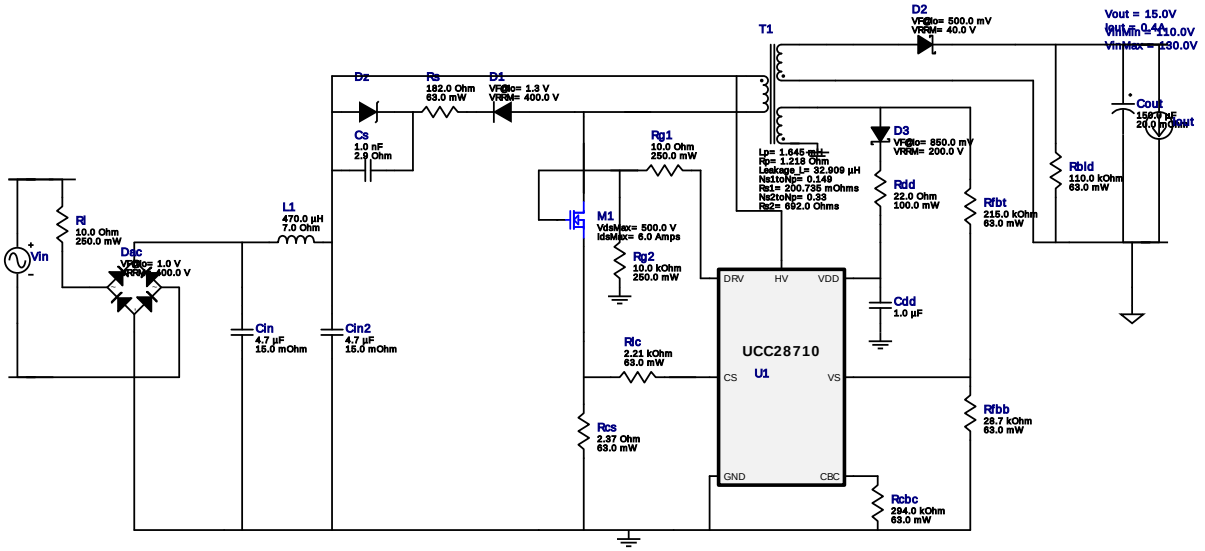
VinMin = 110.0V
VinMax = 130.0V
Vout = 15.0V
Iout = 0.4A

Device = UCC28710DR
Topology = Flyback
创建 = 11/26/13 12:49:29 AM
BOM成本 = $0.00
Total Pd = 1.03W
大小 = 1,953.0mm2
BOM 数量 = 25

WEBENCH® 设计报告

Design : 1025083/19 UCC28710DR
UCC28710DR 110.0V-130.0V to 15.103V @ 0.4A



1. Rbld is a starting point, but may need to be experimented with in order to get minimum current needed to hold Vout at no load. Rlc and the feedback resistors may also need adjustment based on the actual transformer used. For more information please click the design assistance button.

电气材料清单

#	名称	制造商	零件编号	属性	Qty	Price	大小
1.	Cdd	Taiyo Yuden	GMK212B7105KG-T Series= X7R	Cap= 1.0 µF VDC= 35.0 V IRMS= 0.0 A	1	$0.05	0805 7mm2
2.	Cin	EPCOS Inc	B32924C3475M Series= 303	Cap= 4.7 µF ESR= 15.0 mOhm VDC= 630.0 V IRMS= 457.0 mA	1	$1.83	B32924_33mm 670mm2
3.	Cin2	EPCOS Inc	B32924C3475M Series= 303	Cap= 4.7 µF ESR= 15.0 mOhm VDC= 630.0 V IRMS= 457.0 mA	1	$1.83	B32924_33mm 670mm2

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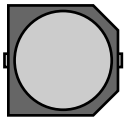
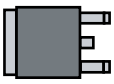
#	名称	制造商	零件编号	属性	Qty	Price	大小
4.	Cout	Sanyo	20SVP150M Series= 261	Cap= 150.0 µF ESR= 20.0 mOhm VDC= 20.0 V IRMS= 4.32 A	1	$0.72	 SM_RADIAL_10AMM 160mm2
5.	Cs	MuRata	GRM188R72E102KW07D Series= X7R	Cap= 1.0 nF ESR= 2.9 Ohm VDC= 250.0 V IRMS= 90.0 mA	1	$0.02	 0603 5mm2
6.	D1	Diodes Inc.	RS1G-13-F	VF@Io= 1.3 V VRRM= 400.0 V	1	$0.07	 SMA 37mm2
7.	D2	Diodes Inc.	B140-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.06	 SMA 37mm2
8.	D3	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	 PowerDI123 13mm2
9.	Dac	Diodes Inc.	HD04-T	VF@Io= 1.0 V VRRM= 400.0 V	1	$0.12	 MiniDIP 62mm2
10.	Dz	ON Semiconductor	1SMB5956BT3G	Zener	1	$0.08	 SMB 44mm2
11.	L1	Bourns	SDR0703-471KL	L= 470.0 µH DCR= 7.0 Ohm	1	$0.27	 SDR0703 55mm2
12.	M1	Fairchild Semiconductor	FDD6N50TM	VdsMax= 500.0 V IdsMax= 6.0 Amps	1	$0.41	 DPAK 102mm2
13.	Rbld	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
14.	Rcbc	Vishay-Dale	CRCW0402294KFKED Series= CRCW..e3	Res= 294.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
15.	Rcs	Vishay-Dale	CRCW04022R37FKED Series= CRCW..e3	Res= 2.37 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
16.	Rdd	Susumu Co Ltd	RR1220Q-220-D Series= 264	Res= 22.0 Ohm Power= 100.0 mW Tolerance= 0.5%	1	$0.01	 0805 7mm2
17.	Rfbb	Vishay-Dale	CRCW040228K7FKED Series= CRCW..e3	Res= 28.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
18.	Rfbt	Vishay-Dale	CRCW0402215KFKED Series= CRCW..e3	Res= 215.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
19.	Rg1	Panasonic	ERJ-8ENF10R0V Series= ERJ-8E	Res= 10.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	 1206 11mm2
20.	Rg2	Panasonic	ERJ-8ENF1002V Series= ERJ-8E	Res= 10.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	 1206 11mm2
21.	Rl	Panasonic	ERJ-8ENF10R0V Series= ERJ-8E	Res= 10.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	 1206 11mm2
22.	Rlc	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2

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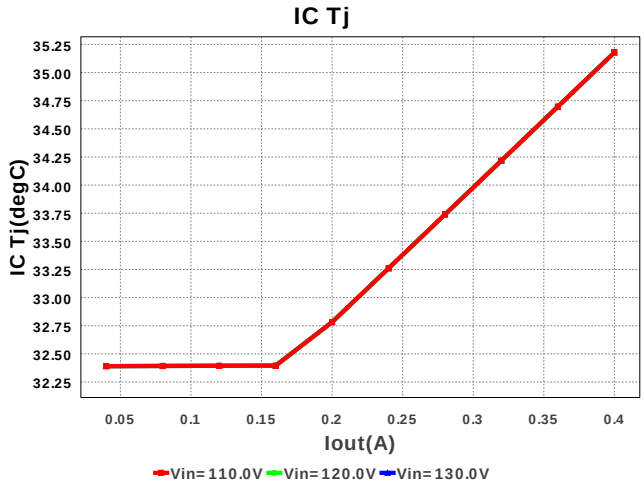
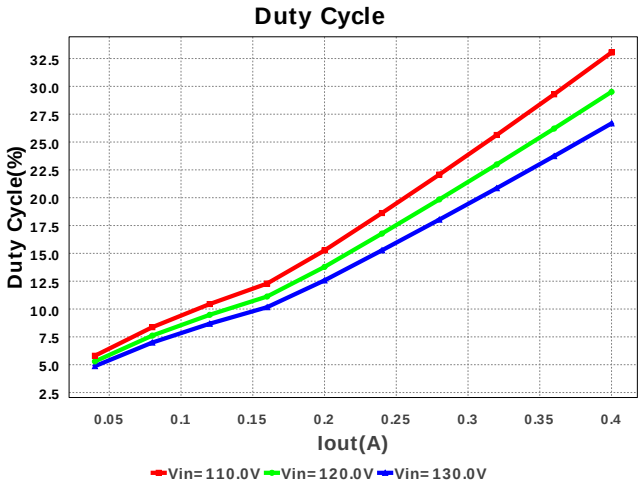
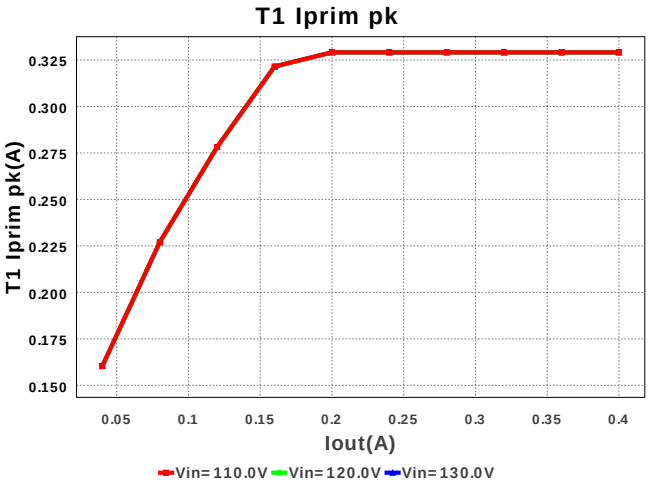
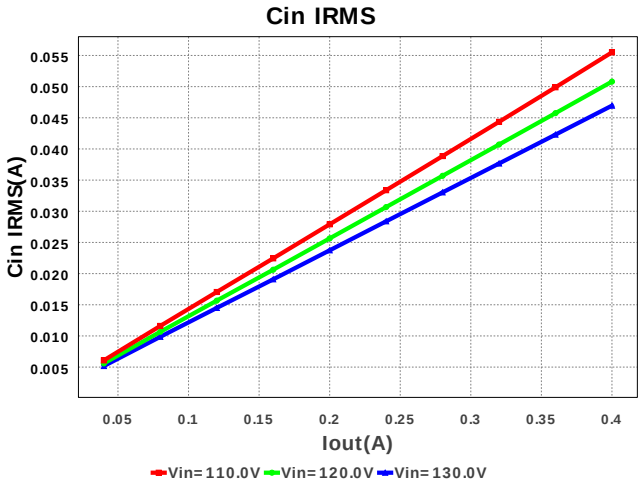
#	名称	制造商	零件编号	属性	Qty	Price	大小
23.	Rs	Vishay-Dale	CRCW0402182RFKED Series= CRCW..e3	Res= 182.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
24.	T1	CUSTOM	CUSTOM	Lp= 1.645 mH Rp= 1.218 Ohm Leakage_L= 32.909 µH Ns1toNp= 0.149 Rs1= 200.735 mOhms Ns2toNp= 0.33 Rs2= 692.0 Ohms	1	NA	CUSTOM 0mm2
25.	U1	Texas Instruments	UCC28710DR	Switcher	1	$0.42	 SOIC-7 0mm2









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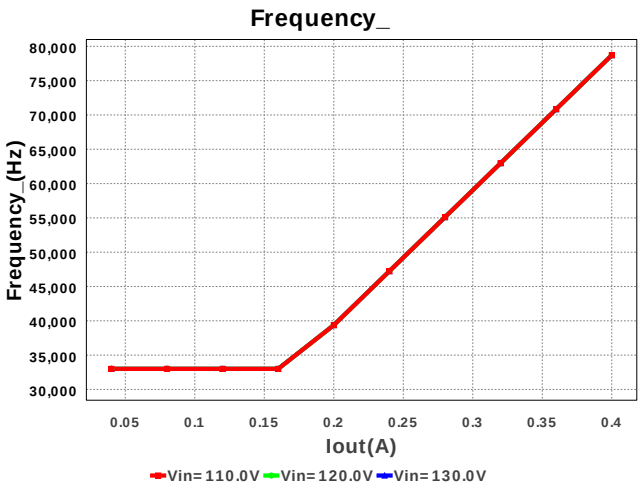

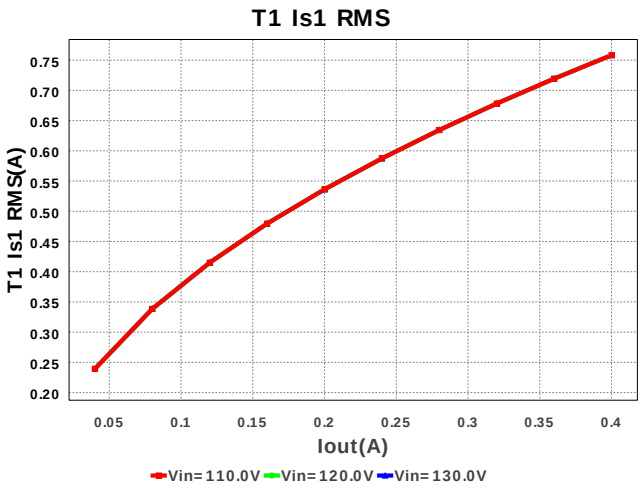

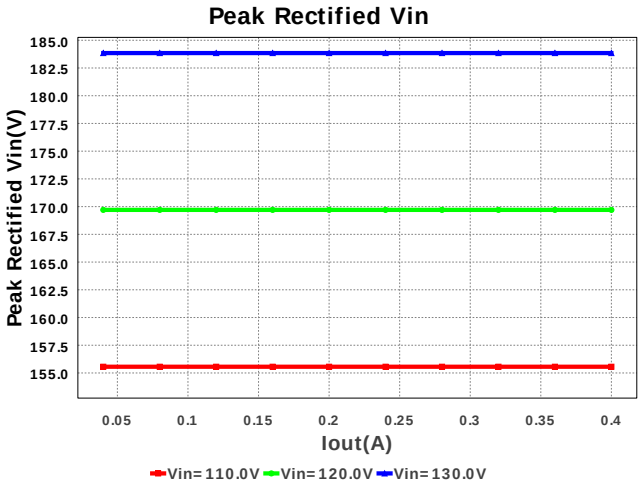

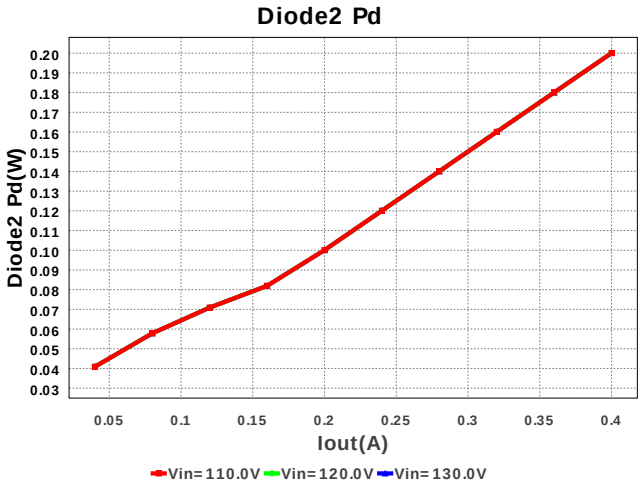

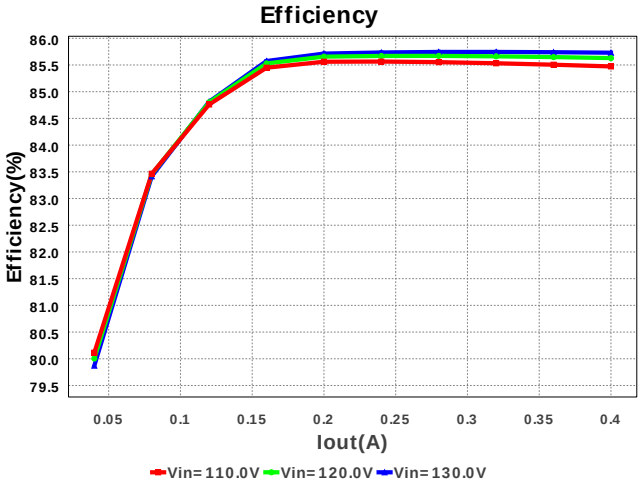

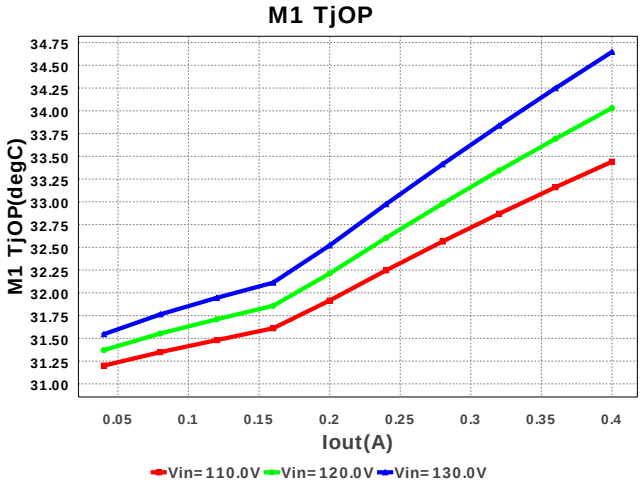

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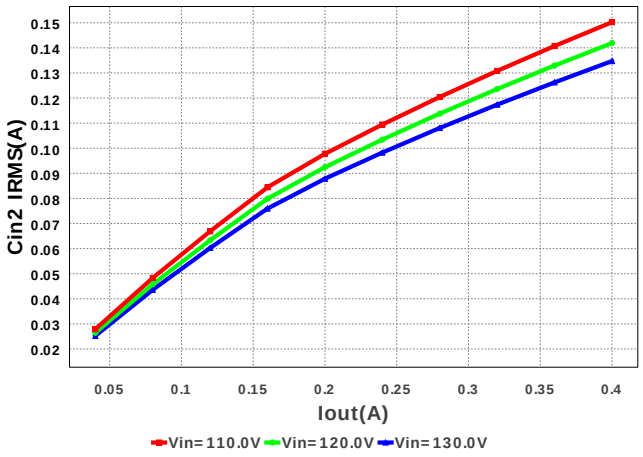
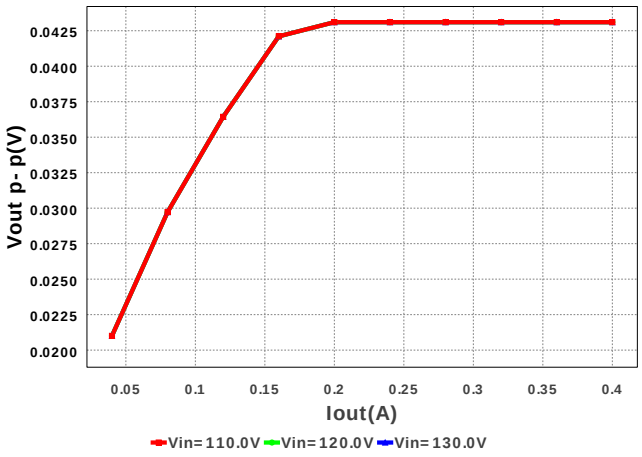
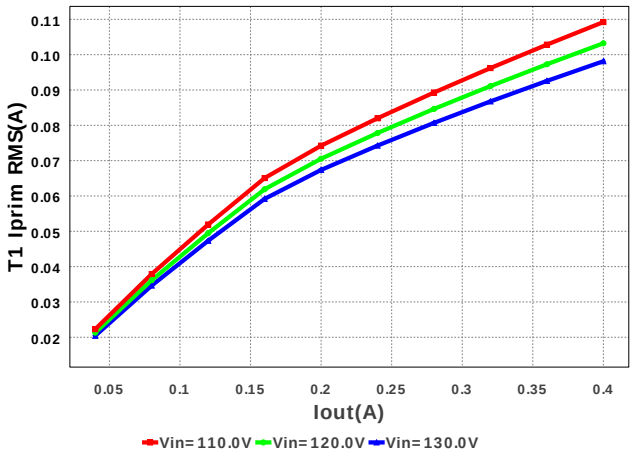
Cin2 IRMS



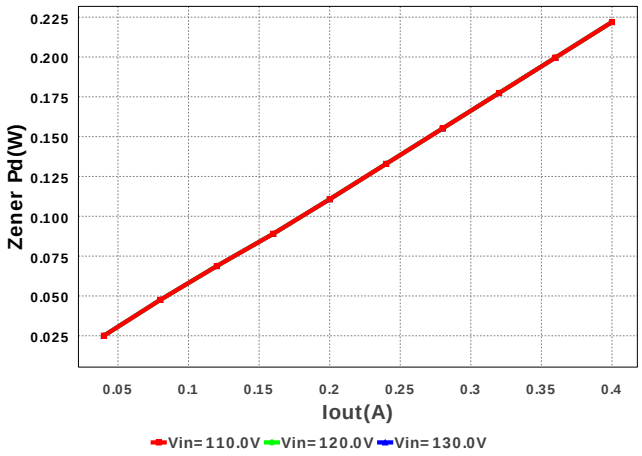
Vout p- p



T1 Iprim RMS



Zener Pd



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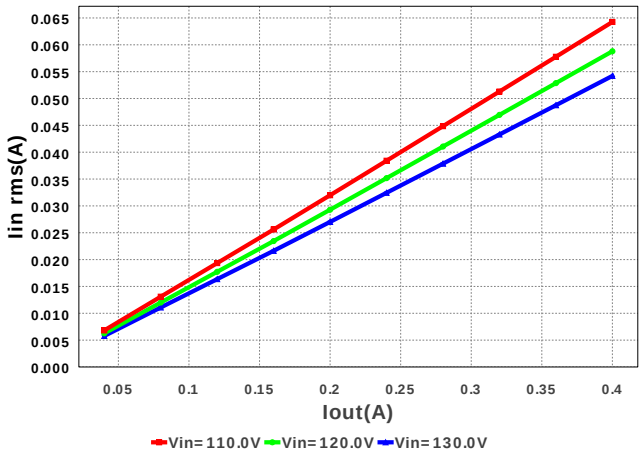

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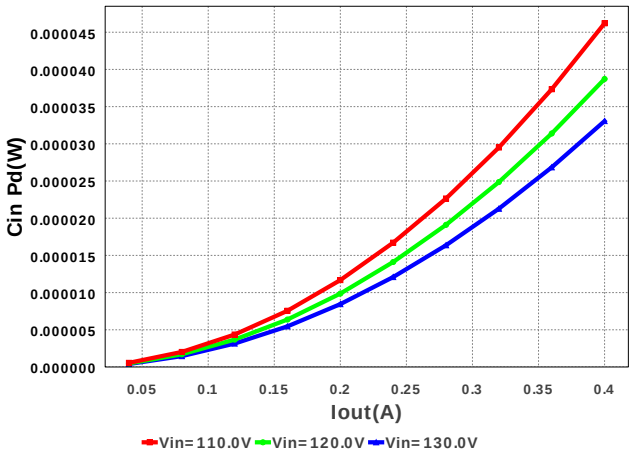

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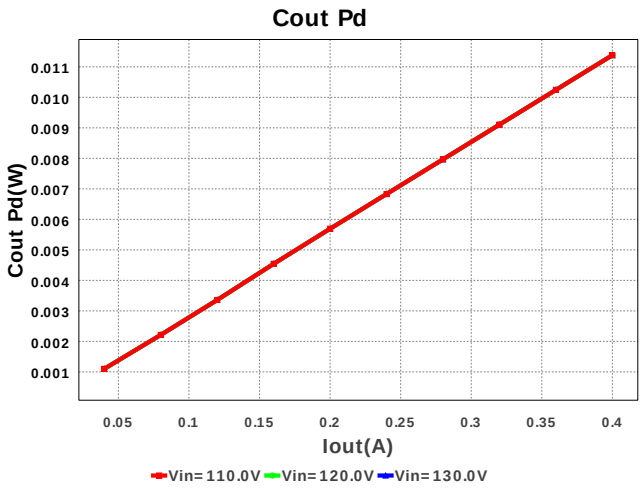

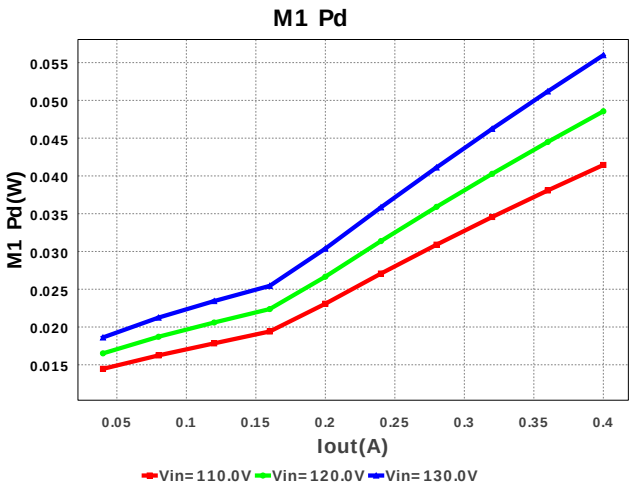

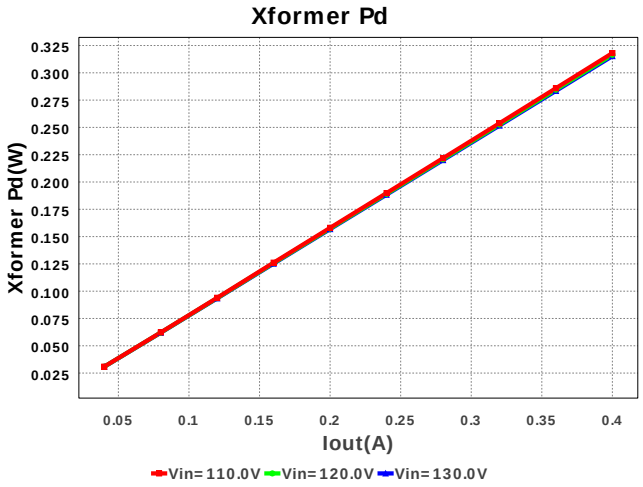

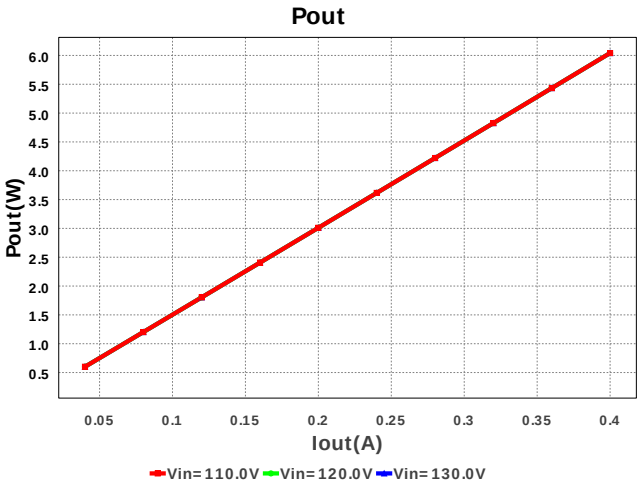

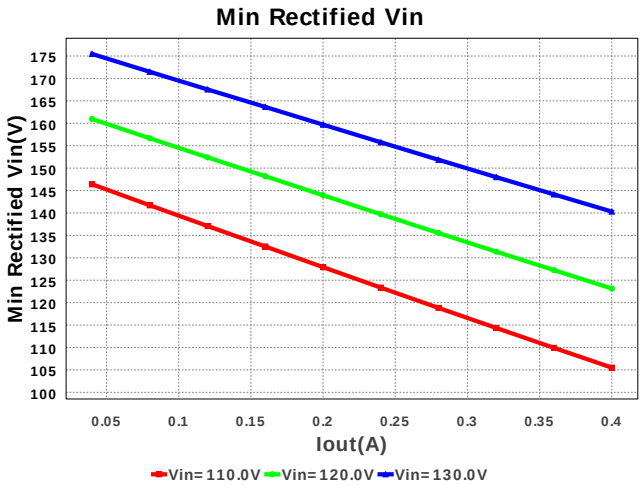

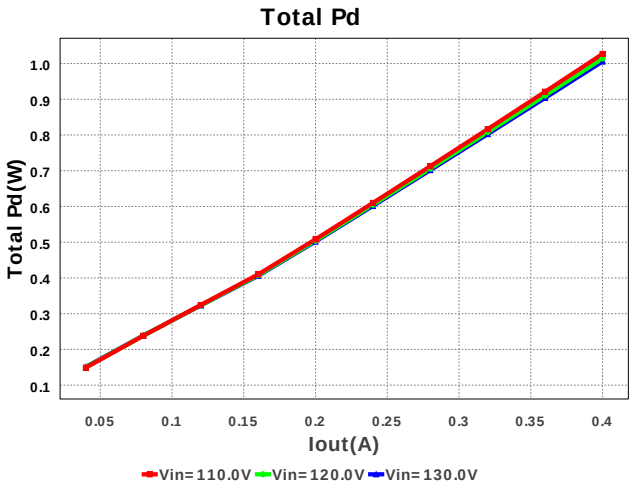

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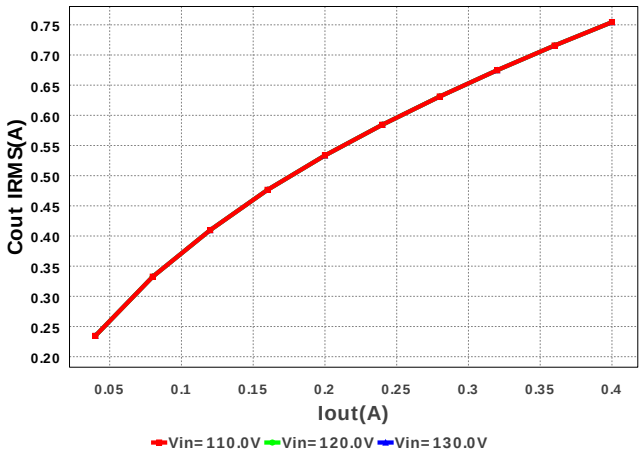
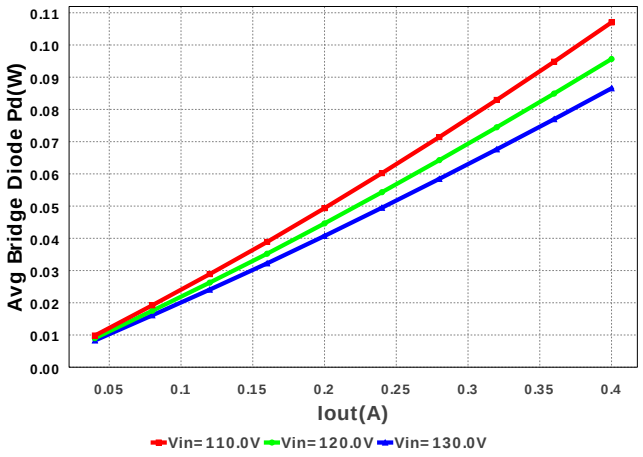
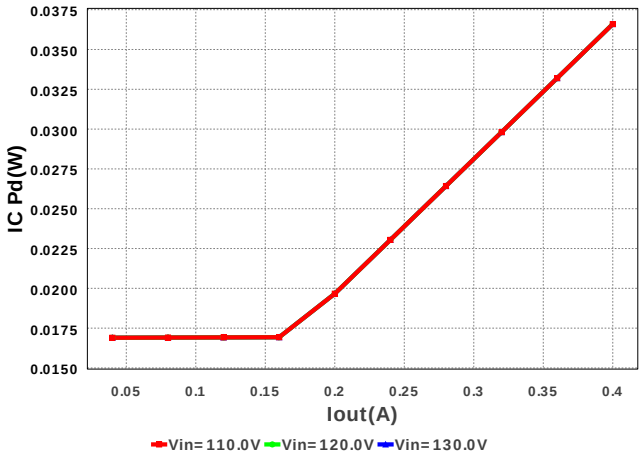
Cout IRMS



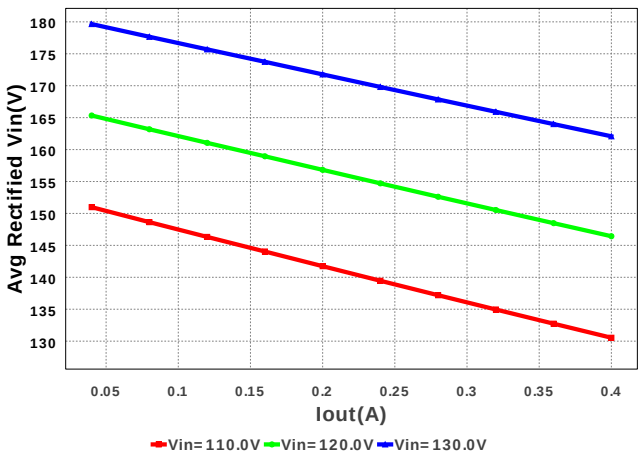
Avg Bridge Diode Pd



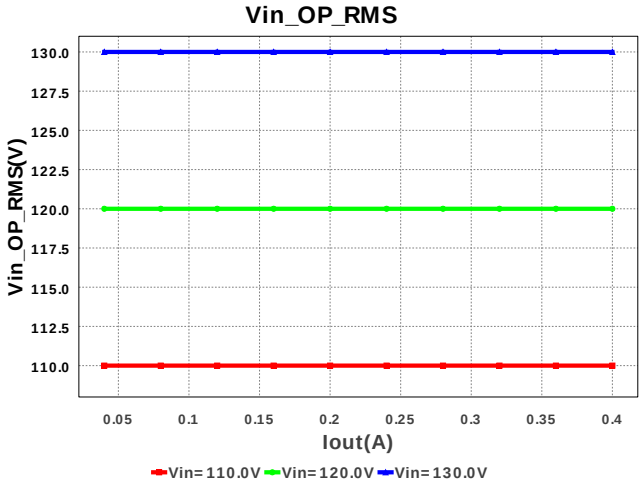
IC Pd



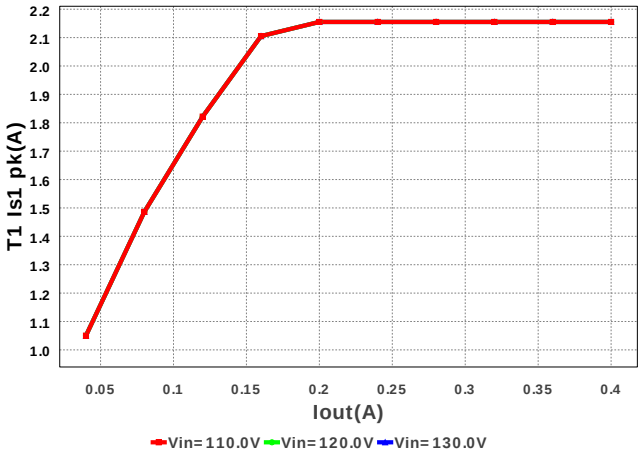
Avg Rectified Vin



Vin_OP_RMS



T1 Is1 pk



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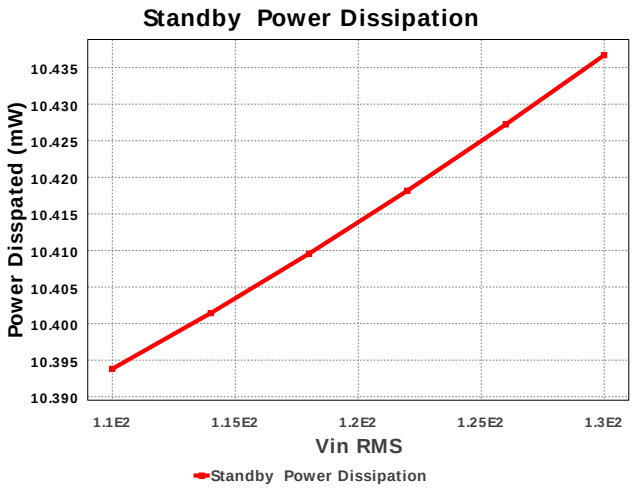

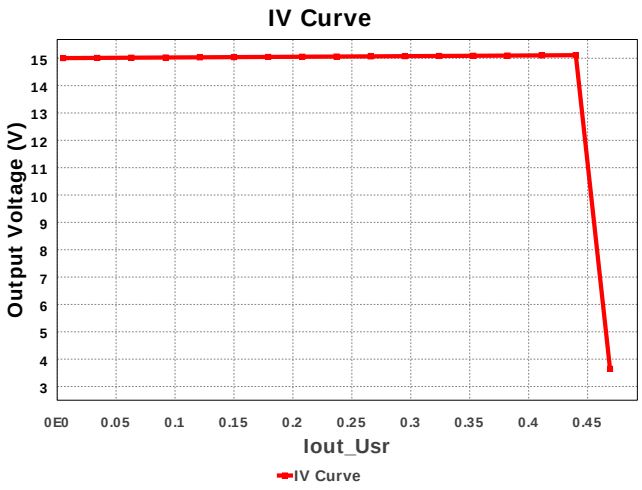

工作数值

#	名称	数值	类别	说明
1.	Cin IRMS	47.21 mA	Current	输入电容器均方根纹波电流
2.	Cin2 IRMS	135.252 mA	Current	Input capacitor2 RMS ripple current
3.	Cout IRMS	754.385 mA	Current	输出电容器均方根纹波电流
4.	Iin rms	54.357 mA	Current	RMS 输入电流
5.	T1 Iprim RMS	98.538 mA	Current	Transformer Primary RMS Current
6.	T1 Iprim pk	329.114 mA	Current	Transformer Primary Peak Current
7.	T1 Is1 RMS	758.223 mA	Current	Transformer Secondary1 RMS Current
8.	T1 Is1 pk	2.155 A	Current	Transformer Secondary1 Peak Current
9.	平均的整流输入电压	160.721 V	General	针对交流线路时段的平均整流电压
10.	BOM 数量	25	General	Total Design BOM count
11.	大小	1.953 kmm2	General	BOM组件的总所占面积
12.	Pout	6.041 W	General	总输出功率
13.	总 BOM	$0.0	General	Total BOM Cost
14.	Vout OP	15.103 V	Op_Point	Operational Output Voltage
15.	占空比	26.893 %	Op_point	占空比
16.	效率	85.492 %	Op_point	稳态效率
17.	频率	78.712 kHz	Op_point	开关频率
18.	IC Tj	32.562 degC	Op_point	电路接点温度
19.	ICThetaJA	70.0 degC/W	Op_point	电路接点到环境热敏电阻
20.	IOUT_OP	400.0 mA	Op_point	Iout 操作点
21.	M1 TjOP	34.595 degC	Op_point	M1 MOSFET 接点温度
22.	Min Rectified Vin	137.596 V	Op_point	Minimum voltage seen at rectified input
23.	Peak Rectified Vin	183.846 V	Op_point	Peak voltage seen at rectified input
24.	Vin_OP_RMS	130.0 V	Op_point	交流输入均方根电压
25.	Vout p-p	43.102 mV	Op_point	峰值到峰值输出纹波电压
26.	平均桥二极管 Pd	87.252 mW	Power	桥二极管在交流线路期间的平均功率耗散
27.	Cin Pd	33.432 µW	Power	输入电容器功率耗散
28.	Cout Pd	11.382 mW	Power	输出电容器功率耗散
29.	二极管2 Pd	200.071 mW	Power	二极管2功率耗散
30.	IC Pd	36.597 mW	Power	电路功率耗散
31.	M1 Pd	55.359 mW	Power	M1 MOSFET 总功率耗散
32.	整体 Pd	1.025 W	Power	总功率耗散
33.	Xformer Pd	315.385 mW	Power	变压器功率耗散
34.	Zener Pd	221.922 mW	Power	Zener 功率耗散

设计输入

#	名称	数值	说明
1.	输出电流	400.0 mA	最大输出电流
2.	Iout1	400.0 mAmps	Output Current #1
3.	Vin 最大	130.0 V	最高输入电压
4.	Vin 最小	110.0 V	最低输入电压
5.	输出电压:	15.0 V	输出电压
6.	Vout1	15.0 Volt	Output Voltage #1
7.	base_pn	UCC28710	美国国家半导体的产品编号
8.	源	AC	输入源类别
9.	工作环境温度	30.0 degC	环境温度

设计协助

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1. Application Hints Rbld Rbld is used to to set a minimum load for the circuit, so that in standby the output voltage does not float up. The value chosen by WEBENCH should be a good starting point but may need to be adjusted to achieve minimum power dissipation at standby as well. Rlc Rlc provides the function of feed-forward line compensation to eliminate change in IPP due to change in di/dt and the propagation delay of the internal comparator and MOSFET turn-off time. For best results the chosen value may need to be adjusted based on board, FET and transformer parasitics. Rfbt & Rfbb The feedback resistors will set the output voltage of the circuit. The values chosen may need to be fined tuned based on the final Transformer turns ratios and the voltage across the output diode at close to zero current. Part Description The UCC28710 family of flyback power supply controllers provides Constant-Voltage (CV) and Constant-Current (CC) output regulation. Primary-Side Regulation (PSR) eliminates the use of an Opto-Coupler. Please see the datasheet for further design guidance. http://www.ti.com/lit/ds/symlink/ucc28710.pdf

2. UCC28710 Product Folder : http://www.ti.com/product/ucc28710 : contains the data sheet and other resources.

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You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

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