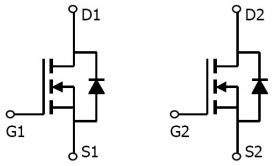
APG12N06GD

N-Channel Enhancement Mosfet

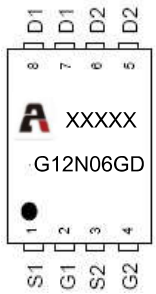
DATA SHEET

Feature

- 60V,50A
  $R_{DS(ON)}$ <13mΩ @V_{GS}=10V TYP:11 mΩ
  $R_{DS(ON)}$ <26mΩ @V_{GS}=4.5V TYP:20 mΩ
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



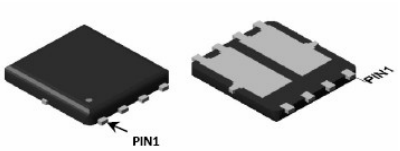
Schematic diagram



Marking and pin assignment

Application

- PWM applications
- LCD TV applications
- Power management



Top View **Bottom View**

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G12N06GD	APG12N06GD	PDFN5X6-D	13 inch	-	5000

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_a =25℃)	I_D	50	A
Continuous Drain Current (T_a =100℃)	I_D	25	A
Pulsed Drain Currenr (1)	I_{DM}	120	A
Power Dissipation	P_D	35	W
Thermal Resistance from Junction to Case(3)	$R_{\theta JC}$	3.6	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

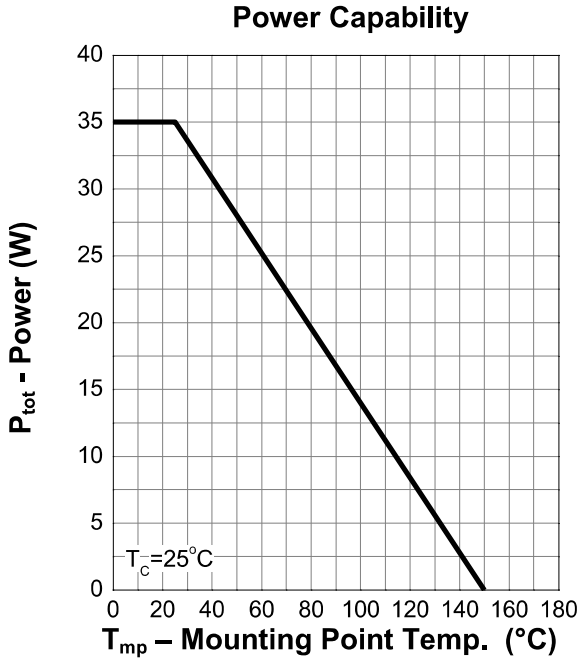
MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

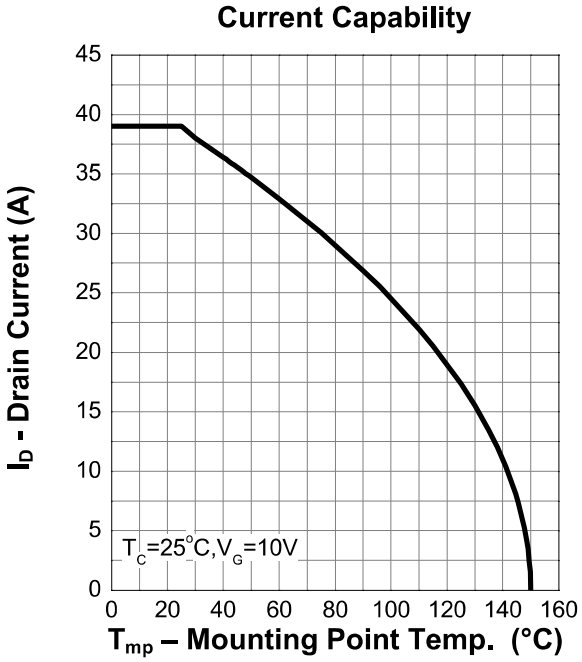
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	60	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =60V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V,V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(2)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.5	-	2.5	V
Drain-source on-resistance(2)	$R_{DS(on)}$	V_{GS} =10V, I_D =12A	-	11	13	mΩ
		V_{GS} =4.5V, I_D =8A	-	20	26	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =30V, V_{GS} =0V, f =1MHz	-	757	-	pF
Output Capacitance	C_{oss}		-	340	-	
Reverse Transfer Capacitance	C_{rss}		-	28	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, I_D=12A, R_L=4.5Ω V_{GS}=10V, R_G=1Ω	-	6.2	-	ns
Turn-on rise time	t_r		-	23	-	
Turn-off delay time	$t_{d(off)}$		-	13	-	
Turn-off fall time	t_f		-	17	-	
Total Gate Charge	Qg	VDS=30V, ID=12A, VGS=10V	-	15	-	nC
Gate-Source Charge	Qgs		-	3.6	-	
Gate-Drain Charge	Qgd		-	3.6	-	
Source-Drain Diode characteristics						
Diode Forward voltage(2)	V_{DS}	V_{GS} =0V, I_S=10A	-	-	1.2	V
Diode Forward current(3)	I_S		-	-	50	A
Reverse Recovery Chrage	Qrr	I_F=12A,di/dt=100A/us		11		uC
Reverse Recovery Time	Trr	I_F=12A,di/dt=100A/us		31		ns

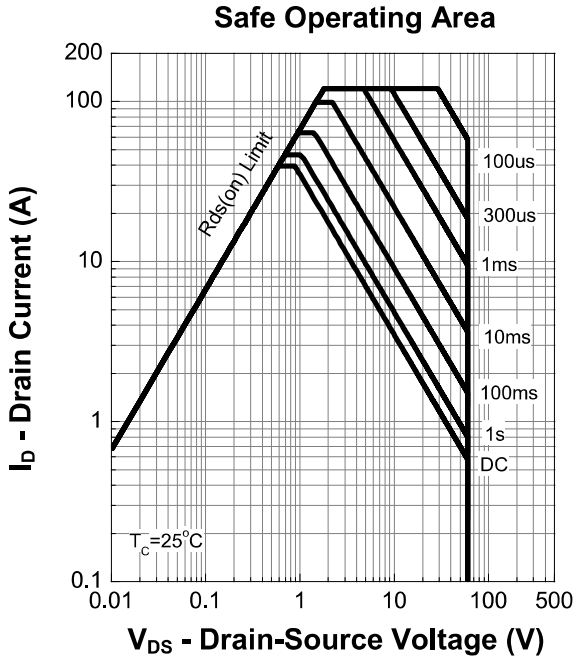
Notes:

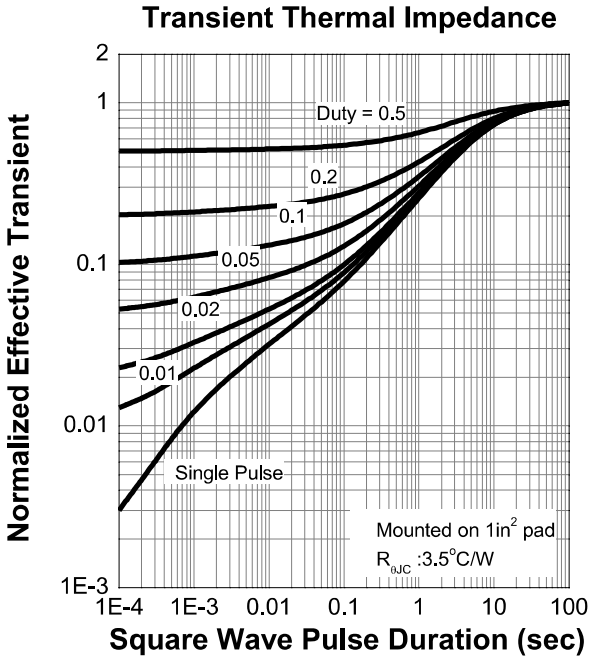
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec

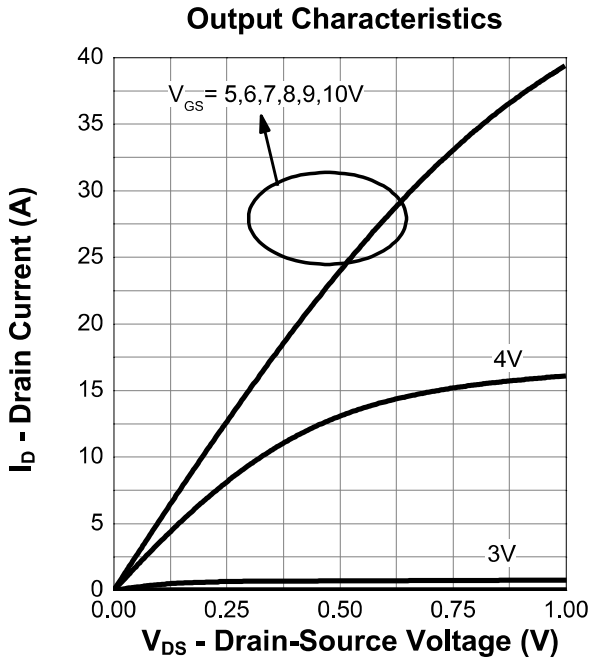
Typical Performance Characteristics

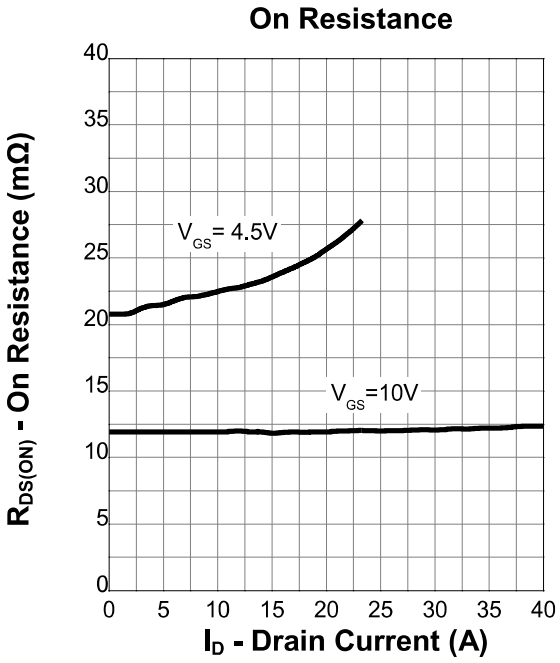


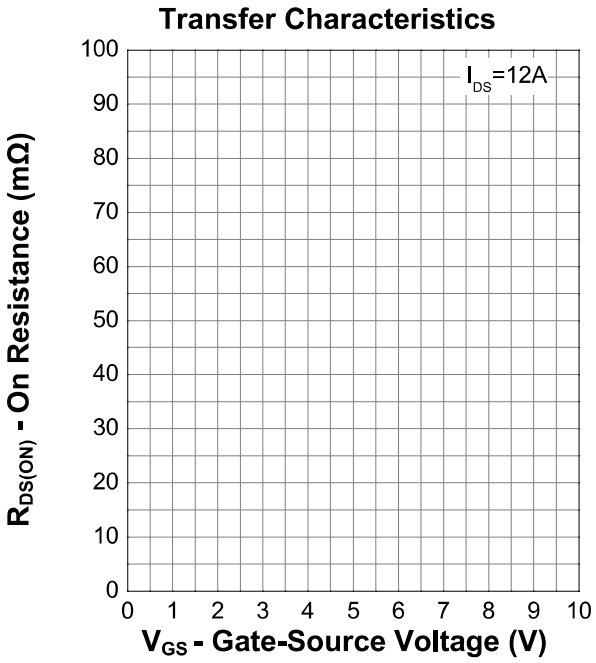


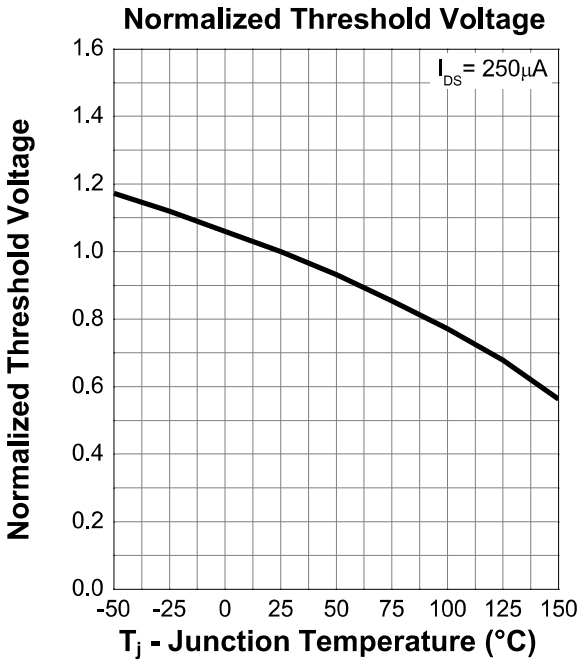


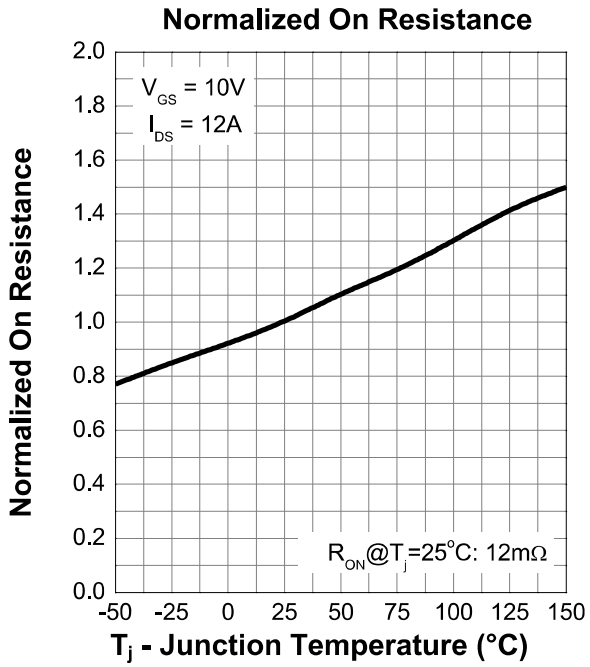


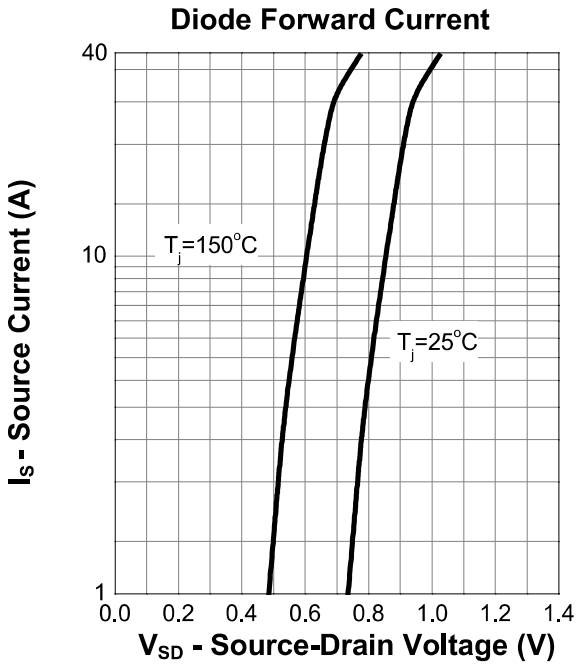

Output Characteristics
V_{GS}= 5,6,7,8,9,10V
4V
3V
I_D - Drain Current (A)
V_{DS} - Drain-Source Voltage (V)
0.00
0.25
0.50
0.75
1.00

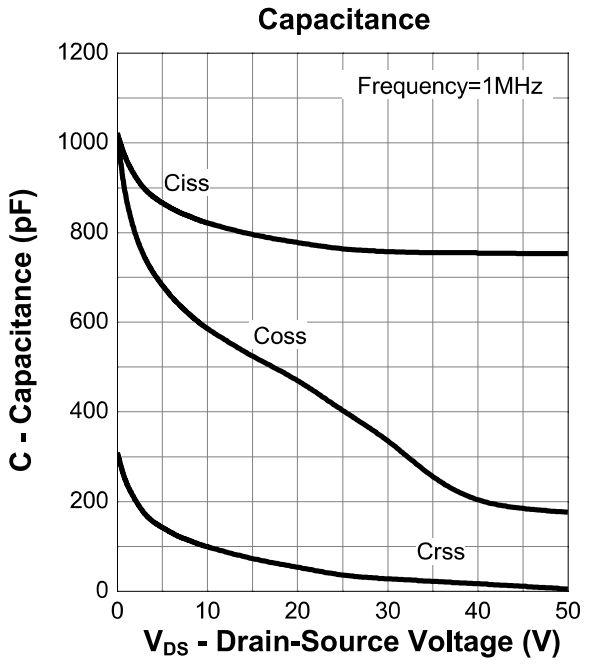

On Resistance
V_{GS}= 4.5V
V_{GS}=10V
$R_{DS(ON)}$ - On Resistance (mΩ)
I_D - Drain Current (A)

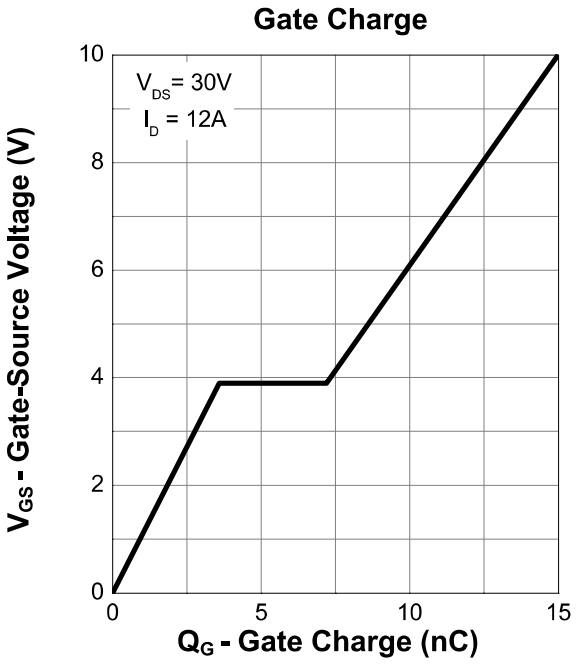

Transfer Characteristics
I_{DS}=12A
$R_{DS(ON)}$ - On Resistance (mΩ)
V_{GS} - Gate-Source Voltage (V)


Normalized Threshold Voltage
I_{DS}= 250μA
Normalized Threshold Voltage
T_j - Junction Temperature (°C)

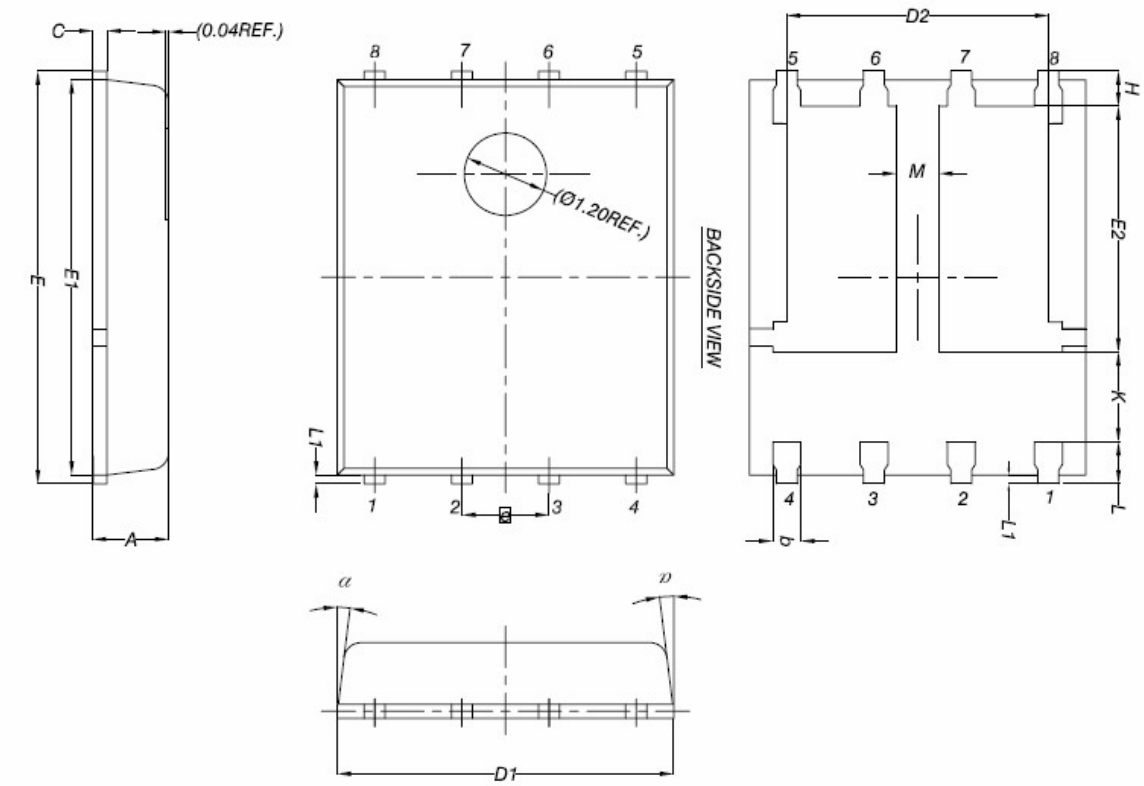

Normalized On Resistance
Normalized On Resistance
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{GS} = 10V
I_{DS} = 12A
R_{ON}@T_j=25°C: 12mΩ
-50 -25 0 25 50 75 100 125 150
T_j - Junction Temperature (°C)


Diode Forward Current
I_S - Source Current (A)
40
10
1
T_j=150°C
T_j=25°C
0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4
V_{SD} - Source-Drain Voltage (V)


Capacitance
C - Capacitance (pF)
1200
1000
800
600
400
200
0
Frequency=1MHz
Ciss
Coss
Crss
0 10 20 30 40 50
V_{DS} - Drain-Source Voltage (V)


Gate Charge
V_{GS} - Gate-Source Voltage (V)
10
8
6
4
2
0
V_{DS}= 30V
I_D = 12A
0 5 10 15
Q_G - Gate Charge (nC)

PDFN5X6-D Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	-	-
α	0°	-	12°