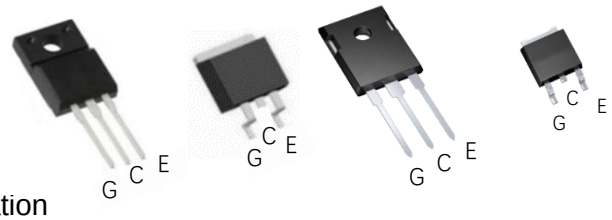
WGD10L65STSB3 WGD10M65STSB3
WGD10D65STSB3 WGD10J65STSB3

650V 10A Trench FS Technology IGBT

Features:

- High ruggedness performance
- 10μs short circuit capability
- Positive $V_{CE(sat)}$ temperature coefficient
- High efficiency for motor control
- Excellent current sharing in parallel operation
- RoHS complian

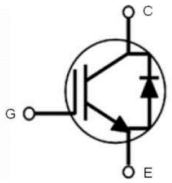
TO-220F TO-263 TO-247 TO-252



Applications:

- Motor Drives
- Home Appliance Applications

RoHS



Maximum Ratings

Parameter	Symbol	Test Condition	TO-220F	TO-263/TO-247/ TO-252	Unit
Collector to Emitter Voltage	V_{CES}		650		V
Gate to Emitter Voltage	V_{GES}		±30		V
Collector Current	I_C	T_C=25℃	14	20	A
		T_C=100℃	7.8	10	
Pulsed Collector Current	I_{CM}	Pulse width limited by T_{Jmax}	40		A
Diode Continuous Forward Current	I_F	T_C=100℃	7.5	10	A
Maximum Power Dissipation	P_D	T_C=25℃	30	100	W
		T_C=100℃	12	50	
Operating Junction Temperature Range	$T_{J\,OP}$		-40~+150		℃
Storage Temperature Range	T_{STG}		-55~+150		℃
Thermal Resistance, Junction to case for IGBT	$R_{th(J-C)}$		4.2	1.5	℃/W
Thermal Resistance, Junction to case for Diode	$R_{th(J-C)}$		5.6	1.8	℃/W
Thermal Resistance, Junction to Ambient	$R_{th(J-A)}$		65	50	℃/W

Electrical Characteristics of IGBT

Parameter	Symbol	Test Condition		Min.	Typ.	Max.	Unit
Collector to Emitter Breakdown Voltage	BV_{CES}	I_C=250uA, V_{GE}=0V	T_J=25℃	650	-	-	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=10A, V_{GE}=15V	T_J=25℃	-	1.8	-	V
Gate Threshold Voltage	$V_{GE(th)}$	I_C=250uA, V_{GE}= V_{CE}	T_J=25℃	5.5	5.7	6.0	V
Zero Gate Voltage Collector current	I_{CES}	V_{CE}=650V, V_{GS}=0V	T_J=25℃	-	-	100	μA
Gate to Emitter Leakage Current	I_{GES}	V_{GE}=±20V, V_{CE}=0V	T_J=25℃	-	-	±250	nA
Input Capacitance	C_{ies}	f=1MHz, V_{CE}=30V, V_{GE}=0V	T_J=25℃	-	670	-	pF
Output Capacitance	C_{oes}			-	37	-	
Reverse Transfer Capacitance	C_{res}			-	10	-	
Total Gate Charge	Q_g	V_{CC}=520V, I_C=10A, V_{GE}=15V		-	28	-	nc
Short Circuit Withstand Time	t_{SC}	V_{CC}=400V, V_{GE}=15V	T_J=25℃	-	5	-	μs
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=10A, V_{GE}=0/15V, R_G=10Ω, Inductive load	T_J=25℃	-	12	-	ns
Rising Time	t_r		T_J=25℃	-	11	-	ns
Turn-off Delay Time	$t_{d(off)}$		T_J=25℃	-	71	-	ns
Falling Time	t_f		T_J=25℃	-	74	-	ns
Turn-on Switching Loss	E_{on}		T_J=25℃	-	0.18	-	mJ
Turn-off Switching Loss	E_{off}		T_J=25℃	-	0.17	-	mJ
Total Switching Energy	E_{total}		T_J=25℃	-	0.35	-	mJ
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=10A, VGE=0/15V, RG=10Ω, Inductive load	T_J=150℃	-	10	-	ns
Rising Time	t_r		T_J=150℃	-	12	-	ns
Turn-off Delay Time	$t_{d(off)}$		T_J=150℃	-	86	-	ns
Falling Time	t_f		T_J=150℃	-	112	-	ns
Turn-on Switching Loss	E_{on}		T_J=150℃	-	0.21	-	mJ
Turn-off Switching Loss	E_{off}		T_J=150℃	-	0.25	-	mJ
Total Switching Energy	E_{total}		T_J=150℃	-	0.46		mJ

Electrical Characteristics of Diode

Parameter	Symbol	Test Condition		Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	I_F=10A	T_J=25℃	-	1.4	-	V
			T_J=150℃	-	1.2	-	
Diode Peak Reverse Recovery Current	I_{RM}	I_F=10A di/dt=-750A/μs V_{CC}=400V	T_J=25℃	-	12	-	A
			T_J=150℃	-	13	-	
Diode Reverse Recovery Time	t_{rr}		T_J=25℃	-	57	-	ns
			T_J=150℃	-	118	-	
Diode Reverse Recovery Charge	Q_{rr}		T_J=25℃	-	411	-	nC
			T_J=150℃	-	728	-	

Typical Performance

Fig.1 Typical Output Characteristics(T_J=25℃)

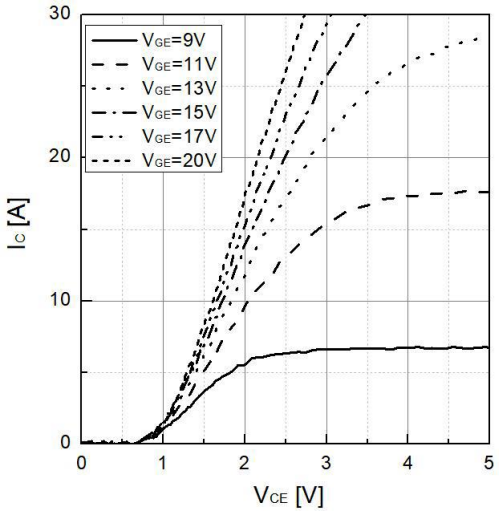


Fig.2 Transfer Characteristic

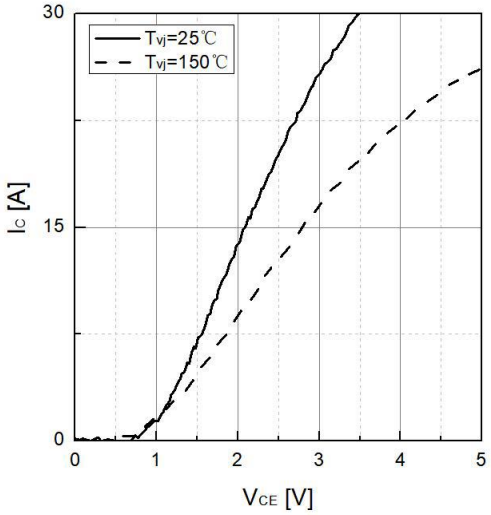


Fig.3 Diode Characteristic

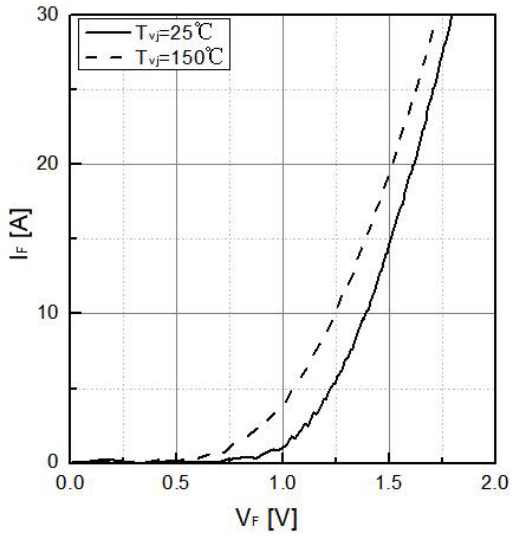


Fig.4 Gate-Charge Characteristics

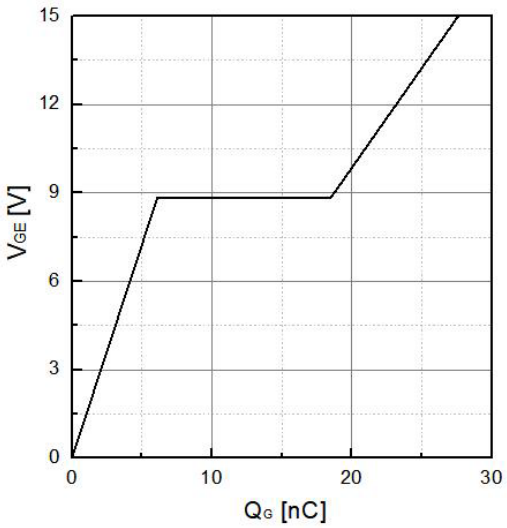


Fig.5 Capacitance Characteristics

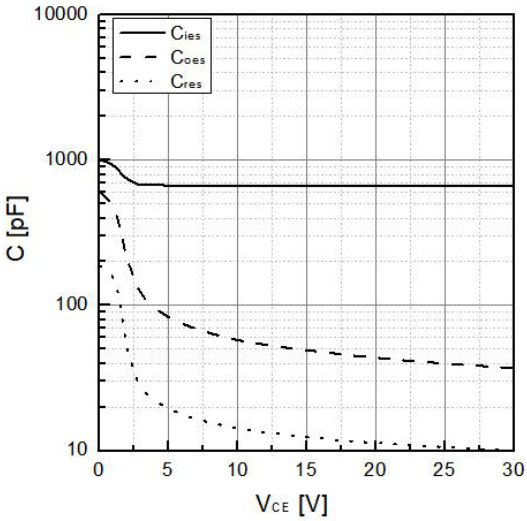


Fig.6 Power Disspation as Function of Case

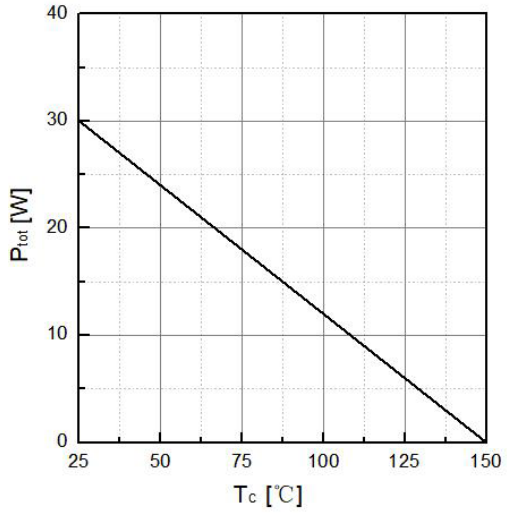


Fig.7 Switching Time vs. I_C

(T_J=25℃,V_{GE}=15V,V_{CE}=400V,R_g=10Ω)

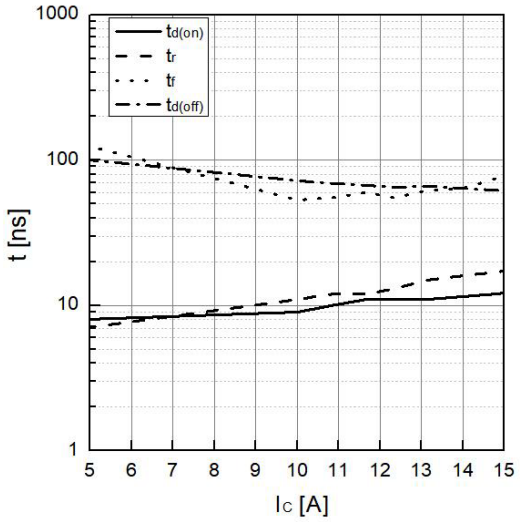


Fig.8 Switching Time vs. R_g

(T_J=25℃,V_{GE}=15V,V_{CE}=400V,I_C=10A)

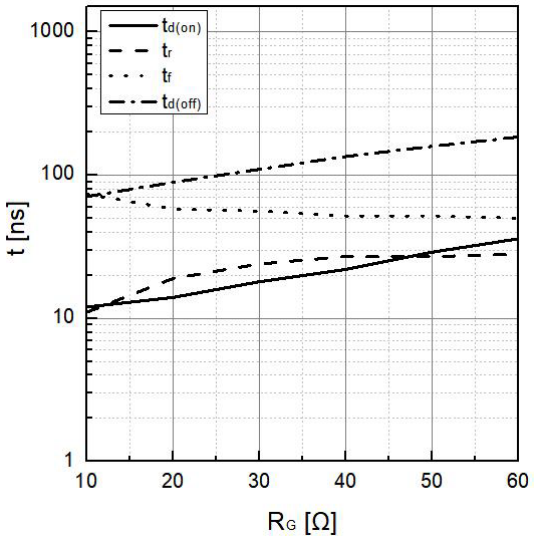


Fig.9 Switching Loss vs. I_C

(T_J=25℃,V_{GE}=15V,V_{CE}=400V,R_g=10Ω)

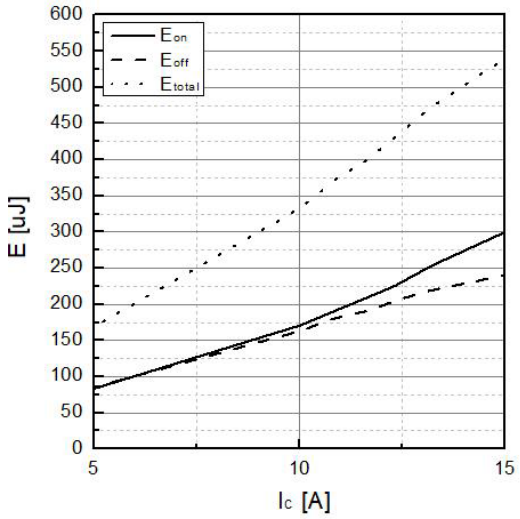
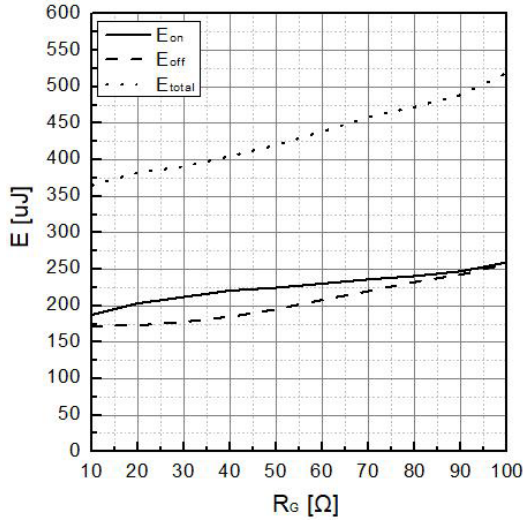
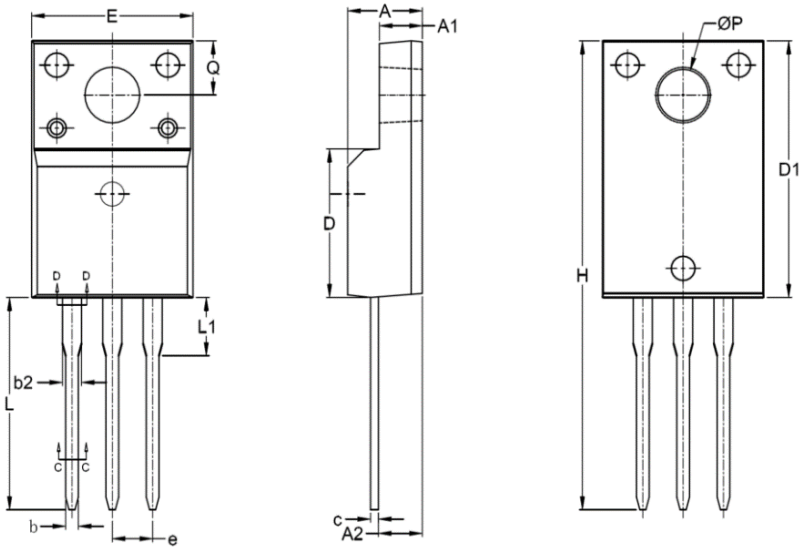


Fig.10 Switching Loss vs. R_g

(T_J=25℃,V_{GE}=15V,V_{CE}=400V,I_C=10A)



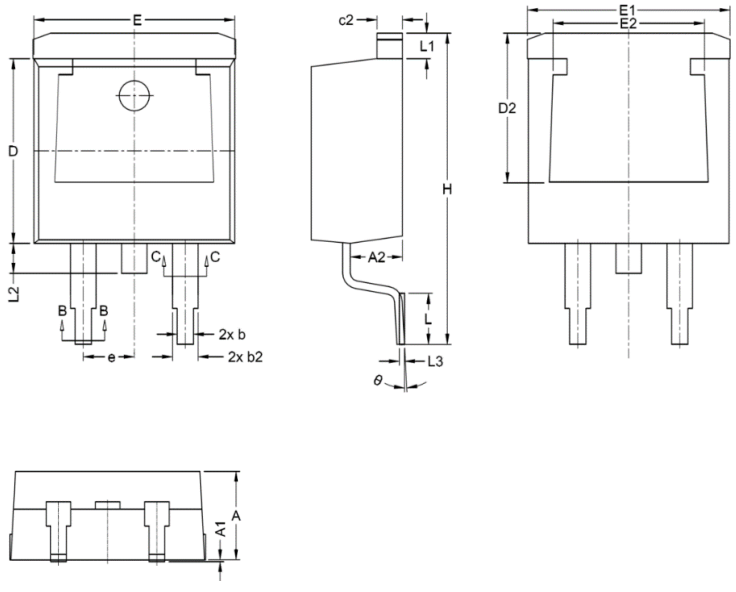
Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.30	4.70
A1	2.30	2.82
b	0.70	0.94
b1	1.17	1.41
c	0.30	0.64
c1	1.17	1.44
D	9.70	10.20
E	8.50	9.30
E1	12.00	12.50
e	2.44	2.64
e1	4.88	5.26
F	2.60	2.94
L	13.00	14.00
L1	3.385	4.20
ØP	3.74	3.95

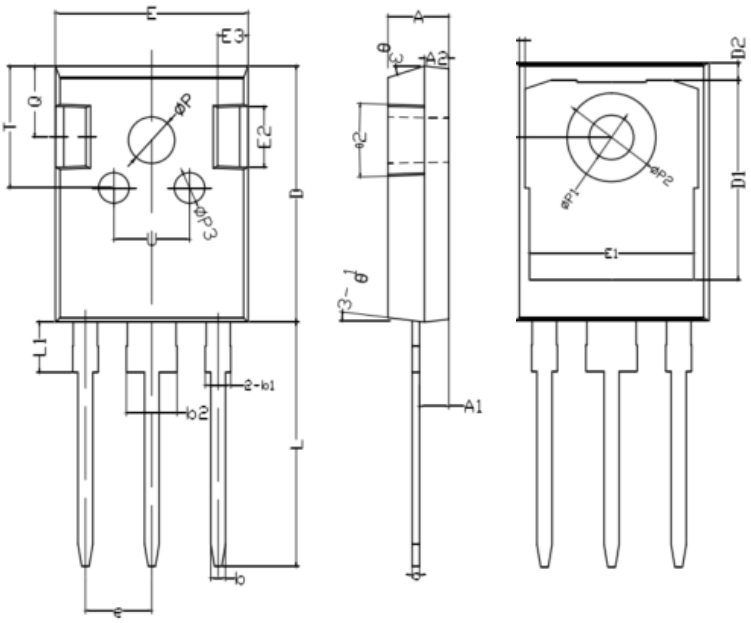
Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.45	4.65
A2	2.50	2.70
b	0.75	0.96
b2	1.21	1.41
c	0.33	0.52
c2	1.21	1.41
D	9.10	9.30
D2	7.21	7.62
E	9.90	10.10
E2	7.34	7.74
e	2.50	2.60
H	15.30	15.70
L	2.34	2.74
L1	1.06	1.47
L2	1.40	1.60
L3	0.25	0.26

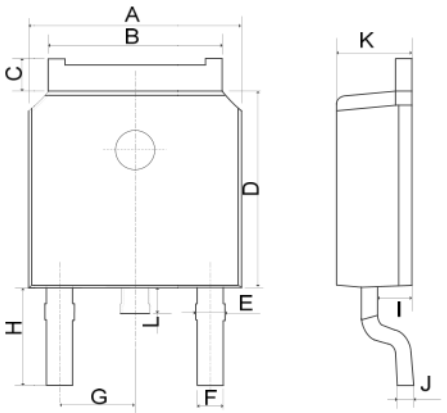
Mechanical Dimensions for TO-247



COMMON DIMENSIONS

SYMBO L	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.59
A2	1.85	2.15
b	1.11	1.36
b1	1.91	2.25
b2	2.91	3.25
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.40	5.48
L	19.62	20.22
L1	-	4.30
ØP	3.40	3.80
ØP2	6.90	7.30
S	6.05	6.25

Mechanical Dimensions for TO-252



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
F	0.68	0.91
G	2.29REF	
H	2.90REF	
I	0.85	1.17
J	0.51REF	
K	2.10	2.50
L	0.40	1.00

Ordering Information

Part	Marking	Package	Packing method	Minimum packing number
WGD10L65STSB3	10L65STSB3	TO-220F	Tube	50 / Tube
WGD10M65STSB3	10M65STSB3	TO-263	Tape and reel	800 / Reel
WGD10J65STSB3	10J65STSB3	TO-247	Tube	30 / Tube
WGD10D65STSB3	10D65STSB3	TO-252	Tape and reel	2500 / Reel

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WAYON website: http://www.way-on.com

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Product Specification Statement

1.The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2.The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3.WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

4.Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

5.The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

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