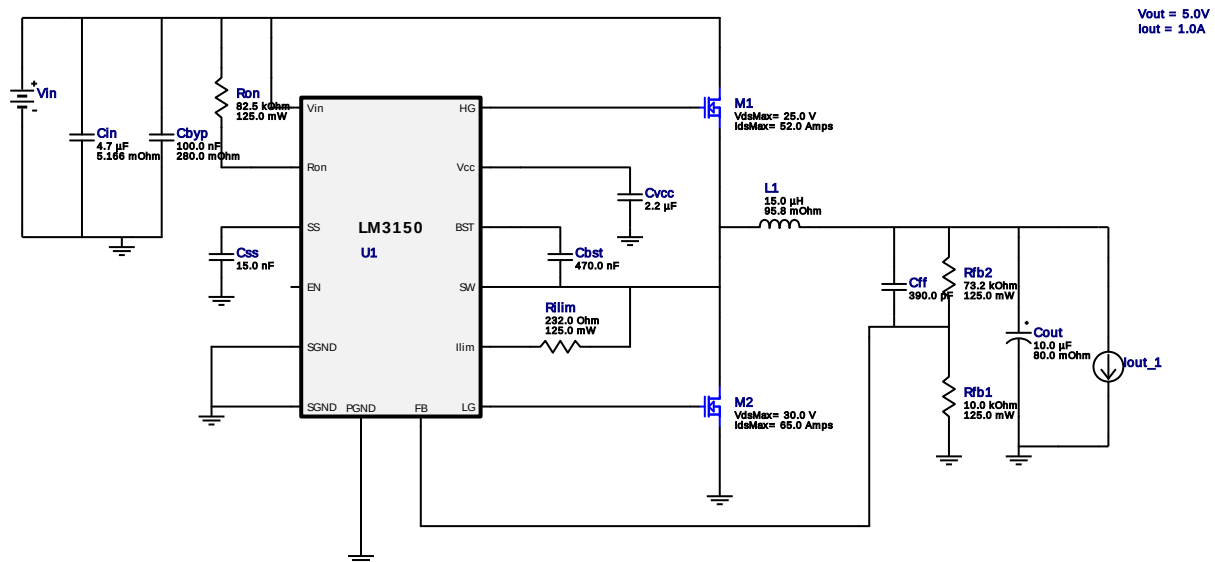


WEBENCH® Design Report

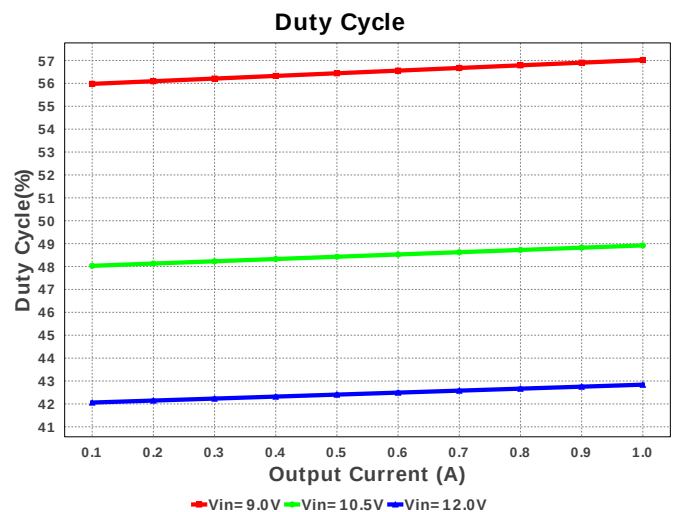
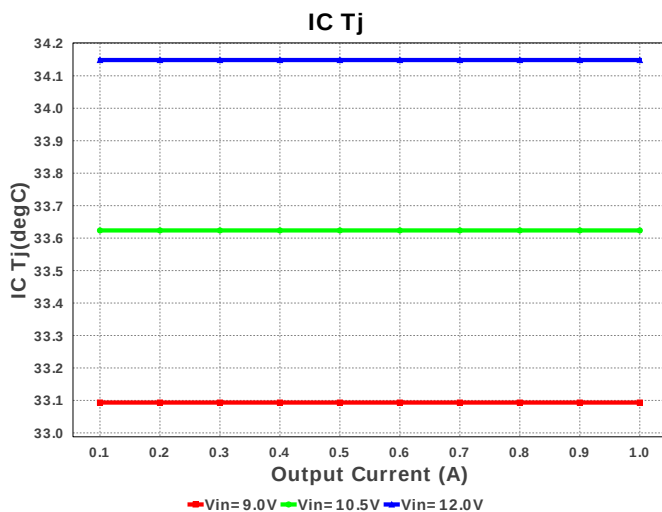
Design : 4372614/43 LM3150MH/NOPB
LM3150MH/NOPB 9.0V-12.0V to 5.00V @ 1.0A



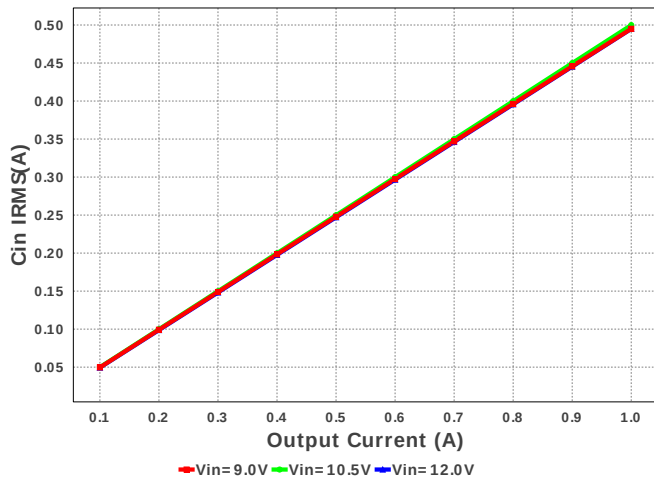
Electrical BOM

#	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 mm ²
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 mm ²
3.	Cff	Yageo America	CC0805KRX7R9BB391 Series= X7R	Cap= 390.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	\$0.02	0805 7 mm ²
5.	Cout	Panasonic	12TPC10M Series= ?	Cap= 10.0 uF ESR= 80.0 mOhm VDC= 12.5 V IRMS= 800.0 mA	1	\$0.35	CAPSMT_6_B1G 17 mm ²
6.	Css	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	Cvcc	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm ²
8.	L1	Bourns	SRN6045-150M	L= 15.0 µH DCR= 95.8 mOhm	1	\$0.16	SRN6045 64 mm ²

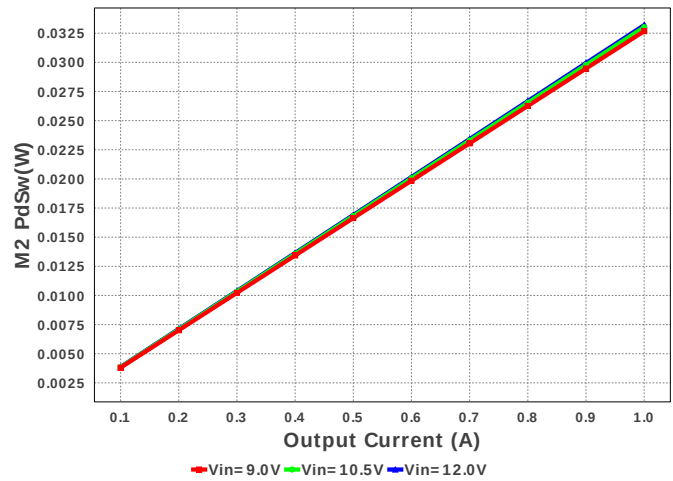
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	M1	Texas Instruments	CSD16412Q5A	VdsMax= 25.0 V IdsMax= 52.0 Amps	1	\$0.34	 TRANS_NexFET_Q5A 55 mm ²
10.	M2	Texas Instruments	CSD17507Q5A	VdsMax= 30.0 V IdsMax= 65.0 Amps	1	\$0.34	 TRANS_NexFET_Q5A 55 mm ²
11.	Rfb1	Panasonic	ERJ-6ENF1002V Series= ERJ-6E	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
12.	Rfb2	Panasonic	ERJ-6ENF7322V Series= ERJ-6E	Res= 73.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
13.	Rilim	Vishay-Dale	CRCW0805232RFKEA Series= CRCW..e3	Res= 232.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
14.	Ron	Panasonic	ERJ-6ENF8252V Series= ERJ-6E	Res= 82.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
15.	U1	Texas Instruments	LM3150MH/NOPB	Switcher	1	\$1.62	 MXA14A 59 mm ²



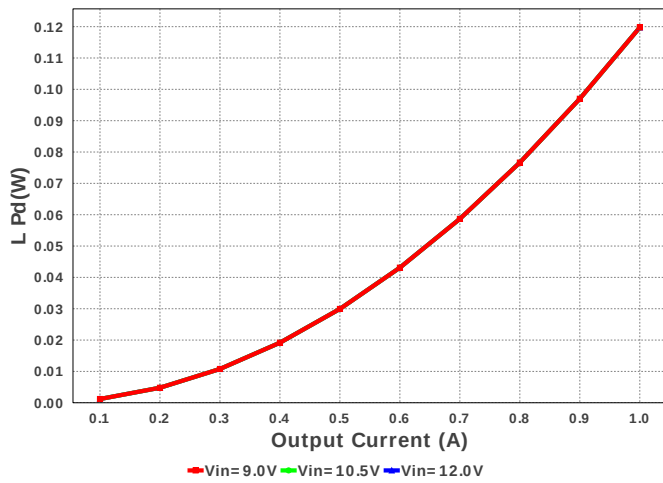
Cin IRMS



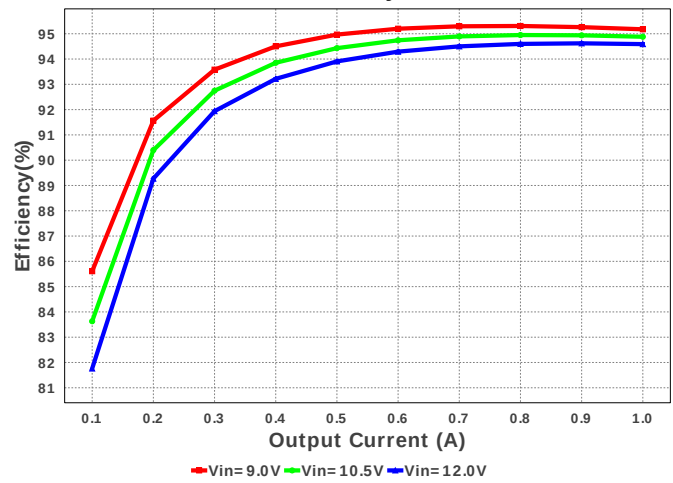
M2 PdSw



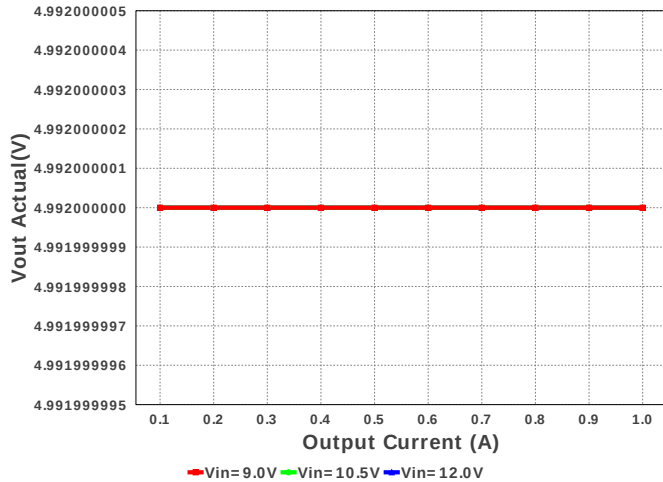
L Pd



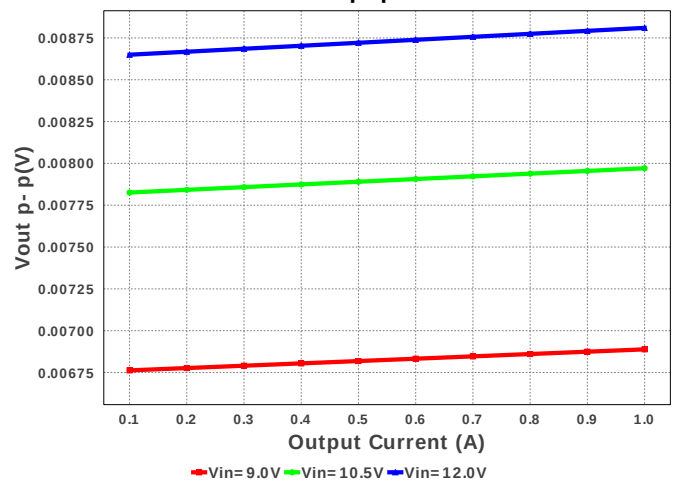
Efficiency



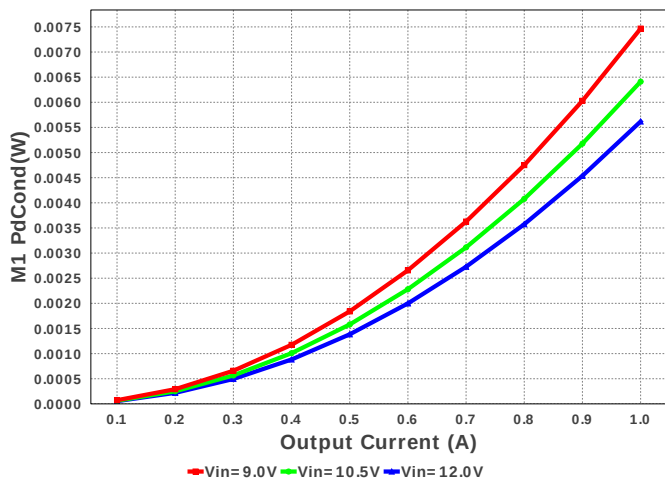
Vout Actual



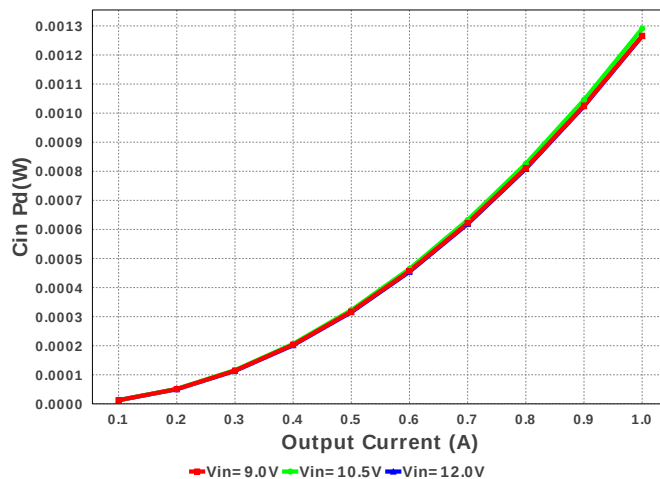
Vout p-p



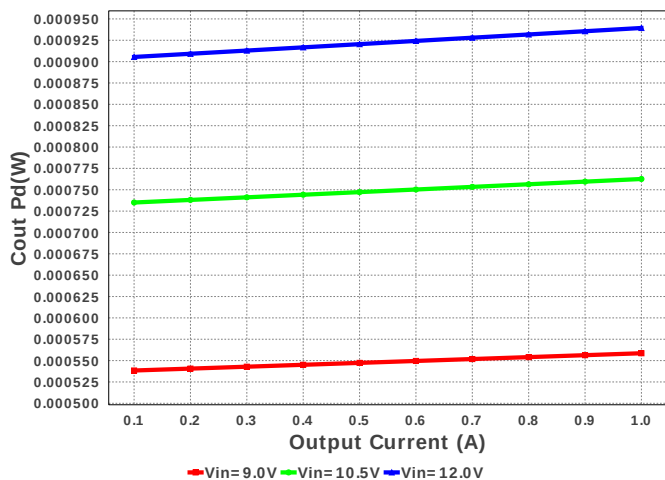
M1 PdCond



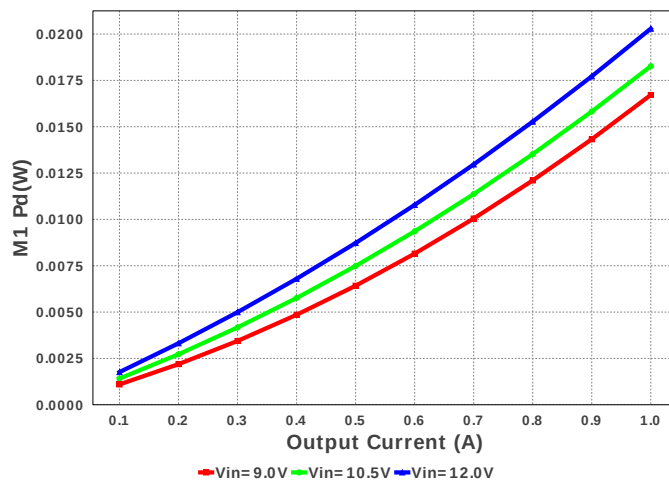
Cin Pd



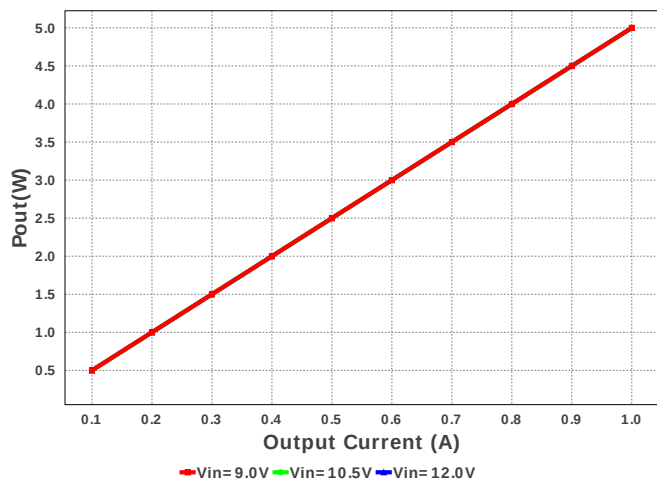
Cout Pd



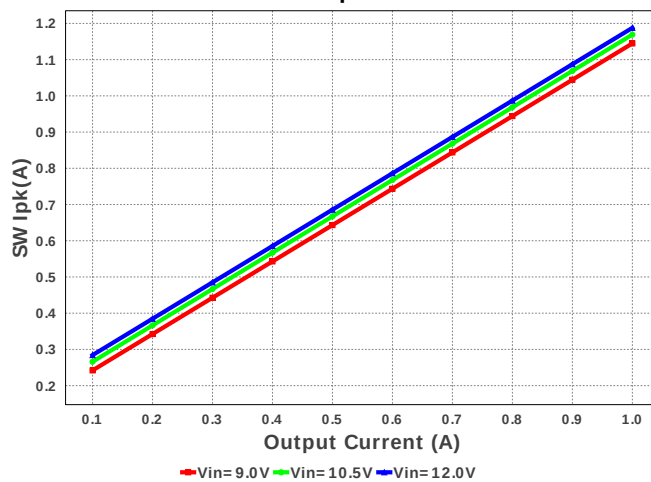
M1 Pd

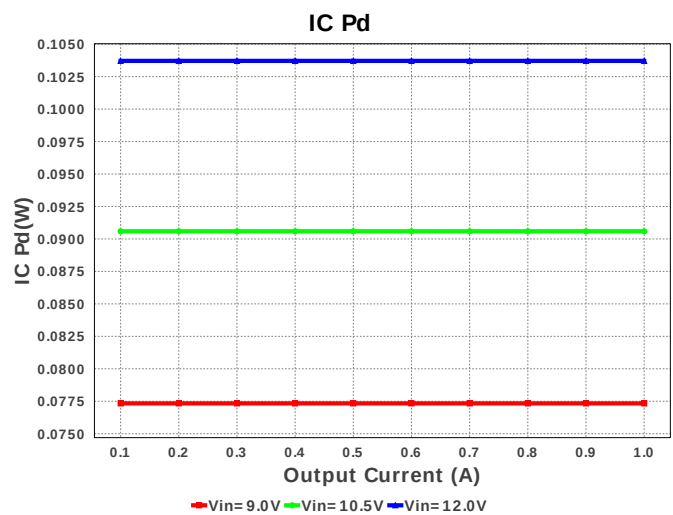
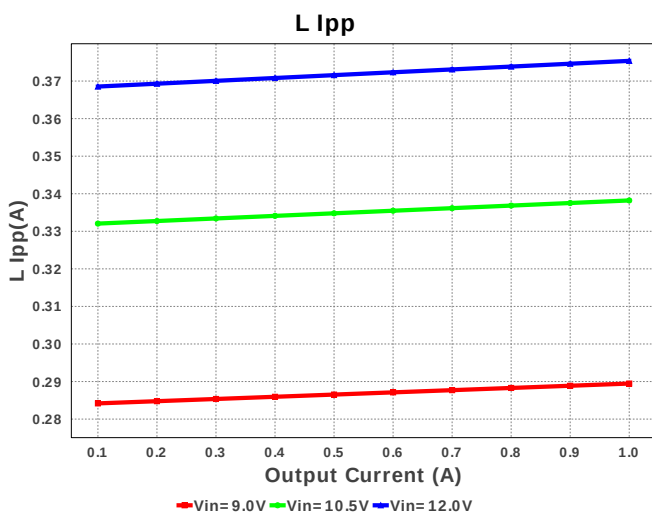
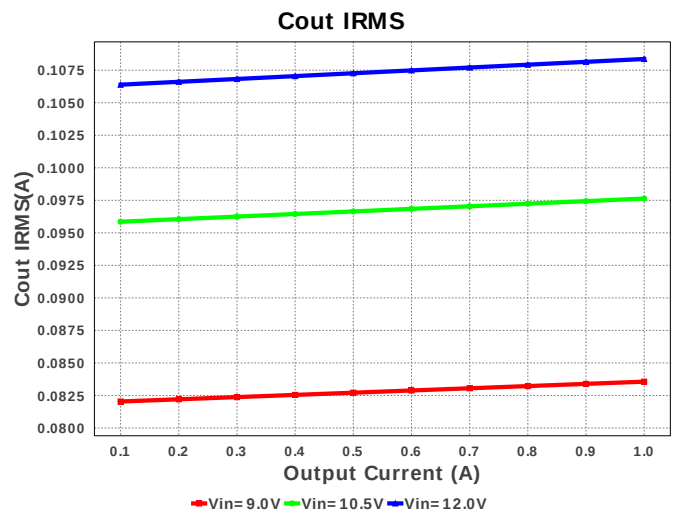
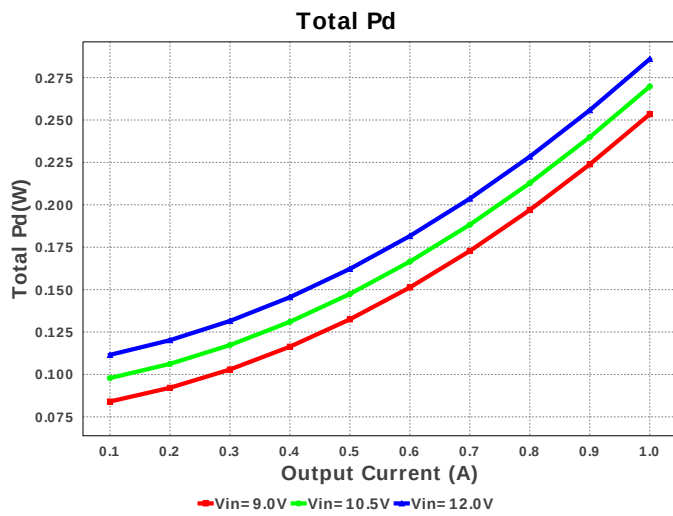
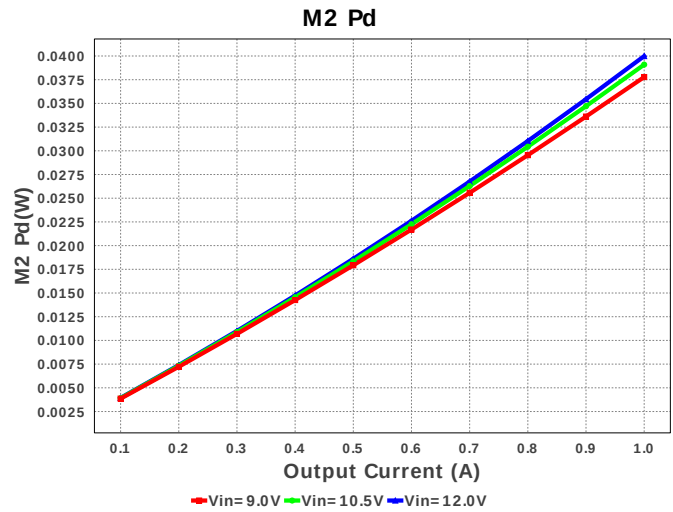
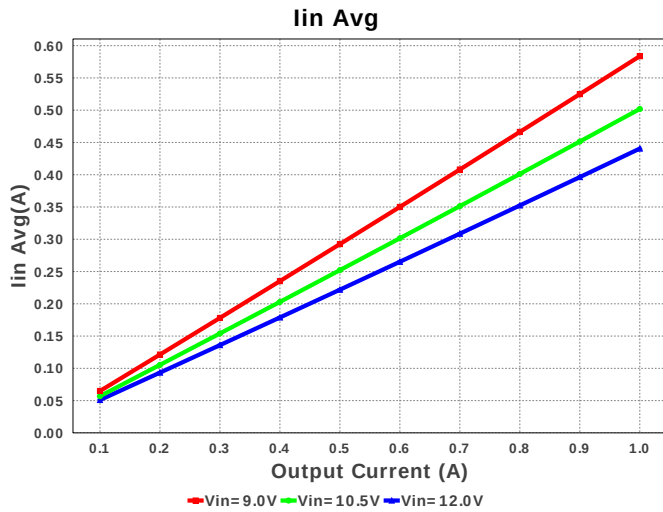


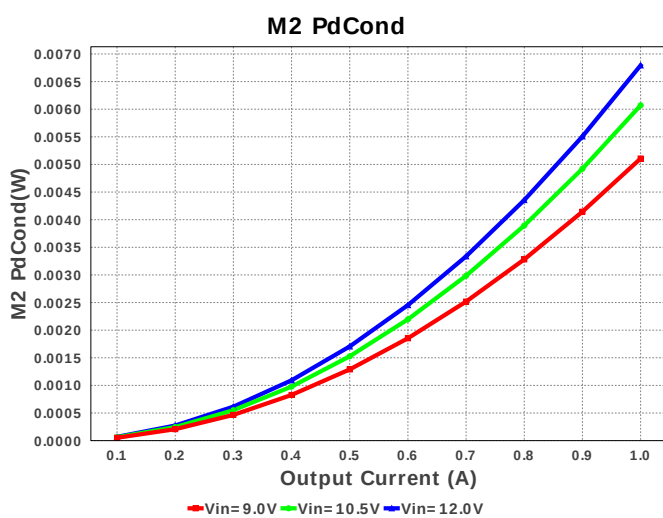
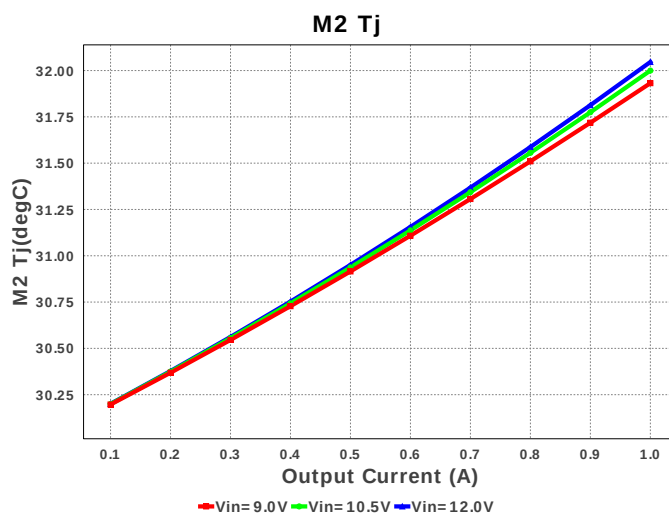
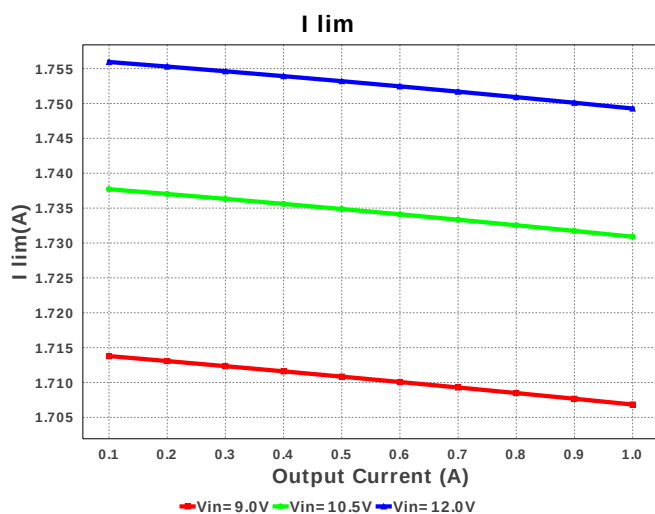
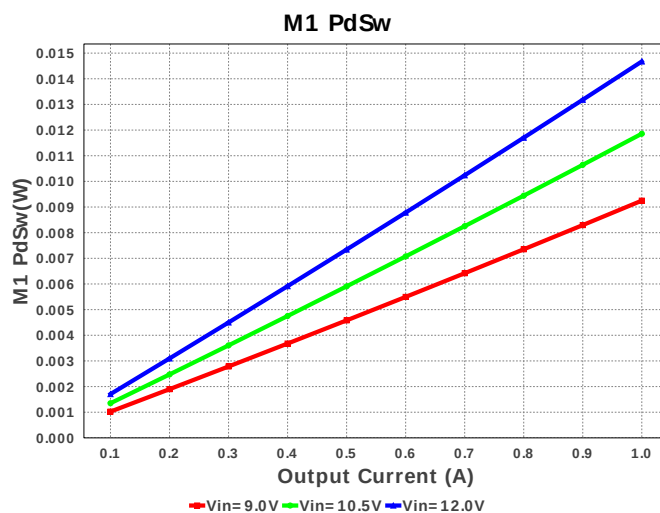
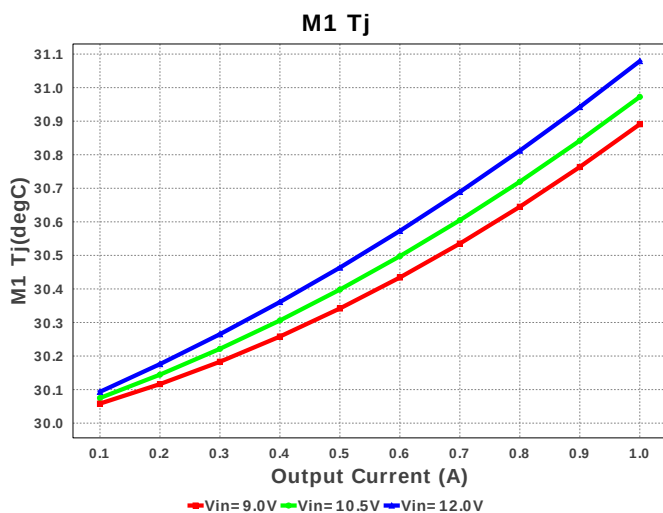
Pout



SW Ipk







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	494.847 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	108.362 mA	Current	Output capacitor RMS ripple current
3.	I lim	1.749 A	Current	Current limit threshold
4.	Iin Avg	440.62 mA	Current	Average input current
5.	L Ipp	375.38 mA	Current	Peak-to-peak inductor ripple current
6.	SW Ipk	1.188 A	Current	Peak switch current
7.	BOM Count	15	General	Total Design BOM count
8.	FootPrint	318.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	532.589 kHz	General	Switching frequency
10.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
11.	Pout	5.0 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	\$2.95	General	Total BOM Cost
13.	Vout Actual	4.992 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Duty Cycle	42.84 %	Op_point	Duty cycle
15.	Efficiency	94.564 %	Op_point	Steady state efficiency
16.	IC Tj	36.741 degC	Op_point	IC junction temperature
17.	IOUT_OP	1.0 A	Op_point	Iout operating point
18.	M1 Tj	31.079 degC	Op_point	M1 MOSFET junction temperature
19.	M2 Tj	32.121 degC	Op_point	M2 MOSFET junction temperature
20.	VIN_OP	12.0 V	Op_point	Vin operating point
21.	Vout p-p	8.81 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	1.265 mW	Power	Input capacitor power dissipation
23.	Cout Pd	939.384 μ W	Power	Output capacitor power dissipation
24.	IC Pd	103.715 mW	Power	IC power dissipation
25.	L Pd	119.75 mW	Power	Inductor power dissipation
26.	M1 Pd	20.294 mW	Power	M1 MOSFET total power dissipation
27.	M1 PdCond	5.619 mW	Power	M1 MOSFET conduction losses
28.	M1 PdSw	14.674 mW	Power	M1 MOSFET switching losses
29.	M2 Pd	41.448 mW	Power	M2 MOSFET total power dissipation
30.	M2 PdCond	6.796 mW	Power	M2 MOSFET conduction losses
31.	M2 PdSw	34.653 mW	Power	M2 MOSFET switching losses
32.	Total Pd	287.425 mW	Power	Total Power Dissipation
33.	Vout Tolerance	3.813 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	9.0	Minimum input voltage
4.	Vout	5.0	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.

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