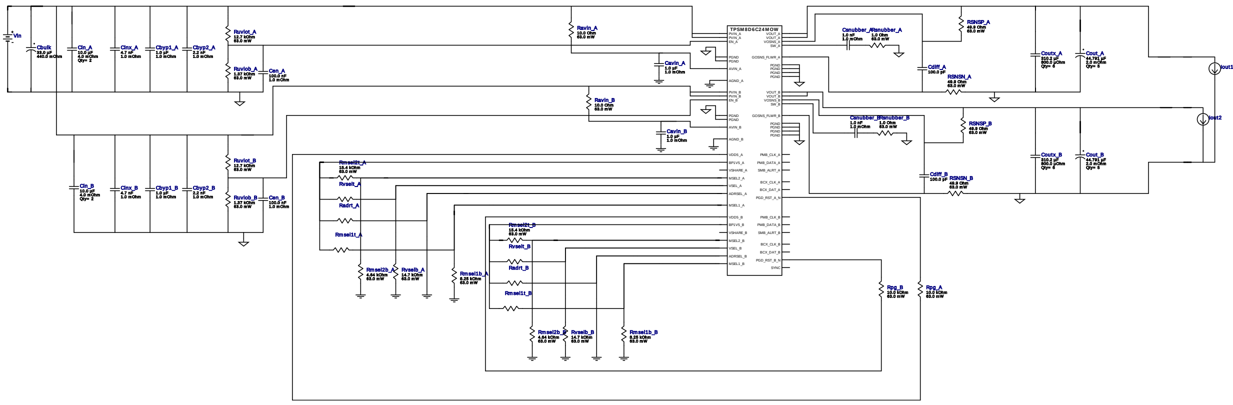
VinMin = 11.0V
VinMax = 13.0V
Vout = 0.8V
Iout = 25.0A

Device = TPSM8D6C24MOWR
Topology = Buck
Created = 2024-03-11 02:42:52.075
BOM Cost = NA
BOM Count = 64
Total Pd = 8.32W

WEBENCH ® Design Report

Design : 101 TPSM8D6C24MOWR
TPSM8D6C24MOWR 11V-13V to .80V @ 25A



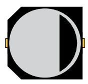
1. Do not place Rmsel2t, Rvselt, Radrt, Rmsel1t resistors for Ch-A and Rmsel2t, Rvselt, Radrt, Rmsel1t resistors for Ch-B..

Design Alerts

Component Selection Information

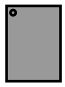
DESIGN ERROR MESSAGE Ch-A: For the entered input condition Phase margin is 12 (less than 45 degree), try changing the compensation gains to match the recommended VLOOP and ILOOP in the OPERATING VALUES Compensation tab. DESIGN ERROR MESSAGE Ch-B: For the entered input condition Phase margin is 12 (less 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

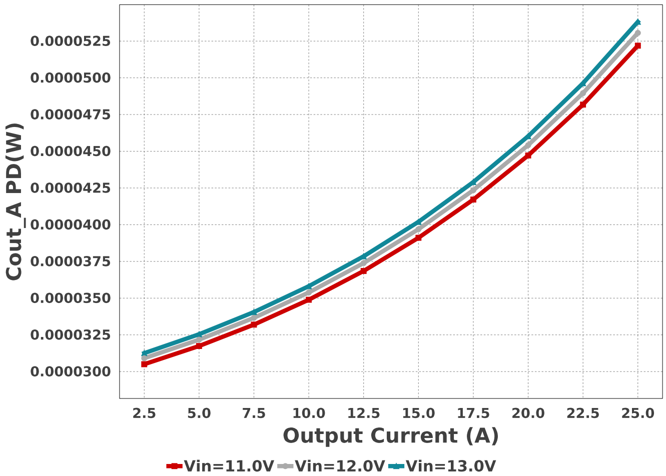
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cavin_A	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm^2
Cavin_B	Taiyo Yuden	TMK212BJ105KG-T Series= X5R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm^2
Cbulk	Nichicon	UUD1V330MCL1GS Series= uD	Cap= 33.0 uF ESR= 440.0 mOhm VDC= 35.0 V IRMS= 230.0 mA	1	$0.13	 SM_RADIAL_6.3AMM 80 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
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

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
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 mm²
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 mm²
Cdiff_A	MuRata	GRM1555C1H101GA01D Series= C0G/NP0	Cap= 100.0 pF VDC= 2.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
Cdiff_B	MuRata	GRM1555C1H101GA01D Series= C0G/NP0	Cap= 100.0 pF VDC= 2.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
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 mm²
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 mm²
Cin_A	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.0 mOhm VDC= 25.0 V IRMS= 6.0 A	2	$0.06	1206_180 11 mm²
Cin_B	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.0 mOhm VDC= 25.0 V IRMS= 6.0 A	2	$0.06	1206_180 11 mm²
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 mm²
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 mm²
Cout_A	murata	GRM21BR61A476ME15 Series= PXF	Cap= 44.791 uF ESR= 2.0 mOhm VDC= 6.3 V IRMS= 4.5 A	5	NA	CAPSMT_62_H80 0 mm²
Cout_B	murata	GRM21BR61A476ME15 Series= PXF	Cap= 44.791 uF ESR= 2.0 mOhm VDC= 6.3 V IRMS= 4.5 A	5	NA	CAPSMT_62_H80 0 mm²
Coutx_A	murata	GRM32ER60G337ME05L Series= X6S	Cap= 310.2 uF ESR= 800.0 uOhm VDC= 6.3 V IRMS= 6.0 A	6	NA	1210_270 0 mm²
Coutx_B	murata	GRM32ER60G337ME05L Series= X6S	Cap= 310.2 uF ESR= 800.0 uOhm VDC= 6.3 V IRMS= 6.0 A	6	NA	1210_270 0 mm²
Csnubber_A	Yageo	CC0805KRX7R9BB102 Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
Csnubber_B	Yageo	CC0805KRX7R9BB102 Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²

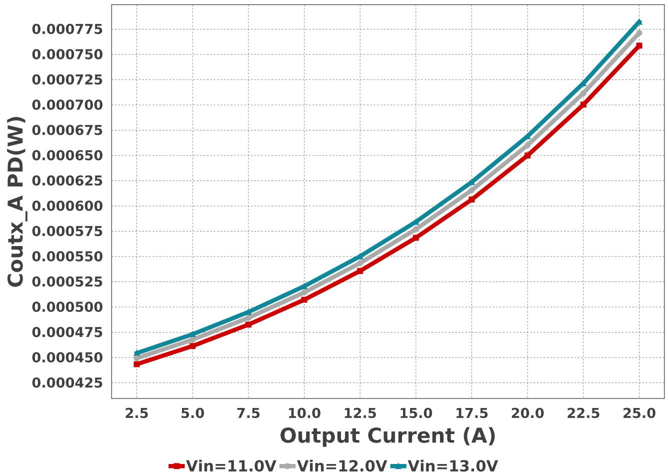
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
RSNSN_A	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
RSNSN_B	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
RSNSP_A	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
RSNSP_B	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Ravin_A	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Ravin_B	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rmsel1b_A	Vishay-Dale	CRCW04028K25FKED Series= CRCW..e3	Res= 8.25 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rmsel1b_B	Vishay-Dale	CRCW04028K25FKED Series= CRCW..e3	Res= 8.25 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rmsel2b_A	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4.64 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rmsel2b_B	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4.64 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rmsel2t_A	Yageo	AC0402FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rmsel2t_B	Yageo	AC0402FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rpg_A	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rpg_B	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsnubber_A	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsnubber_B	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Ruvlob_A	Vishay-Dale	CRCW04021K37FKED Series= CRCW..e3	Res= 1.37 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
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

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Rvselb_B	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
U1	Texas Instruments	TPSM8D6C24MOWR	Switcher	1	$27.60	 RVF0040A 63 mm²

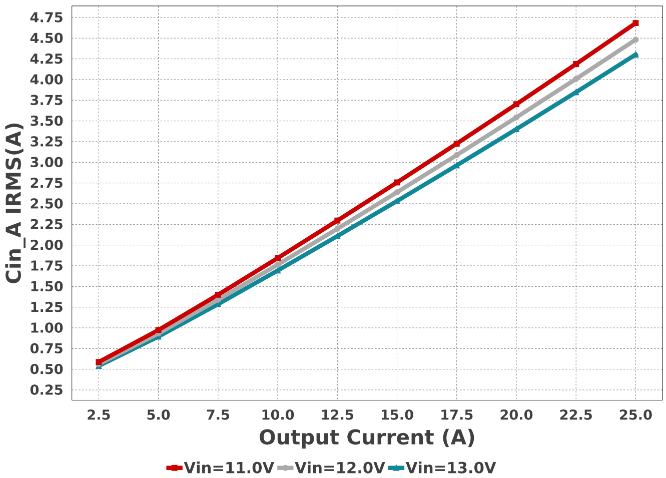
Cout_A PD



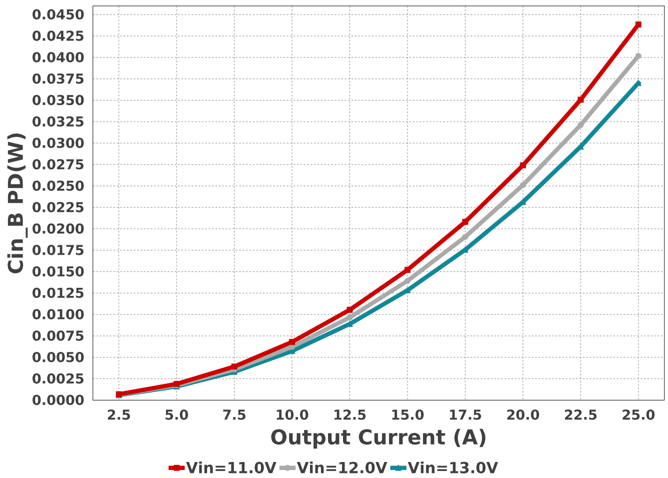
Coutx_A PD



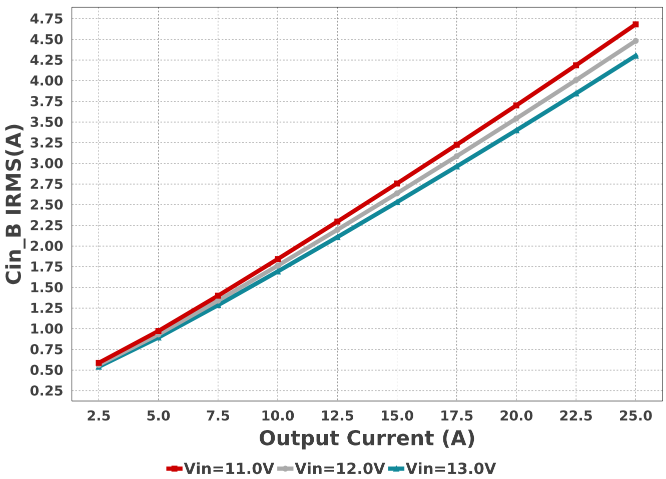
Cin_A IRMS



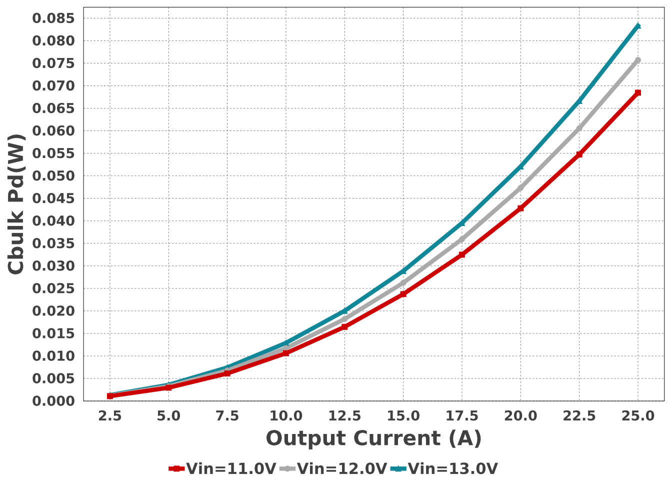
Cin_B PD

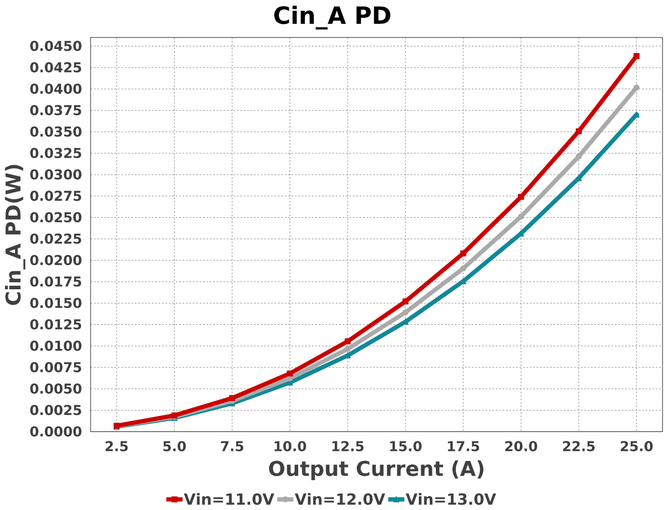


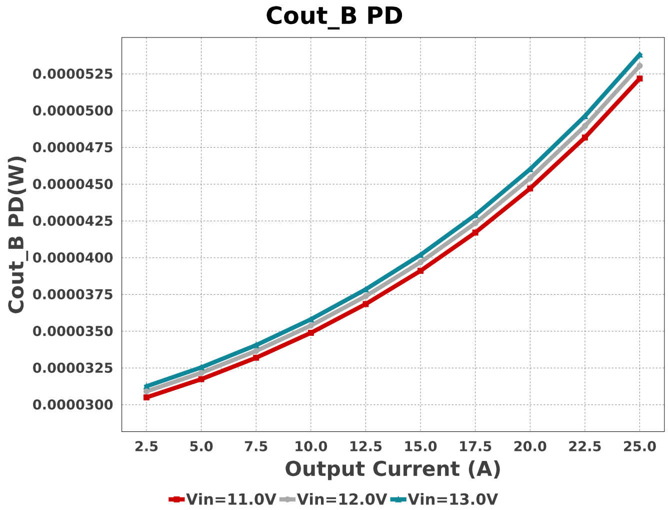
Cin_B IRMS

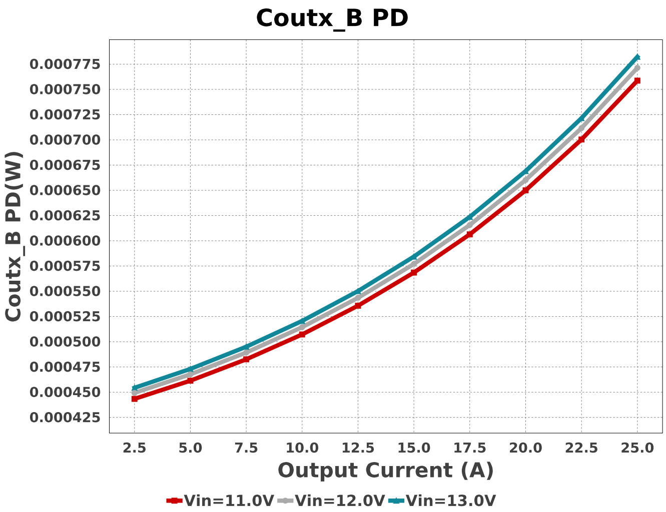


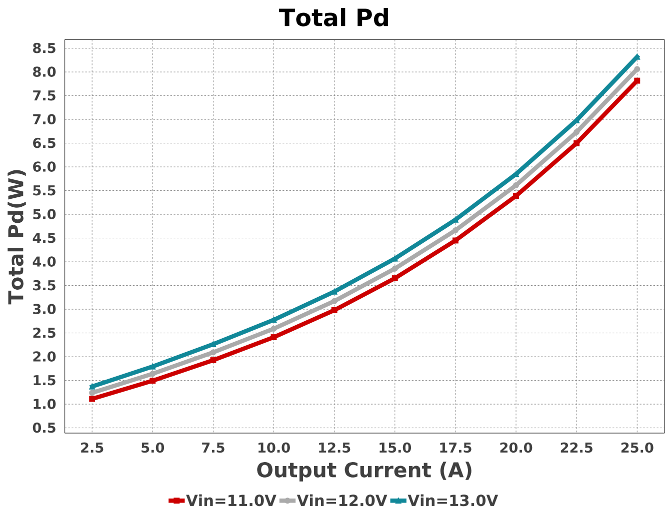
Cbulk Pd

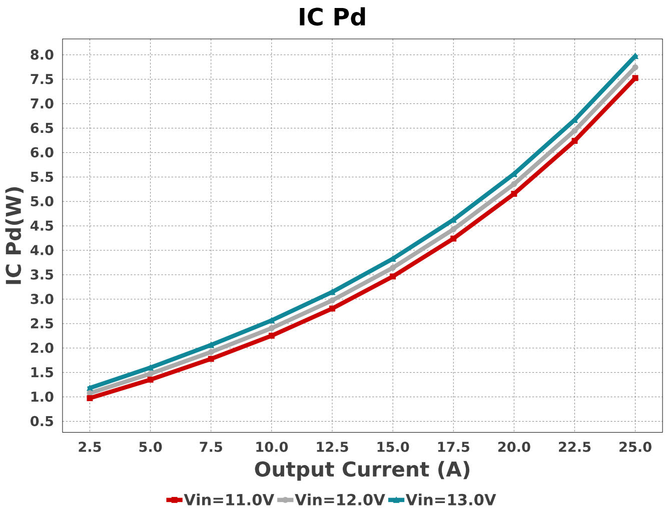


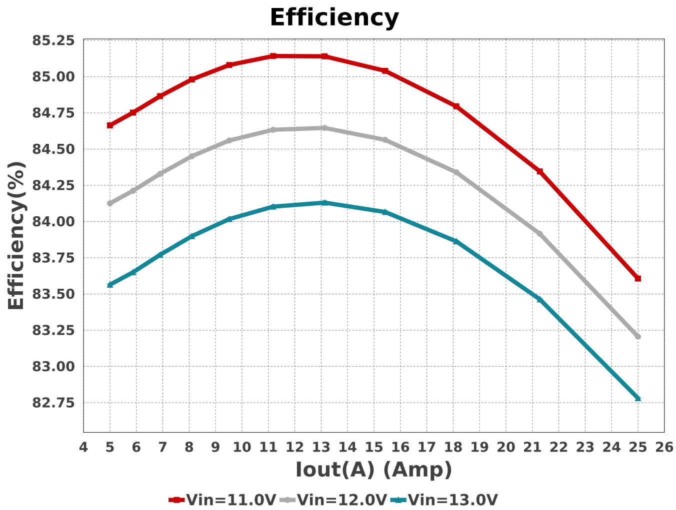

Cin_A PD
Cin_A PD(W)
0.0450
0.0425
0.0400
0.0375
0.0350
0.0325
0.0300
0.0275
0.0250
0.0225
0.0200
0.0175
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

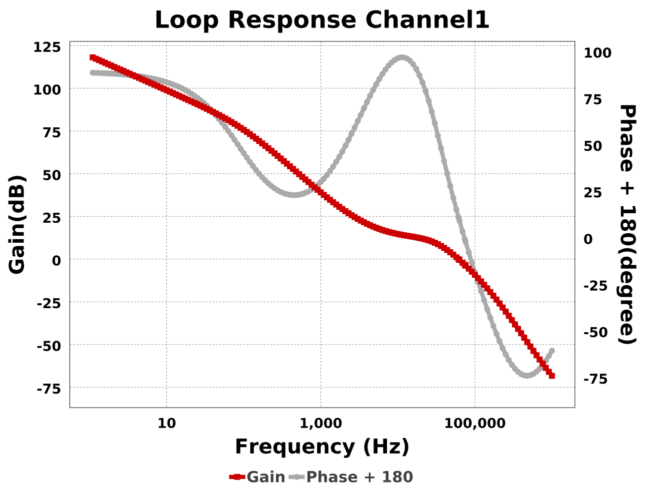

Cout_B PD
Cout_B PD(W)
0.0000525
0.0000500
0.0000475
0.0000450
0.0000425
0.0000400
0.0000375
0.0000350
0.0000325
0.0000300
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

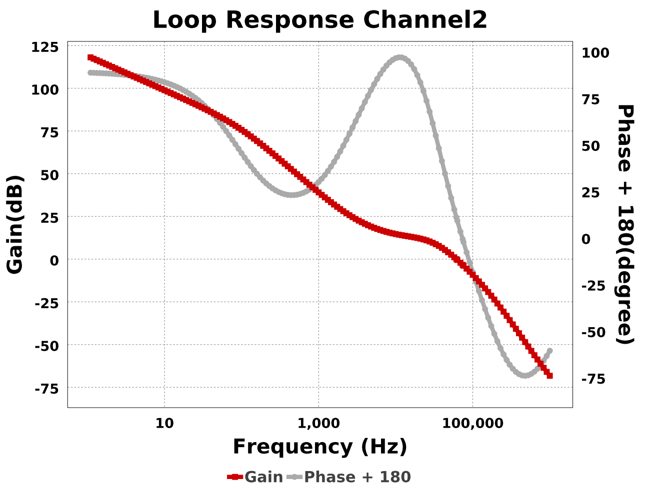

Coutx_B PD
Coutx_B PD(W)
0.000775
0.000750
0.000725
0.000700
0.000675
0.000650
0.000625
0.000600
0.000575
0.000550
0.000525
0.000500
0.000475
0.000450
0.000425
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

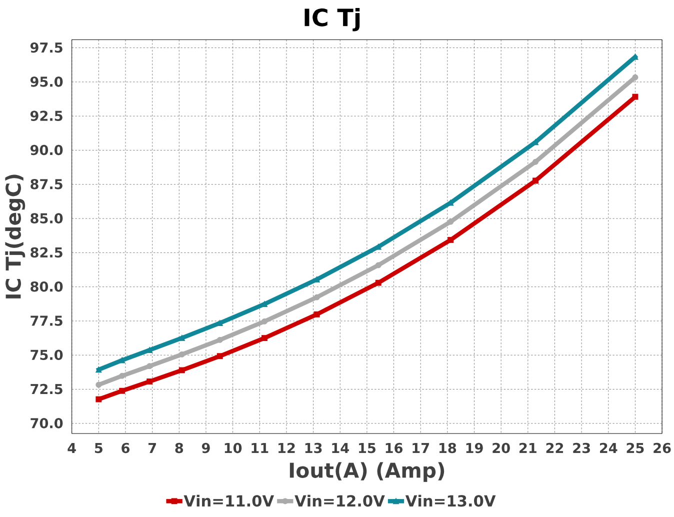

Total Pd
Total Pd(W)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

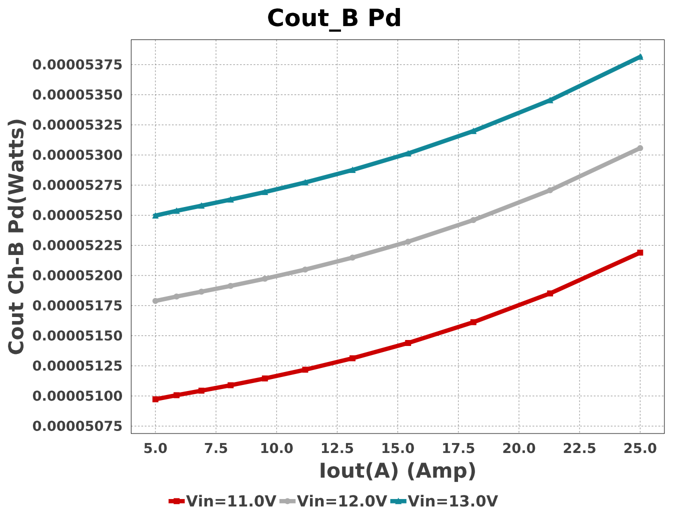

IC Pd
IC Pd(W)
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Output Current (A)
Vin=11.0V Vin=12.0V Vin=13.0V

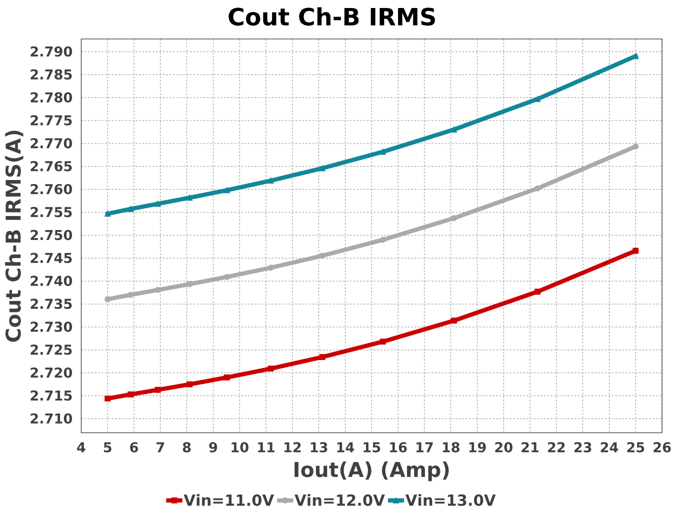

Efficiency
Efficiency(%)
85.25
85.00
84.75
84.50
84.25
84.00
83.75
83.50
83.25
83.00
82.75
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V Vin=12.0V Vin=13.0V

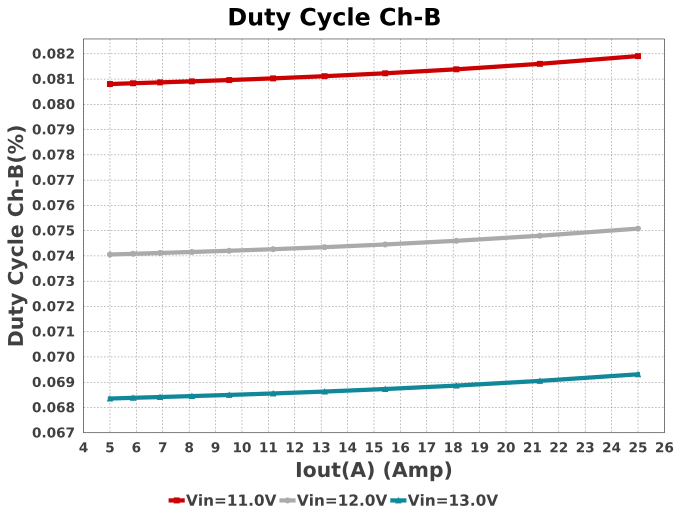

Loop Response Channel1
Gain(dB)
Phase + 180(degree)
125
100
75
50
25
0
-25
-50
-75
100
75
50
25
0
-25
-50
-75
10
1,000
100,000
Frequency (Hz)
Gain
Phase + 180

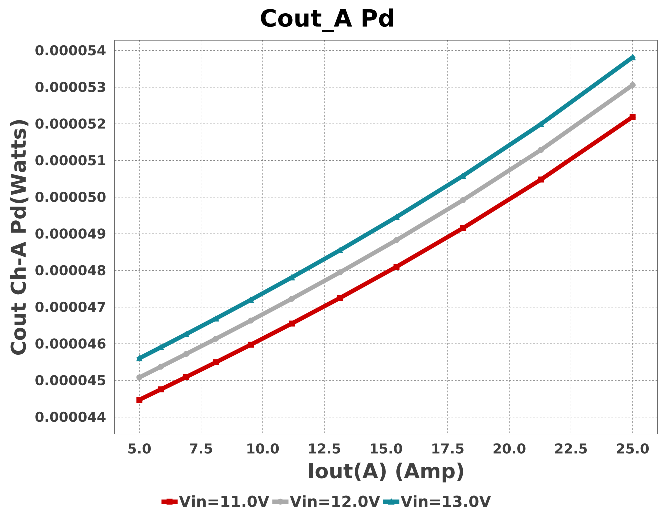

Loop Response Channel2
Gain(dB)
Phase + 180(degree)
125
100
75
50
25
0
-25
-50
-75
100
75
50
25
0
-25
-50
-75
10
1,000
100,000
Frequency (Hz)
Gain
Phase + 180

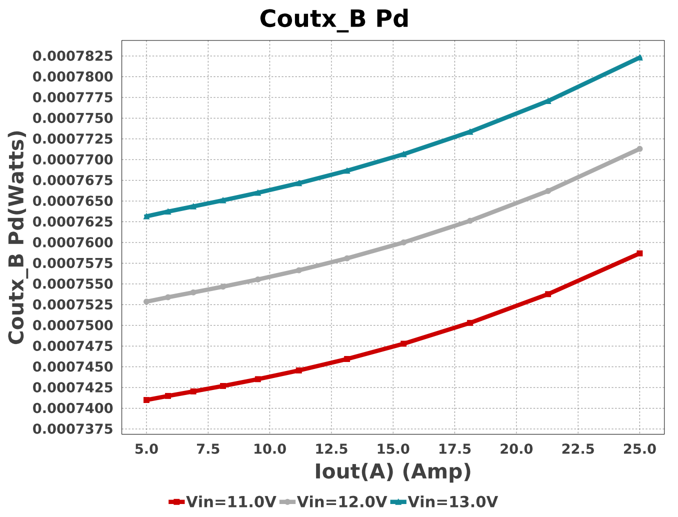

IC Tj
IC Tj(degC)
97.5
95.0
92.5
90.0
87.5
85.0
82.5
80.0
77.5
75.0
72.5
70.0
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V
Vin=12.0V
Vin=13.0V

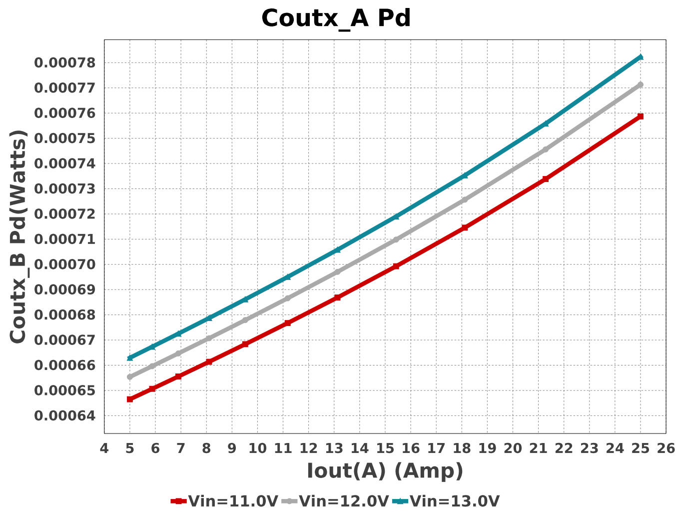

Cout_B Pd
Cout Ch-B Pd(Watts)
0.00005375
0.00005350
0.00005325
0.00005300
0.00005275
0.00005250
0.00005225
0.00005200
0.00005175
0.00005150
0.00005125
0.00005100
0.00005075
5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0
Iout(A) (Amp)
Vin=11.0V
Vin=12.0V
Vin=13.0V

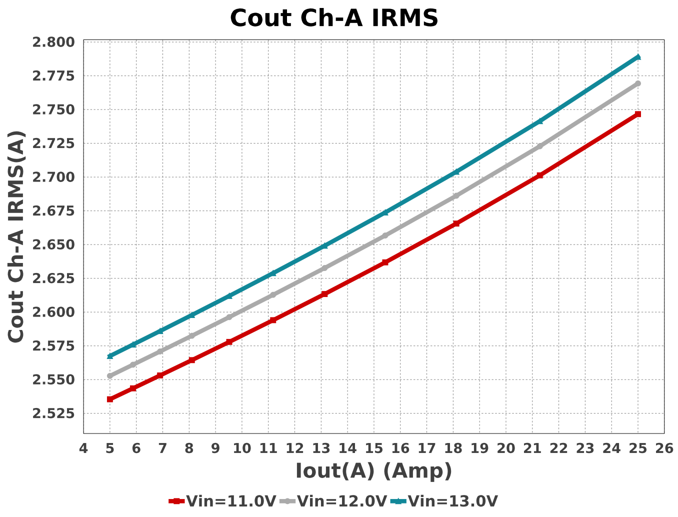

Cout Ch-B IRMS
Cout Ch-B IRMS(A)
2.790
2.785
2.780
2.775
2.770
2.765
2.760
2.755
2.750
2.745
2.740
2.735
2.730
2.725
2.720
2.715
2.710
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V
Vin=12.0V
Vin=13.0V

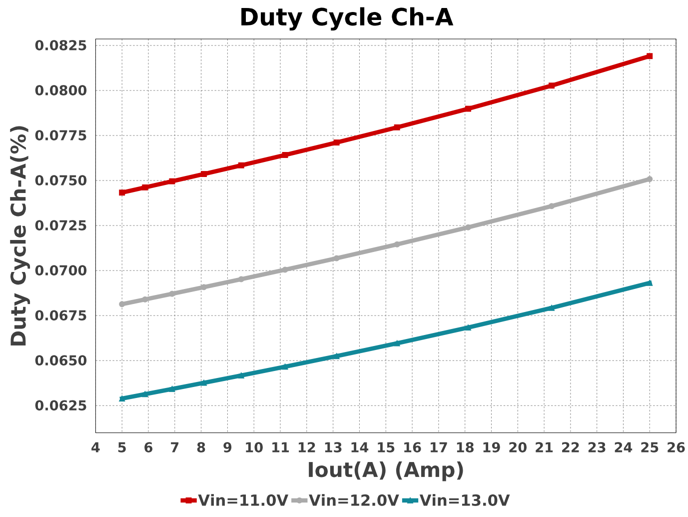

Duty Cycle Ch-B
Duty Cycle Ch-B(%)
0.082
0.081
0.080
0.079
0.078
0.077
0.076
0.075
0.074
0.073
0.072
0.071
0.070
0.069
0.068
0.067
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Iout(A) (Amp)
Vin=11.0V
Vin=12.0V
Vin=13.0V











Operating Values

#	Name	Value	Category	Description
1.	BOM Count	64		Total Design BOM count
2.	Total BOM	NA		Total BOM Cost
3.	Cbulk IRMS	435.178 mA	Capacitor	Bulk capacitor RMS ripple current
4.	Cbulk Pd	83.327 mW	Capacitor	Bulk capacitor power dissipation
5.	Cin_A ESR	2.0 mOhm	Capacitor	Cin Capacitor ESR
6.	Cin_A IRMS	4.302 A	Capacitor	Input capacitor RMS ripple current
7.	Cin_A PD	37.018 mW	Capacitor	Input capacitor power dissipation
8.	Cin_B ESR	2.0 mOhm	Capacitor	Cin Capacitor ESR
9.	Cin_B IRMS	4.302 A	Capacitor	Input Capacitor Cin2 RMS Ripple Current
10.	Cin_B PD	37.018 mW	Capacitor	Input capacitor power dissipation
11.	Cout Ch-A IRMS	2.789 A	Capacitor	Output Channel 1 Capacitor RMS ripple current

#	Name	Value	Category	Description
12.	Cout Ch-B IRMS	2.789 A	Capacitor	Output Channel 2 Capacitor RMS ripple current
13.	Cout_A ESR	400.0 µOhm	Capacitor	Cout Capacitor ESR
14.	Cout_A PD	53.815 µW	Capacitor	Output capacitor power dissipation
15.	Cout_B ESR	400.0 µOhm	Capacitor	Cout Capacitor ESR
16.	Cout_B PD	53.815 µW	Capacitor	Output capacitor power dissipation
17.	Coutx_A PD	782.31 µW	Capacitor	Output capacitor_x power loss
18.	Coutx_B PD	782.31 µW	Capacitor	Output capacitor_x power loss
19.	Fpi Ch-A	276.311 kHz	Compensation	Current Loop Pole Frequency
20.	Fpi Ch-B	276.311 kHz	Compensation	Current Loop Pole Frequency
21.	Fpv Ch-A	159.155 kHz	Compensation	Voltage Loop Pole Frequency
22.	Fpv Ch-B	159.155 kHz	Compensation	Voltage Loop Pole Frequency
23.	Fzi Ch-A	22.107 kHz	Compensation	Current Loop Zero Frequency
24.	Fzi Ch-B	22.107 kHz	Compensation	Current Loop Zero Frequency
25.	Fzv Ch-A	3.979 kHz	Compensation	Voltage Loop Zero Frequency
26.	Fzv Ch-B	3.979 kHz	Compensation	Voltage Loop Zero Frequency
27.	ILOOP Gain Ch-A	3.388	Compensation	Recommended Current Loop Mid-band Gain
28.	ILOOP Gain Ch-B	3.388	Compensation	Recommended Current Loop Mid-band Gain
29.	VLOOP Gain Ch-A	7.829	Compensation	Recommended Voltage Loop Mid-band Gain
30.	VLOOP Gain Ch-B	7.829	Compensation	Recommended Voltage Loop Mid-band Gain
31.	Zout (Fco) Ch-A	1.249 mOhm	Compensation	Output Impedance at Crossover Frequency
32.	Zout (Fco) Ch-B	1.249 mOhm	Compensation	Output Impedance at Crossover Frequency
33.	Zout (Fsw) Ch-A	177.868 µOhm	Compensation	Output Impedance at Switching Frequency
34.	Zout (Fsw) Ch-B	177.868 µOhm	Compensation	Output Impedance at Switching Frequency
35.	IC Pd	7.975 W	IC	IC power dissipation
36.	IC Tj	96.838 degC	IC	IC junction temperature
37.	ICThetaJA Effective	6.5 degC/W	IC	Effective IC Junction-to-Ambient Thermal Resistance
38.	Iin Avg	3.717 A	IC	Average input current
39.	CPI Ch-A	19.2 pF	PMBus	Selectable compensation parameter through pinstrapping
40.	CPI Ch-B	19.2 pF	PMBus	Selectable compensation parameter through pinstrapping
41.	CPV Ch-A	6.25 pF	PMBus	Selectable compensation parameter through pinstrapping
42.	CPV Ch-B	6.25 pF	PMBus	Selectable compensation parameter through pinstrapping
43.	CZI Ch-A	239.976 pF	PMBus	Selectable compensation parameter through pinstrapping
44.	CZI Ch-B	239.976 pF	PMBus	Selectable compensation parameter through pinstrapping
45.	CZV Ch-A	250.0 pF	PMBus	Selectable compensation parameter through pinstrapping
46.	CZV Ch-B	250.0 pF	PMBus	Selectable compensation parameter through pinstrapping
47.	GMI Ch-A	100.0 µS	PMBus	Selectable compensation parameter through pinstrapping
48.	GMI Ch-B	100.0 µS	PMBus	Selectable compensation parameter through pinstrapping
49.	GMV Ch-A	50.0 µS	PMBus	Selectable compensation parameter through pinstrapping
50.	GMV Ch-B	50.0 µS	PMBus	Selectable compensation parameter through pinstrapping
51.	PMBus Vout Command Ch-A	800.0 m	PMBus	PMBus Vout Command
52.	PMBus Vout Command Ch-B	800.0 m	PMBus	PMBus Vout Command
53.	PMBus Vout Scale Loop Ch-A	500.0 m	PMBus	PMBus Vout Scale Loop
54.	PMBus Vout Scale Loop Ch-B	500.0 m	PMBus	PMBus Vout Scale Loop
55.	RVI Ch-A	30.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
56.	RVI Ch-B	30.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
57.	RVV Ch-A	160.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
58.	RVV Ch-B	160.0 kOhm	PMBus	Selectable compensation parameter through pinstrapping
59.	Cbulk Pd	83.327 mW	Power	Bulk capacitor power dissipation
60.	Cin_A PD	37.018 mW	Power	Input capacitor power dissipation
61.	Cin_B PD	37.018 mW	Power	Input capacitor power dissipation
62.	Cout_A PD	53.815 µW	Power	Output capacitor power dissipation
63.	Cout_B PD	53.815 µW	Power	Output capacitor power dissipation
64.	Coutx_A PD	782.31 µW	Power	Output capacitor_x power loss
65.	Coutx_B PD	782.31 µW	Power	Output capacitor_x power loss
66.	IC Pd	7.975 W	Power	IC power dissipation
67.	Snubber Pd Ch-A	92.95 mW	Power	Snubber Power Dissipation
68.	Snubber Pd Ch-B	92.95 mW	Power	Snubber Power Dissipation
69.	Total Pd	8.32 W	Power	Total Power Dissipation
70.	Conduction Mode Ch-A	CCM	System Information	Conduction Mode
71.	Conduction Mode Ch-B	CCM	System Information	Conduction Mode
72.	Duty Cycle Ch-A	6.931 %	System Information	Duty cycle for Channel 1
73.	Duty Cycle Ch-B	6.931 %	System Information	Duty cycle for Channel 1
74.	Efficiency	82.781 %	System Information	Steady state efficiency
75.	FootPrint	1.554 k mm^2	System Information	Total Foot Print Area of BOM components
76.	Frequency	550.0 kHz	System Information	Switching frequency

#	Name	Value	Category	Description
77.	Gain Marg Ch-A	-3.359 dB	System Information	Bode Plot Gain Margin
78.	Gain Marg Ch-B	-3.359 dB	System Information	Bode Plot Gain Margin
79.	Iout Ch-A	25.0 A	System Information	Iout1 operating point
80.	Iout Ch-B	25.0 A	System Information	Iout2 operating point
81.	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).
82.	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).
83.	Minimum Cout Ch-A required for stability	1.508 mF	System Information	Minimum Cout required for stability
84.	Minimum Cout Ch-B required for stability	1.508 mF	System Information	Minimum Cout required for stability
85.	Overshoot Value for Cout Ch-A	1.831 mV	System Information	Theoretical Vout Overshoot Value
86.	Overshoot Value for Cout Ch-B	1.831 mV	System Information	Theoretical Vout Overshoot Value
87.	Pout Ch-A	20.0 W	System Information	Total output power
88.	Pout Ch-B	20.0 W	System Information	Total output power
89.	SW Ipk Ch-A	29.831 A	System Information	Peak switch current
90.	SW Ipk Ch-B	29.831 A	System Information	Peak switch current
91.	Undershoot Value for Cout Ch-A	268.066 µV	System Information	Theoretical Vout Undershoot Value
92.	Undershoot Value for Cout Ch-B	268.066 µV	System Information	Theoretical Vout Undershoot Value
93.	Vin	13.0 V	System Information	Vin operating point
94.	Vout Ch-A	800.0 mV	System Information	Operational Voltage 1
95.	Vout Ch-A Tolerance	1.25 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
96.	Vout Ch-B	800.0 mV	System Information	Operational Voltage 2
97.	Vout Ch-B Tolerance	1.25 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
98.	Vout Tolerance	1.25 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
99.	Vout p-p Ch-A	1.718 mV	System Information	Peak-to-peak output1 ripple voltage
100.	Vout p-p Ch-B	1.718 mV	System Information	Peak-to-peak output1 ripple voltage
101.	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).
102.	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

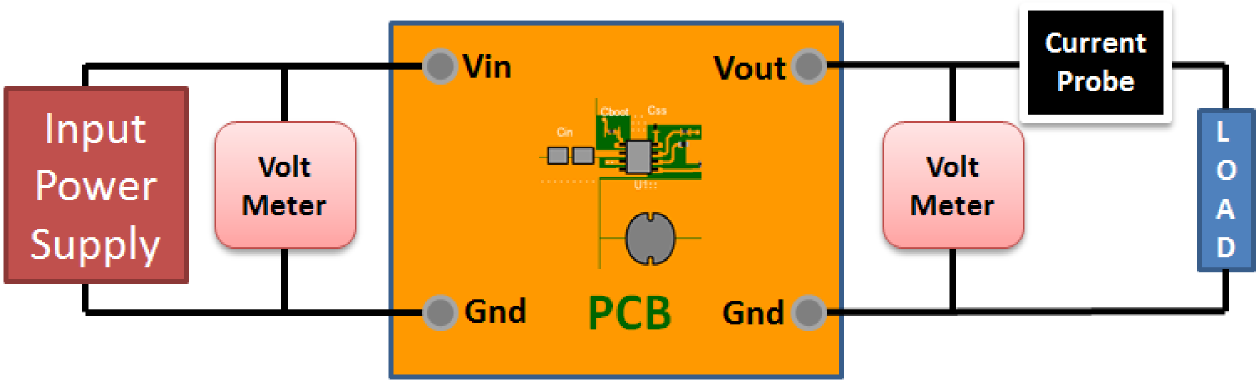
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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.

Important Notice and Disclaimer

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

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

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