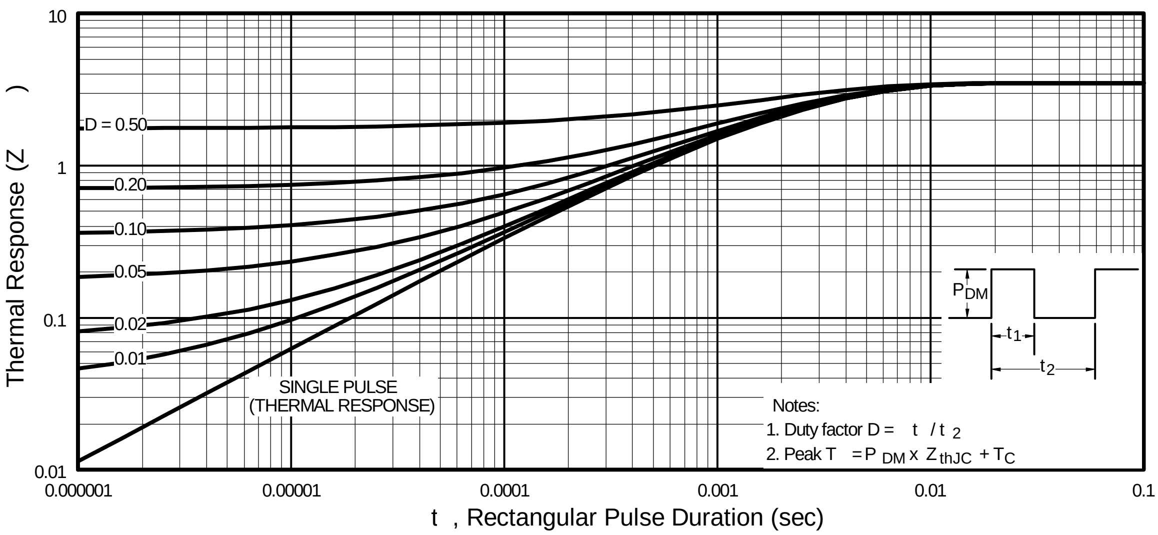


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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