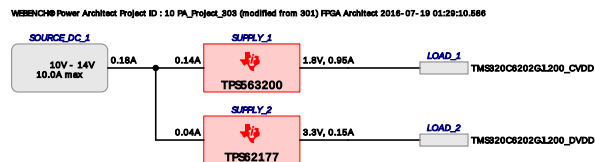


WEBENCH® Power Architect



Project Report

Project : 3496425/10 : PA_Project_303 (modified from 301)

Created : 2016-07-19 01:29:10.586

Optimize project optFactor=3

Project Summary

1. Total System Efficiency	87.227 %
2. Total System BOM Count	12.0
3. Total System Footprint	199.0 mm ²
4. Total System BOM Cost	\$2.08
5. Total System Power Dissipation	322.9 mW

--> Launch WEBENCH Power Architect.

Sequencer Flag Table

Supply	Sequencer Flag	Load	Load Name
SUPPLY_1	0	LOAD_1	TMS320C6202GJL200_CVDD
SUPPLY_2	0	LOAD_2	TMS320C6202GJL200_DVDD

Power Supplies

#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	SUPPLY_1	TPS563200	Switcher : 17V, 3A,6-pin, Low Iq Synchronous buck converter with Advanced Eco-mode	1.8 V	0.95 A	88.2%	149	\$1.06	46	4
2.	SUPPLY_2	TPS62177	Switcher : Fixed 3.3Vout, High Light-Load Efficiency Buck Converter	3.3 V	0.15 A	84.1%	50	\$1.02	47	9

Power Loads

#	Name	VLoad	ILoad	Description
1.	TMS320C6202GJL200_CVDD	1.8 V	0.95 A	VoutRipple=10%
2.	TMS320C6202GJL200_DVDD	3.3 V	0.15 A	VoutRipple=9%

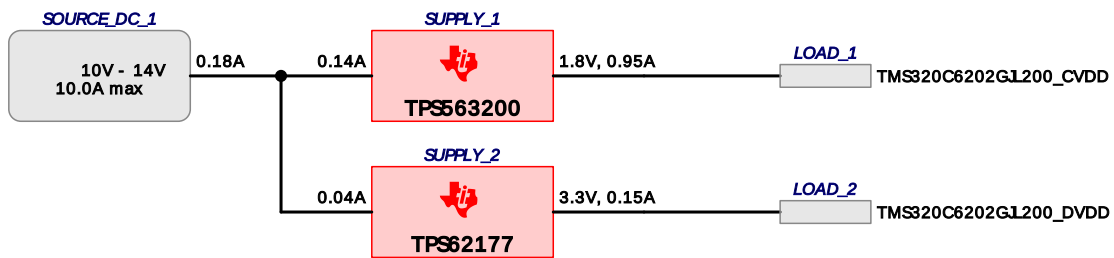
FPGAs, Processors

#	Manufacturer	Part Number	Name	Series	Description
1.	Texas Instruments	TMS320C6202GJL200	FPGA_1	TMS320C62xx	FPGA Texas Instruments TMS320C62xx TMS320C6202GJL200

<http://focus.ti.com/lit/ds/symlink/tms320c6202b.pdf>

Project Diagram

WEBENCH® Power Architect Project ID : 10_PA_Project_303 (modified from 301) FPGA Architect 2016-07-19 01:29:10.586



Electrical Procurement BOM

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm ²)
AVX	08053C104KAT2A	0805	1	\$0.01	7
TDK	C3216X6S0G476M	1206	1	\$0.13	11
Vishay-Dale	CRCW0402100KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040210K0FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040213K7FKED	0402	1	\$0.01	3
MuRata	GRM188R61C225KE15D	0603	1	\$0.02	5
MuRata	GRM21BR60J226ME39L	0805	1	\$0.04	7
MuRata	GRM32ER61E226KE15L	1210	1	\$0.16	15
Coilcraft	LPS4018-103MRB	LPS4018	1	\$0.35	24
Bourns	SRN8040-2R2Y	SRN8040	1	\$0.22	100
Texas Instruments	TPS563200DDCR	DDC0006A	1	\$0.52	10
Texas Instruments	TPS62177DQCR	R- PWSON- N10	1	\$0.60	12
Total			12	\$2.08	199.2775

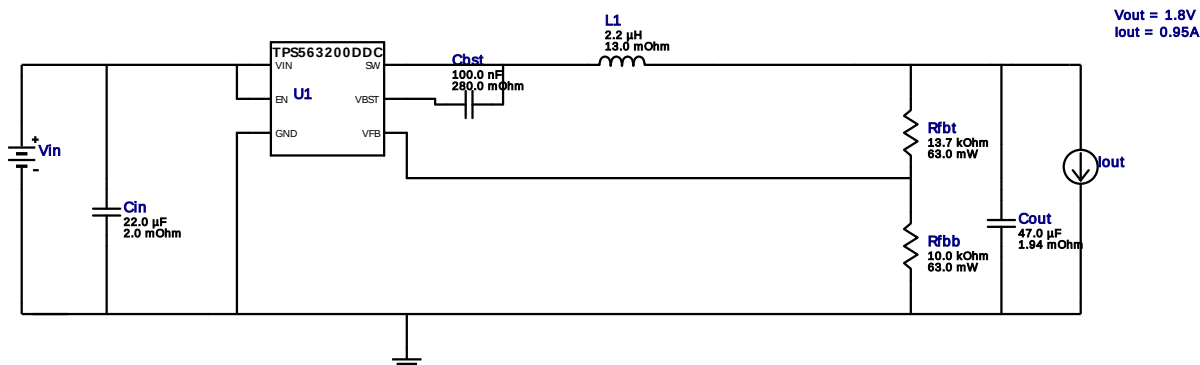


Vout = 1.8V
Iout = 0.95A

Device = TPS563200DDCR
Topology = Buck
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BOM Cost = \$1.06
BOM Count = 7
Total Pd = 0.23W

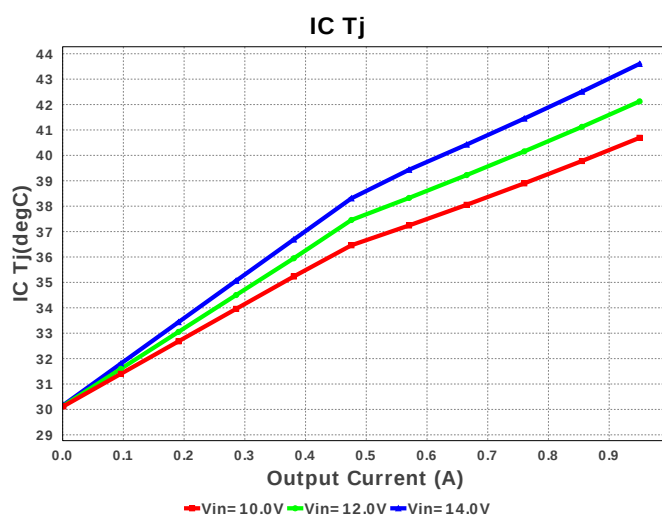
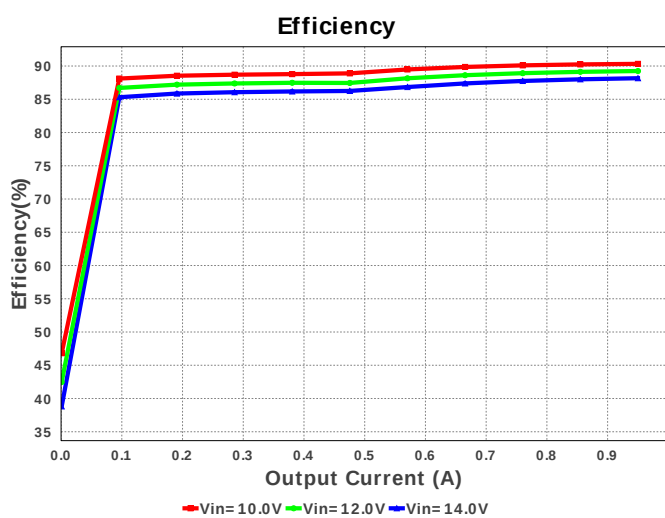
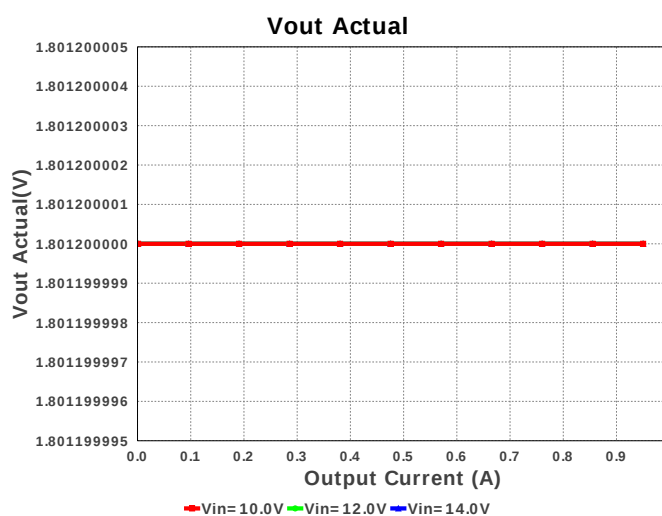
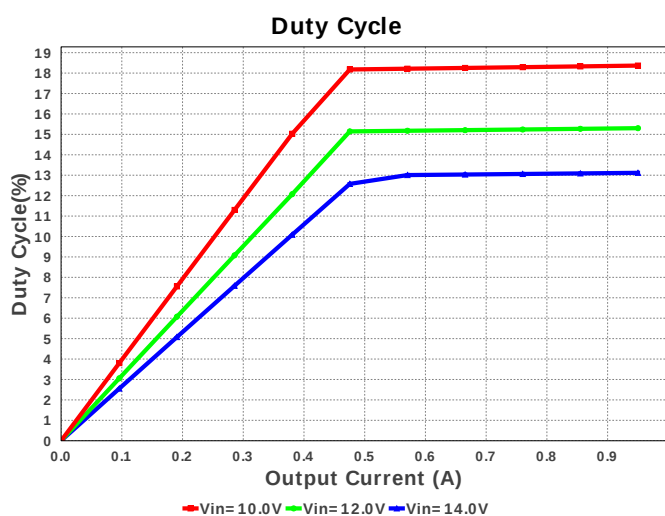
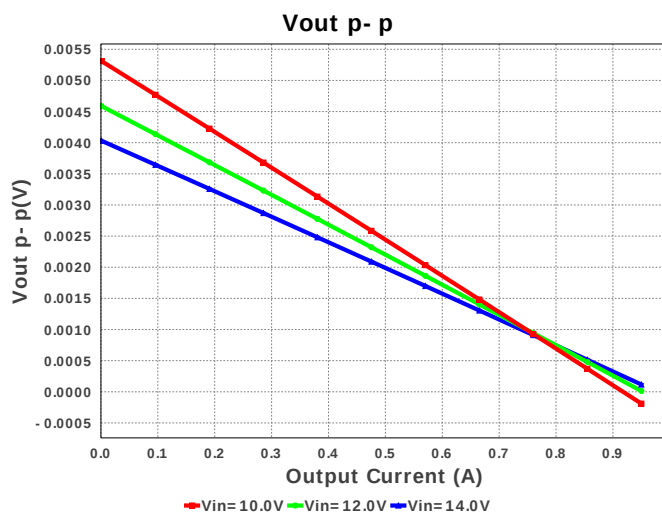
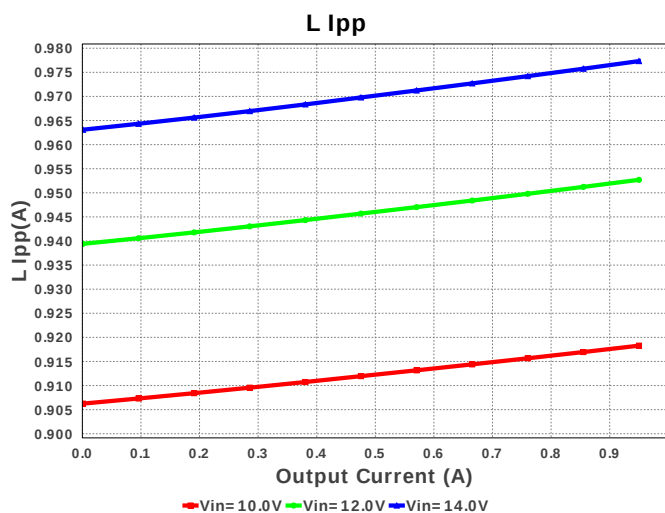
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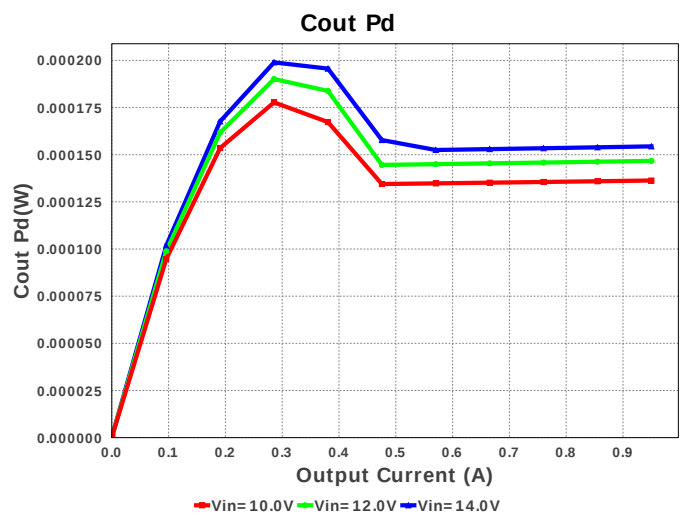
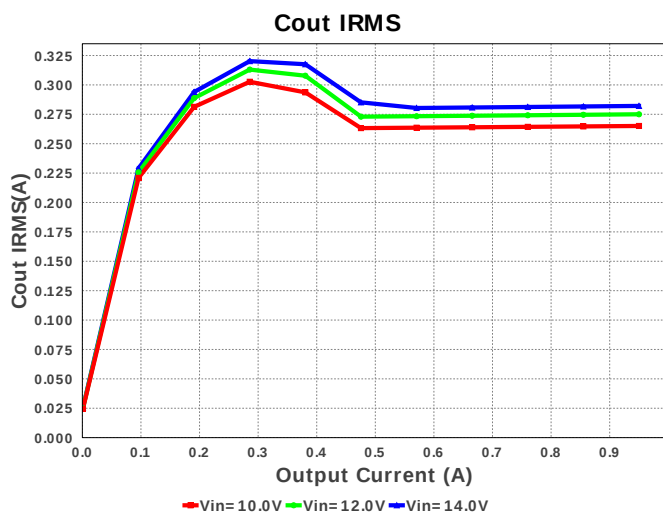
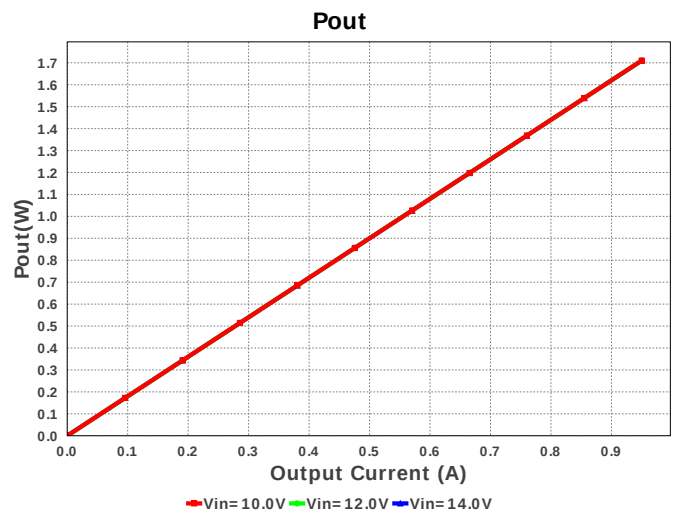
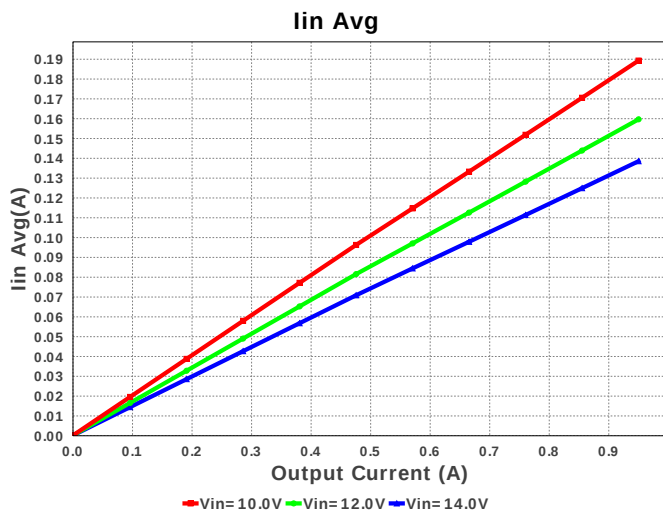
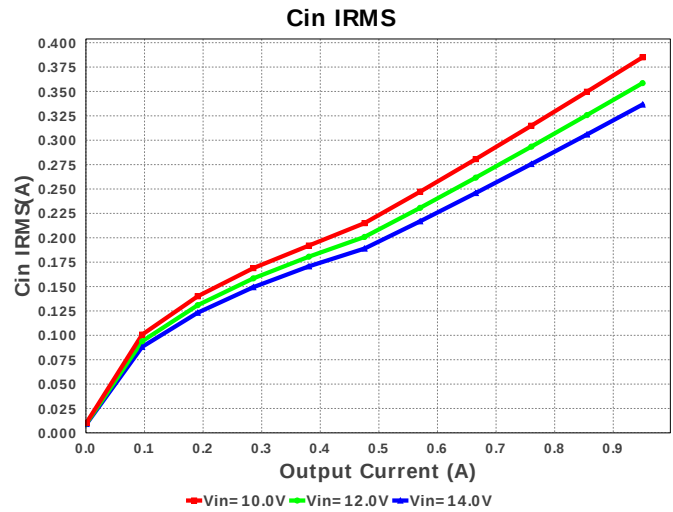
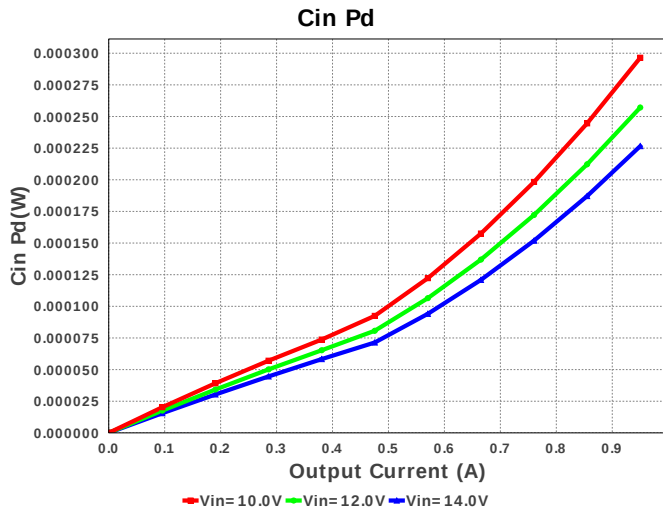
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TPS563200DDCR 10.0V-14.0V to 1.80V @ 0.95A

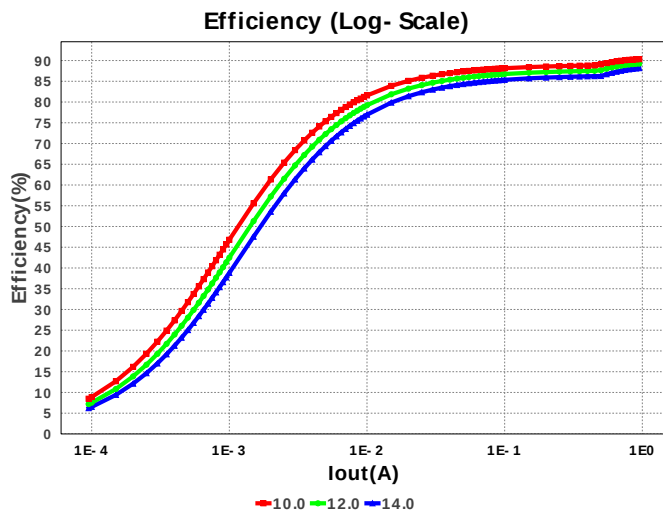
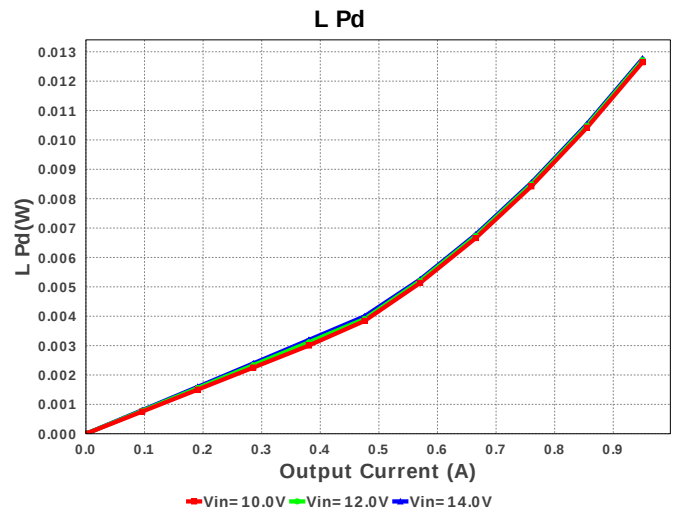
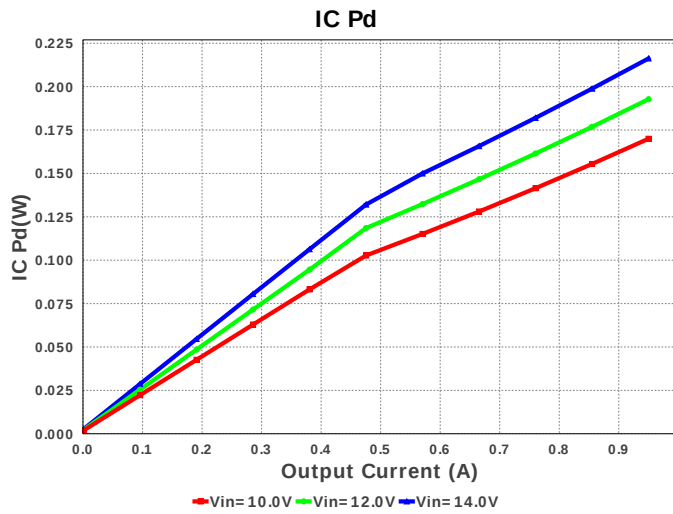
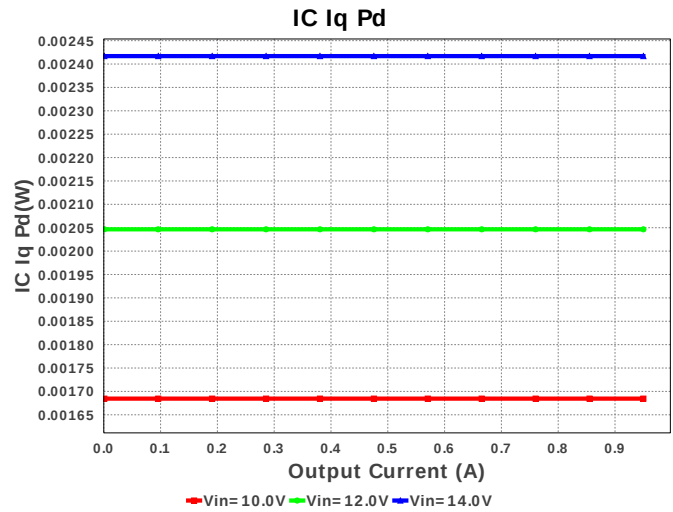
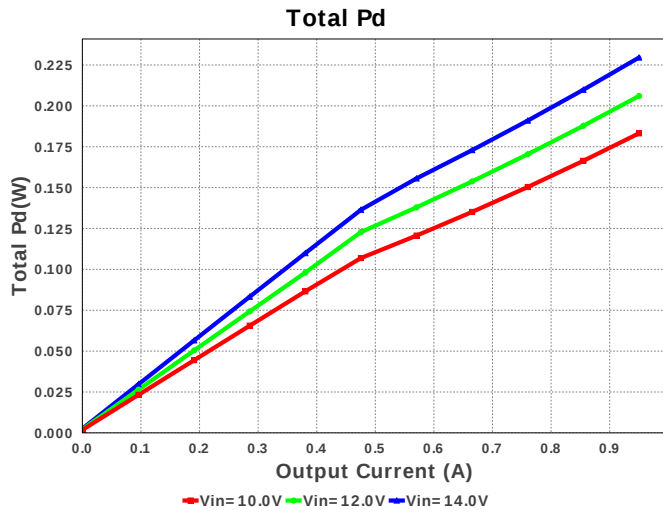


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
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 7 mm ²
2.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	\$0.16	 1210 15 mm ²
3.	Cout	TDK	C3216X6S0G476M Series= X6S	Cap= 47.0 uF ESR= 1.94 mOhm VDC= 4.0 V IRMS= 0.0 A	1	\$0.13	 1206 11 mm ²
4.	L1	Bourns	SRN8040-2R2Y	L= 2.2 uH DCR= 13.0 mOhm	1	\$0.22	 SRN8040 100 mm ²
5.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
6.	Rfbs	Vishay-Dale	CRCW040213K7FKED Series= CRCW..e3	Res= 13.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
7.	U1	Texas Instruments	TPS563200DDCR	Switcher	1	\$0.52	 DDC0006A 10 mm ²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	336.587 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	282.131 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	138.54 mA	Current	Average input current
4.	L Ipp	977.33 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	7	General	Total Design BOM count
6.	FootPrint	149.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	740.801 kHz	General	Switching frequency
8.	Pout	1.71 W	General	Total output power
9.	Total BOM	\$1.06	General	Total BOM Cost
10.	Vout Actual	1.801 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
11.	Vout OP	1.8 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
12.	Duty Cycle	13.117 %	Op_point	Duty cycle
13.	Efficiency	88.166 %	Op_point	Steady state efficiency
14.	IC Tj	43.601 degC	Op_point	IC junction temperature
15.	ICThetaJA	62.9 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	950.0 mA	Op_point	Iout operating point
17.	VIN_OP	14.0 V	Op_point	Vin operating point
18.	Vout p-p	4.474 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	226.582 μ W	Power	Input capacitor power dissipation
20.	Cout Pd	154.419 μ W	Power	Output capacitor power dissipation
21.	IC Iq Pd	2.417 mW	Power	IC Iq Pd
22.	IC Pd	216.237 mW	Power	IC power dissipation
23.	L Pd	12.767 mW	Power	Inductor power dissipation
24.	Total Pd	229.528 mW	Power	Total Power Dissipation
25.	Vout Tolerance	2.499 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	950.0 m	Maximum Output Current
2.	VinMax	14.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	1.8	Output Voltage
5.	base_pn	TPS563200	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. TPS563200 Product Folder : <http://www.ti.com/product/TPS563200> : contains the data sheet and other resources.

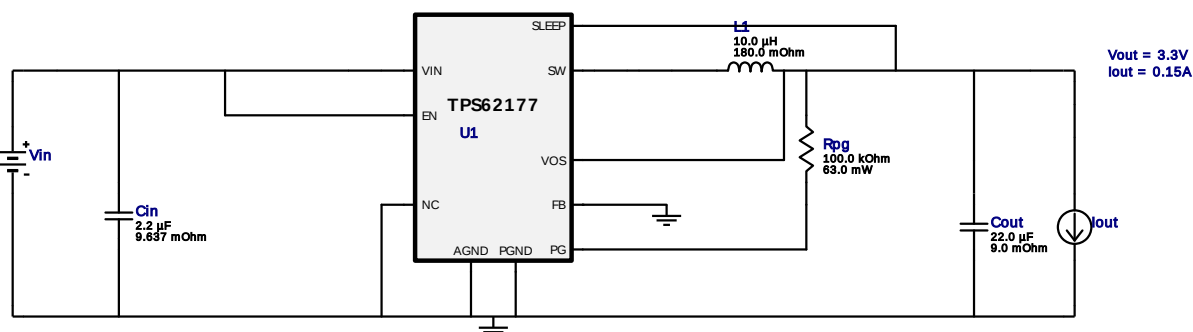


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Iout = 0.15A

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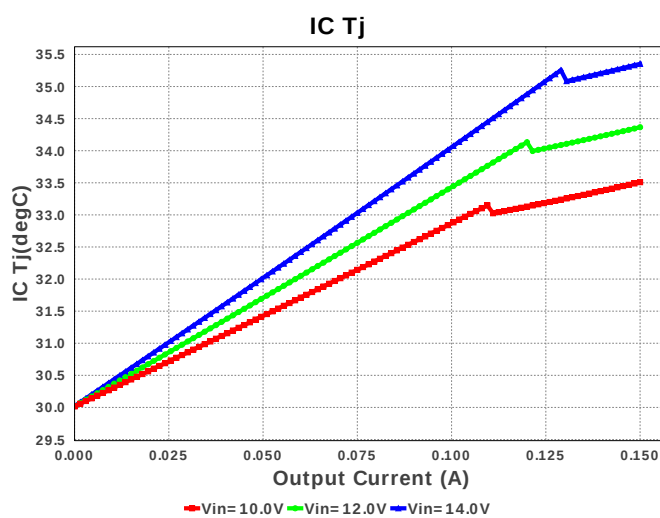
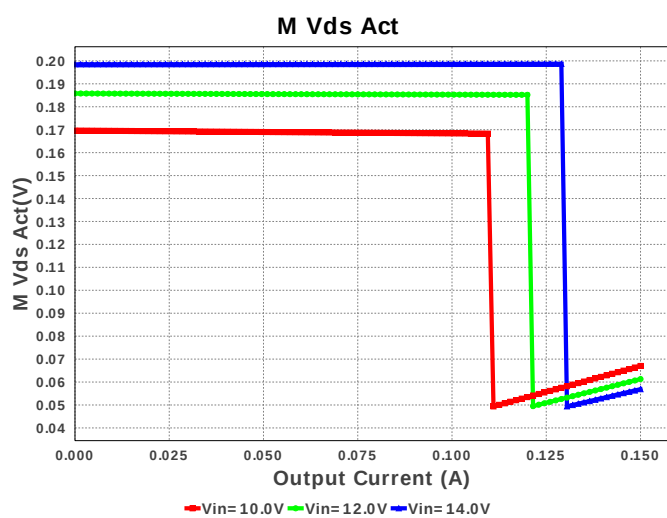
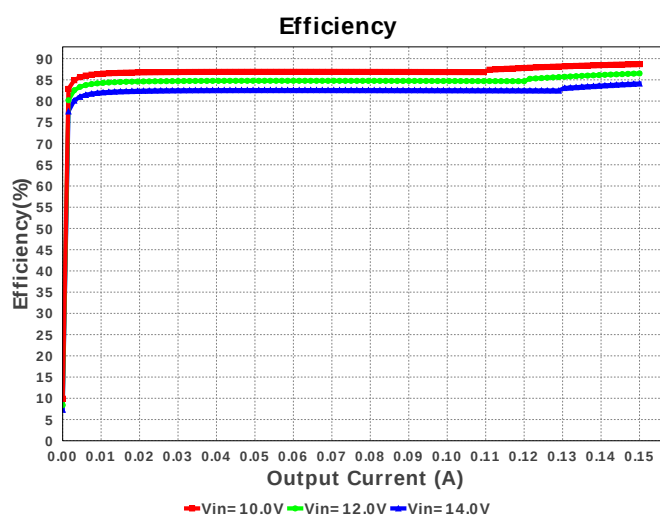
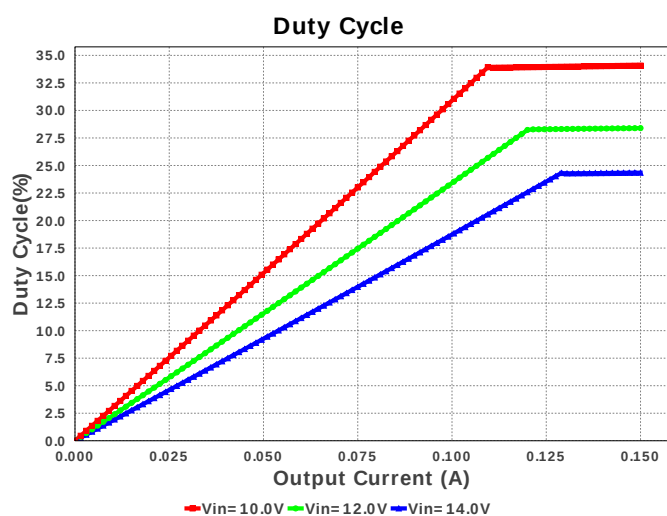
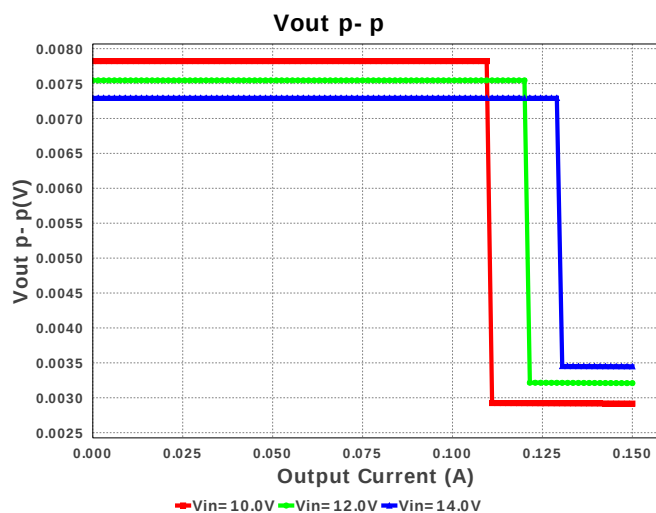
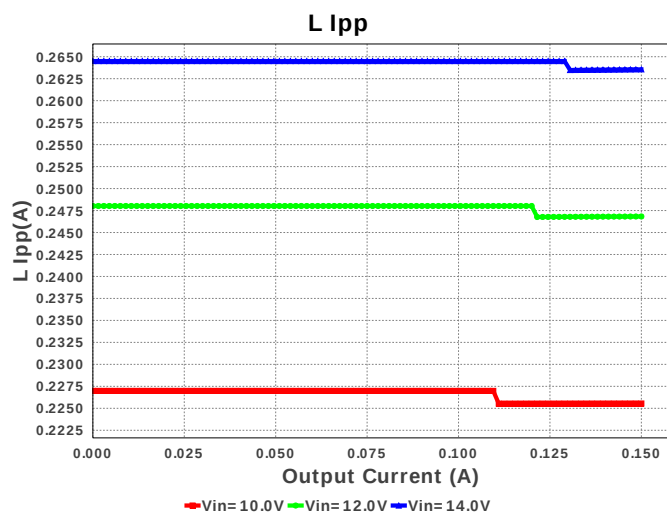
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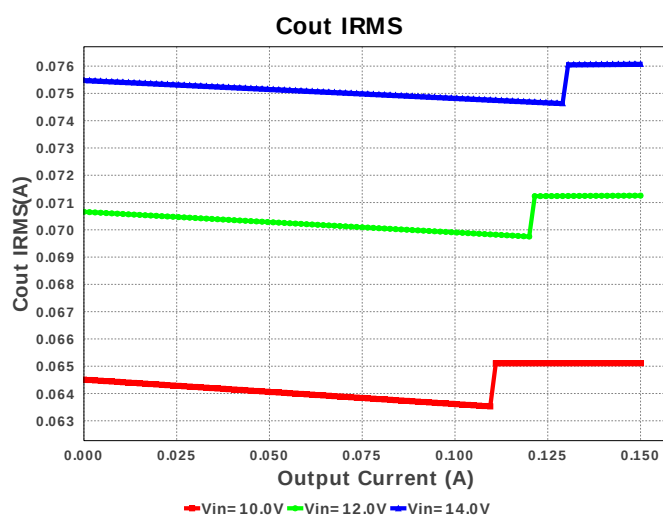
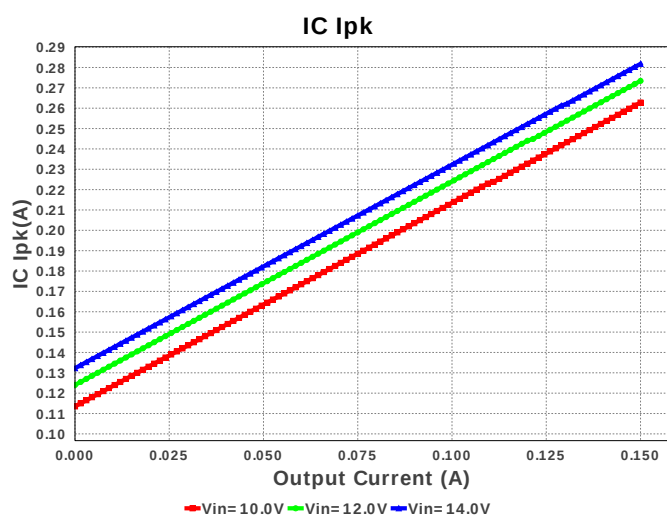
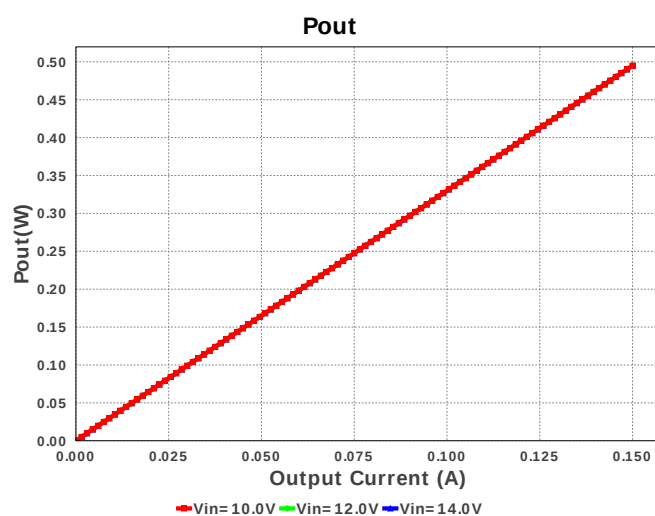
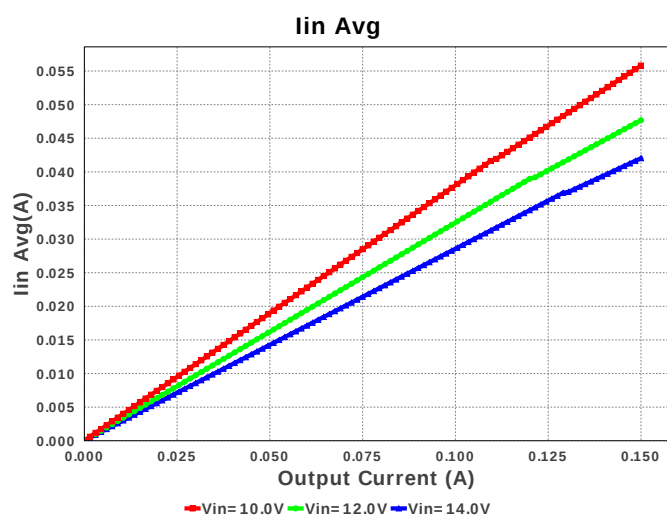
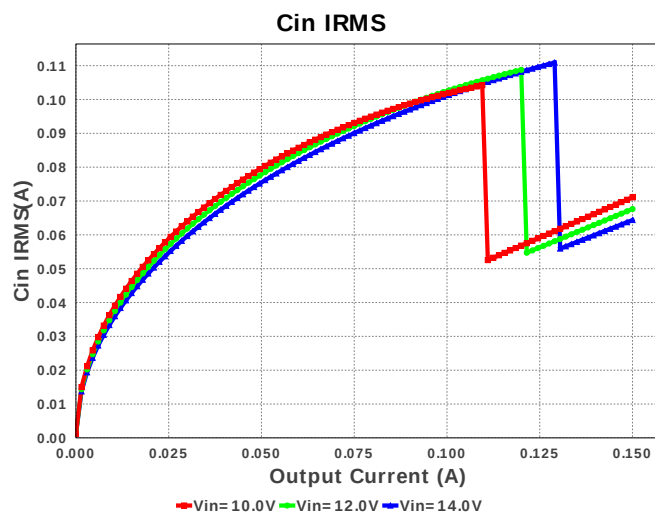
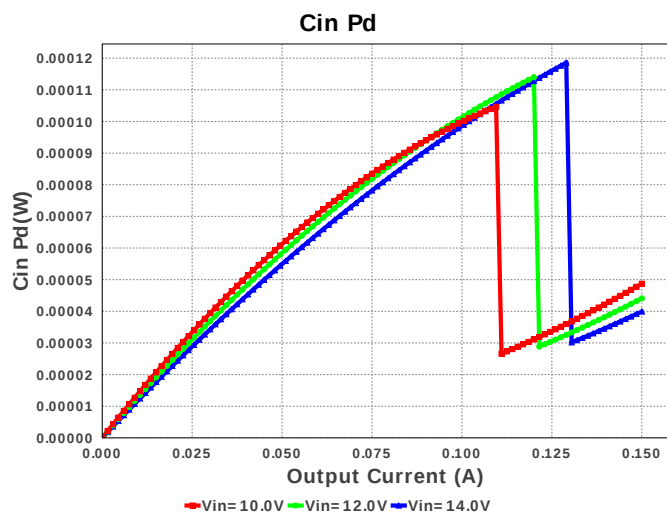
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TPS62177DQCR 10.0V-14.0V to 3.30V @ 0.15A

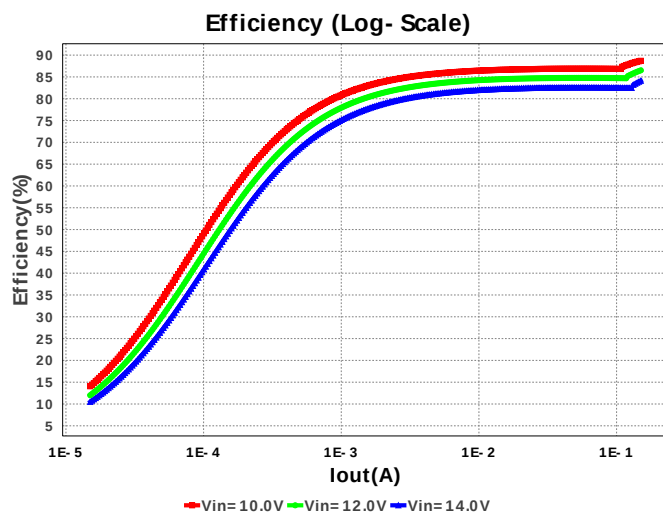
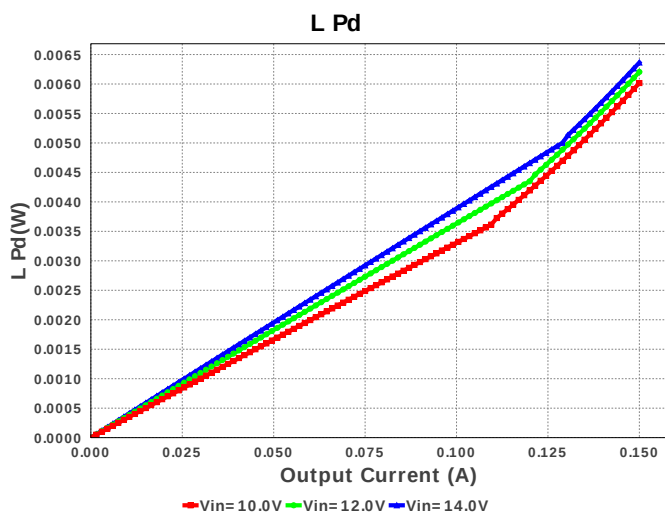
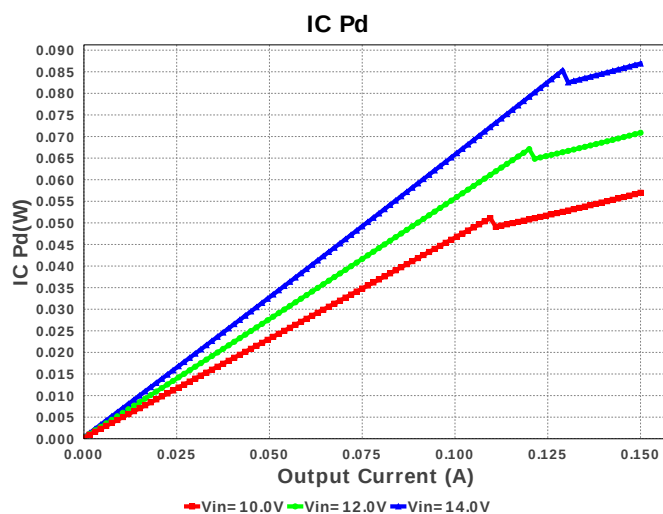
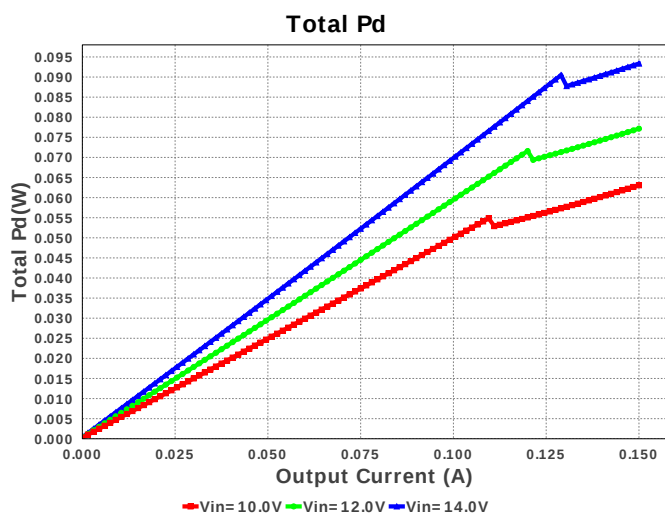
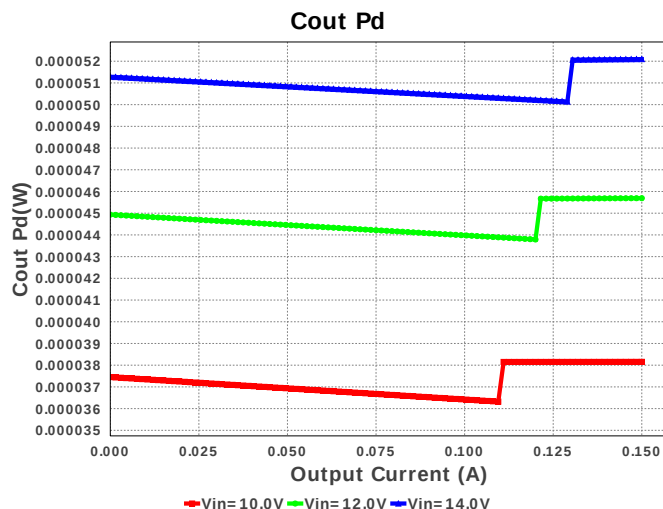
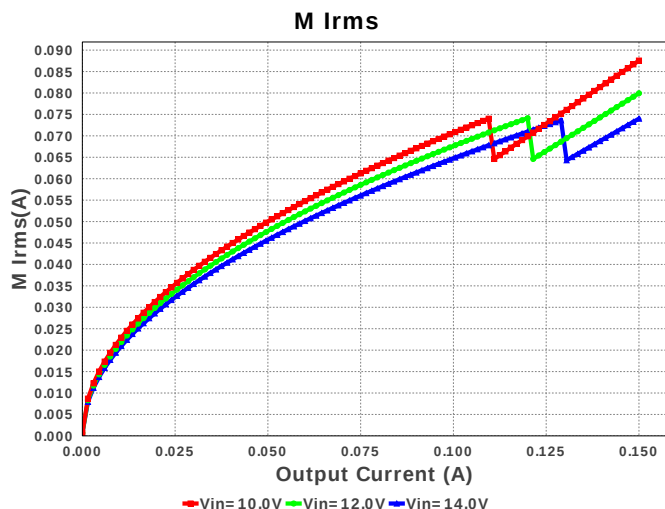


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM188R61C225KE15D Series= X5R	Cap= 2.2 uF ESR= 9.637 mOhm VDC= 16.0 V IRMS= 1.20373 A	1	\$0.02	0603 5 mm ²
2.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	1	\$0.04	0805 7 mm ²
3.	L1	Coilcraft	LPS4018-103MRB	L= 10.0 µH DCR= 180.0 mOhm	1	\$0.35	LPS4018 24 mm ²
4.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
5.	U1	Texas Instruments	TPS62177DQCR	Switcher	1	\$0.60	R-PWSON-N10 12 mm ²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	64.374 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	76.083 mA	Current	Output capacitor RMS ripple current
3.	IC IpK	281.779 mA	Current	Peak switch current in IC
4.	Iin Avg	42.026 mA	Current	Average input current
5.	L Ipp	263.56 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	74.009 mA	Current	MOSFET RMS current
7.	BOM Count	5	General	Total Design BOM count
8.	FootPrint	50.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	988.322 kHz	General	Switching frequency
10.	IC Tolerance	24.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	56.885 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	495.0 mW	General	Total output power
13.	Total BOM	\$1.02	General	Total BOM Cost
14.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	24.344 %	Op_point	Duty cycle
16.	Efficiency	84.133 %	Op_point	Steady state efficiency
17.	IC Tj	35.353 degC	Op_point	IC junction temperature
18.	ICThetaJA	61.6 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	150.0 mA	Op_point	Iout operating point
20.	VIN_OP	14.0 V	Op_point	Vin operating point
21.	Vout p-p	3.45 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	39.936 μ W	Power	Input capacitor power dissipation
23.	Cout Pd	52.097 μ W	Power	Output capacitor power dissipation
24.	IC Pd	86.9 mW	Power	IC power dissipation
25.	L Pd	6.365 mW	Power	Inductor power dissipation
26.	Total Pd	93.356 mW	Power	Total Power Dissipation
27.	Vout Tolerance	727.273 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	150.0 m	Maximum Output Current
2.	VinMax	14.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS62177	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. [TPS62177 Product Folder](http://www.ti.com/product/TPS62177) : <http://www.ti.com/product/TPS62177> : contains the data sheet and other resources.

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