

General Description

The WSR110N20 is the highest performance trench N-Channel MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the device is suitable for use as a Battery protection or in other Switching application.

The WSR110N20 meet the RoHS and GreenProduct 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

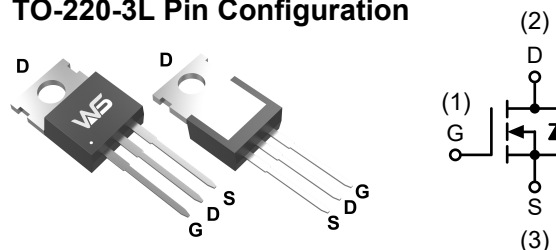
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
200V	9.2mΩ	110A

Applications

- DC Motor Driver
- Synchronous Rectification in DC/DC
- AC/DC Converters

TO-220-3L Pin Configuration



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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, $V_{GS} @ 10V^3$	110	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^3$	49	A
I_{DM}	Pulsed Drain Current ² $T_C=25^\circ C$	332	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	166.7	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Resistance Ratings

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62.5	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	0.75	$^\circ C/W$

Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=30A$	---	9.2	12	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.0	4.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=160V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge	$V_{DS}=100V, V_{GS}=10V, I_D=55A$	---	146	---	nC
Q_{gs}	Gate-Source Charge		---	50	---	
Q_{gd}	Gate-Drain Charge		---	28	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=100V, I_D=55A, R_G=4.7\Omega, V_{GS}=10V$	---	22	---	ns
T_r	Rise Time		---	47	---	
$T_{d(off)}$	Turn-Off Delay Time		---	19	---	
T_f	Fall Time		---	89	---	
C_{iss}	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	---	10700	---	pF
C_{oss}	Output Capacitance		---	390	---	
C_{rss}	Reverse Transfer Capacitance		---	70	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	83	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.2	V

Note :

1. The value of R_{thJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_G=25^\circ C$. The value in any given application depends on the user's specific board design.
2. Repetitive rating, pulse width limited by junction temperature.
3. The current rating is based on the $\leq 10s$ junction to ambient thermal resistance rating.
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Typical Characteristics

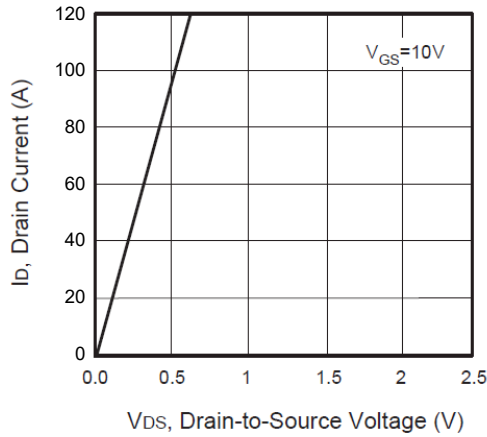


Figure 1. Output Characteristics

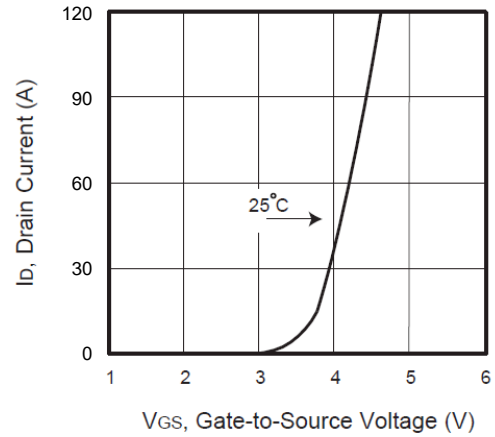


Figure 2. Transfer Characteristics

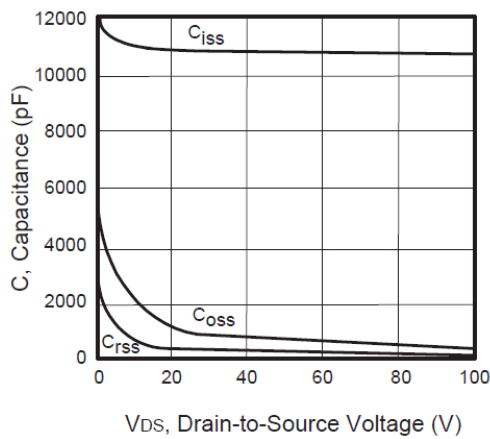


Figure 3. Capacitance

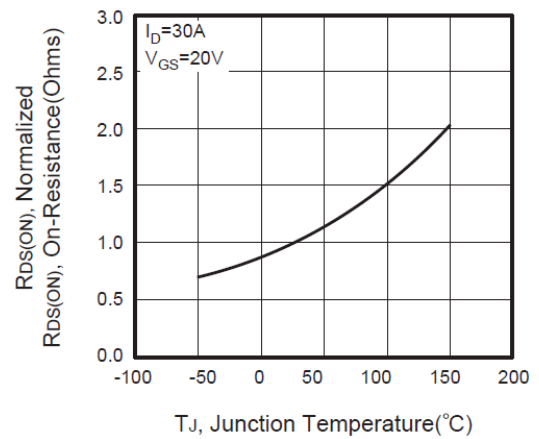


Figure 4. On-Resistance Variation with Temperature

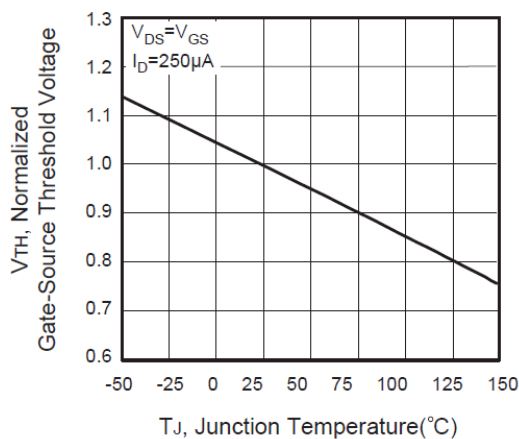


Figure 5. Gate Threshold Variation with Temperature

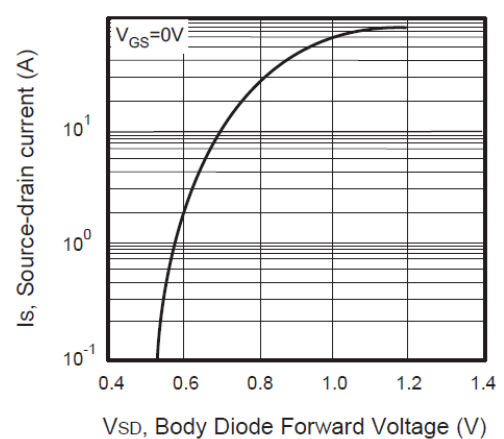


Figure 6. Body Diode Forward Voltage Variation with Source Current

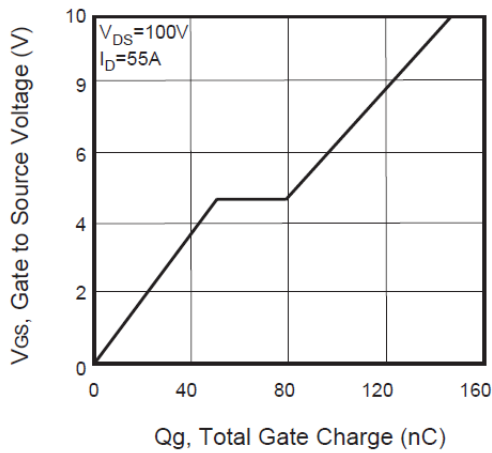


Figure 7. Gate Charge

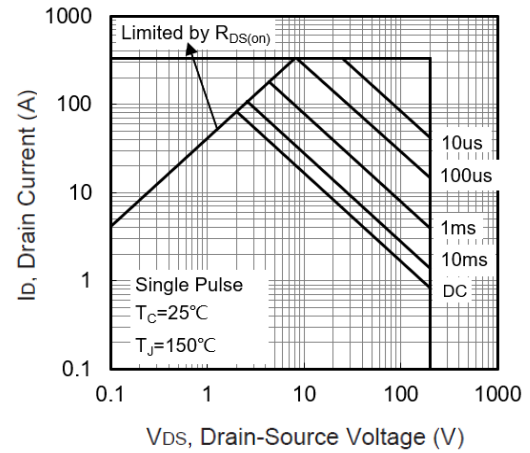


Figure 8. Maximum Safe Operating Area

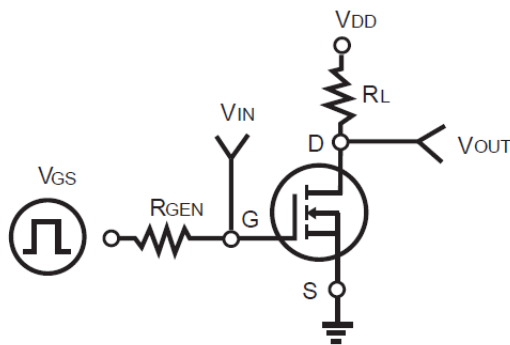


Figure 9. Switching Test Circuit

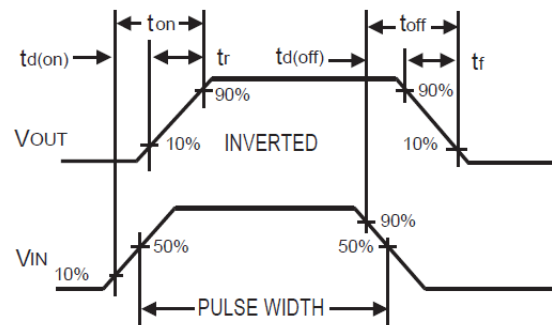


Figure 10. Switching Waveforms

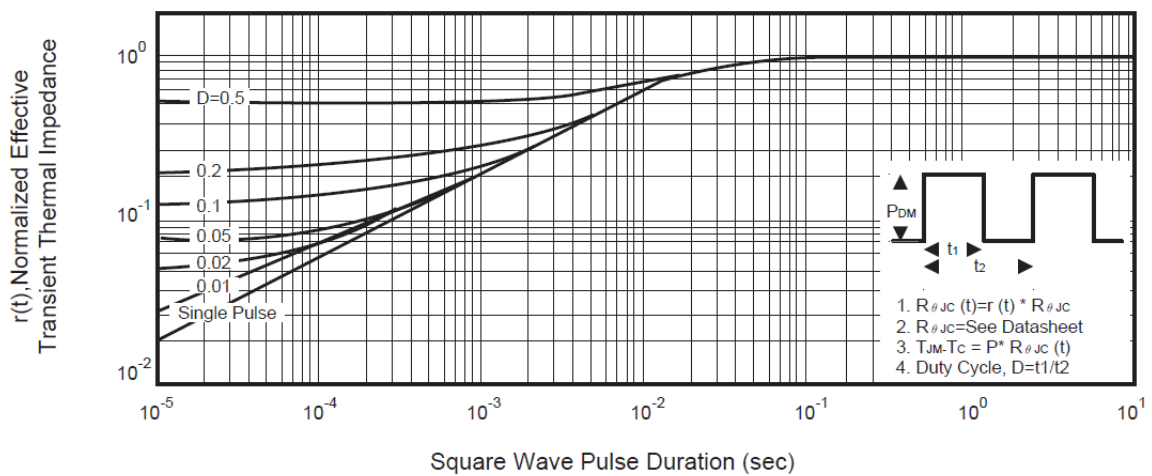
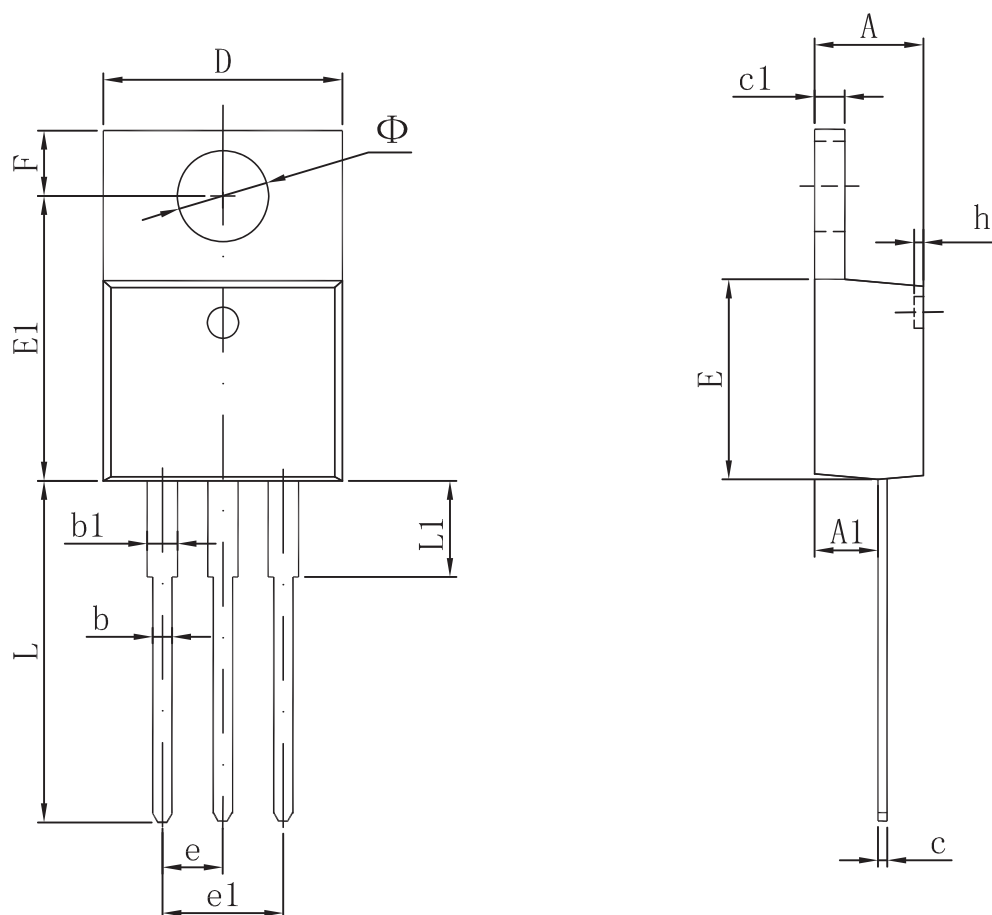


Figure 11. Normalized Thermal Transient Impedance Curve

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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