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UNISEM –новое подразделение IR Параметрические стабилизаторы и управляющие ИС для импульсных источников питания

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Unisem – лидер на рынке стабилизаторов и УИС для импульсных источников питания

- Founded in August, 1996
- Acquired by IR in January, 2001
- Focus on Power Management ICs such as Low Dropout (LDO) Regulators and Switching (PWM) Controllers
- Technology - Bipolar, CMOS and BICMOS
- Location - 34A Mauchly, Irvine, CA, 92618

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Low Dropout (LDO) Regulators

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Regulator Basics

Q What is a Low Dropout (LDO) Regulator?

A Typically a regulator with a dropout voltage of less than 1.5V is called an LDO Regulator.

Q What is a Dropout Voltage?

A In order for a regulator to be stable, the input voltage must be higher than the desired output voltage by a minimum of the dropout voltage.

Example – If the desired output voltage is 3.3V, and the dropout voltage of the regulator is 1.3V, then in order for the LDO to maintain regulation the input supply must be at least 4.6V.

$$V_{IN} \geq 3.3V + 1.3V = 4.6V$$

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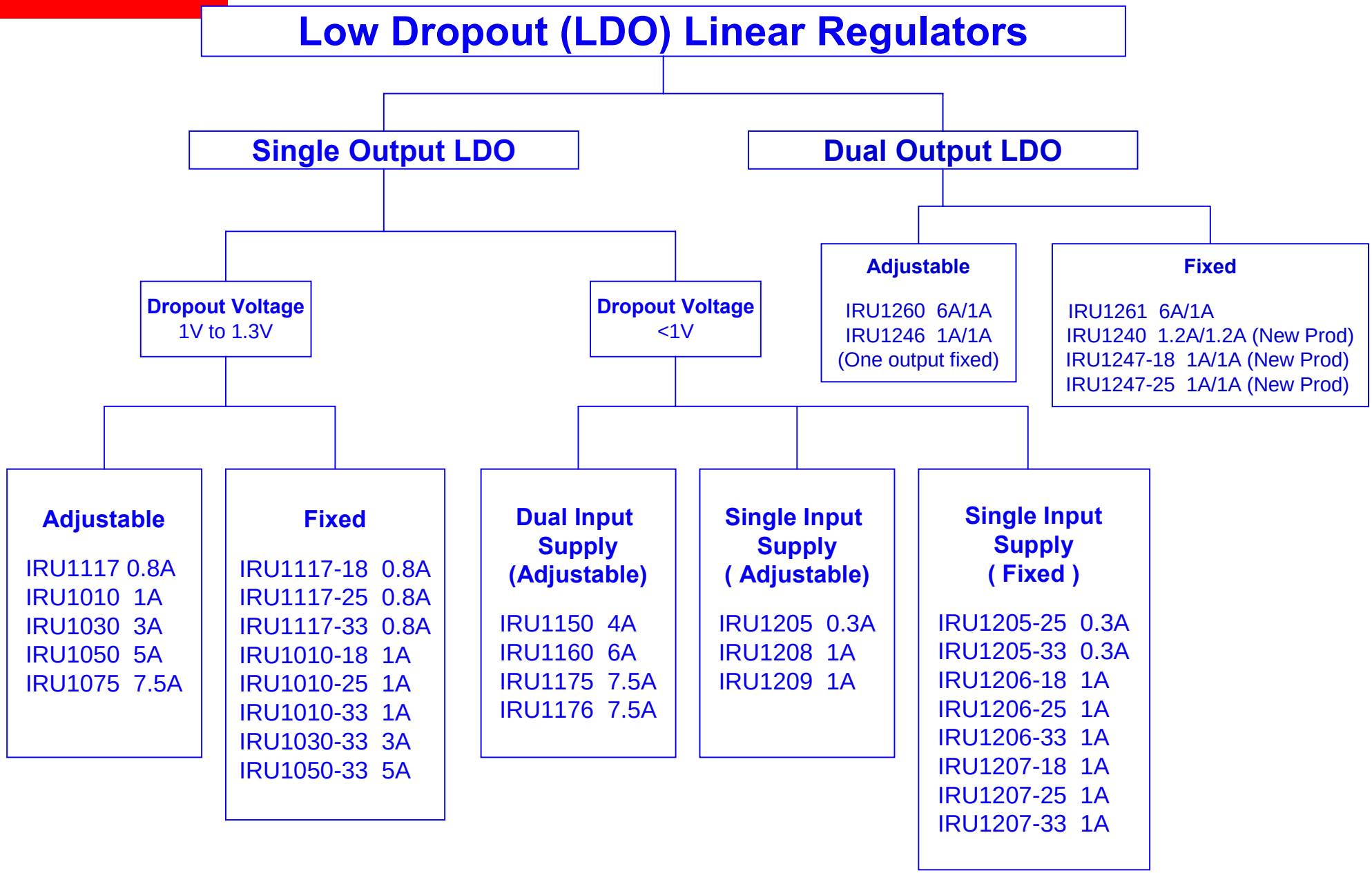
Low Dropout (LDO) Linear Regulators



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Applications 3 Lead Single LDOs

- **IRU1010, 1015 and 1117 series**
  - Disk Drives, Sound Cards, Motherboard, Modems, any 5 - 3.3/2.5V or 3.3 - 1.8V
- **IRU1030 and 1050 series**
  - VGA Card, Motherboard, any 5 - 3.3/2.5V or 3.3 - 1.8V
- **IRU1075**
  - Switching Power Supply Secondary side Post Regulator, for 5 - 3.3V or 3.3 - 1.8V

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Applications 5 Lead Dual Supply LDOs

- **IRU1150 and 1160**
  - VGA Cards, Motherboards, Low Current 3.3 - 2.5V
- **IRU1175**
  - VGA Card, High Current 3.3 - 2.5V or 3.3 - 2.8V

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Applications Single Supply (PNP) Very Low Dropout

- **IRU1205**
  - Any applications with single 3.3V input such as Network Interface Cards, Modems, IA, …
- **Advantages**
  - Low Dropout Voltage (350 mV at 300 mA)
  - 1% Voltage Reference Accuracy
  - Stable with 2.2 uF Ceramic Cap.
  - 10 nA Quiescent Current in Shutdown
  - Available in SOT-23 Package

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Applications Single Supply (PNP) Very Low Dropout

- **IRU1206,1207,1208 and 1209 Family**
  - Any applications with single 3.3V input such as Network Interface Card
- **Advantages**
  - Low Dropout Voltage (500 mV at 1A)
  - 1% Voltage Reference Accuracy
  - Low Ground Current
  - 10 uA Quiescent Current in Shutdown (IRU1207, 1208)
  - Error Flag Signal for Output out of Regulation (IRU1207, 1209)
  - Available in Power SO-8 Package
  - Pin Compatible with MIC39100/101/102 series

    1206-xx with MIC39100-xx
    1207 with MIC39101
    1209 with MIC39102

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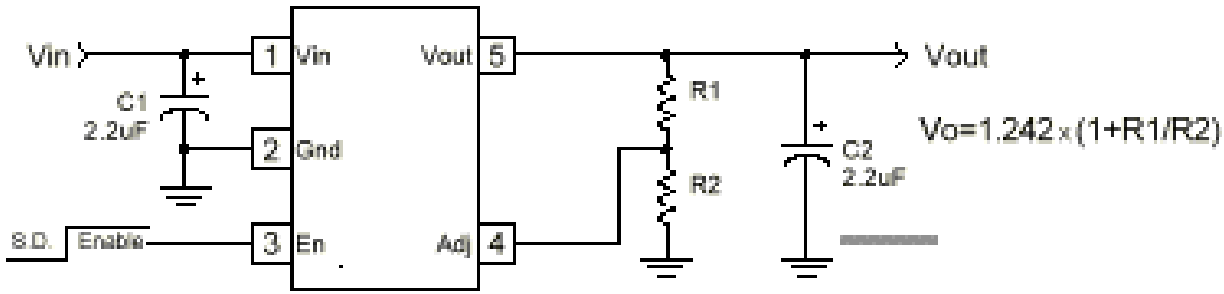
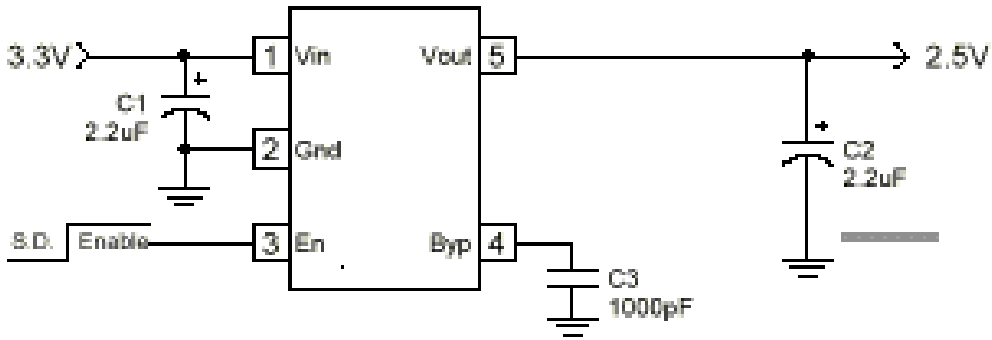
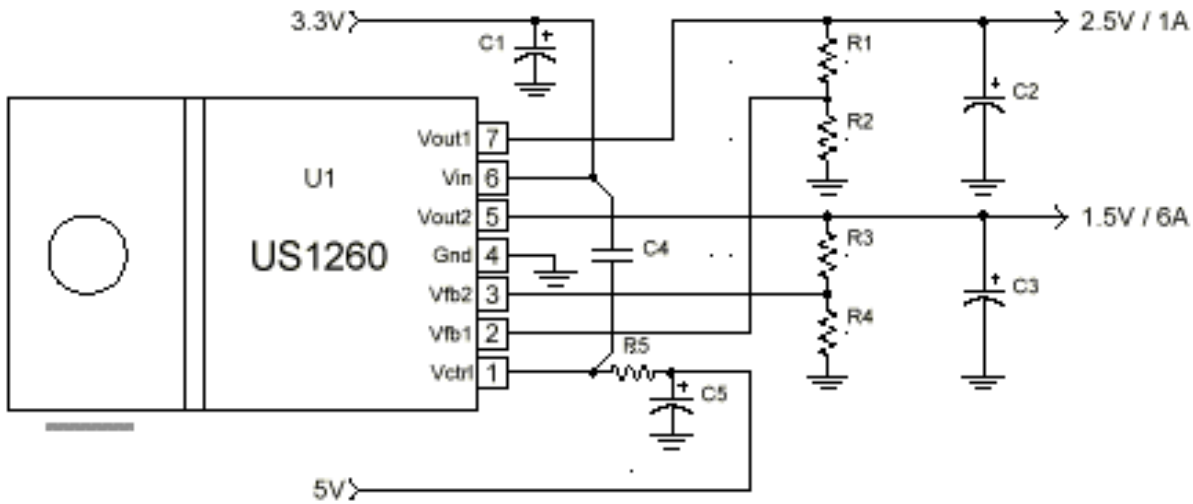
LDO-примеры схем включения



Typical application of the US1205 ajustable.



Typical application of the US1205 Fixed voltage.



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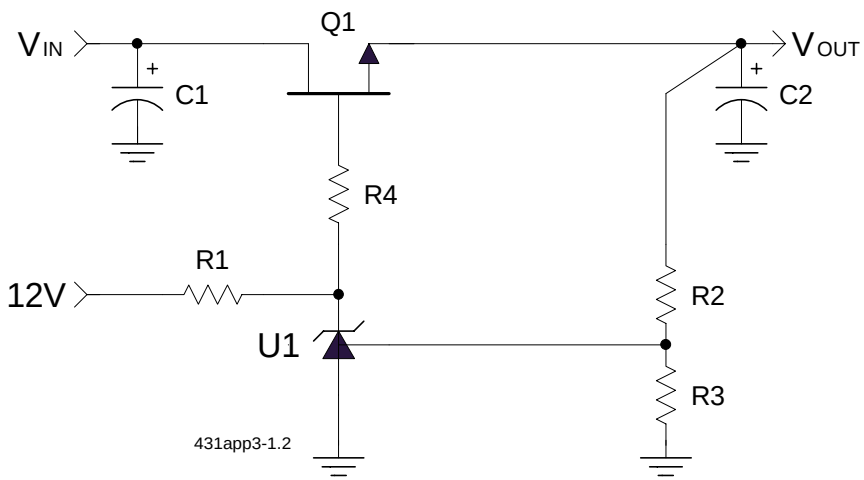
Precision Shunt Regulator

SOT23-3 Lead, 5 Lead and SO-8 Packages

- **IRU431L**
  - **Precision Voltage Reference, 1.24 - 6V**
  - **No Output Protection:**

    MOSFET is not protected against short circuit.



Extremely Low Dropout Applications
No Protection for Pass Transistor

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Benefits to Customer

Single LDO Regulators

- **Cost/Performance**
  - Simple and Low Cost method of generating on-board regulators
  - Offers a wide variety of currents and low-dropouts ranging from 7.5A to less than 0.1V dropout
- **Output Stable with Variety of Output Caps**
  - IRU10xx, 11xx, 120x, 1260 stable with Aluminum or Tantalum Caps
  - IRU1205, 1240 stable with low profile Ceramic Caps
- **Package Variety**
  - IR offers a complete package selection including New Low-Profile Power Packages such as Thin-Pak & Power SO-8
- **Cost Competitive**

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Applications Dual LDO Regulators

- **IRU1260 (Adjustable, 1.25 - 5.5V)**
  - Any add-on card requiring more than one LDO
- **IRU1246 (Adjustable & Fixed, 1.25 - 8V & 3.3V)**
  - Any add-on card requiring more than one LDO
- **IRU1240 (Fixed, 2.5V & 3.3V)**
  - Any add-on card requiring more than one LDO
  - Stable with 0.1 uF Ceramic

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Benefits to Customer

Dual Regulators

Cost/Performance

- One package offers two regulators, minimizing board area and reducing cost
- IRU1240 Stable with 0.1 μF Ceramic Cap
- Available in Ultra Thin-Pak & Power SO-8 Packages

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Switching (PWM) Controllers

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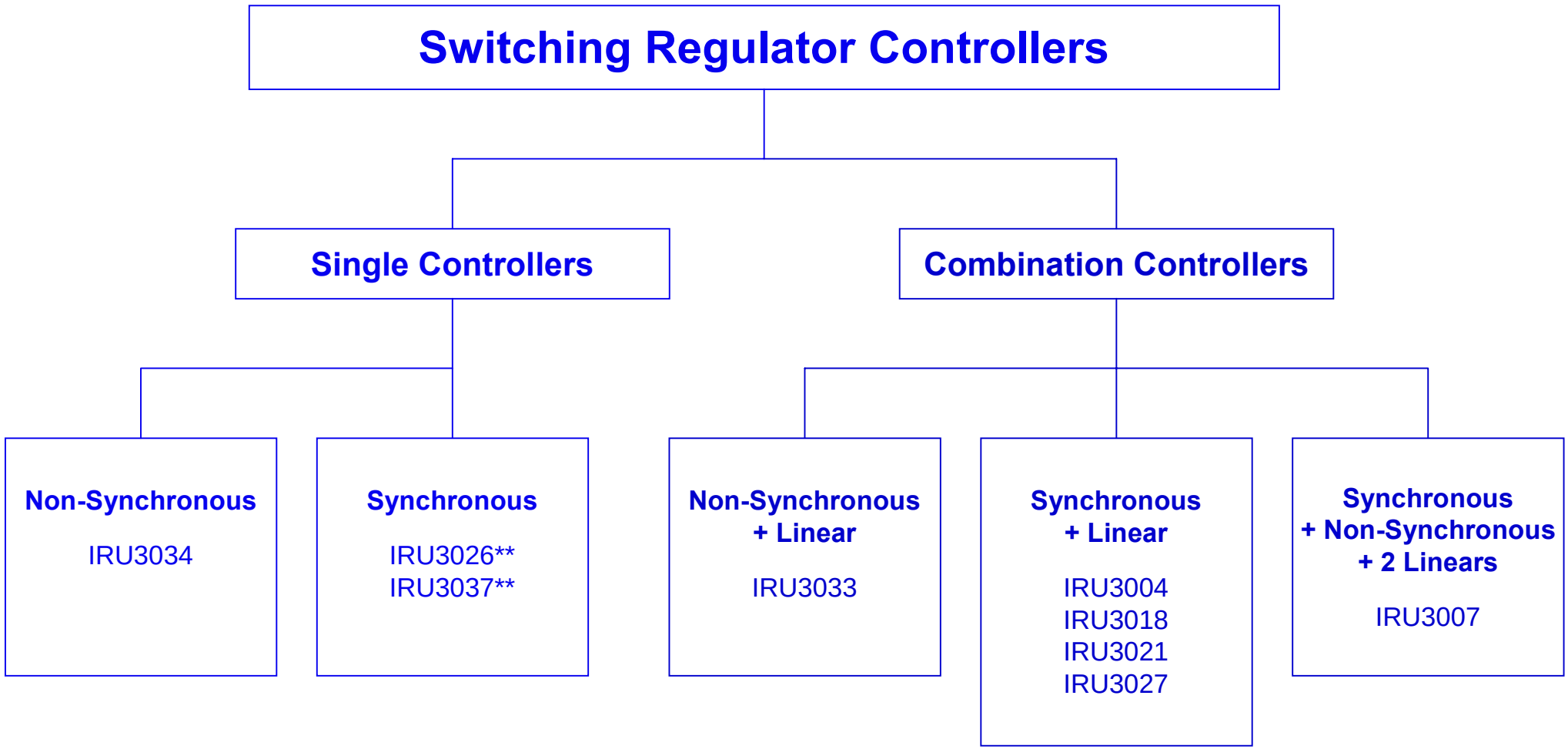
Switching Regulator Controllers



** Future Product

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Applications Switching Controllers

- **Applications**
  - Any Application Requiring On-Board DC-DC Conversion like 5 - 3.3V, 12 - 5V, 5 - 2.5V or lower (1.5V, 1.8V, …)

- **Customers**
  - Customers range from PC Motherboards, VGA Cards, HDD, Set Top Box, IA, …

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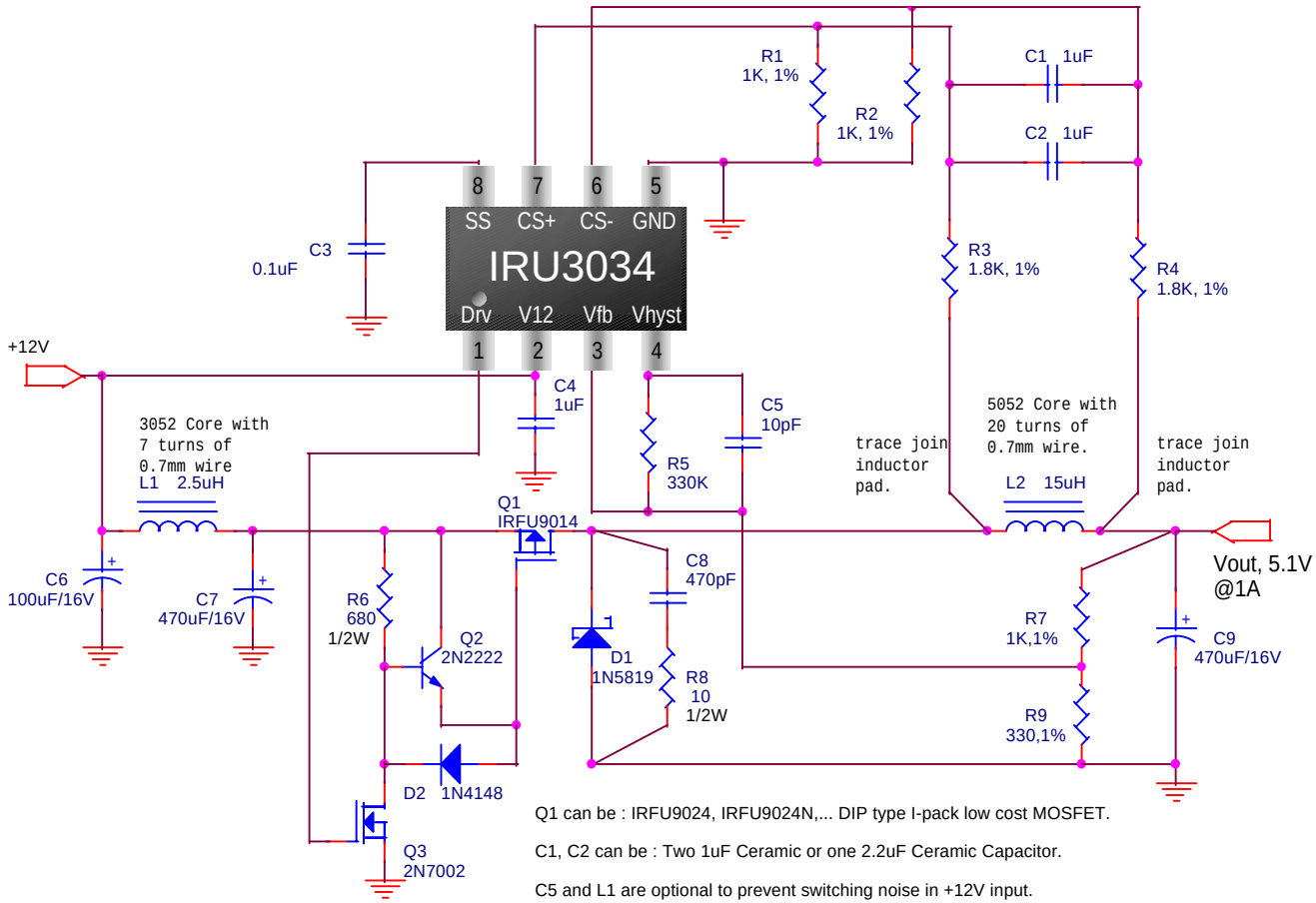
IRU3034
8-Lead PWM Switching Controller IC

- **Simple Hysteretic Switching Controller in an 8 lead SOIC Package**
- **Output Short Circuit Protection**
- **Fastest transient response of any controller method (0 - 100% Duty Cycle in 100 ns)**
- **No Compensation needed**
- **On board MOSFET driver**
- **1% internal voltage reference**
- **Internal Under Voltage Lockout protects MOSFET during start-up**



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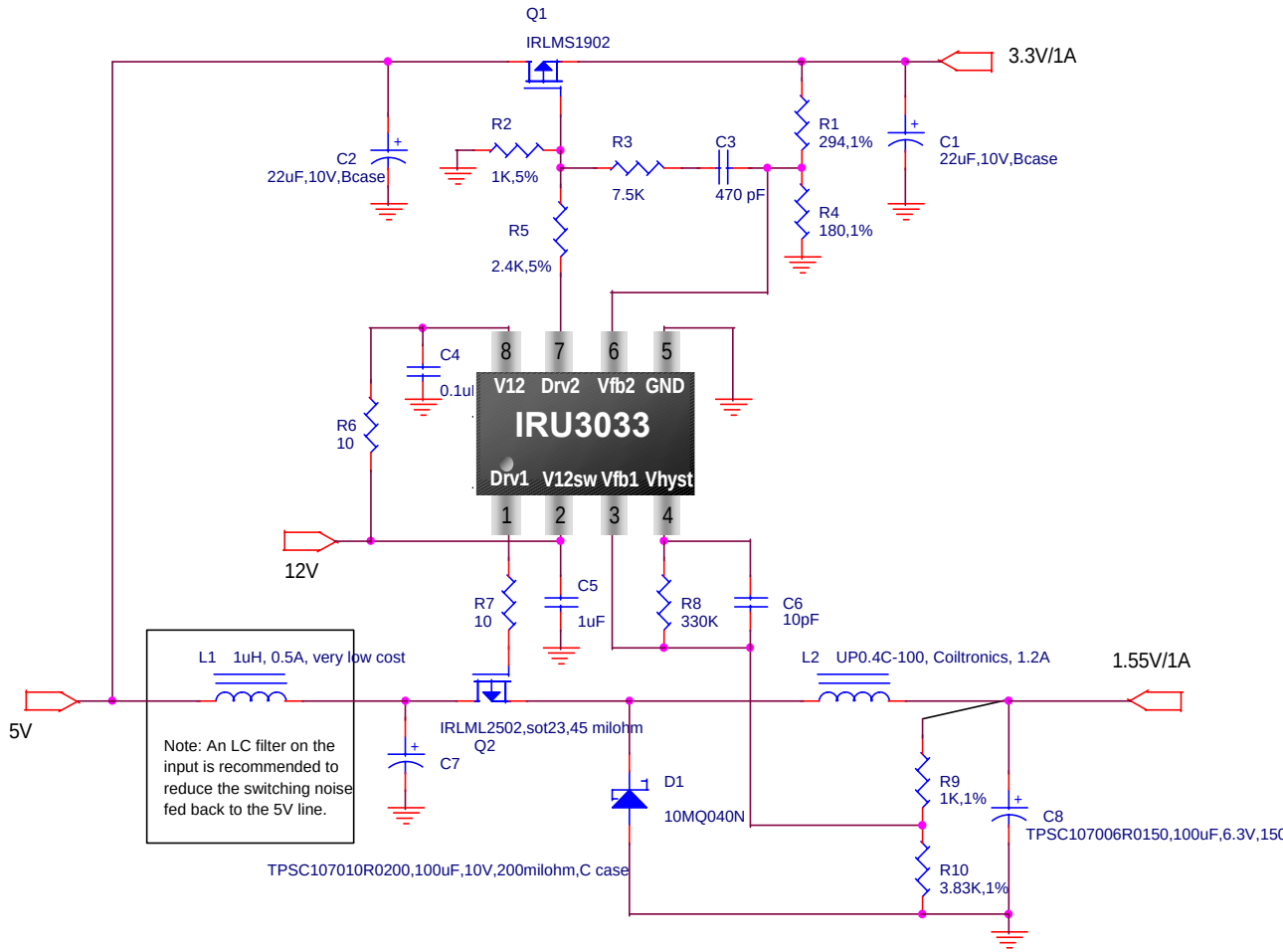
IRU3033
PWM Switcher & Linear Controller IC

- **Simple Hysteretic Switching Controller and LDO Controller in an 8 lead SOIC Package**
- **Output Short Circuit Protection**
- **Fastest transient response of any controller method (0 - 100% Duty Cycle in 100 ns)**
- **No Compensation needed**
- **On board MOSFET driver**
- **1% internal voltage reference**
- **Internal Under Voltage Lockout protects MOSFET during start-up**



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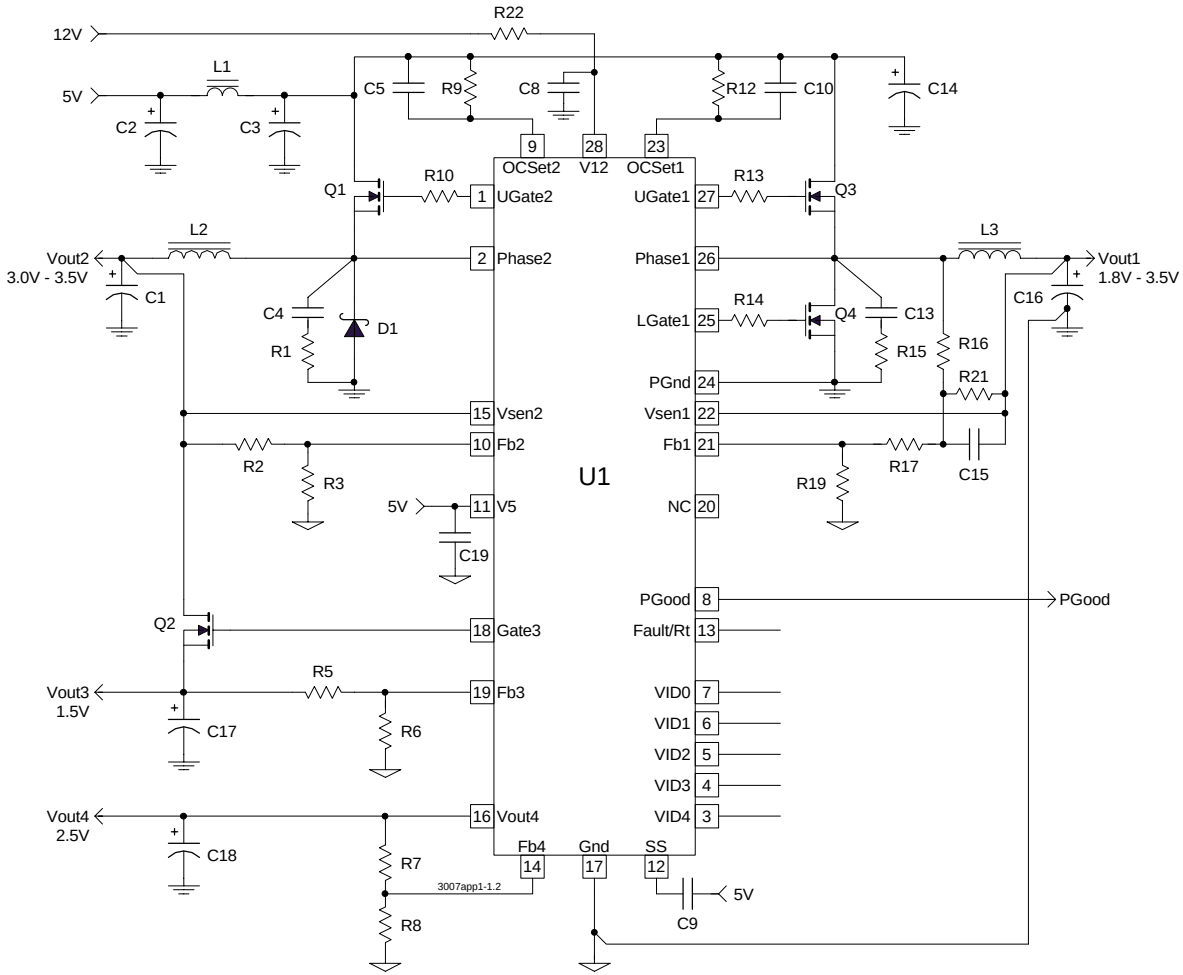
IRU3007

Dual Switching Regulator Controller + Dual LDO Controller

- Synchronous Controller with 1.3 - 3.5V DAC range
- Adjustable Non Synch Switching Controller
- Adjustable LDO Controller
- On Board 200 mA Adjustable LDO
- Adaptive Output Drivers
- Loss-less $R_{DS(on)}$ Current Sensing
- No Compensation Required
- Ultra Fast Dynamic Response
- Soft Start
- Power Good and OVP
- Internal 200 kHz Oscillator with ability to externally adjust
- UVLO on both 5V and 12V supplies



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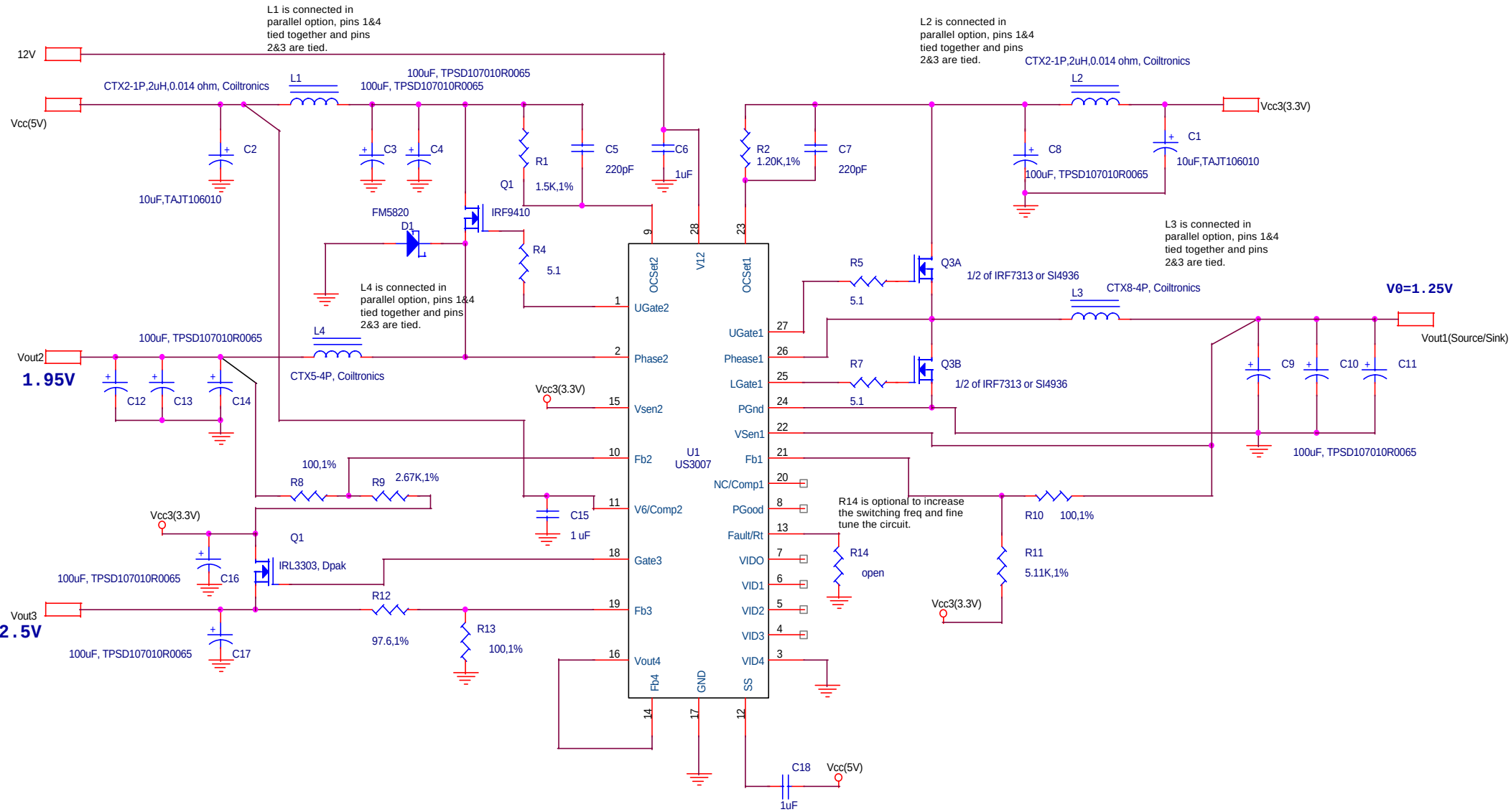
IRU3007
Application at NVIDIA



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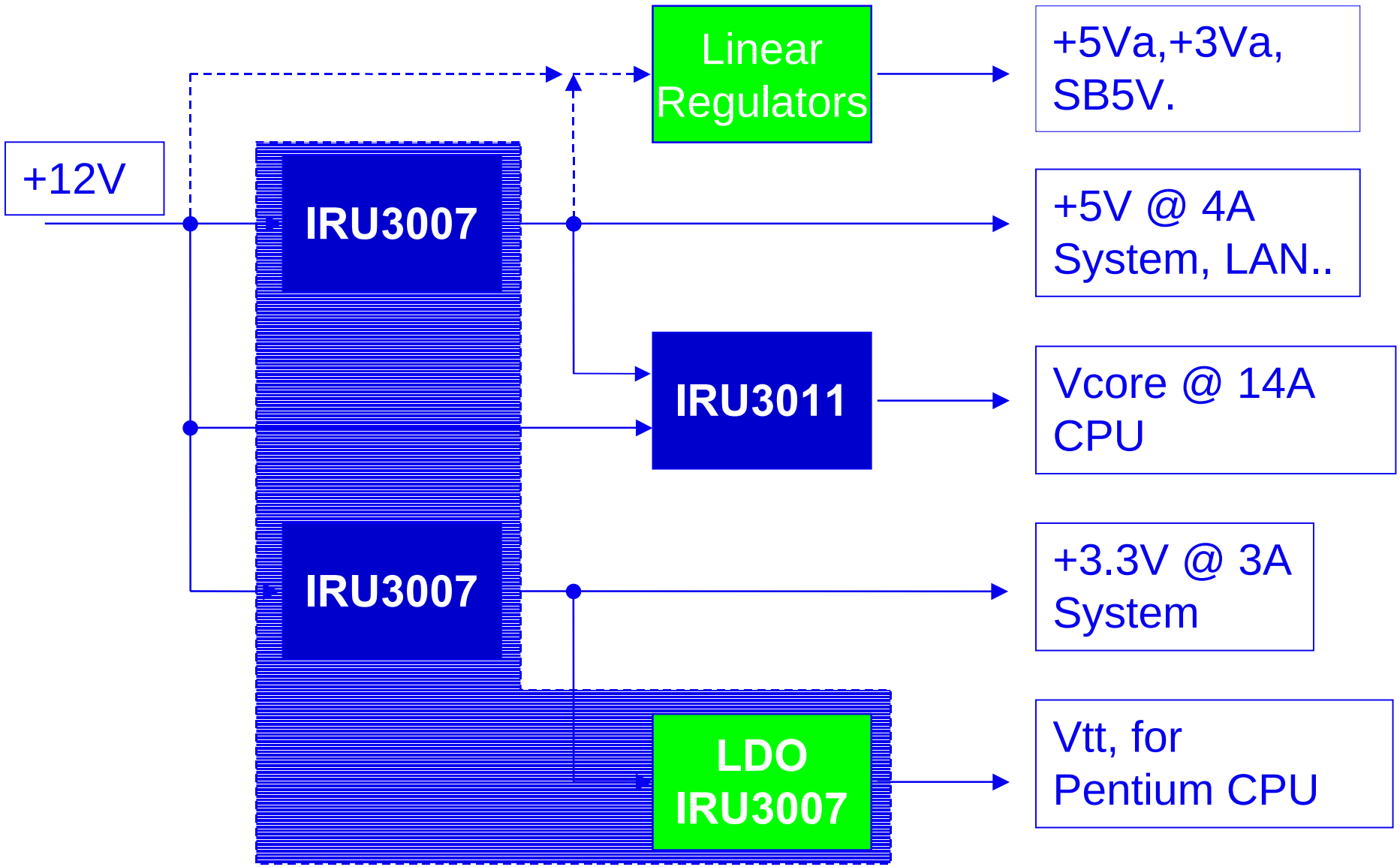
Block Diagram – Set Top Box



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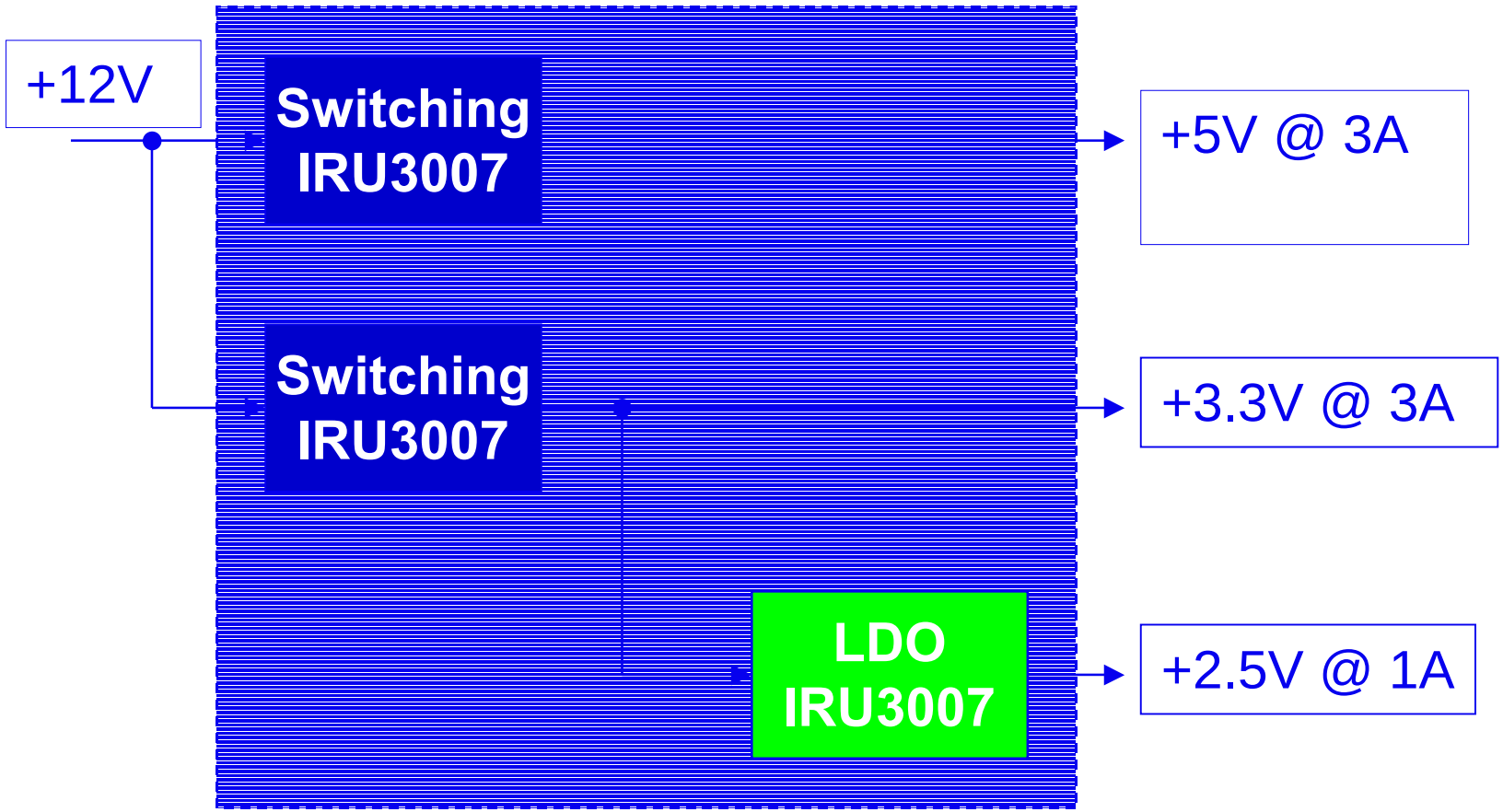
Block Diagram – LCD Monitor



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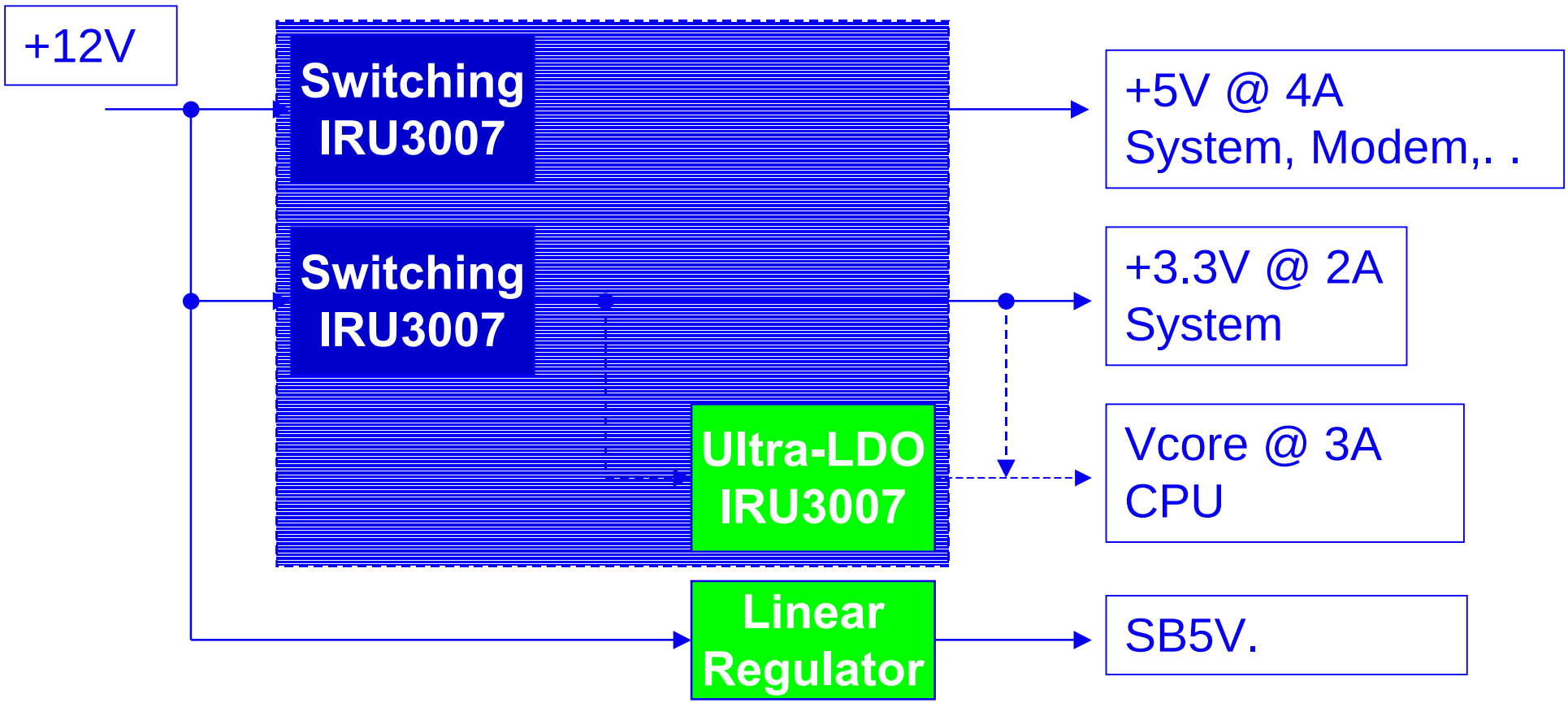
Block Diagram – Information Appliance (I.A.)



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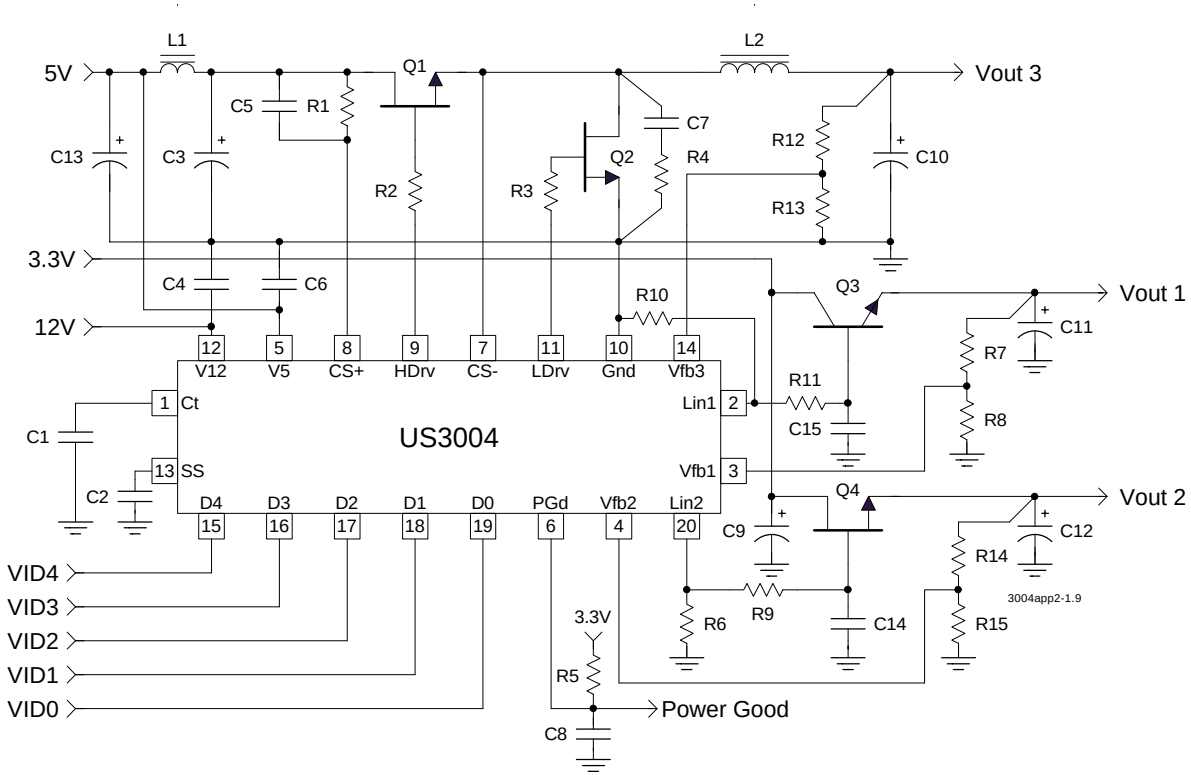
IRU3004

Switching Regulator Controller + Dual LDO Controller

- Synchronous Controller with 1.3 - 3.5V DAC range
- Two Adjustable LDO Controllers
- Adaptive Output Drivers
- Loss-less $R_{DS(on)}$ Current Sensing
- No Compensation Required
- Ultra Fast Dynamic Response
- Soft Start
- Power Good and OVP
- Programmable Switching Frequency
- UVLO on both 5V and 12V supplies



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Block Diagram – DDR Motherboards