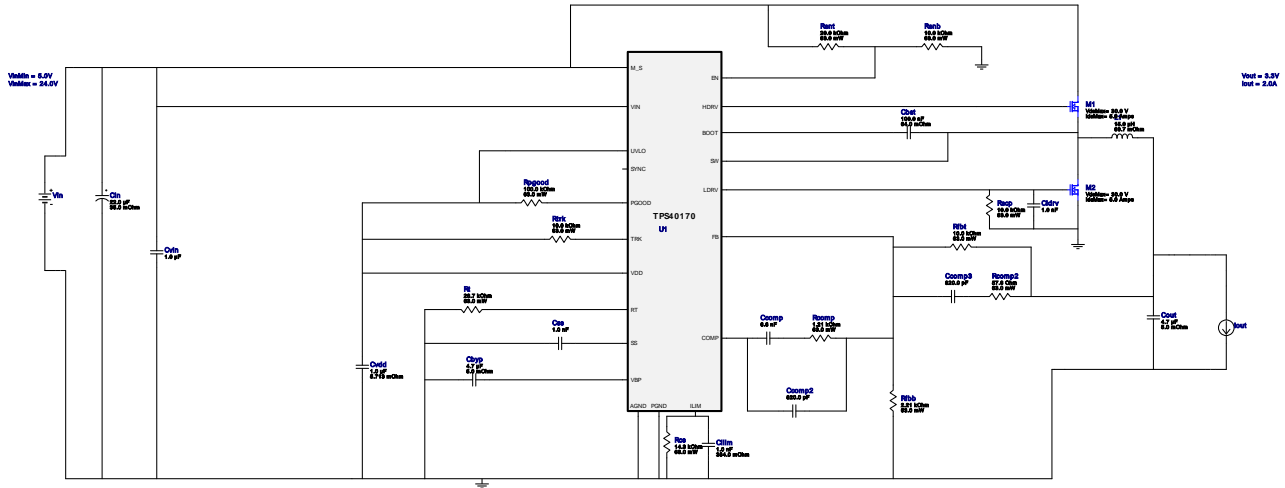

















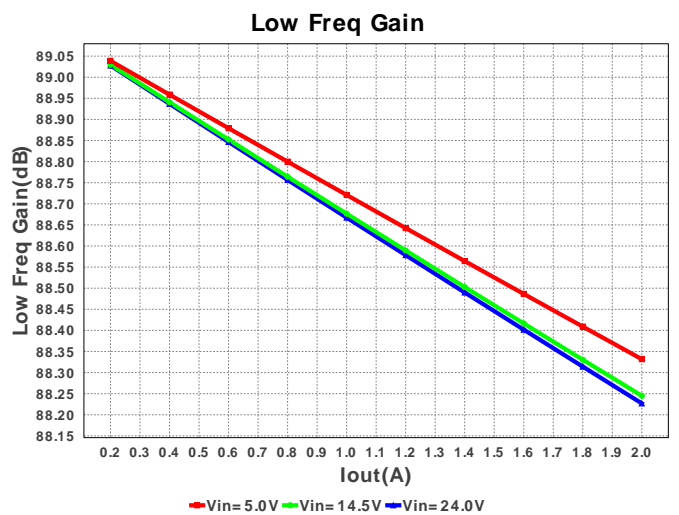
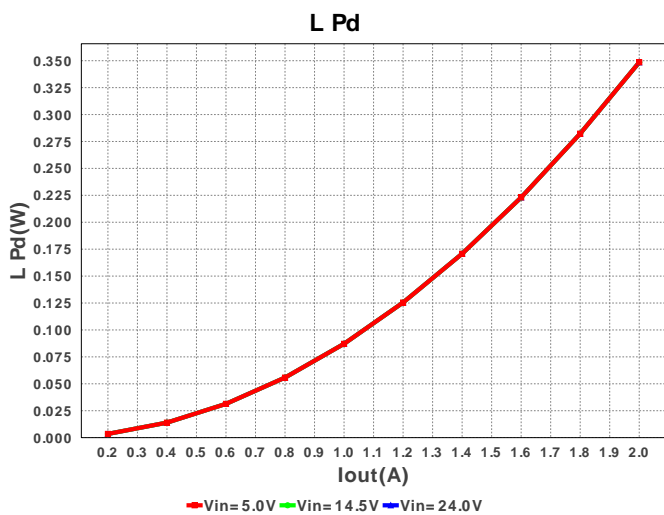
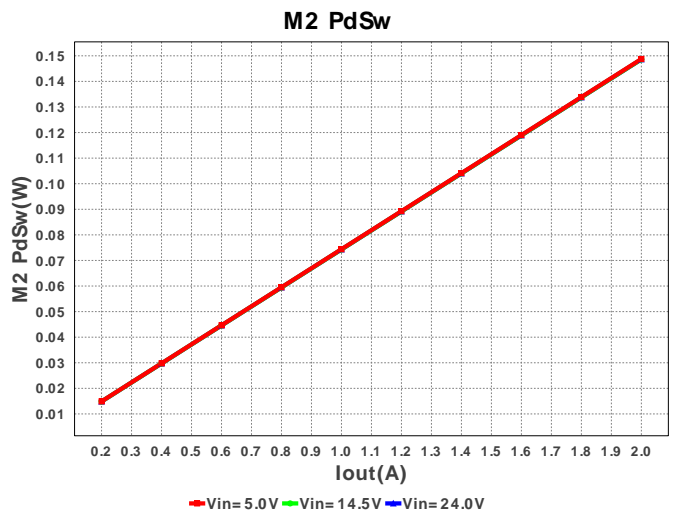
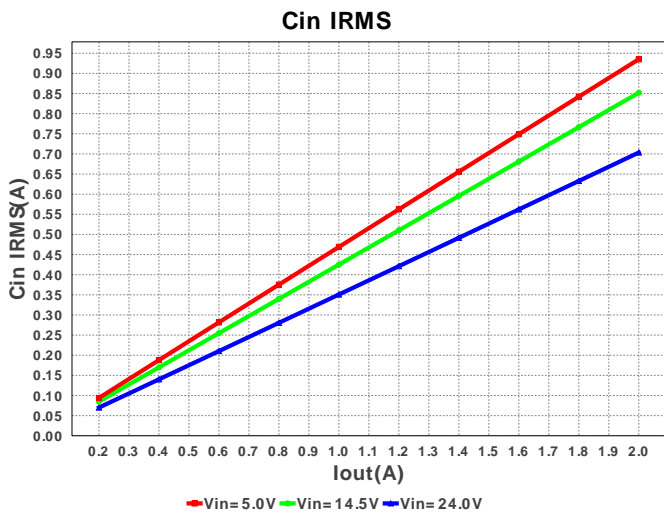
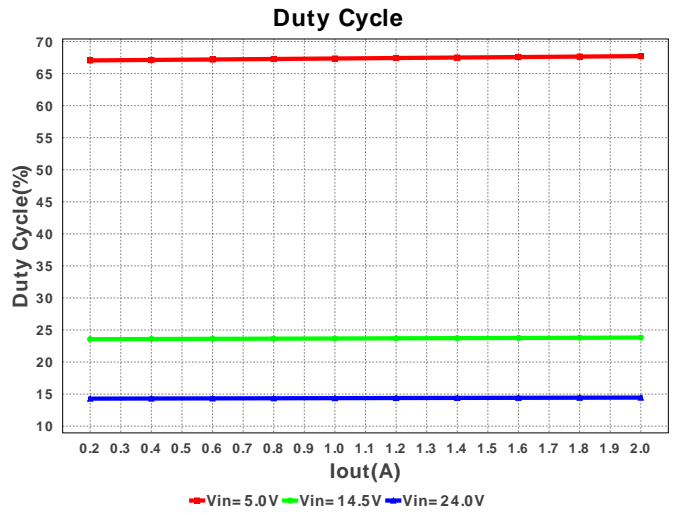
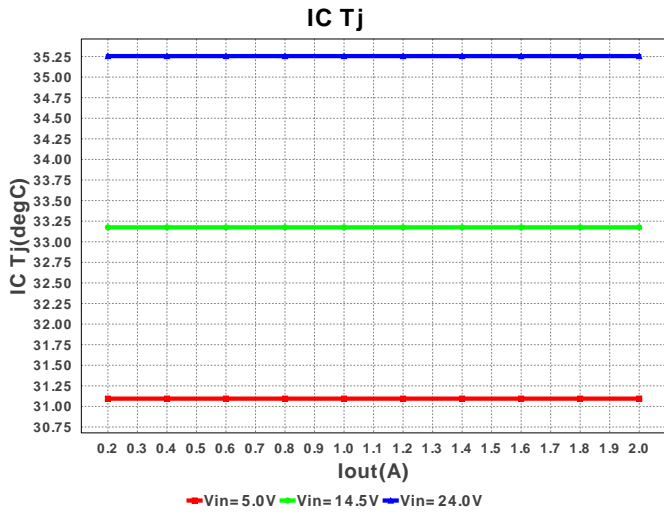


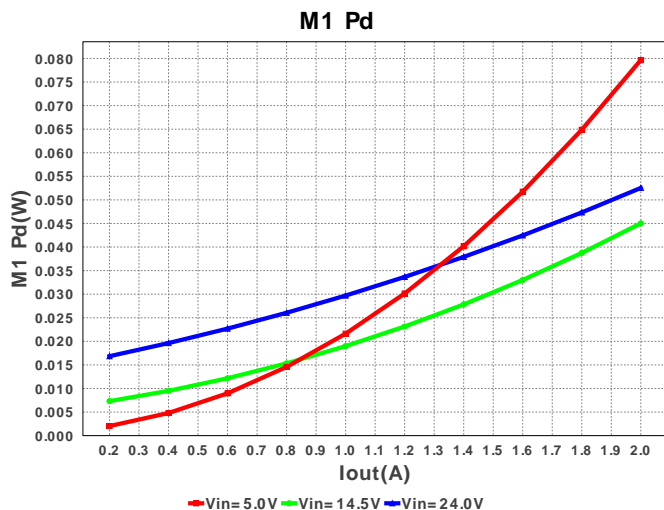
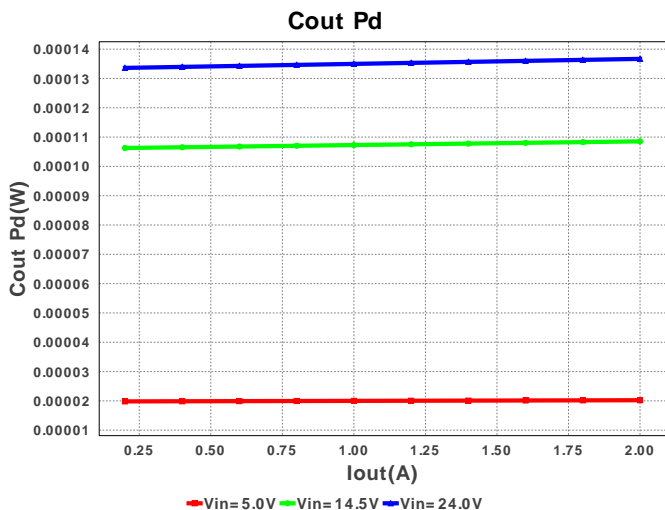
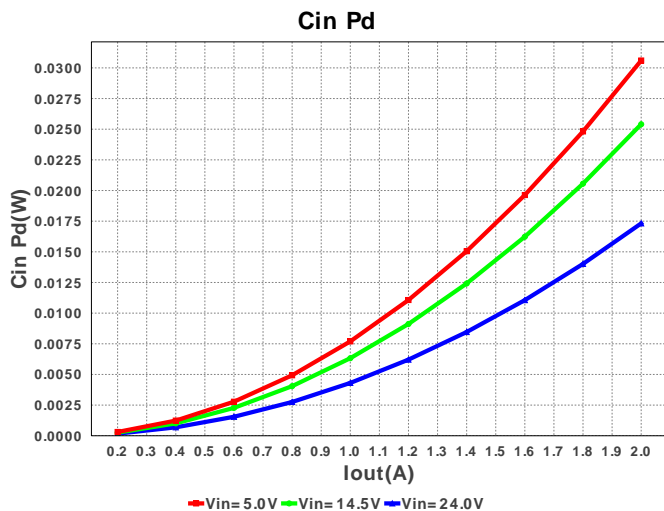
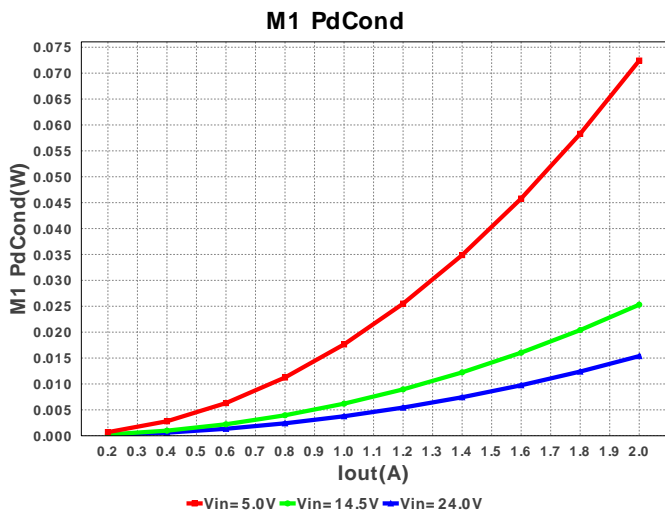
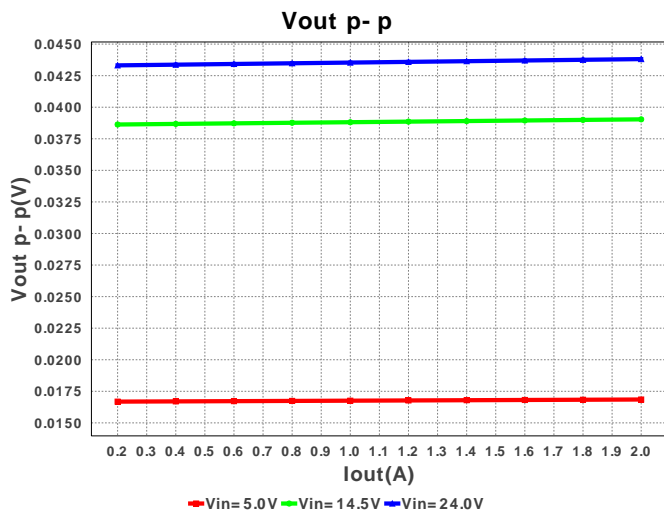
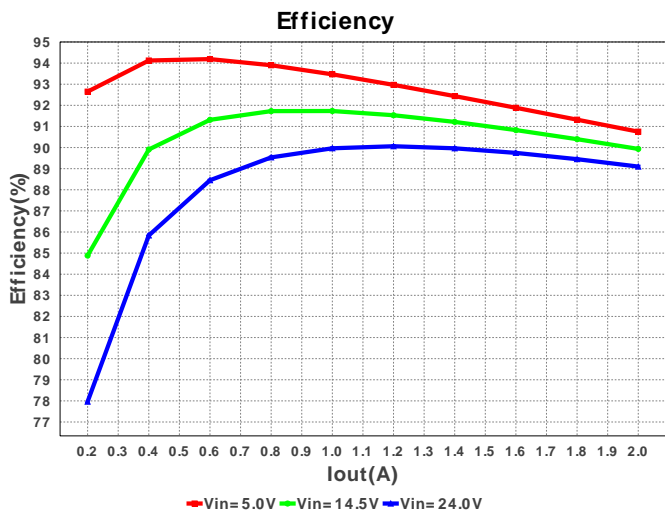
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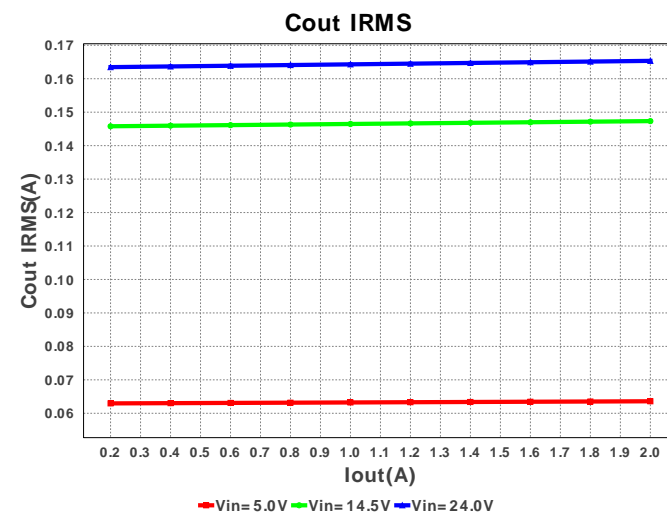
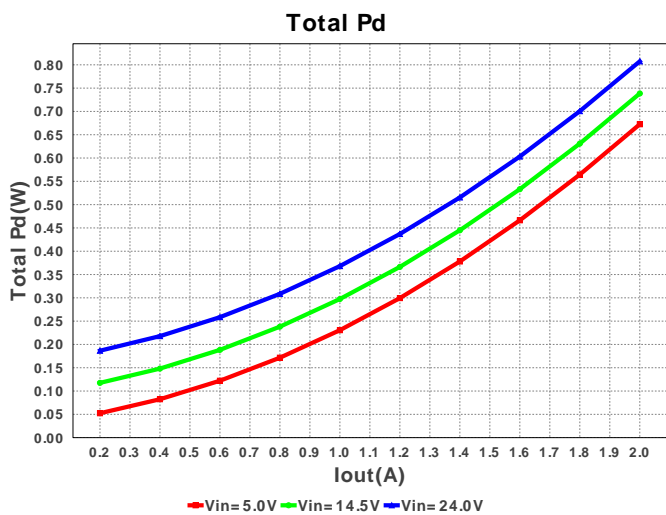
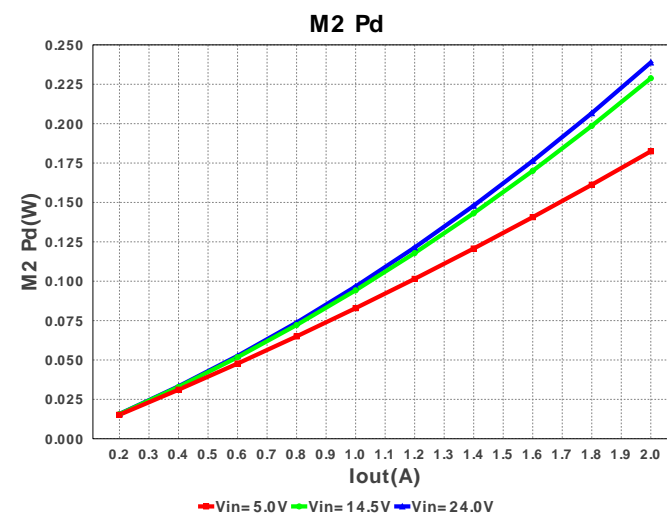
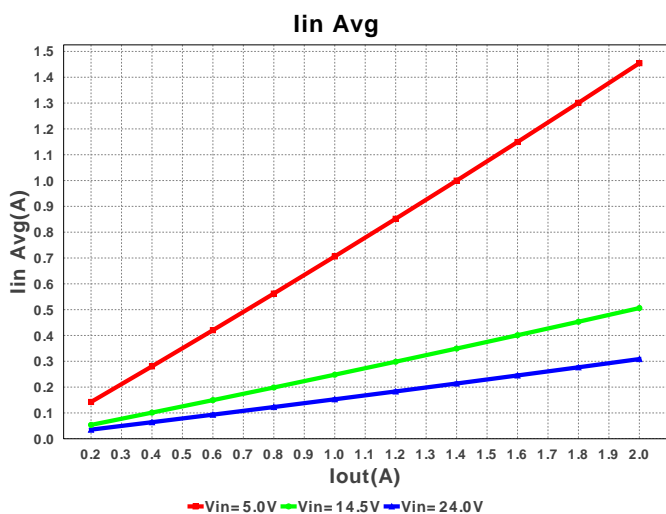
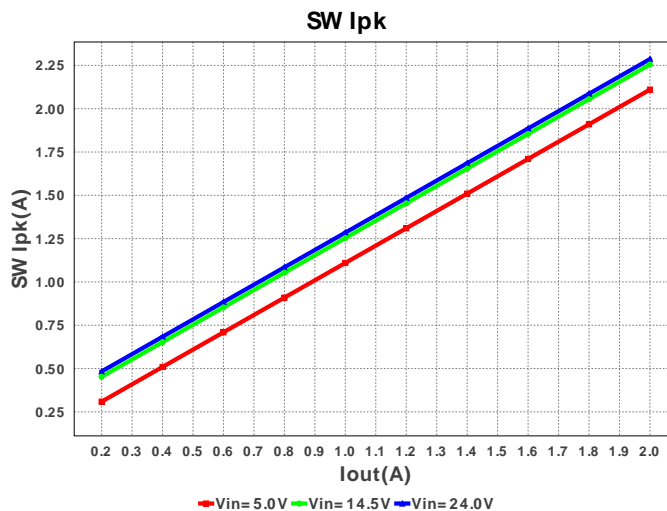
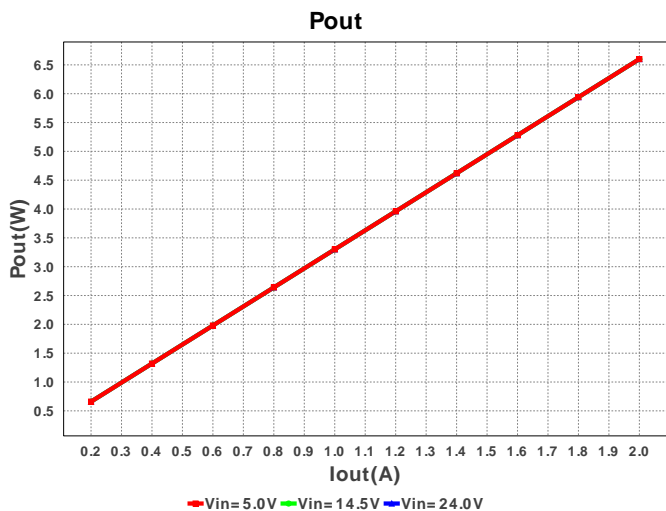
 Design : 3792524/4 TPS40170RGYR
 TPS40170RGYR 5.0V-24.0V to 3.3V @ 2.0A

Electrical BOM

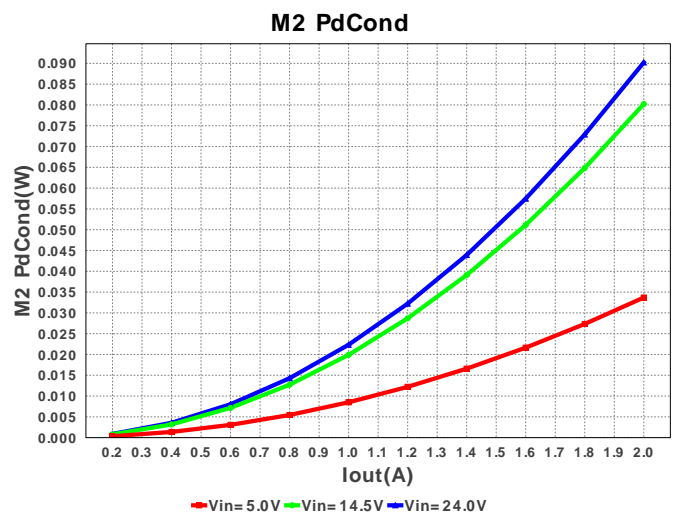
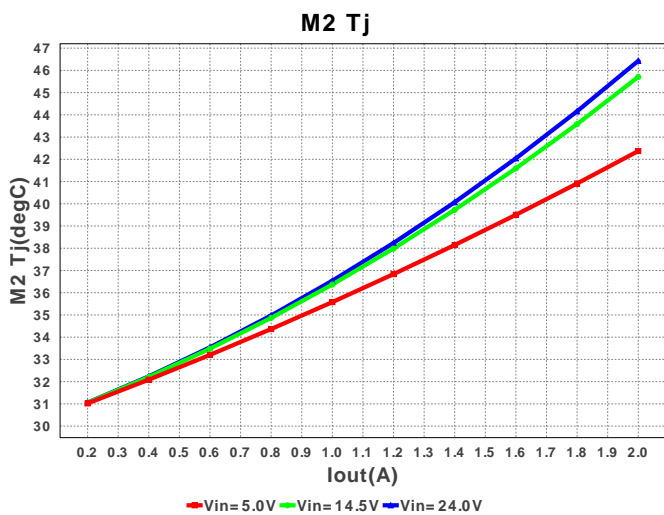
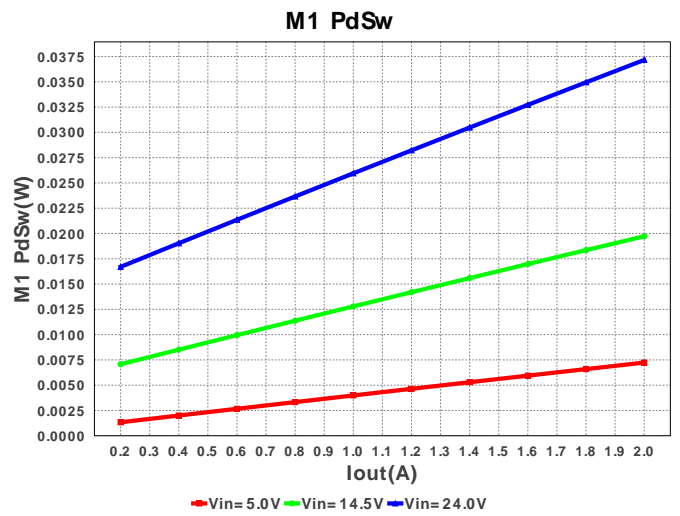
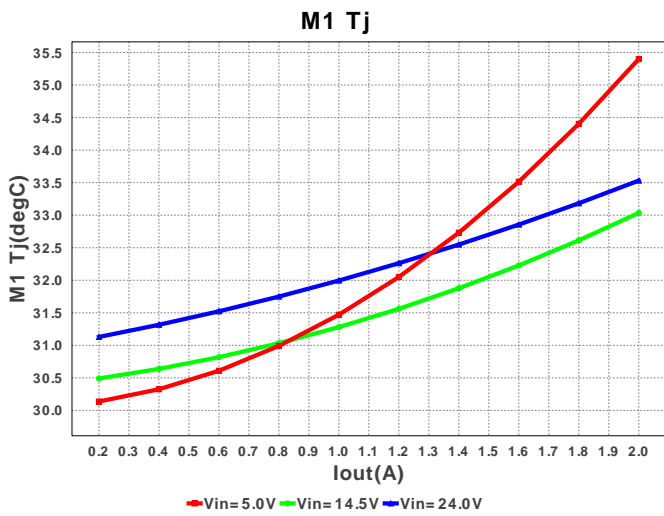
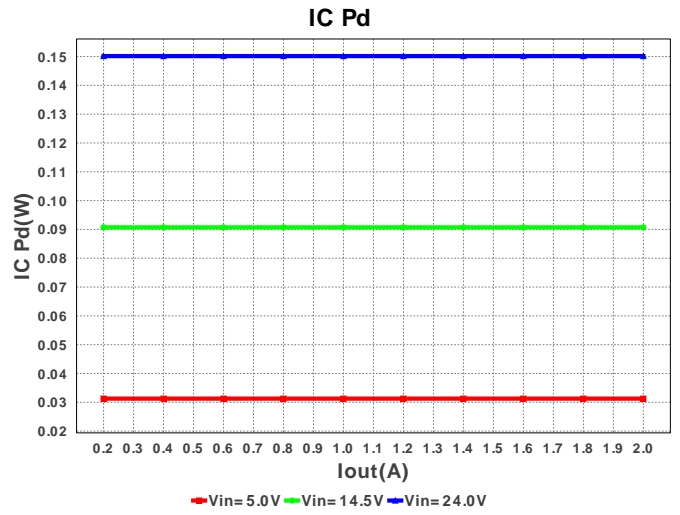
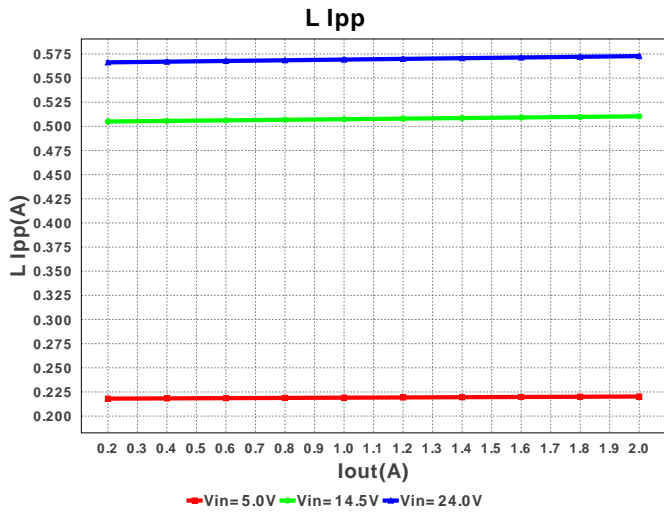
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7mm2
2.	Cby	MuRata	GRM21BR61C475KA88L Series= X5R	Cap= 4.7 µF ESR= 5.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.04	 0805 7mm2
3.	Ccomp	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
4.	Ccomp2	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
5.	Ccomp3	Yageo America	CC0805KRX7R9BB821 Series= X7R	Cap= 820.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
6.	Cilim	Kemet	C0805C102K5RACTU Series= X7R	Cap= 1.0 nF ESR= 384.0 mOhm VDC= 50.0 V IRMS= 214.0 mA	1	\$0.01	 0805 7mm2
7.	Cin	Panasonic	35SVPF22M Series= 1273	Cap= 22.0 µF ESR= 35.0 mOhm VDC= 35.0 V IRMS= 2.6 A	1	\$0.43	 CAPSMT_62_F61 74mm2
8.	Cldr	MuRata	GRM033R71E102KA01D Series= X7R	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0201 2mm2
9.	Cout	MuRata	GRM188R60J475KE19D Series= X5R	Cap= 4.7 µF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 2.0 A	1	\$0.02	 0603 5mm2
10.	Css	MuRata	GRM033R71E102KA01D Series= X7R	Cap= 1.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0201 2mm2

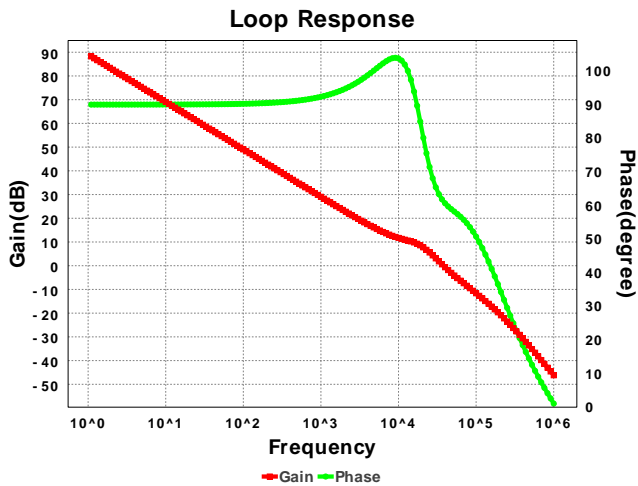
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11.	Cvdd	TDK	C1608X5R1C105K Series= 285	Cap= 1.0 μ F ESR= 5.713 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 1608 5mm2
12.	Cvin	Taiyo Yuden	GMK212B7105KG-T Series= X7R	Cap= 1.0 μ F VDC= 35.0 V IRMS= 0.0 A	1	\$0.05	 0805 7mm2
13.	L1	Coilcraft	XAL5050-153MEB	L= 15.0 μ H DCR= 69.7 mOhm	1	\$0.60	 XAL5050 54mm2
14.	M1	Texas Instruments	CSD17313Q2	VdsMax= 30.0 V IdsMax= 5.0 Amps	1	\$0.17	 TRANS_NexFET_Q2 9mm2
15.	M2	Texas Instruments	CSD17313Q2	VdsMax= 30.0 V IdsMax= 5.0 Amps	1	\$0.17	 TRANS_NexFET_Q2 9mm2
16.	Rcomp	Vishay-Dale	CRCW04021K21FKED Series= CRCW..e3	Res= 1.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
17.	Rcomp2	Vishay-Dale	CRCW040257R6FKED Series= CRCW..e3	Res= 57.6 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
18.	Rcs	Vishay-Dale	CRCW040214K3FKED Series= CRCW..e3	Res= 14.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
19.	Renb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
20.	Rent	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
21.	Rfbb	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
22.	Rfbt	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
23.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
24.	Rscp	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
25.	Rt	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
26.	Rtrk	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
27.	U1	Texas Instruments	TPS40170RGYR	Switcher	1	\$2.10	 RGY0020A 25mm2











Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	703.417 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	165.338 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	308.69 mA	Current	Average input current
4.	L Ipp	572.747 mA	Current	Peak-to-peak inductor ripple current
5.	SW Ipk	2.286 A	Current	Peak switch current
6.	BOM Count	27	General	Total Design BOM count
7.	FootPrint	265.0 mm2	General	Total Foot Print Area of BOM components
8.	Frequency	348.432 kHz	General	Switching frequency
9.	IC Tolerance	6.0 μ V	General	IC Feedback Tolerance
10.	Pout	6.6 W	General	Total output power
11.	Total BOM	\$3.77	General	Total BOM Cost
12.	Cross Freq	37.938 kHz	Op_point	Bode plot crossover frequency
13.	Duty Cycle	14.461 %	Op_point	Duty cycle
14.	Efficiency	89.086 %	Op_point	Steady state efficiency
15.	IC Tj	35.255 degC	Op_point	IC junction temperature
16.	IOUT_OP	2.0 A	Op_point	Iout operating point
17.	M1 Tj	33.532 degC	Op_point	M1 MOSFET junction temperature
18.	M2 Tj	46.428 degC	Op_point	M2 MOSFET junction temperature
19.	Phase Marg	61.22 deg	Op_point	Bode Plot Phase Margin
20.	VIN_OP	24.0 V	Op_point	Vin operating point
21.	Vout p-p	43.811 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	17.318 mW	Power	Input capacitor power dissipation
23.	Cout Pd	136.683 μ W	Power	Output capacitor power dissipation
24.	IC Pd	150.146 mW	Power	IC power dissipation
25.	L Pd	348.5 mW	Power	Inductor power dissipation
26.	M1 Pd	52.694 mW	Power	M1 MOSFET total power dissipation
27.	M1 PdCond	15.537 mW	Power	M1 MOSFET conduction losses
28.	M1 PdSw	37.158 mW	Power	M1 MOSFET switching losses
29.	M2 Pd	239.783 mW	Power	M2 MOSFET total power dissipation
30.	M2 PdCond	91.168 mW	Power	M2 MOSFET conduction losses
31.	M2 PdSw	148.616 mW	Power	M2 MOSFET switching losses
32.	Total Pd	808.57 mW	Power	Total Power Dissipation
33.	Low Freq Gain	88.227 dB	Unknown	Gain at 10Hz

Design Inputs

#	Name	Value	Description
1.	Iout	2.0 A	Maximum Output Current
2.	Iout1	2.0 Amps	Output Current #1
3.	VinMax	24.0 V	Maximum input voltage
4.	VinMin	5.0 V	Minimum input voltage
5.	Vout	3.3 V	Output Voltage
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	TPS40170	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. TPS40170 Product Folder : <http://www.ti.com/product/tps40170> : contains the data sheet and other resources.

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