

TPS255xx Precision Adjustable Current-Limited Power-Distribution Switches

1 Features

- Up to 1.5-A Maximum Load Current
- $\pm 6\%$ Current-Limit Accuracy at 1.7 A (Typical)
- Meets USB Current-Limiting Requirements
- Backwards Compatible With TPS2550 and TPS2551
- Adjustable Current Limit: 75 mA to 1700 mA (Typical)
- Constant-Current (TPS255x) and Latch-Off (TPS255x-1) Versions
- Fast Overcurrent Response - 2 μ s (Typical)
- 85-m Ω High-Side MOSFET (DBV Package)
- Reverse Input-Output Voltage Protection
- Operating Range: 2.5 V to 6.5 V
- Built-In Soft Start
- 15-kV ESD Protection per IEC 61000-4-2 (With External Capacitance)
- UL Listed – File No. E169910 and NEMKO IEC60950-1-am1 ed2.0
- See the TI Switch Portfolio

2 Applications

- USB Ports and Hubs
- Digital TVs
- Set-Top Boxes
- VOIP Phones

3 Description

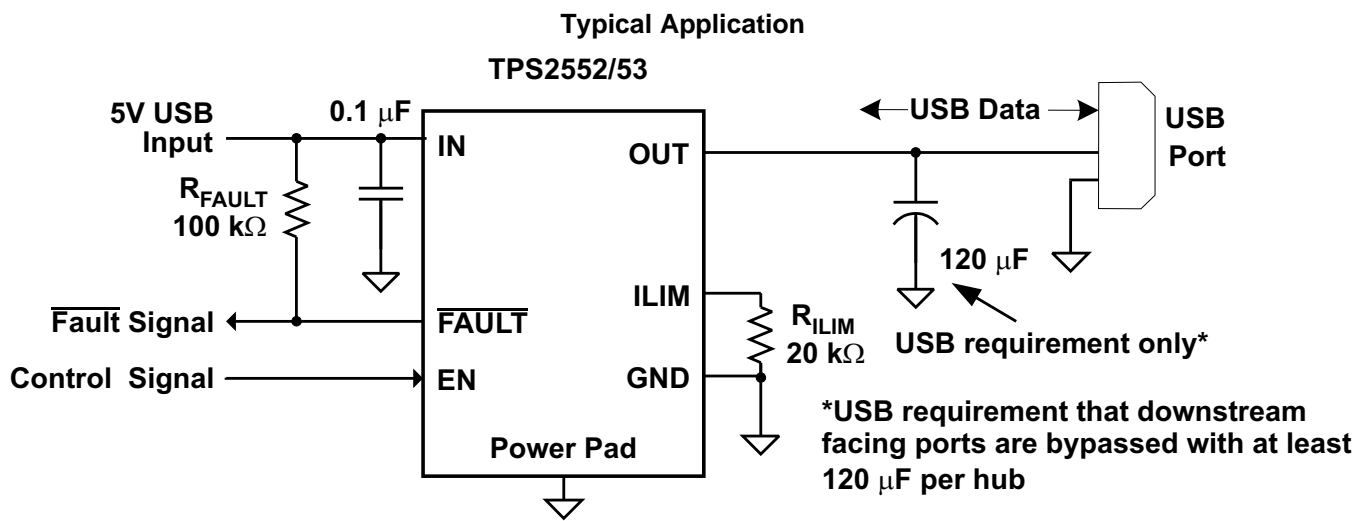
The TPS255x and TPS255x-1 power-distribution switches are intended for applications where precision current limiting is required or heavy capacitive loads and short circuits are encountered and provide up to 1.5 A of continuous load current. These devices offer a programmable current-limit threshold between 75 mA and 1.7 A (typical) through an external resistor. Current-limit accuracy as tight as $\pm 6\%$ can be achieved at the higher current-limit settings. The power-switch rise and fall times are controlled to minimize current surges during turnon and turnoff.

TPS255x devices limit the output current to a safe level by using a constant-current mode when the output load exceeds the current-limit threshold. TPS255x-1 devices provide circuit breaker functionality by latching off the power switch during overcurrent or reverse-voltage situations. An internal reverse-voltage comparator disables the power-switch when the output voltage is driven higher than the input to protect devices on the input side of the switch. The $\overline{\text{FAULT}}$ output asserts low during overcurrent and reverse-voltage conditions.

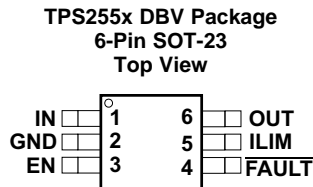
Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
TPS2552	SOT-23 (6)	2.90 mm x 1.60 mm
	WSON (6)	2.00 mm x 2.00 mm
TPS2553	SOT-23 (6)	2.90 mm x 1.60 mm
	WSON (6)	2.00 mm x 2.00 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.



6 Pin Configuration and Functions



EN = Active Low for the TPS2552
EN = Active High for the TPS2553
Add –1 to part number for latch-off version



EN = Active Low for the TPS2552
EN = Active High for the TPS2553
Add –1 to part number for latch-off version

Pin Functions

NAME	PIN				I/O	DESCRIPTION
	TPS2552		TPS2553			
	SOT-23	WSON	SOT-23	WSON		
$\overline{\text{EN}}$	3	4	—	—	I	Enable input, logic low turns on power switch
EN	—	—	3	4	I	Enable input, logic high turns on power switch
$\overline{\text{FAULT}}$	4	3	4	3	O	Active-low open-drain output, asserted during overcurrent, overtemperature, or reverse-voltage conditions.
GND	2	5	2	5	—	Ground connection; connect externally to PowerPAD
ILIM	5	2	5	2	O	External resistor used to set current-limit threshold; recommended $15 \text{ k}\Omega \leq R_{\text{ILIM}} \leq 232 \text{ k}\Omega$.
IN	1	6	1	6	I	Input voltage; connect a 0.1 μF or greater ceramic capacitor from IN to GND as close to the IC as possible.
OUT	6	1	6	1	O	Power-switch output
PowerPAD™	—	PAD	—	PAD	—	Internally connected to GND; used to heat-sink the part to the circuit board traces. Connect PowerPAD to GND pin externally.

Add –1 for Latch-Off version

7 Specifications

7.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted) ⁽¹⁾⁽²⁾

	MIN	MAX	UNIT
Voltage range on IN, OUT, EN or $\overline{\text{EN}}$, ILIM, $\overline{\text{FAULT}}$	–0.3	7	V
Voltage range from IN to OUT	–7	7	V
I_{O} Continuous output current	Internally Limited		
Continuous total power dissipation	See the <i>Thermal Information</i>		
Continuous $\overline{\text{FAULT}}$ sink current	0	25	mA
ILIM source current	0	1	mA
T_{J} Maximum junction temperature	–40	150	°C
T_{stg} Storage temperature	–65	150	°C

- Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- Voltages are referenced to GND unless otherwise noted.