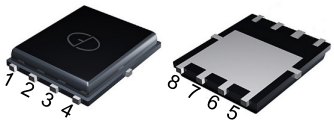
N-Channel 60V (D-S) Power MOSFET

Features

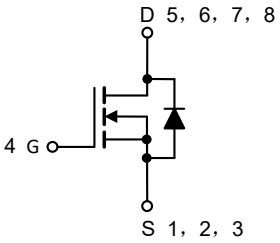
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM Rdson*Qg
- RoHS Compliant, Halogen Free, Pb-Free
- RoHS Compliant
- MSL 1



PDFN3333

Applications

- DC/DC
- Motors, lamps
- Power switching



Absolute Maximum Ratings (T_J=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain Source Voltage		V_{DS}	60	V
Gate Source Voltage		V_{GS}	±20	V
Drain Current, Continuous V_{GS}=10V	T_C=25°C	I_D	45	A
	T_C=100°C		29	
Drain Current, Pulsed *(Note 1)*		I_{DM}	180	A
Single Avalanche Energy *(Note 2)*		E_{AS}	48	mJ
Power Dissipation	T_C=25°C	P_D	42	W
	T_C=100°C		17	
Operating Junction/ Storage Temperature Range		T_J/ T_{STG}	-55 to +150	°C

Note 1: Single pulse; t_p ≤ 1us.
Note 2: V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω, starting T_J = 25 °C.

Thermal Characteristics

Parameter	Symbol	Max	Unit
Thermal Resistance Junction to Case	R_{thJC}	3	°C/W
Thermal Resistance Junction to Ambient *(Note 3)*	R_{thJA}	62.5	°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	60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	--	--	1	uA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_{DS}=250uA	1.6	1.8	2	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	--	12	13	mΩ
		V_{GS}=4.5V, I_D=15A	--	16	17	
Total Gate Charge	Q_g	$V_{GS(off)}$=0V, $V_{GS(on)}$=10V, V_{DD}=30V, I_D=20A	--	13	--	nC
Gate-Source Charge	Q_{gs}		--	2.2	--	
Gate-Drain Charge	Q_{gd}		--	3.4	--	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DD}=30V, R_L=0.75Ω, R_G=3Ω	--	7.9	--	ns
Turn-on Rise Time	t_r		--	31	--	
Turn-off Delay Time	$t_{d(off)}$		--	17	--	
Turn-off Fall Time	t_f		--	2.8	--	
Gate Resistance	R_g	V_{GS}=0V, f=1MHz, open drain	--	2.1	--	Ω
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=60V, f=1MHz	--	704	--	pF
Output Capacitance	C_{oss}		--	124	--	
Reverse Transfer Capacitance	C_{rss}		--	5.2	--	

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	--	--	24	A
Diode Forward Voltage *(Note 4)*	V_{SD}	I_F=20A, V_{GS}=0V	--	--	1.2	V
Reverse Recovery Time	T_{rr}	V_R =30V, I_F =20A, di/dt = 100 A/μs	--	19	--	ns
Reverse Recovery Charge	Q_{rr}		--	9.3	--	nC

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

Typical Characteristics Curves (T_J = 25℃ unless otherwise noted)

Fig. 1 - Output Characteristics

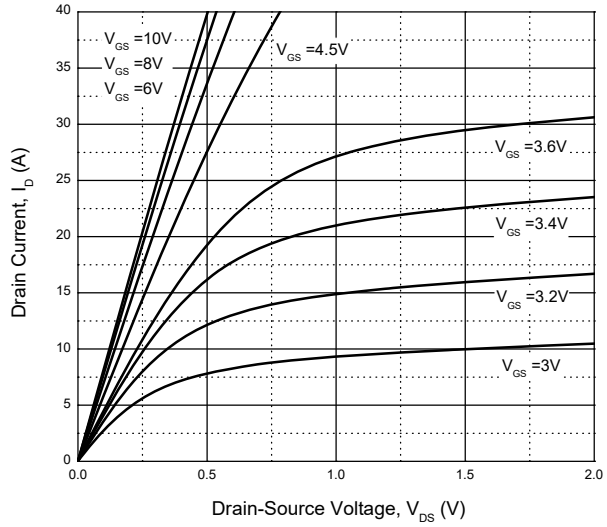


Fig. 2 - Transfer Characteristics

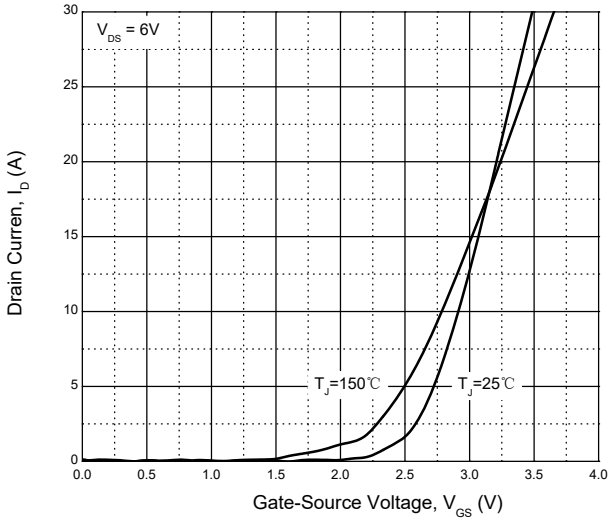


Fig. 3 - Drain-Source On-Resistance

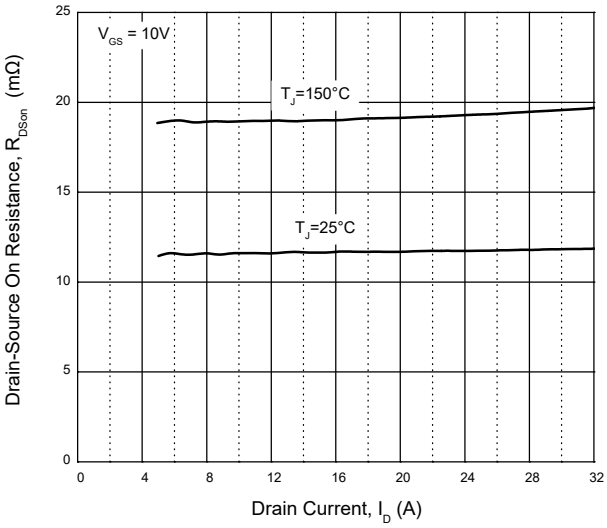


Fig. 4 - Normalized On-Resistance

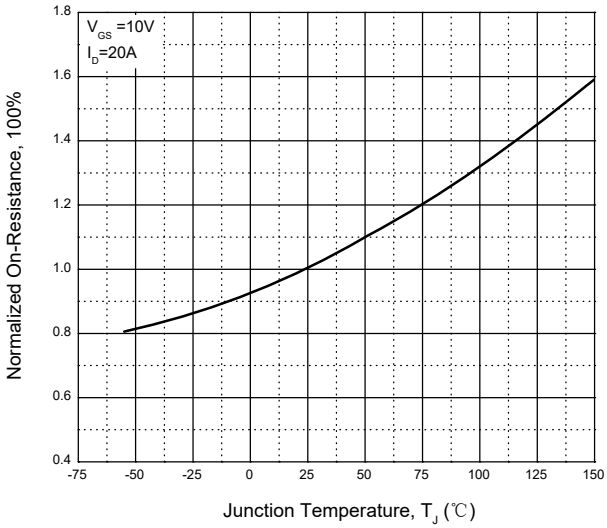


Fig. 5 - Drain-Source On-Resistance

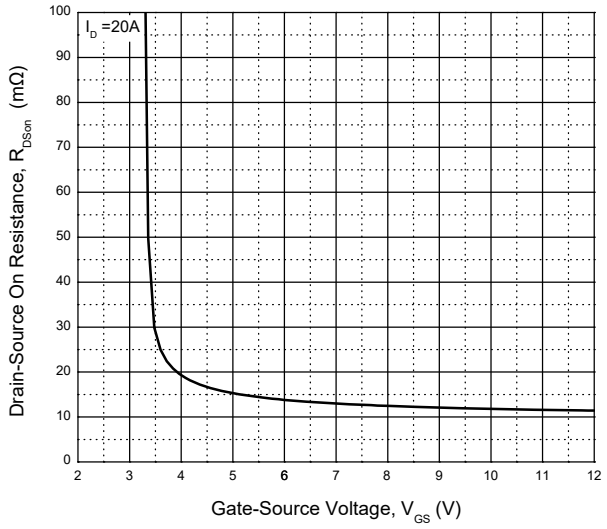
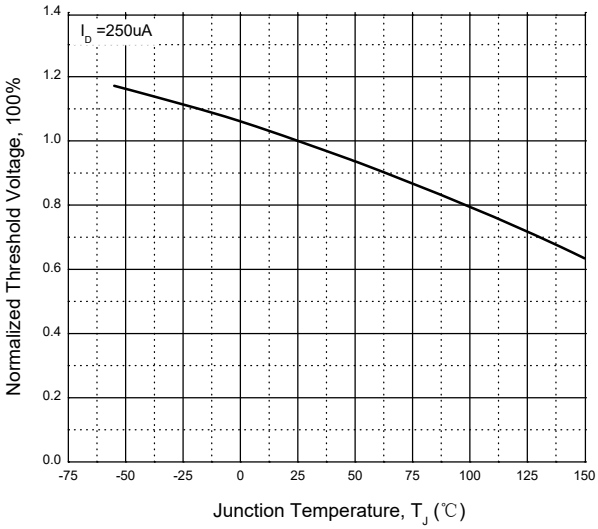


Fig. 6 - Normalized Threshold Voltage



Typical Characteristics Curves (T_J = 25℃ unless otherwise noted)

Fig. 7 - Capacitance

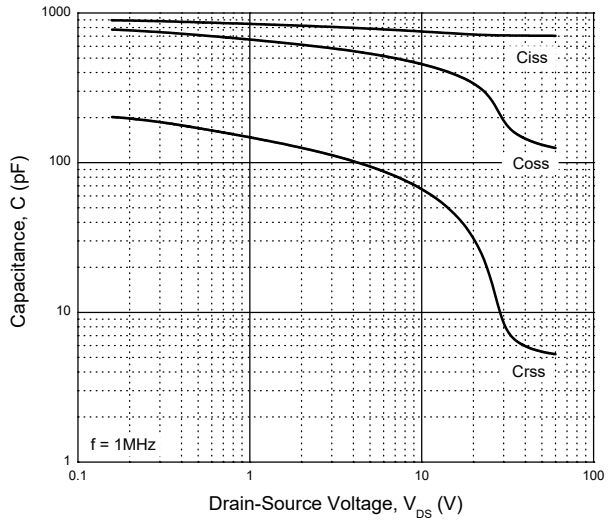


Fig. 8 - Gate Charge

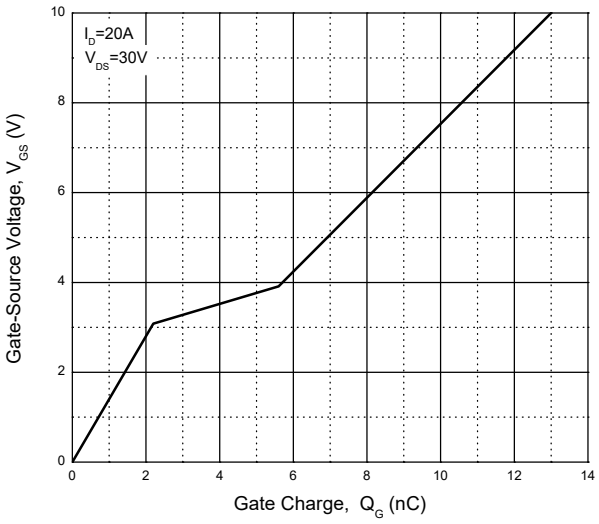


Fig. 9 - Forward Characteristic

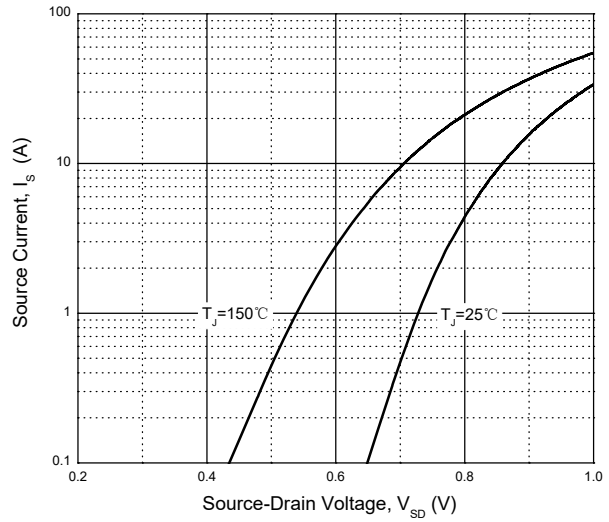


Fig. 10 - Safe Operating Area

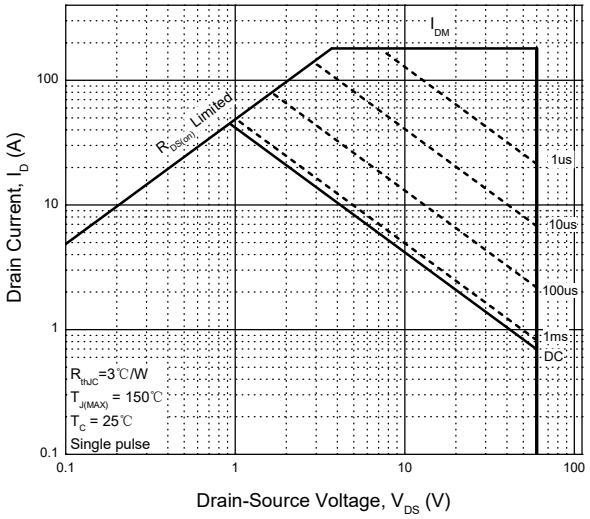
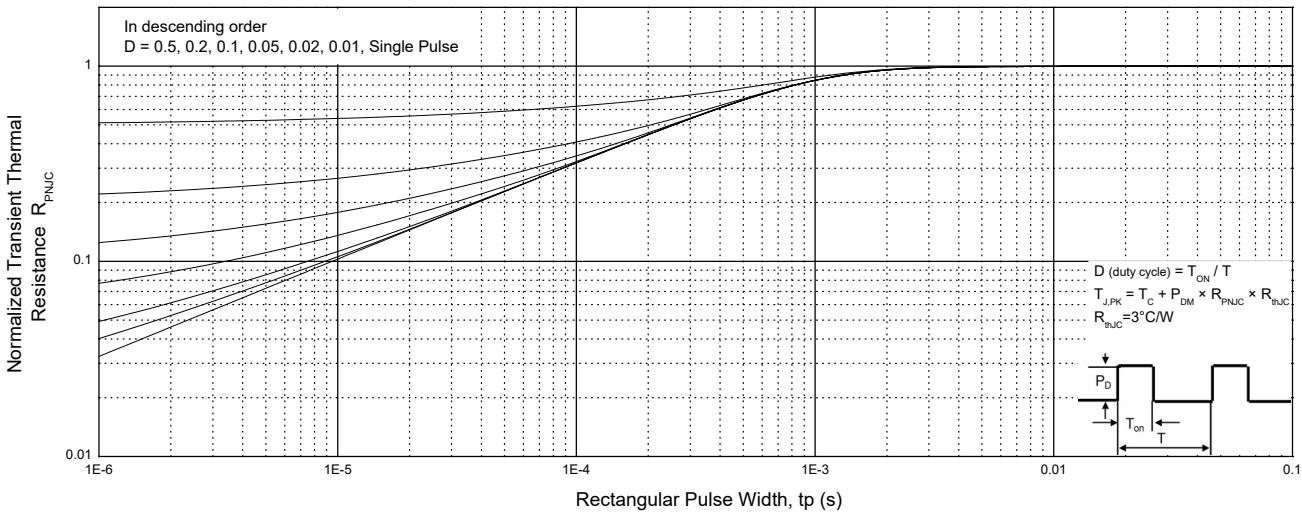


Fig.11 - Normalized Thermal Impedance, Junction-Case



Typical Characteristics Curves (TJ = 25°C unless otherwise noted)

Fig. 12 - Power Derating

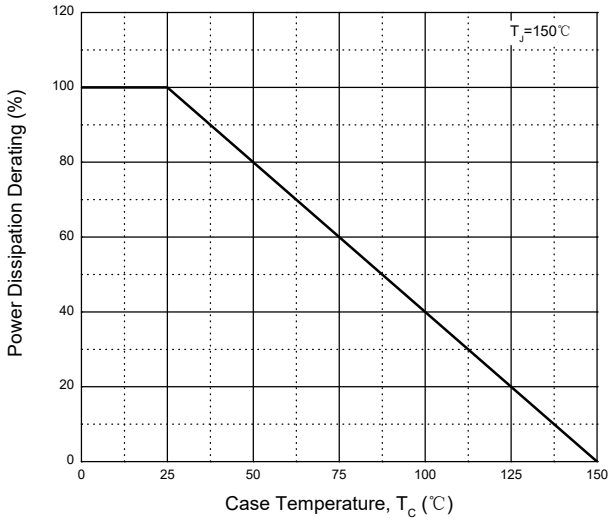
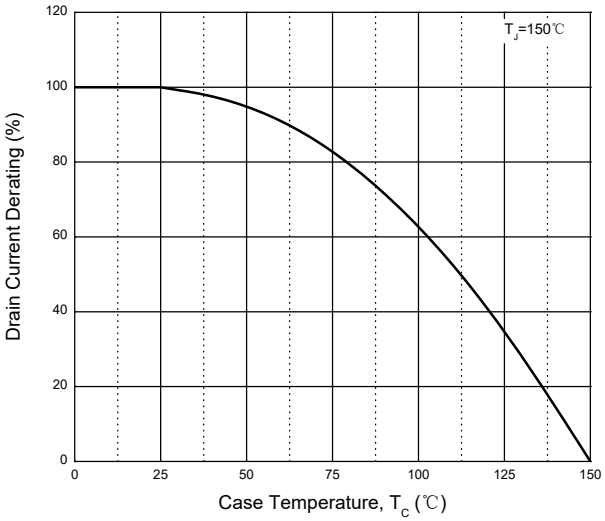
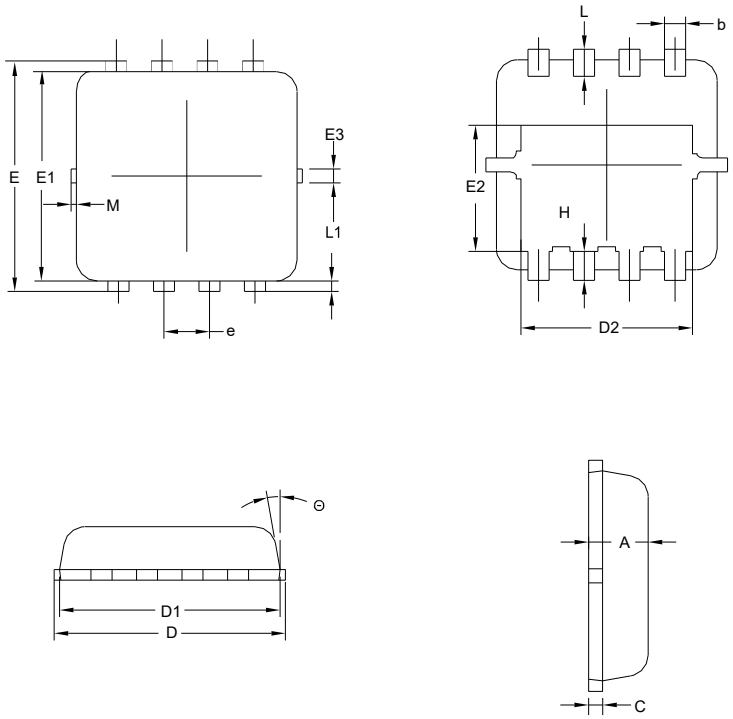


Fig. 13 - Drain Current Derating



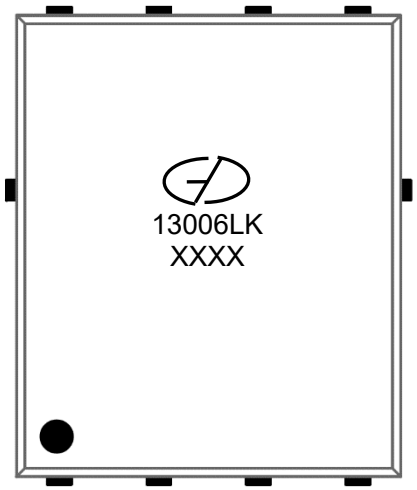
Package Outline Dimensions (Unit: millimeters)

PDFN3333



PDFN3333							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.75	0.85	0.95	D1	3.0	3.15	3.25
b	0..2	0.3	0.4	D2	2.29	2.47	2.65
c	0.10	0.15	0.25	e	0.65BSC		
E	3.15	3.3	3.45	H	0.28	0.41	0.65
E1	2.9	3.05	3.2	L	0.3	0.4	0.5
E2	1.54	1.76	1.98	L1	-	0.13	-
E3	0.1	0.2	0.3	θ	0°	7°	14°
D	3.15	3.3	3.45	M	-	-	15°

Marking Outline



Part Name: GMN13006LK

1. Logo Mark:
2. P/N Mark: 13006LK
3. Date Code: XXXX
4. Pin 1#: ●

Revision History

Version	Date	Major Changes
Rev.A	2025.12.03	Official Release

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