



TLVR Power Inductor

ARTIFICIAL INTELLIGENCE (AI)

Table of contents



01

TLVR@Lc suggestion

TLVR @Lc 建議

02

Short circuit cause

短路原因

03

Anti -EMI version

抗EMI版本

04

Specifications

規格

01

TLVR @Lc suggestion

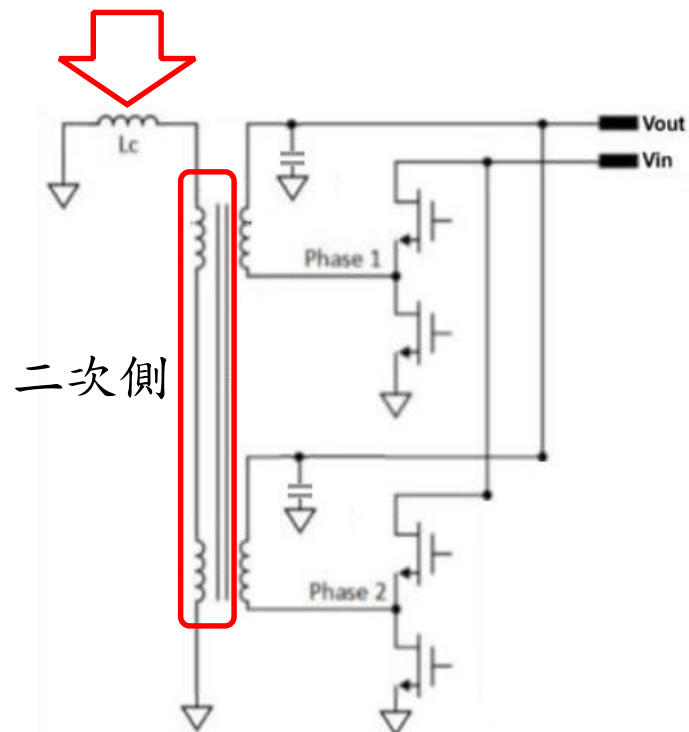
TLVR @Lc 建議

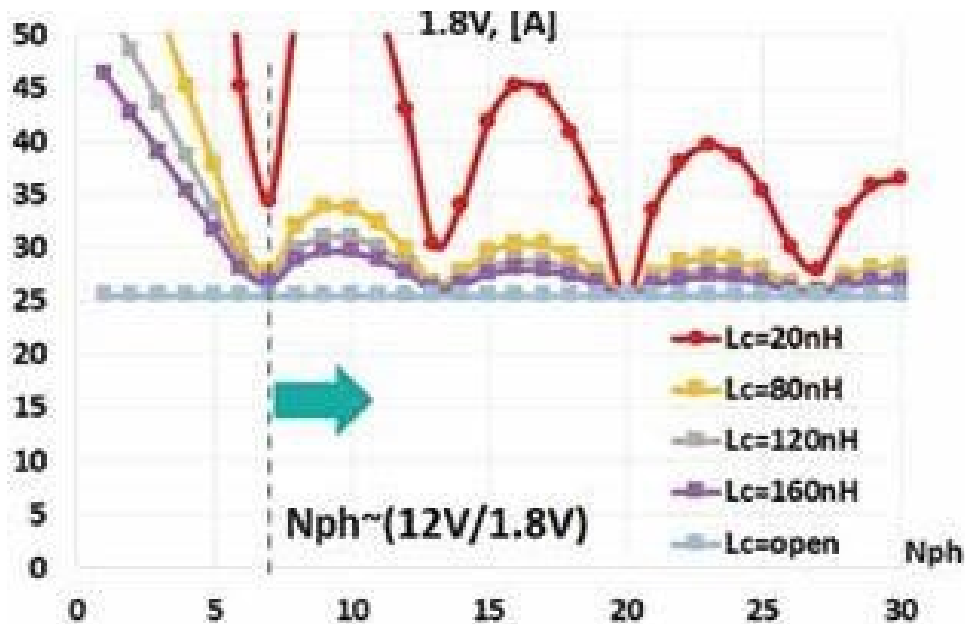
TLVR circuits can optimize the change of voltage and current Ripple during the "transient period", and the inductance leakage inductance (about 5nH) of TLVR circuits is small and efficient, and the LC inductance is one of the key points for optimizing current Ripple.

The purpose of LC is to link the entire string (secondary-side) inductor, the purpose is to strengthen the "correlation" of each phase, such as removing LC (open circuit) to become Buck discrete inductor, such as Lc short circuit, when each correlation has the strongest instantaneous performance, but Ripple and efficiency are also the worst.

LC is a compensation inductor (tuned inductor), and the design points of this inductor are as follows:

1. High pressure resistant
2. Tolerance within 20%





LC sets how much is optimal ?

The primary side inductance value* ≈ 1.8 is a setting that balances the phase correlation with instantaneous performance and Ripple and efficiency.

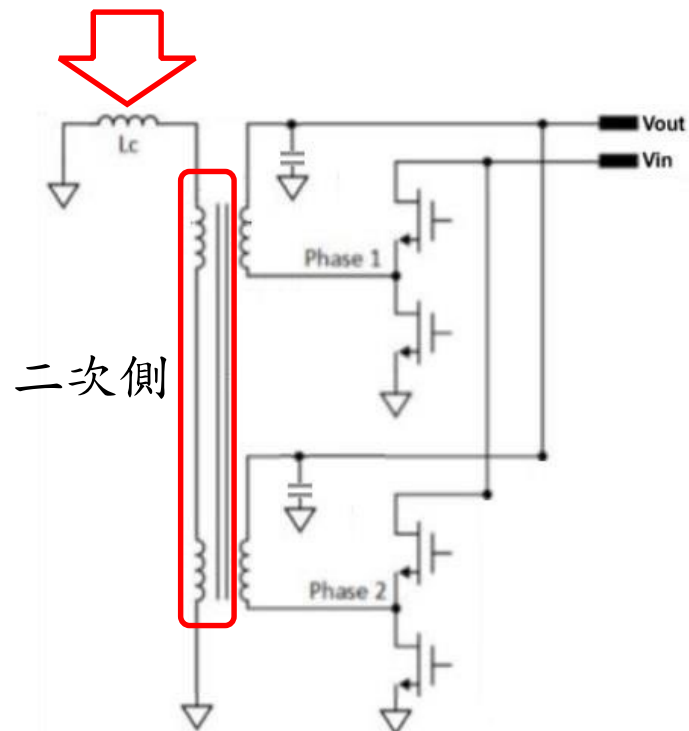
Note: Under FM settings.

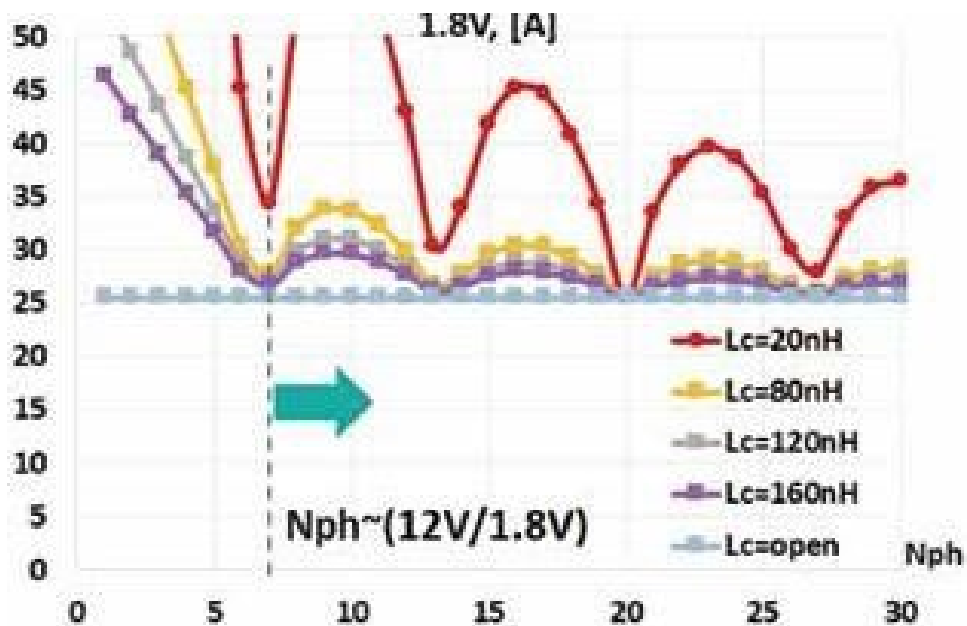
TLVR的電路是可以優化“瞬變期”的電壓及電流Ripple的變化，TLVR電路的電感漏感(約5nH)要小及效率要高外，其中的Lc電感就是優化電流Ripple的其中一項重點。

Lc的目的是鏈結整串(二次側)電感，目的是強化各相位的“相關性”，如將LC去除(開路)就成為Buck分離式電感，如Lc短路，這時各相關性最強有最快的暫態效能，但Ripple及效率也是最差時。

Lc為補償電感(調諧電感)，此電感的設計要點如下：

1. 抗高壓
2. 公差20%內





Lc 設定多少最佳？

一次側感值 ≈ 1.8 時是各相位
相關性與暫態效能及Ripple
及效率較為平衡的設定。

註：調頻設定下。

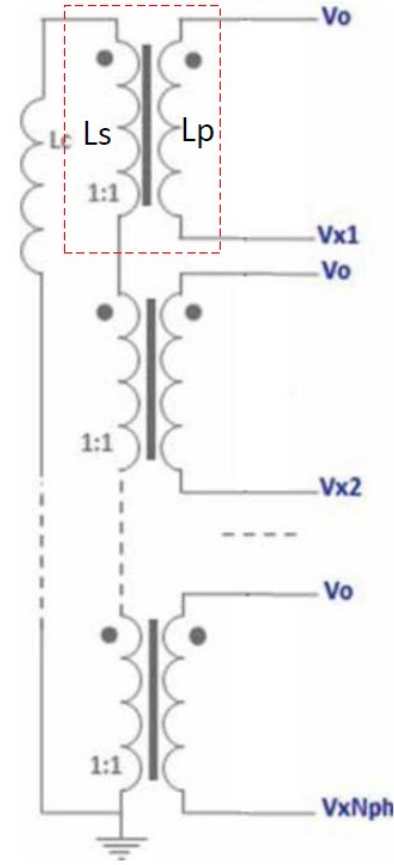
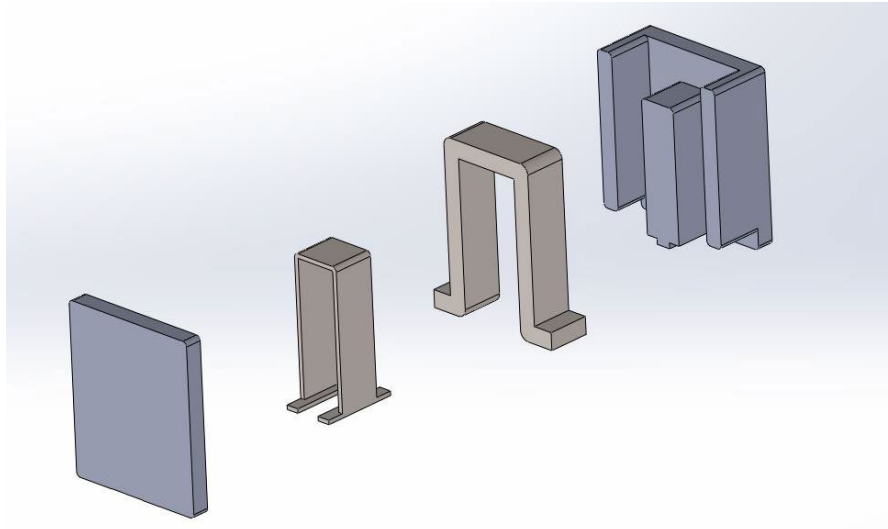


02

Short circuit cause

短路原因

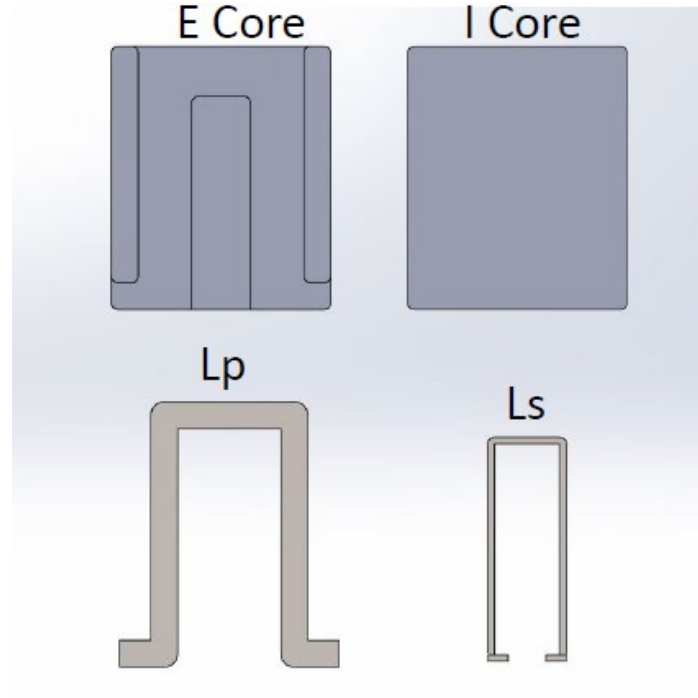
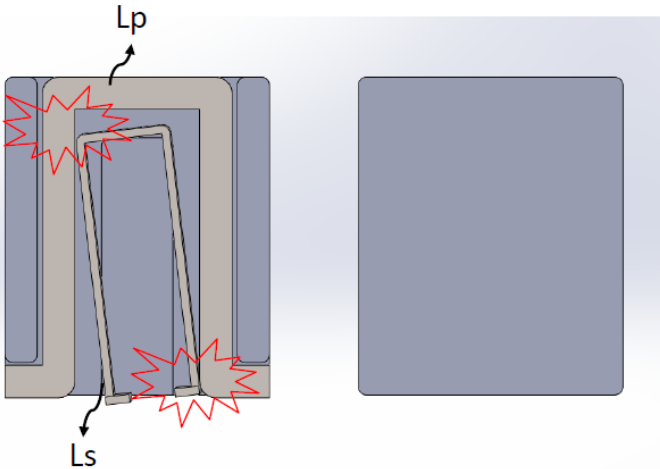
TLVR system is a circuit designed by Intel, this circuit 2K7 is designed to reduce voltage transient drop and reduce ripple rate and other problems, the focus of this circuit is on TLVR inductor red dotted frame frame, this inductor is a 1 1 transformer, is two groups of conductors wound on the same core to correct voltage transient drop and reduce ripple rate and other problems.

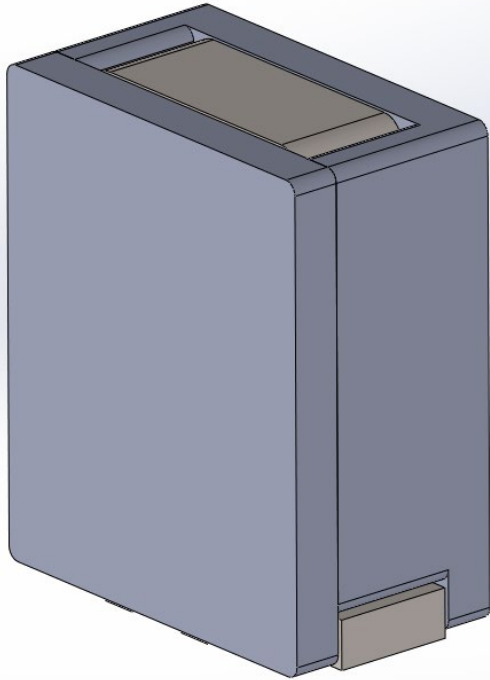


FORMOSA INDUCTOR CORP.

When personnel assemble the inductor, if the LP or Ls is accidentally offset or tilted, it will cause a short circuit or near short circuit of the two sets of conductors, which will cause the motherboard to burn out.

The picture on the right shows the appearance of the current market design, without card slot prevention Stop Lp and Ls from being exposed and causing short circuits.



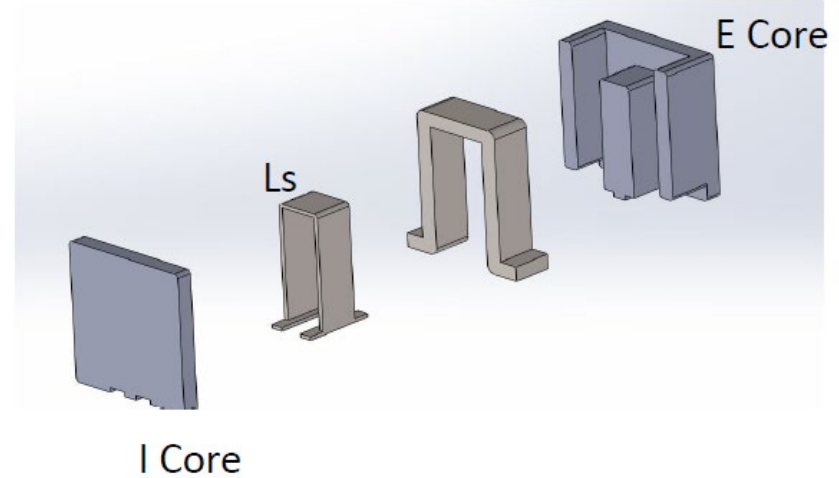
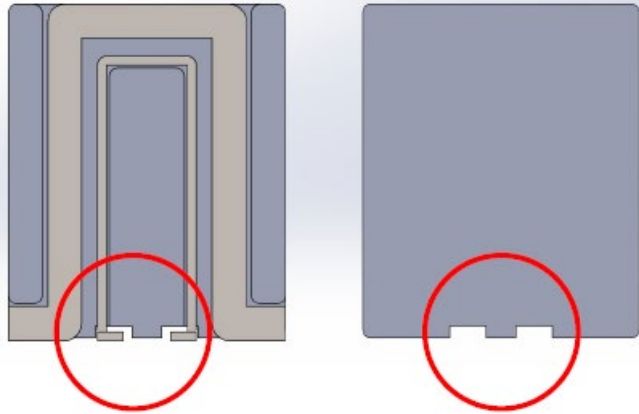


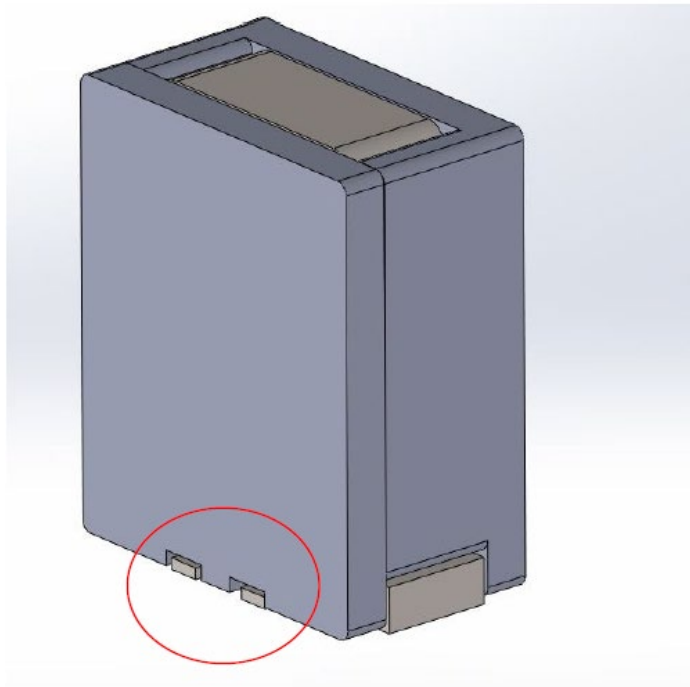
If the personnel assembly is abnormal, it will cause the internal LP or Ls to be offset or tilted, such as LP and Ls short circuit or in the case of fast short circuit, this condition is completely invisible from the appearance of the finished product.

For example, in the case of fast short circuit but not short circuit, because Ls and Lp two group conductors are positive temperature coefficient materials, because of the thermal expansion and contraction effect of thermal expansion "thermal expansion produces Lp and Ls short circuit situation °

Slots are made on the lower edge of the I Core and ECore so that the Ls gets stuck in the card slot to prevent it Ls has the possibility of Lp coming into contact with Ls due to problems such as drift or tilt caused by personnel assembly.

The red circle below shows the groove





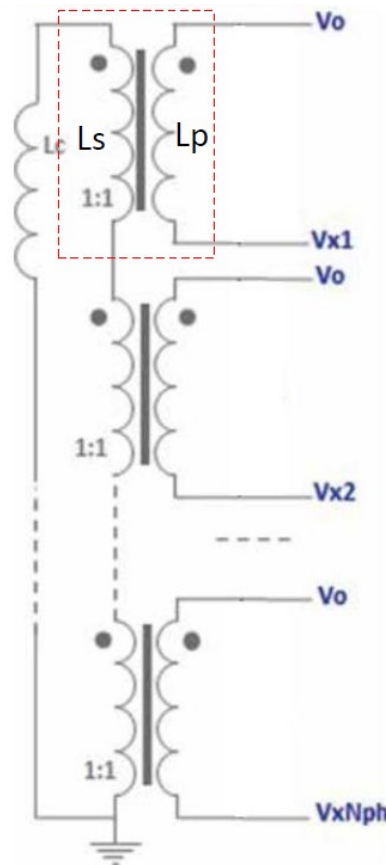
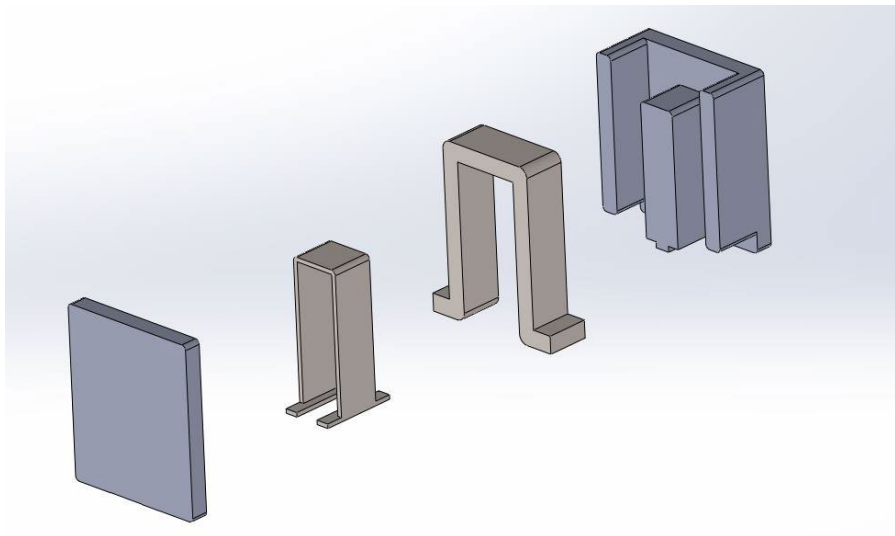
Patent pending

The picture on the left is the assembled finished drawing, and the red circle shows that the Ls conductor is stuck in the card slot, which can 100% guarantee the possibility of short circuit caused by LP and Ls contact.



Bottom appearance perspective

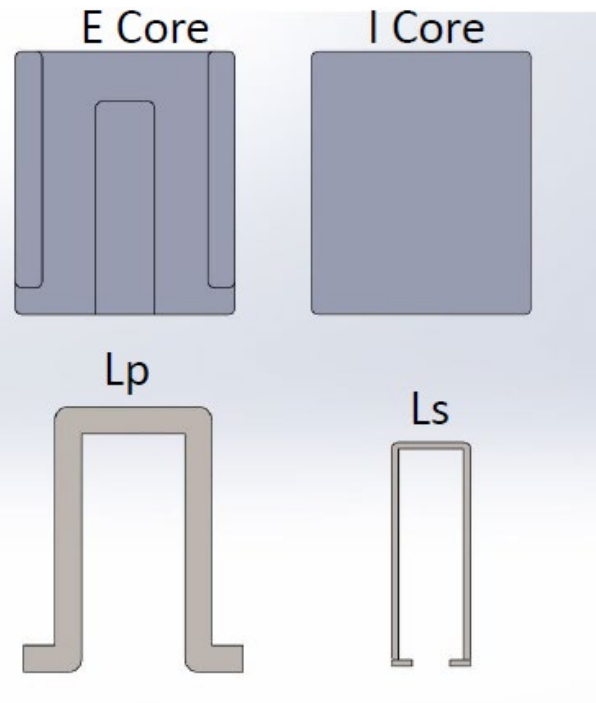
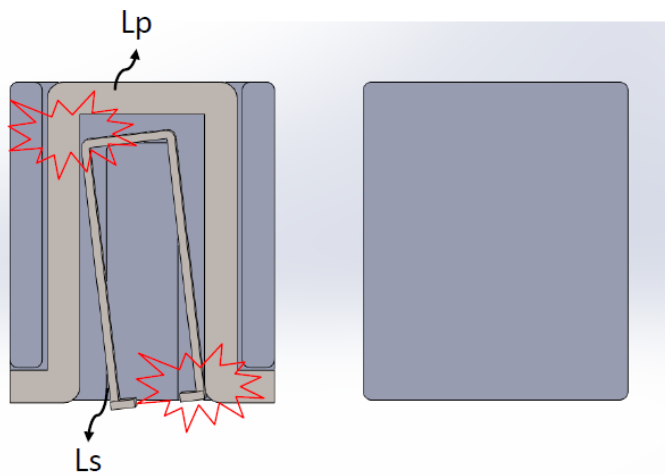
TLVR系統為 Intel 設計的電路，此電路2K7目的在下修電壓瞬降及降低漣波率等問題，此電路的重點在TLVR電感 紅色虛線框框，此電感為 1:1 變壓器，是二組導體共繞在同一鐵芯上達到修正電壓瞬降及降低漣波率等問題。

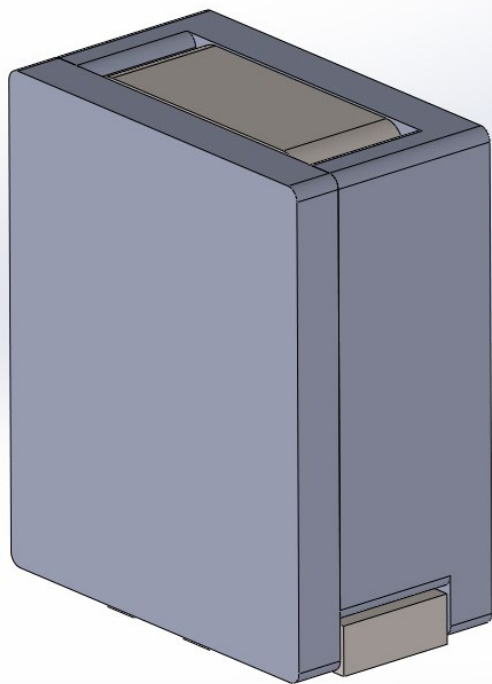


FORMOSA INDUCTOR CORP.

人員組裝該電感時，如不慎造成 L_p 或 L_s 有偏移或傾斜時會造成二組導體短路或快要短路，此短路將會造成主機板有燒燬的大問題。

右圖為現市場設計的外觀，無卡槽防止 L_p 及 L_s 有接觸可能而造成短路。



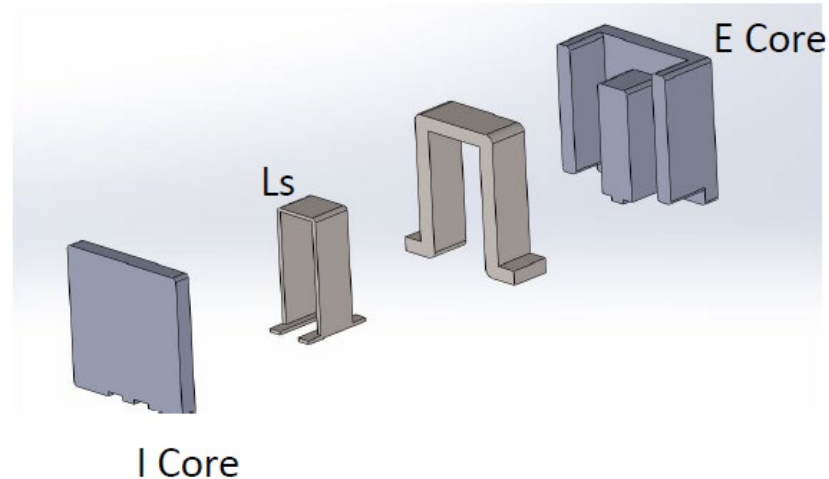
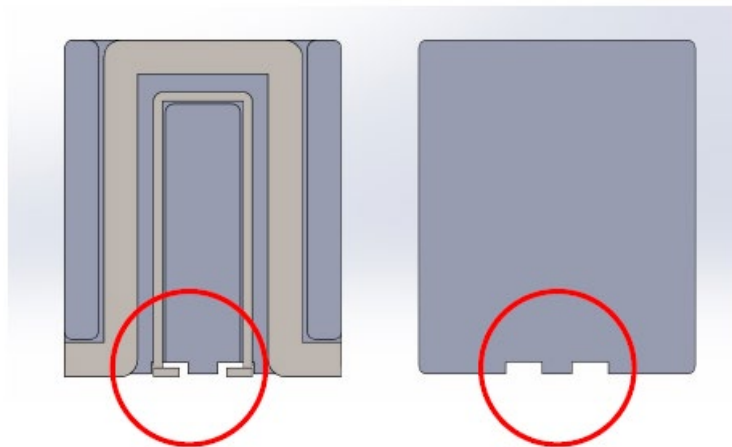


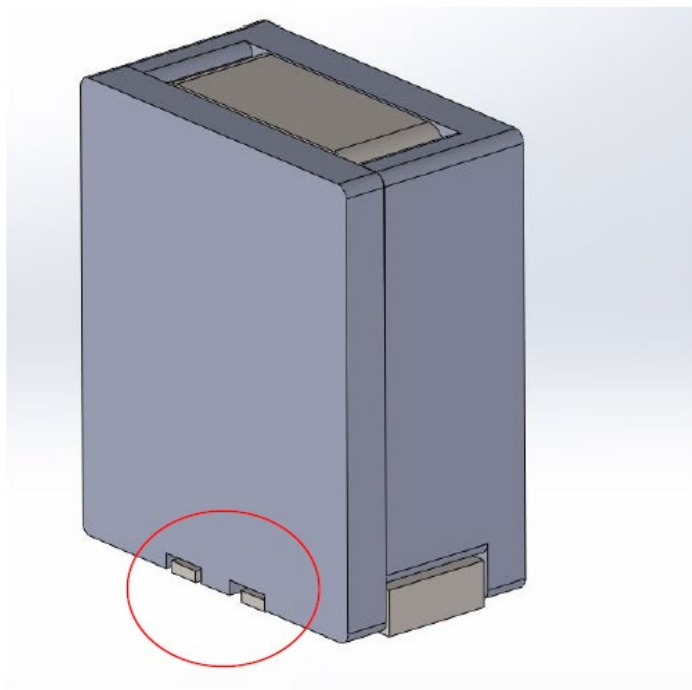
如人員組裝異常將會造成內部 L_p 或 L_s 偏移或傾斜，如 L_p 及 L_s 短路或處於快短路的情況下時，此裝況由成品的外觀上是完全看不出來。

如快短路情況下但未短路時，因為 L_s 及 L_p 二組導體是正溫度系數材料，因為熱脹冷縮效應的“熱膨脹產生 L_p 及 L_s 出現短路的狀況。

在 I Core 及 E Core 的下緣開槽，讓 Ls 卡在卡槽內，防止 Ls 因為人員組裝不慎造成的偏移或傾斜等問題而產生 Lp 與 Ls 有接觸的可能性。

下圖紅色圈圈為開槽處





申請專利中

左圖為組裝成品圖，由紅色圈圈可以看出 Ls 導體已卡在卡槽內，此裝況就可以 100% 保證 Lp 及 Ls 無接觸造成短路的可能性。



底部外觀視角



03

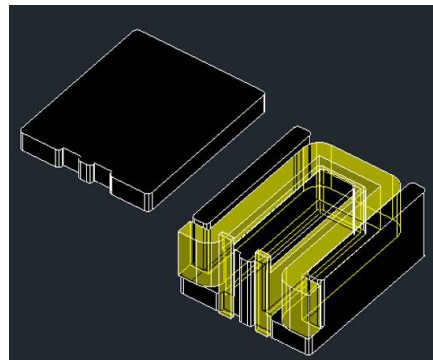
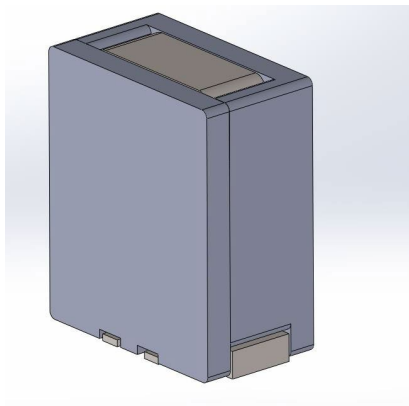
Anti - EMI version

抗EMI版本



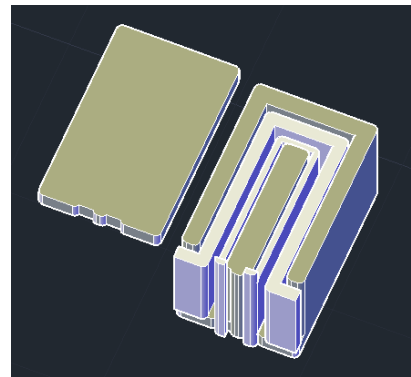
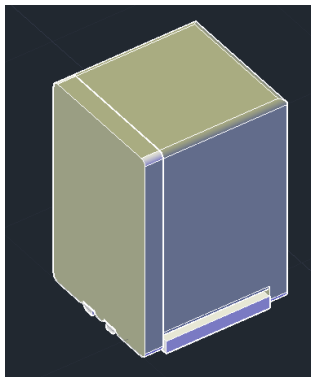
General type

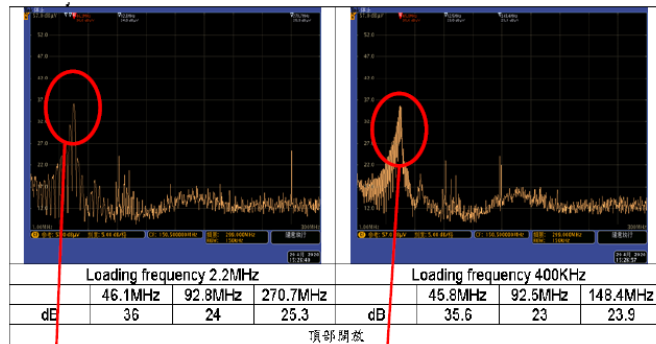
一般型



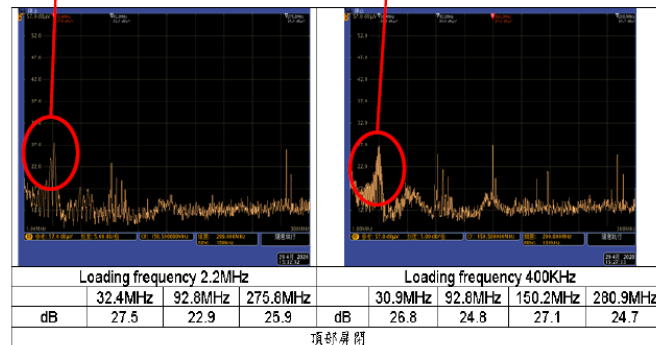
EMI resistant type
(It can also be in contact with
the top guide by anti-fly wire)

抗EMI 型
(亦可以抗飛線與頂部導片接觸)





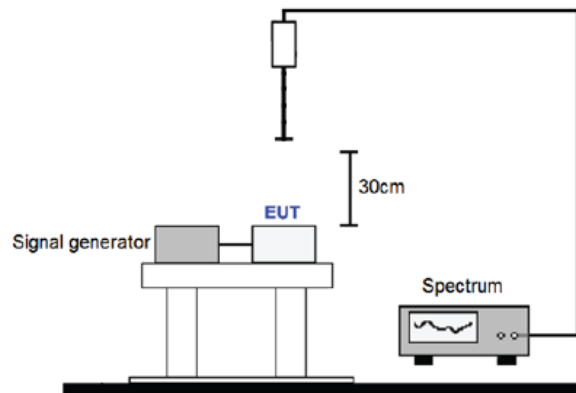
頂部開放



頂部屏閉

Loading frequency 400KHz
 Loading frequency 2.2MHz
 Detector Mode : PK

↓



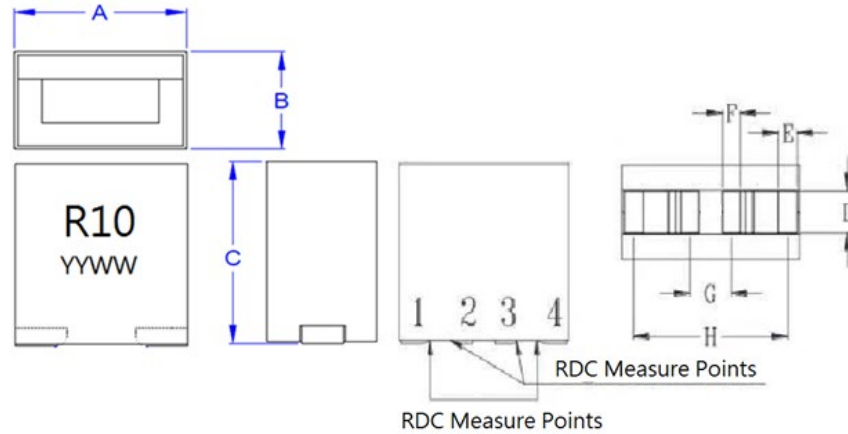


04

Specifications

規格

FRPI100612 Series



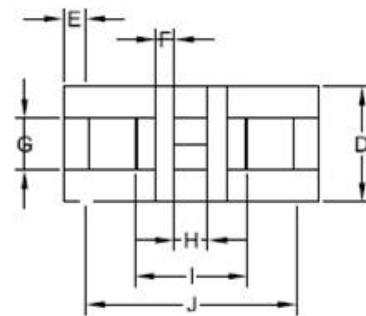
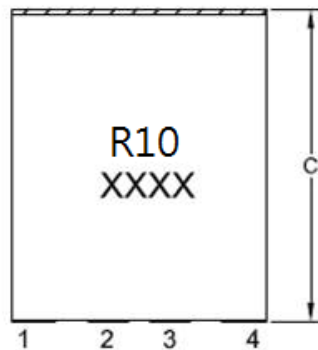
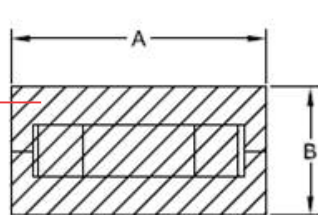
Type	A/mm	B/mm	C/mm	D/mm	E/mm	F/mm	G/mm	H/mm
FRPI100612	10.0max	6.0max	12.0max	3.4±0.2	1.2±0.2	0.6±0.1	2.45±0.2	9.0±0.3

FRPI100612 Series

Part Number	Inductance	RDC(P)	RDC(S)	P - I SAT (Typ.)	P - I RMS (Typ.)	S - I RMS (Typ.)	Marking
FRPI100612-R10L	100nH± 15%	0.12 m Ω ± 10%	0.37 m Ω ± 10%	125 A	78 A	45 A	R10
FRPI100612-R12L	120nH± 15%	0.12 m Ω ± 10%	0.37 m Ω ± 10%	102A	78A	45A	R12
FRPI100612-R15L	150nH± 15%	0.12 m Ω ± 10%	0.37 m Ω ± 10%	75A	78A	45A	R15
FRPI100612-R20L	200nH± 15%	0.12 m Ω ± 10%	0.37 m Ω ± 10%	60A	78A	45A	R20

FRPE100512A Series

麥拉膠帶



Type	A/mm	B/mm	C/mm	D/mm	E/mm
FRPE100512A	10.0max	5.0max	12.0max	4.5±0.3	0.9±0.3
	F/mm	G/mm	H/mm	I/mm	J/mm
	0.73	2.0	1.3	4.4	7.8

FRPE100512A R10L

Part Number	P-Ls	RDC(P)	RDC(S)	P- I RMS (Typ.)	S - I RMS (Typ.)
FREI100512A-R10L	100nH± 15%	0.15 m Ω± 10%	0.56 m Ω± 10%	70 A	36 A
	P- I SAT (Typ.)	P- I SAT (Typ.)	P- I SAT (Typ.)	L@ P - I SAT Min	
	25°C	100°C	125°C		
	90A	77A	72A	72nH	

FRPE100512A R15L

Part Number	P-Ls	RDC(P)	RDC(S)	P- I RMS (Typ.)	S - I RMS (Typ.)
FRPE100512A-R15L	150nH± 15%	0.15 m Ω± 10%	0.56 m Ω± 10%	70 A	36 A
	P- I SAT (Typ.)	P- I SAT (Typ.)	P- I SAT (Typ.)	L@ P - I SAT Min	
	25°C	100°C	125°C		
	78A	73A	68A	108nH	

FRPE100512A R20L

Part Number	P-Ls	RDC(P)	RDC(S)	P- I RMS (Typ.)	S - I RMS (Typ.)
FRPE100512A-R20L	200nH± 15%	0.15 m Ω± 10%	0.56 m Ω± 10%	70 A	36 A
	P- I SAT (Typ.)	P- I SAT (Typ.)	P- I SAT (Typ.)	L@ P - I SAT Min	
	25°C	100°C	125°C		
	35A	30A	30A	156nH	