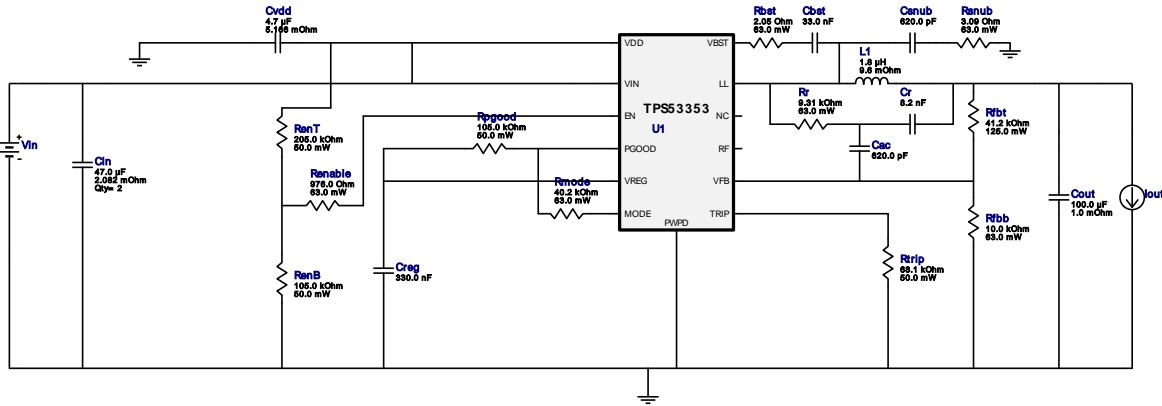


## WEBENCH® Design Report

 Design : TPS53353DQPR  
 TPS53353DQPR 11.7V-12.3V to 3.30V @ 8.0A

 Vout = 3.3V  
 Iout = 8.0A


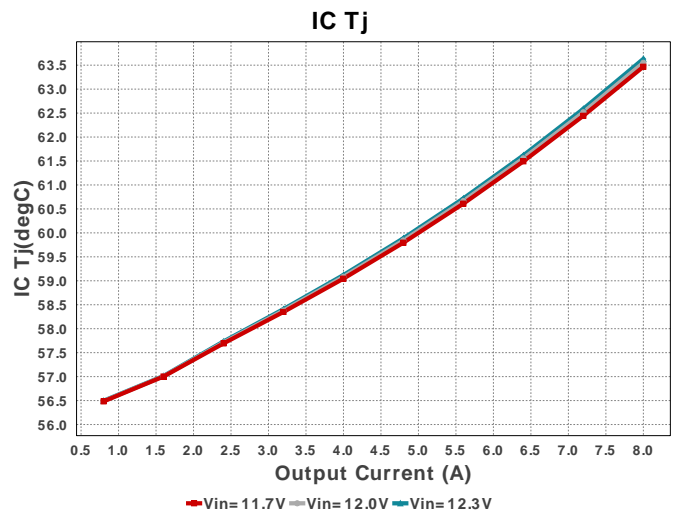
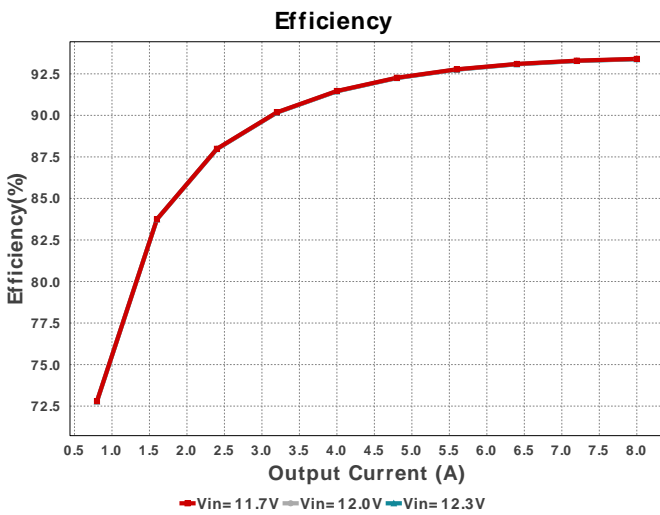
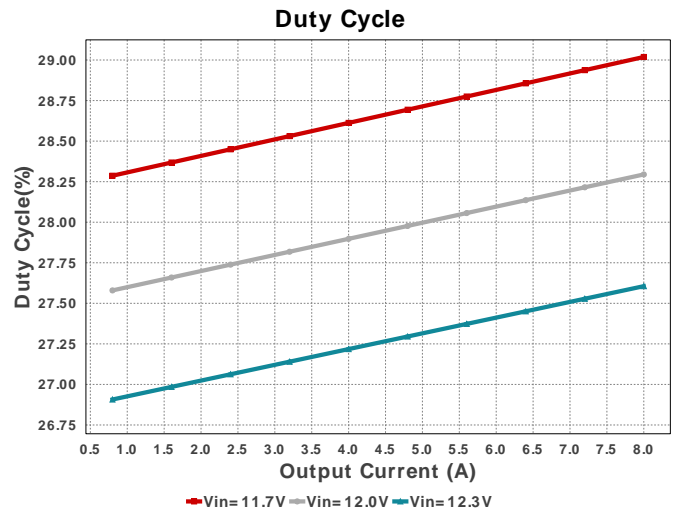
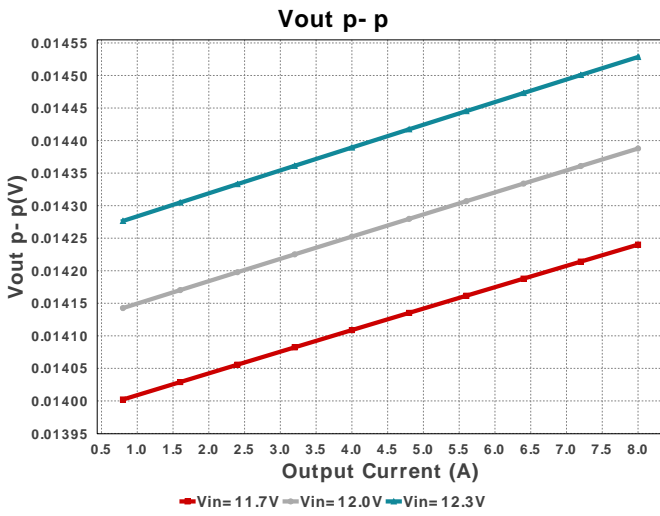
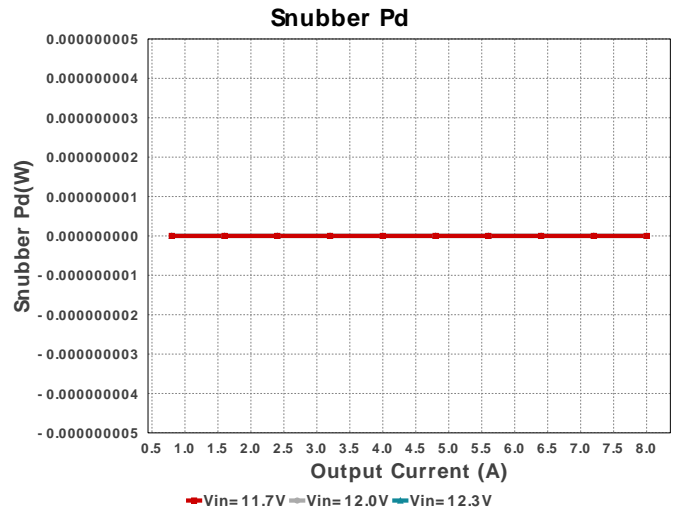
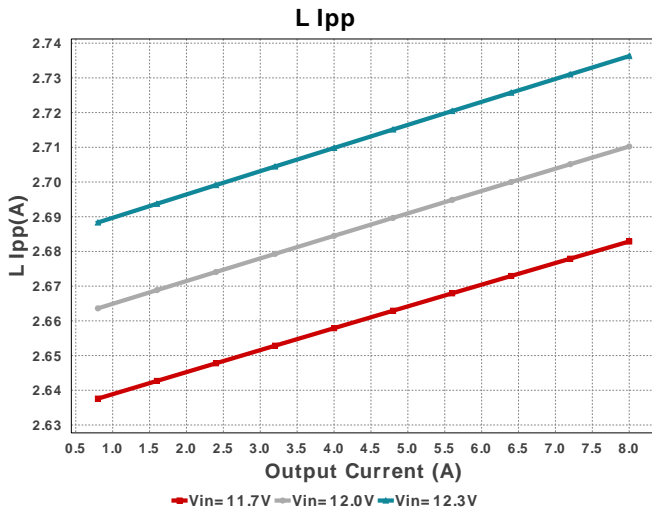
### My Comments

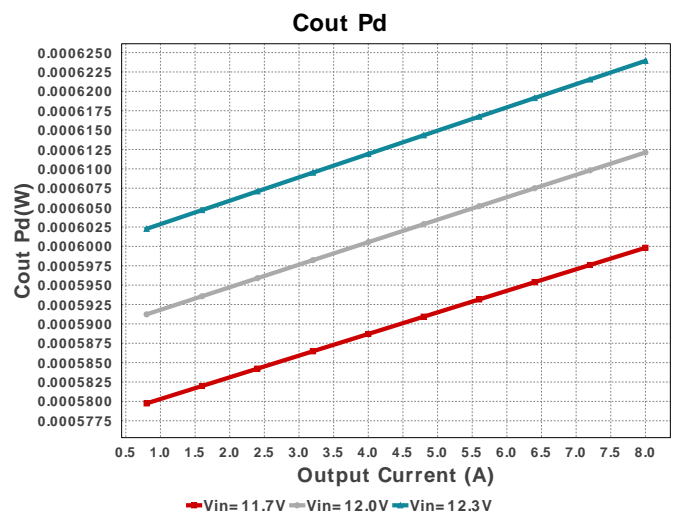
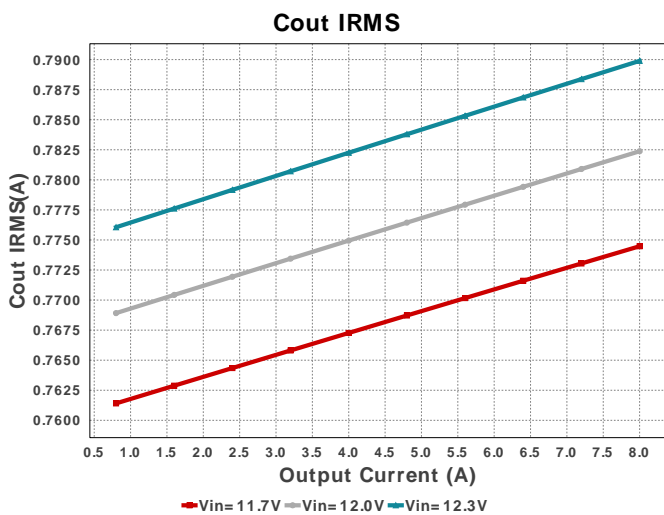
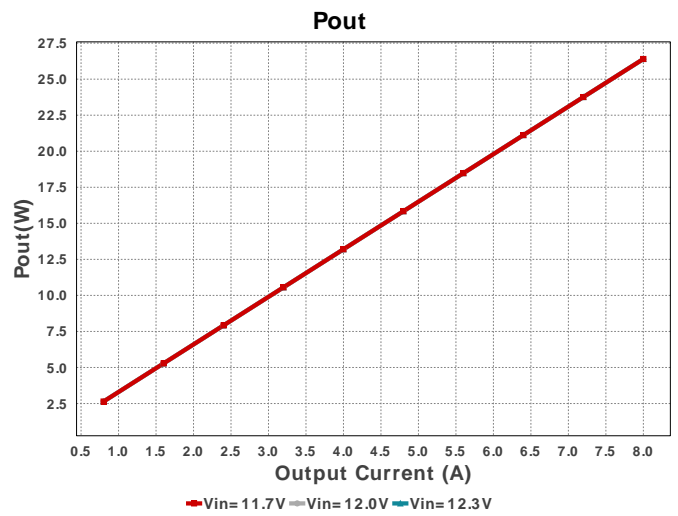
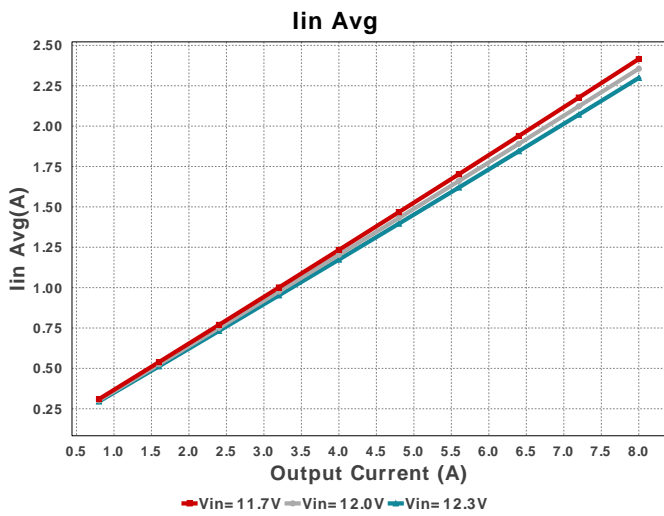
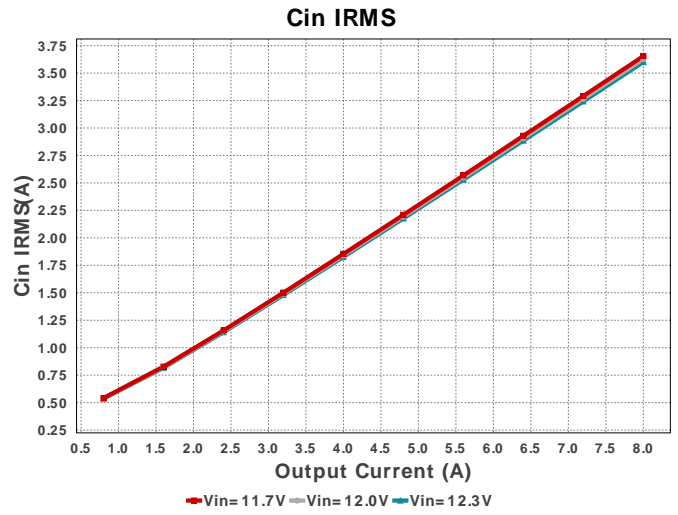
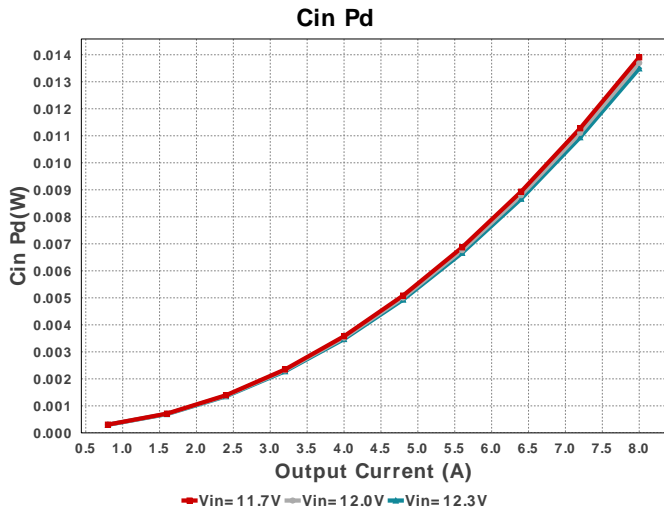
No comments

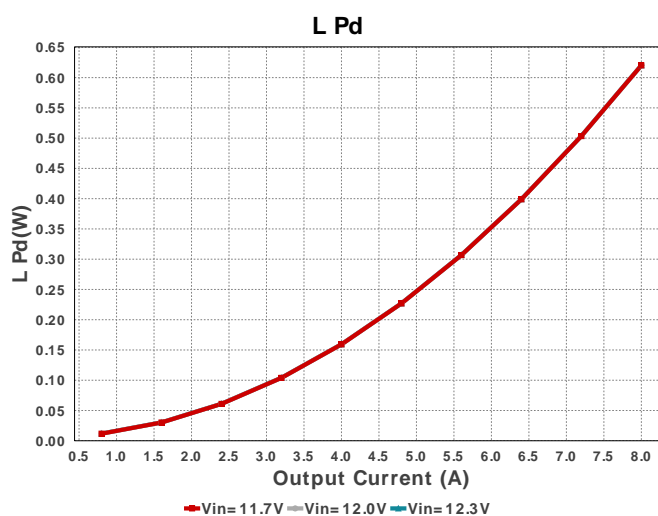
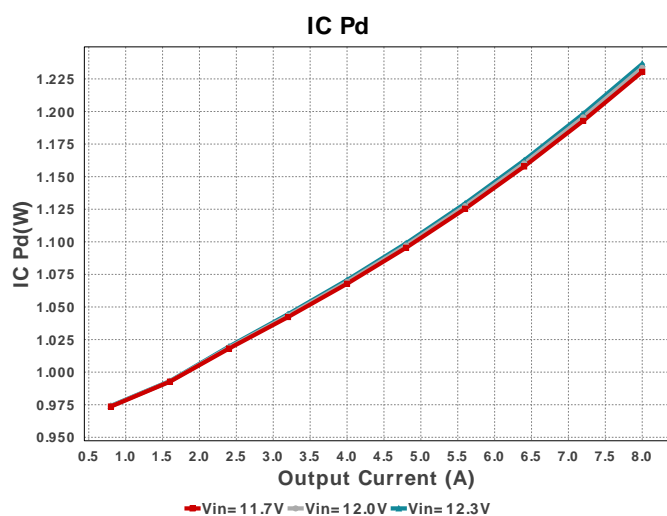
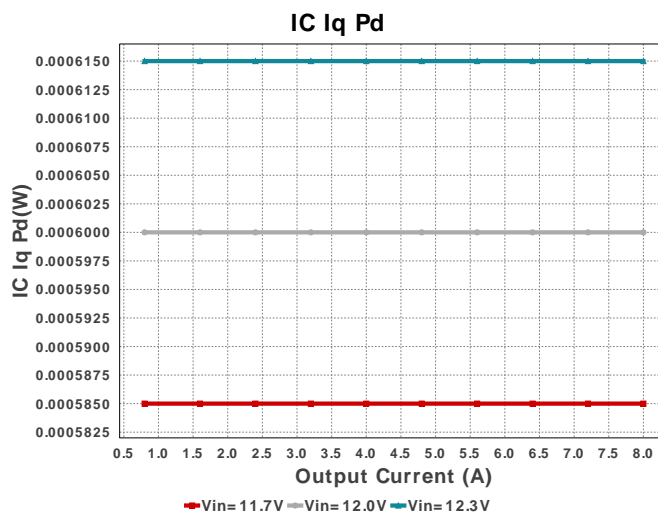
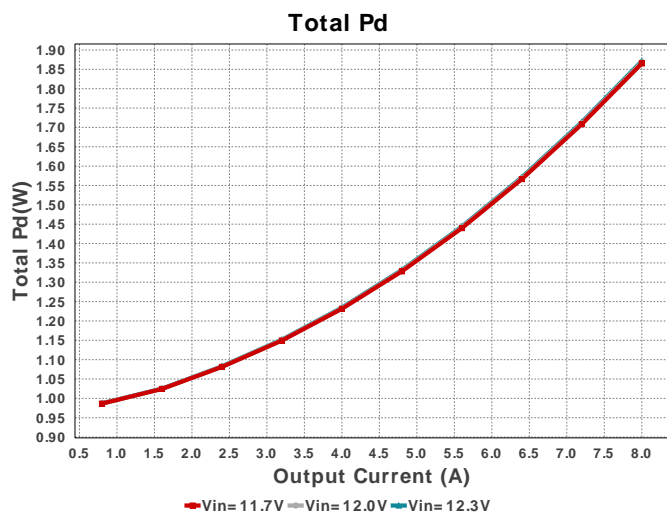
### Electrical BOM

#	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 <sup>2</sup>
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 <sup>2</sup>
3.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	2	\$0.44	1206 11 mm <sup>2</sup>
4.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	2	\$0.44	1206 11 mm <sup>2</sup>
5.	Cout	Taiyo Yuden	JMK316BJ107ML-T Series= X5R	Cap= 100.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.33	1206 11 mm <sup>2</sup>
6.	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 <sup>2</sup>
7.	Creg	Panasonic	EPCU1C334MA5 Series= EPCU(A)	Cap= 330.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.16	1206 11 mm <sup>2</sup>
8.	Csub	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 <sup>2</sup>
9.	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 <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	L1	Coilcraft	XAL6030-182MEB	L= 1.8 $\mu$ H DCR= 9.6 mOhm	1	\$0.65	 XAL6030 72 mm <sup>2</sup>
11.	Rbst	Vishay-Dale	CRCW04022R05FKED Series= CRCW..e3	Res= 2.05 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
12.	RenB	Yageo	RC0201FR-07105KL Series= ?	Res= 105.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
13.	RenT	Yageo	RC0201FR-07205KL Series= ?	Res= 205.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
14.	Renable	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
15.	Rfbb	Stackpole Electronics Inc	RMCF0402FT10K0 Series= ?	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
16.	Rfbt	Vishay-Dale	CRCW080541K2FKEA Series= CRCW..e3	Res= 41.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
17.	Rmode	Vishay-Dale	CRCW040240K2FKED Series= CRCW..e3	Res= 40.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
18.	Rpgood	Yageo	RC0201FR-07105KL Series= ?	Res= 105.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
19.	Rr	Vishay-Dale	CRCW04029K31FKED Series= CRCW..e3	Res= 9.31 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
20.	Rsnub	Vishay-Dale	CRCW04023R09FKED Series= CRCW..e3	Res= 3.09 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
21.	Rtrip	Yageo	RC0201FR-0768K1L Series= ?	Res= 68.1 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
22.	U1	Texas Instruments	TPS53353DQPR	Switcher	1	\$3.05	 DQP0022A 56 mm <sup>2</sup>







### Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	3.6 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	789.894 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.298 A	Current	Average input current
4.	L Ipp	2.736 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	24	General	Total Design BOM count
6.	FootPrint	260.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
7.	Frequency	500.0 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	26.4 W	General	Total output power
10.	Total BOM	\$6.23	General	Total BOM Cost
11.	Duty Cycle	27.606 %	Op Point	Duty cycle
12.	Efficiency	93.227 %	Op Point	Steady state efficiency
13.	IC Tj	63.632 degC	Op Point	IC junction temperature
14.	ICThetaJA	27.2 degC/W	Op Point	IC junction-to-ambient thermal resistance
15.	IOUT_OP	8.0 A	Op Point	Iout operating point
16.	VIN_OP	12.3 V	Op Point	Vin operating point
17.	Vout Actual	3.072 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	3.3 V	Op Point	Operational Output Voltage
19.	Vout Tolerance	2.642 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
20.	Vout p-p	14.528 mV	Op Point	Peak-to-peak output ripple voltage
21.	Cin Pd	13.494 mW	Power	Input capacitor power dissipation
22.	Cout Pd	623.932 μW	Power	Output capacitor power dissipation
23.	IC Iq Pd	615.0 μW	Power	IC Iq Pd
24.	IC Pd	1.236 W	Power	IC power dissipation
25.	L Pd	620.39 mW	Power	Inductor power dissipation
26.	Snubber Pd	46.9 mW	Power	Snubber Power Dissipation
27.	Total Pd	1.915 W	Power	Total Power Dissipation

### Design Inputs

#	Name	Value	Description
1.	Iout	8.0	Maximum Output Current
2.	VinMax	12.3	Maximum input voltage
3.	VinMin	11.7	Minimum input voltage
4.	Vout	3.3	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.

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