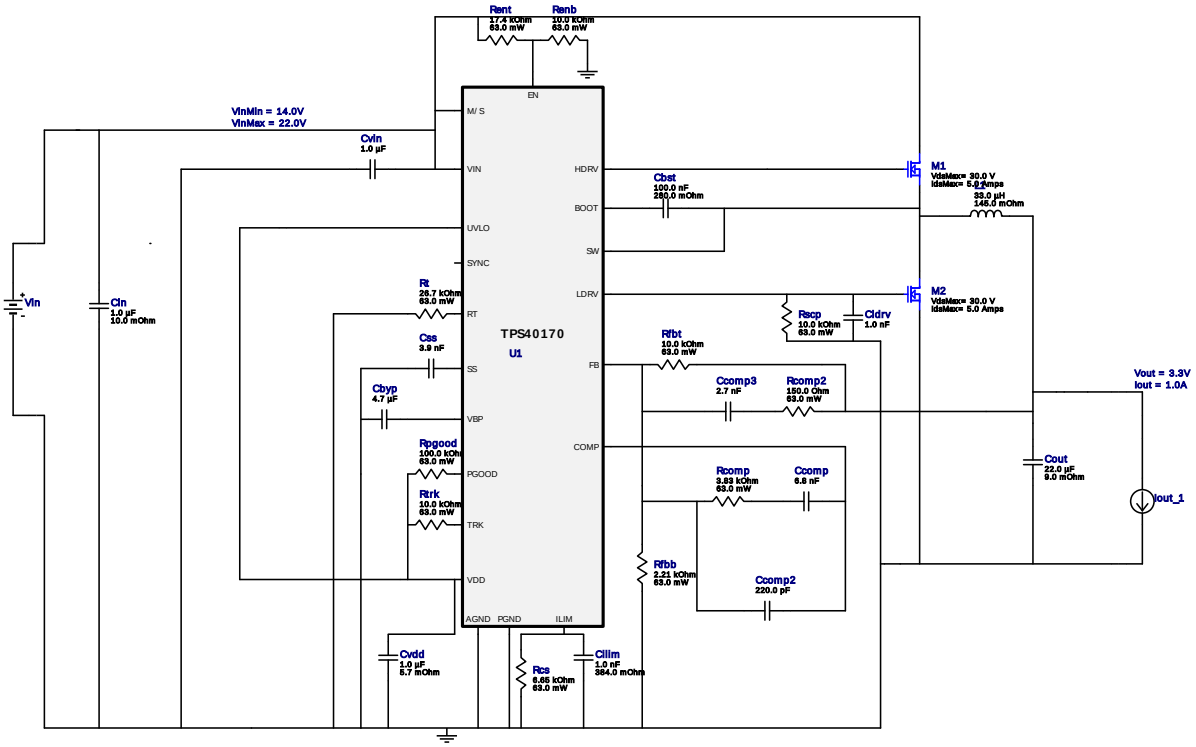
VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 1.0A

Device = TPS40170RGYR
Topology = Buck
创建 = 5/27/13 9:47:59 PM
BOM成本 = $3.17
Total Pd = 0.44W
大小 = 402.0mm2
BOM 数量 = 27

WEBENCH® 设计报告

Design : 1147140/194 TPS40170RGYR
TPS40170RGYR 14.0V-22.0V to 3.3V @ 1.0A



电气材料清单

#	名称	制造商	零件编号	属性	Qty	Price	大小
1.	Cbst	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
2.	Cbyp	MuRata	GRM219R61C475KE15D Series= X5R	Cap= 4.7 µF VDC= 16.0 V IRMS= 0.0 A	1	$0.04	0805 13mm2
3.	Ccomp	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
4.	Ccomp2	Yageo America	CC0805KRX7R9BB221 Series= X7R	Cap= 220.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
5.	Ccomp3	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
6.	Cilim	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
7.	Cin	TDK	C3216X7R1H105K Series= X7R	Cap= 1.0 µF ESR= 10.0 mOhm VDC= 50.0 V IRMS= 3.2 A	1	$0.04	1206 19mm2
8.	Cldrv	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2

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#	名称	制造商	零件编号	属性	Qty	Price	大小
9.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 µF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	1	$0.05	0805 13mm2
10.	Css	MuRata	GRM033R70J392KA01D Series= X7R	Cap= 3.9 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0201 6mm2
11.	Cvdd	TDK	C1608X5R1C105K Series= X5R	Cap= 1.0 µF ESR= 5.7 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0603 10mm2
12.	Cvin	Taiyo Yuden	GMK212B7105KG-T Series= X7R	Cap= 1.0 µF VDC= 35.0 V IRMS= 0.0 A	1	$0.05	0805 13mm2
13.	L1	Bourns	SRN8040-330M	L= 33.0 µH DCR= 145.0 mOhm	1	$0.21	SRN8040 100mm2
14.	M1	Texas Instruments	CSD17313Q2	VdsMax= 30.0 V IdsMax= 5.0 Amps	1	$0.17	TRANS_NexFET_Q2 16mm2
15.	M2	Texas Instruments	CSD17313Q2	VdsMax= 30.0 V IdsMax= 5.0 Amps	1	$0.17	TRANS_NexFET_Q2 16mm2
16.	Rcomp	Vishay-Dale	CRCW04023K83FKED Series= CRCW..e3	Res= 3.83 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
17.	Rcomp2	Vishay-Dale	CRCW0402150RFKED Series= CRCW..e3	Res= 150.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
18.	Rcs	Vishay-Dale	CRCW04026K65FKED Series= CRCW..e3	Res= 6.65 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
19.	Renb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
20.	Rent	Vishay-Dale	CRCW040217K4FKED Series= CRCW..e3	Res= 17.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
21.	Rfbb	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
22.	Rfbt	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
23.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
24.	Rscp	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
25.	Rt	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
26.	Rtrk	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
27.	U1	Texas Instruments	TPS40170RGYR	Switcher	1	$2.25	RGY-20 36mm2

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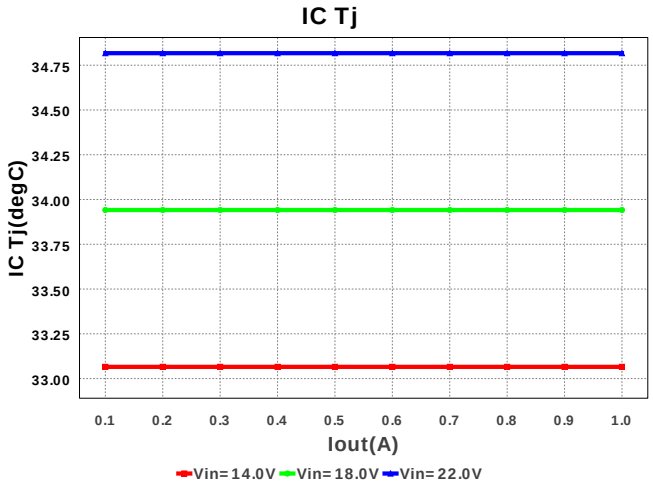

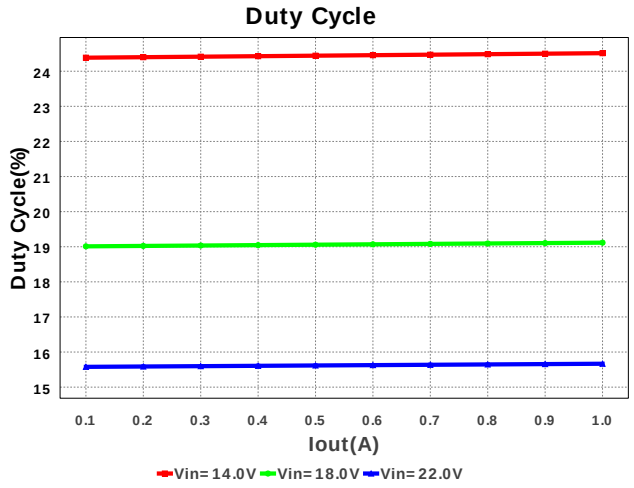

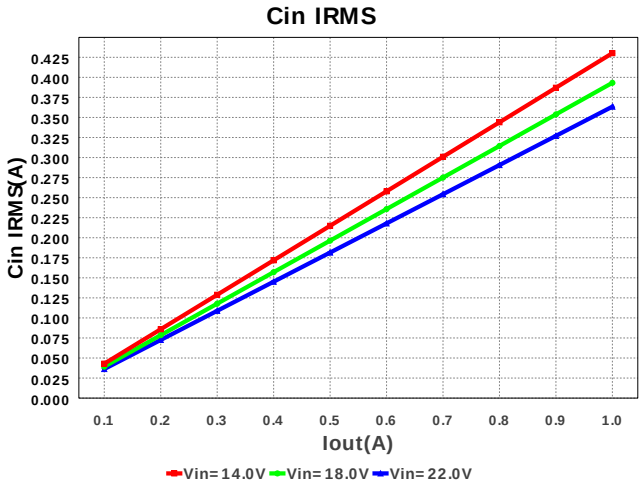

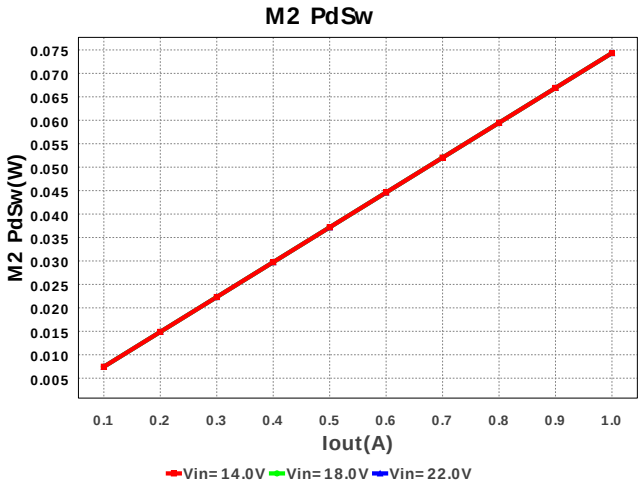

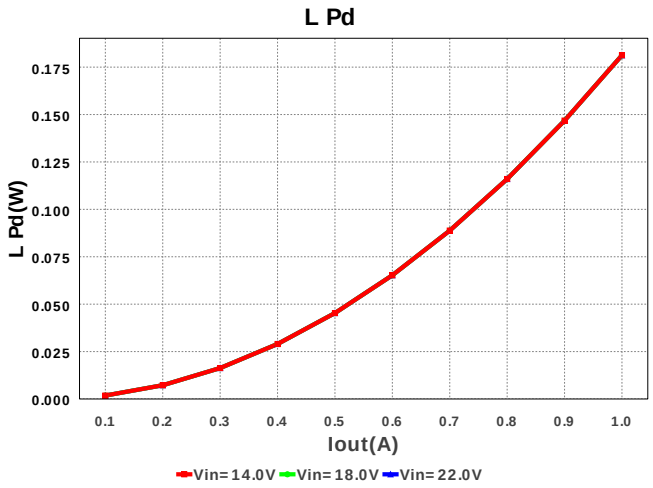

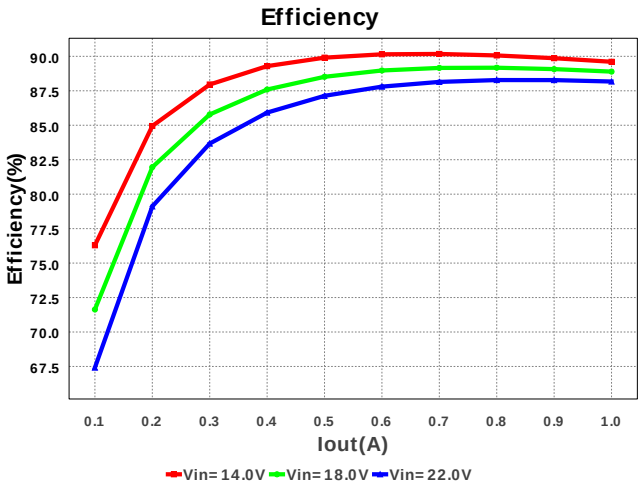

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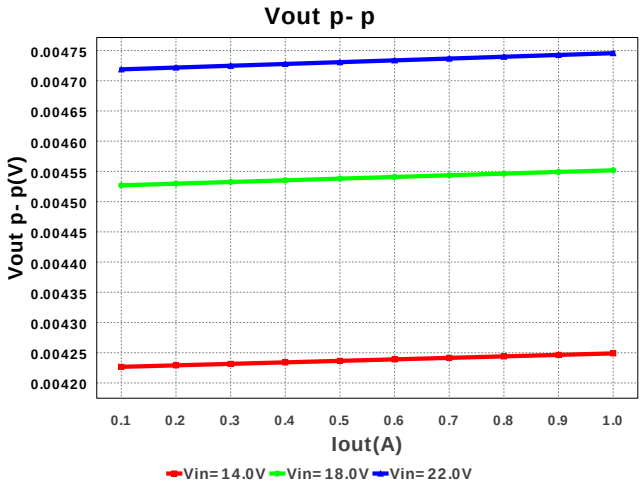

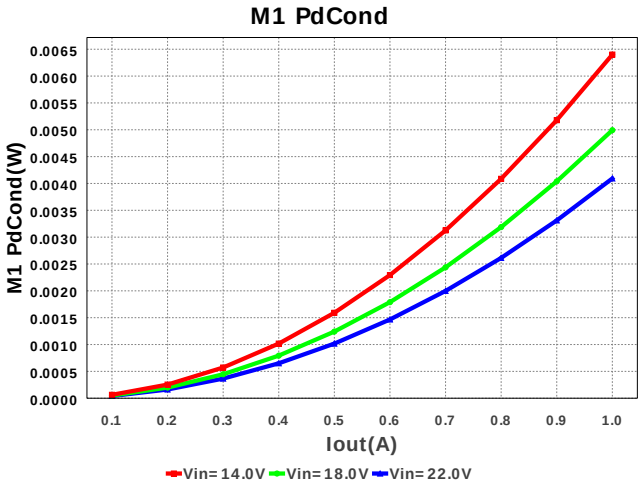

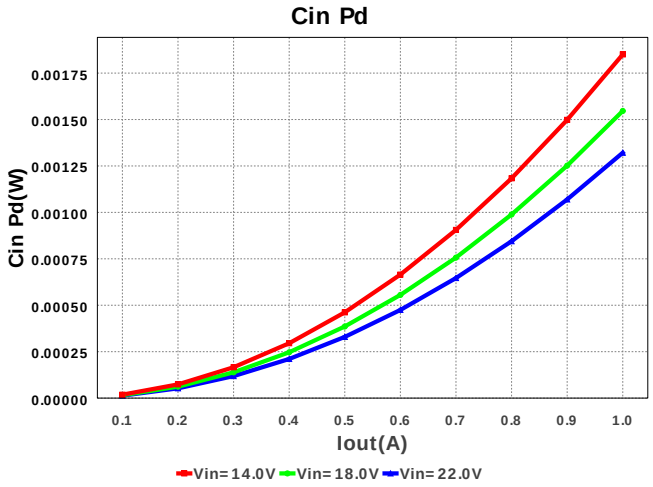

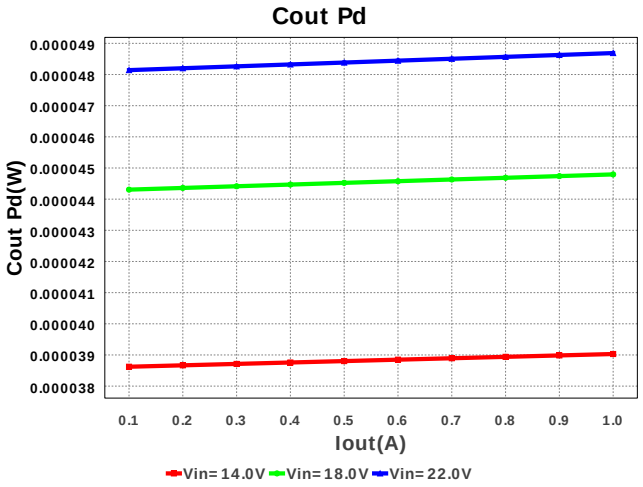

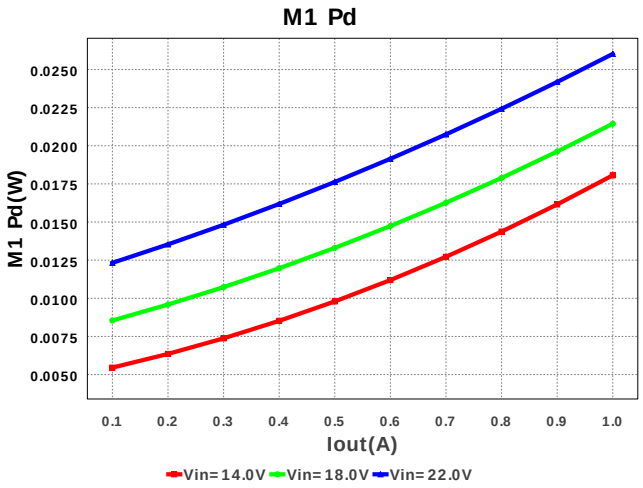

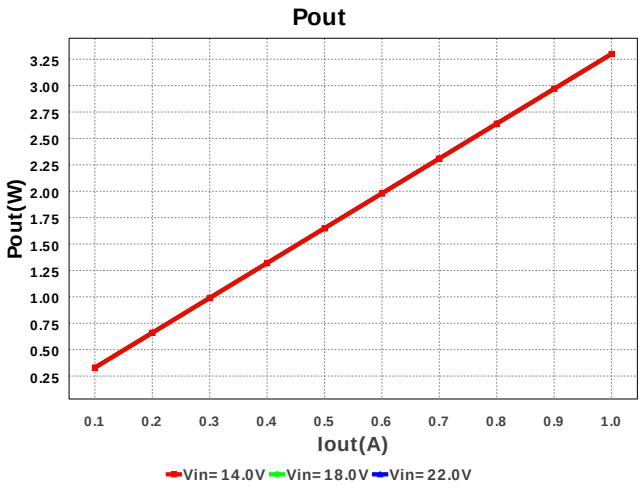

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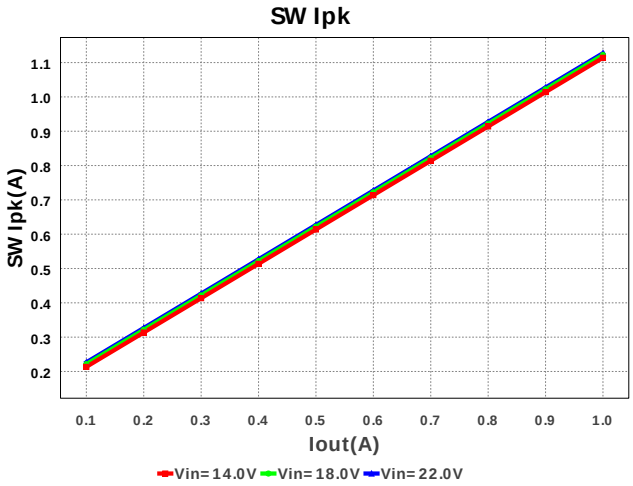

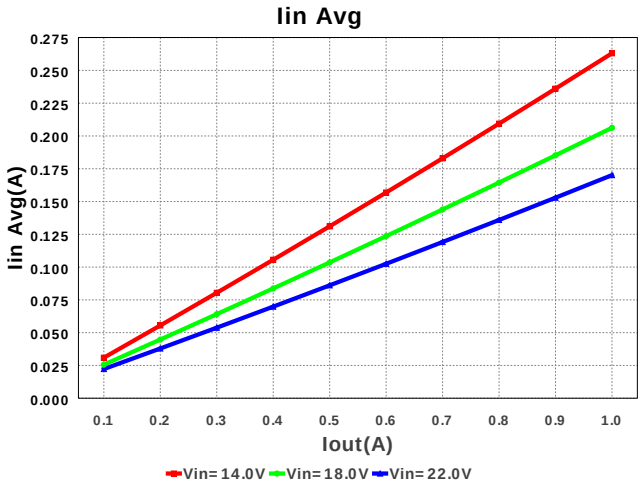

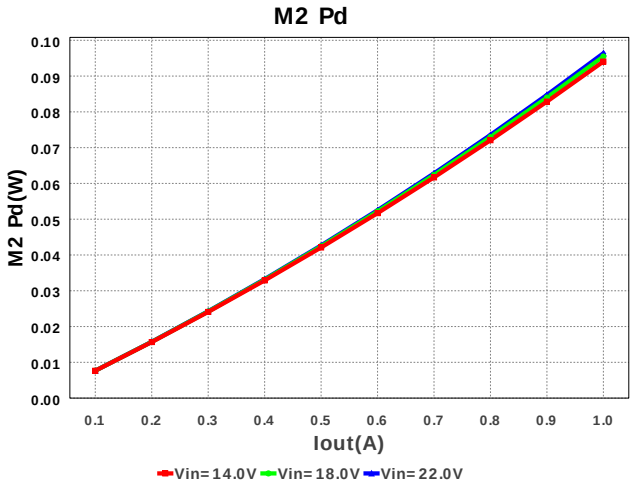

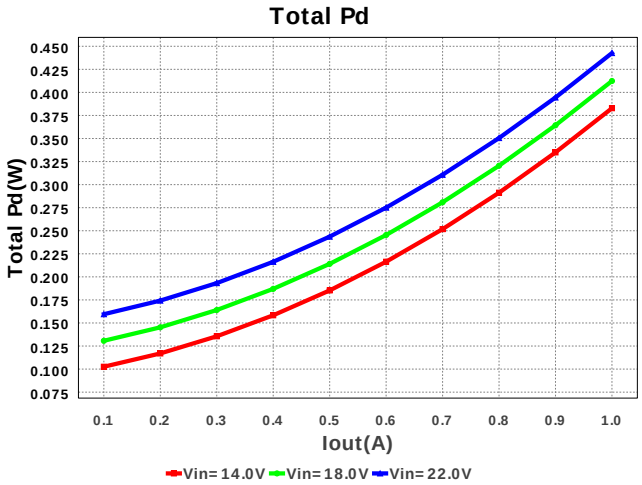

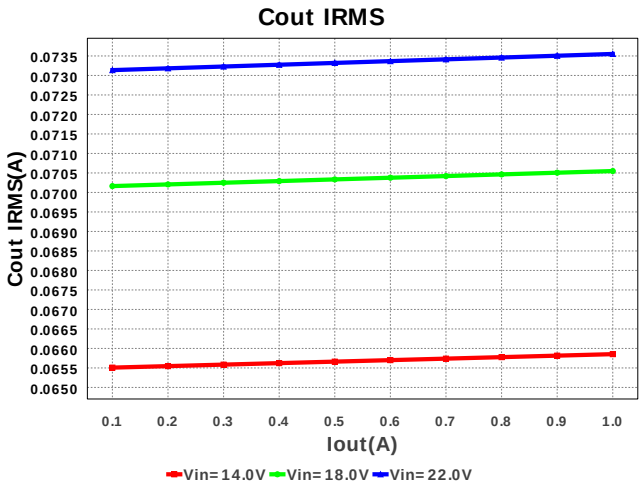

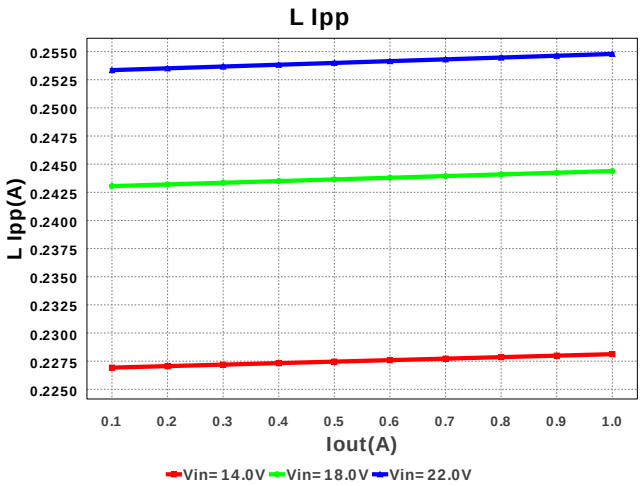

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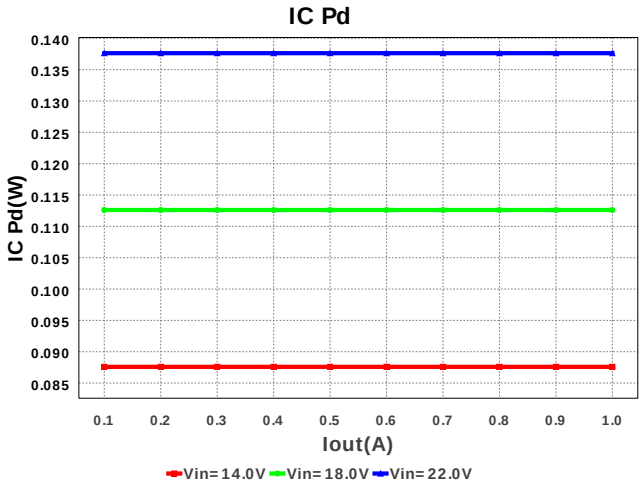

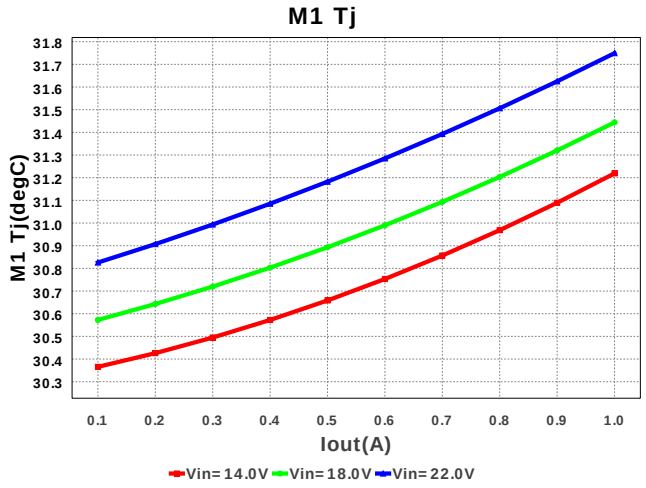

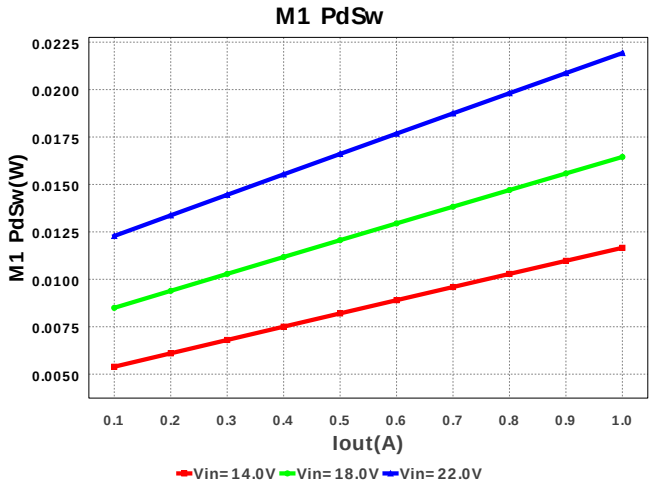

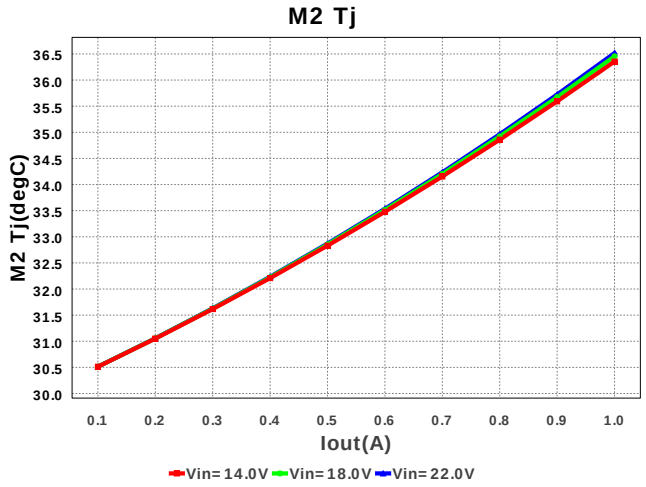

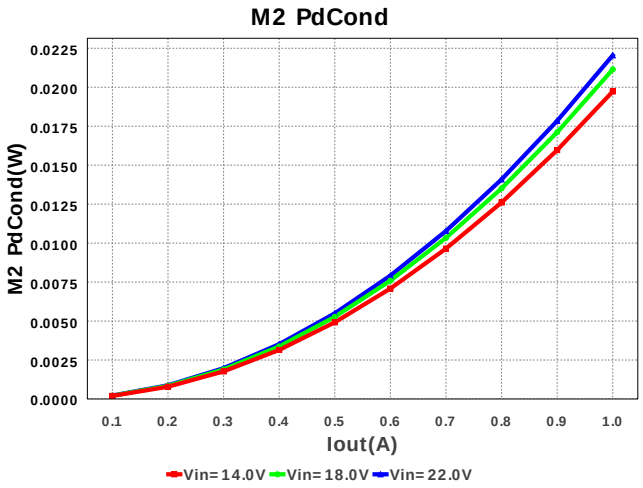

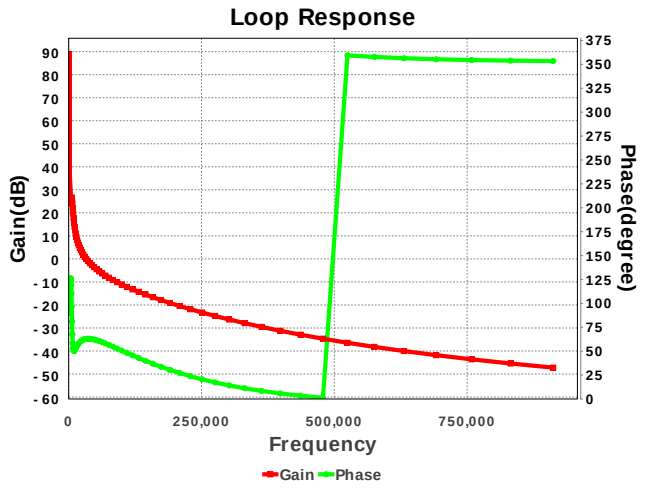

工作数值

#	名称	数值	类别	说明
1.	Cin IRMS	363.485 mA	Current	输入电容器均方根纹波电流
2.	Cout IRMS	73.551 mA	Current	输出电容器均方根纹波电流
3.	Iin Avg	170.12 mA	Current	平均输入电流
4.	L Ipp	254.79 mA	Current	峰值到峰值电感器纹波电流
5.	SW Ipk	1.127 A	Current	峰值开关电流
6.	BOM 数量	27	General	Total Design BOM count
7.	大小	402.0 mm2	General	BOM组件的总所占面积
8.	频率	348.432 kHz	General	开关频率
9.	IC Tolerance	6.0 µV	General	IC Feedback Tolerance
10.	模式	CCM	General	传导模式
11.	Pout	3.3 W	General	总输出功率

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#	名称	数值	类别	说明
12.	总 BOM	$3.17	General	Total BOM Cost
13.	交叉频率	33.216 kHz	Op_point	波特图交叉频率
14.	占空比	15.667 %	Op_point	占空比
15.	效率	88.173 %	Op_point	稳态效率
16.	IC Tj	34.817 degC	Op_point	电路接点温度
17.	IOUT_OP	1.0 A	Op_point	Iout 操作点
18.	M1 Tj	31.749 degC	Op_point	M1 MOSFET 接点温度
19.	M2 Tj	36.517 degC	Op_point	M2 MOSFET 接点温度
20.	相位裕度	62.881 deg	Op_point	波特图相位裕度
21.	VIN_OP	22.0 V	Op_point	Vin操作点
22.	Vout p-p	4.746 mV	Op_point	峰值到峰值输出纹波电压
23.	Cin Pd	1.321 mW	Power	输入电容器功率耗散
24.	Cout Pd	48.688 µW	Power	输出电容器功率耗散
25.	IC Pd	137.634 mW	Power	电路功率耗散
26.	L Pd	181.25 mW	Power	电感器功率耗散
27.	M1 Pd	26.02 mW	Power	M1 MOSFET 总功率耗散
28.	M1 PdCond	4.095 mW	Power	M1 MOSFET 传导损耗
29.	M1 PdSw	21.925 mW	Power	M1 MOSFET 开关损耗
30.	M2 Pd	96.389 mW	Power	M2 MOSFET 总功率耗散
31.	M2 PdCond	22.059 mW	Power	M2 MOSFET 传导损耗
32.	M2 PdSw	74.33 mW	Power	M2 MOSFET 开关损耗
33.	整体 Pd	442.642 mW	Power	总功率耗散

设计输入

#	名称	数值	说明
1.	输出电流	1.0 A	最大输出电流
2.	Iout1	1.0 Amps	Output Current #1
3.	Vin 最大	22.0 V	最高输入电压
4.	Vin 最小	14.0 V	最低输入电压
5.	输出电压:	3.3 V	输出电压
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	TPS40170	美国国家半导体的产品编号
8.	源	DC	输入源类别
9.	工作环境温度	30.0 degC	环境温度

设计协助

1. TPS40170 Product Folder : http://www.ti.com/product/tps40170 : contains the data sheet and other resources.

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