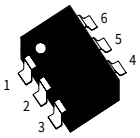
I. NEWLY DESIGNED AND DEVELOPED PROGRAMMABLE PRECISION REFERENCES

The SH4312 is an integrated Chip of Shunt regulator (TO-92 or SOT-23 Type) and general small signal amplifier (SOT-23Type). The SH4312 is designed and developed to perfectly embody all electrical feature and all function of shunt regulator and signal amplifier on one chip.
For your references, please see the each technical information of "Shunt Regulator and Signal amplifier"

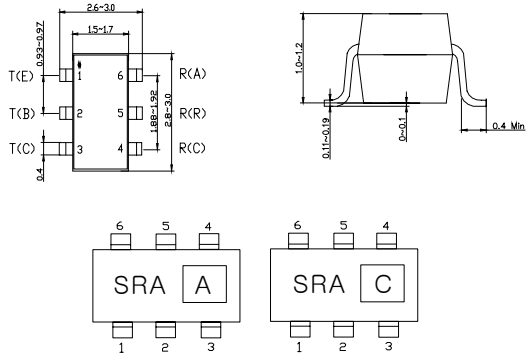
SOT-26/SC-74



1 TR - Emitter
2 TR - Base
3 TR - Collector
4 REG - Cathode
5 REG - Reference
6 REG - Anode

* Dimension : 2.9 * 1.6 * 1.1
* Pin : 6
* Packing 1 : Reel Packing
* Packing 2 :

SOT-26/SC-74



1.Technical features and functions
-.Technical features and functions : To meet shunt regulator and signal amplifier and refer each technical sheets of regulator and amplifier
-.Features itself
*.To integrate one chip of shunt regulator and signal amplifier
*.To develop TO-92 type to SMD type from the manual insertion
*.Modification is possible to meet your requirements after checking your circuit diagram

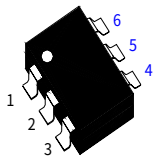
2.Product classification is defined by tolerances of the specified voltage and current. According to this, we have produced two types with "0.5% or 1.0%" tolerance. Please refer and consider it when you select the product to meet your final products.
※.Model : SRA-A is 1.0 % tolerance SRA-C is 0.5% tolerance

3.Application
* All products operating on the specified voltage and currents.
* Main application
- Mobile Phone Charger(CDMA Type)
- Mobile Phone (GSM Type)
■ The specified current and voltage is enlarged
■ The specified current and voltage can be revised to exchange the external resister.
- MP3
- Anther charging system on small current and voltage

II. PROGRAMMABLE PRECISION REFERENCES

It is included three-terminal adjustable shunt regulator with specified thermal stability. The output voltage may be set to any value between VREF(approx. 2.5V)and 36V with two external resistors. This device has a typical output impedance of 0.2Ω. Active output circuitry provides a very sharp turn-on characteristic, making this device excellent replacement for zener diodes in many application.

SOT-26/SC-74



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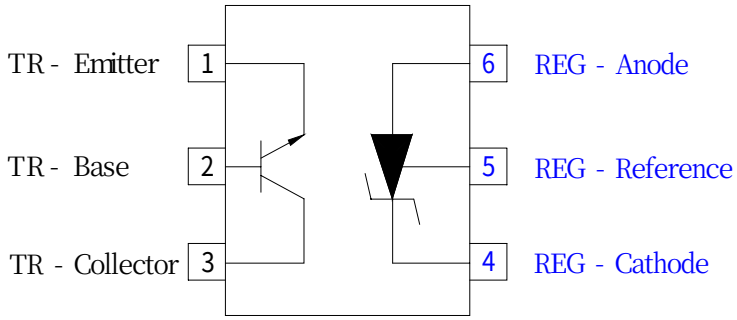
* Dimension : 2.9 * 1.6 * 1.1
* Pin : 6
* Packing 1 : Reel Packing
* Packing 2 :

FEATURES

- Equivalent Full Range Temperature Coefficient 50ppm/℃
- Temperature Compensated For Operation Over Full Rate Operating Temperature Range
- Adjustable Output Voltage
- Fast Turn-on Response
- Sink Current Capability 1mA to 100mA
- Low (0.2Ω Typ.) Dynamic Output Impedance
- Low Output Noise

Device	Operating temp	Package
SH4312,A,C	0~+70℃	SOT-26

BLOCK DIAGRAM



RECOMMENDED OPERATING CONDITIONS

Characteristic	Symbol	Min.	Max.	Unit.
Cathode Voltage	VKA	VREF	36	V
Cathode Current	1K	1	100	mA

ABSOLUTE MAXIMUM RATINGS

(Full operating ambient temperature range applies unless otherwise noted.)

Characteristic	Symbol	Rating	Unit
Cathode voltage	VKA	37	V
Continuous cathode current range	1k	-100 ~ 150	mA
Reference input current range	IREF	-0.05 ~ 10	mA
Junction temperature	Tj	150	℃
Operating temperature	Topr	0 ~ 70	℃
Storage temperature	Tstg	-65 ~ 150	℃
Total power dissipation	PD	700	mW

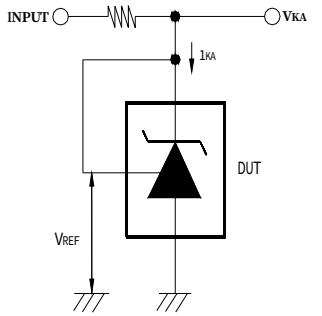
ELECTRICAL CHARACTERISTICS

(Ta=25℃, unless otherwise specified)

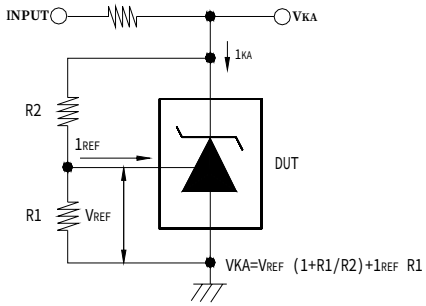
Characteristic	Symbol	Test condition		SH4312-A			SH4312-C			Unit
				Min	Typ	Max.	Min	Typ	Max.	
Reference input voltage	VREF	VKA=VREF,1K=1mA		2,470	2,495	2,520	2,482	2,495	2,508	V
Deviation of reference input voltage over full temperature range	△VREF/△T	VKA=VREF,1K=10mA Ta=Full range			4.5	17		4.5	17	mV
Ratio of change in Reference input voltage to the change in cathode voltage	△VREF/△1KA	1K=10mA	△VKA=10V-VREF		-1.4	-2.7		-1.4	-2.7	mV/V
			△VKA=36V-10V		-1.0	-2.0		-1.0	-2.0	
Reference input current	IREF	1K=10mA, R1=10KΩ, R2=∞			1.5	4		1.5	4	μA
Deviation of reference input current over full temperature range	△IREF	1K=10mA, R1=10kΩ, R2=∞ Ta=Full Range			0.4	1.2		0.4	1.2	
Minimum cathode current for regulation	Imin	VKA=VREF			0.4	1.0		0.4	1.0	mA
Off-state cathode current	Ioff	VKA=36V, VREF=0			0.1	1.0		0.1	1.0	μA
Dynamic impedance	ZKA	VKA=VREF, 1K=1mA~00mA, f≤1KHZ			0.2	0.5		0.2	0.5	Ω

TEST CIRCUITS

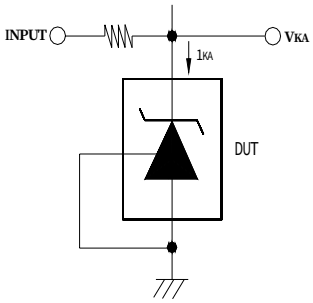
Flg. 1 Test Circuit for Vka=Vref



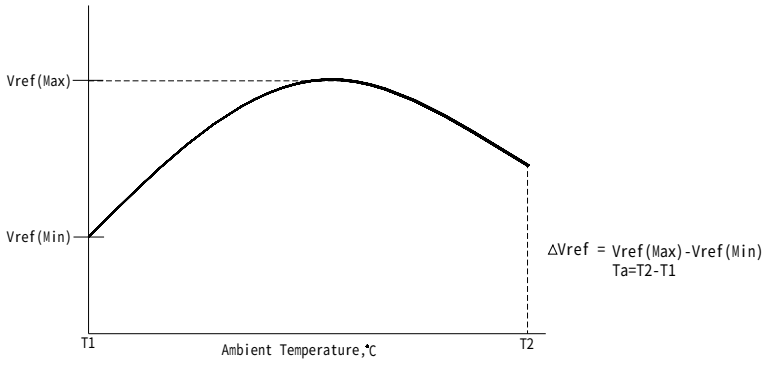
Flg. 2 Test Circuit for Vka≥Vref



Flg. 3 Test Circuit for 1KA(off)



Note1) The deviation parameter △Vref is defined as the differences between the maximum and minimum values obtained over the full operating ambient temperature range that applies.



The aveage temperature coefficient of the Reference input voltage, α Vref. is defined as:

$$\alpha \text{ Vref.} = \frac{PPM}{^{\circ}C} = \frac{\left(\frac{\triangle Vref}{Vref@25^{\circ}C}\right)\times 10^{6}}{\triangle Ta} = \frac{\triangle Vref \times 10^{6}}{\triangle Ta(Vref@25\ ^{\circ}C)}$$

α Vref. is can be positive or negative depending on whether Vref.Min. or Vref.Max. occurs at the lower ambient temperature.

Example : △Vref=8㎷ and slope is positive,Vref at 25℃=2,495V, △Ta=70℃

$$\alpha \text{ Vref.} = \frac{0.008 \times 10^{6}}{70 \times (2.495)} = 45.8 \text{ ppm/}^{\circ}C$$

Note2) The dynamic impedance Zka is defined as:

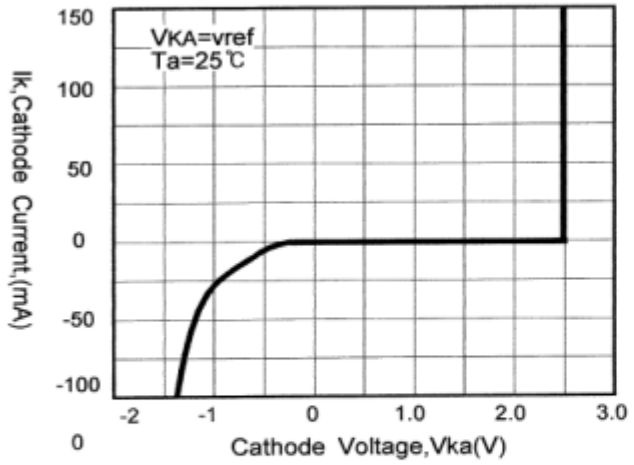
$$|Zka| = \frac{\triangle VkA}{\triangle Ik}$$

When the device is programmed with two external resistors, R1 an R2,(Refer ot Fig.2) the total dynamic impedance of the circuit is defined as:

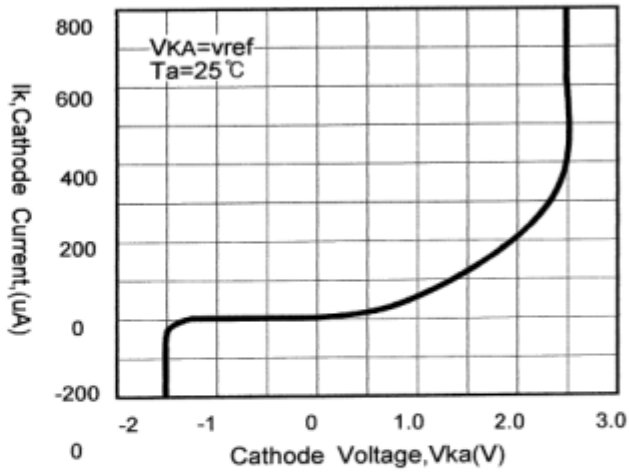
$$|Zka'| = |Zka|\left(1+ \frac{R1}{R2}\right)$$

TYPICAL PERFORMANCE CHARACTERISTICS

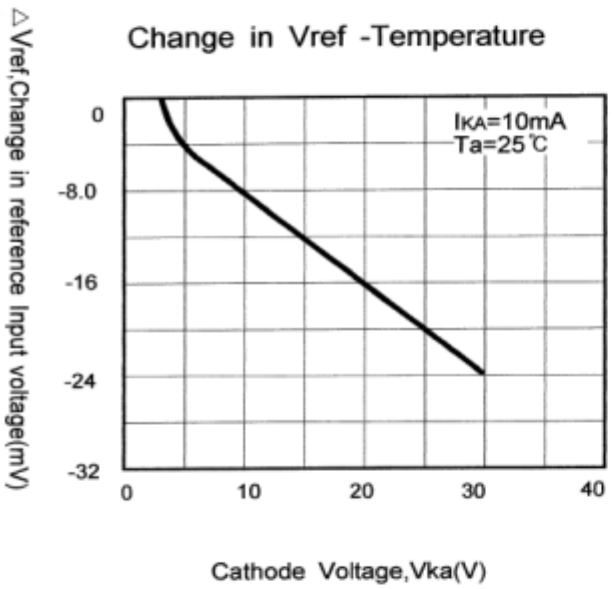
Cathode Current-Cathode Voltage



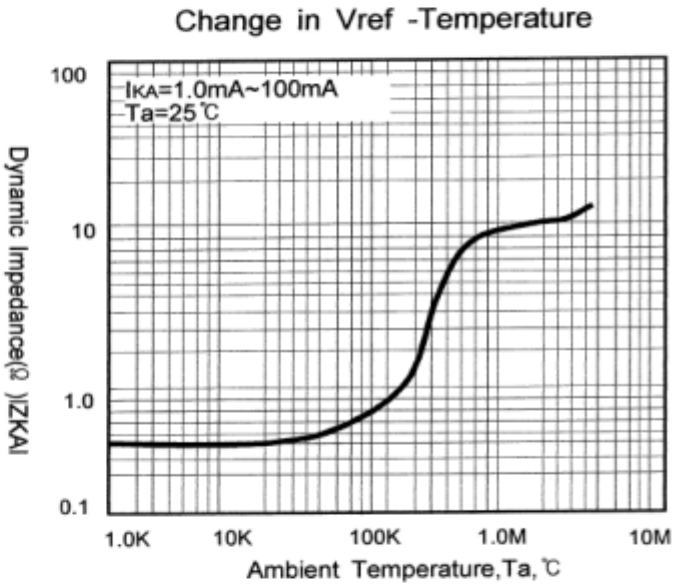
Cathode Current-Cathode Voltage



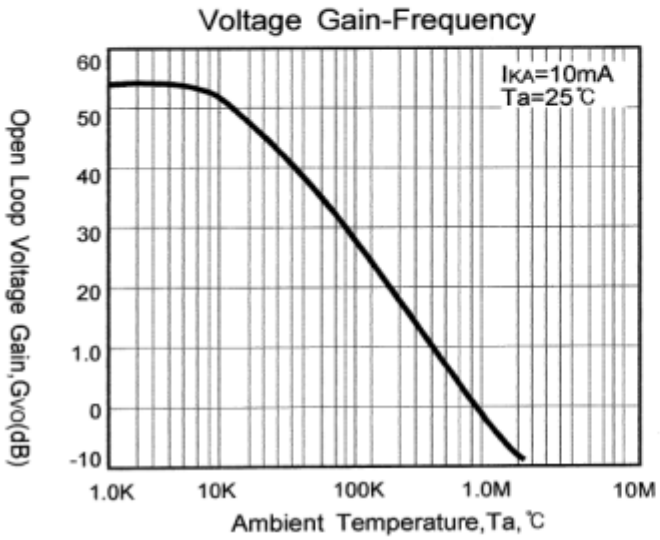
Change in Vref -Temperature



Change in Vref -Temperature



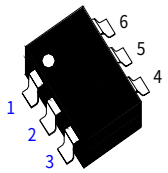
Voltage Gain-Frequency



III. GENERAL SMALL SIGNAL AMPLIFIER
LOW NOISE AMPLIFIER

- Low output Capacitance: Cob=2pF(Typ)
- Low Collector Saturation Voltage
- Low Noise: NF=10dB(Max)

SOT-26/SC-74



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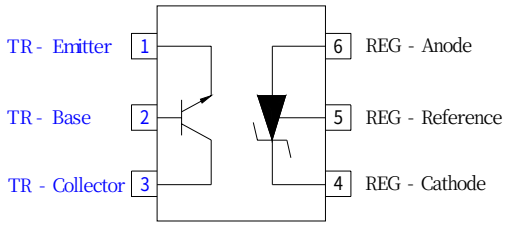
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

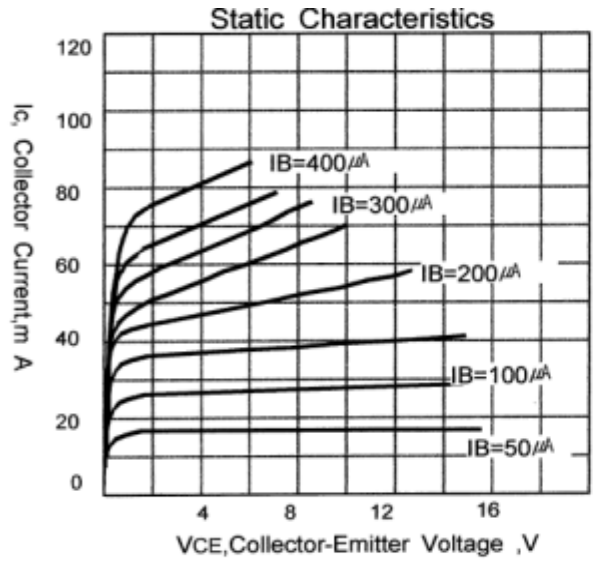
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	VCBO	50	V
Collector-Emitter Vollage	VCEO	50	V
Emitter-Base Voltage	VEBO	5	V
Collector Current	lC	100	mA
Collector Power Dissipation	Pc	200	mW
Junction Temperature	Tj	125	℃
Storage Temperature	Tstg	-55~+125	℃

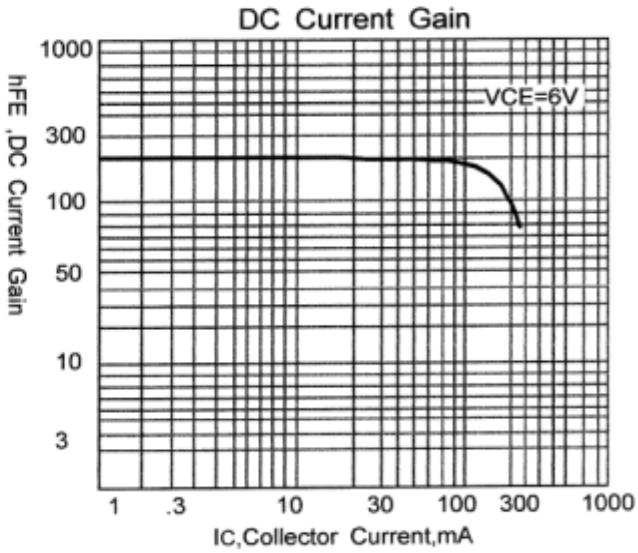
ELECTRICAL CHARACTERISTICS (Ta=25℃, unless otherwise specified)

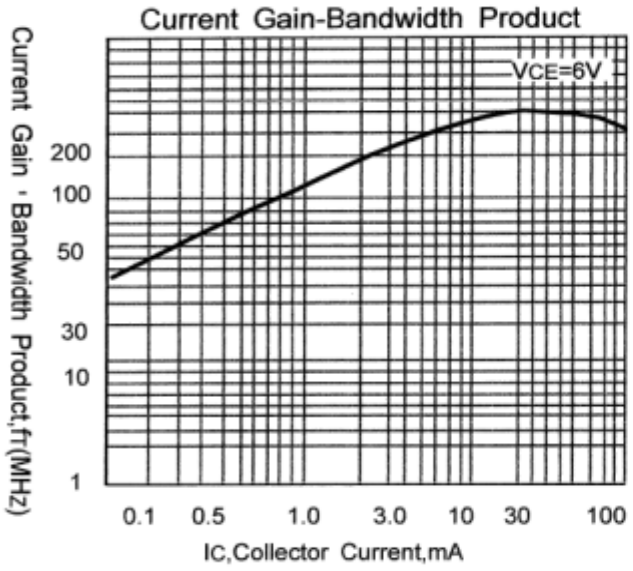
Characteristic	Symbol	Test condition	Min	TYP	MAX	Unit
Collector-base breakdown Voltage	BVCBO	lC=50μA, lE=0	50			V
Collector-emitter breakdown Voltage	BVCEO	lC=1mA, lB=0	50			V
Emitter-base breakdown Voltage	BVEBO	lE=50μA, lC=0	5			V
Collector cut-off current	lCBO	VCB=30V, lE=0			100	nA
Emitter cut-off current	lEBO	VBE=4V, lC=0			100	nA
DC current gain	*hFE	VCE=6V, lC=1mA	70		240	
Collector-emitter saturation Voltage	VCE(sat)	lC=50mA, lB=5mA			0.4	V
Output Capacitance	Cob	VCB=12V,f=1MHZ		2.0		pF
Transition Frequency	fT	VCE=5V, lC=20mA		250		MHZ
Noise Figure	NF	VCE=6V, lC=0.1mAf=1KHZ,Rs=10kΩ		1	10	dB

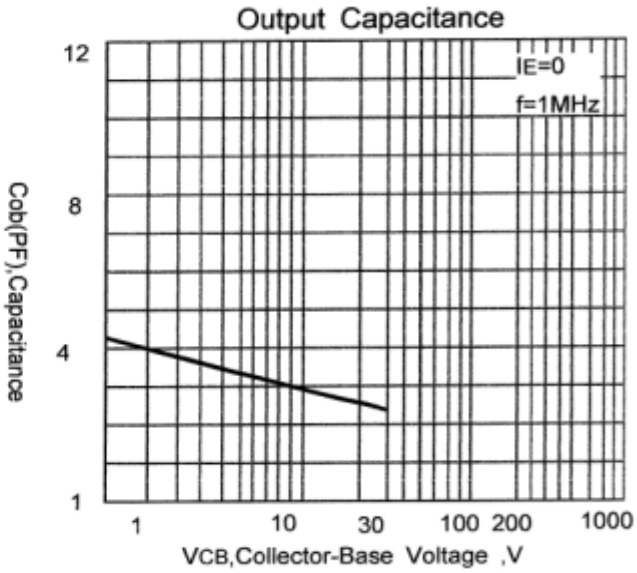
*hFE Classification

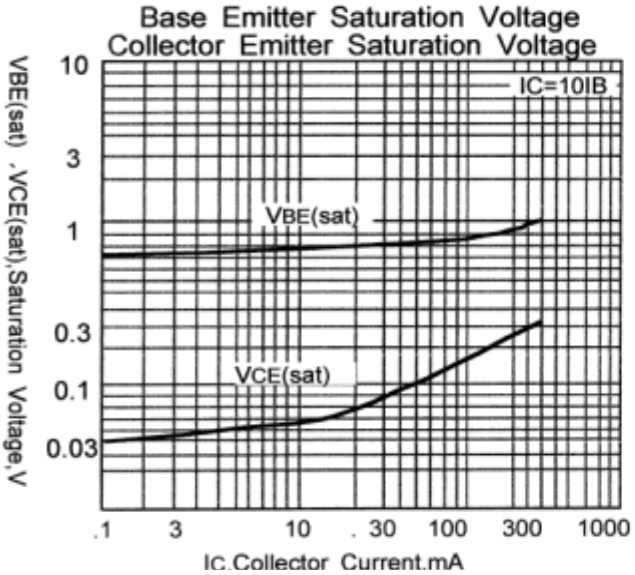
Classification	Y
hFE	120~240







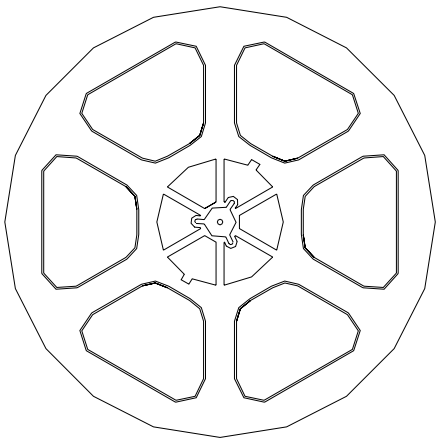


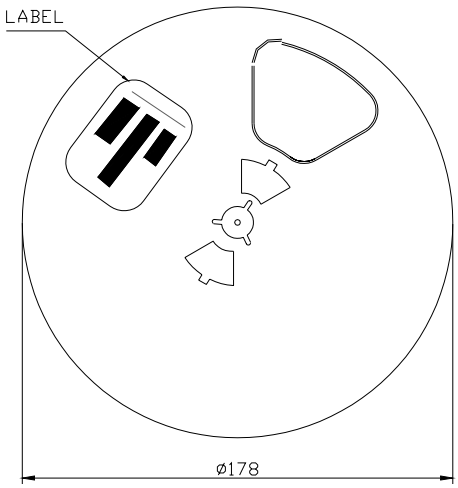


IV. TAPING SPECIFICATION

1.Dimension of reel

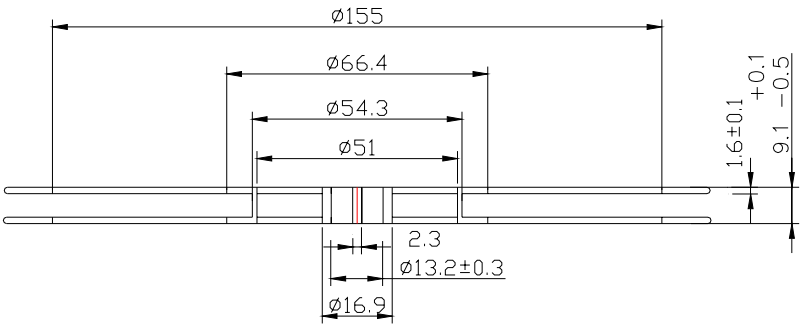
Unit : mm





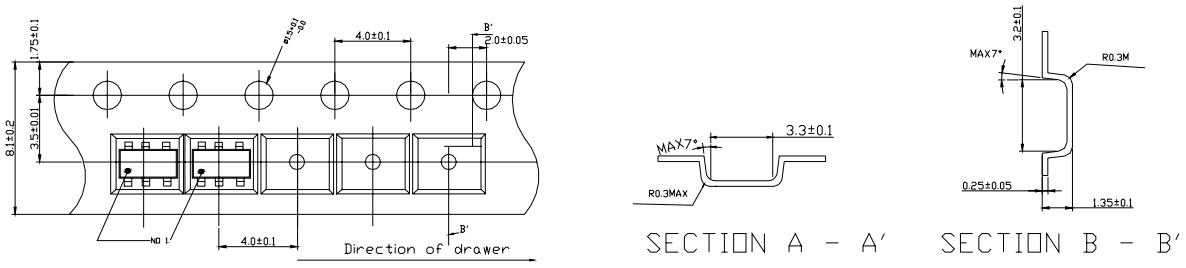
LABEL

DVC:_____
LOT:_____ Q'TY:_____ S/N:_____
W/D:_____



2.Dimension of reel

Unit : mm



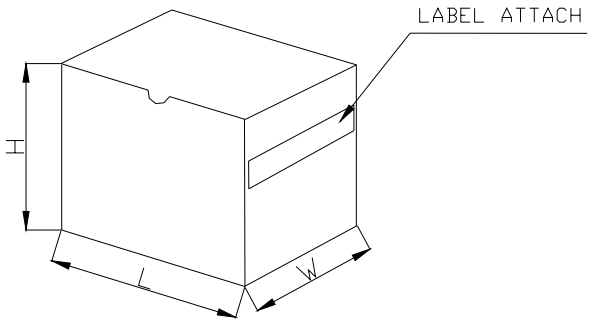
3.Taping format

(END)

Unloaded Tape	SOT_26 Parkage	Unloaded Tape	Sealing tape(Cover Tape)

4.Dimensions Box

Inner Box

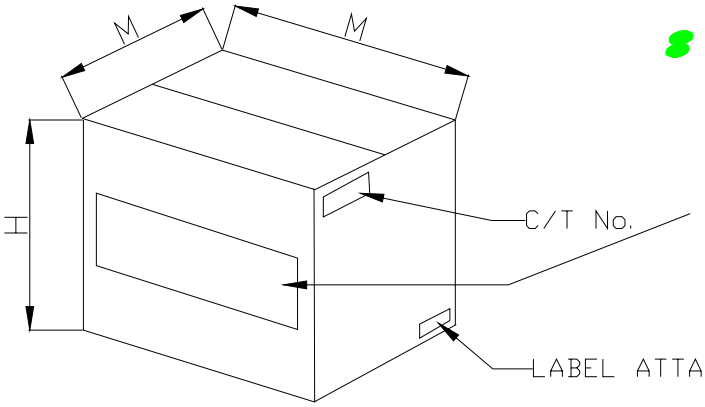


Dimensions : 210(L) × 135(w) × 190(H) (mm)

Quantity : 30kp

10ea(Loaded quantity per reel : 3,000pcs)

Out Box



SHINHEUNG HIGH TECH Co., LTD

Daeryung Techno Tower I - 601 , 327-24
Gasan-dong,Geumcheon-gu,Seoul,Korea
TEL : 82-2-868-5577(Rep)
FAX : 82-2-868-8705
E-mail : sinheung@shelec.co.kr

Dimensions : 359(L)× 369(w) × 435(H) (mm)
Quantity : 240kp
8ea (inner box)

PACKING FLOW