

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
200V	0.25Ω@10V	9A

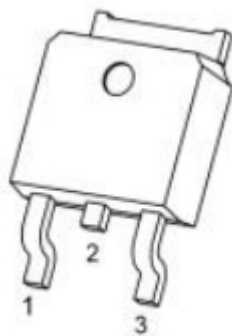
Feature

- Fast Switching
- Improved dv/dt capability
- 100% Single Pulse avalanche energy Test

Application

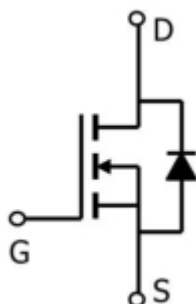
- DC Motor Control and Class D Amplifier
- Uninterruptible Power Supply (UPS)

Package

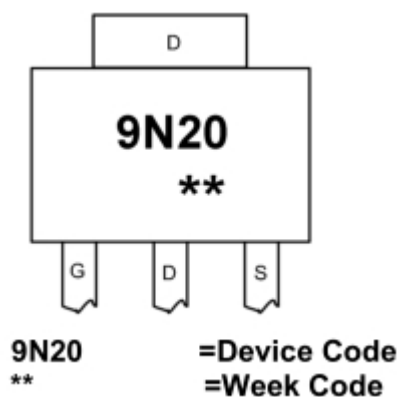


TO-252(G:1 D:2 S:3)

Circuit diagram



Marking



Absolute maximum ratings

(T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	200	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current ¹ (T _C =25°C)	I _D	9	A
Pulsed Drain Current ²	I _{DM}	36	A
Single Pulse Avalanche Energy ³	E _{AS}	259	mJ
Total Power Dissipation(T _C =25°C)	P _D	83	W
Thermal Resistance Junction-Case ¹	R _{θJC}	1.5	°C/ W
Storage Temperature Range	T _{STG}	-55~ +150	°C
Operating Junction Temperature Range	T _J	-55~ +150	°C

Electrical characteristics

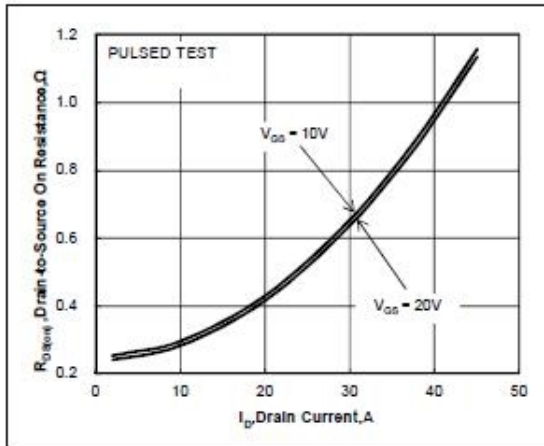
($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	200			V
Bvdss Temperature Coefficient	$\Delta BV_{DSS}/\Delta T$	$I_D = 1mA, \text{Reference } 25^{\circ}C$		0.25		V/ $^{\circ}C$
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 48V, V_{GS} = 0V$ $T_J = 25^{\circ}C$			1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Static Drain-Source on-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4.5A$		0.25	0.32	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1MHz$		510		pF
Output Capacitance	C_{oss}			52		
Reverse Transfer Capacitance	C_{rss}			3.3		
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 160V, V_{GS} = 10V,$ $I_D = 9A$		12		nC
Gate-Source Charge	Q_{gs}			2.4		
Gate-Drain Charge	Q_{gd}			4		
Turn-On Delay Time	$T_{d(on)}$	$V_{DD} = 100V, V_{GS} = 10V,$ $R_G = 10\Omega, I_D = 9A$		10.3		nS
Rise Time	T_r			10.5		
Turn-Off Delay Time	$T_{d(off)}$			29		
Fall Time	T_f			11		

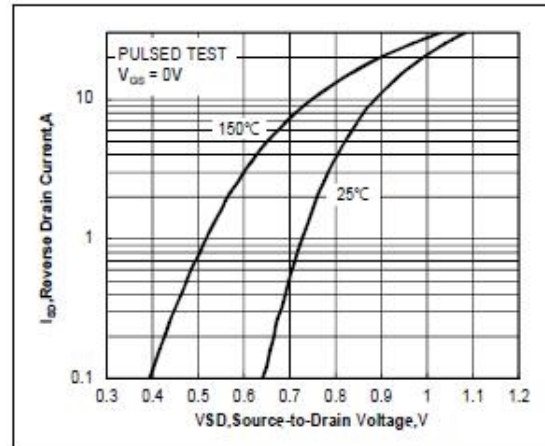
Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $R_G = 25\Omega, L = 10mH, V_{DD} = 50V$

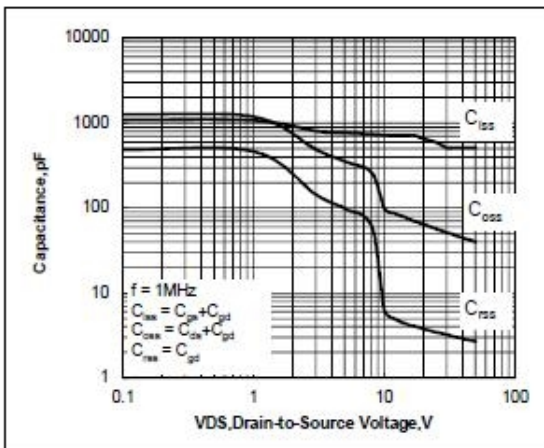
Typical Characteristics



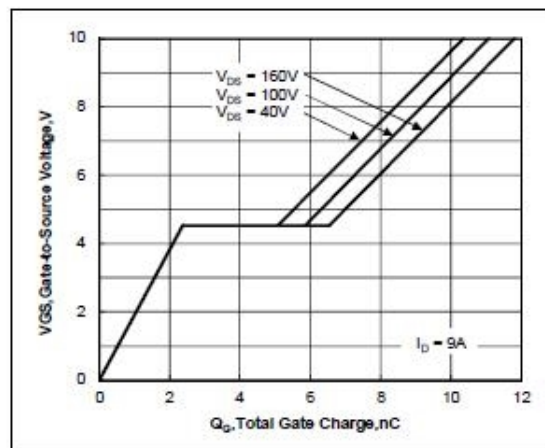
Drain-to-Source On Resistance vs.
Drain Current and Gate Voltage



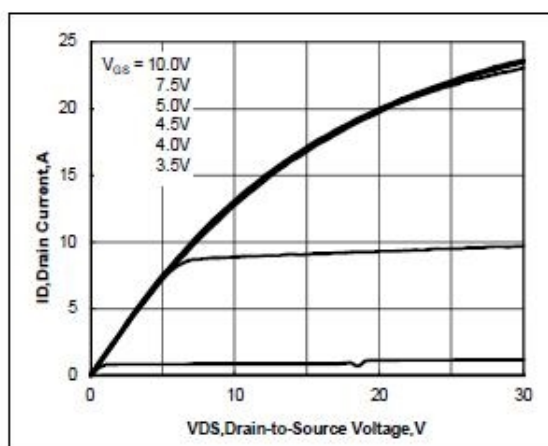
Body Diode Forward Voltage vs.
Source Current and Temperature



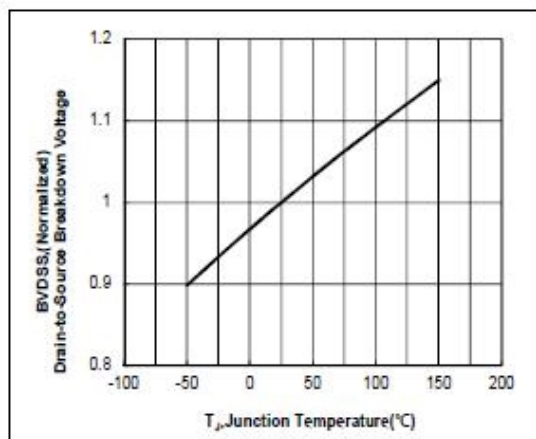
Capacitance Characteristics



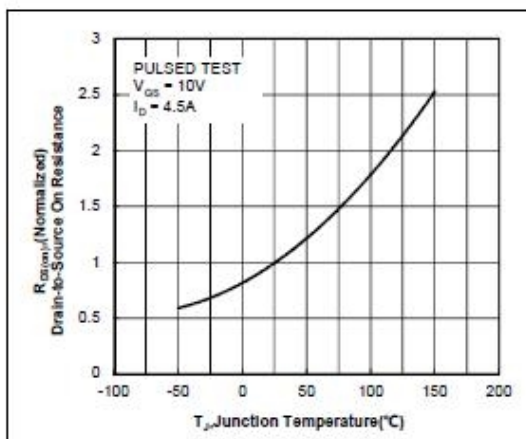
Gate Charge Characteristics



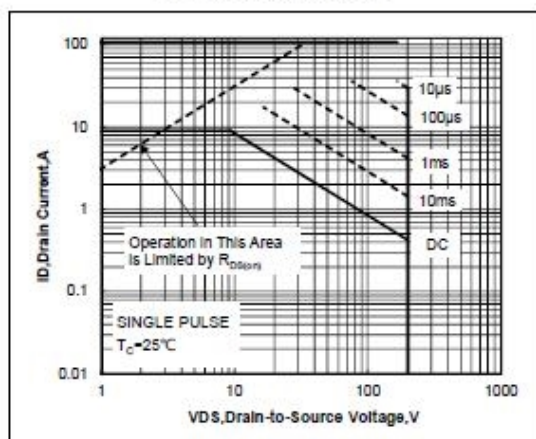
Output Characteristics



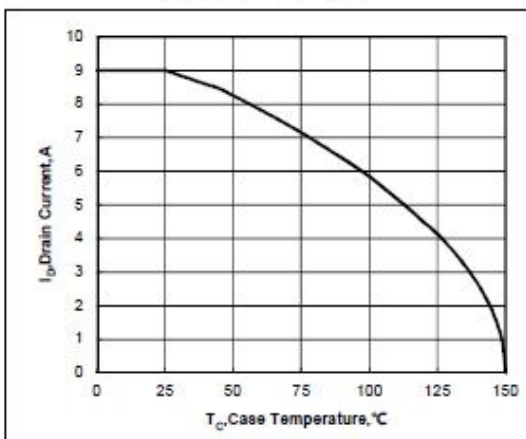
Normalized Breakdown Voltage vs.
Junction Temperature



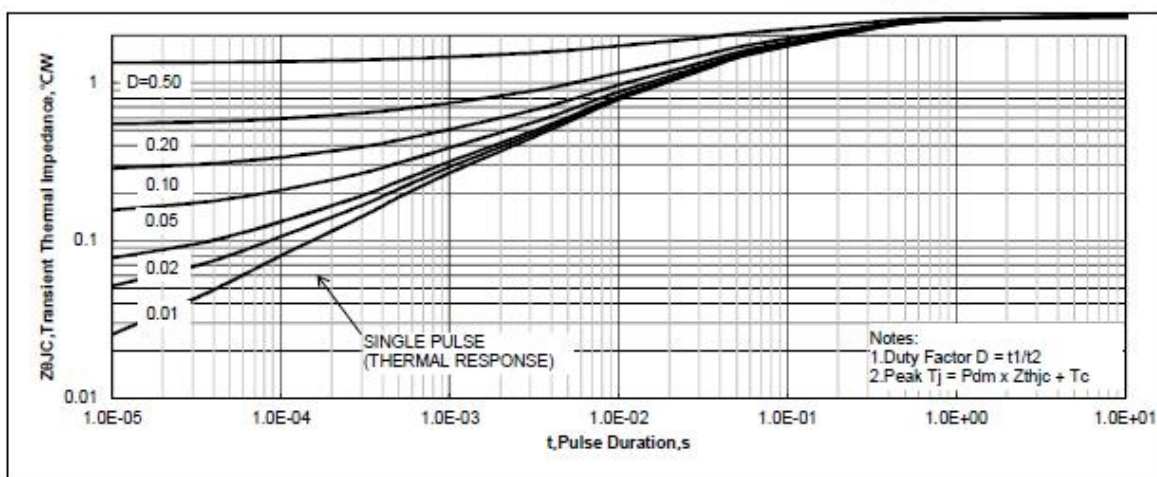
Normalized On Resistance vs.
Junction Temperature



Maximum Safe Operating Area for ZL9N20A

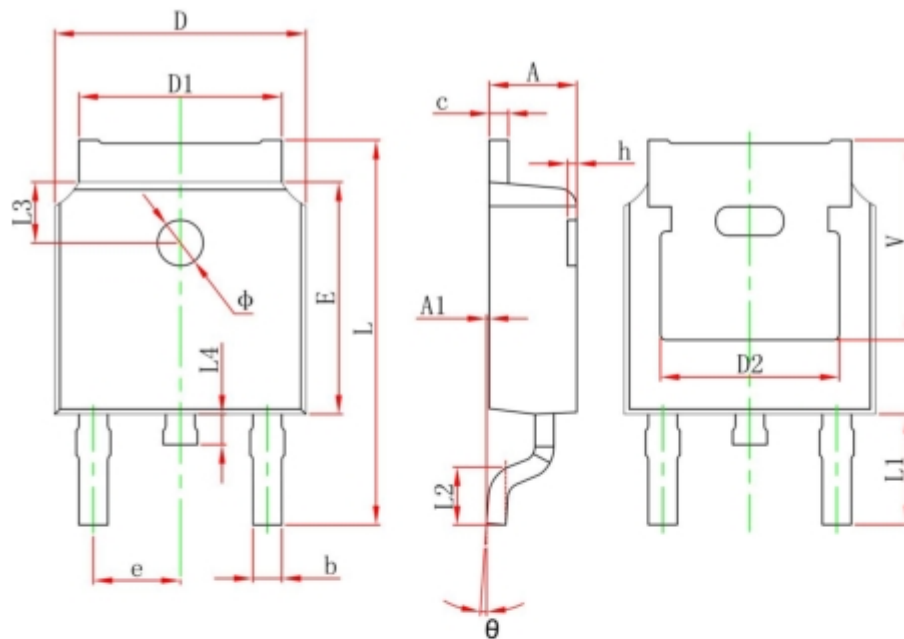


Maximum Continuous Drain Current vs.
Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case for ZL9N20A

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	