WEBENCH® Design Report

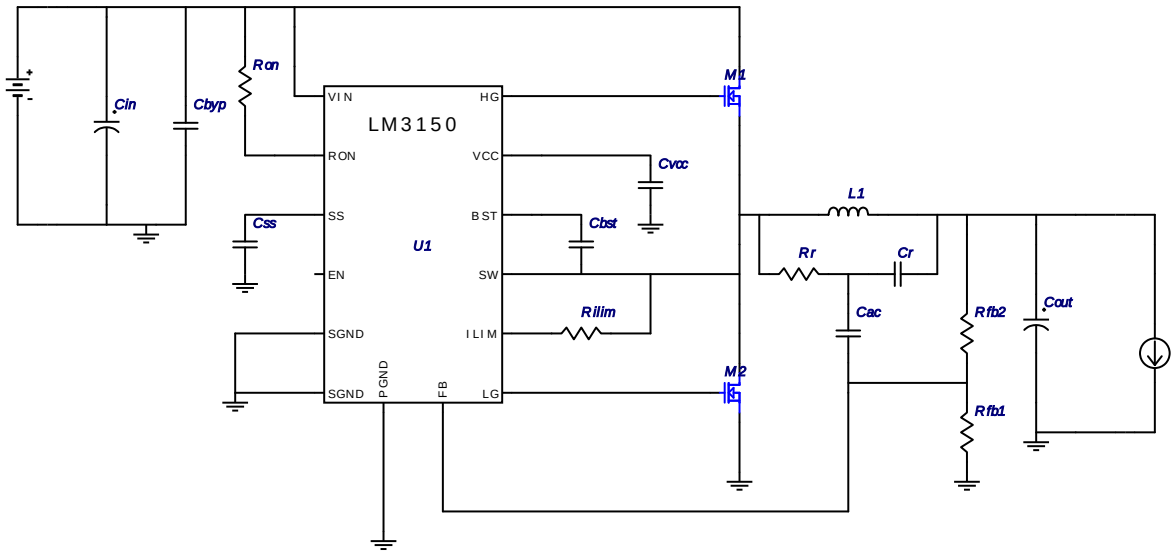
Design : 1185292/6 LM3150MH

Design 6 - LM3150MH

WEBENCH®Design : LM3150_none_Buck_RIPPLE_GENERATOR

VinMin = 21.0V
VinMax = 25.0V
Vout = 19.5V
Iout = 12.0A

Device = LM3150MH
Topology = Buck
Creation date = 5/6/11 2:52:23 PM
Total BOM Cost = $23.11
Total Pd = 4.34 W
Footprint = 1,821.0 mm2
BOM Count = 24



Electrical BOM

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
1.	Cac	Yageo America	CC0805KRX7R9BB272 Series= X7R	1	$0.01	Cap= 2.7 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	Vishay-Sprague	595D156X0050R2T Series= 595D	7	$2.44	Cap= 15.0 µF ESR= 400.0 mOhm VDC= 50.0 V IRMS= 790.0 mA	CC_CASER 74mm2
5.	Cout	Panasonic	EEE-FC1E221P Series= FC	2	$0.24	Cap= 220.0 µF ESR= 150.0 mOhm VDC= 25.0 V IRMS= 670.0 mA	SM_RADIAL_G 172mm2
6.	Cr	Yageo America	CC0805KRX7R9BB821 Series= X7R	1	$0.01	Cap= 820.0 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	MuRata	GRM188C81A225KE34D Series= 379	1	$0.02	Cap= 2.2 µF ESR= 0.0 Ohm VDC= 10.0 V IRMS= 0.0 A	0603 10mm2
9.	L1	Coilcraft	SER2915H-103KL	1	$1.81	L= 10.0 µH DCR= 1.86 mOhm	SER2915H 652mm2

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
10.	M1	Infineon Technologies	BSC016N04LS G	1	$1.01	VdsMax= 40.0 V IdsMax= 100.0 Amps	 PG-TDSON-8 55mm2
11.	M2	Infineon Technologies	BSC093N04LS G	1	$0.30	VdsMax= 40.0 V IdsMax= 49.0 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-6ENF1911V Series= 225	1	$0.01	Res= 1.91 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
15.	Ron	Vishay-Dale	CRCW08051M74FKEA Series= CRCW..e3	1	$0.01	Res= 1.74 MOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
16.	Rr	Vishay-Dale	CRCW08051M54FKEA Series= CRCW..e3	1	$0.01	Res= 1.54 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	24.0		Total Design BOM count
2.	Total BOM	$23.11		Total BOM Cost
3.	Cin IRMS	4.947 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	1.21 A	Current	Output capacitor RMS ripple current
5.	I lim	11.418 A	Current	Current limit threshold
6.	Iin Avg	9.534 A	Current	Average input current
7.	L Ipp	4.193 A	Current	Peak-to-peak inductor ripple current
8.	SW Ipk	14.097 A	Current	Peak switch current
9.	FootPrint	1.821 kmm2	General	Total Foot Print Area of BOM components
10.	Frequency	102.689 kHz	General	Switching frequency
11.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
12.	Mode	CCM	General	Conduction Mode
13.	Pout	234.0 W	General	Total output power
14.	Duty Cycle	78.289 %	Op_point	Duty cycle
15.	Efficiency	98.178 %	Op_point	Steady state efficiency
16.	IC Tj	61.714 degC	Op_point	IC junction temperature
17.	IOUT_OP	12.0 A	Op_point	Iout operating point
18.	M1 Tj	91.365 degC	Op_point	M1 MOSFET junction temperature
19.	M2 Tj	65.61 degC	Op_point	M2 MOSFET junction temperature
20.	VIN_OP	25.0 V	Op_point	Vin operating point
21.	Vout p-p	314.7 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	1.399 W	Power	Input capacitor power dissipation
23.	Cout Pd	109.891 mW	Power	Output capacitor power dissipation
24.	IC Pd	528.567 mW	Power	IC power dissipation
25.	L Pd	334.8 mW	Power	Inductor power dissipation
26.	M1 Pd	1.256 W	Power	M1 MOSFET total power dissipation
27.	M1 PdCond	369.273 mW	Power	M1 MOSFET conduction losses
28.	M1 PdSw	886.794 mW	Power	M1 MOSFET switching losses
29.	M2 Pd	714.273 mW	Power	M2 MOSFET total power dissipation
30.	M2 PdCond	512.477 mW	Power	M2 MOSFET conduction losses
31.	M2 PdSw	201.796 mW	Power	M2 MOSFET switching losses
32.	Total Pd	4.343 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	ErrorFeature	I	Error feature
2.	Iout	12.0 A	Maximum Output Current
3.	Iout1	12.0 Amps	Output Current #1
4.	SoftStart	0.0 ms	Soft Start Time (ms)

#	Name	Value	Description
5.	SyncFeature	I	External Sync feature
6.	VinMax	25.0 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	Y	Use Customer Frequency
12.	onOff	I	On/Off feature
13.	optfactor	0.0	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

Design Assist

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