TM18N20D

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

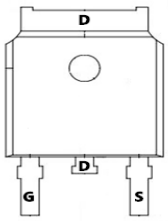
General Features

V_{DS}=200V I_D =18A

$R_{DS(ON)}$ = 120 mΩ (typ.)@ V_{GS}=10V

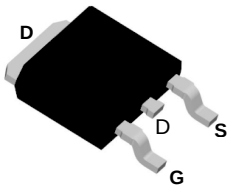
100% UIS Tested
100% R_g Tested

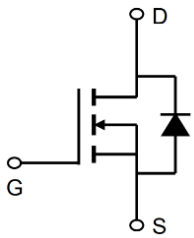
Green Product



Marking:18N20

D:TO-252-3L





Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-T_C=25℃ [G]	18	A
	Continuous Drain Current-T_C=100℃	13	
E_{AS}	Single Pulse Avalanche Energy	125	mJ
I_{DM}	Drain Current - Pulsed [C]	45	A
I_{AS}	Avalanche Current [C] (L=10mH)	9.5	A
P_D	Power Dissipation,T_C=25℃ [B]	102	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristic

Symbol	Parameter	Max	Units
$R_{\Theta JC}$	Thermal Resistance,Junction to Case (Steady-State)	0.82	℃/W
$R_{\Theta JA}$	Thermal Resistance Junction to mbient [A] (t<10S)	23	℃/W

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Electrical Characteristics: (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	200	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=200V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	2	3	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=1A	---	120	165	mΩ
		V_{GS}=4.5V,I_D=1A	---	150	180	mΩ
Dynamic Characteristics						
R_g	Gate resistance	V_{DS}=0V, V_{GS}=0V, f=1MHz	---	6.5	----	Ω
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	800	---	pF
C_{oss}	Output Capacitance		---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	60	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{GS}=10V ,V_{DS}=100V, R_L=5.5Ω,R_{GEN}=3Ω	---	8	---	ns
t_r	Rise Time		---	10	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	30	---	ns
t_f	Fall Time		---	4	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=100V, I_D=18A	---	27	40	nC
Q_{gs}	Gate-Source Charge		---	7	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	3	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage	I_D=9A	---	---	1.45	V
trr	Body Diode Reverse Recovery Time	IF=18A dI/dt=500A/μS	---	60	80	ns
Qrr	Body Diode Reverse Recovery Charge		---	800	---	nC

Notes:

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_A =25°C.

B. The power dissipation PD is based on TJ(MAX)=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5%max.

F. These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C.

G. The maximum current rating is limited by bond-wires.

Typical Characteristics： (T_A=25℃ unless otherwise noted)

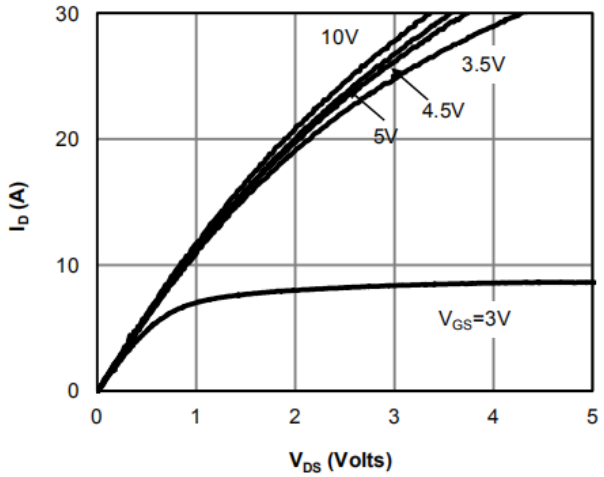


Figure 1: On-Region Characteristics

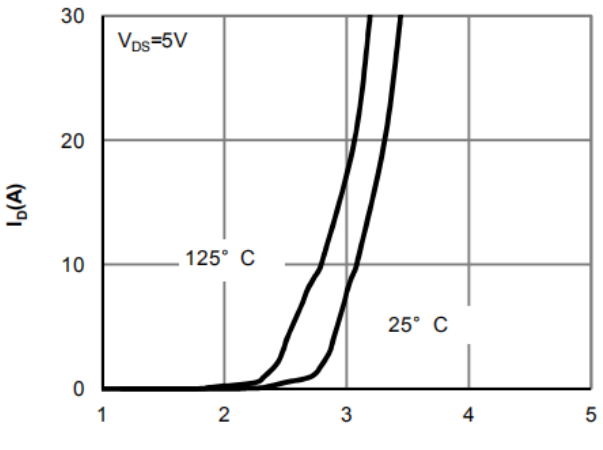


Figure 2: Transfer Characteristics

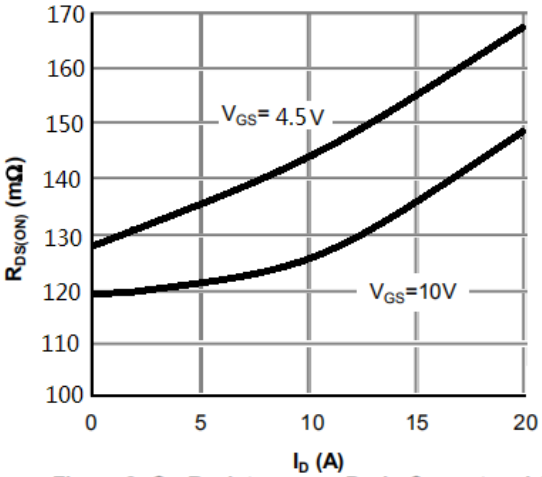


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

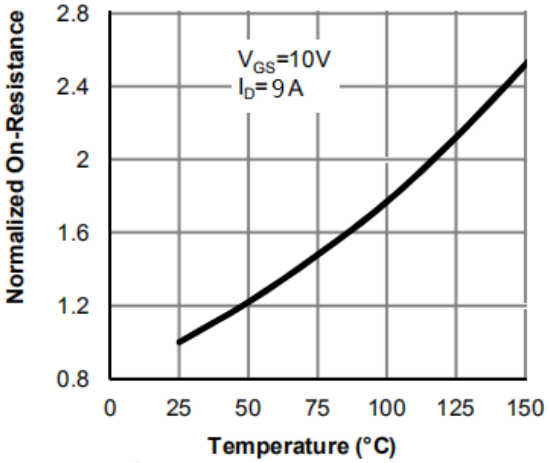


Figure 4: On-Resistance vs. Junction Temperature

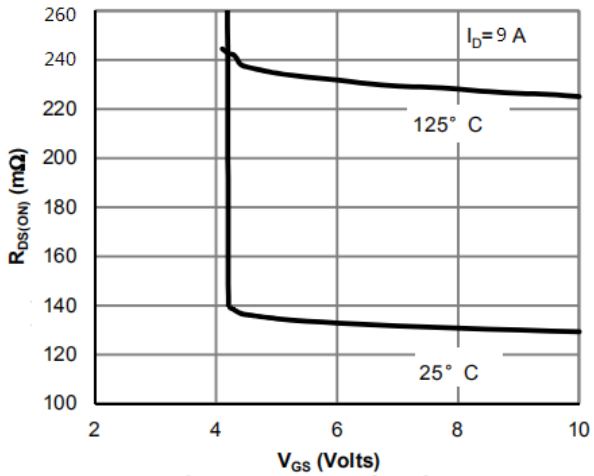


Figure 5: On-Resistance vs. Gate-Source Voltage

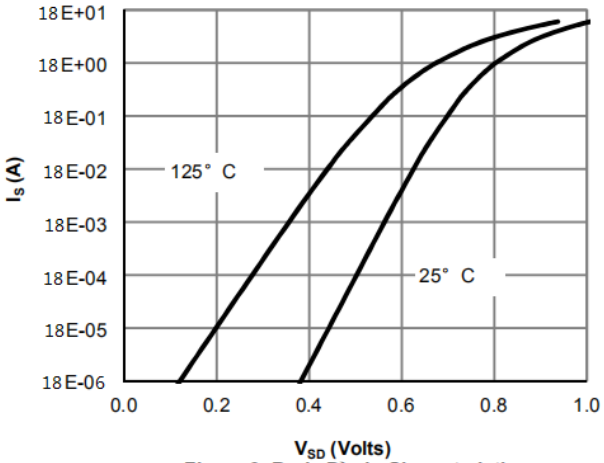


Figure 6: Body-Diode Characteristics

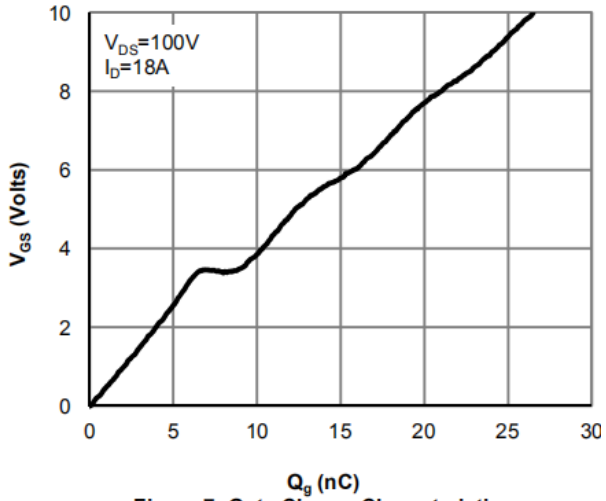


Figure 7: Gate-Charge Characteristics

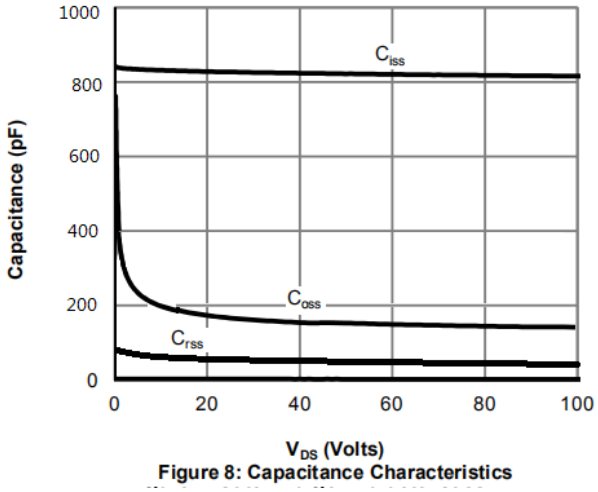


Figure 8: Capacitance Characteristics

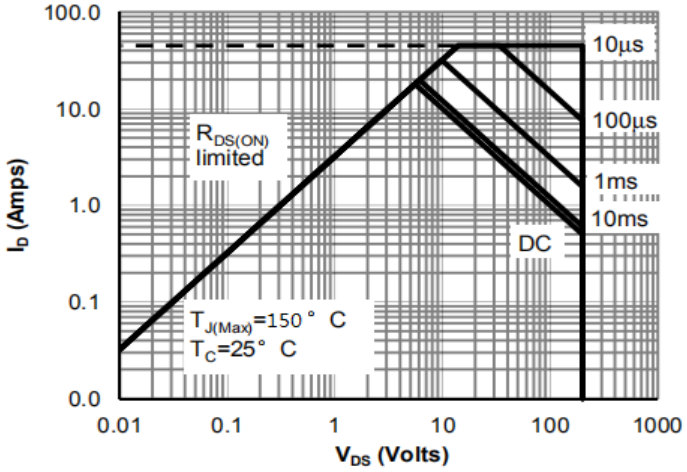


Figure 9: Maximum Forward Biased Safe Operating Area

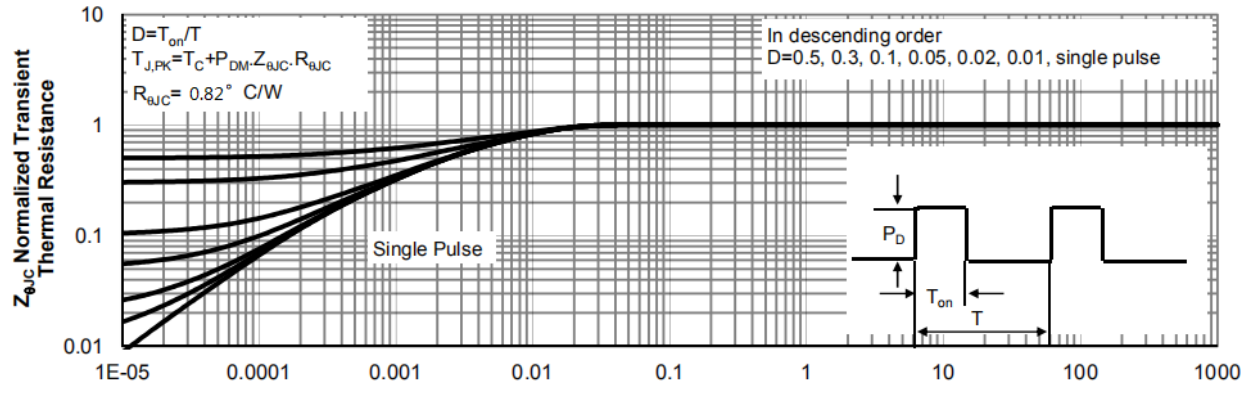
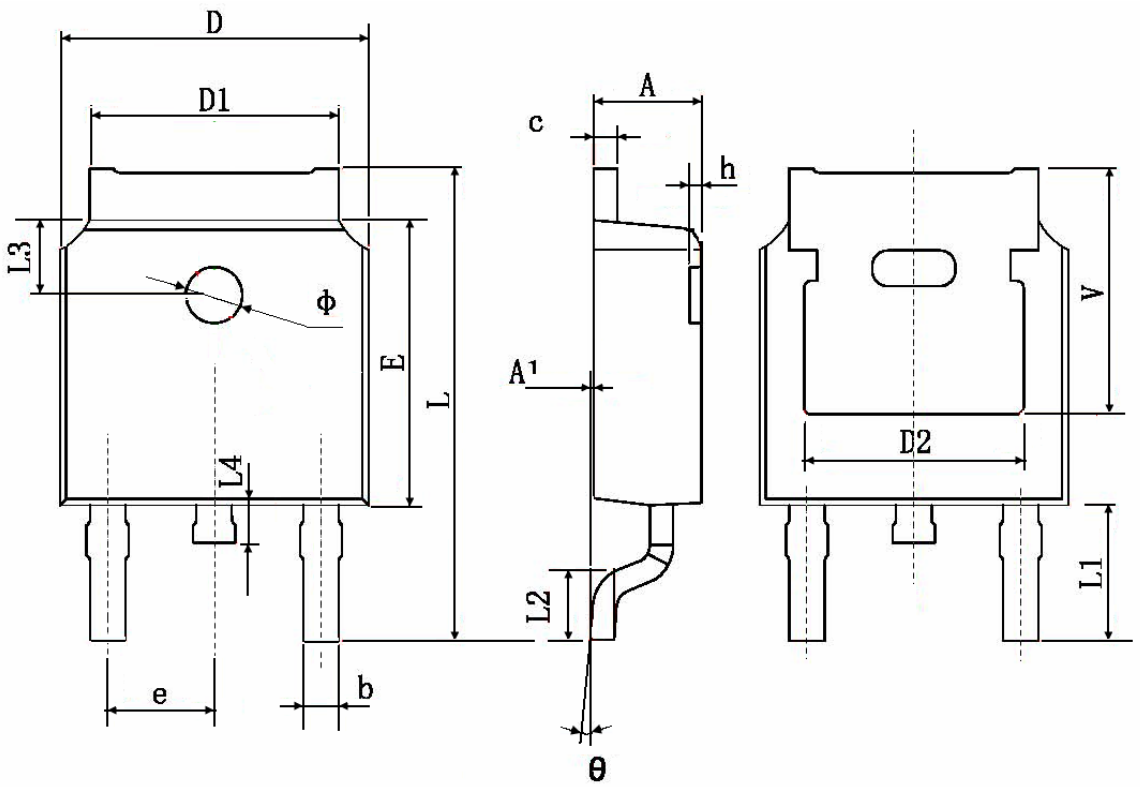


Figure 10 : Normalized Maximum Transient Thermal Impedance

Package Mechanical Data: TO-252-3L



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 TYP.		0.190 TYP.	
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 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
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 TYP.		0.211 TYP.	