



AnaSem

Reliability Report
Analog Semiconductor IC

Specification Receipt

Model	MR Sensor IC
Type	MRX1518H Series
Spec Sheet No.	AS—M090001
Issue Date	

Revision Records

Customer's Acceptance Stamp	AnaSem's Stamp

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• Applicable Area:

This reliability report which is issued to _____ from AnaSem Inc. is applicable to MR Sensor IC product part number MRX1518H Series.

• Voidance of Report:

This reliability report can be voided or to be terminated only upon the agreement of both parties of _____ and AnaSem Inc.

• Notice on Modification Report:

Shall there be any change / modification on the product(s) enlisted, material, manufacturing process and monitoring system...etc., aside of providing the modified product quality measurement and reliability data, AnaSem Inc. will also provide a written notification of such change / modification to _____.

TABLE OF CONTENT

1. Products Specification	P4
1-(1) External Appearance.....	P4
1-(2) External Dimensions.....	P4~P5
1-(3) Block Diagram.....	P6
1-(4) Magnetic-Electric Conversion Characteristics.....	P6
1-(5) Timing Chart.....	P6
1-(6) Absolute Maximum Ratings.....	P7
1-(7) Electrical Characteristics.....	P7
1-(8) Magnetic Characteristics.....	P7
1-(9) Test Circuit.....	P7
1-(10) QC Process Flow Chart.....	P8~P9
1-(11) General Packaging Information.....	P10
1-(12) Marking Specification.....	P11
 2. Packing Specification	 P12
2-(1) Taping Specification.....	P12~P15
2-(2) Packing Condition.....	P16
2-(3) Label Specification.....	P17
 3. Lead-Free Reflow Soldering Temperature Profile	 P18
 4. Reliability Testing	 P19
 5. Cautions on Storing & Transferring	 P20

1. Products Specification

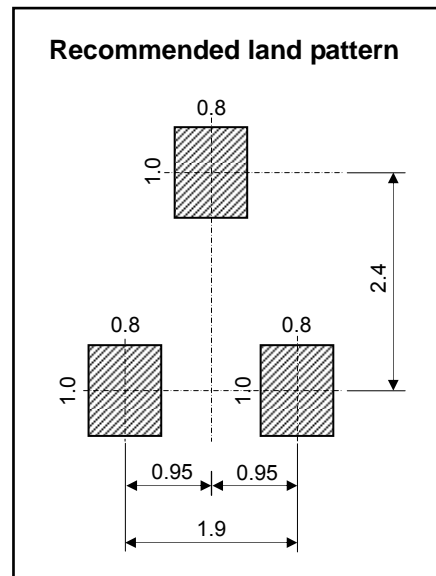
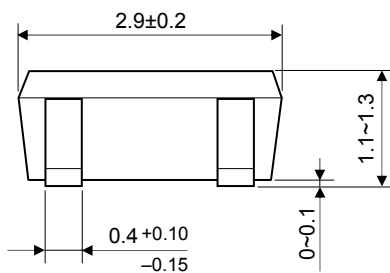
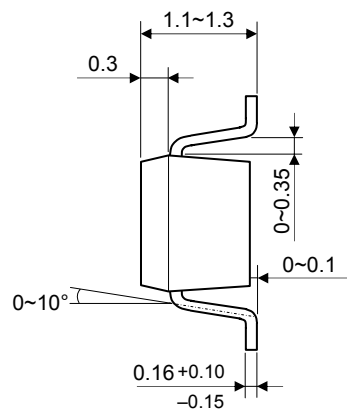
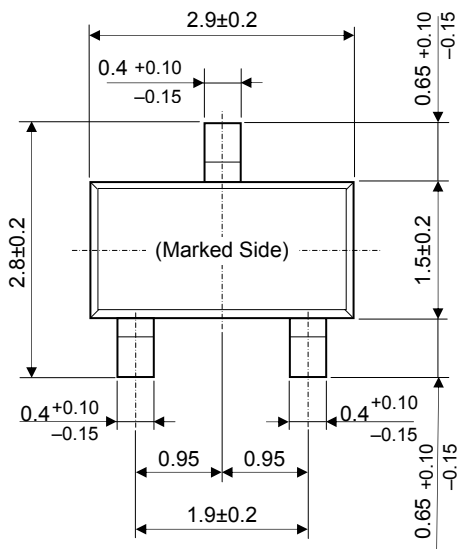
1-(1) External Appearance

- 1) There appear no scars or dirt on the outer surface of the mentioned product
- 2) Marks can be observed clearly on the outer surface of the mentioned product

1-(2) External Dimensions

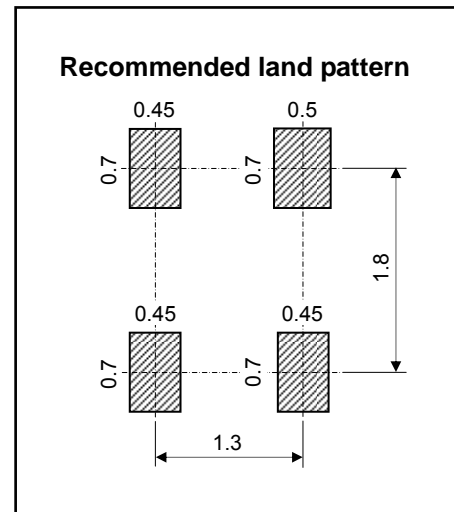
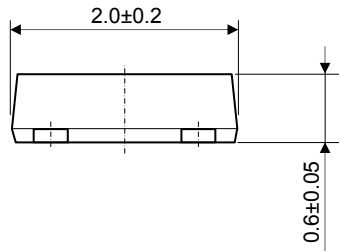
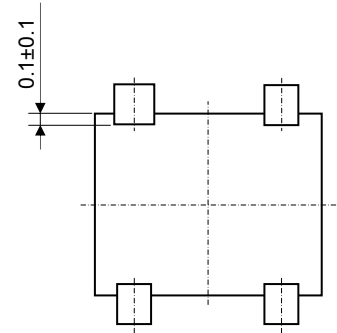
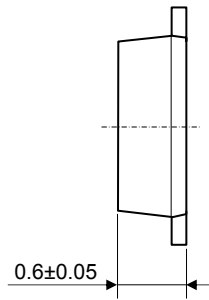
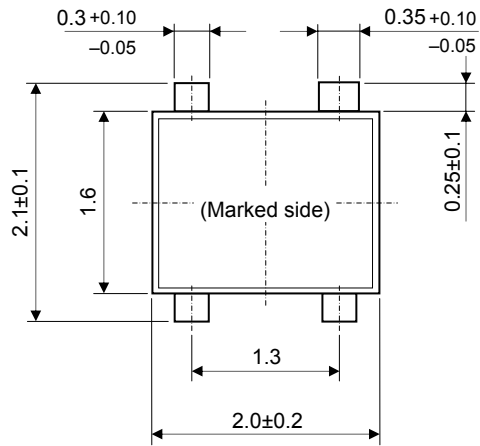
- **SOT-23**

(Unit : mm)

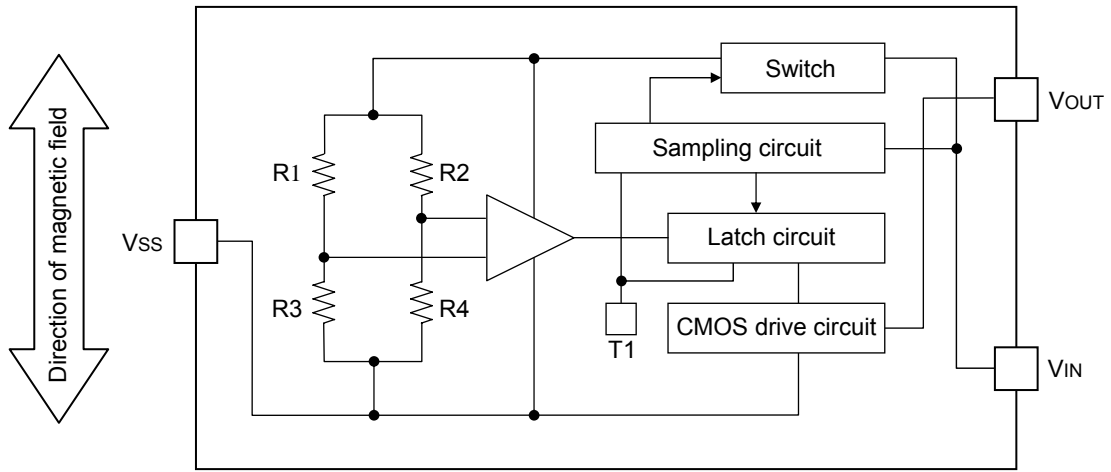


● SON-4

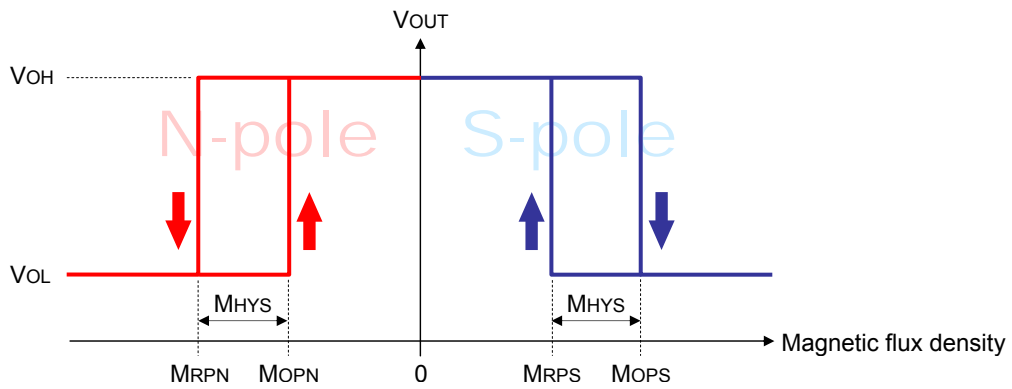
(Unit : mm)



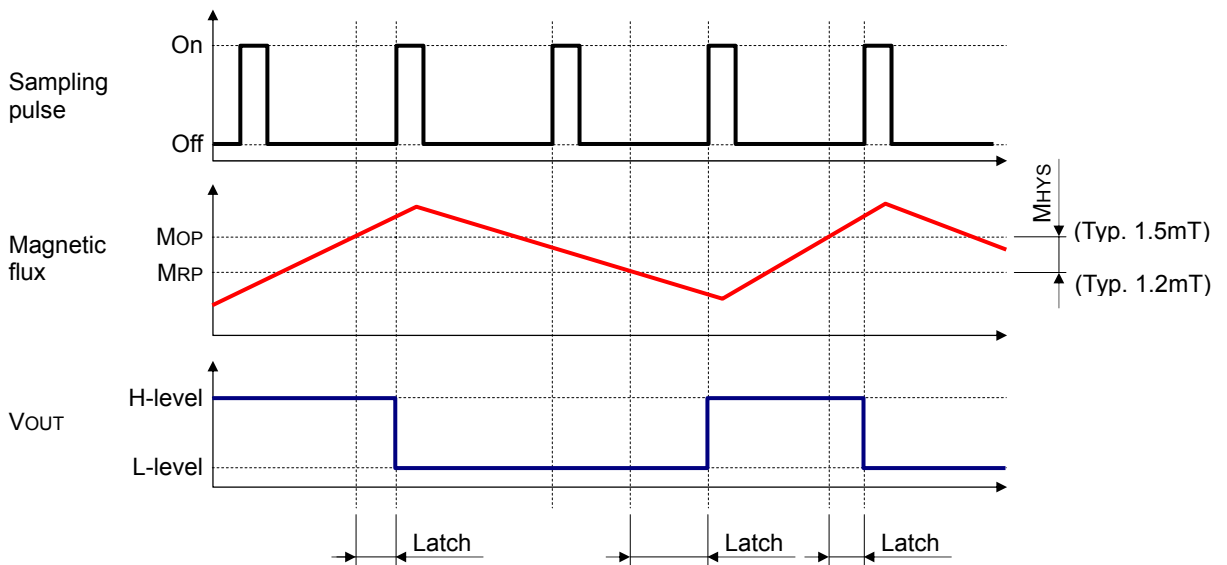
1-(3) Block Diagram



1-(4) Magnetic-Electric Conversion Characteristics



1-(5) Timing Chart



1-(6) Absolute Maximum Ratings

Items	Symbol	Min.	Typ.	Max.	Conditions	Unit
Operating temperature	TOPR	-40	-	+85		°C
Storage temperature	TSTG	-50	-	+125		°C
Supply voltage	VMAX	VIN-0.3	-	VIN+6.0		V
Assembly temp. condition	TASY	-	255	260	t=max:5sec/Tmax	°C

1-(7) Electrical Characteristics

(Unless otherwise specified, VDD=1.8V, Ta=25°C)

Items	Symbol	Min.	Typ.	Max.	Conditions	Unit
Operating voltage	VIN	1.6	1.8	3.5		V
Current consumption	I _{AVG}	-	1.6	3.0	Avg. current at VIN=1.8V	μA
Detection pulse driving cycle	t _s	-	50	90	Pulse width : 1/2000	msec
“H”-level output voltage	V _{OH}	0.9V _{IN}	-	-	I _{OUT} =+1.0mA	V
“L”-level output voltage	V _{OL}	-	-	0.1V _{IN}	I _{OUT} =-1.0mA	V

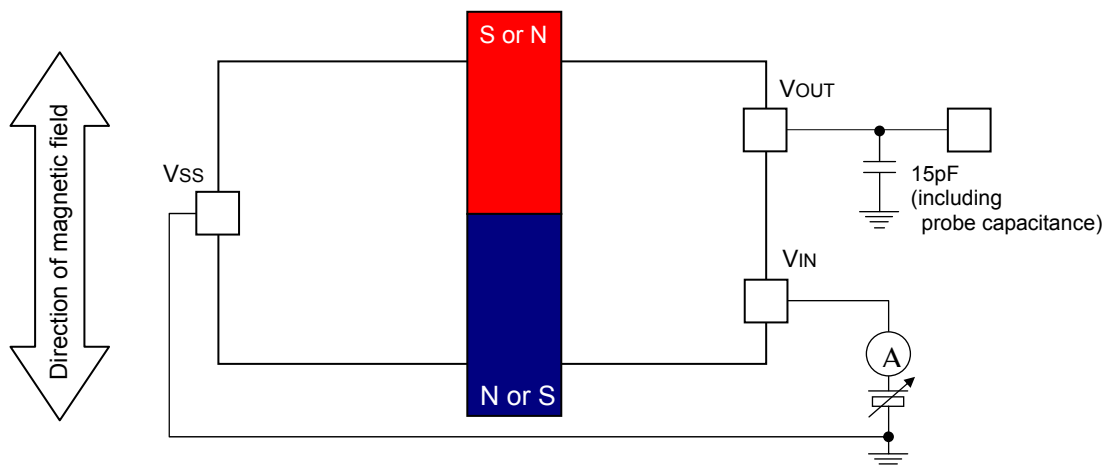
1-(8) Magnetic Characteristics

(Unless otherwise specified, VDD=1.8V, Ta=25°C)

Items	Symbol	Min.	Typ.	Max.	Unit
Magnetic flux density at operating point (H→L)	MOPS	1.0*	1.5	2.2	mT
	MOPN	-2.2	-1.5	-1.0*	
Magnetic flux density at release point (L→H)	MRPS	0.8	1.2	1.9*	mT
	MRPN	-1.9*	-1.2	-0.8	
Width of hysteresis	MHYS	0.1*	0.3	0.8*	mT

Note : The values with [*] marks are guaranteed by design, not tested in production.

1-(9) Test Circuit



1-(10) QC Process Flow Chart (SOT-23 / SON-4)

Process Flow Chart	Name of Process (Name of Materials)	Quality control				Production / Equipment condition control		
		Control item	Confirm method	Frequency	Quantity	Control item	Confirm	Frequency
▲○□▽	(Wafer)	-	-	-	-	-	-	-
△○■▽	Incoming wafer Inspection	Type / Quantity	Documents matching	per Lot	-	-	-	-
▲○□▽	(Dicing tape)	-	-	-	-	-	-	-
△●□▽	Seat Placement	-	-	-	-	Temperature	Surface Temp.	1 time/week
△●□▽	Dicing	Wafer Appearance	Dicer Monitor	per Lot	-	Ultra-pure Water	Resistance Meter	1 time/week
		Inner Wafer Condition	Human Eye	per Lot	-	Number of cutting	Counter	per Lot
△○■▽	PRM	Defective chip removal	Human Eye	per Wafer	-	-	-	-
▲○□▽	(Lead frame)	-	-	-	-	-	-	-
▲○□▽	(Paste)	-	-	-	-	-	-	-
△●□▽	Die Bonding	Mount Appearance	Microscope	1 time/shift	n=100	Shape of Collets	Microscope	1 time/day
			-	-	-	Pressure Time	Set Parameter	1 time/day
△●□▽	Cure	Bond Strength	Tension Gauge	1 time/week	n=10	Cure Temp.	Indicated Value	1 time/day
▲○□▽	(Au Wire)	-	-	-	-	-	-	-
△●□▽	Wire Bonding	Wire	Microscope	1 time/shift	n=100	Bonding temp.	Indicated value	1 time/day
		Wire pull Strength	Tension Gauge	1 time/week	n=10	Program Condition	Set Parameter	1 time/day
		Bonding Position	Microscope	1 time/week	n=10	-	-	-
▲○□▽	(Resin)	-	-	-	-	-	-	-
△●□▽	Molding	Mold Appearance	Microscope	1 time/day	1 shot	Temperature of Metal Mold	Indicated Value	1 time/day
		Wire Transformation	X-ray Inspection Machine	2 times/month	1 shot	Shooting Time	Indicated Value	1 time/day
		-	-	-	-	Injection Pressure	Indicated Value	1 time/day
△●□▽	Resin Cure	-	-	-	-	Cure Temp.	Recorder	per batch
		-	-	-	-	Cure Time	Recorder	per batch
△●□▽	De-burring (Subcontract)	Appearance	Human Eye	per Lot	50cm	Line Speed	Speed Meter	Prior to processing
		-	-	-	-	Plating Liquid Density	Quantitative Analysis	1 time/week

	Solder plating (Subcontract)	Appearance	Human Eye	per Lot	50cm	Plating liquid Temp.	Indicated Value	Prior to processing		
		Plating Thickness	X-ray Fluorescence	per Lot	n=10	Line Speed	Speed Meter	Prior to processing		
		Plating Composition	X-ray Fluorescence	per Lot	n=10	Cure Value	Indicated Value	per Lot		
		Solder-Ability	Microscope	1 time/day	n=10	-	-	-		
	T	Lead Cut / Bending	Dimensional Measurement	Measuring Instrument	1 time/day	n=10	-	-		
		Characteristic inspection	Electric Characteristics	Tester	per Lot	all	Tester Performance	Standard Sample Measurement	1 time/day	
		Marking	-	-	-	-	Graphical Confirmation	Monitor	1 time/day	
		M	(Career Tape)	-	-	-	-	-	-	-
			T	(Cover Tape)	-	-	-	-	-	-
				(Reel)	-	-	-	-	-	-
		Taping	Peel-Off Strength	Strength Test Machine	per each time/ per tape	20cm	Taping Temp.	Indicated Value	1 time/day	
	Taping Appearance Observation	Taping Appearance	Microscope	per Lot	1/5 peels	-	-	-		
		Lead Package Appearance	Human Eye	per Lot	1/5 peels	-	-	-		
	Outgoing Shipment Inspection	Appearance	Microscope	per Lot	n=231	-	-	-		
		Label Signs	Human Eye	per Reel	-	-	-	-		
	(Packing Material)	-	-	-	-	-	-	-		
	Boxing	-	-	-	-	-	-	-		
	Shipment	-	-	-	-	-	-	-		

Process Flow Symbols

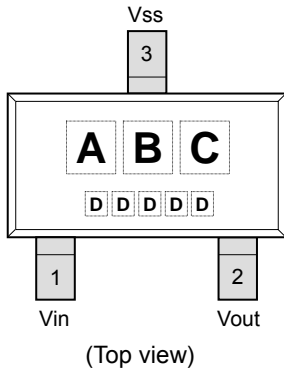
△ : Raw materials IN	○ : Processing	□ : Inspection confirmation	▽ : Products OUT
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1-(11) General Packaging Information

Item		Specification		Memorandum
		SOT-23	SON-4	
Chip	Chip Size	0.6×0.6mm	0.6×0.6mm	
	Thickness	150±10µm	150±10µm	
Packaging	Lead Frame Material	Copper Alloy	Copper Alloy	
	Die Bonding Material	Insulator Type Paste	Ag Paste	
	Wire Bonding Material	Au Line ø20µm	Au Line ø20µm	
	Resin	Epoxy Resin	Epoxy Resin	Flammability Rating : UL94-V0
	Package Plating	Semi-Glossy Plating Composition : Sn-Bi(1~3%) Thickness : 4~15µm	Semi-Glossy Plating Composition : Sn-Bi(1~3%) Thickness : 4~15µm	Plating's Pb (Lead) content level's upper limit is 500PPM
	Marking	Laser Marking	Laser Marking	
Packing	Carrier Tape	Conductive Carrier Taping	Conductive Carrier Taping	PS Material
	Cover Tape	Conductive Cover Taping	Conductive Cover Taping	
	Reel	EIAJ RRV08B	EIAJ RRV08B	
	Shipment Box	10 Reels Capacity	10 Reels Capacity	

1-(12) Marking Specification

● SOT-23



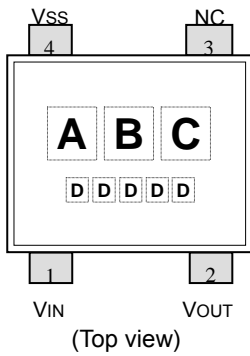
Pin Configuration

No.	Symbol	Descriptions
1	VIN	Voltage input
2	VOUT	Output
3	VSS	Power ground

Marking Specification

Code	Mark	Contents
A	M	Series name
BC	AA	Products specification & version
D	Internal rule	Lot number

● SON-4



Pin Configuration

No.	Symbol	Descriptions
1	VIN	Voltage input
2	VOUT	Output
3	NC	Non connection (open)
4	VSS	Power ground

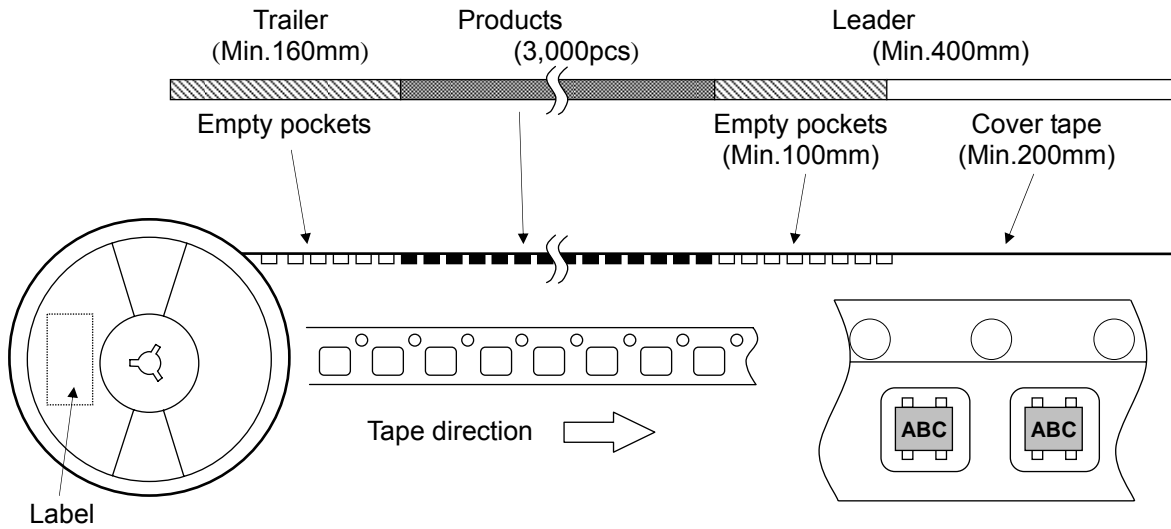
Marking Specification

Code	Mark	Contents
A	M	Series name
BC	AA	Products specification & version
D	Internal rule	Lot number

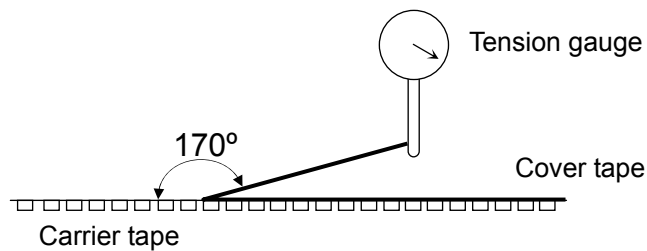
2. Packing Specification

2-(1) Taping Specification

Taping 3,000 pieces/reel



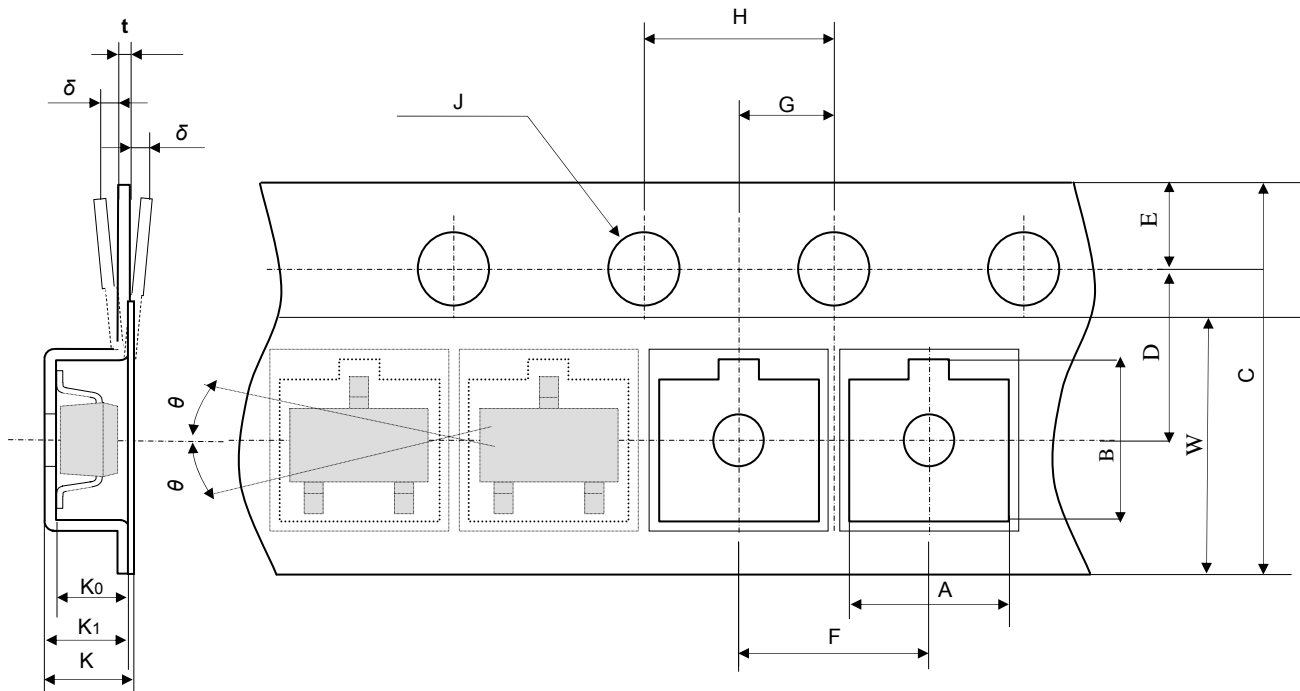
Taping Peel-Off Resistance Strength Test Method



Testing Method

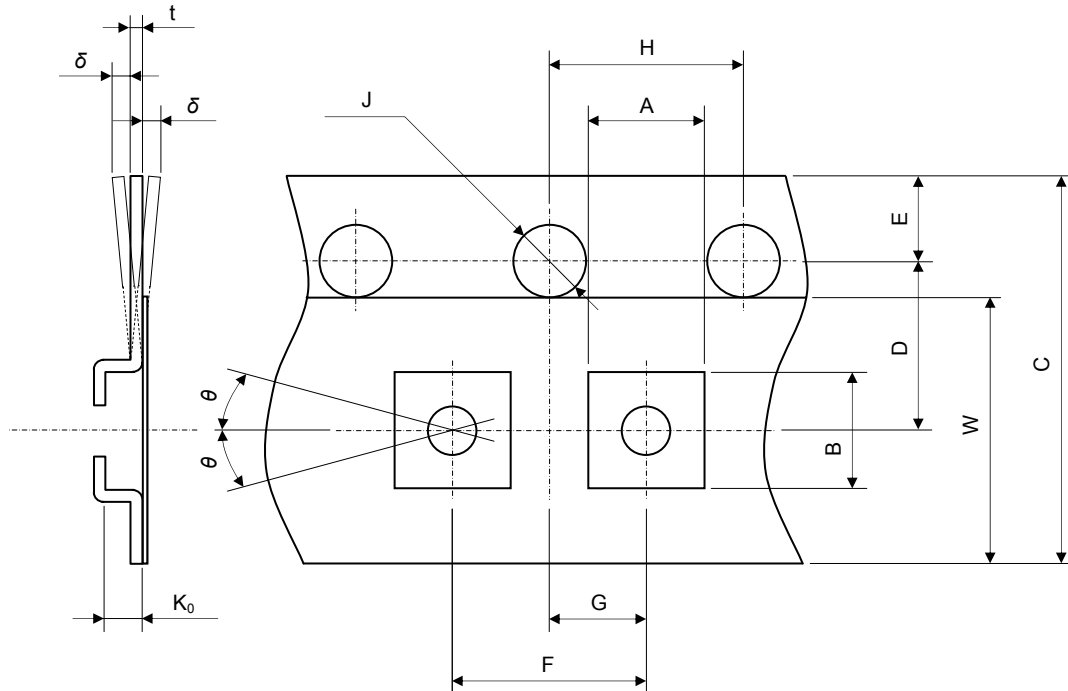
Taping Peel-Off Resistance Strength Test is performed by fixing the position of the Carrier Tape, using 300mm/min speed to peel the Cover Tape at 170° degree under the measurement of the Tension Gauge, with the specification of the Tape's peel off strength rated at 20~70g

● Carrier Tape Specification (SOT-23)



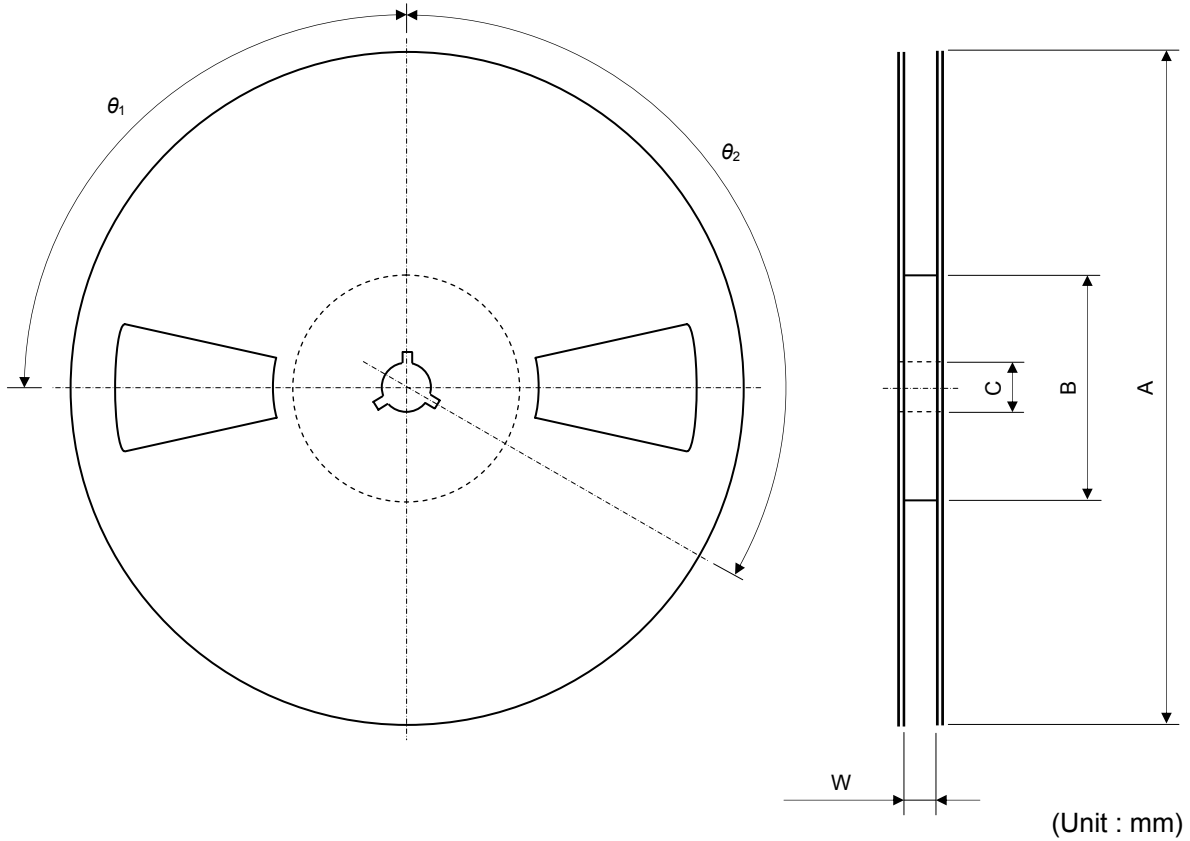
Item	Symbol	Size	Remarks	
Pocket	Length	A	3.35± 0.1	
	Width	B	3.3 ± 0.1	
	Depth	K ₀	1.4 ± 0.1	
	Pitch	F	4.0 ± 0.1	Accumulative pitch +0.1/-0.3 Max./10 pitch
Feeding Hole	Diameter	J	Ø1.5 +0.1/-0	
	Pitch	H	4.0 ± 0.1	Accumulative pitch +0.1/-0.3 Max./10 pitch
	Position	E	1.75 ± 0.1	
Distance between center lines	Length direction	G	2.0 ± 0.05	
	Width direction	D	3.5 ± 0.05	
Cover tape	Width	W	5.5 ± 0.3/-0	
Carrier tape	Width	C	8.0 ± 0.2	
	Thickness	t	0.25 ± 0.05	
	Pocket's Ext.Depth	K ₁	1.5 ± 0.1	
	Bend	δ	0.3 Max	
Device	Tilt	θ	20° Max.	
Total thickness		K	1.65 Max	

- Carrier Tape Specification (SON-4)



Item	Symbol	Size	Remarks	
Pocket	Length	A	2.4 ± 0.1	
	Width	B	2.4 ± 0.1	
	Depth	K ₀	0.75 ± 0.1	
	Pitch	F	4.0 ± 0.1	Accumulative pitch +0.1/-0.3 Max./10 pitch
Feeding Hole	Diameter	J	Ø1.5 +0.1/-0	
	Pitch	H	4.0 ± 0.1	Accumulative pitch +0.1/-0.3 Max./10 pitch
	Position	E	1.75 ± 0.1	
Distance between center lines	Length direction	G	2.0 ± 0.05	
	Width direction	D	3.5 ± 0.05	
Cover tape	Width	W	5.5 ± 0.1	
Carrier tape	Width	C	8.0 ± 0.2	
	Thickness	t	0.25 ± 0.05	
	Bend	δ	0.3 Max	
Device	Tilt	θ	30° Max.	

● Taping Reel Dimensions

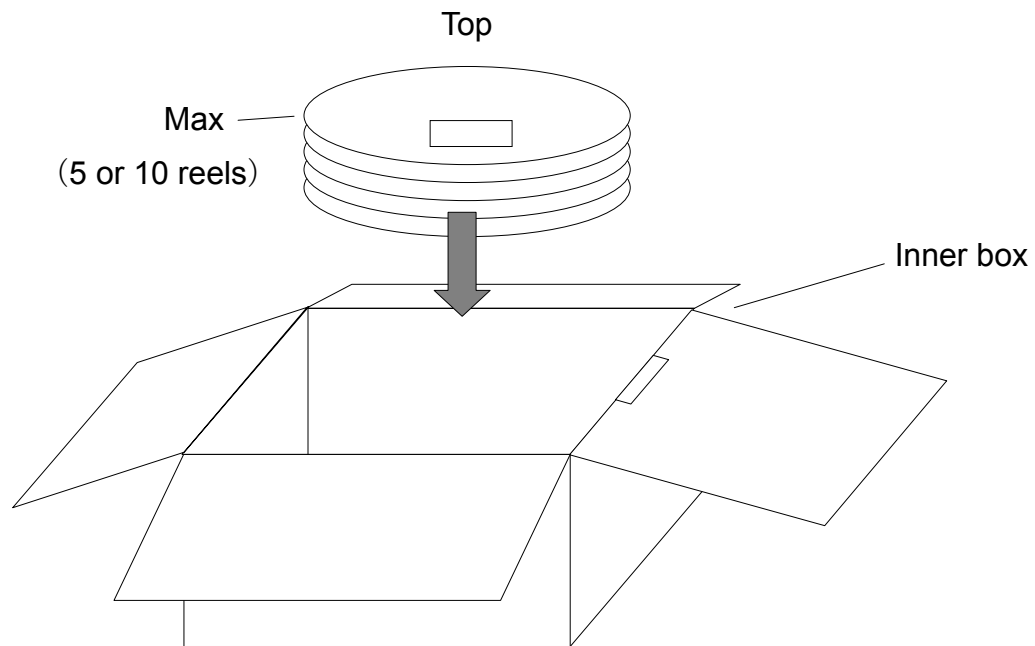


Item		Symbol	Size	Remarks
Flange	Diameter	A	$\text{Ø}178 \pm 2$	
	Space between flange	W	9 ± 0.5	
Pocket	Outer diameter	B	$\text{Ø}60 \pm 1$	
	Slit location	θ_1	90°	
	Spindle hole diameter	C	$\text{Ø}13 \pm 0.5$	
	Key slit location	θ_2	120°	

* Products number, quantity and lot code are marked or labeled.

* 1 Reel = 3,000 pcs


2-(2) Packing Condition



While using a 5 or 10 reels box container, in case when the box is not fully loaded (less than 5 or 10 reels of ICs), the gaps will be filled by ESD-protected materials in order to prevent the IC products moving or dislocate within the box container.

2-(3) Label Specification

Reel Label

 AnaSem	TYPE: MRXxxxxxxxx	アナセム株式会社 AnaSem.InC http://www.anasem.net
	LOT: 945A1234	<div style="border: 1px solid black; padding: 2px;"> 製造管理用バーコード領域 Bar Code </div>
QTY: 3,000pcs		
DATE: 2009/07/01	<div style="border: 1px solid black; padding: 2px;"> 製品管理用バーコード領域 / Bar Code </div>	

TYPE : Represents the Product Name

LOT : Represents AnaSem's Production Lot Number

Example : 945A1234

9.....4th Digit of Production Year

4.....Month (10= "X", 11= "Y", 12= "Z")

5A.....Fixed Suffix

1234.... Sequenced Identification Number

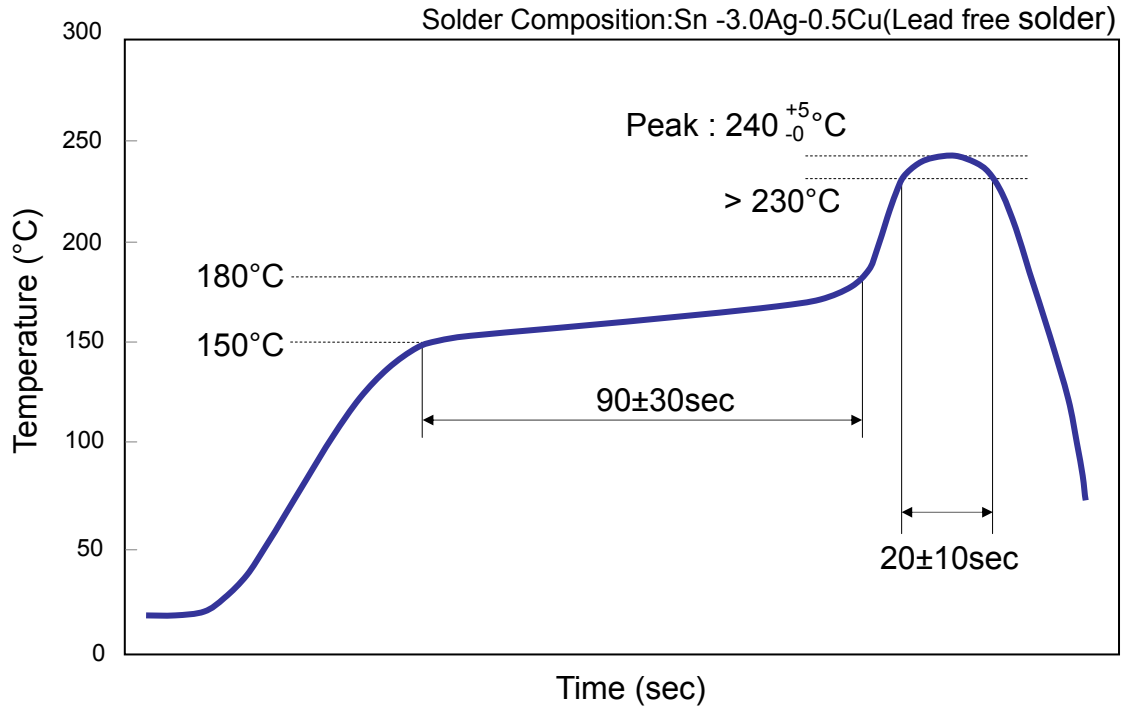
QTY : Represents the quantity of IC parts within the specific reel

DATE : Represents the Date when the Label is printed

Bar Code Usage:

AnaSem prints out the Bar Code and Serial Number together.

3. Lead-Free Reflow Soldering Temperature Profile



Reflow portion	
Peak temperature / Time	240°C / within 5sec
Above 230°C	20±10sec
Pre-heat portion	
150~180°C	90±30sec
Testing point	Product surface
Product storage condition	10~40°C, within 30~60%RH

※While using the above recommended Reflow Temperature with the solder paste, please limit this process to 2 times only.

4. Reliability Testing

No.	Items	Conditions	Criterion
1	High Temperature Storage	Ta=85°C, 1000Hr (without conducting voltage)	satisfying to electrical characteristics
2	High Temperature Bias	Ta=85°C, 1000Hr (VDD=3.5V)	satisfying to electrical characteristics
3	High Temperature / Humidity Storage	Ta=85°C, RH=85%, 1000Hr	satisfying to electrical characteristics
4	HAST	Ta=121°C, RH=100%, P=2atm, 100Hr	satisfying to electrical characteristics
5	Temperature Cycle	-40°C/30min ↔ +85°C/30min, 200 Cycle (without conducting voltage)	satisfying to electrical characteristics
6	Solder Heat	EIAJ ED-4701 standard : solder heating process method "I" Max. 260°C/10sec, 3 Cycle	satisfying to electrical characteristics
7	Solder ability	245°C/3sec, Melt & sink	Above 95%
8	ESD (MM)	C=200pF, R=0Ω, 2 times, Min. 200V	satisfying to electrical characteristics
9	ESD (HBM)	C=100pF, R=1.5KΩ, 2 times, Min. 1500V	satisfying to electrical characteristics
10	Latch-Up	C=200pF, R=0Ω, 100V Bias 1 time	Does not latch up
11	Fixation Strength	CHA strength after mounted on PCB	10N over
12	Drop	At height of 75cm, naturally dropped to P-tile	satisfying to electrical characteristics

Note :

- 1) Prior to the high temperature / humidity storage test and the temperature cycle test, samples are stored at high temperature of 125°C / 1Hr timing of dry condition, 85°C / 85HR / 168±1 timing of humid condition, then reflowed 2 times (preparation of heating at 150°C / 90sec, heating at 230°C / 20sec)
- 2) Each measured data item listed above are specifications derived from individual testing.

5. Cautions on Storing and Transferring

- During the time period of storing the “Dan-Ball” boxes, there may be possibility of worsen humidity and dirt in the storage environment, hence we recommend our customers to implement “First-In, First-Out” inventory management.
- Although the packing materials are ESD-protected, while handling the IC products such as taking out the parts from the container box, please pay special attention to any possible ESD discharge that may possibly damage the IC goods.
- Please handle the container boxes with care, as it may be possible to damage the IC products within the container boxes due to strong outer impact or vibration.
- As the container boxes are made by “Dan-Ball” material, please be cautious of preventing the boxes from soaking any liquid. Also please avoid storing these containers in outdoor environment with high temperature or high humidity.
- Recommended Storage Condition:
 - 1) Temperature : 10~40°C
 - 2) Humidity : 30~60%
- Storage Time Period:
Storage period is rated for one 1 year time frame from the date of production. But please do consider of complying to the storage condition stated in above mentioned 1) Temperature and 2) Humidity.
- O-Zone Layer Depleting Substance Usage Restriction:
Restricted Substances
 ①Polychlorinated Biphenyls ②Polychlorinated Naphthalenes ③Hexachlorobenzene ④Aldrin ⑤Dieldrin
 ⑥Endrin ⑦Dichloro Diphenyl Trichloroethane ⑧Chlordane ⑨Bis Tributyltin Oxide ⑩N-Phenylenediamine
 Type ⑪2,4,6-Tri Tert Butylphenol ⑫Asbesto Type ⑬PBDE ⑭PBB ⑮Cadmium Type Compound ⑯Azo
 Compound ⑰Mercury ⑱Hexavalent Chromium ⑲Lead

The materials and components used for the enlisted product(s) within this report do not contain the above listed substances.

Within the manufacturing process of the enlisted product(s) in this report does not contain the above listed substances

※“Do not contain” refers to content level of below 100PPM for the substance ⑮Cadmium for the enlisted product(s) within this report.

The content level of ⑬PBDE ⑭PBB ⑰Mercury ⑱Hexavalent Chromium ⑲Lead for the enlisted product(s) within this report is below 1000PPM.