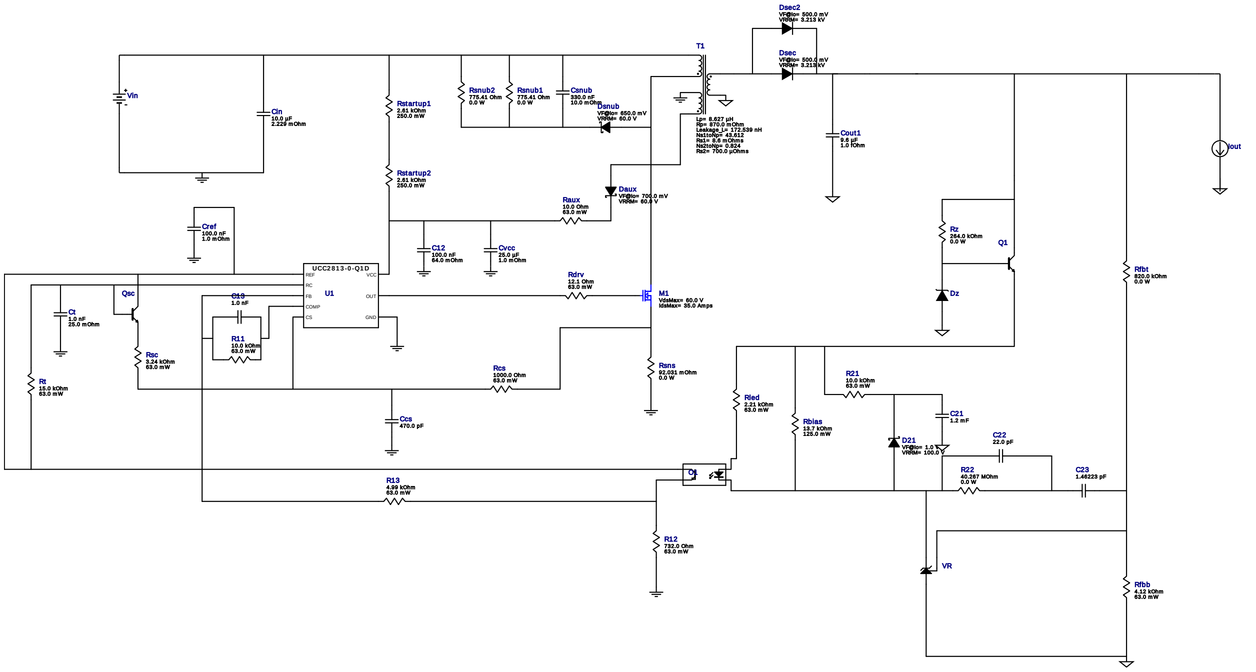
VinMin = 9.0V
VinMax = 18.0V
Vout = 500.0V
Iout = 0.04A

Device = UCC2813QDR-0Q1
Topology = Flyback
Created = 2022-01-07 00:01:03.035
BOM Cost = NA
BOM Count = 45
Total Pd = 11.42W

WEBENCH ® Design Report

Design : 10 UCC2813QDR-0Q1
UCC2813QDR-0Q1 9V-18V to 500.00V @ 0.04A



Design Alerts

Component Selection Information

The UCC2813-0-Q1 is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application.

Electrical BOM

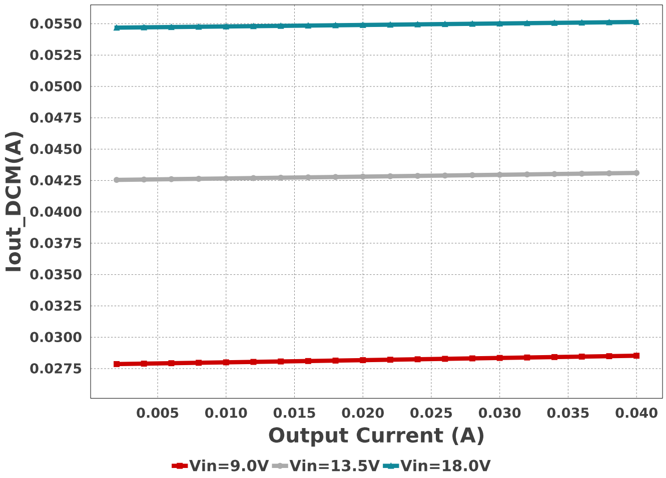
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C12	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm^2
C13	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
C21	CUSTOM	CUSTOM Series= ?	Cap= 1.2 mF VDC= 40.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 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	CUSTOM	CUSTOM Series= ?	Cap= 1.46223 pF VDC= 0.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 mm^2
Ccs	AVX	04025A471JAT2A Series= C0G/NP0	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cin	TDK	C3216X6S1V106K160AC Series= X6S	Cap= 10.0 uF ESR= 2.229 mOhm VDC= 35.0 V IRMS= 4.8593 A	1	$0.18	1206_180 11 mm^2

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cout1	CUSTOM	CUSTOM Series= ?	Cap= 9.6 uF ESR= 1.0 fOhm VDC= 1.25 kV IRMS= 68.481 mA	1	NA	CUSTOM 0 mm^2
Cref	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Csnub	MuRata	GRM219R71H334KA88D Series= X7R	Cap= 330.0 nF ESR= 10.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	$0.07	0805 7 mm^2
Ct	Kemet	C0805C102J1GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 100.0 V IRMS= 1.71 A	1	$0.09	0805 7 mm^2
Cvcc	CUSTOM	CUSTOM Series= ?	Cap= 25.0 uF ESR= 1.0 mOhm VDC= 14.6141 V IRMS= 60.0 mA	1	NA	CUSTOM 0 mm^2
D21	Comchip Technology	CDBW46-G	VF@Io= 1.0 V VRRM= 100.0 V	1	$0.03	SOD-123 13 mm^2
Daux	Fairchild Semiconductor	SS26FL	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.07	SOD-123F 12 mm^2
Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 3.213 kV	1	NA	CUSTOM 0 mm^2
Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 3.213 kV	1	NA	CUSTOM 0 mm^2
Dsnub	Fairchild Semiconductor	FSV360FP	VF@Io= 650.0 mV VRRM= 60.0 V	1	$0.10	SOD-123HE 13 mm^2
Dz	Diodes Inc.	MMSZ5250B-7-F	Zener	1	$0.03	SOD-123 13 mm^2
M1	Texas Instruments	CSD18543Q3A	VdsMax= 60.0 V IdsMax= 35.0 Amps	1	$0.26	DNH0008A 18 mm^2
O1	Fairchild Semiconductor	FOD817A	Optocoupler	1	$0.11	DIP-4 71 mm^2
Q1	CUSTOM	Custom	Bipolar Transistor	1	NA	CUSTOM 0 mm^2
Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	$1.11	TO-18 57 mm^2
R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R12	Vishay-Dale	CRCW0402732RFKED Series= CRCW..e3	Res= 732.0 Ohm 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	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R22	CUSTOM	CUSTOM Series= ?	Res= 40.267 MOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2

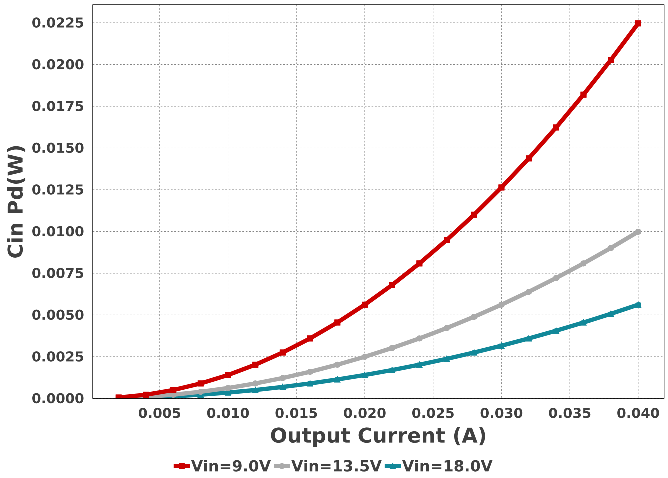
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Raux	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rbias	Vishay-Dale	CRCW080513K7FKEA Series= CRCW..e3	Res= 13.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm^2
Rcs	Vishay-Dale	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	CRCW040212R1FKED Series= CRCW..e3	Res= 12.1 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfbb	Vishay-Dale	CRCW04024K12FKED Series= CRCW..e3	Res= 4.12 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfbt	CUSTOM	CUSTOM Series= ?	Res= 820.0 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rled	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsc	Vishay-Dale	CRCW04023K24FKED Series= CRCW..e3	Res= 3.24 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsns	CUSTOM	CUSTOM Series= ?	Res= 92.031 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 775.41 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 775.41 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rstartup1	Yageo	RC1206FR-072K61L Series= ?	Res= 2.61 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rstartup2	Yageo	RC1206FR-072K61L Series= ?	Res= 2.61 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rt	Vishay-Dale	CRCW040215K0FKED Series= CRCW..e3	Res= 15.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rz	CUSTOM	CUSTOM Series= ?	Res= 264.0 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
T1	CUSTOM	CUSTOM	Lp= 8.627 µH Rp= 870.0 mOhm Leakage_L= 172.539 nH Ns1toNp= 43.612 Rs1= 8.6 mOhms Ns2toNp= 0.824 Rs2= 700.0 µOhms	1	NA	CUSTOM 0 mm^2
U1	Texas Instruments	UCC2813QDR-0Q1	Switcher	1	$1.04	D0008A 57 mm^2

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.07	R-PDSO-G3 16 mm²

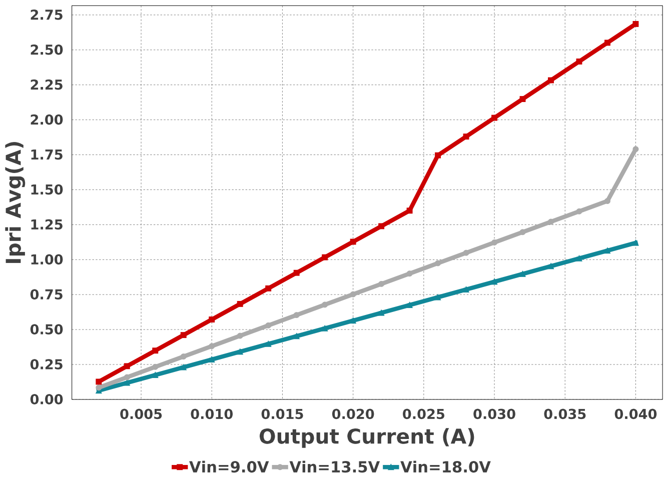
Iout_DCM



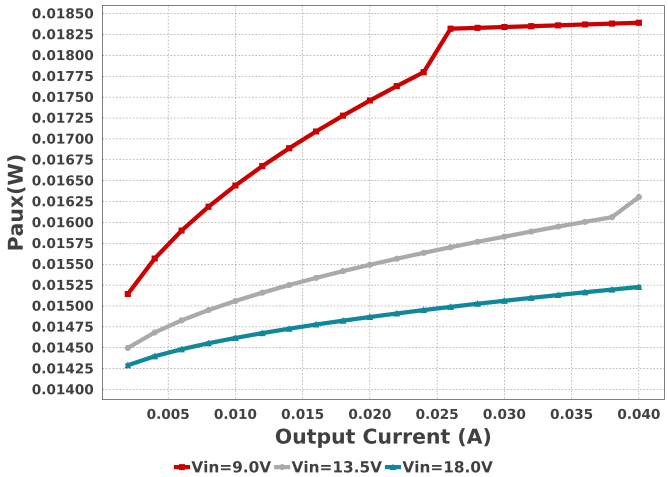
Cin Pd



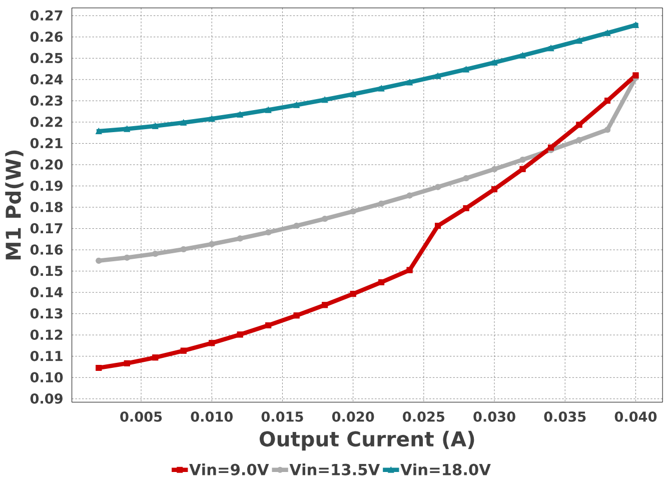
Ipri Avg



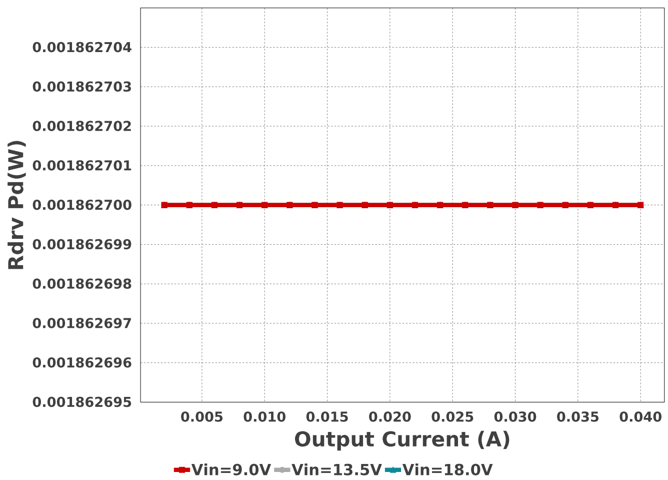
Paux

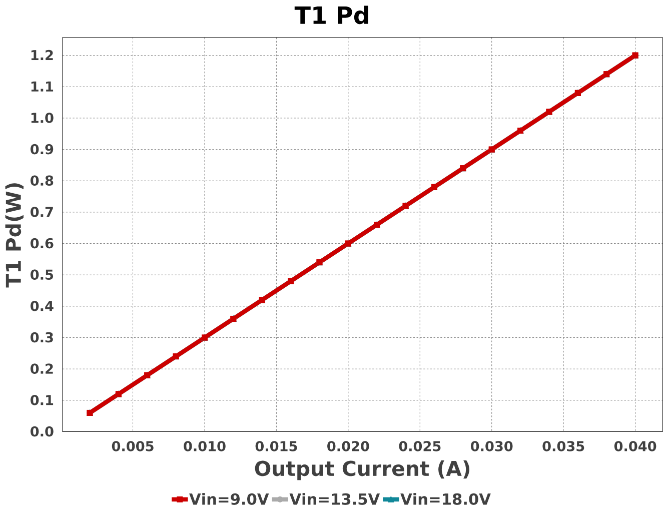


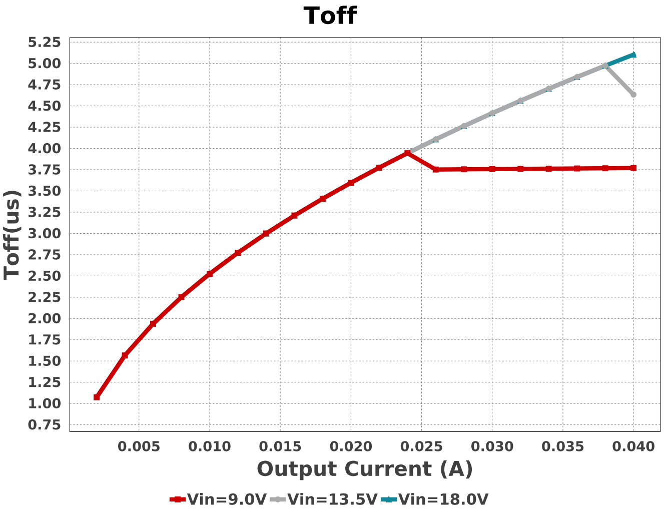
M1 Pd

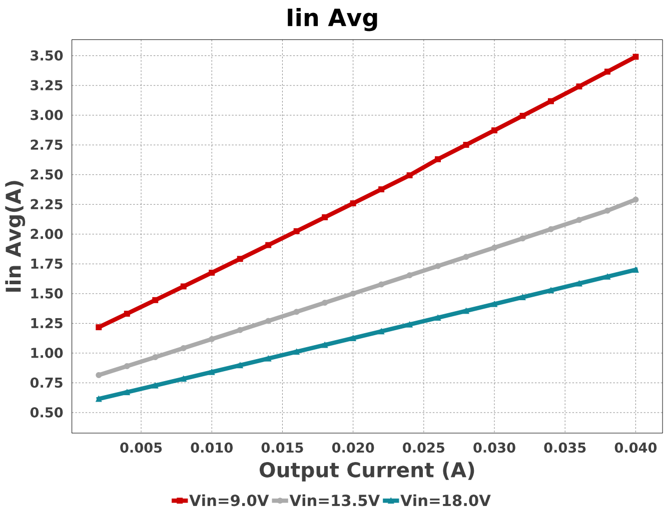


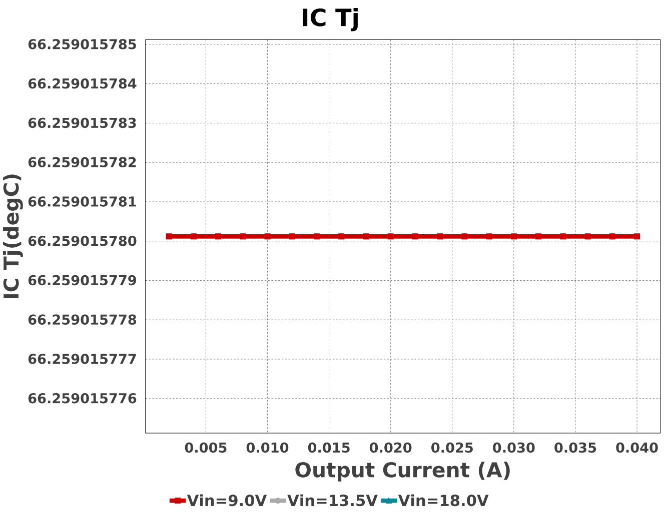
Rdrv Pd

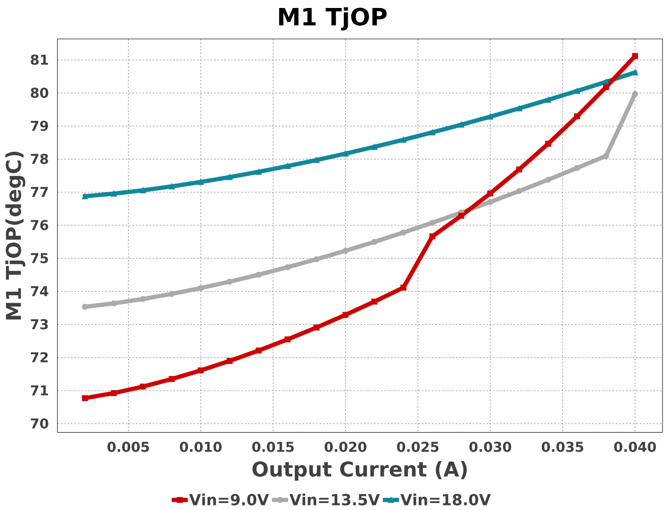


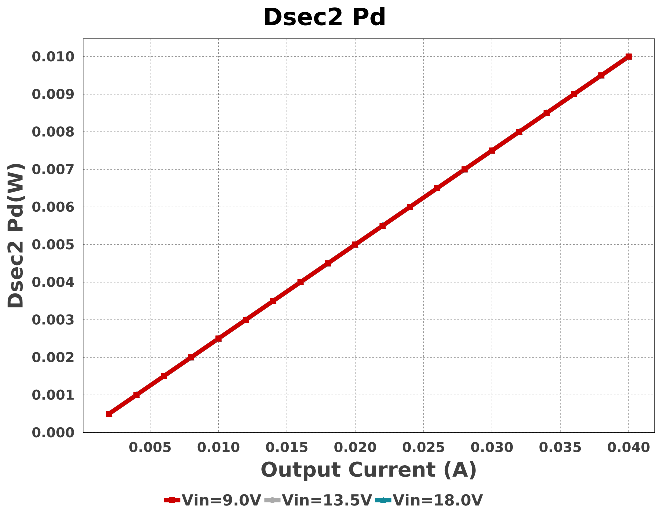

T1 Pd
T1 Pd(W)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

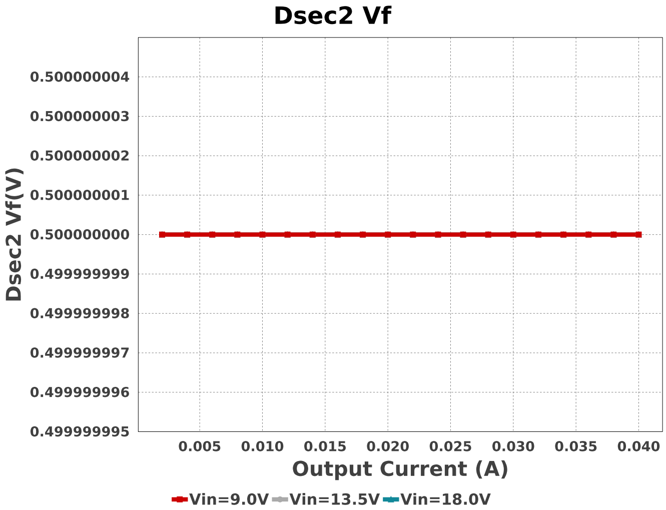

Toff
Toff(us)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

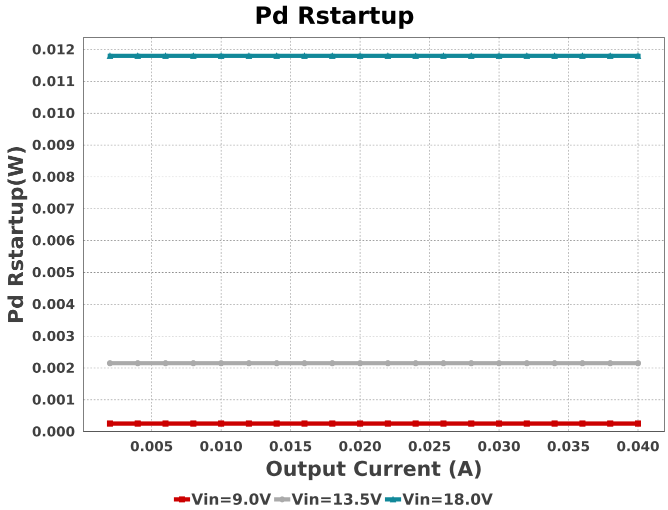

Iin Avg
Iin Avg(A)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

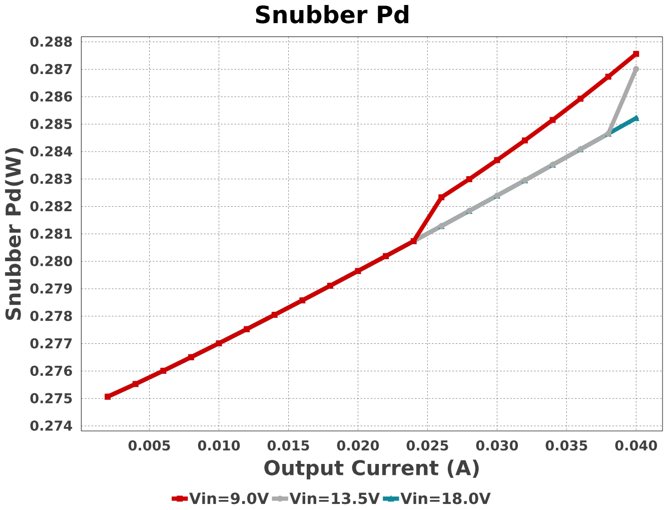

IC Tj
IC Tj(degC)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

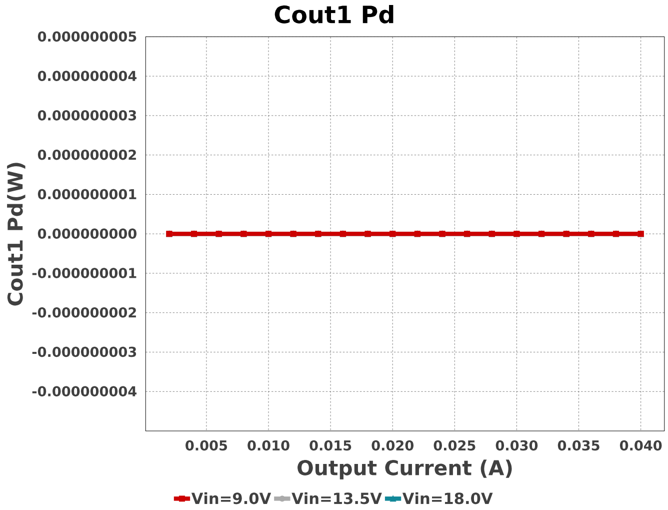

M1 TjOP
M1 TjOP(degC)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

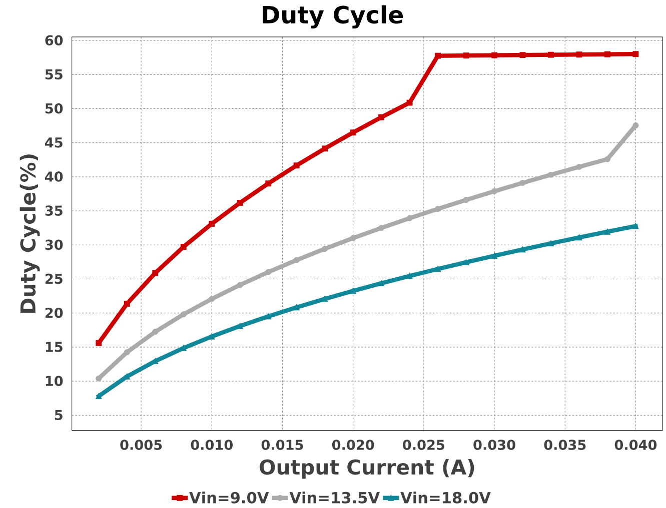

Dsec2 Pd
Dsec2 Pd(W)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

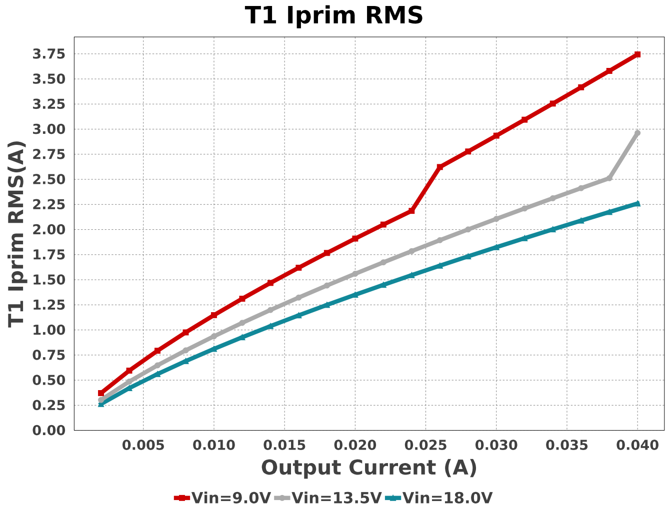

Dsec2 Vf
Dsec2 Vf(V)
0.500000004
0.500000003
0.500000002
0.500000001
0.500000000
0.499999999
0.499999998
0.499999997
0.499999996
0.499999995
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

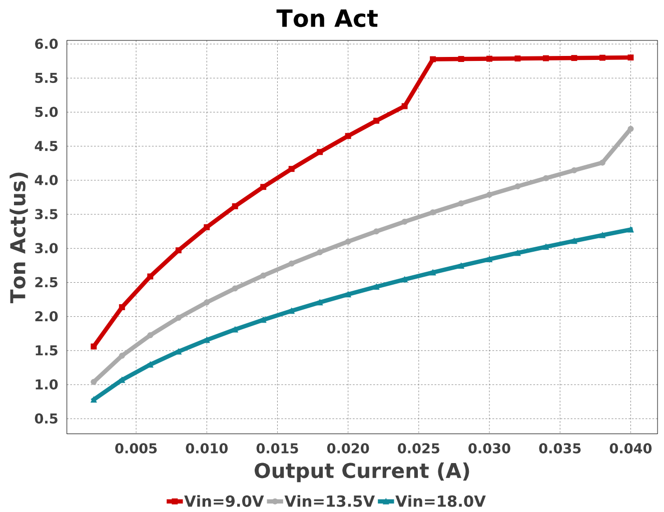

Pd Rstartup
Pd Rstartup(W)
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

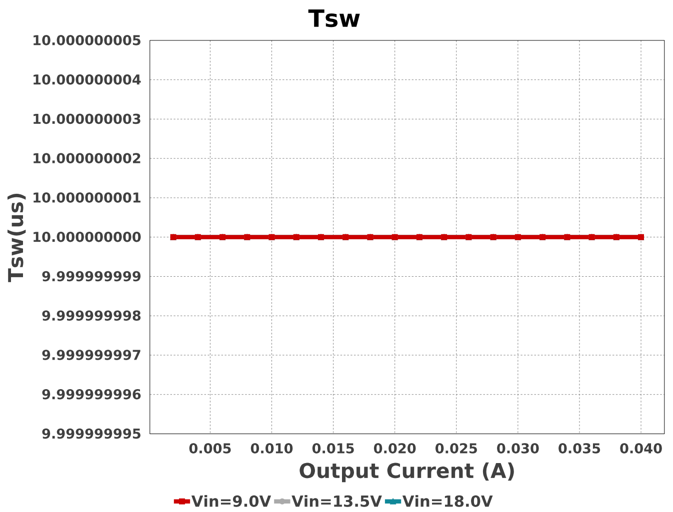

Snubber Pd
Snubber Pd(W)
0.288
0.287
0.286
0.285
0.284
0.283
0.282
0.281
0.280
0.279
0.278
0.277
0.276
0.275
0.274
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

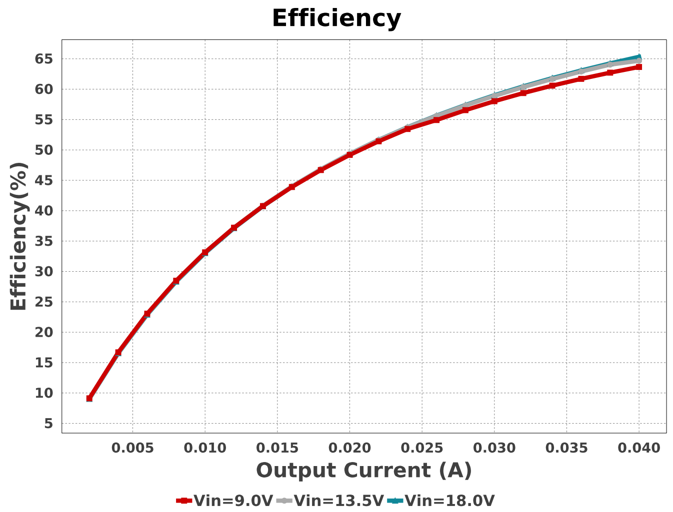

Cout1 Pd
Cout1 Pd(W)
0.000000005
0.000000004
0.000000003
0.000000002
0.000000001
0.000000000
-0.000000001
-0.000000002
-0.000000003
-0.000000004
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

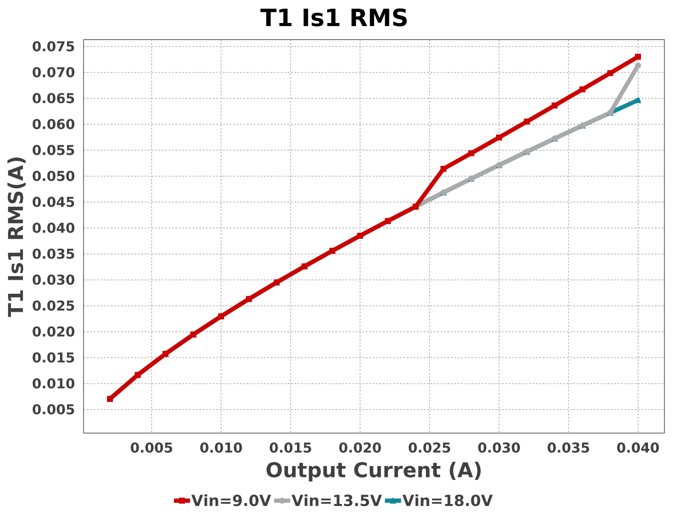

Duty Cycle
Duty Cycle(%)
60
55
50
45
40
35
30
25
20
15
10
5
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

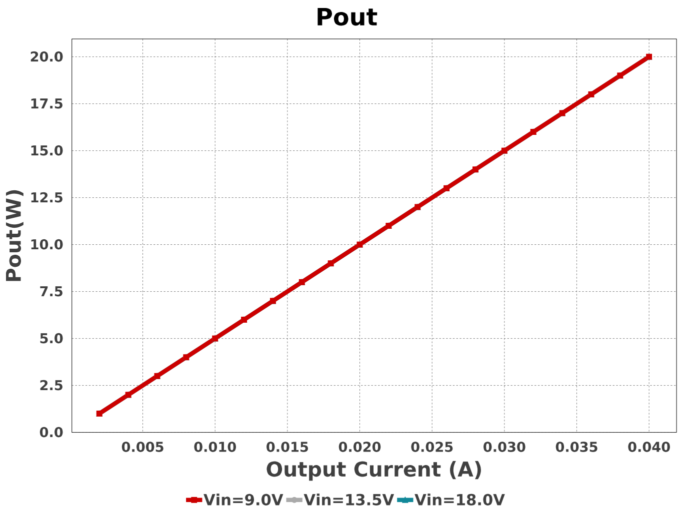

T1 Iprim RMS
T1 Iprim RMS(A)
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

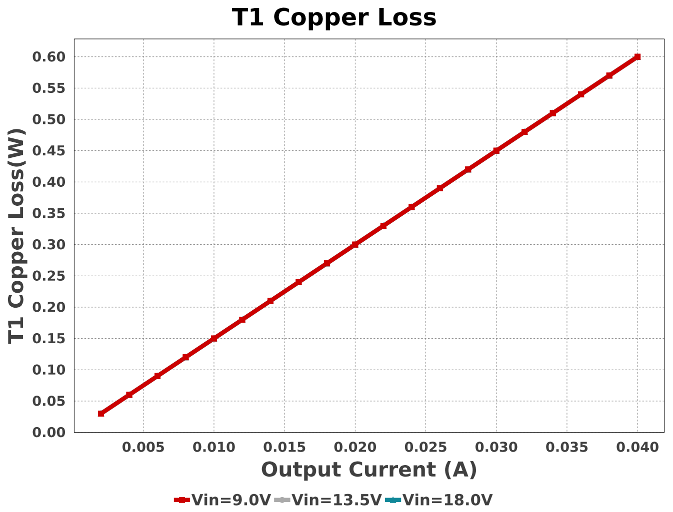

Ton Act
Ton Act(us)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V


Tsw
Tsw(us)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

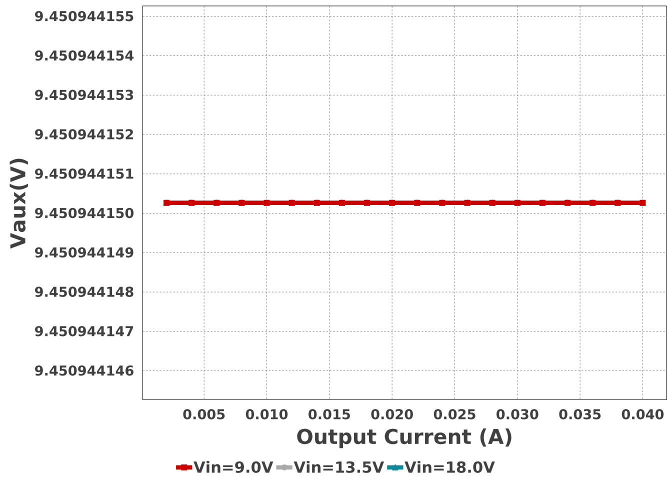

Efficiency
Efficiency(%)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V


T1 Is1 RMS
T1 Is1 RMS(A)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

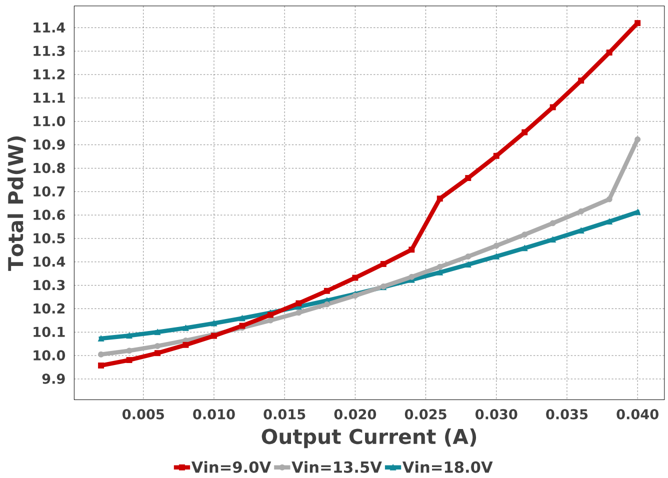

Pout
Pout(W)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V


T1 Copper Loss
T1 Copper Loss(W)
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

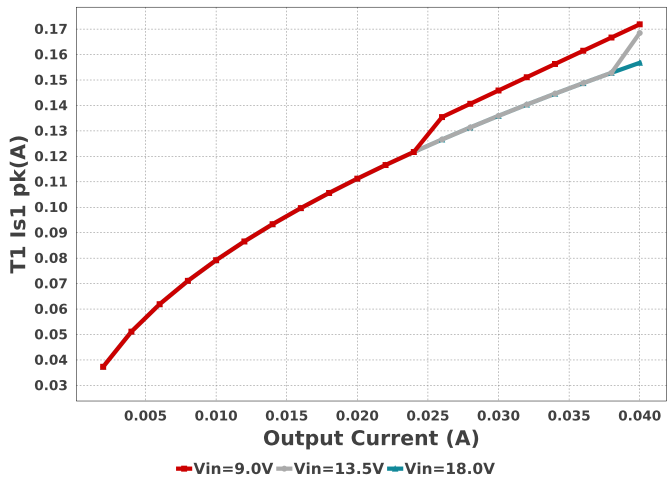
Vaux



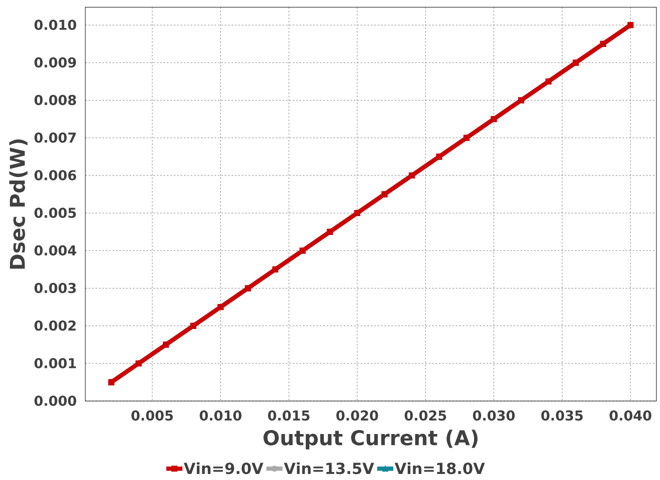
Total Pd



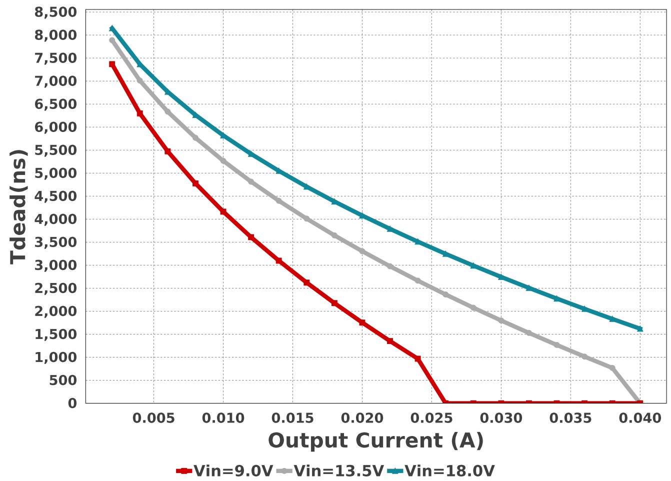
T1 Is1 pk



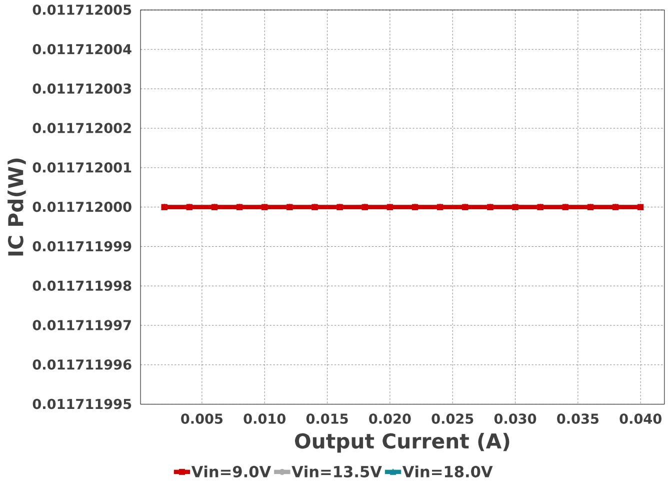
Dsec Pd

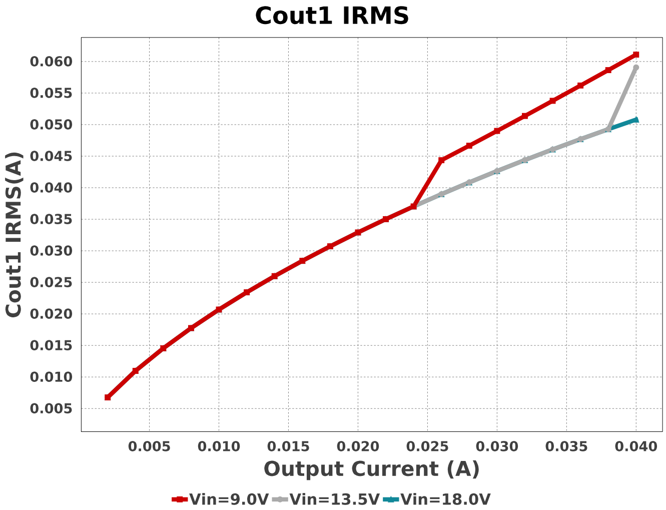


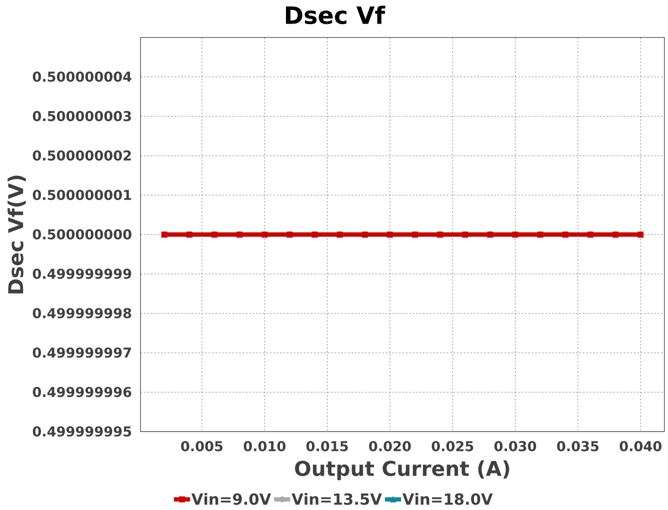
Tdead

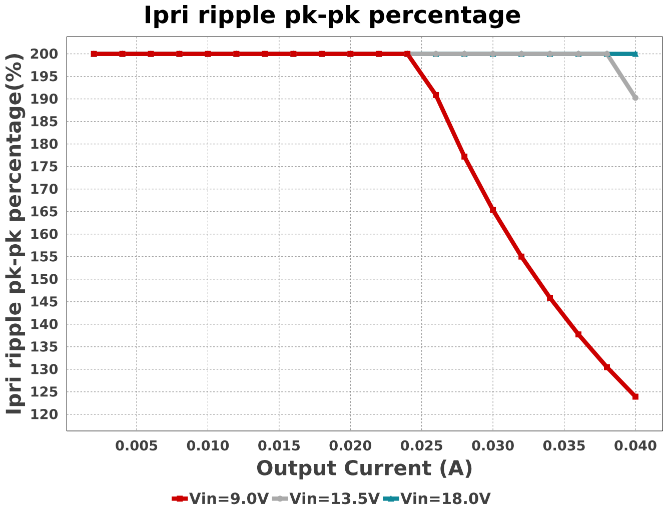


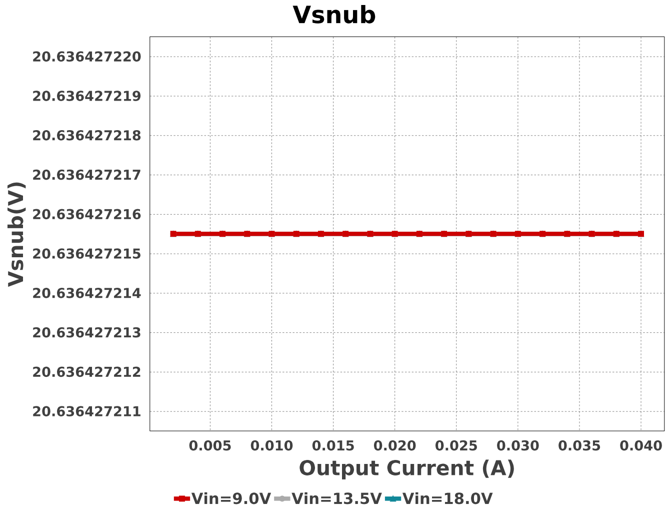
IC Pd

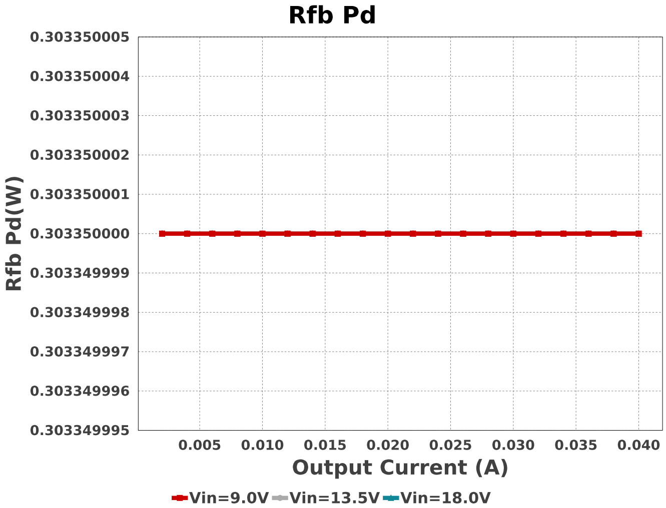


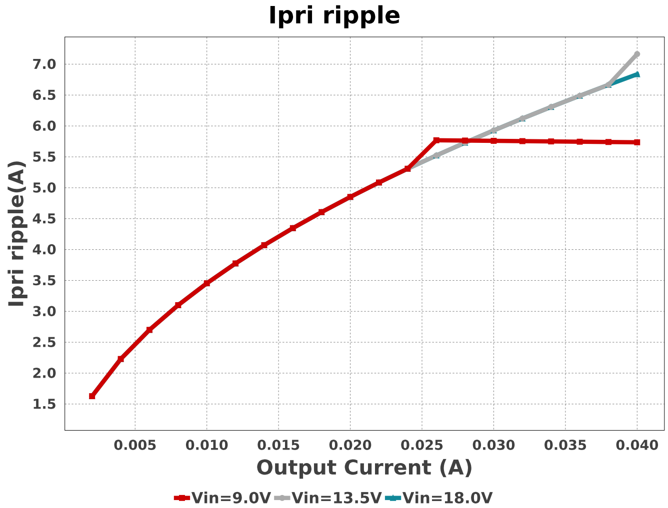

Cout1 IRMS
Cout1 IRMS(A)
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V


Dsec Vf
Dsec Vf(V)
0.500000004
0.500000003
0.500000002
0.500000001
0.500000000
0.499999999
0.499999998
0.499999997
0.499999996
0.499999995
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

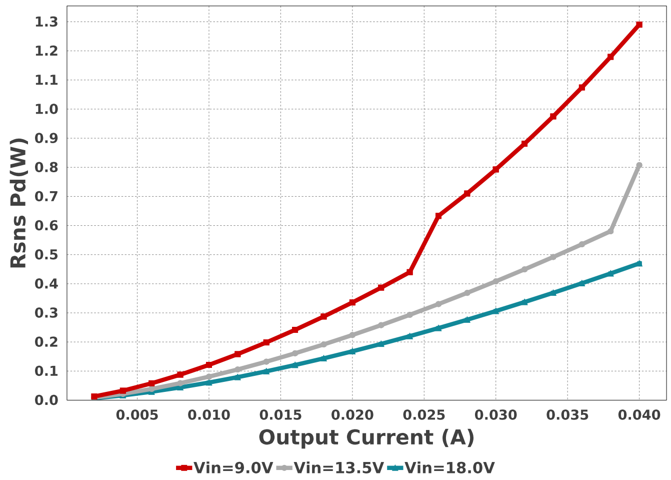

Ipri ripple pk-pk percentage
Ipri ripple pk-pk percentage(%)
200
195
190
185
180
175
170
165
160
155
150
145
140
135
130
125
120
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V


Vsnub
Vsnub(V)
20.636427220
20.636427219
20.636427218
20.636427217
20.636427216
20.636427215
20.636427214
20.636427213
20.636427212
20.636427211
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

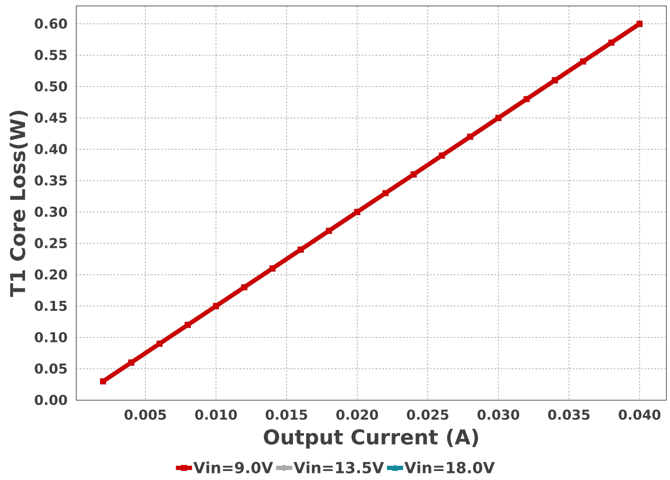

Rfb Pd
Rfb Pd(W)
0.303350005
0.303350004
0.303350003
0.303350002
0.303350001
0.303350000
0.303349999
0.303349998
0.303349997
0.303349996
0.303349995
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V


Ipri ripple
Ipri ripple(A)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
0.005 0.010 0.015 0.020 0.025 0.030 0.035 0.040
Output Current (A)
Vin=9.0V Vin=13.5V Vin=18.0V

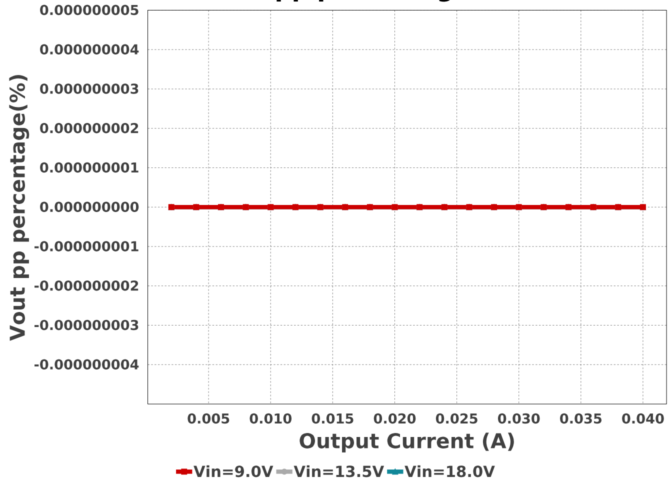
Rsns Pd



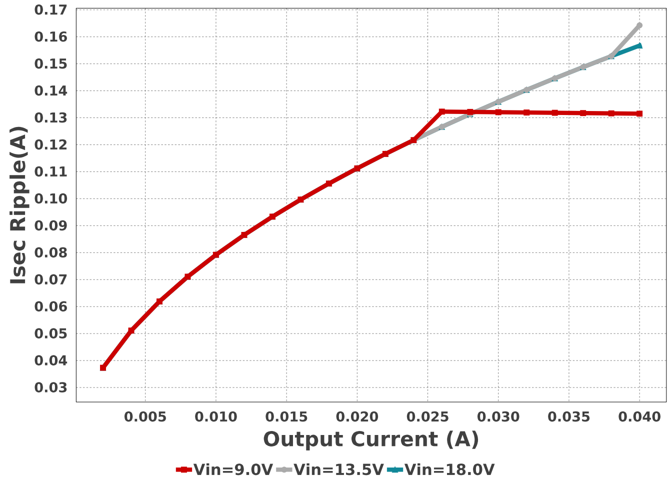
T1 Core Loss



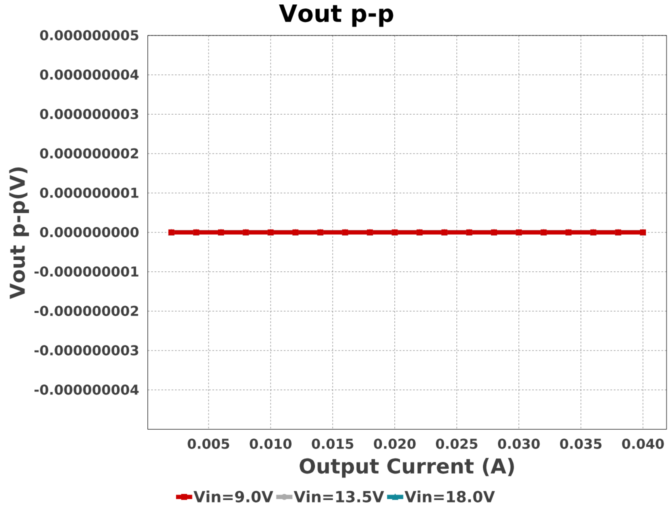
Vout pp percentage



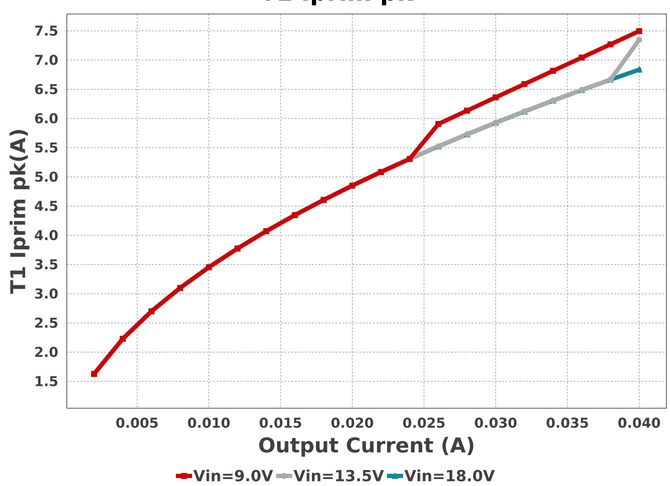
Isec Ripple



Vout p-p



T1 Iprim pk



Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	22.464 mW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	61.094 mA	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	0.004 fW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	8.26 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	10.0 mW	Diode	Secondary Diode Power Dissipation
6.	Dsec Vf	500.0 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	10.0 mW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	500.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	10.62 ns	Diode	Snubber Diode Reverse Recovery Time
11.	IC Pd	11.712 mW	IC	IC power dissipation

#	Name	Value	Category	Description
12.	IC Tj	66.259 degC	IC	IC junction temperature
13.	ICThetaJA	107.5 degC/W	IC	IC junction-to-ambient thermal resistance
14.	Iin Avg	3.491 A	IC	Average input current
15.	M1 Pd	241.96 mW	Mosfet	M1 MOSFET total power dissipation
16.	M1 TjOP	81.118 degC	Mosfet	M1 MOSFET junction temperature
17.	Cin Pd	22.464 mW	Power	Input capacitor power dissipation
18.	Cout1 Pd	0.004 fW	Power	Output capacitor1 power dissipation
19.	Dsec Pd	10.0 mW	Power	Secondary Diode Power Dissipation
20.	Dsec2 Pd	10.0 mW	Power	Secondary Diode Power Dissipation
21.	IC Pd	11.712 mW	Power	IC power dissipation
22.	M1 Pd	241.96 mW	Power	M1 MOSFET total power dissipation
23.	Paux	18.39 mW	Power	Power Dissipation in Raux and Daux
24.	Pd Rstartup	253.77 µW	Power	Power Dissipation in Rstartup1 and Rstartup2
25.	Rdrv Pd	1.863 mW	Power	Power Dissipation in Gate Drive Resistor
26.	Rfb Pd	303.35 mW	Power	Rfb Power Dissipation
27.	Rsns Pd	1.29 W	Power	Current Limit Sense Resistor Power Dissipation
28.	Snubber Pd	287.562 mW	Power	Snubber Power Dissipation
29.	T1 Copper Loss	600.0 mW	Power	Transformer Copper Loss Power Dissipation
30.	T1 Core Loss	600.0 mW	Power	Transformer Core Loss Power Dissipation
31.	T1 Pd	1.2 W	Power	Estimated Losses in Transformer
32.	Total Pd	11.42 W	Power	Total Power Dissipation
33.	Pd Rstartup	253.77 µW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
34.	Rdrv Pd	1.863 mW	Resistor	Power Dissipation in Gate Drive Resistor
35.	Rfb Pd	303.35 mW	Resistor	Rfb Power Dissipation
36.	Rsns Pd	1.29 W	Resistor	Current Limit Sense Resistor Power Dissipation
37.	BOM Count	45	System Information	Total Design BOM count
38.	Duty Cycle	58.022 %	System Information	Duty cycle
39.	Efficiency	63.654 %	System Information	Steady state efficiency
40.	FootPrint	484.0 mm^2	System Information	Total Foot Print Area of BOM components
41.	Frequency	100.0 kHz	System Information	Switching frequency
42.	Iout	40.0 mA	System Information	Iout operating point
43.	Iout_DCM	28.527 mA	System Information	Approximate Current below which DCM mode of operation will begin
44.	Mode	CCM	System Information	Conduction Mode
45.	Pout	20.0 W	System Information	Total output power
46.	Tdead	0.0 ns	System Information	Approximate Dead Time of the Regulator
47.	Toff	3.769 us	System Information	Approximate Converter Off Time
48.	Ton Act	5.802 us	System Information	Approximate Converter On Time
49.	Total BOM	NA	System Information	Total BOM Cost
50.	Tsw	10.0 us	System Information	Switching Time Period
51.	Vin	9.0 V	System Information	Vin operating point
52.	Vout	500.0 V	System Information	Operational Output Voltage
53.	Vout Actual	499.073 V	System Information	Vout Actual calculated based on selected voltage divider resistors
54.	Vout Tolerance	1.329 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
55.	Vout p-p	0.132 fV	System Information	Peak-to-peak output ripple voltage
56.	Vout pp percentage	0.026 f%	System Information	Output Voltage ripple percentage
57.	Vsnub	20.636 V	System Information	Voltage Across the Snubber
58.	Ipri Avg	2.685 A	Transformer	Average Current in Primary Winding over the complete Switching Period
59.	Ipri ripple	5.736 A	Transformer	Ripple Current in the Primary Winding
60.	Ipri ripple pk-pk percentage	123.926 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
61.	Isec Ripple	131.512 mA	Transformer	Ripple Current in the Secondary Winding
62.	Paux	18.39 mW	Transformer	Power Dissipation in Raux and Daux
63.	T1 Copper Loss	600.0 mW	Transformer	Transformer Copper Loss Power Dissipation
64.	T1 Core Loss	600.0 mW	Transformer	Transformer Core Loss Power Dissipation

#	Name	Value	Category	Description
65.	T1 Iprim RMS	3.744 A	Transformer	Transformer Primary RMS Current
66.	T1 Iprim pk	7.496 A	Transformer	Transformer Primary Peak Current
67.	T1 Is1 RMS	73.024 mA	Transformer	Transformer Secondary1 RMS Current
68.	T1 Is1 pk	171.878 mA	Transformer	Transformer Secondary1 Peak Current
69.	T1 Pd	1.2 W	Transformer	Estimated Losses in Transformer
70.	Vaux	9.451 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	40.0 m	Maximum Output Current
VinMax	18.0	Maximum input voltage
VinMin	9.0	Minimum input voltage
VinTyp	12.0	Typical input voltage
Vout	500.0	Output Voltage
base_pn	UCC2813-0-Q1	Base Product Number
source	DC	Input Source Type
Ta	65.0	Ambient temperature
UserFsw	100.0 k	Customer Selected Frequency

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

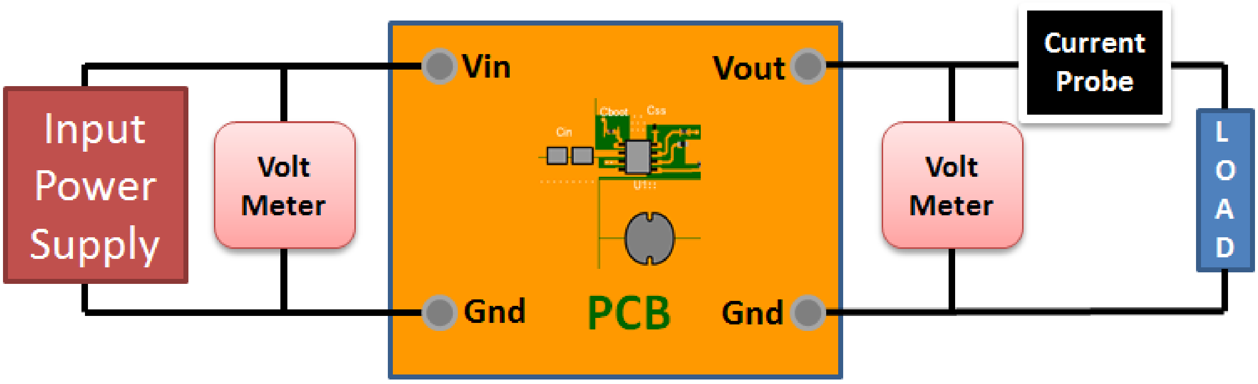
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 9.0V 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. Feature Highlights: This device provides the features that are necessary to implement off-line or dc-to-dc fixed-frequency current-mode control schemes, with a minimum number of external components.

2. The UCC2813-0-Q1 is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application

3. Master key : B552701C06DE1275[v1]

4. **UCC2813-0-Q1** Product Folder : http://www.ti.com/product/UCC2813%2D0%2DQ1 : contains the data sheet and other resources.

Important Notice and Disclaimer