

LTC3787 Supply Design Summary Report

Vin : 20V (min.), 27V (nom.), 33,6V (max.)

Output Rails : Vout1 = 37,28V / 30A (max.)

Project Name : TPA3251 Boost Converter

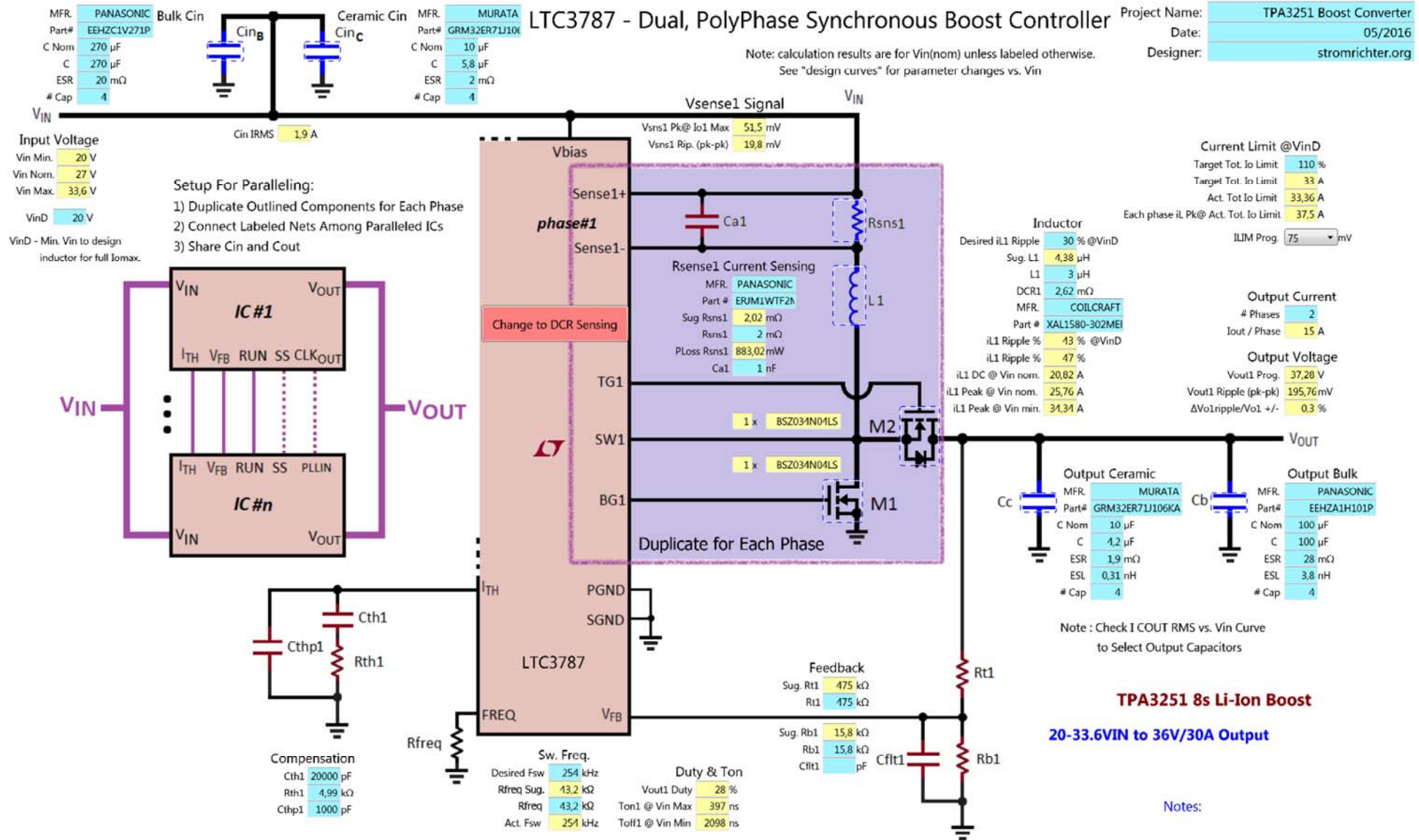
Project Date : 05/2016

Designer : stromrichter.org

LTC3787 Solution - Simplified Schematic

Vin : 20V (min.), 27V (nom.), 33,6V (max.)

Output Rails : Vout1 = 37,28V / 30A (max.)

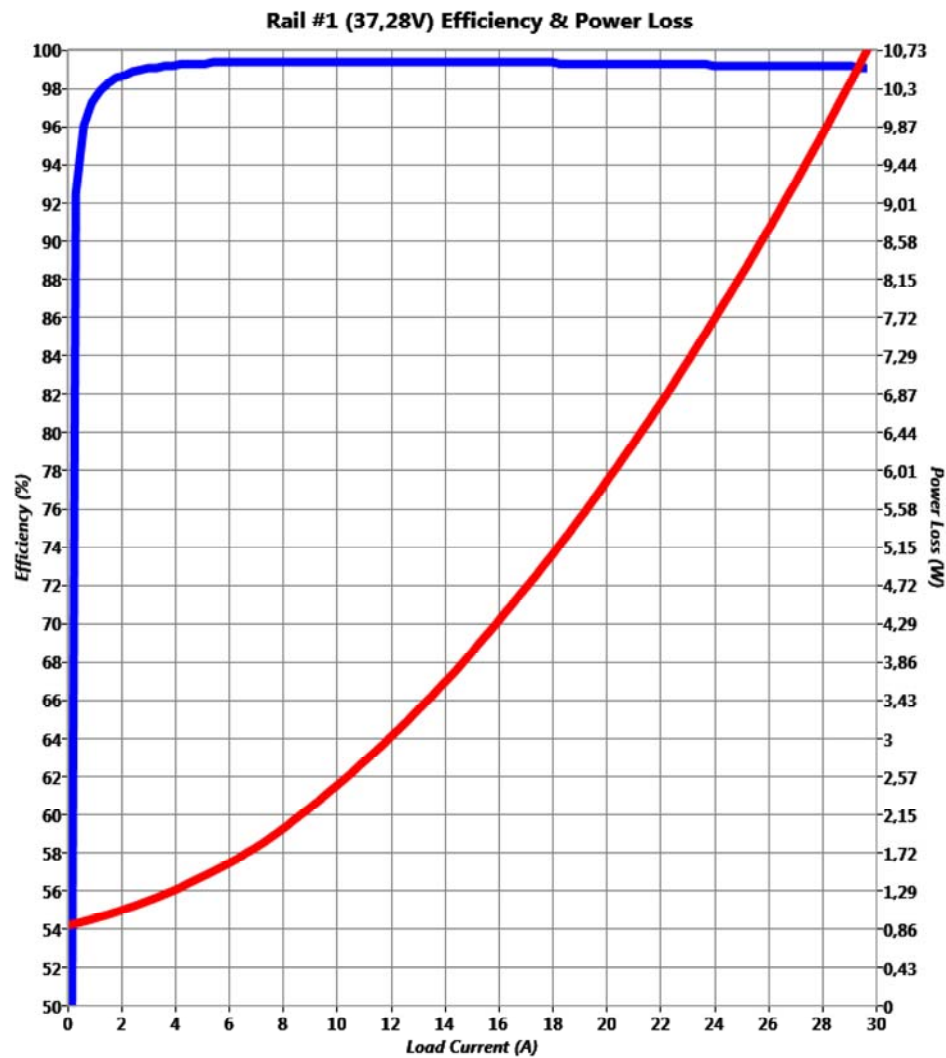


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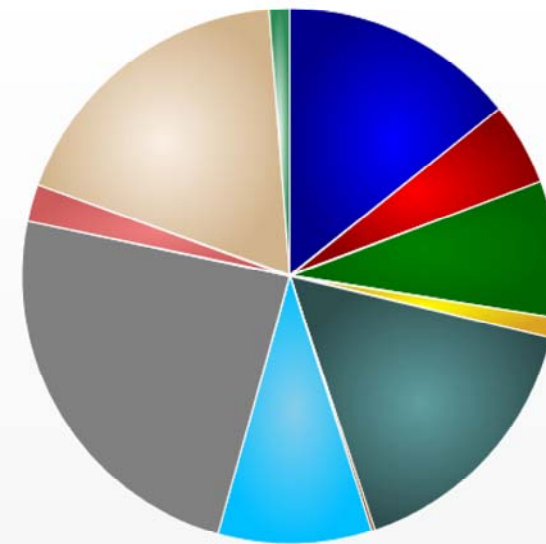
LTC3787 Solution - Efficiency & Loss Estimations

Rail # 1 : $V_{in} = 20V$, $V_{out1} = 37,28V$

** Estimations For CCM Mode Only. Inductor AC Losses Entered by User*



Rail #1 (37,28V) Power Loss Breakdown (Full Load)



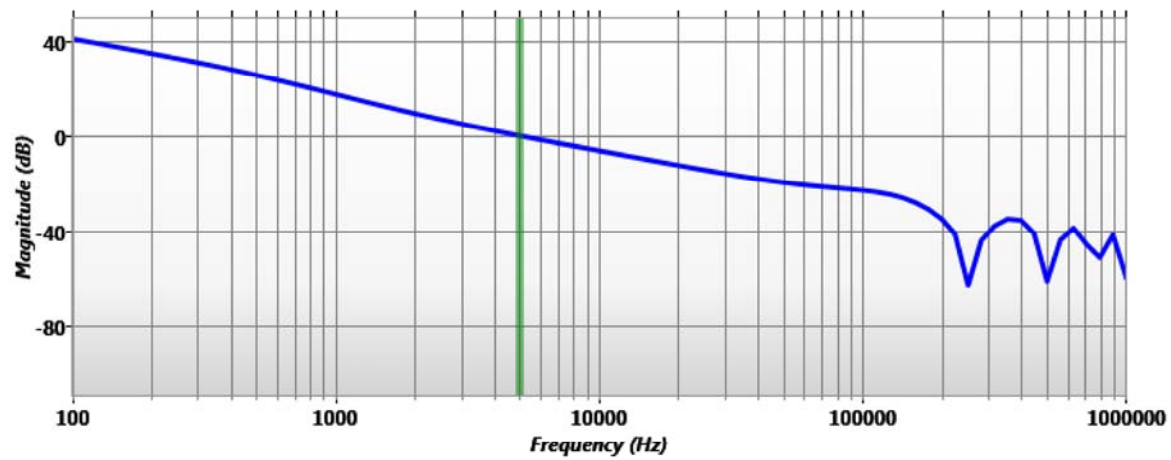
- Control Fet Conduction (2,532W,14,28%)
- Control Fet Turn On (0,889W,5,01%)
- Control Fet Turn Off (1,443W,8,14%)
- IC LDO (0,215W,1,21%)
- Sync Fet Conduction (2,872W,16,2%)
- Sync Fet Driving (0,036W,0,2%)
- Sync Fet Body Diode (1,646W,9,28%)
- Inductor DCR (4,239W,23,91%)
- Inductor Core (0,4W,2,26%)
- Rsense (3,236W,18,25%)
- Cout (0,22W,1,24%)

LTC3787 Solution - Loop Gain & Load Transient Estimations

Rail # 1 : $V_{in} = 20V$, $V_{out1} = 37,28V$, $I_{out1} = 25A$

** Estimations For CCM Mode Only. Estimations Based On Small Signal Avg. Model*

Rail #1 (37,28V) Loop Gain



LTC3787 Solution - Summary

LTC3787 Supply Design Summary



Project Info: TPA3251 Boost Converter, 05/2016, stromrichter.org

Design Specifications

Steady State :

Rail #	Vin Min.	Vin Nom.	Vin Max.	Fsw	Vo	ΔVo rip. p-p	ΔVo rip. %	Io Max	ΔILp-p	ΔIL %	iLpk	Duty Max	Ton min.	Ton max.
1	20 V	27 V	33,6 V	254 kHz	37,28 V	195,76 mV	0,3 %	30 A	9,88 A	47 %	25,76 A	4685 %	397 ns	2

Efficiency and Loop :

Rail #	Vo	Iomax	Eff.@Iomax	PLoss@Iomax	Loop BW	Loop PM
1	37,28 V	30 A	98,46 %	17,53 W	5,01 kHz	67,18 deg

Recommendations and Warnings :

Message

Power Components

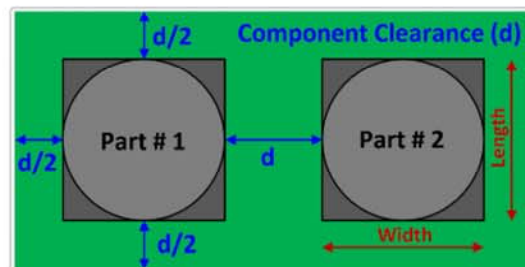
Power Components Bill Of Materials :

Export BOM

Ref. Des.	Value	Quantity	Description	Mfr. Name	Mfr. Part #	Pkg. (Imperial)	L(mm)	W(mm)	H(mm)	User Note
U1		1	IC	LINEAR TECH	LTC3787		5	4	0.8	
Lo1 Lo2	3μH	2	IND	COILCRAFT	XAL1580-302MEB		16.4	15.4	7.5	
Cinb1 Cinb2 Cinb3 Cinb4	270μF	4	CAP	PANASONIC	EEHZC1V271P	G	10	10	10.2	
Cinc1 Cinc2 Cinc3 Cinc4	10μF	4	CAP	MURATA	GRM32ER71J106KA12	1210	3.2	2.5	2.7	
Cob1 Cob2 Cob3 Cob4	100μF	4	CAP	PANASONIC	EEHZA1H101P	G	10	10	10.2	
Coc1 Coc2 Coc3 Coc4	10μF	4	CAP	MURATA	GRM32ER71J106KA12	1210	3.2	2.5	2.7	
Rsense1 Rsense2	2mΩ	2	RES	PANASONIC	ERJM1WTF2M0	2512	6.4	3.2	0.8	
Mctrl1 Mctrl2	40V	2	FET	Infineon	BSZ034N04LS		3.4	3.4	1.1	
Msync1 Msync2	40V	2	FET	Infineon	BSZ034N04LS		3.4	3.4	1.1	

Power Components Footprint :

# Components	25
Max. Height	10,2 mm
Component Clearance (d)	1 mm
* Power Components Area (Excludes ICs)	1795,9 mm ² 2,784 in ²
* Power Components Area (Includes ICs)	1825,9 mm ² 2,83 in ²



* Note :

The calculated power component area is only the simple sum of component footprint areas with given clearance.