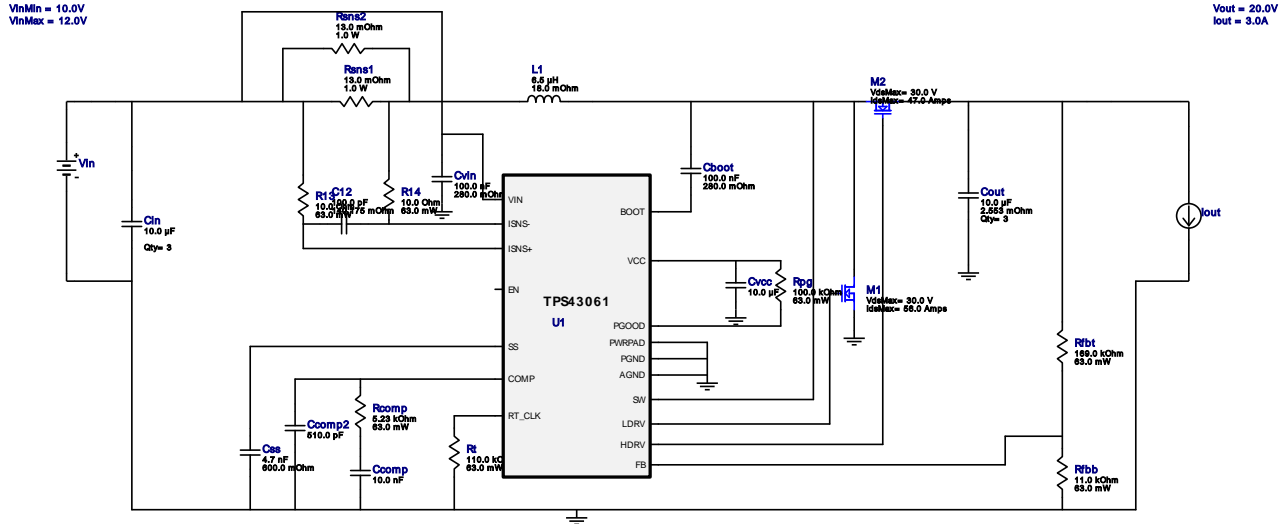


WEBENCH[®] Design Report

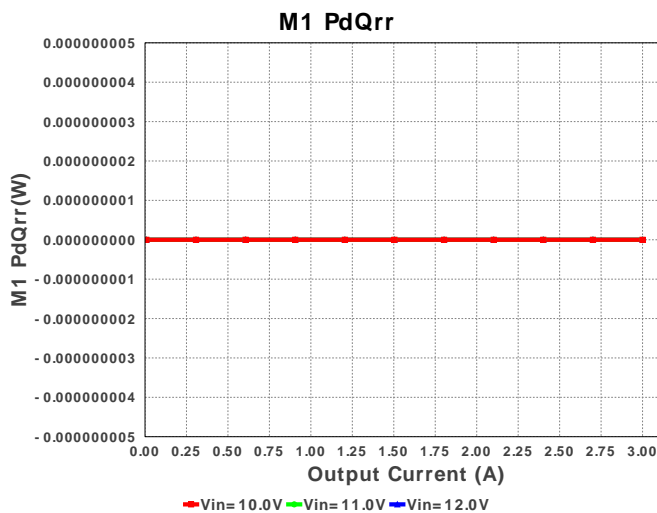
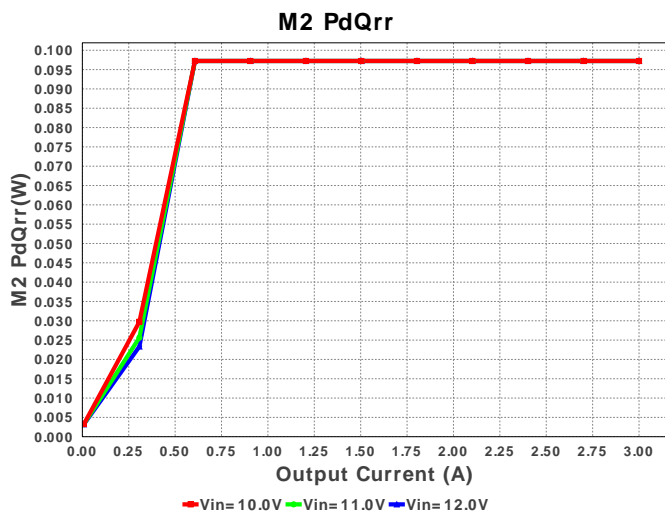
 Design : 4407031/15 TPS43061RTER
 TPS43061RTER 10.0V-12.0V to 20.00V @ 3.0A


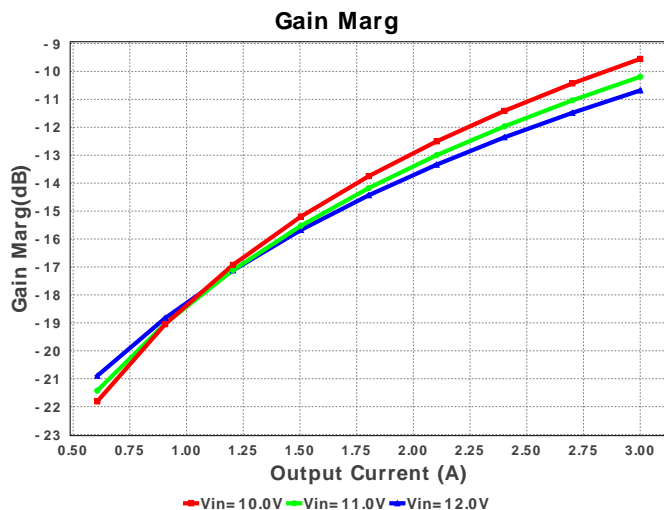
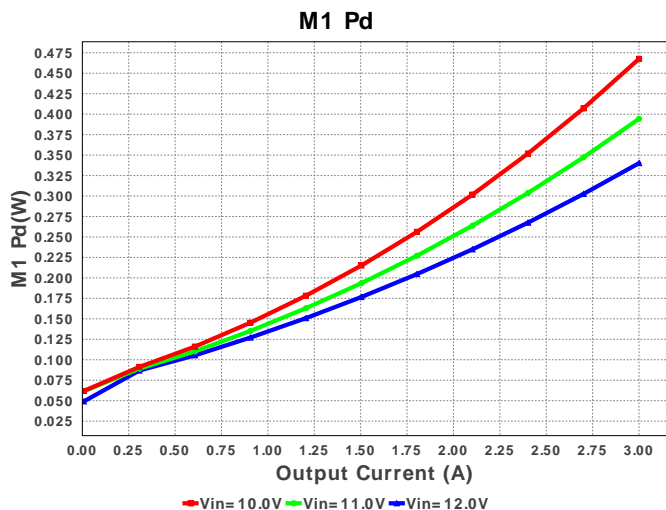
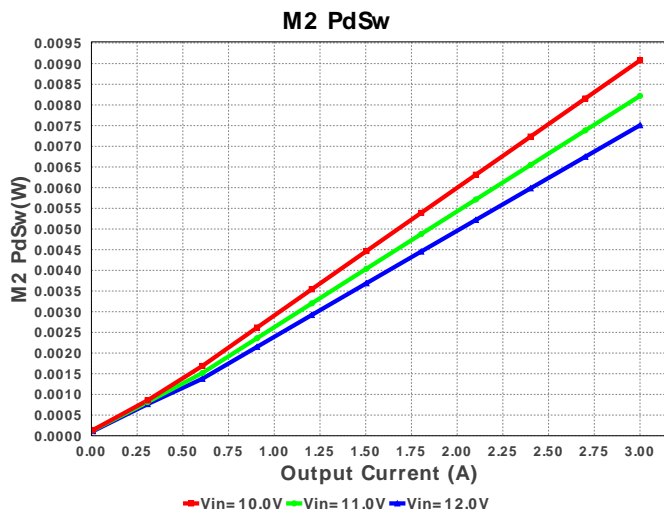
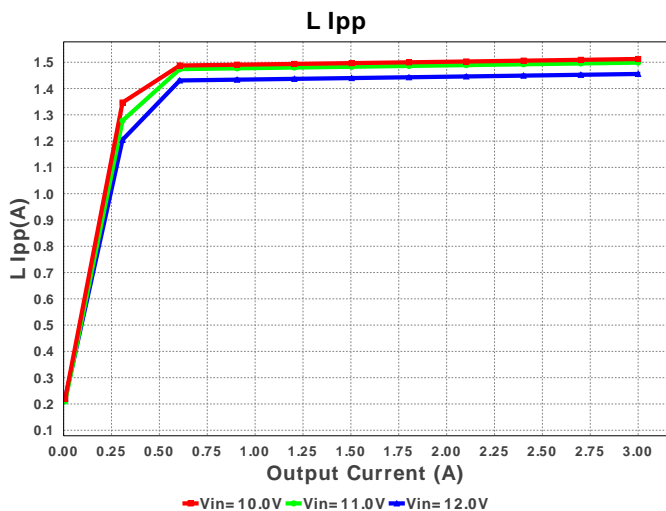
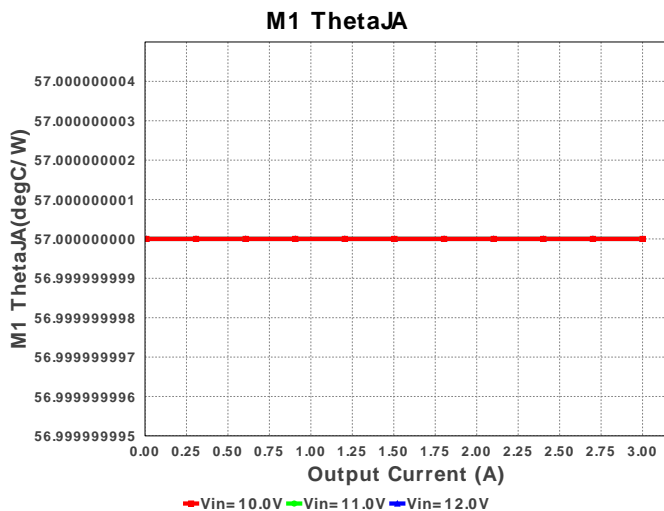
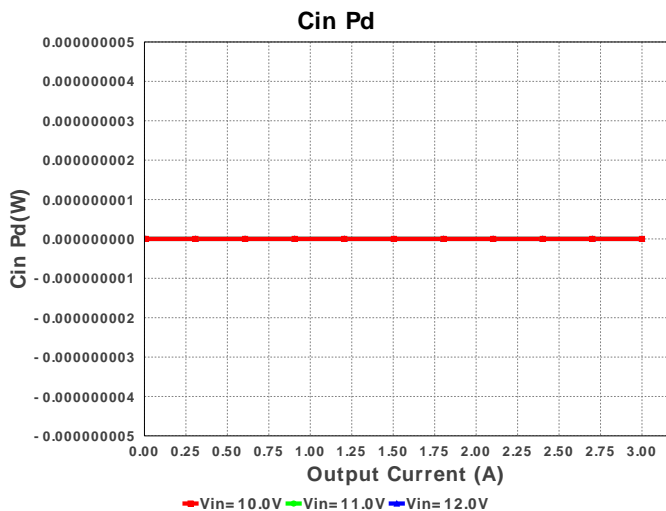
1. The pulse skip mode in the device has not been modeled. Efficiency and operational parameters of the model in pulse skip mode is not valid.

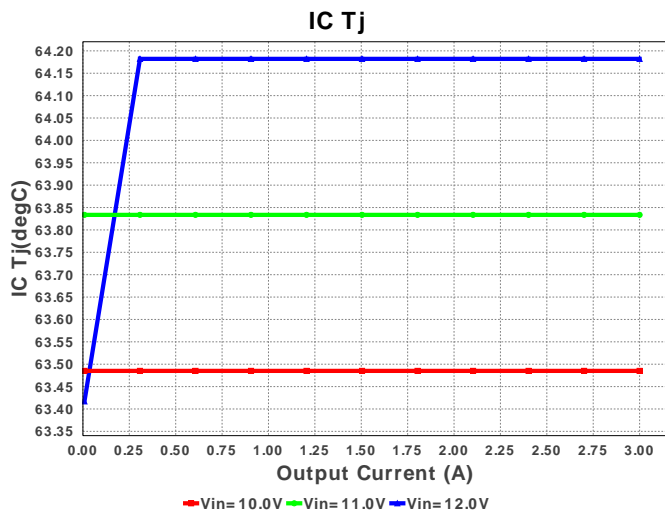
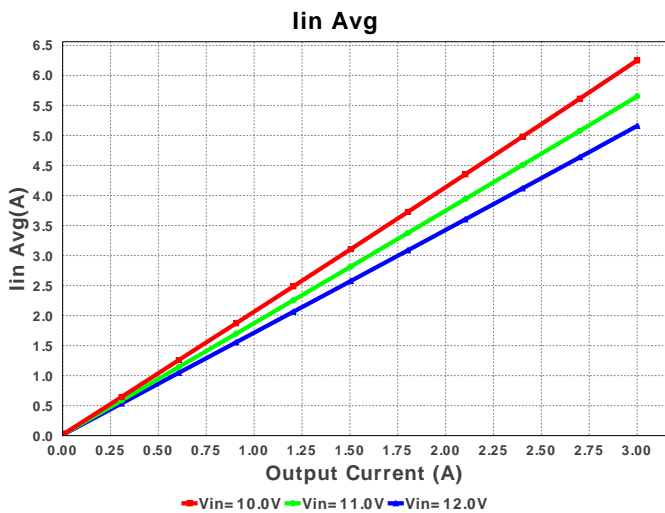
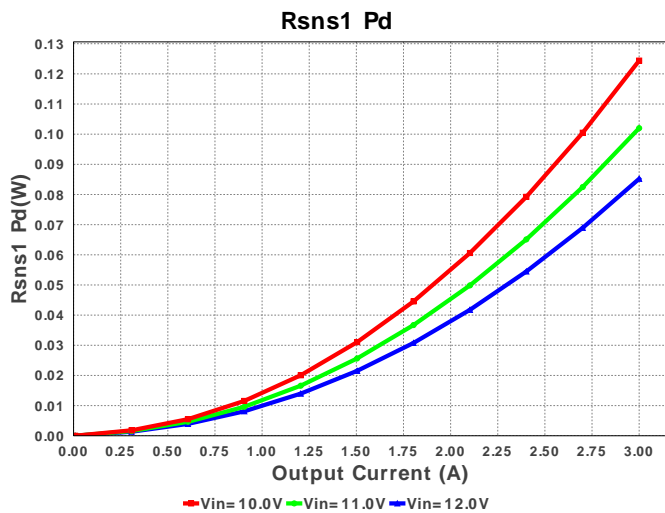
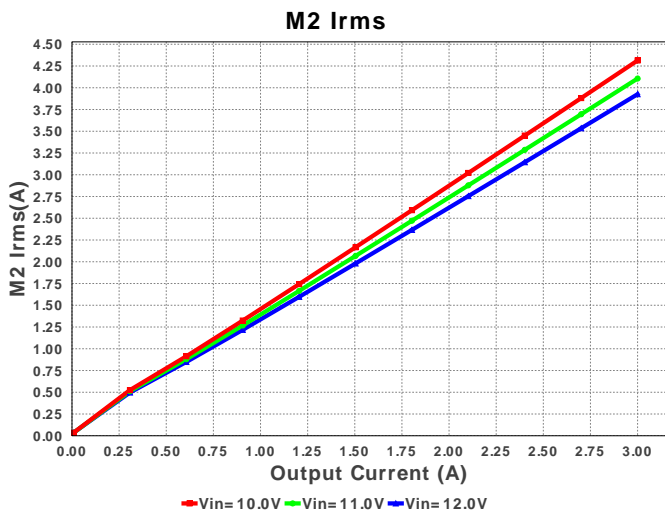
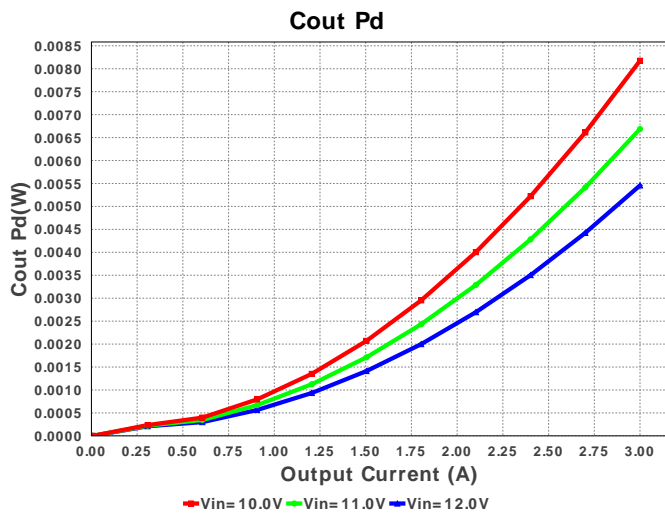
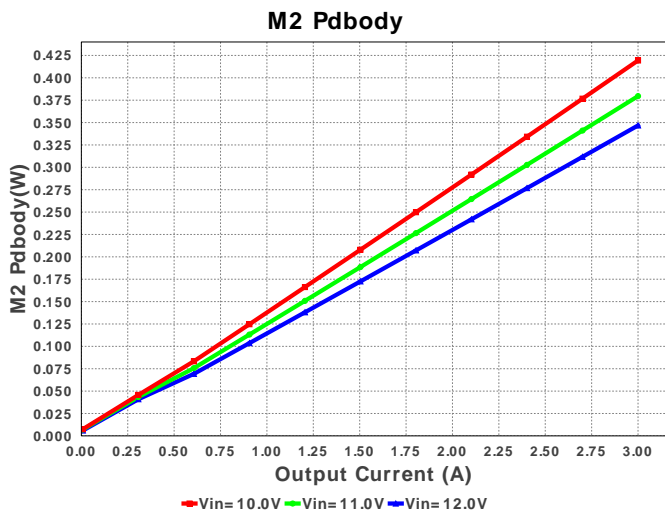
Electrical BOM

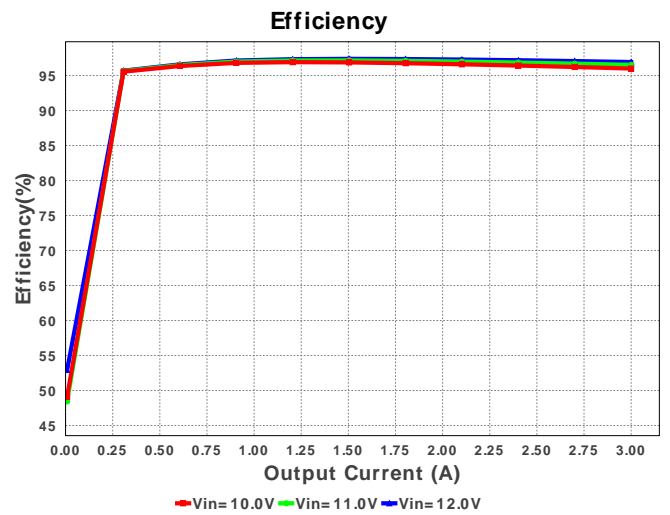
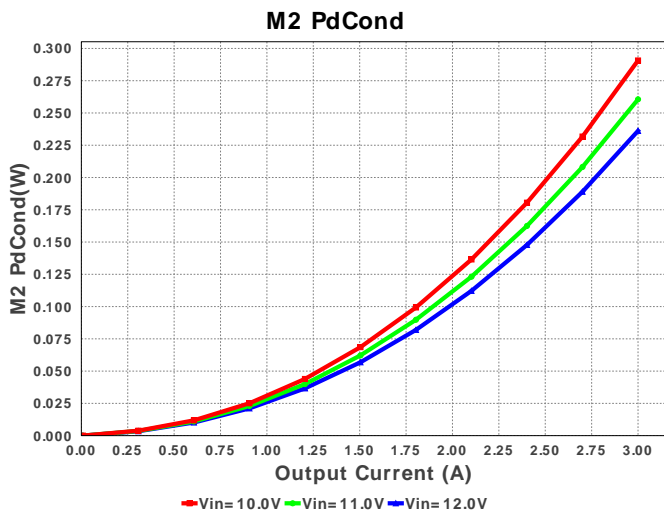
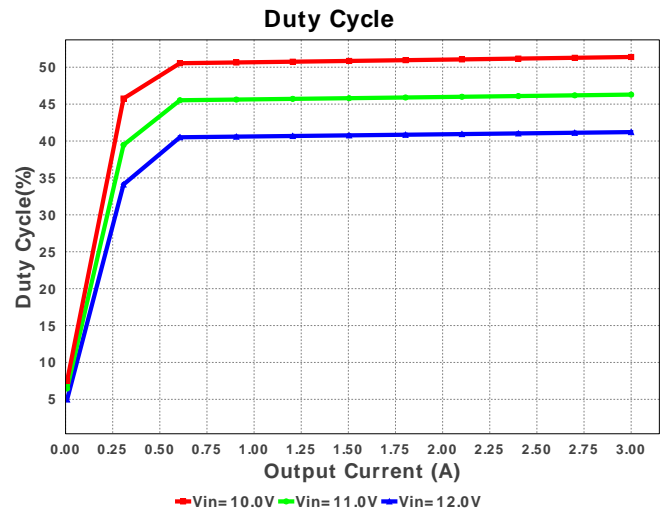
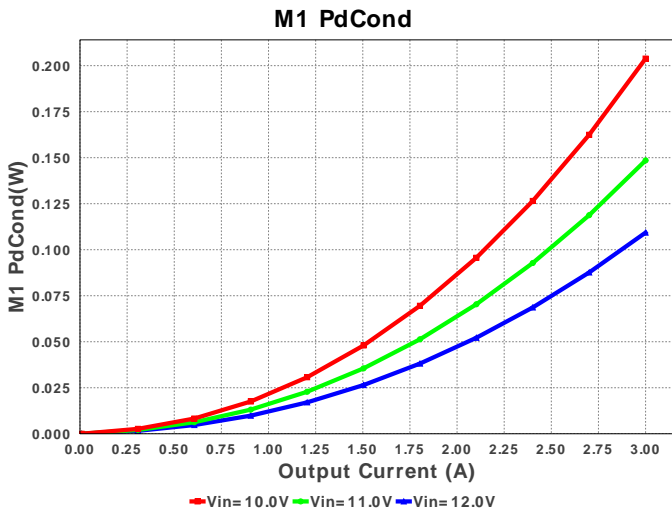
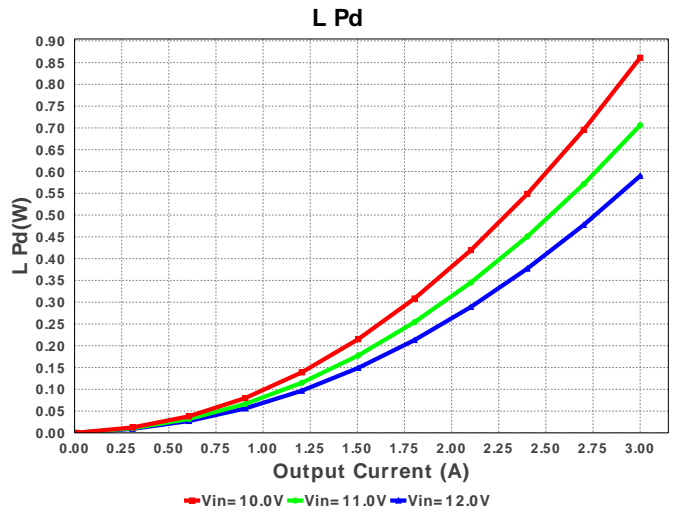
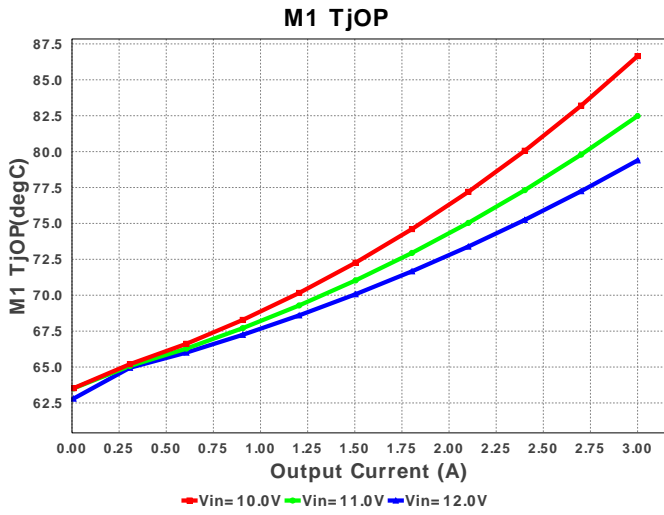
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	TDK	C1608C0G1H101J Series= C0G/NP0	Cap= 100.0 pF ESR= 140.175 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
2.	Cboot	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Ccomp2	MuRata	GRM1555C1H511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
5.	Cin	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF VDC= 25.0 V IRMS= 0.0 A	3	\$0.05	0805 7 mm ²
6.	Cout	TDK	C3216JB1V106K Series= JB	Cap= 10.0 uF ESR= 2.553 mOhm VDC= 35.0 V IRMS= 0.0 A	3	\$0.18	1206 11 mm ²
7.	Css	MuRata	GRM188R71E472KA01D Series= X7R	Cap= 4.7 nF ESR= 600.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
8.	Cvcc	MuRata	GRM188R61C106MA73D Series= X5R	Cap= 10.0 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.06	0603 5 mm ²
9.	Cvin	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

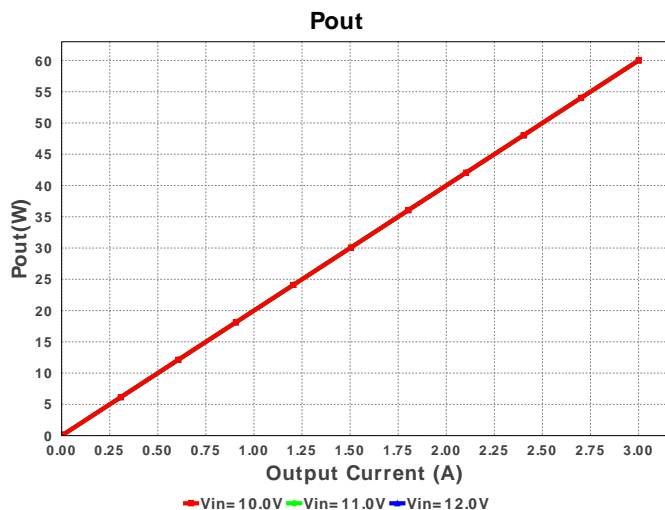
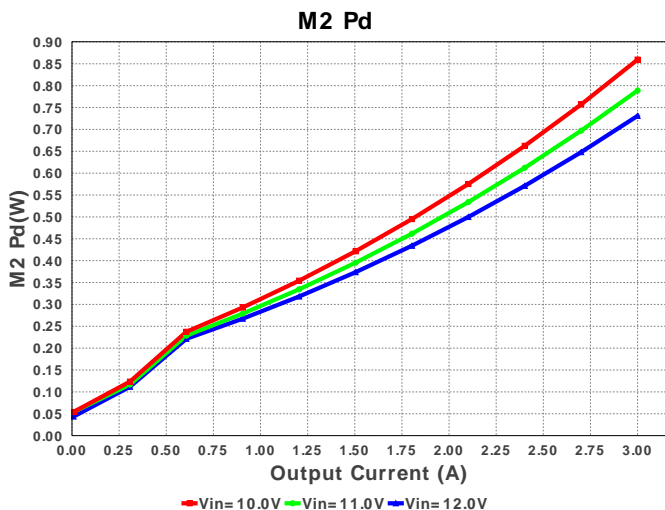
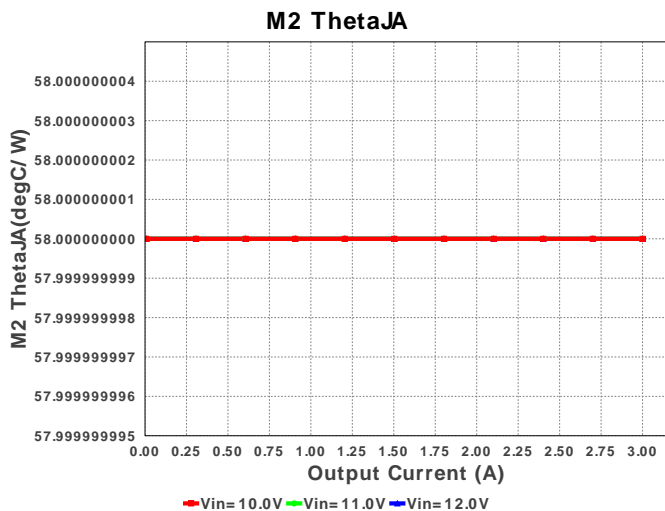
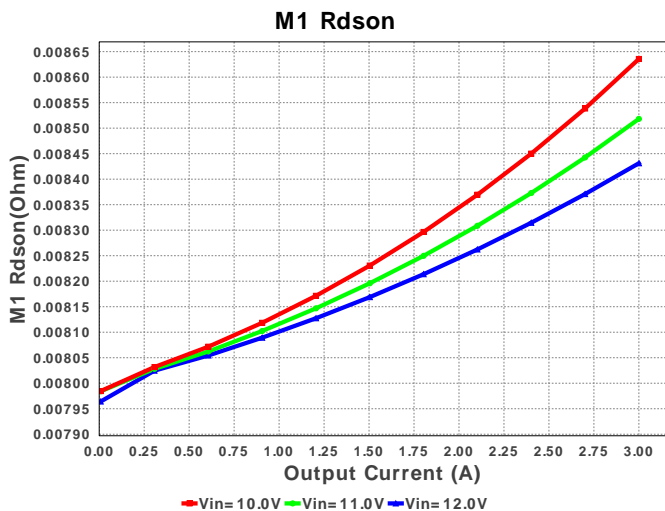
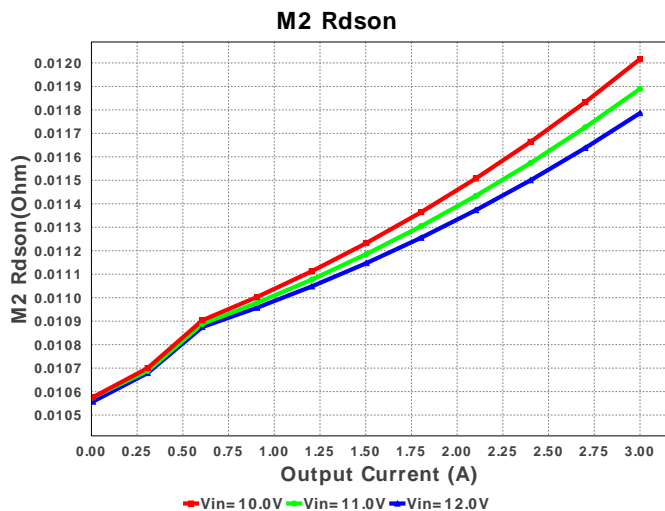
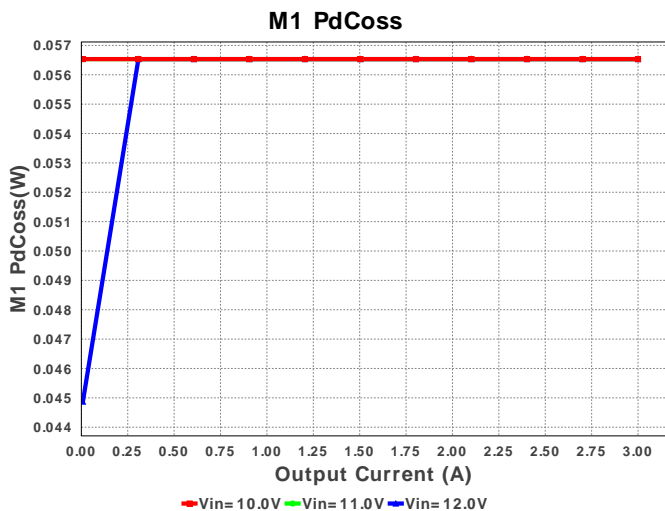
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	L1	Bourns	SRR1208-6R5ML	L= 6.5 μ H DCR= 18.0 mOhm	1	\$0.37	 SRR1208 216 mm ²
11.	M1	Texas Instruments	CSD17304Q3	VdsMax= 30.0 V IdsMax= 56.0 Amps	1	\$0.36	 TRANS_NexFET_Q3 19 mm ²
12.	M2	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 47.0 Amps	1	\$0.34	 TRANS_NexFET_Q3 19 mm ²
13.	R13	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	R14	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	Rcomp	Vishay-Dale	CRCW04025K23FKED Series= CRCW..e3	Res= 5.23 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	Rfbb	Vishay-Dale	CRCW040211K0FKED Series= CRCW..e3	Res= 11.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rfbt	Vishay-Dale	CRCW0402169KFKED Series= CRCW..e3	Res= 169.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
19.	Rsns1	Susumu Co Ltd	PRL1632-R013-F-T1 Series= PRL1632	Res= 13.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.19	 1206 11 mm ²
20.	Rsns2	Susumu Co Ltd	PRL1632-R013-F-T1 Series= PRL1632	Res= 13.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.19	 1206 11 mm ²
21.	Rt	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
22.	U1	Texas Instruments	TPS43061RTER	Switcher	1	\$1.40	 S-PVQFN-N16 25 mm ²



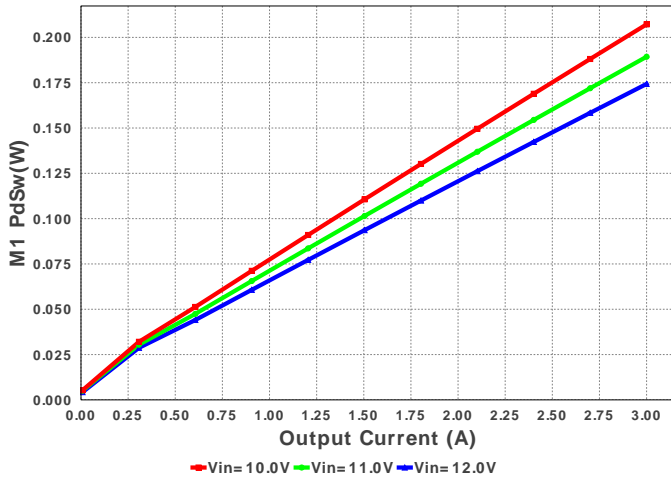




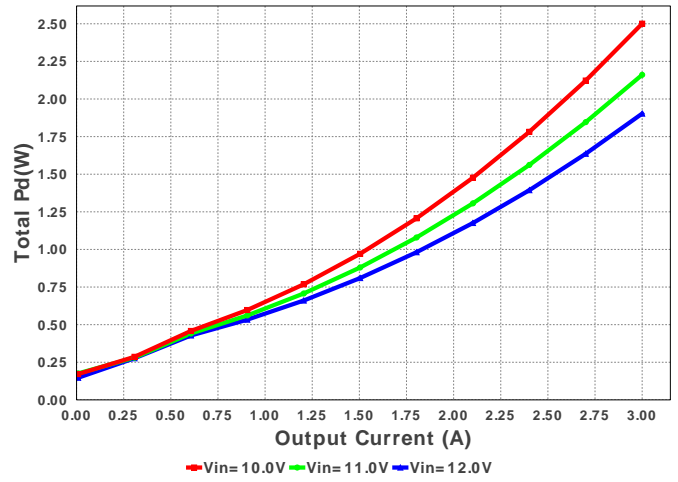




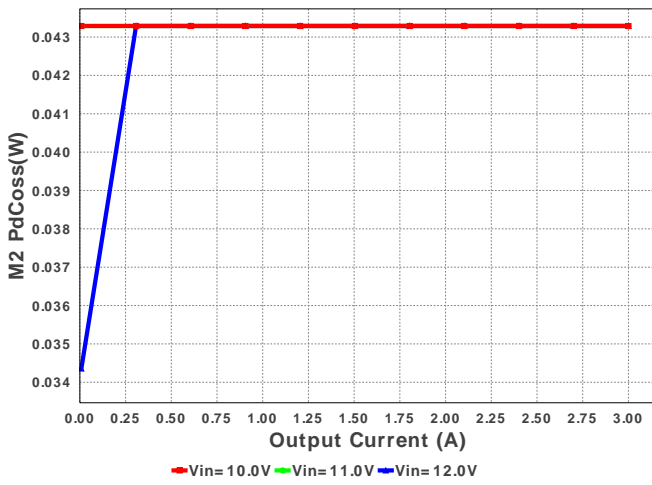
M1 PdSw



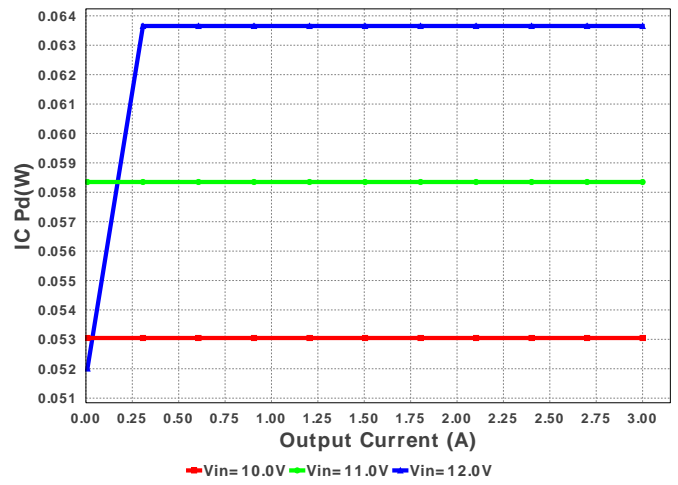
Total Pd



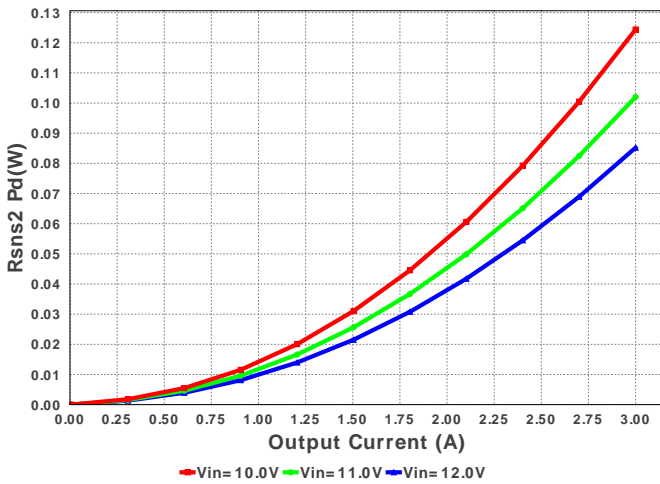
M2 PdCoss



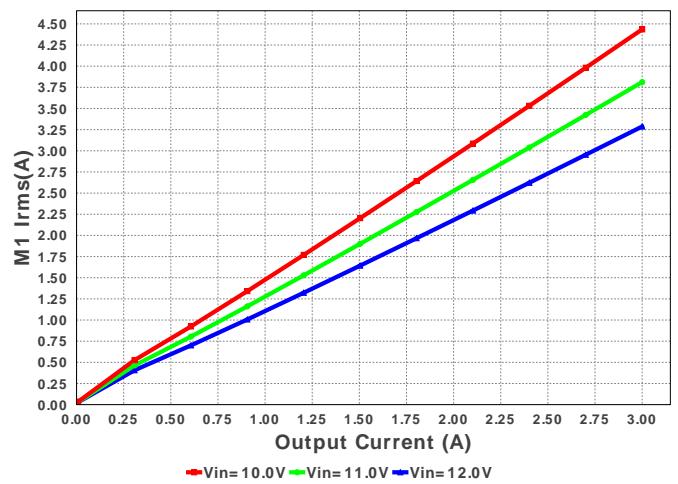
IC Pd

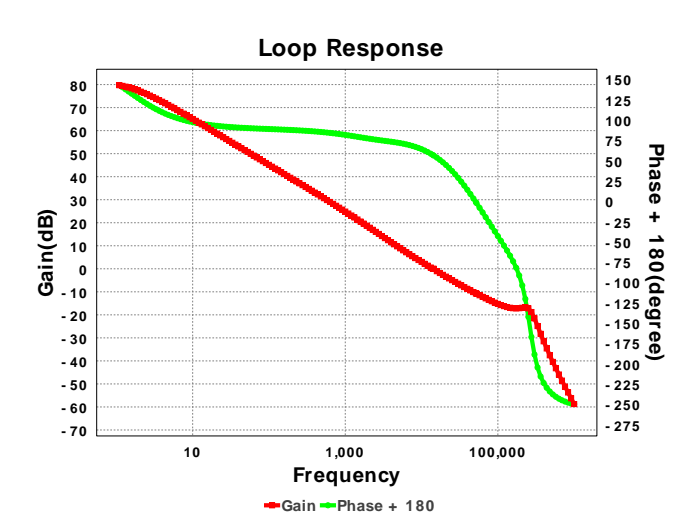
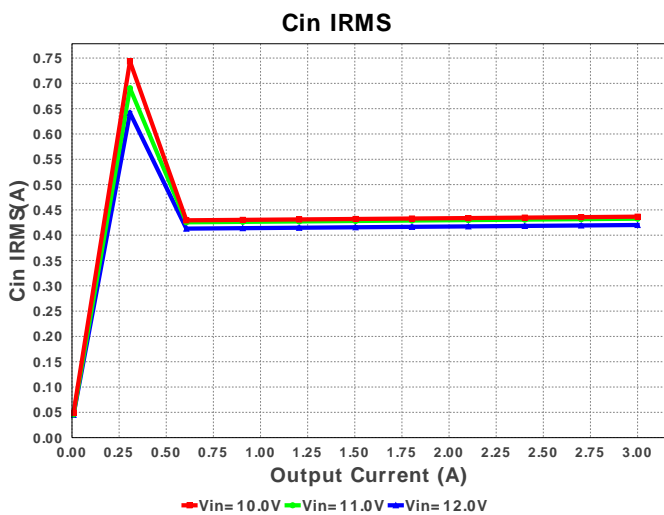
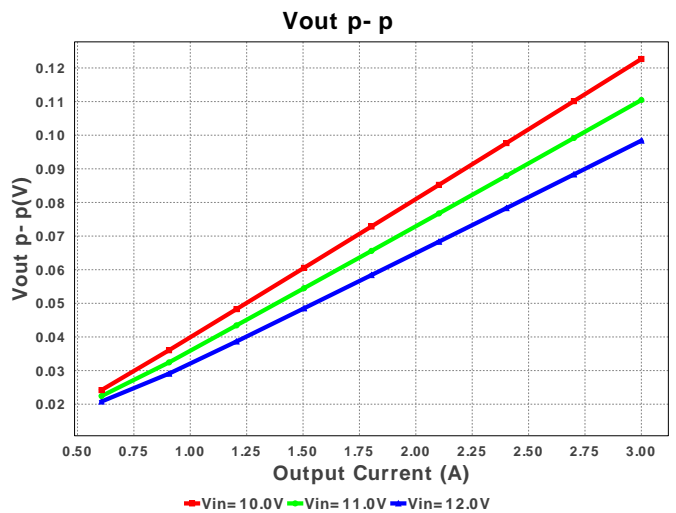
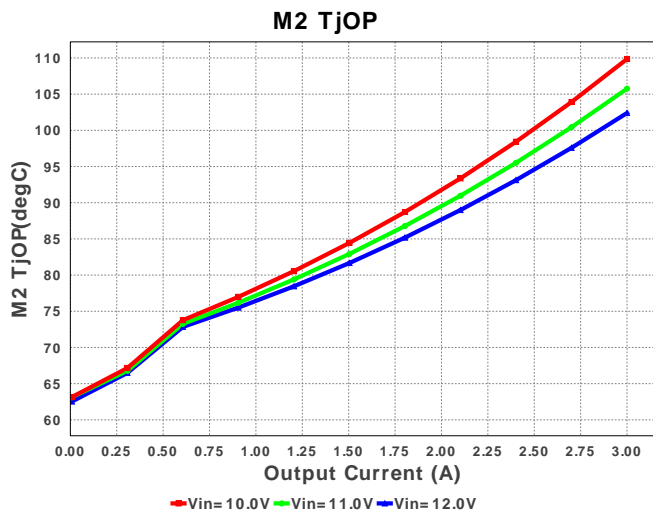
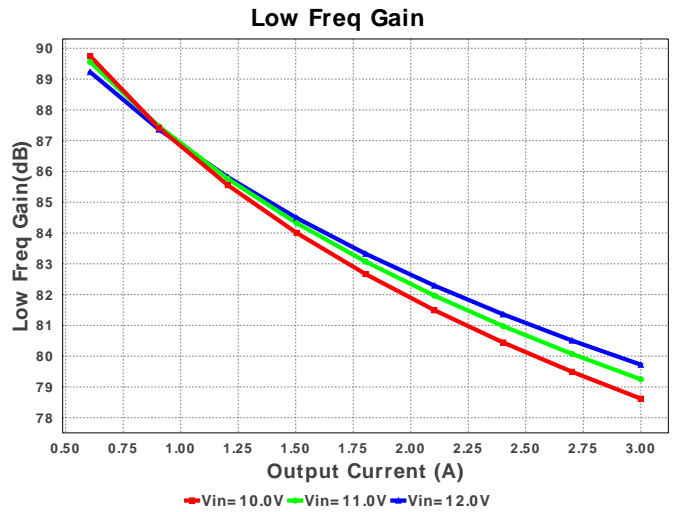
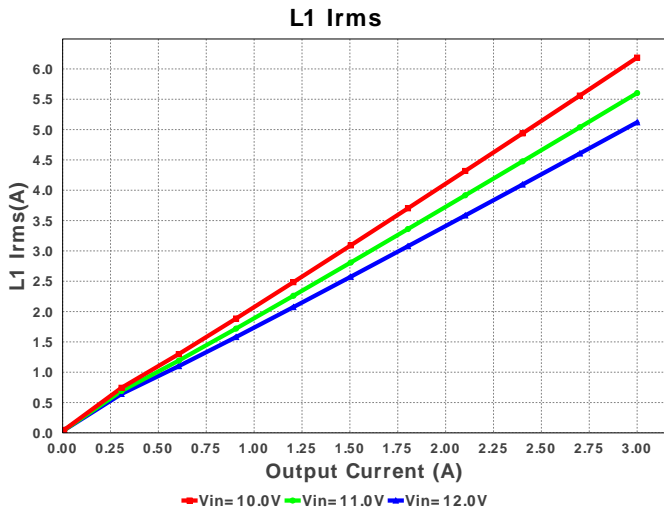


Rsns2 Pd



M1 Irms





Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	436.597 mA	Current	Input capacitor RMS ripple current
2.	Iin Avg	6.25 A	Current	Average input current
3.	L Ipp	1.512 A	Current	Peak-to-peak inductor ripple current
4.	L1 Irms	6.187 A	Current	Inductor ripple current
5.	M1 Irms	4.435 A	Current	MOSFET RMS ripple current
6.	M2 Irms	4.314 A	Current	MOSFET RMS ripple current
7.	BOM Count	26	General	Total Design BOM count
8.	FootPrint	413.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	522.727 kHz	General	Switching frequency
10.	M1 Rdson	8.636 mOhm	General	Drain-Source On-resistance
11.	M1 ThetaJA	57.0 degC/W	General	MOSFET junction-to-ambient thermal resistance

#	Name	Value	Category	Description
12.	M2 Rdson	12.017 mOhm	General	Drain-Source On-resistance
13.	M2 ThetaJA	58.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
14.	Pout	60.0 W	General	Total output power
15.	Total BOM	\$3.73	General	Total BOM Cost
16.	Low Freq Gain	78.621 dB	Op_Point	Gain at 10Hz
17.	Vout OP	20.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	11.822 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	51.388 %	Op_point	Duty cycle
20.	Efficiency	95.998 %	Op_point	Steady state efficiency
21.	Gain Marg	-9.551 dB	Op_point	Bode Plot Gain Margin
22.	IC Tj	63.485 degC	Op_point	IC junction temperature
23.	ICThetaJA	65.7 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	3.0 A	Op_point	Iout operating point
25.	M1 TjOP	86.65 degC	Op_point	M1 MOSFET junction temperature
26.	M2 TjOP	109.883 degC	Op_point	MOSFET junction temperature
27.	Phase Marg	56.238 deg	Op_point	Bode Plot Phase Margin
28.	VIN_OP	10.0 V	Op_point	Vin operating point
29.	Vout p-p	122.668 mV	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
31.	Cout Pd	8.175 mW	Power	Output capacitor power dissipation
32.	IC Pd	53.045 mW	Power	IC power dissipation
33.	L Pd	861.195 mW	Power	Inductor power dissipation
34.	M1 Pd	467.546 mW	Power	MOSFET power dissipation
35.	M1 PdCond	203.822 mW	Power	M1 MOSFET conduction losses
36.	M1 PdCoss	56.534 mW	Power	M1 MOSFET Coss Losses
37.	M1 PdQrr	0.0 W	Power	M1 MOSFET switching losses
38.	M1 PdSw	207.19 mW	Power	M1 MOSFET switching losses
39.	M2 Pd	860.058 mW	Power	MOSFET power dissipation
40.	M2 PdCond	290.676 mW	Power	M2 MOSFET conduction losses
41.	M2 PdCoss	43.289 mW	Power	M2 MOSFET Coss Losses
42.	M2 PdQrr	97.65 mW	Power	Synchronous Boost High Side Reverse Recovery
43.	M2 PdSw	9.077 mW	Power	M2 MOSFET switching losses
44.	M2 Pdbody	419.367 mW	Power	Power dissipation through lower FET
45.	Rsns1 Pd	124.395 mW	Power	Rsns1 Power Dissipation
46.	Rsns2 Pd	124.395 mW	Power	Rsns2 Power Dissipation
47.	Total Pd	2.501 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	Iout1	3.0	Output Current #1
3.	VinMax	12.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage
5.	Vout	20.0	Output Voltage
6.	Vout1	20.0	Output Voltage #1
7.	base_pn	TPS43061	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	60.0	Ambient temperature

Design Assistance

1. Feature Highlights: Low Quiescent Current Boost Controller, Wide Vin Range 4.5V to 38V Vin, 58V Vout, 5.5V Gate Drive optimized for Low Qg NexFETs Thermal Shutdown

2. TPS43061 Product Folder : <http://www.ti.com/product/TPS43061> : contains the data sheet and other resources.

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