

WEBENCH® Power Architect

Project Report

Project : 1382630/41 : PA_Project_304 (modified from 301)

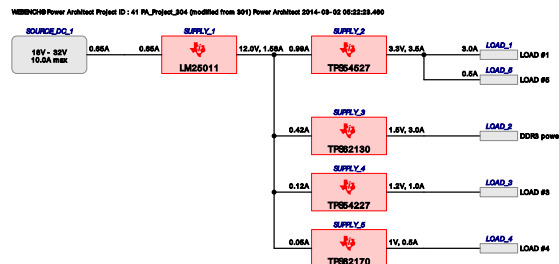
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Optimize project optFactor=3

Project Summary

1. Total System Efficiency	78.736 %
2. Total System BOM Count	50.0
3. Total System Footprint	887.0 mm ²
4. Total System BOM Cost	\$7.38
5. Total System Power Dissipation	4.794 W

--> Launch WEBENCH Power Architect.



Power Supplies

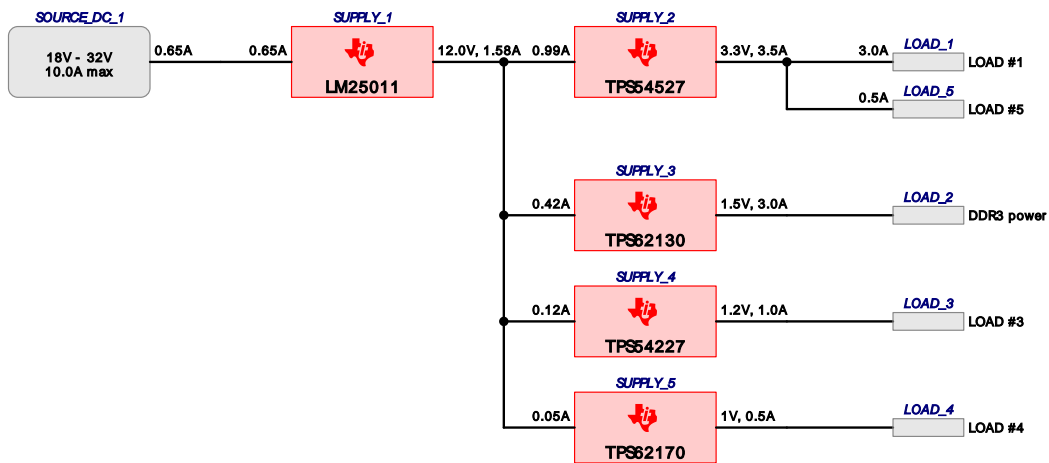
#	Name	NSID	Description	Vout	Iout	Efficiency	Foot-print	Cost	Design	Page
1.	SUPPLY_1	LM25011	Switcher : COT BUCK regulator with adjustable current limit	12.0 V	1.575 A	91.5%	340	\$1.80	446	24
2.	SUPPLY_2	TPS54527	Switcher : 5A Synchronous Buck Converter	3.3 V	3.5 A	88.7%	204	\$1.66	442	4
3.	SUPPLY_3	TPS62130	Switcher : 3V-17V, 3A, DCS-Control, pin selectable frequency	1.5 V	3.0 A	80.8%	154	\$1.63	443	9
4.	SUPPLY_4	TPS54227	Switcher : 2A Synchronous Buck Converter	1.2 V	1.0 A	78.8%	129	\$1.24	444	14
5.	SUPPLY_5	TPS62170	Switcher : 3V-17V, 0.5A, Buck Converter with Power Good	1 V	0.5 A	73.9%	60	\$1.05	445	19

Power Loads

#	Name	VLoad	ILoad	Description
1.	LOAD #1	3.3 V	3 A	VoutRipple=10%
2.	LOAD #5	3.3 V	0.5 A	VoutRipple=10%
3.	DDR3 power	1.5 V	3 A	VoutRipple=10%
4.	LOAD #3	1.2 V	1 A	VoutRipple=10%
5.	LOAD #4	1 V	0.5 A	VoutRipple=10%

Project Diagram

WEBENCH® Power Architect Project ID : 41_PA_Project_304 (modified from 301) Power Architect 2014-03-02 05:22:23.460



Electrical Procurement BOM






Manufacturer	Part Number	Description	Quantity	Budgetary Price	Footprint (mm ²)
Vishay-Semiconductor	BYS12-90-E3/TR	SMA	1	\$0.08	37
Kemet	C0603C104K3RACTU	0603	1	\$0.01	5
TDK	C1005X5R1A104K	0402	2	\$0.01	6
TDK	C2012X5R0J226M	0805	2	\$0.06	14
TDK	C3216X5R1C106M	1206	1	\$0.06	11
TDK	C3216X7R1H105K	1206	1	\$0.04	11
Vishay-Dale	CRCW0402100KFKED	0402	2	\$0.01	6
Vishay-Dale	CRCW040210K0FKED	0402	3	\$0.01	9
Vishay-Dale	CRCW0402130KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040213K0FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0402150KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0402200KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040222K1FKED	0402	2	\$0.01	6
Vishay-Dale	CRCW040237K4FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040249K9FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW0402649KFKED	0402	1	\$0.01	3
Vishay-Dale	CRCW040273K2FKED	0402	1	\$0.01	3
Vishay-Dale	CRCW04029K76FKED	0402	1	\$0.01	3
Stackpole Electronics Inc	CSR1206FK75L0	1206	1	\$0.10	11
MuRata	GRM033R71E181KA01D	0201	1	\$0.01	2
MuRata	GRM1555C1E5R1CA01D	0402	1	\$0.01	3
MuRata	GRM155R61A105KE15D	0402	2	\$0.01	6
MuRata	GRM155R71E822KA01D	0402	2	\$0.01	6
MuRata	GRM216R71H103KA01D	0805	1	\$0.01	7
MuRata	GRM219R61E106KA12	0805	2	\$0.06	14
MuRata	GRM21BR71H104KA01L	0805	1	\$0.01	7
MuRata	GRM31CR60J476ME19L	1206	2	\$0.12	22
MuRata	GRM31CR71H475KA12L	1206	1	\$0.10	11
MuRata	GRM32ER61E226KE15L	1210	2	\$0.28	29
Texas Instruments	LM25011MY/NOPB	MUC10A	1	\$0.95	24
Bourns	SDR0403-2R2ML	SDR0403	1	\$0.17	28
Bourns	SDR0403-3R3ML	SDR0403	1	\$0.17	28
Bourns	SRN8040-2R2Y	SRN8040	2	\$0.21	200
Bourns	SRR1260-390M	SRR1260	1	\$0.41	210
Texas Instruments	TPS54227DDAR	R-PDSO-G8	1	\$0.61	57
Texas Instruments	TPS54527DDAR	R-PDSO-G8	1	\$0.98	57
Texas Instruments	TPS62130RGTR	S-PVQFN-N16	1	\$1.25	25
Texas Instruments	TPS62170DSGR	S-PWSON-N8	1	\$0.73	10
Total			50	\$7.38	887

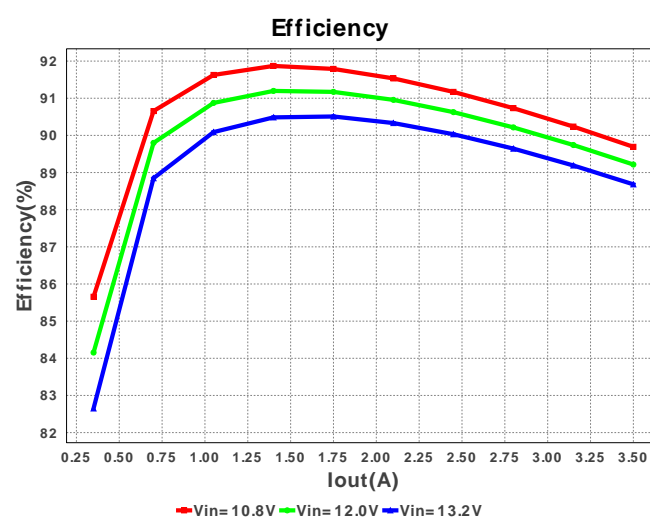
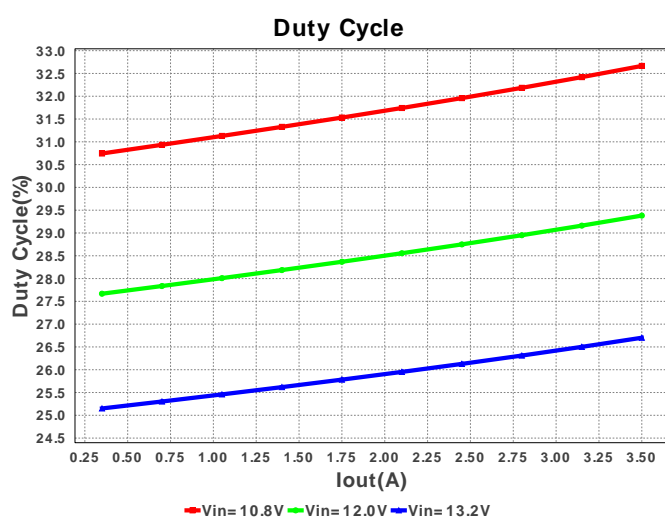
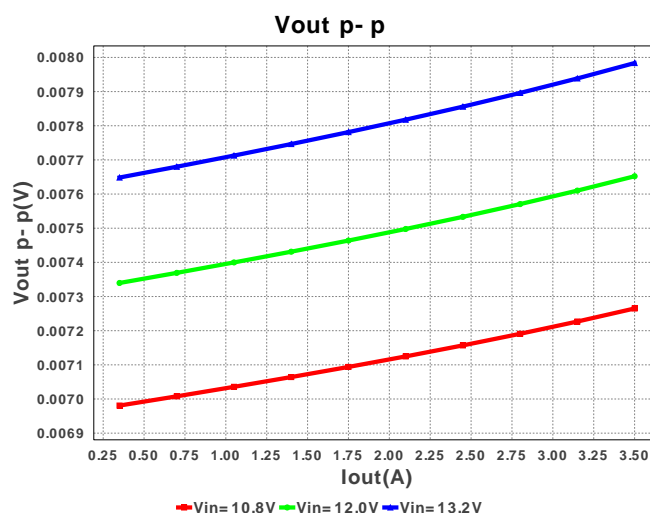
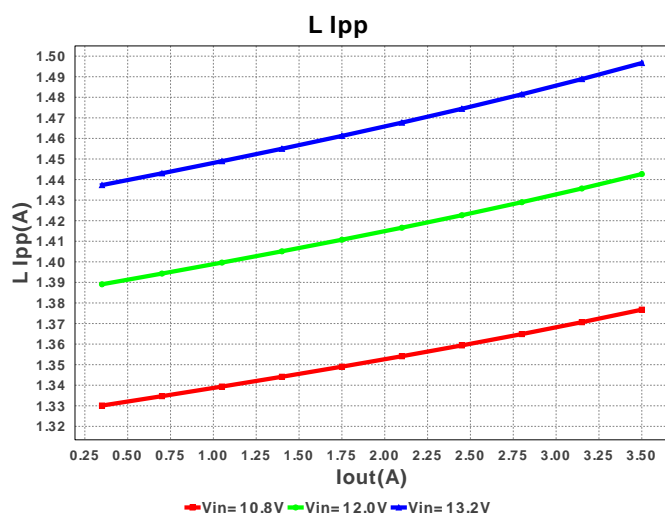
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Total Pd = 1.47W
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BOM Count = 11

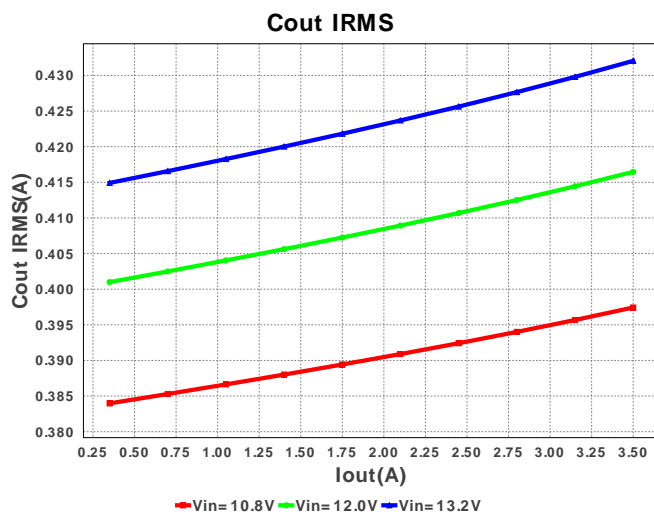
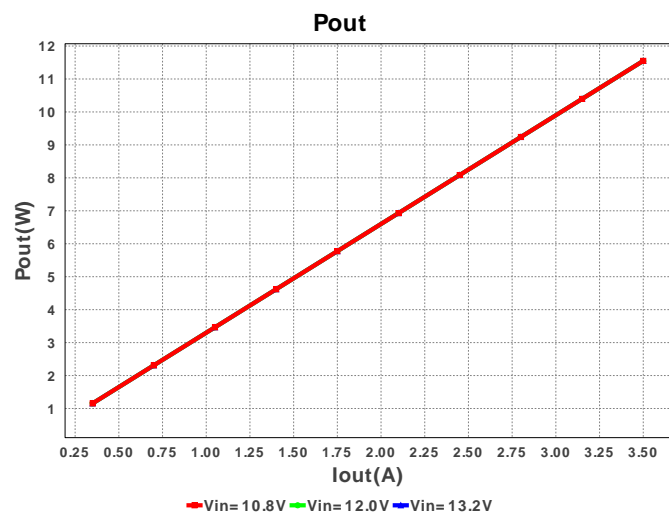
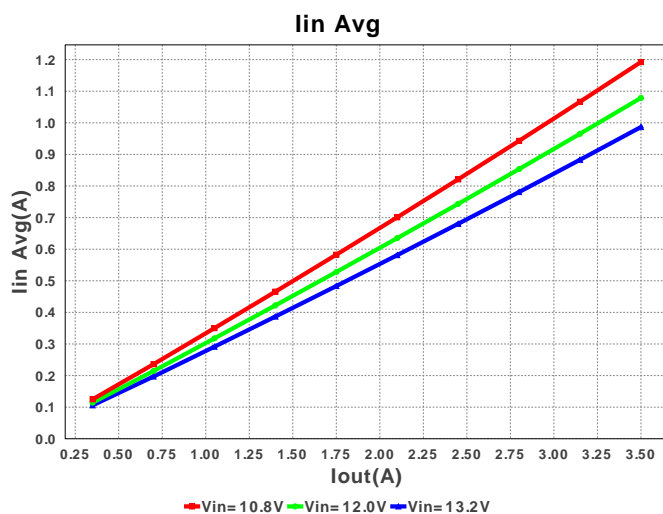
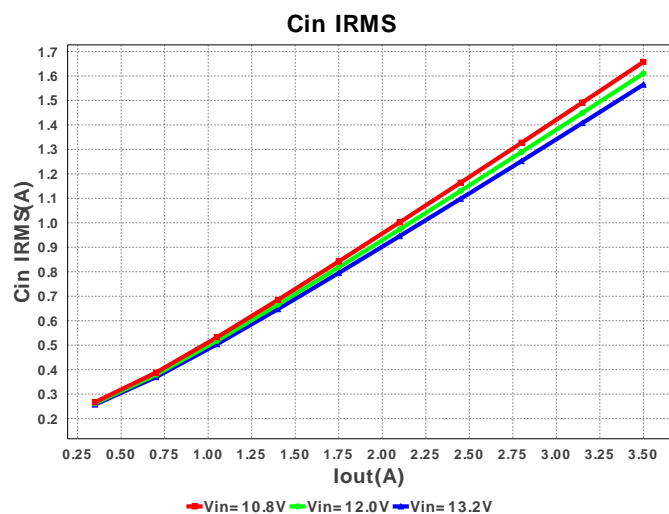
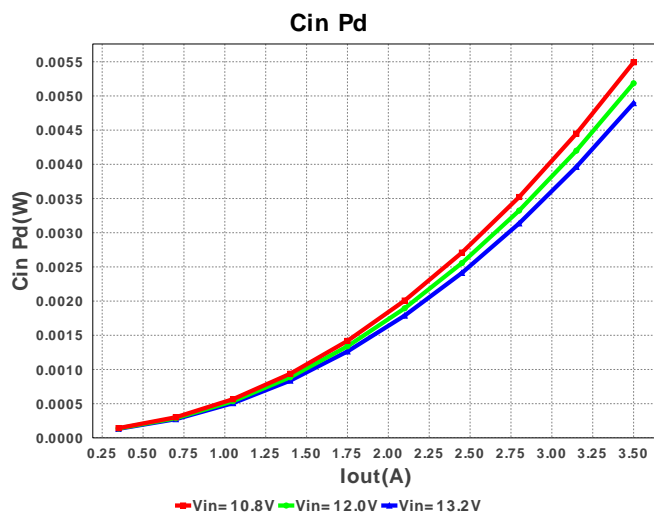
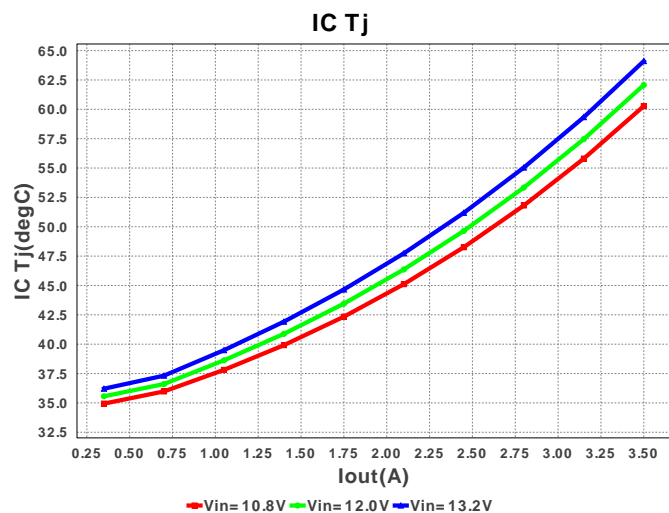
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TPS54527DDAR 10.8V-13.2V to 3.3V @ 3.5A

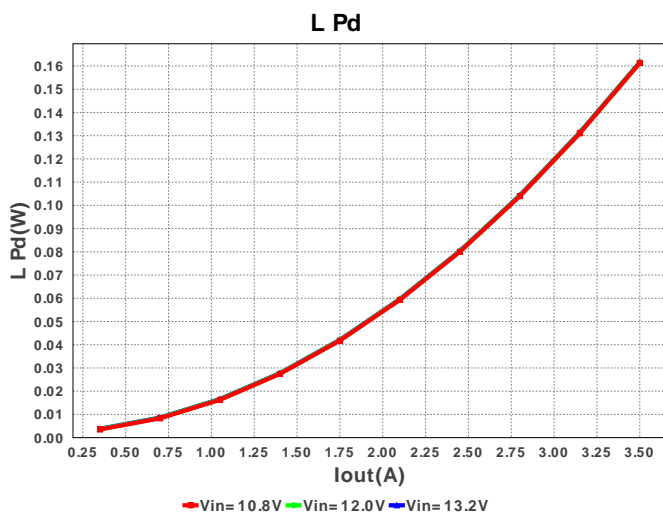
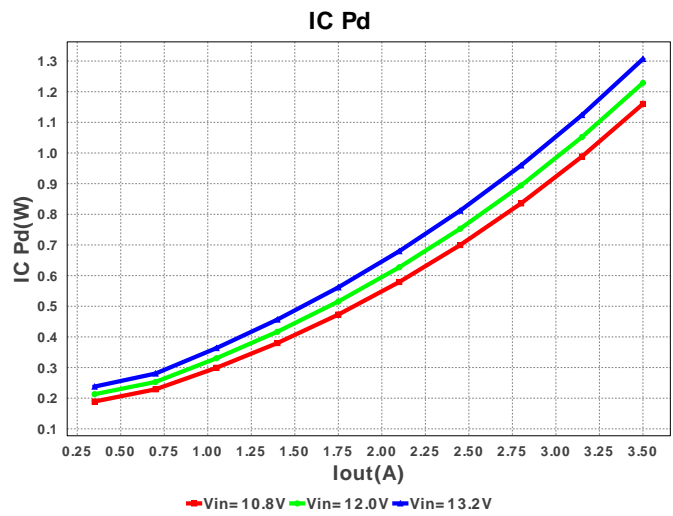
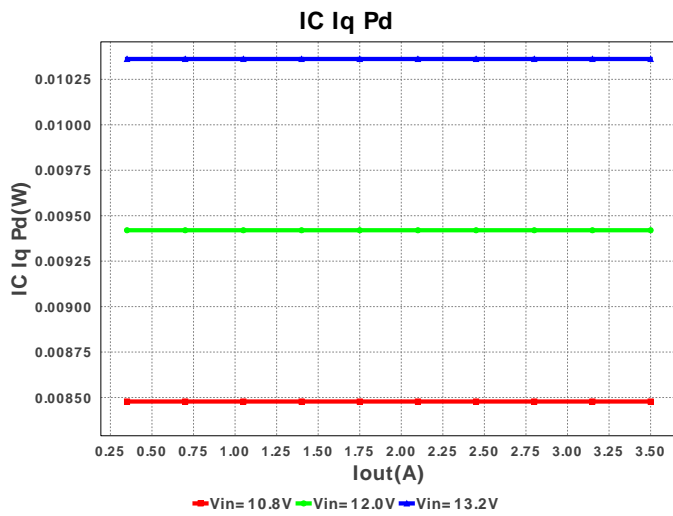
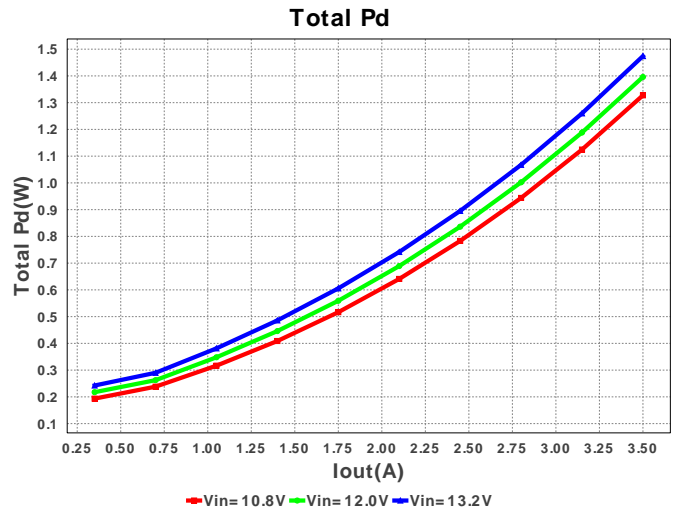
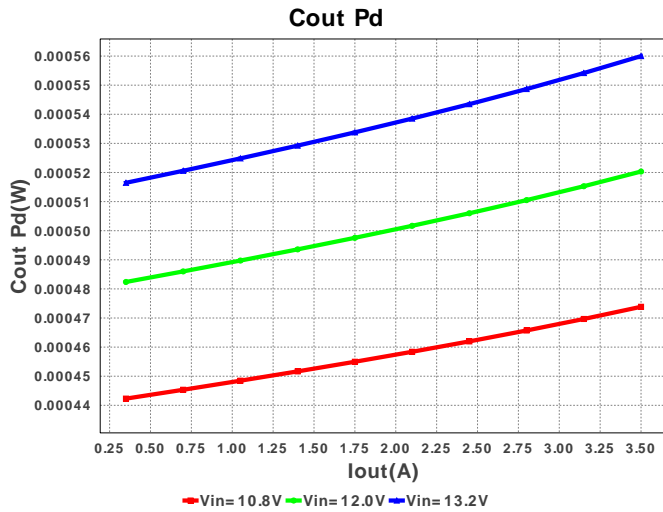


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#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	L1	Bourns	SRN8040-2R2Y	L= 2.2 μ H DCR= 13.0 mOhm	1	\$0.21	 SRN8040 100mm2
8.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
9.	Rfbb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
10.	Rfbt	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
11.	U1	Texas Instruments	TPS54527DDAR	Switcher	1	\$0.98	 R-PDSO-G8 57mm2







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.564 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	432.046 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	986.67 mA	Current	Average input current
4.	L Ipp	1.497 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	11	General	Total Design BOM count
6.	FootPrint	204.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	778.067 kHz	General	Switching frequency
8.	Pout	11.55 W	General	Total output power
9.	Total BOM	\$1.66	General	Total BOM Cost
10.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
11.	Duty Cycle	26.702 %	Op_point	Duty cycle

#	Name	Value	Category	Description
12.	Efficiency	88.682 %	Op_point	Steady state efficiency
13.	IC Tj	64.107 degC	Op_point	IC junction temperature
14.	ICThetaJA	43.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
15.	IOUT_OP	3.5 A	Op_point	Iout operating point
16.	VIN_OP	13.2 V	Op_point	Vin operating point
17.	Vout p-p	7.984 mV	Op_point	Peak-to-peak output ripple voltage
18.	Cin Pd	4.895 mW	Power	Input capacitor power dissipation
19.	Cout Pd	559.991 µW	Power	Output capacitor power dissipation
20.	IC Iq Pd	10.362 mW	Power	IC Iq Pd
21.	IC Pd	1.307 W	Power	IC power dissipation
22.	L Pd	161.677 mW	Power	Inductor power dissipation
23.	Total Pd	1.474 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.5 A	Maximum Output Current
2.	Iout1	3.5 Amps	Output Current #1
3.	VinMax	13.2 V	Maximum input voltage
4.	VinMin	10.8 V	Minimum input voltage
5.	Vout	3.3 V	Output Voltage
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	TPS54527	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. TPS54527 Product Folder : <http://www.ti.com/product/tps54527> : contains the data sheet and other resources.

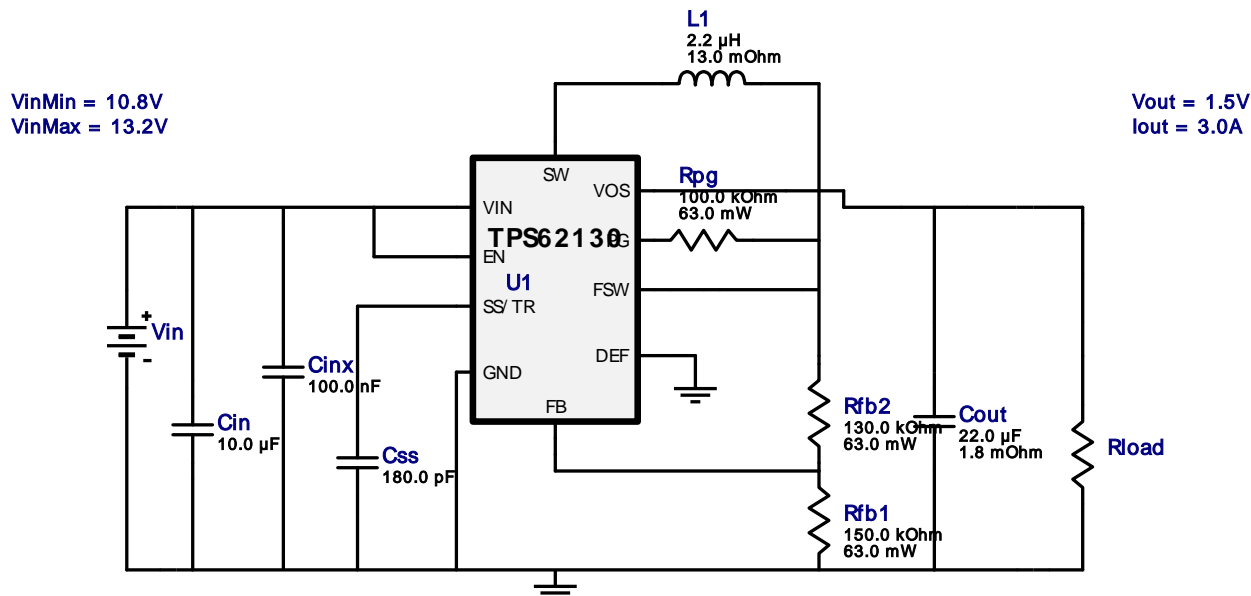


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 VinMax = 13.2V
 Vout = 1.5V
 Iout = 3.0A

Device = TPS62130RGTR
 Topology = Buck
 Created = 3/2/14 5:22:06 AM
 BOM Cost = \$1.63
 Total Pd = 1.07W
 Footprint = 154.0mm²
 BOM Count = 9


WEBENCH® Design Report

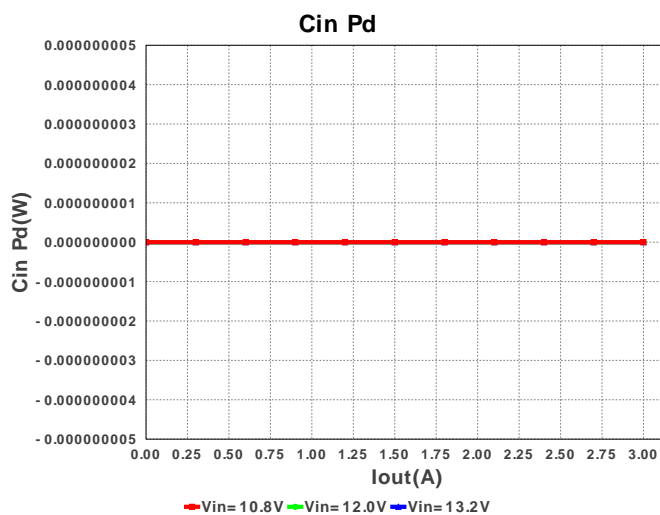
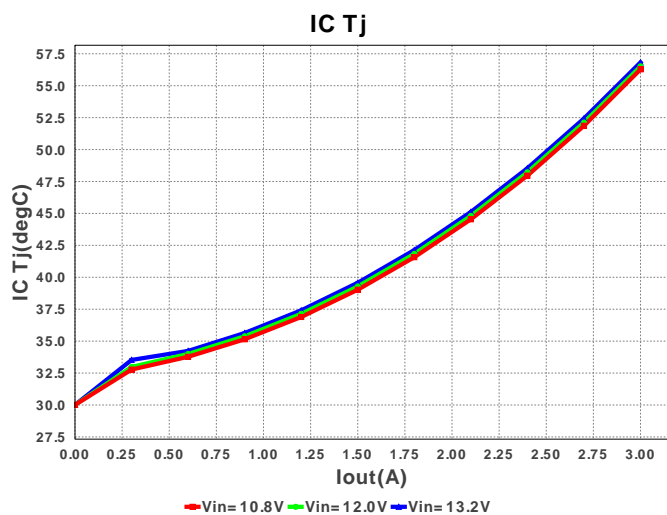
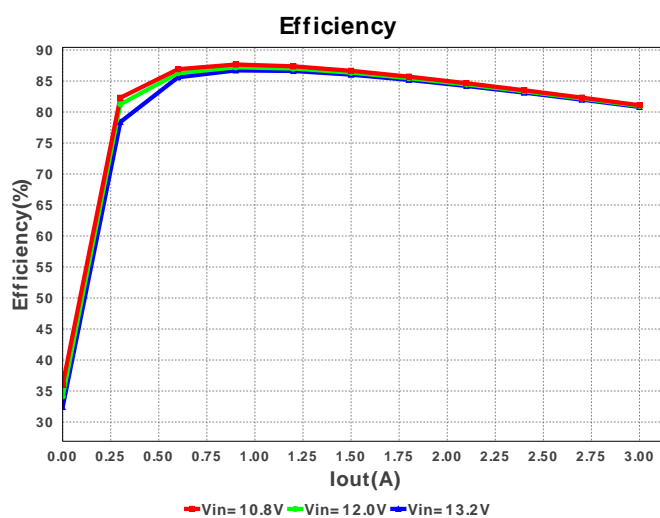
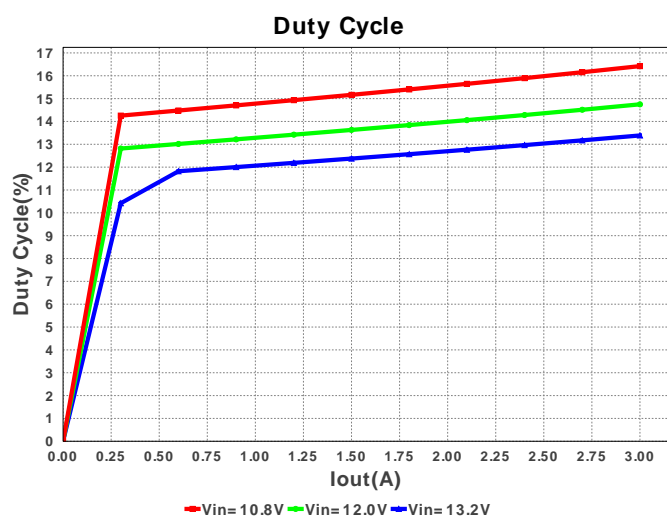
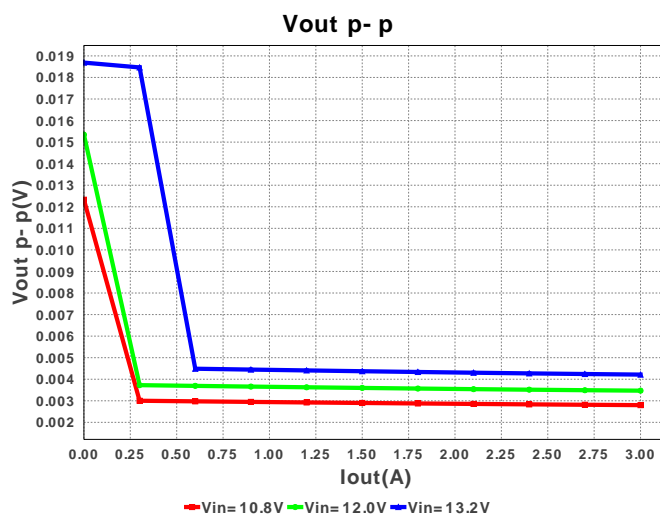
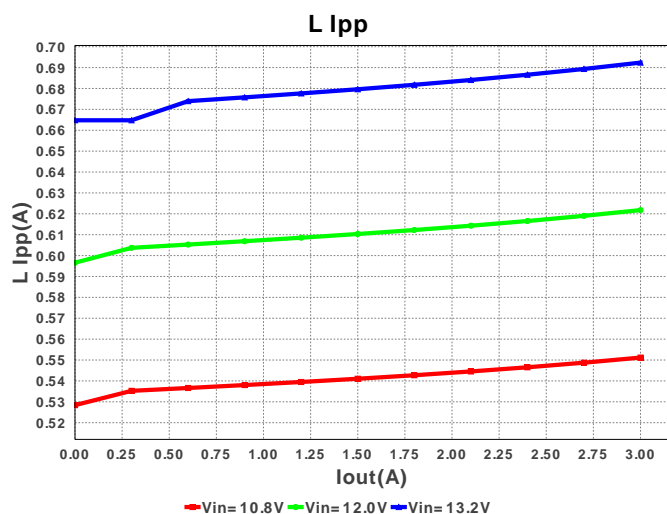
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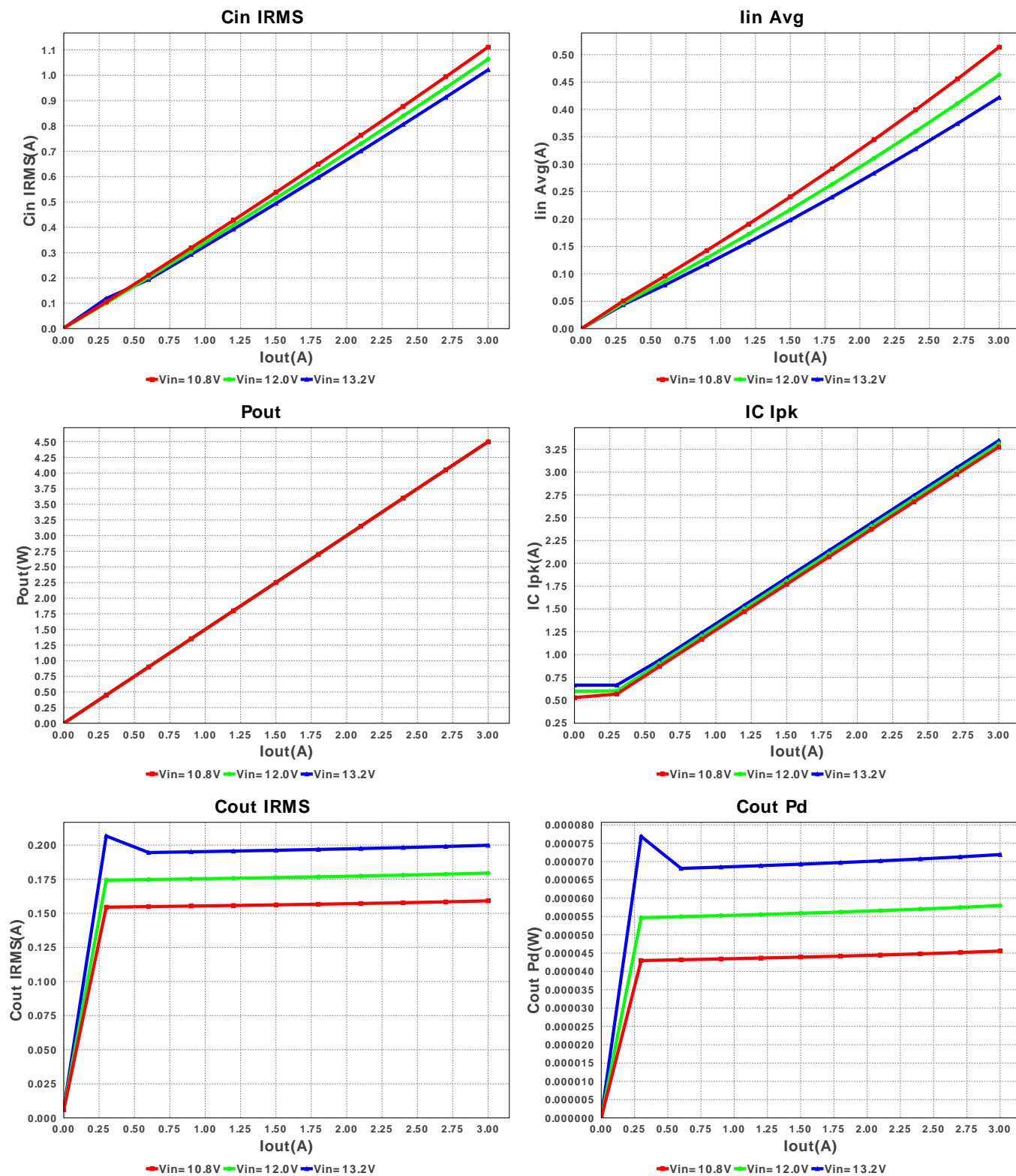


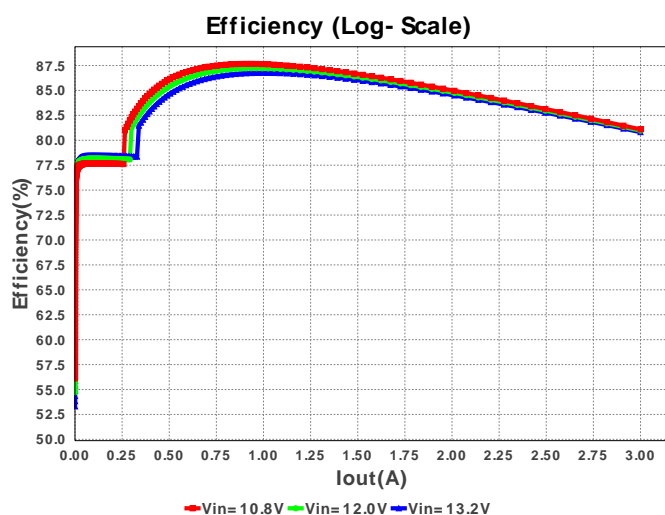
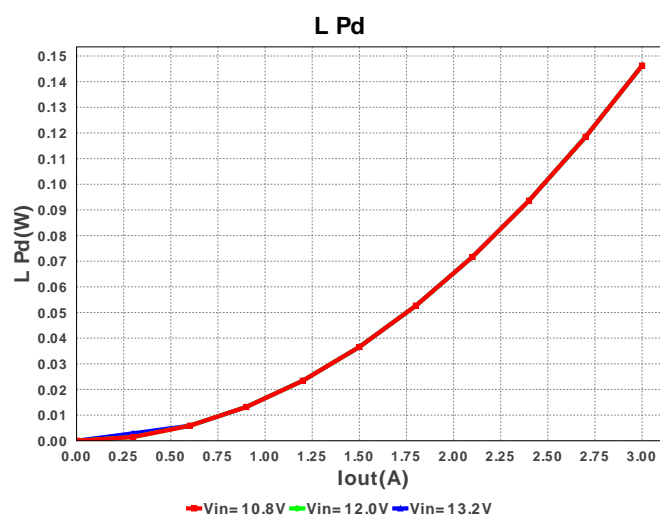
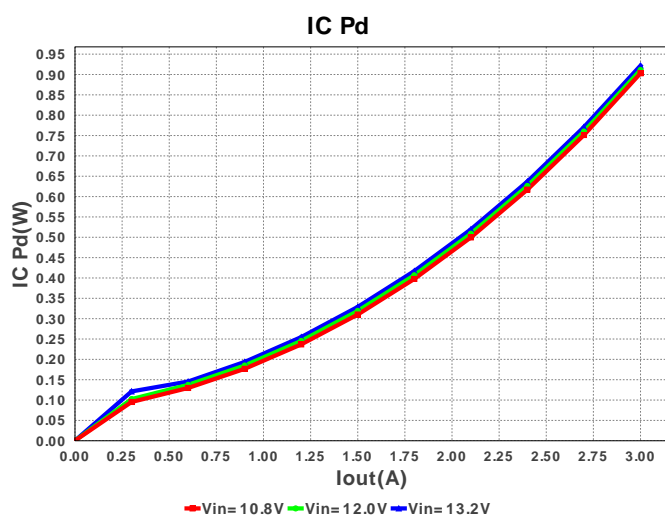
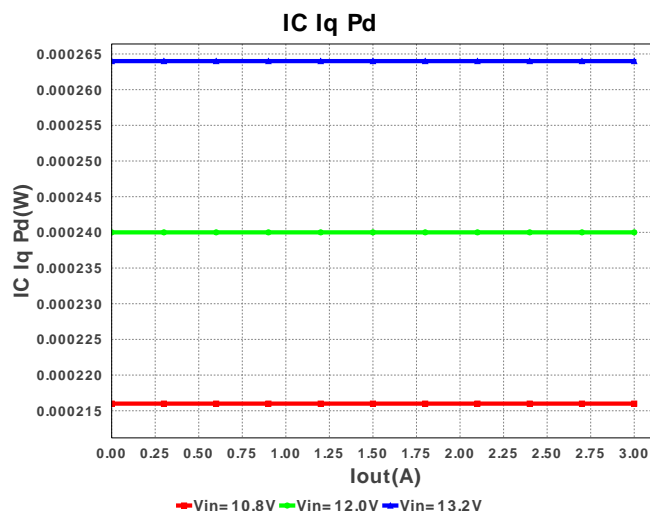
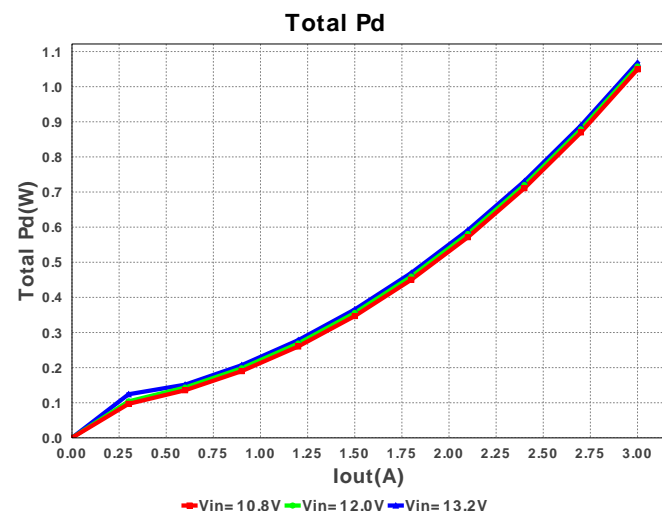
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM219R61E106KA12 Series= ?	Cap= 10.0 µF VDC= 25.0 V IRMS= 0.0 A	1	\$0.06	 0805 7mm ²
2.	Cinx	Kemet	C0603C104K3RACTU Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5mm ²
3.	Cout	TDK	C2012X5R0J226M Series= X5R	Cap= 22.0 µF ESR= 1.8 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.06	 0805 7mm ²
4.	Css	MuRata	GRM033R71E181KA01D Series= X7R	Cap= 180.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0201 2mm ²
5.	L1	Bourns	SRN8040-2R2Y	L= 2.2 µH DCR= 13.0 mOhm	1	\$0.21	 SRN8040 100mm ²
6.	Rfb1	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm ²
7.	Rfb2	Vishay-Dale	CRCW0402130KFKED Series= CRCW..e3	Res= 130.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm ²
8.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	TPS62130RGTR	Switcher	1	\$1.25	 S-PVQFN-N16 25mm2







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.022 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	199.874 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	3.346 A	Current	Peak switch current in IC
4.	Iin Avg	421.83 mA	Current	Average input current
5.	L Ipp	692.382 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	154.0 mm2	General	Total Foot Print Area of BOM components
8.	Frequency	1.028 MHz	General	Switching frequency
9.	Pout	4.5 W	General	Total output power
10.	Total BOM	\$1.63	General	Total BOM Cost
11.	Vout OP	1.5 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
12.	Duty Cycle	13.387 %	Op_point	Duty cycle
13.	Efficiency	80.817 %	Op_point	Steady state efficiency
14.	IC Tj	56.826 degC	Op_point	IC junction temperature
15.	ICThetaJA	29.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	3.0 A	Op_point	Iout operating point
17.	VIN_OP	13.2 V	Op_point	Vin operating point
18.	Vout p-p	4.215 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
20.	Cout Pd	71.909 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	264.0 µW	Power	IC Iq Pd
22.	IC Pd	921.843 mW	Power	IC power dissipation
23.	L Pd	146.25 mW	Power	Inductor power dissipation
24.	Total Pd	1.068 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.0 A	Maximum Output Current
2.	Iout1	3.0 Amps	Output Current #1
3.	VinMax	13.2 V	Maximum input voltage
4.	VinMin	10.8 V	Minimum input voltage
5.	Vout	1.5 V	Output Voltage
6.	Vout1	1.5 Volt	Output Voltage #1
7.	base_pn	TPS62130	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with upto 3A output current, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 6VSelectable operating frequency, Optional Softstart Capacitor for slow startup, Tracking,Pin selectable output voltage (nominal, +5%) Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. TPS62130 Product Folder : <http://www.ti.com/product/tps62130> : contains the data sheet and other resources.



WEBENCH® Design Report

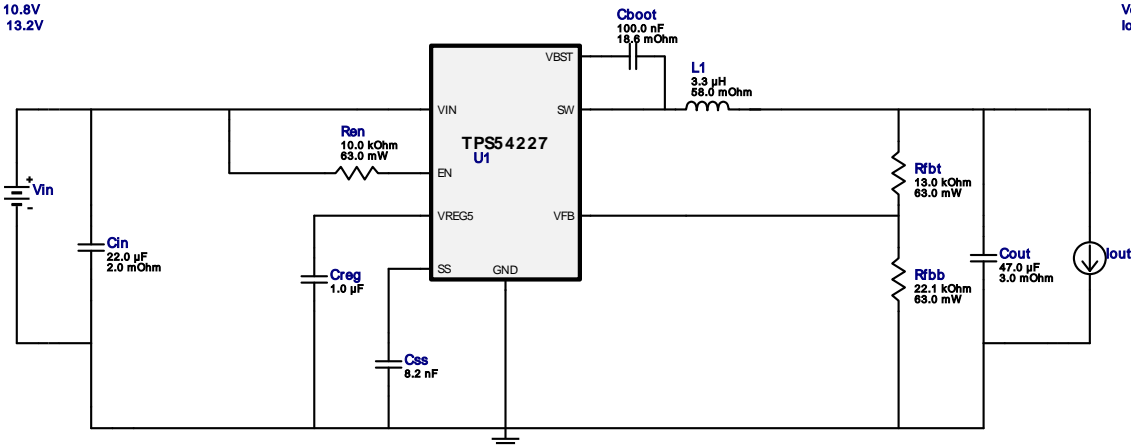
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TPS54227DDAR 10.8V-13.2V to 1.2V @ 1.0A

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VinMax = 13.2V
Vout = 1.2V
Iout = 1.0A

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Topology = Buck
Created = 3/2/14 5:22:07 AM
BOM Cost = \$1.24
Total Pd = 0.32W
Footprint = 129.0mm2
BOM Count = 10

VinMin = 10.8V
VinMax = 13.2V

Vout = 1.2V
Iout = 1.0A



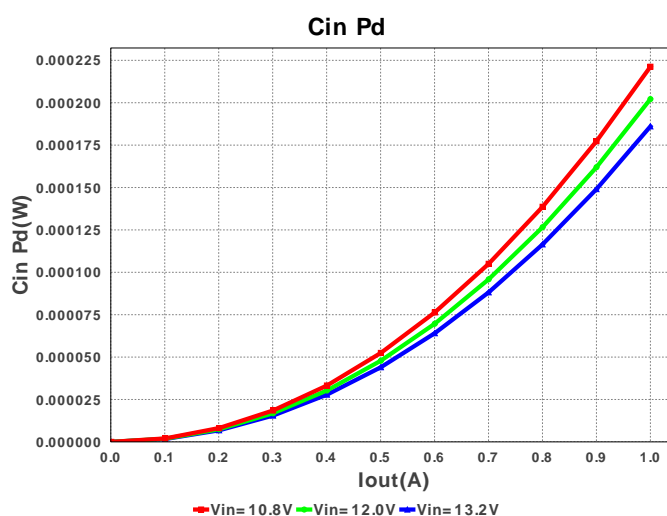
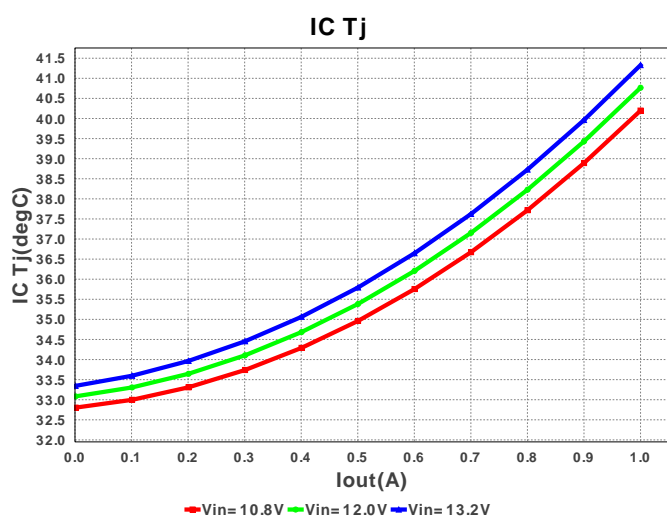
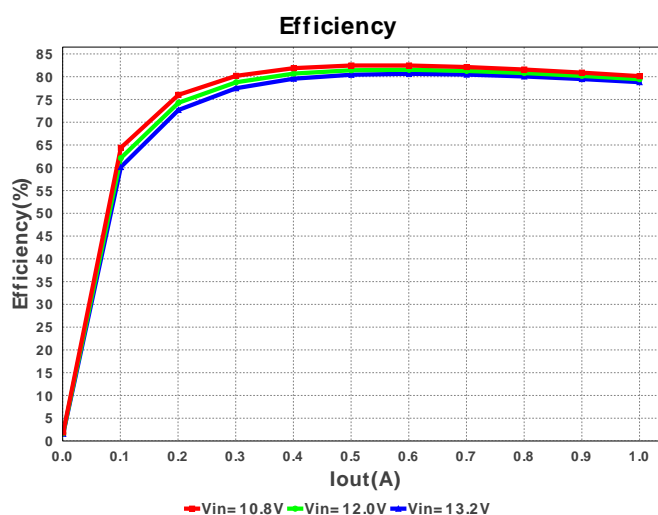
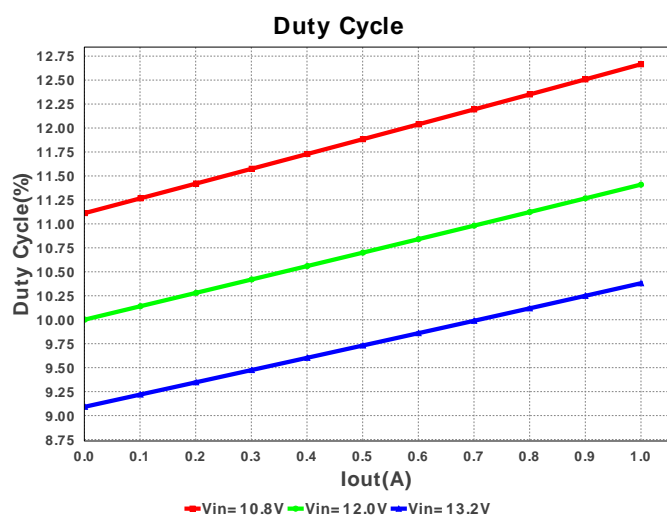
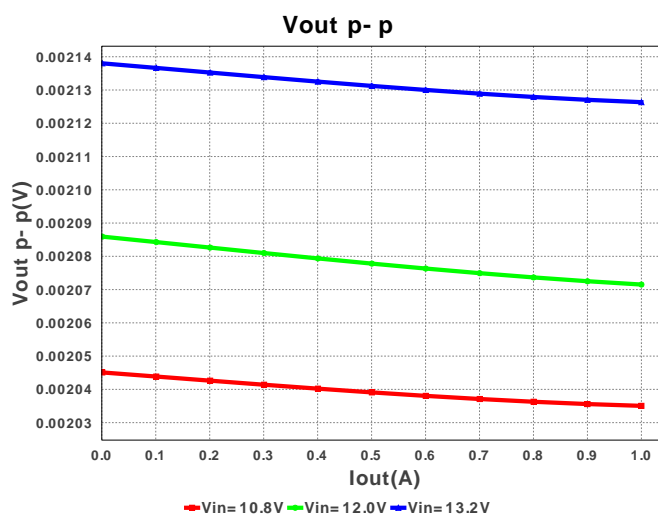
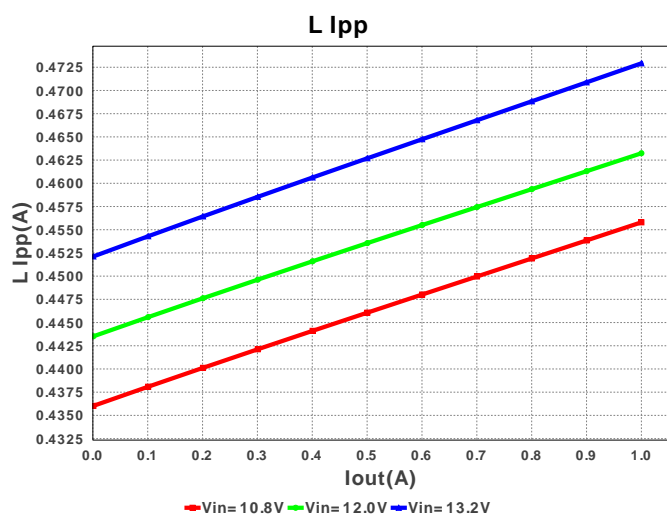
Electrical BOM

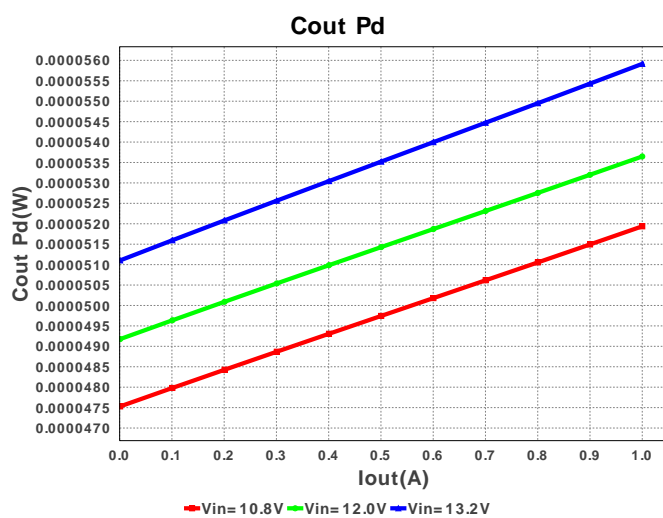
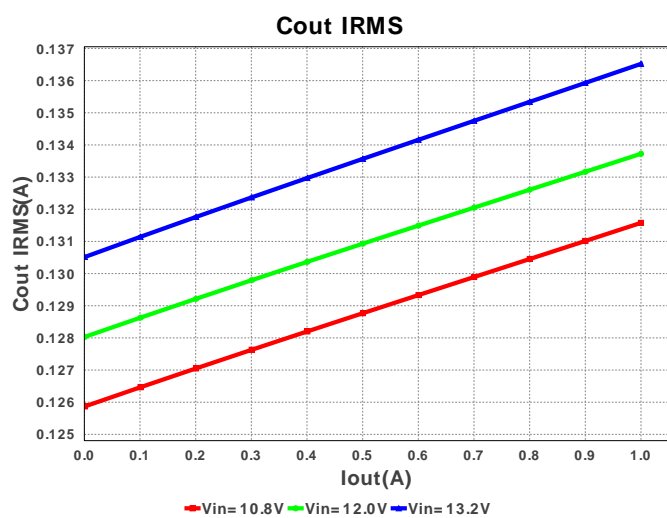
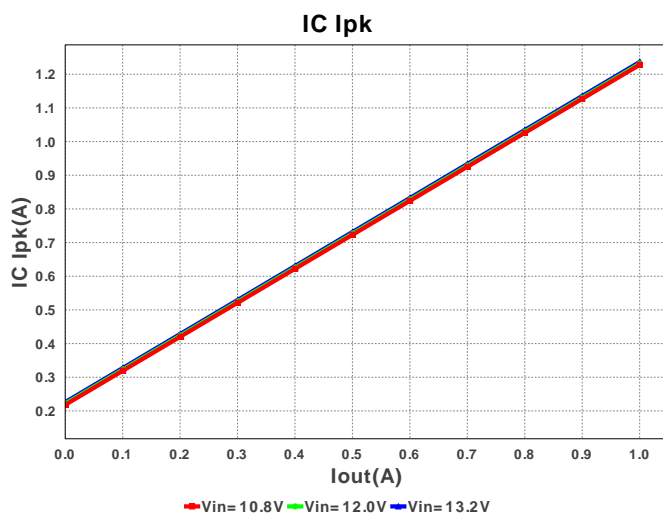
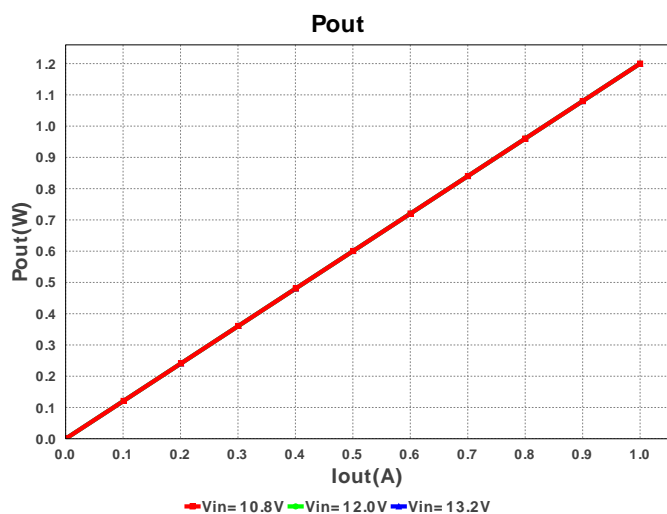
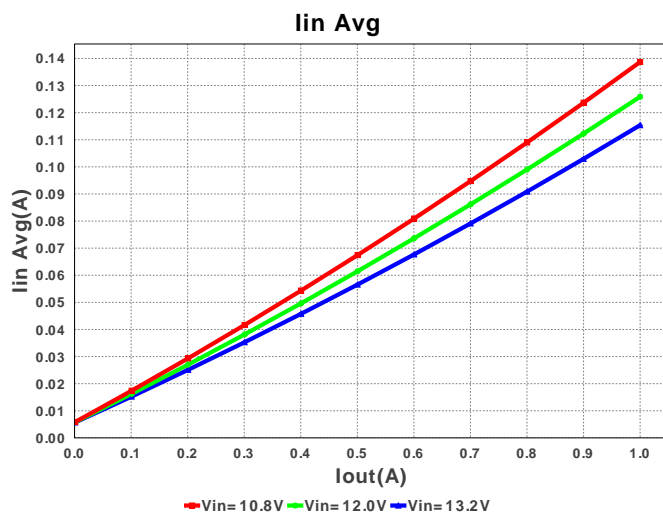
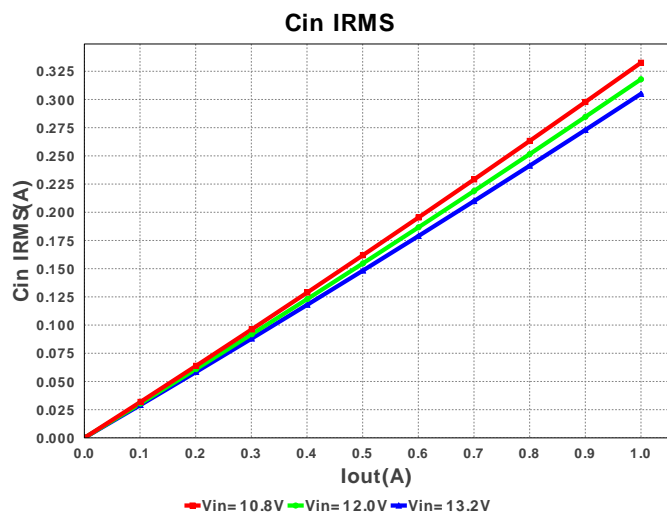
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	C1005X5R1A104K Series= X5R	Cap= 100.0 nF ESR= 18.6 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
2.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	\$0.28	1210 15mm2
3.	Cout	MuRata	GRM31CR60J476ME19L Series= X5R	Cap= 47.0 uF ESR= 3.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.12	1206 11mm2
4.	Creg	MuRata	GRM155R61A105KE15D Series= X5R	Cap= 1.0 uF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
5.	Css	MuRata	GRM155R71E822KA01D Series= X7R	Cap= 8.2 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
6.	L1	Bourns	SDR0403-3R3ML	L= 3.3 uH DCR= 58.0 mOhm	1	\$0.17	SDR0403 28mm2
7.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
8.	Rfb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
9.	Rfbt	Vishay-Dale	CRCW040213K0FKED Series= CRCW..e3	Res= 13.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2

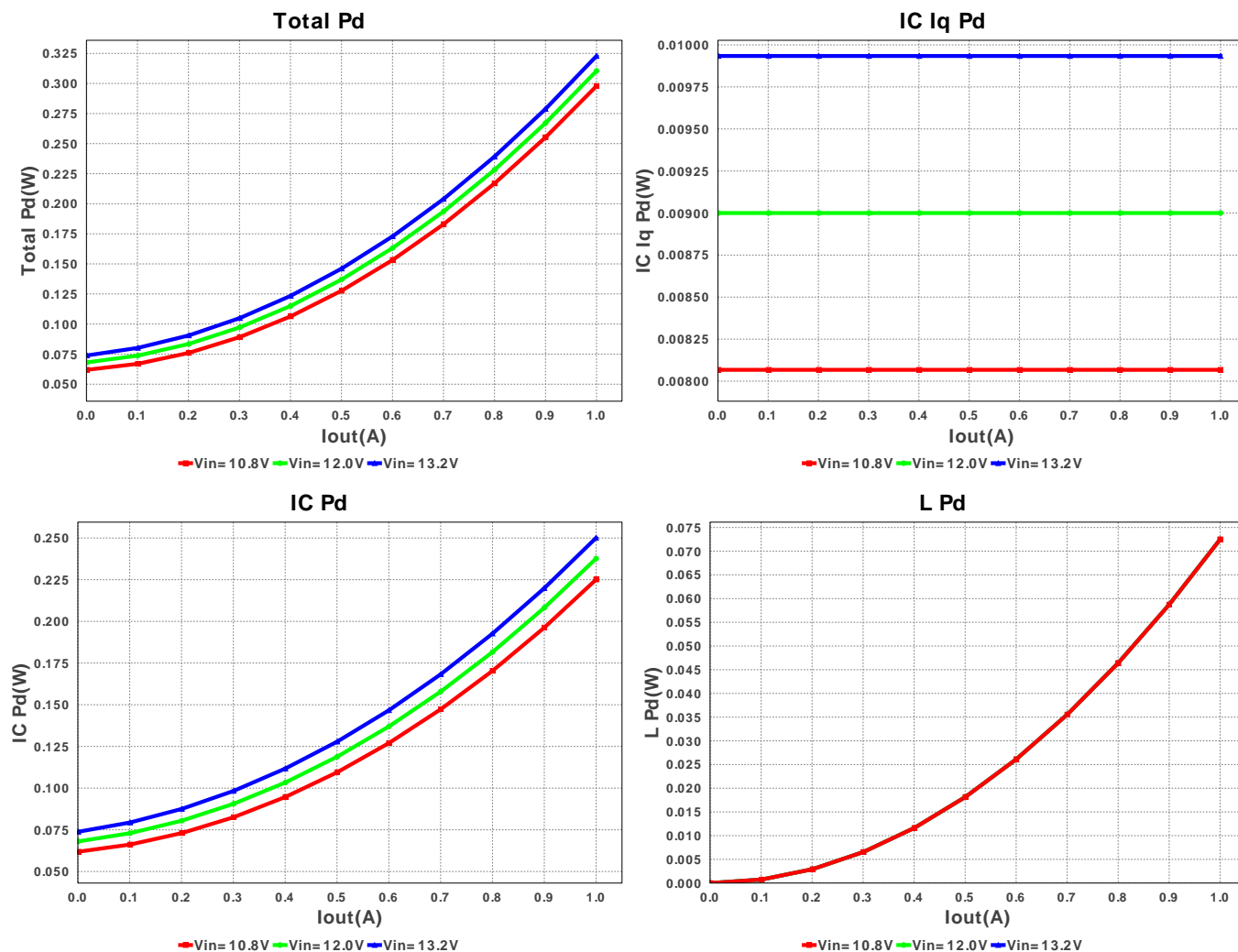
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	TPS54227DDAR	Switcher	1	\$0.61	



R-PDSO-G8 57mm2







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	305.01 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	136.521 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.236 A	Current	Peak switch current in IC
4.	Iin Avg	115.37 mA	Current	Average input current
5.	L Ipp	472.923 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	10	General	Total Design BOM count
7.	FootPrint	129.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	798.187 kHz	General	Switching frequency
9.	Pout	1.2 W	General	Total output power
10.	Total BOM	\$1.24	General	Total BOM Cost
11.	Vout OP	1.2 V	Op_Point	Operational Output Voltage
12.	Duty Cycle	10.381 %	Op_point	Duty cycle
13.	Efficiency	78.8 %	Op_point	Steady state efficiency
14.	IC Tj	41.329 degC	Op_point	IC junction temperature
15.	ICThetaJA	45.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	1.0 A	Op_point	Iout operating point
17.	VIN_OP	13.2 V	Op_point	Vin operating point
18.	Vout p-p	2.126 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	186.063 μ W	Power	Input capacitor power dissipation
20.	Cout Pd	55.914 μ W	Power	Output capacitor power dissipation
21.	IC Iq Pd	9.934 mW	Power	IC Iq Pd
22.	IC Pd	250.093 mW	Power	IC power dissipation
23.	L Pd	72.5 mW	Power	Inductor power dissipation
24.	Total Pd	322.851 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.0 A	Maximum Output Current
2.	Iout1	1.0 Amps	Output Current #1
3.	VinMax	13.2 V	Maximum input voltage

#	Name	Value	Description
4.	VinMin	10.8 V	Minimum input voltage
5.	Vout	1.2 V	Output Voltage
6.	Vout1	1.2 Volt	Output Voltage #1
7.	base_pn	TPS54227	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. TPS54227 Product Folder : <http://www.ti.com/product/tps54227> : contains the data sheet and other resources.

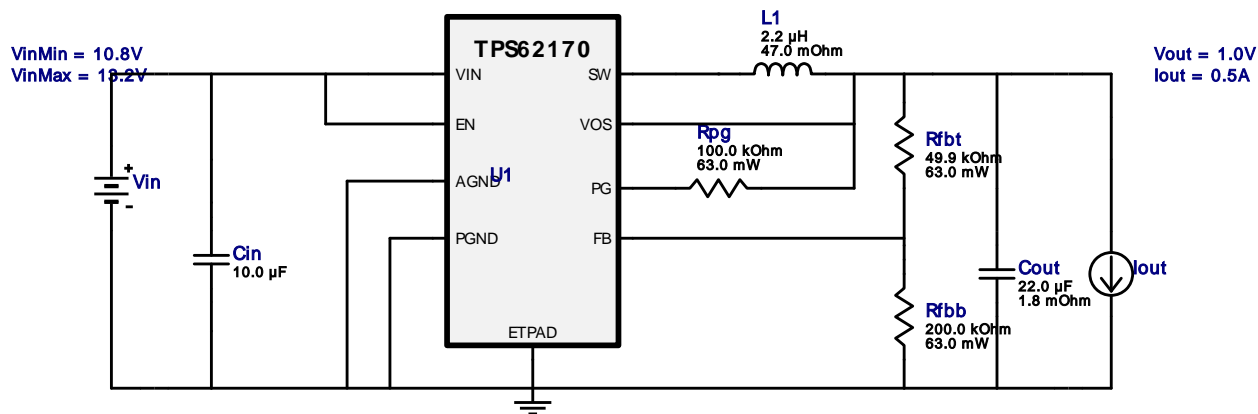


VinMin = 10.8V
 VinMax = 13.2V
 Vout = 1.0V
 Iout = 0.5A








Device = TPS62170DSGR
 Topology = Buck
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 BOM Cost = \$1.05
 Total Pd = 0.18W
 Footprint = 60.0mm2
 BOM Count = 7

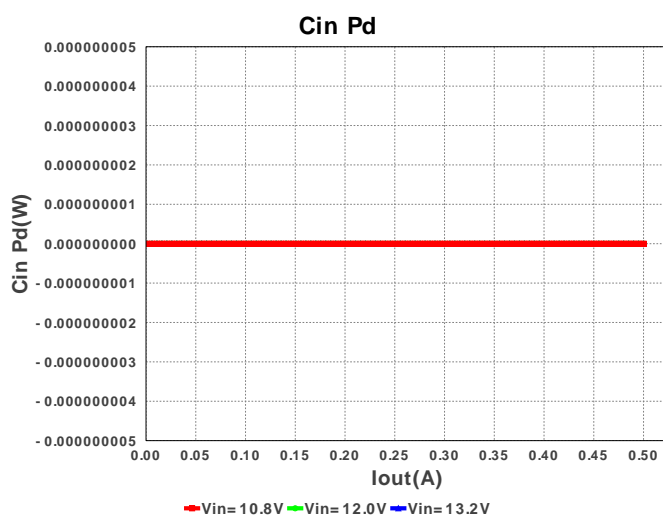
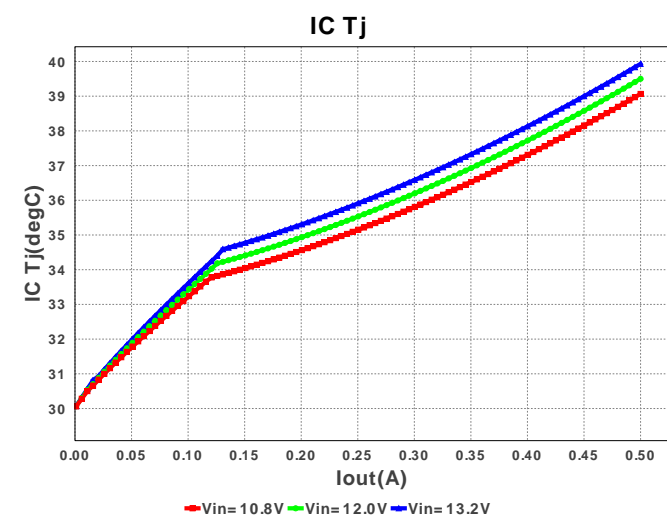
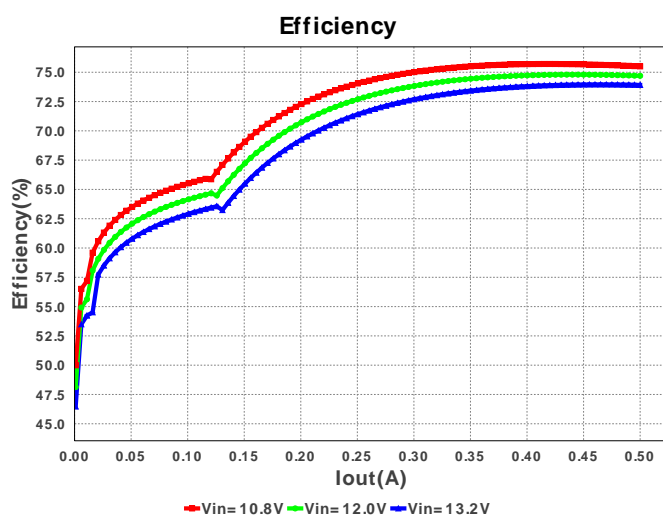
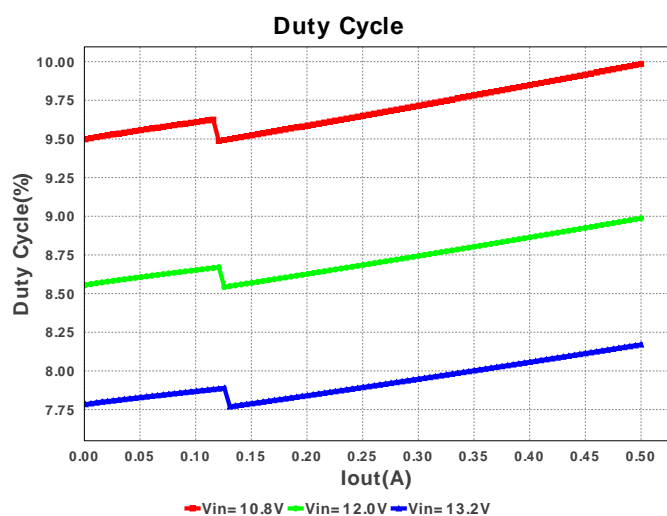
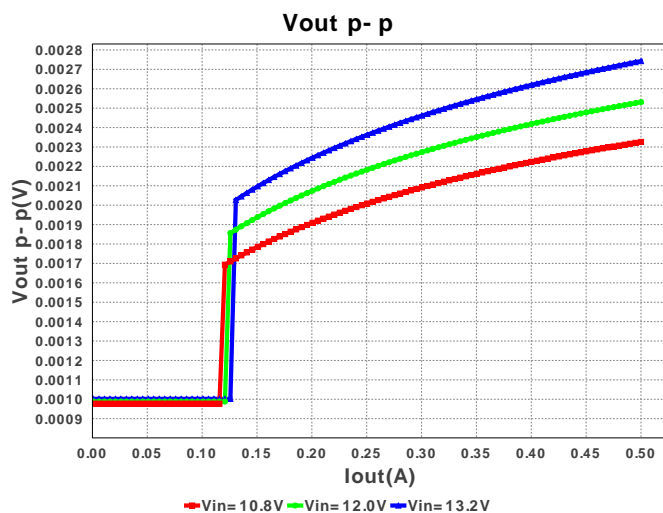
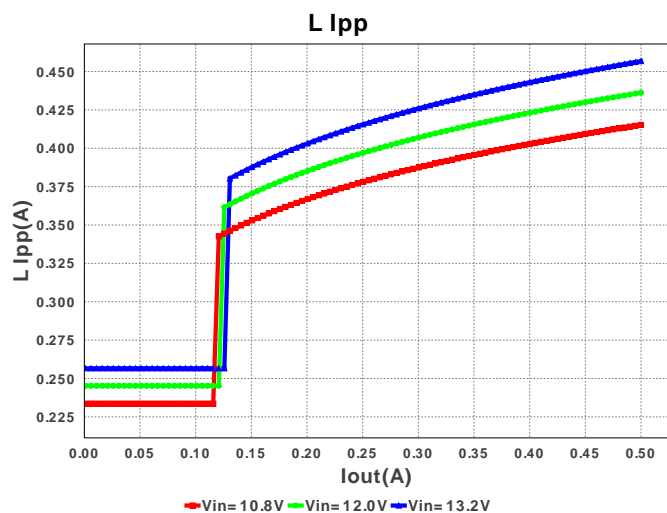
WEBENCH® Design Report

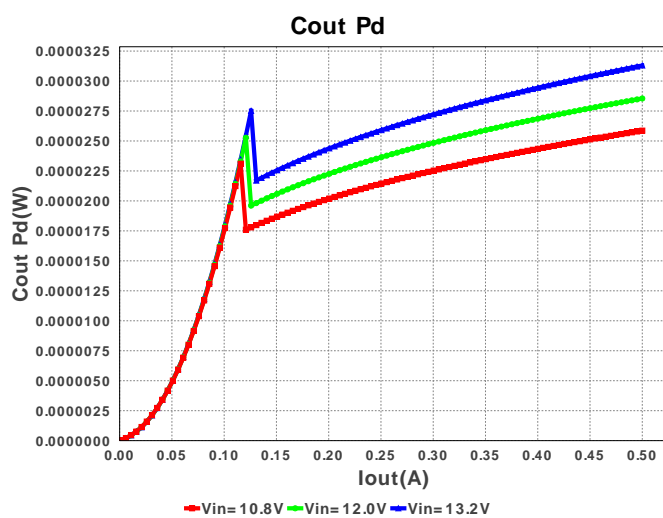
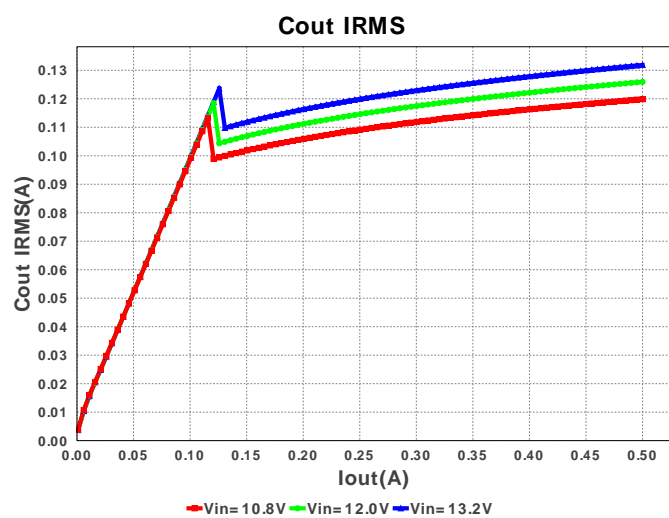
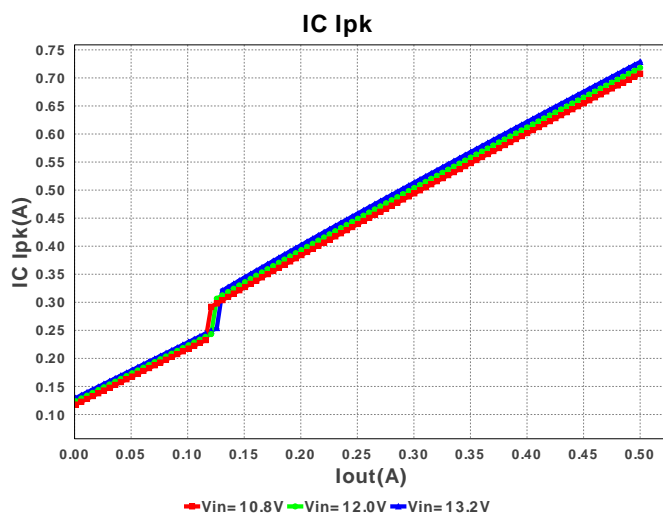
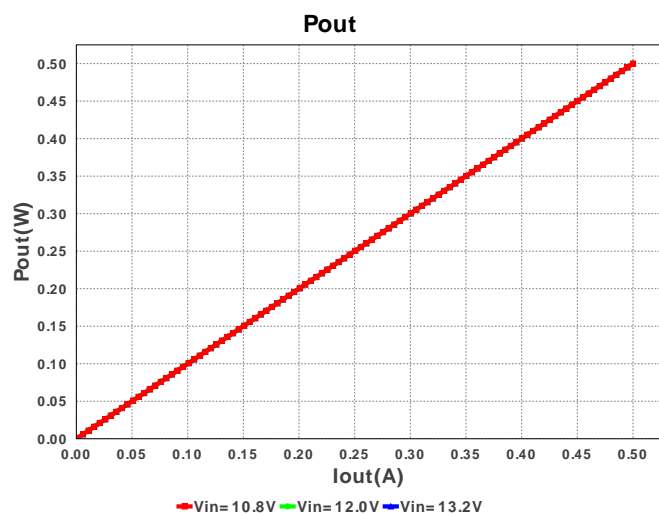
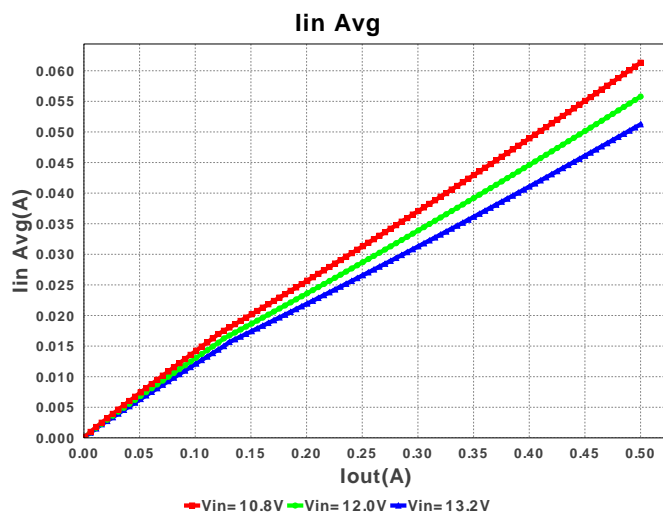
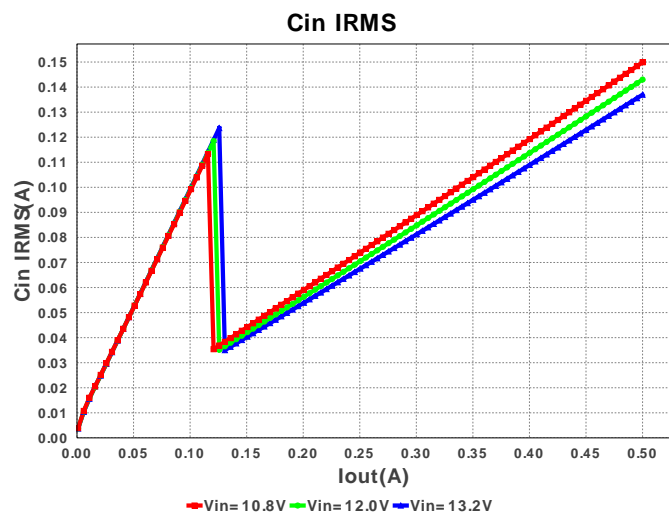
Design : 1382630/445 TPS62170DSGR
 TPS62170DSGR 10.8V-13.2V to 1.0V @ 0.5A

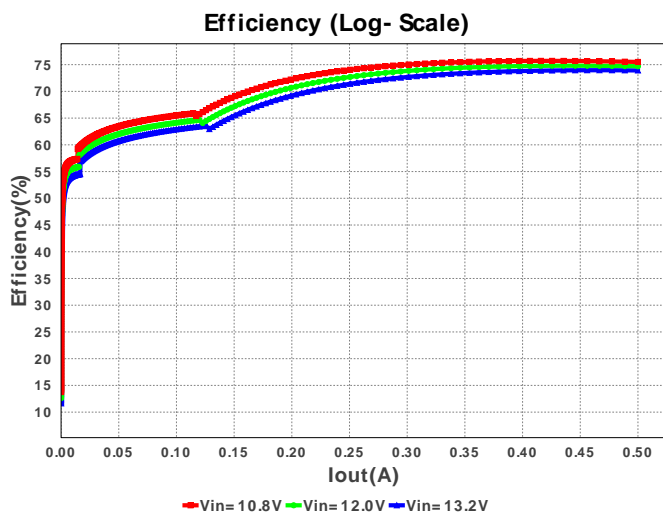
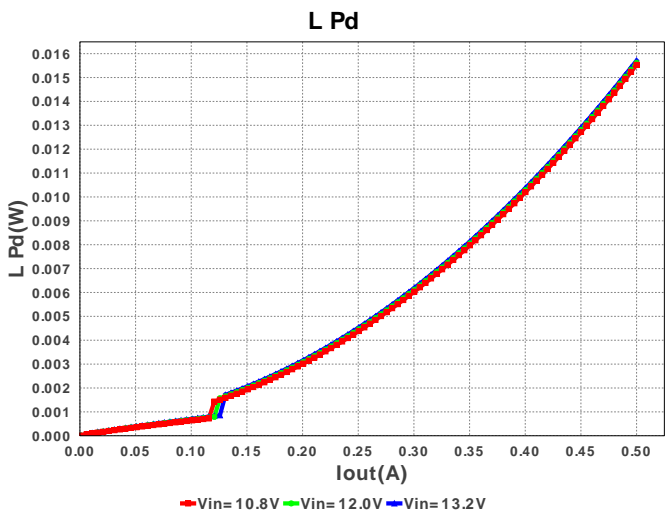
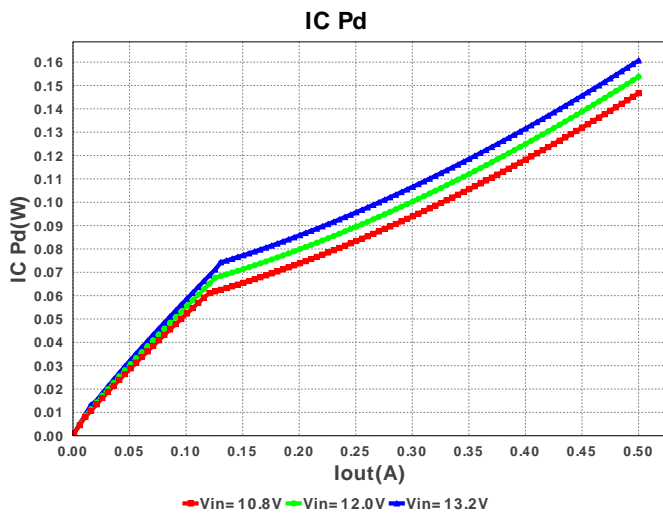
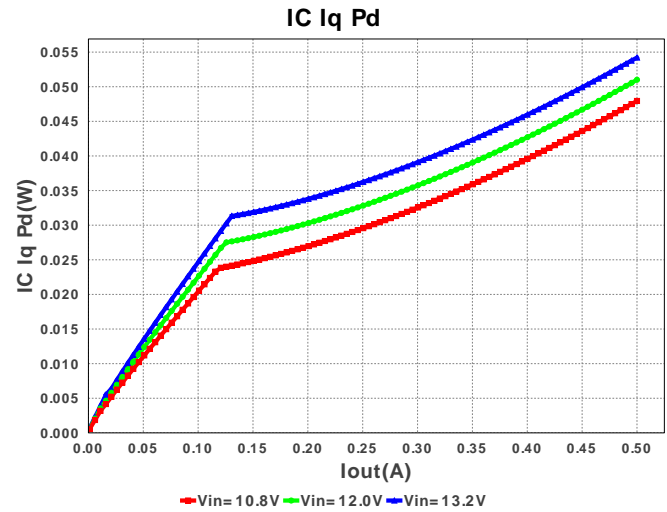
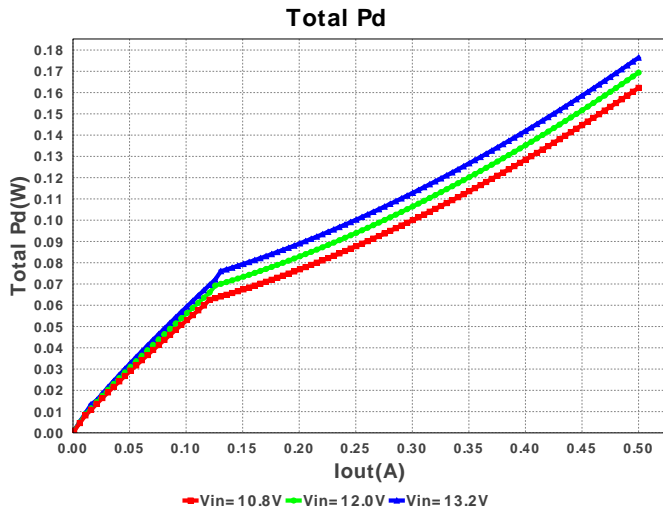


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM219R61E106KA12 Series= ?	Cap= 10.0 µF VDC= 25.0 V IRMS= 0.0 A	1	\$0.06	 0805 7mm2
2.	Cout	TDK	C2012X5R0J226M Series= X5R	Cap= 22.0 µF ESR= 1.8 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.06	 0805 7mm2
3.	L1	Bourns	SDR0403-2R2ML	L= 2.2 µH DCR= 47.0 mOhm	1	\$0.17	 SDR0403 28mm2
4.	Rfbb	Vishay-Dale	CRCW0402200KFKED Series= CRCW..e3	Res= 200.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
5.	Rfbt	Vishay-Dale	CRCW040249K9FKED Series= CRCW..e3	Res= 49.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
6.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
7.	U1	Texas Instruments	TPS62170DSGR	Switcher	1	\$0.73	 S-PWSON-N8 10mm2







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	136.961 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	131.862 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	728.391 mA	Current	Peak switch current in IC
4.	Iin Avg	51.245 mA	Current	Average input current
5.	L Ipp	456.782 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	7	General	Total Design BOM count
7.	FootPrint	60.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	1.645 MHz	General	Switching frequency
9.	Pout	500.0 mW	General	Total output power
10.	Total BOM	\$1.05	General	Total BOM Cost
11.	Vout OP	1.0 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
12.	Duty Cycle	8.171 %	Op_point	Duty cycle
13.	Efficiency	73.917 %	Op_point	Steady state efficiency
14.	IC Tj	39.931 degC	Op_point	IC junction temperature
15.	ICThetaJA	61.8 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	500.0 mA	Op_point	Iout operating point
17.	VIN_OP	13.2 V	Op_point	Vin operating point
18.	Vout p-p	2.742 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
20.	Cout Pd	31.297 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	54.214 mW	Power	IC Iq Pd
22.	IC Pd	160.696 mW	Power	IC power dissipation
23.	L Pd	15.709 mW	Power	Inductor power dissipation
24.	Total Pd	176.434 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 mA	Maximum Output Current
2.	Iout1	500.0 mAmps	Output Current #1
3.	VinMax	13.2 V	Maximum input voltage
4.	VinMin	10.8 V	Minimum input voltage
5.	Vout	1.0 V	Output Voltage
6.	Vout1	1.0 Volt	Output Voltage #1
7.	base_pn	TPS62170	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with upto 0.5A output current, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 6V, Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. TPS62170 Product Folder : <http://www.ti.com/product/tps62170> : contains the data sheet and other resources.

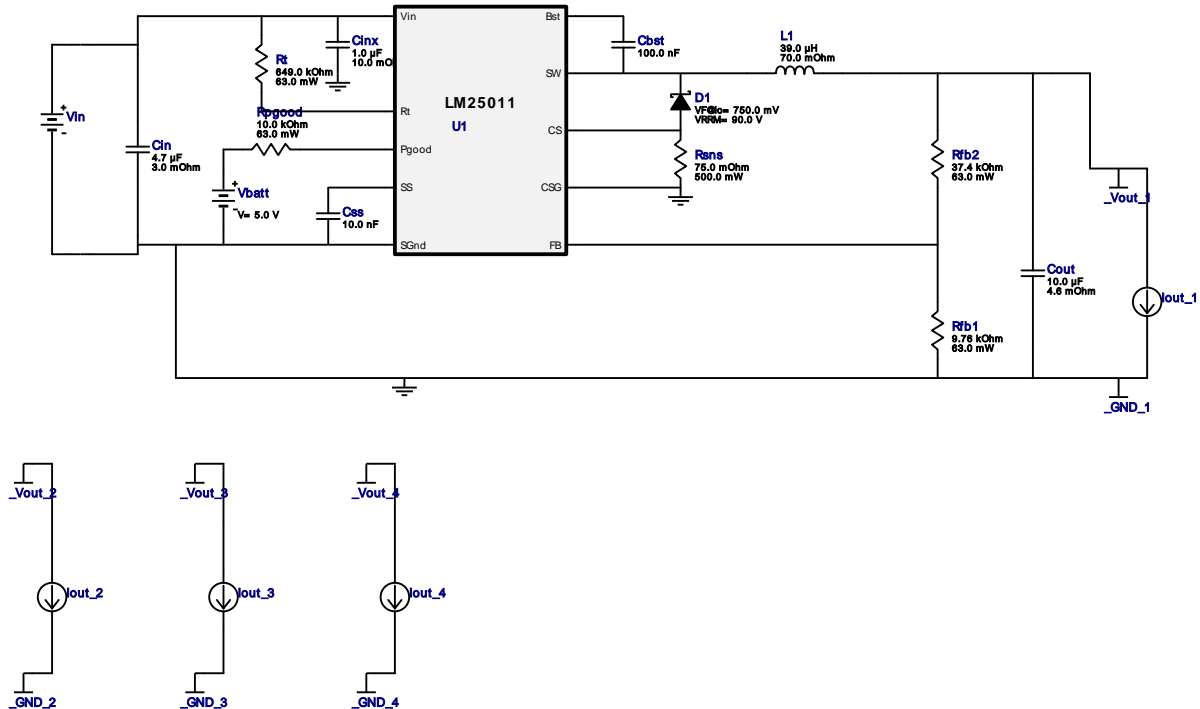


VinMin = 18.0V
VinMax = 32.0V
Vout = 12.0V
Iout = 1.58A

Device = LM25011MY/NOPB
Topology = Buck
Created = 3/2/14 5:22:12 AM
BOM Cost = \$1.80
Total Pd = 1.75W
Footprint = 340.0mm2
BOM Count = 13







WEBENCH[®] Design Report








Design : 1382630/446 LM25011MY/NOPB
LM25011MY/NOPB 18.0V-32.0V to 12.0V @ 1.575A

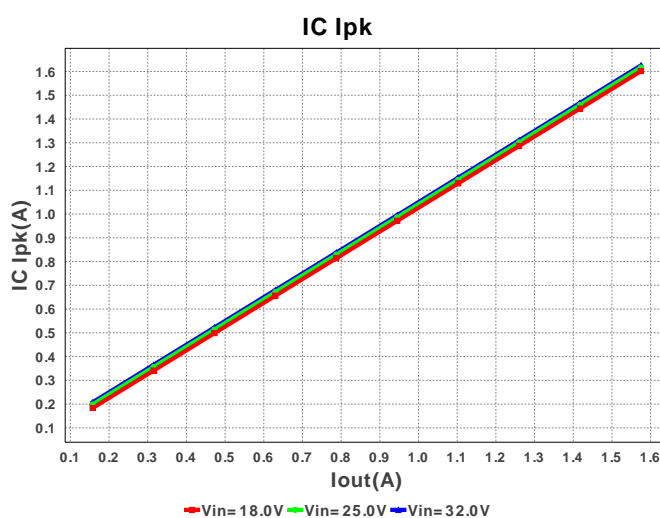
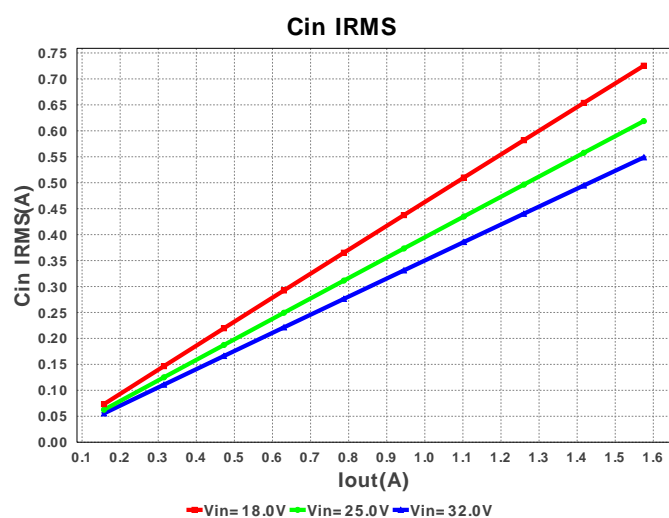
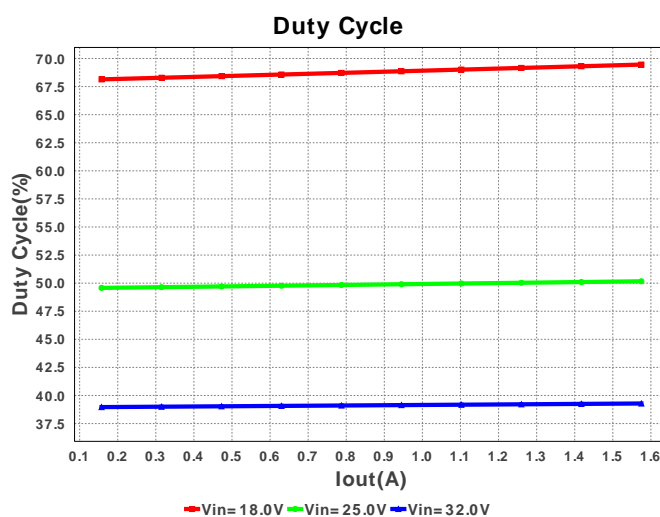
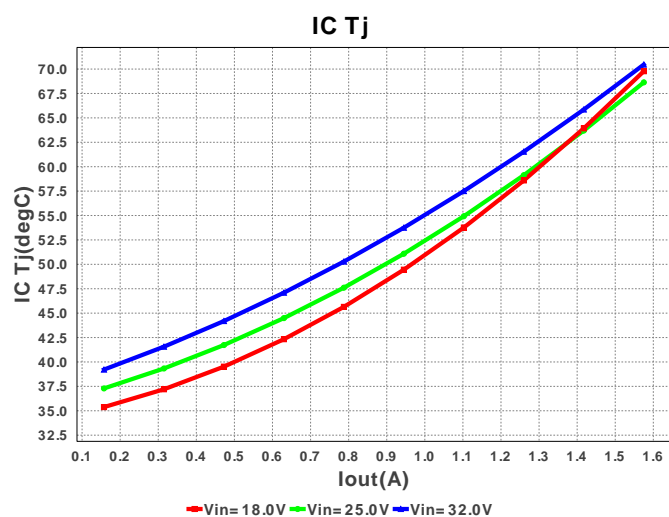


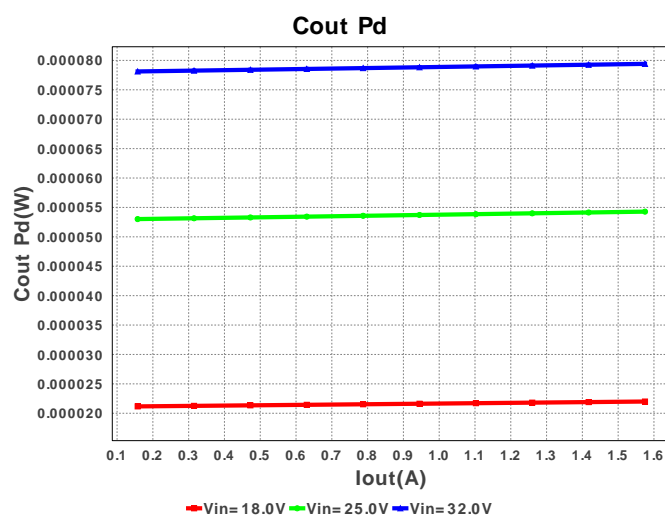
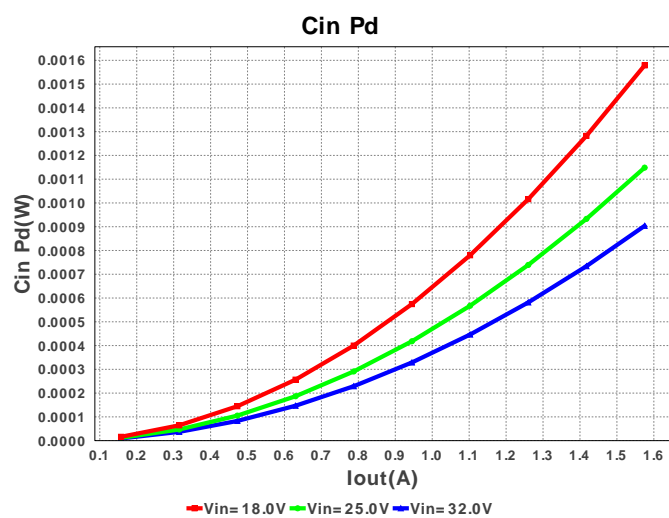
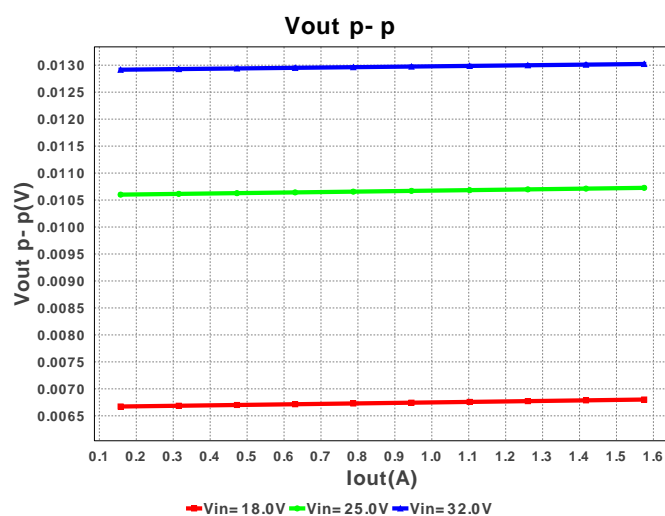
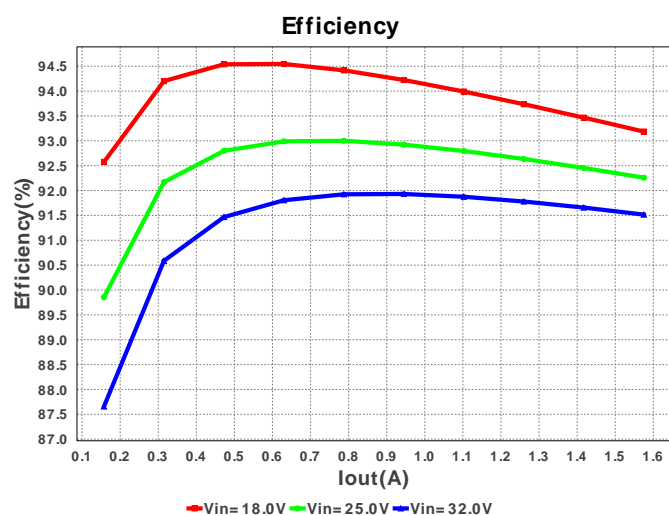
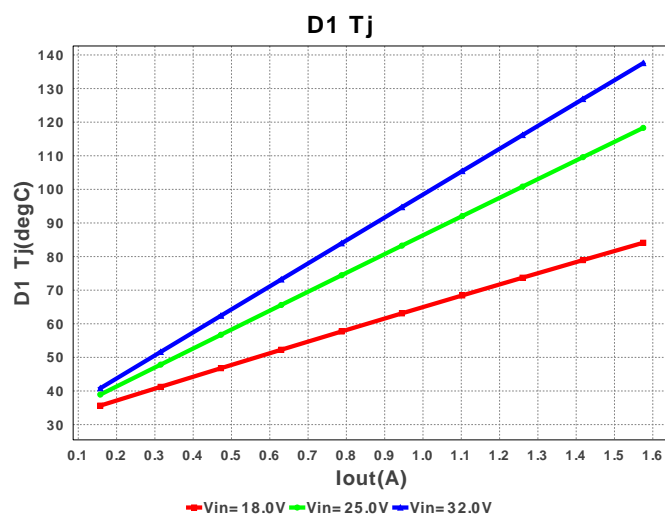
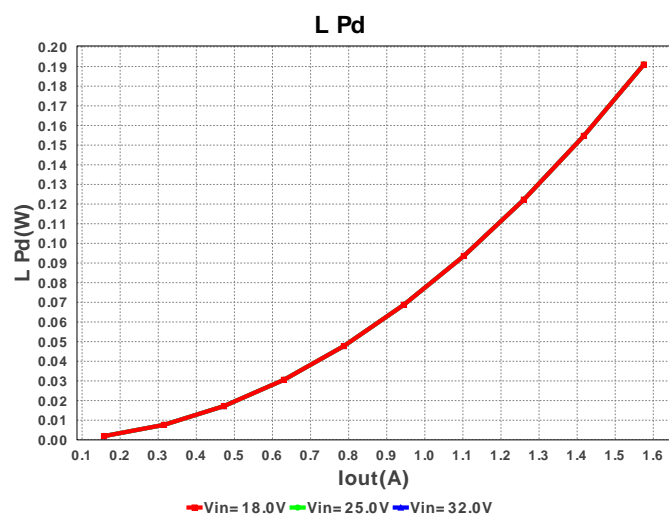
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

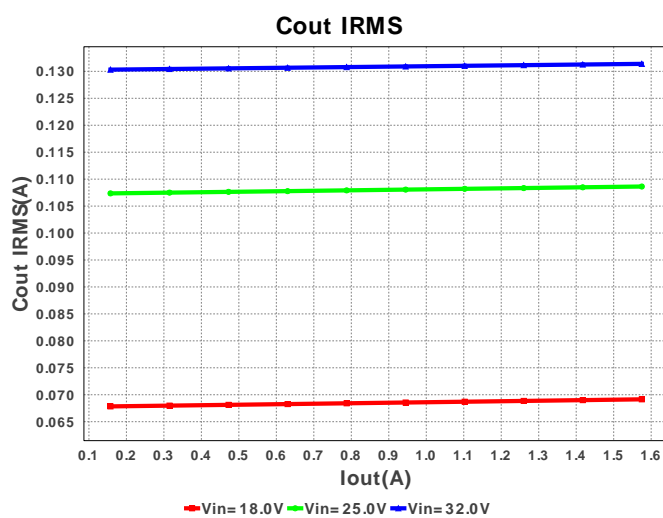
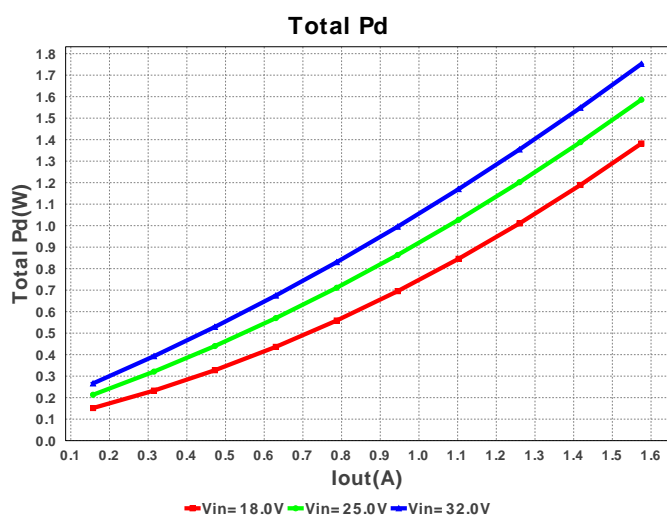
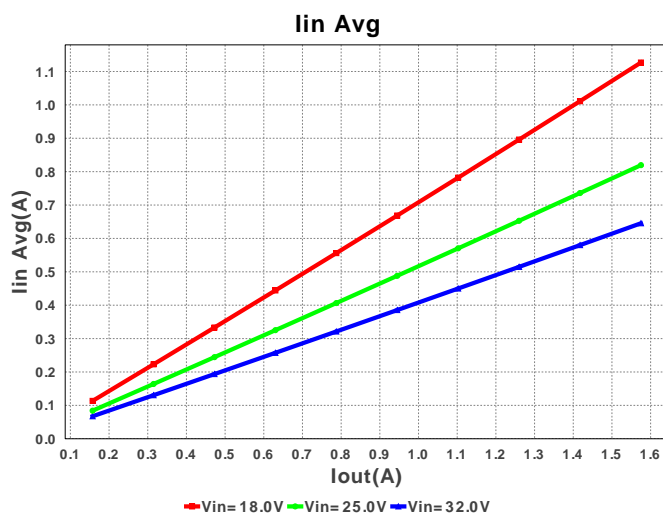
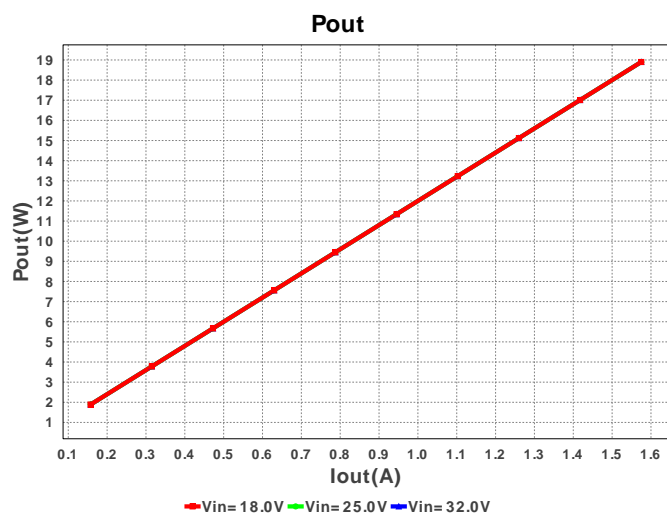
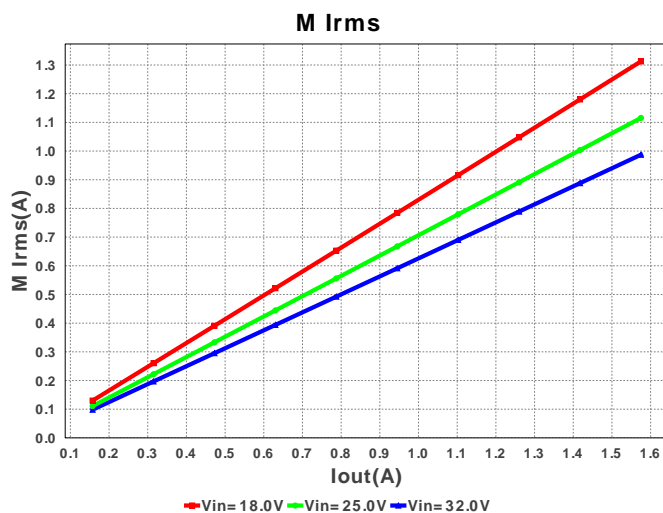
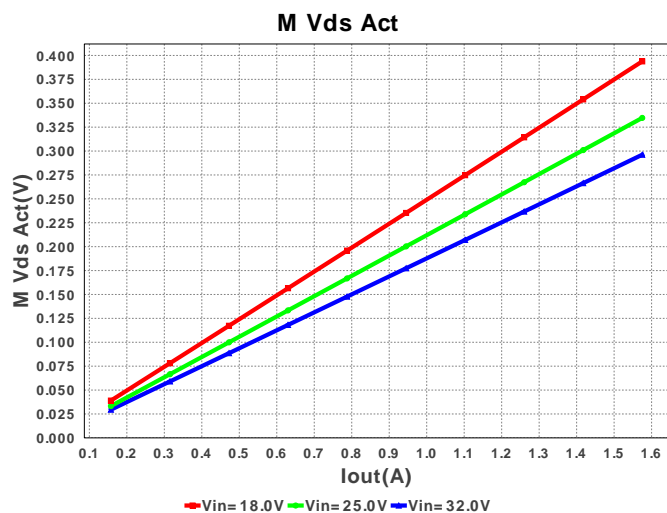
Electrical BOM

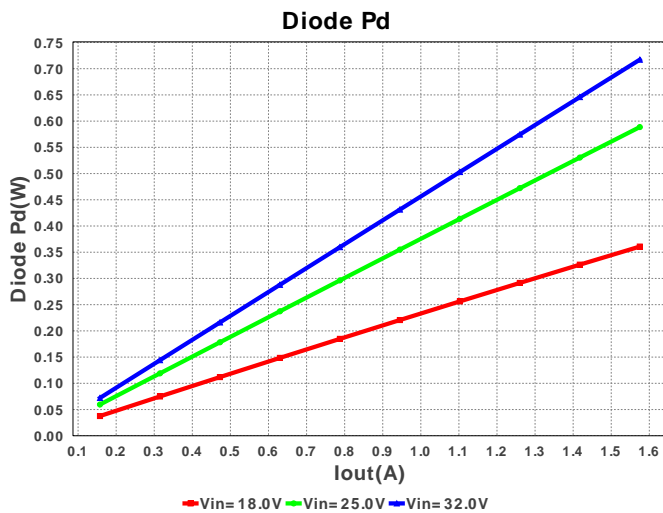
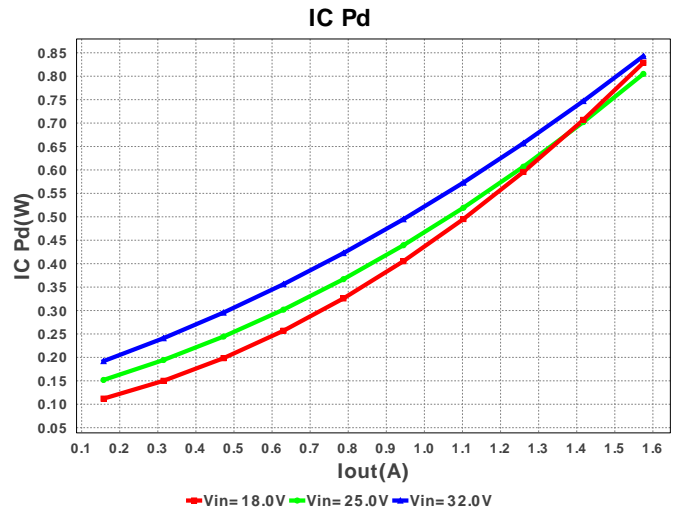
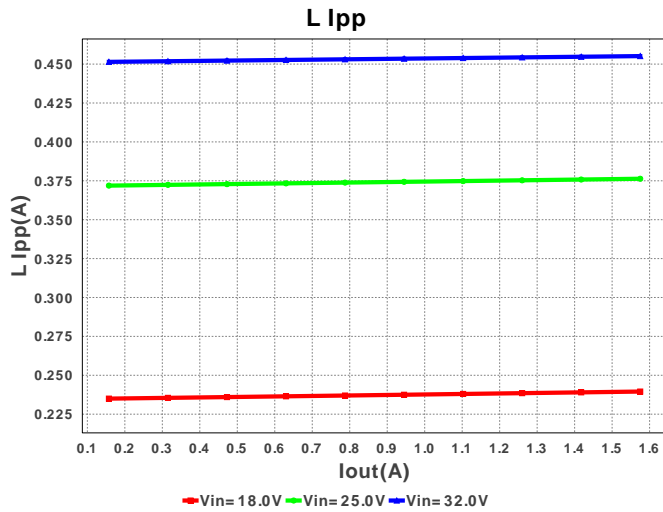
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM21BR71H104KA01L Series= X7R	Cap= 100.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.10	 1206 11mm2
3.	Cinx	TDK	C3216X7R1H105K Series= X7R	Cap= 1.0 µF ESR= 10.0 mOhm VDC= 50.0 V IRMS= 3.2 A	1	\$0.04	 1206 11mm2
4.	Cout	TDK	C3216X5R1C106M Series= X5R	Cap= 10.0 µF ESR= 4.6 mOhm VDC= 16.0 V IRMS= 2.7 A	1	\$0.06	 1206 11mm2
5.	Css	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
6.	D1	Vishay-Semiconductor	BYS12-90-E3/TR	VF@Io= 750.0 mV VRRM= 90.0 V	1	\$0.08	 SMA 37mm2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	L1	Bourns	SRR1260-390M	L= 39.0 μ H DCR= 70.0 mOhm	1	\$0.41	 SRR1260 210mm2
8.	Rfb1	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
9.	Rfb2	Vishay-Dale	CRCW040237K4FKED Series= CRCW..e3	Res= 37.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
10.	Rpgood	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
11.	Rsns	Stackpole Electronics Inc	CSR1206FK75L0 Series= ?	Res= 75.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11mm2
12.	Rt	Vishay-Dale	CRCW0402649KFKED Series= CRCW..e3	Res= 649.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
13.	U1	Texas Instruments	LM25011MY/NOPB	Switcher	1	\$0.95	 MUC10A 24mm2









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	548.836 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	131.389 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.803 A	Current	Peak switch current in IC
4.	Iin Avg	645.38 mA	Current	Average input current
5.	L Ipp	455.145 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	987.194 mA	Current	MOSFET RMS current
7.	BOM Count	13	General	Total Design BOM count
8.	FootPrint	340.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	442.649 kHz	General	Switching frequency
10.	IC Tolerance	50.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	296.158 mV	General	Voltage drop across the MosFET
12.	Pout	18.9 W	General	Total output power
13.	Total BOM	\$1.8	General	Total BOM Cost
14.	D1 Tj	137.577 degC	Op_Point	D1 junction temperature
15.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	39.287 %	Op_point	Duty cycle
17.	Efficiency	91.516 %	Op_point	Steady state efficiency
18.	IC Tj	70.46 degC	Op_point	IC junction temperature
19.	ICThetaJA	48.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	1.575 A	Op_point	Iout operating point
21.	VIN_OP	32.0 V	Op_point	Vin operating point
22.	Vout p-p	13.022 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	903.664 μ W	Power	Input capacitor power dissipation
24.	Cout Pd	79.41 μ W	Power	Output capacitor power dissipation
25.	Diode Pd	717.177 mW	Power	Diode power dissipation
26.	IC Pd	842.926 mW	Power	IC power dissipation
27.	L Pd	191.008 mW	Power	Inductor power dissipation
28.	Total Pd	1.752 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.575 A	Maximum Output Current
2.	Iout1	1.575 Amps	Output Current #1
3.	VinMax	32.0 V	Maximum input voltage
4.	VinMin	18.0 V	Minimum input voltage
5.	Vout	12.0 V	Output Voltage
6.	Vout1	12.0 Volt	Output Voltage #1
7.	base_pn	LM25011	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. LM25011 Product Folder : <http://www.ti.com/product/lm25011> : contains the data sheet and other resources.

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