

WEBENCH® Design Report

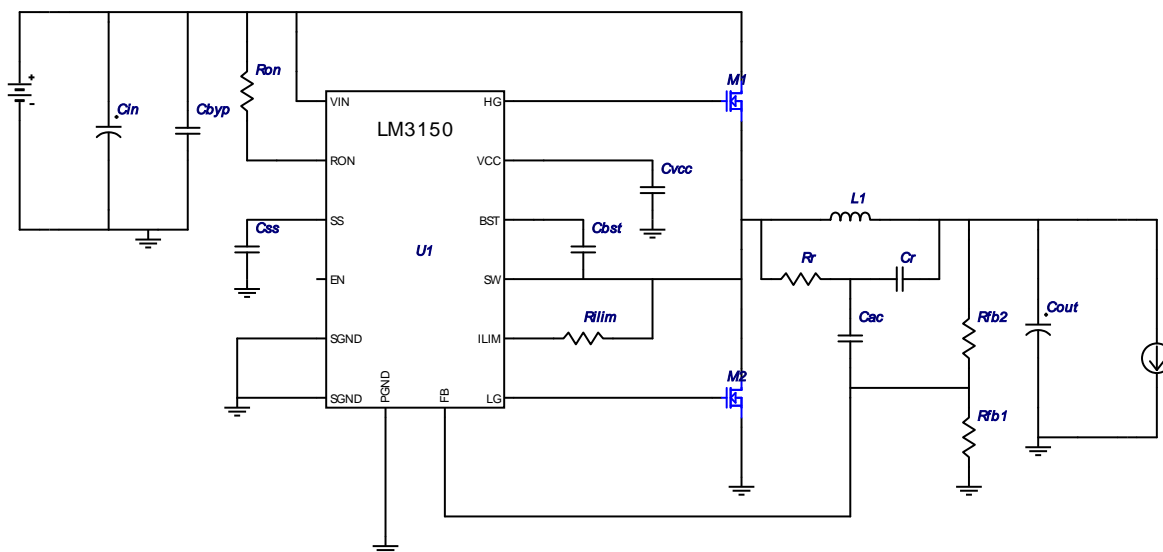
Design : 1185292/11 LM3150MH

IGVC: (21-36)->19.5

WEBENCH® Design : LM3150_none_Buck_RIPPLE_GENERATOR

VinMin = 21.0V
VinMax = 36.0V
Vout = 19.5V
Iout = 8.0A

Device = LM3150MH
Topology = Buck
Creation date = 5/11/11 4:17:10 PM
Total BOM Cost = \$8.03
Total Pd = 2.36 W
Footprint = 2,363.0 mm2
BOM Count = 25



Electrical BOM

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
1.	Cac	Yageo America	CC0805KRX7R9BB222 Series= X7R	1	\$0.01	Cap= 2.2 nF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
2.	Cbst	Taiyo Yuden	EMK212B7474KD-T Series= X7R	1	\$0.02	Cap= 470.0 nF ESR= 0.0 Ohm VDC= 16.0 V IRMS= 0.0 A	 0805 13mm2
3.	Cbyp	Kemet	C0805C104K5RACTU Series= X7R	1	\$0.01	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	 0805 13mm2
4.	Cin	Panasonic	EEUED2D220 Series= 286	8	\$0.20	Cap= 22.0 µF ESR= 813.86 mOhm VDC= 200.0 V IRMS= 600.0 mA	 CAPPR5-10X20 144mm2
5.	Cout	Panasonic	EEE-FC1E101P Series= FC	2	\$0.21	Cap= 100.0 µF ESR= 300.0 mOhm VDC= 25.0 V IRMS= 450.0 mA	 SM_RADIAL_F 124mm2
6.	Cr	Yageo America	CC0805KRX7R9BB681 Series= X7R	1	\$0.01	Cap= 680.0 pF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
7.	Css	Yageo America	CC0805KRX7R9BB153 Series= X7R	1	\$0.01	Cap= 15.0 nF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
8.	Cvcc	Taiyo Yuden	LMK212BJ225KD-T Series= X5R	1	\$0.03	Cap= 2.2 µF ESR= 0.0 Ohm VDC= 10.0 V IRMS= 0.0 A	 0805 13mm2

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
9.	L1	Coilcraft	SER2918H-223KL	1	\$1.99	L= 22.0 μ H DCR= 2.6 mOhm	SER2918H 652mm2
10.	M1	Infineon Technologies	BSC057N08NS3 G	1	\$0.79	VdsMax= 80.0 V IdsMax= 100.0 Amps	 PG-TDSON-8 55mm2
11.	M2	Infineon Technologies	BSC057N08NS3 G	1	\$0.79	VdsMax= 80.0 V IdsMax= 100.0 Amps	 PG-TDSON-8 55mm2
12.	Rfb1	Panasonic	ERJ-6ENF1002V Series= 225	1	\$0.01	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
13.	Rfb2	Panasonic	ERJ-6ENF3163V Series= 225	1	\$0.01	Res= 316.0 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
14.	Rilim	Panasonic	ERJ-6ENF3321V Series= 225	1	\$0.01	Res= 3.32 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
15.	Ron	Vishay-Dale	CRCW08051M40FKEA Series= CRCW...e3	1	\$0.01	Res= 1.4 MOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
16.	Rr	Vishay-Dale	CRCW08054M32FKEA Series= CRCW...e3	1	\$0.01	Res= 4.32 MOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
17.	U1	National Semiconductor	LM3150MH	1	\$2.30	Switcher	 MXA14A 59mm2

Op Vals

#	Name	Value	Category	Description
1.	BOM Count	25.0		Total Design BOM count
2.	Total BOM	\$8.03		Total BOM Cost
3.	Cin IRMS	2.717 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	370.58 mA	Current	Output capacitor RMS ripple current
5.	I lim	39.02 A	Current	Current limit threshold
6.	Iin Avg	5.786 A	Current	Average input current
7.	L Ipp	1.284 A	Current	Peak-to-peak inductor ripple current
8.	SW Ipk	7.642 A	Current	Peak switch current
9.	FootPrint	2.363 kmm2	General	Total Foot Print Area of BOM components
10.	Frequency	129.899 kHz	General	Switching frequency
11.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
12.	Mode	CCM	General	Conduction Mode
13.	Pout	136.5 W	General	Total output power
14.	Duty Cycle	81.525 %	Op_point	Duty cycle
15.	Efficiency	98.298 %	Op_point	Steady state efficiency
16.	IC Tj	56.055 degC	Op_point	IC junction temperature
17.	IOUT_OP	7.0 A	Op_point	Iout operating point
18.	M1 Tj	64.304 degC	Op_point	M1 MOSFET junction temperature
19.	M2 Tj	45.418 degC	Op_point	M2 MOSFET junction temperature
20.	VIN_OP	24.0 V	Op_point	Vin operating point
21.	Vout p-p	192.658 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	750.815 mW	Power	Input capacitor power dissipation
23.	Cout Pd	20.599 mW	Power	Output capacitor power dissipation
24.	IC Pd	434.253 mW	Power	IC power dissipation
25.	L Pd	159.25 mW	Power	Inductor power dissipation
26.	M1 Pd	691.411 mW	Power	M1 MOSFET total power dissipation
27.	M1 PdCond	317.281 mW	Power	M1 MOSFET conduction losses
28.	M1 PdSw	374.13 mW	Power	M1 MOSFET switching losses
29.	M2 Pd	306.524 mW	Power	M2 MOSFET total power dissipation
30.	M2 PdCond	62.65 mW	Power	M2 MOSFET conduction losses
31.	M2 PdSw	243.874 mW	Power	M2 MOSFET switching losses
32.	Total Pd	2.363 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	ErrorFeature	I	Error feature
2.	Iout	8.0 A	Maximum Output Current

#	Name	Value	Description
3.	Iout1	8.0 Amps	Output Current #1
4.	SoftStart	1.0 ms	Soft Start Time (ms)
5.	SyncFeature	I	External Sync feature
6.	VinMax	36.0 V	Maximum input voltage
7.	VinMin	21.0 V	Minimum input voltage
8.	Vout	19.5 V	Output Voltage
9.	Vout1	19.5 Volt	Output Voltage #1
10.	base_pn	LM3150	National Based Product Number
11.	customfreq	N	Use Customer Frequency
12.	onOff	I	On/Off feature
13.	optfactor	3.0	Optimization factor to tune up the design
14.	pricefactor	0.0	Price factor to tune up the design cost
15.	ta	30.0 degC	Ambient temperature
16.	userfs	147.94 kHz	Customer Selected Frequency

Design Assist

1. **LM3150** Product Folder : <http://www.national.com/pf/LM/LM3150.html> : contains the data sheet and other resources.

National's WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using National's published specifications as well as the published specifications of other device manufacturers. While National does update this information periodically, this information may not be current at the time the simulation is built. National does not warrant the accuracy or completeness of the specifications or any information contained therein. National does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. National does not warrant that the designs are production worthy.

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