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## iceLynx-Micro IEEE 1394a-2000 Consumer Electronics Solution

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### FEATURES

- **1394 Features**
  - Integrated 400 Mbps 3-port PHY
  - Compliant with IEEE 1394-1995 and IEEE 1394a-2000 standards
  - Supports bus manager functions and automatic 1394 self-ID verification.
  - Separate Async Ack FIFO decreases the ack-tracking burden on in-CPU and ex-CPU
- **DTLA Encryption Support for MPEG2-DVB, DSS, DV, and Audio (TSB43CA43A and TSB43CA42 Only)**
  - Two M6 baseline ciphers (one per HSDI port)
    - Content key generation from exchange key
  - AKE acceleration features in hardware
    - Random Number Generator
    - Secure Hash Algorithm, Revision 1 (SHA-1)
  - Other AKE acceleration features
    - Elliptical curve digital signature algorithm (EC-DCA) both signature and verification
    - Elliptical curve Diffie-Hellman (EC-DH), first phase value and shared secret calculation
    - 160-bit math functions
- **High Speed Data Interface (HSDI)**
  - Two configurable high speed data interfaces support the following audio and video modes:
    - MPEG2-DVB interface
    - MPEG2-DSS interface
    - DV codec interface
    - IEC60958 interface
    - Audio DAC interface
    - SACD interface
- **External CPU Interface**
  - 16-bit parallel asynchronous I/O-type
  - 16-bit parallel synchronous I/O-type
  - 16-bit parallel synchronous memory type
- **Internal ARM7**
  - 50-MHz operating frequency
  - 32-bit and thumb (16-bit) mode support
  - UART included for communication
  - 256K bytes of program memory included on chip
  - ARM JTAG included for software debug
- **Data Buffers**
  - Large 16.5K byte total FIFO
  - Programmable data/space available indicators for buffer flow control
- **Hardware Packet Formatting for the Following Standards**
  - DVB MPEG2 transport stream (IEC61883-4)
  - DSS MPEG2 transport stream per standard
  - DV Stream (IEC 61883-2) SD-DV
  - Audio over 1394 (IEC 61883-6)
  - Audio Music Protocol (version 1.0 and enhancements)
  - Asynchronous and asynchronous stream (as defined by IEEE 1394)
- **Additional Features**
  - PID filtering for transmit function (up to 16 separate PIDs per HSDI)
  - Packet insertion – two insertion buffers per HSDI
  - 11 general-purpose inputs/outputs (GPIOs)
  - Interrupt driven to minimize CPU polling.
  - Single 3.3-V supply
  - JTAG interface to support post-assembly scan of device I/O – boundary scan



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## DESCRIPTION

The iceLynx-Micro (consumer electronics link with integrated microcontroller and physical layer (PHY)) is a high performance 1394 link-layer device designed as a total solution for digitally interfacing advanced audio/video consumer electronics applications. The device is offered in both a DTCP encryption/decryption version (TSB43CA43A and TSB43CA42) and a non-DTCP encryption/decryption version (TSB43CB43).

In addition to supporting transmit and receive of MPEG2 and DSS formatted transport streams with encryption and decryption, the iceLynx-Micro supports the IEC 61883-6 and audio music protocol standards for audio format and packetizing and asynchronous and asynchronous stream (as defined by 1394).

The device also features an embedded ARM7TDMI microprocessor core with access to 256K bytes of internal program memory. The ARM7 is embedded to process 1394 specific transactions, thus significantly reducing the processing power required by the host CPU and the development time required by the user. The ARM7 is accessed from the 16/1-bit host CPU interface, from a UART communication port, or from a JTAG debug port.

The iceLynx-Micro integrated 3-port PHY allows the user enhanced flexibility as two additional devices can be utilized in a system application. The PHY's speeds are capable of running at 100 Mbps, 200 Mbps, or 400 Mbps. The PHY follows all requirements as stated in the IEEE 1394-1995 and IEEE 1394a-2000 standards.

The TSB43CA43A and TSB43CA42 version of iceLynx-Micro incorporates two M6 baseline ciphers (one per HSDI port) per the 5C specification to support transmit and receive of MPEG2 formatted transport streams with encryption and decryption. The TSB43CB43 version of iceLynx-Micro is identical to the TSB43CA43A without implementation of the encryption/decryption features. The TSB43CB43 device allows customers that do not require the encryption/decryption features to incorporate iceLynx-Micro without becoming DTLA licensees. Both devices support the IEC 61883-6 and audio music protocol standards for audio format and packetizing.

### NOTE:

This product is for high-volume CE applications only. For a complete datasheet or more information contact [support@ti.com](mailto:support@ti.com).

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
TSB43CA42GGW	OBSOLETE	BGA MICROSTAR	GGW	176		TBD	Call TI	Call TI	
TSB43CA42PGF	ACTIVE	LQFP	PGF	176	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	
TSB43CA42PGFG4	ACTIVE	LQFP	PGF	176	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	
TSB43CA42ZGW	ACTIVE	BGA MICROSTAR	ZGW	176	126	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-260C-168 HR	
TSB43CA43AZGW	OBSOLETE	BGA MICROSTAR	ZGW	176		TBD	Call TI	Call TI	
TSB43CB43APGF	ACTIVE	LQFP	PGF	176	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	
TSB43CB43APGFG4	ACTIVE	LQFP	PGF	176	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	

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**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.

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**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.

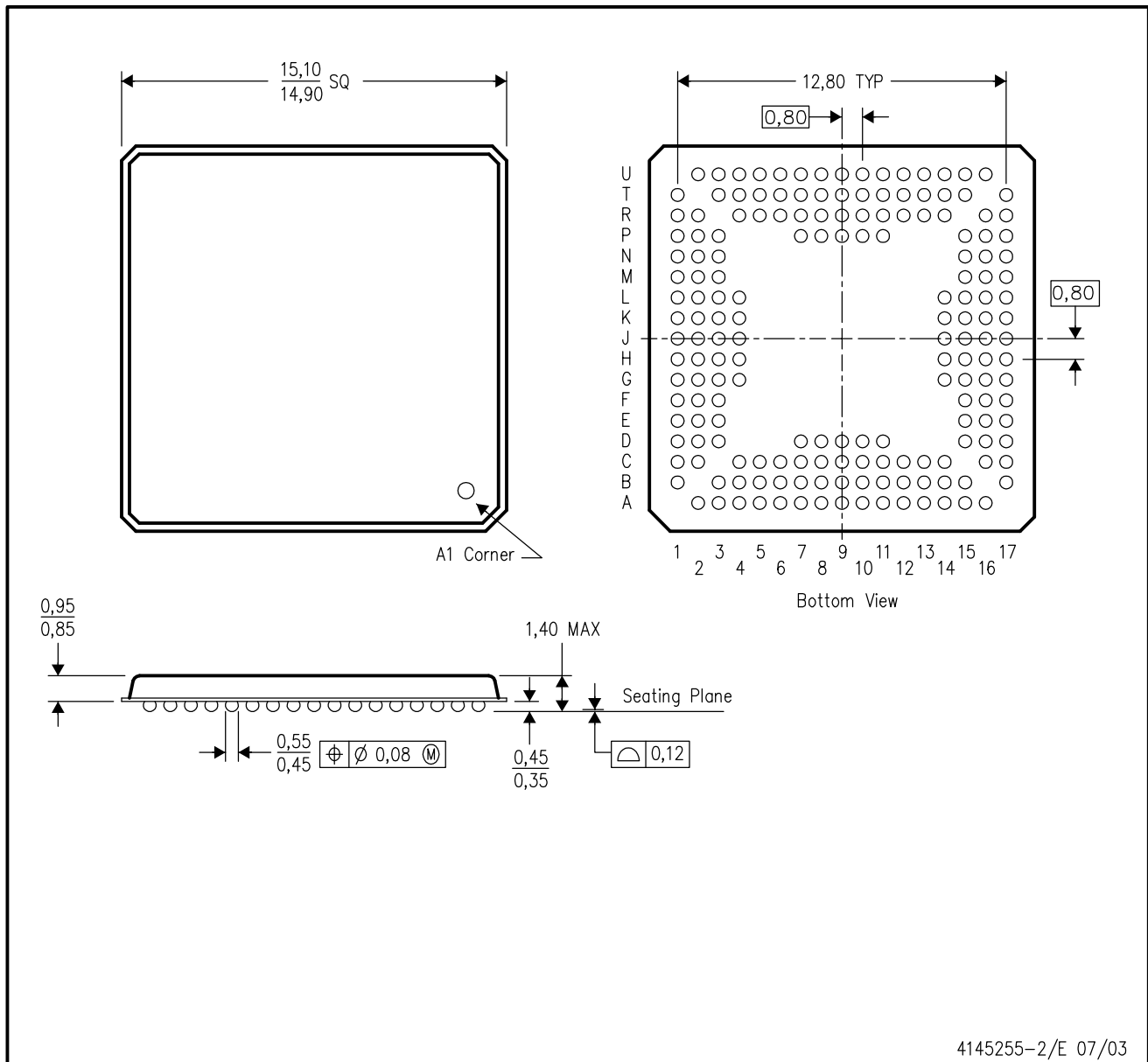
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GGW (S-PBGA-N176)

PLASTIC BALL GRID ARRAY



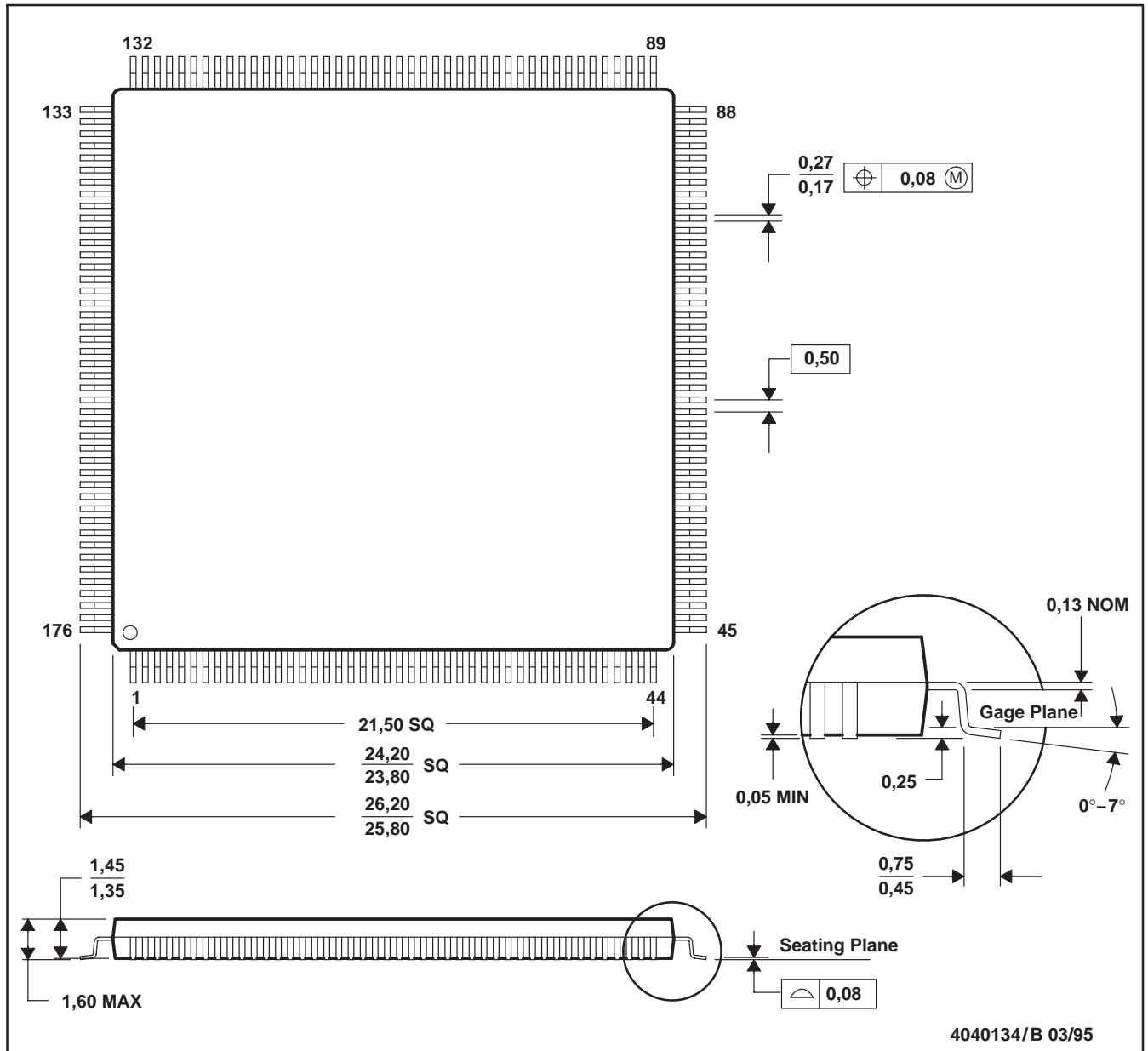
- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. MicroStar BGA™ configuration

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PGF (S-PQFP-G176)

PLASTIC QUAD FLATPACK



- NOTES: A. All linear dimensions are in millimeters.  
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 C. Falls within JEDEC MO-136

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