



AHEAD OF WHAT'S POSSIBLE™

LTpowerCAD Design Tool 101

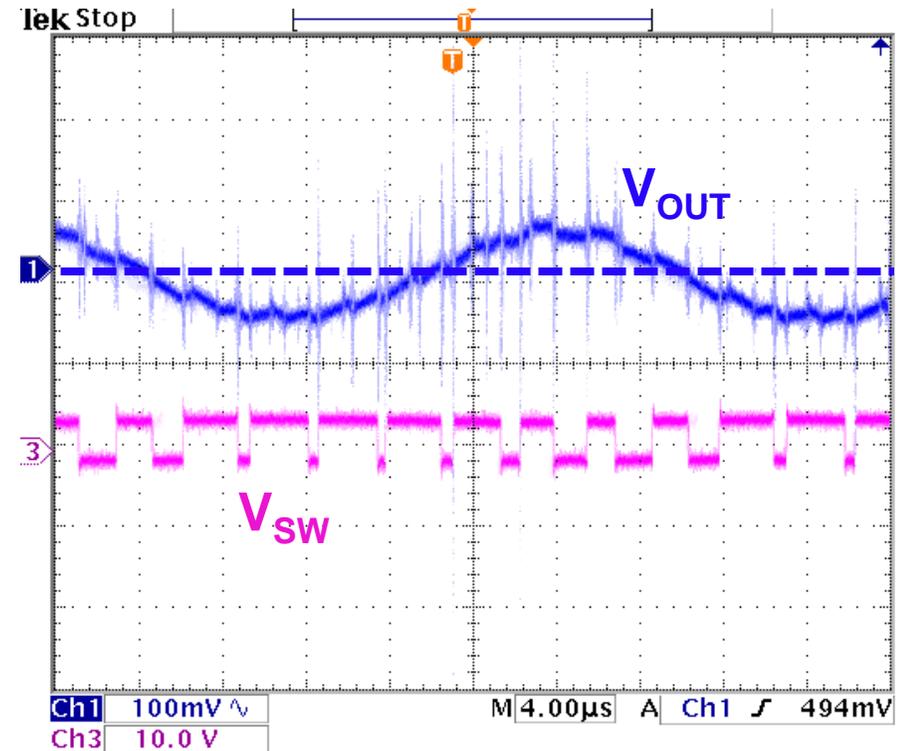
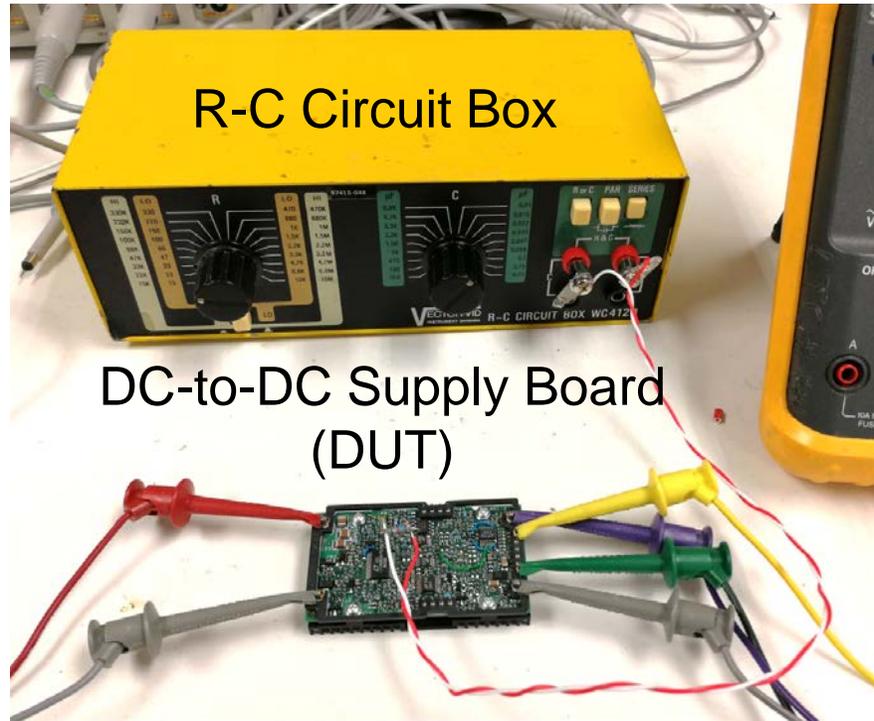


Number of Occupants: 3-4
Occupancy Level: 12%

NE

70°F
21°C

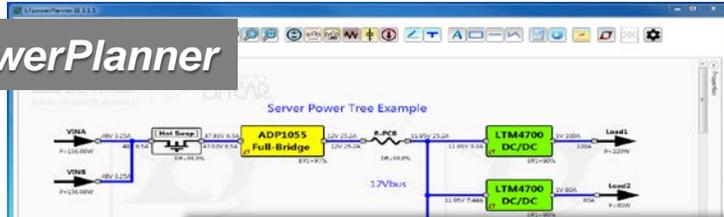
CO ₂	VOC
540 PPM	0.6 PPM



- ▶ Manually adjust R and C values. Check loop or load transient.
- ▶ **Accurate, but time-consuming.**
- ▶ **How to support remote customers?**

Complete Power Design Flow with LT Tools ...

LTpowerPlanner



System Level Power Tree



Search/Selection a Solution



Circuit Parameter Design



Simulation

LTpowerCAD

LTspice



Paper Design Is Difficult and Time Consuming ...

- ▶ Define supply specifications
- ▶ Decide topology
- ▶ Search for an IC (**time↑↑**)
- ▶ Calculate power components (**time↑↑, suboptimal**)
- ▶ Select components: L, C, FET (**time↑↑, suboptimal**)
- ▶ Estimate efficiency/loss (**difficult, inaccurate**)
- ▶ Guess/simulate loop compensation (**difficult, inaccurate**)
- ▶ Draft schematics



☹ **Time consuming, difficult, suboptimal ...**

☹ **Requires good power supply knowledge and skills**

LTpowerCAD Design in 5 Simple Steps! Fast and Easy



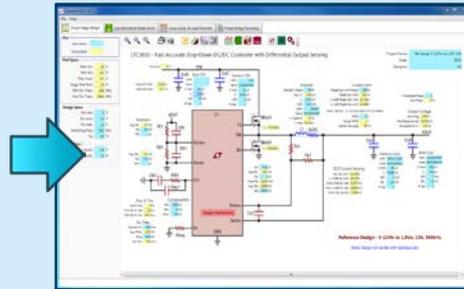
Step 1

Find Solutions



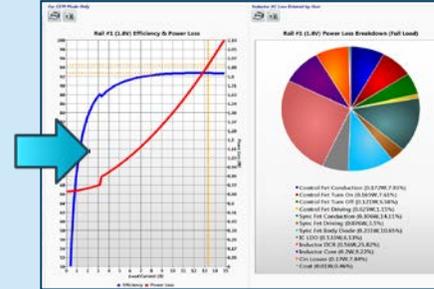
Step 2

Power Stage Design



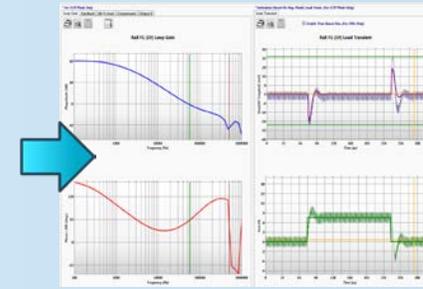
Step 3

Efficiency and Loss



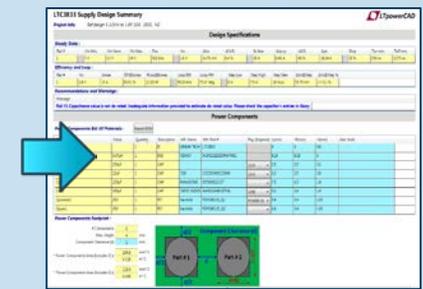
Step 4

Loop and Transient



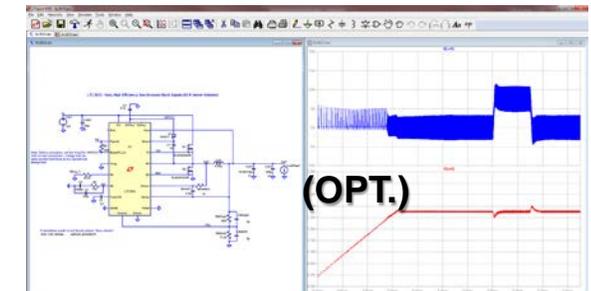
Step 5

Summary, BOM, Size



↓
LTspice™

- ▶ Free download at analog.com/LTpowerCAD
- ▶ Runs on Windows PC



Note for ADI users only: Install the program by **RUN Elevated** on an ADI PC.



LTpowerCAD Main Window

LTpowerCAD II V2.5.2

LTpowerCAD®

Start a New Supply Design

Supply Design System Design Simulation Open File

Toolbox Contact Help Sync/Release

LTpowerCAD II Design Tool **V2.5.2**
Copyright 2014, Analog Devices Inc. All rights reserved.

ANALOG DEVICES
AHEAD OF WHAT'S POSSIBLE™

POWER BY LINEAR™

Design Step 1: Enter Spec, Search a Part

1. Enter spec

2. Search

3. Select IC and open a Tool

LTpowerCAD Design Tool v2.5.2
Copyright 2014, Analog Devices Inc. All rights reserved.

Converter Specification

Converter Topology: Buck
Controller: [Dropdown]
Output Rail 1: Vout1, 1 V, 0 A
Min. Input Voltage: [Input]
Nom. Input Voltage: 13.2 V
Max. Input Voltage: [Input]
Num. of Output Rails: One
Num. of Parallel Phases: 1
Find Part #: (####) [Input] Go

Optional Features

- Burst Mode
- Synchronous FET
- Isolated
- Run / Enable
- Sync. to External Clock
- Output Voltage Tracking
- Remote Voltage Sensing
- Margin Control
- Power Good Monitor
- Poly-phase / Load Share
- I2C/PMBus Interface

Search

(circled in red)

 Search Designer's Tools Only
 Always Keep Search Page Open

Search For Parts

Design Tool	Website	Part #	Type	Description	Topology	IC Max Vin (V)	IC Min Vin (V)	Max Isw/F
[Icon]	Web	LTC3883	Controller	Single Phase Step-Down Current Mode Buck Controller	Buck	24	4.5	50
[Icon]	Web	LTC3854	Controller	Small Footprint, Single Phase Sync-buck Controller, 400	Buck	38	4.5	50
[Icon]	Web	LTC3833	Controller	Fast Accurate Buck Controller with Remote Vo Sense, Vi	Buck	38	4.5	50
[Icon]	Web	LTC3851A	Controller	Single Phase Sync-Buck Controller, fixed fsw peak i-moc	Buck	38	4	50
[Icon]					Buck	38	4	50
[Icon]					Buck	32	4	50
[Icon]					Buck	38	4.5	50
[Icon]	Web	LTC3778	Controller	Valley current mode buck regulator. Use LTC3878/3879.	Buck	36	4	50

LTpowerCAD currently supports design tools for a limited number of parts. For more part options click the Web Search button.



Step 2: Power Stage Design (fs, L, C, etc.)

Power Stage Design | Loss Estimate & Break Down | Loop Comp. & Load Transient | Power Design Summary

Key
User Entry:
Calculated:

Part Specs
Max Vin: 38 V
Min Vin: 4.5 V
Max Vout: 5.5 V
Sugg. Max Iout: 50 A
Min Sw. Freq.: 200 kHz
Max Sw. Freq.: 2000 kHz

Design Specs
Vin min: 4.5 V
Vin nom: 12 V
Vin max: 24 V
Switching Freq: 298 kHz
Ta: 25 °C

Output Rail 1
Vout1: 1.5 V
Iout1: 20 A

LTC3833 - Fast Accurate Step-Down DC/DC Controller with Differential Output Sensing

Vin(norm) 12 V VIN
CinB Bulk CIN MFR. PANASONIC
CinC Ceramic CIN MFR. MURATA

Total CIN RMS 6.614 A
Total CIN Ploss 0.291 W

Feedback
Sug. Rt1 15 kΩ
Rt1 15 kΩ
Cff1 pF

Sug. Rb1 10 kΩ
Rb1 10 kΩ
Cff1 pF

Duty & Ton
Vout1 Duty 12.5 %
Ton1 @ Vin Max 210 ns
Toff1 @ Vin Min 2237.1 ns

Sw. Freq.
Desired Fsw 298 kHz
Sug. Rfreq 137 kΩ
Rfreq 137 kΩ
Act. Fsw 298 kHz

Compensa
Cth1 470 pF
Rth1 33.2 kΩ
Cthp1 68 pF

Recommended Design Steps

- (1) Select Inductor L
- (2) Design Current Limit
- (3) Check Cin RMS Current
- (4) Select Cout, Check Vout Ripple
- (5) Select Mosfets & Check η % [Tab #2]
- (6) Loop Compensation & Load Transient [Tab #3]

OK

Limit
135 %
27 A
468 A
532 A
mV, INTVCC=50mV
2 V
2 V
100 mV

Paralleled Phases 1
Iout/Phase 20 A

Output Voltage
Vout Prog. 1.5 V
Vout Ripple (pk-pk) 6.82 mV
 Δ Vripple/Vo +/- 0.227 %

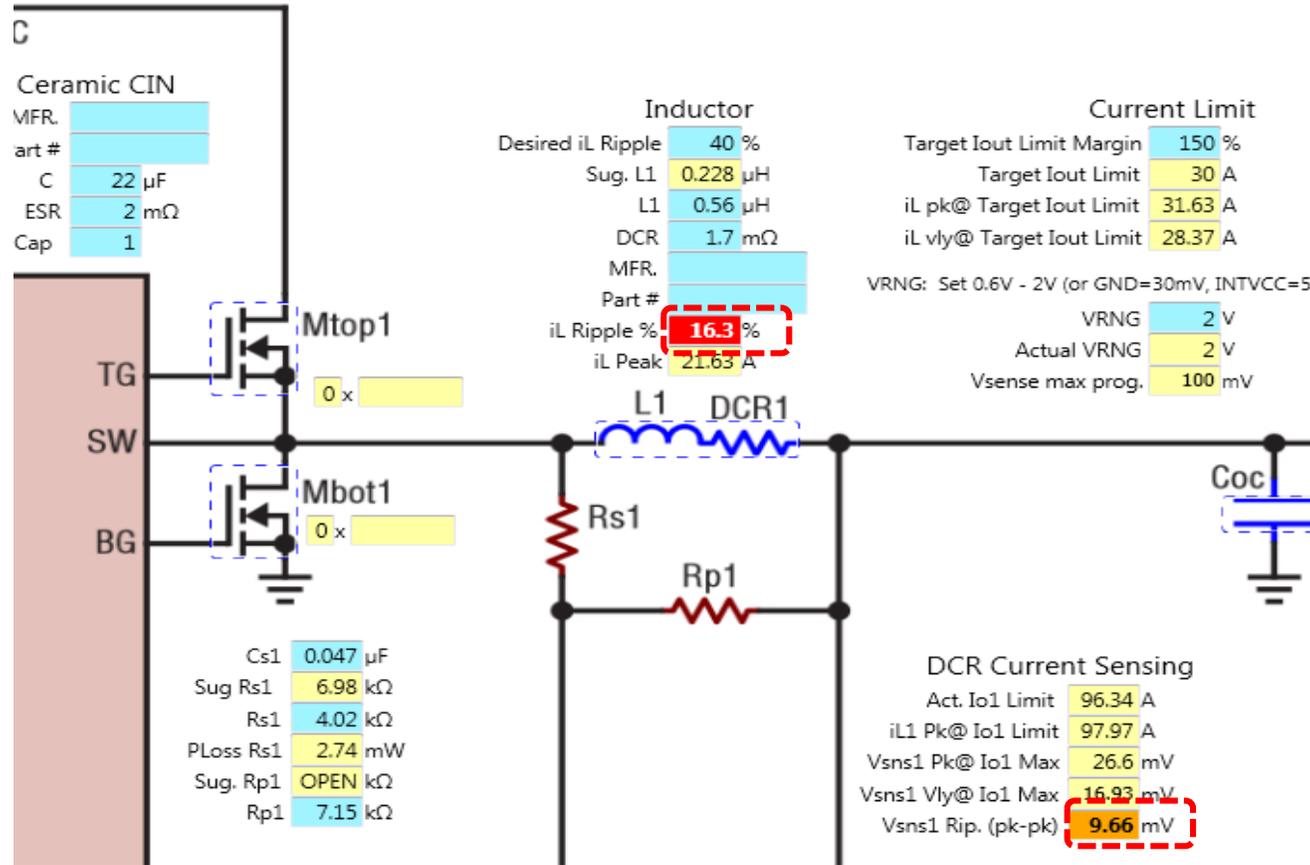
VOUT

Coc Ceramic Cout MFR. MURATA Part# GRM31CR60J
C Nom 10 μF
C 78 μF
ESR 5 mΩ
ESL 0.71 nH
Cap 2

CoB Bulk Cout MFR. SANYO Part# 2RSTPE330M
C Nom 330 μF
C 330 μF
ESR 9 mΩ
ESL 1.6 nH
Cap 2

Legend:
Yellow box: Recommended / Calculated
Cyan box: User Entered

Step 2: Power Stage Smart Warnings

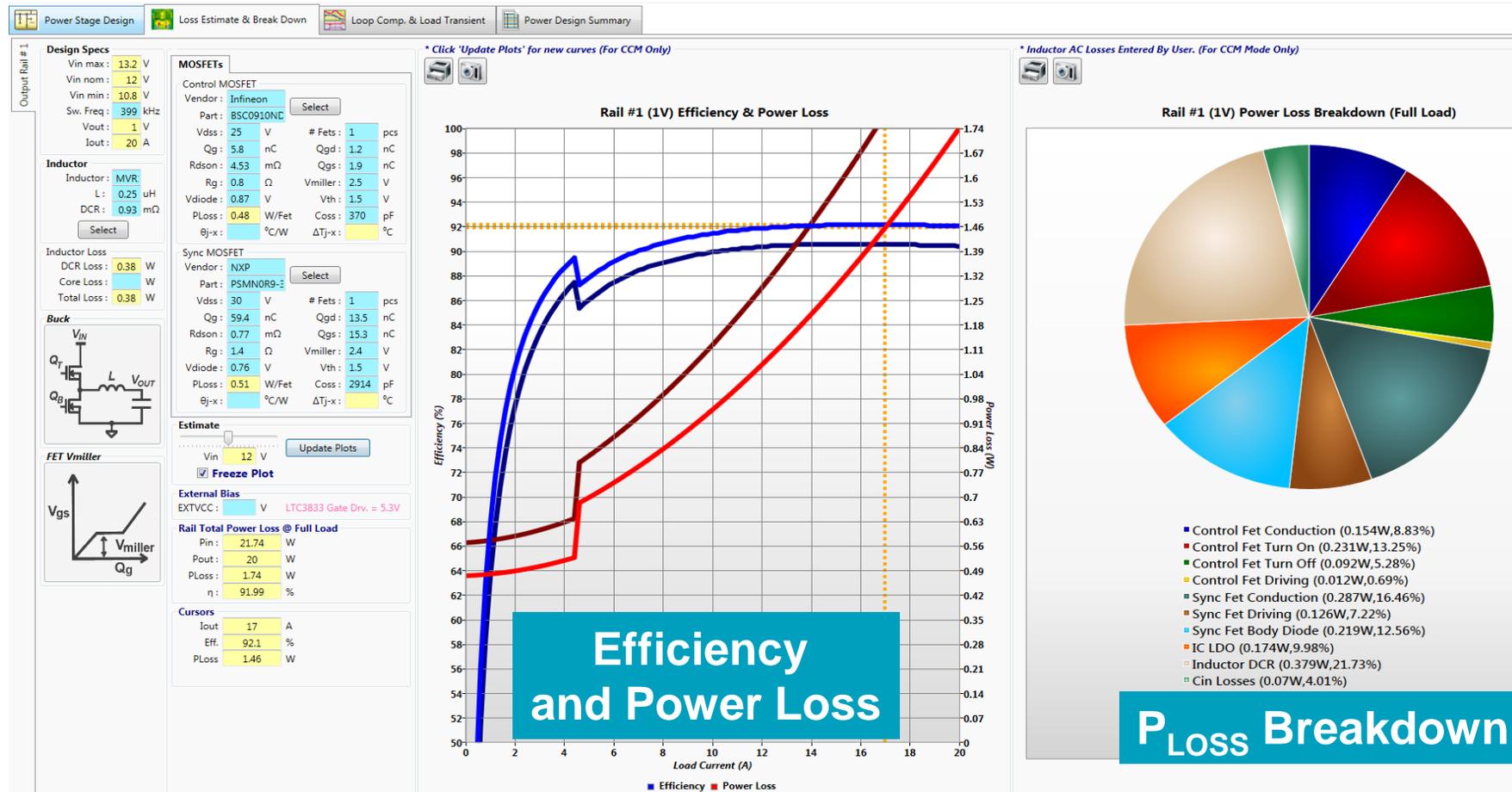


- Strong warning (Hard)
- Soft warning

► Warning levels are set by apps engineers for different products.

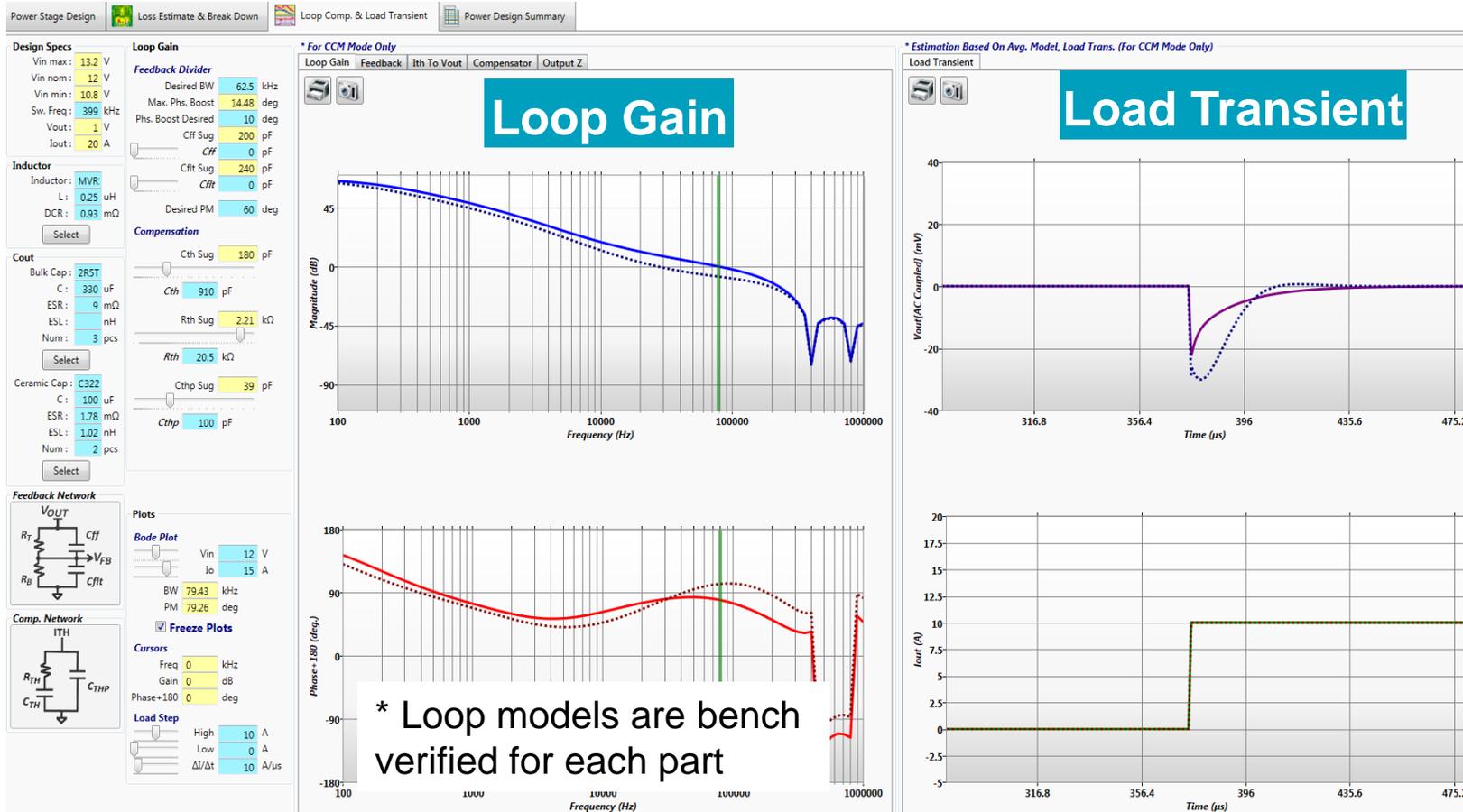
Automatic warnings guide to proper values

Step 3: Efficiency Optimization



Real-Time Estimations for Optimum η%

Step 4: Loop and Transient Design



Real-Time Loop and Transient Optimization



Step 5: Design Summary, BOM, Size

Loss Estimate & Break Down | Loop Comp. & Load Transient | Power Design Summary

[Print Summary Report](#) **Summary Report**

LTC3833 Supply Design Summary

Project Info: Ref Design 12Vin to 1V/20A, 10/2014, H.Z.

Design Specifications

Steady State :

Rail #	Vin Min.	Vin Nom.	Vin Max.	Fsw	Vo	ΔV_o rip. p-p	ΔV_o rip.%	Io Max	Δi_{Lp} -p	Δi_{Lp} %	iLpk
1	10.8 V	12 V	13.2 V	399 kHz	1 V	7.82 mV	0.4 %	20 A	9.19 A	45.9 %	24.59 A

Efficiency and Loop :

Rail #	Vo	Iomax	Eff.@Iomax	PLoss@Iomax	Loop BW	Loop PM	Step Low	Step High	Step Slew	ΔV_o @Step	ΔV_o @Step %
1	1 V	20 A	91.99 %	1.741 W	79.43 kHz	79.26 deg	0 A	10 A	10 A/ μ s	22.1 mV	+/-2.2 %

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	LTC3833		4	3	0.8	
Lo1	0.25 μ H	1	IND	COILCRAFT	MVR1251T-251		11.5	9.75	5.1	
Cinb1	180 μ F	1	CAP	PANASONIC	16SVP180MX	F8	10.3	10.3	7.9	
Cinc1 Cinc2	47 μ F	2	CAP	MURATA	GRM32ER61C476KE15	1210	3.2	2.5	1.7	
Cob1 Cob2 Cob3	330 μ F	3	CAP	SANYO	2R5TPE330M9	D2E	7.3	4.3	1.8	
Coc1 Coc2	100 μ F	2	CAP	TDK	C3225X5R0J107M	1210	3.2	2.5	1.7	
Qcontrol1	25V	1	FET	Infineon	BSC0910NDL_Q1		6.35	5.35	1.1	
Qsync1	30V	1	FET	NXP	PSMN0R9-30YLD		6	5	1.7	

Power Components Footprint :

# Components	12	
Max. Height	7.9	mm
Component Clearance (d)	1	mm
Power Components Area (Excludes ICs)	541.5	mm ²
	0.839	in ²
* Power Components Area (Includes ICs)	561.5	mm ²
	0.87	in ²

Performance Summary

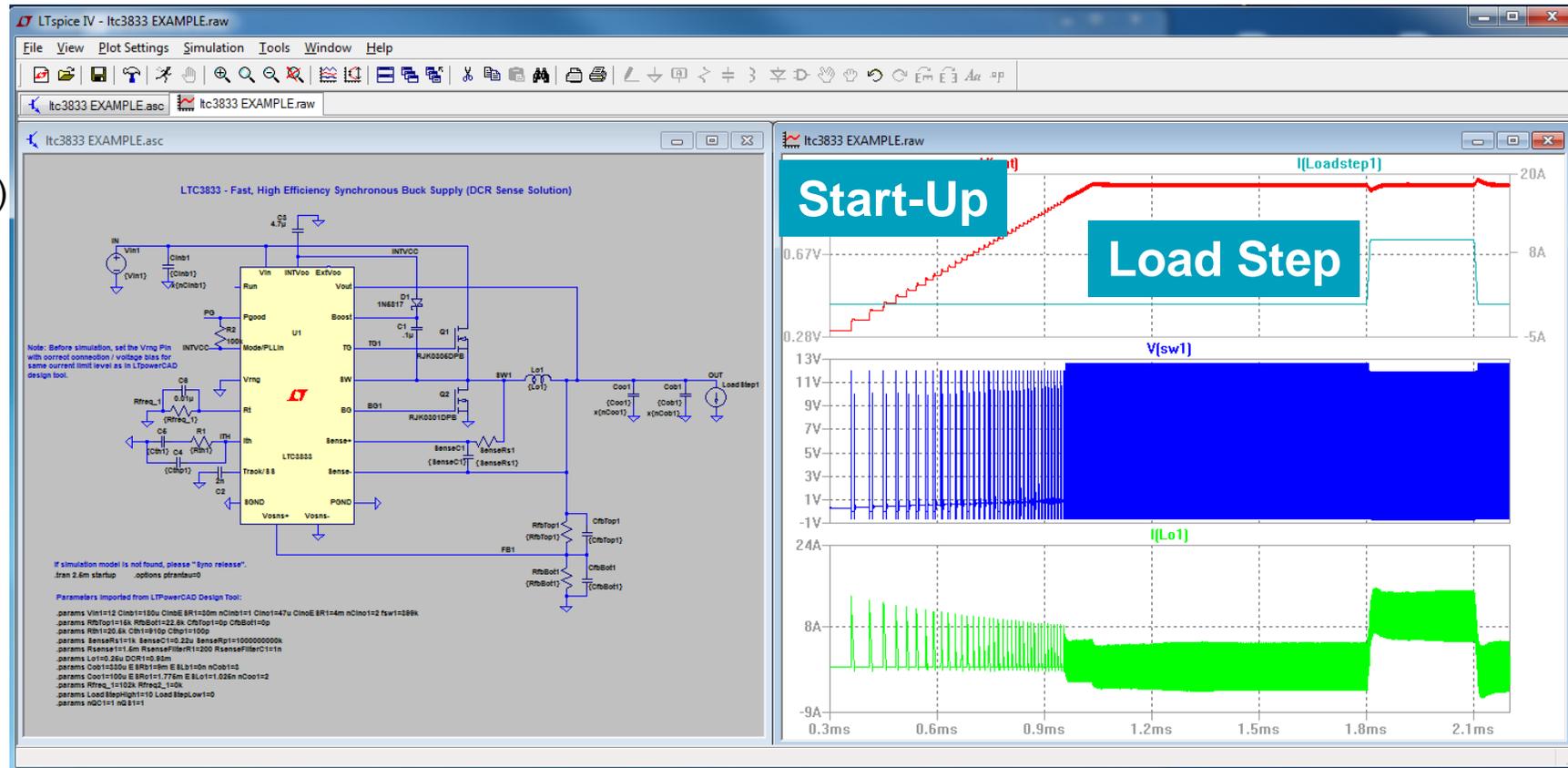
BOM

Solution Size

(Optional) Step 6: Export to LTspice Simulation



(on Schematic Page)



* Key LTpowerCAD design tool values are exported to LTspice

LTspice Simulation for Detailed Waveforms



Design Shortcut: Leveraging Existing Solutions

LTC3833 - Fast Accurate Step-Down DC/DC Controller with Differential Output Sensing

Project Name:
Date:

Solutions Library

Built-In Solutions

Part Name	Solution Name	(V)	Vin [nom] (V)	Vin [max] (V)	Rail Voltage(s) (V)	Output Current(s) (A)	Description
LTC3833	Datasheet P36		12	14	Vout1 = 5.5V	Iout1 = 4A	Fsw=2MHz Design
LTC3833	DC1516A-A		12	24	Vout1 = 1.5V	Iout1 = 15A	1.5V/15A DCR Sense
LTC3833	DC1516A-B		12	24	Vout1 = 1.5V	Iout1 = 15A	1.5V/15A with Rsense
LTC3833	DC1640A-A		12	24	Vout1 = 1.5V	Iout1 = 20A	1.5V/20A DCR Sense
LTC3833	Ref Design 5-12Vin to 10A 1V 500kHz dual 3x3 FET DCR		12	14	Vout1 = 1V	Iout1 = 10A	DCR Sensing. Reference Design Only.
LTC3833	Ref Design 5-12Vin to 10A 1V 500kHz dual 3x3 FET Rsen		12	14	Vout1 = 1V	Iout1 = 10A	Rsense Sensing. Reference Design Only.

User's Solutions

Part Name	Solution Name	Vin [min] (V)	Vin [nom] (V)	Vin [max] (V)	Rail Voltage(s) (V)	Output Currents(s) (A)	Description	File Name
LTC3833	DC1640A-A Demo Board	4.5	12	24	Vout1 = 1.5V	Iout1 = 20A	Inductor DCR Sense	LTC3833 DC1640A-A Demo Board.Itpc
LTC3833	DC1640A-B Demo Board	4.5	12	24	Vout1 = 1.5V	Iout1 = 20A	Rsense	LTC3833 DC1640A-B Demo Board.Itpc

Solution Library

Add This Project As A New Solution

New Solution Name :

New Solution Description :

- ▶ Solution library demo boards, data sheet circuits, reference designs ...
- ▶ Users can add/build their solutions, too.
- ▶ Quick start point of a new design!

LTpowerCAD Bench Verification Report (on a Standard Demo Board)

Duty ~ 35%

V_{OUT} : 12 V at 10 A resistive load

V_{in} = 36 V

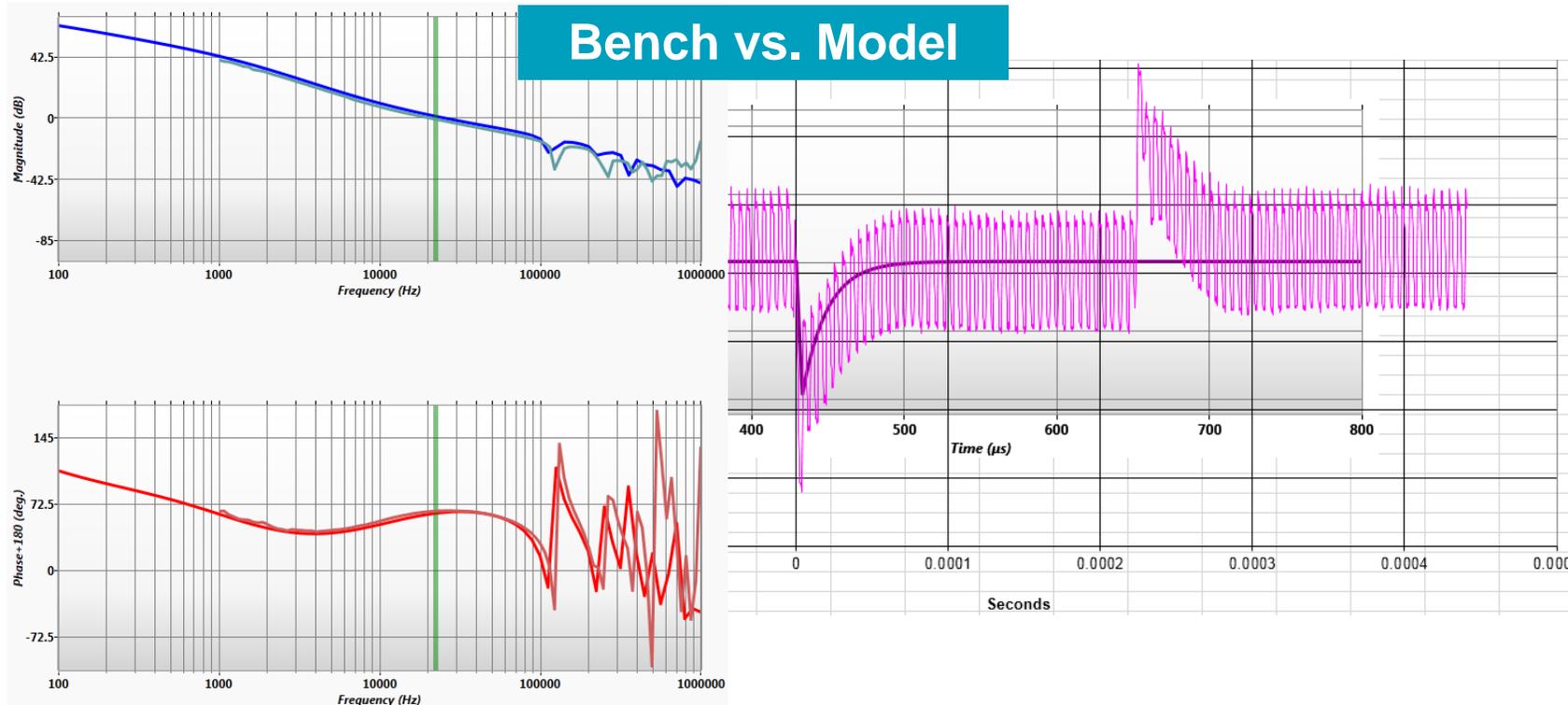
C_{OUT} bulk: 4x 150 μ F, 12 m Ω

VFB: 499 k Ω ||22 pF +35.7 k Ω

f_{sw} = 120 kHz

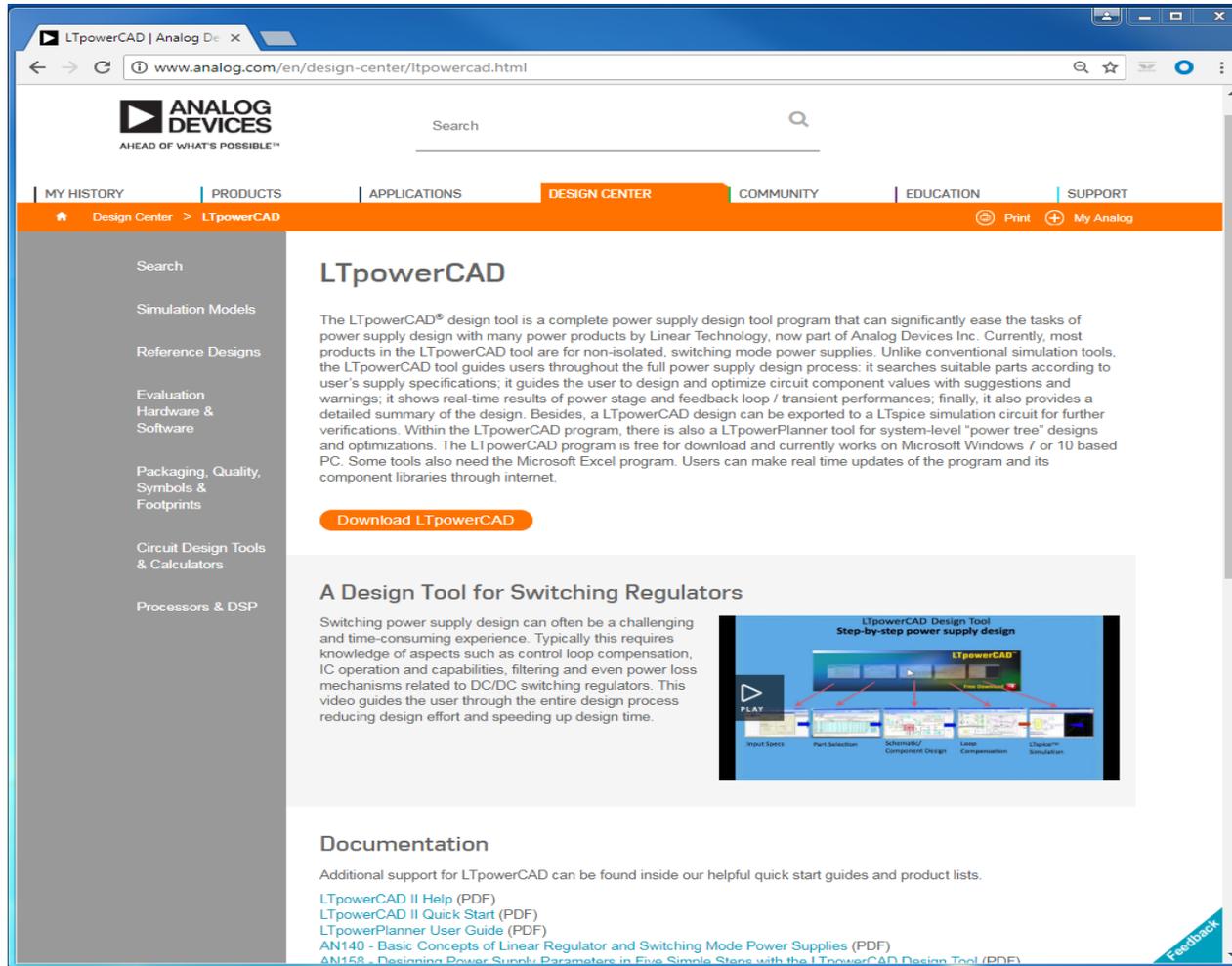
C_{OUT} ceramic: 4x 35 V 10 μ F 1206

Comp: (1.5 k Ω +10 nF)||610 pF



Other Tools in LTpowerCAD





The screenshot shows the LTpowerCAD webpage on the Analog Devices website. The page features a navigation menu with options like MY HISTORY, PRODUCTS, APPLICATIONS, DESIGN CENTER (highlighted), COMMUNITY, EDUCATION, and SUPPORT. A search bar is located at the top. The main content area is titled "LTpowerCAD" and includes a detailed description of the design tool, a "Download LTpowerCAD" button, and a section titled "A Design Tool for Switching Regulators" with a video player. Below this is a "Documentation" section with links to various PDF guides and user manuals. A "Feedback" button is visible in the bottom right corner of the page content.

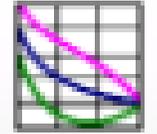
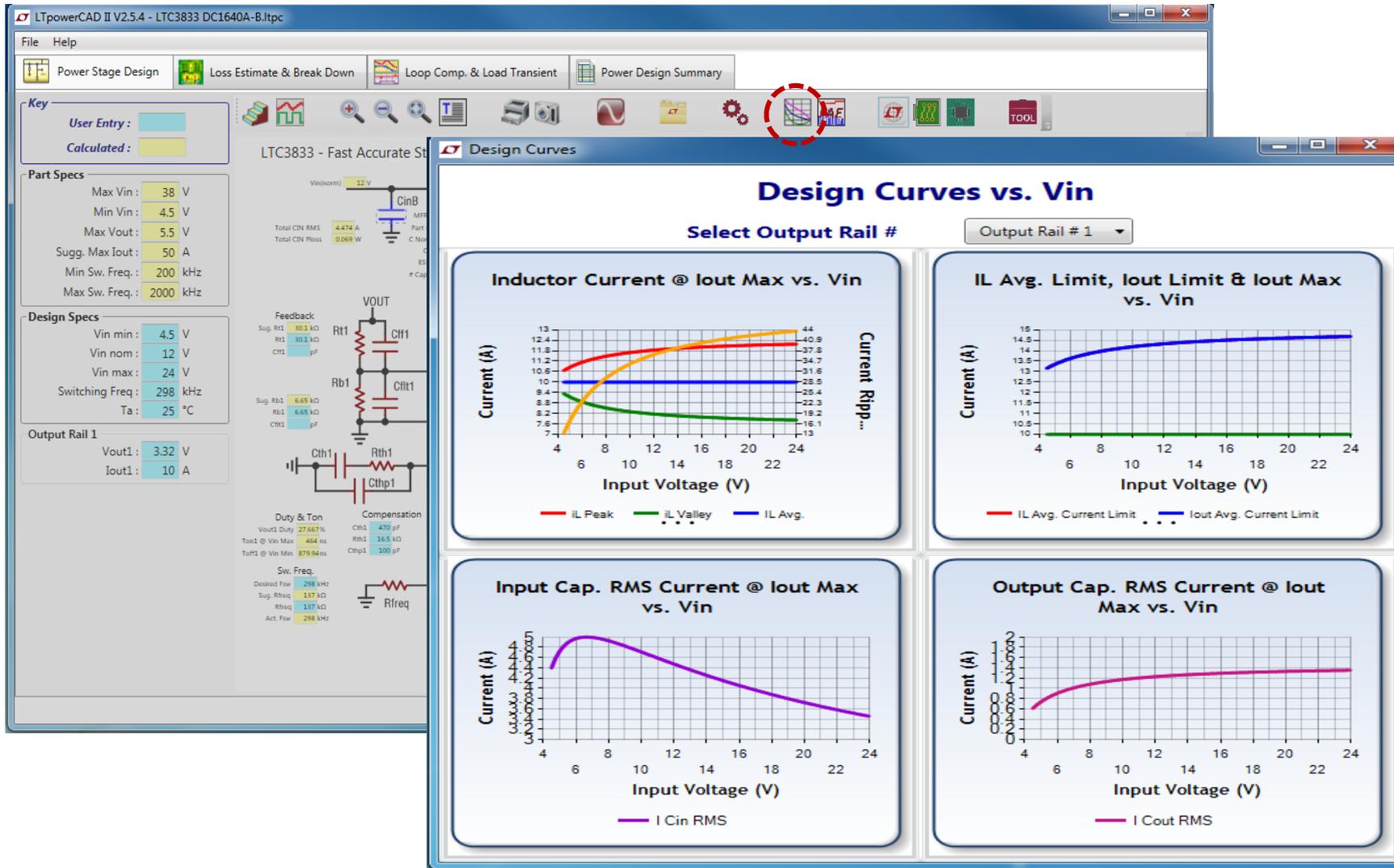
- ▶ Free download
- ▶ Quick-start guide
- ▶ Articles and videos



Advanced Features ...



Design Curves (for Wide V_{IN} Range)



- ▶ Check the design in the full V_{IN} range.
- ▶ Check the worst case.



Power Stage Design: Component Libraries

Power Stage Design | Loss Estimate & Break Down | Loop Comp. & Load Transient | Power Design Summary

Key
User Entry: []
Calculated: []

Part Specs

- Max Vin: 38 V
- Min Vin: 4.5 V
- Max Vout: 5.5 V
- Sugg. Max Iout: 50 A
- Min Sw. Freq.: 200 kHz
- Max Sw. Freq.: 2000 kHz

Design Specs

- Vin min: 4.5 V
- Vin nom: 12 V
- Vin max: 24 V
- Switching Freq.: 298 kHz
- Ta: 25 °C

Output Rail 1

- Vout1: 1.5 V
- Iout1: 20 A

LTC3833 - Fast Accurate Step-Down DC/DC Controller with Differential Output Sensing

Inductor

- Desired iL Ripple: 40 %
- Sug. L1: 0.55 µH
- L1: 1.5 µH
- DCR: 1.7 mΩ
- MFR.: VISHAY
- Part #: IHLP4040DZ-
- iL Ripple: 15 %
- iL Peak: 21.468 A

Current Limit

- Target Iout Limit Margin: 135 %
- Target Iout Limit: 27 A
- iL pk@ Target Iout Limit: 28.468 A
- iL vly@ Target Iout Limit: 25.532 A
- VRNG: Set 0.6V - 2V (or GND=30mV, INTVCC=50mV)
- VRNG: 2 V
- Actual VRNG: 2 V
- Vsense max prog.: 100 mV

Output Voltage

- Vout Prog.: 1.5 V
- Vout Ripple (pk-pk): 6.82 mV
- ΔVripple/Vo +/-: 0.227 %

Power INDUCTOR Library

Show All Parts | Show Suggested Parts | Show Only AECQ Qualified Parts

Vendor	Name	Area(mm ²)	DCR Loss(W)	DCRxArea(mΩ-mm ²)	ΔiL x DCR(mV)	L(µH)	L Tol
COILCRAFT	XAL6020-271ME	44.3	1.393	152.8	23.3	0.27	20
PULSE	PG0426.201	52.5	0.814	105	18.3	0.2	20
PULSE	PG0426.221	52.5	0.811	105	16.6	0.22	20
COILCRAFT	MLC7532-221ME	52.5	1.014	131.2	20.8	0.22	20
VISHAY	IHLP3232CZERR2	66.9	0.649	107	13.3	0.22	20
VISHAY	IHLP3232CZERR2	66.9	0.649	107	13.3	0.22	20
PANASONIC	FTOP41 R19WFC	115	0.285	80.5	6.4	0.2	20

User Parts:

Add A New L []

Vendor [] Part (A) [] L []

Add Part To Library

Vendor Search Tools

Coilcraft | WE WORTH ELECTRONIC | VISHAY | UITEC | TDK | TOKO | Pulse Electronics | sumida

Show Suggested Parts eases component selections



Component Library (Power MOSFET Example)

Power MOSFET Library

Show All Parts | **Show Suggested Parts** | Vin: 12 (V) | # Parallel Fets: 1 pcs. (for MOSFET Loss Calculation) | Update Search | Show Only AEC-Q Parts | Clear Search Entries

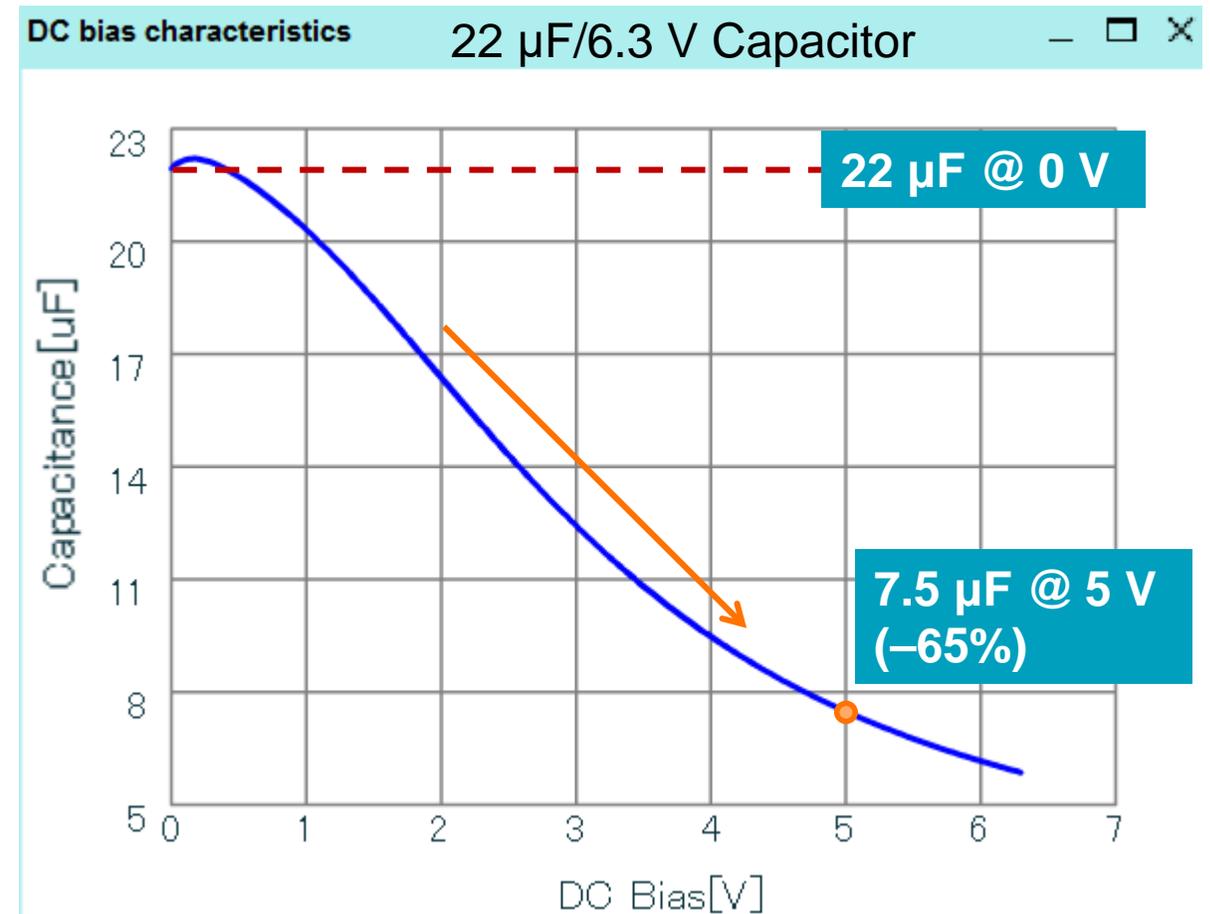
Vendor	Name	Est. Loss(W)	Vds(V)	Vgs1(V)	Rds1(mΩ)	Qg1(nC)	Vgs2(V)	Rds2(mΩ)	Qg2(nC)	Qgd(nC)	Qgs(nC)	Coss(pF)
Infineon	BSC0504NSI	0.204	30	4.5	4	5.2	10	3	11	1.4	1.9	250
Infineon	BSZ0506NS	0.208	30	4.5	4.4	5.2	10	3.5	11	1.4	1.9	220
Infineon	BSC0503NSI	0.209	30	4.5	3	7.1	10	2.3	15	1.8	2.5	330
Infineon	BSC0502NSI	0.223	30	4.5	2.4	9	10	1.9	19	2.3	3.1	420
Infineon	BSZ0503NSI	0.223	30	4.5	3.5	7.1	10	2.8	15	1.8	2.5	330
Infineon	BSZ0502NSI	0.239	30	4.5	2.9	9	10	2.4	19	2.3	3.1	420
Infineon	BSC0501NSI	0.252	30	4.5	2	11.4	10	1.5	23	2.9	3.9	530
Infineon	BSZ0501NSI	0.256	30	4.5	2.1	11.4	10	1.7	23	2.9	3.9	540
Infineon	BSC052N03LS	0.261	30	4.5	5.8	5.9	10	4.3	12	1.9	2.2	300
...												
User Parts:												
test	test part 1	0.522	30	4.5	12.2	7.5	10	8.1	17	2	3.9	370
...												
Add A New User Part:												
Vendor	Name	Vds(V)	Vgs1(V)	Rds1(mΩ)	Qg1(nC)	Vgs2(V)	Rds2(mΩ)	Qg2(nC)	Qgd(nC)	Qgs(nC)	Coss(pF)	Rg(Ω)
...												
Add Part To Library												
Vendor Links												

Show Suggested Parts—quick efficiency optimization

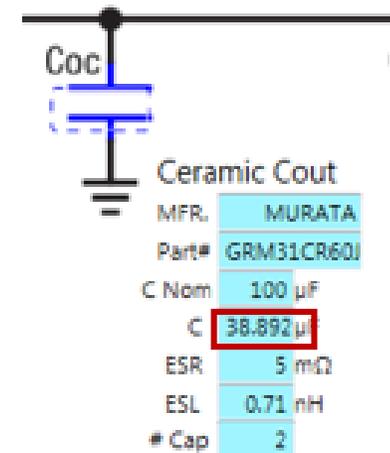
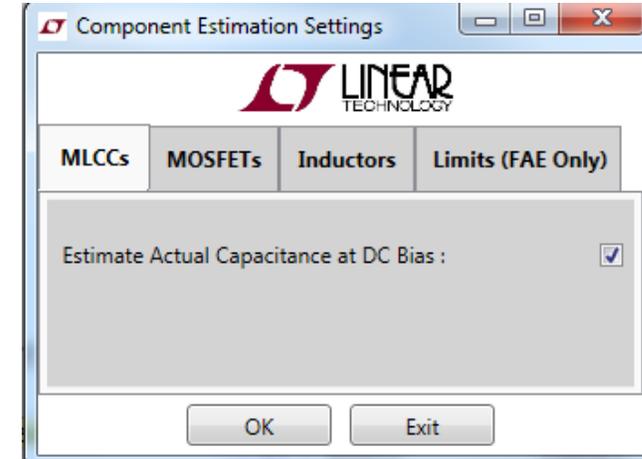
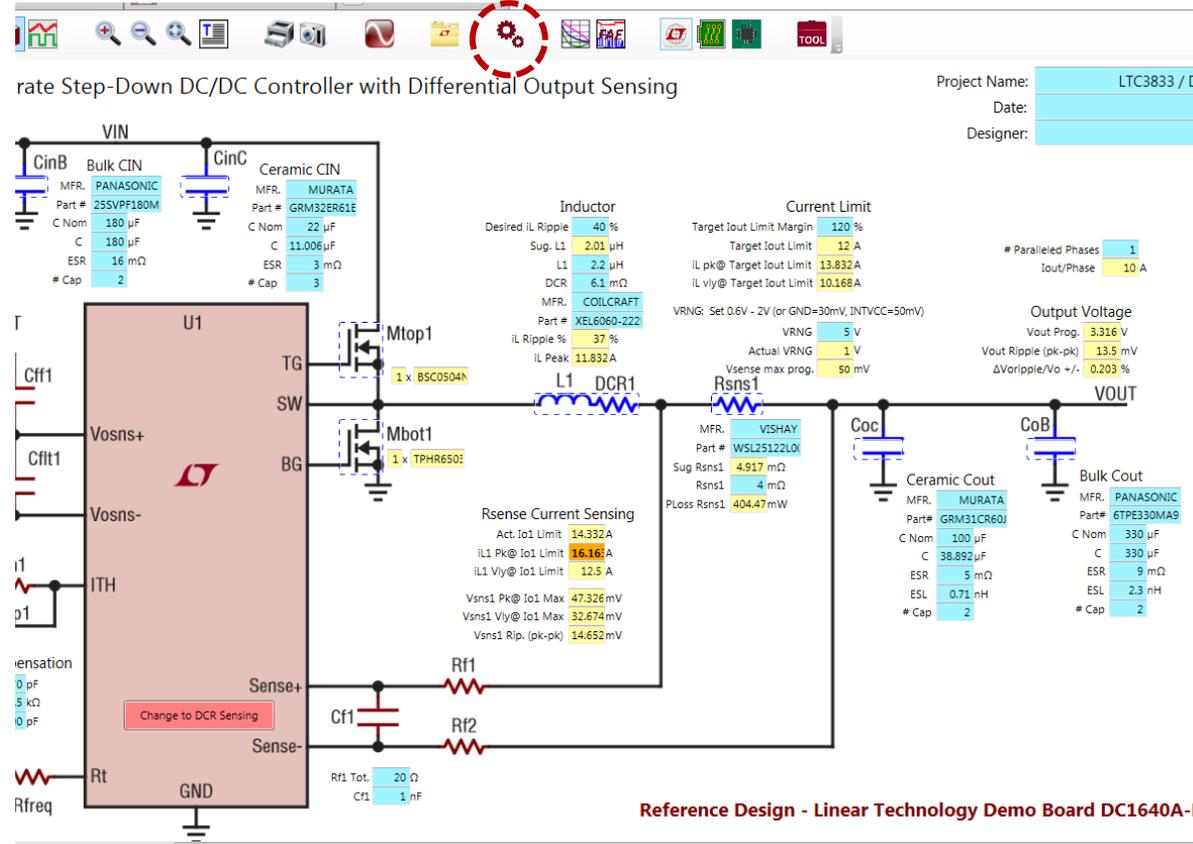


Ceramic Capacitor Derating vs. DC Bias

- ▶ **MLCC: significant capacitance loss at V_{BIAS}**
- ▶ **How to design it in LTpowerCAD?**



MLCC Auto Derating vs. DC Bias



Input EMI Filter Design (Only for Differential Mode, Conducted EMI)

Linear Technology DC189
4-20Vin, 5V/3.3V/2.5V, 5

Conducted (Differential Mode) EMI Filter Design

EMI Specification: CISPR22 | EMI Margin Desired: 0 dB μ V | Use Suggested Values | Show EMI Without Input Filter | Cursor X: 0.4944 MHz | Cursor Y: 13.3 dB μ V

Component Values:

Component	Value
CdA	100 μ F
Lf	0.044 μ H
CdB	127.09 μ F
CinB	10 μ F
CinC	22 μ F
RdA	500 Ω
RdB	500 Ω
Cf	4.7 μ F
C	10.591 μ F
ESR	7 m Ω
ESL	1 nH
# Caps	3

Operating Conditions: Vin: 12 V, Vout1: 2.5 V, Iout1: 5 A, Fsw: 988 kHz

EMI vs. Specification: Actual EMI Margin (min.): 8.358 dB μ V @ 0.989 MHz

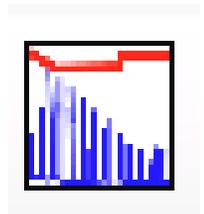
Filter vs Input Impedance: ZIN - ZOF Headroom (min.): 29.083 dB @ 0.087 MHz

Filter Attenuation Graph: Conducted EMI vs. CISPR22 Class B (PEAK) : 150kHz - 30MHz. The graph shows Magnitude (dB μ V) vs. Frequency (Hz) on a log scale. A red line indicates the EMI Spec, and a blue line shows the Conducted EMI. A vertical dashed line is at 0.4944 MHz.

Component Selection Table:

Vendor	Part#	C Nom	C	ESR	# caps
MURATA	GRM32ER61E226	22 μ F	10.591 μ F	7 m Ω	3 pcs.

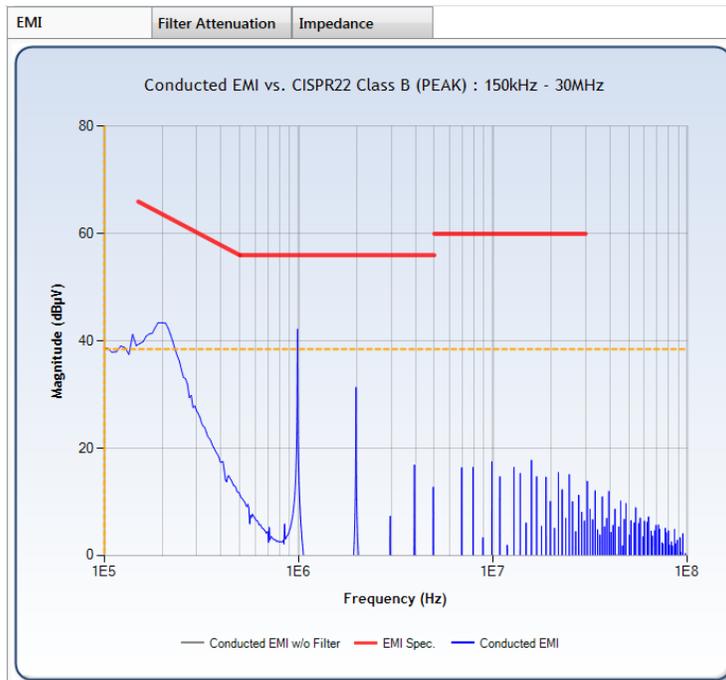
Summary: Total Cin IRMS: 2.031 A, Total Cin Loss: 0.01 W



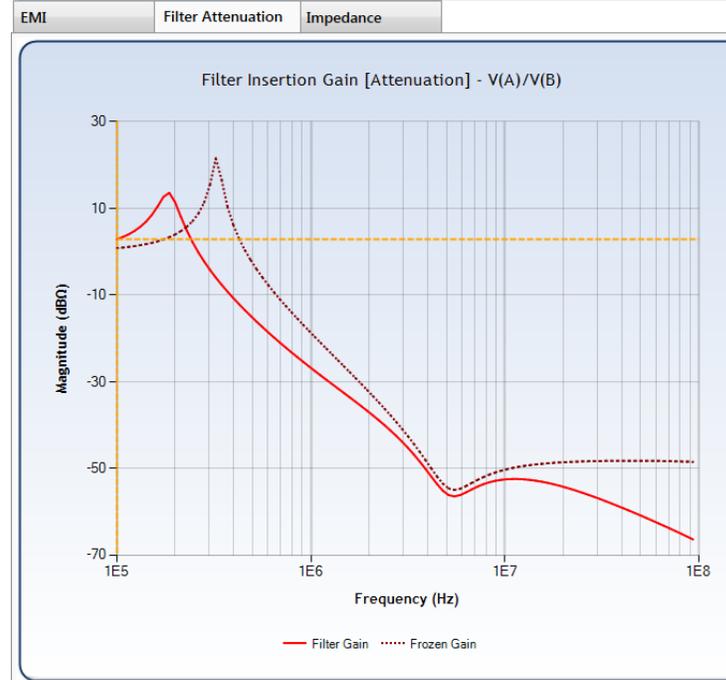
Released for buck and boost converters



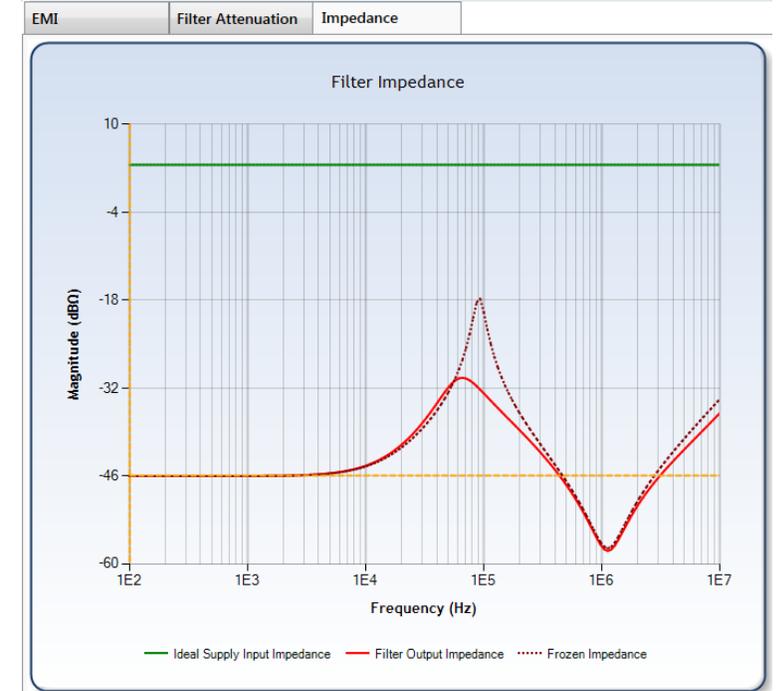
EMI Noise vs. Standard



Filter Insertion Gain (with Damping)

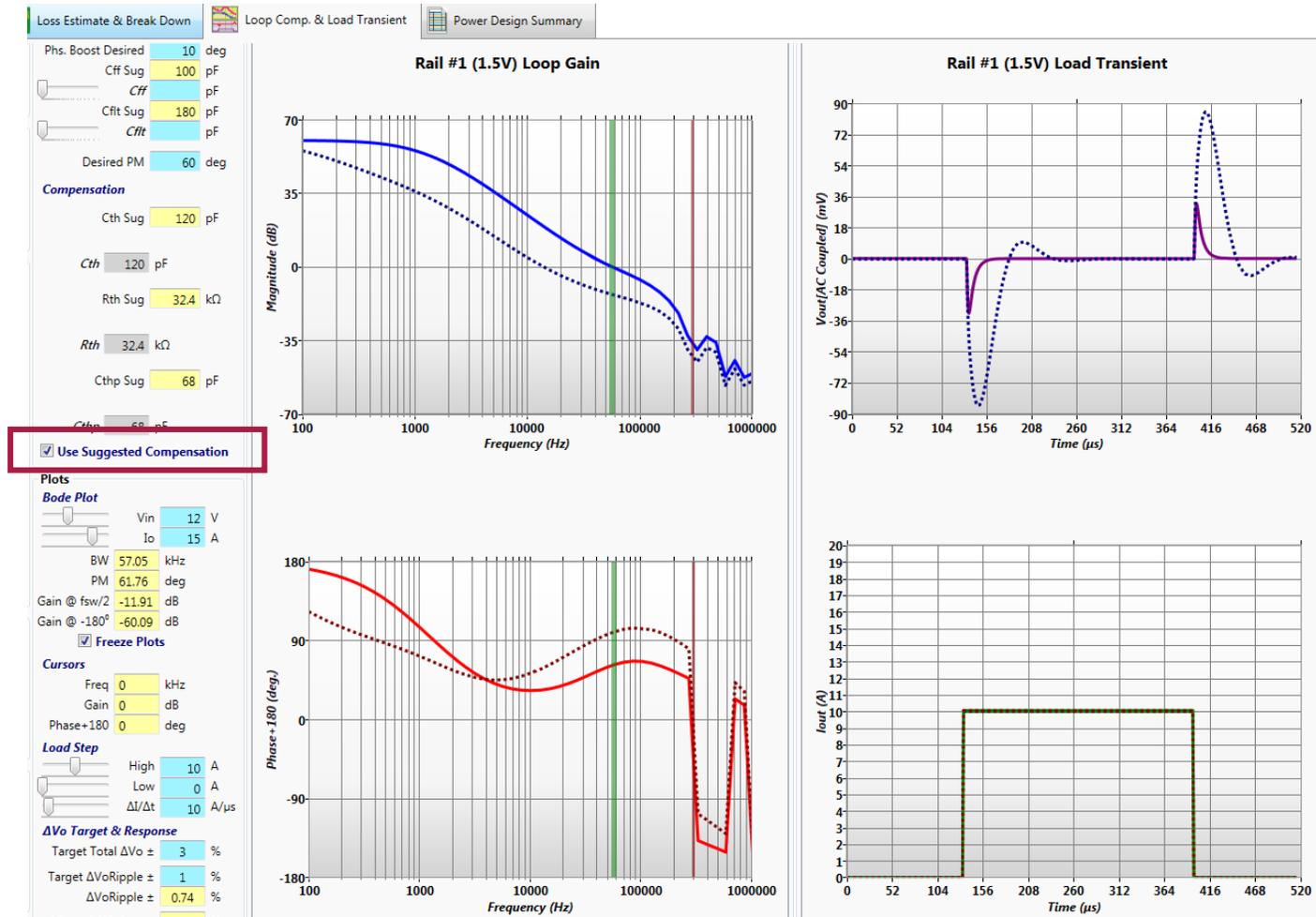


Filter/Supply Impedance (with Damping)



Auto Loop Compensation

One click





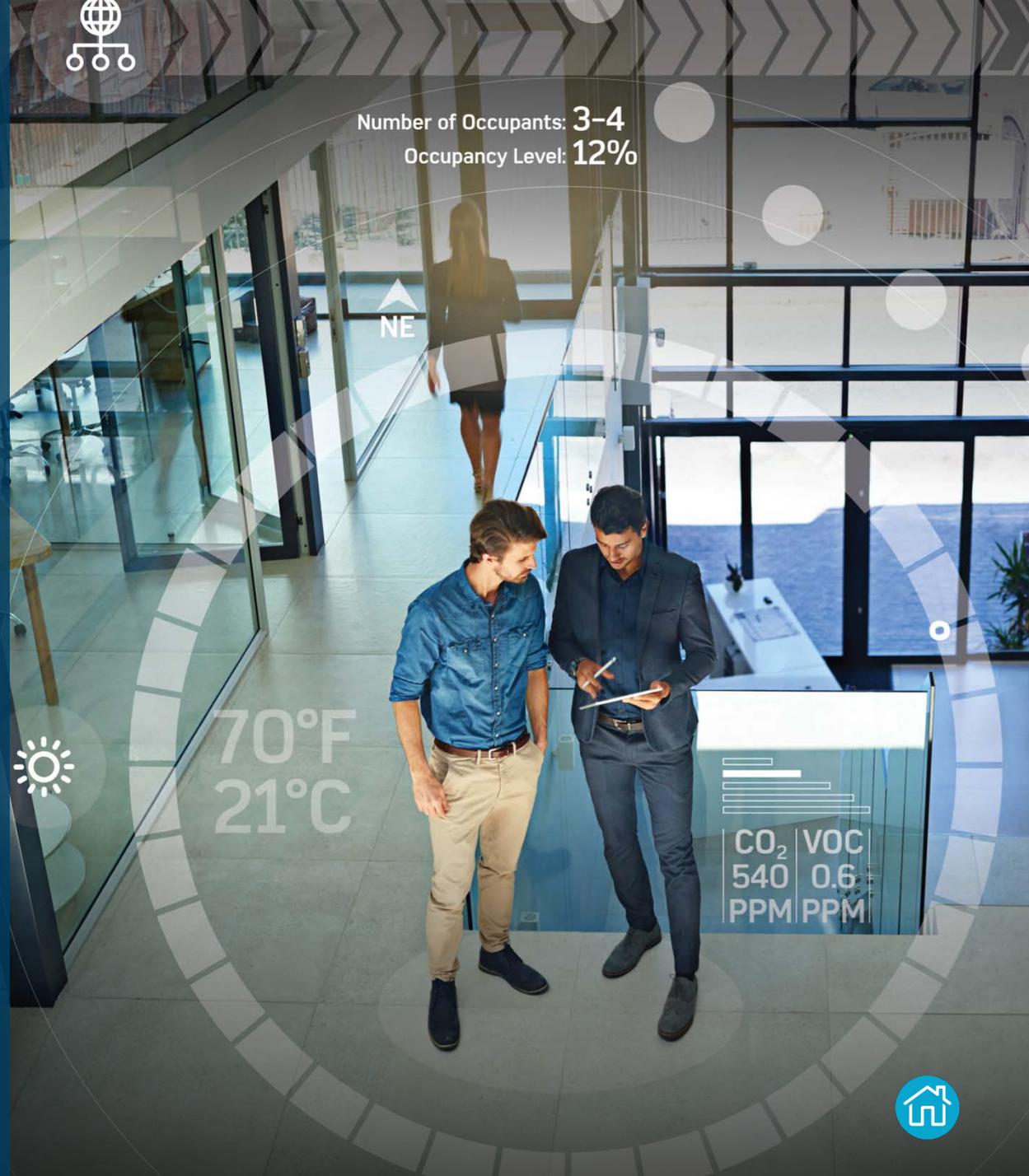
AHEAD OF WHAT'S POSSIBLE™

LTpowerPlanner® Design Tool Brief Introduction

BY HENRY ZHANG AND TIM KOZONO

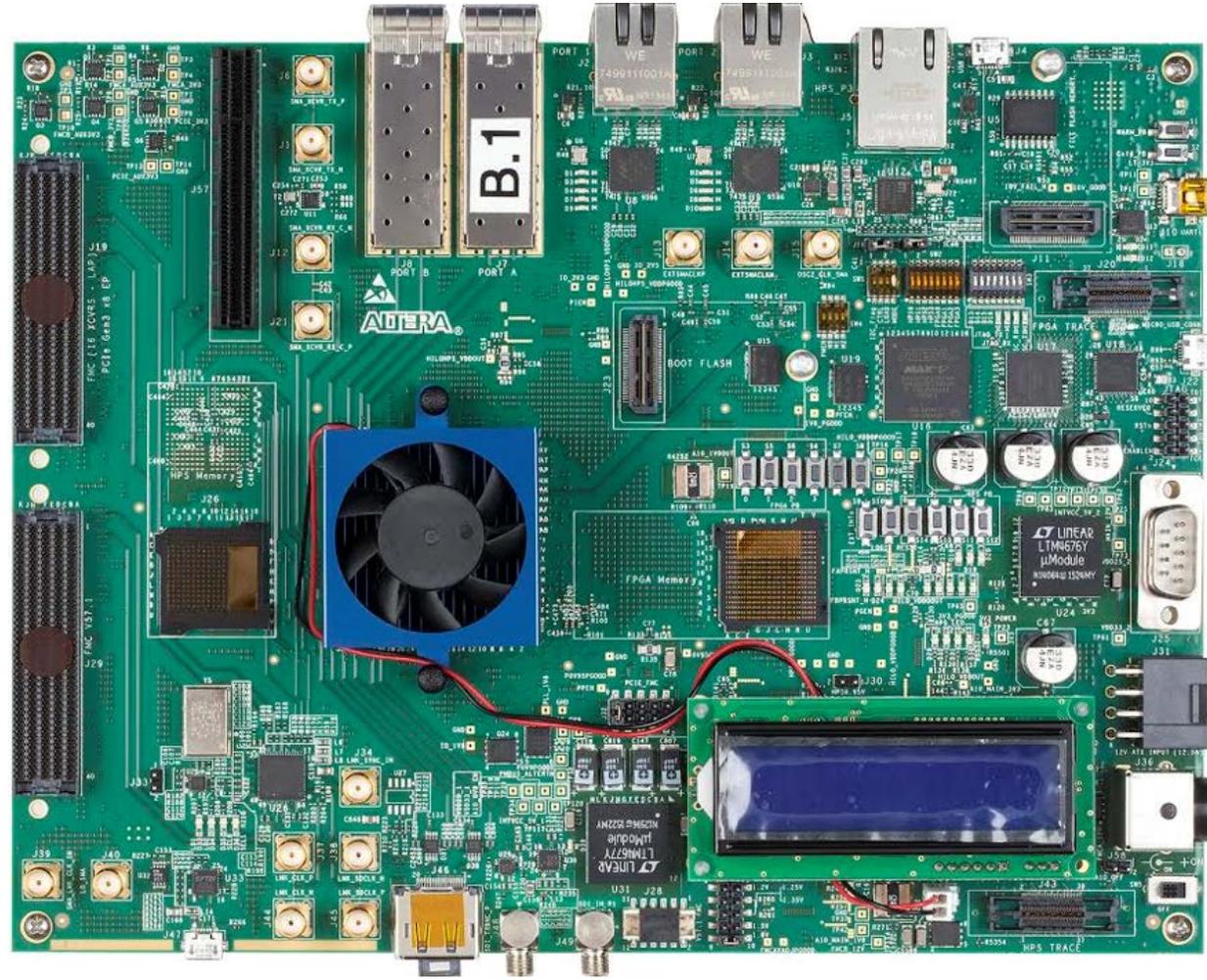
APPLICATIONS ENGINEERING

POWER PRODUCTS



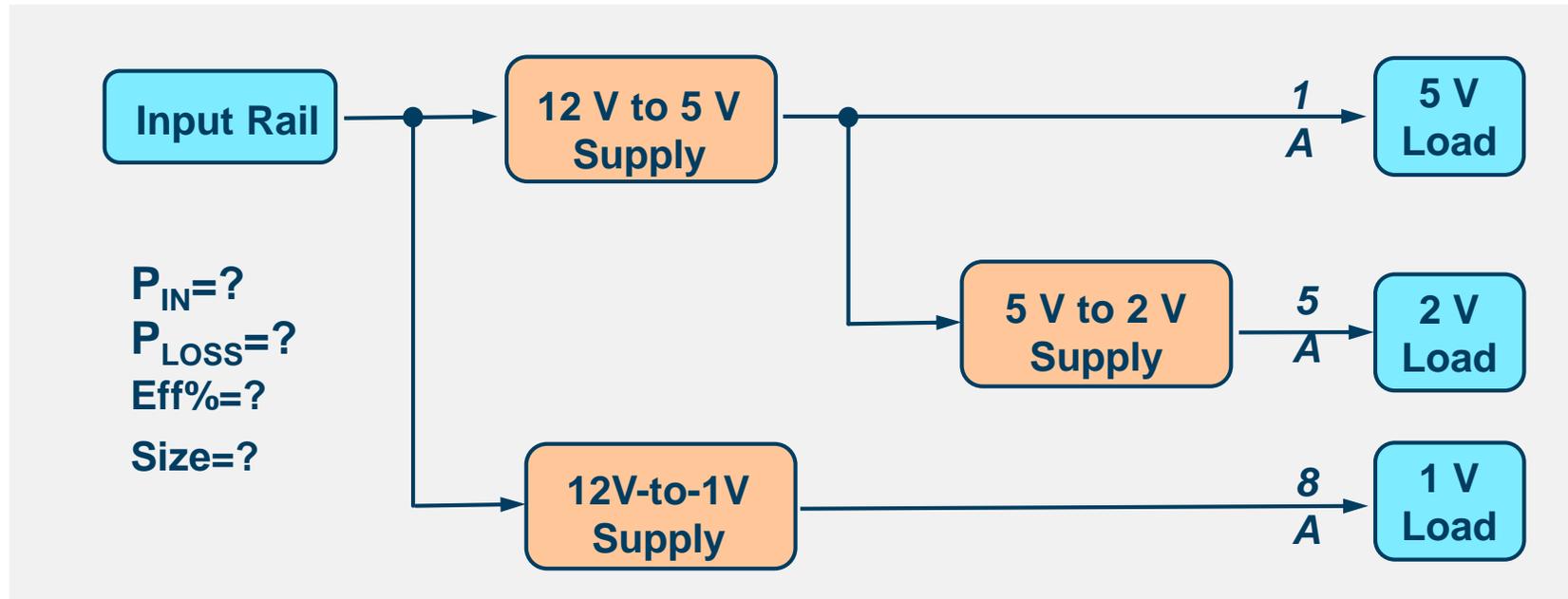
A System Board Example

- ▶ A modern electronic system usually has **many power supplies and loads.**
- ▶ A **power tree** drawing is needed.



A Power Management System Example

- ▶ A system designer needs to plan and development the entire power management system.
- ▶ System optimization: **total efficiency, loss, size, cost**, etc.



A system-level design and optimization tool is needed

A System-Level Power Planning Tool:

- ▶ Create a system power tree diagram.
 - ▶ Estimate total system power, efficiency, and size.
 - ▶ Optional links to **LTpowerCAD** and **LTspice** Designs.
-
- ▶ Available in the **LTpowerCAD package**.
 - ▶ LTpowerCAD free download: analog.com/LTpowerCAD.
 - ▶ Windows PC based.

Why Use the LTpowerPlanner® Tool?



- ▶ **Draw** system power tree diagram
- ▶ **Calculate** total system power, efficiency, and solution size
- ▶ **Document** system architecture and design solutions
- ▶ **Compare** different system solutions for optimum solution
- ▶ **Present** intuitive system solutions

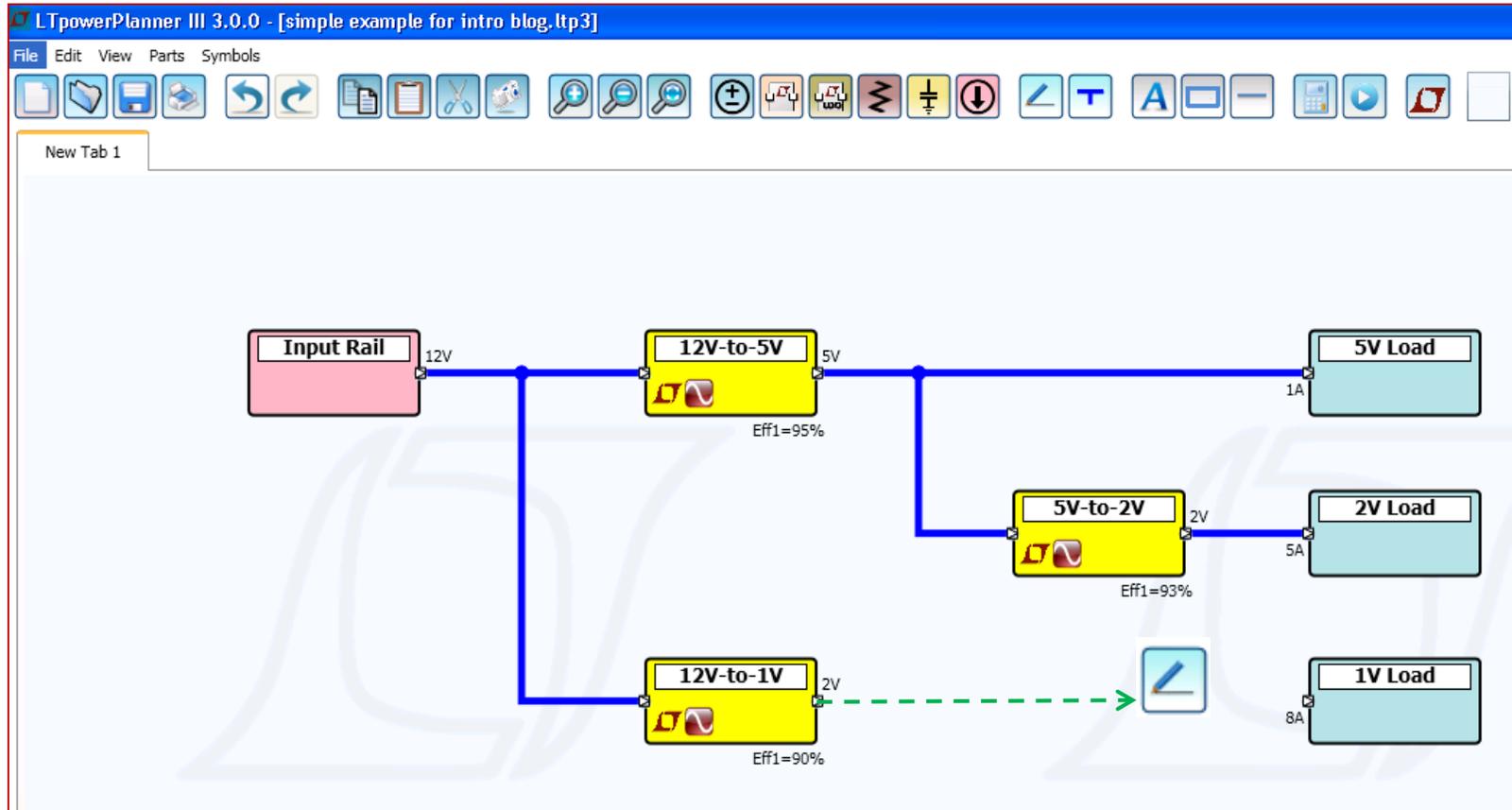


LTpowerPlanner® Tool: Getting Started



“System Design” in the LTpowerCAD package.

Step 1: Drawing a System Power Tree



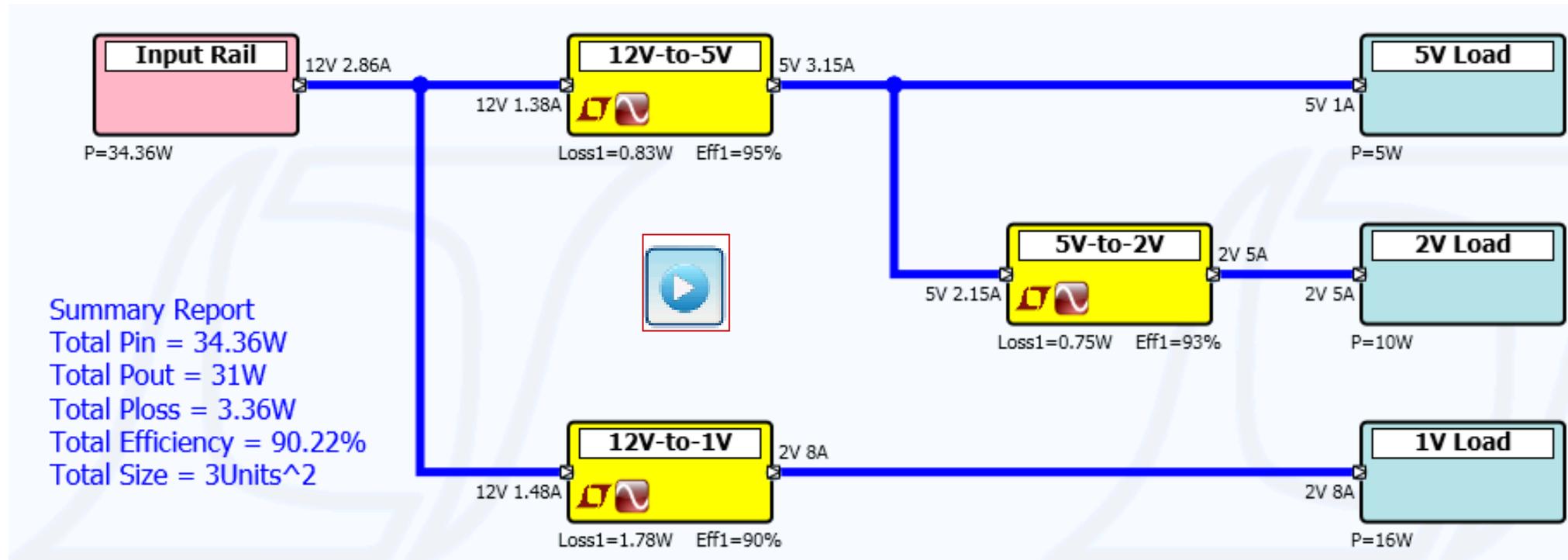
- ▶ Place input source, converter, and load components.
- ▶ Draw power wire connections (from left to right)

Step 2: Updating Parameters (For Input Source, Converters, and Loads)

► Enter key parameters in the **Properties** window for each *generic* part.

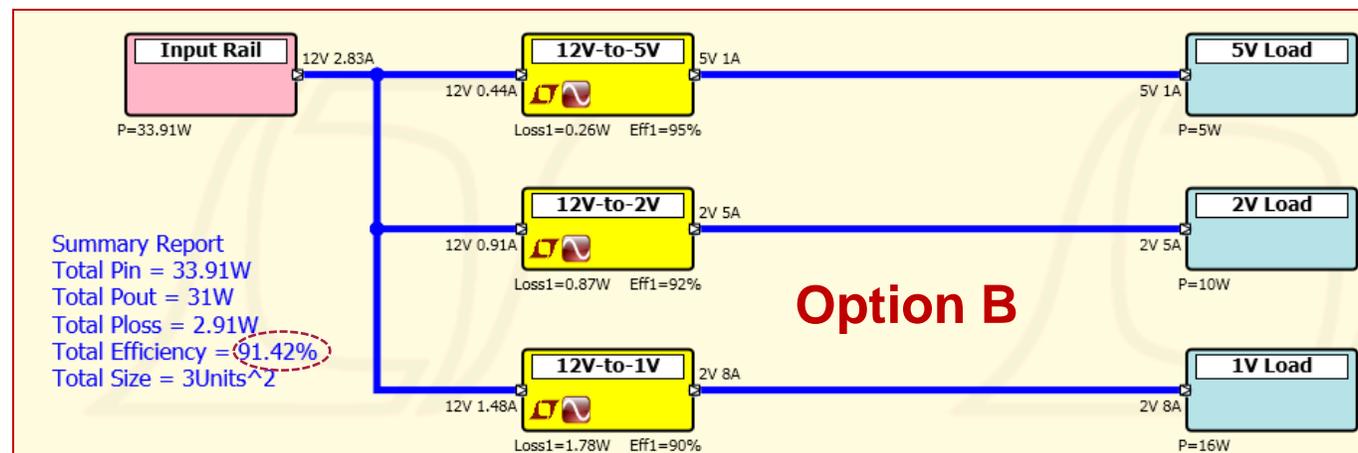
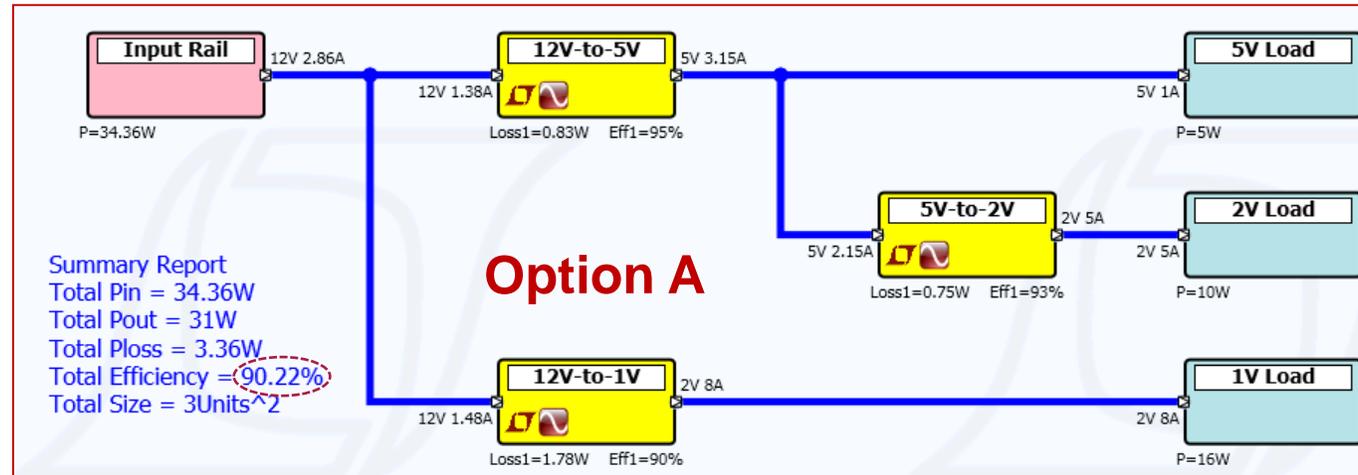
Converter			
Name:	12V-to-1V	Color:	[Yellow]
IC Part #		Solution Size (x):	1 Units
Vin Min:	4.5 V	Solution Size (y):	1 Units
Vin Max:	20 V	Solution Area:	1 Units ²
Topology:	All	Converter Type:	All
Output 1 +			
Vout	2 V	Iout Max:	15 A
Vout Min:	0.6 V	Eff Nom:	90 %
Vout Max:	15 V	Eff Peak:	95 %

Step 3: Run Calculation



- Calculate total input power, output power, loss, efficiency, and size (based on user's entries of generic component parameters).

Comparing Different Architectures



A quick power tree comparison for optimum design

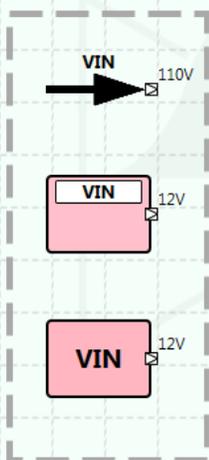
LTpowerPlanner® Component Visual Options

LTpowerPlanner Component Visual Options

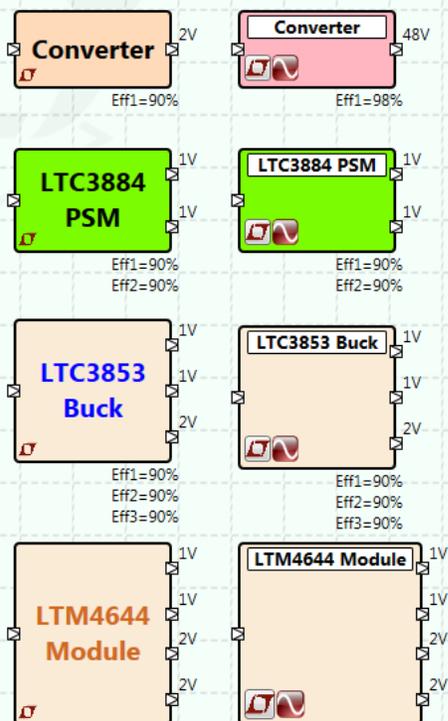
(Click on a component, when properties window shows up, click on "Change Visual")

LTpowerPlanner Example

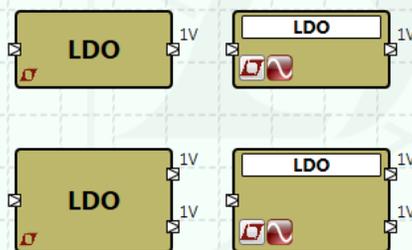
Power Source



Converters



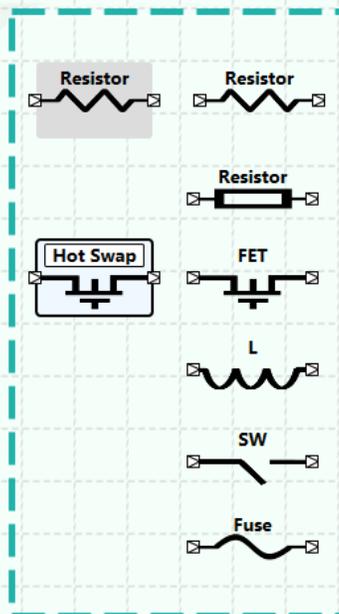
LDOs



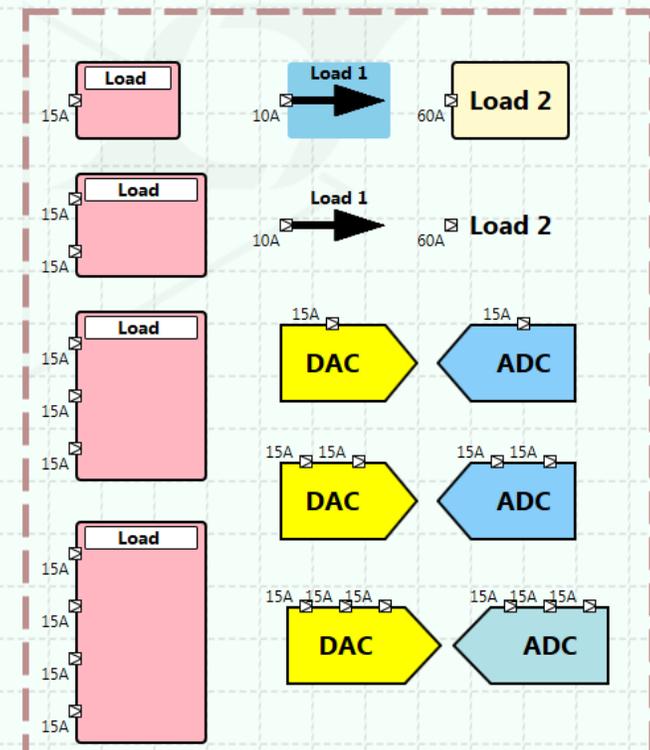
Symbols

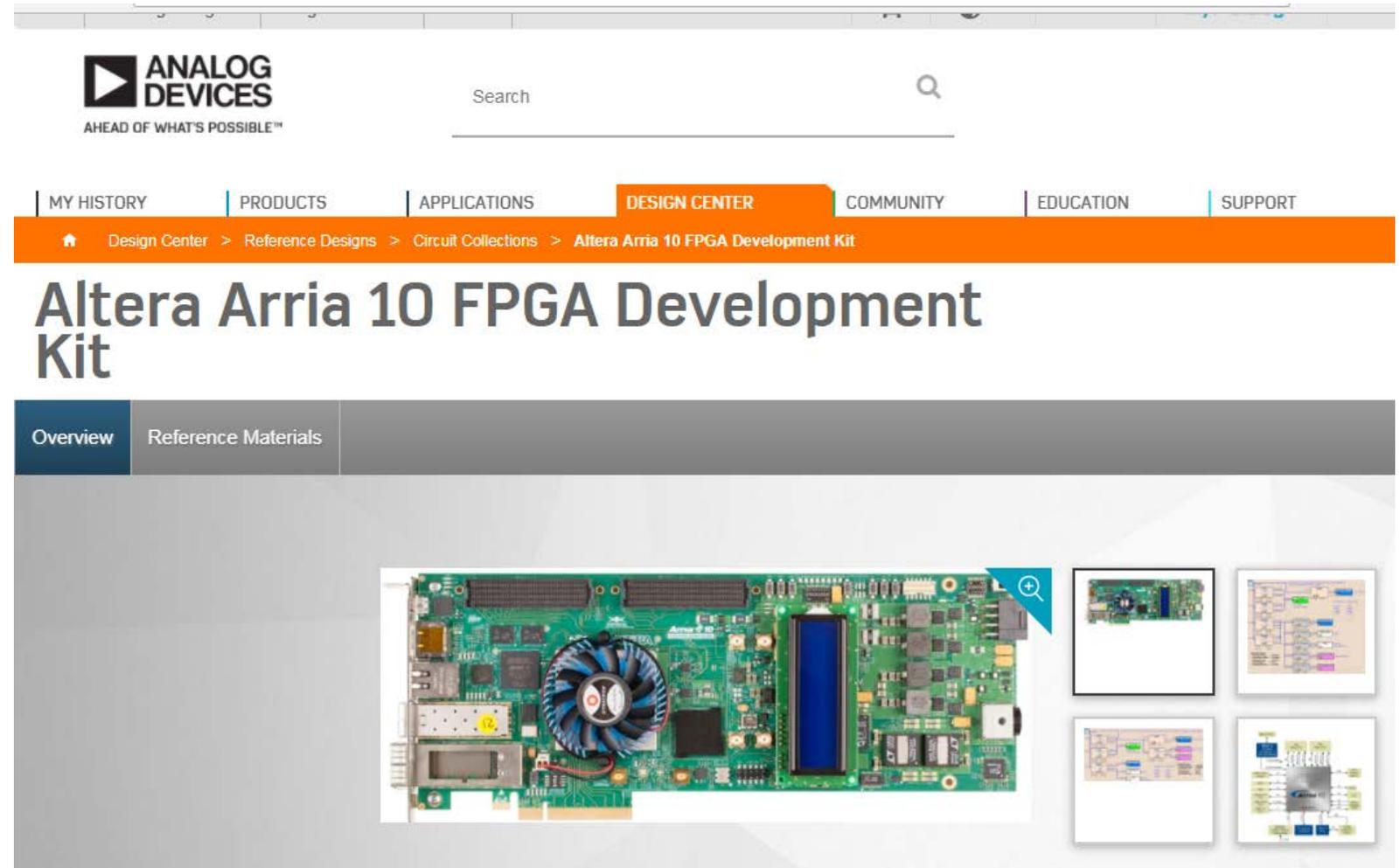


Resistive parts



Loads





Many existing
FPGA/processor
reference power trees.

Solution Power Tree Example Library

Some existing
FPGA/processor
reference power trees.

Arria 10 GX FPGA Power Tree
- Updated with power parts recommended by Linear Technology

2015

Output Rails
VCCRT_GXB (1.1V)
VCCRT_GXB (L,R)

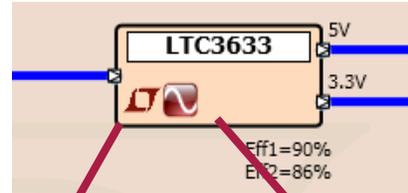
12VIN P=164.86W
12V 13.74A
12V 1.73A
11V 17A
11V 17A
12V 4.67A
12V 4.67A
12V 2.22A

LTC3877 Discrete
VID Control
LTC3874 Discrete
LTM4620 Module
LTM4637 Module

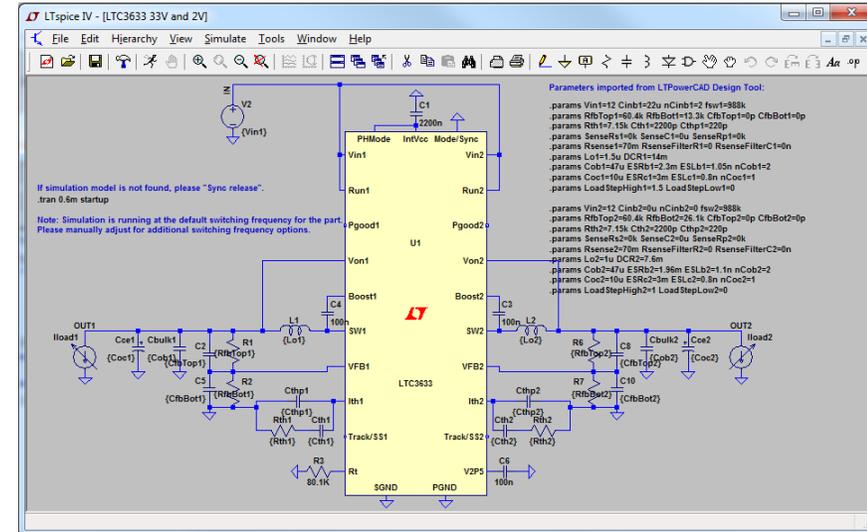
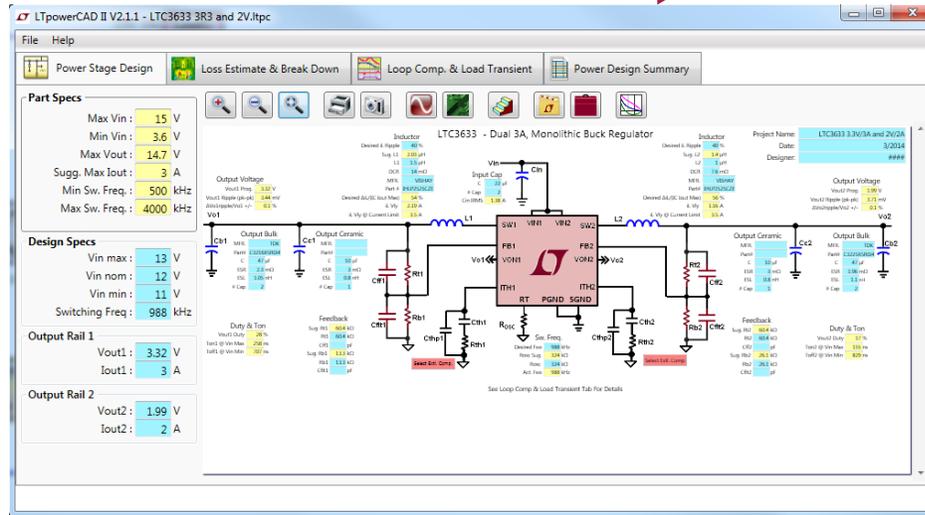
Group	Vendor	Device	Solution Name	Description	Note	Input Rails	Output Rails	Power Part Number	Date	Designer
Automotive	LTC	LTC3871	48V-14V Bidirectional Pol	4 x LTC3871 solution example		48V	14V/200A	LTC3871, LTC3871, LTC3871	10/27/2016	
FPGA	Altera	Arria 10	Arria 10 GX FPGA Power T	Power parts recommended by Linear		12V	0.95V/105A, 0.95	LTC3877, LTC3874	10/27/2016	
FPGA	Altera	Arria 10	Arria 10 SoC Development	Two Power Tree Options Available		12V, 12V	0.9V/30A, 3.3V/1	LTM4677, LTM4676A, LTM4	10/27/2016	
FPGA	Xilinx	Artix-7	Artix-7 on Basys 3 Board b	Evaluation platform using the LTC3		5V	0.9997V/3A, 3.29	LTC3633, LTC3621	10/27/2016	
Datacom	LTC	LTM/LTI	Communication Power Ch	Example from AC to loads		110V	1.8V/10A, 1V/50A	LTC7150, LTC3887, LTM46	10/27/2016	
Datacom	LTC	LTC388	Communication Power Tre	Example with 12Vbus and PSM POL:		48V	5V/4.1A, 1.5V/6.1	LTC3765/3766, LTC3887, L	10/27/2016	
Datacom	NA	NA	Datacom power architectu	Generic examples with 12V or 48V b		48V, 48V, 48V, 48V	1V/150A, 1V/80A		10/27/2016	
LTC Den	LTC	PSM LTI	DC2204A PSM uModule Po	Power Stick Board using LTM4676A,		12V	0.9V/9A, 0.7V/9A	LTM4675, LTM4676A,	10/27/2016	
LTC Den	LTC	LTC781	DC2435A LTC7813 Demo E	A-A: regulated 24Vo, A-B: unregulat		24V, 24V, 14V	24V/5A, 24V/5A,	LTC7813, LTC7813, LTC781	10/27/2016	



(Optional) Links to LTpowerCAD and LTspice



Click “Properties” to Link Existing Design Files



Leverage LTpowerCAD and LTspice tools to design each supply.



LTpowerPlanner tool helps you design a system with:

- ▶ Easy steps
- ▶ Intuitive GUI interface
- ▶ Short time
- ▶ Optimum system power solution

LTPOWERCAD MAKES DESIGN QUICK AND EASY

Questions and Suggestions?

Email : LTpowerCAD@analog.com

(formerly LTpowerCAD@linear.com)

Free Download at analog.com/LTpowerCAD

