1 Scope

The present specifications shall apply to switching power supply IC SFA0001-VF-RP

2 Outline

Type	Semiconductor IC (Monolithic IC)
Structure	Plastic package (Transfer mold)
Features	Build-in current limit protection, thermal shutdown protection. Built-in error-amp helps eliminate components at sensing stage such as shunt regulator.

3 Absolute maximum ratings

3－1 Absolute maximum ratings（Ta=25℃）

Parameter	Symbol	Ratings	Unit
OCP terminal voltage	VOCP	−6～+6	V
SS terminal voltage	VSS	−0.3～+9	V
FB terminal voltage	VFB	−0.3～+6	V
Input voltage for control part	VCC	0～36	V
Phase compensation terminal voltage	VCOMP	−0.3～+6	V
Frequency setting terminal voltage	VFREQ	−0.3～+6	V
Drive terminal peak current	IDRV(peak)	−540mA～+270mA	mA
Drive terminal DC current	IDRV(DC)	−180mA～+90mA	mA
Power dissipation	PD	1.2（※1）	W
Junction temperature	Tj	−40～150	℃
Storage temperature	Tstg	−40～150	℃

（※1）Mounted on glass epoxy board (The dimension of PCB : 42mm×32mm×1mmt)

3－2 Recommended operating conditions

Parameter	Symbol	Ratings	Unit
Input voltage for control part	VCC	6～24	V
Switching frequency	FOSC	20～200	kHz

4 Electrical characteristic

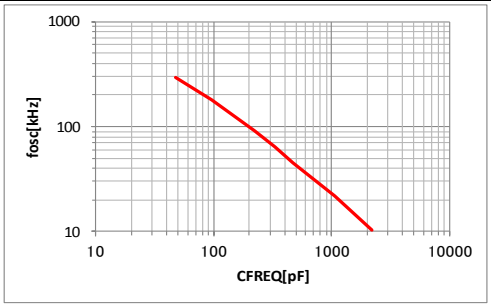
4－1 Electrical characteristics (VCC=14V, Ta=-40～125℃) (*1)

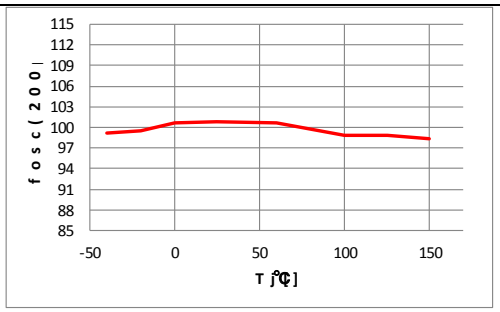
Parameter	Symbol	Ratings MIN	Ratings TYP	Ratings MAX	Unit	Conditions
Power supply Start-up Operation						
Operation start voltage	VCC(ON)	4.9	5.1	5.3	V	FB=0V、SS=0V、OCP=0V、FREQ=200pF VCC=0V→14V
Operation stop voltage	VCC(OFF)	4.4	4.6	4.8	V	FB=0V、SS=0V、OCP=0V、FREQ=200pF VCC=14V→0V
Circuit current in operation	ICC(ON)	1.8	2.8	4	mA	FB=0V、SS=0V、OCP=0V、FREQ=200pF、VCC=14V
Circuit current in non-operation	ICC(OFF)	0.3	0.6	1	mA	FB=0V、SS=0V、OCP=0V、FREQ=200pF、VCC=4.8V
Normal Operation						
SS terminal high threshold voltage	VHSS	1.9	2	2.1	V	FB=0V、OCP=0V、FREQ=0V、VCC=14V、SS=0V→2.5V
SS terminal low threshold voltage	VLSS	0.9	1	1.1	V	FB=0V、OCP=0V、FREQ=0V、VCC=14V、SS=2.5V→0V
SS terminal voltage hysteresis width	Δ VSS	0.9	1	1.1	V	VHSS-VLSS
SS terminal outflow current	Isrc(SS)	11	15	19	uA	FB=0V、OCP=0V、FREQ=0V、VCC=14V、SS=0.9V
SS terminal inflow current	Isnk(SS)	13	17	21	uA	FB=0V、OCP=0V、FREQ=0V、VCC=14V、SS=2.1V
Switching frequency	fosc(200p)	85	100	115	kHz	FB=0V、SS=0V、OCP=0V、FREQ=200pF、VCC=14V
FREQ terminal outflow current	Isrc(FREQ)	27	30	33	uA	FB=0V、OCP=0V、SS=0V、VCC=14V、FREQ=0.9V
FREQ terminal inflow current	Isnk(FREQ)	75	86	95	uA	FB=0V、OCP=0V、SS=0V、VCC=14V、FREQ=2.1V
Oscillation circuit high threshold voltage	VHF	1.9	2	2.1	V	FB=0V、OCP=0V、SS=0V、VCC=14V、FREQ=0V→2.5V
Oscillation circuit low threshold voltage	VLF	0.9	1	1.1	V	FB=0V、OCP=0V、SS=0V、VCC=14V、FREQ=2.5V→0V
Maximum on-duty width	Dmax	70	73	78	%	FB=0V、SS=0V、OCP=0V、FREQ=200pF、VCC=14V
Slope compensation rate	SLP	2.1	2.5	2.9	mV/%	FB=0V、SS=2.5V、COMP=1.3V、FREQ=470p、VCC=14V、OCP=0V→1V
Feedback voltage	VFB	2.45	2.5	2.55	V	SS=0V、OCP=0V、FREQ=0V、VCC=14V FB=0V→2.5V
Drive voltage	Vdrive	7.6	8.3	9	V	FB=0V、OCP=0V、SS=0V、VCC=14V FREQ＝3V・1pluse
Minimam drive voltage	Vdrive(min)	4			V	FB=0V、OCP=0V、SS=0V、VCC≧6V FREQ＝3V・1pluse
Minimum on-time	Ton(min)		400		ns	FB=3V、SS=0V、OCP=1V、FREQ=200pF、VCC=14V
Protection Operation						
Leading edge blanking time	Tbw	(70)	100	(150)	ns	(*2)
OCP threshold voltage	VOCP	0.46	0.5	0.54	V	FB=0V、SS=0V、VCC=14V FREQ＝3V・1pluse、OCP=0V→1V
OLP delay time	TOLP	32	42	52	ms	FB=0V、OCP=0V、SS=10nF、VCC=14V FREQ＝3V・1pluse
Drive stop threshold voltage	VST	3.5	4	4.5	V	FB=0V、OCP=0V、VCC=14V FREQ＝3V・1pluse、SS=0V→5V
Thermal shutdown operating temperature	TjH (TSD)	150	165		℃	(*2)
Thermal shutdown release temperature	TjL (TSD)		150		℃	(*2)

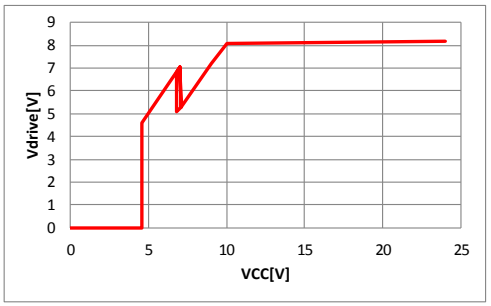
*1 The ratings at Ta=-40℃ to 125℃ shall be treated as a design value.
The ratings of devices shall be checked at -30℃,25℃,125℃ at Outgoing Inspection.

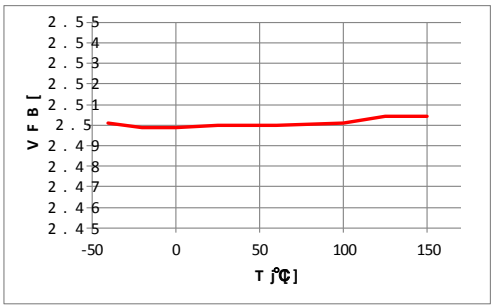
*2 The rating of devices shall be treated as a design value.

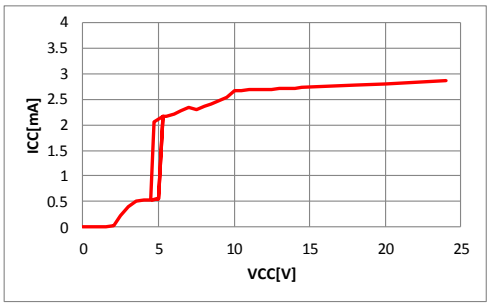
4－2 Typical characteristics(Ta=25℃)



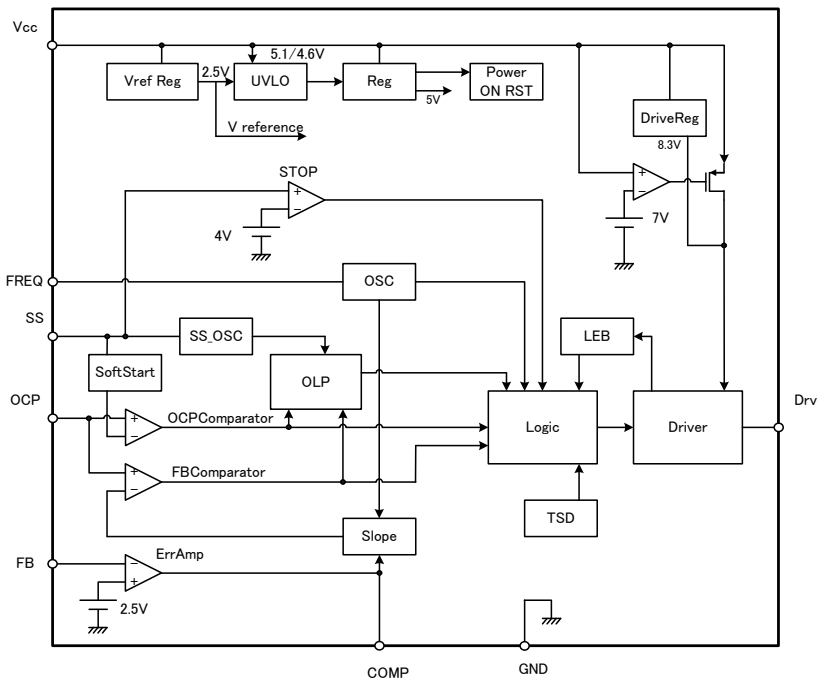




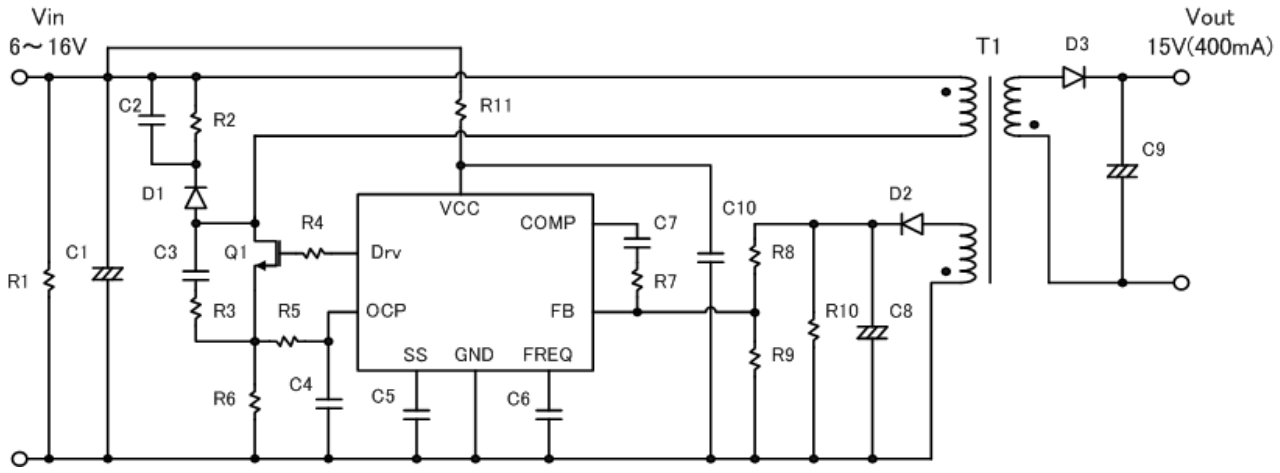




5 Block diagram



6 Standard connection



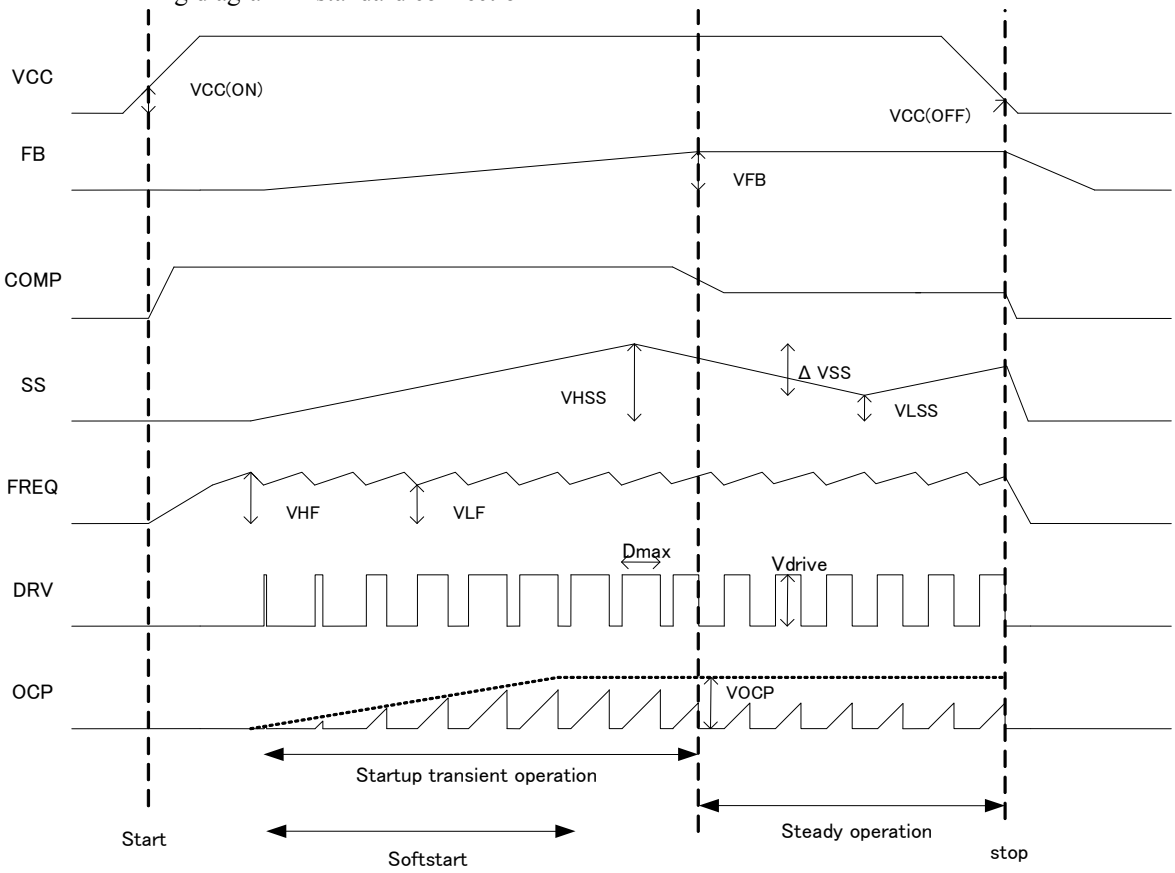
※Since the switching noise caused by Q1 may affect the operation of an IC ,appropriate design for peripheral circuits is required to prevent the malfunction of an IC by adding snubber circuit and /or filter circuit.

7 Pins function description

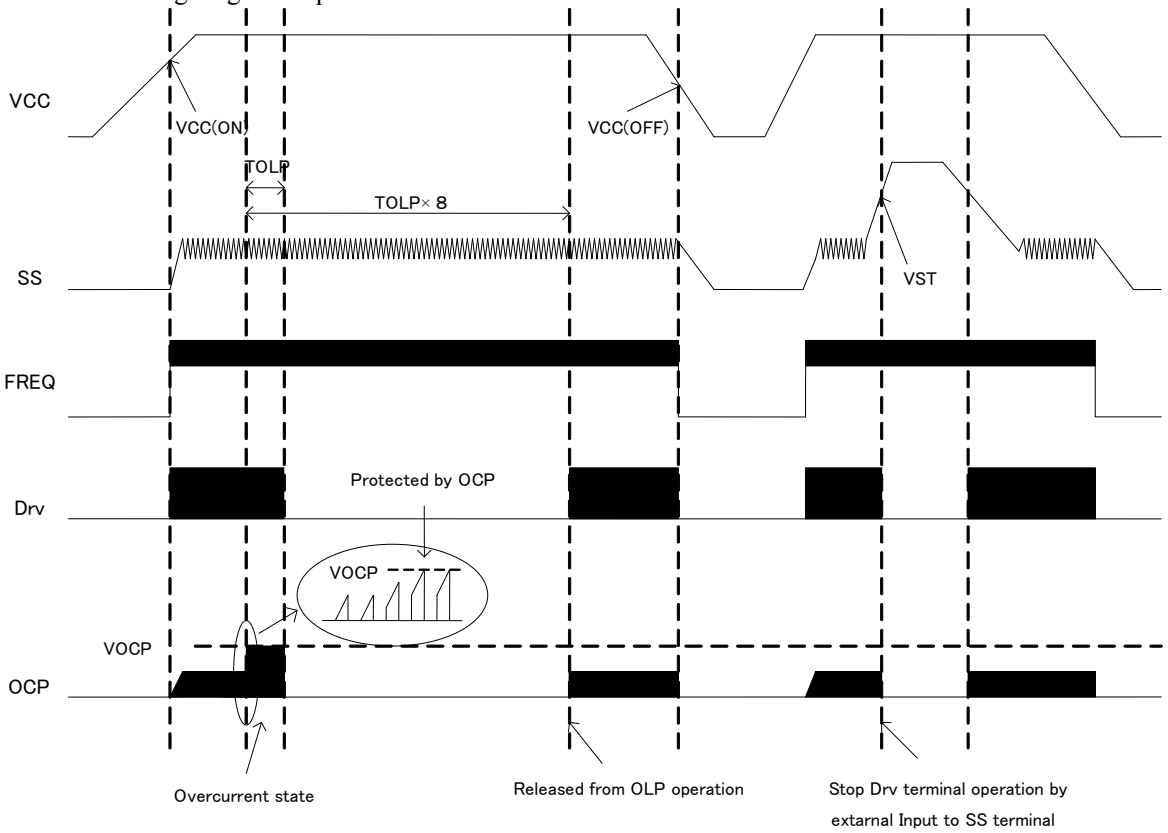
Terminal No	symbols	Descripton
1	VCC	Power supply terminal
2	FB	Feedback terminal
3	GND	Ground terminal
4	SS	Soft start terminal
5	FREQ	Frequency setting terminal
6	COMP	Phase compensation terminal
7	Drive	Gate drive terminal
8	OCP	Over current protection terminal

8 Timing diagram

8 － 1 Timing diagram in standard connection

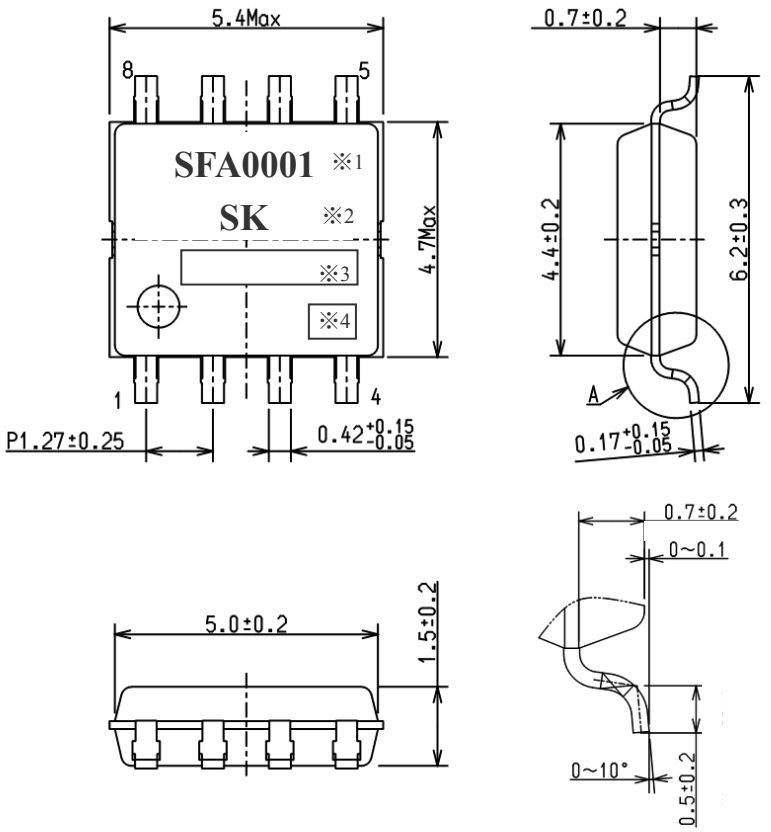


8 － 2 Timing diagram in protection



9 Package information

9 － 1 Package type, physical dimensions and material



※1：Part Number
※2：Logo Mark
※3：Lot Number
1st letter：The Last digit of year
2nd letter：Month
（1 to 9 Jan. to Sept.,O for Oct. N for Nov. D for Dec.）
3rd & 4th letter：day
01～31 Arabic Numeral
※4：Administer number

Dimensions in mm

Lead is solder-plated
(except cutting surface of lead)

Zoom of A part

Terminal No	symbols	Descripton
1	VCC	Power supply terminal
2	FB	Feedback terminal
3	GND	Ground terminal
4	SS	Soft start terminal
5	FREQ	Frequency setting terminal
6	COMP	Phase compensation terminal
7	Drive	Gate drive terminal
8	OCP	Over current protection terminal

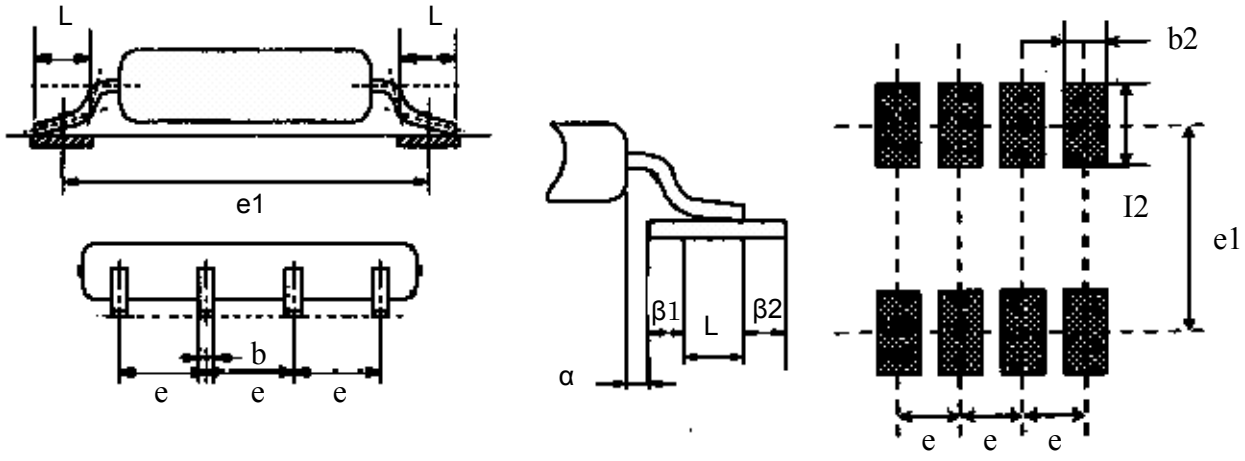
9 － 2 Appearance

The body shall be clean and shall not bear any stain, rust or flaw.

9 － 3 Marking

The type number and lot number shall be legitimately marked in order not to be erased easily.

The example of the solder pattern



Symbol	Dimensions(mm)
e1	5.72
e	1.27
α	0.2 or more
β1	0.2～0.5
β2	0.2
L	0.6
b	0.42
b2	0.76
I2	L+β1+β2

There are reference value that are according with the EIAJ standards. (ED-7402-1)

SOP8 Taping specifications for packing

1. Outline

This specification specifies packaging spec. for Sanken electric co., SFA0001-VF-RP as well as its related matters. Shipping is only taping as to SOP8.

2. Part name indication

This followings specifies part name for taping spec.

2.1 Part name indication method

"Part name" - VF

2.2 IC direction in carrier tape pocket

SFA0001-VF-RP is [VF type] .

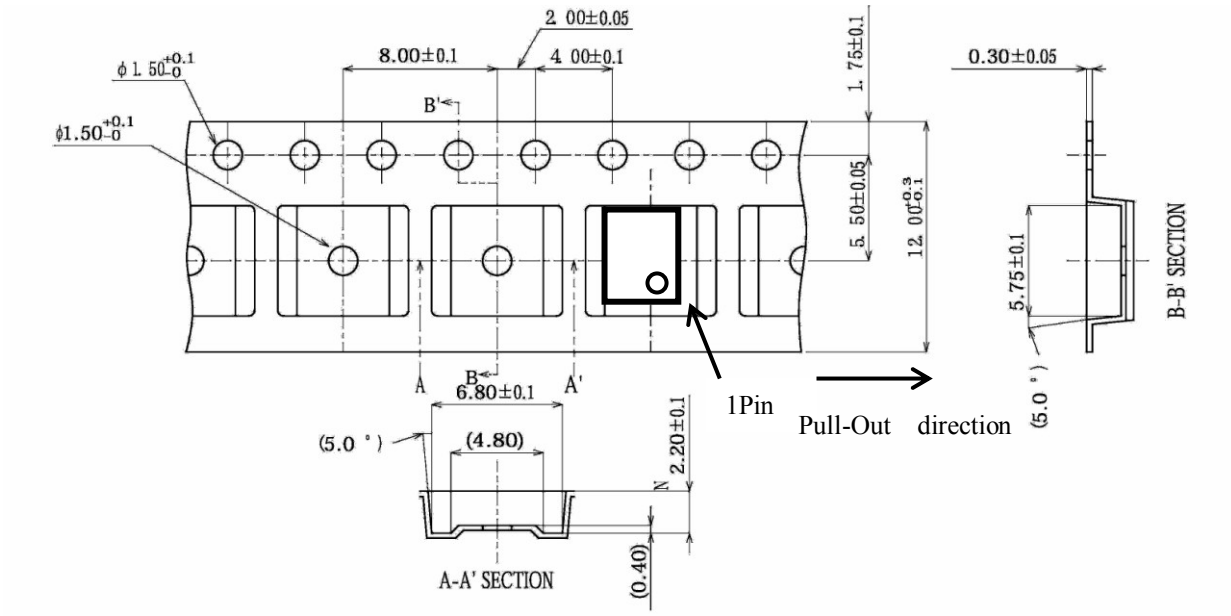
End of "Part name" is [- VB]: 1 pin of IC is facing to tape roll-in direction.

End of "Part name" is [- VF]: 1 pin of IC is facing to tape pull-out direction.

3. Embossed taping specifications

3.1 Taping type and physical dimensions

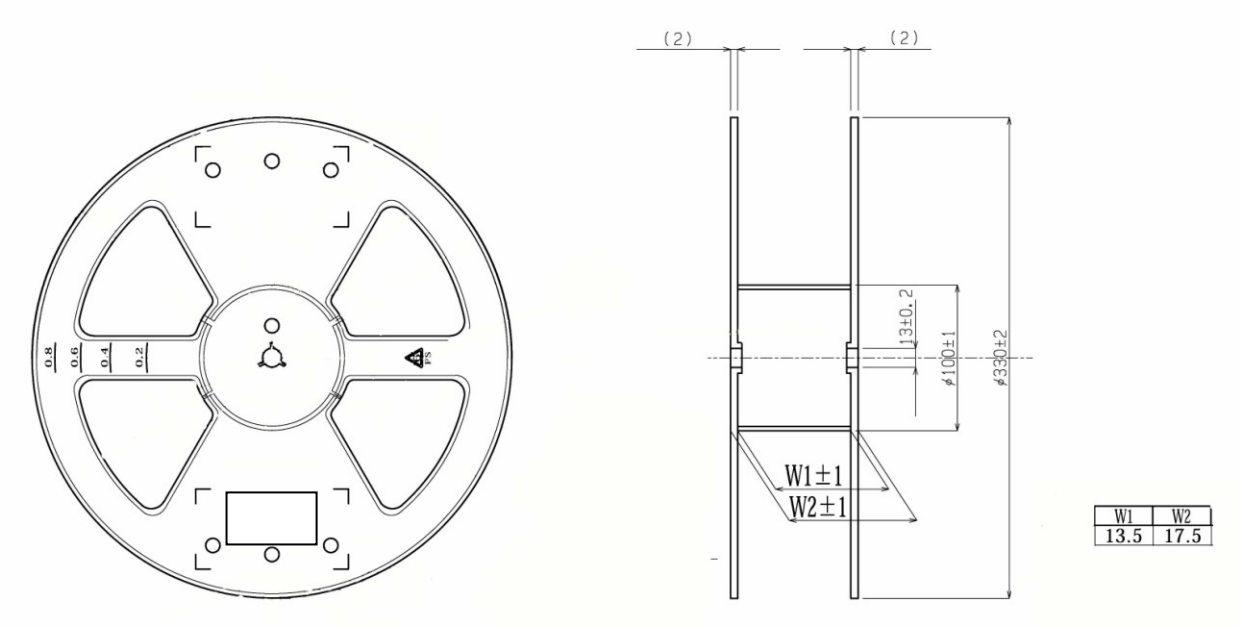
This carrier tape is treated antistatic treatment.



Material: Emboss

Note
1) The radius (R) is 0.3mm max
2) Cumulative tolerance of 10 pitches of the sprocket hole is ± 0.2mm

3.2 Reeling type and physical dimensions
This reel is made of plastic with antistatic treatment.



A label shall be put on a side of flange. A label has part number including a direction for unreeling, quantity, and lot number.

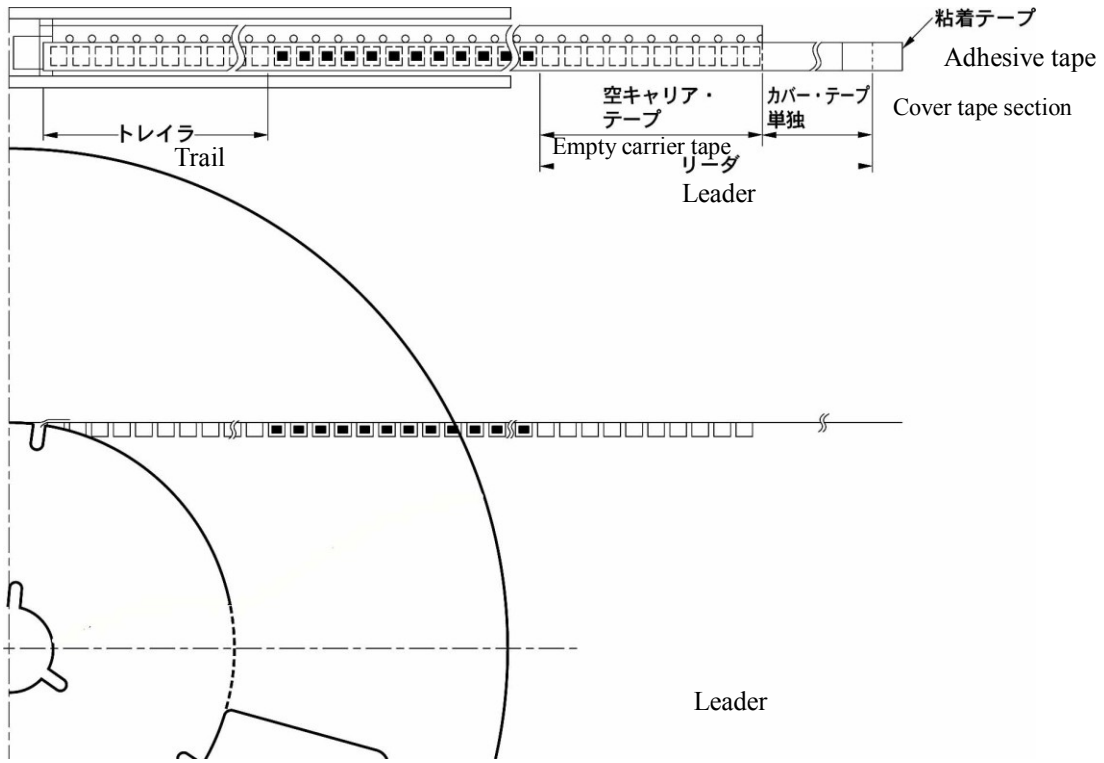
Note
Reel Material : Plastic

Label content

NAME
LOT No.
AMOUNT P・C・S

SANKEN ELECTRIC CO.,LTD

3.3 Reeling specifications (Leader/Trail)



Leader

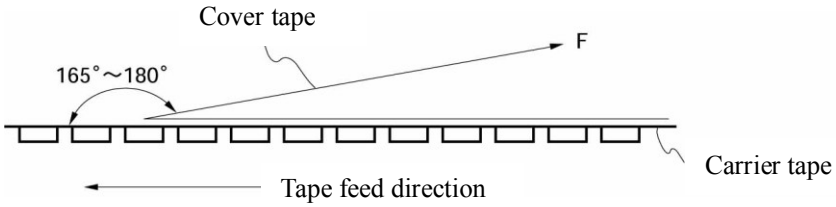
Cover tape section	MIN	100mm
Empty carrier tape	MIN	320mm
Leader Section	MIN	420mm

Trail

Empty carrier tape	MIN	80mm

3.4 Strength of taping seal

Detachment Strength of cover tape 0.1～1.0N
Tear away angle: 165～180° Detachment speed: 300±10mm／min



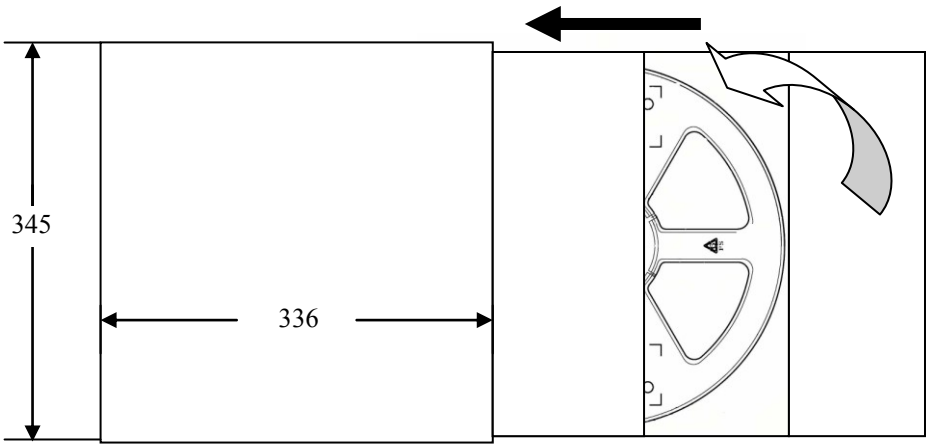
3.5 Missed parts on tape

The number of missed parts cannot exceed 0.2% of total parts on the tape. Also, missing of sequential parts must not happen.

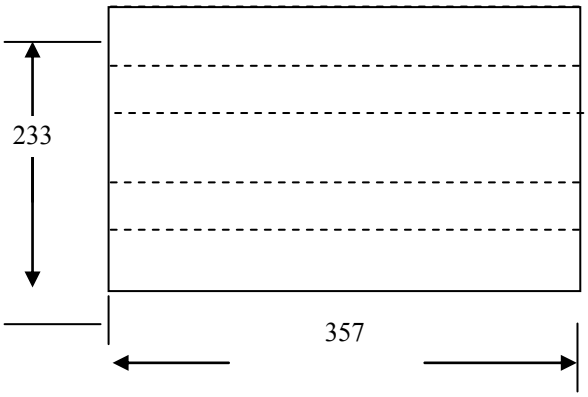
4. Packaging
   4.1 The number of parts per a reel: 3000 parts (MAX)
   4.2 Indication of part name and quantity
   A label shows part number, quantity, and lot number.

   4.3 Outer packaging of reel
   Reel is put into moisture barrier bag and seal with desiccant and put into outer box.

5. Packing Dimensions and Appearance (A box is made of card boards.
The following dimensions are reference value.)



Dimensions of a box: H336mm x V345mm x T 40mm



Size of a box contains 5 small boxes: 357mm x 357x 233mm

6. Storage

In order to avoid failures during picking and mounting of devices by degradation of taping peel strength and to maintain mounting quality, the box shall be stored under temperature +5~+40 degree C and humidity 40%~60%. Parts shall be used within 3 months from the shipping date with unpacked state.

After unpacking the bag, the parts shall be stored under temperature 30℃ and humidity 60% and used within 168hrs.
Moisture sensitivity level (MSL): Level 3

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  In addition, it should be noted that since power devices or IC's including power devices have large self-heating value, the degree of derating of junction temperature (Tj) affects the reliability significantly.
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