

LTC3787 Supply Design Summary Report

Vin : 9V (min.), 12V (nom.), 15V (max.)

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

Project Name : TPA3251 Boost Converter

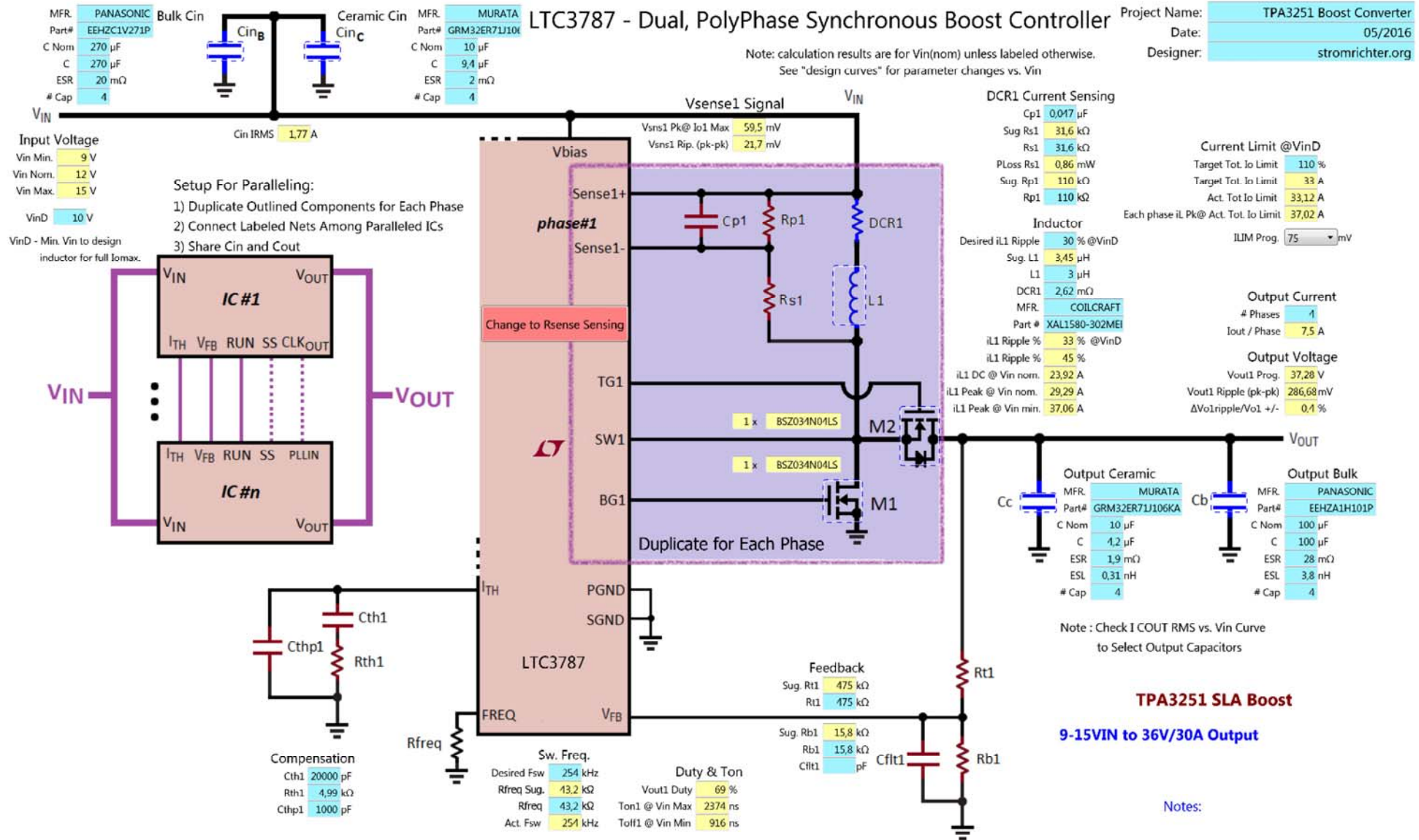
Project Date : 05/2016

Designer : stromrichter.org

LTC3787 Solution - Simplified Schematic

Vin : 9V (min.), 12V (nom.), 15V (max.)

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

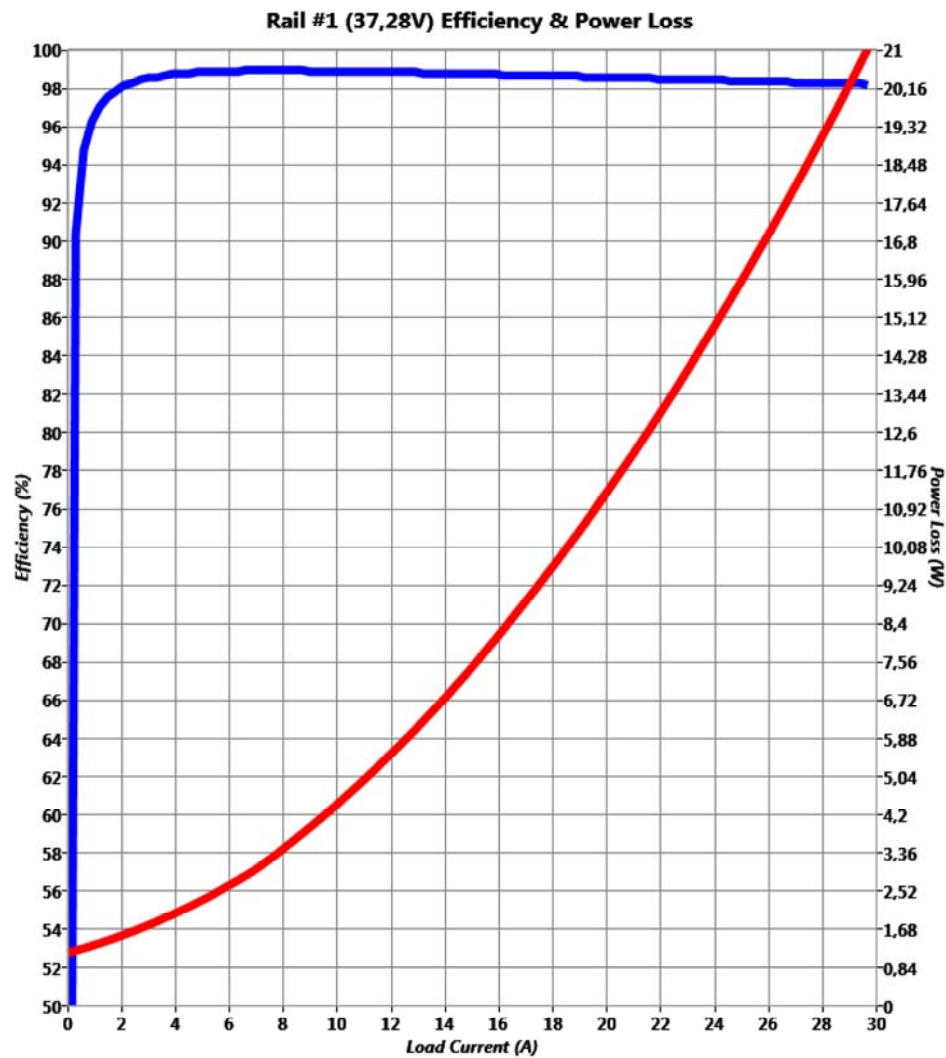


Linear Technology Confidential - For Internal Use Only

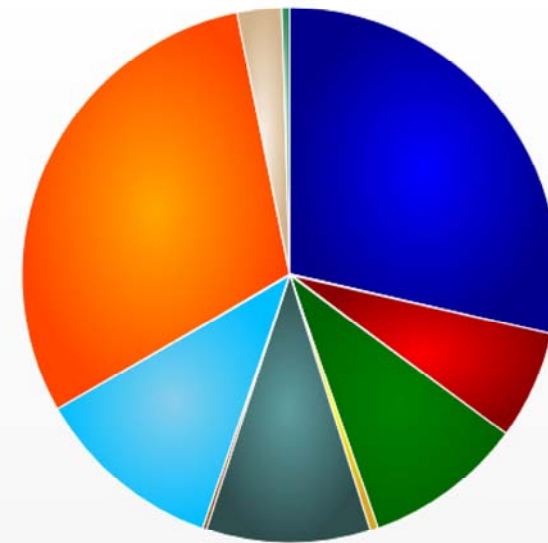
LTC3787 Solution - Efficiency & Loss Estimations

Rail # 1 : $V_{in} = 10V$, $V_{out1} = 37,28V$

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



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



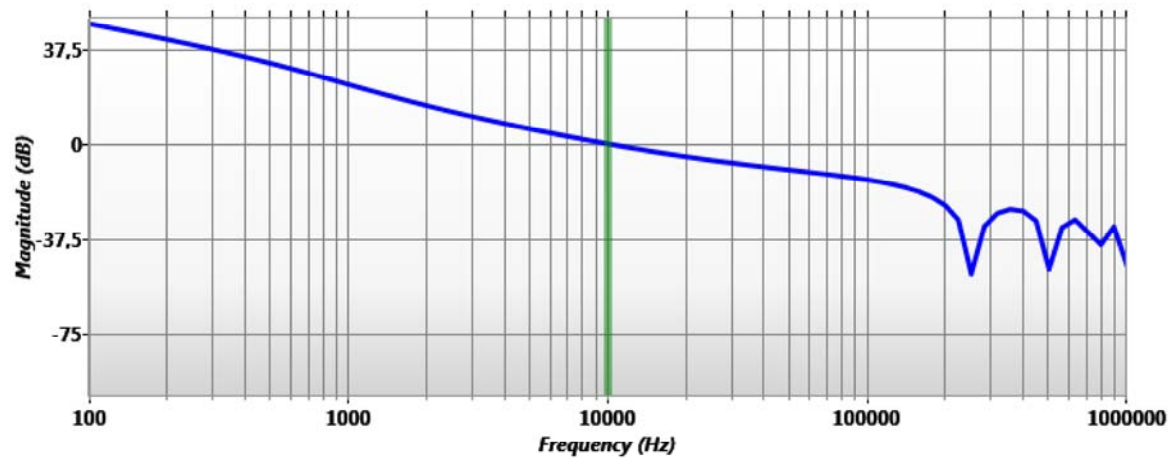
- Control Fet Conduction (8,437W,28,47%)
- Control Fet Turn On (1,95W,6,58%)
- Control Fet Turn Off (2,847W,9,61%)
- IC LDO (0,143W,0,48%)
- Sync Fet Conduction (2,937W,9,91%)
- Sync Fet Driving (0,072W,0,24%)
- Sync Fet Body Diode (3,388W,11,43%)
- Inductor DCR (8,922W,30,11%)
- Inductor Core (0,8W,2,7%)
- Cout (0,14W,0,47%)

LTC3787 Solution - Loop Gain & Load Transient Estimations

Rail # 1 : $V_{in} = 10V$, $V_{out1} = 37,28V$, $I_{out1} = 24A$

** 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	ΔV_o rip. p-p	ΔV_o rip. %	Io Max	ΔI_L p-p	ΔI_L %	I_Lpk	Duty Max	Ton min.	Ton max.
1	9 V	12 V	15 V	254 kHz	37,28 V	286,68 mV	0,4 %	30 A	10,74 A	45 %	29,29 A	7697 %	2374 ns	9

Efficiency and Loop :

Rail #	Vo	Iomax	Eff.@Iomax	PLoss@Iomax	Loop BW	Loop PM
1	37,28 V	30 A	97,47 %	29,035 W	10 kHz	45,34 deg

Recommendations and Warnings :

Message

Power Components

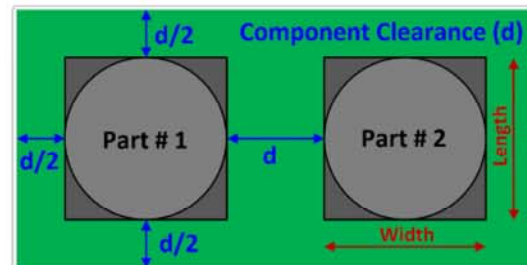
Power Components Bill Of Materials :

Export BOM

Ref. Des.	Value	Quantity	Description	Mfr. Name	Mfr. Part #	Pkg. (Imperial)	L(mm)	W(mm)	H(mm)	User Note
U1 U2		2	IC	LINEAR TECH	LTC3787		5	4	0.8	
Lo1 Lo2 Lo3 Lo4	3 μ H	4	IND	COILCRAFT	XAL1580-302MEB		16.4	15.4	7.5	
Cinb1 Cinb2 Cinb3 Cinb4	270 μ F	4	CAP	PANASONIC	EEH2C1V271P	G	10	10	10.2	
Cinc1 Cinc2 Cinc3 Cinc4	10 μ F	4	CAP	MURATA	GRM32ER71J106KA12	1210	3.2	2.5	2.7	
Cob1 Cob2 Cob3 Cob4	100 μ F	4	CAP	PANASONIC	EEH2A1H101P	G	10	10	10.2	
Coc1 Coc2 Coc3 Coc4	10 μ F	4	CAP	MURATA	GRM32ER71J106KA12	1210	3.2	2.5	2.7	
Mctrl1 Mctrl2 Mctrl3 Mctrl4	40V	4	FET	Infineon	BSZ034N04LS		3.4	3.4	1.1	
Msync1 Msync2 Msync3 Msync4	40V	4	FET	Infineon	BSZ034N04LS		3.4	3.4	1.1	

Power Components Footprint :

# Components	30
Max. Height	10,2 mm
Component Clearance (d)	1 mm
* Power Components Area (Excludes ICs)	2381,9 mm ² 3,692 in ²
* Power Components Area (Includes ICs)	2441,9 mm ² 3,785 in ²



* Note :

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