

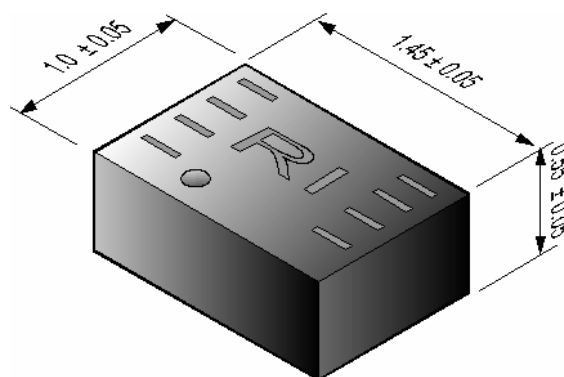
SMT EPC Gen2 IC

FEATURES

- Meets EPCglobal™ Gen2 (v1.0.9) and ISO/IEC 18000-6C
- Global Frequency Operability: 840 MHz to 960 MHz
- Supports Optional Gen2 Commands: Block Write and Block Erase
- 192-bit Memory: 96-bit Electronic Product Code™ (EPC), 32-bit Access Password, 32-bit KILL Password, 32-bit TID Memory
- Designed for High Performance and Low Power Consumption, Based on the Most Advanced Silicon Node for RFID (130 nm)
- Fast Tag Singulation Using Most Advanced Anticollision Scheme
- Green (RoHS and No Sb/Br) Compliant

APPLICATIONS

- PCB Tracking
- Specialized Tag Designs



Dimensions in mm

DESCRIPTION

Printed circuit board (PCB) manufacturers want to track products and component parts through their manufacturing and distribution systems. As space is at a premium, the typical requirement is for a robust method that can survive the manufacturing processes and yet has a footprint which takes up very little of the valuable board space. This UHF Gen2 packaged IC is designed for just that purpose – it can be placed across a typical dipole, near field loop, or a small etched slot to communicate specific information about that PCB when interrogated by fixed or hand held readers on a production line.

ORDERING INFORMATION

DELIVERY ⁽¹⁾⁽²⁾	PART NUMBER	QUANTITY
Texas Instruments UHF IC is packaged in a standard SMT (TLLGA) package and is delivered on 179-mm × 55-mm × 8-mm reels.	RI-UHF-IC116-00	5000

- (1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.
- (2) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

ABSOLUTE MAXIMUM RATINGS

		MIN	MAX	UNIT
I_{IN}	Input current, from any active pin to any active pin		1.5	mADC
V_{IN}	Input voltage to active pins (sustained)		1.5	VDC
T_{stg}	Storage temperature range	-40	125	°C
	Assembly survival temperature	Moisture Sensitivity Level 1 (MSL1) lead-free reflow (IPC/JEDEC J-STD-020C)		260 °C
ESD	Electrostatic discharge immunity	Charged-Device Model (CDM)		0.5 kV
		Human-Body Model (HBM)		2 kV

RECOMMENDED OPERATING CONDITIONS

		MIN	MAX	UNIT
T_A	Operating temperature	Reading	-40	85 °C
		Writing	-25	65 °C
f_{res}	Carrier frequency	840	960	MHz

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Sensitivity (power level at the die terminals with a conjugate value)	Reading	-9	-13		dBm
	Writing	-6	-9		
$\Delta\Gamma$	Change in modulator reflection coefficient		≥ 0.2		
T	Data retention time	$T_A = 25^\circ\text{C}$		10	Years
W&E	Write and erase endurance	$T_A = 25^\circ\text{C}$		100 000	Cycles

RECOMMENDED ANTENNA SERIES IMPEDANCE

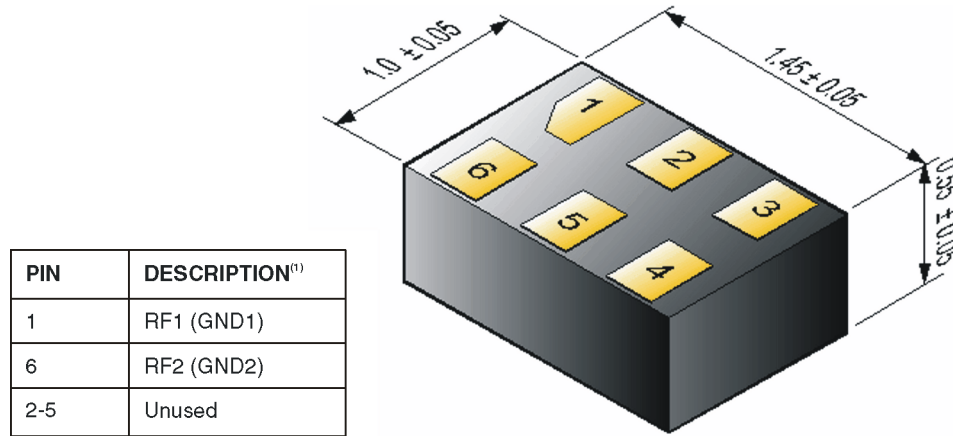
Use this data for the target impedance for antenna designs.

	EUROPE 866.5 MHz	USA 915 MHz	JAPAN 953 MHz	UNIT
Series impedance	$9.8 + j73$	$8.2 + j61$	$7.2 + j53$	Ω

DEVICE INFORMATION

IC Layout

The IC layout is shown in [Figure 1](#) and [Figure 2](#).



- (1) If using a discrete antenna type such as a dipole or loop, use pin names RF1 and RF2. If using a ground plane based antenna, use GND1 and GND2 for net list.

Figure 1. Overall Dimensions and Pin Layout

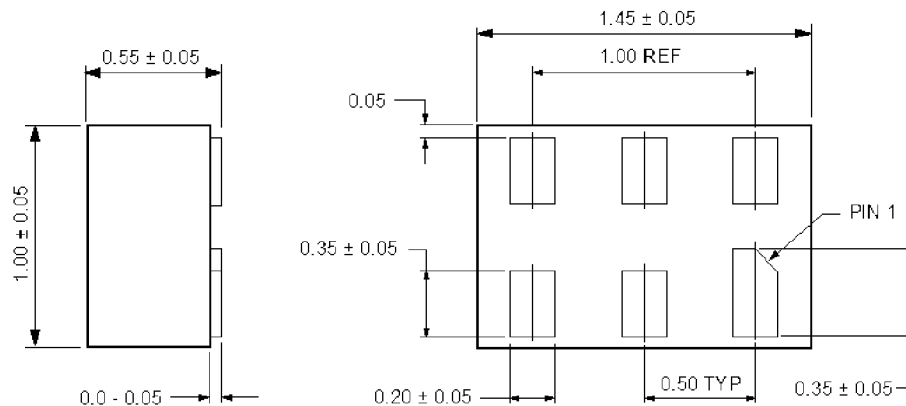


Figure 2. IC Dimensions (TI Package Designator DRY)

The land pattern for board layout is shown in [Figure 3](#).

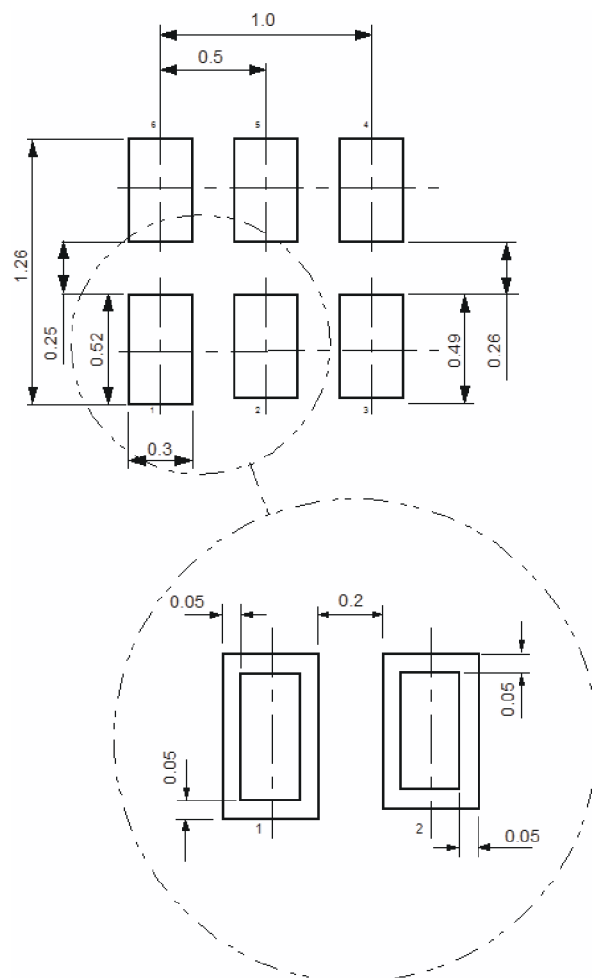


Figure 3. Board Layout With Solder Mask Clearance

Shipping, Packaging, and Further Handling

The packaged ICs are delivered in individual pockets on 179-mm (7-inch) reels. The overall dimensions of the reel are shown [Figure 4](#).

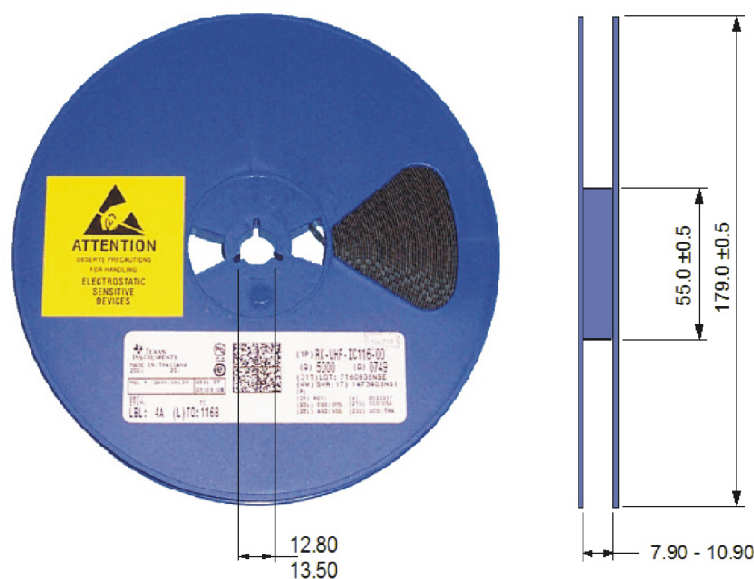


Figure 4. Reel Dimensions

The dimensions of the sprocket holes and IC pockets are shown in [Figure 5](#).

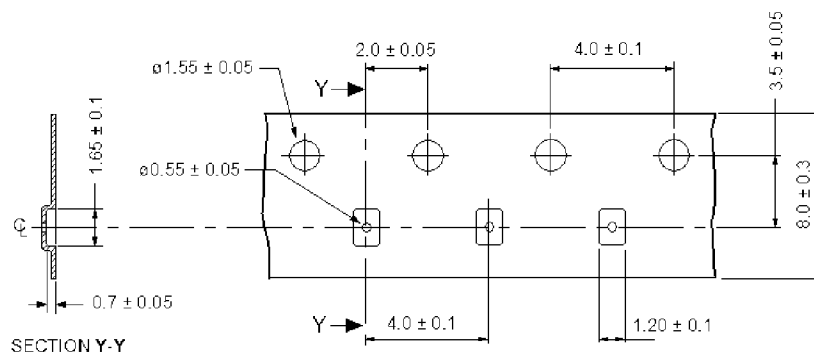


Figure 5. Tape Dimensions

The ICs are held in place by a continuous cover tape and are orientated in the pockets as shown in [Figure 6](#).

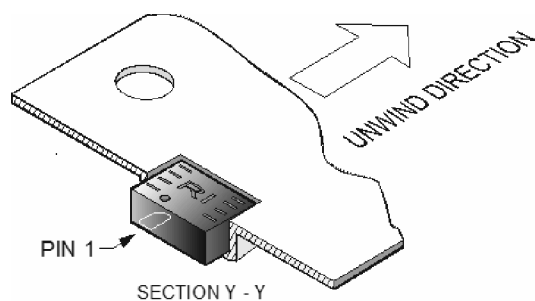


Figure 6. Die Orientation in Pocket

The packaged IC is delivered on reels of 5000. Each reel is packaged as shown in [Figure 7](#).

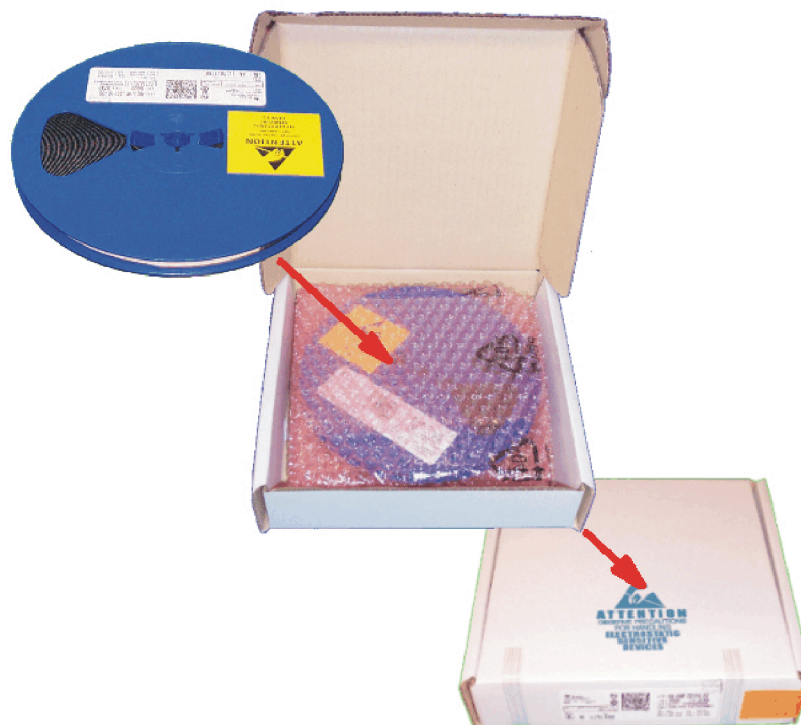


Figure 7. Single Reel Packaging

Terms and Abbreviations

A list of the terms and abbreviations used in the various TI manuals can be found in a separate document:

TI-RFID Product Manuals –Terms & Abbreviations ([SCBU014](#))

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
RI-UHF-IC116-00	ACTIVE	SON	DRY	6	5000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

⁽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⁾ 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)

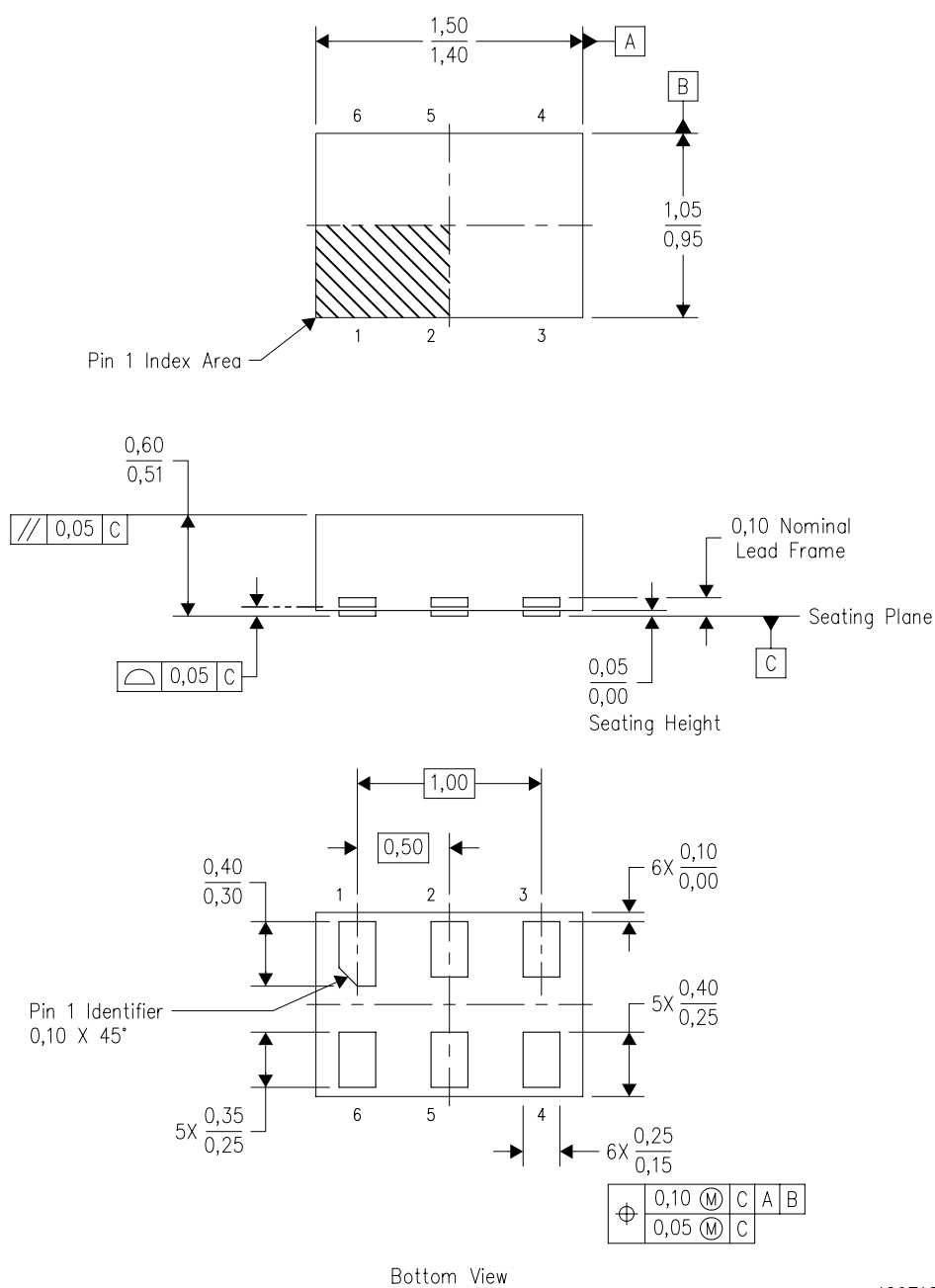
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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DRY (R-PDSO-N6)

PLASTIC SMALL OUTLINE



4207181/C 02/2009

- 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. This package complies to JEDEC MO-287 variation UFAD.

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