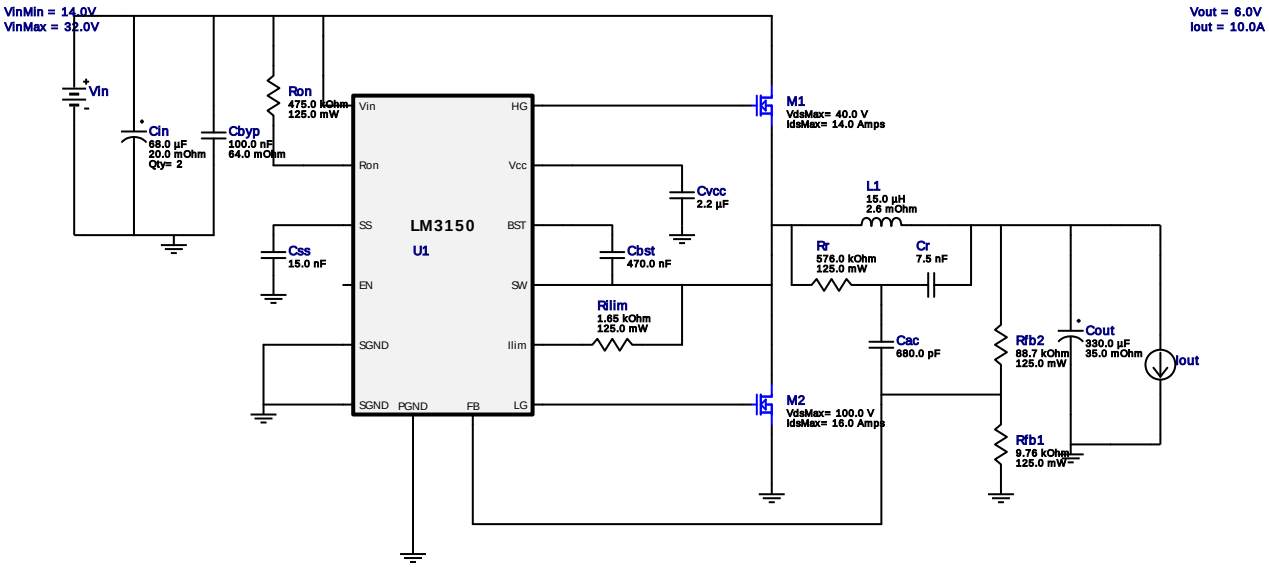
WEBENCH® Design Report

VinMin = 14.0V
VinMax = 32.0V
Vout = 6.0V
Iout = 10.0A

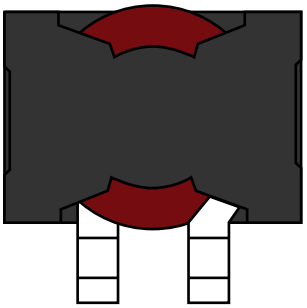
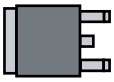
Device = LM3150MH/NOPB
Topology = Buck
Created = 10/22/15 11:39:23 PM
BOM Cost = $8.81
BOM Count = 18
Total Pd = 2.55W

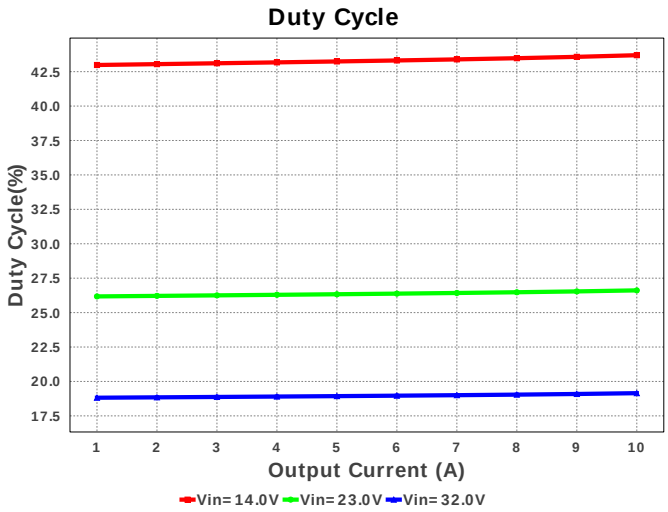
Design : 3685577/22 LM3150MH/NOPB
LM3150MH/NOPB 14.0V-32.0V to 6.00V @ 10.0A

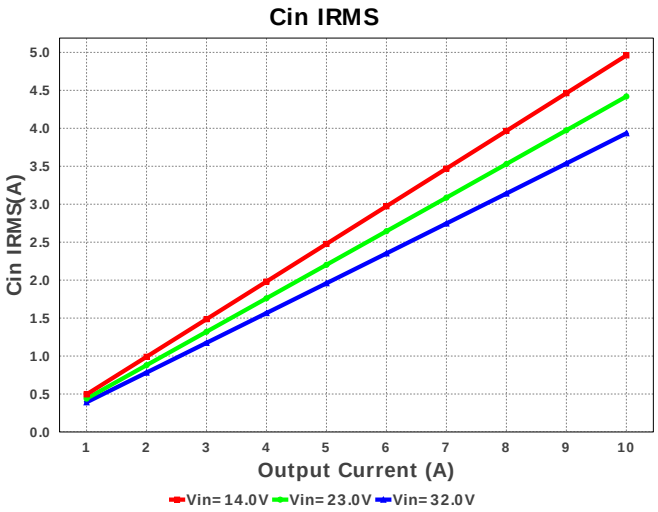


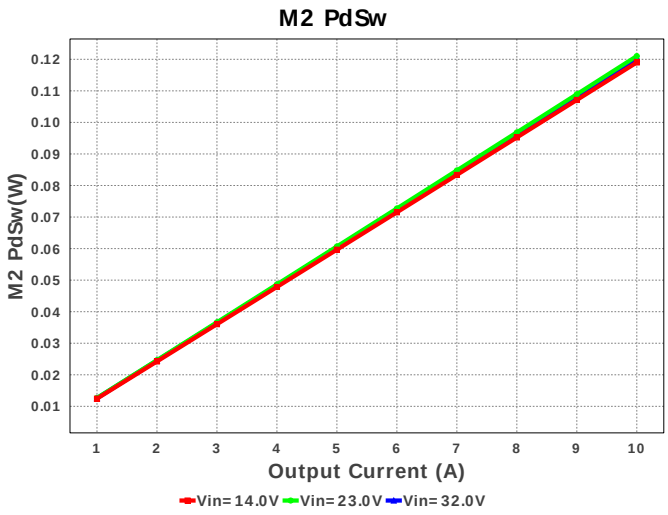
Electrical BOM

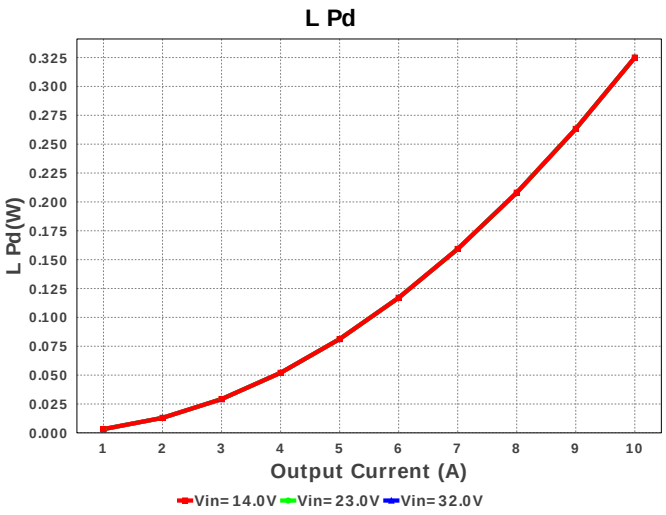
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cac	Yageo America	CC0805KRX7R9BB681 Series= X7R	Cap= 680.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cbst	Taiyo Yuden	EMK212B7474KD-T Series= X7R	Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
3.	Cbyp	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
4.	Cin	Panasonic	50SVPF68M Series= SVPF	Cap= 68.0 uF ESR= 20.0 mOhm VDC= 50.0 V IRMS= 4.3 A	2	$0.92	CAPSMT_62_F12 151 mm²
5.	Cout	Panasonic	10TPB330M Series= TPB	Cap= 330.0 uF ESR= 35.0 mOhm VDC= 10.0 V IRMS= 3.0 A	1	$0.86	7343-43 59 mm²
6.	Cr	MuRata	GRM2195C1H752JA01D Series= C0G/NP0	Cap= 7.5 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.06	0805 7 mm²
7.	Css	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
8.	Cvcc	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²

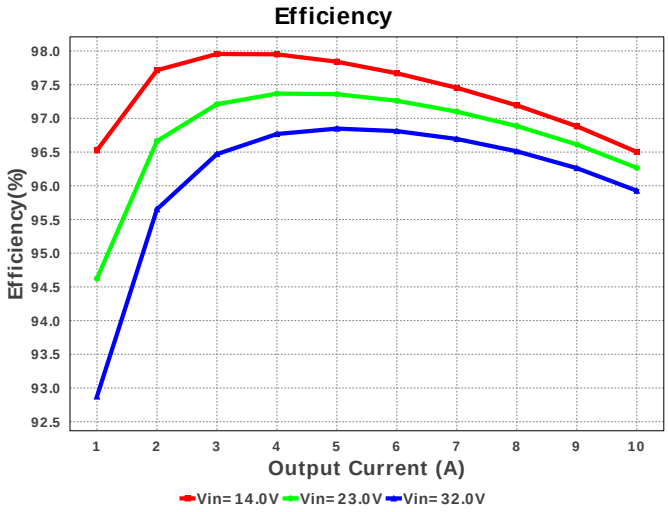
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	L1	Coilcraft	SER2918H-153KL	L= 15.0 µH DCR= 2.6 mOhm	1	$2.65	 SER2918H 652 mm^2
10.	M1	Fairchild Semiconductor	FDD8647L	VdsMax= 40.0 V IdsMax= 14.0 Amps	1	$0.50	 DPAK 102 mm^2
11.	M2	Texas Instruments	CSD19531Q5A	VdsMax= 100.0 V IdsMax= 16.0 Amps	1	$1.15	 TRANS_NexFET_Q5A 55 mm^2
12.	Rfb1	Panasonic	ERJ-6ENF9761V Series= ERJ-6E	Res= 9.76 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
13.	Rfb2	Panasonic	ERJ-6ENF8872V Series= ERJ-6E	Res= 88.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
14.	Rilim	Panasonic	ERJ-6ENF1651V Series= ERJ-6E	Res= 1.65 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
15.	Ron	Panasonic	ERJ-6ENF4753V Series= ERJ-6E	Res= 475.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
16.	Rr	Panasonic	ERJ-6ENF5763V Series= ERJ-6E	Res= 576.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
17.	U1	Texas Instruments	LM3150MH/NOPB	Switcher	1	$1.62	 MXA14A 59 mm^2

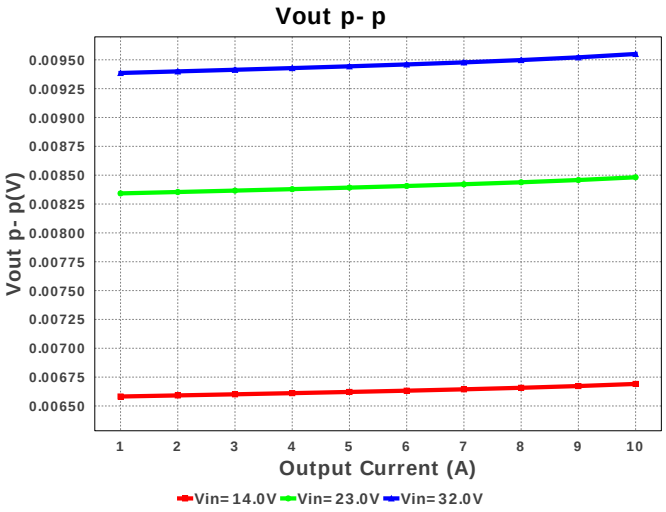


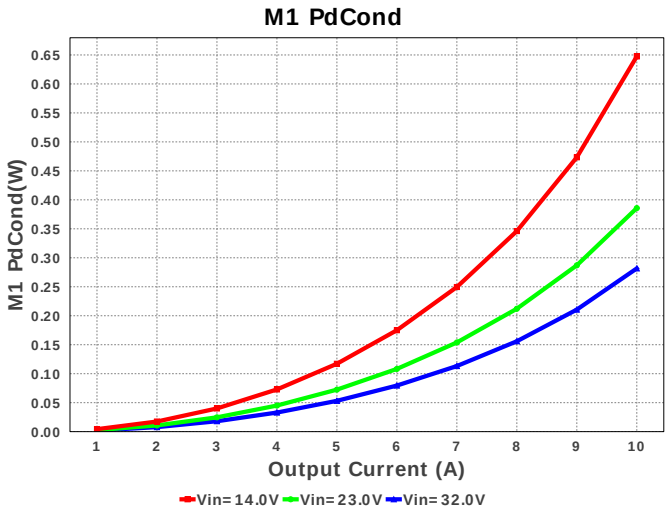


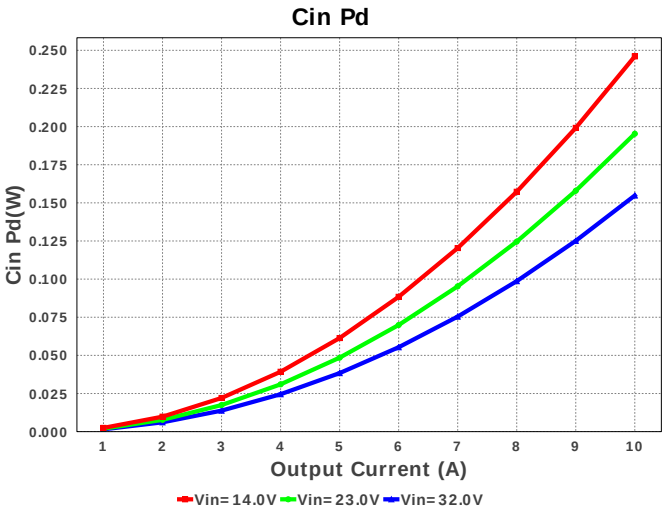


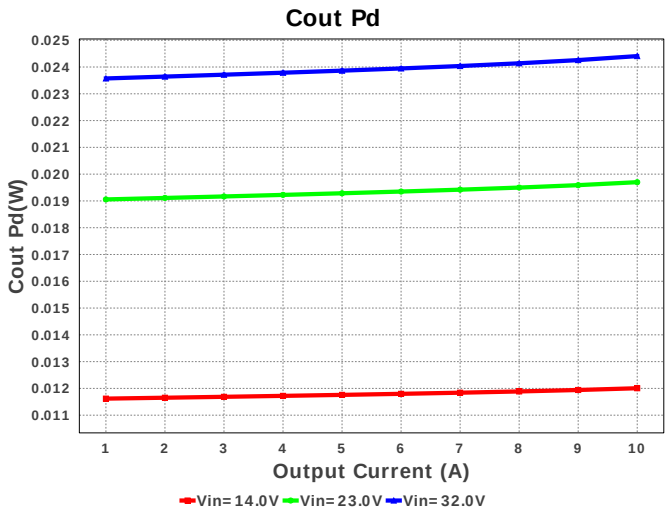


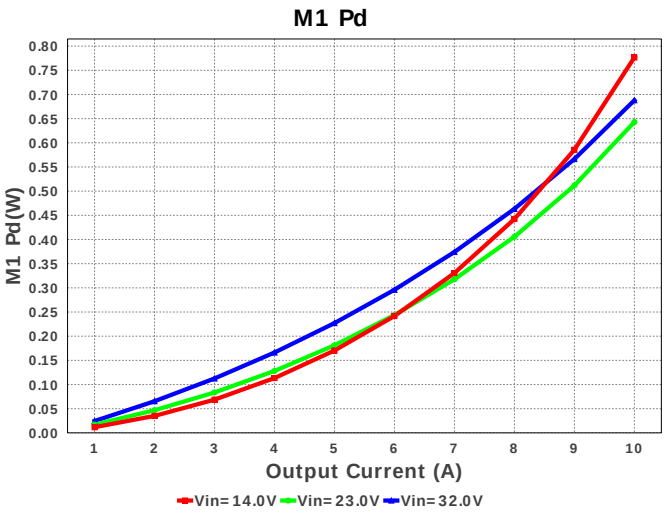


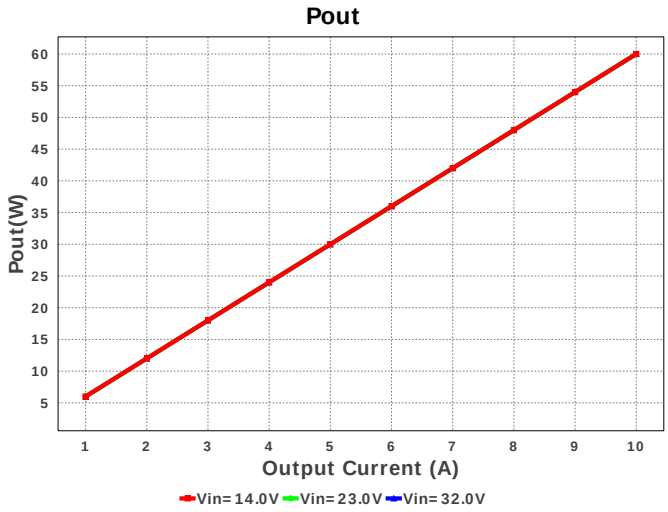


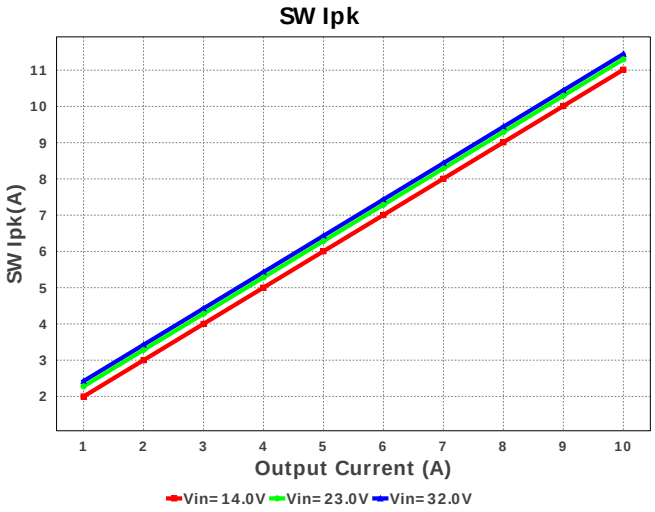


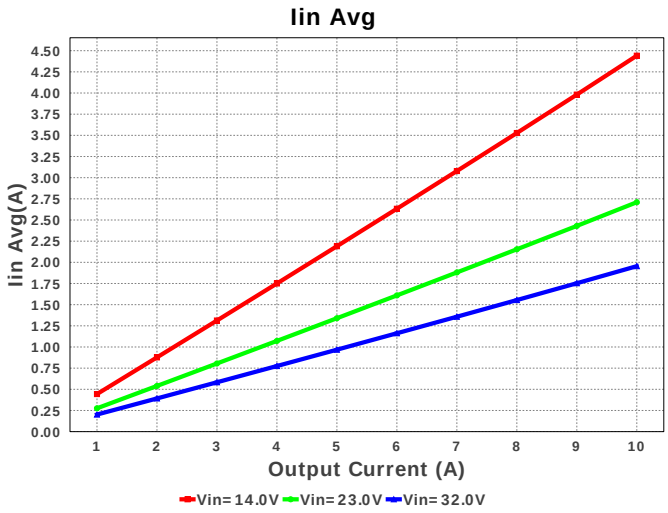


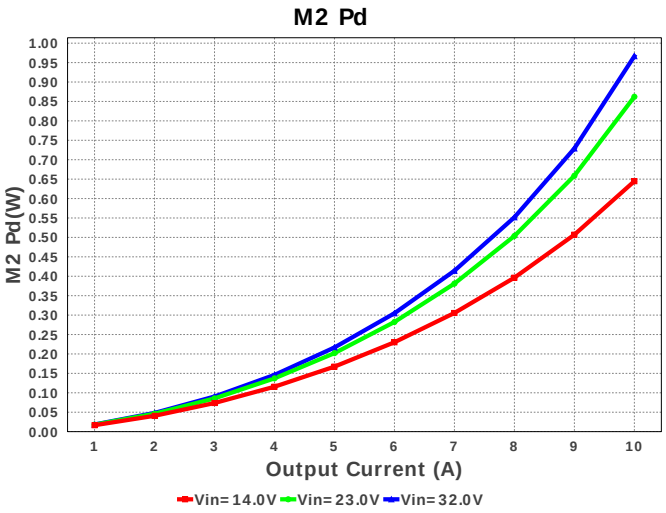


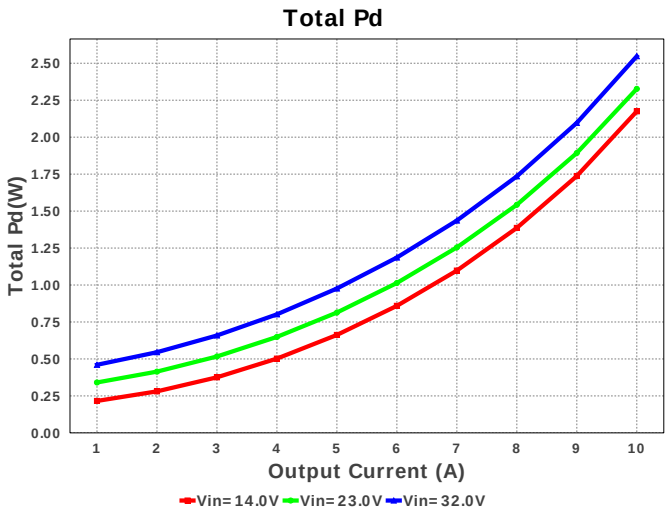


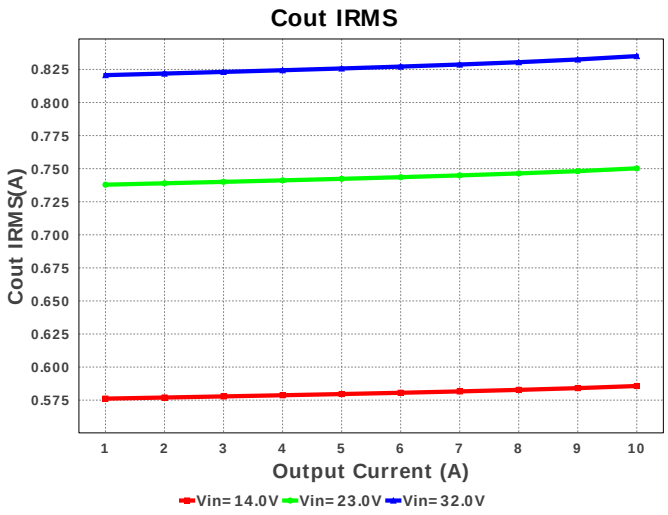


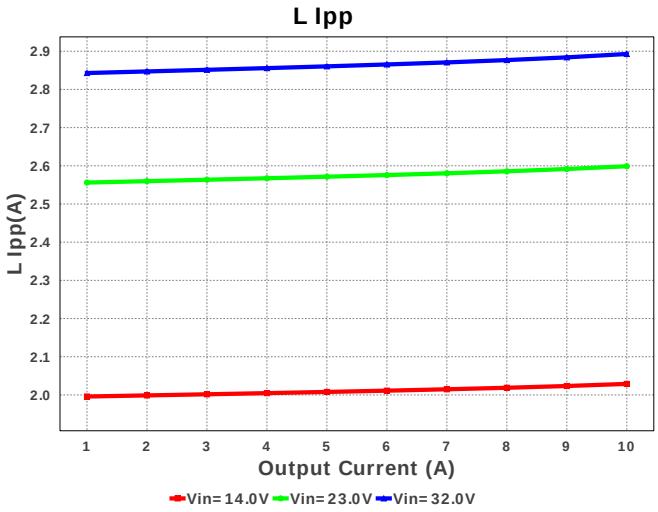


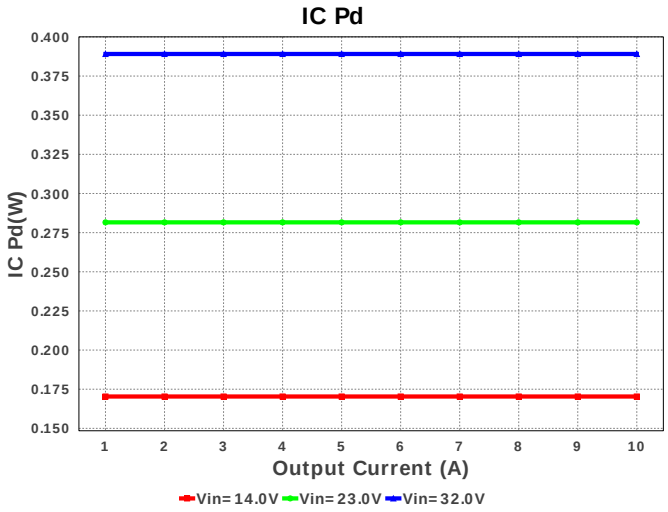


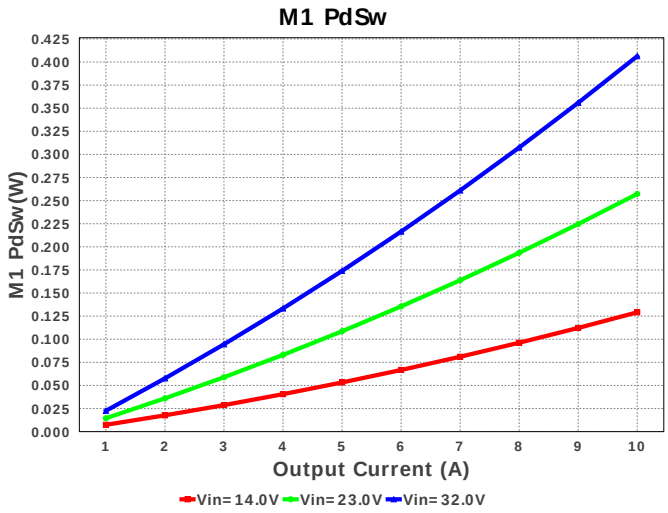


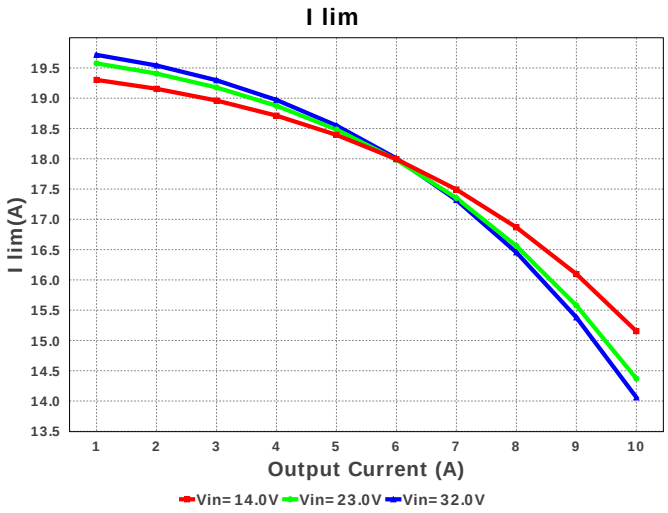


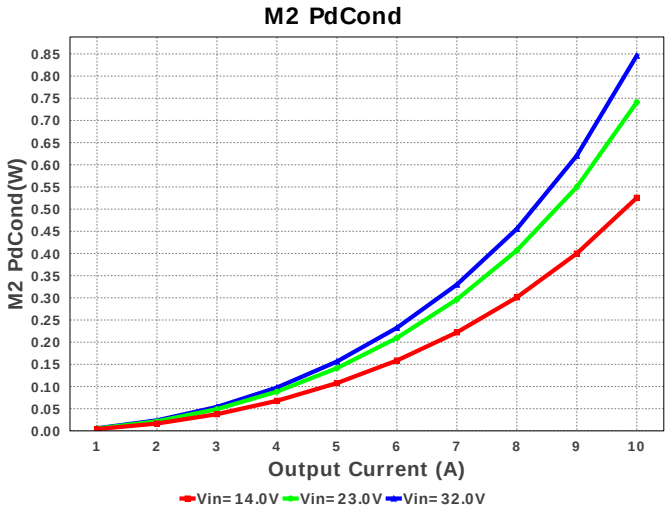












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	3.935 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	835.088 mA	Current	Output capacitor RMS ripple current
3.	I lim	14.052 A	Current	Current limit threshold
4.	Iin Avg	1.955 A	Current	Average input current
5.	L Ipp	2.893 A	Current	Peak-to-peak inductor ripple current
6.	SW Ipk	11.446 A	Current	Peak switch current
7.	BOM Count	18	General	Total Design BOM count
8.	FootPrint	1.303 k mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	114.734 kHz	General	Switching frequency
10.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
11.	Pout	60.0 W	General	Total output power
12.	Total BOM	$8.81	General	Total BOM Cost
13.	Duty Cycle	19.148 %	Op_point	Duty cycle
14.	Efficiency	95.922 %	Op_point	Steady state efficiency
15.	IOUT_OP	10.0 A	Op_point	Iout operating point
16.	VIN_OP	32.0 V	Op_point	Vin operating point
17.	Vout p-p	9.551 mV	Op_point	Peak-to-peak output ripple voltage
18.	Cin Pd	154.818 mW	Power	Input capacitor power dissipation
19.	Cout Pd	24.408 mW	Power	Output capacitor power dissipation
20.	IC Pd	389.101 mW	Power	IC power dissipation
21.	L Pd	325.0 mW	Power	Inductor power dissipation
22.	M1 Pd	688.636 mW	Power	M1 MOSFET total power dissipation
23.	M1 PdCond	282.316 mW	Power	M1 MOSFET conduction losses
24.	M1 PdSw	406.32 mW	Power	M1 MOSFET switching losses
25.	M2 Pd	968.806 mW	Power	M2 MOSFET total power dissipation
26.	M2 PdCond	846.669 mW	Power	M2 MOSFET conduction losses
27.	M2 PdSw	122.136 mW	Power	M2 MOSFET switching losses
28.	Total Pd	2.551 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	10.0	Maximum Output Current
2.	Iout1	10.0	Output Current #1
3.	VinMax	32.0	Maximum input voltage
4.	VinMin	14.0	Minimum input voltage
5.	Vout	6.0	Output Voltage
6.	Vout1	6.0	Output Voltage #1
7.	base_pn	LM3150	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM3150** Product Folder : http://www.ti.com/product/LM3150 : contains the data sheet and other resources.