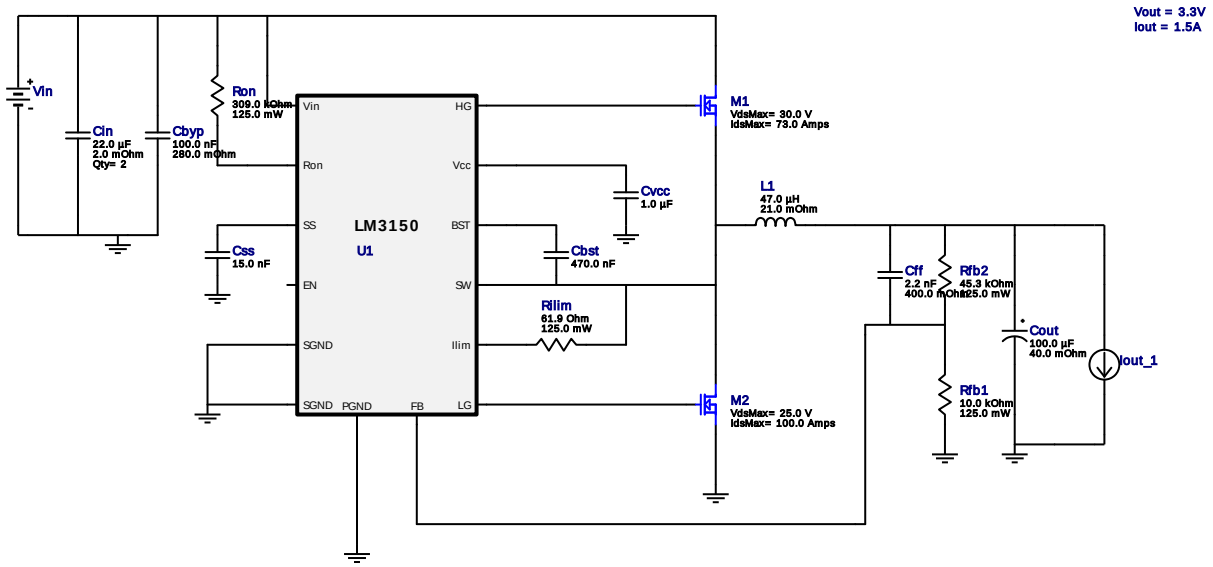
WEBENCH® Design Report

VinMin = 6.0V
VinMax = 12.0V
Vout = 3.3V
Iout = 1.5A

Device = LM3150MH/NOPB
Topology = Buck
Created = 3/11/16 6:49:28 AM
BOM Cost = $4.49
BOM Count = 16
Total Pd = 0.17W

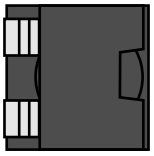
Design : 4116161/15 LM3150MH/NOPB
LM3150MH/NOPB 6.0V-12.0V to 3.30V @ 1.5A

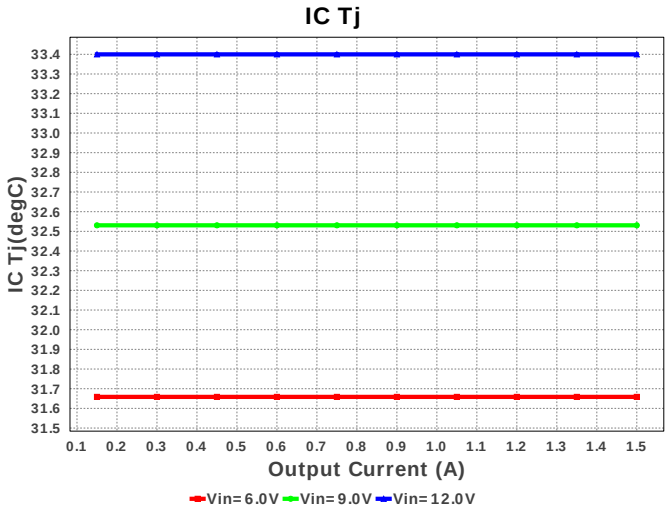


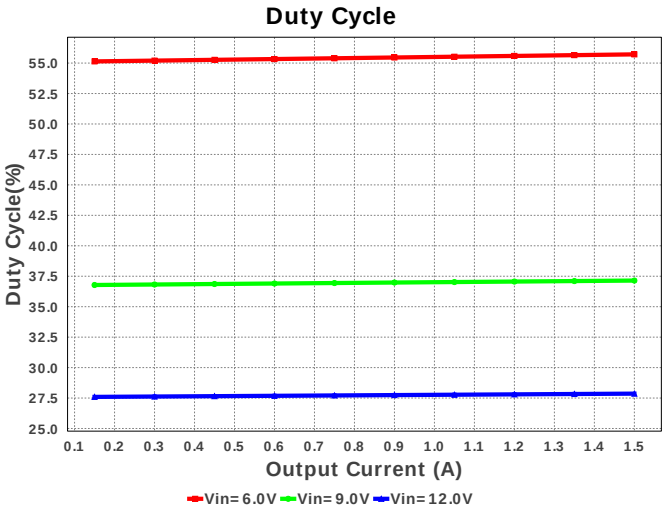
My Comments

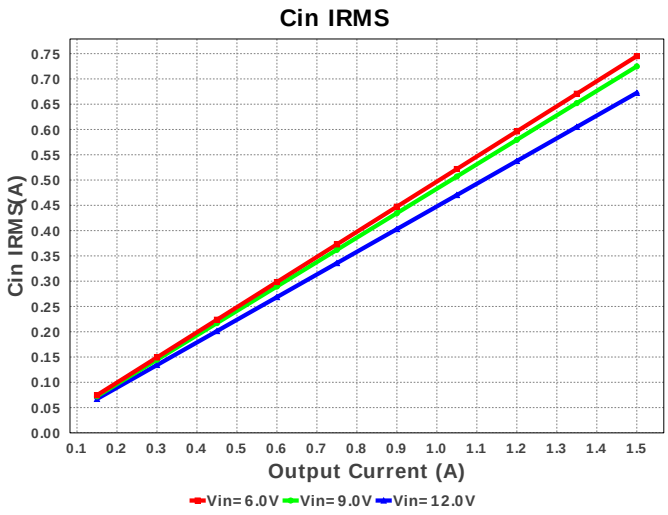
Electrical BOM

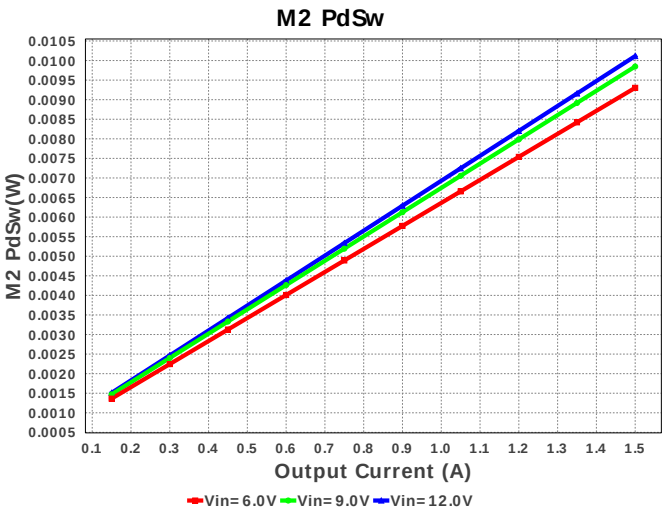
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Taiyo Yuden	EMK212B7474KD-T Series= X7R	Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
2.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cff	Kemet	C0805C222K5RACTU Series= X7R	Cap= 2.2 nF ESR= 400.0 mOhm VDC= 50.0 V IRMS= 251.0 mA	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM32ER61C226KE20L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 16.0 V IRMS= 3.68 A	2	$0.16	1210 15 mm²
5.	Cout	Panasonic	6SVP100M Series= SVP	Cap= 100.0 uF ESR= 40.0 mOhm VDC= 6.3 V IRMS= 1.81 A	1	$0.42	SM_RADIAL_6.3AMM 80 mm²
6.	Css	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
7.	Cvcc	Taiyo Yuden	EMK212B7105KG-T Series= X7R	Cap= 1.0 uF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²

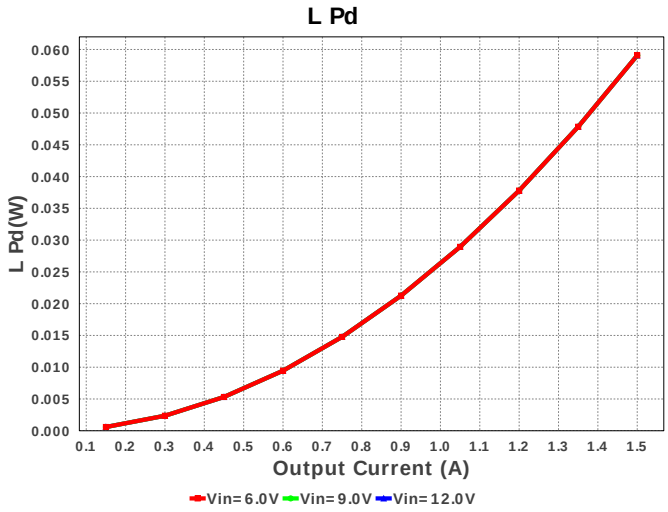
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	L1	Coilcraft	SER1390-473MLB	L= 47.0 µH DCR= 21.0 mOhm	1	$0.95	 SER1390 240 mm²
9.	M1	Texas Instruments	CSD17307Q5A	VdsMax= 30.0 V IdsMax= 73.0 Amps	1	$0.34	 TRANS_NexFET_Q5A 55 mm²
10.	M2	Texas Instruments	CSD16321Q5	VdsMax= 25.0 V IdsMax= 100.0 Amps	1	$0.73	 TRANS_NexFET_Q5 55 mm²
11.	Rfb1	Panasonic	ERJ-6ENF1002V Series= ERJ-6E	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
12.	Rfb2	Panasonic	ERJ-6ENF4532V Series= ERJ-6E	Res= 45.3 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
13.	Rilim	Vishay-Dale	CRCW080561R9FKEA Series= CRCW..e3	Res= 61.9 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
14.	Ron	Panasonic	ERJ-6ENF3093V Series= ERJ-6E	Res= 309.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
15.	U1	Texas Instruments	LM3150MH/NOPB	Switcher	1	$1.62	 MXA14A 59 mm²

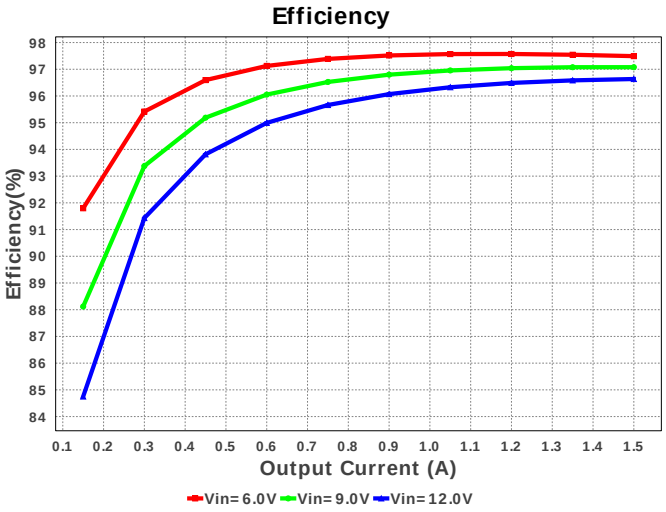


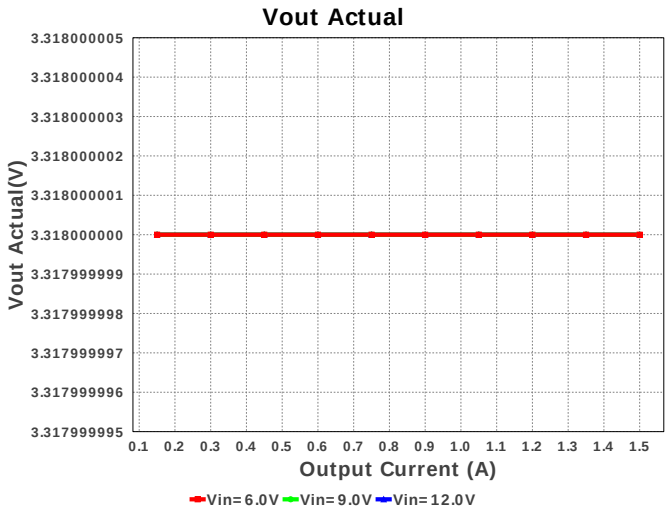


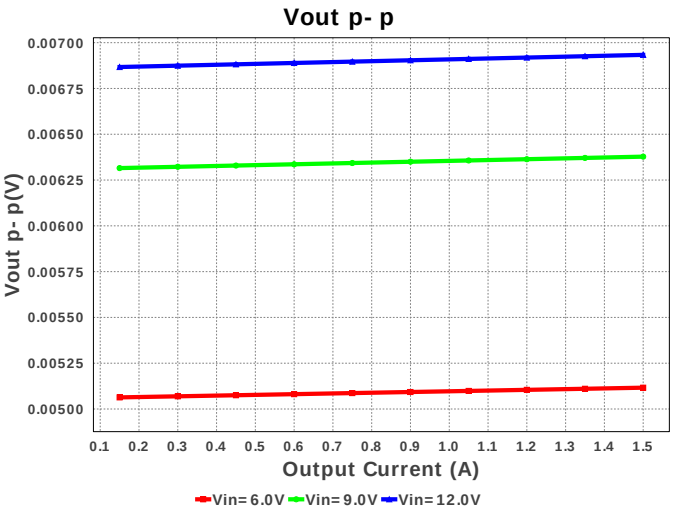


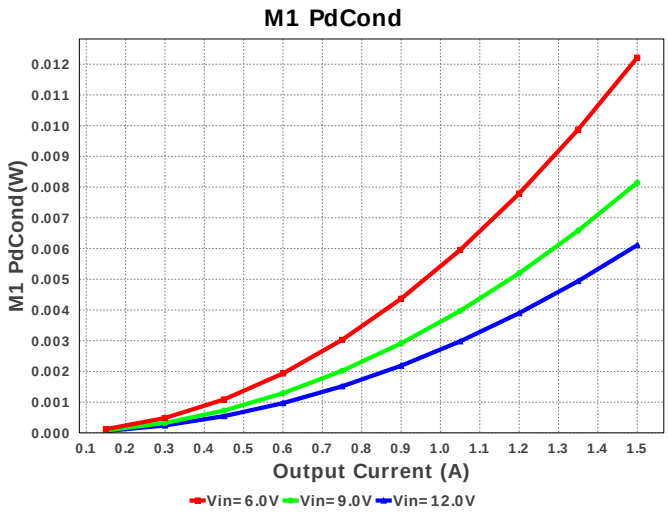


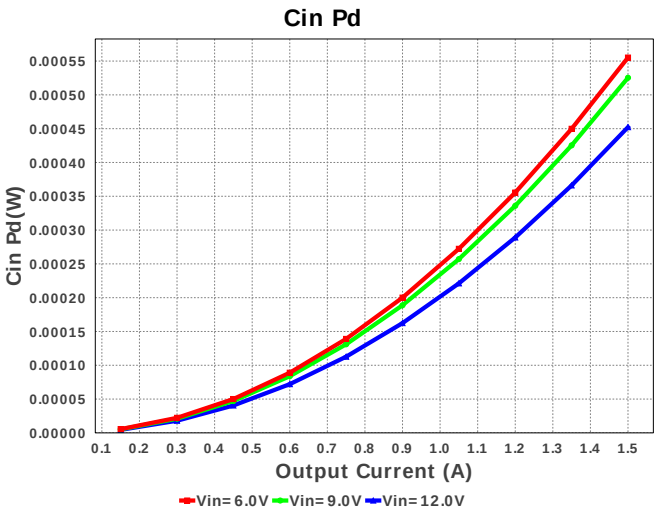


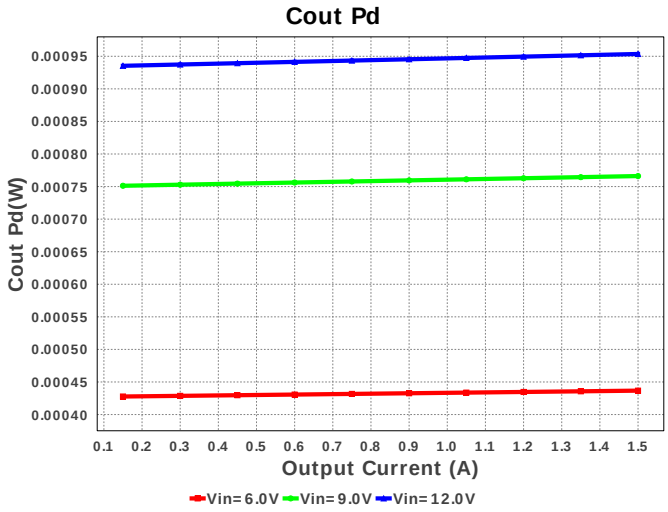


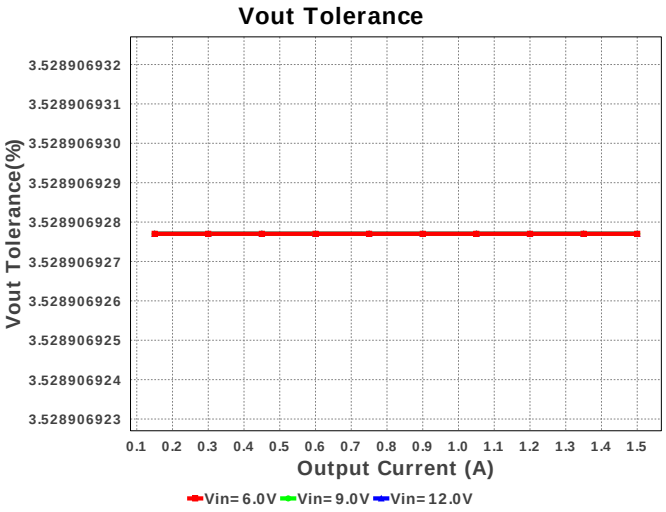


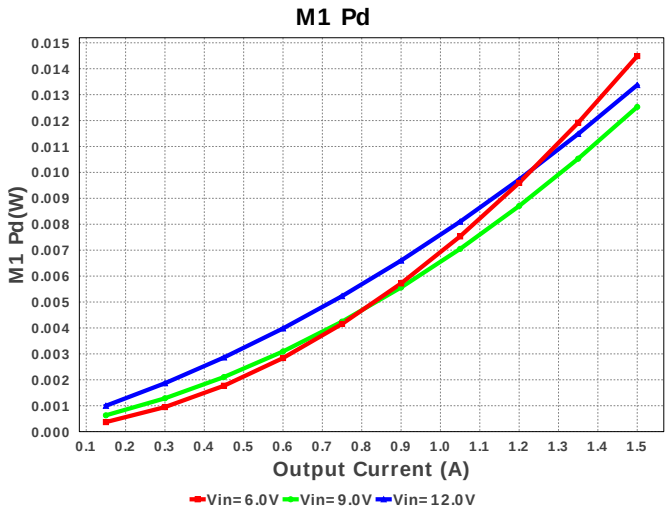


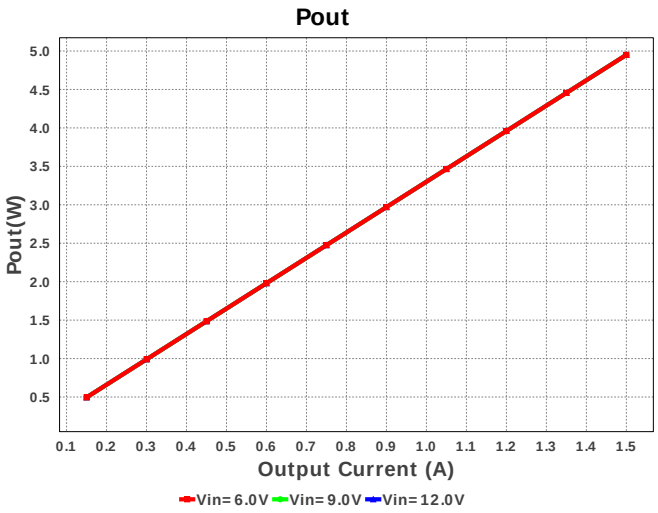


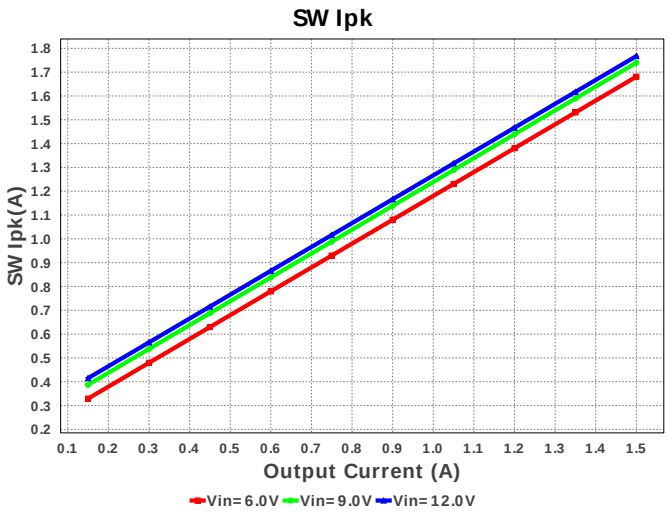


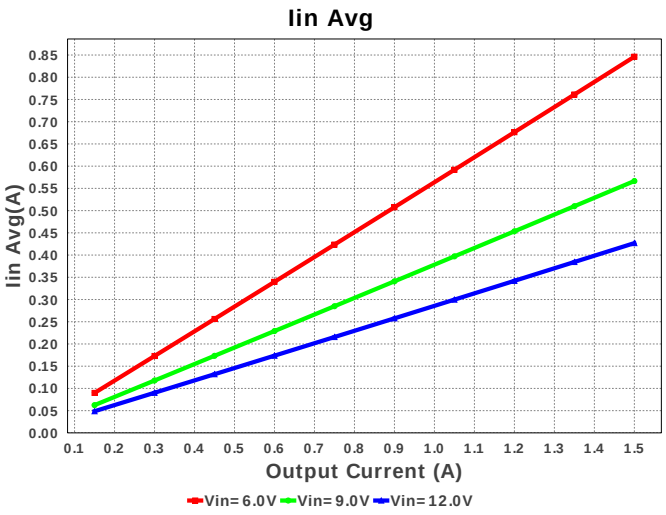


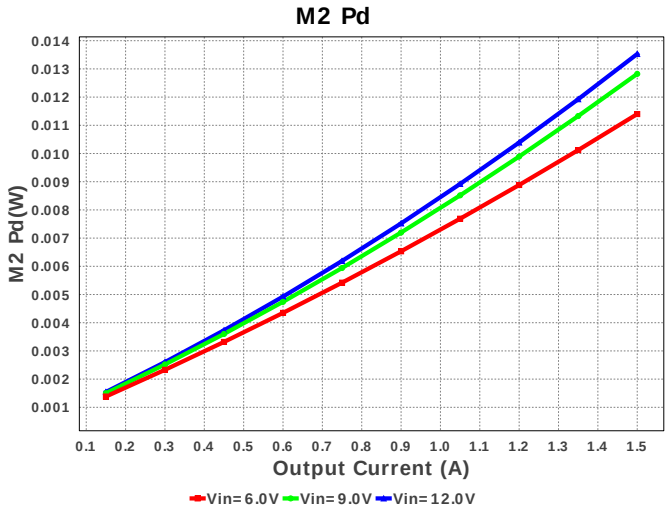


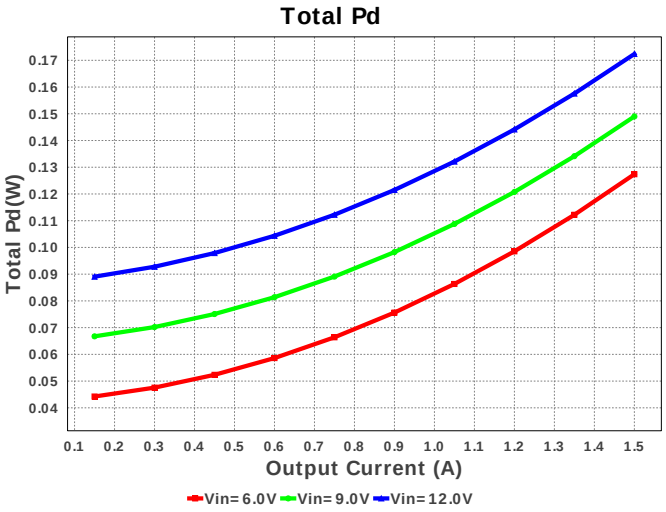


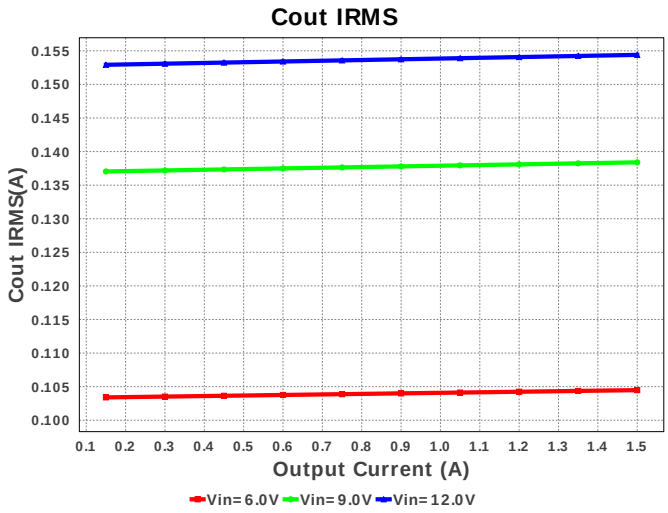


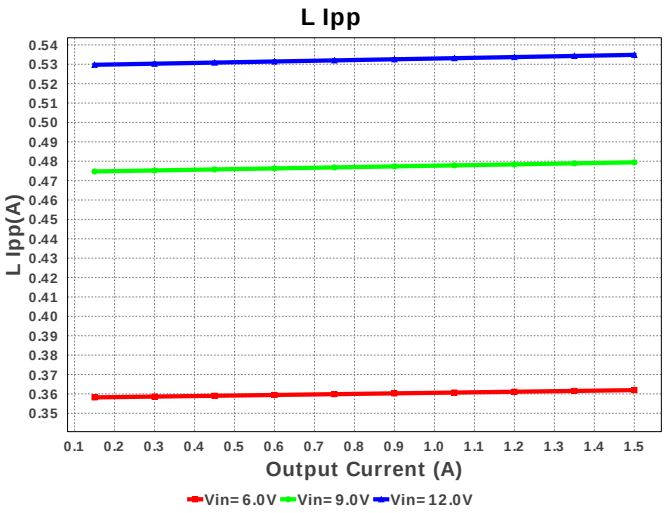


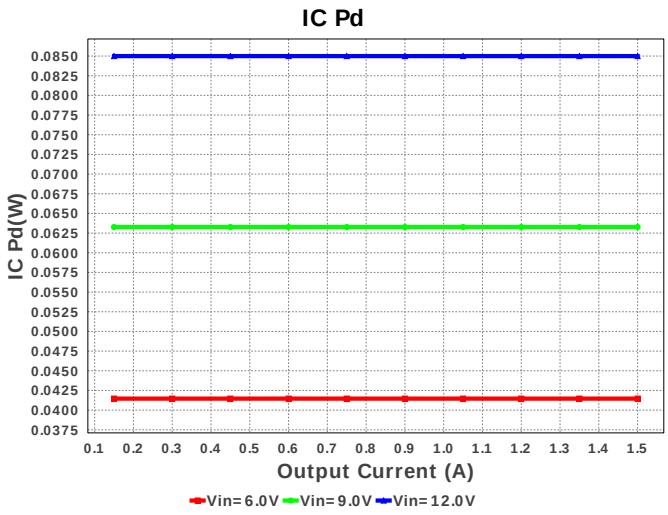


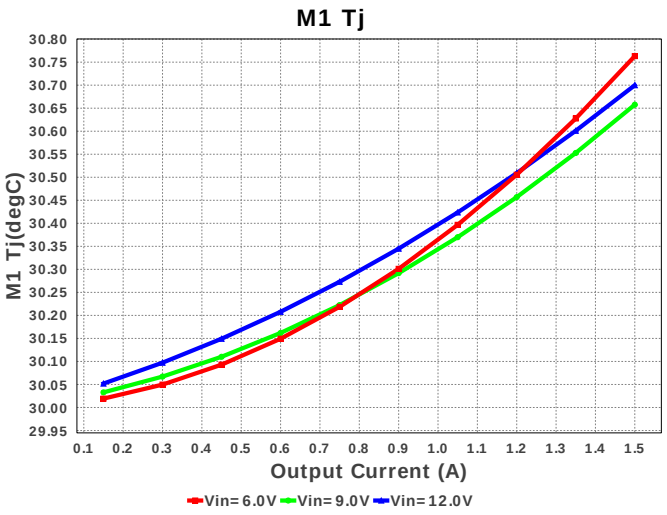


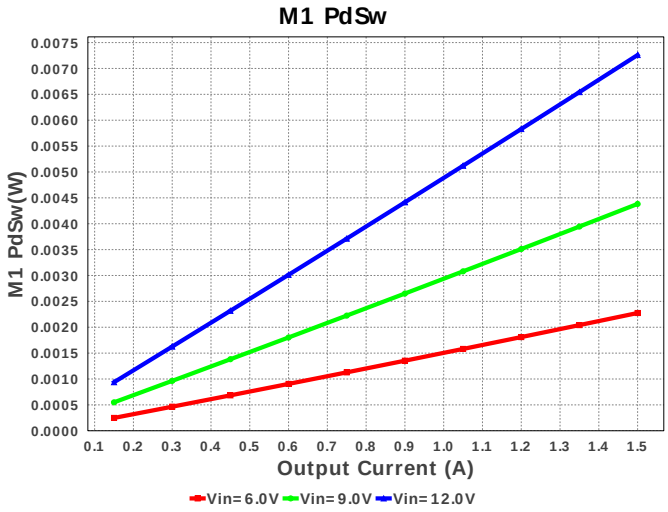


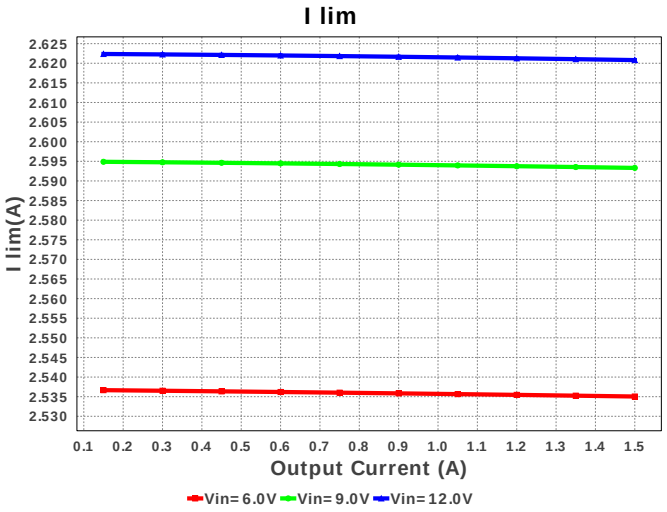


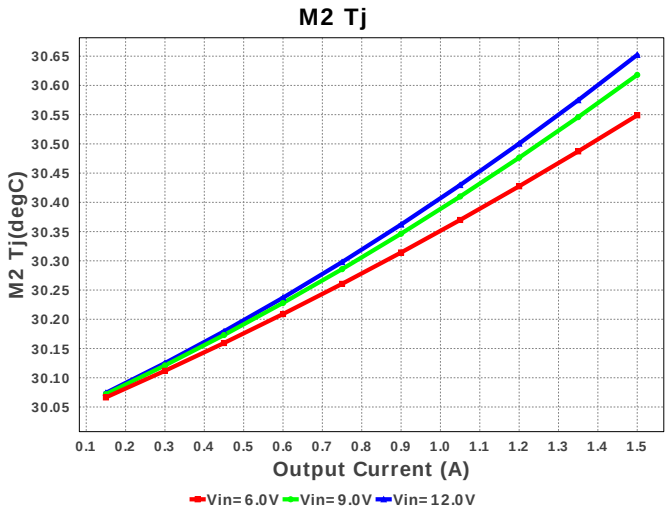


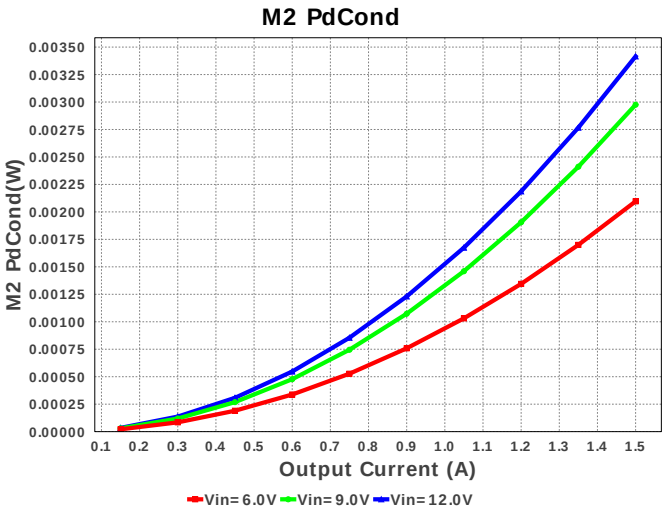












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	672.476 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	154.398 mA	Current	Output capacitor RMS ripple current
3.	I lim	2.621 A	Current	Current limit threshold
4.	Iin Avg	426.9 mA	Current	Average input current
5.	L Ipp	534.85 mA	Current	Peak-to-peak inductor ripple current
6.	SW Ipk	1.767 A	Current	Peak switch current
7.	BOM Count	16	General	Total Design BOM count
8.	FootPrint	580.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	96.426 kHz	General	Switching frequency
10.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
11.	Pout	4.95 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	$4.49	General	Total BOM Cost
13.	Vout Actual	3.318 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Duty Cycle	27.861 %	Op_point	Duty cycle
15.	Efficiency	96.627 %	Op_point	Steady state efficiency
16.	IC Tj	35.525 degC	Op_point	IC junction temperature
17.	IOUT_OP	1.5 A	Op_point	Iout operating point
18.	M1 Tj	30.7 degC	Op_point	M1 MOSFET junction temperature
19.	M2 Tj	30.673 degC	Op_point	M2 MOSFET junction temperature
20.	VIN_OP	12.0 V	Op_point	Vin operating point
21.	Vout p-p	6.933 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	452.224 µW	Power	Input capacitor power dissipation
23.	Cout Pd	953.544 µW	Power	Output capacitor power dissipation
24.	IC Pd	84.994 mW	Power	IC power dissipation
25.	L Pd	59.063 mW	Power	Inductor power dissipation
26.	M1 Pd	13.371 mW	Power	M1 MOSFET total power dissipation
27.	M1 PdCond	6.111 mW	Power	M1 MOSFET conduction losses
28.	M1 PdSw	7.26 mW	Power	M1 MOSFET switching losses
29.	M2 Pd	13.963 mW	Power	M2 MOSFET total power dissipation
30.	M2 PdCond	3.416 mW	Power	M2 MOSFET conduction losses
31.	M2 PdSw	10.548 mW	Power	M2 MOSFET switching losses
32.	Total Pd	172.792 mW	Power	Total Power Dissipation
33.	Vout Tolerance	3.529 %		Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.5	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	6.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LM3150	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

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