GOODWORK

9N20

N-Channel Enhancement Mode MOSFET

Description

The 9N20 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 200V I_D = 9A

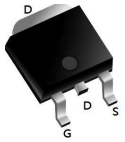
$R_{DS(ON)}$ < 270mΩ @ V_{GS}=10V

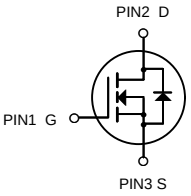
Application

Battery protection

Load switch

Uninterruptible power supply

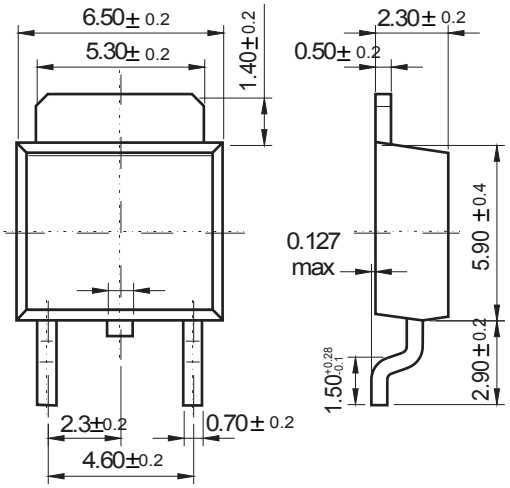




N-Channel MOSFET

TO-252

Unit: mm



Dimensions in inches and (millimeters)

Absolute Maximum Ratings (T_C=25 unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	9	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	5.7	A
I_{AS}	Avalanche Current	9	A
P_D@T_C=25°C	Total Power Dissipation[4]	72	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

9N20

Electrical Characteristics: (T_C=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_{DS}=200V, V_{GS}=0V	---	---	1	μA
		V_{DS}=160V, V_{GS}=0V,Tc=125℃	---	---	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	2	---	4	V
$R_{DS(ON)}$	Drain-Source On Resistanc	V_{GS}=10V,I_D=4.5A	---	0.235	0.27	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	720	920	pF
C_{oss}	Output Capacitance		---	85	110	
C_{rss}	Reverse Transfer Capacitance		---	22	29	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time[3,4]	VDD=100V , VGS=10V , RG=25Ω， I_D=9A	---	10	23	ns
t_r	Rise Time[3,4]		---	69	138	ns
$t_{d(off)}$	Turn-Off Delay Time[3,4]		---	59	118	ns
t_f	Fall Time[3,4]		---	63	128	ns
Q_g	Total Gate Charge[3,4]	V_{GS}=10V, V_{DS}=160V, I_D=9A	---	21	28	nC
Q_{gs}	Gate-Source Charge[3,4]		---	3.8	---	nC
Q_{gd}	Gate-Drain “Miller” Charge[3,4]		---	11	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	9	A
I_{SM}	Pulsed Source Current		---	---	36	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=9A , T_J=25℃	---	---	1.45	V
Trr	Reverse Recovery Time	IF=9A , dI/dt=100A/μs , T_J=25℃	---	140	---	ns
Qrr	Reverse Recovery Charge		---	2.2	---	nC

Notes:

1, L=8mH, IAS=9A, VDD=50V, RG=25Ω, Starting TJ =25°C
2, Repetitive Rating : Pulse width limited by maximum junction temperature
3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
4, Essentially Independent of Operating Temperature

RATING AND CHARACTERISTIC CURVES (9N20)

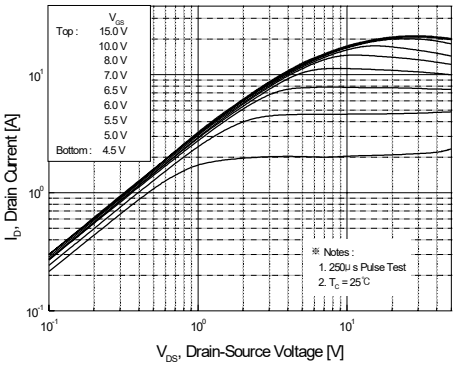


Figure 1. On-Region Characteristics

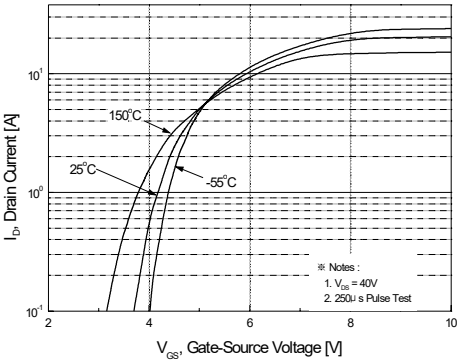


Figure 2. Transfer Characteristics

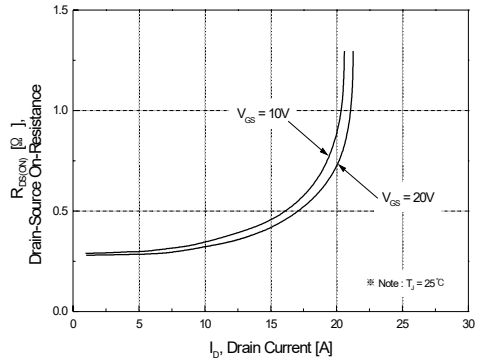


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

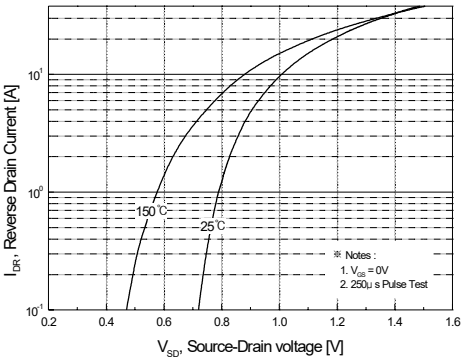


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

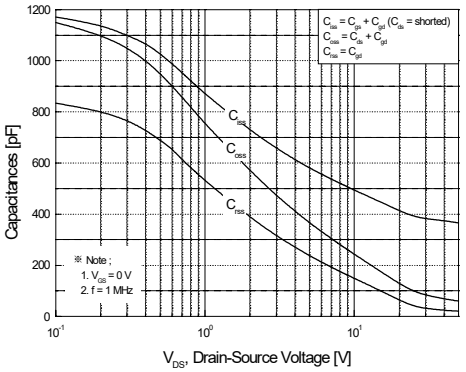


Figure 5. Capacitance Characteristics

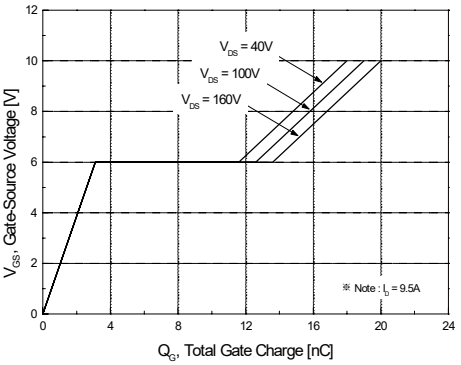


Figure 6. Gate Charge Characteristics

RATING AND CHARACTERISTIC CURVES (9N20)

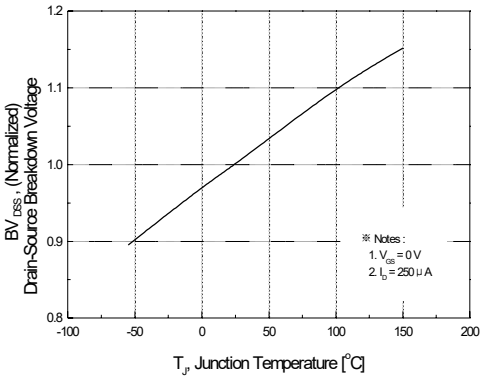


Figure 7. Breakdown Voltage Variation vs Temperature

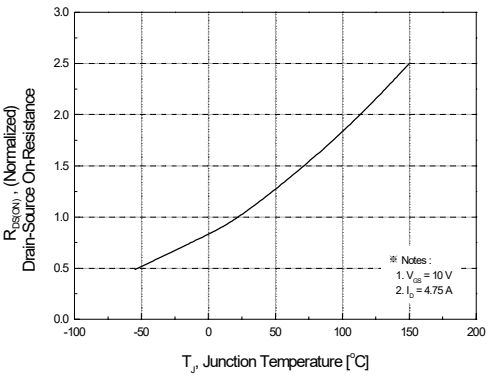


Figure 8. On-Resistance Variation vs Temperature

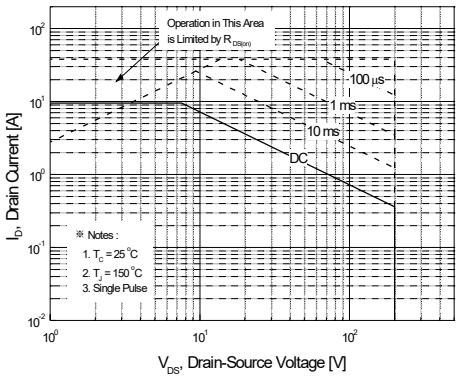


Figure 9-1. Maximum Safe Operating Area

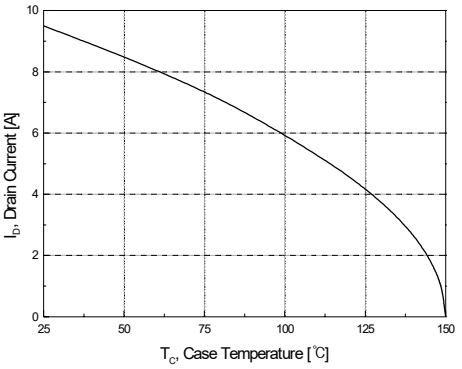


Figure 10. Maximum Drain Current vs Case Temperature

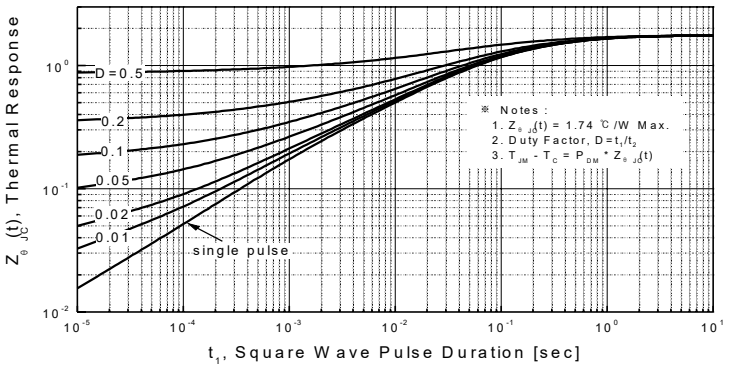


Figure 11-1. Transient Thermal Response Curve