

AP21P015P

P-Channel Enhancement Mosfet

AIPOWER

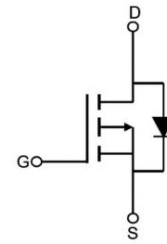
DATA SHEET

Features

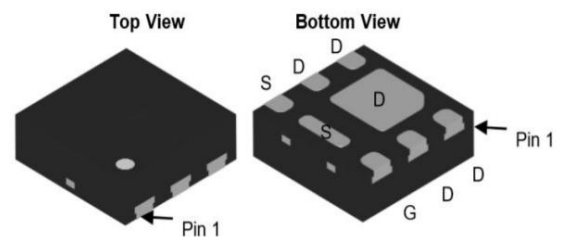
- -12V,-11.5A
 $R_{DS(on)} < 21m\ \Omega @ V_{GS} = -4.5V$ TYP: 13.5m Ω
 $R_{DS(on)} < 26m\ \Omega @ V_{GS} = -2.5V$ TYP: 19m Ω
- Good stability and uniformity
- 100% avalanche tested
- Excellent package for good heat dissipation

Applications

- Interfacing Switching
- Load Switching
- Power management



Schematic Diagram



DFN2X2

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
21P015P	AP21P015P	DFN2X2	-	-	3000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-15	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ($T_c=25^\circ\text{C}$) ⁽¹⁾	I_D	-11.5	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	I_D	-7.3	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	-46	A
Drain Power Dissipation	P_D	3	W
Thermal Resistance from Junction to Ambient ⁽²⁾	$R_{\theta JA}$	40	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	-55~ +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

Notes:

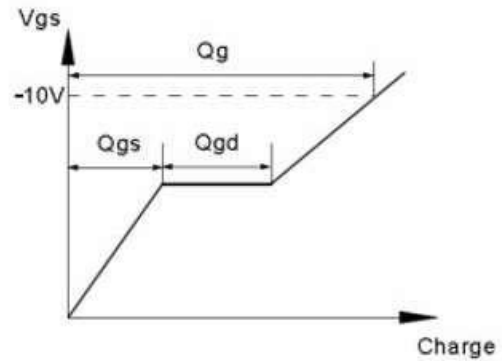
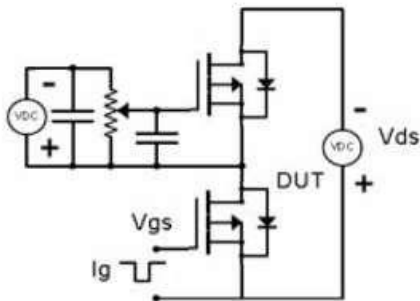
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) The value of $R_{\theta JA}$ Mounted on FR4 Board (25.4mm*25.4mm*t1.6mm) With 2oz Copper $T_A=25^\circ\text{C}$

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

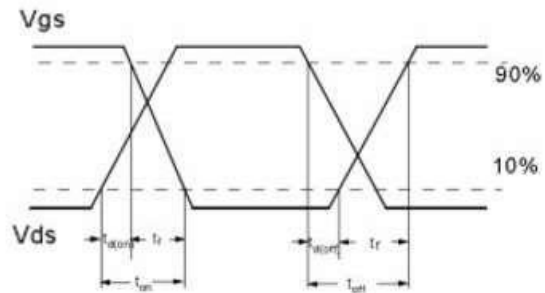
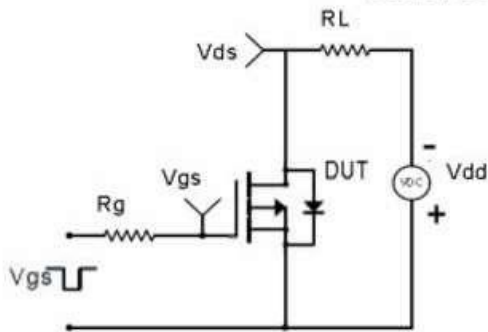
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-15	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -15V, V _{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.5	-	-1.0	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -5A	-	13.5	21	mΩ
		V _{GS} = -2.5V, I _D = -4A	-	19	26	mΩ
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0V, f = 1MHz	-	1450	-	pF
Output Capacitance	C _{oss}		-	324	-	
Reverse Transfer Capacitance	C _{rss}		-	283	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} = -10V, I _D = -5A, R _G = 3Ω, V _{GS} = -4.5V	-	16	-	nS
Turn-on rise time	t _r		-	65	-	
Turn-off delay time	t _{d(off)}		-	72	-	
Turn-off fall time	t _f		-	63	-	
Total Gate Charge	Q _g	V _{DS} = -10V, I _D = -5A, V _{GS} = -4.5V	-	16	-	nC
Gate-Source Charge	Q _{gs}		-	3.5	-	
Gate-Drain Charge	Q _{gd}		-	4.2	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	T _J = 25°C, V _{GS} = 0V, I _S = -5A	-	-	-1.2	V
Diode Forward current	I _S	T _C = 25°C	-	-	-11.5	A

Test Circuit & Waveform

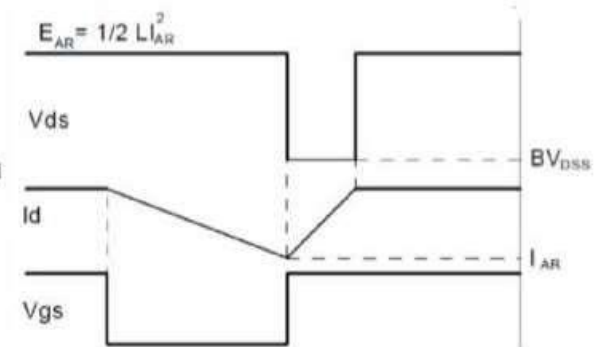
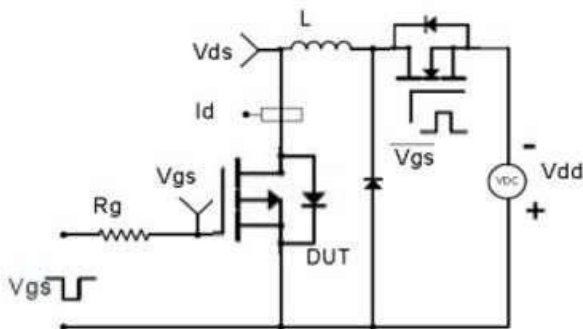
Gate Charge Test Circuit & Waveform



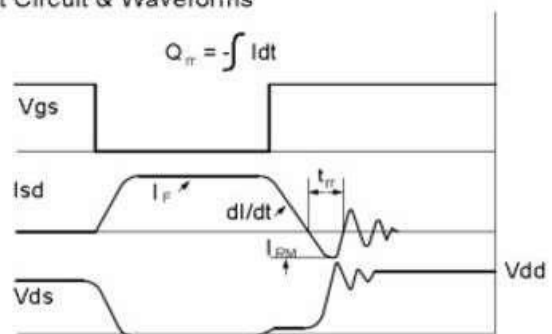
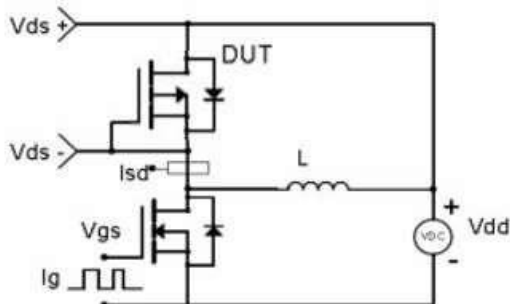
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

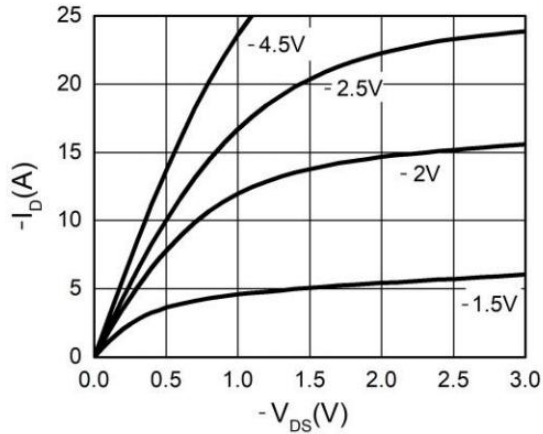


Figure 1. Output Characteristics

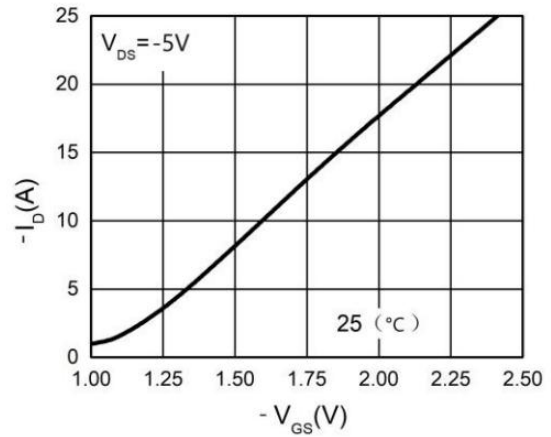


Figure 2. Transfer Characteristics

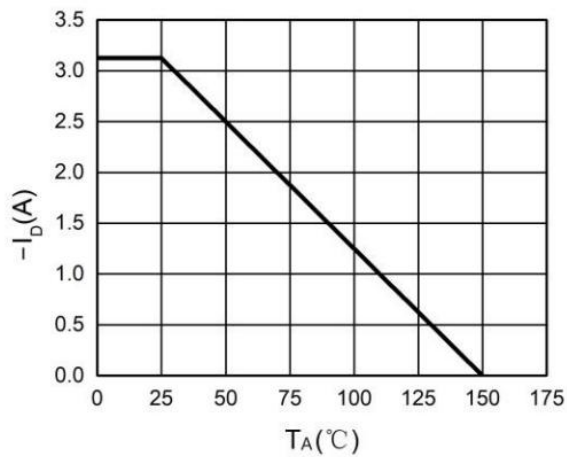


Figure 3. Power Dissipation

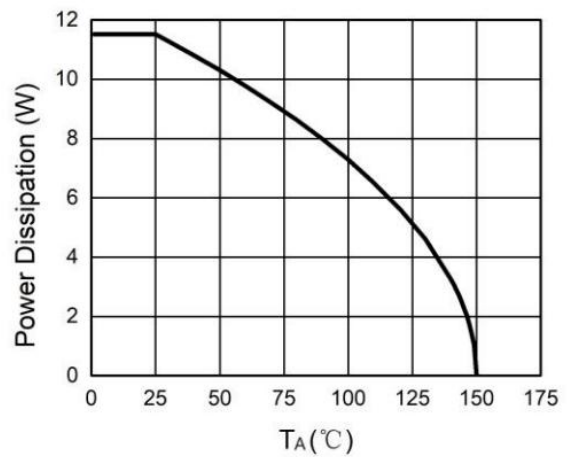


Figure 4. Drain Current

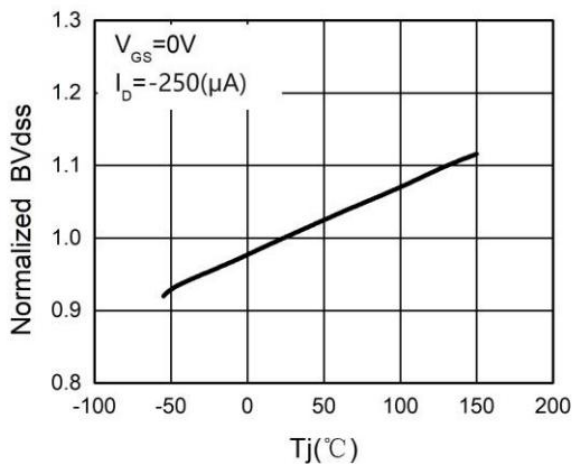


Figure 5. BV_{DS} vs Junction Temperature

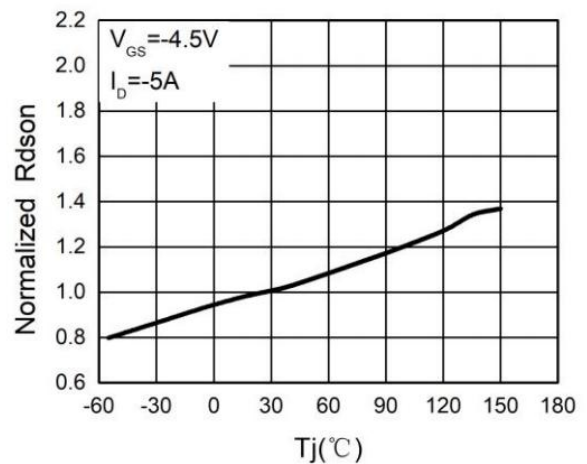


Figure 6. $R_{DS(on)}$ vs Junction Temperature

Typical Characteristics (cont.)

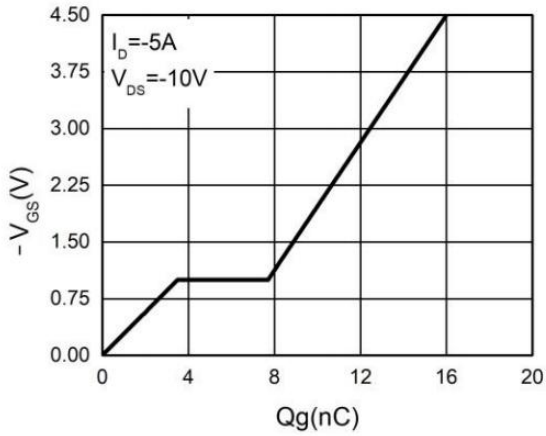


Figure 7. Gate Charge Waveforms

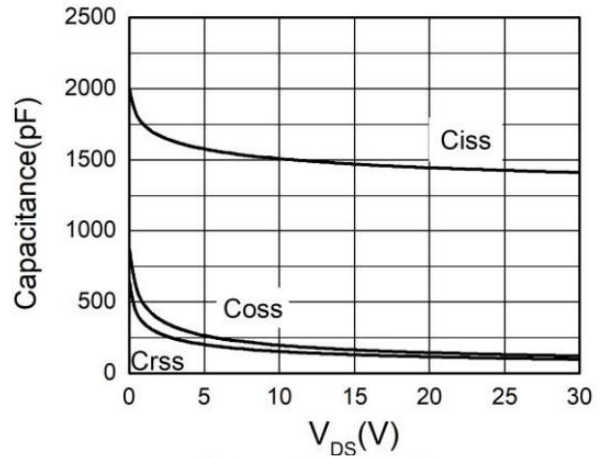


Figure 8. Capacitance

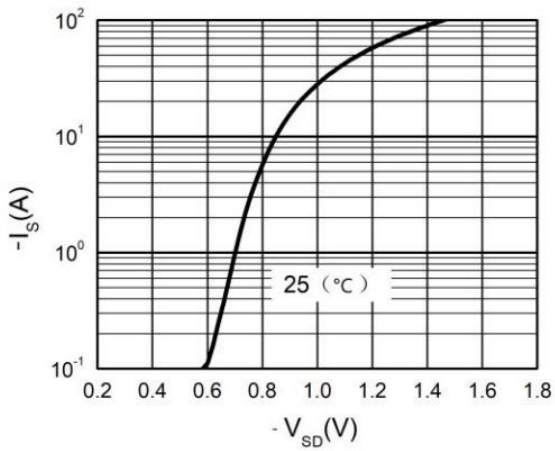


Figure 9. Body-Diode Characteristics

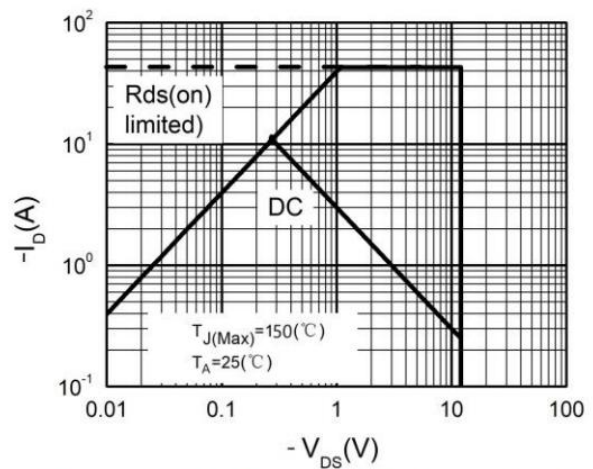
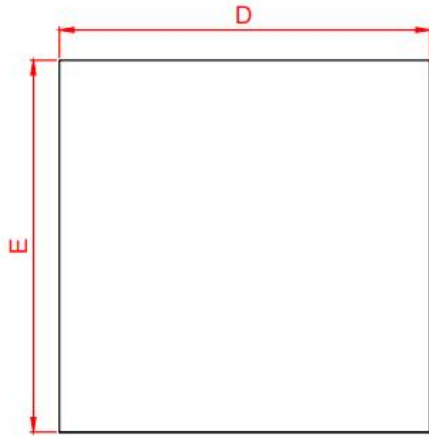
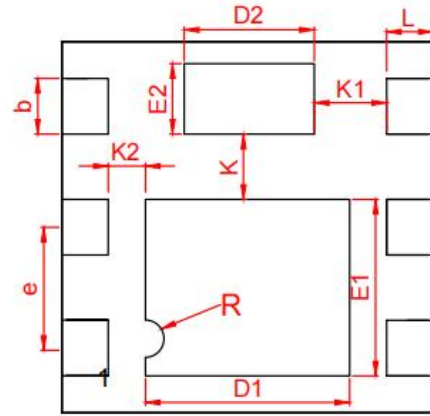


Figure 10. Maximum Safe Operating Area

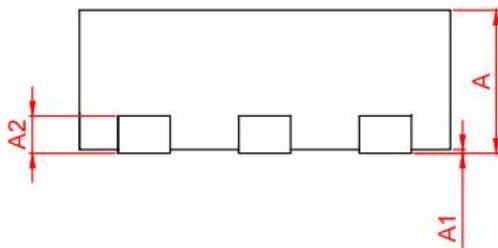
DFN2X2 Package Information



TOP VIEW



BOTTOM VIEW



SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
*A1	0.00	0.02	0.05
*b	0.25	0.30	0.35
*A2	0.203 BSC		
*D	1.90	2.00	2.10
*E	1.90	2.00	2.10
*E1	0.90	0.95	1.00
*E2	0.33	0.38	0.43
*D1	1.10	1.15	1.20
*D2	0.65	0.70	0.75
*e	0.65 REF		
*L	0.22	0.25	0.27
*K	0.30	0.35	0.40
*K1	0.35	0.40	0.45
*K2	0.18	0.20	0.22

Revision History

Revision	Release	Remark
V1.0	2024/03/15	Initial Release
V1.1	2024/05/30	Revise RDSON Testing Conditions

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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