

Notice for TAIYO YUDEN products

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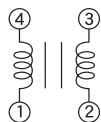
Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

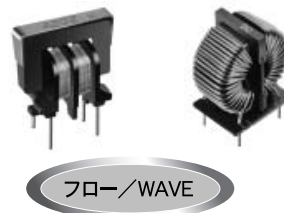
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コモンモードチョークコイル (ACライン用) リードタイプ COMMON MODE CHOKE COILS (FOR AC LINES) LEADED TYPE

等価回路 (Equivalent circuit)



OPERATING TEMP.	TLF9UAタイプ: -25~+115°C
	TLF14CBタイプ: -20~+105°C
	TLF25RAタイプ: -25~+105°C
(製品自己発熱を含む) (Including self-generated heat)	



特長 FEATURES

- ・TLF 9UA (H) タイプ 小型形状
- ・TLF 14CB (H) タイプ 普通形状
- ・TLF 25RA タイプ 大電流容量

- ・TLF 9UA (H) TYPE Small-sized configuration
- ・TLF 14CB (H) TYPE Ordinary configuration
- ・TLF 25RA TYPE Large current capacity for power supply line use

用途 APPLICATIONS

TV、VTR、SW電源、NCマシン、コンピュータおよび周辺機器、各種計測器、各種制御装置などの雑音端子電圧、電源ラインノイズ対策

- ・TLF 9UA (H) TYPE 小電力用の機器
- ・TLF 14CB (H) TYPE 入力電力数10W の機器
- ・TLF 25RA TYPE 高電力用の機器

As a preventive measure against noise terminal voltage or power supply noise in TV or VTR units, SW power supplies, NC machines, computer systems, peripheral units, measuring instruments, and controllers.

- ・TLF 9UA (H) Type low-current applications
- ・TLF 14CB (H) Types equipment with several tens of watts of input power
- ・TLF 25RA Type high-current applications

形名表記法 ORDERING CODE

1

形式

TLF	ラインフィルタ
-----	---------

2

コア寸法 (mm)

△9	9
14	14
25	25

△=スペース

3

形状

RA△	リングコア縦形
UA△	U字コア縦形
UAH	U字コア横形
CB△	<input type="checkbox"/> 字コア分割巻縦型
CBH	<input type="checkbox"/> 字コア分割巻横型

△=スペース

4

公称インダクタンス (μH)

例	
102	1000
103	10000

5

インダクタンス許容差 (%)

△	公称値以上
W	± $\frac{100}{10}$

△=スペース

6

定格電流 (A)

R54	0.54
0R8	0.8

R=小数点

7

製品区分記号

△	一般
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△=スペース

8

当社管理記号

△	標準品
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△=スペース

T L F △ 9 U A H 1 0 2 W 0 R 8 ○ ○

1 2 3 4 5 6 7 8

1	Type	
	TLF	Line filter

2	Core dimensions (mm)	
	△9	9
	14	14
	25	25
	△=Blank space	

3	Shape	
	RA△	Ring core, vertical type
	UA△	U core, vertical type
	UAH	U core, horizontal type
	CB△	Square type core vertically split wound
	CBH	Square type core horizontally split wound
	△=Blank space	

4	Nominal Inductance (μH)	
	example	
	102	1000
	103	10000

5	Inductance tolerance (%)	
	△	Nominal Values or higher
	W	±100/10
	△=Blank space	

6	Rated current (A)	
	R54	0.54
	0R8	0.8
	R=decimal point	

7	Product classification code	
	△	Standard
	△=Blank space	

8	Internal code	
	△	Standard Product
	△=Blank space	

TLF14CB Type	TLF14CBH Type	TLF25RA Type
TLF9UA Type	TLF9UA H Type	<p>() 参考値 () Reference Values</p> <p>unit : mm (inch)</p>

セレクトショングイド
Selection Guide

アイテム一覧
Part Numbers

特性図
Electrical Characteristics

梱包
Packaging

信頼性
Reliability Data

使用上の注意
Precautions



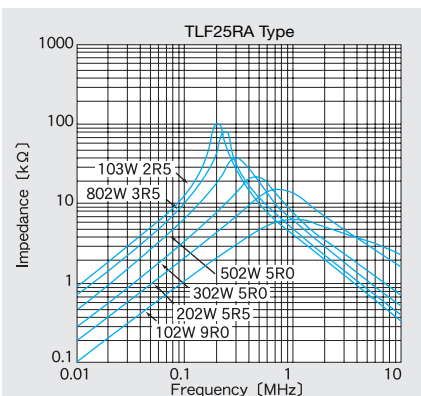
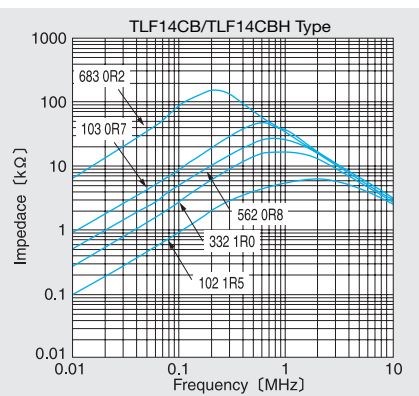
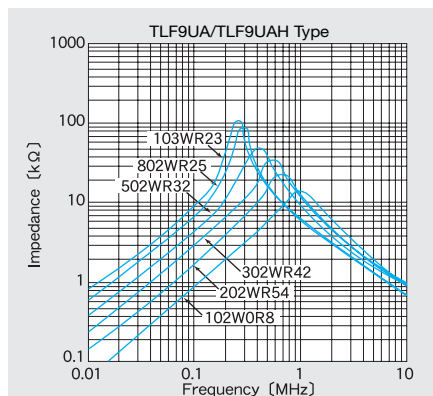
etc

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TAIYO YUDEN 2009

△Please read the "Notice for TAIYO YUDEN products" before using this catalog.

Type	形 名 Ordering code	EHS (Environmental Hazardous Substances)	インダクタンス [mH] Inductance	インダクタンス 許容差 Inductance Tolerance	直流抵抗 [Ω] DC resistance (max)	定格電流 [A] Rated current (max)	定格電圧 [V] Rated voltage (max)	耐電圧 [V] Withstanding voltage [1 minute] (min)	適用周波数 [MHz] Applicable frequency 参考値 Reference Value
TLF9UA	TLF 9UA 102W0R8	RoHS	1	+100%/−10%	0.5	0.80	AC250	AC2000	0.1~10
	TLF 9UA 202WR54	RoHS	2	+100%/−10%	1.0	0.54			
	TLF 9UA 302WR42	RoHS	3	+100%/−10%	1.5	0.42			
	TLF 9UA 502WR32	RoHS	5	+100%/−10%	2.5	0.32			
	TLF 9UA 802WR25	RoHS	8	+100%/−10%	4.0	0.25			
TLF9UAH	TLF 9UA 103WR23	RoHS	10	+100%/−10%	4.5	0.23			
	TLF 9UAH 102W0R8	RoHS	1	+100%/−10%	0.5	0.80			
	TLF 9UAH 202WR54	RoHS	2	+100%/−10%	1.0	0.54			
	TLF 9UAH 302WR42	RoHS	3	+100%/−10%	1.5	0.42			
	TLF 9UAH 502WR32	RoHS	5	+100%/−10%	2.5	0.32			
TLF14CB	TLF 9UAH 802WR25	RoHS	8	+100%/−10%	4.0	0.25			
	TLF 9UAH 103WR23	RoHS	10	+100%/−10%	4.5	0.23			
	TLF14CB 102 1R5	RoHS	1.0	min	0.1	1.5			
	TLF14CB 222 1R2	RoHS	2.2	min	0.18	1.2			
	TLF14CB 332 1R0	RoHS	3.3	min	0.32	1.0			
	TLF14CB 472 1R0	RoHS	4.7	min	0.38	1.0			
	TLF14CB 562 0R8	RoHS	5.6	min	0.42	0.8			
	TLF14CB 682 0R8	RoHS	6.8	min	0.6	0.8			
	TLF14CB 103 0R7	RoHS	10	min	0.85	0.7			
	TLF14CB 223 0R4	RoHS	22	min	1.7	0.4			
	TLF14CB 333 0R3	RoHS	33	min	2.7	0.3			
	TLF14CB 473 0R2	RoHS	47	min	3.6	0.2			
	TLF14CB 563 0R2	RoHS	56	min	5	0.2			
	TLF14CB 683 0R2	RoHS	68	min	6.5	0.2			
	TLF14CBH 102 1R5	RoHS	1.0	min	0.1	1.5			
TLF14CBH	TLF14CBH 222 1R2	RoHS	2.2	min	0.18	1.2			
	TLF14CBH 332 1R0	RoHS	3.3	min	0.32	1.0			
	TLF14CBH 472 1R0	RoHS	4.7	min	0.38	1.0			
	TLF14CBH 562 0R8	RoHS	5.6	min	0.42	0.8			
	TLF14CBH 682 0R8	RoHS	6.8	min	0.6	0.8			
	TLF14CBH 103 0R7	RoHS	10	min	0.85	0.7			
	TLF14CBH 223 0R4	RoHS	22	min	1.7	0.4			
	TLF14CBH 333 0R3	RoHS	33	min	2.7	0.3			
	TLF14CBH 473 0R2	RoHS	47	min	3.6	0.2			
	TLF14CBH 563 0R2	RoHS	56	min	5	0.2			
	TLF14CBH 683 0R2	RoHS	68	min	6.5	0.2			
TLF25RA	TLF25RA 102W9R0	RoHS	1	+100%/−10%	0.03	9.0			0.1~20
	TLF25RA 202W5R5	RoHS	2	+100%/−10%	0.05	5.5			
	TLF25RA 302W5R0	RoHS	3	+100%/−10%	0.06	5.0			
	TLF25RA 502W5R0	RoHS	5	+100%/−10%	0.07	5.0			
	TLF25RA 802W3R5	RoHS	8	+100%/−10%	0.11	3.5			
	TLF25RA 103W2R5	RoHS	10	+100%/−10%	0.17	2.5			

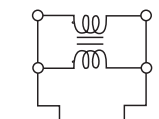


(測定条件)

使用測定器 : HP-4192A

Vosc=0.35V

測定回路


インピーダンス
アナライザーへ

Test conditions

Equipment : HP-4192A

Vosc=0.35V

Test circuit

To impedance analyzer

梱包 PACKAGING

最小受注単位数 Minimum Quantity
CM / BU Type

Type	最小受注単位数 (pcs.) Minimum Quantity	
	箱づめ Box	袋づめ Bulk
CM05RA06	—	500
CM05RB□□	1000	—
CM08RA□□	—	250
CM08RB□□	500	—
CM12RA02	—	100
BU08RA□□	—	200

TLF Type

Type	最小受注単位数 (pcs.) Minimum Quantity
	箱づめ Box
TLF9UA□	500
TLF9UB□	500
TLF14CB□	500
TLF25RA	200

Item	Specified Value				Test method and remarks												
	CM—RA/ BU—RA Type	CM—RB Type	TLF9U TLF14CB	TLF25RA													
1.Operating Temperature Range	−25~+105℃		TLF9U : −25~+115℃ TLF14CB : −20~+105℃	−25~+105℃	Including temperature rise due to self—generated heat.												
2.Storage temperature range	−40~+85℃																
3.Rated current	Within the specified range				CM : The maximum DC value having temperature increase within specified temperature, as detailed in individual specification. TLF9UA, 14CB, 25RA : The maximum AC value having temperature increase within 45℃ by the application of AC current. TLF9UB : The maximum DC value having temperature increase within 45℃ by the application of DC current.												
4.Inductance	Within the specified tolerance				CM : Measuring equipmet : 4262A (HP) or its equivalent Measuring frequency : 1kHz TLF9U, 25RA : Measuring equipment : Impedance analyzer (HP4192A) or its equivalent Measuring frequency : 1kHz Measuring voltage : 0.35Vosc TLF14CB : Measuring equipment : LCR meter 4284A or its equivalent Measuring frequency : 1kHz Measuring voltage : 1.0V												
5.DC resistance	Within the specified tolerance				CM, TLF : Measuring equipment : DC ohmmeter												
6.Terminal strength tensile force	No abnormality				CM : Fix the component in the direction to draw terminal and gradually apply tensile force as detailed in individual specifications. TLF9U : Apply the stated tensile force gradually in the direction to draw terminal. <table><tr><td>Nominal wire diameter tensile ϕ d (mm)</td><td>force (N)</td><td>duration (S)</td></tr><tr><td>ϕ 0.6</td><td>5</td><td>30±5</td></tr></table> TLF14CB : Apply the stated tensile force gradually in the direction to draw terminal. <table><tr><td>Nominal wire diameter tensile ϕ d (mm)</td><td>force (N)</td><td>duration (S)</td></tr><tr><td>ϕ 0.8</td><td>10</td><td>30±5</td></tr></table> TLF25RA : Apply the tensile force of 10N in the direction to draw terminal for 5 seconds.	Nominal wire diameter tensile ϕ d (mm)	force (N)	duration (S)	ϕ 0.6	5	30±5	Nominal wire diameter tensile ϕ d (mm)	force (N)	duration (S)	ϕ 0.8	10	30±5
Nominal wire diameter tensile ϕ d (mm)	force (N)	duration (S)															
ϕ 0.6	5	30±5															
Nominal wire diameter tensile ϕ d (mm)	force (N)	duration (S)															
ϕ 0.8	10	30±5															
7.Temperature rise	Refer to individual specification		45℃ max.		TLF : Resistance substitution method Applied current : Rated current Duration : 1 hr												
8. Insulation resistance between wires	100MΩ min.				CM・TLF : Applied voltage : Rated voltage (CM—RA/BU—RA, CM—RB) : 500VDC (TLF9UA、14CB、25RA) : 250VDC (TLF 9 UB) Duration : 60sec.												
9. Insulation resistance between wire and core			100MΩ min.		TLF : Applied voltage : 500VDC (TLF9UA、14CB) : 250VDC (TLF 9 UB) Duration : 60 sec.												

Item	Specified Value				Test method and remarks
	CM—RA/ BU—RA Type	CM—RB Type	TLF9U TLF14CB	TLF25RA	
10. Withstanding : between wires	No abnormality				CM・TLF : Applied voltage : 250VDC (CM—RA/BU—RA, CM—RB) : 2000VAC (TLF9UA, 14CB, 25RA) : 500VDC (TLF 9UB) Duration : 60sec.
11. Withstanding : between wires and core			No abnormality		TLF : Applied voltage : 2000VAC (TLF9UA, 14CB) : 500VDC (TLF9UB) Duration : 60sec.
12. Rated voltage	Within the specified range				TLF9UA, 14CB, 25RA : 250VAC TLF9UB : 50VDC
13. Resistance to vibration		Appearance : No abnormality Inductance change : Within $\pm 15\%$	TLF9U Inductance change : Within $\pm 5\%$ TLF14CB Within the specified range		CM, TLF : According to JIS C0040 Direction : 2hrs each in X, Y and Z direction Total : 6hrs Frequency range : 10 to 55 to 10Hz (1 min.) Amplitude : 1.5mm (shall not exceed acceleration $196\text{m}^2/\text{s}$) Mounting method : soldering onto PC board Recovery : 2 to 24 hrs of recovery under the standard condition after the test. (CM—RB) : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. (TLF9U, 14CB)
14. Solderability	At least 75% of terminal electrode is covered by new solder.		Solder shall be uniformly adhered onto immersed surfaces.		CM : Solder temperature : $235 \pm 5^\circ\text{C}$ Duration : $2 \pm 0.5\text{sec.}$ Immersion depth : According to detailed specification. TLF : Solder temperature : $230 \pm 5^\circ\text{C}$ Duration : $2 \pm 0.5\text{sec.}$ (9U, 25RA) : $3 \pm 0.5\text{sec.}$ (14CB) Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level.
15. Resistance to soldering heat	Appearance : No abnormality Impedance change : Refer to individual specification		TLF9UA・TLF25RA : Inductance change : Within $\pm 5\%$ TLF14CB Within the specified range		CM : Solder temperature : $260 \pm 5^\circ\text{C}$ Duration : $5 \pm 0.5\text{sec.}$ Immersion depth : Up to 2~2.5mm from terminal root. Recovery : 1 to 2 hrs of recovery under the standard condition after the test. TLF : Solder temperature : $260 \pm 5^\circ\text{C}$ Duration : $5 \pm 1\text{sec.}$ (25RA) : $10 \pm 1\text{sec.}$ (9U, 14CB) Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level. Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs.

Item	Specified Value				Test method and remarks															
	CM—RA/ BU—RA Type	CM—RB Type	TLF9U TLF14CB	TLF25RA																
16.Thermnal shock	Appearance : No abnormality Impedance change : Refer to individual specification		TLF9UA・TLF25RA : Inductance change : Within±15% TLF14CB : ・Withstanding voltage : No abnormality ・Insulation resistance : No abnormality		CM, TLF : According to JIS C0025 Conditions for 1 cycle <table><tr><th>Step</th><th>Temperature [°C]</th><th>Duration [min]</th></tr><tr><td>1</td><td>—25±3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temperature</td><td>Within 3</td></tr><tr><td>3</td><td>+85±2</td><td>30±3</td></tr><tr><td>4</td><td>Room Temperature</td><td>Within 3</td></tr></table> Number of cycles : 10 Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.	Step	Temperature [°C]	Duration [min]	1	—25±3	30±3	2	Room Temperature	Within 3	3	+85±2	30±3	4	Room Temperature	Within 3
Step	Temperature [°C]	Duration [min]																		
1	—25±3	30±3																		
2	Room Temperature	Within 3																		
3	+85±2	30±3																		
4	Room Temperature	Within 3																		
17.Damp heat			TLF9UA・TLF25RA : Inductance change : Within±15% TLF14CB : Withstanding voltage : No abnormality Insulation resistance : No abnormality	TLF : Temperature : 60±2℃ ※TLF14CB Temperature : 40±2℃ Humidity : 90～95%RH Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.																
18. Loading under damp heat	Appearance : No abnormality Inductance change : Refer to individual specification		Withstanding voltage : No abnormality Insulation resistance : No abnormality		CM : Temperature : 40±2℃ Humidity : 90～95%RH Duration : 500 (+12, —0) hrs Applied current : Rated current Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber. TLF : Temperature : 60±2℃ ※TLF14CB Temperature : 40±2℃ Humidity : 90～95%RH Duration : 100 hrs Applied voltage : Apply the following specified voltage between windings. <table><tr><td>TLF9UA、25RA</td><td>250VAC</td></tr><tr><td>TLF9UB</td><td>50VDC</td></tr></table> ※TLF14CB Duration : 500 hrs Apply rated current across windings Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.	TLF9UA、25RA	250VAC	TLF9UB	50VDC											
TLF9UA、25RA	250VAC																			
TLF9UB	50VDC																			
19.Loading at high temperature			Withstanding voltage : No abnormality Insulation resistance : No abnormality		TLF : Temperature : 85±2℃ Duration : 100 hrs Applied voltage : Apply the following specified voltage between windings. <table><tr><td>TLF9UA、25RA</td><td>250VAC</td></tr><tr><td>TLF9UB</td><td>50VDC</td></tr></table> ※TLF14CB Duration : 500 hrs Apply rated current across windings Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.	TLF9UA、25RA	250VAC	TLF9UB	50VDC											
TLF9UA、25RA	250VAC																			
TLF9UB	50VDC																			

Item	Specified Value				Test method and remarks
	CM—RA/ BU—RA Type	CM—RB Type	TLF9U TLF14CB	TLF25RA	
20.Low temperature life test	Appearance : No abnormality Inductance change : Refer to individual specification		TLF9U・TLF25RA : Inductance change : Within $\pm 15\%$ TLF14CB : ・ Withstanding voltage : No abnormality ・ Insulation resistance : No abnormality		CM : Temperature : $-40 \pm 3^{\circ}\text{C}$ Duration : 500 (+12, -0) hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber. (CM—RA) : 1 to 2hrs of recovery under the standard condition after the removal from test chamber. (CM—RB) TLF : Temperature : $-25 \pm 2^{\circ}\text{C}$ ※TLF14CB Temperature : $-40 \pm 2^{\circ}\text{C}$ Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.
21.High Temperature life test	Appearance : No abnormality Inductance change : Refer to individual specification		TLF9U・TLF25RA : Inductance change : Within $\pm 15\%$ TLF14CB : ・ Withstanding voltage : No abnormality ・ Insulation resistance : No abnormality		CM : Temperature : $85 \pm 2^{\circ}\text{C}$ Duration : 500 (+12, -0) hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber. (CM—RA) : 1 to 2hrs of recovery under the standard condition after the removal from test chamber. (CM—RB) TLF : Temperature : $85 \pm 2^{\circ}\text{C}$ ※TLF14CB Temperature : $105 \pm 3^{\circ}\text{C}$ Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.

CM-RA Type,CM-RB Type,TLF Type

Stages	Precautions	Technical considerations
1.Circuit Design	<p>Operating environment,</p> <p>1.The products described in this specification are intended for use in general electronic equipment,(office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.</p>	
2.PCB Design	<p>Design</p> <p>1.Please design insertion pitches of a base in the pitches that fitted a terminal interval.</p>	<p>1.When Inductors are mounted onto a PC board, hole dimensions on the board should match the lead pitch of the component, if not, it will cause breakage of the terminals or cracking of terminal roots covered with resin as excess stress travels through the terminal legs.</p>
3.Soldering	<p>Wave soldering</p> <p>1.Please refer to the specifications in the catalog for a wave soldering.</p> <p>2.Do not immerse the entire Inductors in the flux during the soldering operation.</p> <p>Lead free soldering</p> <p>1.When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, etc. sufficiently.</p> <p>Recommended conditions for using a soldering iron</p> <p>Put the soldering iron on the land-pattern.</p> <p>Soldering iron's temperature - Below 350 °C</p> <p>Duration - 3 seconds or less</p> <p>The soldering iron should not directly touch the product.</p>	<p>1.If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p>
4.Cleaning	<p>Cleaning conditions</p> <p>1.TLF type</p> <p>Please contact any of our offices for about a cleaning,</p>	
5.Handling	<p>Handling</p> <p>1.Keep the product away from all magnets and magnetic objects.</p> <p>Mechanical considerations</p> <p>1.Please do not give the product any excessive mechanical shocks.</p> <p>2.TLF type</p> <p>Please do not add any shock or and power to a product in transportation.</p> <p>Packing</p> <p>1.Please do not give the product any excessive mechanical shocks.</p> <p>In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).</p>	<p>1.There is a case that a characteristic varies with magnetic influence.</p> <p>1.There is a case to be damaged by a mechanical shock.</p> <p>2.TLF type</p> <p>There is a case to be broken by a fall.</p> <p>1.There is a case that a lead route turns at by a fall or an excessive shock.</p>
6.Storage conditions	<p>Storage</p> <p>1.To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.</p> <p>・Recommended conditions</p> <p>Ambient temperature 0~40°C</p> <p>Humidity Below 70% RH</p> <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used within one year from the time of delivery.</p> <p>In case of storage over 6 months, solderability shall be checked before actual usage.</p>	<p>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.</p>