SwitcherPro™

Analog eLab Design Center

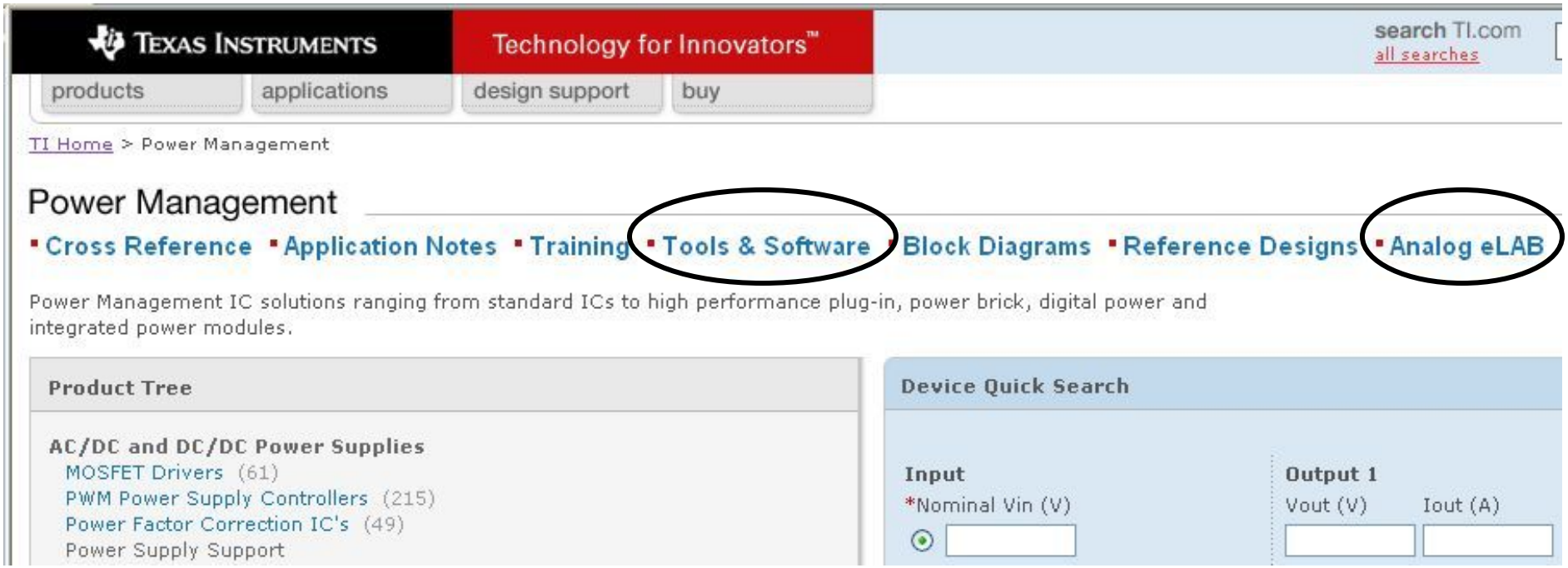
Presentation by Allen Wachter

What is the SwitcherPro™ Design Tool?

- Easy to use simulator supporting TPS branded Switching DC/DC Controllers and Converters
- Selects actual external components from a library based on design parameter input
- Provides a schematic & BOM, performs stress analysis, plots efficiency, displays loop response, and recommends a layout
- Web based design tool with secure online design storage & sharing
- Downloadable version for portability

Where is SwitcherPro?

Visit power.ti.com and click on Tools & Software or Analog eLAB



Where is SwitcherPro?

Power Quick Search highlights supported devices

2 of 9 Results Show All Results Go to Parametic Search

DC/DC Converters (Integrated Switch)		
Part Number	Description	Design Software
TPS54610	Low Input Voltage 6A Synchronous Buck Converter with Adjustable Output Voltage	Design Now
TPS54673	Low Input Voltage 6A Synchronous Buck Converter with Disabled Sinking During Start Up	

Back to Top

2 of 11 Results Show All Results Go to Parametic Search

DC/DC Controllers (External Switch)		
Part Number	Description	Design Software
TPS40009	Low Input (2.25V-5.5V) 600 kHz Frequency, Synchronous Buck Controller, Source/ Sink, Prebias Operati	Design Now
TPS40041	Low Pin Count, Low Vin Synchronous Buck DC/DC Controller	

Where is SwitcherPro?

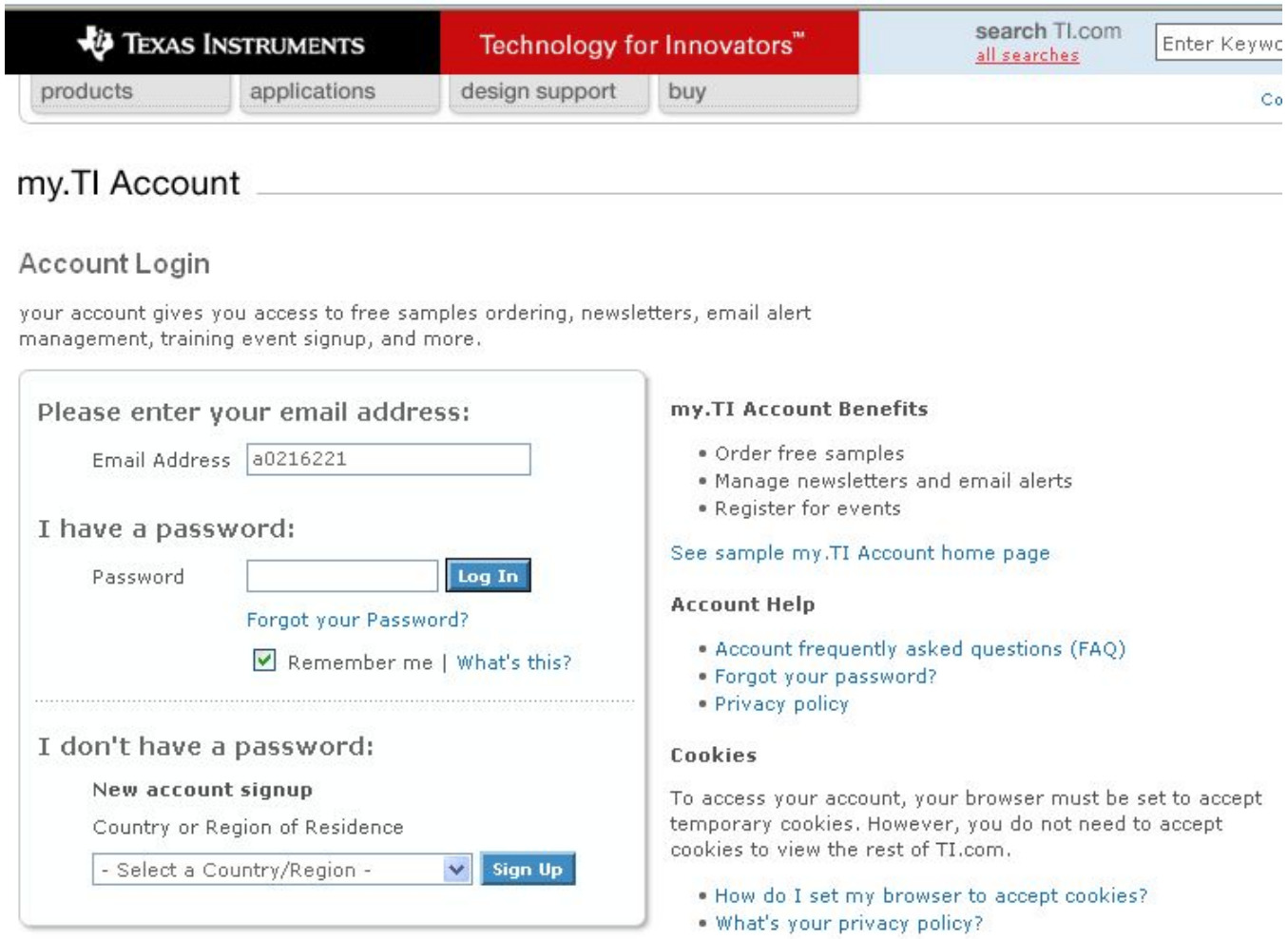
Parametric searches highlight supported devices

Customize Columns | Download Spreadsheet

Part Number	Status	Design Software	Sub Family	Vin (min) (V)	Vin (max) (V)	Iout (max) (A)
TPS5420	ACTIVE	Design Now	Step-Down Regulators	5.5	36	2

Customize Columns | Download Spreadsheet

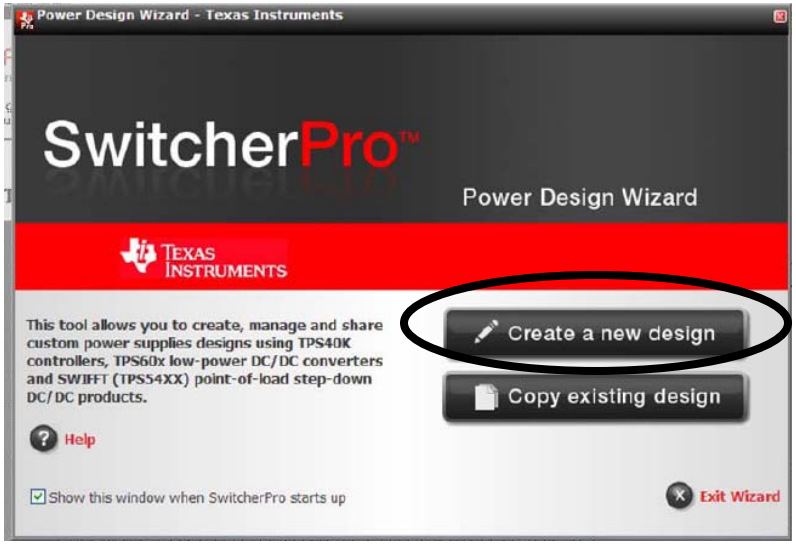
Login Screen



Getting Started

After logging in the Design Wizard Screen will pop up

Click Create a New Design



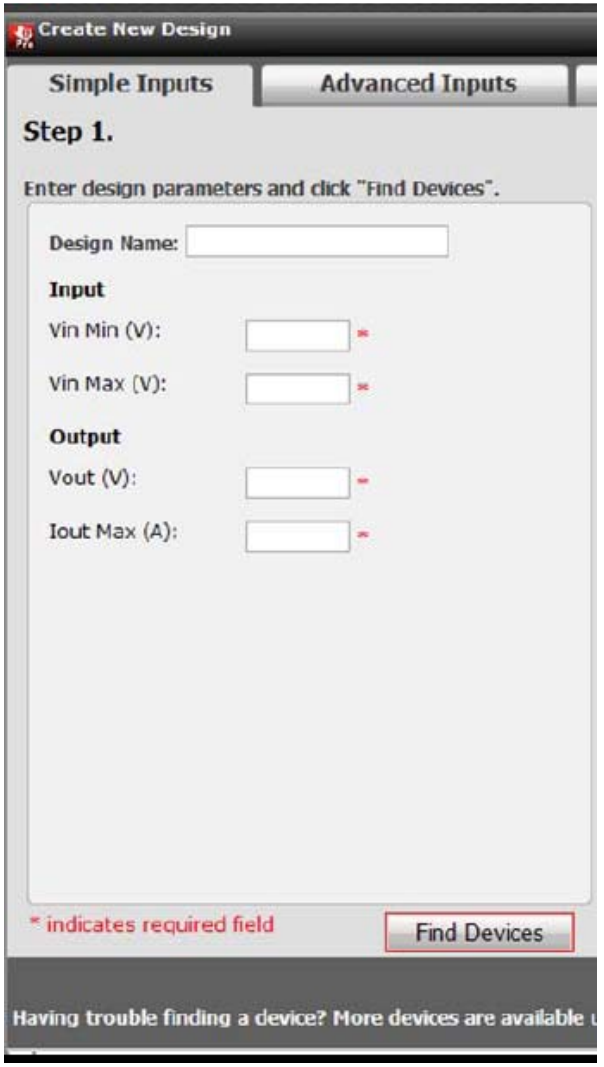
There are two ways to begin a simulation:

1. Select a Device: Brings up a list of devices supported by SwitcherPro in Alphanumeric order. Select the device you wish to use for your design.

2. Enter Specifications: Brings up boxes for you to enter design parameters.

Getting Started

Either method above will open a window to enter design specifications.

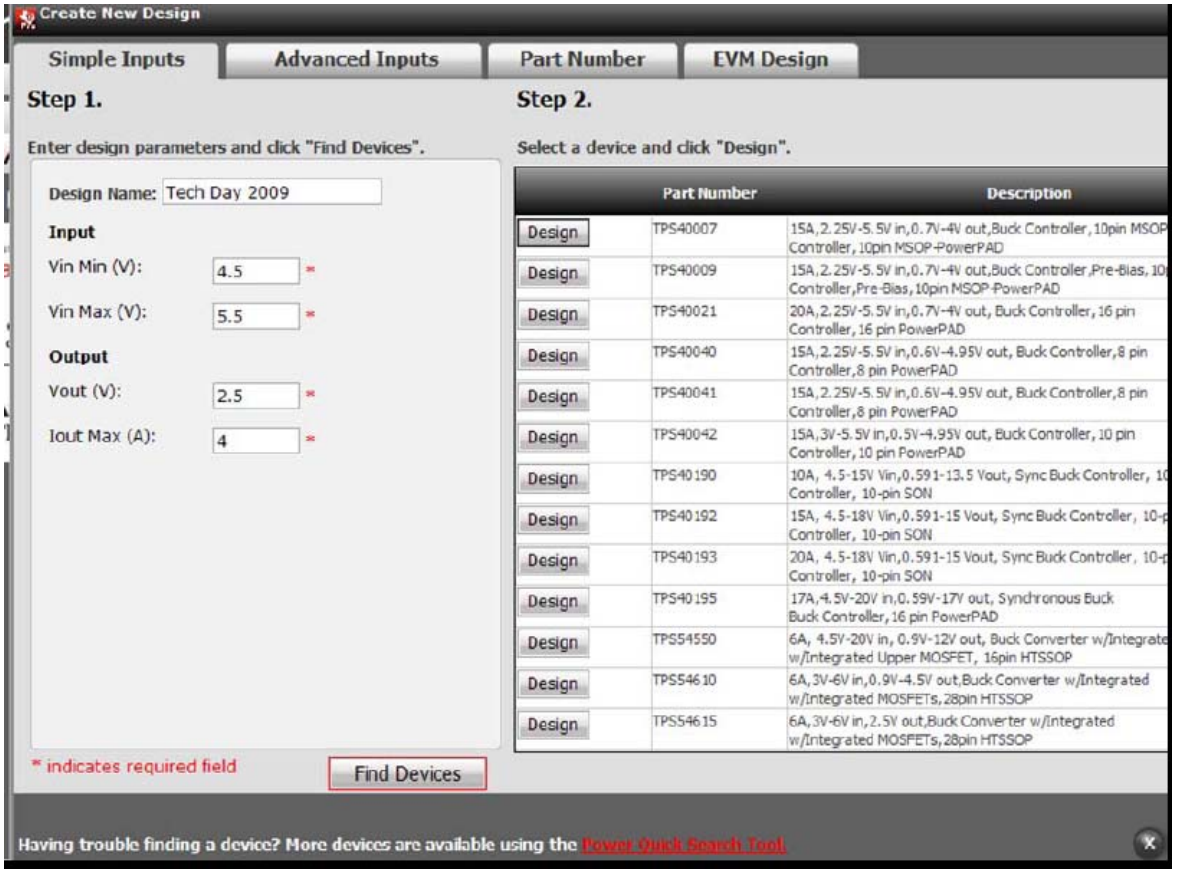


1. Simple Input Form only needs Vout, Current, and Vin Range. Click Find Devices to display devices that meet the criteria

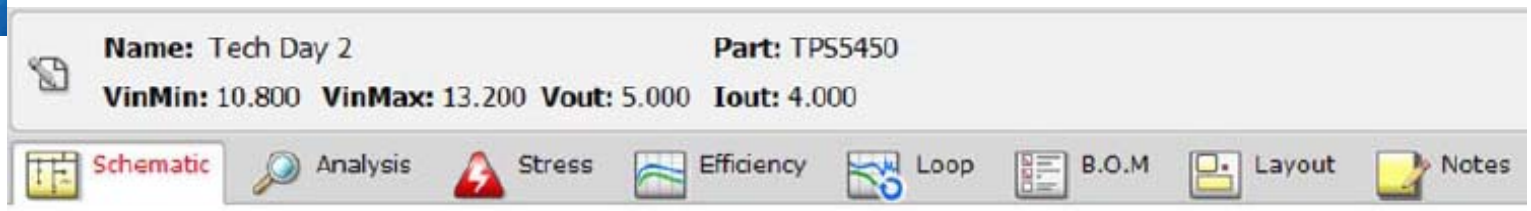
2. Advanced Input Form allows many more design parameters such as switching frequency, cap type, ripple voltages, phase and gain min to help narrow the search. Click Find Devices to display devices that meet the criteria.

Getting Started

S/W displays all devices that meet your criteria. These may be converters or controllers. Again they are listed in Alphanumeric order and not by most relevant.



Output Views



Schematic

- Any external component highlighted in red may be modified
- Mouse-over displays component information

Analysis

- View calculated versus input parameters
- Export to Word or Excel file

Stress

- Shows worse case power dissipation for the components

Efficiency

- Shows nominal efficiencies using RMS currents

Loop Response (Bode Plot)

- Displays cross-over frequency and gain/phase margin
- Scale up or down to improve the view

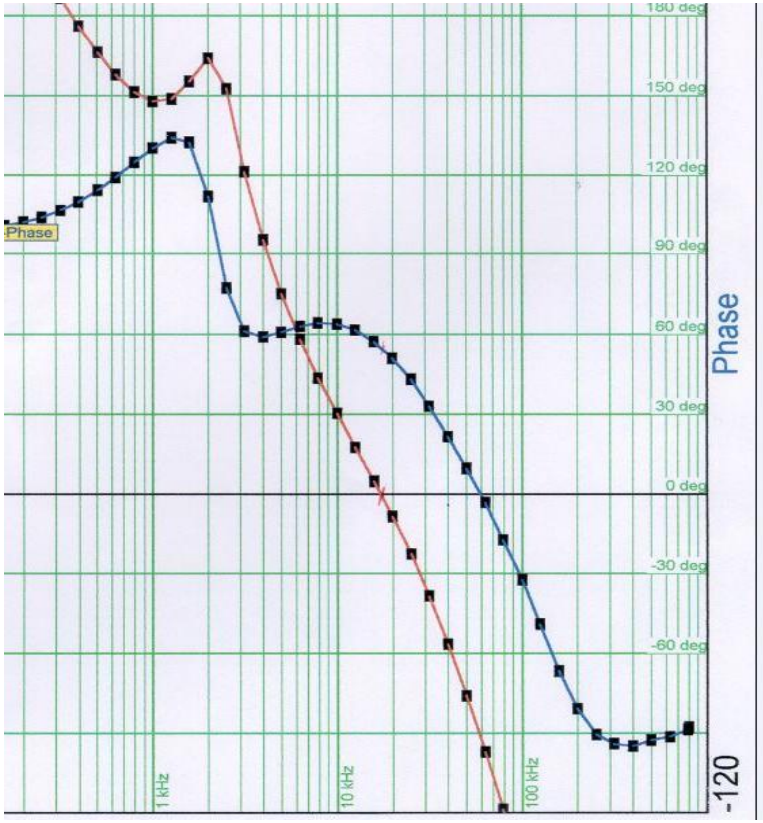
Bill of Materials

- Export to Excel file

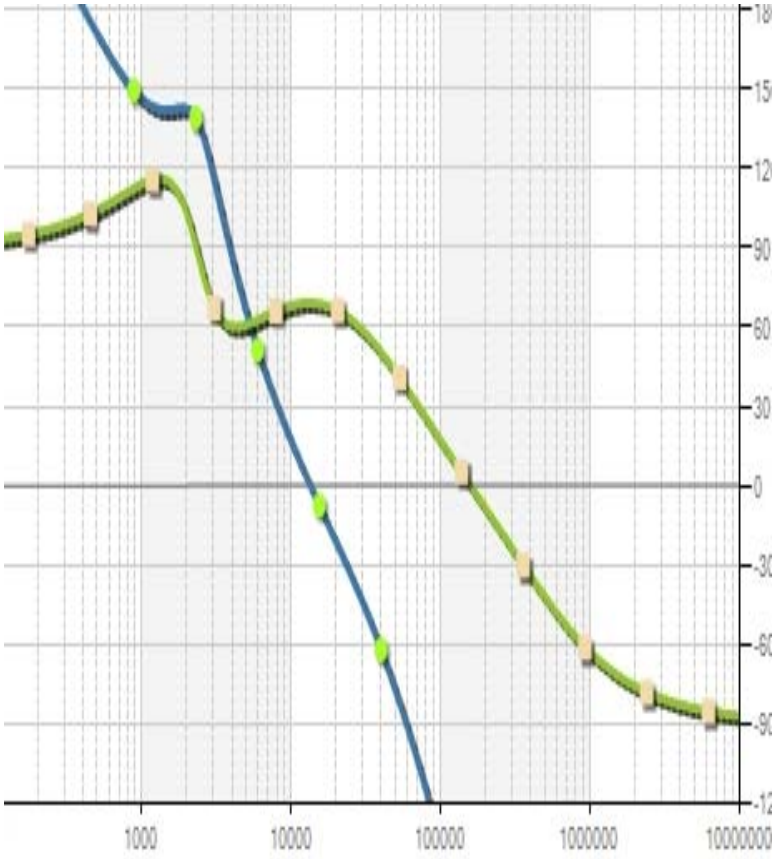
Layout

- Shows recommended top side layout and text guidelines

Lab Comparisons



Actual from Venable



Output from SwitcherPro

Lab Comparisons

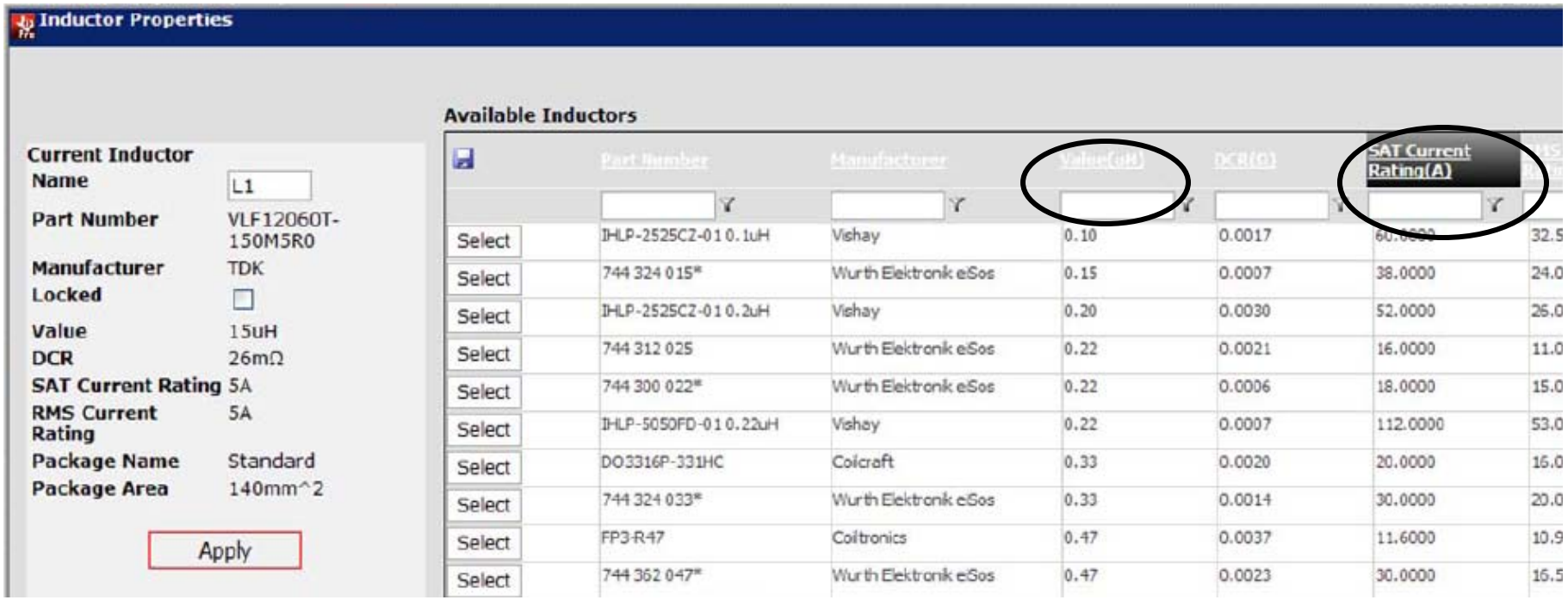
Efficiency at 10Vin / 5Vout	Tool	Lab
η @ 2-A	90.7%	92.7%
η @ 1-A	92.3%	94.1%

- A SwitcherPro simulation is available for many Evaluation Modules
- SwitcherPro output views are checked by TI against real world measurements before new TI devices are added to the software tool
- SwitcherPro uses a conservative approach for calculations, such as Rds(on). Expect some variance in external component parameters

Changing Components

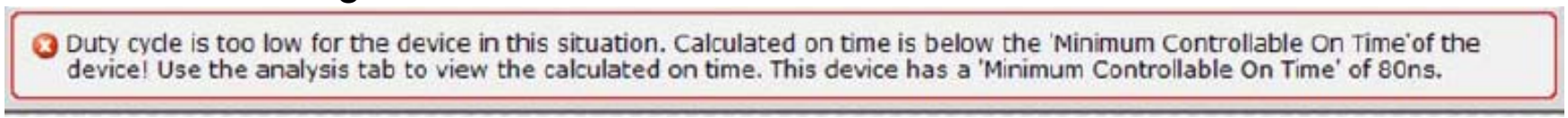
Selecting another component:

- Use the filter engines with text to search for a suitable replacement

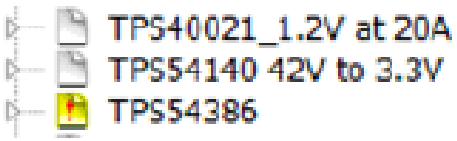


Error Messages

SwitcherPro recognizes problems with a design and displays an error message.



SwitcherPro recognizes problems when a poor choice for a substitute component is made, and displays a caution or an error message that will force you to choose a correct component

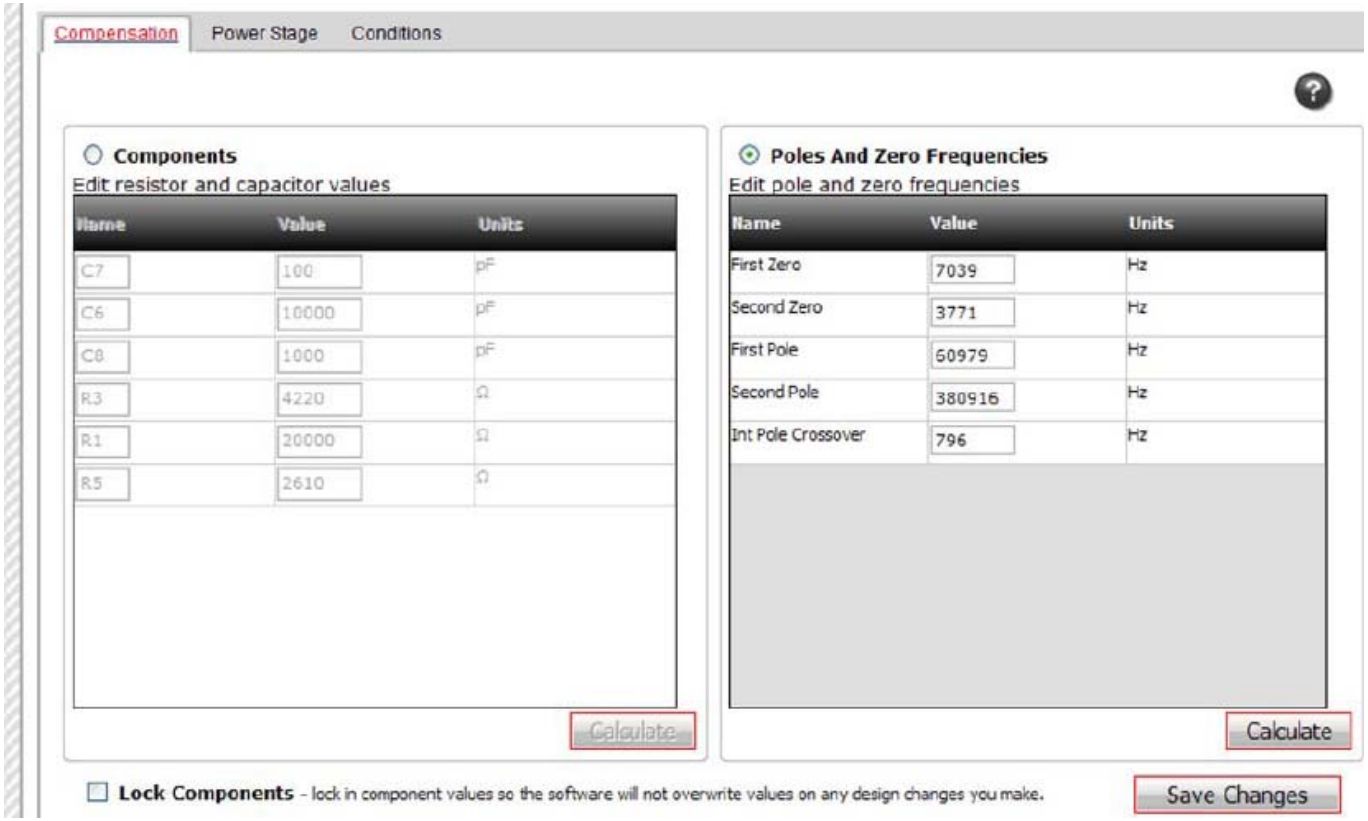


An error flag will be displayed if there are problems with the design. Click the error flag next to the design name to display the error messages.

What-If Analysis

To tailor the gain and phase margin, perform a What-If analysis

- View your changes as they are made
- Modify compensation components, frequencies, & other parameters



Help Using SwitcherPro

- Video support available in SwitcherPro tool folder

Products Currently Supported

As of Today:

82 Power Devices

21 EVMs

Ciclon Power MOSFETs

- More devices continue to be added SwitcherPro
- SWIFT, TPS40K, and TPS62K devices are supported
- Online and Downloadable Versions – Your choice

Design Management

Design is automatically saved when updated

- All designs kept in My Designs folder
- Designs can be renamed, cloned, deleted, or sent to another user

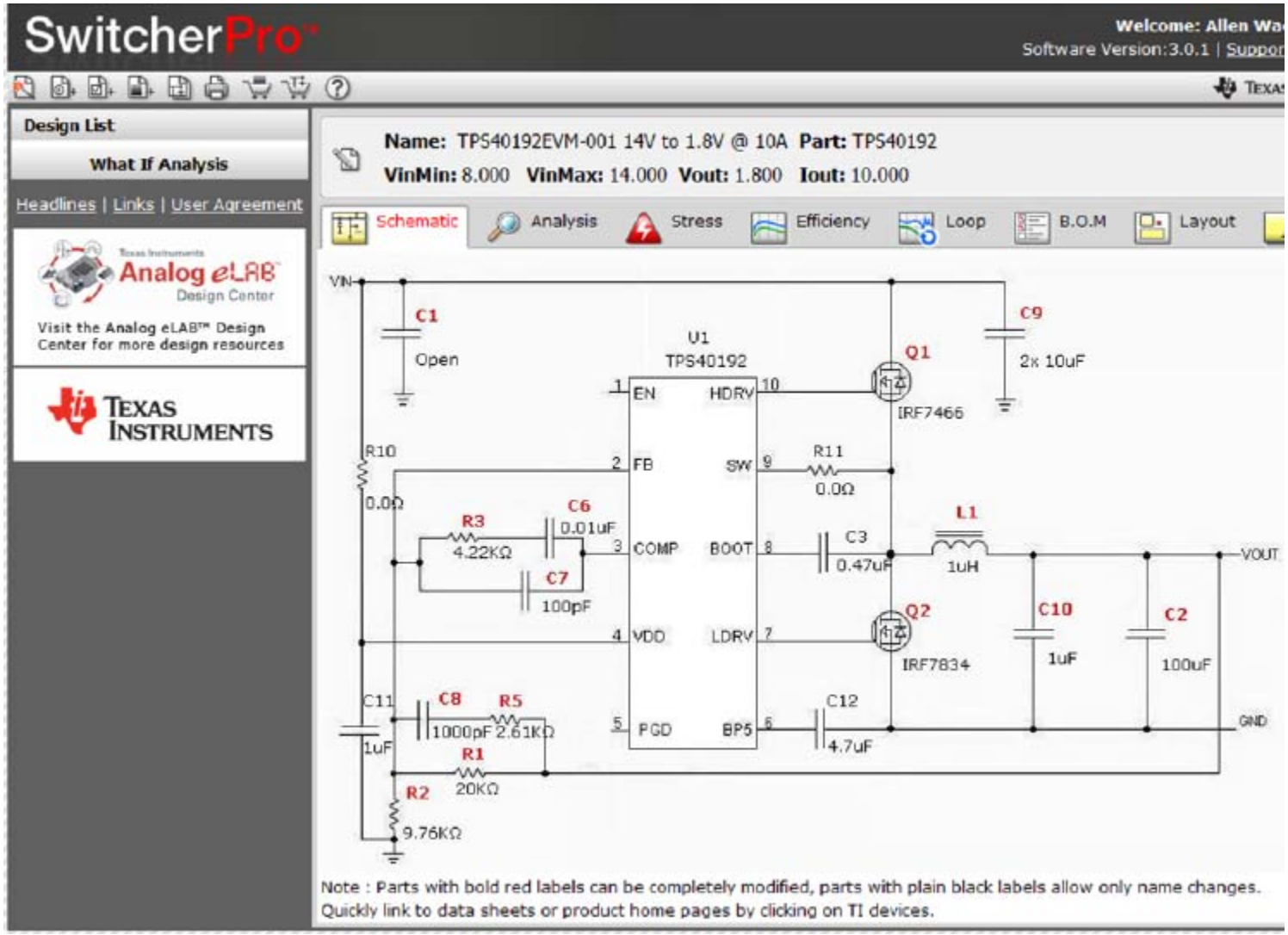
Transfer design to another user (Online Only)

- Right-click on the design to send and select Send Copy To… then enter recipient's email address
- Design is copied onto another registered user's inbox, not emailed
- Send design to a coworker or one of our Applications Engineers

3DES encryption is employed

- https web server encryption within my.ti.com
- Traffic between web server and SQL server is encrypted
- 100% stored procedure prevents SQL injection attack
- Viewstate cache is stored on server, not on the client machine

Simple Interface Screen



Summary

- One on-line tool supports TPS DC/DC switching regulators
- Automatically designs the power supply with minimal input from the user
- Chooses real world external components from database
- Modify the external components to better suit design goals
- Compare several designs on one screen to see the differences
- Easily save and transfer design files securely

Let’s Take it for a Spin

A Few Demos…

Thank You!

Questions?