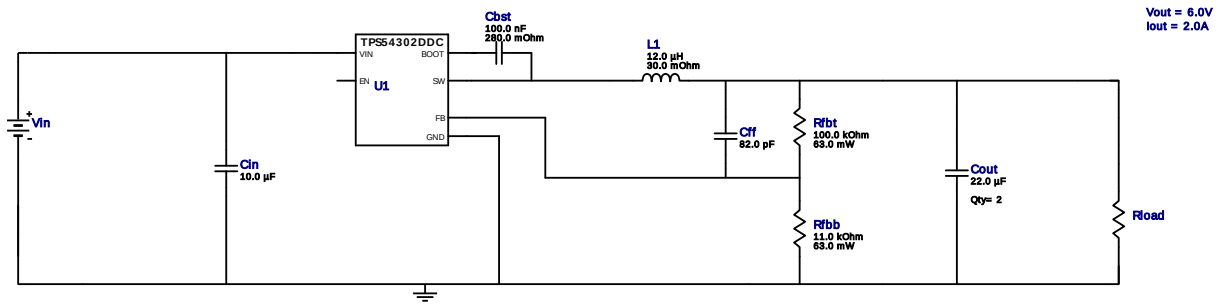
WEBENCH® Design Report

VinMin = 7.0V
VinMax = 14.0V
Vout = 6.0V
Iout = 2.0A

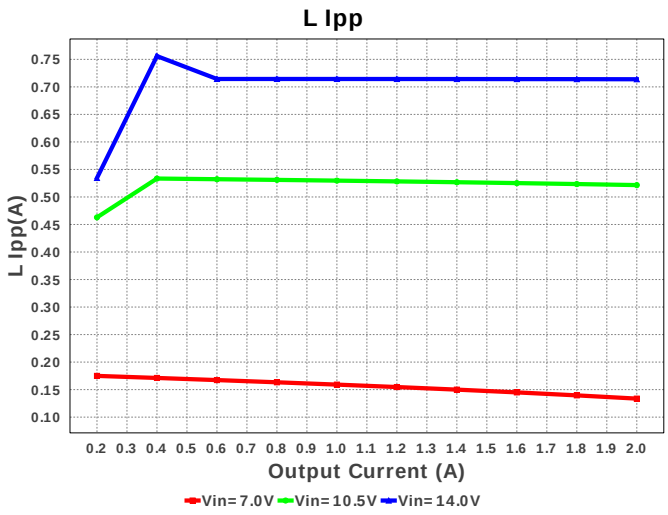
Device = TPS54302DDCR
Topology = Buck
Created = 2017-07-25 13:55:09.092
BOM Cost = $1.58
BOM Count = 9
Total Pd = 0.78W

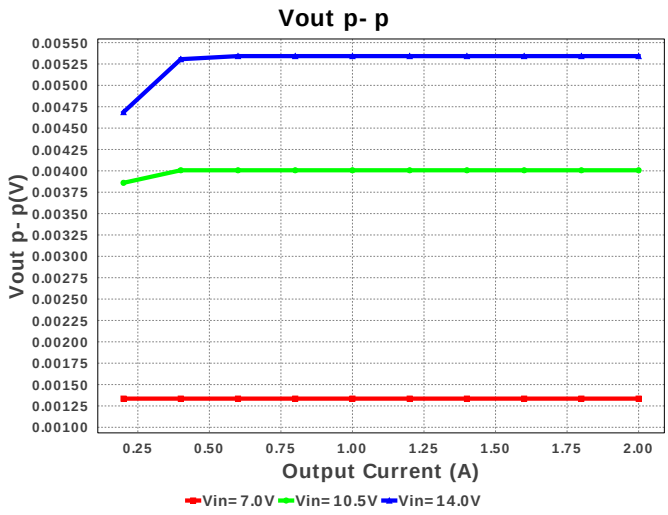
Design : 1901621/7 TPS54302DDCR
TPS54302DDCR 7.0V-14.0V to 6.00V @ 2.0A

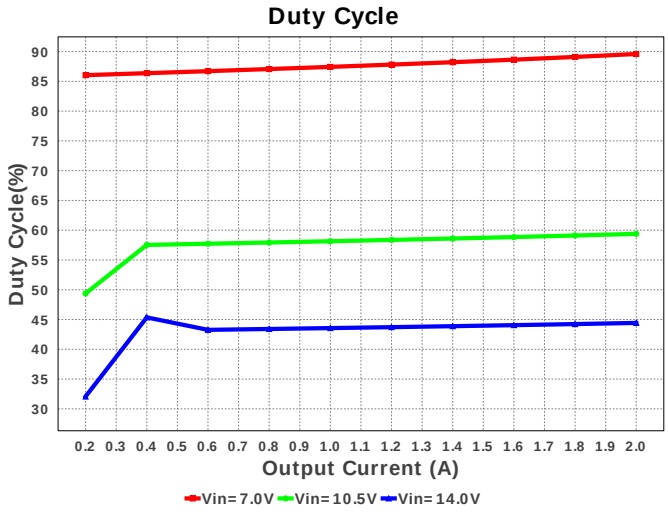


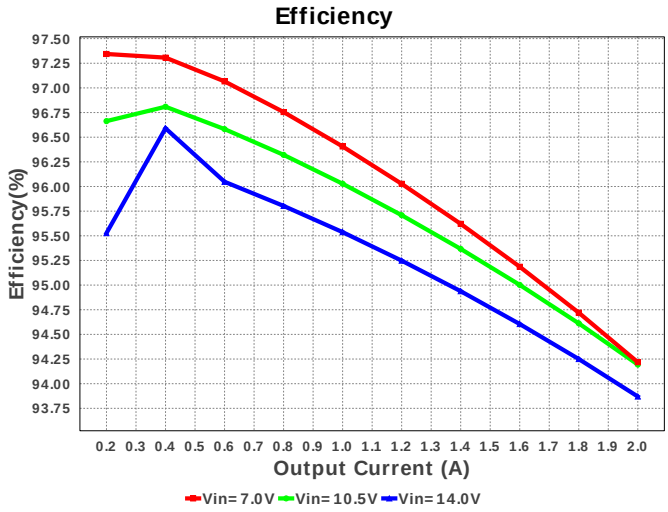
Electrical BOM

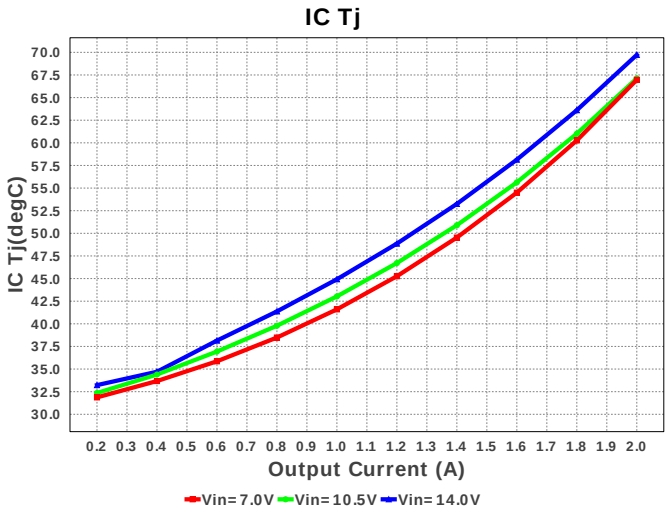
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cff	Yageo America	CC0201JRNPO8BN820 Series= C0G/NP0	Cap= 82.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
3.	Cin	Taiyo Yuden	TMK316BJ106KL-T Series= X5R	Cap= 10.0 uF VDC= 25.0 V IRMS= 0.0 A	1	$0.06	1206 11 mm²
4.	Cout	AVX	12103D226MAT2A Series= X5R	Cap= 22.0 uF VDC= 25.0 V IRMS= 0.0 A	2	$0.19	1210 15 mm²
5.	L1	Bourns	SDR1307-120ML	L= 12.0 µH DCR= 30.0 mOhm	1	$0.35	SDR1307 227 mm²
6.	Rfbb	Vishay-Dale	CRCW040211K0FKED Series= CRCW..e3	Res= 11.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	TPS54302DDCR	Switcher	1	$0.75	DDC0006A_N 10 mm²

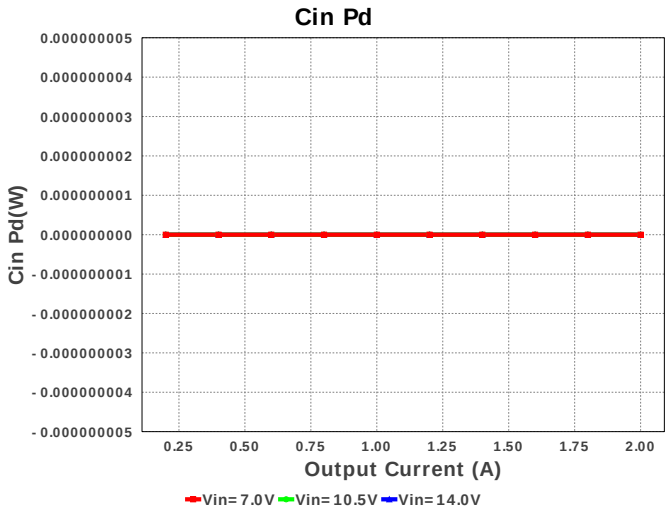


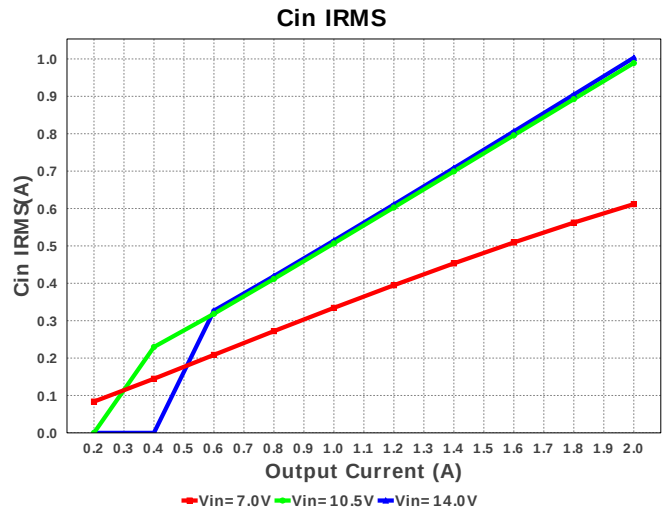


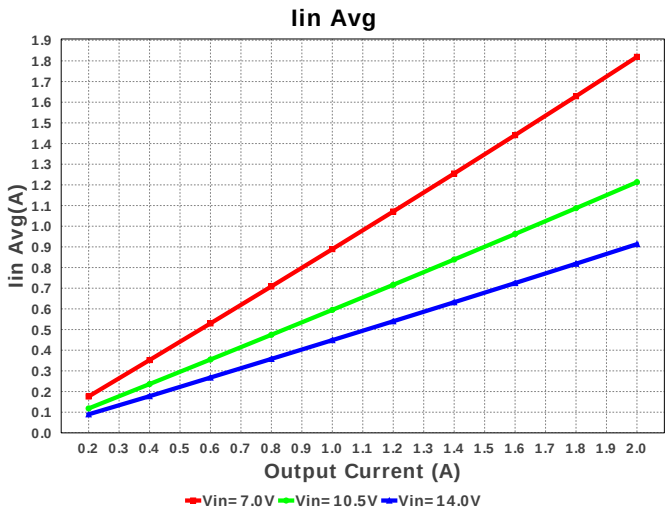


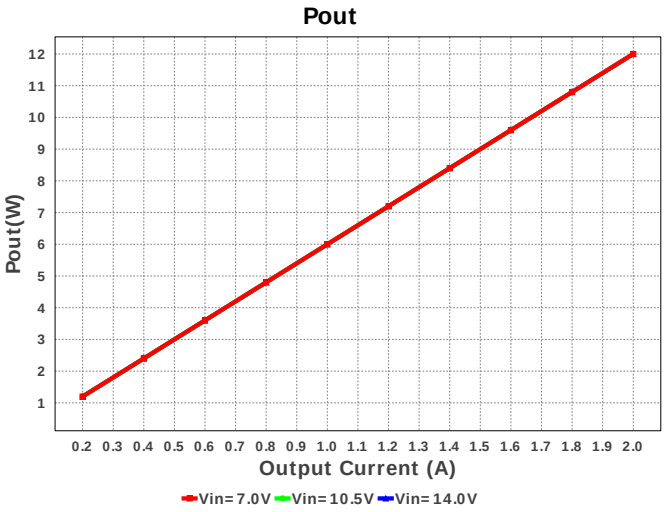


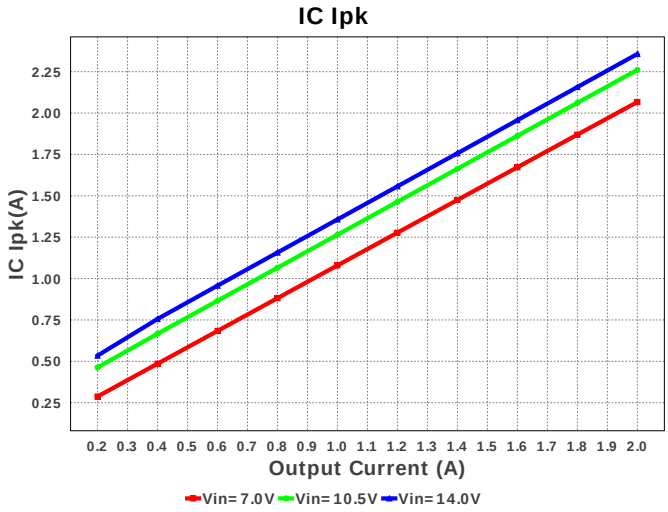


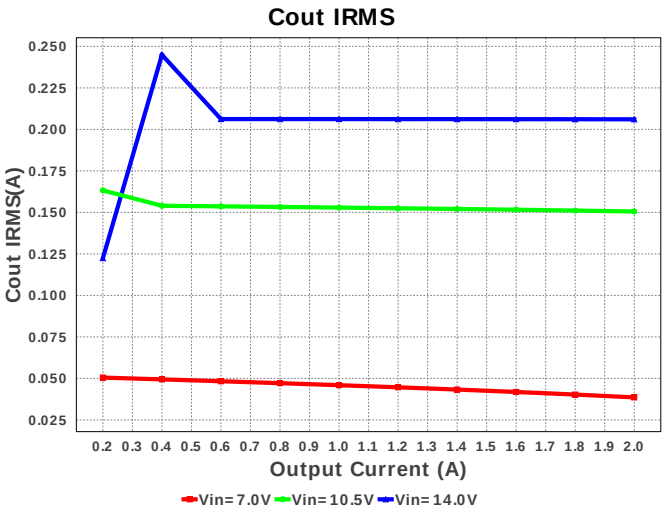


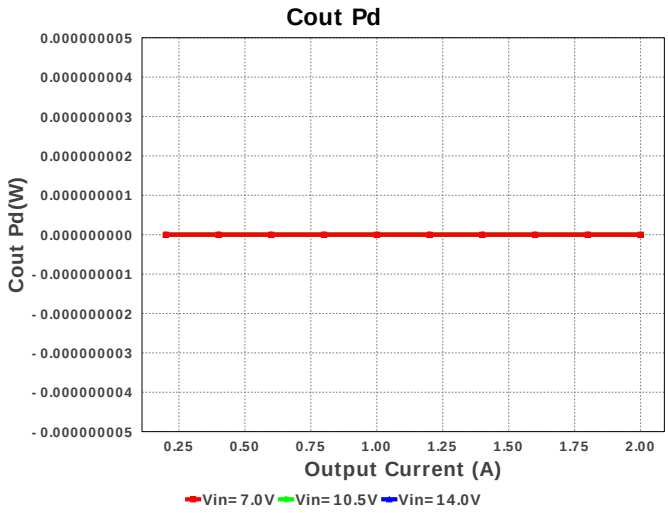


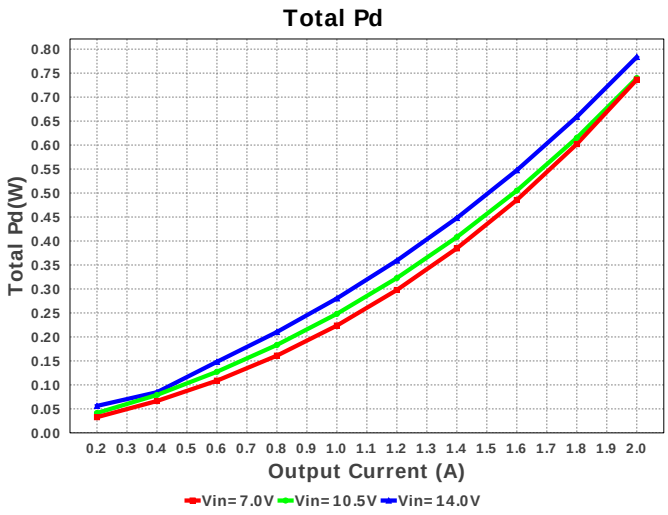


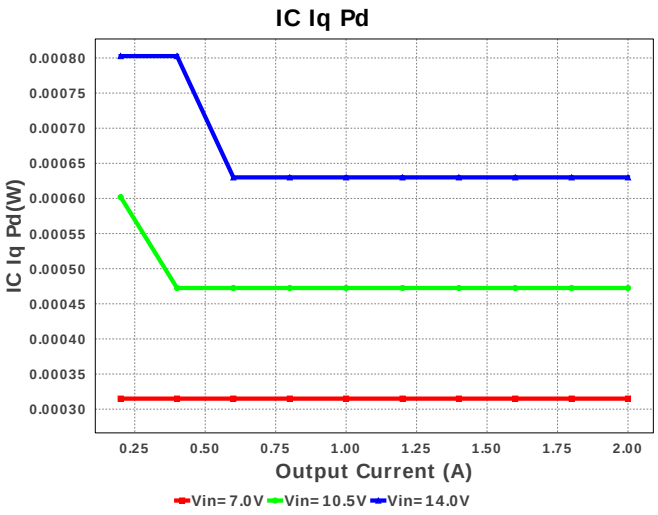


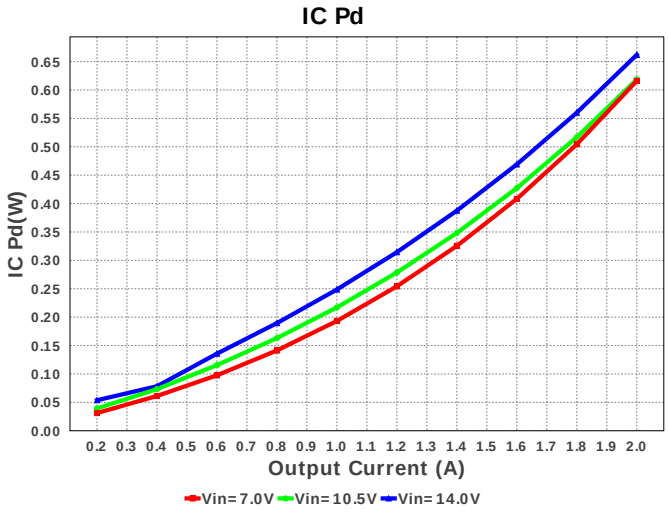


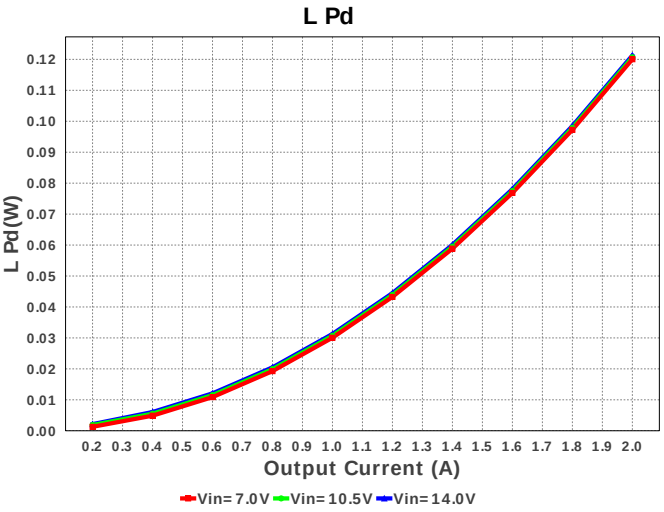


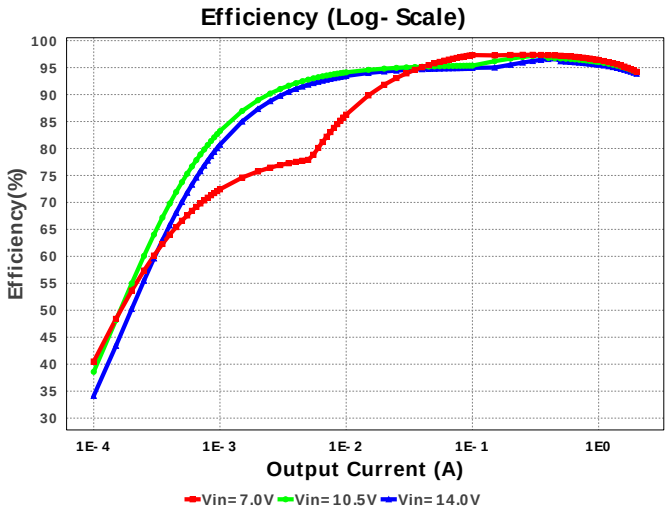












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.003 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	206.079 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.357 A	Current	Peak switch current in IC
4.	Iin Avg	913.12 mA	Current	Average input current
5.	L Ipp	713.88 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	292.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	400.0 kHz	General	Switching frequency
9.	Mode	CCM	General	PWM/PFM Mode
10.	Pout	12.0 W	General	Total output power
11.	Total BOM	$1.58	General	Total BOM Cost

#	Name	Value	Category	Description
12.	ICThetaJA Effective	60.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Vout Actual	6.014 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Duty Cycle	44.429 %	Op_point	Duty cycle
15.	Efficiency	93.87 %	Op_point	Steady state efficiency
16.	IC Tj	69.721 degC	Op_point	IC junction temperature
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	VIN_OP	14.0 V	Op_point	Vin operating point
19.	Vout p-p	5.342 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
21.	Cout Pd	0.0 W	Power	Output capacitor power dissipation
22.	IC Iq Pd	630.0 µW	Power	IC Iq Pd
23.	IC Pd	662.023 mW	Power	IC power dissipation
24.	L Pd	121.274 mW	Power	Inductor power dissipation
25.	Total Pd	783.64 mW	Power	Total Power Dissipation
26.	Vout Tolerance	1.82 %		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	7.0	Minimum input voltage
4.	Vout	6.0	Output Voltage
5.	base_pn	TPS54302	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54302** Product Folder : http://www.ti.com/product/TPS54302 : contains the data sheet and other resources.