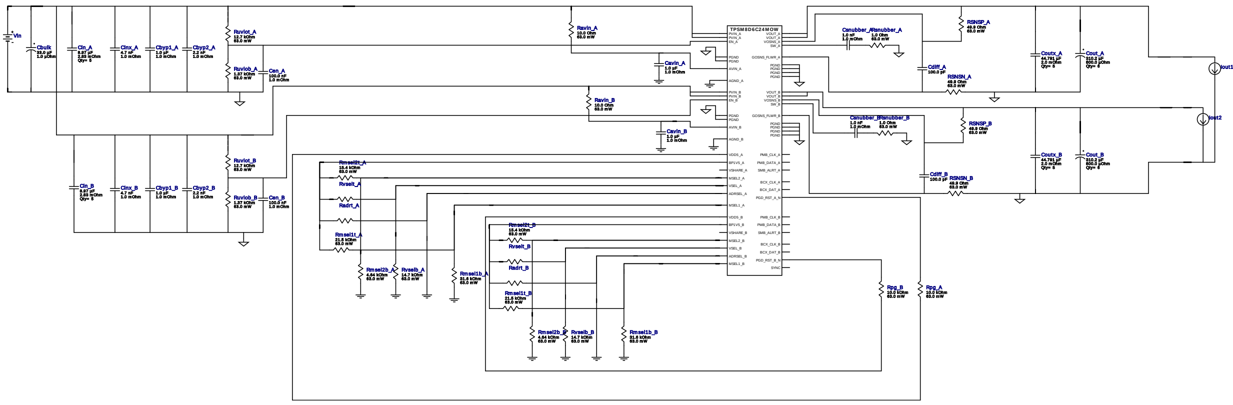
VinMin = 11.0V
VinMax = 13.0V
Vout = 0.8V
Iout = 25.0A

Device = TPSM8D6C24MOWR
Topology = Buck
Created = 2024-03-11 21:04:50.069
BOM Cost = NA
BOM Count = 72
Total Pd = 8.56W

WEBENCH ® Design Report

Design : 104 TPSM8D6C24MOWR
TPSM8D6C24MOWR 11V-13V to .80V @ 25A

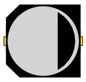


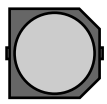
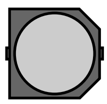
Design Alerts

Component Selection Information

DESIGN ERROR MESSAGE Ch-A: Compensation setting does not give the required VLOOP; try changing the VLOOP gain, GMV*Rvv, to match the recommended VLOOP in the OPERATING VALUES Compensation tab.DESIGN ERROR MESSAGE Ch-A: For the entered input condition Phase margin is 5 (less than 45 degree), try changing the compensation gains to match the recommended VLOOP and ILOOP in the OPERATING VALUES Compensation tab. DESIGN ERROR MESSAGE Ch-B: Compensation setting does not give the required VLOOP; try changing the VLOOP gain, GMV*Rvv, to match the recommended VLOOP in the OPERATING VALUES Compensation tab.DESIGN ERROR MESSAGE Ch-B: For the entered input condition Phase margin is 5 (less than 45 degree), try changing the compensation gains to match the recommended VLOOP and ILOOP in the OPERATING VALUES Compensation tab. The TPSM8D6C24 is a PMBus(TM) device with key features listed below: PMBus(TM) features marked with * are included in WEBENCH(R) Power Designer. - Adaptive Voltage Scaling (AVS) through VOUT_COMMAND*, - Output voltage and current monitoring, - Thermal Shutdown, - Programmable over current protection, - OCP,OV, UV, OT Levels, - Selectable Internal Compensation*, - Selectable Switching Frequency*, - Turn-On and Turn-Off Delays, - UVLO*, Soft-Start*,OCP* and Soft-Stop. Use the Advanced Options on the left side to set the PMBus(TM) commands. Please refer to the TPSM8D6C24 datasheet and visit http://www.ti.com/pmbus for more information.

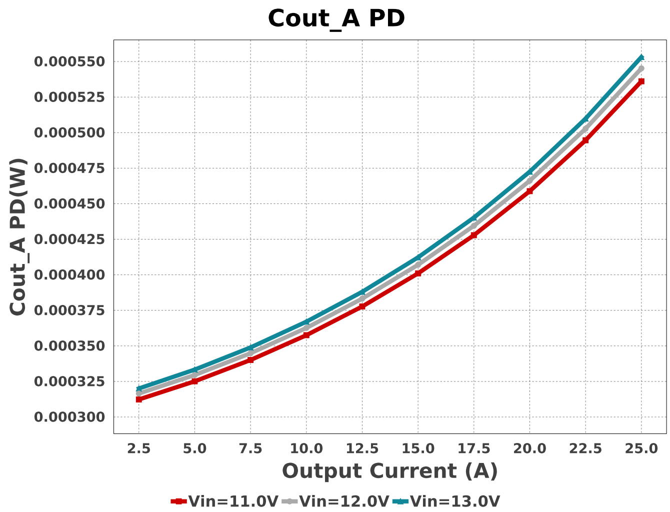
Electrical BOM

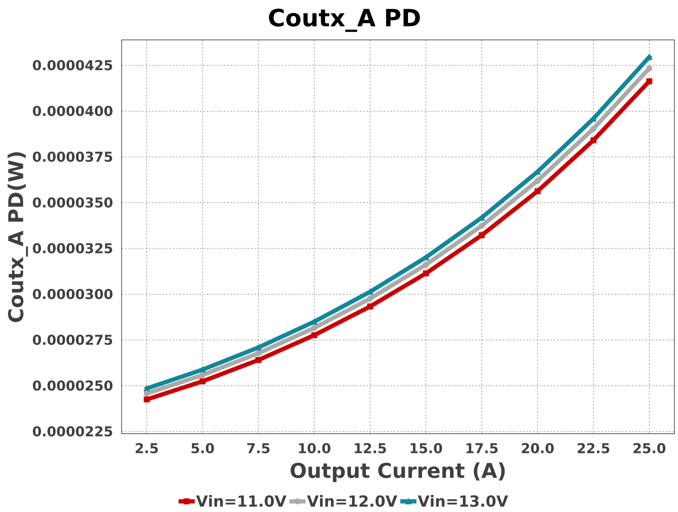
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cavin_A	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm^2
Cavin_B	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm^2
Cbulk	CUSTOM	CUSTOM Series= uD	Cap= 33.0 uF ESR= 1.0 uOhm VDC= 35.0 V IRMS= 230.0 mA	0	NA	 SM_RADIAL_6.3AMM 0 mm^2
Cbyp1_A	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^2

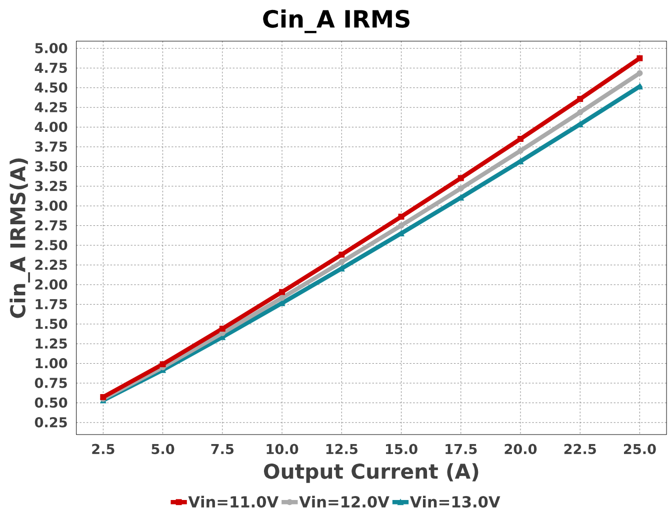
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cbyp1_B	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm^2
Cbyp2_A	MuRata	GRM155R61E222KA01D Series= X5R	Cap= 2.2 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cbyp2_B	MuRata	GRM155R61E222KA01D Series= X5R	Cap= 2.2 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cdiff_A	MuRata	GRM1555C1H101GA01D Series= C0G/NP0	Cap= 100.0 pF VDC= 2.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cdiff_B	MuRata	GRM1555C1H101GA01D Series= C0G/NP0	Cap= 100.0 pF VDC= 2.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cen_A	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cen_B	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cin_A	sumsung	CL32B226KAJNNPE Series= X7R	Cap= 8.97 uF ESR= 2.83 mOhm VDC= 25.0 V IRMS= 6.0 A	5	NA	1206_180 0 mm^2
Cin_B	sumsung	CL32B226KAJNNPE Series= X7R	Cap= 8.97 uF ESR= 2.83 mOhm VDC= 25.0 V IRMS= 6.0 A	5	NA	1206_180 0 mm^2
Cinx_A	MuRata	GRM155R71E472KA01D Series= X7R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cinx_B	MuRata	GRM155R71E472KA01D Series= X7R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cout_A	murata	GRM32ER60G337ME05L Series= PXF	Cap= 310.2 uF ESR= 800.0 uOhm VDC= 6.3 V IRMS= 4.5 A	6	NA	 CAPSMT_62_H80 0 mm^2
Cout_B	murata	GRM32ER60G337ME05L Series= PXF	Cap= 310.2 uF ESR= 800.0 uOhm VDC= 6.3 V IRMS= 4.5 A	6	NA	 CAPSMT_62_H80 0 mm^2
Coutx_A	murata	GRM21BR61A476ME15 Series= X6S	Cap= 44.791 uF ESR= 2.0 mOhm VDC= 6.3 V IRMS= 6.0 A	5	NA	1210_270 0 mm^2
Coutx_B	murata	GRM21BR61A476ME15 Series= X6S	Cap= 44.791 uF ESR= 2.0 mOhm VDC= 6.3 V IRMS= 6.0 A	5	NA	1210_270 0 mm^2
Csnubber_A	CUSTOM	CUSTOM Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	0	NA	0805 0 mm^2

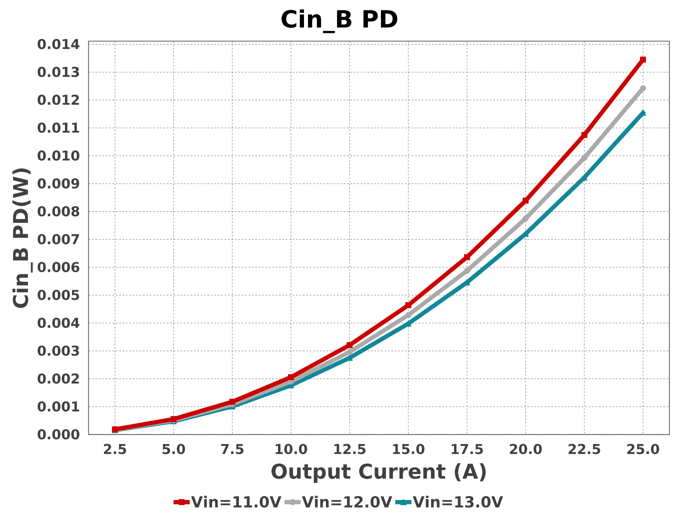
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Csnubber_B	CUSTOM	CUSTOM Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	0	NA	0805 0 mm²
RSNSN_A	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
RSNSN_B	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
RSNSP_A	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
RSNSP_B	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Ravin_A	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Ravin_B	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel1b_A	Vishay-Dale	CRCW040231K6FKED Series= CRCW..e3	Res= 31.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel1b_B	Vishay-Dale	CRCW040231K6FKED Series= CRCW..e3	Res= 31.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel1t_A	Vishay-Dale	CRCW040221K5FKED Series= CRCW..e3	Res= 21.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel1t_B	Vishay-Dale	CRCW040221K5FKED Series= CRCW..e3	Res= 21.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel2b_A	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4.64 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel2b_B	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4.64 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel2t_A	Yageo	AC0402FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rmsel2t_B	Yageo	AC0402FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rpg_A	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rpg_B	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rsnubber_A	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rsnubber_B	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Ruvlob_A	Vishay-Dale	CRCW04021K37FKED Series= CRCW..e3	Res= 1.37 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

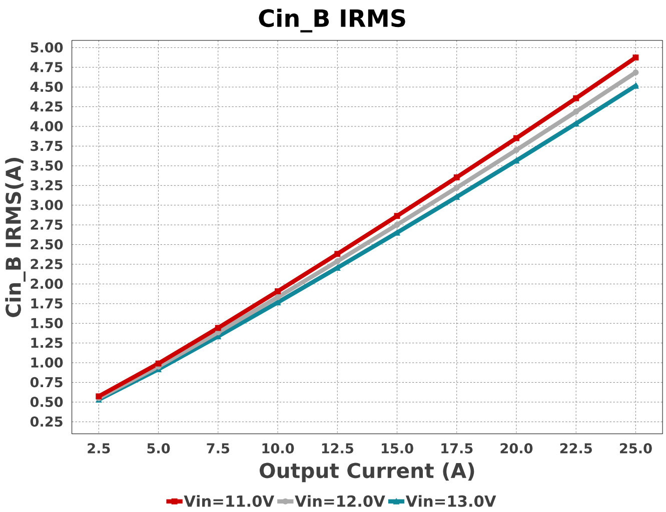
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Ruvlob_B	Vishay-Dale	CRCW04021K37FKED Series= CRCW..e3	Res= 1.37 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Ruvlot_A	Vishay-Dale	CRCW040212K7FKED Series= CRCW..e3	Res= 12.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Ruvlot_B	Vishay-Dale	CRCW040212K7FKED Series= CRCW..e3	Res= 12.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rvselb_A	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rvselb_B	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
U1	Texas Instruments	TPSM8D6C24MOWR	Switcher	1	$27.60	RVF0040A 63 mm^2

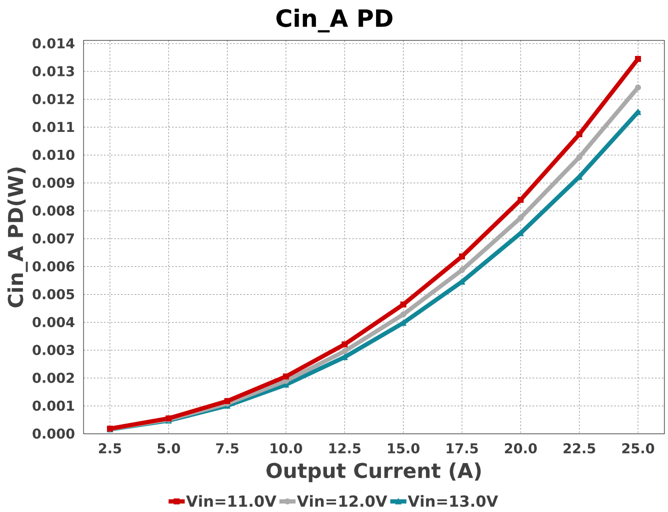


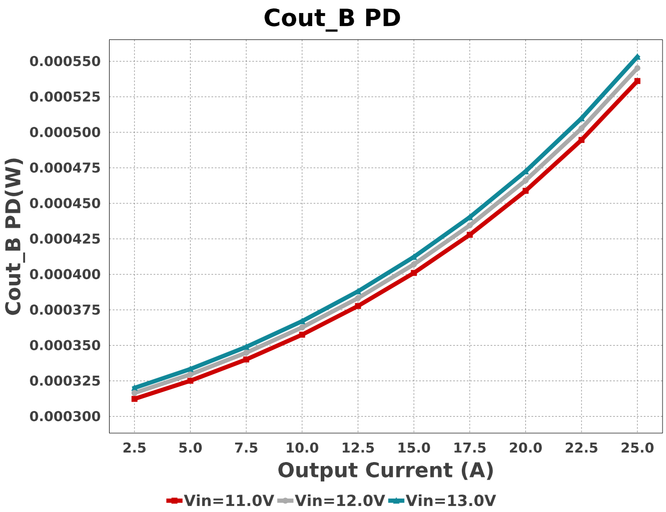


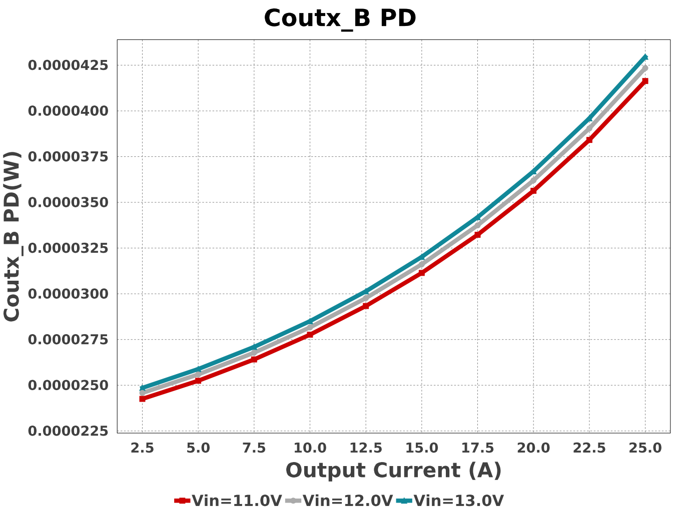


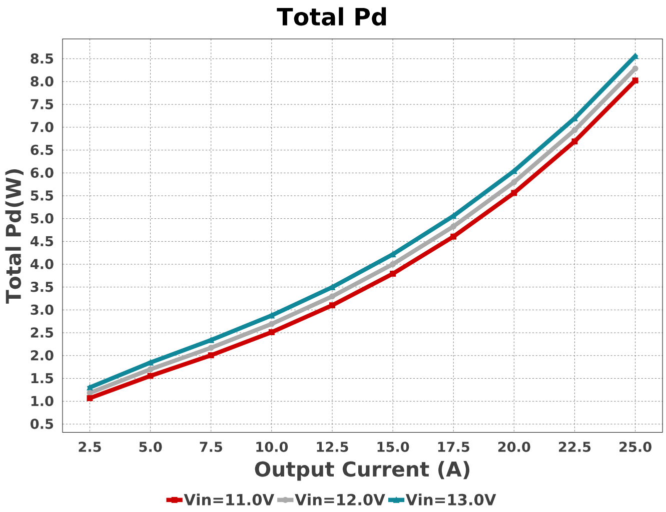


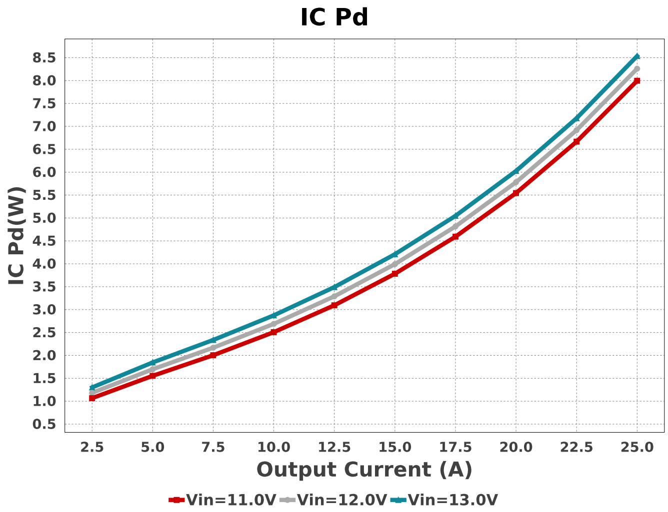

Cin_B IRMS
Cin_B IRMS(A)
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

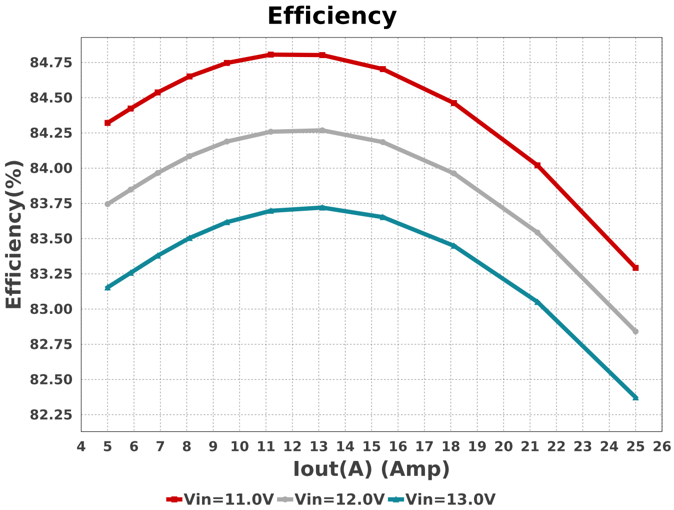

Cin_A PD
Cin_A PD(W)
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

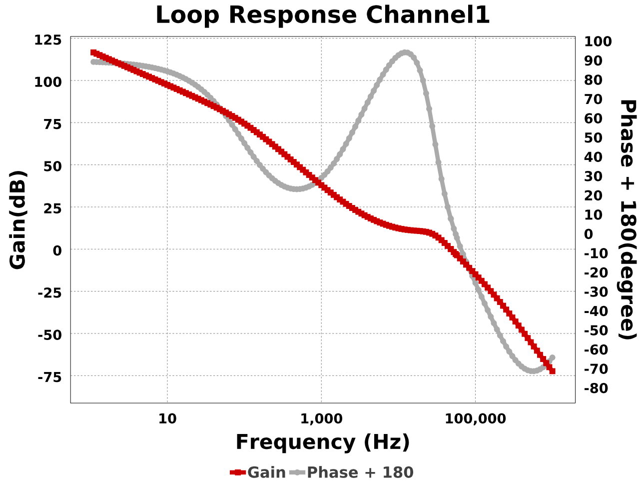

Cout_B PD
Cout_B PD(W)
0.000550
0.000525
0.000500
0.000475
0.000450
0.000425
0.000400
0.000375
0.000350
0.000325
0.000300
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

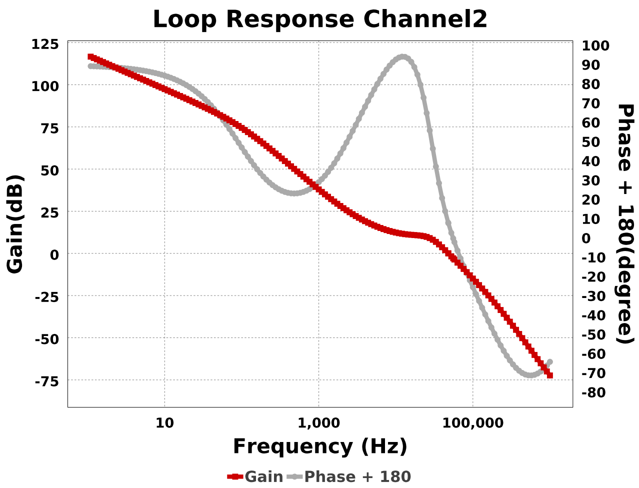

Coutx_B PD
Coutx_B PD(W)
0.0000425
0.0000400
0.0000375
0.0000350
0.0000325
0.0000300
0.0000275
0.0000250
0.0000225
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

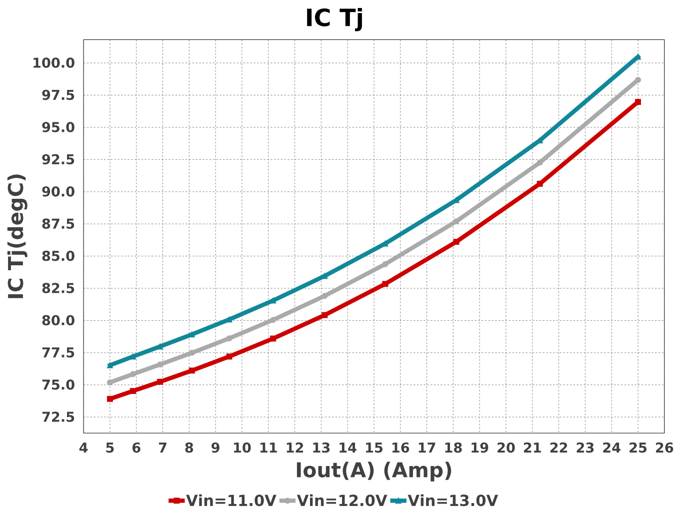

Total Pd
Total Pd(W)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

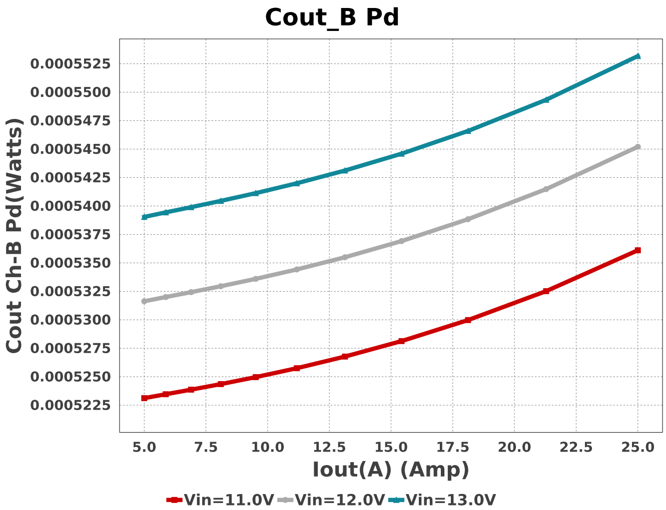

IC Pd
IC Pd(W)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

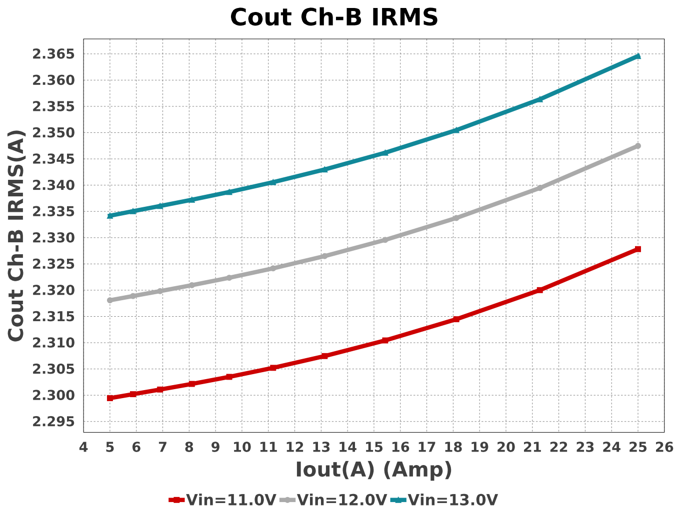

Efficiency
Efficiency(%)
84.75
84.50
84.25
84.00
83.75
83.50
83.25
83.00
82.75
82.50
82.25
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V Vin=12.0V Vin=13.0V


Loop Response Channel1
Gain(dB)
Phase + 180(degree)
125
100
75
50
25
0
-25
-50
-75
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
10
1,000
100,000
Frequency (Hz)
Gain Phase + 180

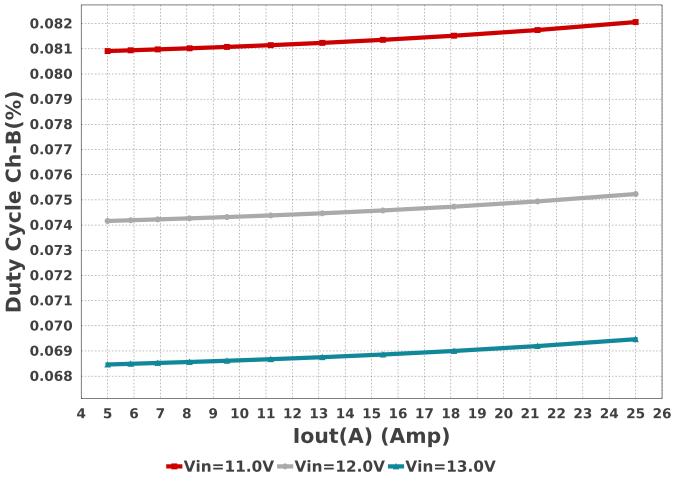

Loop Response Channel2
Gain(dB)
Phase + 180(degree)
125
100
75
50
25
0
-25
-50
-75
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
10
1,000
100,000
Frequency (Hz)
Gain Phase + 180


IC Tj
IC Tj(degC)
100.0
97.5
95.0
92.5
90.0
87.5
85.0
82.5
80.0
77.5
75.0
72.5
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V Vin=12.0V Vin=13.0V

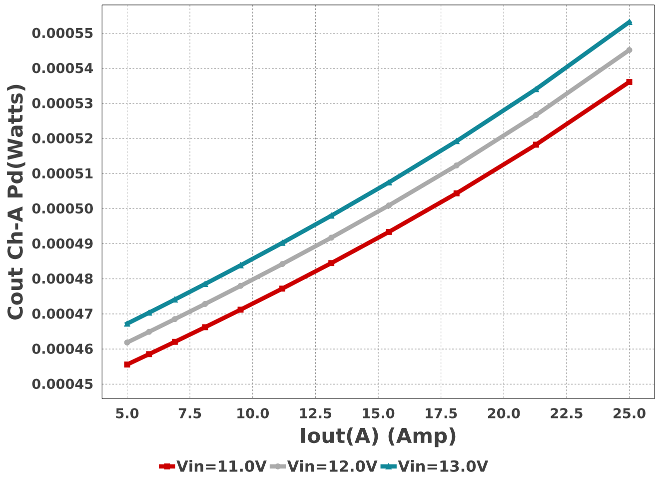

Cout_B Pd
Cout Ch-B Pd(Watts)
0.0005525
0.0005500
0.0005475
0.0005450
0.0005425
0.0005400
0.0005375
0.0005350
0.0005325
0.0005300
0.0005275
0.0005250
0.0005225
5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Iout(A) (Amp)
Vin=11.0V Vin=12.0V Vin=13.0V


Cout Ch-B IRMS
Cout Ch-B IRMS(A)
2.365
2.360
2.355
2.350
2.345
2.340
2.335
2.330
2.325
2.320
2.315
2.310
2.305
2.300
2.295
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V Vin=12.0V Vin=13.0V

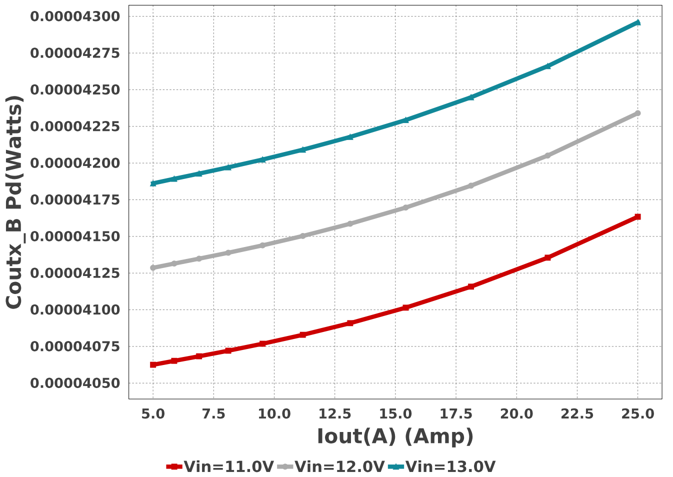
Duty Cycle Ch-B



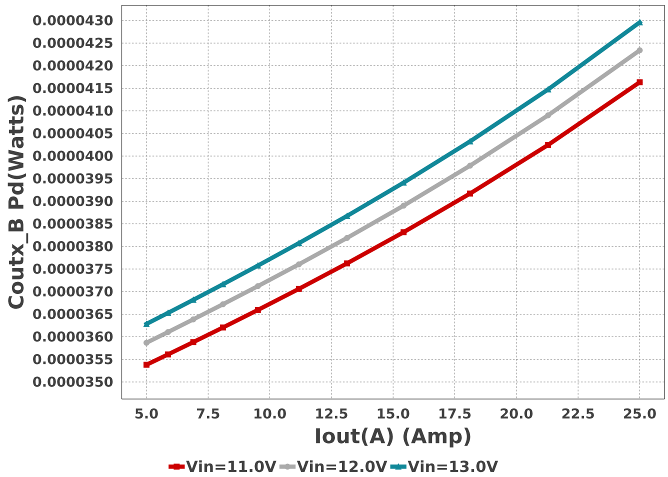
Cout_A Pd



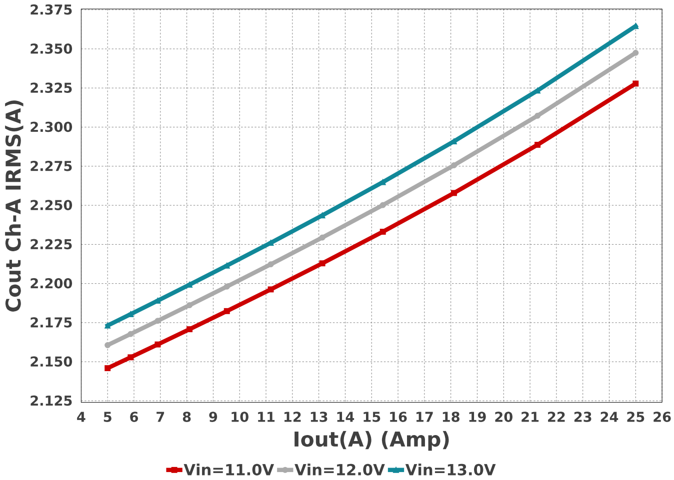
Coutx_B Pd



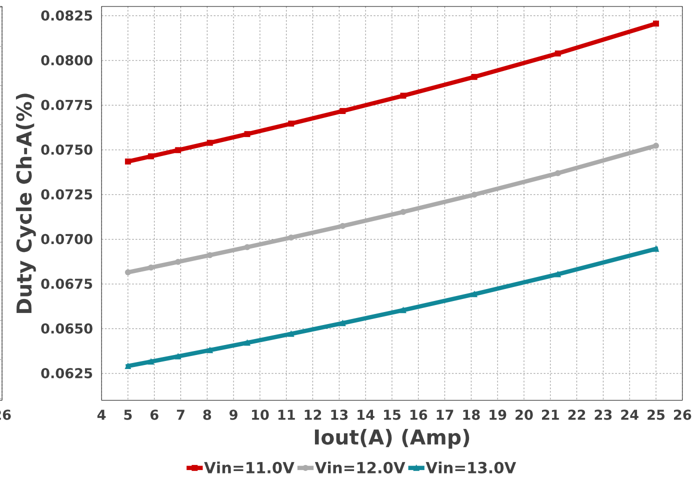
Coutx_A Pd



Cout Ch-A IRMS



Duty Cycle Ch-A



Operating Values

#	Name	Value	Category	Description
1.	BOM Count	72		Total Design BOM count
2.	Total BOM	NA		Total BOM Cost
3.	Cin_A ESR	566.0 µOhm	Capacitor	Cin Capacitor ESR
4.	Cin_A IRMS	4.516 A	Capacitor	Input capacitor RMS ripple current
5.	Cin_A PD	11.543 mW	Capacitor	Input capacitor power dissipation
6.	Cin_B ESR	566.0 µOhm	Capacitor	Cin Capacitor ESR
7.	Cin_B IRMS	4.516 A	Capacitor	Input Capacitor Cin2 RMS Ripple Current
8.	Cin_B PD	11.543 mW	Capacitor	Input capacitor power dissipation
9.	Cout Ch-A IRMS	2.365 A	Capacitor	Output Channel 1 Capacitor RMS ripple current
10.	Cout Ch-B IRMS	2.365 A	Capacitor	Output Channel 2 Capacitor RMS ripple current
11.	Cout_A ESR	133.333 µOhm	Capacitor	Cout Capacitor ESR

#	Name	Value	Category	Description
12.	Cout_A PD	553.18 µW	Capacitor	Output capacitor power dissipation
13.	Cout_B ESR	133.333 µOhm	Capacitor	Cout Capacitor ESR
14.	Cout_B PD	553.18 µW	Capacitor	Output capacitor power dissipation
15.	Coutx_A PD	42.959 µW	Capacitor	Output capacitor_x power loss
16.	Coutx_B PD	42.959 µW	Capacitor	Output capacitor_x power loss
17.	Fpi Ch-A	414.466 kHz	Compensation	Current Loop Pole Frequency
18.	Fpi Ch-B	414.466 kHz	Compensation	Current Loop Pole Frequency
19.	Fpv Ch-A	159.155 kHz	Compensation	Voltage Loop Pole Frequency
20.	Fpv Ch-B	159.155 kHz	Compensation	Voltage Loop Pole Frequency
21.	Fzi Ch-A	33.161 kHz	Compensation	Current Loop Zero Frequency
22.	Fzi Ch-B	33.161 kHz	Compensation	Current Loop Zero Frequency
23.	Fzv Ch-A	3.979 kHz	Compensation	Voltage Loop Zero Frequency
24.	Fzv Ch-B	3.979 kHz	Compensation	Voltage Loop Zero Frequency
25.	ILOOP Gain Ch-A	4.004	Compensation	Recommended Current Loop Mid-band Gain
26.	ILOOP Gain Ch-B	4.004	Compensation	Recommended Current Loop Mid-band Gain
27.	VLOOP Gain Ch-A	7.819	Compensation	Recommended Voltage Loop Mid-band Gain
28.	VLOOP Gain Ch-B	7.819	Compensation	Recommended Voltage Loop Mid-band Gain
29.	Zout (Fco) Ch-A	1.591 mOhm	Compensation	Output Impedance at Crossover Frequency
30.	Zout (Fco) Ch-B	1.591 mOhm	Compensation	Output Impedance at Crossover Frequency
31.	Zout (Fsw) Ch-A	161.338 µOhm	Compensation	Output Impedance at Switching Frequency
32.	Zout (Fsw) Ch-B	161.338 µOhm	Compensation	Output Impedance at Switching Frequency
33.	IC Pd	8.535 W	IC	IC power dissipation
34.	IC Tj	100.479 degC	IC	IC junction temperature
35.	ICThetaJA Effective	6.5 degC/W	IC	Effective IC Junction-to-Ambient Thermal Resistance
36.	Iin Avg	3.735 A	IC	Average input current
37.	CPI Ch-A	12.8 pF	PMBus	Selectable compensation parameter through pinstrapping
38.	CPI Ch-B	12.8 pF	PMBus	Selectable compensation parameter through pinstrapping
39.	CPV Ch-A	6.25 pF	PMBus	Selectable compensation parameter through pinstrapping
40.	CPV Ch-B	6.25 pF	PMBus	Selectable compensation parameter through pinstrapping
41.	CZI Ch-A	159.984 pF	PMBus	Selectable compensation parameter through pinstrapping
42.	CZI Ch-B	159.984 pF	PMBus	Selectable compensation parameter through pinstrapping
43.	CZV Ch-A	250.0 pF	PMBus	Selectable compensation parameter through pinstrapping
44.	CZV Ch-B	250.0 pF	PMBus	Selectable compensation parameter through pinstrapping
45.	GMI Ch-A	100.0 µS	PMBus	Selectable compensation parameter through pinstrapping
46.	GMI Ch-B	100.0 µS	PMBus	Selectable compensation parameter through pinstrapping
47.	GMV Ch-A	50.0 µS	PMBus	Selectable compensation parameter through pinstrapping
48.	GMV Ch-B	50.0 µS	PMBus	Selectable compensation parameter through pinstrapping
49.	PMBus Vout Command Ch-A	800.0 m	PMBus	PMBus Vout Command
50.	PMBus Vout Command Ch-B	800.0 m	PMBus	PMBus Vout Command
51.	PMBus Vout Scale Loop Ch-A	500.0 m	PMBus	PMBus Vout Scale Loop
52.	PMBus Vout Scale Loop Ch-B	500.0 m	PMBus	PMBus Vout Scale Loop
53.	RVI Ch-A	30.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
54.	RVI Ch-B	30.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
55.	RVV Ch-A	160.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
56.	RVV Ch-B	160.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
57.	Cin_A PD	11.543 mW	Power	Input capacitor power dissipation
58.	Cin_B PD	11.543 mW	Power	Input capacitor power dissipation
59.	Cout_A PD	553.18 µW	Power	Output capacitor power dissipation
60.	Cout_B PD	553.18 µW	Power	Output capacitor power dissipation
61.	Coutx_A PD	42.959 µW	Power	Output capacitor_x power loss
62.	Coutx_B PD	42.959 µW	Power	Output capacitor_x power loss
63.	IC Pd	8.535 W	Power	IC power dissipation
64.	Snubber Pd Ch-A	0.0 W	Power	Snubber Power Dissipation
65.	Snubber Pd Ch-B	0.0 W	Power	Snubber Power Dissipation
66.	Total Pd	8.559 W	Power	Total Power Dissipation
67.	Conduction Mode Ch-A	CCM	System Information	Conduction Mode
68.	Conduction Mode Ch-B	CCM	System Information	Conduction Mode
69.	Duty Cycle Ch-A	6.947 %	System Information	Duty cycle for Channel 1
70.	Duty Cycle Ch-B	6.947 %	System Information	Duty cycle for Channel 1
71.	Efficiency	82.373 %	System Information	Steady state efficiency
72.	FootPrint	1.809 k mm^2	System Information	Total Foot Print Area of BOM components
73.	Frequency	650.0 kHz	System Information	Switching frequency
74.	Gain Marg Ch-A	-2.897 dB	System Information	Bode Plot Gain Margin

#	Name	Value	Category	Description
75.	Gain Marg Ch-B	-2.897 dB	System Information	Bode Plot Gain Margin
76.	Iout Ch-A	25.0 A	System Information	Iout1 operating point
77.	Iout Ch-B	25.0 A	System Information	Iout2 operating point
78.	Iout transient step used for Cout Ch-A calculations	6.25 A	System Information	Custom Transient current step requirement that was used for Cout selection (A).
79.	Iout transient step used for Cout Ch-B calculations	6.25 A	System Information	Custom Transient current step requirement that was used for Cout selection (A).
80.	Minimum Cout Ch-A required for stability	1.276 mF	System Information	Minimum Cout required for stability
81.	Minimum Cout Ch-B required for stability	1.276 mF	System Information	Minimum Cout required for stability
82.	Overshoot Value for Cout Ch-A	1.831 mV	System Information	Theoretical Vout Overshoot Value
83.	Overshoot Value for Cout Ch-B	1.831 mV	System Information	Theoretical Vout Overshoot Value
84.	Pout Ch-A	20.0 W	System Information	Total output power
85.	Pout Ch-B	20.0 W	System Information	Total output power
86.	SW Ipk Ch-A	29.096 A	System Information	Peak switch current
87.	SW Ipk Ch-B	29.096 A	System Information	Peak switch current
88.	Undershoot Value for Cout Ch-A	292.405 µV	System Information	Theoretical Vout Undershoot Value
89.	Undershoot Value for Cout Ch-B	292.405 µV	System Information	Theoretical Vout Undershoot Value
90.	Vin	13.0 V	System Information	Vin operating point
91.	Vout Ch-A	800.0 mV	System Information	Operational Voltage 1
92.	Vout Ch-A Tolerance	1.25 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
93.	Vout Ch-B	800.0 mV	System Information	Operational Voltage 2
94.	Vout Ch-B Tolerance	1.25 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
95.	Vout Tolerance	1.25 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
96.	Vout p-p Ch-A	1.322 mV	System Information	Peak-to-peak output1 ripple voltage
97.	Vout p-p Ch-B	1.322 mV	System Information	Peak-to-peak output1 ripple voltage
98.	Vout transient requirement used for Cout Ch-A calculations	1.5 %	System Information	Custom Transient voltage change requirement that was used for Cout selection (% of Vout).
99.	Vout transient requirement used for Cout Ch-B calculations	1.5 %	System Information	Custom Transient voltage change requirement that was used for Cout selection (% of Vout).

Design Inputs

Name	Value	Description
Iout	25.0	Maximum Output Current
Iout1	25.0	Output Current #1
Iout2	25.0	Output Current #2
VinMax	13.0	Maximum input voltage
VinMin	11.0	Minimum input voltage
Vout	800.0 m	Output Voltage
Vout1	800.0 m	Output Voltage #1
Vout2	800.0 m	Output Voltage #2
base_pn	TPSM8D6C24	Base Product Number
source	DC	Input Source Type
Ta	45.0	Ambient temperature

WEBENCH® Assembly

Component Testing

Some published data on components in datasheets such as Capacitor ESR and Inductor DC resistance is based on conservative values that will guarantee that the components always exceed the specification. For design purposes it is usually better to work with typical values. Since this data is not always available it is a good practice to measure the Capacitance and ESR values of Cin and Cout, and the inductance and DC resistance of L1 before assembly of the board. Any large discrepancies in values should be electrically simulated in WEBENCH to check for instabilities and thermally simulated in WebTHERM to make sure critical temperatures are not exceeded.

Soldering Component to Board

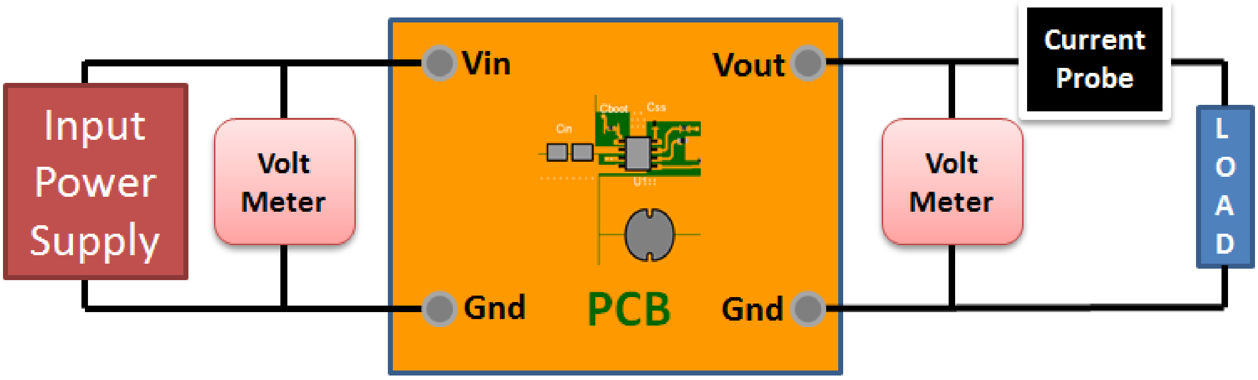
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. To solder the tab town to the board place the iron down on the board while resting against the tab, heating both surfaces simultaneously. Apply light pressure to the top of the plastic case until the solder flows around the part and the part is flush with the PCB. If the solder is not flowing around the board you may need a higher wattage iron (generally 25W to 30W is enough).

Initial Startup of Circuit

It is best to initially power up the board by setting the input supply voltage to the lowest operating input voltage 11.0V and set the input supply's current limit to zero. With the input supply off connect up the input supply to Vin and GND. Connect a digital volt meter and a load if needed to set the minimum Iout of the design from Vout and GND. Turn on the input supply and slowly turn up the current limit on the input supply. If the voltage starts to rise on the input supply continue increasing the input supply current limit while watching the output voltage. If the current increases on the input supply, but the voltage remains near zero, then there may be a short or a component misplaced on the board. Power down the board and visually inspect for solder bridges and recheck the diode and capacitor polarities. Once the power supply circuit is operational then more extensive testing may include full load testing, transient load and line tests to compare with simulation results.

Load Testing

The setup is the same as the initial startup, except that an additional digital voltmeter is connected between Vin and GND, a load is connected between Vout and GND and a current meter is connected in series between Vout and the load. The load must be able to handle at least rated output power + 50% (7.5 watts for this design). Ideally the load is supplied in the form of a variable load test unit. It can also be done in the form of suitably large power resistors. When using an oscilloscope to measure waveforms on the prototype board, the ground leads of the oscilloscope probes should be as short as possible and the area of the loop formed by the ground lead should be kept to a minimum. This will help reduce ground lead inductance and eliminate EMI noise that is not actually present in the circuit.



Design Assistance

1. Master key : 755E548B8C0A2872[v1]

2. **TPSM8D6C24** Product Folder : http://www.ti.com/product/TPSM8D6C24 : contains the data sheet and other resources.