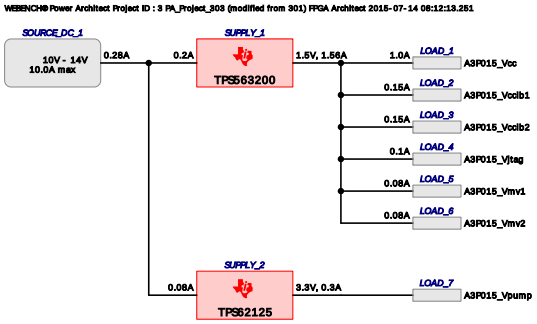
WEBENCH® Power Architect



Project Report

Project : 4417704/3 : PA_Project_303 (modified from 301)
Created : 2015-07-14 08:12:13.251
Optimize project optFactor=3

Project Summary

1.	Total System Efficiency	86.279 %
2.	Total System BOM Count	17.0
3.	Total System Footprint	145.0 mm2
4.	Total System BOM Cost	$2.39
5.	Total System Power Dissipation	529.6 mW

--> Launch WEBENCH Power Architect.

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	1.5 V	1.56 A	85.6%	74	$1.38	26	4
2.	SUPPLY_2	TPS62125	Switcher : 3V-17V, 300mA Buck Converter With Adjustable Enable Threshold And Hysteresis	3.3 V	0.3 A	87.8%	71	$1.01	27	9

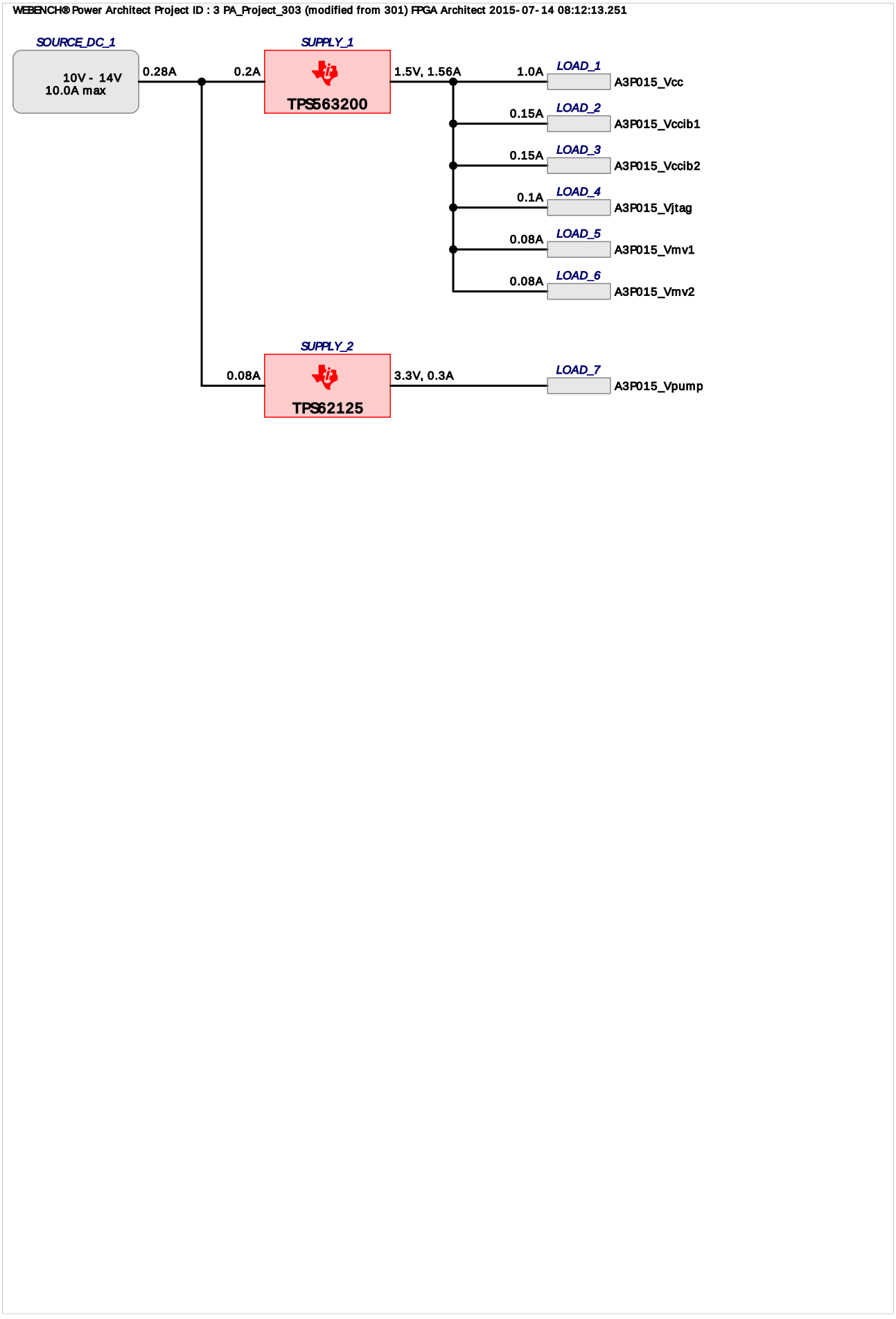
Power Loads

#	Name	VLoad	ILoad	Description
1.	A3P015_Vcc	1.5 V	1 A	VoutRipple=5%, SoftStart delay=1.0 mSec
2.	A3P015_Vccib1	1.5 V	0.15 A	VoutRipple=5%, SoftStart delay=1.0 mSec
3.	A3P015_Vccib2	1.5 V	0.15 A	VoutRipple=5%, SoftStart delay=1.0 mSec
4.	A3P015_Vjtag	1.5 V	0.1 A	VoutRipple=5%, SoftStart delay=1.0 mSec
5.	A3P015_Vmv1	1.5 V	0.08 A	VoutRipple=5%, SoftStart delay=1.0 mSec
6.	A3P015_Vmv2	1.5 V	0.08 A	VoutRipple=5%, SoftStart delay=1.0 mSec
7.	A3P015_Vpump	3.3 V	0.3 A	VoutRipple=9%, Group=Pump, SoftStart delay=1.0 mSec

FPGAs, Processors

#	Manufacturer	Part Number	Name	Series	Description
1.	Actel http://www.actel.com/documents/PA3_DS.pdf	A3P015	FPGA_1	ProASIC3	FPGA Actel ProASIC3 A3P015

Project Diagram



Electrical Procurement BOM

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm^2)
AVX	08053C104KAT2A	0805	1	$0.01	7
Kemet	C0603C106M9PACTU	0603	1	$0.08	5
TDK	C3216X5R1C106KT	1206	1	$0.08	11
Vishay-Dale	CRCW0402100KFKED	0402	2	$0.01	6
Vishay-Dale	CRCW040210K0FKED	0402	1	$0.01	3
Vishay-Dale	CRCW04021M33FKED	0402	1	$0.01	3
Vishay-Dale	CRCW0402200KFKED	0402	1	$0.01	3
Vishay-Dale	CRCW0402309KFKED	0402	1	$0.01	3
Vishay-Dale	CRCW040233K2FKED	0402	1	$0.01	3
Vishay-Dale	CRCW04029K76FKED	0402	1	$0.01	3
MuRata	GRM31CR60J476ME19L	1206	1	$0.12	11
MuRata	GRM32ER61E226KE15L	1210	1	$0.16	15
Bourns	SDR0403-150ML	SDR0403	1	$0.18	28
Texas Instruments	TPS563200DDCR	DDC0006A	1	$0.52	10
Texas Instruments	TPS62125DSGR	S-PWSON-N8	1	$0.61	10
Coilcraft	XFL4020-152MEB	XFL4020	1	$0.55	25
Total			17	$2.39	146

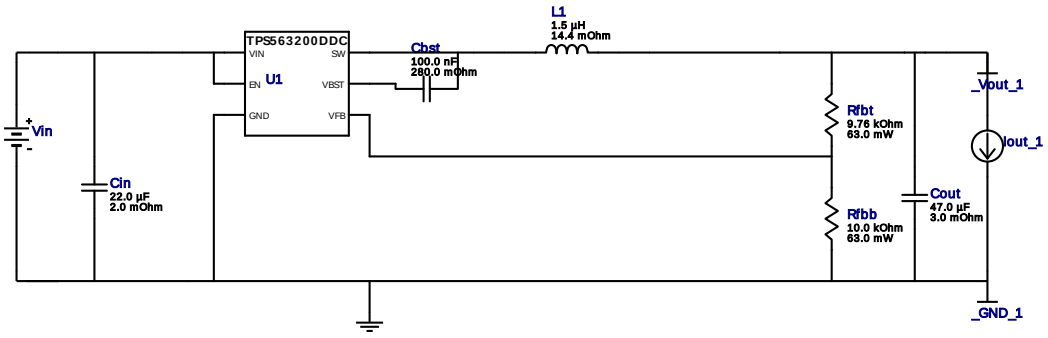
TEXAS INSTRUMENTS

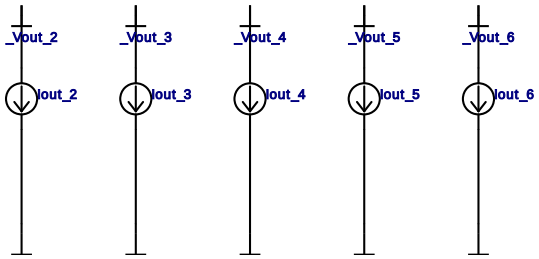
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 14.0V
Vout = 1.5V
Iout = 1.56A

Device = TPS563200DDCR
Topology = Buck
Created = 7/14/15 8:12:12 AM
BOM Cost = $1.38
Footprint = 74.0 mm^2
BOM Count = 7
Total Pd = 0.39W

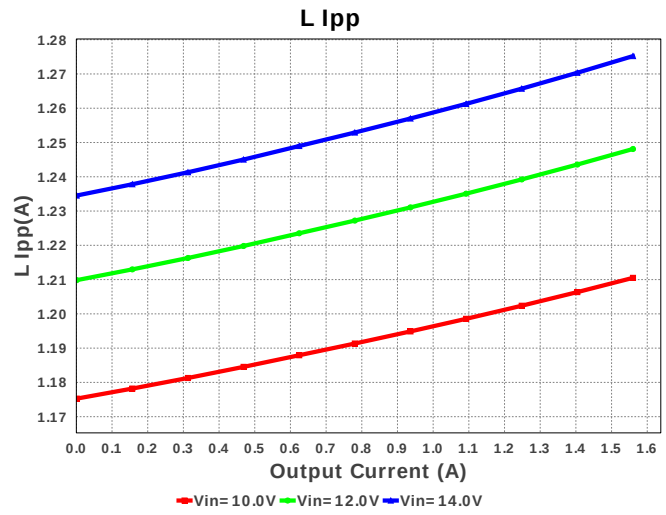
Design : 4417704/26 TPS563200DDCR
TPS563200DDCR 10.0V-14.0V to 1.50V @ 1.56A

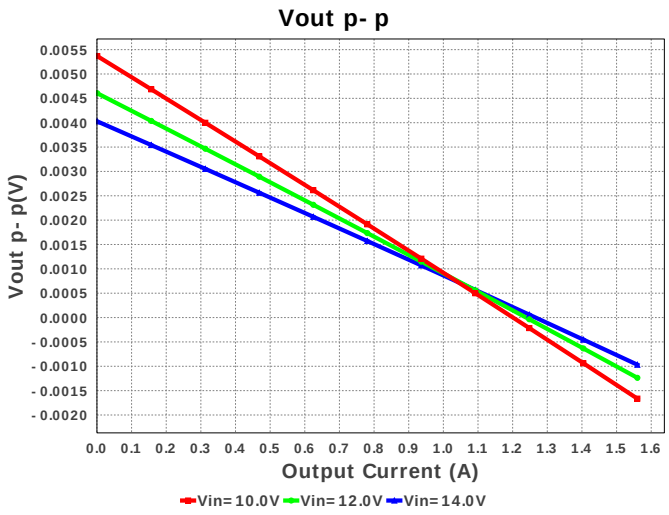


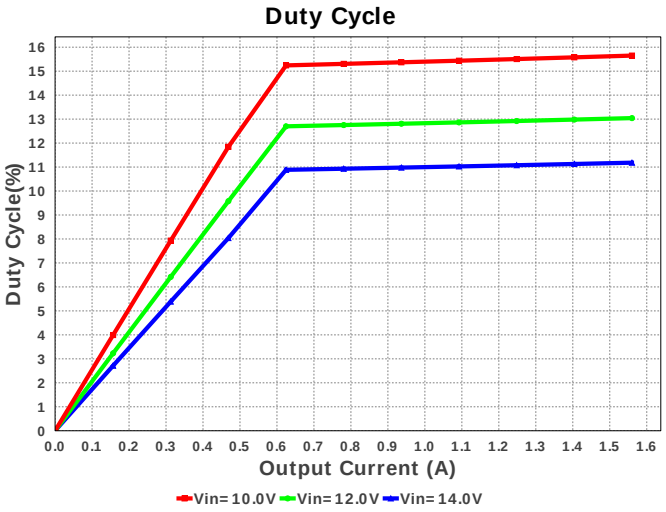


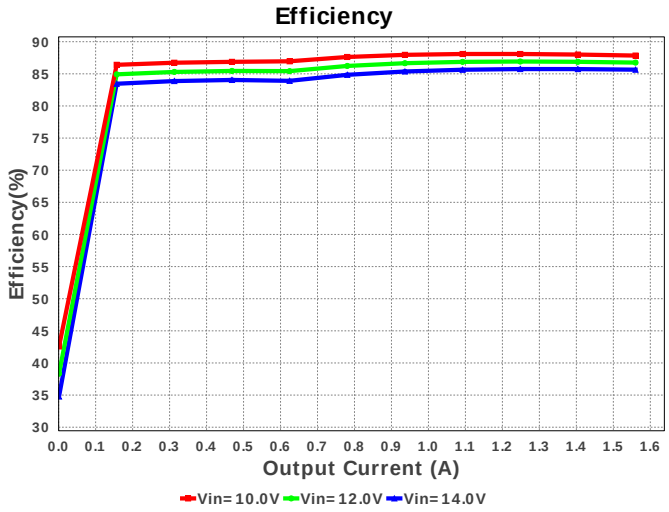
Electrical BOM

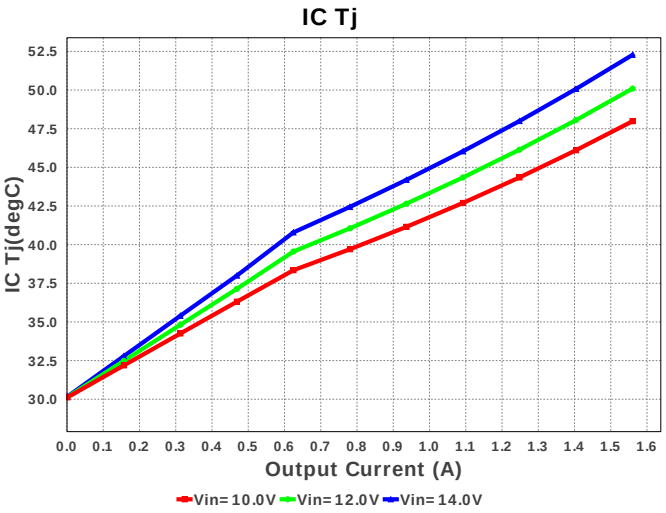
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
2.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm^2
3.	Cout	MuRata	GRM31CR60J476ME19L Series= X5R	Cap= 47.0 uF ESR= 3.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.12	1206 11 mm^2
4.	L1	Coilcraft	XFL4020-152MEB	L= 1.5 µH DCR= 14.4 mOhm	1	$0.55	XFL4020 25 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.	Rfbt	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 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

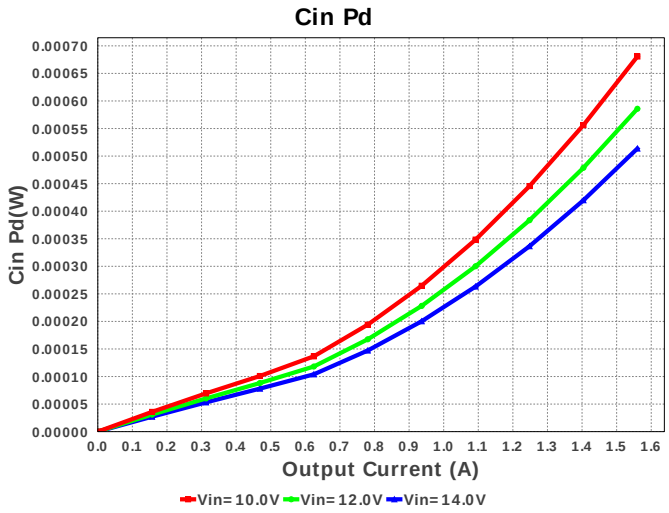


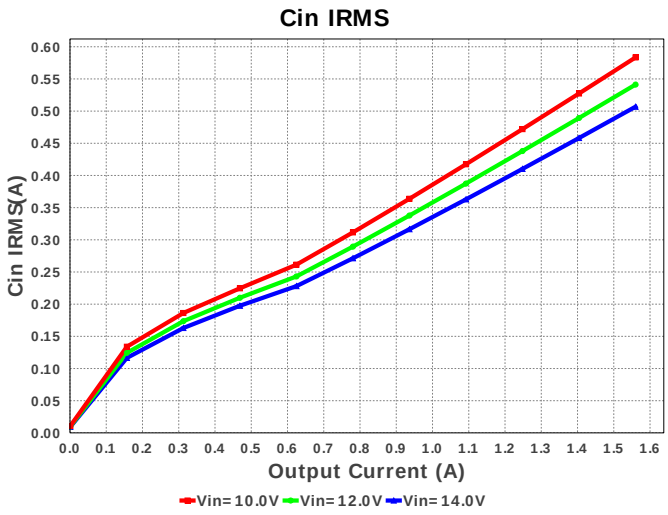


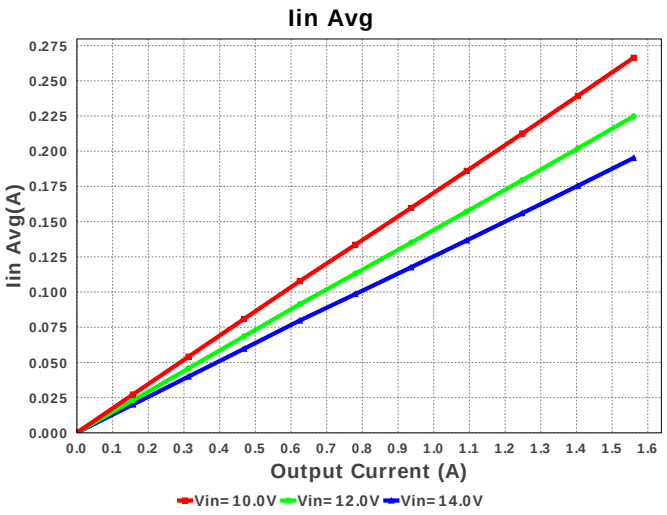


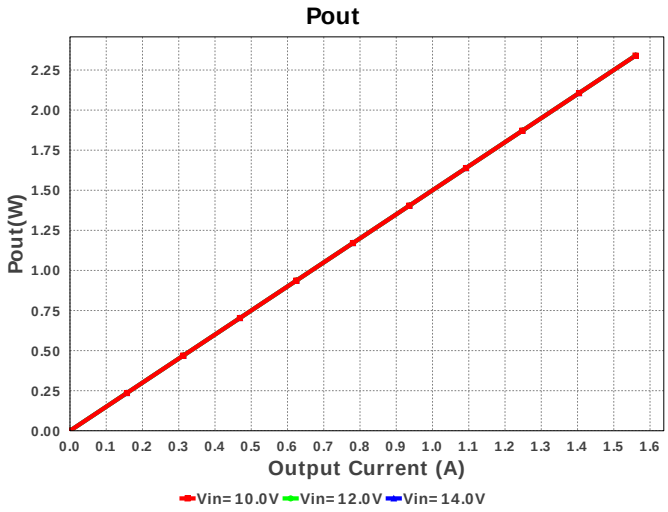


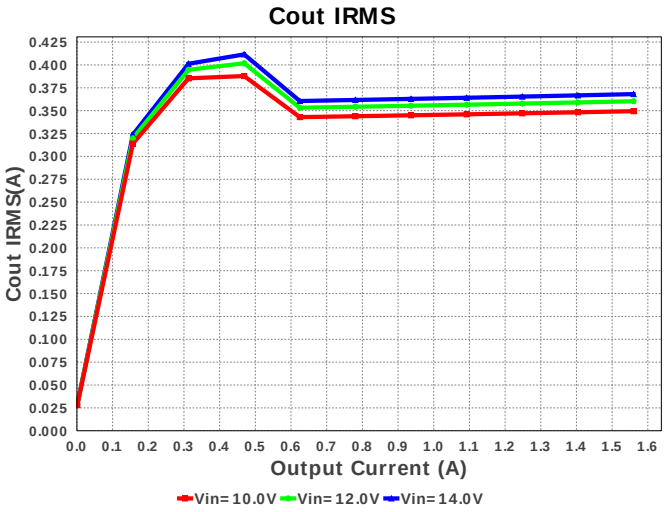


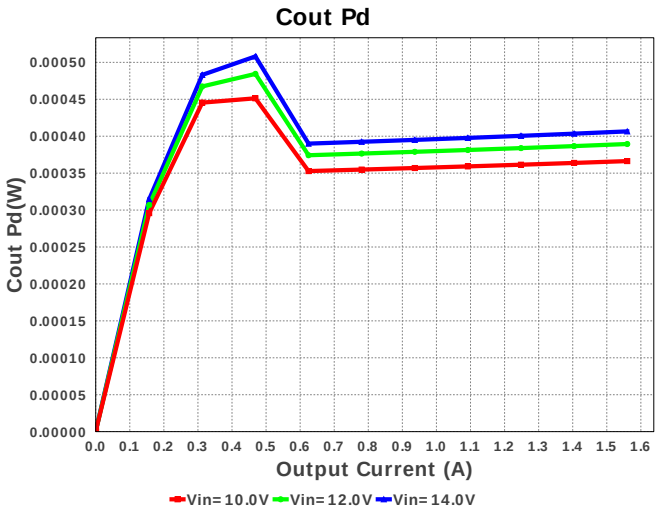


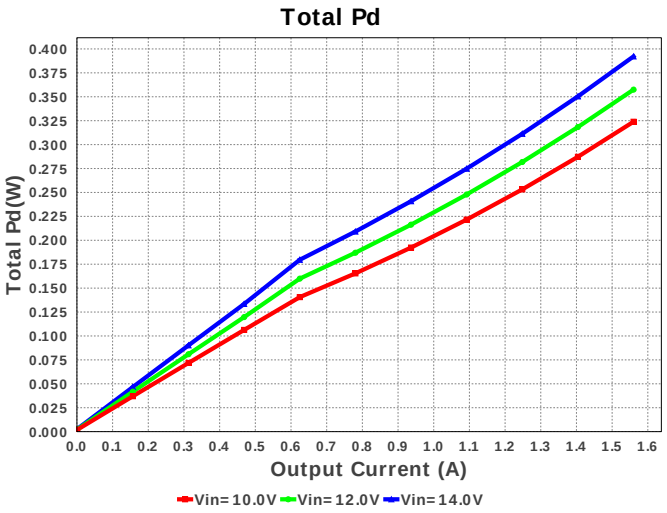


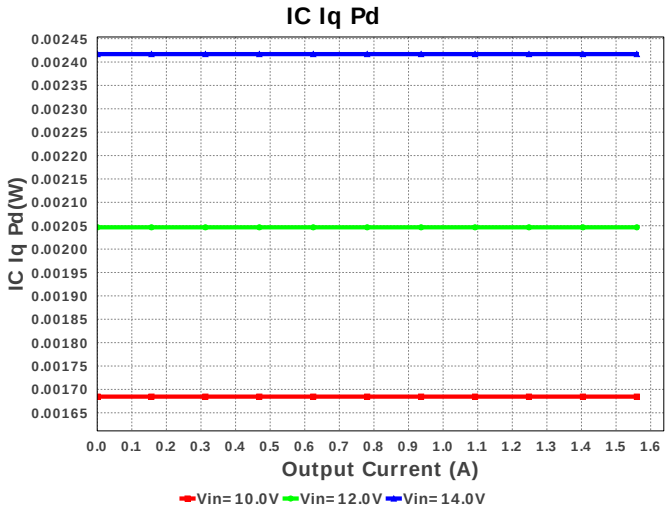


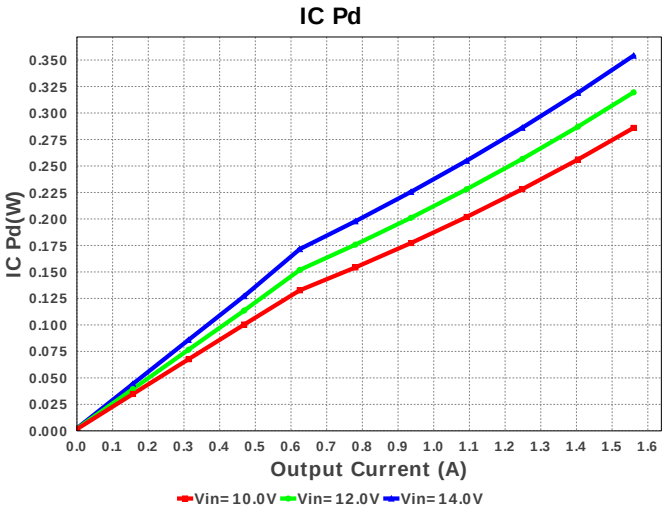


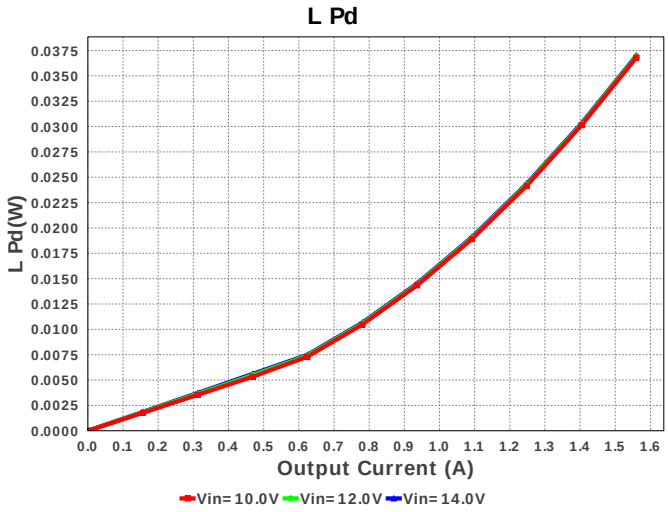


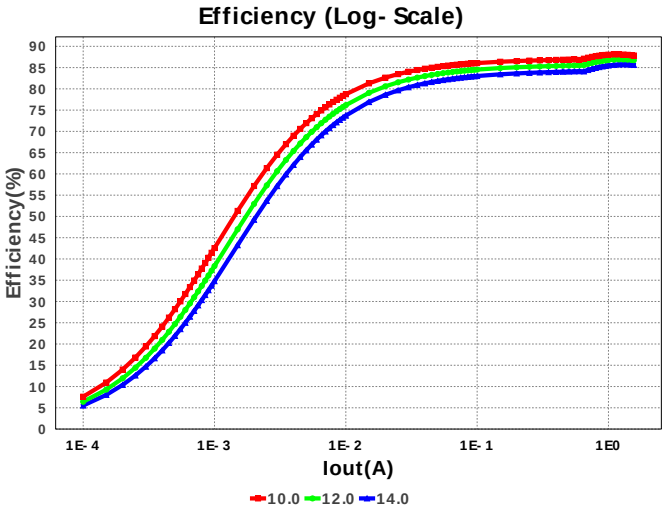












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	506.805 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	368.122 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	195.16 mA	Current	Average input current
4.	L Ipp	1.275 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	7	General	Total Design BOM count
6.	FootPrint	74.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	725.184 kHz	General	Switching frequency
8.	Pout	2.34 W	General	Total output power
9.	Total BOM	$1.38	General	Total BOM Cost
10.	Vout OP	1.5 V	Op_Point	Operational Output Voltage
11.	Duty Cycle	11.182 %	Op_point	Duty cycle
12.	Efficiency	85.646 %	Op_point	Steady state efficiency
13.	IC Tj	52.276 degC	Op_point	IC junction temperature
14.	ICThetaJA	62.9 degC/W	Op_point	IC junction-to-ambient thermal resistance
15.	IOUT_OP	1.56 A	Op_point	Iout operating point
16.	VIN_OP	14.0 V	Op_point	Vin operating point
17.	Vout p-p	6.428 mV	Op_point	Peak-to-peak output ripple voltage
18.	Cin Pd	513.703 µW	Power	Input capacitor power dissipation
19.	Cout Pd	406.54 µW	Power	Output capacitor power dissipation
20.	IC Iq Pd	2.417 mW	Power	IC Iq Pd
21.	IC Pd	354.148 mW	Power	IC power dissipation
22.	L Pd	36.995 mW	Power	Inductor power dissipation
23.	Total Pd	392.186 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.56	Maximum Output Current
2.	Iout1	1.56	Output Current #1
3.	SoftStart	1.0 ms	Soft Start Time (ms)
4.	VinMax	14.0	Maximum input voltage

#	Name	Value	Description
5.	VinMin	10.0	Minimum input voltage
6.	Vout	1.5	Output Voltage
7.	Vout1	1.5	Output Voltage #1
8.	base_pn	TPS563200	Texas Instruments Base Part Number
9.	source	DC	Input Source Type
10.	ta	30.0	Ambient temperature

Design Assistance

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

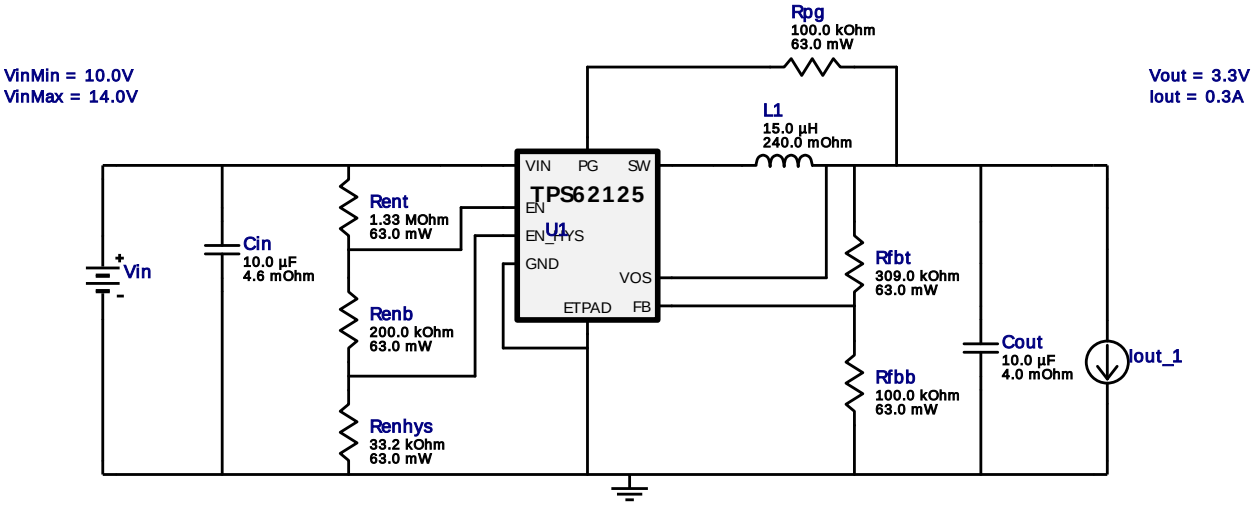
TEXAS INSTRUMENTS

WEBENCH® Design Report

VinMin = 10.0V
VinMax = 14.0V
Vout = 3.3V
Iout = 0.3A

Device = TPS62125DSGR
Topology = Buck
Created = 7/14/15 8:12:12 AM
BOM Cost = $1.01
Footprint = 71.0 mm²
BOM Count = 10
Total Pd = 0.14W

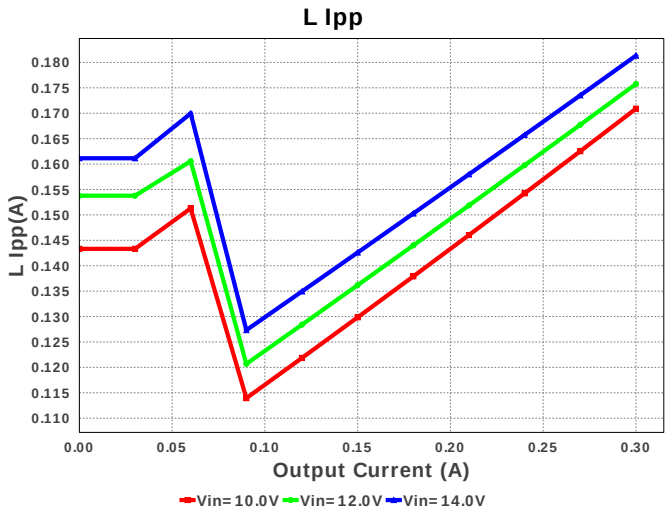
Design : 4417704/27 TPS62125DSGR
TPS62125DSGR 10.0V-14.0V to 3.30V @ 0.3A

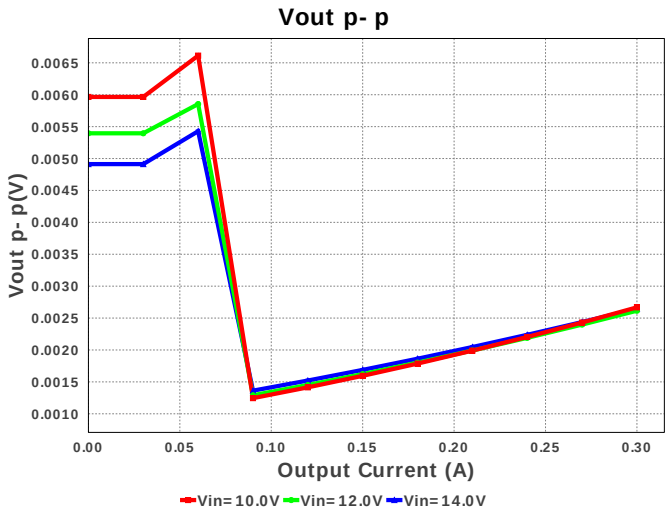


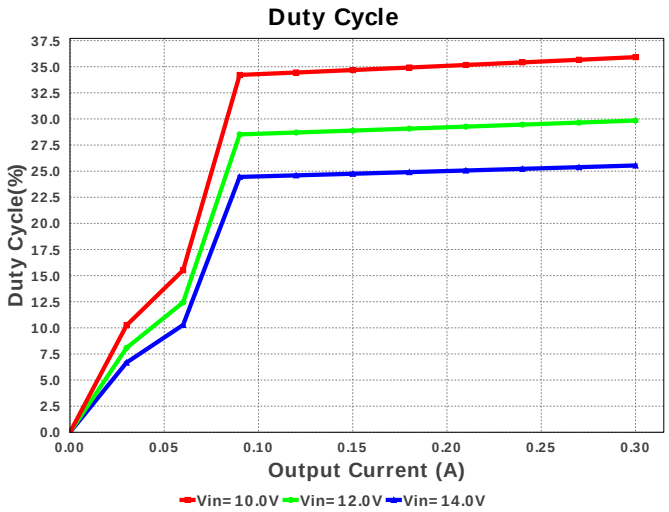
Electrical BOM

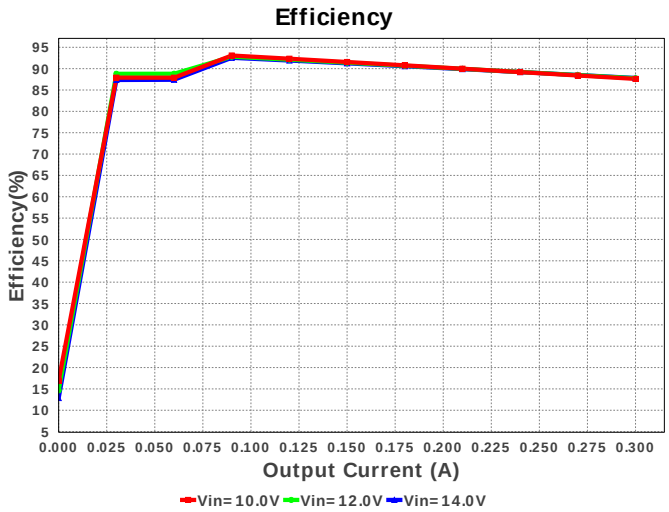
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	TDK	C3216X5R1C106KT Series= X5R	Cap= 10.0 uF ESR= 4.6 mOhm VDC= 16.0 V IRMS= 2.7 A	1	$0.08	1206 11 mm²
2.	Cout	Kemet	C0603C106M9PACTU Series= X5R	Cap= 10.0 uF ESR= 4.0 mOhm VDC= 6.3 V IRMS= 8.9 A	1	$0.08	0603 5 mm²
3.	L1	Bourns	SDR0403-150ML	L= 15.0 µH DCR= 240.0 mOhm	1	$0.18	SDR0403 28 mm²
4.	Renb	Vishay-Dale	CRCW0402200KFKED Series= CRCW..e3	Res= 200.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
5.	Renhys	Vishay-Dale	CRCW040233K2FKED Series= CRCW..e3	Res= 33.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	Rent	Vishay-Dale	CRCW04021M33FKED Series= CRCW..e3	Res= 1.33 MOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbb	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rfbt	Vishay-Dale	CRCW0402309KFKED Series= CRCW..e3	Res= 309.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

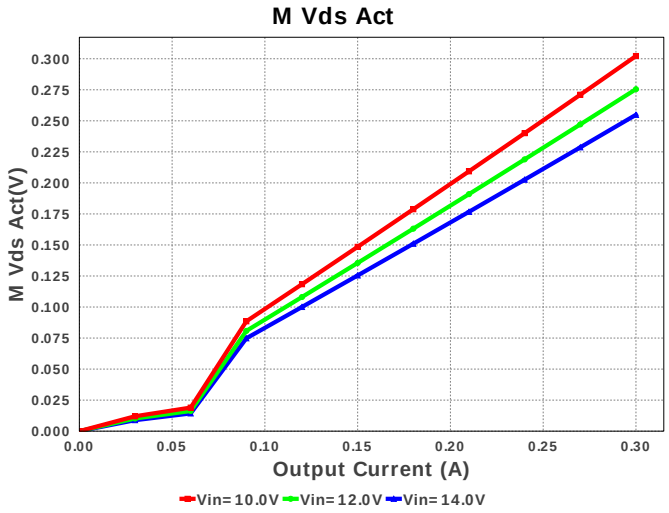
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	TPS62125DSGR	Switcher	1	$0.61	S-PWSON-N8 10 mm²

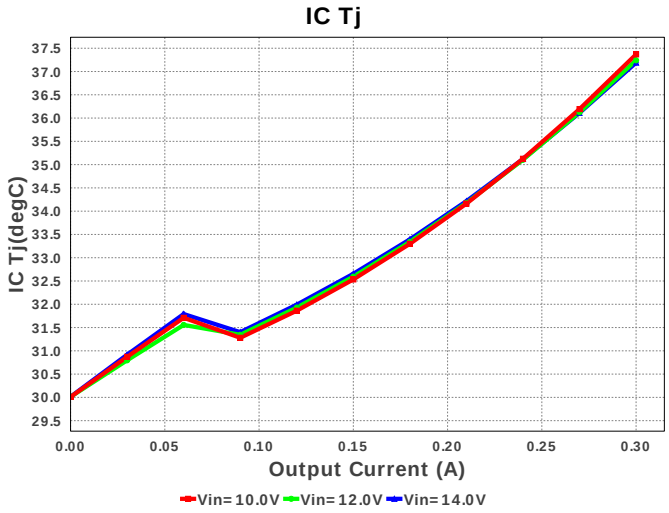


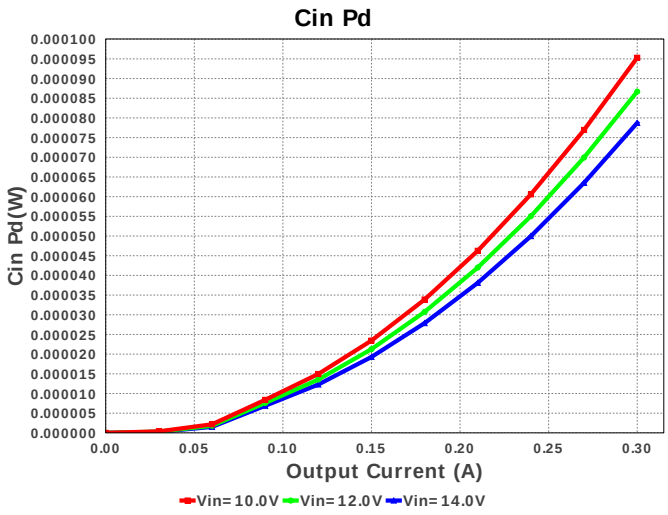


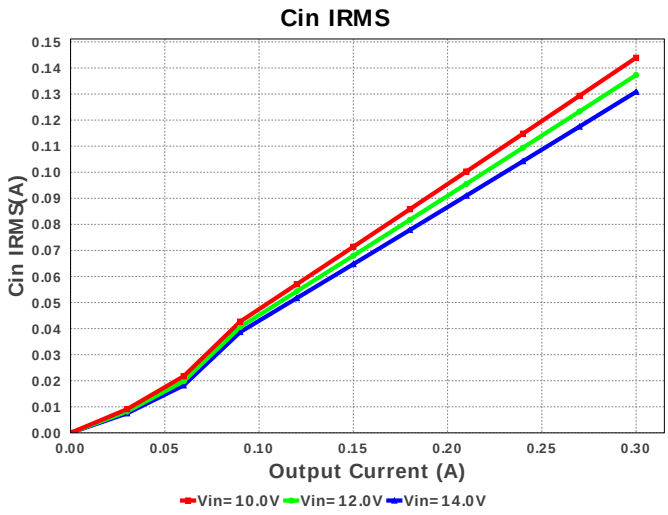


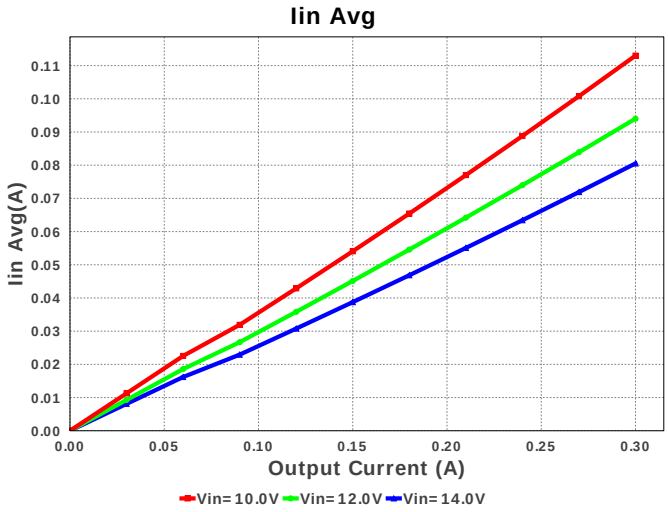


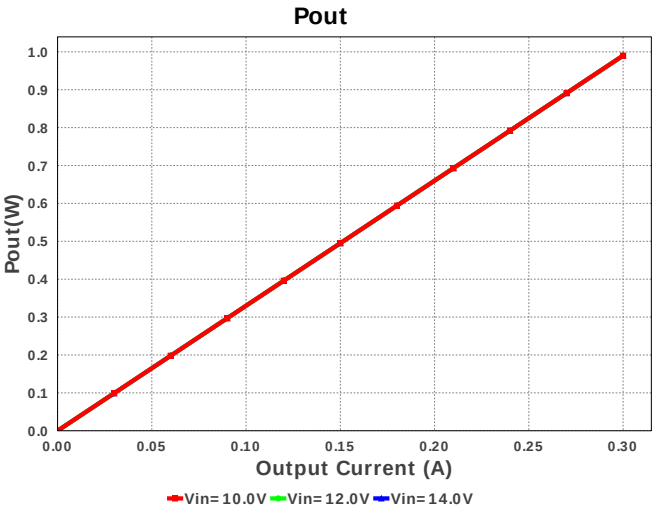


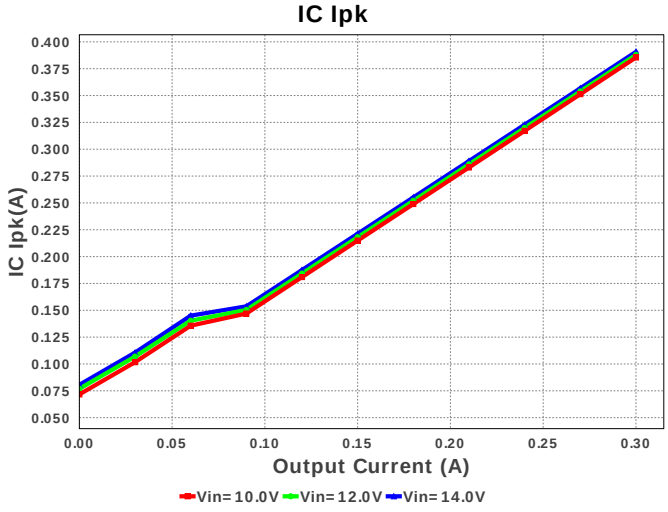


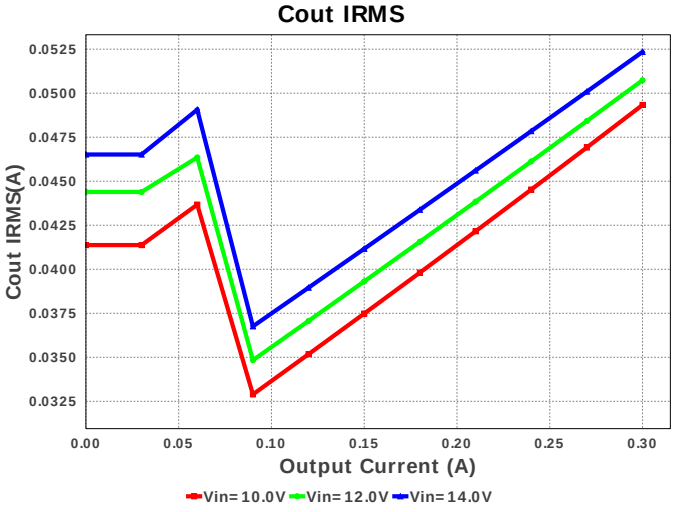


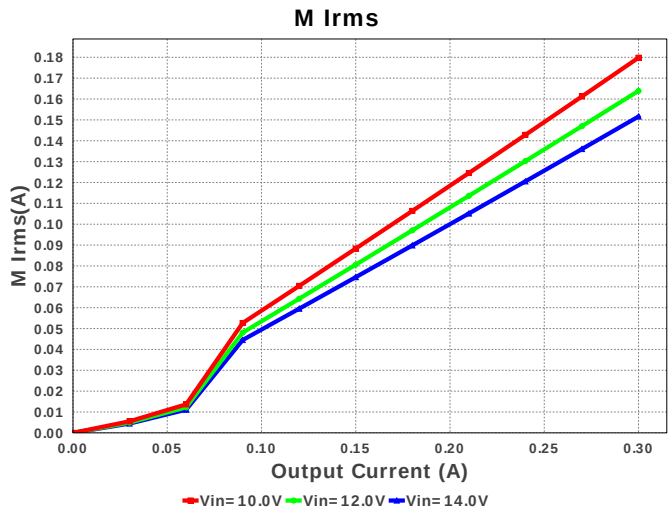


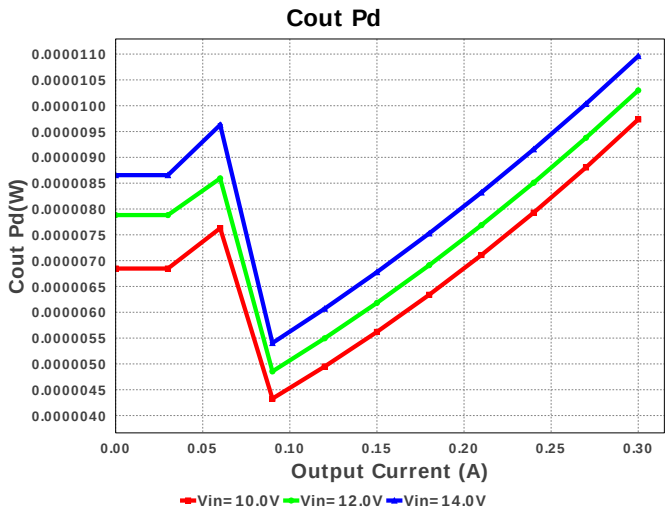


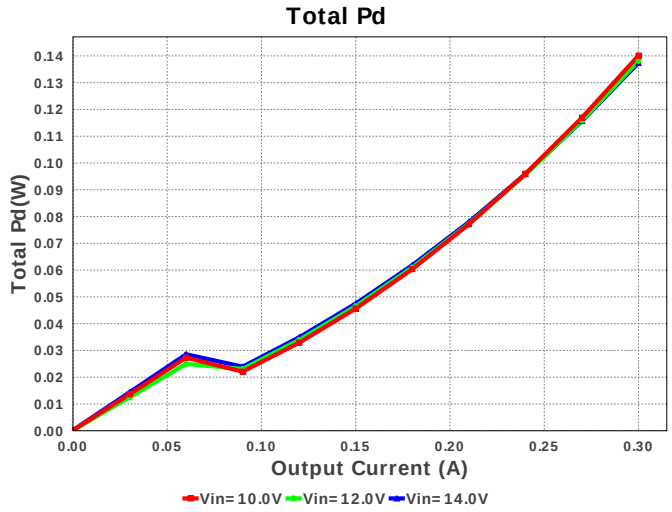


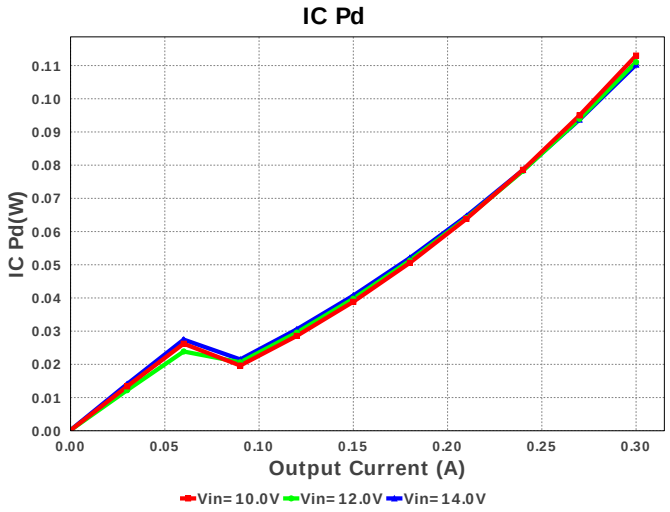


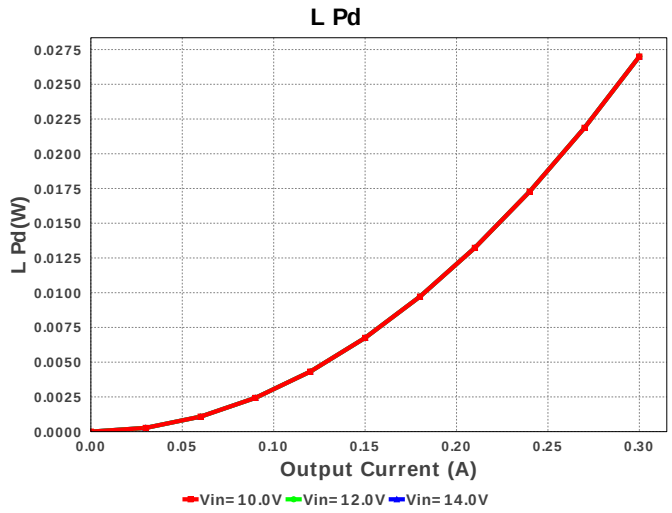


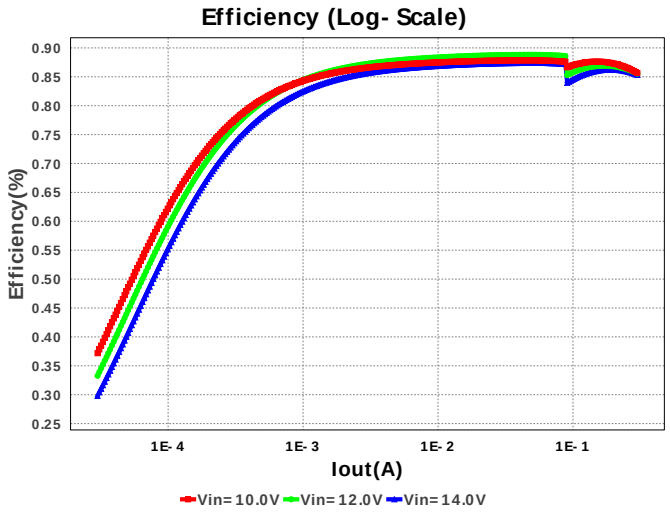












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	130.832 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	52.347 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	390.668 mA	Current	Peak switch current in IC
4.	Iin Avg	80.527 mA	Current	Average input current
5.	L Ipp	181.34 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	151.622 mA	Current	MOSFET RMS current
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	71.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	1.005 MHz	General	Switching frequency
10.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	254.848 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	990.0 mW	General	Total output power
13.	Total BOM	$1.01	General	Total BOM Cost
14.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	25.544 %	Op_point	Duty cycle
16.	Efficiency	87.815 %	Op_point	Steady state efficiency
17.	IC Tj	37.19 degC	Op_point	IC junction temperature
18.	ICThetaJA	65.2 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	300.0 mA	Op_point	Iout operating point
20.	VIN_OP	14.0 V	Op_point	Vin operating point
21.	Vout p-p	2.645 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	78.738 µW	Power	Input capacitor power dissipation
23.	Cout Pd	10.961 µW	Power	Output capacitor power dissipation
24.	IC Pd	110.283 mW	Power	IC power dissipation
25.	L Pd	27.0 mW	Power	Inductor power dissipation
26.	Total Pd	137.371 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	300.0 m	Maximum Output Current
2.	Iout1	300.0 m	Output Current #1
3.	SoftStart	1.0 ms	Soft Start Time (ms)
4.	VinMax	14.0	Maximum input voltage
5.	VinMin	10.0	Minimum input voltage
6.	Vout	3.3	Output Voltage
7.	Vout1	3.3	Output Voltage #1
8.	base_pn	TPS62125	Texas Instruments Base Part Number
9.	source	DC	Input Source Type
10.	ta	30.0	Ambient temperature

Design Assistance

1. TPS62125 Product Folder : http://www.ti.com/product/TPS62125 : contains the data sheet and other resources.