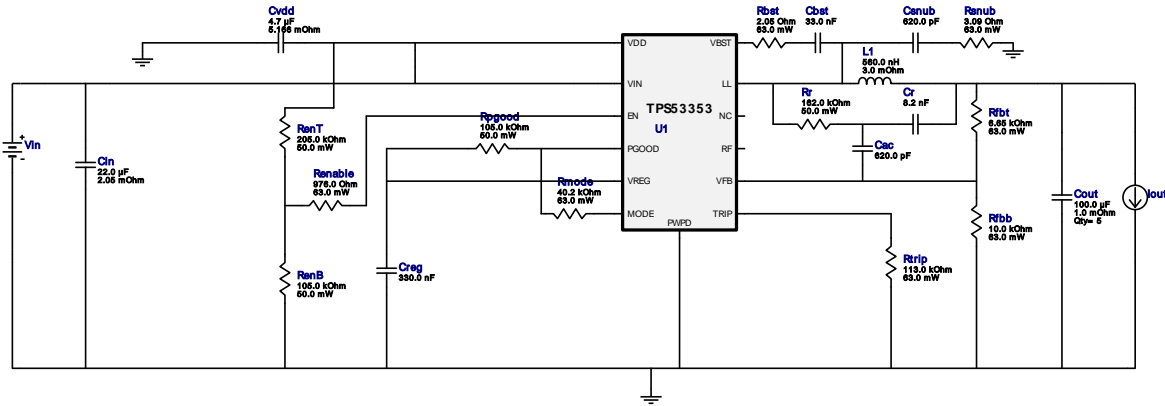


WEBENCH® Design Report

 Design : TPS53353DQPR
 TPS53353DQPR 11.7V-12.3V to 1.00V @ 13.0A

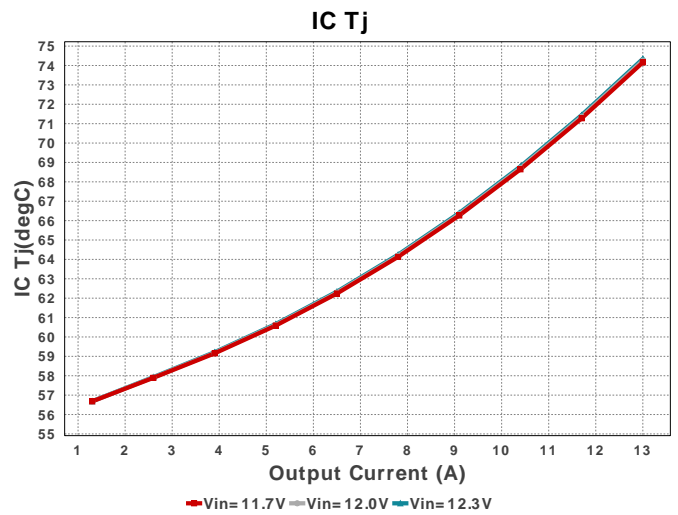
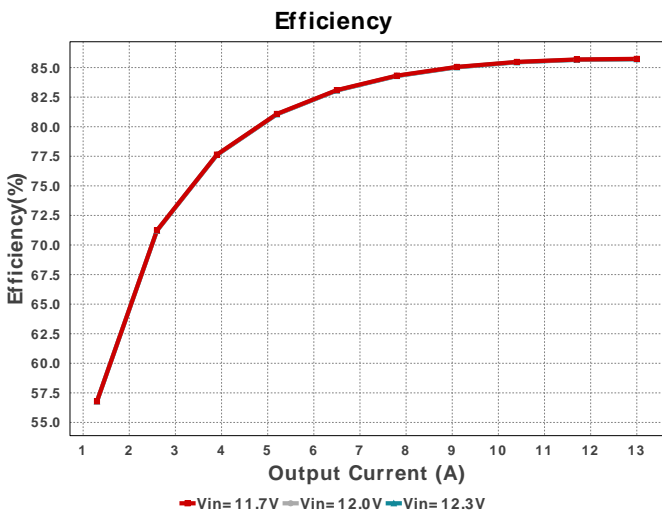
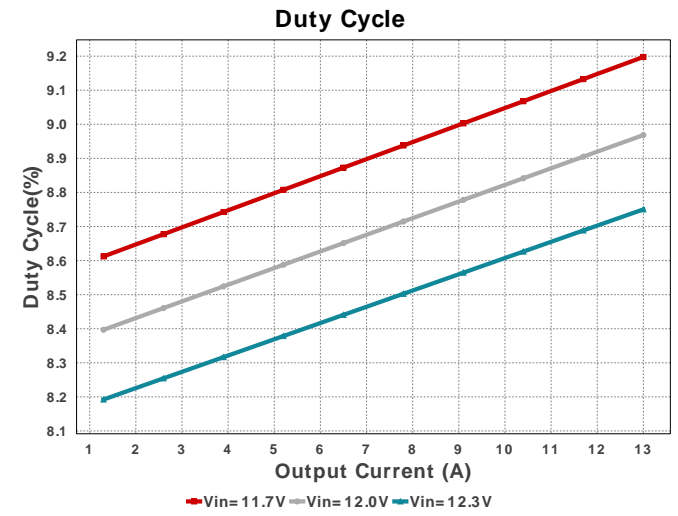
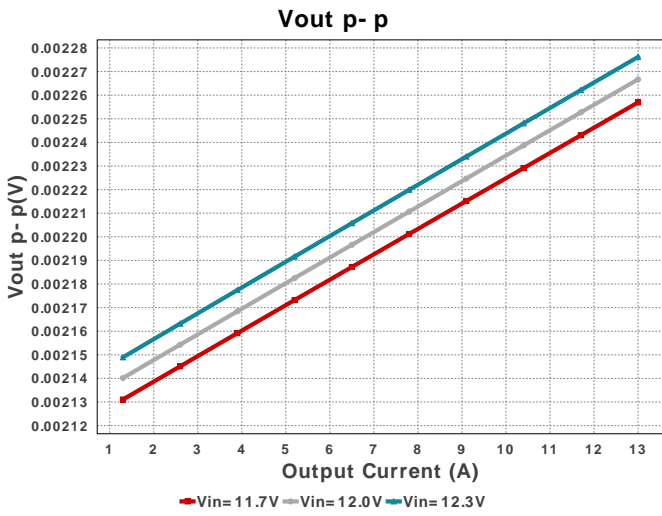
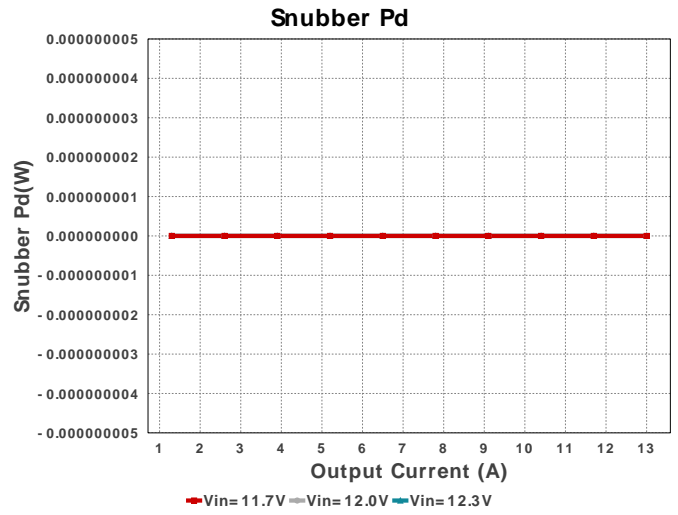
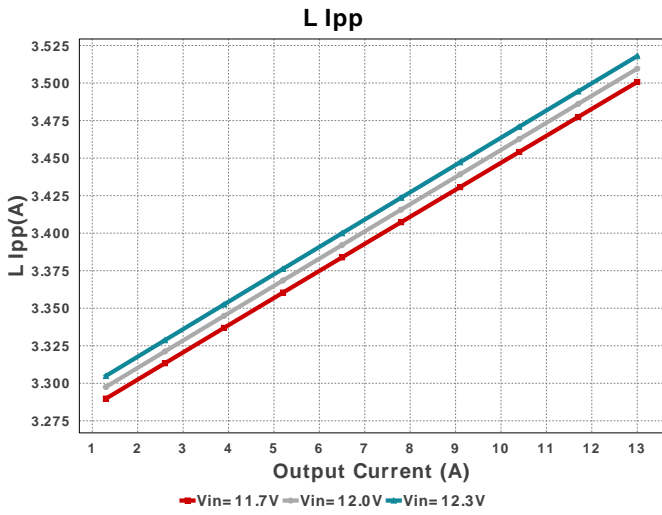
 Vout = 1.0V
 Iout = 13.0A

My Comments

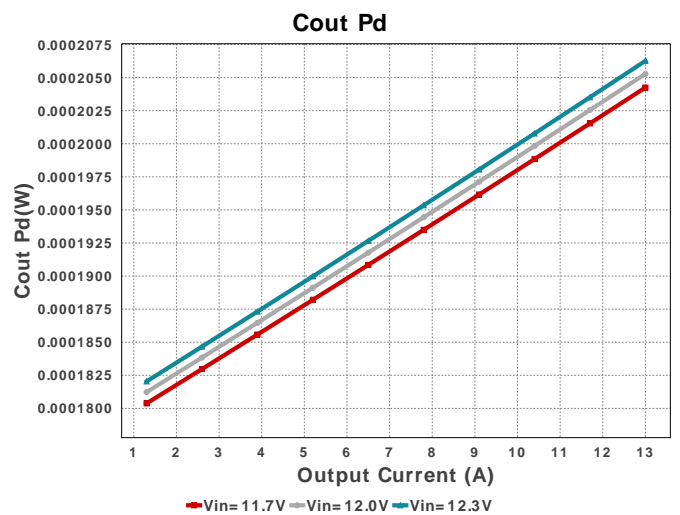
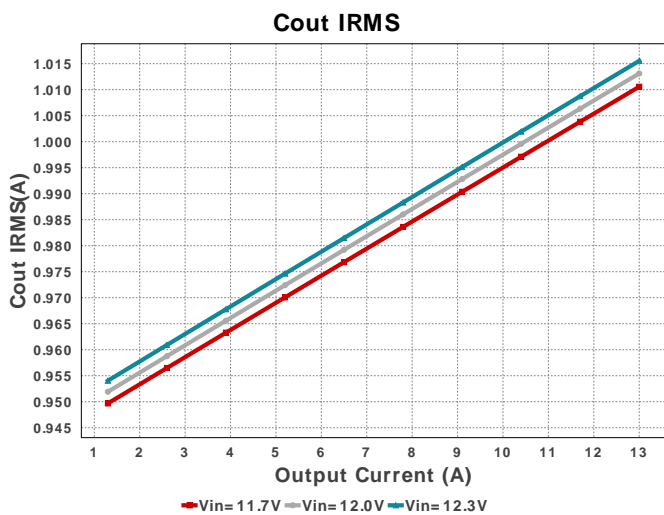
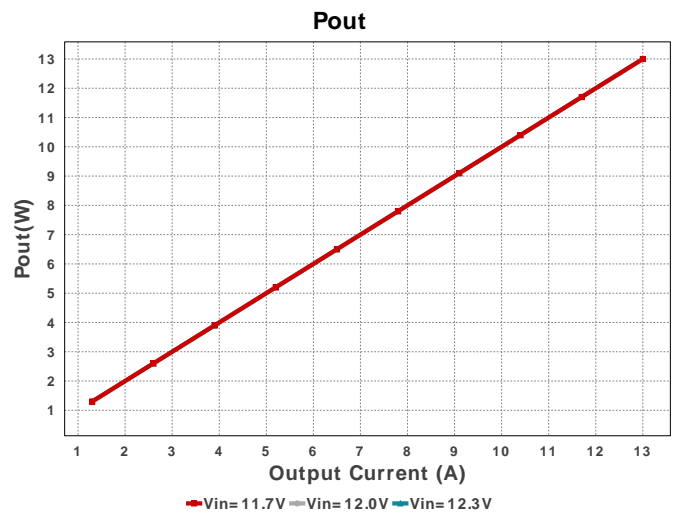
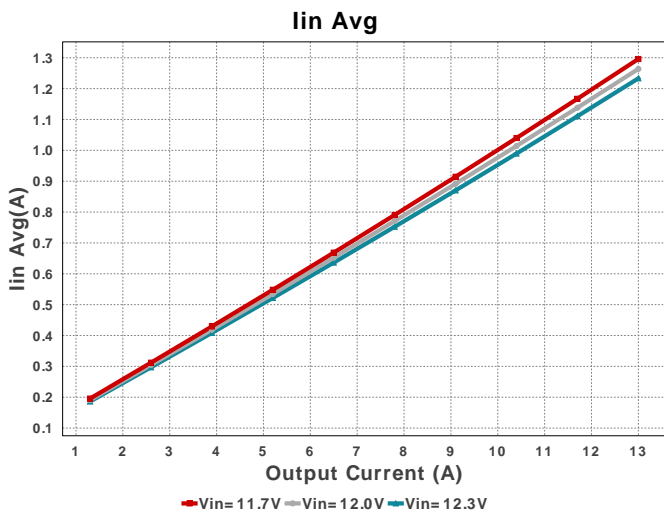
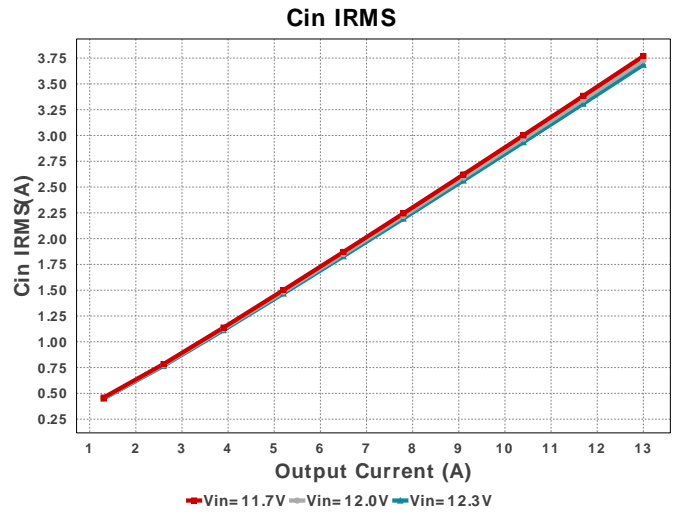
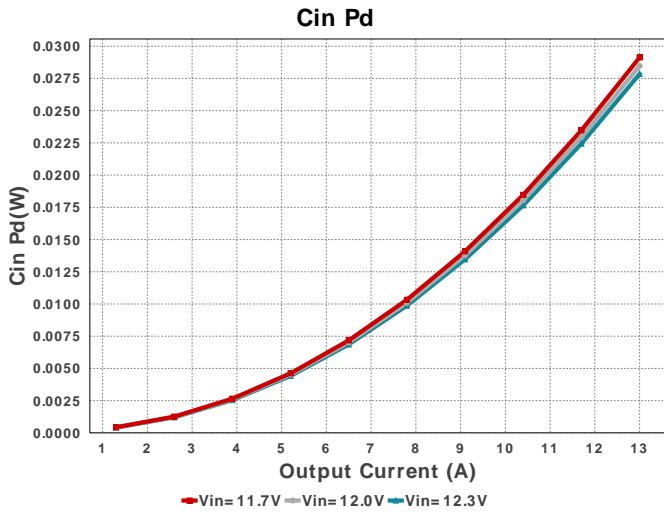
No comments

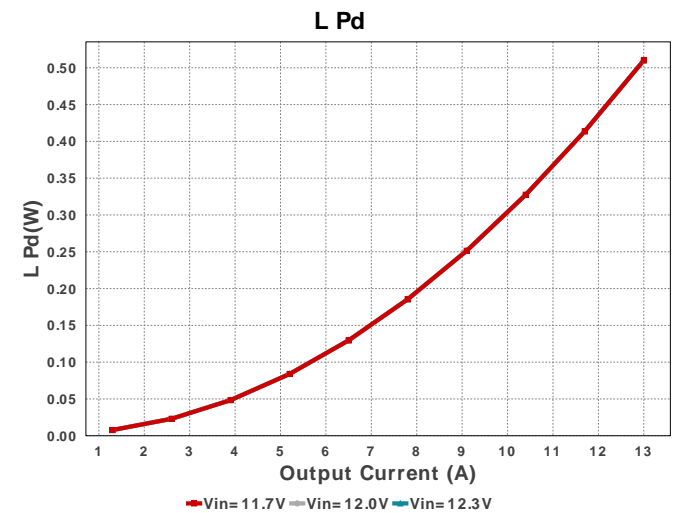
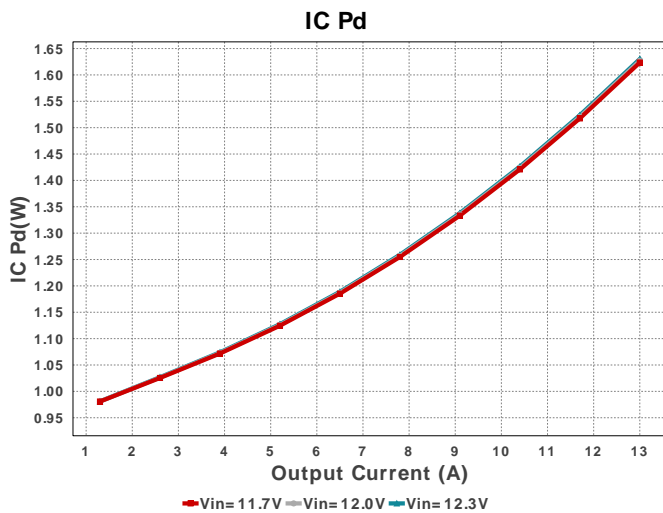
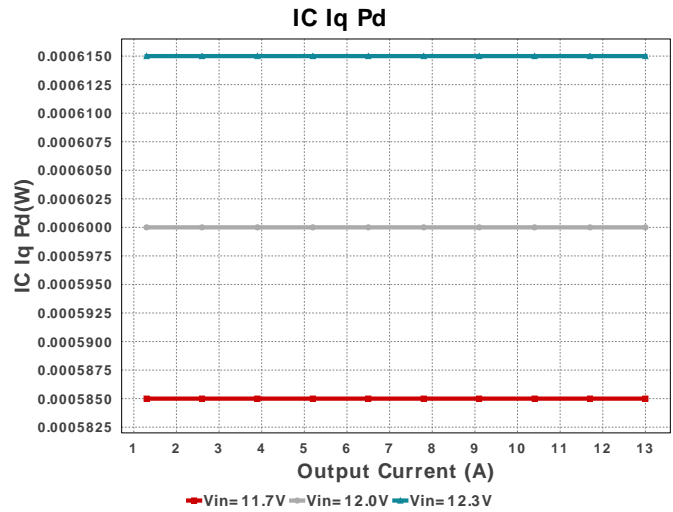
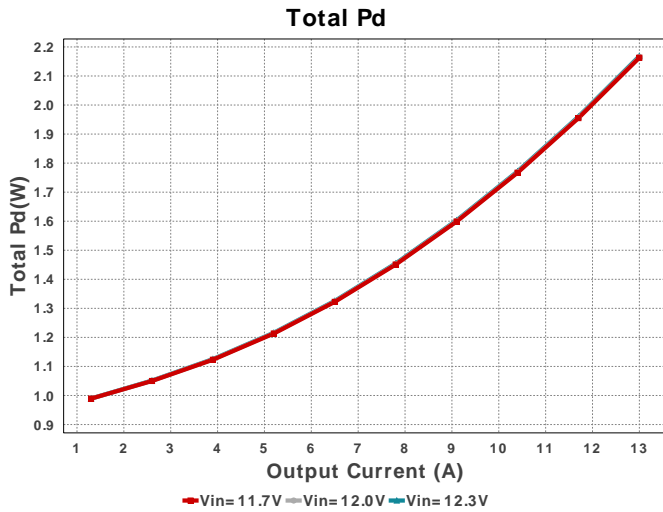
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cac	Samsung Electro-Mechanics	CL21C621JBCNNNC Series= C0G/NP0	Cap= 620.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	Cbst	TDK	CGA4J2C0G1H333J125AA Series= C0G/NP0	Cap= 33.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.10	0805 7 mm ²
3.	Cin	TDK	C2012X5R1V226M125AC Series= X5R	Cap= 22.0 uF ESR= 2.05 mOhm VDC= 35.0 V IRMS= 4.5559 A	1	\$0.38	0805 7 mm ²
4.	Cout	Taiyo Yuden	JMK316BJ107ML-T Series= X5R	Cap= 100.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	5	\$0.33	1206 11 mm ²
5.	Cr	Samsung Electro-Mechanics	CL21C822JBFNNNE Series= C0G/NP0	Cap= 8.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	0805 7 mm ²
6.	Creg	Panasonic	ECPU1C334MA5 Series= ECPU(A)	Cap= 330.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.16	1206 11 mm ²
7.	Csnub	Samsung Electro-Mechanics	CL21C621JBCNNNC Series= C0G/NP0	Cap= 620.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
8.	Cvdd	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	\$0.03	0805 7 mm ²
9.	L1	Coilcraft	XAL6030-561MEB	L= 560.0 nH DCR= 3.0 mOhm	1	\$0.65	XAL6030 72 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rbst	Vishay-Dale	CRCW04022R05FKED Series= CRCW..e3	Res= 2.05 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
11.	RenB	Yageo	RC0201FR-07105KL Series= ?	Res= 105.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm ²
12.	RenT	Yageo	RC0201FR-07205KL Series= ?	Res= 205.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm ²
13.	Renable	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rfbb	Stackpole Electronics Inc	RMCF0402FT10K0 Series= ?	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	Rfbt	Vishay-Dale	CRCW04026K65FKED Series= CRCW..e3	Res= 6.65 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	Rmode	Vishay-Dale	CRCW040240K2FKED Series= CRCW..e3	Res= 40.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rpgood	Yageo	RC0201FR-07105KL Series= ?	Res= 105.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm ²
18.	Rr	Yageo	RC0201FR-07162KL Series= ?	Res= 162.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm ²
19.	Rsnub	Vishay-Dale	CRCW04023R09FKED Series= CRCW..e3	Res= 3.09 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
20.	Rtrip	Vishay-Dale	CRCW0402113KFKED Series= CRCW..e3	Res= 113.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
21.	U1	Texas Instruments	TPS53353DQPR	Switcher	1	\$3.05	 DQP0022A 56 mm ²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	3.686 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.016 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.233 A	Current	Average input current
4.	L Ipp	3.518 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	25	General	Total Design BOM count
6.	FootPrint	263.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	500.0 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	13.0 W	General	Total output power
10.	Total BOM	\$6.17	General	Total BOM Cost
11.	Duty Cycle	8.75 %	Op Point	Duty cycle
12.	Efficiency	85.441 %	Op Point	Steady state efficiency
13.	IC Tj	74.342 degC	Op Point	IC junction temperature
14.	ICThetaJA	27.2 degC/W	Op Point	IC junction-to-ambient thermal resistance
15.	IOUT_OP	13.0 A	Op Point	Iout operating point
16.	VIN_OP	12.3 V	Op Point	Vin operating point
17.	Vout Actual	999.0 mV	Op Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	1.0 V	Op Point	Operational Output Voltage
19.	Vout Tolerance	1.815 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
20.	Vout p-p	2.276 mV	Op Point	Peak-to-peak output ripple voltage
21.	Cin Pd	27.848 mW	Power	Input capacitor power dissipation
22.	Cout Pd	206.265 μW	Power	Output capacitor power dissipation
23.	IC Iq Pd	615.0 μW	Power	IC Iq Pd
24.	IC Pd	1.63 W	Power	IC power dissipation
25.	L Pd	510.094 mW	Power	Inductor power dissipation
26.	Snubber Pd	46.9 mW	Power	Snubber Power Dissipation
27.	Total Pd	2.208 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	13.0	Maximum Output Current
2.	VinMax	12.3	Maximum input voltage
3.	VinMin	11.7	Minimum input voltage
4.	Vout	1.0	Output Voltage
5.	base_pn	TPS53353	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS53353** Product Folder : <http://www.ti.com/product/TPS53353> : contains the data sheet and other resources.

Important Notice and Disclaimer

TI provides technical and reliability data (including datasheets), design resources (including reference designs), application or other design advice, web tools, safety information, and other resources AS IS and with all faults, and disclaims all warranties. These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

Providing these resources does not expand or otherwise alter TI's applicable Terms of Sale or other applicable terms available either on ti.com or provided in conjunction with TI products.