

Description

The WOC-354X is a photoelectric coupler composed of two light-emitting diode and phototransistor. It is packaged in a 4-pin small outline SOP4 package.



SOP4

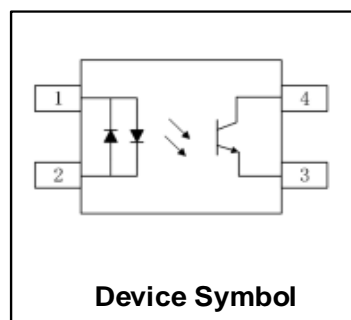
Features

- Current transfer ratio: $\geq 20\%$ ($I_F = \pm 1\text{mA}$, $V_{CE} = 5\text{V}$, $T_a = 25^\circ\text{C}$)
- High isolation voltage between input and output ($V_{ISO} = 3750\text{Vrms}$)
- Operating Temperature: $-55^\circ\text{C} \sim 110^\circ\text{C}$
- Safety approval
(UL 1577, VDE DIN EN60747-5-5 (VDE 0884-5), CQC11-471543-2022)
- RoHS
- MSL1

Applications

- Programmable controllers
- Switching power supply, intelligent meter
- Household appliances: such as air conditioners, fans, water heaters, etc.

Schematic & PIN Configuration



Pin Configuration
 1. Anode/Cathode
 2. Cathode/Anode
 3. Emitter
 4. Collector

Order Code

WOC -354 X -X X- X X X- XX
 ① ② ③ ④ ⑤ ⑥ ⑦

Designation:

WOC=WAYON Optocoupler

354= Product Series

- ① = Lead form option(NONE)₍₁₎
- ② = CTR Rank(A,B,NONE)₍₂₎
- ③ = Tape and Reel option(TP,TP1)₍₃₎
- ④ = Lead frame Material(F,NONE)₍₄₎
- ⑤ = VDE order option(fixed code "V")
- ⑥ = Halogen free option(fixed code"G")
- ⑦ = Customer code

Notes

1. Lead form option:

Symbol	Description
NONE	SOP4

2. CTR Rank:

Symbol	Description
A,B	CTR Rank
NONE	No Rank

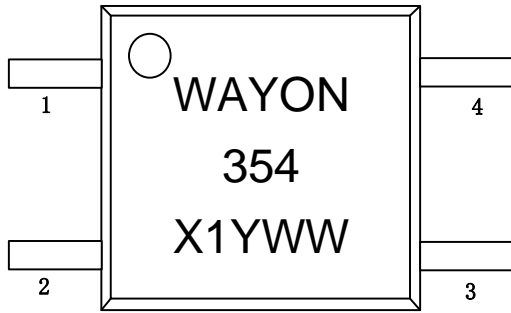
3. Tape and Reel option:

Symbol	Description
TP&TP1	Tape and Reel Type

4. Lead frame Material

Symbol	Description
NONE	Copper

Marking Information



Designation:

WAYON denotes WAYON
 354 denotes Device
 X denotes CTR Rank
 1Y denotes year code
 WW denotes week code

Absolute Maximum Rating ($T_{amb}=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Input	Forward Current	I_F	± 50	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P_D	70	mW
	Power dissipation Derating factor (above $T_a = 90^{\circ}C$)		2.9	mW/ $^{\circ}C$
Output	Collector Power Dissipation	P_C	150	mW
	Collector Power Dissipation Derating factor (above $T_a = 70^{\circ}C$)		3.7	mW/ $^{\circ}C$
	Collector Current	I_C	50	mA
	Collector-Emitter Voltage	V_{CEO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
Total Power Dissipation		P_W	200	mW
Isolation Voltage ⁽¹⁾		V_{iso}	3750	Vrms
Operating Temperature		T_{op}	-55 ~ +110	$^{\circ}C$
Storage Temperature		T_{stg}	-55 ~ +125	$^{\circ}C$
Soldering Temperature ⁽²⁾		T_{sol}	260	$^{\circ}C$

Notes:

(1). AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

(2).For 10 seconds

Electrical Characteristics (T_{amb}=25°C unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V _F	I _F = ±20mA	-	1.2	1.4	V
	Reverse Current	I _R	V _R =4V	-	-	10	μA
	Terminal Capacitance	C _t	V = 0, f = 1kHz	-	30	250	pF
Output	Collector Dark Current	I _{CEO}	V _{CE} = 20V, I _F = 0mA	-	-	100	nA
	Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C = 0.1mA, I _F = 0mA	80	-	-	V
	Emitter-Collector Breakdown Voltage	BV _{ECO}	I _E = 10μA, I _F = 0mA	7	-	-	V
Transfer Characteristics	Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _F = ±20mA, I _C = 1mA	-	0.1	0.2	V
	Isolation Resistance	R _{ISO}	DC500V, 40~60%RH	5x10 ¹⁰	1x10 ¹¹	-	Ω
	Isolation capacitance	C _i	V = 0, f = 1MHz	-	0.6	1.0	pF
	Cut-off Frequency	F _C	V _{CE} = 5V, I _C = 2mA, R _L =100Ω, -3dB	-	80	-	kHz
	Rise Time	T _r	V _{CE} = 2V, I _C = 2mA, R _L =100Ω	-	4	18	μs
	Fall Time	T _f	V _{CE} = 2V, I _C = 2mA, R _L =100Ω	-	3	18	μs

CTR Classification Table (I_F=±1mA, V_{CE}=5V, T_a=25°C)Note*: CTR=I_C/I_F x 100%.

Code	Min.	Max.
A	50	150
B	100	300
None	20	300

Typical Characteristics

Fig.1 Relative Current Transfer Ratio vs. Forward Current

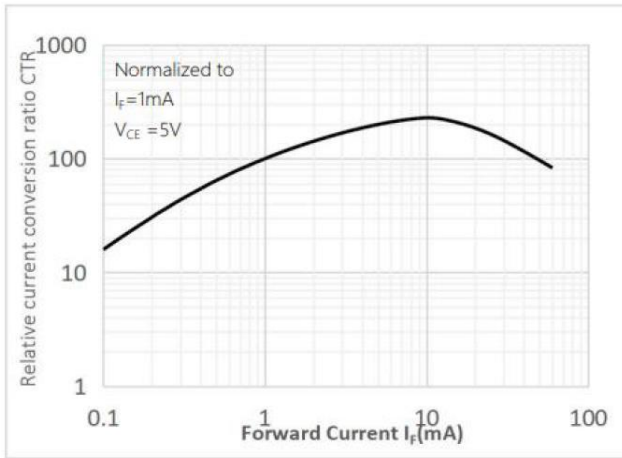


Fig.2 Forward Current vs. Forward Voltage

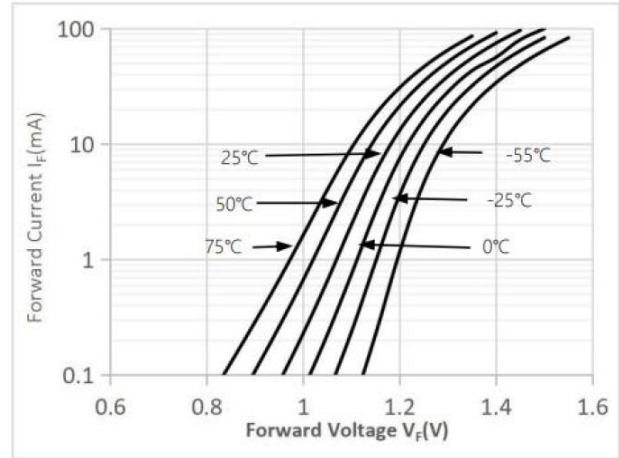


Fig.3 Collector Current vs. Collector-emitter Voltage

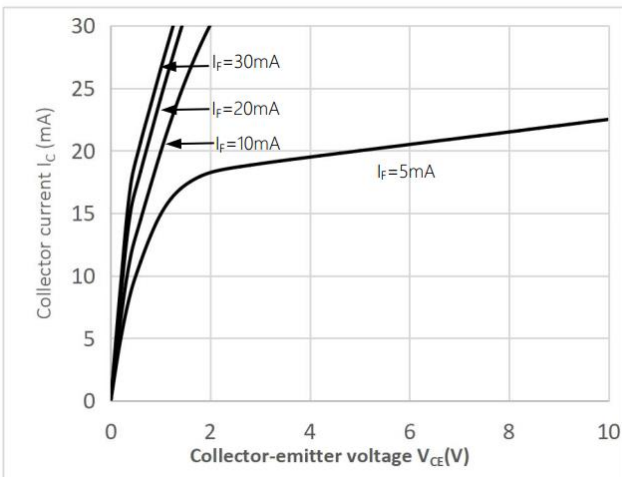


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

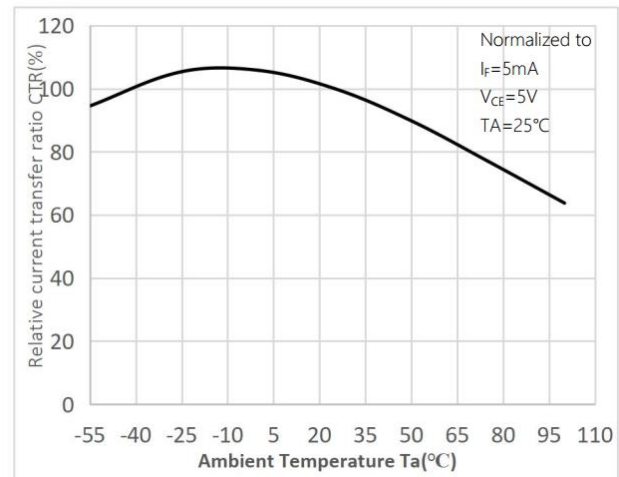


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature Fig.6 Collector Dark Current vs Ambient Temperature

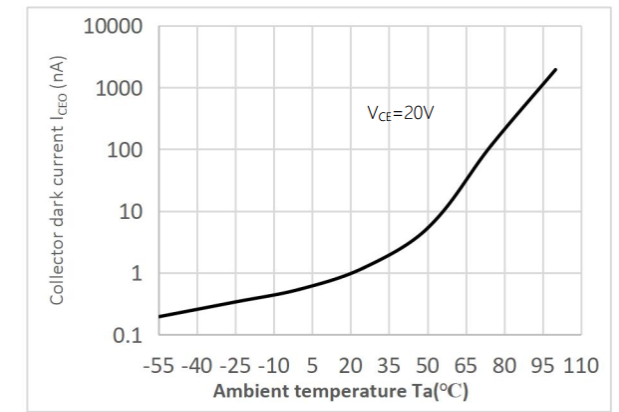
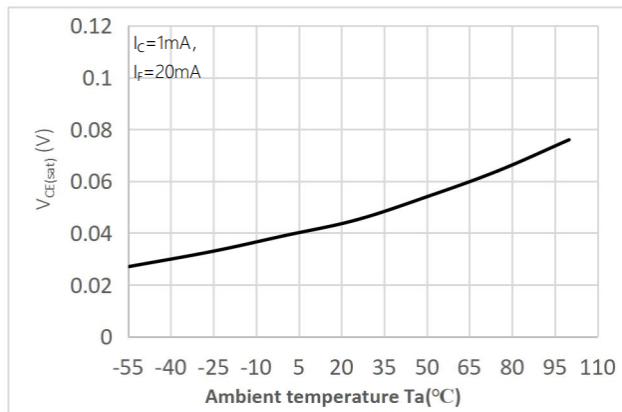


Fig.7 Response Time vs. Load Resistance

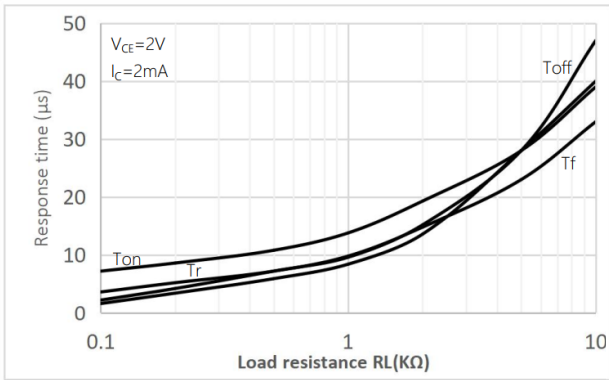


Fig.8 Frequency Response

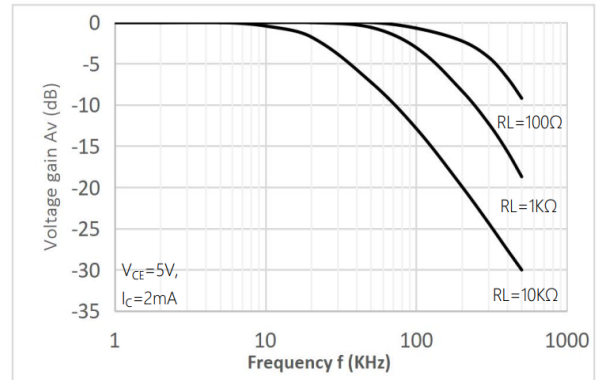


Fig.9 Collector-emitter Saturation Voltage vs Forward Current

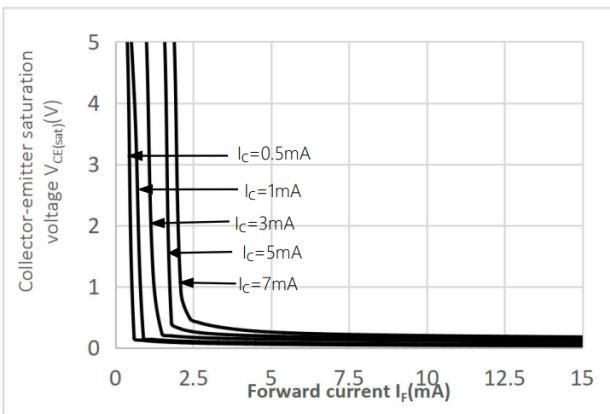
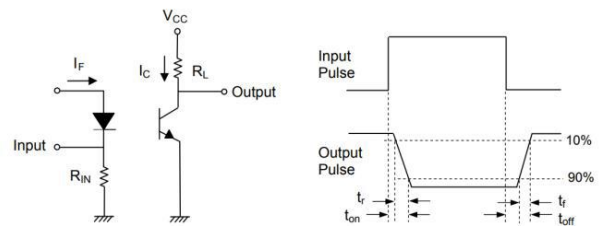
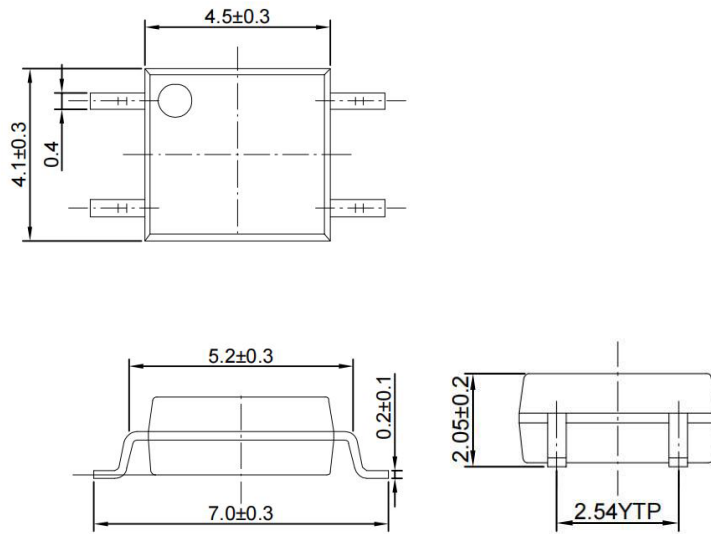


Fig.10. Switching Time Test Circuit & Waveform



Outline Dimensions

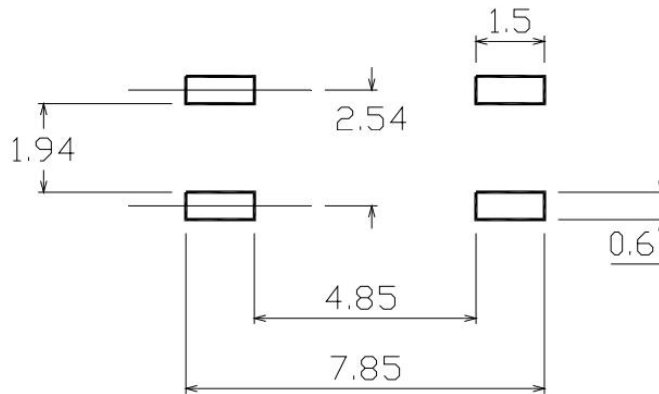
SOP4



Unit: mm

Tolerance: ± 0.1 mm

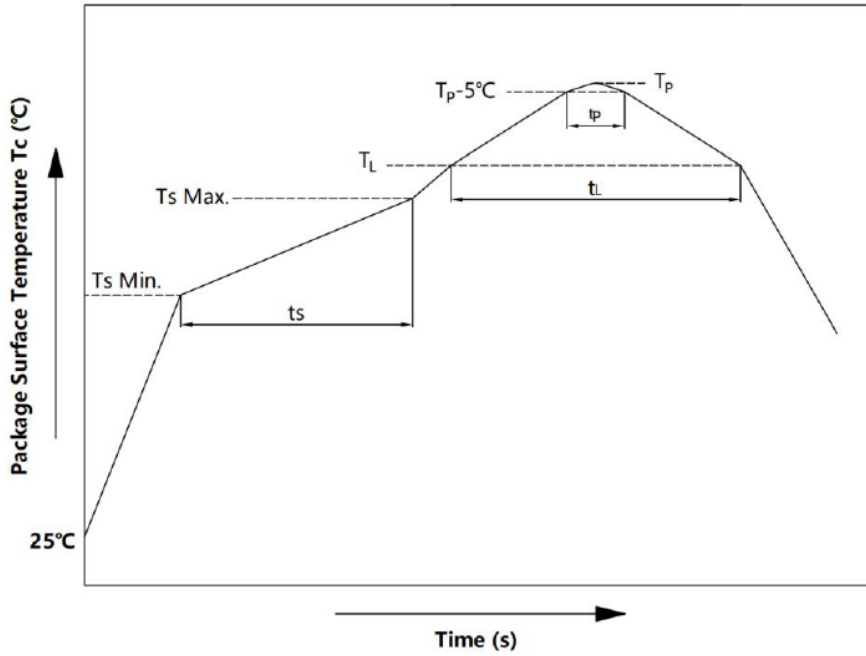
Recommended Pad Layout



Unit: mm

Tolerance: ± 0.1 mm

**Solder Reflow Profile
(JEDEC-STD-020D compliant)**

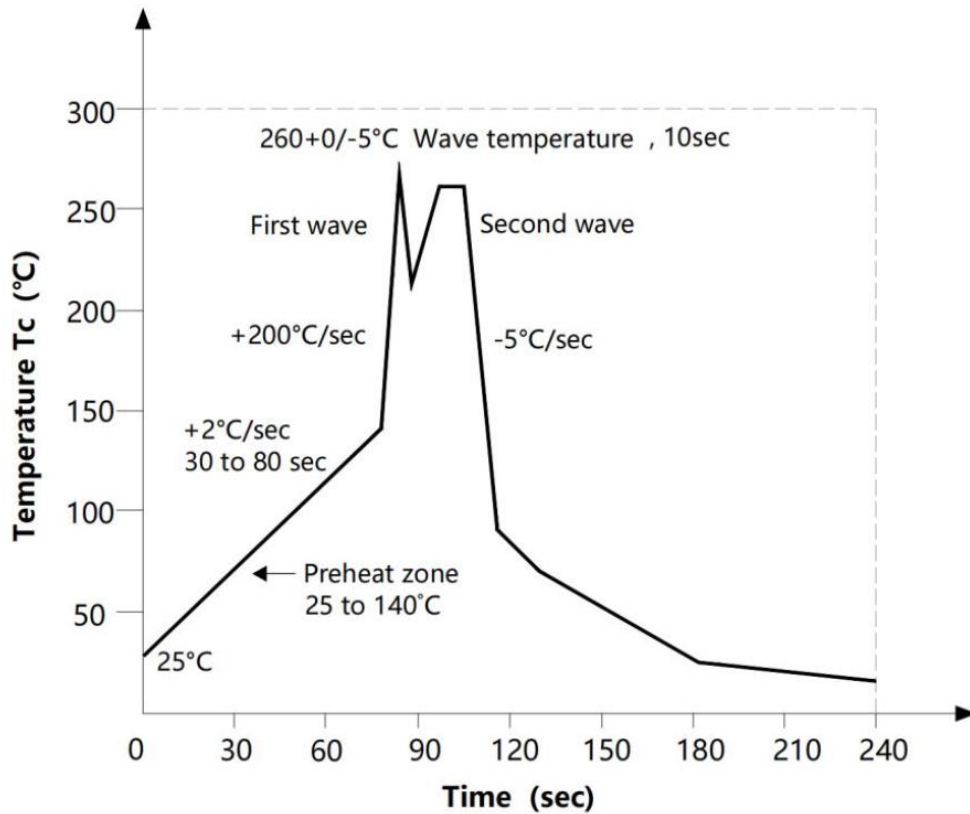


Item	Symbol	Min.	Max.	Unit
Preheat Temperature	T_s	150	200	$^\circ\text{C}$
Preheat Time	t_s	60	120	s
Ramp-Up Rate (T_L to T_P)	-	-	3	$^\circ\text{C}/\text{s}$
Liquidus Temperature	T_L	217		$^\circ\text{C}$
Time Above T_L	t_L	60	150	s
Peak Temperature	T_P	-	260	$^\circ\text{C}$
Time During Which T_c Is Between ($T_P - 5$) and T_P	t_p	-	30	s
Ramp-down Rate(T_P to T_L)	-	3	6	$^\circ\text{C}/\text{s}$

Note:

Reflow soldering is recommended at the temperatures and times shown, no more than three times.

Wave Soldering Profile(JEDEC22A111 compliant)



Soldering with hand soldering iron

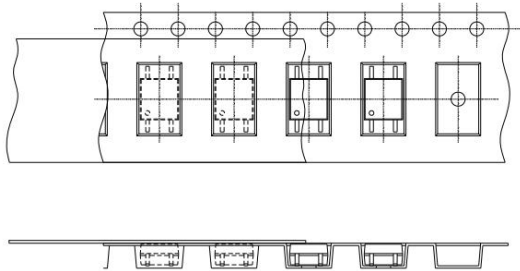
A: Hand soldering iron is only used for product rework or sample testing;

B: Hand soldering iron requirements: Temperature: 380+0/-5°C, within 3s.

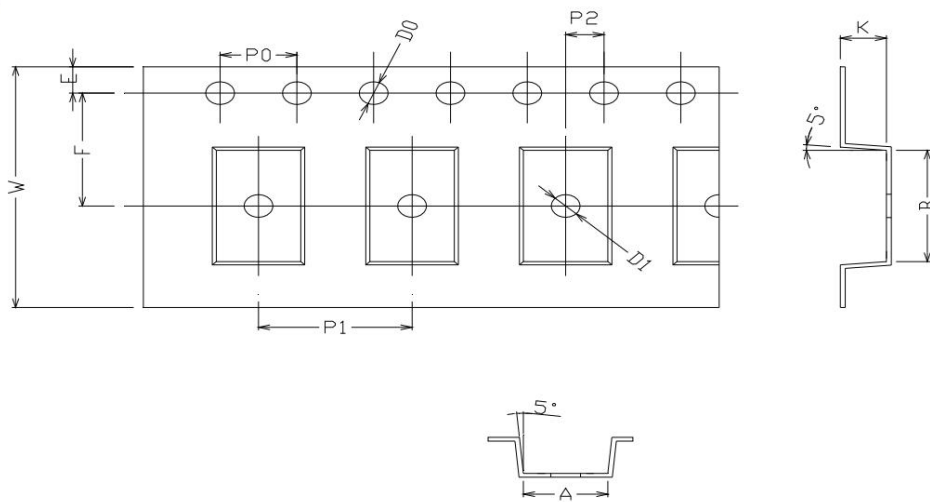
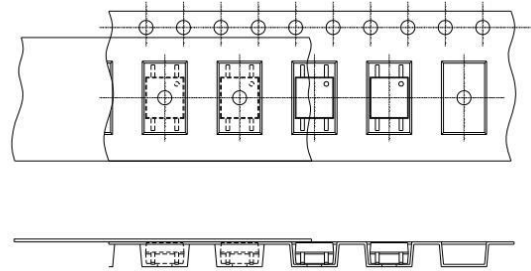
Packing

Tape & Reel

Option TP:



Option TP1:



Deminsion/mm	W	E	F	P0	P1	P2
Package type:SOP4	16±0.2	1.75±0.1	7.5±0.1	4±0.1	8±0.1	2±0.1

Deminsion/mm	A	B	D0	D1	K
Package type:SOP4	4.4±0.1	7.5±0.1	1.5±0.1	1.5±0.1	2.4±0.1

Package type:SOP4	Reel	Inner carton	Outer carton
QTY/PCS	3K/reel	6K(2 reels)	60K

CONTACT INFORMATION

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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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