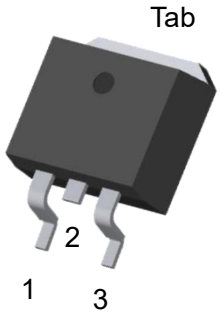
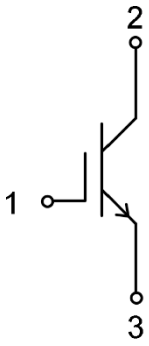
IGBT with Trench and Field-Stop technology

WGS75M65FT3



Features

- V_{CES}=650V
- I_C=75A@T_C=100℃
- Very low V_{CEsat}
- High speed switching
- High ruggedness
- RoHS compliant
- Halogen free



Applications

- PFC
- Discharge switch

Package pin definition	1	2/Tab	3
	Gate	Collector	Emitter

Part	Package	Marking	Packing method	MPQ
WGS75M65FT3	TO-263	WGS75M65FT3	Tape and reel	800/Reel

1 Maximum Ratings

Table 1 Maximum rated Values(T_C=25℃ unless otherwise specified)

Parameter	Symbol	Condition	Values	Unit
Collector to Emitter Voltage	V_{CES}		650	V
Gate to Emitter Voltage	V_{GES}		±20	V
Continuous Collector Current	I_C		150	A
		T_C =100℃	75	A
Pulsed Collector Current [1]	I_{CM}		300	A
Maximum Power Dissipation	P_{tot}		333	W
		T_C =100℃	167	W
Operating Junction Temperature Range	T_J		-55~+175	℃
Storage Temperature Range	T_{STG}		-55~+150	℃
Thermal Resistance, Junction to case for IGBT	$R_{th(J-C)}$		0.45	K/W

Notes:

1. Pulse width limited by maximum junction temperature.

2 Electrical Characteristics, IGBT

Table 2 Characteristics Values(T_C=25℃ unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Collector to Emitter Breakdown Voltage	BV_{CES}	I_C=250μA, V_{GE}=0V	650	-	-	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=75A, V_{GE}=15V	-	1.9	2.4	V
		I_C=75A, V_{GE}=15V, T_J=150℃	-	2.3	-	V
Gate Threshold Voltage	$V_{GE(th)}$	I_C=1mA, V_{GE}= V_{CE}	4.2	5.2	6.2	V
Zero Gate Voltage Collector current	I_{CES}	V_{CE}=650V, V_{GS}=0V	-	-	50	μA
Gate to Emitter Leakage Current	I_{GES}	V_{GE}=±20V, V_{CE}=0V	-	-	±100	nA
Internal Gate Resistor	R_{Gint}	f=1MHz, V_{AC}=25mV	-	3.4	-	Ω
Input Capacitance	C_{ies}	f=1MHz, V_{CE}=30V, V_{GE}=0V	-	3900	-	pF
Output Capacitance	C_{oes}		-	274	-	pF
Reverse Transfer Capacitance	C_{res}		-	27	-	pF
Total Gate charge	Q_G	V_{CC}=520V, I_C=75A, V_{GE}=15V	-	180	-	nc
Gate to Emiter charge	Q_{GE}		-	64	-	nc
Gate to Collector charge	Q_{GC}		-	40	-	nc
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=75A, V_{GE}=0/15V, R_G=10Ω, T_J=25℃ Inductive load	-	64	-	ns
Rising Time	t_r		-	76	-	ns
Turn-off Delay Time	$t_{d(off)}$		-	86	-	ns
Falling Time	t_f		-	47	-	ns
Turn-on Switching Loss Energy [2]	E_{on}		-	2.5	-	mJ
Turn-off Switching Loss Energy	E_{off}		-	1.1	-	mJ
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=75A, V_{GE}=0/15V, R_G=10Ω, T_J=150℃ Inductive load	-	70	-	ns
Rising Time	t_r		-	82	-	ns
Turn-off Delay Time	$t_{d(off)}$		-	108	-	ns
Falling Time	t_f		-	75	-	ns
Turn-on Switching Loss Energy [2]	E_{on}		-	4.6	-	mJ
Turn-off Switching Loss Energy	E_{off}		-	1.6	-	mJ

Notes:

2. This value is tested with the FRD of WGD75J65FTFB3.

3 Typical Characteristics diagrams

Fig.1 Typical output characteristic
$I_C=f(V_{CE})$, $T_{vj}=25℃$

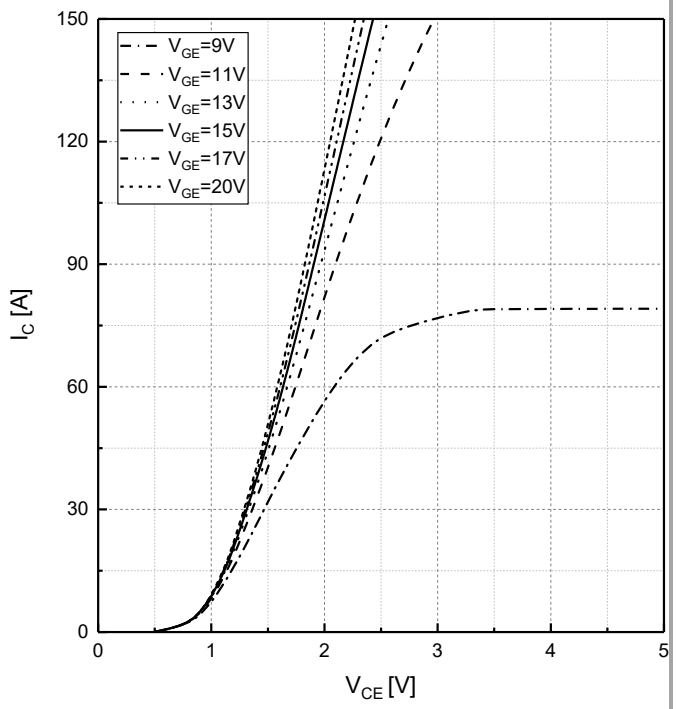


Fig.2 Typical output characteristic
$I_C=f(V_{CE})$, $T_{vj}=150℃$

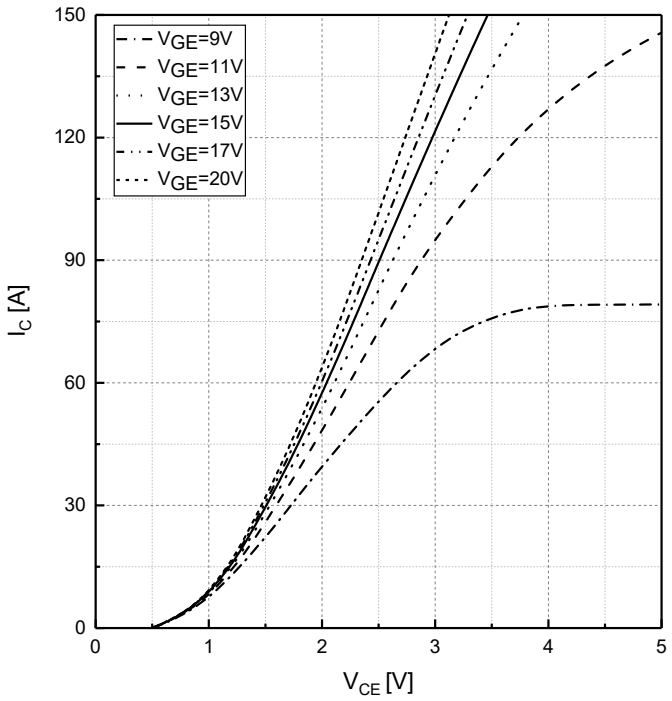


Fig.3 Typical transfer characteristic
$I_C=f(V_{GE})$, $V_{CE}=20V$

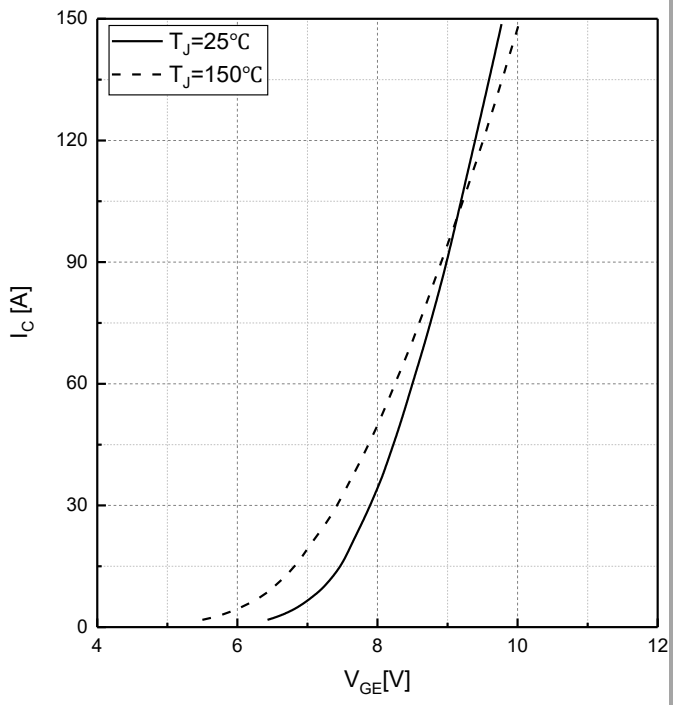


Fig.4 Typical $V_{GE(th)}$ as a function of T_{vj}
$V_{GEth}=f(T_{vj})$, $I_C=1mA$

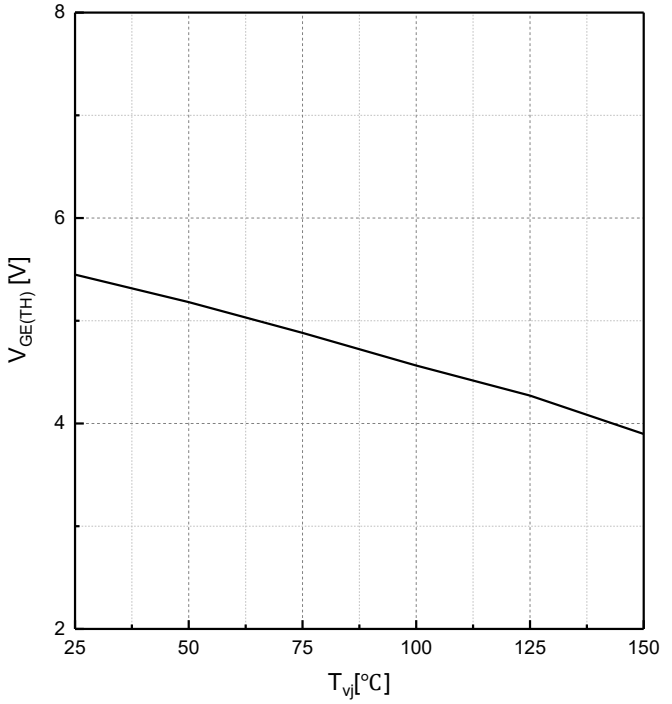


Fig.5 Typical V_{CEsat} as a function of T_{vj}

$V_{CEsat}=f(T_{vj})$, $V_{GE}=15V$

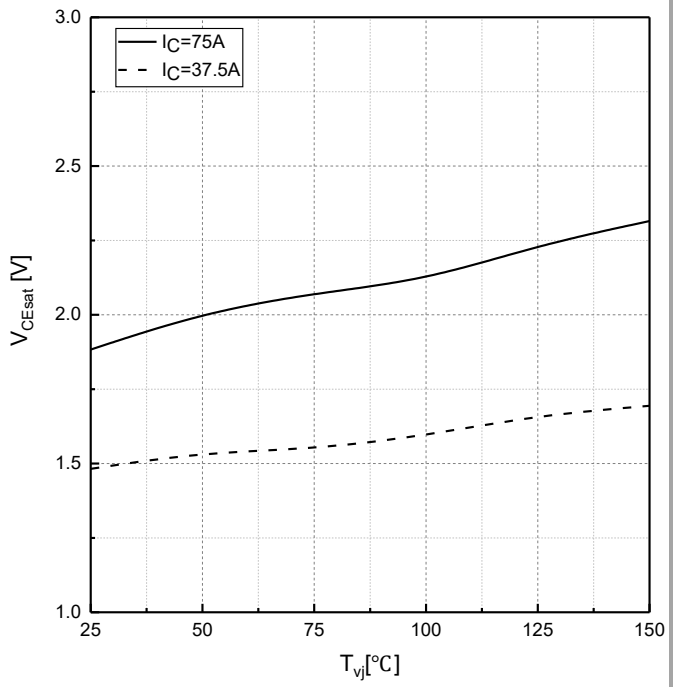


Fig.6 Typical switching loss energy as a function of R_G

$E=f(R_G)$, $V_{CC}=400V$, $I_C=75A$, $V_{GE}=0/15V$, $T_J=150℃$

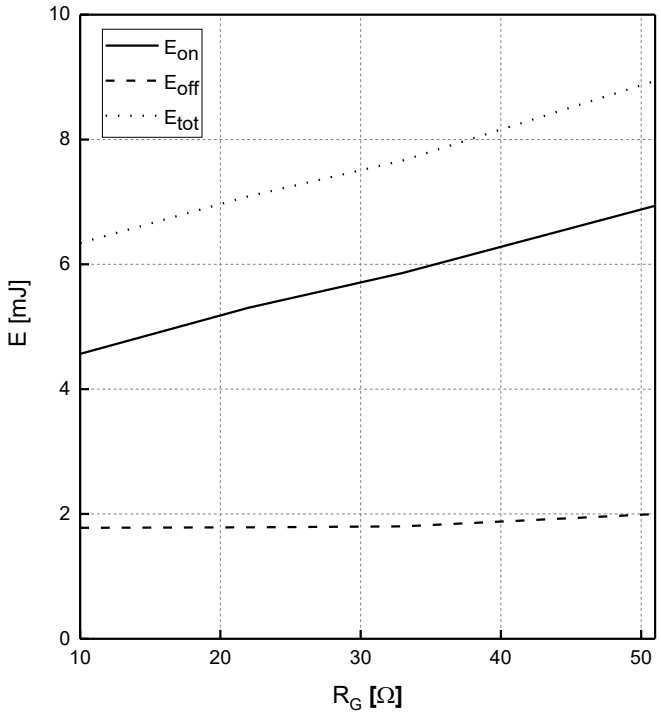


Fig.7 Typical switching loss energy as a function of I_C

$E=f(I_C)$, $V_{CC}=400V$, $R_G=10Ω$, $V_{GE}=0/15V$, $T_J=150℃$

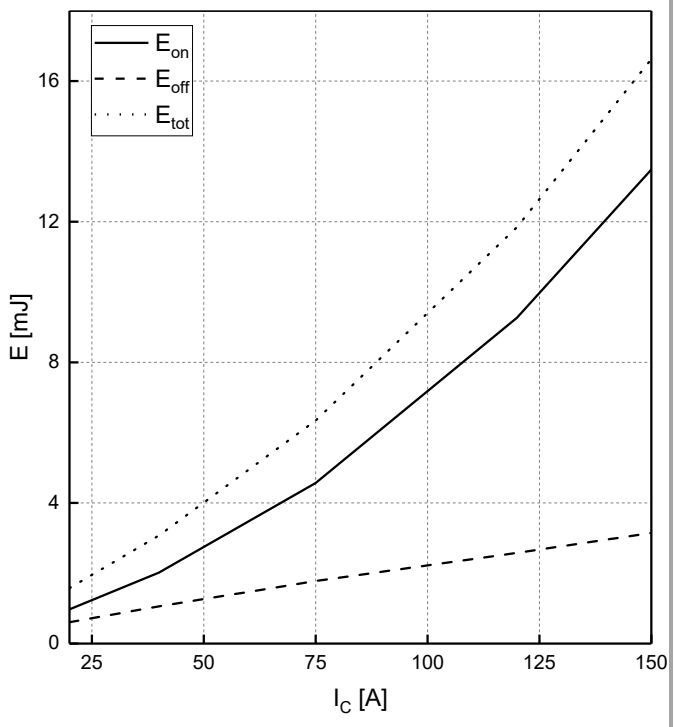


Fig.8 Typical Gate charge

$V_{GE}=f(Q_G)$, $I_C=75A$

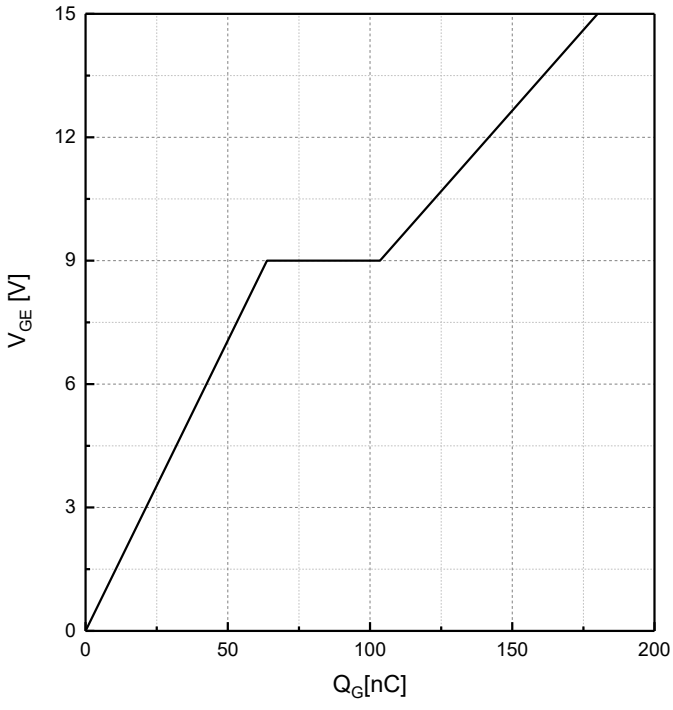


Fig.9 Typical capacitance as a function of V_{CE}

$C=f(V_{CE})$, f=1MHz, V_{GE}=0V

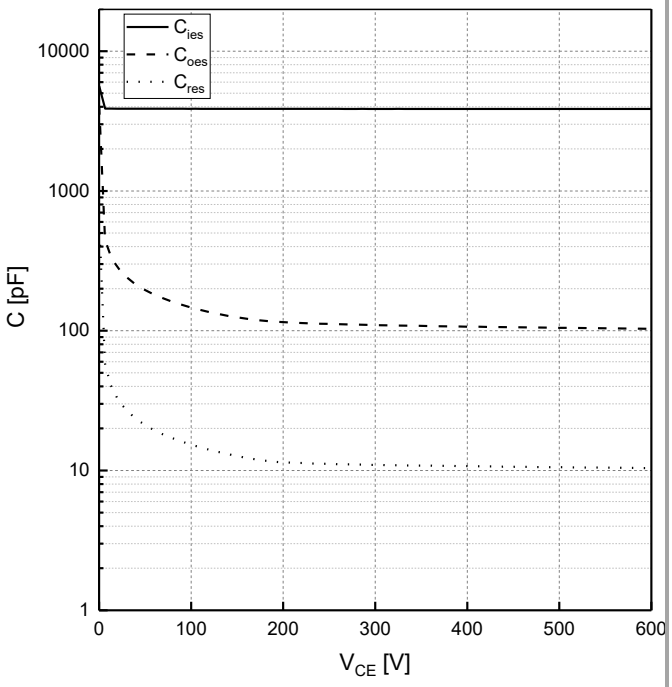


Fig.10 Power dissipation as a function of T_C

$P_{tot}=f(T_C)$, $T_{vj}\leq 175℃$

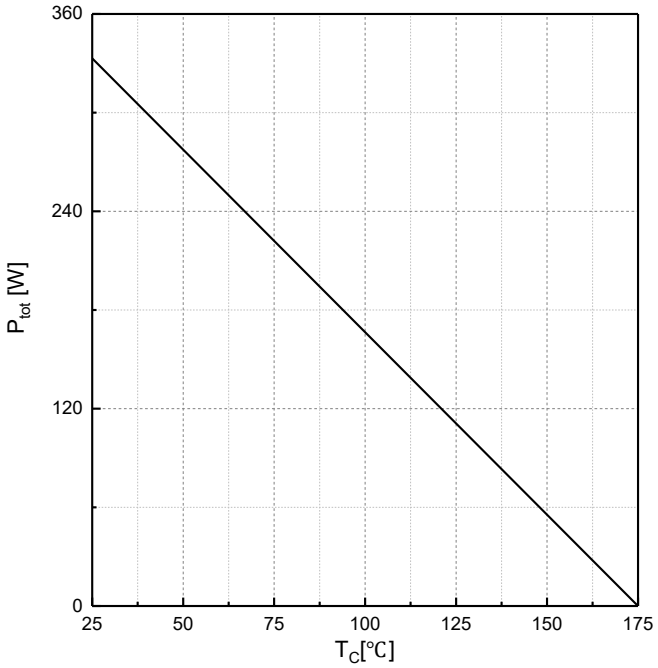
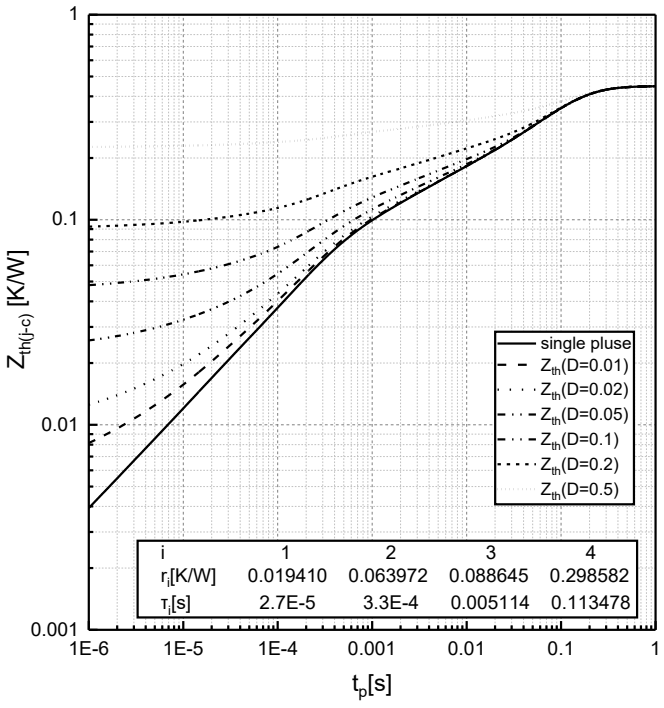
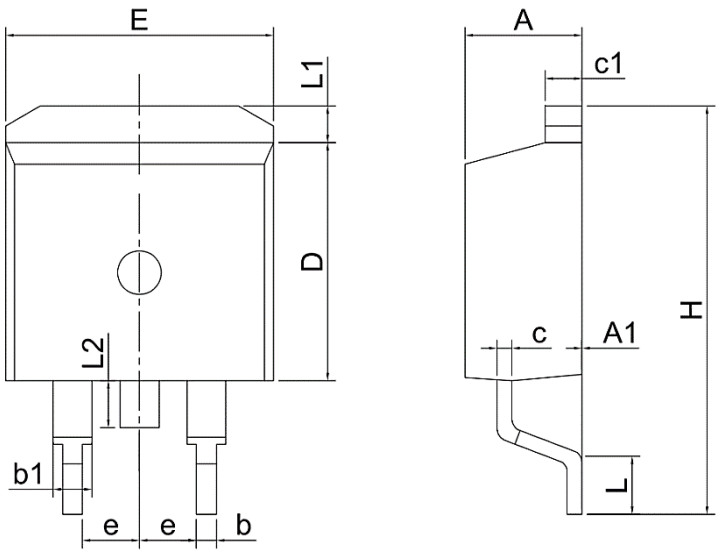


Fig.11 Transient thermal impedance of IGBT

$Z_{th(j-c)}=f(t_p)$, $D=t_p/T$



4 Package Outlines



SYMBOL	mm		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	0.00	0.13	0.25
b	0.70	0.80	0.90
b1	1.21	1.27	1.40
c	0.30	-	0.60
c1	1.20	1.30	1.40
D	9.10	9.20	9.30
E	9.70	9.90	10.20
e	2.54BSC		
H	14.80	15.10	15.40
L	2.10	2.30	2.50
L1	1.00	1.20	1.40
L2	1.10	1.30	1.50

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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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