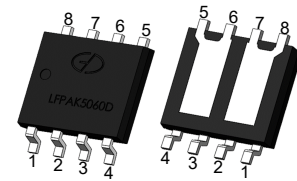


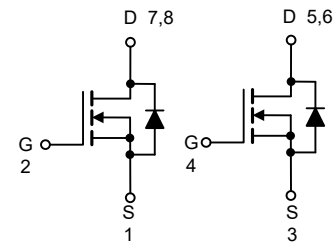
N-Channel 40V (D-S) Power MOSFET

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



LFPAK5060D



Applications

- Automotive systems
- Motors, lamps and solenoid control
- Ultra high performance power switching

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted, Single-side)

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	$T_C=25^\circ\text{C}$	72
		$T_C=100^\circ\text{C}$	51
Drain Current, Pulsed (Note 1)	I_{DM}	288	A
Single Avalanche Energy (Note 2)	E_{AS}	200	mJ
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	68
		$T_C=100^\circ\text{C}$	34
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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

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 (Single-side active)

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Case	R_{thJC}	2.2	$^\circ\text{C/W}$
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	2	2.7	4	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	--	4.8	5.8	mΩ
Total Gate Charge	Q _g	V _{GS(off)} =0V, V _{GS(on)} =10V, V _{DD} =32V, I _D =20A	--	41.1	--	nC
Gate-Source Charge	Q _{gs}		--	8.4	--	
Gate-Drain Charge	Q _{gd}		--	12.8	--	
Turn-on Delay Time	t _{d(on)}	V _{GS} =10V, V _{DD} =32V, I _D =20A, R _L =1.6Ω, R _G =5Ω	--	6.3	--	ns
Turn-on Rise Time	t _r		--	24.3	--	
Turn-off Delay Time	t _{d(off)}		--	39.3	--	
Turn-off Fall Time	t _f		--	25.5	--	
Gate Resistance	R _g	V _{GS} =0V, f=1MHz, open drain	--	3.0	--	Ω
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =40V, f=1MHz	--	2410	--	pF
Output Capacitance	C _{oss}		--	270	--	
Reverse Transfer Capacitance	C _{rss}		--	150	--	

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	--	--	58	A
Diode Forward Voltage (Note 4)	V _{SD}	I _F =20A, V _{GS} =0V	--	--	1.2	V
Reverse Recovery Time	T _{rr}	V _R =20V, I _F =20A, di/dt=100 A/μs	--	17	--	ns
Reverse Recovery Charge	Q _{rr}		--	11	--	nC

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

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

Fig. 1 - Output Characteristics

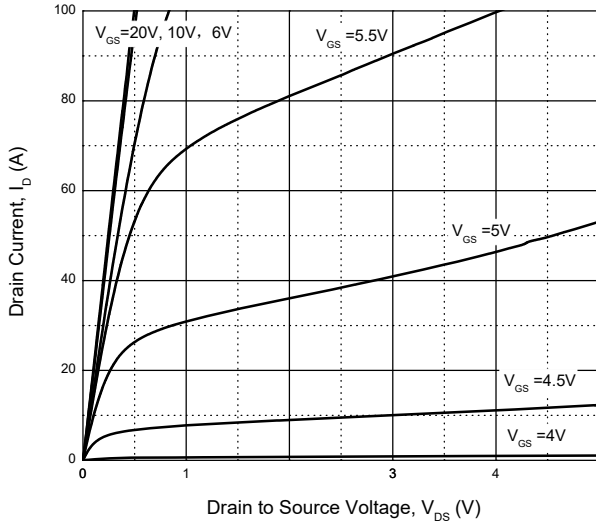


Fig. 2 - Transfer Characteristics

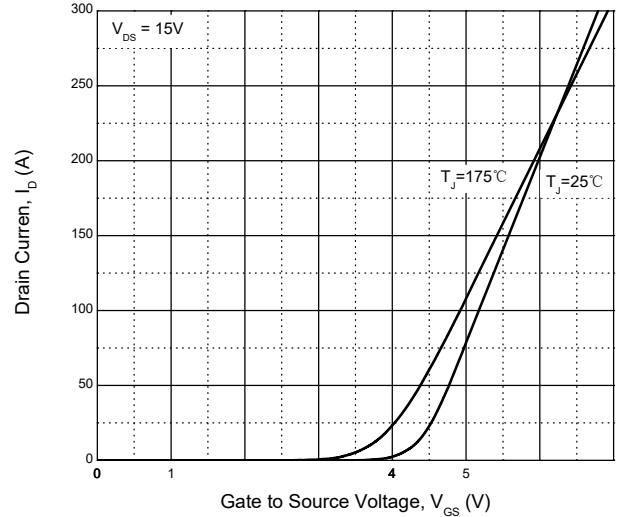


Fig. 3 - Drain-Source On-Resistance

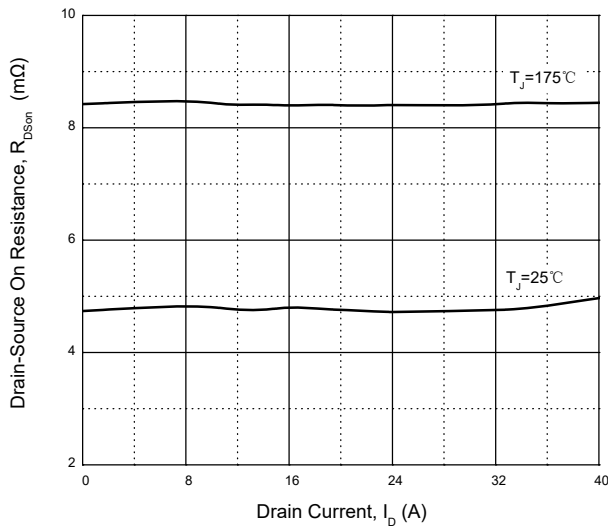


Fig. 4 - Normalized On-Resistance

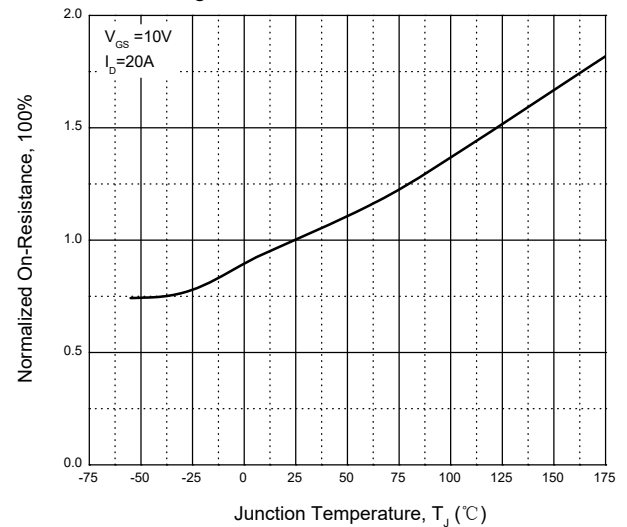


Fig. 5 - Drain-Source On-Resistance

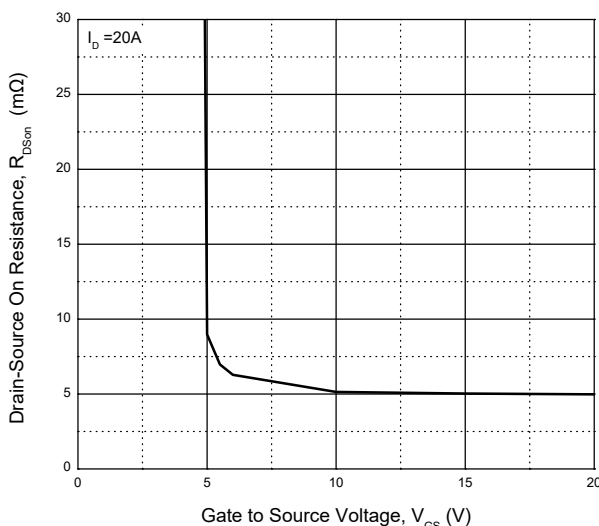
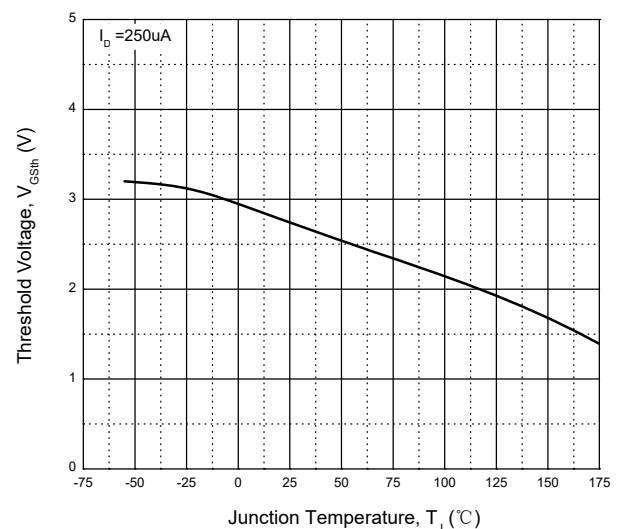


Fig. 6 - Threshold Voltage



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

Fig. 7 - Capacitance

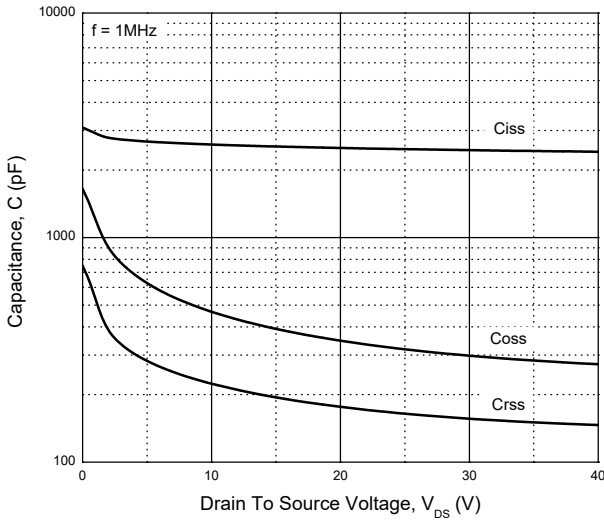


Fig. 8 - Gate Charge

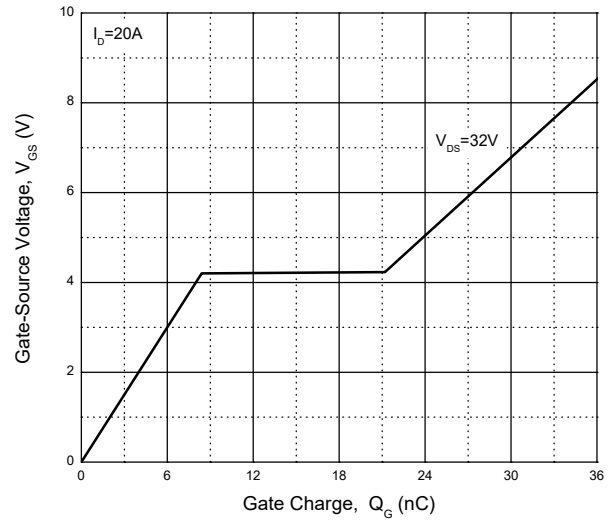


Fig. 9 - Forward Characteristic

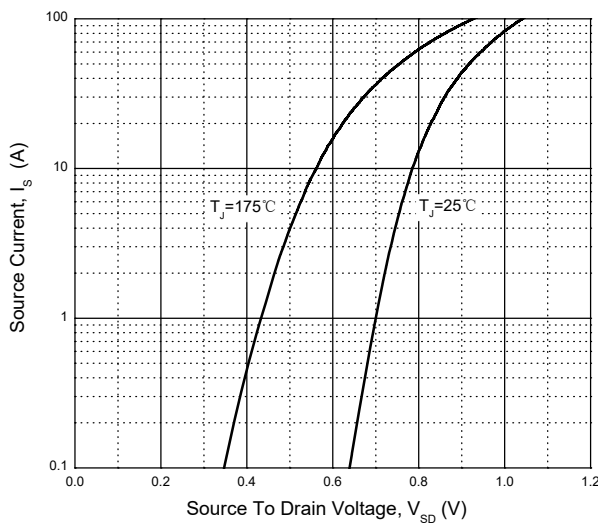


Fig. 10 - Safe Operating Area

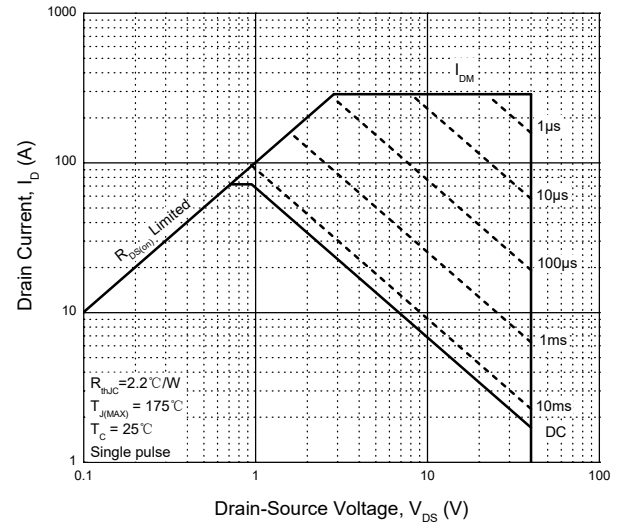
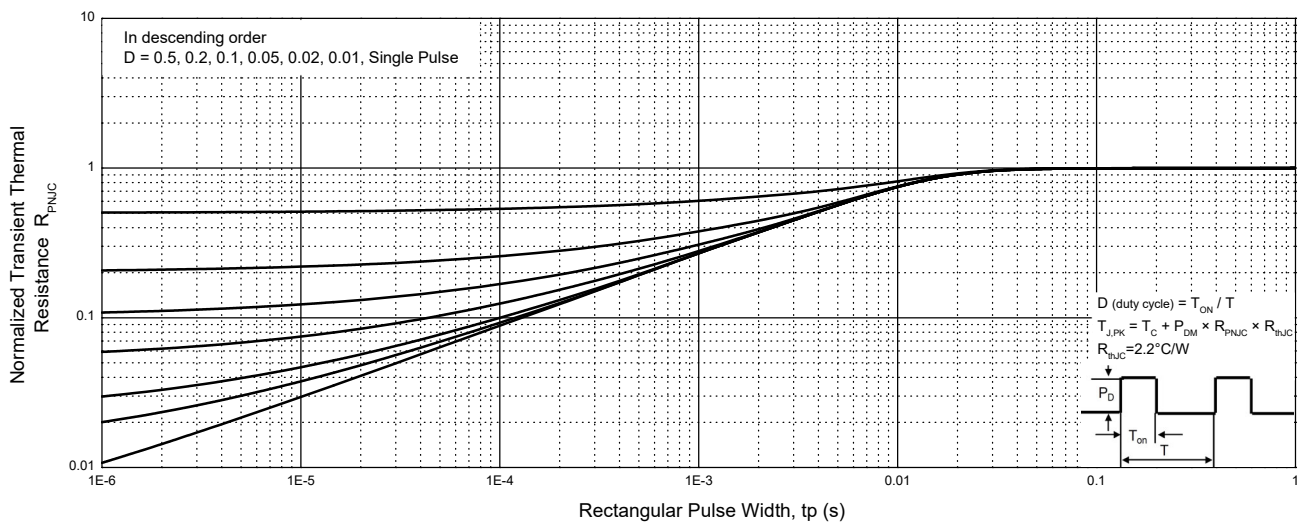


Fig.11 - Normalized Thermal Impedance, Junction-Case



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

Fig. 12 - Power Derating

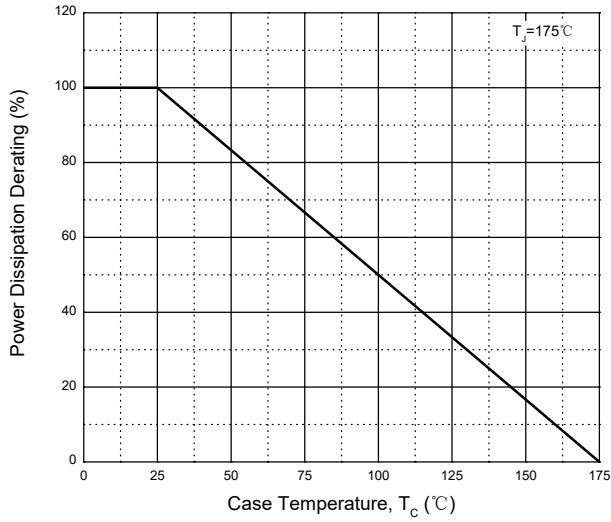
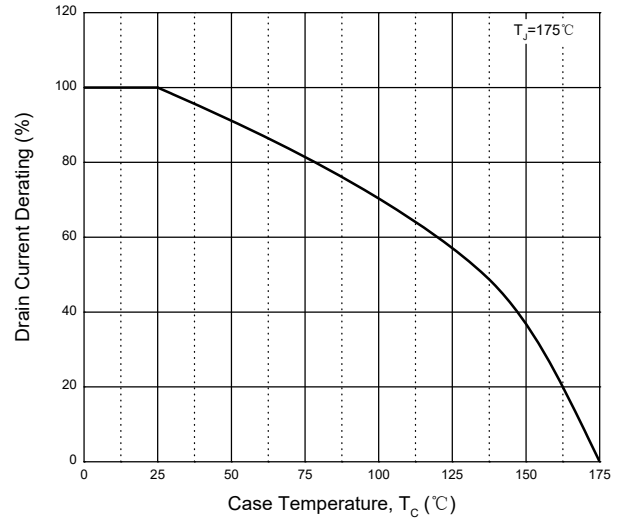
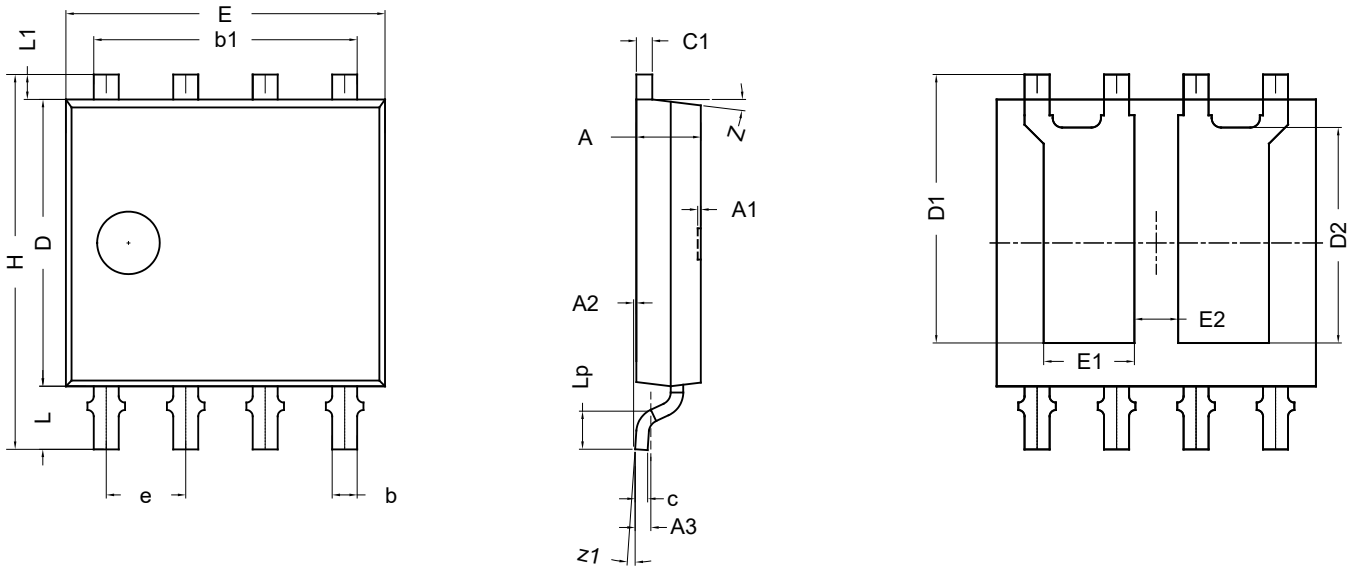


Fig. 13 - Drain Current Derating



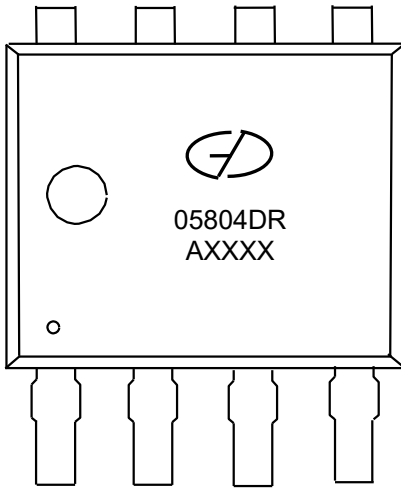
Package Outline Dimensions (Unit: millimeters)

LFPAK5060D



LFPAK5060D							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.980	1.030	1.080	E	4.950	5.100	5.300
A1	-	0.050	-	E1	1.300	1.450	1.600
A2	0.000	-	0.100	E2	-	0.700	0.850
A3	-	0.254	-	e	-	1.270	-
b	0.350	0.400	0.500	L	0.800	1.010	1.300
b1	4.10	4.210	4.400	L1	0.300	0.510	0.750
c	0.190	0.200	0.250	Lp		0.610	
c1	0.240	0.254	0.300	H	5.900	6.000	6.200
D	4.450	4.590	4.700	Z	-	7°	-
D1	-	4.298	4.800	Z1	0°	-	8°
D2	-	3.450	-	-	-	-	-

Marking Outline



Part Name: AGMN05804DR

1. Logo Mark: 
2. P/N Mark: 05804DR
3. Date Code: AXXXX
4. Pin 1#: 

Revision History

Version	Date	Major Changes
Rev.A	2024.06.18	Official Release

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