TI Mobile and Embedded Sandy Bridge CPU Power Solution

Mobile and Embedded Sandy Bridge Platform Power Solutions

Includes 5V/3.3V Integrated FET Options

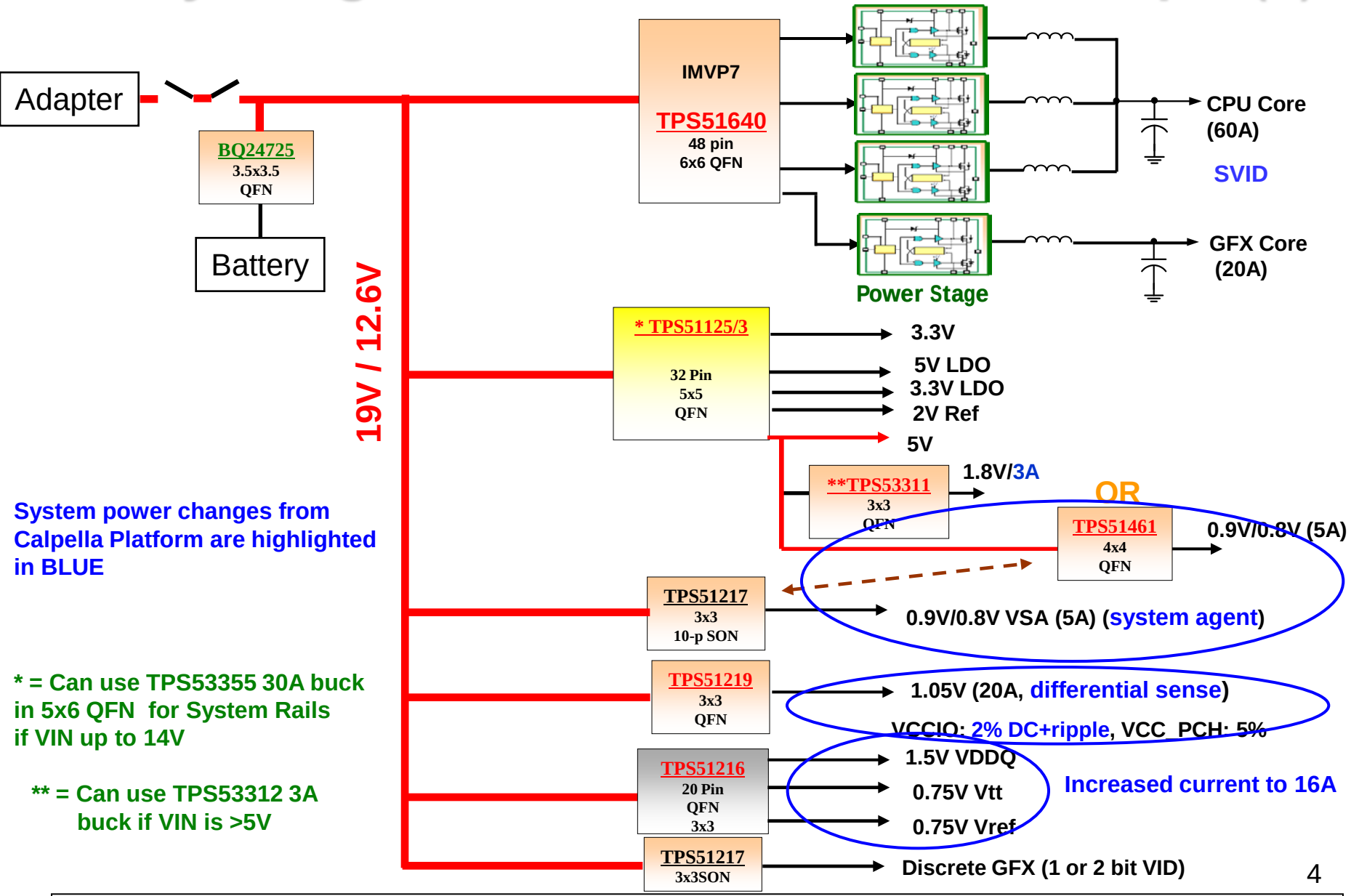
Texas Instruments

Intel Mobile/Embedded Sandy Bridge PWR Solution

IMVP7	ULV 17W	LV 25W
CPU + GPU core controller	TPS51640 1-Phase/1-Phase	TPS51640 2-phase/1-Phase
CPU + GPU core MOSFET Driver	TPS51601 for GPU	TPS51601 for GPU
2012 GPU	TPS51640 2-Phase	TPS51640 2-phase
CPU/GPU NexFET Power Block	CSD86350Q5D	CSD86350Q5D
System	TPS51123/25A	TPS51123/25A
CPU and PCH PLL	TPS53312	TPS53312
PCH and ME Core	TPS51219/51513	TPS51219/51513
PCH and ME Core (AMT)	TPS53312	TPS53312
System Agent (SA)	TPS51217/51461	TPS51217/51461
DDR3 Core and Termination	TPS59116/216	TPS59116/216

IMVP7	SV 35W	Quad Core 45W
CPU + GPU core controller	TPS51640 2-Phase/1-Phase	TPS51640 3-phase/1-Phase
CPU + GPU core MOSFET Driver	TPS51601 for GPU	TPS51601 for CPU/GPU
2012 GPU	TPS51640 2-Phase	TPS51640 2-Phase
CPU/GPU NexFET Power Block	CSD86350Q5D	CSD86350Q5D
System	TPS51123/25A	TPS51123/25A
CPU and PCH PLL	TPS53312	TPS53312
PCH and ME Core	TPS51219/51513	TPS51219/51513
PCH and ME Core (AMT)	TPS53312	TPS53312
System Agent (SA)	TPS51217/51461	TPS51217/51461
DDR3 Core and Termination	TPS59116/216	TPS59116/216

Sandy Bridge CPU Platform Solution Example (1)

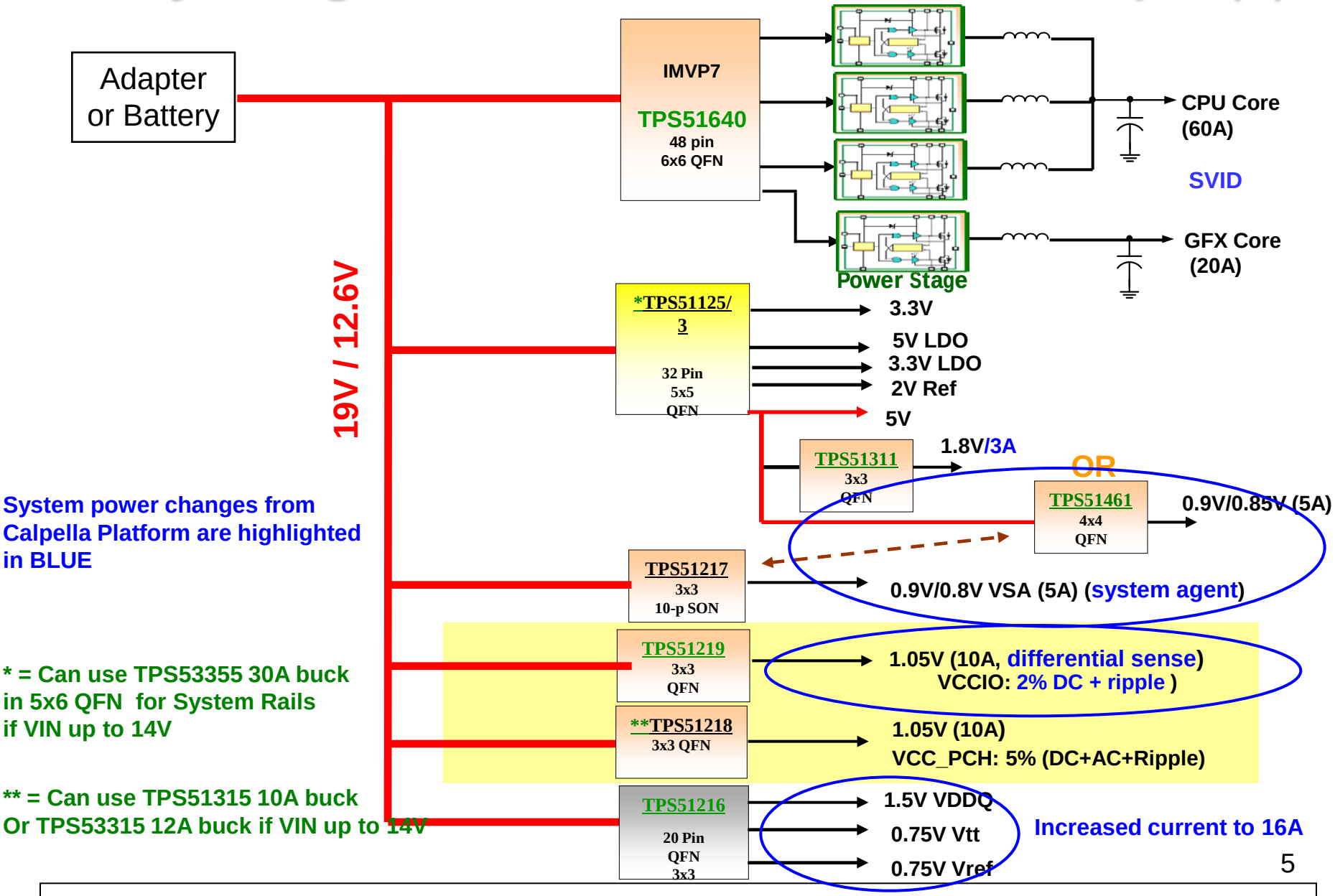


System power changes from Calpella Platform are highlighted in BLUE

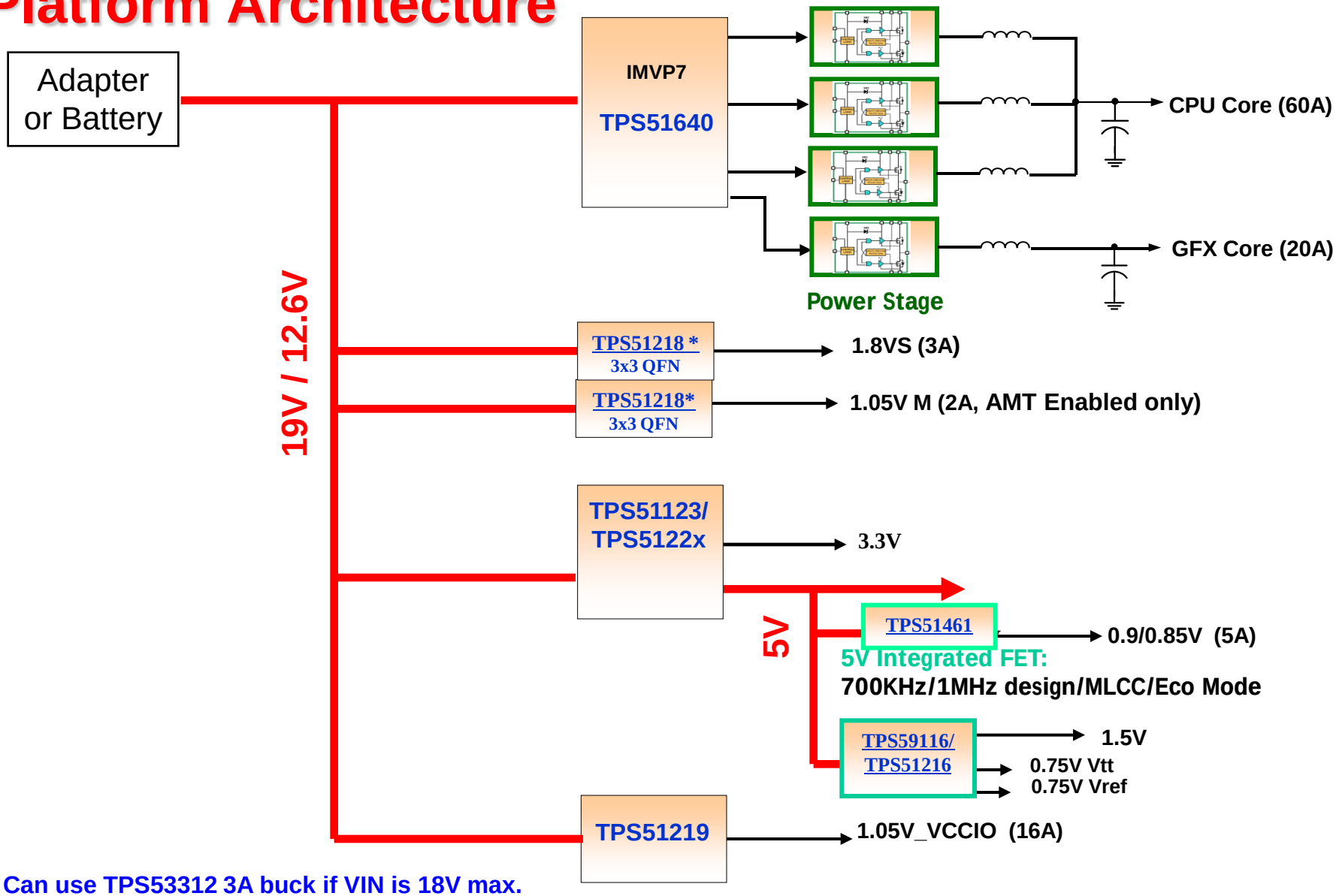
* = Can use TPS53355 30A buck in 5x6 QFN for System Rails if VIN up to 14V

** = Can use TPS53312 3A buck if VIN is >5V

Sandy Bridge CPU Platform Solution Example (2)

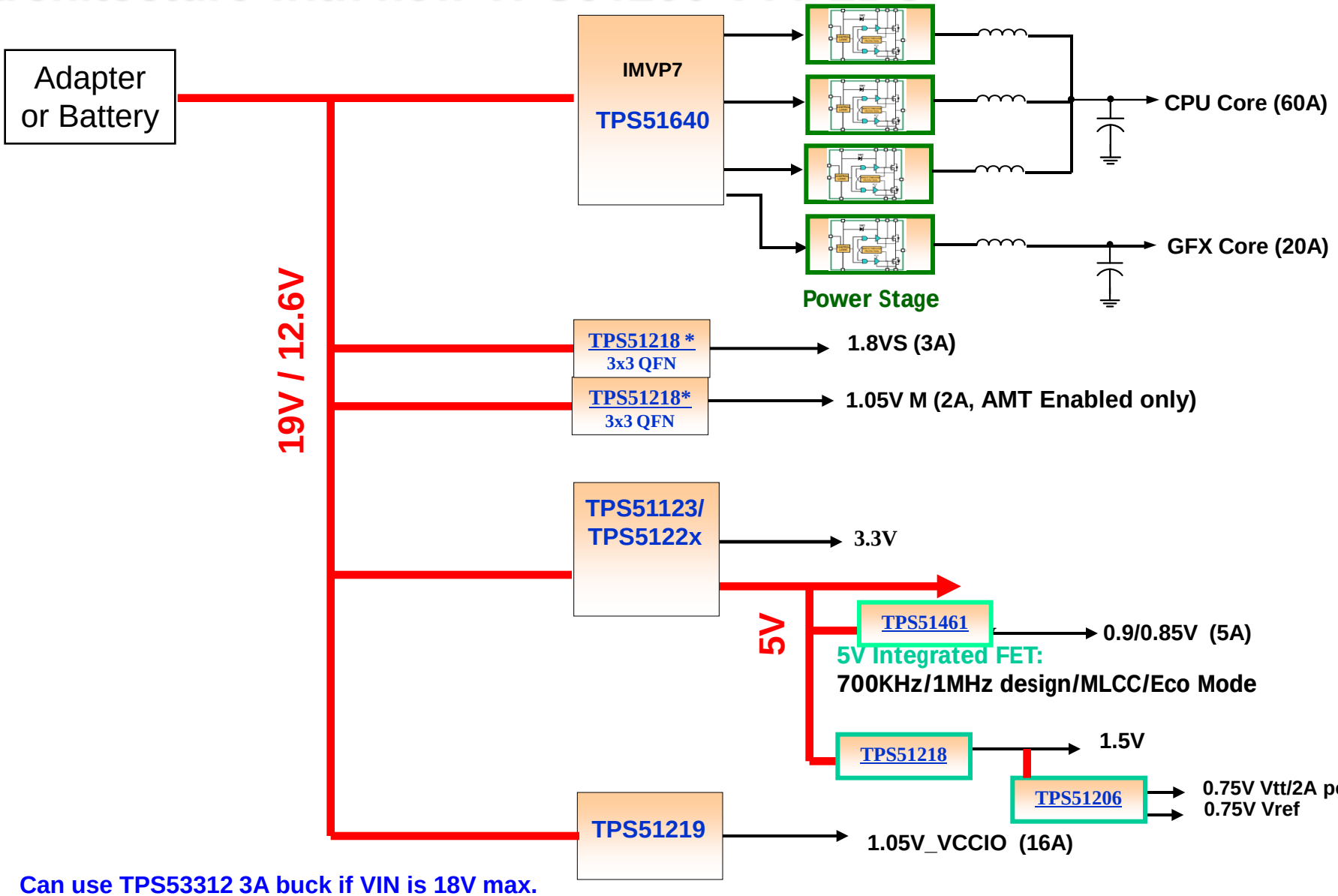


5V Integrated FET Converter Sandy Bridge Platform Architecture



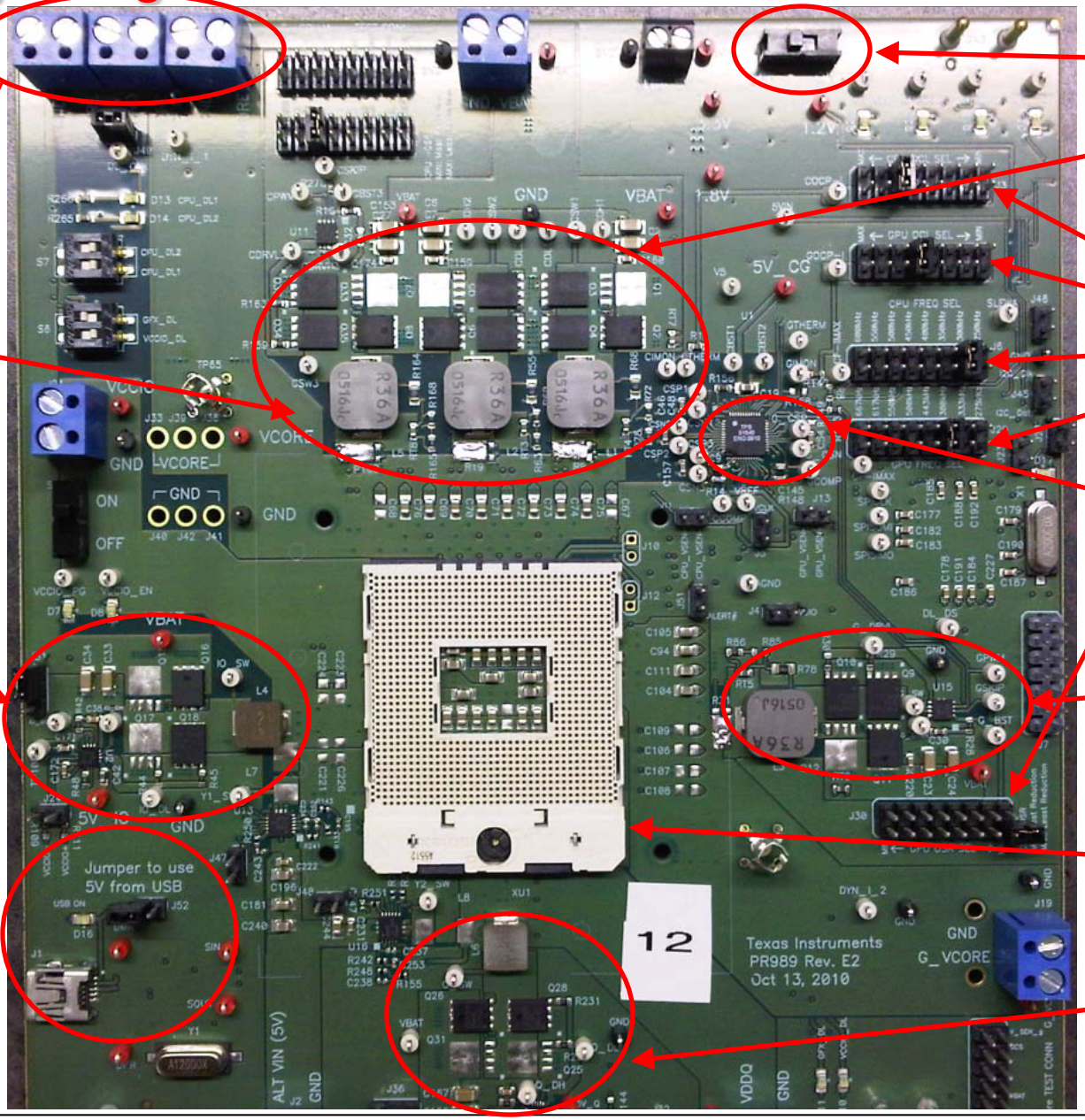
* = Can use TPS53312 3A buck if VIN is 18V max.

5V Integrated FET Converter Sandy Bridge Platform Architecture with new TPS51206 VTT LDO



* = Can use TPS53312 3A buck if VIN is 18V max.

Sandy Bridge TPS51640 + TPS51219 + TPS51216 POWER EVM



Connections for electronic loads

CPU Core

TPS51219 VCCIO/PCH controller

Intel SVID GUI input and 5V jumper to use 5V from USB

Main Power Switch (On/Off)

30V TI NexFETs CSD17xxx

OCL, FSW, OSR jumpers

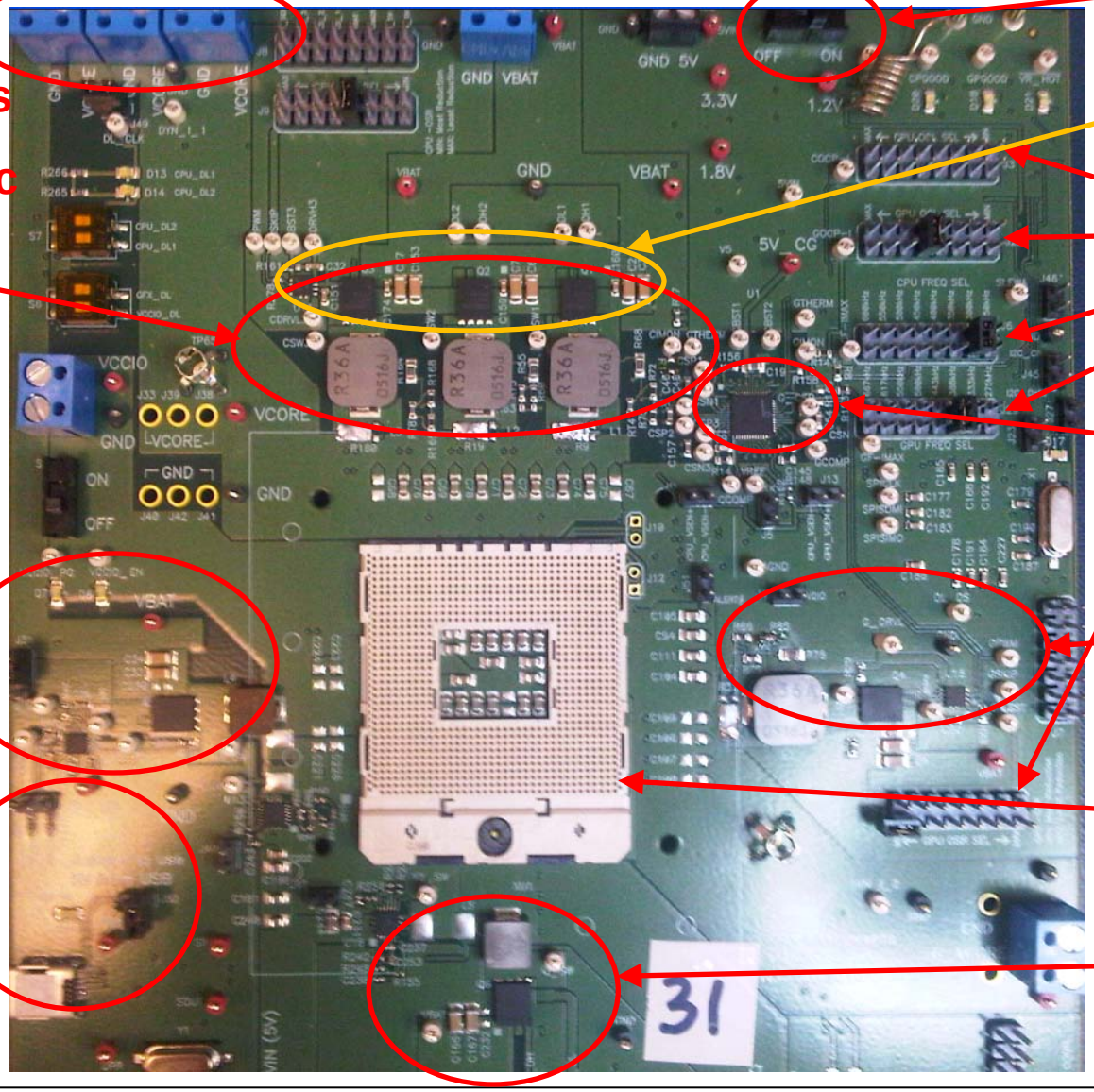
TPS51640 CPU/GPU controller

GPU CORE

Sandy Bridge CPU socket

TPS51216 DDR3 core controller with integrated Vtt LDO

Sandy Bridge TPS51640 + TPS51219 + TPS51216 Power EVM with CSD86350Q5D Power Blocks



Connections for electronic loads

CPU Core

TPS51219 VCCIO

Intel SVID GUI input and 5V jumper to use 5V from USB

Main Power Switch (On/Off)

CSD86350Q5D 5x6 Power Blocks

OCL, FSW, OSR jumpers

TPS51640

GPU CORE

Sandy Bridge CPU socket

TPS51216 DDR3 core and Vtt

Sandy Bridge CPU Power System Reference Designs available

Reference Design	CPU Phases/CPU Current	GPU Phases/GPU Current	Power Train per phase	TI PWM / Drivers
3+1 CPU/GPU core	3 / 94A peak	1 / 33A peak	CSD86350Q5D	TPS51640 TPS51601 x2
3 + 1 CPU/GPU core	3 / 66A peak	1 / 26A peak	CSD17302Q5A CSD17303Q5	TPS51640 TPS51601 x2
2 + 1 CPU/GPU core	2 / 50A peak	1 / 26A peak	CSD86350Q5D	TPS51640 TPS51601
3 + 1 CPU/GPU core	3 / 94A peak	1 / 33A peak	CSD86350Q5D	TPS51640 TPS51601 x2 (2” x 2” PCB area)
PR989E2 IMVP7 power system EVM	3 / 94A peak	1 / 33A peak	CSD17302Q5A x1 CSD17303Q5 x2 for CPU/GPU CSD17302Q5A x1 CSD17303Q5 x1 for DDR3 core and PCH core	TPS51640 TPS51601 x2 TPS51219 TPS51216
2 + 1 CPU/GPU core	2 / 53A peak	1 / 33A peak	CSD17302Q5A CSD17303Q5	TPS51640
3 + 1 CPU/GPU core	3 / 94A peak	1 / 33A peak	CSD96370Q5M power stage x 4	TPS51640
3 + 1 CPU/GPU core	3 / 94A peak	1 / 33A peak	CSD86350Q5D for CPU phases 1-2, CSD96370Q5M for CPU phase 3, GPU	TPS51640
2 + 0 CPU/GPU core	2 / 53A peak	0 - No GPU used	CSD17302Q5A CSD17303Q5	TPS51640

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		**Applications**	
Audio	www.ti.com/audio	Communications and Telecom	www.ti.com/communications
Amplifiers	amplifier.ti.com	Computers and Peripherals	www.ti.com/computers
Data Converters	dataconverter.ti.com	Consumer Electronics	www.ti.com/consumer-apps
DLP® Products	www.dlp.com	Energy and Lighting	www.ti.com/energy
DSP	dsp.ti.com	Industrial	www.ti.com/industrial
Clocks and Timers	www.ti.com/clocks	Medical	www.ti.com/medical
Interface	interface.ti.com	Security	www.ti.com/security
Logic	logic.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Power Mgmt	power.ti.com	Transportation and Automotive	www.ti.com/automotive
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com	Wireless	www.ti.com/wireless-apps
RF/IF and ZigBee® Solutions	www.ti.com/lprf		
	TI E2E Community Home Page		e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2011, Texas Instruments Incorporated