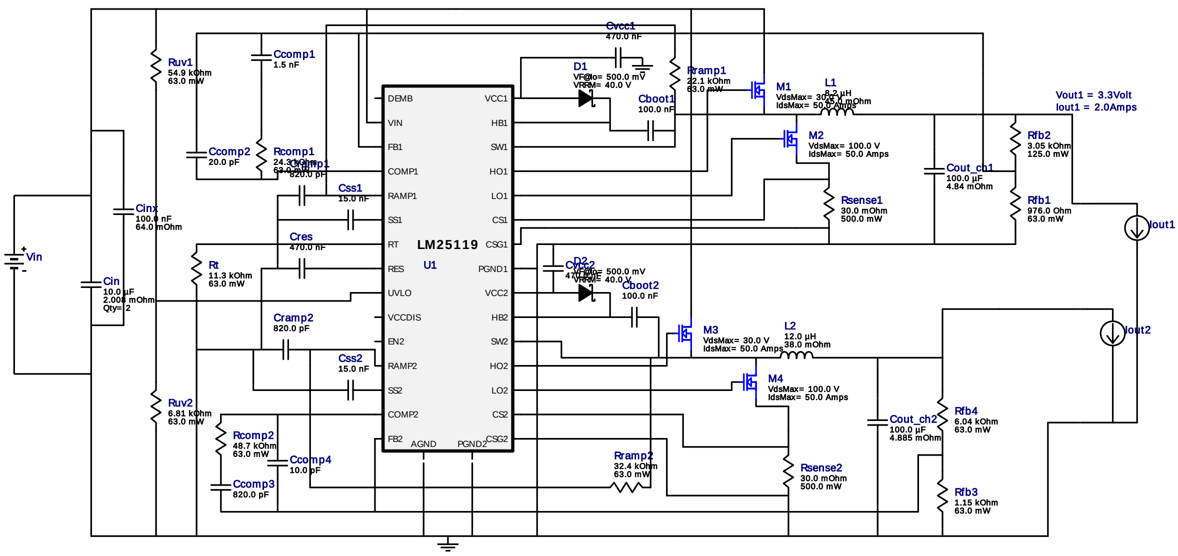
VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 2.0A

Device = LM25119PSQ/NOPB
Topology = Buck
Created = 8/11/16 7:55:21 AM
BOM Cost = $6.11
BOM Count = 40
Total Pd = 1.85W

WEBENCH ® Design Report

Design : 4085315/11 LM25119PSQ/NOPB
LM25119PSQ/NOPB 14.0V-22.0V to 5.00V @ 2.0A



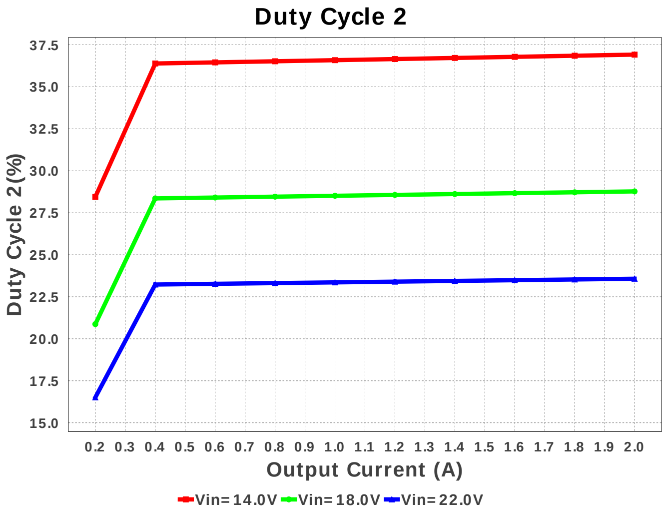
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

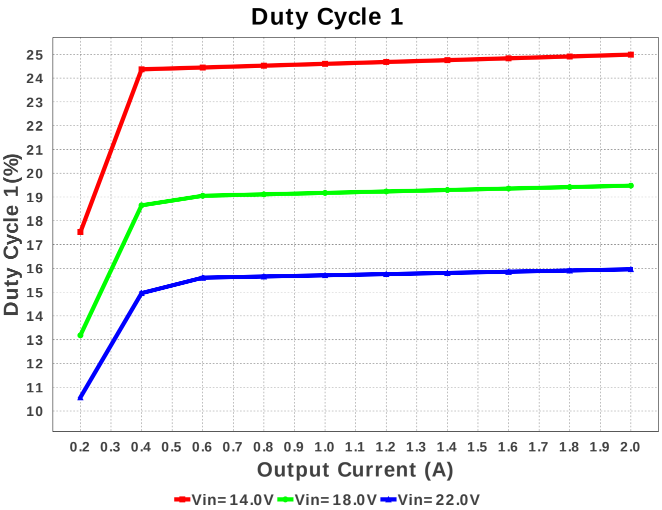
Electrical BOM

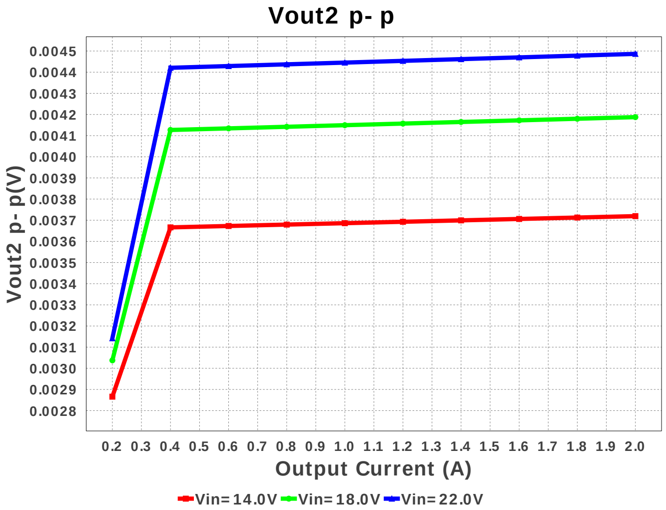
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot1	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cboot2	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Ccomp1	Yageo America	CC0805KRX7R9BB152 Series= X7R	Cap= 1.5 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Ccomp2	Samsung Electro-Mechanics	CL21C200JBANNNC Series= C0G/NP0	Cap= 20.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
5.	Ccomp3	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
6.	Ccomp4	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
7.	Cin	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	2	$0.22	1210_280 15 mm²
8.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²

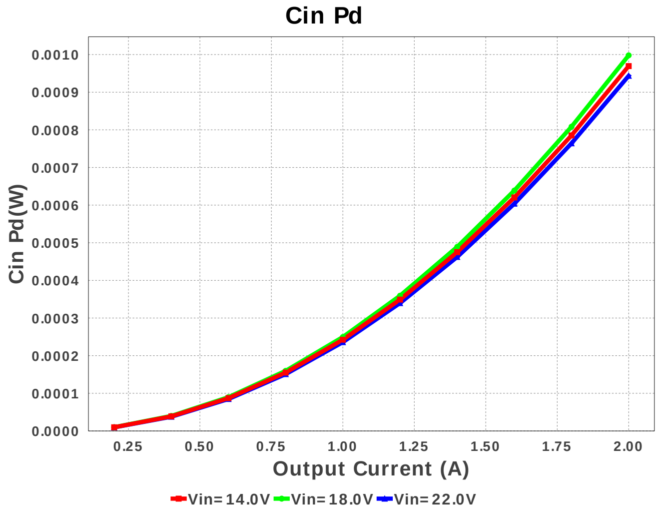
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cout_ch1	MuRata	GRM31CD80G107ME39L Series= X6T	Cap= 100.0 uF ESR= 4.84 mOhm VDC= 4.0 V IRMS= 4.3381 A	1	$0.14	1206_190 11 mm^2
10.	Cout_ch2	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	1	$0.14	1206_190 11 mm^2
11.	Cramp1	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
12.	Cramp2	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
13.	Cres	MuRata	GRM155C80J474KE19D Series= X6S	Cap= 470.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
14.	Css1	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
15.	Css2	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
16.	Cvcc1	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
17.	Cvcc2	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
18.	D1	Vishay-Semiconductor	SS14-E3/61T	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.08	SMA 37 mm^2
19.	D2	Vishay-Semiconductor	SS14-E3/61T	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.08	SMA 37 mm^2
20.	L1	Bourns	SRN8040-8R2Y	L= 8.2 µH DCR= 45.0 mOhm	1	$0.22	SRN8040 100 mm^2
21.	L2	Bourns	SRR1206-120ML	L= 12.0 µH DCR= 38.0 mOhm	1	$0.37	SRR1206 216 mm^2
22.	M1	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	TRANS_NexFET_Q3 18 mm^2
23.	M2	Texas Instruments	CSD19537Q3	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	$0.50	TRANS_NexFET_Q3 18 mm^2
24.	M3	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	$0.28	TRANS_NexFET_Q3 18 mm^2
25.	M4	Texas Instruments	CSD19537Q3	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	$0.50	TRANS_NexFET_Q3 18 mm^2

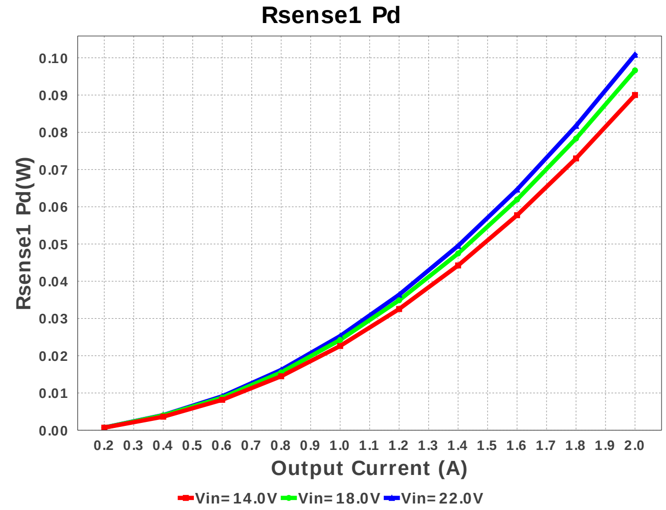
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
26.	Rcomp1	Vishay-Dale	CRCW040224K3FKED Series= CRCW..e3	Res= 24.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
27.	Rcomp2	Vishay-Dale	CRCW040248K7FKED Series= CRCW..e3	Res= 48.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
28.	Rfb1	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
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	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
33.	Rramp2	Vishay-Dale	CRCW040232K4FKED Series= CRCW..e3	Res= 32.4 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	Stackpole Electronics Inc	CSR1206FK30L0 Series= ?	Res= 30.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.10	1206 11 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	CRCW04026K81FKED Series= CRCW..e3	Res= 6.81 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

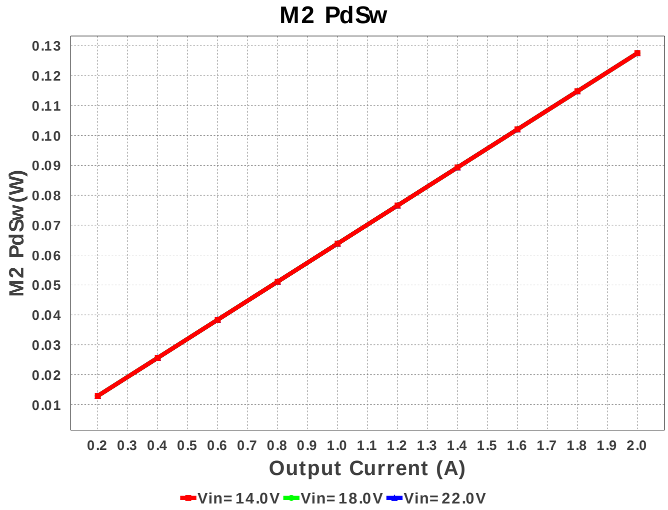

Duty Cycle 2
Duty Cycle 2(%)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

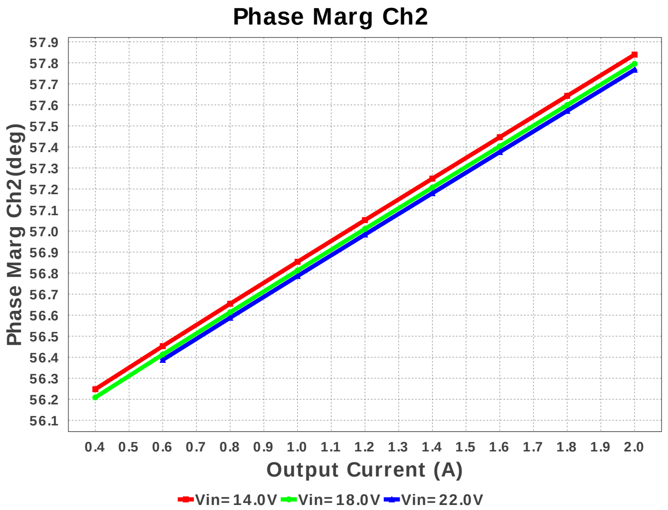

Duty Cycle 1
Duty Cycle 1(%)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


Vout2 p- p
Vout2 p- p(V)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

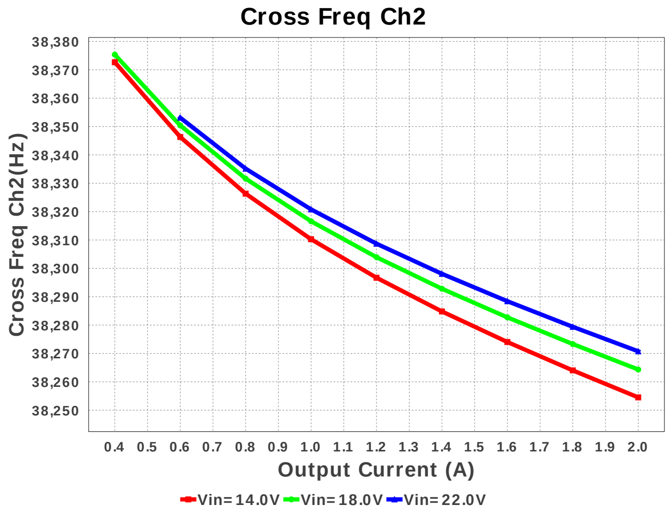

Cin Pd
Cin Pd(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


Rsense1 Pd
Rsense1 Pd(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

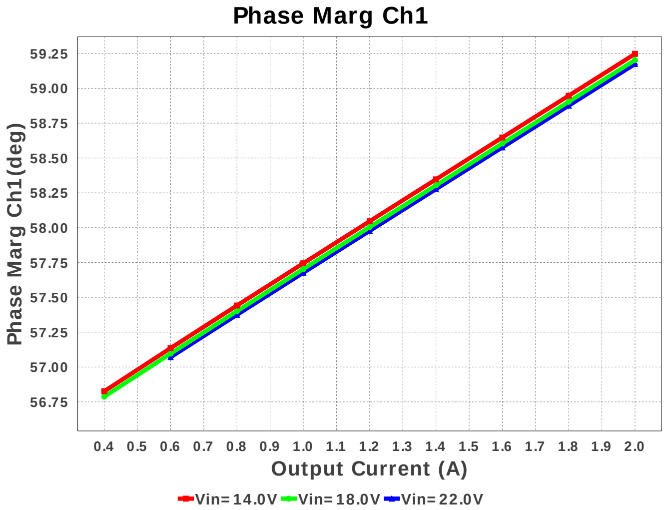

M2 PdSw
M2 PdSw(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V



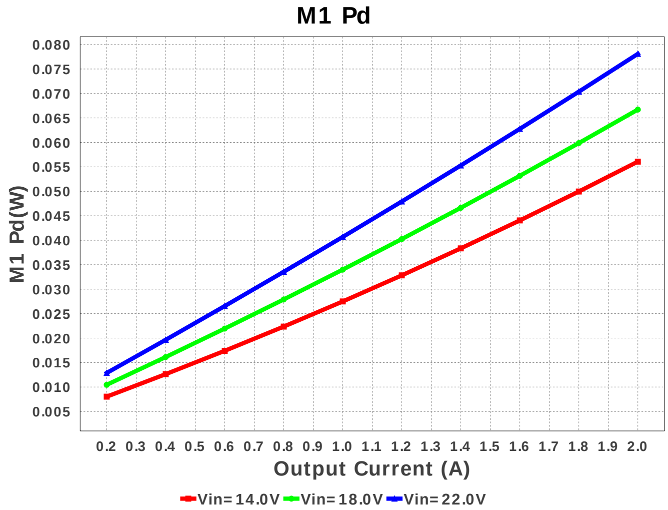
Phase Marg Ch2
Phase Marg Ch2(deg)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V



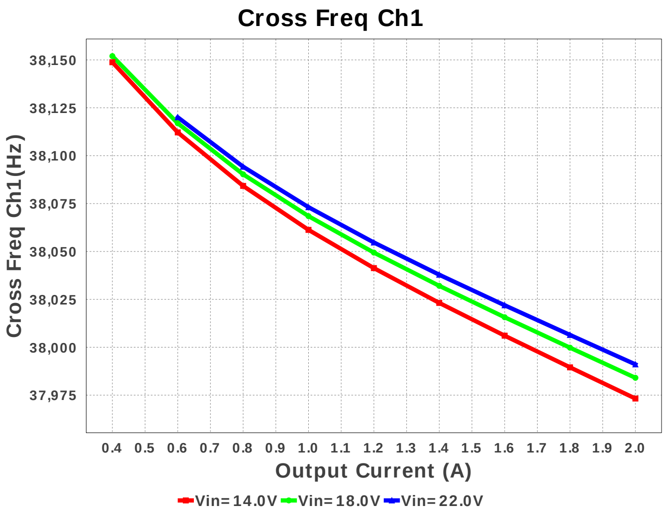
Cross Freq Ch2
Cross Freq Ch2(Hz)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V



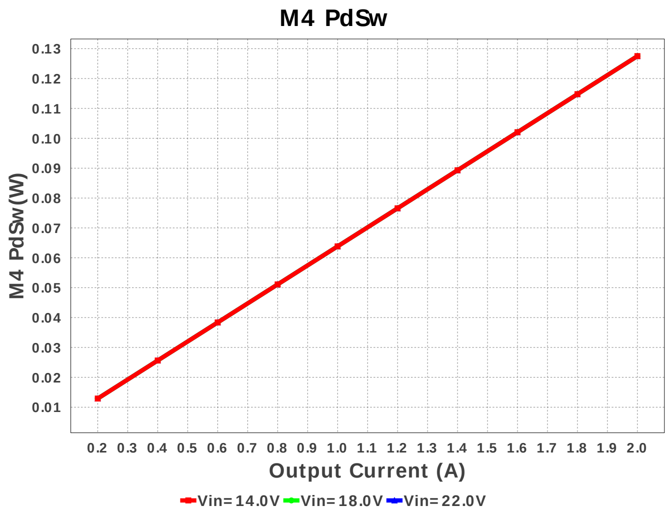
Phase Marg Ch1
Phase Marg Ch1(deg)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V



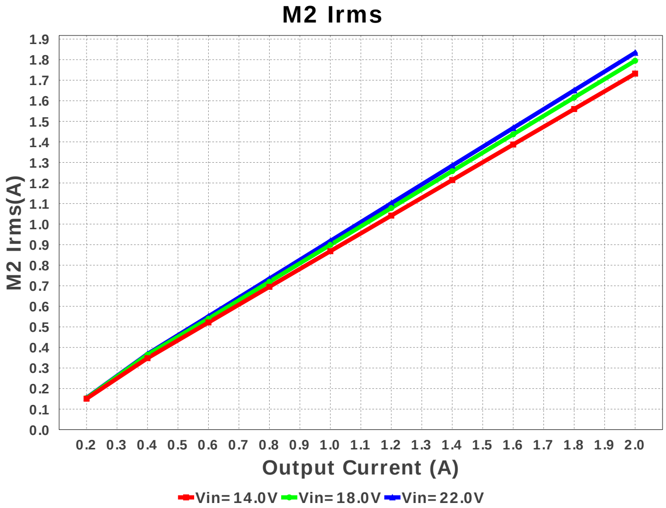
M1 Pd
M1 Pd(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

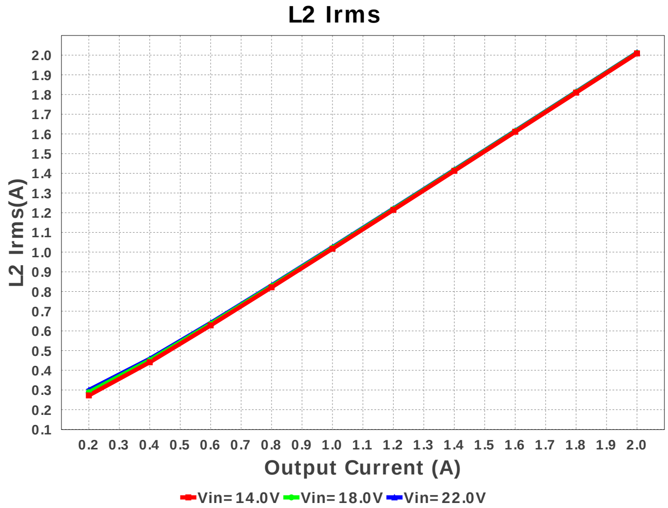


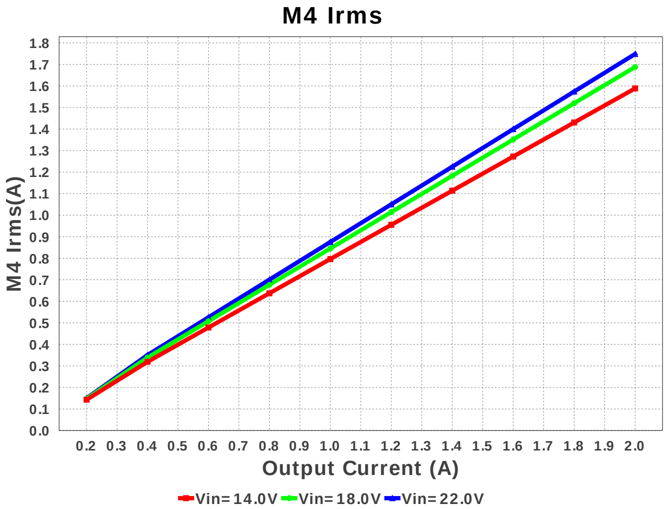
Cross Freq Ch1
Cross Freq Ch1(Hz)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

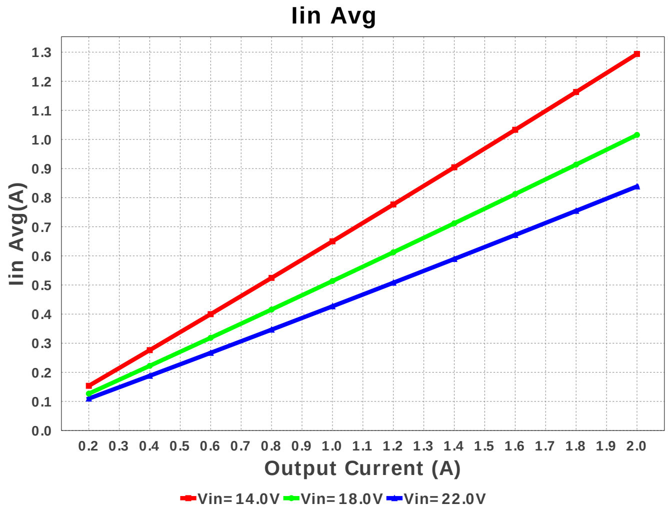


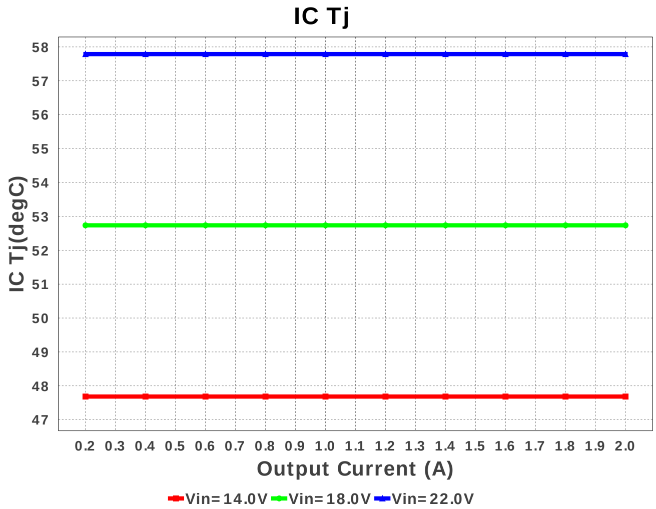
M4 PdSw
M4 PdSw(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

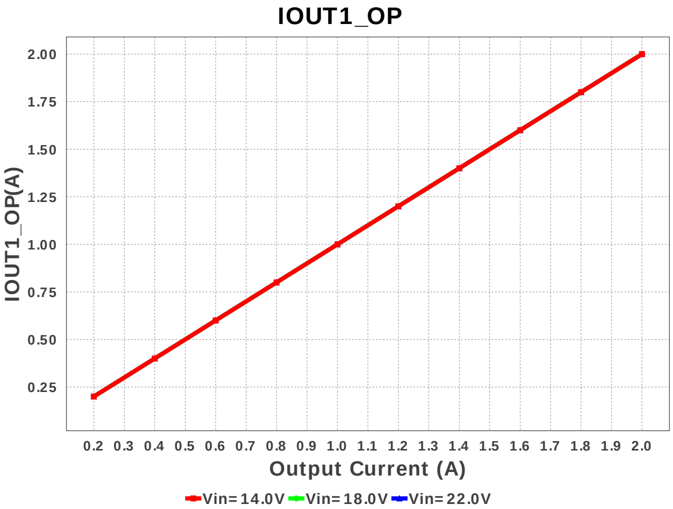

M2 Irms
M2 Irms(A)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


L2 Irms
L2 Irms(A)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

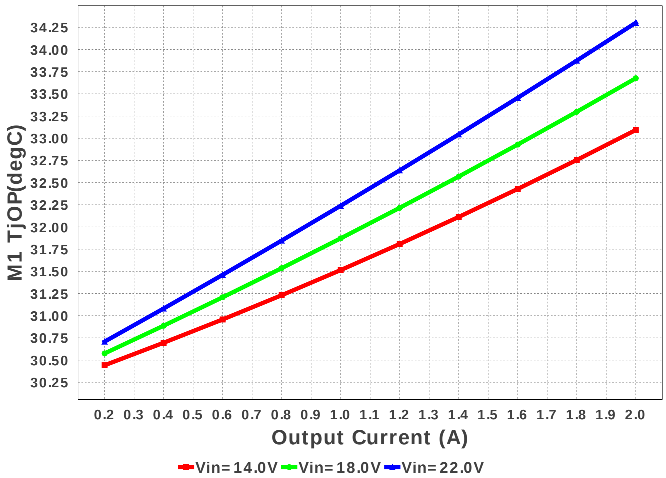

M4 Irms
M4 Irms(A)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


Iin Avg
Iin Avg(A)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

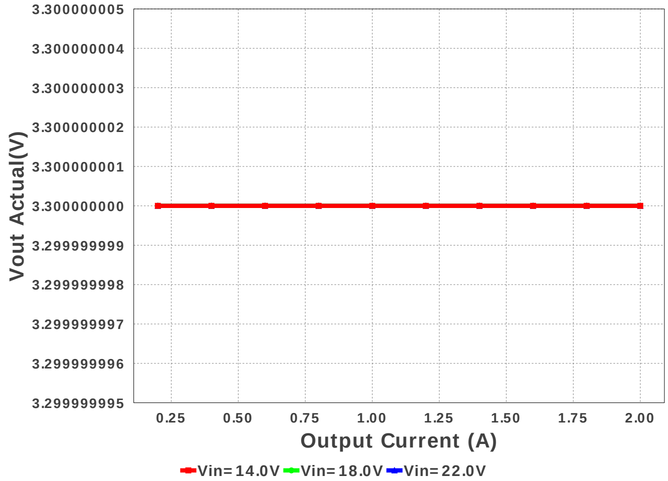

IC Tj
IC Tj(degC)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


IOUT1_OP
IOUT1_OP(A)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

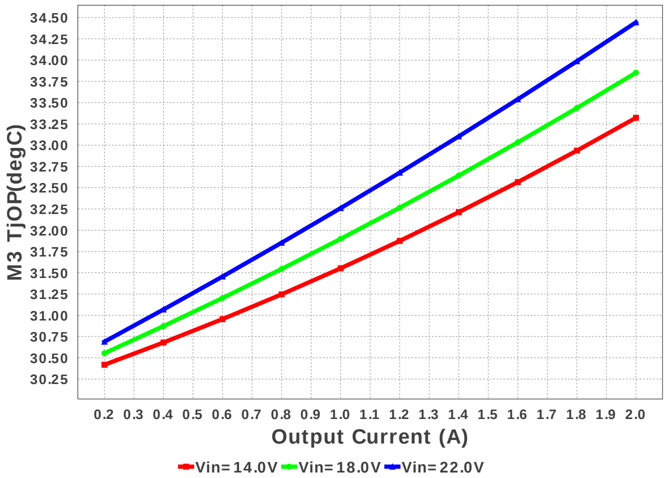
M1 TjOP



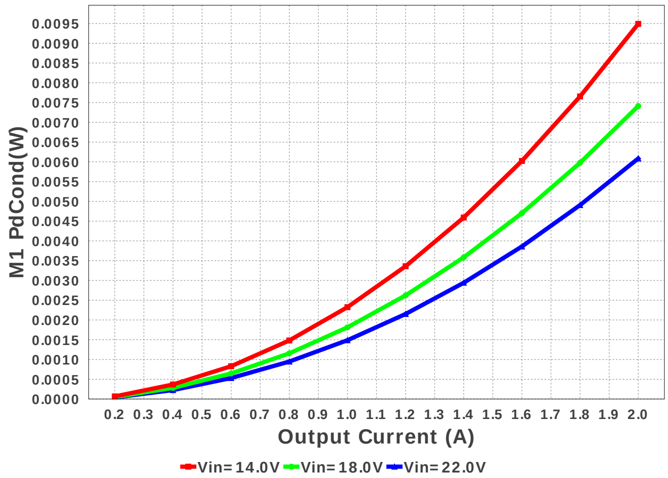
Vout Actual



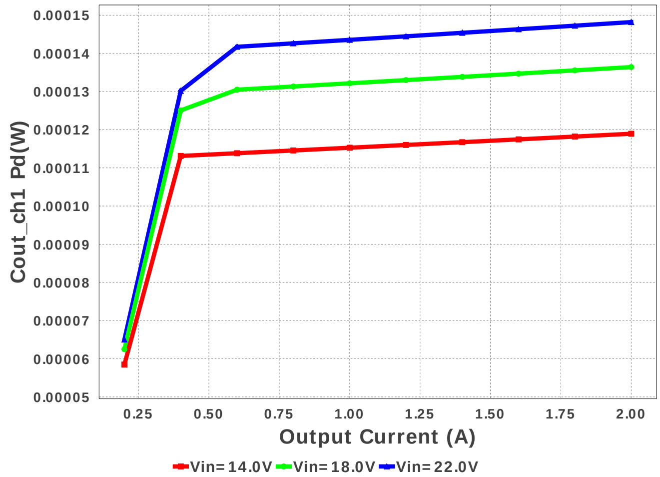
M3 TjOP



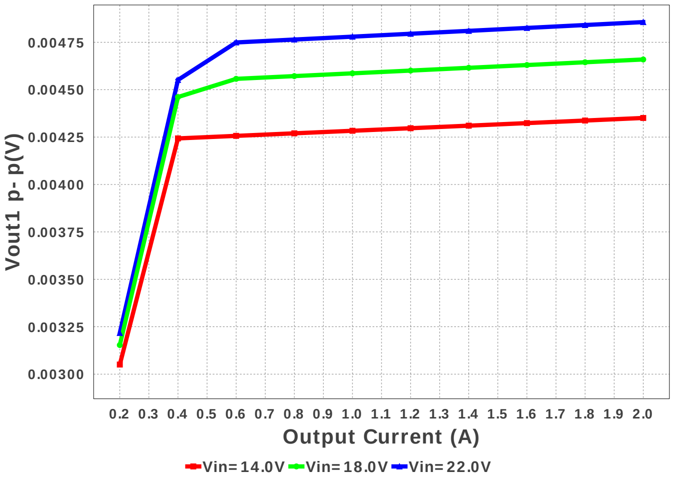
M1 PdCond



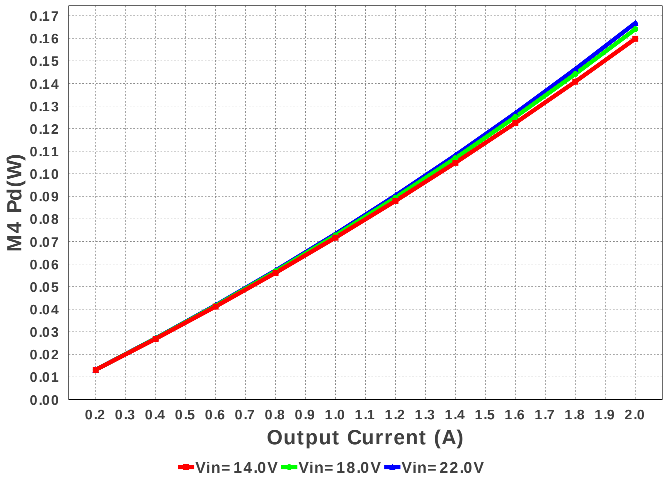
Cout_ch1 Pd



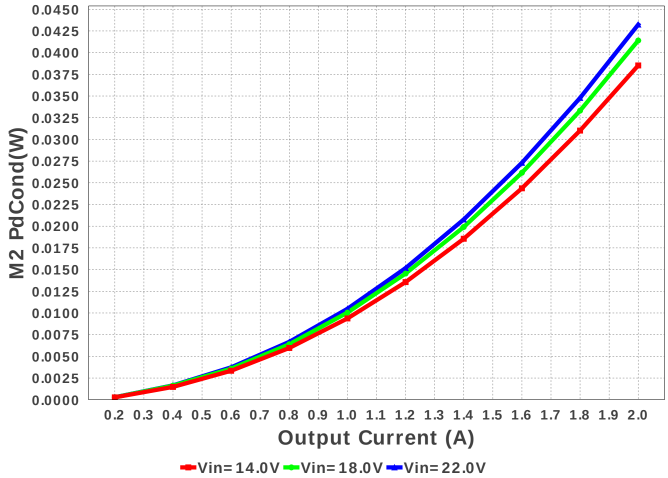
Vout1 p- p



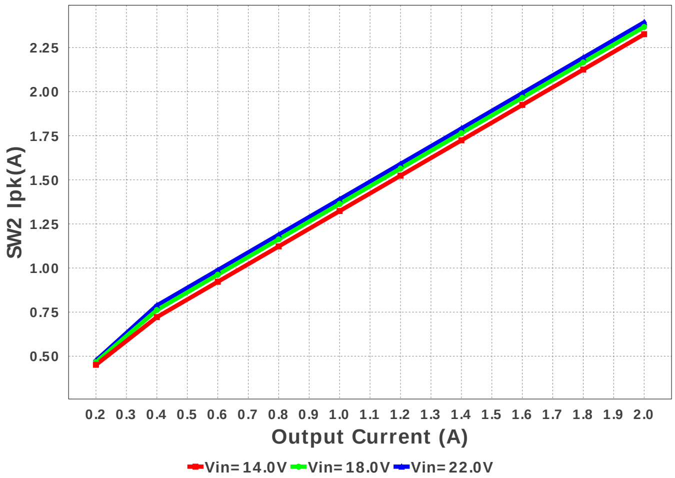
M4 Pd



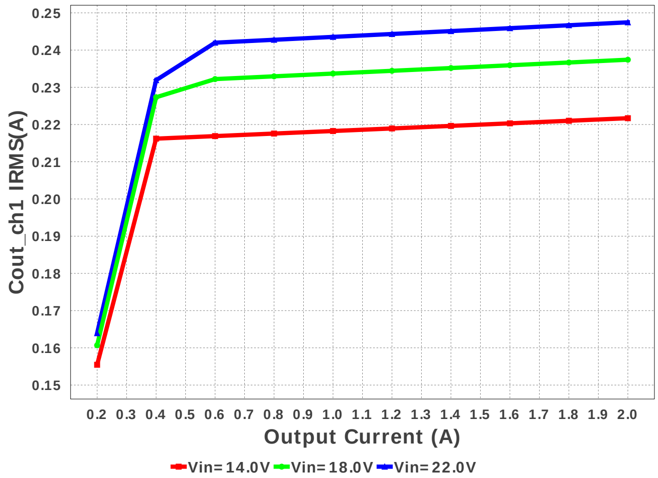
M2 PdCond



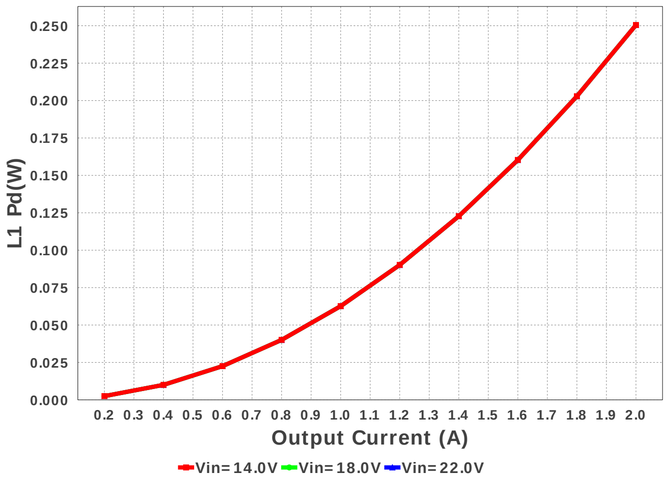
SW2 Ipk



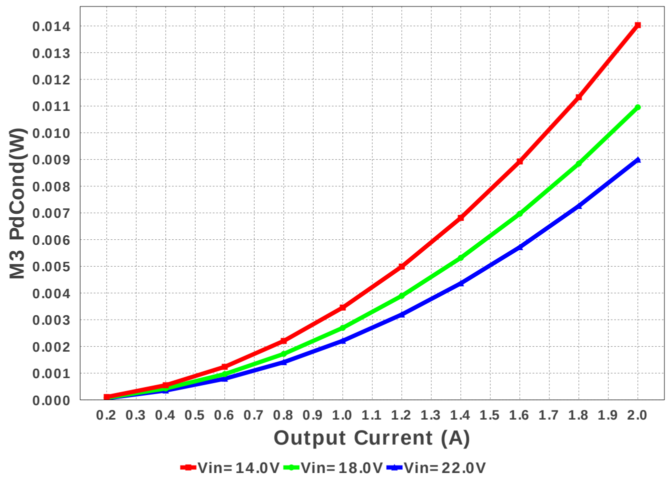
Cout_ch1 IRMS

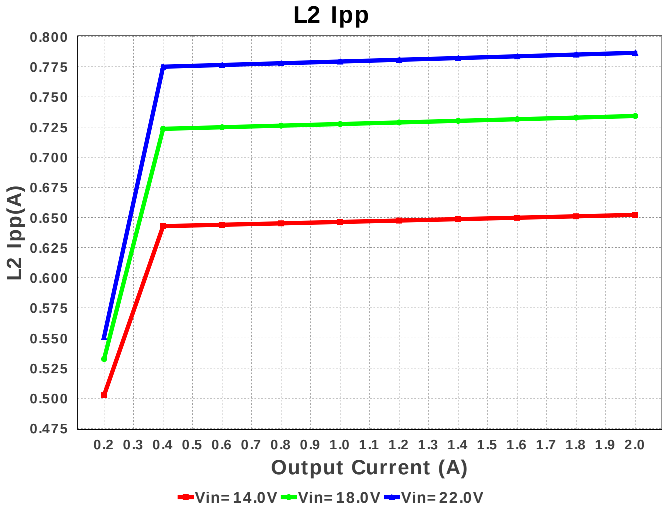


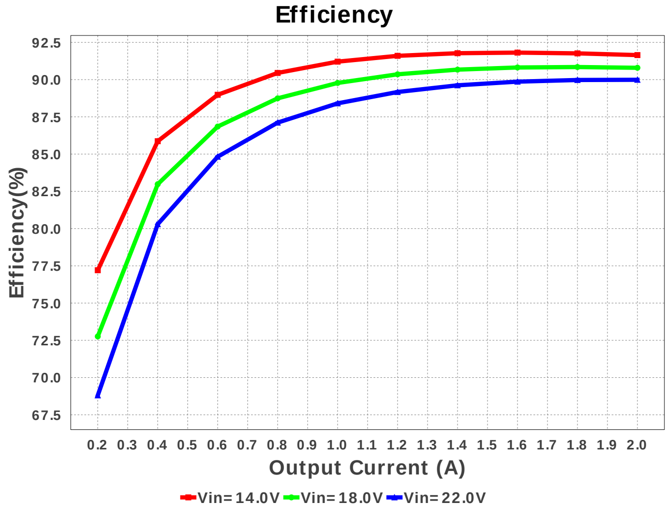
L1 Pd

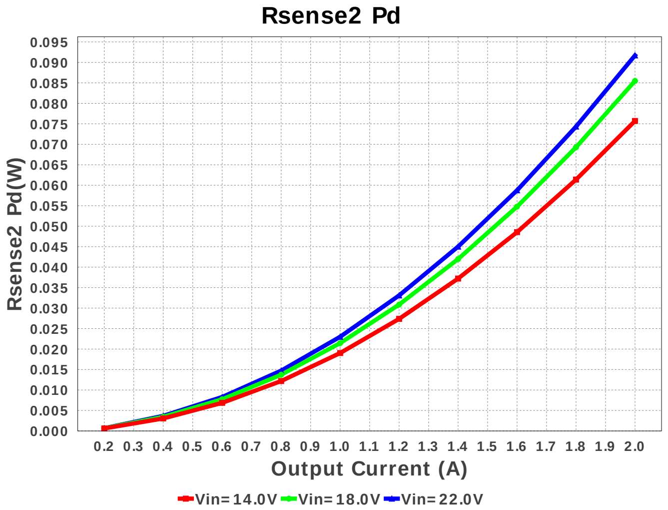


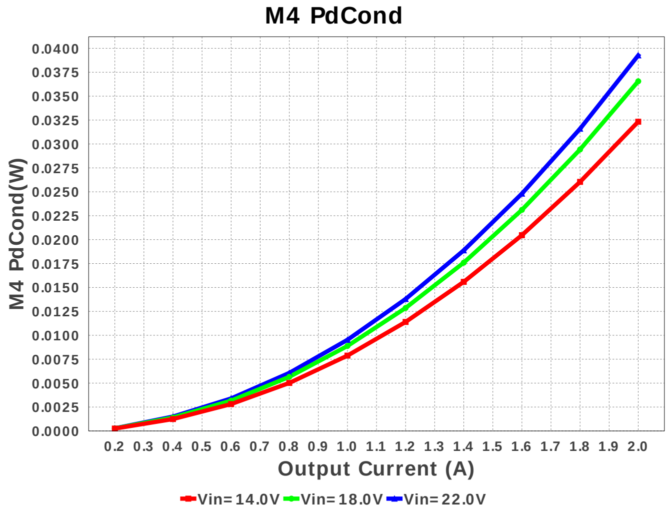
M3 PdCond

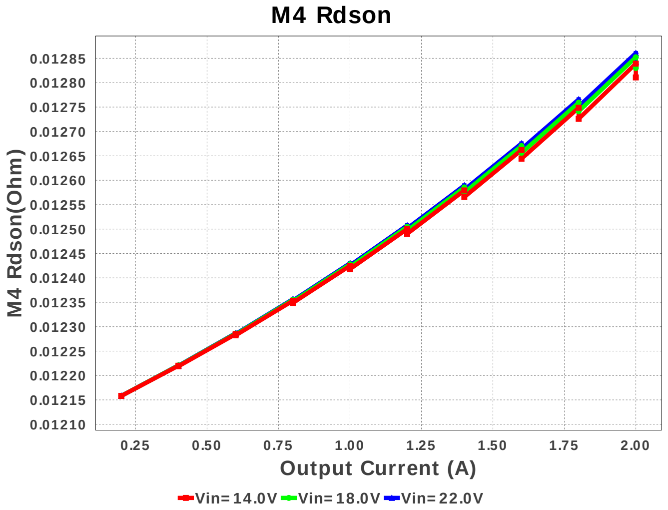


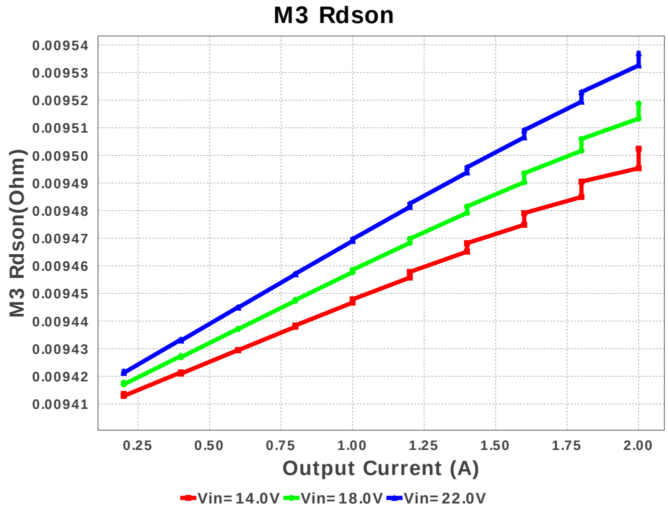

L2 Ipp
L2 Ipp(A)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


Efficiency
Efficiency(%)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

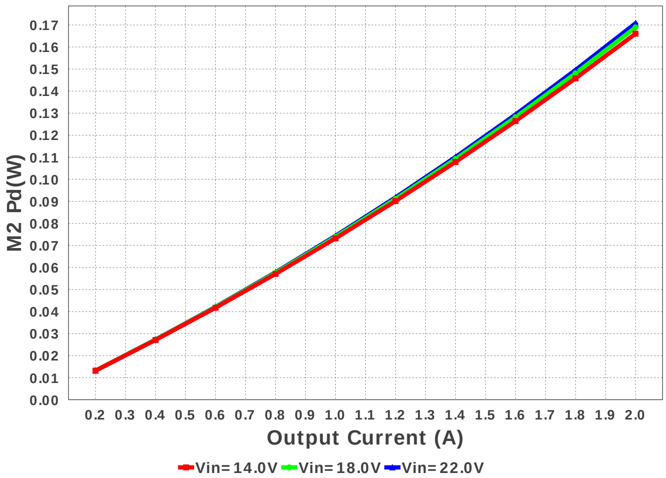

Rsense2 Pd
Rsense2 Pd(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


M4 PdCond
M4 PdCond(W)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

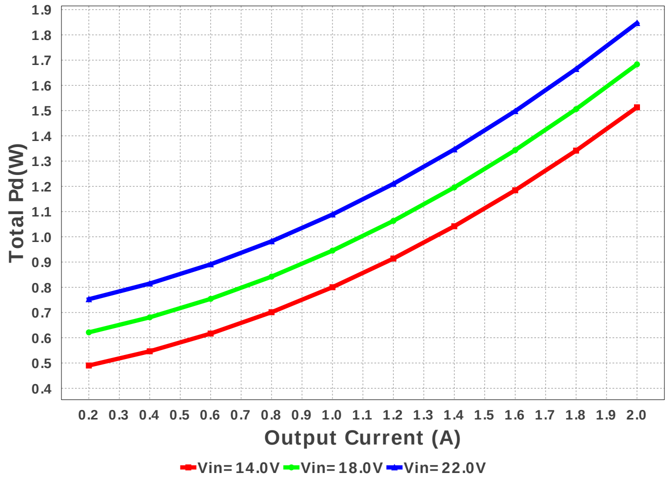

M4 Rdson
M4 Rdson(Ohm)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


M3 Rdson
M3 Rdson(Ohm)
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V

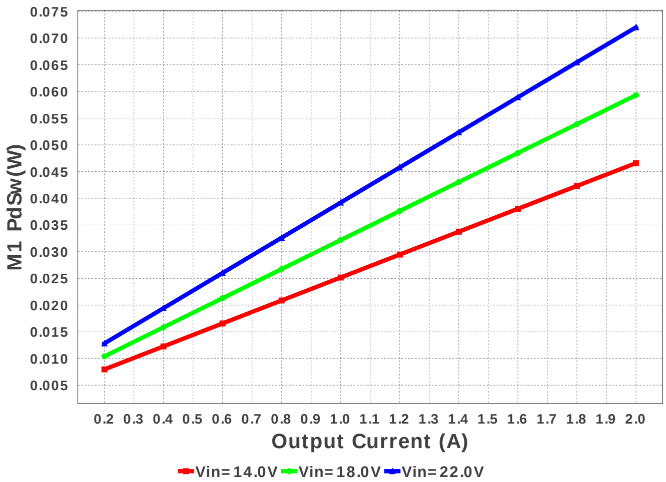
M2 Pd



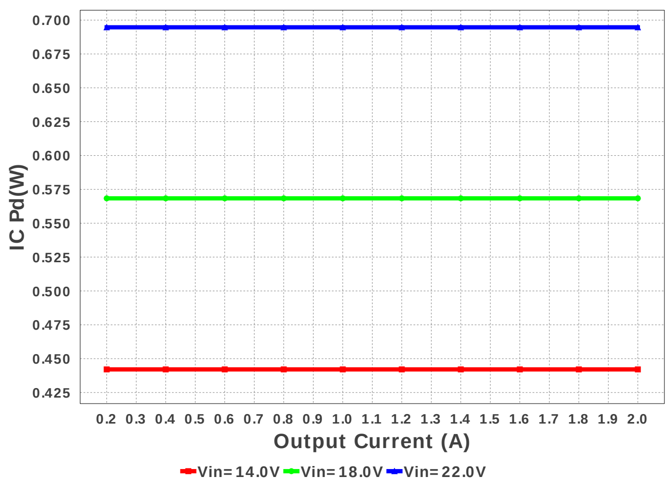
Total Pd



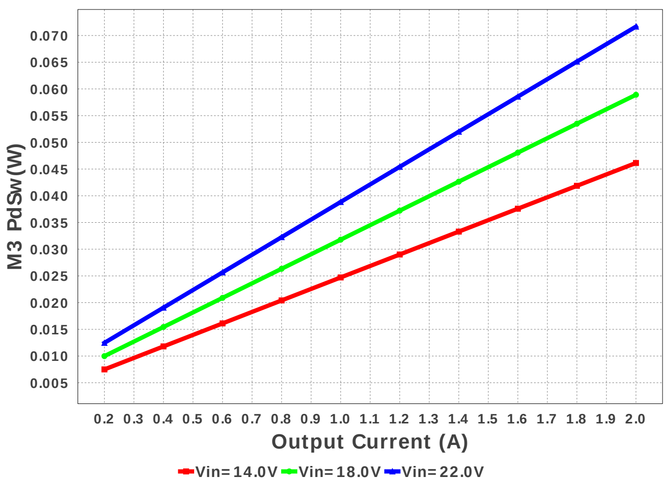
M1 PdSw



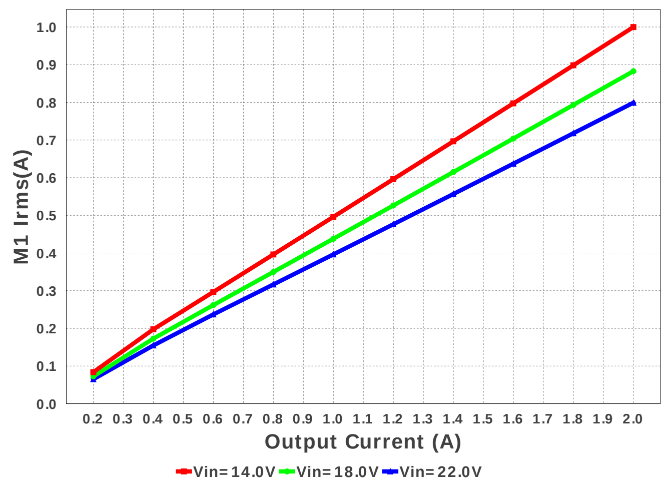
IC Pd

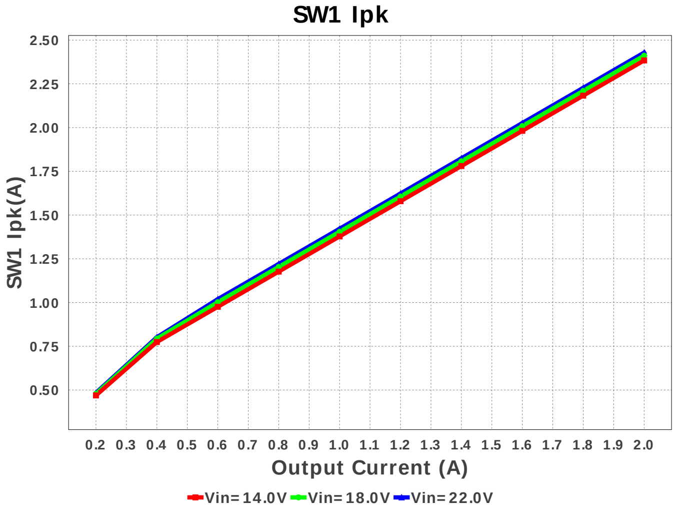


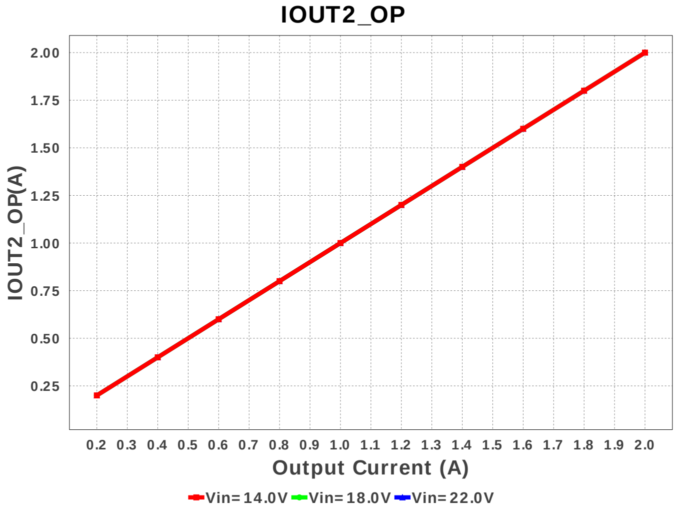
M3 PdSw

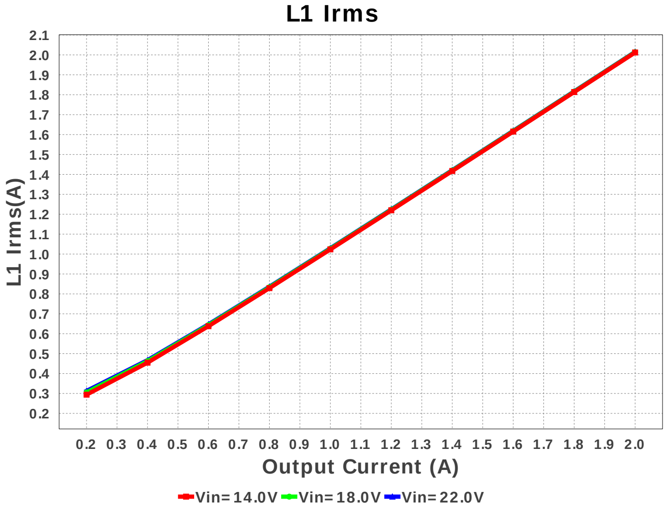


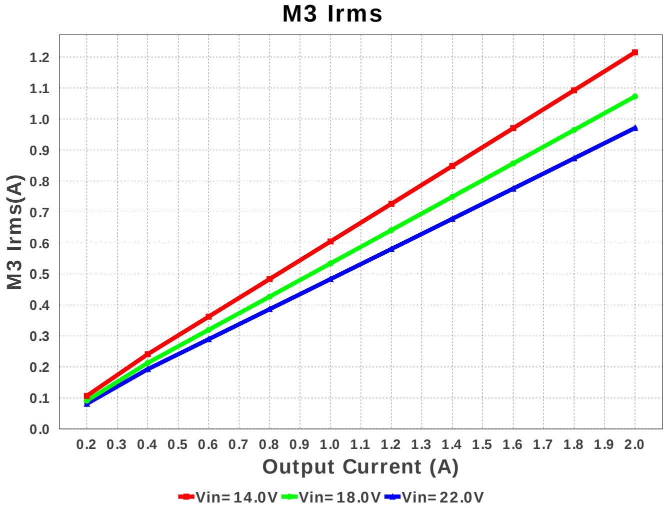
M1 Irms

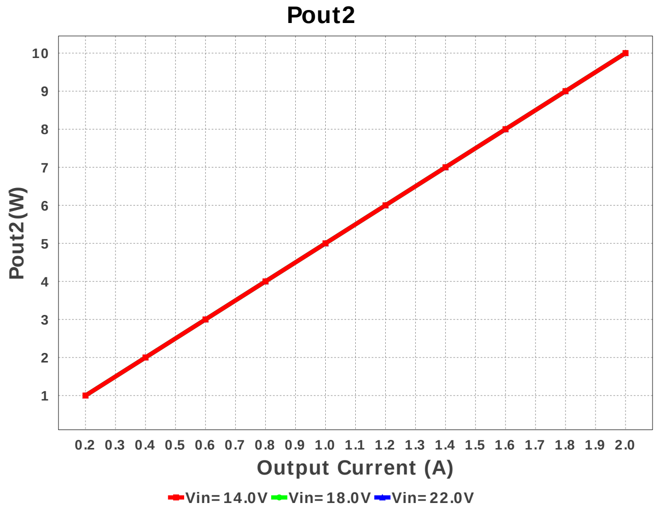


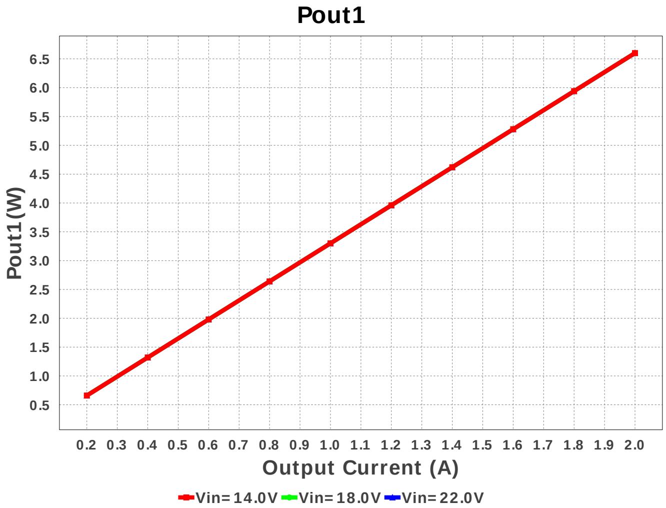

SW1 Ipk
SW1 Ipk(A)
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


IOUT2_OP
IOUT2_OP(A)
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
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=14.0V Vin=18.0V Vin=22.0V

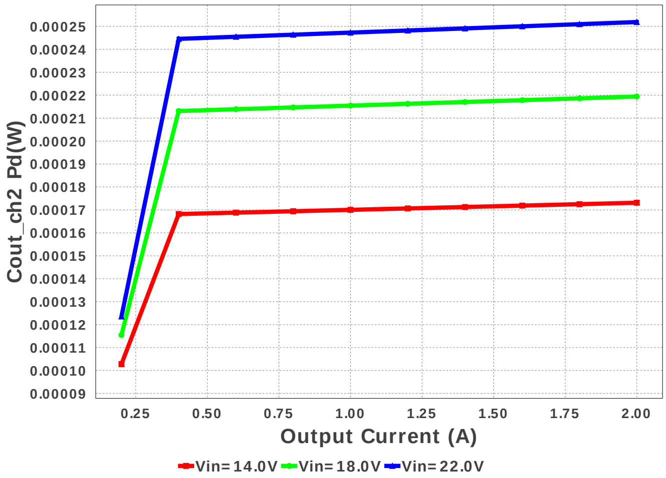

L1 Irms
L1 Irms(A)
2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3 1.2 1.1 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


M3 Irms
M3 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=14.0V Vin=18.0V Vin=22.0V

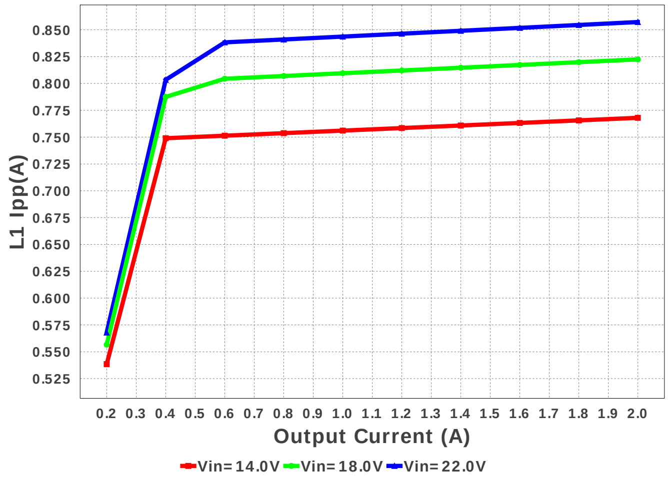

Pout2
Pout2(W)
10 9 8 7 6 5 4 3 2 1
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
Output Current (A)
Vin=14.0V Vin=18.0V Vin=22.0V


Pout1
Pout1(W)
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
0.2 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=14.0V Vin=18.0V Vin=22.0V

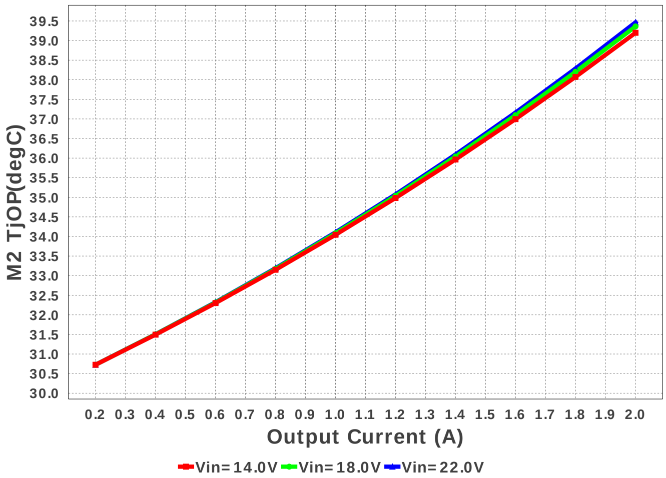
Cout_ch2 Pd



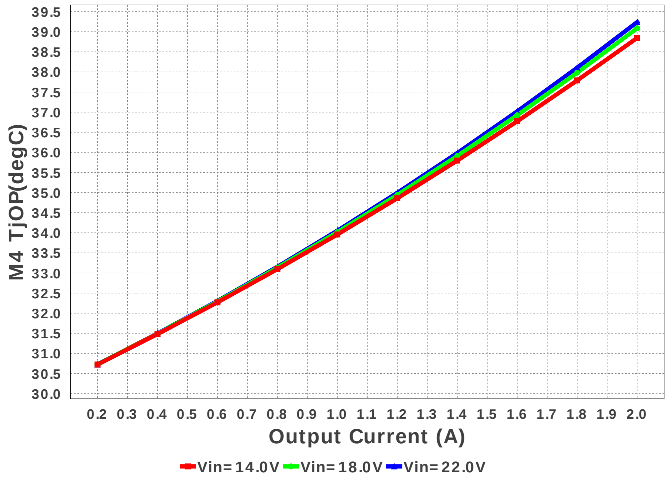
L1 Ipp



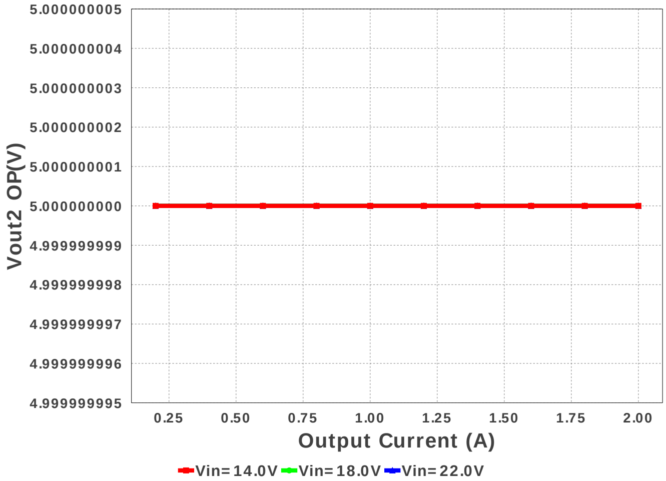
M2 TjOP



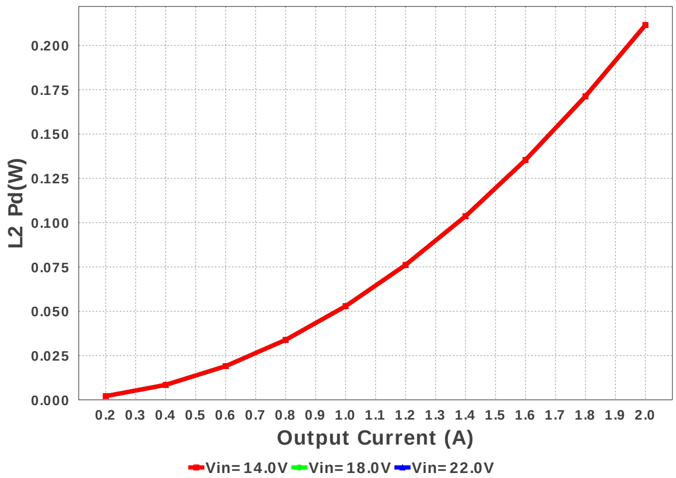
M4 TjOP

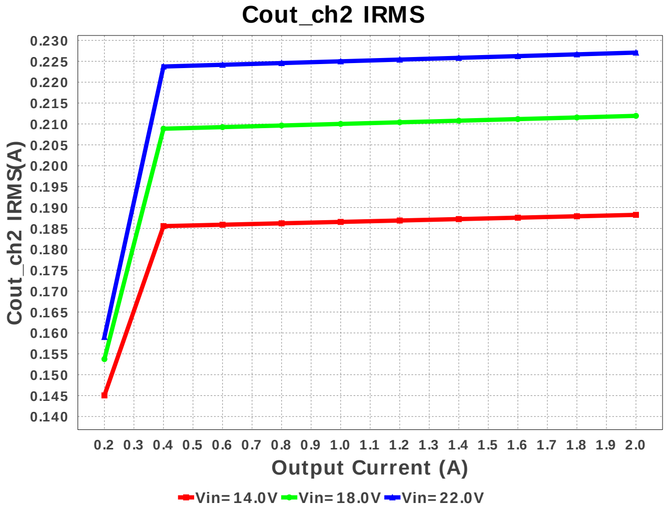


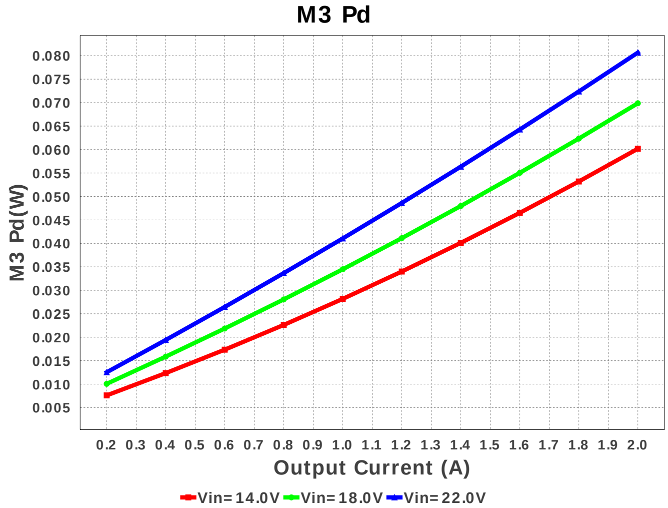
Vout2 OP

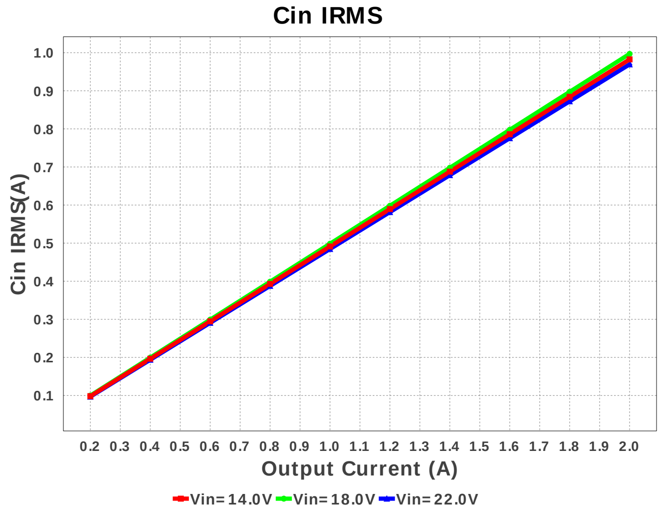


L2 Pd









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	969.448 mA	Current	Input capacitor RMS ripple current
2.	Cout_ch1 IRMS	247.457 mA	Current	Output Channel 1 Capacitor RMS ripple current
3.	Cout_ch2 IRMS	227.125 mA	Current	Output Channel 2 Capacitor RMS ripple current
4.	Iin Avg	838.65 mA	Current	Average input current
5.	L1 Ipp	857.216 mA	Current	Peak-to-peak inductor ripple current
6.	L1 Irms	2.015 A	Current	Inductor ripple current
7.	L2Ipp	786.785 mA	Current	Channel 2 Inductor Peak to peak Current
8.	L2 Irms	2.013 A	Current	Inductor ripple current
9.	M1 Irms	798.97 mA	Current	MOSFET RMS ripple current
10.	M2 Irms	1.833 A	Current	MOSFET RMS ripple current
11.	M3 Irms	971.215 mA	Current	MOSFET RMS ripple current
12.	M4 Irms	1.748 A	Current	MOSFET RMS ripple current
13.	SW1 Ipk	2.429 A	Current	Peak switch current
14.	SW2 Ipk	2.393 A	Current	Peak switch current
15.	BOM Count	40	General	Total Design BOM count
16.	FootPrint	699.0 mm^2	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	10.003 W	General	Channel 2 output Power
21.	Total BOM	$6.11	General	Total BOM Cost
22.	Ch1 Mode	CCM	General	Conduction Mode
23.	Ch2 Mode	CCM	General	Conduction Mode
24.	M3 TjOP	34.444 degC	Op_Point	M3 MOSFET junction temperature
25.	M4 TjOP	39.24 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	15.959 %	Op_point	Duty cycle for Channel 1
28.	Duty Cycle 2	23.581 %	Op_point	Duty cycle for Channel 2
29.	Efficiency	89.99 %	Op_point	Steady state efficiency
30.	IC Tj	57.788 degC	Op_point	IC junction temperature
31.	IOUT1_OP	2.0 A	Op_point	Iout1 operating point

#	Name	Value	Category	Description
32.	IOUT2_OP	2.0 A	Op_point	Iout2 operating point
33.	M1 TjOP	34.3 degC	Op_point	M1 MOSFET junction temperature
34.	M2 TjOP	39.465 degC	Op_point	M2 MOSFET junction temperature
35.	VIN_OP	22.0 V	Op_point	Vin operating point
36.	Vout1 OP	3.3 V	Op_point	Operational Voltage 1
37.	Vout1 p-p	4.856 mV	Op_point	Peak-to-peak output1 ripple voltage
38.	Vout2 OP	5.002 V	Op_point	Operational Voltage 2
39.	Vout2 p-p	4.488 mV	Op_point	Peak-to-peak output2 ripple voltage
40.	Cin Pd	943.589 µW	Power	Input capacitor power dissipation
41.	Cout_ch1 Pd	148.188 µW	Power	Ouput channel 1 capacitor power dissipation
42.	Cout_ch2 Pd	251.997 µW	Power	Ouput channel 2 capacitor power dissipation
43.	IC Pd	694.693 mW	Power	IC power dissipation
44.	L1 Pd	250.474 mW	Power	Inductor power dissipation
45.	L2 Pd	211.511 mW	Power	Inductor power dissipation
46.	M1 Pd	78.091 mW	Power	M1 MOSFET total power dissipation
47.	M1 PdCond	6.085 mW	Power	M1 MOSFET conduction losses
48.	M1 PdSw	72.006 mW	Power	M1 MOSFET switching losses
49.	M2 Pd	170.746 mW	Power	M2 MOSFET total power dissipation
50.	M2 PdCond	43.232 mW	Power	M2 MOSFET conduction losses
51.	M2 PdSw	127.513 mW	Power	M2 MOSFET switching losses
52.	M3 Pd	80.662 mW	Power	M3 MOSFET total power dissipation
53.	M3 PdCond	8.996 mW	Power	M3 MOSFET conduction losses
54.	M3 PdSw	71.666 mW	Power	M3 MOSFET switching losses
55.	M1 Rdson	9.533 mOhm	Power	Drain-Source On-resistance
56.	M3 Rdson	9.537 mOhm	Power	Drain-Source On-resistance
57.	M4 Pd	166.766 mW	Power	M4 MOSFET total power dissipation
58.	M4 PdCond	39.256 mW	Power	M4 MOSFET conduction losses
59.	M4 PdSw	127.51 mW	Power	M4 MOSFET switching losses
60.	M2 Rdson	12.86 mOhm	Power	Drain-Source On-resistance
61.	M4 Rdson	12.842 mOhm	Power	Drain-Source On-resistance
62.	Rsense1 Pd	100.849 mW	Power	Current Limit Sense Resistor Power Dissipation
63.	Rsense2 Pd	91.702 mW	Power	Current Limit Sense Resistor Power Dissipation
64.	Total Pd	1.847 W	Power	Total Power Dissipation
65.	Cross Freq Ch1	37.992 kHz		Bode plot crossover frequency
66.	Cross Freq Ch2	38.271 kHz		Bode plot crossover frequency
67.	Phase Marg Ch1	59.17 deg		Bode Plot Phase Margin
68.	Phase Marg Ch2	57.764 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	2.0	Output Current #2
4.	VinMax	22.0	Maximum input voltage
5.	VinMin	14.0	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.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to Texas Instruments' Site Terms and Conditions of Use. Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the Evaluation License Agreement.