

PRODUCT SUMMARY

SKY69110/SKY69112: NetSync™ Clocks with Time-of-Day (ToD) Support

Applications

- Ethernet and optical core switches and routers
- Metro, access, and edge routers
- Single-board pizza box and multi-blade systems
- IEEE 1588 slave clocks (T-TSC, T-TSC-A, T-TSC-P)
- IEEE 1588 boundary clocks (T-TBC, T-TBC-A, T-TBC-P)
- IEEE 1588 grandmaster clocks (T-GM)
- O-RAN front-haul gateways and switches
- Wireless BBU and DU applications

Features

- Optimized for timing card and pizza box designs
- Companion to SKY69120/SKY69122 line card jitter attenuators
- Integrated time-of-day counters with multiwire ToDclk + FSync + ToD, or single-wire eToD or ePPS/eSYNC interface
- Compatible with multiple switch vendor products
- Programmable input-to-output delay
- Input-to-input and input-to-output delay measurements
- Integrated crystal reference (SKY69110 only)
- Integrated reprogrammable memory for power-up configuration, with factory pre-programming option (SKY69110 only)
- Temperature range –40 to +85 °C ambient
- Package options:
 - Thermally enhanced 10 x 10 mm 144-BGA and 11 x 11 mm 80-LGA (SKY69110)
 - Wettable-flank, 9 x 9 mm 64-QFN (SKY69112)
- Supports external TCXO/OCXO for low bandwidth operation and holdover
- ITU-T G.8262 and G.8262.1 Synchronous Internet (SyncE) compliant
- Supported by AccuTime™ synchronization software
- For RoHS and other product compliance information, see the [Skyworks Certificate of Conformance](#)

Description

As networks evolve towards needing time alignment and distribution instead of the traditional frequency-only synchronization requirements, new challenges face designers, especially for multi-card systems. The SKY69110/SKY69112 NetSync™ and companion SKY69120/122 NetSync jitter attenuation clocks are designed to support these network time and frequency synchronization demands.

The SKY69110/SKY69112 are targeted at timing card applications for multi-blade systems or control cards for wireless BBUs and DUs. These devices use 6th generation DSPLL® and MultiSynth™ technologies and an innovative, multi-reference nested architecture to combine the functions of a network synchronizer and a jitter attenuator in a single device.

The built-in crystal oscillator (SKY69110) or external XO (SKY69112) provides a low-jitter reference to the high-performance PLL R. An external OCXO or TCXO is used to support the low bandwidths needed for network synchronization functions, including SyncE and IEEE 1588 PTP, as well as providing extended holdover in the event of network sync failure.

A low-jitter mode is available for applications requiring jitter as low as 50 fs (12 kHz to 20 MHz) to allow direct connection to SERDES with speeds up to 224 Gbps+ without additional jitter attenuators or buffers.

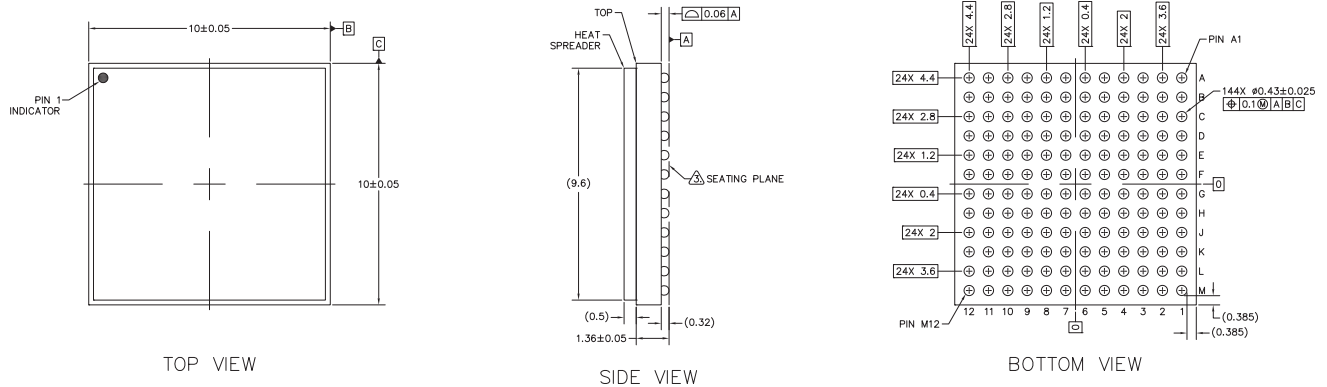
The integrated time-of-day (ToD) counters and timestampers support flexible PWM-based formats for ToD and clock transmission over reduced pin-count connections (eToD), making the SKY69110/SKY69112 ideal for IEEE 1588 PTP applications.

Skyworks AccuTime software provides a complete synchronization software solution, including IEEE 1588 (PTP), for single and multi-processor pizza box architectures and complex blade-based systems.

Features

- Part of the NetSync network synchronizer clock family
- Utilizes 6th generation DSPLL and MultiSynth technologies
- Nested PLL architecture eliminates need for separate jitter attenuator in many applications
- Integrated crystal reduces external component count (SKY69110 only)
- Integrated flash memory supports in-field reprogramming of boot-up configuration (SKY69110 only)
- Orderable with factory-programmed custom configuration
- Reference PLL (PLL R)
 - Provides reference to DSPLLs from the integrated VCO and crystal oscillator
 - Locks to external TCXO/OCXO to provide high-stability clock for low-bandwidth operation and holdover
 - Modulated by DSPLL A in low-jitter mode to support output jitter of 50 fs from Q-dividers
 - Programmable loop bandwidth from 20 Hz to 400 Hz
- Digital PLLs (DSPLL A, B, C, and D)
 - Four independent DSPLLs (DSPLLD only available on SKY69110)
 - Programmable loop bandwidth from 0.1 mHz to 4 kHz
 - Hitless input clock switching, automatic or manual input clock selection, and holdover mode
 - Compliant with ITU-T and other standards
 - Can lock to 1PPS and ePPS inputs, supports ref/sync pairs
 - Can generate 1PPS, ePPS, and PP2S outputs
 - Can be used as a MultiSynth fractional divider when not being used in DSPLL mode
 - Zero-delay mode utilizes external feedback to eliminate delay through DSPLL
- Additional MultiSynth NE (SKY69110 only)
 - One independent MultiSynth NE
 - Provides low-noise fractional division from PLL R or DSPLL D
 - Software/hardware controllable DCO with ppt-scale resolution
- SKY69110: 10 differential inputs and 14 differential outputs
 - Can be used as up to 15 single-ended inputs and 28 single-ended outputs total
- SKY69112: Nine differential inputs and nine differential outputs
 - Can be used as up to 13 single-ended inputs and 18 single-ended outputs total
- Flexible any-input, any-output frequency and format
 - Universal standard inputs
 - LVDS, S-LVDS, ac-coupled LVPECL, LVCMOS, slew-rate limited LVCMOS, HCSL, CML, custom differential
 - Output-to-output static delay adjustment (resolution, range): 20 ps, ± 10 ns
 - Output-output skew: ± 50 ps
- Status monitoring (LOS, OOF, PHMON, FLOL, and PLOL)
- Time-of-day (ToD) handling
 - Three 96-bit ToD counters (SKY69110), two 96-bit ToD counters (SKY69112)
 - Flexible PWM ToD encoders and decoders
 - Input-to-input and input-to-output delay measurement and delay adjust
- On-chip temperature sensor and die temperature readout
- Serial interface: I²C or SPI (3 or 4-wire)
- Integrated MCU supports cross-product NetSync application programming interface (API) for device control
- ClockBuilder® Pro software tool simplifies device configuration
- Optional AccuTime host-based synchronization software
 - Field tested and proven PTP stack and time-recovery servo
 - Demonstration platform support with compliance reports

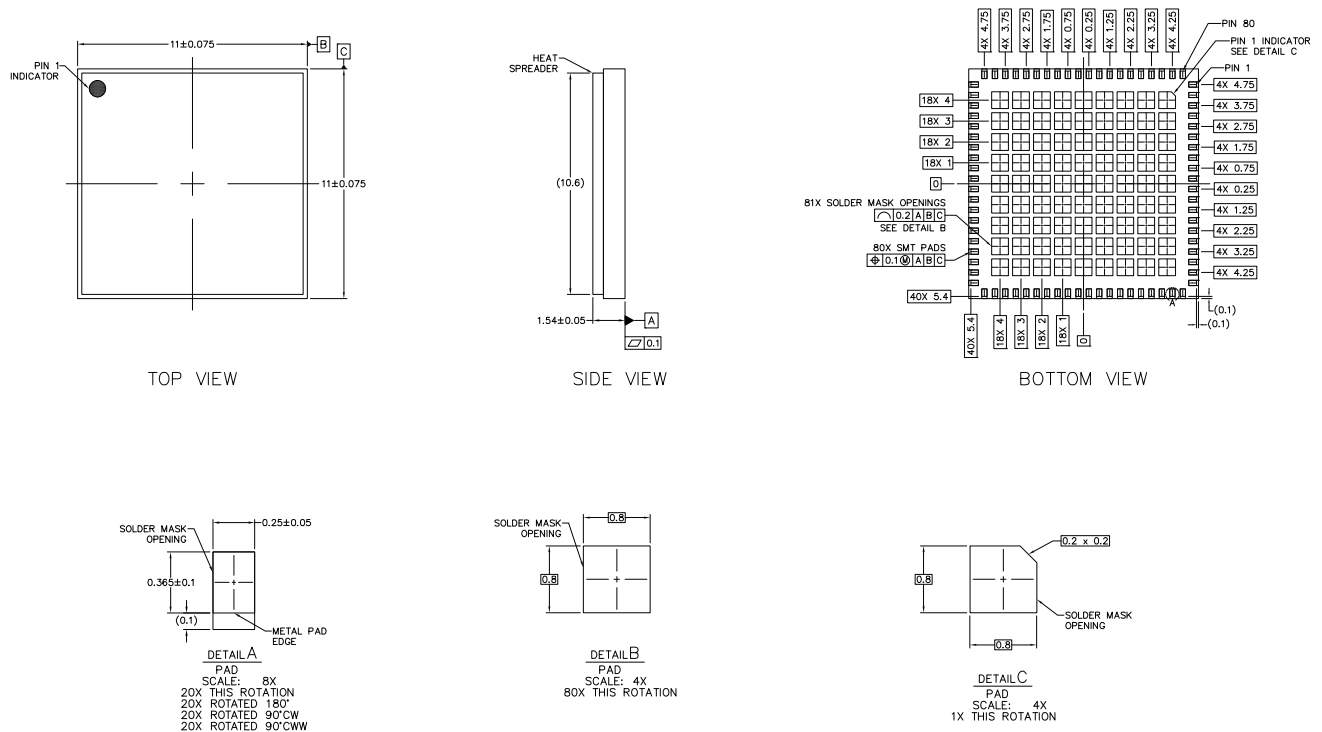
Package Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED.

1. DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.
2. DIMENSIONS ARE IN MILLIMETERS
3. PRIMARY DATUM A AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

Figure 1. SKY69110 144-BGA with Heat Spreader Package Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED.

1. DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.
2. DIMENSIONS ARE IN MILLIMETERS
3. PAD DEFINITIONS PER DETAILS ON DRAWING.

Figure 2. SKY69110 80-LGA with Heat Spreader Package Dimensions

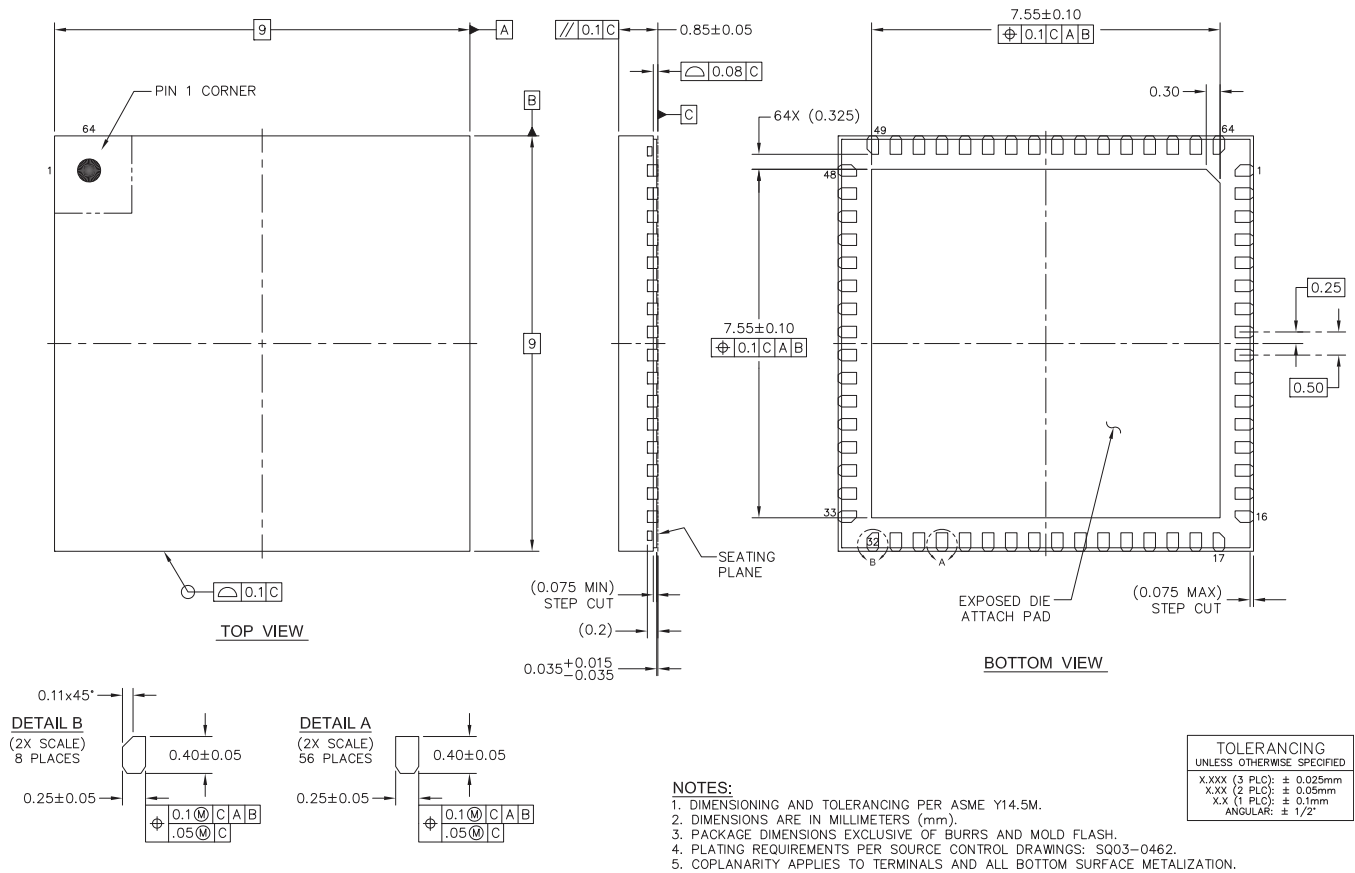
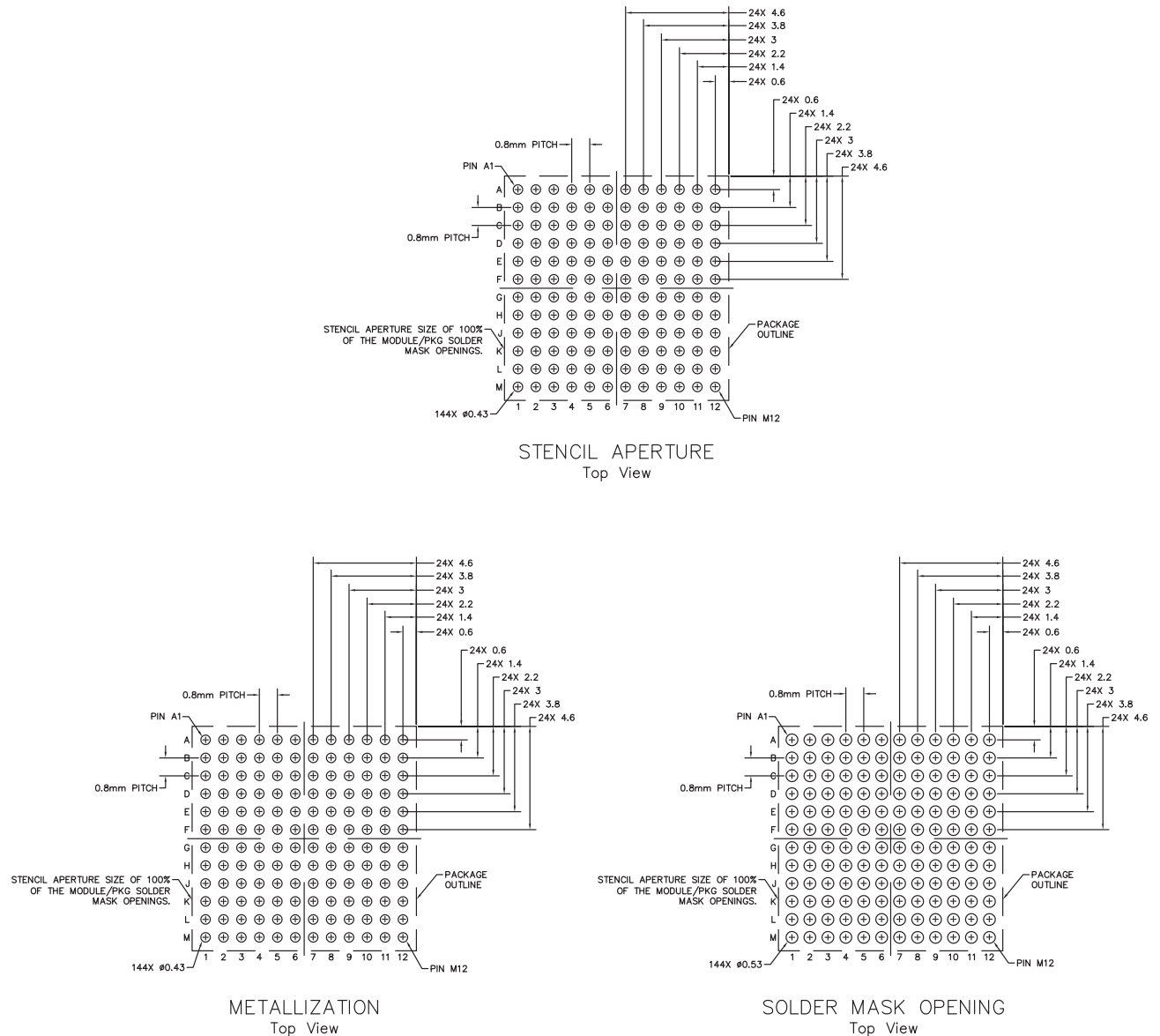


Figure 3. SKY69112 64-QFN Wettable Flank Package Dimensions

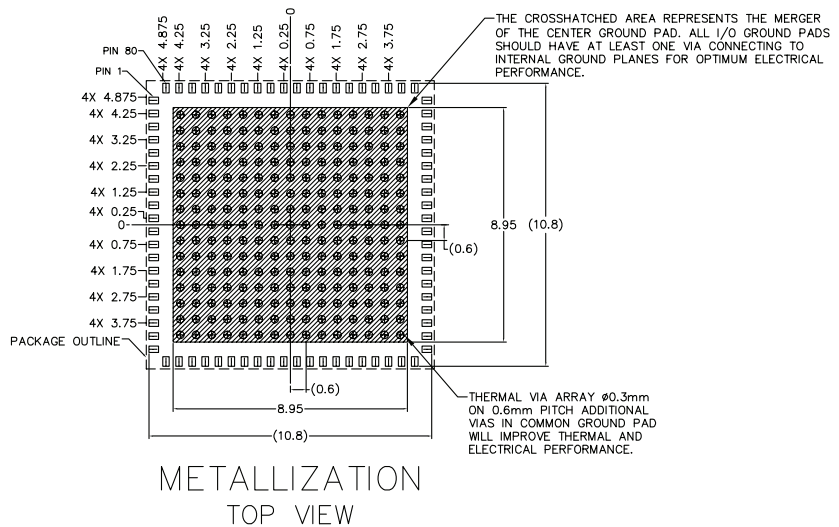
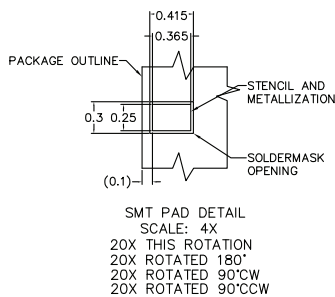
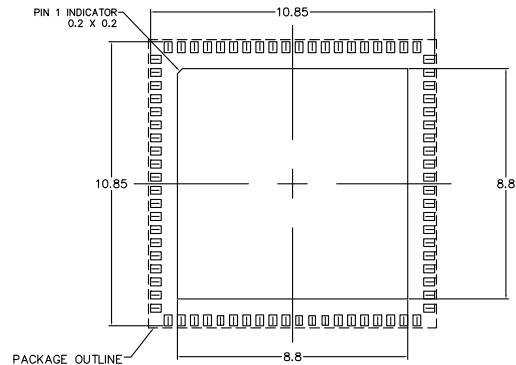
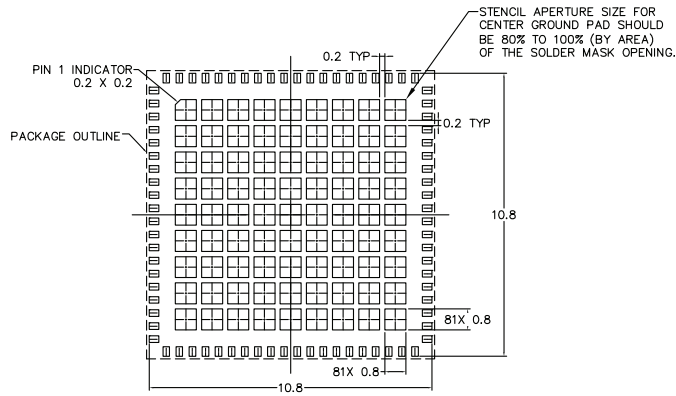
PCB Layout Footprint



Notes:

1. Dimensions are in millimeters, unless otherwise specified.
2. Thermal vias should be resin-filled and capped in accordance with IPC-4761 Type VII vias. 30 to 35 μm Cu thickness is recommended.

Figure 4. Recommended PCB Land Pattern, SKY69110 144-BGA



NOTES:

1. DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED.
2. THERMAL VIAS SHOULD BE RESIN FILLED AND CAPPED IN ACCORDANCE WITH IPC-4761 TYPE VII VIAS. 30-35UM Cu THICKNESS IS RECOMMENDED.

Figure 5. Recommended PCB Land Pattern, SKY69110 80-LGA

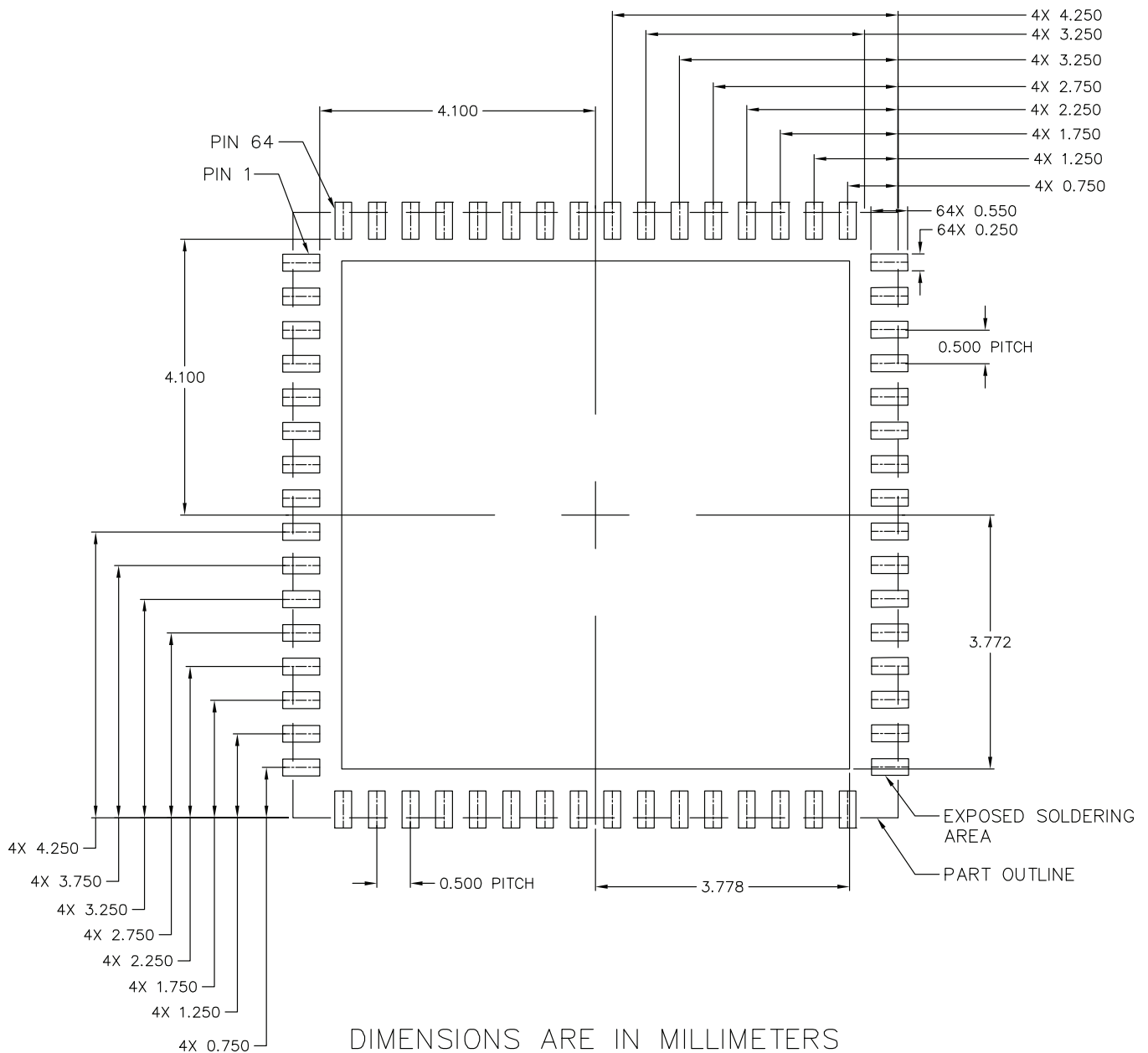


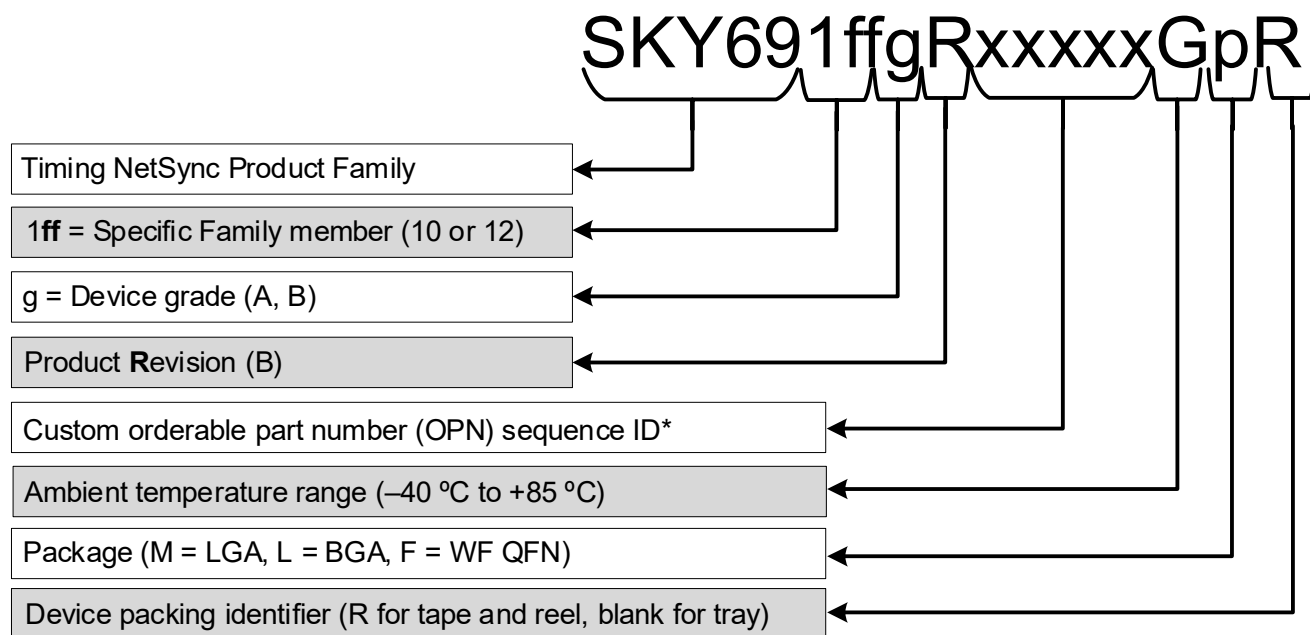
Figure 6. Recommended PCB Land Pattern, SKY69112 64-QFN Wettable Flank Package

Ordering Information

Table 1. SKY69110/SKY69112 Ordering Information

Orderable Part Number ^{1,2}	AccuTime™ IEEE 1588 Software Support ³	Package	Delivery Packing	Temperature Range
SKY69110ABxxxxxGL	No	144-ball BGA, 10 x 10 mm with heat spreader	Tray ⁴	–40 to 85 °C ambient ⁴ –40 to 95 °C board
SKY69110ABxxxxxGLR	No		Tape and reel ⁵	
SKY69110BBxxxxxGL	Yes		Tray ⁴	
SKY69110BBxxxxxGLR	Yes		Tape and reel ⁵	
SKY69110xBxxxxxGMx <i>Contact Skyworks for ordering information</i>	–	80-pad LGA, 11 x 11 mm with heat spreader	–	–40 to 95 °C board
SKY69112xBxxxxxGFx <i>Contact Skyworks for ordering information</i>	–	64-lead, 9 x 9 mm wettable flank QFN	–	
SKY69110BB-BGA-EVB	Yes	–	–	Not specified

1. “xxxxx” should be replaced with the unique customer and/or application-specific sequence number created by ClockBuilder Pro or assigned by Skyworks.
2. For a given unique sequence number for SKY69110, the internal flash may be blank or factory programmed as defined within ClockBuilder Pro.
3. Use of AccuTime requires acceptance of a separate license agreement and may be subject to restrictions regarding supported platforms and applications.
4. Tray quantity = 50. Contact Skyworks for details about the tray format.
5. Reel quantity = 1000. Contact Skyworks for details about the reel format.



*5 digits; assigned by ClockBuilder Pro for Custom OPN devices.

Revision History

Revision	Date	Description
A	July, 2026	Initial release

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