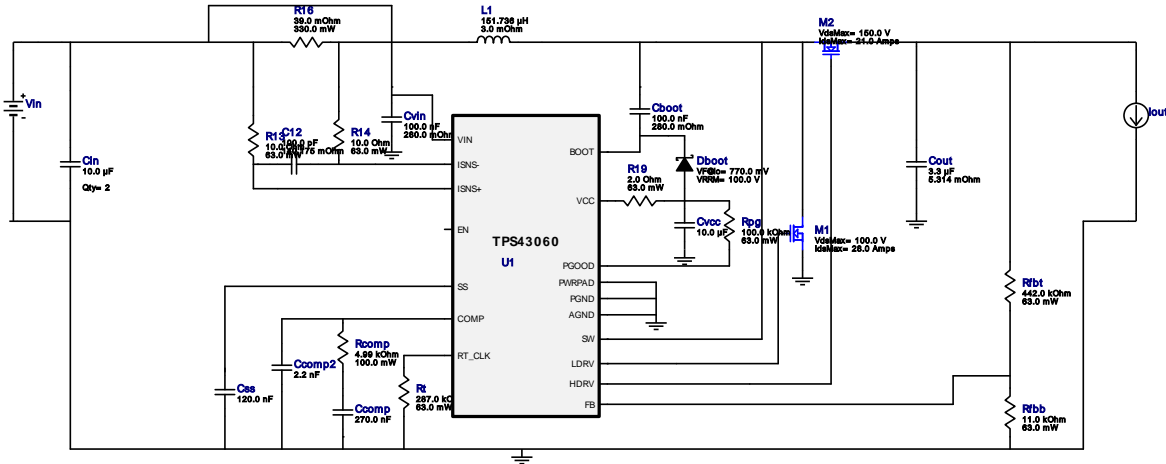


**WEBENCH<sup>®</sup> Design Report**

 Design : 1542746/403 TPS43060RTER  
 TPS43060RTER 5.0V-12.0V to 50.00V @ 0.1A

 VinMin = 5.0V  
 VinMax = 12.0V

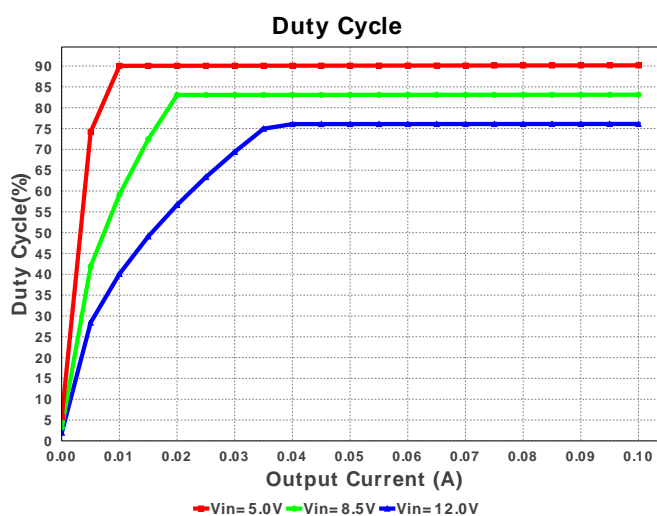
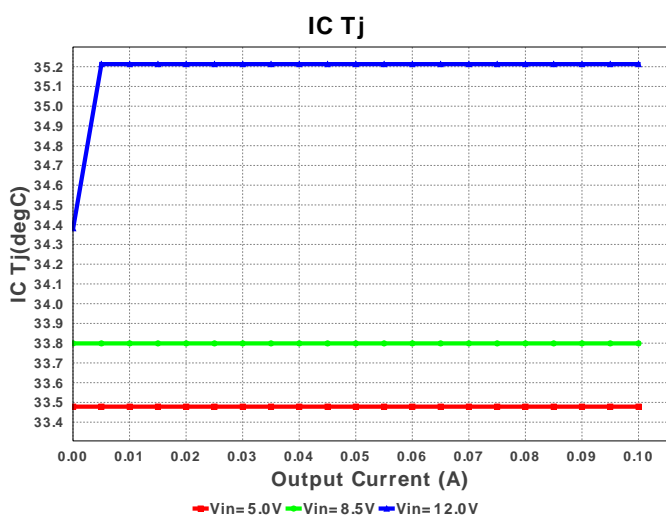
 Vout = 50.0V  
 Iout = 0.1A


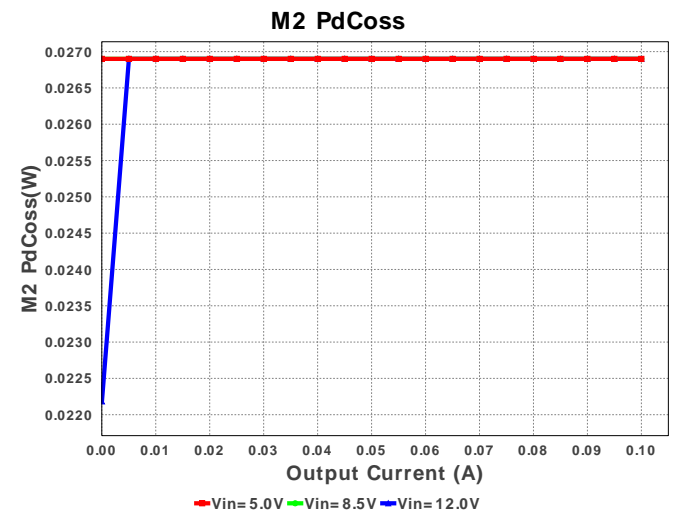
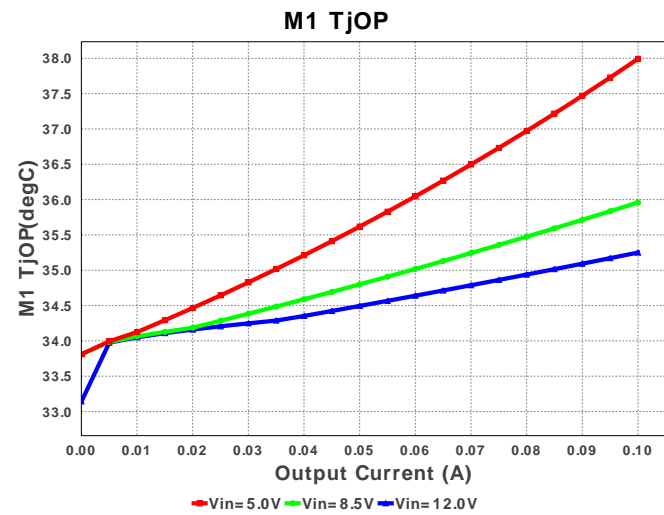
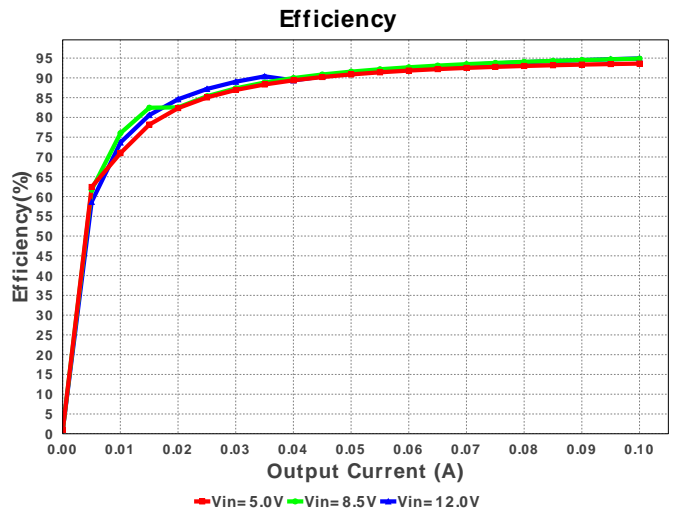
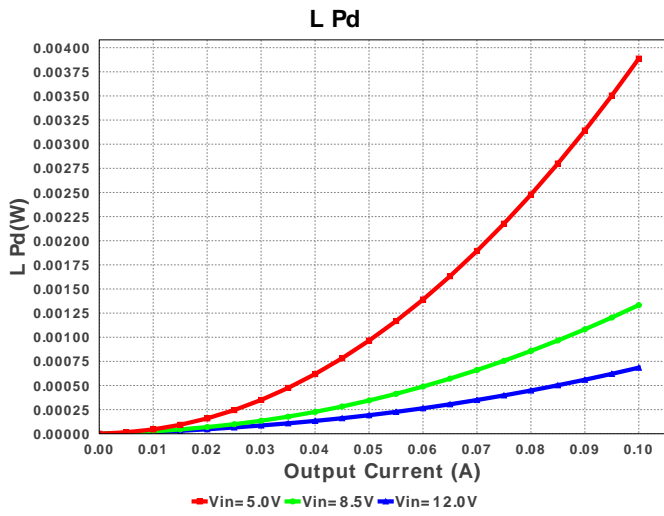
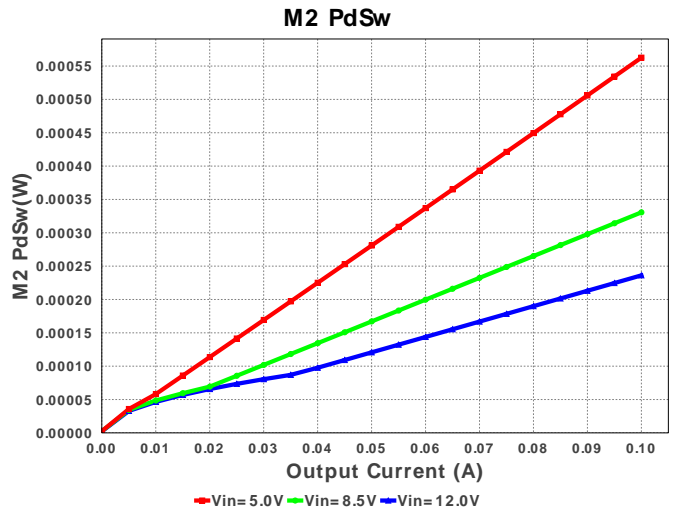
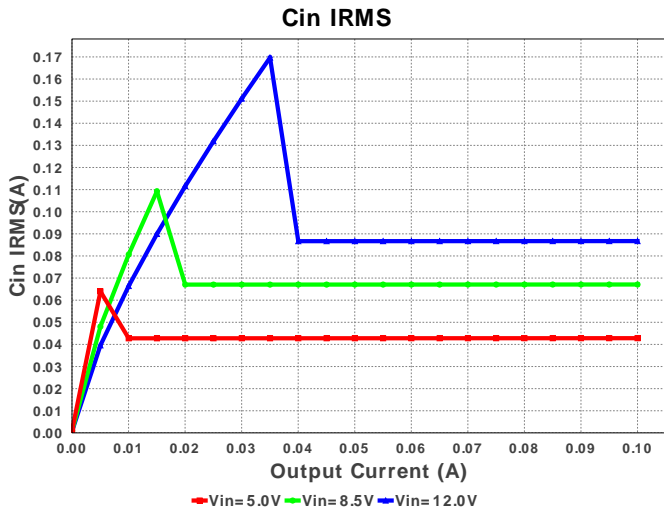
1. The pulse skip mode in the device has not been modeled. Efficiency and operational parameters of the model in pulse skip mode is not valid.

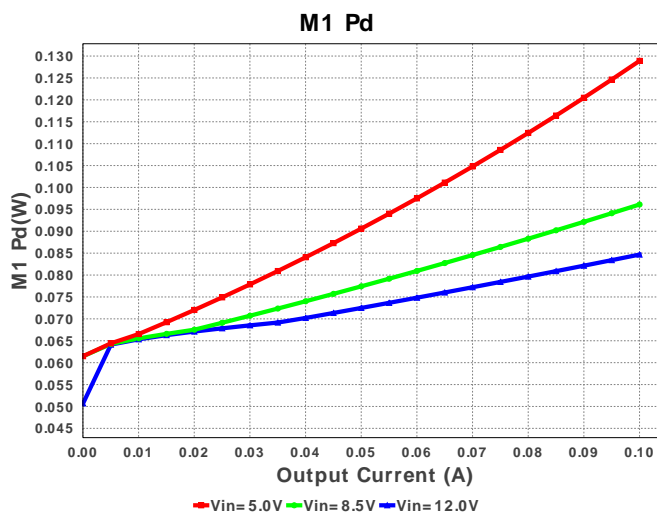
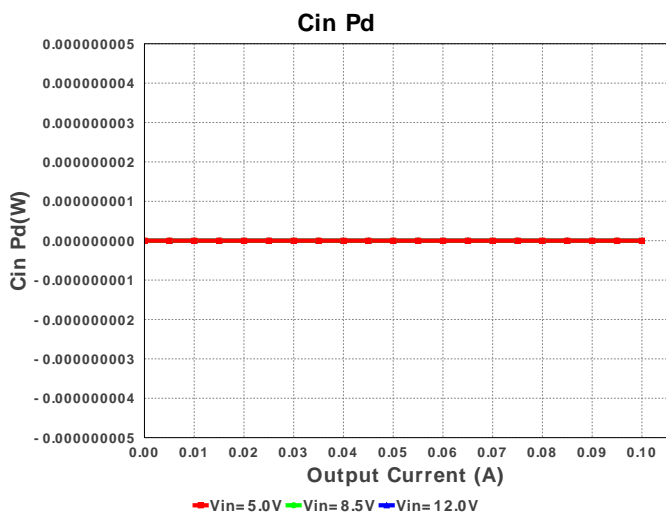
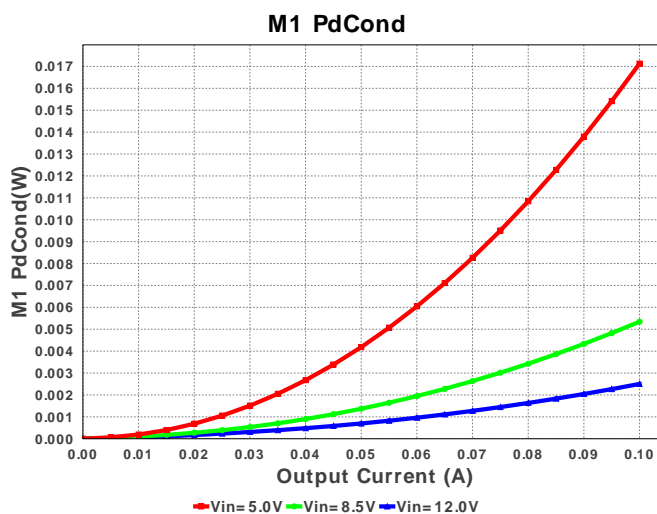
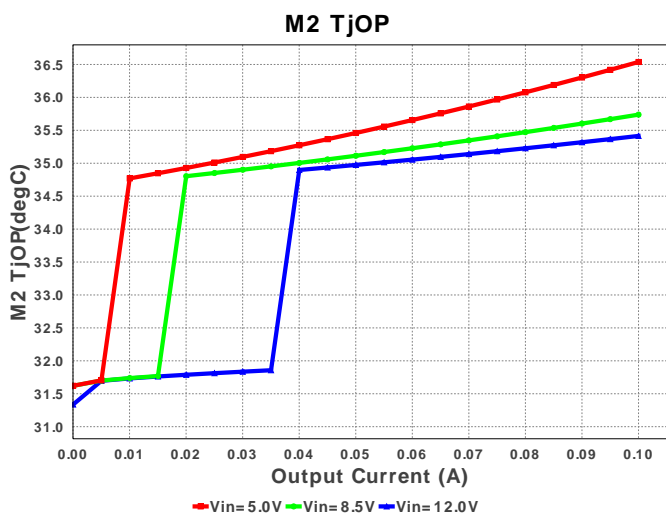
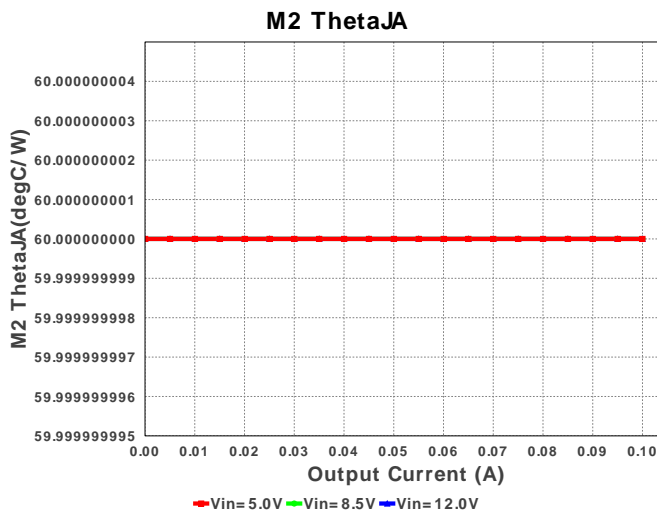
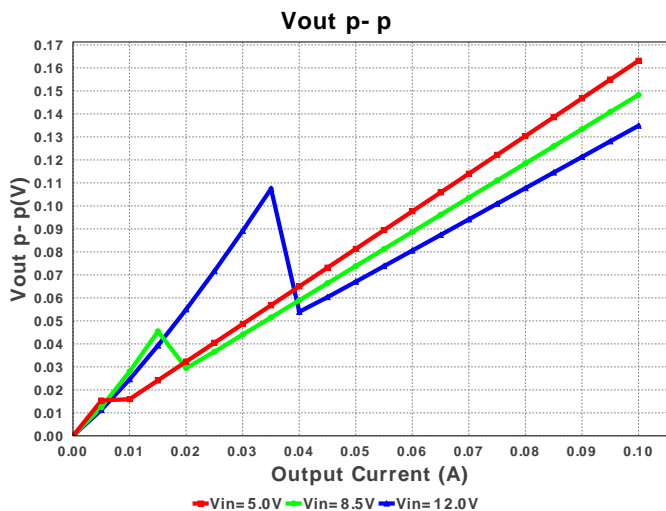
**Electrical BOM**

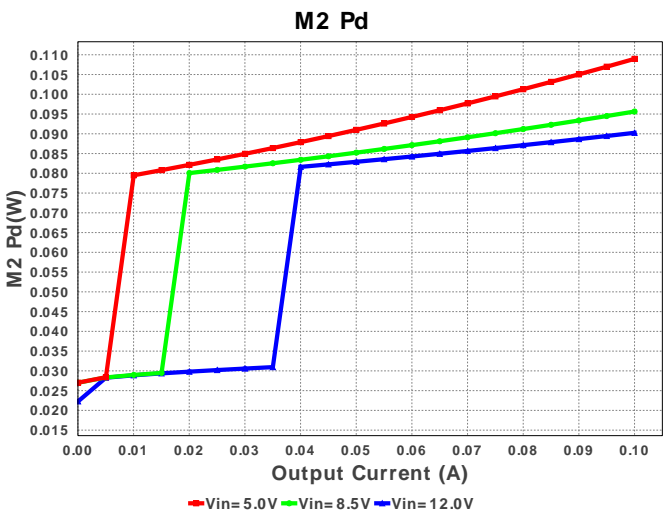
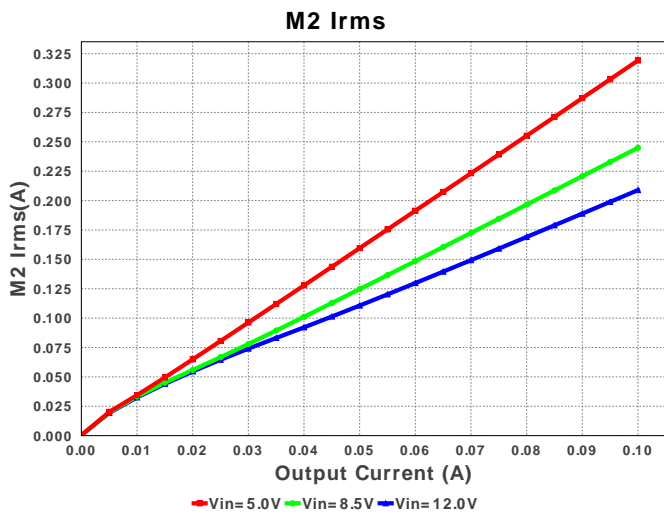
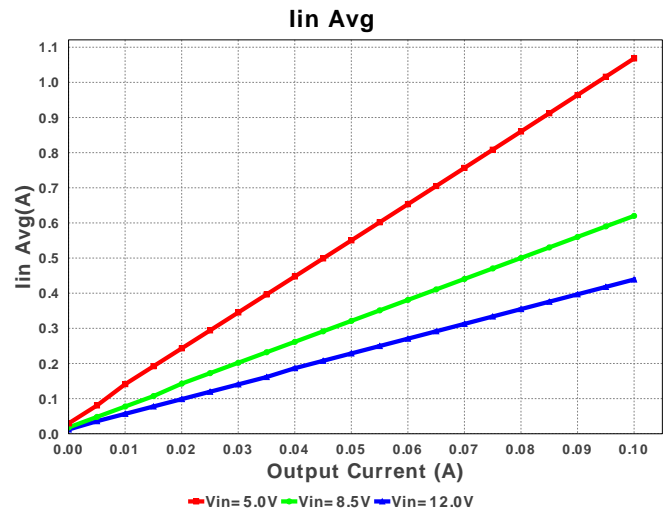
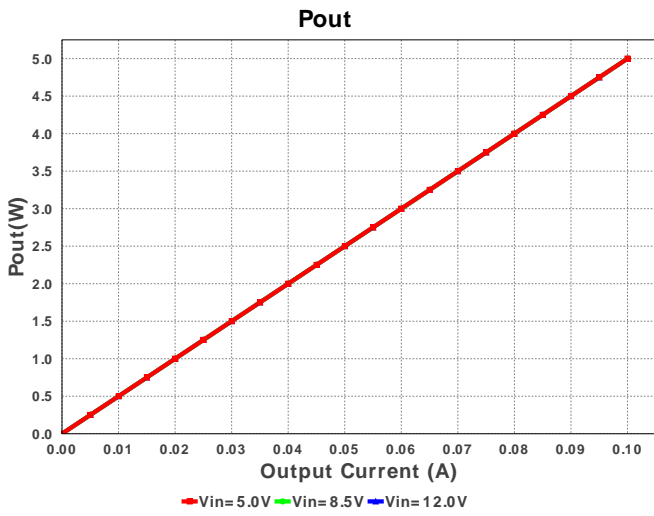
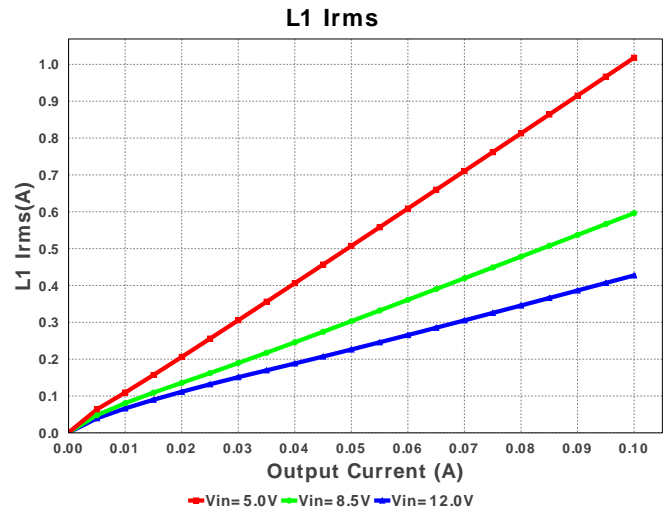
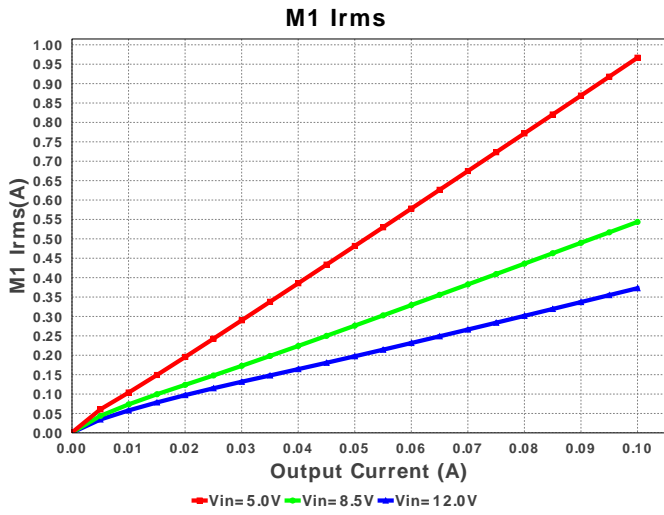
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	TDK	C1608C0G1H101J Series= 285	Cap= 100.0 pF ESR= 140.175 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
2.	Cboot	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
3.	Ccomp	MuRata	GRM188R71C274KA01D Series= X7R	Cap= 270.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	0603 5 mm <sup>2</sup>
4.	Ccomp2	Kemet	C0603C222K5RACTU Series= X7R	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm <sup>2</sup>
5.	Cin	MuRata	GRM219R61E106KA12 Series= ?	Cap= 10.0 uF VDC= 25.0 V IRMS= 0.0 A	2	\$0.05	0805 7 mm <sup>2</sup>
6.	Cout	TDK	C3225X7S2A335K Series= 285	Cap= 3.3 uF ESR= 5.314 mOhm VDC= 100.0 V IRMS= 0.0 A	1	\$0.24	1210 15 mm <sup>2</sup>
7.	Css	MuRata	GRM188R71C124KA01D Series= X7R	Cap= 120.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	0603 5 mm <sup>2</sup>
8.	Cvcc	MuRata	GRM188R61C106MA73D Series= X5R	Cap= 10.0 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.09	0603 5 mm <sup>2</sup>
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 <sup>2</sup>
10.	Dboot	Diodes Inc.	DFLS1100-7	VF@Io= 770.0 mV VRRM= 100.0 V	1	\$0.19	PowerDI123 13 mm <sup>2</sup>

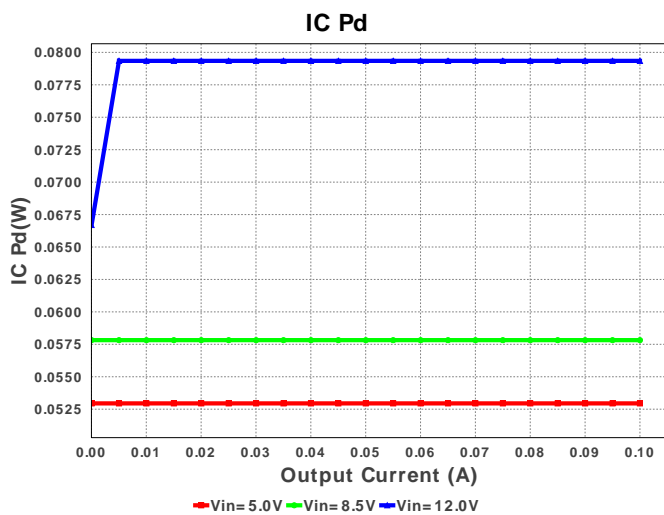
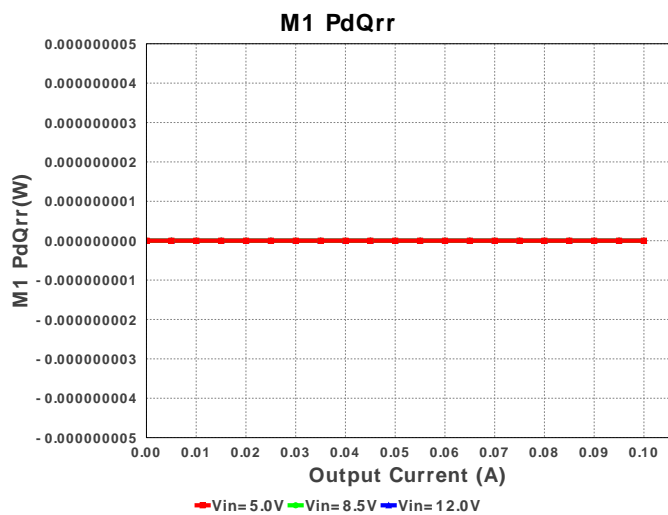
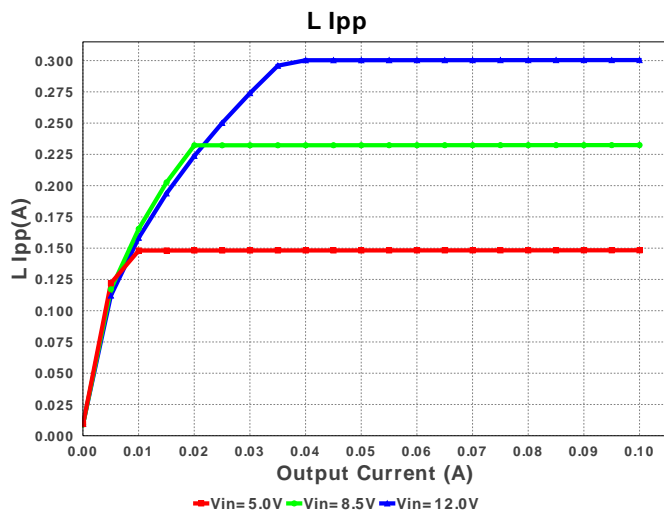
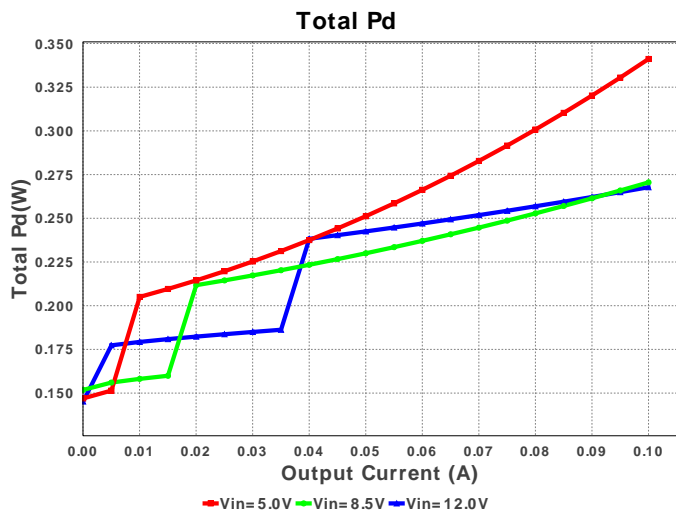
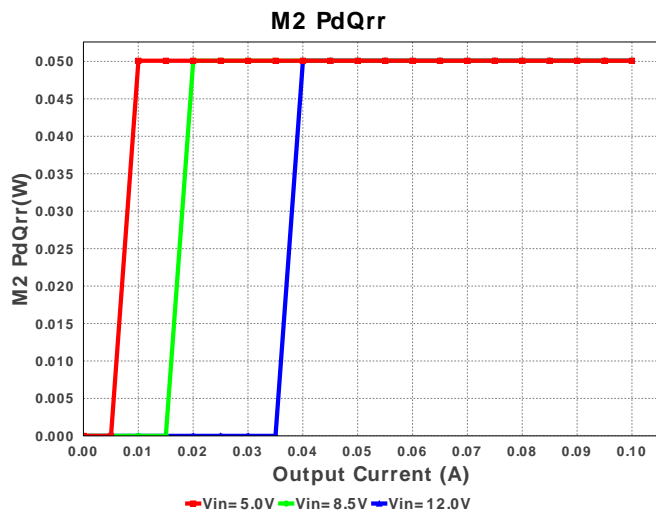
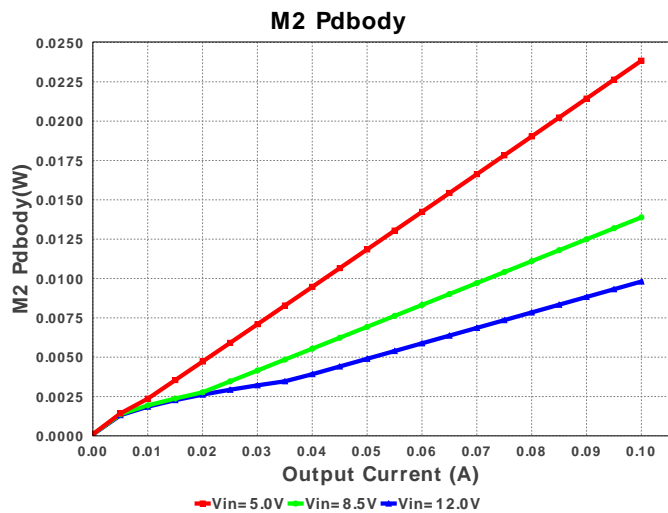
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	L1	CUSTOM	CUSTOM	L= 151.736 µH DCR= 3.0 mOhm	1	NA	CUSTOM 0 mm <sup>2</sup>
12.	M1	Infineon Technologies	BSZ160N10NS3 G	VdsMax= 100.0 V IdsMax= 28.0 Amps	1	\$0.53	PG-TSDSON-8 19 mm <sup>2</sup>
13.	M2	Infineon Technologies	BSZ520N15NS3 G	VdsMax= 150.0 V IdsMax= 21.0 Amps	1	\$0.53	PG-TSDSON-8 19 mm <sup>2</sup>
14.	R13	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
15.	R14	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
16.	R16	Panasonic	ERJ-L14KF39MU Series= 232	Res= 39.0 mOhm Power= 330.0 mW Tolerance= 1.0%	1	\$0.11	1210 15 mm <sup>2</sup>
17.	R19	Vishay-Dale	CRCW04022R00FKED Series= CRCW..e3	Res= 2.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
18.	Rcomp	Vishay-Dale	CRCW06034K99FKEA Series= CRCW..e3	Res= 4.99 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	0603 5 mm <sup>2</sup>
19.	Rfbb	Vishay-Dale	CRCW040211K0FKED Series= CRCW..e3	Res= 11.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
20.	Rfbt	Vishay-Dale	CRCW0402442KFKED Series= CRCW..e3	Res= 442.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
21.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
22.	Rt	Vishay-Dale	CRCW0402287KFKED Series= CRCW..e3	Res= 287.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
23.	U1	Texas Instruments	TPS43060RTER	Switcher	1	\$1.40	S-PWQFN-N16 17 mm <sup>2</sup>

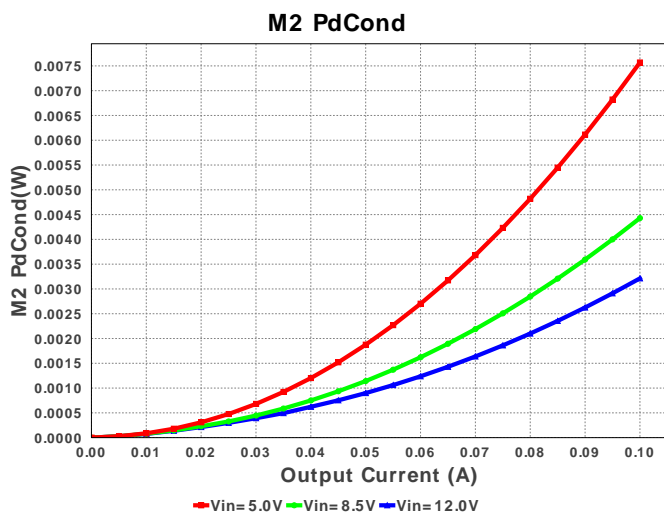
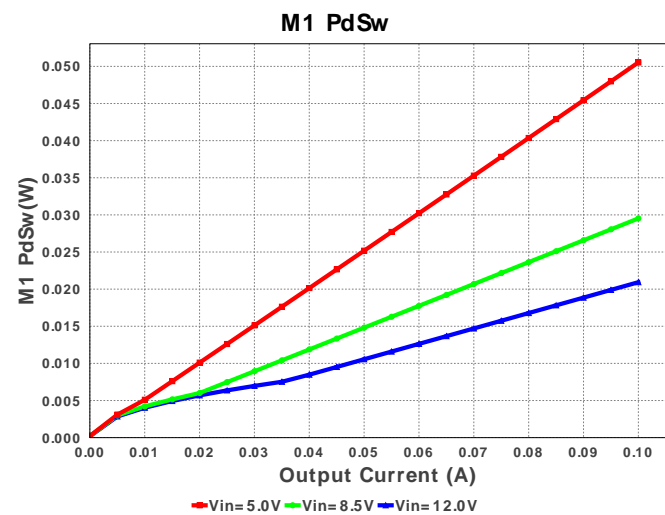
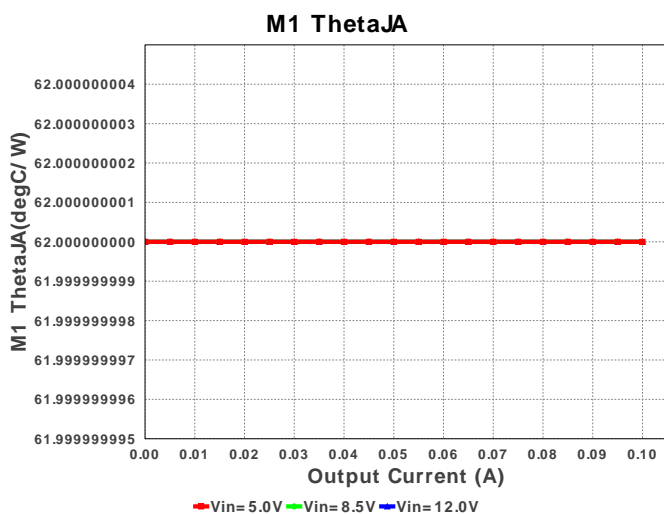
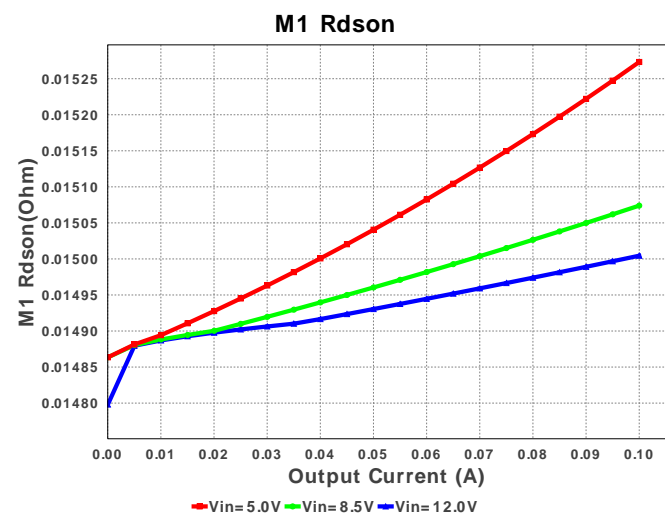
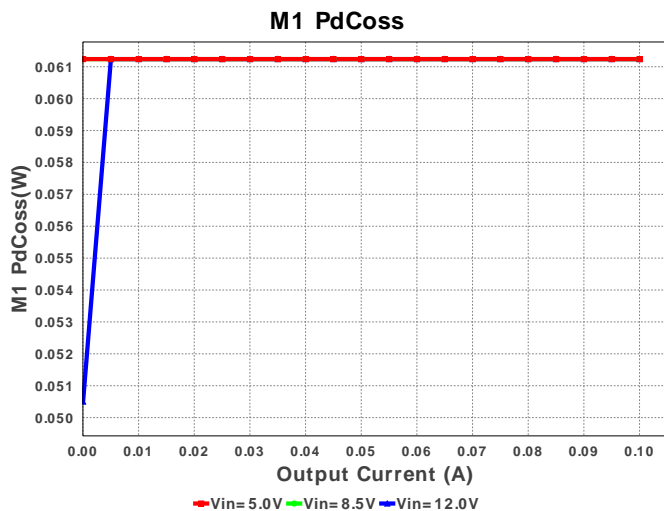
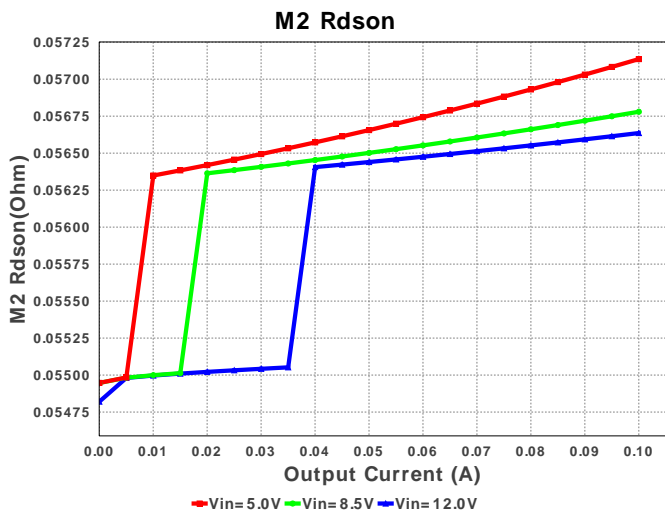


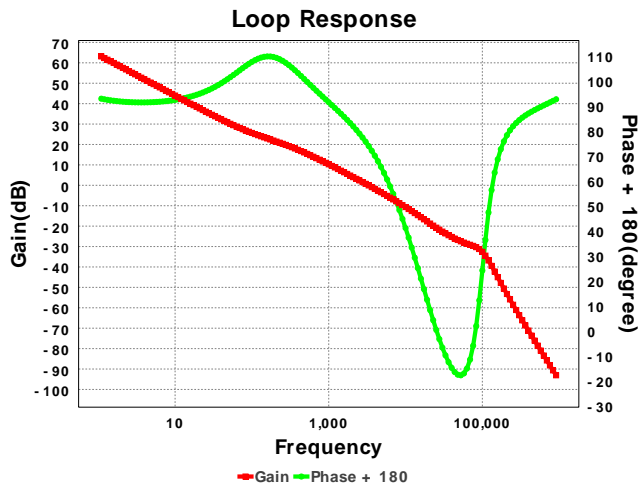












## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	42.812 mA	Current	Input capacitor RMS ripple current
2.	Iin Avg	1.068 A	Current	Average input current
3.	L Ipp	148.3 mA	Current	Peak-to-peak inductor ripple current
4.	L1 Irms	1.018 A	Current	Inductor ripple current
5.	M1 Irms	966.725 mA	Current	MOSFET RMS ripple current
6.	M2 Irms	319.212 mA	Current	MOSFET RMS ripple current
7.	BOM Count	24	General	Total Design BOM count
8.	FootPrint	427.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
9.	Frequency	200.348 kHz	General	Switching frequency
10.	M1 Rdson	15.273 mOhm	General	Drain-Source On-resistance
11.	M1 ThetaJA	62.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
12.	M2 Rdson	57.133 mOhm	General	Drain-Source On-resistance
13.	M2 ThetaJA	60.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
14.	Pout	5.0 W	General	Total output power
15.	Total BOM	\$0.0	General	Total BOM Cost
16.	Vout OP	50.0 V	Op_point	Operational Output Voltage
17.	Cross Freq	1.299 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	90.169 %	Op_point	Duty cycle
19.	Efficiency	93.615 %	Op_point	Steady state efficiency
20.	IC Tj	33.479 degC	Op_point	IC junction temperature
21.	ICThetaJA	65.7 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	100.0 mA	Op_point	Iout operating point
23.	M1 TjOP	37.992 degC	Op_point	M1 MOSFET junction temperature
24.	M2 TjOP	36.532 degC	Op_point	MOSFET junction temperature
25.	Phase Marg	74.323 deg	Op_point	Bode Plot Phase Margin
26.	VIN_OP	5.0 V	Op_point	Vin operating point
27.	Vout p-p	163.13 mV	Op_point	Peak-to-peak output ripple voltage
28.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
29.	IC Pd	52.947 mW	Power	IC power dissipation
30.	L Pd	3.887 mW	Power	Inductor power dissipation
31.	M1 Pd	128.9 mW	Power	MOSFET power dissipation
32.	M1 PdCond	17.128 mW	Power	M1 MOSFET conduction losses
33.	M1 PdCoss	61.239 mW	Power	M1 MOSFET Coss Losses
34.	M1 PdQrr	0.0 W	Power	M1 MOSFET switching losses
35.	M1 PdSw	50.533 mW	Power	M1 MOSFET switching losses
36.	M2 Pd	108.874 mW	Power	MOSFET power dissipation
37.	M2 PdCond	7.568 mW	Power	M2 MOSFET conduction losses
38.	M2 PdCoss	26.9 mW	Power	M2 MOSFET Coss Losses
39.	M2 PdQrr	50.0 mW	Power	Synchronous Boost High Side Reverse Recovery
40.	M2 PdSw	562.59 μW	Power	M2 MOSFET switching losses
41.	M2 Pdbody	23.843 mW	Power	Power dissipation through lower FET
42.	Total Pd	341.023 mW	Power	Total Power Dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	100.0 m	Maximum Output Current
2.	Iout1	100.0 m	Output Current #1
3.	VinMax	12.0	Maximum input voltage
4.	VinMin	5.0	Minimum input voltage
5.	Vout	50.0	Output Voltage
6.	Vout1	50.0	Output Voltage #1



#	Name	Value	Description
7.	base_pn	TPS43060	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0	Ambient temperature

## Design Assistance

1. Feature Highlights: Low Quiescent Current Boost Controller, Wide Vin Range 4.5V to 38V Vin, 58V Vout, 7.5V Gate Drive optimized for standard MOSFET Thresholds Thermal Shutdown

2. TPS43060 Product Folder : <http://www.ti.com/product/tps43060> : contains the data sheet and other resources.

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