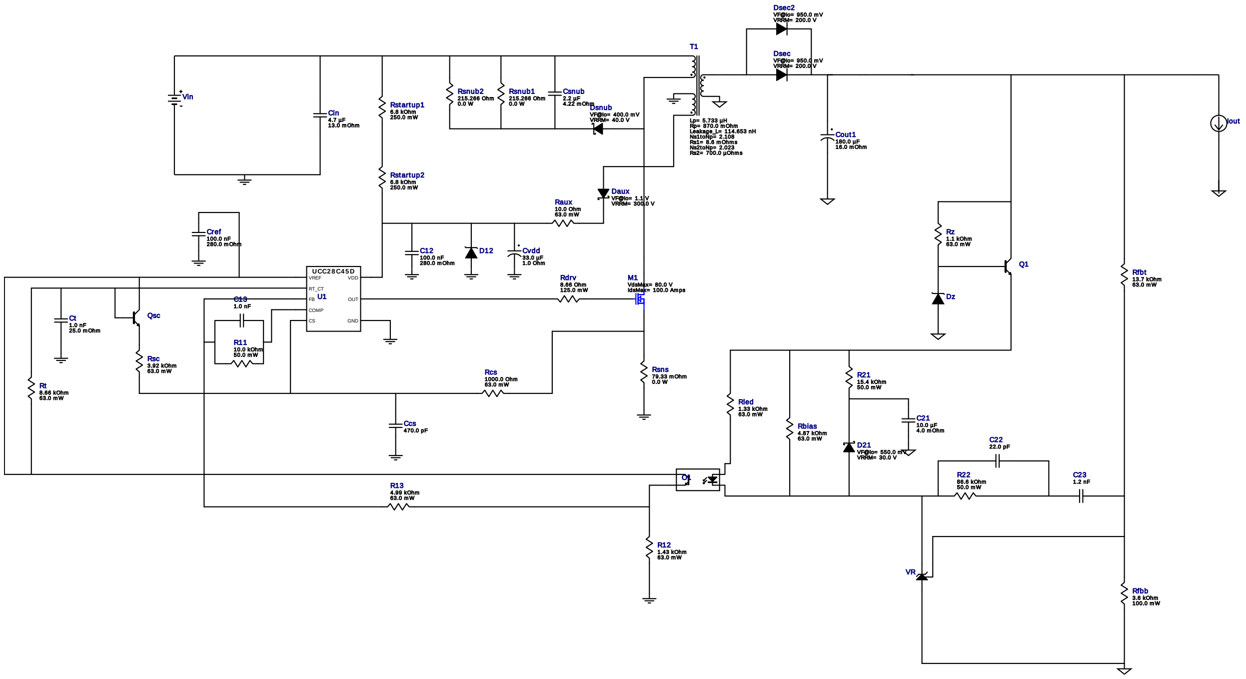
VinMin = 12.0V
VinMax = 12.0V
Vout = 12.0V
Iout = 1.5A

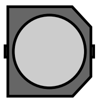
Device = UCC28C45DR
Topology = Flyback
Created = 2023-05-10 07:04:34.204
BOM Cost = NA
BOM Count = 46
Total Pd = 2.55W

WEBENCH ® Design Report

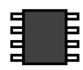
Design : 59 UCC28C45DR
UCC28C45DR 12V-12V to 12.00V @ 1.5A



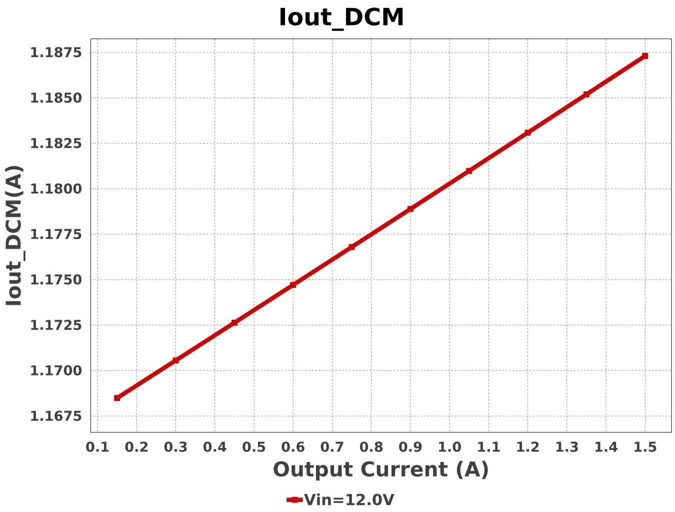
Electrical BOM

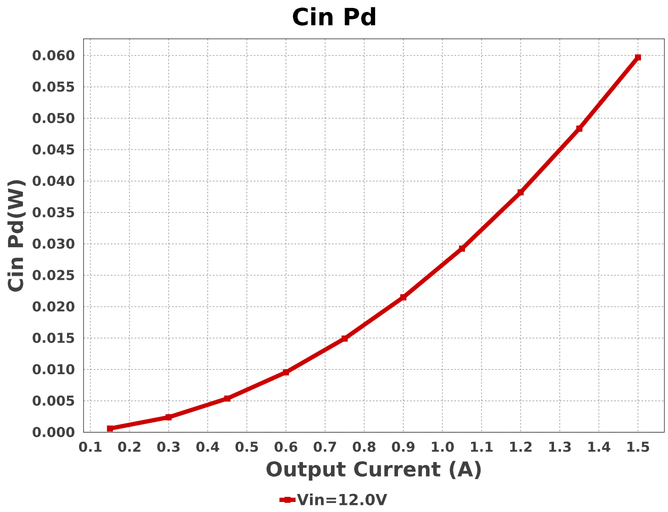
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
C13	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
C21	MuRata	GRM21BR61E106MA73L Series= X5R	Cap= 10.0 uF ESR= 4.0 mOhm VDC= 25.0 V IRMS= 2.8 A	1	$0.04	0805 7 mm^2
C22	Samsung Electro-Mechanics	CL21C220JBANNNC Series= C0G/NP0	Cap= 22.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
C23	TDK	C2012C0G1H122J060AA Series= C0G/NP0	Cap= 1.2 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm^2
Ccs	Samsung Electro-Mechanics	CL21C471JBANNNC Series= C0G/NP0	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
Cin	Kemet	C1206C475K4PACTU Series= X5R	Cap= 4.7 uF ESR= 13.0 mOhm VDC= 16.0 V IRMS= 4.9 A	1	$0.07	1206 11 mm^2
Cout1	Panasonic	25SVPF180M Series= SVPF	Cap= 180.0 uF ESR= 16.0 mOhm VDC= 25.0 V IRMS= 4.65 A	1	$1.17	 CAPSMT_62_E12 106 mm^2

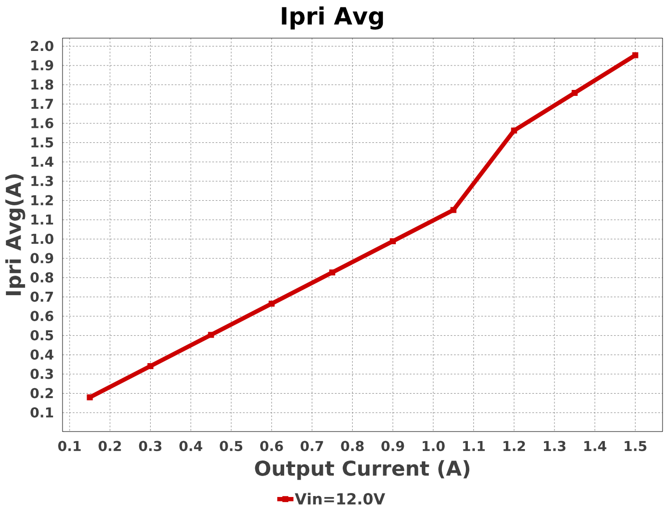
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cref	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
Csnub	MuRata	GRM21BR71C225KA12L Series= X7R	Cap= 2.2 uF ESR= 4.22 mOhm VDC= 16.0 V IRMS= 1.94677 A	1	$0.09	0805 7 mm^2
Ct	Kemet	C0805C102J5GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 50.0 V IRMS= 1.71 A	1	$0.02	0805 7 mm^2
Cvdd	Chemi-Con	EMVY250ADA330MF55G Series= MVY	Cap= 33.0 uF ESR= 1.0 Ohm VDC= 25.0 V IRMS= 140.0 mA	1	$0.13	CAPSMT_62_F55 77 mm^2
D12	Diodes Inc.	MMSZ5248B-7-F	Zener	1	$0.04	SOD-123 13 mm^2
D21	Panasonic	DB2S31600L	VF@Io= 550.0 mV VRRM= 30.0 V	1	$0.03	SOD-523 5 mm^2
Daux	SMC Diode Solutions	ST1300ATR	VF@Io= 1.1 V VRRM= 300.0 V	1	$0.12	SMA 37 mm^2
Dsec	SMC Diode Solutions	SBRD10200TR	VF@Io= 950.0 mV VRRM= 200.0 V	1	$0.18	DPAK 102 mm^2
Dsec2	SMC Diode Solutions	SBRD10200TR	VF@Io= 950.0 mV VRRM= 200.0 V	1	$0.18	DPAK 102 mm^2
Dsnub	Diodes Inc.	ZLLS400TA	VF@Io= 400.0 mV VRRM= 40.0 V	1	$0.16	SOD-323 9 mm^2
Dz	ON Semiconductor	BZX84C9V1LT1G	Zener	1	$0.03	SOT-23 14 mm^2
M1	Texas Instruments	CSD19502Q5B	VdsMax= 80.0 V IdsMax= 100.0 Amps	1	$0.81	DQK0006C 9 mm^2
O1	Vishay-Semiconductor	TCMT1107	Optocoupler	1	$0.19	SOP-4 44 mm^2
Q1	Diodes Inc.	MMBT3904-7-F	Bipolar Transistor	1	$0.02	SOT-23 14 mm^2
Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	$1.19	TO-18 57 mm^2
R11	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
R12	Vishay-Dale	CRCW04021K43FKED Series= CRCW..e3	Res= 1.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R21	Yageo	RC0201FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
R22	Yageo	RC0201FR-0786K6L Series= ?	Res= 86.6 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2

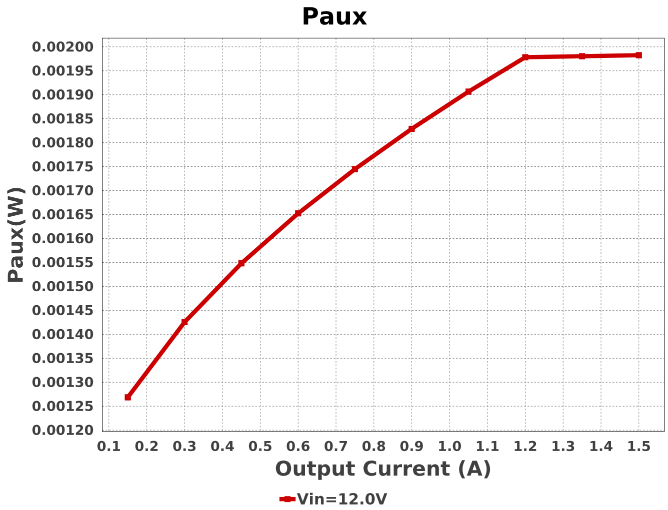
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Raux	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rbias	Vishay-Dale	CRCW04024K87FKED Series= CRCW..e3	Res= 4.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rcs	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rdrv	Vishay-Dale	CRCW08058R66FKEA Series= CRCW..e3	Res= 8.66 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm^2
Rfbb	Yageo	RC0603FR-073K6L Series= ?	Res= 3.6 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rfbt	Vishay-Dale	CRCW040213K7FKED Series= CRCW..e3	Res= 13.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rled	Vishay-Dale	CRCW04021K33FKED Series= CRCW..e3	Res= 1.33 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsc	Vishay-Dale	CRCW04023K92FKED Series= CRCW..e3	Res= 3.92 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsns	CUSTOM	CUSTOM Series= ?	Res= 79.33 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 215.266 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 215.266 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rstartup1	Yageo	RC1206FR-076K8L Series= ?	Res= 6.8 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rstartup2	Yageo	RC1206FR-076K8L Series= ?	Res= 6.8 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rt	Vishay-Dale	CRCW04028K66FKED Series= CRCW..e3	Res= 8.66 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rz	Vishay-Dale	CRCW04021K10FKED Series= CRCW..e3	Res= 1.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
T1	CUSTOM	CUSTOM	Lp= 5.733 µH Rp= 870.0 mOhm Leakage_L= 114.653 nH Ns1toNp= 2.108 Rs1= 8.6 mOhms Ns2toNp= 2.023 Rs2= 700.0 µOhms	1	NA	CUSTOM 0 mm^2
U1	Texas Instruments	UCC28C45DR	Switcher	1	$0.54	 D0008A 57 mm^2

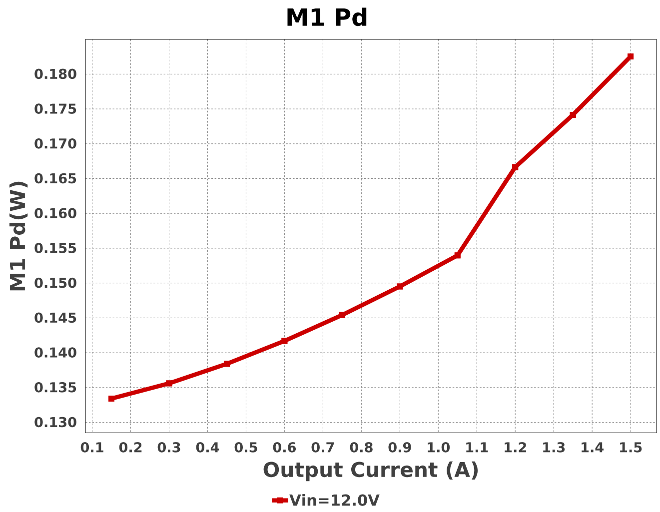
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.09	R-PDSO-G3 16 mm²

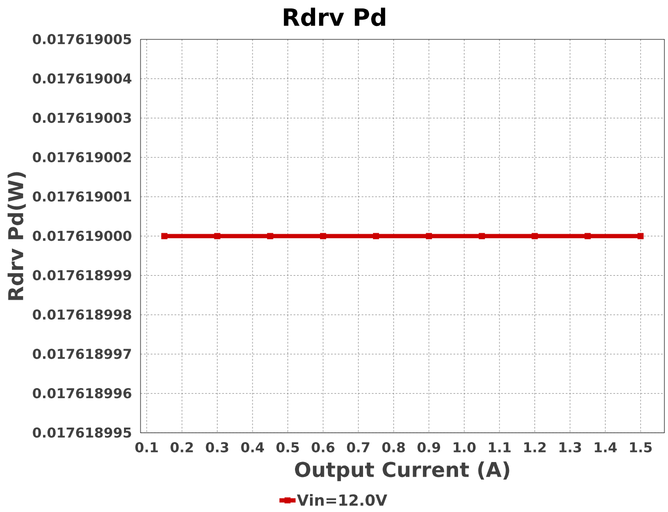


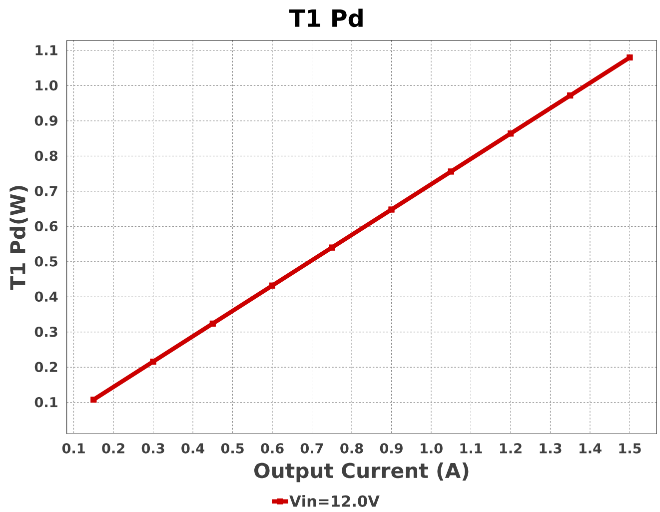


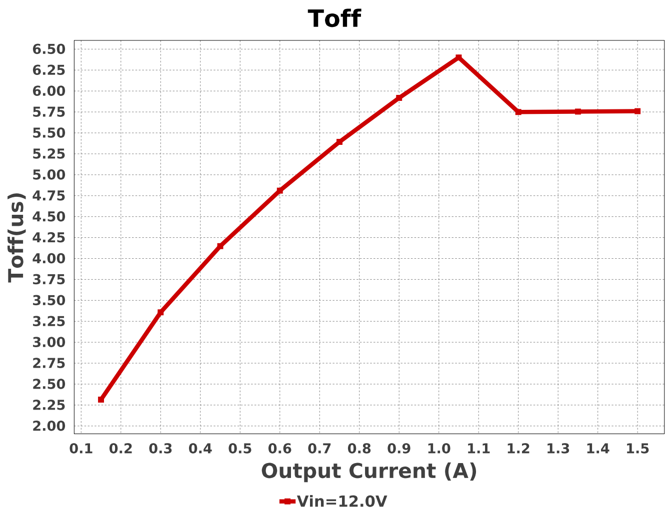


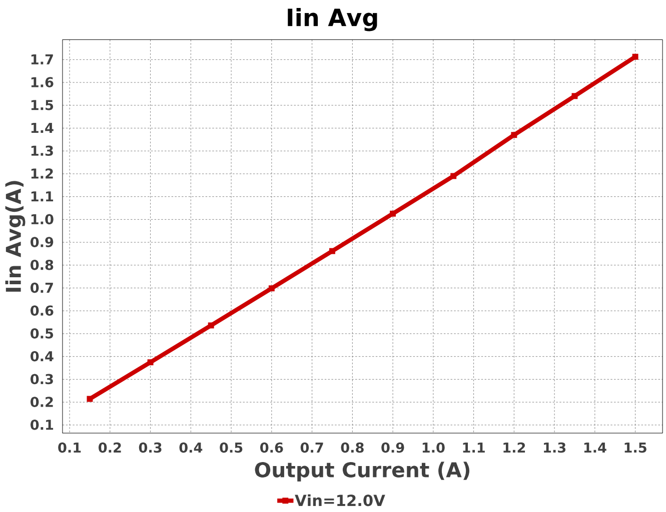


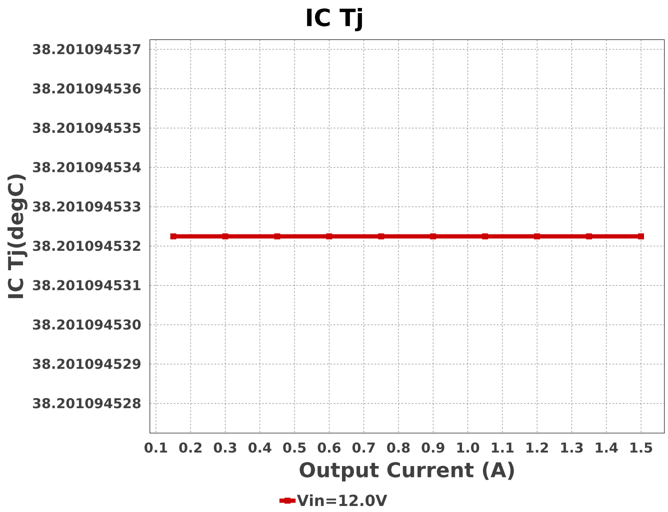


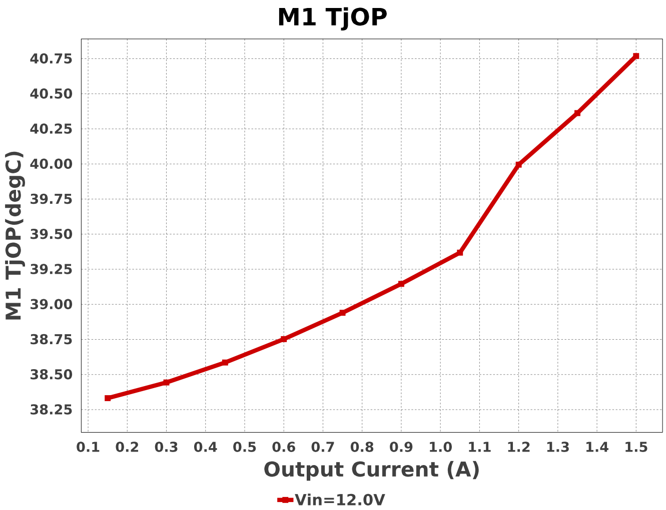


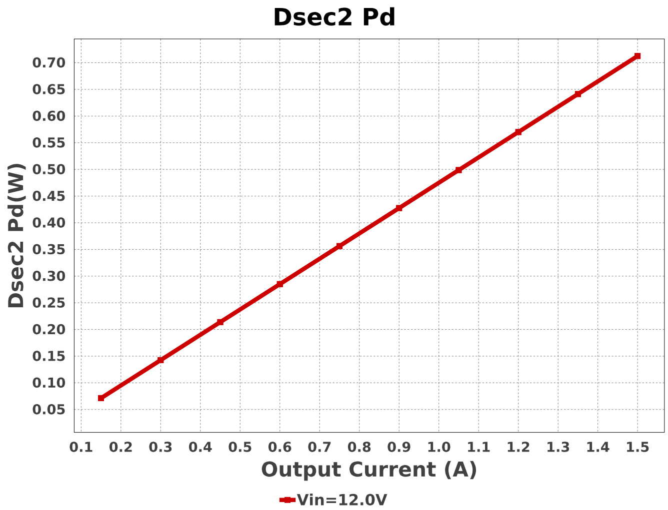

T1 Pd
T1 Pd(W)
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

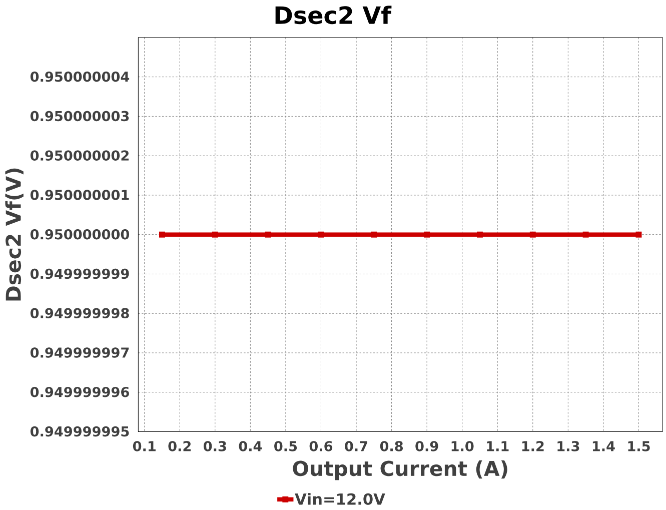

Toff
Toff(us)
6.50
6.25
6.00
5.75
5.50
5.25
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

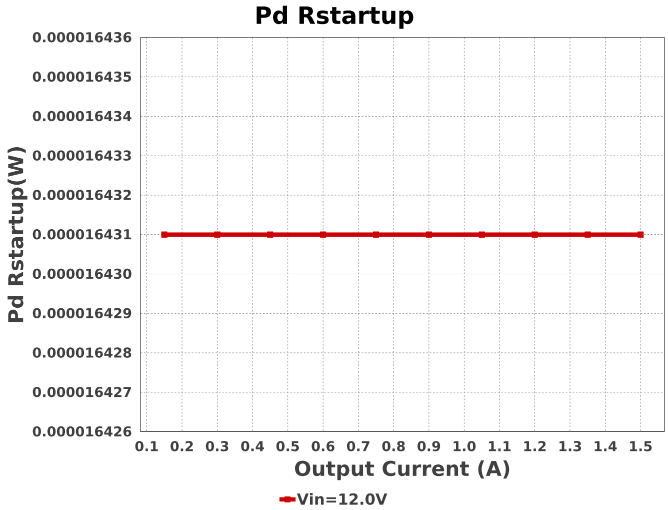

Iin Avg
Iin Avg(A)
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

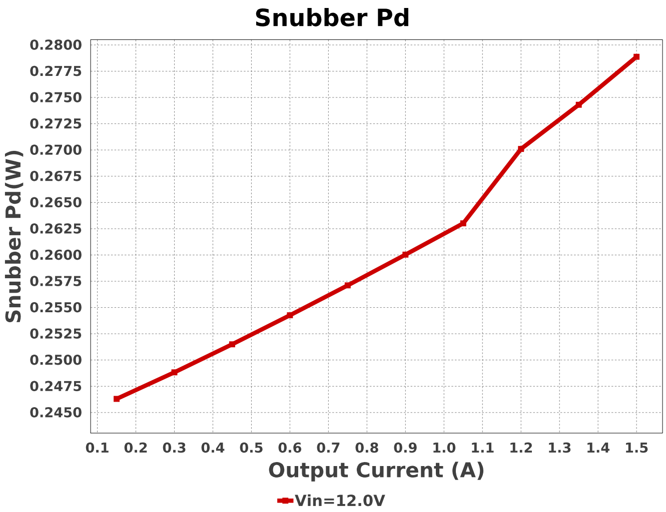

IC Tj
IC Tj(degC)
38.201094537
38.201094536
38.201094535
38.201094534
38.201094533
38.201094532
38.201094531
38.201094530
38.201094529
38.201094528
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

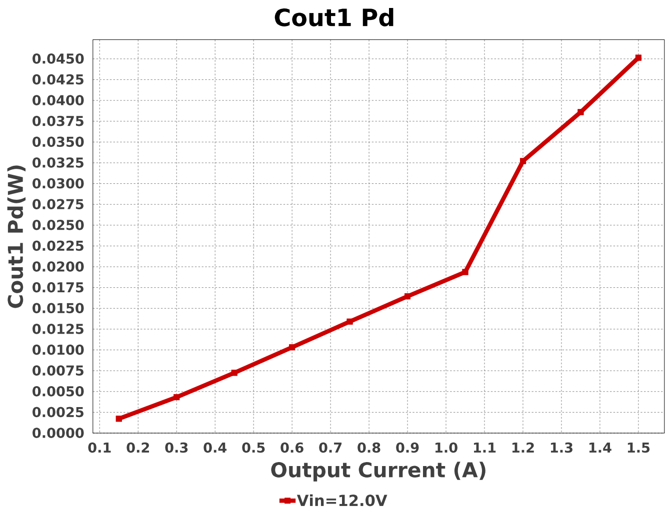

M1 TjOP
M1 TjOP(degC)
40.75
40.50
40.25
40.00
39.75
39.50
39.25
39.00
38.75
38.50
38.25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

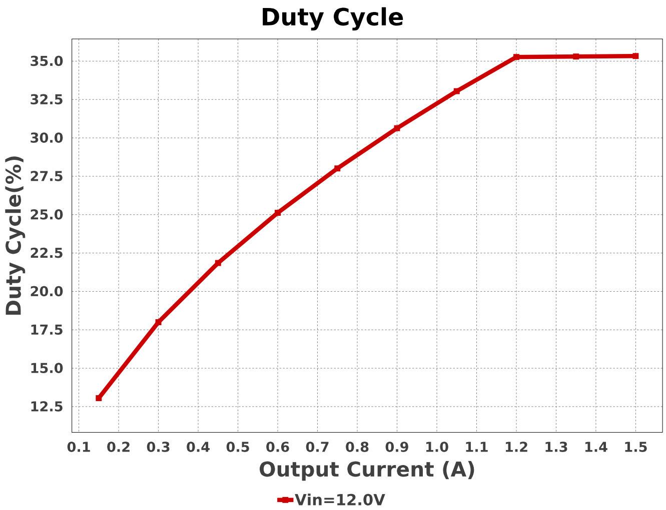

Dsec2 Pd
Dsec2 Pd(W)
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

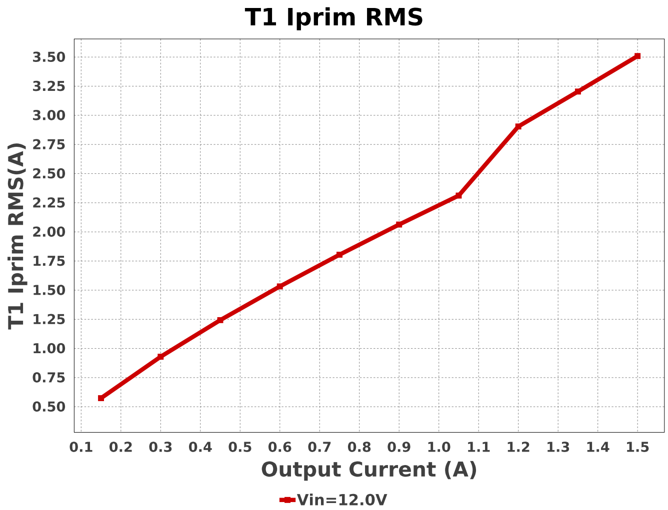

Dsec2 Vf
Dsec2 Vf(V)
Output Current (A)
Vin=12.0V

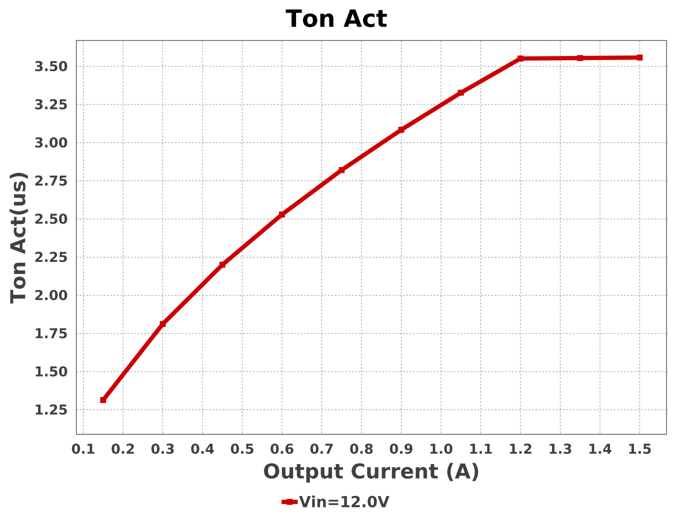

Pd Rstartup
Pd Rstartup(W)
Output Current (A)
Vin=12.0V

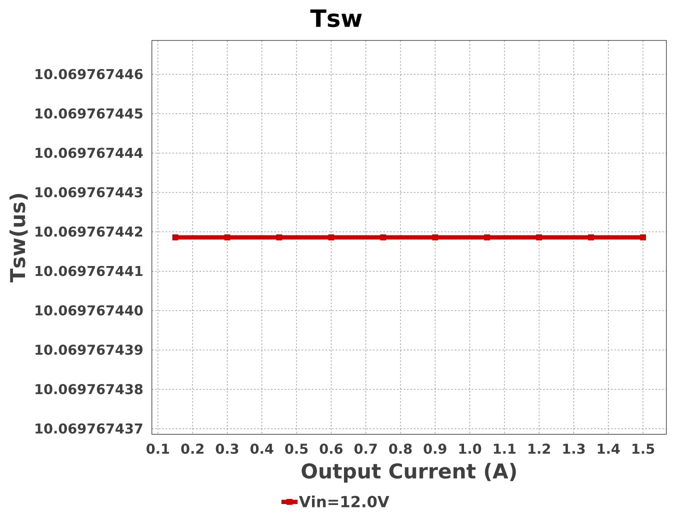

Snubber Pd
Snubber Pd(W)
Output Current (A)
Vin=12.0V

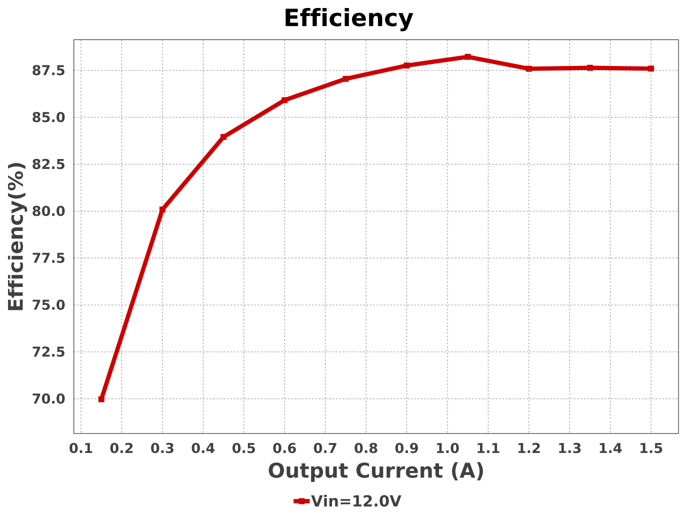

Cout1 Pd
Cout1 Pd(W)
Output Current (A)
Vin=12.0V

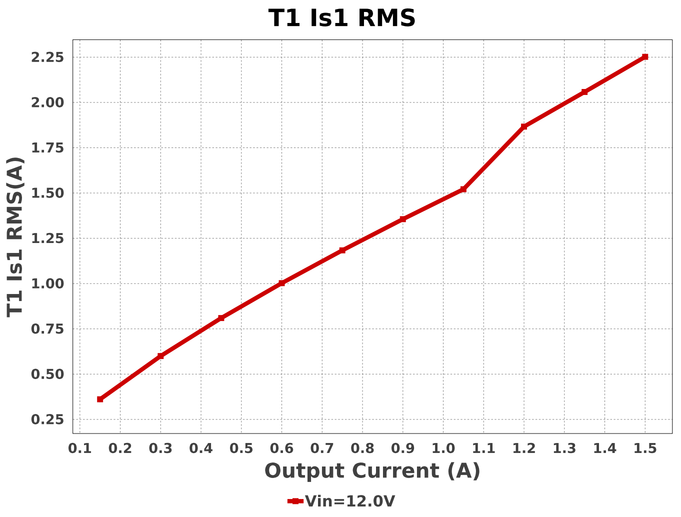

Duty Cycle
Duty Cycle(%)
Output Current (A)
Vin=12.0V

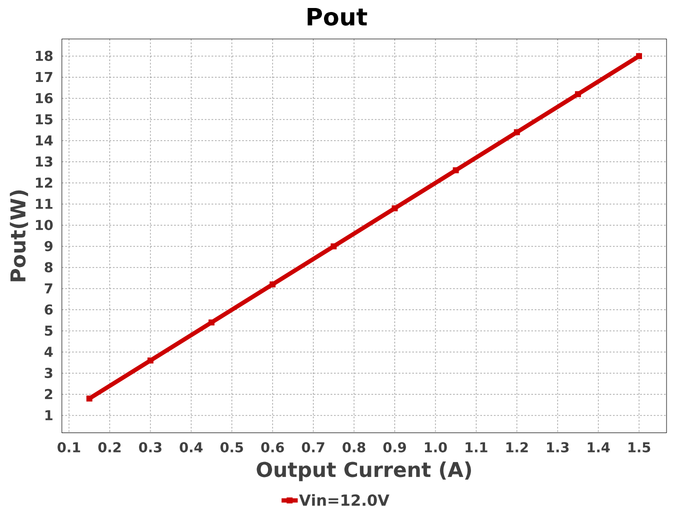

T1 Iprim RMS
T1 Iprim RMS(A)
Output Current (A)
Vin=12.0V

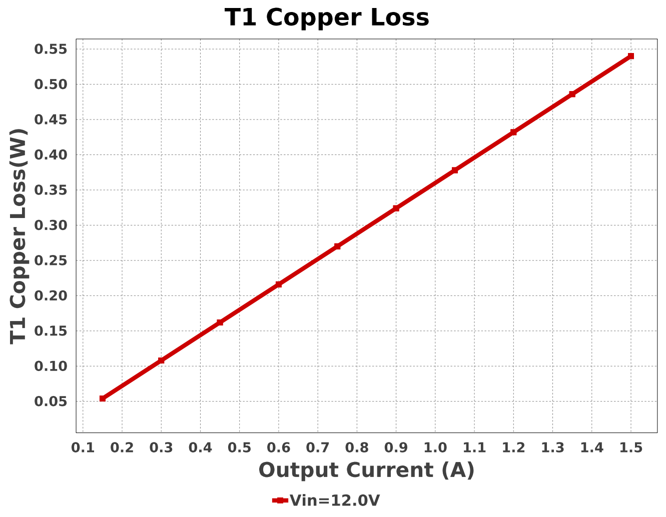

Ton Act
Ton Act(us)
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

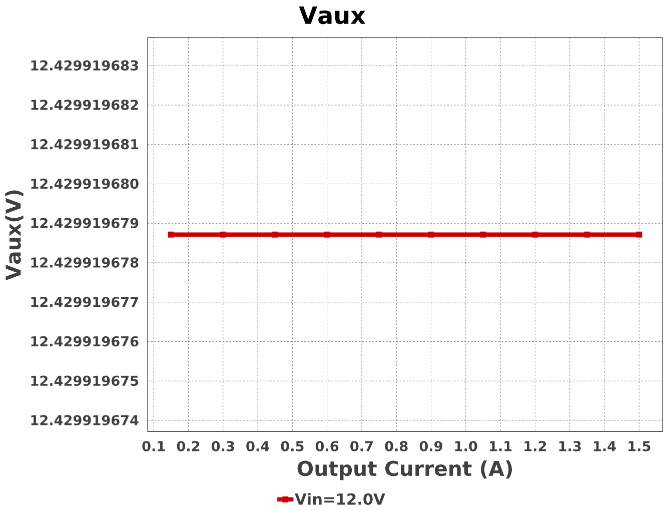

Tsw
Tsw(us)
10.069767446
10.069767445
10.069767444
10.069767443
10.069767442
10.069767441
10.069767440
10.069767439
10.069767438
10.069767437
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

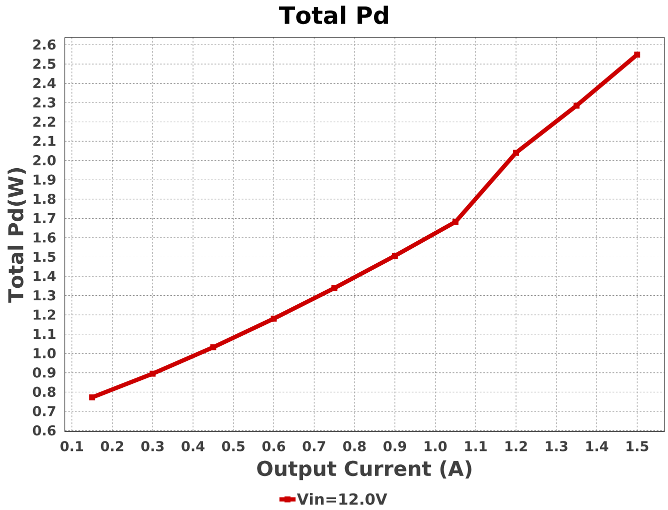

Efficiency
Efficiency(%)
87.5
85.0
82.5
80.0
77.5
75.0
72.5
70.0
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

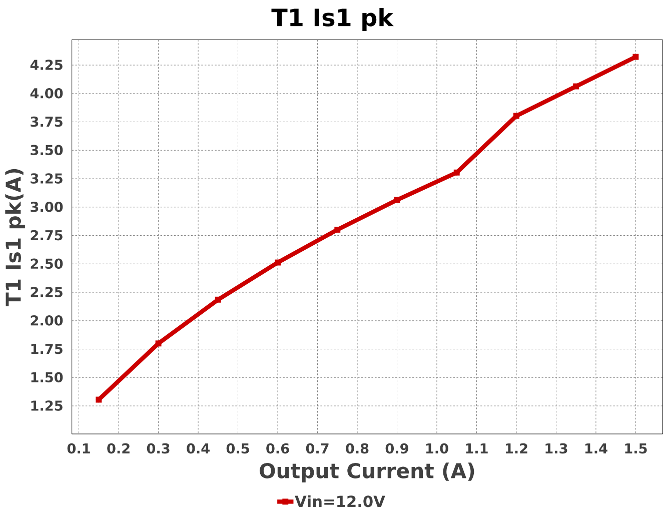

T1 Is1 RMS
T1 Is1 RMS(A)
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

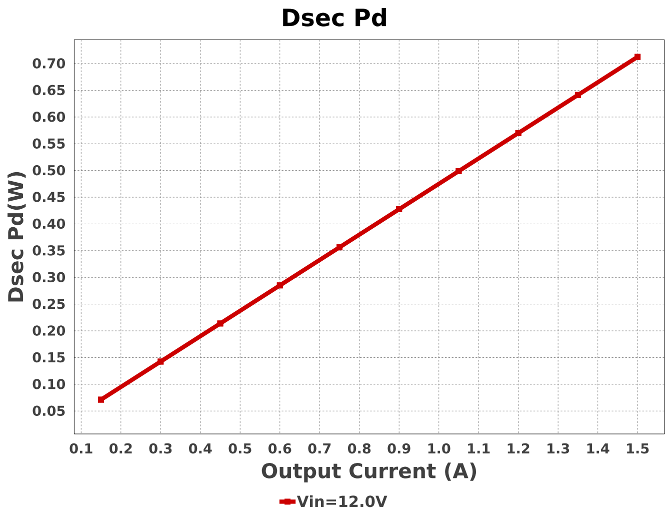

Pout
Pout(W)
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

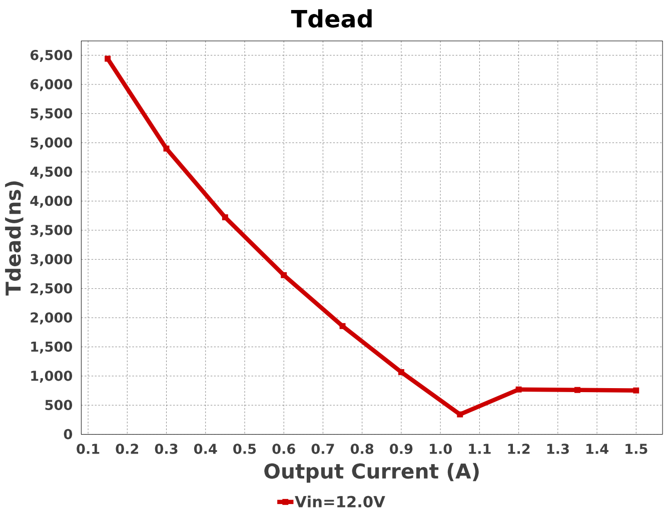

T1 Copper Loss
T1 Copper Loss(W)
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

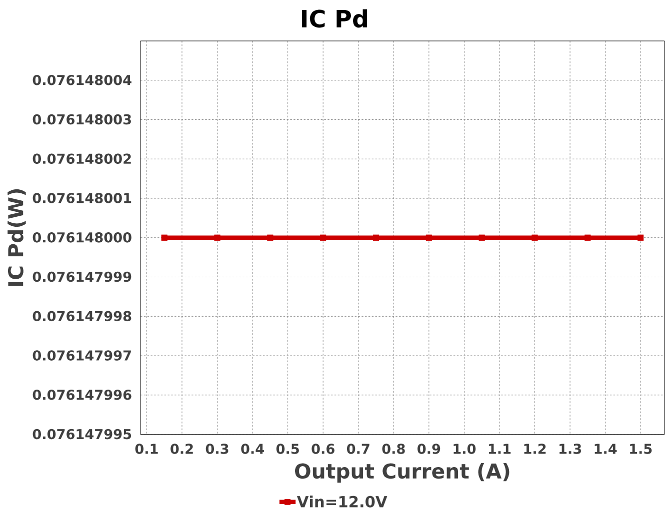

Vaux
Vaux(V)
Output Current (A)
Vin=12.0V

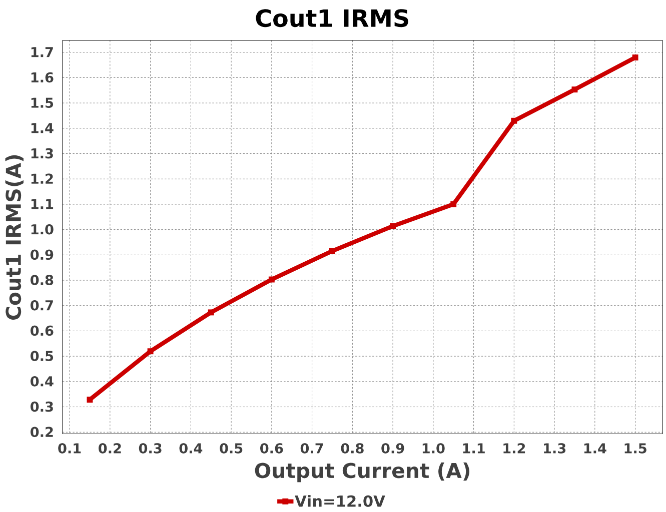

Total Pd
Total Pd(W)
Output Current (A)
Vin=12.0V

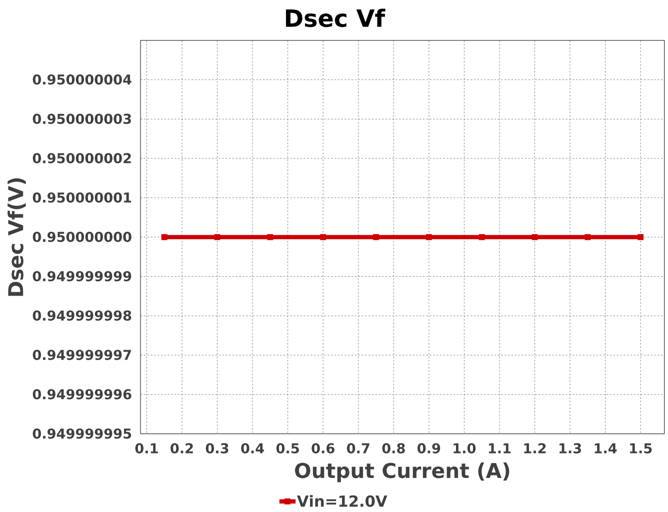

T1 Is1 pk
T1 Is1 pk(A)
Output Current (A)
Vin=12.0V

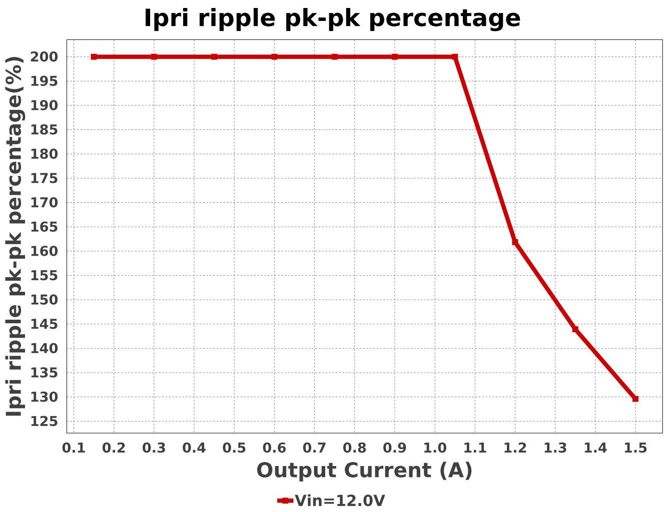

Dsec Pd
Dsec Pd(W)
Output Current (A)
Vin=12.0V

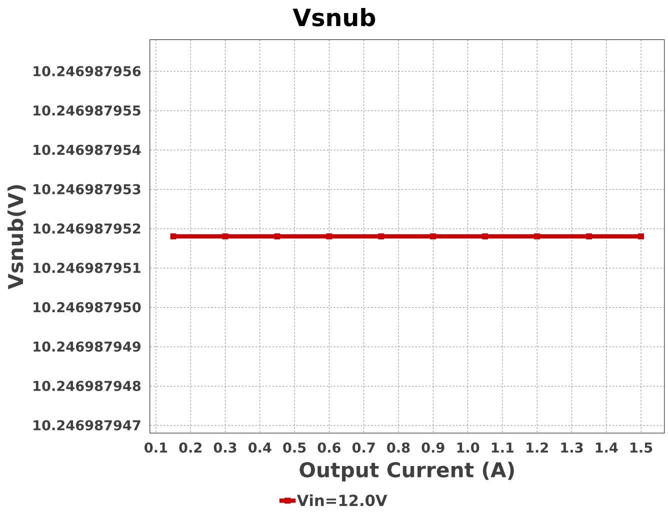

Tdead
Tdead(ns)
Output Current (A)
Vin=12.0V

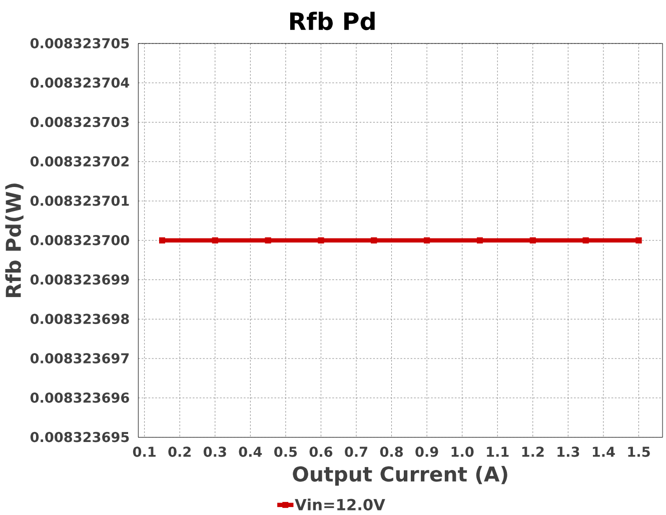

IC Pd
IC Pd(W)
Output Current (A)
Vin=12.0V

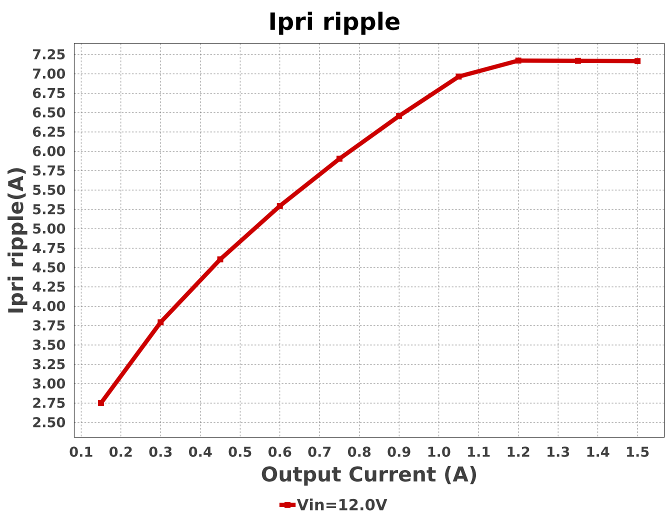

Cout1 IRMS
Cout1 IRMS(A)
1.7 1.6 1.5 1.4 1.3 1.2 1.1 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

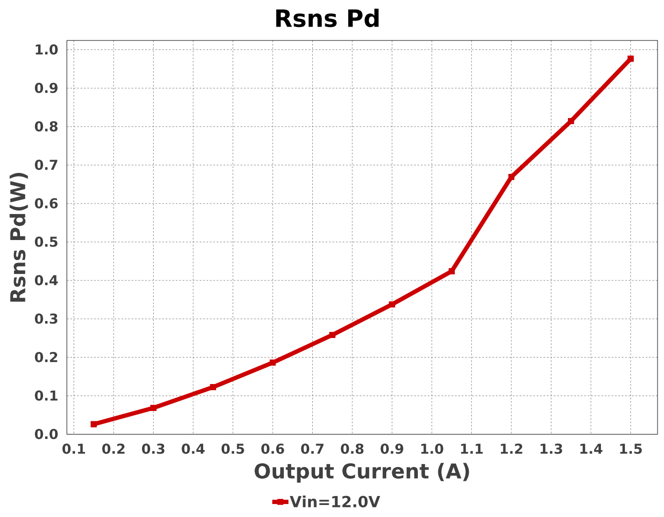

Dsec Vf
Dsec Vf(V)
0.950000004 0.950000003 0.950000002 0.950000001 0.950000000 0.949999999 0.949999998 0.949999997 0.949999996 0.949999995
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

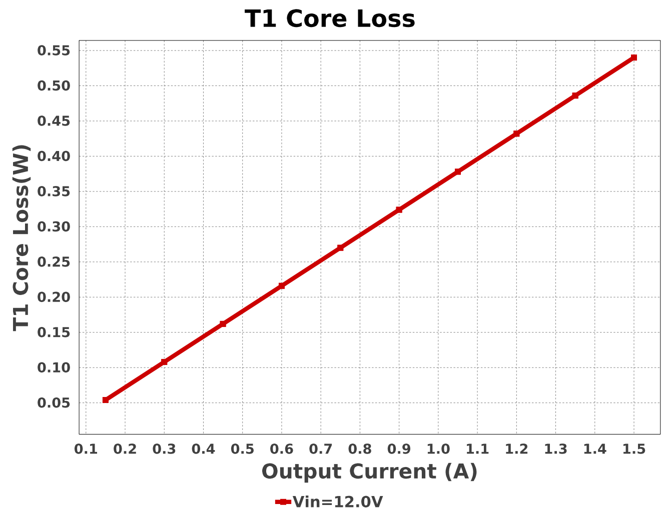

Ipri ripple pk-pk percentage
Ipri ripple pk-pk percentage(%)
200 195 190 185 180 175 170 165 160 155 150 145 140 135 130 125
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

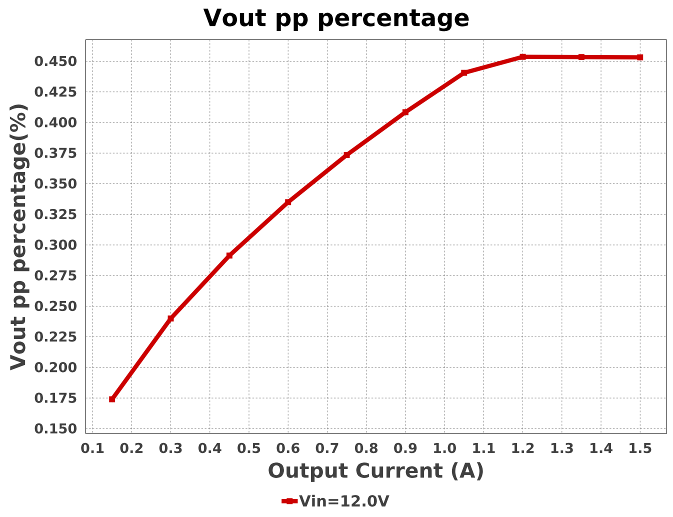

Vsnub
Vsnub(V)
10.246987956 10.246987955 10.246987954 10.246987953 10.246987952 10.246987951 10.246987950 10.246987949 10.246987948 10.246987947
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

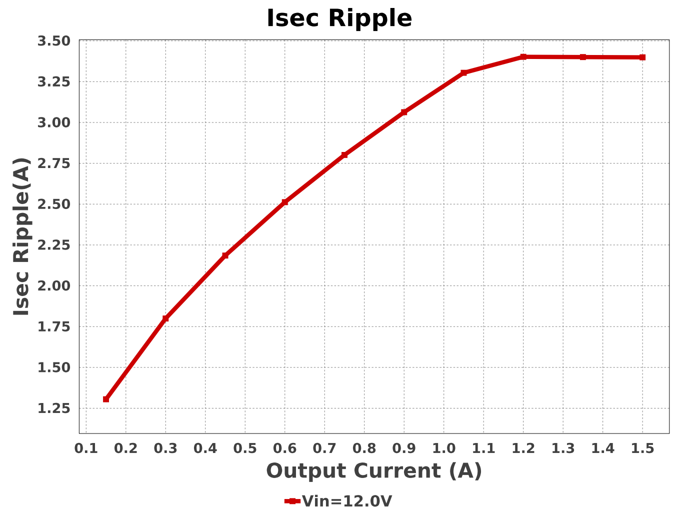

Rfb Pd
Rfb Pd(W)
0.008323705 0.008323704 0.008323703 0.008323702 0.008323701 0.008323700 0.008323699 0.008323698 0.008323697 0.008323696 0.008323695
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

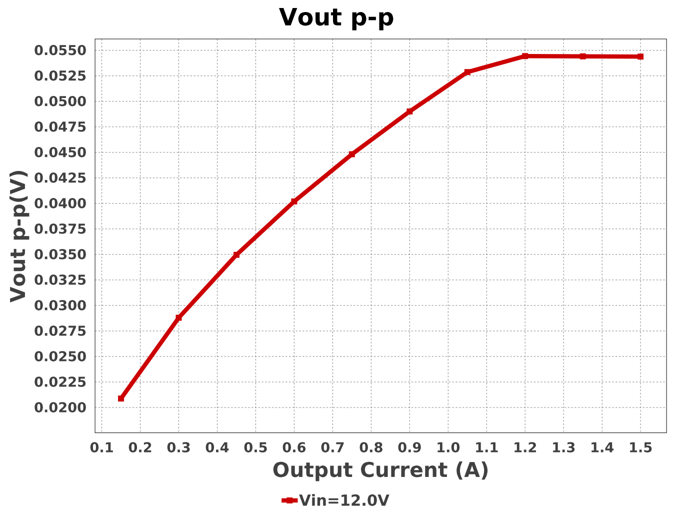

Ipri ripple
Ipri ripple(A)
7.25 7.00 6.75 6.50 6.25 6.00 5.75 5.50 5.25 5.00 4.75 4.50 4.25 4.00 3.75 3.50 3.25 3.00 2.75 2.50
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
Output Current (A)
Vin=12.0V

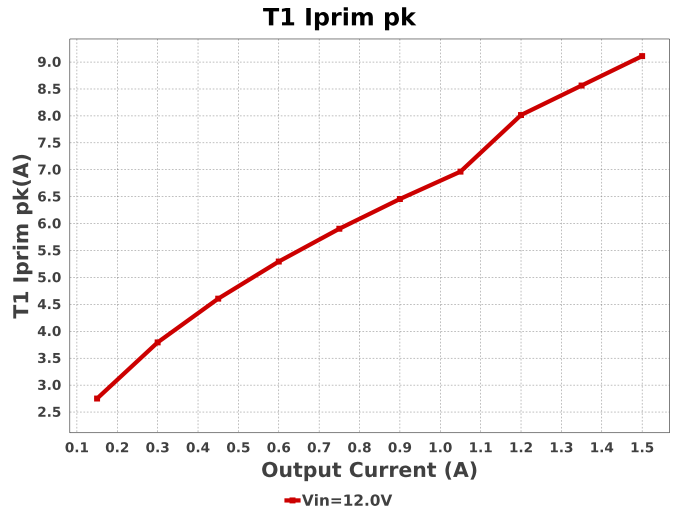












Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	59.694 mW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	1.68 A	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	45.135 mW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	35.0 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	712.5 mW	Diode	Secondary Diode Power Dissipation
6.	Dsec Vf	950.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
7.	Dsec trr	0.0 ns	Diode	Output Diode Reverse Recovery Time
8.	Dsec2 Pd	712.5 mW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	950.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	3.0 ns	Diode	Snubber Diode Reverse Recovery Time
11.	IC Pd	76.148 mW	IC	IC power dissipation

#	Name	Value	Category	Description
12.	IC Tj	38.201 degC	IC	IC junction temperature
13.	ICThetaJA	107.7 degC/W	IC	IC junction-to-ambient thermal resistance
14.	Iin Avg	1.712 A	IC	Average input current
15.	M1 Pd	182.53 mW	Mosfet	M1 MOSFET total power dissipation
16.	M1 TjOP	39.397 degC	Mosfet	M1 MOSFET junction temperature
17.	Cin Pd	59.694 mW	Power	Input capacitor power dissipation
18.	Cout1 Pd	45.135 mW	Power	Output capacitor1 power dissipation
19.	Dsec Pd	712.5 mW	Power	Secondary Diode Power Dissipation
20.	Dsec2 Pd	712.5 mW	Power	Secondary Diode Power Dissipation
21.	IC Pd	76.148 mW	Power	IC power dissipation
22.	M1 Pd	182.53 mW	Power	M1 MOSFET total power dissipation
23.	Paux	1.982 mW	Power	Power Dissipation in Raux and Daux
24.	Pd Rstartup	16.431 µW	Power	Power Dissipation in Rstartup1 and Rstartup2
25.	Rdrv Pd	17.619 mW	Power	Power Dissipation in Gate Drive Resistor
26.	Rfb Pd	8.324 mW	Power	Rfb Power Dissipation
27.	Rsns Pd	976.54 mW	Power	Current Limit Sense Resistor Power Dissipation
28.	Snubber Pd	278.873 mW	Power	Snubber Power Dissipation
29.	T1 Copper Loss	540.0 mW	Power	Transformer Copper Loss Power Dissipation
30.	T1 Core Loss	540.0 mW	Power	Transformer Core Loss Power Dissipation
31.	T1 Pd	1.08 W	Power	Estimated Losses in Transformer
32.	Total Pd	2.549 W	Power	Total Power Dissipation
33.	Pd Rstartup	16.431 µW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
34.	Rdrv Pd	17.619 mW	Resistor	Power Dissipation in Gate Drive Resistor
35.	Rfb Pd	8.324 mW	Resistor	Rfb Power Dissipation
36.	Rsns Pd	976.54 mW	Resistor	Current Limit Sense Resistor Power Dissipation
37.	BOM Count	46	System Information	Total Design BOM count
38.	Duty Cycle	35.331 %	System Information	Duty cycle
39.	Efficiency	87.596 %	System Information	Steady state efficiency
40.	FootPrint	820.0 mm^2	System Information	Total Foot Print Area of BOM components
41.	Frequency	99.307 kHz	System Information	Switching frequency
42.	Iout	1.5 A	System Information	Iout operating point
43.	Iout_DCM	1.187 A	System Information	Approximate Current below which DCM mode of operation will begin
44.	Mode	CCM	System Information	Conduction Mode
45.	Pout	18.0 W	System Information	Total output power
46.	Tdead	752.866 ns	System Information	Approximate Dead Time of the Regulator
47.	Toff	5.759 us	System Information	Approximate Converter Off Time
48.	Ton Act	3.558 us	System Information	Approximate Converter On Time
49.	Total BOM	NA	System Information	Total BOM Cost
50.	Tsw	10.07 us	System Information	Switching Time Period
51.	Vin	12.0 V	System Information	Vin operating point
52.	Vout	12.0 V	System Information	Operational Output Voltage
53.	Vout Actual	11.99 V	System Information	Vout Actual calculated based on selected voltage divider resistors
54.	Vout Tolerance	1.926 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
55.	Vout p-p	54.384 mV	System Information	Peak-to-peak output ripple voltage
56.	Vout pp percentage	453.201 m%	System Information	Output Voltage ripple percentage
57.	Vsnub	10.247 V	System Information	Voltage Across the Snubber
58.	Ipri Avg	1.953 A	Transformer	Average Current in Primary Winding over the complete Switching Period
59.	Ipri ripple	7.165 A	Transformer	Ripple Current in the Primary Winding
60.	Ipri ripple pk-pk percentage	129.6 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
61.	Isec Ripple	3.399 A	Transformer	Ripple Current in the Secondary Winding
62.	Paux	1.982 mW	Transformer	Power Dissipation in Raux and Daux
63.	T1 Copper Loss	540.0 mW	Transformer	Transformer Copper Loss Power Dissipation
64.	T1 Core Loss	540.0 mW	Transformer	Transformer Core Loss Power Dissipation

#	Name	Value	Category	Description
65.	T1 Iprim RMS	3.509 A	Transformer	Transformer Primary RMS Current
66.	T1 Iprim pk	9.111 A	Transformer	Transformer Primary Peak Current
67.	T1 Is1 RMS	2.252 A	Transformer	Transformer Secondary1 RMS Current
68.	T1 Is1 pk	4.322 A	Transformer	Transformer Secondary1 Peak Current
69.	T1 Pd	1.08 W	Transformer	Estimated Losses in Transformer
70.	Vaux	12.43 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	1.5	Maximum Output Current
VinMax	12.0	Maximum input voltage
VinMin	12.0	Minimum input voltage
Vout	12.0	Output Voltage
base_pn	UCC28C45	Base Product Number
source	DC	Input Source Type
Ta	30.0	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

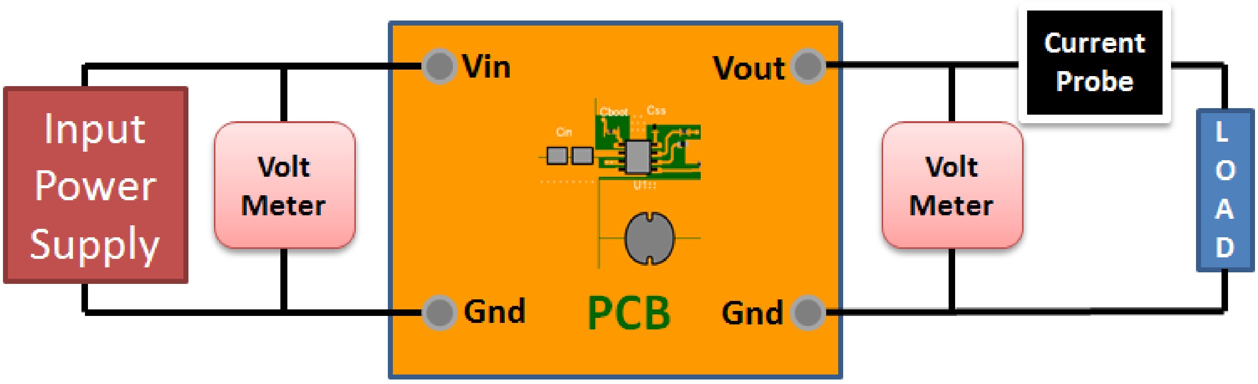
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 12.0V 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 : 8806C969D088DD38[v1]

2. **UCC28C45** Product Folder : http://www.ti.com/product/UCC28C45 : contains the data sheet and other resources.

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