

## SPECIFICATION FOR APPROVAL

<p><b>CUSTOMER'S APPROVAL CHOP</b></p> <p style="margin-top: 20px;">Approval's condition: _____</p> <p style="margin-top: 10px;">Approved date: _____</p>
---

KINDLY RETURN A SET WITH YOUR COMPANY'S OFFICIAL  
STAMP ON APPROVAL OF THIS ITEM

**CUSTOMER'S NAME:** \_\_\_\_\_

**CUSTOMER'S MODEL NO. :** \_\_\_\_\_

**CUSTOMER'S PART NO. :** \_\_\_\_\_

**DESCRIPTION:** EP13

**Semitel'S MODEL NO. :** EP13-135

**VERSION:** D

**DATE:** 2018/12/10

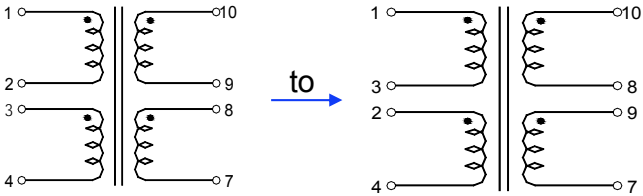
**Attachments:**

- Product Specification
- Sample Qty. :
- Test Data

Prepared By	Checked By	Approved By
Hebe Deng 2018/12/10	Liang Wong 2018/12/10	Alan Wong 2018/12/10

Semitel International Ltd.,	TEL: 886-2-86922121      FAX: 886-2-26483379
www.semitelint.com	12F, No.183, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 22145, Taiwan

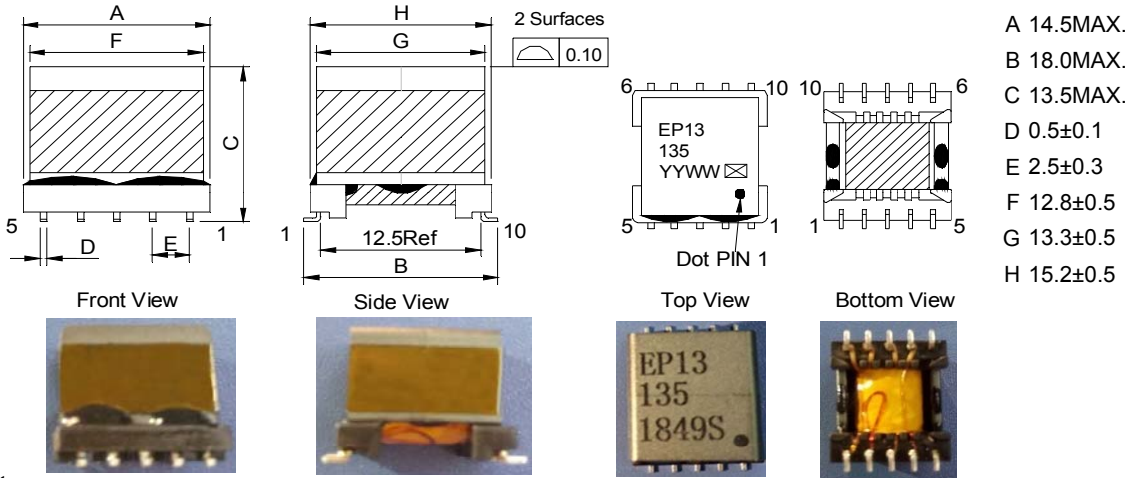
## Revision Record

Version	Revision Date	Revision For Items	Reason For Revision																																																																								
A	2015/8/31	New Revision	-																																																																								
B	2015/9/21	Connection change from chart 1 to chart 2 	Modify the Pin number of connection																																																																								
C	2015/12/24	Add the LCL test project	Customer request																																																																								
D	2018/12/10	1, Wire spec change from <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>No</th> <th>No of Pin</th> <th>No of Truns</th> <th>Wire Spec</th> </tr> </thead> <tbody> <tr><td>N1</td><td>1 - 3</td><td>32 Ts</td><td>e0.10mm*1P P180</td></tr> <tr><td>N2</td><td>2 - 4</td><td>32 Ts</td><td>e0.10mm*1P P180</td></tr> <tr><td>N3</td><td>10 - 8</td><td>16 Ts</td><td>e0.09mm*1P TIW-F</td></tr> <tr><td>N4</td><td>9 - 7</td><td>16 Ts</td><td>e0.09mm*1P TIW-F</td></tr> <tr><td>N5</td><td>1 - 3</td><td>32 Ts</td><td>e0.10mm*1P P180</td></tr> <tr><td>N6</td><td>2 - 4</td><td>32 Ts</td><td>e0.10mm*1P P180</td></tr> <tr><td>N7</td><td>10 - 8</td><td>16 Ts</td><td>e0.09mm*1P TIW-F</td></tr> <tr><td>N8</td><td>9 - 7</td><td>16 Ts</td><td>e0.09mm*1P TIW-F</td></tr> </tbody> </table> <span style="font-size: 2em;">to</span> <table border="1" style="display: inline-table;"> <thead> <tr> <th>No</th> <th>No of Pin</th> <th>No of Truns</th> <th>Wire Spec</th> </tr> </thead> <tbody> <tr><td>N1</td><td>1 - 3</td><td>32 Ts</td><td>e0.10mm*1P QPN180</td></tr> <tr><td>N2</td><td>2 - 4</td><td>32 Ts</td><td>e0.10mm*1P QPN180</td></tr> <tr><td>N3</td><td>10 - 8</td><td>16 Ts</td><td>e0.09mm*1P TIW-F(D75H)</td></tr> <tr><td>N4</td><td>9 - 7</td><td>16 Ts</td><td>e0.09mm*1P TIW-F(D75H)</td></tr> <tr><td>N5</td><td>1 - 3</td><td>32 Ts</td><td>e0.10mm*1P QPN180</td></tr> <tr><td>N6</td><td>2 - 4</td><td>32 Ts</td><td>e0.10mm*1P QPN180</td></tr> <tr><td>N7</td><td>10 - 8</td><td>16 Ts</td><td>e0.09mm*1P TIW-F(D75H)</td></tr> <tr><td>N8</td><td>9 - 7</td><td>16 Ts</td><td>e0.09mm*1P TIW-F(D75H)</td></tr> </tbody> </table>	No	No of Pin	No of Truns	Wire Spec	N1	1 - 3	32 Ts	e0.10mm*1P P180	N2	2 - 4	32 Ts	e0.10mm*1P P180	N3	10 - 8	16 Ts	e0.09mm*1P TIW-F	N4	9 - 7	16 Ts	e0.09mm*1P TIW-F	N5	1 - 3	32 Ts	e0.10mm*1P P180	N6	2 - 4	32 Ts	e0.10mm*1P P180	N7	10 - 8	16 Ts	e0.09mm*1P TIW-F	N8	9 - 7	16 Ts	e0.09mm*1P TIW-F	No	No of Pin	No of Truns	Wire Spec	N1	1 - 3	32 Ts	e0.10mm*1P QPN180	N2	2 - 4	32 Ts	e0.10mm*1P QPN180	N3	10 - 8	16 Ts	e0.09mm*1P TIW-F(D75H)	N4	9 - 7	16 Ts	e0.09mm*1P TIW-F(D75H)	N5	1 - 3	32 Ts	e0.10mm*1P QPN180	N6	2 - 4	32 Ts	e0.10mm*1P QPN180	N7	10 - 8	16 Ts	e0.09mm*1P TIW-F(D75H)	N8	9 - 7	16 Ts	e0.09mm*1P TIW-F(D75H)	Customer request
No	No of Pin	No of Truns	Wire Spec																																																																								
N1	1 - 3	32 Ts	e0.10mm*1P P180																																																																								
N2	2 - 4	32 Ts	e0.10mm*1P P180																																																																								
N3	10 - 8	16 Ts	e0.09mm*1P TIW-F																																																																								
N4	9 - 7	16 Ts	e0.09mm*1P TIW-F																																																																								
N5	1 - 3	32 Ts	e0.10mm*1P P180																																																																								
N6	2 - 4	32 Ts	e0.10mm*1P P180																																																																								
N7	10 - 8	16 Ts	e0.09mm*1P TIW-F																																																																								
N8	9 - 7	16 Ts	e0.09mm*1P TIW-F																																																																								
No	No of Pin	No of Truns	Wire Spec																																																																								
N1	1 - 3	32 Ts	e0.10mm*1P QPN180																																																																								
N2	2 - 4	32 Ts	e0.10mm*1P QPN180																																																																								
N3	10 - 8	16 Ts	e0.09mm*1P TIW-F(D75H)																																																																								
N4	9 - 7	16 Ts	e0.09mm*1P TIW-F(D75H)																																																																								
N5	1 - 3	32 Ts	e0.10mm*1P QPN180																																																																								
N6	2 - 4	32 Ts	e0.10mm*1P QPN180																																																																								
N7	10 - 8	16 Ts	e0.09mm*1P TIW-F(D75H)																																																																								
N8	9 - 7	16 Ts	e0.09mm*1P TIW-F(D75H)																																																																								
		2, The letter or number is added behind the date code.	This is used to identify and control the production lines of the product.																																																																								

Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		

# Product Specification

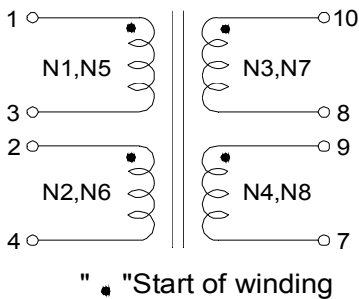
## 1.Physical Dimensions (Unit:mm)



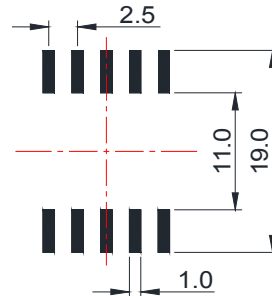
**Notes:**

- \*Terminals should be measured excluding the length of the soldered point.
- \*YY: Year Code; WW: Week Code
- \* :When making samples, S is used to represent the product is a sample.
- \* :Use different letters or numbers to represent the products are produced from different production lines .
- \*Marking type is laser printing, Dot indicates the location of pin#1.
- \*Coplanarity Requirement: Less than 0.10mm
- \*Triple insulated wires, or triple insulated wires and copper wires. are not in contact inside the transformer, crossing each other at an angle between 45 and 90 degree.
- \*ITDSC Model:SF13AD

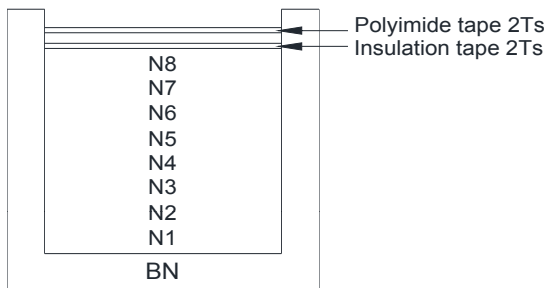
## 2.Connection



## 3.Recommended Pad Layout (Unit:mm)



## 4.Structure of Products



## 5.No of Turns & Wire Spec

No	No of Pin	No of Truns	Wire Spec
N1	1 - 3	32 Ts	ø0.10mm*1P QPN180
N2	2 - 4	32 Ts	ø0.10mm*1P QPN180
N3	10 - 8	16 Ts	ø0.09mm*1P TIW-F(D75H)
N4	9 - 7	16 Ts	ø0.09mm*1P TIW-F(D75H)
N5	1 - 3	32 Ts	ø0.10mm*1P QPN180
N6	2 - 4	32 Ts	ø0.10mm*1P QPN180
N7	10 - 8	16 Ts	ø0.09mm*1P TIW-F(D75H)
N8	9 - 7	16 Ts	ø0.09mm*1P TIW-F(D75H)

Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		

## Product Specification

### 6. Electrical Characteristics

\*Was passed ITU-T K.21 2003 Enhance Level 6KV.

\*Electrical specifications @ 25°C unless otherwise noted:

\*Surge standard: IEC61000-4-5

Items	Winding	Specifications	Test Conditions
Inductance	L(1-4) (tie2-3)	400uH±10%	at 10KHz,0.1Vrms
LK-Inductance	LK(1-4) (tie2-3, 7-8-9-10)	1.0uH MAX.	at 1MHz ,0.1Vrms
DCR	R(1-4) (tie2-3)	2.0Ω MAX.	at 25°C
DCR	R(10-7) (tie9-8)	1.65Ω MAX.	at 25°C
Turns Ratio	(1-4) : (10-7) (tie2-3,9-8)	2:1±2%	at 10KHz,0.1Vrms
Hi-Pot	(1-10) (tie2-3,9-8)	1875 VAC	at 0.5mA,1Sec
Interwinding Capacitance	(1-10)(tie2-3,9-8)	110pF MAX.	at 100KHz,0.1Vrms
THD	(1-4):(10-7) (tie2-3,9-8)	-90dB MAX.	at 25kHz 2Vac
LCL (ITU 993.2+3dB )		-41dB MAX.	at 12MHz
LCL (ITU 993.2+3dB )		-33dB MAX.	at 30MHz
Operating Temperature		-40°C ~ 85°C	
Safety Requirements		Supplementary Insulation	operating voltage up to 250V

### 7. Bill of Material

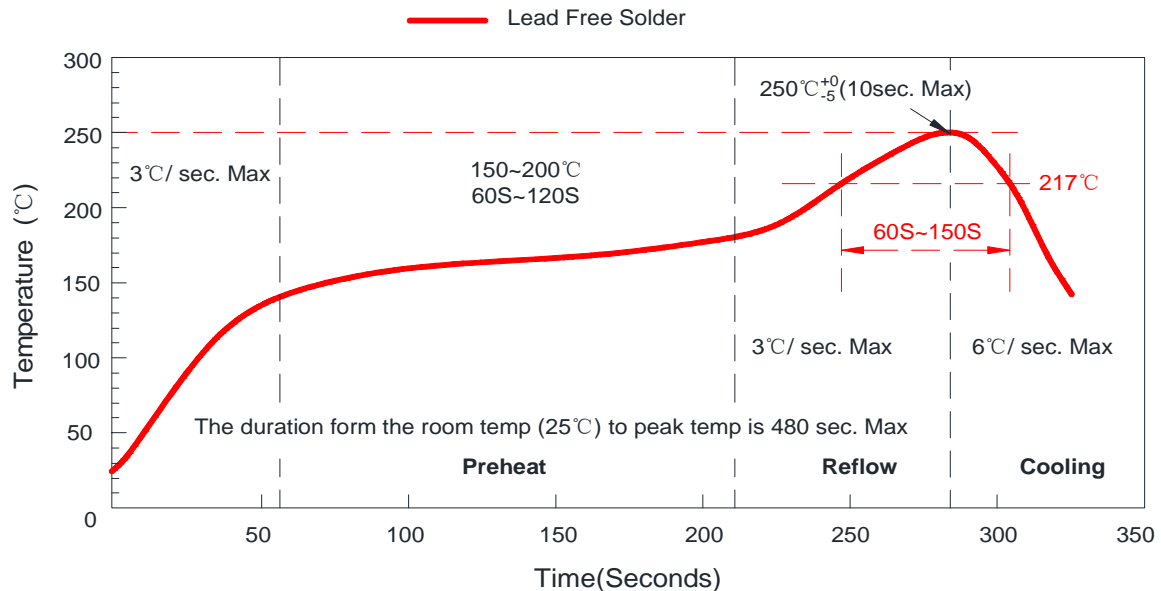
No	Items	Material Name	Manufacturer	Rating	UL File No	SGS File No
1	Core	FERRITE CORE A101	ACME or Equivalent	N/A	NIL	CE/2015/B2410A
OR	Core	FERRITE CORE EP13L JCH10S	FCRI or Equivalent	N/A	NIL	CANEC1712442501
2	Bobbin	PM-9630	SUMITOMO (SumiDurez) or Equivalent	150°C	E41429	10363385(2)
3	Copper Wire	enamelled wire QPN 180	SUNTEK or Equivalent	180°C	E234867	A2180011364102E
4	Wire	Single layer and multilayer insulated wire TIW-FXX	FLUO-TECH or Equivalent	155°C	E488352	CE/2015/24762
OR	Wire	Single layer and multilayer insulated wire FIW-F*	Yusheng or Equivalent	155°C	E332529	SHAEC1512279501
5	Insulation tape	YELLOW COLOR 1350F-1(b)	3M or Equivalent	130°C	E17385	CE/2015/A3854
6	Polyimide Tape	Brown adhesive plastic HN NC 0.025mm V-0	RUNSEA (RAYITEK) or Equivalent	180°C	E339977	CANEC1507074101
7	Epoxy	TH320	TIANHUAN or Equivalent	130°C	E257593	CANEC1417094801
8	Epoxy	EB-360	CHANGFENG or Equivalent	130°C	NIL	SHAEC1423099403
9	Solder	Lead free solder	HONGTAIZHOU or Equivalent	227°C	NIL	CANEC1510999213

Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		

## Product Specification

### 8.Recommended Temperature Conditions of Air Reflow Soldering

#### Test Solderability Temperature Profile



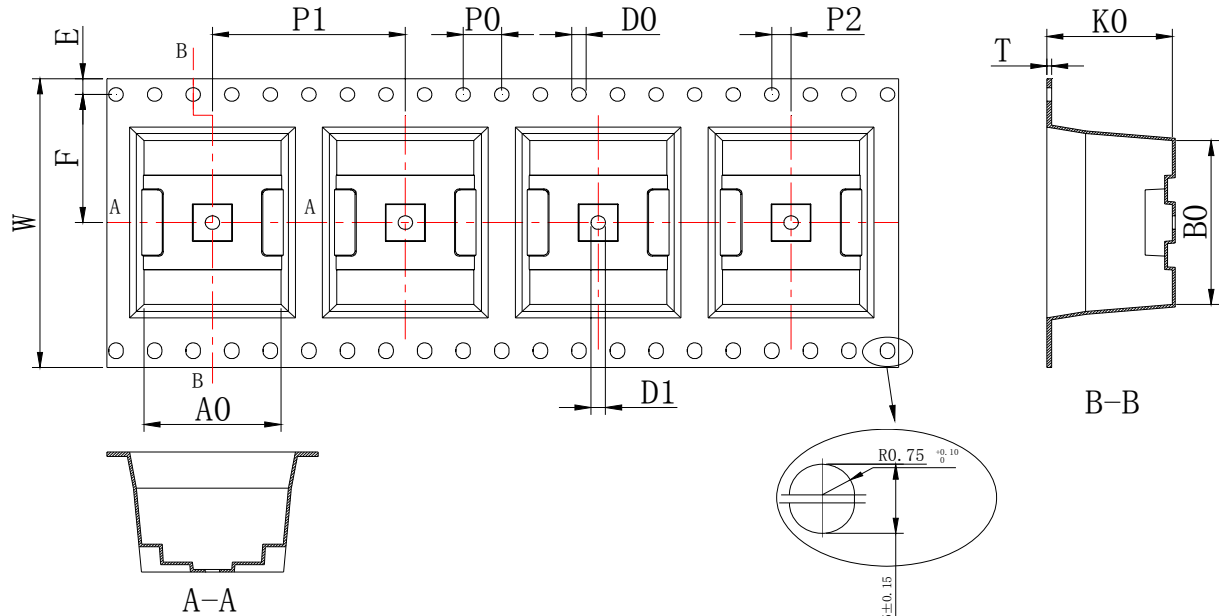
Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T <sub>Smax</sub> to T <sub>p</sub> )	3°C/Second Max.
Preheat -Temperature Min(T <sub>Smin</sub> ) -Temperature Max(T <sub>Smax</sub> )	150°C 200°C 60-180 Seconds
Time maintained above: -Temperature(T <sub>L</sub> ) -Time(t <sub>L</sub> )	217°C 60-150 Seconds
Peak/Classification Temperature(T <sub>p</sub> )	250°C
Time within 5°C of actual Peak Temperature(tp)	10 Seconds Max
Ramp-Down Rate	6°C/Second Max.
Time 25°C to Peak Temperature	8 Minutes Max.

Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		

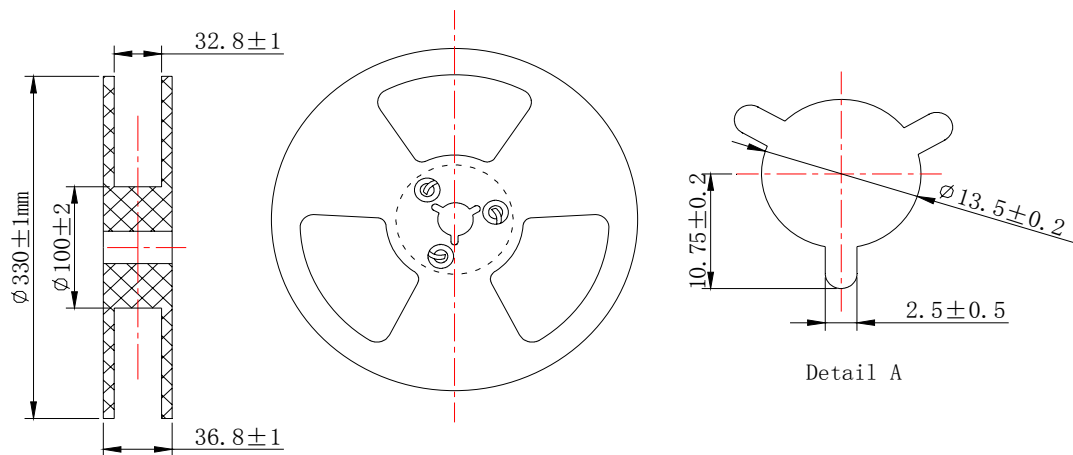
## Product Specification

### 9. Tape and Reel Dimensions (Unit: mm)

\*Packing information is according with EIA-481 standard, When W=32mm and other wider tapes that should have elongated sprocket holds on the other side.



ITEM	A0	B0	K0	P0	P1	P2
DIM	14.2±0.1	18.15±0.1	13±0.1	4.0±0.1	20.0±0.1	2.0±0.1
ITEM	W	T	E	F	D0	D1
DIM	32.0±0.3	0.5±0.05	1.75±0.1	14.2±0.1	$\phi 1.5^{+0.1}_0$	$\phi 2.0^{+0.1}_0$



Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		

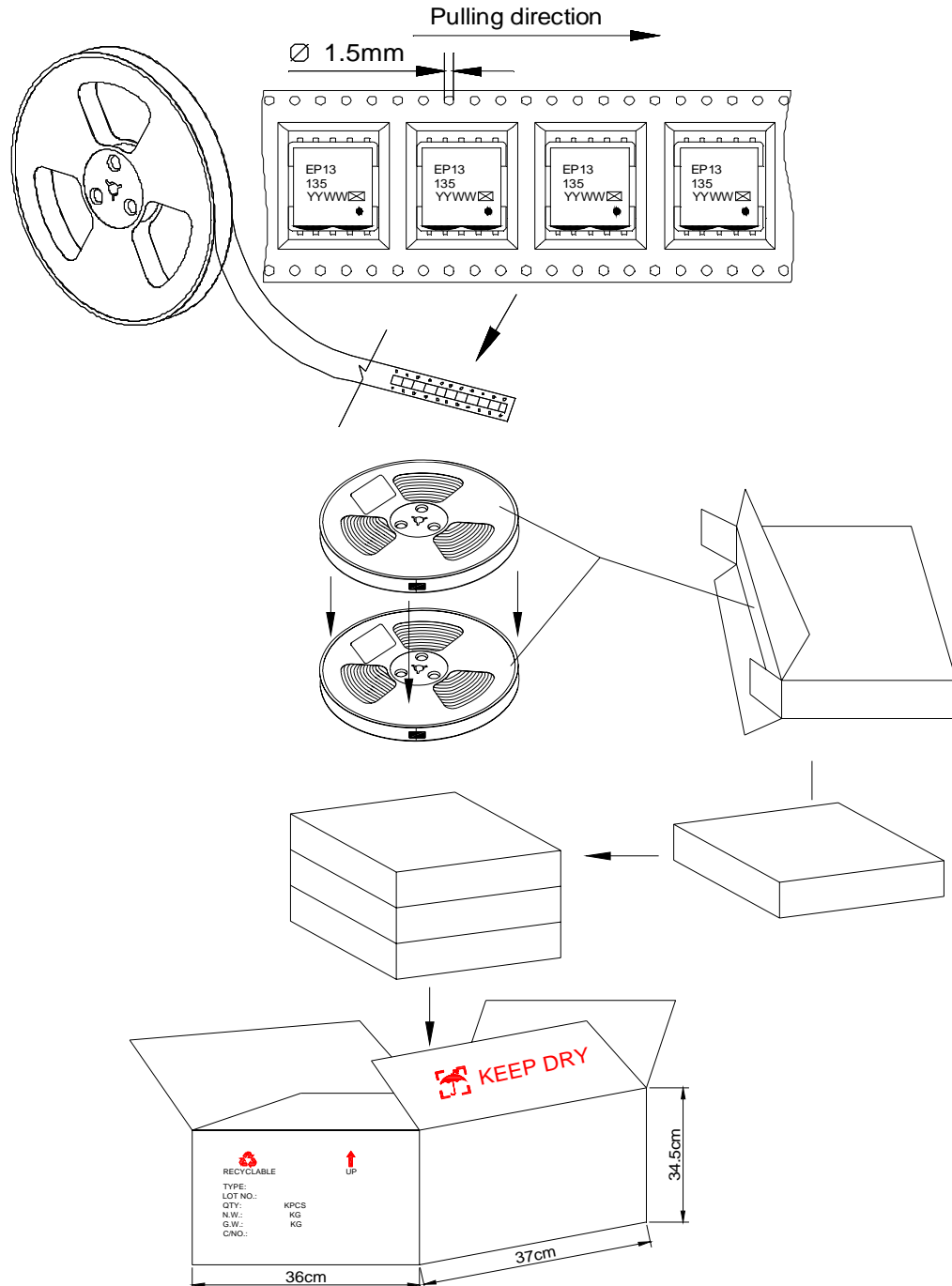
## Product Specification

### 10.Packing Request

\*Every roll of the carrier tape can contain 200pcs products.

\*Every small packing box contains two rolls of carrier tape. Total quantity: 400pcs.

\*Every carton box contains 3 small packing boxes. Total quantity: 1200pcs.



Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		

### Test Report

NO	Test Instruments									
	HP4284A	HP4284A	VR131		HP4284A	SYS2702A	HP 87510A		HP4284A	CS2670A
	Inductance	LK-Inductance	DCR		Interwinding Capacitance	THD	LCL (ITU 993.2+3dB )		Turns Ratio	Hi-Pot
	at 10KHz,0.1Vrms	at 1MHz,0.1Vrms	at 25°C	at 25°C	at 100KHz,0.1Vrms	at 25kHz 2Vac	at 12MHz	at 30MHz	at 10KHz,0.1Vrms	at 0.5mA,1Sec
	L(1-4) (tie2-3)	LK(1-4) (tie2-3, 7-8-9-10)	R(1-4) (tie2-3)	R(10-7) (tie9-8)	(1-10)(tie2-3,9-8)	(1-4):(10-7) (tie2-3,9-8)			(1-4) : (10-7) (tie2-3,9-8)	(1-10)(tie2-3,9-8)
	400uH±10%	1.0uH MAX.	2.0Ω MAX.	1.65Ω MAX.	110pF MAX.	-90dB MAX.	-41dB MAX.	-33dB MAX.	2:1±2%	1875 VAC
1	394.9	0.92	1.54	0.98	91.3	-94.2	-53.2	-46.1	PASS	PASS
2	391.1	0.92	1.55	0.98	92.3	-95.6	-51.4	-48.6	PASS	PASS
3	395.2	0.93	1.57	0.99	90.5	-94.3	-46.1	-47.5	PASS	PASS
4	397.9	0.93	1.56	0.99	89.3	-94.8	-48.9	-52.6	PASS	PASS
5	394.7	0.94	1.54	0.99	92.2	-94.4	-46.4	-49.2	PASS	PASS
MIN.	391.1	0.92	1.54	0.98	89.3	-95.6	-53.2	-52.6		
MAX.	397.9	0.94	1.57	0.99	92.3	-94.2	-46.1	-46.1		
AVG.	394.8	0.93	1.55	0.99	91.1	-94.6	-49.2	-48.8		
Result	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed

#### Overall Dimensions Test

Measurement Tools: Caliper (Unit:mm)

NO	A	B	C	D	E	F	G	H			
		14.5MAX.	18.0MAX.	13.5MAX.	0.5±0.1	2.5±0.3	12.8±0.5	13.3±0.5	15.2±0.5		
1	13.80	17.24	12.23	0.53	2.49	12.67	13.24	15.17			
2	13.88	17.17	12.25	0.54	2.49	12.74	13.23	15.18			
3	13.85	17.18	12.30	0.55	2.48	12.82	13.27	15.20			
4	13.91	17.23	12.28	0.52	2.50	12.74	13.19	15.18			
5	13.87	17.16	12.25	0.54	2.46	12.73	13.24	15.19			
MIN.	13.80	17.16	12.23	0.52	2.46	12.67	13.19	15.17			
MAX.	13.91	17.24	12.30	0.55	2.50	12.82	13.27	15.20			
AVG.	13.86	17.20	12.26	0.54	2.48	12.74	13.23	15.18			
Result	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed			

Semitel'S MODEL NO. :	EP13-135	CUSTOMER'S MODEL NO. :	
VERSION:	D	CUSTOMER'S PART NO. :	
DATE:	2018/12/10		