

WEBENCH® Power Architect

Project Report

Project : 4097880/1 : PA_Project_302 (modified from 301)

Created : 2015-06-07 22:47:42.509

Optimize project optFactor=3

Project Summary

- | | |
|-----------------------------------|----------------------|
| 1. Total System Efficiency | 83.989 % |
| 2. Total System BOM Count | 5.0 |
| 3. Total System Footprint | 84.0 mm ² |
| 4. Total System BOM Cost | \$1.14 |
| 5. Total System Power Dissipation | 314.5 mW |

--> Launch WEBENCH Power Architect.

Power Supplies

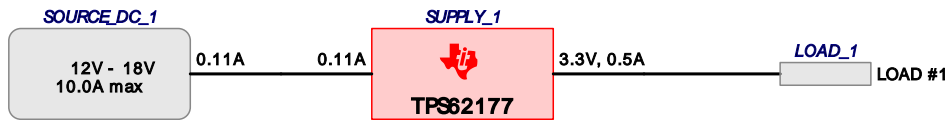
#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	SUPPLY_1	TPS62177	Switcher : Fixed 3.3Vout, High Light-Load Efficiency Buck Converter	3.3 V	0.5 A	84%	84	\$1.14	1	4

Power Loads

#	Name	VLoad	ILoad	Description
1.	LOAD #1	3.3 V	0.5 A	VoutRipple=10%

Project Diagram

WEBENCH® Power Architect Project ID : 1 PA_Project_302 (modified from 301) Power Architect 2015-06-07 22:47:42.509



Electrical Procurement BOM

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm²)
TDK	C3225X7R2A225K230AB	1210	1	\$0.19	15
Vishay-Dale	CRCW0402100KFKED	0402	1	\$0.01	3
MuRata	GRM21BR60J226ME39L	0805	1	\$0.05	7
Bourns	SDR0503-100ML	SDR0503	1	\$0.19	48
Texas Instruments	TPS62177DQCR	R-PWSON-N10	1	\$0.70	12
Total			5	\$1.14	84

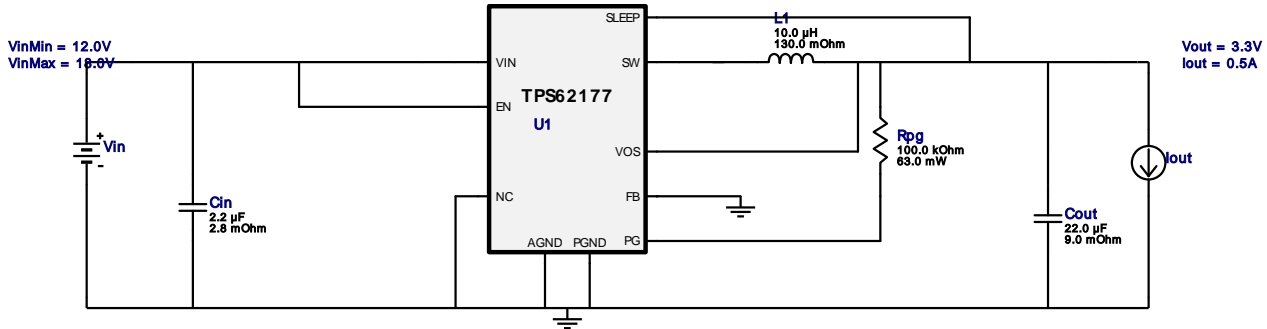


VinMin = 12.0V
 VinMax = 18.0V
 Vout = 3.3V
 Iout = 0.5A

Device = TPS62177DQCR
 Topology = Buck
 Created = 6/7/15 10:47:40 PM
 BOM Cost = \$1.14
 Footprint = 84.0 mm²
 BOM Count = 5
 Total Pd = 0.31W

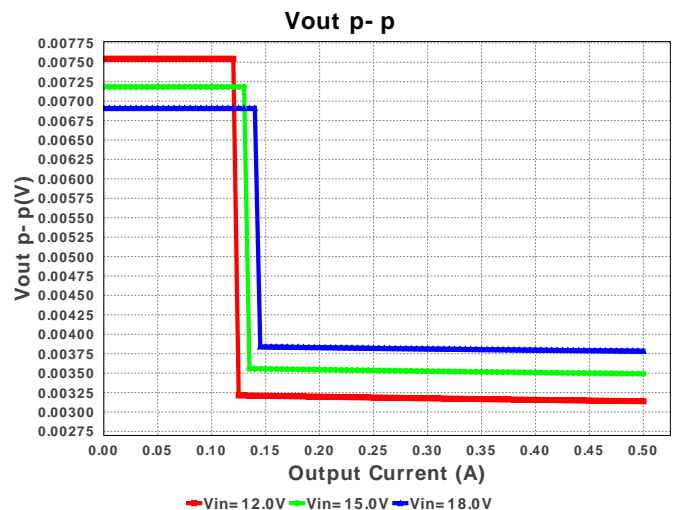
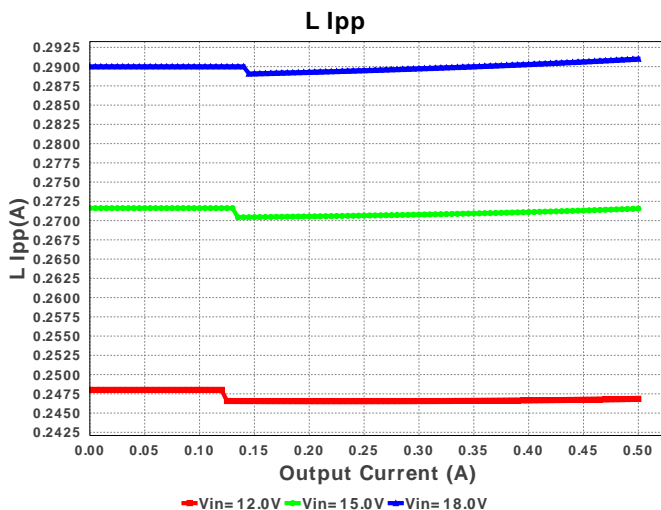
WEBENCH® Design Report

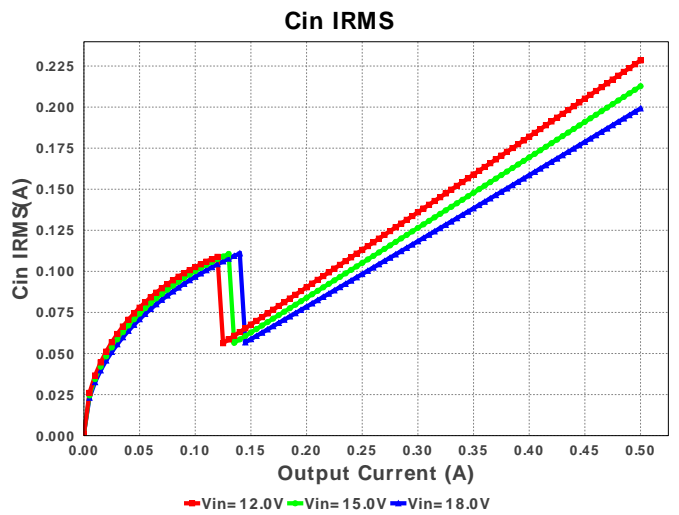
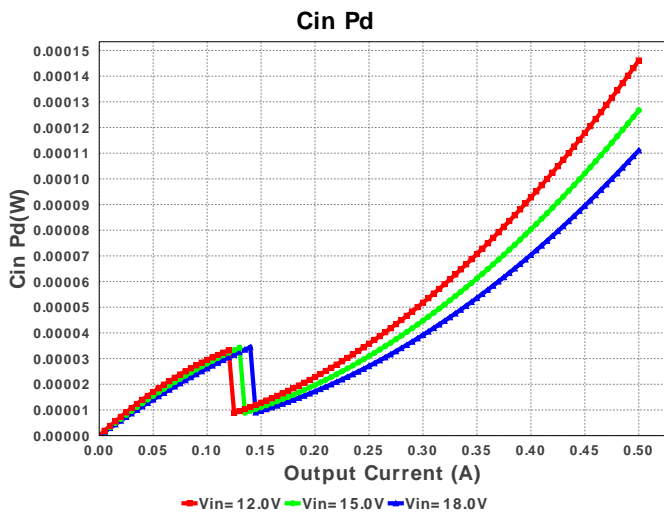
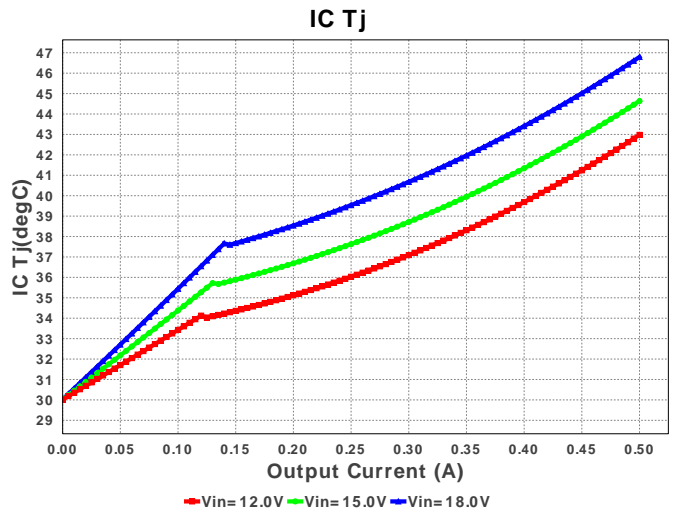
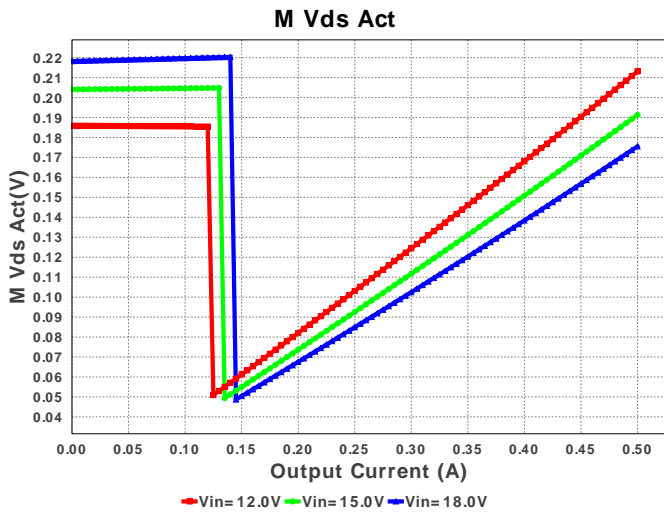
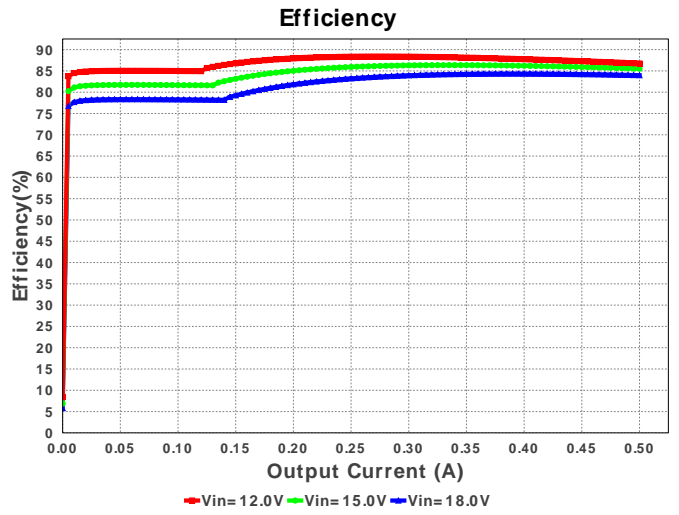
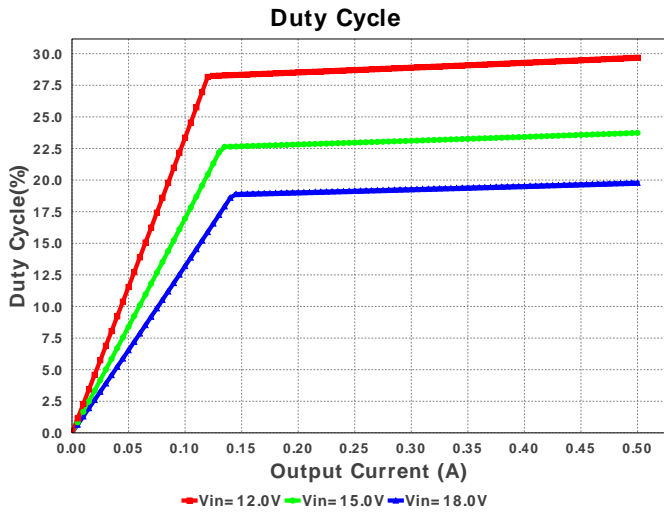
Design : 4097880/1 TPS62177DQCR
 TPS62177DQCR 12.0V-18.0V to 3.30V @ 0.5A

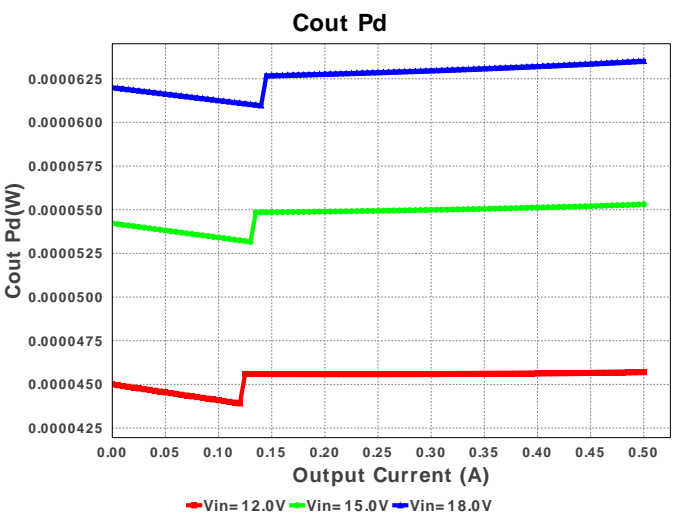
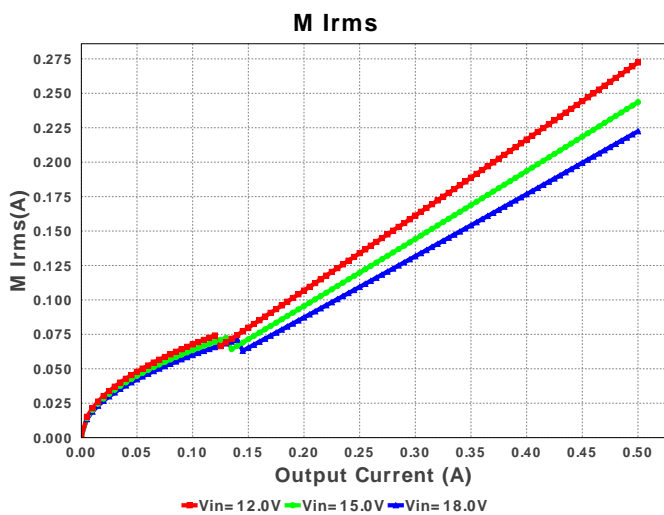
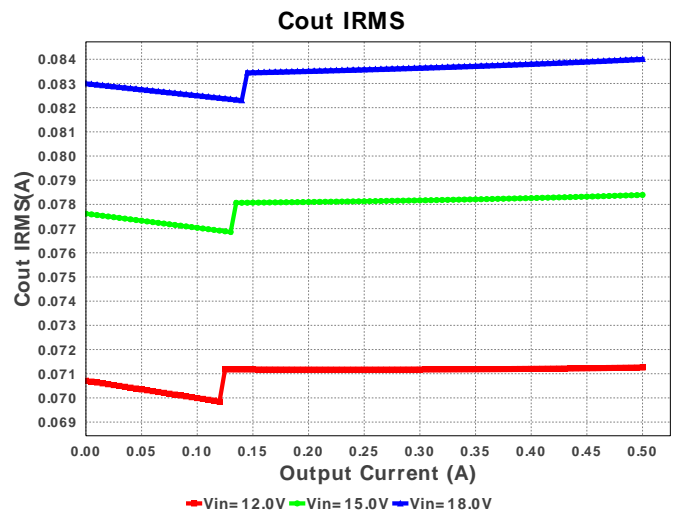
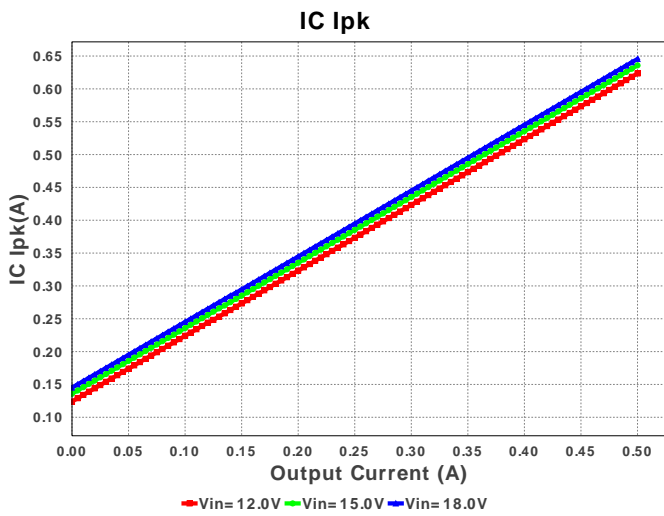
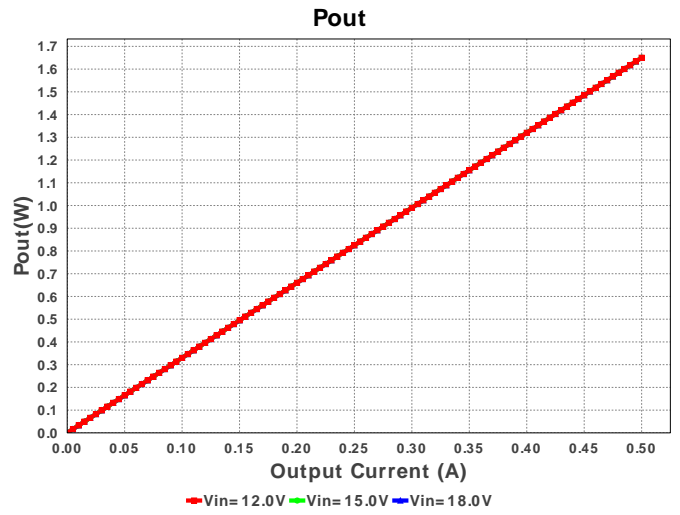
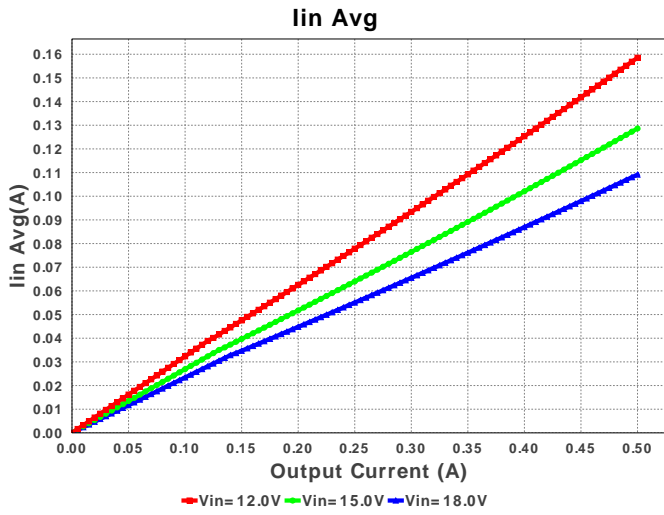


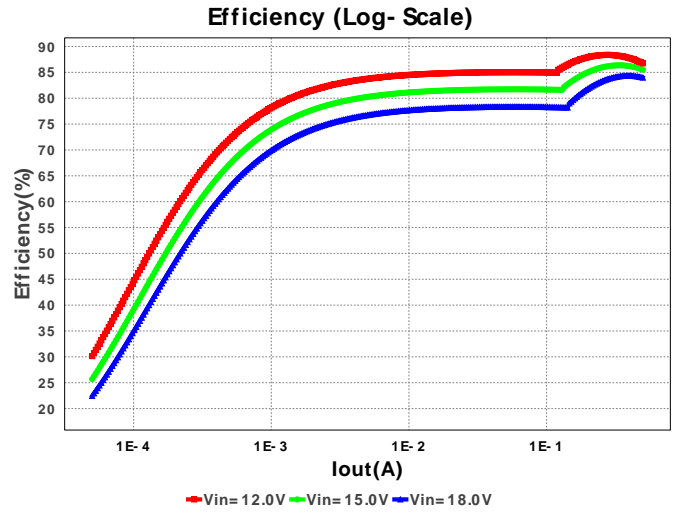
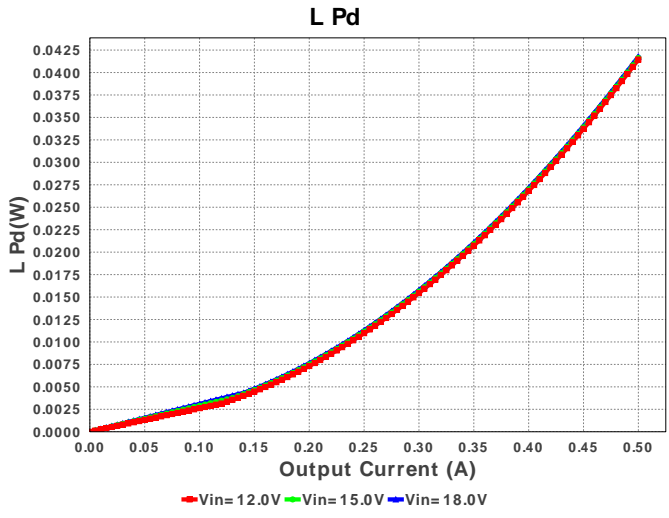
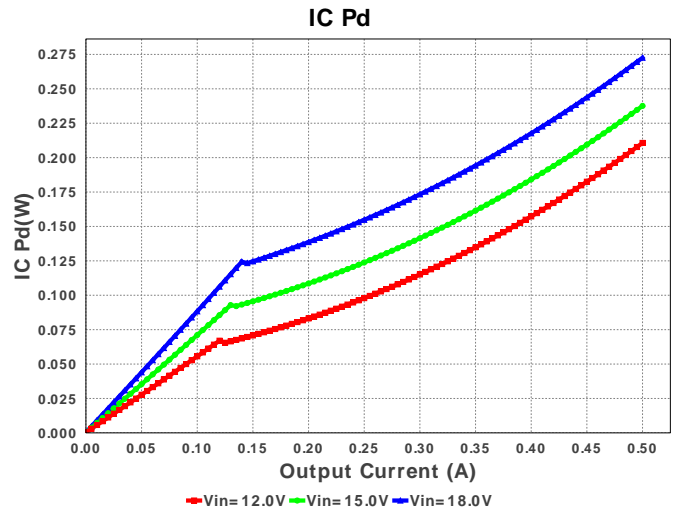
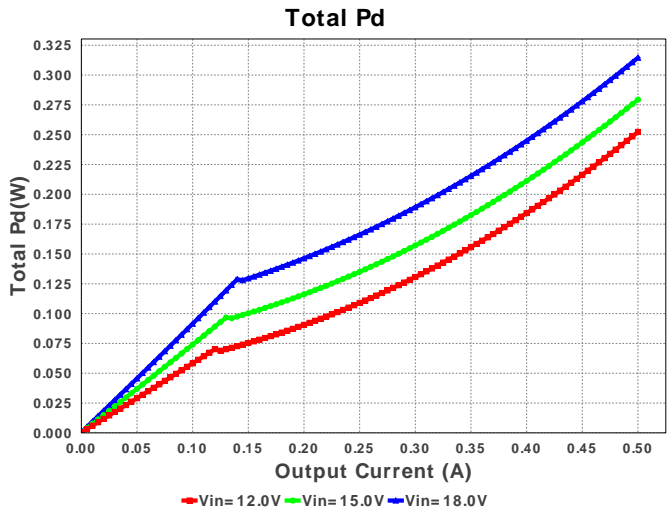
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 2.8 mOhm VDC= 100.0 V IRMS= 9.8247 A	1	\$0.19	 1210 15 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	\$0.05	 0805 7 mm ²
3.	L1	Bourns	SDR0503-100ML	L= 10.0 uH DCR= 130.0 mOhm	1	\$0.19	 SDR0503 48 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	\$0.70	 R-PWSON-N10 12 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	199.201 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	84.013 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	645.514 mA	Current	Peak switch current in IC
4.	Iin Avg	109.14 mA	Current	Average input current
5.	L Ipp	291.03 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	222.419 mA	Current	Q lavg
7.	BOM Count	5	General	Total Design BOM count
8.	FootPrint	84.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	999.505 kHz	General	Switching frequency
10.	IC Tolerance	24.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	175.532 mV	General	Voltage drop across the MosFET
12.	Pout	1.65 W	General	Total output power
13.	Total BOM	\$1.14	General	Total BOM Cost
14.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	19.788 %	Op_point	Duty cycle
16.	Efficiency	83.989 %	Op_point	Steady state efficiency
17.	IC Tj	46.793 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	18.0 V	Op_point	Vin operating point
21.	Vout p-p	3.787 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	111.107 μW	Power	Input capacitor power dissipation
23.	Cout Pd	63.523 μW	Power	Output capacitor power dissipation
24.	IC Pd	272.607 mW	Power	IC power dissipation
25.	L Pd	41.772 mW	Power	Inductor power dissipation
26.	Total Pd	314.539 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current

#	Name	Value	Description
2.	Iout1	500.0 m	Output Current #1
3.	VinMax	18.0	Maximum input voltage
4.	VinMin	12.0	Minimum input voltage
5.	Vout	3.3	Output Voltage
6.	Vout1	3.3	Output Voltage #1
7.	base_pn	TPS62177	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

Design Assistance

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

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