

INTEGRATED USB SWITCH WITH BOOST CONVERTER

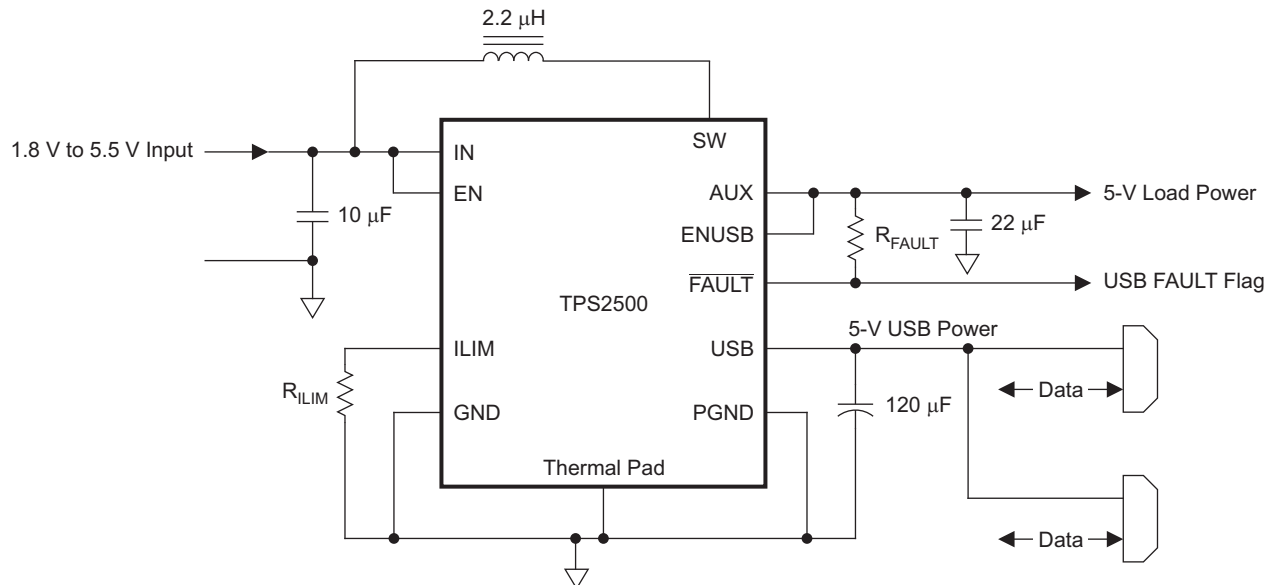
FEATURES

- Integrated Synchronous Boost Converter and USB Current-Limit Switch
- 1.8-V to 5.3-V Input Voltage (2.2-V Minimum Start-Up Voltage)
- Adjustable USB Current Limit
 - 100 mA to 1100 mA
- Accurate 15% Current Limit
- Powers up to Two USB Ports
- Auxiliary 5.1-V Output
- Minimal External Components Required
- Fast Overcurrent Response Time – 5 μ s Typical
- Deglitched Fault Reporting
- Small 3-mm $\times$ 3-mm SON-10 Package
- Industrial Temperature Range

APPLICATIONS

- Portable Applications Using Single Li+ Cell
- USB Hosts Without Native 5-V Supplies

TYPICAL APPLICATION



S0380-01

ADVANCE INFORMATION



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This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

ORDERING INFORMATION

DEVICE	TEMPERATURE	PACKAGE	ORDERING CODE ⁽¹⁾	STATUS
TPS2500	–40°C to 85°C	DRC (SON)	TPS2500DRC	PREVIEW

(1) Add an R suffix to the device type for tape and reel.

ABSOLUTE MAXIMUM RATINGS⁽¹⁾ (1)

over operating free-air temperature range (unless otherwise noted)

	VALUE	UNIT
Input voltage range on SW, AUX, IN, USB, ENUSB, EN, $\overline{\text{FAULT}}$, ILIM	–0.3 To 7	V
I_{USB} Output current	Internally Limited	
$\overline{\text{FAULT}}$ sink current	25	mA
ILIM source current	1	mA
T_J Maximum junction temperature	–40 to 150	°C
ESD – HBM	2	KV
ESD – CDM	500	V
T_{stg} Storage temperature	65 to 150	°C
Lead temperature 1,6 mm (1/16-inch) from case for 10 seconds	300	°C

(1) Stresses beyond those listed under *absolute maximum ratings* may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under *recommended operating conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

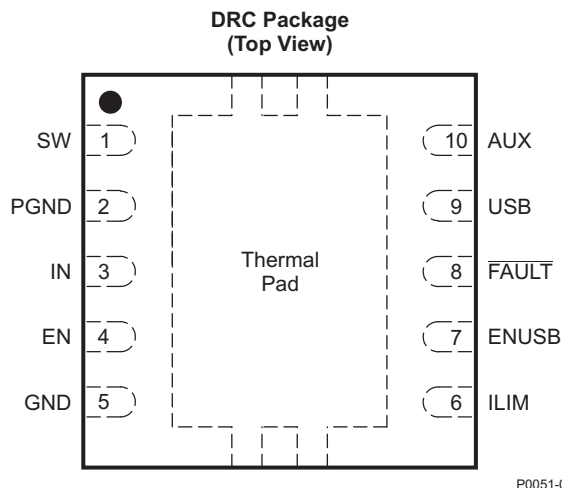
DISSIPATION RATINGS⁽¹⁾

PACKAGE	THERMAL RESISTANCE ⁽²⁾ θ_{JA}	THERMAL RESISTANCE θ_{JC}	$T_A \leq 25^\circ\text{C}$ POWER RATING
DRC	41.6°C/W	10.7°C/W	2403 mW

- (1) The JEDE high-K (2s2p) board used to derive this data was a 3-inch × 3-inch (7.62-mm × 7.62-mm), multilayer board with 1-ounce (0.035-mm) internal power and ground planes and 2-ounce (0.071-mm) copper traces on the top and bottom of the board.
- (2) Mounting per the *PowerPAD™ Thermally Enhanced Package* application report (SLMA002).

RECOMMENDED OPERATING CONDITIONS

	MIN	NOM	MAX	UNIT
V_{IN} Supply voltage at IN	1.8		5.3	V
V_{START} Supply voltage at IN for start-up	2.2			V
V_{AUX} Boost output voltage at AUX		5.1		V
Enable voltage at EN, ENUSB	0		5.3	V
V_{IH} High-level input voltage on EN (or ENUSB) to turn on boost converter (or USB switch)	1.1			V
V_{IL} Low-level input voltage on EN (or ENUSB) to turn off boost converter (or USB switch)			0.66	V
Nominal USB current-limit adjustable threshold range	130		1300	mA
Continuous output current (auxiliary current + USB current)	$V_{\text{IN}} = 3\text{ V}$		1100	mA
	$V_{\text{IN}} = 1.8\text{ V}$		550	
T_A Operating free-air temperature range	–40		85	°C
T_J Operating junction temperature range	–40		125	°C

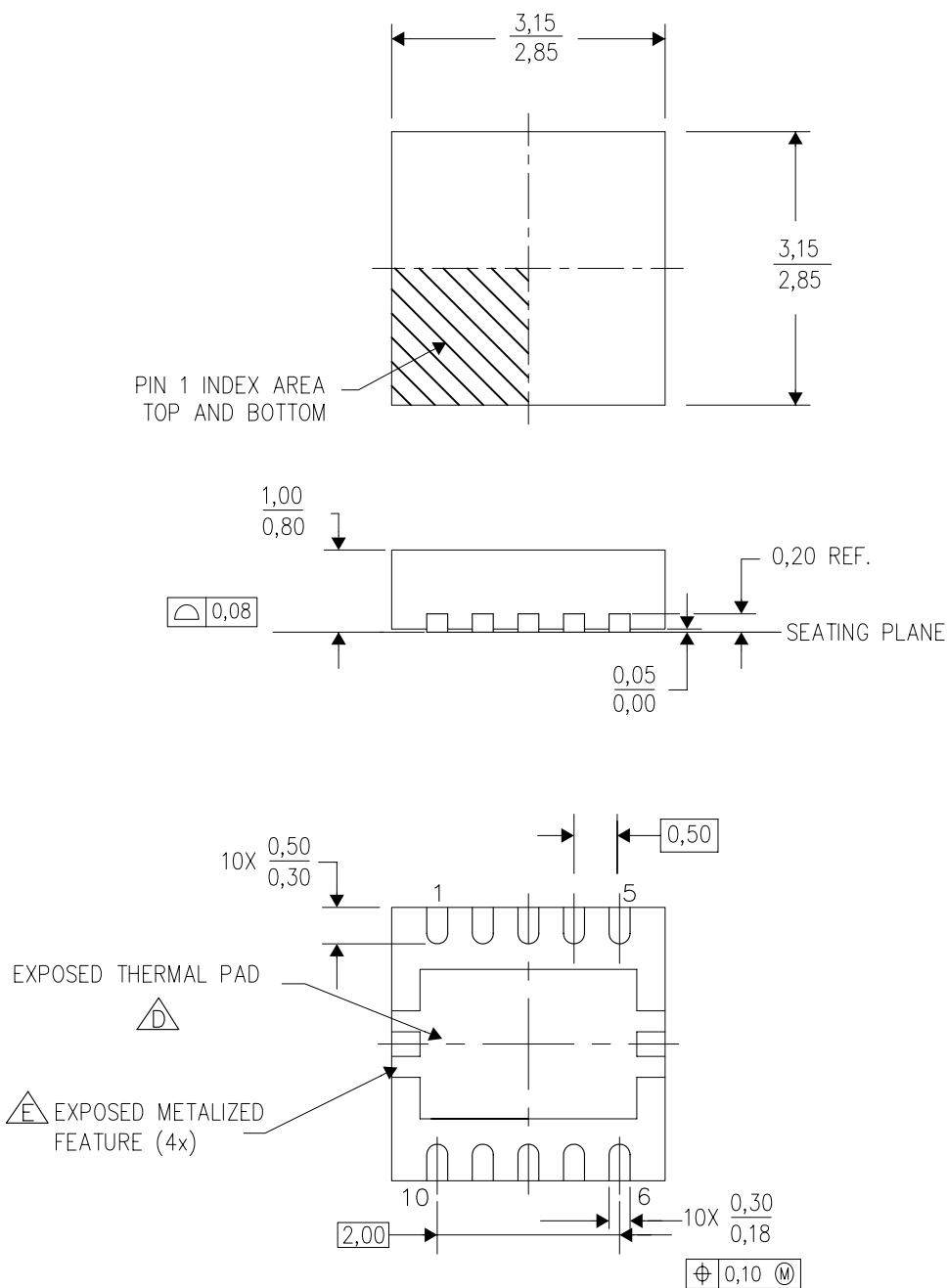


PIN DESCRIPTIONS

SIGNAL		TYPE	DESCRIPTION
NAME	NO.		
AUX	10	O	Fixed 5.1-V boost converter output. Connect a low-ESR ceramic capacitor from AUX to PGND.
EN	4	I	Enable input for boost converter. Tie to IN to enable.
ENUSB	7	I	Enable input for the USB switch. Tie to IN or AUX to enable.
$\overline{\text{FAULT}}$	8	O	Active-low USB fault indicator (open-drain)
GND	5	P	Control/logic ground. Must be tied to PGND close to the IC externally.
ILIM	6	I	Program the nominal USB-switch current-limit threshold with a resistor to GND.
IN	3	I	Input supply voltage for boost converter
PGND	2	P	Source connection for the internal low-side boost-converter power switch. Connect to GND with a low-impedance connection to the input and output capacitors.
SW	1	P	Boost and rectifying switch input. This node is switched between PGND and AUX. Connect the boost inductor from IN to SW.
USB	9	O	Output of the USB power switch. Connect to the USB port.
Thermal pad	—	—	Must be soldered to achieve appropriate power dissipation. Should be connected to GND.

DRC (S-PVSON-N10)

PLASTIC SMALL OUTLINE NO-LEAD



4204102/G 06/08

- NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 B. This drawing is subject to change without notice.
 C. Small Outline No-Lead (SON) package configuration.
 D. The package thermal pad must be soldered to the board for thermal and mechanical performance. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.
 E. Metalized features are supplier options and may not be on the package.

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