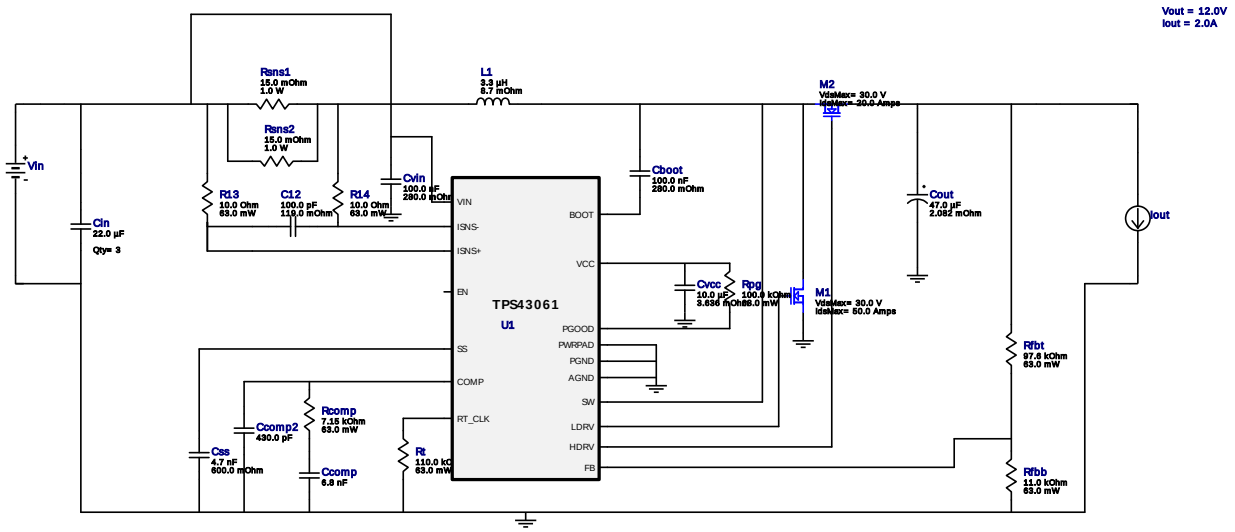
VinMin = 5.0V
VinMax = 5.0V
Vout = 12.0V
Iout = 2.0A

Device = TPS43061RTER
Topology = Boost
Created = 8/11/16 8:07:00 AM
BOM Cost = $3.38
BOM Count = 24
Total Pd = 1.3W

WEBENCH® Design Report

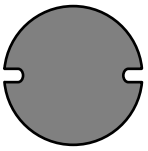
Design : 4085315/17 TPS43061RTER
TPS43061RTER 5.0V-5.0V to 12.00V @ 2.0A

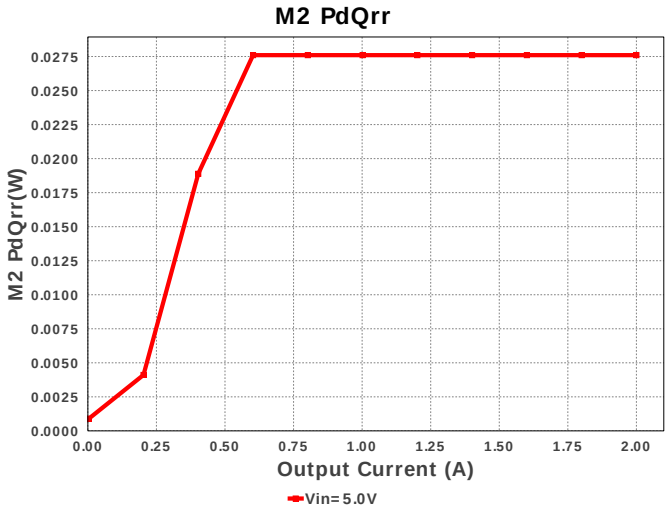


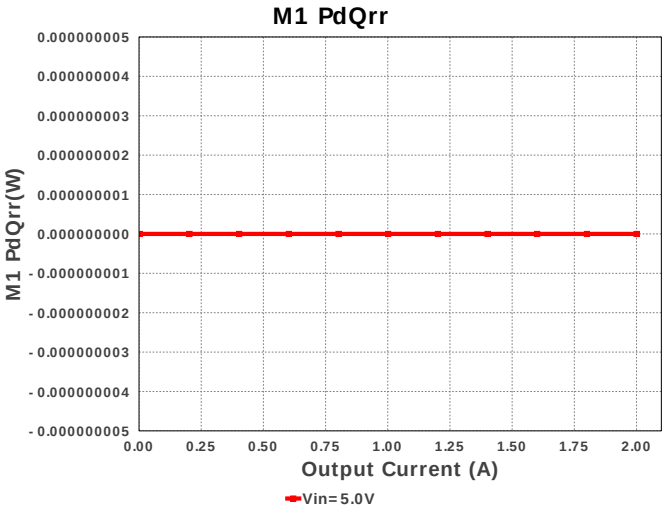
1. The pulse skip mode in the device has not been modeled. Efficiency and operational parameters of the model in pulse skip mode is not valid.

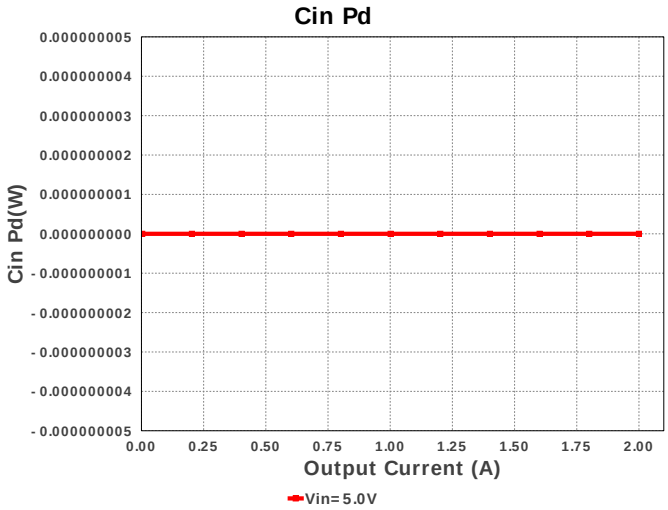
Electrical BOM

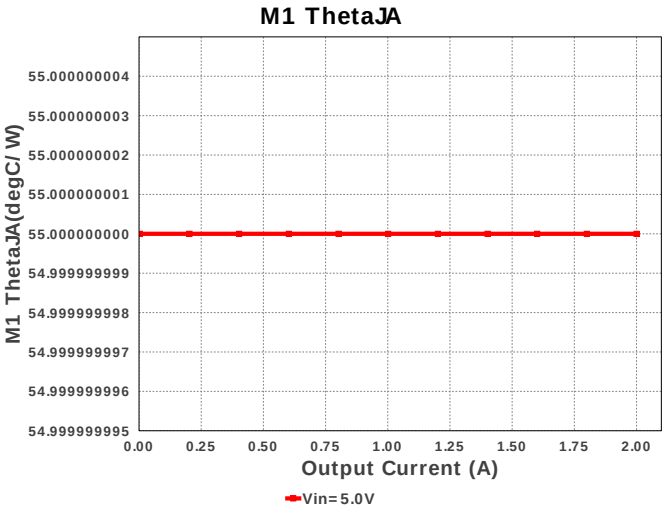
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	AVX	06035A101JAT2A Series= C0G/NP0	Cap= 100.0 pF ESR= 119.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
2.	Cboot	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
3.	Ccomp	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
4.	Ccomp2	MuRata	GRM1555C1E431JA01D Series= C0G/NP0	Cap= 430.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
5.	Cin	Taiyo Yuden	LMK212BJ226MG-T Series= X5R	Cap= 22.0 uF VDC= 10.0 V IRMS= 0.0 A	3	$0.12	0805 7 mm^2
6.	Cout	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	1	$0.35	1206 11 mm^2
7.	Css	MuRata	GRM188R71E472KA01D Series= X7R	Cap= 4.7 nF ESR= 600.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
8.	Cvcc	MuRata	GRM188R61C106MA73D Series= X5R	Cap= 10.0 uF ESR= 3.636 mOhm VDC= 16.0 V IRMS= 2.8889 A	1	$0.07	0603 5 mm^2

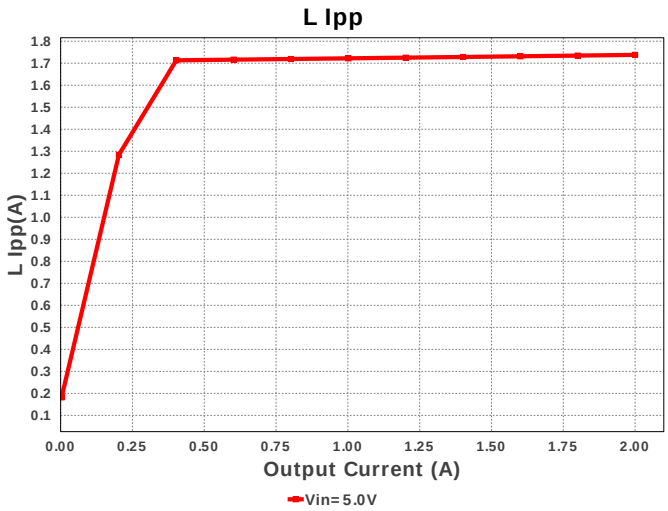
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cvin	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	 0805 7 mm^2
10.	L1	Bourns	SDR1307-3R3ML	L= 3.3 µH DCR= 8.7 mOhm	1	$0.35	 SDR1307 227 mm^2
11.	M1	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	 TRANS_NexFET_Q3 18 mm^2
12.	M2	Texas Instruments	CSD17578Q3A	VdsMax= 30.0 V IdsMax= 20.0 Amps	1	$0.21	 TRANS_NexFET_Q3A 18 mm^2
13.	R13	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
14.	R14	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
15.	Rcomp	Vishay-Dale	CRCW04027K15FKED Series= CRCW..e3	Res= 7.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
16.	Rfbb	Vishay-Dale	CRCW040211K0FKED Series= CRCW..e3	Res= 11.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
17.	Rfbt	Vishay-Dale	CRCW040297K6FKED Series= CRCW..e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
18.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
19.	Rsns1	Susumu Co Ltd	PRL1632-R015-F-T1 Series= PRL1632	Res= 15.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	$0.19	 0612 11 mm^2
20.	Rsns2	Susumu Co Ltd	PRL1632-R015-F-T1 Series= PRL1632	Res= 15.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	$0.19	 0612 11 mm^2
21.	Rt	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
22.	U1	Texas Instruments	TPS43061RTER	Switcher	1	$1.25	 S-PVQFN-N16 17 mm^2

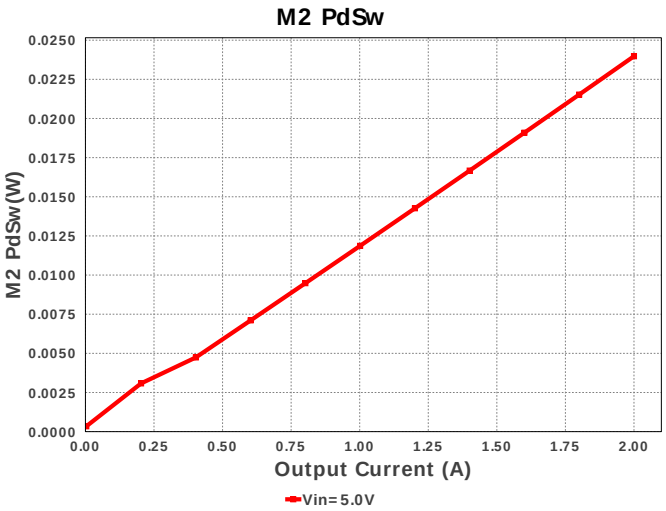


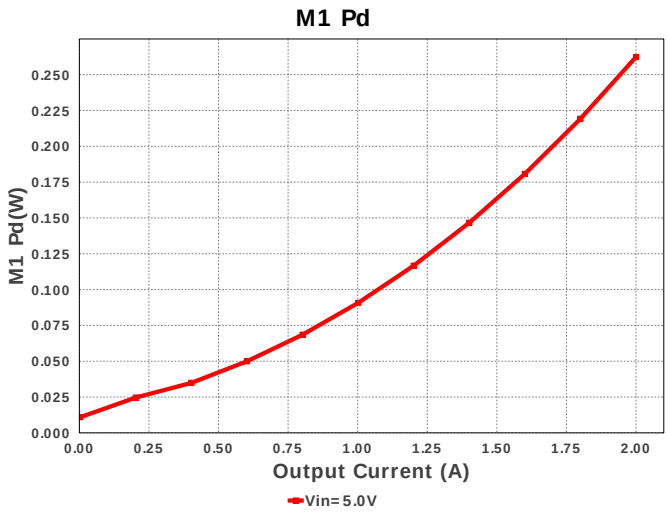


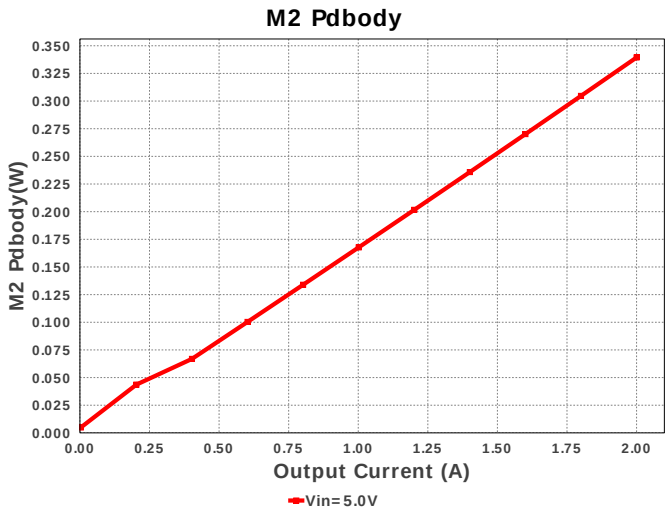


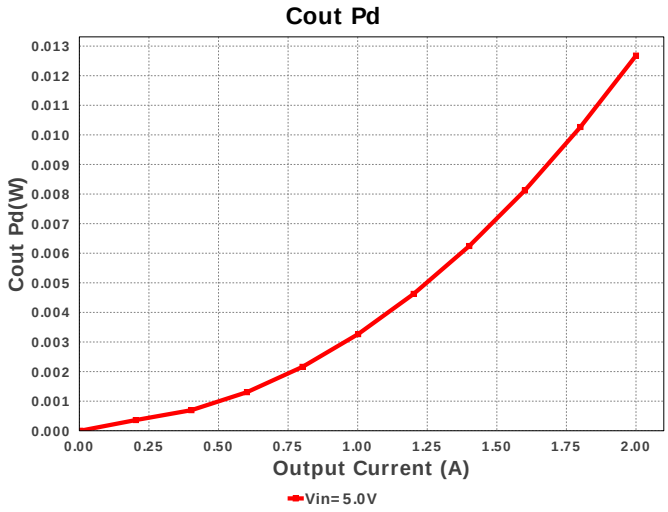


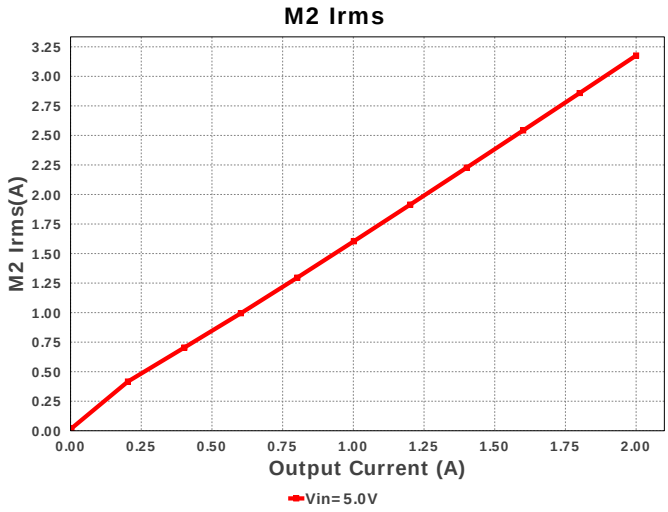


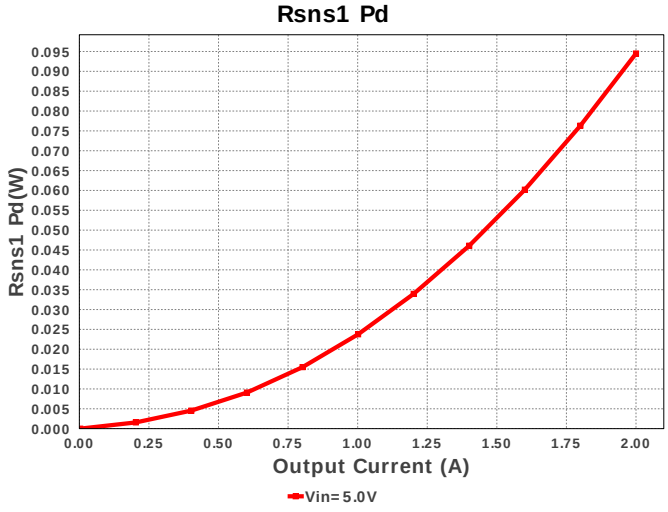


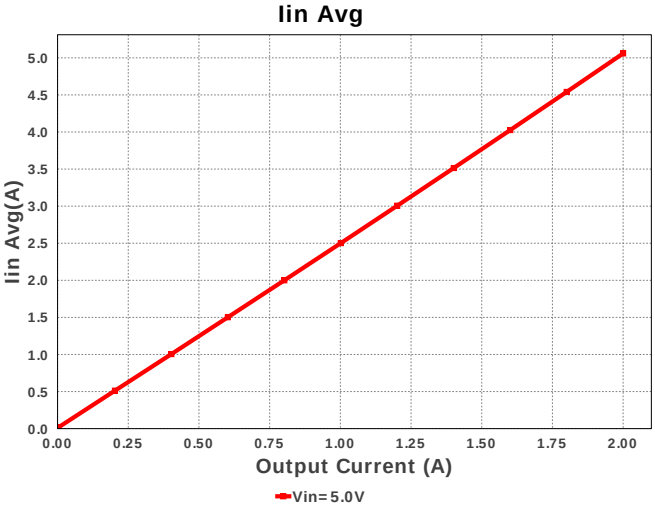


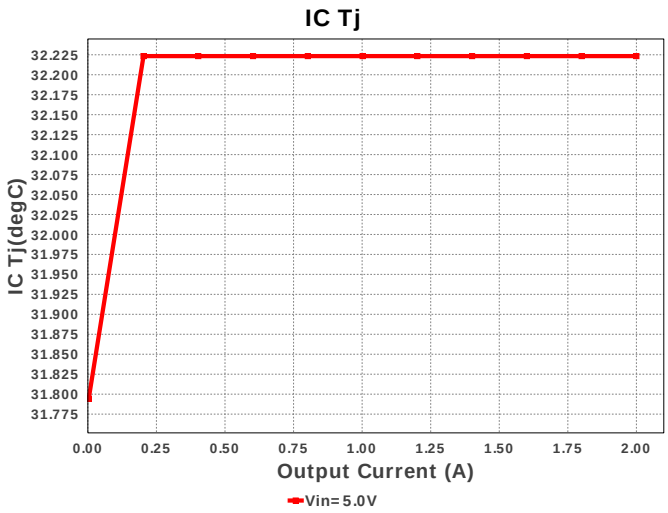


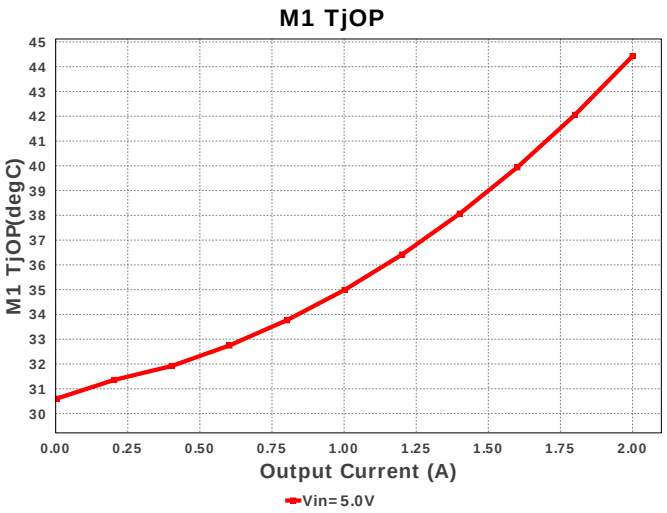


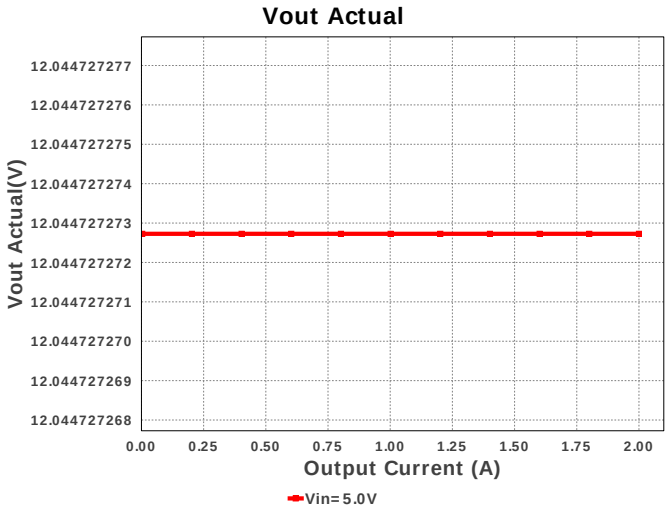


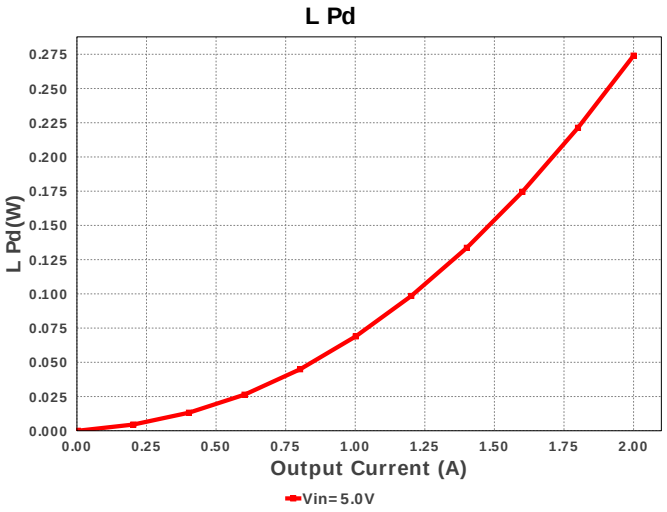


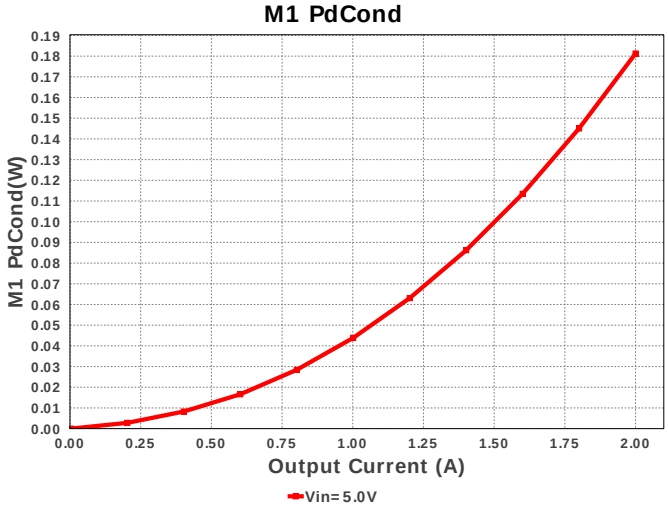


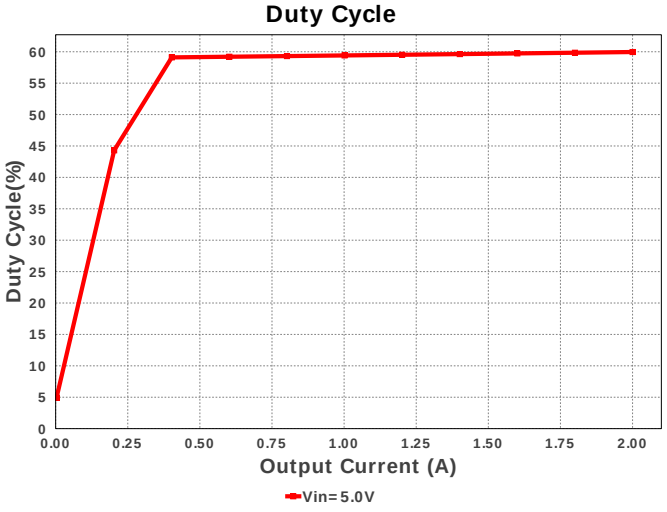


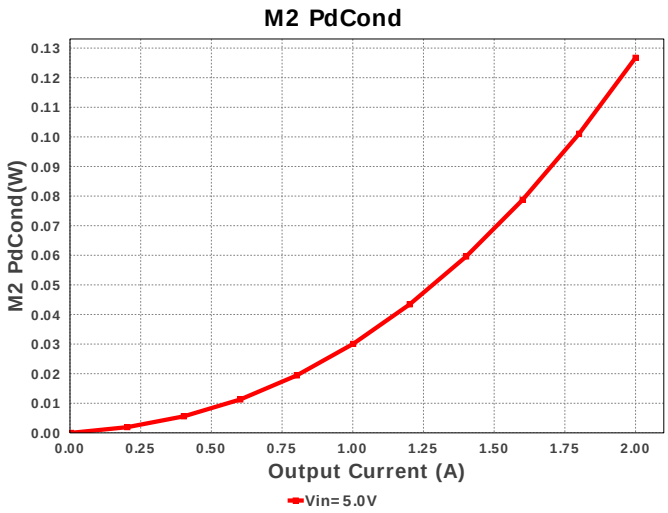


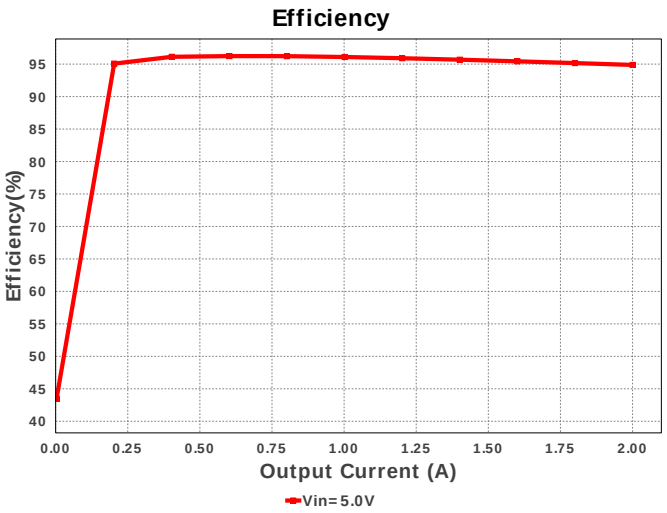


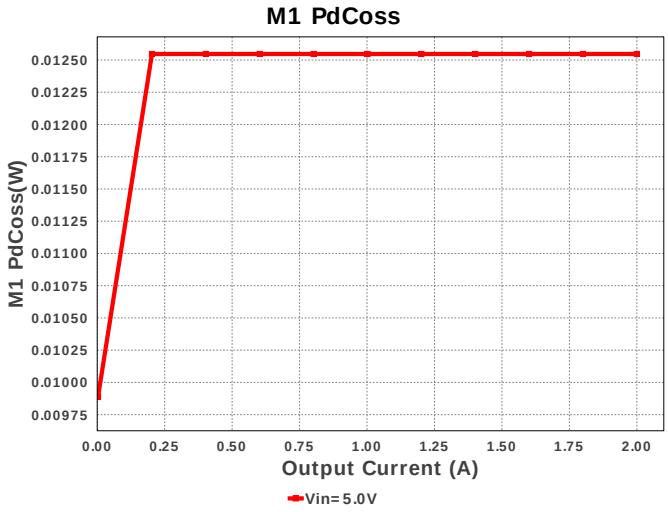


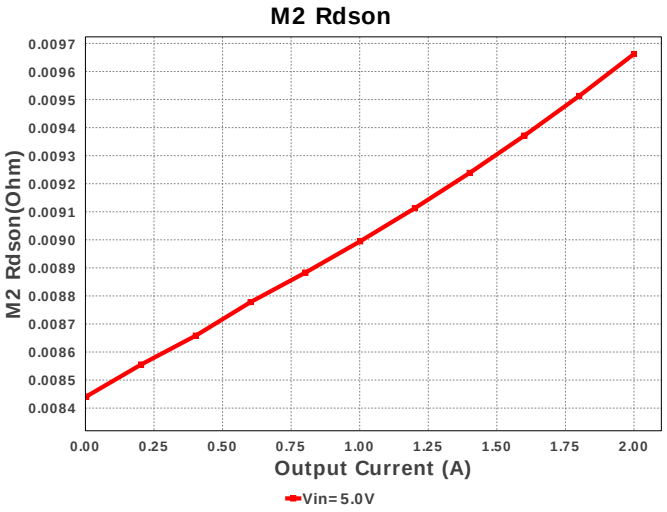


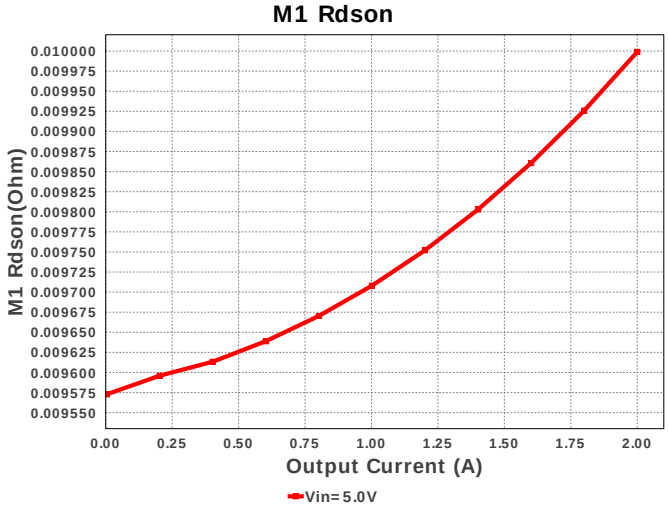


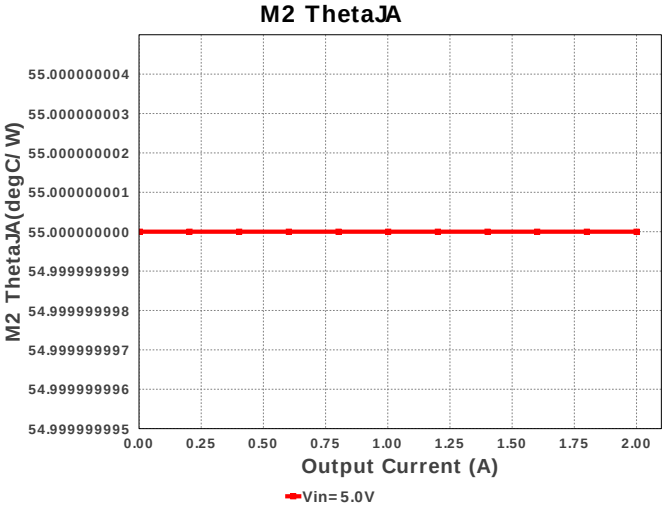


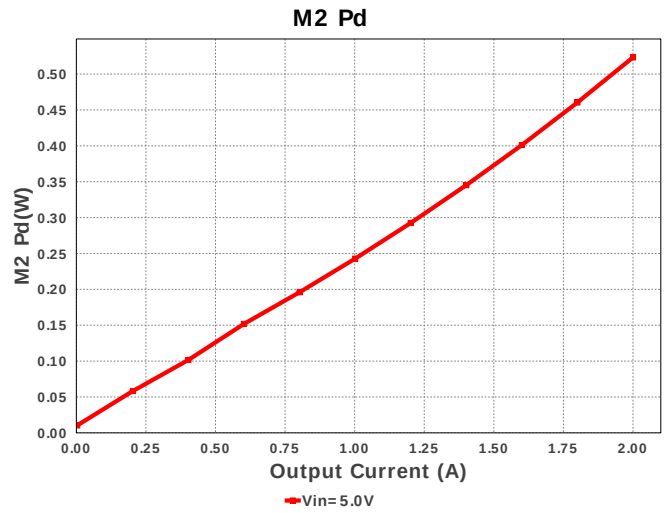


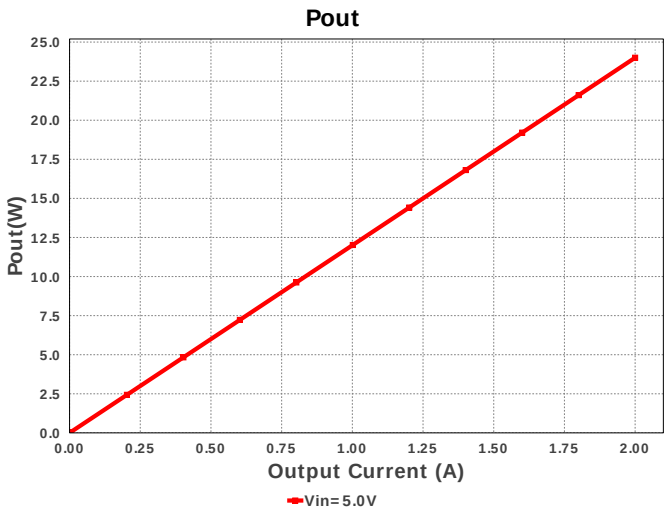


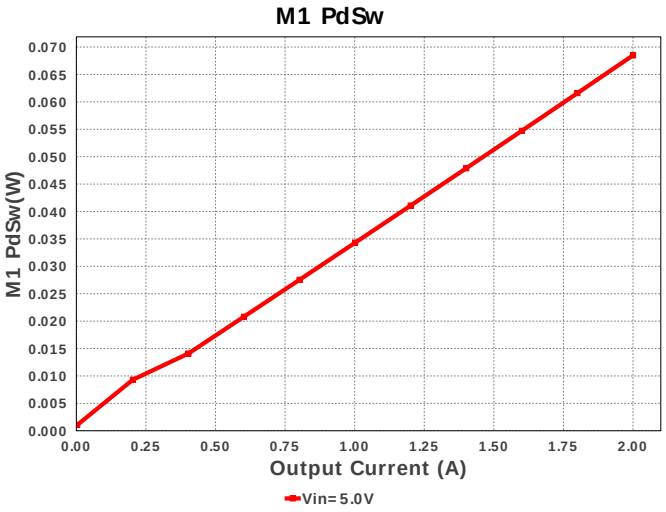


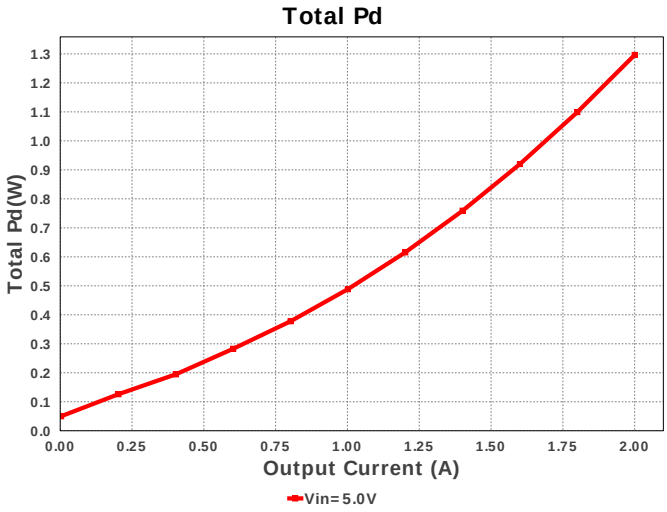


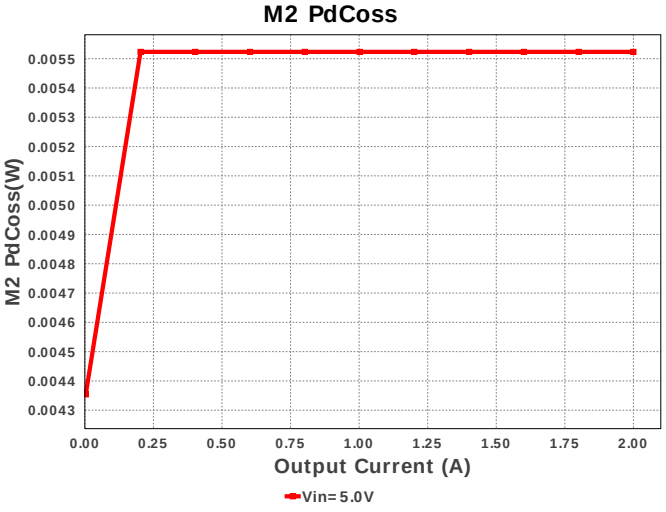


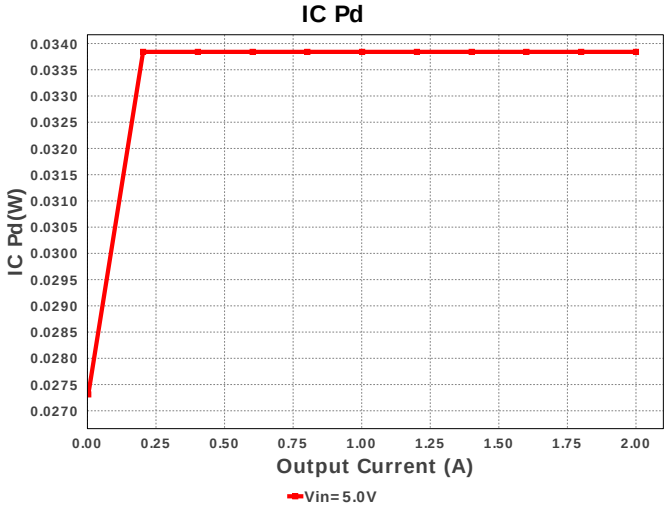




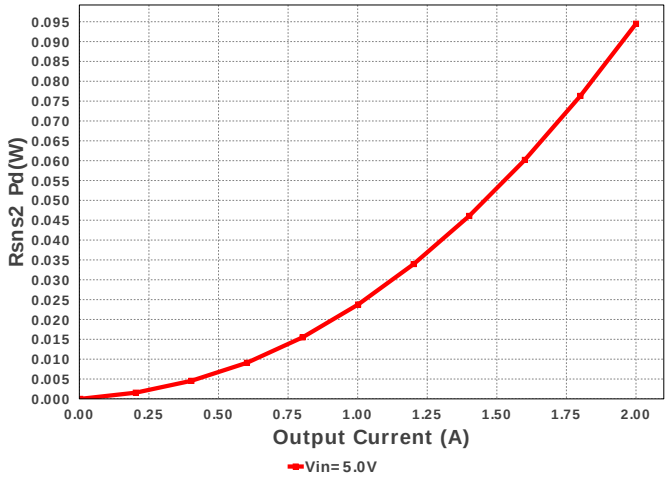




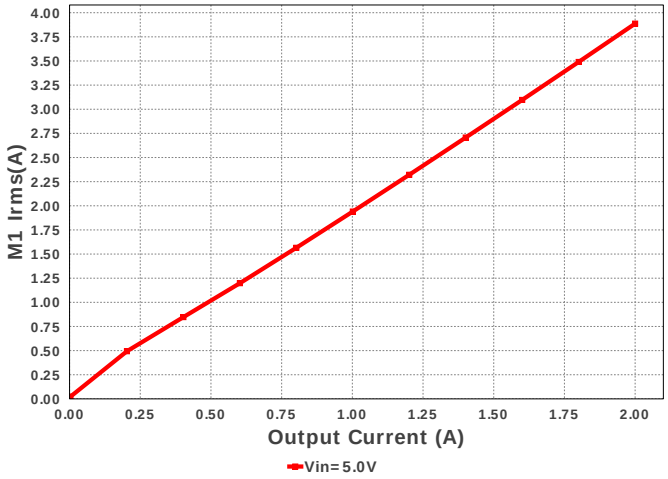




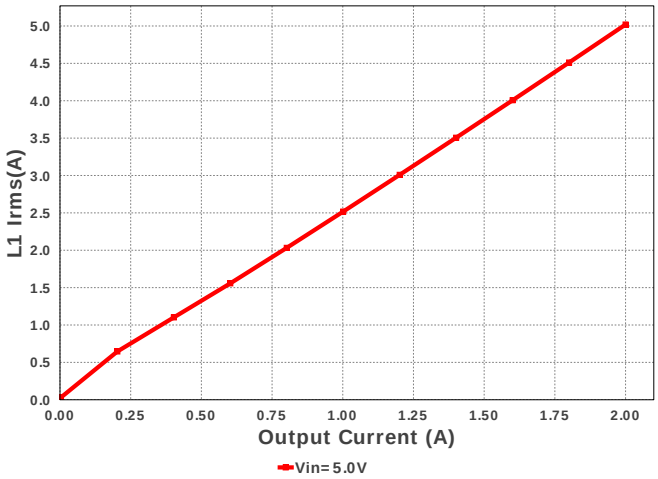
Rsns2 Pd



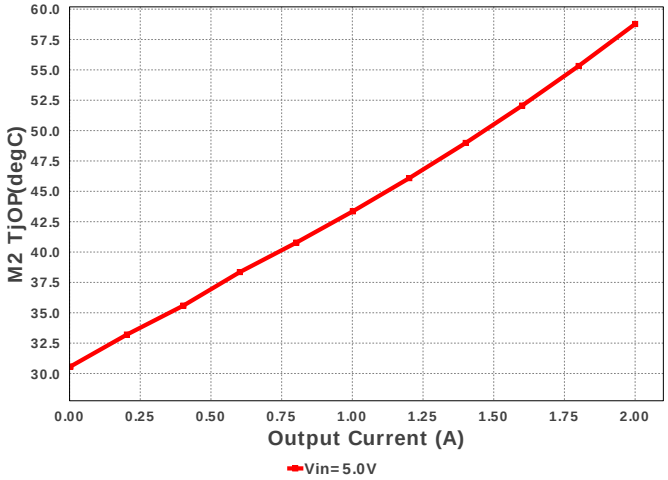
M1 Irms



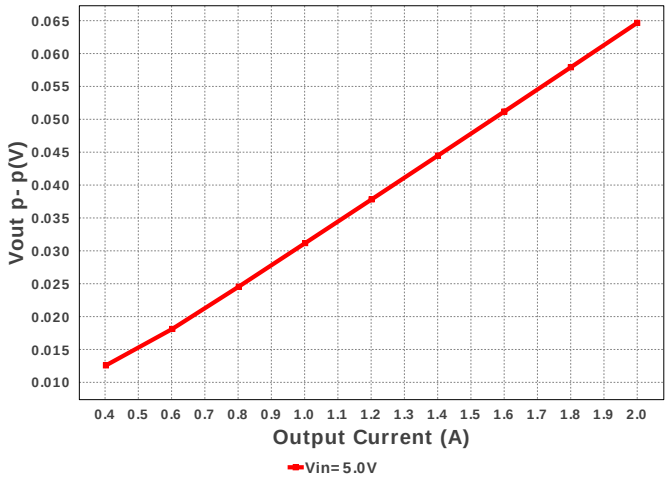
L1 Irms



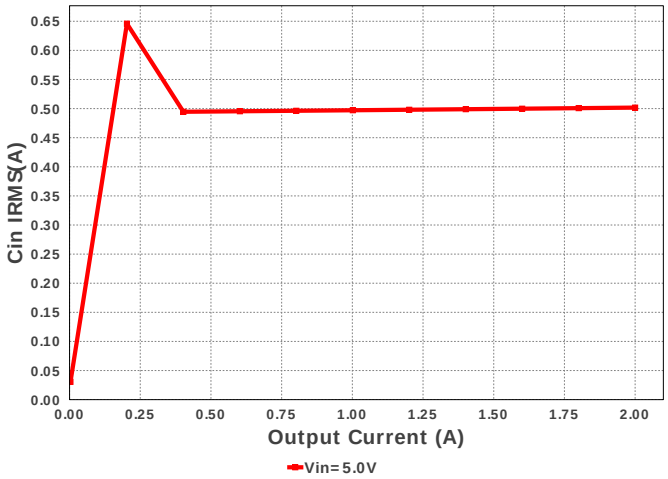
M2 TjOP

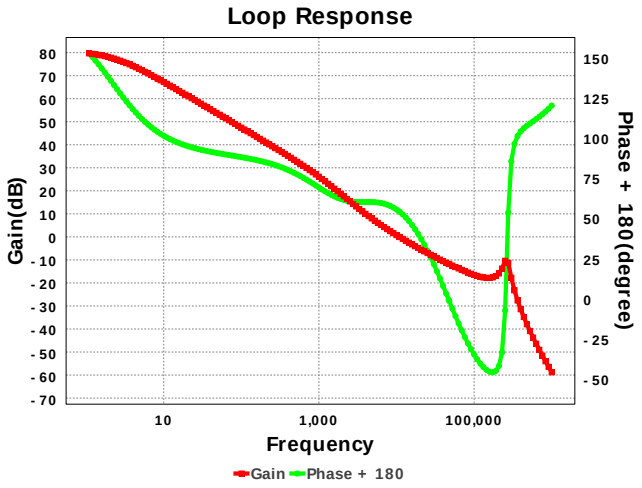


Vout p- p



Cin IRMS





Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	501.685 mA	Current	Input capacitor RMS ripple current
2.	Iin Avg	5.059 A	Current	Average input current
3.	L Ipp	1.738 A	Current	Peak-to-peak inductor ripple current
4.	L1 Irms	5.02 A	Current	Inductor ripple current
5.	M1 Irms	3.887 A	Current	MOSFET RMS ripple current
6.	M2 Irms	3.176 A	Current	MOSFET RMS ripple current
7.	BOM Count	24	General	Total Design BOM count
8.	FootPrint	392.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	522.727 kHz	General	Switching frequency
10.	M1 Rdson	9.999 mOhm	General	Drain-Source On-resistance
11.	M1 ThetaJA	55.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
12.	M2 Rdson	9.663 mOhm	General	Drain-Source On-resistance
13.	M2 ThetaJA	55.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
14.	Mode	CCM	General	Conduction Mode
15.	Pout	24.0 W	General	Total output power
16.	Total BOM	$3.38	General	Total BOM Cost
17.	Low Freq Gain	79.649 dB	Op_Point	Gain at 10Hz
18.	Vout Actual	12.045 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
19.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
20.	Cross Freq	10.891 kHz	Op_point	Bode plot crossover frequency
21.	Duty Cycle	59.957 %	Op_point	Duty cycle
22.	Efficiency	94.875 %	Op_point	Steady state efficiency
23.	Gain Marg	-11.701 dB	Op_point	Bode Plot Gain Margin
24.	IC Tj	32.223 degC	Op_point	IC junction temperature
25.	ICThetaJA	65.7 degC/W	Op_point	IC junction-to-ambient thermal resistance
26.	IOUT_OP	2.0 A	Op_point	Iout operating point
27.	M1 TjOP	44.427 degC	Op_point	M1 MOSFET junction temperature
28.	M2 TjOP	58.786 degC	Op_point	MOSFET junction temperature
29.	Phase Marg	54.852 deg	Op_point	Bode Plot Phase Margin
30.	VIN_OP	5.0 V	Op_point	Vin operating point
31.	Vout p-p	64.664 mV	Op_point	Peak-to-peak output ripple voltage
32.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
33.	Cout Pd	12.679 mW	Power	Output capacitor power dissipation
34.	IC Pd	33.841 mW	Power	IC power dissipation
35.	L Pd	274.03 mW	Power	Inductor power dissipation
36.	M1 Pd	262.313 mW	Power	MOSFET power dissipation
37.	M1 PdCond	181.279 mW	Power	M1 MOSFET conduction losses
38.	M1 PdCoss	12.547 mW	Power	M1 MOSFET Coss Losses
39.	M1 PdQrr	0.0 W	Power	M1 MOSFET switching losses
40.	M1 PdSw	68.488 mW	Power	M1 MOSFET switching losses
41.	M2 Pd	523.375 mW	Power	MOSFET power dissipation
42.	M2 PdCond	126.748 mW	Power	M2 MOSFET conduction losses
43.	M2 PdCoss	5.523 mW	Power	M2 MOSFET Coss Losses
44.	M2 PdQrr	27.72 mW	Power	Synchronous Boost High Side Reverse Recovery
45.	M2 PdSw	23.975 mW	Power	M2 MOSFET switching losses
46.	M2 Pdbody	339.409 mW	Power	Power dissipation through lower FET
47.	Rsns1 Pd	94.493 mW	Power	Rsns1 Power Dissipation
48.	Rsns2 Pd	94.493 mW	Power	Rsns2 Power Dissipation
49.	Total Pd	1.296 W	Power	Total Power Dissipation
50.	Vout Tolerance	3.902 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	5.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	TPS43061	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: Low Quiescent Current Boost Controller, Wide Vin Range 4.5V to 38V Vin, 58V Vout, 5.5V Gate Drive optimized for Low Qg NexFETs Thermal Shutdown

2. **TPS43061** Product Folder : http://www.ti.com/product/TPS43061 : contains the data sheet and other resources.