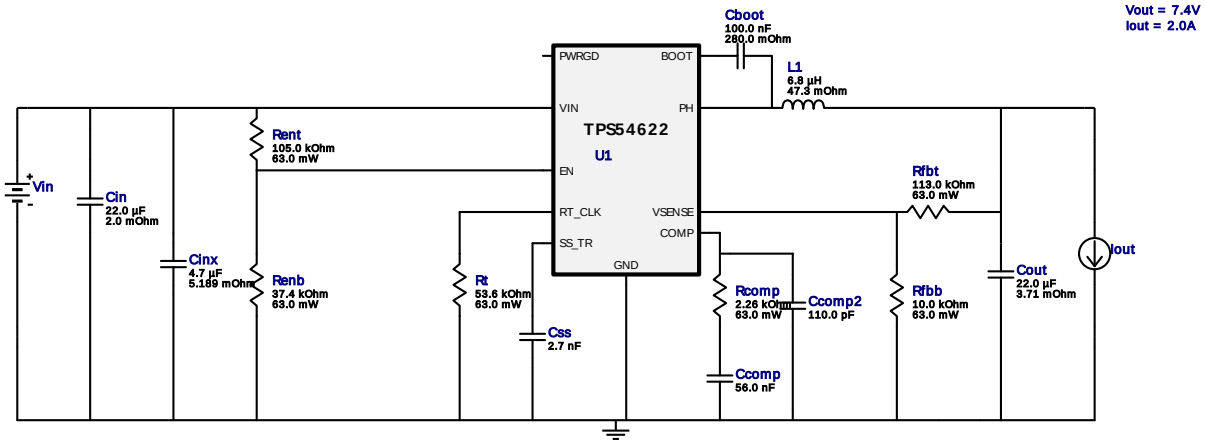
WEBENCH® Design Report

VinMin = 12.0V
VinMax = 14.0V
Vout = 7.4V
Iout = 2.0A

Device = TPS54622RHLR
Topology = Buck
Created = 3/27/17 6:11:39 AM
BOM Cost = $2.51
BOM Count = 15
Total Pd = 0.94W

Design : 957852/95 TPS54622RHLR
TPS54622RHLR 12.0V-14.0V to 7.40V @ 2.0A



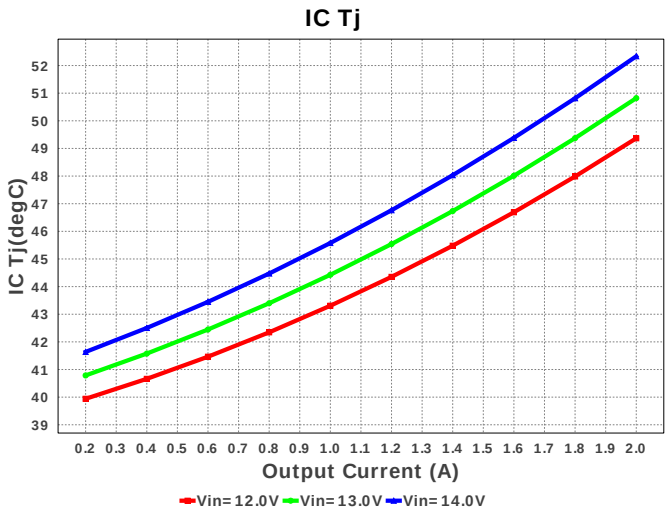
My Comments

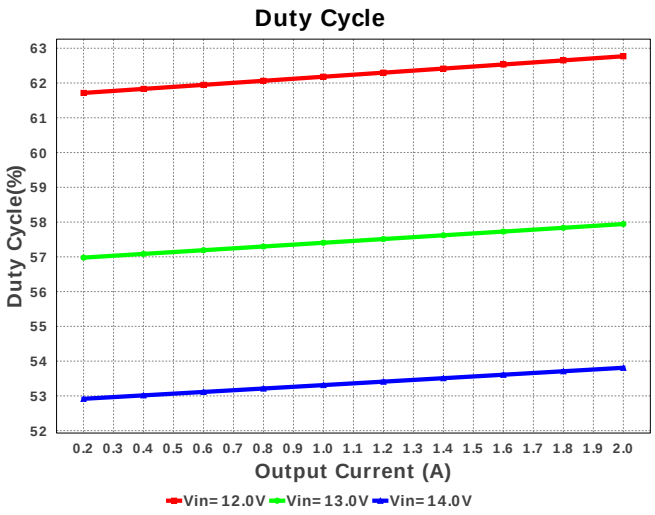
No comments

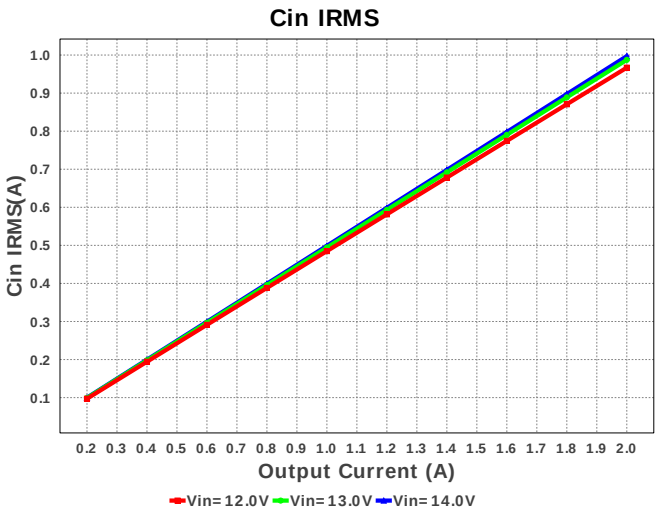
Electrical BOM

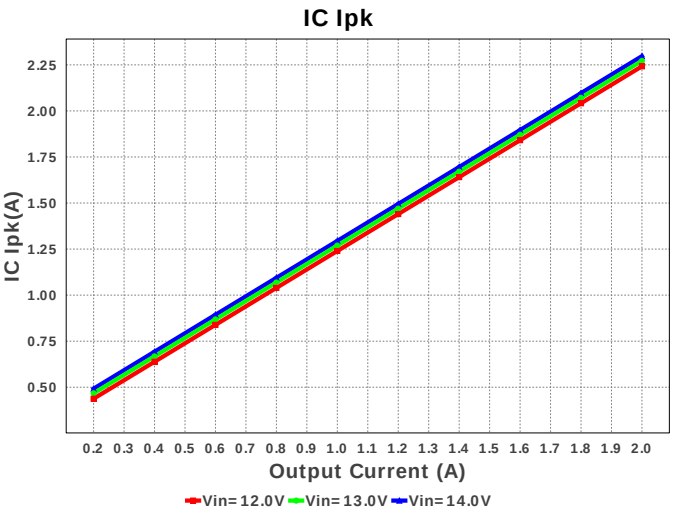
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Ccomp	MuRata	GRM155R61A563KA01D Series= X5R	Cap= 56.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C111JBANNNC Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.17	1210 15 mm²
5.	Cinx	MuRata	GRM21BR61E475KA12L Series= X5R	Cap= 4.7 uF ESR= 5.189 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
6.	Cout	TDK	C1608X5R1A226M080AC Series= X5R	Cap= 22.0 uF ESR= 3.71 mOhm VDC= 10.0 V IRMS= 2.69936 A	1	$0.11	0603 5 mm²
7.	Css	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
8.	L1	Bourns	SRN6045-6R8Y	L= 6.8 µH DCR= 47.3 mOhm	1	$0.16	SRN6045 64 mm²
9.	Rcomp	Vishay-Dale	CRCW04022K26FKED Series= CRCW..e3	Res= 2.26 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

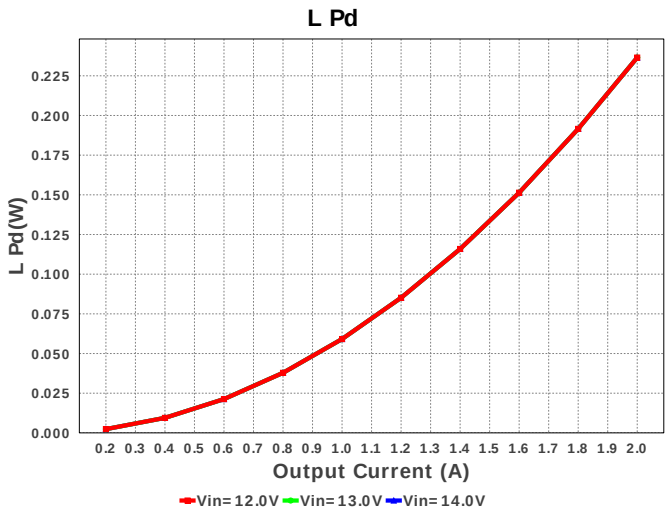
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Renb	Vishay-Dale	CRCW040237K4FKED Series= CRCW..e3	Res= 37.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
11.	Rent	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	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
13.	Rfbt	Vishay-Dale	CRCW0402113KFKED Series= CRCW..e3	Res= 113.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
14.	Rt	Vishay-Dale	CRCW040253K6FKED Series= CRCW..e3	Res= 53.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
15.	U1	Texas Instruments	TPS54622RHLR	Switcher	1	$1.95	S-PVQFN-N14 22 mm^2

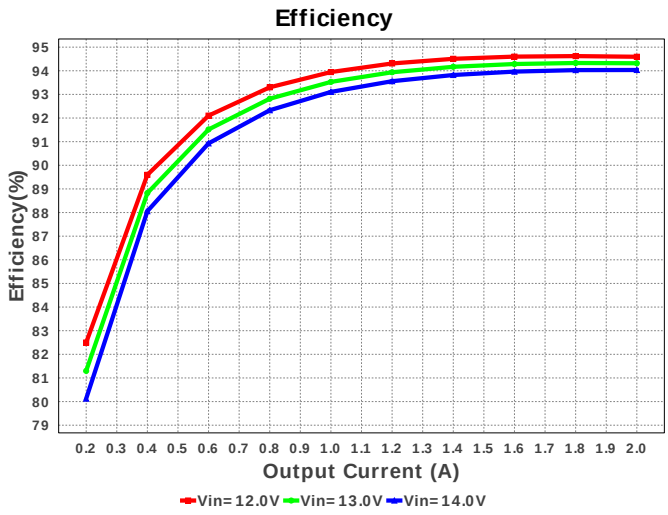


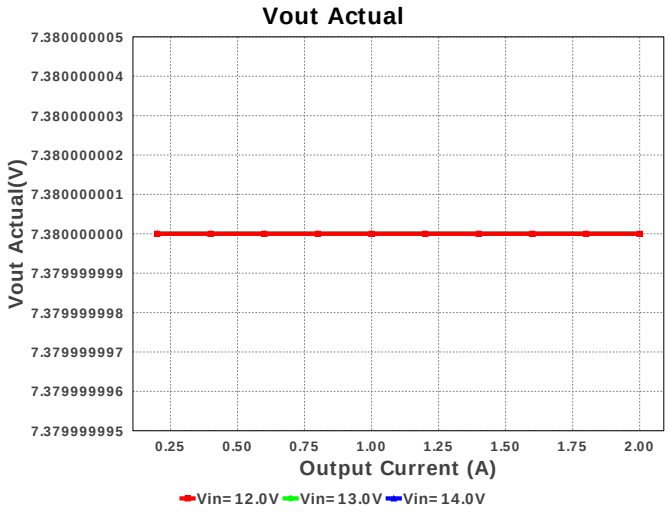


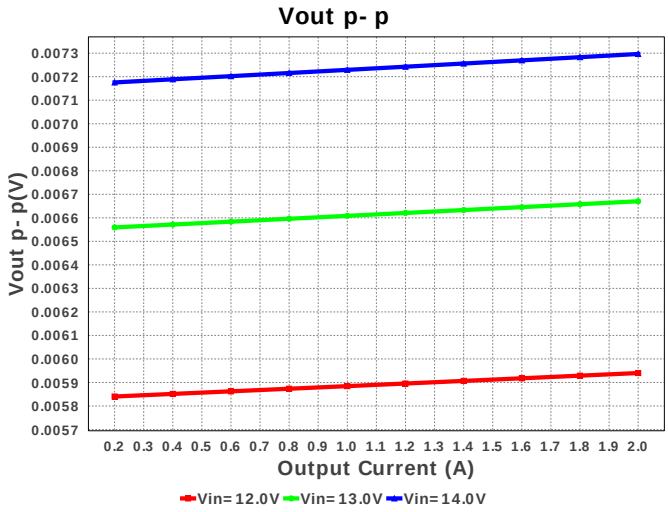


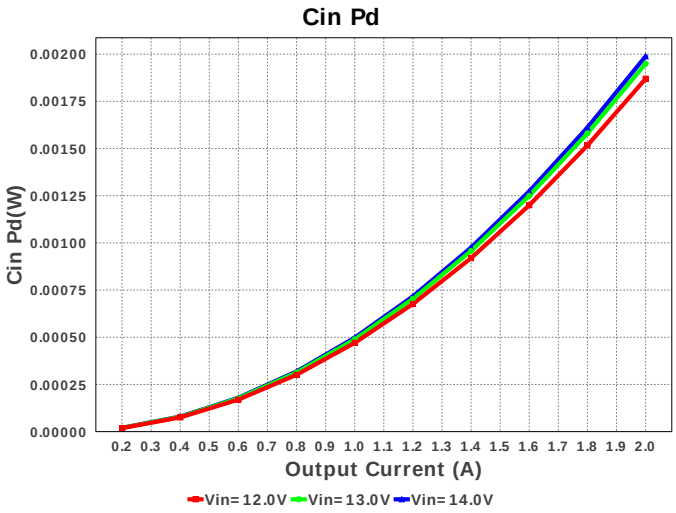


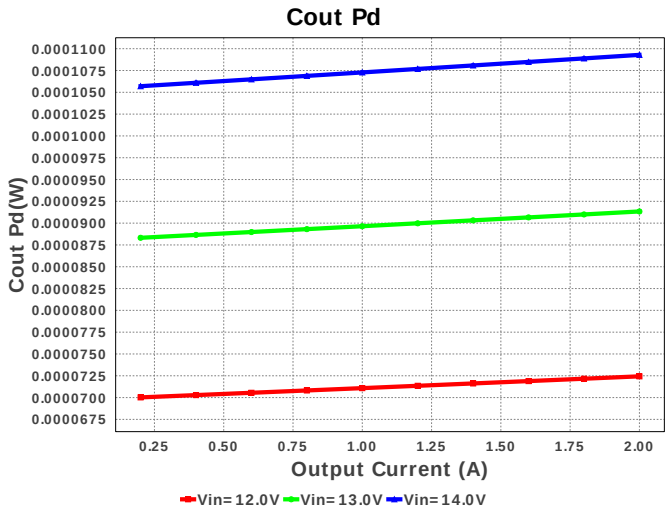


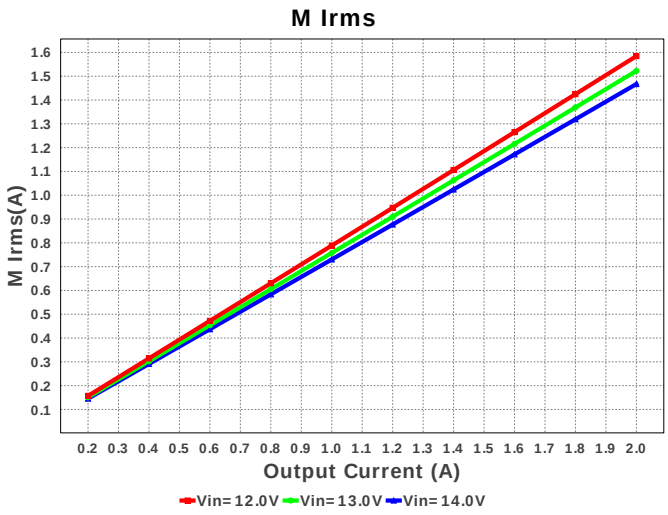


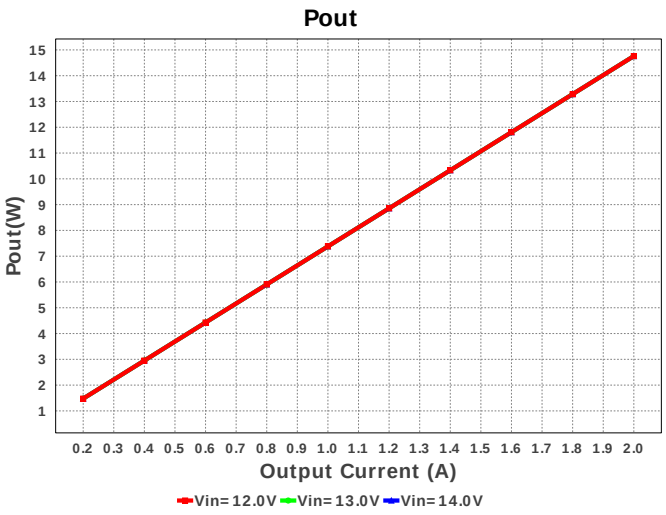


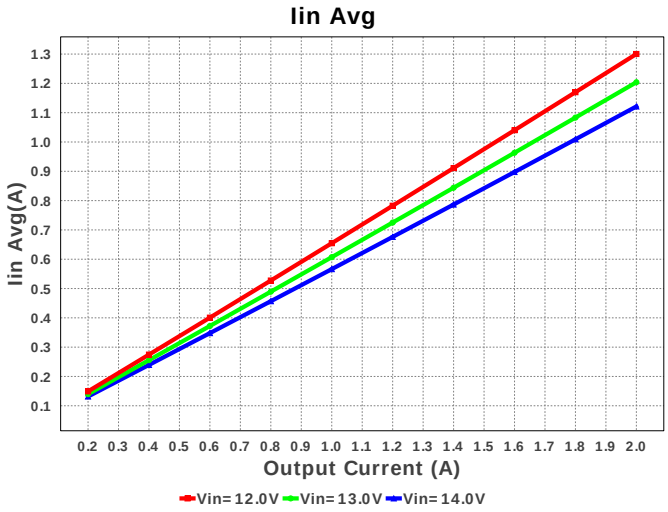


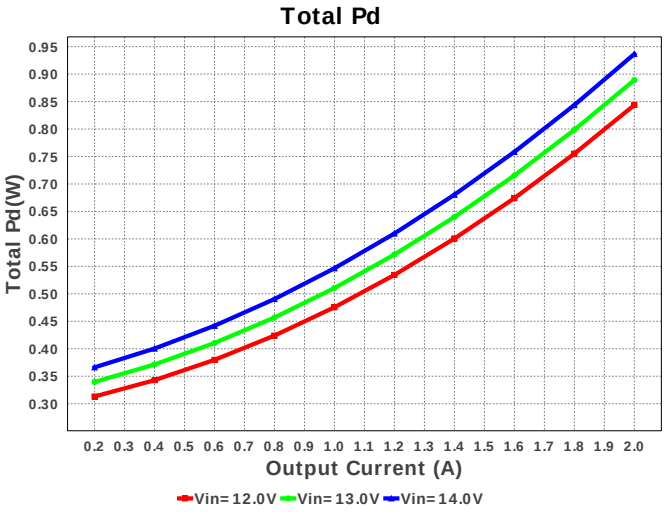


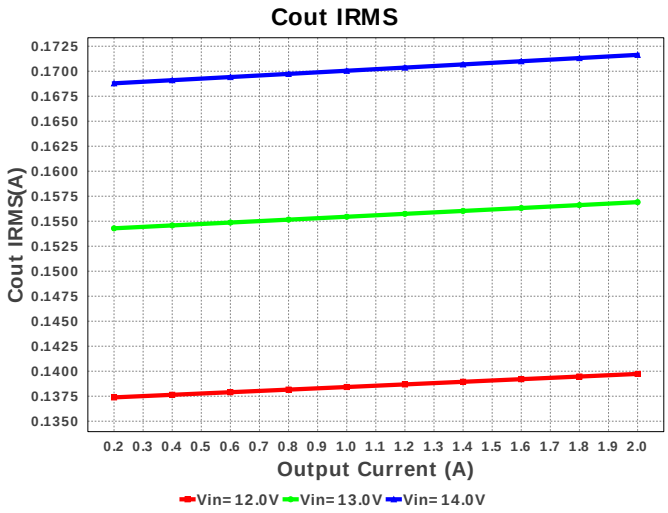


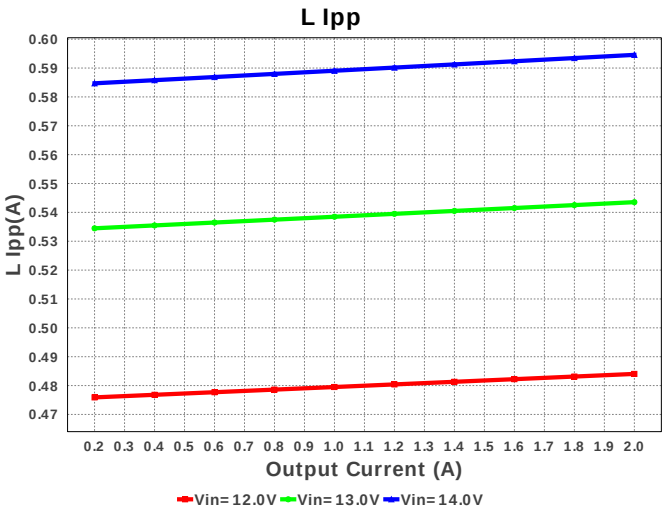


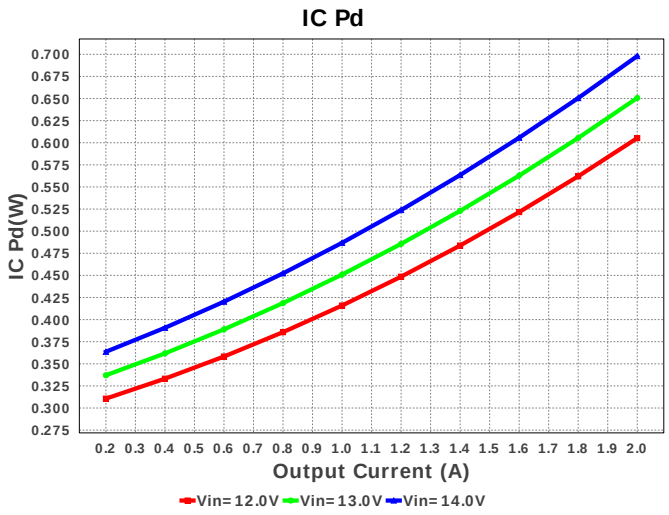


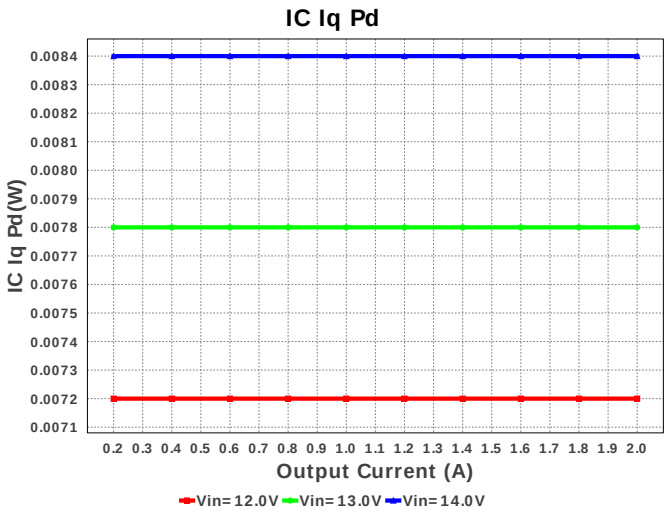


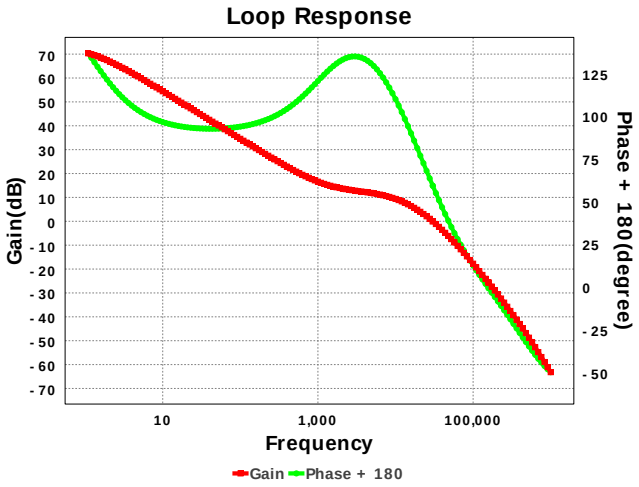












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	996.873 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	171.571 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.297 A	Current	Peak switch current in IC
4.	Iin Avg	1.124 A	Current	Average input current
5.	L Ipp	594.34 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.469 A	Current	Q Iavg
7.	BOM Count	15	General	Total Design BOM count
8.	FootPrint	153.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	881.052 kHz	General	Switching frequency
10.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	14.8 W	General	Total output power
13.	Total BOM	$2.51	General	Total BOM Cost
14.	Low Freq Gain	70.322 dB	Op_Point	Gain at 10Hz
15.	Vout Actual	7.38 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	7.4 V	Op_Point	Operational Output Voltage
17.	Cross Freq	30.142 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	53.951 %	Op_point	Duty cycle
19.	Efficiency	94.048 %	Op_point	Steady state efficiency
20.	Gain Marg	-25.613 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	52.337 degC	Op_point	IC junction temperature
22.	ICThetaJA	32.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	2.0 A	Op_point	Iout operating point
24.	Phase Marg	59.978 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	14.0 V	Op_point	Vin operating point
26.	Vout p-p	7.301 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	1.988 mW	Power	Input capacitor power dissipation
28.	Cout Pd	109.21 µW	Power	Output capacitor power dissipation
29.	IC Iq Pd	8.4 mW	Power	IC Iq Pd
30.	IC Pd	698.019 mW	Power	IC power dissipation
31.	L Pd	236.5 mW	Power	Inductor power dissipation

#	Name	Value	Category	Description
32.	Total Pd	936.607 mW	Power	Total Power Dissipation
33.	Vout Tolerance	3.554 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	14.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	7.4	Output Voltage
5.	base_pn	TPS54622	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54622** Product Folder : http://www.ti.com/product/TPS54622 : contains the data sheet and other resources.