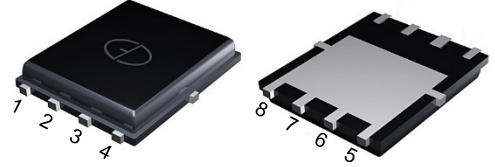


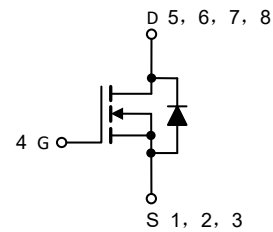
N-Channel 40V (D-S) Power MOSFET

Features

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



PDFN5060



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	I_D	$T_C=25^\circ\text{C}$	107
		$T_C=100^\circ\text{C}$	68
Drain Current, Pulsed (Note 1)	I_{DM}	428	A
Single Avalanche Energy (Note 2)	E_{AS}	576	mJ
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	58
		$T_C=100^\circ\text{C}$	23
Operating Junction/ Storage Temperature Range	T_J/ T_{STG}	-55 to +150	$^\circ\text{C}$

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

Note 2: $V_{DD} = 30\text{V}$, $V_{GS} = 10\text{V}$, $L = 1\text{mH}$, $R_G = 25\Omega$, starting $T_J = 25^\circ\text{C}$.

Thermal Characteristics

Parameter	Symbol	Max	Unit
Thermal Resistance Junction to Case	R_{thJC}	2.15	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 3)	R_{thJA}	38	$^\circ\text{C/W}$

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 ($T_J = 25^\circ\text{C}$ unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	--	--	1.0	μA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.0	--	2.5	V
Gate Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Drain-Source On-state Resistance (Note 4)	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	--	2.2	2.9	m Ω
		$V_{GS}=4.5V, I_D=20A$	--	3.3	4.4	
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=20V, I_D=20A$	--	112	--	nC
Gate-Source Charge	Q_{gs}		--	16.7	--	
Gate-Drain Charge	Q_{gd}		--	26.5	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=20V, R_L=1\Omega, R_{GEN}=2\Omega$	--	18	--	ns
Turn-on Rise Time	t_r		--	4.4	--	
Turn-off Delay Time	$t_{d(off)}$		--	67	--	
Turn-off Fall Time	t_f		--	9.5	--	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	0.67	--	Ω
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, f=1MHz$	--	6460	--	pF
Output Capacitance	C_{oss}		--	455	--	
Reverse Transfer Capacitance	C_{rss}		--	276	--	

Reverse Diode Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Current, Continuous	I_{SD}	$T_C=25^\circ\text{C}$	--	--	107	A
Diode Forward Voltage (Note 4)	V_{SD}	$V_{GS}=0V, I_F=20A$	--	--	1.2	V
Reverse Recovery Time	T_{rr}	$I_F=20A, di/dt = 500 A/\mu s$	--	6	--	ns
Reverse Recovery Charge	Q_{rr}		--	14	--	nC

Note 4: Pulse test; pulse width $\leq 380\mu s$, duty cycle $\leq 1\%$.

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

Fig.1 - Output Characteristics

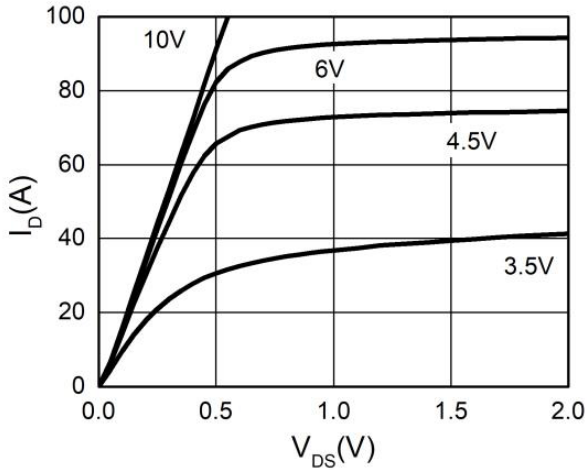


Fig.2 - Transfer Characteristics

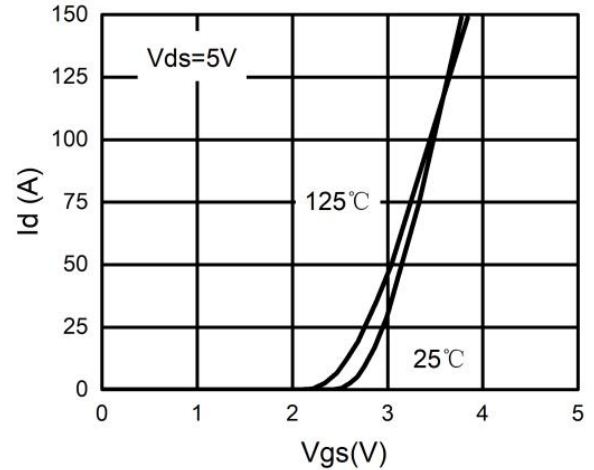


Fig.3 - Normalized On-Resistance

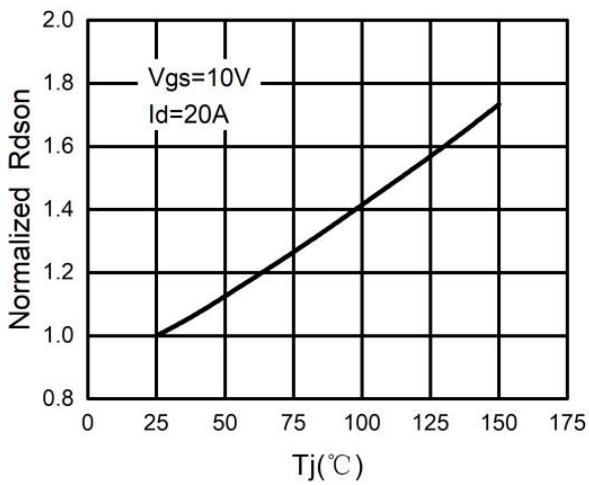


Fig.4 - Capacitance

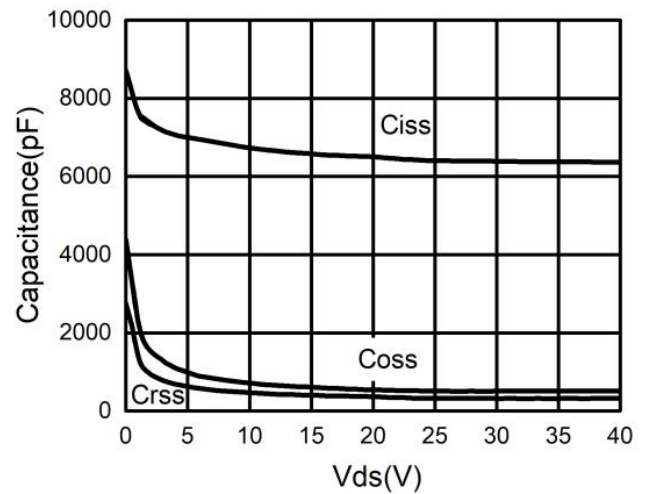


Fig.5 - Gate charge

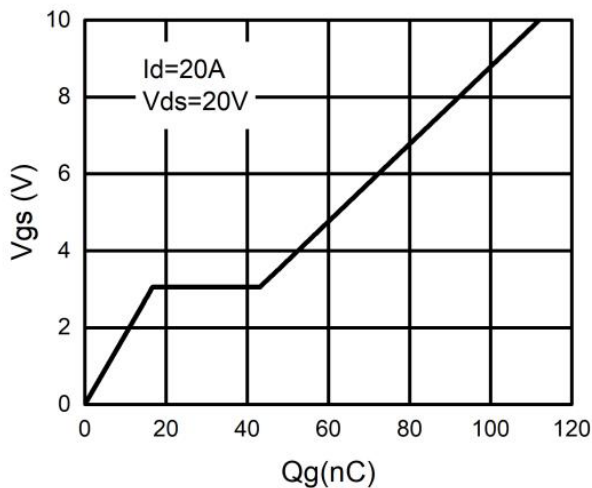
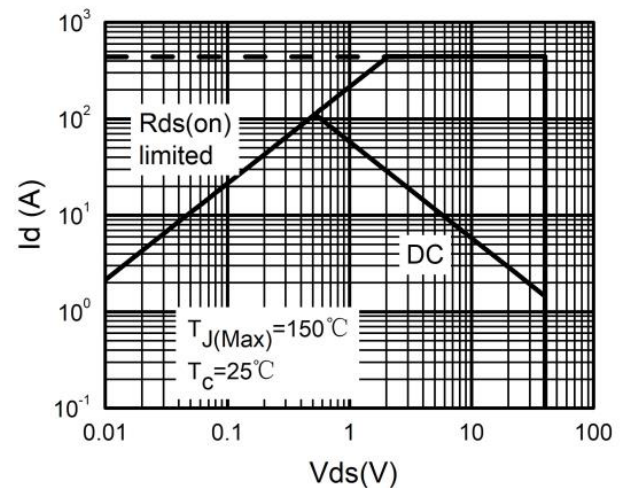
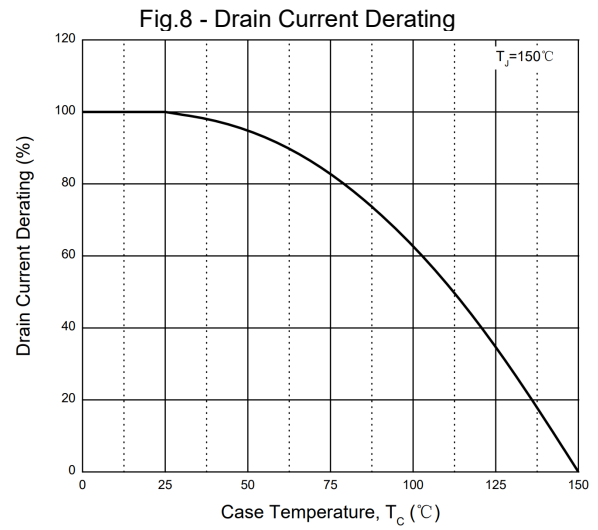
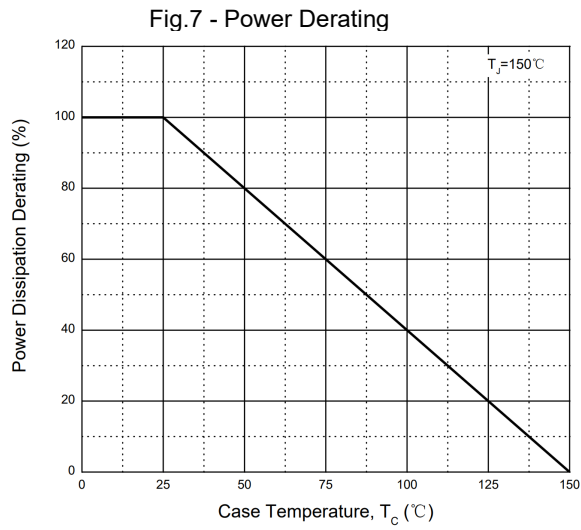


Fig.6 - Safe Operating Area

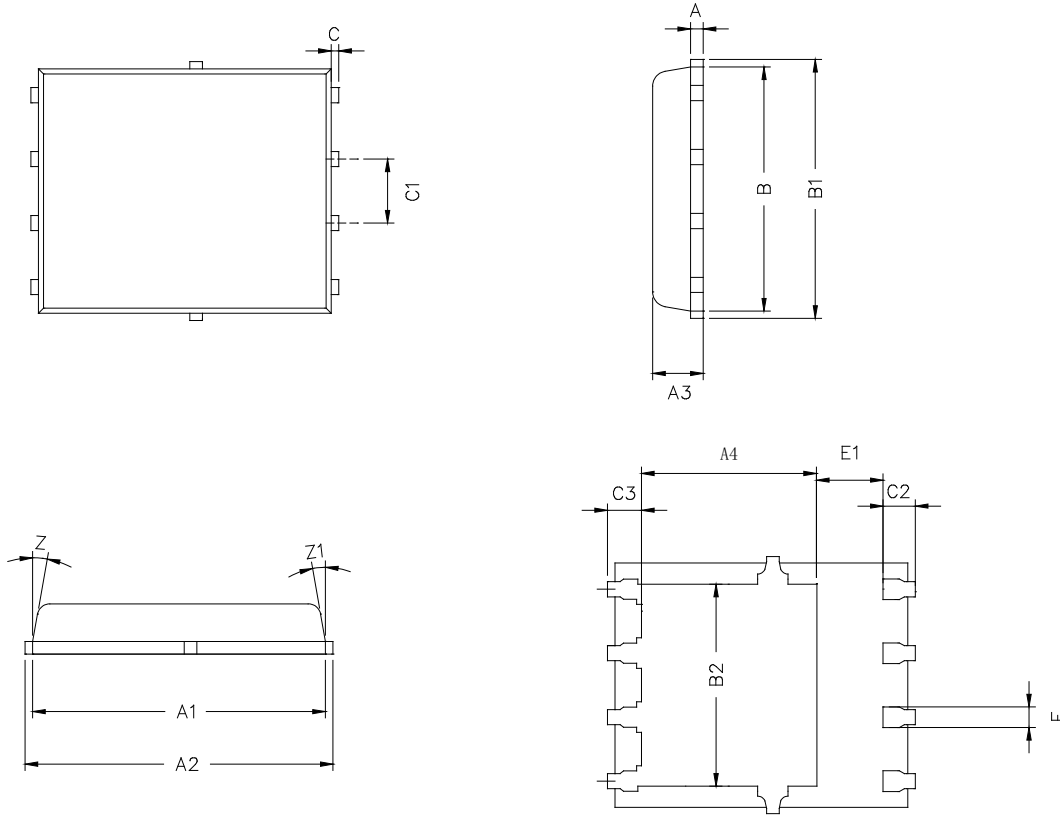


Typical Characteristics Curves ($T_J = 25^\circ\text{C}$ unless otherwise noted)



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: GMN03004LM

1. Logo Mark: 
2. P/N Mark: 03004LM
3. Date Code: XXXX
4. Pin 1#: ●

Revision History

Version	Date	Major Changes
Rev.A	2024.02.08	Official Release

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