有关敝公司产品的注意事项

请务必在使用敝公司产品之前阅读。

⚠ 注 意

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未按照本产品目录中所记载的内容或交货规格说明书使用敝公司产品，即便其致使用设备发生损害、不良情况等时，敝公司也不承担任何责任，敬请知悉。

签署交货规格说明书

就本产品目录中所记载产品的产品规格等相关内容，敝公司备有交货规格说明书，详情请向敝公司咨询。在使用敝公司产品前请务必就交货规格说明书之内容确认并批准之。

实装前的事前评估

使用敝公司产品时，请务必事先安装到使用设备之后，在实际使用的环境下进行评估和确认。

用途的限定

1. 可以使用的设备

本产品目录中所记载的产品预设为使用于一般电子设备 [音像设备、办公自动化设备、家电产品、办公设备、信息通讯设备 (手机、电脑等)] 以及面向本产品目录或是交货规格说明书中另行注明的设备的通用性、标准性用途。

另外，面向汽车用电子设备、电信基础设施 / 工业设备、医疗设备 (国际 (GHTF) 第一类、第二类、第三类) 方面的应用，敝公司也备有预设的产品线，请参考本产品目录或是交货规格说明书的内容，使用相对应的产品。

2. 需要另行确认的设备

若考虑将本产品目录中所记载的产品使用于当产品发生故障、品质不良，或是由此引起的运转失常而可能会危及生命、身体或是财产，以及有可能给社会造成深刻影响的以下设备 (不包括本产品目录或是交货规格说明书中另行注明可以使用设备) 等时，请务必事先向敝公司咨询。

(1) 运输用设备 (汽车驱动控制设备、火车控制设备、船舶控制设备等)
(2) 交通信号设备
(3) 防灾 / 保安设备
(4) 医疗设备 (国际 (GHTF) 第三类)
(5) 高公共性信息通讯设备 / 信息处理设备 (电话交换机、电话 / 无线 / 广播电视基站等)
(6) 其他与上述设备有同等品质与可靠性要求的设备

3. 禁止使用的设备

请勿将敝公司产品使用于对安全性和可靠性有着极高要求的以下设备。

(1) 航天设备 (人工卫星、火箭等)
(2) 航空设备 (注释1)
(3) 医疗设备 (国际 (GHTF) 第四类)、植体 (体内植入型) 医疗设备 (注释2)
(4) 发电控制设备 (面向核能 / 水力 / 火力发电厂等的设备)
(5) 海底设备 (海底中继设备、海中的作业设备等)
(6) 军事设备
(7) 其他与上述设备有同等品质与可靠性要求的设备

注释 1 ：仅限于对航空设备的安全运行不产生直接干扰的设备 [机内娱乐设备、机内照明设备、电动座椅、餐饮设备等]，在满足敝公司另行指定的相关条件时，亦可将敝公司产品用于以上用途。在贵公司考虑将敝公司的产品用于以上用途时，请务必事先向敝公司咨询相关的信息。

注释 2 ：包括注入人体内的部分和与此相连接的体外部分。

4. 责任的限制

未经敝公司的事先书面同意，把本产品目录中所记载的产品使用于非敝公司预设用途的设备、前述需要向敝公司咨询的设备或敝公司禁止使用的设备，从而给客户或第三方造成损害的，敝公司不承担任何责任，敬请知悉。

安全设计

需将敝公司的产品使用于对安全性和可靠性要求较高的设备、电路上时，请进行充分的安全性评估和可靠性评估。另外，请通过设置保护电路、保护装置的系统，设置冗余电路不会被单一故障影响安全性的系统等失效导向安全 (fail-safe) 设计，确保充分的安全性。

有关知识产权

本产品目录中所记载的信息是用于说明相关产品的典型操作以及相关应用。此类信息的使用不代表对于敝公司以及第三方的知识产权以及其他权利的使用许可或是不侵权保证。

保证范围

敝公司产品的保证范围仅限于已经交付的敝公司产品本身，由敝公司产品的故障或不良情况所诱发的损害，敝公司不承担任何责任，敬请知悉。但是，以书面形式另行签署了交易基本合同书、品质保证协定书等时，敝公司将根据该合同的条件提供保证。

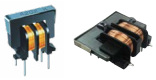
正规销售渠道

本产品目录中所记载的内容适用于从敝公司营业所、销售子公司、销售代理店 (即“正规销售渠道”) 购买的敝公司产品，并不适用于从其他渠道购买的敝公司产品，敬请知悉。

出口时的注意事项

本产品目录中所记载的部分产品在出口时须事先确认《外汇和对外贸易法》以及美国在出口管理方面的相关法规，并办理相关手续。如有不明之处，请向敝公司咨询。

导线型共模模式扼流线圈(交流线路用)



波峰焊

■型号标示法

※使用温度范围: -25～+105℃ (包含产品本身发热)

T	L	F	△	9	U	A	△	1	0	2	W	0	R	8	K	1
①			②		③			④			⑤	⑥			⑦	

△=空格

①类型

代码	类型
TLF	共模模式扼流圈
TLH	混合阻风门

②磁芯尺寸

代码	磁芯尺寸 [mm]
△9	9
10	10

③外型

代码	外型
UA△	U 形磁芯、垂直型
UAH	U 形磁芯、水平型
UB△	U 形磁芯、垂直分割绕线型

④标称电感值

代码 (例)	标称电感值 [μH]
102	1000
103	10000

⑤电感量公差

代码	电感量公差
△	公称值以上
W	＋100/－10%

⑥额定电流

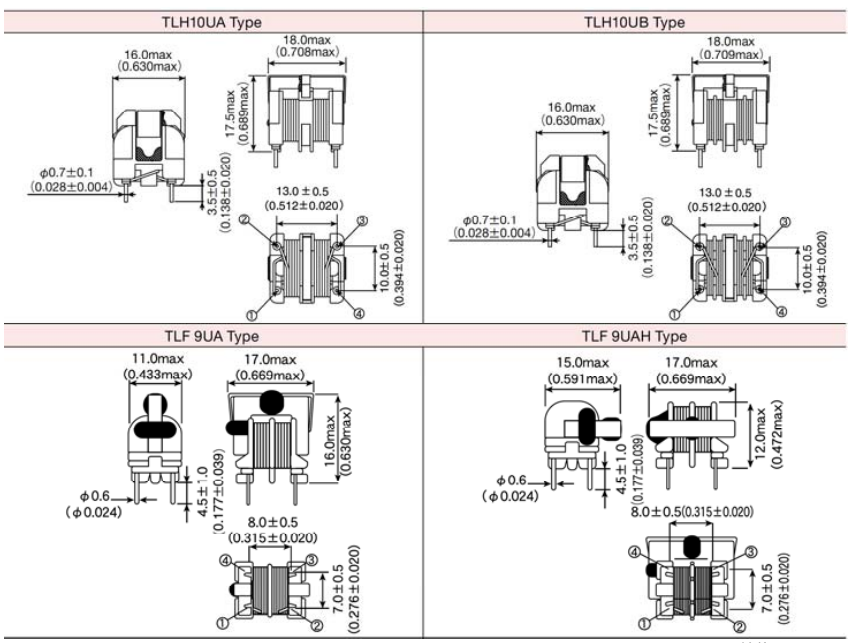
代码	额定电流 [A]
R54	0.54
0R8	0.8

※R=小数点

⑦本公司管理记号

代码	本公司管理记号
K1	标准品

■标准外型尺寸 / 最小订货单位数量



单位: mm (inch)

Type	Minimum quantity (pcs.) Box
TLH type	500
TLF type	

■型号一览

●TLH10UA 型（混成式扼流圈）

型号	EHS	共模模式 电感值 [mH]	电感值公差	正常模式 电感值 [mH] (typ.)	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	额定电压AC [V] (max.)
TLH10UA 901 2R0	RoHS	0.9	min.	0.067	0.089	2.0	250
TLH10UA 112 1R8	RoHS	1.1	min.	0.087	0.126	1.8	250
TLH10UA 152 1R6	RoHS	1.5	min.	0.126	0.171	1.6	250
TLH10UA 212 1R4	RoHS	2.1	min.	0.160	0.222	1.4	250
TLH10UA 282 1R2	RoHS	2.8	min.	0.215	0.272	1.2	250
TLH10UA 432 1R0	RoHS	4.3	min.	0.330	0.398	1.0	250
TLH10UA 622 0R8	RoHS	6.2	min.	0.430	0.578	0.8	250
TLH10UA 872 0R7	RoHS	8.7	min.	0.644	0.878	0.7	250
TLH10UA 992 0R6	RoHS	9.9	min.	0.836	1.138	0.6	250
TLH10UA 143 0R5	RoHS	14	min.	1.256	1.567	0.5	250

●TLH10UB 型（混成式扼流圈）

型号	EHS	共模模式 电感值 [mH]	电感值公差	正常模式 电感值 [mH] (typ.)	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	额定电压AC [V] (max.)
TLH10UB 701 2R0	RoHS	0.7	min.	0.056	0.097	2.0	250
TLH10UB 112 1R7	RoHS	1.1	min.	0.068	0.133	1.7	250
TLH10UB 142 1R4	RoHS	1.4	min.	0.113	0.214	1.4	250
TLH10UB 232 1R2	RoHS	2.3	min.	0.150	0.274	1.2	250
TLH10UB 352 1R0	RoHS	3.5	min.	0.232	0.422	1.0	250
TLH10UB 442 0R8	RoHS	4.4	min.	0.328	0.624	0.8	250
TLH10UB 872 0R7	RoHS	8.7	min.	0.580	0.982	0.7	250
TLH10UB 972 0R6	RoHS	9.7	min.	0.735	1.314	0.6	250
TLH10UB 113 0R5	RoHS	11	min.	0.877	1.577	0.5	250

●TLF 9UA 型

型号	EHS	共模模式 电感值 [mH]	电感值公差	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	额定电压AC [V] (max.)
TLF 9UA 102W0R8K1	RoHS	1.0	＋100/－10%	0.5	0.80	250
TLF 9UA 202WR54K1	RoHS	2.0	＋100/－10%	1.0	0.54	250
TLF 9UA 302WR42K1	RoHS	3.0	＋100/－10%	1.5	0.42	250
TLF 9UA 502WR32K1	RoHS	5.0	＋100/－10%	2.5	0.32	250
TLF 9UA 802WR25K1	RoHS	8.0	＋100/－10%	4.0	0.25	250
TLF 9UA 103WR23K1	RoHS	10	＋100/－10%	4.5	0.23	250

●TLF 9UAH 型

型号	EHS	共模模式 电感值 [mH]	电感值公差	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	额定电压AC [V] (max.)
TLF 9UAH102W0R8K1	RoHS	1.0	＋100/－10%	0.5	0.80	250
TLF 9UAH202WR54K1	RoHS	2.0	＋100/－10%	1.0	0.54	250
TLF 9UAH302WR42K1	RoHS	3.0	＋100/－10%	1.5	0.42	250
TLF 9UAH502WR32K1	RoHS	5.0	＋100/－10%	2.5	0.32	250
TLF 9UAH802WR25K1	RoHS	8.0	＋100/－10%	4.0	0.25	250
TLF 9UAH103WR23K1	RoHS	10	＋100/－10%	4.5	0.23	250

▶由于篇幅有限，本产品目录中只记载了有代表性的产品规格，若考虑使用敝公司产品时，请确认交货规格说明书中的详细规格。
另外，有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等)，请参阅敝公司网站(http://www.ty-top.com/)。

LEADED COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES
LEADED COMMON MODE CHOKE COILS FOR AC LINES

■PACKAGING

①Minimum Quantity

●TLH/TLF Type

Type	Minimum Quantity[pcs]
	Box
TLH10UA	1000
TLH10UB	
TLF9UA□	500
TLF9UB□	

LEADED COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES, LEADED COMMON MODE CHOKE COILS FOR AC LINES

■RELIABILITY DATA

1. Operating Temperature Range		
Specified Value	TLH, TLF Type	−25～＋ 105℃
Test Method and Remarks	Including temperature rise due to self−generated heat.	

2. Storage temperature range		
Specified Value	TLH, TLF Type	−40～＋ 85℃

3. Rated current		
Specified Value	TLH, TLF Type	Within the specified range
Test Method and Remarks	TLH10U : The maximum value of AC current within the temperature rise of 60℃ TLF9UA : The maximum value of AC current within the temperature rise of 45℃ TLF9UB : The maximum value of DC current within the temperature rise of 45℃	

4. Inductance		
Specified Value	TLH, TLF Type	Within the specified tolerance
Test Method and Remarks	TLF9U : Measuring equipment : LCR meter 4284A or its equivalent Measuring frequency : 1kHz Measuring voltage : 1Vrms TLH、TLF(except TLF9U) : Measuring equipment : LCR meter 4284A or its equivalent Measuring frequency : 1kHz Measuring voltage : 0.1Vrms	

5. DC resistance		
Specified Value	TLH, TLF Type	Within the specified tolerance
Test Method and Remarks	Measuring equipment : DC ohmmeter	

6. Terminal strength tensile force		
Specified Value	TLH, TLF Type	No abnormality
Test Method and Remarks	TLH10UA, TLH10UB, TLF9U : Apply the stated tensile force gradually in the direction to draw terminal. force [N] / duration [s]: 5 / 30±5 TLF (except TLF9U): Apply the stated tensile force gradually in the direction to draw terminal. force [N] / duration [s]: 10 / 30±5	

7. Insulation resistance between wires		
Specified Value	TLH, TLF Type	100MΩmin.
Test Method and Remarks	Applied voltage : 500VDC (TLH, TLF (except TLF9UB)) : 250VDC (TLF9UB) Duration : 60sec.	

8. Insulation resistance between wire and core		
Specified Value	TLH, TLF Type	100MΩ min.(except TLH)
Test Method and Remarks	TLF : Applied voltage : 500VDC (TLF (except TLF9UB)) : 250VDC (TLF9UB) Duration : 60 sec.	

9. Withstanding : between wires		
Specified Value	TLH, TLF Type	No abnormality
Test Method and Remarks	Applied voltage : 2000VAC (TLH, TLF (except TLF9UB)) : 500VDC (TLF9UB) Duration : 60sec	

10. Withstanding : between wires and core		
Specified Value	TLH, TLF Type	No abnormality(except TLH)
Test Method and Remarks	TLF : Applied voltage : 2000VAC (TLF (except TLF9UB)) : 500VDC (TLF9UB) Duration : 60sec.	

11. Rated voltage		
Specified Value	TLH, TLF Type	Within the specified range
Test Method and Remarks	TLH, TLF (except TLF9UB) : 250VAC TLF9UB : 50VDC	

12. Resistance to vibration		
Specified Value	TLH, TLF Type	TLF9U : Inductance change : Within ±5% TLH, TLF (except TLF9U) : Appearance is no abnormality and within the specified range
Test Method and Remarks	TLH, TLF : According to JIS C60068-2-6. 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 196m/s^2) Mounting method : soldering onto PC board Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs.	

13. Solderability		
Specified Value	TLH, TLF Type	At least 90% of terminal electrode is covered by new solder.
Test Method and Remarks	TLH, TLF : Solder temperature : 235±0.5℃ Duration : 2±0.5sec. Immersion depth : Up to 1.5 to 2.0mm from PBC mounted level. TLH, TLF : Solder temperature : 245±5℃ Duration : 4±1sec. Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level.	

14. Resistance to soldering heat

Specified Value	TLH, TLF Type	TLF9UA : Inductance change : Within ±5%
Test Method and Remarks	TLH, TLF : Solder temperature : 260±5℃ Duration : 5±0.5sec. Immersion depth : Up to 1.5 to 2.0mm 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. TLH, TLF : Solder temperature : 260±5℃ Duration : 10±1sec. 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.	

15. Thermal shock

Specified Value	TLH, TLF Type	TLF9UA : Inductance change : Within ±15% TLH, TLF (except TLF9UA) : Withstanding voltage : No abnormality Insulation resistance : No abnormality
Test Method and Remarks	TLH, TLF : According to JIS C60068-2-14. Conditions for 1 cycle -25℃～+85℃、keep each 30min 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.	

16. Damp heat

Specified Value	TLH, TLF Type	TLF9UA : Inductance change : Within ±15% TLH, TLF (except TLF9UA) : Withstanding voltage : No abnormality Insulation resistance : No abnormality
Test Method and Remarks	TLH, TLF : Temperature : 60±2℃ : 40±2℃ (※except TLF9U) 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.	

17. Loading under damp heat

Specified Value	TLH, TLF Type	Withstanding voltage : No abnormality Insulation resistance : No abnormality
Test Method and Remarks	TLH, TLF : Temperature : 60±2℃ : 40±2℃ (※except TLF9U) Humidity : 90～95%RH Duration : 100 hrs : 500 hrs Apply rated current across windings (※except TLF9U) Applied voltage : Apply the following specified voltage between windings. TLF9UA : 250VAC TLF9UB : 50VDC Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.	

18. Low temperature life test		
Specified Value	TLH, TLF Type	TLF9U : Inductance change : Within ±15% TLH, TLF (except TLF9U) : Withstanding voltage : No abnormality Insulation resistance : No abnormality
Test Method and Remarks	TLH, TLF : Temperature : −25±2℃ : −40±2℃ (※TLF・TLH) Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.	

19. High Temperature life test		
Specified Value	TLH, TLF Type	TLF9U : Inductance change : Within ±15% TLH, TLF (except TLF9U) : Withstanding voltage : No abnormality Insulation resistance : No abnormality
Test Method and Remarks	TLH, TL F : Temperature : 105±3℃ (※ TLF・TLH) Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.	

LEADED COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES, LEADED COMMON MODE CHOKE COILS FOR AC LINES

■PRECAUTIONS

1. Circuit Design	
Precautions	◆Operating environment 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.

2. PCB Design	
Precautions	◆Design 1. Please design insertion pitches as matching to that of leads of the component on PCBs.
Technical considerations	◆Design 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.

3. Soldering	
Precautions	◆Wave soldering 1. Please refer to the specifications in the catalog for a wave soldering. 2. Do not immerse the entire inductor in the flux during the soldering operation. ◆Lead free soldering 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. ◆Recommended conditions for using a soldering iron ・ Put the soldering iron on the land-pattern. ・ Soldering iron's temperature – Below 350°C ・ Duration – 3 seconds or less ・ The soldering iron should not directly touch the product.
Technical considerations	◆Lead free soldering 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. ◆Recommended conditions for using a soldering iron 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.

4. Cleaning	
Precautions	◆Cleaning conditions 1. Please contact any of our offices for about a cleaning.

5. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Mechanical considerations 1. Please do not give the product any excessive mechanical shocks. 2. Please do not add any shock or power to a product in transportation. ◆Packing 1. Please do not give the product any excessive mechanical shocks. In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).
Technical considerations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by a fall. ◆Packing 1. There is a case that a lead route turns at by a fall or an excessive shock.

6. Storage conditions	
Precautions	◆Storage 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. ・ Recommended conditions Ambient temperature : 0～40℃ Humidity : Below 70% RH The ambient temperature must be kept below 30℃. Even under ideal storage conditions, the solderbility of electrodes decreases gradually, so the products should be mounted within one year from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.
Technical considerations	◆Storage 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.