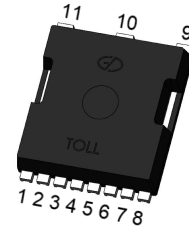


N-Channel 40V (D-S) Power MOSFET

Features

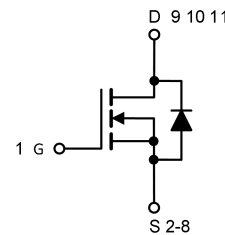
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM $R_{ds(on)} \cdot Q_g$
- RoHS Compliant, Halogen Free, Pb-Free
- AEC-Q101 Qualified
- MSL 1



TOLL

Applications

- Automotive systems
- 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}	40	V
Gate Source Voltage	V_{GS}	± 20	V
Drain Current, Continuous $V_{GS}=10\text{V}$ (Note 1)	I_D	$T_C=25^\circ\text{C}$	180
		$T_C=100^\circ\text{C}$	107
Drain Current, Pulsed (Note 2)	I_{DM}	720	A
Single Avalanche Energy @ $L=0.3\text{mH}$	E_{AS}	590	mJ
Power Dissipation (Note 3)	P_D	290	W
Operating Junction/ Storage Temperature Range	T_J / T_{STG}	-55 to +150	$^\circ\text{C}$

Note 1: Calculated continuous current based on maximum allowable junction temperature.

Note 2: Repetitive rating; pulse width limited by max. junction temperature.

Thermal Characteristics

Parameter	Symbol	Max	Unit
Thermal Resistance Junction to Case (Note 3)	R_{thJC}	0.43	$^\circ\text{C/W}$

Note 3: The power dissipation P_D is based on max. junction temperature, using junction-to-case thermal resistance.

Electrical Characteristics (T_J =25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	40	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	--	--	1	uA
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250uA	2	--	4	V
Gate Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
Drain-Source On-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =40A	--	1.6	3	mΩ
Total Gate Charge	Q _g	I _D = 20A, V _{DS} =20V, V _{GS} = 10V	--	135	--	nC
Gate Source Charge	Q _{gs}		--	25	--	
Gate Drain Charge	Q _{gd}		--	35	--	
Turn-on Delay Time	t _{d(on)}	V _{GS} =10V, V _{DD} =20V, R _{GEN} =3.6Ω, R _L =1Ω	--	32	--	ns
Turn-on Rise Time	t _r		--	31	--	
Turn-off Delay Time	t _{d(off)}		--	68	--	
Turn-off Fall Time	t _f		--	23	--	
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =30V, f=1MHz	--	10547	--	pF
Output Capacitance	C _{oss}		--	654	--	
Reverse Transfer Capacitance	C _{rss}		--	553	--	

Reverse Diode Characteristics (T_J =25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I _S	T _C =25°C	--	--	180	A
Pulsed Source Current (Body Diode)	I _{SM}		--	--	720	
Diode Forward Voltage	V _{SD}	I _S =40A, V _{GS} =0V	--	--	1.2	V
Reverse Recovery Time	T _{rr}	T _C =25°C, I _F =20A, di/dt = 100 A/μs	--	50	--	ns
Reverse Recovery Charge	Q _{rr}		--	75	--	nC

Typical Characteristics Curves ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 - Typical Output Characteristics

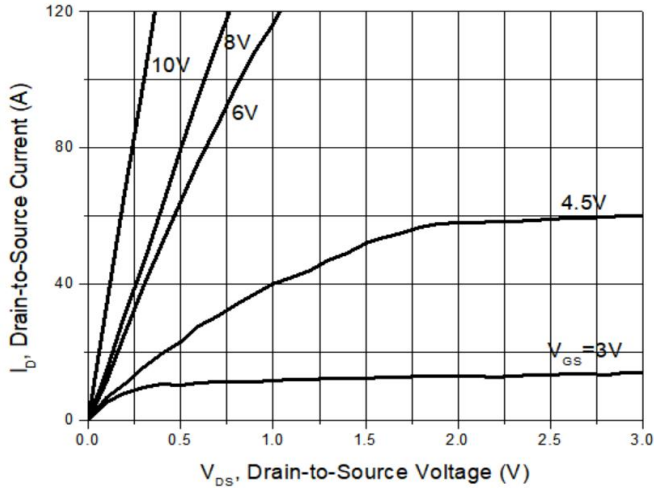


Fig.2 - Typical Transfer Characteristics

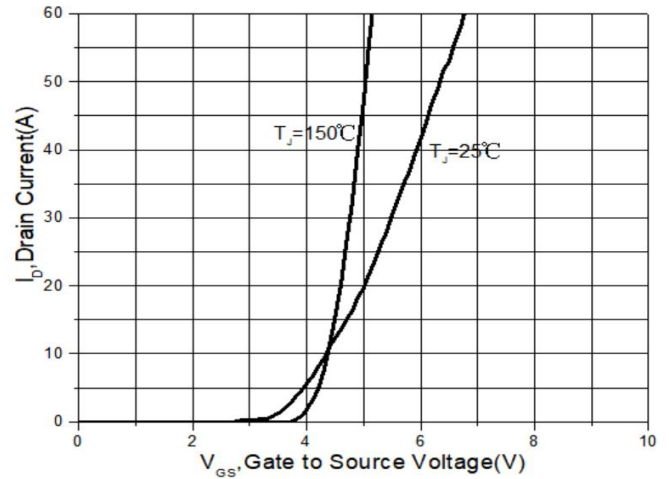


Fig.3 - Drain-to-Source Breakdown Voltage vs. Junction Temperature

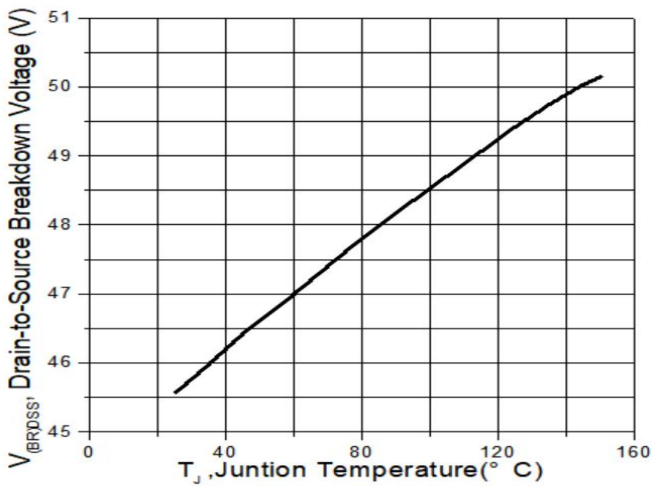


Fig.4 - Normalized On-Resistance vs. Junction Temperature

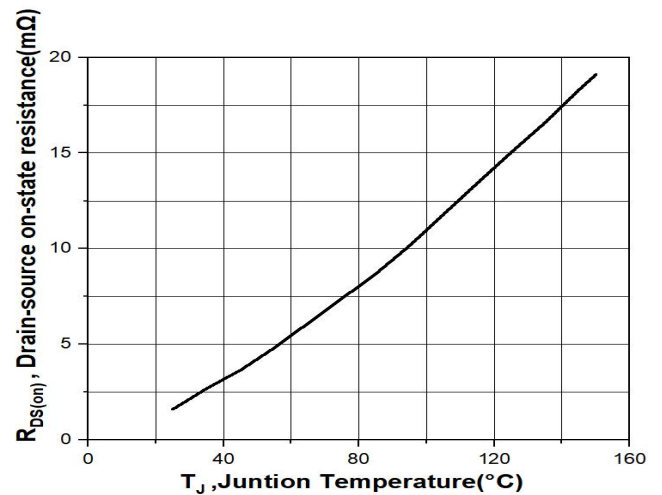


Fig.5 - Normalized $V_{GS(th)}$ vs. Junction Temperature

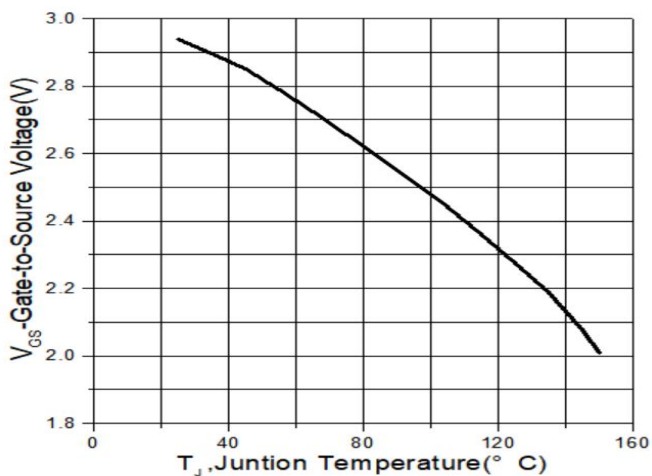
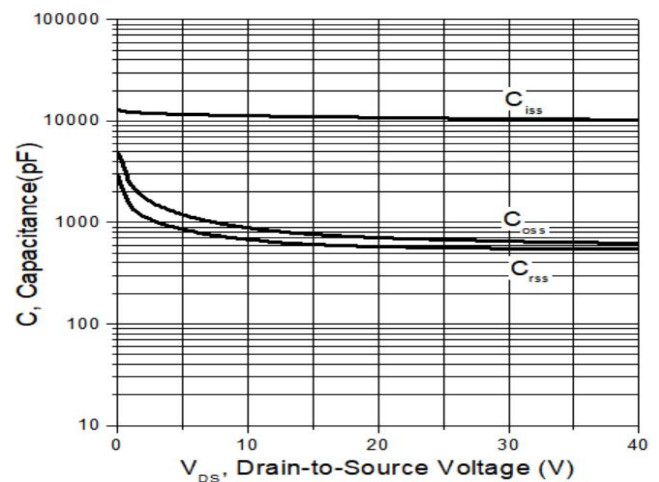
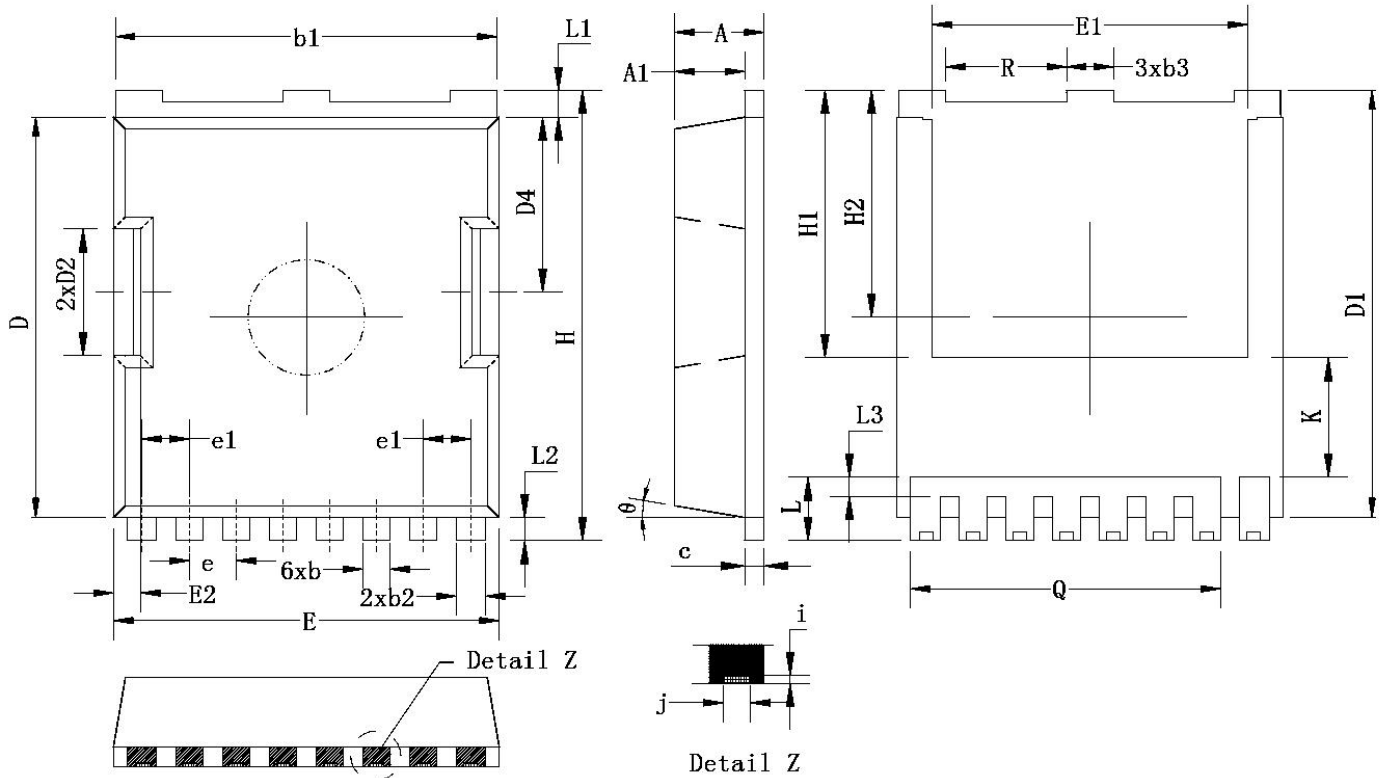


Fig.6 - Capacitance Characteristics



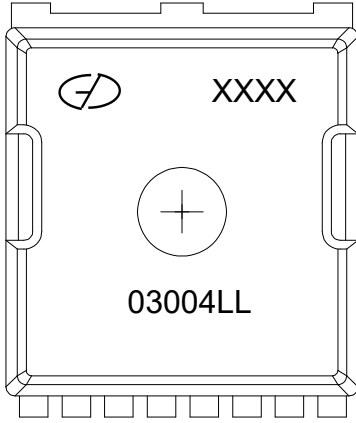
Package Outline Dimensions (Unit: millimeters)

TOLL




Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.25	2.30	2.35	E2	0.65	0.70	0.75
A1	1.75	1.80	1.85	H	11.60	11.70	11.80
b	0.65	0.70	0.75	H1	6.95 BSC		
b1	9.75	9.80	9.85	H2	5.90 BSC		
b2	0.70	0.75	0.80	i	0.10 REF		
b3	1.15	1.20	1.25	j	0.35 REF		
c	0.45	0.50	0.55	K	3.10 REF		
D	10.35	10.40	10.45	L	1.55	1.65	1.75
D1	11.00	11.10	11.20	L1	0.65	0.70	0.75
D2	3.25	3.30	3.35	L2	0.50	0.60	0.70
D4	4.50	4.55	4.60	L3	0.40	0.50	0.60
e	1.20 BSC			Q	7.95 REF		
e1	1.225 BSC			R	3.05	3.10	3.15
E	9.85	9.90	9.95	θ	10°REF		
E1	8.00	8.10	8.20				

Marking Outline



Part Name: GMN03004LL

1. Logo Mark: 
2. Date Code: XXXX
3. P/N Mark: 03004LL

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