GL20N80A47

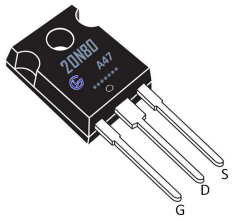
GL Silicon N-Channel Power MOSFET

V_{DSS}	800	V
I_D	20	A
P_D (T_C=25℃)	400	W
$R_{DS(ON)TYP}$	0.5	Ω

General Description

GL20N80A47 the silicon N-channel Enhanced VDMOSFETS, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-247, which accords with the RoHS standard.

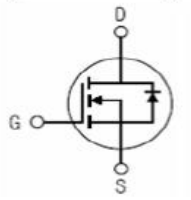
TO-247



Features

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Inner Equivalent Principium Chart



Applications

- Power switch circuit of adaptor and charger

Absolute (Tc= 25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	800	V
I_D	Continuous Drain Current	20	A
	Continuous Drain Current T_C=100°C	15	A
I_{DM} [a1]	Pulsed Drain Current	80	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS} [a2]	Single Pulse Avalanche Energy	2500	mJ
E_{AR} [a1]	Avalanche Energy ,Repetitive	210	mJ
I_{AR} [a1]	Avalanche Current	20	A
dv/dt [a3]	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	400	W
	Derating Factor above 25°C	3.2	W/℃
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, −55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

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

Electrical Characteristics (Tc= 25℃ 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=250μA	800	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA,Reference25℃	--	0.8	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=800V,V_{GS}=0V,T_a=25℃	--	--	10	μA
		V_{DS}=640V,V_{GS}=0V,T_a=125℃	--	--	1000	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+30V	--	--	1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-30V	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=8.5A	--	0.5	0.65	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.5	--	4.5	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=15V,I_D=8.5A	--	8.0	--	S
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=25V f=1.0MHz	--	4150	--	pF
C_{oss}	Output Capacitance		--	310	--	
C_{rss}	Reverse Transfer Capacitance		--	55	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=10A,V_{DD}=400V V_{GS}=10V,R_G=9.1Ω	--	60	--	ns
t_r	Rise Time		--	105	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	39	--	
t_f	Fall Time		--	80	--	
Q_g	Total Gate Charge	I_D=10A,V_{DD}=400V V_{GS}=10V	--	74	--	nC
Q_{gs}	Gate to Source Charge		--	20	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	33	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	20	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	80	A
V_{SD}	Diode Forward Voltage	I_S=20A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=20A,T_j=25°C	--	510	--	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt=100A/us,V_{GS}=0V	--	2100	--	nC
Pulse width tp≤380μs,δ≤2%						

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	0.32	℃/W
$R_{\theta JA}$	Junction-to-Ambient	55	℃/W

[a1]: Repetitive rating; pulse width limited by maximum junction temperature

[a2]: L=10.0mH, I_D=23A, Start T_J=25℃

[a3]: I_{SD} =20A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Test Circuit and Waveform

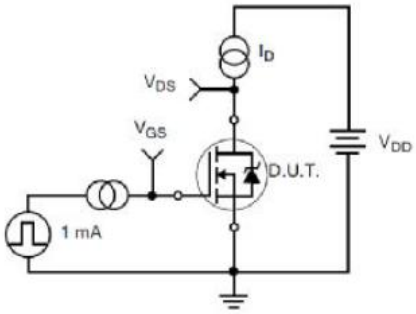


Figure 17. Gate Charge Test Circuit

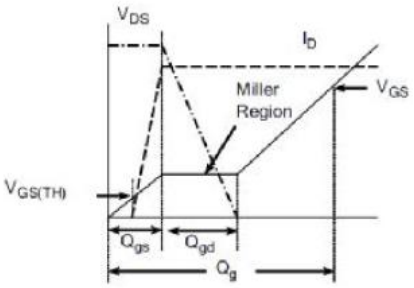


Figure 18. Gate Charge Waveform

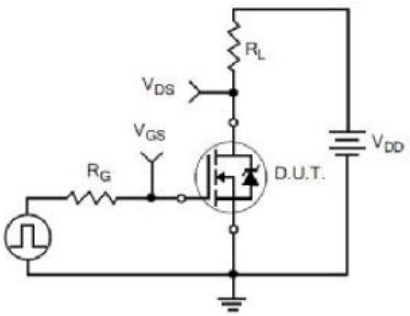


Figure 19. Resistive Switching Test Circuit

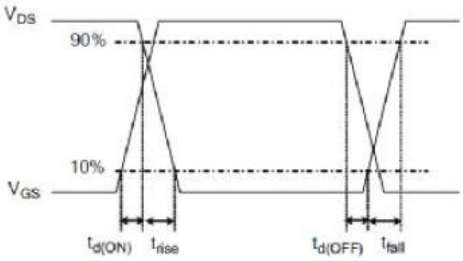


Figure 20. Resistive Switching Waveforms

Characteristics Curves

Fig. 1. Output Characteristics @ 25°C

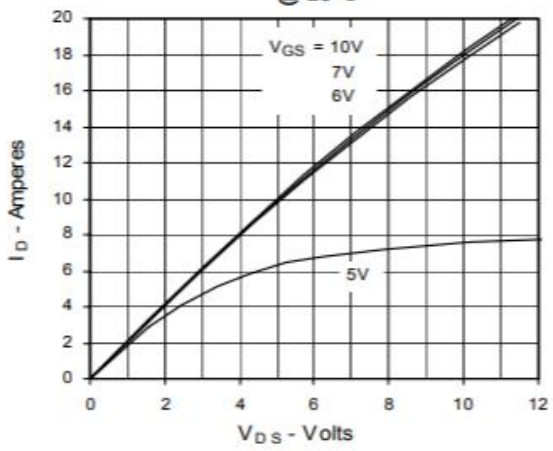


Fig. 2. Extended Output Characteristics @ 25°C

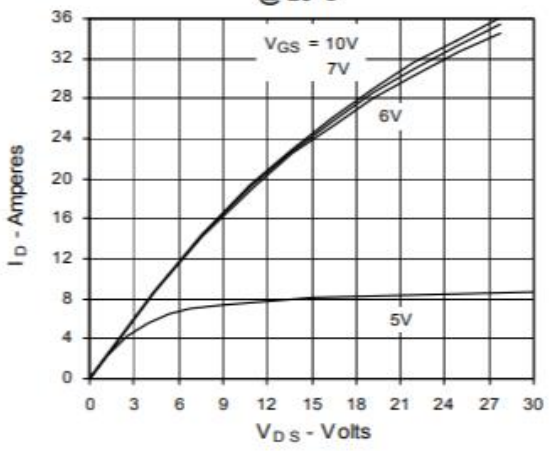


Fig. 3. Output Characteristics @ 125°C

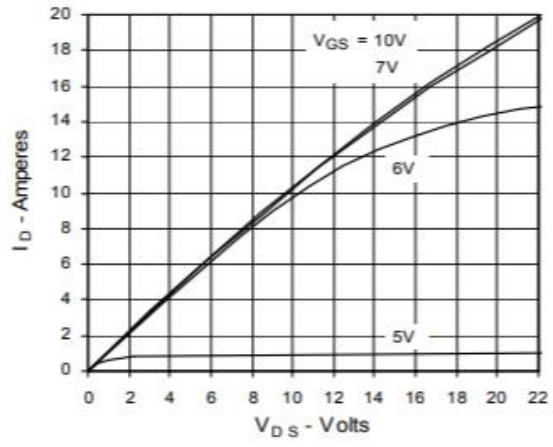


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 10A Value vs. Junction Temperature

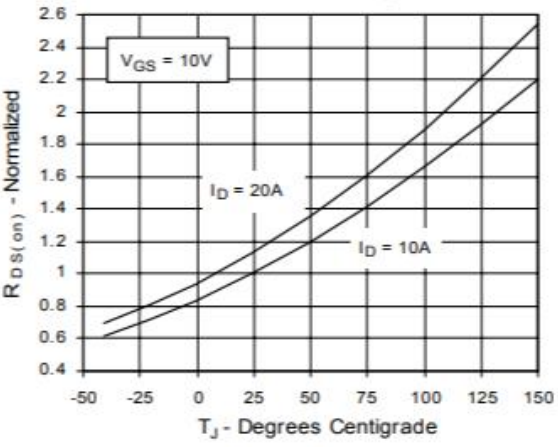


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 10A Value vs. Drain Current

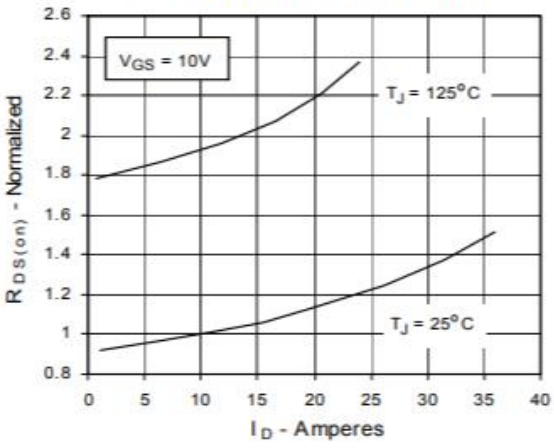


Fig. 6. Drain Current vs. Case Temperature

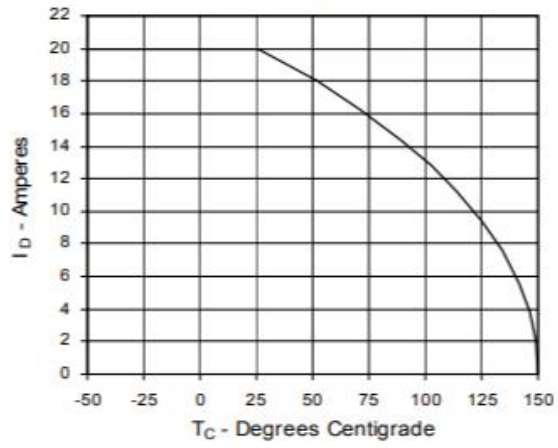


Fig. 7. Input Admittance

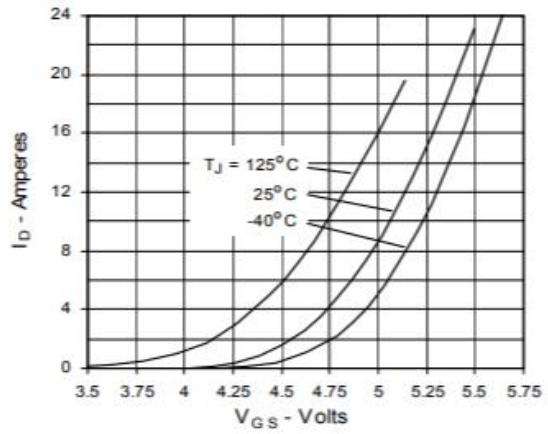


Fig. 8. Transconductance

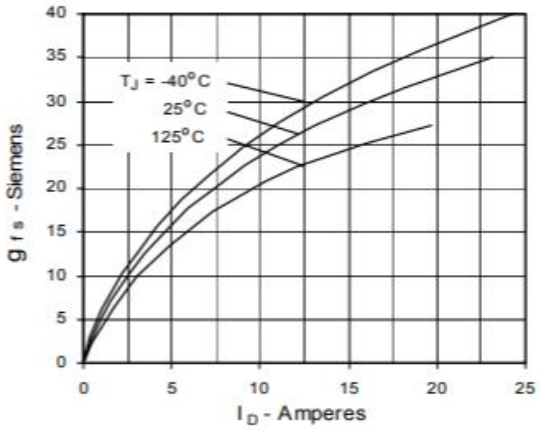


Fig. 9. Source Current vs. Source-To-Drain Voltage

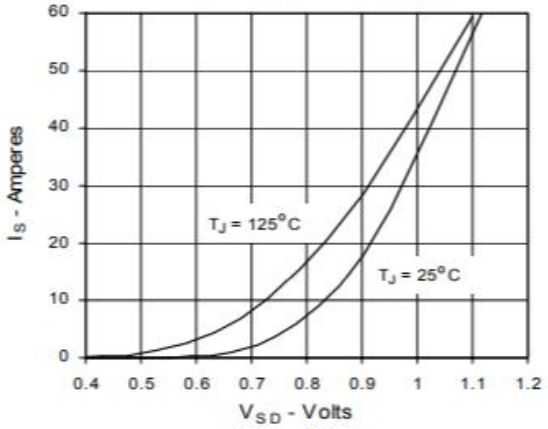


Fig. 10. Gate Charge

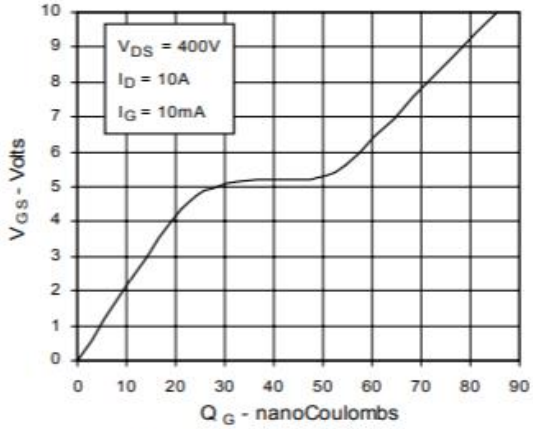


Fig. 11. Capacitance

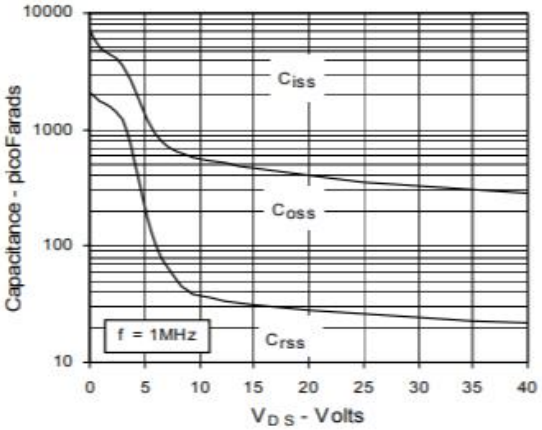


Fig. 12. Maximum Transient Thermal Resistance