



乾坤科技



Customer: TI

Cyntec P/N: VT-19151B

March 20, 2023



Design Form of xEV Magnetics

General DC-DC Transformer (L2+L3)

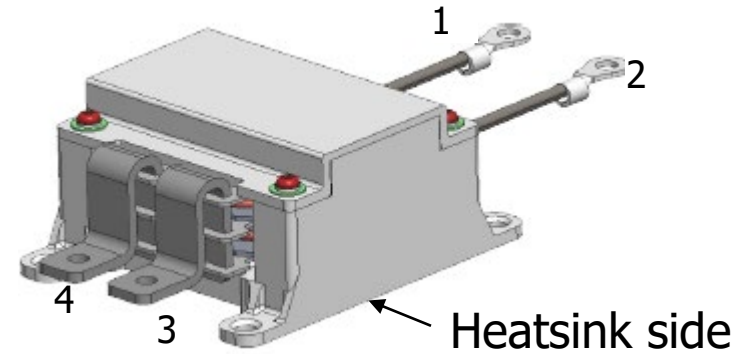
Circuit topology	PSFB	
Input voltage range (V)	200V-470V	
Output voltage range (V)	9V-15V	
Output current (A)	300A (max)	
Switching frequency (kHz)	100kHz	
Maximum duty cycle	45% (due to control IC)	
Primary inductance (μH)	(in the range of 500 μH – 1mH) to be selected by Cytec	
Leakage inductance (μH)	To be Minimized, plus shim inductance (can be integrated with transformer housing but needs to have access to the inductor terminals) = 0.5 μH	
Winding turn ratio	Pri: Sec = 11 : 1	
Maximum temperature of transformer ($^{\circ}\text{C}$) (self temperature rise included)	100 $^{\circ}\text{C}$ including core temperature	
Cooling conditions and maximum ambient temperature ($^{\circ}\text{C}$)	Air cool, 70 $^{\circ}\text{C}$ maximum ambient	
Dielectric strength / Hi-pot (Vac)	Primary to Secondary	5kV rms for 1 minute
	Primary to Core	2.5kV rms for 1 minute (assuming core is thermally coupled to heatsink and touchable)
	Secondary to Core	500 Vac
Safety spacing requirement (clearance and creepage distance in mm)	Primary to Secondary	6.1mm minimum
	Primary to Core	6.1mm minimum
	Secondary to Core	Meet 500Vac Hi-pot
Safety standards (<i>Recommended stds, like as UL 2202, UL 458A, IEC 60664-1 & IEC 60950-1 or others.</i>)	IEC 60664-1	
Specified lead wire & terminal (<i>optional</i>)	design by cyntec	
Potting requirement (<i>optional</i>)	design by cyntec	
Maximum available space (L x W x H in mm)	design by cyntec, prefer lower height	
Assembly method	design by cyntec	

Proposal Overview

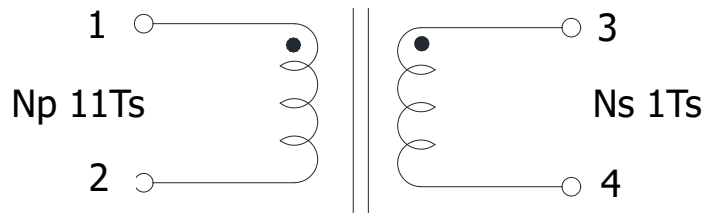
Item	Lp (1-2) @100kHz/1V (μH)	Lk @100kHz/1V (Sec. shorted) (μH)	Turn Ratio	L(1-2) DCR (mΩ)	L(3-4) DCR (mΩ)	Dielectric Strength / Hi-pot (Vac):		
						PRI- SEC	PRI- Core	SEC- Core
Customer's Request	500~1000	To be minimized	11:1	-	-	5000	2500	500
VT-19151B	500 Min.	*2.0 TYP	11:1	9.7 Typ.	0.1 Typ.	5000	2500	500

Note :

- 100% check before shipment and don't care Cpk.
- PRI - SEC min. creepage/clearance: 6.1mm
- $L_{Resonant} = L_{k_trans} + L_{inductor} = 2.0 + 3.0 = 5.0 \mu H$



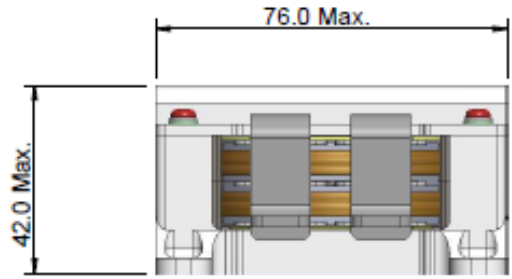
➤ Schematic



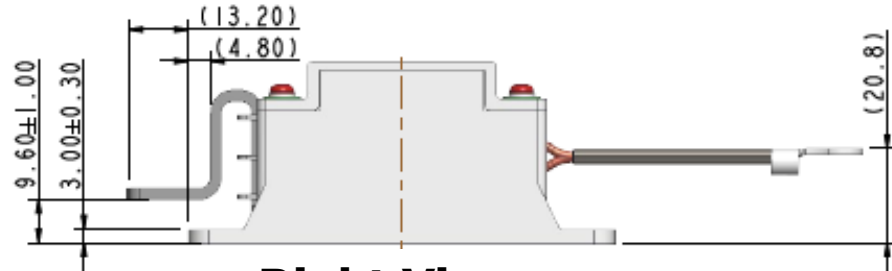
	Estimated Loss
PRI.	2.96 W
SEC.	3.92 W
Core	7.26 W

Size: 94.5 * 76.0 * 42.0 mm³ Max.

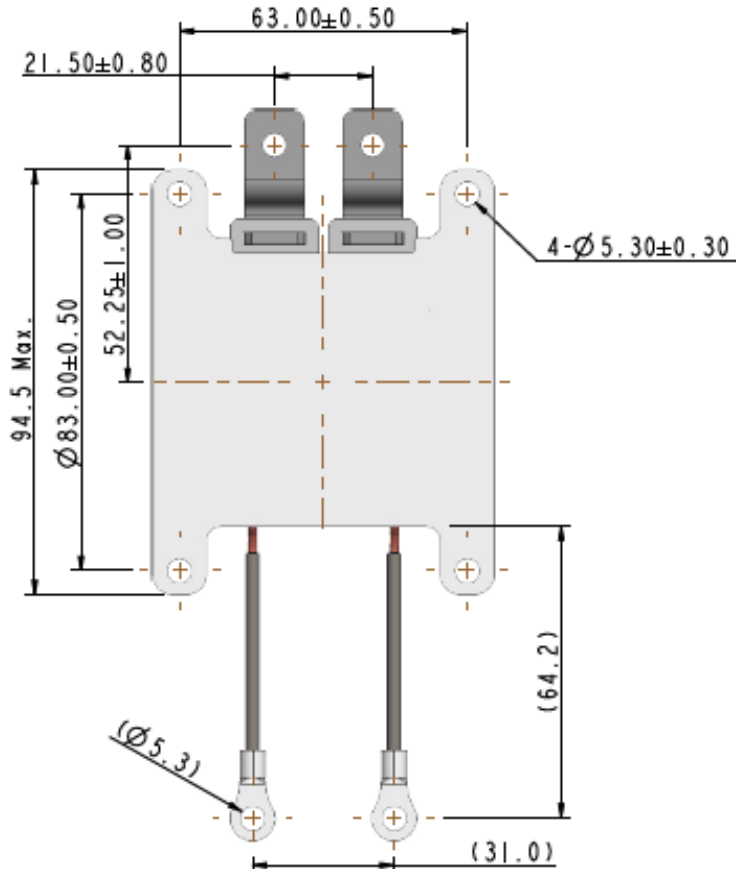
Mechanical Drawing & Dimensions



Front View



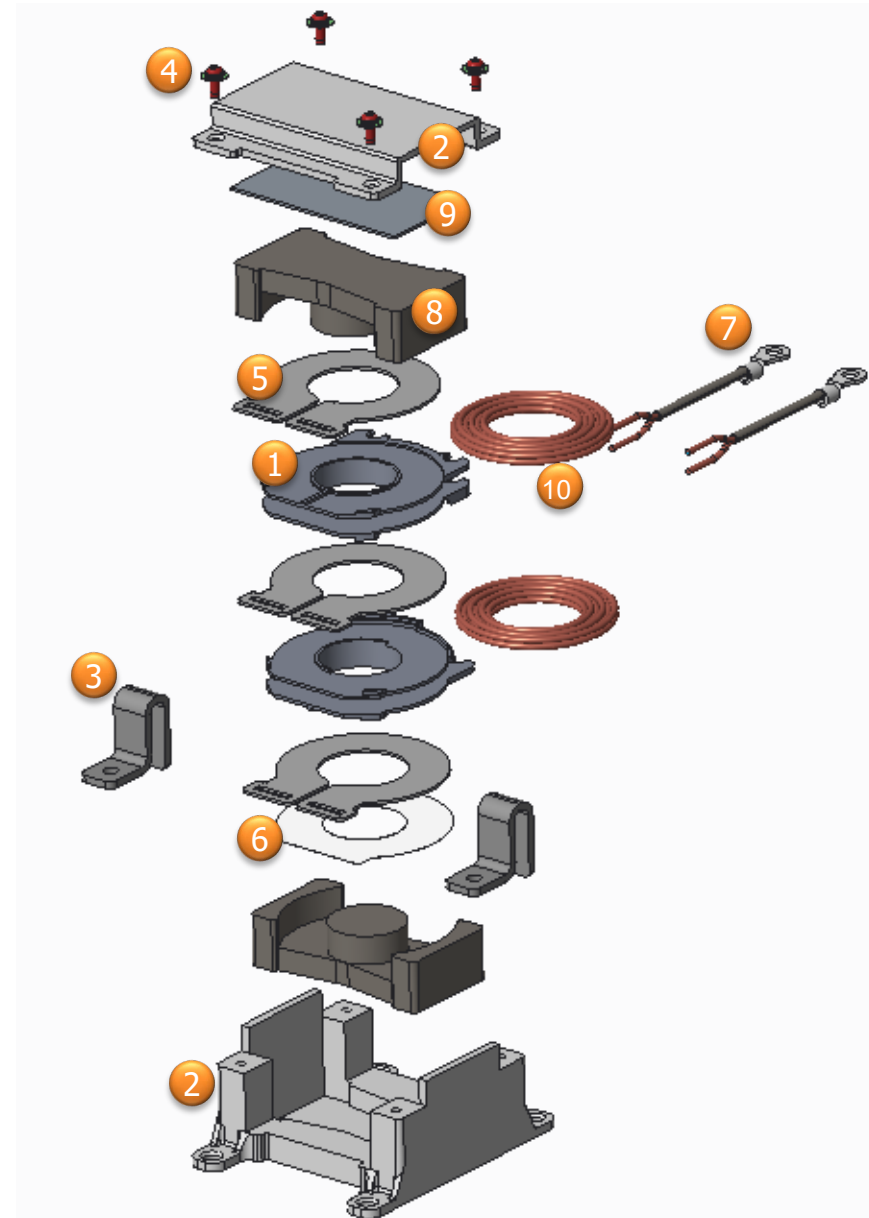
Right View



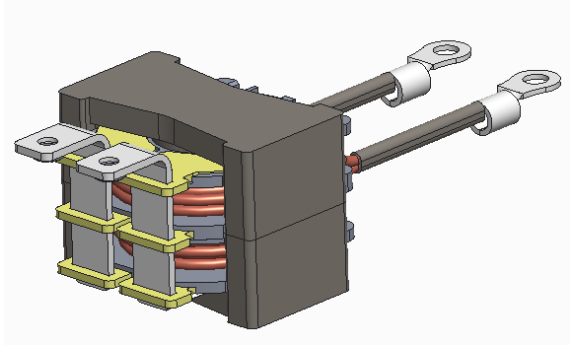
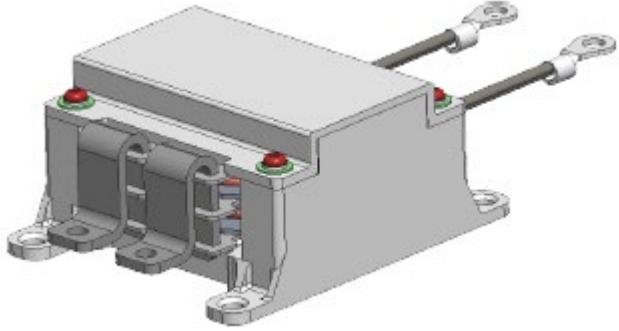
Bottom View

Material List

Item	Name	Material
1	Bobbin	Phenolic
2	Heat Sink	Aluminum
3	Clip	Copper Alloy
4	Screw	Stainless
5	Sec Winding	Copper Alloy
6	Nomex	Meta Aramid
7	Terminal	Copper Alloy
8	Core	DMR95
9	Thermal Pad	Silicone
10	Wire	Litz Wire



Dimensions & Loss Comparison

Version	A	B
Fig.		
Turn Ratio	11 : 1	11 : 1
Volume	76.1* 65.7* 50 mm (249988 mm ³)	94.5* 76.0* 42.0 mm (353433 mm ³)
Lk	4.4 uH	2.0 uH
PRI.	1.86 W	2.96 W
SEC.	3.98 W	3.92 W
Core	9.97 W	7.26 W
Total Loss	15.81 W	14.14 W

➤ Estimated condition : Vin:380 V / Vo:15 V