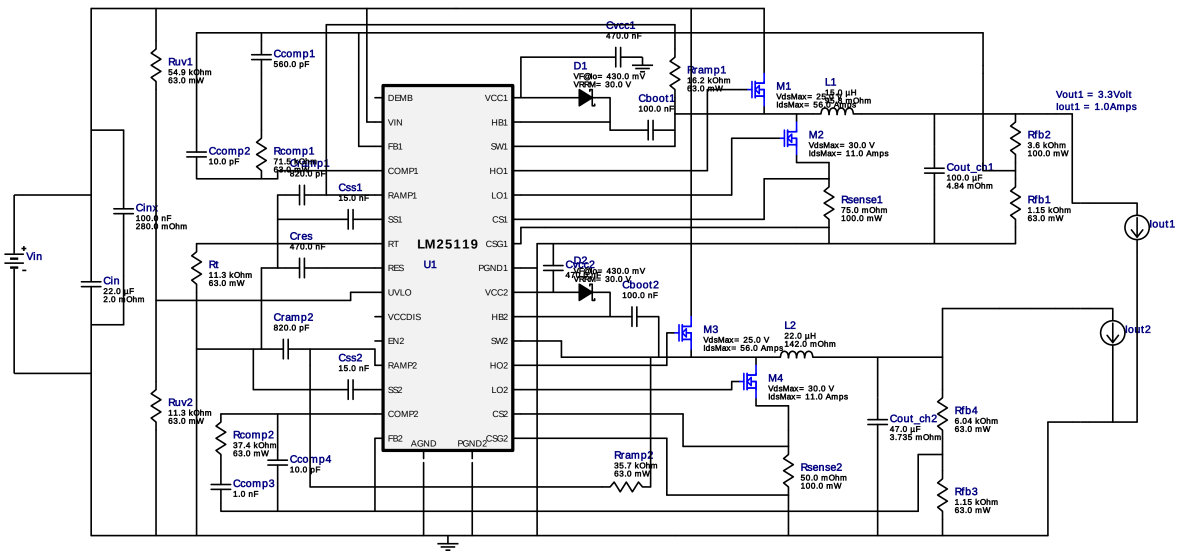
VinMin = 9.0V
VinMax = 15.0V
Vout = 3.3V
Iout = 1.0A

Device = LM25119PSQ/NOPB
Topology = Buck
Created = 3/15/16 2:04:47 AM
BOM Cost = $5.12
BOM Count = 39
Total Pd = 0.91W

WEBENCH ® Design Report

Design : 3777290/2 LM25119PSQ/NOPB
LM25119PSQ/NOPB 9.0V-15.0V 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.

My Comments

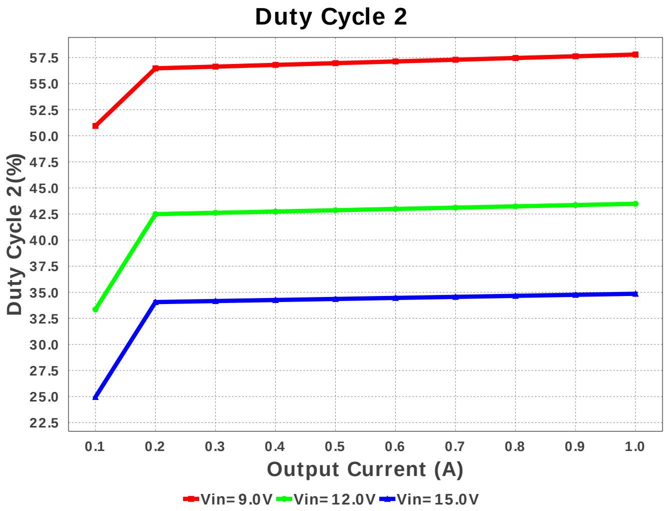
No comments

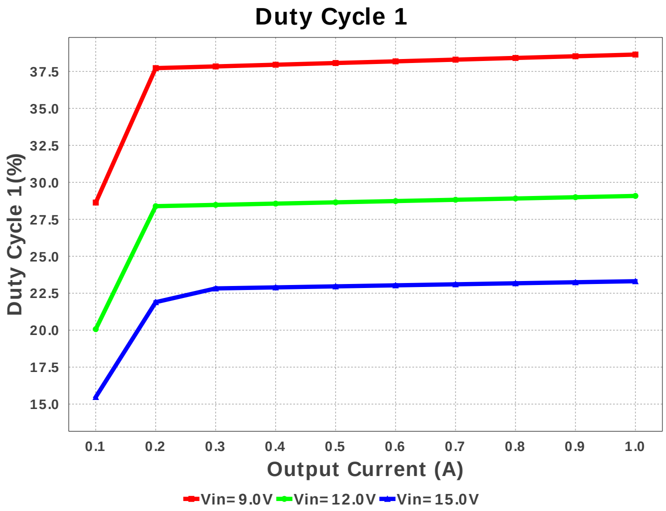
Electrical BOM

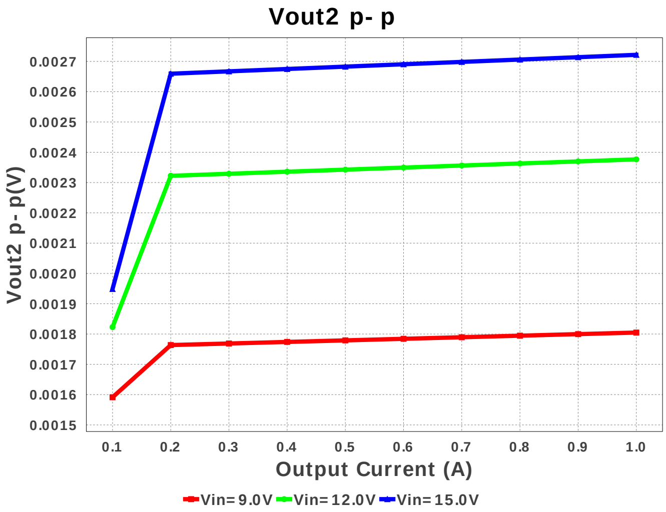
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot1	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cboot2	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Ccomp1	Yageo America	CC0805KRX7R9BB561 Series= X7R	Cap= 560.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Ccomp2	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
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 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	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm²
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 mm²

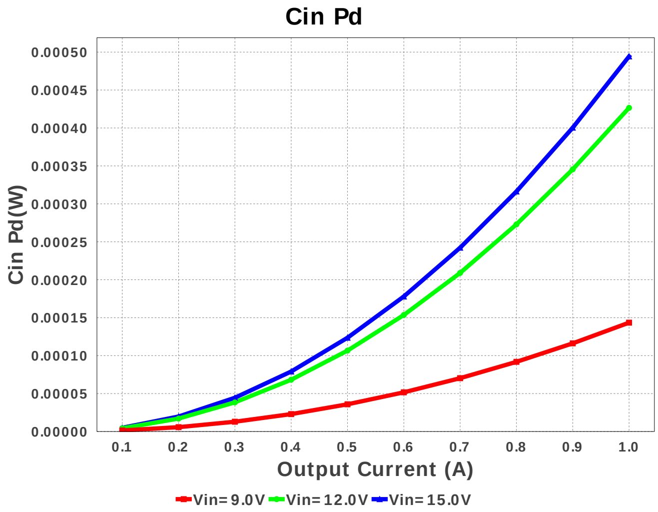
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cout_ch1	MuRata	GRM31CR60G107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.84 mOhm VDC= 4.0 V IRMS= 4.3381 A	1	$0.23	1206_190 11 mm^2
10.	Cout_ch2	MuRata	GRM31CR60J476ME19L Series= X5R	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.091 A	1	$0.12	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	ON Semiconductor	MBR0530T1G	VF@Io= 430.0 mV VRRM= 30.0 V	1	$0.06	SOD-123 13 mm^2
19.	D2	ON Semiconductor	MBR0530T1G	VF@Io= 430.0 mV VRRM= 30.0 V	1	$0.06	SOD-123 13 mm^2
20.	L1	Bourns	SRN6045-150M	L= 15.0 µH DCR= 95.8 mOhm	1	$0.16	SRN6045 64 mm^2
21.	L2	Bourns	SRN6045-220M	L= 22.0 µH DCR= 142.0 mOhm	1	$0.16	SRN6045 64 mm^2
22.	M1	Texas Instruments	CSD16411Q3	VdsMax= 25.0 V IdsMax= 56.0 Amps	1	$0.34	TRANS_NexFET_Q3 18 mm^2
23.	M2	Texas Instruments	CSD17579Q3A	VdsMax= 30.0 V IdsMax= 11.0 Amps	1	$0.23	TRANS_NexFET_Q3A 18 mm^2
24.	M3	Texas Instruments	CSD16411Q3	VdsMax= 25.0 V IdsMax= 56.0 Amps	1	$0.34	TRANS_NexFET_Q3 18 mm^2
25.	M4	Texas Instruments	CSD17579Q3A	VdsMax= 30.0 V IdsMax= 11.0 Amps	1	$0.23	TRANS_NexFET_Q3A 18 mm^2
26.	Rcomp1	Vishay-Dale	CRCW040271K5FKED Series= CRCW..e3	Res= 71.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
27.	Rcomp2	Vishay-Dale	CRCW040237K4FKED Series= CRCW..e3	Res= 37.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

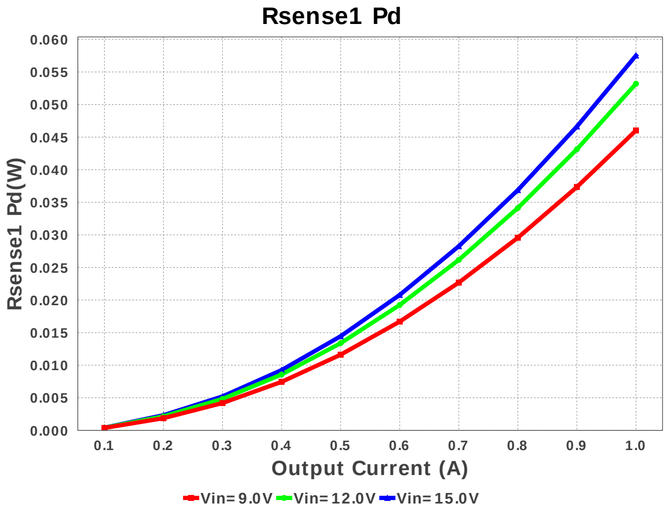
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
28.	Rfb1	Vishay-Dale	CRCW04021K15FKED Series= CRCW..e3	Res= 1.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
29.	Rfb2	Yageo America	RC0603FR-073K6L Series= ?	Res= 3.6 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
30.	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	CRCW040216K2FKED Series= CRCW..e3	Res= 16.2 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	Panasonic	ERJ-L03UF75MV Series= ERJ-L03	Res= 75.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.09	0603 5 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	CRCW040211K3FKED Series= CRCW..e3	Res= 11.3 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

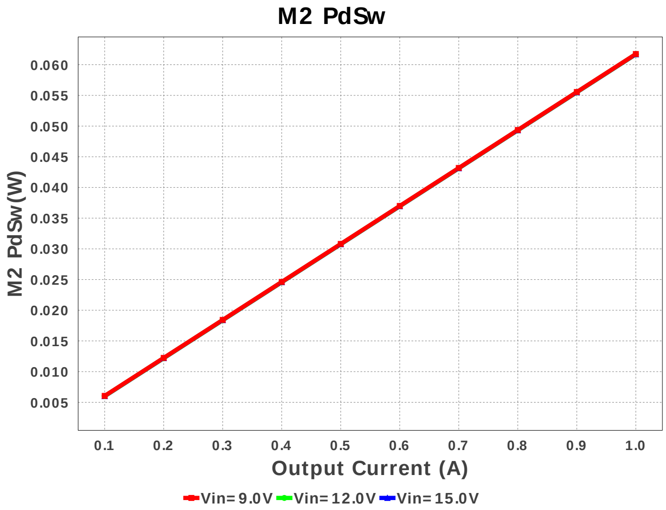

Duty Cycle 2
Duty Cycle 2(%)
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

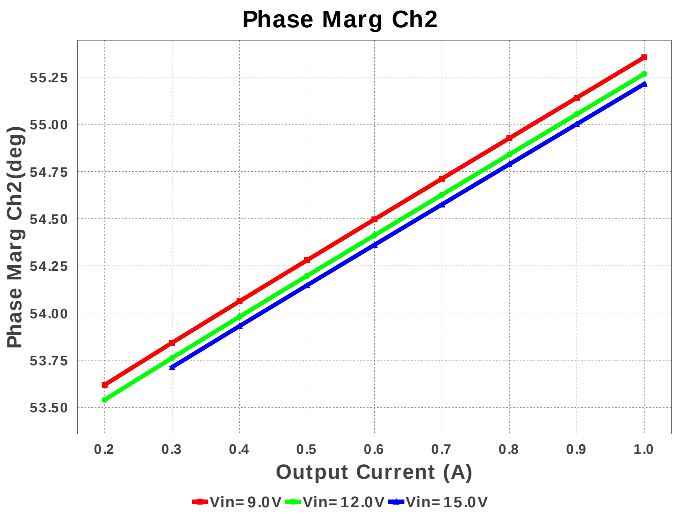

Duty Cycle 1
Duty Cycle 1(%)
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

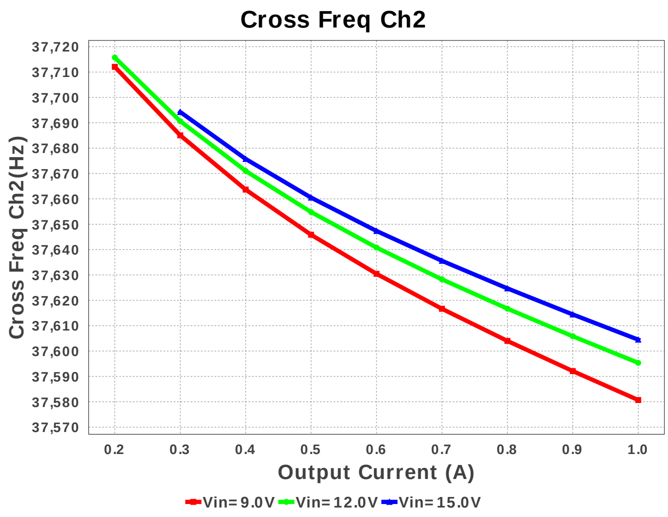

Vout2 p-p
Vout2 p-p(V)
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

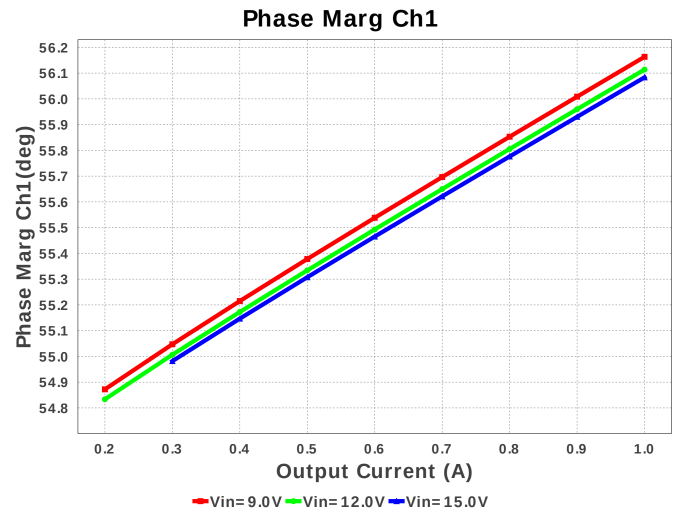

Cin Pd
Cin Pd(W)
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

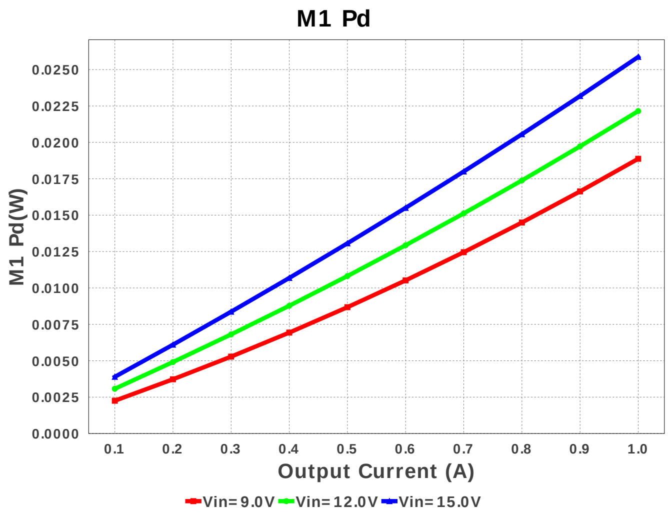

Rsense1 Pd
Rsense1 Pd(W)
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

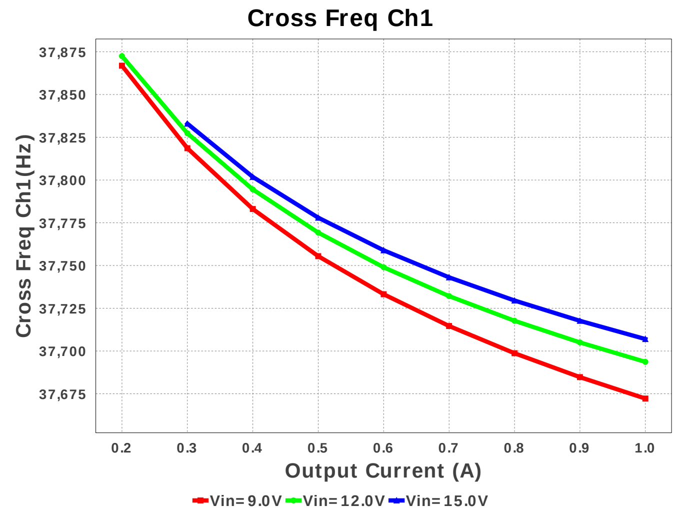

M2 PdSw
M2 PdSw(W)
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

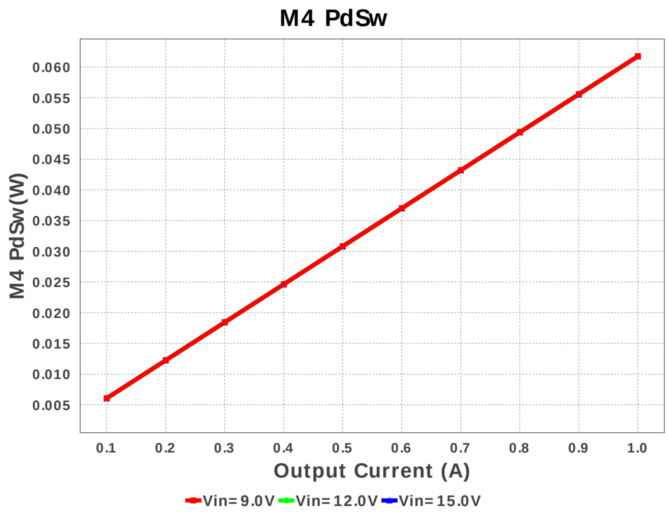

Phase Marg Ch2
Phase Marg Ch2(deg)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

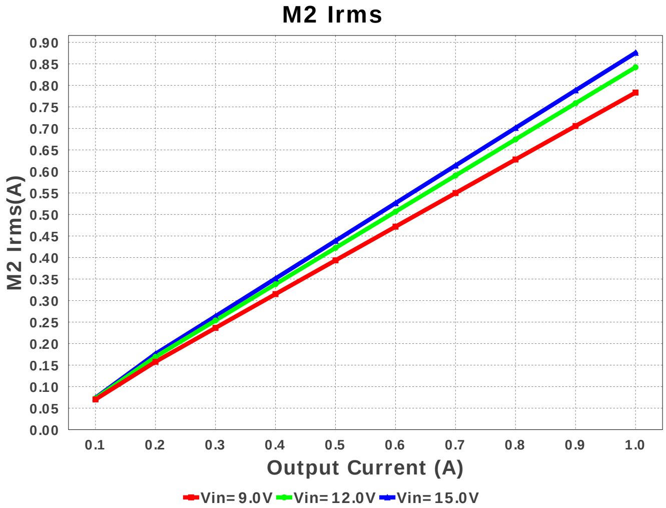

Cross Freq Ch2
Cross Freq Ch2(Hz)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

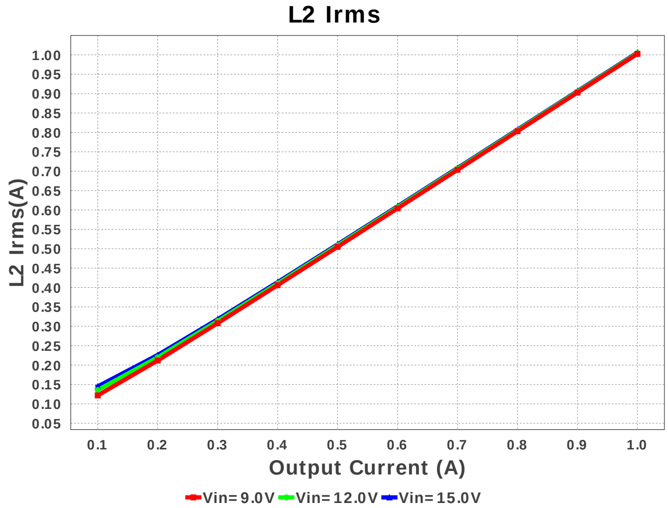

Phase Marg Ch1
Phase Marg Ch1(deg)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

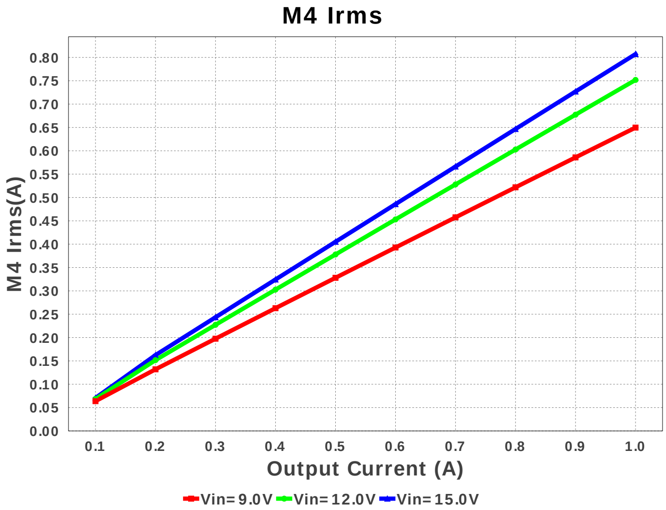

M1 Pd
M1 Pd(W)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

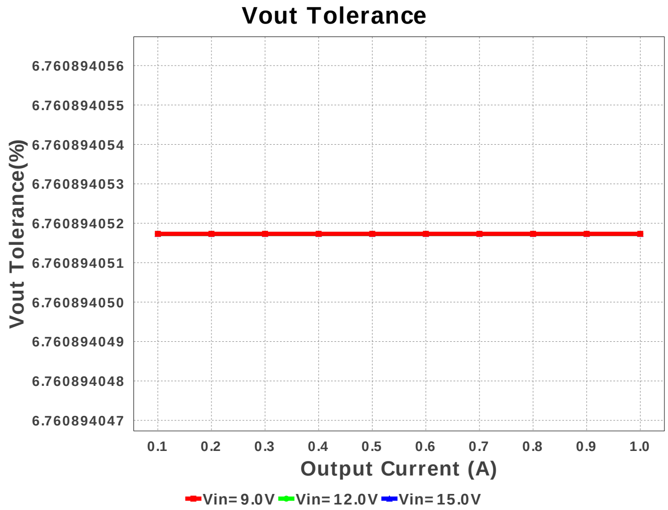

Cross Freq Ch1
Cross Freq Ch1(Hz)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

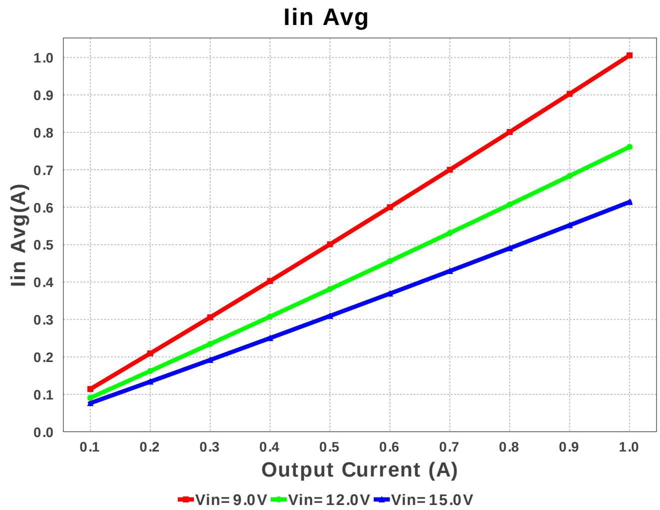

M4 PdSw
M4 PdSw(W)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

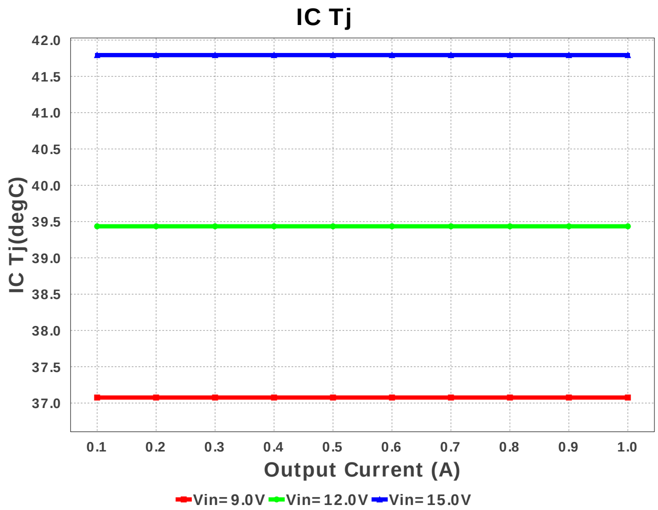

M2 Irms
M2 Irms(A)
0.90 0.85 0.80 0.75 0.70 0.65 0.60 0.55 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.10 0.05 0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

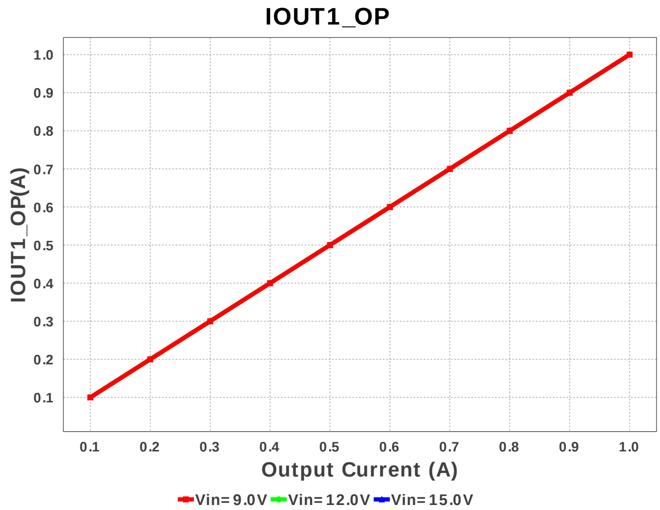

L2 Irms
L2 Irms(A)
1.00 0.95 0.90 0.85 0.80 0.75 0.70 0.65 0.60 0.55 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.10 0.05
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

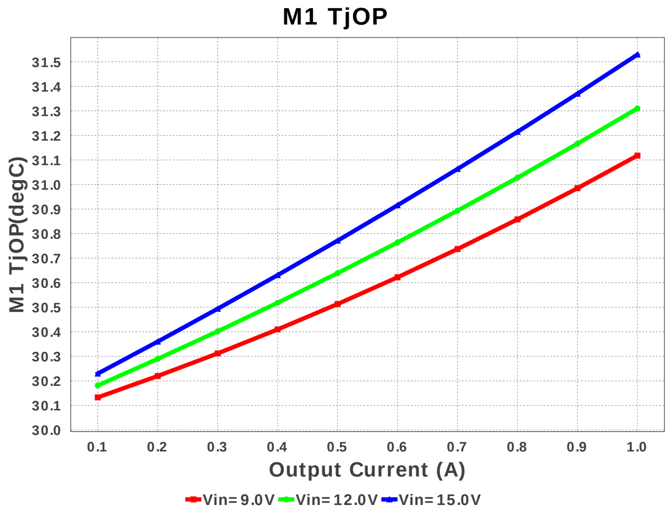

M4 Irms
M4 Irms(A)
0.80 0.75 0.70 0.65 0.60 0.55 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.10 0.05 0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

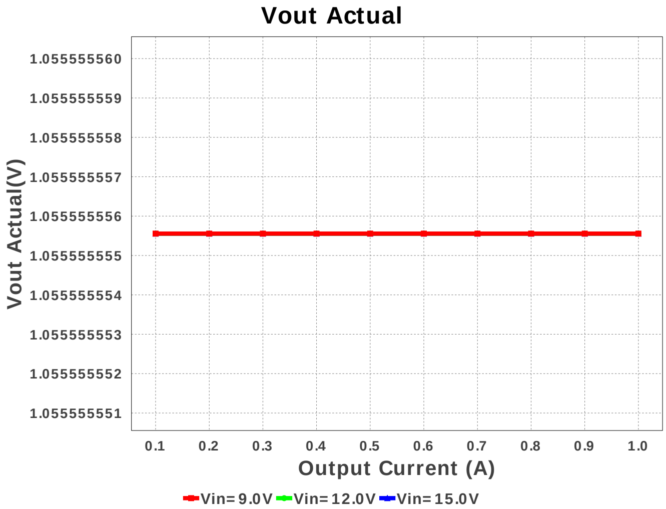

Vout Tolerance
Vout Tolerance(%)
6.760894056 6.760894055 6.760894054 6.760894053 6.760894052 6.760894051 6.760894050 6.760894049 6.760894048 6.760894047
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

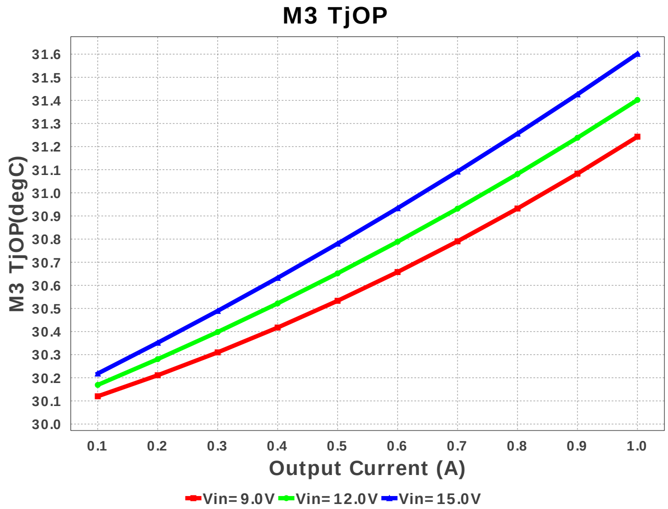

Iin Avg
Iin Avg(A)
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

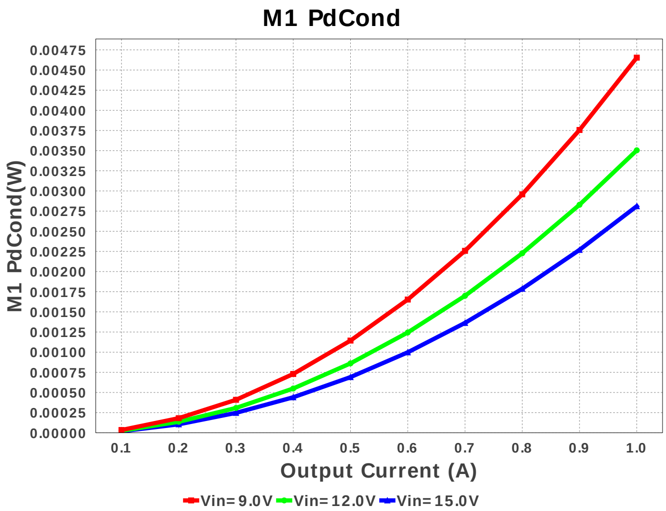

IC Tj
IC Tj(degC)
42.0 41.5 41.0 40.5 40.0 39.5 39.0 38.5 38.0 37.5 37.0
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

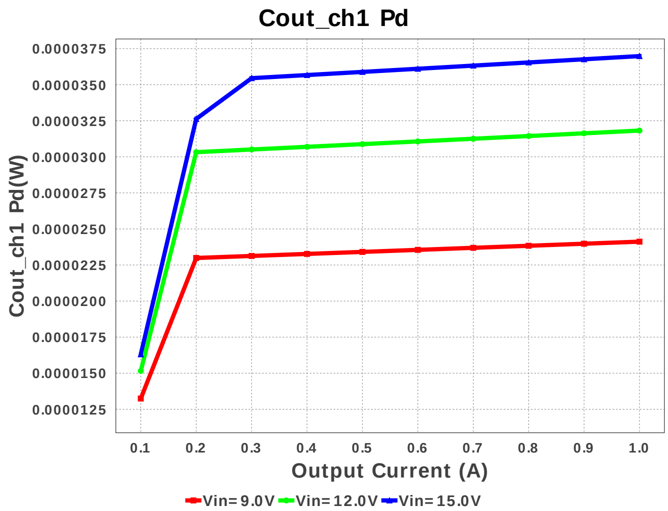

IOUT1_OP
IOUT1_OP(A)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

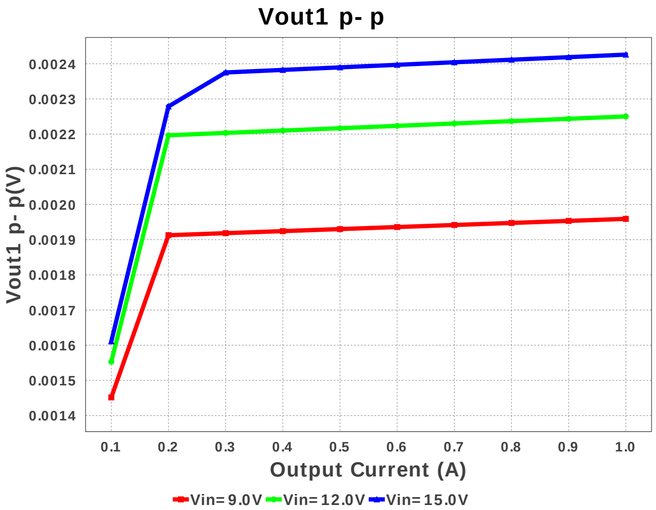

M1 TjOP
M1 TjOP(degC)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

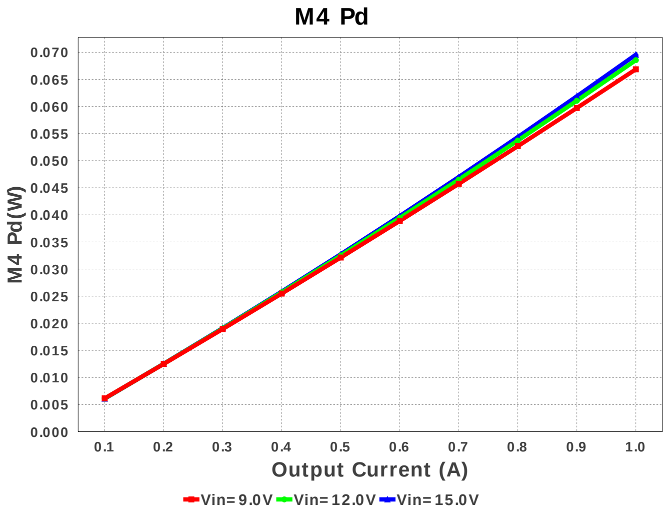

Vout Actual
Vout Actual(V)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

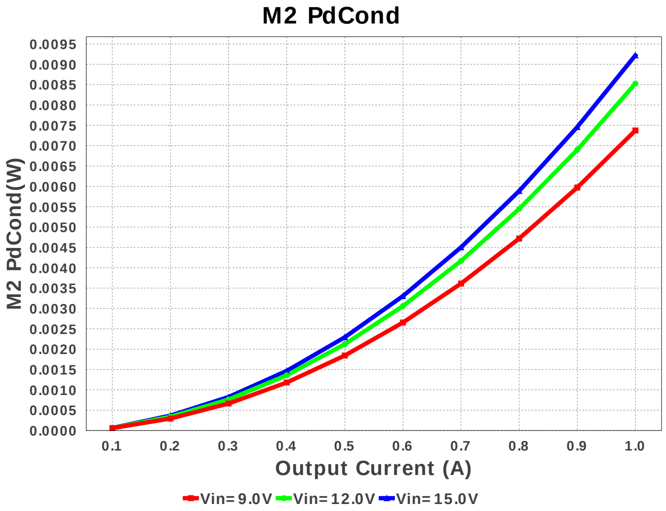

M3 TjOP
M3 TjOP(degC)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

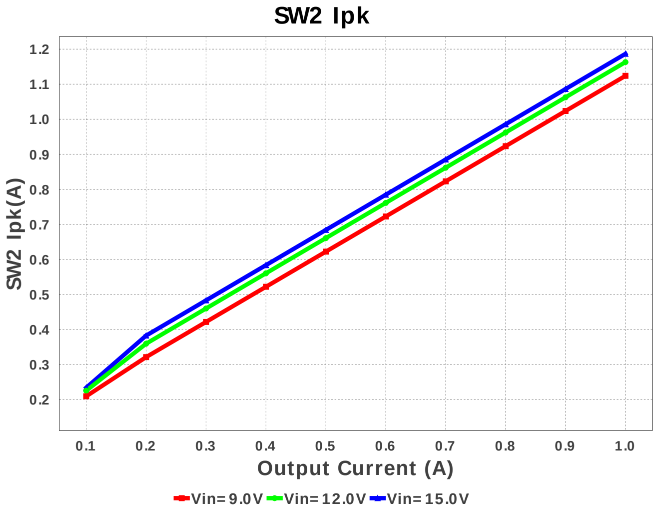

M1 PdCond
M1 PdCond(W)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

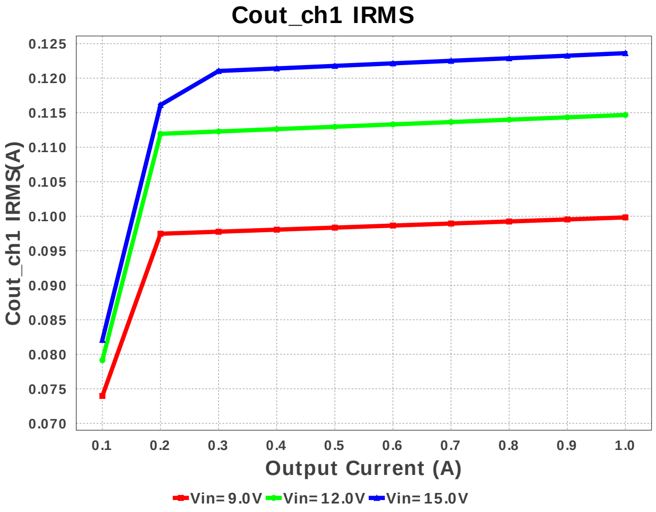

Cout_ch1 Pd
Cout_ch1 Pd(W)
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

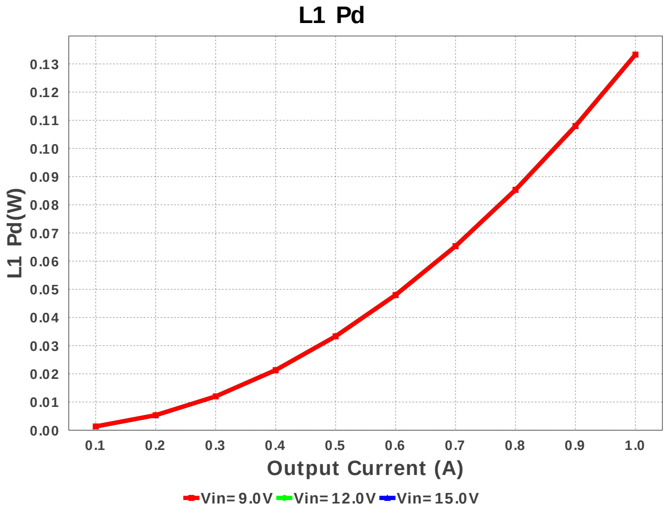

Vout1 p- p
Vout1 p- p(V)
0.0024
0.0023
0.0022
0.0021
0.0020
0.0019
0.0018
0.0017
0.0016
0.0015
0.0014
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V


M4 Pd
M4 Pd(W)
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

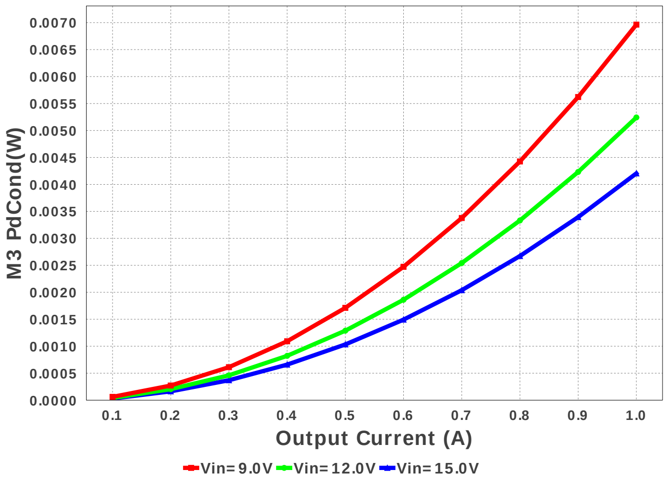

M2 PdCond
M2 PdCond(W)
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V


SW2 Ipk
SW2 Ipk(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 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

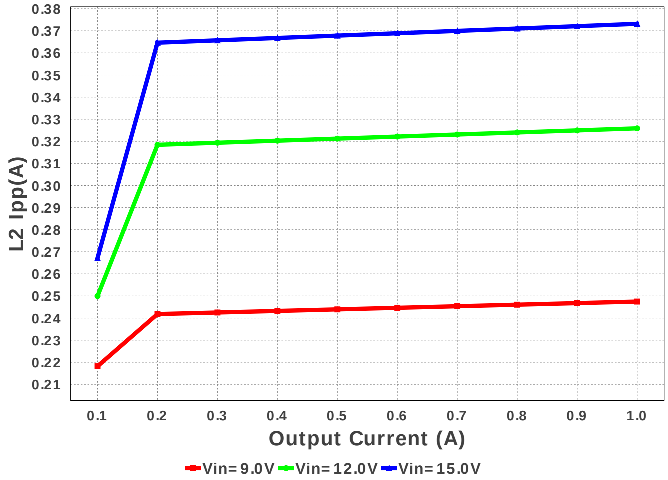

Cout_ch1 IRMS
Cout_ch1 IRMS(A)
0.125
0.120
0.115
0.110
0.105
0.100
0.095
0.090
0.085
0.080
0.075
0.070
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V


L1 Pd
L1 Pd(W)
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 9.0V Vin= 12.0V Vin= 15.0V

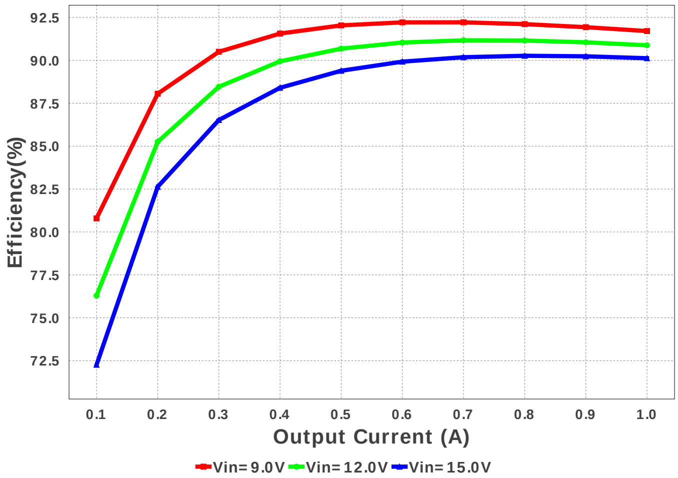
M3 PdCond



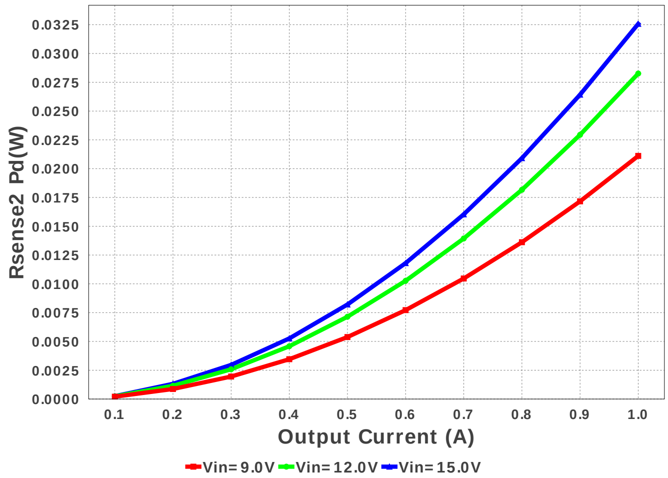
L2 Ipp



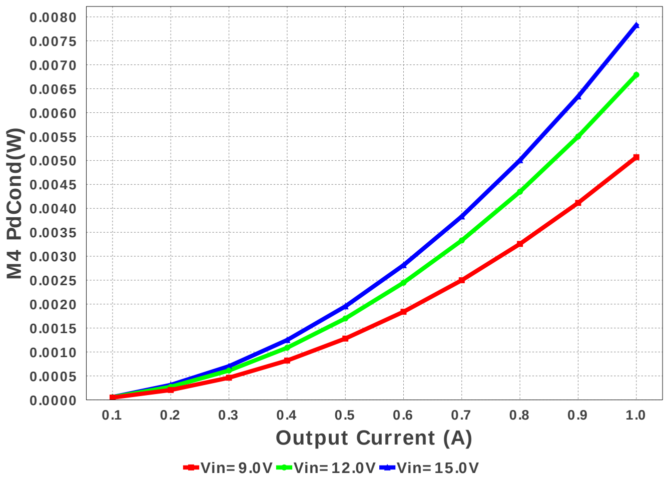
Efficiency



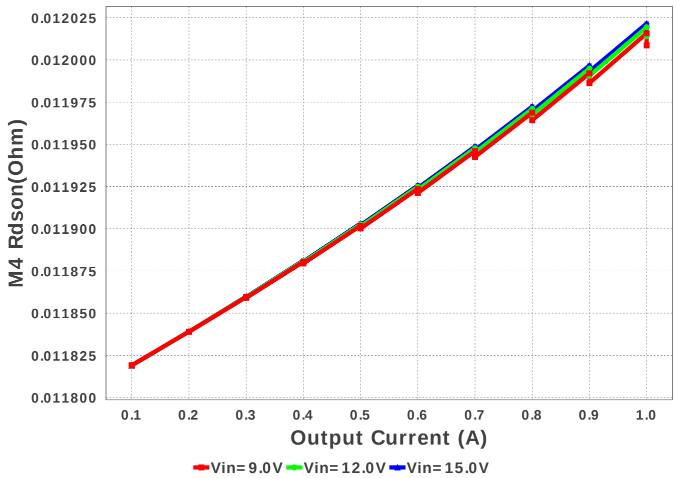
Rsense2 Pd

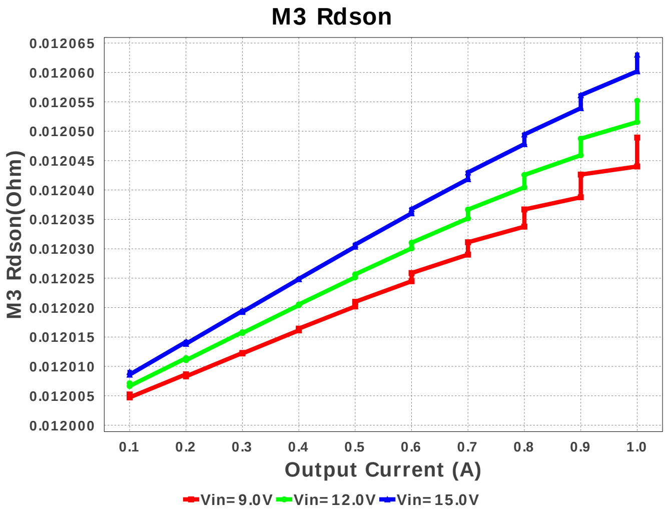


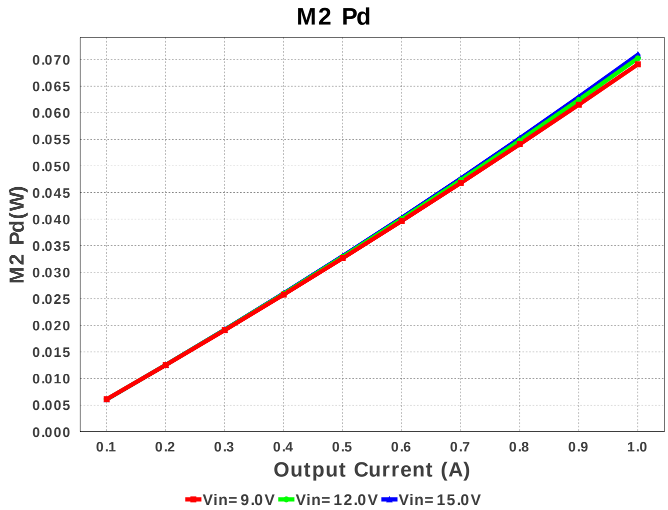
M4 PdCond

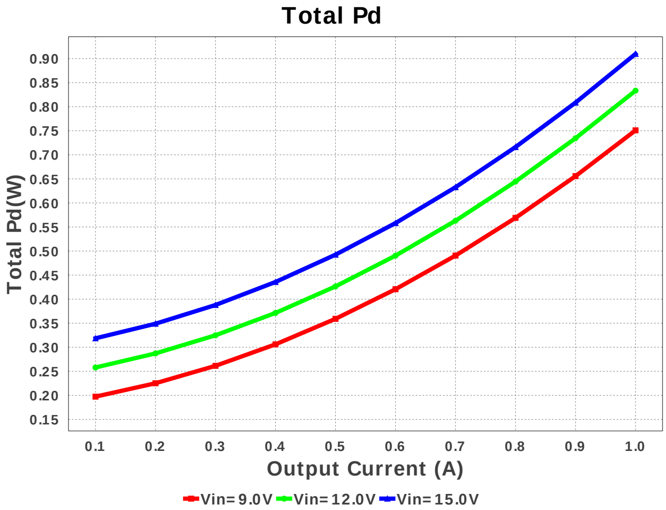


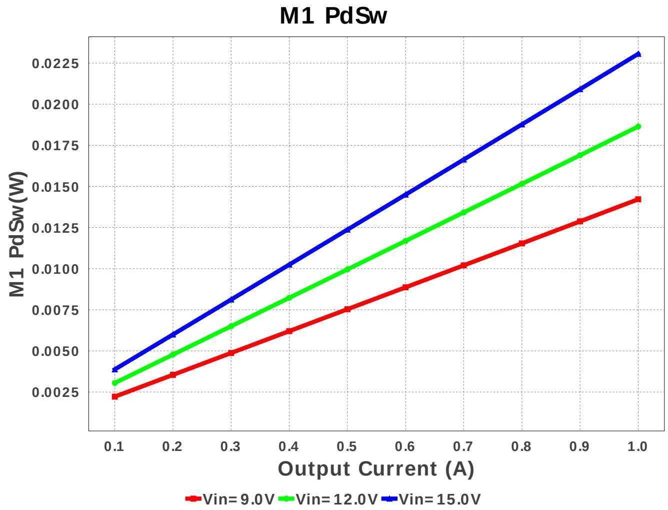
M4 Rdson

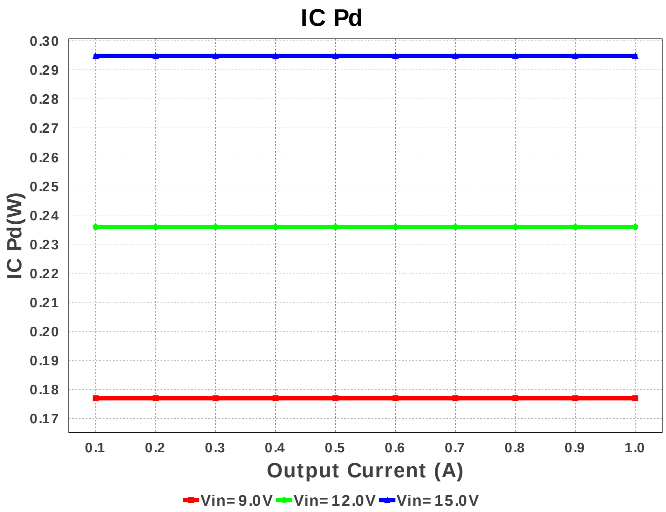


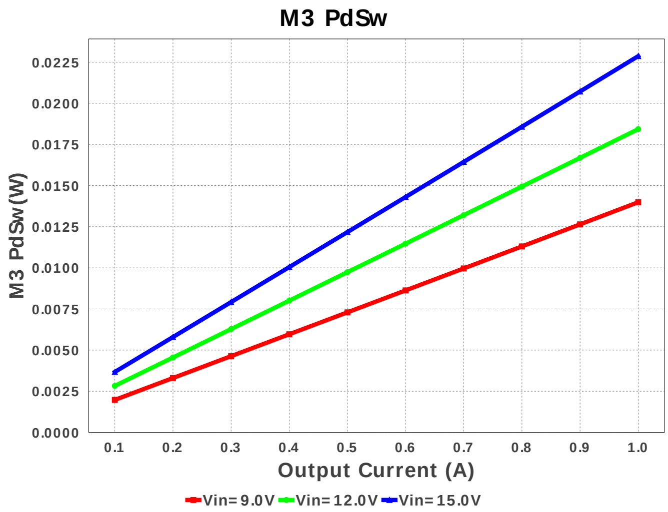

M3 Rdson
M3 Rdson(Ohm)
0.012065 0.012060 0.012055 0.012050 0.012045 0.012040 0.012035 0.012030 0.012025 0.012020 0.012015 0.012010 0.012005 0.012000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

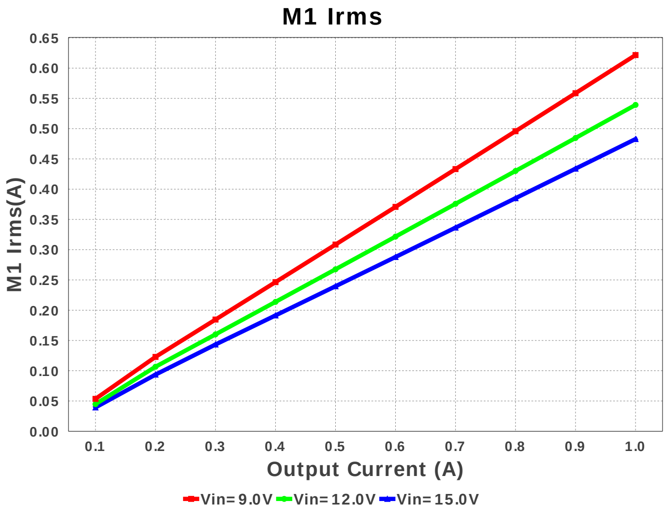

M2 Pd
M2 Pd(W)
0.070 0.065 0.060 0.055 0.050 0.045 0.040 0.035 0.030 0.025 0.020 0.015 0.010 0.005 0.000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

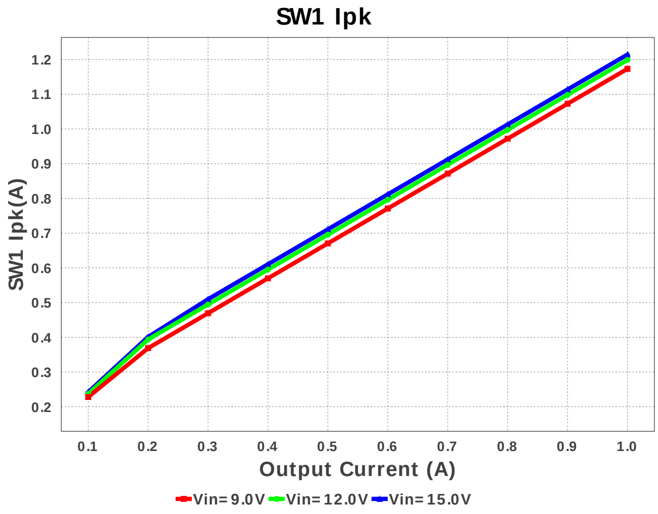

Total Pd
Total Pd(W)
0.90 0.85 0.80 0.75 0.70 0.65 0.60 0.55 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

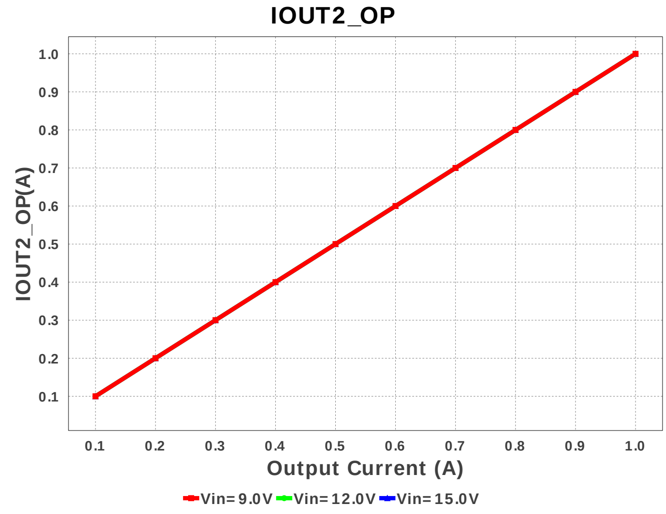

M1 PdSw
M1 PdSw(W)
0.0225 0.0200 0.0175 0.0150 0.0125 0.0100 0.0075 0.0050 0.0025
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

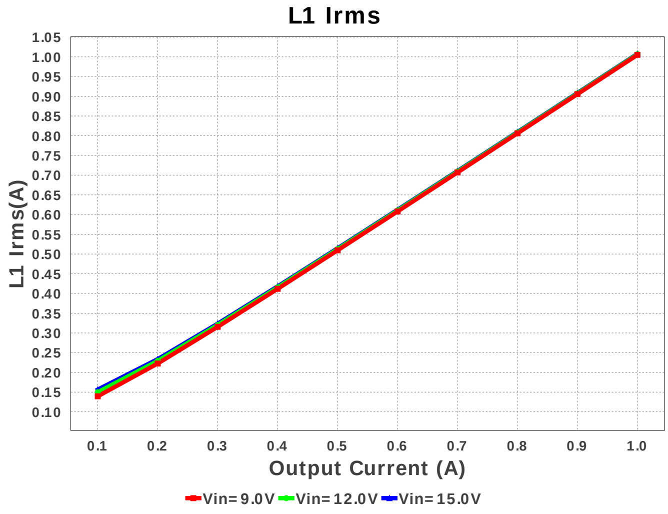

IC Pd
IC Pd(W)
0.30 0.29 0.28 0.27 0.26 0.25 0.24 0.23 0.22 0.21 0.20 0.19 0.18 0.17
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

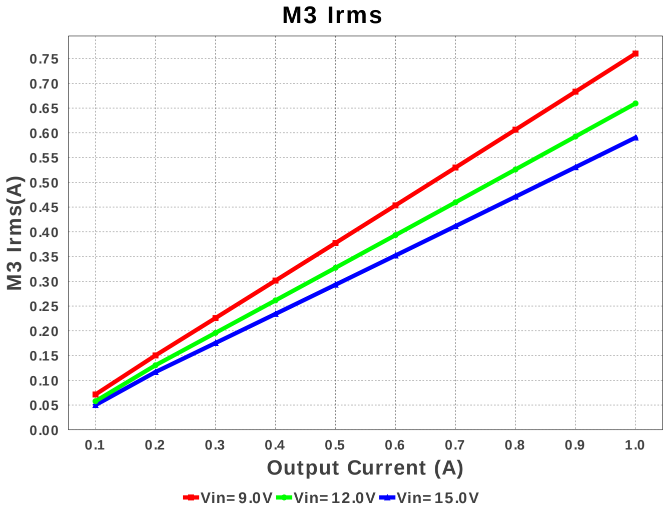

M3 PdSw
M3 PdSw(W)
0.0225 0.0200 0.0175 0.0150 0.0125 0.0100 0.0075 0.0050 0.0025 0.0000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

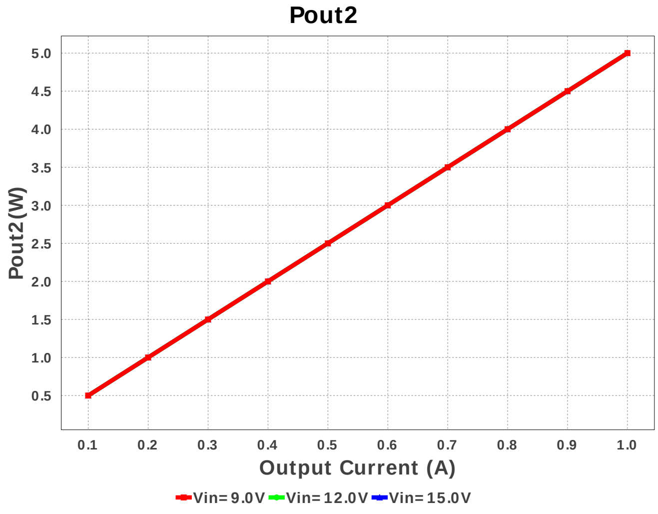

M1 Irms
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
M1 Irms(A)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Output Current (A)
Vin= 9.0V
Vin= 12.0V
Vin= 15.0V

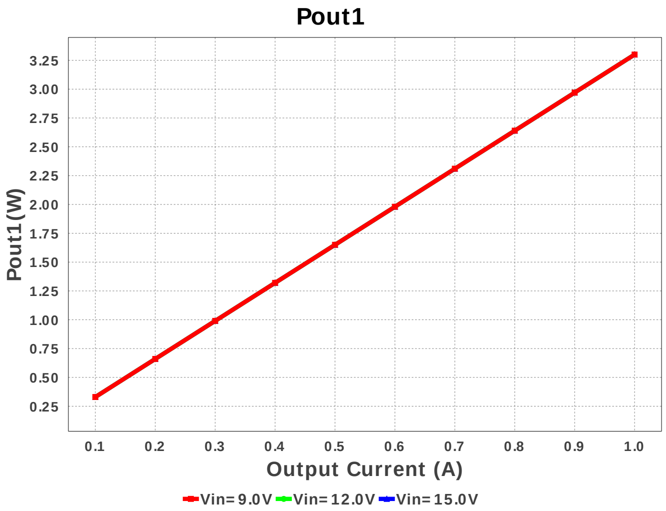

SW1 Ipk
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
SW1 Ipk(A)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Output Current (A)
Vin= 9.0V
Vin= 12.0V
Vin= 15.0V

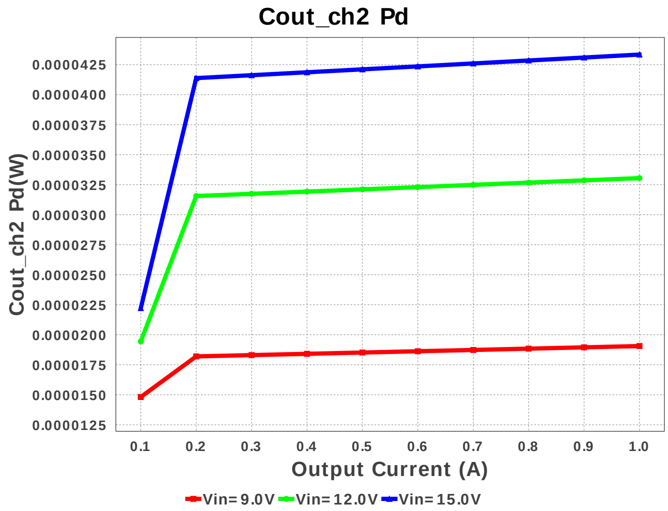

IOUT2_OP
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
IOUT2_OP(A)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Output Current (A)
Vin= 9.0V
Vin= 12.0V
Vin= 15.0V

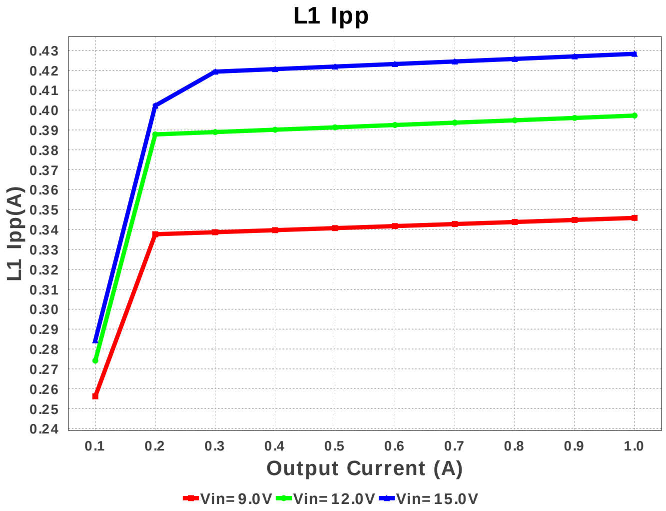

L1 Irms
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
L1 Irms(A)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Output Current (A)
Vin= 9.0V
Vin= 12.0V
Vin= 15.0V

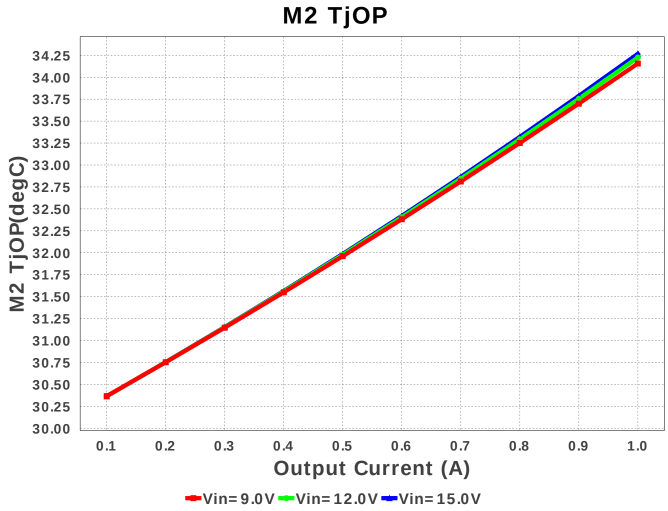

M3 Irms
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
M3 Irms(A)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Output Current (A)
Vin= 9.0V
Vin= 12.0V
Vin= 15.0V

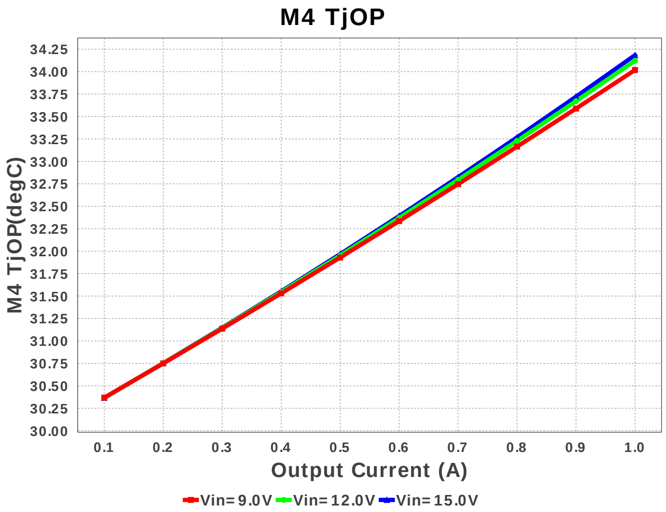

Pout2
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Pout2(W)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Output Current (A)
Vin= 9.0V
Vin= 12.0V
Vin= 15.0V

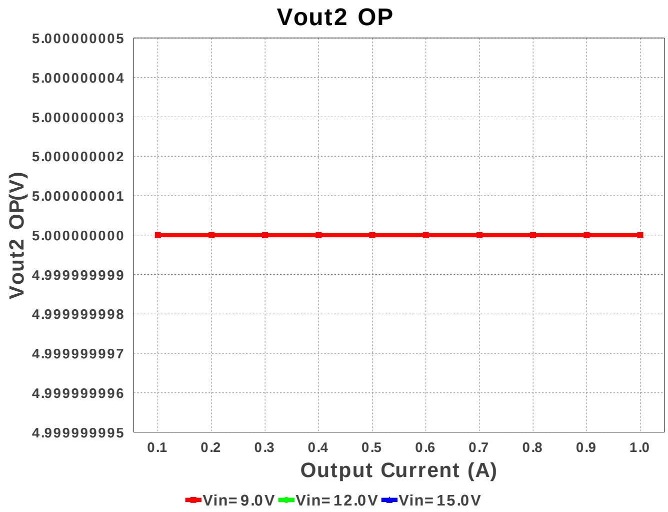

Pout1
Pout1(W)
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

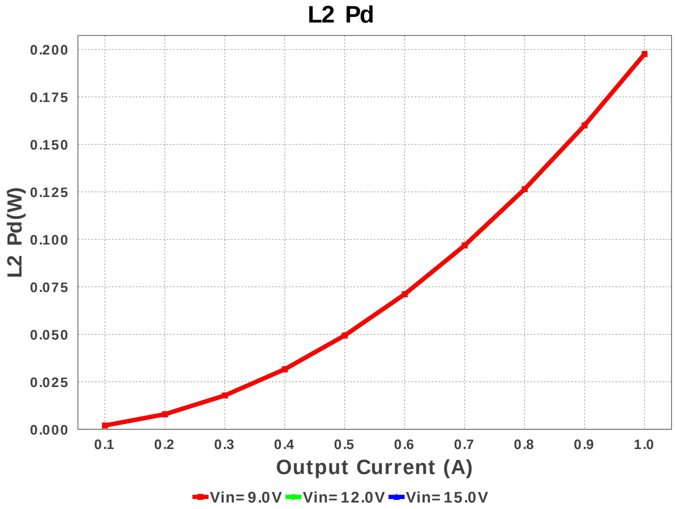

Cout_ch2 Pd
Cout_ch2 Pd(W)
0.0000425
0.0000400
0.0000375
0.0000350
0.0000325
0.0000300
0.0000275
0.0000250
0.0000225
0.0000200
0.0000175
0.0000150
0.0000125
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

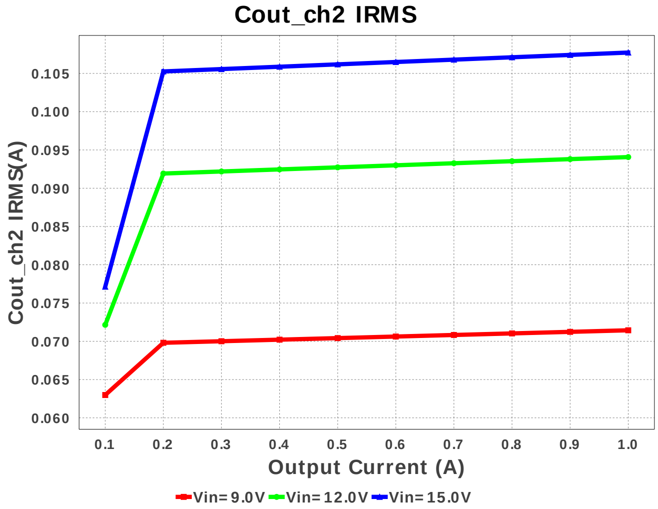

L1 Ipp
L1 Ipp(A)
0.43
0.42
0.41
0.40
0.39
0.38
0.37
0.36
0.35
0.34
0.33
0.32
0.31
0.30
0.29
0.28
0.27
0.26
0.25
0.24
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

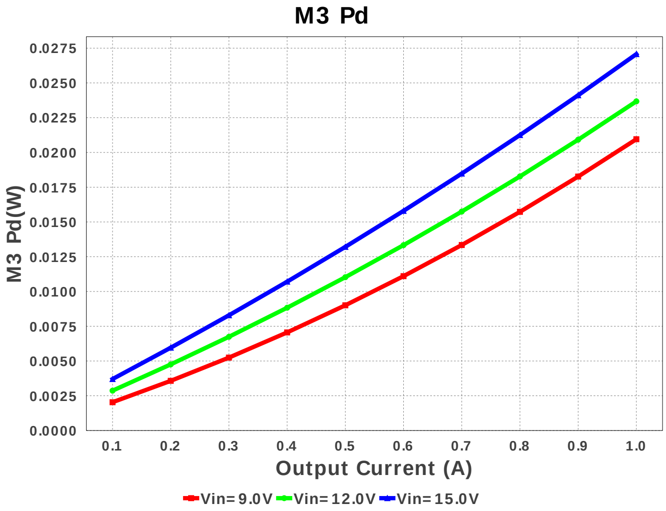

M2 TjOP
M2 TjOP(degC)
34.25
34.00
33.75
33.50
33.25
33.00
32.75
32.50
32.25
32.00
31.75
31.50
31.25
31.00
30.75
30.50
30.25
30.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V

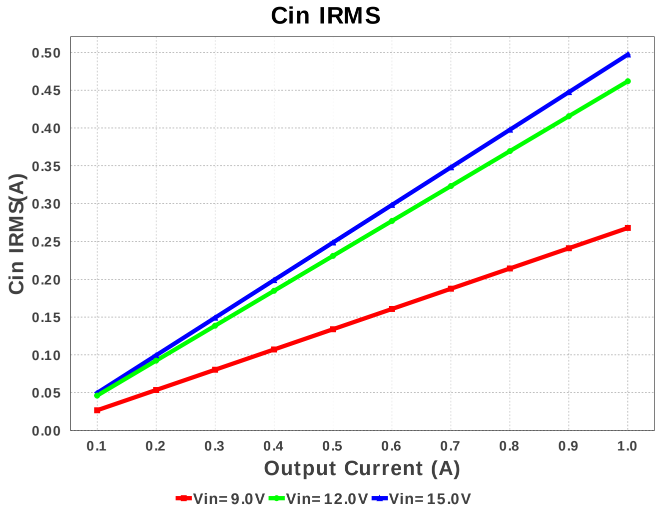

M4 TjOP
M4 TjOP(degC)
34.25
34.00
33.75
33.50
33.25
33.00
32.75
32.50
32.25
32.00
31.75
31.50
31.25
31.00
30.75
30.50
30.25
30.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V


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
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=9.0V Vin=12.0V Vin=15.0V









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	497.104 mA	Current	Input capacitor RMS ripple current
2.	Cout_ch1 IRMS	123.728 mA	Current	Output Channel 1 Capacitor RMS ripple current
3.	Cout_ch2 IRMS	107.741 mA	Current	Output Channel 2 Capacitor RMS ripple current
4.	Iin Avg	614.39 mA	Current	Average input current
5.	L1 Ipp	428.608 mA	Current	Peak-to-peak inductor ripple current
6.	L1 Irms	1.008 A	Current	Inductor ripple current
7.	L2 Ipp	373.226 mA	Current	Inductor 2 peak to peak current
8.	L2 Irms	1.006 A	Current	Inductor ripple current
9.	M1 Irms	483.095 mA	Current	MOSFET RMS ripple current
10.	M2 Irms	875.568 mA	Current	MOSFET RMS ripple current
11.	M3 Irms	590.478 mA	Current	MOSFET RMS ripple current
12.	M4 Irms	807.054 mA	Current	MOSFET RMS ripple current
13.	SW1 Ipk	1.214 A	Current	Peak switch current
14.	SW2 Ipk	1.187 A	Current	Peak switch current
15.	BOM Count	39	General	Total Design BOM count
16.	FootPrint	433.0 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	3.304 W	General	Channel 1 output Power
20.	Pout2	5.002 W	General	Channel 2 output Power
21.	Total BOM	$5.12	General	Total BOM Cost
22.	M3 TjOP	31.601 degC	Op_Point	M3 MOSFET junction temperature
23.	M4 TjOP	34.183 degC	Op_Point	M4 MOSFET junction temperature
24.	Vout Actual	1.056 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
25.	Efficiency	90.128 %	Op_point	Steady state efficiency
26.	IC Tj	41.793 degC	Op_point	IC junction temperature
27.	IOUT1_OP	1.0 A	Op_point	Iout1 operating point
28.	IOUT2_OP	1.0 A	Op_point	Iout2 operating point
29.	M1 TjOP	31.529 degC	Op_point	M1 MOSFET junction temperature
30.	M2 TjOP	34.267 degC	Op_point	M2 MOSFET junction temperature
31.	VIN_OP	15.0 V	Op_point	Vin operating point

#	Name	Value	Category	Description
32.	Vout1 OP	3.304 V	Op_point	Operational Voltage 1
33.	Vout1 p-p	2.428 mV	Op_point	Peak-to-peak output1 ripple voltage
34.	Vout2 OP	5.002 V	Op_point	Operational Voltage 2
35.	Vout2 p-p	2.722 mV	Op_point	Peak-to-peak output2 ripple voltage
36.	Cin Pd	494.224 µW	Power	Input capacitor power dissipation
37.	Cout_ch1 Pd	37.047 µW	Power	Ouput channel 1 capacitor power dissipation
38.	Cout_ch2 Pd	43.356 µW	Power	Ouput channel 2 capacitor power dissipation
39.	IC Pd	294.83 mW	Power	IC power dissipation
40.	L1 Pd	133.308 mW	Power	Inductor power dissipation
41.	L2 Pd	197.596 mW	Power	Inductor power dissipation
42.	M1 Pd	25.877 mW	Power	M1 MOSFET total power dissipation
43.	M1 PdCond	2.815 mW	Power	M1 MOSFET conduction losses
44.	M1 PdSw	23.062 mW	Power	M1 MOSFET switching losses
45.	M2 Pd	70.912 mW	Power	M2 MOSFET total power dissipation
46.	M2 PdCond	9.216 mW	Power	M2 MOSFET conduction losses
47.	M2 PdSw	61.696 mW	Power	M2 MOSFET switching losses
48.	M3 Pd	27.074 mW	Power	M3 MOSFET total power dissipation
49.	M3 PdCond	4.206 mW	Power	M3 MOSFET conduction losses
50.	M3 PdSw	22.868 mW	Power	M3 MOSFET switching losses
51.	M3 Rdson	12.06 mOhm	Power	Drain-Source On-resistance
52.	M3 Rdson	12.063 mOhm	Power	Drain-Source On-resistance
53.	M4 Pd	69.549 mW	Power	M4 MOSFET total power dissipation
54.	M4 PdCond	7.827 mW	Power	M4 MOSFET conduction losses
55.	M4 PdSw	61.722 mW	Power	M4 MOSFET switching losses
56.	M4 Rdson	12.022 mOhm	Power	Drain-Source On-resistance
57.	M4 Rdson	12.017 mOhm	Power	Drain-Source On-resistance
58.	Rsense1 Pd	57.496 mW	Power	Current Limit Sense Resistor Power Dissipation
59.	Rsense2 Pd	32.567 mW	Power	Current Limit Sense Resistor Power Dissipation
60.	Total Pd	909.783 mW	Power	Total Power Dissipation
61.	Cross Freq Ch1	37.709 kHz		Bode plot crossover frequency
62.	Cross Freq Ch2	37.605 kHz		Bode plot crossover frequency
63.	Duty Cycle 1	23.338 %		Duty cycle for Channel 1
64.	Duty Cycle 2	34.866 %		Duty cycle for Channel 2
65.	Phase Marg Ch1	56.078 deg		Bode Plot Phase Margin
66.	Phase Marg Ch2	55.21 deg		Bode Plot Phase Margin
67.	Vout Tolerance	6.761 %		Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	Iout1	1.0	Output Current #1
3.	Iout2	1.0	Output Current #2
4.	VinMax	15.0	Maximum input voltage
5.	VinMin	9.0	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	Texas Instruments Base Part 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.