General Description

The WSR55N20 uses advanced Planar MOSFET to provide excellent $R_{DS(ON)}$, low gate charge

This device is suitable for use as a Battery protection or in other Switching application.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
200V	48mΩ	55A

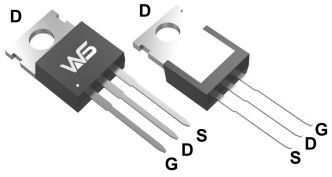
Features

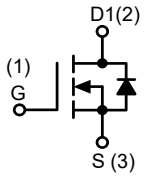
- 100% UIS + R_g Tested.
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

TO-220-3L Pin Configuration





Absolute Maximum Ratings (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		200	V
V_{GS}	Gate-Source Voltage		±20	
I_S	Diode Continuous Forward Current	T_C=25°C	55	A
I_D	Continuous Drain Current	T_C=25°C	55	
		T_C=100°C	45	
I_{DM} [2]	Pulse Drain Current	T_C=25°C	200	
P_D	Maximum Power Dissipation	T_C=25°C	158	W
$R_{\theta JA}$ [4]	Thermal Resistance-Junction to Ambient	Steady State	41	°C/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.8	
I_{AS} [3]	Avalanche Current, Single pulse	L=0.5mH	30	A
E_{AS} [3]	Avalanche Energy, Single pulse	L=0.5mH	800	mJ
T_{STG}	Storage Temperature Range		-55 to 150	°C
T_J	Maximum Junction Temperature		150	

Electrical Characteristics (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	200	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=200V , V_{GS}=0V	---	---	1.0	μA
		T_J=85°C	---	---	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_{DS}=250μA	2.0	3.0	4.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
$R_{DS(ON)}$ [5]	Drain-Source On-state Resistance	V_{GS}=10V , I_D=15A	---	48	55	mΩ
Diode Characteristics						
V_{SD} [5]	Diode Forward Voltage	I_{SD}=10A , V_{GS}=0V	---	---	1.4	V
t_{rr}	Reverse Recovery Time	I_{DS}=20A , di_{SD}/dt=500A/μs	---	220	---	ns
Q_{rr}	Reverse Recovery Charge		---	2.0	---	nC
Dynamic Characteristics [6]						
C_{iss}	Input Capacitance	V_{GS}=0V , V_{DS}=25V , Frequency=1.0MHz	---	2926	3833	pF
C_{oss}	Output Capacitance		---	371	---	
C_{rss}	Reverse Transfer Capacitance		---	219	---	
$T_{d(on)}$	Turn-on Delay Time	V_{DD}=100V , R_L=1Ω V_{GEN}=10V , R_G=25Ω	---	30	---	ns
T_r	Turn-on Rise Time		---	263	---	
$T_{d(off)}$	Turn-off Delay Time		---	311	---	
T_f	Turn-off Fall Time		---	222	---	
Gate Charge Characteristics [6]						
Q_g	Total Gate Charge	V_{DS}=30V , V_{GS}=10V , I_{DS}=60A	---	105	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	53	---	

Note:

1. Calculated continuous current based on maximum allowable junction temperature. Bonding wire limitation current is 8A.
2. Pulse width limited by max. junction temperature.
3. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).
4. Surface Mounted on 1in^2 pad area.
5. Pulse test ; pulse width≤300μs, duty cycle≤2%.
6. Guaranteed by design, not subject to production testing.

Typical Characteristics

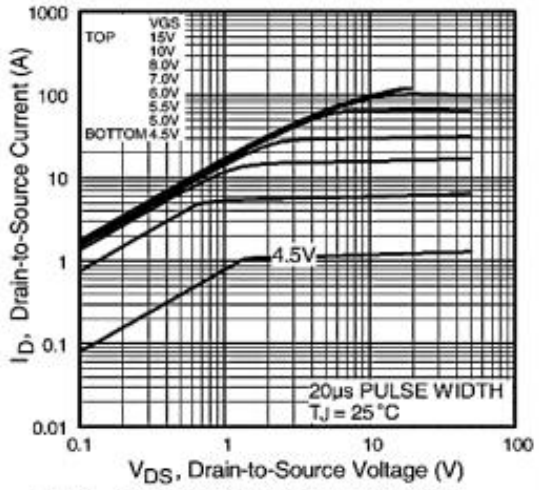


Fig 1. Typical Output Characteristics

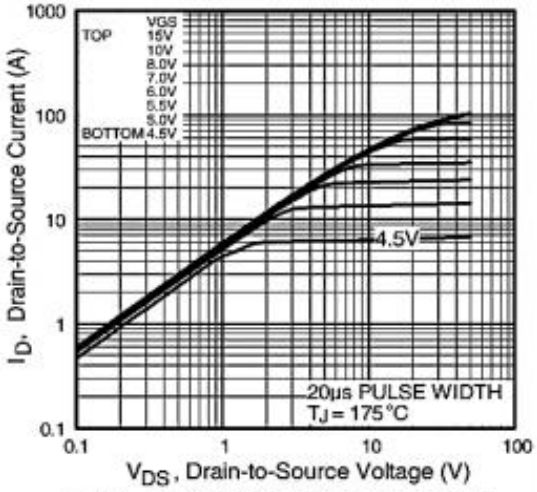


Fig 2. Typical Output Characteristics

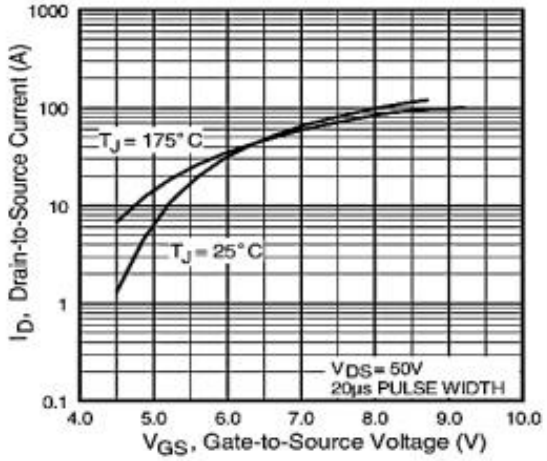


Fig 3. Typical Transfer Characteristics

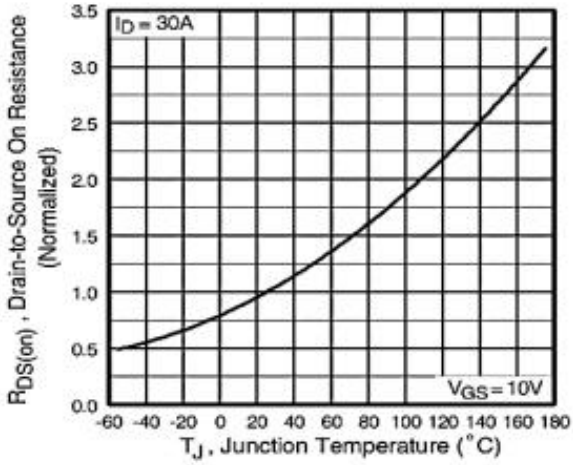


Fig 4. Normalized On-Resistance Vs. Temperature

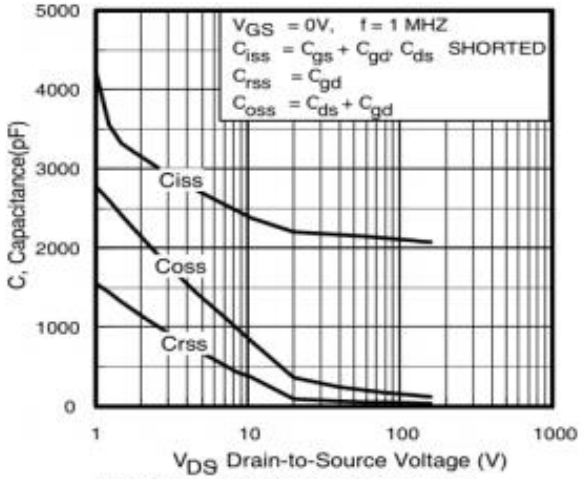


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

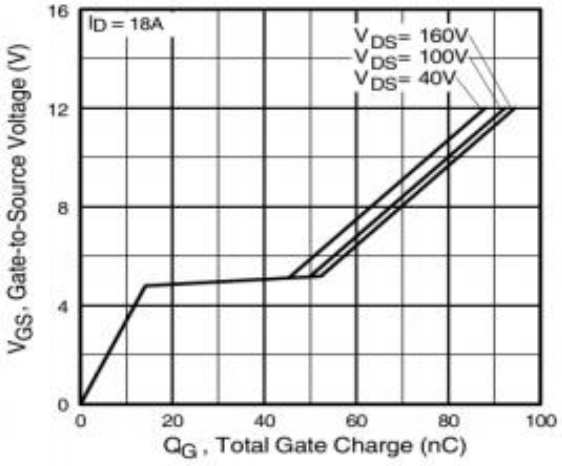


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

Typical Characteristics (Cont.)

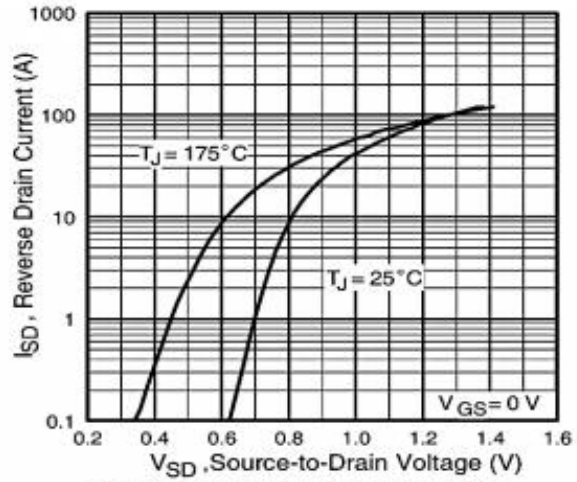


Fig 7. Typical Source-Drain Diode Forward Voltage

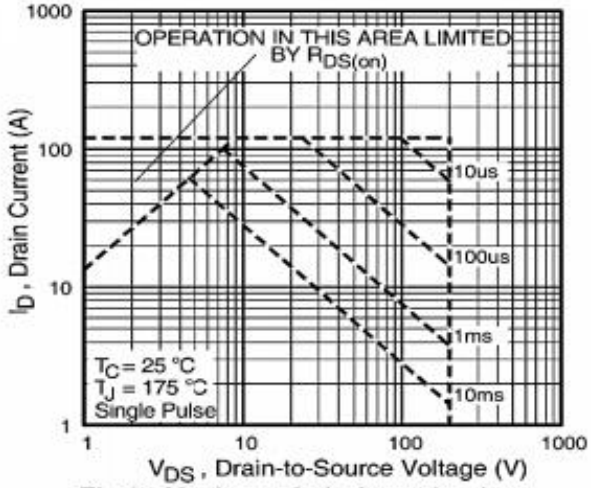


Fig 8. Maximum Safe Operating Area

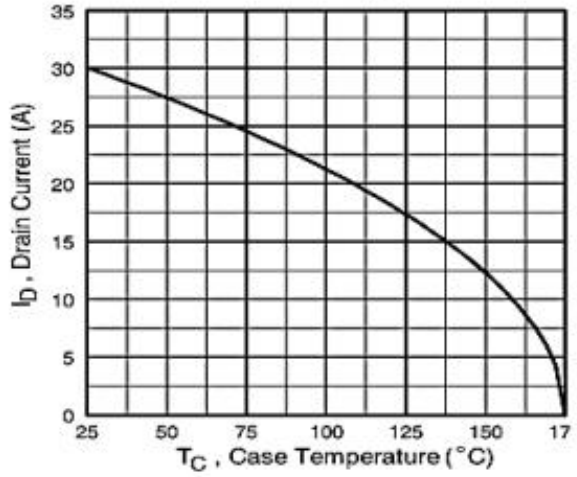


Fig 9. Maximum Drain Current Vs. Case Temperature

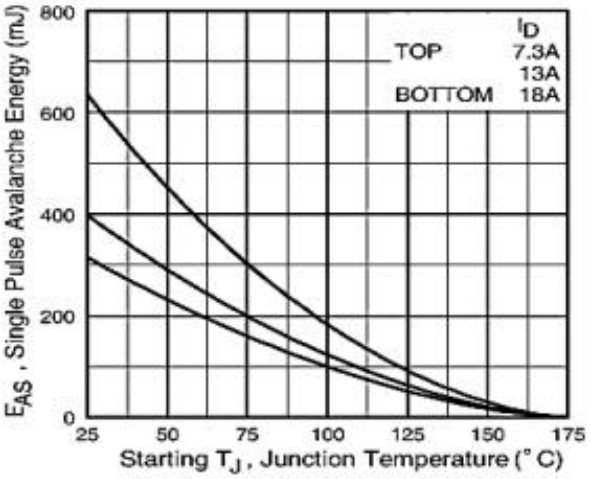


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

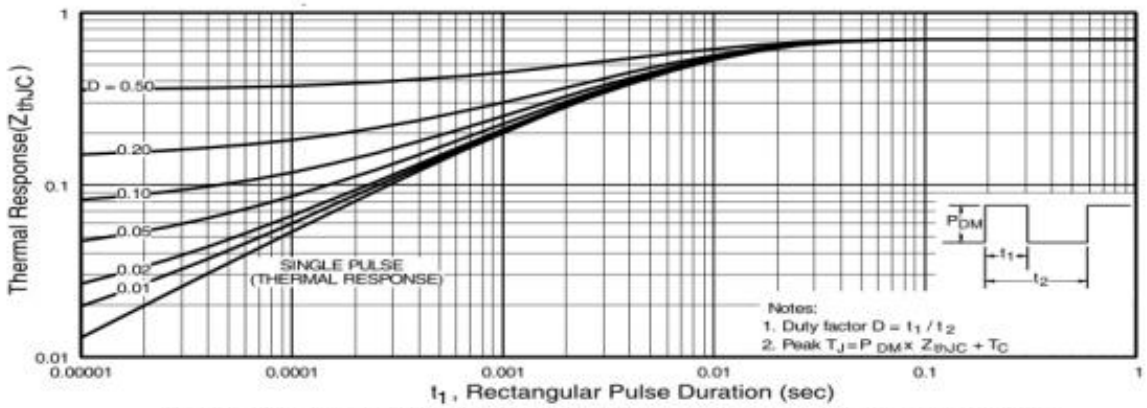
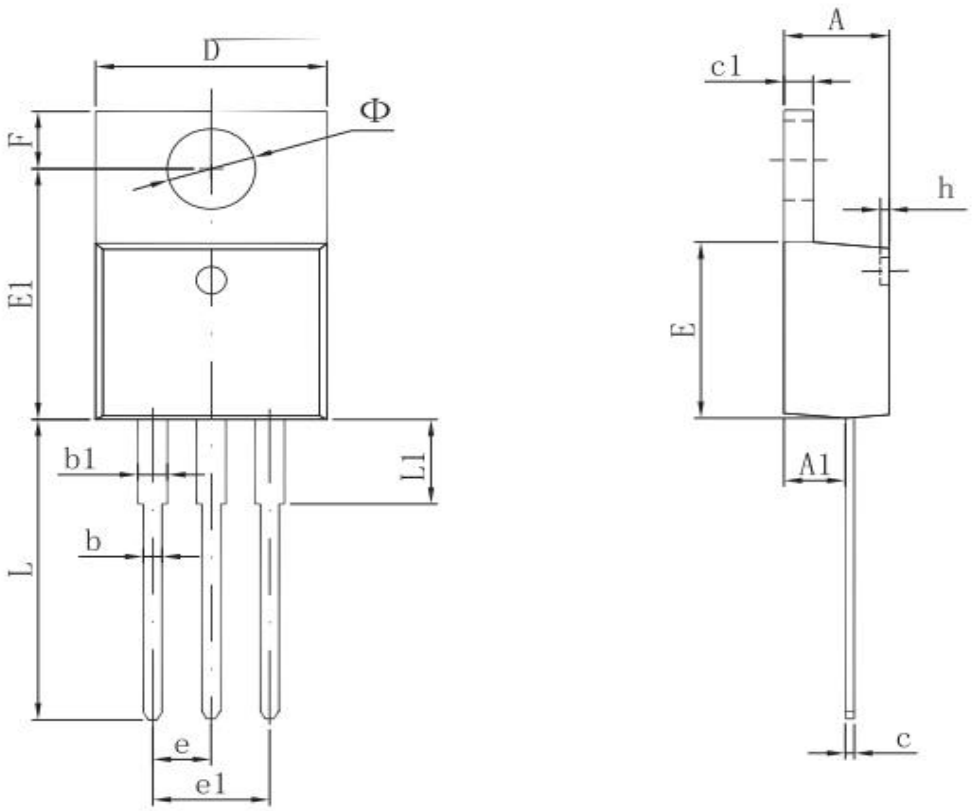


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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