

JOR412D6 Series

Photo Relay

Description

The JOR412D6 PhotoRelay consist of a photo MOSFET、Photovoltage generator、infrared LED. The JOR412D6 achieves low on-resistance.

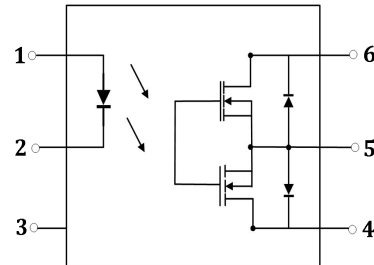
Features

- Control 60V AC or DC voltage
- Switch 3.5A load
- Operating Temperature: $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
- Low off state leakage current
- Low on-resistance
- High isolation voltage between input and output($V_{\text{ISO}}=5000\text{ V}_{\text{rms}}$)
- Meet reinforced insulation standards
- Lead free, meet RoHS standards

Applications

- Industrial machinery and Equipment
- Anti-theft, Aisaster prevention market
- Air conditioning control
- Entertainment market

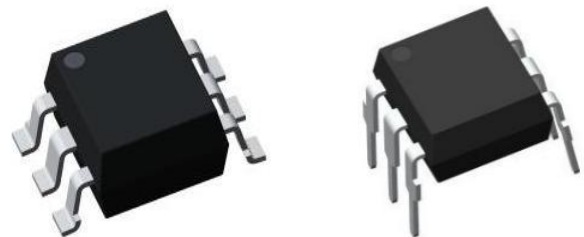
SCHEMATIC



PIN DEFINITION

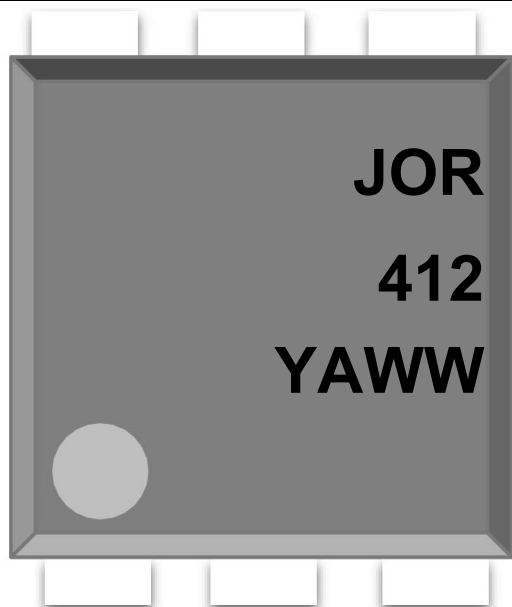
1. Anode
2. Cathode
3. N/CO
4. 6.Drain
5. Source

PACKAGE OUTLINE



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



JOR : Company Abbr.
 412 : Part Number
 Y : Fiscal Year
 A : Manufacturing Code
 WW : Work Week

ORDERING INFORMATION

JOR412DX(Y)(Z)-G

JOR – Company Abbr
 412 – Part Number
 D – DIP or SMD Package
 X – 6(Pin Count)
 Y – Lead Form Option (SL/None)
 Z – Tape and Reel Option (T1/T2)
 G – Green

LABEL INFORMATION



Insulation and Safety related specifications

Item	Symbol	Value	Unit	Remark
Creepage Distance	L	7.0	mm	Measured from input terminals to output terminals, shortest distance path along body.
Clearance Distance	L	7.0	mm	Measured from input terminals to output terminals, shortest distance through air.
Insulation Thickness	DTI	0.4	mm	Insulation thickness between emitter and detector.
Peak Isolation Voltage	VIORM	1500	V _{peak}	DIN/EN/IEC EN60747-5-5.
Transient isolation voltage	VIOTM	7000	V _{peak}	DIN/EN/IEC EN60747-5-5.
Isolation Voltage	VISO	5000	V _{rms}	For 1 minute.

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Rating	Unit	
Input	LED Forward Current	I _F	50	mA	
	LED Reverse Voltage	V _R	5	V	
	Peak Forward Current	I _{FP}	1	A	
	Power Dissipation	P _{in}	75	mW	
Output	Load Voltage (Peak AC)	V _L	60	V	
	Continuous Load Current	I _L	A	3.5	A
			B	5	
			C	7	
	Peak Load Current	I _{peak}	10	A	
Power Dissipation	P _{out}	600	mW		
Total Power Dissipation		P _{tot}	650	mW	
Isolation Voltage		VISO	5000	V _{rms}	
Operating Temperature		T _{opr}	-40~+85	°C	
Storage Temperature		T _{stg}	-40~+100	°C	
Soldering Temperature		T _{sol}	260	°C	

Note: A connection: Peak AC, DC; B, C connection: DC.

Electro-optical Characteristics ($T_A=25^\circ\text{C}$)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit			
Input	LED Operate Current	I_{Fon}	$I_L = 100\text{mA}$.	-	0.5	3	mA			
	LED Turn Off Current	I_{Foff}	$I_L = 100\text{mA}$	0.2	0.4	-	mA			
	LED Dropout Voltage	V_F	$I_F=5\text{mA}$	-	1.3	1.5	V			
Output	On Resistance	R_{on} <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>A</td></tr> <tr><td>B</td></tr> <tr><td>C</td></tr> </table>	A	B	C	$I_F = 5\text{ mA}$ $I_L = \text{MAX.}$ Within 1s on time	-	0.052	0.06	Ω
			A							
			B							
	C									
-	0.028	0.04	Ω							
-	0.016	0.02	Ω							
Off State Leakage Current	I_{Leak}	$I_F = 0\text{ mA}$ $V_L = \text{MAX}$	-	-	1	μA				
Transfer Characteristics	Turn On Time	T_{on}	$I_F = 5\text{ mA}$ $V_L = 10\text{V}$ $I_L = 100\text{mA}$	-	2.5	5	ms			
	Turn Off Time	T_{off}	$I_F = 5\text{ mA}$ $V_L = 10\text{V}$ $I_L = 100\text{mA}$	-	0.15	0.5	ms			
	I/O Capacitance	C_{ISO}	$f = 1\text{ MHz}$ $V_B = 0\text{V}$	-	0.8	1.5	pF			
	Initial I/O Isolation Resistance	R_{ISO}	500 V DC	1000	-	-	M Ω			

Typical Electro-Optical Characteristics Curves

Fig.1 LED Dropout Voltage vs. Ambient Temperature

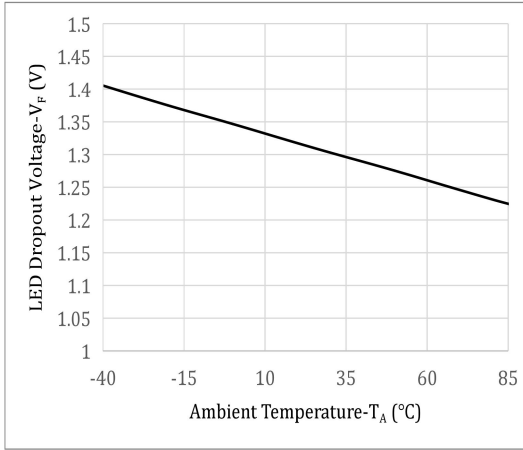


Fig.2 Output Current vs. Output Voltage

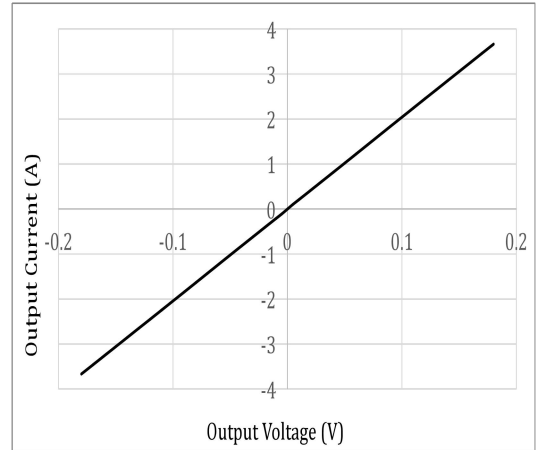


Fig.3 On Resistance vs. Ambient Temperature

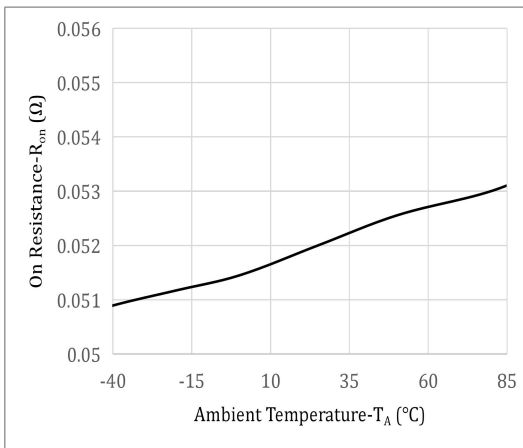


Fig.4 Load Current vs. Ambient Temperature

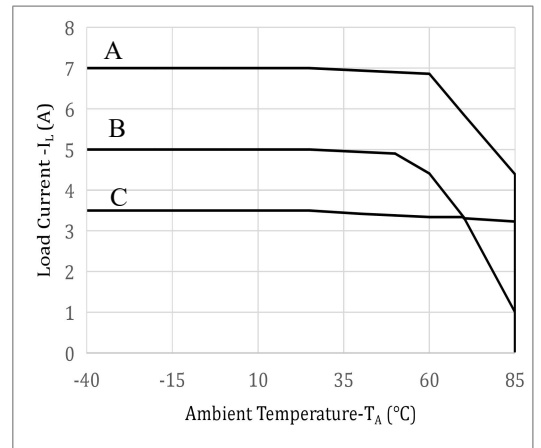


Fig.5 LED Operate Current vs. Ambient Temperature

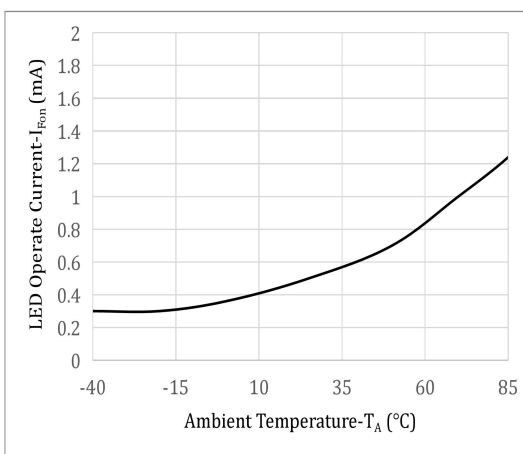


Fig.6 LED Turn Off Current vs. Ambient Temperature

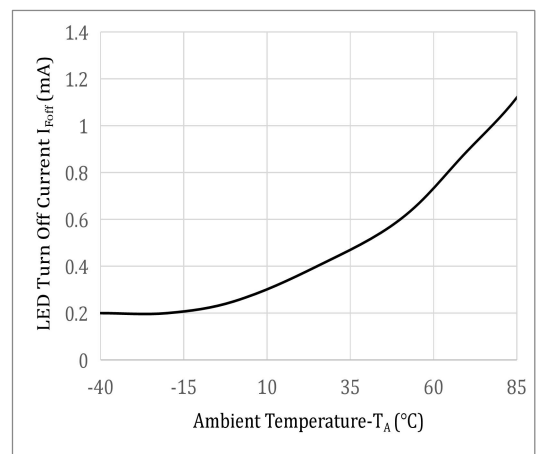


Fig.7 Turn On Time vs. Ambient Temperature

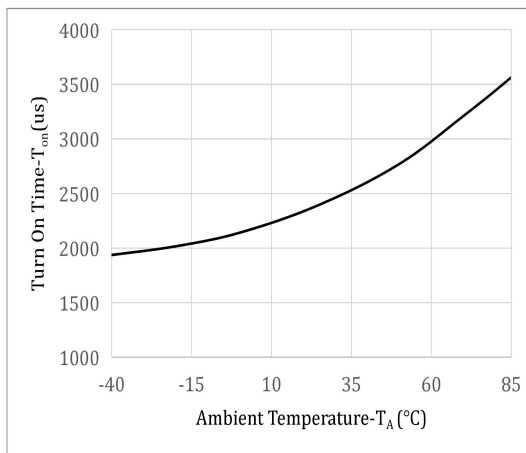


Fig.8 Turn Off Time vs. Ambient Temperature

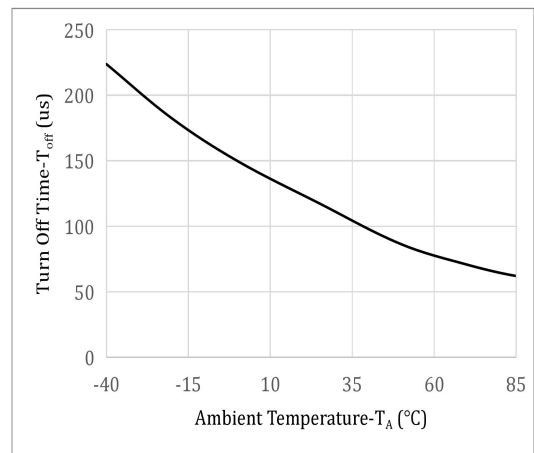


Fig.9 Turn On Time vs. LED Forward Current

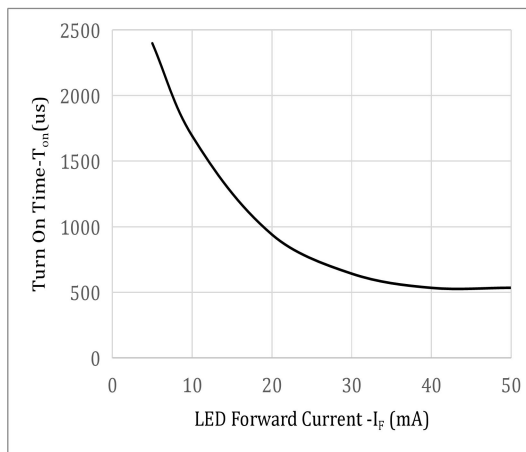


Fig.10 Turn Off Time vs. LED Forward Current

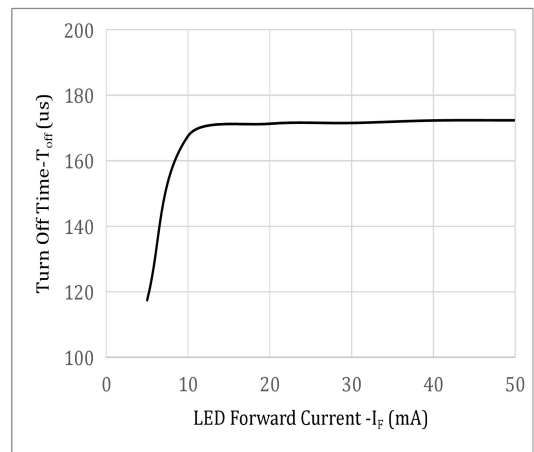
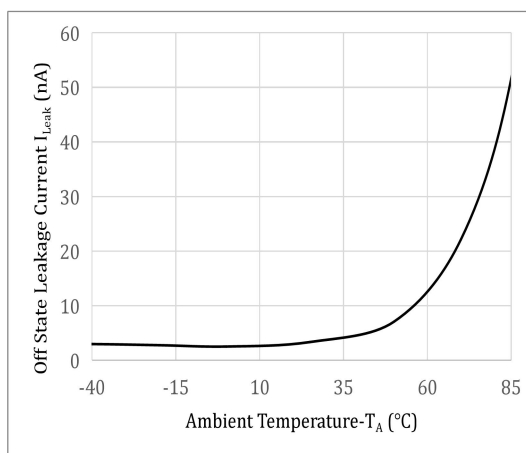
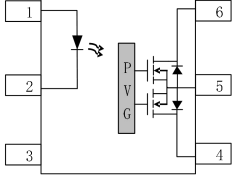
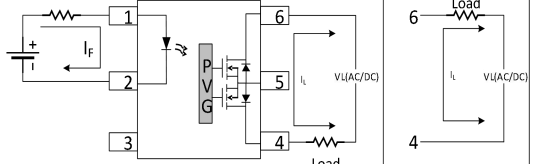
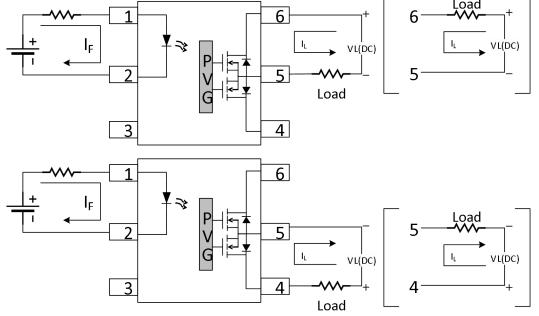
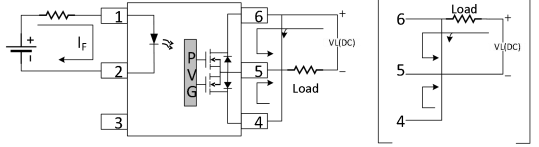


Fig.11 Off State Leakage Current vs. Ambient Temperature



Schematic And Wiring Diagrams

Photo Relay

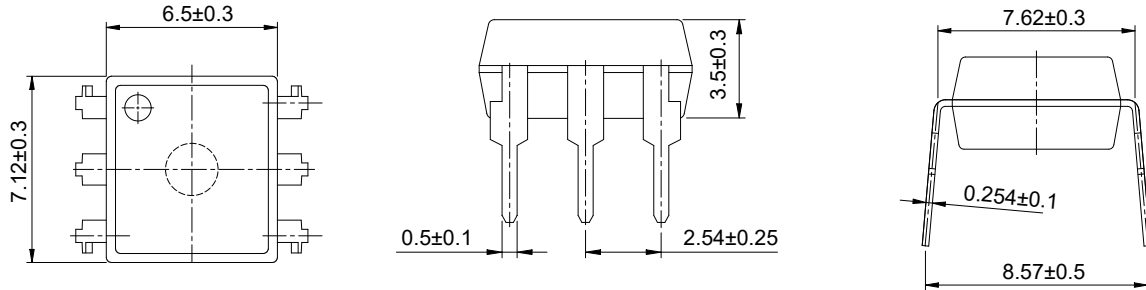
Schematic	Output Configuration	Load Type	Connection	Wiring diagram
	<p>1 Form A</p>	AC/DC	A	
		DC	B	 <p>Can be also connected as 2 Form A type. (However, the sum of the continuous load current should not exceed the absolute maximum rating.)</p>
		DC	C	

Terminal 3 cannot be used

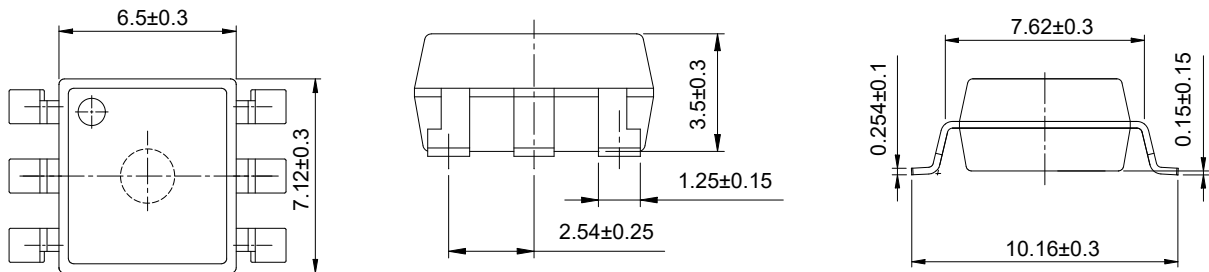
Outline Dimensions

Photo Relay

DIP6

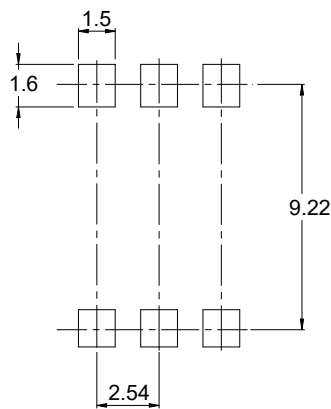


SMD6



Unit: mm

Recommended Pad Layout

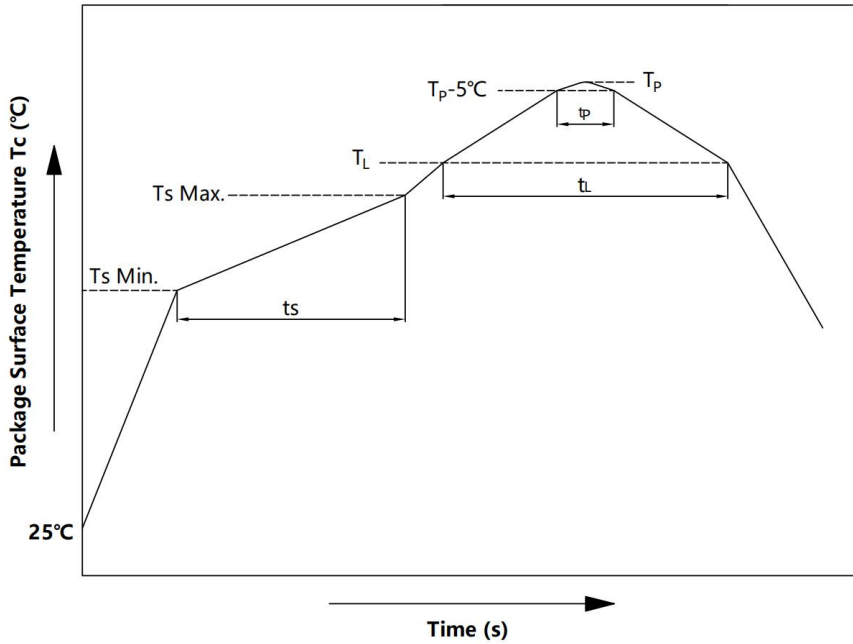


Unit: mm

Note: The picture above is the front view of the product.

Solder Reflow Profile

Photo Relay

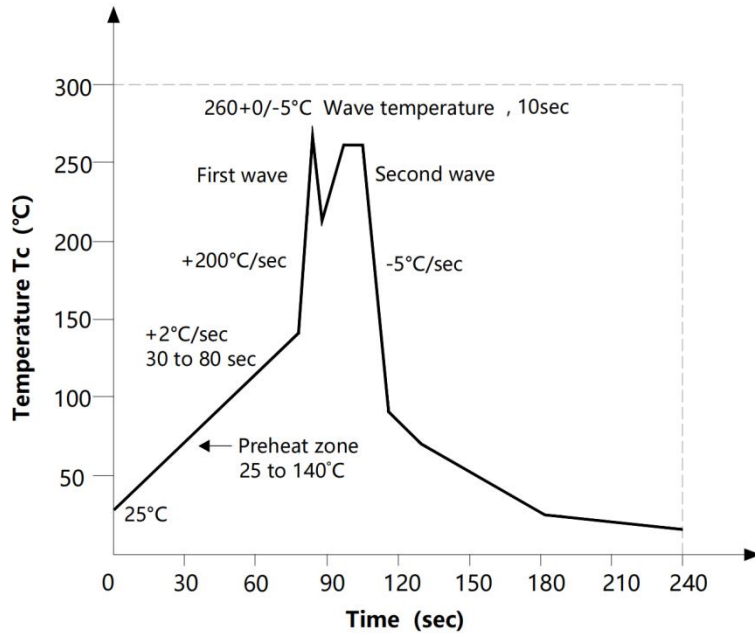


Item	Symbol	Min.	Max.	Unit
Preheat Temperature	T_s	150	200	$^\circ\text{C}$
Preheat Time	T_s	60	120	s
Ramp-Up Rate (T_L to T_P)	-	-	3	$^\circ\text{C/s}$
Liquidus Temperature	T_L	217		$^\circ\text{C}$
Time Above T_L	T_L	60	150	s
Peak Temperature	T_P	-	260	$^\circ\text{C}$
Time During Which T_C Is Between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

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

Wave Soldering Profile

Photo Relay



Soldering with hand soldering iron

- A. Hand soldering iron is only used for product rework or sample testing;
- B. Manual soldering method Temperature: 360°C ± 5°C, within 3s.

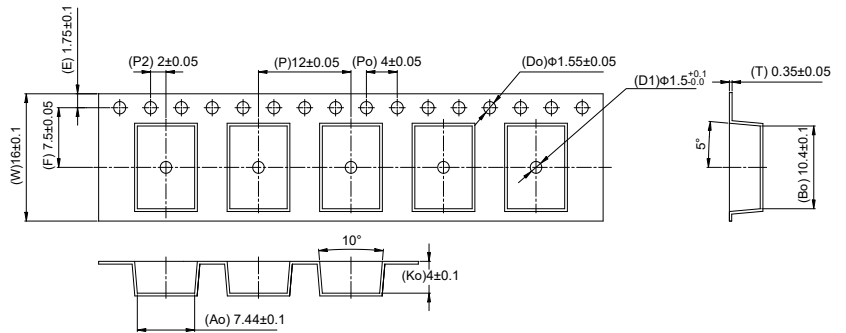
Packing

■ Summary table

Package Type	Packing Form	Quantity per Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
SMD6	Reel (ϕ 330mm Blue)	1k pcs/reel	2 reels /box	10 boxes /ctn	380*380mm	340*60*340 mm	620*360*365mm	Leave at least 200mm of blank space at both ends
DIP6	Tube (500*12*11mm)	65 pcs/tube	50 tubes/box	10 boxes/ctn	Not applicable	525*128*56 mm	535*275*300mm	Use blue and white rubber stoppers for each tube, with the same direction

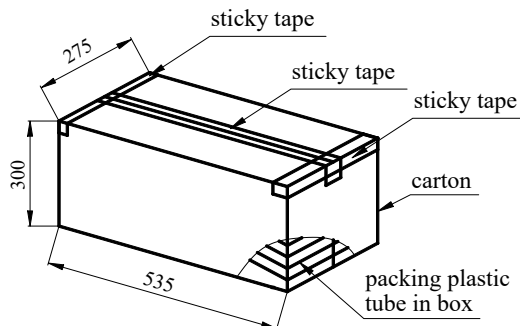
■ SMD6 ape & Reel

- 1) reel: 2000 pcs.
- 2) ctn: 40000 pcs.
- 3) Inner packing: 2 reels/box.
- 4) Schematic:



■ DIP6 Tube

- 5) Qty/tube: 65 pcs.
- 6) Qty/ctn: 32500 pcs.
- 7) Inner packing: 50 tubes/box.
- 8) Schematic:



Unit: mm

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