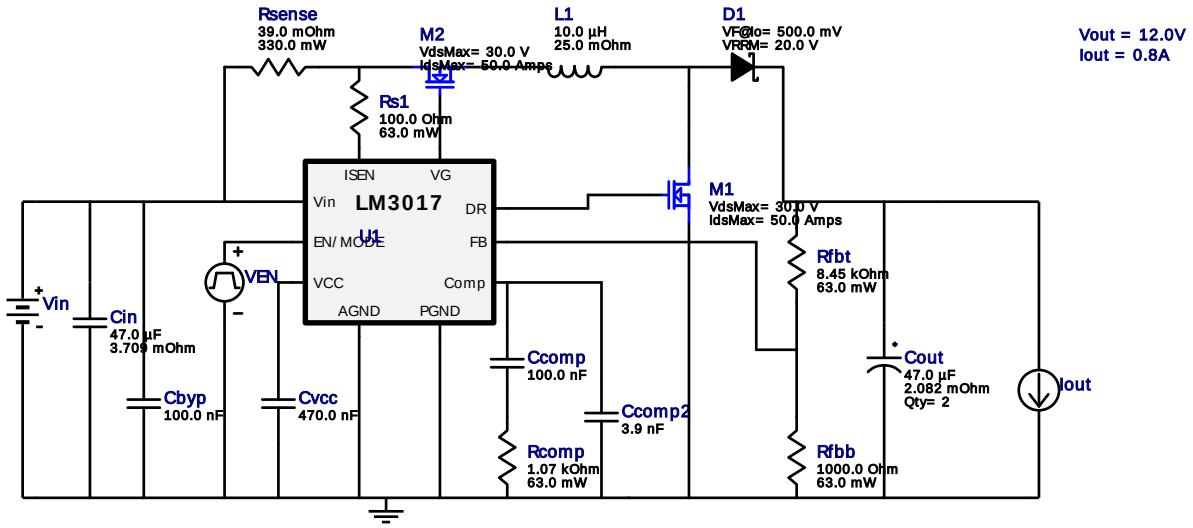
TEXAS INSTRUMENTS

WEBENCH® Design Report

VinMin = 5.0V
VinMax = 5.0V
Vout = 12.0V
Iout = 0.8A

Device = LM3017LEX/NOPB
Topology = Boost
Created = 9/24/16 8:33:10 AM
BOM Cost = $2.96
BOM Count = 17
Total Pd = 0.82W

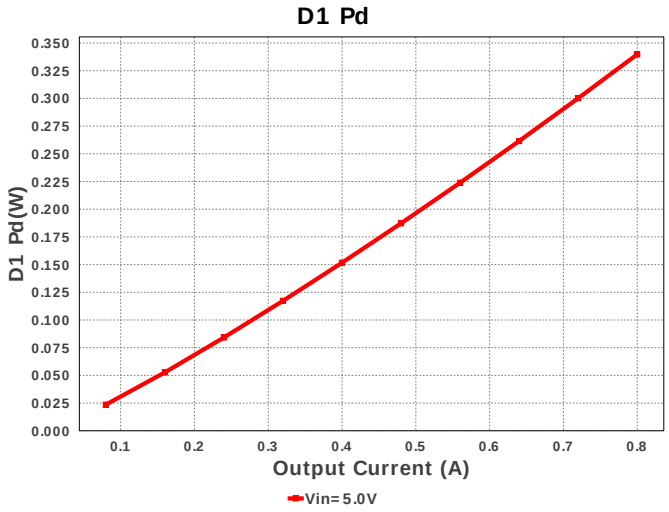
Design : 4790845/36 LM3017LEX/NOPB
LM3017LEX/NOPB 5.0V-5.0V to 12.00V @ 0.8A

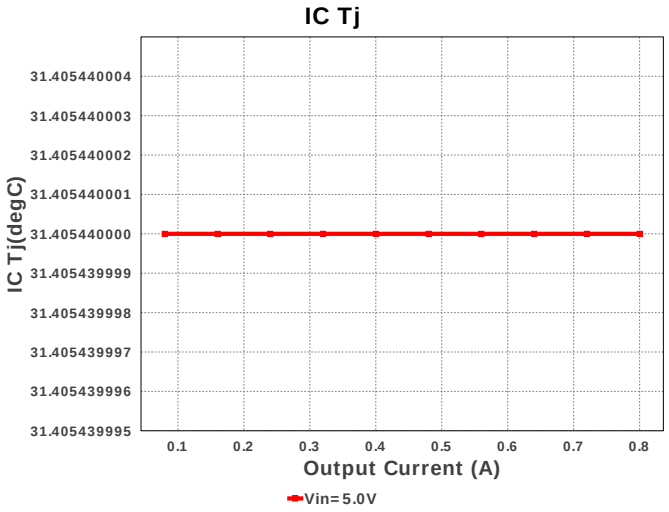


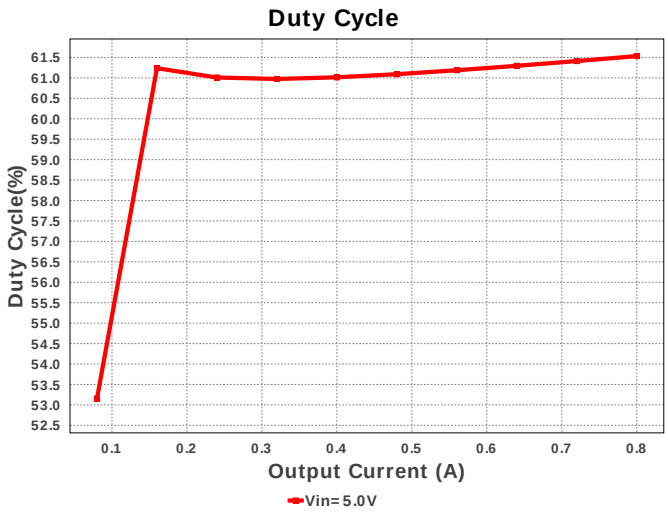
Electrical BOM

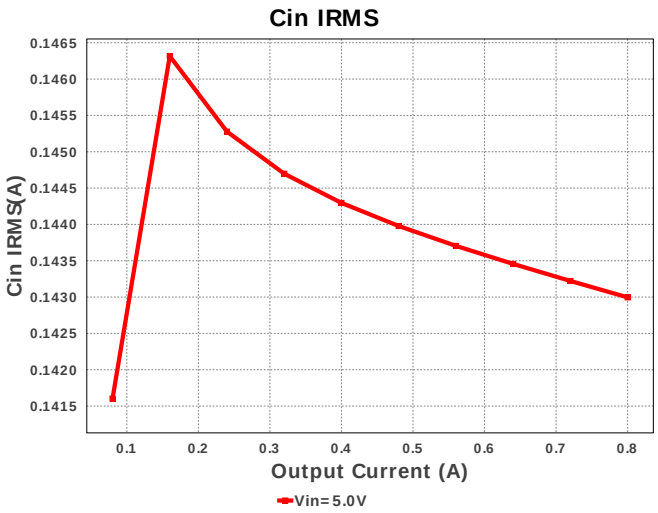
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	MuRata	GRM155R60J104KA01D Series= X5R	Cap= 100.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Ccomp	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB392 Series= X7R	Cap= 3.9 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	$0.15	1206_190 11 mm²
5.	Cout	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	2	$0.35	1206 11 mm²
6.	Cvcc	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
7.	D1	Diodes Inc.	B220-13-F	VF@Io= 500.0 mV VRRM= 20.0 V	1	$0.08	SMB 44 mm²
8.	L1	Bourns	SRU1038-100Y	L= 10.0 µH DCR= 25.0 mOhm	1	$0.33	SRU1038 144 mm²
9.	M1	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	DQG0008A 18 mm²

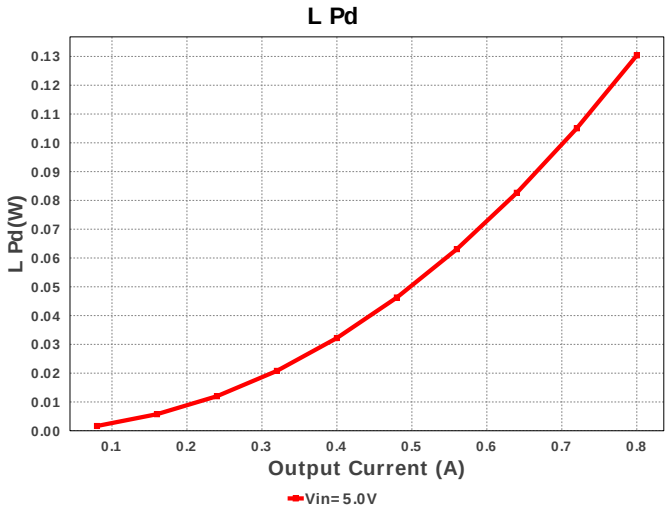
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	M2	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	DQG0008A 18 mm^2
11.	Rcomp	Vishay-Dale	CRCW04021K07FKED Series= CRCW..e3	Res= 1.07 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	Rfbb	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
13.	Rfbt	Vishay-Dale	CRCW04028K45FKED Series= CRCW..e3	Res= 8.45 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
14.	Rs1	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
15.	Rsense	Panasonic	ERJ-L14KF39MU Series= ERJ-L14	Res= 39.0 mOhm Power= 330.0 mW Tolerance= 1.0%	1	$0.11	1210 15 mm^2
16.	U1	Texas Instruments	LM3017LEX/NOPB	Switcher	1	$0.95	LEK10A 13 mm^2

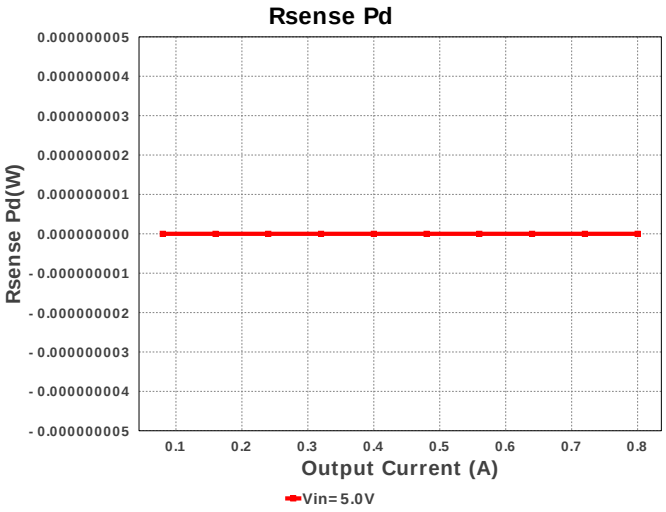


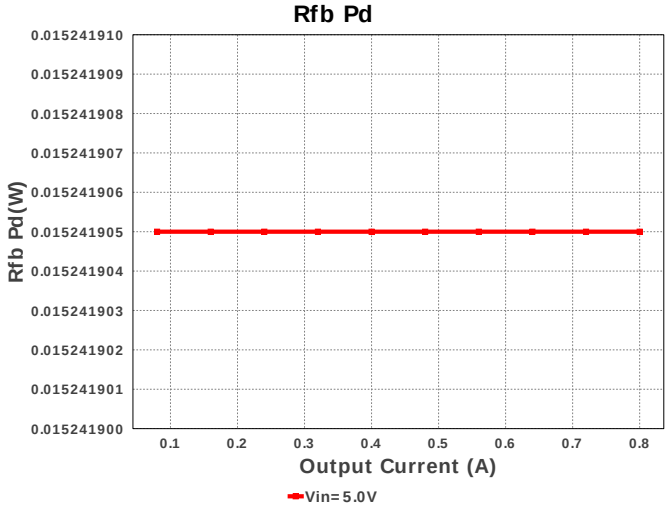


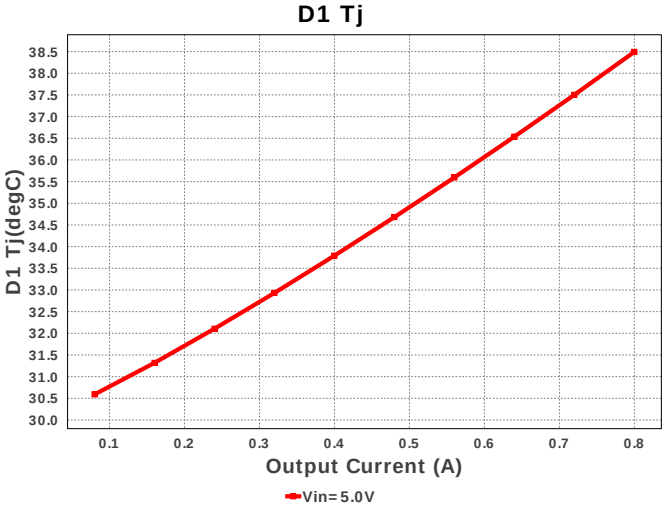


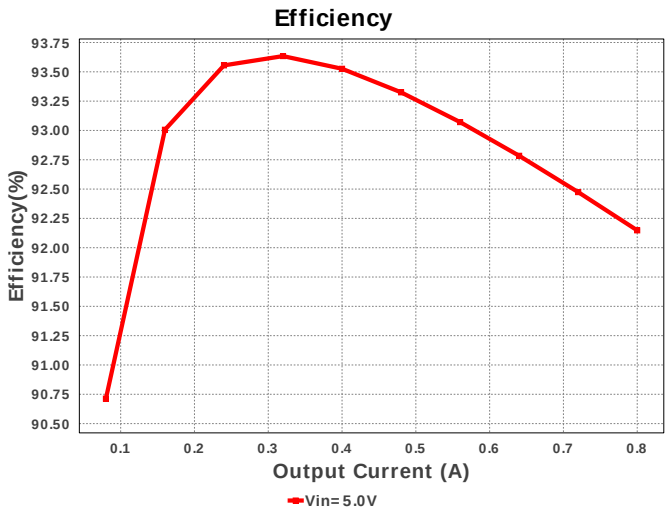


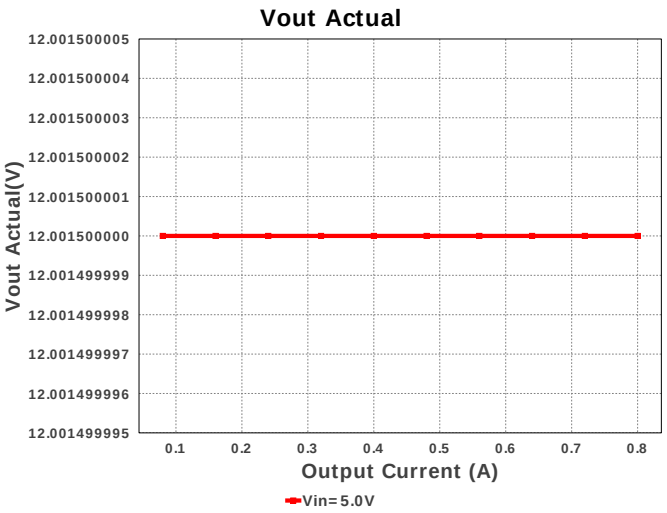


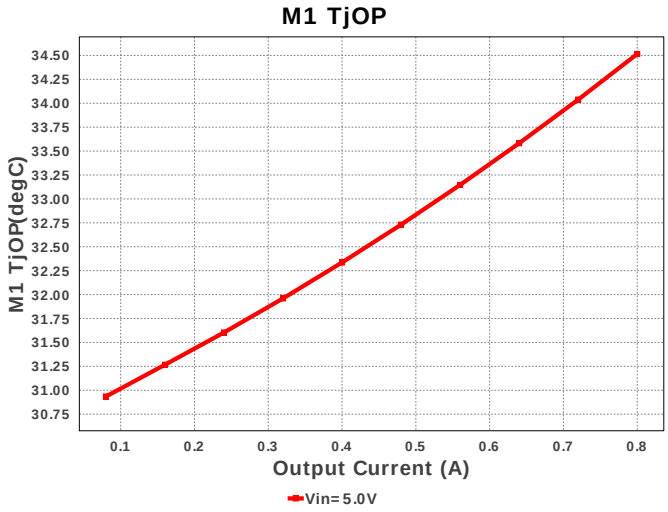


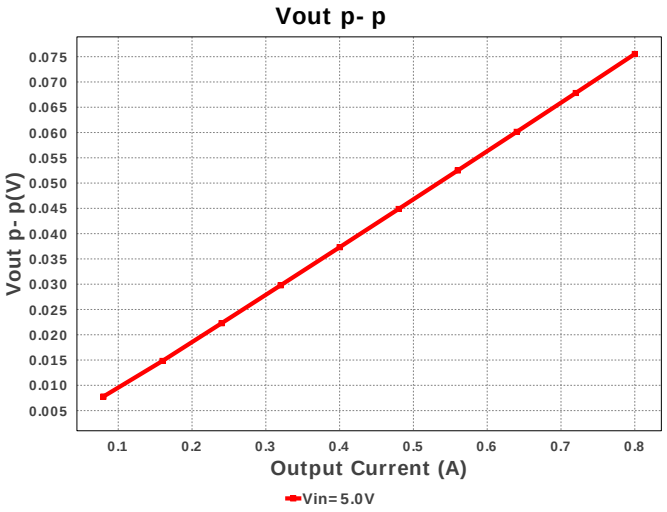


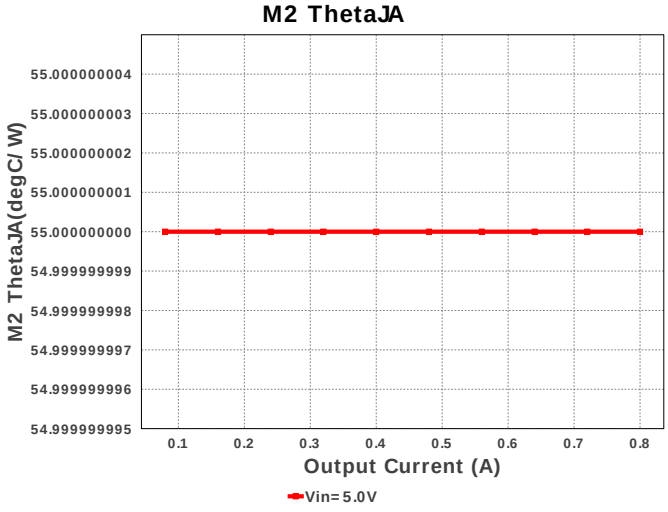


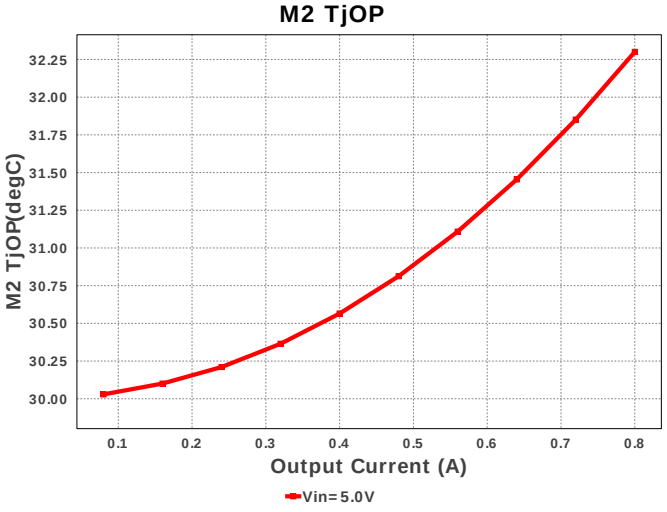


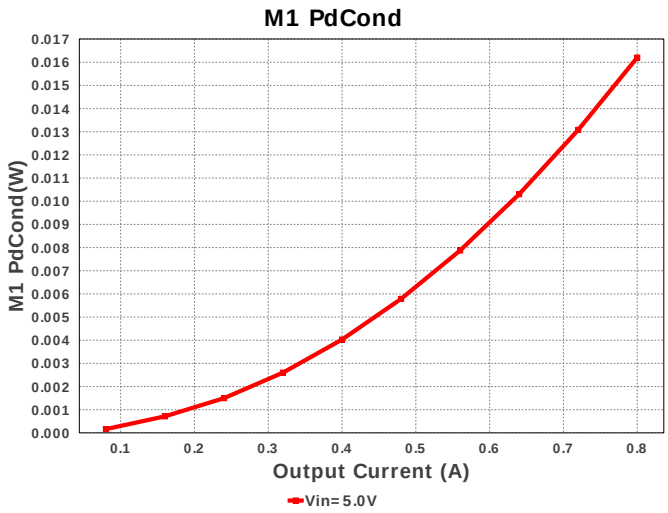


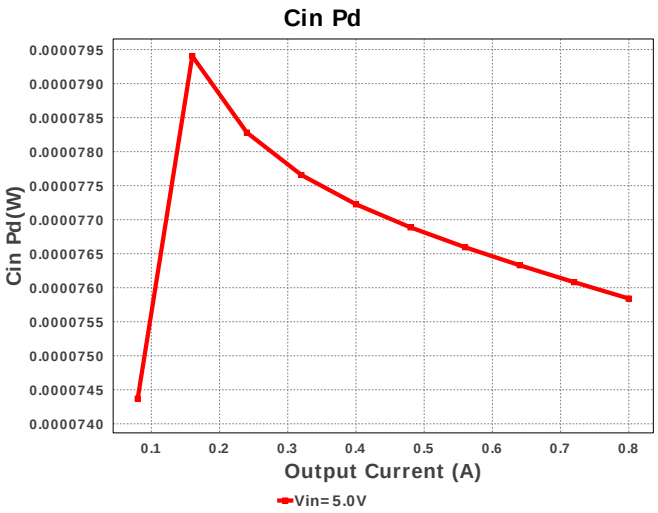


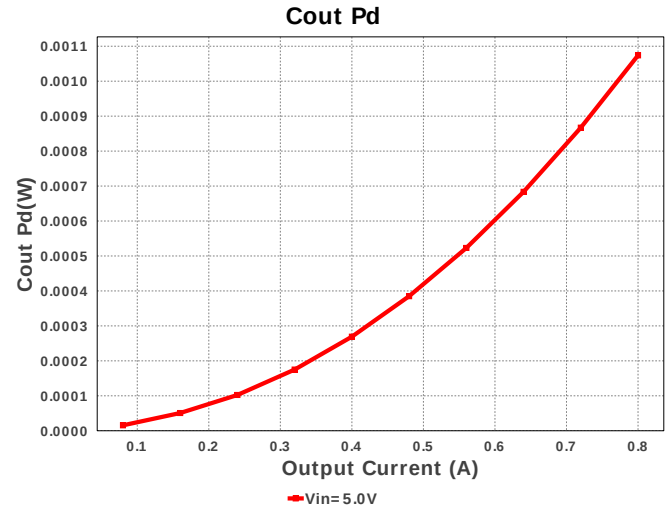


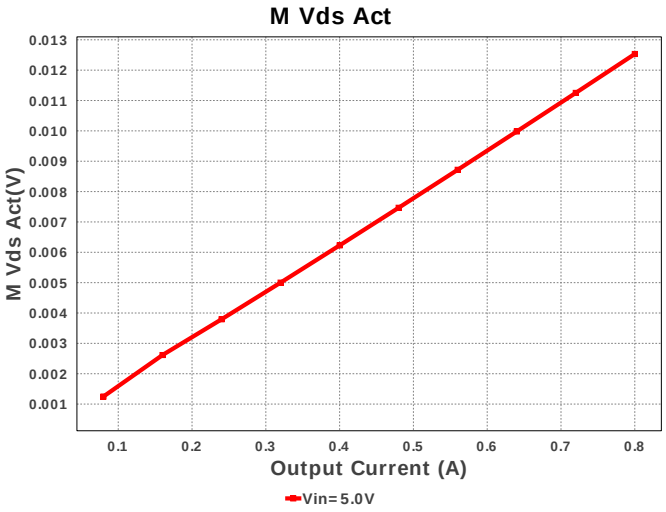


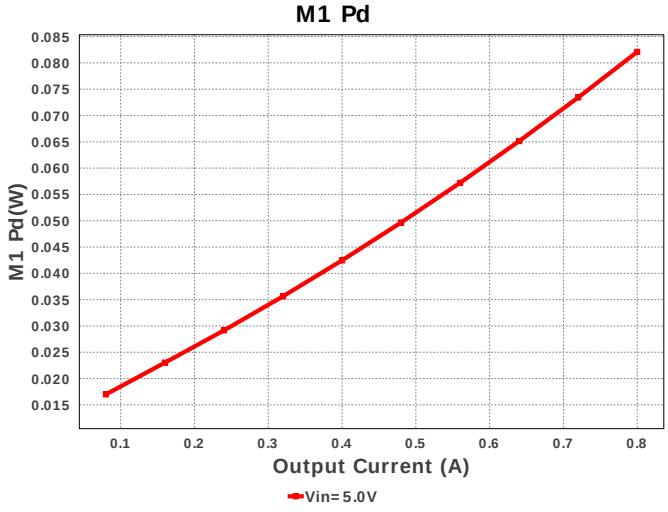


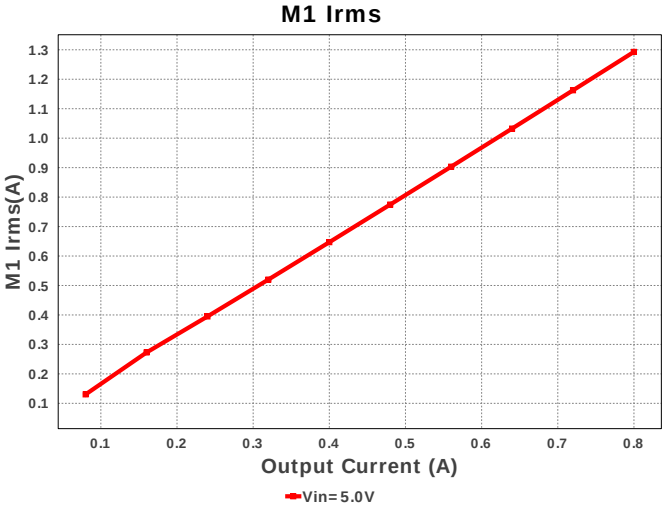


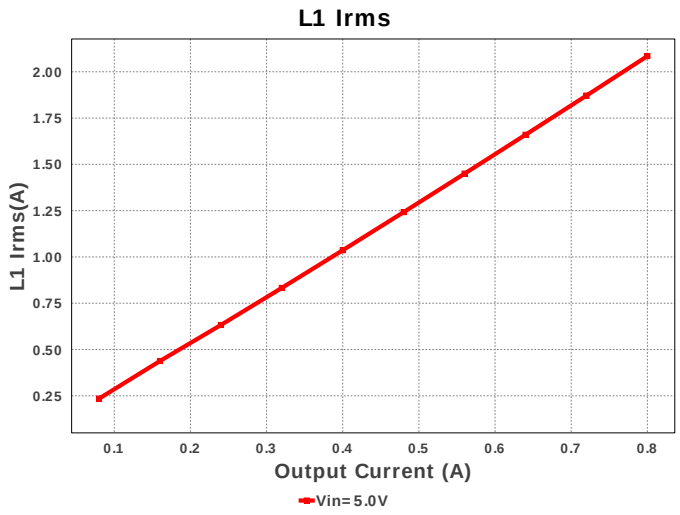


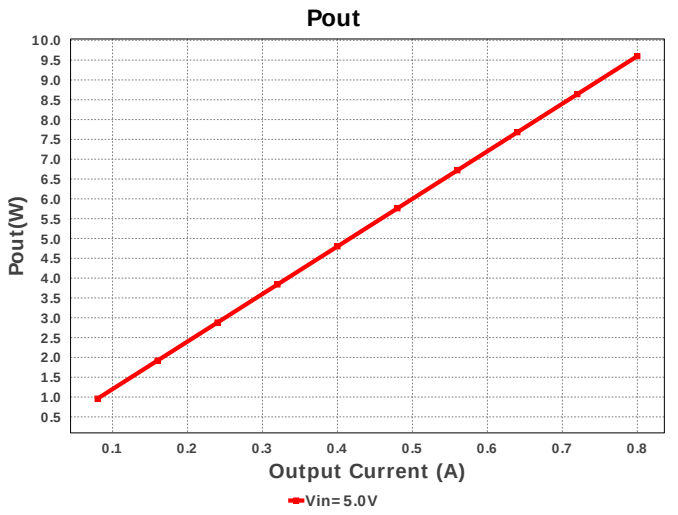


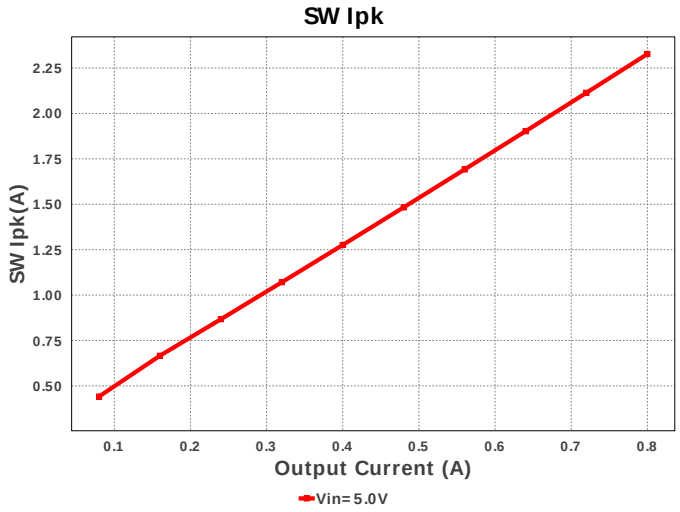


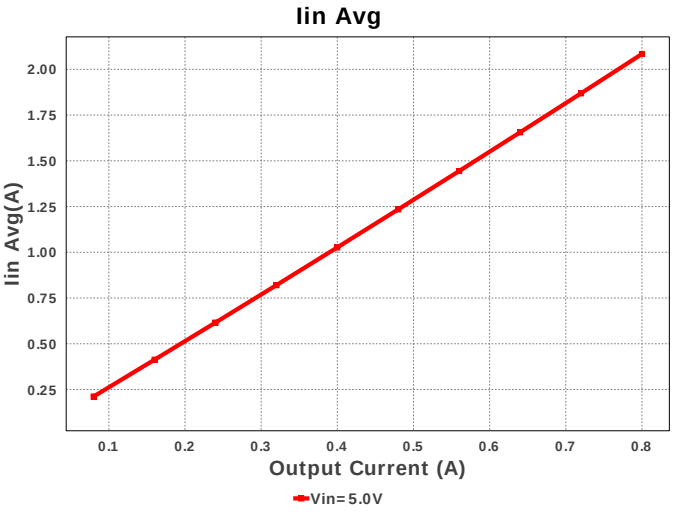


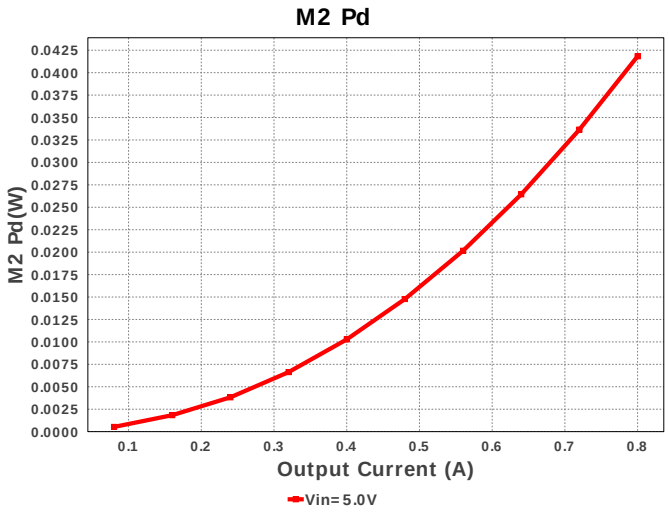


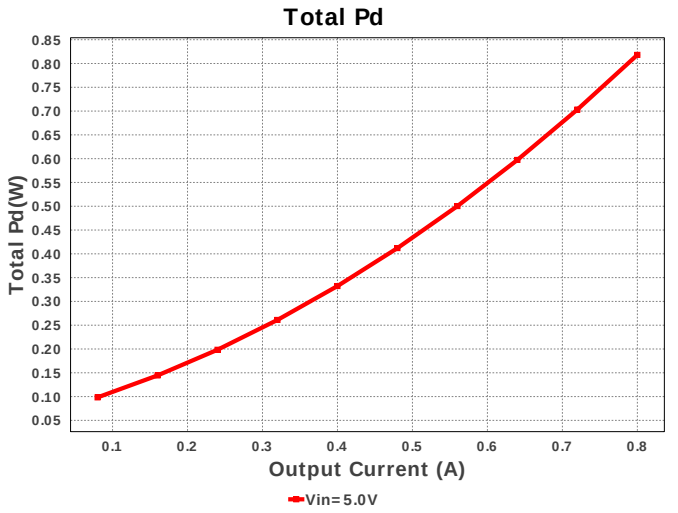


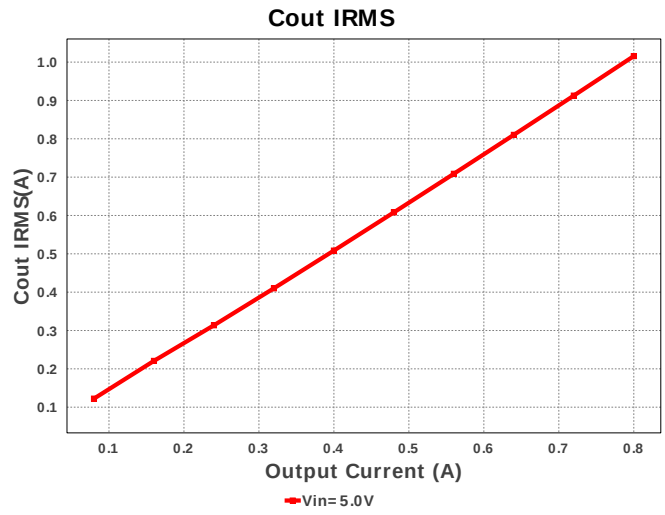


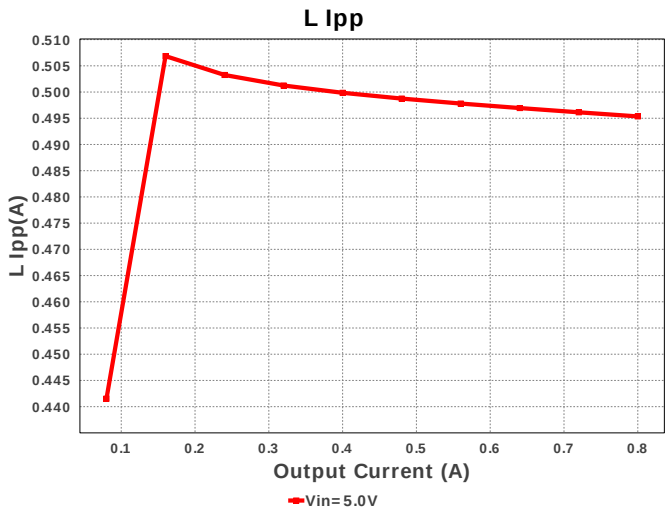


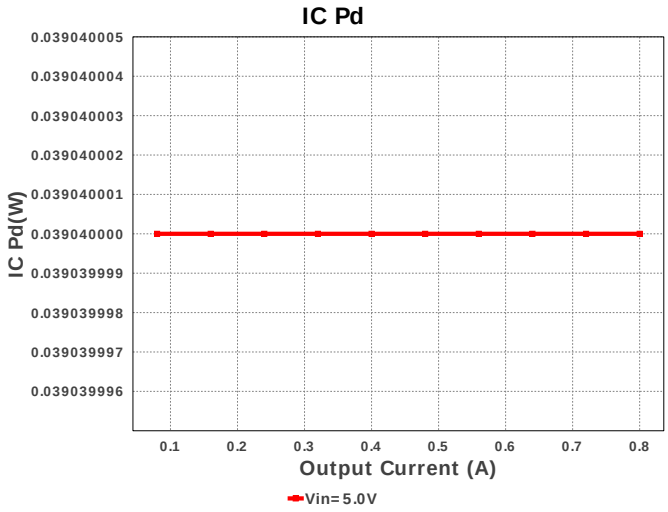


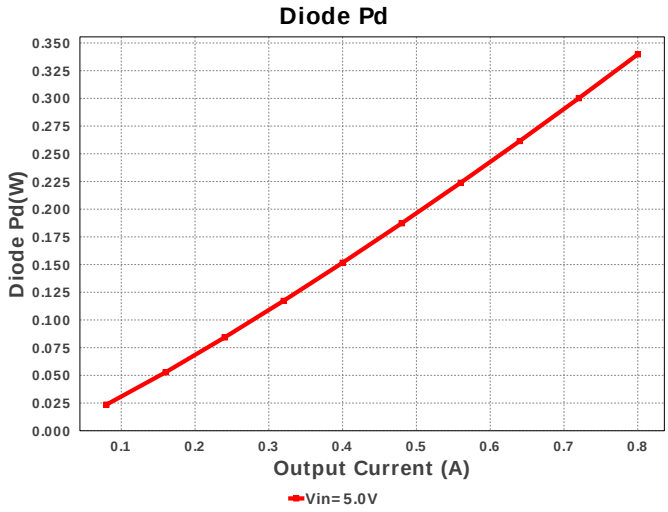


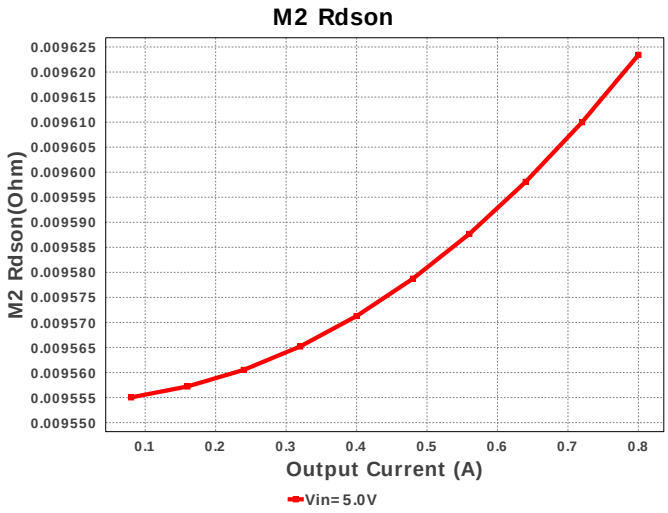


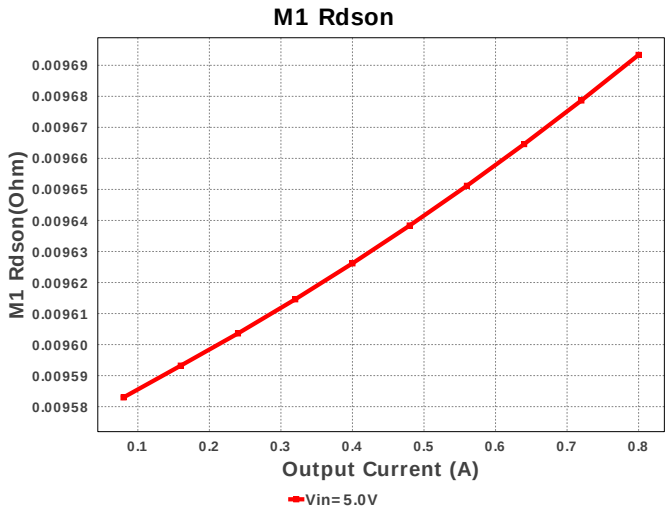


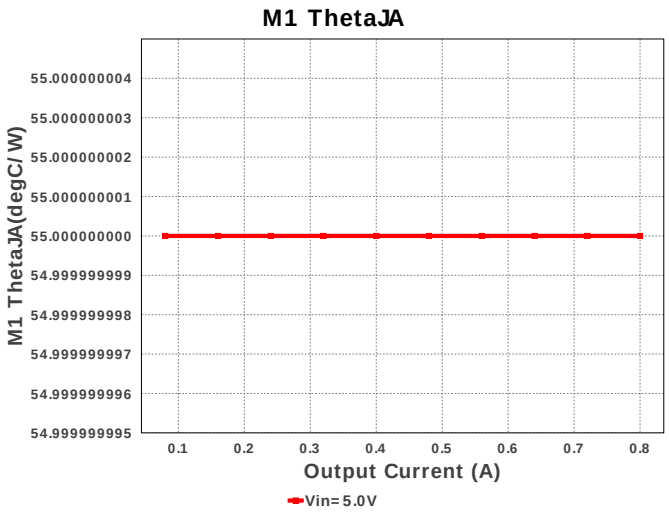


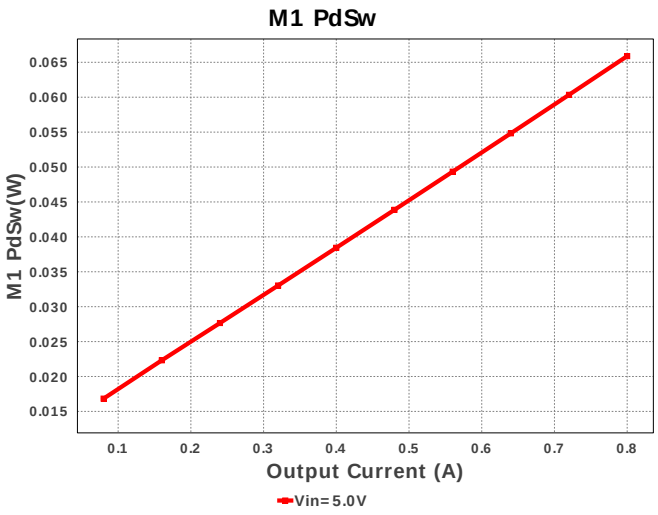


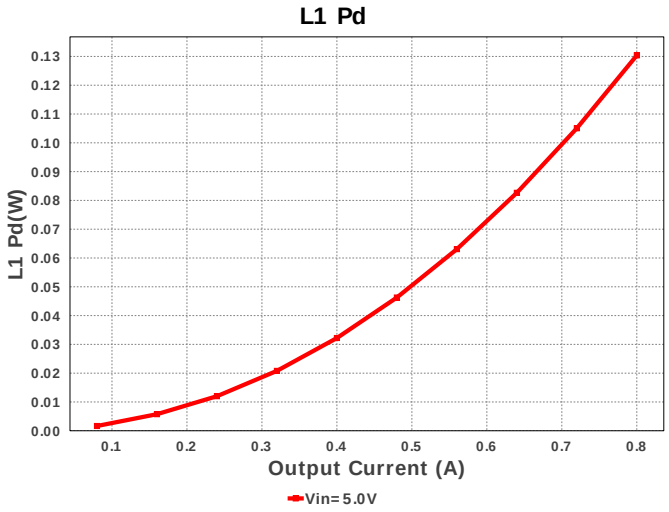


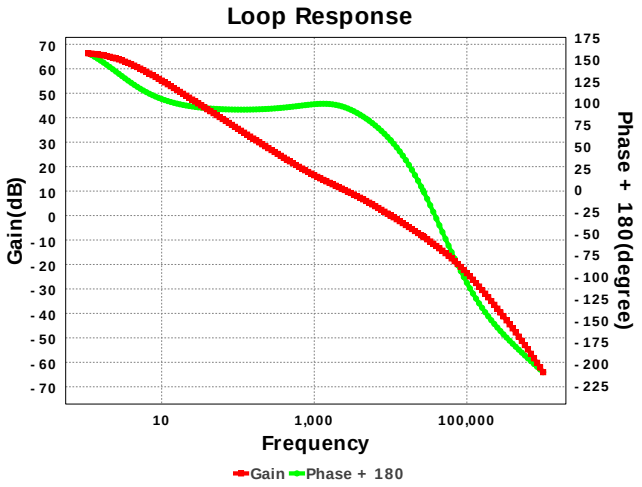












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	142.996 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.016 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.084 A	Current	Average input current
4.	L Ipp	495.35 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	2.085 A	Current	Inductor ripple current
6.	M1 Irms	1.293 A	Current	M1 MOSFET Irms
7.	SW Ipk	2.327 A	Current	Peak switch current
8.	BOM Count	17	General	Total Design BOM count
9.	FootPrint	317.0 mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	600.0 kHz	General	Switching frequency
11.	IC Tolerance	13.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	12.533 mV	General	M Vds
13.	M1 Rdson	9.693 mOhm	General	Drain-Source On-resistance
14.	M1 ThetaJA	55.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
15.	M2 Rdson	9.623 mOhm	General	Drain-Source On-resistance
16.	M2 ThetaJA	55.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
17.	Mode	CCM	General	Conduction Mode
18.	Pout	9.601 W	General	Total output power
19.	Total BOM	$2.96	General	Total BOM Cost
20.	D1 Tj	38.493 degC	Op_Point	D1 junction temperature
21.	Low Freq Gain	66.322 dB	Op_Point	Gain at 10Hz
22.	Vout Actual	12.002 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
23.	Vout OP	12.002 V	Op_Point	Operational Output Voltage
24.	Cross Freq	10.067 kHz	Op_point	Bode plot crossover frequency
25.	Duty Cycle	61.533 %	Op_point	Duty cycle
26.	Efficiency	92.148 %	Op_point	Steady state efficiency
27.	Gain Marg	-8.532 dB	Op_point	Bode Plot Gain Margin
28.	IC Tj	31.405 degC	Op_point	IC junction temperature
29.	ICThetaJA	36.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
30.	IOUT_OP	800.0 mA	Op_point	Iout operating point
31.	M1 TjOP	34.515 degC	Op_point	M1 MOSFET junction temperature

#	Name	Value	Category	Description
32.	M2 TjOP	32.3 degC	Op_point	M2 MOSFET junction temperature
33.	Phase Marg	57.312 deg	Op_point	Bode Plot Phase Margin
34.	VIN_OP	5.0 V	Op_point	Vin operating point
35.	Vout p-p	75.534 mV	Op_point	Peak-to-peak output ripple voltage
36.	Cin Pd	75.841 µW	Power	Input capacitor power dissipation
37.	Cout Pd	1.074 mW	Power	Output capacitor power dissipation
38.	D1 Pd	339.733 mW	Power	Output Diode Power Dissipation
39.	Diode Pd	339.733 mW	Power	Diode power dissipation
40.	IC Pd	39.04 mW	Power	IC power dissipation
41.	L Pd	130.366 mW	Power	Inductor power dissipation
42.	L1 Pd	130.366 mW	Power	Power Dissipation in the Inductor
43.	M1 Pd	82.092 mW	Power	M1 MOSFET total power dissipation
44.	M1 PdCond	16.204 mW	Power	M1 MOSFET conduction losses
45.	M1 PdSw	65.888 mW	Power	M1 MOSFET switching losses
46.	M2 Pd	41.826 mW	Power	M2 MOSFET total power dissipation
47.	Rfb Pd	15.242 mW	Power	Rfb Power Dissipation
48.	Rsense Pd	154.795 mW	Power	Rsense Power Dissipation
49.	Total Pd	818.139 mW	Power	Total Power Dissipation
50.	Vout Tolerance	2.848 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	800.0 m	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	LM3017	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. LM3017 Product Folder : http://www.ti.com/product/LM3017 : contains the data sheet and other resources.