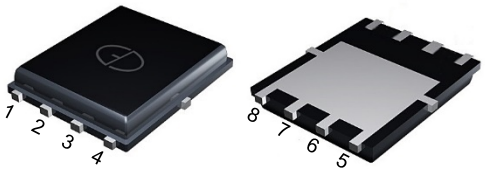
N-Channel 40V (D-S) Power MOSFET

Features

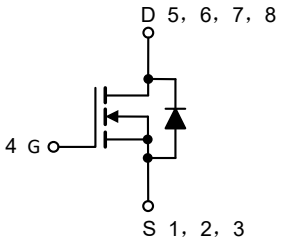
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM Rdson*Qg
- Halogen Free, Pb-Free
- RoHS Compliant



PDFN5060

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}	40	V
Gate Source Voltage		V_{GS}	±20	V
Drain Current, Continuous V_{GS}=10V	T_C=25°C	I_D	57	A
	T_C=100°C		36	
Drain Current, Pulsed *(Note 1)*		I_{DM}	228	A
Single Avalanche Energy *(Note 2)*		E_{AS}	256	mJ
Power Dissipation	T_C=25°C	P_D	33	W
	T_C=100°C		14	
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}	3.7	°C/W
Thermal Resistance Junction to Ambient *(Note 3)*	R_{thJA}	38	°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	--	4.5	5.4	mΩ
		V_{GS}=4.5V, I_D=15A	--	8	10.4	
Total Gate Charge	Q_g	$V_{GS(off)}$=0V, $V_{GS(on)}$=10V, V_{DD}=20V, I_D=20A	--	55	--	nC
Gate-Source Charge	Q_{gs}		--	8.7	--	
Gate-Drain Charge	Q_{gd}		--	13.5	--	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DD}=20V, R_G=3Ω, R_L=1Ω	--	14	--	ns
Turn-on Rise Time	t_r		--	8	--	
Turn-off Delay Time	$t_{d(off)}$		--	44	--	
Turn-off Fall Time	t_f		--	15	--	
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=20V, f=1MHz	--	3000	--	pF
Output Capacitance	C_{oss}		--	250	--	
Reverse Transfer Capacitance	C_{rss}		--	170	--	

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	--	--	57	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 =100 A/μs	--	44	--	ns
Reverse Recovery Charge	Q_{rr}		--	49	--	nC

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

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

Fig.1 - Output Characteristics

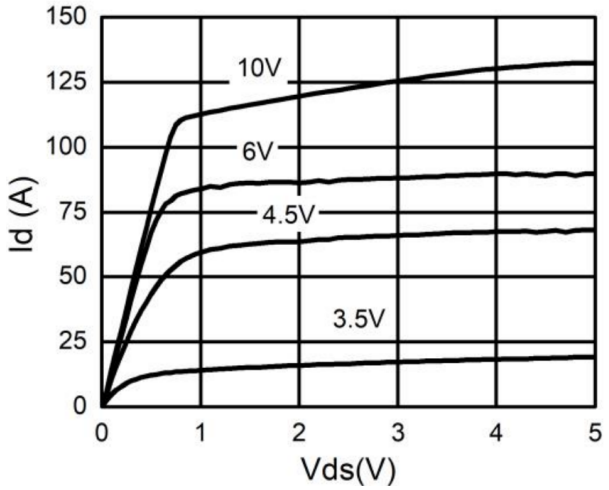


Fig.2 - Transfer Characteristics

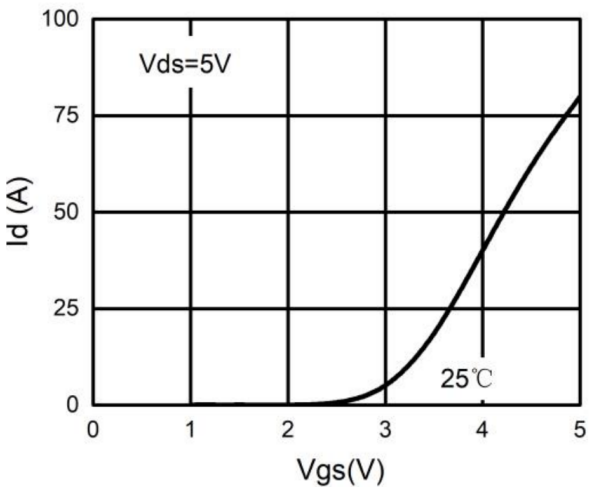


Fig.3 - Normalized On-Resistance

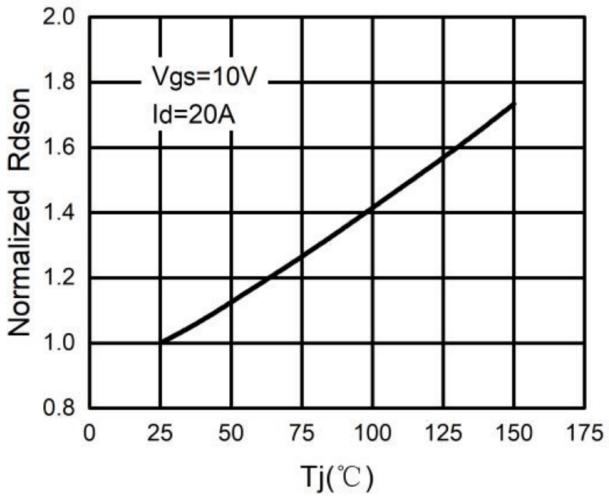


Fig.4 - Capacitance

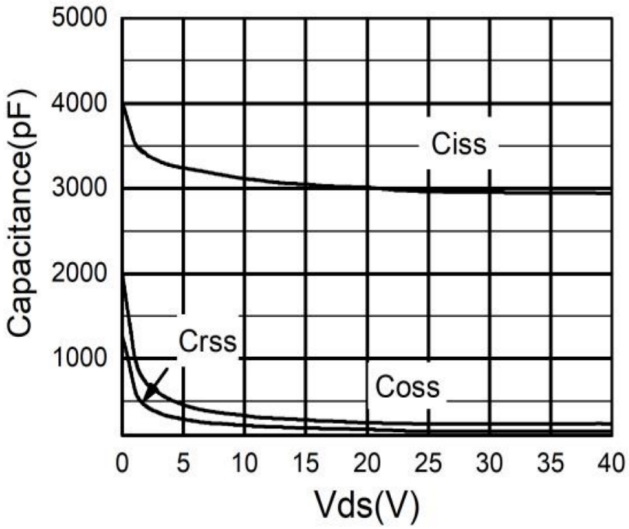


Fig.5 - Gate charge

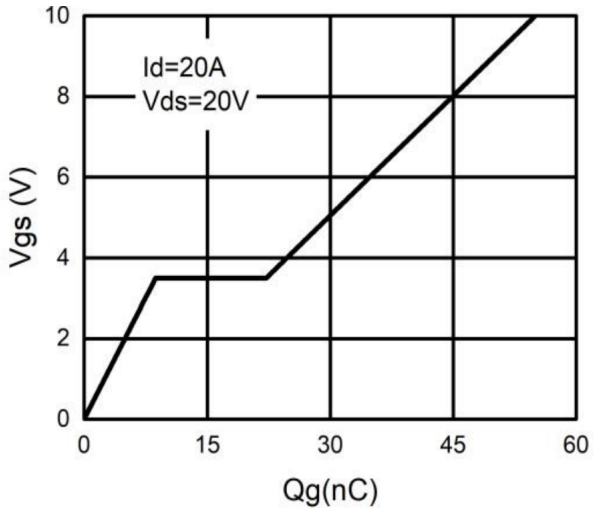
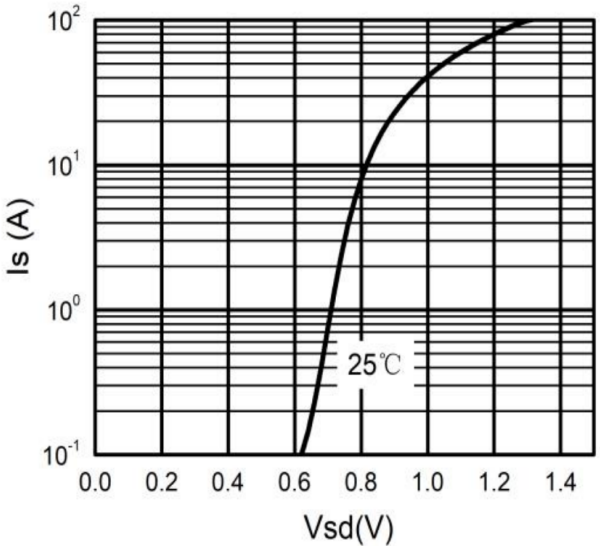


Fig.6 - Forward Characteristic



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

Fig.7 - Safe Operating Area

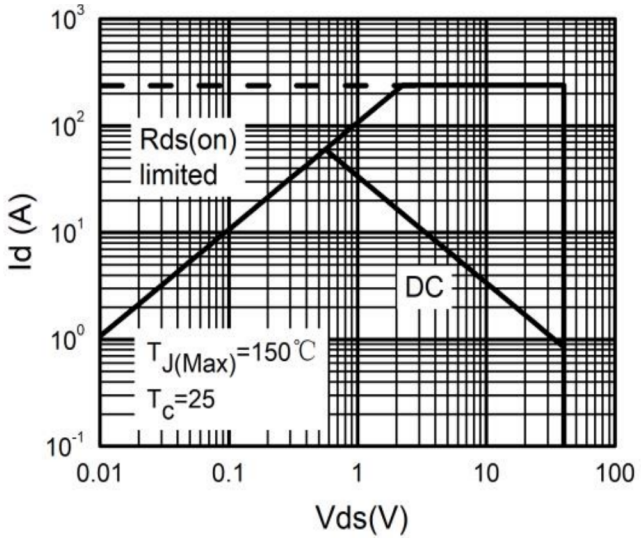


Fig.8 - Power Derating

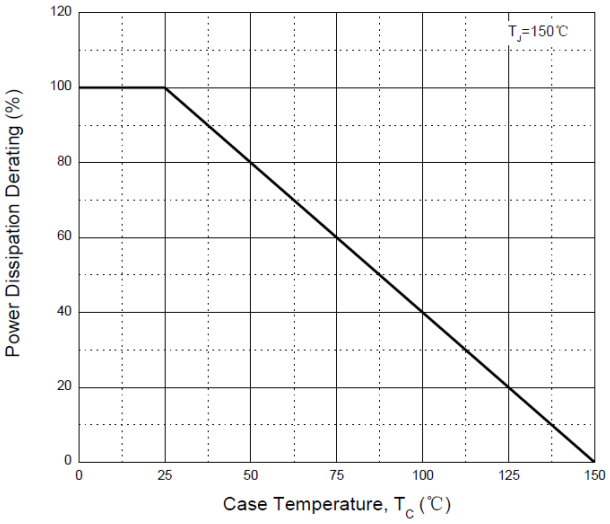
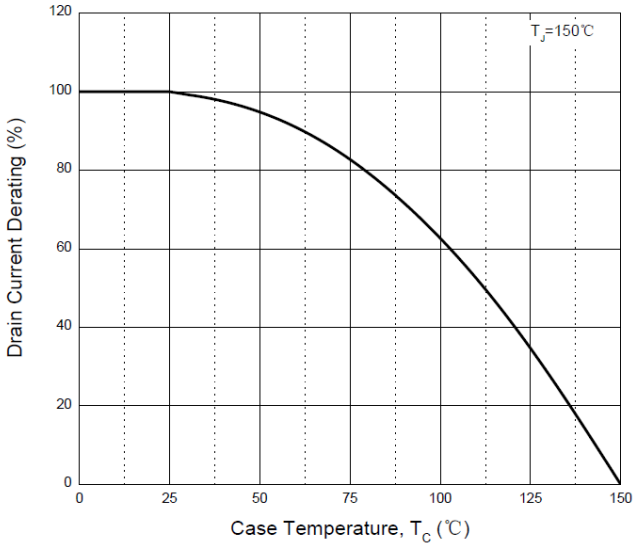
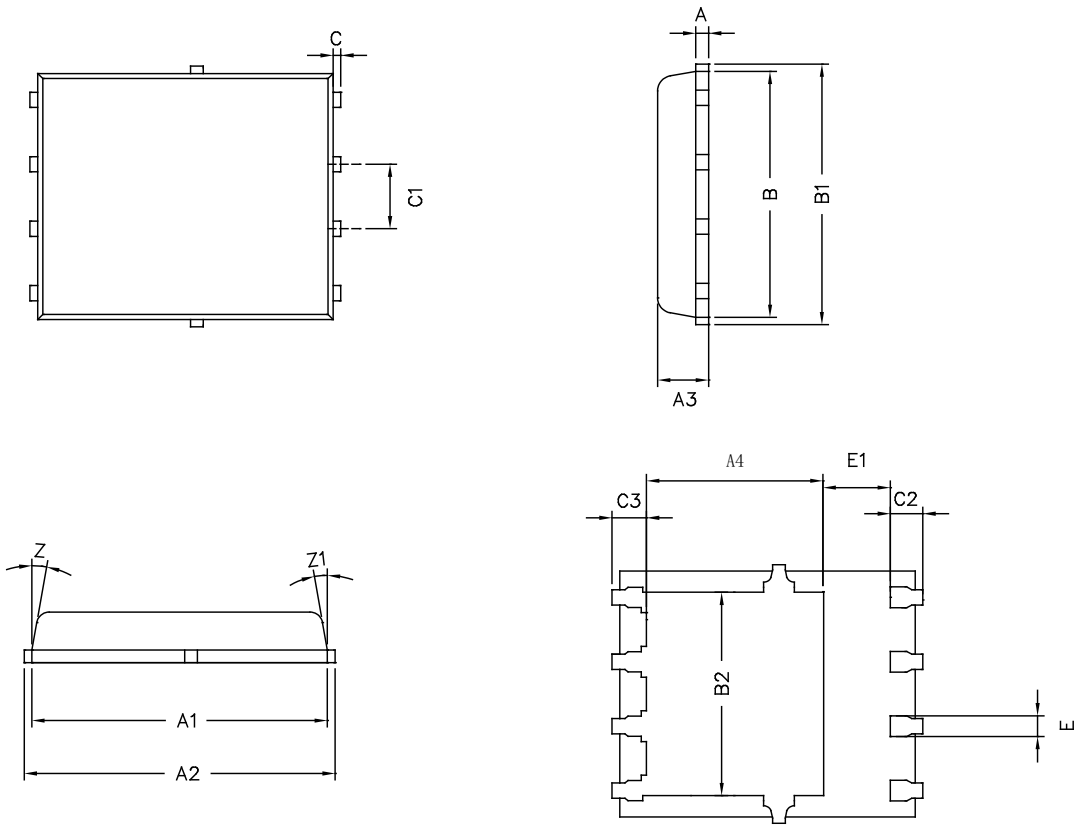


Fig.9 - Drain Current Derating



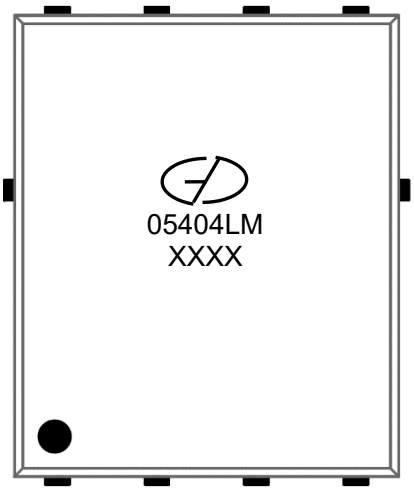
Package Outline Dimensions (Unit: millimeters)

PDFN5060



PDFN5060							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.15	0.25	0.35	C	0.05	0.15	0.25
A1	5.6	5.8	6.0	C1	1.17	1.27	1.37
A2	5.9	6.1	6.3	C2	0.53	0.63	0.73
A3	0.9	1.0	1.1	C3	0.53	0.63	0.73
A4	-	3.5	-	E	0.31	0.41	0.51
B	4.7	4.9	5.1	E1	1.2	1.3	1.4
B1	5.0	5.2	5.4	Z	8°	10°	12°
B2	-	4.01	-	Z1	8°	10°	12°

Marking Outline



Part Name: GMN05404LM

1. Logo Mark:
2. P/N Mark: 05404LM
3. Date Code: XXXX
4. Pin 1#: ●

Revision History

Version	Date	Major Changes
Rev.A	2024.04.09	Official Release

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