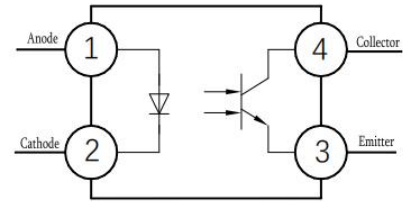


Features

HF

- Current transfer ratio
(CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
(CTR: 63~320% at $I_F = 10\text{mA}$, $V_{CE}=5\text{V}$)
- High isolation voltage between input and output ($V_{iso} = 5000\text{V}_{rms}$)
- Collector - emitter breakdown voltage $BV_{CEO} \geq 80\text{V}$
- Operating Temperature: $-55^\circ\text{C} \sim 110^\circ\text{C}$



Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as Fan Heaters, etc
- Signal transmission between circuits of different potentials and impedances

Mechanical Data

- Case: LSOP-4L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



Ordering Information

TWS 100 X (G) - E
① ② ③ ④ ⑤

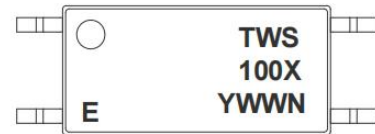
- ① Brand(TWS)
- ② Product series(100)
- ③ CTR Bank(0、2、3、4、7、8、9)
- ④ Halogen option(None :Halogen free)
- ⑤ Product Versions: E

Part Number	Package	Shipping Quantity	Marking Code
TWS100X*1-E	LSOP-4L	3000 pcs / Reel	TWS100X*1...E

Notes 1: X denotes CTR Rank : 0, 2, 3, 4, 7, 8, 9.

Marking Information

- "TWS" denotes brand
- "X" denotes CTR Rank : 0、2、3、4、7、8、9
- "Y" denotes Year : A(2024), B(2025), C(2026)
- "WW" denotes Week's number
- "N" denotes the day of Week.
- "E" fixed



Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Input	Forward Current	I _F	60	mA
	Peak Forward Current *1	I _{FM}	1.5	A
	Reverse Voltage	V _R	6	V
	Power Dissipation	P _D	100	mW
Output	Collector Power Dissipation	P _C	150	mW
	Collector Current	I _C	50	mA
	Collector-Emitter Voltage	V _{CEO}	80	V
	Emitter-Collector Voltage	V _{ECO}	7	V

Thermal Characteristics

Parameter	Symbol	Value	Unit
Total Power Dissipation	P _{TOT}	250	mW
Isolation Voltage ^{*2}	V _{ISO}	5000	V _{rms}
Operating Temperature	T _{OPR}	-55 ~ +110	°C
Storage Temperature Range	T _{STG}	-55 ~ +125	°C
Soldering Temperature ^{*3}	T _{SOL}	260	°C

Notes:

1. Pulse width ≤ 1μs, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute
3. For 10 seconds

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V _F	I _F = 50mA	-	1.3	1.5	V
	Reverse Current	I _R	V _R = 6V	-	-	10	μA
	Input Capacitance	C _{in}	V _R = 0V, f = 1kHz	-	50	-	pF
Output	Collector-Emitter Dark Current	I _{CEO}	V _{CE} = 20V, I _F = 0	-	-	100	nA
	Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C = 0.1mA, I _F = 0	80	-	-	V
	Emitter-Collector Breakdown Voltage	BV _{ECO}	I _E = 0.1mA, I _F = 0	7	-	-	V
Transfer Characteristics	Current Transfer Ratio	CTR	I _F = 5 mA, V _{CE} = 5V	50	-	600	%
			I _F = 10 mA, V _{CE} = 5V	63	-	320	%
			I _F = 1 mA, V _{CE} = 5V	22	-	-	%
	Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _F = 10mA, I _C = 1mA	-	0.1	0.3	V
	Isolation Resistance	R _{IO}	V _{IO} = 500Vdc 40~60% R.H.	1×10 ¹²	-	-	Ω
	Floating Capacitance	C _{IO}	V _{IO} = 0, f = 1MHz	-	-	1.0	pF
	Turn On Time	T _{on}	V _{CE} =5V I _C =5mA RL= 100Ω	1	4	19	μs
	Turn Off Time	T _{off}		1	3	19	
	Rise Time	t _r		-	-	18	
	Fall Time	T _f		-	-	18	

Rank Table of Current Transfer Ratio CTR

Rank Mark	Min. (%)	Max. (%)	Condition
TWS1000-E	50	600	$I_F=5\text{mA}, V_{CE}=5\text{V}$
TWS1007-E	80	160	
TWS1008-E	130	260	
TWS1009-E	200	400	
TWS1002-E	63	125	$I_F=10\text{mA}, V_{CE}=5\text{V}$
TWS1003-E	100	200	
TWS1004-E	160	320	
TWS1002-E	22	-	$I_F=1\text{mA}, V_{CE}=5\text{V}$
TWS1003-E	34	-	
TWS1004-E	56	-	

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Fig.1 Allowable Forward Current vs. Ambient Temperature

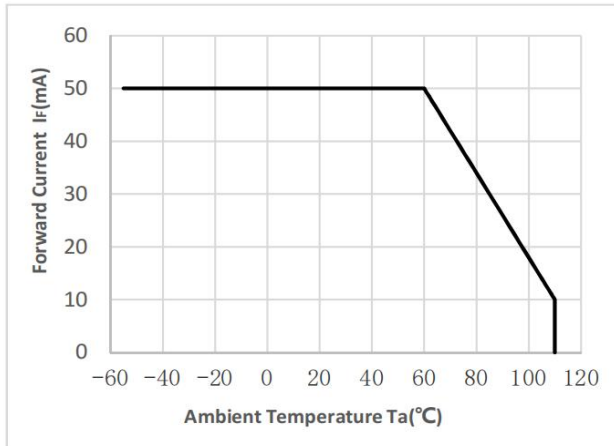


Fig.2 Allowable collector power dissipation vs. Ambient Temperature(°C)

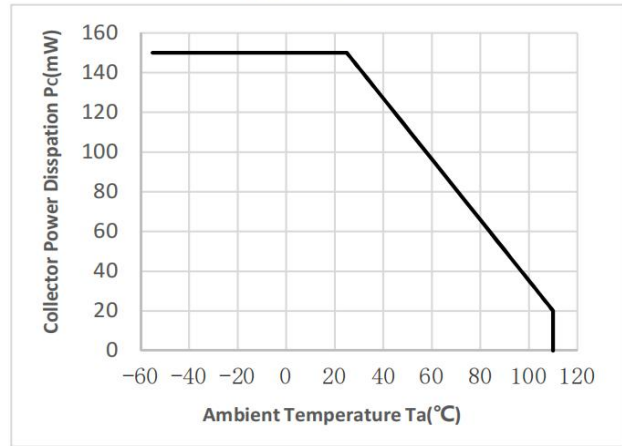


Fig.3 Relative Current Transfer Ratio vs. Forward Current

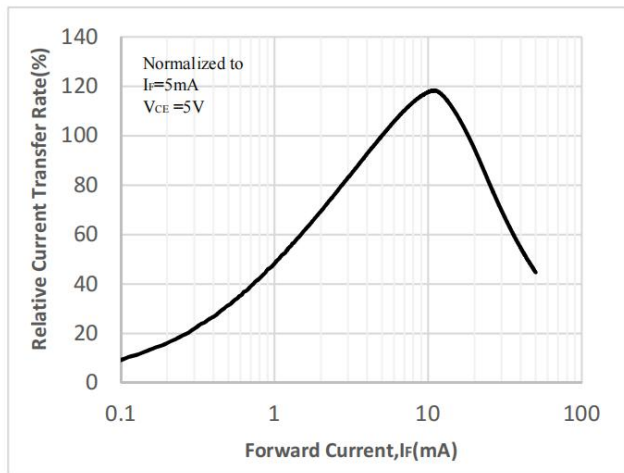


Fig.4 Forward Current vs. Forward Voltage

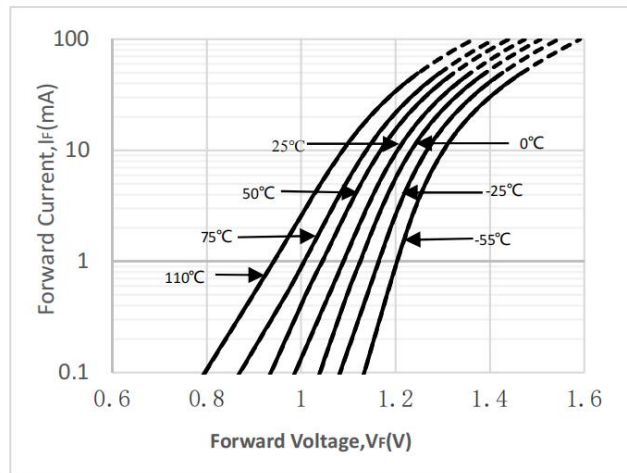


Fig.5 Collector Current vs. Collector-emitter Voltage

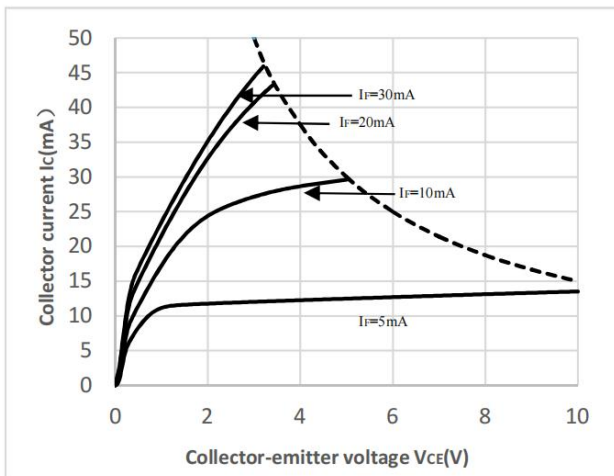


Fig.6 Relative Current Transfer Ratio vs. Ambient Temperature

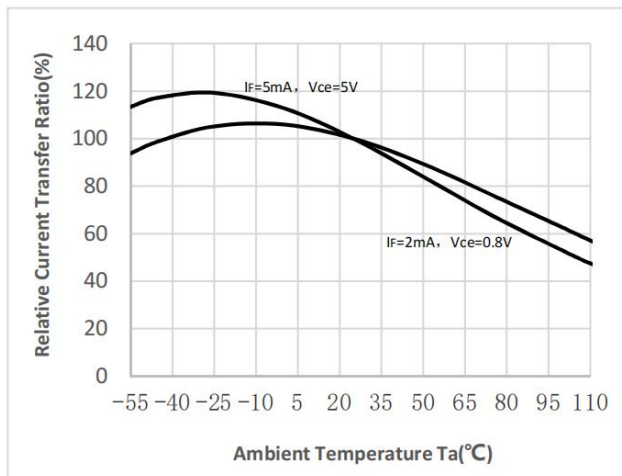


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

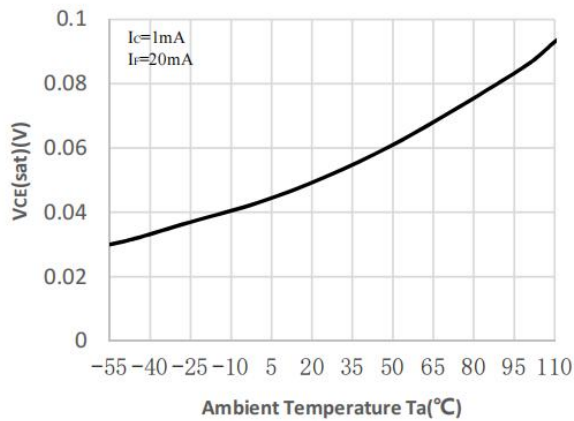


Fig.8 Collector Dark Current vs. Ambient Temperature

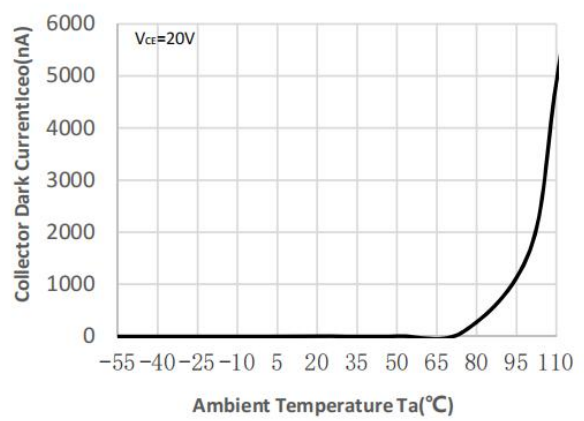


Fig.9 Response Time vs. Load Resistance

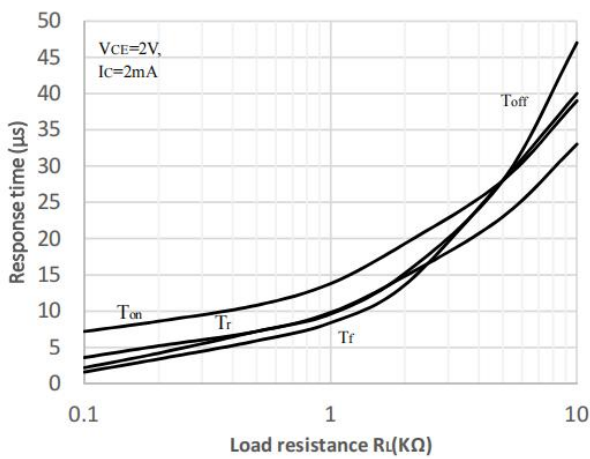


Fig.10 Frequency Response

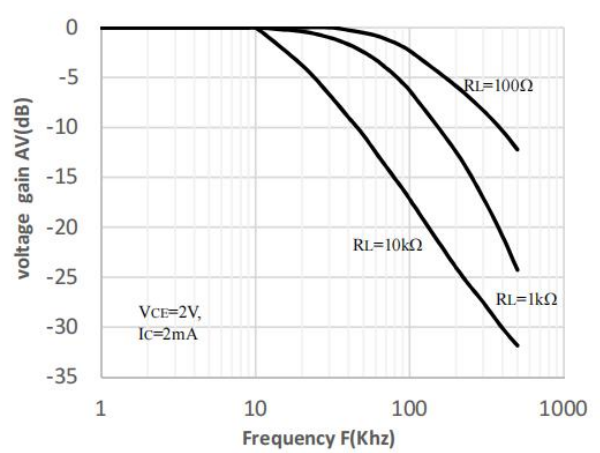


Fig.11 Collector-emitter Saturation Voltage vs. Forward Current

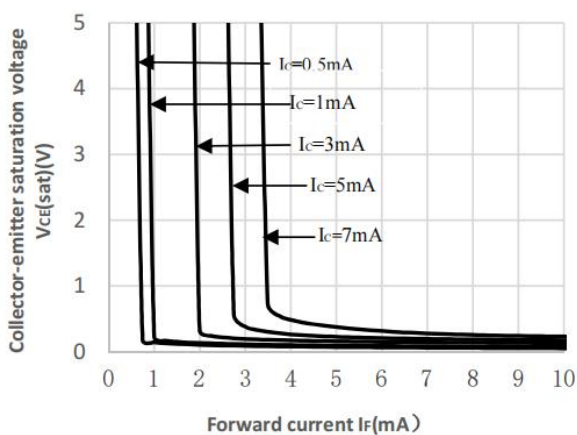
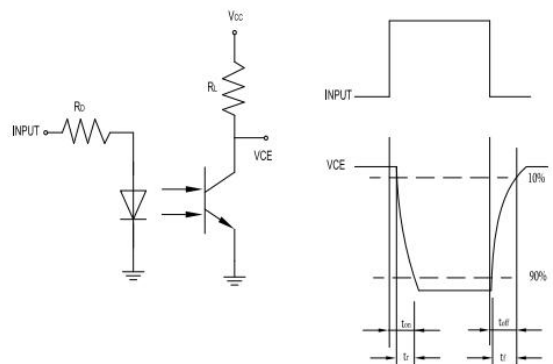
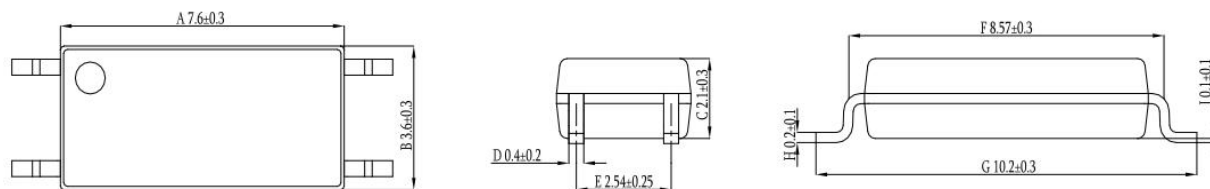


Fig.12 Switching Time Test Circuit & Waveforms

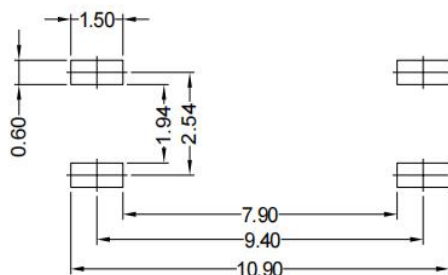


Package Outline Dimensions (unit: mm)

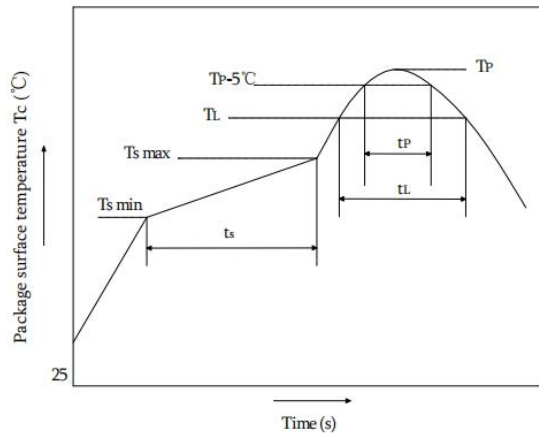
LSOP-4L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

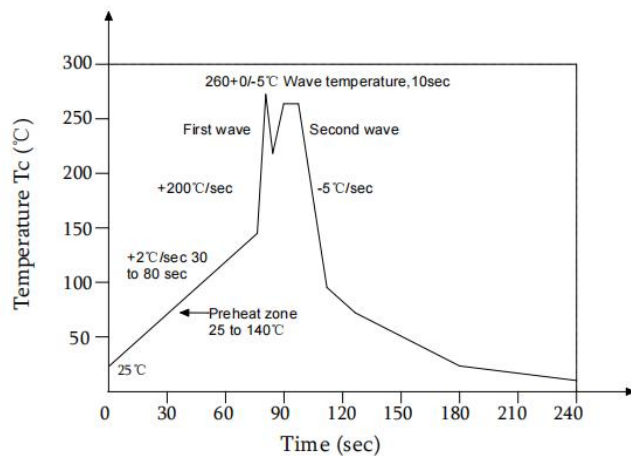


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(T _L to T _P)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _P		260	°C
Time during which T _c is between (T _P -5) and T _P	t _p		30	s
Ramp-down rate(T _P to T _L)			6	°C/s

Note:

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

Wave soldering



Profile feature	
Average ramp-up rate	~200°C/s
Heating rate during preheat	1°C/s to 2°C/s typical; 4°C/s maximum
Final preheat temperature Ts	~130°C
Preheat time (25°C to Ts)	>60s
Peak temperature T _p	260°C
Time within peak temperature t _p	10s
Ramp-down rate	5°C/s maximum

Soldering with hand soldering iron

Hand soldering iron is only used for product rework or sample testing.

Hand soldering iron requirements: Temperature: 360 °C±5°C within 3s.

Packing

Package Type	Packing Form	Quantity per Tube & Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
LSOP-4L	Reel($\phi 330$ mm)	3000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Leave 25 Spaces at the beginning and 50 Spaces at the end

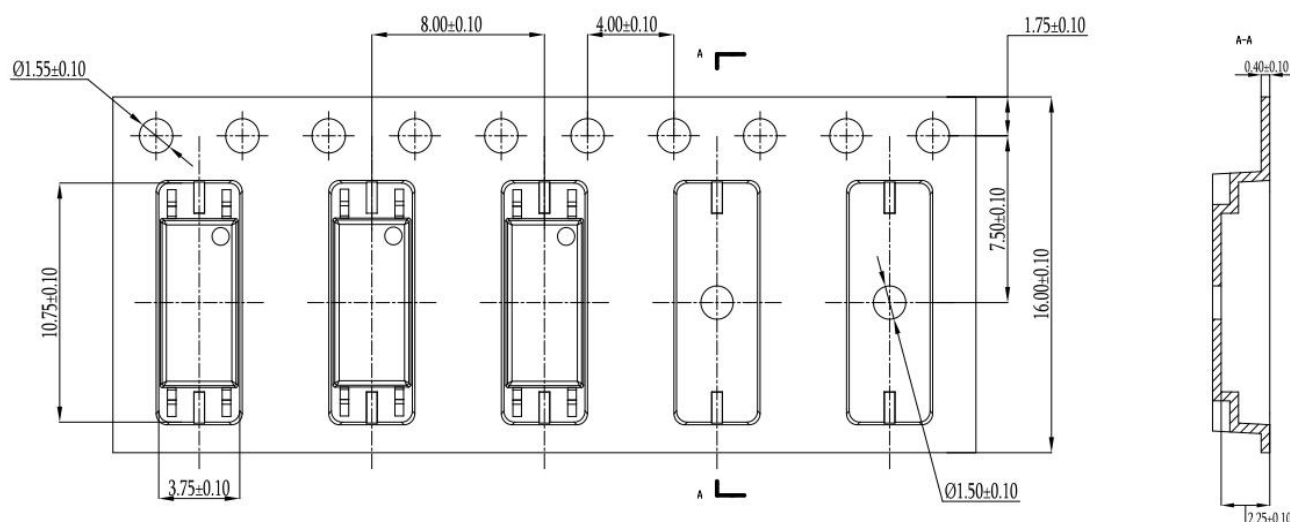
■Summary table

■LSOP-4L (Reel)

Qty/reel: 3000 pcs. Qty/box: 6000 pcs.

Qty/ctn : 30000 pcs.

Schematic: (unit:mm)



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