



TPS2295x 5.7-V, 5-A, 14-mΩ On-Resistance Load Switch

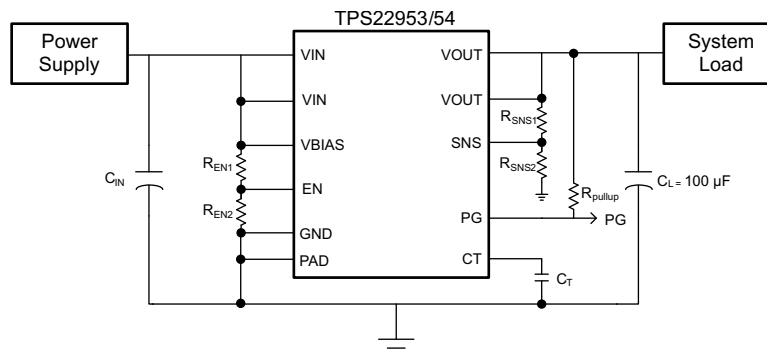
1 Features

- Integrated Single Channel Load Switch
- Input Voltage Range: 0.7 V to 5.7 V
- Low RON Resistance
 - $R_{ON} = 14\text{ m}\Omega$ at $V_{IN} = 5\text{ V}$ ($V_{BIAS} = 5\text{ V}$)
- 5A Maximum Continuous Switch Current
- Adjustable Undervoltage Lockout Threshold (UVLO)
- Adjustable Power Good (PG) Threshold
- Adjustable Output Slew Rate Control
- Very Low Quick Output Discharge Resistance (TPS22954 Only)
- Reverse Current Protection when disabled (TPS22953 Only)
- Thermal Shutdown
- Low Quiescent Current $< 50\text{ }\mu\text{A}$
- Low Control Input Threshold Enables Use of 1.2 V/1.8 V/2.5 V/3.3 V Logic
- SON 10-pin Package with Thermal Pad
- ESD Performance Tested Per JESD 22
 - 1 kV HBM and 250 V CDM

2 Applications

- Solid State Drives
- Embedded/Industrial PC
- Ultrabook™/Notebooks
- Desktops
- Servers
- Telecom Systems

4 Simplified Schematic



3 Description

The TPS22953/54 are small, low RON, single channel load switches with controlled turn on. The devices contain a N-channel MOSFET that can operate over an input voltage range of 0.7 V to 5.7 V and can support a maximum continuous current of 5 A.

The integrated adjustable undervoltage lockout (UVLO) and adjustable power good (PG) threshold provides voltage monitoring as well as robust power sequencing. The adjustable rise time control of the device greatly reduces inrush current for a wide variety of bulk load capacitances, thereby reducing or eliminating power supply droop. The switch is independently controlled by an on/off input (EN), which is capable of interfacing directly with low-voltage control signals. A 15 Ω on-chip load is integrated into the device for output quick discharge when switch is turned off.

The TPS22953/54 are available in small, space-saving 10-SON packages with integrated thermal pad allowing for high power dissipation. The device is characterized for operation over the free-air temperature range of -40°C to 105°C .

Device Information⁽¹⁾

PART NUMBER	PACKAGE (PIN)	BODY SIZE
TPS22954	DSQ (10)	2.00 mm x 2.00 mm
	DQC (10)	2.00 mm x 3.00 mm
TPS22953	DSQ (10)	2.00 mm x 2.00 mm
	DQC (10)	2.00 mm x 3.00 mm

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



5 Device and Documentation Support

5.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
TPS22953	Click here	Click here	Click here	Click here	Click here
TPS22954	Click here	Click here	Click here	Click here	Click here

5.2 Trademarks

All trademarks are the property of their respective owners.

5.3 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

5.4 Export Control Notice

Recipient agrees to not knowingly export or re-export, directly or indirectly, any product or technical data (as defined by the U.S., EU, and other Export Administration Regulations) including software, or any controlled product restricted by other applicable national regulations, received from disclosing party under nondisclosure obligations (if any), or any direct product of such technology, to any destination to which such export or re-export is restricted or prohibited by U.S. or other applicable laws, without obtaining prior authorization from U.S. Department of Commerce and other competent Government authorities to the extent required by those laws.

5.5 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.

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
TPS22953DQCR	PREVIEW	WSO	DQC	10	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 105	RB953	
TPS22953DSQR	PREVIEW	SON	DSQ	10	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 105	ZFDI	
TPS22954DQCR	PREVIEW	WSO	DQC	10	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 105	RB954	
TPS22954DSQR	PREVIEW	SON	DSQ	10	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 105	ZDKI	

(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.

OBSELETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(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.

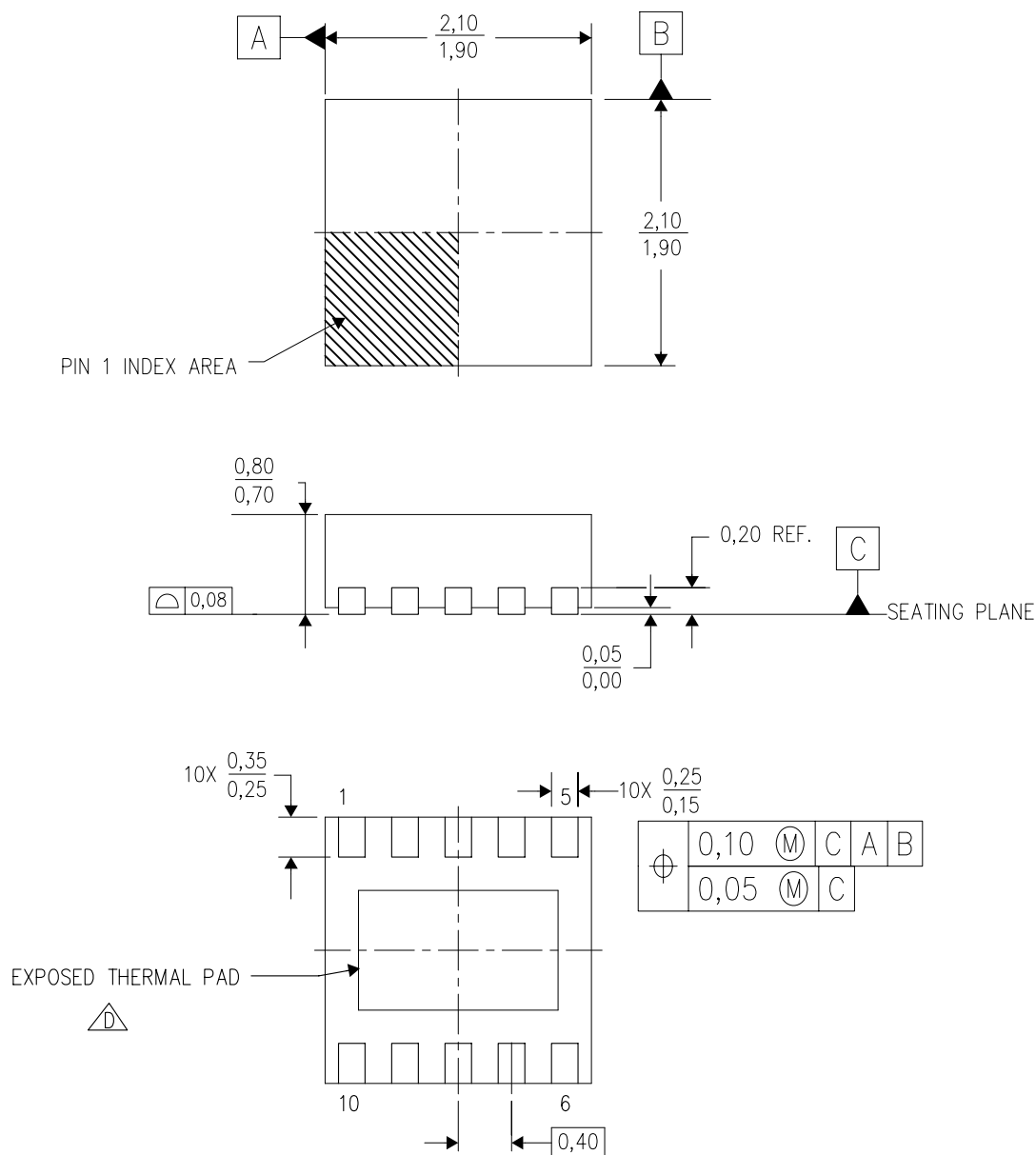
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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DSQ (S-PWSON-N10)

PLASTIC SMALL OUTLINE NO-LEAD



4209243/B 04/10

- 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.

DSQ (R-PWSON-N10)

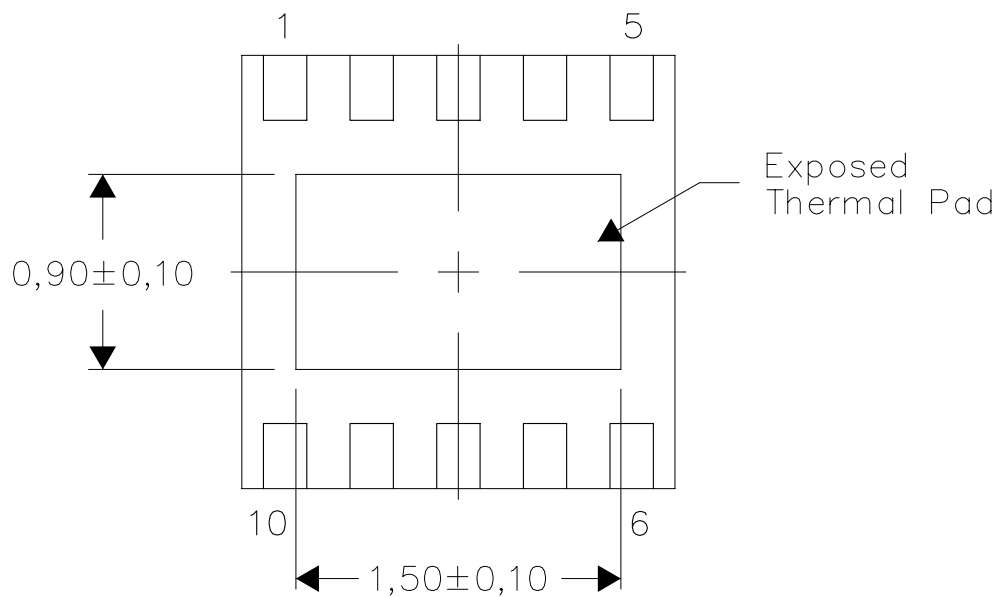
PLASTIC SMALL OUTLINE NO-LEAD

THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at www.ti.com.

The exposed thermal pad dimensions for this package are shown in the following illustration.



Bottom View

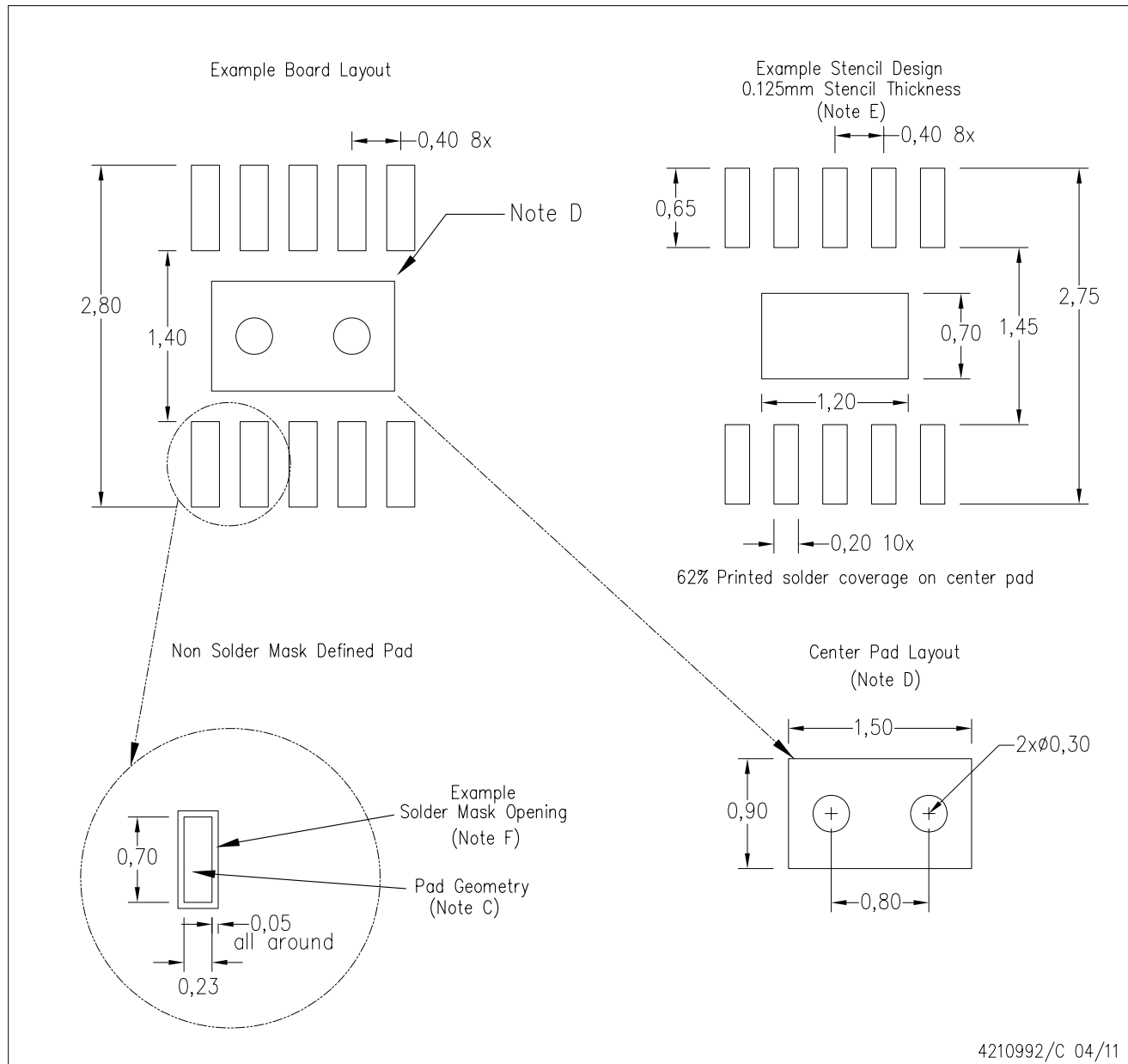
Exposed Thermal Pad Dimensions

4210993/C 04/11

NOTES: A. All linear dimensions are in millimeters

DSQ (R-PWSON-N10)

PLASTIC SMALL OUTLINE NO-LEAD

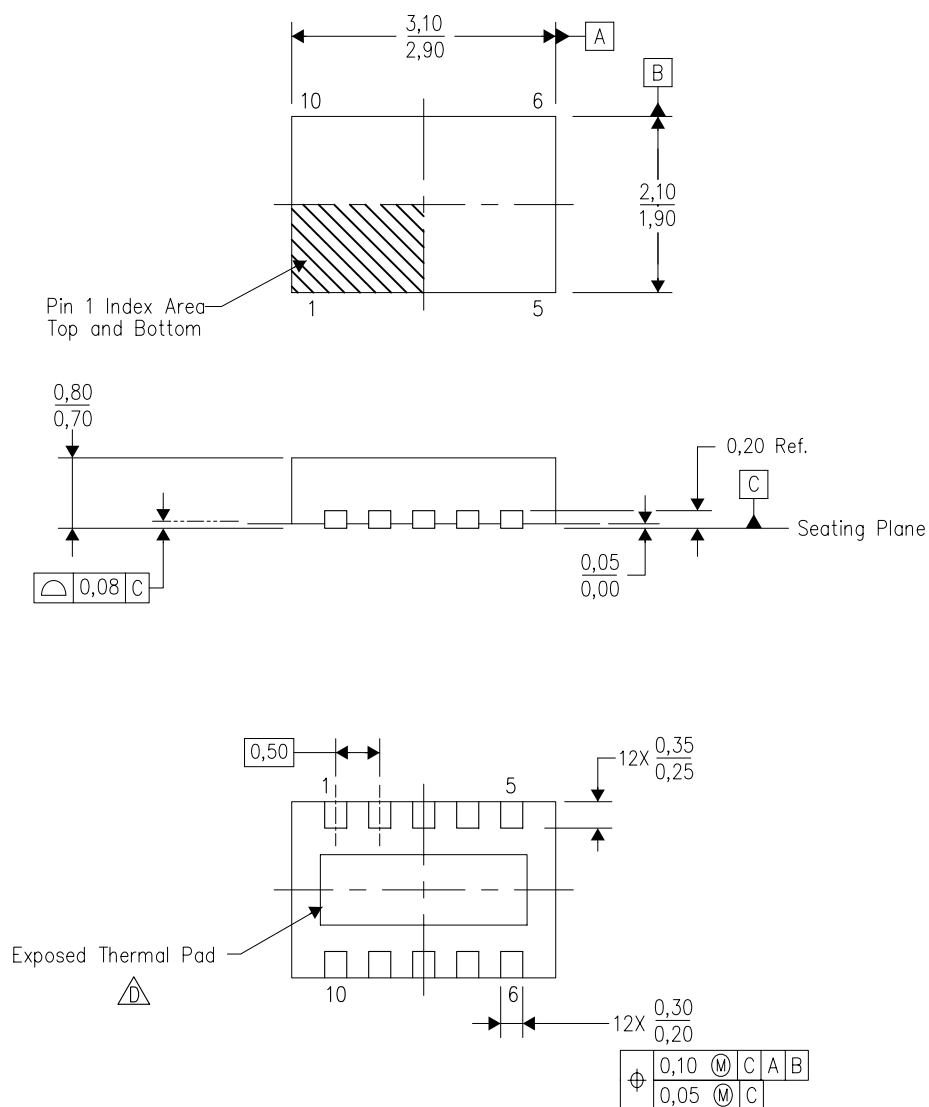


- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at www.ti.com <<http://www.ti.com>>.
 - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
 - Customers should contact their board fabrication site for solder mask tolerances.

MECHANICAL DATA

DQC (R-PWSON-N10)

PLASTIC SMALL OUTLINE NO-LEAD



4209674/A 07/08

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. SON (Small Outline No-Lead) 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.

THERMAL PAD MECHANICAL DATA

DQC (R-PWSON-N10)

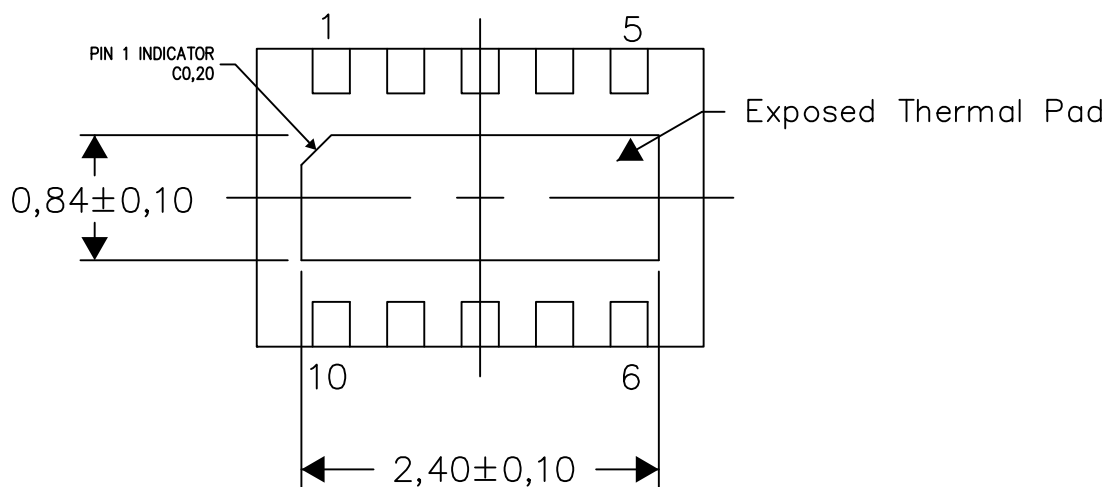
PLASTIC SMALL OUTLINE NO-LEAD

THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

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The exposed thermal pad dimensions for this package are shown in the following illustration.



Bottom View

Exposed Thermal Pad Dimensions

4209909/D 01/14

NOTE: All linear dimensions are in millimeters

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