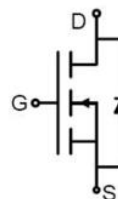


Features

- 200V,5A
 $R_{DS(on)}$ (TYP:430m Ω)<500m Ω @ $V_{GS}=10V$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge

Applications

- PWM Application
- 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)
5N20K	AP5N20K	TO-252	-	-	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^{\circ}C$) ⁽¹⁾	I_D	5	A
Continuous Drain Current ($T_c=100^{\circ}C$)	I_D	3.2	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	20	A
Drain Power Dissipation	P_D	29	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	56	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	64	$^{\circ}C/W$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.2	$^{\circ}C/W$
Junction Temperature	T_J	-55~ +150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

Notes:

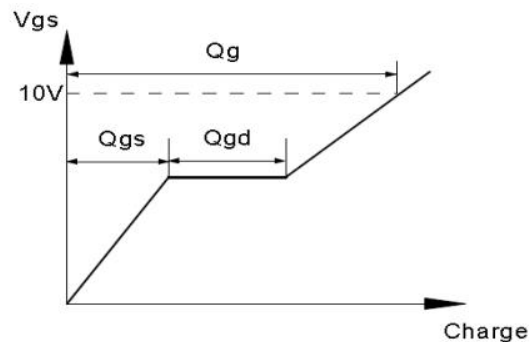
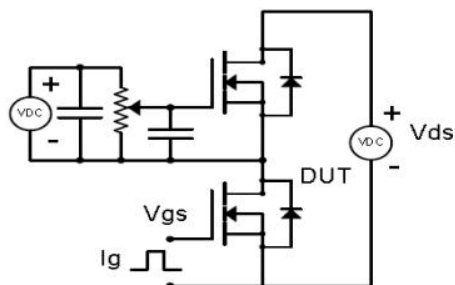
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : $T_J=25^{\circ}C$, $V_{DD}=50V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=15A$

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

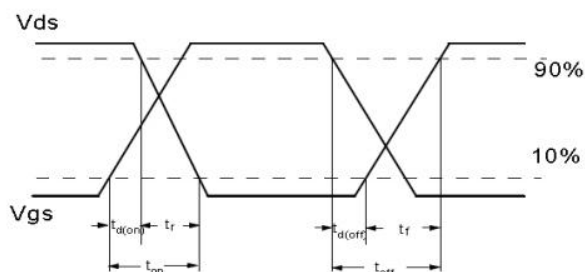
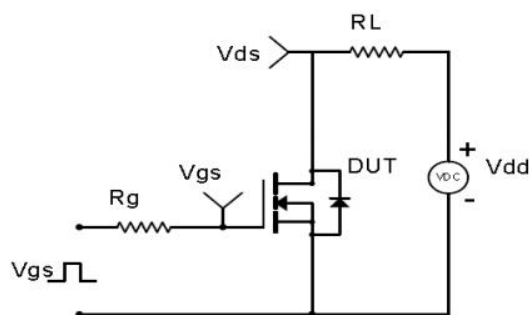
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	200	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =200V, V _{GS} =0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =2.5A	-	430	500	mΩ
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	-	2.2	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =100V,V _{GS} =0V, f=1MHz	-	253	-	pF
Output Capacitance	C _{oss}		-	23	-	
Reverse Transfer Capacitance	C _{rss}		-	6.5	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{GS} =10V,V _{DS} =100V RG=3 Ω , I _D =2.5A	-	7.4	-	ns
Turn-on rise time	t _r		-	10.7	-	
Turn-off delay time	t _{d(off)}		-	18.2	-	
Turn-off fall time	t _f		-	11.9	-	
Total Gate Charge	Q _g	V _{DS} =100V,I _D =2.5A, V _{GS} =10V	-	7.9	-	nC
Gate-Source Charge	Q _{gs}		-	0.9	-	
Gate-Drain Charge	Q _{gd}		-	2.1	-	
Gate Plateau	V _{plateau}		-	2.5	-	V
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	T _J =25℃, V _{GS} =0V, I _D =2.5A	-	0.8	1.2	V
Diode Forward current	I _s	T _J =25℃	-	-	5	A

Test Circuit & Waveform

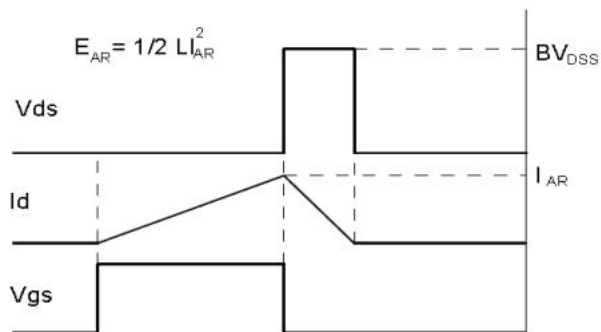
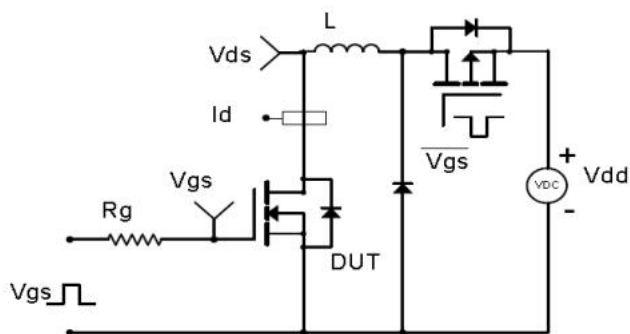
Gate Charge Test Circuit & Waveform



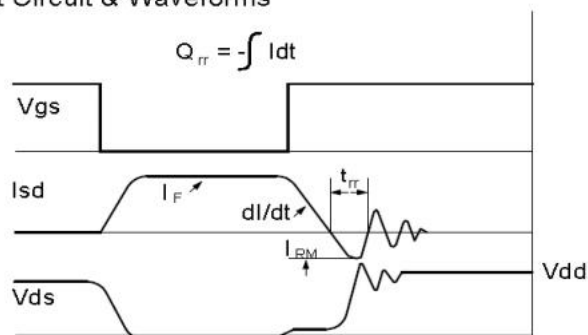
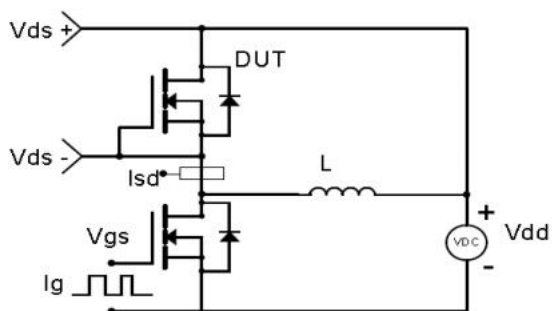
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

Figure 1. Output Characteristics

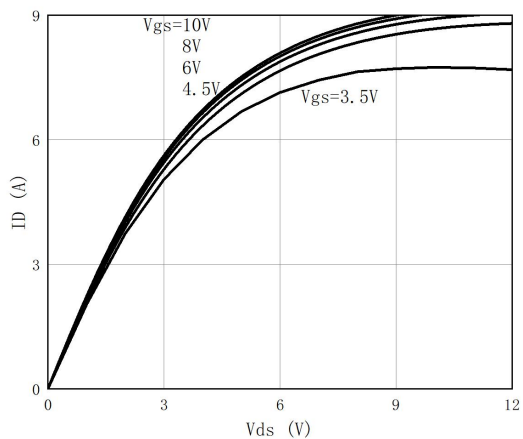


Figure 2. Transfer Characteristics

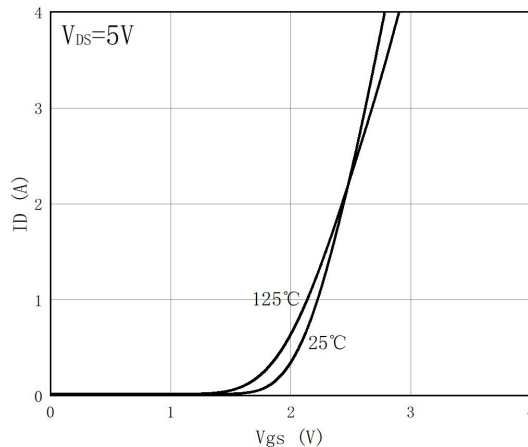


Figure 3. Source Drain Forward Characteristics

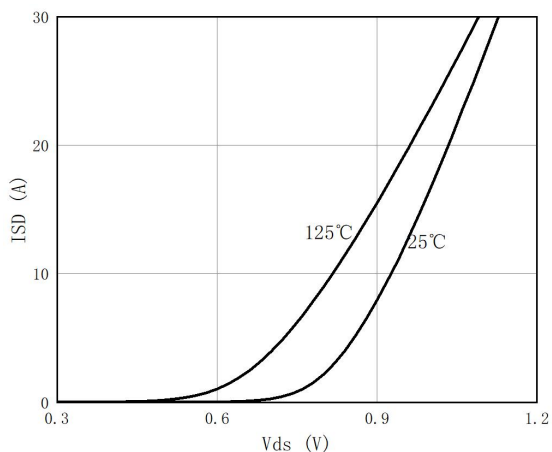


Figure 4. Gate-Charge Characteristics

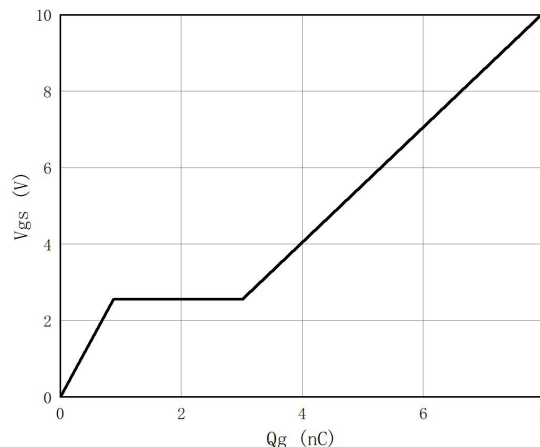


Figure 5. On-Resistance vs. Drain Current and Gate Voltage

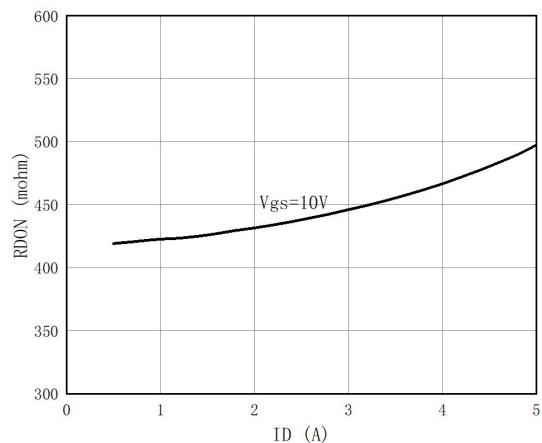
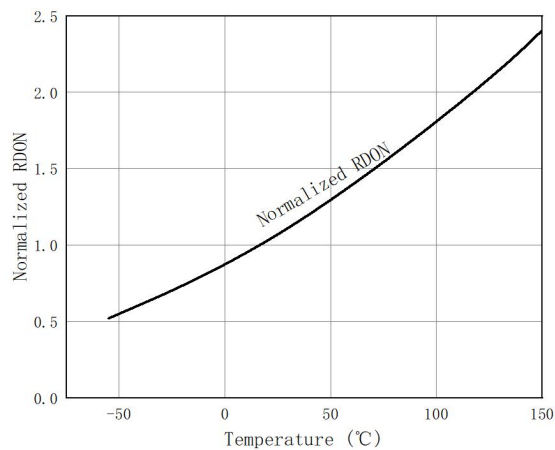


Figure 6. $R_{DS(on)}$ vs Junction Temperature



Typical Characteristics

Figure 7: V_{th} vs Junction Temperature

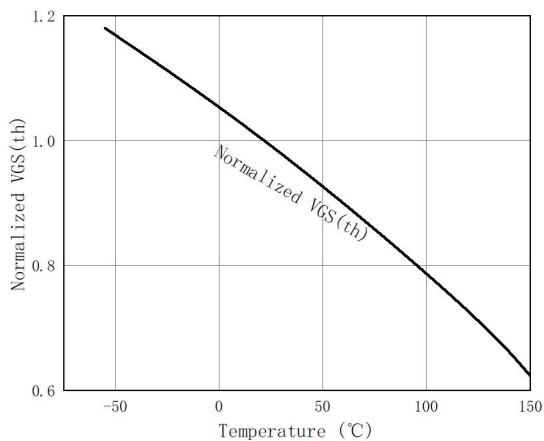


Figure 8: $BVDSS$ vs. Junction Temperature

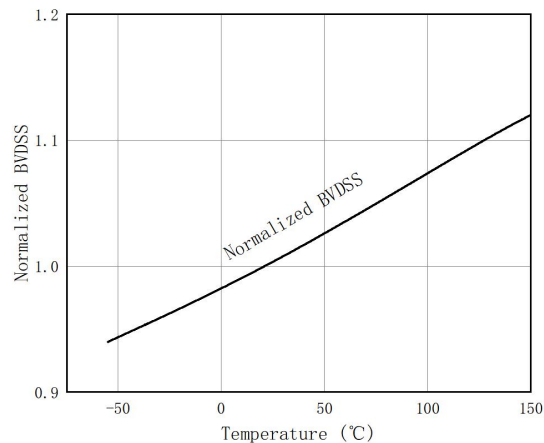


Figure 9. Capacitance

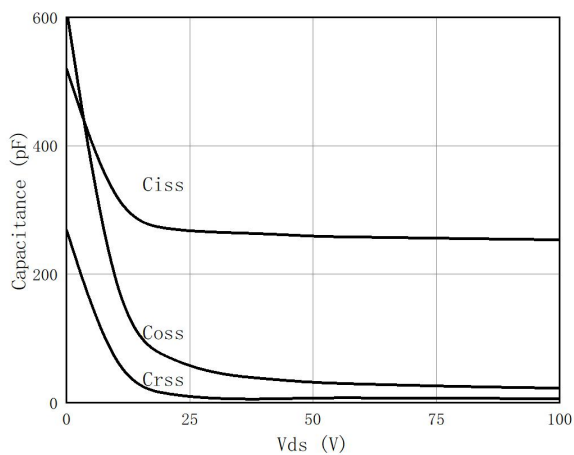


Figure 10. On-Resistance vs. Gate-Source Voltage

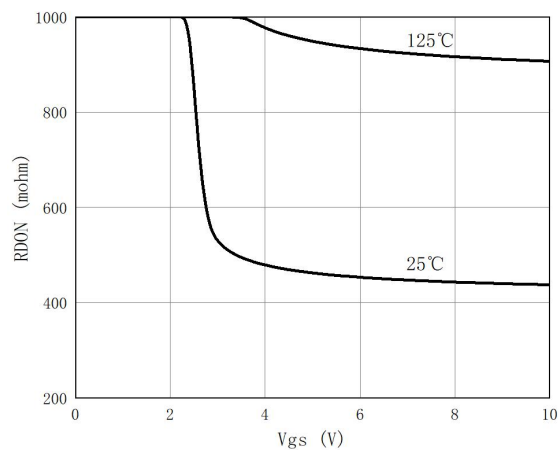


Figure 11. Current De-rating

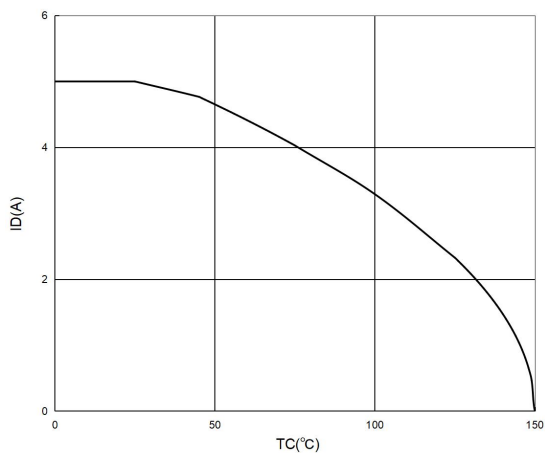
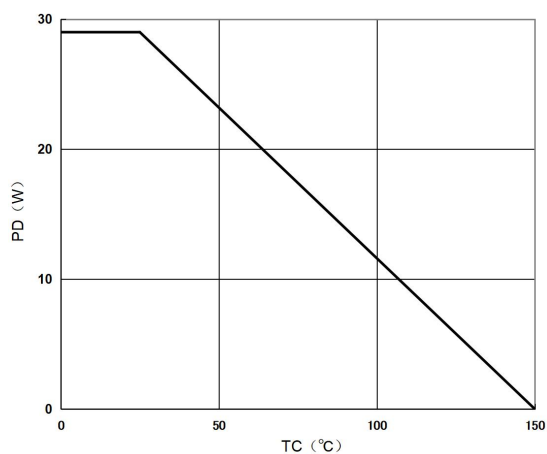


Figure 12. Power De-rating



Typical Characteristics

Figure 13. Safe Operating Area

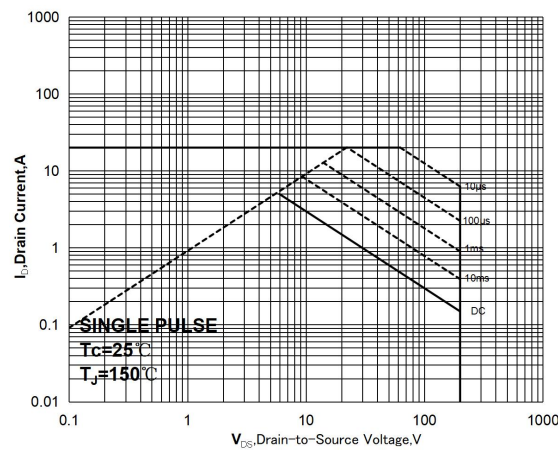
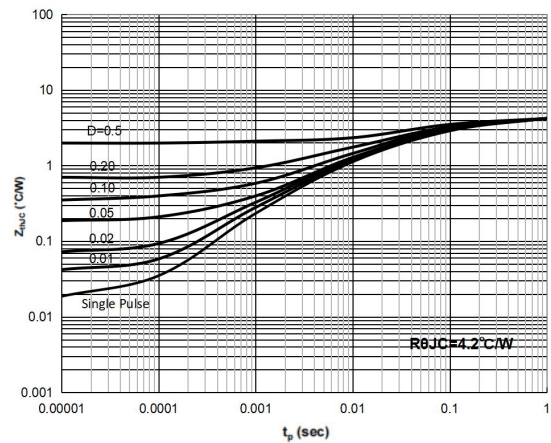
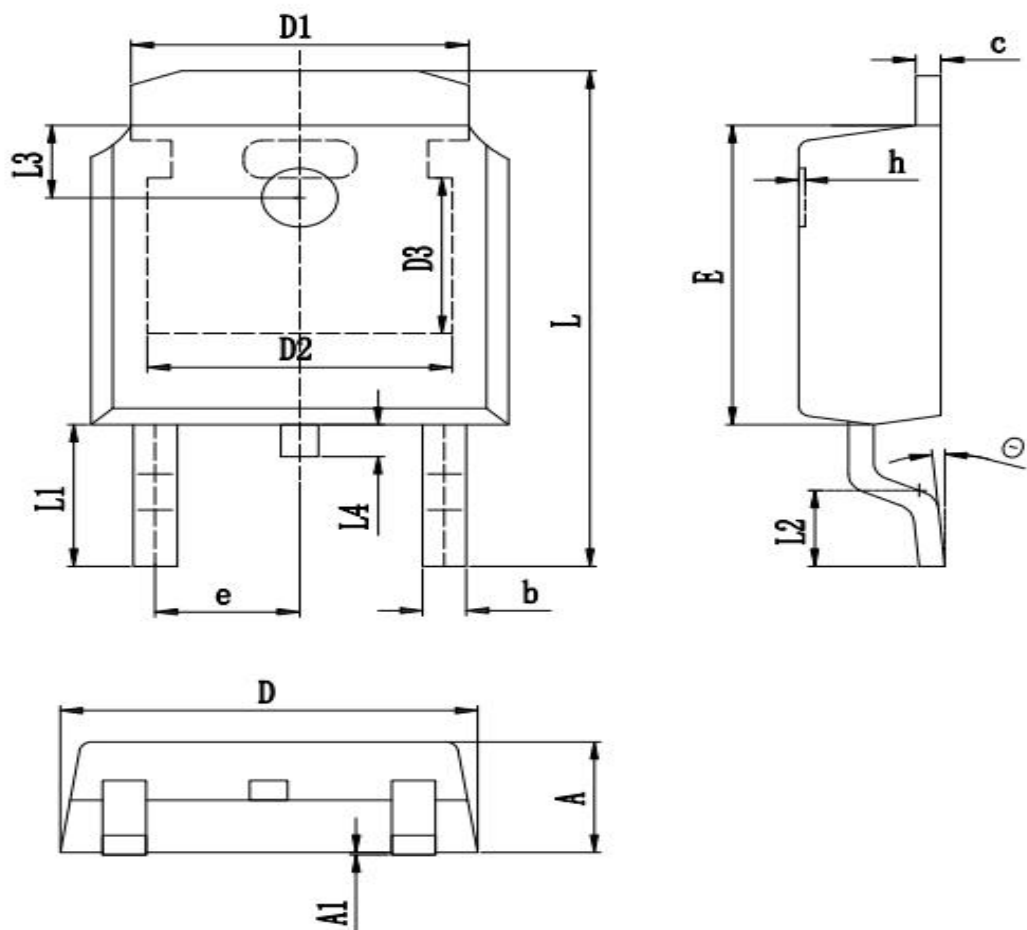


Figure 14. Normalized Maximum Transient Thermal Impedance



TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.500	0.690	0.900
c	0.450	0.520	0.580
D	6.450	6.600	6.750
D1	5.100	5.334	5.500
D2	4.700	4.826	5.000
D3	3.000	3.166	3.250
E	5.950	6.100	6.250
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.450	10.100	10.200
L1	2.888 REF		
L2	1.250	1.550	1.750
L3	1.600 REF		
L4	0.600	0.800	1.000
θ	0°		8°

Revision History

Revision	Release	Remark
V1.0	2024/08/09	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.