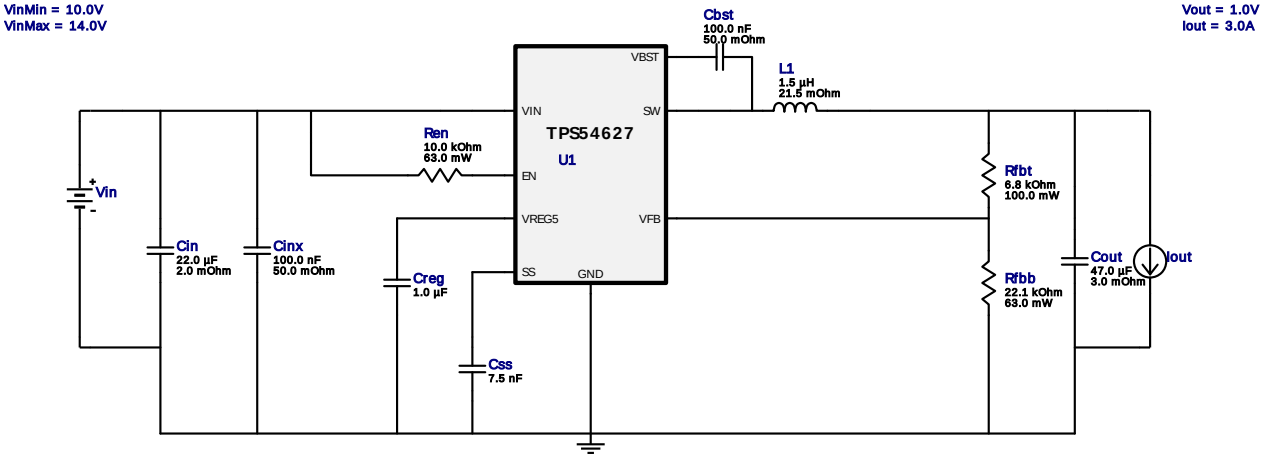
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 14.0V
Vout = 1.0V
Iout = 3.0A

Device = TPS54627DDAR
Topology = Buck
Created = 2/9/15 4:41:41 AM
BOM Cost = $2.62
Footprint = 140.0 mm²
BOM Count = 11
Total Pd = 1.03W

Design : 4192112/191 TPS54627DDAR
TPS54627DDAR 10.0V-14.0V to 1.00V @ 3.0A

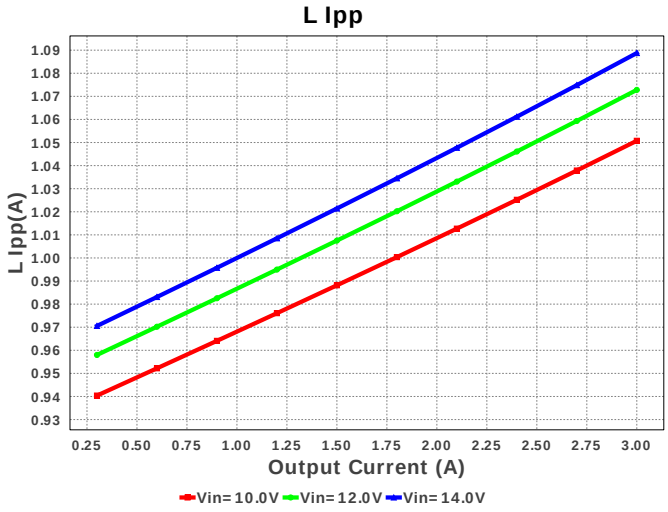


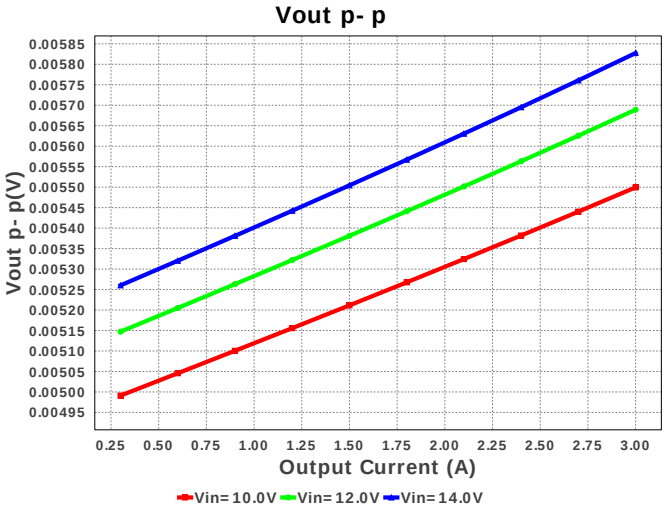
Electrical BOM

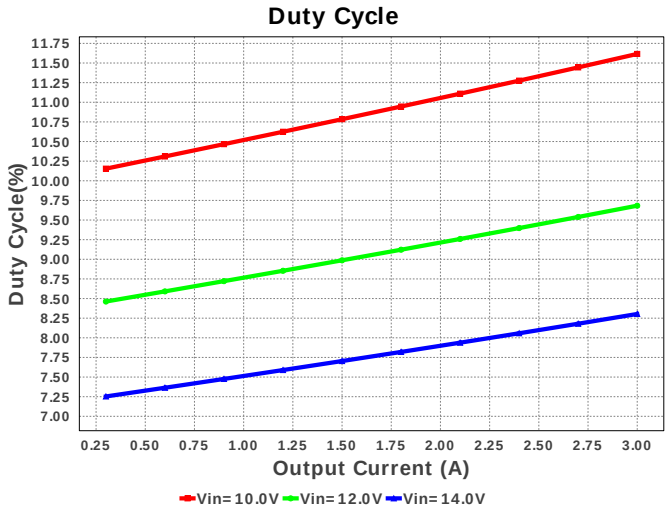
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	AVX	06033C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 50.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
2.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.28	1210 15 mm²
3.	Cinx	AVX	06033C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 50.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
4.	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 mm²
5.	Creg	MuRata	GRM155R61A105KE15D Series= X5R	Cap= 1.0 uF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
6.	Css	MuRata	GRM2195C1H752JA01D Series= C0G/NP0	Cap= 7.5 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.06	0805 7 mm²
7.	L1	Coilcraft	XAL4020-152MEB	L= 1.5 µH DCR= 21.5 mOhm	1	$0.60	XAL4020 25 mm²
8.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Susumu Co Ltd	RR1220P-682-D Series= 264	Res= 6.8 kOhm Power= 100.0 mW Tolerance= 0.5%	1	$0.01	0805 7 mm²

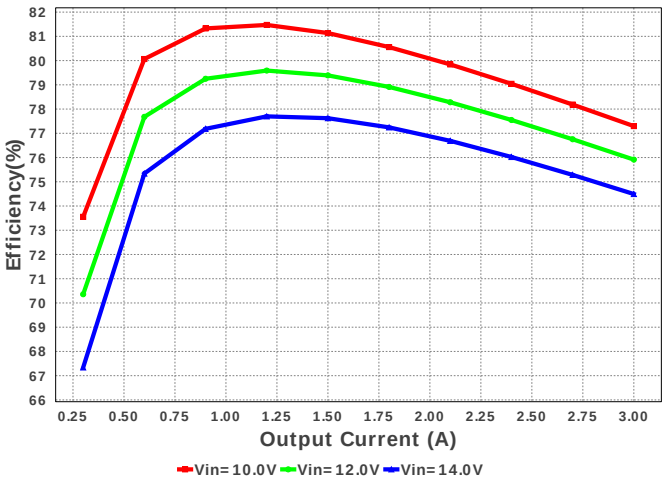
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54627DDAR	Switcher	1	$1.50	

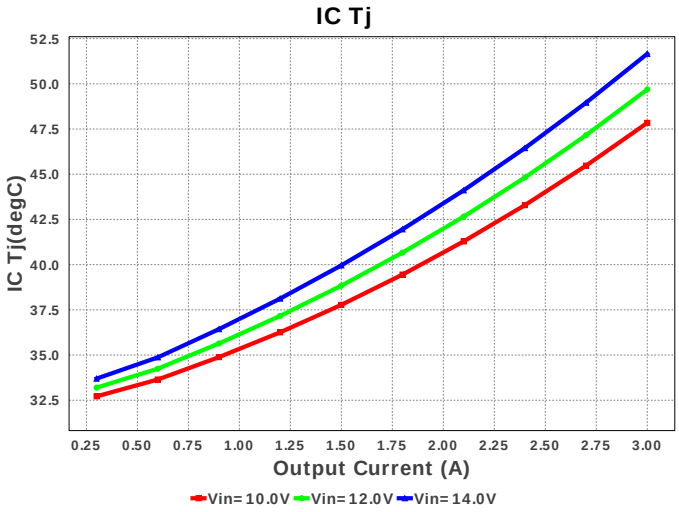
R-PDSO-G8 57 mm²

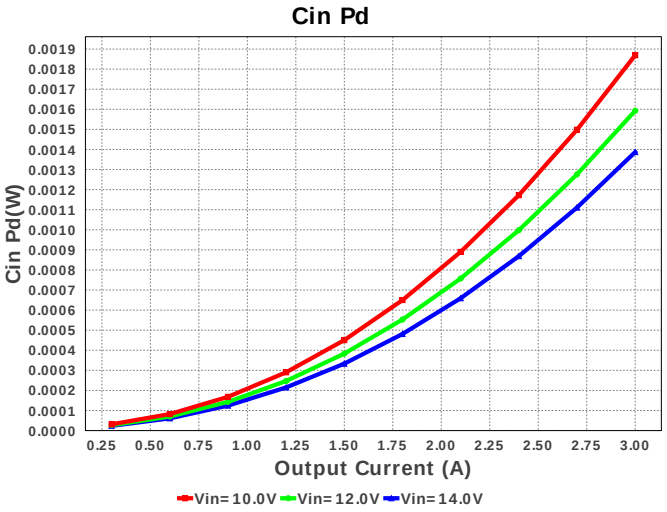




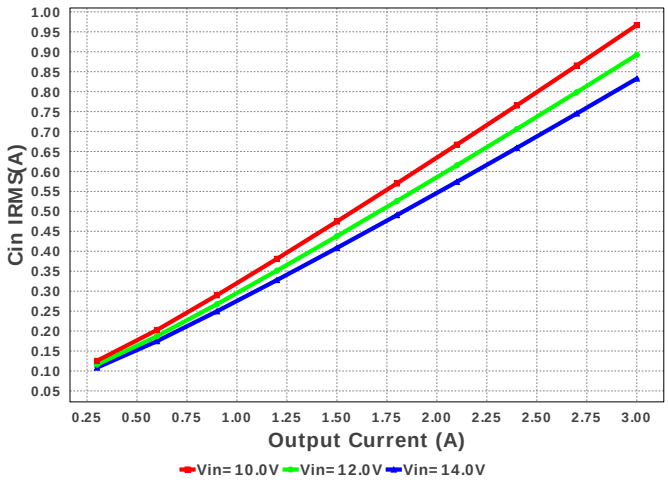




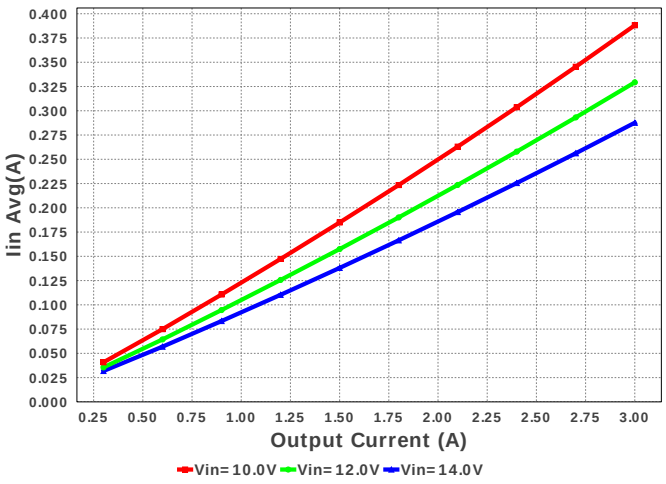




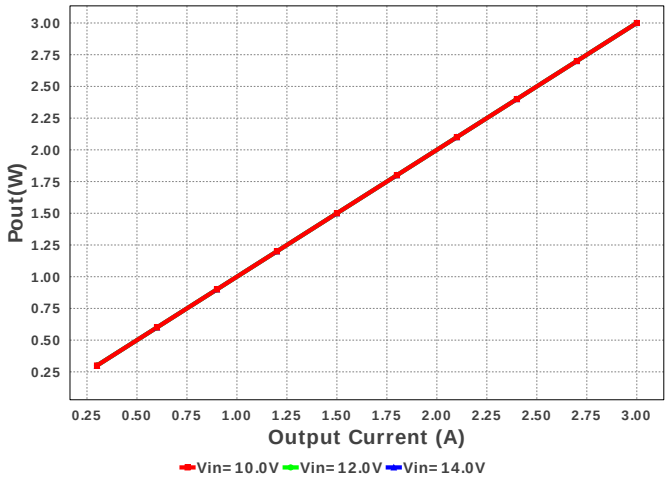
Cin IRMS



Iin Avg



Pout



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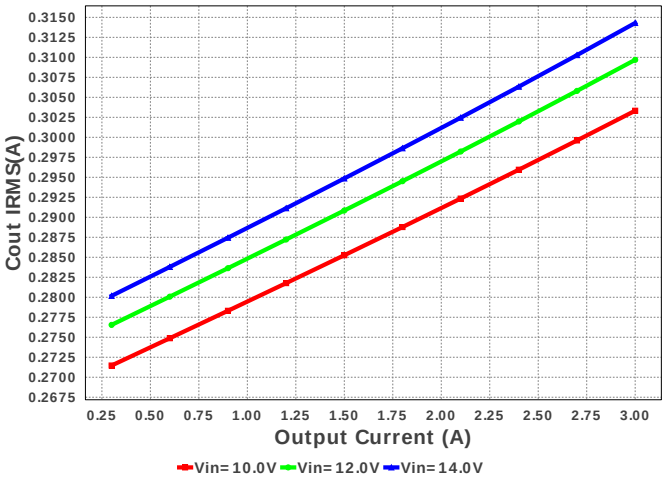
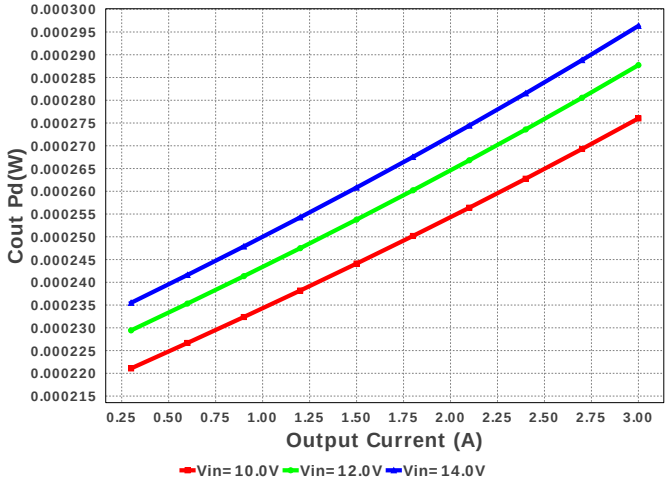
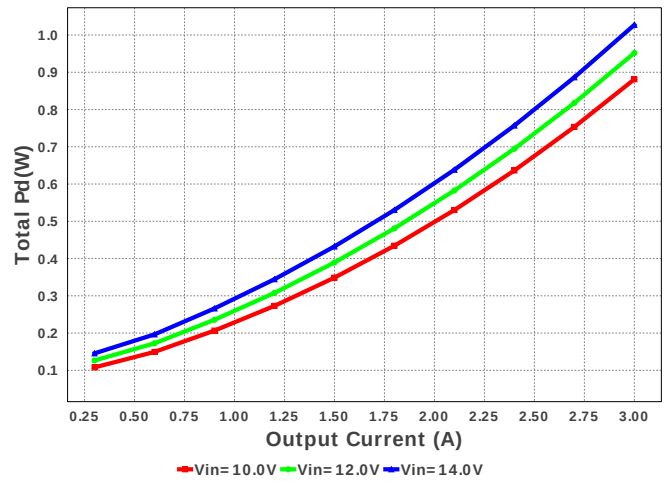
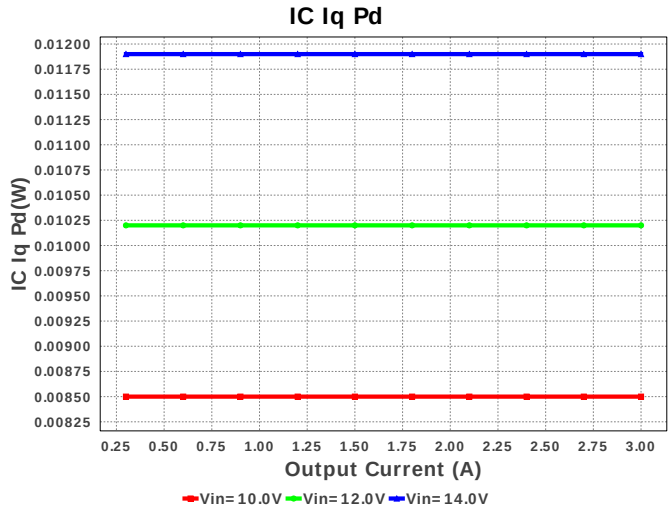


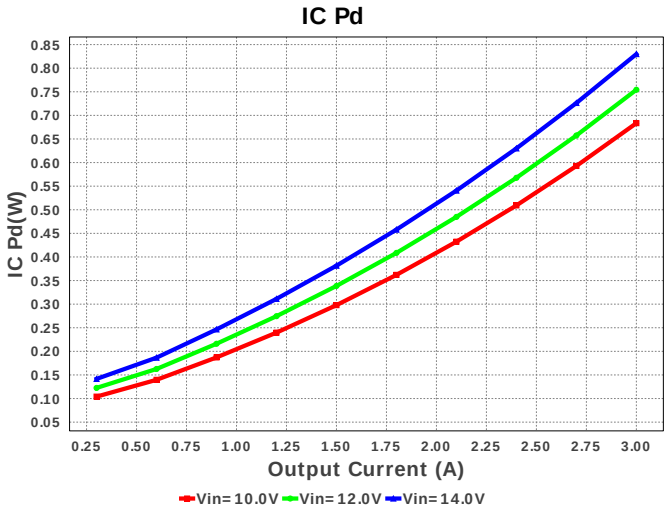
Cout Pd

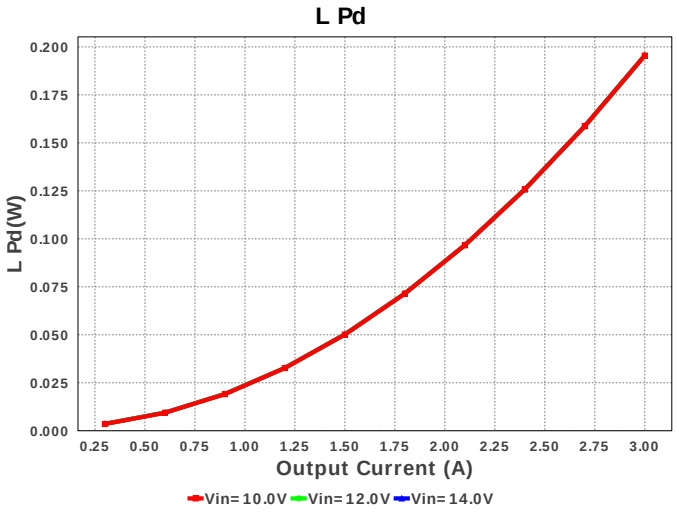


Total Pd









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	832.745 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	314.296 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	287.66 mA	Current	Average input current
4.	L Ipp	1.089 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	11	General	Total Design BOM count
6.	FootPrint	140.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	651.591 kHz	General	Switching frequency
8.	Pout	3.0 W	General	Total output power
9.	Total BOM	$2.62	General	Total BOM Cost
10.	Vout OP	1.0 V	Op_Point	Operational Output Voltage
11.	Duty Cycle	8.303 %	Op_point	Duty cycle
12.	Efficiency	74.494 %	Op_point	Steady state efficiency
13.	IC Tj	51.659 degC	Op_point	IC junction temperature
14.	ICThetaJA	26.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
15.	IOUT_OP	3.0 A	Op_point	Iout operating point
16.	VIN_OP	14.0 V	Op_point	Vin operating point
17.	Vout p-p	5.827 mV	Op_point	Peak-to-peak output ripple voltage
18.	Cin Pd	1.387 mW	Power	Input capacitor power dissipation
19.	Cout Pd	296.347 µW	Power	Output capacitor power dissipation
20.	IC Iq Pd	11.9 mW	Power	IC Iq Pd
21.	IC Pd	829.84 mW	Power	IC power dissipation
22.	L Pd	195.624 mW	Power	Inductor power dissipation
23.	Total Pd	1.027 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	Iout1	3.0	Output Current #1
3.	VinMax	14.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage

#	Name	Value	Description
5.	Vout	1.0	Output Voltage
6.	Vout1	1.0	Output Voltage #1
7.	base_pn	TPS54627	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54627** Product Folder : http://www.ti.com/product/tps54627 : contains the data sheet and other resources.