Application Report
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TPS65217x Schematic Checklist

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ABSTRACT

This application note for the TPS65217x, a power companion device for application processors (see the device data sheet) lists the connection details for each pin. The ball details include a brief explanation of the function of each pin or signal and whether the signal is analog or digital. Use this information to check the connectivity for each ball on a system schematic.

In addition to this list, customers are advised to use the information in the data sheet,*TPS65217x Single-Chip PMIC for Battery-Powered Systems,* (SLVSB64) and user's guide, *Powering the AM335x with the TPS65217x* (SLVU551).

NOTE: Customer must ensure that the power-up sequence for the application processor is met. This document does not cover the details of the power-up sequence for the TPS65217x or the application processor. Refer to the device data sheet, reference designs, and user's guides for the application processors for the correct power-up sequence requirements.

Contents

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1 Recommended Operating Conditions

Table 1 lists the recommended operating conditions for the TPS65217x devices.

Table 1. Recommended Operating Conditions

		MIN	NOM	MAX	Unit
Supply voltage, USB, AC		4.3		5.8	V
Supply voltage, BAT		2.75		5.5	V
Input Current from AC				2.5	A
Input current from USB				1.3	A
Battery current				2	A
Input voltage range for DCDC1, DCDC2, and DCDC3		2.7		5.8	V
Input Voltage range for LDO1, LDO2		1.8		5.8	V
Input Voltage range for LS1/LDO3, LS2/LDO4 configured as LDOs		2.7		5.8	V
Input Voltage range for LS1/LDO3, LS2/LDO4 configured as load switches		1.8		5.8	V
Output voltage range for LDO1		1.0		3.3	V
Output voltage range for LDO2		0.9		3.3	V
Output voltage range for LS1/LDO3, LS2/LDO4		1.8		3.3	V
Output current DCDC1		0		1.2	A
Output current DCDC2		0		1.2	A
Output current DCDC3		0		1.2	A
Output current LDO1, LDO2		0		100	mA
Output current LS1/LDO3, LS2/LDO4 configured as LDOs	TPS65217A	0		200	mA
	TPS65217B	0		200	
	TPS65217C	0		400	
	TPS65217D	0		400	
Output current LS1/LDO3, LS2/LDO4 configured as load switches		0		200	mA

NOTE: Ensure current capabilities of DCDC switchers and LDOs meet the maximum demand of all devices that are attached. You can find the maximum current draw of all AM335x I/O rails in the datasheet. If these rails from the PMIC also power other devices, the maximum current draw of these devices needs to be taken into consideration as well.

Ensure I2C0 is used for communication to PMIC. All TI software distributions (Linux SDK, Starterware, and so forth) assumes the use of this interface with the PMIC.

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Name	Pin	Type	I/O	Description	Recommended Connection	Not Used Features
VLDO2	1	Power	O	Output voltage of LDO2	Connect to ground via a 2.2-µF capacitor.	Tie to voltage higher than output voltage expected
VINLDO	2	Power	I	Input voltage for LDO1 and LDO2	Connect to SYS pin and to GND via a 4.7-µF capacitor	Tie to Vsys
VLDO1	3	Power	O	Output voltage of LDO1	Connect to ground via a 2.2-µF capacitor.	Tie to voltage higher than output voltage expected
BAT	4, 5	Power	I/O	Battery charger output	connect to battery	Connect to GND through a pull-down resistor (1kΩ to 10kΩ resistance)
BAT_SENSE	6	Power	I	Battery voltage sense input	Connect to BAT directly at the battery terminal	Connect to BAT directly at the battery terminal
SYS	7,8	Powr	O	System voltage pin and output of power path.	Connect pin 7 and 8 together and connect to ground via 22-µF capacitor	N/A
PWR_EN	9	Digital	I	Enable input for DCDC1, 2, 3 converters and LDO1, 2, 3, 4	Pull high to start power up sequence within 5 seconds of wakeup event	N/A
AC	10	Power	I	AC adapter input to power path	Connect to external DC supply	GND or Float
TS	11	Power	I	Temperature sense input.	Connect to NTC thermistor to sense battery temperature. Works with 10k and 100k thermistors	Float
USB	12	Powr	I	USB voltage input to power path	Connect to an external voltage from USB port	GND
nWAKEUP	13	Digital	O	Signal to host to indicate a power on event (active low, open-drain output)	Pull up through 10k resistor to 3.3v	N/A
MUX_IN	14	Analog	I	Input to analog multiplexer	Connect to any system voltage (see electrical characteristics for ranges)	Float
MUX_OUT	16	Analog	O	Output pin of analog multiplexer	Connect to GND via 100-nF capacitor	Float
NC	15, 17	N/A	N/A	Not used	N/A	N/A
VIO	18	Power	I	Output-high supply for output buffers	Connect to 3.3V rail	Float
VDCDC1	19	Analog/ Power	I/O	DCDC1 output/ feedback voltage sense input	Connect between capacitor and inductor on pin 20.	Tie to voltage higher than output voltage expected
L1	20	Power	O	Switch pin for DCDC1	Connect to a 2.2-µH inductor and a 22-µF capacitor to ground	Float
VIN_DCDC1	21	Power	I	Input voltage for DCDC1	Connect to SYS with 10-µF capacitor to ground	Tie to Vsys
VIN_DCDC2	22	Power	I	Input voltage for DCDC2	Connect to SYS with 10-µF capacitor to ground	Tie to Vsys
L2	23	Power	O	Switch pin for DCDC2	Connect to a 2.2-µH inductor and a 22-µF capacitor to ground	Float
VDCDC2	24	Analog/ Power	I/O	DCDC output/feedback boltage sense input	Connect between capacitor and inductor on pin 23	Tie to voltage higher than output voltage expected
PB_IN	25	Digital	I	External switch-on control	Push-button pulled low will power up PMIC	Float
PGOOD	26	Digital	O	Power-good output (push/pull output). Pulled low when any of the power rails are out of regulation. Behavior is register programmable	Attach test point	Float
SDA	27	Digital	I/O	Data Line for the I2C interface	4.7-k pullup to VIO (3.3-V)	N/A
SCL	28	Digital	I	Clock input for the I2C interface	4.7-k pullup to VIO (3.3-V)	N/A
VDCDC3	29	Analog/ Power	I/O	DCDC3 output/feedback	Connect between capacitor and inductor on pin 31	Tie to voltage higher than output voltage expected
PGND	30	Analog		Power ground	Connect to ground plane	N/A
L3	31	Power	O	Switch pin for DCDC3	Connect to a 2.2-µH inductor and a 22-µF capacitor to ground	Float
VIN_DCDC3	29	Power	I	Input voltage for DCDC3	Connect to SYS with 10-µF capacitor to ground	Tie to Vsys
ISINK1/2	34,33	Analog	I	Input to WLED current SINK1 and 2	"Connect to the cathode of the WLED string. Current through SINK1 equals current through SINK2. if only one WLED string is used, short ISINK1 and ISINK2 together."	GND if both are not needed

Name	Pin	Type	I/O	Description	Recommended Connection	Not Used Features
ISET1	35	Analog	I	Low-level WLED current set	Connect 130-k resistor to ground to set the WLED low-current level	Float
ISET2	36	Analog	I	High-level WLED current set.	Connect 52.3-k resistor to ground to set the WLED high-current level	Float
L4	37	Power	O	Switch pin of the WLED boost converter	"Connect to SYS with 18-µH inductor. Connect to ground through anode of zener diode and 4.7-µF capacitor. Connect end of LED strings between cathode of zener diode and capacitor."	Float
FB_WLED	38	Analog /Power	I	Feedback pin for WLED boost converter.	Connect to anode ot the WLED strings	Float
LS1_IN	39	Power	I	Input voltage pin for load switch 1/LDO3	Connect to SYS pin or VDCDC1	Tie to Vsys
LS1_OUT	40	Power	O	Output voltage pin for load switch 1/LDO3	Connect to ground through 10-µF capacitor	Tie to voltage higher than output voltage expected
AGND	41	Power		Analog GND	Connect to PGND(Power Pad)	N/A
LS2_IN	42	Power	I	Input voltage pin for load switch 2/LDO4	Connect to SYS pin or VDCDC2	Tie to Vsys
LS2_OUT	43	Power	O	Output voltage pin for load switch 2/LDO4	Connect to ground through 10-µF capacitor	Tie to voltage higher than output voltage expected
nRESET	44	Digital	I	interrupt output (active low)	"Pull this pin low and the PMIC will shut down, and after 1 second power up in its default state"	N/A
nINT	45	Digital	O	interrupt output (active low, open drain)	Connect to processor interrupt pin or a GPIO	Pull this pin up to 3.3V through a 10-k resistor
LDO_PGOOD	46	Digital	O	"LDO power good (LDO1 and LDO2 only, push/pull output). Pulled low when these resources are out of regulation "	Leave floating, good place for a test point	Float
BYPASS	47	Power	O	Internal bias voltage (2.25V).	"DO NOT connect any external load to this pin. Connect to ground via 10-µF capacitor."	N/A
INT_LDO	48	Power	O	Internal bias voltage (2.30V).	"DO NOT connect any external load to this pin. Connect to ground via 100-nF capacitor."	N/A
POWER PAD		Power		Power ground connection for the PMU	Connect to GND	N/A

Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from B Revision (November 2016) to C Revision	Page
• Updates were made in Section 2.	3

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