TPS22919-Q1 5.5 V, 1.5 A, 90-mΩ Self-Protected Load Switch

1 Features

- Qualified for automotive applications
- AEC-Q100 Qualified:
  - Device temperature grade 1: –40°C to 125°C ambient operating temperature range
- Input operating voltage range (V_{IN}): 1.6 V to 5.5 V
- Maximum continuous current (I_{MAX}): 1.5 A
- On-Resistance (R_{ON}):
  - 5-V V_{IN}: 89 mΩ (typical)
  - 3.6-V V_{IN}: 90 mΩ (typical)
  - 1.8-V V_{IN}: 105 mΩ (typical)
- Output short protection (I_{SC}): 3 A (typical)
- Low power consumption:
  - ON state (I_Q): 8 µA (typical)
  - OFF state (I_{SD}): 2 nA (typical)
- Smart ON pin pull down (R_{PD}):
  - ON ≥ V_{IH} (I_{ON}): 100 nA (maximum)
  - ON ≤ V_{IL} (R_{PD}): 530 kΩ (typical)
- Slow Turn ON timing to limit inrush current (t_{ON}):
  - 5.0 V Turn ON time (t_{ON}): 1.95 ms at 3.2 mV/µs
  - 3.6 V Turn ON time (t_{ON}): 1.75 ms at 2.7 mV/µs
  - 1.8 V Turn ON time (t_{ON}): 1.5 ms at 1.8 mV/µs
- Adjustable output discharge and fall time:
  - Internal QOD resistance = 24 Ω (typical)

2 Applications

- Infotainment and cluster head unit
- Automotive cluster display
- ADAS Surround view system ECU
- Body control module and gateway

3 Description

The TPS22919-Q1 device is a small, single channel load switch with controlled slew rate. The device contains an N-channel MOSFET that can operate over an input voltage range of 1.6 V to 5.5 V and can support a maximum continuous current of 1.5 A.

The switch ON state is controlled by a digital input that is capable of interfacing directly with low-voltage control signals. When power is first applied, a Smart Pull Down is used to keep the ON pin from floating until system sequencing is complete. Once the pin is deliberately driven High (>V_{IH}), the Smart Pull Down will be disconnected to prevent unnecessary power loss.

The TPS22919-Q1 load switch is also self-protected, meaning that it will protect itself from short circuit events on the output of the device. It also has thermal shutdown to prevent any damage from overheating.

TPS22919-Q1 is available in a standard SC-70 package characterized for operation over a junction temperature range of –40°C to 125°C.

Device Information[1]

PART NUMBER	PACKAGE	BODY SIZE (NOM)
TPS22919-Q1	SC-70 (6)	2.1 mm × 2.0 mm

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

ADVANCE INFORMATION

Simplified Schematic

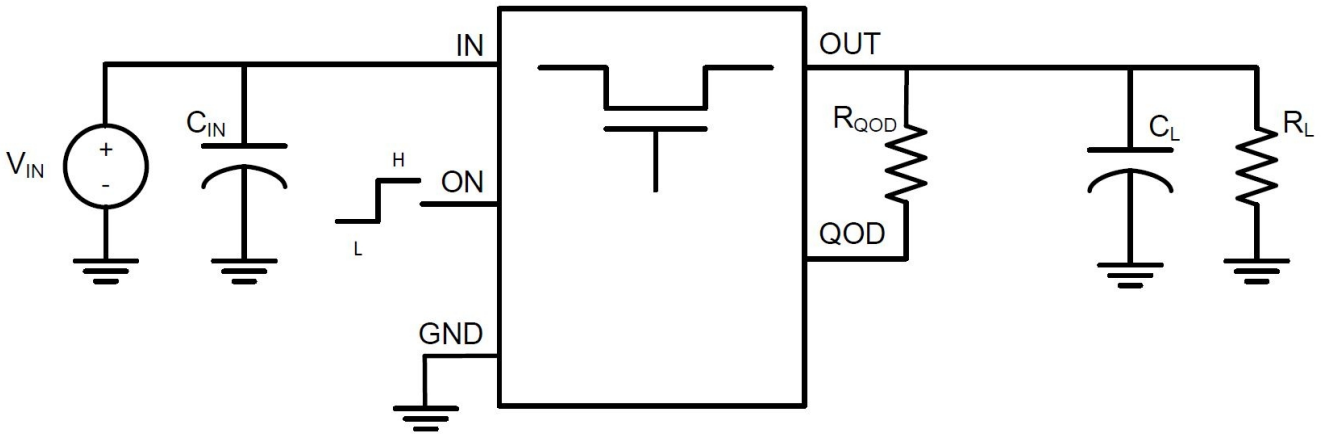


Table of Contents

1 Features 1
2 Applications 1
3 Description 1
4 Revision History 2
5 Device and Documentation Support 3
5.1 Trademarks 3
5.2 Electrostatic Discharge Caution 3
5.3 Glossary 3
6 Mechanical, Packaging, and Orderable Information 3

4 Revision History

DATE	REVISION	NOTES
January 2020	*	Initial release.

ADVANCE INFORMATION

5 Device and Documentation Support

5.1 Trademarks

All trademarks are the property of their respective owners.

5.2 Electrostatic Discharge Caution

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.

5.3 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

ADVANCE INFORMATION

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
PTPS22919QDCKRQ1	ACTIVE	SC70	DCK	6	3000	TBD	Call TI	Call TI	-40 to 125		Samples
TPS22919QDCKRQ1	PREVIEW	SC70	DCK	6	3000	TBD	Call TI	Call TI	-40 to 125		

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

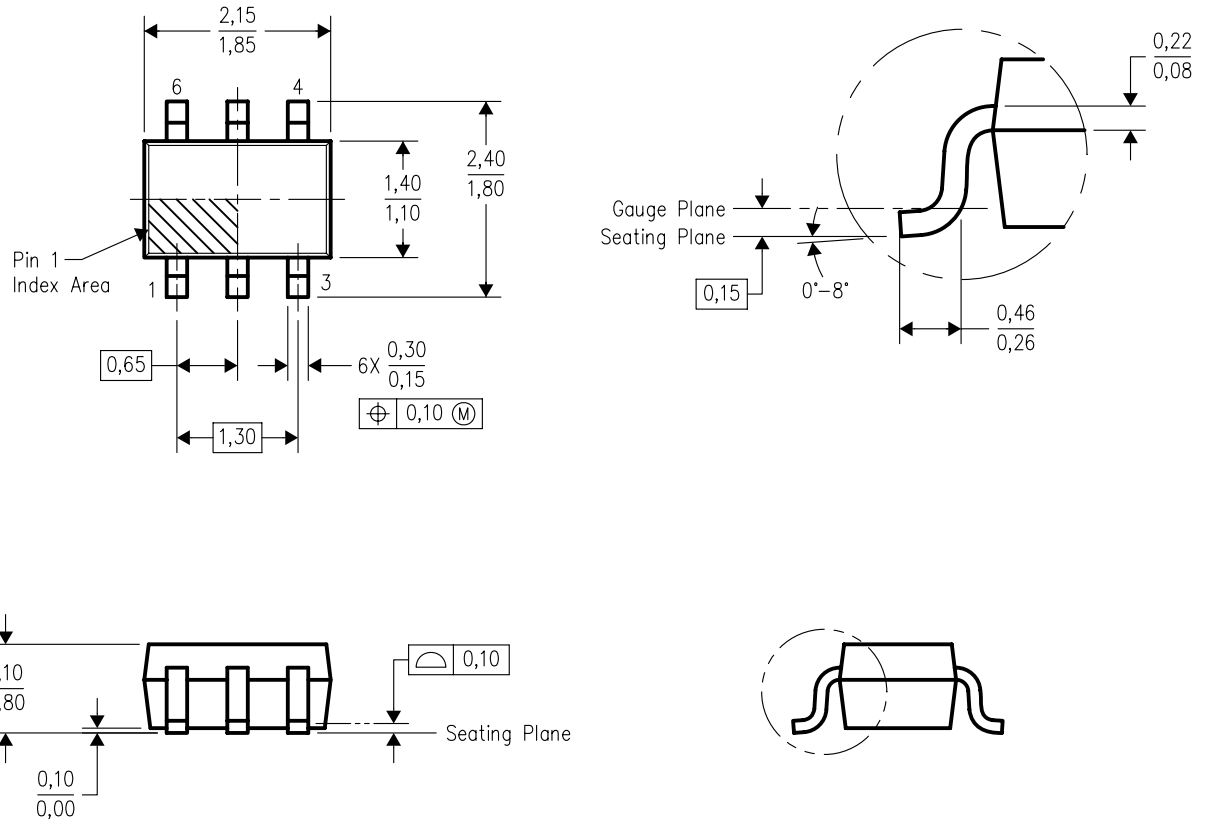
(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

DCK (R–PDSO–G6) PLASTIC SMALL–OUTLINE PACKAGE



4093553–4/G 01/2007

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
D. Falls within JEDEC MO–203 variation AB.

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale (www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265