



GL200N20A47

GL Silicon N-Channel Power MOSFET

General Description

The GL200N20A47 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-247, which accords with the RoHS standard.

Features

- Fast Switching
- Low Gate Charge and $R_{DS(ON)}$
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute (T_c = 25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	200	V
I_D	Continuous Drain Current	200	A
	Continuous Drain Current T _c = 100 °C	140	A
I_{DM}	Pulsed Drain Current	800	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	2400	mJ
E_{AR}^{a1}	Avalanche Energy ,Repetitive	160	mJ
I_{AR}^{a1}	Avalanche Current	140	A
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	600	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	175, -55 to 175	°C
T_L	Maximum Temperature for Soldering	300	°C

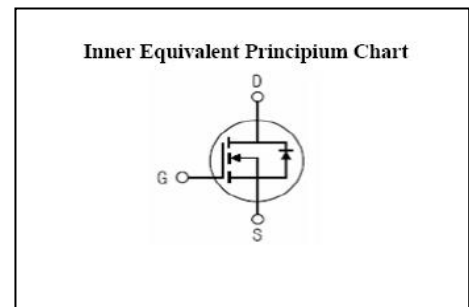
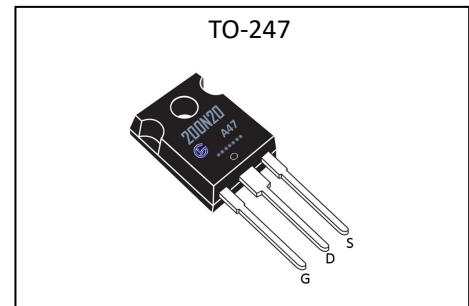
Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta c}$	Junction-to-Case	0.25	°C/W

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V_{DSS}	200	V
I_D	200	A
P_D	600	W
$R_{DS(ON)type}$	5.0	mΩ





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Electrical Characteristics (Tc= 25°C unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	200	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A$, Reference 25°C	--	0.1	--	V/°C
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=200V, V_{GS}=0V, T_a=25^\circ C$	--	--	15	μA
		$V_{DS}=160V, V_{GS}=0V, T_a=125^\circ C$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	300	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-300	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=100A$	--	5.0	6.5	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	--	4.5	V
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=100A$	140	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=100V$ $f=1.0MHz$	--	8800	--	pF
C_{oss}	Output Capacitance		--	650	--	
C_{rss}	Reverse Transfer Capacitance		--	90	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=100A, V_{DD}=100V$ $V_{GS}=10V, R_G=4.7\Omega$	--	36	--	ns
t_r	Rise Time		--	54	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	85	--	
t_f	Fall Time		--	24	--	
Q_g	Total Gate Charge	$I_D=100A, V_{DD}=100V$ $V_{GS}=10V$	--	130	--	nC
Q_{gs}	Gate to Source Charge		--	50	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	35	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	200	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	400	A
V_{SD}	Diode Forward Voltage	$I_S = 100A, V_{GS} = 0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S = 100A, T_j = 25^\circ C$	--	140	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt = 100A/us, V_{GS} = 0V$	--	600	--	nC

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: EAS condition : $T_j = 25^\circ C, V_{DD} = 50V, V_G = 10V, L = 0.5mH, R_g = 25\Omega$

^{a3}: $I_{SD} = 100A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j = 25^\circ C$

Test Circuit and Waveform

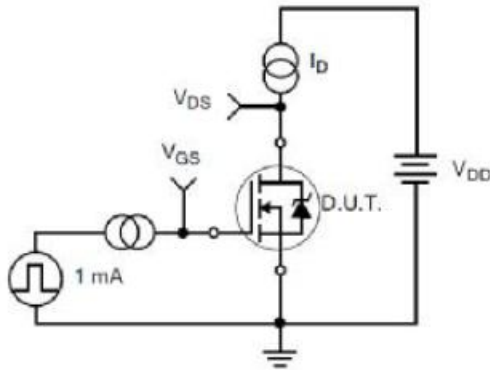


Figure 17. Gate Charge Test Circuit

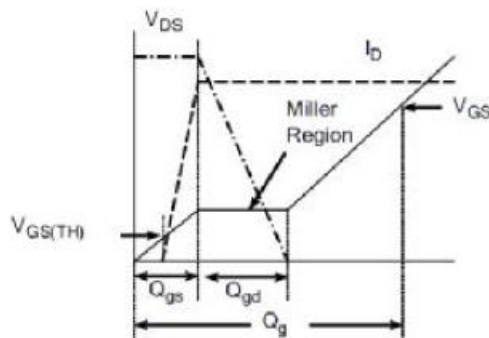


Figure 18. Gate Charge Waveform

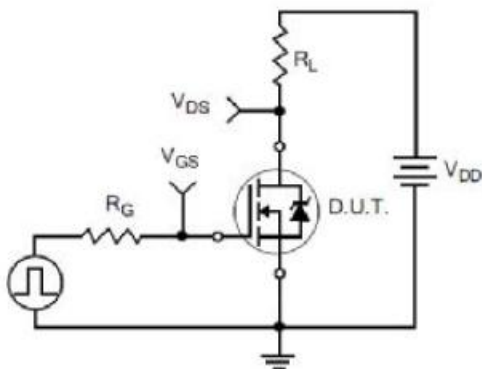


Figure 19. Resistive Switching Test Circuit

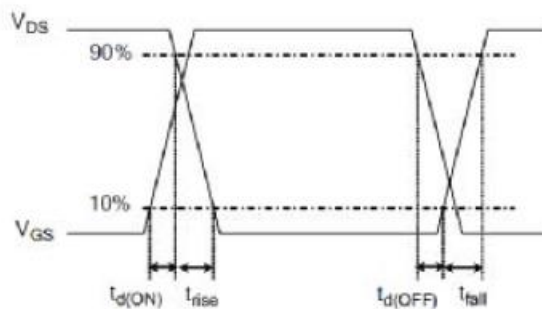


Figure 20. Resistive Switching Waveforms

Characteristics Curves

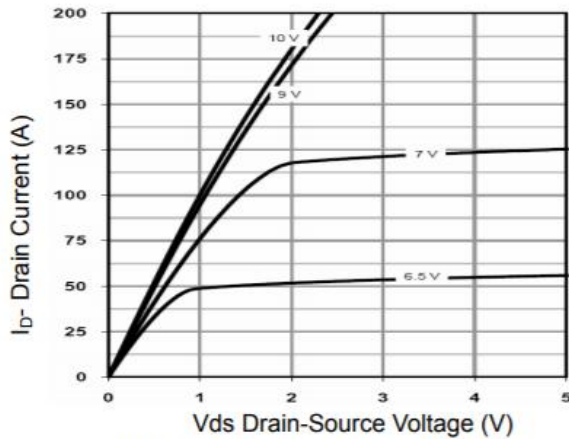


Figure 1 Output Characteristics

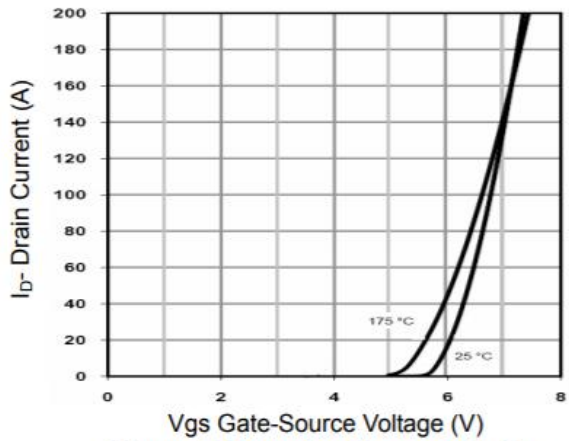


Figure 2 Transfer Characteristics

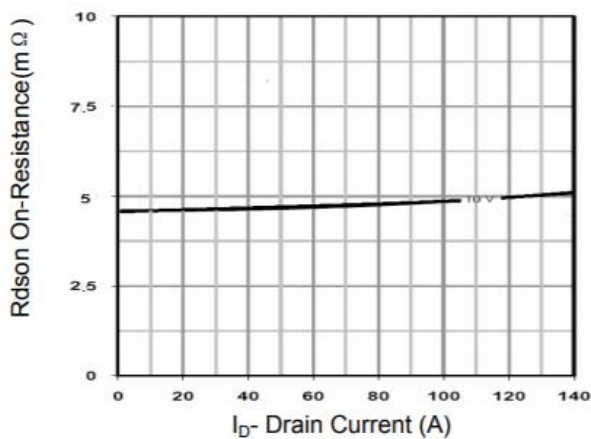


Figure 3 $R_{DS(on)}$ - Drain Current

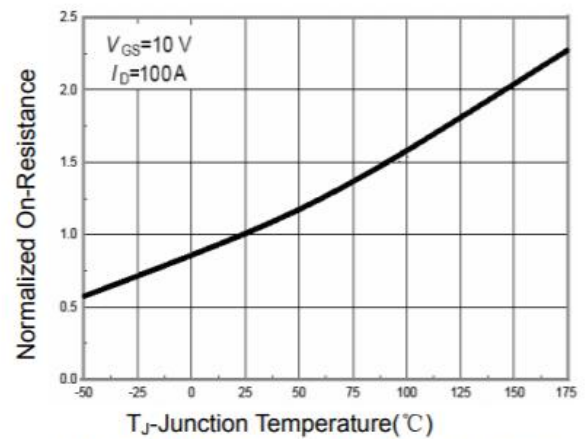


Figure 4 $R_{DS(on)}$ -Junction Temperature

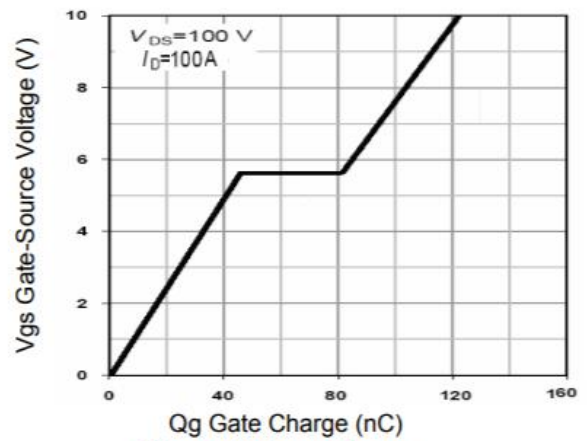


Figure 5 Gate Charge

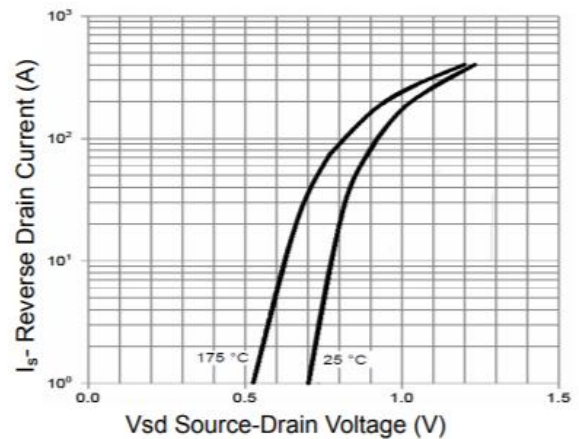


Figure 6 Source- Drain Diode Forward

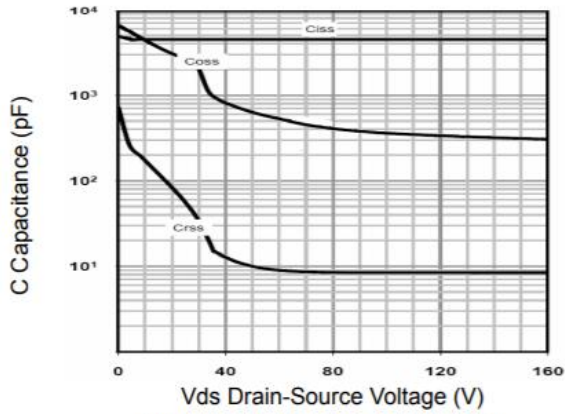


Figure 7 Capacitance vs Vds

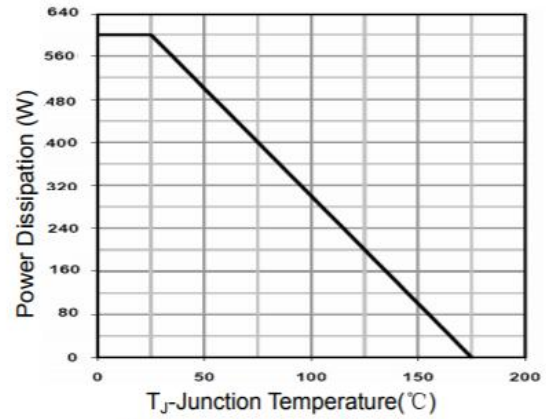


Figure 9 Power De-rating

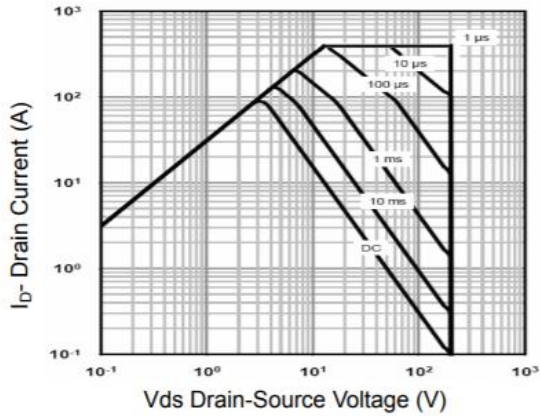


Figure 8 Safe Operation Area

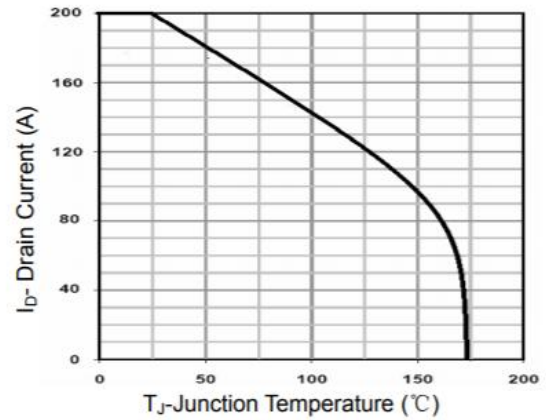


Figure 10 Current De-rating

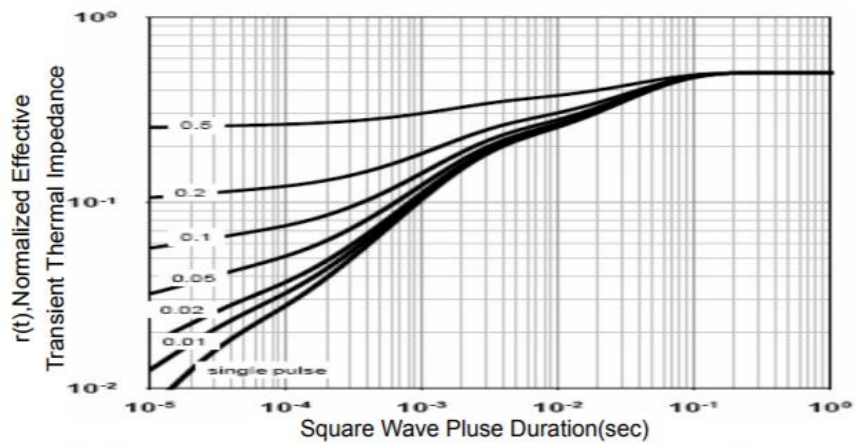


Figure 11 Normalized Maximum Transient Thermal Impedance