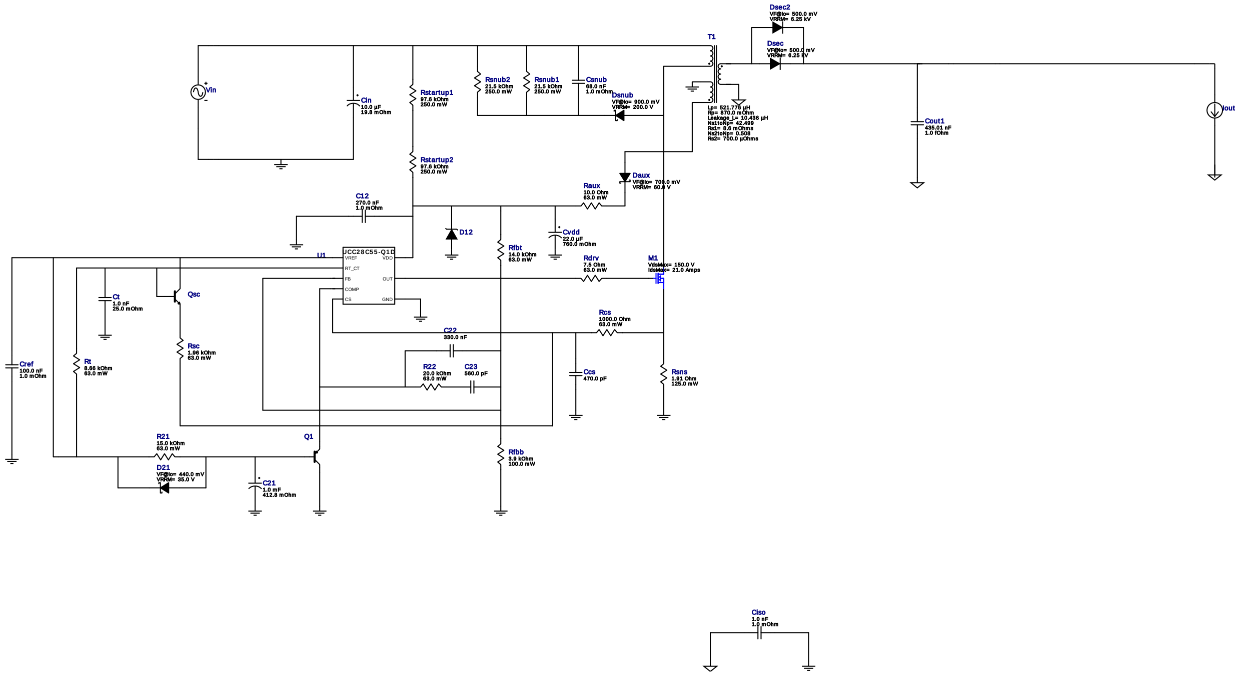
VinMin = 45.0V	Device = UCC28C55QDRQ1
VinMax = 50.0V	Topology = Flyback
Vout = 1000.0V	Created = 2024-02-12 07:48:22.185
Iout = 0.0A	BOM Cost = NA
	BOM Count = 37
	Total Pd = 0.36W

WEBENCH ® Design Report

Design : 2 UCC28C55QDRQ1
UCC28C55QDRQ1 45V-50V to 1000.00V @ 0.003A



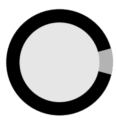
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application.View WEBENCH(R) Disclaimer.

Design Alerts

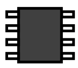
Component Selection Information

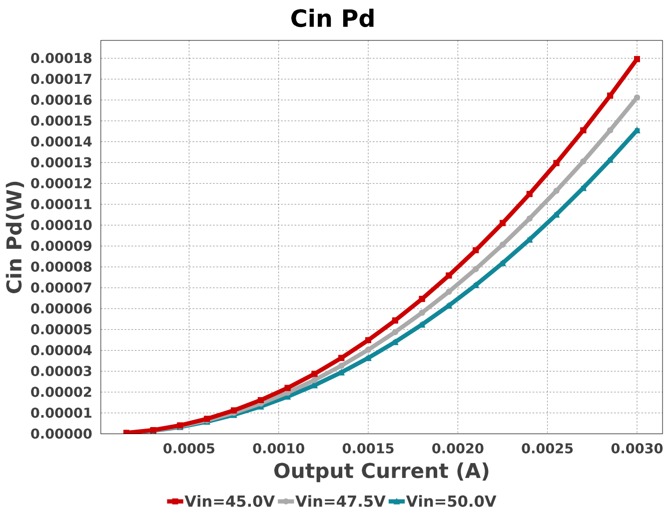
The UCC28C55-Q1 is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application.

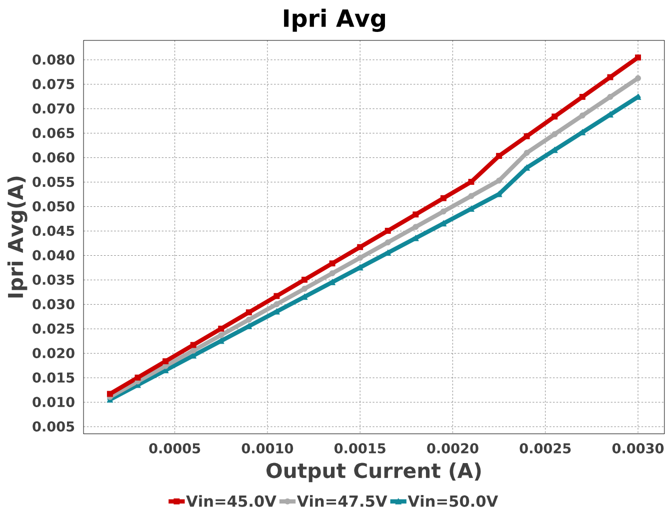
Electrical BOM

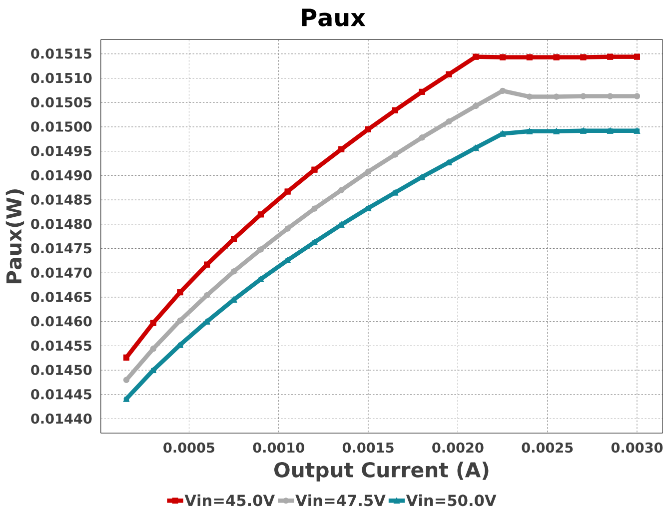
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C12	MuRata	GRM219R71E274KA01D Series= X7R	Cap= 270.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.10	0805 7 mm²
C21	Chemi-Con	EKMG250ELL102MJ20S Series= 2200	Cap= 1.0 mF ESR= 412.8 mOhm VDC= 25.0 V IRMS= 680.0 mA	1	$0.28	 Chemi-Con_1000x2000 144 mm²
C22	Panasonic	ECPU1C334MA5 Series= ECPU(A)	Cap= 330.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.23	 1206 11 mm²
C23	Samsung Electro-Mechanics	CL31C561JBCNNNC Series= C0G/NP0	Cap= 560.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.20	 1206 11 mm²
Ccs	Kemet	C0805X471J5GACTU Series= C0G/NP0	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.10	0805 7 mm²

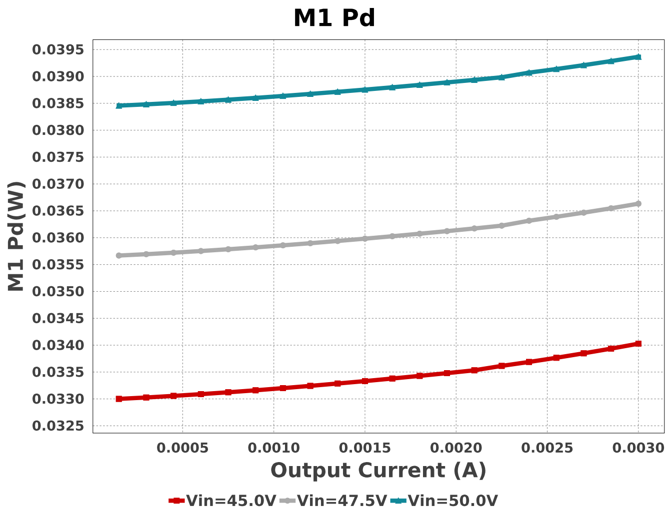
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cin	Rubycon	200RX3010M8X16 Series= ?	Cap= 10.0 uF ESR= 19.8 mOhm VDC= 200.0 V IRMS= 200.0 mA	1	$0.22	RX30_800x1600 100 mm^2
Ciso	Johanson Technology	202R18W102KV4E Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 2.0 kV IRMS= 0.0 A	1	$0.06	1206_190 11 mm^2
Cout1	CUSTOM	CUSTOM Series= ?	Cap= 435.01 nF ESR= 1.0 fOhm VDC= 2.5 kV IRMS= 6.8988 mA	1	NA	CUSTOM 0 mm^2
Cref	MuRata	LLL315R71E104MA11L Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.10	0612 11 mm^2
Csnub	MuRata	GRM31BR72E683KW01L Series= X7R	Cap= 68.0 nF ESR= 1.0 mOhm VDC= 250.0 V IRMS= 0.0 A	1	$0.20	1206 11 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	Nichicon	UUD1V220MCL1GS Series= uD	Cap= 22.0 uF ESR= 760.0 mOhm VDC= 35.0 V IRMS= 150.0 mA	1	$0.14	SM_RADIAL_5MM 58 mm^2
D12	Diodes Inc.	MMSZ5248B-7-F	Zener	1	$0.04	SOD-123 13 mm^2
D21	Bourns	CD0603-B0130L	VF@Io= 440.0 mV VRRM= 35.0 V	1	$0.09	Diode_0603 5 mm^2
Daux	Fairchild Semiconductor	SS26FL	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.11	SOD-123F 12 mm^2
Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 6.25 kV	1	NA	CUSTOM 0 mm^2
Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 6.25 kV	1	NA	CUSTOM 0 mm^2
Dsnub	Fairchild Semiconductor	S320	VF@Io= 900.0 mV VRRM= 200.0 V	1	$0.33	SMB 44 mm^2
M1	Infineon Technologies	BSZ520N15NS3 G	VdsMax= 150.0 V IdsMax= 21.0 Amps	1	$0.77	PG-TSDSON-8 19 mm^2
Q1	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	$0.02	SOT-23 14 mm^2
Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	$1.19	TO-18 57 mm^2
R21	Vishay-Dale	CRCW040215K0FKED Series= CRCW..e3	Res= 15.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R22	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
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

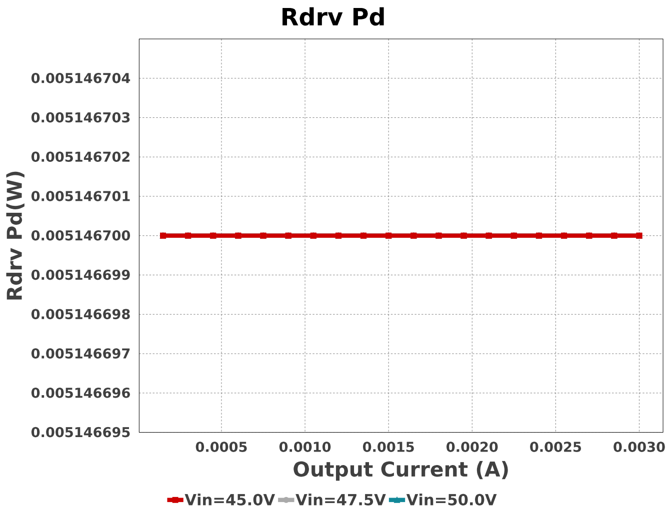
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Rcs	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rdrv	Vishay-Dale	CRCW04027R50FKED Series= CRCW..e3	Res= 7.5 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rfbb	Yageo	RC0603FR-073K9L Series= ?	Res= 3.9 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
Rfbt	Vishay-Dale	CRCW040214K0FKED Series= CRCW..e3	Res= 14.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rsc	Vishay-Dale	CRCW04021K96FKED Series= CRCW..e3	Res= 1.96 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
Rsns	Vishay-Dale	CRCW08051R91FKEA Series= CRCW..e3	Res= 1.91 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
Rsnub1	Vishay-Dale	CRCW120621K5FKEA Series= CRCW..e3	Res= 21.5 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
Rsnub2	Vishay-Dale	CRCW120621K5FKEA Series= CRCW..e3	Res= 21.5 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
Rstartup1	Vishay-Dale	CRCW120697K6FKEA Series= CRCW..e3	Res= 97.6 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
Rstartup2	Vishay-Dale	CRCW120697K6FKEA Series= CRCW..e3	Res= 97.6 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
Rt	Vishay-Dale	CRCW04028K66FKED Series= CRCW..e3	Res= 8.66 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
T1	CUSTOM	CUSTOM	Lp= 521.776 µH Rp= 870.0 mOhm Leakage_L= 10.436 µH Ns1toNp= 42.499 Rs1= 8.6 mOhms Ns2toNp= 0.508 Rs2= 700.0 µOhms	1	NA	CUSTOM 0 mm²
U1	Texas Instruments	UCC28C55QDRQ1	Switcher	1	$0.67	 D0008A 57 mm²

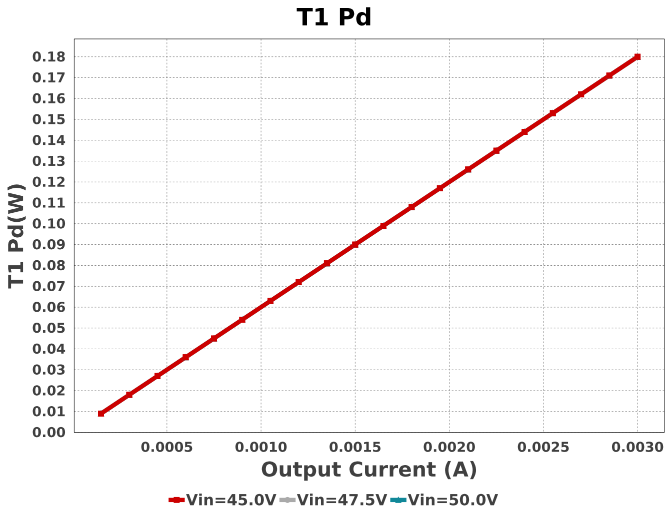

Cin Pd
0.00018
0.00017
0.00016
0.00015
0.00014
0.00013
0.00012
0.00011
0.00010
0.00009
0.00008
0.00007
0.00006
0.00005
0.00004
0.00003
0.00002
0.00001
0.00000
Cin Pd(W)
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

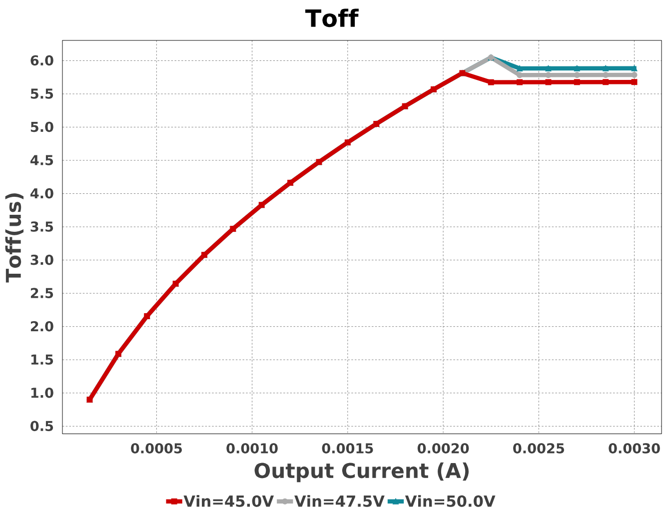

Ipri Avg
0.080
0.075
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
Ipri Avg(A)
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

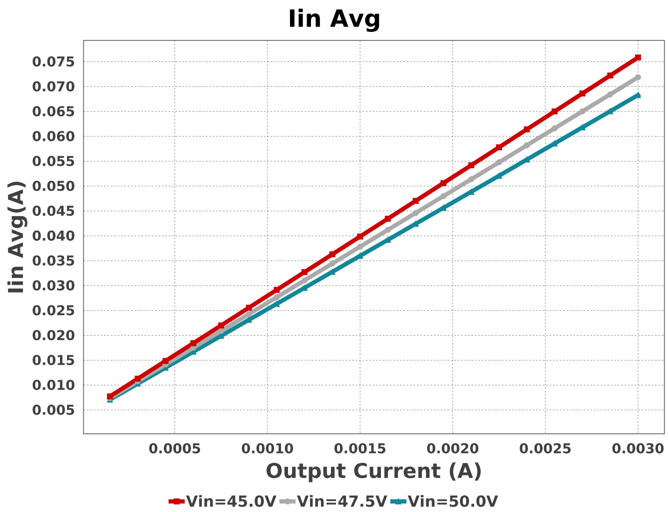

Paux
0.01515
0.01510
0.01505
0.01500
0.01495
0.01490
0.01485
0.01480
0.01475
0.01470
0.01465
0.01460
0.01455
0.01450
0.01445
0.01440
Paux(W)
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

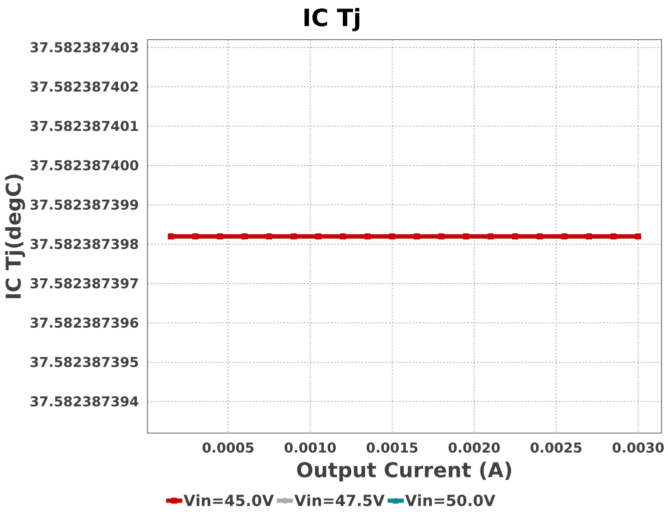

M1 Pd
0.0395
0.0390
0.0385
0.0380
0.0375
0.0370
0.0365
0.0360
0.0355
0.0350
0.0345
0.0340
0.0335
0.0330
0.0325
M1 Pd(W)
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

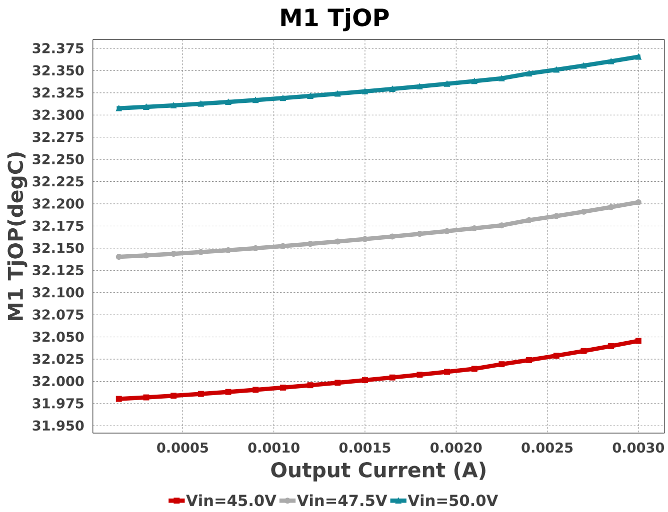

Rdrv Pd
0.005146704
0.005146703
0.005146702
0.005146701
0.005146700
0.005146699
0.005146698
0.005146697
0.005146696
0.005146695
Rdrv Pd(W)
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

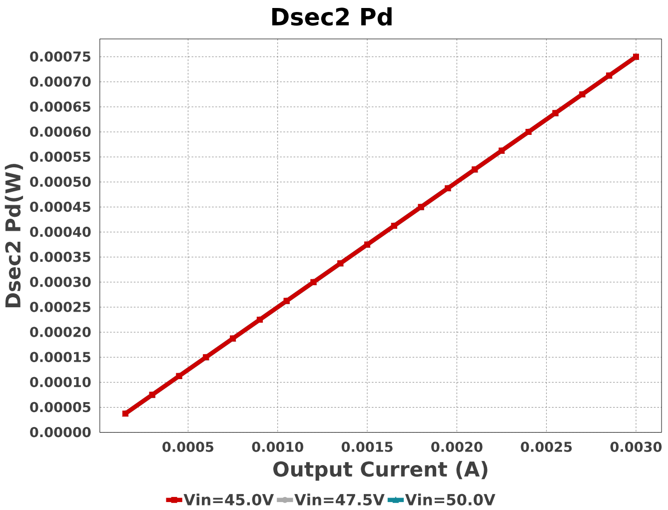

T1 Pd
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
T1 Pd(W)
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

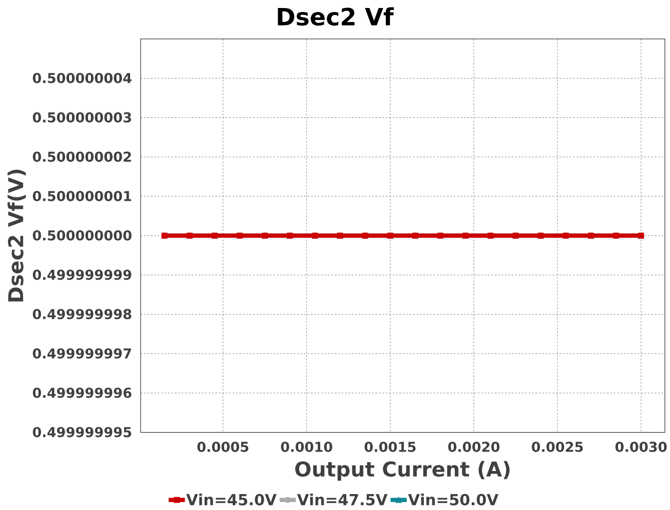

Toff
Toff(us)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

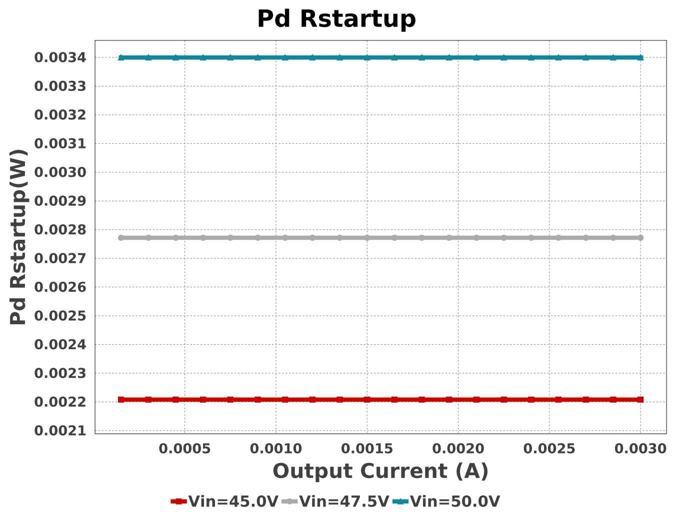

Iin Avg
Iin Avg(A)
0.075
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

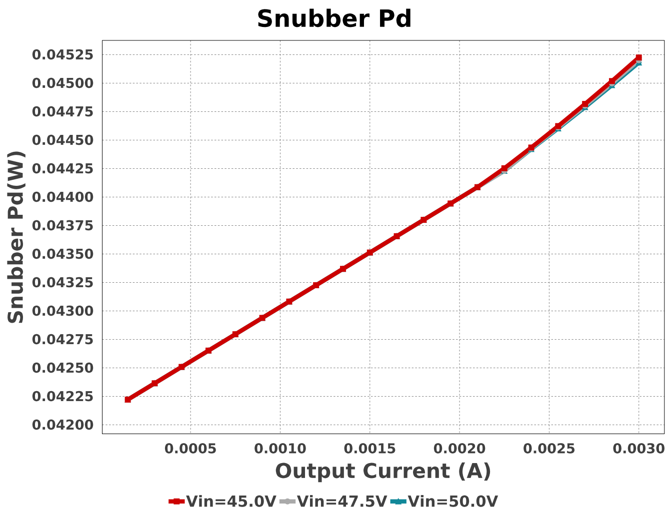

IC Tj
IC Tj(degC)
37.582387403
37.582387402
37.582387401
37.582387400
37.582387399
37.582387398
37.582387397
37.582387396
37.582387395
37.582387394
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

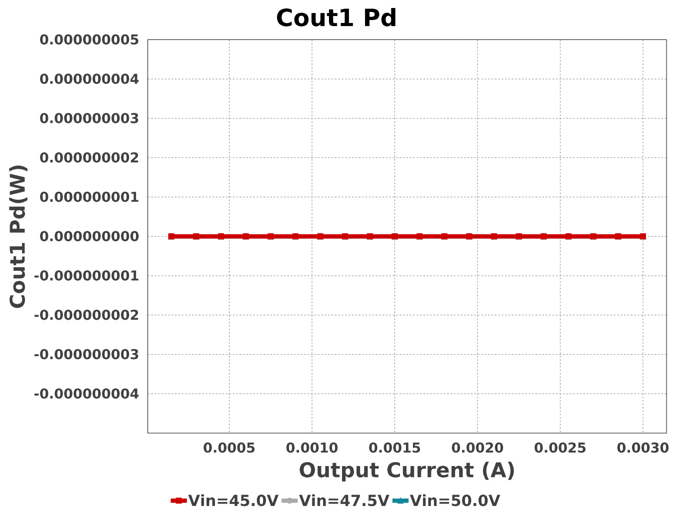

M1 TjOP
M1 TjOP(degC)
32.375
32.350
32.325
32.300
32.275
32.250
32.225
32.200
32.175
32.150
32.125
32.100
32.075
32.050
32.025
32.000
31.975
31.950
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

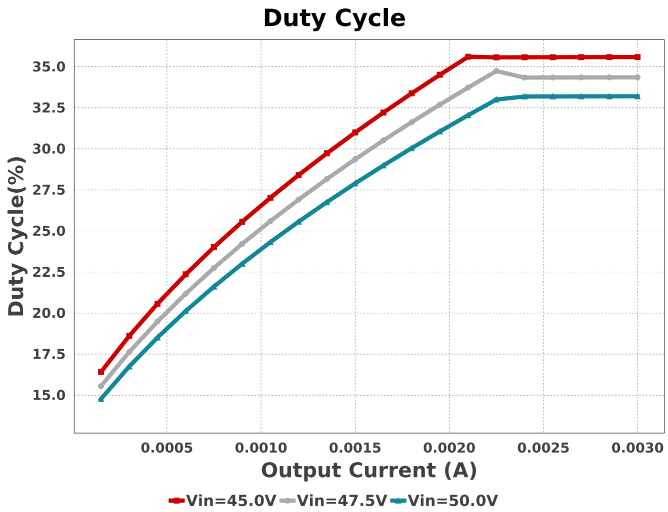

Dsec2 Pd
Dsec2 Pd(W)
0.00075
0.00070
0.00065
0.00060
0.00055
0.00050
0.00045
0.00040
0.00035
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

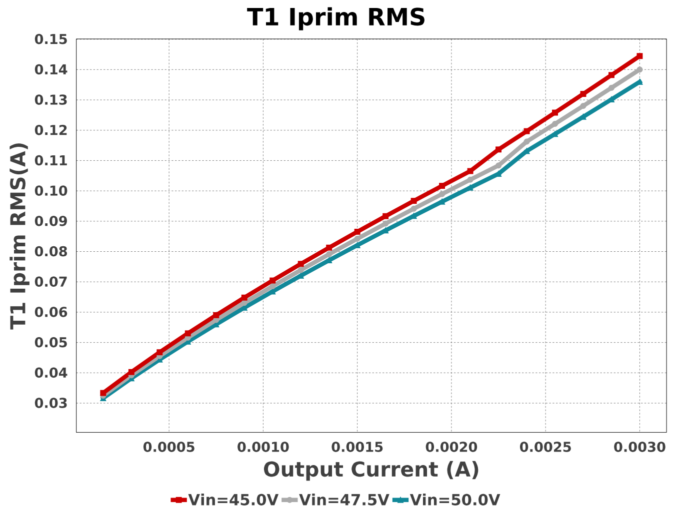

Dsec2 Vf
Dsec2 Vf(V)
0.500000004
0.500000003
0.500000002
0.500000001
0.500000000
0.499999999
0.499999998
0.499999997
0.499999996
0.499999995
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

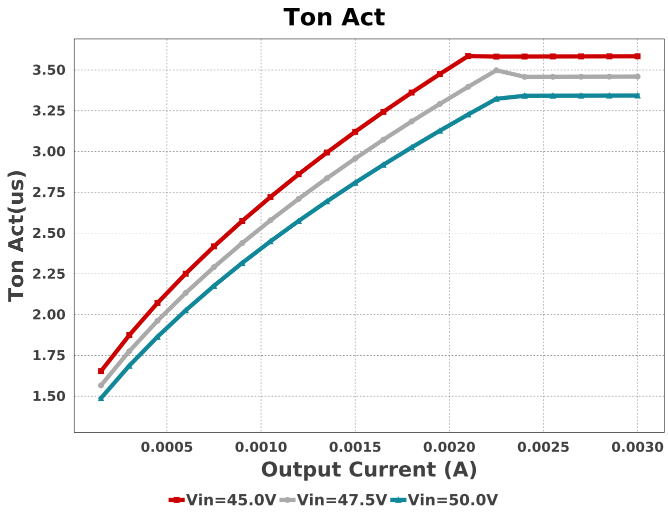

Pd Rstartup
Pd Rstartup(W)
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

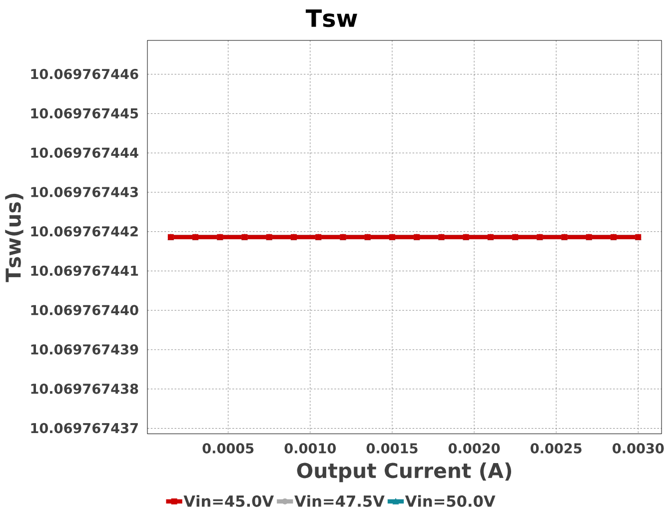

Snubber Pd
Snubber Pd(W)
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

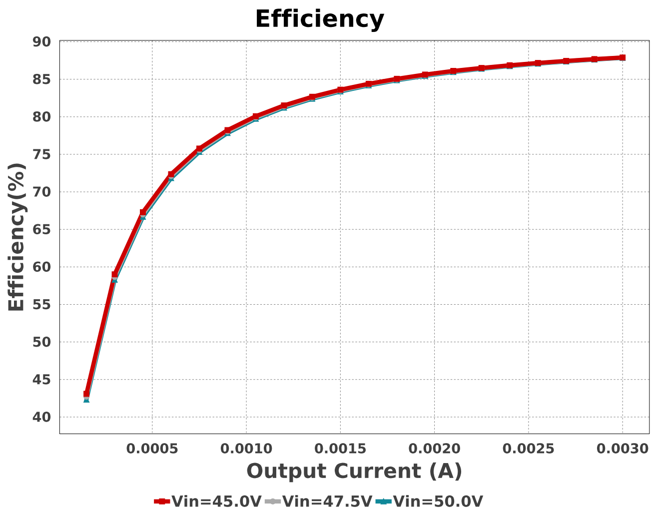

Cout1 Pd
Cout1 Pd(W)
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

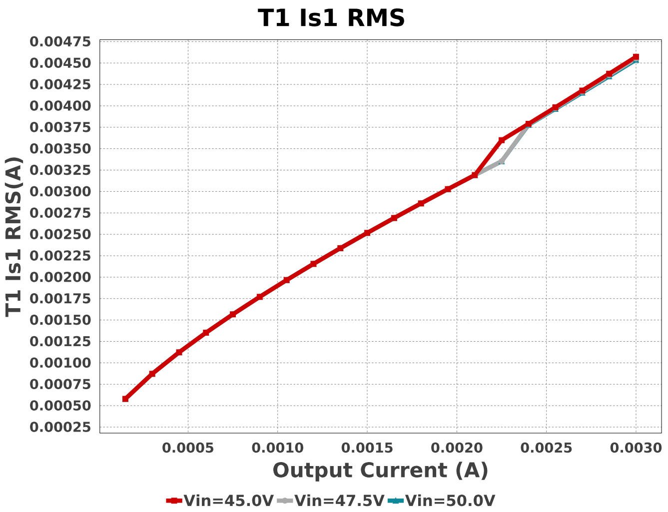

Duty Cycle
Duty Cycle(%)
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

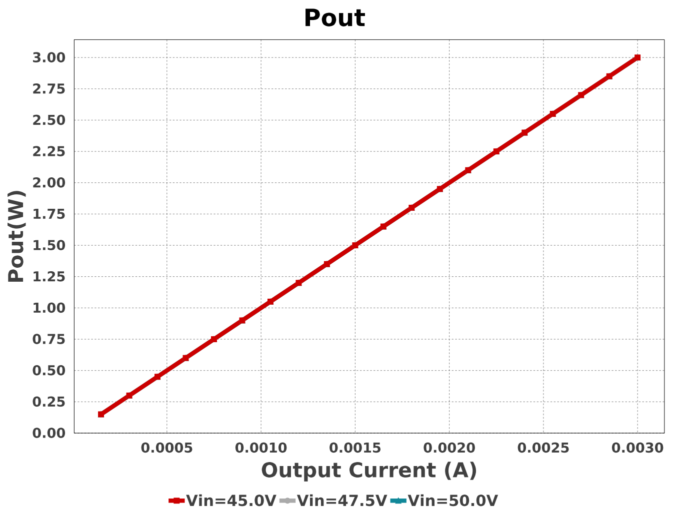

T1 Iprim RMS
T1 Iprim RMS(A)
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

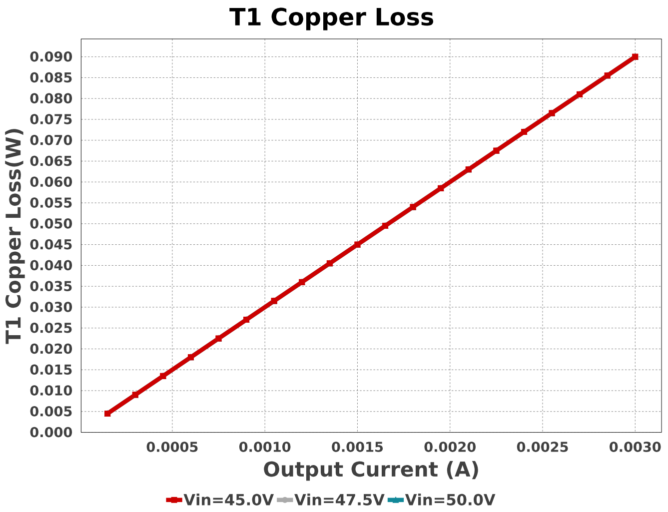

Ton Act
Ton Act(us)
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

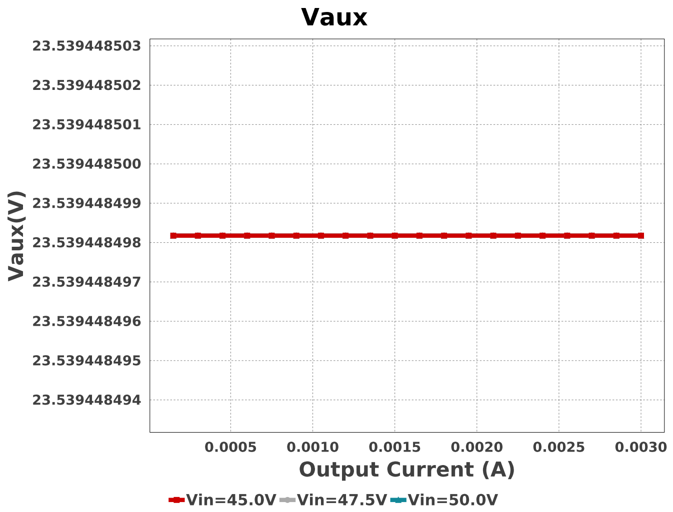

Tsw
Tsw(us)
10.069767446
10.069767445
10.069767444
10.069767443
10.069767442
10.069767441
10.069767440
10.069767439
10.069767438
10.069767437
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

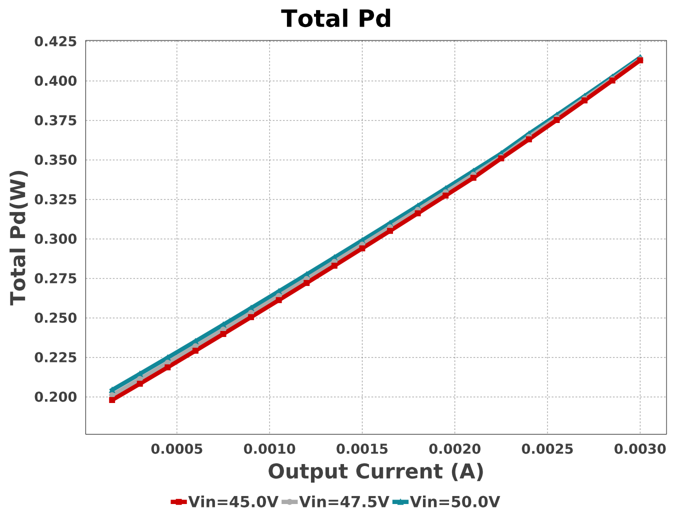

Efficiency
Efficiency(%)
90
85
80
75
70
65
60
55
50
45
40
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

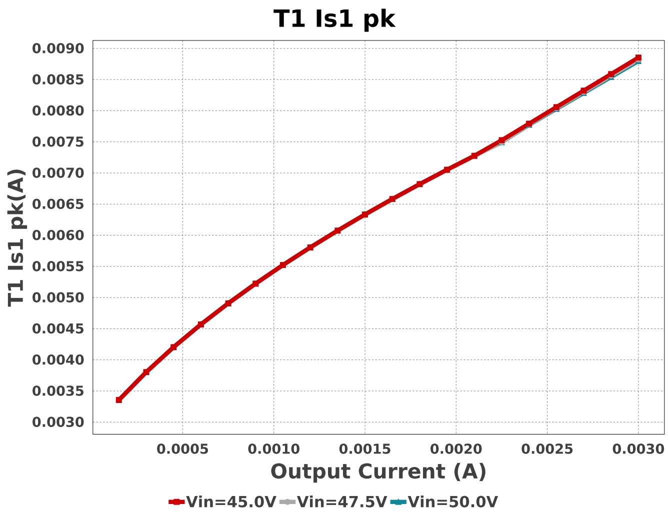

T1 Is1 RMS
T1 Is1 RMS(A)
0.00475
0.00450
0.00425
0.00400
0.00375
0.00350
0.00325
0.00300
0.00275
0.00250
0.00225
0.00200
0.00175
0.00150
0.00125
0.00100
0.00075
0.00050
0.00025
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

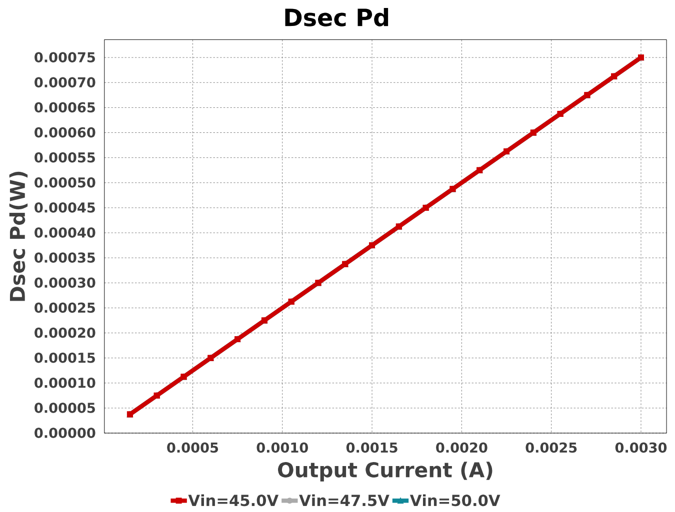

Pout
Pout(W)
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

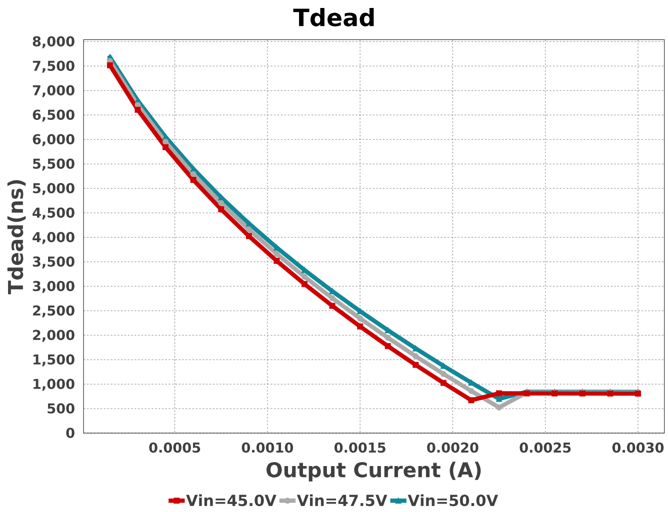

T1 Copper Loss
T1 Copper Loss(W)
0.090
0.085
0.080
0.075
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

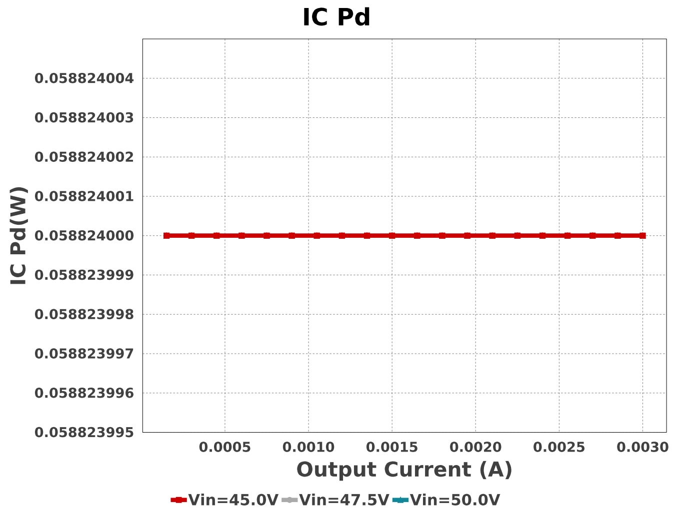

Vaux
Vaux(V)
23.539448503
23.539448502
23.539448501
23.539448500
23.539448499
23.539448498
23.539448497
23.539448496
23.539448495
23.539448494
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

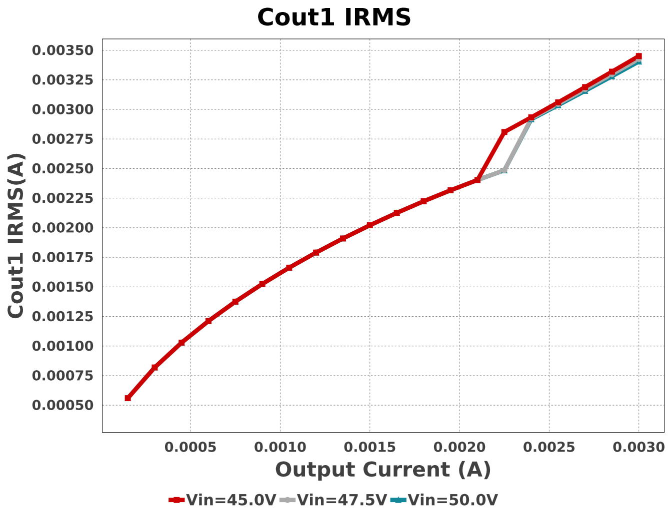

Total Pd
Total Pd(W)
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V


T1 Is1 pk
T1 Is1 pk(A)
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

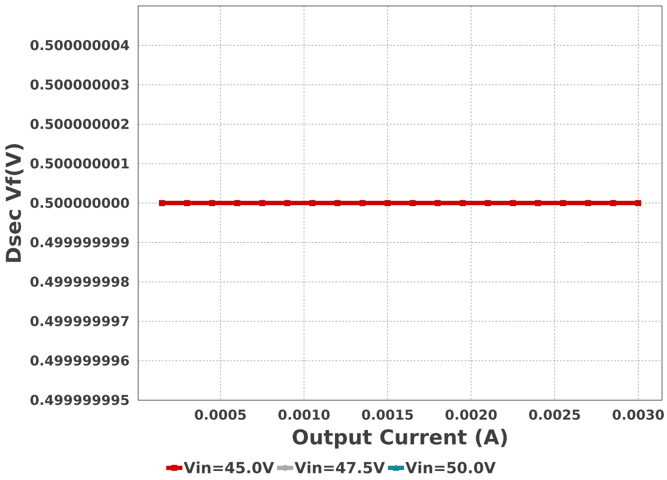

Dsec Pd
Dsec Pd(W)
0.00075
0.00070
0.00065
0.00060
0.00055
0.00050
0.00045
0.00040
0.00035
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V


Tdead
Tdead(ns)
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

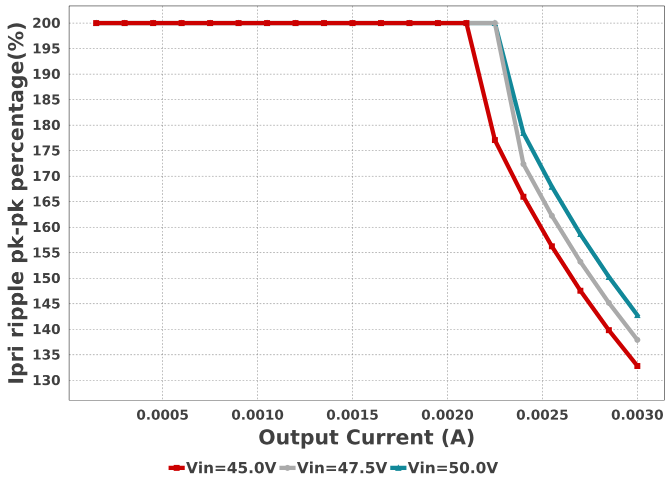

IC Pd
IC Pd(W)
0.058824004
0.058824003
0.058824002
0.058824001
0.058824000
0.058823999
0.058823998
0.058823997
0.058823996
0.058823995
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V


Cout1 IRMS
Cout1 IRMS(A)
0.00350
0.00325
0.00300
0.00275
0.00250
0.00225
0.00200
0.00175
0.00150
0.00125
0.00100
0.00075
0.00050
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
Output Current (A)
Vin=45.0V
Vin=47.5V
Vin=50.0V

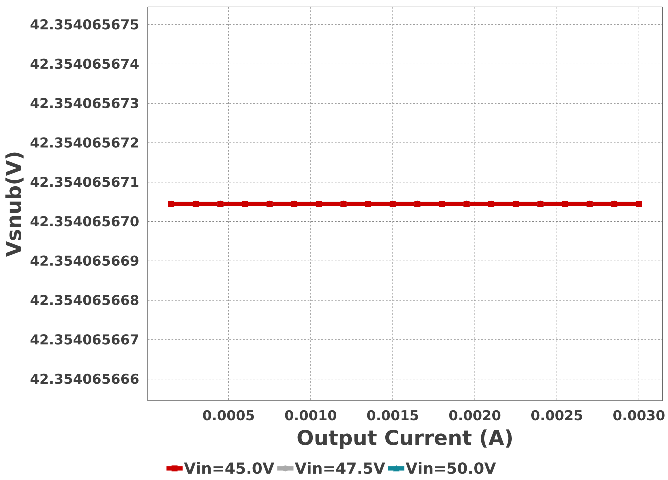
Dsec Vf



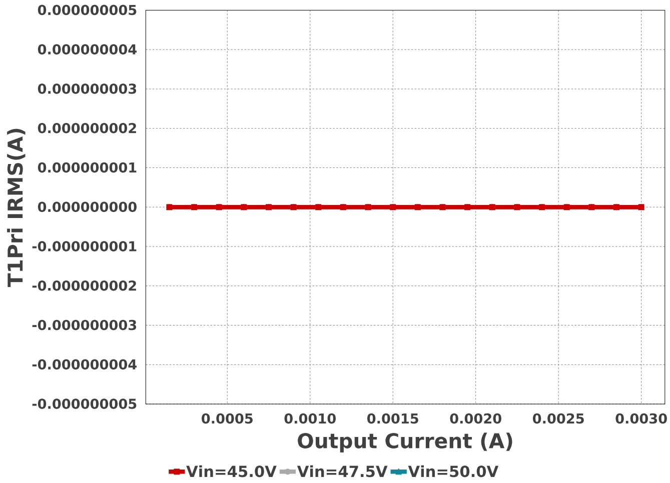
Ipri ripple pk-pk percentage



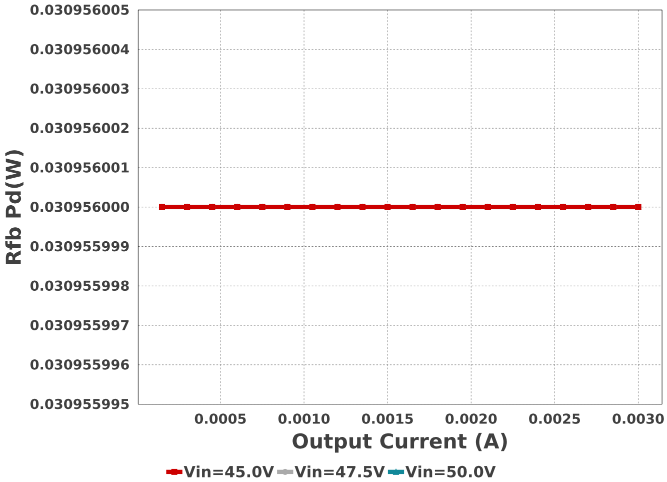
Vsnub



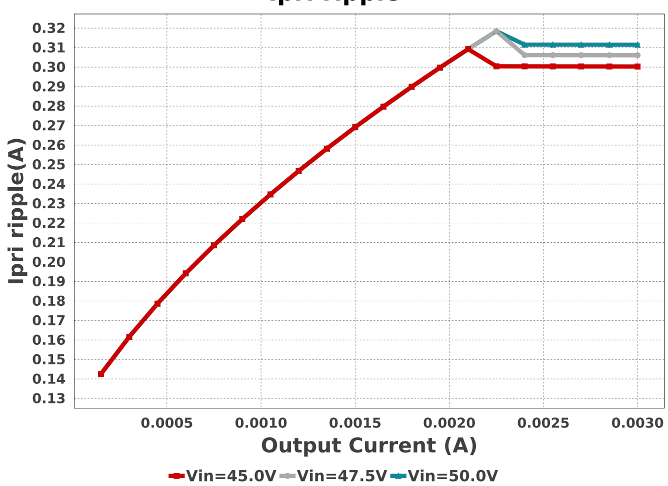
T1Pri IRMS

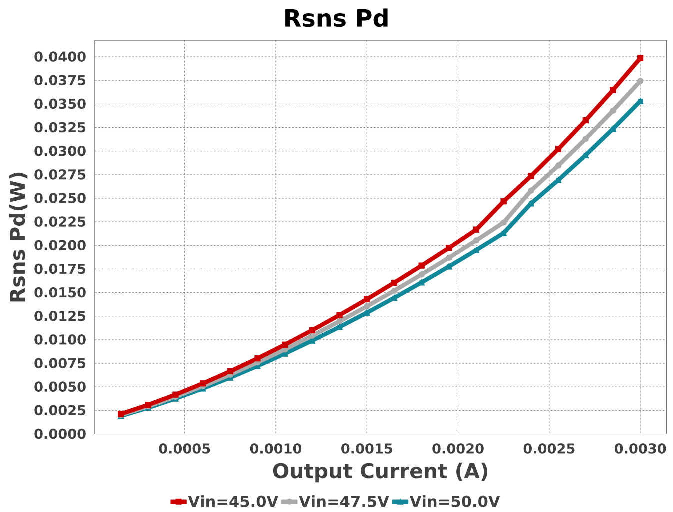


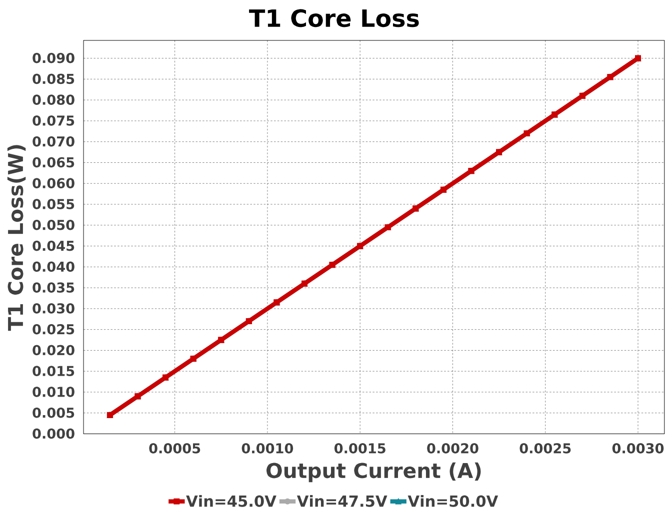
Rfb Pd

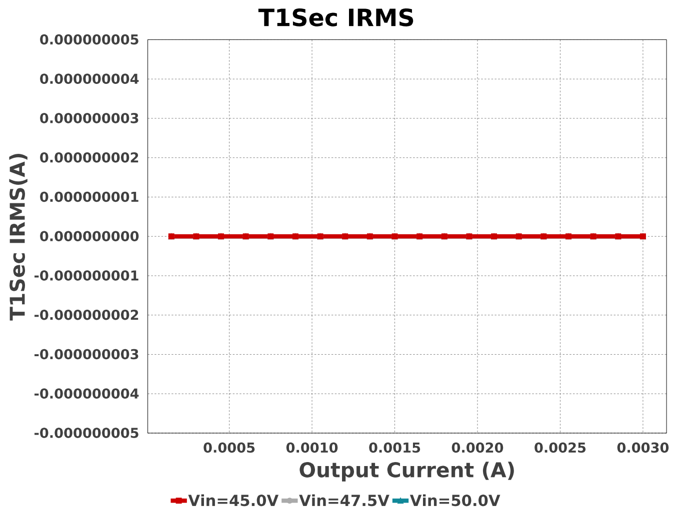


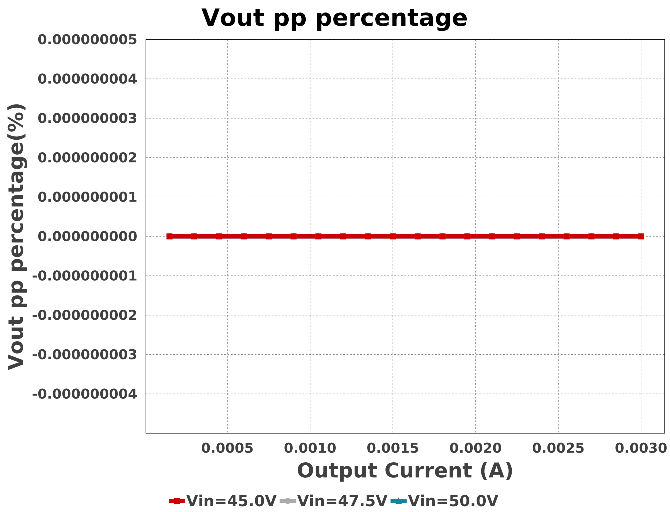
Ipri ripple

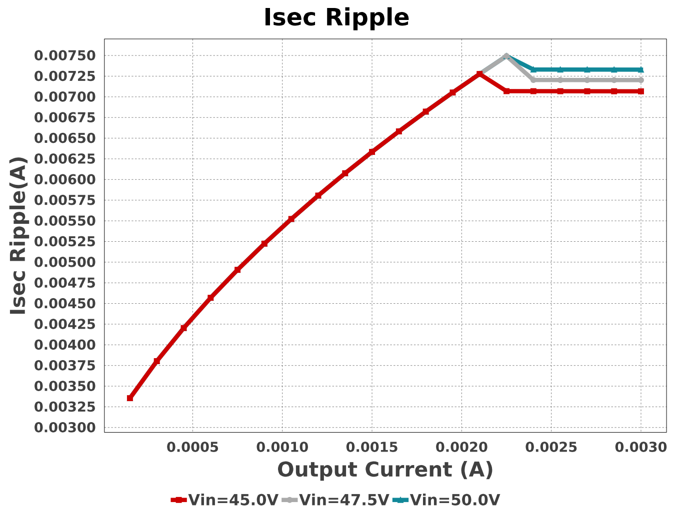


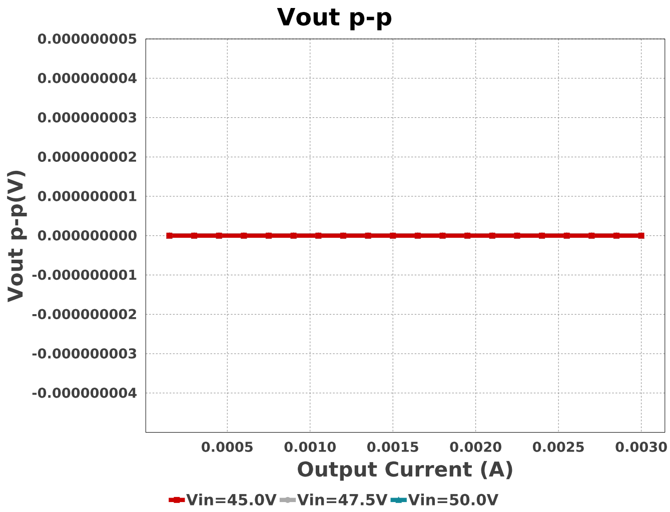

Rsns Pd
Rsns Pd(W)
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V

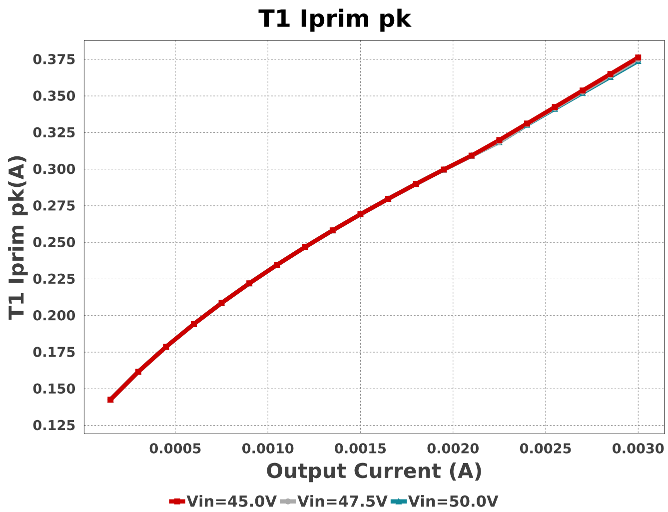

T1 Core Loss
T1 Core Loss(W)
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V


T1Sec IRMS
T1Sec IRMS(A)
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V


Vout pp percentage
Vout pp percentage(%)
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V


Isec Ripple
Isec Ripple(A)
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V


Vout p-p
Vout p-p(V)
Output Current (A)
Vin=45.0V Vin=47.5V Vin=50.0V



Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	179.59 µW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	3.451 mA	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	0.0 fW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	8.26 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	750.0 µW	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	750.0 µW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	500.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	30.0 ns	Diode	Snubber Diode Reverse Recovery Time
11.	IC Pd	28.973 mW	IC	IC power dissipation
12.	IC Tj	33.735 degC	IC	IC junction temperature
13.	ICThetaJA	128.9 degC/W	IC	IC junction-to-ambient thermal resistance
14.	Iin Avg	74.668 mA	IC	Average input current
15.	M1 Pd	33.3 mW	Mosfet	M1 MOSFET total power dissipation
16.	M1 TjOP	32.002 degC	Mosfet	M1 MOSFET junction temperature
17.	Cin Pd	179.59 µW	Power	Input capacitor power dissipation
18.	Cout1 Pd	0.0 fW	Power	Output capacitor1 power dissipation
19.	Dsec Pd	750.0 µW	Power	Secondary Diode Power Dissipation
20.	Dsec2 Pd	750.0 µW	Power	Secondary Diode Power Dissipation
21.	IC Pd	28.973 mW	Power	IC power dissipation
22.	M1 Pd	33.3 mW	Power	M1 MOSFET total power dissipation
23.	Paux	15.144 mW	Power	Power Dissipation in Raux and Daux
24.	Pd Rstartup	5.362 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
25.	Rdrv Pd	2.535 mW	Power	Power Dissipation in Gate Drive Resistor
26.	Rfb Pd	7.977 mW	Power	Rfb Power Dissipation
27.	Rsns Pd	39.868 mW	Power	Current Limit Sense Resistor Power Dissipation
28.	Snubber Pd	45.225 mW	Power	Snubber Power Dissipation
29.	T1 Copper Loss	90.0 mW	Power	Transformer Copper Loss Power Dissipation
30.	T1 Core Loss	90.0 mW	Power	Transformer Core Loss Power Dissipation
31.	T1 Pd	180.0 mW	Power	Estimated Losses in Transformer
32.	Total Pd	360.064 mW	Power	Total Power Dissipation
33.	Pd Rstartup	5.362 mW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
34.	Rdrv Pd	2.535 mW	Resistor	Power Dissipation in Gate Drive Resistor
35.	Rfb Pd	7.977 mW	Resistor	Rfb Power Dissipation
36.	Rsns Pd	39.868 mW	Resistor	Current Limit Sense Resistor Power Dissipation
37.	BOM Count	37	System Information	Total Design BOM count
38.	Duty Cycle	35.595 %	System Information	Duty cycle
39.	Efficiency	89.284 %	System Information	Steady state efficiency
40.	FootPrint	733.0 mm^2	System Information	Total Foot Print Area of BOM components
41.	Frequency	99.307 kHz	System Information	Switching frequency
42.	Iout	3.0 mA	System Information	Iout operating point
43.	Mode	CCM	System Information	Conduction Mode
44.	Pout	3.0 W	System Information	Total output power

#	Name	Value	Category	Description
45.	Tdead	807.33 ns	System Information	Approximate Dead Time of the Regulator
46.	Toff	5.678 us	System Information	Approximate Converter Off Time
47.	Ton Act	3.584 us	System Information	Approximate Converter On Time
48.	Total BOM	NA	System Information	Total BOM Cost
49.	Tsw	10.07 us	System Information	Switching Time Period
50.	Vin	45.0 V	System Information	Vin operating point
51.	Vout	1,000.0 V	System Information	Operational Output Voltage
52.	Vout p-p	0.007 fV	System Information	Peak-to-peak output ripple voltage
53.	Vout pp percentage	0.001 f%	System Information	Output Voltage ripple percentage
54.	Vsnub	42.354 V	System Information	Voltage Across the Snubber
55.	Ipri Avg	80.483 mA	Transformer	Average Current in Primary Winding over the complete Switching Period
56.	Ipri ripple	300.342 mA	Transformer	Ripple Current in the Primary Winding
57.	Ipri ripple pk-pk percentage	132.832 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
58.	Isec Ripple	7.067 mA	Transformer	Ripple Current in the Secondary Winding
59.	Paux	15.144 mW	Transformer	Power Dissipation in Raux and Daux
60.	T1 Copper Loss	90.0 mW	Transformer	Transformer Copper Loss Power Dissipation
61.	T1 Core Loss	90.0 mW	Transformer	Transformer Core Loss Power Dissipation
62.	T1 Iprim RMS	144.476 mA	Transformer	Transformer Primary RMS Current
63.	T1 Iprim pk	376.278 mA	Transformer	Transformer Primary Peak Current
64.	T1 Is1 RMS	4.573 mA	Transformer	Transformer Secondary1 RMS Current
65.	T1 Is1 pk	8.854 mA	Transformer	Transformer Secondary1 Peak Current
66.	T1 Pd	180.0 mW	Transformer	Estimated Losses in Transformer
67.	T1Pri IRMS	144.092 mA	Transformer	Transformer Primary RMS Current
68.	T1Sec IRMS	4.521 mA	Transformer	Transformer Secondary RMS Current
69.	Vaux	11.949 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	3.0 m	Maximum Output Current
VinMax	50.0	Maximum input voltage
VinMin	45.0	Minimum input voltage
VinTyp	48.0	Typical input voltage
Vout	1,000.0	Output Voltage
base_pn	UCC28C55-Q1	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

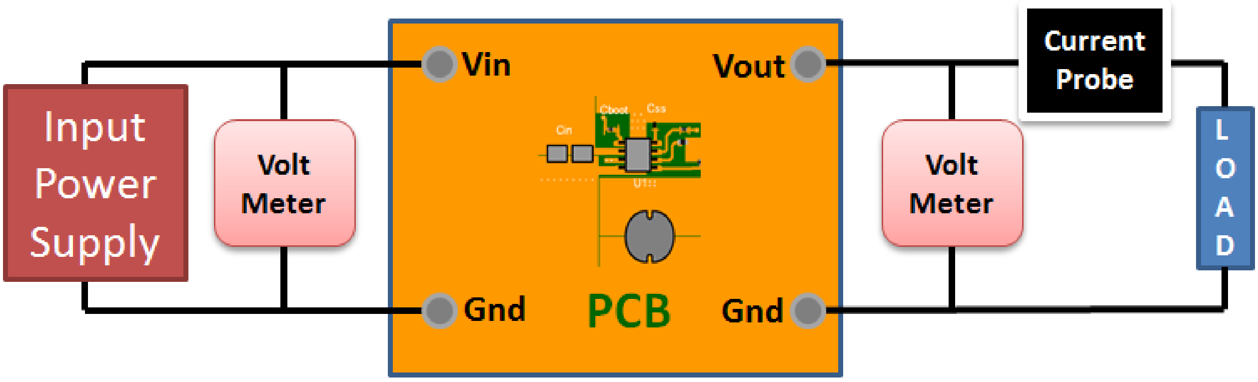
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 45.0V 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 UCC28C55-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 : 366641DE25EF4AD362E4507971127DFF[v1]

4. **UCC28C55-Q1** Product Folder : http://www.ti.com/product/UCC28C55%2DQ1 : contains the data sheet and other resources.

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