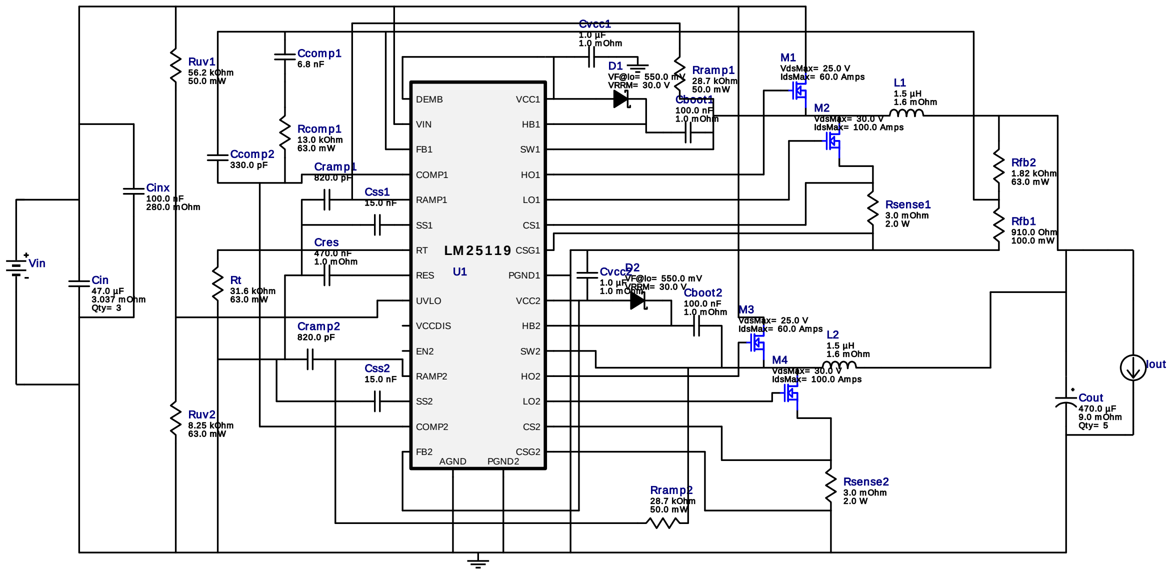
VinMin = 12.0V
VinMax = 12.0V
Vout = 2.4V
Iout = 40.0A

Device = LM25119PSQ/NOPB
Topology = Buck
Created = 2024-02-27 17:39:41.447
BOM Cost = $12.39
BOM Count = 39
Total Pd = 7.95W

WEBENCH ® Design Report

Design : 15 LM25119PSQ/NOPB
LM25119PSQ/NOPB 12V-12V to 2.40V @ 40A

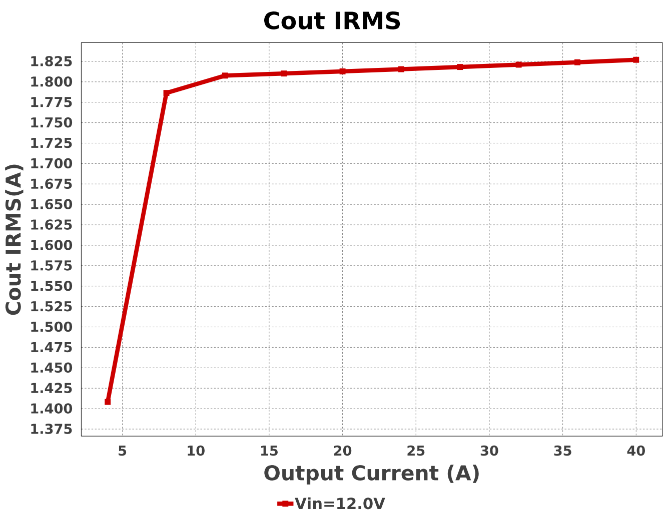


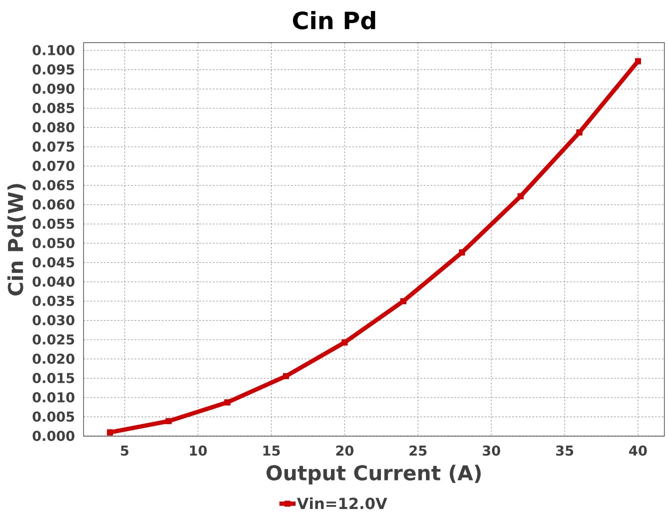
Electrical BOM

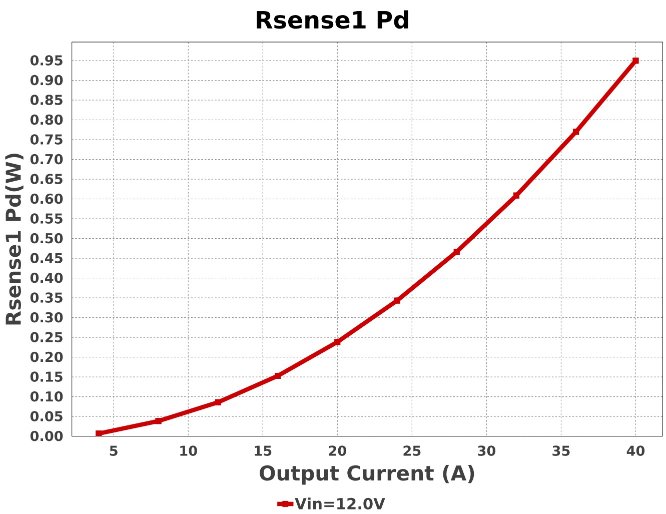
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cboot1	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
Cboot2	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
Ccomp1	TDK	C2012C0G1H682J060AA Series= C0G/NP0	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.04	0805 7 mm²
Ccomp2	Samsung Electro-Mechanics	CL21C331JBANNNC Series= C0G/NP0	Cap= 330.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
Cin	MuRata	GRM32ER61C476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.037 mOhm VDC= 16.0 V IRMS= 4.59346 A	3	$0.17	1210_280 15 mm²
Cinx	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 mm²
Cout	Chemi-Con	APXF6R3ARA471MH80G Series= PXF	Cap= 470.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 4.5 A	5	$0.44	CAPSMT_62_H80 106 mm²
Cramp1	Samsung Electro-Mechanics	CL21C821JBCNNNC Series= C0G/NP0	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²

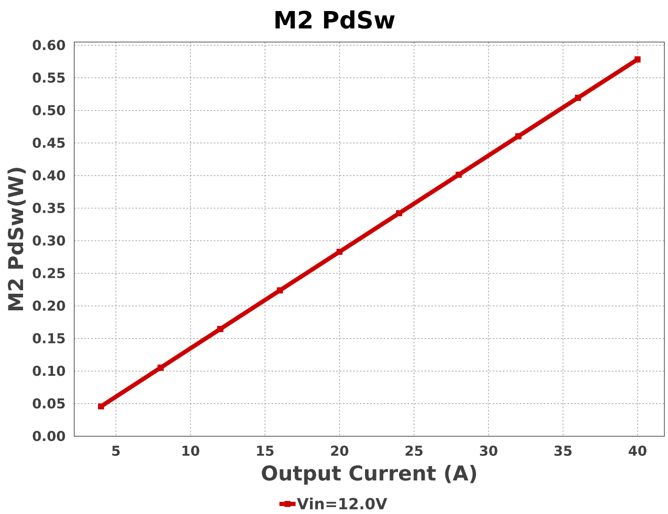
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cramp2	Samsung Electro-Mechanics	CL21C821JBCNNNC Series= C0G/NP0	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
Cres	Taiyo Yuden	GMK212BJ474KG-T Series= X5R	Cap= 470.0 nF ESR= 1.0 mOhm VDC= 35.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm^2
Css1	TDK	C2012C0G1H153J085AA Series= C0G/NP0	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.06	0805 7 mm^2
Css2	TDK	C2012C0G1H153J085AA Series= C0G/NP0	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.06	0805 7 mm^2
Cvcc1	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
Cvcc2	Kemet	C0603C105Z8VACTU Series= Y5V	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
D1	Panasonic	DB2S31600L	VF@Io= 550.0 mV VRRM= 30.0 V	1	$0.03	SOD-523 5 mm^2
D2	Panasonic	DB2S31600L	VF@Io= 550.0 mV VRRM= 30.0 V	1	$0.03	SOD-523 5 mm^2
L1	Coilcraft	XAL1010-152MEB	L= 1.5 µH 1.6 mOhm	1	$1.71	XAL1010 160 mm^2
L2	Coilcraft	XAL1010-152MEB	L= 1.5 µH 1.6 mOhm	1	$1.71	XAL1010 160 mm^2
M1	Texas Instruments	CSD16340Q3	VdsMax= 25.0 V IdsMax= 60.0 Amps	1	$0.33	DQG0008A 18 mm^2
M2	Texas Instruments	CSD17573Q5B	VdsMax= 30.0 V IdsMax= 100.0 Amps	1	$0.48	DNK0008A 56 mm^2
M3	Texas Instruments	CSD16340Q3	VdsMax= 25.0 V IdsMax= 60.0 Amps	1	$0.33	DQG0008A 18 mm^2
M4	Texas Instruments	CSD17573Q5B	VdsMax= 30.0 V IdsMax= 100.0 Amps	1	$0.48	DNK0008A 56 mm^2
Rcomp1	Vishay-Dale	CRCW040213K0FKED Series= CRCW..e3	Res= 13.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfb1	Yageo	RC0603FR-07910RL Series= ?	Res= 910.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rfb2	Vishay-Dale	CRCW04021K82FKED Series= CRCW..e3	Res= 1.82 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rramp1	Yageo	RC0201FR-0728K7L Series= ?	Res= 28.7 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2

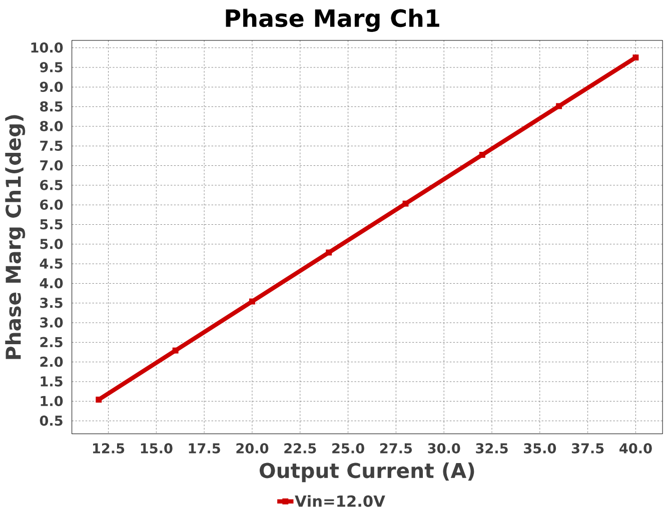
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Rramp2	Yageo	RC0201FR-0728K7L Series= ?	Res= 28.7 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rsense1	Vishay-Dale	WSR23L000FEA Series= WSR	Res= 3.0 mOhm Power= 2.0 W Tolerance= 1.0%	1	$0.74	4527 122 mm^2
Rsense2	Vishay-Dale	WSR23L000FEA Series= WSR	Res= 3.0 mOhm Power= 2.0 W Tolerance= 1.0%	1	$0.74	4527 122 mm^2
Rt	Vishay-Dale	CRCW040231K6FKED Series= CRCW..e3	Res= 31.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Ruv1	Yageo	RC0201FR-0756K2L Series= ?	Res= 56.2 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Ruv2	Vishay-Dale	CRCW04028K25FKED Series= CRCW..e3	Res= 8.25 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
U1	Texas Instruments	LM25119PSQ/NOPB	Switcher	1	$2.75	SQA32A 49 mm^2

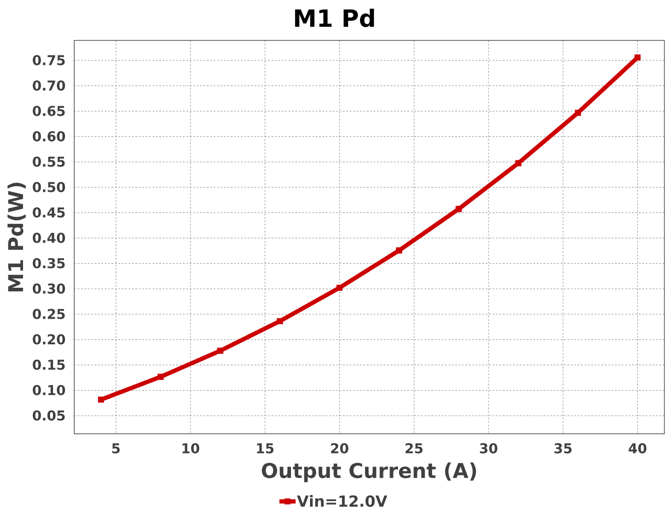


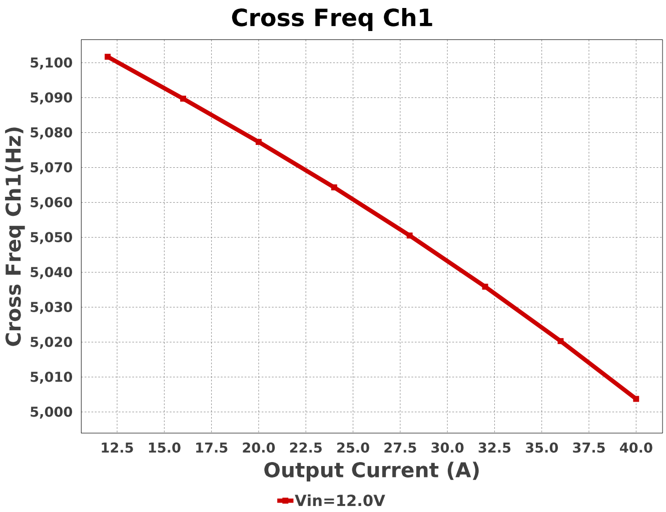


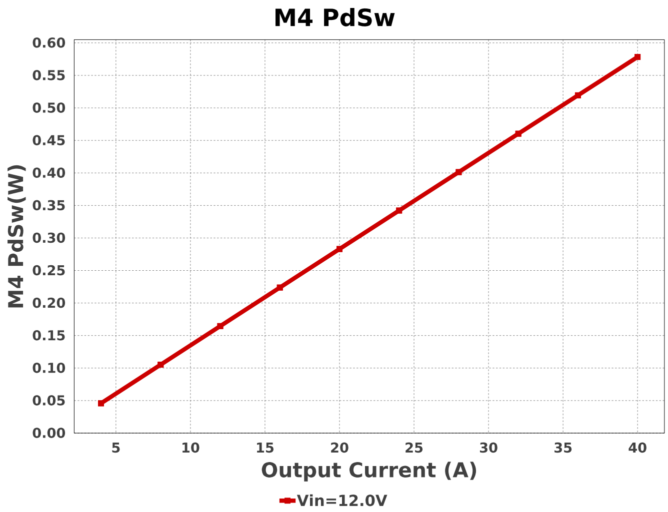


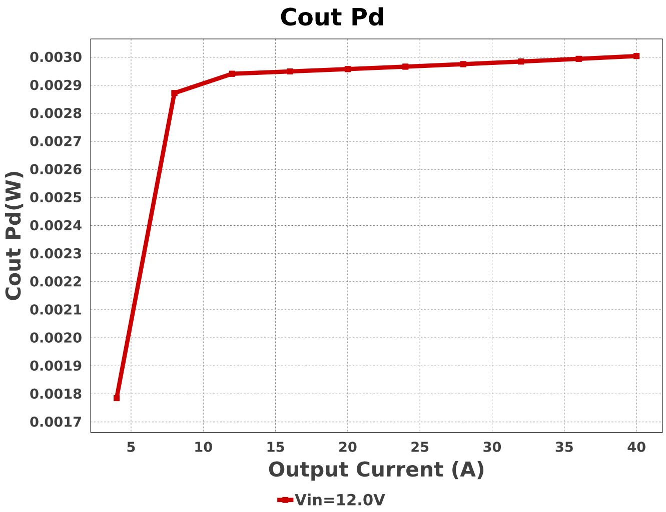


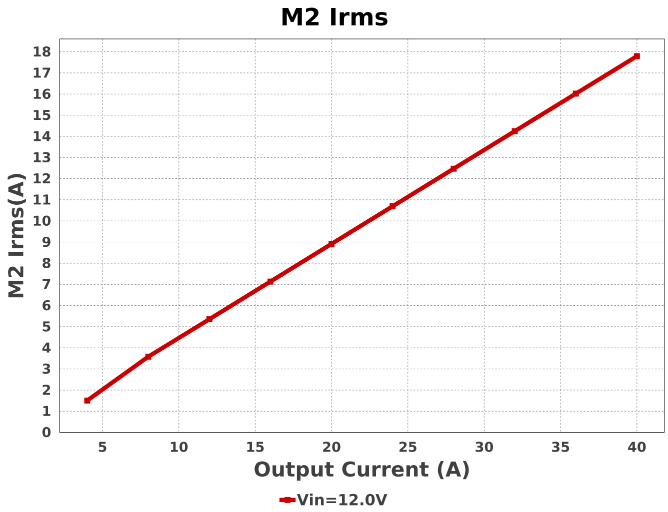

Phase Marg Ch1
Phase Marg Ch1(deg)
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
12.5 15.0 17.5 20.0 22.5 25.0 27.5 30.0 32.5 35.0 37.5 40.0
Output Current (A)
Vin=12.0V

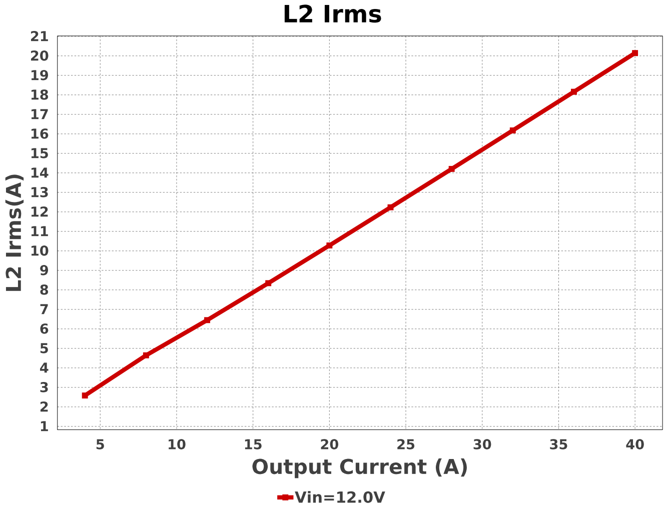

M1 Pd
M1 Pd(W)
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
5 10 15 20 25 30 35 40
Output Current (A)
Vin=12.0V

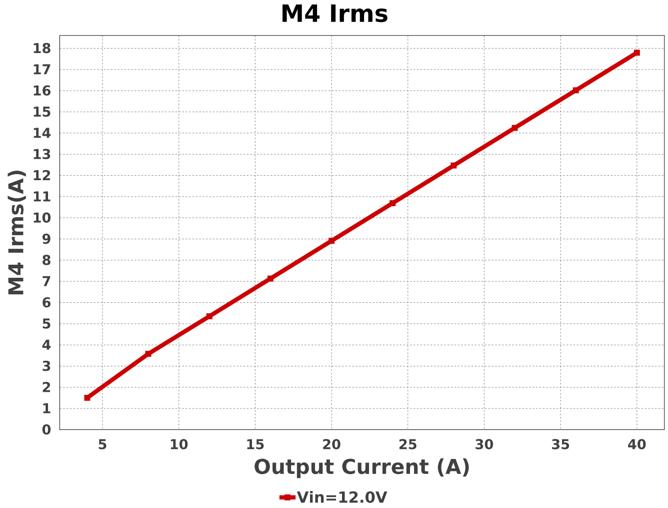

Cross Freq Ch1
Cross Freq Ch1(Hz)
5,100
5,090
5,080
5,070
5,060
5,050
5,040
5,030
5,020
5,010
5,000
12.5 15.0 17.5 20.0 22.5 25.0 27.5 30.0 32.5 35.0 37.5 40.0
Output Current (A)
Vin=12.0V

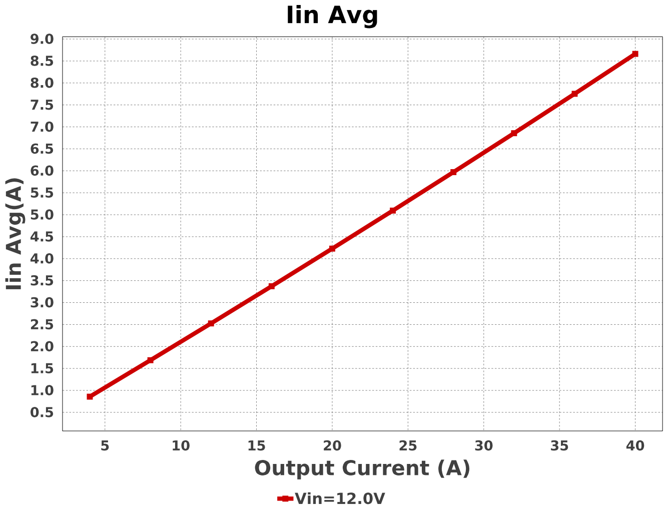

M4 PdSw
M4 PdSw(W)
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
5 10 15 20 25 30 35 40
Output Current (A)
Vin=12.0V

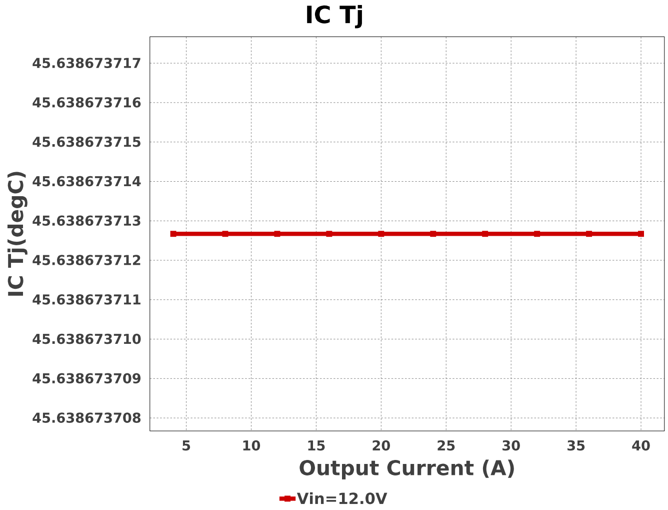

Cout Pd
Cout Pd(W)
0.0030
0.0029
0.0028
0.0027
0.0026
0.0025
0.0024
0.0023
0.0022
0.0021
0.0020
0.0019
0.0018
0.0017
5 10 15 20 25 30 35 40
Output Current (A)
Vin=12.0V

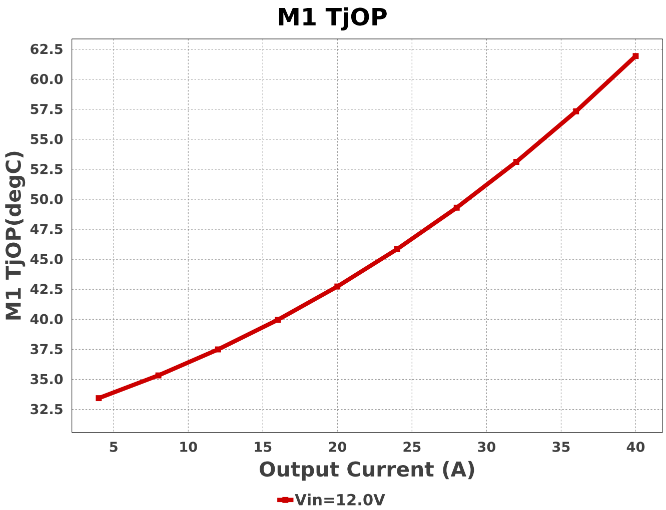

M2 Irms
M2 Irms(A)
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
5 10 15 20 25 30 35 40
Output Current (A)
Vin=12.0V

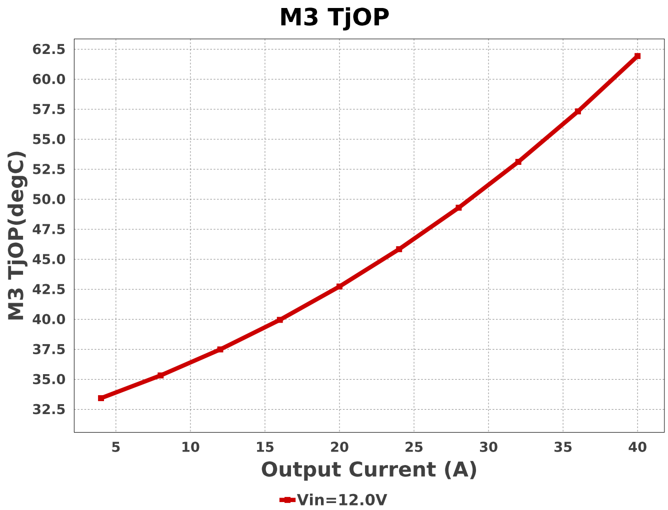

L2 Irms
L2 Irms(A)
Output Current (A)
Vin=12.0V

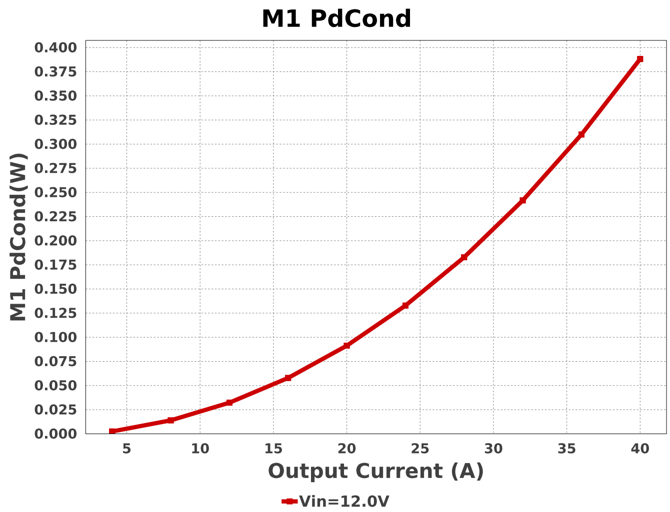

M4 Irms
M4 Irms(A)
Output Current (A)
Vin=12.0V

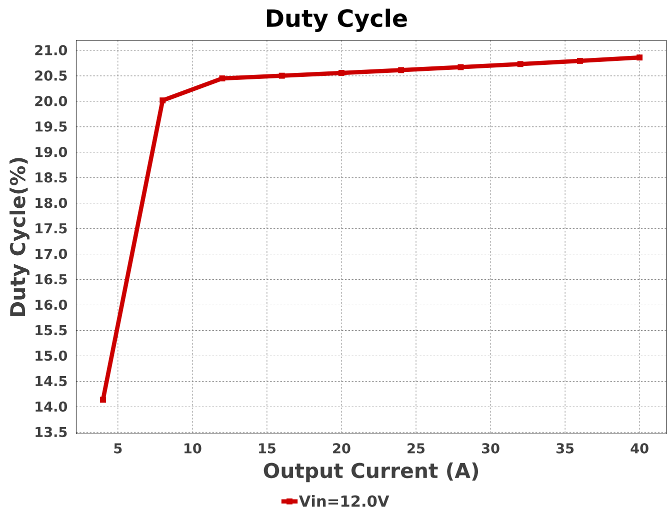

Iin Avg
Iin Avg(A)
Output Current (A)
Vin=12.0V

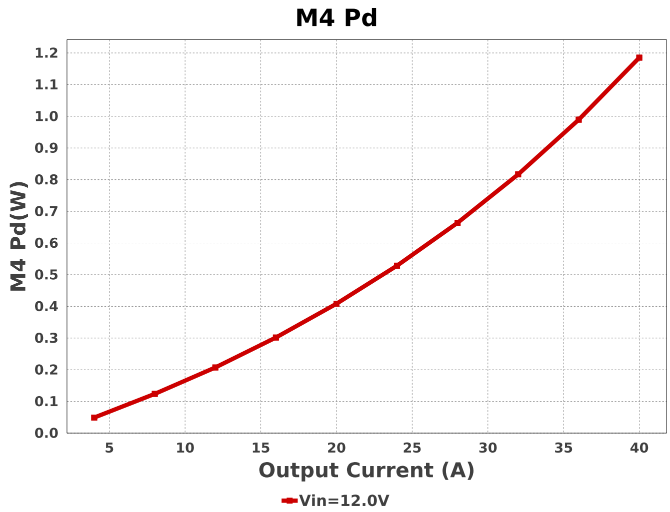

IC Tj
IC Tj(degC)
Output Current (A)
Vin=12.0V

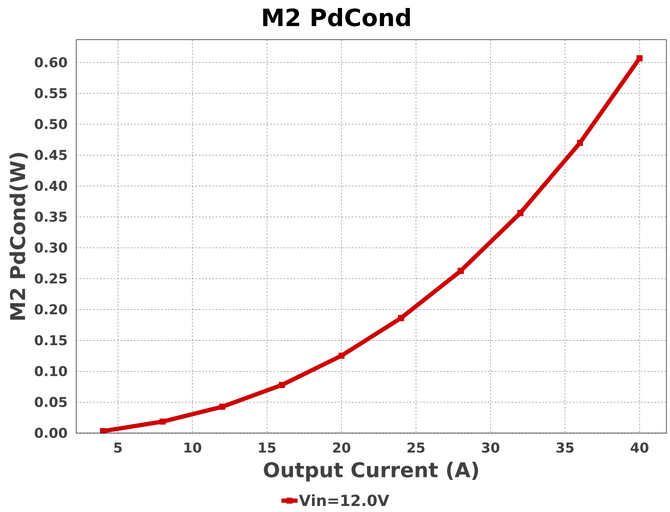

M1 TjOP
M1 TjOP(degC)
Output Current (A)
Vin=12.0V

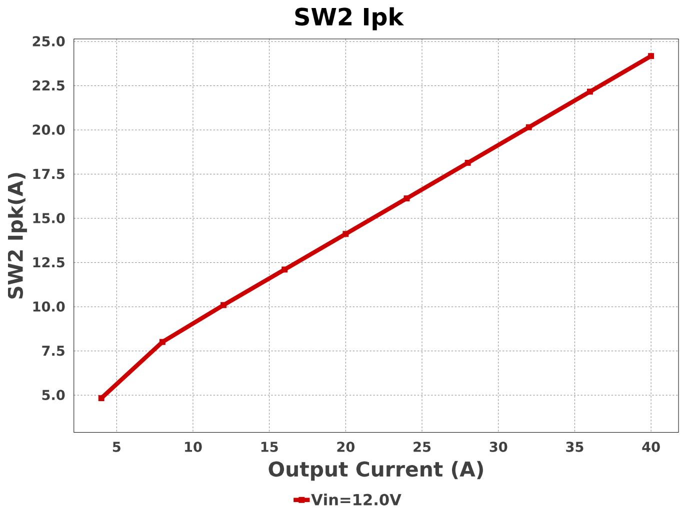

M3 TjOP
M3 TjOP(degC)
Output Current (A)
Vin=12.0V

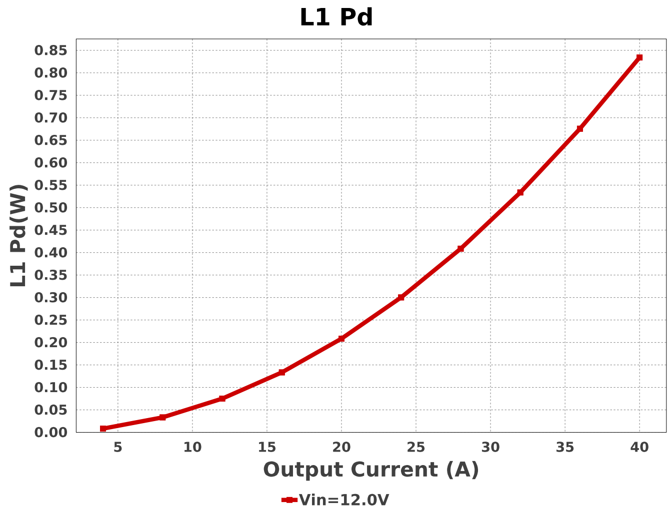

M1 PdCond
M1 PdCond(W)
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

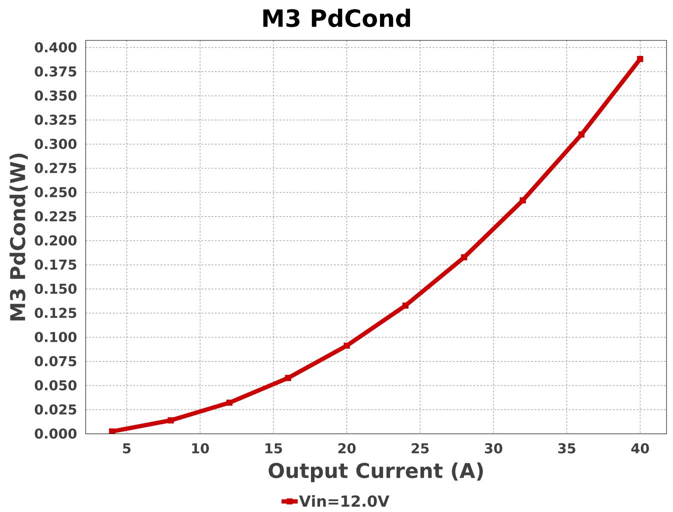

Duty Cycle
Duty Cycle(%)
21.0
20.5
20.0
19.5
19.0
18.5
18.0
17.5
17.0
16.5
16.0
15.5
15.0
14.5
14.0
13.5
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

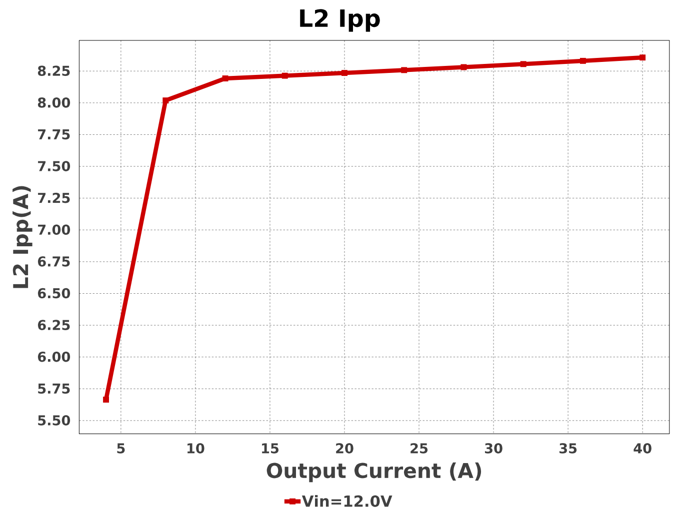

M4 Pd
M4 Pd(W)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

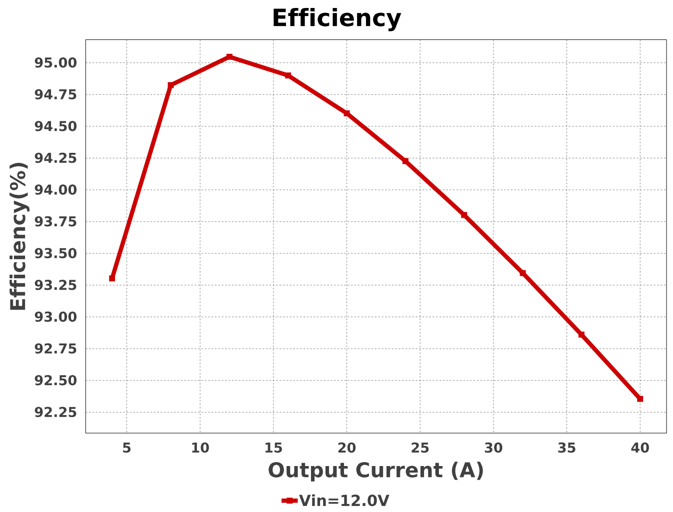

M2 PdCond
M2 PdCond(W)
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

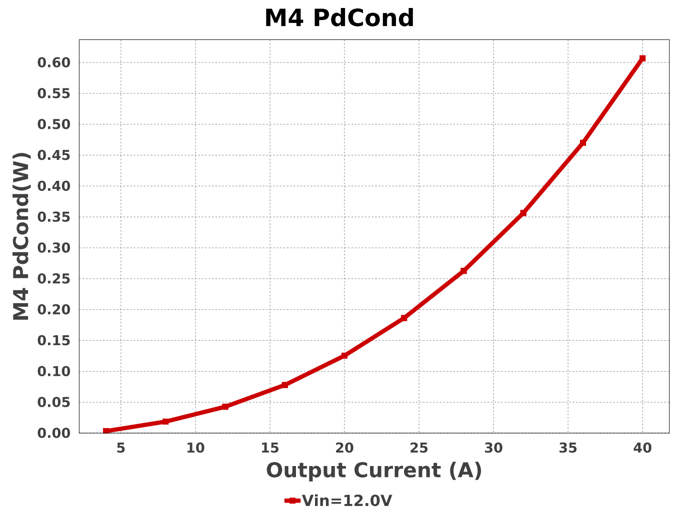

SW2 Ipk
SW2 Ipk(A)
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

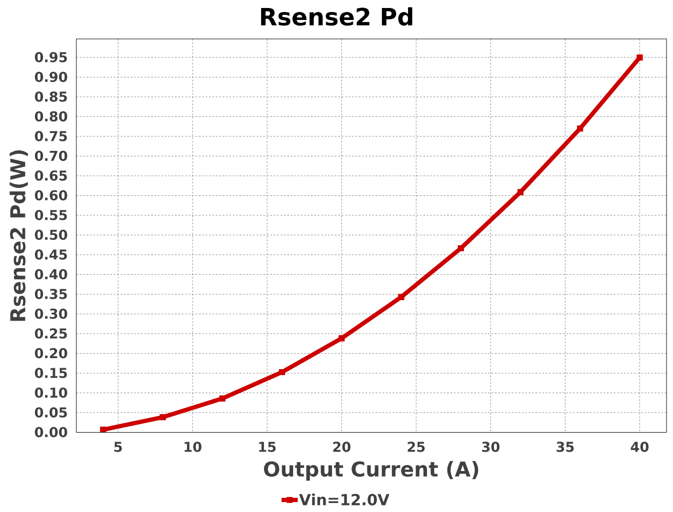

L1 Pd
L1 Pd(W)
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

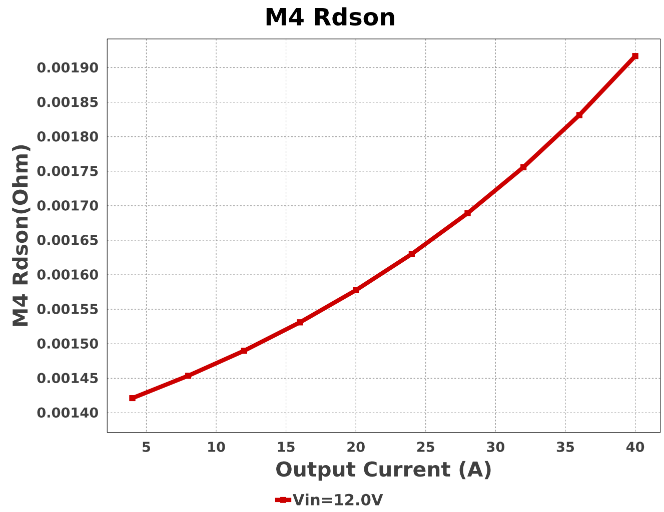

M3 PdCond
M3 PdCond(W)
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

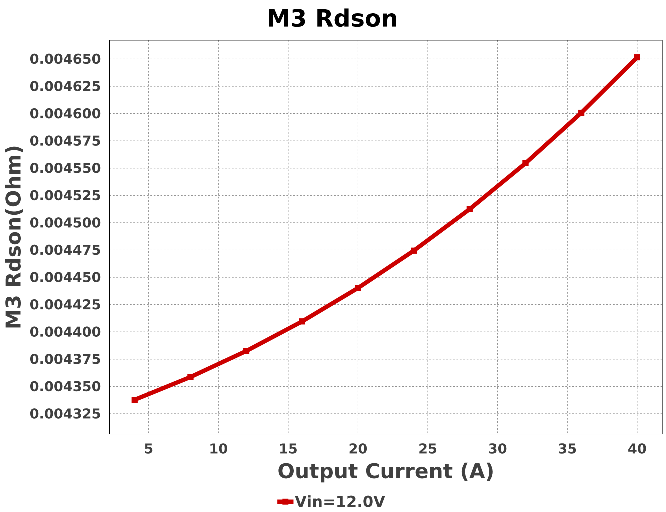

L2 Ipp
L2 Ipp(A)
8.25
8.00
7.75
7.50
7.25
7.00
6.75
6.50
6.25
6.00
5.75
5.50
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

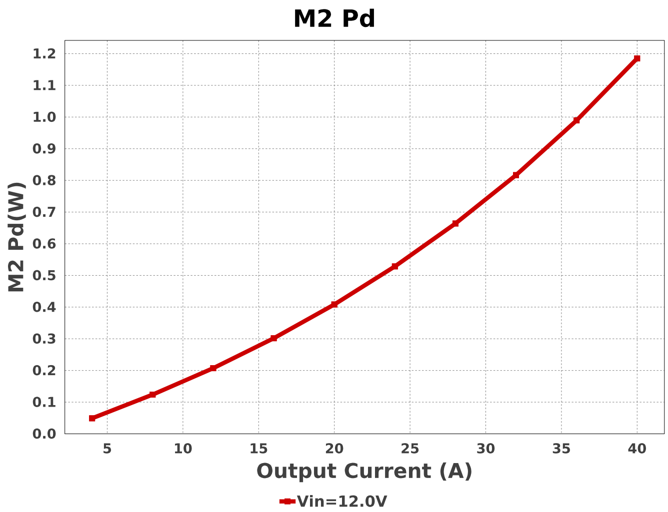

Efficiency
Efficiency(%)
95.00
94.75
94.50
94.25
94.00
93.75
93.50
93.25
93.00
92.75
92.50
92.25
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

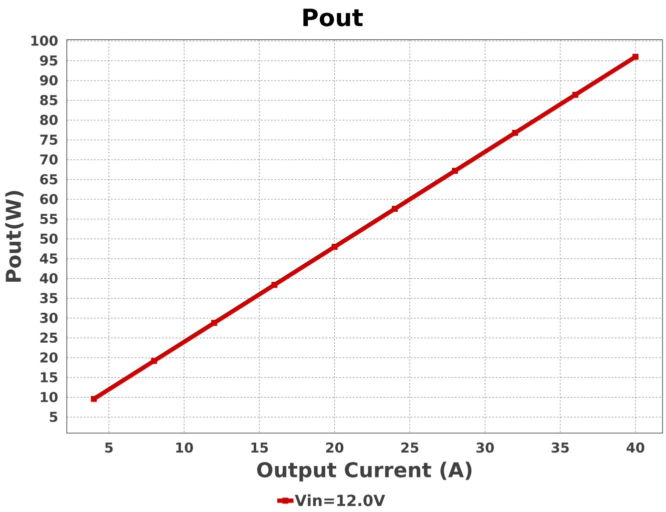

M4 PdCond
M4 PdCond(W)
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

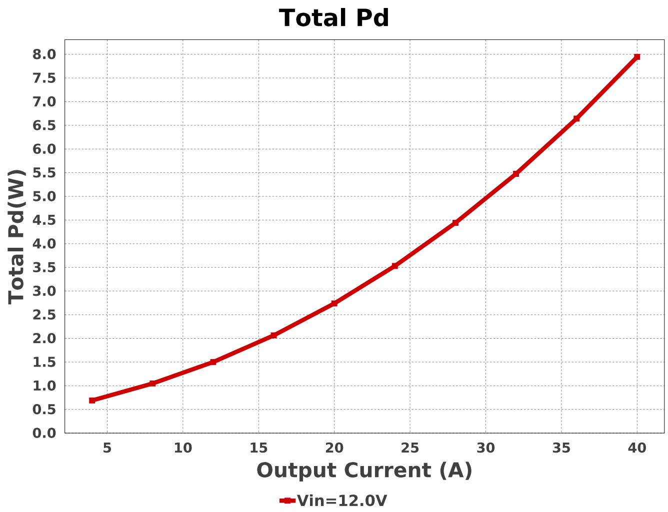

Rsense2 Pd
Rsense2 Pd(W)
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

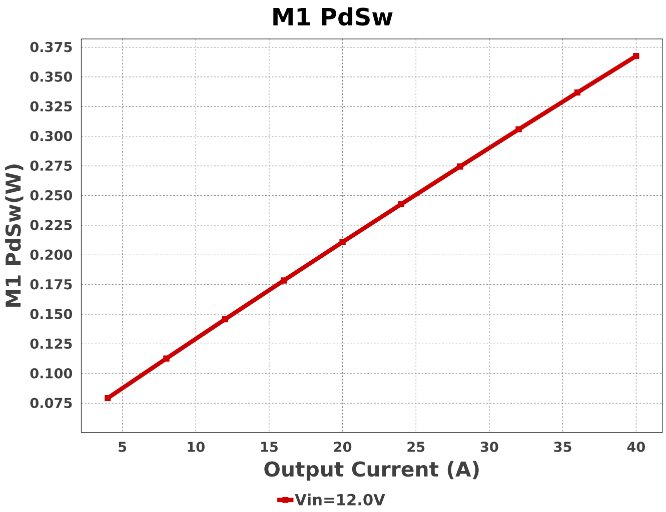

M4 Rdson
M4 Rdson(Ohm)
0.00190
0.00185
0.00180
0.00175
0.00170
0.00165
0.00160
0.00155
0.00150
0.00145
0.00140
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

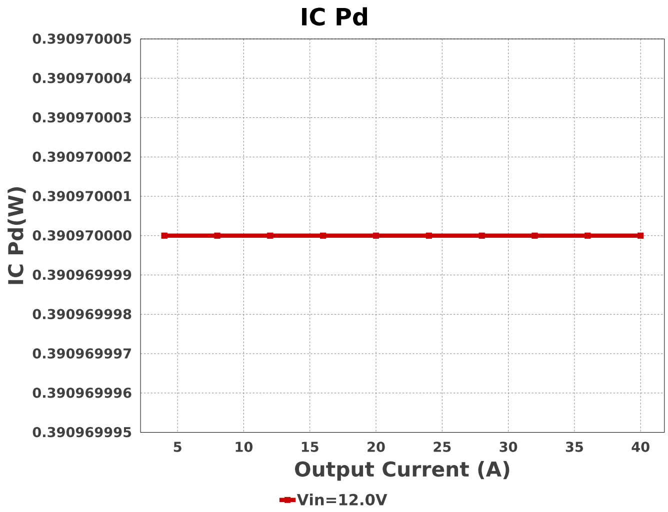

M3 Rdson
M3 Rdson(Ohm)
Output Current (A)
Vin=12.0V

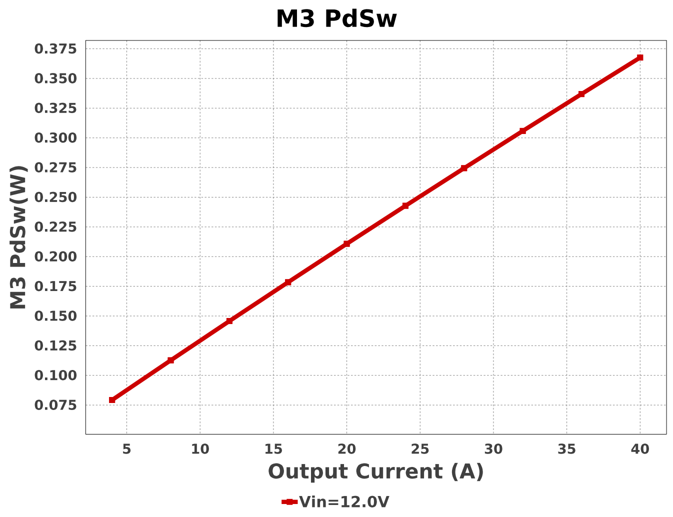

M2 Pd
M2 Pd(W)
Output Current (A)
Vin=12.0V

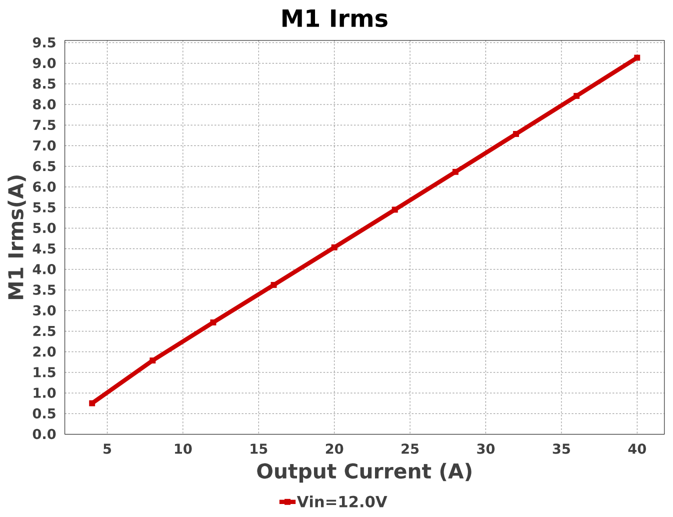

Pout
Pout(W)
Output Current (A)
Vin=12.0V

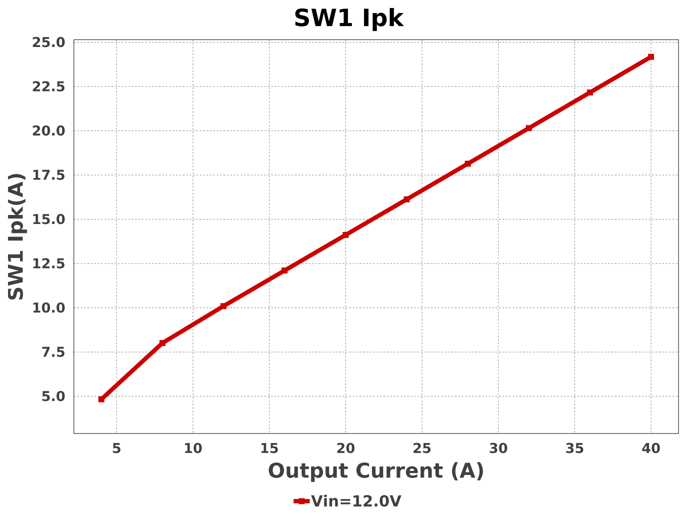

Total Pd
Total Pd(W)
Output Current (A)
Vin=12.0V

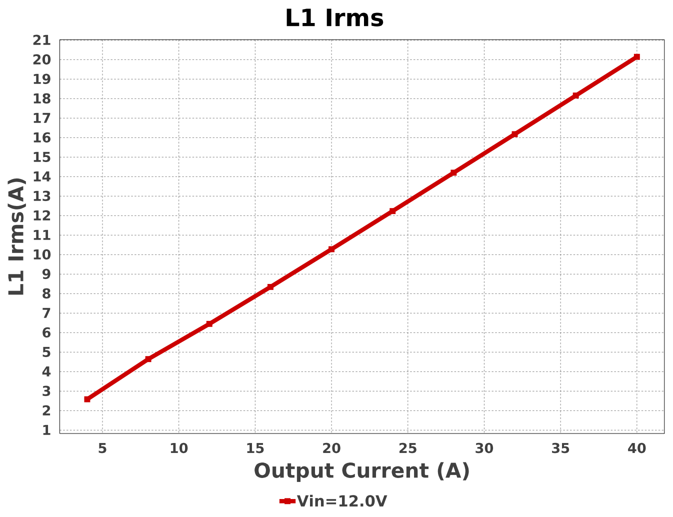

M1 PdSw
M1 PdSw(W)
Output Current (A)
Vin=12.0V

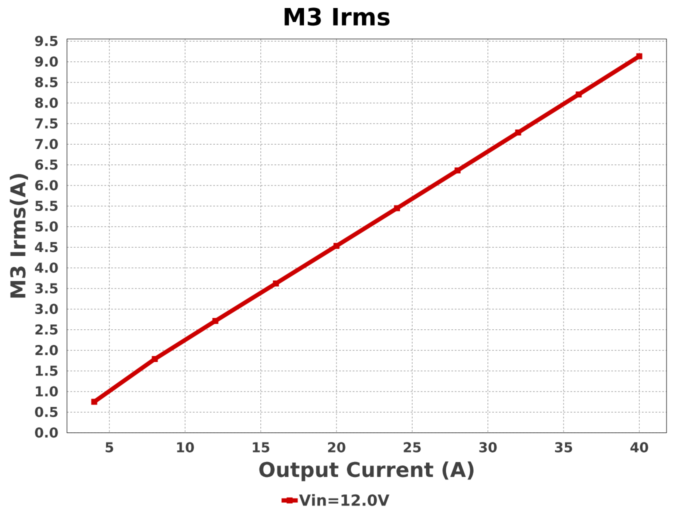

IC Pd
IC Pd(W)
Output Current (A)
Vin=12.0V

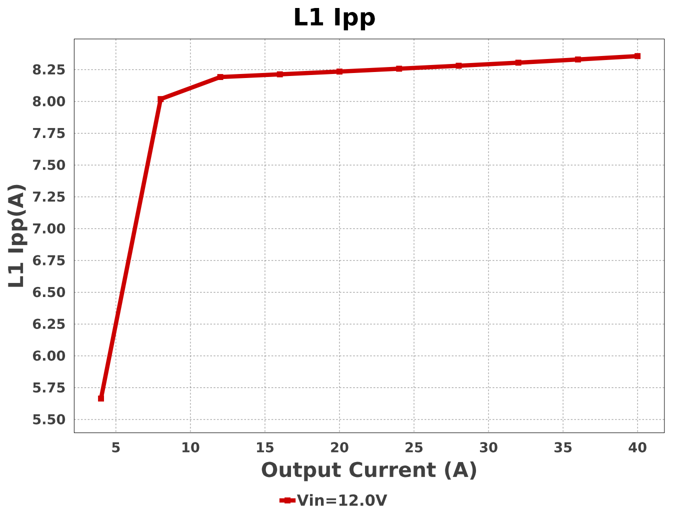

M3 PdSw
M3 PdSw(W)
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

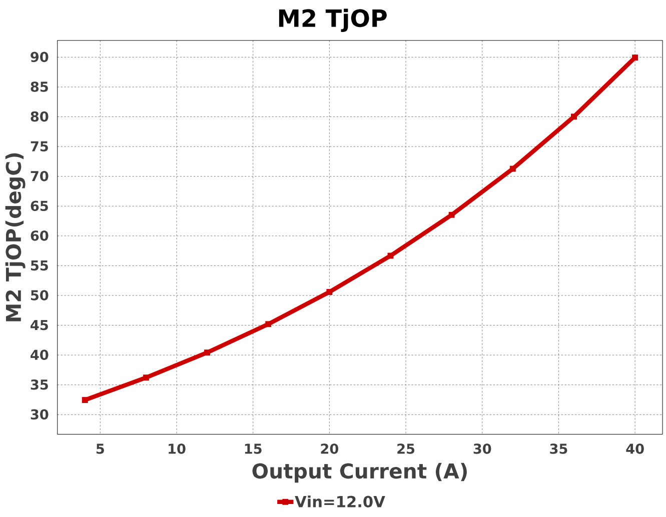

M1 Irms
M1 Irms(A)
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

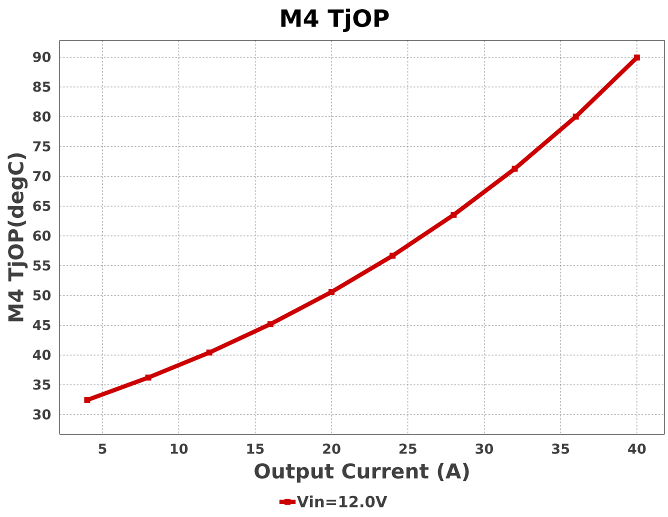

SW1 Ipk
SW1 Ipk(A)
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

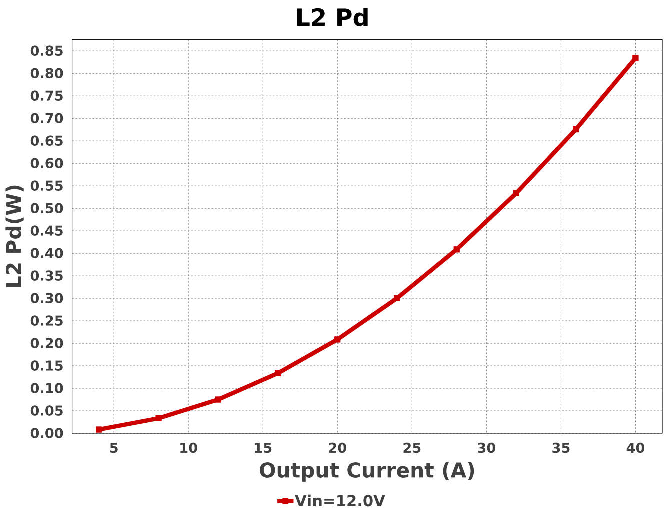

L1 Irms
L1 Irms(A)
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

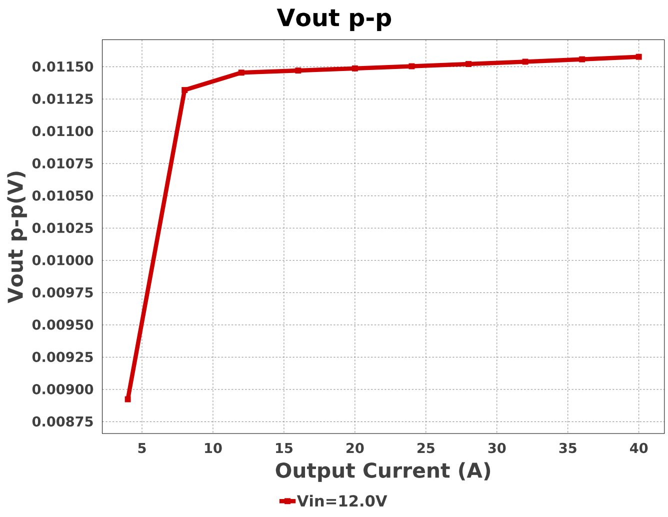

M3 Irms
M3 Irms(A)
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

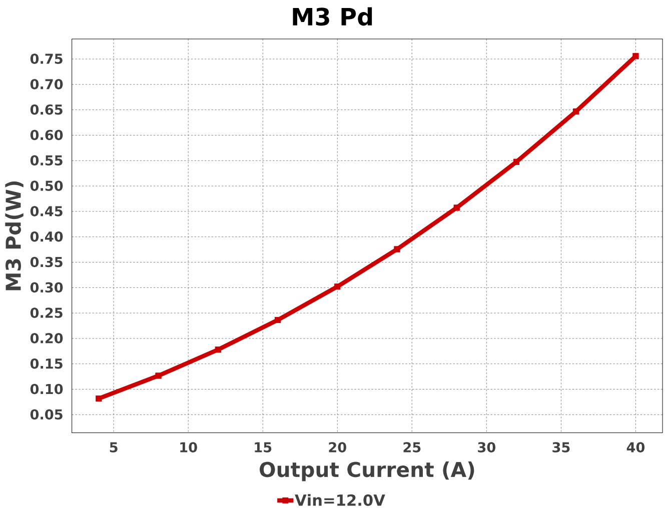

L1 Ipp
L1 Ipp(A)
8.25
8.00
7.75
7.50
7.25
7.00
6.75
6.50
6.25
6.00
5.75
5.50
5
10
15
20
25
30
35
40
Output Current (A)
Vin=12.0V

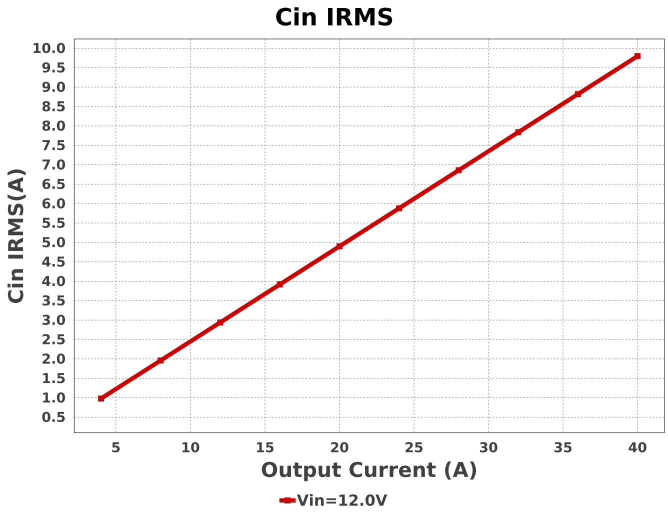

M2 TjOP
M2 TjOP(degC)
Output Current (A)
Vin=12.0V

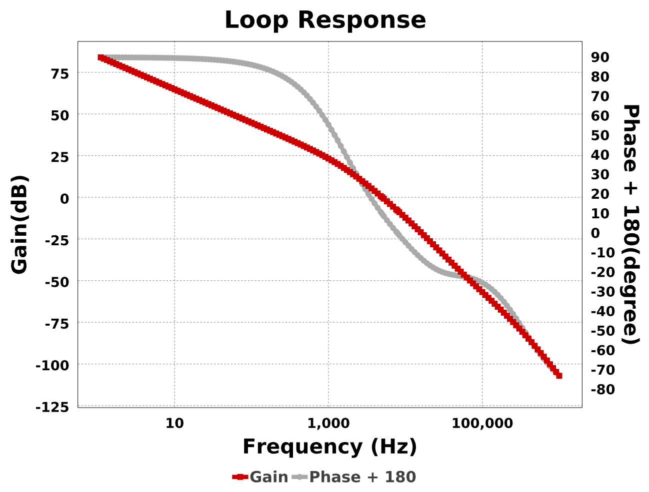

M4 TjOP
M4 TjOP(degC)
Output Current (A)
Vin=12.0V


L2 Pd
L2 Pd(W)
Output Current (A)
Vin=12.0V


Vout p-p
Vout p-p(V)
Output Current (A)
Vin=12.0V


M3 Pd
M3 Pd(W)
Output Current (A)
Vin=12.0V


Cin IRMS
Cin IRMS(A)
Output Current (A)
Vin=12.0V



Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	9.798 A	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	97.184 mW	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	1.827 A	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	3.004 mW	Capacitor	Output capacitor power dissipation
5.	SW1 Ipk	24.178 A	Current	Peak switch current
6.	SW2 Ipk	24.178 A	Current	Peak switch current
7.	IC Pd	390.97 mW	IC	IC power dissipation
8.	IC Tj	45.639 degC	IC	IC junction temperature
9.	IC Tolerance	12.0 mV	IC	IC Feedback Tolerance
10.	Iin Avg	8.662 A	IC	Average input current
11.	L1 Ipp	8.357 A	Inductor	Peak-to-peak inductor ripple current
12.	L1 Irms	20.144 A	Inductor	Inductor ripple current
13.	L1 Pd	834.08 mW	Inductor	Inductor power dissipation
14.	L2Ipp	8.357 A	Inductor	Channel 2 Inductor Peak to peak Current
15.	L2 Irms	20.144 A	Inductor	Inductor ripple current
16.	L2 Pd	834.08 mW	Inductor	Inductor power dissipation
17.	M1 Irms	9.135 A	Mosfet	MOSFET RMS ripple current
18.	M1 Pd	755.73 mW	Mosfet	M1 MOSFET total power dissipation
19.	M1 PdCond	388.13 mW	Mosfet	M1 MOSFET conduction losses
20.	M1 PdSw	367.6 mW	Mosfet	M1 MOSFET switching losses
21.	M1 TjOP	61.934 degC	Mosfet	M1 MOSFET junction temperature
22.	M2 Irms	17.792 A	Mosfet	MOSFET RMS ripple current
23.	M2 Pd	1.185 W	Mosfet	M2 MOSFET total power dissipation
24.	M2 PdCond	606.81 mW	Mosfet	M2 MOSFET conduction losses
25.	M2 PdSw	578.28 mW	Mosfet	M2 MOSFET switching losses
26.	M2 TjOP	89.937 degC	Mosfet	M2 MOSFET junction temperature
27.	M3 Irms	9.135 A	Mosfet	MOSFET RMS ripple current
28.	M3 Pd	755.73 mW	Mosfet	M3 MOSFET total power dissipation
29.	M3 PdCond	388.13 mW	Mosfet	M3 MOSFET conduction losses
30.	M3 PdSw	367.6 mW	Mosfet	M3 MOSFET switching losses
31.	M3 TjOP	61.934 degC	Mosfet	M3 MOSFET junction temperature
32.	M4 Irms	17.792 A	Mosfet	MOSFET RMS ripple current
33.	M4 Pd	1.185 W	Mosfet	M4 MOSFET total power dissipation
34.	M4 PdCond	606.81 mW	Mosfet	M4 MOSFET conduction losses
35.	M4 PdSw	578.28 mW	Mosfet	M4 MOSFET switching losses
36.	M4 TjOP	89.937 degC	Mosfet	M4 MOSFET junction temperature
37.	Cin Pd	97.184 mW	Power	Input capacitor power dissipation
38.	Cout Pd	3.004 mW	Power	Output capacitor power dissipation
39.	IC Pd	390.97 mW	Power	IC power dissipation
40.	L1 Pd	834.08 mW	Power	Inductor power dissipation
41.	L2 Pd	834.08 mW	Power	Inductor power dissipation
42.	M1 Pd	755.73 mW	Power	M1 MOSFET total power dissipation
43.	M1 PdCond	388.13 mW	Power	M1 MOSFET conduction losses
44.	M1 PdSw	367.6 mW	Power	M1 MOSFET switching losses
45.	M2 Pd	1.185 W	Power	M2 MOSFET total power dissipation
46.	M2 PdCond	606.81 mW	Power	M2 MOSFET conduction losses
47.	M2 PdSw	578.28 mW	Power	M2 MOSFET switching losses
48.	M3 Pd	755.73 mW	Power	M3 MOSFET total power dissipation
49.	M3 PdCond	388.13 mW	Power	M3 MOSFET conduction losses
50.	M3 PdSw	367.6 mW	Power	M3 MOSFET switching losses
51.	M1 Rdson	4.652 mOhm	Power	Drain-Source On-resistance
52.	M3 Rdson	4.652 mOhm	Power	Drain-Source On-resistance

#	Name	Value	Category	Description
53.	M4 Pd	1.185 W	Power	M4 MOSFET total power dissipation
54.	M4 PdCond	606.81 mW	Power	M4 MOSFET conduction losses
55.	M4 PdSw	578.28 mW	Power	M4 MOSFET switching losses
56.	M2 Rdson	1.917 mOhm	Power	Drain-Source On-resistance
57.	M4 Rdson	1.917 mOhm	Power	Drain-Source On-resistance
58.	Rsense1 Pd	949.67 mW	Power	Current Limit Sense Resistor Power Dissipation
59.	Rsense2 Pd	949.67 mW	Power	Current Limit Sense Resistor Power Dissipation
60.	Total Pd	7.946 W	Power	Total Power Dissipation
61.	Rsense1 Pd	949.67 mW	Resistor	Current Limit Sense Resistor Power Dissipation
62.	Rsense2 Pd	949.67 mW	Resistor	Current Limit Sense Resistor Power Dissipation
63.	BOM Count	39	System Information	Total Design BOM count
64.	Cross Freq Ch1	5.004 kHz	System Information	Bode plot crossover frequency
65.	Duty Cycle	20.86 %	System Information	Duty cycle
66.	Efficiency	92.355 %	System Information	Steady state efficiency
67.	FootPrint	1.438 k mm^2	System Information	Total Foot Print Area of BOM components
68.	Frequency	159.764 kHz	System Information	Switching frequency
69.	Gain Marg	-7.954 dB	System Information	Bode Plot Gain Margin
70.	Iout	40.0 A	System Information	Iout operating point
71.	Low Freq Gain	83.986 dB	System Information	Gain at 1Hz
72.	Mode	CCM	System Information	Conduction Mode
73.	Phase Marg Ch1	9.752 deg	System Information	Bode Plot Phase Margin
74.	Pout	96.0 W	System Information	Total output power
75.	Total BOM	$12.386	System Information	Total BOM Cost
76.	Vin	12.0 V	System Information	Vin operating point
77.	Vout	2.4 V	System Information	Operational Output Voltage
78.	Vout Actual	2.4 V	System Information	Vout Actual calculated based on selected voltage divider resistors
79.	Vout Tolerance	2.867 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
80.	Vout p-p	11.577 mV	System Information	Peak-to-peak output ripple voltage

Design Inputs

Name	Value	Description
Iout	40.0	Maximum Output Current
VinMax	12.0	Maximum input voltage
VinMin	12.0	Minimum input voltage
Vout	2.4	Output Voltage
base_pn	LM25119	Base Product Number
source	DC	Input Source Type
Ta	30.0	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

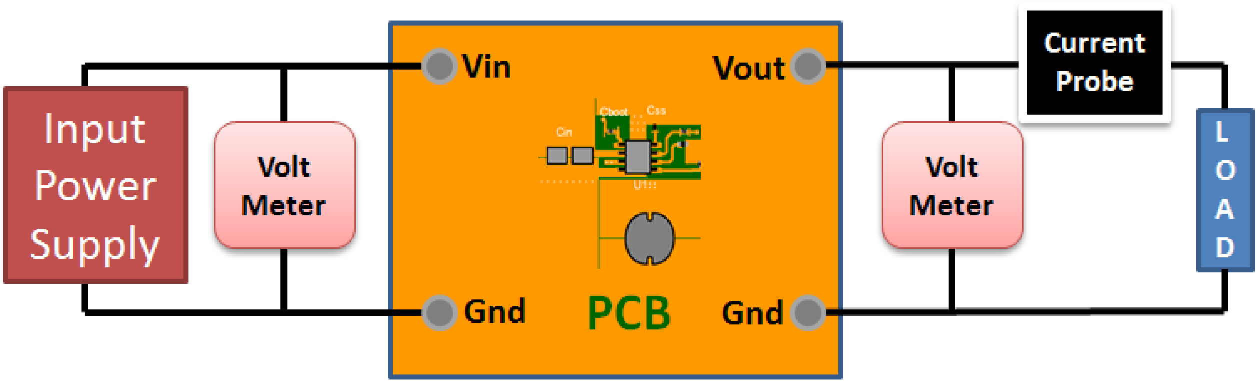
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 12.0V 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.



Design Assistance

1. Outline The LM5119 is a dual synchronous buck controller intended for step-down regulator applications from a high voltage or widely varying input supply. The control method is based upon current mode control utilizing an emulated current ramp. Current mode control provides inherent line feed-forward, cycle-by-cycle current limiting and ease of loop compensation. The use of an emulated control ramp reduces noise sensitivity of the pulse-width modulation circuit, allowing reliable control of very small duty cycles necessary in high input voltage applications. Interleaved Operation Interleaved operation can offer many advantages in single output, high current applications. The output power path is split between two identical channels reducing the current in each channel by one-half. Ripple current reduction in the output capacitors is reduced significantly since each channel operates 180 degrees out of phase from the other. Diode Emulation A fully synchronous buck regulator implemented with a freewheel MOSFET rather than a diode has the capability to sink current from the output in certain conditions such as light load, over-voltage or pre-bias startup. The LM(2)5119 provides a diode emulation feature that can be enabled to prevent reverse (drain to source) current flow in the low side free-wheel MOSFET.

2. Master key : 199B827D66DC0C6B8BB2074C791C30A4[v1]

3. **LM25119** Product Folder : http://www.ti.com/product/LM25119 : contains the data sheet and other resources.