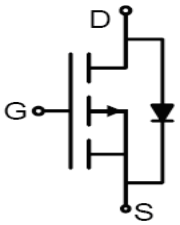
AP110P04D

P-Channel Enhancement Mosfet

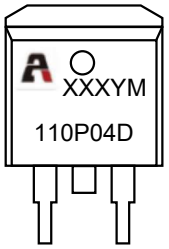
DATA SHEET

Features

- -40V, -110A
  $R_{DS(ON)}$ <6.0mΩ @V_{GS}=-10V TYP: 5.2mΩ
  $R_{DS(ON)}$ <7.6mΩ @V_{GS}=-4.5V TYP:6.6mΩ
- Advanced Trench Technology
- High Power and current handing capability
- Lead free product is acquired



Schematic Diagram



Applications

- Load Switch
- PWM Application
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
110P04D	AP110P04D	TO-263	13inch	-	800

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 (T_C =25℃)	I_D	-110	A
Continuous Drain Current (T_C =100℃)	I_D	-70	A
Pulsed Drain Current [1]	I_{DM}	-440	A
Single Pulsed Avalanche Energy [2]	E_{AS}	576	mJ
Drain Power Dissipation	P_D	96	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.3	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	50	℃/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	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-1.0	-1.7	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =-10V, I_D =-20A	-	5.2	6.0	mΩ
		V_{GS} =-4.5V, I_D =-20A		6.6	7.6	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-20V, V_{GS} =0V, f =1.0MHz	-	6638	-	pF
Output Capacitance	C_{oss}		-	545	-	
Reverse Transfer Capacitance	C_{rss}		-	345	-	
Gate resistance	R_g	V_{DS} =0V, V_{GS} =0V, f =1.0MHz		1.9		Ω
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DS}=-20V, I_D=-20A, R_G=3Ω, V_G=-10V	-	16	-	ns
Turn-on rise time	t_r		-	17	-	
Turn-off delay time	$t_{d(off)}$		-	68	-	
Turn-off fall time	t_f		-	31	-	
Total Gate Charge	Qg	V_{DS}=-20V, I_D=-20A, V_{GS}=-10V	-	118	-	nC
Gate-Source Charge	Qgs		-	13	-	
Gate-Drain Charge	Qgd		-	22	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=-20A	-	-	-1.2	V
Diode Forward current	I_S	T_C=25℃	-	-	-110	A
Body Diode Reverse Recovery Time	trr	T_J=25℃，IF=-20A,di/dt=100A/us		24		ns
Body Diode Reverse Recovery Charge	Qrr	T_J=25℃，IF=-20A,di/dt=100A/us		140		nc

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: TJ=25℃, VDD=-15V, VG=-10V, IAS=-48A,RG=25Ω, L=0.5mH

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

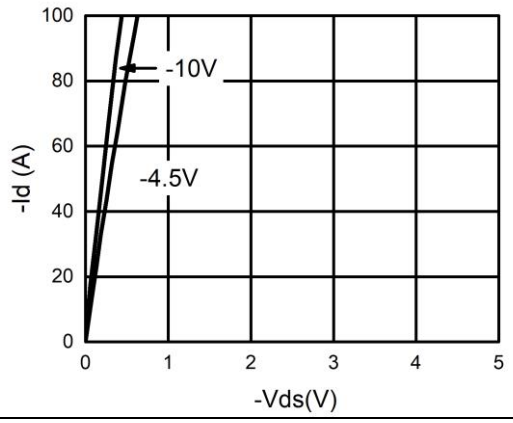


Figure 2. Transfer Characteristics

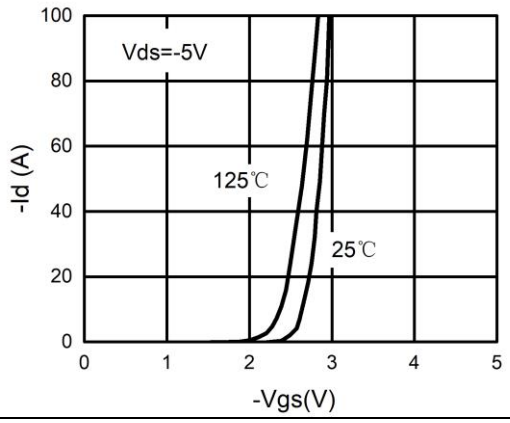


Figure 3. Power Dissipation

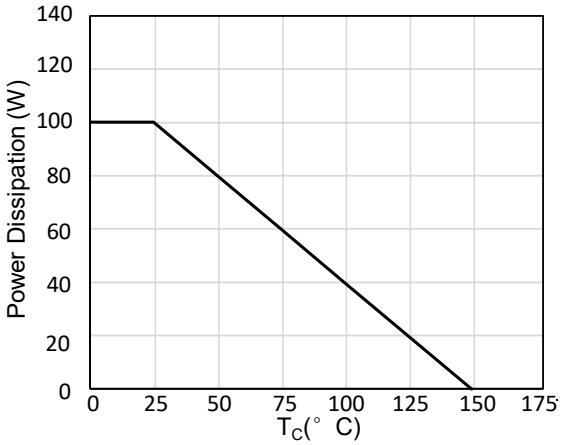


Figure 4. Drain Current

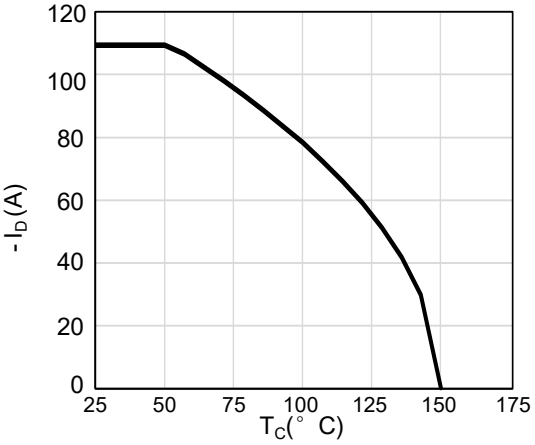


Figure 5. BV_{DSS} vs Junction Temperature

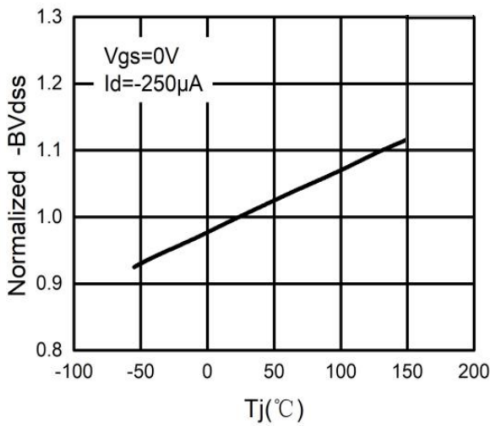
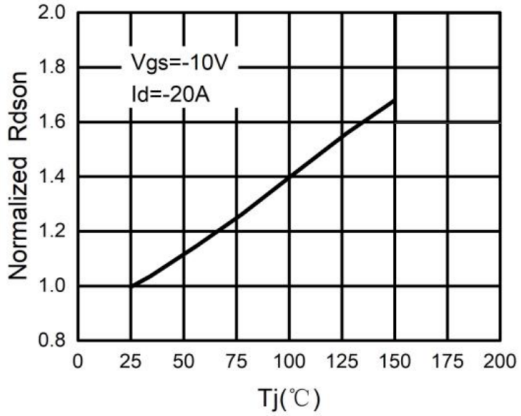


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

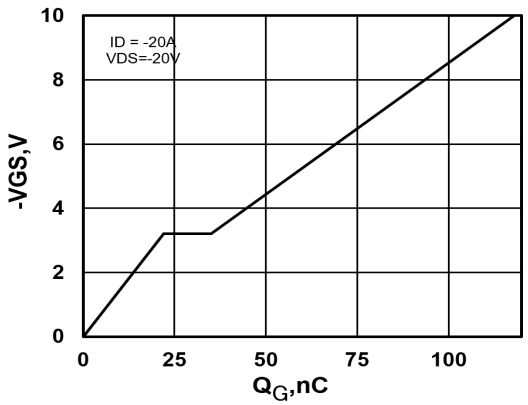


Figure 8. Capacitance

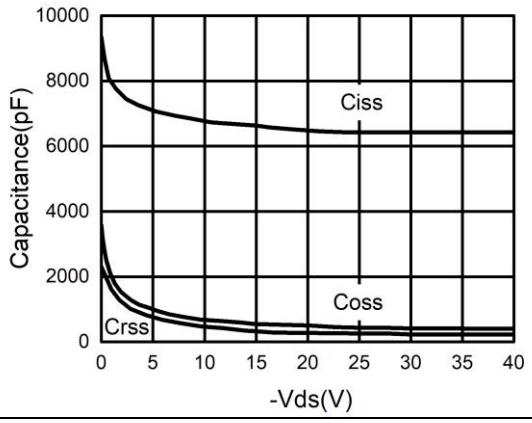


Figure 9. Body-Diode Characteristics

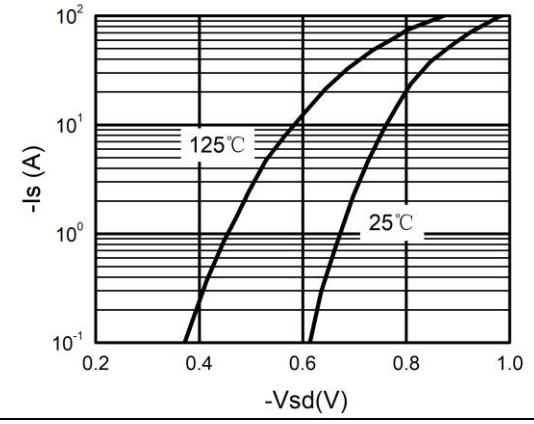


Figure 10. Maximum Safe Operating Area

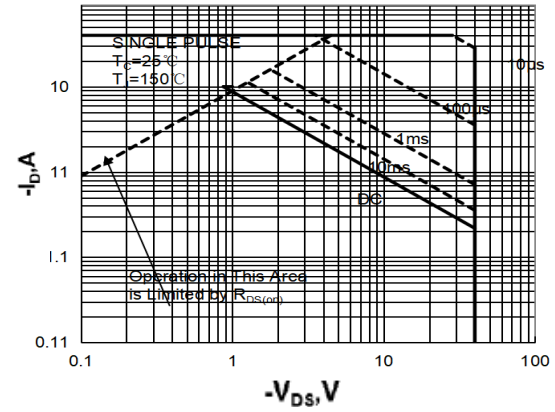
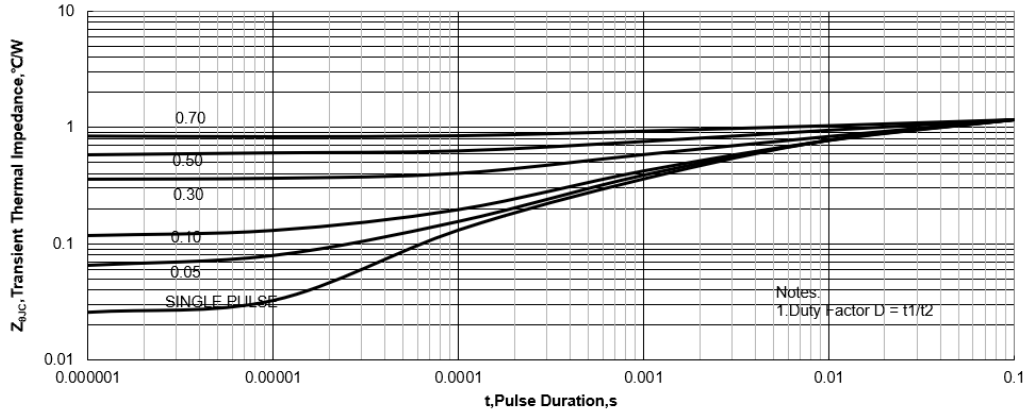
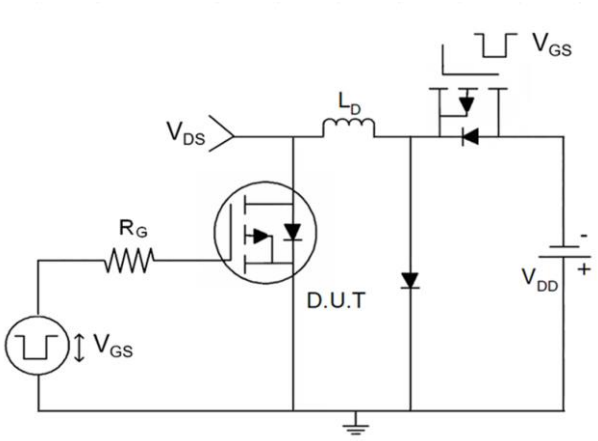


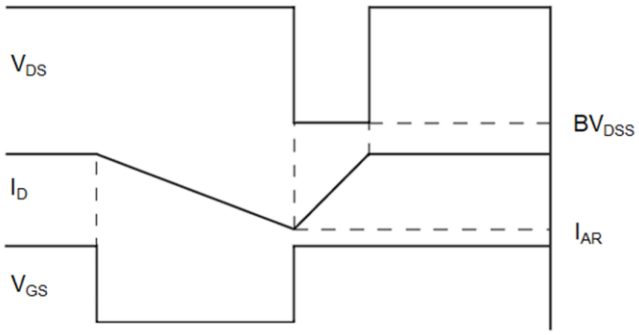
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



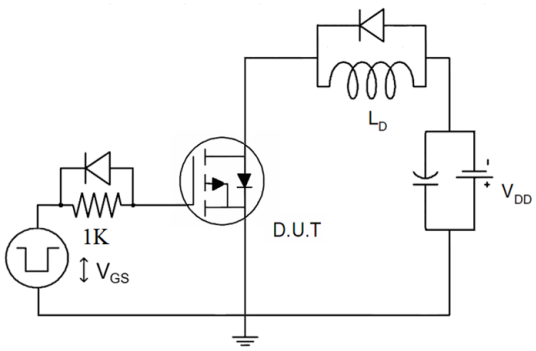
Test Circuit

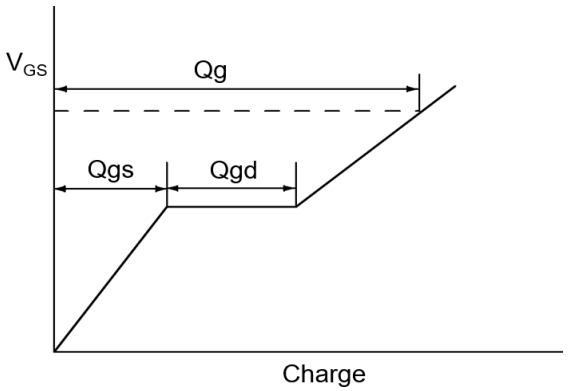
1) E_{AS} Test Circuits



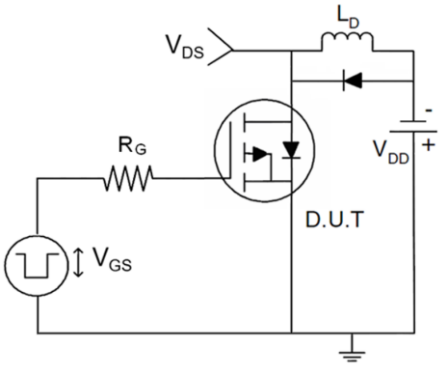


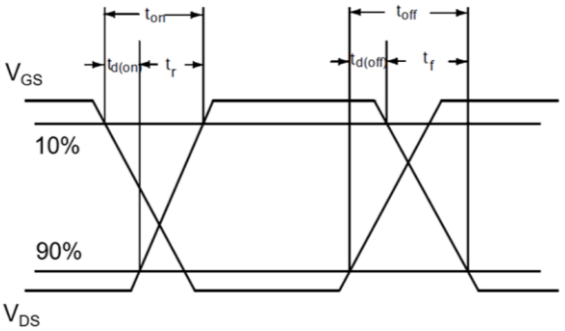
2) Gate Charge Test Circuit



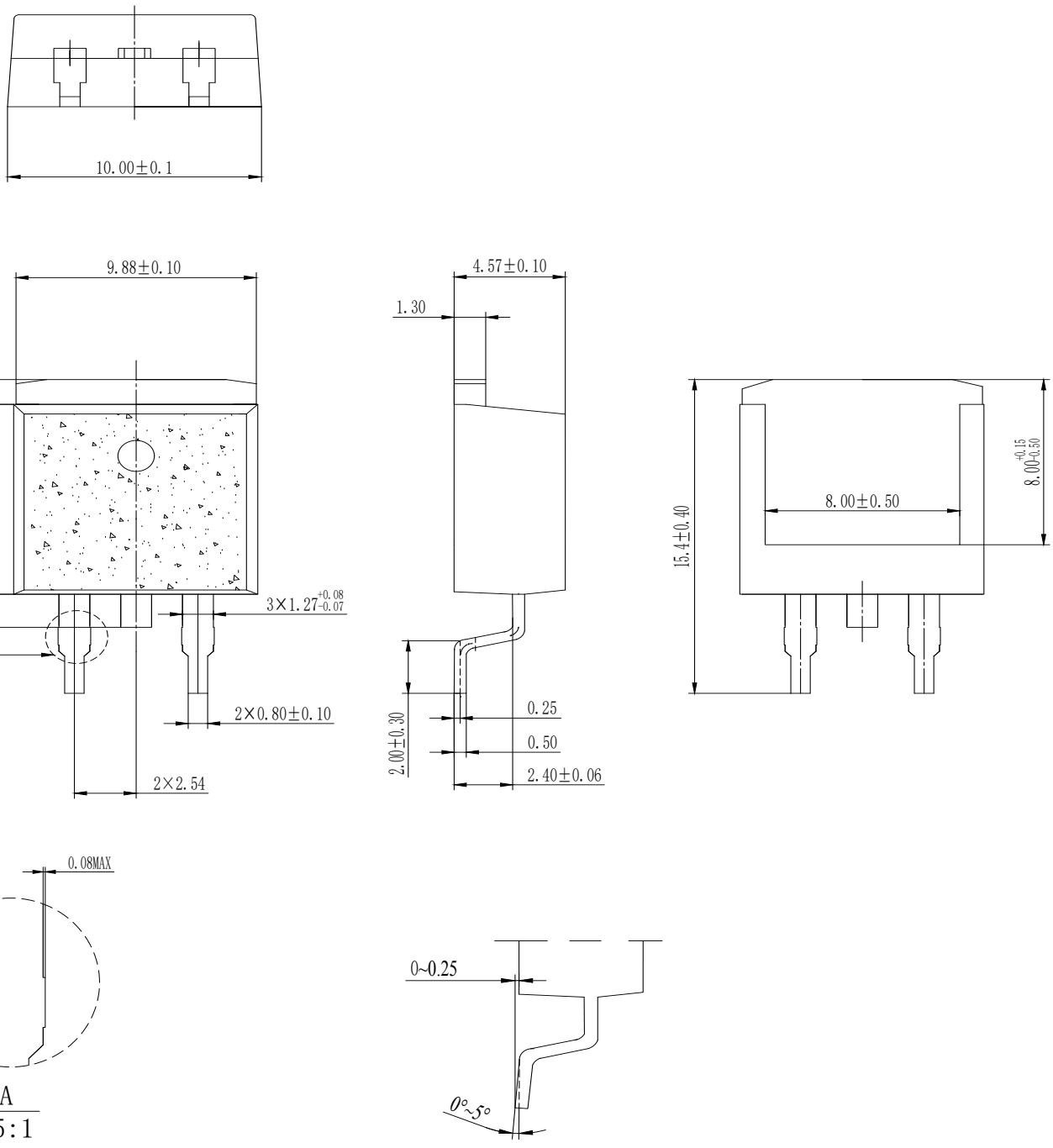


3) Switch Time Test Circuit





TO-263 Package Information



Revision History

Revision	Release	Remark
V1.0	2023/02/06	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.

Due to product or technical improvements,the information described or contained herein may be changed without prior notice.