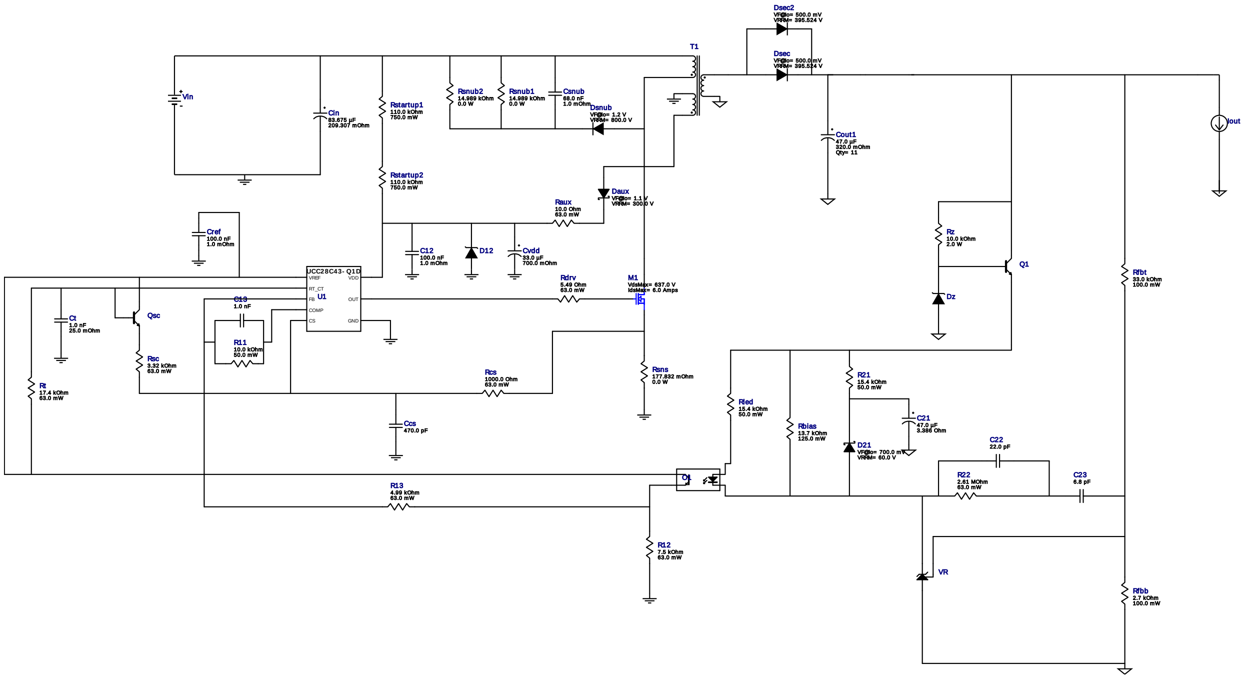
VinMin = 75.0V
VinMax = 395.0V
Vout = 33.0V
Iout = 2.6A

Device = UCC28C43QDRQ1
Topology = Flyback
Created = 2019-10-29 06:29:37.884
BOM Cost = NA
BOM Count = 56
Total Pd =

WEBENCH ® Design Report

Design : 175 UCC28C43QDRQ1
UCC28C43QDRQ1 75V-395V to 33.00V @ 2.6A



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 UCC28C43-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. Click on the transformer symbol in the schematic and select "Explore Transformer Core/Bobbin Selection" to design using specific transformer cores and bobbin. With the current design condition, suitable FET could not be found in the current database. Hence, this design is created using an ideal FET. Please note that the resulting FET parameters are ideal, so the efficiency/loss values have been disabled. Also, the schematic/PCB export and Thermal simulations will not work with the ideal FET.

Electrical BOM

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C12	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
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	Chemi-Con	EKMG500ELL470MF11D Series= 2200	Cap= 47.0 uF ESR= 3.3858 Ohm VDC= 50.0 V IRMS= 110.0 mA	1	$0.07	Chemi-Con_630x1100 69 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

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Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C23	AVX	06031U6R8BAT2A Series= C0G/NP0	Cap= 6.8 pF VDC= 100.0 V IRMS= 0.0 A	1	$0.07	0603 5 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	CUSTOM	CUSTOM Series= ?	Cap= 83.675 uF ESR= 209.31 mOhm VDC= 474.0 V IRMS= 2.45143 A	1	NA	CUSTOM 0 mm^2
Cout1	Panasonic	EEV-FK2A470Q Series= FK	Cap= 47.0 uF ESR= 320.0 mOhm VDC= 100.0 V IRMS= 500.0 mA	11	$0.45	SM_RADIAL_H13 264 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	GRM43QR72J683KW01L Series= X7R	Cap= 68.0 nF ESR= 1.0 mOhm VDC= 630.0 V IRMS= 0.0 A	1	$0.59	1812 23 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	Panasonic	EEE-FK1E330UR Series= FK	Cap= 33.0 uF ESR= 700.0 mOhm VDC= 25.0 V IRMS= 160.0 mA	1	$0.09	SM_RADIAL_C 62 mm^2
D12	ON Semiconductor	MMSZ4705T1G	Zener	1	$0.04	SOD-123 13 mm^2
D21	Diodes Inc.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.09	SMA 37 mm^2
Daux	SMC Diode Solutions	ST1300ATR	VF@Io= 1.1 V VRRM= 300.0 V	1	$0.07	SMA 37 mm^2
Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 395.524 V	1	NA	CUSTOM 0 mm^2
Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 395.524 V	1	NA	CUSTOM 0 mm^2
Dsnub	Microsemi	UFS180JE3/TR13	VF@Io= 1.2 V VRRM= 800.0 V	1	$0.73	DO-214BA 42 mm^2
Dz	Diodes Inc.	MMSZ5250B-7-F	Zener	1	$0.03	SOD-123 13 mm^2
M1	NA	IdealFET	VdsMax= 637.0 V IdsMax= 6.0 Amps	1	NA	NA 0 mm^2
O1	Fairchild Semiconductor	FOD817A	Optocoupler	1	$0.11	DIP-4 71 mm^2
Q1	Diodes Inc.	MMBT4401-7-F	Bipolar Transistor	1	$0.02	SOT-23 14 mm^2
Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	$1.11	TO-18 57 mm^2

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Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
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	CRCW04027K50FKED Series= CRCW..e3	Res= 7.5 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	Vishay-Dale	CRCW04022M61FKED Series= CRCW..e3	Res= 2.61 MOhm 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
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	CRCW04025R49FKED Series= CRCW..e3	Res= 5.49 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfbb	Yageo	RC0603FR-072K7L Series= ?	Res= 2.7 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rfbt	Yageo	RC0603FR-0733KL Series= ?	Res= 33.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rled	Yageo	RC0201FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rsc	Vishay-Dale	CRCW04023K32FKED Series= CRCW..e3	Res= 3.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsns	CUSTOM	CUSTOM Series= ?	Res= 177.832 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 14.989 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 14.989 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rstartup1	Vishay-Dale	CRCW2010110KFKEF Series= CRCW..e3	Res= 110.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	$0.03	2010 32 mm^2
Rstartup2	Vishay-Dale	CRCW2010110KFKEF Series= CRCW..e3	Res= 110.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	$0.03	2010 32 mm^2
Rt	Vishay-Dale	CRCW040217K4FKED Series= CRCW..e3	Res= 17.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rz	TE Connectivity	352110KFT Series= ?	Res= 10.0 kOhm Power= 2.0 W Tolerance= 1.0%	1	$0.17	2512 43 mm^2

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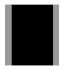
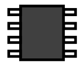
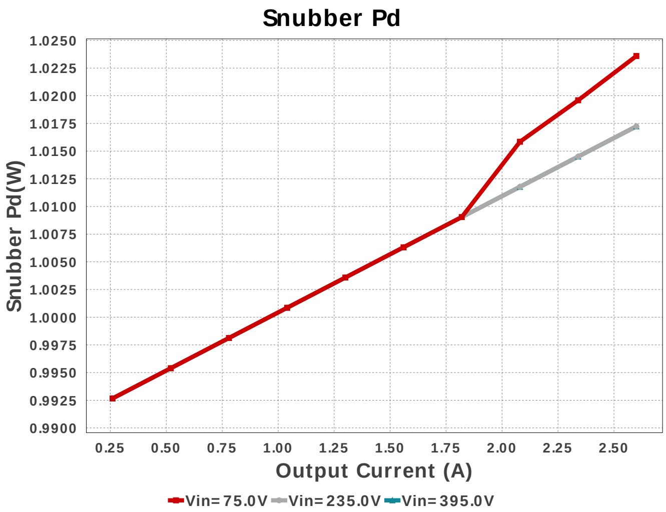
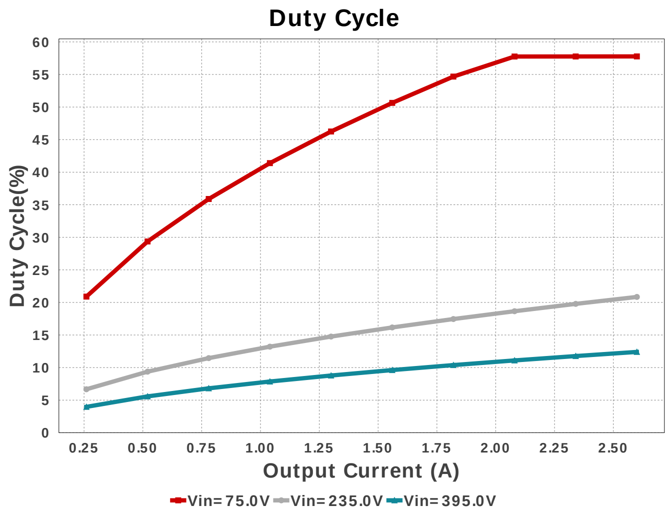
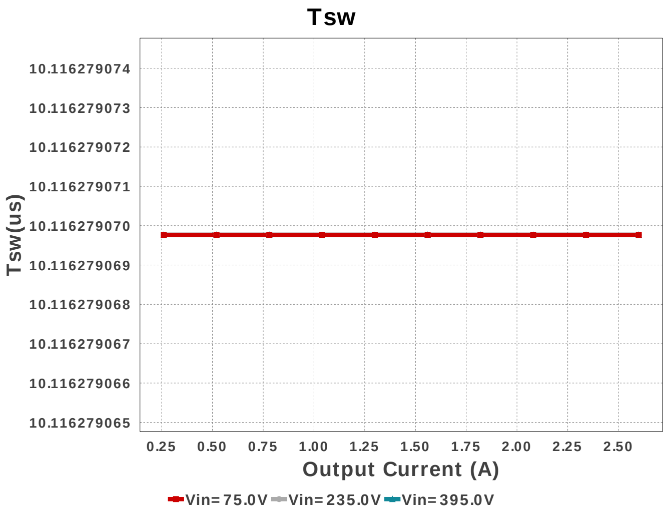
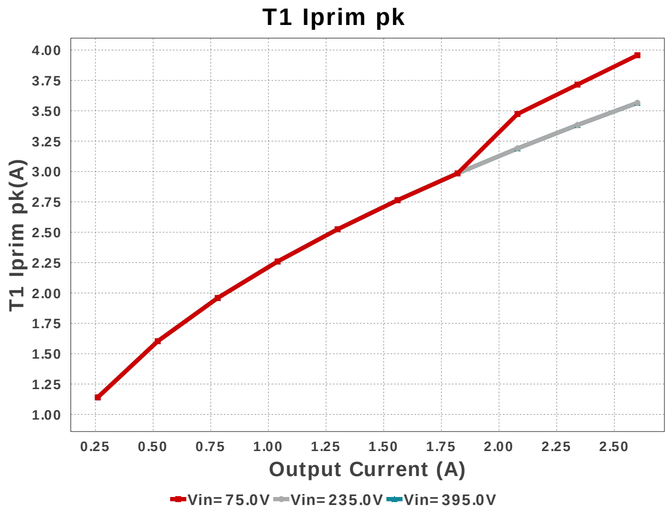
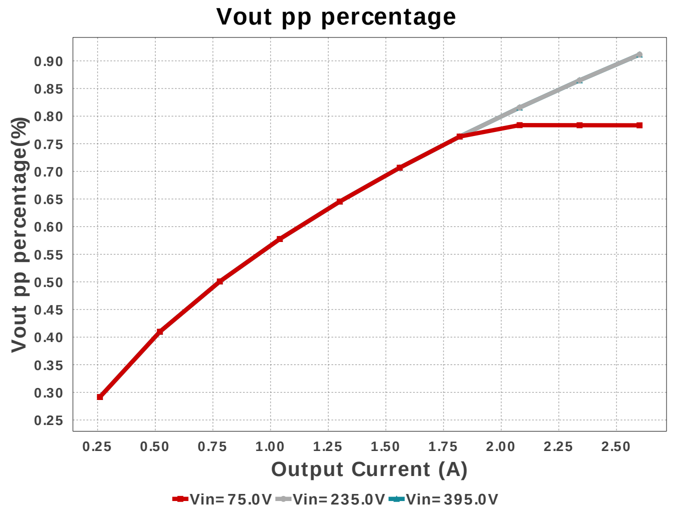
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
T1	Core=TDK , CoilFormer=TDK	Core=B66229G0000X187 , CoilFormer=B66230A1114T001	Lp= 139.0 µH Turns Ratio(Nas)= 4:10 Turns Ratio(Nps)= 29:10 Npri= 29.0 Naux= 4.0 Nsec= 10.0	1	$1.45	 1462 mm²
U1	Texas Instruments	UCC28C43QDRQ1	Switcher	1	$0.68	 D0008A 57 mm²
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.07	 R-PDSO-G3 16 mm²

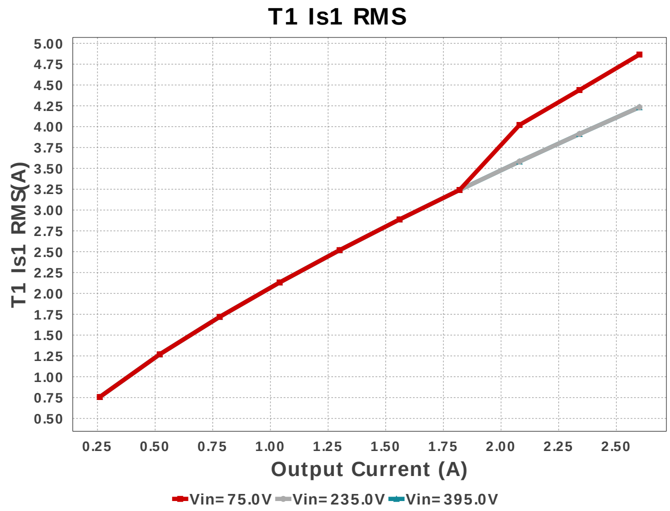


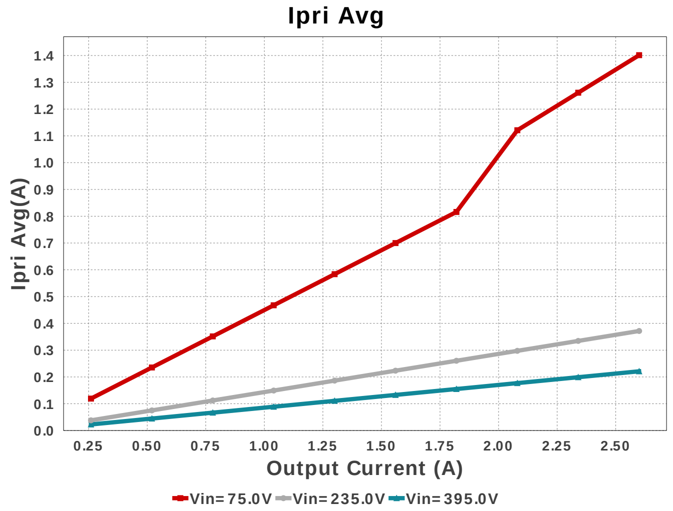


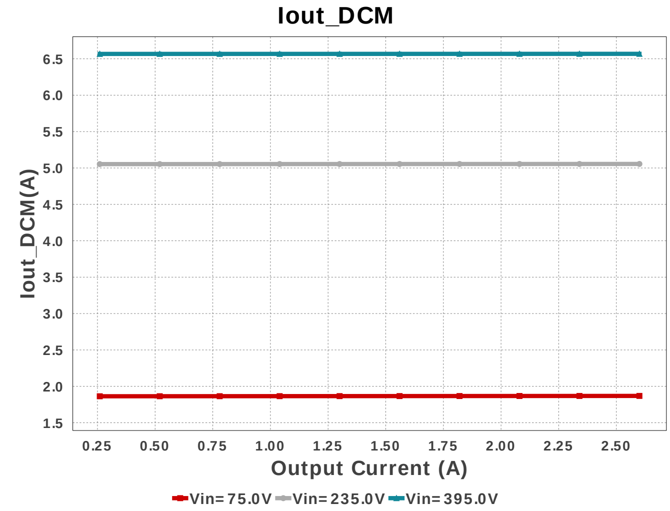


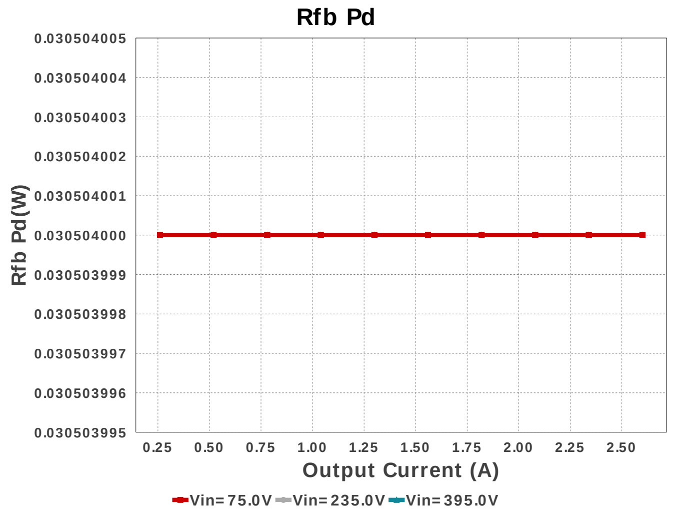


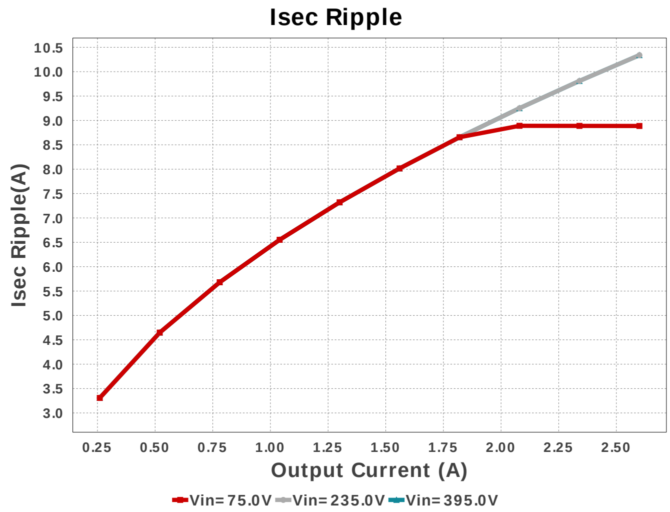

Vout pp percentage
Vout pp percentage(%)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

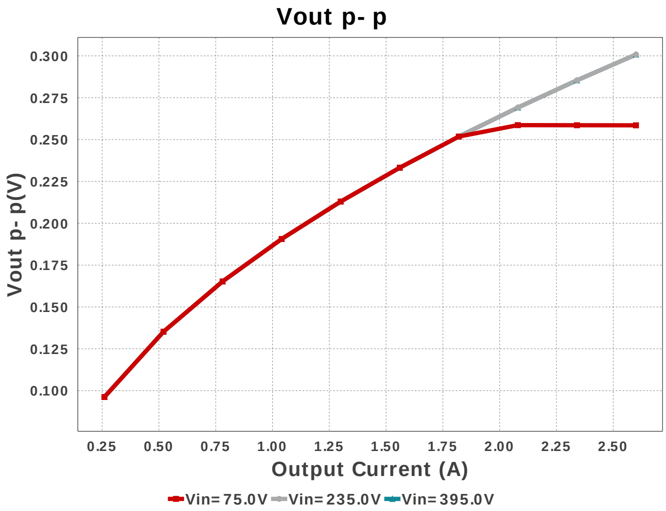

T1 Is1 RMS
T1 Is1 RMS(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

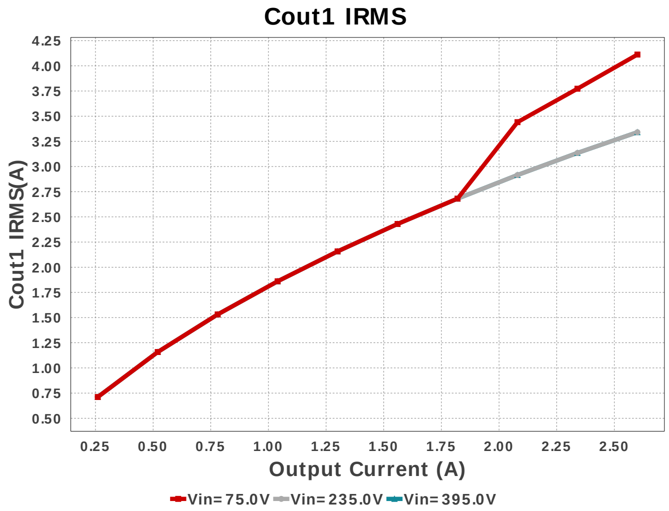

Ipri Avg
Ipri Avg(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

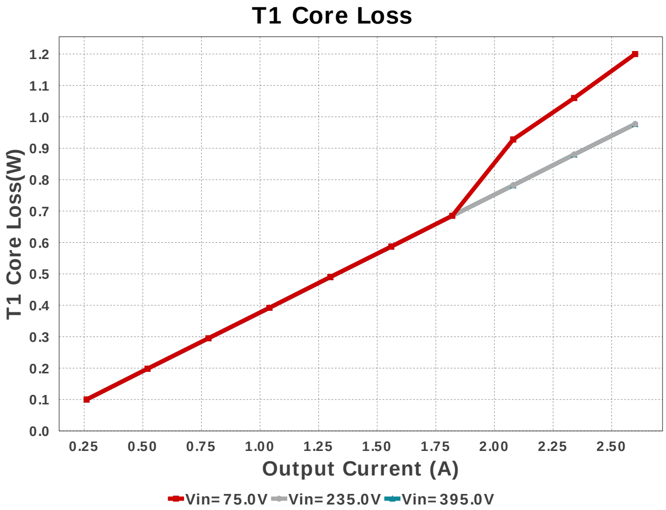

Iout_DCM
Iout_DCM(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

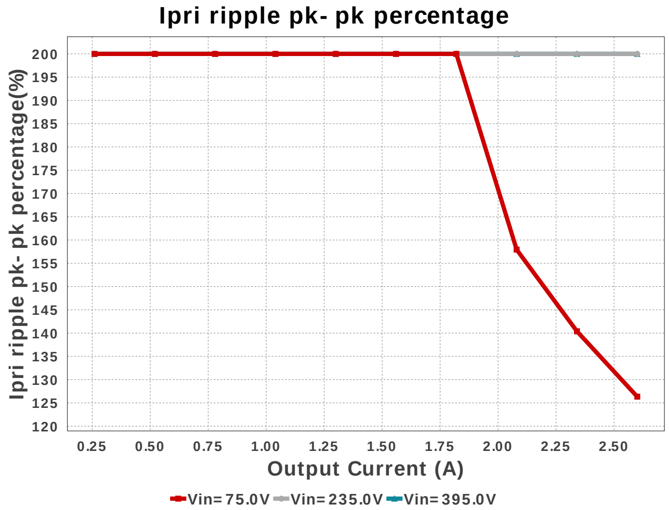

Rfb Pd
Rfb Pd(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

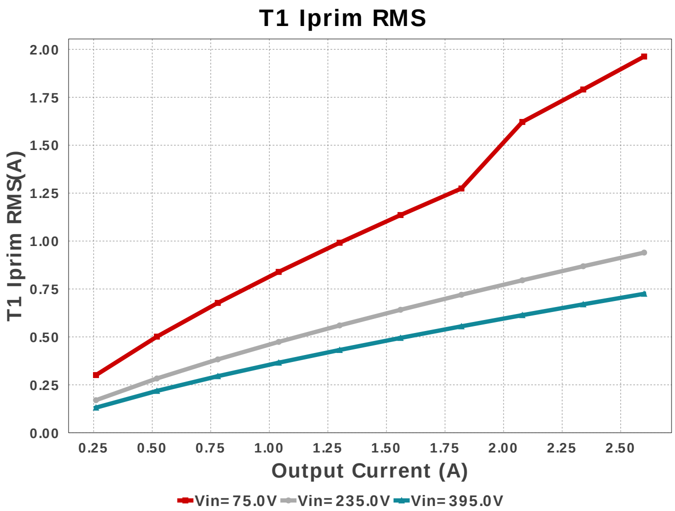

Isec Ripple
Isec Ripple(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

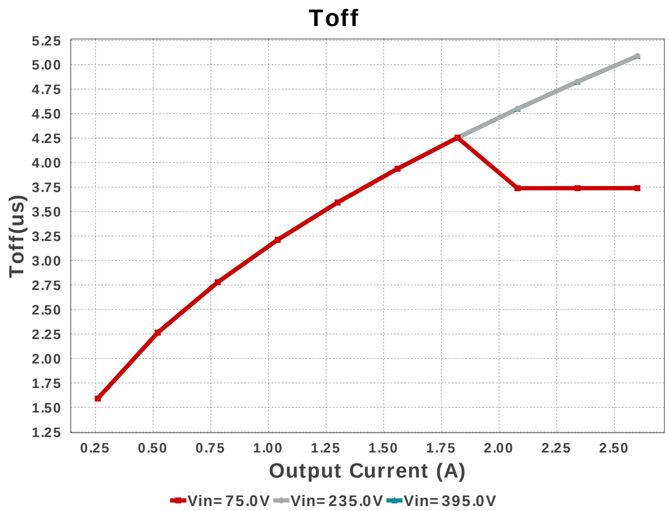

Vout p- p
Vout p- p(V)
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin= 75.0V Vin= 235.0V Vin= 395.0V

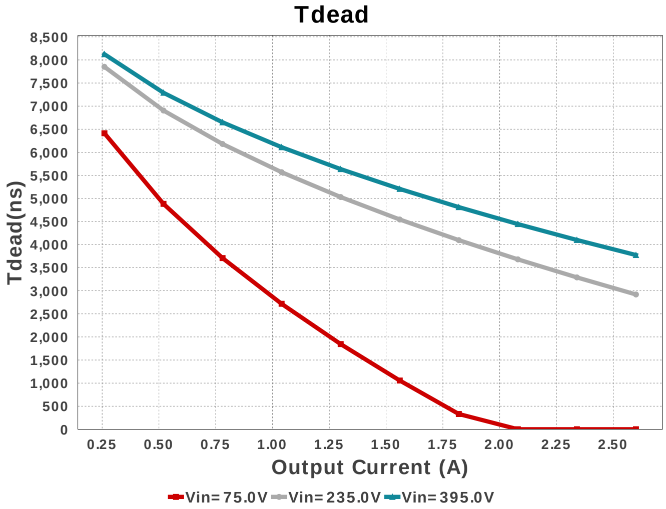

Cout1 IRMS
Cout1 IRMS(A)
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin= 75.0V Vin= 235.0V Vin= 395.0V

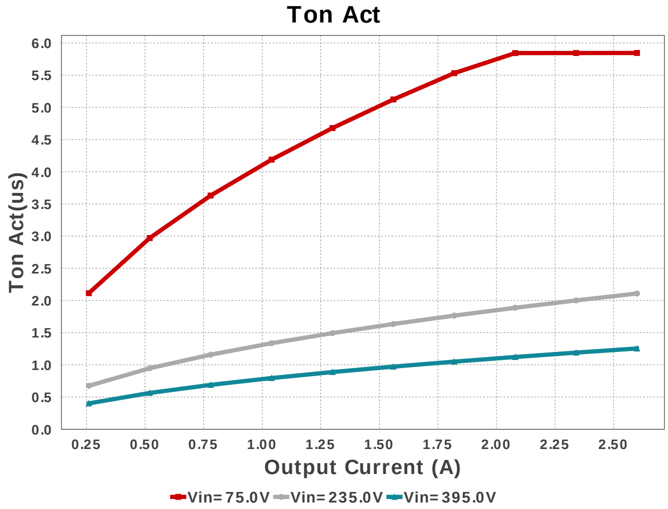

T1 Core Loss
T1 Core Loss(W)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin= 75.0V Vin= 235.0V Vin= 395.0V

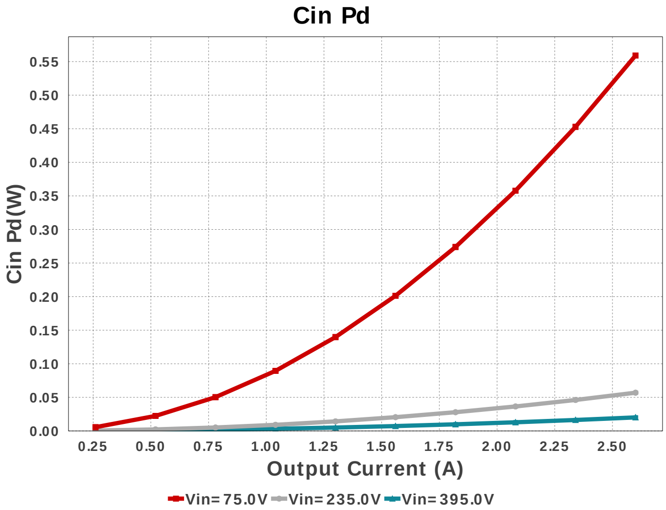

Ipri ripple pk- pk percentage
Ipri ripple pk- pk percentage(%)
200
195
190
185
180
175
170
165
160
155
150
145
140
135
130
125
120
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin= 75.0V Vin= 235.0V Vin= 395.0V

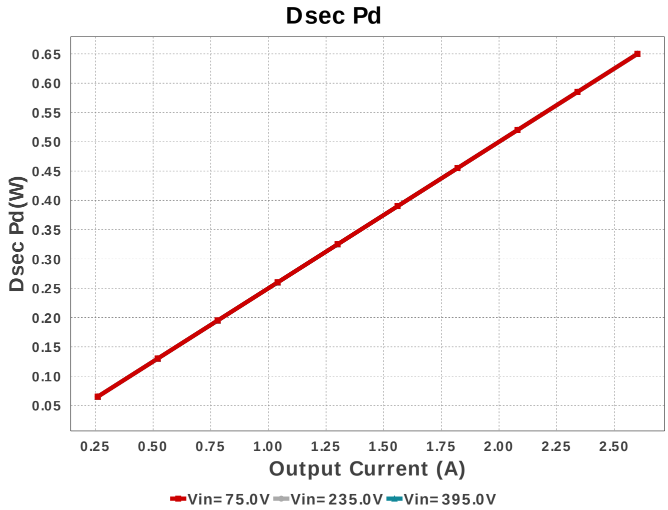

T1 Iprim RMS
T1 Iprim RMS(A)
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin= 75.0V Vin= 235.0V Vin= 395.0V

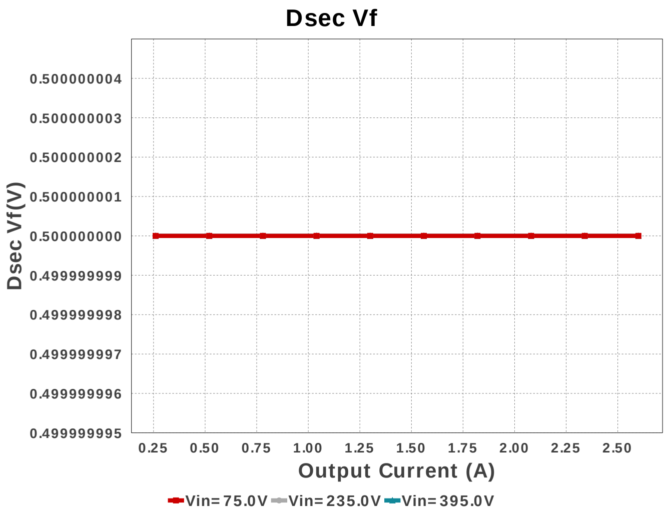

Toff
Toff(us)
5.25
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin= 75.0V Vin= 235.0V Vin= 395.0V

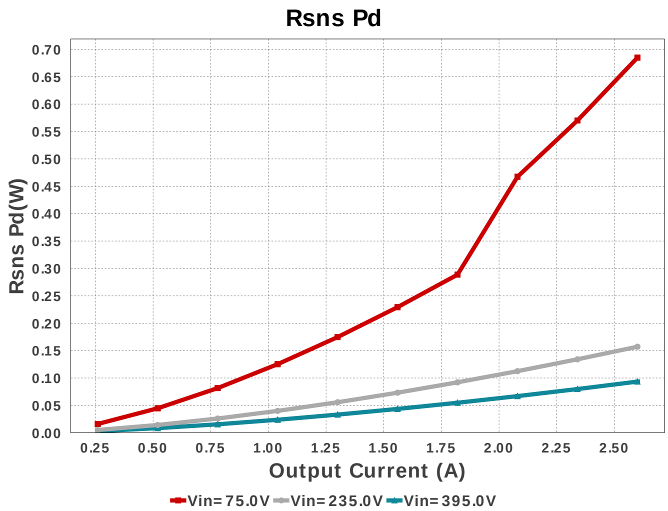

Tdead
Tdead(ns)
8,500
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

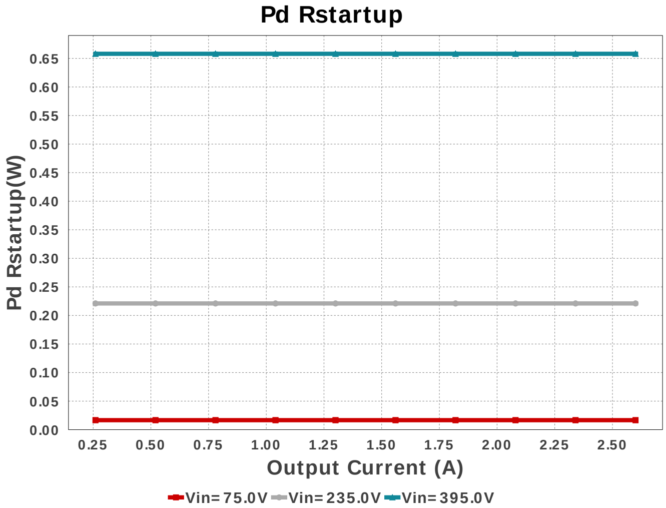

Ton Act
Ton Act(us)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

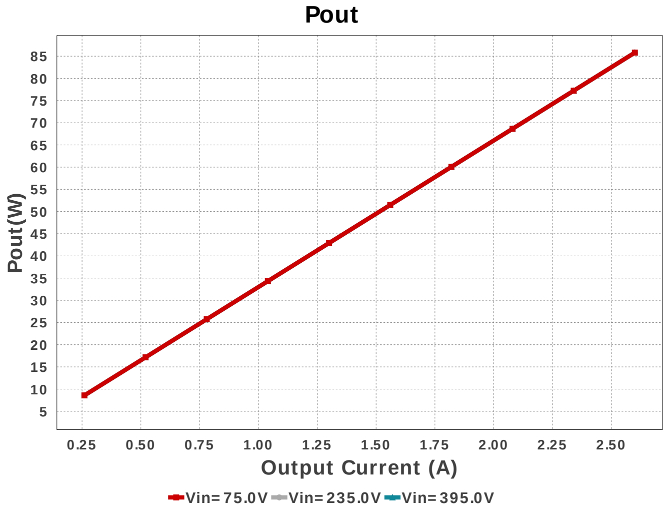

Cin Pd
Cin Pd(W)
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

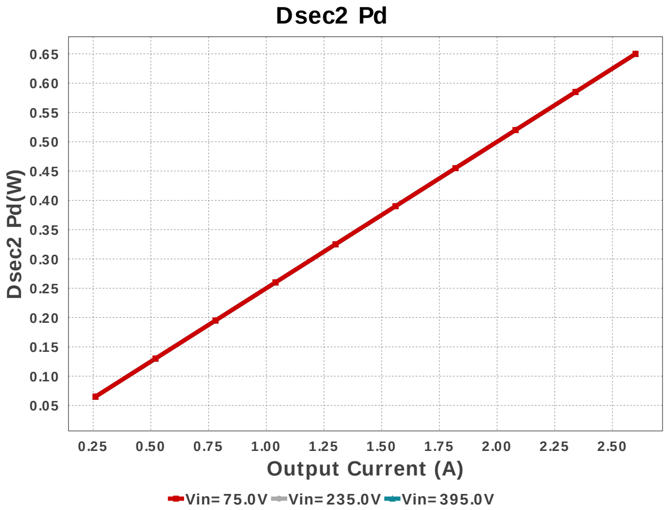

Dsec Pd
Dsec Pd(W)
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

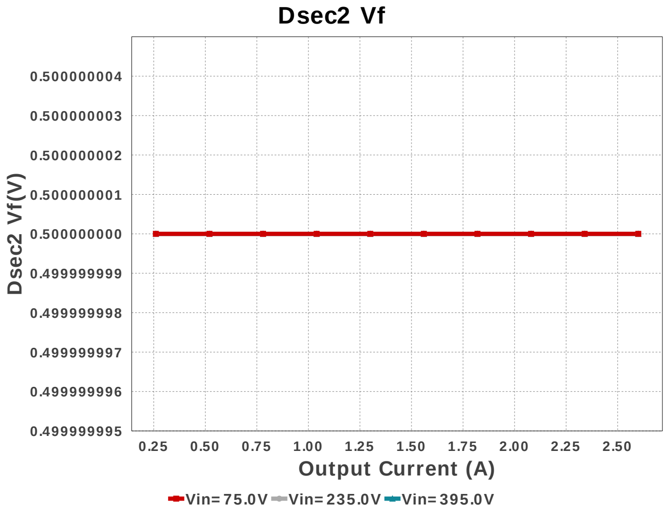

Dsec Vf
Dsec Vf(V)
0.500000004
0.500000003
0.500000002
0.500000001
0.500000000
0.499999999
0.499999998
0.499999997
0.499999996
0.499999995
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

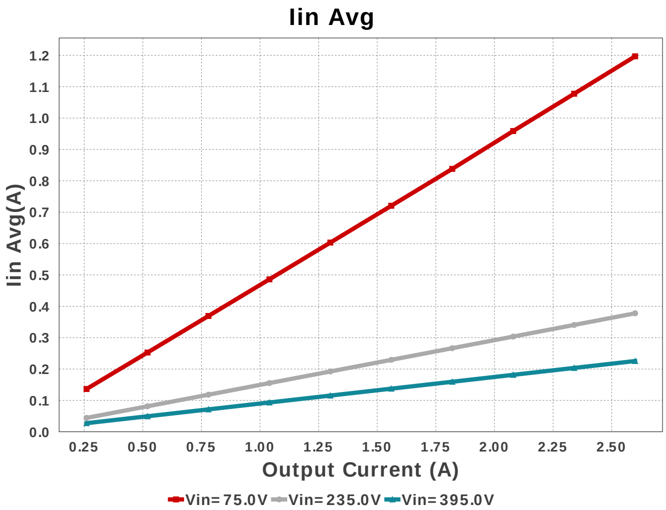

Rsns Pd
Rsns Pd(W)
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

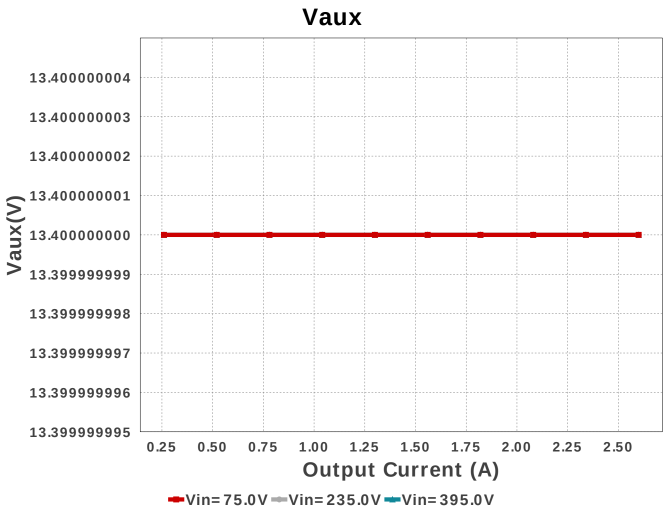

Pd Rstartup
Pd Rstartup(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

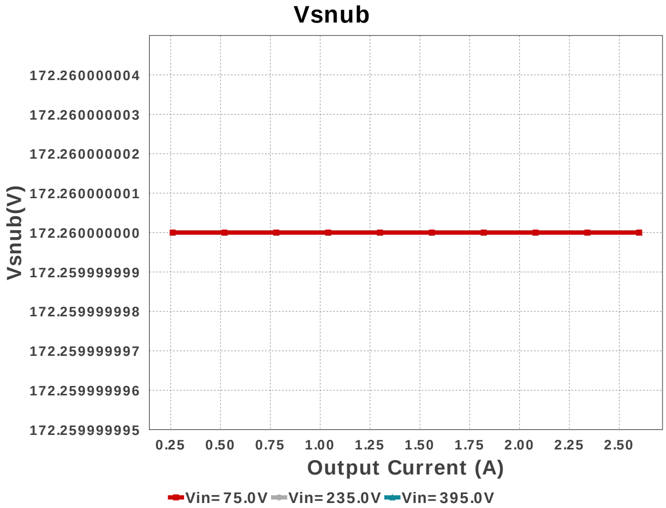

Pout
Pout(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

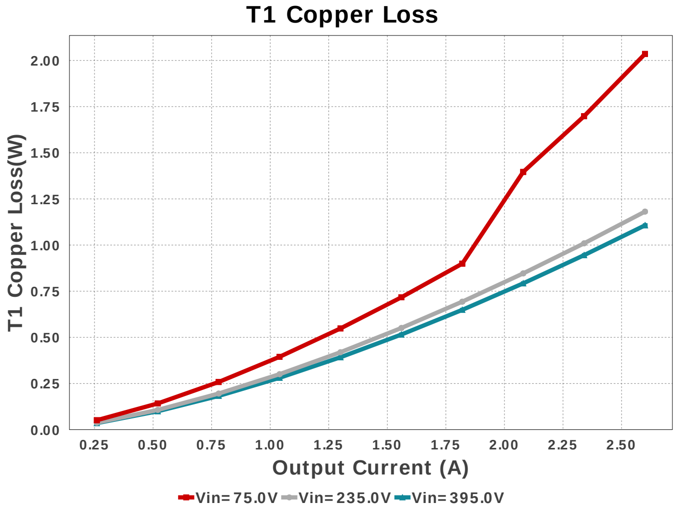

Dsec2 Pd
Dsec2 Pd(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

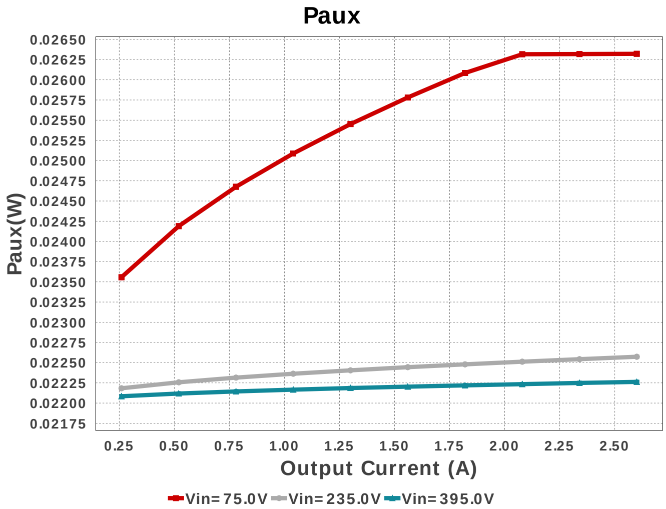

Dsec2 Vf
Dsec2 Vf(V)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

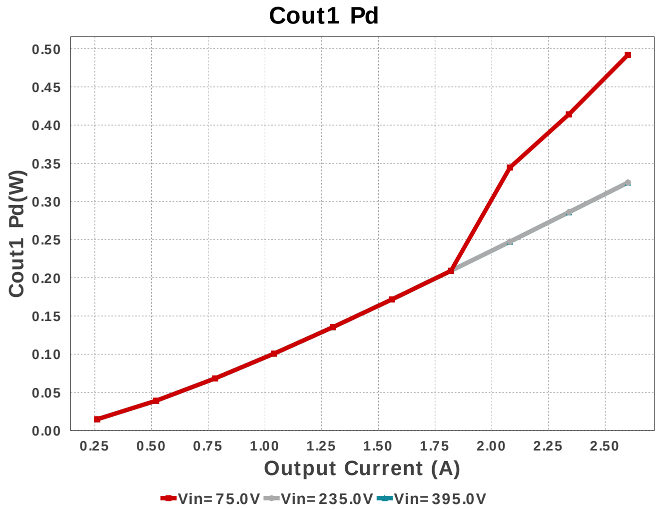

Iin Avg
Iin Avg(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

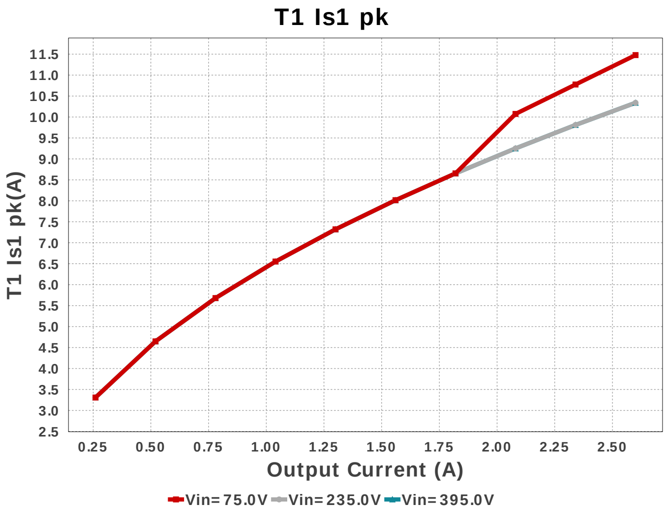

Vaux
Vaux(V)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

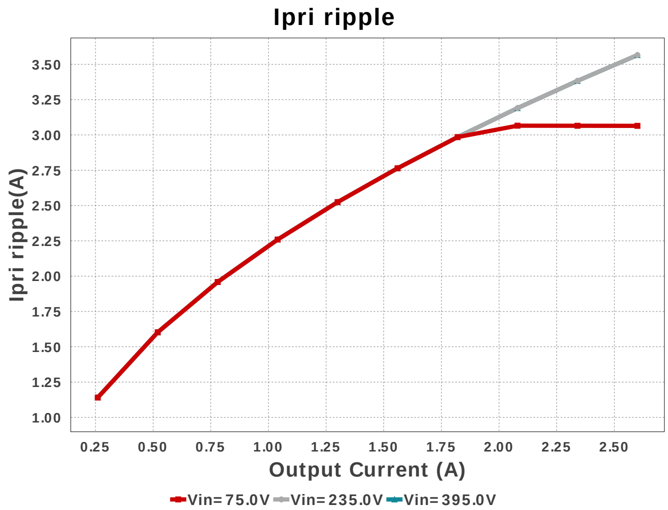

Vsnub
Vsnub(V)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V

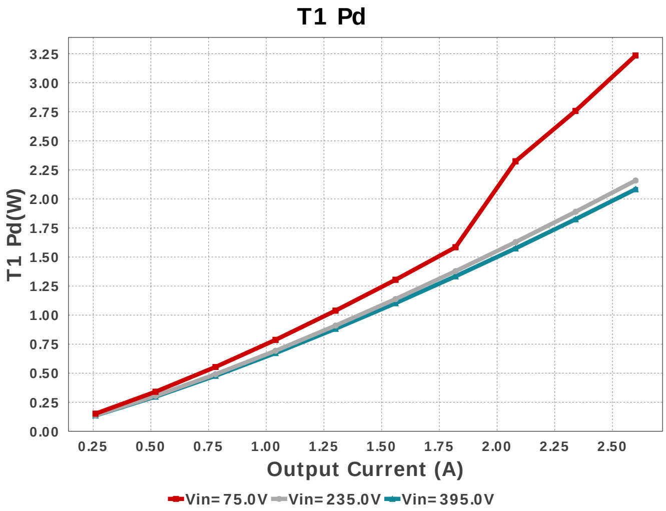

T1 Copper Loss
T1 Copper Loss(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V


Paux
Paux(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V


Cout1 Pd
Cout1 Pd(W)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V


T1 Is1 pk
T1 Is1 pk(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V


Ipri ripple
Ipri ripple(A)
Output Current (A)
Vin=75.0V Vin=235.0V Vin=395.0V



Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	559.04 mW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	4.112 A	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	491.89 mW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	35.0 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	650.0 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	650.0 mW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	500.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	60.0 ns	Diode	Snubber Diode Reverse Recovery Time
11.	ICThetaJA	115.0 degC/W	IC	IC junction-to-ambient thermal resistance
12.	Iin Avg	1.2 A	IC	Average input current
13.	Cin Pd	559.04 mW	Power	Input capacitor power dissipation
14.	Cout1 Pd	491.89 mW	Power	Output capacitor1 power dissipation
15.	Dsec Pd	650.0 mW	Power	Secondary Diode Power Dissipation
16.	Dsec2 Pd	650.0 mW	Power	Secondary Diode Power Dissipation
17.	Paux	26.321 mW	Power	Power Dissipation in Raux and Daux
18.	Pd Rstartup	16.637 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
19.	Rfb Pd	30.504 mW	Power	Rfb Power Dissipation
20.	Rsns Pd	684.81 mW	Power	Current Limit Sense Resistor Power Dissipation
21.	Snubber Pd	1.024 W	Power	Snubber Power Dissipation
22.	T1 Copper Loss	1.809 W	Power	Transformer Copper Loss Power Dissipation
23.	T1 Core Loss	1.17 W	Power	Transformer Core Loss Power Dissipation
24.	T1 Pd	2.979 W	Power	Estimated Losses in Transformer
25.	Pd Rstartup	16.637 mW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
26.	Rfb Pd	30.504 mW	Resistor	Rfb Power Dissipation
27.	Rsns Pd	684.81 mW	Resistor	Current Limit Sense Resistor Power Dissipation
28.	BOM Count	56	System Information	Total Design BOM count
29.	Duty Cycle	57.776 %	System Information	Duty cycle
30.	FootPrint	5.214 k mm^2	System Information	Total Foot Print Area of BOM components
31.	Frequency	98.851 kHz	System Information	Switching frequency
32.	Iout	2.6 A	System Information	Iout operating point
33.	Iout_DCM	1.869 A	System Information	Approximate Current below which DCM mode of operation will begin
34.	Mode	CCM	System Information	Conduction Mode
35.	Pout	85.8 W	System Information	Total output power
36.	Tdead	0.0 ns	System Information	Approximate Dead Time of the Regulator
37.	Toff	3.739 us	System Information	Approximate Converter Off Time
38.	Ton Act	5.845 us	System Information	Approximate Converter On Time
39.	Total BOM	NA	System Information	Total BOM Cost

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#	Name	Value	Category	Description
40.	Tsw	10.116 us	System Information	Switching Time Period
41.	Vin	75.0 V	System Information	Vin operating point
42.	Vout	33.0 V	System Information	Operational Output Voltage
43.	Vout Actual	32.989 V	System Information	Vout Actual calculated based on selected voltage divider resistors
44.	Vout Tolerance	2.194 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
45.	Vout p-p	258.517 mV	System Information	Peak-to-peak output ripple voltage
46.	Vout pp percentage	783.384 m%	System Information	Output Voltage ripple percentage
47.	Vsnub	172.26 V	System Information	Voltage Across the Snubber
48.	Ipri Avg	1.401 A	Transformer	Average Current in Primary Winding over the complete Switching Period
49.	Ipri ripple	3.064 A	Transformer	Ripple Current in the Primary Winding
50.	Ipri ripple pk-pk percentage	126.341 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
51.	Isec Ripple	8.887 A	Transformer	Ripple Current in the Secondary Winding
52.	Paux	26.321 mW	Transformer	Power Dissipation in Raux and Daux
53.	T1 Copper Loss	1.809 W	Transformer	Transformer Copper Loss Power Dissipation
54.	T1 Core Loss	1.17 W	Transformer	Transformer Core Loss Power Dissipation
55.	T1 Iprim RMS	1.962 A	Transformer	Transformer Primary RMS Current
56.	T1 Iprim pk	3.958 A	Transformer	Transformer Primary Peak Current
57.	T1 Is1 RMS	4.865 A	Transformer	Transformer Secondary1 RMS Current
58.	T1 Is1 pk	11.477 A	Transformer	Transformer Secondary1 Peak Current
59.	T1 Pd	2.979 W	Transformer	Estimated Losses in Transformer
60.	Vaux	13.4 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	2.6	Maximum Output Current
VinMax	395.0	Maximum input voltage
VinMin	75.0	Minimum input voltage
Vout	33.0	Output Voltage
base_pn	UCC28C43-Q1	Base Product Number
source	DC	Input Source Type
Ta	85.0	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

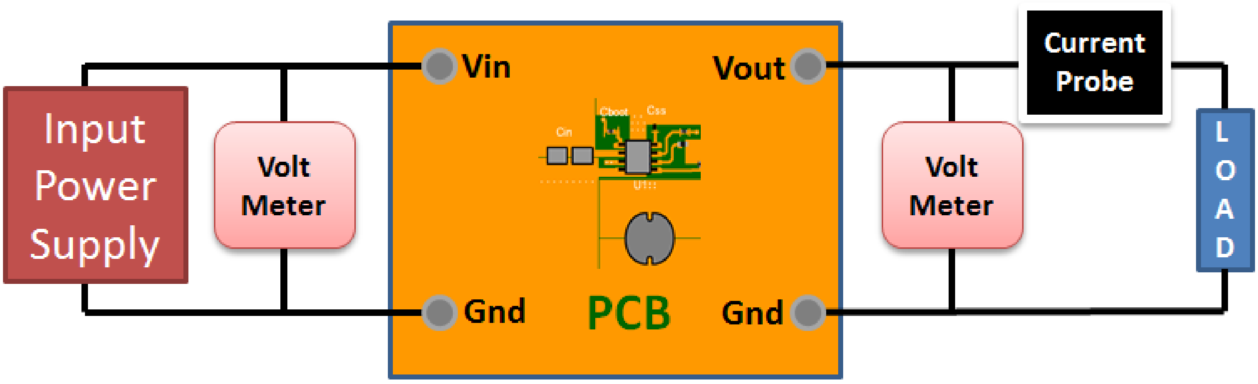
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 75.0V 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.



WEBENCH® Transformer Report

#	Name	Value
1.	Core Part Number	B66229G0000X187
2.	Core Manufacturer	TDK
3.	Coil Former Part Number	B66230A1114T001
4.	Coil Former Manufacturer	TDK

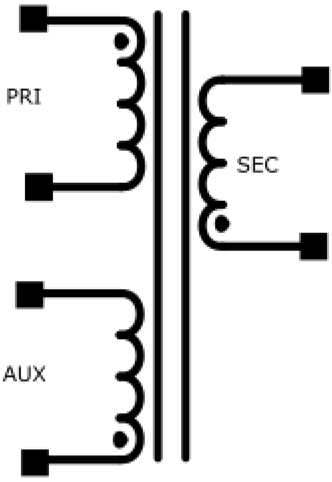
Transformer Electrical Diagram

Primary

Turns	29.0
AWG	30.0
Layers	2.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire

Auxiliary

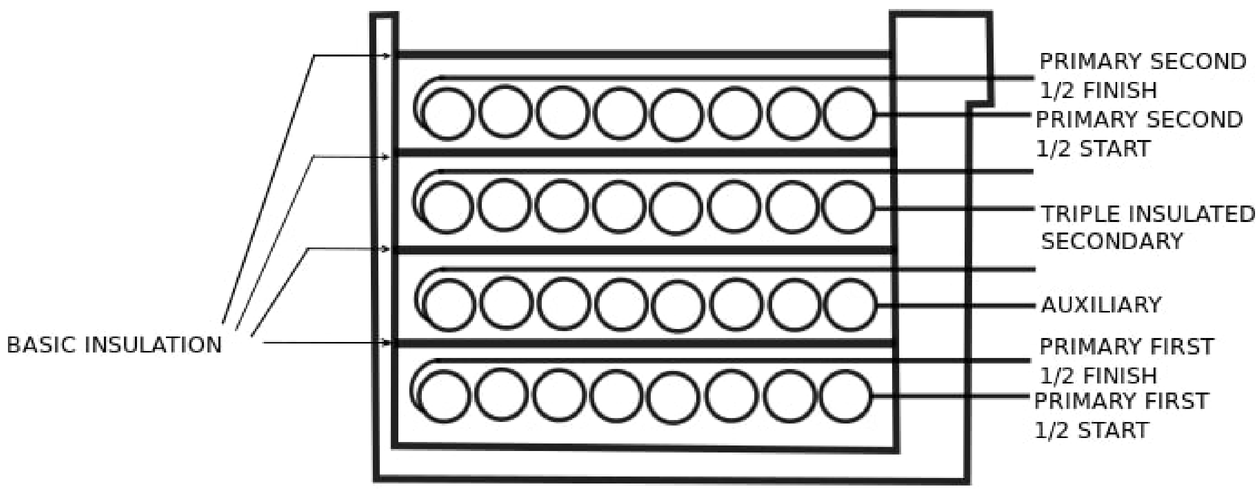
Turns	4.0
AWG	28.0
Layers	1.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire



Secondary

Turns	10.0
AWG	29.0
Layers	1.0
Strands	3.0
Insulation Type	Triple Insulated

Transformer Construction Diagram



Winding Instruction

Winding	AWG	Turns	Winding Orientation
Primary First 1/2.0	30.0	15	Clockwise

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Winding	AWG	Turns	Winding Orientation
Auxiliary	28.0	4.0	Counter Clockwise
Triple Insulated Secondary	29.0	10.0	Counter Clockwise
Primary Second 1/2.0	30.0	14	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	1.39E-4H
2.	Inductance Factor(Al)	166.0nH
3.	Npri	29.0
4.	Nsec	10.0
5.	Naux	4.0
6.	Core Type	E32/16/9
7.	Core Material	N87
8.	Bmax	0.23T
9.	Switching Frequency	98.85kHz
10.	DMax	0.6
11.	Ipk(Primary)	3.89A
12.	Irms(Primary)	1.92A
13.	Ipk(Secondary)	11.3A
14.	Irms(Secondary)	4.54A

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 UCC28C43-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 : 749F840C69F1A82E[v1]

4. **UCC28C43-Q1** Product Folder : http://www.ti.com/product/UCC28C43%2DQ1 : contains the data sheet and other resources.

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