

APG068N04G

N-Channel Enhancement Mosfet

AIIPOWER

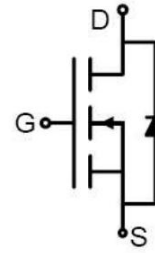
DATA SHEET

Feature

- 40V,50A
 $R_{DS(ON)}$ (TYP:5.7m Ω) < 6.8m Ω @ $V_{GS}=10V$
 $R_{DS(ON)}$ (TYP:8.5m Ω) < 10m Ω @ $V_{GS}=4.5V$
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge

Application

- PWM applications
- Load Switch
- Power management



Schematic Diagram



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G068N04G	APG068N04G	PDFN5X6	-	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c = 25^{\circ}\text{C}$)	I_D	50	A
Continuous Drain Current ($T_c = 100^{\circ}\text{C}$)	I_D	32	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	200	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	56	mJ
Power Dissipation	P_D	41.6	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.0	$^{\circ}\text{C/W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	80	$^{\circ}\text{C/W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$ unless otherwise noted)

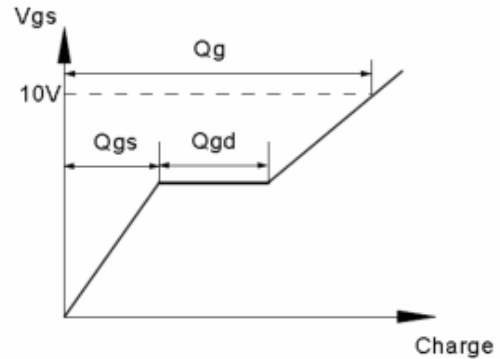
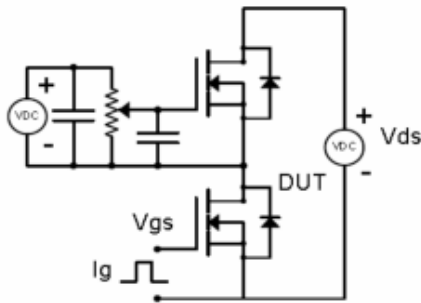
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ± 20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽³⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.0	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	5.7	6.8	mΩ
		V _{GS} =4.5V, I _D =15A	-	8.5	10	
Gate Resistance	R _g	V _{DS} =V _{GS} =0V, f =1MHz	-	3.6	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz	-	840	-	pF
Output Capacitance	C _{oss}		-	254	-	
Reverse Transfer Capacitance	C _{rss}		-	5	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =20V, I _D =20A, V _{GS} =10V, R _G =10Ω	-	4	-	ns
Turn-on rise time	t _r		-	11	-	
Turn-off delay time	t _{d(off)}		-	25	-	
Turn-off fall time	t _f		-	23	-	
Total Gate Charge	Q _g	V _{DS} =20V, I _D =20A, V _{GS} =4.5V	-	13.1	-	nC
Gate-Source Charge	Q _{gs}		-	2.2	-	
Gate-Drain Charge	Q _{gd}		-	2.6	-	
Reverse Recovery Chrage	Q _{rr}	I _F =20A,di/dt=100A/us		5.8		nC
Reverse Recovery Time	T _{rr}	I _F =20A,di/dt=100A/us		18		ns
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} =0V, I _S =20A	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	50	A

Notes:

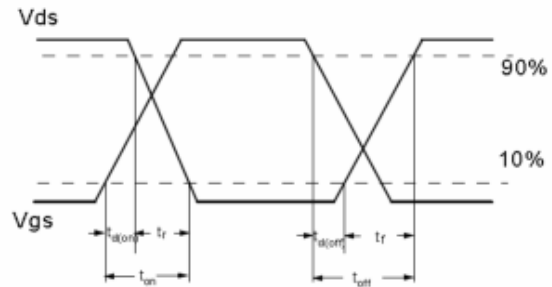
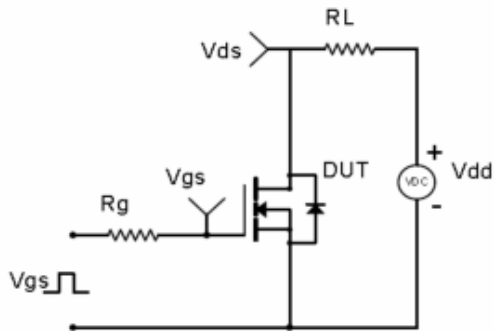
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, R_G = 25\Omega, L = 0.5mH$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10\text{ sec}$

Test Circuit & Waveform

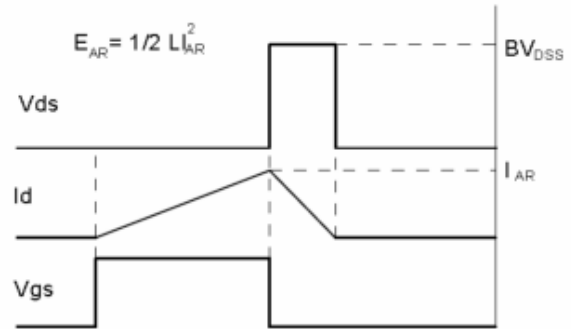
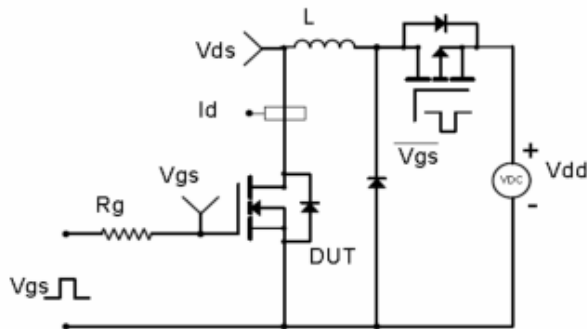
Gate Charge Test Circuit & Waveform



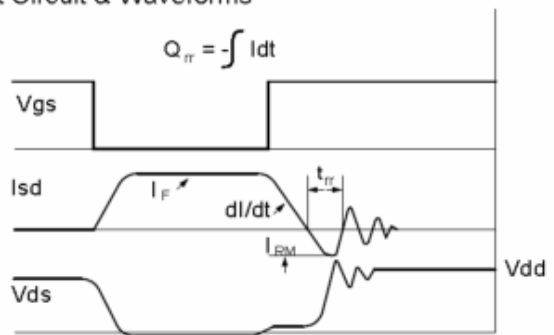
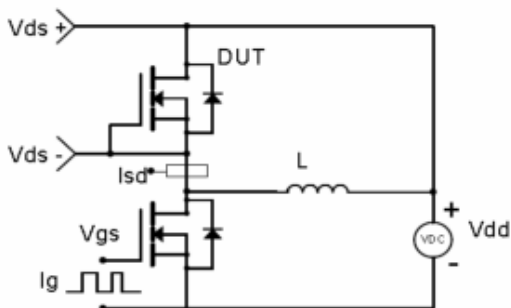
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Electrical Characteristics Diagrams

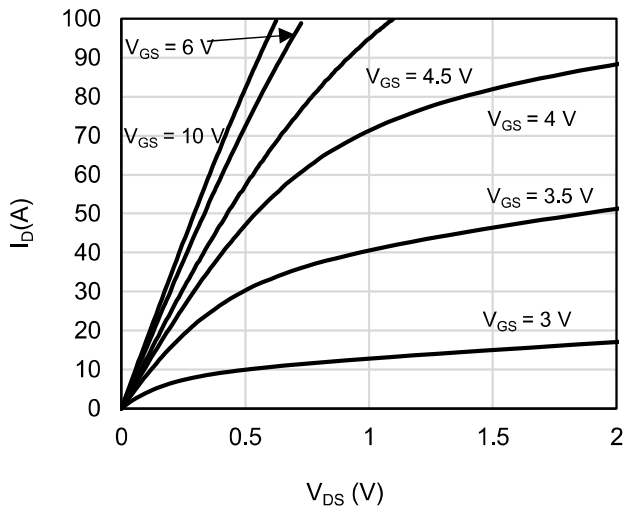


Figure 1: On-Region Characteristics

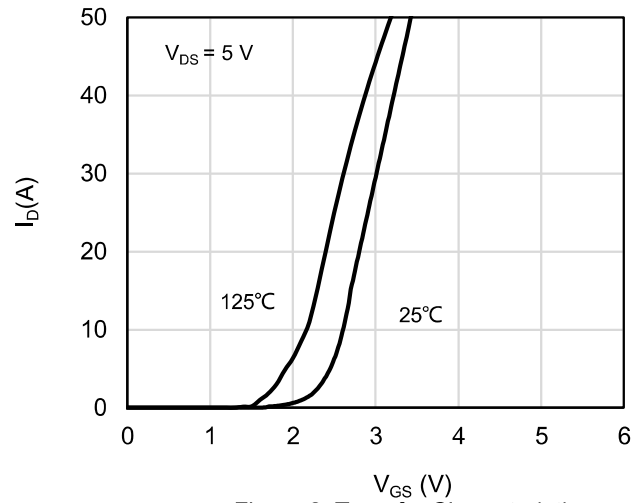


Figure 2: Transfer Characteristics

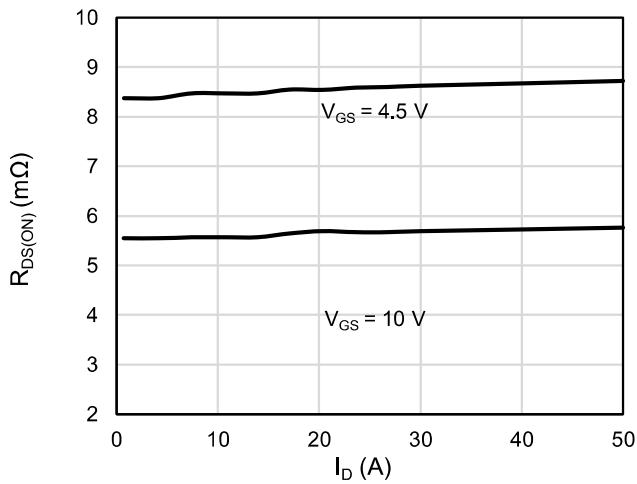


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

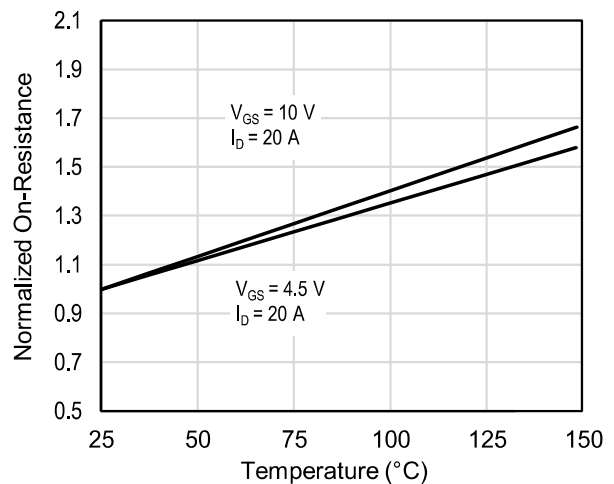


Figure 4: On-Resistance vs. Junction Temperature

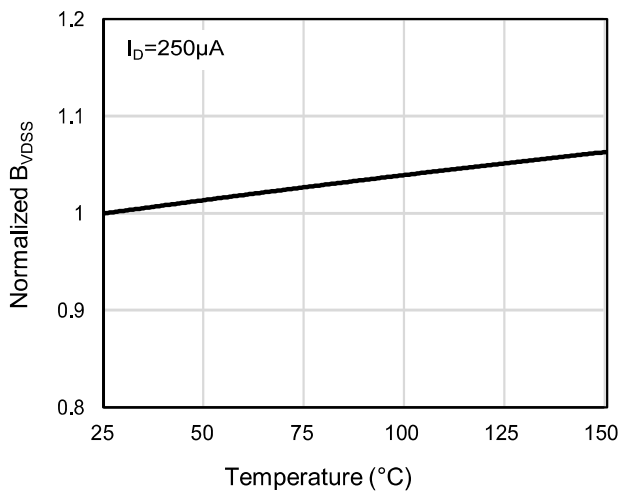


Figure 5: Breakdown Voltage vs. Junction Temperature

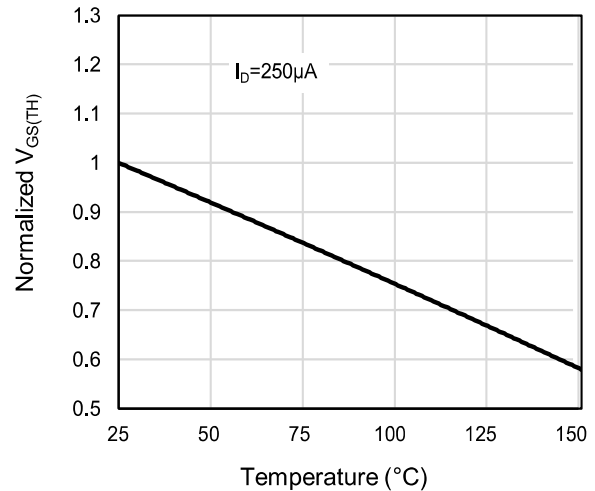


Figure 6: Threshold Voltage vs. Junction Temperature

Electrical Characteristics Diagrams

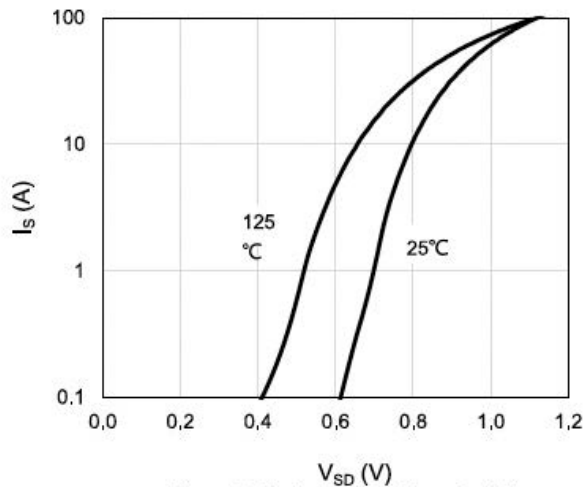


Figure 7: Body-Diode Characteristics

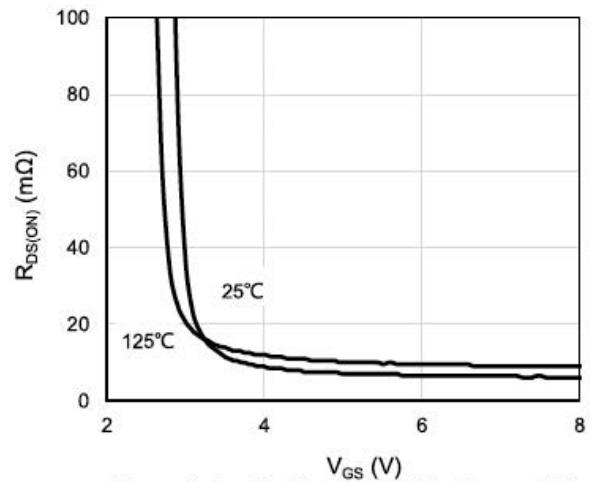


Figure 8: On-Resistance vs. Gate-Source Voltage

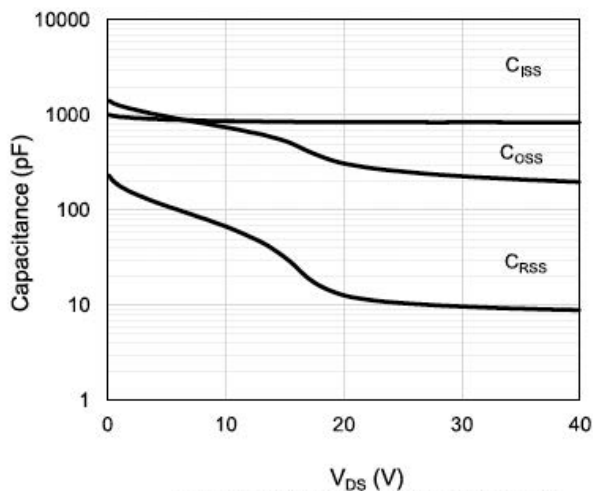


Figure 9: Capacitance Characteristics

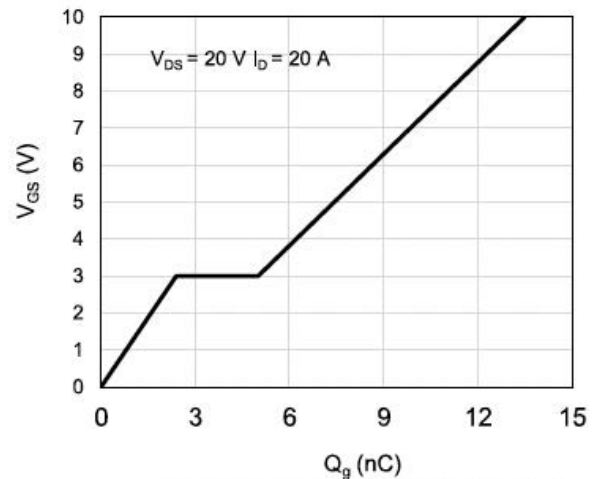


Figure 10: Gate-Charge Characteristics

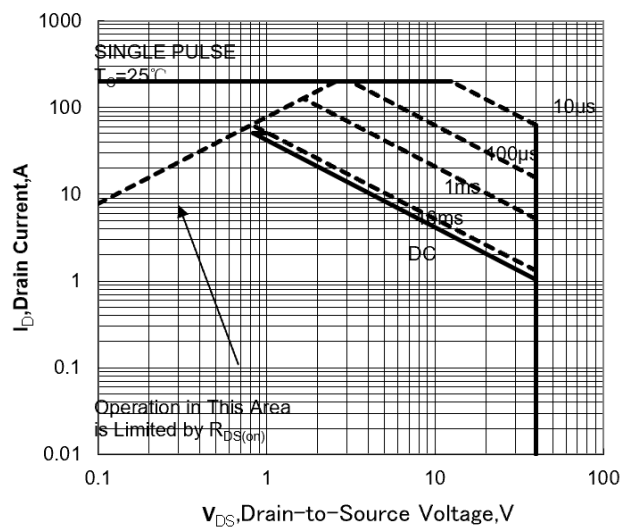


Figure 11: Maximum Safe Operating Area

Electrical Characteristics Diagrams

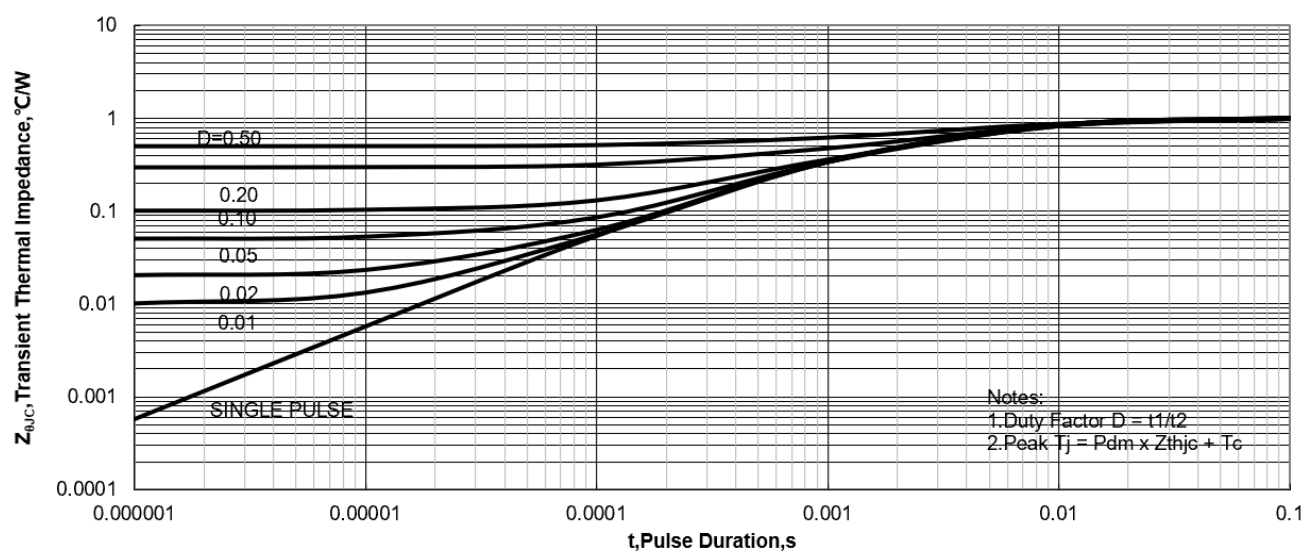


Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 1 illustrates the geometric parameters of the proposed antenna. (a) Top view: Shows the overall dimensions $D2$ and D , the inner dimensions $L2$ and $E2$, and the total height E . A circular patch with diameter Φ is centered on the top surface. (b) Front view: Shows the profile of the antenna with dimensions H (height of the top section), $L1$ (width of the top section), $D1$ (inner width), $E1$ (inner height), L (total width), k (height of the bottom section), b (width of the bottom section), e (width of the bottom section), and A (total height). (c) Side view: Shows the profile of the antenna with dimensions $A2$ (height of the top section), d (width of the top section), θ (angle of the top section), $A1$ (width of the bottom section), and A (total height).

SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100

Revision History

Revision	Release	Remark
V1.0	2023/06/16	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.