

# WEBENCH® Power Architect

## Project Report

Project : 5954436/3 : PA\_Project\_403 (modified from 402)

Created : 2019-05-06 03:50:17.266

Optimize project optFactor=4

### Project Summary

1. Total System Efficiency	90.993 %
2. Total System BOM Count	243.0
3. Total System Footprint	3.491 kmm2
4. Total System BOM Cost	\$0.00
5. Total System Power Dissipation	12.71 W

--> Launch WEBENCH Power Architect.

### My Comments

No comments

### Sequencer Flag Table

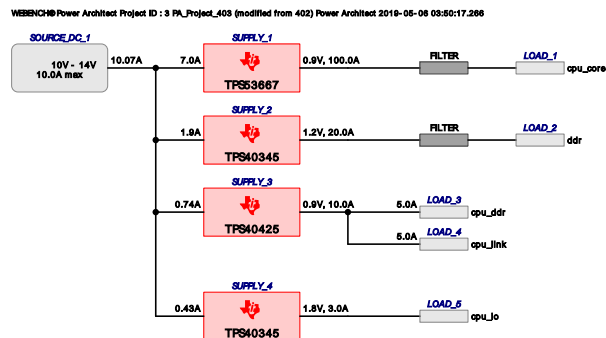
Supply	Sequencer Flag	Load	Load Name
SUPPLY_1	0	LOAD_1	cpu_core
SUPPLY_2	0	LOAD_2	ddr
SUPPLY_3	0	LOAD_3	cpu_ddr
SUPPLY_3	0	LOAD_4	cpu_link
SUPPLY_4	0	LOAD_5	cpu_io

### Power Supplies

#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	SUPPLY_1	TPS53667	Switcher : 6-Phase D-Cap+ Buck Controller with PMBus	0.9 V	100.0 A	91.6%	2007	\$32.22	8	23
2.	SUPPLY_2	TPS40345	Switcher : 3-V to 20-V Input Synchronous Buck Controller, 600kHz	1.2 V	20.0 A	90.1%	507	\$7.74	9	36
3.	SUPPLY_3	TPS40425	Switcher : 2-Phase PMBus Synch Buck Controller with AVS, Non-Smart Power	0.9 V	10.0 A	86.8%	1091	\$15.92	10	5
4.	SUPPLY_4	TPS40345	Switcher : 3-V to 20-V Input Synchronous Buck Controller, 600kHz	1.8 V	3.0 A	89%	258	\$2.13	11	15

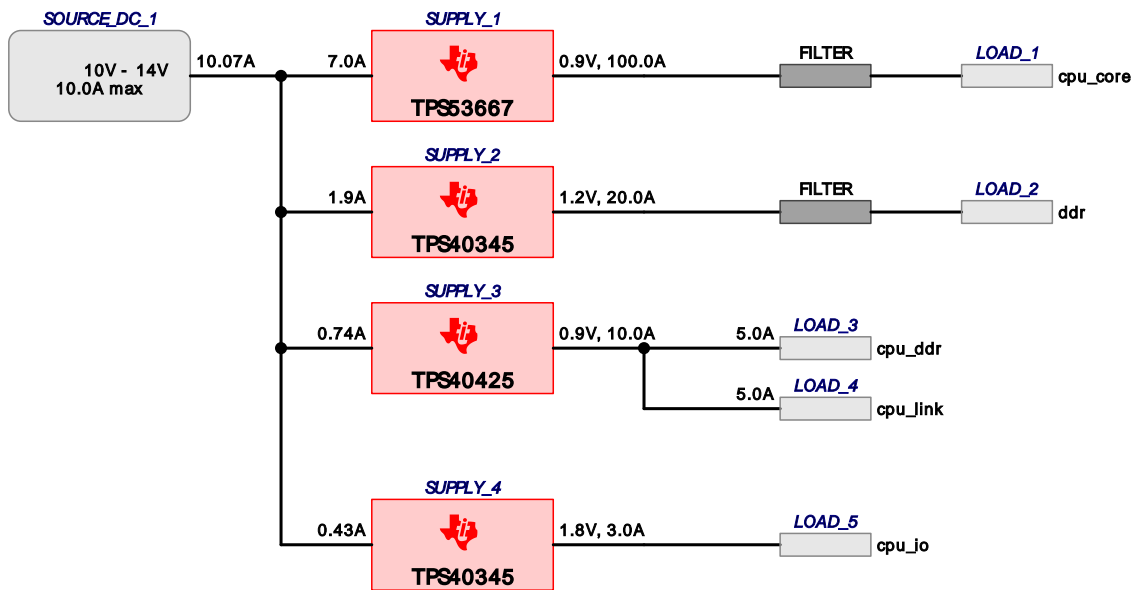
### Power Loads

#	Name	VLoad	ILoad	Description
1.	cpu_core	0.9 V	100 A	VoutRipple=2%, Filter required, SoftStart delay=50.0 µSec
2.	ddr	1.2 V	20 A	VoutRipple=5%, Filter required, SoftStart delay=50.0 µSec
3.	cpu_ddr	0.9 V	5 A	VoutRipple=2%, SoftStart delay=50.0 µSec
4.	cpu_link	0.9 V	5 A	VoutRipple=2%, SoftStart delay=50.0 µSec
5.	cpu_io	1.8 V	3 A	VoutRipple=10%, SoftStart delay=50.0 µSec



## Project Diagram

WEBENCH® Power Architect Project ID : 3 PA\_Project\_403 (modified from 402) Power Architect 2019-05-06 03:50:17.266



## Electrical Procurement BOM

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm <sup>2</sup> )
Panasonic	16SVPG270M	CAPSMT_62_C10	2	\$0.67	74
Wurth Elektronik	744309033	SLF1189	1	\$1.81	173
Kemet	C0603C102K3GACTU	0603	5	\$0.01	23
Kemet	C0603C104Z4VACTU	0603	5	\$0.01	23
Kemet	C0603C105Z8VACTU	0603	6	\$0.01	28
Kemet	C0603C123J3GACTU	0603	1	\$0.12	5
Kemet	C0603C475K9PACTU	0603	1	\$0.02	5
Kemet	C0805C105K4RACTU	0805	1	\$0.02	7
Kemet	C1210C107M9PACTU	1210	6	\$0.50	15
TDK	C1608X5R1V335K080AC	0603	1	\$0.09	5
TDK	C1608X6S1C475K080AC	0603	1	\$0.08	5
TDK	C2012C0G1H103K060AA	0805	1	\$0.06	7
TDK	C3216X5R1E336M160AC	1206_180	1	\$0.42	11
TDK	C3216X5R1V226M160AC	1206_180	16	\$0.38	44
TDK	C3216X6S0G107M160AC	1206_190	11	\$0.38	11
TDK	C3216X6S1V106K160AC	1206_180	2	\$0.18	11
TDK	C4532X5R1E226M250KA	1812_280	5	\$0.37	116
TDK	CGA3E2C0G1H332J080AA	0603	1	\$0.03	5
TDK	CGA4C2C0G1H272J060AA	0805	1	\$0.04	7
Samsung Electro-Mechanics	CL10C101JB8NNNC	0603	1	\$0.01	5
Samsung Electro-Mechanics	CL21C122JBFNNNE	0805	1	\$0.02	7
Samsung Electro-Mechanics	CL21C200JBANNNC	0805	1	\$0.01	7
Samsung Electro-Mechanics	CL21C221JBANNNC	0805	1	\$0.01	7
Samsung Electro-Mechanics	CL21C222JBFNNNE	0805	1	\$0.03	7
Samsung Electro-Mechanics	CL21C332JBFNNNE	0805	1	\$0.04	7
Vishay-Dale	CRCW0402100KFKED	0402	2	\$0.01	6
Vishay-Dale	CRCW040210R0FKED	0402	2	\$0.01	6
Vishay-Dale	CRCW0402150KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040216K9FKED	0402	2	\$0.01	6
Vishay-Dale	CRCW04021R00FKED	0402	19	\$0.01	57
Vishay-Dale	CRCW040220K0FKED	0402	3	\$0.01	9
Vishay-Dale	CRCW040221K5FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0402226RFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04022K15FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0402309RFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04024K64FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04024K99FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04025K90FKED	0402	2	\$0.01	6
Vishay-Dale	CRCW040260K4FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04027K68FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04029K31FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0805232RFKEA	0805	1	\$0.01	7
Vishay-Dale	CRCW08052K55FKEA	0805	1	\$0.01	7
Texas Instruments	CSD16327Q3	DQG0008A	2	\$0.36	37
Texas Instruments	CSD17579Q3A	DNH0008A	2	\$0.17	37
Texas Instruments	CSD95372AQ5M	DQP0012A	2	\$1.54	112
Texas Instruments	CSD95490Q5MC	DMC0012A	5	\$2.48	280
CUSTOM	CUSTOM	CUSTOM	1	\$0.00	0
Panasonic	EEFHX0E471R4	7343-20	5	\$0.67	59
Taiyo Yuden	EMK212BJ225KG-T	0805	5	\$0.03	34
Panasonic	ERJ-6ENF1213V	0805	1	\$0.01	7
Panasonic	ERJ-6ENF2432V	0805	2	\$0.01	14
Panasonic	ERJ-6ENF2491V	0805	1	\$0.01	7
Panasonic	ERJ-6ENF2741V	0805	1	\$0.01	7
Panasonic	ERJ-6ENF4221V	0805	1	\$0.01	7
Panasonic	ERJ-6ENF4321V	0805	1	\$0.01	7
MuRata	GRM033R71A222KA01D	0201	1	\$0.01	2
MuRata	GRM033R71C102KA01D	0201	3	\$0.01	6
MuRata	GRM155R61A334KE15D	0402	1	\$0.03	3
MuRata	GRM155R70J104KA01D	0402	2	\$0.01	6
MuRata	GRM155R71C104KA88D	0402	10	\$0.01	30
MuRata	GRM188R60J226MEA0D	0603	16	\$0.05	9
MuRata	GRM188R61E105KA12D	0603	1	\$0.02	5
MuRata	GRM188R61E224KA88D	0603	2	\$0.03	9
MuRata	GRM216R71E102KA01D	0805	11	\$0.01	74
MuRata	GRM216R71E332KA01D	0805	7	\$0.01	47
Taiyo Yuden	JMK316BJ107ML-T	1206	1	\$0.25	11
Taiyo Yuden	LMK212B7225KG-T	0805	2	\$0.03	14
Coilcraft	MLC1565-372MLB	MLC1565	2	\$1.05	486
Diodes Inc.	MMBT3904T	SOT-523	2	\$0.06	14
Yageo	RC0201FR-0710KL	0201	10	\$0.01	21
Yageo	RC0201FR-0715K4L	0201	2	\$0.01	4
Yageo	RC0201FR-0723K7L	0201	1	\$0.01	2

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm <sup>2</sup> )
Yageo	RC0201FR-07249KL	0201	5	\$0.01	10
Yageo	RC0201FR-0736K5L	0201	1	\$0.01	2
Yageo	RC0201FR-0768K1L	0201	1	\$0.01	2
Yageo	RC0603FR-0724KL	0603	1	\$0.01	5
Coilcraft	SLC1175-301MEB	SLC1175	5	\$0.48	627
Coilcraft	SLC7649S-151KLB	SLC7649S	1	\$0.47	88
Taiyo Yuden	TMK212BJ105KG-T	0805	3	\$0.03	20
Texas Instruments	TPS40345DRCR	DRC0010J	2	\$0.75	32
Texas Instruments	TPS40425RHAR	RHA0040B	1	\$3.25	66
Texas Instruments	TPS53667RTAR	RTA0040B	1	\$4.25	64
Taiyo Yuden	UMK105CG271JV-F	0402	1	\$0.01	3
TDK	VLP8040T-3R3N	VLP8040	1	\$0.22	113
<b>Total</b>			242	\$56.49	3126.2

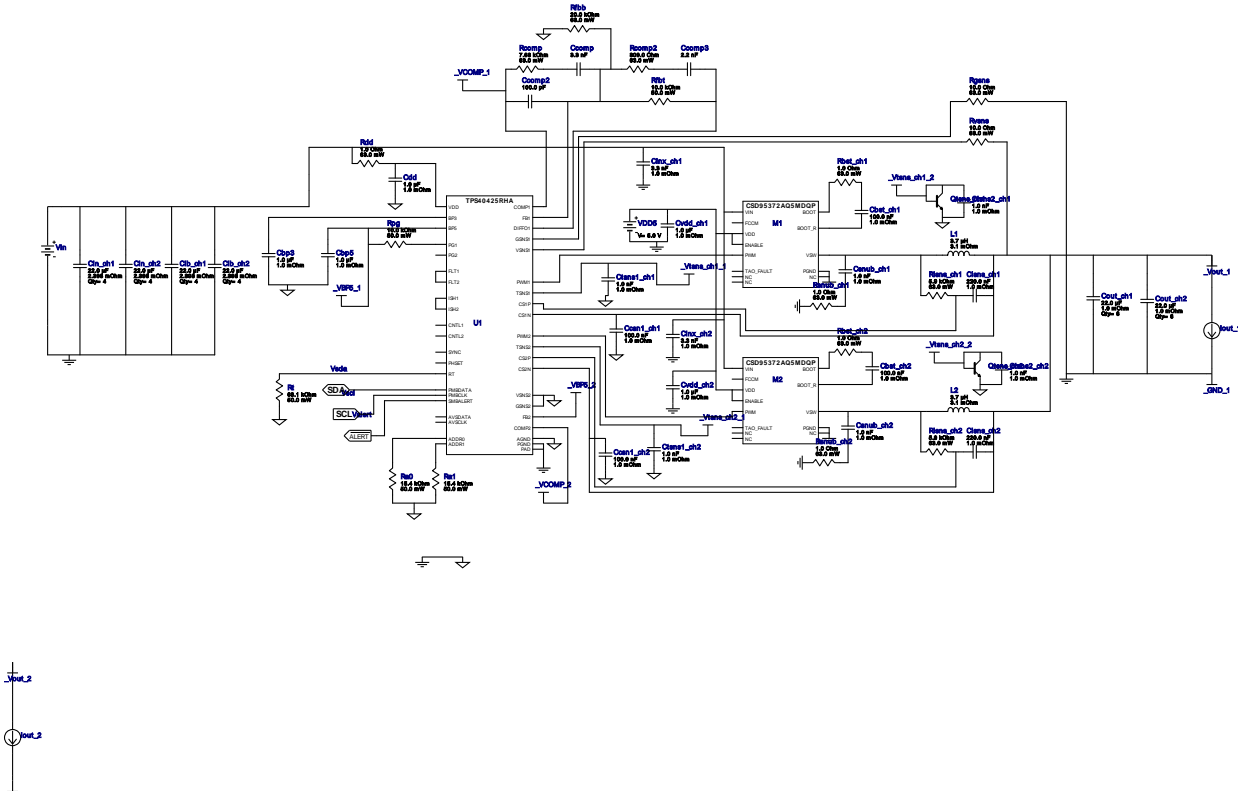


Vout = 0.9V  
Iout = 10.0A

Device = TPS40425RHAR  
Topology = Buck  
Created = 2019-05-06 03:50:11.066  
BOM Cost = \$15.92  
BOM Count = 78  
Total Pd = 1.37W

















## WEBENCH® Design Report

















Design : TPS40425RHAR  
TPS40425RHAR 10V-14V to .90V @ 10A

















## Electrical BOM

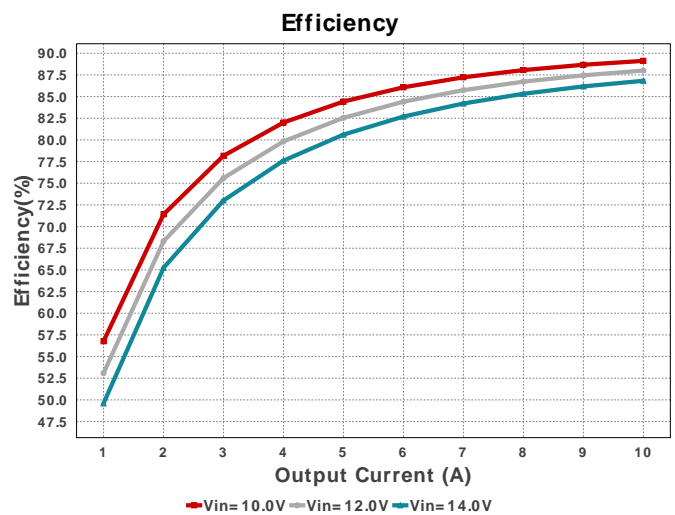
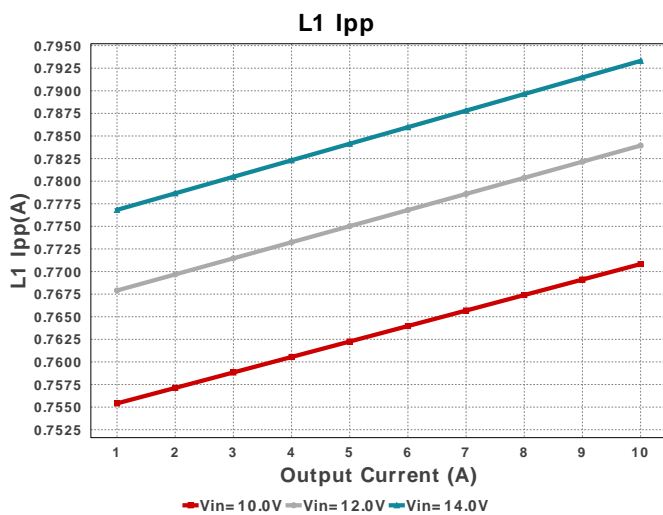
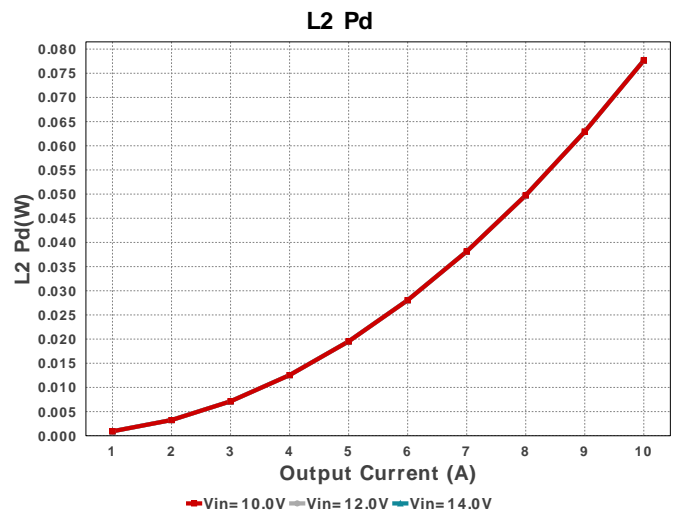
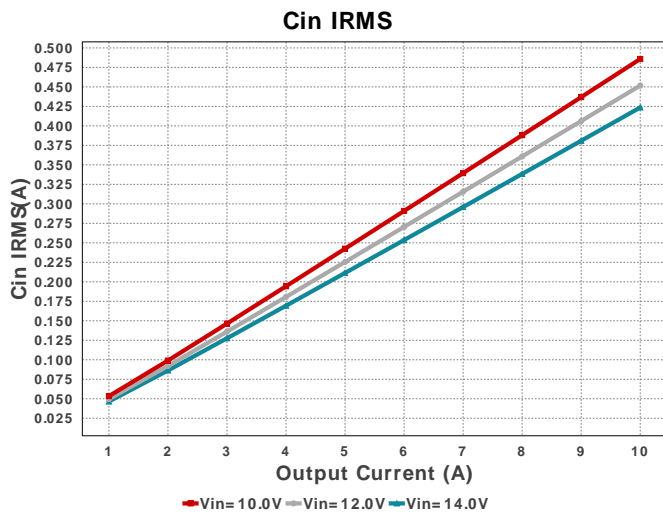
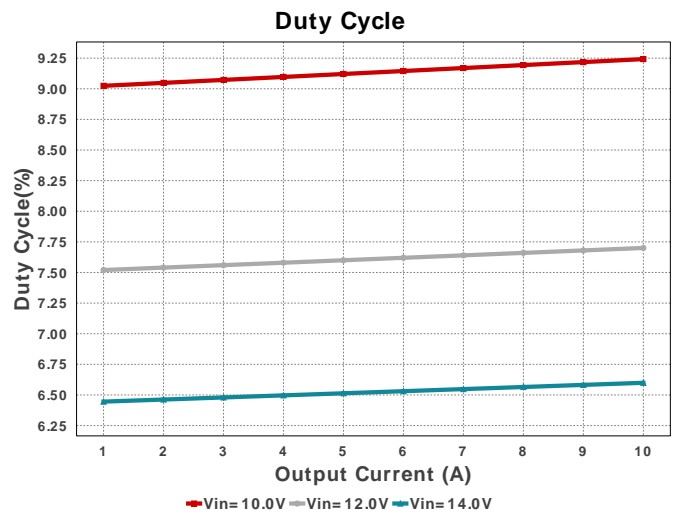
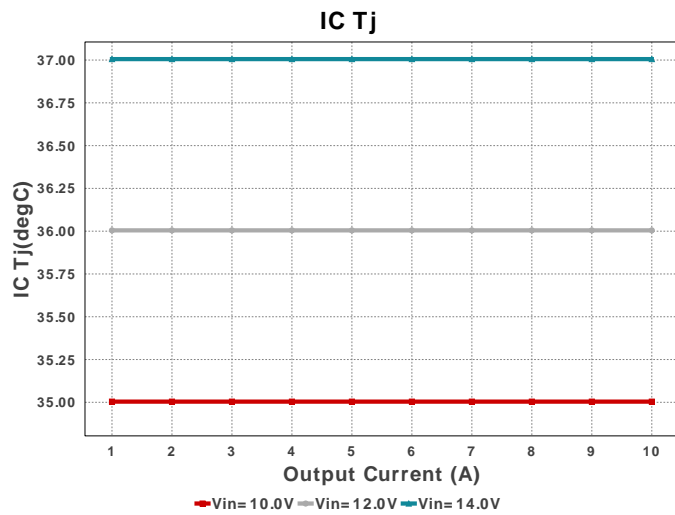
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbp3	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
2.	Cbp5	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
3.	Cbst_ch1	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
4.	Cbst_ch2	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
5.	Ccomp	TDK	CGA3E2C0G1H332J080AA Series= C0G/NP0	Cap= 3.3 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.03	0603 5 mm <sup>2</sup>
6.	Ccomp2	Samsung Electro-Mechanics	CL10C101JB8NNNC Series= C0G/NP0	Cap= 100.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>

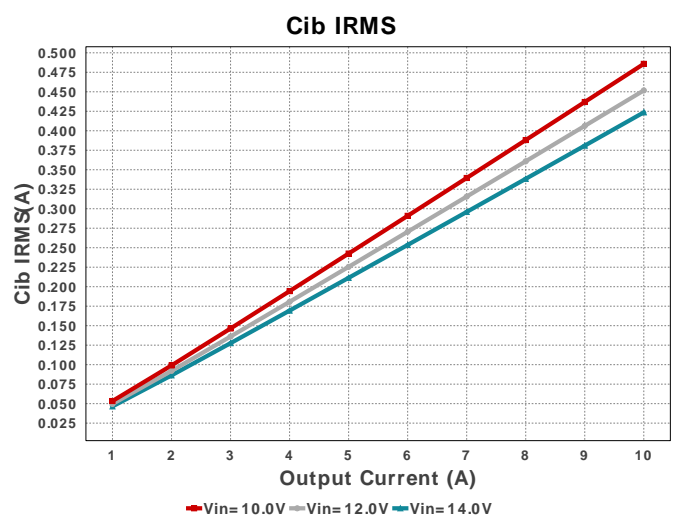
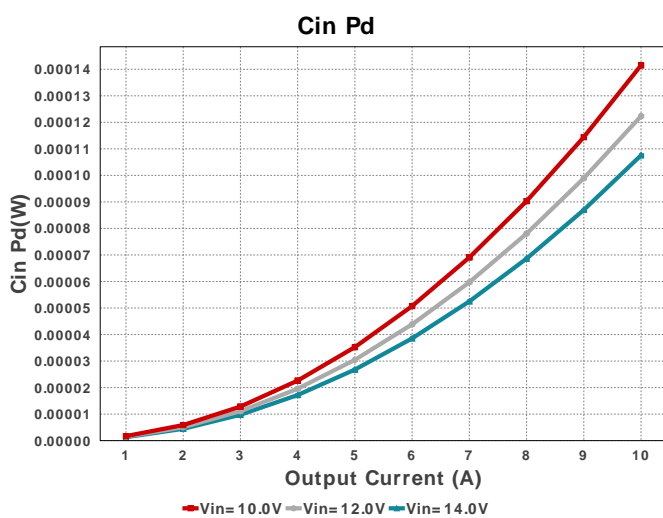
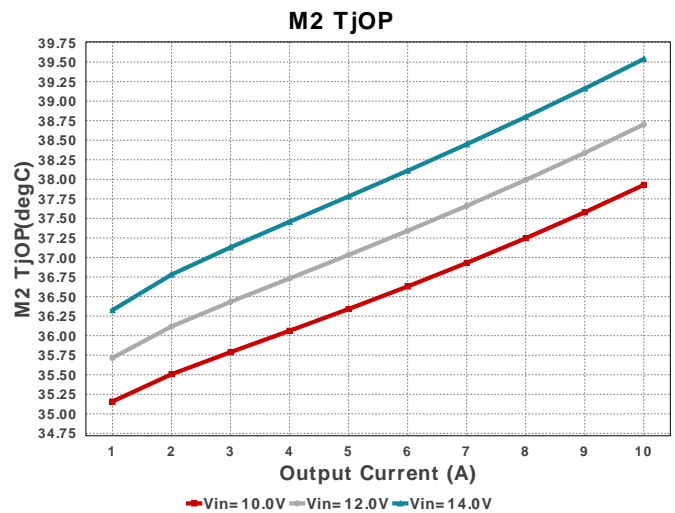
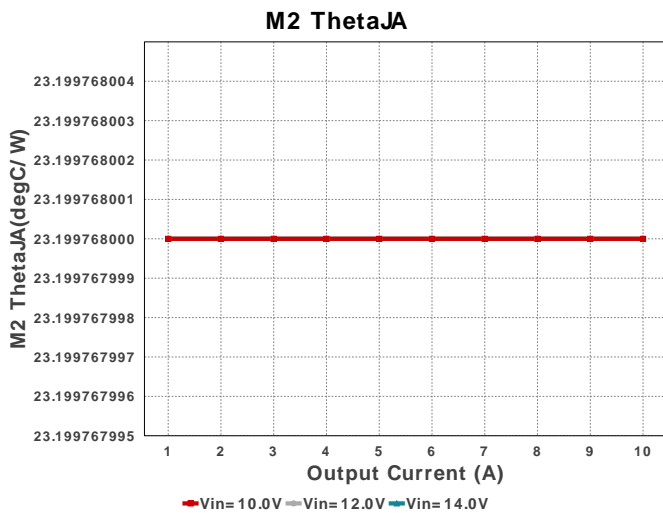
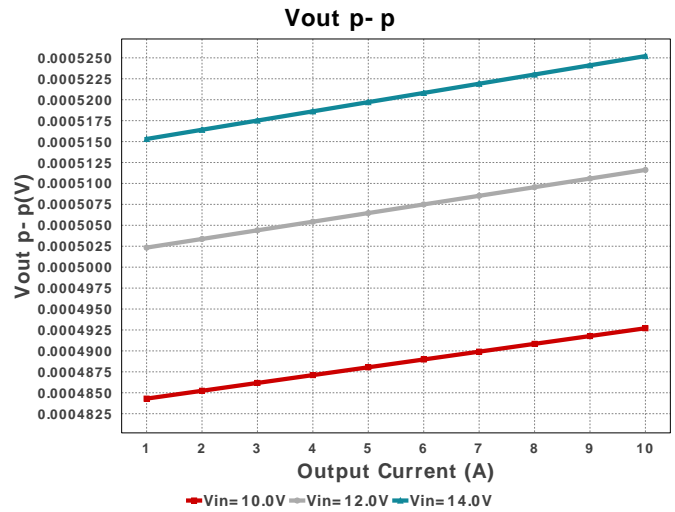
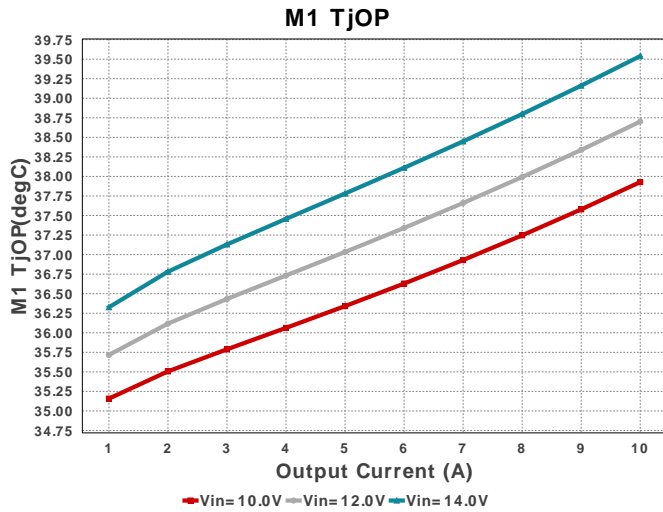
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	Ccomp3	Samsung Electro-Mechanics	CL21C222JBFNNNE Series= C0G/NP0	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
8.	Ccsn1_ch1	MuRata	GRM155R70J104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
9.	Ccsn1_ch2	MuRata	GRM155R70J104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
10.	Cdd	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
11.	Cib_ch1	TDK	C3216X5R1V226M160AC Series= X5R	Cap= 22.0 uF ESR= 2.398 mOhm VDC= 35.0 V IRMS= 4.6851 A	4	\$0.38	 1206_180 11 mm <sup>2</sup>
12.	Cib_ch2	TDK	C3216X5R1V226M160AC Series= X5R	Cap= 22.0 uF ESR= 2.398 mOhm VDC= 35.0 V IRMS= 4.6851 A	4	\$0.38	 1206_180 11 mm <sup>2</sup>
13.	Cin_ch1	TDK	C3216X5R1V226M160AC Series= X5R	Cap= 22.0 uF ESR= 2.398 mOhm VDC= 35.0 V IRMS= 4.6851 A	4	\$0.38	 1206_180 11 mm <sup>2</sup>
14.	Cin_ch2	TDK	C3216X5R1V226M160AC Series= X5R	Cap= 22.0 uF ESR= 2.398 mOhm VDC= 35.0 V IRMS= 4.6851 A	4	\$0.38	 1206_180 11 mm <sup>2</sup>
15.	Cinx_ch1	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
16.	Cinx_ch2	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
17.	Cisns_ch1	MuRata	GRM188R61E224KA88D Series= X5R	Cap= 220.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.03	 0603 5 mm <sup>2</sup>
18.	Cisns_ch2	MuRata	GRM188R61E224KA88D Series= X5R	Cap= 220.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.03	 0603 5 mm <sup>2</sup>
19.	Cout_ch1	MuRata	GRM188R60J226MEA0D Series= X5R	Cap= 22.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 6.0 A	8	\$0.05	 0603 5 mm <sup>2</sup>
20.	Cout_ch2	MuRata	GRM188R60J226MEA0D Series= X5R	Cap= 22.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 6.0 A	8	\$0.05	 0603 5 mm <sup>2</sup>
21.	Csub_ch1	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
22.	Csub_ch2	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>

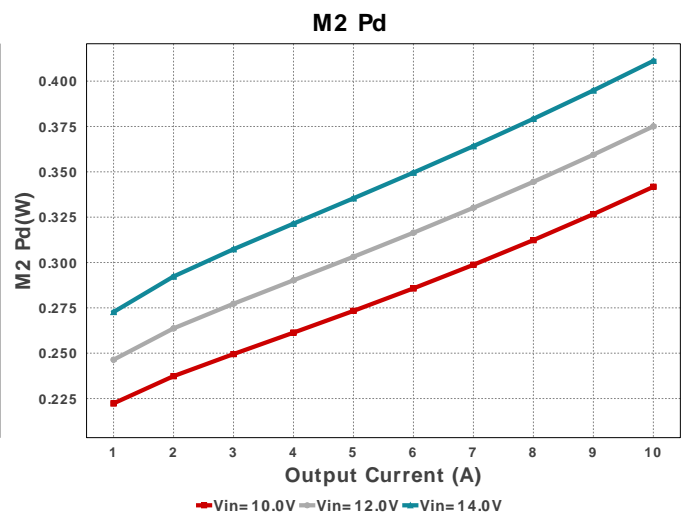
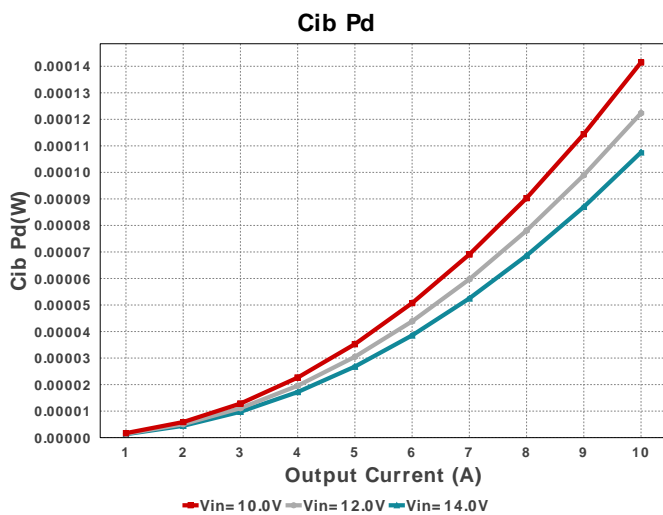
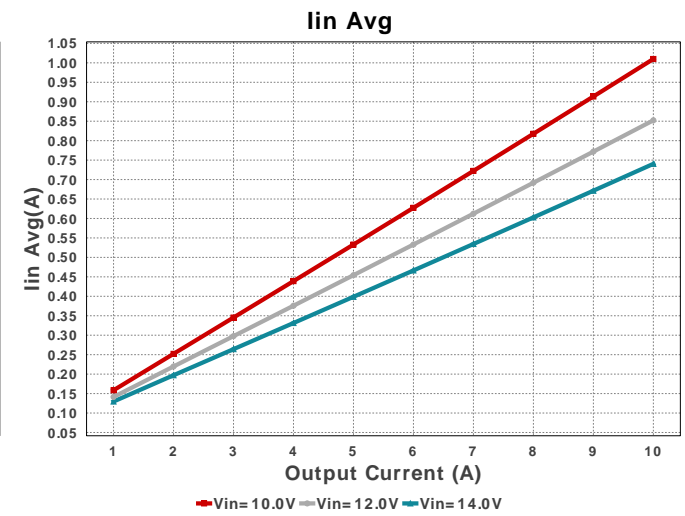
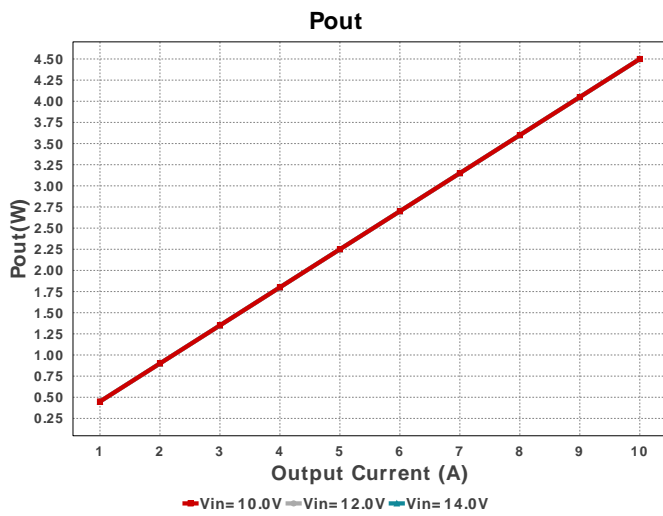
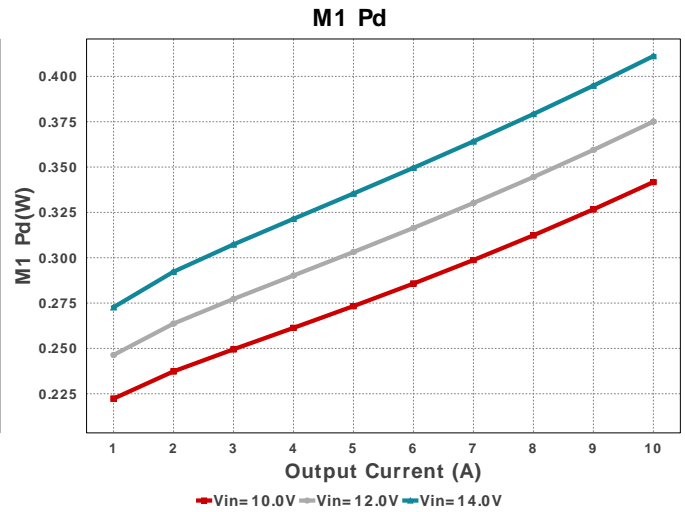
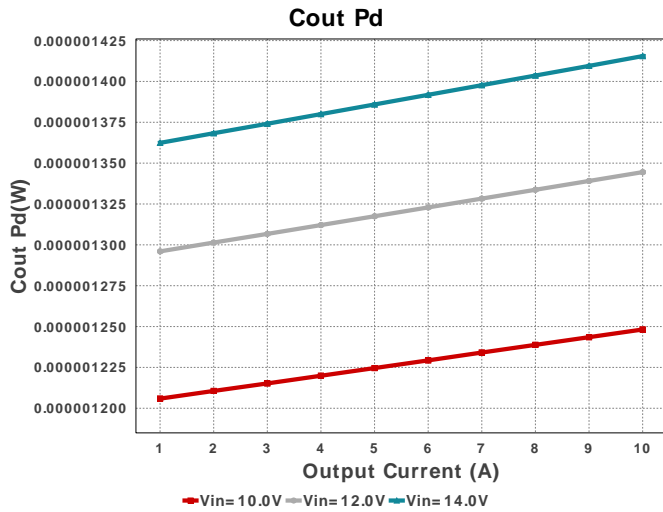
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
23.	Ctsns1_ch1	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
24.	Ctsns1_ch2	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
25.	Ctsns2_ch1	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
26.	Ctsns2_ch2	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
27.	Cvdd_ch1	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
28.	Cvdd_ch2	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
29.	L1	Coilcraft	MLC1565-372MLB	L= 3.7 uH DCR= 3.1 mOhm	1	\$1.05	 MLC1565 243 mm <sup>2</sup>
30.	L2	Coilcraft	MLC1565-372MLB	L= 3.7 uH DCR= 3.1 mOhm	1	\$1.05	 MLC1565 243 mm <sup>2</sup>
31.	M1	Texas Instruments	CSD95372AQ5M	PowerStage	1	\$1.54	 DQP0012A 56 mm <sup>2</sup>
32.	M2	Texas Instruments	CSD95372AQ5M	PowerStage	1	\$1.54	 DQP0012A 56 mm <sup>2</sup>
33.	Qtsns_ch1	Diodes Inc.	MMBT3904T	Bipolar Transistor	1	\$0.06	 SOT-523 7 mm <sup>2</sup>
34.	Qtsns_ch2	Diodes Inc.	MMBT3904T	Bipolar Transistor	1	\$0.06	 SOT-523 7 mm <sup>2</sup>
35.	Ra0	Yageo	RC0201FR-0715K4L Series= ?	Res= 15400.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
36.	Ra1	Yageo	RC0201FR-0715K4L Series= ?	Res= 15400.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
37.	Rbst_ch1	Vishay-Dale	CRCW04021R00FKED Series= CRCW...e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
38.	Rbst_ch2	Vishay-Dale	CRCW04021R00FKED Series= CRCW...e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>

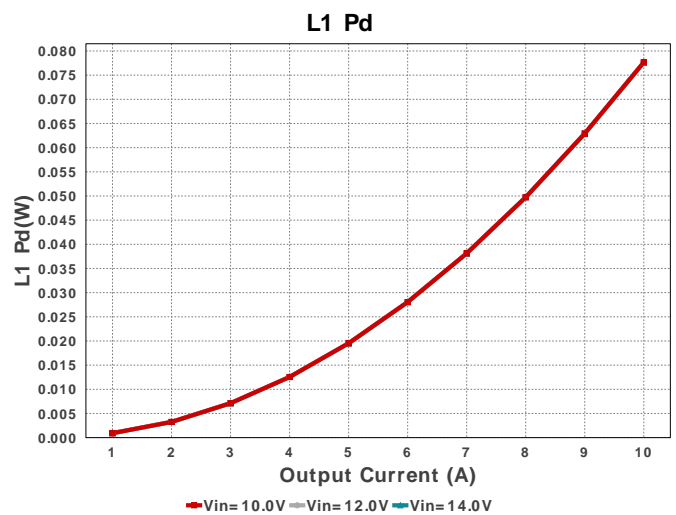
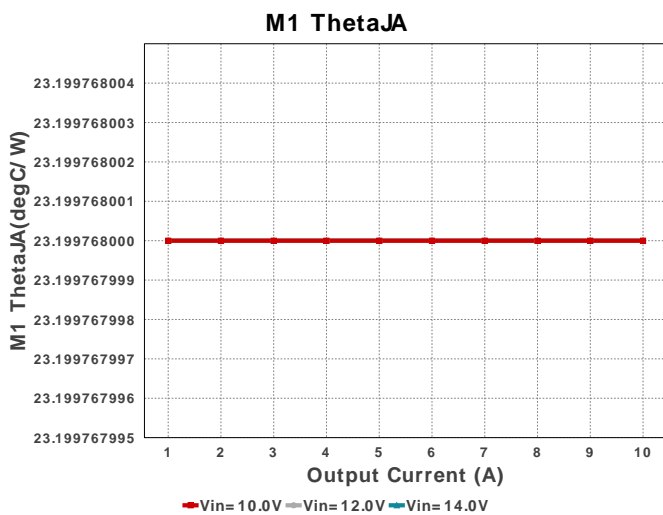
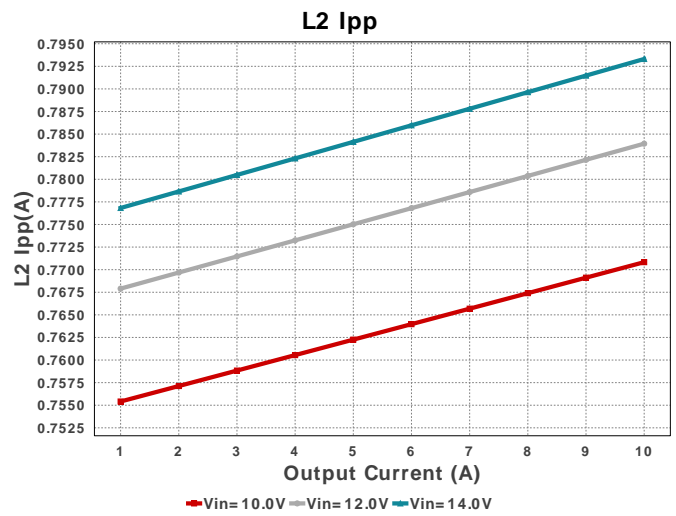
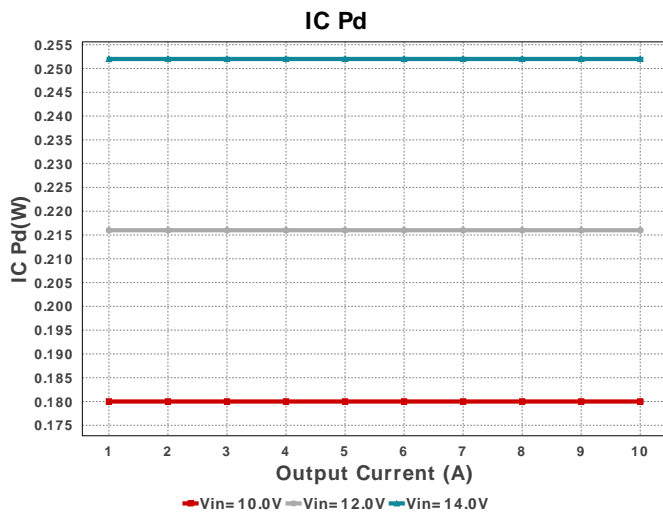
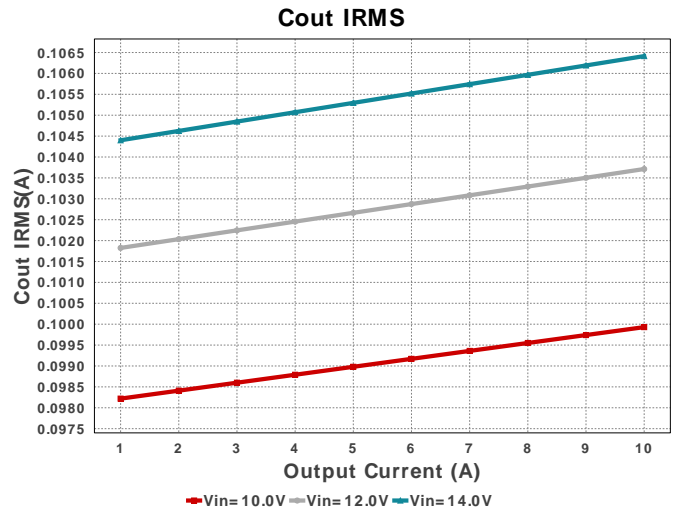
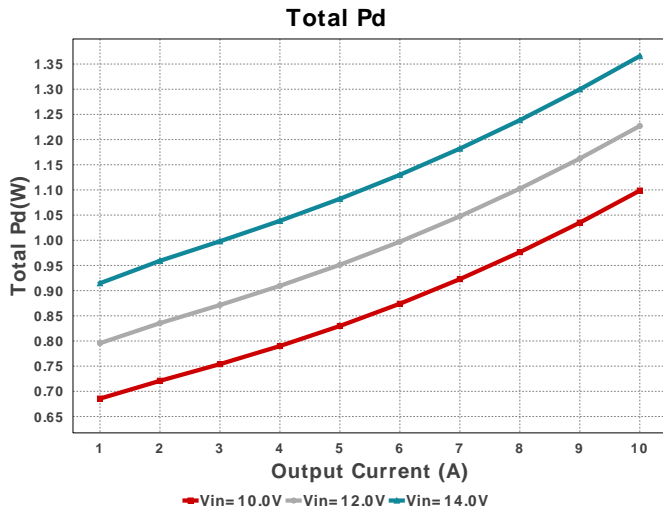
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
39.	Rcomp	Vishay-Dale	CRCW04027K68FKED Series= CRCW..e3	Res= 7680.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
40.	Rcomp2	Vishay-Dale	CRCW0402309RFKED Series= CRCW..e3	Res= 309.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
41.	Rdd	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
42.	Rfbb	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
43.	Rfbt	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm²
44.	Rgsns	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
45.	Risns_ch1	Vishay-Dale	CRCW04025K90FKED Series= CRCW..e3	Res= 5900.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
46.	Risns_ch2	Vishay-Dale	CRCW04025K90FKED Series= CRCW..e3	Res= 5900.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
47.	Rpg	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm²
48.	Rsnub_ch1	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
49.	Rsnub_ch2	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
50.	Rt	Yageo	RC0201FR-0768K1L Series= ?	Res= 68100.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm²
51.	Rvsns	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
52.	U1	Texas Instruments	TPS40425RHAR	Switcher	1	\$3.25	 RHA0040B 66 mm²

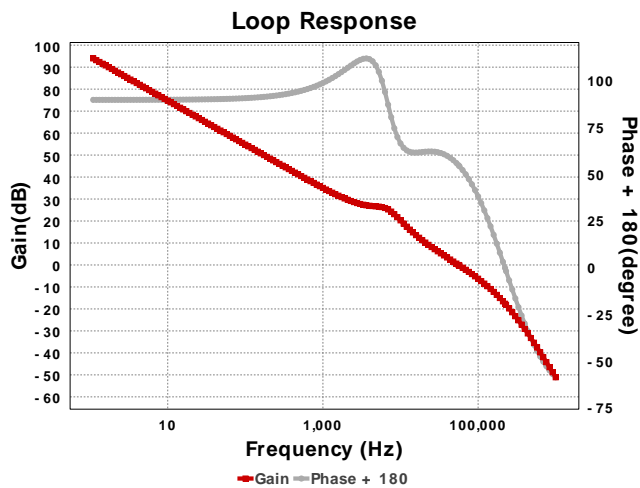












## Operating Values

#	Name	Value	Category	Description
1.	Cib IRMS	423.605 mA	Capacitor	Input capacitor RMS ripple current
2.	Cib Pd	107.57 $\mu$ W	Capacitor	Input capacitor power dissipation
3.	Cin IRMS	423.605 mA	Capacitor	Input capacitor RMS ripple current
4.	Cin Pd	107.57 $\mu$ W	Capacitor	Input capacitor power dissipation
5.	Cout IRMS	106.414 mA	Capacitor	Output capacitor RMS ripple current
6.	Cout Pd	1.416 $\mu$ W	Capacitor	Output capacitor power dissipation
7.	IC Pd	252.0 mW	IC	IC power dissipation
8.	IC Tj	37.006 degC	IC	IC junction temperature
9.	ICThetaJA	27.8 degC/W	IC	IC junction-to-ambient thermal resistance
10.	Iin Avg	740.41 mA	IC	Average input current
11.	L1 lpp	793.312 mA	Inductor	Peak-to-peak inductor ripple current
12.	L1 Pd	77.663 mW	Inductor	Inductor power dissipation
13.	L2lpp	793.312 mA	Inductor	Channel 2 Inductor Peak to peak Current
14.	L2 Pd	77.663 mW	Inductor	Inductor power dissipation
15.	M1 Pd	411.18 mW	Mosfet	Power Stage power dissipation
16.	M1 ThetaJA	23.2 degC/W	Mosfet	Effective Power Stage IC Junction-to-Ambient Thermal Resistance
17.	M1 TjOP	39.539 degC	Mosfet	Power Stage IC junction temperature
18.	M2 Pd	411.18 mW	Mosfet	Power Stage power dissipation
19.	M2 ThetaJA	23.2 degC/W	Mosfet	Effective Power Stage IC Junction-to-Ambient Thermal Resistance
20.	M2 TjOP	39.539 degC	Mosfet	Power Stage IC junction temperature
21.	Cib Pd	107.57 $\mu$ W	Power	Input capacitor power dissipation
22.	Cin Pd	107.57 $\mu$ W	Power	Input capacitor power dissipation
23.	Cout Pd	1.416 $\mu$ W	Power	Output capacitor power dissipation
24.	IC Pd	252.0 mW	Power	IC power dissipation
25.	L1 Pd	77.663 mW	Power	Inductor power dissipation
26.	L2 Pd	77.663 mW	Power	Inductor power dissipation
27.	M1 Pd	411.18 mW	Power	Power Stage power dissipation
28.	M2 Pd	411.18 mW	Power	Power Stage power dissipation
29.	Total Pd	1.366 W	Power	Total Power Dissipation
30.	BOM Count	78	System Information	Total Design BOM count
31.	Cross Freq	54.652 kHz	System Information	Bode plot crossover frequency
32.	Duty Cycle	6.599 %	System Information	Duty cycle
33.	Efficiency	86.824 %	System Information	Steady state efficiency
34.	FootPrint	1.091 k mm <sup>2</sup>	System Information	Total Foot Print Area of BOM components
35.	Frequency	293.686 kHz	System Information	Switching frequency
36.	Gain Marg	-17.872 dB	System Information	Bode Plot Gain Margin
37.	Iout	10.0 A	System Information	Iout operating point
38.	Low Freq Gain	93.963 dB	System Information	Gain at 1Hz
39.	Mode	CCM	System Information	Conduction Mode
40.	Phase Marg	55.303 deg	System Information	Bode Plot Phase Margin

#	Name	Value	Category	Description
41.	Pout	4.5 W	System Information	Total output power
42.	Total BOM	\$15.92	System Information	Total BOM Cost
43.	Vin	14.0 V	System Information	Vin operating point
44.	Vout	900.0 mV	System Information	Operational Output Voltage
45.	Vout Actual	900.0 mV	System Information	Vout Actual calculated based on selected voltage divider resistors
46.	Vout Tolerance	1.177 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
47.	Vout p-p	510.482 $\mu$ V	System Information	Peak-to-peak output ripple voltage

## Design Inputs

#	Name	Value	Description
1.	Iout	10.0	Maximum Output Current
2.	SoftStart	0.05 ms	Soft Start Time (ms)
3.	VinMax	14.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage
5.	Vout	900.0 m	Output Voltage
6.	acFrequency	0.0	AC Frequency
7.	base_pn	TPS40425	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

## Design Assistance

1. **TPS40425** Product Folder : <http://www.ti.com/product/TPS40425> : contains the data sheet and other resources.

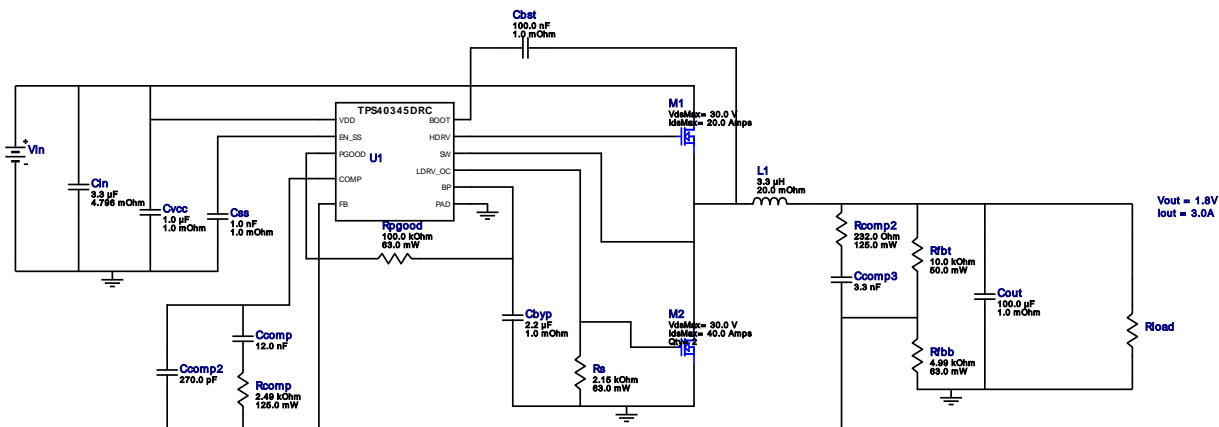


Vout = 1.8V  
Iout = 3.0A

Device = TPS40345DRCR  
Topology = Buck  
Created = 2019-05-06 03:50:15.739  
BOM Cost = \$2.13  
BOM Count = 20  
Total Pd = 0.67W











## WEBENCH® Design Report

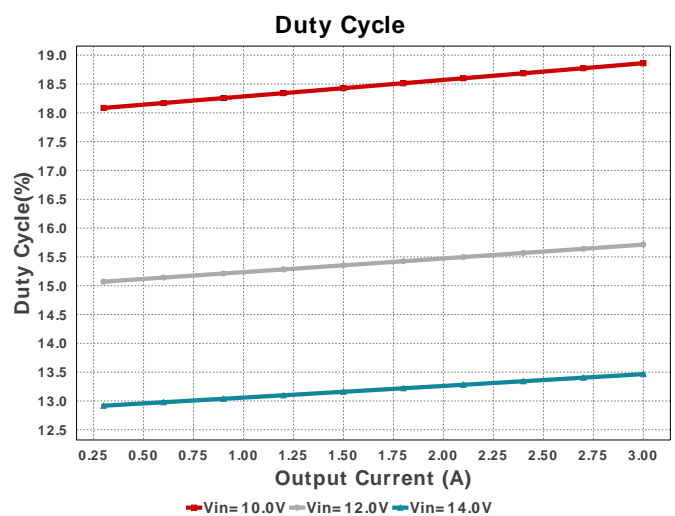
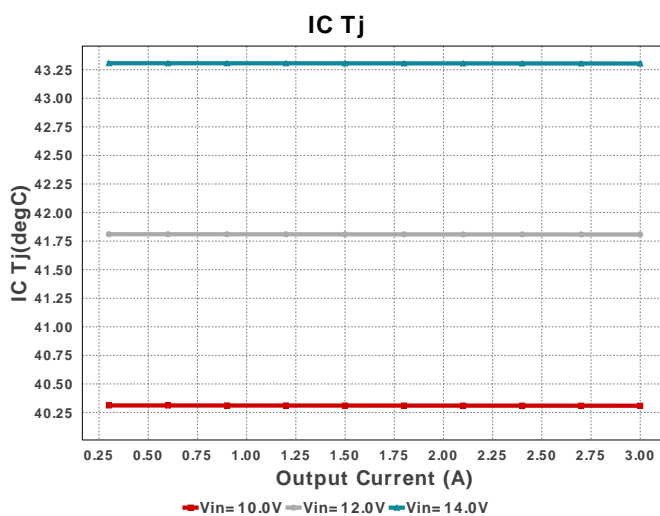
Design : TPS40345DRCR  
TPS40345DRCR 10V-14V to 1.80V @ 3A



## Electrical BOM

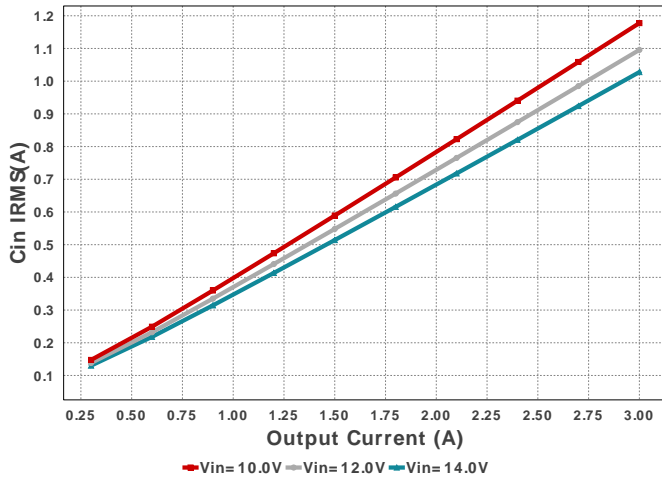
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
2.	Cbyp	Taiyo Yuden	LMK212B7225KG-T Series= X7R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm <sup>2</sup>
3.	Ccomp	Kemet	C0603C123J3GACTU Series= C0G/NP0	Cap= 12.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.12	0603 5 mm <sup>2</sup>
4.	Ccomp2	Taiyo Yuden	UMK105CG271JV-F Series= C0G/NP0	Cap= 270.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
5.	Ccomp3	Samsung Electro-Mechanics	CL21C332JBFNNNE Series= C0G/NP0	Cap= 3.3 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.04	0805 7 mm <sup>2</sup>
6.	Cin	TDK	C1608X5R1V335K080AC Series= X5R	Cap= 3.3 uF ESR= 4.796 mOhm VDC= 35.0 V IRMS= 2.3752 A	1	\$0.09	0603 5 mm <sup>2</sup>
7.	Cout	Taiyo Yuden	JMK316BJ107ML-T Series= X5R	Cap= 100.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.25	1206 11 mm <sup>2</sup>
8.	Css	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0201 2 mm <sup>2</sup>
9.	Cvcc	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	L1	TDK	VLP8040T-3R3N	L= 3.3 $\mu$ H DCR= 20.0 mOhm	1	\$0.22	 VLP8040 113 mm <sup>2</sup>
11.	M1	Texas Instruments	CSD17579Q3A	VdsMax= 30.0 V IdsMax= 20.0 Amps	1	\$0.17	 DNH0008A 18 mm <sup>2</sup>
12.	M2	Texas Instruments	CSD17579Q3A	VdsMax= 30.0 V IdsMax= 40.0 Amps	2	\$0.17	 DNH0008A 18 mm <sup>2</sup>
13.	Rcomp	Panasonic	ERJ-6ENF2491V Series= ERJ-6E	Res= 2490.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
14.	Rcomp2	Vishay-Dale	CRCW0805232RFKEA Series= CRCW..e3	Res= 232.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
15.	Rfbb	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4990.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
16.	Rfbt	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
17.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
18.	Rs	Vishay-Dale	CRCW04022K15FKED Series= CRCW..e3	Res= 2150.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
19.	U1	Texas Instruments	TPS40345DRCR	Switcher	1	\$0.75	 DRC0010J 16 mm <sup>2</sup>

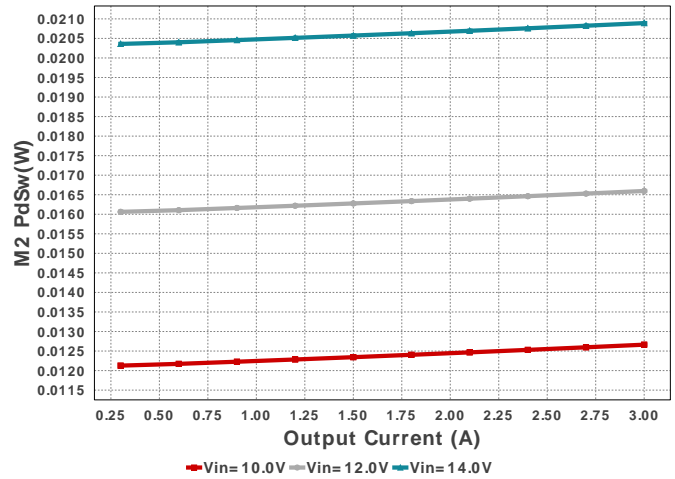




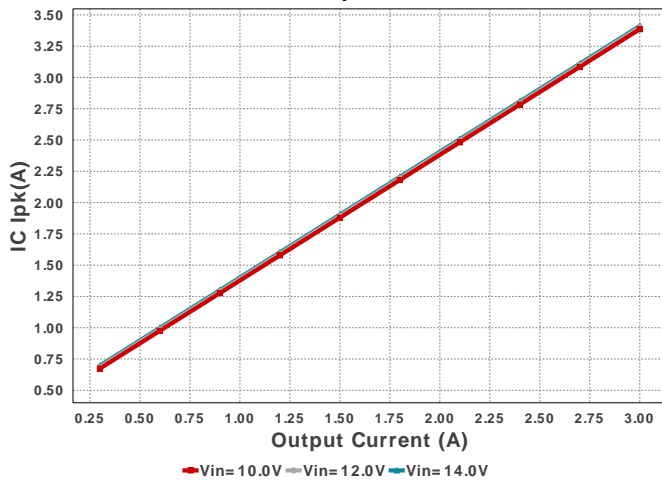
Cin IRMS



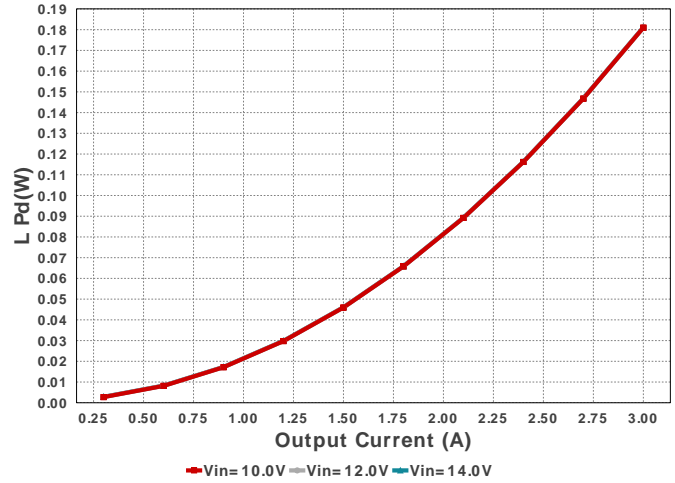
M2 PdSw



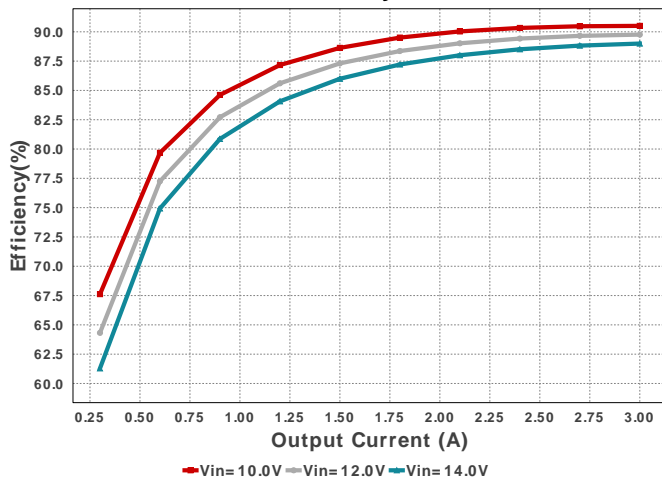
IC Ipk



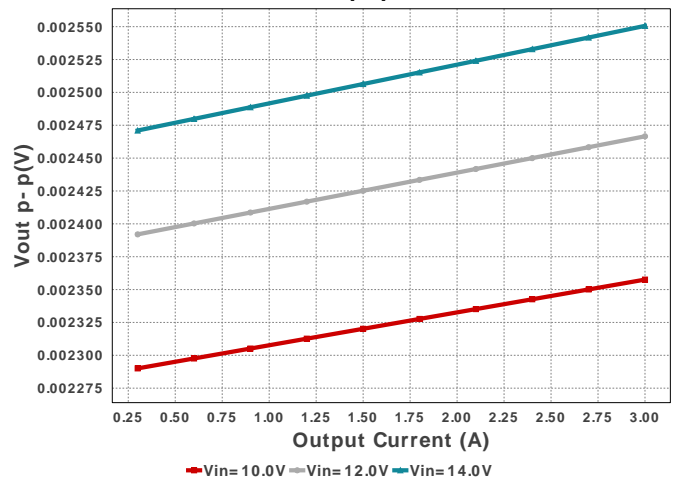
L Pd

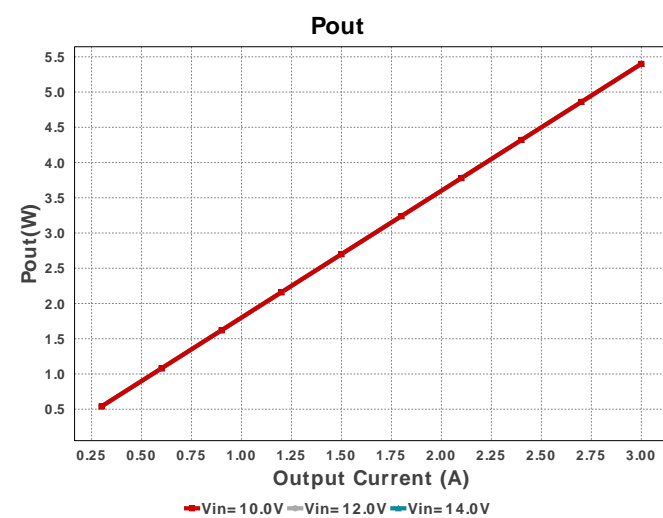
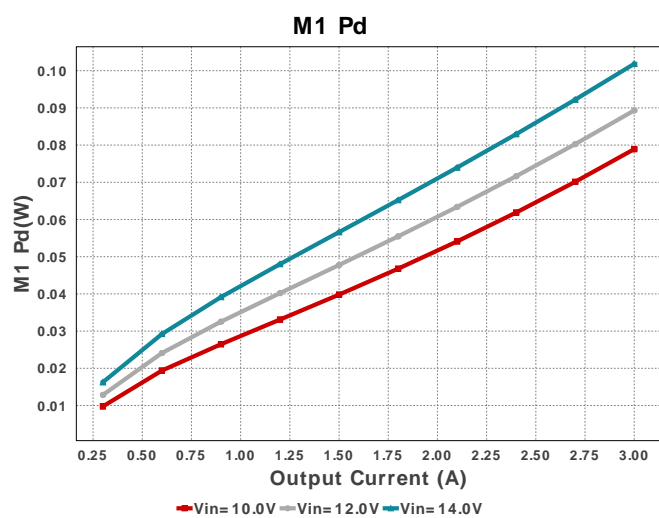
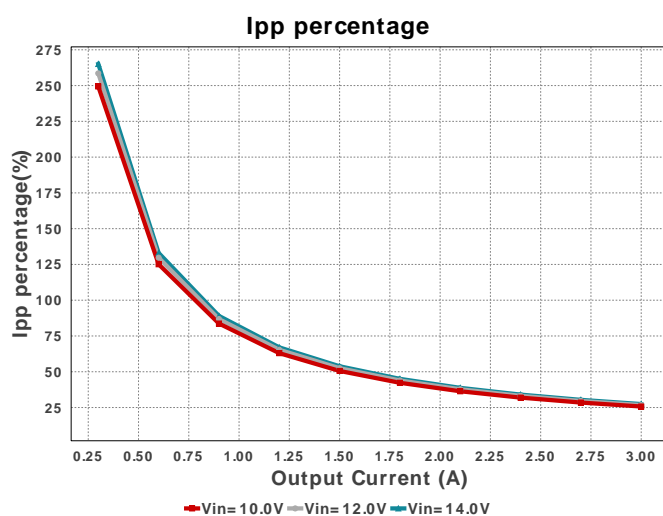
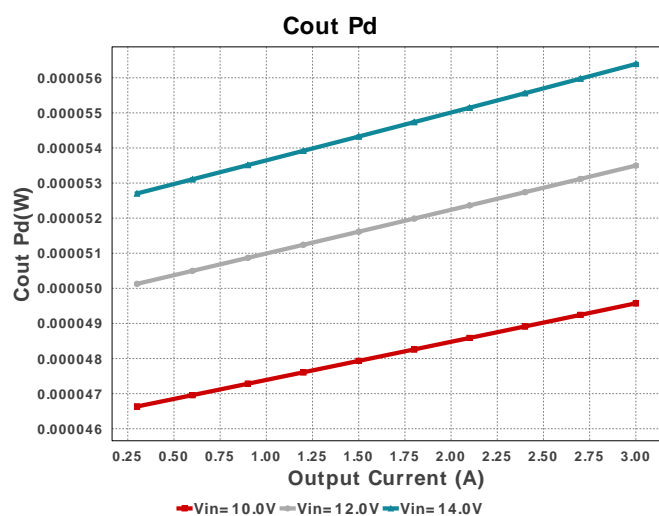
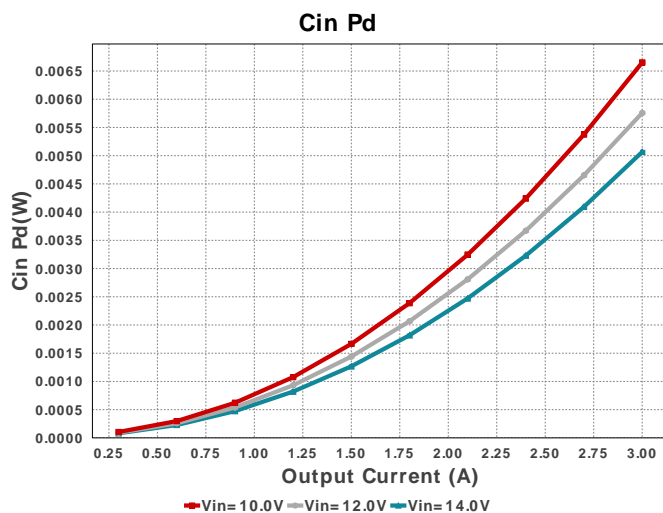
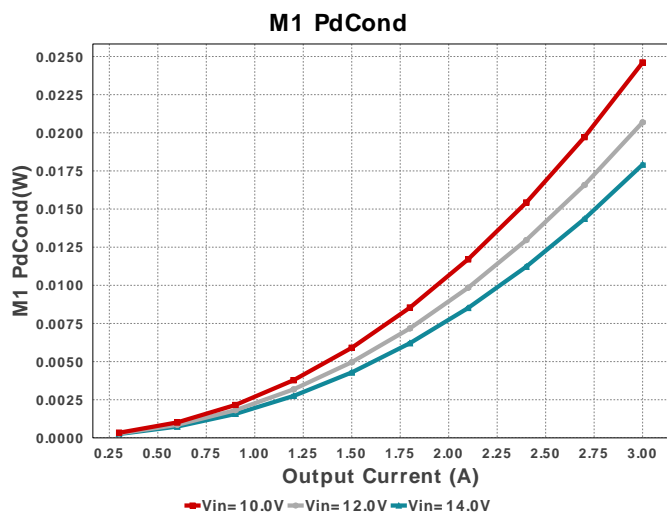


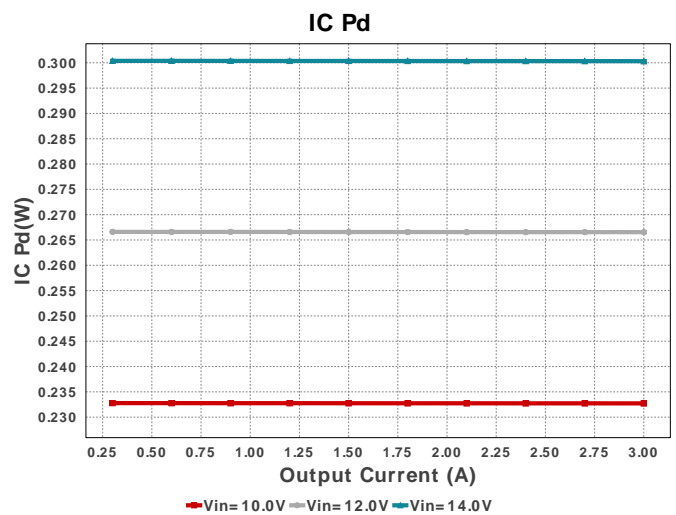
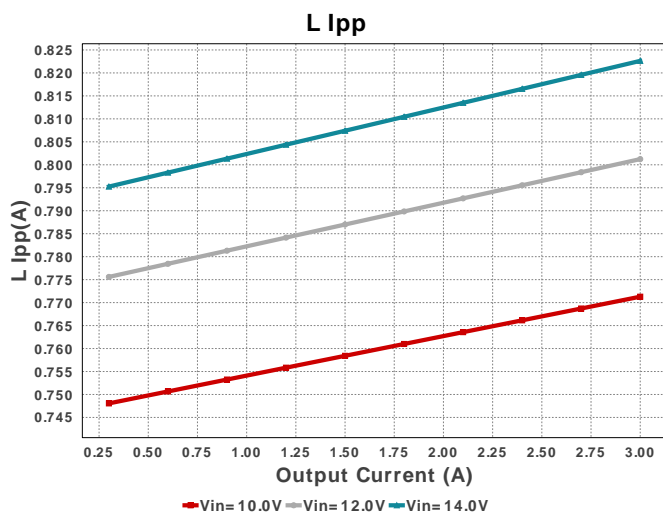
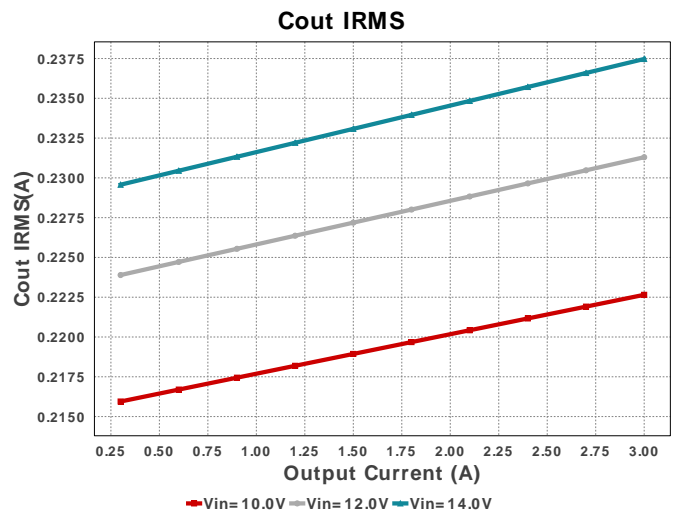
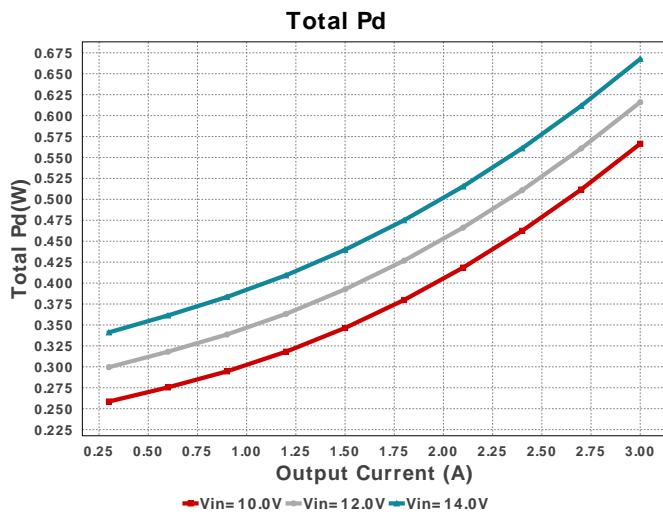
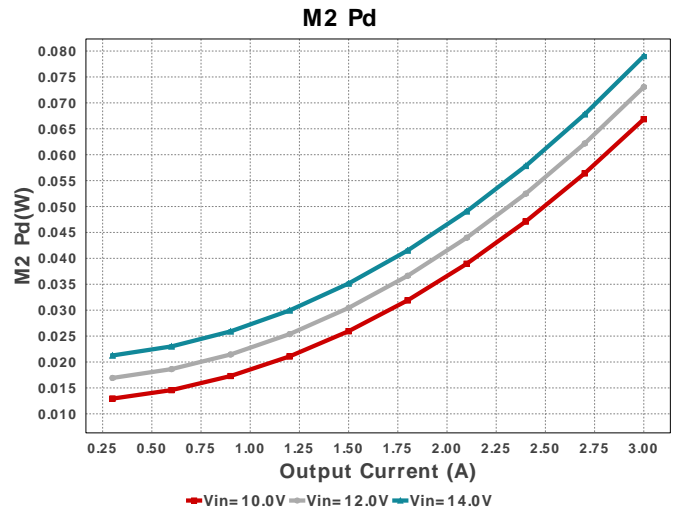
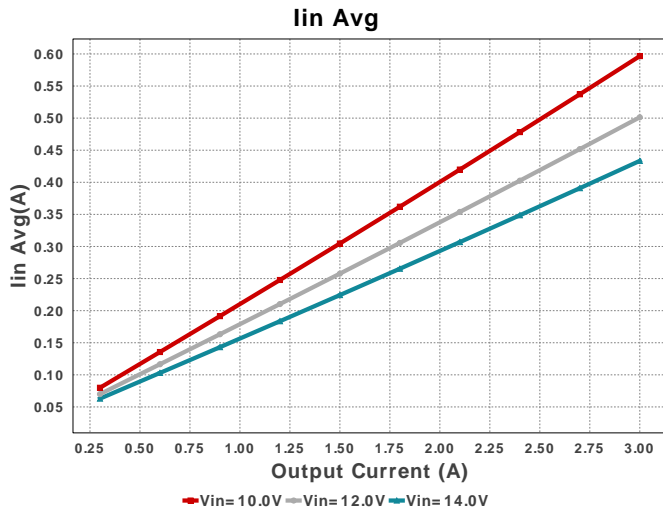
Efficiency

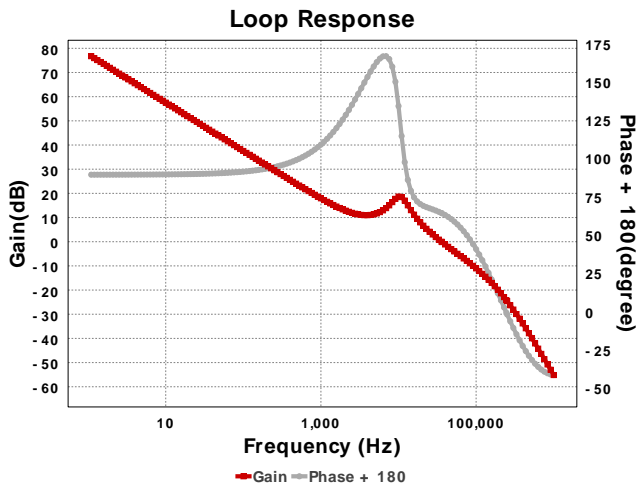
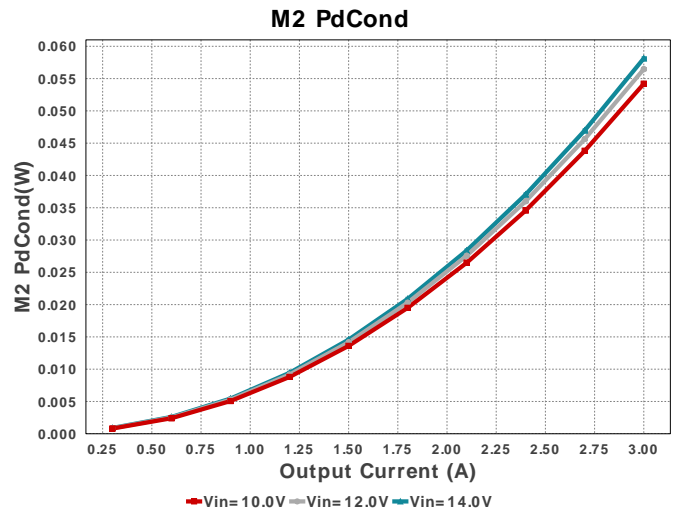
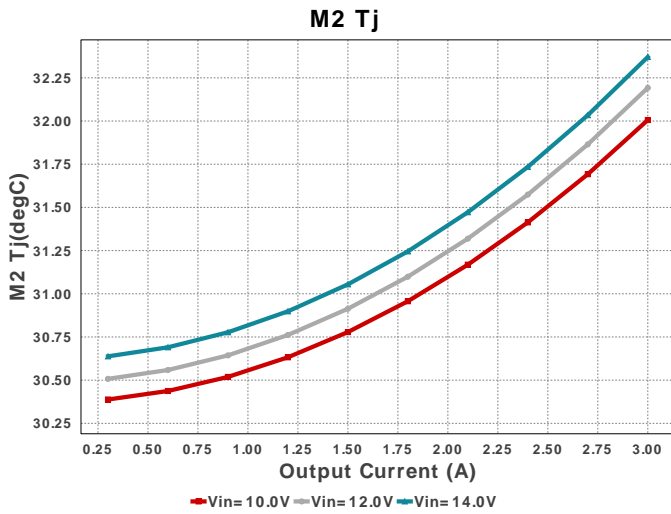
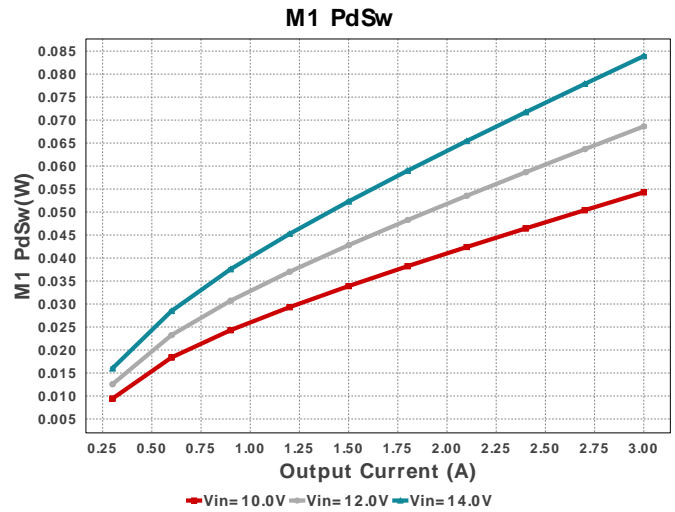
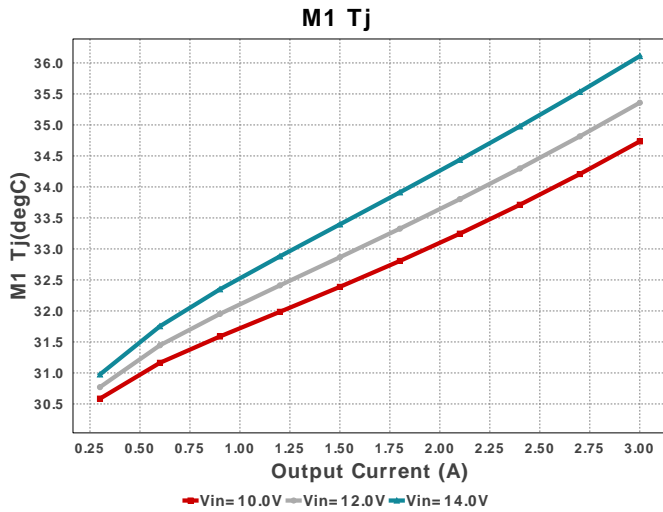


Vout p-p









## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.028 A	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	5.066 mW	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	237.471 mA	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	56.393 $\mu$ W	Capacitor	Output capacitor power dissipation
5.	IC Ipk	3.411 A	IC	Peak switch current in IC
6.	IC Pd	300.32 mW	IC	IC power dissipation
7.	IC Tj	43.304 degC	IC	IC junction temperature
8.	IC Tolerance	13.0 mV	IC	IC Feedback Tolerance
9.	ICThetaJA	44.3 degC/W	IC	IC junction-to-ambient thermal resistance
10.	Iin Avg	433.39 mA	IC	Average input current

#	Name	Value	Category	Description
11.	Ipp percentage	27.421 %	Inductor	Inductor ripple current percentage (with respect to average inductor current)
12.	L Ipp	822.62 mA	Inductor	Peak-to-peak inductor ripple current
13.	L Pd	181.13 mW	Inductor	Inductor power dissipation
14.	M1 Pd	101.83 mW	Mosfet	M1 MOSFET total power dissipation
15.	M1 PdCond	17.917 mW	Mosfet	M1 MOSFET conduction losses
16.	M1 PdSw	83.917 mW	Mosfet	M1 MOSFET switching losses
17.	M1 Tj	36.11 degC	Mosfet	M1 MOSFET junction temperature
18.	M2 Pd	79.024 mW	Mosfet	M2 MOSFET total power dissipation
19.	M2 PdCond	58.131 mW	Mosfet	M2 MOSFET conduction losses
20.	M2 PdSw	20.892 mW	Mosfet	M2 MOSFET switching losses
21.	M2 Tj	32.371 degC	Mosfet	M2 MOSFET junction temperature
22.	Cin Pd	5.066 mW	Power	Input capacitor power dissipation
23.	Cout Pd	56.393 $\mu$ W	Power	Output capacitor power dissipation
24.	IC Pd	300.32 mW	Power	IC power dissipation
25.	L Pd	181.13 mW	Power	Inductor power dissipation
26.	M1 Pd	101.83 mW	Power	M1 MOSFET total power dissipation
27.	M1 PdCond	17.917 mW	Power	M1 MOSFET conduction losses
28.	M1 PdSw	83.917 mW	Power	M1 MOSFET switching losses
29.	M2 Pd	79.024 mW	Power	M2 MOSFET total power dissipation
30.	M2 PdCond	58.131 mW	Power	M2 MOSFET conduction losses
31.	M2 PdSw	20.892 mW	Power	M2 MOSFET switching losses
32.	Total Pd	667.421 mW	Power	Total Power Dissipation
33.	BOM Count	20	System	Total Design BOM count
			Information	
34.	Cross Freq	35.844 kHz	System	Bode plot crossover frequency
			Information	
35.	Duty Cycle	13.466 %	System	Duty cycle
			Information	
36.	Efficiency	89.0 %	System	Steady state efficiency
			Information	
37.	FootPrint	258.0 mm <sup>2</sup>	System	Total Foot Print Area of BOM components
			Information	
38.	Frequency	600.0 kHz	System	Switching frequency
			Information	
39.	Gain Marg	-24.139 dB	System	Bode Plot Gain Margin
			Information	
40.	Iout	3.0 A	System	Iout operating point
			Information	
41.	Low Freq Gain	76.738 dB	System	Gain at 1Hz
			Information	
42.	Mode	CCM	System	Conduction Mode
			Information	
43.	Phase Marg	64.973 deg	System	Bode Plot Phase Margin
			Information	
44.	Pout	5.4 W	System	Total output power
			Information	
45.	Total BOM	\$2.13	System	Total BOM Cost
			Information	
46.	Vin	14.0 V	System	Vin operating point
			Information	
47.	Vout	1.8 V	System	Operational Output Voltage
			Information	
48.	Vout Actual	1.802 V	System	Vout Actual calculated based on selected voltage divider resistors
			Information	
49.	Vout Tolerance	3.544 %	System	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
			Information	
50.	Vout p-p	2.551 mV	System	Peak-to-peak output ripple voltage
			Information	

## Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	SoftStart	0.05 ms	Soft Start Time (ms)
3.	VinMax	14.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage
5.	Vout	1.8	Output Voltage
6.	acFrequency	0.0	AC Frequency
7.	base_pn	TPS40345	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

## Design Assistance

1. **TPS40345** Product Folder : <http://www.ti.com/product/TPS40345> : contains the data sheet and other resources.

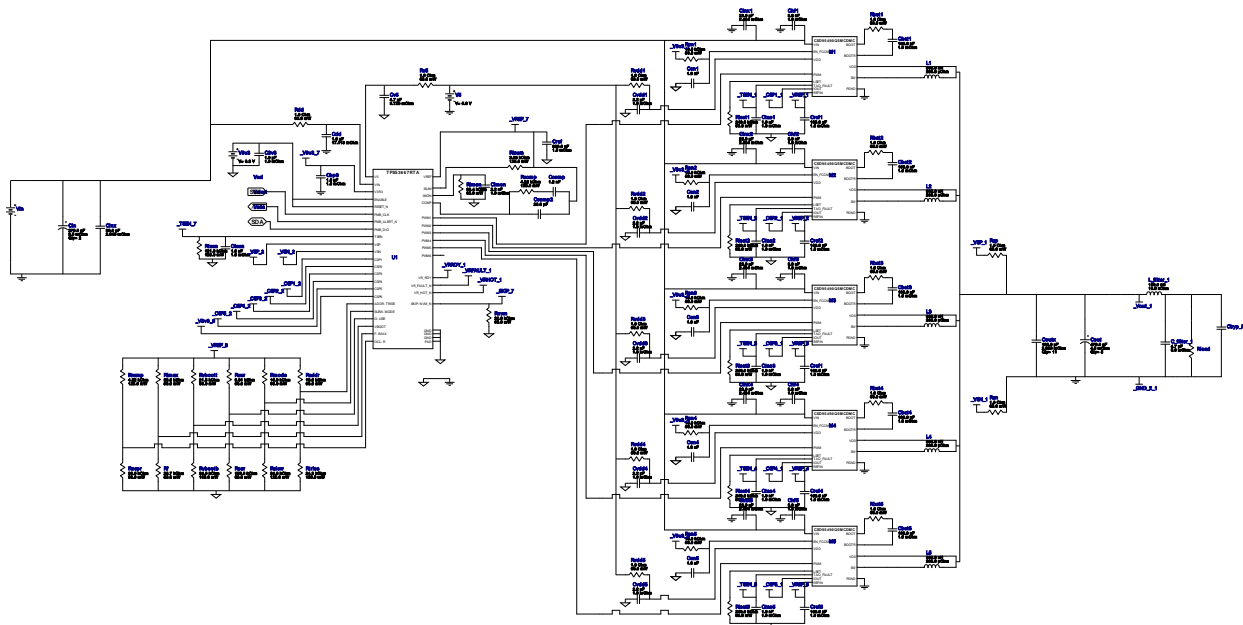


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Iout = 100.0A

Device = TPS53667RTAR  
Topology = Buck  
Created = 2019-05-06 03:50:07.902  
BOM Cost = NA  
BOM Count = 117  
Total Pd = 8.28W


















## WEBENCH® Design Report

Design : TPS53667RTAR  
TPS53667RTAR 10V-14V to .90V @ 100A




### Electrical BOM



















#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C3v3	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
2.	C_filter_1	Kemet	C0603C475K9PACTU Series= X5R	Cap= 4.7 uF ESR= 6.0 mOhm VDC= 6.3 V IRMS= 7.24 A	1	\$0.02	0603 5 mm <sup>2</sup>
3.	Cbp3	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
4.	Cbst1	Kemet	C0603C104Z4VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
5.	Cbst2	Kemet	C0603C104Z4VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
6.	Cbst3	Kemet	C0603C104Z4VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	Cbst4	Kemet	C0603C104Z4VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
8.	Cbst5	Kemet	C0603C104Z4VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
9.	Ccomp	Samsung Electro-Mechanics	CL21C122JBFNNNE Series= C0G/NP0	Cap= 1.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	 0805 7 mm <sup>2</sup>
10.	Ccomp2	Samsung Electro-Mechanics	CL21C200JBANNNC Series= C0G/NP0	Cap= 20.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
11.	Cdd	MuRata	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	\$0.02	 0603 5 mm <sup>2</sup>
12.	Cen1	Kemet	C0603C102K3GACTU Series= C0G/NP0	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
13.	Cen2	Kemet	C0603C102K3GACTU Series= C0G/NP0	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
14.	Cen3	Kemet	C0603C102K3GACTU Series= C0G/NP0	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
15.	Cen4	Kemet	C0603C102K3GACTU Series= C0G/NP0	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
16.	Cen5	Kemet	C0603C102K3GACTU Series= C0G/NP0	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm <sup>2</sup>
17.	Chf1	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
18.	Chf2	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
19.	Chf3	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
20.	Chf4	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
21.	Chf5	MuRata	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
22.	Cimon	MuRata	GRM033R71A222KA01D Series= X7R	Cap= 2.2 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm <sup>2</sup>
23.	Cin	Panasonic	16SVPG270M Series= SVPG	Cap= 270.0 uF ESR= 8.0 mOhm VDC= 16.0 V IRMS= 5.8 A	2	\$0.67	 CAPSMT_62_C10 74 mm <sup>2</sup>










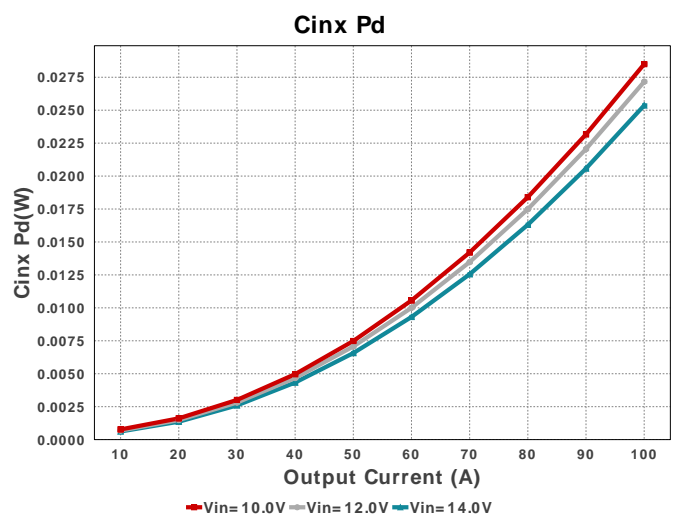
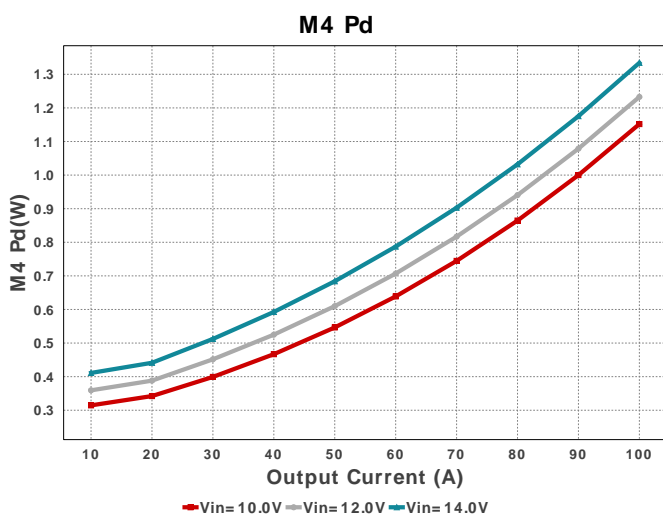
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	Cinx	TDK	C3216X5R1E336M160AC Series= X5R	Cap= 33.0 uF ESR= 2.648 mOhm VDC= 25.0 V IRMS= 4.4586 A	1	\$0.42	 1206_180 11 mm <sup>2</sup>
25.	Cinx1	TDK	C4532X5R1E226M250KA Series= X5R	Cap= 22.0 uF ESR= 2.434 mOhm VDC= 25.0 V IRMS= 4.9165 A	1	\$0.37	 1812_280 23 mm <sup>2</sup>
26.	Cinx2	TDK	C4532X5R1E226M250KA Series= X5R	Cap= 22.0 uF ESR= 2.434 mOhm VDC= 25.0 V IRMS= 4.9165 A	1	\$0.37	 1812_280 23 mm <sup>2</sup>
27.	Cinx3	TDK	C4532X5R1E226M250KA Series= X5R	Cap= 22.0 uF ESR= 2.434 mOhm VDC= 25.0 V IRMS= 4.9165 A	1	\$0.37	 1812_280 23 mm <sup>2</sup>
28.	Cinx4	TDK	C4532X5R1E226M250KA Series= X5R	Cap= 22.0 uF ESR= 2.434 mOhm VDC= 25.0 V IRMS= 4.9165 A	1	\$0.37	 1812_280 23 mm <sup>2</sup>
29.	Cinx5	TDK	C4532X5R1E226M250KA Series= X5R	Cap= 22.0 uF ESR= 2.434 mOhm VDC= 25.0 V IRMS= 4.9165 A	1	\$0.37	 1812_280 23 mm <sup>2</sup>
30.	Cout	Panasonic	EEFHX0E471R4 Series= 3296	Cap= 470.0 uF ESR= 4.5 mOhm VDC= 2.5 V IRMS= 8.5 A	5	\$0.67	 7343-20 59 mm <sup>2</sup>
31.	Coutx	TDK	C3216X6S0G107M160AC Series= X6S	Cap= 100.0 uF ESR= 2.838 mOhm VDC= 4.0 V IRMS= 4.3069 A	11	\$0.38	 1206_190 11 mm <sup>2</sup>
32.	Cref	MuRata	GRM155R61A334KE15D Series= X5R	Cap= 330.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.03	 0402 3 mm <sup>2</sup>
33.	Cref1	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
34.	Cref1	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
35.	Cref2	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
36.	Cref3	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
37.	Cref4	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
38.	Cref5	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
39.	Ctao1	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>

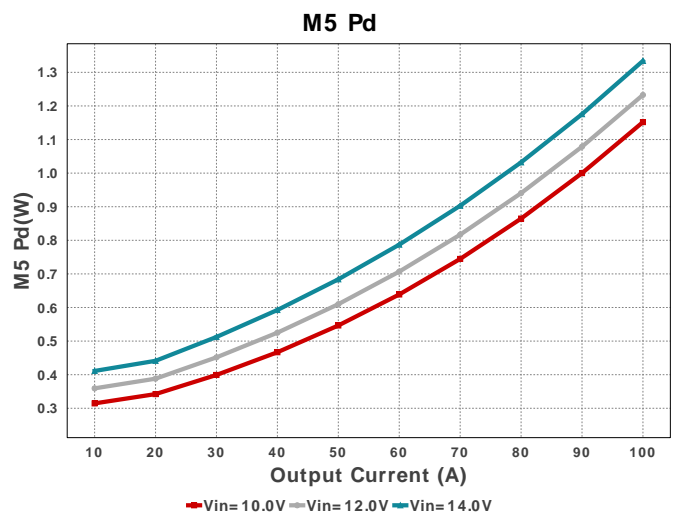
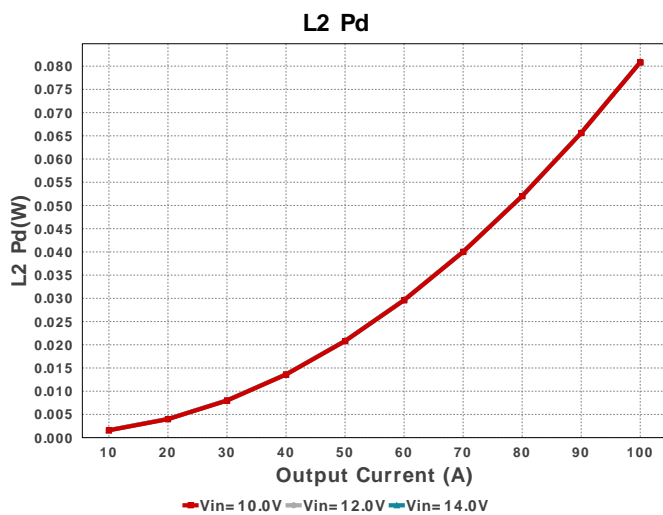
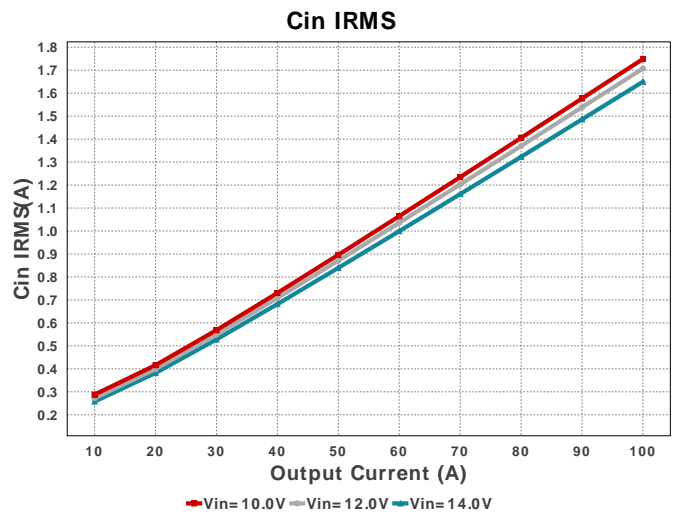
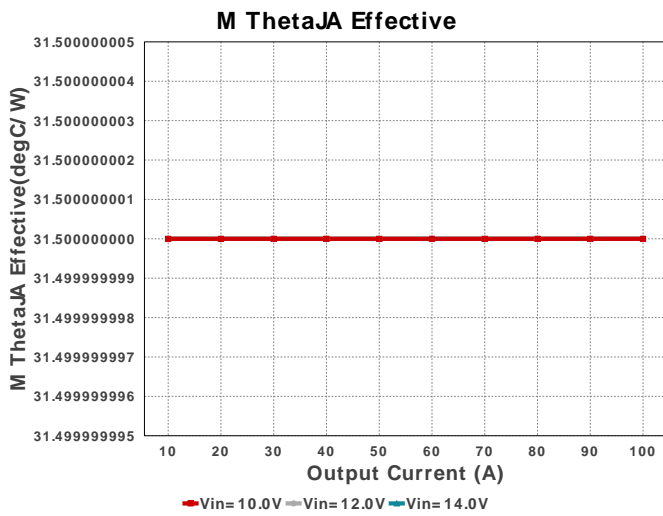
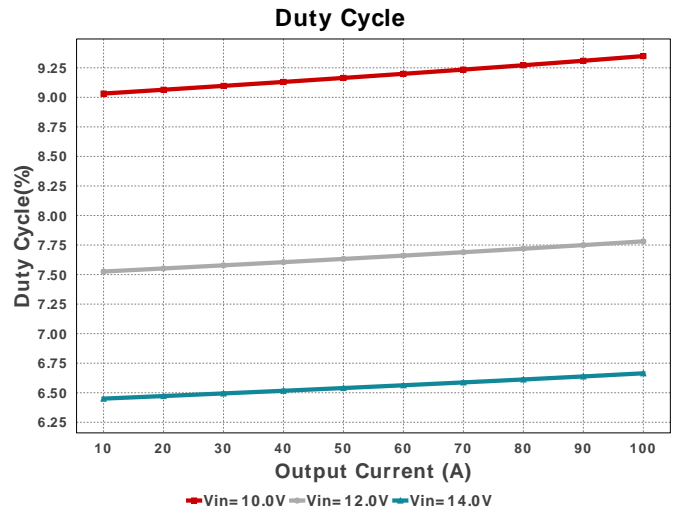
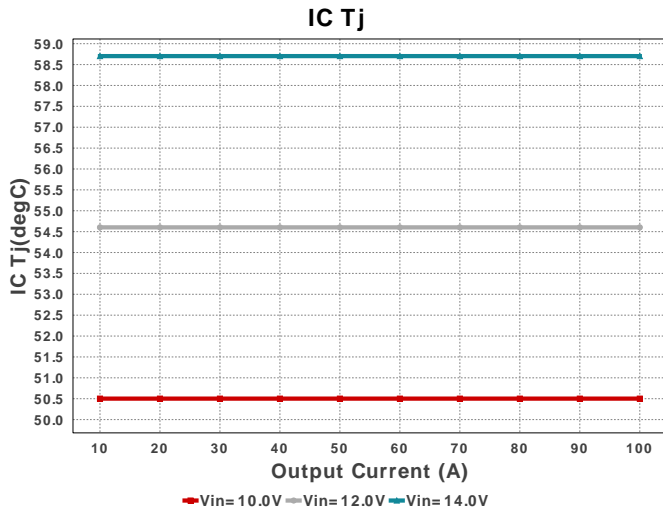
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
40.	Ctao2	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
41.	Ctao3	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
42.	Ctao4	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
43.	Ctao5	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
44.	Ctsen	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm <sup>2</sup>
45.	Cv5	TDK	C1608X6S1C475K080AC Series= X6S	Cap= 4.7 uF ESR= 3.728 mOhm VDC= 16.0 V IRMS= 2.69359 A	1	\$0.08	 0603 5 mm <sup>2</sup>
46.	Cvdd1	Taiyo Yuden	EMK212BJ225KG-T Series= X5R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
47.	Cvdd2	Taiyo Yuden	EMK212BJ225KG-T Series= X5R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
48.	Cvdd3	Taiyo Yuden	EMK212BJ225KG-T Series= X5R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
49.	Cvdd4	Taiyo Yuden	EMK212BJ225KG-T Series= X5R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
50.	Cvdd5	Taiyo Yuden	EMK212BJ225KG-T Series= X5R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
51.	L1	Coilcraft	SLC1175-301MEB	L= 300.0 nH DCR= 200.0 µOhm	1	\$0.48	 SLC1175 125 mm <sup>2</sup>
52.	L2	Coilcraft	SLC1175-301MEB	L= 300.0 nH DCR= 200.0 µOhm	1	\$0.48	 SLC1175 125 mm <sup>2</sup>
53.	L3	Coilcraft	SLC1175-301MEB	L= 300.0 nH DCR= 200.0 µOhm	1	\$0.48	 SLC1175 125 mm <sup>2</sup>
54.	L4	Coilcraft	SLC1175-301MEB	L= 300.0 nH DCR= 200.0 µOhm	1	\$0.48	 SLC1175 125 mm <sup>2</sup>

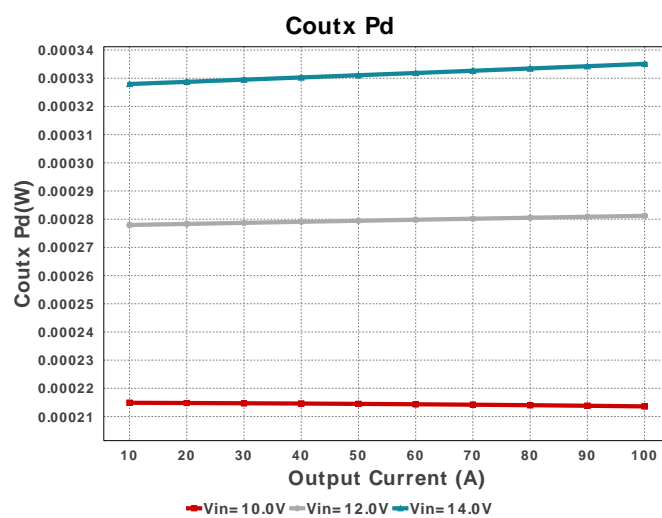
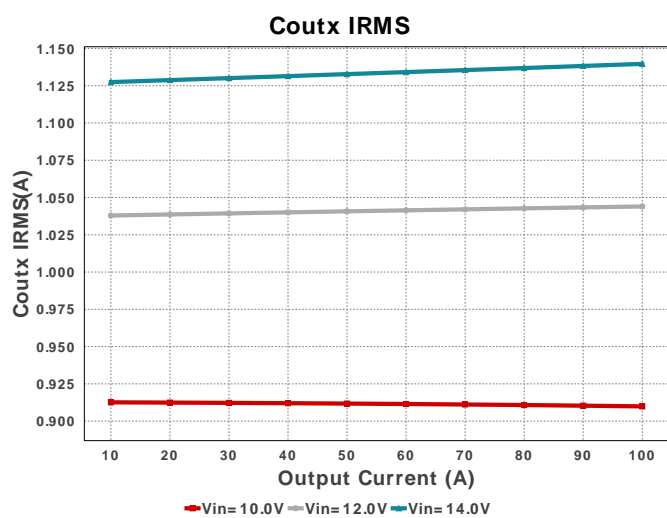
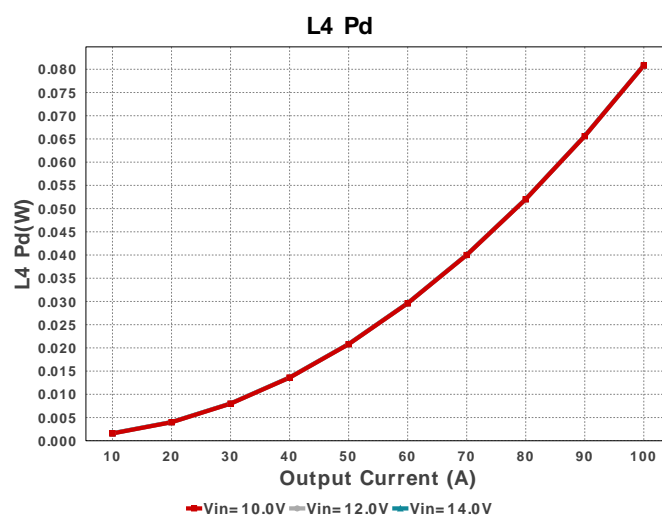
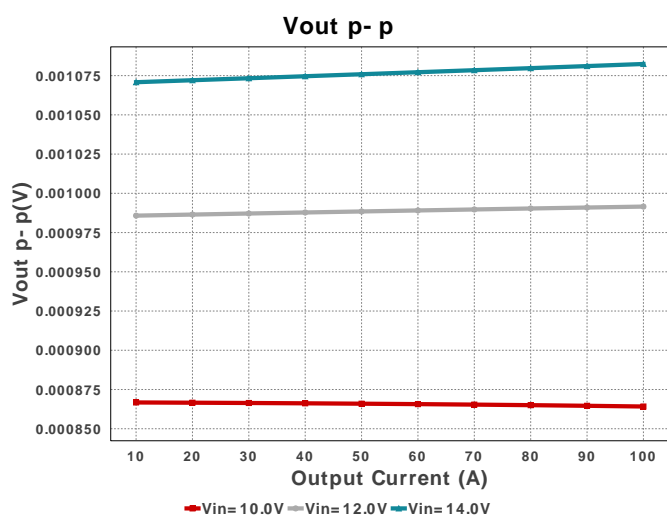
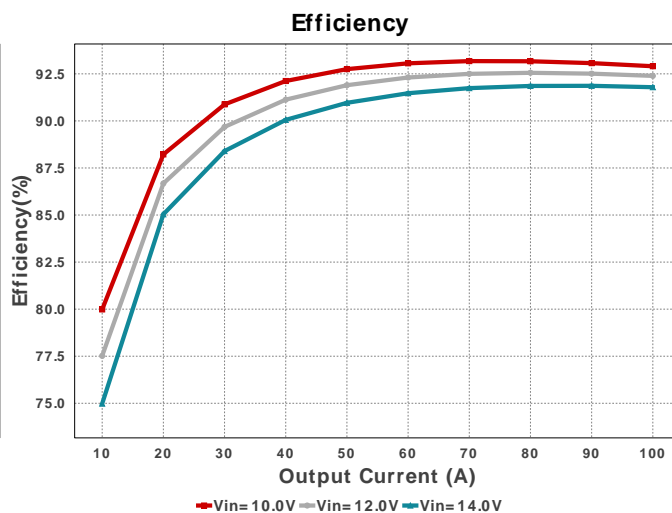
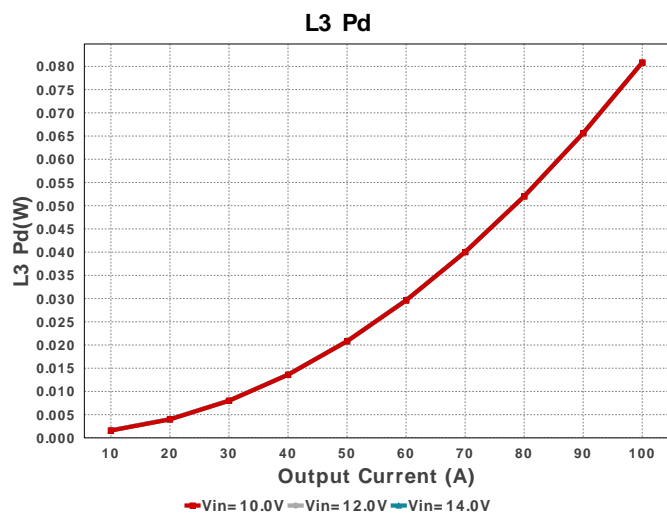
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
55.	L5	Coilcraft	SLC1175-301MEB	L= 300.0 nH DCR= 200.0 µOhm	1	\$0.48	 SLC1175 125 mm <sup>2</sup>
56.	L_filter_1	CUSTOM	CUSTOM	L= 100.0 nH DCR= 10.0 nOhm	1	NA	CUSTOM 0 mm <sup>2</sup>
57.	M1	Texas Instruments	CSD95490Q5MC	PowerStage	1	\$2.48	 DMC0012A 56 mm <sup>2</sup>
58.	M2	Texas Instruments	CSD95490Q5MC	PowerStage	1	\$2.48	 DMC0012A 56 mm <sup>2</sup>
59.	M3	Texas Instruments	CSD95490Q5MC	PowerStage	1	\$2.48	 DMC0012A 56 mm <sup>2</sup>
60.	M4	Texas Instruments	CSD95490Q5MC	PowerStage	1	\$2.48	 DMC0012A 56 mm <sup>2</sup>
61.	M5	Texas Instruments	CSD95490Q5MC	PowerStage	1	\$2.48	 DMC0012A 56 mm <sup>2</sup>
62.	Raddr	Vishay-Dale	CRCW040216K9FKED Series= CRCW..e3	Res= 16900.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
63.	Rbst1	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
64.	Rbst2	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
65.	Rbst3	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
66.	Rbst4	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
67.	Rbst5	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
68.	Rcomp	Panasonic	ERJ-6ENF4221V Series= ERJ-6E	Res= 4220.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
69.	Rdd	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
70.	Ren1	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
71.	Ren2	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
72.	Ren3	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
73.	Ren4	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>

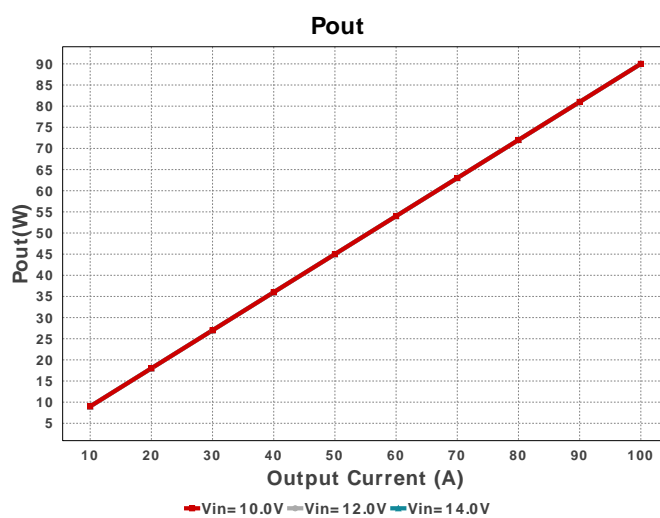
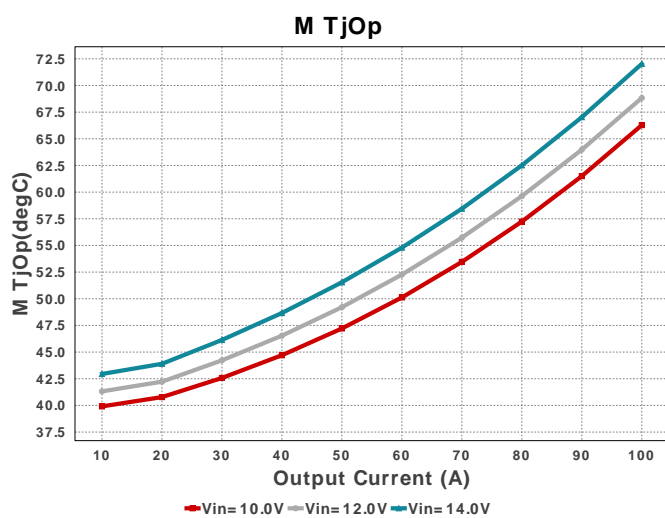
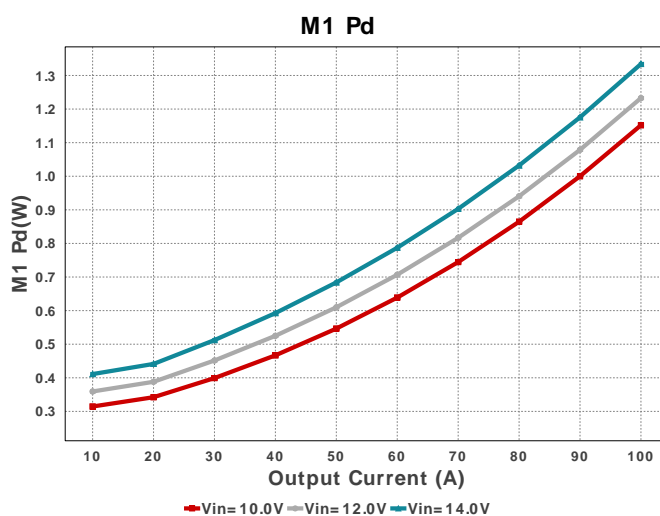
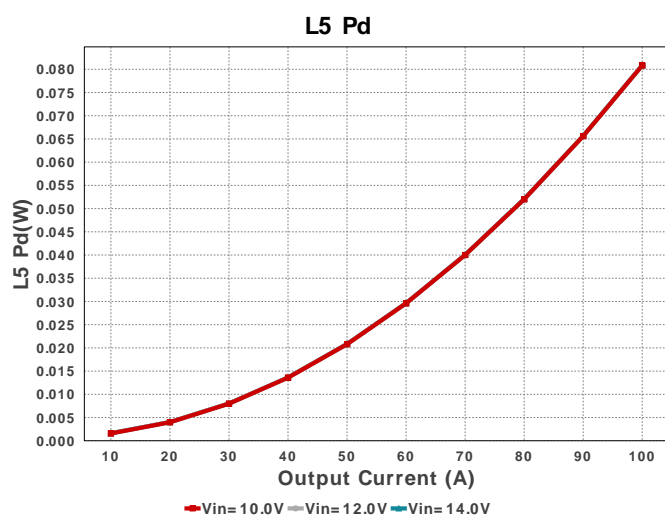
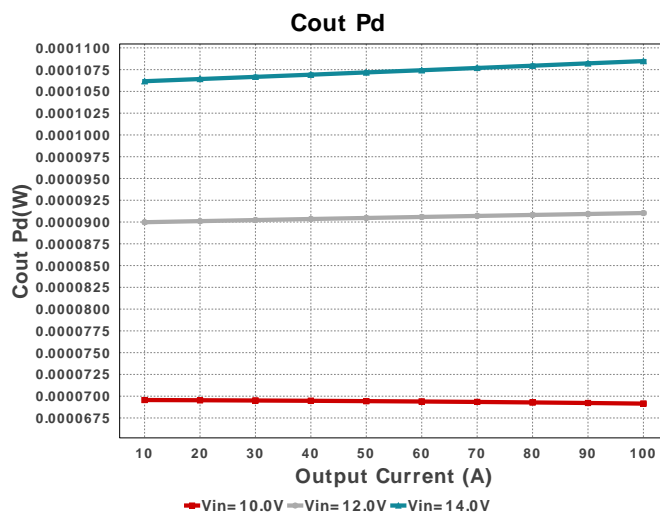
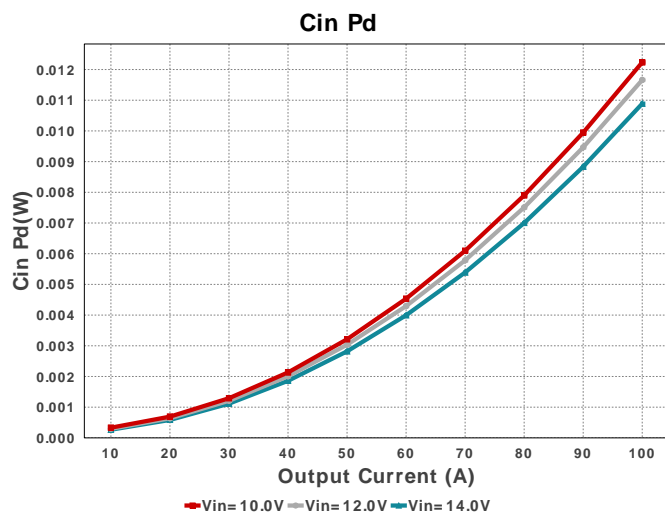
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
74.	Ren5	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
75.	Rf	Yageo	RC0201FR-0723K7L Series= ?	Res= 23700.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
76.	Rimax	Yageo	RC0201FR-0736K5L Series= ?	Res= 36500.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
77.	Rimon	Vishay-Dale	CRCW040260K4FKED Series= CRCW..e3	Res= 60400.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
78.	Risum	Vishay-Dale	CRCW08052K55FKEA Series= CRCW..e3	Res= 2550.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>
79.	Rlset1	Yageo	RC0201FR-07249KL Series= ?	Res= 249000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
80.	Rlset2	Yageo	RC0201FR-07249KL Series= ?	Res= 249000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
81.	Rlset3	Yageo	RC0201FR-07249KL Series= ?	Res= 249000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
82.	Rlset4	Yageo	RC0201FR-07249KL Series= ?	Res= 249000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
83.	Rlset5	Yageo	RC0201FR-07249KL Series= ?	Res= 249000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	0201 2 mm <sup>2</sup>
84.	Rmode	Vishay-Dale	CRCW040216K9FKED Series= CRCW..e3	Res= 16900.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
85.	Rnvm	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
86.	Rocpr	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
87.	Rosr	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
88.	Rramp	Panasonic	ERJ-6ENF4321V Series= ERJ-6E	Res= 4320.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>
89.	Rslew	Panasonic	ERJ-6ENF2432V Series= ERJ-6E	Res= 24300.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>
90.	Rsn	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
91.	Rsp	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
92.	Rtrise	Panasonic	ERJ-6ENF2432V Series= ERJ-6E	Res= 24300.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>
93.	Rtsen	Panasonic	ERJ-6ENF1213V Series= ERJ-6E	Res= 121000.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>
94.	Rusr	Vishay-Dale	CRCW04029K31FKED Series= CRCW..e3	Res= 9310.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
95.	Rv5	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
96.	Rvbootb	Yageo	RC0603FR-0724KL Series= ?	Res= 24000.0Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm <sup>2</sup>
97.	Rvboott	Vishay-Dale	CRCW040221K5FKED Series= CRCW..e3	Res= 21500.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
98.	Rvdd1	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
99.	Rvdd2	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
100.	Rvdd3	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
101.	Rvdd4	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
102.	Rvdd5	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
103.	U1	Texas Instruments	TPS53667RTAR	Switcher	1	\$4.25	 RTA0040B 64 mm <sup>2</sup>

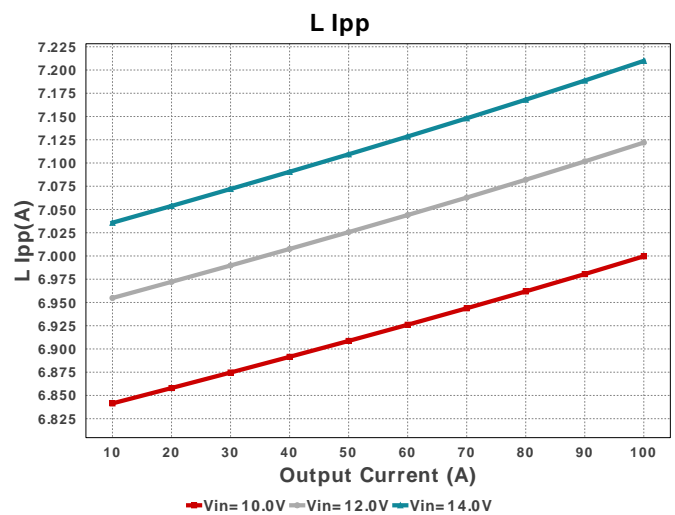
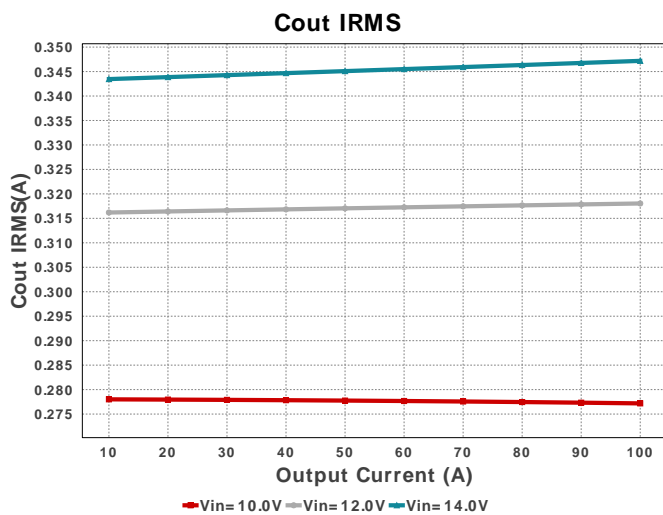
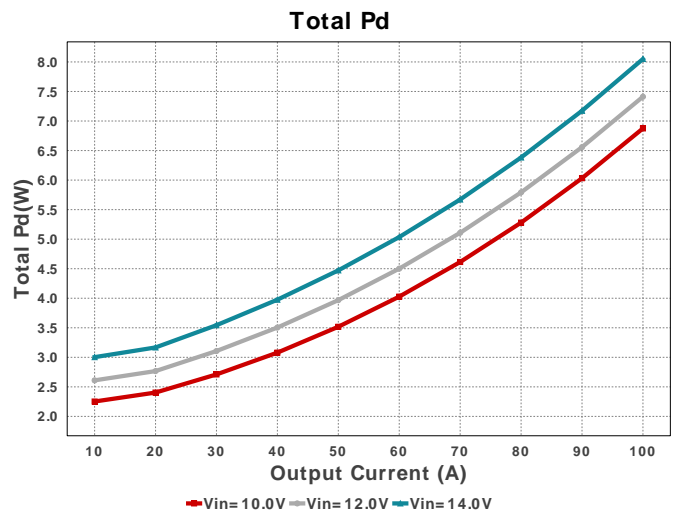
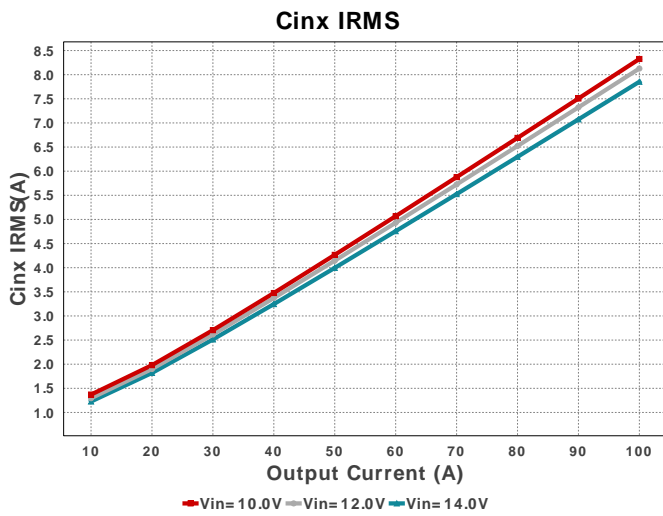
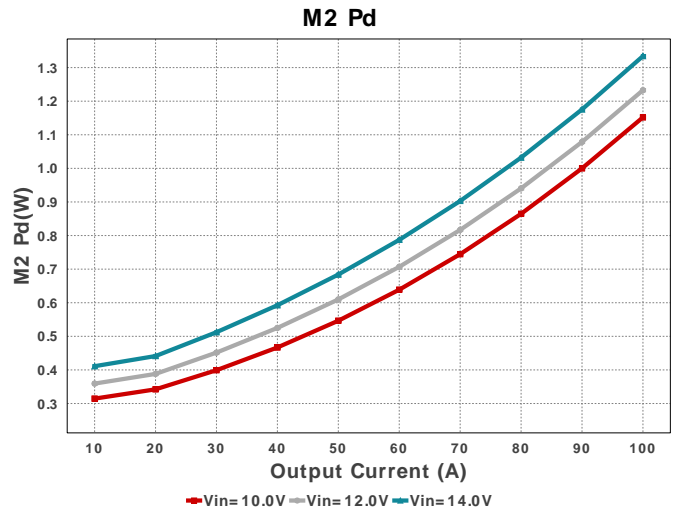
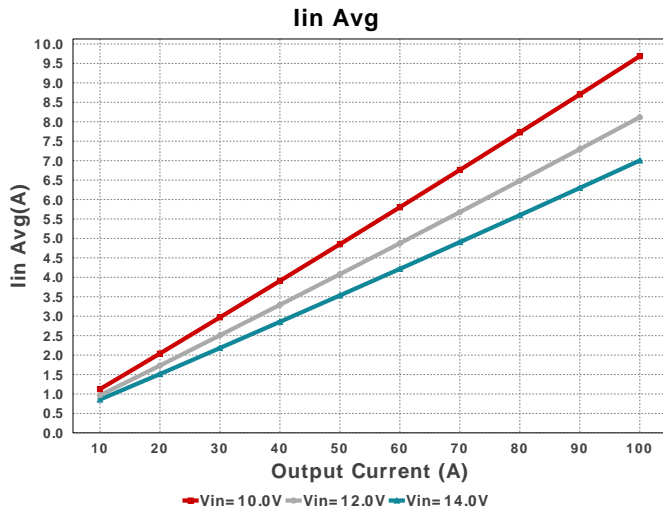


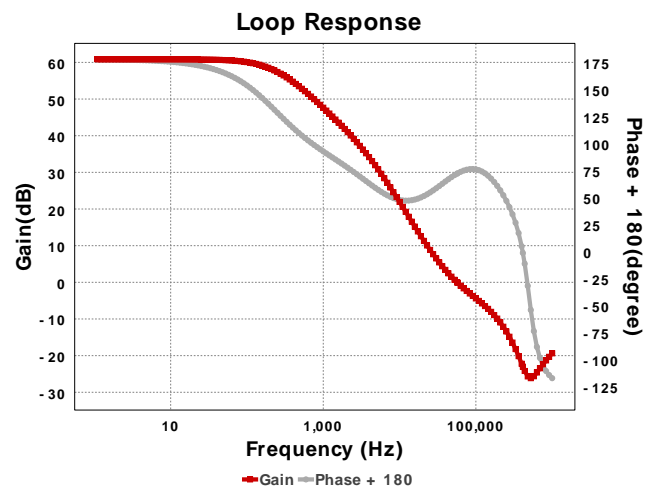
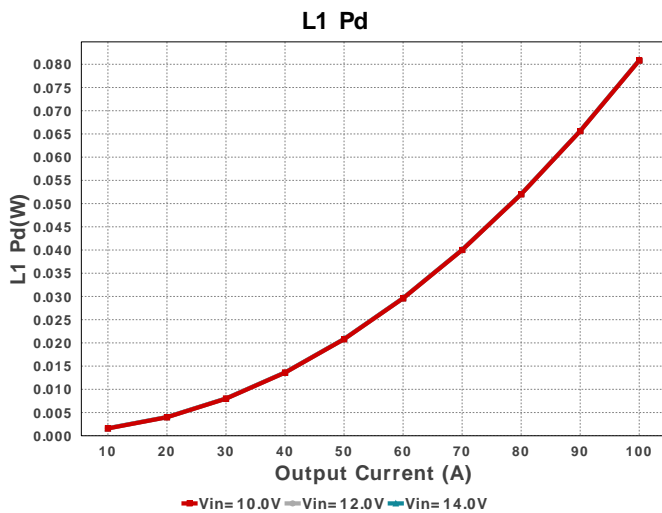
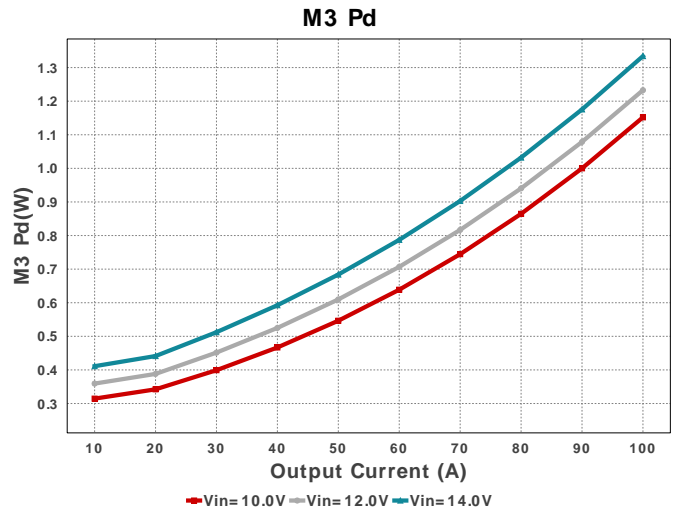
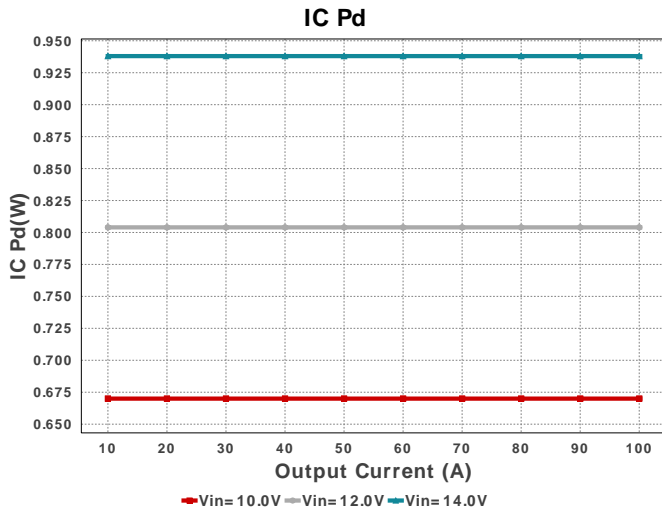












## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	8.075 A	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	260.83 mW	Capacitor	Input capacitor power dissipation
3.	Cinx IRMS	1.428 A	Capacitor	Bulk capacitor RMS ripple current
4.	Cinx Pd	5.403 mW	Capacitor	Bulk capacitor power dissipation
5.	Cout IRMS	347.184 mA	Capacitor	Output capacitor RMS ripple current
6.	Cout Pd	108.48 $\mu$ W	Capacitor	Output capacitor power dissipation
7.	Coutx IRMS	1.14 A	Capacitor	Output capacitor_x RMS ripple current
8.	Coutx Pd	335.1 $\mu$ W	Capacitor	Output capacitor_x power loss
9.	filter_1 attenuation Factor	500.0 m	Filter	Attenuation factor
10.	filter_1 cut-off freq	238.327 kHz	Filter	Filter cut off frequency filter_1
11.	filter_1 target Vpp	541.207 $\mu$ V	Filter	Target voltage ripple through filter filter_1
12.	filter_1 voltage drop	1.0 $\mu$ V	Filter	Voltage drop through filter filter_1
13.	filter_1_Pd	100.01 $\mu$ W	Filter	Filter Power Loss filter_1
14.	IC Pd	938.0 mW	IC	IC power dissipation
15.	IC Tj	58.703 degC	IC	IC junction temperature
16.	ICThetaJA	30.6 degC/W	IC	IC junction-to-ambient thermal resistance
17.	Iin Avg	7.02 A	IC	Average input current
18.	M ThetaJA Effective	31.5 degC/W	IC	Effective Power Stage IC Junction-to-Ambient Thermal Resistance
19.	L Ipp	7.21 A	Inductor	Peak-to-peak inductor ripple current
20.	L1 Pd	80.866 mW	Inductor	Inductor power dissipation
21.	L2 Pd	80.866 mW	Inductor	Inductor power dissipation
22.	L3 Pd	80.866 mW	Inductor	Inductor power dissipation
23.	L4 Pd	80.866 mW	Inductor	Inductor power dissipation
24.	L5 Pd	80.866 mW	Inductor	Inductor power dissipation
25.	M TjOp	72.026 degC	Mosfet	Power Stage IC junction temperature
26.	M1 Pd	1.334 W	Mosfet	Power Stage power dissipation
27.	M2 Pd	1.334 W	Mosfet	Power Stage power dissipation
28.	PMBus Vout Command	131.0	PMBus	PMBus Vout Command
29.	Cin Pd	260.83 mW	Power	Input capacitor power dissipation
30.	Cinx Pd	5.403 mW	Power	Bulk capacitor power dissipation
31.	Cout Pd	108.48 $\mu$ W	Power	Output capacitor power dissipation

#	Name	Value	Category	Description
32.	Coutx Pd	335.1 $\mu$ W	Power	Output capacitor_x power loss
33.	IC Pd	938.0 mW	Power	IC power dissipation
34.	L1 Pd	80.866 mW	Power	Inductor power dissipation
35.	L2 Pd	80.866 mW	Power	Inductor power dissipation
36.	L3 Pd	80.866 mW	Power	Inductor power dissipation
37.	L4 Pd	80.866 mW	Power	Inductor power dissipation
38.	L5 Pd	80.866 mW	Power	Inductor power dissipation
39.	M1 Pd	1.334 W	Power	Power Stage power dissipation
40.	M2 Pd	1.334 W	Power	Power Stage power dissipation
41.	M3 Pd	1.334 W	Power	Power Stage power dissipation
42.	M4 Pd	1.334 W	Power	Power Stage power dissipation
43.	M5 Pd	1.334 W	Power	Power Stage power dissipation
44.	Total Pd	8.28 W	Power	Total Power Dissipation
45.	filter_1_Pd	100.01 $\mu$	Power	
46.	BOM Count	117	System	Total Design BOM count
47.	Cross Freq	56.744 kHz	System Information	Bode plot crossover frequency
48.	Duty Cycle	6.665 %	System Information	Duty cycle
49.	Efficiency	91.575 %	System Information	Steady state efficiency
50.	FootPrint	2.007 k mm <sup>2</sup>	System Information	Total Foot Print Area of BOM components
51.	Frequency	400.0 kHz	System Information	Switching frequency
52.	Iout	100.0 A	System Information	Iout operating point
53.	Mode	CCM	System Information	Conduction Mode
54.	Phase Marg	73.627 deg	System Information	Bode Plot Phase Margin
55.	Pout	90.0 W	System Information	Total output power
56.	Total BOM	NA	System Information	Total BOM Cost
57.	Vin	14.0 V	System Information	Vin operating point
58.	Vout	900.0 mV	System Information	Operational Output Voltage
59.	Vout Sch	900.0 mV	System Information	Output voltage selected
60.	Vout Tolerance	888.89 m%	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
61.	Vout p-p	1.082 mV	System Information	Peak-to-peak output ripple voltage

## Design Inputs

#	Name	Value	Description
1.	Iout	100.0	Maximum Output Current
2.	SoftStart	0.05 ms	Soft Start Time (ms)
3.	VinMax	14.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage
5.	Vout	900.0 m	Output Voltage
6.	acFrequency	0.0	AC Frequency
7.	base_pn	TPS53667	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

## Design Assistance

1. **TPS53667** Product Folder : <http://www.ti.com/product/TPS53667> : contains the data sheet and other resources.

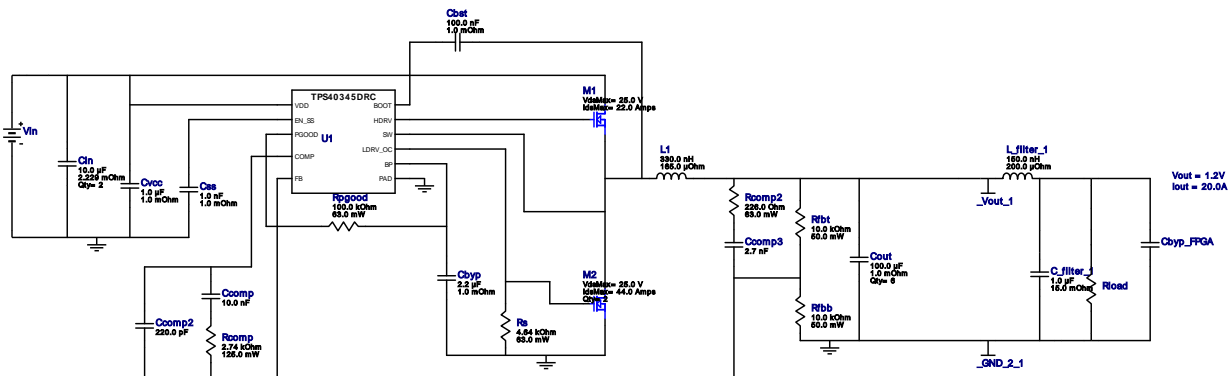


Vout = 1.2V  
Iout = 20.0A

Device = TPS40345DRCR  
Topology = Buck  
Created = 2019-05-06 03:50:10.243  
BOM Cost = \$7.74  
BOM Count = 28  
Total Pd = 2.63W

## WEBENCH® Design Report

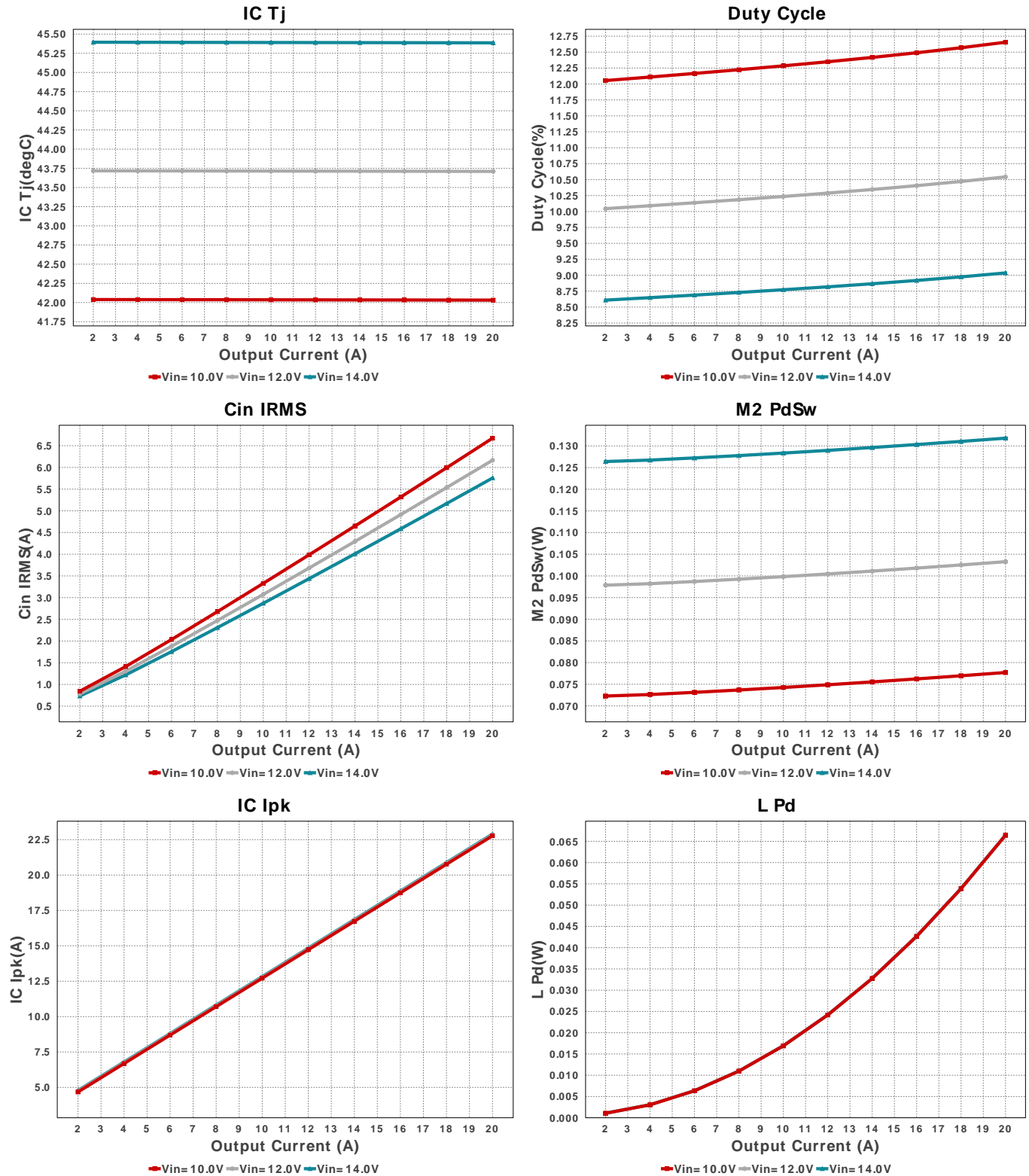
Design : TPS40345DRCR  
TPS40345DRCR 10V-14V to 1.20V @ 20A

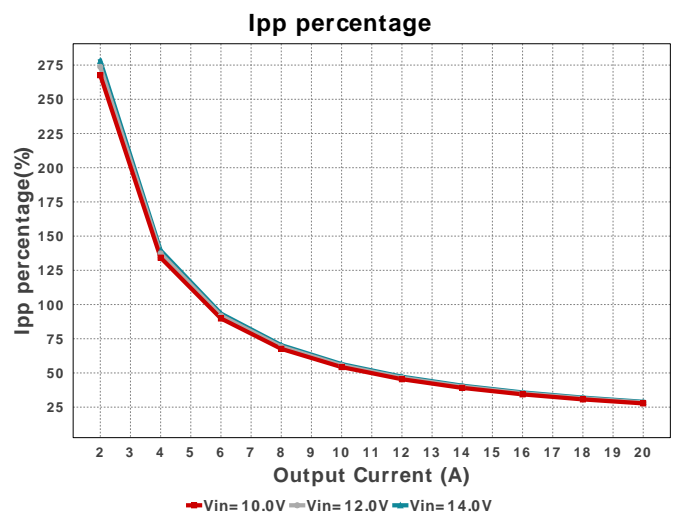
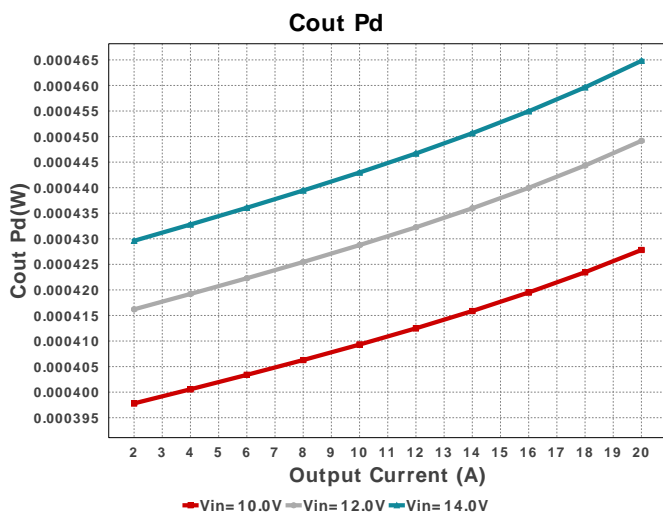
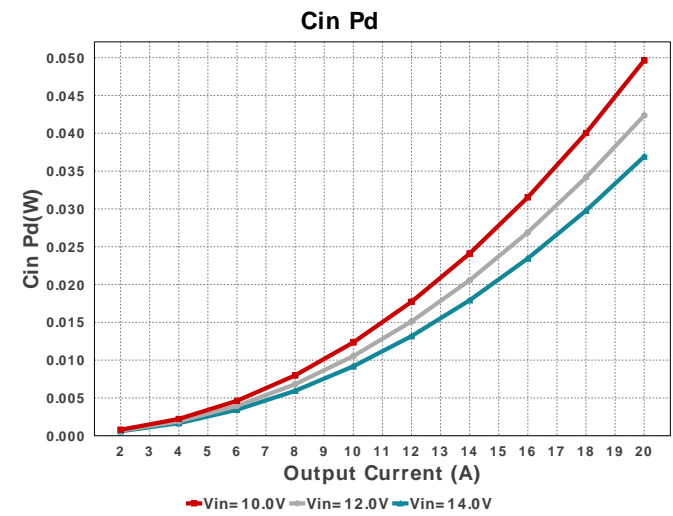
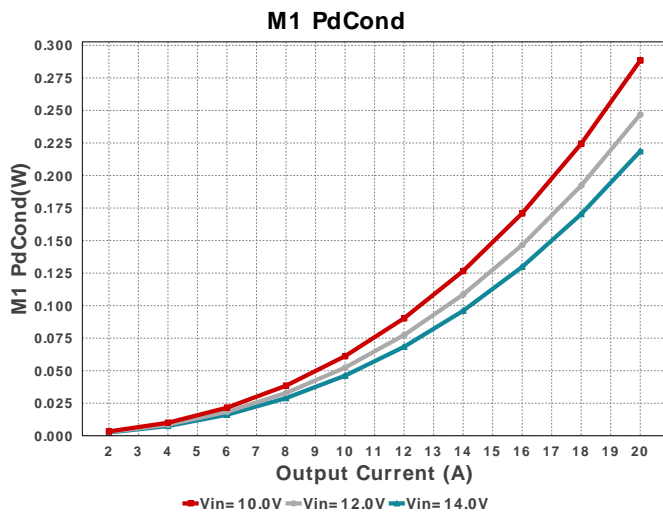
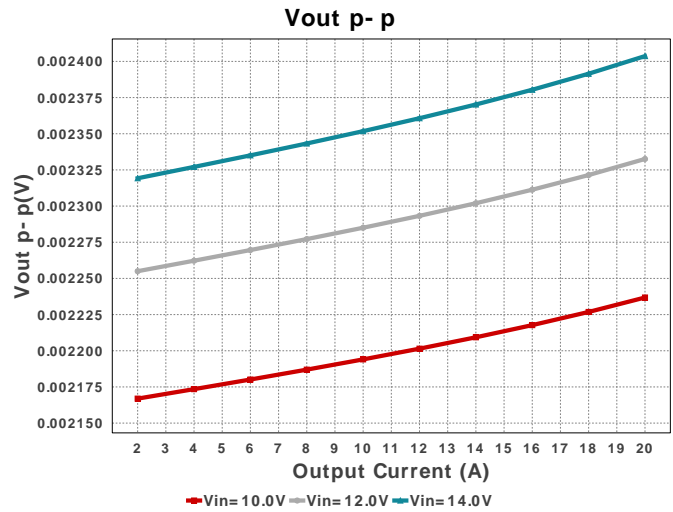
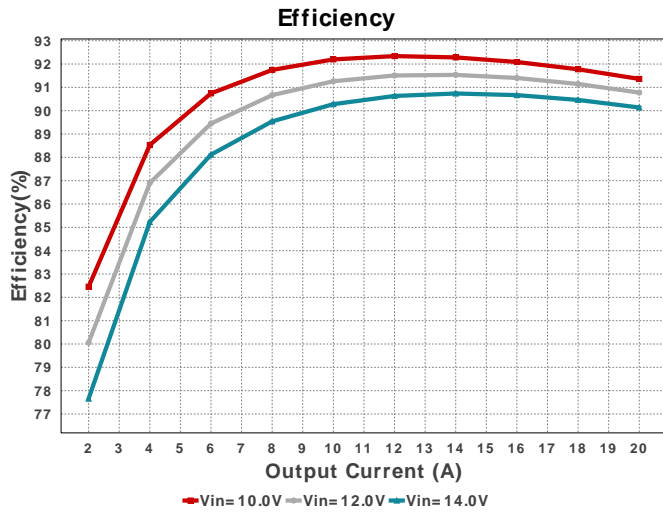


### Electrical BOM

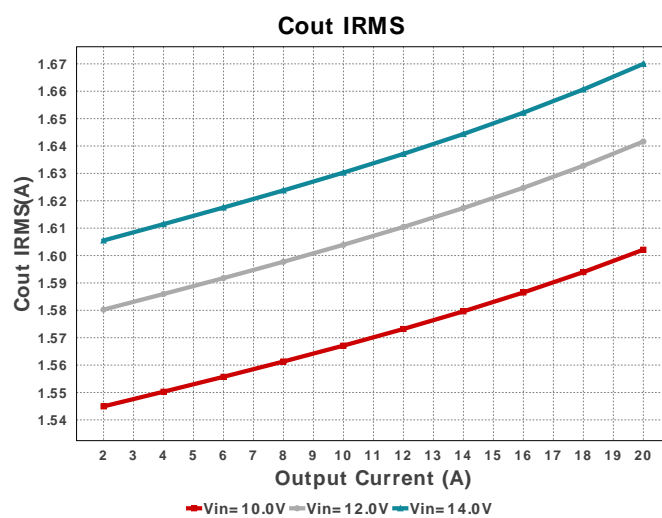
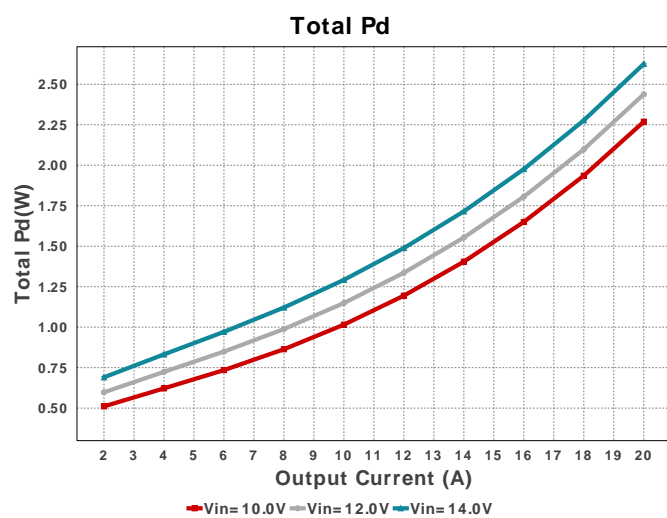
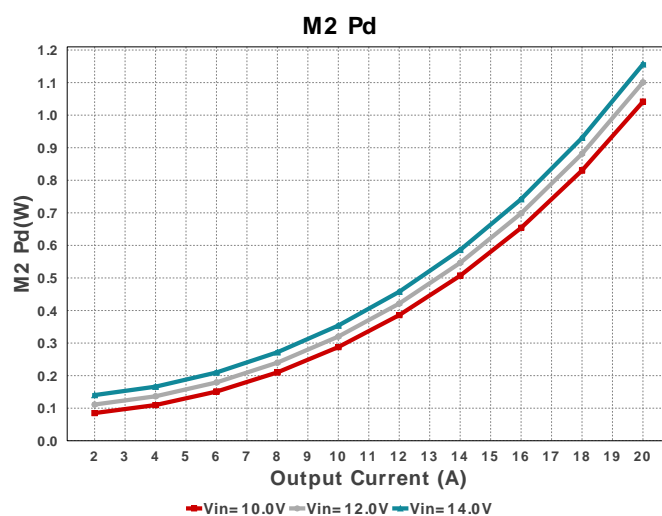
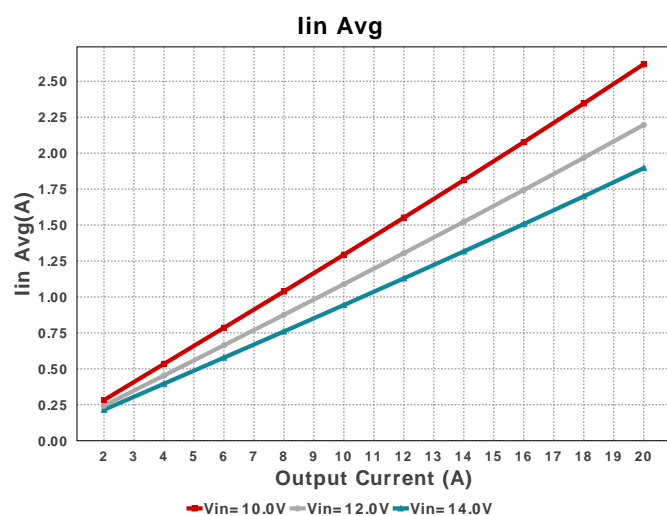
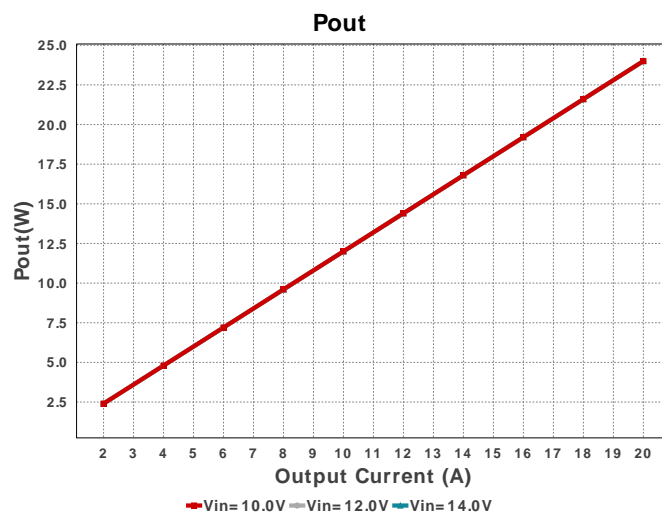
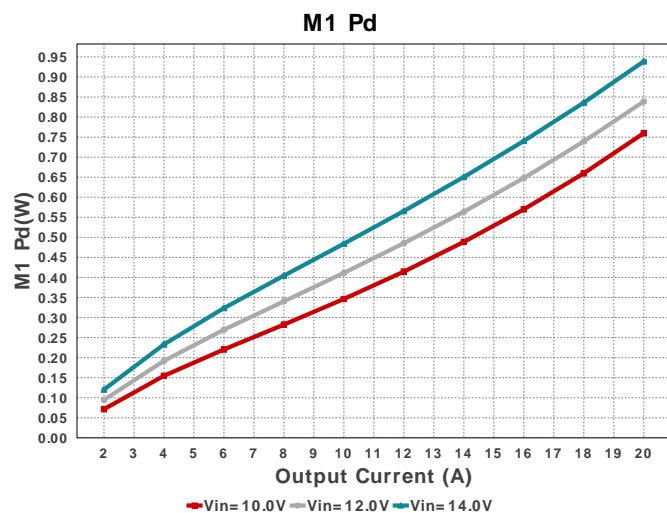
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C_filter_1	Kemet	C0805C105K4RACTU Series= X7R	Cap= 1.0 uF ESR= 15.0 mOhm VDC= 16.0 V IRMS= 8.19 A	1	\$0.02	0805 7 mm <sup>2</sup>
2.	Cbst	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
3.	Cbyp	Taiyo Yuden	LMK212B7225KG-T Series= X7R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm <sup>2</sup>
4.	Ccomp	TDK	C2012C0G1H103K060AA Series= C0G/NP0	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.06	0805 7 mm <sup>2</sup>
5.	Ccomp2	Samsung Electro-Mechanics	CL21C221JBANNNC Series= C0G/NP0	Cap= 220.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
6.	Ccomp3	TDK	CGA4C2C0G1H272J060AA Series= C0G/NP0	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.04	0805 7 mm <sup>2</sup>
7.	Cin	TDK	C3216X6S1V106K160AC Series= X6S	Cap= 10.0 uF ESR= 2.229 mOhm VDC= 35.0 V IRMS= 4.8593 A	2	\$0.18	1206_180 11 mm <sup>2</sup>
8.	Cout	Kemet	C1210C107M9PACTU Series= X5R	Cap= 100.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	6	\$0.50	1210 15 mm <sup>2</sup>
9.	Css	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0201 2 mm <sup>2</sup>
10.	Cvcc	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	L1	Würth Elektronik	744309033	L= 330.0 nH DCR= 165.0 µOhm	1	\$1.81	 SLF1189 173 mm <sup>2</sup>
12.	L_filter_1	Coilcraft	SLC7649S-151KLB	L= 150.0 nH DCR= 200.0 µOhm	1	\$0.47	 SLC7649S 88 mm <sup>2</sup>
13.	M1	Texas Instruments	CSD16327Q3	VdsMax= 25.0 V IdsMax= 22.0 Amps	1	\$0.36	 DQG0008A 18 mm <sup>2</sup>
14.	M2	Texas Instruments	CSD16327Q3	VdsMax= 25.0 V IdsMax= 44.0 Amps	2	\$0.36	 DQG0008A 18 mm <sup>2</sup>
15.	Rcomp	Panasonic	ERJ-6ENF2741V Series= ERJ-6E	Res= 2740.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
16.	Rcomp2	Vishay-Dale	CRCW0402226RFKED Series= CRCW..e3	Res= 226.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
17.	Rfbb	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
18.	Rfbt	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
19.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
20.	Rs	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4640.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
21.	U1	Texas Instruments	TPS40345DRCR	Switcher	1	\$0.75	 DRC0010J 16 mm <sup>2</sup>

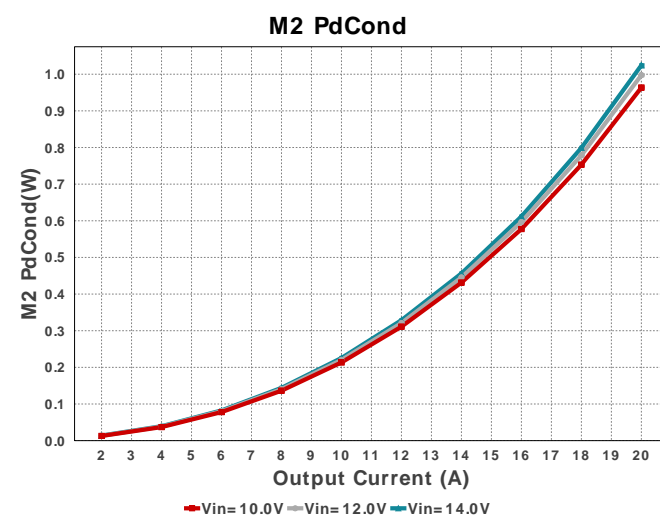
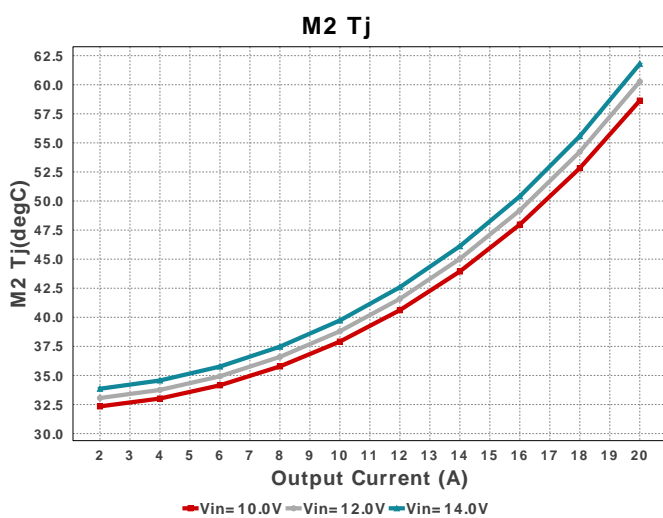
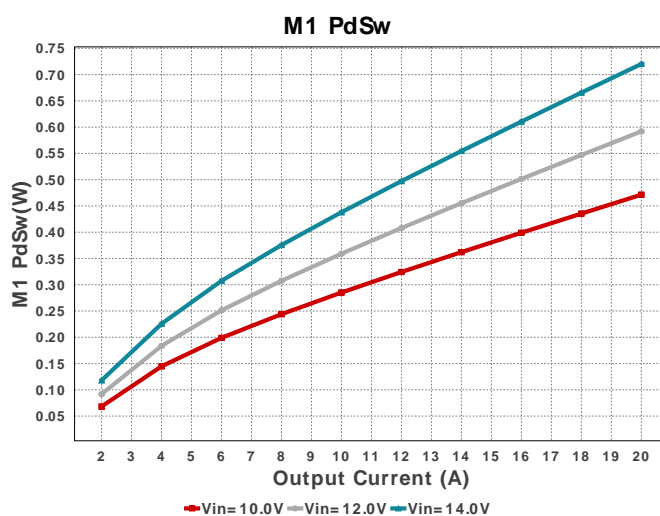
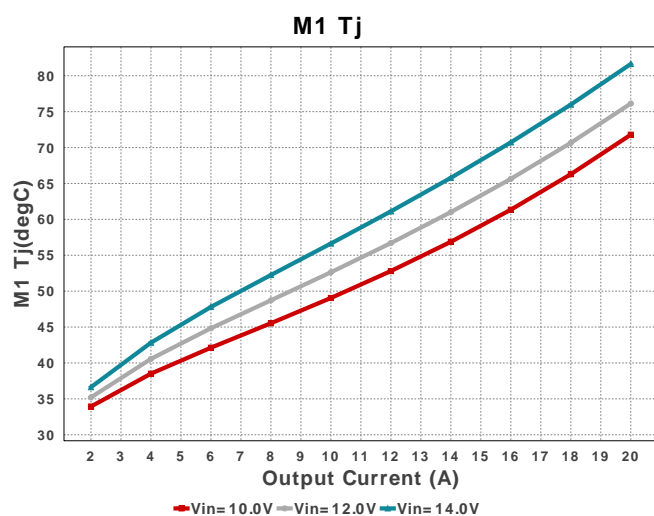
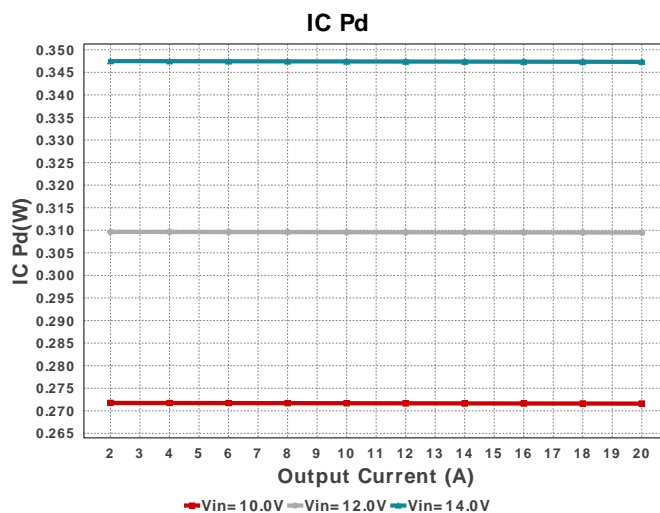
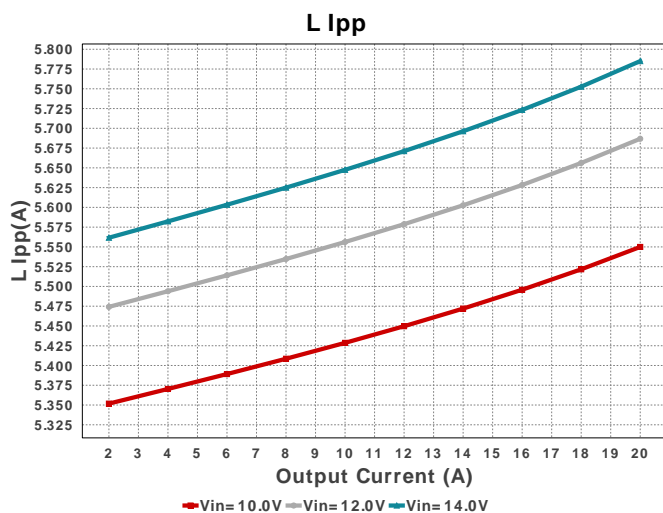


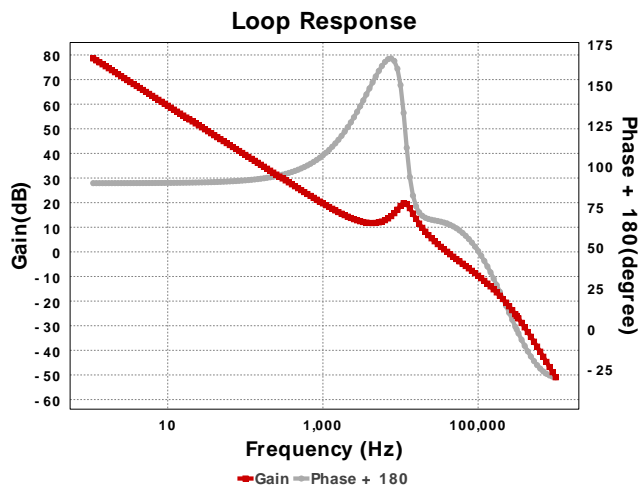












## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	5.756 A	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	36.923 mW	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	1.67 A	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	464.81 $\mu$ W	Capacitor	Output capacitor power dissipation
5.	filter_1 attenuation Factor	500.0 m	Filter	Attenuation factor
6.	filter_1 cut-off freq	412.301 kHz	Filter	Filter cut off frequency filter_1
7.	filter_1 target Vpp	1.202 mV	Filter	Target voltage ripple through filter filter_1
8.	filter_1 voltage drop	4.0 mV	Filter	Voltage drop through filter filter_1
9.	filter_1_Pd	80.0 mW	Filter	Filter Power Loss filter_1
10.	IC Ipk	22.893 A	IC	Peak switch current in IC
11.	IC Pd	347.32 mW	IC	IC power dissipation
12.	IC Tj	45.386 degC	IC	IC junction temperature
13.	IC Tolerance	13.0 mV	IC	IC Feedback Tolerance
14.	ICThetaJA	44.3 degC/W	IC	IC junction-to-ambient thermal resistance
15.	Iin Avg	1.896 A	IC	Average input current
16.	Ipp percentage	28.925 %	Inductor	Inductor ripple current percentage (with respect to average inductor current)
17.	L Ipp	5.785 A	Inductor	Peak-to-peak inductor ripple current
18.	L Pd	66.46 mW	Inductor	Inductor power dissipation
19.	M1 Pd	938.88 mW	Mosfet	M1 MOSFET total power dissipation
20.	M1 PdCond	218.66 mW	Mosfet	M1 MOSFET conduction losses
21.	M1 PdSw	720.22 mW	Mosfet	M1 MOSFET switching losses
22.	M1 Tj	81.639 degC	Mosfet	M1 MOSFET junction temperature
23.	M2 Pd	1.156 W	Mosfet	M2 MOSFET total power dissipation
24.	M2 PdCond	1.024 W	Mosfet	M2 MOSFET conduction losses
25.	M2 PdSw	131.79 mW	Mosfet	M2 MOSFET switching losses
26.	M2 Tj	61.794 degC	Mosfet	M2 MOSFET junction temperature
27.	Cin Pd	36.923 mW	Power	Input capacitor power dissipation
28.	Cout Pd	464.81 $\mu$ W	Power	Output capacitor power dissipation
29.	IC Pd	347.32 mW	Power	IC power dissipation
30.	L Pd	66.46 mW	Power	Inductor power dissipation
31.	M1 Pd	938.88 mW	Power	M1 MOSFET total power dissipation
32.	M1 PdCond	218.66 mW	Power	M1 MOSFET conduction losses
33.	M1 PdSw	720.22 mW	Power	M1 MOSFET switching losses
34.	M2 Pd	1.156 W	Power	M2 MOSFET total power dissipation
35.	M2 PdCond	1.024 W	Power	M2 MOSFET conduction losses
36.	M2 PdSw	131.79 mW	Power	M2 MOSFET switching losses
37.	Total Pd	2.626 W	Power	Total Power Dissipation
38.	filter_1_Pd	80.0 m	Power	
39.	BOM Count	28	System Information	Total Design BOM count
40.	Cross Freq	39.822 kHz	System Information	Bode plot crossover frequency
41.	Duty Cycle	9.036 %	System Information	Duty cycle
42.	Efficiency	90.137 %	System Information	Steady state efficiency
43.	FootPrint	507.0 mm <sup>2</sup>	System Information	Total Foot Print Area of BOM components
44.	Frequency	600.0 kHz	System Information	Switching frequency

#	Name	Value	Category	Description
45.	Gain Marg	-26.051 dB	System Information	Bode Plot Gain Margin
46.	Iout	20.0 A	System Information	Iout operating point
47.	Low Freq Gain	78.587 dB	System Information	Gain at 1Hz
48.	Mode	CCM	System Information	Conduction Mode
49.	Phase Marg	65.146 deg	System Information	Bode Plot Phase Margin
50.	Pout	24.0 W	System Information	Total output power
51.	Total BOM	\$7.74	System Information	Total BOM Cost
52.	Vin	14.0 V	System Information	Vin operating point
53.	Vout	1.2 V	System Information	Operational Output Voltage
54.	Vout Actual	1.2 V	System Information	Vout Actual calculated based on selected voltage divider resistors
55.	Vout Tolerance	3.199 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
56.	Vout p-p	2.404 mV	System Information	Peak-to-peak output ripple voltage

## Design Inputs

#	Name	Value	Description
1.	Iout	20.0	Maximum Output Current
2.	SoftStart	0.05 ms	Soft Start Time (ms)
3.	VinMax	14.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage
5.	Vout	1.2	Output Voltage
6.	acFrequency	0.0	AC Frequency
7.	base_pn	TPS40345	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

## Design Assistance

1. **TPS40345** Product Folder : <http://www.ti.com/product/TPS40345> : contains the data sheet and other resources.

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