



# GL20N04A4

## GL Silicon N-Channel Power MOSFET

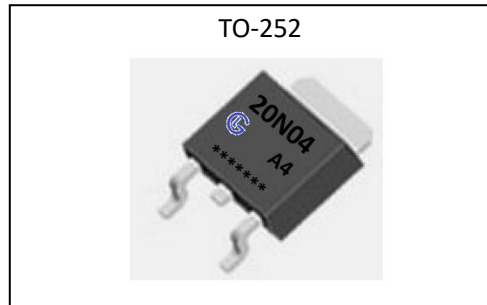
### General Description:

The GL20N04A4 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-252, which accords with the RoHS standard.

$V_{DSS}$	40	V
$I_D$	20	A
$P_D$	32.5	W
$R_{DS(ON)MAX}$	25	m $\Omega$

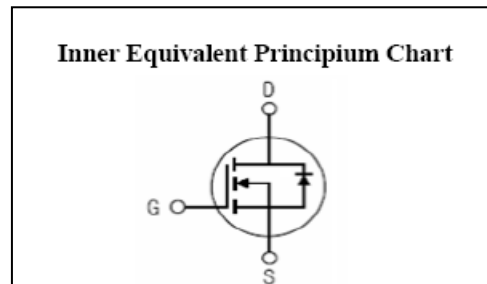
### Features:

- $R_{DS(ON)} < 25m\Omega$  @  $V_{GS} = 10V$
- High density cell design for ultra low  $R_{dson}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



### Applications:

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



### Absolute (Tc= 25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	40	V
$I_D$	Continuous Drain Current	20	A
$I_{DM}$	Pulsed Drain Current	80	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	32.5	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	150, -55 to 150	$^{\circ}C$



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**Electrical Characteristics** ( $T_c = 25^\circ\text{C}$  unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$V_{DSS}$	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=40V, V_{GS}=0V, T_a=25^\circ\text{C}$	--	--	1.0	$\mu A$
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	0.1	$\mu A$
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-0.1	$\mu A$

ON Characteristics <sup>a3</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=10A$	--	--	25	$m\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	--	2.5	V

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

Dynamic Characteristics <sup>a4</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$g_{fs}$	Forward Transconductance	$V_{DS}=15V, I_D=2A$	--	3	--	S
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=20V$ $f=1.0\text{MHz}$	--	247	--	pF
$C_{oss}$	Output Capacitance		--	34	--	
$C_{rss}$	Reverse Transfer Capacitance		--	19.5	--	

Resistive Switching Characteristics <sup>a4</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, I_D=3A$ $V_{GS}=10V, R_G=1\Omega$	--	6	--	ns
$t_r$	Rise Time		--	15	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	15	--	
$t_f$	Fall Time		--	10	--	
$Q_g$	Total Gate Charge	$V_{DD}=20V, I_D=3A$ $V_{GS}=4.5V$	--	6	--	nC
$Q_{gs}$	Gate to Source Charge		--	1	--	
$Q_{gd}$	Gate to Drain ( "Miller" )Charge		--	1.3	--	



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Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$I_S$	Continuous Source Current <sup>a2</sup> (Body Diode)		--	--	20	A
$V_{SD}$	Diode Forward Voltage <sup>a3</sup>	$I_S=20A, V_{GS}=0V$	--	--	1.5	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case <sup>a2</sup>	3.846	°C/W

<sup>a1</sup>: Repetitive Rating: Pulse width limited by maximum junction temperature.

<sup>a2</sup>: Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$ .

<sup>a3</sup>: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

<sup>a4</sup>: Guaranteed by design, not subject to production



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Characteristics Curve:

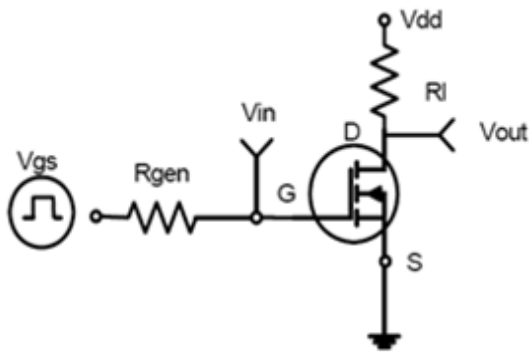


Figure 1: Switching Test Circuit

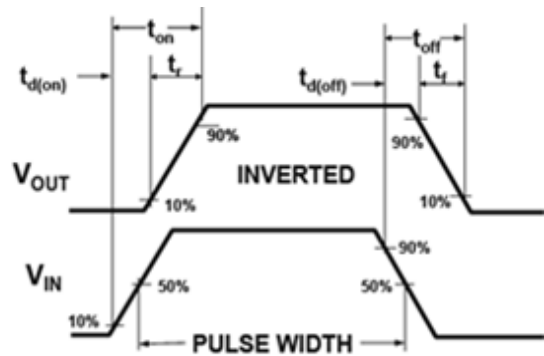


Figure 2: Switching Waveforms

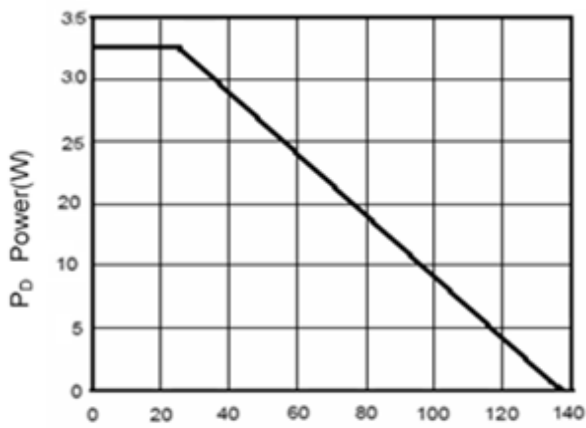


Figure 3 Power Dissipation

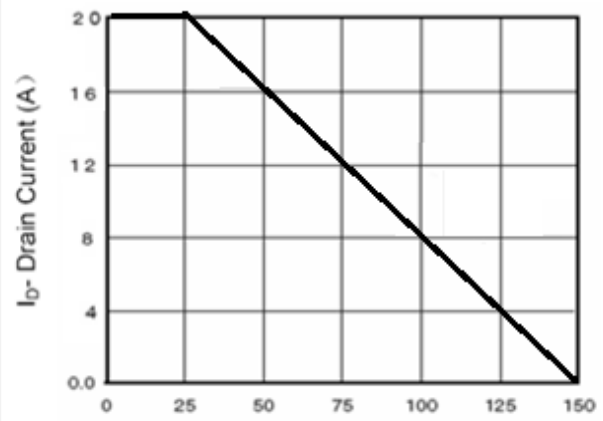


Figure 4 Drain Current

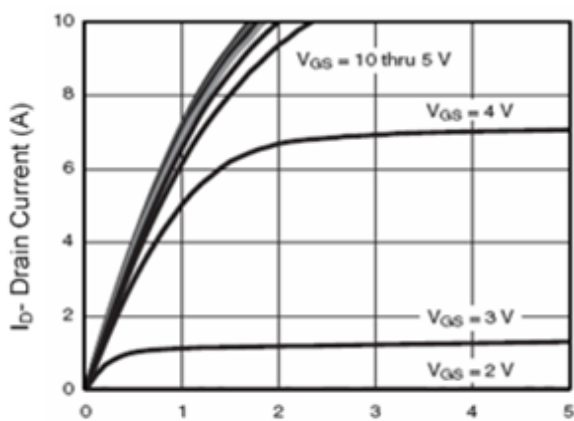


Figure 5 Output Characteristics

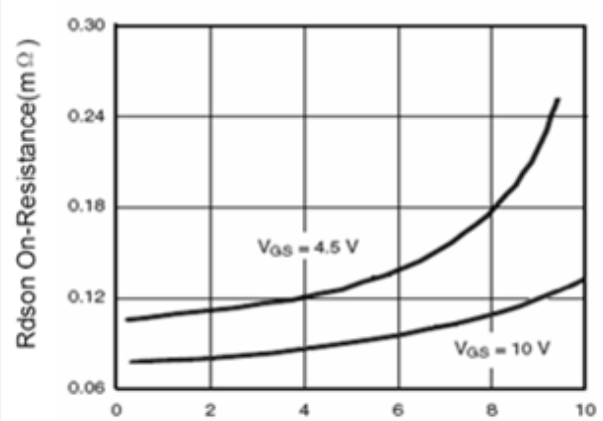


Figure 6 Drain-Source On-Resistance



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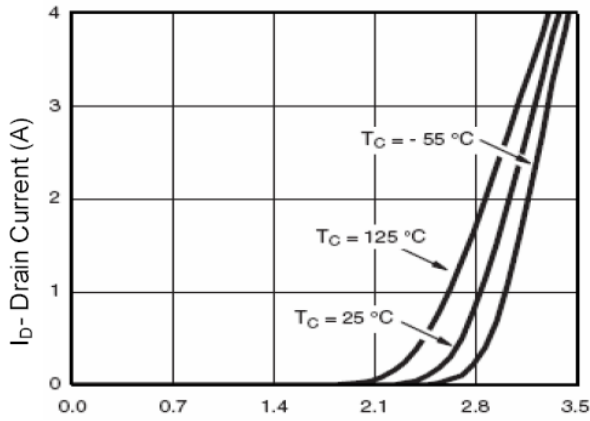


Figure 7 Transfer Characteristics

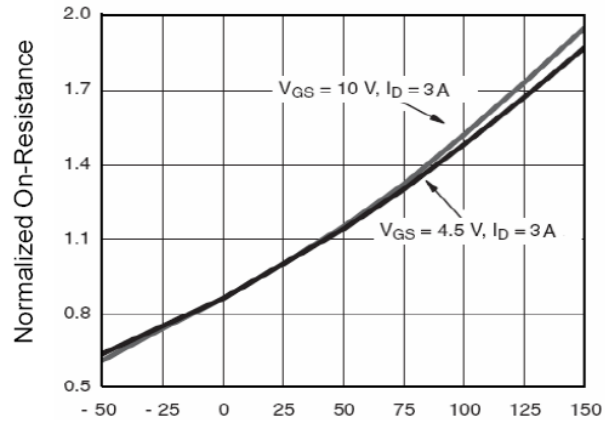


Figure 8 Drain-Source On-Resistance

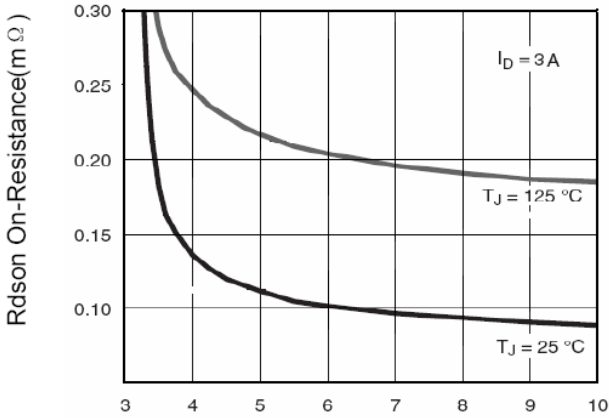


Figure 9 Rdson vs Vgs

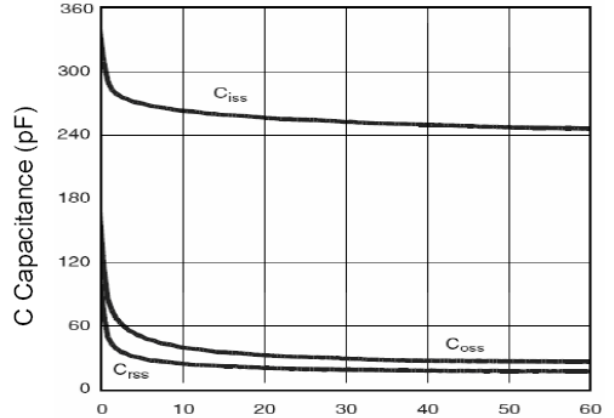


Figure 10 Capacitance vs Vds

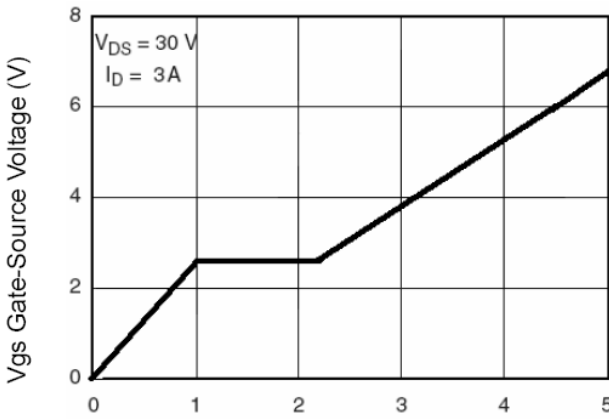


Figure 11 Gate Charge

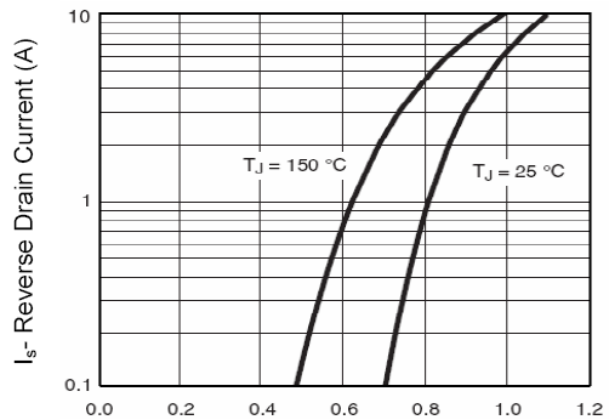


Figure 12 Source-Drain Diode Forward