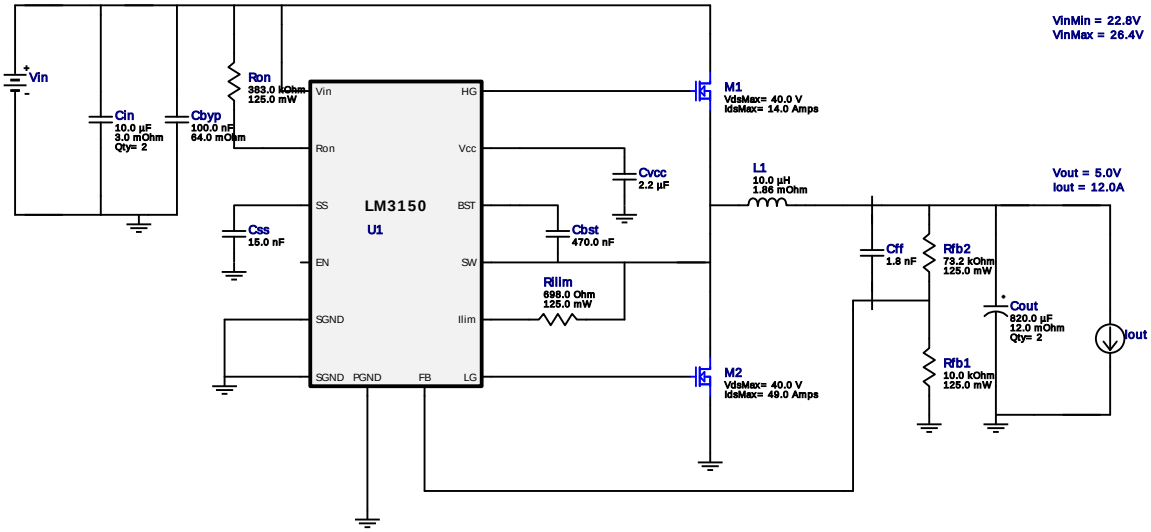
WEBENCH® Design Report

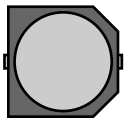
VinMin = 22.8V
VinMax = 26.4V
Vout = 5.0V
Iout = 12.0A

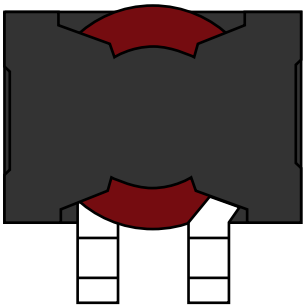
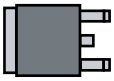
Device = LM3150MH/NOPB
Topology = Buck
Created = 12/27/13 1:07:15 PM
BOM Cost = $8.22
Total Pd = 2.16W
Footprint = 1,612.0mm2
BOM Count = 17

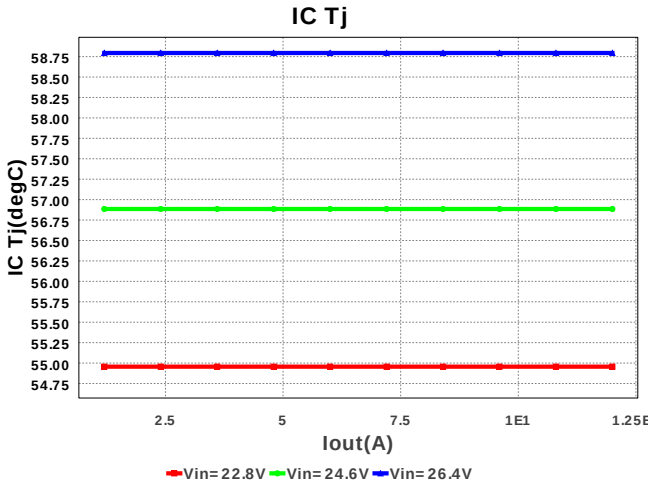
Design : 1202835/28 LM3150MH/NOPB
LM3150MH/NOPB 22.8V-26.4V to 5.0V @ 12.0A

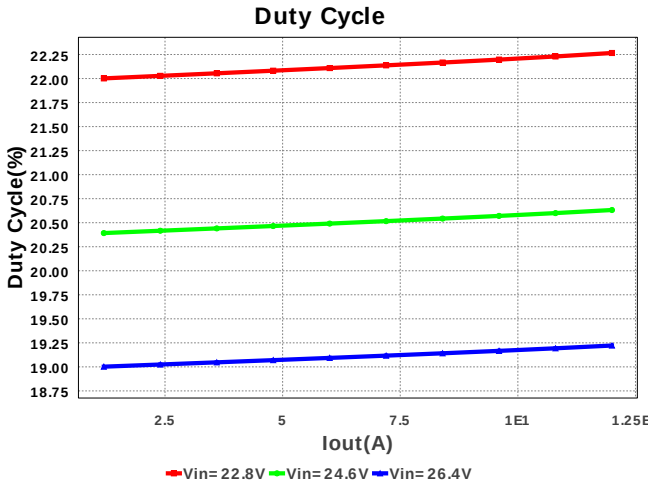


Electrical BOM

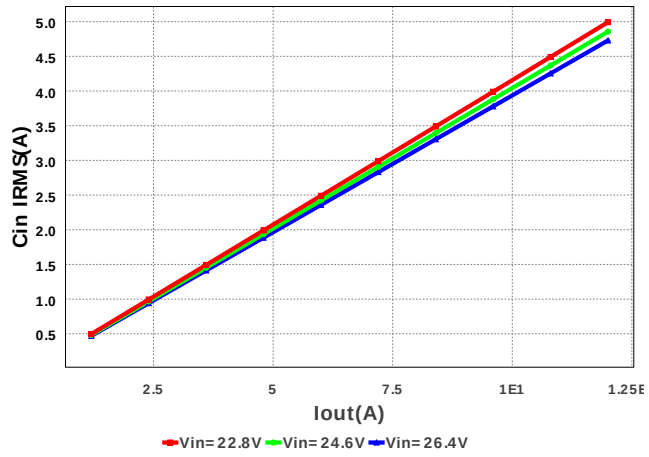
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Taiyo Yuden	EMK212B7474KD-T Series= X7R	Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	 0805 7mm2
2.	Cbyp	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	 0805 7mm2
3.	Cff	MuRata	GRM216R71E182KA01D Series= X7R	Cap= 1.8 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	 0805 7mm2
4.	Cin	TDK	C5750X7R1H106M Series= X7R	Cap= 10.0 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 5.5 A	2	$0.68	 2220 60mm2
5.	Cout	Sanyo	6SVP820M Series= 261	Cap= 820.0 µF ESR= 12.0 mOhm VDC= 6.3 V IRMS= 5.44 A	2	$0.72	 SM_RADIAL_10AMM 160mm2
6.	Css	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0805 7mm2
7.	Cvcc	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 µF VDC= 16.0 V IRMS= 0.0 A	1	$0.03	 0805 7mm2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	L1	Coilcraft	SER2915H-103KL	L= 10.0 µH DCR= 1.86 mOhm	1	$2.17	 SER2915 895mm2
9.	M1	Fairchild Semiconductor	FDD8647L	VdsMax= 40.0 V IdsMax= 14.0 Amps	1	$0.50	 DPAK 102mm2
10.	M2	Fairchild Semiconductor	FDMS8460	VdsMax= 40.0 V IdsMax= 49.0 Amps	1	$1.08	 TRANS_Fairchild_PQFN08A 56mm2
11.	Rfb1	Vishay-Dale	CRCW080510K0FKEA Series= CRCW..e3	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
12.	Rfb2	Vishay-Dale	CRCW080573K2FKEA Series= CRCW..e3	Res= 73.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
13.	Rilim	Vishay-Dale	CRCW0805698RFKEA Series= CRCW..e3	Res= 698.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
14.	Ron	Vishay-Dale	CRCW0805383KFKEA Series= CRCW..e3	Res= 383.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
15.	U1	Texas Instruments	LM3150MH/NOPB	Switcher	1	$1.55	 MXA14A 59mm2

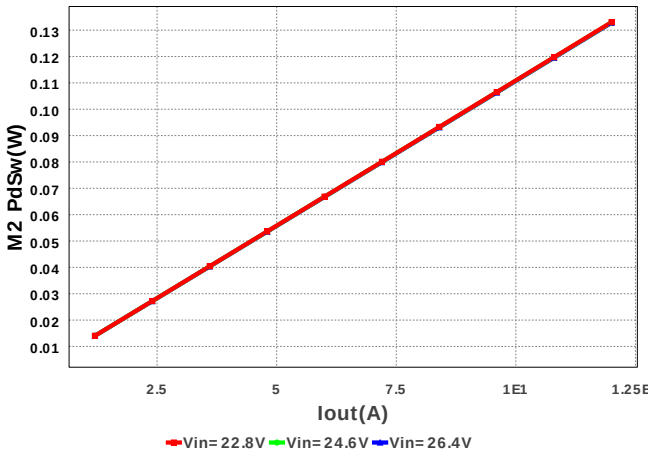




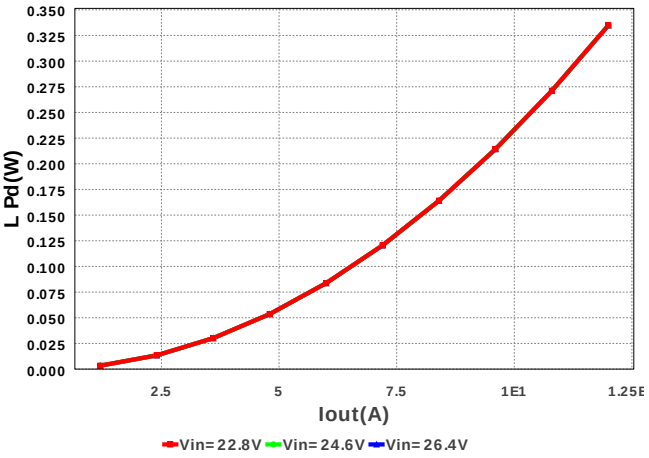
Cin IRMS



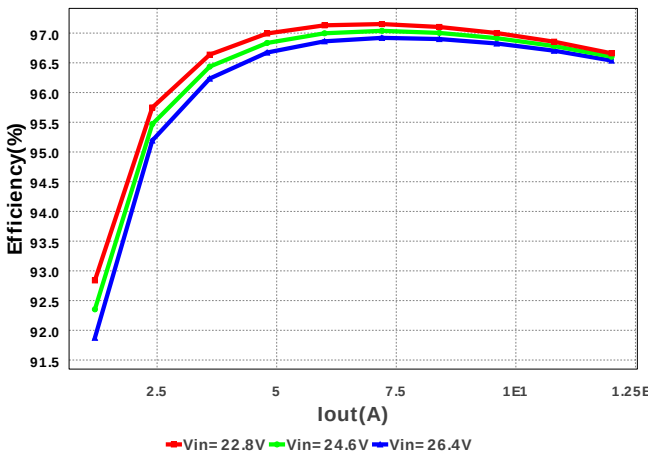
M2 PdSw



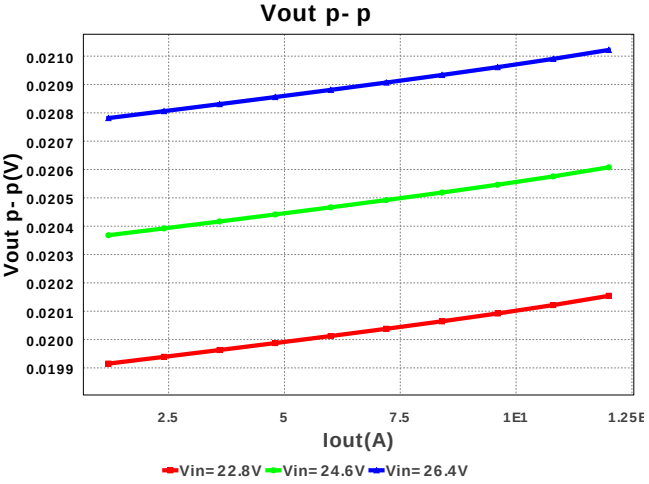
L Pd



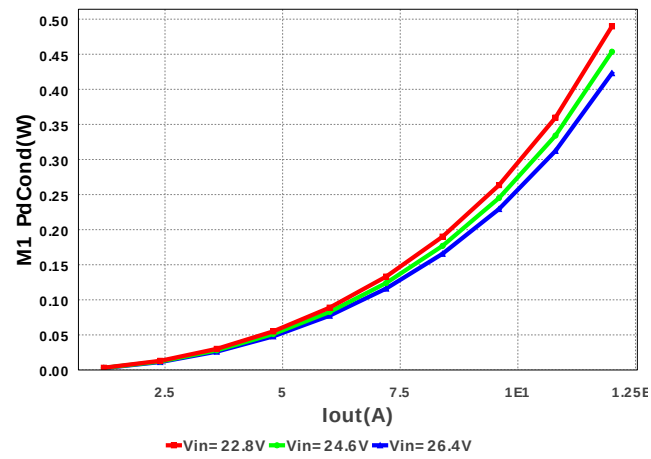
Efficiency

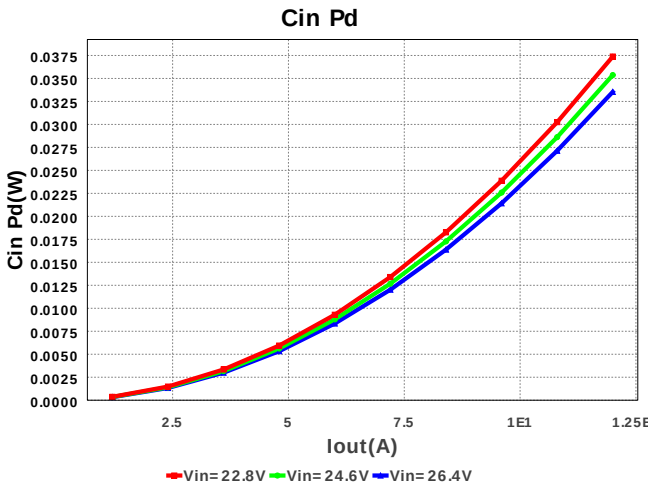


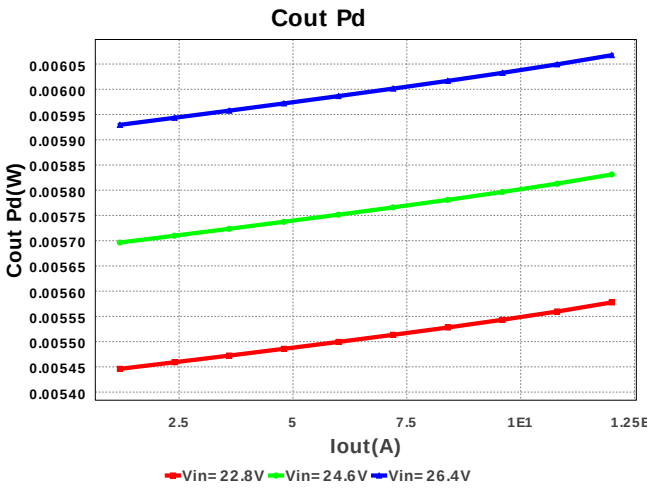
Vout p- p

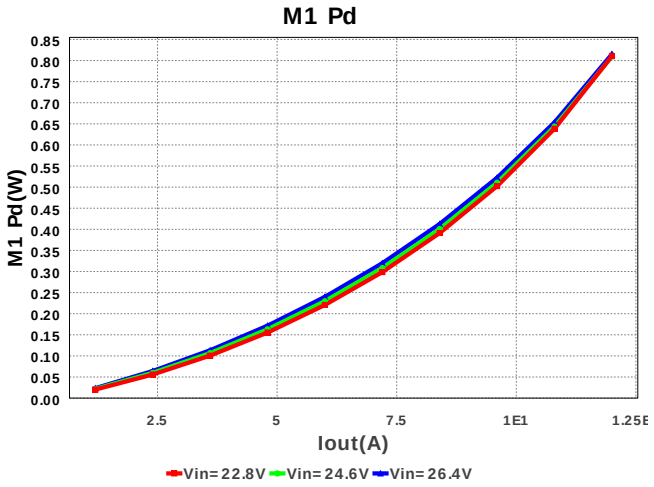


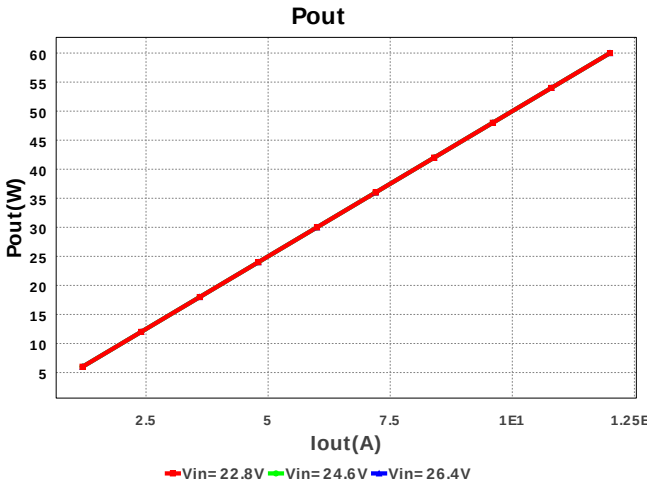
M1 PdCond

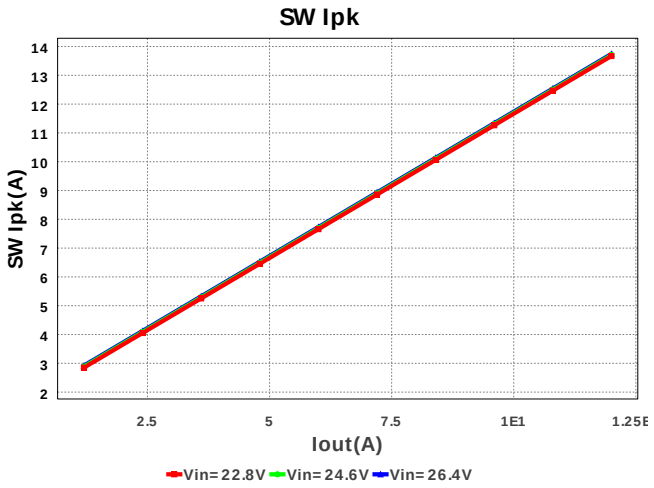


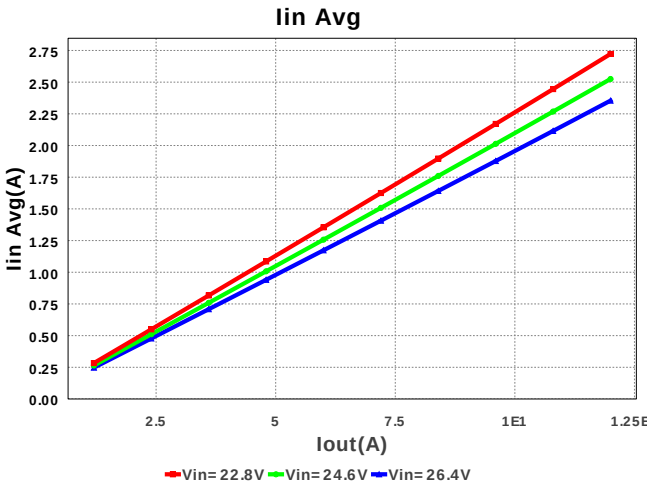


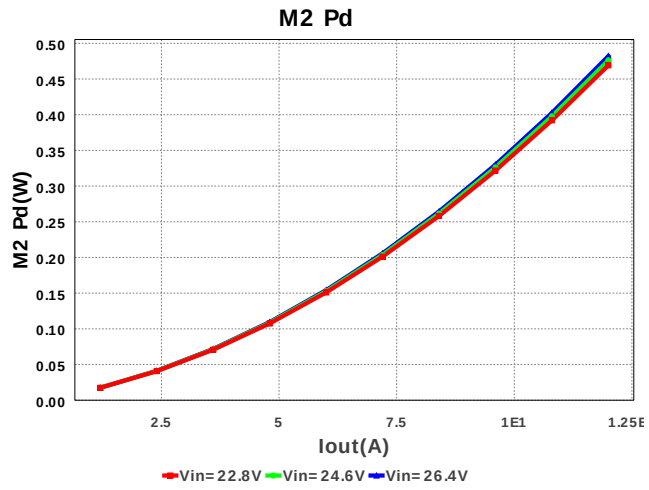


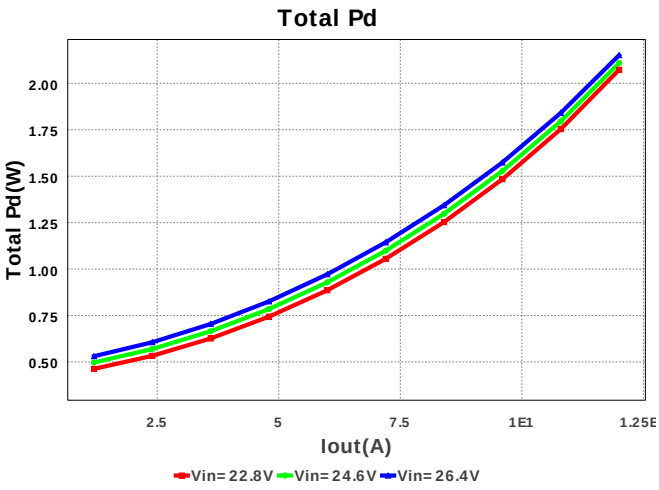


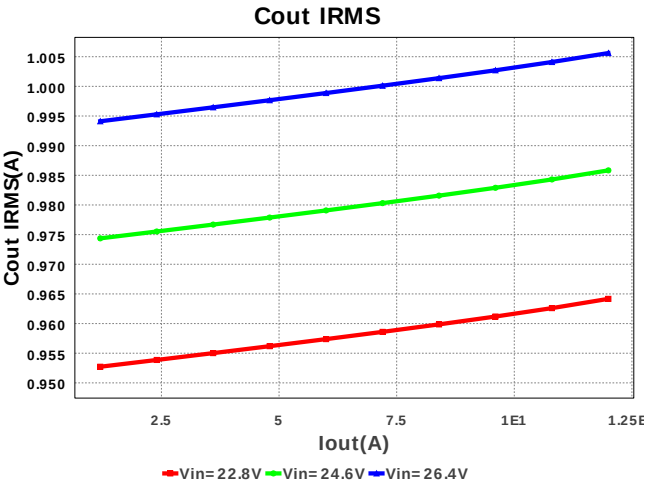


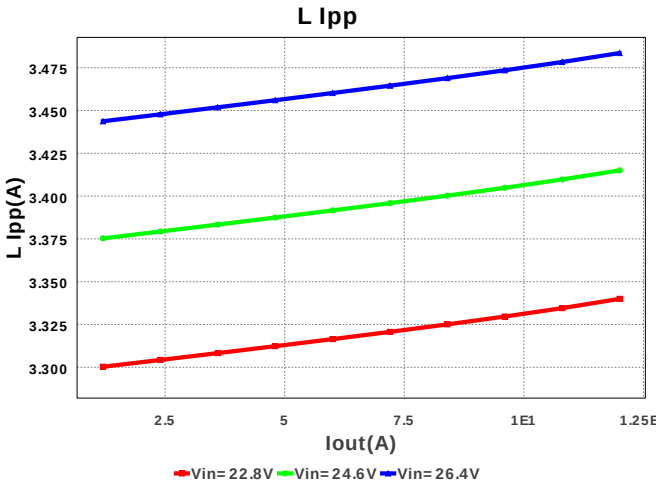


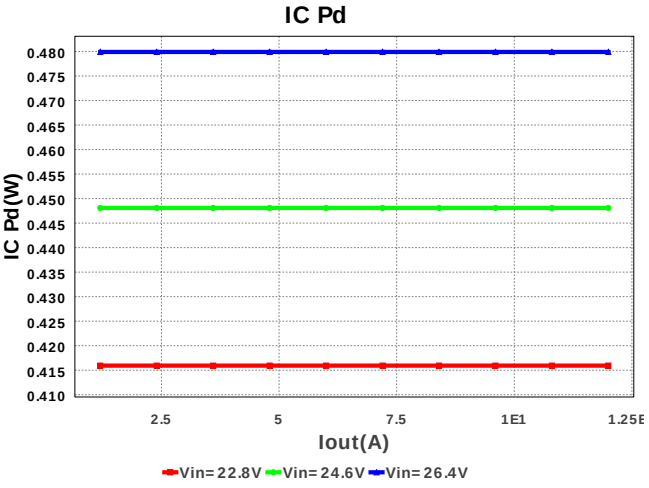


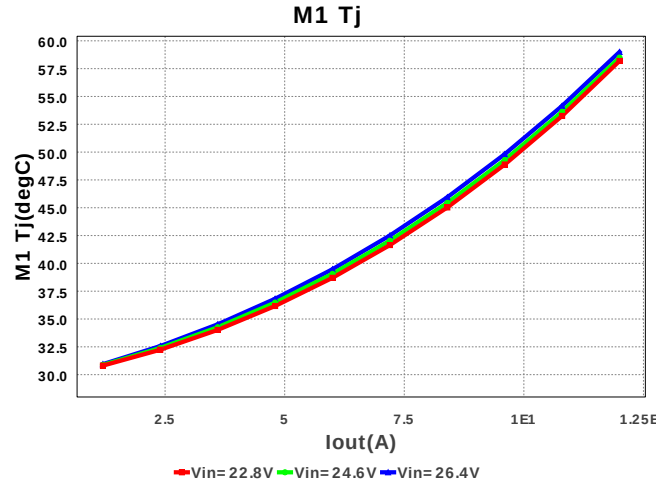


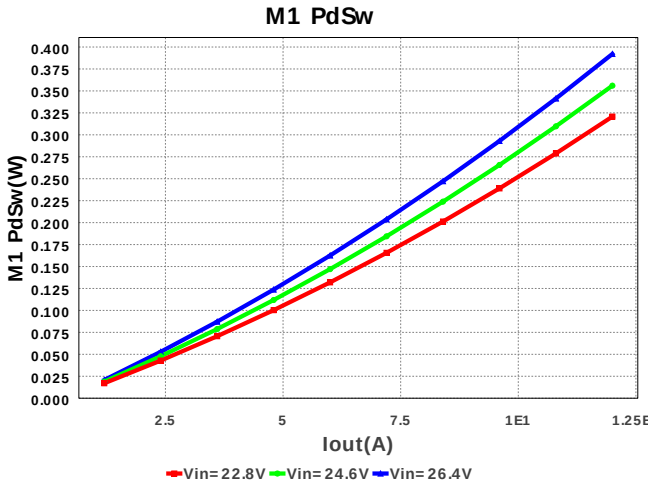


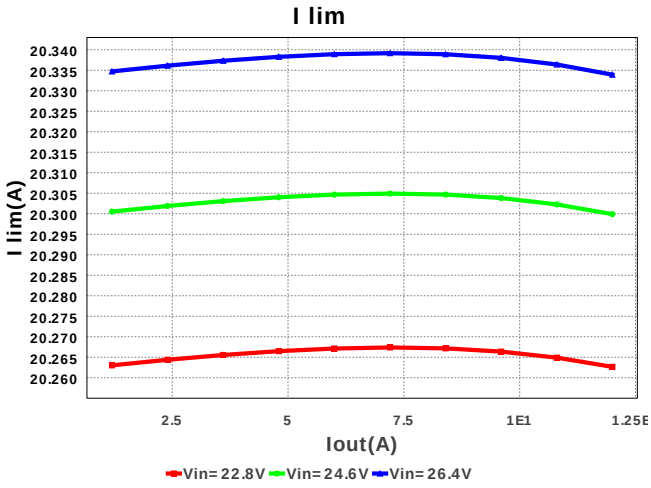


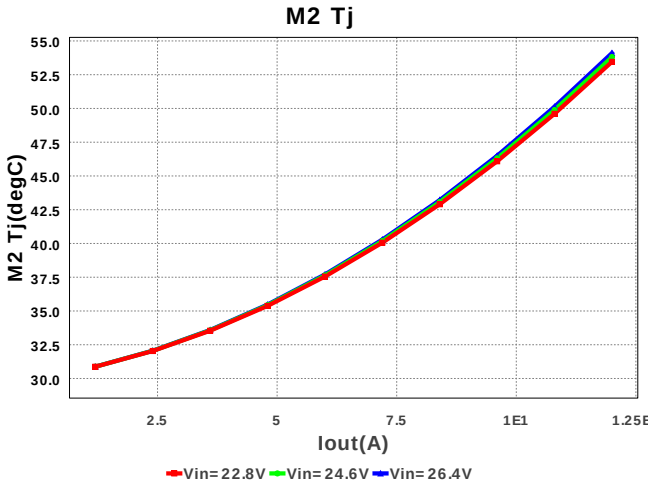


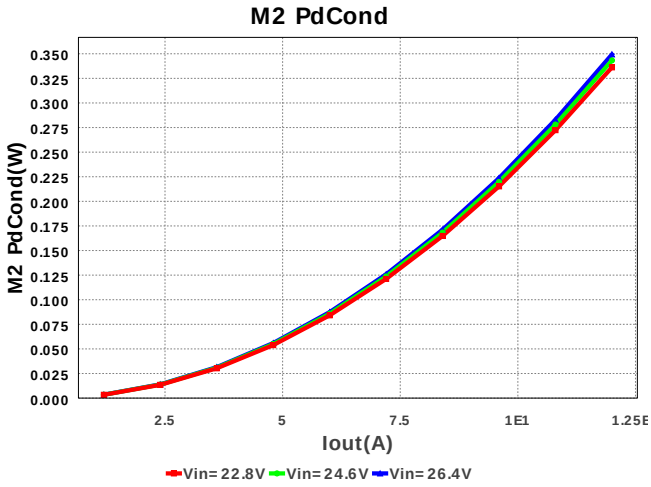












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	4.729 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.006 A	Current	Output capacitor RMS ripple current
3.	I lim	20.334 A	Current	Current limit threshold
4.	Iin Avg	2.354 A	Current	Average input current
5.	L Ipp	3.484 A	Current	Peak-to-peak inductor ripple current
6.	SW Ipk	13.742 A	Current	Peak switch current
7.	BOM Count	17	General	Total Design BOM count
8.	FootPrint	1.612 kmm2	General	Total Foot Print Area of BOM components
9.	Frequency	118.084 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	$8.22	General	Total BOM Cost
13.	Duty Cycle	19.222 %	Op_point	Duty cycle
14.	Efficiency	96.531 %	Op_point	Steady state efficiency
15.	IC Tj	61.194 degC	Op_point	IC junction temperature
16.	IOUT_OP	12.0 A	Op_point	Iout operating point
17.	M1 Tj	59.001 degC	Op_point	M1 MOSFET junction temperature
18.	M2 Tj	54.256 degC	Op_point	M2 MOSFET junction temperature
19.	VIN_OP	26.4 V	Op_point	Vin operating point
20.	Vout p-p	21.022 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	33.539 mW	Power	Input capacitor power dissipation
22.	Cout Pd	6.068 mW	Power	Output capacitor power dissipation
23.	IC Pd	479.904 mW	Power	IC power dissipation
24.	L Pd	334.8 mW	Power	Inductor power dissipation
25.	M1 Pd	816.748 mW	Power	M1 MOSFET total power dissipation
26.	M1 PdCond	424.652 mW	Power	M1 MOSFET conduction losses
27.	M1 PdSw	392.096 mW	Power	M1 MOSFET switching losses
28.	M2 Pd	485.211 mW	Power	M2 MOSFET total power dissipation
29.	M2 PdCond	349.359 mW	Power	M2 MOSFET conduction losses
30.	M2 PdSw	135.852 mW	Power	M2 MOSFET switching losses
31.	Total Pd	2.156 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	12.0 A	Maximum Output Current
2.	Iout1	12.0 Amps	Output Current #1
3.	VinMax	26.4 V	Maximum input voltage
4.	VinMin	22.8 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	LM3150	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

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