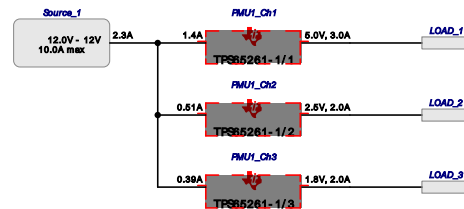


# WEBENCH® Power Architect



## Project Report

Project : 4466246/10 : TPS65261-1 PMU project  
 Created : 2018-03-27 05:52:51.312

### Project Summary

- |                                   |                       |
|-----------------------------------|-----------------------|
| 1. Total System Efficiency        | 85.459 %              |
| 2. Total System BOM Count         | 47.0                  |
| 3. Total System Footprint         | 407.0 mm <sup>2</sup> |
| 4. Total System BOM Cost          | \$3.97                |
| 5. Total System Power Dissipation | 4.016 W               |

--> Launch WEBENCH Power Architect.

### My Comments

No comments

### Sequencer Flag Table

Supply	Sequencer Flag	Load	Load Name
PMU1_Ch1	0	LOAD_1	
PMU1_Ch2	0	LOAD_2	
PMU1_Ch3	0	LOAD_3	
PMU1	NA		

### Power Supplies

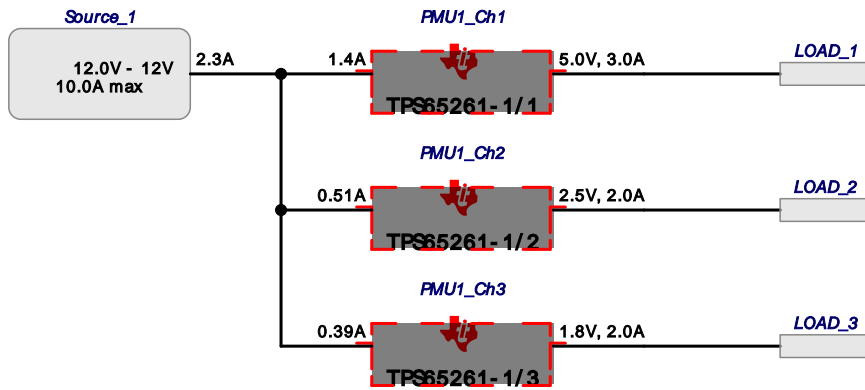
#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	PMU1_Ch1	TPS65261-1/1	Buck : 4.5V to 18V Input, 2A/3A Output Triple DC-DC Buck Converters	5.0 V	3.0 A	89.4%	209	\$1.99	107	9
2.	PMU1_Ch2	TPS65261-1/2	Buck : 4.5V to 18V Input, 2A/3A Output Triple DC-DC Buck Converters	2.5 V	2.0 A	81.2%	126	\$2.28	108	14
3.	PMU1_Ch3	TPS65261-1/3	Buck : 4.5V to 18V Input, 2A/3A Output Triple DC-DC Buck Converters	1.8 V	2.0 A	77%	126	\$2.39	109	19
4.	PMU1	TPS65261-1	PMU : 4.5V to 18V Input, 2A/3A Output Triple DC-DC Buck Converters	V	NaN A	85.5%	407	\$3.97	106	4

### Power Loads

#	Name	VLoad	Iload	Description
1.	LOAD_1	5.0 V	3.0 A	VoutRipple=10%
2.	LOAD_2	2.5 V	2.0 A	VoutRipple=10%
3.	LOAD_3	1.8 V	2.0 A	VoutRipple=10%

## Project Diagram

WEBENCH® Power Architect Project ID : 10 TPS65261-1 PMU project Power Architect 2018-03-27 05:52:51.312



## Electrical Procurement BOM

Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm <sup>2</sup> )
Kemet	C0805C100K5GACTU	0805	1	\$0.01	7
Kemet	C0805C103M5RACTU	0805	3	\$0.01	20
Kemet	C0805C105K4RACTU	0805	1	\$0.02	7
Kemet	C0805C220K3GACTU	0805	1	\$0.01	7
Samsung Electro-Mechanics	CL05C102JB5NNNC	0402	2	\$0.01	6
Samsung Electro-Mechanics	CL21C300JBANNNC	0805	1	\$0.01	7
Samsung Electro-Mechanics	CL21C621JBCNNNC	0805	1	\$0.01	7
Vishay-Dale	CRCW040210R0FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040212K4FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0402147KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040214K7FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040219K6FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040230K1FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040230K9FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040240K2FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040273K2FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04027K68FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040297K6FKED	0402	2	\$0.01	6
Vishay-Dale	CRCW04029K76FKED	0402	3	\$0.01	9
MuRata	GRM155R61C472KA01D	0402	3	\$0.01	9
MuRata	GRM155R61C473KA01D	0402	3	\$0.01	9
MuRata	GRM219R61E106KA12	0805	6	\$0.05	20
MuRata	GRM21BR60J226ME39L	0805	4	\$0.05	14
MuRata	GRM31CR61A226ME19L	1206_190	2	\$0.09	11
Bourns	SDR0805-4R7ML	SDR0805	1	\$0.24	96
Texas Instruments	TPS65261-1RHBR	RHB0032E	1	\$1.40	49
Coilcraft	XAL4030-472MEB	XAL4030	1	\$0.72	25
Coilcraft	XFL4020-472MEB	XFL4020	1	\$0.61	25
Total			47	\$3.62	1000000000004

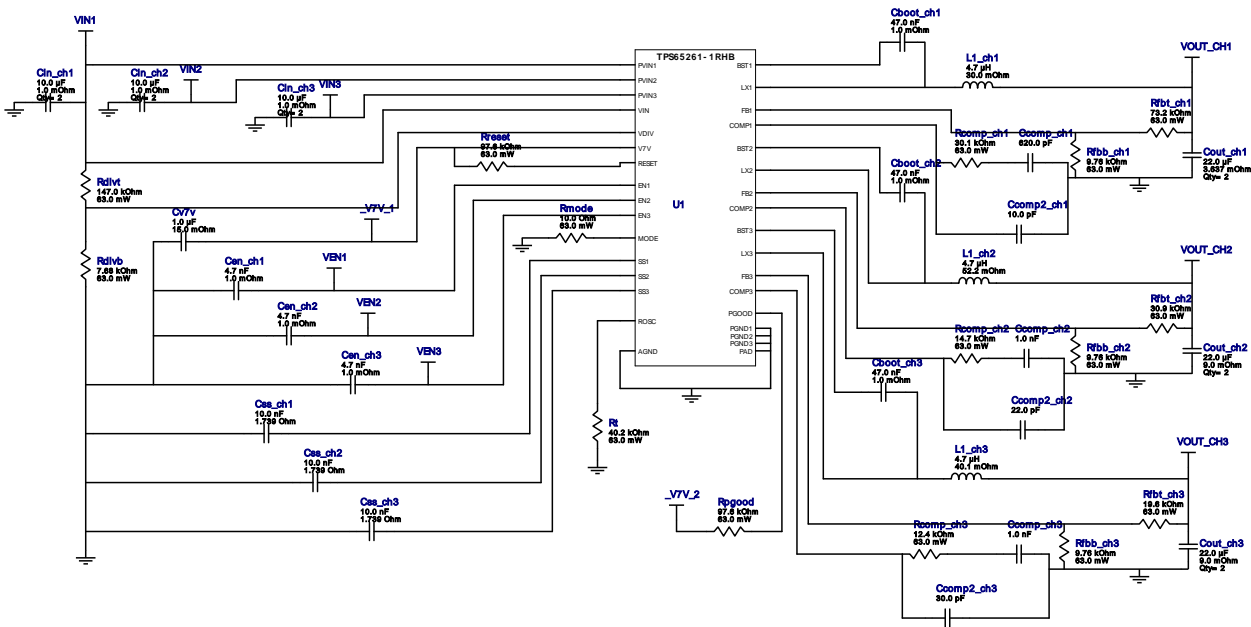


Vout = 5.0V  
 Vout2 = 2.5V  
 Iout = 3.0A  
 Iout2 = 2.0A

Device = TPS65261-1RHBR  
 Topology = PMU  
 Created = 2018-03-27 05:52:49.982  
 BOM Cost = \$3.97  
 BOM Count = 47  
 Total Pd = 4.02W

## WEBENCH® Design Report

















Design : 4466246/106 TPS65261-1RHBR  
 Design 106 - TPS65261-1RHBR










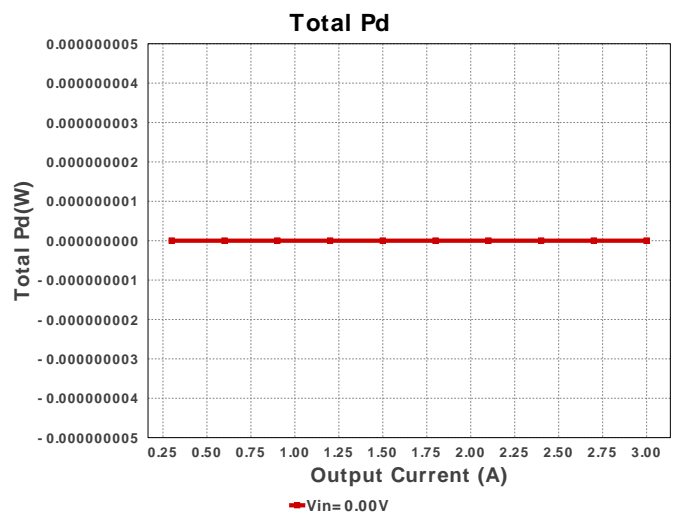
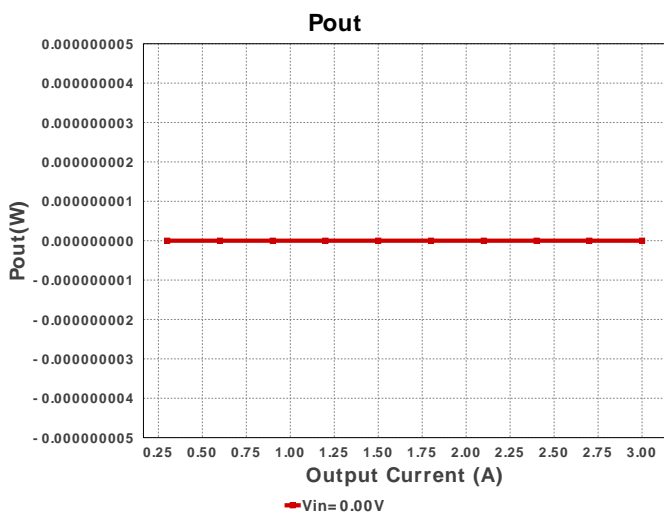
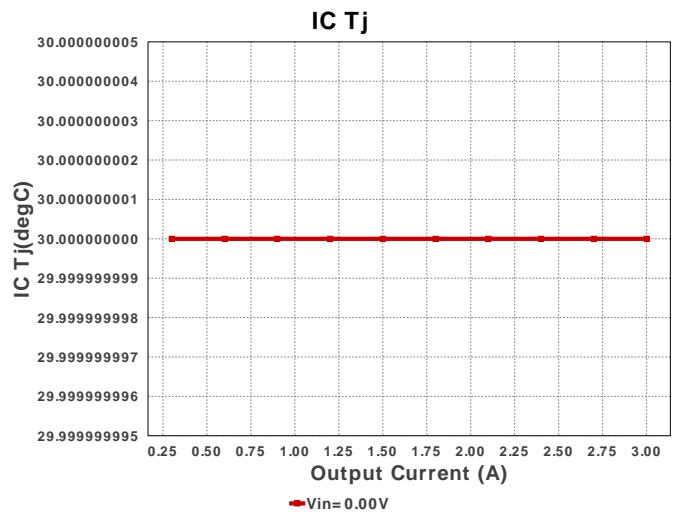
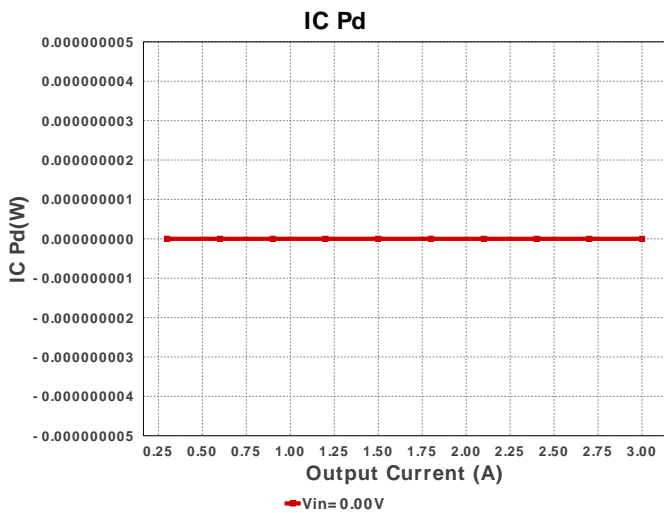
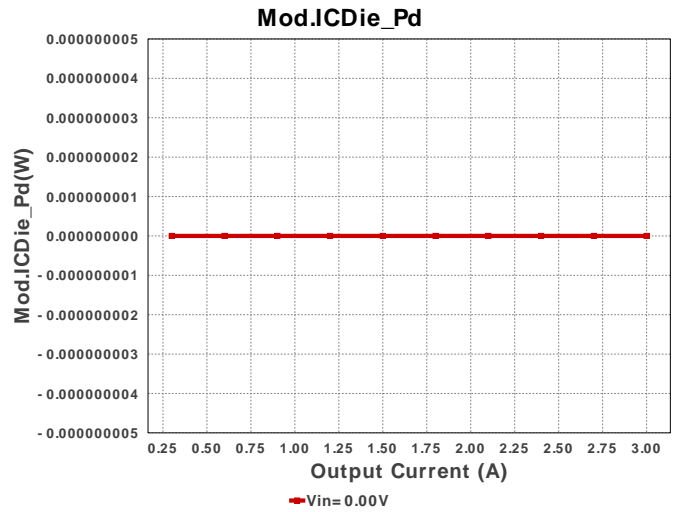
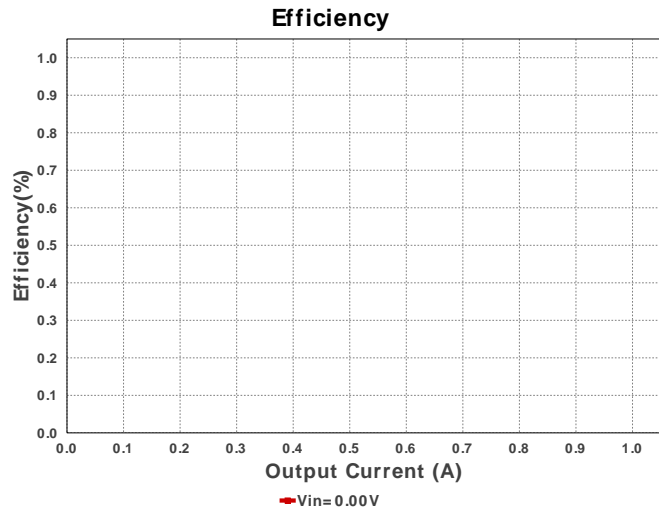
1. This schematic shows all the components for this Power Management Unit. The block diagram on the left shows how the channels are connected. Use the drop down PMU Options selector below the optimization dial on the summary page to get the details for each channel. Or click on the block diagram on the left to select a specific channel.

### Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot_ch1	MuRata	GRM155R61C473KA01D Series= X5R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
2.	Cboot_ch2	MuRata	GRM155R61C473KA01D Series= X5R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
3.	Cboot_ch3	MuRata	GRM155R61C473KA01D Series= X5R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
4.	Ccomp2_ch1	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
5.	Ccomp2_ch2	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
6.	Ccomp2_ch3	Samsung Electro-Mechanics	CL21C300JBANNNC Series= C0G/NP0	Cap= 30.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
7.	Ccomp_ch1	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>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Ccomp_ch2	Samsung Electro-Mechanics	CL05C102JB5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
9.	Ccomp_ch3	Samsung Electro-Mechanics	CL05C102JB5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
10.	Cen_ch1	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
11.	Cen_ch2	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
12.	Cen_ch3	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
13.	Cin_ch1	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	 0805 7 mm <sup>2</sup>
14.	Cin_ch2	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	 0805 7 mm <sup>2</sup>
15.	Cin_ch3	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	 0805 7 mm <sup>2</sup>
16.	Cout_ch1	MuRata	GRM31CR61A226ME19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	2	\$0.09	 1206_190 11 mm <sup>2</sup>
17.	Cout_ch2	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	2	\$0.05	 0805 7 mm <sup>2</sup>
18.	Cout_ch3	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	2	\$0.05	 0805 7 mm <sup>2</sup>
19.	Css_ch1	Kemet	C0805C103M5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	 0805 7 mm <sup>2</sup>
20.	Css_ch2	Kemet	C0805C103M5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	 0805 7 mm <sup>2</sup>
21.	Css_ch3	Kemet	C0805C103M5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	 0805 7 mm <sup>2</sup>
22.	Cv7v	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>
23.	L1_ch1	Bourns	SDR0805-4R7ML	L= 4.7 uH DCR= 30.0 mOhm	1	\$0.24	 SDR0805 96 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	L1_ch2	Coilcraft	XFL4020-472MEB	L= 4.7 $\mu$ H DCR= 52.2 mOhm	1	\$0.61	 XFL4020 25 mm <sup>2</sup>
25.	L1_ch3	Coilcraft	XAL4030-472MEB	L= 4.7 $\mu$ H DCR= 40.1 mOhm	1	\$0.72	 XAL4030 25 mm <sup>2</sup>
26.	Rcomp_ch1	Vishay-Dale	CRCW040230K1FKED Series= CRCW..e3	Res= 30.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
27.	Rcomp_ch2	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
28.	Rcomp_ch3	Vishay-Dale	CRCW040212K4FKED Series= CRCW..e3	Res= 12.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
29.	Rdivb	Vishay-Dale	CRCW04027K68FKED Series= CRCW..e3	Res= 7.68 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
30.	Rdivt	Vishay-Dale	CRCW0402147KFKED Series= CRCW..e3	Res= 147.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
31.	Rfbb_ch1	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
32.	Rfbb_ch2	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
33.	Rfbb_ch3	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
34.	Rfbt_ch1	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
35.	Rfbt_ch2	Vishay-Dale	CRCW040230K9FKED Series= CRCW..e3	Res= 30.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
36.	Rfbt_ch3	Vishay-Dale	CRCW040219K6FKED Series= CRCW..e3	Res= 19.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
37.	Rmode	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
38.	Rpgood	Vishay-Dale	CRCW040297K6FKED Series= CRCW..e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
39.	Rreset	Vishay-Dale	CRCW040297K6FKED Series= CRCW..e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
40.	Rt	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>
41.	U1	Texas Instruments	TPS65261-1RHBR	Switcher	1	\$1.40	 RHB0032E 49 mm <sup>2</sup>



### Operating Values

#	Name	Value	Category	Description
1.	BOM Count	47	General	Total Design BOM count
2.	FootPrint	407.0 mm <sup>2</sup>	General	Total PMU footprint area of BOM components
3.	Frequency	1.079 MHz	General	Switching frequency
4.	Pout	23.6 W	General	Total PMU output power
5.	Total BOM	\$3.97	General	Total BOM Cost
6.	Efficiency	85.459 %	Op Point	PMU steady state efficiency
7.	IC Tj	90.696 degC	Op Point	PMU IC junction temperature
8.	ICThetaJA	18.0 degC/W	Op Point	IC junction-to-ambient thermal resistance
9.	Cin_ch1 Pd	1.116 mW	Power	Input capacitor power dissipation
10.	Cin_ch2 Pd	361.748 μW	Power	Input capacitor power dissipation
11.	Cin_ch3 Pd	289.056 μW	Power	Input capacitor power dissipation

#	Name	Value	Category	Description
12.	Cout_ch1 Pd	50.551 $\mu$ W	Power	Output capacitor power dissipation
13.	Cout_ch2 Pd	66.987 $\mu$ W	Power	Output capacitor power dissipation
14.	Cout_ch3 Pd	42.939 $\mu$ W	Power	Output capacitor power dissipation
15.	IC Pd	3.372 W	Power	IC Pd
16.	L1_ch1 Pd	270.834 mW	Power	Inductor power dissipation
17.	L1_ch2 Pd	209.577 mW	Power	Inductor power dissipation
18.	L1_ch3 Pd	160.783 mW	Power	Inductor power dissipation
19.	Mod.ICDie_Pd	3.372 W	Power	IC Pd
20.	Total Pd	4.016 W	Power	PMU total power dissipation
21.	Total Pd	4.016 W	Power	PMU total power dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	Iout1	3.0	Output Current #1
3.	Iout2	2.0	Output Current #2
4.	Iout3	2.0	Output Current #3
5.	Vin1Max	12.0	Maximum Input Voltage #1
6.	Vin1Min	12.0	Minimum Input Voltage #1
7.	Vin2Max	12.0	Maximum Input Voltage #2
8.	Vin2Min	12.0	Minimum Input Voltage #2
9.	Vin3Max	12.0	Maximum Input Voltage #3
10.	Vin3Min	12.0	Minimum Input Voltage #3
11.	Vout	5.0	Output Voltage
12.	Vout1	5.0	Output Voltage #1
13.	Vout2	2.5	Output Voltage #2
14.	Vout3	1.8	Output Voltage #3
15.	base_pn	TPS65261-1	Texas Instruments Base Part Number
16.	source	DC	Input Source Type
17.	ta	30.0	Ambient temperature

## Design Assistance

1. TPS65261-1 Product Folder : <http://www.ti.com/product/tps65261-1> : contains the data sheet and other resources.



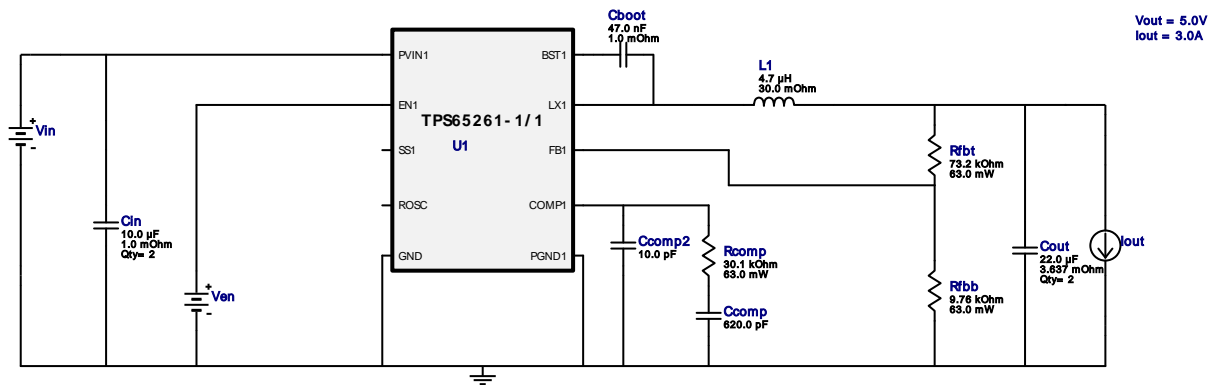


Vout = 5.0V  
Iout = 3.0A

Device = TPS65261-1RHBR  
Topology = Buck  
Created = 2018-03-27 05:52:50.171  
BOM Cost = \$NaN  
BOM Count = NaN  
Total Pd = 1.78W


## WEBENCH® Design Report

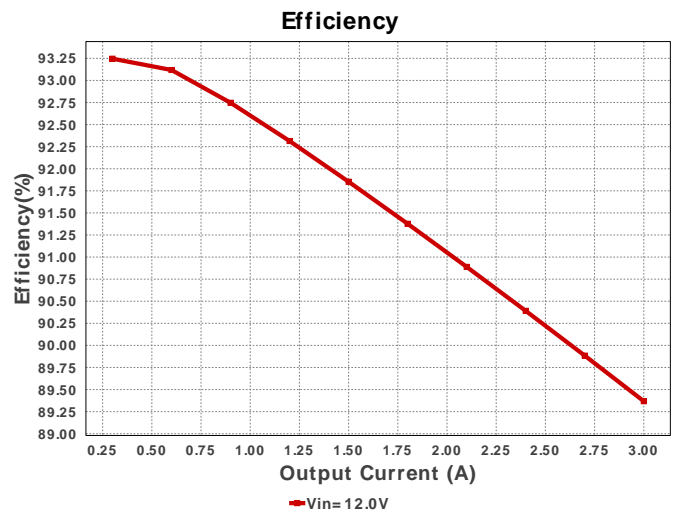
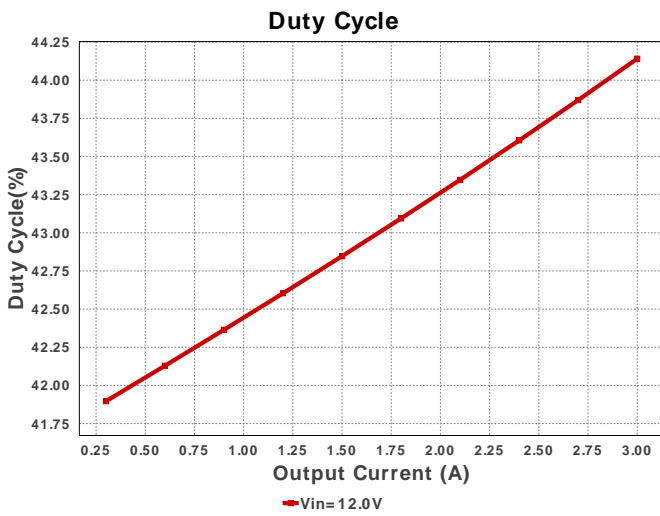
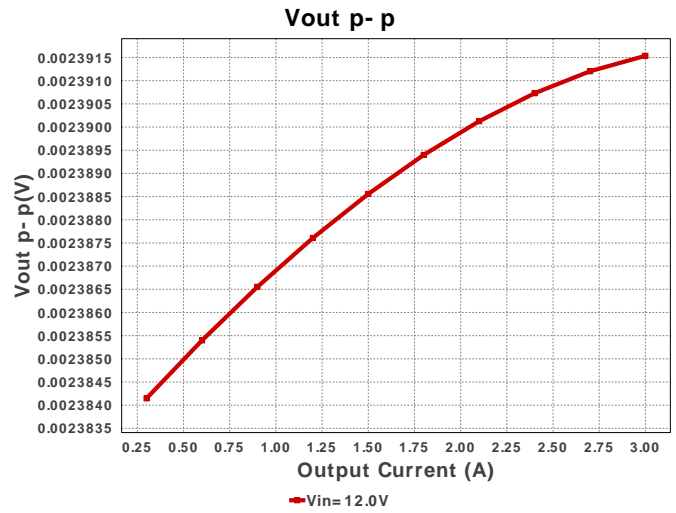
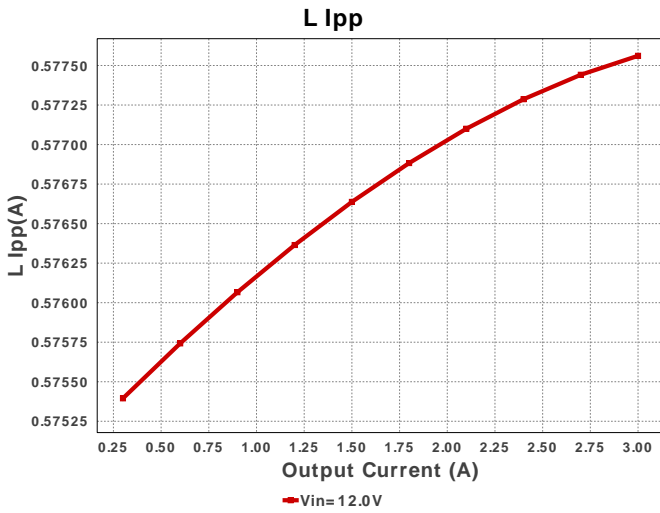
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TPS65261-1RHBR 12.0V-12.0V to 5.00V @ 3.0A

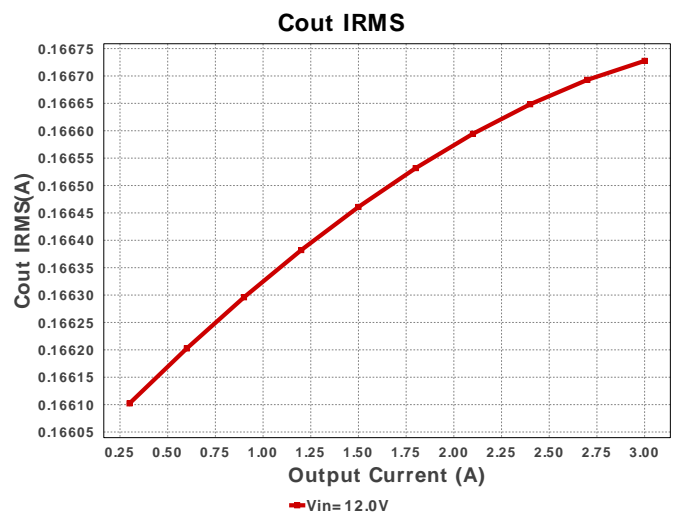
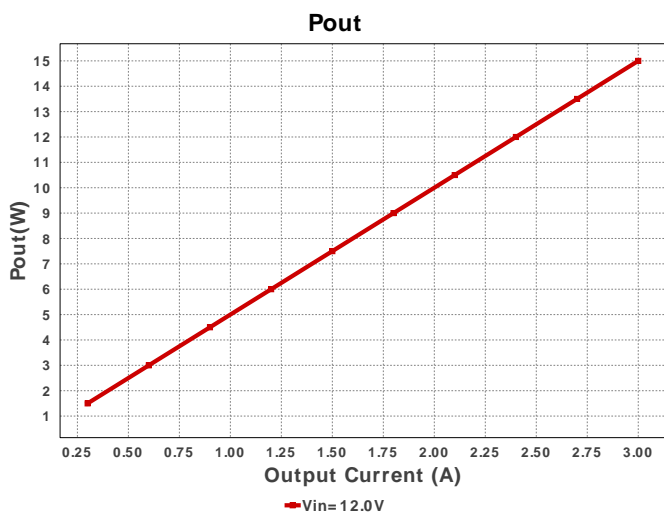
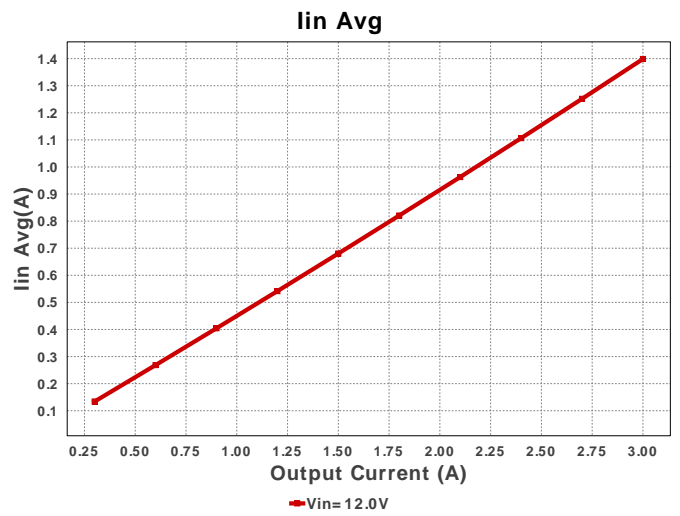
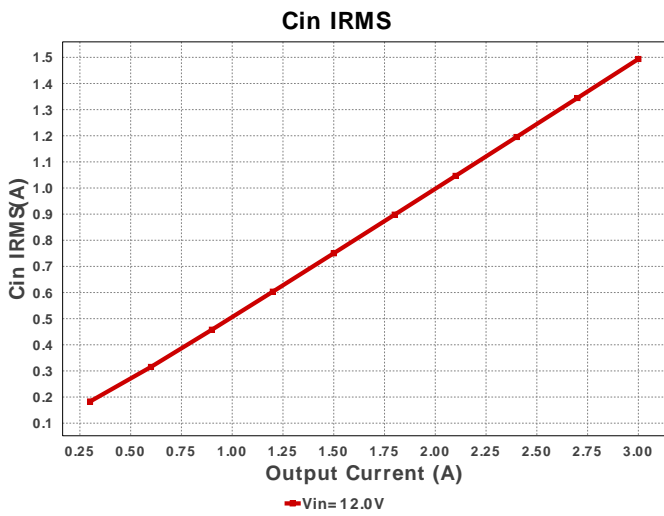
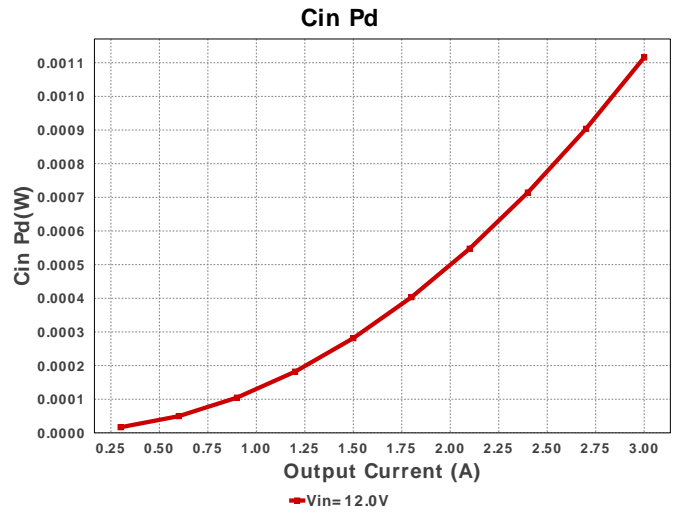
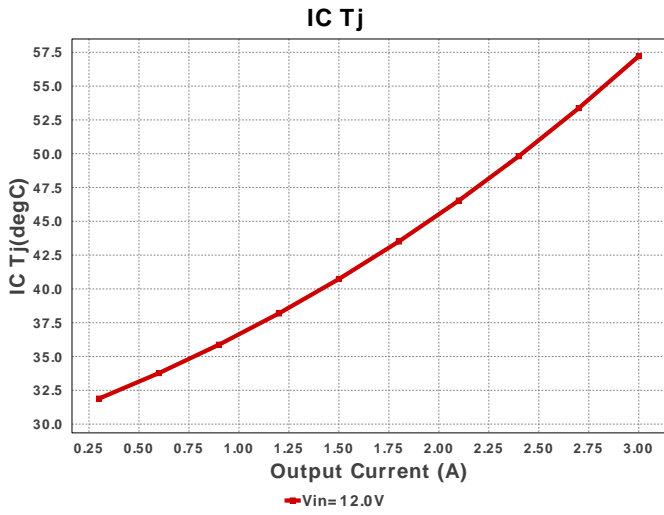


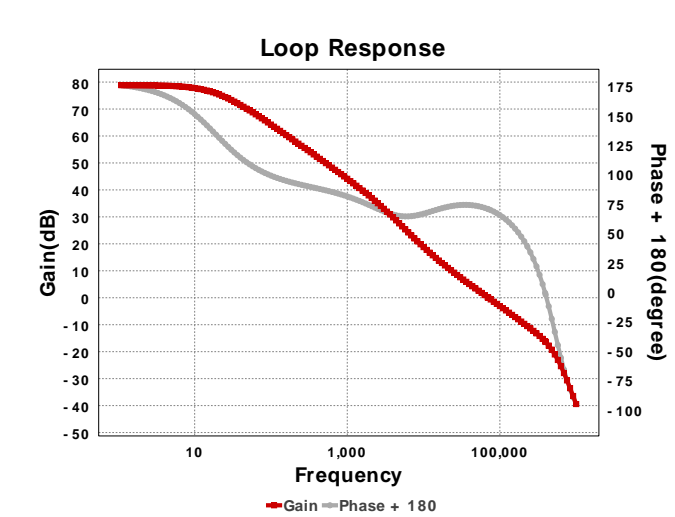
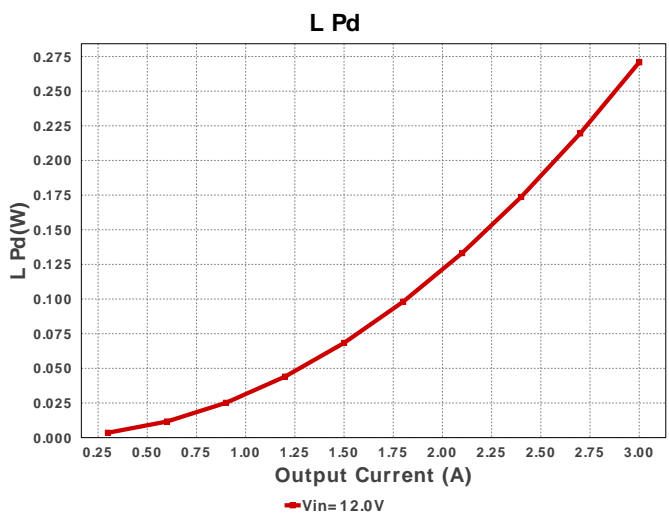
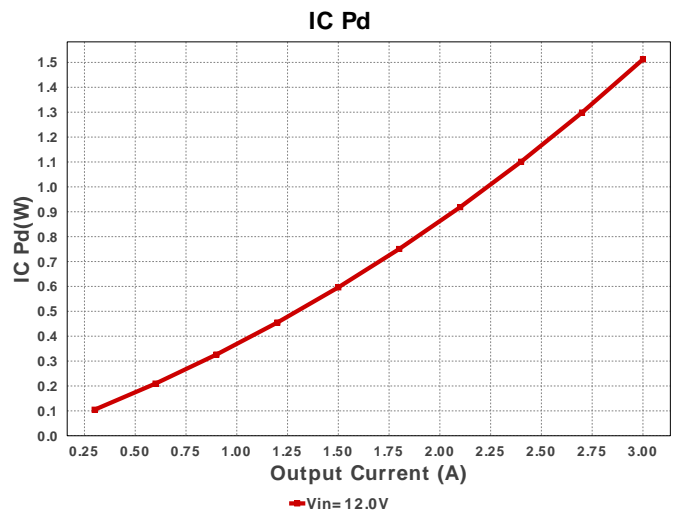
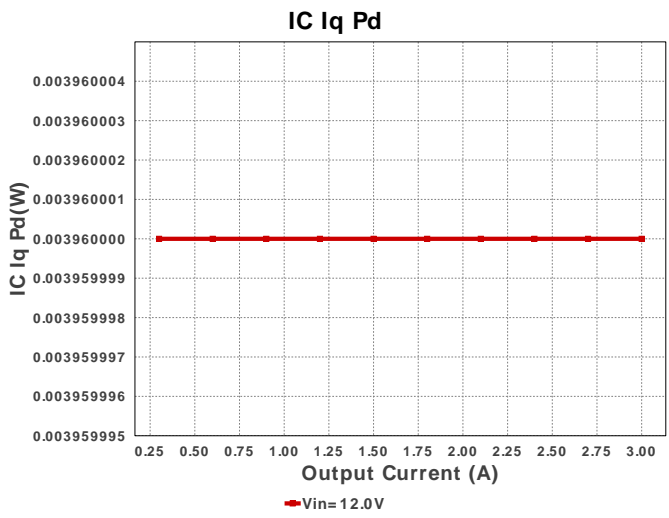
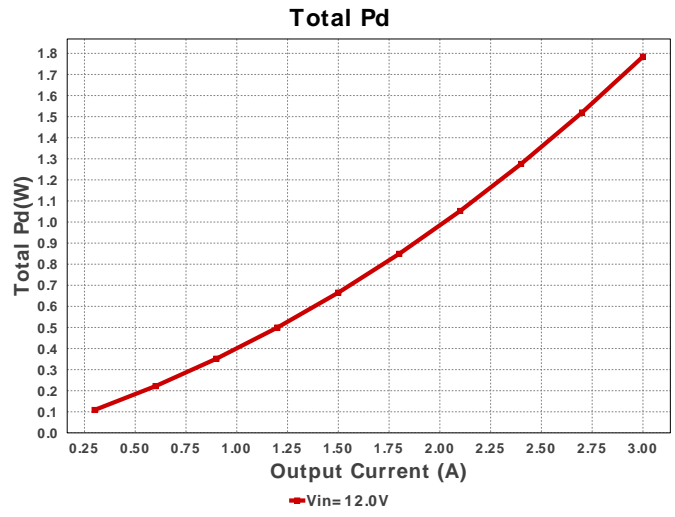
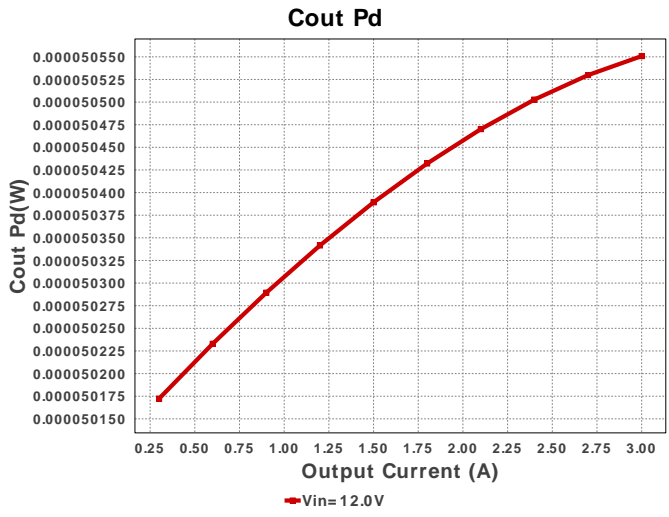
## Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61C473KA01D Series= X5R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
2.	Ccomp	Samsung Electro-Mechanics	CL21C621JBCNMMC Series= C0G/NP0	Cap= 620.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
3.	Ccomp2	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
4.	Cen	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
5.	Cin	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	0805 7 mm <sup>2</sup>
6.	Cout	MuRata	GRM31CR61A226ME19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	2	\$0.09	1206_190 11 mm <sup>2</sup>
7.	L1	Bourns	SDR0805-4R7ML	L= 4.7 uH DCR= 30.0 mOhm	1	\$0.24	SDR0805 96 mm <sup>2</sup>
8.	Rcomp	Vishay-Dale	CRCW040230K1FKED Series= CRCW..e3	Res= 30.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
9.	Rfbb	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
10.	Rfbt	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS65261-1RHBR	Switcher	0	\$1.40	 RHB0032E 49 mm <sup>2</sup>







**Operating Values**

#	Name	Value	Category	Description
1.	Cin IRMS	1.494 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	166.728 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.399 A	Current	Average input current
4.	L Ipp	577.56 mA	Current	Peak-to-peak inductor ripple current
5.	Frequency	1.079 MHz	General	Switching frequency
6.	Mode	CCM	General	Conduction Mode
7.	Pout	15.0 W	General	Total output power
8.	Cross Freq	70.539 kHz	Op Point	Bode plot crossover frequency
9.	Duty Cycle	44.141 %	Op Point	Duty cycle
10.	Efficiency	89.368 %	Op Point	PMU channel steady state efficiency
11.	Gain Marg	-16.215 dB	Op Point	Bode Plot Gain Margin

#	Name	Value	Category	Description
12.	ICThetaJA Effective	18.0 degC/W	Op Point	Applicable to the EVM in free space with no airflow
13.	IOUT_OP	3.0 A	Op Point	Iout operating point
14.	Low Freq Gain	78.837 dB	Op Point	Gain at 1Hz
15.	Phase Marg	71.267 deg	Op Point	Bode Plot Phase Margin
16.	VIN_OP	12.0 V	Op Point	Vin operating point
17.	Vout Actual	5.1 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	5.0 V	Op Point	Operational Output Voltage
19.	Vout Tolerance	2.8 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
20.	Vout p-p	2.392 mV	Op Point	Peak-to-peak output ripple voltage
21.	Cin Pd	1.116 mW	Power	Input capacitor power dissipation
22.	Cout Pd	50.551 $\mu$ W	Power	Output capacitor power dissipation
23.	IC Iq Pd	3.96 mW	Power	IC Iq Pd
24.	IC Pd	1.512 W	Power	IC power dissipation
25.	L Pd	270.834 mW	Power	Inductor power dissipation
26.	Total Pd	1.785 W	Power	PMU channel power dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS65261-1/1	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

## Design Assistance

1. TPS65261-1/1 Product Folder : <http://www.ti.com/product/TPS65261%2D1> : contains the data sheet and other resources.

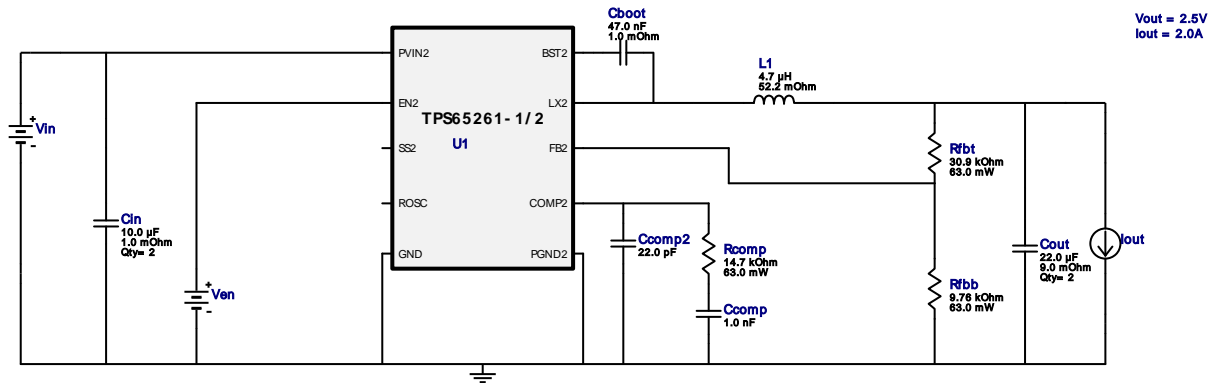


Vout = 2.5V  
Iout = 2.0A

Device = TPS65261-1RHBR  
Topology = Buck  
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BOM Cost = \$NaN  
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Total Pd = 1.16W


## WEBENCH® Design Report

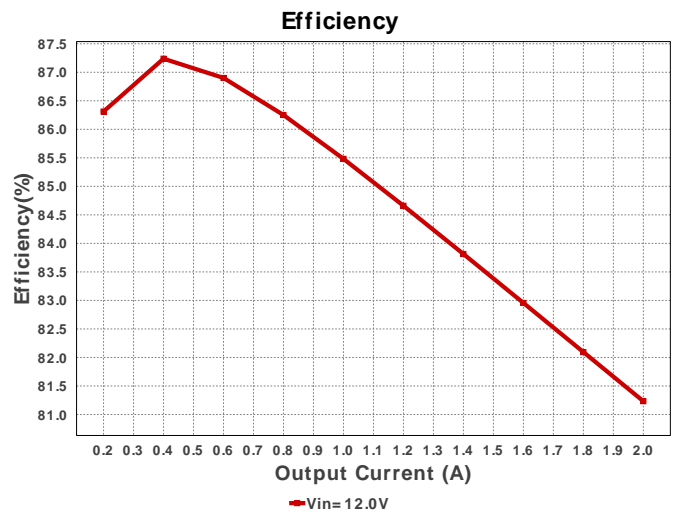
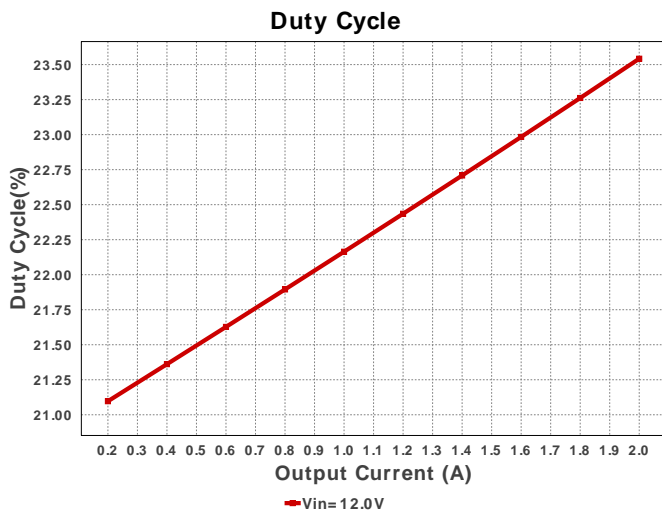
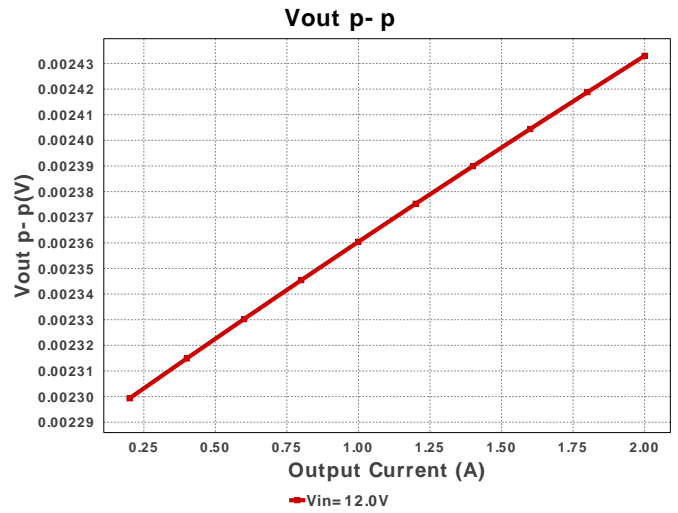
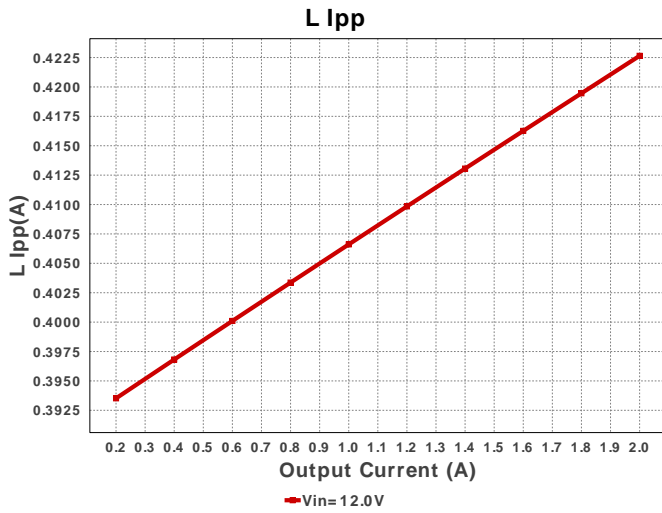
Design : 4466246/108 TPS65261-1RHBR  
TPS65261-1RHBR 12.0V-12.0V to 2.50V @ 2.0A

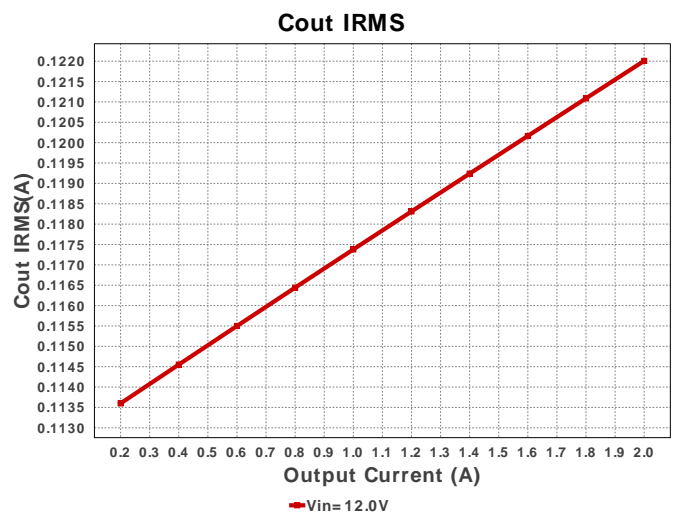
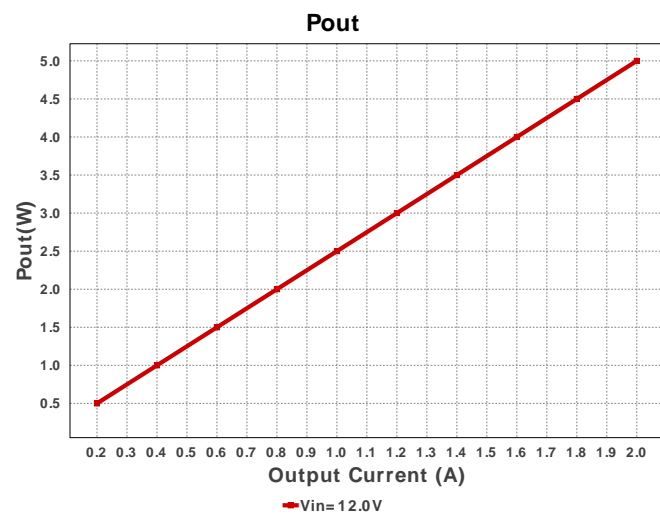
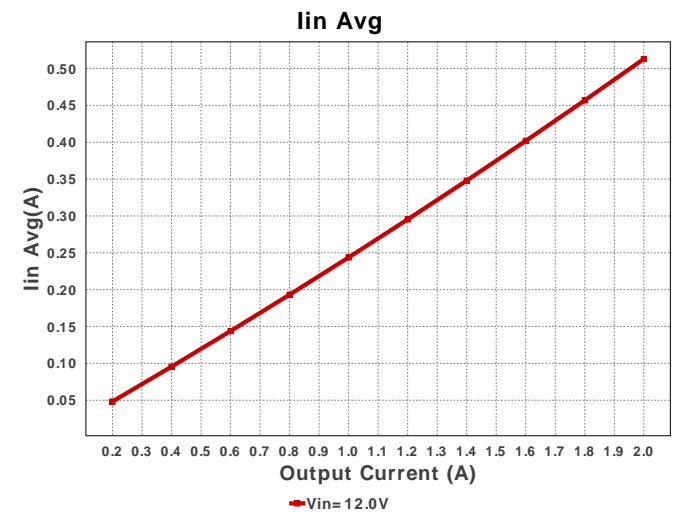
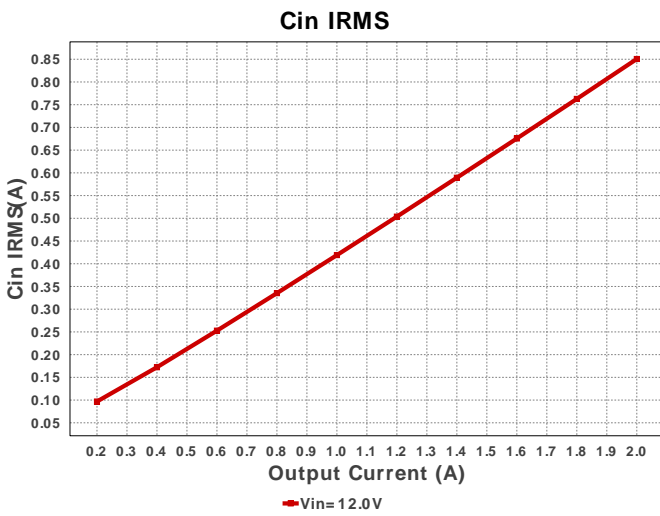
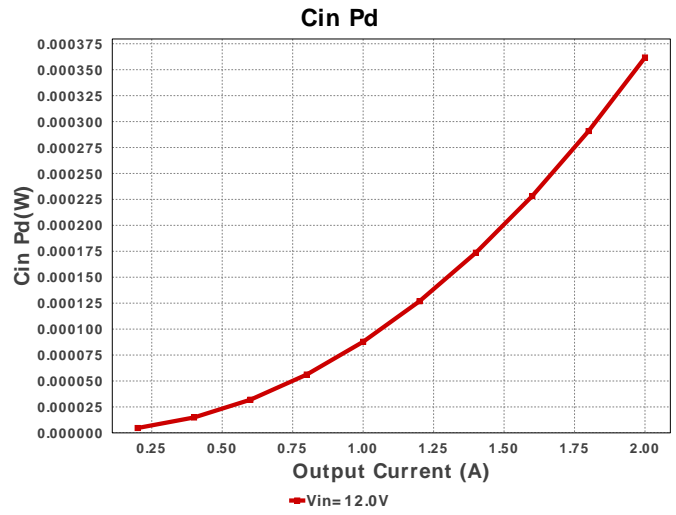
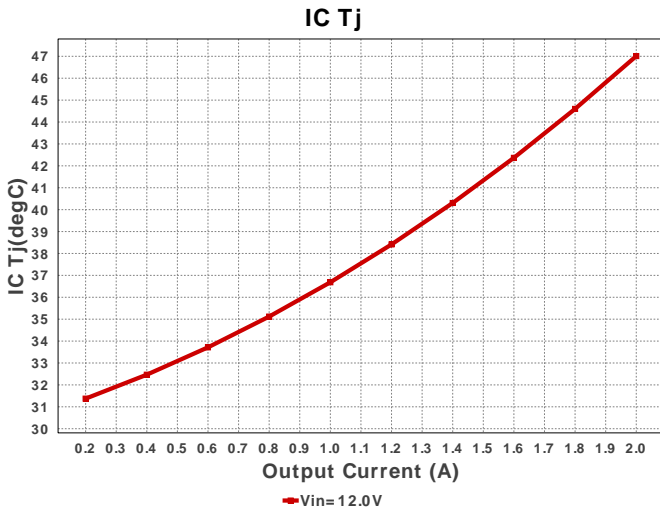


## Electrical BOM

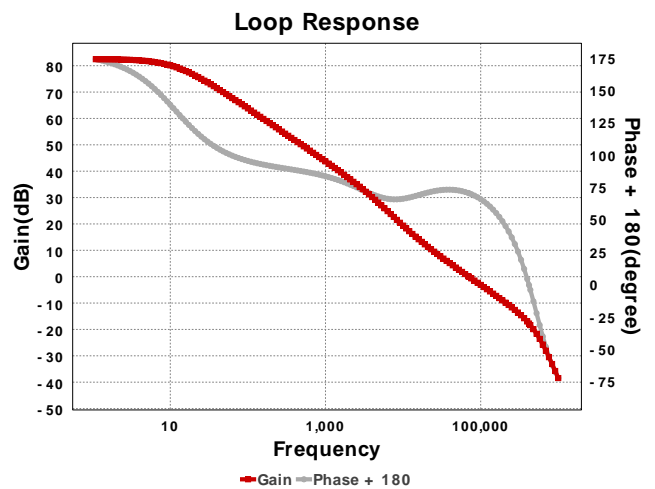
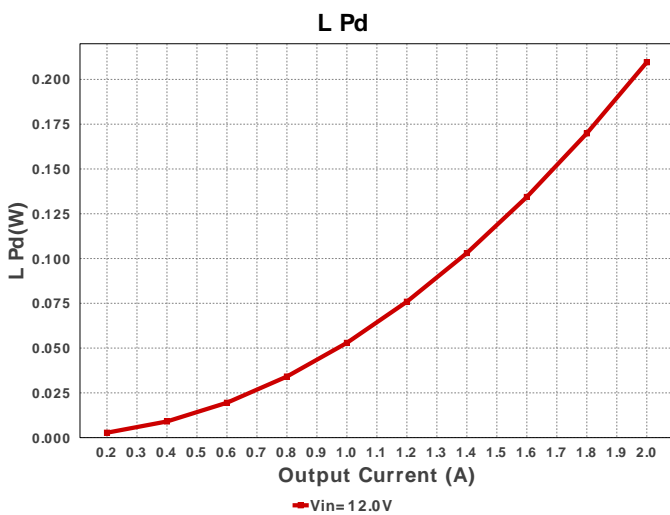
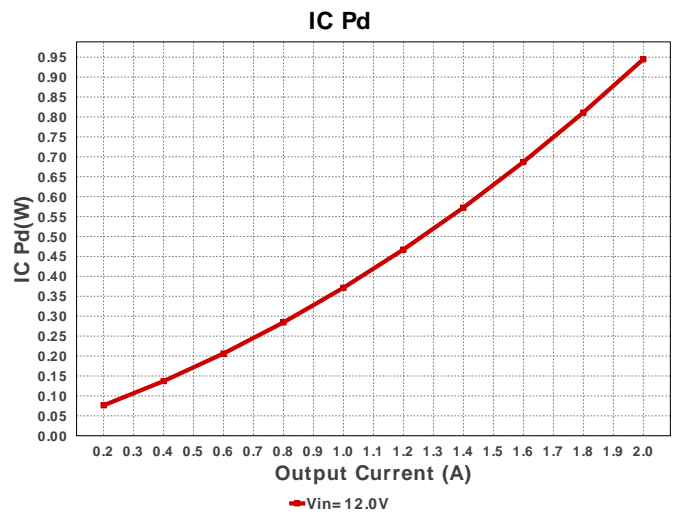
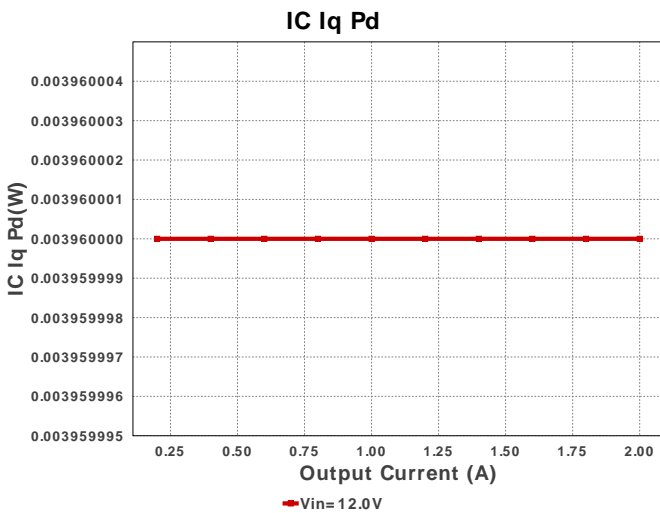
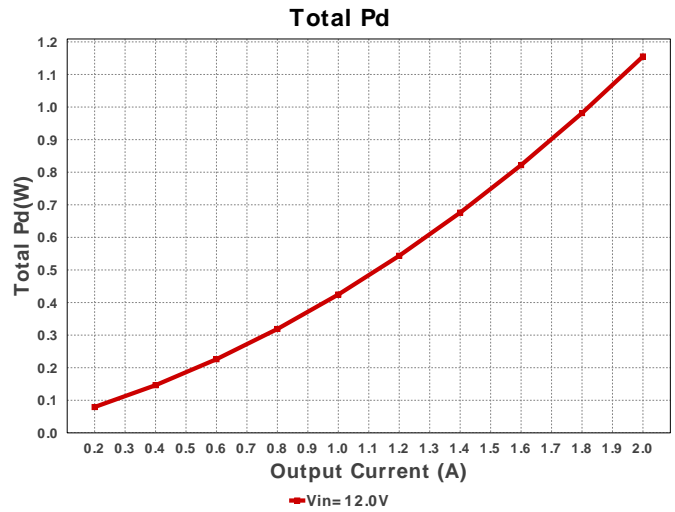
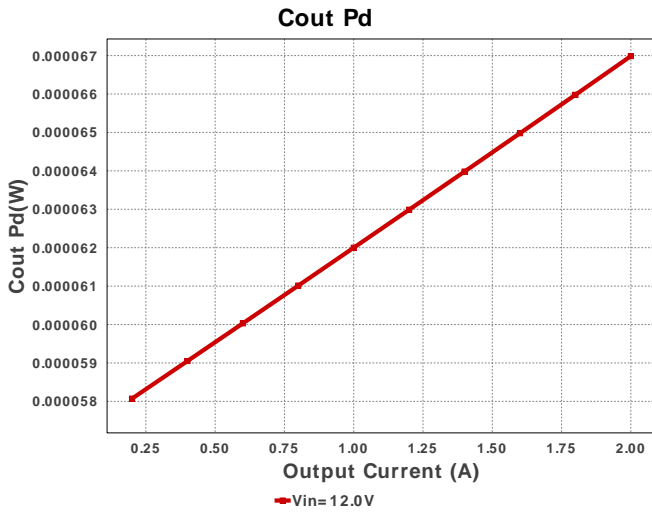
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61C473KA01D Series= X5R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
2.	Ccomp	Samsung Electro-Mechanics	CL05C102JB5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
3.	Ccomp2	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
4.	Cen	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
5.	Cin	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	0805 7 mm <sup>2</sup>
6.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	2	\$0.05	0805 7 mm <sup>2</sup>
7.	L1	Coilcraft	XFL4020-472MEB	L= 4.7 uH DCR= 52.2 mOhm	1	\$0.61	XFL4020 25 mm <sup>2</sup>
8.	Rcomp	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
9.	Rfbb	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.78 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
10.	Rfbt	Vishay-Dale	CRCW040230K9FKED Series= CRCW..e3	Res= 30.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS65261-1RHBR	Switcher	0	\$1.40	 RHB0032E 49 mm <sup>2</sup>









### Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	850.586 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	122.008 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	512.93 mA	Current	Average input current
4.	L Ipp	422.65 mA	Current	Peak-to-peak inductor ripple current
5.	Frequency	1.079 MHz	General	Switching frequency
6.	Mode	CCM	General	Conduction Mode
7.	Pout	5.0 W	General	Total output power
8.	Cross Freq	70.539 kHz	Op Point	Bode plot crossover frequency
9.	Duty Cycle	23.542 %	Op Point	Duty cycle
10.	Efficiency	81.233 %	Op Point	PMU channel steady state efficiency
11.	Gain Marg	-17.759 dB	Op Point	Bode Plot Gain Margin

#	Name	Value	Category	Description
12.	ICThetaJA Effective	18.0 degC/W	Op Point	Applicable to the EVM in free space with no airflow
13.	IOUT_OP	2.0 A	Op Point	Iout operating point
14.	Low Freq Gain	82.461 dB	Op Point	Gain at 1Hz
15.	Phase Marg	71.035 deg	Op Point	Bode Plot Phase Margin
16.	VIN_OP	12.0 V	Op Point	Vin operating point
17.	Vout Actual	2.5 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	2.5 V	Op Point	Operational Output Voltage
19.	Vout Tolerance	2.551 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
20.	Vout p-p	2.433 mV	Op Point	Peak-to-peak output ripple voltage
21.	Cin Pd	361.748 $\mu$ W	Power	Input capacitor power dissipation
22.	Cout Pd	66.987 $\mu$ W	Power	Output capacitor power dissipation
23.	IC Iq Pd	3.96 mW	Power	IC Iq Pd
24.	IC Pd	944.968 mW	Power	IC power dissipation
25.	L Pd	209.577 mW	Power	Inductor power dissipation
26.	Total Pd	1.155 W	Power	PMU channel power dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	2.5	Output Voltage
5.	base_pn	TPS65261-1/2	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

## Design Assistance

1. TPS65261-1/2 Product Folder : <http://www.ti.com/product/TPS65261%2D1> : contains the data sheet and other resources.

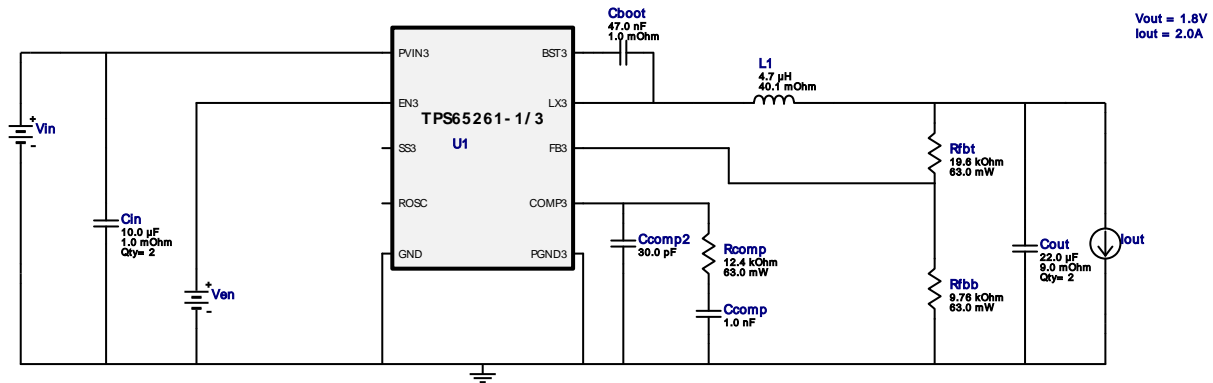


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Iout = 2.0A

Device = TPS65261-1RHBR  
Topology = Buck  
Created = 2018-03-27 05:52:50.751  
BOM Cost = \$NaN  
BOM Count = NaN  
Total Pd = 1.08W


## WEBENCH® Design Report

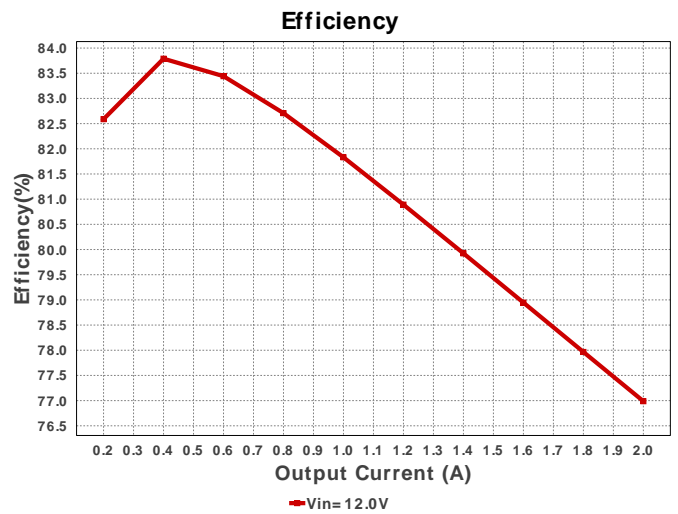
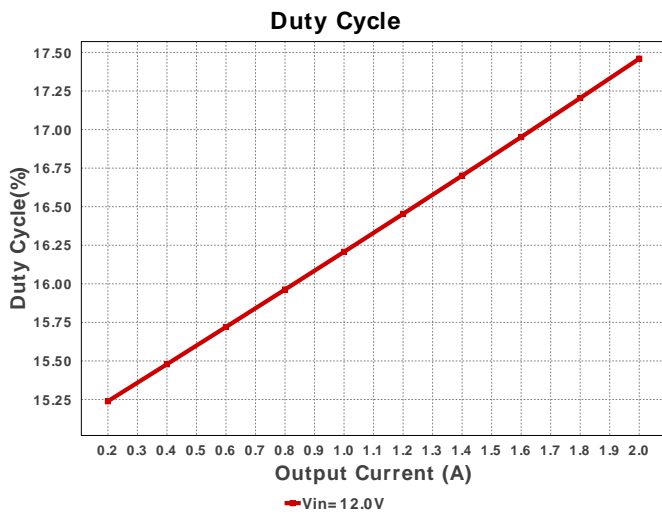
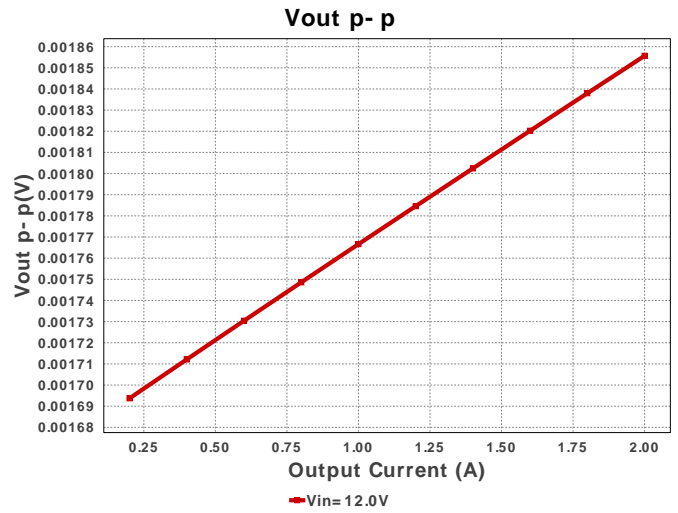
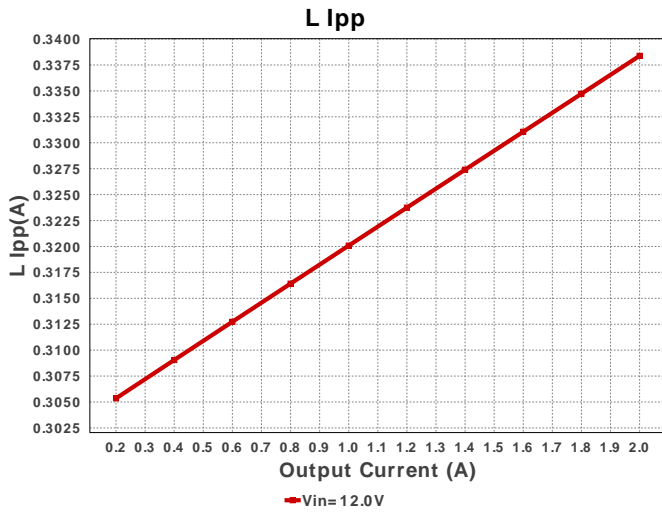
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TPS65261-1RHBR 12.0V-12.0V to 1.80V @ 2.0A

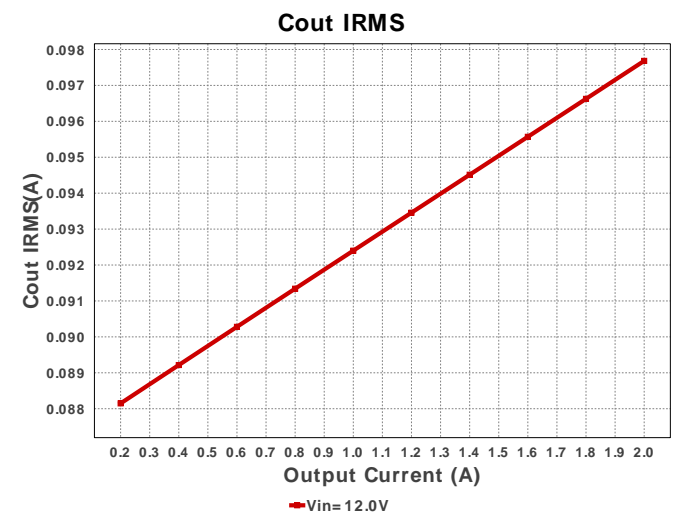
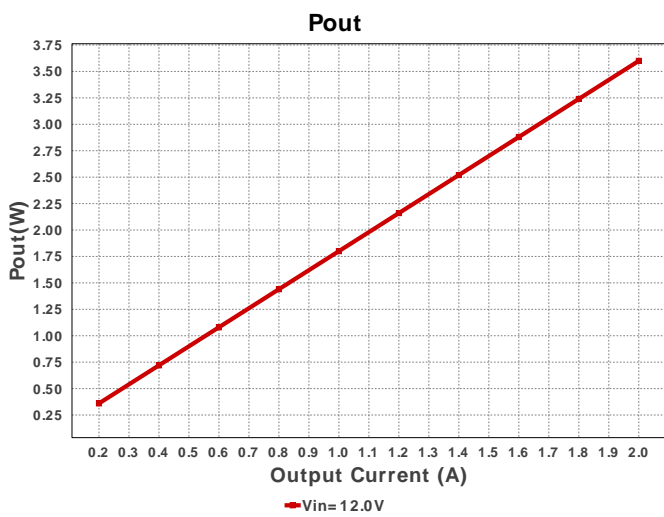
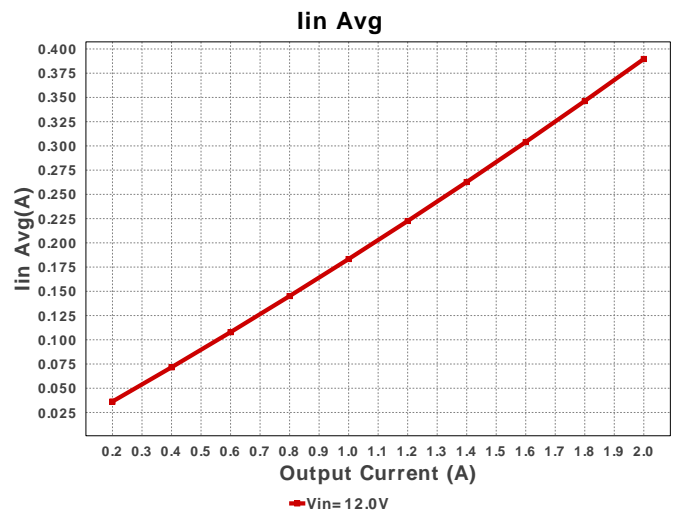
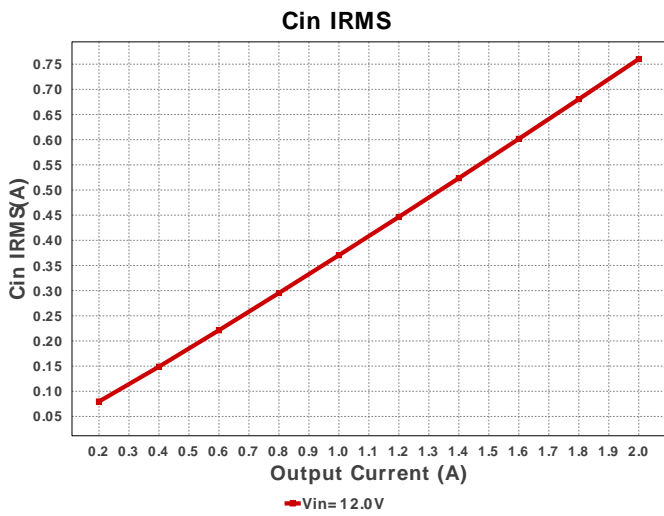
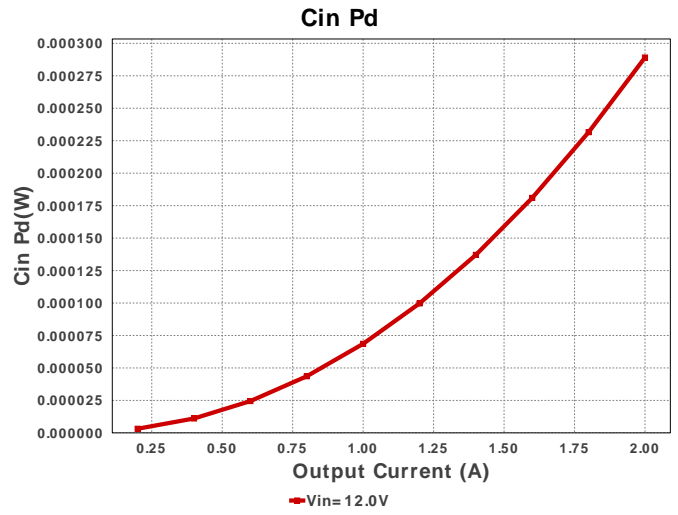
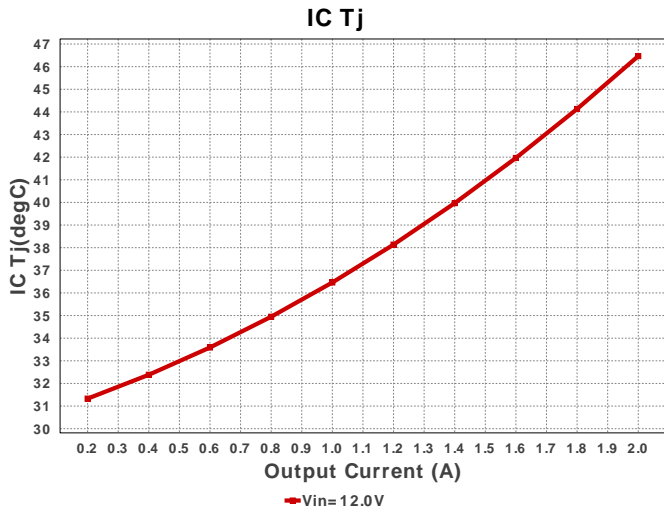


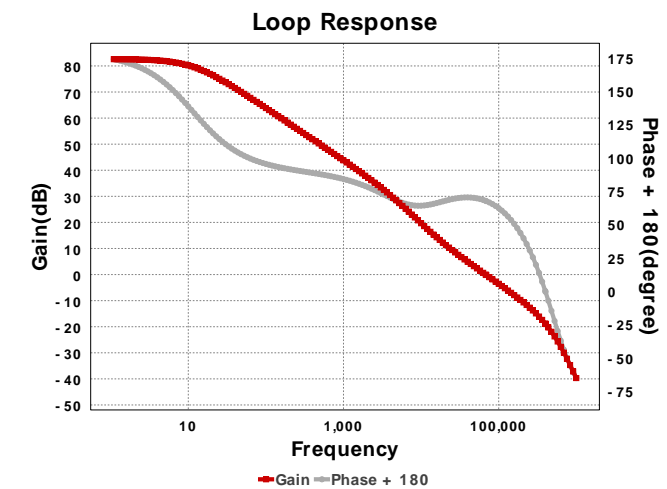
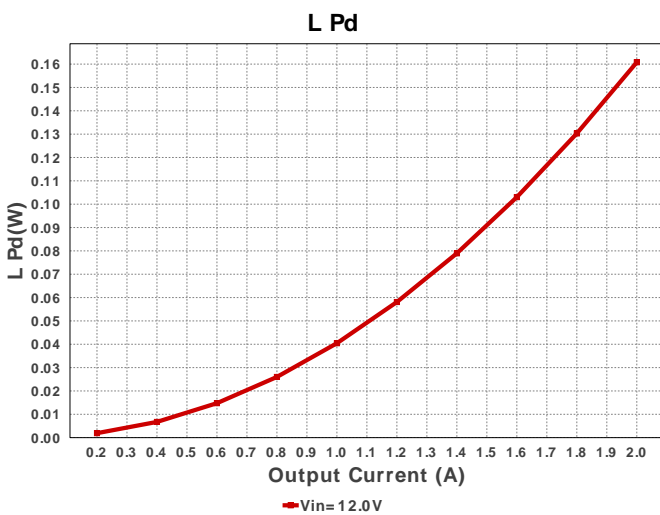
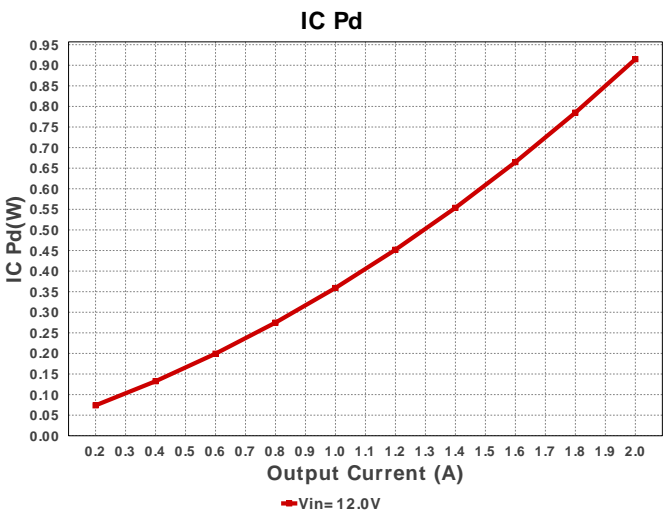
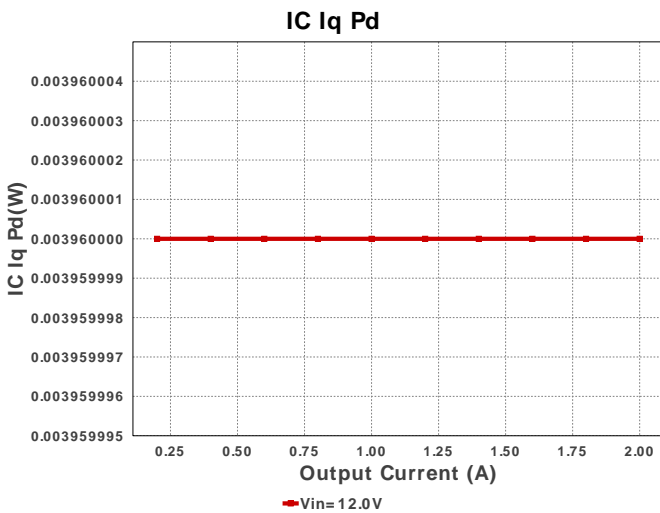
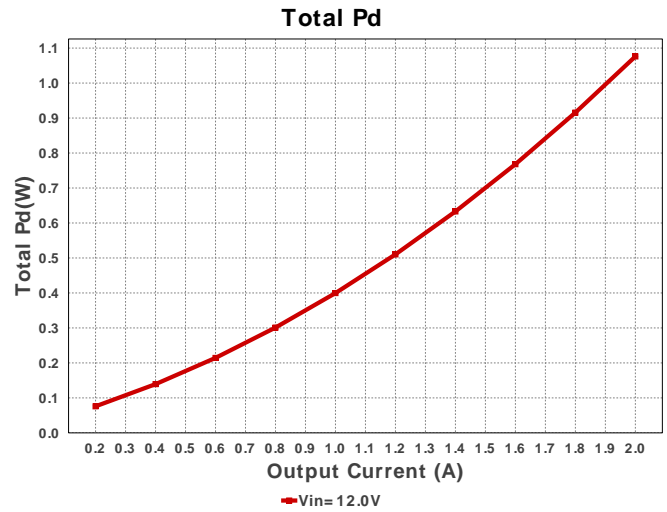
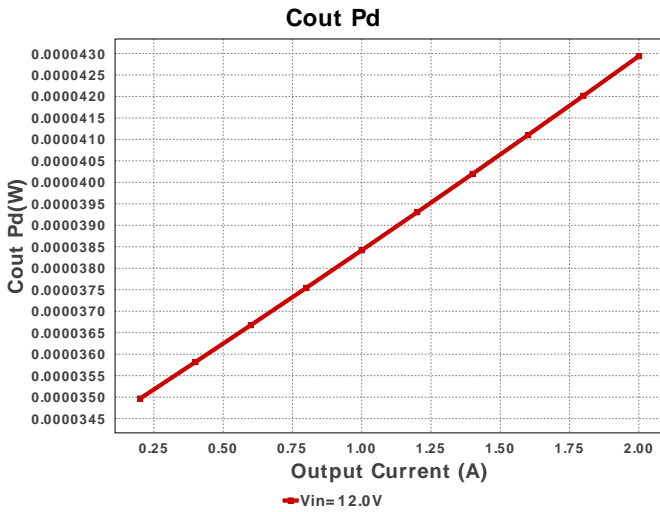
## Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61C473KA01D Series= X5R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
2.	Ccomp	Samsung Electro-Mechanics	CL05C102JB5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
3.	Ccomp2	Samsung Electro-Mechanics	CL21C300JBANNNC Series= C0G/NP0	Cap= 30.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
4.	Cen	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
5.	Cin	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	0805 7 mm <sup>2</sup>
6.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	2	\$0.05	0805 7 mm <sup>2</sup>
7.	L1	Coilcraft	XAL4030-472MEB	L= 4.7 uH DCR= 40.1 mOhm	1	\$0.72	XAL4030 25 mm <sup>2</sup>
8.	Rcomp	Vishay-Dale	CRCW040212K4FKED Series= CRCW..e3	Res= 12.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
9.	Rfbb	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
10.	Rfbb	Vishay-Dale	CRCW040219K6FKED Series= CRCW..e3	Res= 19.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS65261-1RHBR	Switcher	0	\$1.40	 RHB0032E 49 mm <sup>2</sup>







**Operating Values**

#	Name	Value	Category	Description
1.	Cin IRMS	760.337 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	97.683 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	389.67 mA	Current	Average input current
4.	L Ipp	338.38 mA	Current	Peak-to-peak inductor ripple current
5.	Frequency	1.079 MHz	General	Switching frequency
6.	Mode	CCM	General	Conduction Mode
7.	Pout	3.6 W	General	Total output power
8.	Cross Freq	67.968 kHz	Op Point	Bode plot crossover frequency
9.	Duty Cycle	17.46 %	Op Point	Duty cycle
10.	Efficiency	76.988 %	Op Point	PMU channel steady state efficiency
11.	Gain Marg	-18.909 dB	Op Point	Bode Plot Gain Margin

#	Name	Value	Category	Description
12.	ICThetaJA Effective	18.0 degC/W	Op Point	Applicable to the EVM in free space with no airflow
13.	IOUT_OP	2.0 A	Op Point	Iout operating point
14.	Low Freq Gain	82.58 dB	Op Point	Gain at 1Hz
15.	Phase Marg	68.304 deg	Op Point	Bode Plot Phase Margin
16.	VIN_OP	12.0 V	Op Point	Vin operating point
17.	Vout Actual	1.805 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	1.8 V	Op Point	Operational Output Voltage
19.	Vout Tolerance	2.362 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
20.	Vout p-p	1.856 mV	Op Point	Peak-to-peak output ripple voltage
21.	Cin Pd	289.056 $\mu$ W	Power	Input capacitor power dissipation
22.	Cout Pd	42.939 $\mu$ W	Power	Output capacitor power dissipation
23.	IC Iq Pd	3.96 mW	Power	IC Iq Pd
24.	IC Pd	914.812 mW	Power	IC power dissipation
25.	L Pd	160.783 mW	Power	Inductor power dissipation
26.	Total Pd	1.076 W	Power	PMU channel power dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	1.8	Output Voltage
5.	base_pn	TPS65261-1/3	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

## Design Assistance

1. TPS65261-1/3 Product Folder : <http://www.ti.com/product/TPS65261%2D1> : contains the data sheet and other resources.

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