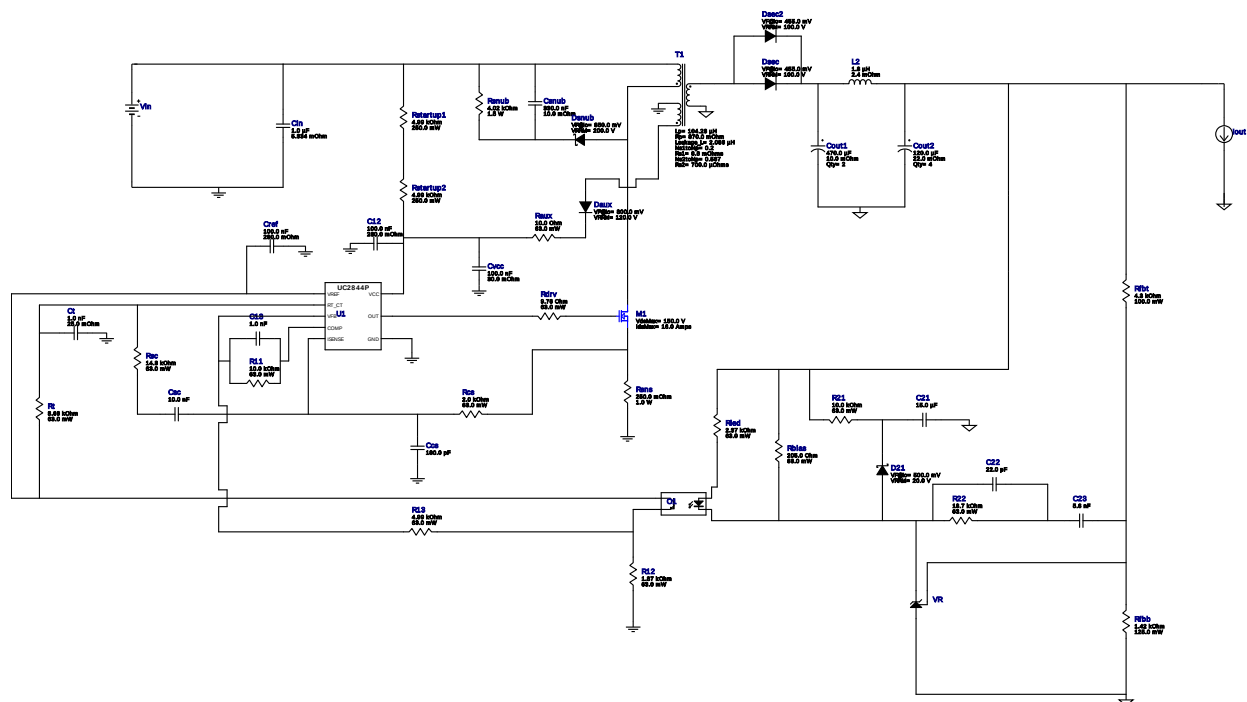


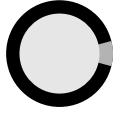
WEBENCH® Design Report

Design : 4766763/3 UC2844N
UC2844N 44.0V-56.0V to 5.00V @ 5.0A

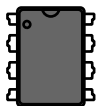


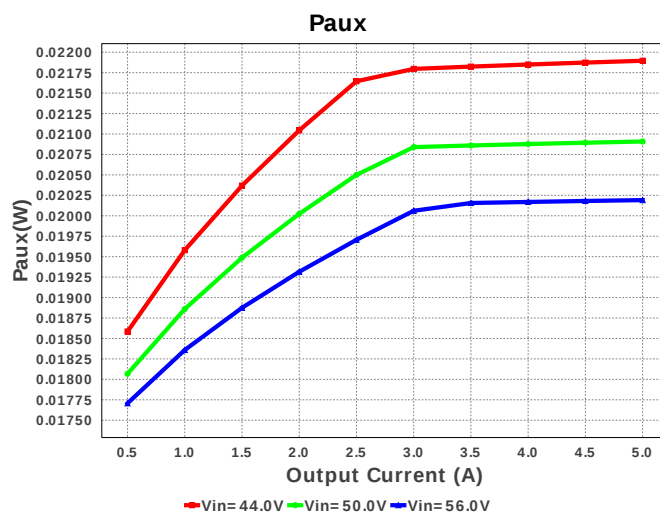
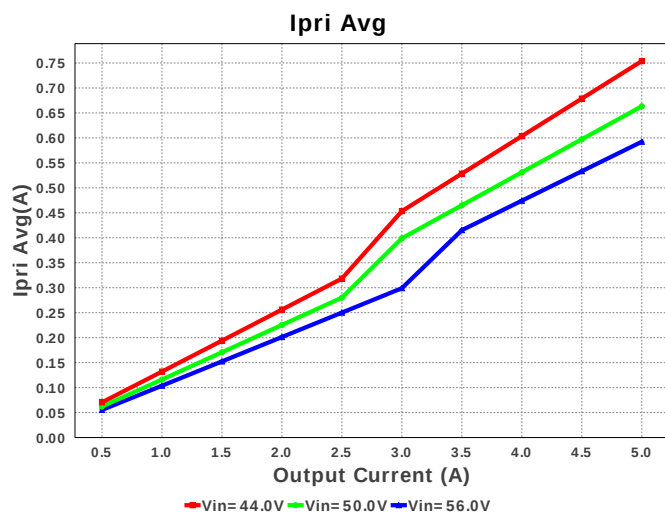
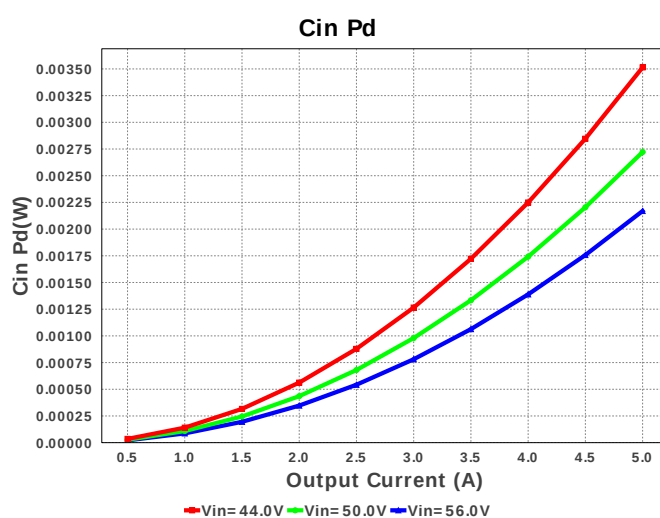
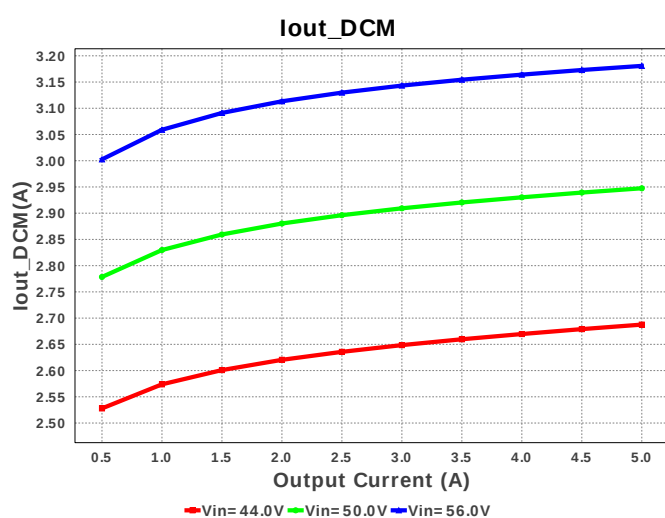
Electrical BOM

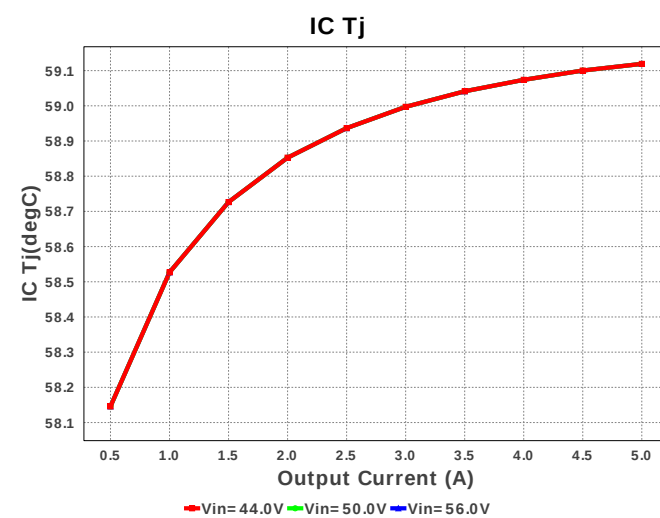
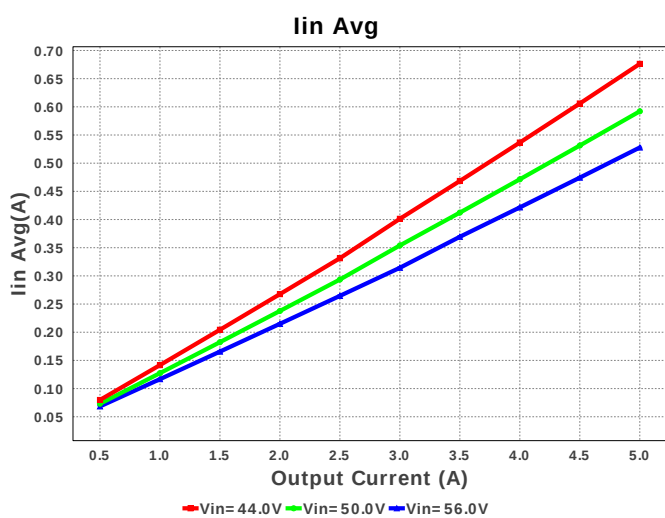
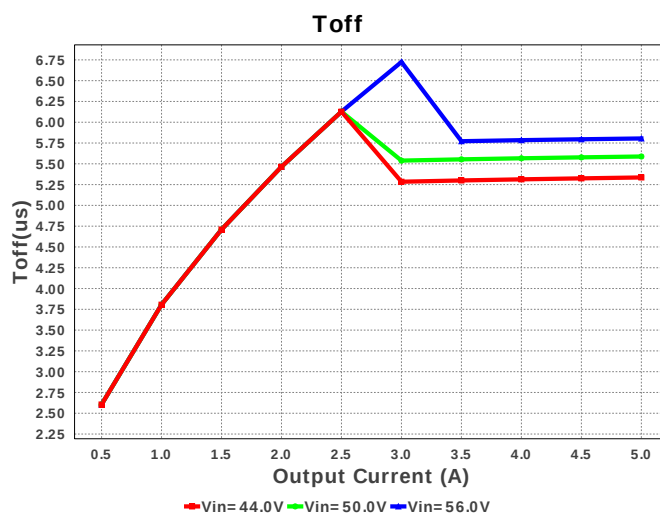
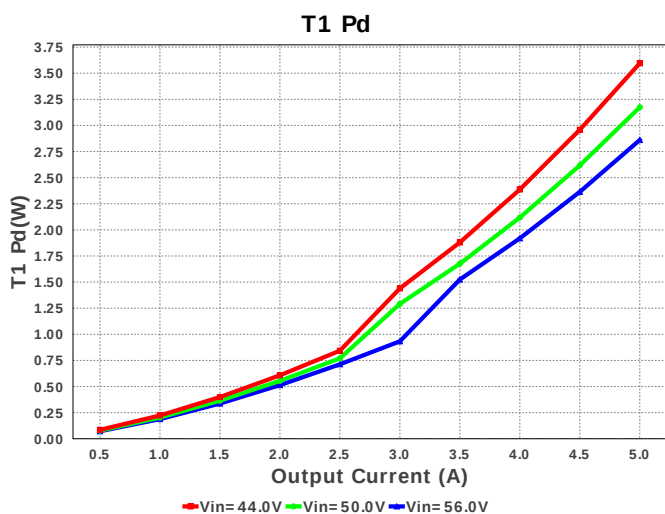
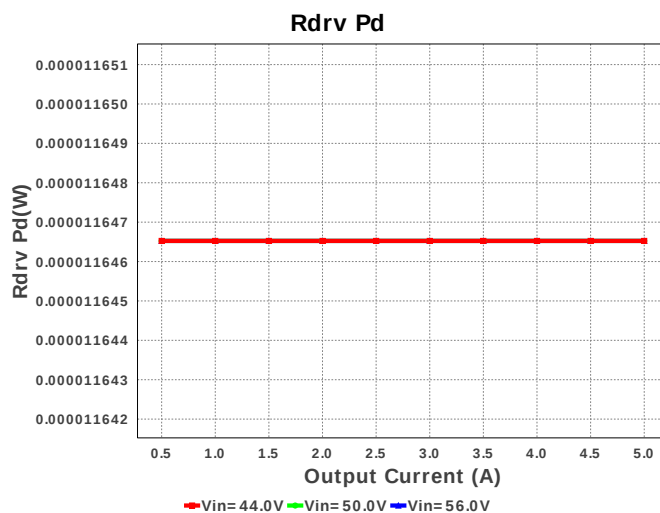
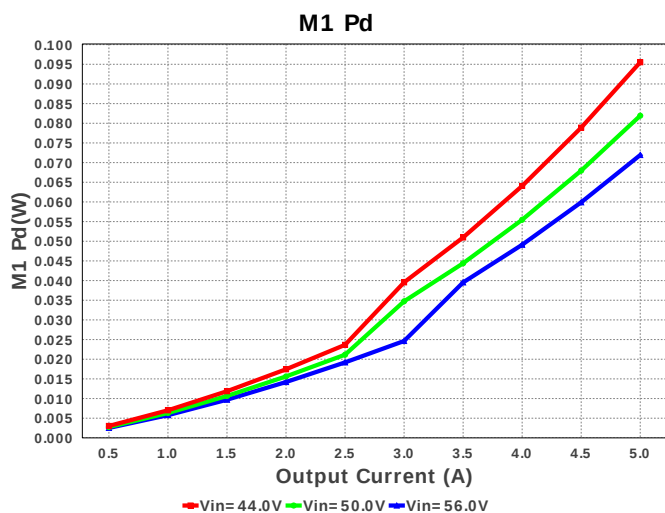
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	C13	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	C21	MuRata	KCM55WR72A156MH01K Series= X7R	Cap= 15.0 uF VDC= 100.0 V IRMS= 0.0 A	1	\$1.51	KCM55W 59 mm ²
4.	C22	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	C23	Yageo America	CC0805KRX7R9BB562 Series= X7R	Cap= 5.6 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
6.	Ccs	Kemet	C0805C181K5GACTU Series= C0G/NP0	Cap= 180.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	Cin	MuRata	GRM31CR72A105KA01L Series= X7R	Cap= 1.0 uF ESR= 5.334 mOhm VDC= 100.0 V IRMS= 1.55432 A	1	\$0.11	1206_190 11 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Cout1	Nichicon	RNU1C471MDN1PH Series= ?	Cap= 470.0 uF ESR= 10.0 mOhm VDC= 16.0 V IRMS= 6.1 A	2	\$0.52	 NU_1000x1250 144 mm ²
9.	Cout2	Panasonic	10SVPC120MV Series= SVPC	Cap= 120.0 uF ESR= 22.0 mOhm VDC= 10.0 V IRMS= 2.6 A	4	\$0.62	 SM_RADIAL_6.3AMM 80 mm ²
10.	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
11.	Csc	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
12.	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
13.	Ct	Kemet	C0805C102J5GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 50.0 V IRMS= 1.71 A	1	\$0.01	 0805 7 mm ²
14.	Cvcc	MuRata	GRM188R71E104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 1.51 A	1	\$0.01	 0603 5 mm ²
15.	D21	Diodes Inc.	B220-13-F	VF@Io= 500.0 mV VRRM= 20.0 V	1	\$0.08	 SMB 44 mm ²
16.	Daux	Fairchild Semiconductor	FSV10120V	VF@Io= 800.0 mV VRRM= 120.0 V	1	\$0.21	 TO-277A 56 mm ²
17.	Dsec	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
18.	Dsec2	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
19.	Dsnub	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	\$0.21	 PowerDI123 13 mm ²
20.	L2	Coilcraft	SER1360-182KLB	L= 1.8 uH DCR= 2.4 mOhm	1	\$0.72	 SER1360 225 mm ²
21.	M1	Fairchild Semiconductor	FDMC86240	VdsMax= 150.0 V IdsMax= 16.0 Amps	1	\$0.93	 TRANS_Fairchild_MLP08S 18 mm ²
22.	O1	Vishay-Semiconductor	TCMT1109	Optocoupler	1	\$0.21	 SOP-4 44 mm ²

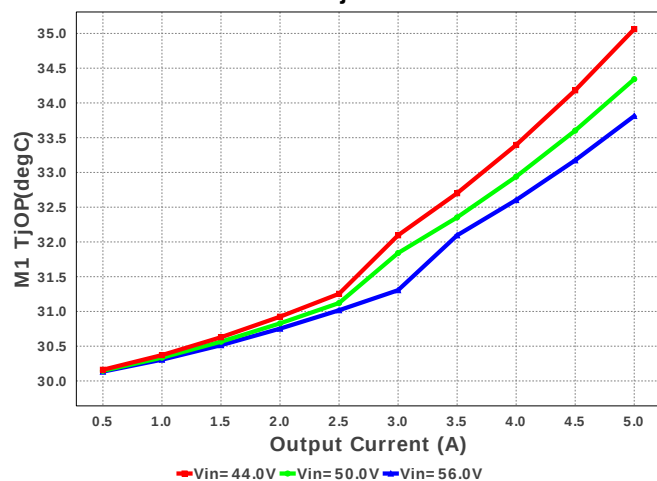
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23.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
24.	R12	Vishay-Dale	CRCW04021K87FKED Series= CRCW..e3	Res= 1.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
25.	R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
26.	R21	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
27.	R22	Vishay-Dale	CRCW040218K7FKED Series= CRCW..e3	Res= 18.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
28.	Raux	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
29.	Rbias	Vishay-Dale	CRCW0402205RFBKED Series= CRCW..e3	Res= 205.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
30.	Rcs	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
31.	Rdrv	Vishay-Dale	CRCW04029R76FKED Series= CRCW..e3	Res= 9.76 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
32.	Rfbb	Yageo America	RT0805BRD071K42L Series= RT0805	Res= 1.42 kOhm Power= 125.0 mW Tolerance= 0.1%	1	\$0.05	 0805 7 mm²
33.	Rfbt	Yageo America	RC0603FR-074K3L Series= ?	Res= 4.3 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm²
34.	Rled	Vishay-Dale	CRCW04022K37FKED Series= CRCW..e3	Res= 2.37 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
35.	Rsc	Vishay-Dale	CRCW040214K3FKED Series= CRCW..e3	Res= 14.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
36.	Rsns	Stackpole Electronics Inc	CSRN2010FKR250 Series= ?	Res= 250.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.11	 2010 32 mm²
37.	Rsns	Vishay Draloric	CRCW25124K02FKEGHP Series= ?	Res= 4.02 kOhm Power= 1.5 W Tolerance= 1.0%	1	\$0.44	 2512 43 mm²
38.	Rstartup1	Panasonic	ERJ-8ENF4991V Series= ERJ-8E	Res= 4.99 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm²
39.	Rstartup2	Panasonic	ERJ-8ENF4991V Series= ERJ-8E	Res= 4.99 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm²
40.	Rt	Vishay-Dale	CRCW04028K66FKED Series= CRCW..e3	Res= 8.66 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
41.	T1	CUSTOM	CUSTOM	Lp= 104.28 µH Rp= 870.0 mOhm Leakage_L= 2.086 µH Ns1toNp= 0.2 Rs1= 8.6 mOhms Ns2toNp= 0.567 Rs2= 700.0 µOhms	1	NA	CUSTOM 0 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
42.	U1	Texas Instruments	UC2844N	Switcher	1	\$0.64	 P0008A 116 mm ²
43.	VR	Texas Instruments	LMV431CM5/NOPB	Voltage References	1	\$0.16	 R-PDSO-G3 16 mm ²

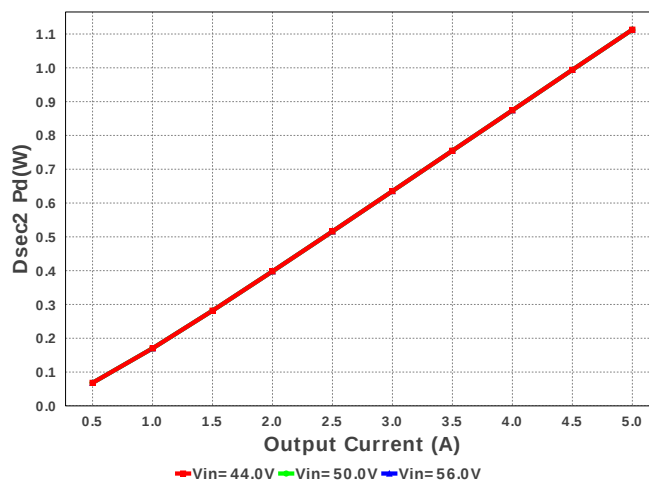




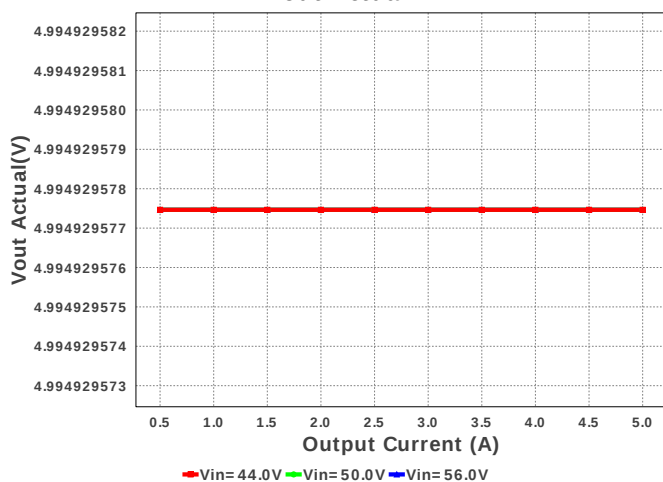
M1 TjOP



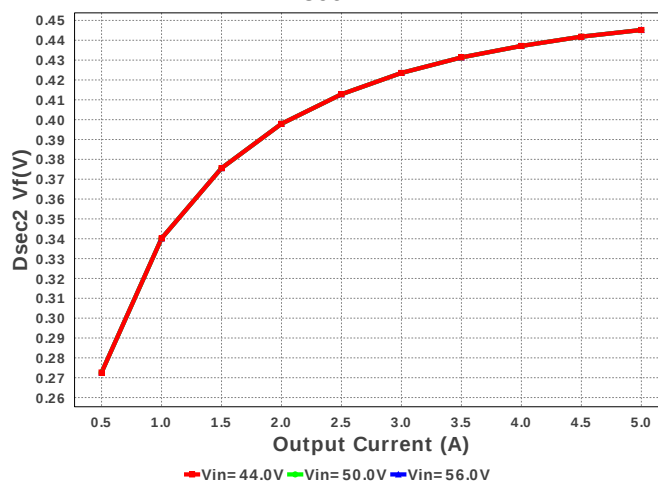
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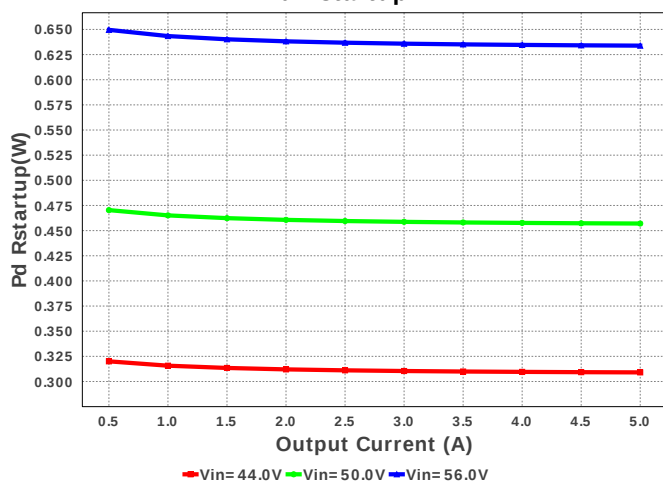
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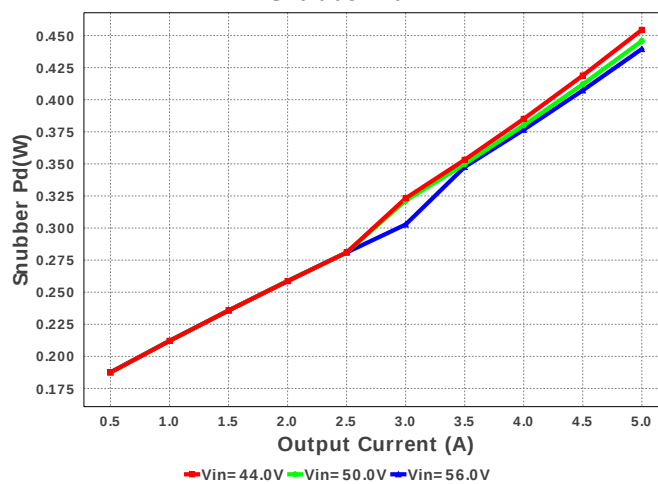
Dsec2 Vf

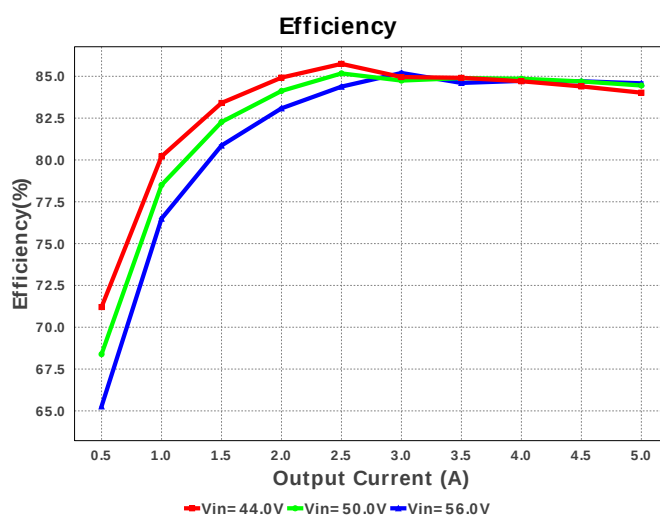
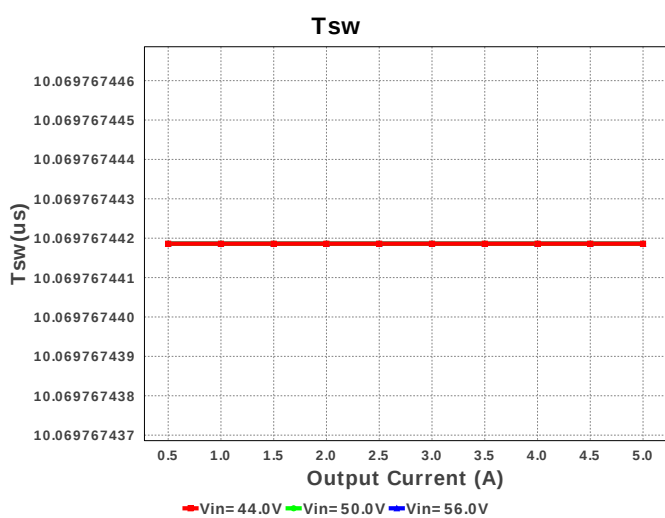
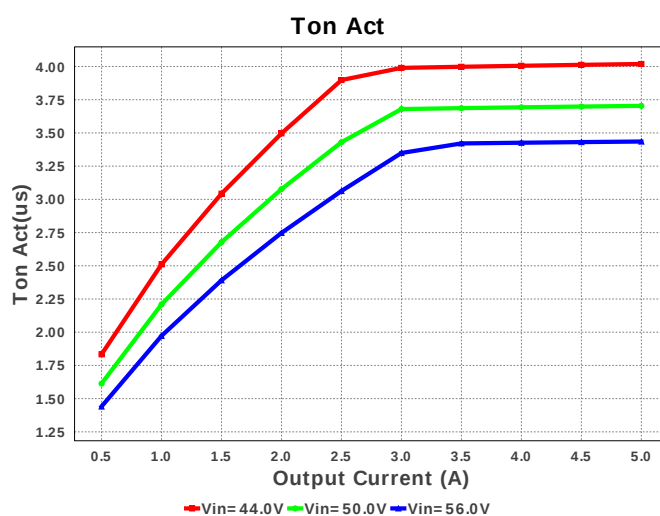
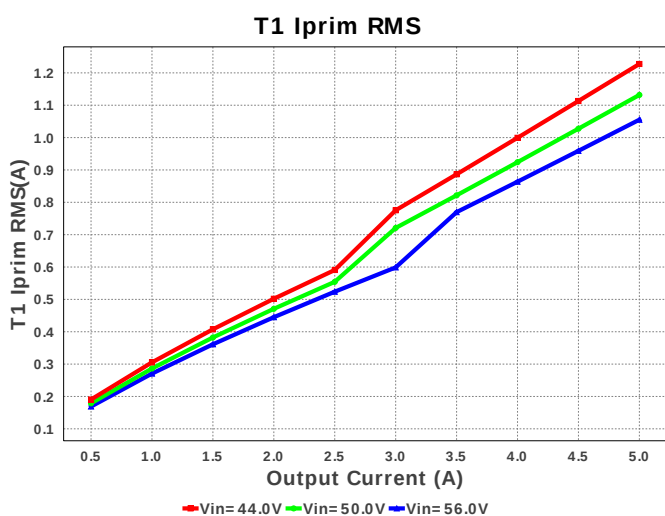
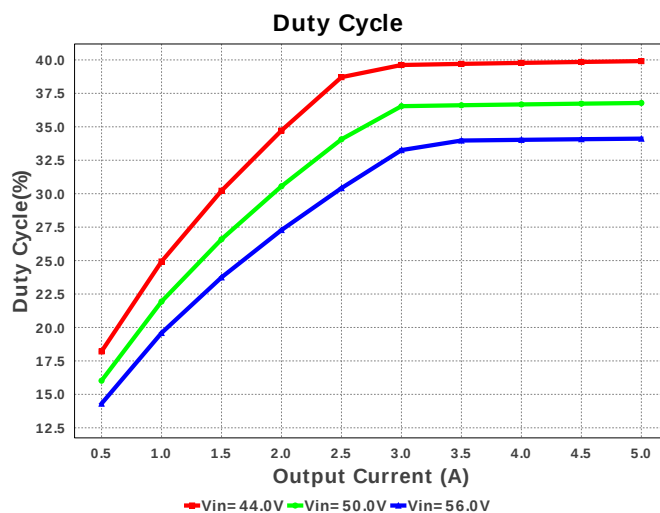
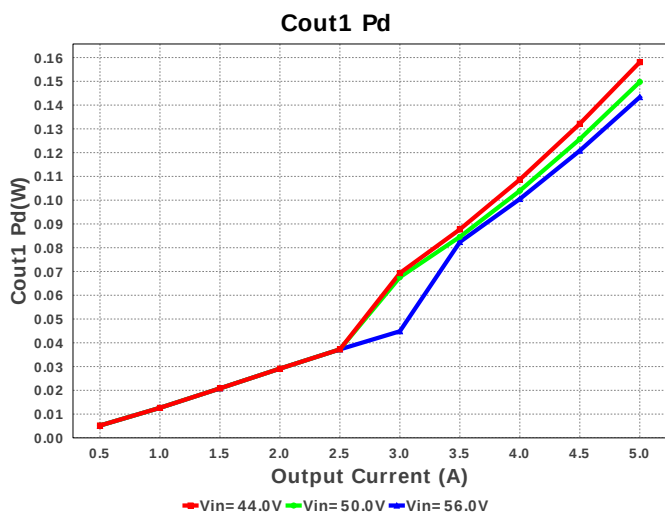


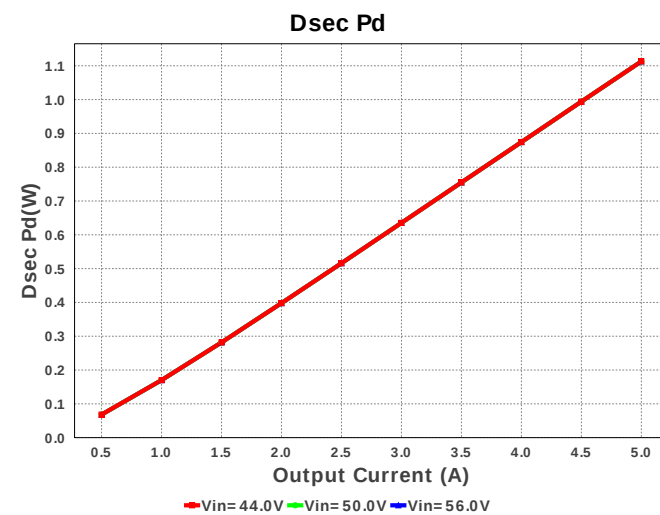
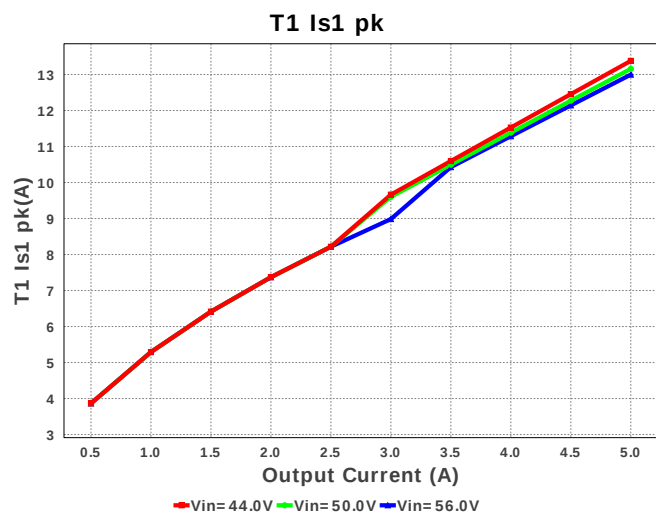
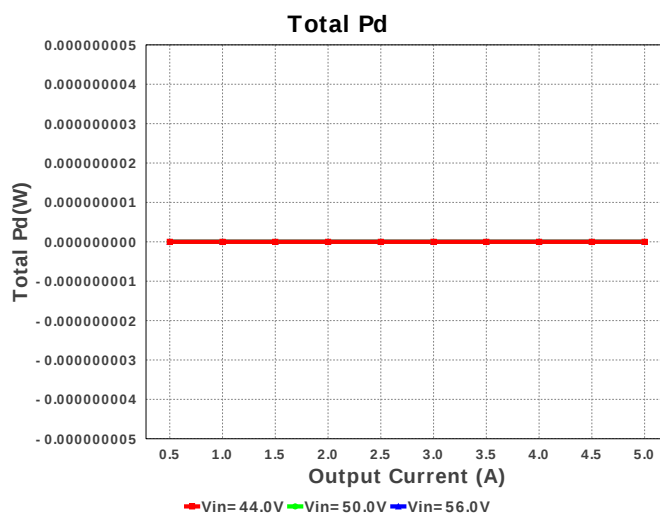
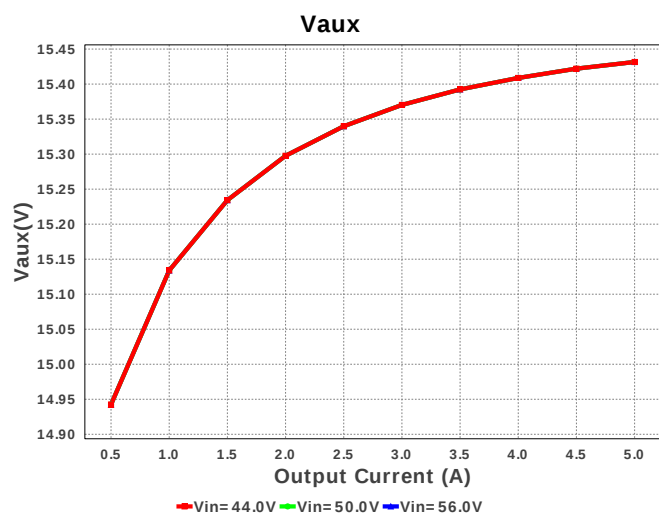
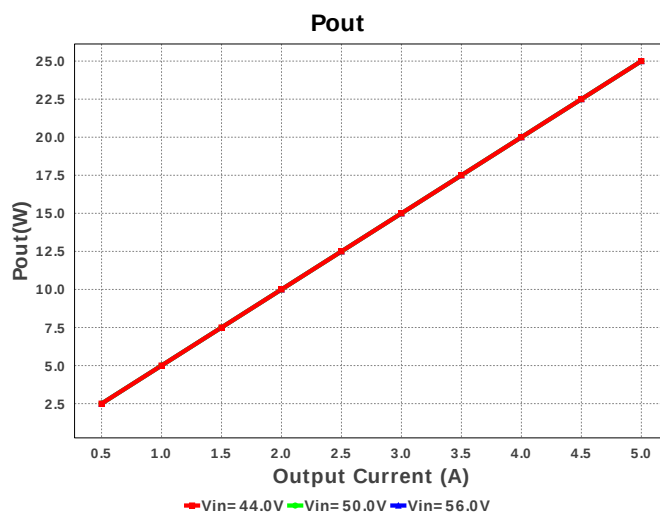
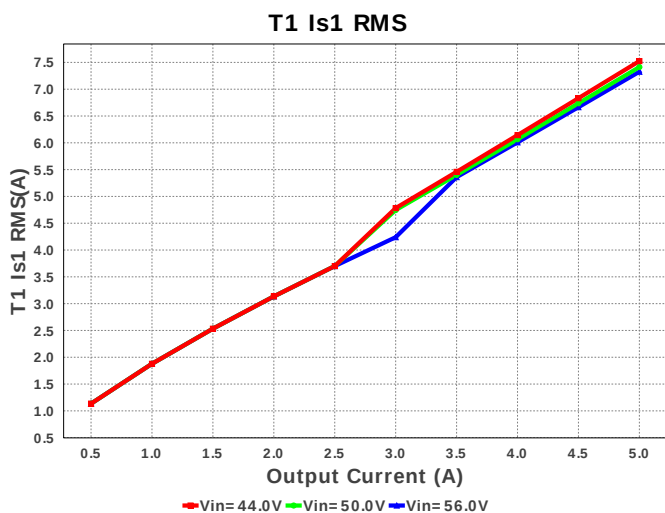
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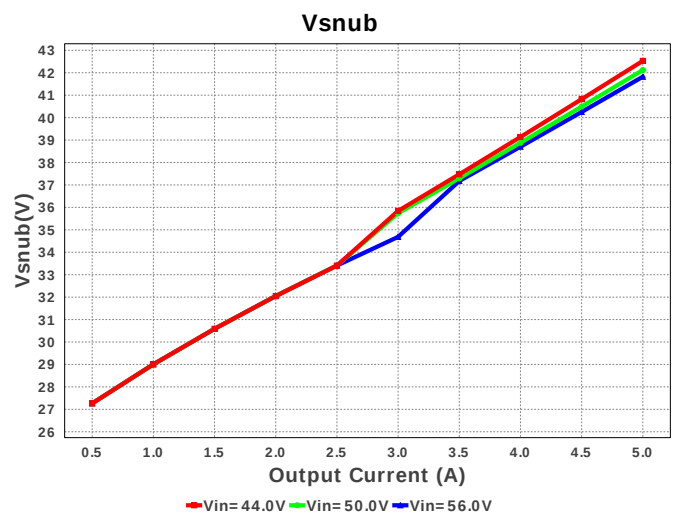
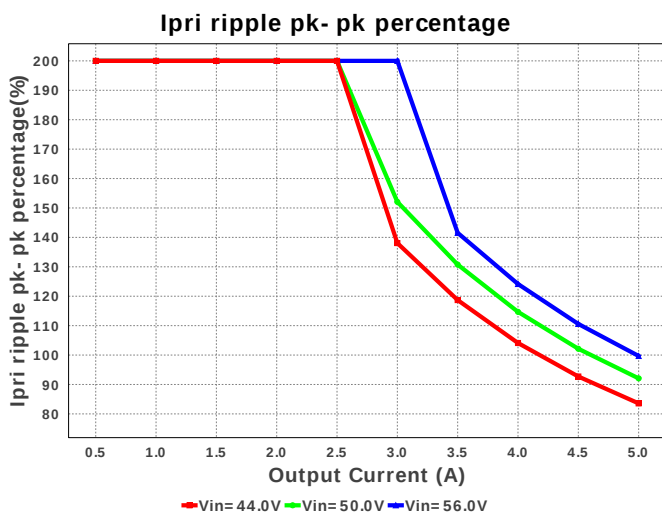
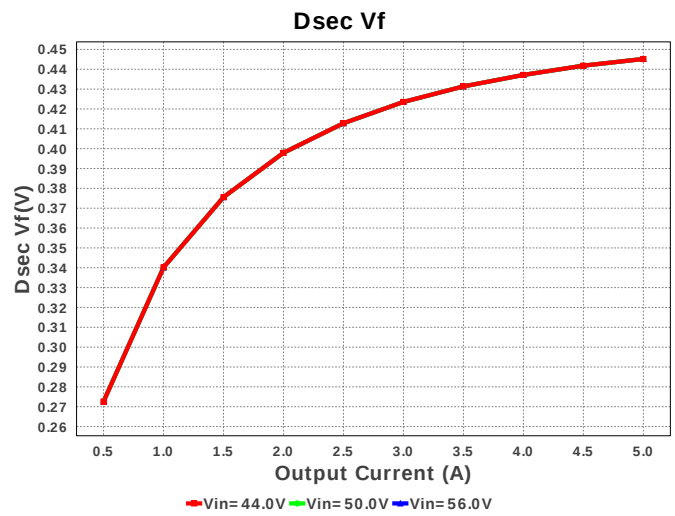
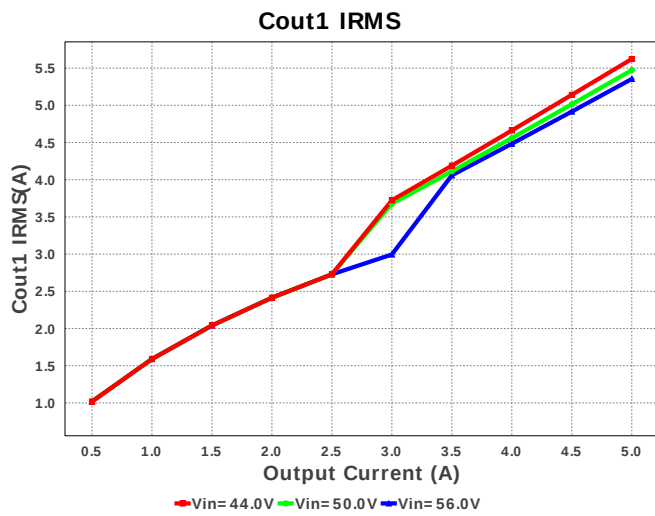
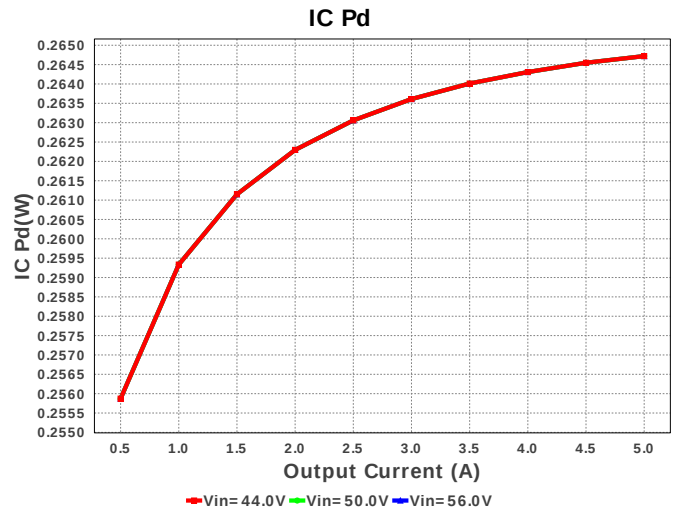
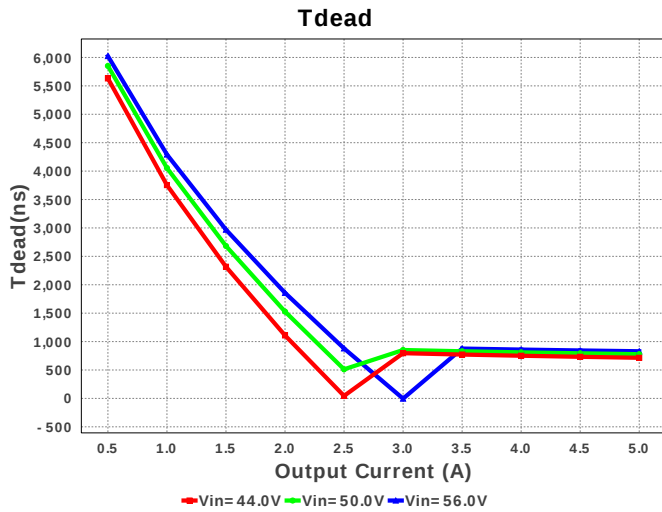


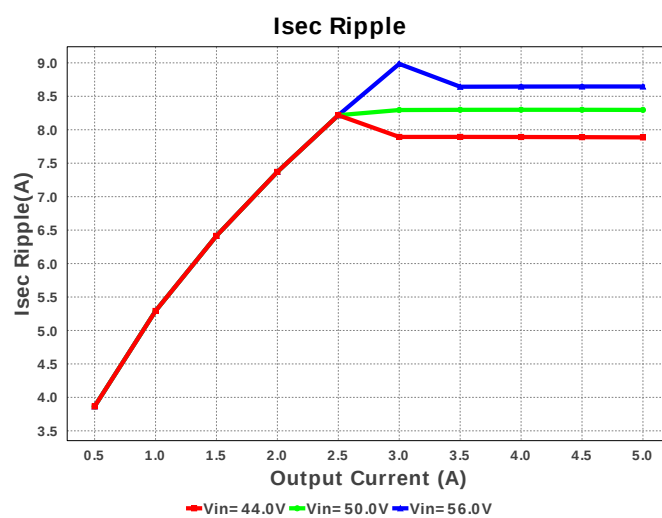
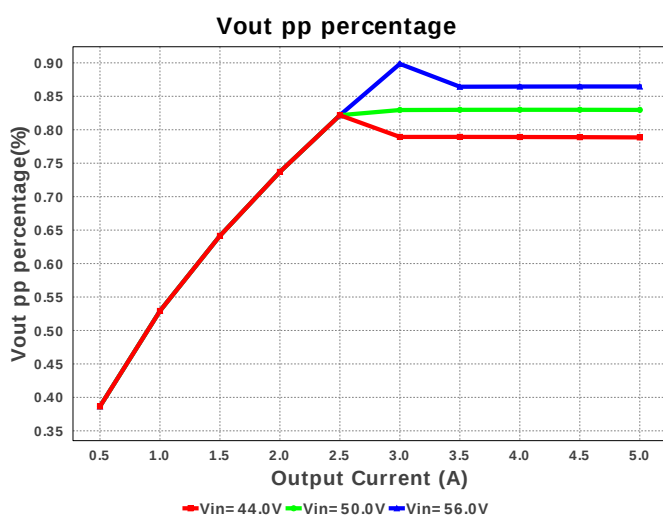
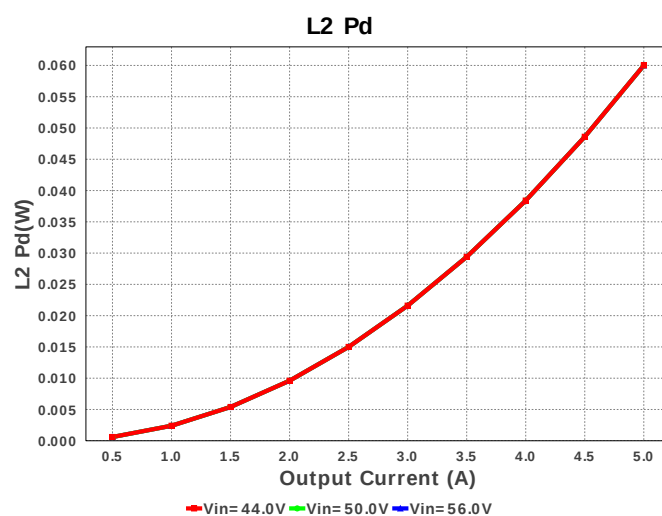
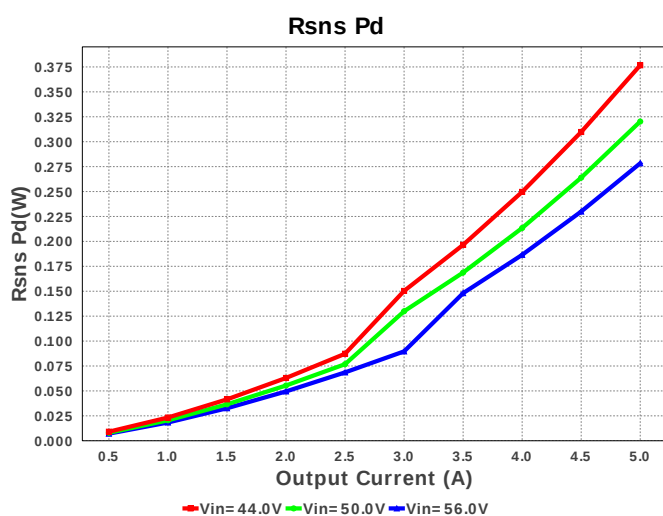
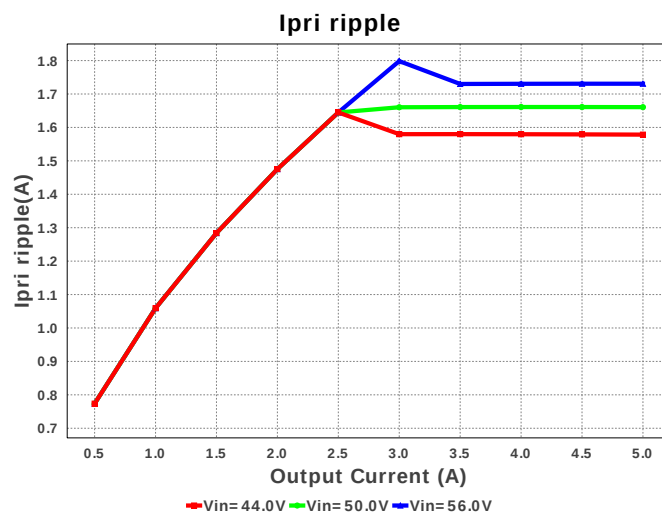
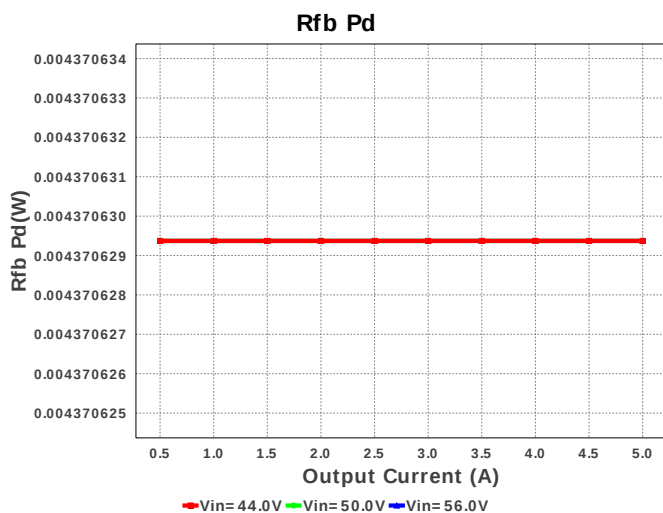
Snubber Pd

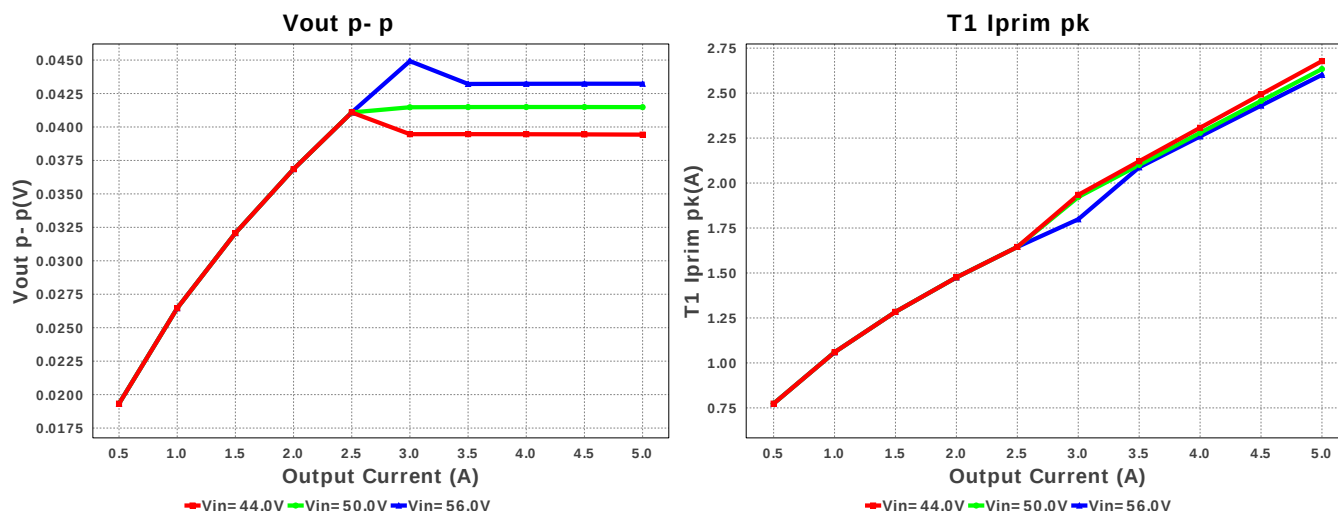












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	5.623 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	676.239 mA	Current	Average input current
3.	Iout_DCM	2.688 A	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	753.825 mA	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	1.578 A	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	83.572 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	7.886 A	Current	Ripple Current in the Secondary Winding
8.	T1 lprim RMS	1.227 A	Current	Transformer Primary RMS Current
9.	T1 lprim pk	2.678 A	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	7.524 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	13.379 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	47	General	Total Design BOM count
13.	Daux trr	16.7 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec Vf	445.177 mV	General	Effective Forward Voltage Drop at the Operating Current
15.	Dsec trr	0.0 ns	General	Output Diode Reverse Recovery Time
16.	Dsec2 Vf	445.177 mV	General	Effective Forward Voltage Drop at the Operating Current
17.	Dsnub trr	0.0 ns	General	Snubber Diode Reverse Recovery Time
18.	FootPrint	1.844 k mm ²	General	Total Foot Print Area of BOM components
19.	Frequency	99.307 kHz	General	Switching frequency
20.	Mode	CCM	General	Conduction Mode
21.	Pout	25.0 W	General	Total output power
22.	Tdead	714.869 ns	General	Approximate Dead Time of the Regulator
23.	Toff	5.336 us	General	Approximate Converter Off Time
24.	Ton Act	4.019 us	General	Approximate Converter On Time
25.	Total BOM	\$0.0	General	Total BOM Cost
26.	Tsw	10.07 us	General	Switching Time Period
27.	Vaux	15.432 V	General	Auxiliary Voltage
28.	Vsnub	42.529 V	General	Voltage Across the Snubber
29.	Vout Actual	4.995 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
30.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
31.	Duty Cycle	39.912 %	Op_point	Duty cycle
32.	Efficiency	84.021 %	Op_point	Steady state efficiency
33.	IC Tj	59.119 degC	Op_point	IC junction temperature
34.	ICThetaJA	110.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
35.	IOUT_OP	5.0 A	Op_point	Iout operating point
36.	M1 TjOP	35.062 degC	Op_point	M1 MOSFET junction temperature
37.	Vout p-p	39.429 mV	Op_point	Peak-to-peak output ripple voltage
38.	Cin Pd	3.514 mW	Power	Input capacitor power dissipation
39.	Cout1 Pd	158.07 mW	Power	Output capacitor1 power dissipation
40.	Dsec Pd	1.113 W	Power	Secondary Diode Power Dissipation
41.	Dsec2 Pd	1.113 W	Power	Secondary Diode Power Dissipation
42.	IC Pd	264.72 mW	Power	IC power dissipation
43.	L2 Pd	60.0 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
44.	M1 Pd	95.516 mW	Power	M1 MOSFET total power dissipation
45.	Paux	21.895 mW	Power	Power Dissipation in Raux and Daux
46.	Pd Rstartup	309.053 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
47.	Rdrv Pd	11.647 μW	Power	Power Dissipation in Gate Drive Resistor
48.	Rfb Pd	4.371 mW	Power	Rfb Power Dissipation
49.	Rsns Pd	376.661 mW	Power	Current Limit Sense Resistor Power Dissipation
50.	Snubber Pd	454.394 mW	Power	Snubber Power Dissipation

#	Name	Value	Category	Description
51.	T1 Pd	3.595 W	Power	Estimated Losses in Transformer
52.	Total Pd	0.0 W	Power	Total Power Dissipation
53.	Vout Tolerance	1.478 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
54.	Vout pp percentage	788.573 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	5.0	Maximum Output Current
2.	VinMax	56.0	Maximum input voltage
3.	VinMin	44.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	UC2844	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **UC2844** Product Folder : <http://www.ti.com/product/UC2844> : contains the data sheet and other resources.

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