

Ambient Light Sensor

AT442-ALS-T1

DATA SHEET

REV. : 1.05

DATE : 13-JUN.-2005

Ambient Light Sensor, RoHS Compliant, Released for Lead**(Pb)-free Solder Process****Description**

AT442-ALS-T1 ambient light sensor plays a key role in power savings strategies by controlling LCD display intensity and keypad backlighting of mobile devices and in commercial on/off-lighting operation. It is sensitive to visible light much like the human eye and has peak sensitivity at 580 nm. AT442-ALS-T1 has analog output and is packaged in a small surface mount package.

Features

- High sensitivity, $I_{PCE} = 40 \mu A$ ($E_V = 100 \text{ lx}$)
- Adapted to human eye responsivity
- Wide angle of half sensitivity $\varphi = \pm 60^\circ$
- Surface mount package
- Dimensions: L 4.0 mm x W 2.0 mm x H 1.05 mm
- Lead (Pb)-free component in accordance with RoHS

Applications

Ambient light sensor for control of display backlight dimming in LCD displays and keypad backlighting of mobile devices and in commercial on/off-lighting operation.

- Mobile phones
- Notebook computers
- PDA's
- Cameras

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition Symbol	Symbol	Value	Unit
Collector emitter voltage		V _{CEO}	6	V
Emitter collector voltage		V _{ECO}	1.5	V
Collector current		I _C	20	mA
Total power dissipation	T _{amb} ≤ 55 °C	P _{tot}	100	mW
Junction temperature		T _j	100	°C
Operating temperature range		T _{amb}	- 40 to + 100	°C
Storage temperature range		T _{stg}	-40 to + 100	°C
Soldering temperature	Reflow Profile Figure 7	T _{sd}	260	°C
Thermal resistance junction/ambient		R _{thJA}	450	K/W

Basic Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ	Max	Unit
Collector emitter breakdown voltage	I _C = 0.1 mA	V _{CEO}	15			V
Collector dark current	V _{CE} = 5 V, E = 0 lx	I _{CEO}		3	50	nA
Collector-emitter capacitance	V _{CE} = 0 V, f = 1 MHz, E _v = 0	C _{CEO}		16		pF
Collector light current	E _v = 20 lx, CIE illuminant A, V _{CE} = 5 V	I _{PCE}	3.5	10	16	μA
	E _v = 100 lx, CIE illuminant A, V _{CE} = 5 V	I _{PCE}		40		μA
Angle of half sensitivity		φ	± 60			deg
Wavelength of peak sensitivity		λ _p		580		nm
Range of spectral bandwidth		λ _{0.1}		360 to 970		nm
Collector emitter saturation voltage	E _v = 20 lx, standard light A, I _{PCE} = 1.2 μA	V _{CEsat}		0.1		V

Typical Characteristics

Tamb = 25 °C, unless otherwise specified

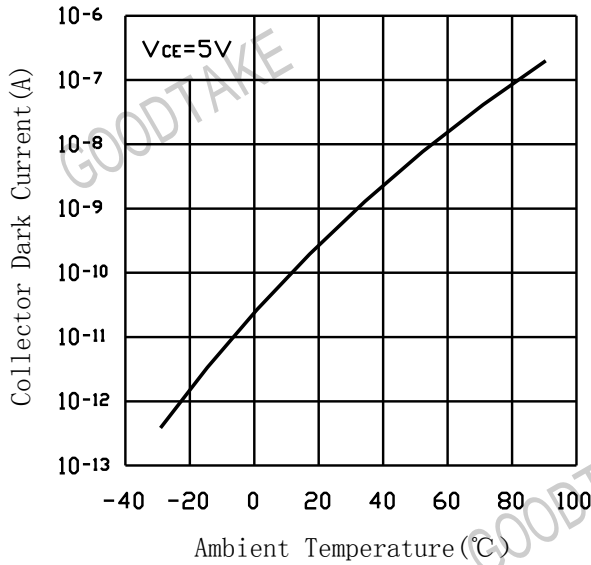


Figure 1. Collector Dark Current vs. Ambient Temperature

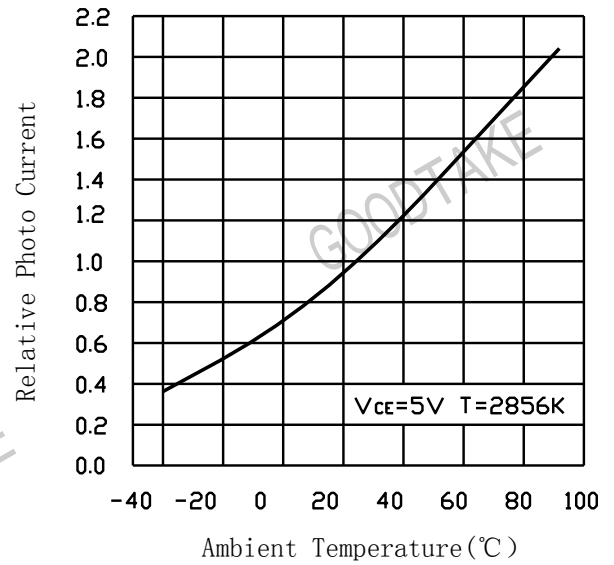


Figure 2. Relative Photo Current vs. Ambient Temperature

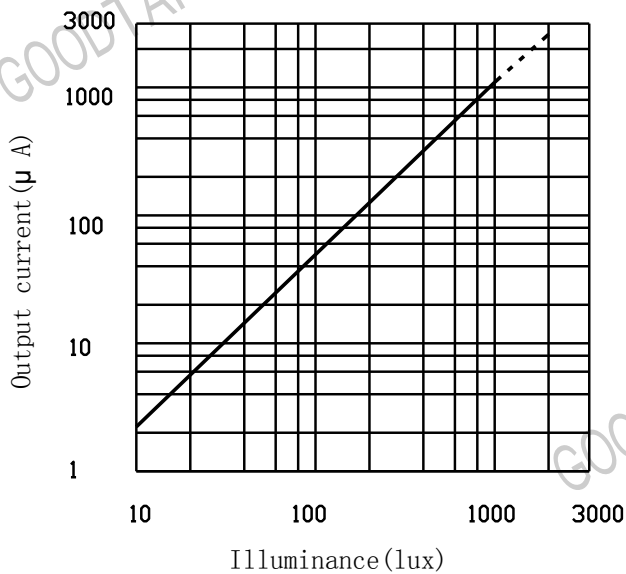


Figure 3. Output Current vs. Illuminance

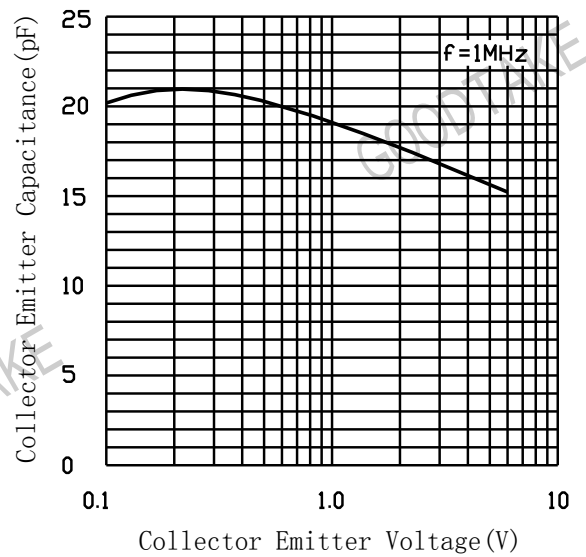


Figure 4. Collector Emitter Capacitance vs. Collector Emitter Voltage

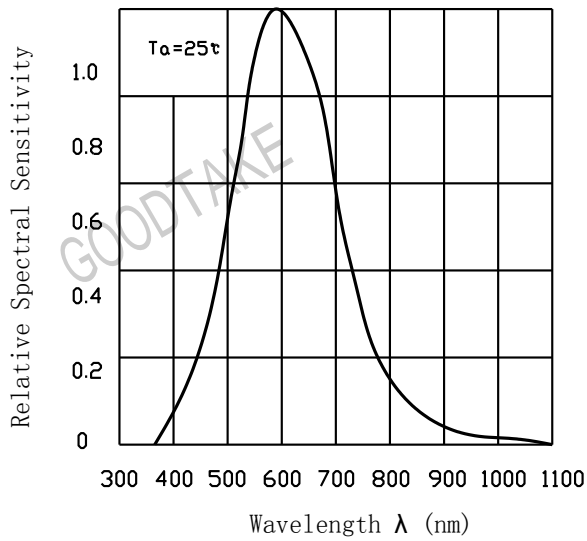


Figure 5. Relative Spectral Sensitivity vs. Wavelength

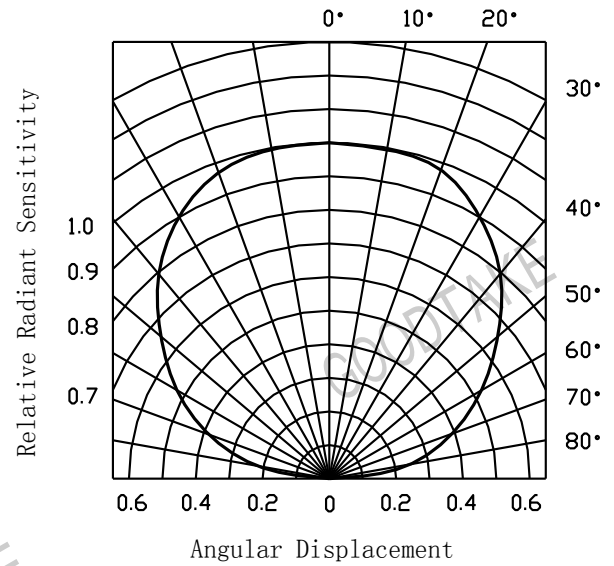
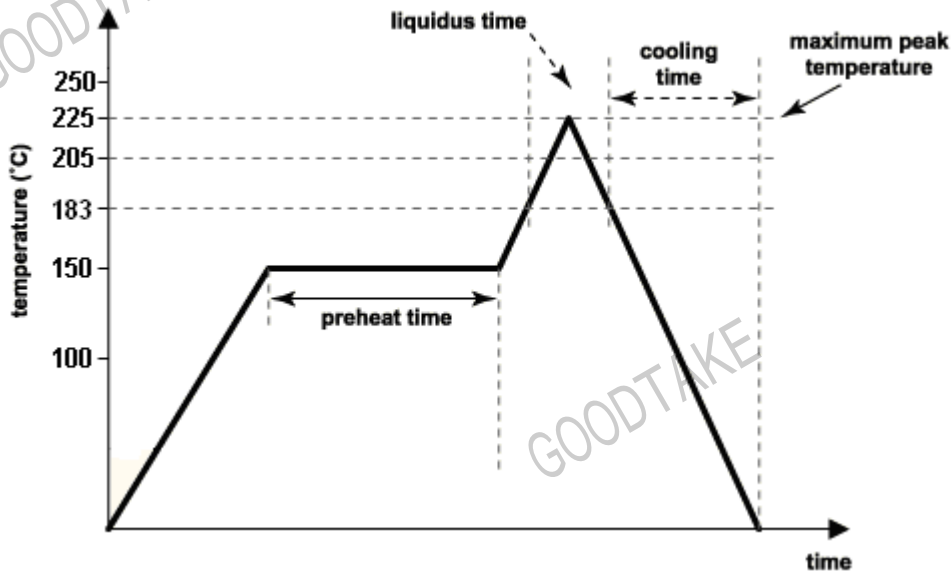


Figure 6. Relative Radiant Sensitivity vs. Angular Displacement

Reflow Solder Profiles



Manual Soldering

- 1) Pb-free solder, the following component is recommended: Sn/Ag 3%/Cu 0.5%
- 2) Use a soldering iron of 25W or smaller. Adjust the temperature of the soldering iron below 350°C.
- 3) Finish soldering within 3 seconds.
- 4) Handle products only after the temperature is cooled off.

Pb-free solder

Pb-free soldering paste, melting temperature: 230~235°C

Components: Sn/Ag 3%/ Cu 0.5%

Antistatic packing

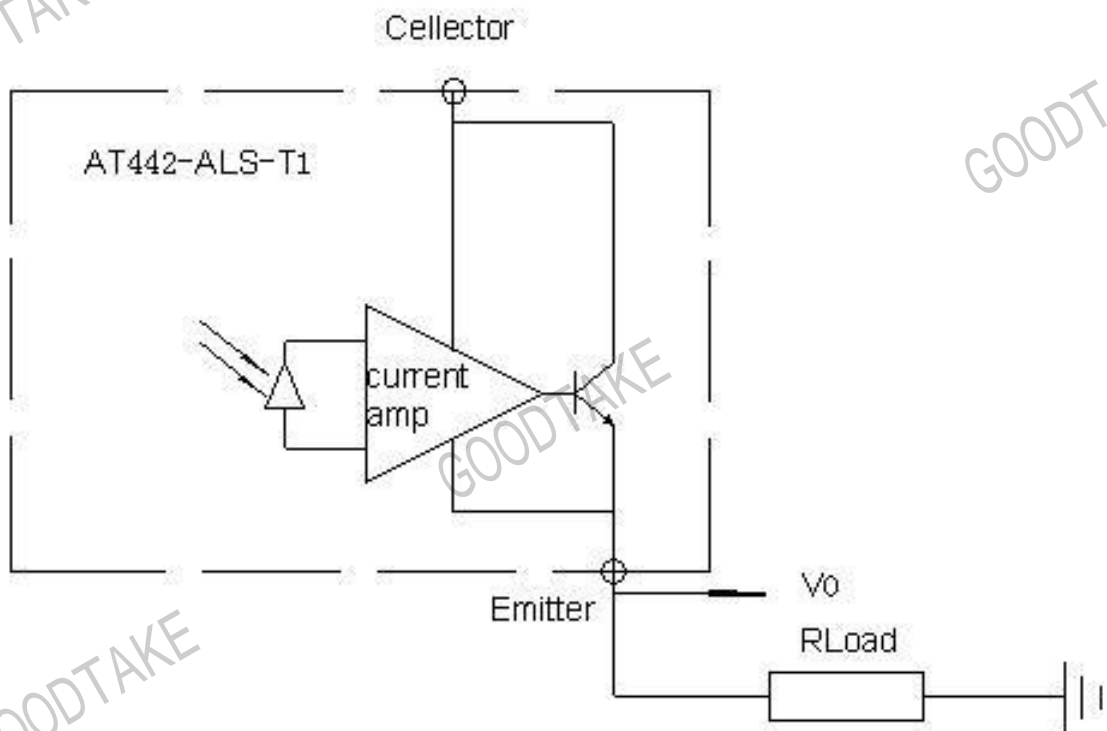
AT442-ALS-T1 is not sensitive to moisture. However, devices are tape & reeled in antistatic bag with silica gel desiccants. Standard packing is 1,200 pcs per reel

Storage

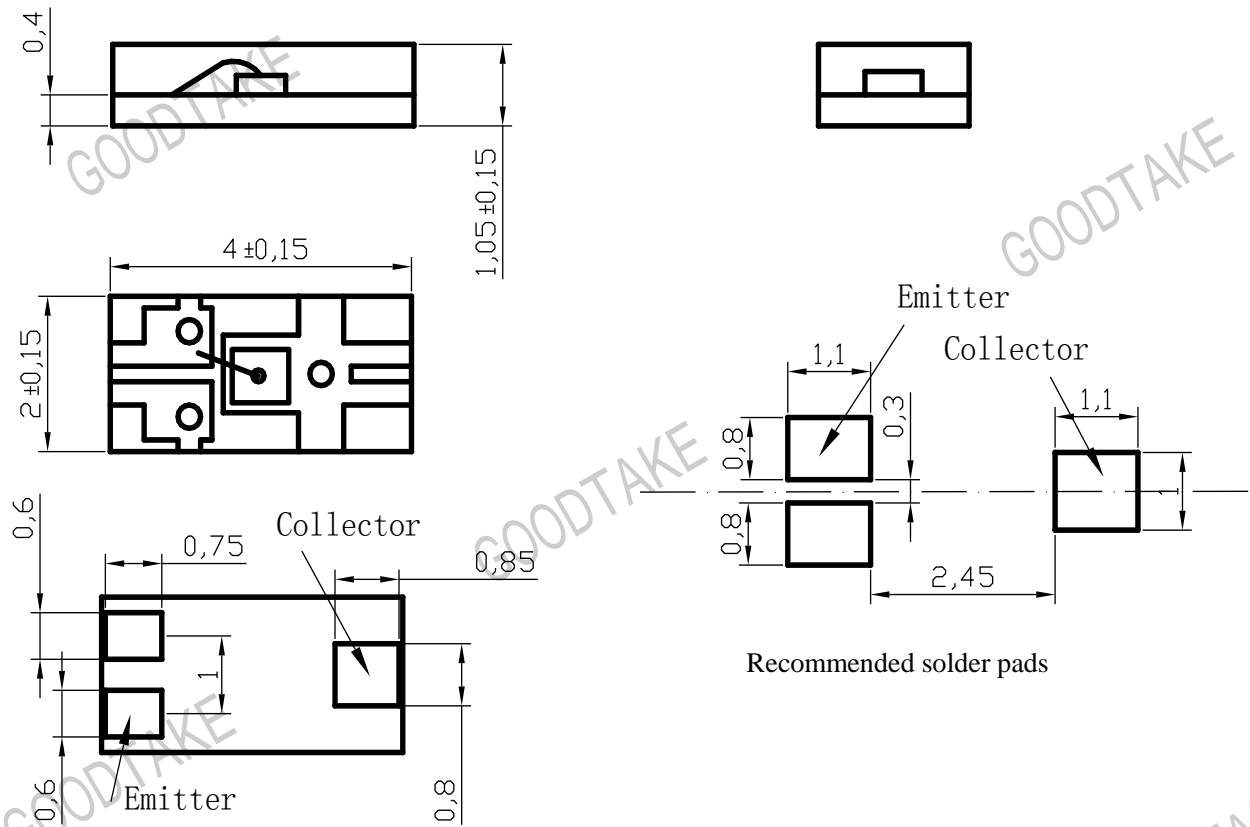
Shelf life & floor life: AT442-ALS-T1 should be stored in an environment with the temperature less than 40 °C and the relative humidity less than 60 percent. Suggested shelf life is 12 months.

Floor life – When package has opened for exceeding 72 hours, unused devices should be repacked into original antistatic bag with desiccant.

Application circuit

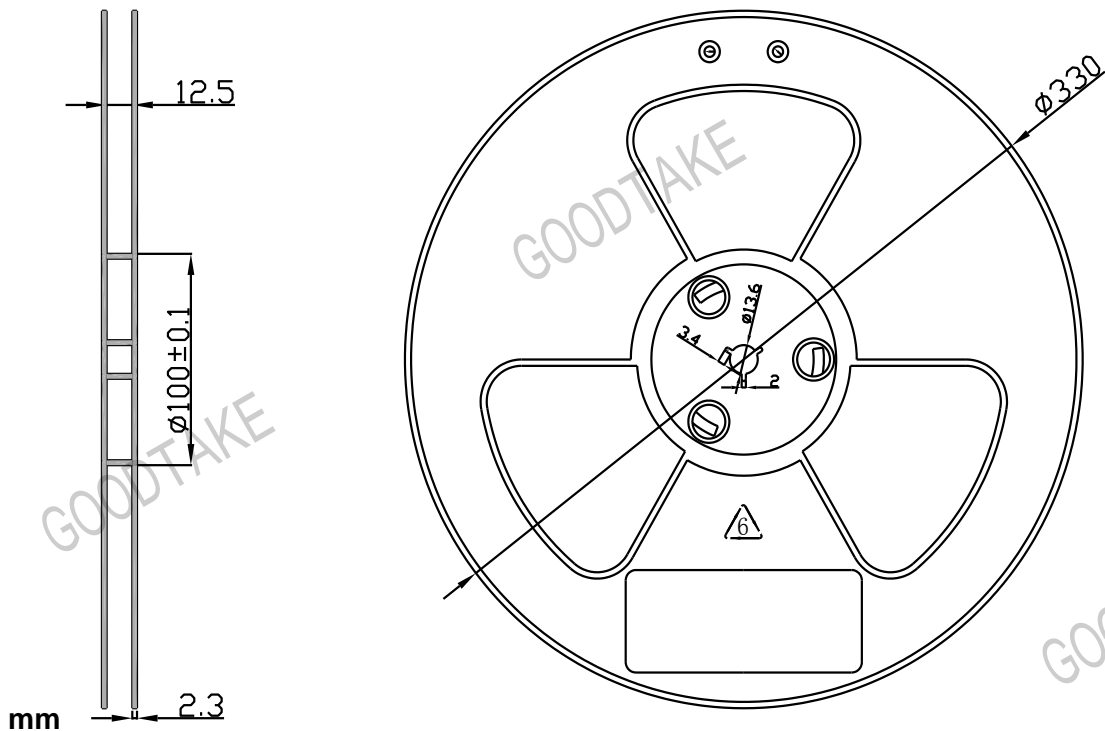


Package Dimensions in millimeters

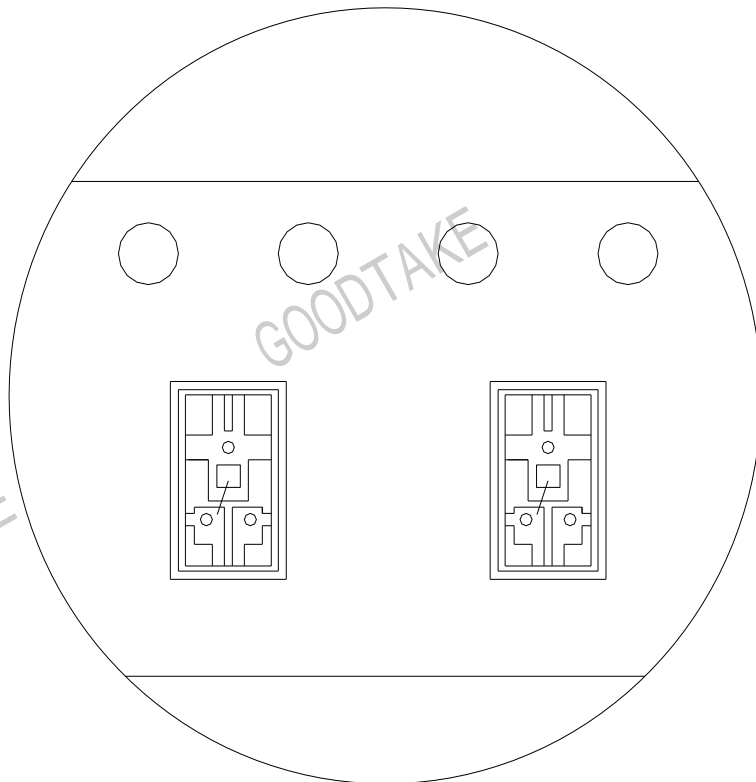
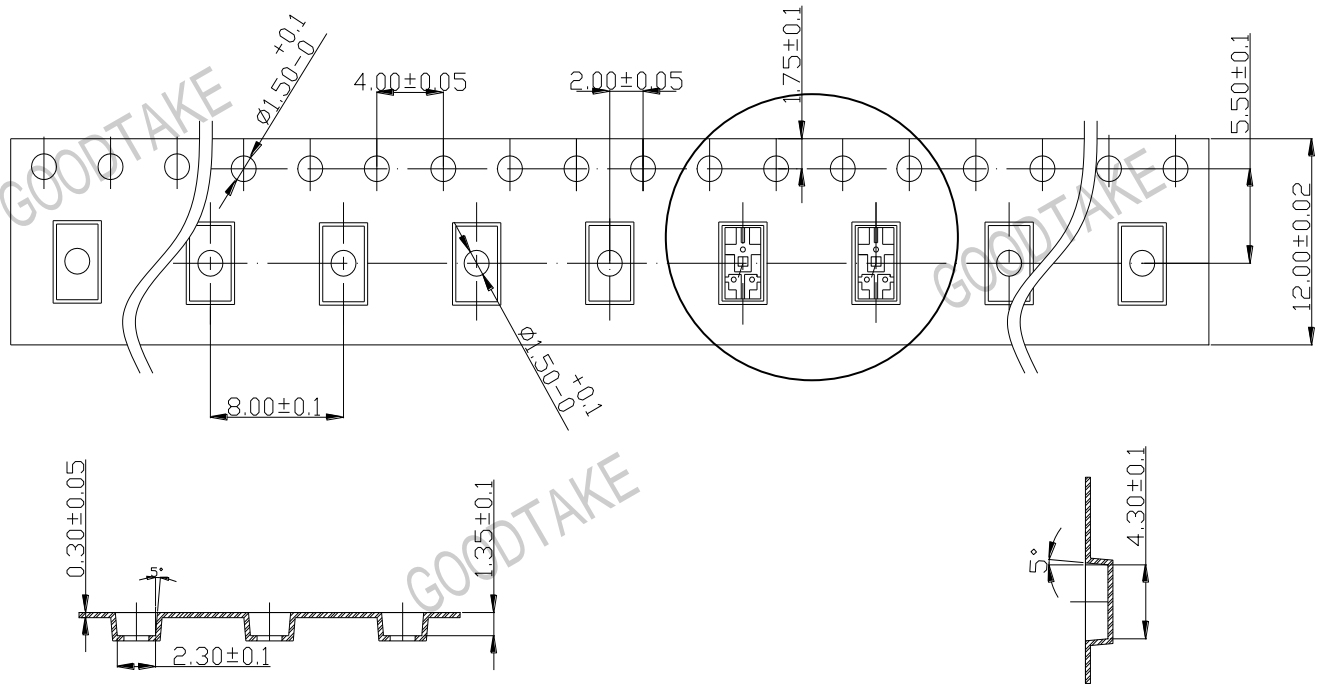


Taping Specifications

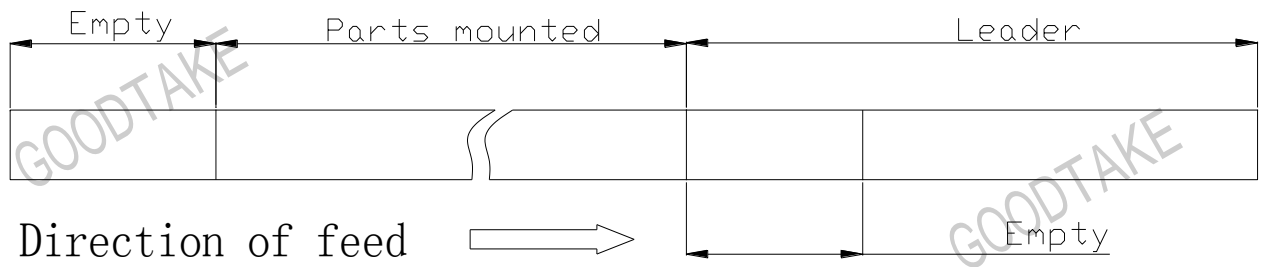
(1) Shape and dimensions of reels: unit in



(2) Dimensions of tape



(3) Configuration of tape



(4) Quantity: 5000pcs/reel