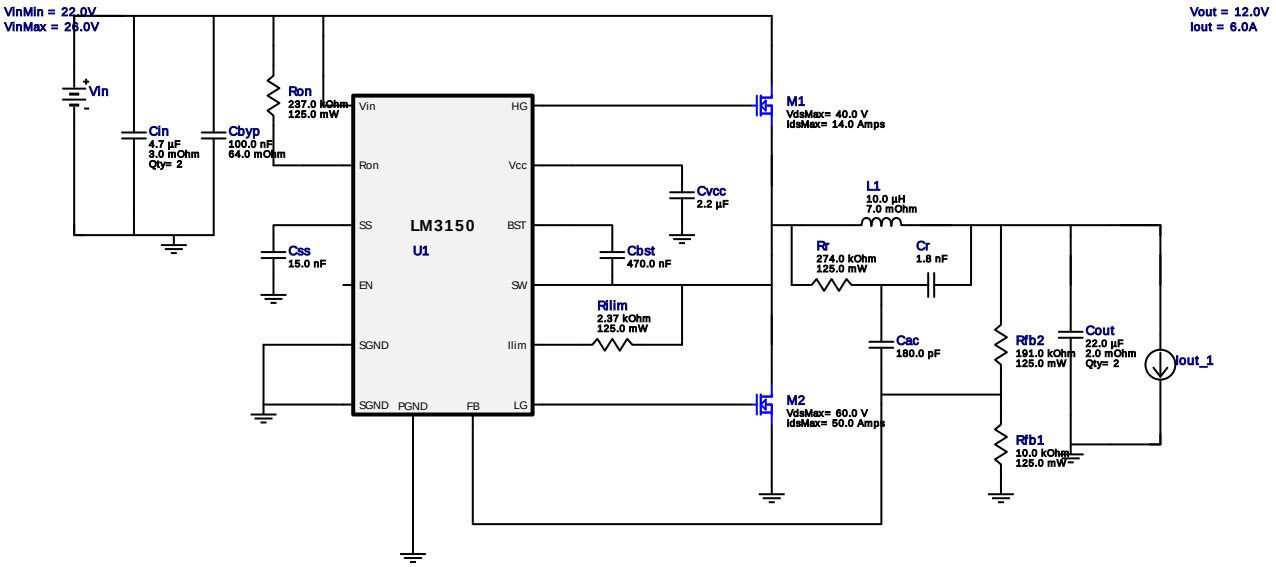
WEBENCH® Design Report

VinMin = 22.0V
VinMax = 26.0V
Vout = 12.0V
Iout = 6.0A

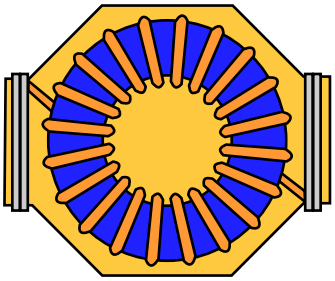
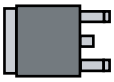
Device = LM3150MH/NOPB
Topology = Buck
Created = 1/29/15 6:07:03 AM
BOM Cost = $5.05
Footprint = 1,232.0 mm^2
BOM Count = 19
Total Pd = 2.37W

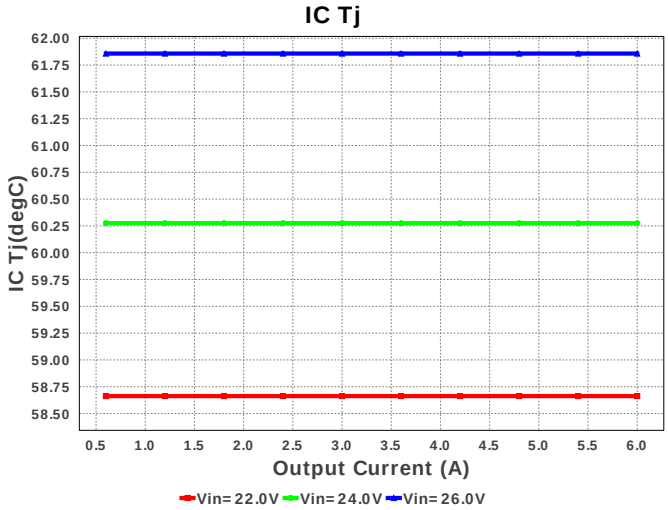
Design : 388886/100 LM3150MH/NOPB
LM3150MH/NOPB 22.0V-26.0V to 12.00V @ 6.0A

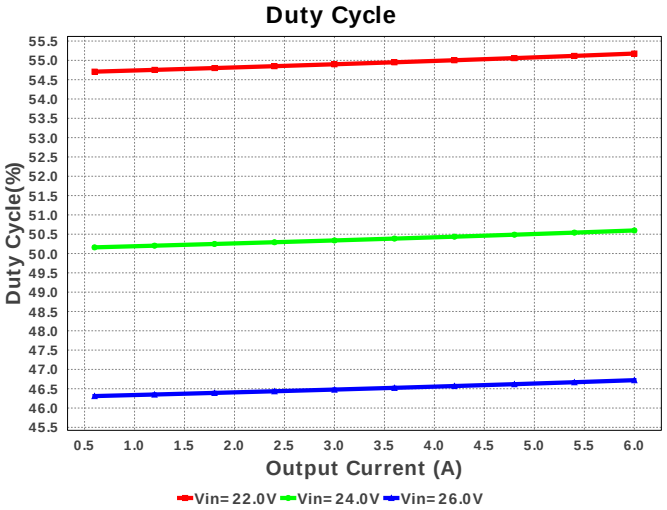


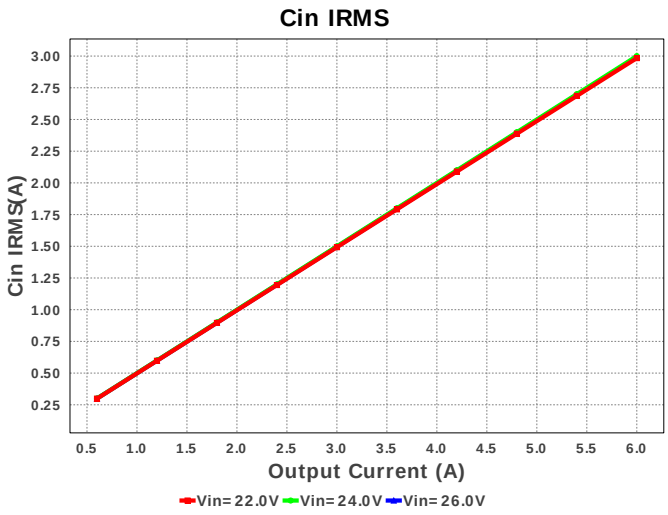
Electrical BOM

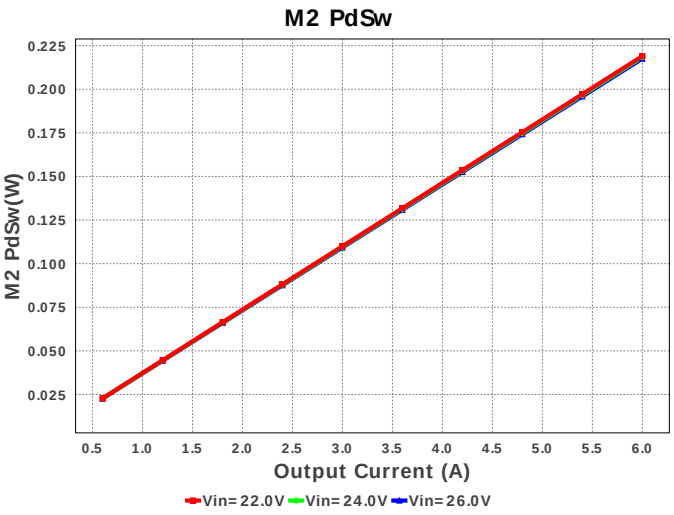
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cac	Kemet	C0805C181K5GACTU Series= C0G	Cap= 180.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
2.	Cbst	Taiyo Yuden	EMK212B7474KD-T Series= X7R	Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm^2
3.	Cbyp	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm^2
4.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	2	$0.22	1206 11 mm^2
5.	Cout	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	2	$0.28	1210 15 mm^2
6.	Cr	MuRata	GRM216R71E182KA01D Series= X7R	Cap= 1.8 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
7.	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
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 mm^2

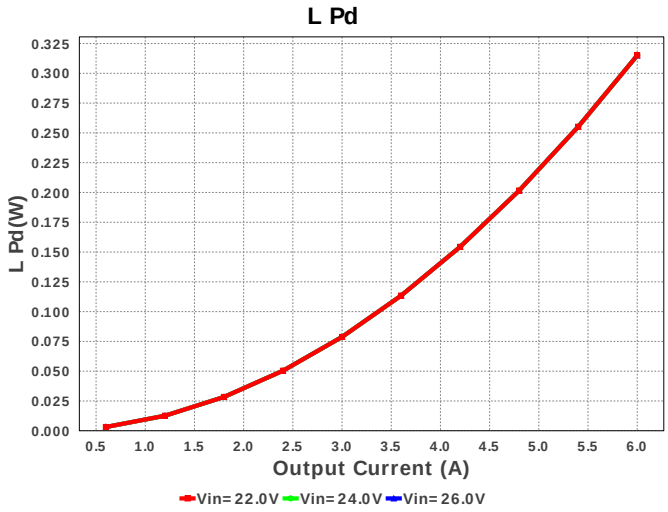
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	L1	Bourns	PM2110-100K-RC	L= 10.0 µH DCR= 7.0 mOhm	1	$1.21	 PM2110 890 mm^2
10.	M1	Fairchild Semiconductor	FDD8647L	VdsMax= 40.0 V IdsMax= 14.0 Amps	1	$0.50	 DPAK 102 mm^2
11.	M2	Infineon Technologies	BSC100N06LS3 G	VdsMax= 60.0 V IdsMax= 50.0 Amps	1	$0.34	 PG-TDSON-8 55 mm^2
12.	Rfb1	Panasonic	ERJ-6ENF1002V Series= 225	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
13.	Rfb2	Panasonic	ERJ-6ENF1913V Series= 225	Res= 191.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
14.	Rilim	Panasonic	ERJ-6ENF2371V Series= 225	Res= 2.37 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
15.	Ron	Panasonic	ERJ-6ENF2373V Series= 225	Res= 237.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
16.	Rr	Panasonic	ERJ-6ENF2743V Series= 225	Res= 274.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
17.	U1	Texas Instruments	LM3150MH/NOPB	Switcher	1	$1.86	 MXA14A 59 mm^2

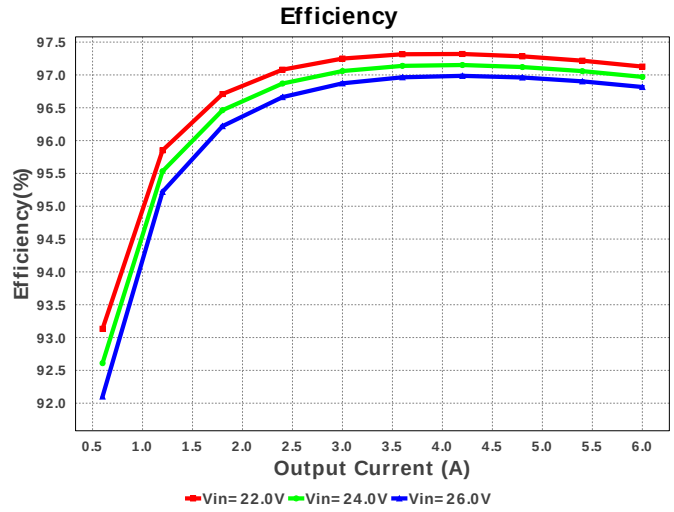


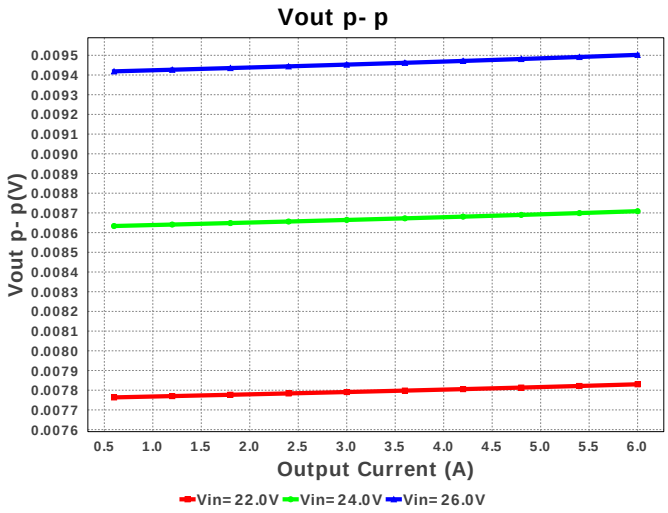


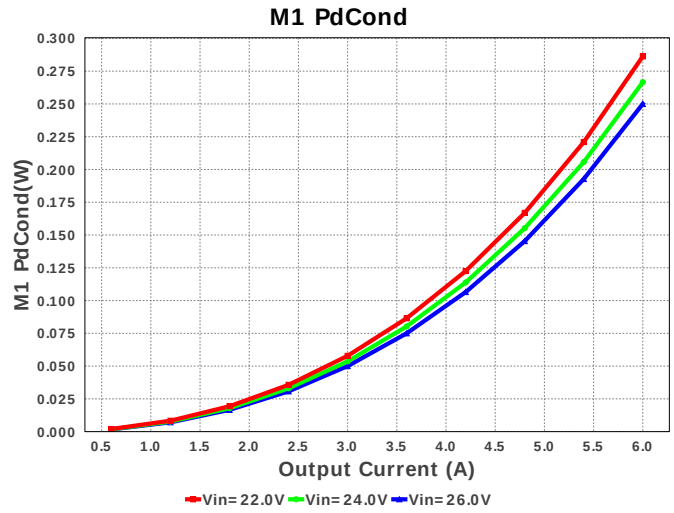


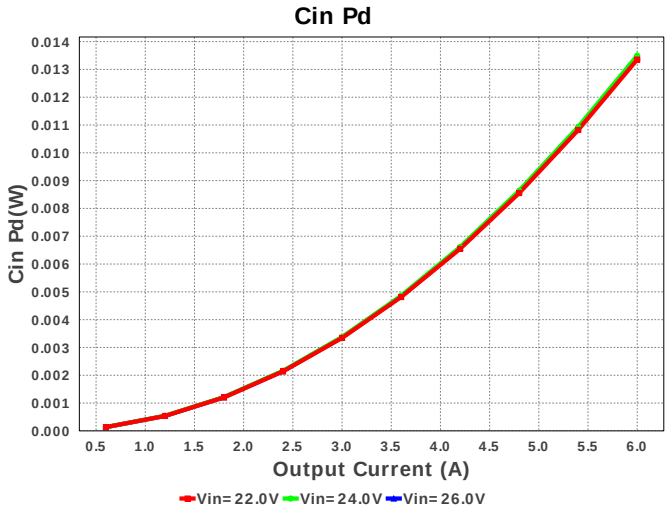


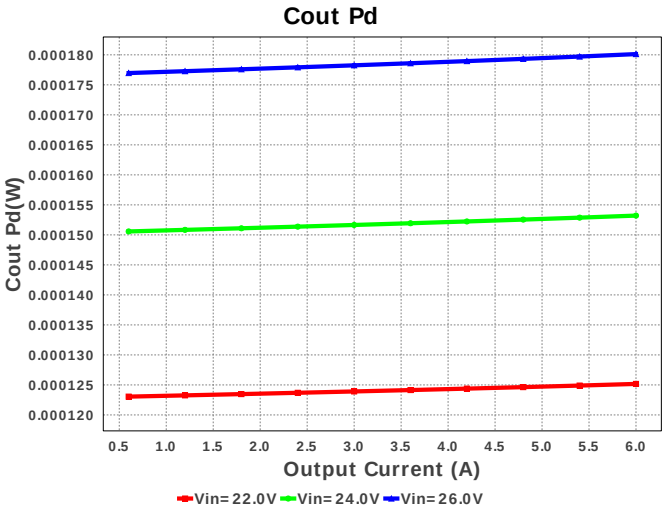


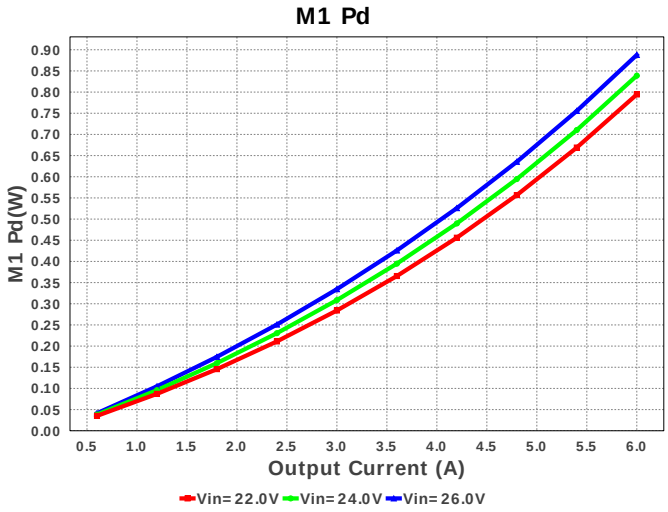


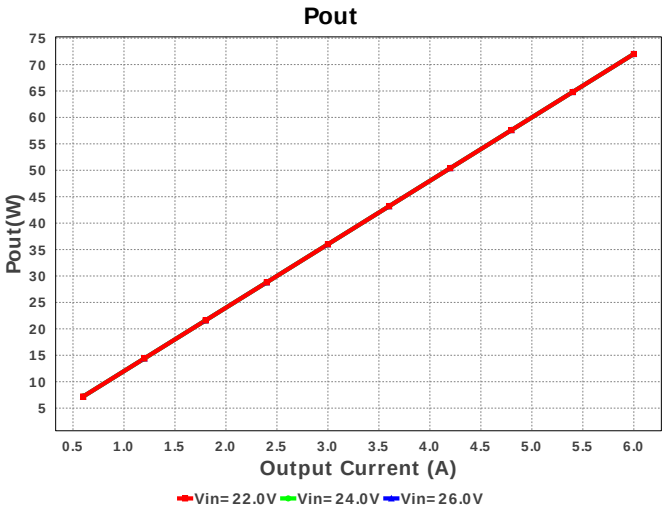


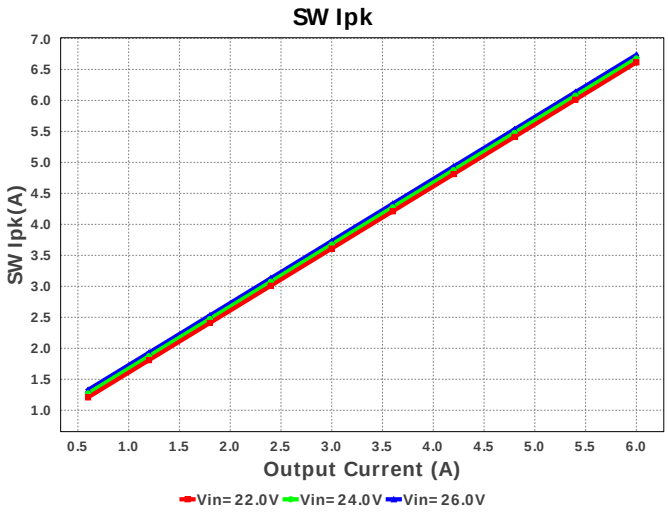


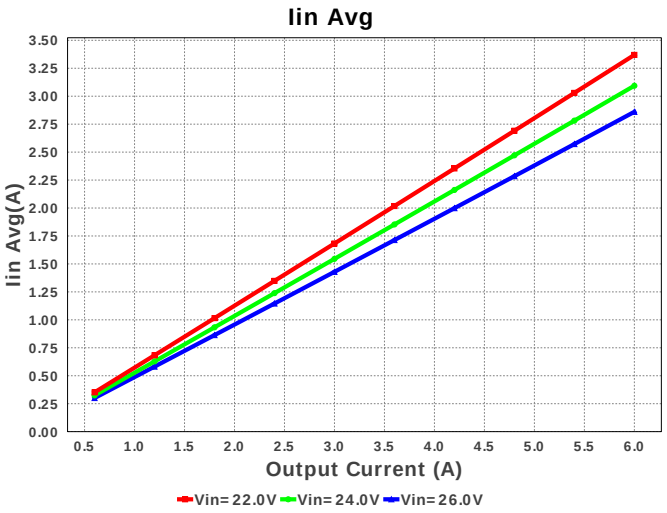


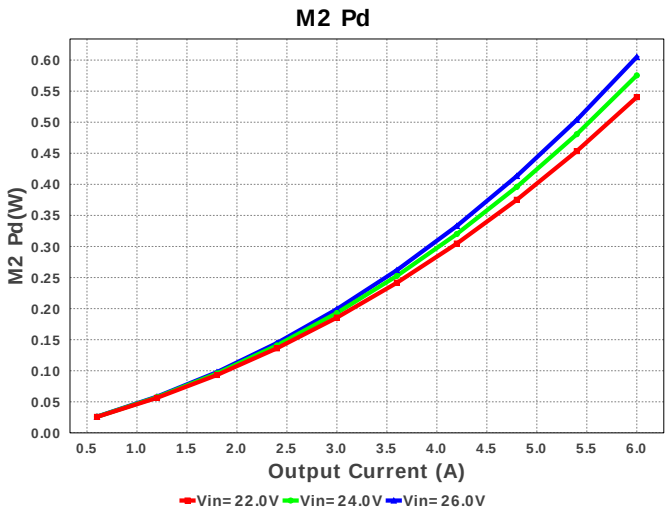


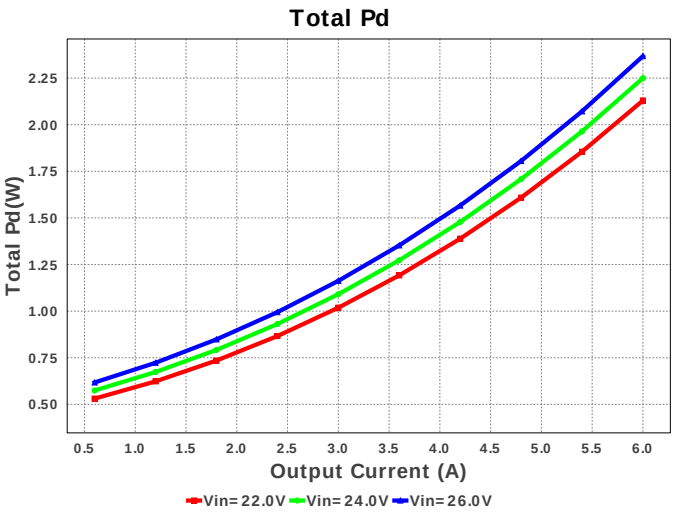


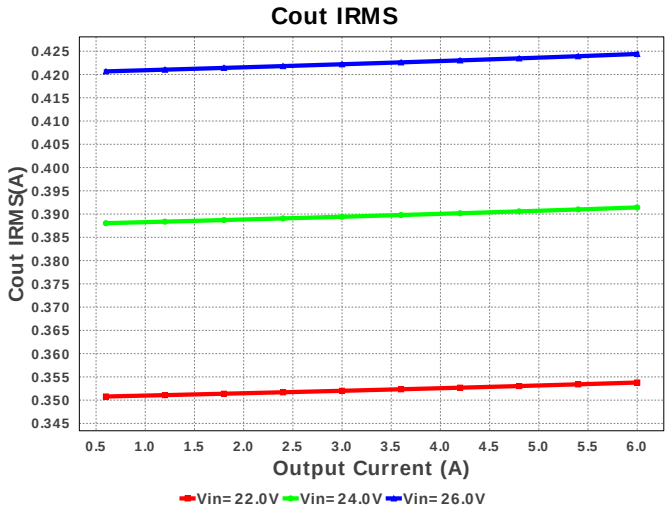


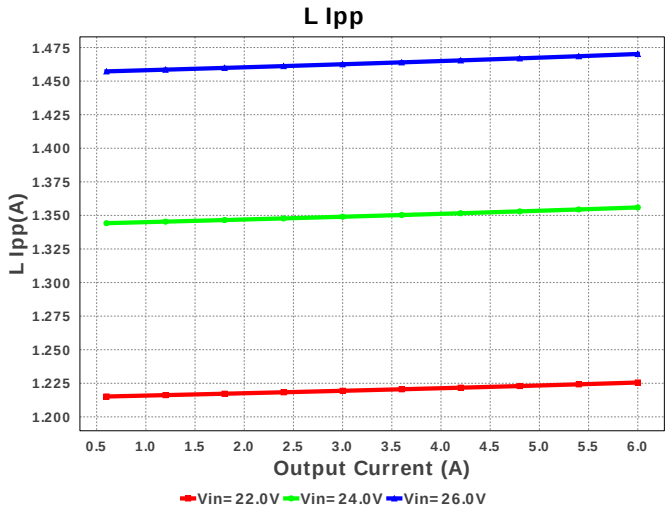


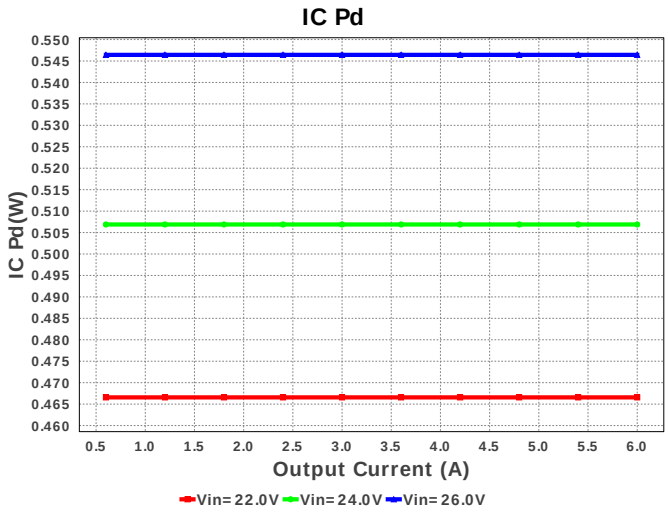


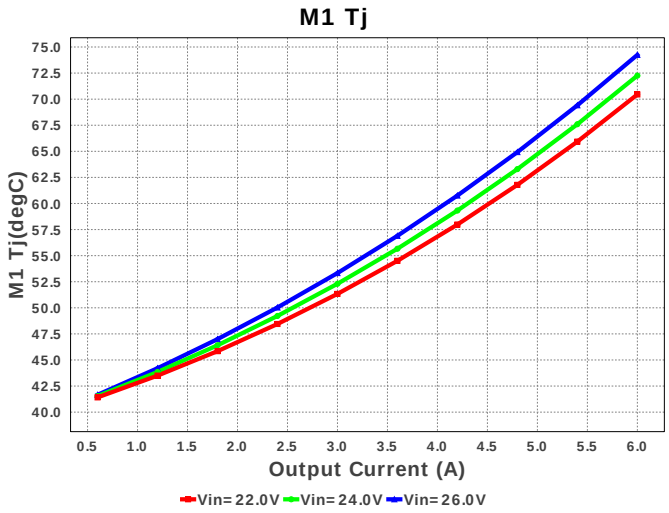


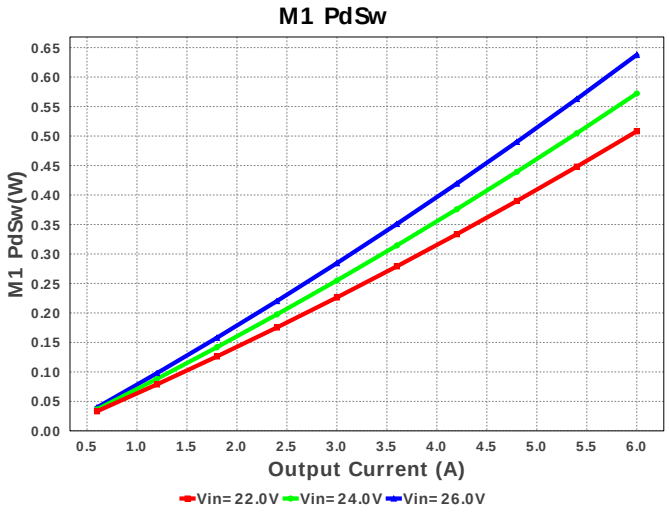


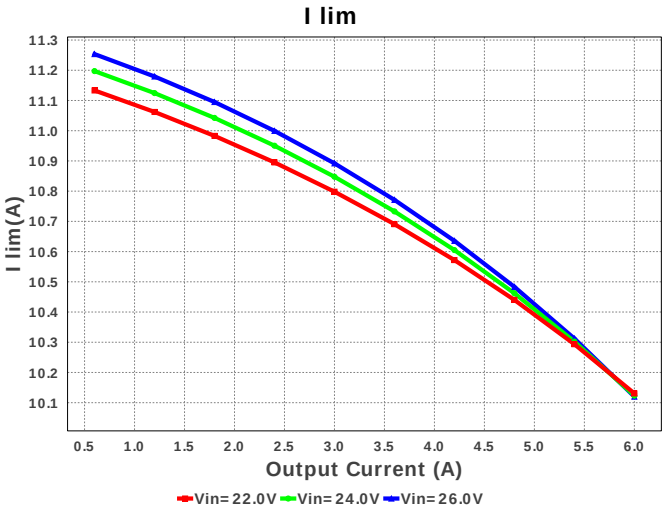


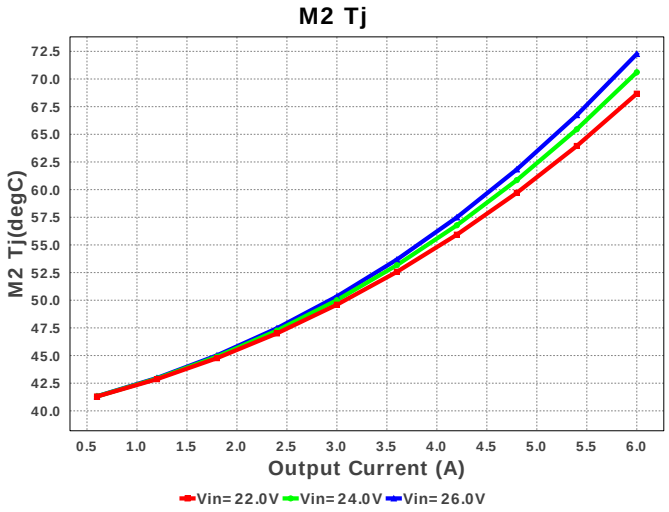


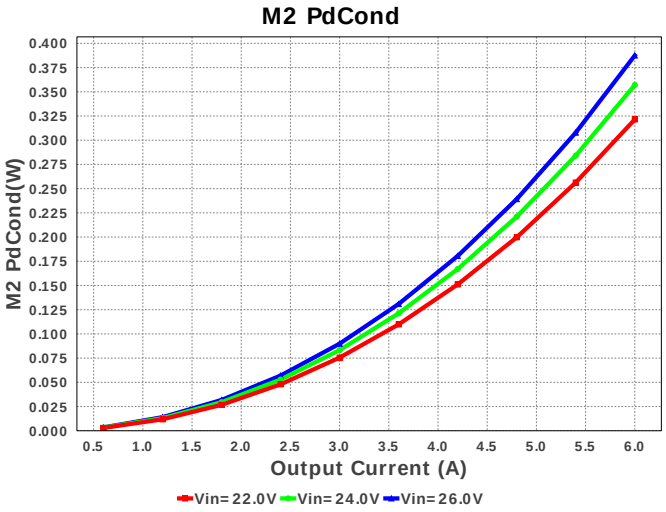












Operating Values

#	Name	Value	Category	Description
1.	BOM Count	19		Total Design BOM count
2.	Total BOM	$5.05		Total BOM Cost
3.	Cin IRMS	2.994 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	424.408 mA	Current	Output capacitor RMS ripple current
5.	I lim	10.12 A	Current	Current limit threshold
6.	Iin Avg	2.86 A	Current	Average input current
7.	L Ipp	1.47 A	Current	Peak-to-peak inductor ripple current
8.	SW Ipk	6.735 A	Current	Peak switch current
9.	FootPrint	1.232 k mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	444.905 kHz	General	Switching frequency
11.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
12.	Pout	72.0 W	General	Total output power
13.	Duty Cycle	46.721 %	Op_point	Duty cycle
14.	Efficiency	96.816 %	Op_point	Steady state efficiency
15.	IC Tj	61.857 degC	Op_point	IC junction temperature
16.	IOUT_OP	6.0 A	Op_point	Iout operating point
17.	M1 Tj	74.245 degC	Op_point	M1 MOSFET junction temperature
18.	M2 Tj	72.262 degC	Op_point	M2 MOSFET junction temperature
19.	VIN_OP	26.0 V	Op_point	Vin operating point
20.	Vout p-p	9.502 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	13.442 mW	Power	Input capacitor power dissipation
22.	Cout Pd	180.122 µW	Power	Output capacitor power dissipation
23.	IC Pd	546.431 mW	Power	IC power dissipation
24.	L Pd	315.0 mW	Power	Inductor power dissipation
25.	M1 Pd	887.834 mW	Power	M1 MOSFET total power dissipation
26.	M1 PdCond	250.039 mW	Power	M1 MOSFET conduction losses
27.	M1 PdSw	637.795 mW	Power	M1 MOSFET switching losses
28.	M2 Pd	605.021 mW	Power	M2 MOSFET total power dissipation
29.	M2 PdCond	387.492 mW	Power	M2 MOSFET conduction losses
30.	M2 PdSw	217.529 mW	Power	M2 MOSFET switching losses
31.	Total Pd	2.368 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	6.0	Maximum Output Current
2.	Iout1	6.0	Output Current #1
3.	VinMax	26.0	Maximum input voltage
4.	VinMin	22.0	Minimum input voltage
5.	Vout	12.0	Output Voltage
6.	Vout1	12.0	Output Voltage #1
7.	base_pn	LM3150	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	40.0	Ambient temperature

Design Assistance

1. **LM3150** Product Folder : http://www.ti.com/product/lm3150 : contains the data sheet and other resources.