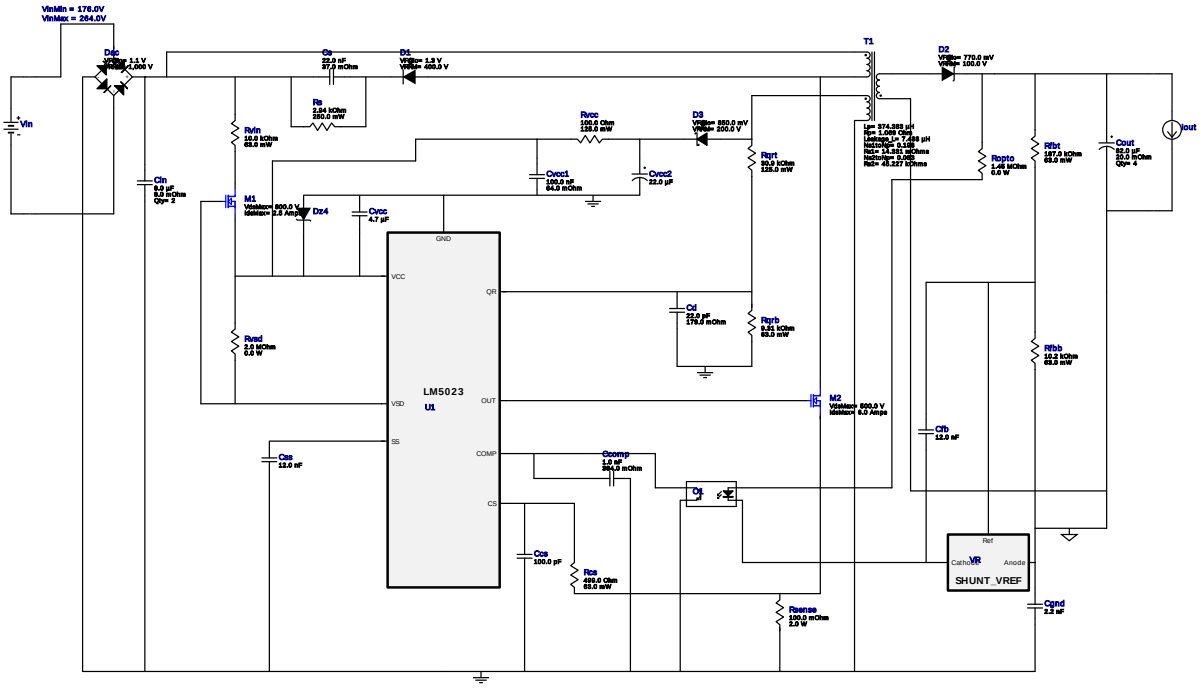
VinMin = 176.0V
VinMax = 264.0V
Vout = 24.0V
Iout = 5.0A

Device = LM5023MM-2/NOPB
Topology = Flyback
创建 = 8/23/13 10:32:21 PM
BOM成本 = $0.00
Total Pd = 13.13W
大小 = 3,298.0mm2
BOM 数量 = 38

WEBENCH® 设计报告

Design : 3814054/48 LM5023MM-2/NOPB
LM5023MM-2/NOPB 176.0V-264.0V to 24.166666666666668V @ 5.0A



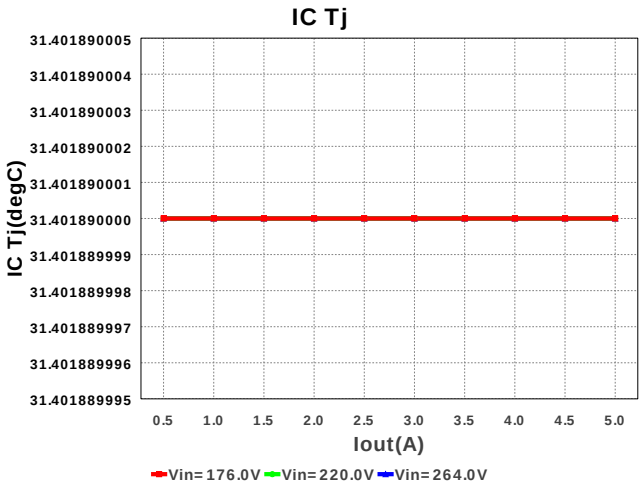
1. Rbld is a starting point, but may need to be experimented with in order to get minimum current needed to hold Vout at no load. Rlc and the feedback resistors may also need adjustment based on the actual transformer used. For more information please click the design assistance button.

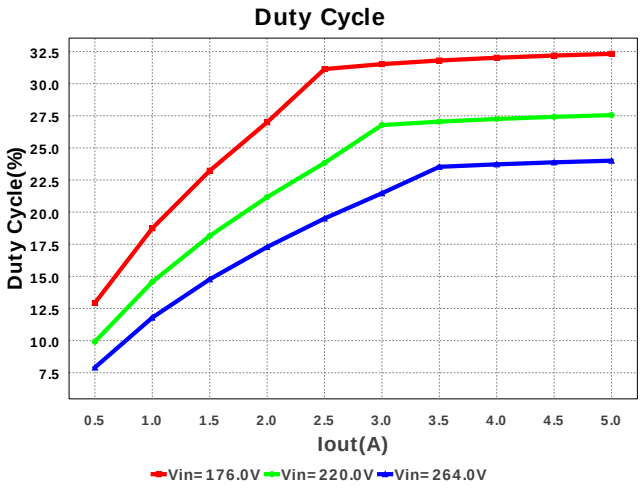
电气材料清单

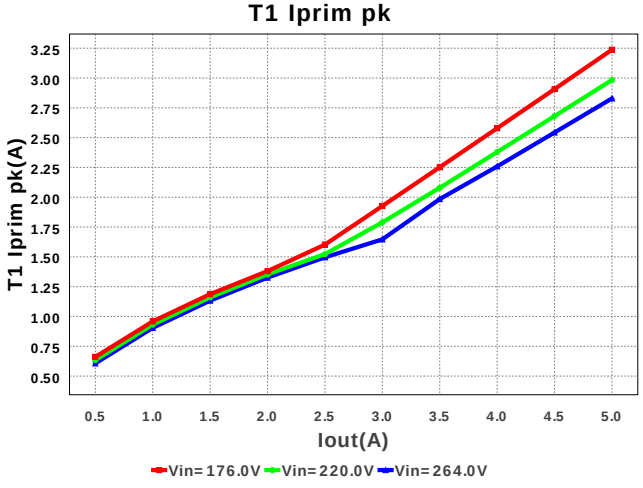
#	名称	制造商	零件编号	属性	Qty	Price	大小
1.	Ccomp	Kemet	C0805C102K5RACTU Series= X7R	Cap= 1.0 nF ESR= 384.0 mOhm VDC= 50.0 V IRMS= 214.0 mA	1	$0.01	0805 13mm2
2.	Ccs	MuRata	GRM033R71C101KA01D Series= X7R	Cap= 100.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0201 6mm2
3.	Cd	Kemet	C0805C220J5GACTU Series= C0G/NP0	Cap= 22.0 pF ESR= 179.0 mOhm VDC= 50.0 V IRMS= 464.0 mA	1	$0.01	0805 13mm2
4.	Cfb	MuRata	GRM155R71E123KA61D Series= X7R	Cap= 12.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 8mm2
5.	Cgnd	TDK	C4532X7R3D222K Series= X7R	Cap= 2.2 nF VDC= 2.0 kV IRMS= 0.0 A	1	$0.21	1812 39mm2
6.	Cin	EPCOS Inc	B32776G1805K Series= 358	Cap= 8.0 µF ESR= 8.0 mOhm VDC= 1.3 kV IRMS= 8.0 A	2	$4.77	CAP_B32776G_102 957mm2
7.	Cout	Sanyo	35SVPF82M Series= 1273	Cap= 82.0 µF ESR= 20.0 mOhm VDC= 35.0 V IRMS= 4.0 A	4	NA	CAPSMT_62_E12 106mm2

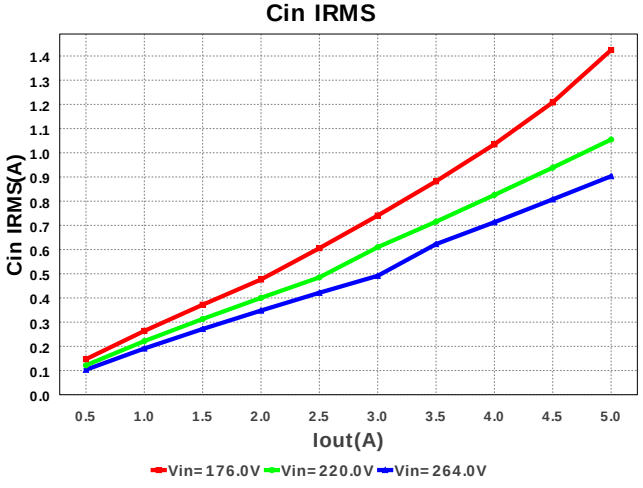
#	名称	制造商	零件编号	属性	Qty	Price	大小
8.	Cs	TDK	C1608X7R2A223K Series= X7R	Cap= 22.0 nF ESR= 37.0 mOhm VDC= 100.0 V IRMS= 0.0 A	1	$0.01	0603 10mm2
9.	Css	MuRata	GRM155R71E123KA61D Series= X7R	Cap= 12.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 8mm2
10.	Cvcc	MuRata	GRM21BC81E475KA12L Series= 379	Cap= 4.7 µF VDC= 25.0 V IRMS= 0.0 A	1	$0.04	0805 13mm2
11.	Cvcc1	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 13mm2
12.	Cvcc2	Nippon Chemi-Con	EMVA160ADA220MD55G Series= MVA	Cap= 22.0 µF VDC= 16.0 V IRMS= 26.0 mA	1	$0.07	CAPSMT_62_D55 40mm2
13.	D1	Diodes Inc.	RS1G-13-F	VF@Io= 1.3 V VRRM= 400.0 V	1	$0.07	SMA 37mm2
14.	D2	Vishay-Semiconductor	50WQ10FNPBF	VF@Io= 770.0 mV VRRM= 100.0 V	1	$0.41	DPAK 102mm2
15.	D3	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	PowerDI123 22mm2
16.	Dac	Vishay-Semiconductor	DF10SA	VF@Io= 1.1 V VRRM= 1,000 V	1	$0.24	DF-S 99mm2
17.	Dz4	ON Semiconductor	BZX84C15LT1G	Zener	1	$0.02	SOT-23 22mm2
18.	M1	ST Microelectronics	STD3NK80ZT4	VdsMax= 800.0 V IdsMax= 2.5 Amps	1	$0.62	DPAK 102mm2
19.	M2	Fairchild Semiconductor	FDD6N50TM	VdsMax= 500.0 V IdsMax= 6.0 Amps	1	$0.41	DPAK 102mm2
20.	O1	California Eastern Laboratories	PS2811-1	Optocoupler	1	$0.39	SSOP-4 111mm2
21.	Rcs	Vishay-Dale	CRCW0402499RFKED Series= CRCW..e3	Res= 499.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
22.	Rfbb	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
23.	Rfbt	Vishay-Dale	CRCW0402187KFKED Series= CRCW..e3	Res= 187.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
24.	Ropto	CUSTOM	CUSTOM Series= ?	Res= 1.45 MOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0mm2
25.	Rqrb	Vishay-Dale	CRCW04029K31FKED Series= CRCW..e3	Res= 9.31 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
26.	Rqrt	Vishay-Dale	CRCW080530K9FKEA Series= CRCW..e3	Res= 30.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 13mm2

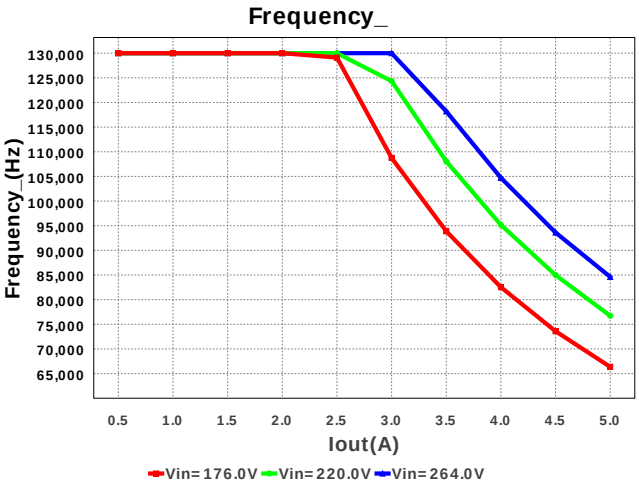
#	名称	制造商	零件编号	属性	Qty	Price	大小
27.	Rs	Panasonic	ERJ-8ENF2941V Series= ERJ-8E	Res= 2.94 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 19mm2
28.	Rsense	Stackpole Electronics Inc	CSRN2512FKR100 Series= ?	Res= 100.0 mOhm Power= 2.0 W Tolerance= 1.0%	1	$0.13	2512 43mm2
29.	Rvcc	Vishay-Dale	CRCW0805100RFKEA Series= CRCW..e3	Res= 100.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 13mm2
30.	Rvin	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
31.	Rvsd	CUSTOM	CUSTOM Series= ?	Res= 2.0 MOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0mm2
32.	T1	CUSTOM	CUSTOM	Lp= 374.383 µH Rp= 1.069 Ohm Leakage_L= 7.488 µH Ns1toNp= 0.198 Rs1= 14.331 mOhms Ns2toNp= 0.083 Rs2= 45.227 kOhms	1	NA	CUSTOM 0mm2
33.	U1	Texas Instruments	LM5023MM-2/NOPB	Switcher	1	$2.00	S-PDSO-G8 36mm2
34.	VR	Texas Instruments	LMV431	Voltage References	1	NA	R-PDSO-G3 25mm2

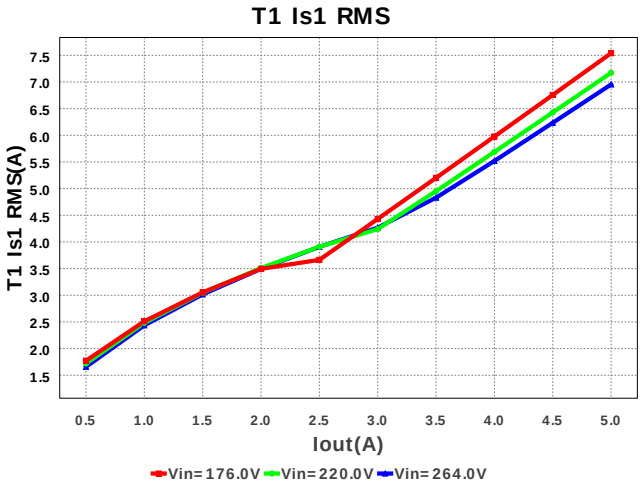


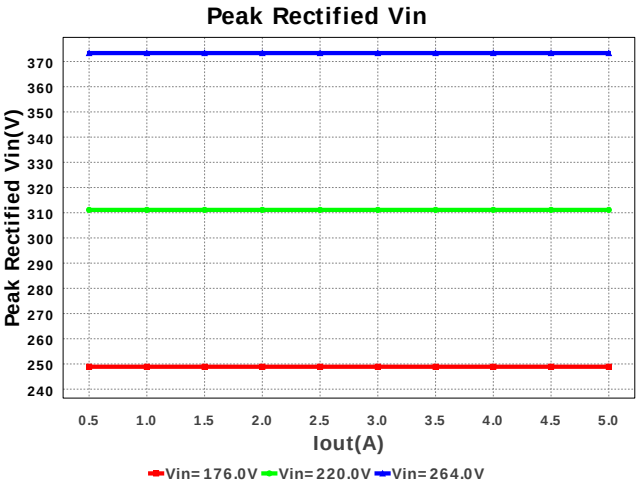


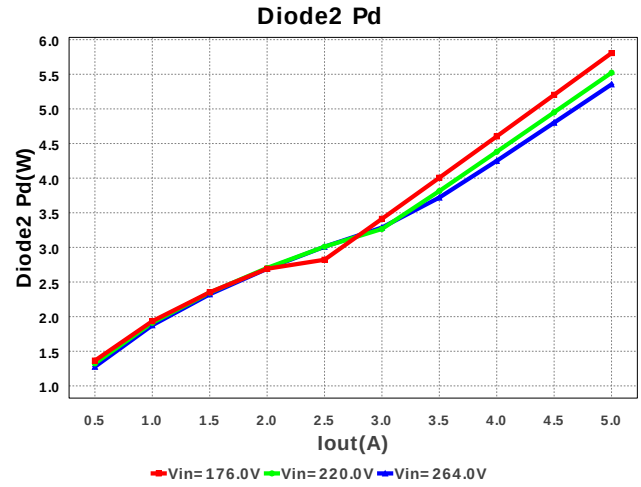


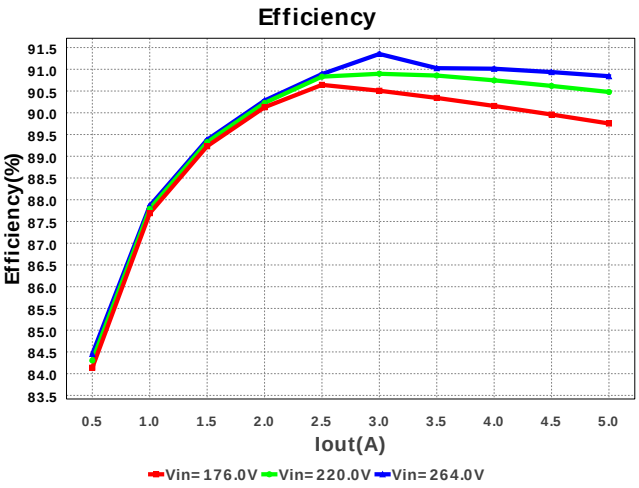


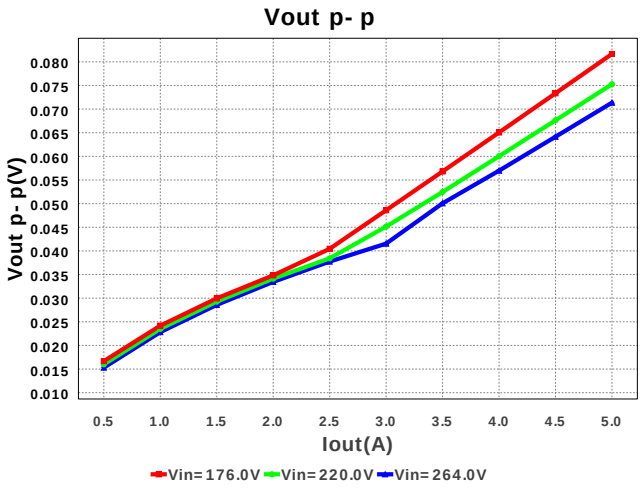


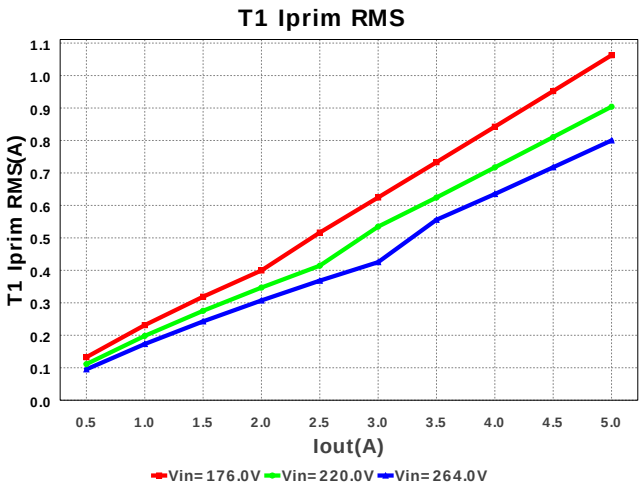


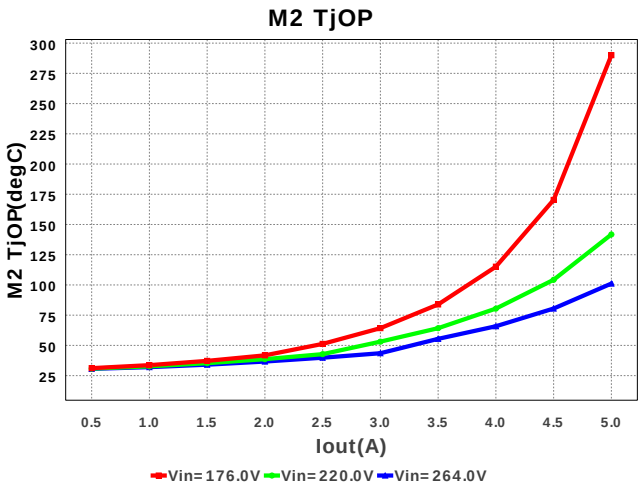


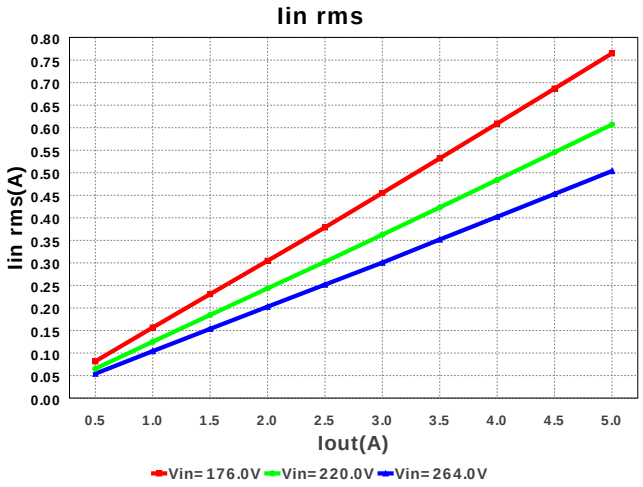


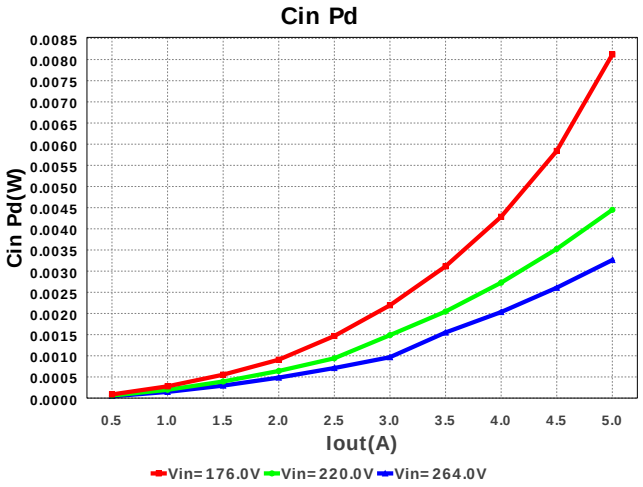


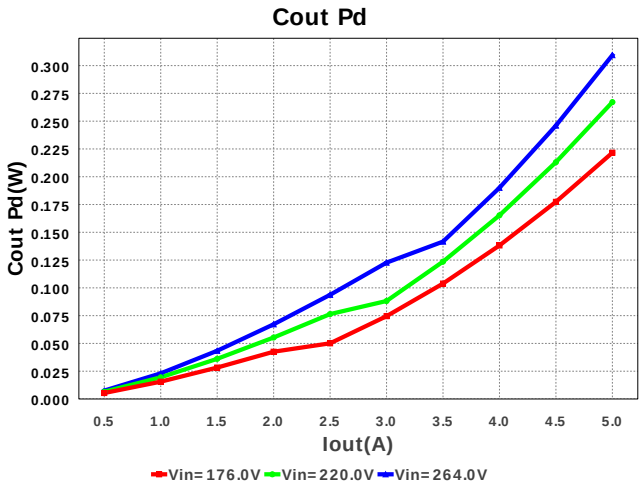


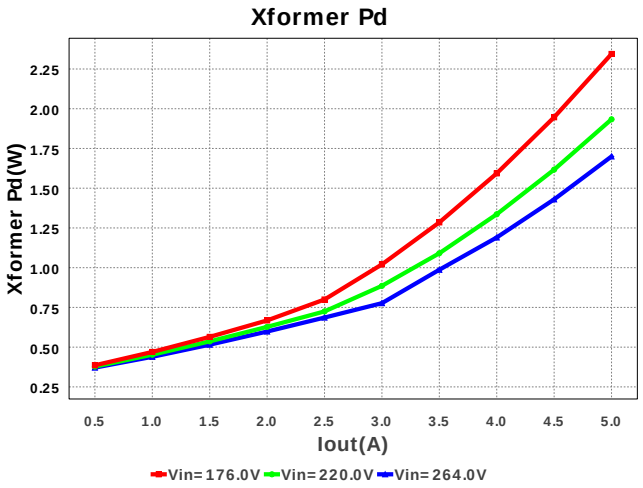


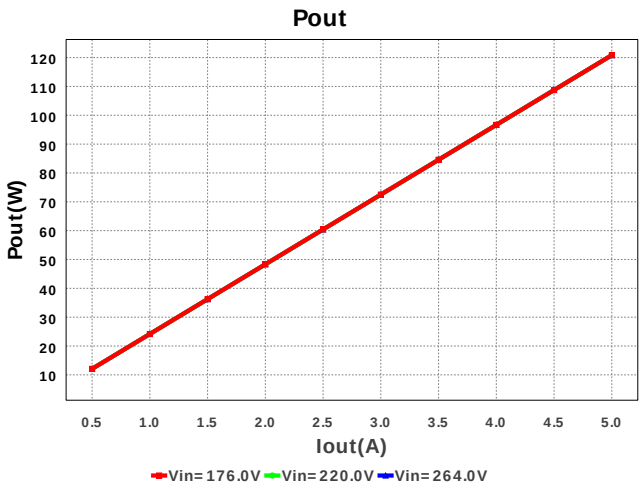


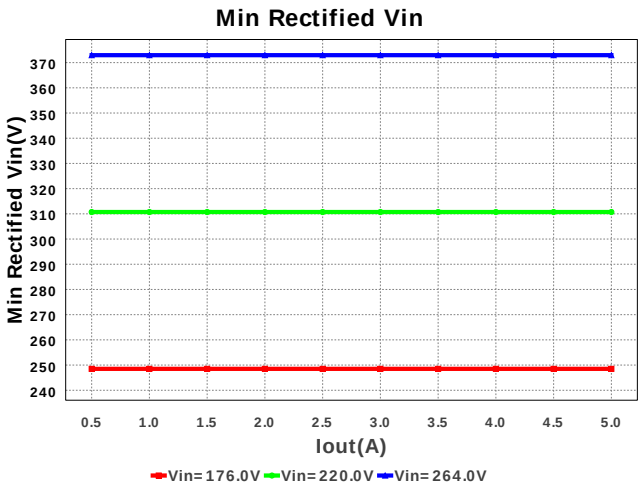


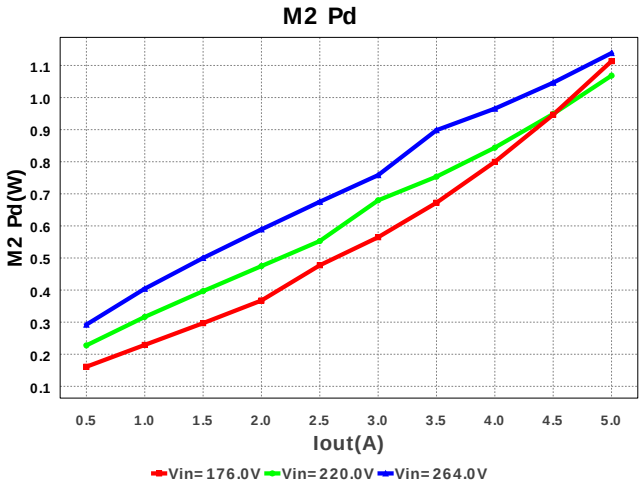


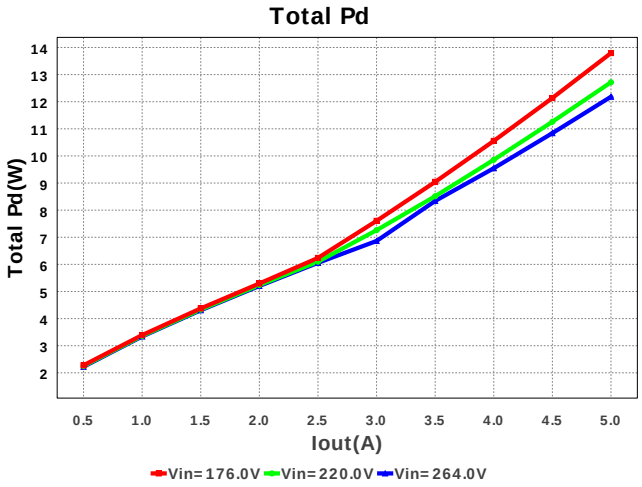


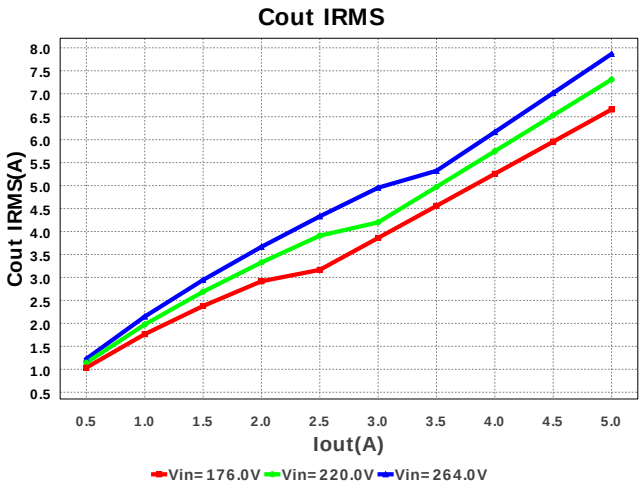


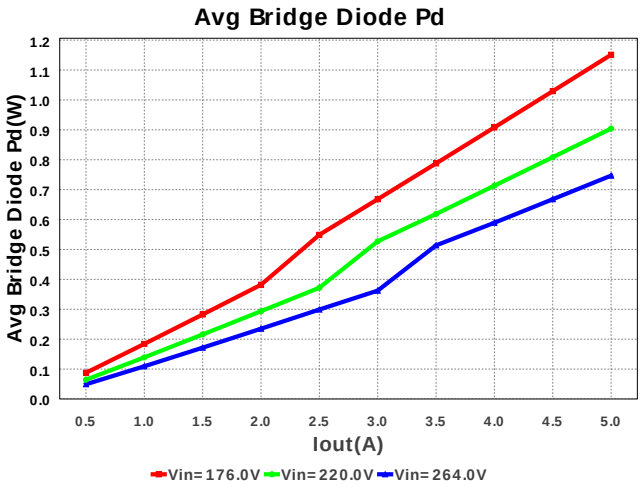


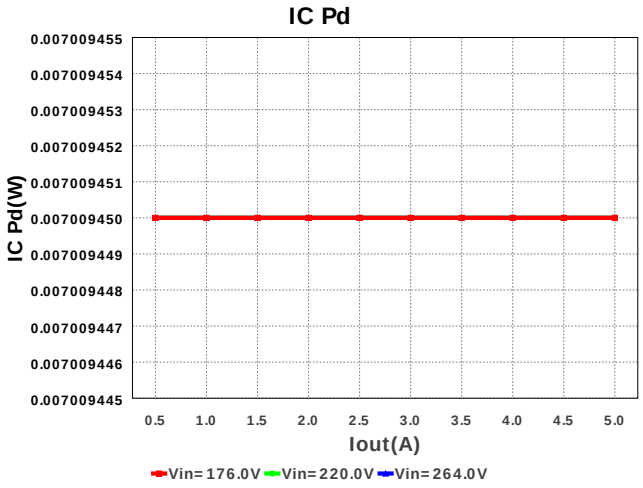


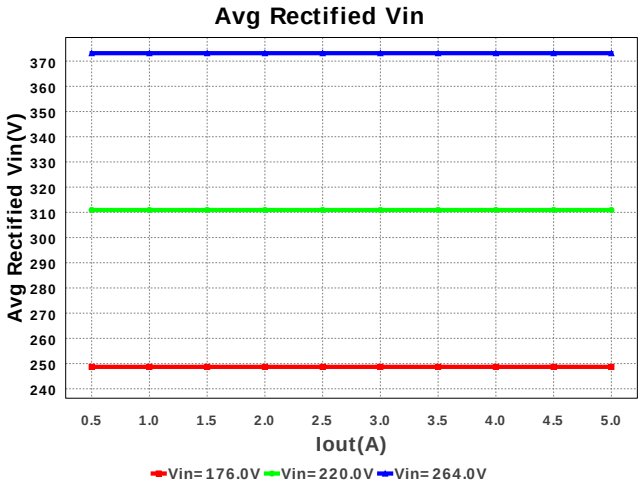


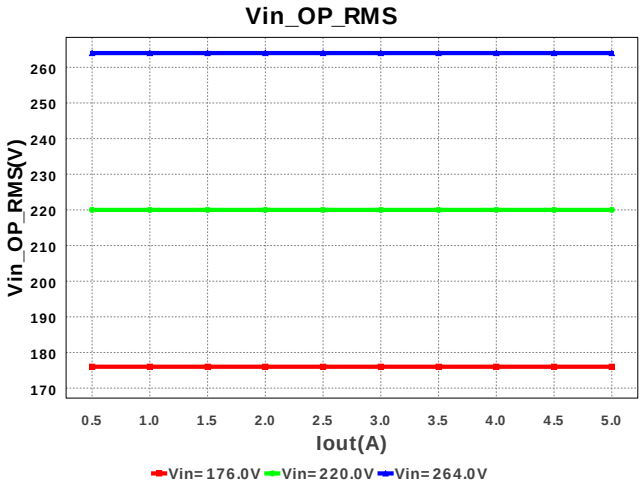


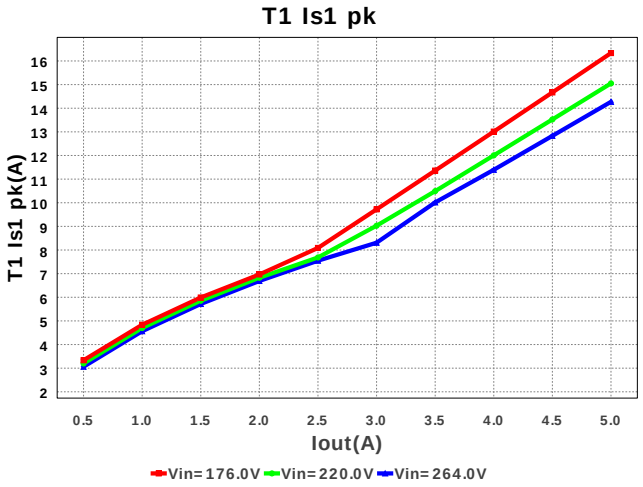












工作数值

#	名称	数值	类别	说明
1.	Cin IRMS	1.145 A	Current	输入电容器均方根纹波电流
2.	Cout IRMS	6.612 A	Current	输出电容器均方根纹波电流
3.	Iin rms	507.44 mA	Current	RMS 输入电流
4.	T1 Iprim RMS	936.864 mA	Current	Transformer Primary RMS Current
5.	T1 Iprim pk	2.861 A	Current	Transformer Primary Peak Current
6.	T1 Is1 RMS	7.036 A	Current	Transformer Secondary1 RMS Current
7.	T1 Is1 pk	14.436 A	Current	Transformer Secondary1 Peak Current
8.	平均的整流输入电压	373.149 V	General	针对交流线路时段的平均整流电压
9.	BOM 数量	38	General	Total Design BOM count
10.	大小	3.298 kmm2	General	BOM组件的总所占面积
11.	模式	DCM	General	传导模式
12.	Pout	120.833 W	General	总输出功率
13.	总 BOM	$0.0	General	Total BOM Cost
14.	Vout OP	24.167 V	Op_Point	Operational Output Voltage
15.	占空比	36.027 %	Op_point	占空比
16.	效率	90.198 %	Op_point	稳态效率
17.	频率	83.701 kHz	Op_point	开关频率
18.	IC Tj	32.406 degC	Op_point	电路接点温度
19.	ICThetaJA	200.0 degC/W	Op_point	电路接点到环境热敏电阻
20.	IOUT_OP	5.0 A	Op_point	Iout 操作点
21.	M2 TjOP	160.248 degC	Op_point	M2 MOSFET 接点温度
22.	Min Rectified Vin	372.949 V	Op_point	Minimum voltage seen at rectified input
23.	Peak Rectified Vin	373.349 V	Op_point	Peak voltage seen at rectified input
24.	Vin_OP_RMS	264.0 V	Op_point	交流输入均方根电压
25.	Vout p-p	72.179 mV	Op_point	峰值到峰值输出纹波电压
26.	平均桥二极管 Pd	1.012 W	Power	桥二极管在交流线路期间的平均功率耗散
27.	Cin Pd	5.243 mW	Power	输入电容器功率耗散
28.	Cout Pd	218.622 mW	Power	输出电容器功率耗散
29.	二极管2 Pd	5.418 W	Power	二极管2功率耗散
30.	IC Pd	12.032 mW	Power	电路功率耗散
31.	M2 Pd	1.319 W	Power	M2 MOSFET 总功率耗散
32.	整体 Pd	13.131 W	Power	总功率耗散

#	名称	数值	类别	说明
33.	Xformer Pd	2.073 W	Power	变压器功率耗散

设计输入

#	名称	数值	说明
1.	输出电流	5.0 A	最大输出电流
2.	Iout1	5.0 Amps	Output Current #1
3.	Vin 最大	264.0 V	最高输入电压
4.	Vin 最小	176.0 V	最低输入电压
5.	输出电压:	24.0 V	输出电压
6.	Vout1	24.0 Volt	Output Voltage #1
7.	base_pn	LM5023	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

1. Application Hints Rbld The European Standard for offline power supplies reuires that power supplies with an output power greater than 70W need to have a PFC front end. There may be application�s where a PFC front end is not required, so please make a choice based on whatever works for you 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. Please see the datasheet for further design guidance. http://www.ti.com/lit/ds/symlink/lm5023.pdf

2. LM5023 Product Folder : http://www.ti.com/product/lm5023 : contains the data sheet and other resources.