

## ***TPS54362QPWPRQ1 Errata***

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### **1 Errata / Observed Device Behavior**

Investigating a customer inquiry, TI has observed that in certain systems or applications, a device failure can be caused during power-up with a shorted load condition, if the Phase pin voltage drops more than 1V below ground. This condition can de-bias the substrate and cause the TPS54362-Q1 control circuitry to malfunction. The external recirculation diode has to be fast and robust enough to limit this negative voltage to protect the substrate from a de-biased condition. The potential for failure appears to increase as the supply voltage increases above 18V.

The condition occurs while the device's frequency foldback protection mode is disabled for the first 1ms after power is applied or the Enable input has been switched to active. This allows the regulator to switch at the maximum frequency into the shorted load and the inductor current will build up. The condition does not occur if the shorted load condition occurs after power-up has completed, because frequency foldback will initiate and prevent the inductor current build up.

(Please note that adherence to the Maximum Ratings table in the TI published datasheet for this device would avoid this issue.)

#### **1.1 Workaround**

TI has identified two possible workarounds for testing and consideration by our customers in their systems or applications:

1. Improve recirculation diode performance to guarantee that the phase pin voltage does not drop more than 1V below ground.
2. Install a safety circuit to detect an over-current condition and disable the device. One example would be to place a shunt resistor in the output path and use a current shunt monitor to detect an over-current condition and pull the Enable pin on the TPS54362-Q1 low.

In addition, customers may wish to evaluate possible substitution of the TI TPS54262-Q1 device in applications having a load current requirement of 2A or less. TI believes that in the event this substitution is made, it will likely also be advisable to change the soft start capacitor, CSS, to a 100nF capacitor in most applications (which will delay start-up until after the 1ms power-up time has elapsed and frequency foldback will then engage preventing a build-up of the inductor current during a shortened load condition).

#### **1.2 Severity**

High

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