TEXAS INSTRUMENTS

TCAN1162-Q1
SLLSFN0 – MAY 2021

TCAN1162-Q1 Automotive Self-supplied CAN FD Transceiver with Sleep Mode

1 Features

- AEC Q100 (Grade 1) Qualified for automotive applications
- Meets the requirements of ISO 11898-2:2016
- Wide input operational voltage range:
  - V_{SUP} range: 5.5 V to 28 V
- Integrated LDO for CAN transceiver supply
- Support of classic CAN and CAN FD up to 8 Mbps
  - Short and symmetrical propagation delays and fast loop times for enhanced timing margin
  - Higher data rates in loaded CAN networks
- V_{IO} level shifting supports: 1.7 V to 5.5 V
- Operating modes
  - Normal mode
  - Standby mode with INH output and local and remote wake up request
  - Low power sleep mode with INH output and local and remote wake up request
- Optimized behavior when unpowered
  - Bus and logic terminals are high impedance (no load to operating bus or application)
  - Hot plug capable: power up/down glitch free operation on bus and RXD output
- Protection features: ±58-V bus fault tolerant, 42-V load dump support on V_{SUP}, IEC ESD protection, undervoltage protection, over voltage protection, thermal shutdown protection, TXD dominant state timeout
- Junction temperatures from: –40°C to 150°C
- Available in the leadless VSON (14) package 4.5 mm x 3.0 mm with improved automated optical inspection (AOI) capability

2 Applications

- Advanced driver assistance system (ADAS)
- Body electronics & lighting
- Automotive infotainment & cluster
- Hybrid, electric & powertrain systems

3 Description

The TCAN1162-Q1 is a high speed Controller Area Network (CAN) transceiver that meets the physical layer requirements of the ISO 11898-2:2016 high speed CAN specification. The TCAN1162-Q1 supports both classical CAN and CAN FD networks up to 8 megabits per second (Mbps).

The TCAN1162-Q1 integrates an LDO with a wide input operating range which provides the 5 V CAN transceiver voltage thereby eliminating the need for the 5 V to be supplied from an external voltage source.

The TCAN1162-Q1 allows for system-level reductions in battery current consumption by selectively enabling the various power supplies that may be present on a node via the INH output pin. This allows an ultra-low-current sleep state in which power is gated to all system components except for the TCAN1162-Q1, which remains in a low-power state while monitoring the CAN bus. When a wake-up event is detected, the TCAN1162-Q1 initiates node start-up by driving INH high.

Device Information

PART NUMBER	PACKAGE[(1)]	BODY SIZE (NOM)
TCAN1162-Q1	VSON (14)	4.5 mm x 3.00 mm

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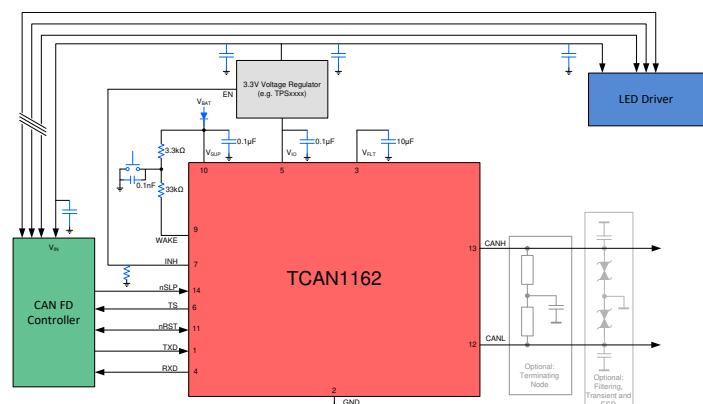
Simplified Schematic

ADVANCE INFORMATION

4 Description (continued)

The TCAN1162-Q1 supports an ultra low-power standby mode where the high-speed transmitter and normal receiver are switched off and a low-power wake-up receiver enables remote wake-up via the ISO 11898-2:2016 defined wake-up pattern (WUP).

The TCAN1162-Q1 includes internal logic level translation via the V_{IO} terminal to allow for interfacing directly to 1.8 V, 2.5 V, 3.3 V, or 5 V controllers. The transceiver includes many protection and diagnostic features including undervoltage detection, over voltage detection, thermal shutdown (TSD), driver dominant timeout (TXD DTO), and bus fault protection up to ±58 V.

The TCAN1162-Q1 allows for system-level reductions in battery current consumption by selectively enabling the various power supplies that may be present on a node via the INH output pin. This allows an ultra-low-current sleep state in which power is gated to all system components except for the TCAN1162-Q1, which remains in a low-power state while monitoring the CAN bus. When a wake-up pattern is detected on the bus or when a local wake-up is requested via the WAKE input, the TCAN1162-Q1 initiates node start-up by driving INH high.

ADVANCE INFORMATION

5 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

5.1 Documentation Support

5.1.1 Related Documentation

5.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

5.3 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

5.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

5.5 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.
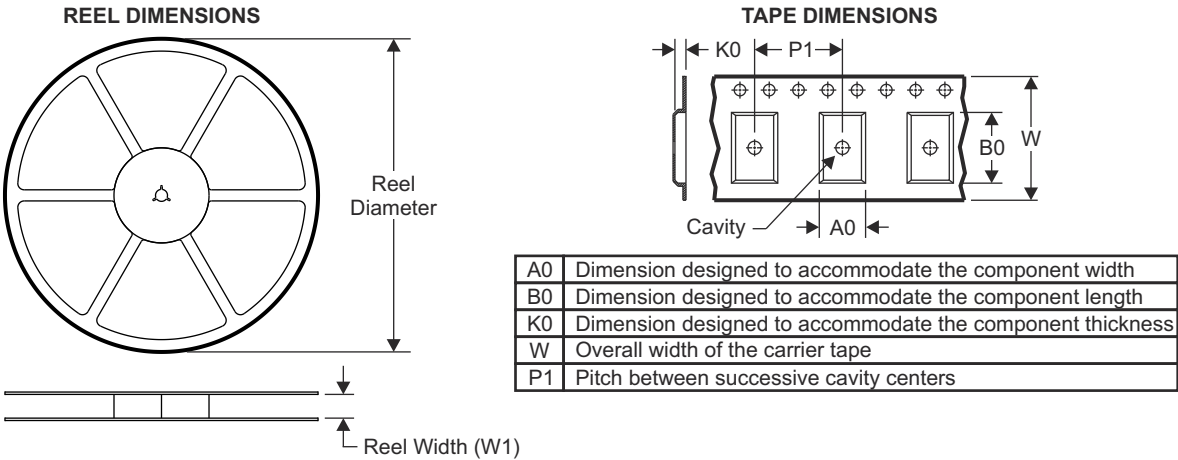
5.6 Glossary

TI Glossary   This glossary lists and explains terms, acronyms, and definitions.
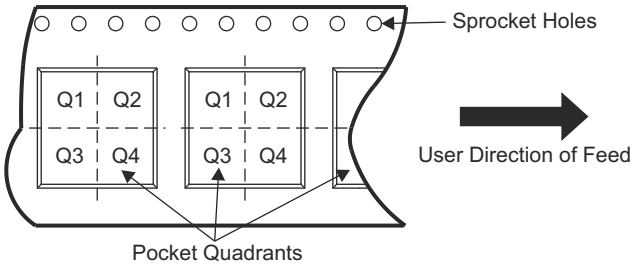
Mechanical, Packaging, and Orderable Information

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

ADVANCE INFORMATION

6.1 Tape and Reel Information

REEL DIMENSIONS

TAPE DIMENSIONS

A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
PTCAN1162DMTRQ1	VSON	DMT	14	3000	330.0	12.4	3.3	4.8	1.2	8.0	12.0	Q1

Product Folder Links: *TCAN1162-Q1*

TAPE AND REEL BOX DIMENSIONS
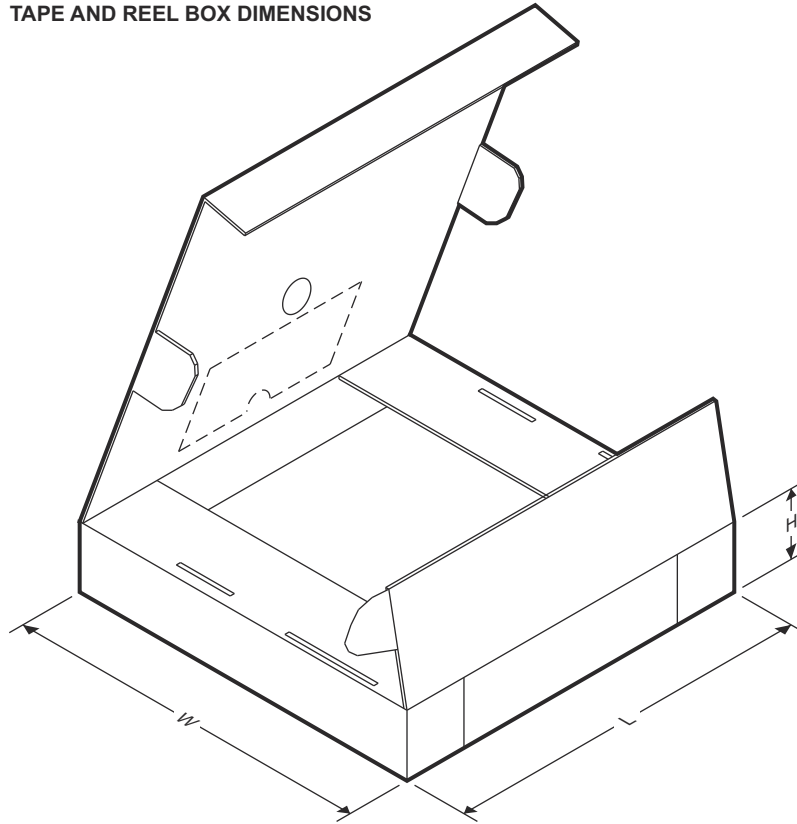
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
PTCAN1162DMTRQ1	VSON	DMT	14	3000	367.0	367.0	35.0

ADVANCE INFORMATION

6.2 Mechanical Data

ADVANCE INFORMATION

DMT0014B

PACKAGE OUTLINE

VSON - 1 mm max height

PLASTIC SMALL OUTLINE - NO LEAD

SECTION A-A
TYPICAL

4225087/B   01/2021

NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

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EXAMPLE BOARD LAYOUT

DMT0014B

VSON - 1 mm max height

PLASTIC SMALL OUTLINE - NO LEAD

ADVANCE INFORMATION
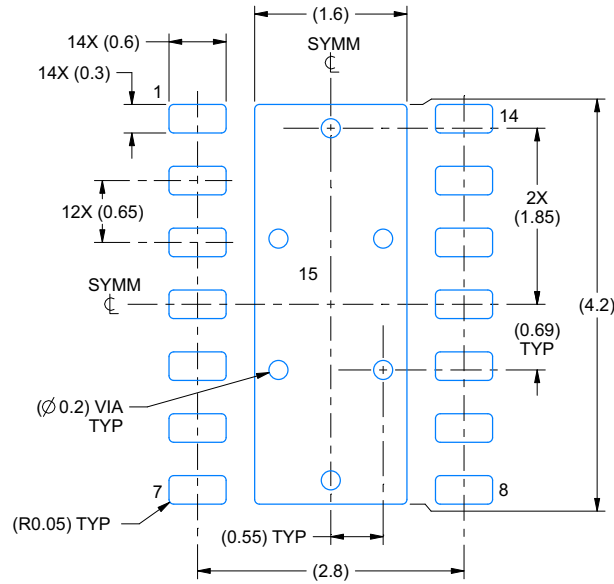
LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X

NON SOLDER MASK
DEFINED
(PREFERRED)

SOLDER MASK
DEFINED

SOLDER MASK DETAILS
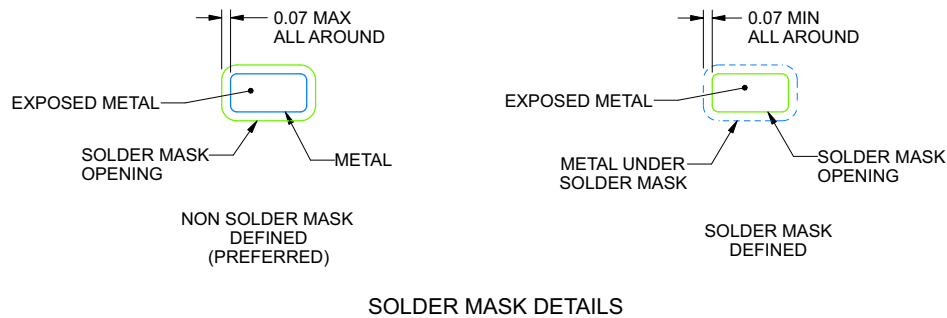
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NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

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Product Folder Links: *TCAN1162-Q1*

EXAMPLE STENCIL DESIGN

DMT0014B

VSON - 1 mm max height

PLASTIC SMALL OUTLINE - NO LEAD

ADVANCE INFORMATION
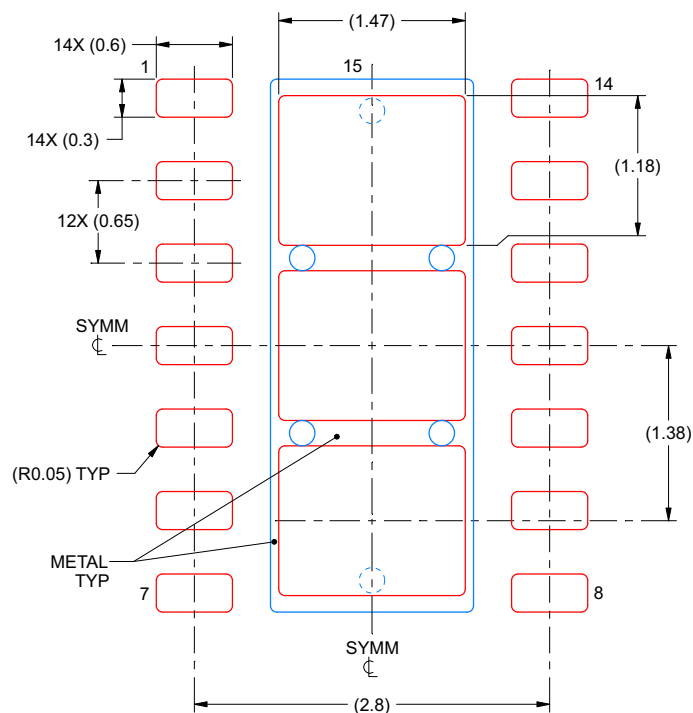
SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD 15
77.4% PRINTED SOLDER COVERAGE BY AREA
SCALE:20X

4225087/B   01/2021

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

PACKAGE OPTION ADDENDUM

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
PTCAN1162DMTRQ1	ACTIVE	VSON	DMT	14	3000	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		Samples

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

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