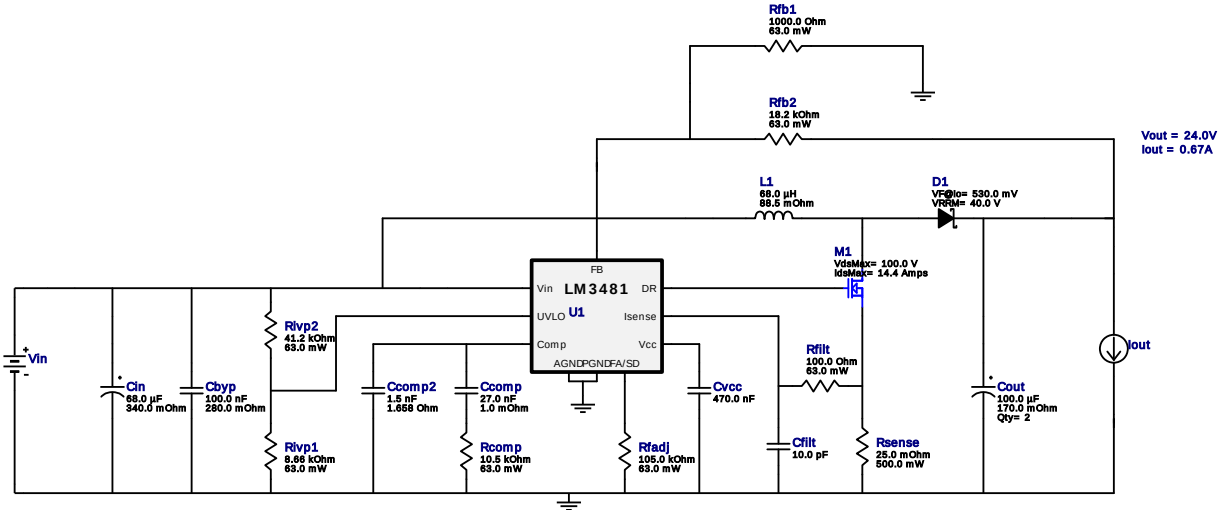


WEBENCH® Design Report

Design : 15205 LM3481MM/NOPB
LM3481MM/NOPB 9V-16V to 24.00V @ 0.666A

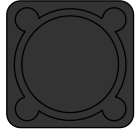
VinMin = 9.0V
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Vout = 24.0V
Iout = 0.67A

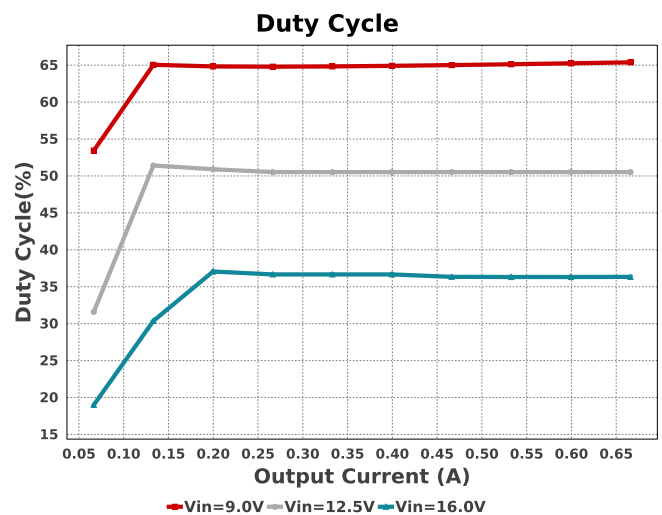
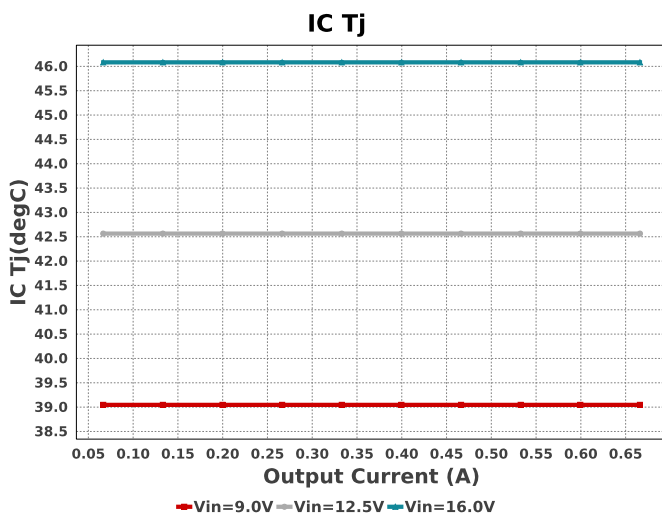
Device = LM3481MM/NOPB
Topology = Boost
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BOM Cost = \$3.80
BOM Count = 20
Total Pd = 1.02W

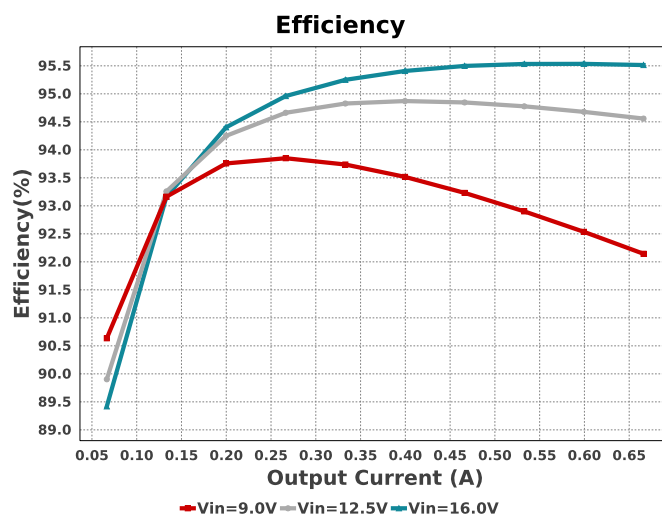
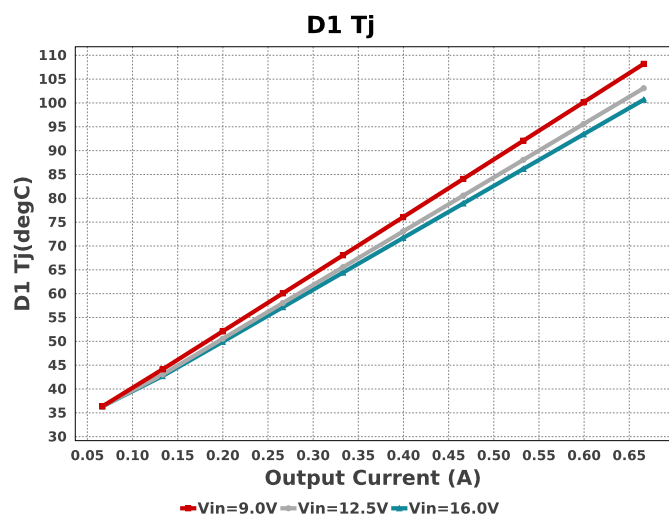
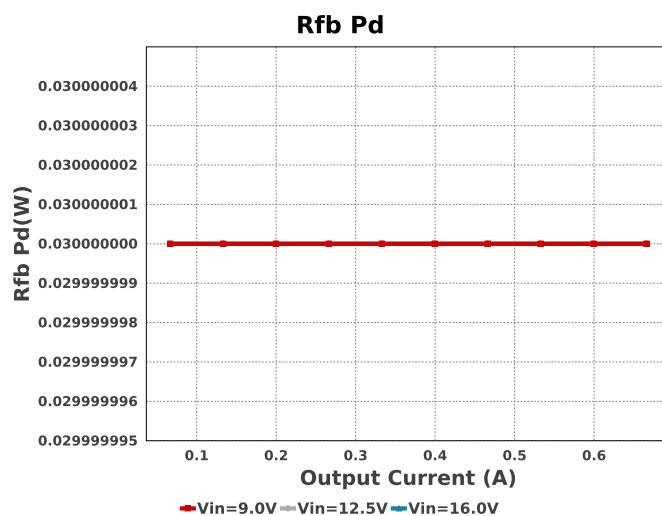
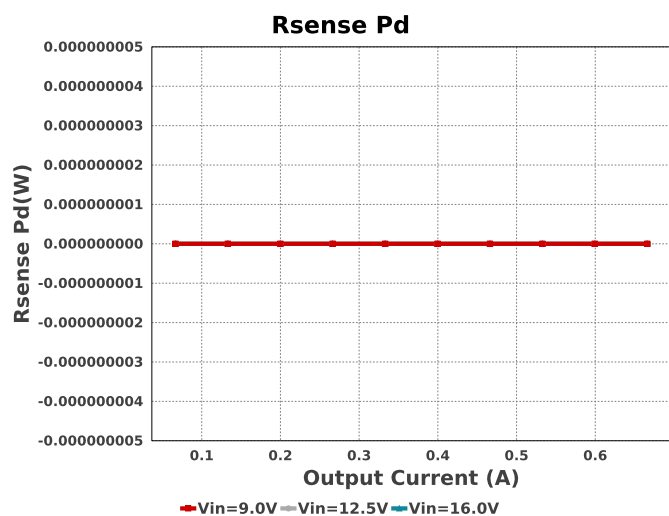
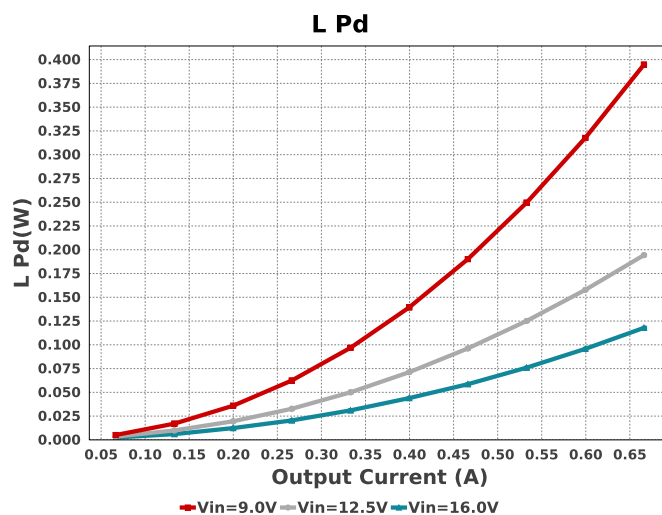
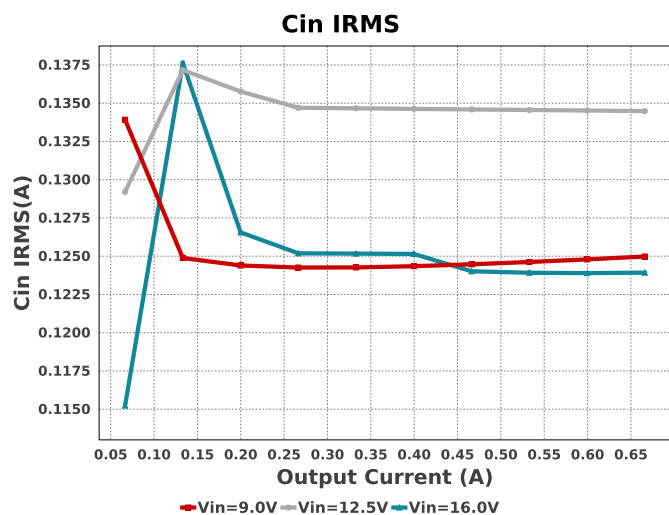


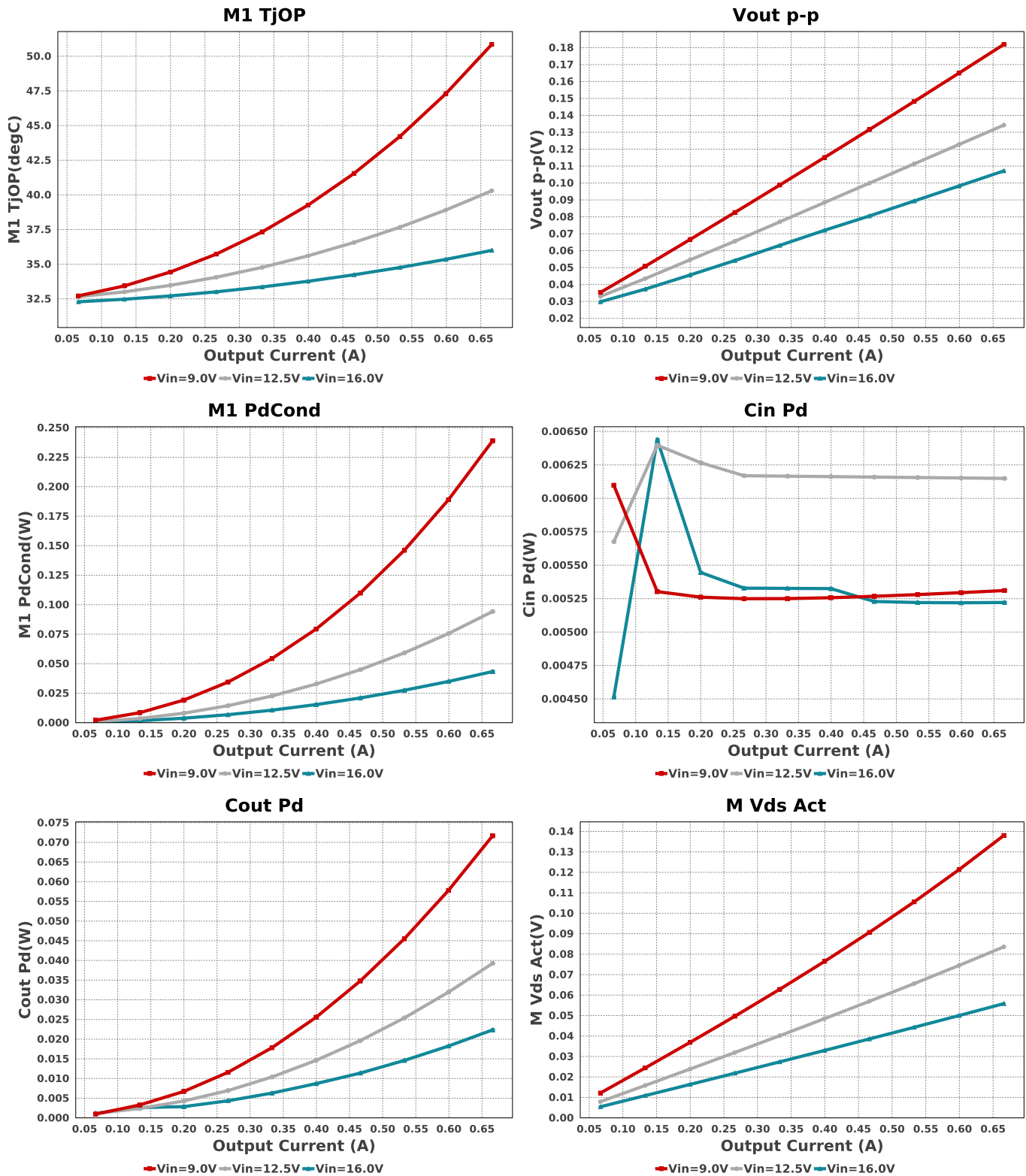
Electrical BOM

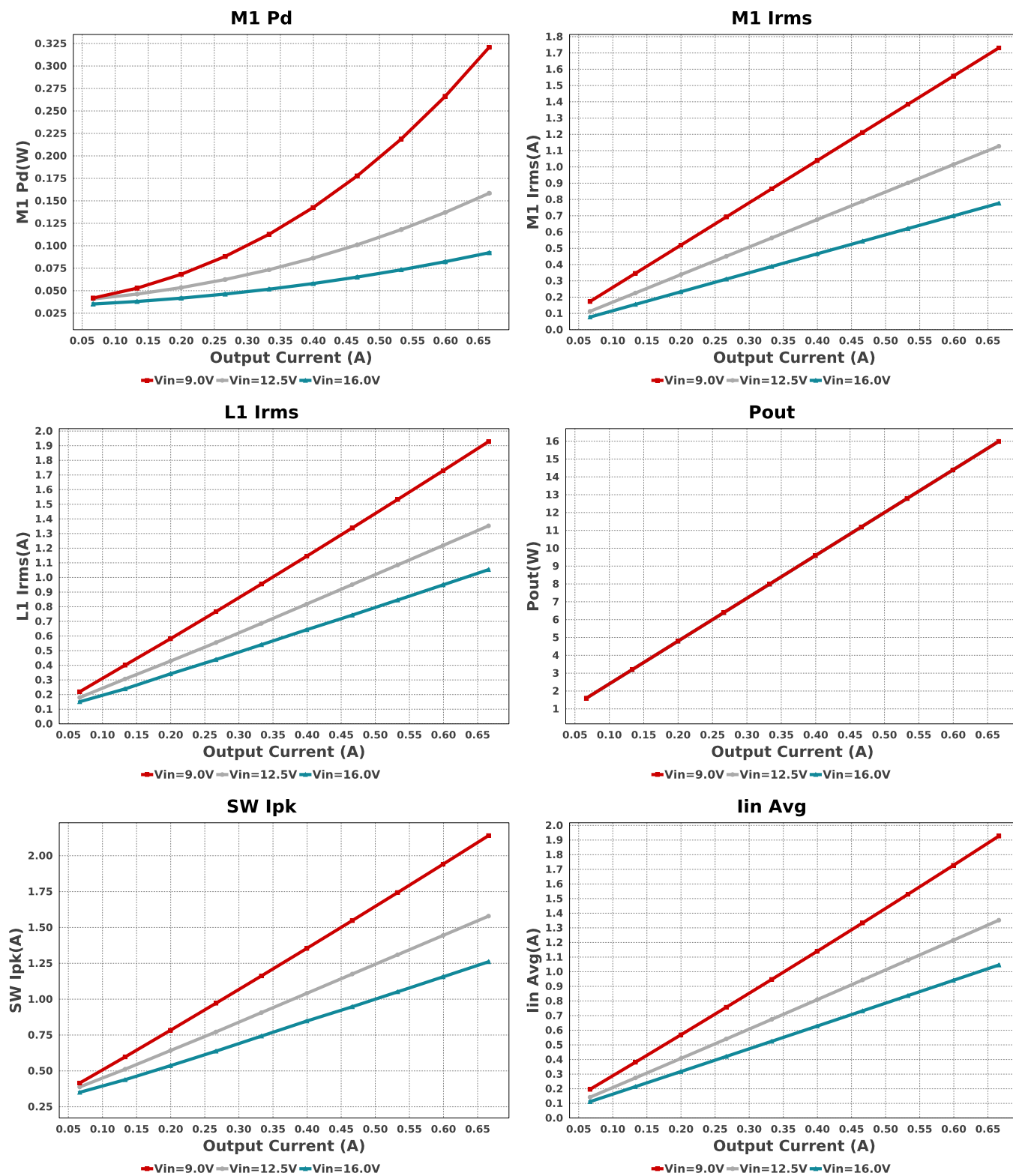
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
Ccomp	MuRata	GRM155R71C273KA01D Series= X7R	Cap= 27.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Ccomp2	TDK	CGA2B2X7R1H152K050BA Series= X7R	Cap= 1.5 nF ESR= 1.6581 Ohm VDC= 50.0 V IRMS= 254.831 mA	1	\$0.01	0402 3 mm ²
Cfilt	Yageo	CC0805JRNPO9BN100 Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
Cin	Nichicon	UUD1V680MCL1GS Series= uD	Cap= 68.0 uF ESR= 340.0 mOhm VDC= 35.0 V IRMS= 280.0 mA	1	\$0.10	SM_RADIAL_6.3BMM 80 mm ²
Cout	Nichicon	UUD1V101MNL1GS Series= uD	Cap= 100.0 uF ESR= 170.0 mOhm VDC= 35.0 V IRMS= 450.0 mA	2	\$0.24	SM_RADIAL_8MM 113 mm ²
Cvcc	Panasonic	ECPU1C474MA5 Series= ECPU(A)	Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.27	1206 11 mm ²
D1	Vishay-Semiconductor	SL04-GS18	VF@Io= 530.0 mV VRRM= 40.0 V	1	\$0.06	DO-219AB 13 mm ²

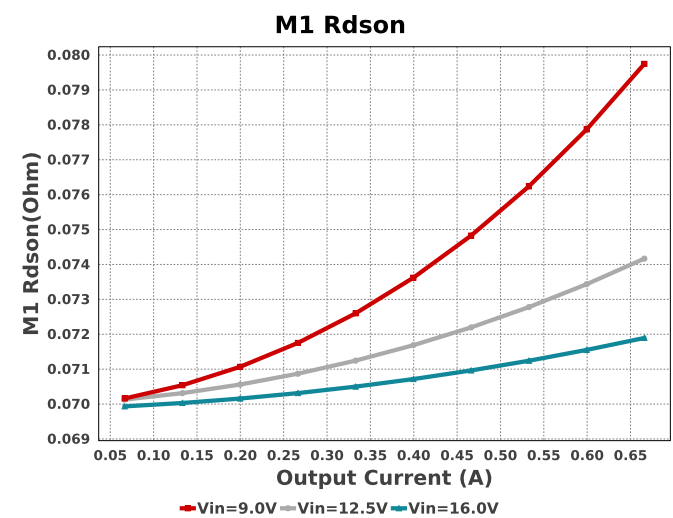
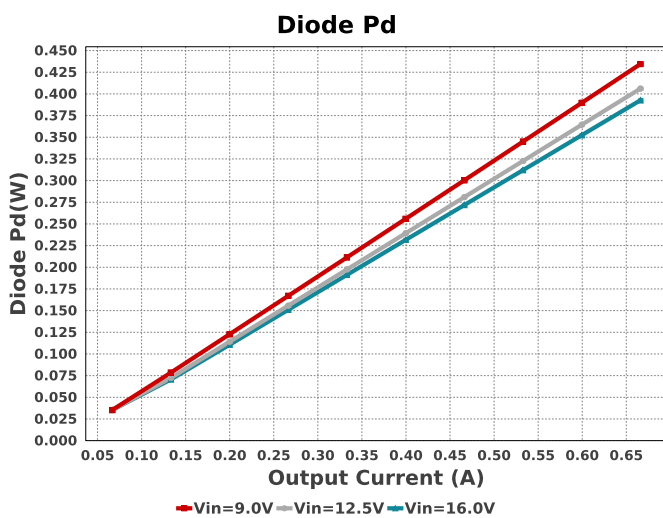
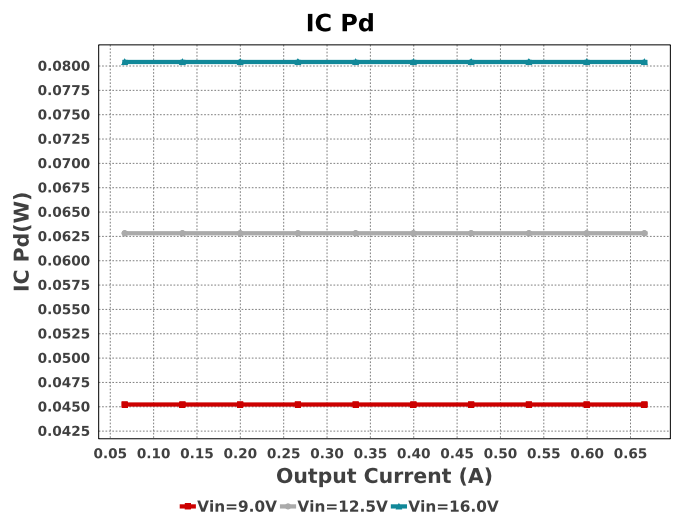
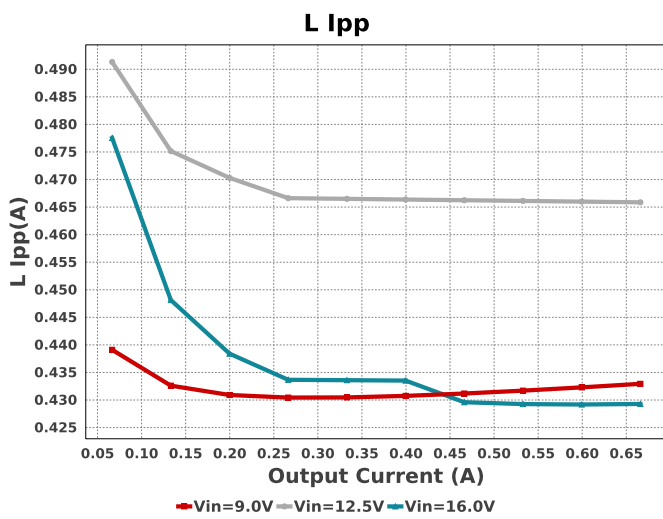
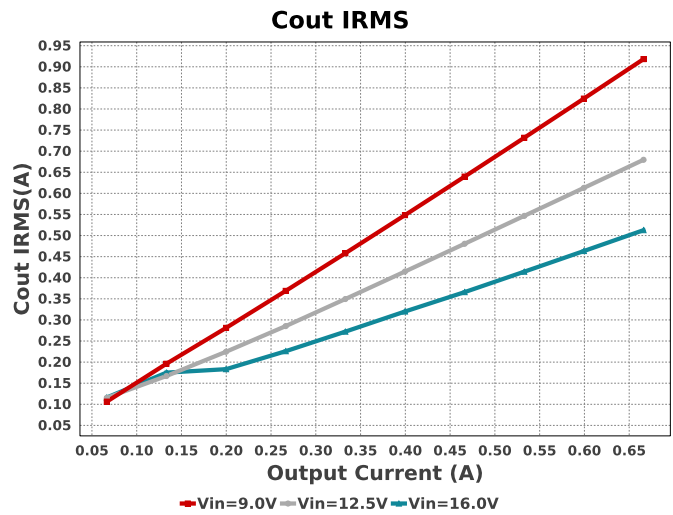
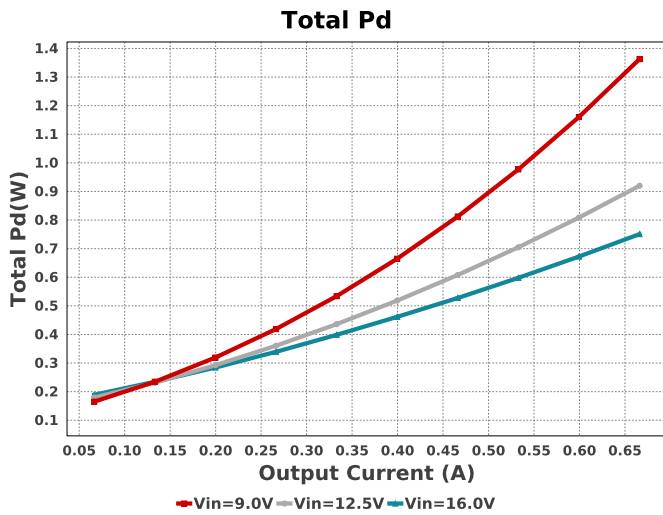
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
L1	Würth Elektronik	7447709680	L= 68.0 μ H 88.5 mOhm	1	\$1.48	 WE-PD_1210 196 mm²
M1	Texas Instruments	CSD19538Q2	VdsMax= 100.0 V IdsMax= 14.4 Amps	1	\$0.12	DQK0006C 9 mm²
Rcomp	Vishay-Dale	CRCW040210K5FKED Series= CRCW..e3	Res= 10.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rfadj	Yageo	AC0402FR-07105KL Series= ?	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rfb1	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rfb2	Vishay-Dale	CRCW040218K2FKED Series= CRCW..e3	Res= 18.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rfilt	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rivp1	Vishay-Dale	CRCW04028K66FKED Series= CRCW..e3	Res= 8.66 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rivp2	Vishay-Dale	CRCW040241K2FKED Series= CRCW..e3	Res= 41.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
Rsense	Stackpole Electronics Inc	CSR1206FK25L0 Series= ?	Res= 25.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11 mm²
U1	Texas Instruments	LM3481MM/NOPB	Switcher	1	\$1.08	DGS0010A_N 24 mm²

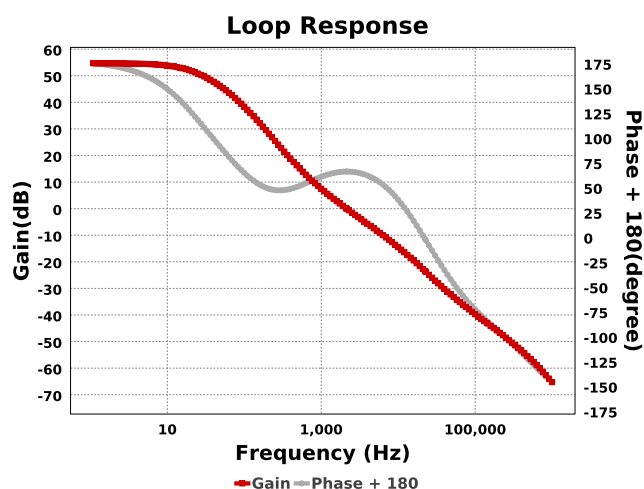
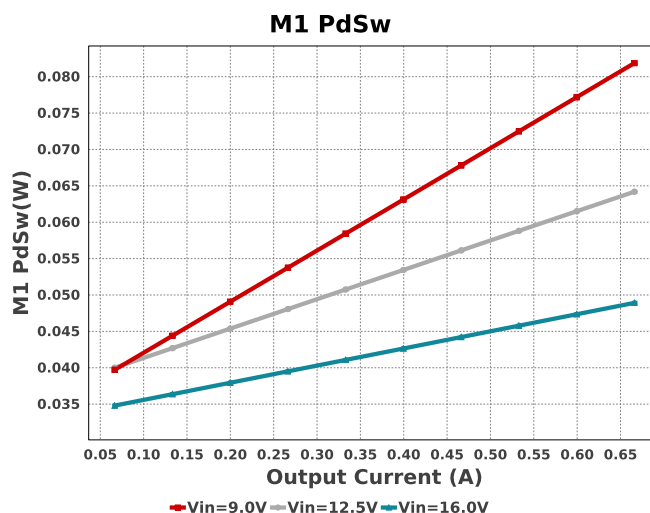
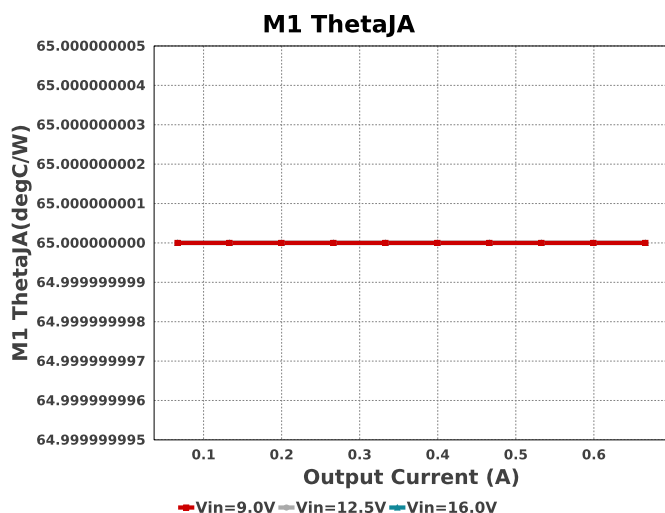












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	123.742 mA	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	5.206 mW	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	905.21 mA	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	69.649 mW	Capacitor	Output capacitor power dissipation
5.	D1 Tj	107.91 degC	Diode	D1 junction temperature
6.	Diode Pd	432.85 mW	Diode	Diode power dissipation
7.	IC Pd	45.288 mW	IC	IC power dissipation
8.	IC Tj	39.058 degC	IC	IC junction temperature
9.	IC Tolerance	19.0 mV	IC	IC Feedback Tolerance
10.	ICThetaJA	200.0 degC/W	IC	IC junction-to-ambient thermal resistance
11.	Iin Avg	1.889 A	IC	Average input current
12.	L Ipp	428.65 mA	Inductor	Peak-to-peak inductor ripple current
13.	L Pd	380.27 mW	Inductor	Inductor power dissipation
14.	L1 Irms	1.892 A	Inductor	Inductor ripple current
15.	M Vds Act	138.076 mV	Mosfet	M Vds
16.	M1 Irms	1.731 A	Mosfet	M1 MOSFET Irms
17.	M1 Pd	321.37 mW	Mosfet	M1 MOSFET total power dissipation
18.	M1 PdCond	239.01 mW	Mosfet	M1 MOSFET conduction losses
19.	M1 PdSw	82.357 mW	Mosfet	M1 MOSFET switching losses
20.	M1 Rdson	79.766 mOhm	Mosfet	Drain-Source On-resistance
21.	M1 ThetaJA	65.0 degC/W	Mosfet	MOSFET junction-to-ambient thermal resistance
22.	M1 TjOP	50.889 degC	Mosfet	M1 MOSFET junction temperature
23.	Cin Pd	5.206 mW	Power	Input capacitor power dissipation
24.	Cout Pd	69.649 mW	Power	Output capacitor power dissipation
25.	Diode Pd	432.85 mW	Power	Diode power dissipation
26.	IC Pd	45.288 mW	Power	IC power dissipation
27.	L Pd	380.27 mW	Power	Inductor power dissipation
28.	M1 Pd	321.37 mW	Power	M1 MOSFET total power dissipation
29.	M1 PdCond	239.01 mW	Power	M1 MOSFET conduction losses
30.	M1 PdSw	82.357 mW	Power	M1 MOSFET switching losses
31.	Rfb Pd	30.0 mW	Power	Rfb Power Dissipation
32.	Rsense Pd	78.854 mW	Power	LED Current Rsns Power Dissipation

#	Name	Value	Category	Description
33.	Total Pd	1.021 W	Power	Total Power Dissipation
34.	Rfb Pd	30.0 mW	Resistor	Rfb Power Dissipation
35.	Rsense Pd	78.854 mW	Resistor	LED Current Rsns Power Dissipation
36.	BOM Count	20	System Information	Total Design BOM count
37.	Cross Freq	1.265 kHz	System Information	Bode plot crossover frequency
38.	Duty Cycle	64.729 %	System Information	Duty cycle
39.	Efficiency	93.996 %	System Information	Steady state efficiency
40.	FootPrint	611.0 mm ²	System Information	Total Foot Print Area of BOM components
41.	Frequency	198.811 kHz	System Information	Switching frequency
42.	Gain Marg	-18.62 dB	System Information	Bode Plot Gain Margin
43.	Iout	666.0 mA	System Information	Iout operating point
44.	Low Freq Gain	49.539 dB	System Information	Gain at 1Hz
45.	Mode	CCM	System Information	Conduction Mode
46.	Phase Marg	61.035 deg	System Information	Bode Plot Phase Margin
47.	Pout	15.984 W	System Information	Total output power
48.	SW Ipk	2.103 A	System Information	Peak switch current
49.	Total BOM	\$3.8	System Information	Total BOM Cost
50.	Vin	9.0 V	System Information	Vin operating point
51.	Vout	24.0 V	System Information	Operational Output Voltage
52.	Vout Actual	24.192 V	System Information	Vout Actual calculated based on selected voltage divider resistors
53.	Vout Tolerance	3.452 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
54.	Vout p-p	178.717 mV	System Information	Peak-to-peak output ripple voltage

Design Inputs

Name	Value	Description
Iout	666.0 m	Maximum Output Current
VinMax	16.0	Maximum input voltage
VinMin	9.0	Minimum input voltage
Vout	24.0	Output Voltage
base_pn	LM3481	Base Product Number
source	DC	Input Source Type
Ta	30.0	Ambient temperature
UserFsw	200.0 k	Customer Selected Frequency

WEBENCH® Assembly

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