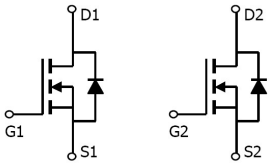
AP4008QD

N-Channel Power Mosfet

DATA SHEET

Feature

- 40V,20A
  $R_{DS(ON)}$ <22mΩ @V_{GS}=10V TYP:17mΩ
  $R_{DS(ON)}$ <30mΩ @V_{GS}=4.5V TYP:22mΩ
- Advanced trench cell design
- Fast Switching
- Exceptional on-resistance and maximum DC current capability



Schematic diagram

Marking and pin assignment

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
4008QD	AP4008QD	PDFN3X3	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃)	I_D	20	A
Continuous Drain Current (Tc=100℃)	I_D	13	A
Pulsed Drain Current (1)	I_{DM}	48	A
Power Dissipation	P_D	20	W
Thermal Resistance from Junction to Ambient	$R_{\theta JC}$	6.25	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_J=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	40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =40V, 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	1.6	2.5	V
Drain-source on-resistance(2)	$R_{DS(on)}$	V_{GS} =10V, I_D =10A	-	17	22	mΩ
		V_{GS} =4.5V, I_D =6A	-	22	30	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =20V, V_{GS} =0V, f =1MHz	-	1050	-	pF
Output Capacitance	C_{oss}		-	84	-	
Reverse Transfer Capacitance	C_{rss}		-	72	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, R_L=1.5Ω V_{GS}=10V, R_G=3Ω	-	11	-	ns
Turn-on rise time	t_r		-	13	-	
Turn-off delay time	$t_{d(off)}$		-	36	-	
Turn-off fall time	t_f		-	9	-	
Total Gate Charge	Qg	VDS=20V, ID=5A, VGS=10V	-	11	-	nC
Gate-Source Charge	Qgs		-	1.9	-	
Gate-Drain Charge	Qgd		-	2.2	-	
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		-	-	20	A

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

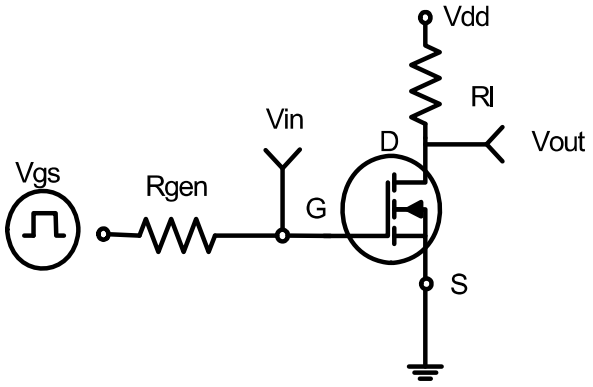


Figure 1:Switching Test Circuit

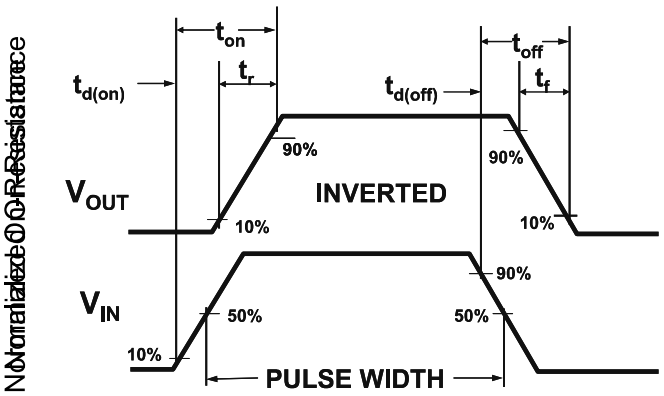
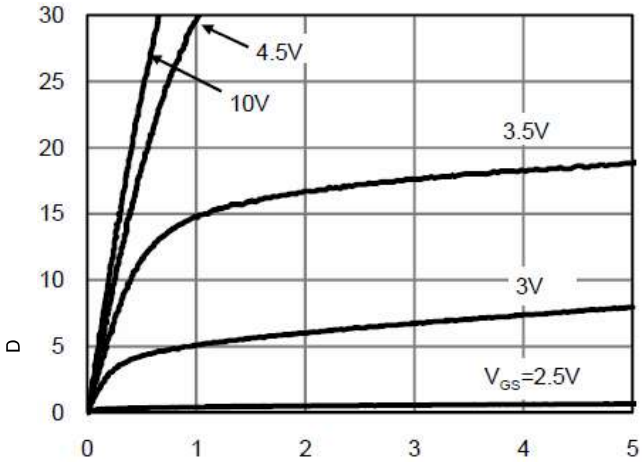
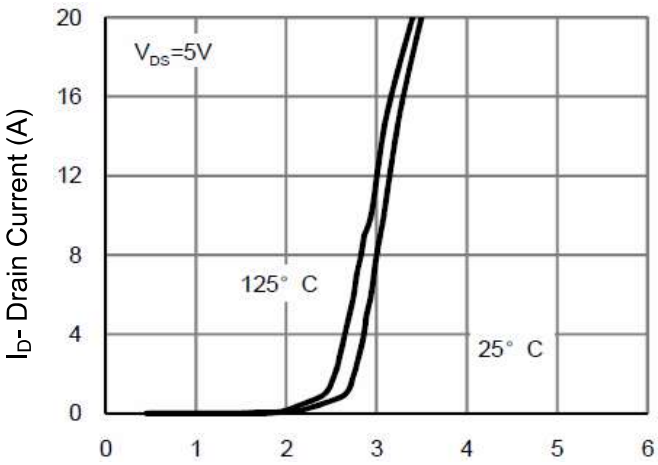


Figure 2:Switching Waveforms



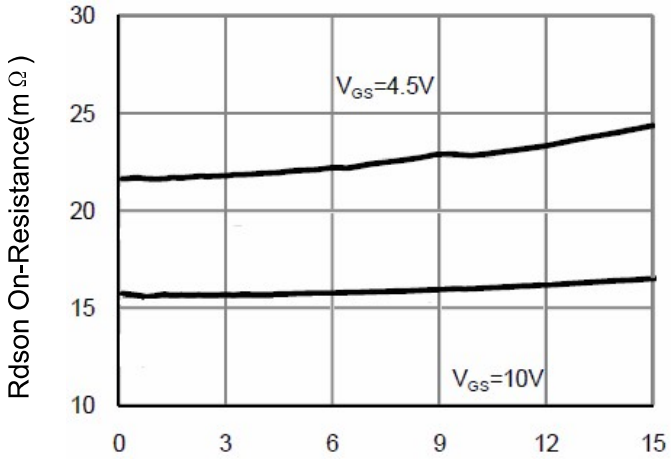
Vds Drain-Source Voltage (V)

Figure 3 Output Characteristics



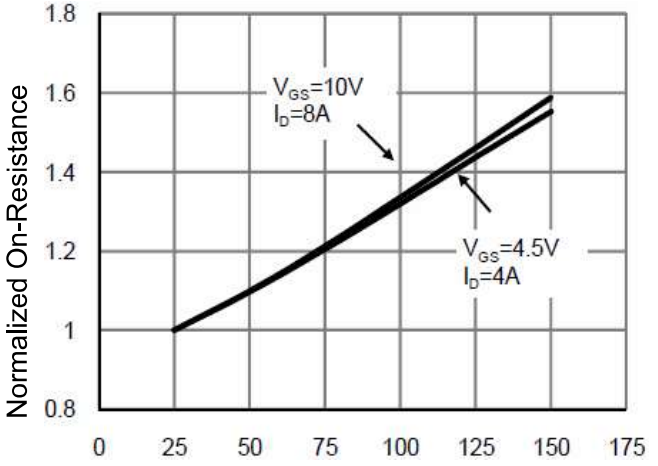
Vgs Gate-Source Voltage (V)

Figure 4 Transfer Characteristics



I_D- Drain Current (A)

Figure 5 Drain-Source On-Resistance



T_J-Junction Temperature(℃)

Figure 6 Drain-Source On-Resistance

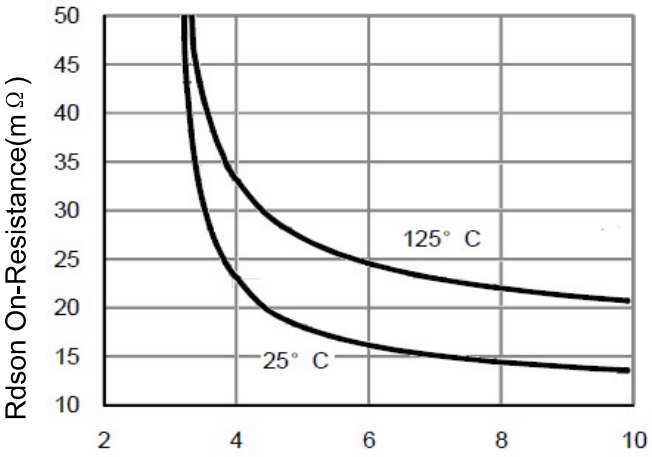


Figure7 Rdson vs Vgs

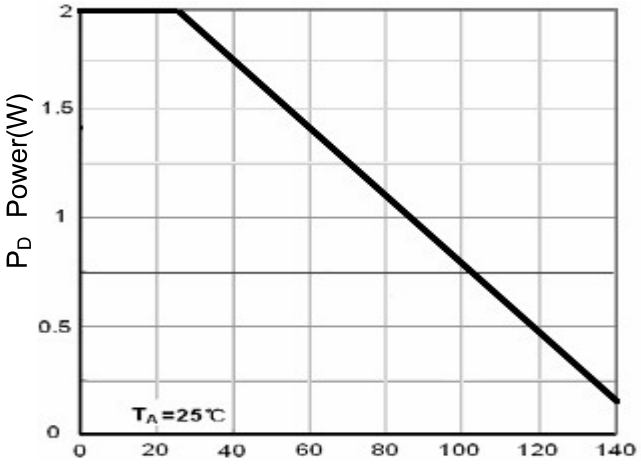


Figure 8 Power Dissipation

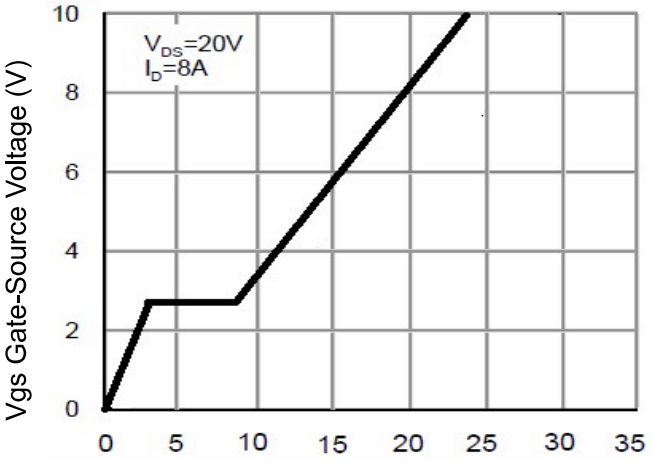


Figure 9 Gate Charge

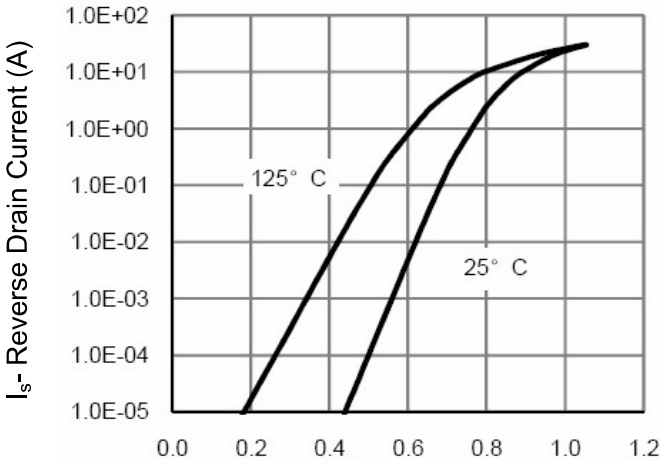


Figure 10 Source- Drain Diode Forward

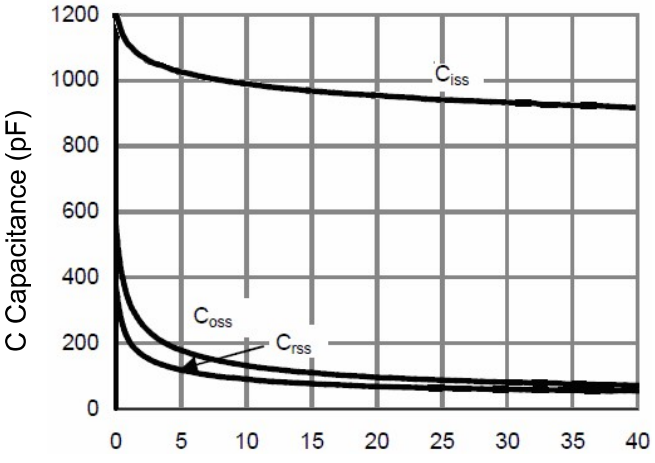


Figure 11 Capacitance vs Vds

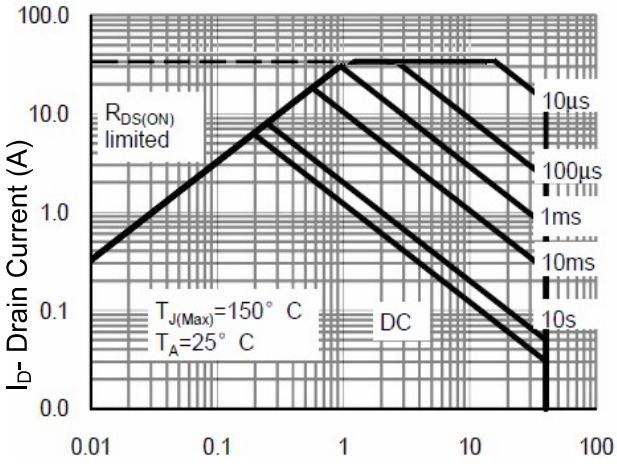
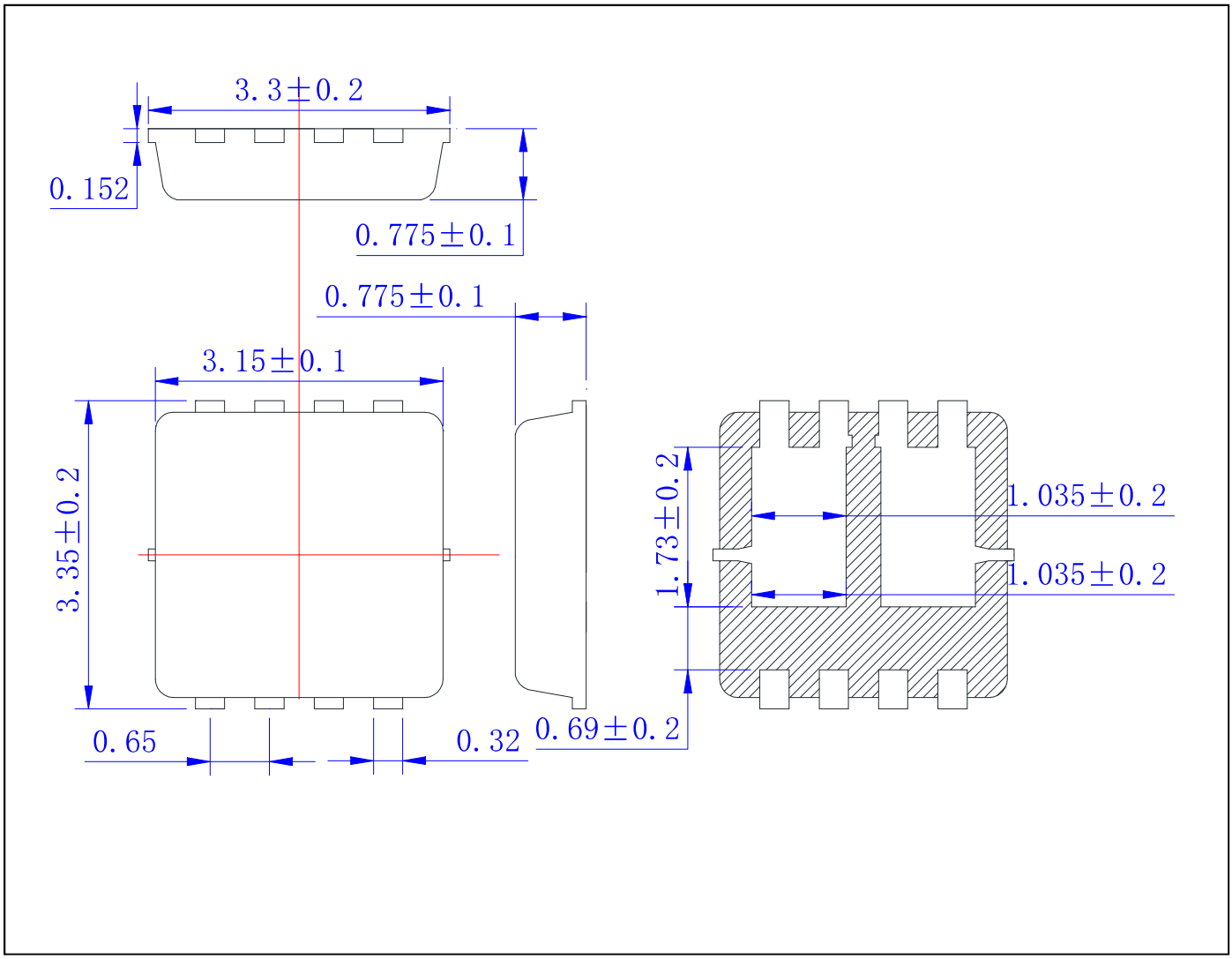


Figure 12 Safe Operation Area

PACKAGE OUTLINE DIMENSIONS



Revision History

Revision	Release	Remark
V1.0	2023/03/07	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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