

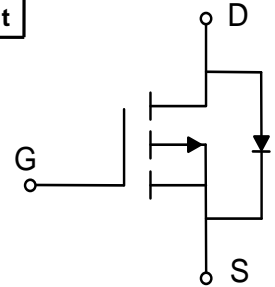
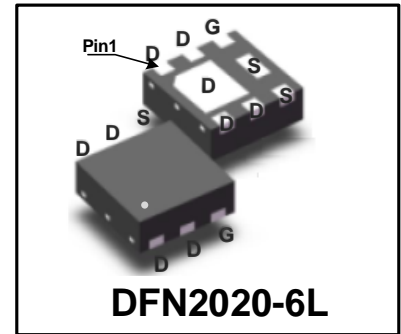
18V P-Channel Enhancement Mode Power MOSFET

Description

WMR09P01TS uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = -18V$, $I_D = -9A$
 $R_{DS(on)} < 24m\Omega @ V_{GS} = -4.5V$
 $R_{DS(on)} < 35m\Omega @ V_{GS} = -2.5V$
- Green Device Available
- Low Gate Charge
- RoHS Compliant & Halogen-Free
- 100% EAS Guaranteed



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings ($T_A = 25^\circ C$, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-18	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_A = 25^\circ C$	I_D	-9	A
	$T_A = 100^\circ C$		-5.7	
Pulsed Drain Current ¹		I_{DM}	-36	A
Single Pulse Avalanche Energy ²		EAS	12.8	mJ
Total Power Dissipation	$T_A = 25^\circ C$	P_D	2.8	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Ambient ³	$R_{\theta JA}$	44.6	$^\circ C/W$

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Static Characteristics							
Drain-Source Breakdown Voltage	V_{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-18	-	-	V	
Gate-Source Leakage	I_{GSS}	V _{DS} = 0V, V _{GS} = ±12V	-	-	±100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	V _{DS} = -18V, V _{GS} = 0V	T _J =25°C	-	-	-1	μA
			T _J =100°C	-	-	-100	
Gate-Source Threshold Voltage	V_{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.3	-0.6	-1	V	
Drain-Source on-State Resistance ⁴	R_{DS(on)}	V _{GS} = -4.5V, I _D = -8A	-	18	24	mΩ	
		V _{GS} = -2.5V, I _D = -6A	-	25	35		
Forward Transconductance ⁴	g_{fs}	V _{DS} = -4.5V, I _D = -8A	-	25	-	S	
Dynamic Characteristics⁵							
Input Capacitance	C_{iss}	V _{GS} = 0V, V _{DS} = -9V, f=1MHz	-	980	-	pF	
Output Capacitance	C_{oss}		-	110	-		
Reverse Transfer Capacitance	C_{rss}		-	92	-		
Gate Resistance	R_g	f = 1MHz	-	10	-	Ω	
Switching Characteristics⁵							
Total Gate Charge	Q_g	V _{GS} = -4.5V, V _{DS} = -9V, I _D = -8A	-	12	-	nC	
Gate-Source Charge	Q_{gs}		-	1.8	-		
Gate-Drain Charge	Q_{gd}		-	3.3	-		
Turn-on Delay time	t_{d(on)}	V _{GS} = -4.5V, V _{DD} = -9V, R _G = 3Ω, I _D = -8A	-	13	-	ns	
Rise Time	t_r		-	21	-		
Turn-off Delay Time	t_{d(off)}		-	41	-		
Fall Time	t_f		-	18	-		
Source-Drain Diode Characteristics							
Body Diode Voltage ⁴	V_{SD}	I _S = -1A, V _{GS} = 0V	-	-	-1.2	V	
Continuous Source Current	T _A =25°C I_S	-	-	-	-9	A	

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. The test condition is V_{DD}= -12V, V_{GS}= -10V, L=0.4mH, I_{AS}= -8A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

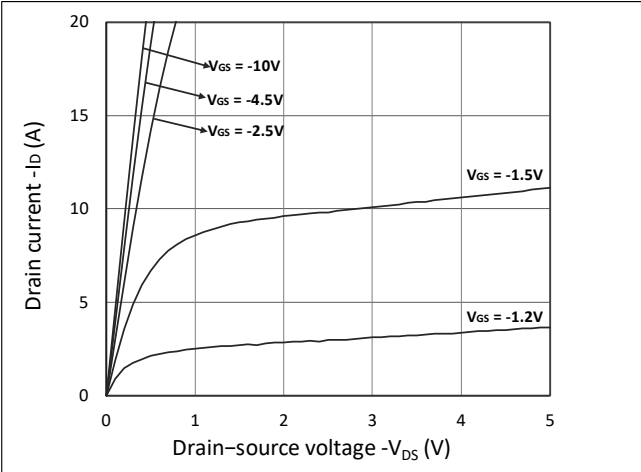


Figure 1. Output Characteristics

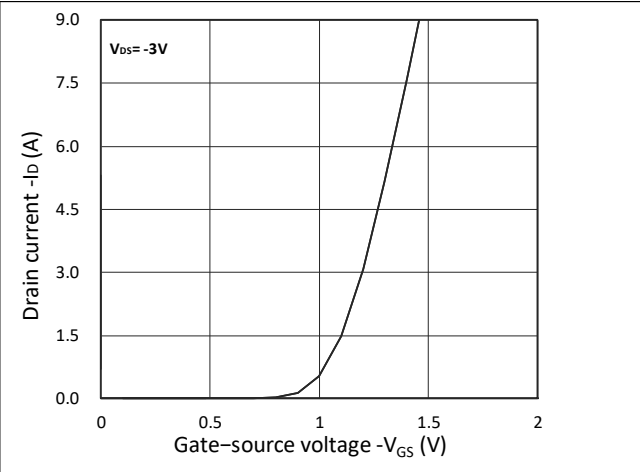


Figure 2. Transfer Characteristics

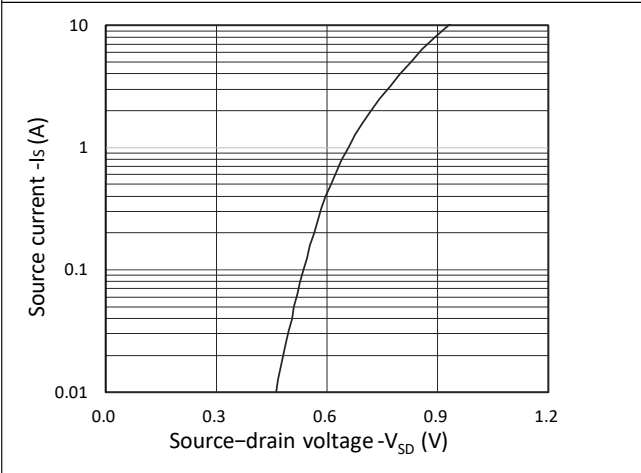


Figure 3. Forward Characteristics of Reverse

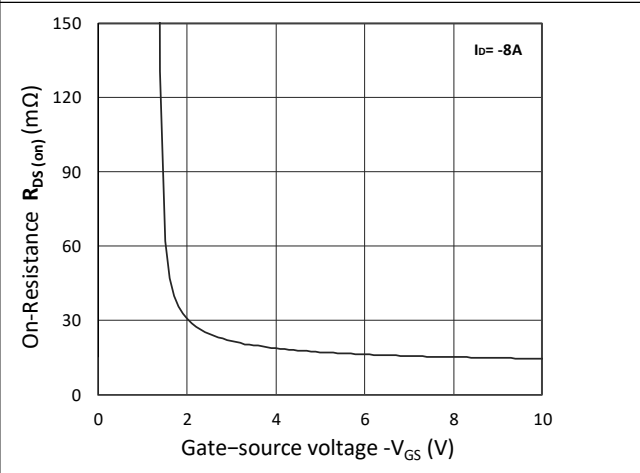


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

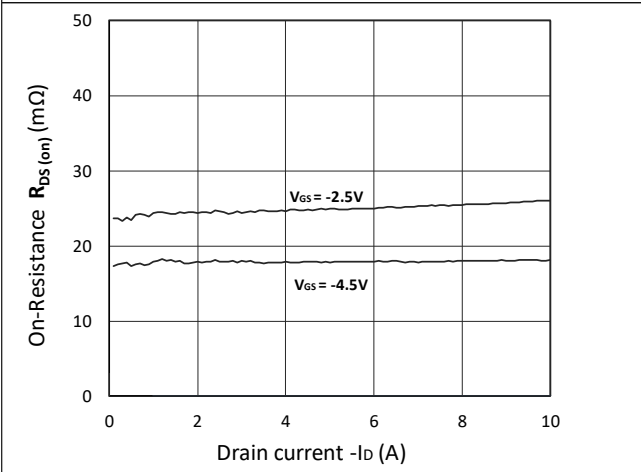


Figure 5. $R_{DS(ON)}$ vs. I_D

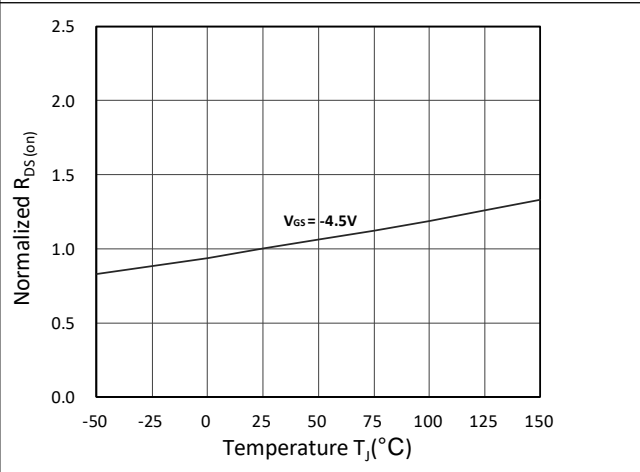


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

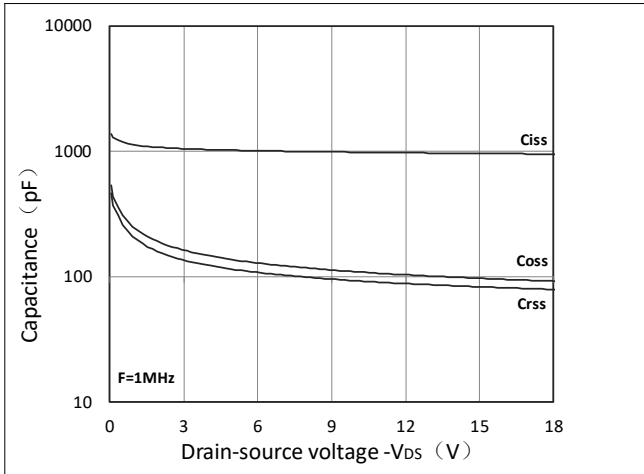


Figure 7. Capacitance Characteristics

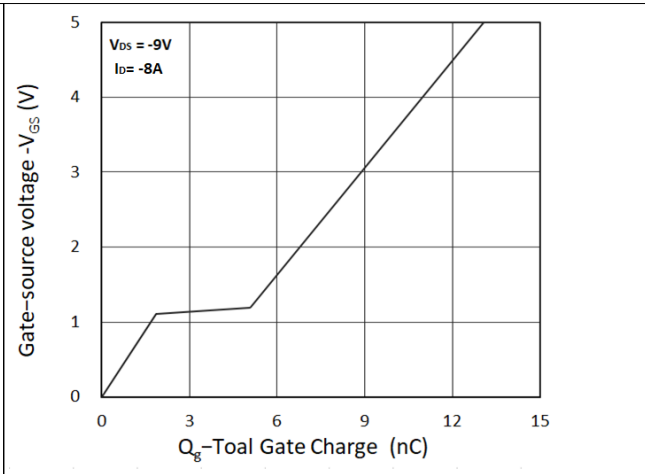


Figure 8. Gate Charge Characteristics

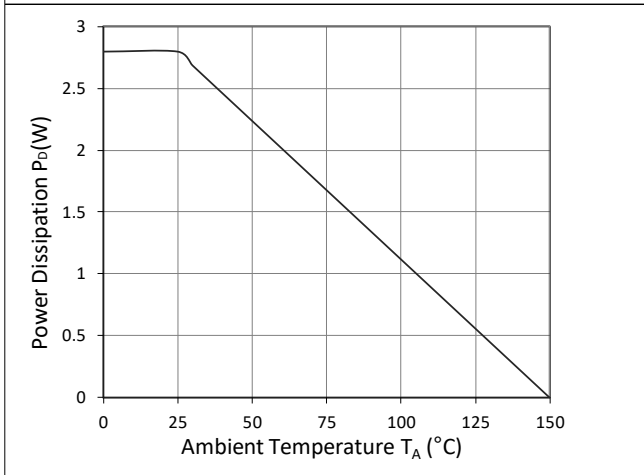


Figure 9. Power Dissipation

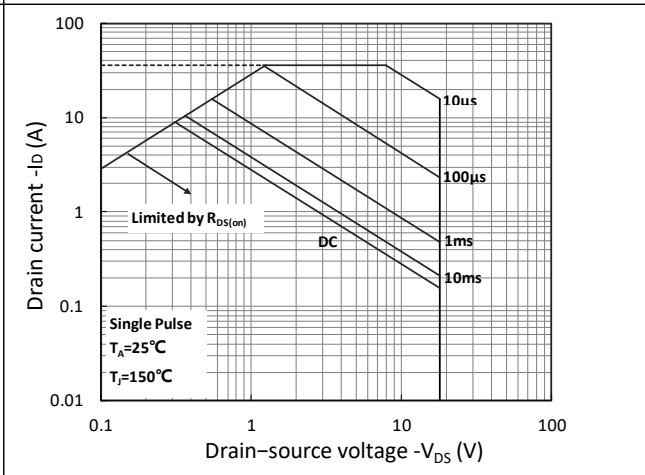


Figure 10. Safe Operating Area

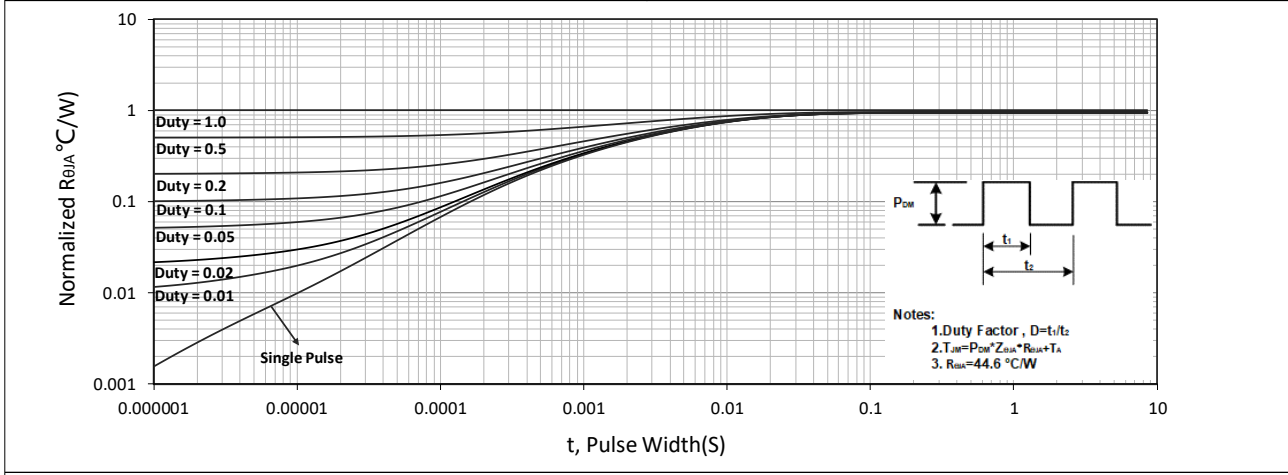


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

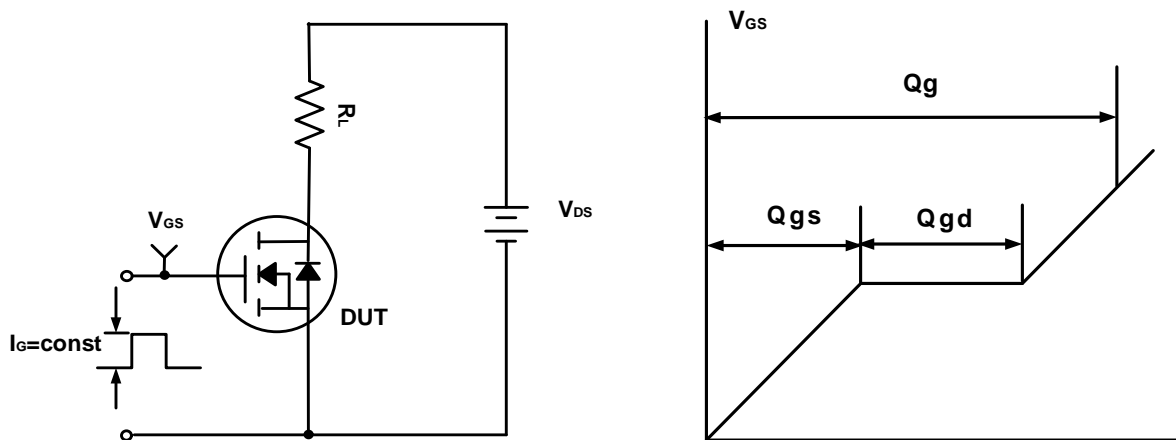


Figure A. Gate Charge Test Circuit & Waveforms

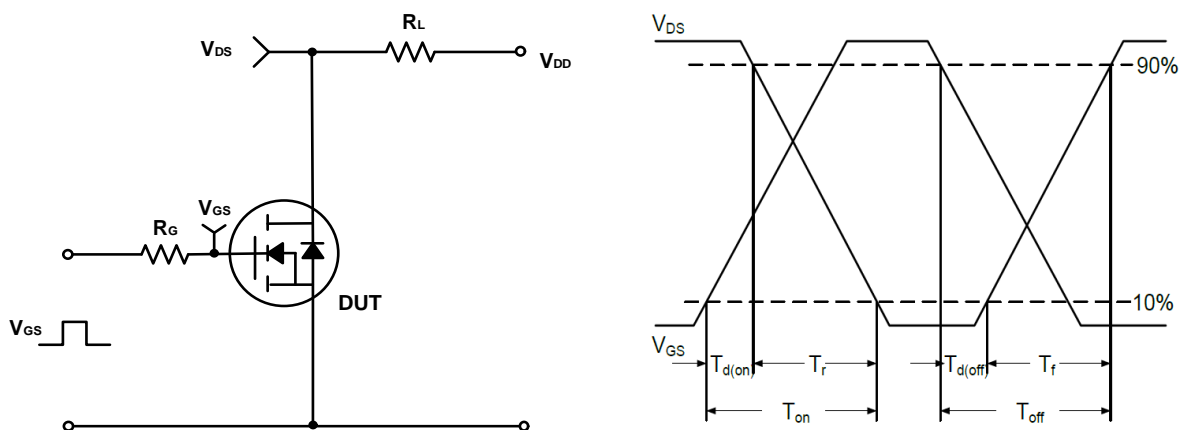


Figure B. Switching Test Circuit & Waveforms

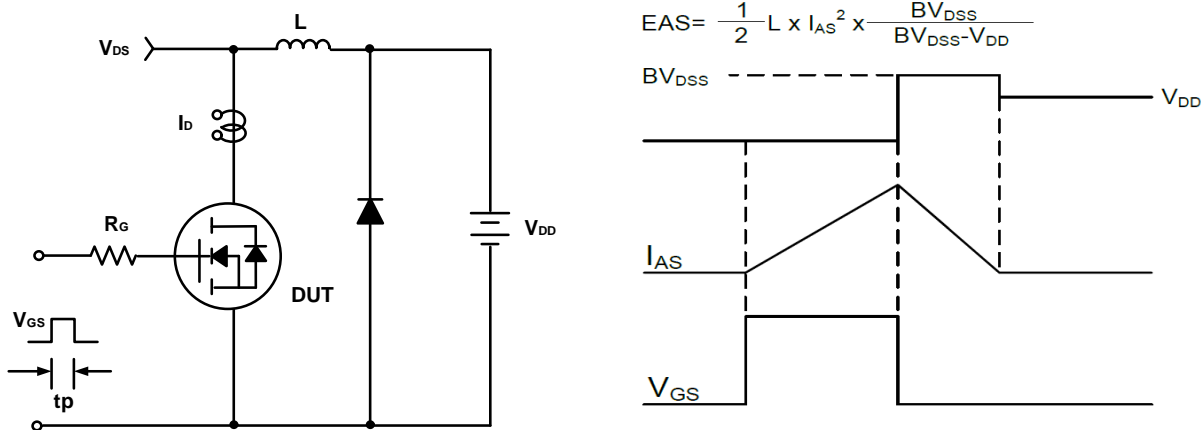
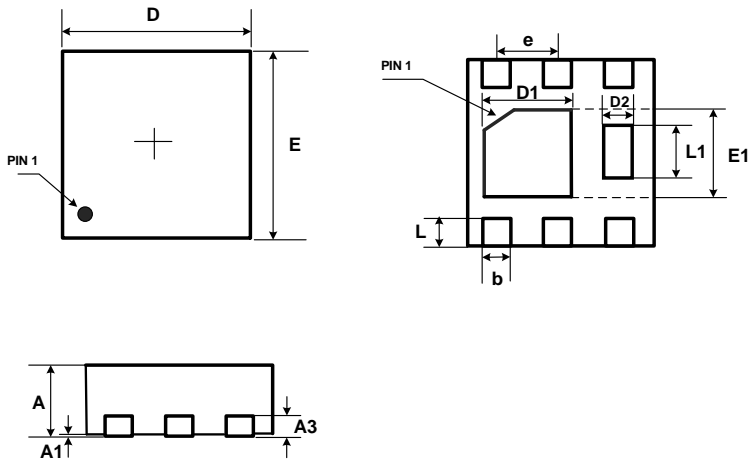


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for DFN2020-6L

COMMON DIMENSIONS

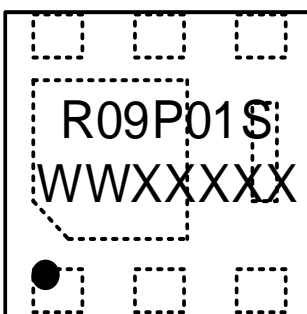


SYMBOL	MM	
	MIN	MAX
A	0.50	0.60
A1	0.00	0.05
A3	0.152REF	
b	0.25	0.35
D	1.90	2.10
D1	0.80	1.00
E	1.90	2.10
E1	0.80	1.00
L1	0.46	0.66
e	0.65BSC	
D2	0.25	0.35
L	0.25	0.35

Ordering Information

Part	Package	Marking	Packing method
WMR09P01TS	DFN2020-6L	R09P01S	Tape and Reel

Marking Information



Contact Information

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

For additional information, please contact your local Sales Representative.

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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.
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