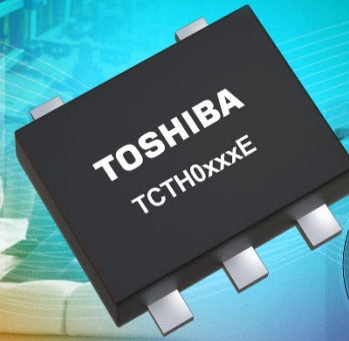


Thermoflagger



Over-Temperature Detection ICs

Over-temperature monitoring and protection are key for all kinds of electrical equipment. Toshiba's Thermoflagger™ devices can be combined with positive temperature coefficient (PTC) thermistors to detect over-temperature conditions within electronic systems, for safety reasons or to take countermeasures if necessary. Thermoflagger™ products each have a built-in current source. Used in combination with PTC thermistors they offer a simple and inexpensive, low current consumption solution suited to increasing the safety level in a wide range of applications.

Applications

- Battery Management Systems
- Charger
- Power supply
- White goods
- Factory automation
- Mobile devices
- Home appliances

Features

- High accuracy
- No supply voltage stabilization required
- Uses current source for temperature detection
- Industrial temperature range (-40°C to +125°C)

Advantages

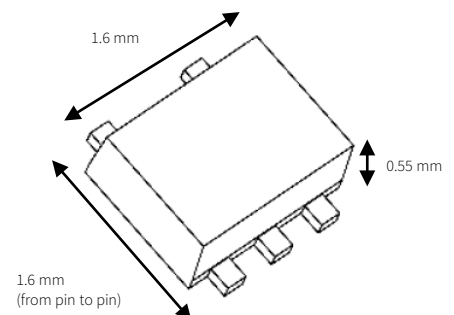
- High integration
- Low cost
- Multiple temperature measuring points

Benefits

- Easy to use
- Reduced bill of materials
- No calibration needed

Overview of package size

The package options for Toshiba's Thermoflagger™ range from smallest 0.42mm² WCSP4 package up to the largest SOT-25. The first package version to be released will be SOT-553. The best thermal performance is achieved using DFN4D package. Due to the low heights of WCSP and DFN packages, these Thermoflaggers™ are particularly suitable for applications which require very flat package types.



SOT-553 (ESV) package

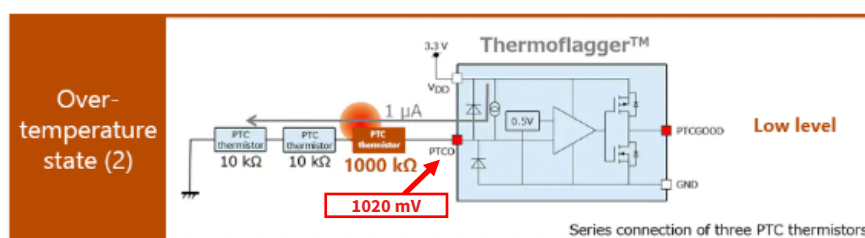
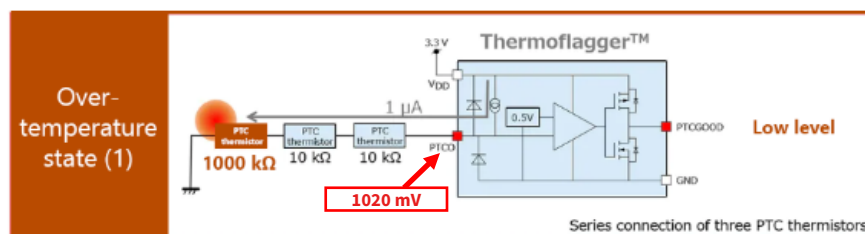
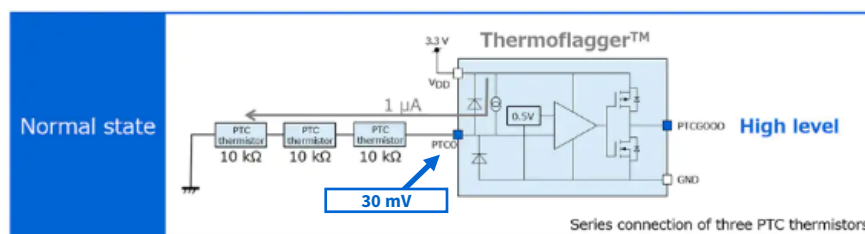
How the Thermoflagger™ IC operates

A PTC thermistor can be connected to the PTCO pin of the Thermoflagger™. A constant current source inside the Thermoflagger™ generates a low voltage across the PTC thermistor. In case of a temperature increase near the PTC thermistor, its ohmic resistance will increase exponentially, resulting in a voltage rise at the PTCO pin. This voltage increase is detected by the Thermoflagger™, which results in FLAG signal to an MCU to take further actions.

The number of thermal control points can be increased by connecting several PTC thermistors in series and locating them at different points inside a system.

Over-temperature detection

Thermoflagger™ indicates a warning signal, when a change of resistance in the PTC thermistor is detected.



Thermoflagger™ product line-up

Part Number	PTCO Output Current (typ.)	PTC Thermistor Select Range	Latch Function	PTCGOOD Output Type	Package Name	MP Status
TCTH011AE*	1μA	4.7 kΩ to 10 kΩ		Push-pull	SOT-553 (ESV)	OK
TCTH012AE*	1μA	4.7 kΩ to 10 kΩ	✓ Y	Push-pull	SOT-553 (ESV)	OK
TCTH021AE*	10μA	470 Ω to 1 kΩ		Push-pull	SOT-553 (ESV)	OK
TCTH022AE*	10μA	470 Ω to 1 kΩ	✓ Y	Push-pull	SOT-553 (ESV)	OK
TCTH011BE*	1μA	4.7 kΩ to 10 kΩ		Open-drain	SOT-553 (ESV)	OK
TCTH012BE*	1μA	4.7 kΩ to 10 kΩ	✓ Y	Open-drain	SOT-553 (ESV)	OK
TCTH021BE*	10μA	470 Ω to 1 kΩ		Open-drain	SOT-553 (ESV)	OK
TCTH022BE*	10μA	470 Ω to 1 kΩ	✓ Y	Open-drain	SOT-553 (ESV)	OK

More line-up at <https://toshiba.semicon-storage.com/eu/search/part-number.1.1.TCth.html>

* New product