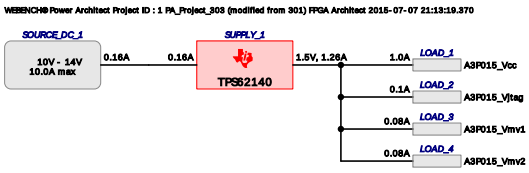
WEBENCH® Power Architect



Project Report

Project : 4420283/1 : PA_Project_303 (modified from 301)
Created : 2015-07-07 21:13:19.370
Optimize project optFactor=3

Project Summary

1.	Total System Efficiency	83.66 %
2.	Total System BOM Count	8.0
3.	Total System Footprint	82.0 mm2
4.	Total System BOM Cost	$1.28
5.	Total System Power Dissipation	369.2 mW

--> Launch WEBENCH Power Architect.

Power Supplies

#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	SUPPLY_1	TPS62140	Switcher : 3V-17V,2A,DCS-Control,FSW pin	1.5 V	1.26 A	83.7%	82	$1.28	3	4

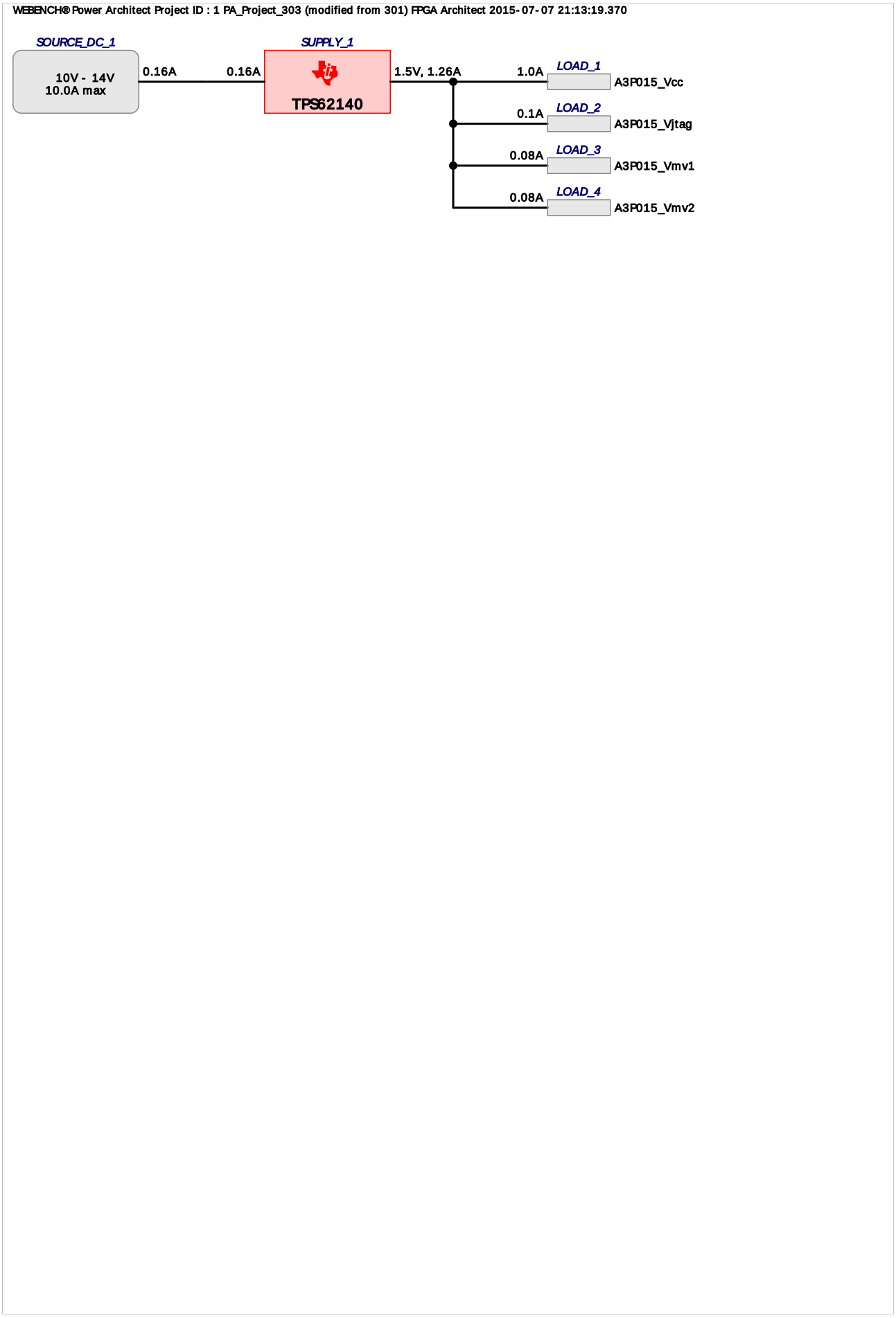
Power Loads

#	Name	VLoad	ILoad	Description
1.	A3P015_Vcc	1.5 V	1 A	VoutRipple=5%, SoftStart delay=1.0 mSec
2.	A3P015_Vjtag	1.5 V	0.1 A	VoutRipple=5%, SoftStart delay=1.0 mSec
3.	A3P015_Vmv1	1.5 V	0.08 A	VoutRipple=5%, SoftStart delay=1.0 mSec
4.	A3P015_Vmv2	1.5 V	0.08 A	VoutRipple=5%, 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)
Kemet	C0805C222K5RACTU	0805	1	$0.01	7
TDK	C2012X5R0J226M	0805	1	$0.06	7
Vishay-Dale	CRCW0402100KFKED	0402	1	$0.01	3
Vishay-Dale	CRCW0402130KFKED	0402	1	$0.01	3
Vishay-Dale	CRCW0402150KFKED	0402	1	$0.01	3
MuRata	GRM219R61E106KA12	0805	1	$0.05	7
Bourns	SDR0403-2R2ML	SDR0403	1	$0.18	28
Texas Instruments	TPS62140RGTR	S-PVQFN-N16	1	$0.95	25
Total			8	$1.28	83

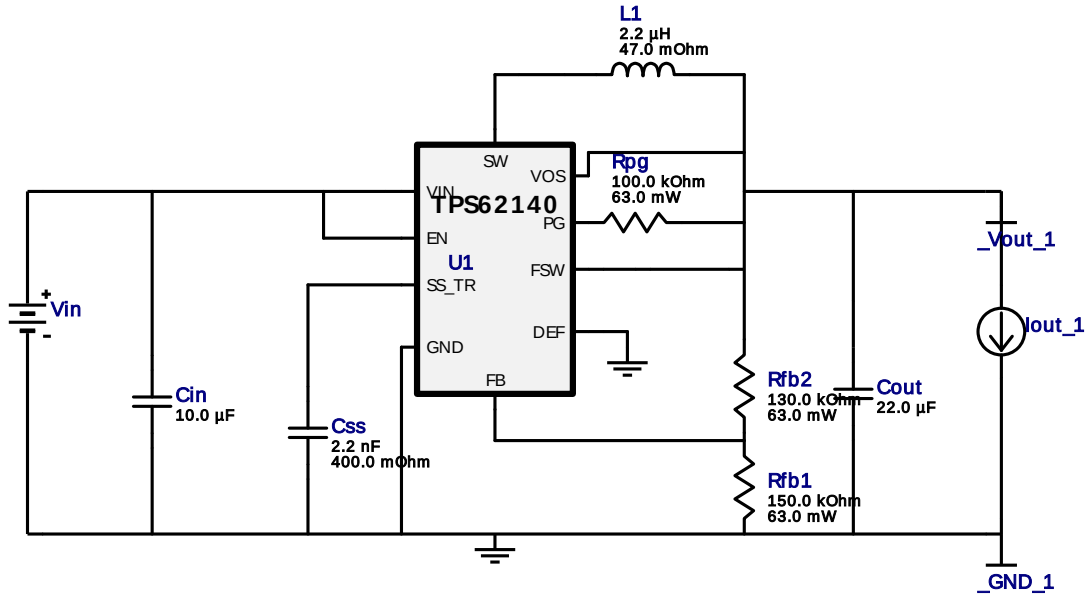
TEXAS INSTRUMENTS

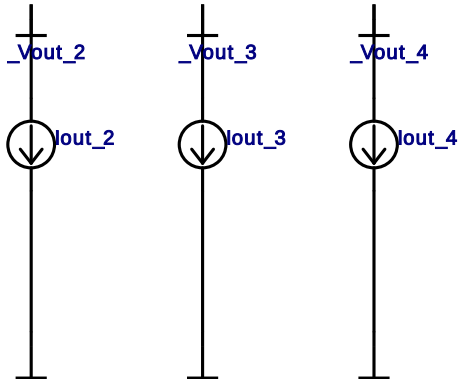
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 14.0V
Vout = 1.5V
Iout = 1.26A

Device = TPS62140RGTR
Topology = Buck
Created = 7/7/15 9:13:18 PM
BOM Cost = $1.28
Footprint = 82.0 mm²
BOM Count = 8
Total Pd = 0.37W

Design : 4420283/3 TPS62140RGTR
TPS62140RGTR 10.0V-14.0V to 1.50V @ 1.26A

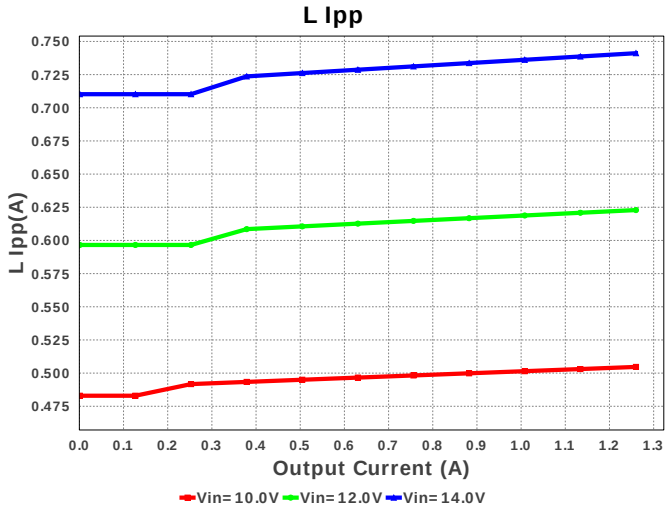


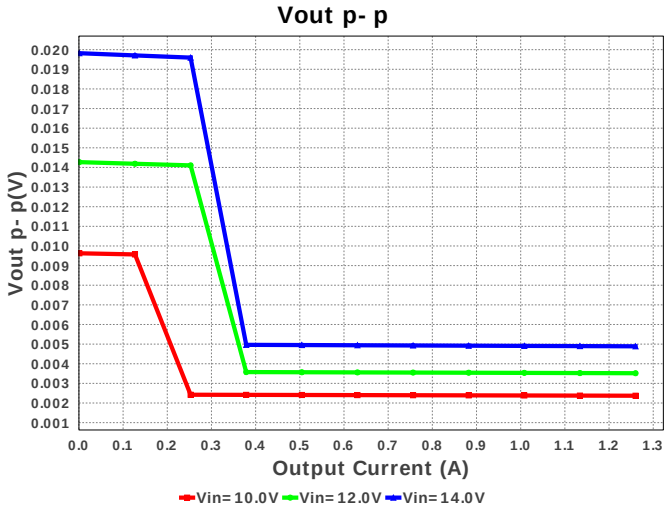


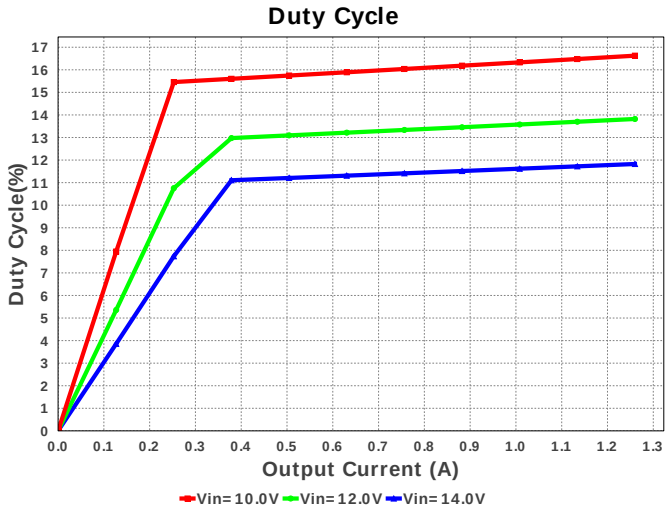
Electrical BOM

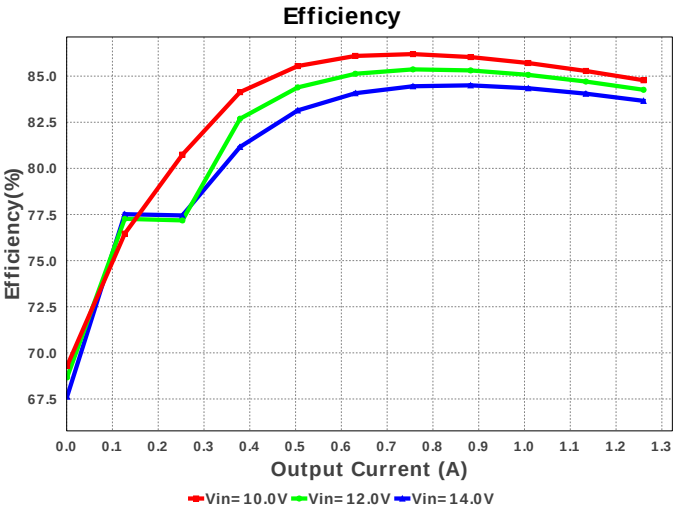
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF VDC= 25.0 V IRMS= 0.0 A	1	$0.05	0805 7 mm²
2.	Cout	TDK	C2012X5R0J226M Series= X5R	Cap= 22.0 uF VDC= 6.3 V IRMS= 0.0 A	1	$0.06	0805 7 mm²
3.	Css	Kemet	C0805C222K5RACTU Series= X7R	Cap= 2.2 nF ESR= 400.0 mOhm VDC= 50.0 V IRMS= 251.0 mA	1	$0.01	0805 7 mm²

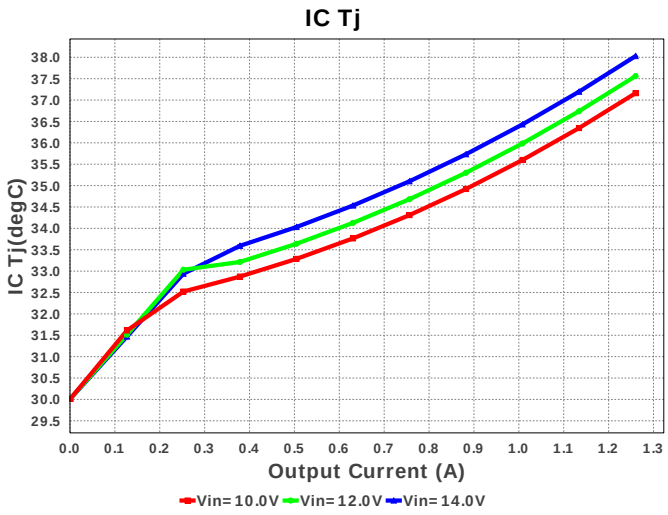
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
4.	L1	Bourns	SDR0403-2R2ML	L= 2.2 µH DCR= 47.0 mOhm	1	$0.18	 SDR0403 28 mm^2
5.	Rfb1	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
6.	Rfb2	Vishay-Dale	CRCW0402130KFKED Series= CRCW..e3	Res= 130.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
7.	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
8.	U1	Texas Instruments	TPS62140RGTR	Switcher	1	$0.95	 S-PVQFN-N16 25 mm^2

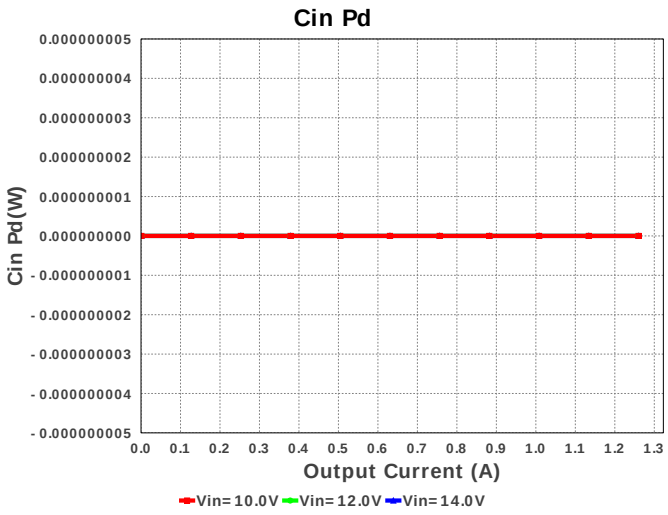


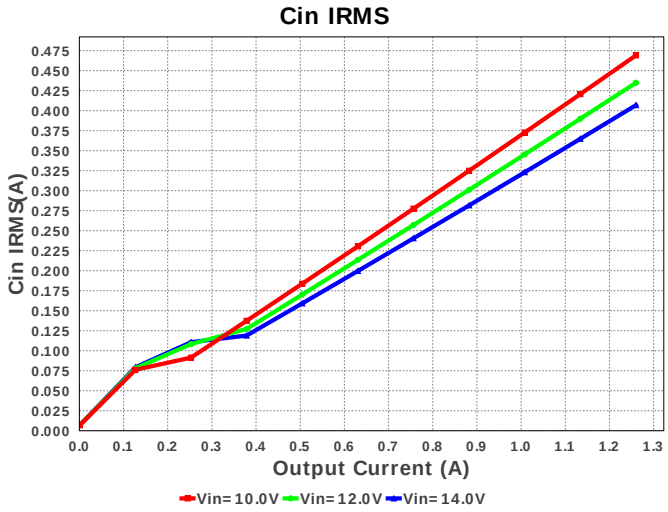


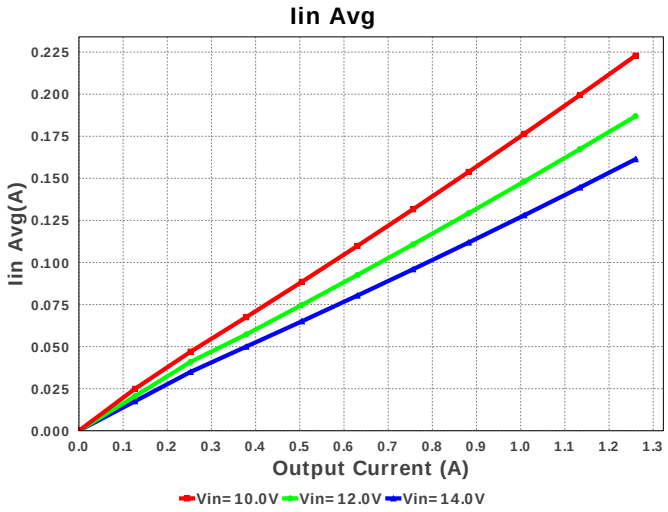


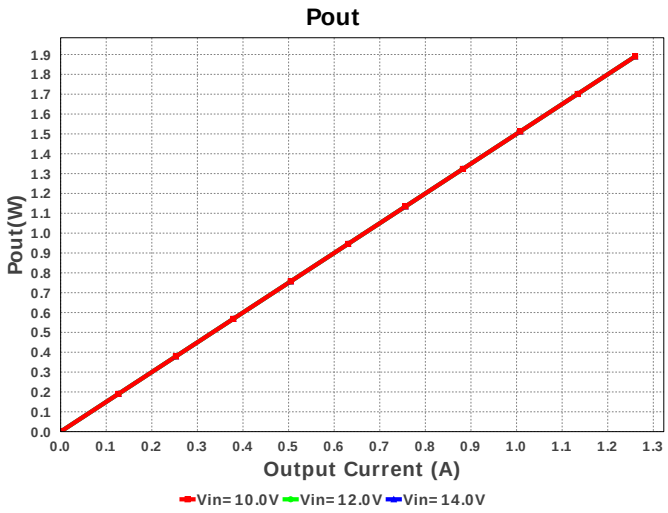


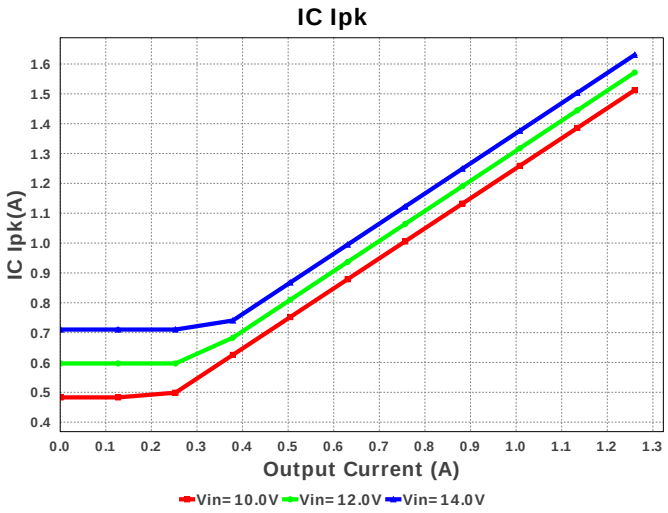


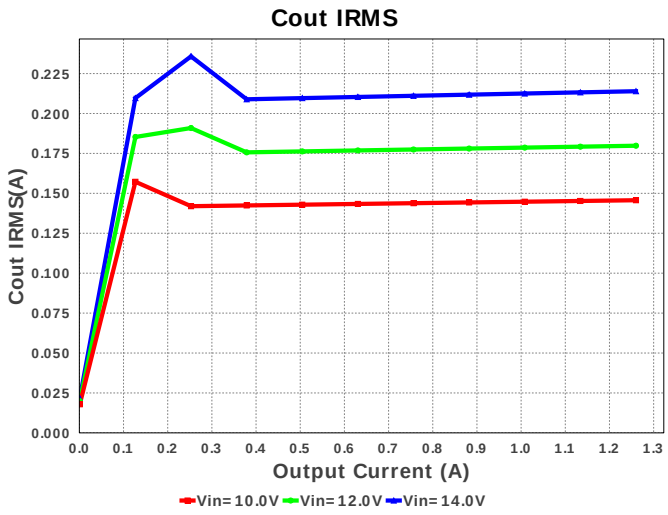


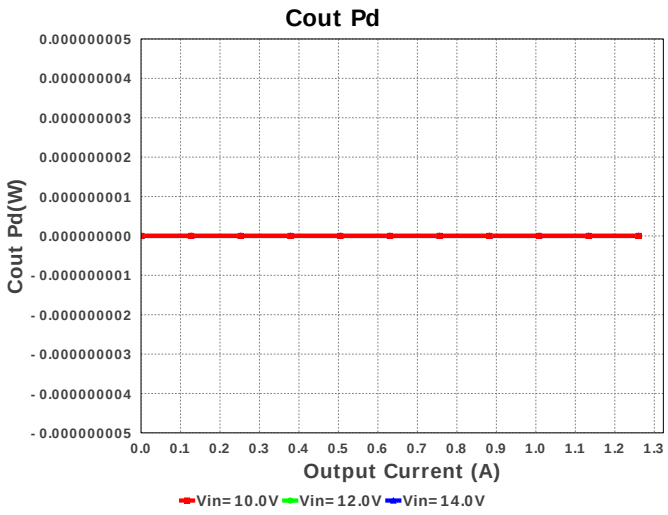


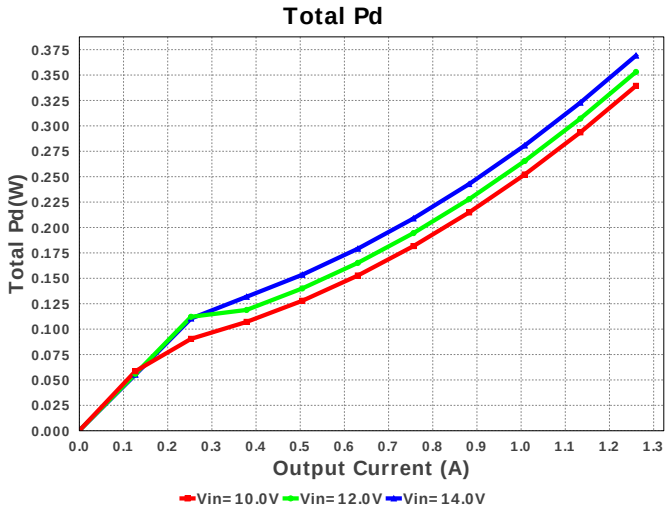


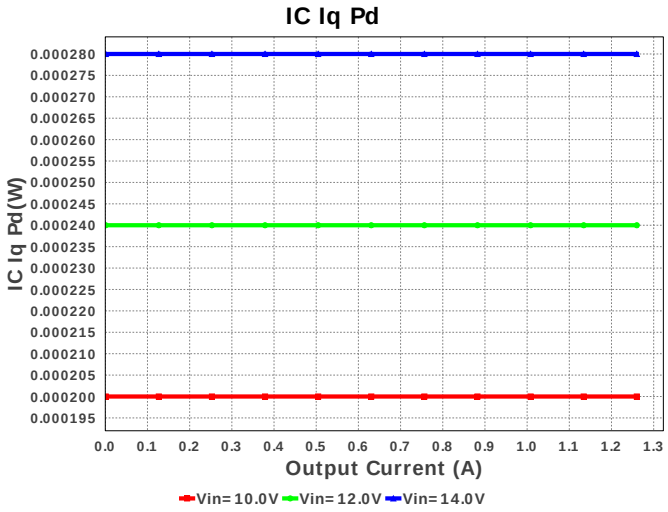


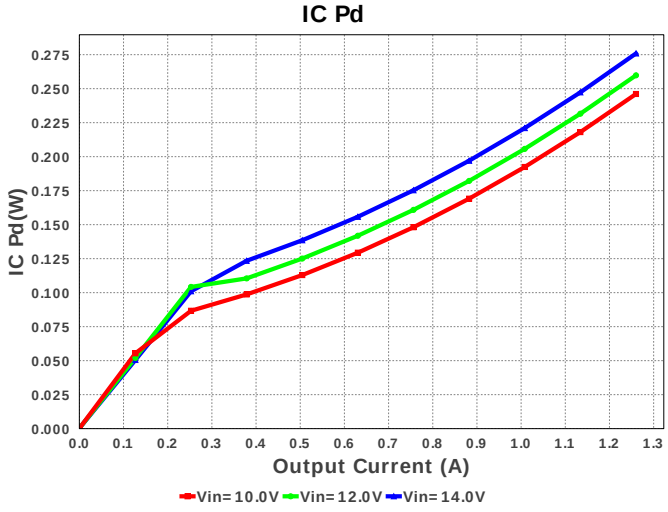


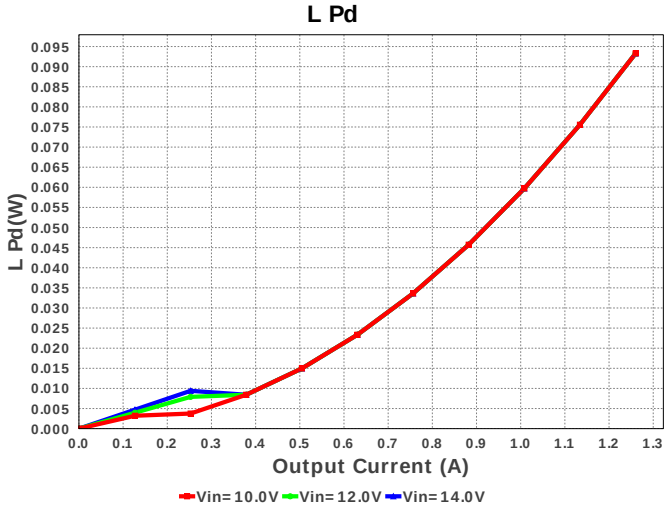


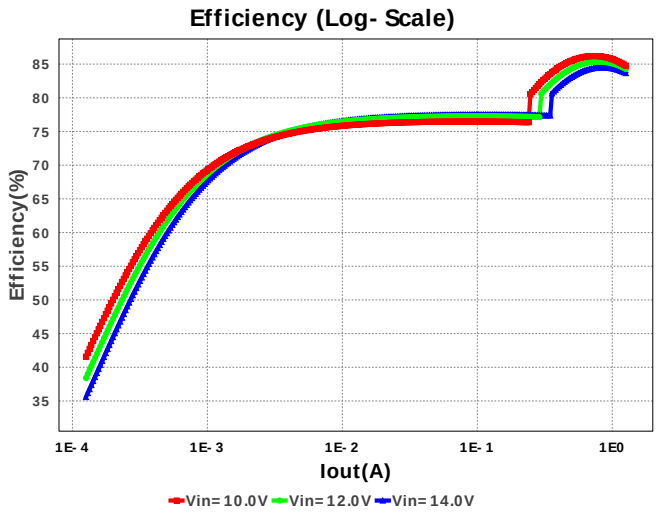












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	406.871 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	213.944 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.631 A	Current	Peak switch current in IC
4.	Iin Avg	161.37 mA	Current	Average input current
5.	L Ipp	741.12 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	8	General	Total Design BOM count
7.	FootPrint	82.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	906.626 kHz	General	Switching frequency
9.	Pout	1.89 W	General	Total output power
10.	Total BOM	$1.28	General	Total BOM Cost
11.	Vout OP	1.5 V	Op_Point	Operational Output Voltage
12.	Duty Cycle	11.826 %	Op_point	Duty cycle
13.	Efficiency	83.66 %	Op_point	Steady state efficiency
14.	IC Tj	38.028 degC	Op_point	IC junction temperature
15.	ICThetaJA	29.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	1.26 A	Op_point	Iout operating point
17.	VIN_OP	14.0 V	Op_point	Vin operating point
18.	Vout p-p	4.888 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
20.	Cout Pd	0.0 W	Power	Output capacitor power dissipation
21.	IC Iq Pd	280.0 µW	Power	IC Iq Pd
22.	IC Pd	275.885 mW	Power	IC power dissipation
23.	L Pd	93.272 mW	Power	Inductor power dissipation
24.	Total Pd	369.15 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.26	Maximum Output Current
2.	Iout1	1.26	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	1.5	Output Voltage
7.	Vout1	1.5	Output Voltage #1
8.	base_pn	TPS62140	Texas Instruments Base Part Number
9.	source	DC	Input Source Type
10.	ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with upto 2A output current, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 6VSelectable operating frequency, Optional Softstart Capacitor for slow startup, Tracking,Pin selectable output voltage (nominal, +5%) Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. TPS62140 Product Folder : http://www.ti.com/product/TPS62140 : contains the data sheet and other resources.