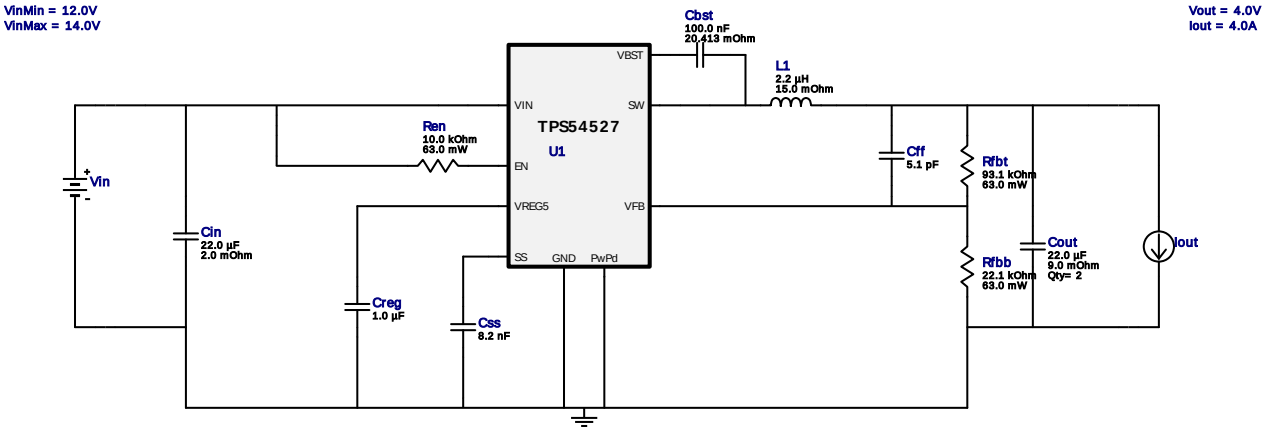
WEBENCH® Design Report

VinMin = 12.0V
VinMax = 14.0V
Vout = 4.0V
Iout = 4.0A

Device = TPS54527DDAR
Topology = Buck
Created = 11/3/14 8:32:09 AM
BOM Cost = $1.70
Footprint = 220.0 mm²
BOM Count = 12
Total Pd = 1.88W

Design : 1244294/69 TPS54527DDAR
TPS54527DDAR 12.0V-14.0V to 4.00V @ 4.0A

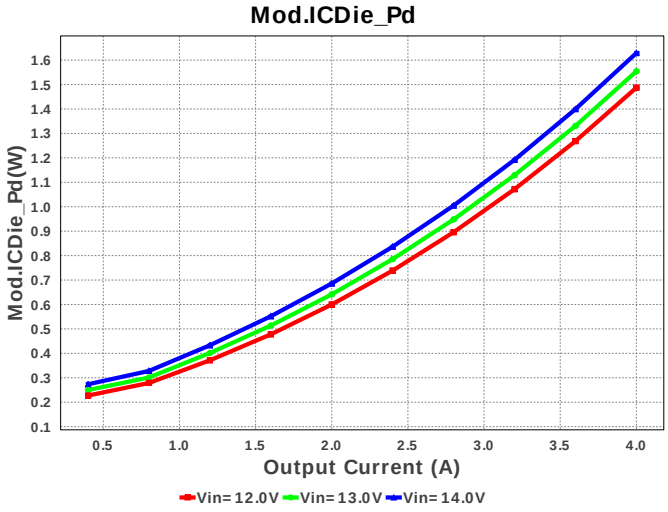


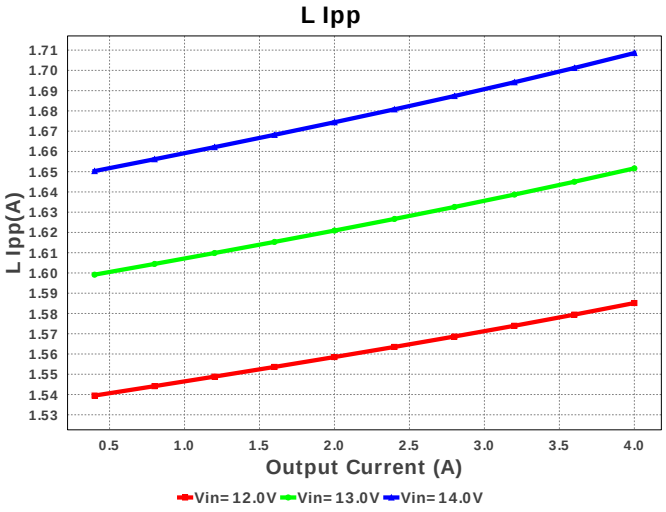
Electrical BOM

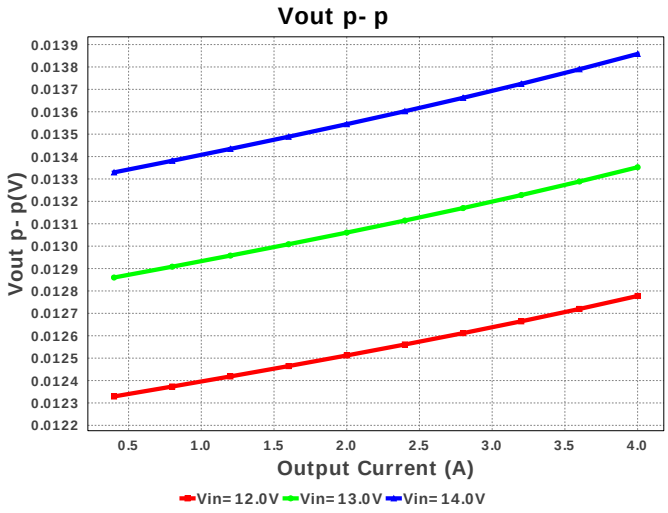
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	TDK	C1005X5R1A104K Series= 285	Cap= 100.0 nF ESR= 20.413 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	MuRata	GRM1555C1E5R1CA01D Series= C0G/NP0	Cap= 5.1 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.28	1210 15 mm²
4.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	2	$0.03	0805 7 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	GRM155R71E822KA01D Series= X7R	Cap= 8.2 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
7.	L1	TDK	VLP8040T-2R2N	L= 2.2 µH DCR= 15.0 mOhm	1	$0.22	VLP8040 113 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	Vishay-Dale	CRCW040293K1FKED Series= CRCW..e3	Res= 93.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

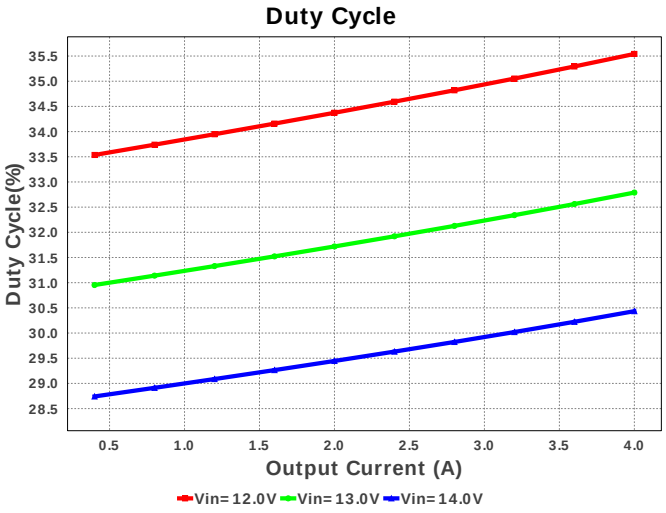
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54527DDAR	Switcher	1	$1.08	

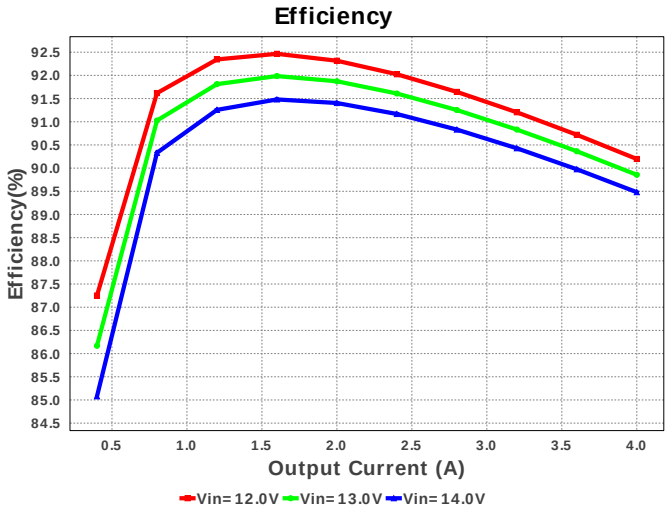
R-PDSO-G8 57 mm²

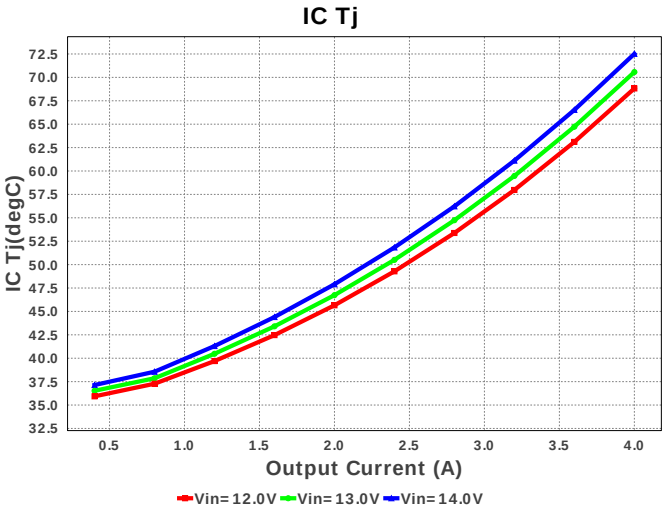


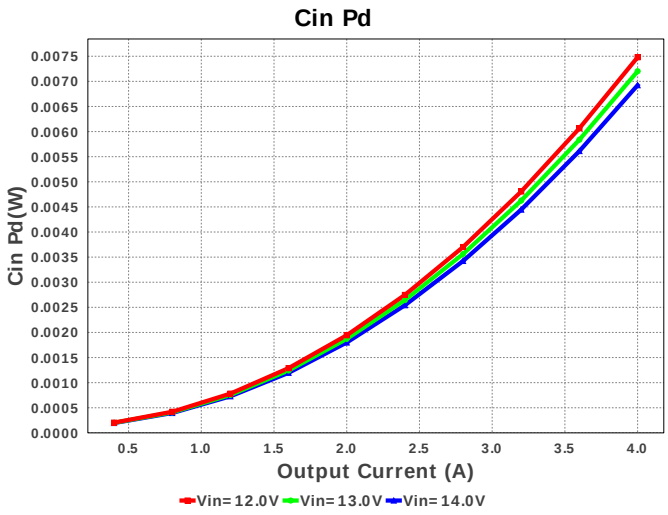


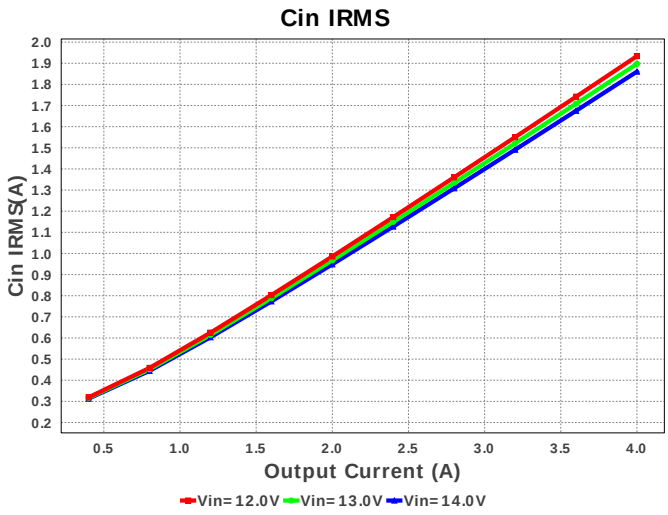


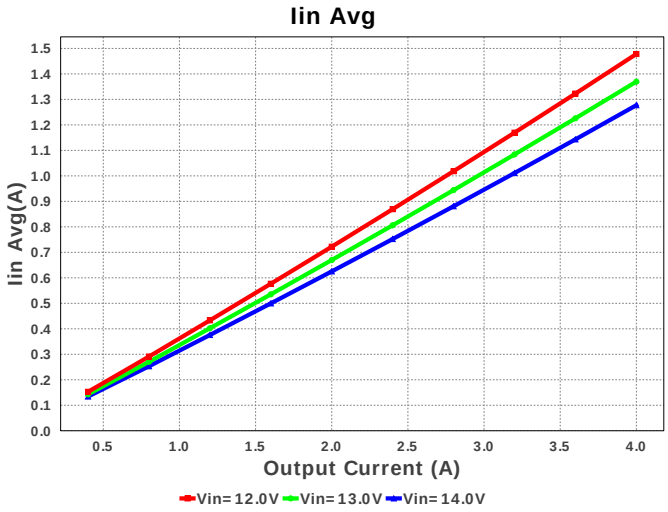


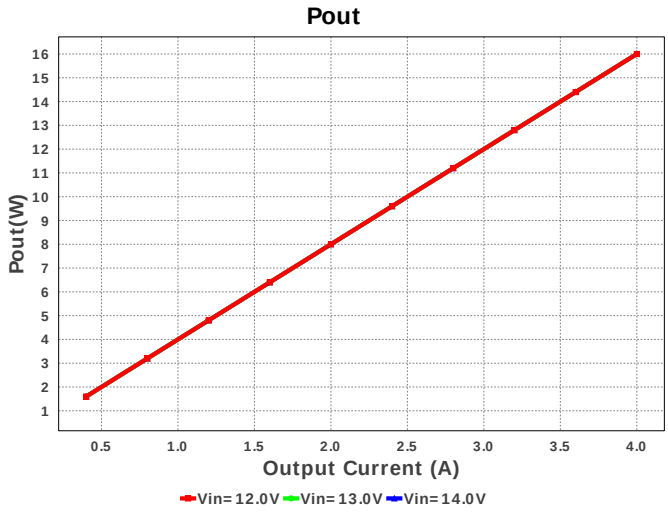


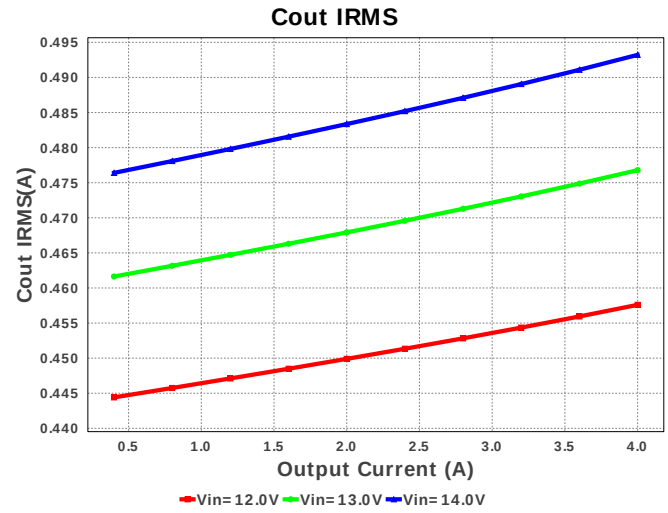


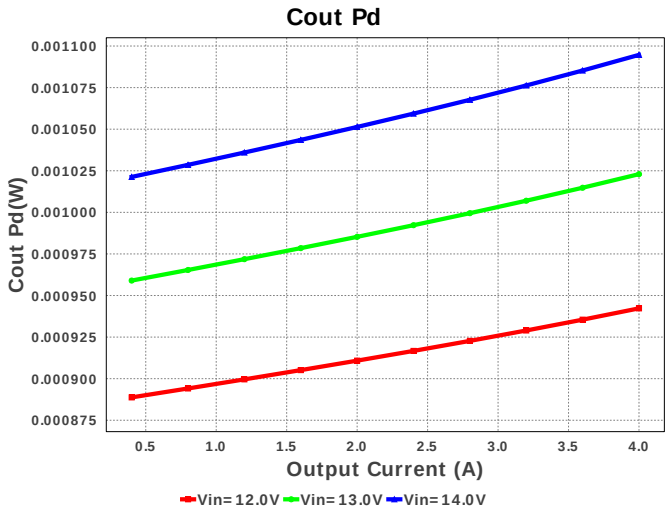


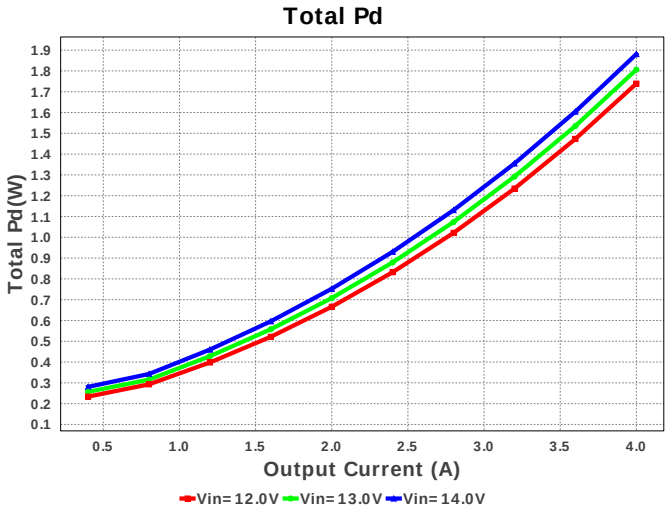


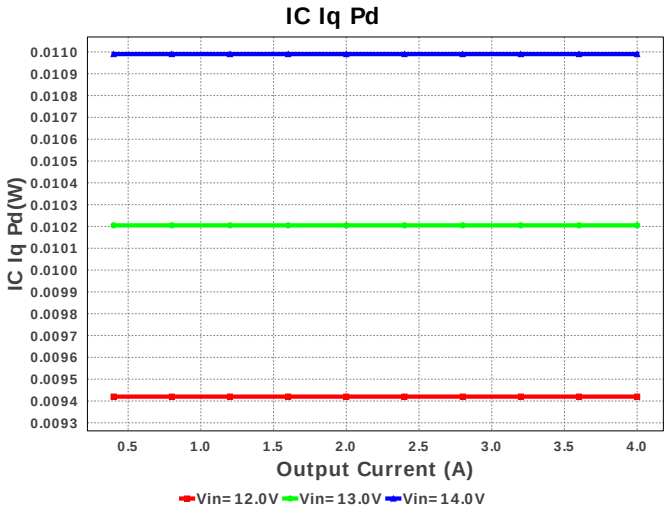


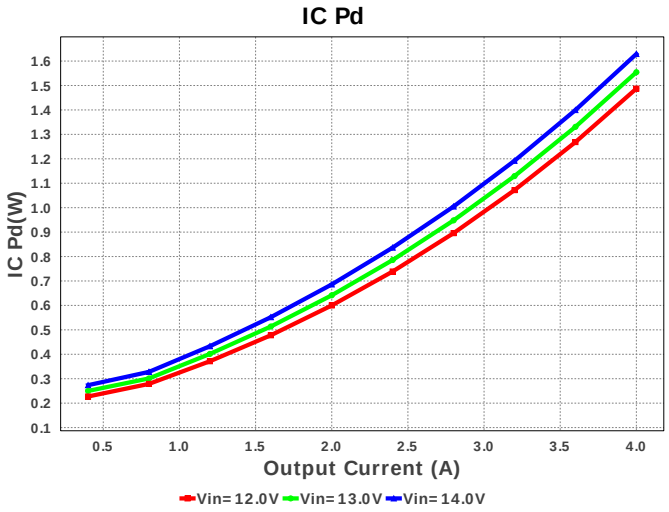


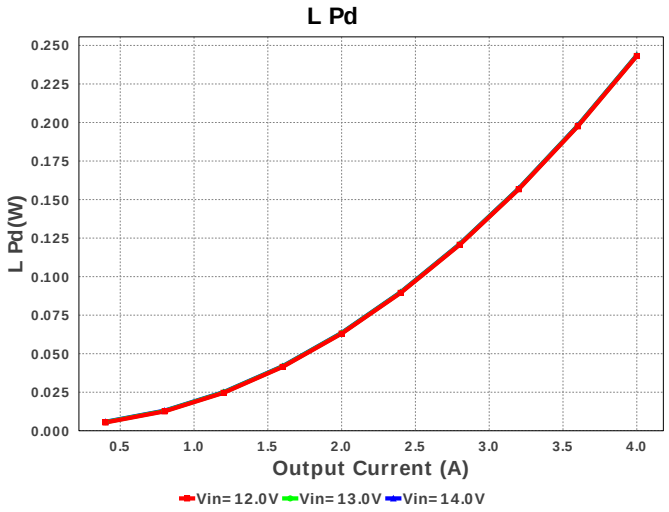












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.861 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	493.217 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.277 A	Current	Average input current
4.	L Ipp	1.709 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	220.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	781.459 kHz	General	Switching frequency
8.	Pout	16.0 W	General	Total output power
9.	Total BOM	$1.7	General	Total BOM Cost
10.	Vout OP	4.0 V	Op_Point	Operational Output Voltage
11.	Duty Cycle	30.434 %	Op_point	Duty cycle
12.	Efficiency	89.481 %	Op_point	Steady state efficiency
13.	IC Tj	72.517 degC	Op_point	IC junction temperature
14.	ICThetaJA	26.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
15.	IOUT_OP	4.0 A	Op_point	Iout operating point
16.	VIN_OP	14.0 V	Op_point	Vin operating point
17.	Vout p-p	13.858 mV	Op_point	Peak-to-peak output ripple voltage
18.	Cin Pd	6.923 mW	Power	Input capacitor power dissipation
19.	Cout Pd	1.095 mW	Power	Output capacitor power dissipation
20.	IC Iq Pd	10.99 mW	Power	IC Iq Pd
21.	IC Pd	1.629 W	Power	IC power dissipation
22.	L Pd	243.649 mW	Power	Inductor power dissipation
23.	Total Pd	1.881 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	4.0 A	Maximum Output Current
2.	Iout1	4.0 Amps	Output Current #1
3.	VinMax	14.0 V	Maximum input voltage
4.	VinMin	12.0 V	Minimum input voltage

#	Name	Value	Description
5.	Vout	4.0 V	Output Voltage
6.	Vout1	4.0 Volt	Output Voltage #1
7.	base_pn	TPS54527	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **TPS54527** Product Folder : http://www.ti.com/product/tps54527 : contains the data sheet and other resources.