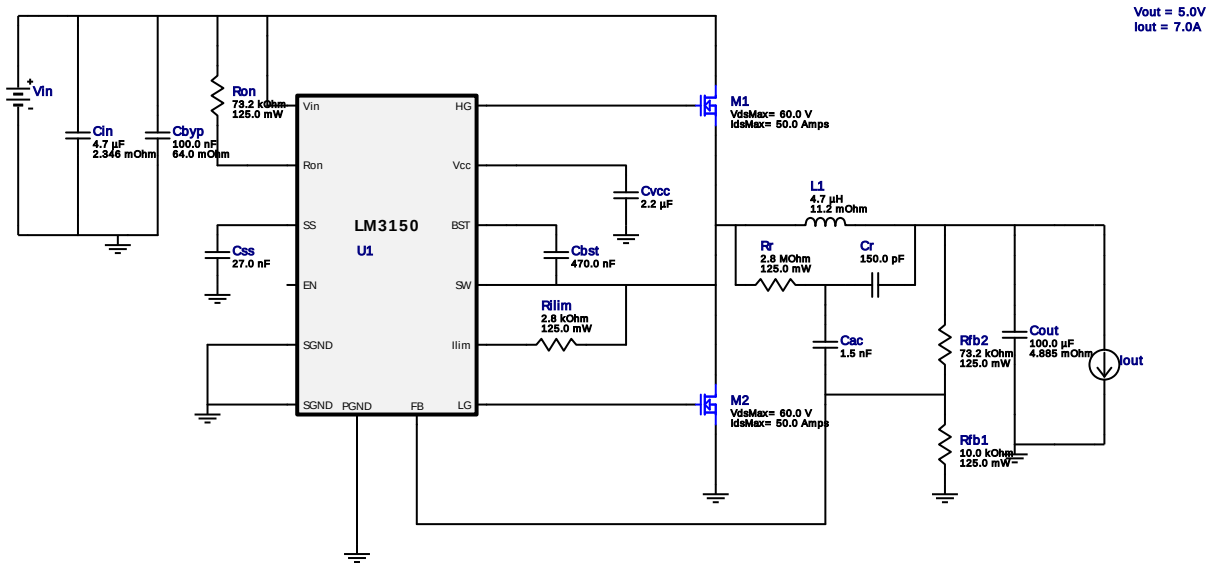
VinMin = 22.0V
VinMax = 27.0V
Vout = 5.0V
Iout = 7.0A

Device = LM3150MH/NOPB
Topology = Buck
Created = 2017-07-27 14:00:15.038
BOM Cost = $3.20
BOM Count = 17
Total Pd = 3.05W

WEBENCH® Design Report

Design : 3569363/110 LM3150MH/NOPB
LM3150MH/NOPB 22.0V-27.0V to 5.00V @ 7.0A

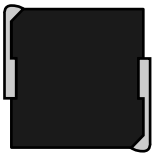


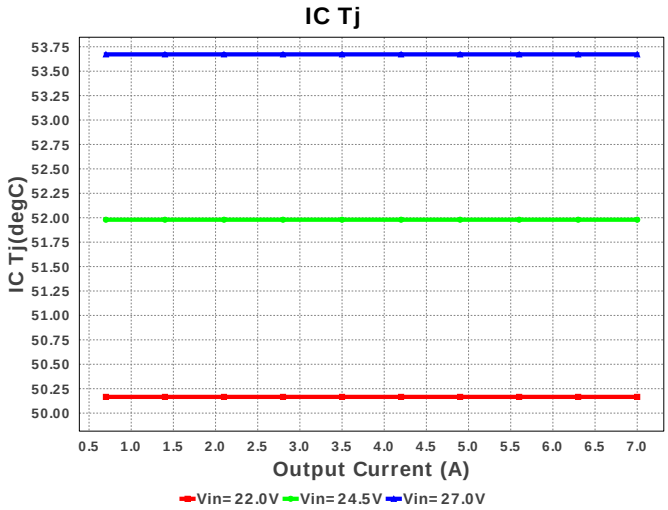
My Comments

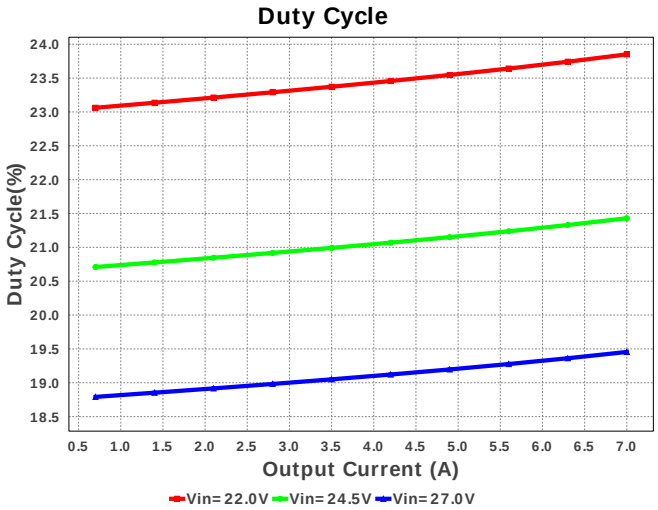
No comments

Electrical BOM

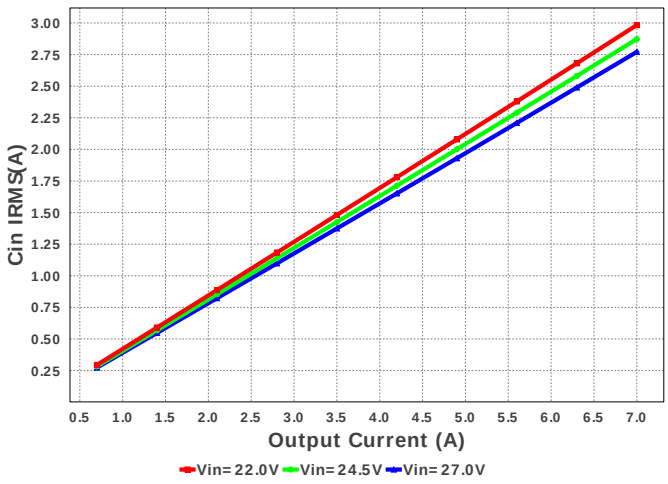
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cac	Yageo America	CC0805KRX7R9BB152 Series= X7R	Cap= 1.5 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cbst	Taiyo Yuden	EMK212B7474KD-T Series= X7R	Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
3.	Cbyp	Kemet	C0805C104K5RACTU 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	TDK	C2012X5R1H475K125AB Series= X5R	Cap= 4.7 uF ESR= 2.346 mOhm VDC= 50.0 V IRMS= 4.2602 A	1	$0.13	0805 7 mm²
5.	Cout	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	1	$0.15	1206_190 11 mm²
6.	Cr	Samsung Electro-Mechanics	CL21C151JBANNNC Series= C0G/NP0	Cap= 150.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
7.	Css	Vishay-Bccomponents	VJ0805Y273KXACW1BC Series= X7R	Cap= 27.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
8.	Cvcc	Taiyo Yuden	EMK212BJ225KG-T Series= X5R	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	Bourns	SRP1270-4R7M	L= 4.7 µH DCR= 11.2 mOhm	1	$0.60	 SRP1270 246 mm²
10.	M1	Texas Instruments	CSD18537NQ5A	VdsMax= 60.0 V IdsMax= 50.0 Amps	1	$0.28	 TRANS_NexFET_Q5A 55 mm²
11.	M2	Texas Instruments	CSD18537NQ5A	VdsMax= 60.0 V IdsMax= 50.0 Amps	1	$0.28	 TRANS_NexFET_Q5A 55 mm²
12.	Rfb1	Panasonic	ERJ-6ENF1002V Series= ERJ-6E	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
13.	Rfb2	Panasonic	ERJ-6ENF7322V Series= ERJ-6E	Res= 73.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
14.	Rilim	Panasonic	ERJ-6ENF2801V Series= ERJ-6E	Res= 2.8 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
15.	Ron	Panasonic	ERJ-6ENF7322V Series= ERJ-6E	Res= 73.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
16.	Rr	Vishay-Dale	CRCW08052M80FKEA Series= CRCW..e3	Res= 2.8 MOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
17.	U1	Texas Instruments	LM3150MH/NOPB	Switcher	1	$1.62	 MXA14A 59 mm²

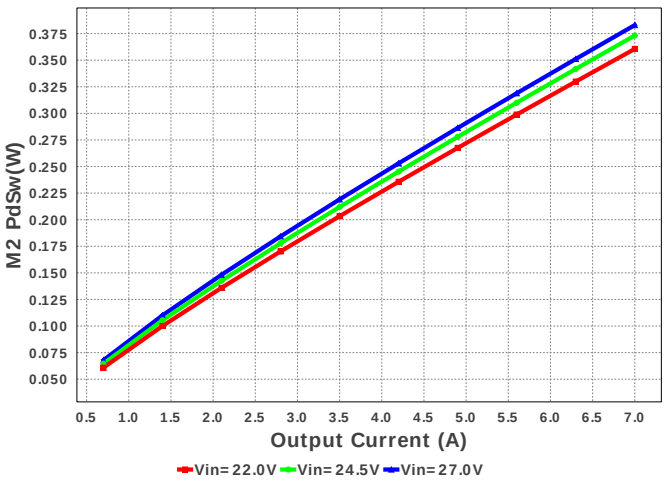




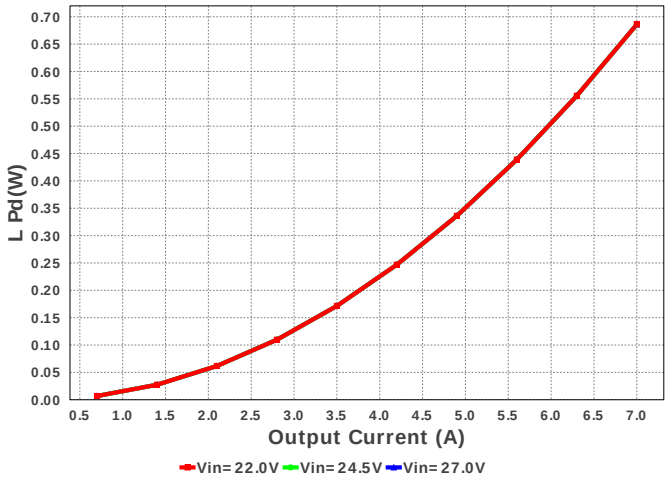
Cin IRMS



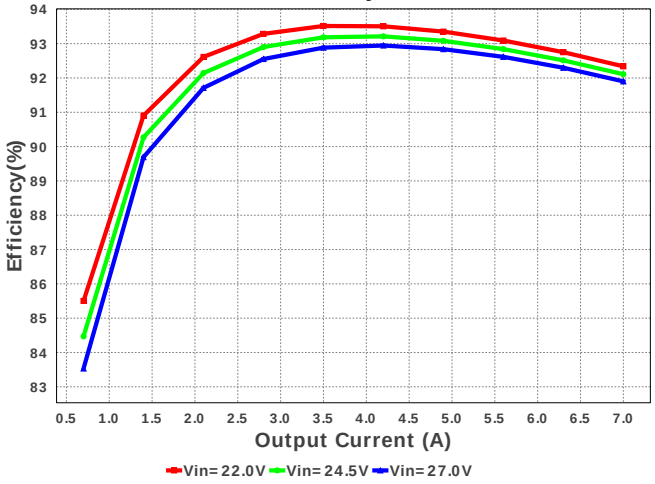
M2 PdSw



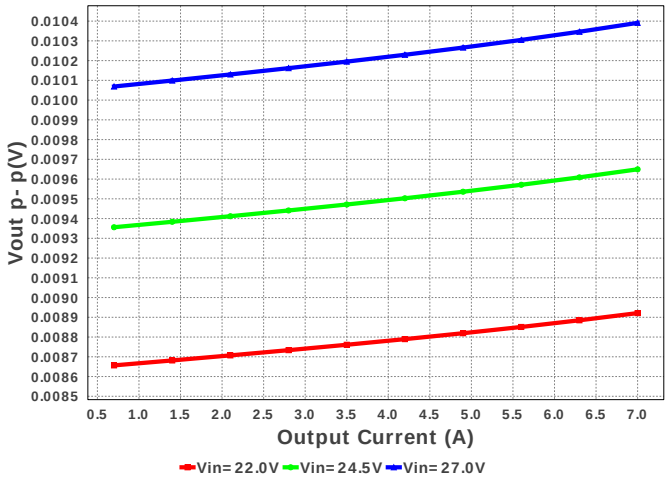
L Pd



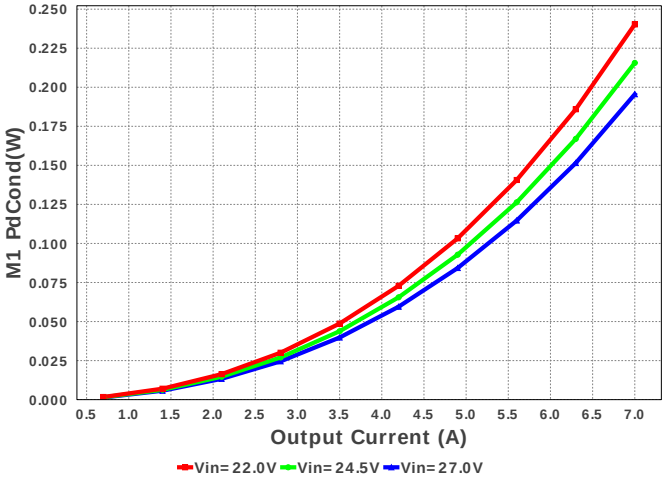
Efficiency

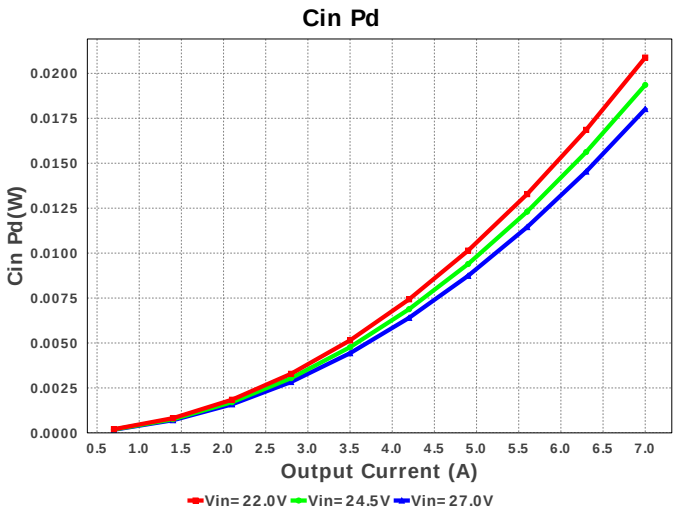


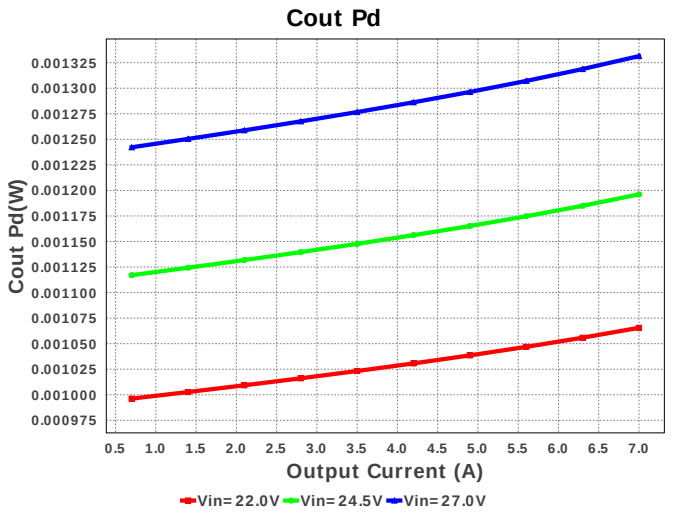
Vout p- p

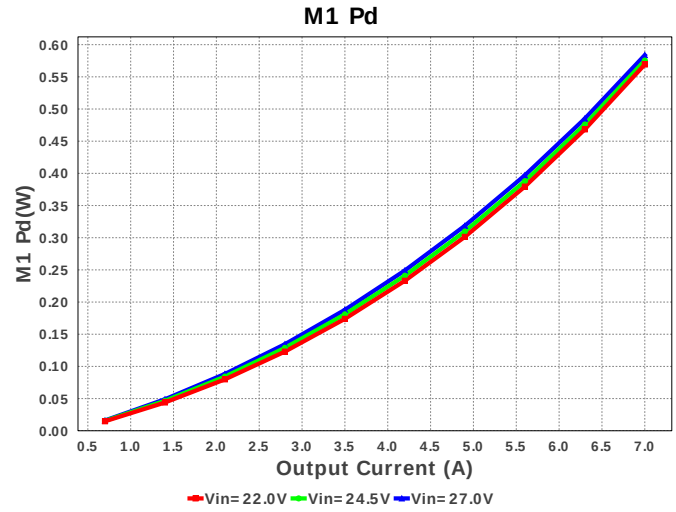


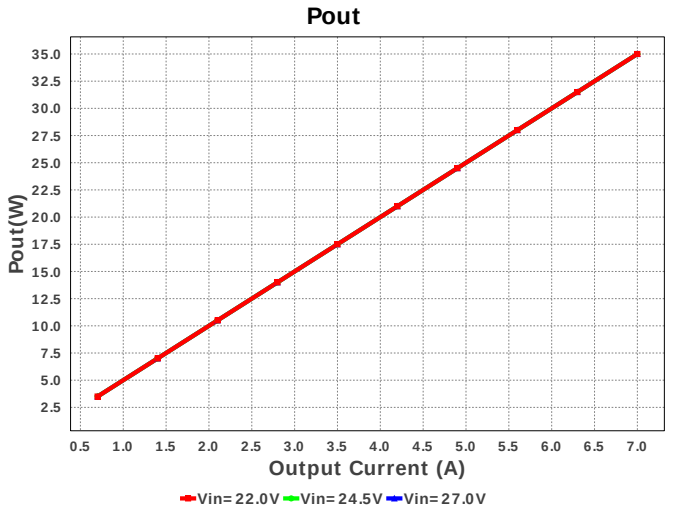
M1 PdCond

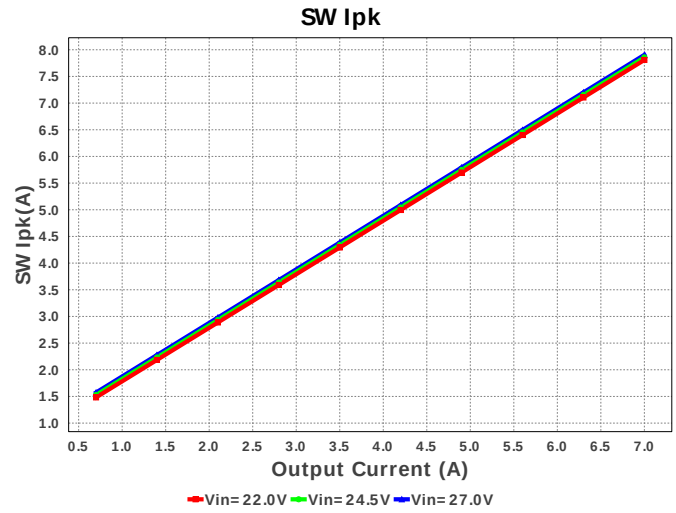


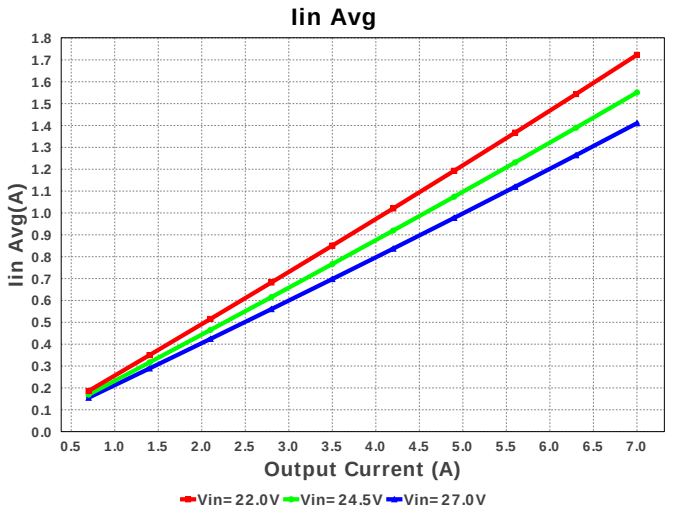


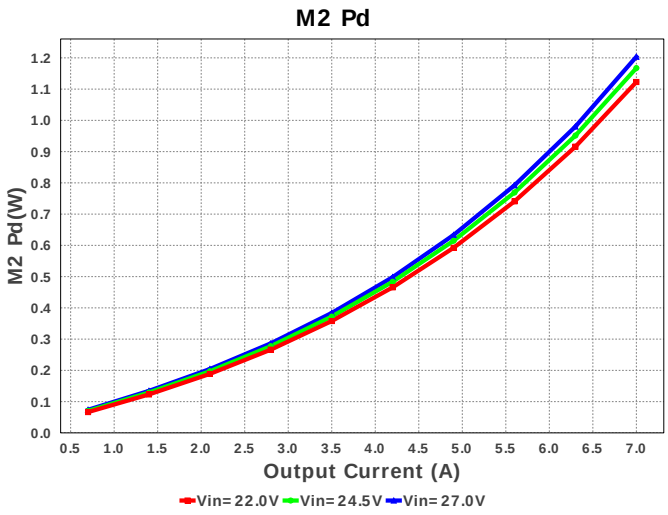


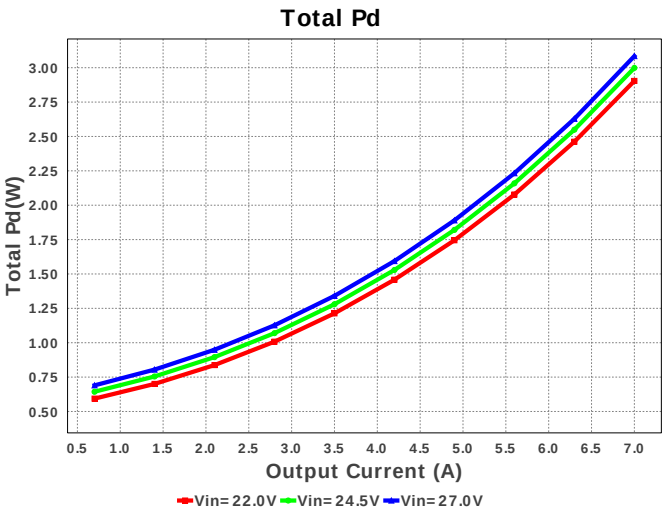


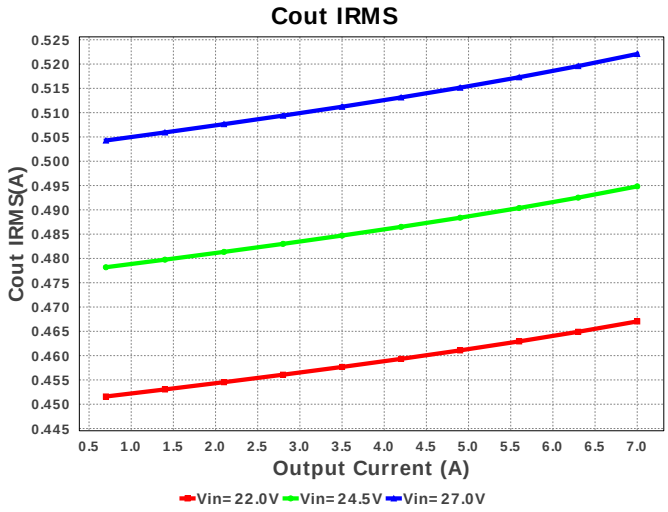


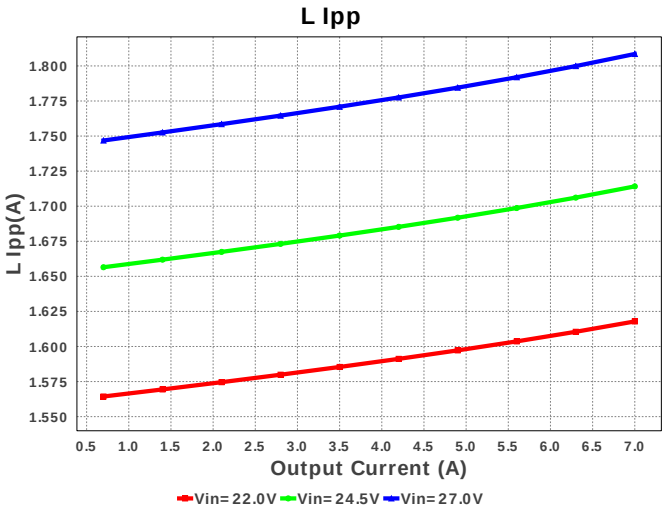


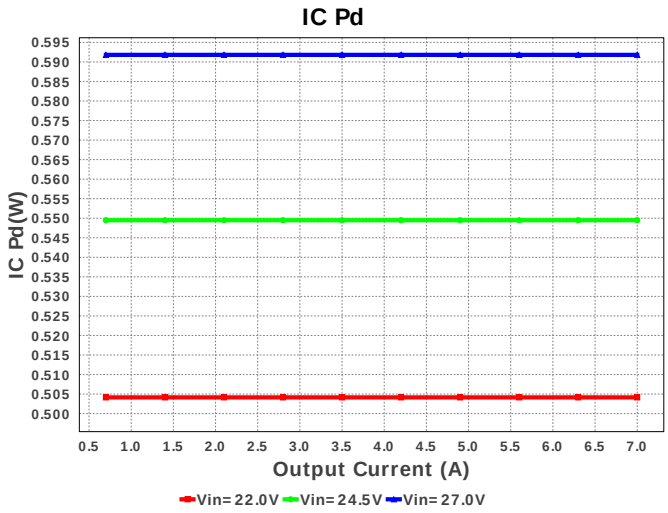


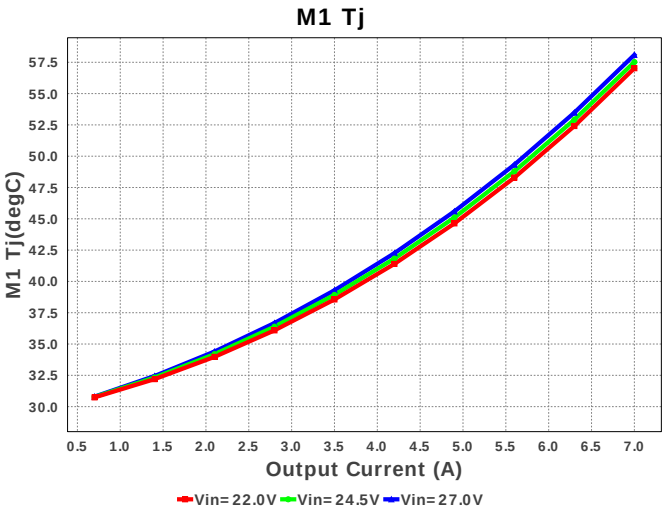


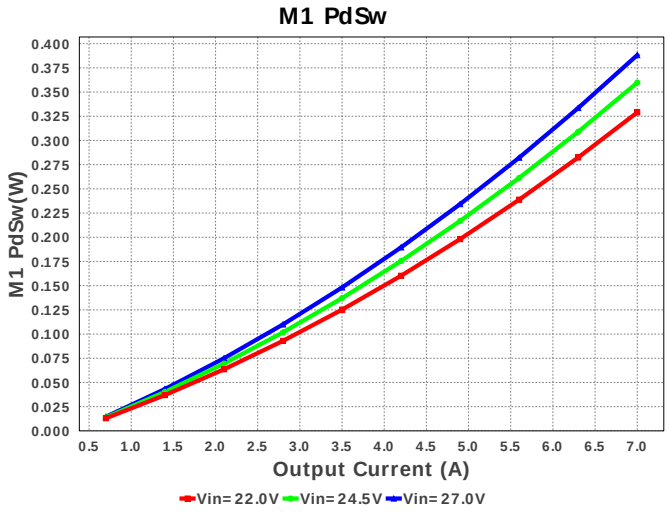


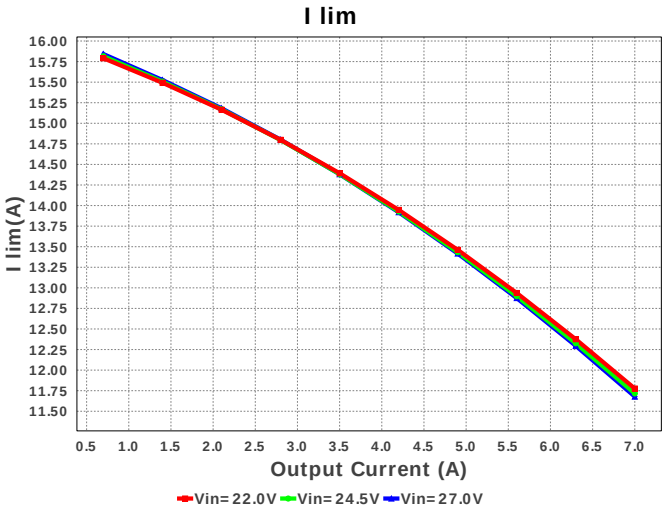


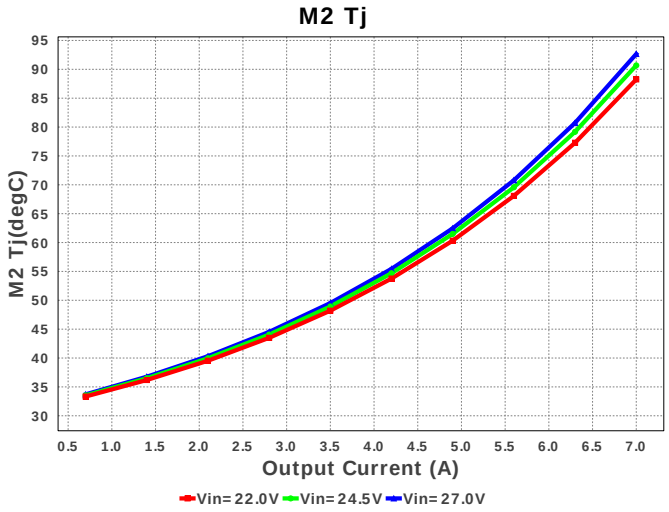


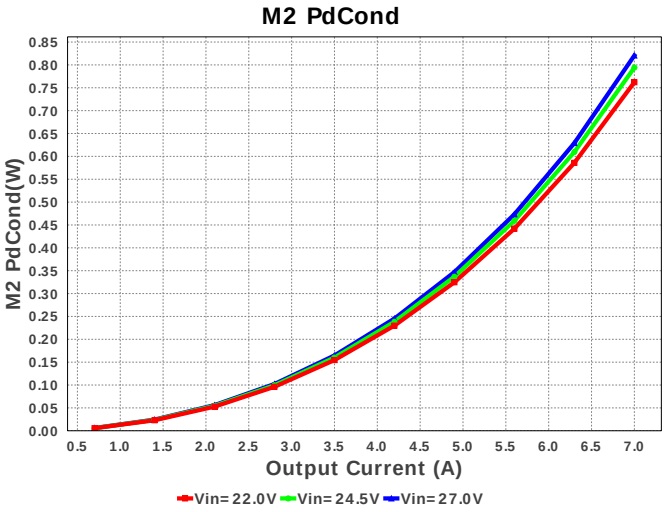












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	2.771 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	521.983 mA	Current	Output capacitor RMS ripple current
3.	I lim	11.755 A	Current	Current limit threshold
4.	Iin Avg	1.409 A	Current	Average input current
5.	L Ipp	1.808 A	Current	Peak-to-peak inductor ripple current
6.	SW Ipk	7.904 A	Current	Peak switch current
7.	BOM Count	17	General	Total Design BOM count
8.	FootPrint	508.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	503.532 kHz	General	Switching frequency
10.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	35.0 W	General	Total output power
13.	Total BOM	$3.2	General	Total BOM Cost
14.	Vout Actual	4.992 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Duty Cycle	19.451 %	Op_point	Duty cycle
16.	Efficiency	91.973 %	Op_point	Steady state efficiency
17.	IC Tj	68.467 degC	Op_point	IC junction temperature
18.	IOUT_OP	7.0 A	Op_point	Iout operating point
19.	M1 Tj	58.091 degC	Op_point	M1 MOSFET junction temperature
20.	M2 Tj	91.277 degC	Op_point	M2 MOSFET junction temperature
21.	VIN_OP	27.0 V	Op_point	Vin operating point
22.	Vout p-p	10.39 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	18.011 mW	Power	Input capacitor power dissipation
24.	Cout Pd	1.331 mW	Power	Output capacitor power dissipation
25.	IC Pd	591.804 mW	Power	IC power dissipation
26.	L Pd	686.0 mW	Power	Inductor power dissipation
27.	M1 Pd	581.162 mW	Power	M1 MOSFET total power dissipation
28.	M1 PdCond	193.015 mW	Power	M1 MOSFET conduction losses
29.	M1 PdSw	388.147 mW	Power	M1 MOSFET switching losses
30.	M2 Pd	1.176 W	Power	M2 MOSFET total power dissipation
31.	M2 PdCond	814.779 mW	Power	M2 MOSFET conduction losses

#	Name	Value	Category	Description
32.	M2 PdSw	361.407 mW	Power	M2 MOSFET switching losses
33.	Total Pd	3.055 W	Power	Total Power Dissipation
34.	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	7.0	Maximum Output Current
2.	SoftStart	2.0 ms	Soft Start Time (ms)
3.	VinMax	27.0	Maximum input voltage
4.	VinMin	22.0	Minimum input voltage
5.	Vout	5.0	Output Voltage
6.	base_pn	LM3150	Base Product Number
7.	source	DC	Input Source Type
8.	Ta	30.0	Ambient temperature
9.	UserFsw	490.099 k	Customer Selected Frequency

Design Assistance

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