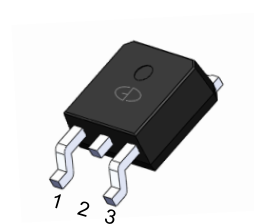


N-Channel 40V (D-S) Power MOSFET

Features

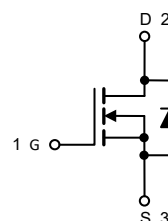
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM $R_{DS(on)} \cdot Q_g$
- Halogen Free, Pb-Free
- RoHS Compliant



TO-252 (D-PAK)

Applications

- DC/DC
- Motors, lamps
- Power switching



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 $V_{GS}=10\text{V}$	I_D	$T_C=25^\circ\text{C}$ 33	A
		$T_C=100^\circ\text{C}$ 21	
Drain Current, Pulsed (Note 1)	I_{DM}	132	A
Single Avalanche Energy (Note 2)	E_{AS}	90	mJ
Power Dissipation	P_D	$T_C=25^\circ\text{C}$ 31	W
		$T_C=100^\circ\text{C}$ 13	
Operating Junction/ Storage Temperature Range	T_J / T_{STG}	-55 to +150	$^\circ\text{C}$

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

Note 2: $V_{DD} = 20\text{V}$, $V_{GS} = 10\text{V}$, $L = 0.5\text{mH}$, $R_G = 25\Omega$, starting $T_J = 25^\circ\text{C}$.

Thermal Characteristics

Parameter	Symbol	Max	Unit
Thermal Resistance Junction to Case	R_{thJC}	4	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 3)	R_{thJA}	62.5	$^\circ\text{C/W}$

Note 3: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a 25°C still air environment.

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	1	--	2.5	V
Gate Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
Drain-Source On-state Resistance (Note 4)	R _{DS(on)}	V _{GS} =10V, I _D =20A	--	11.5	15	mΩ
		V _{GS} =4.5V, I _D =15A	--	15.5	20	
Total Gate Charge	Q _g	V _{GS(off)} =0V, V _{GS(on)} =10V, V _{DD} =20V, I _D =20A	--	24.5	--	nC
Gate-Source Charge	Q _{gs}		--	3.7	--	
Gate-Drain Charge	Q _{gd}		--	6.2	--	
Turn-on Delay Time	t _{d(on)}	V _{GS} =10V, V _{DD} =20V, R _L =1Ω, R _G =6Ω	--	12.6	--	ns
Turn-on Rise Time	t _r		--	3.6	--	
Turn-off Delay Time	t _{d(off)}		--	30.8	--	
Turn-off Fall Time	t _f		--	3.2	--	
Gate Resistance	R _g	V _{GS} =0V, f=1MHz, open drain	--	1.8	--	Ω
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =20V, f=1MHz	--	1314	--	pF
Output Capacitance	C _{oss}		--	95.4	--	
Reverse Transfer Capacitance	C _{rss}		--	78.5	--	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Current, Continuous	I _{SD}	T _C =25°C	--	--	36	A
Diode Forward Voltage (Note 4)	V _{SD}	I _F =20A, V _{GS} =0V	--	--	1.2	V
Reverse Recovery Time	T _{rr}	I _F =20A, di/dt=100A/μs	--	17.5	--	ns
Reverse Recovery Charge	Q _{rr}		--	10.9	--	nC

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

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

Fig.1 - Output Characteristics

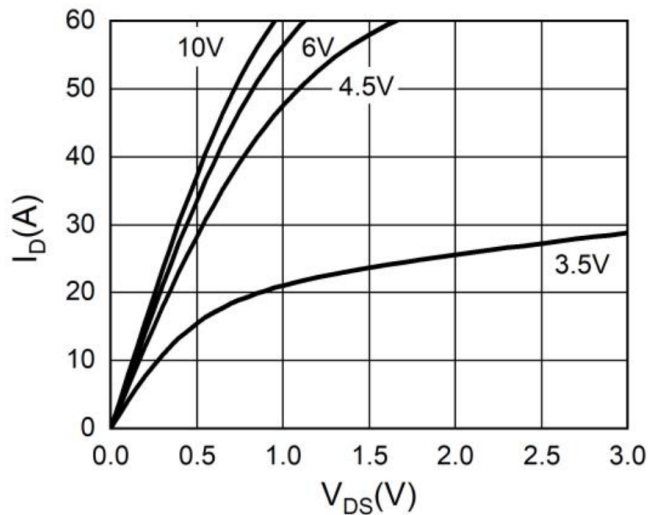


Fig.2 - Transfer Characteristics

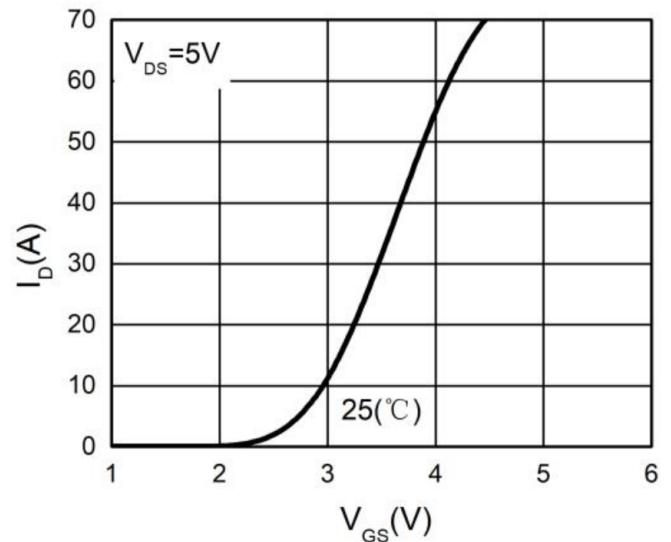


Fig.3 - Normalized On-Resistance

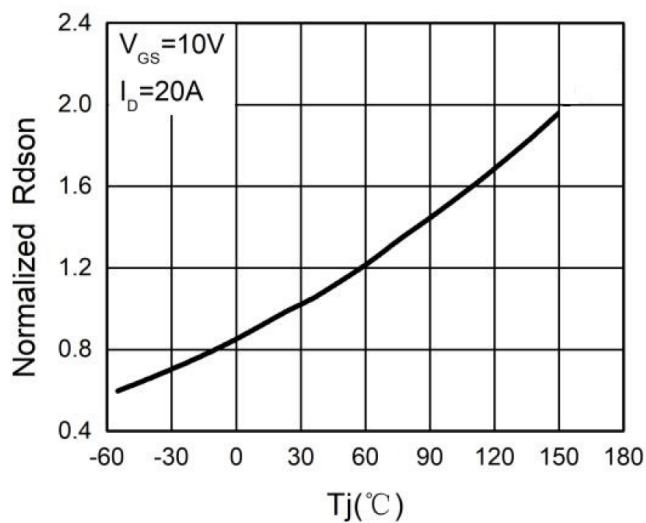


Fig.4 - Capacitance

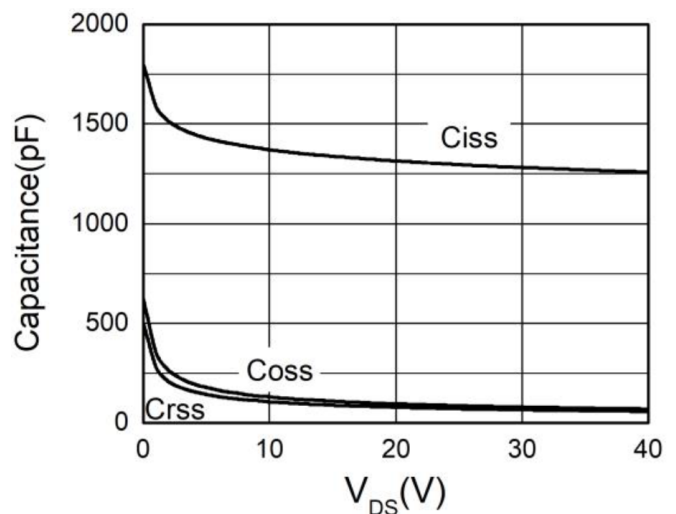


Fig.5 - Gate charge

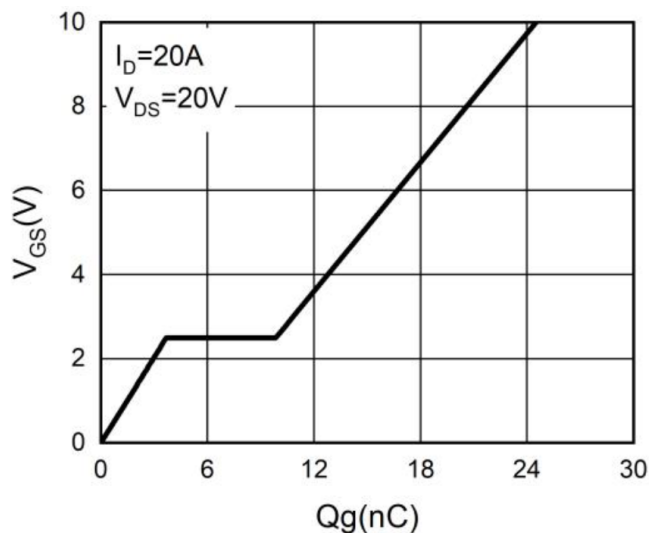
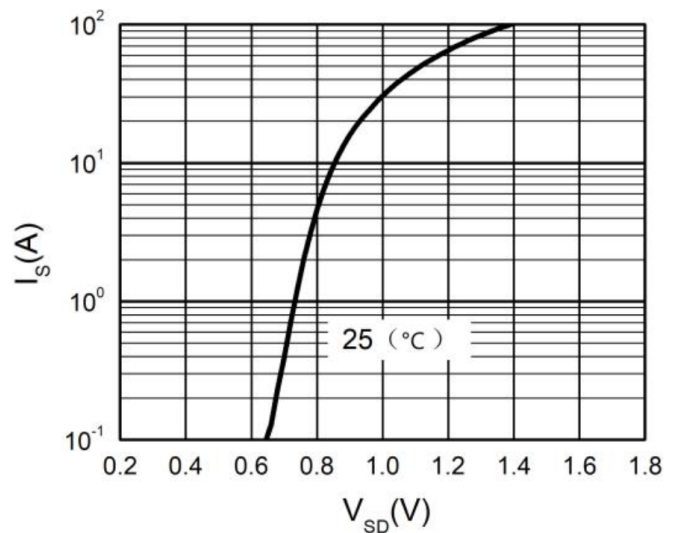


Fig.6 - Forward Characteristic



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

Fig.7 - Safe Operating Area

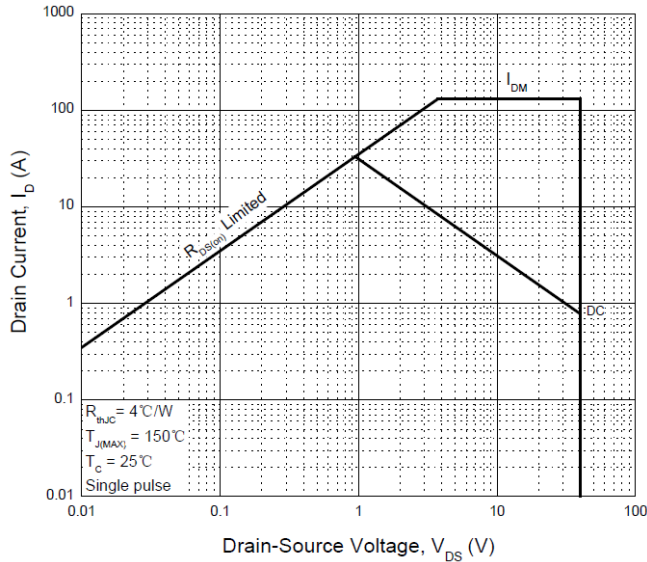


Fig.8 - Power Derating

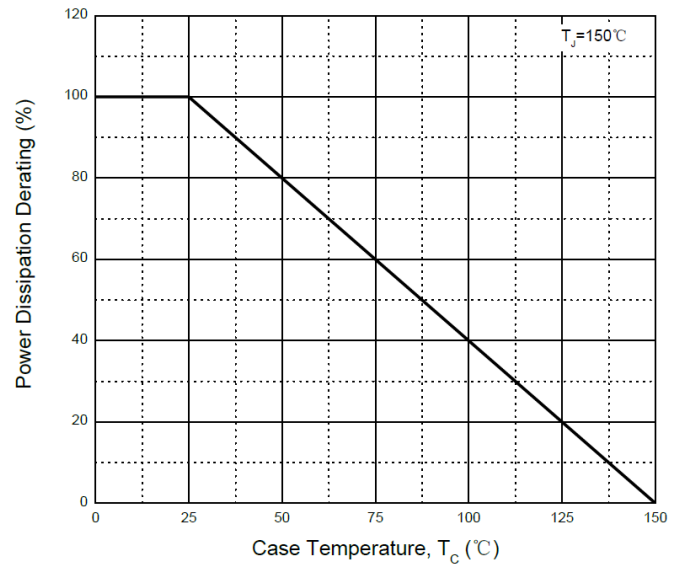
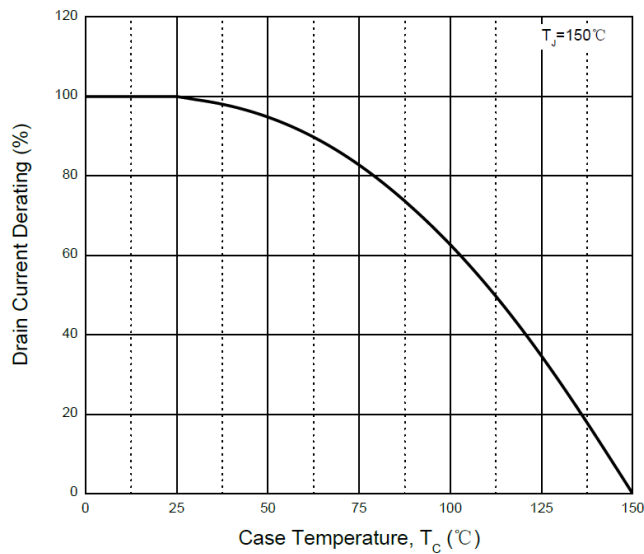
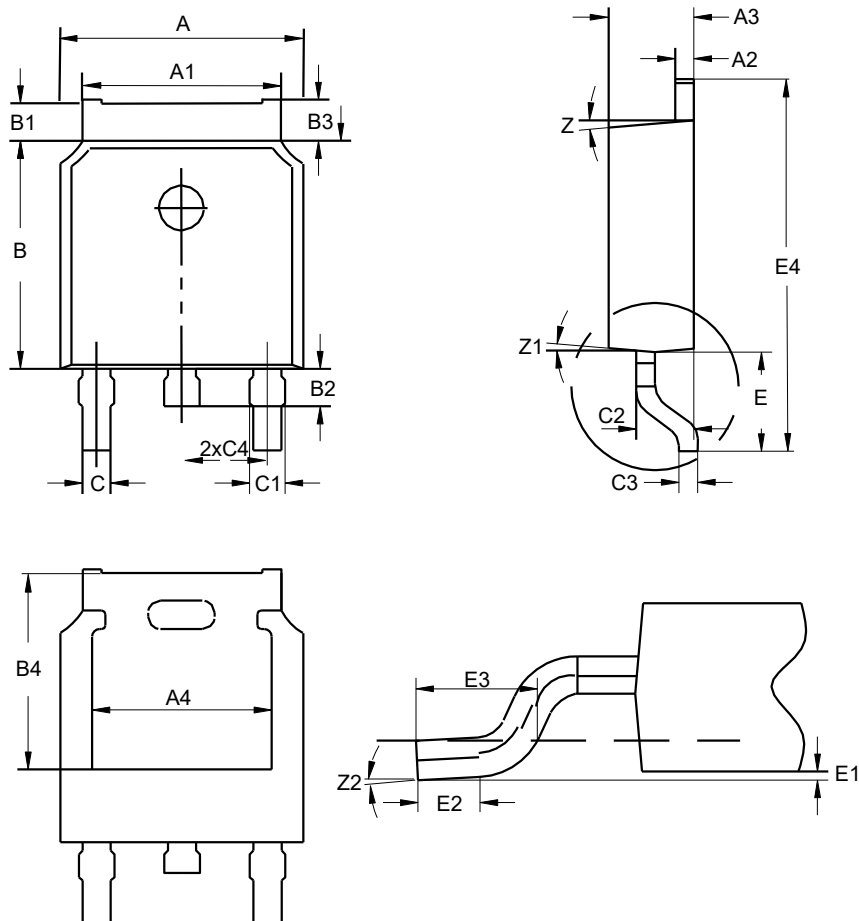


Fig.9 - Drain Current Derating



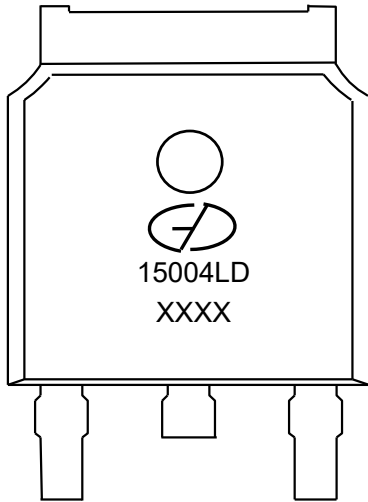
Package Outline Dimensions (Unit: millimeters)

TO-252(D-PAK)



TO-252							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	6.34	6.54	6.74	C2	1.34	1.54	1.74
A1	5.2	5.3	5.4	C3	0.4	0.5	0.6
A2	0.4	0.5	0.6	C4	2.09	2.29	2.49
A3	2.08	2.28	2.48	E	2.6	2.9	3.2
A4	4.6	4.8	5.0	E1	0	-	0.15
B	5.8	6.1	6.4	E2	0.7	-	-
B1	0.82	1.02	1.22	E3	1.3	1.6	1.9
B2	0.8	1	1.2	E4	9.8	10.1	10.4
B3	0.9	1.1	1.3	Z	-	7°	-
B4	5.05	5.25	5.45	Z1	-	7°	-
C	0.66	0.76	0.86	Z2	0°	-	10°
C1	0.65	0.85	1.05	-	-	-	-

Marking Outline



Part Name: GMN15004LD

1. Logo Mark: 
2. P/N Mark: 15004LD
3. Date Code: XXXX

Revision History

Version	Date	Major Changes
Rev.A	2024.05.30	Official Release

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