TCAN1162x-Q1 Automotive CAN FD System Basis Chip with Sleep Mode and LDO Output

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 transciever supply
  - 5-V LDO for external load support up to 100 mA- TCAN11625
  - 3.3-V LDO for external load support up to 70 mA - TCAN11623
- 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
  - Reset mode
- 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 TCAN1162x-Q1 are high speed controller area network (CAN) system basis chips (SBC) that meet the physical layer requirements of the ISO 11898-2:2016 high speed CAN specification. The TCAN1162x-Q1 supports both classical CAN and CAN FD networks up to 8 megabits per second (Mbps).

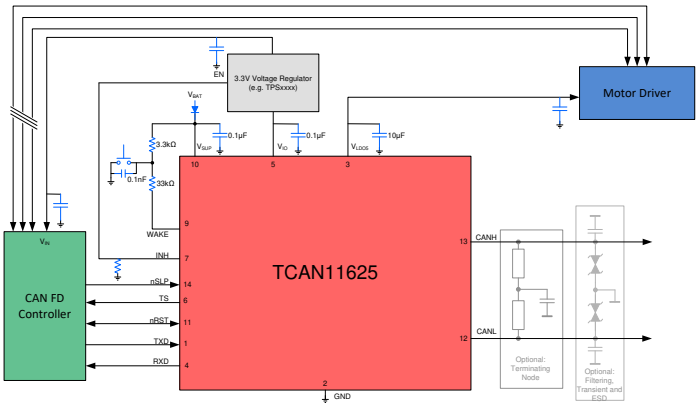
Both the TCAN1162x-Q1 support a wide input supply range and integrates some form of an LDO output. The TCAN11625-Q1 has a 5V LDO output (V_{CCOUT}) which supplies the CAN transceiver voltage internally as well as up to an additional 100 mA externally. The TCAN11623-Q1 has a 3.3 V LDO output (V_{LDO3}) capable of supplying up to 70 mA externally.

The TCAN1162x-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.

Device Information

PART NUMBER	PACKAGE(1)	BODY SIZE (NOM)
TCAN11623-Q1 TCAN11625-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)

This allows an ultra-low-current sleep state in which power is gated to all system components except for the TCAN1162x-Q1, which remains in a low-power state while monitoring the CAN bus. When a wake-up event is detected, the TCAN1162x-Q1 initiates node start-up by driving INH high.

The TCAN1162x-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 TCAN1162x-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 TCAN1162x-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 TCAN1162x-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 TCAN1162x-Q1 initiates node start-up by driving INH high.

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.

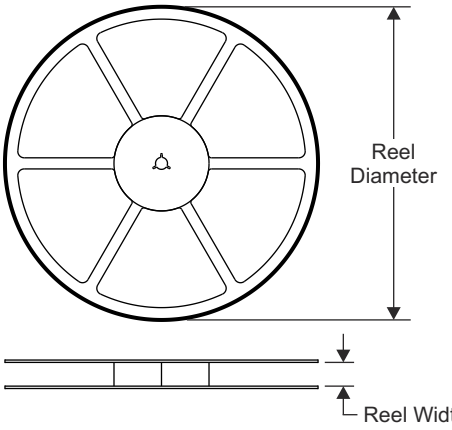
Mechanical, Packaging, and Orderable Information

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.

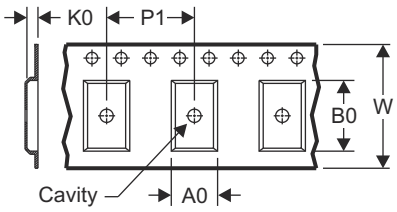
ADVANCE INFORMATION

6.1 Tape and Reel Information

REEL DIMENSIONS

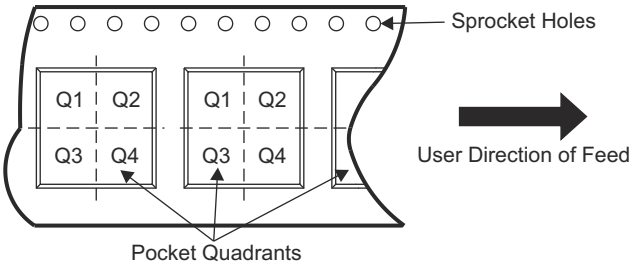


TAPE DIMENSIONS



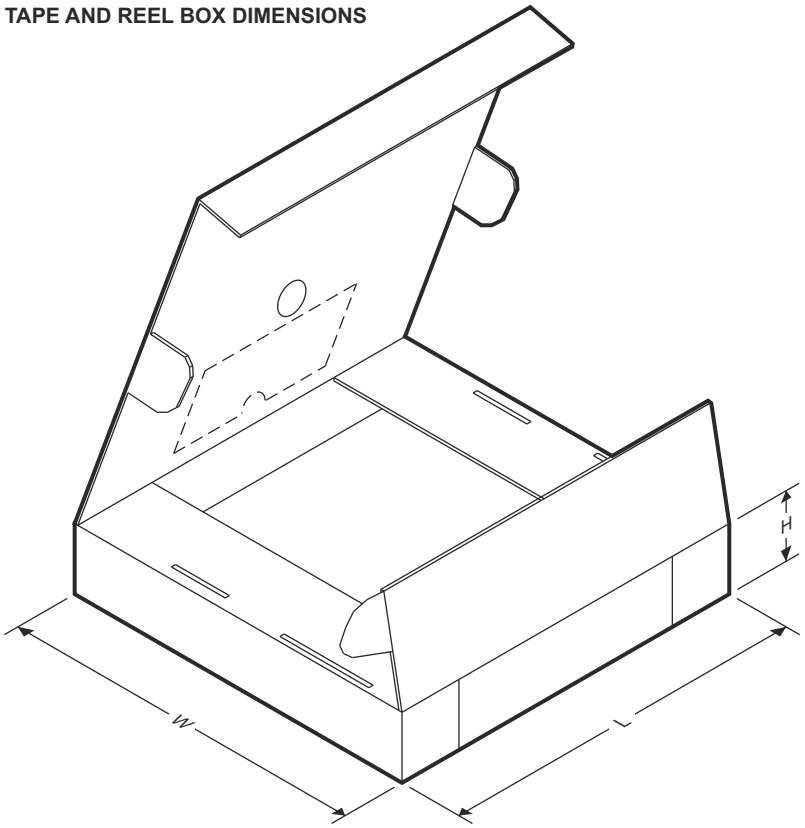
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

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
PTCAN11623DMTRQ1	VSON	DMT	14	3000	330.0	12.4	3.3	4.8	1.2	8.0	12.0	Q1
PTCAN11625DMTRQ1	VSON	DMT	14	3000	330.0	12.4	3.3	4.8	1.2	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
PTCAN11623DMTRQ1	VSON	DMT	14	3000	367.0	367.0	35.0
PTCAN11625DMTRQ1	VSON	DMT	14	3000	367.0	367.0	35.0

ADVANCE INFORMATION

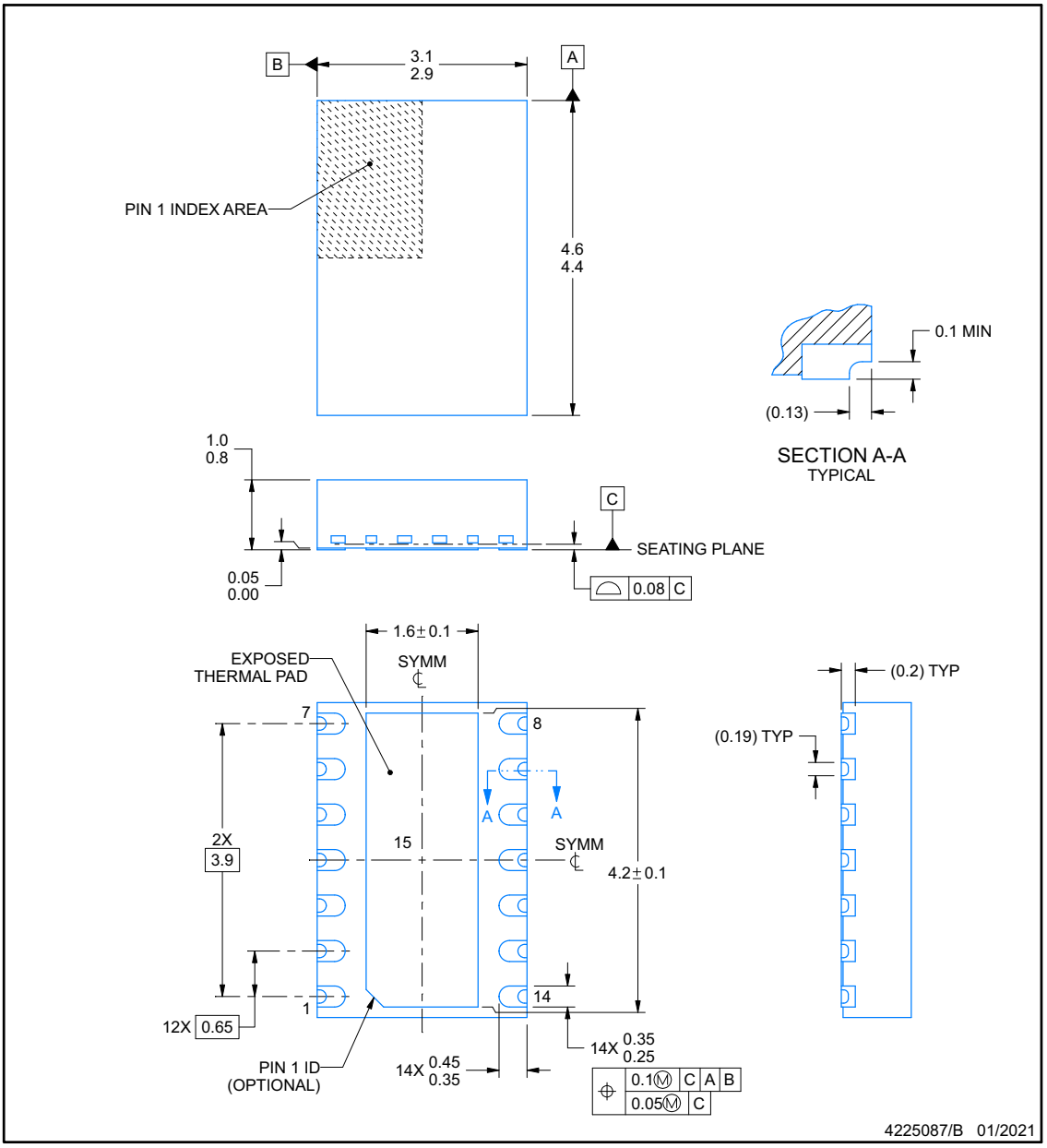
ADVANCE INFORMATION

6.2 Mechanical Data

PACKAGE OUTLINE

DMT0014B — **VSON - 1 mm max height**

PLASTIC SMALL OUTLINE - NO LEAD



NOTES:

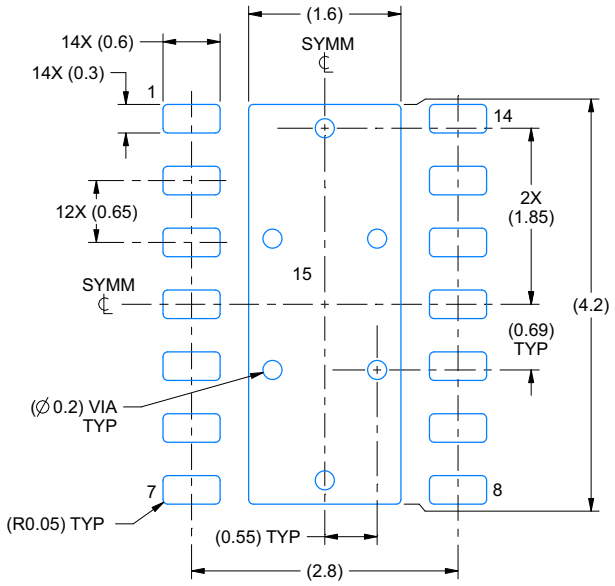
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

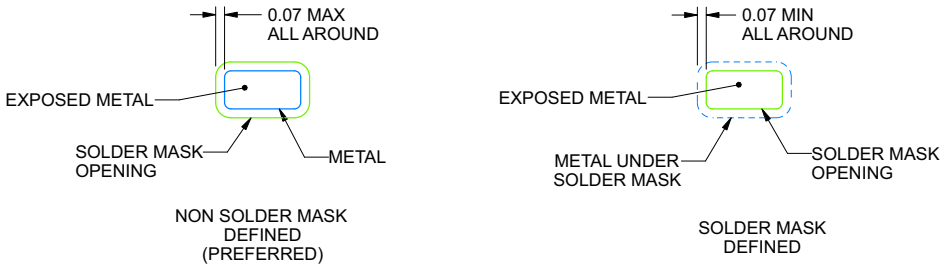
DMT0014B

VSON - 1 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

4225087/B 01/2021

NOTES: (continued)

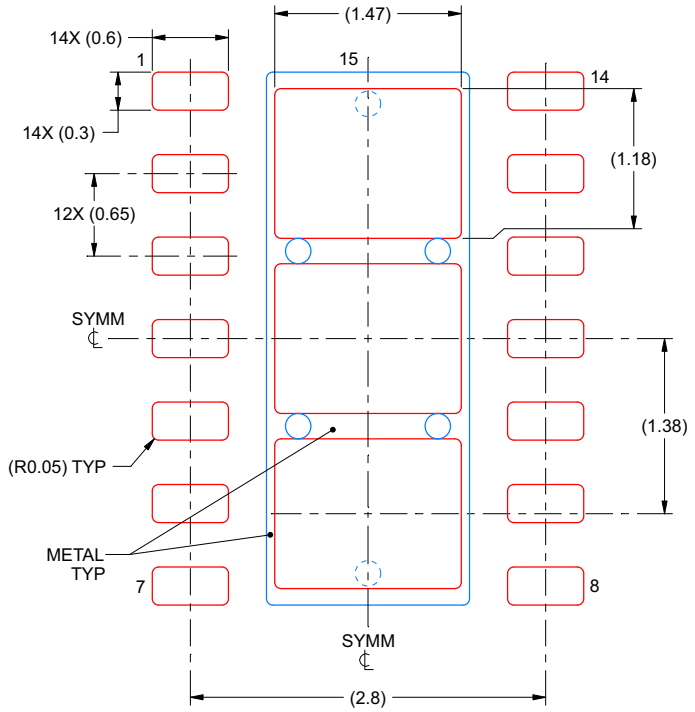
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown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

ADVANCE INFORMATION

EXAMPLE STENCIL DESIGN

DMT0014B — **VSON - 1 mm max height**

PLASTIC SMALL OUTLINE - NO LEAD



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.

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 (https: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