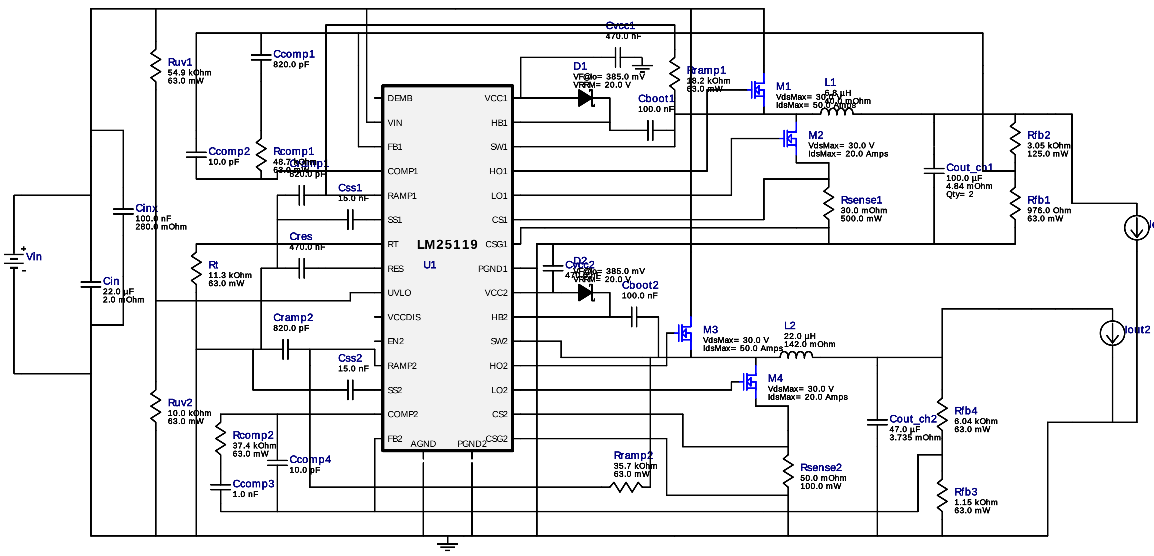
VinMin = 10.0V
VinMax = 14.0V
Vout = 3.3V
Iout = 2.0A

Device = LM25119PSQ/NOPB
Topology = Buck
Created = 8/29/16 5:32:42 PM
BOM Cost = $5.07
BOM Count = 40
Total Pd = 1.15W

TEXAS INSTRUMENTS

WEBENCH ® Design Report

Design : 4779867/1 LM25119PSQ/NOPB
LM25119PSQ/NOPB 10.0V-14.0V to 5.00V @ 1.0A



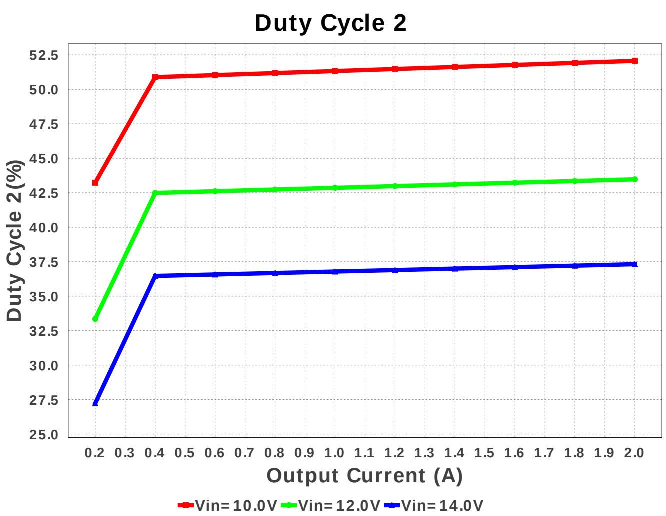
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application.View WEBENCH(R) Disclaimer.

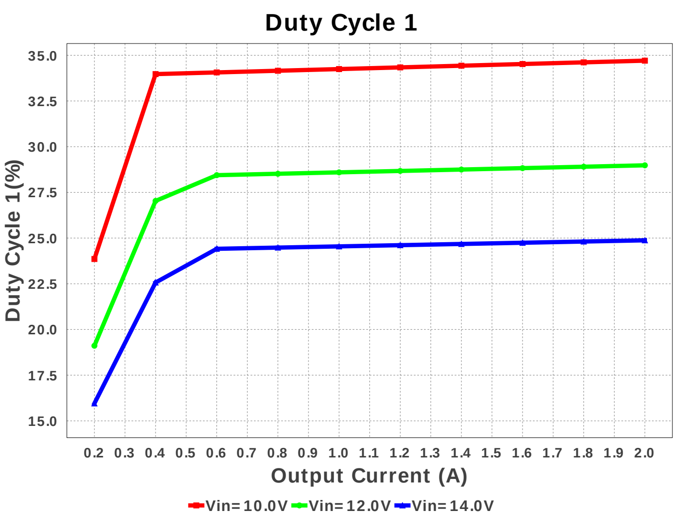
Electrical BOM

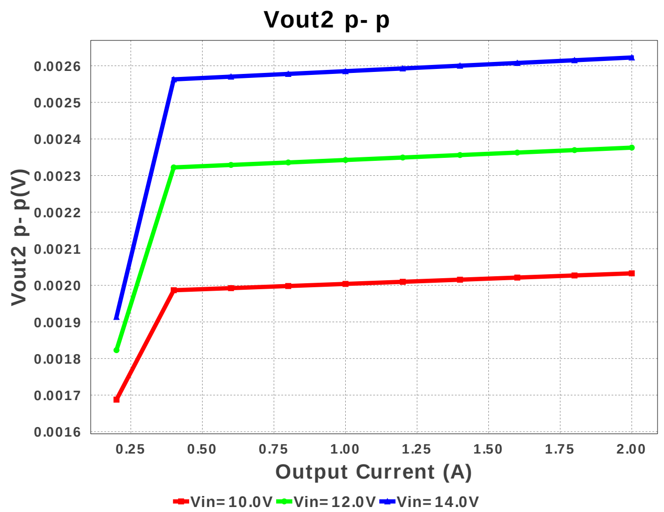
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot1	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
2.	Cboot2	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
3.	Ccomp1	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
4.	Ccomp2	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
5.	Ccomp3	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
6.	Ccomp4	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
7.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm^2
8.	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 mm^2

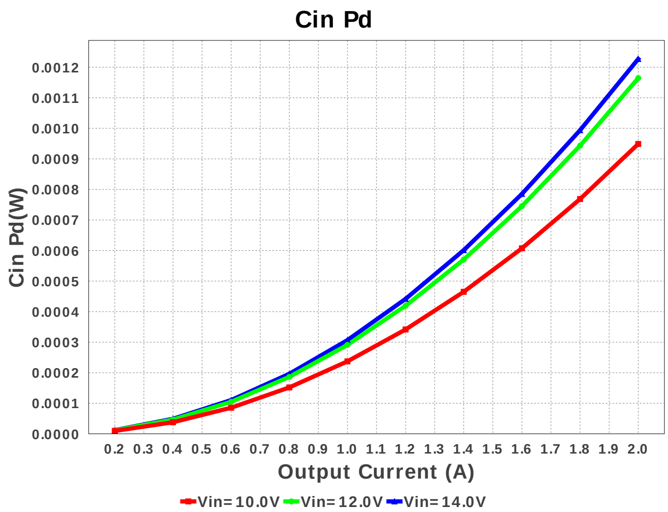
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cout_ch1	MuRata	GRM31CD80G107ME39L Series= X6T	Cap= 100.0 uF ESR= 4.84 mOhm VDC= 4.0 V IRMS= 4.3381 A	2	$0.14	1206_190 11 mm²
10.	Cout_ch2	MuRata	GRM31CC80J476KE18L Series= X6S	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.0522 A	1	$0.10	1206_190 11 mm²
11.	Cramp1	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
12.	Cramp2	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
13.	Cres	MuRata	GRM155C80J474KE19D Series= X6S	Cap= 470.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
14.	Css1	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
15.	Css2	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
16.	Cvcc1	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
17.	Cvcc2	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
18.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13 mm²
19.	D2	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13 mm²
20.	L1	Bourns	SDR0805-6R8ML	L= 6.8 µH DCR= 40.0 mOhm	1	$0.22	SDR0805 96 mm²
21.	L2	Bourns	SRN6045-220M	L= 22.0 µH DCR= 142.0 mOhm	1	$0.16	SRN6045 64 mm²
22.	M1	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	DQG0008A 18 mm²
23.	M2	Texas Instruments	CSD17578Q3A	VdsMax= 30.0 V IdsMax= 20.0 Amps	1	$0.21	DNH0008A 18 mm²
24.	M3	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	DQG0008A 18 mm²
25.	M4	Texas Instruments	CSD17579Q3A	VdsMax= 30.0 V IdsMax= 20.0 Amps	1	$0.19	DNH0008A 18 mm²
26.	Rcomp1	Vishay-Dale	CRCW040248K7FKED Series= CRCW..e3	Res= 48.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
27.	Rcomp2	Vishay-Dale	CRCW040237K4FKED Series= CRCW..e3	Res= 37.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
28.	Rfb1	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

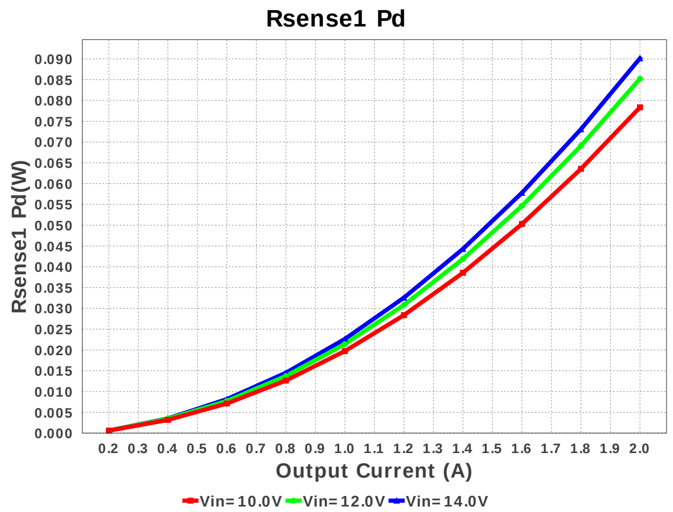
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
29.	Rfb2	Yageo America	RT0805BRD073K05L Series= ?	Res= 3.05 kOhm Power= 125.0 mW Tolerance= 0.1%	1	$0.04	0805 7 mm^2
30.	Rfb3	Vishay-Dale	CRCW04021K15FKED Series= CRCW..e3	Res= 1.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
31.	Rfb4	Vishay-Dale	CRCW04026K04FKED Series= CRCW..e3	Res= 6.04 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
32.	Rramp1	Vishay-Dale	CRCW040218K2FKED Series= CRCW..e3	Res= 18.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
33.	Rramp2	Vishay-Dale	CRCW040235K7FKED Series= CRCW..e3	Res= 35.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
34.	Rsense1	Stackpole Electronics Inc	CSR1206FK30L0 Series= ?	Res= 30.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.10	1206 11 mm^2
35.	Rsense2	Panasonic	ERJ-L03KF50MV Series= ERJ-L03	Res= 50.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.09	0603 5 mm^2
36.	Rt	Vishay-Dale	CRCW040211K3FKED Series= CRCW..e3	Res= 11.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
37.	Ruv1	Vishay-Dale	CRCW040254K9FKED Series= CRCW..e3	Res= 54.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
38.	Ruv2	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
39.	U1	Texas Instruments	LM25119PSQ/NOPB	Switcher	1	$2.60	SQA32A 49 mm^2

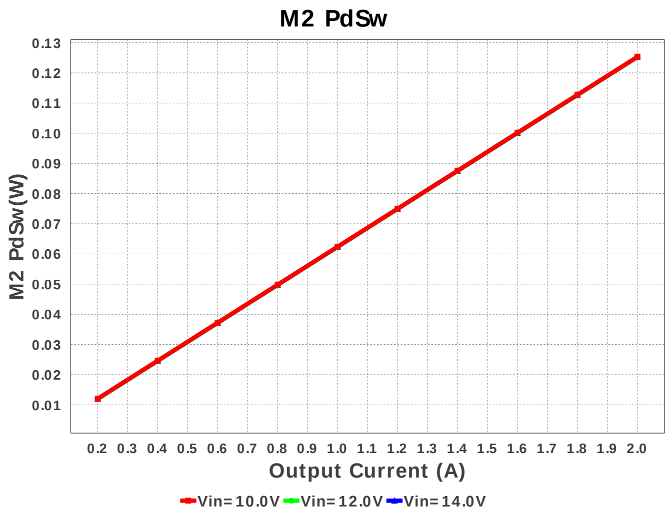


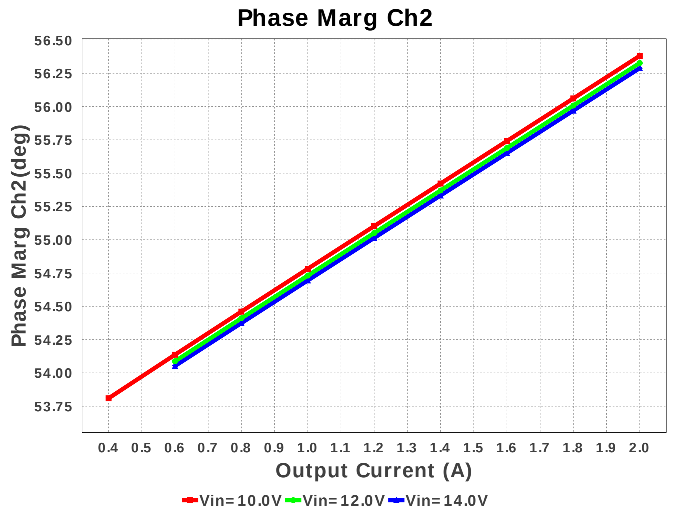


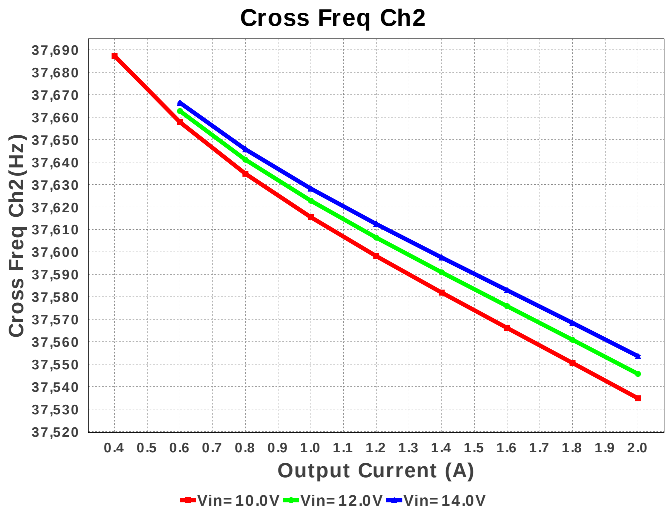

Vout2 p- p
Vout2 p- p(V)
Output Current (A)
Vin= 10.0V Vin= 12.0V Vin= 14.0V

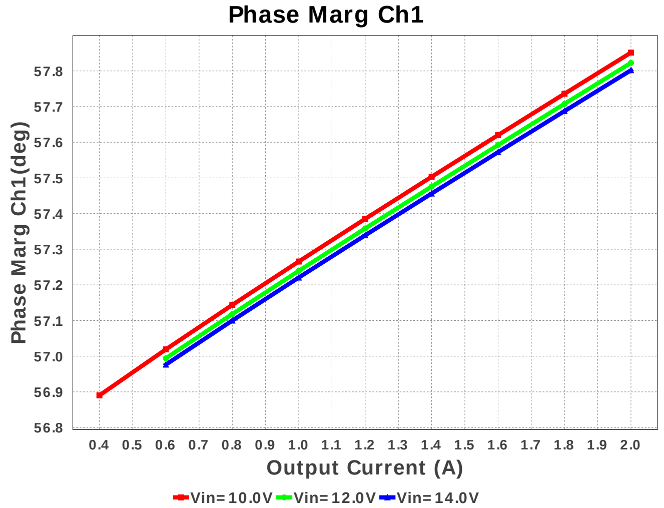

Cin Pd
Cin Pd(W)
Output Current (A)
Vin= 10.0V Vin= 12.0V Vin= 14.0V

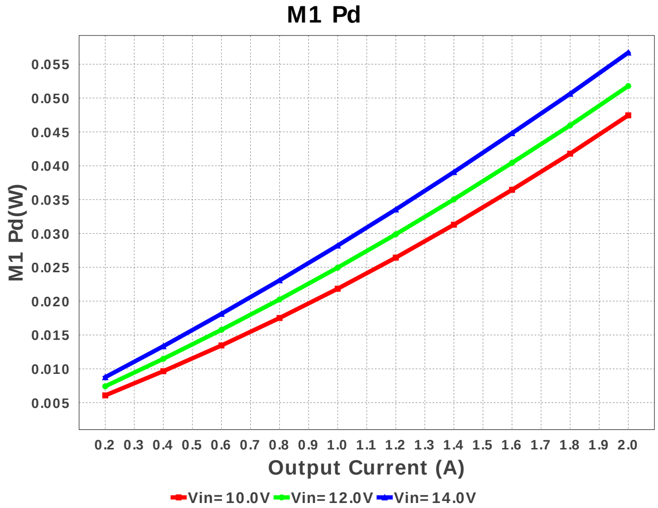

Rsense1 Pd
Rsense1 Pd(W)
Output Current (A)
Vin= 10.0V Vin= 12.0V Vin= 14.0V

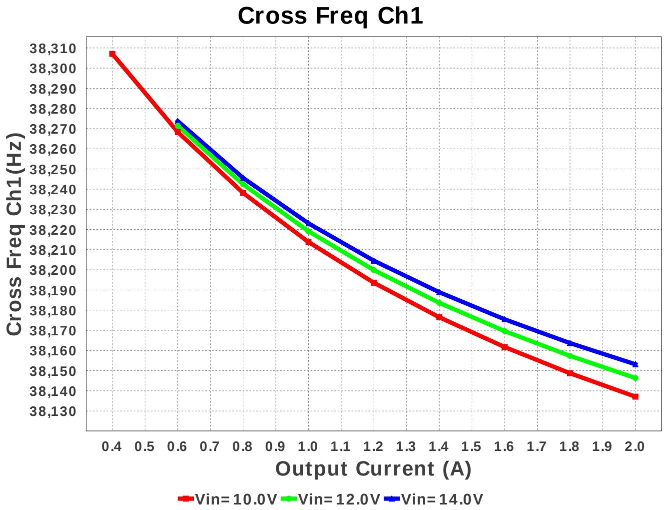

M2 PdSw
M2 PdSw(W)
Output Current (A)
Vin= 10.0V Vin= 12.0V Vin= 14.0V

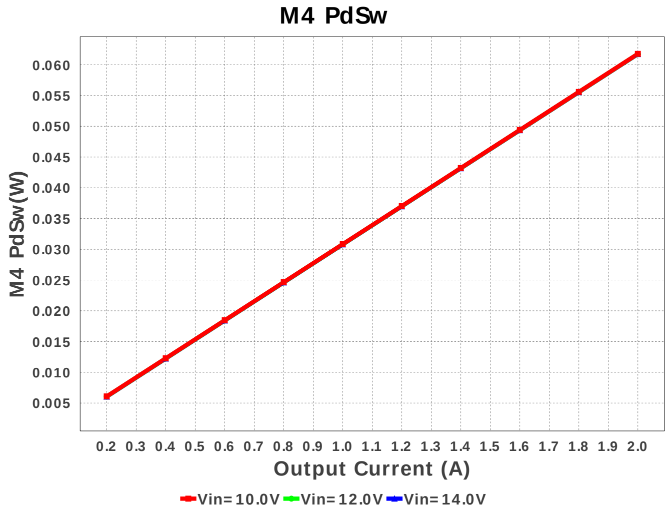

Phase Marg Ch2
Phase Marg Ch2(deg)
Output Current (A)
Vin= 10.0V Vin= 12.0V Vin= 14.0V

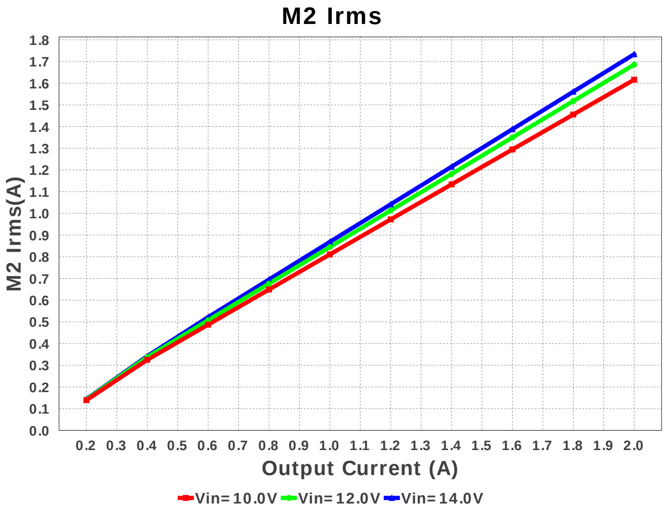

Cross Freq Ch2
Cross Freq Ch2(Hz)
Output Current (A)
Vin= 10.0V Vin= 12.0V Vin= 14.0V

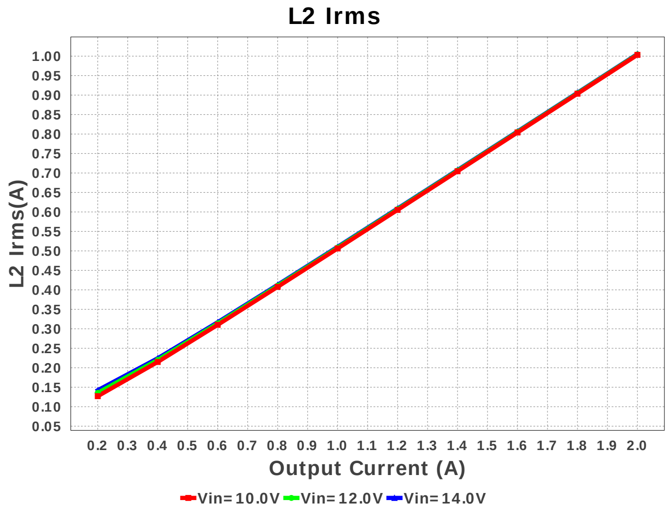

Phase Marg Ch1
Phase Marg Ch1(deg)
57.8
57.7
57.6
57.5
57.4
57.3
57.2
57.1
57.0
56.9
56.8
0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


M1 Pd
M1 Pd(W)
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

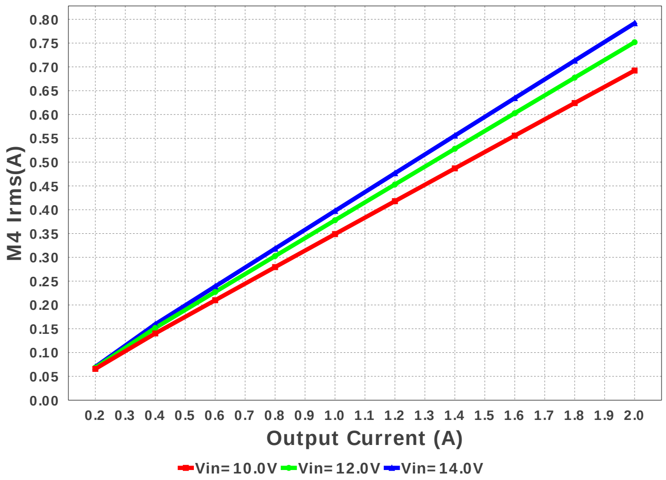

Cross Freq Ch1
Cross Freq Ch1(Hz)
38,310
38,300
38,290
38,280
38,270
38,260
38,250
38,240
38,230
38,220
38,210
38,200
38,190
38,180
38,170
38,160
38,150
38,140
38,130
0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


M4 PdSw
M4 PdSw(W)
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

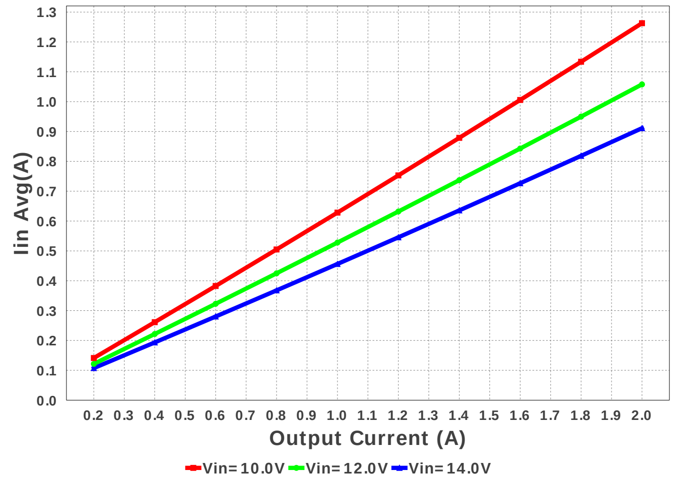

M2 Irms
M2 Irms(A)
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


L2 Irms
L2 Irms(A)
1.00
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
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

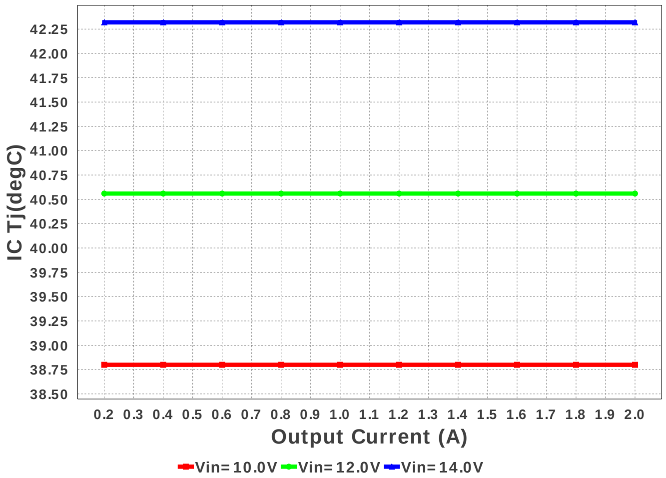
M4 Irms



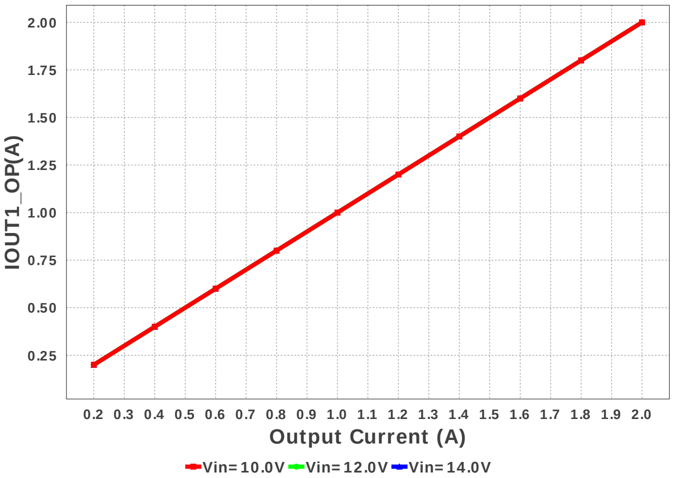
Iin Avg



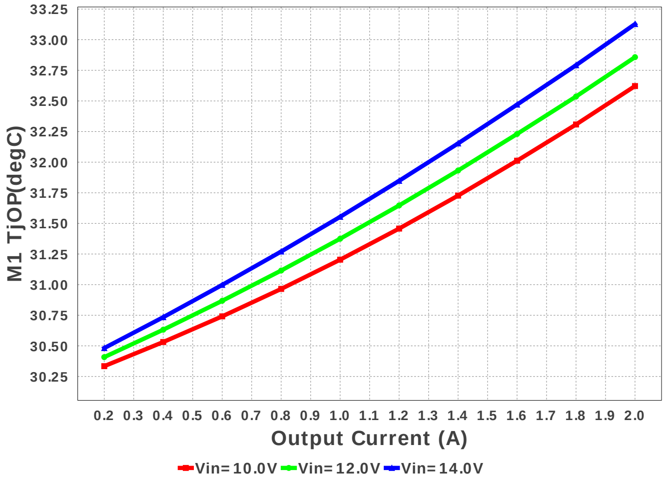
IC Tj



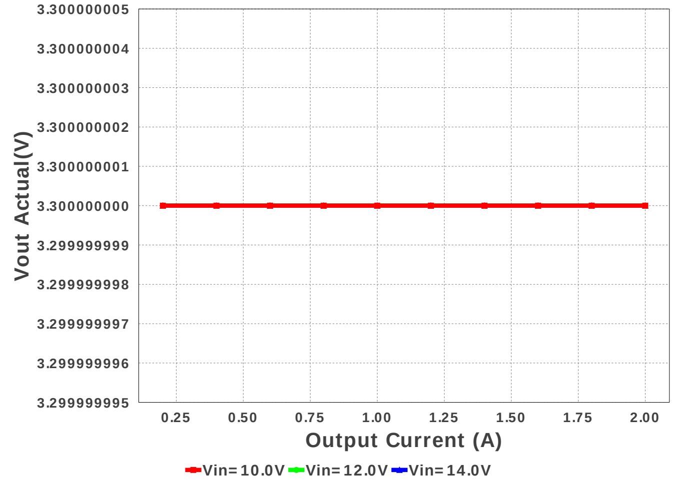
IOUT1_OP



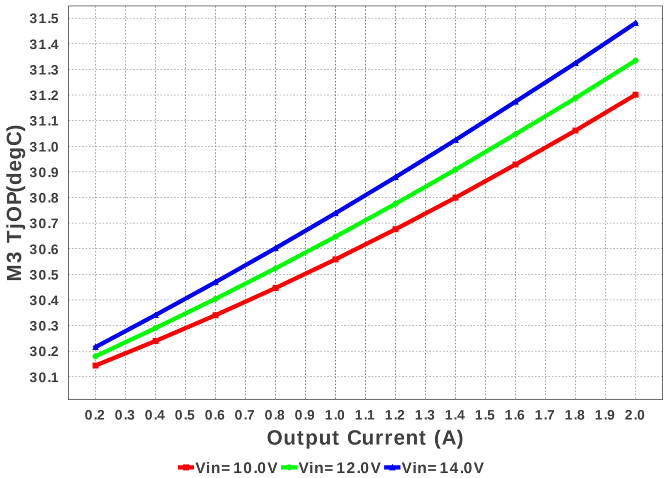
M1 TjOP



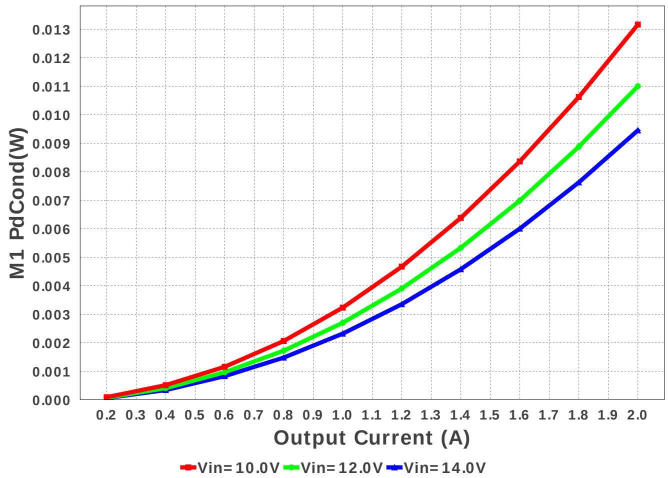
Vout Actual



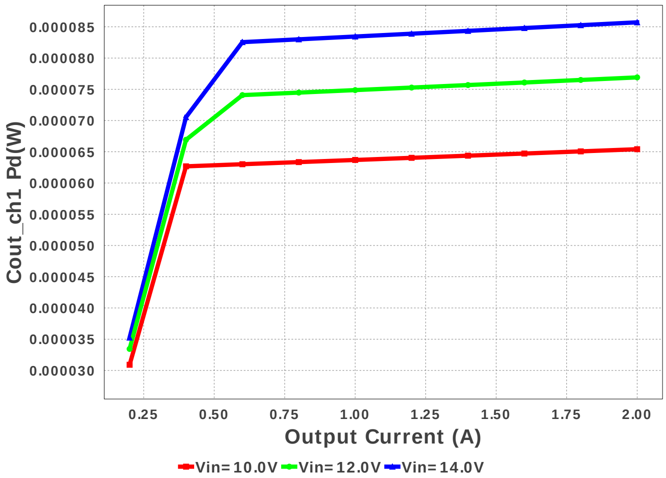
M3 TjOP



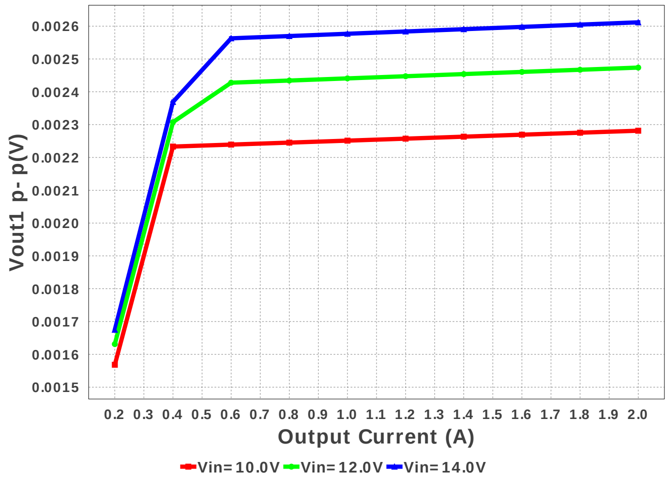
M1 PdCond



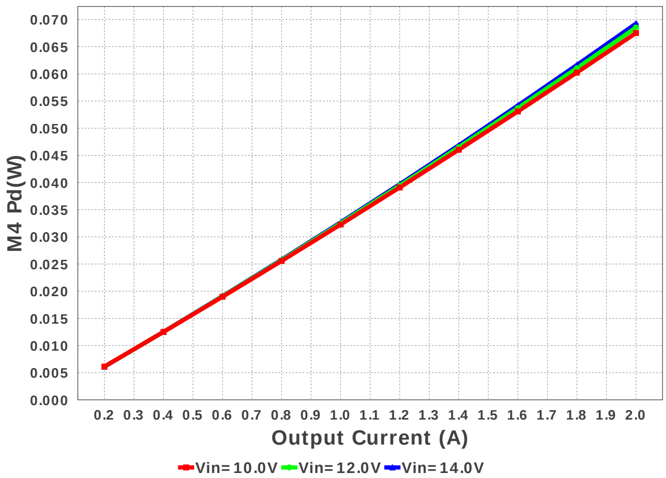
Cout_ch1 Pd



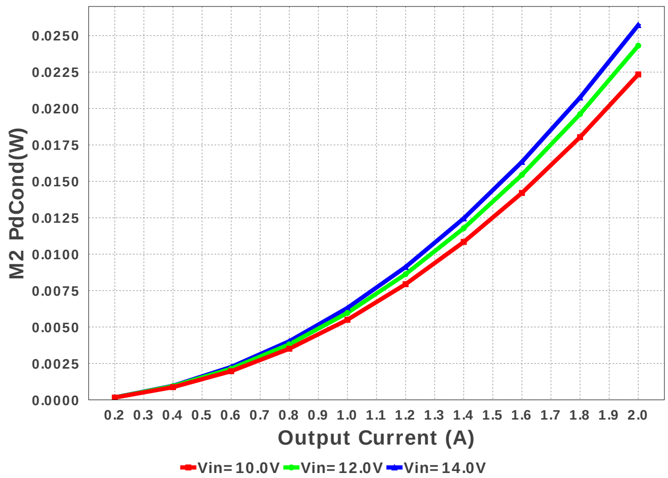
Vout1 p- p

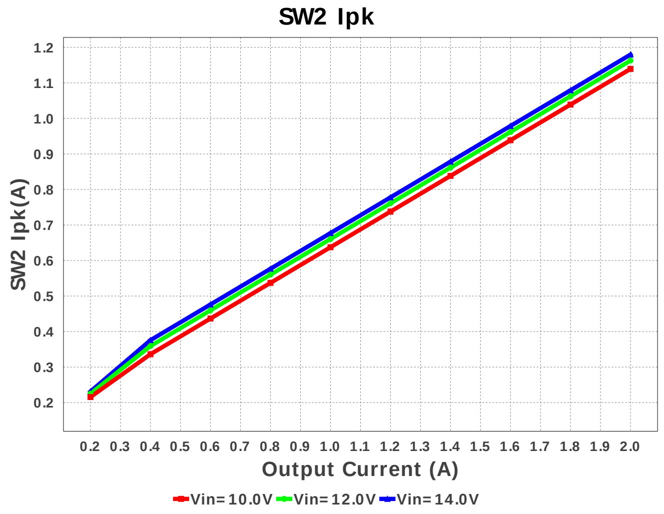


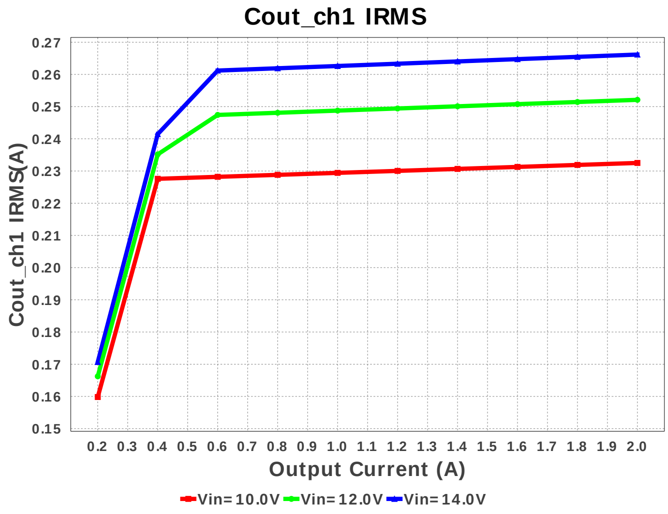
M4 Pd

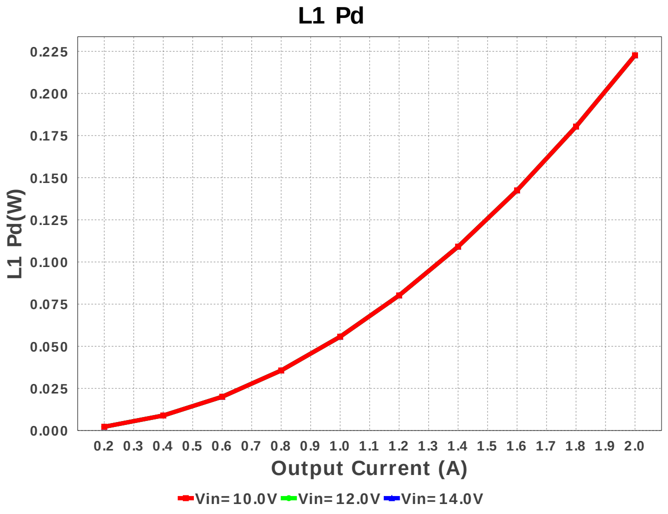


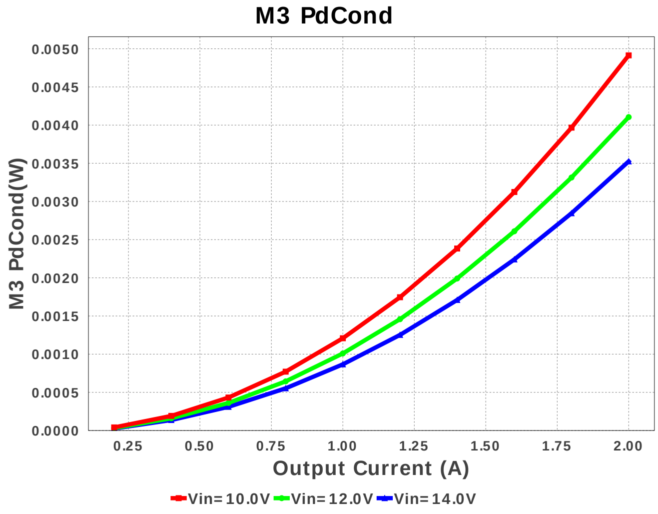
M2 PdCond

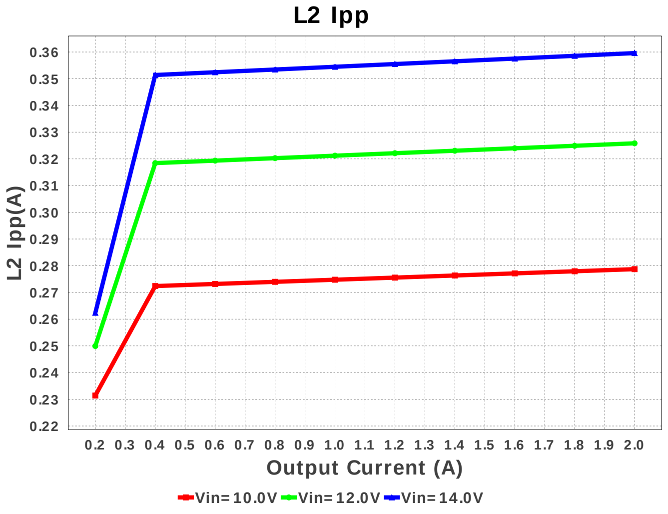


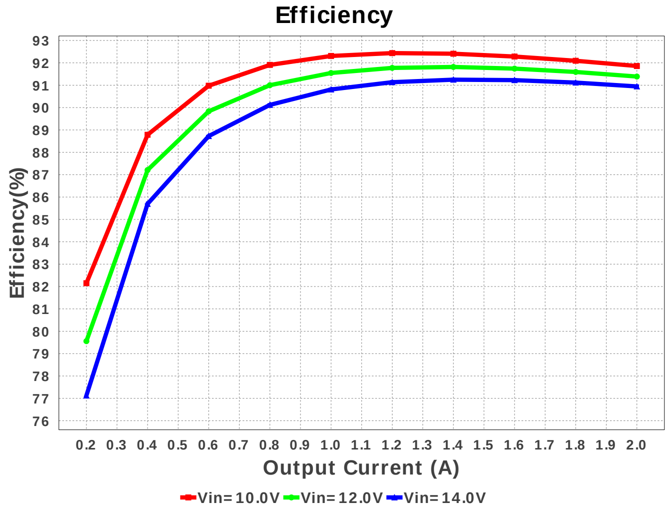

SW2 Ipk
SW2 Ipk(A)
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


Cout_ch1 IRMS
Cout_ch1 IRMS(A)
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

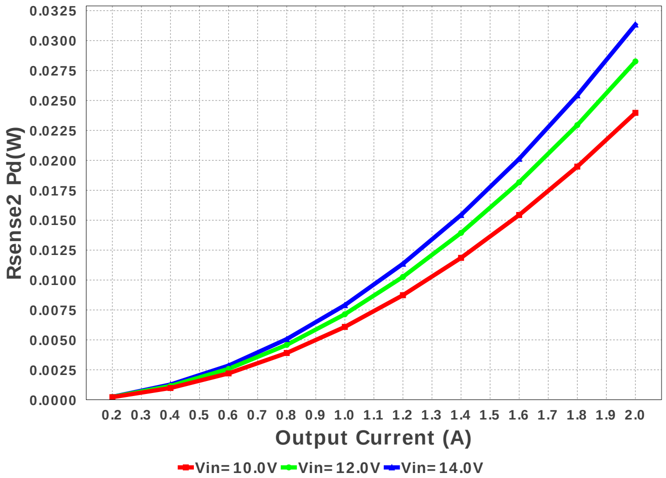

L1 Pd
L1 Pd(W)
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


M3 PdCond
M3 PdCond(W)
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

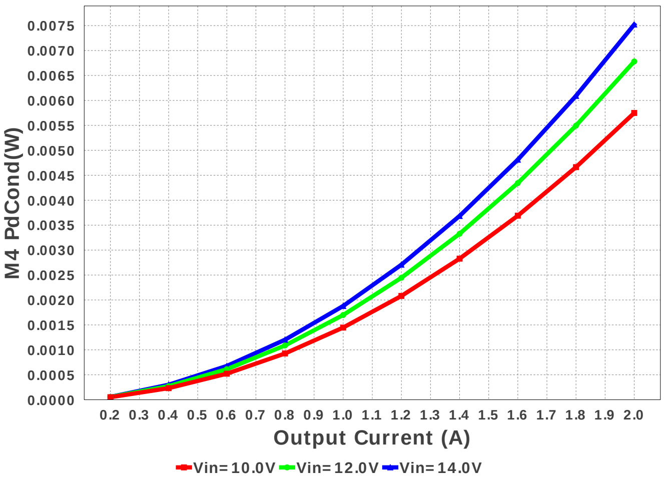

L2 Ipp
L2 Ipp(A)
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


Efficiency
Efficiency(%)
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

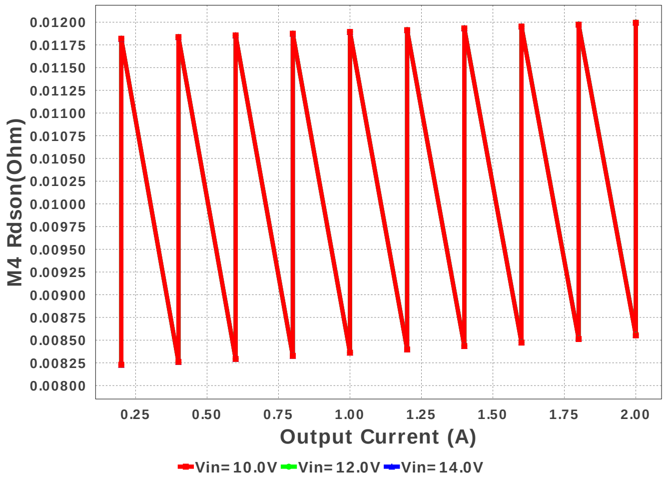
Rsense2 Pd



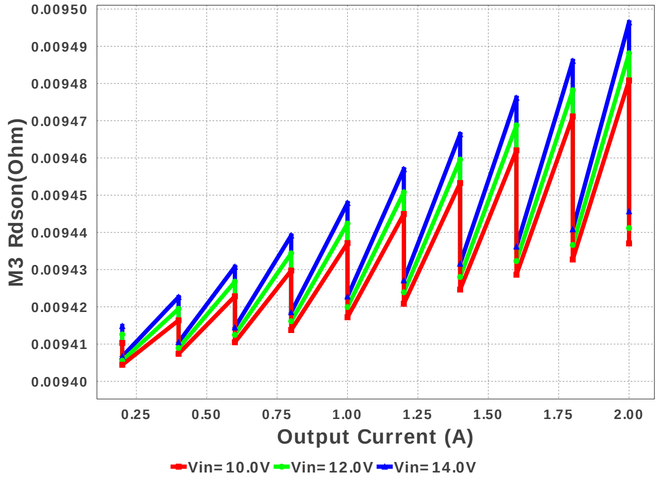
M4 PdCond



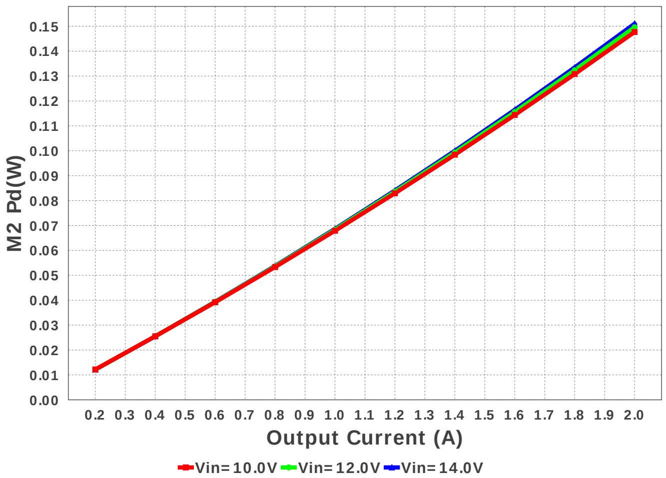
M4 Rdson



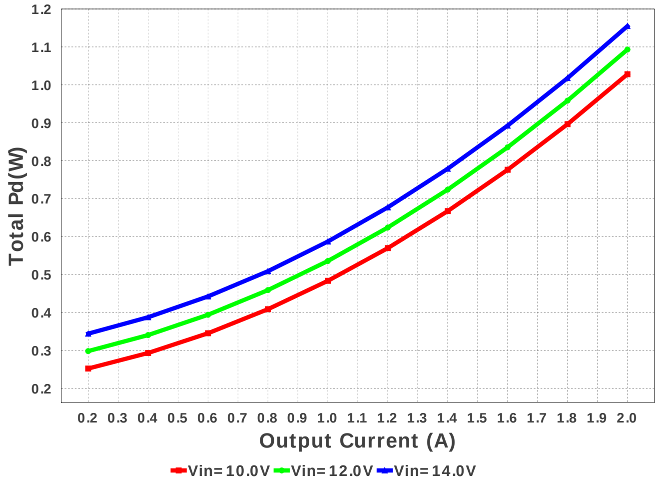
M3 Rdson

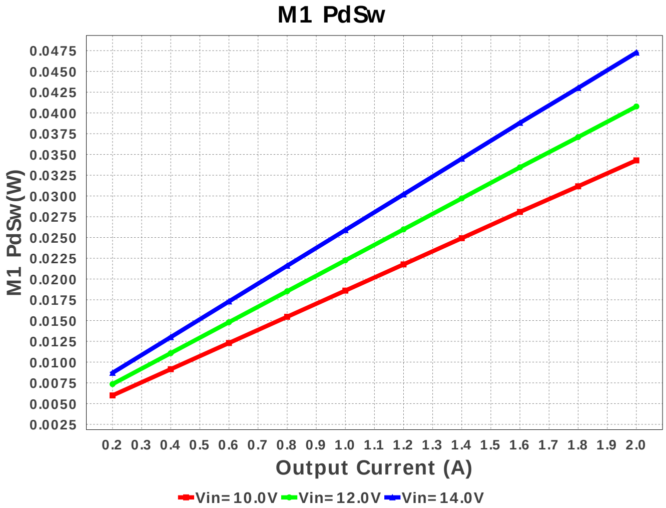


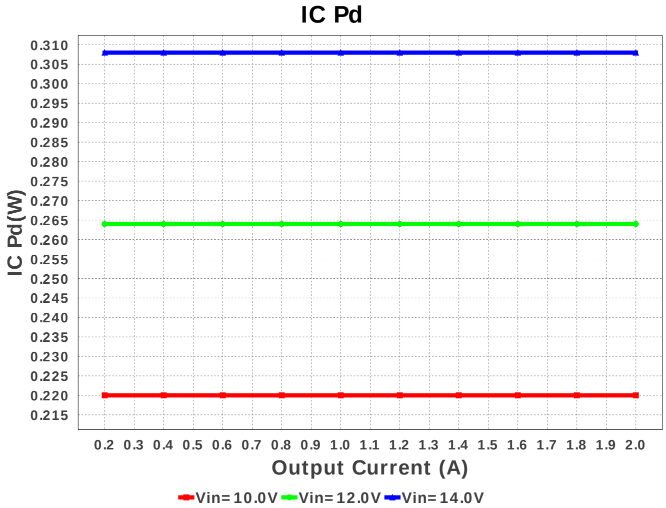
M2 Pd

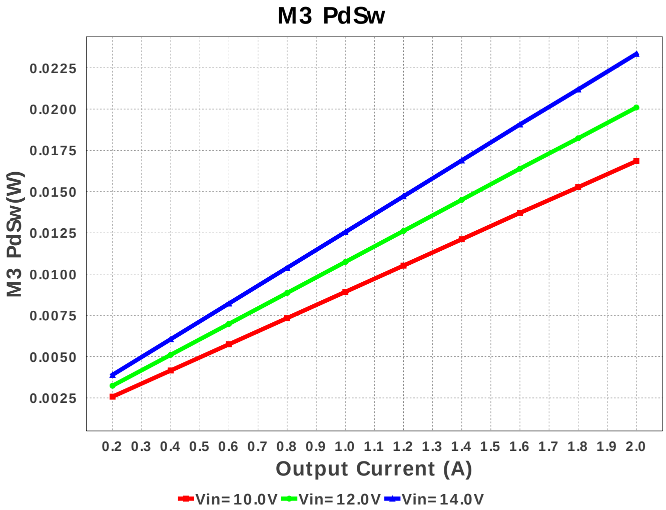


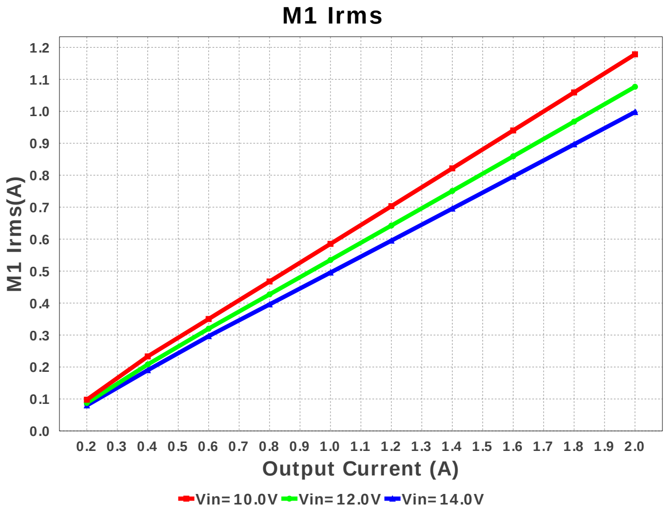
Total Pd

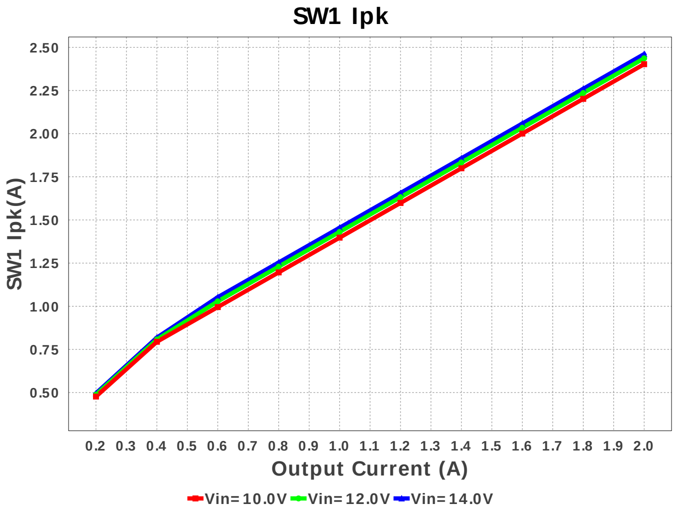


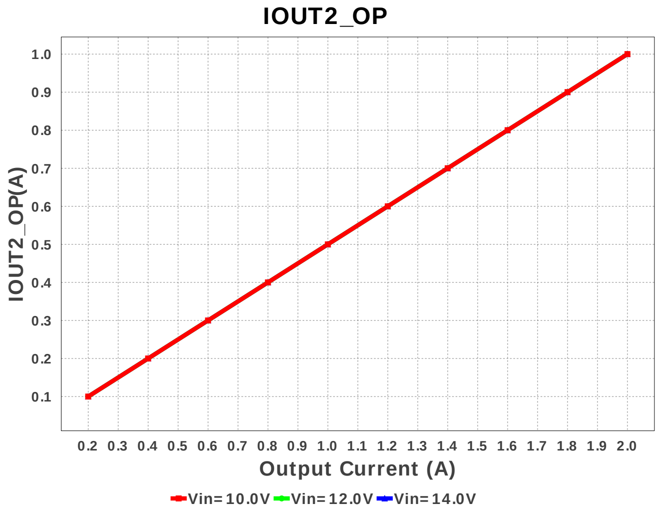

M1 PdSw
M1 PdSw(W)
0.0475 0.0450 0.0425 0.0400 0.0375 0.0350 0.0325 0.0300 0.0275 0.0250 0.0225 0.0200 0.0175 0.0150 0.0125 0.0100 0.0075 0.0050 0.0025
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


IC Pd
IC Pd(W)
0.310 0.305 0.300 0.295 0.290 0.285 0.280 0.275 0.270 0.265 0.260 0.255 0.250 0.245 0.240 0.235 0.230 0.225 0.220 0.215
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

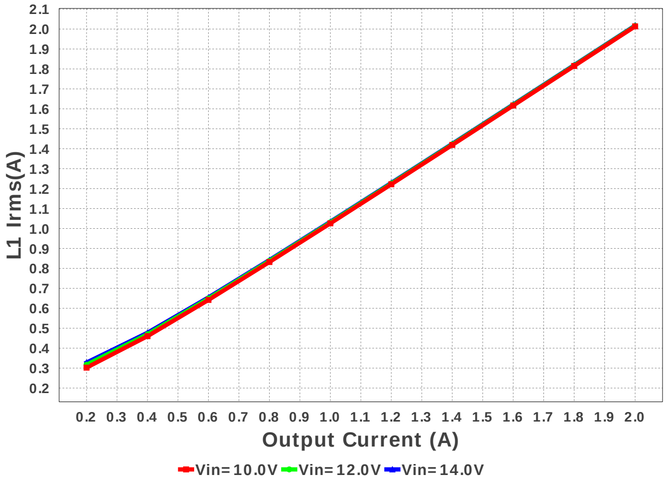

M3 PdSw
M3 PdSw(W)
0.0225 0.0200 0.0175 0.0150 0.0125 0.0100 0.0075 0.0050 0.0025
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


M1 Irms
M1 Irms(A)
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
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

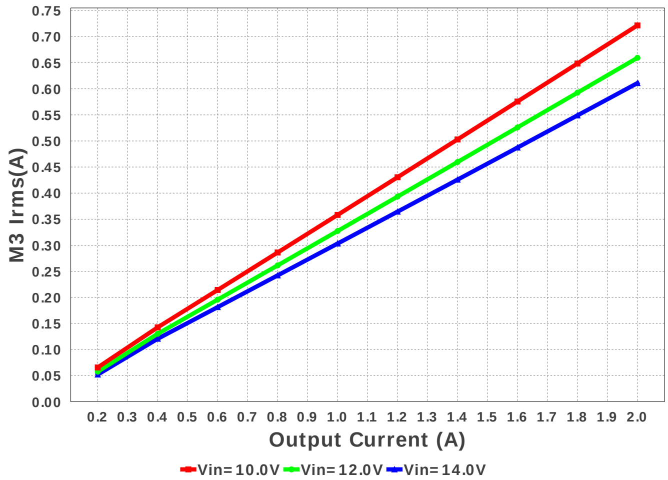

SW1 Ipk
SW1 Ipk(A)
2.50 2.25 2.00 1.75 1.50 1.25 1.00 0.75 0.50
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


IOUT2_OP
IOUT2_OP(A)
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

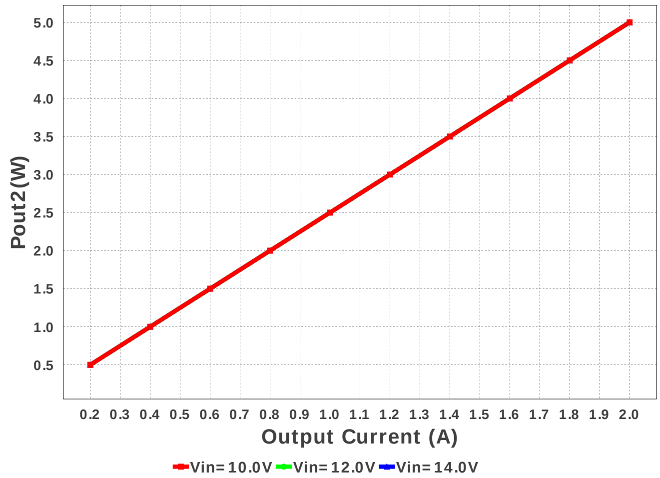
L1 Irms



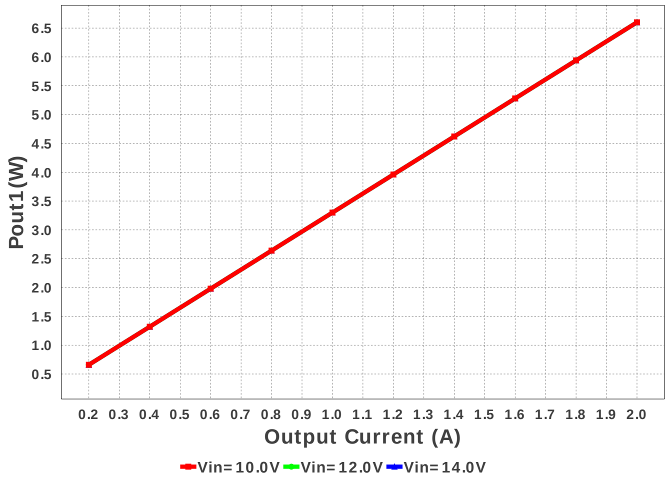
M3 Irms



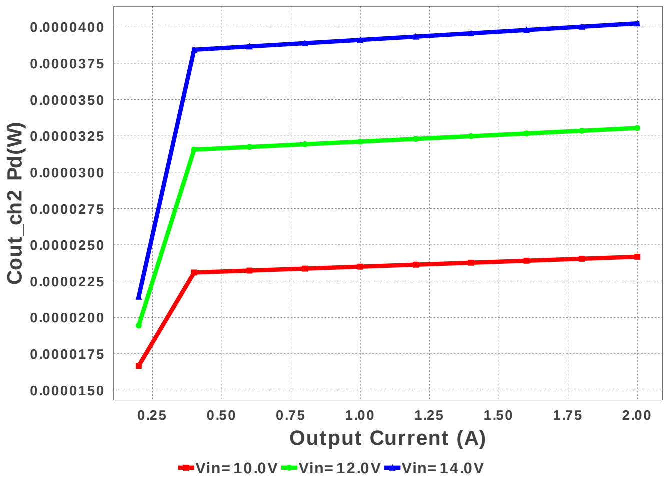
Pout2



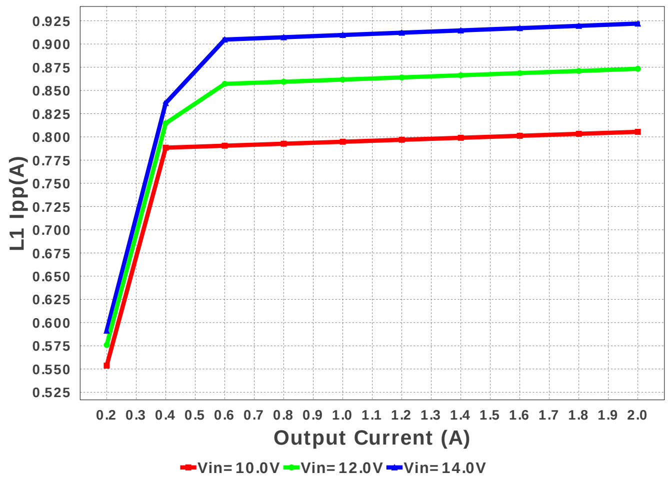
Pout1

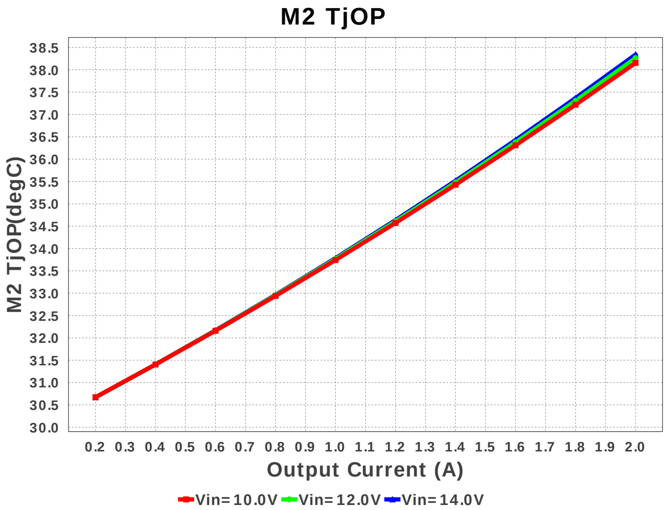


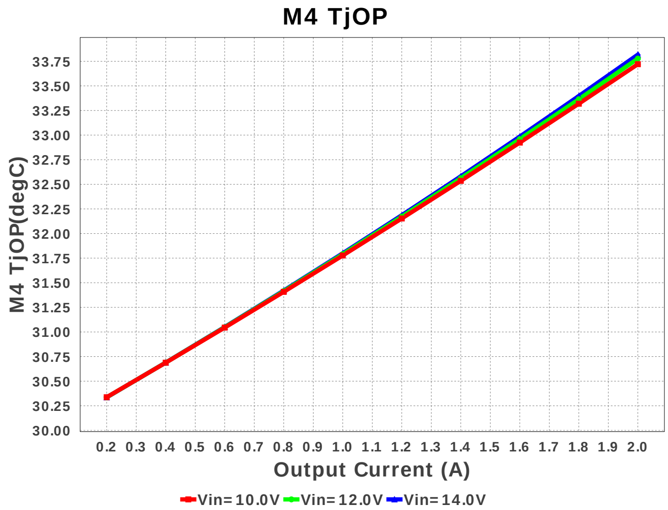
Cout_ch2 Pd

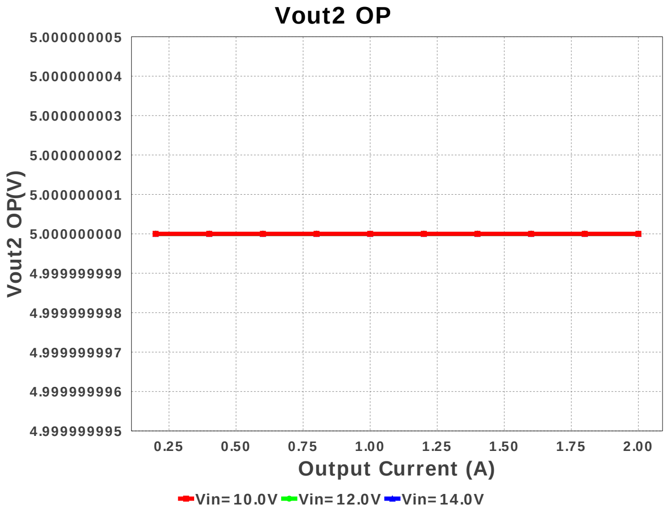


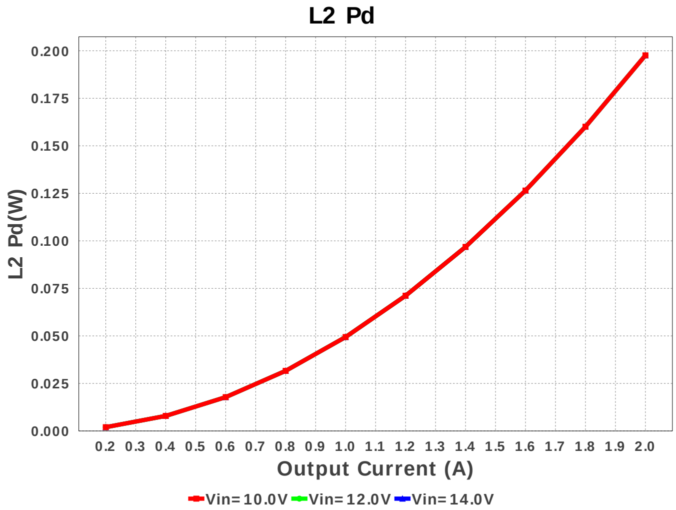
L1 Ipp

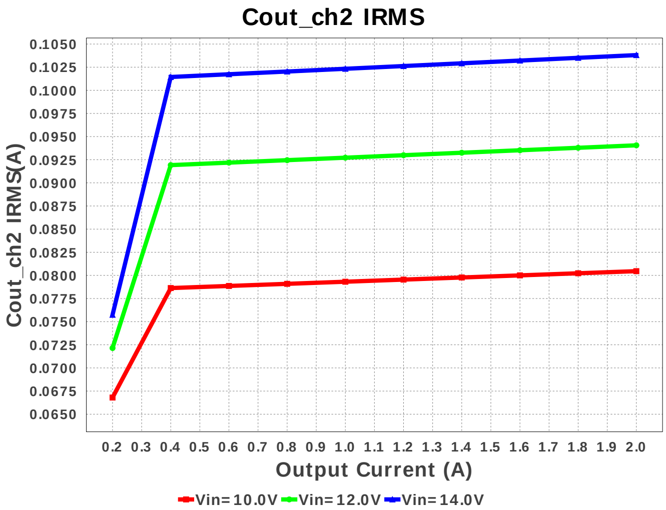


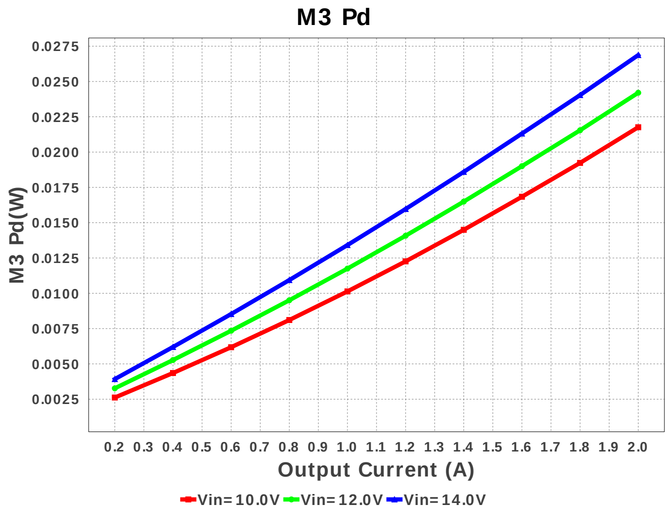

M2 TjOP
M2 TjOP(degC)
38.5
38.0
37.5
37.0
36.5
36.0
35.5
35.0
34.5
34.0
33.5
33.0
32.5
32.0
31.5
31.0
30.5
30.0
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V

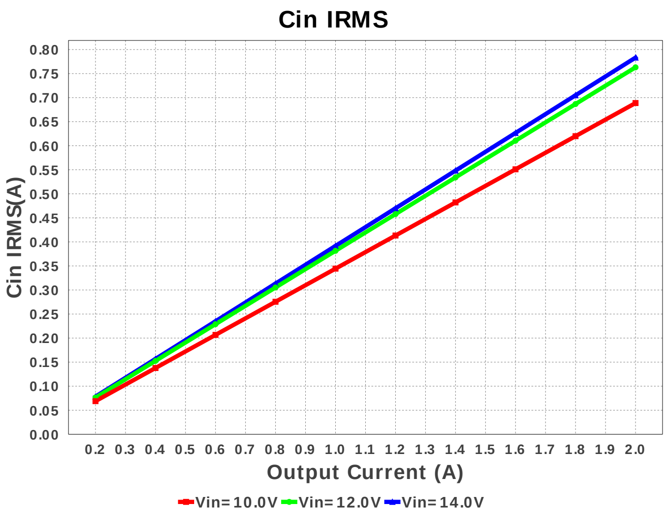

M4 TjOP
M4 TjOP(degC)
33.75
33.50
33.25
33.00
32.75
32.50
32.25
32.00
31.75
31.50
31.25
31.00
30.75
30.50
30.25
30.00
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


Vout2 OP
Vout2 OP(V)
5.000000005
5.000000004
5.000000003
5.000000002
5.000000001
5.000000000
4.999999999
4.999999998
4.999999997
4.999999996
4.999999995
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


L2 Pd
L2 Pd(W)
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


Cout_ch2 IRMS
Cout_ch2 IRMS(A)
0.1050
0.1025
0.1000
0.0975
0.0950
0.0925
0.0900
0.0875
0.0850
0.0825
0.0800
0.0775
0.0750
0.0725
0.0700
0.0675
0.0650
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V


M3 Pd
M3 Pd(W)
0.0275
0.0250
0.0225
0.0200
0.0175
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=10.0V Vin=12.0V Vin=14.0V



Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	783.191 mA	Current	Input capacitor RMS ripple current
2.	Cout_ch1 IRMS	266.163 mA	Current	Output Channel 1 Capacitor RMS ripple current
3.	Cout_ch2 IRMS	103.819 mA	Current	Output Channel 2 Capacitor RMS ripple current
4.	Iin Avg	911.18 mA	Current	Average input current
5.	L1 Ipp	922.016 mA	Current	Peak-to-peak inductor ripple current
6.	L1 Irms	2.018 A	Current	Inductor ripple current
7.	L2Ipp	359.64 mA	Current	Channel 2 Inductor Peak to peak Current
8.	L2 Irms	1.005 A	Current	Inductor ripple current
9.	M1 Irms	997.541 mA	Current	MOSFET RMS ripple current
10.	M2 Irms	1.733 A	Current	MOSFET RMS ripple current
11.	M3 Irms	610.991 mA	Current	MOSFET RMS ripple current
12.	M4 Irms	791.637 mA	Current	MOSFET RMS ripple current
13.	SW1 Ipk	2.461 A	Current	Peak switch current
14.	SW2 Ipk	1.18 A	Current	Peak switch current
15.	BOM Count	40	General	Total Design BOM count
16.	FootPrint	485.0 mm²	General	Total Foot Print Area of BOM components
17.	Frequency	424.559 kHz	General	Switching frequency
18.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
19.	Pout1	6.6 W	General	Channel 1 output Power
20.	Pout2	5.002 W	General	Channel 2 output Power
21.	Total BOM	$5.07	General	Total BOM Cost
22.	Ch1 Mode	CCM	General	Conduction Mode
23.	Ch2 Mode	CCM	General	Conduction Mode
24.	M3 TjOP	31.48 degC	Op_Point	M3 MOSFET junction temperature
25.	M4 TjOP	33.818 degC	Op_Point	M4 MOSFET junction temperature
26.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
27.	Duty Cycle 1	24.877 %	Op_point	Duty cycle for Channel 1
28.	Duty Cycle 2	37.331 %	Op_point	Duty cycle for Channel 2
29.	Efficiency	90.947 %	Op_point	Steady state efficiency
30.	IC Tj	42.319 degC	Op_point	IC junction temperature
31.	IOUT1_OP	2.0 A	Op_point	Iout1 operating point
32.	IOUT2_OP	1.0 A	Op_point	Iout2 operating point
33.	M1 TjOP	33.125 degC	Op_point	M1 MOSFET junction temperature
34.	M2 TjOP	38.34 degC	Op_point	M2 MOSFET junction temperature
35.	VIN_OP	14.0 V	Op_point	Vin operating point
36.	Vout1 OP	3.3 V	Op_point	Operational Voltage 1
37.	Vout1 p-p	2.612 mV	Op_point	Peak-to-peak output1 ripple voltage
38.	Vout2 OP	5.002 V	Op_point	Operational Voltage 2
39.	Vout2 p-p	2.623 mV	Op_point	Peak-to-peak output2 ripple voltage
40.	Cin Pd	1.227 mW	Power	Input capacitor power dissipation
41.	Cout_ch1 Pd	85.72 µW	Power	Ouput channel 1 capacitor power dissipation
42.	Cout_ch2 Pd	40.257 µW	Power	Ouput channel 2 capacitor power dissipation
43.	IC Pd	307.984 mW	Power	IC power dissipation
44.	L1 Pd	222.643 mW	Power	Inductor power dissipation
45.	L2 Pd	197.596 mW	Power	Inductor power dissipation
46.	M1 Pd	56.669 mW	Power	M1 MOSFET total power dissipation
47.	M1 PdCond	9.45 mW	Power	M1 MOSFET conduction losses
48.	M1 PdSw	47.219 mW	Power	M1 MOSFET switching losses
49.	M2 Pd	150.987 mW	Power	M2 MOSFET total power dissipation
50.	M2 PdCond	25.725 mW	Power	M2 MOSFET conduction losses
51.	M2 PdSw	125.261 mW	Power	M2 MOSFET switching losses
52.	M3 Pd	26.847 mW	Power	M3 MOSFET total power dissipation

#	Name	Value	Category	Description
53.	M3 PdCond	3.526 mW	Power	M3 MOSFET conduction losses
54.	M3 PdSw	23.321 mW	Power	M3 MOSFET switching losses
55.	M1 Rdson	9.496 mOhm	Power	Drain-Source On-resistance
56.	M3 Rdson	9.446 mOhm	Power	Drain-Source On-resistance
57.	M4 Pd	69.249 mW	Power	M4 MOSFET total power dissipation
58.	M4 PdCond	7.519 mW	Power	M4 MOSFET conduction losses
59.	M4 PdSw	61.73 mW	Power	M4 MOSFET switching losses
60.	M2 Rdson	8.561 mOhm	Power	Drain-Source On-resistance
61.	M4 Rdson	11.998 mOhm	Power	Drain-Source On-resistance
62.	Rsense1 Pd	90.147 mW	Power	Current Limit Sense Resistor Power Dissipation
63.	Rsense2 Pd	31.334 mW	Power	Current Limit Sense Resistor Power Dissipation
64.	Total Pd	1.155 W	Power	Total Power Dissipation
65.	Cross Freq Ch1	38.154 kHz		Bode plot crossover frequency
66.	Cross Freq Ch2	37.554 kHz		Bode plot crossover frequency
67.	Phase Marg Ch1	57.798 deg		Bode Plot Phase Margin
68.	Phase Marg Ch2	56.284 deg		Bode Plot Phase Margin
69.	Vout Tolerance	2.354 %		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.	Iout1	2.0	Output Current #1
3.	Iout2	1.0	Output Current #2
4.	VinMax	14.0	Maximum input voltage
5.	VinMin	10.0	Minimum input voltage
6.	Vout	3.3	Output Voltage
7.	Vout1	3.3	Output Voltage #1
8.	Vout2	5.0	Output Voltage #2
9.	base_pn	LM25119	Base Product Number
10.	source	DC	Input Source Type
11.	Ta	30.0	Ambient temperature

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. Sequencing the 2 outputs The LM(2)5119 contains an enable function allowing shutdown control of channel2, independent of channel1. If the EN2 pin is pulled below 2.0V, channel2 enters shutdown mode. If the EN2 input is greater than 2.5V, channel2 returns to normal operation. 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. **LM25119** Product Folder : http://www.ti.com/product/LM25119 : contains the data sheet and other resources.