

AP30P06G

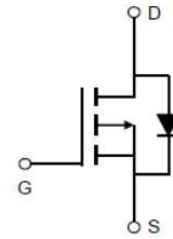
P-Channel Enhancement Mosfet

AIIPOWER

DATA SHEET

Features

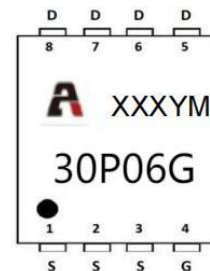
- -60V,-36A
 $R_{DS(on)} < 30m\Omega @ V_{GS} = -10V$ TYP: 24m Ω
 $R_{DS(on)} < 38m\Omega @ V_{GS} = -4.5V$ TYP: 28m Ω
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability



Schematic Diagram

Applications

- Load switch
- DC/DC converter for LCD display



Marking and pin Assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
30P06G	AP30P06G	PDFN5x6	-	-	5000

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^{\circ}C$) ⁽¹⁾	I_D	-36	A
Continuous Drain Current ($T_c=100^{\circ}C$) ⁽¹⁾	I_D	-26	A
Pulsed Drain Current ^(2,3)	I_{DM}	-144	A
Singel Pulsed Avalanche Energy ⁽⁶⁾	E_{AS}	240	mJ
Drain Power Dissipation ⁽¹⁾	P_D	78	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.6	$^{\circ}C/W$
Junction Temperature	T_J	-55~ +150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

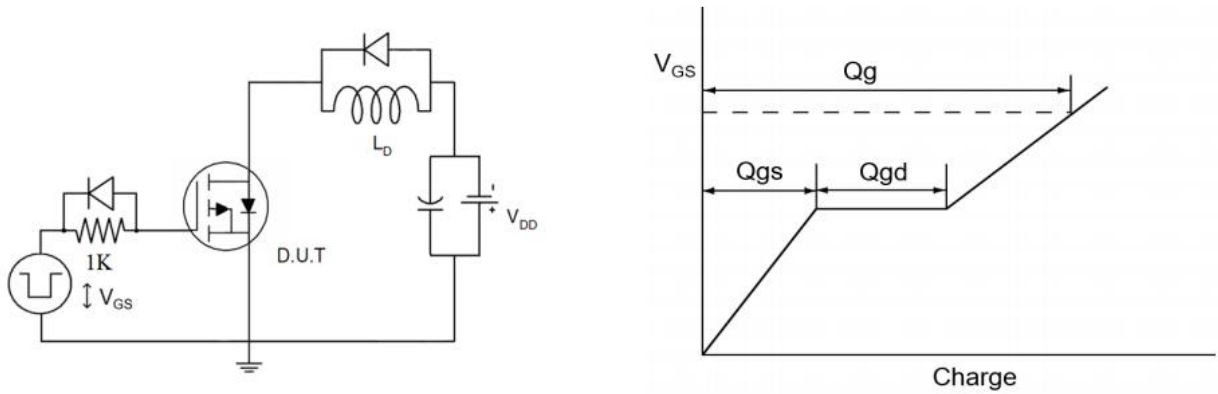
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -60V, V _{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽⁴⁾	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.0	-	-2.5	V
Drain-source on-resistance ⁽⁴⁾	R _{DS(on)}	V _{GS} = -10V, I _D = -10A	-	24	30	mΩ
		V _{GS} = -4.5V, I _D = -8A	-	28	38	mΩ
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -10A	-	25.5	39	S
Gate resistance	R _g	V _{DS} = V _{GS} = 0V, f=1.0MHz	-	7.7	12	Ω
Dynamic characteristics⁽⁵⁾						
Input Capacitance	C _{iss}	V _{DS} = -30V, V _{GS} = 0V, f = 1MHz	-	5104	7656	pF
Output Capacitance	C _{oss}		-	171	257	
Reverse Transfer Capacitance	C _{rss}		-	143	215	
Switching characteristics⁽⁵⁾						
Turn-on delay time	t _{d(on)}	V _{DD} = -30V, I _D = -10A, R _G = 3Ω, V _{GS} = -10V	-	13	20	nS
Turn-on rise time	t _r		-	42	63	
Turn-off delay time	t _{d(off)}		-	172	258	
Turn-off fall time	t _f		-	55	83	
Total Gate Charge	Q _g	V _{DS} = -30V, I _D = -10A, V _{GS} = -10V	-	77	116	nC
Gate-Source Charge	Q _{gs}		-	14	21	
Gate-Drain Charge	Q _{gd}		-	13	20	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽⁴⁾	V _{SD}	T _J = 25°C, V _{GS} = 0V, I _S = -10A	-	-	-1.2	V
Diode Forward current	I _S	T _C = 25°C	-	-	-36	A
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = -10A, di/dt = 100A/us	-	26	39	ns
Body Diode Reverse Recovery Charge	Q _{rr}	T _J = 25°C, I _F = -10A, di/dt = 100A/us	-	26	39	nC

Notes:

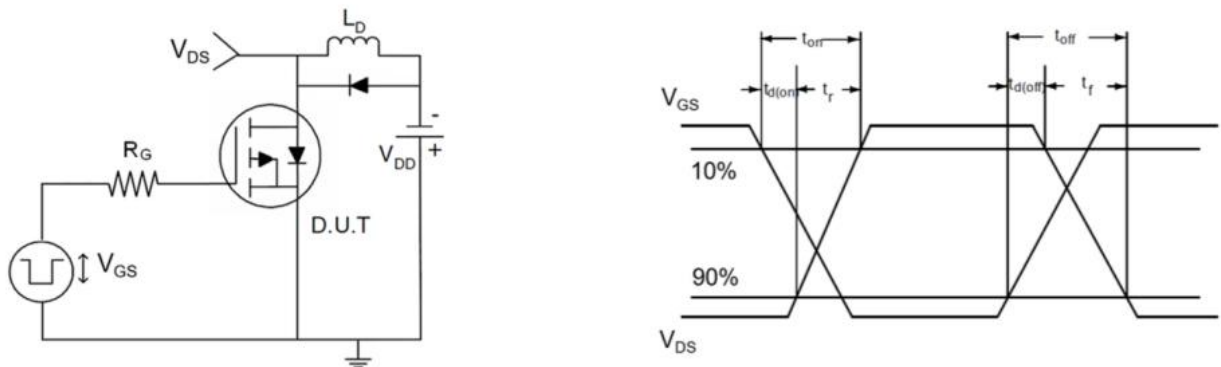
- 1) Surface Mounted on 1 in² pad area, t ≤ 10 sec
- 2) Pulse width ≤ 10μs, duty cycle ≤ 1 %
- 3) Limited by bonding wire
- 4) Pulse width ≤ 300 μs, duty cycle ≤ 2%
- 5) Guaranteed by design, not subject to production testing
- 6) EAS Condition: L=0.5mH, VDD=-40V, R_G =25Ω, Starting T_J = 25°C

Test Circuit

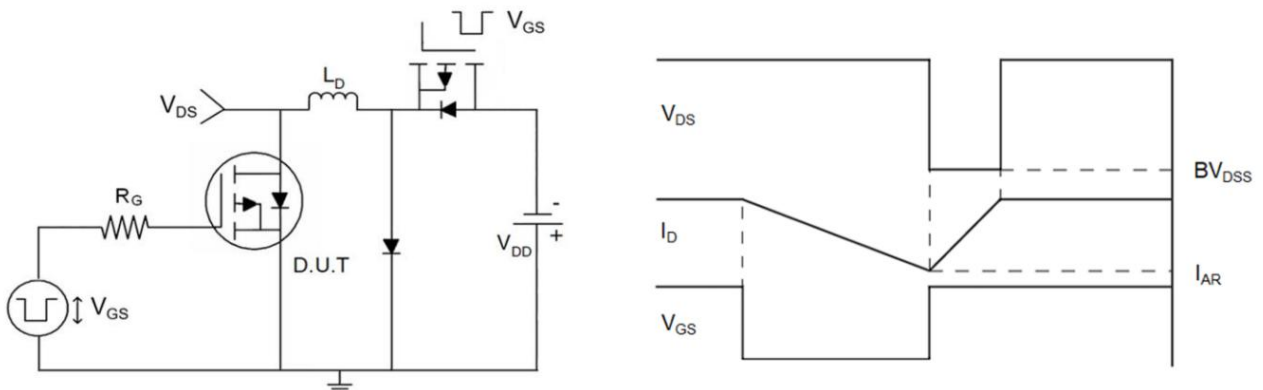
Gate Charge Test Circuit



Switch Time Test Circuit



Unclamped Inductive Switching (UIS) Test Circuit



Typical Characteristics

Figure 1. Output Characteristics

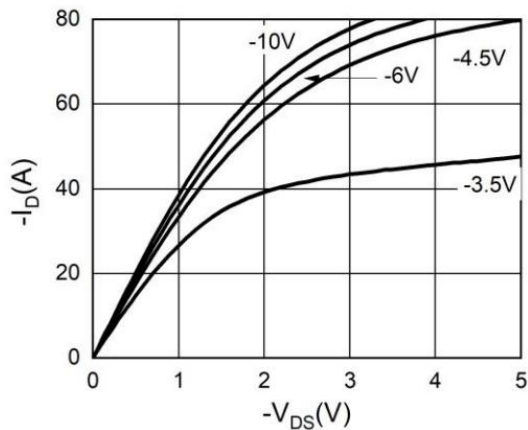


Figure 2. Transfer Characteristics

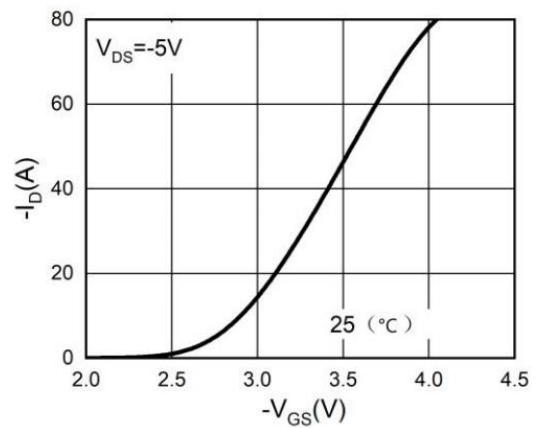


Figure 3. Power Dissipation

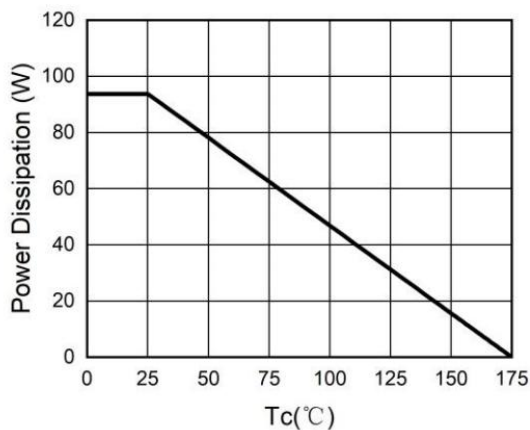


Figure 4. Drain Current

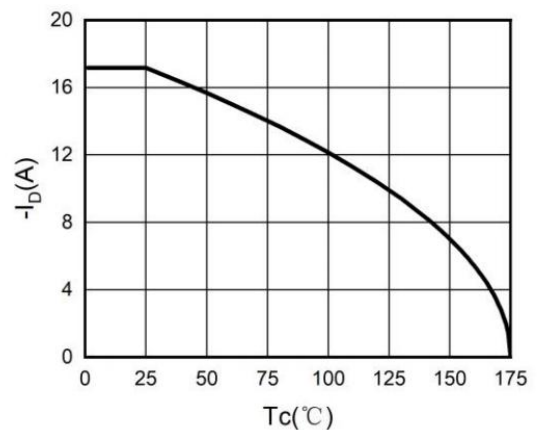


Figure 5. BV_{DSS} vs Junction Temperature

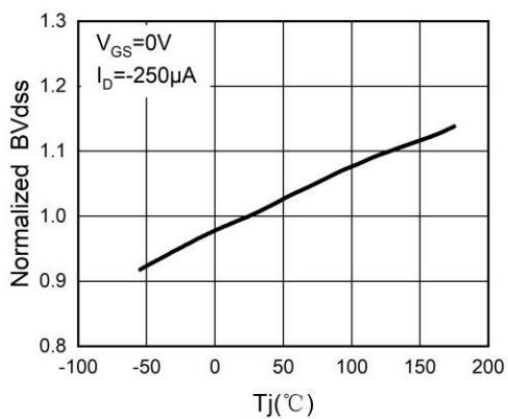
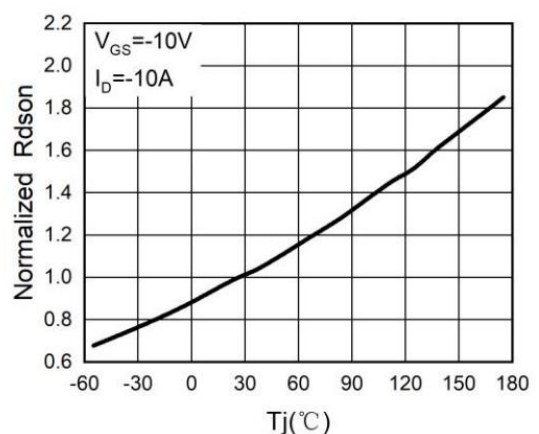


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Characteristics (cont.)

Figure 7. Gate Charge Waveforms

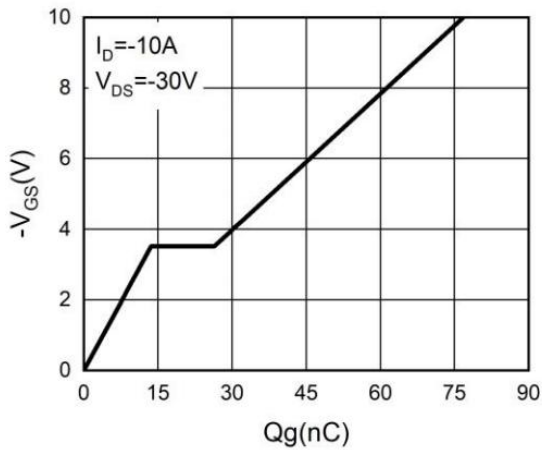


Figure 9. Body-Diode Characteristics

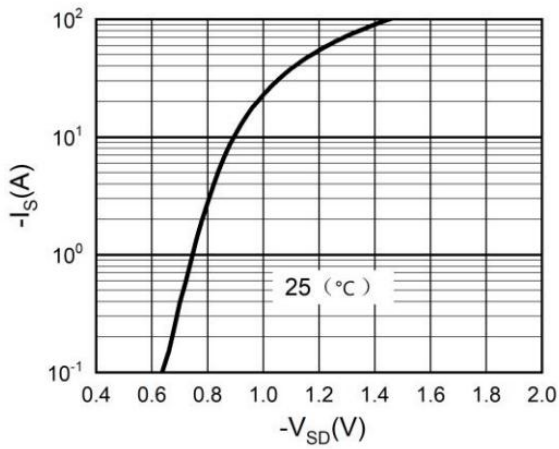


Figure 8. Capacitance

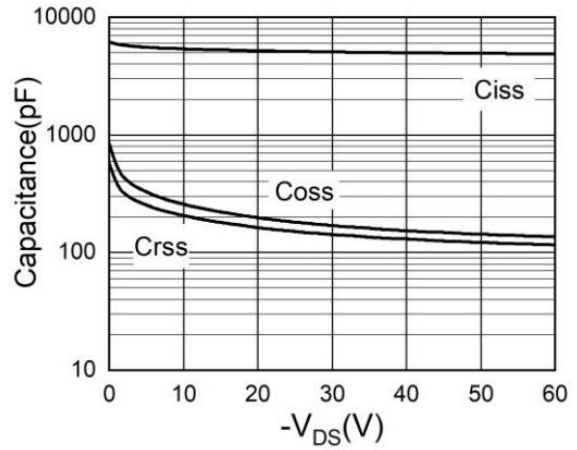
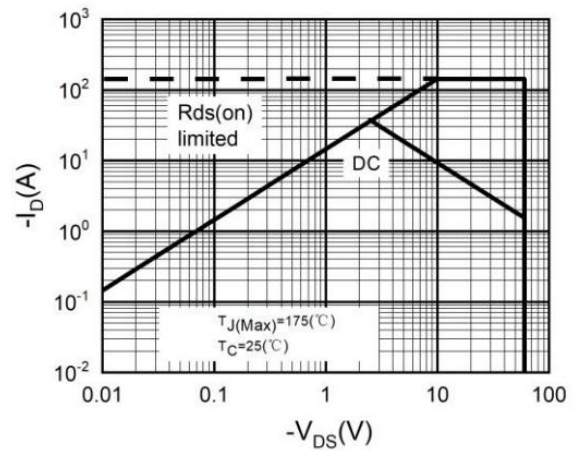


Figure 10. Maximum Safe Operating Area



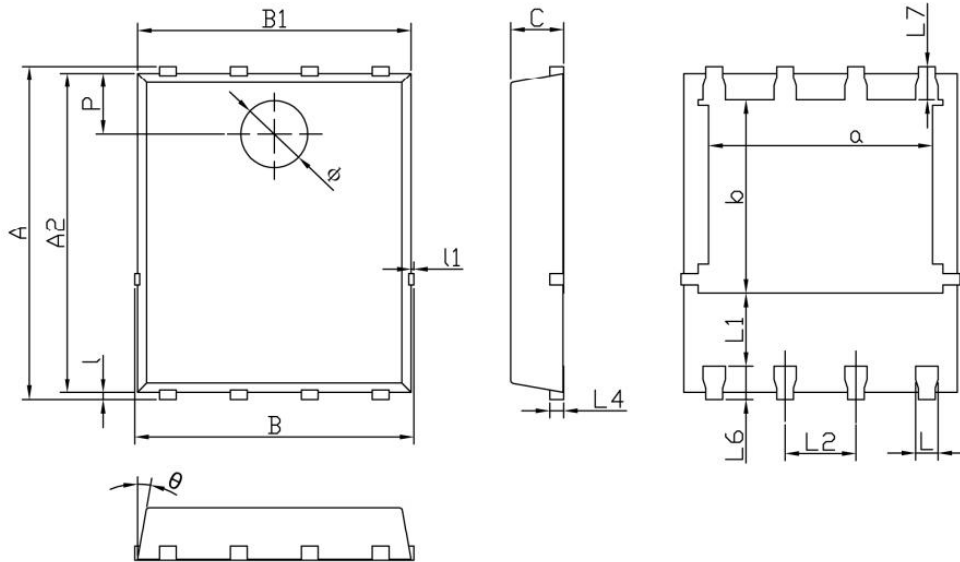
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PDFN5X6 Package Information



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	5.90	6.00	6.10
α	3.91	4.01	4.11
A2	5.70	5.75	5.80
B	4.90	5.00	5.10
b	3.37	3.47	3.57
B1	4.80	4.90	5.00
C	0.90	0.95	1.00
L	0.35	0.40	0.45
l	0.06	0.13	0.20
L1	1.10	-	-
l1	-	-	0.10
L2	1.17	1.27	1.37
L4	0.21	0.26	0.34
L6	0.51	0.61	0.71
L7	0.51	0.61	0.71
P	1.00	1.10	1.20
θ	8°	10°	12°
φ	1.10	1.20	1.30

Revision History

Revision	Release	Remark
V1.0	2023/11/01	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

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