

WEBENCH® Power Architect

Project Report

Project : 3496425/1 : PA_Project_325 (modified from 324)

Created : 2016-07-19 01:05:32.581

Optimize project optFactor=3

Project Summary

1. Total System Efficiency	84.307 %
2. Total System BOM Count	5.0
3. Total System Footprint	50.0 mm2
4. Total System BOM Cost	\$1.02
5. Total System Power Dissipation	307.1 mW

--> Launch WEBENCH Power Architect.

Sequencer Flag Table

Supply	Sequencer Flag	Load	Load Name
SUPPLY_1	0	LOAD_1	LOAD #1

Power Supplies

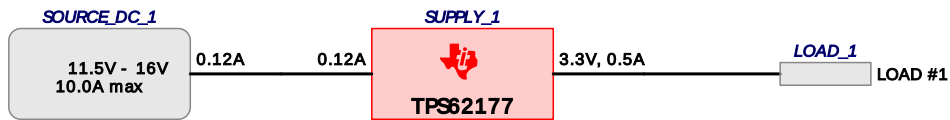
#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	SUPPLY_1	TPS62177	Switcher : Fixed 3.3Vout, High Light-Load Efficiency Buck Converter	3.3 V	0.5 A	84.3%	50	\$1.02	27	4

Power Loads

#	Name	VLoad	ILoad	Description
1.	LOAD #1	3.3 V	0.5 A	VoutRipple=5%

Project Diagram

WEBENCH® Power Architect Project ID : 1 PA_Project_325 (modified from 324) Power Architect 2016-07-19 01:05:32.581



Electrical Procurement BOM

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm ²)
Vishay-Dale	CRCW0402100KFKED	0402	1	\$0.01	3
MuRata	GRM188R61C225KE15D	0603	1	\$0.02	5
MuRata	GRM21BR60J226ME39L	0805	1	\$0.04	7
Coilcraft	LPS4018-103MRB	LPS4018	1	\$0.35	24
Texas Instruments	TPS62177DQCR	R- PWSN- N10	1	\$0.60	12
Total			5	\$1.02	4000000000000005

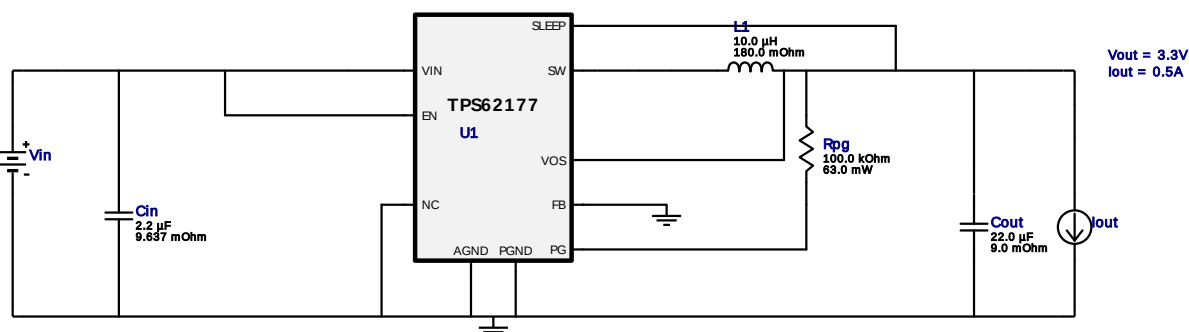


Vout = 3.3V
Iout = 0.5A

Device = TPS62177DQCR
Topology = Buck
Created = 7/19/16 1:05:30 AM
BOM Cost = \$1.02
BOM Count = 5
Total Pd = 0.31W

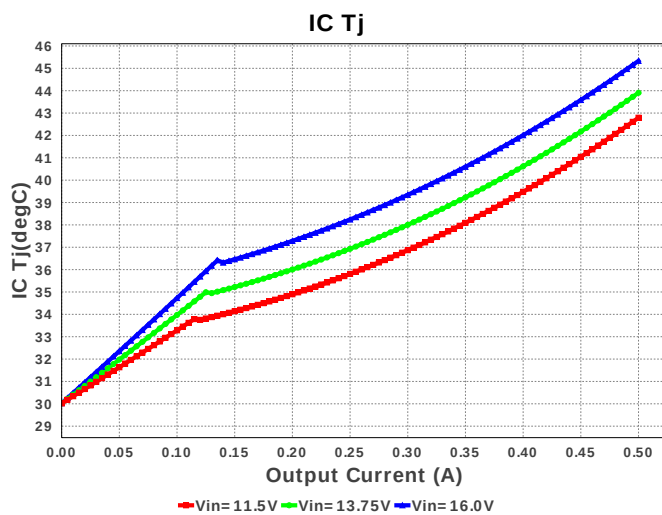
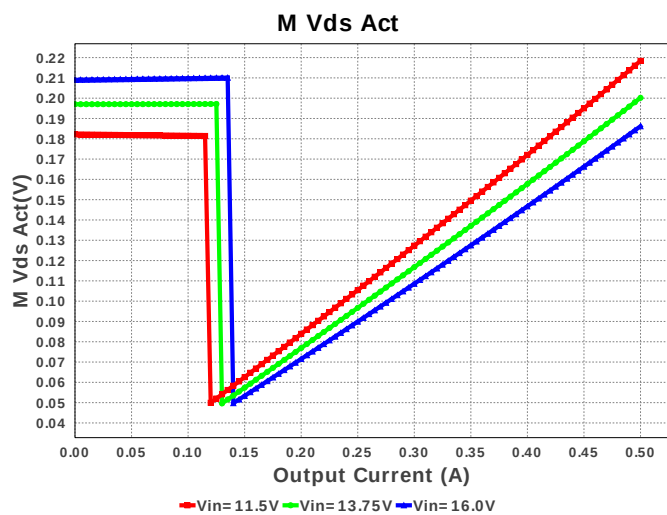
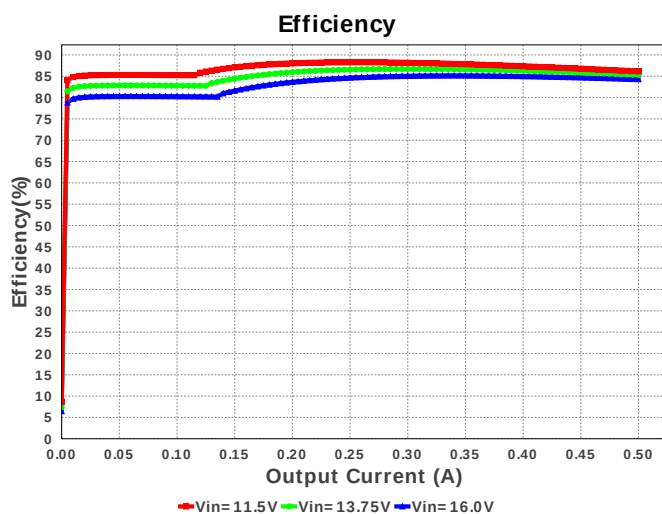
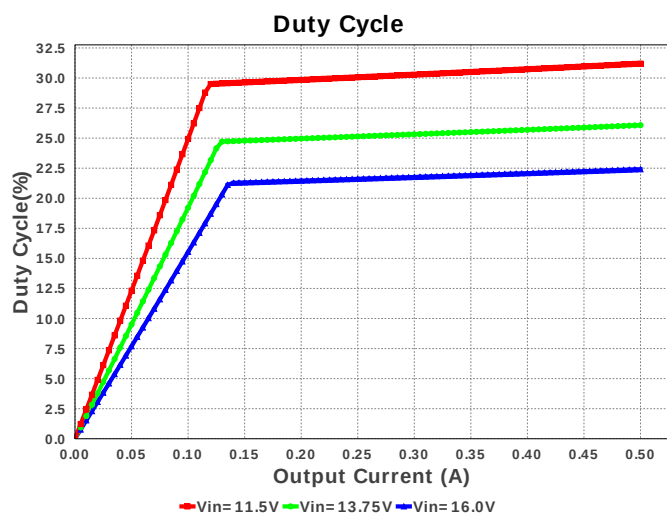
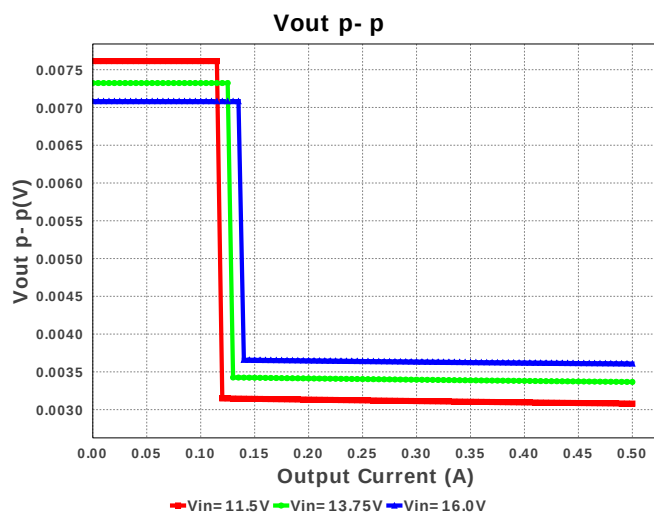
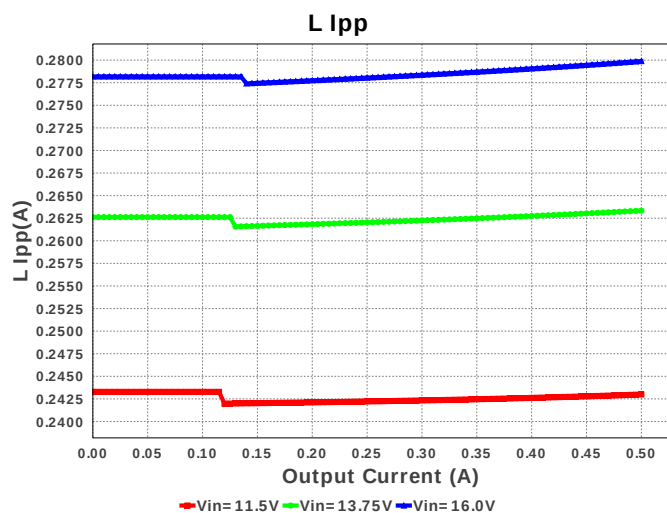
WEBENCH® Design Report

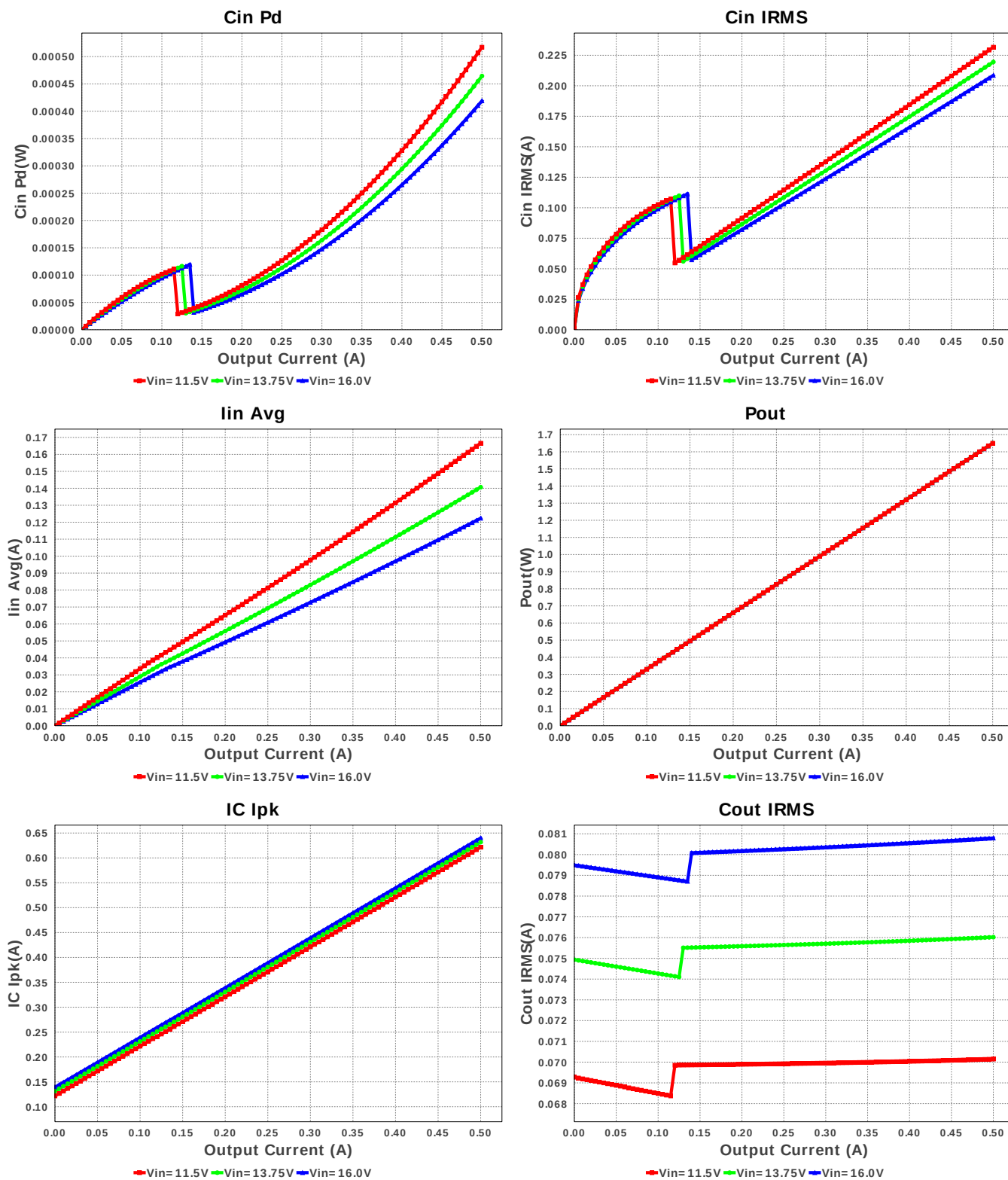
Design : 3496425/27 TPS62177DQCR
TPS62177DQCR 11.5V-16.0V to 3.30V @ 0.5A

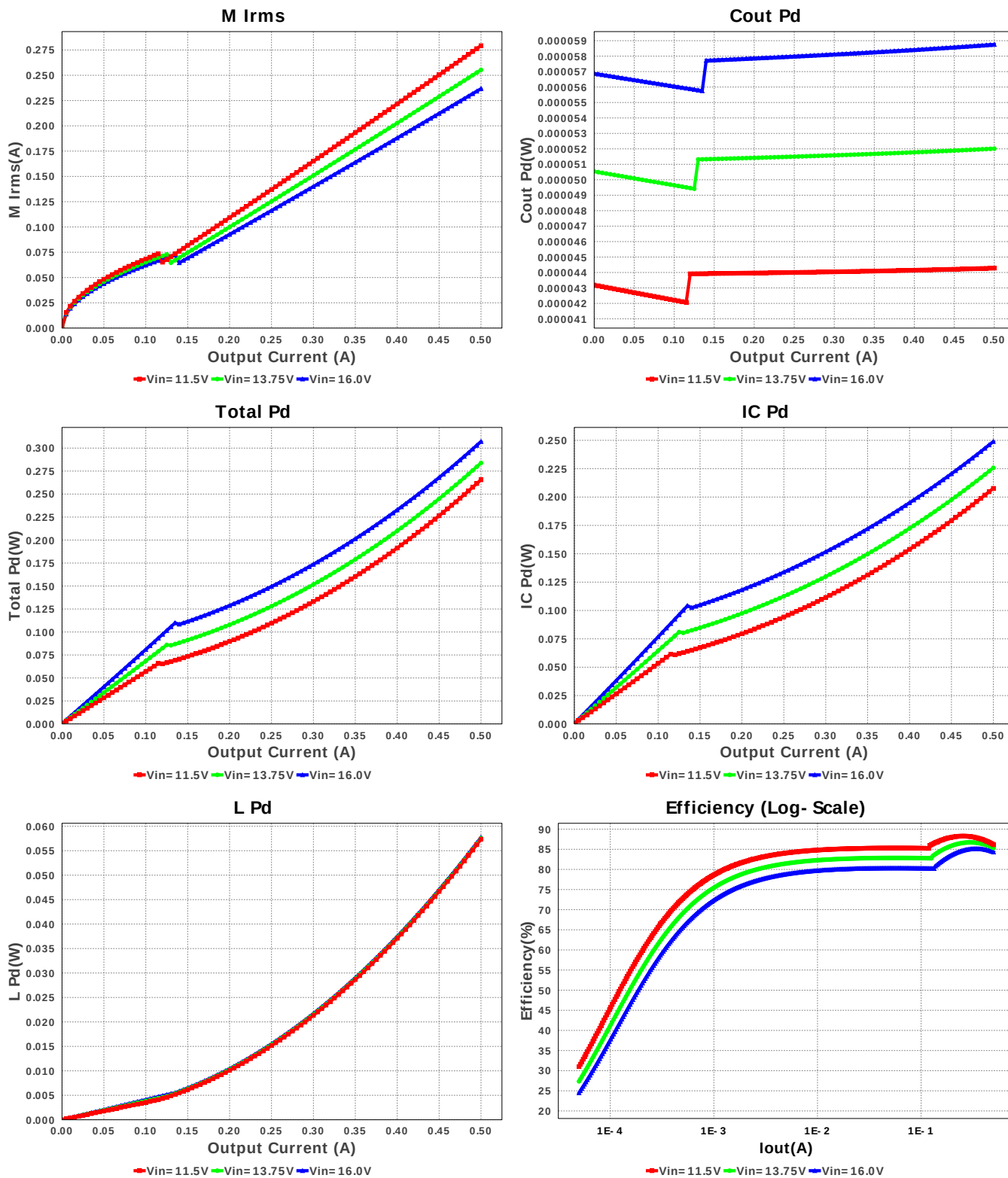


Electrical BOM

#	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	208.496 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	80.797 mA	Current	Output capacitor RMS ripple current
3.	IC IpK	639.945 mA	Current	Peak switch current in IC
4.	Iin Avg	122.32 mA	Current	Average input current
5.	L Ipp	279.89 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	236.698 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	1.017 MHz	General	Switching frequency
10.	IC Tolerance	24.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	186.18 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	1.65 W	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	22.41 %	Op_point	Duty cycle
16.	Efficiency	84.307 %	Op_point	Steady state efficiency
17.	IC Tj	45.334 degC	Op_point	IC junction temperature
18.	ICThetaJA	61.6 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	500.0 mA	Op_point	Iout operating point
20.	VIN_OP	16.0 V	Op_point	Vin operating point
21.	Vout p-p	3.61 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	418.924 μ W	Power	Input capacitor power dissipation
23.	Cout Pd	58.754 μ W	Power	Output capacitor power dissipation
24.	IC Pd	248.926 mW	Power	IC power dissipation
25.	L Pd	57.719 mW	Power	Inductor power dissipation
26.	Total Pd	307.131 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	500.0 m	Maximum Output Current
2.	VinMax	16.0	Maximum input voltage
3.	VinMin	11.5	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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