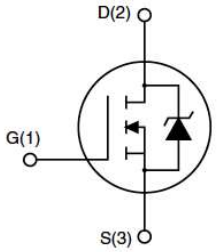
Features

- 30V,120A
  $R_{DS(ON)}$ <3.3 mΩ @ V_{GS}=10V TYP:2.7 mΩ
  $R_{DS(ON)}$ <5.6 mΩ @ V_{GS}=4.5V TYP:4.2 mΩ
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired100% UIS Tested





Marking and pin assignment

Applications

- Load switch
- PWM applications
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
120N03K	AP120N03K	TO-252	-	-	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃)(1)	I_D	120	A
Continuous Drain Current (Tc=100℃)(1)	I_D	76	A
Pulsed Drain Current (1)	I_{DM}	480	A
Single Pulsed Avalanche Energy (3)	E_{AS}	256	mJ
Drain Power Dissipation	P_D	65	W
Thermal Resistance from Junction to Case(2)	$R_{\theta JC}$	1.9	℃/W
Thermal Resistance- Junction to Ambient(2)	$R_{\theta JA}$	50	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

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

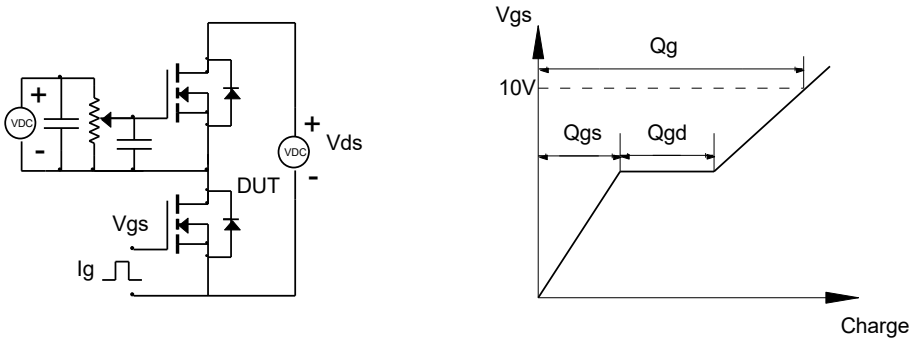
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =30V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.0	-	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =20A	-	2.7	3.3	mΩ
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =4.5V, I_D =15A	-	4.2	5.6	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =15V, V_{GS} =0V, f =1.0MHz	-	2764	-	pF
Output Capacitance	C_{oss}		-	289	-	
Reverse Transfer Capacitance	C_{rss}		-	265	-	
Gate Resistance	R_G	F=1.0MHz		1.7		Ω
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V , R_G=3.0Ω, V_G=10V, R_L=0.75Ω	-	14.4	-	nS
Turn-on rise time	t_r		-	36	-	
Turn-off delay time	$t_{d(off)}$		-	43	-	
Turn-off fall time	t_f		-	22	-	
Total Gate Charge	Qg	V_{DS}=15V, I_D=20A, V_{GS}=10V	-	48	-	nC
Gate-Source Charge	Qgs		-	5.2	-	
Gate-Drain Charge	Qgd		-	9.6	-	
Source-Drain Diode characteristics						
Diode Forward voltage[2]	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=20A	-	-	1.2	V
Diode Forward current	I_S	T_C=25℃	-	-	120	A
Maximum Pulsed Body-Diode Forward Current	I_{SM}				480	A
Body Diode Reverse Recovery Time	trr	V_{DD}=20V，IF=20A,di/dt=100A/us		56		nS
Body Diode Reverse Recovery Charge	Qrr	V_{DD}=20V，IF=20A,di/dt=100A/us		42		nC

Notes:

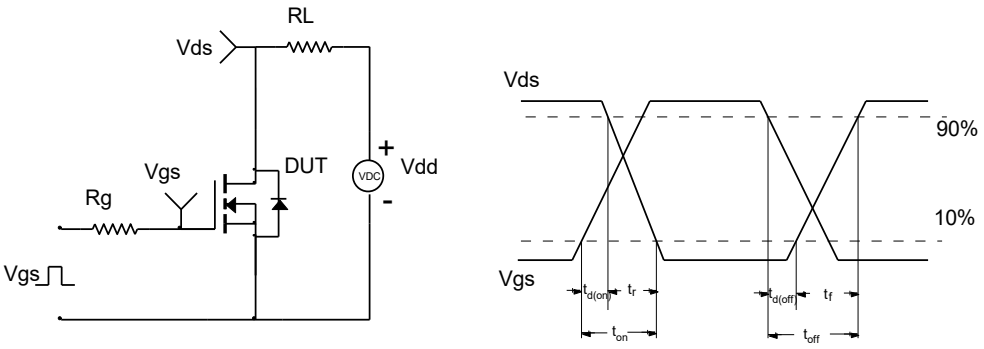
1. The max drain current rating is silicon limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, VDD = 30 V, IAS = 32 A, RG = 25 Ω, Starting TJ = 25 °C
4. Mount on minimum PCB layout

Test Circuit

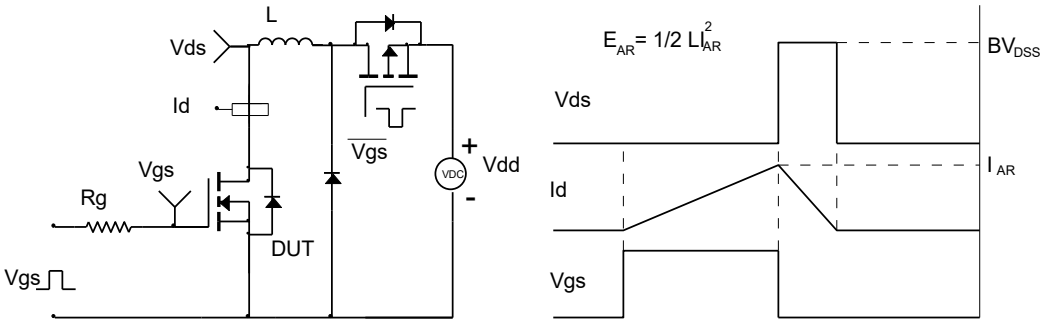
Gate Charge Test Circuit & Waveform



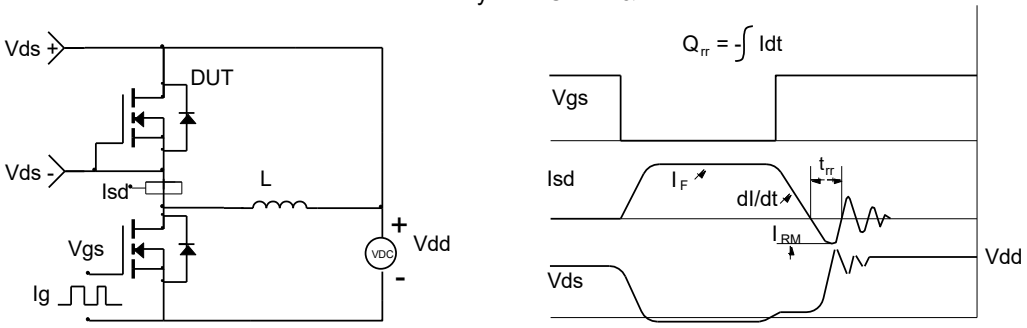
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Figure 1. Output Characteristics

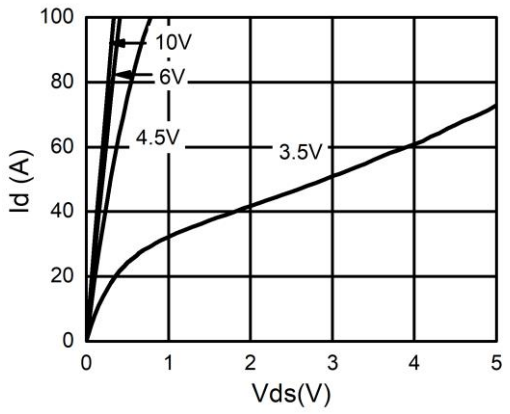


Figure 2. Transfer Characteristics

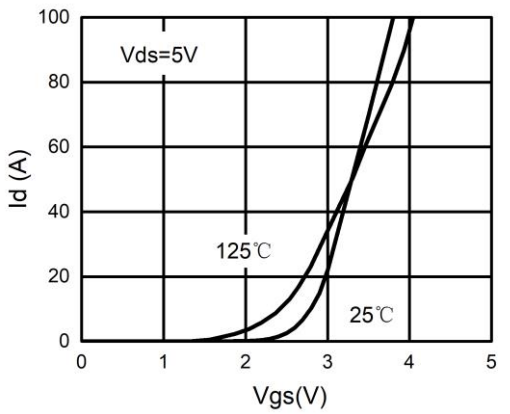


Figure 3. Power Dissipation

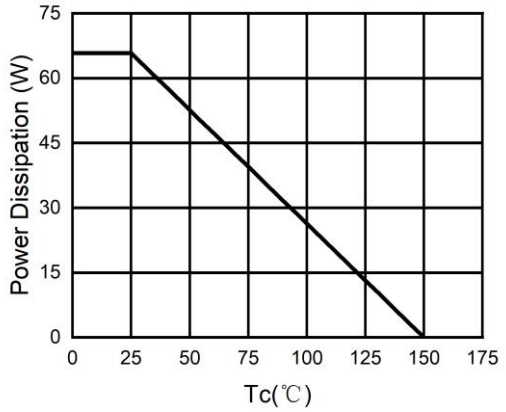


Figure 4. Drain Current

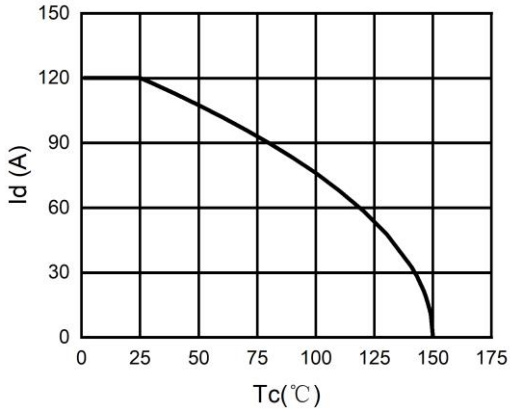


Figure 5. BV_{DSS} vs Junction Temperature

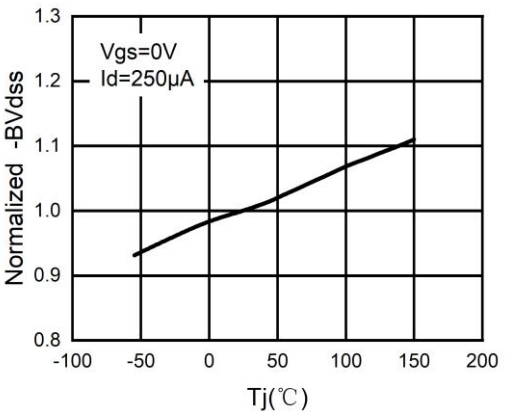
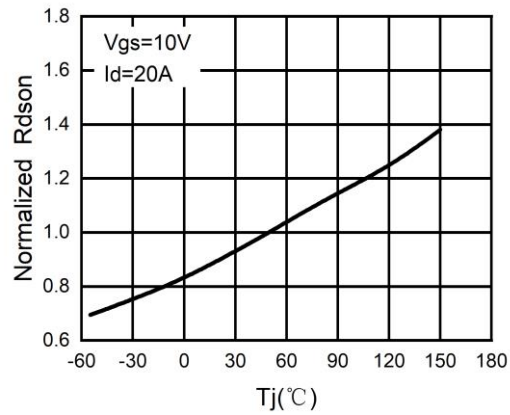


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Performance Characteristics

Figure 7. Gate Charge Waveforms

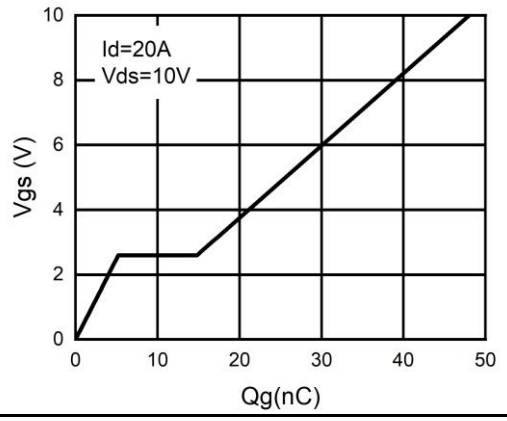


Figure 8. Capacitance

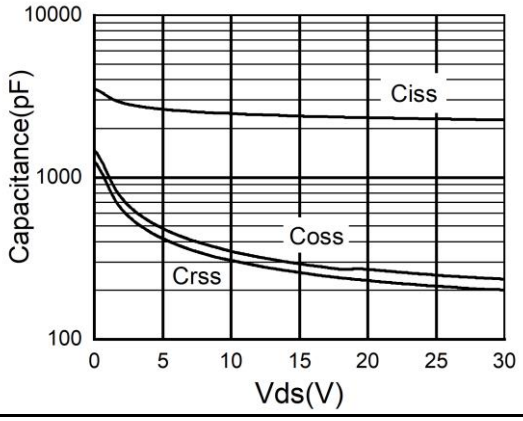


Figure 9. Body-Diode Characteristics

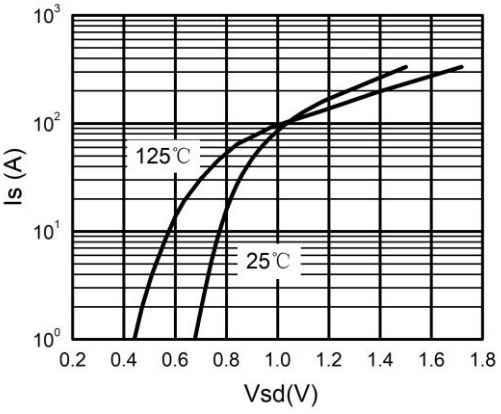
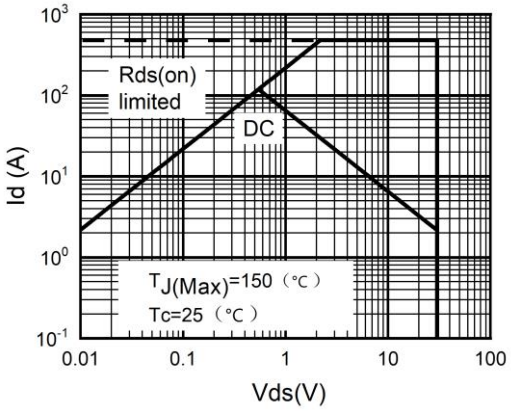
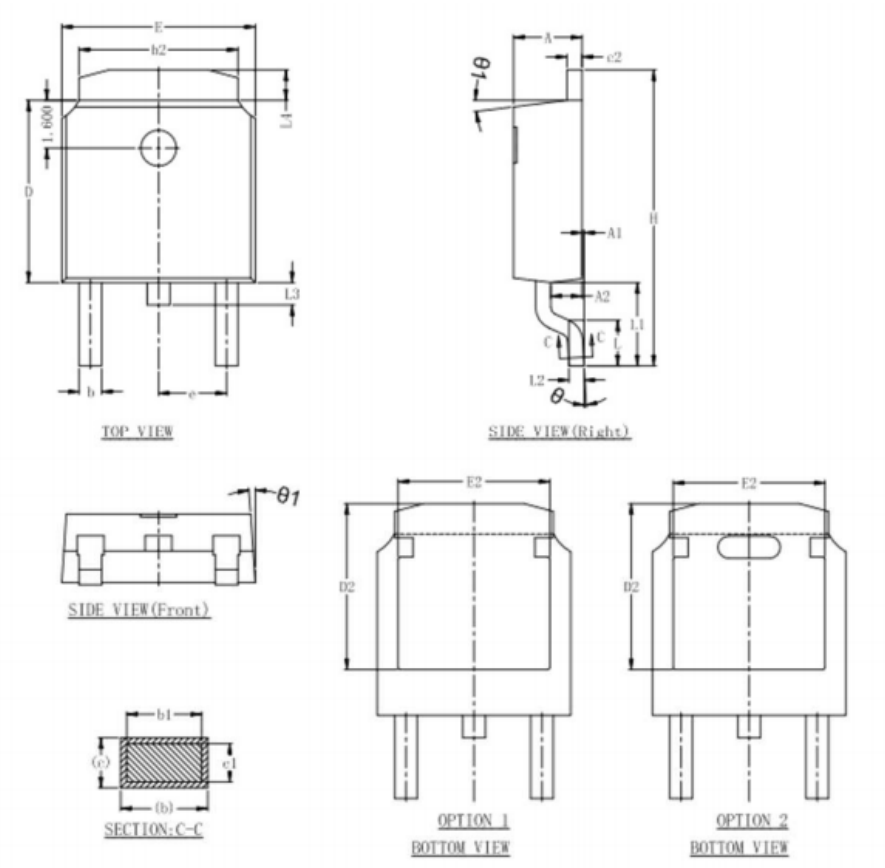


Figure 10. Maximum Safe Operating Area



TO-252 Package Information



DIM / SYMBOL	MIN.	NOM.	MAX.
A	2.200	2.300	2.400
A1	0.000	0.070	0.130
A2	0.950	1.050	1.150
b	0.700	0.800	0.900
b1	0.660	0.760	0.860
b2	5.134	5.334	5.534
c	0.448	0.548	0.648
c1	0.458	0.508	0.558
c2	0.448	0.548	0.648
D	6.000	6.100	6.200
D2	5.372	5.572	5.772
E	6.400	6.500	6.600
E2	4.900	5.100	5.300
e	2.286 BSC.		
H	9.700	9.900	10.100
L	1.380	1.525	1.725
L1	2.588	2.788	2.988
L2	0.508 BSC.		
L3	0.600	0.750	0.950
L4	0.812	1.012	1.212
θ	1°	3°	5°
θ1	6°	7°	8°

Revision History

Revision	Release	Remark
V1.0	2024/04/07	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.

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