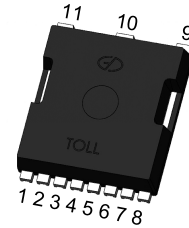


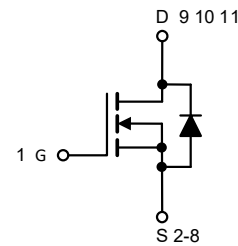
## N-Channel 100V (D-S) Power MOSFET

### Features

- 100% Avalanche Tested
- Extremely Low Losses with Low FOM  $R_{ds(on)} \cdot Q_g$
- RoHS Compliant, Halogen Free, Pb-Free
- MSL 1



TOLL



### Applications

- DC/DC in Telecoms and Industrial
- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit

### Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain Source Voltage	$V_{DS}$	100	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current, Continuous $V_{GS}=10\text{V}$	$I_D$	$T_C=25^\circ\text{C}$	393
		$T_C=100^\circ\text{C}$	278
40 Drain Current, Pulsed (Note 1)	$I_{DM}$	1341	A
Single Avalanche Energy (Note 2)	$E_{AS}$	2016	mJ
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	429
		$T_C=100^\circ\text{C}$	214
Operating Junction and Storage Temperature Range	$T_J / T_{STG}$	-55 to +175	$^\circ\text{C}$

Note 1: Single pulse;  $t_p \leq 1\mu\text{s}$ .

Note 2:  $V_{DD} = 50\text{V}$ ,  $V_{GS} = 10\text{V}$ ,  $L = 1\text{mH}$ ,  $R_G = 25\Omega$ , starting  $T_J = 25^\circ\text{C}$ .

### Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{thJC}$	0.35	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 3)	$R_{thJA}$	29	$^\circ\text{C/W}$

Note 3: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a  $25^\circ\text{C}$  still air environment.

Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1	μA
		V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	--	100	
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	2.0	3.0	4.0	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V	--	--	±100	nA
Drain-Source On-state Resistance (Note 4)	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	--	1.1	1.35	mΩ
Total Gate Charge	Q <sub>g</sub>	V <sub>GS(off)</sub> =0V, V <sub>GS(on)</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =20A	--	79	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	22	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	18	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =20A, R <sub>G</sub> =3Ω	--	25	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	42	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	87	--	
Turn-off Fall Time	t <sub>f</sub>		--	63	--	
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, f=1MHz, open drain	--	2.1	--	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz	--	9600	--	pF
Output Capacitance	C <sub>oss</sub>		--	3476	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	48	--	

Reverse Diode Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Current, Continuous	I <sub>SD</sub>	T <sub>C</sub> =25°C	--	--	393	A
Diode Forward Voltage (Note 4)	V <sub>SD</sub>	I <sub>F</sub> =2A, V <sub>GS</sub> =0V	--	0.7	1.2	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>R</sub> =20V, I <sub>F</sub> =5A, di/dt = 100 A/μs	--	105	--	ns
Reverse Recovery Charge	Q <sub>rr</sub>		--	394	--	nC

Note 4: Pulse test; pulse width ≤ 380μs, duty cycle ≤ 1%.

## Typical Characteristics Curves (T<sub>J</sub> = 25°C unless otherwise noted)

Fig.1 Output Characteristics

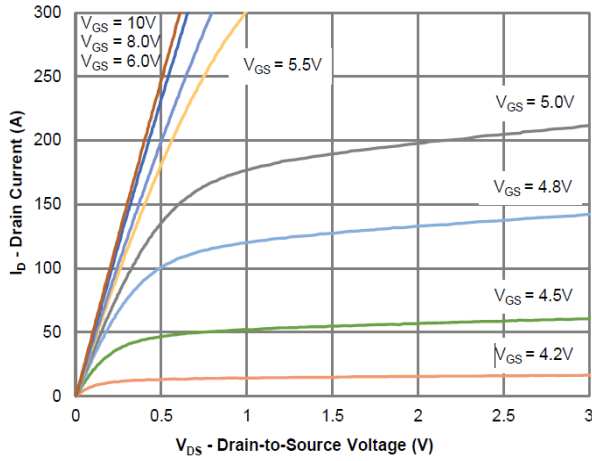


Fig.2 Transfer Characteristics

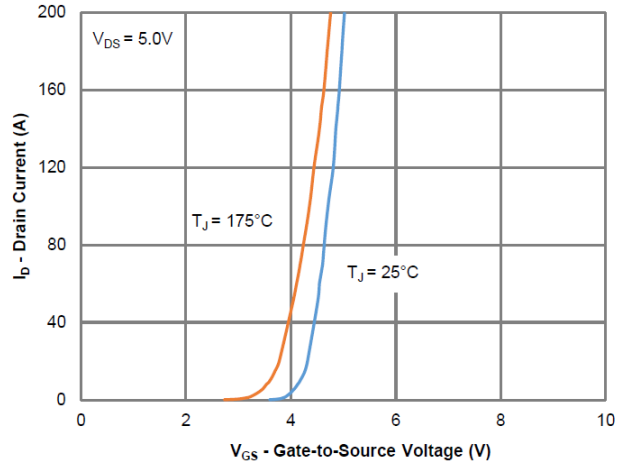


Fig.3 On-Resistance vs. Drain Current

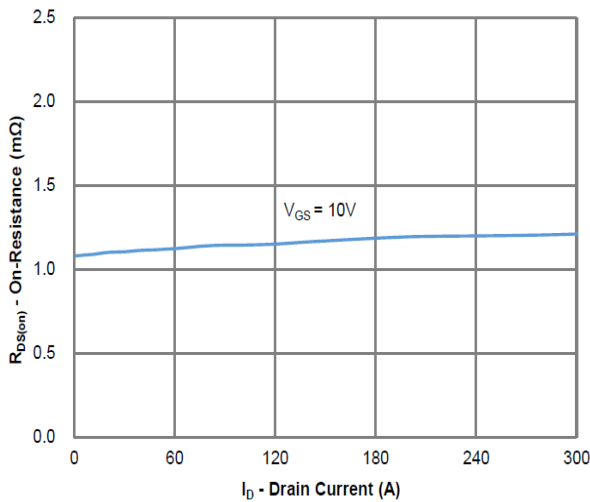


Fig.4 Normalized On-Resistance

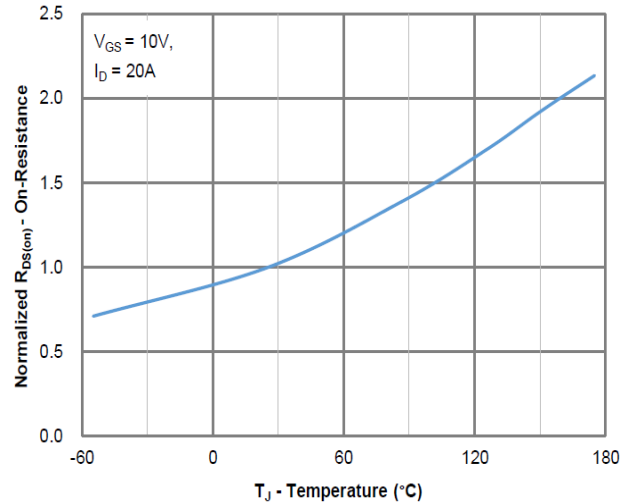


Fig.5 On-Resistance vs. Threshold Voltage

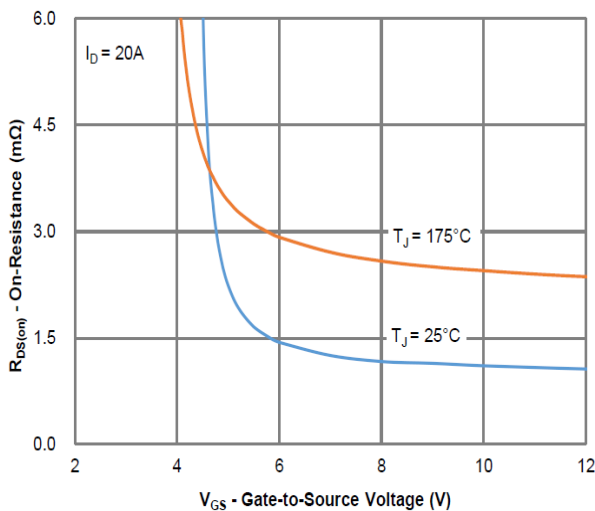
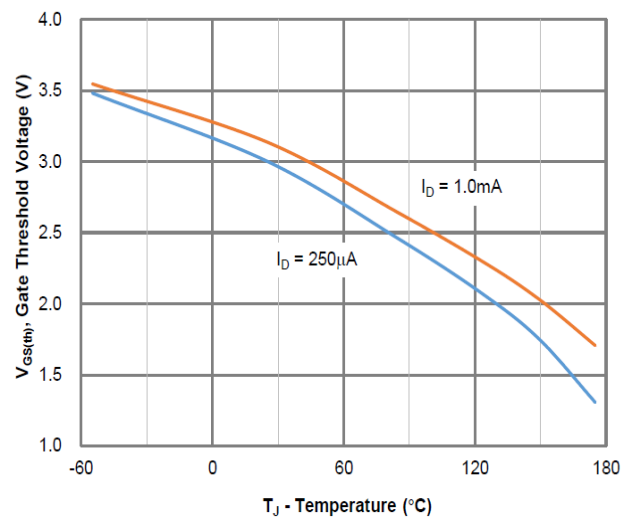


Fig.6 Gate-Source Threshold Voltage



## Typical Characteristics Curves (T<sub>J</sub> = 25°C unless otherwise noted)

Fig.7 Capacitance

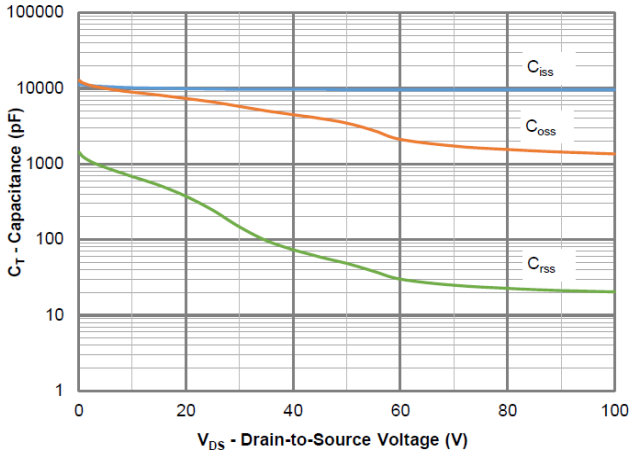


Fig.8 Gate Charge

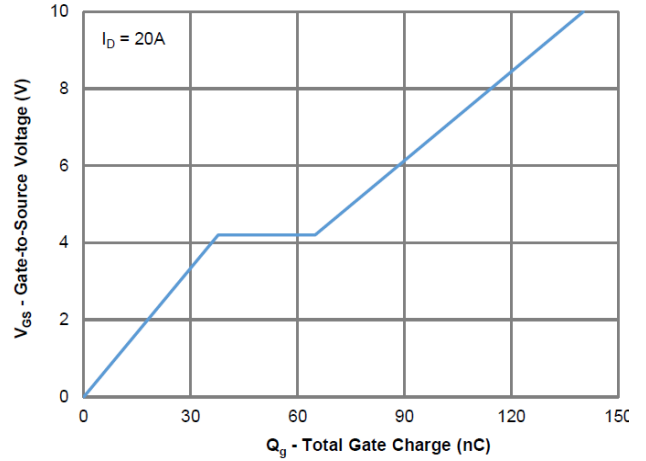


Fig.9 Forward Characteristic

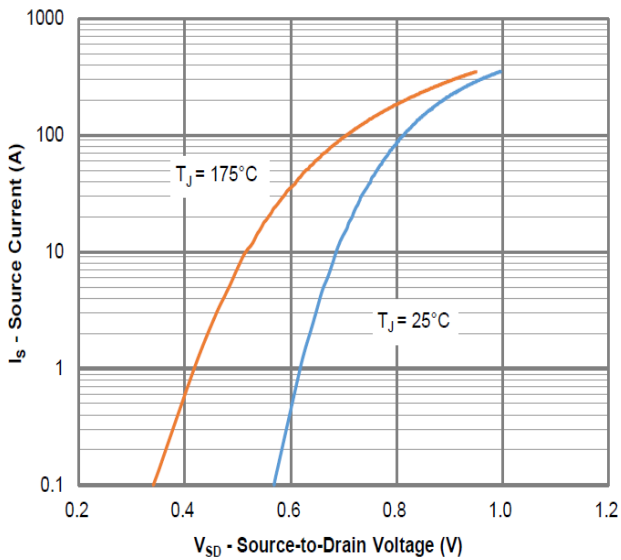


Fig.10 Safe Operating Area

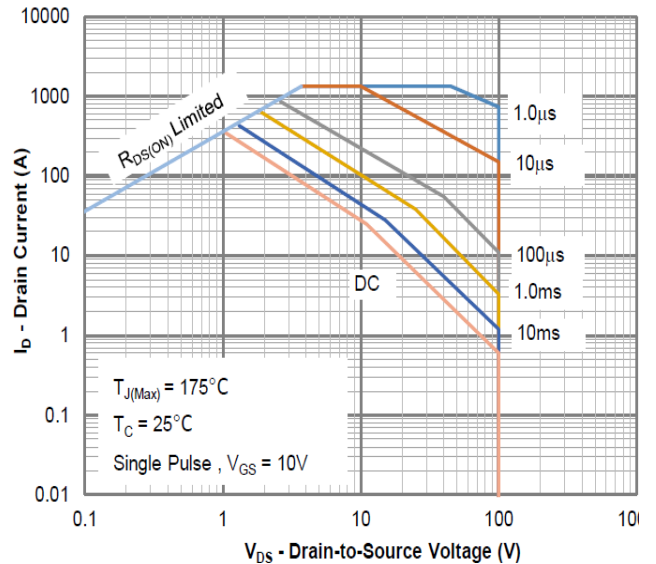


Fig.11 Power Derating

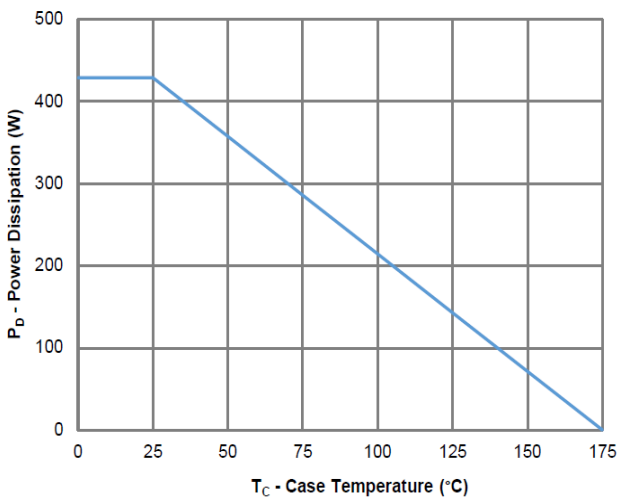
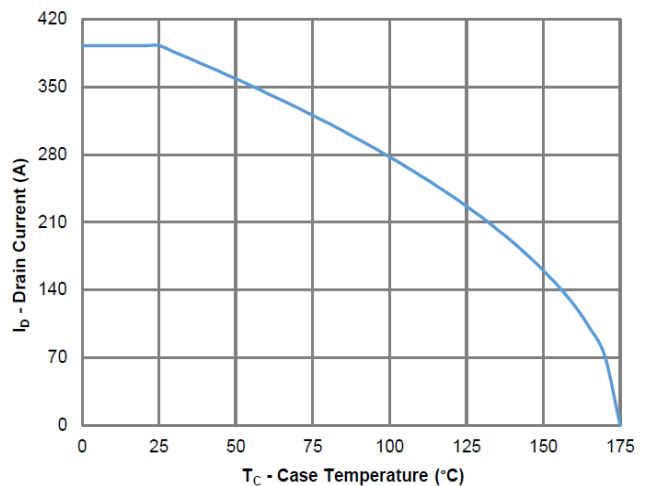
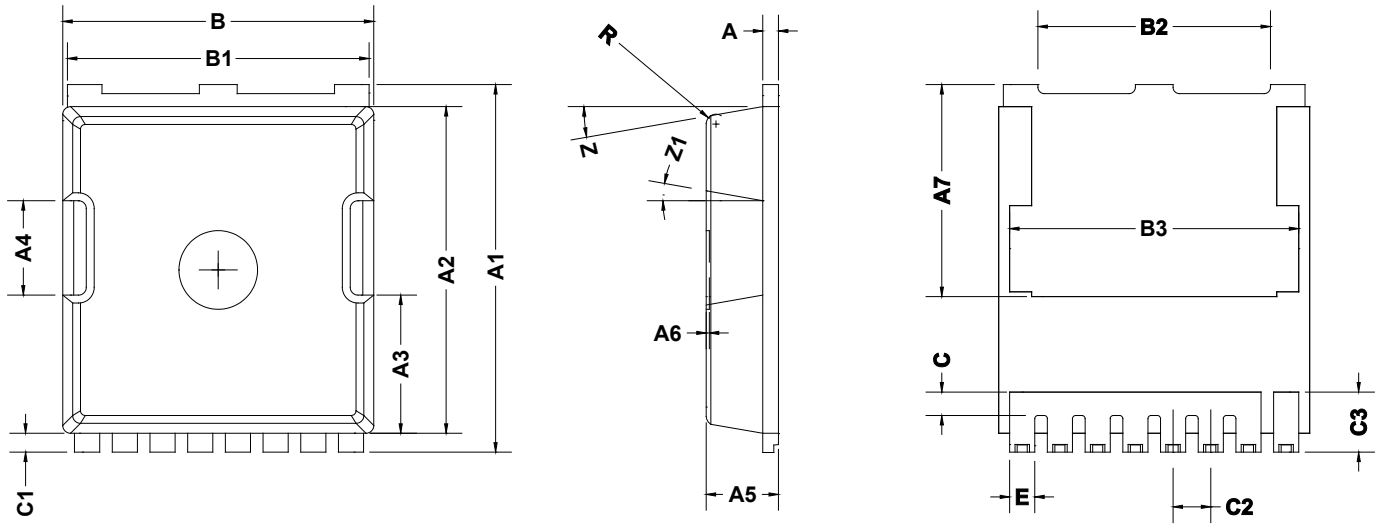


Fig.12 Drain Current Derating



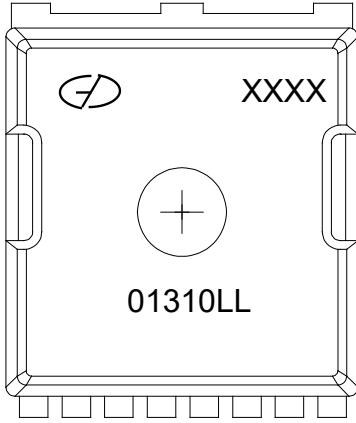
## Package Outline Dimensions (Unit: millimeters)

### TOLL




TOLL							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.400	0.500	0.600	B2	7.300	7.400	7.500
A1	11.58	11.68	11.78	B3	9.100	9.200	9.300
A2	10.33	10.38	10.43	C	0.650	0.750	0.850
A3	4.290	4.390	4.490	C1	0.500	0.600	0.700
A4	2.900	3.000	3.100	C2	1.100	1.200	1.300
A5	2.250	2.300	2.350	C3	1.810	1.910	2.010
A6	-	0.100	0.200	E	0.700	0.800	0.900
A7	6.640	6.740	6.840	R	-	-	0.3
B	9.850	9.900	9.950	Z	-	-	10°
B1	9.500	9.600	9.700	Z1	-	10°	-

**Marking Outline**



Part Name: GMN01310LL

1. Logo Mark: 
2. P/N Mark: 01310LL
3. Date Code: XXXX

**Revision History**

Version	Date	Major Changes
Rev.A	2024.08.05	Official Release

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