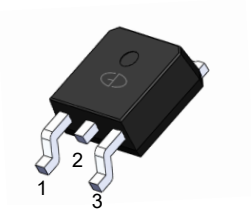
N-Channel 40V (D-S) Power MOSFET

Features

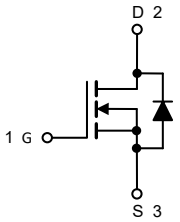
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM Rdson*Qg
- RoHS Compliant, Halogen Free, Pb-Free
- AEC-Q101 Qualified
- MSL 1



TO-252（D-PAK）

Applications

- Automotive systems
- Motors, lamps and solenoid control
- Ultra high performance 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	105	A
	T_C=100°C		74	
Drain Current, Pulsed *(Note 1)*		I_{DM}	420	A
Single Avalanche Energy *(Note 2)*		E_{AS}	246	mJ
Power Dissipation	T_C=25°C	P_D	83	W
	T_C=100°C		41	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°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}	1.8	°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	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	2.6	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	--	3.1	3.8	mΩ
Total Gate Charge	Q_g	$V_{GS(off)}$=0V, $V_{GS(on)}$=10V, V_{DD}=32V, I_D=90A	--	89	--	nC
Gate-Source Charge	Q_{gs}		--	52	--	
Gate-Drain Charge	Q_{gd}		--	15	--	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DD}=20V, R_L=0.75Ω, R_G=3Ω	--	20	--	ns
Turn-on Rise Time	t_r		--	18	--	
Turn-off Delay Time	$t_{d(off)}$		--	47	--	
Turn-off Fall Time	t_f		--	15	--	
Gate Resistance	R_g	V_{GS}=0V, f=1MHz, open drain	--	1.0	--	Ω
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=40V, f=1MHz	--	4800	--	pF
Output Capacitance	C_{oss}		--	360	--	
Reverse Transfer Capacitance	C_{rss}		--	277	--	

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	--	--	71	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 =50A, di/dt = 100 A/μs	--	30	--	ns
Reverse Recovery Charge	Q_{rr}		--	25	--	nC

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

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

Fig. 1 - Output Characteristics

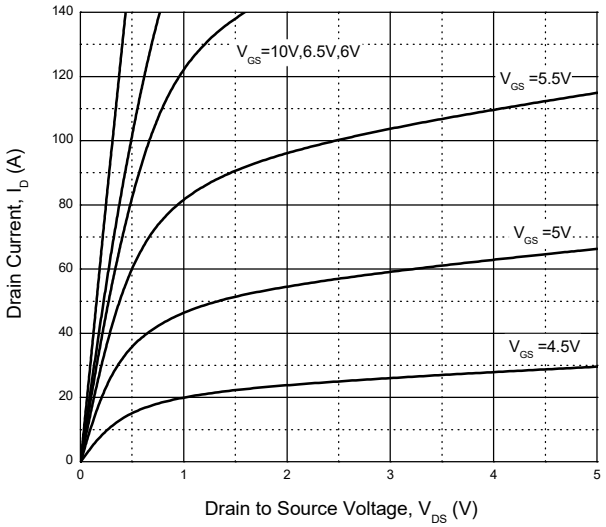


Fig. 2 - Transfer Characteristics

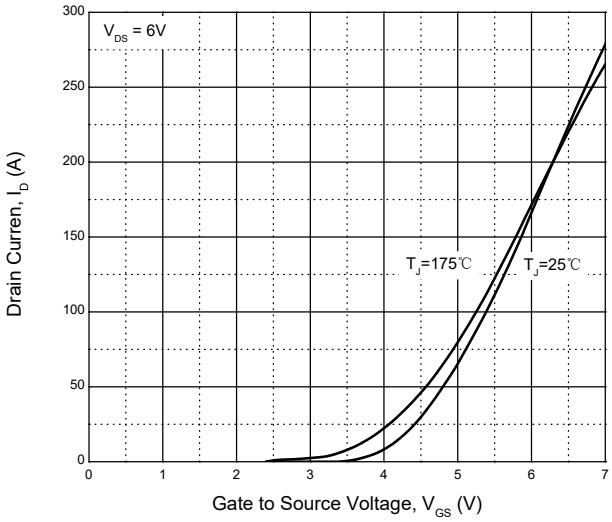


Fig. 3 - Drain-Source On-Resistance

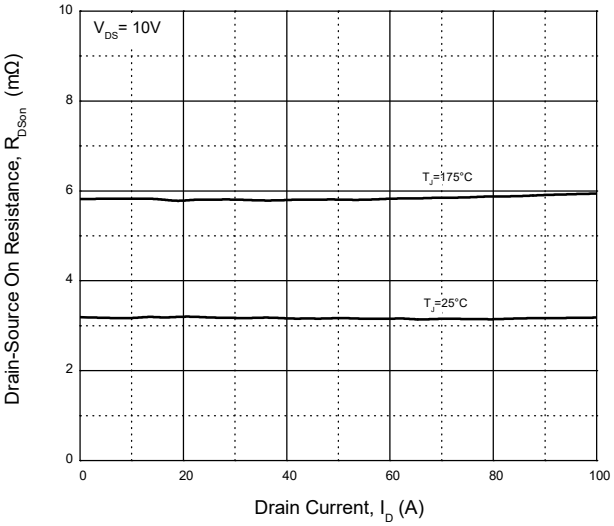


Fig. 4 - Normalized On-Resistance

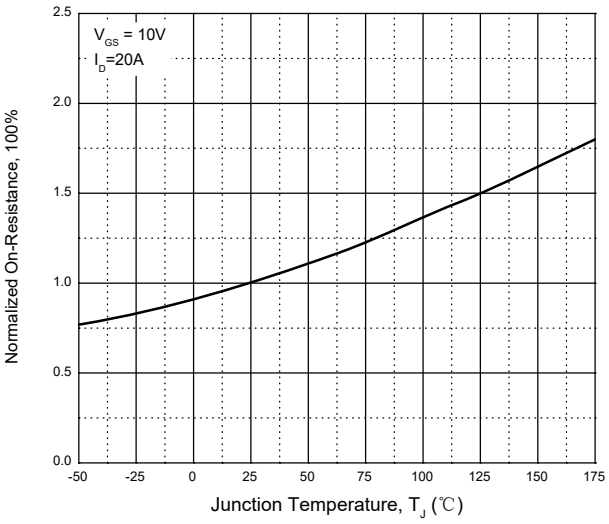


Fig. 5 - Drain-Source On-Resistance

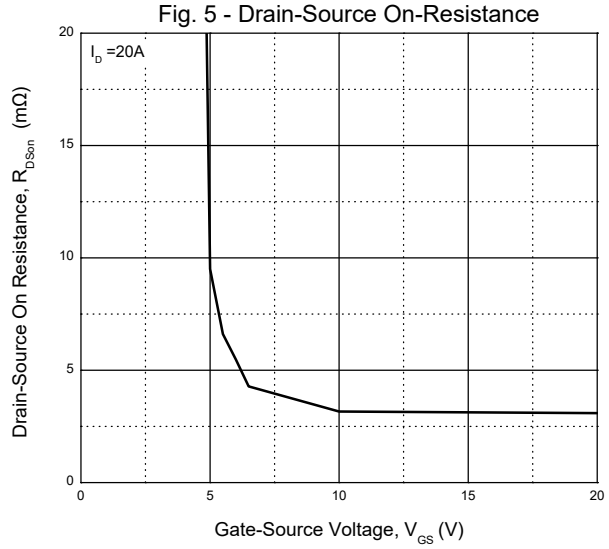
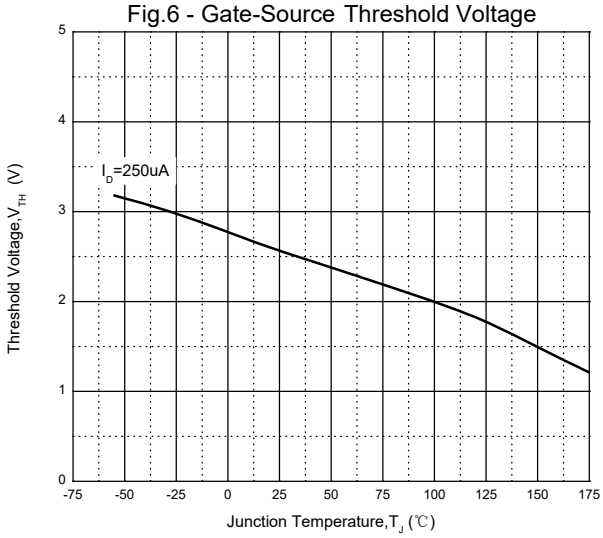


Fig.6 - Gate-Source Threshold Voltage



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

Fig. 7 - Capacitance

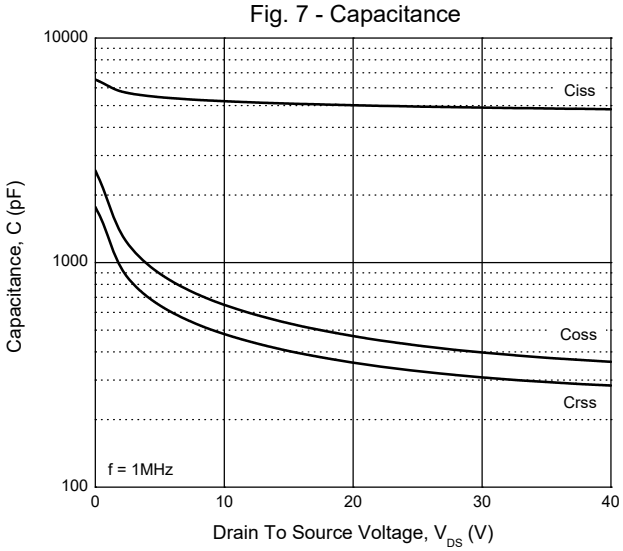


Fig. 8 - Gate Charge

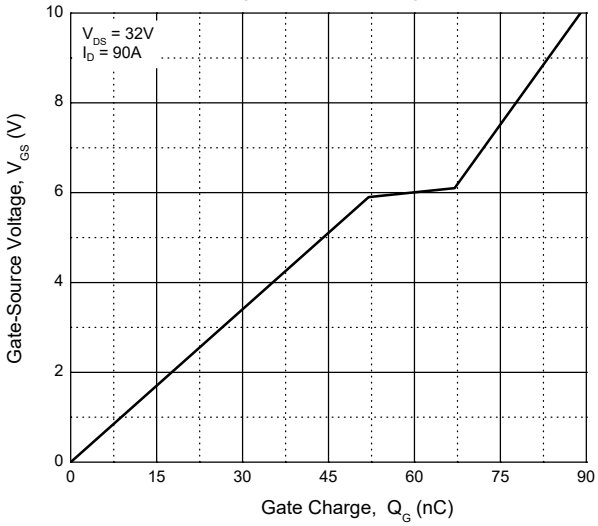


Fig. 9 - Forward Characteristic

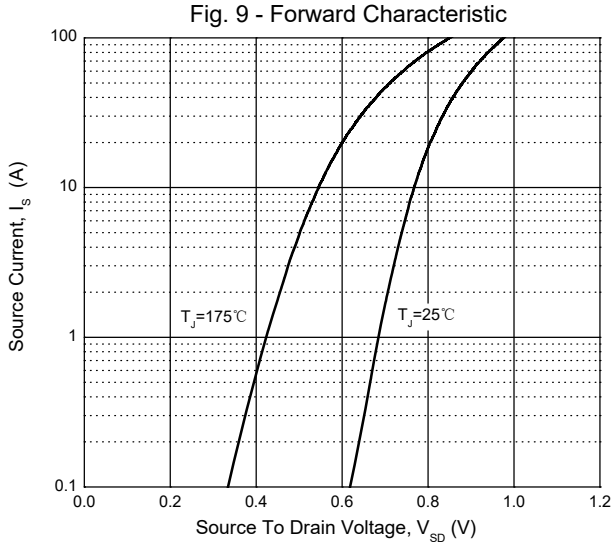


Fig. 10 - Safe Operating Area

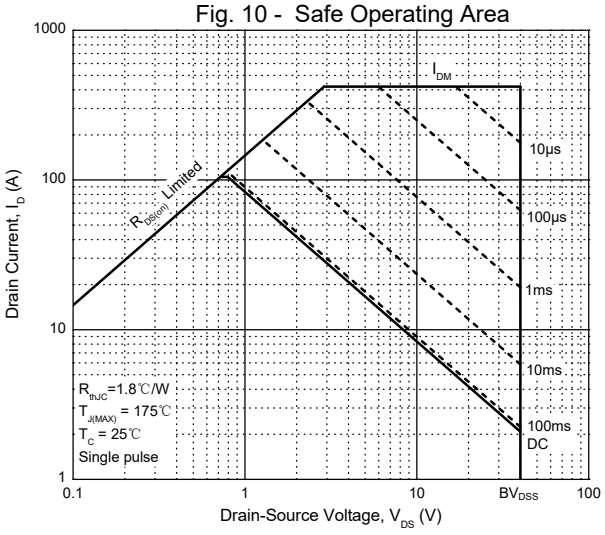
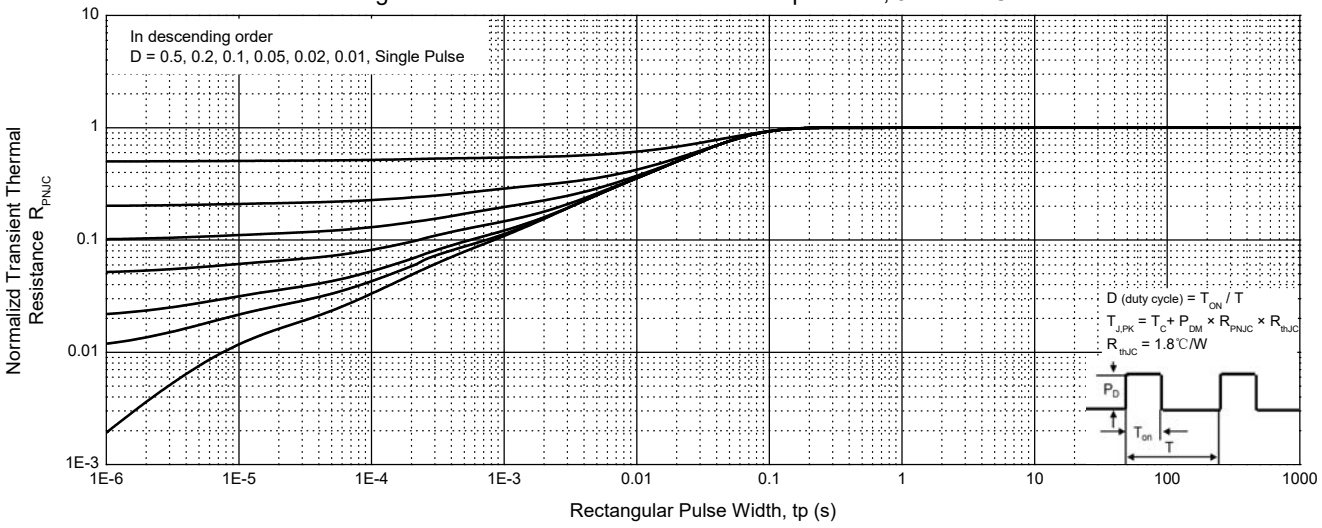


Fig.11 - Normalized Transient Thermal Impedance, Junction-Case



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

Fig. 12 - Power Derating

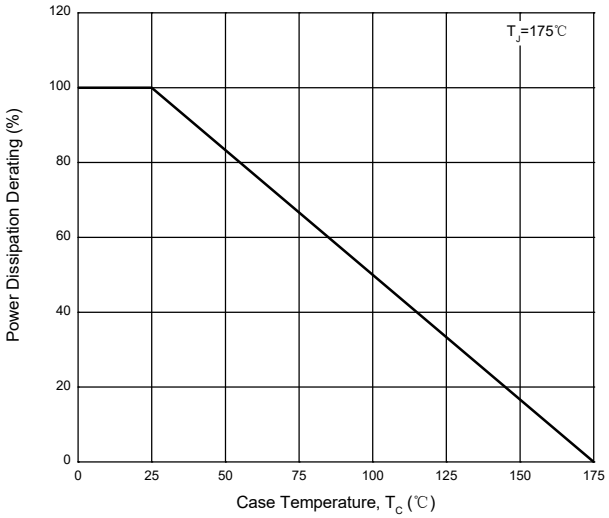
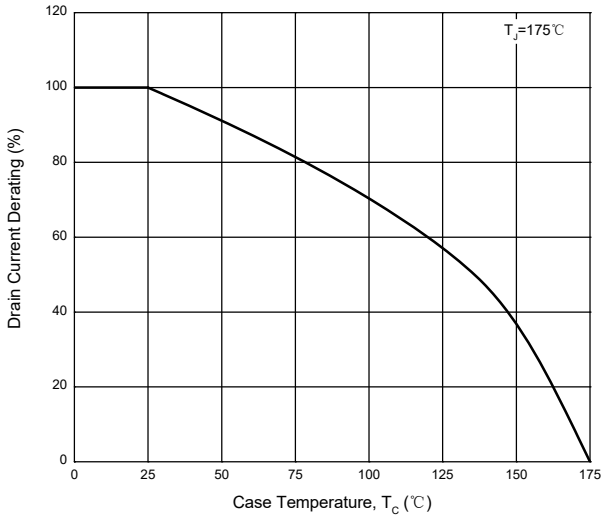
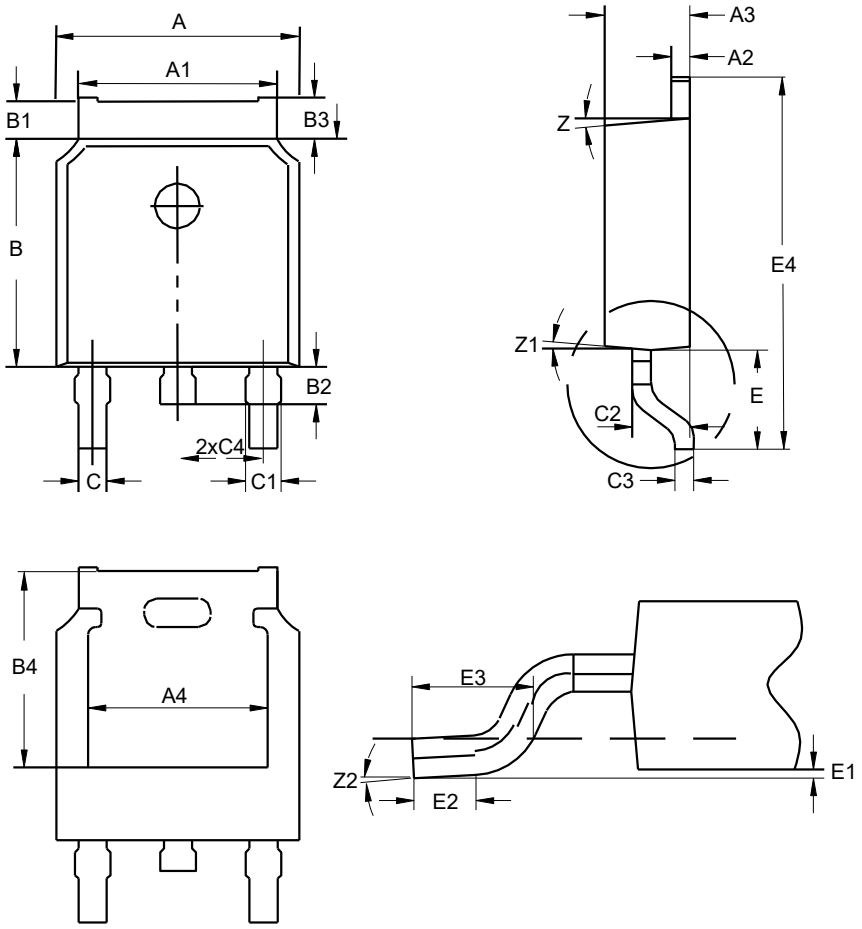


Fig. 13 - Drain Current Derating



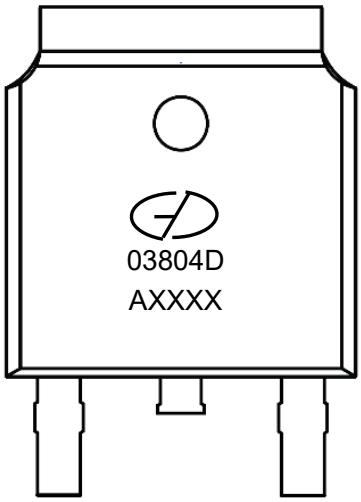
Package Outline Dimensions (Unit: millimeters)

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	0.75	0.95	1.15	-	-	-	-

Marking Outline



Part Name: AGMN03804D

1. Logo Mark:
2. P/N Mark: 03804D
3. Date Code: AXXXX

Revision History

Version	Date	Major Changes
Rev.A	2024.10.28	Official Release

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