



SERIES: PDSE1-M | DESCRIPTION: DC-DC CONVERTER

FEATURES

- 1 W isolated output
- unregulated output
- compact SMT package
- single/dual output models
- continuous short circuit protection
- extended temperature range (-40~105°C)
- 1500 Vdc isolation
- no load input current as low as 5 mA
- UL 62368 approval
- efficiency up to 85%



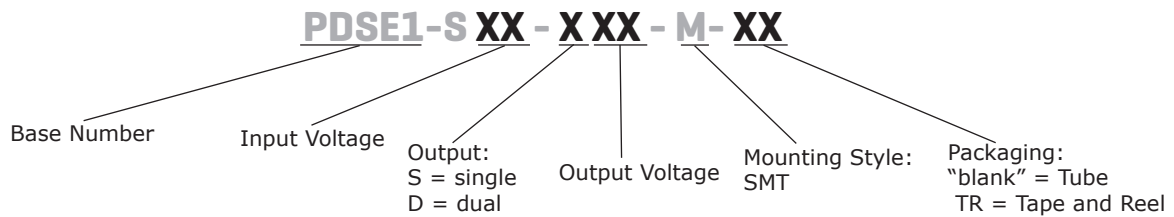
MODEL

MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple & noise ¹ max (mVp-p)	efficiency ² typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
PDSE1-S5-S3-M	5	4.5~5.5	3.3	30	303	1	75	74
PDSE1-S5-S5-M	5	4.5~5.5	5	20	200	1	75	82
PDSE1-S5-S9-M	5	4.5~5.5	9	12	111	1	75	83
PDSE1-S5-S12-M	5	4.5~5.5	12	9	84	1	75	83
PDSE1-S5-S15-M	5	4.5~5.5	15	7	67	1	75	83
PDSE1-S5-S24-M	5	4.5~5.5	24	4	42	1	75	85
PDSE1-S5-D5-M	5	4.5~5.5	±5	±10	±100	1	75	82
PDSE1-S5-D9-M	5	4.5~5.5	±9	±6	±56	1	75	83
PDSE1-S5-D12-M	5	4.5~5.5	±12	±5	±42	1	75	83
PDSE1-S5-D15-M	5	4.5~5.5	±15	±4	±34	1	75	83
PDSE1-S5-D24-M	5	4.5~5.5	±24	±3	±21	1	100	85

Notes:

1. Measured at nominal input, 20 MHz bandwidth oscilloscope, with 10 μ F tantalum and 1 μ F ceramic capacitors on the output.
2. Measured at nominal input voltage, full load.
3. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage		4.5	5	5.5	Vdc
surge voltage	for maximum of 1 second	-0.7		9	Vdc
current	3.3, 5 Vdc output models			286	mA
	±5 Vdc output models			257	mA
	all other models			254	mA
filter	filter capacitor				

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load ⁴	3.3, 5 Vdc output models			2,400	μF
	9 Vdc output models			1,000	μF
	12, 15 Vdc output models			560	μF
	24, ±12, ±15 Vdc output models			220	μF
	±5 Vdc output models			1,200	μF
	±9 Vdc output models			470	μF
	all other models			100	μF
voltage accuracy	see tolerance envelope curves				
line regulation	for Vin change of 1%				
	3.3 Vdc output models			±1.5	%
	all other models			±1.2	%
load regulation	from 10% to full load				
	3.3 Vdc output models			±20	%
	5, ±5 Vdc output models			±15	%
	all other models			±10	%
switching frequency	100% load, nominal input voltage		270		kHz
temperature coefficient	at full load		±0.02		%/°C

Note: 4. Tested at input voltage range and full load.

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, self recovery				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute at 1 mA	1,500			Vdc
isolation resistance	input to output at 500 Vdc	1,000			MΩ
isolation capacitance	input to output, 100 kHz / 0.1 V		20		pF
safety approvals	UL 62368-1, EN 62368-1				
conducted emissions	CISPR32/EN55032, class B (external circuit required, see Figures 3, 4)				

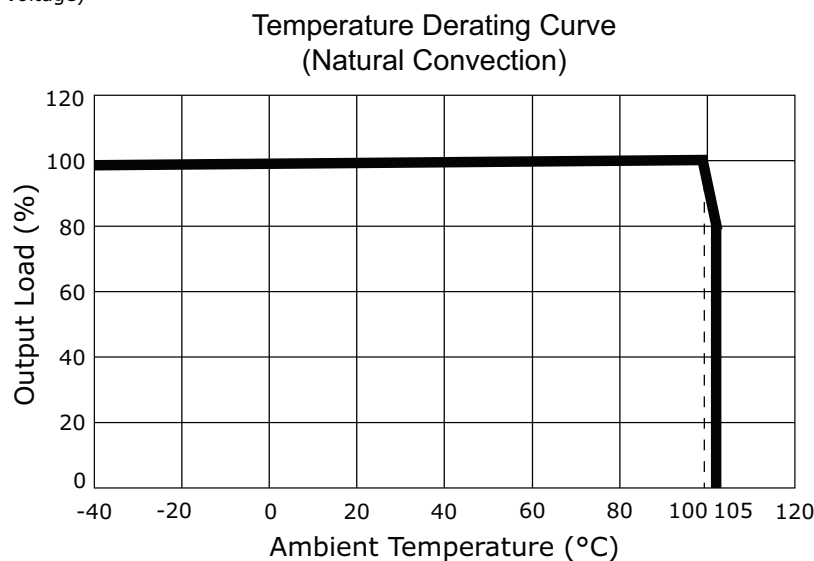
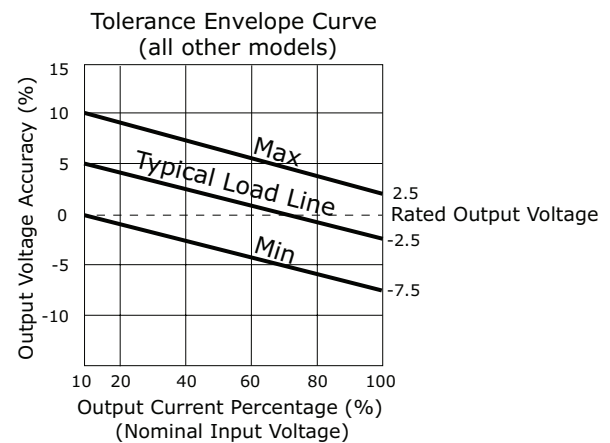
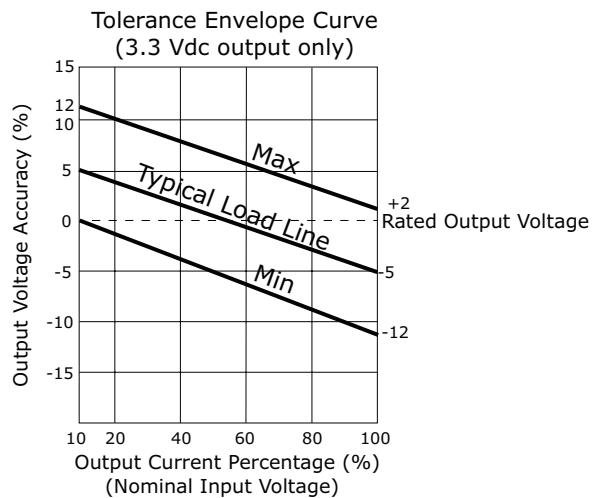
SAFETY AND COMPLIANCE (CONTINUED)

parameter	conditions/description	min	typ	max	units
radiated emissions	CISPR32/EN55032, class B (external circuit required, see Figures 3, 4)				
ESD	IEC/EN61000-4-2, air ± 8 kV; contact ± 4 kV, class B				
MTBF	as per MIL-HDBK-217F, 25°C	3,500,000			hours
RoHS	yes				

ENVIRONMENTAL

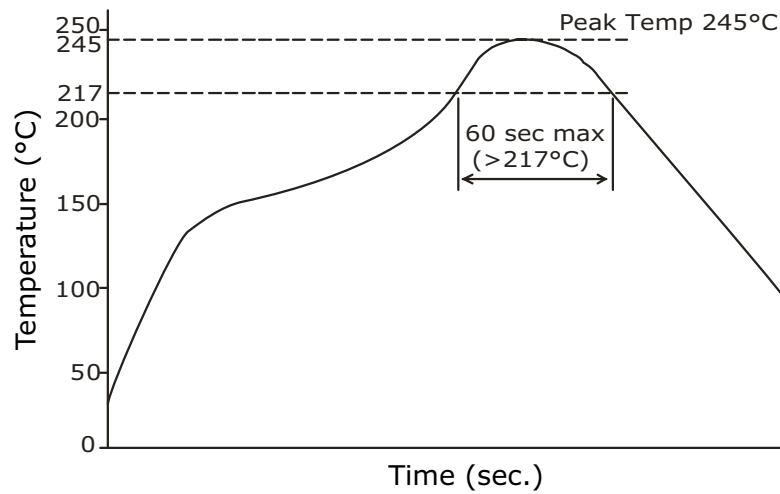
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%
case temperature rise	3.3 Vdc output model at 25°C		25		°C
	all other models at 25°C		15		°C

DERATING CURVES



SOLDERABILITY

parameter	conditions/description	min	typ	max	units
reflow soldering	see reflow soldering profile Maximum duration >217°C is 60 seconds. For actual application, refer to IPC/JEDEC J-STD-020D.1			245	°C



MECHANICAL

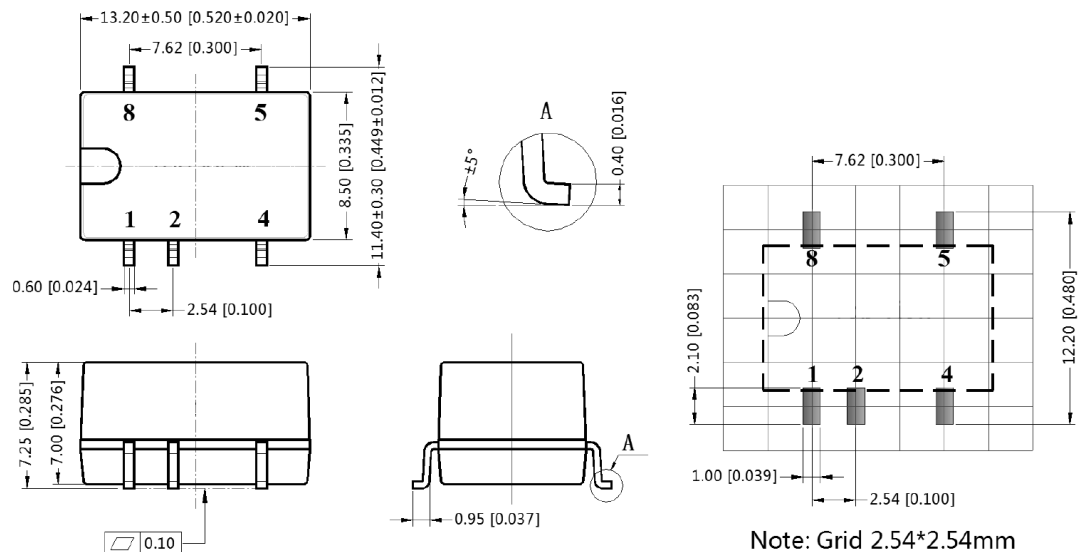
parameter	conditions/description	min	typ	max	units
dimensions	single output models: 13.20 x 8.50 x 7.25 [0.520 x 0.335 x 0.285 inch] dual output models: 15.24 x 8.50 x 7.25 [0.600 x 0.335 x 0.285 inch]				mm mm
case material	black flame-retardant and heat-resistant plastic (UL94V-0)				
weight			1.4		g

MECHANICAL DRAWING (SINGLE OUTPUT)

units: mm [inch]
tolerance: ± 0.25 [± 0.010]
pin section tolerance: ± 0.10 [± 0.004]

PIN CONNECTIONS	
PIN	Function
1	GND
2	Vin
4	0V
5	+Vout
8	NC

NC = No connect



Note: Grid 2.54*2.54mm
Recommended PCB Layout
Top View

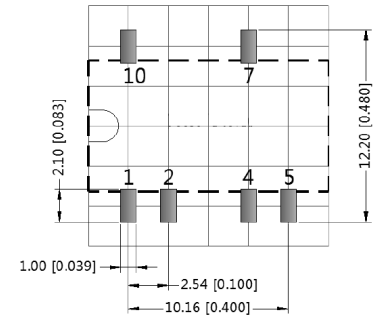
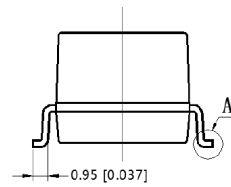
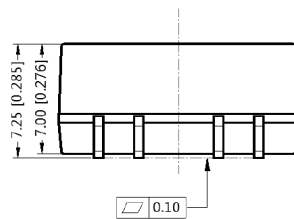
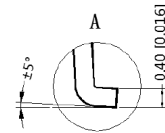
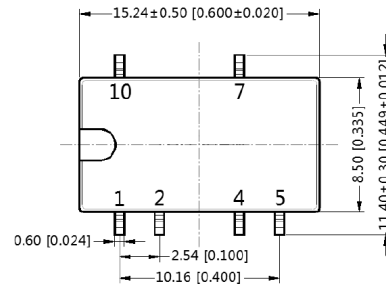
MECHANICAL DRAWING (DUAL OUTPUT)

units: mm [inch]

tolerance: $\pm 0.25[\pm 0.010]$ pin section tolerance: $\pm 0.10[\pm 0.004]$

PIN CONNECTIONS	
PIN	Function
1	GND
2	Vin
4	0V
5	-Vout
7	+Vout
10	NC

NC = No connect



Note: Grid 2.54*2.54mm
Recommended PCB Layout
Top View

APPLICATION CIRCUIT

If you want to further reduce the input and output ripple, a filter capacitor may be connected to the input and output terminals (Figures 1 & 2) provided that the capacitance is less than the maximum capacitive load of the model, otherwise start-up problems may be caused if the capacitance is too large.

Figure 1
Single Output Models

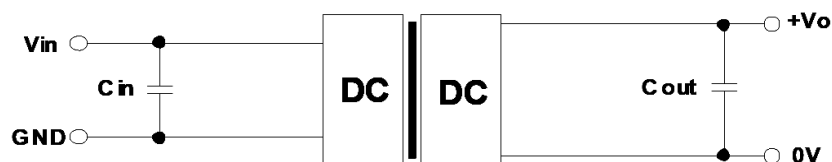


Table 1

Vin (Vdc)	Cin (μF)	Vo (Vdc)	Cout (μF)
5	4.7	3.3, 5	10
		9	4.7
		12	2.2
		15	1.0
		24	0.47

Figure 2
Dual Output Models



Table 2

Vin (Vdc)	Cin (μF)	Vo (Vdc)	Cout (μF)
5	4.7	±5	4.7
		±9	2.2
		±12, ±15, ±24	1

EMC RECOMMENDED CIRCUIT

Figure 3
Single Output Models

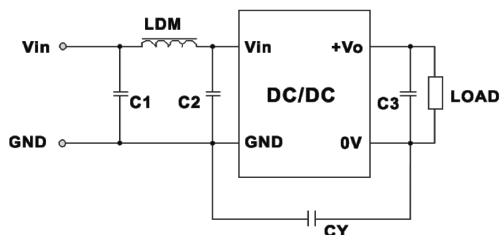


Figure 4
Dual Output Models

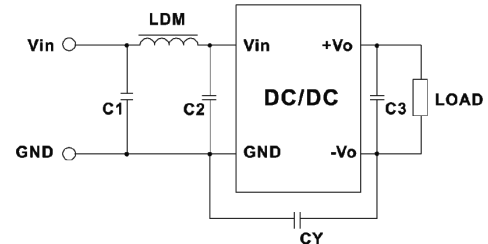


Table 3

Recommended External Circuit Components		
Vo (Vdc)	3.3, 5, 9	12, 15, 24
CY	--	1 nF / 2 kVdc
C3	refer to the Cout in Tables 1, 2	
C1, C2	4.7 μF / 25 V	4.7 μF / 25 V
LDM	6.8 μH	6.8 μH

PACKAGING (SINGLE OUTPUTS, TUBE)

units: mm

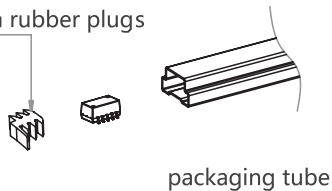
Tube Size: 15.5 x 10.5 mm

Inner Carton Size: 575 x 135 x 100 mm

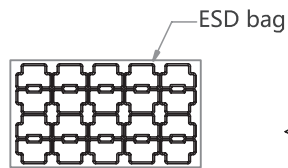
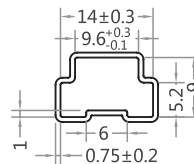
Outer Carton Size: 600 x 285 x 225 mm

Outer Carton QTY: 9,120 pcs

2 PCS of 10mm rubber plugs

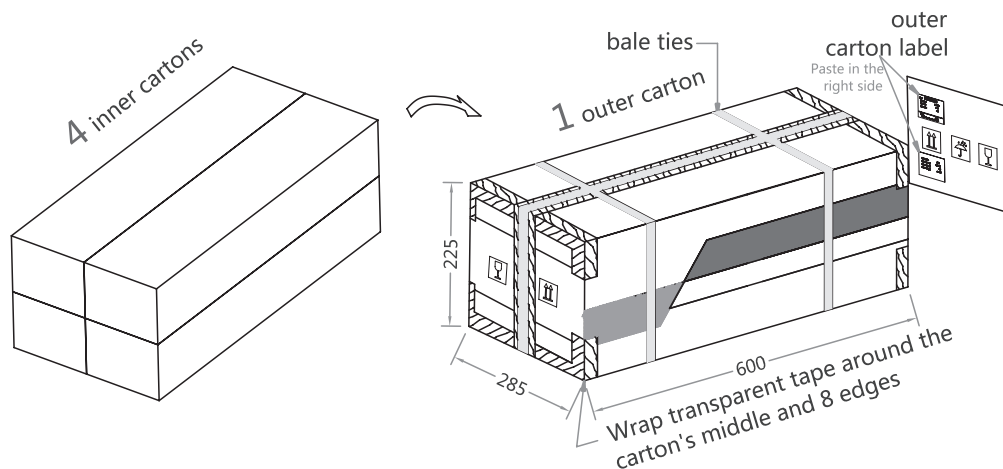
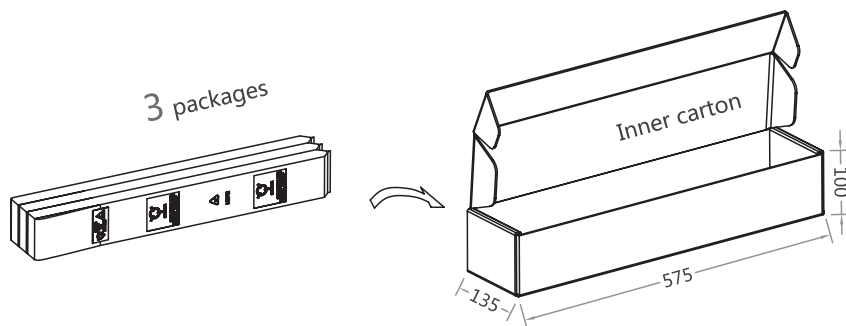
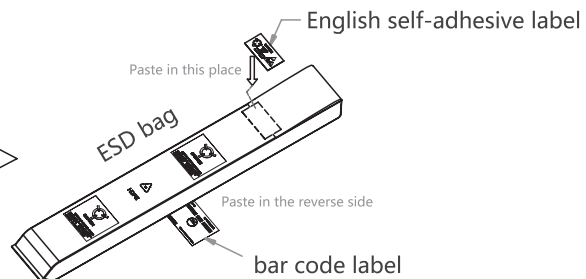


38 products in one packing tube



20 tubes in one ESD bag

Using rubber bands to tie the both ends of 20 tubes, then put into the ESD bag



PACKAGING (SINGLE OUTPUTS, TAPE AND REEL)

units: mm

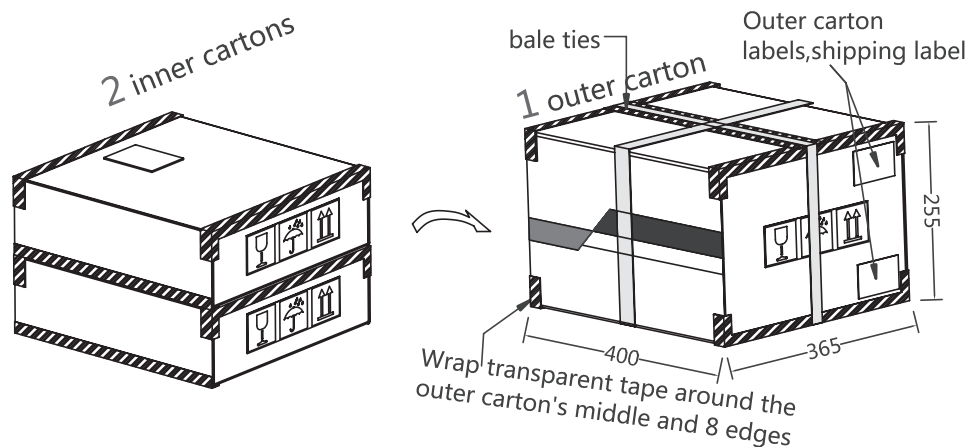
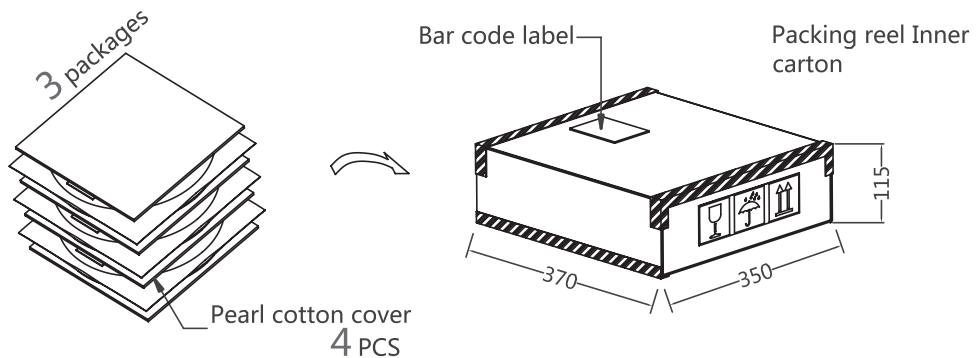
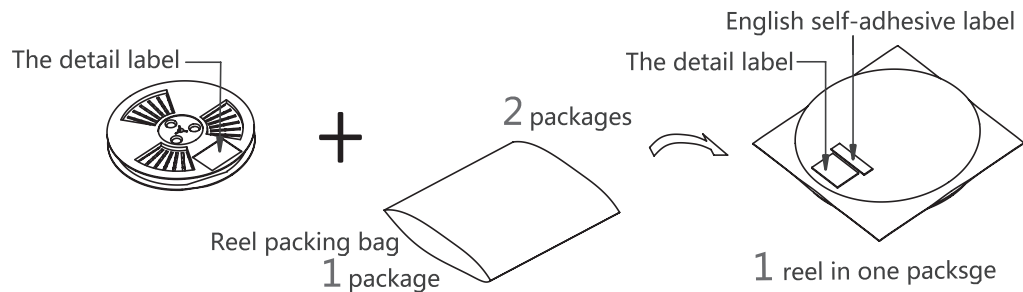
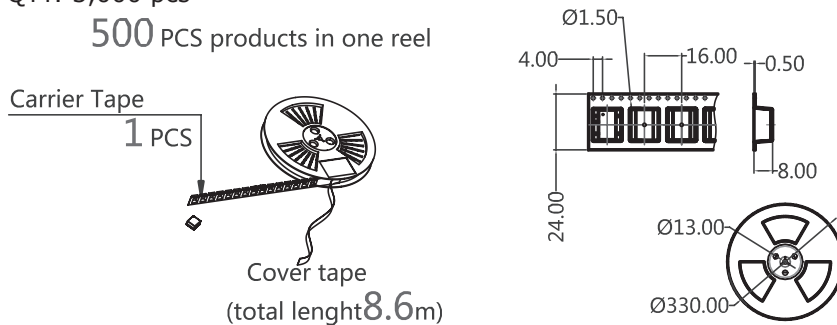
Reel Size: Ø330 mm

Inner Carton Size: 370 x 350 x 115 mm

Outer Carton Size: 400 x 365 x 255 mm

Outer Carton QTY: 3,000 pcs

500 PCS products in one reel



PACKAGING (DUAL OUTPUTS, TUBE)

units: mm

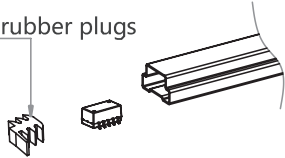
Tube Size: 15.5 x 10.5 mm

Inner Carton Size: 575 x 135 x 100 mm

Outer Carton Size: 600 x 285 x 225 mm

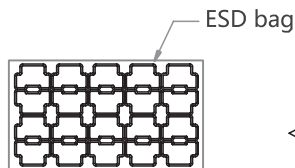
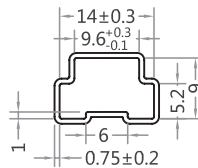
Outer Carton QTY: 7,680 pcs

2 PCS of 10mm rubber plugs



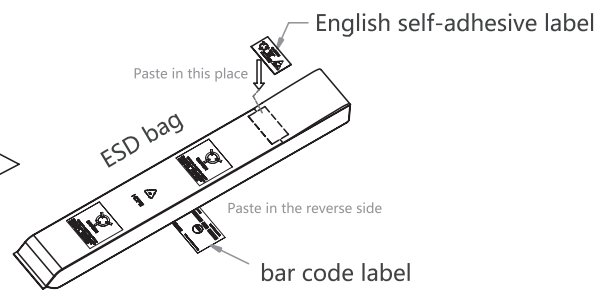
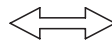
packaging tube

32 products in one packing tube

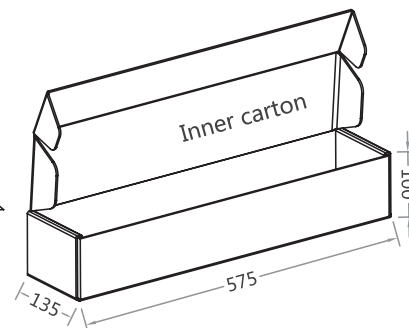
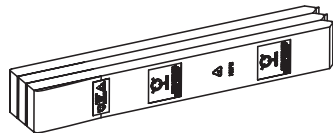


20 tubes in one ESD bag

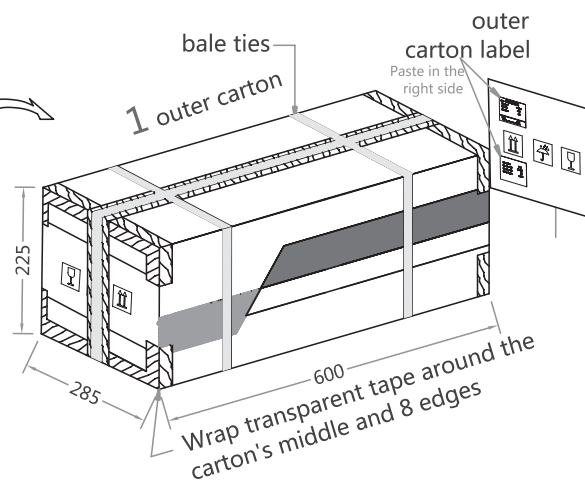
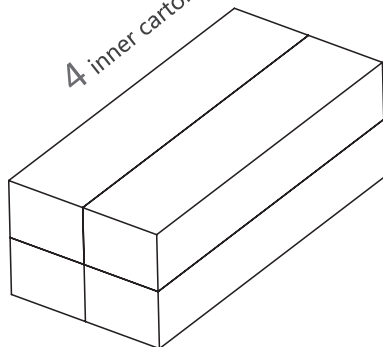
Using rubber bands to tie the both ends of 20 tubes, then put into the ESD bag



3 packages



4 inner cartons



PACKAGING (DUAL OUTPUTS, TAPE AND REEL)

units: mm

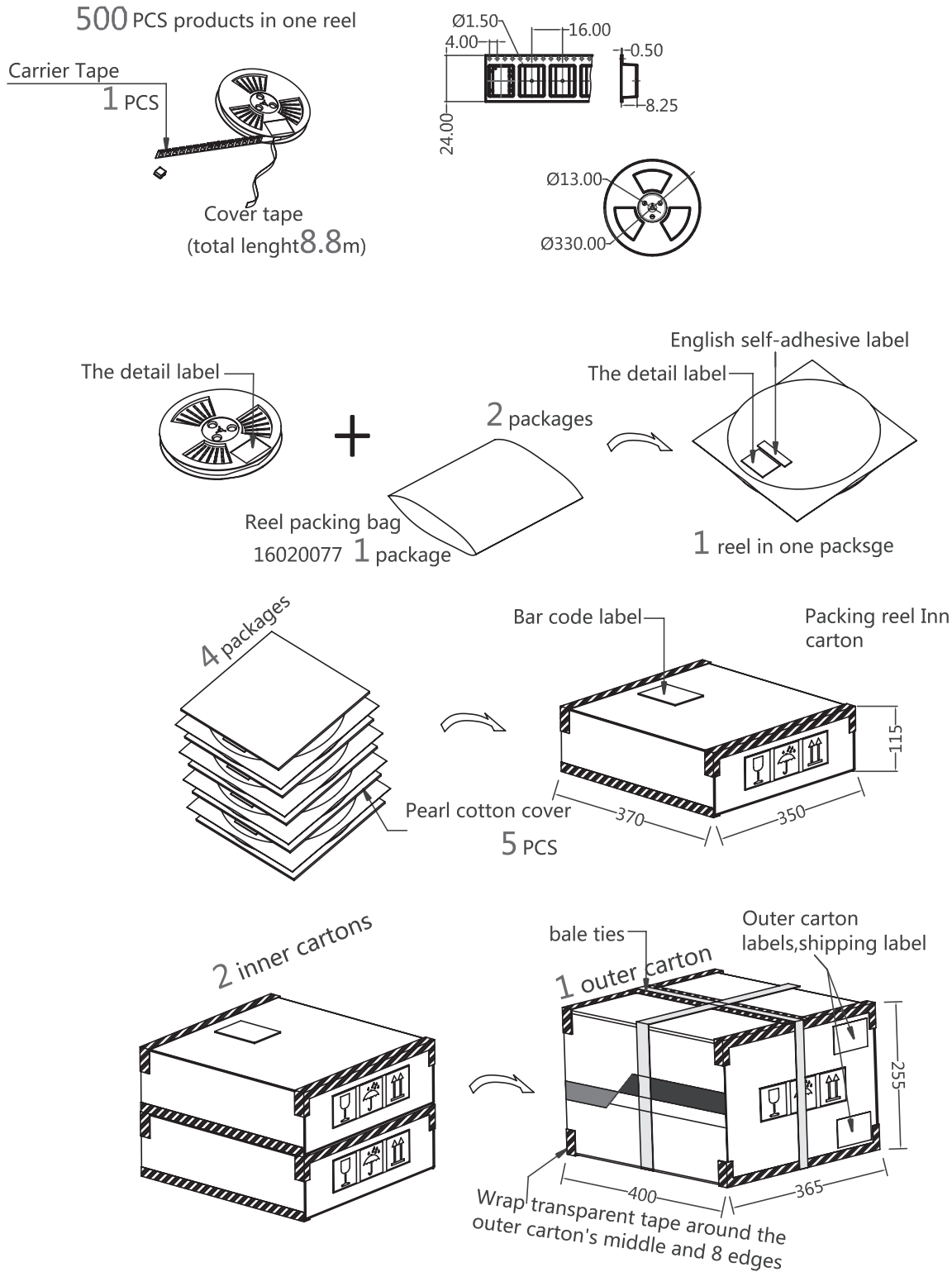
Reel Size: Ø330 mm

Inner Carton Size: 370 x 350 x 115 mm

Outer Carton Size: 400 x 365 x 255 mm

Outer Carton QTY: 4,000 pcs

500 PCS products in one reel



REVISION HISTORY

rev.	description	date
1.0	initial release	05/10/2019

The revision history provided is for informational purposes only and is believed to be accurate.

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