

# Case Design Guidelines for Apple Devices

Release R11

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# 1. Introduction

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**Note:** These Case Design Guidelines for Apple Devices ('Guidelines') are subject to the terms and conditions set forth on the final page of this document. By downloading, accessing, or otherwise utilizing these Guidelines, you agree to be bound by, and only utilize the Guidelines in accordance with, such terms and conditions.

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## 1.1 Purpose of This Specification

This document presents design guidelines for case accessories that are compatible with Apple devices.

## 1.2 Requirements and Recommendations

The use of the words *must*, *must not*, *required*, *shall*, *shall not*, *should*, *should not*, *recommended*, *not recommended*, *may*, *optional*, and *deprecated* in a statement have the following meanings:

- *must*, *shall*, or *required* means the statement is an absolute requirement.
- *must not*, *shall not* or *prohibited* means the statement is an absolute prohibition.
- *should* or *recommended* means the full implications must be understood before choosing a different course.
- *should not* or *not recommended* means the full implications must be understood before choosing this course.
- *may* or *optional* means the statement is truly optional, and its presence or absence cannot be assumed.
- *deprecated* means the statement is provided for historical purposes only and is equivalent to 'must not'.

## 2. Cases

### 2.1 Product Design

A well-designed case will securely house an Apple device while not interfering with the device's operation. Significant factors in mechanical design include access to the device's sensors, controls, and connectors. The case developer should take into account the minimum and maximum dimensional tolerances of the Apple device(s) it claims compatibility with.

#### 2.1.1 Device Layouts and Dimensions for Apple Devices

Cases must be designed to accommodate the full range of Apple device sizes within each product's dimensional variation. Dimensional drawings with tolerances for all Apple devices can be found in [Device Dimensional Drawings](#) (page 20).

#### 2.1.2 Access to Controls

The case must readily permit the user to access and operate the device's mechanical controls such as, but not limited to:

- Volume
- Ring/silent controls
- Sleep/wake control
- Home button

#### 2.1.3 Access to the Headset Jack and 30-pin or Lightning Connector

The case must provide ready access to an Apple device's headset jack. The headset jack opening must be at least 6.0 mm in diameter and at most 14.0 mm deep. At least 6.5 mm in diameter and at most 10.0 mm deep is recommended for best compatibility with a range of headsets.

The case must also provide unobstructed access to either the 30-pin connector or the Lightning connector.

If the case is for an Apple device with the Lightning connector, the opening must be at least 12.05 mm by 6.30 mm with full radii rounded edges. 13.65 mm by 6.85 mm is recommended for best compatibility with a range of cables and docks.

In addition, the headset jack and 30-pin or Lightning connector openings must be designed with enough margin to compensate for shifting or dimensional changes of the case material.

## 2.1.4 Access to the Smart Connector

Cases that do not make use of the Smart Connector must not expose it.

## 2.1.5 Device Protection

Cases must protect the Apple device from a 1 m drop onto a hard paved surface in any device orientation.

Specifically, exposed glass on the Apple device must not come within 1 mm of a flat surface, such as a table or floor, in any orientation when the case is attached. This may be achieved by either covering the exposed glass or creating features around it that will space the exposed glass at least 1 mm away from the flat surface.

## 2.1.6 Cover Glass Contact

Cases that claim compatibility with devices below should not contact the cover glass as defined in their dimensional drawings.

- iPhone 6s Plus
- iPhone 6s
- iPhone 6 Plus
- iPhone 6

See [Device Dimensional Drawings](#) (page 20).

## 2.1.7 Dock Compatibility

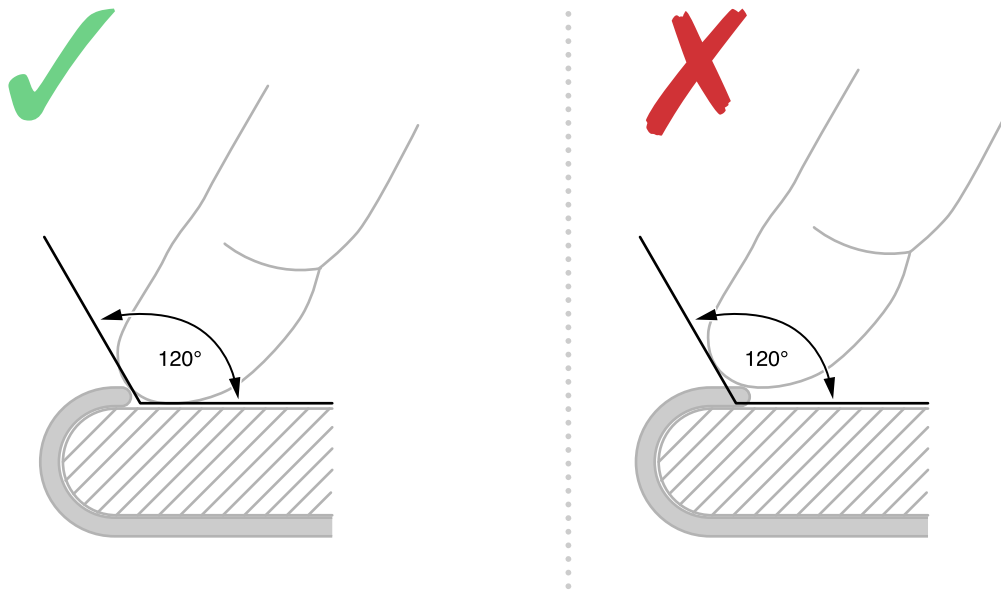
For compatibility with docks, the distance from bottom of the Apple device to the outside of a case should not exceed 1.8 mm.

## 2.1.8 Touchscreen

The case should permit water droplets to freely roll off the screen when the Apple device is held at a 30° angle relative to the horizon.

Cases must allow a 120° opening along the edges of the active area of the touchscreen to ensure compatibility with the Apple device touchscreen features. See [Figure 2-1](#) (page 11) for more information on the keep-out and [Device Dimensional Drawings](#) (page 20) device specific active display areas.

Figure 2-1 Touchscreen keep-out area



## 2.2 Acoustics

The case must not impair or degrade the acoustical performance of an Apple device.

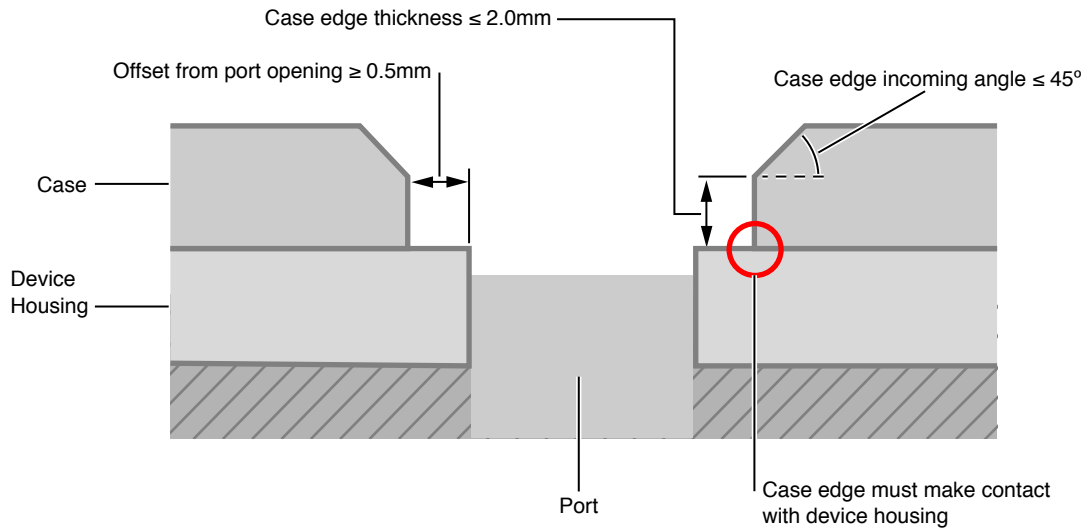
### 2.2.1 Acoustic Ports

Apple device acoustic ports include speakers and microphones. Port locations may vary from model to model; see [Device Dimensional Drawings](#) (page 20).

The case must not obstruct the speaker or microphone ports. All port opening designs must have a:

- Minimum of 0.5 mm offset from any port edge.
- Maximum of 2.0 mm thickness for the inner diameter of the opening.
- Maximum of 45° incoming angle to inner diameter of the opening for case thickness.

Figure 2-2 Requirement for case opening for device port

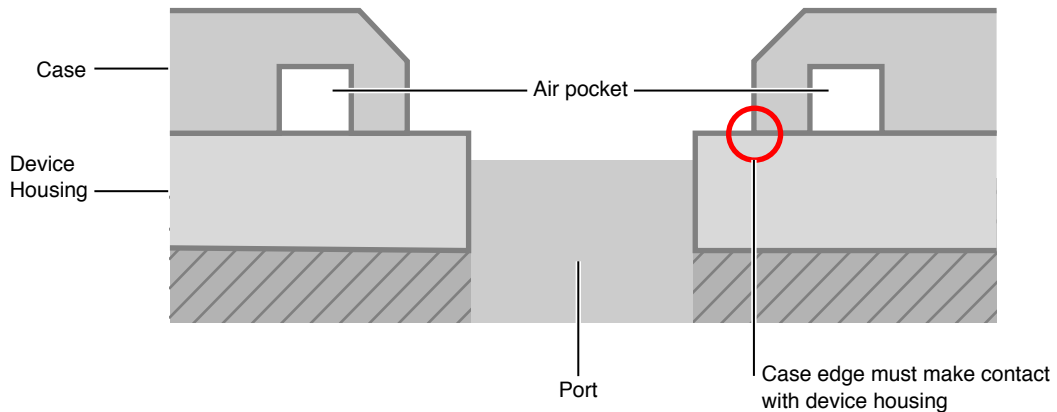


## 2.2.2 Speaker to Microphone Coupling

The case must not facilitate the conduction of sound from the speaker to any microphone. Such sound conduction may cause echoing in phone calls.

Certain solid materials may increase mechanical coupling between the speakers and microphones. To mitigate coupling, a gasket may be used to introduce an air pocket around the port opening as illustrated in [Figure 2-3](#) (page 12).

Figure 2-3 Gasket design recommendation





### 2.2.3 Call Quality

The case must not impair or degrade the user's experience making and receiving both audio calls over a cellular network or audio/video calls using FaceTime in both handset and speakerphone modes. The case should not change the frequency response of the speakers or microphones. In addition, the user should not hear any distortion or echo resulting from the case.

If the case includes a cover or other flap that can be folded over the microphone, the case must provide access to the microphone in at least one accessory configuration where the microphone is not obstructed. It is recommended that the microphone never be obstructed.

## 2.3 Sensors

Cases must be designed so they do not interfere with the operation of the sensors on an Apple device, such as:

- Ambient light sensor
- Magnetic compass
- Proximity sensor
- Accelerometer
- Three-axis gyroscope

### 2.3.1 Ambient Light and Proximity Sensor Interference

The ambient light sensor and proximity sensor locations for various Apple devices are shown in the dimensional drawings cited in [Device Dimensional Drawings](#) (page 20). Some of the dimensional drawings specify a recommended keep-out area around these sensors. No material must be allowed to cover these sensors or their keep-out areas, this includes films and privacy screens. Cases that allow the Apple device to slide around must not obstruct any sensors.

### 2.3.2 Magnetic Interference

Apple recommends avoiding the use of magnets and metal components in cases.

Cases for Apple devices must not affect the device's built-in magnetic compass (if present).

Additionally, iPhone 6s Plus and iPhone 6 Plus have an autofocus rear camera equipped with optical image stabilization that may be affected by magnets and metal components in cases and rear camera accessories. Cases and rear camera accessories that claim compatibility with iPhone 6s Plus and iPhone 6 Plus must not affect operation of the autofocus rear camera.

### 2.3.3 Touch ID Sensor

Cases for Apple devices that are equipped with Touch ID must not inhibit the use of the device's Touch ID sensor. See [Device Dimensional Drawings](#) (page 20) for specific device keep-outs.

## 2.4 Camera

The field of view (FOV) of the camera and the illumination provided by the flash is designed for each Apple product. It is imperative that manufacturers consult technical specifications released for each product and do not assume these parameters are shared between products.

Images from the camera may be affected by the geometry, color and surface finish of the camera opening in the case.

### 2.4.1 Geometry

The camera lens FOV must not be blocked. Making the case opening around the camera too small may block the FOV of the lens. This may cause vignetting in the image, where the corners of are darker than the center. Blocking marginal rays just outside the FOV of the lens may also reduce the sharpness of the image. See [Device Layouts and Dimensions for Apple Devices](#) (page 9) for the detailed mechanical keep-out.

The case opening must not be designed in a way that directs stray light into the camera. If the opening is too narrow or too steep, it may reflect light into the camera, washing out the image or adding an unwanted color cast. Adding a chamfer to the case opening trim may help to direct stray light away from the camera. Additionally, where the product is equipped with a flash, a narrow or steep opening may reflect light from the case opening back into the camera or scene. This may cause the image to appear washed out or contain unwanted artifacts. Designers should ensure that the mechanical keep-outs outlined in the device dimensional drawings ([Device Dimensional Drawings](#) (page 20)) are maintained with worst-case X-Y placement tolerances.

### 2.4.2 Color

Any light reflected from the case may pick up the color of the case. Black material or black coating may help avoid color bleeding into the camera from an external light source or the flash. The darker the color, the less light may be reflected from the source into the camera.

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**Note:** Apple recommends a semi-gloss black material or coating around the camera and flash opening.

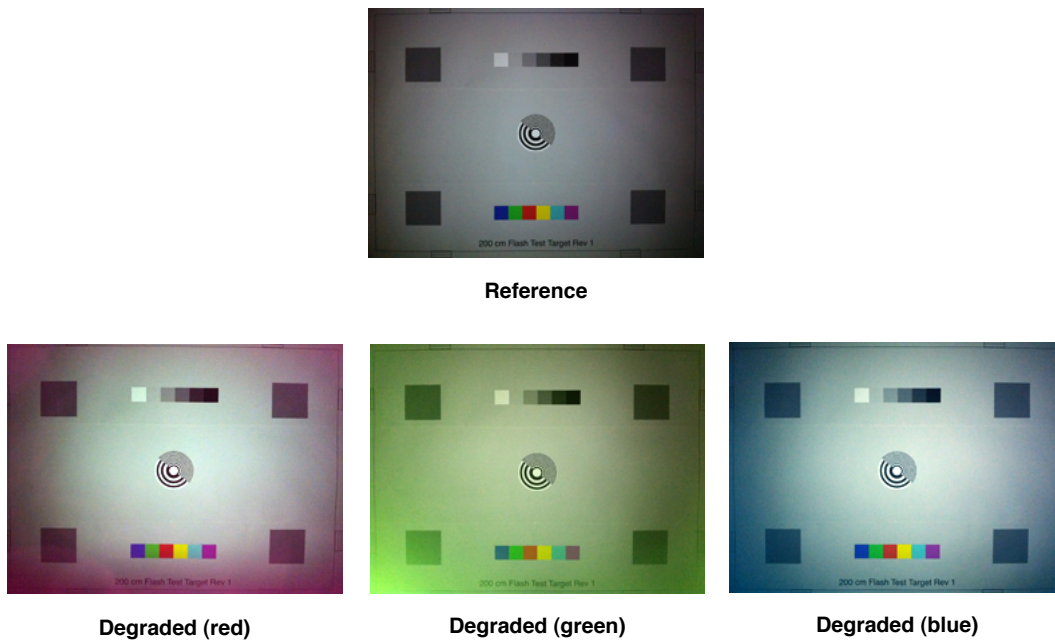
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### 2.4.3 Surface Finish

The flash is a strong source of light and reflections from the camera case opening edge should be managed so they do not reflect back into the camera or the scene. Semi-gloss material may direct light away from the camera. Matte or diffuse materials scatter light in all directions and will increase the likelihood that light from the flash or strong sources in the scene is reflected into the camera.

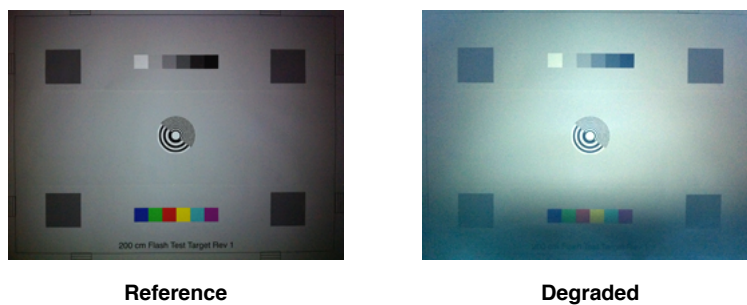
### 2.4.4 Image Degradation Examples

Figure 2-4 Image degradation by color shifting



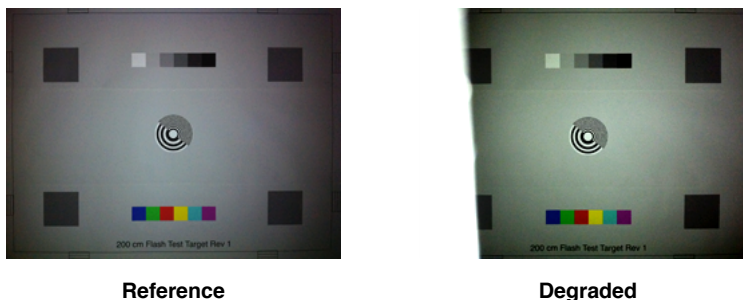
#### 2.4.4.1 Contrast Decrease

Figure 2-5 Image degradation by decrease of contrast



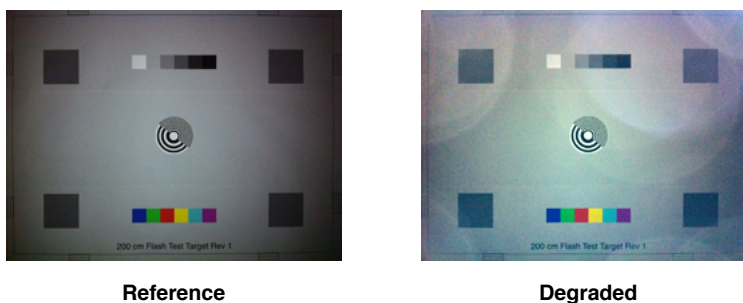
### 2.4.4.2 Image Blocking

Figure 2-6 Image degradation by blocking



### 2.4.4.3 Flash Interference

Figure 2-7 Image degradation by flash interference



## 2.5 Reliability

Cases for Apple devices must be tested to verify that they will withstand long-term use under typical use conditions, and that they do not impair or degrade the functionality of the device, damage it or its immediate surroundings, or adversely affect the user.

### 2.5.1 Device Insertion and Removal

The case must hold the Apple device securely while permitting its easy insertion and removal. The case and the enclosed device must not be damaged by the repeated insertion and removal of the device from the case under conditions representative of long-term use in a variety of environments.

## 2.5.2 Colorfastness

Any dyes, inks, or coatings in or on the case must not bleed color onto either the device or its user, particularly while the case is in contact with common substances such as water or sunscreen.

## 2.6 Environmental

Cases for Apple devices must comply with applicable environmental regulations in the regions in which such cases are to be sold, and any applicable substance or material restrictions, including applicable restrictions on the following substances:

- Organic tin compounds, PFOS, PFOA, phthalates, azo dyes, polybrominated biphenyls (PBBs) and PAHs, per requirements of the EU REACH regulation EC 1907/2006
- Nickel leach rate on surfaces in prolonged skin contact, per requirements of the EU REACH regulation EC 1907/2006
- Cadmium, lead, hexavalent chromium, and nickel, per requirements of EU Directive 2009/48/EC
- Natural rubber latex, per requirements of EU Directive EC 93/42/EEC
- Dimethylfumarate (DMFu), per requirements of EU Regulation 412/2012
- pH and Formaldehyde, per requirements of China GB 18401 for textiles and China GB 20400 for leather
- Endangered species of flora and fauna in products or packaging (US Lacey Act) Polybrominated diphenyl ethers (PBDE)

## 2.7 RF

### 2.7.1 Materials and Coatings

Cases for Apple devices must not contain materials or coatings that absorb radio frequency energy. Such materials may impair or degrade the performance of cellular communication antennas or GPS, Wi-Fi, or Bluetooth antennas. Examples include (but are not limited to) the following:

- Metals (e.g. steel, aluminum, magnesium, titanium, etc.)
- Plastics with any carbon content
- Plastics with any glass content
- Plastics with metallic plating
- Metallic paints

- Black paints with high carbon loading
- White paints with high titanium dioxide loading Metallic
- Physical Vapor Deposition (PVD) coatings

## 2.7.2 Near Field Communication (NFC)

Cases that claim compatibility with NFC enabled Apple devices must not degrade device NFC transaction performance. The following Apple devices are NFC enabled:

- iPhone 6s Plus
- iPhone 6s
- iPhone 6 Plus
- iPhone 6
- iPhone SE

## 2.8 Touchscreen

The touch interface in an Apple device senses the presence of one or more fingers on its surface. Any material between the surface and the user's hand, even a very thin sheet of plastic, may affect the performance of the touch interface.

### 2.8.1 Overlay

If a case design requires the Apple device's touchscreen to be covered with an overlay, the overlay must not:

- Exceed 0.1 mm in thickness.
- Introduce air gaps between the touchscreen and overlay.
- Be electrically conductive.

### 2.8.2 Edge Swipe Gestures

A case must allow the user to easily use edge swipe gestures. These gestures include bringing up Control Center, Notification Center, and swiping back from apps that may use edge swipe gestures (such as the Messages app).

### 2.8.3 Edge Press Gestures

Cases that claim compatibility with iPhone 6s Plus or iPhone 6s must allow the user to easily use the edge press gesture. This gesture is used to bring up the task switcher in iOS 9.0 and later.

# 3. Device Dimensional Drawings

This chapter contains the following dimensional drawings:

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- [iPhone 5c](#) (page 28)
- [iPhone 5](#) (page 29)
- [iPhone 4s](#) (page 30)
- [iPhone 4 \(CDMA model\)](#) (page 31)
- [iPhone 4 \(GSM model\)](#) (page 32)
- [iPhone 3G and iPhone 3GS](#) (page 33)
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- [iPad Pro \(9.7-inch\) with Wi-Fi](#) (page 35)
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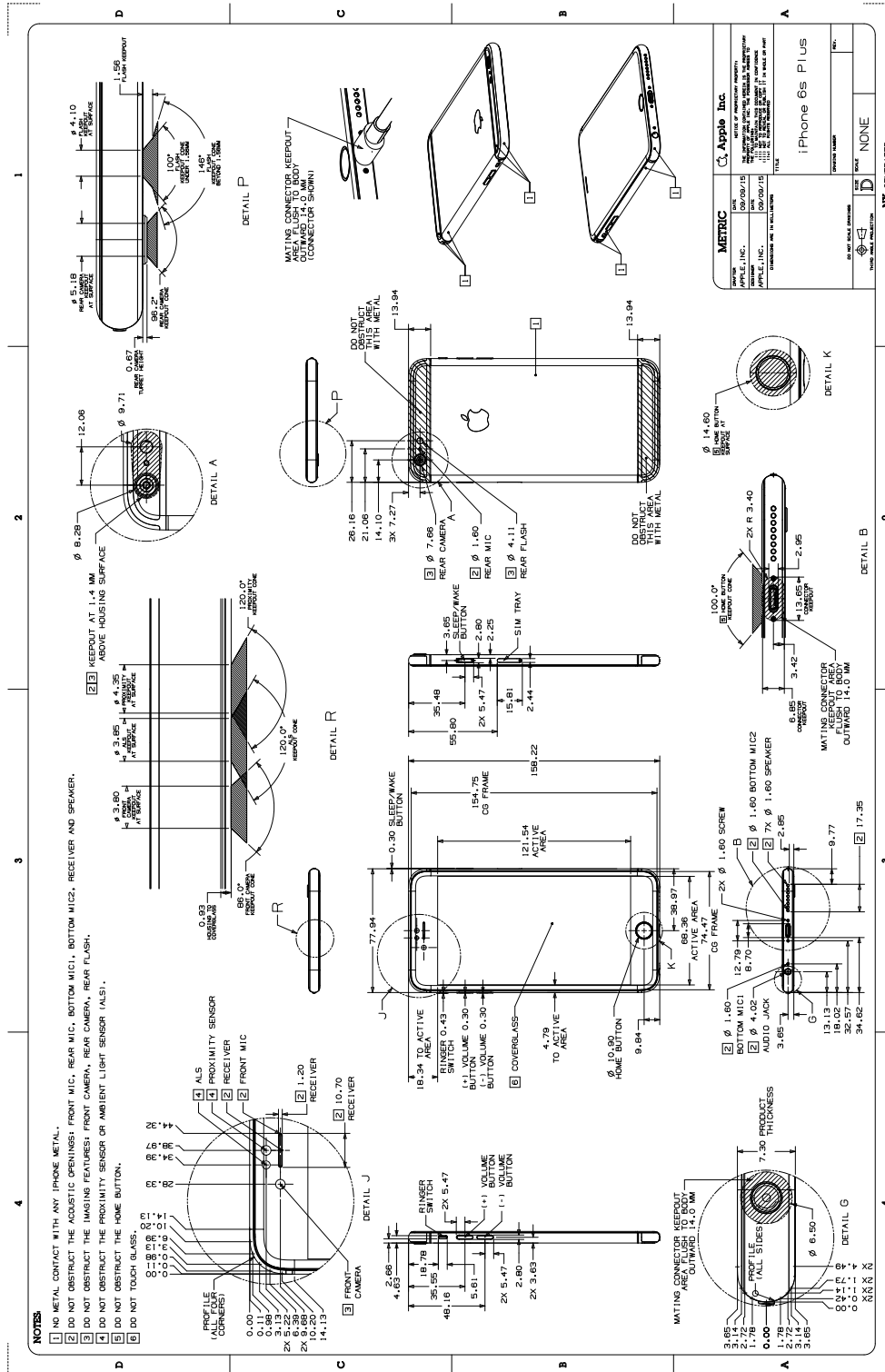


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- [iPod mini](#) (page 88)

# 3.1 iPhone 6s Plus

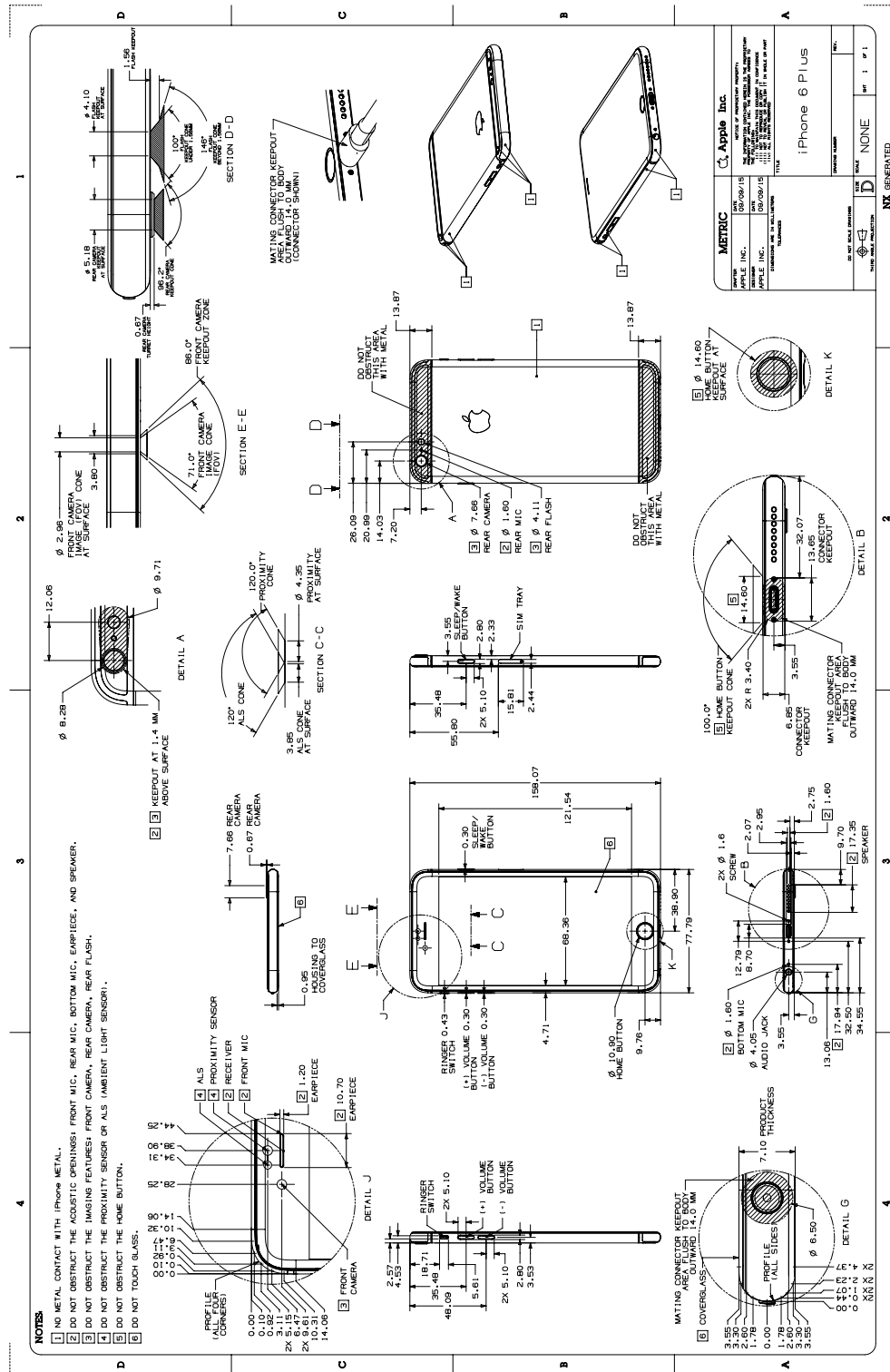
Figure 3-1 iPhone 6s Plus Dimensional Drawing





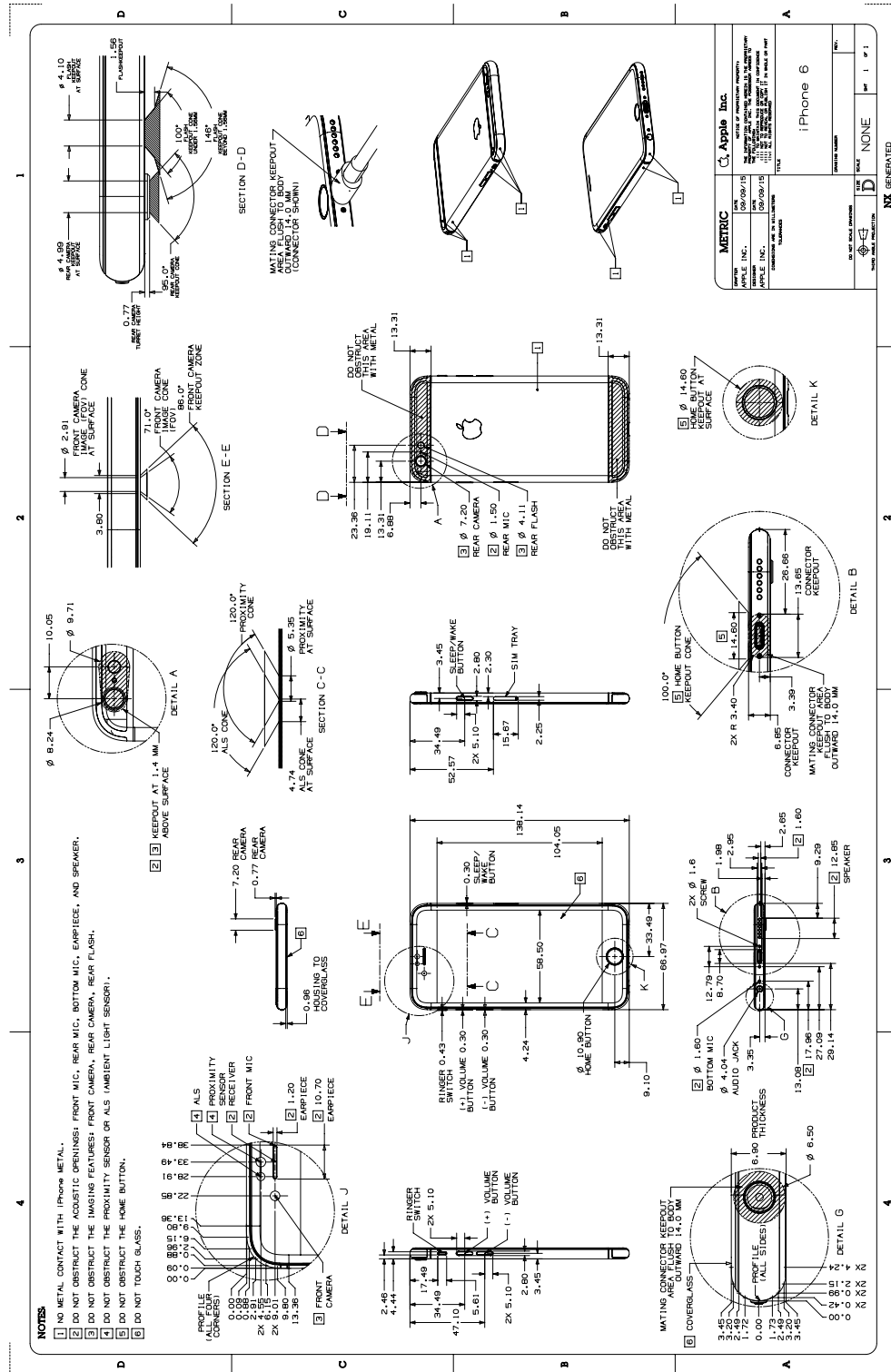
3.3 iPhone 6 Plus

Figure 3-3 iPhone 6 Plus Dimensional Drawing



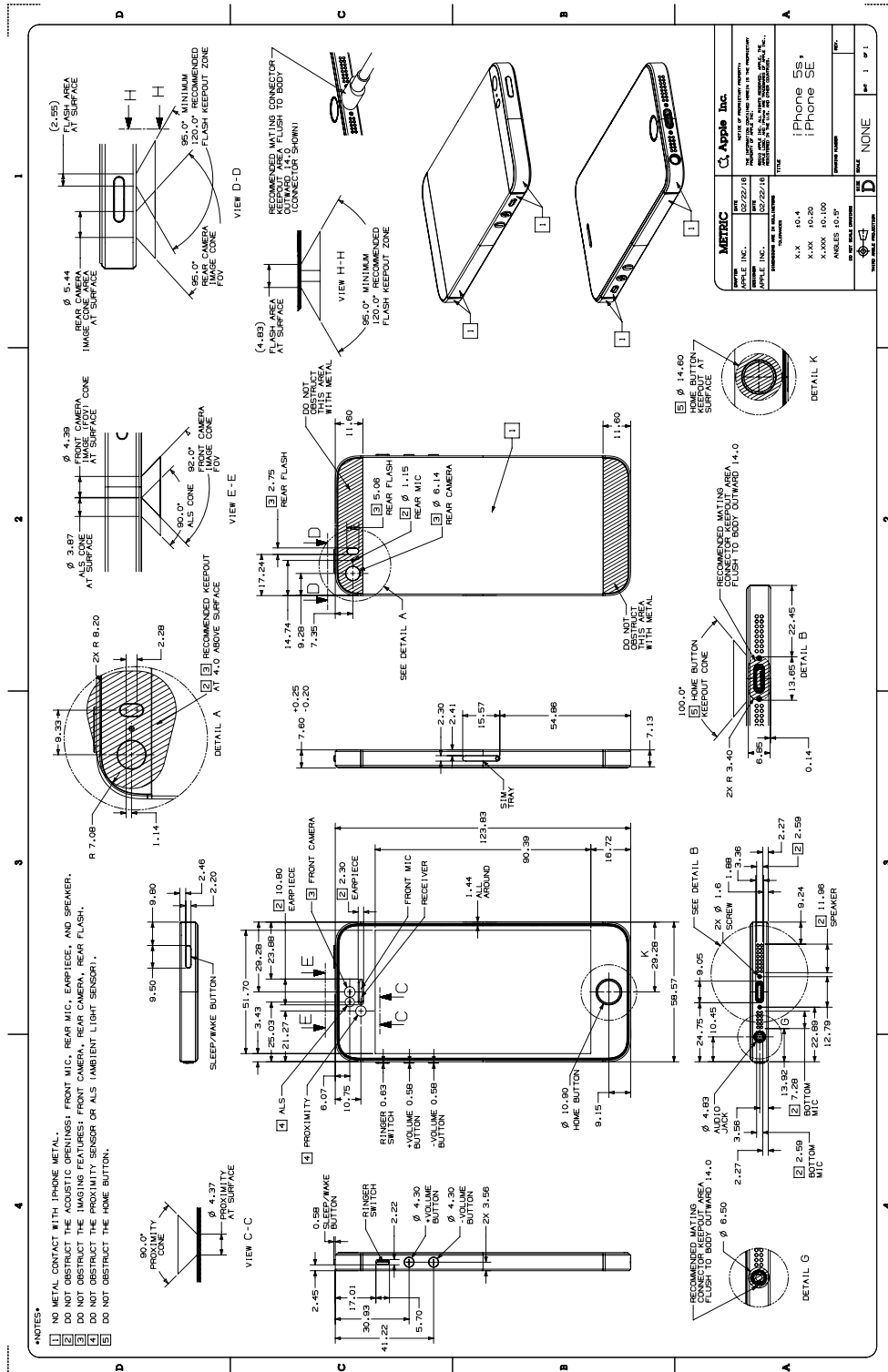
# 3.4 iPhone 6

Figure 3-4 iPhone 6 Dimensional Drawing



# 3.5 iPhone 5s & iPhone SE

Figure 3-5 iPhone 5s & iPhone SE Dimensional Drawing

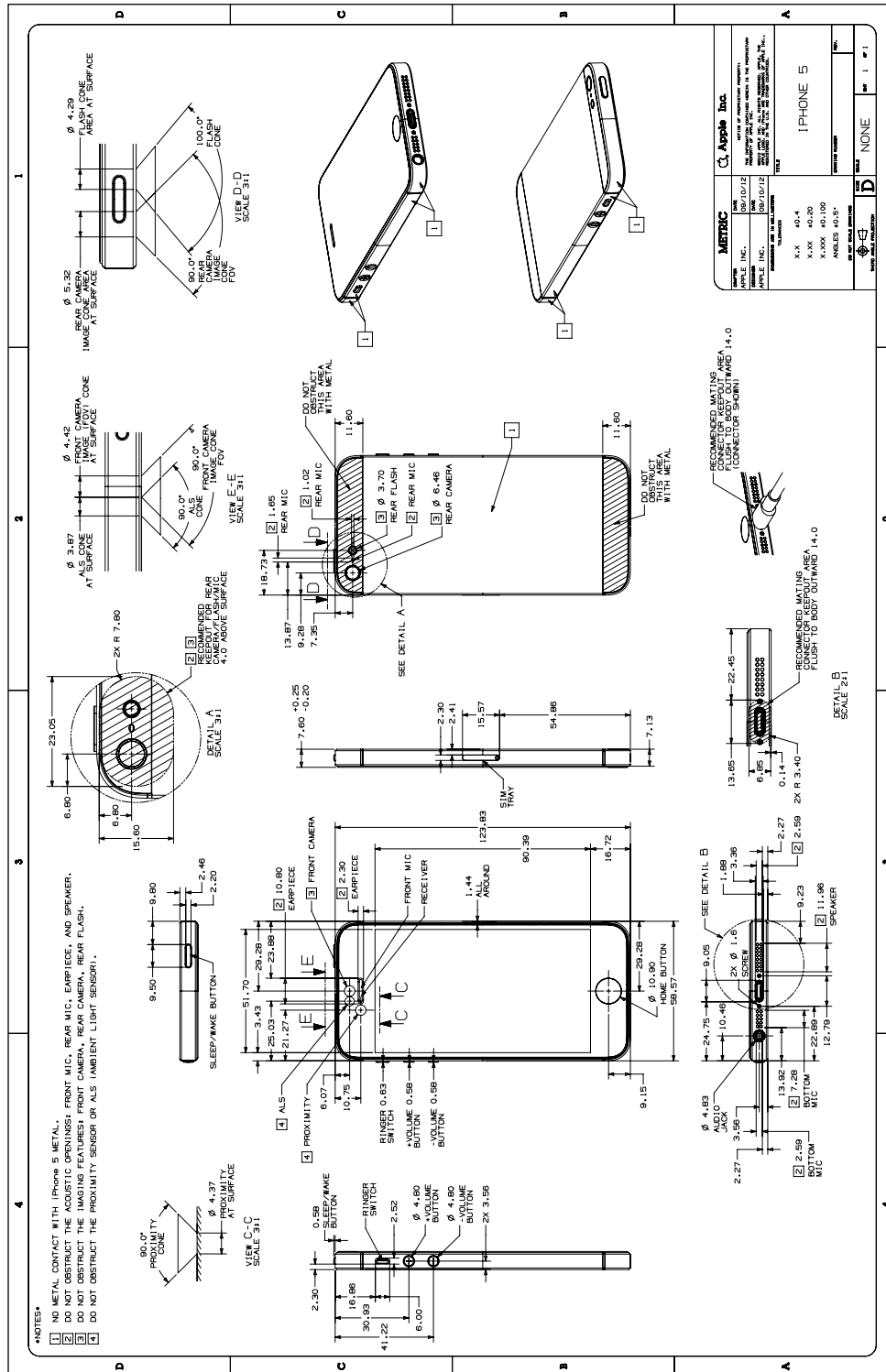






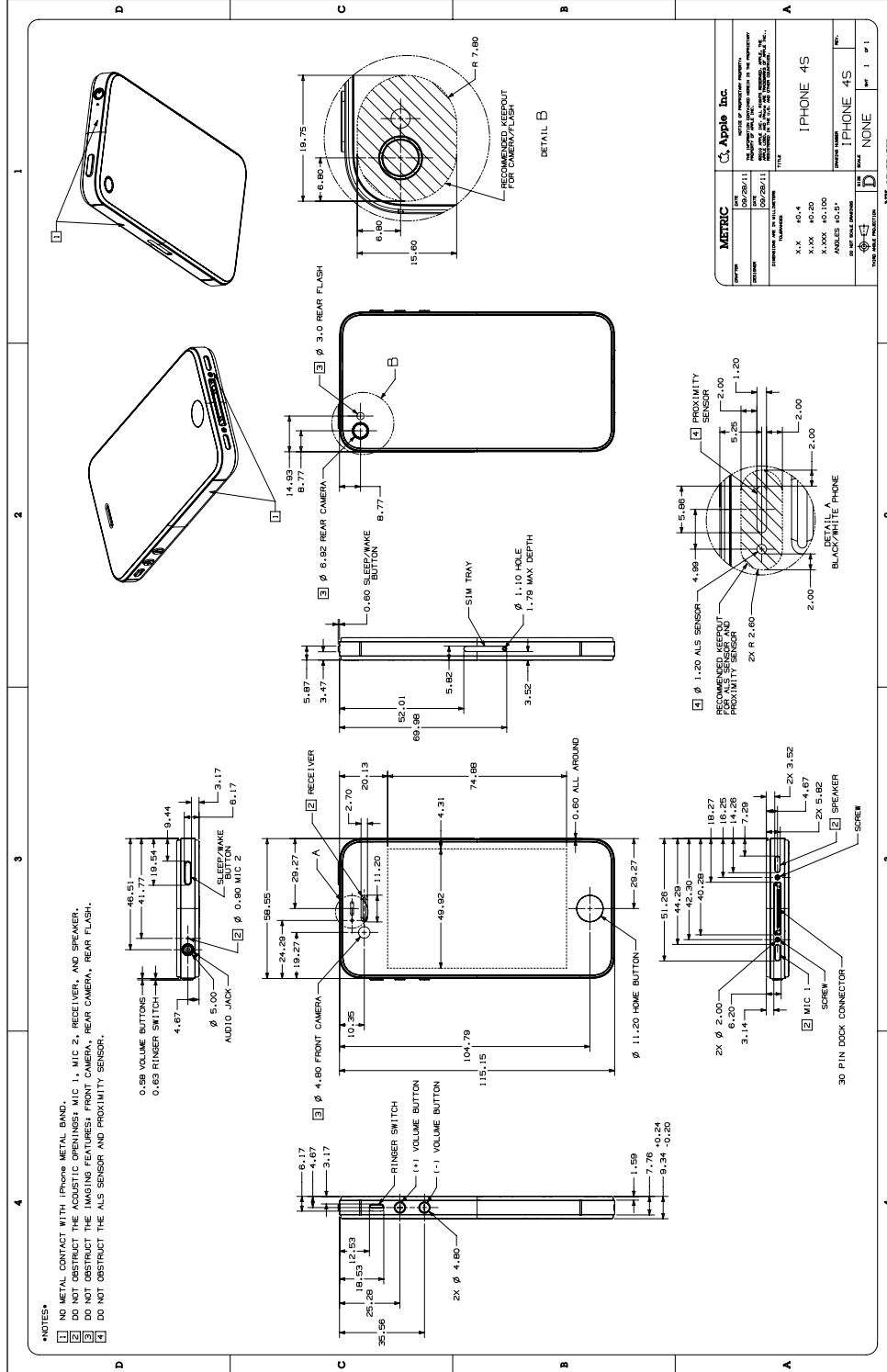
# 3.7 iPhone 5

Figure 3-7 iPhone 5 Dimensional Drawing



3.8 iPhone 4s

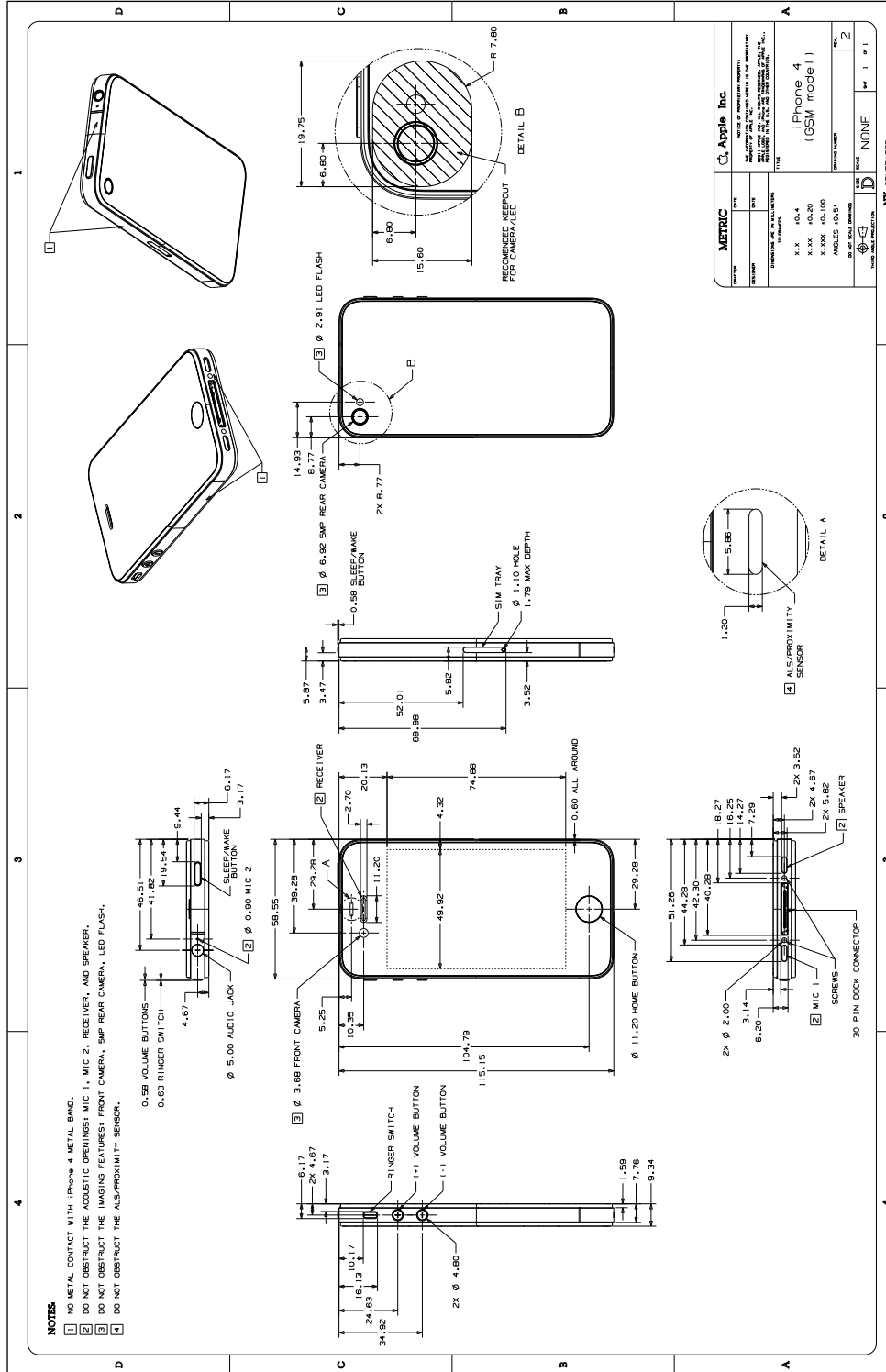
Figure 3-8 iPhone 4s Dimensional Drawing





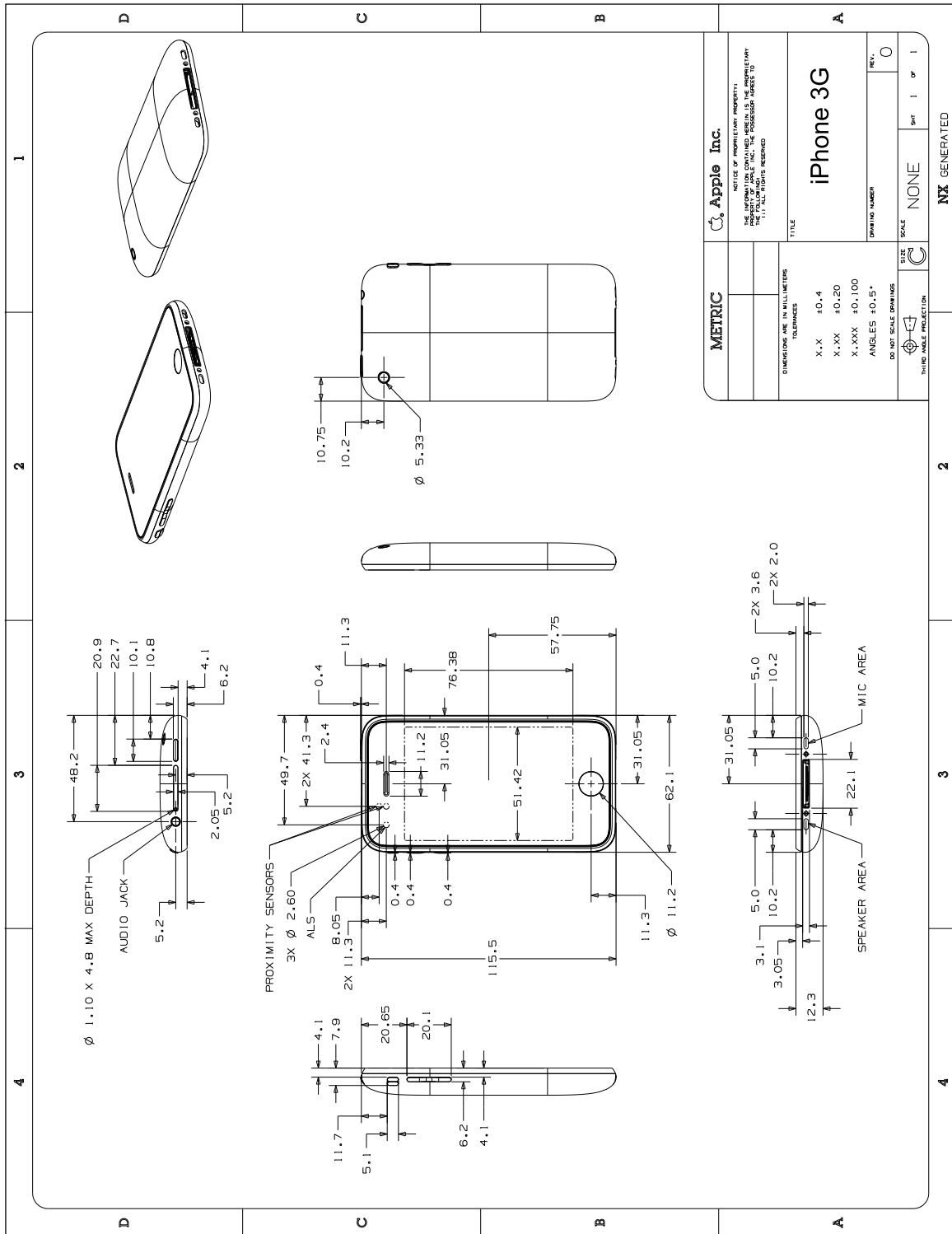
# 3.10 iPhone 4 (GSM model)

Figure 3-10 iPhone 4 GSM Dimensional Drawing



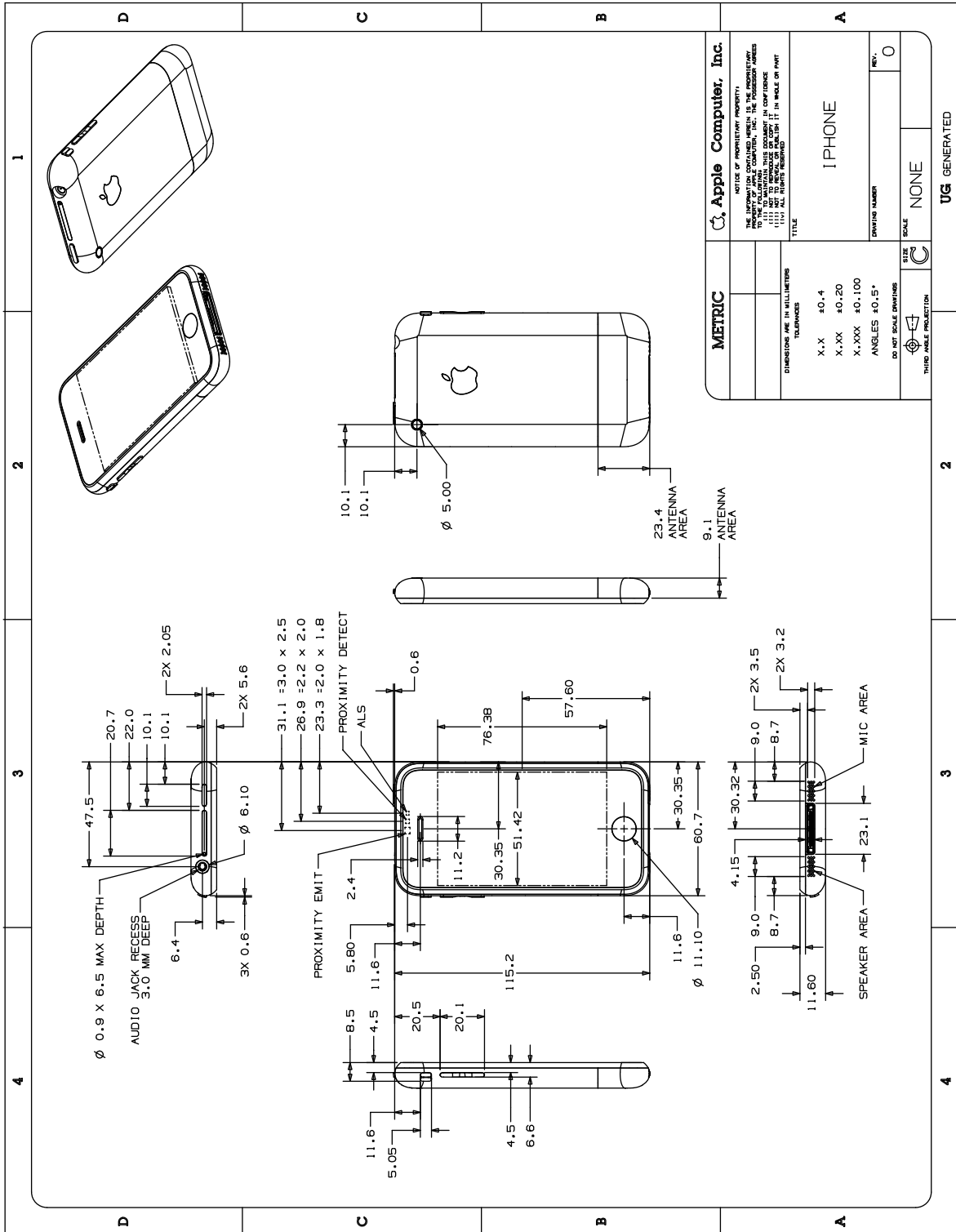
## 3.11 iPhone 3G and iPhone 3GS

Figure 3-11 iPhone 3G and iPhone 3GS Dimensional Drawing



## 3.12 iPhone

Figure 3-12 iPhone Dimensional Drawing



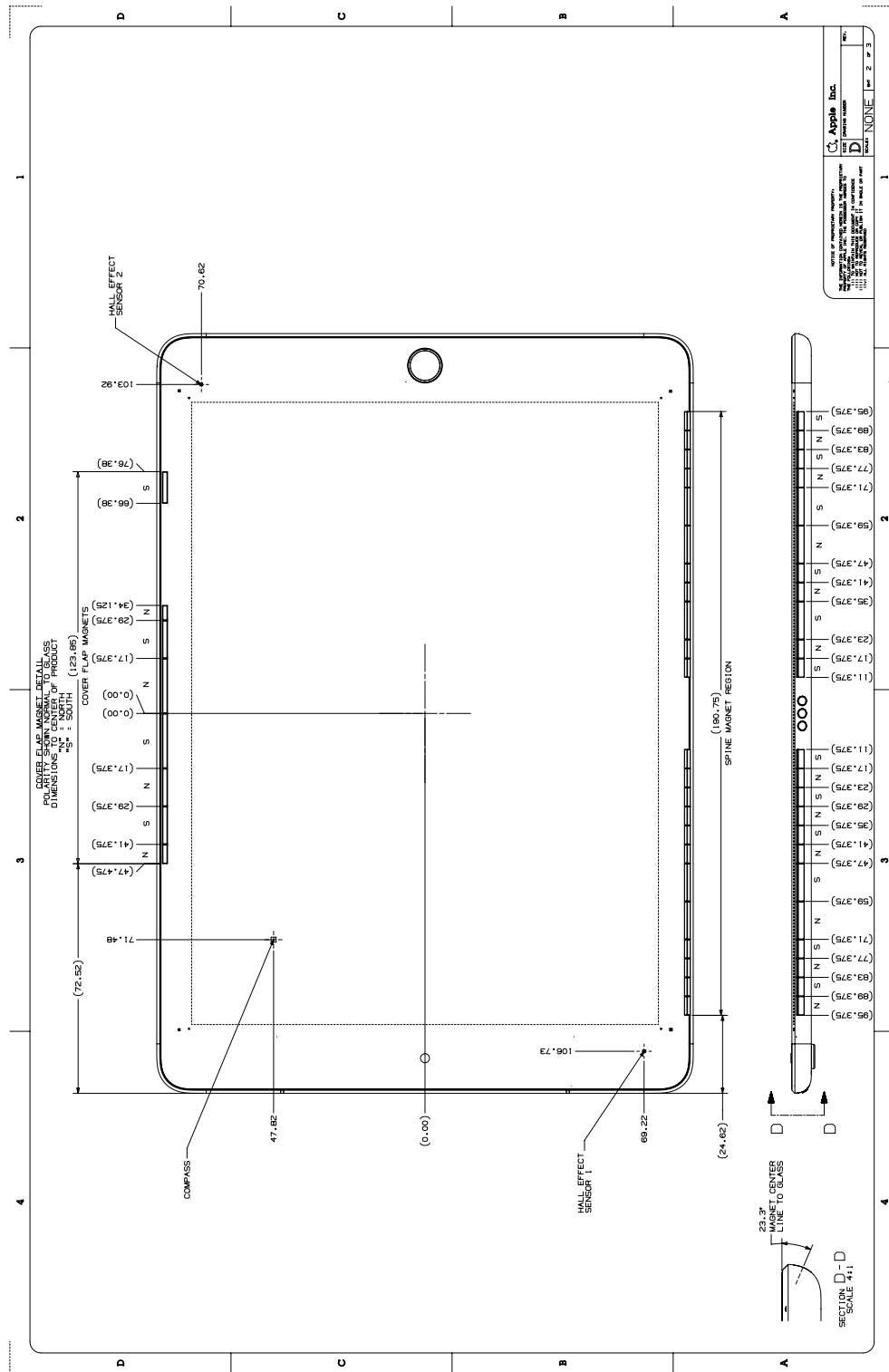






# 3.15 iPad Pro (9.7-inch) Magnet and Hall Effect Sensor Locations

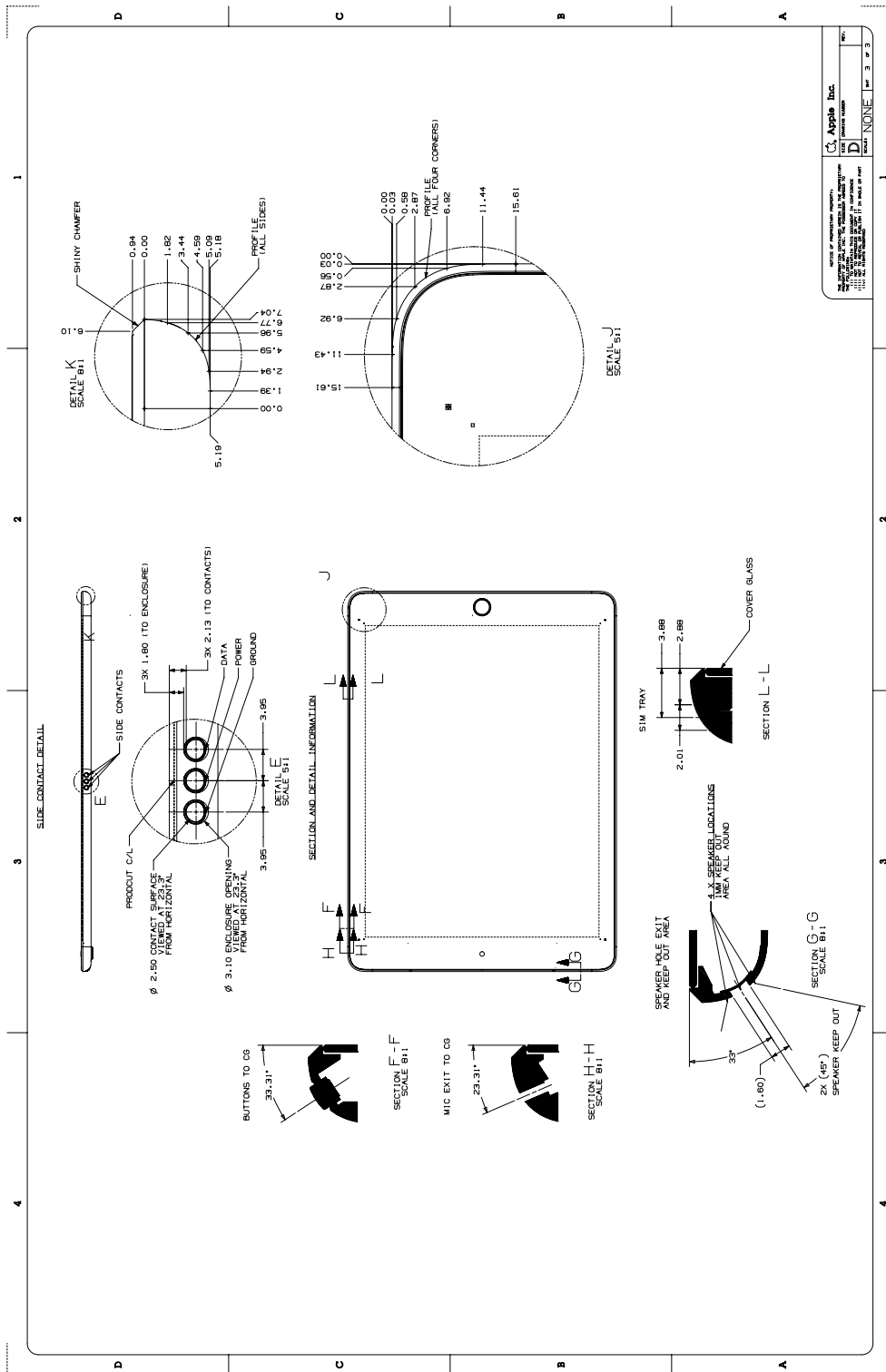
Figure 3-15 iPad Pro (9.7-inch) Magnet and Hall Effect Sensor Locations 1 of 2 Dimensional Drawing



### 3. Device Dimensional Drawings

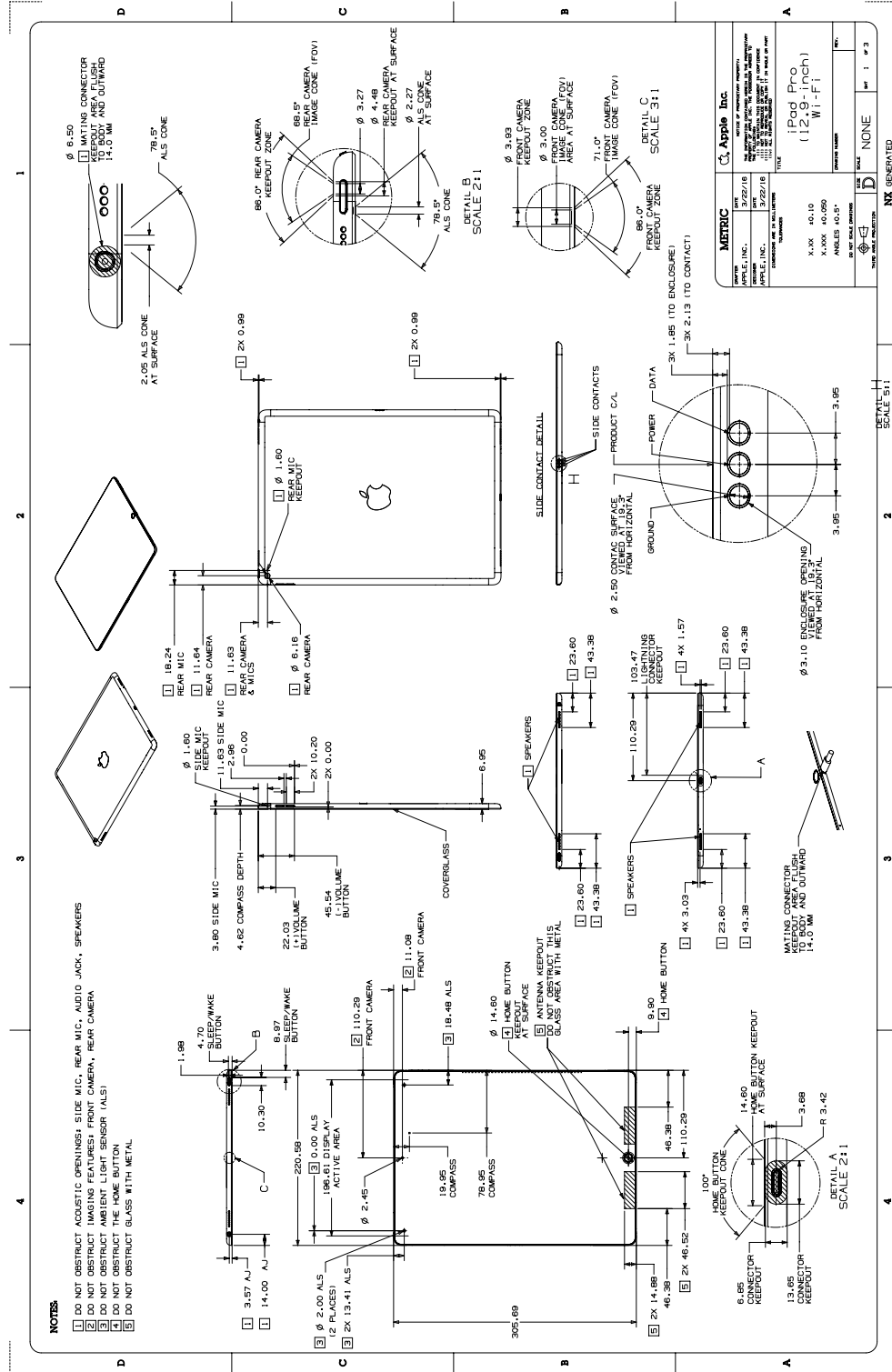
#### 3.15 iPad Pro (9.7-inch) Magnet and Hall Effect Sensor Locations

Figure 3-16 iPad Pro (9.7-inch) Magnet and Hall Effect Sensor Locations 2 of 2 Dimensional Drawing



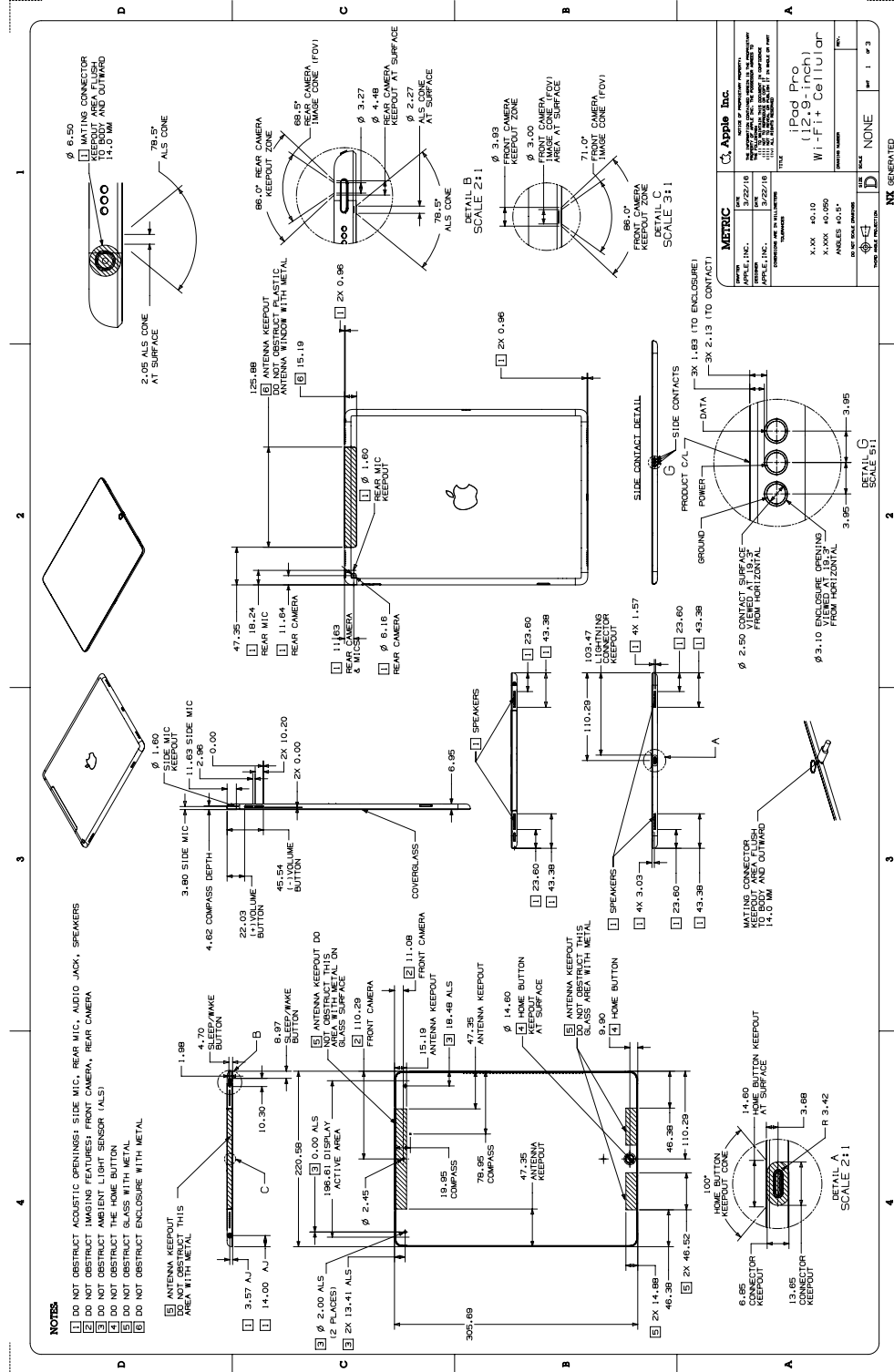
# 3.16 iPad Pro (12.9-inch) with Wi-Fi

Figure 3-17 iPad Pro (12.9-inch) with Wi-Fi Dimensional Drawing



# 3.17 iPad Pro (12.9-inch) with Wi-Fi + Cellular

Figure 3-18 iPad Pro (12.9-inch) with Wi-Fi + Cellular Dimensional Drawing



# 3.18 iPad Pro (12.9-inch) Magnet and Hall Effect Sensor Locations

Figure 3-19 iPad Pro (12.9-inch) Magnet and Hall Effect Sensor Locations 1 of 2 Dimensional Drawing

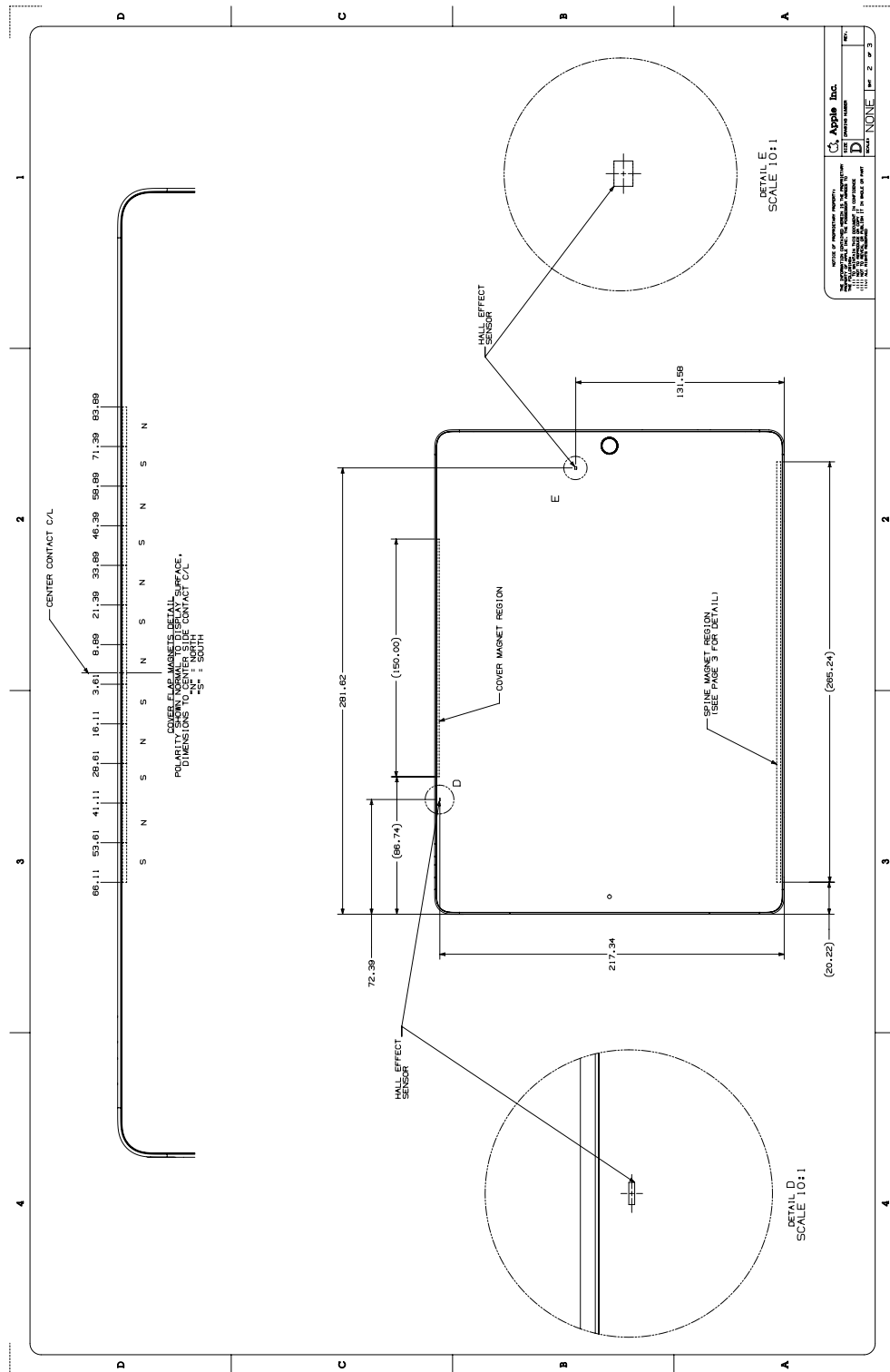
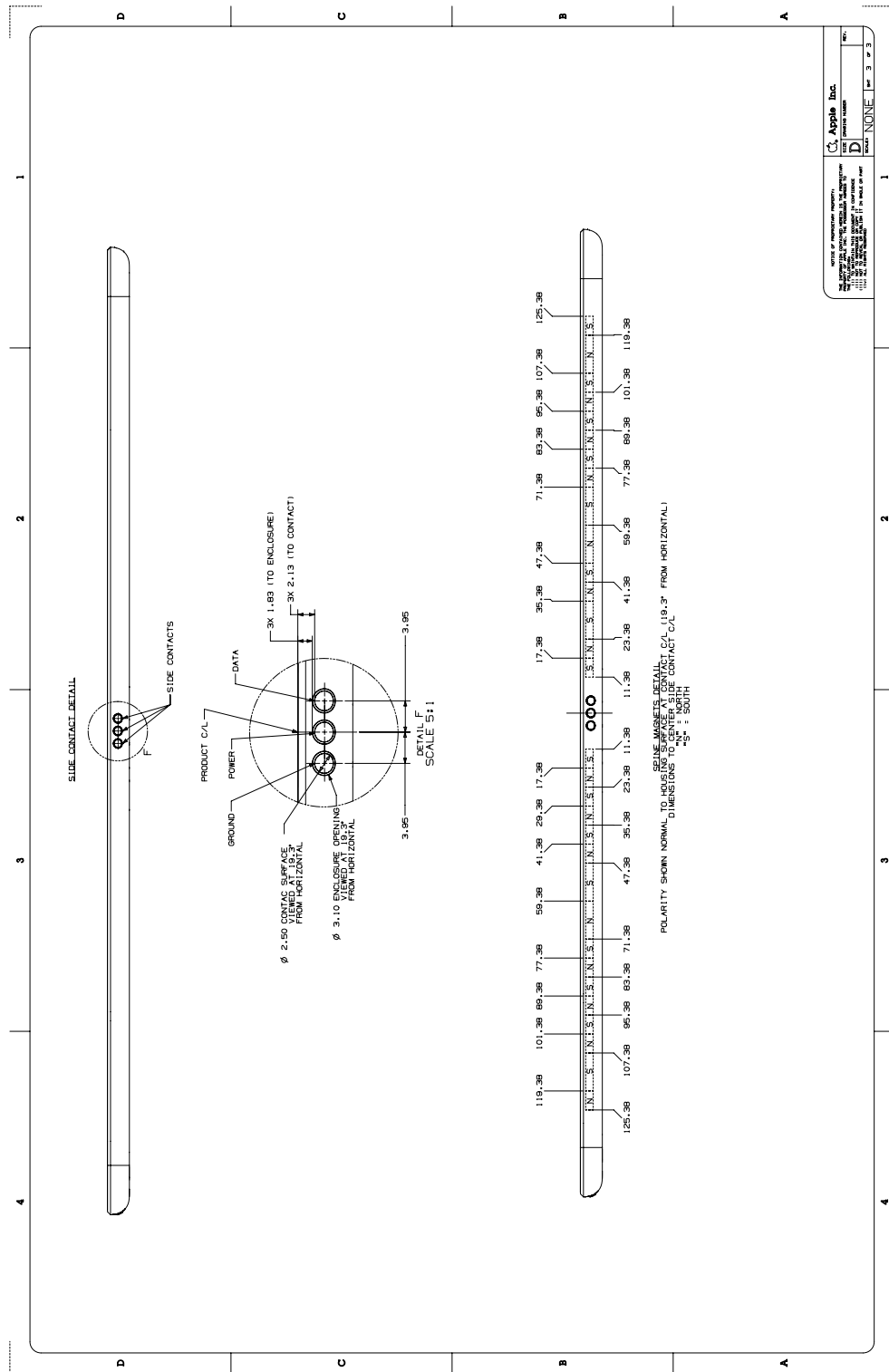
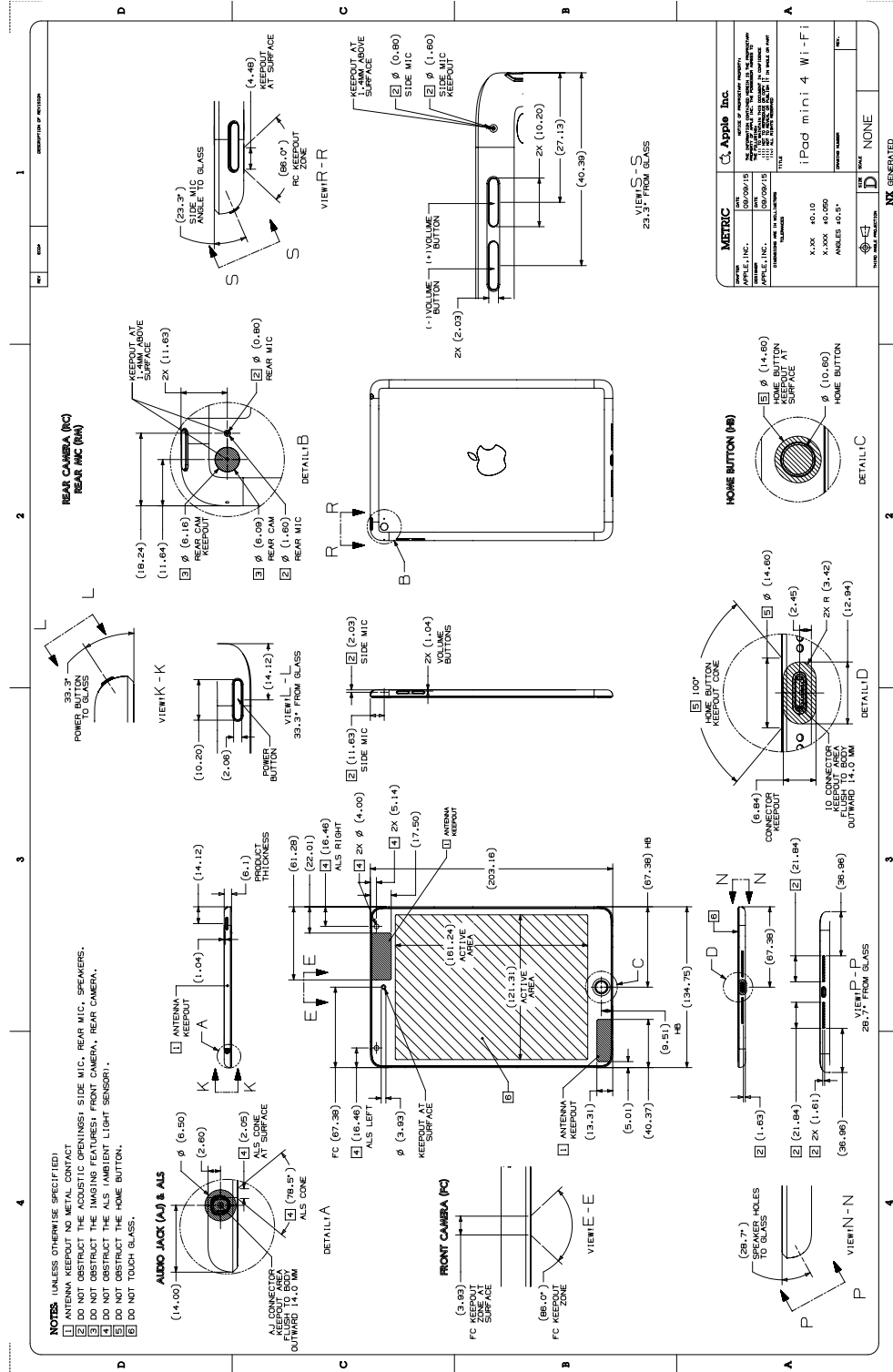


Figure 3-20 iPad Pro (12.9-inch) Magnet and Hall Effect Sensor Locations 2 of 2 Dimensional Drawing



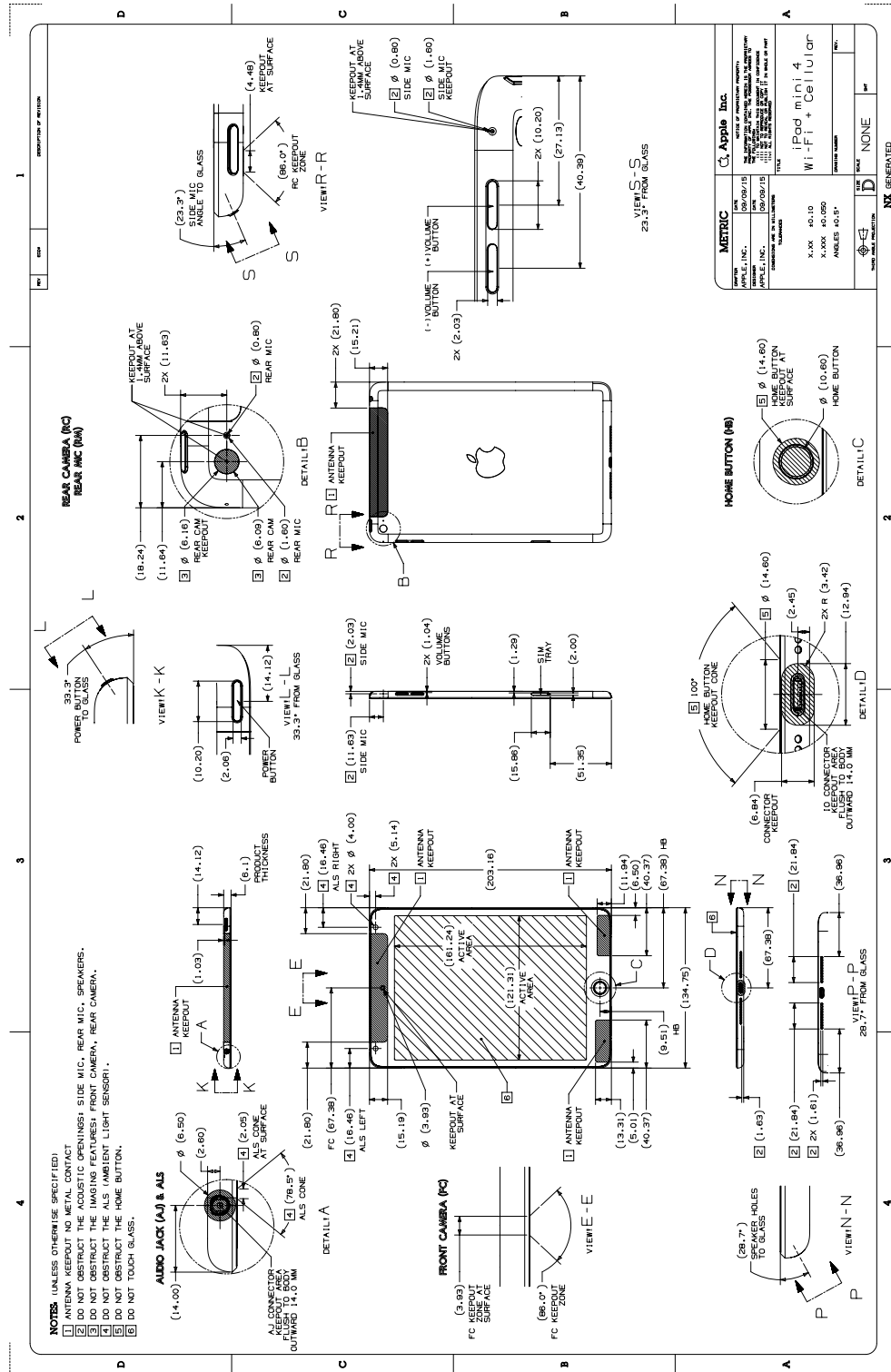
# 3.19 iPad mini 4 with Wi-Fi

Figure 3-21 iPad mini 4 with Wi-Fi Dimensional Drawing



# 3.20 iPad mini 4 with Wi-Fi + Cellular

Figure 3-22 iPad mini 4 with Wi-Fi + Cellular Dimensional Drawing

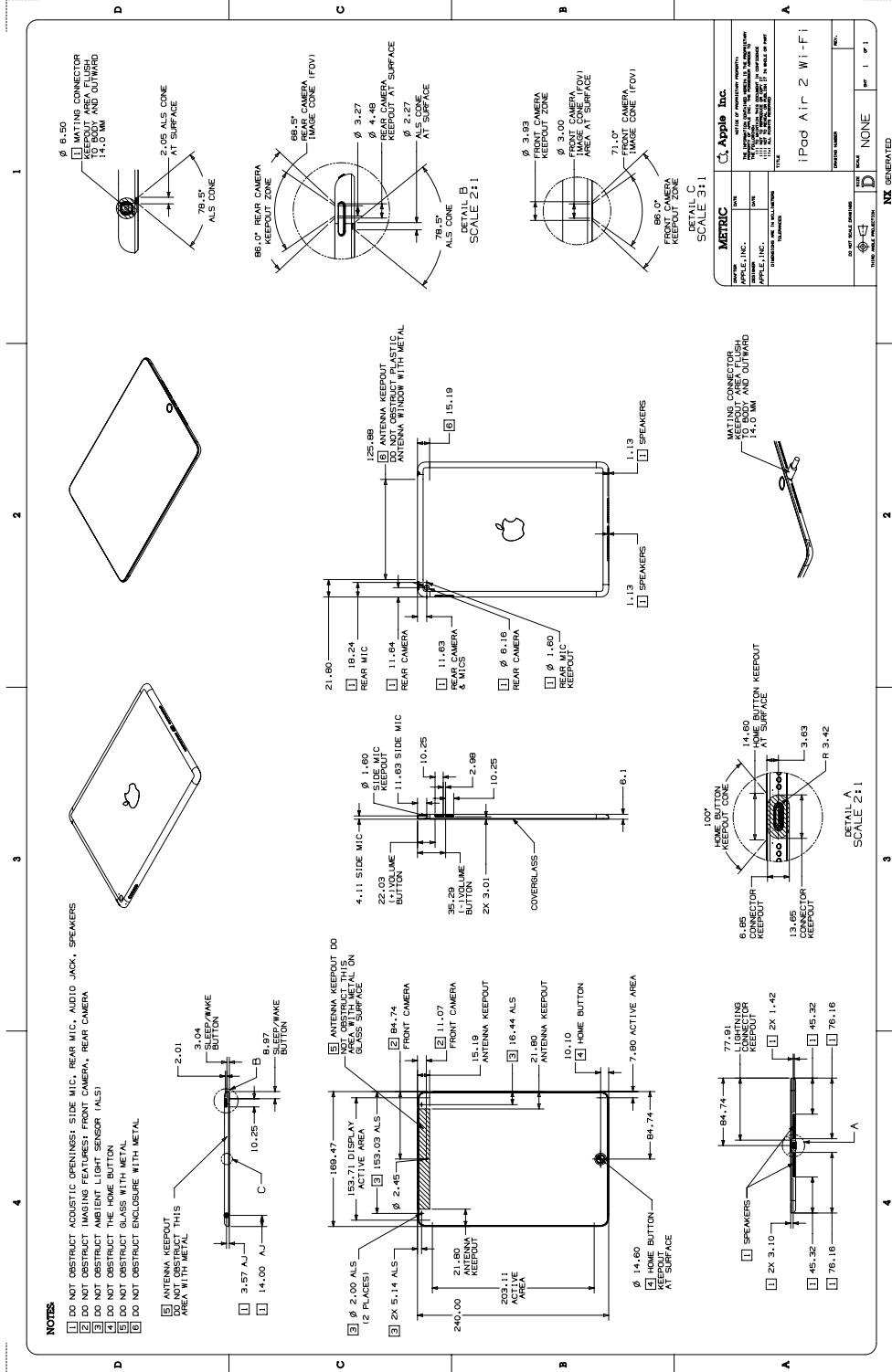






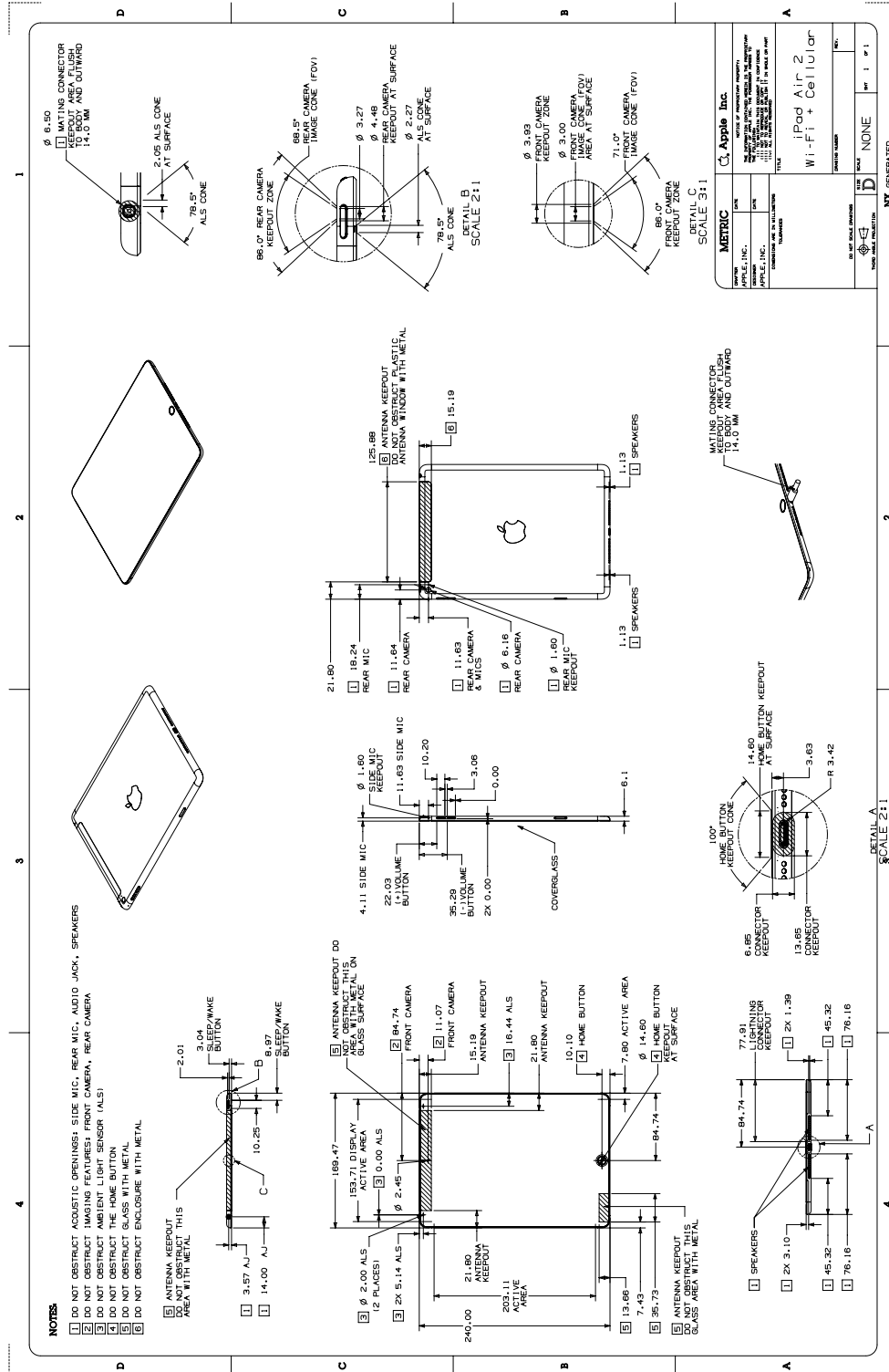
# 3.22 iPad Air 2 with Wi-Fi

Figure 3-24 iPad Air 2 with Wi-Fi Dimensional Drawing



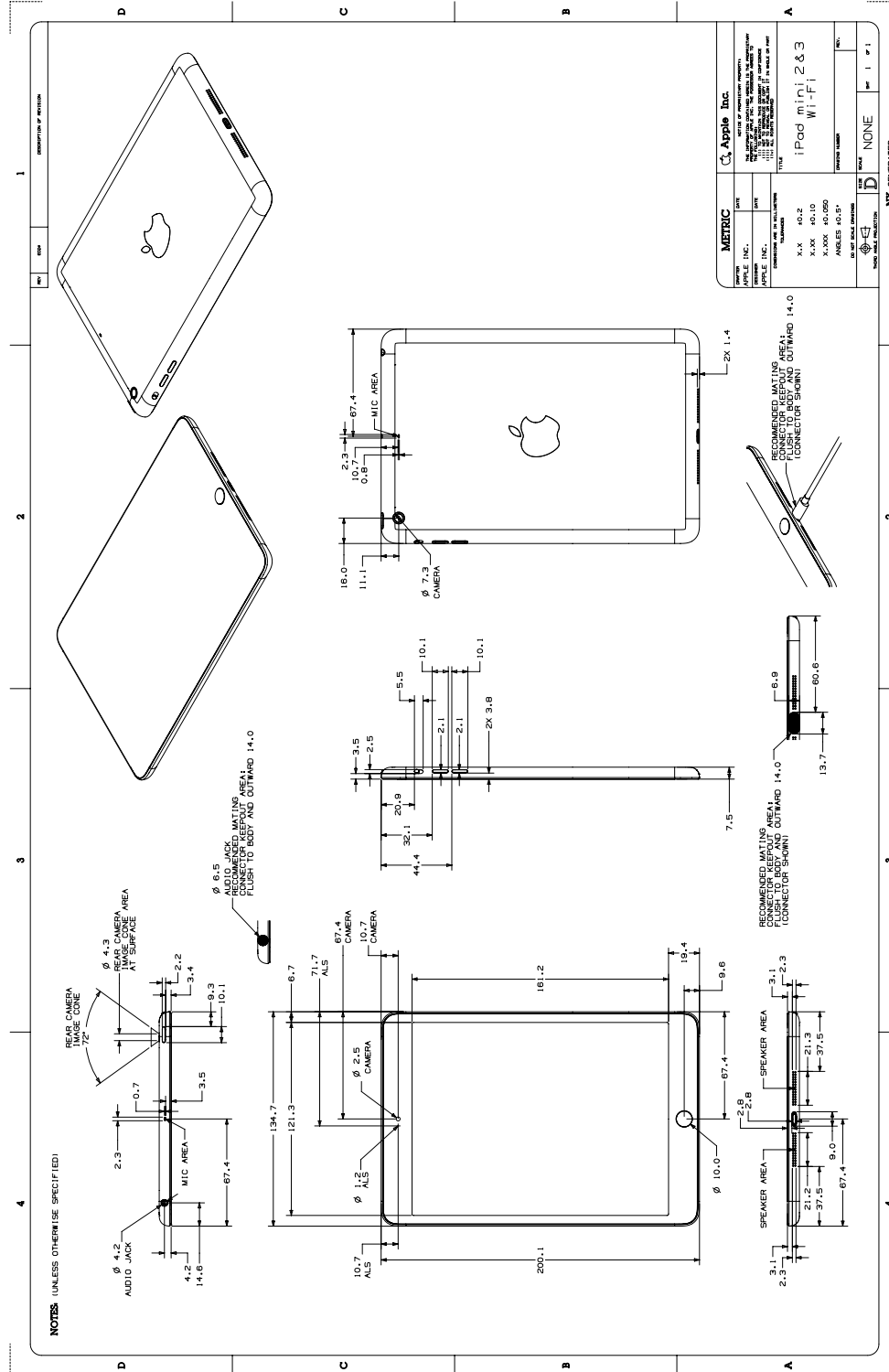
## 3.23 iPad Air 2 with Wi-Fi + Cellular

Figure 3-25 iPad Air 2 with Wi-Fi + Cellular Dimensional Drawing



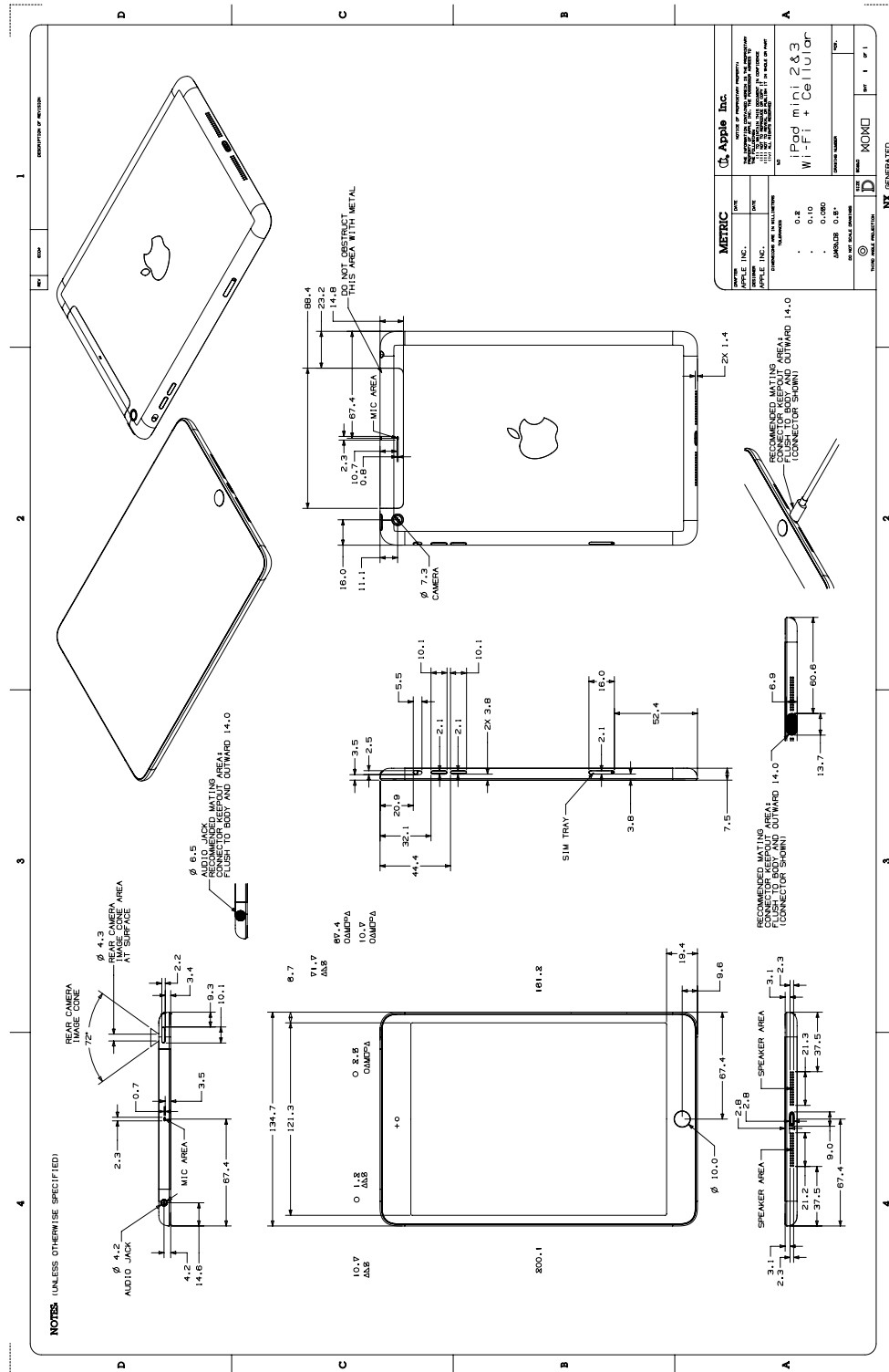
# 3.24 iPad mini 2 & iPad mini 3 with Wi-Fi

Figure 3-26 iPad mini 2 & iPad mini 3 with Wi-Fi Dimensional Drawing



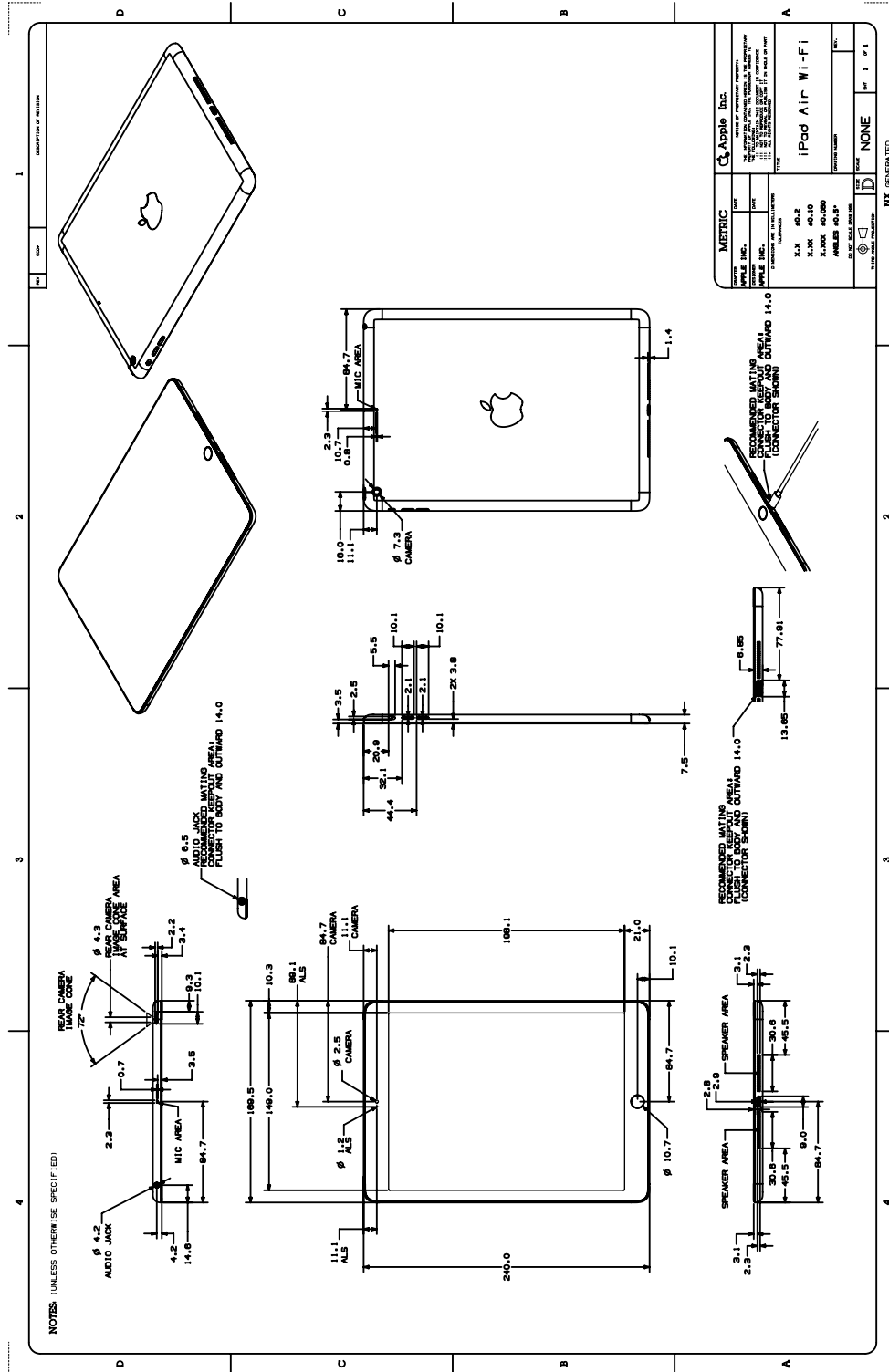
## 3.25 iPad mini 2 & iPad mini 3 with Wi-Fi + Cellular

Figure 3-27 iPad mini 2 & iPad mini 3 with Wi-Fi + Cellular Dimensional Drawing



## 3.26 iPad Air with Wi-Fi

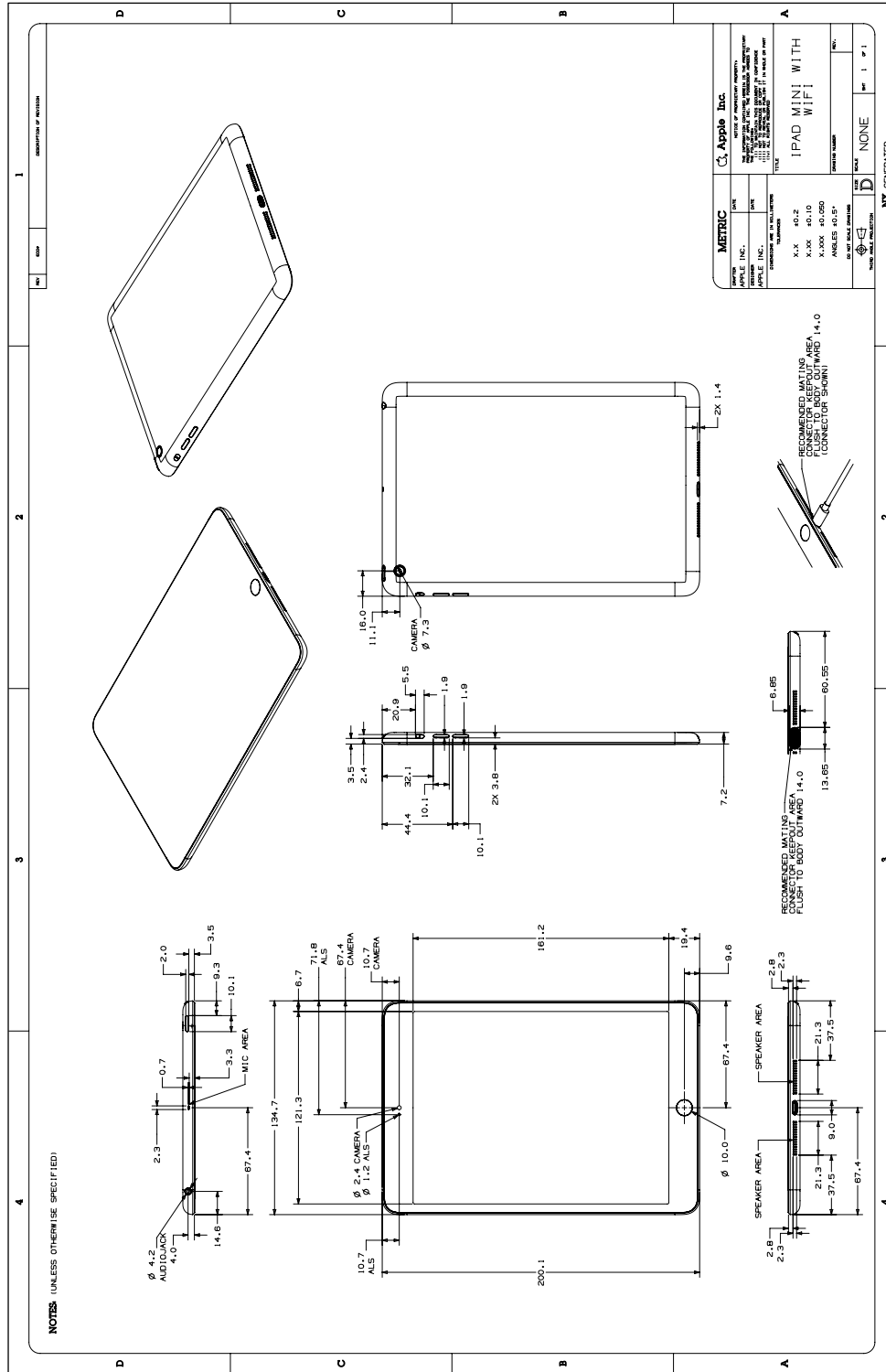
Figure 3-28 iPad Air with Wi-Fi Dimensional Drawing





### 3.28 iPad mini with Wi-Fi

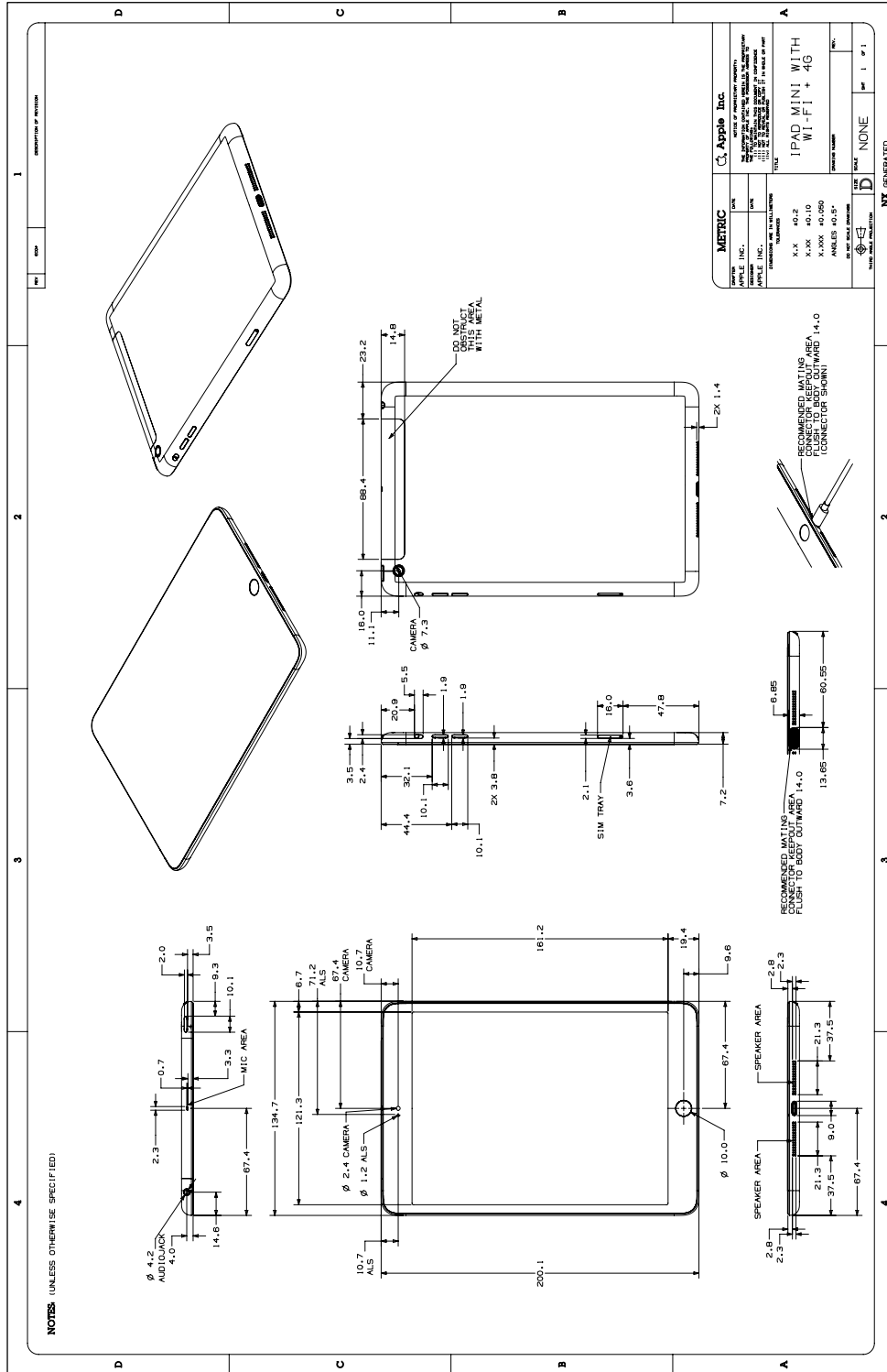
Figure 3-30 iPad mini with Wi-Fi Dimensional Drawing





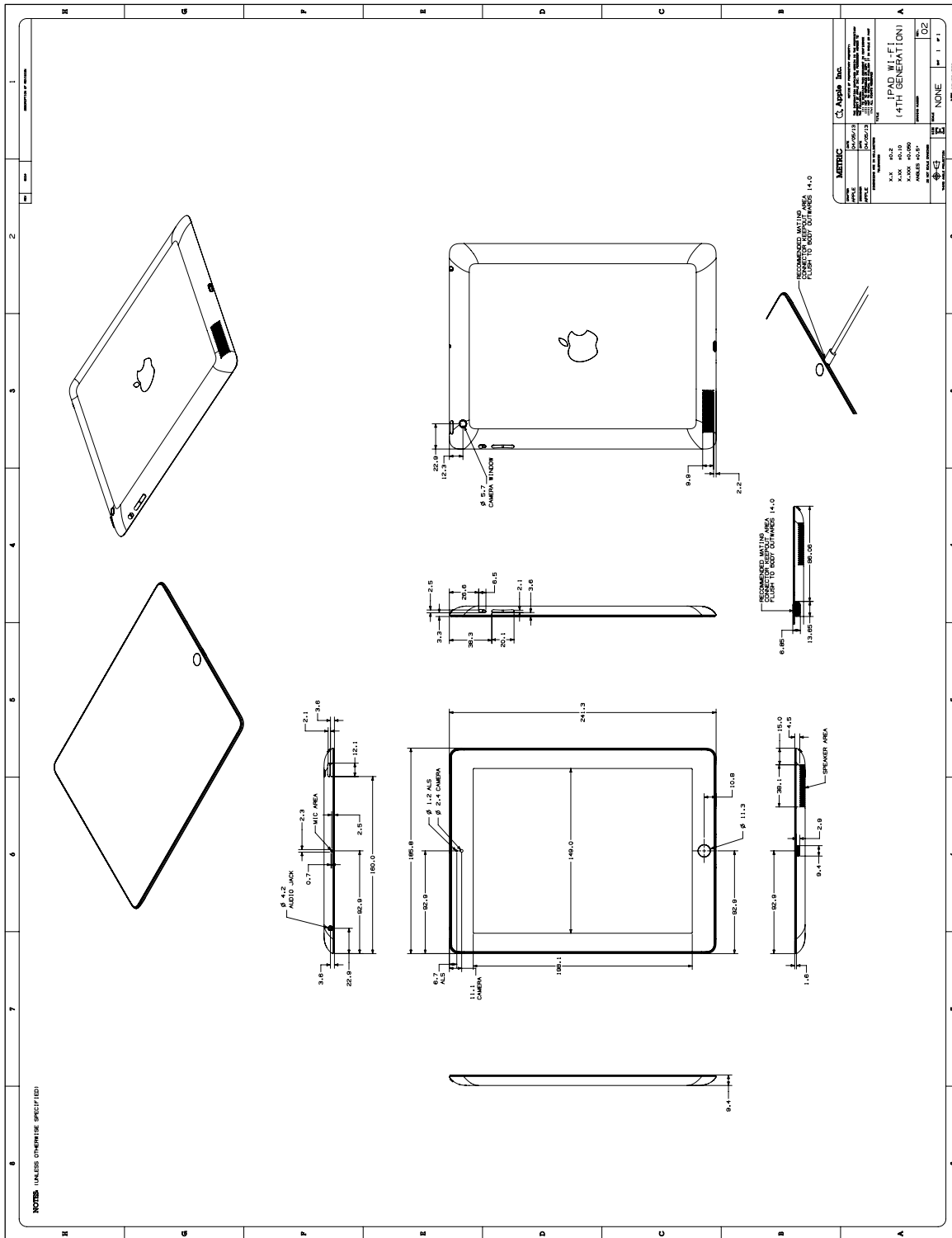
# 3.29 iPad mini with Wi-Fi + Cellular

Figure 3-31 iPad mini with Wi-Fi + Cellular Dimensional Drawing



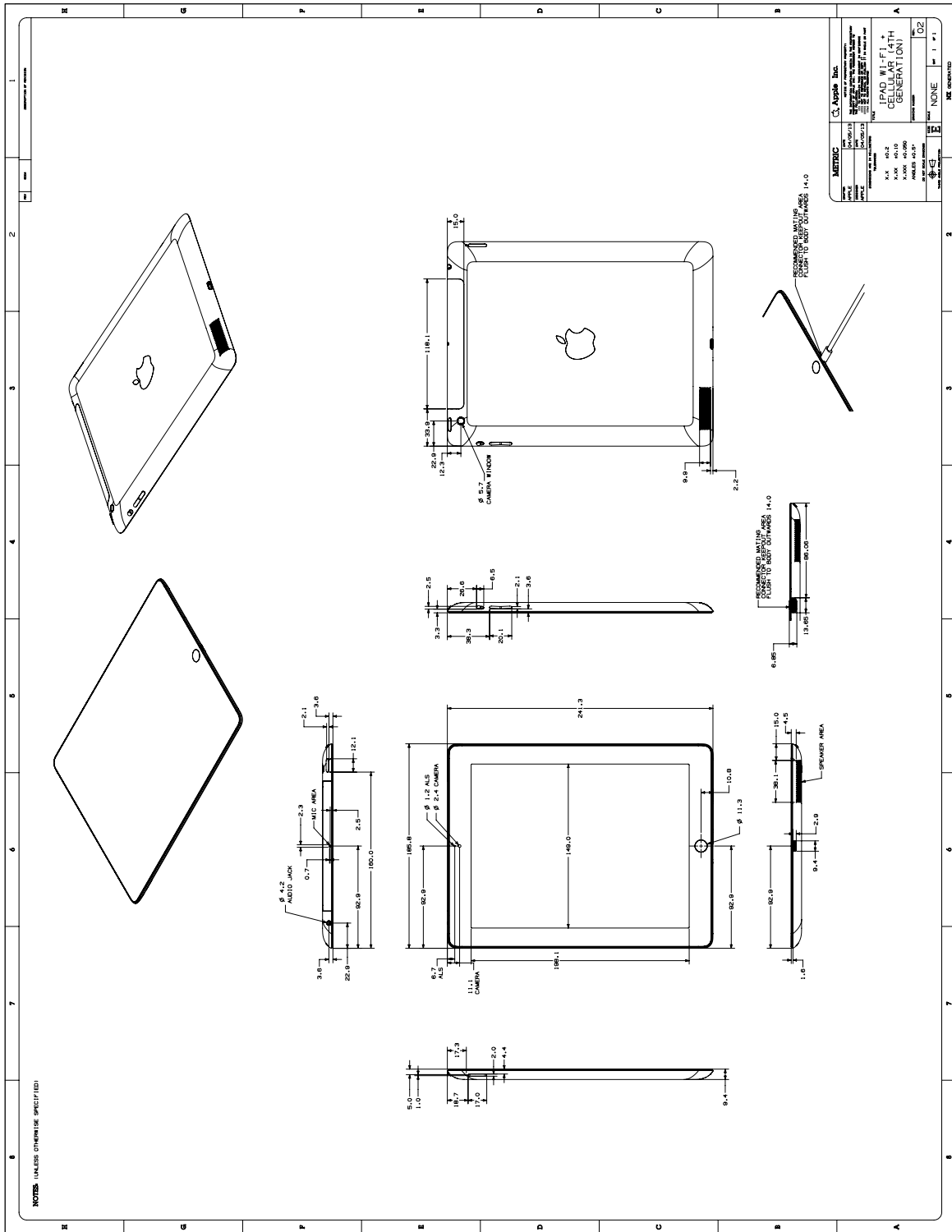
## 3.30 iPad (4th generation) with Wi-Fi

Figure 3-32 iPad (4th generation) with Wi-Fi Dimensional Drawing



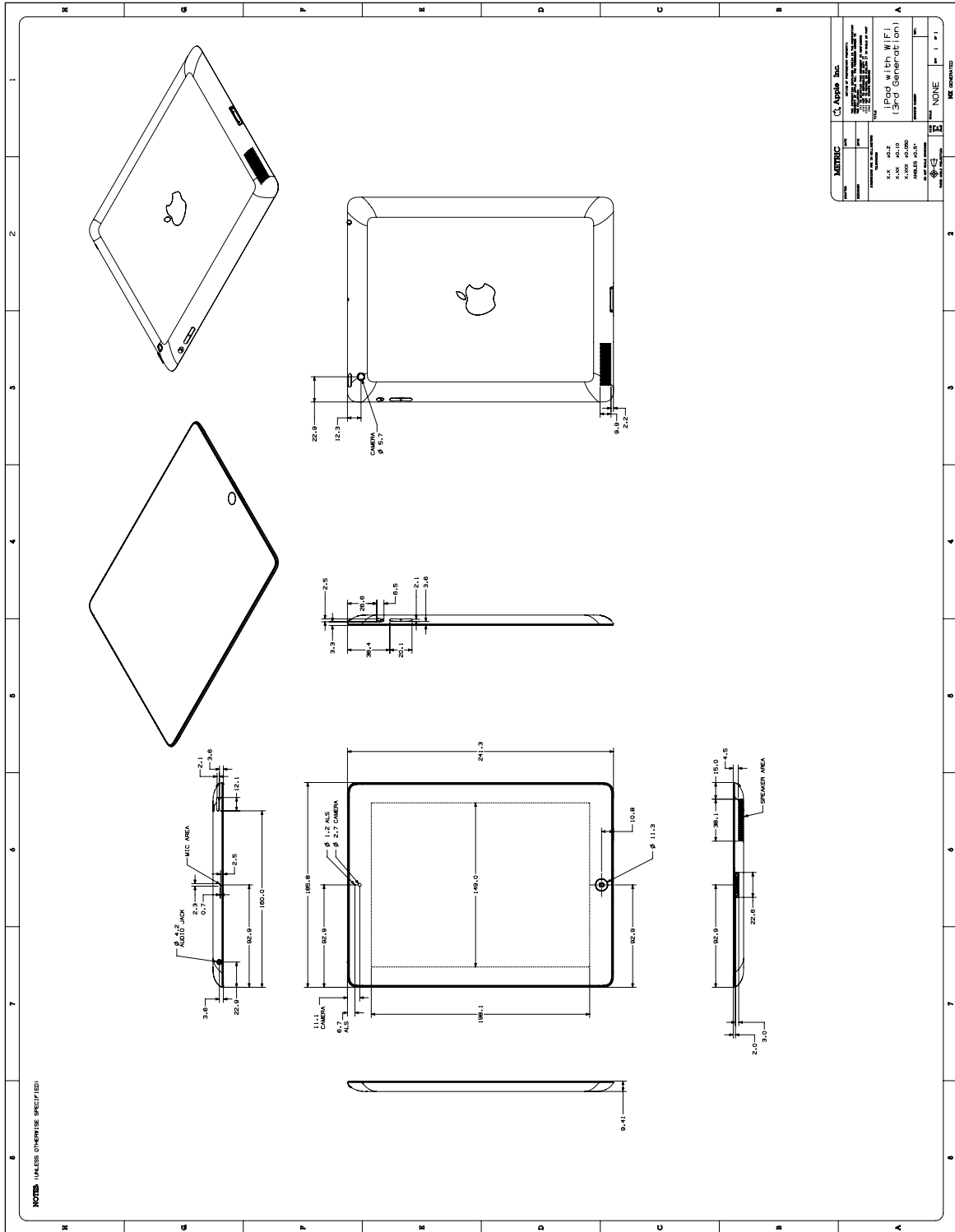
## 3.31 iPad (4th generation) with Wi-Fi + Cellular

Figure 3-33 iPad (4th generation) with Wi-Fi + Cellular Dimensional Drawing



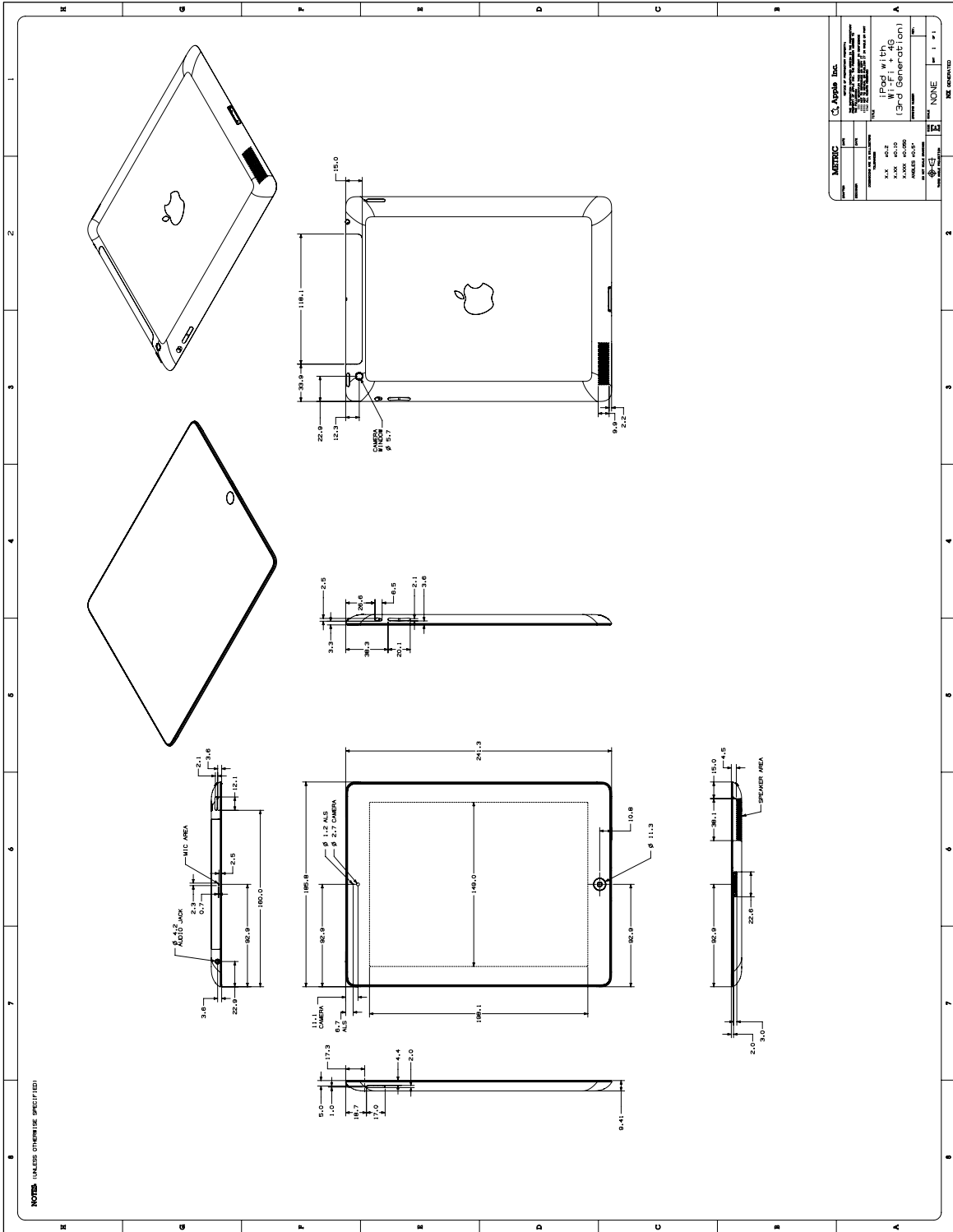
## 3.32 iPad (3rd generation) with Wi-Fi

Figure 3-34 iPad (3rd generation) with Wi-Fi Dimensional Drawing



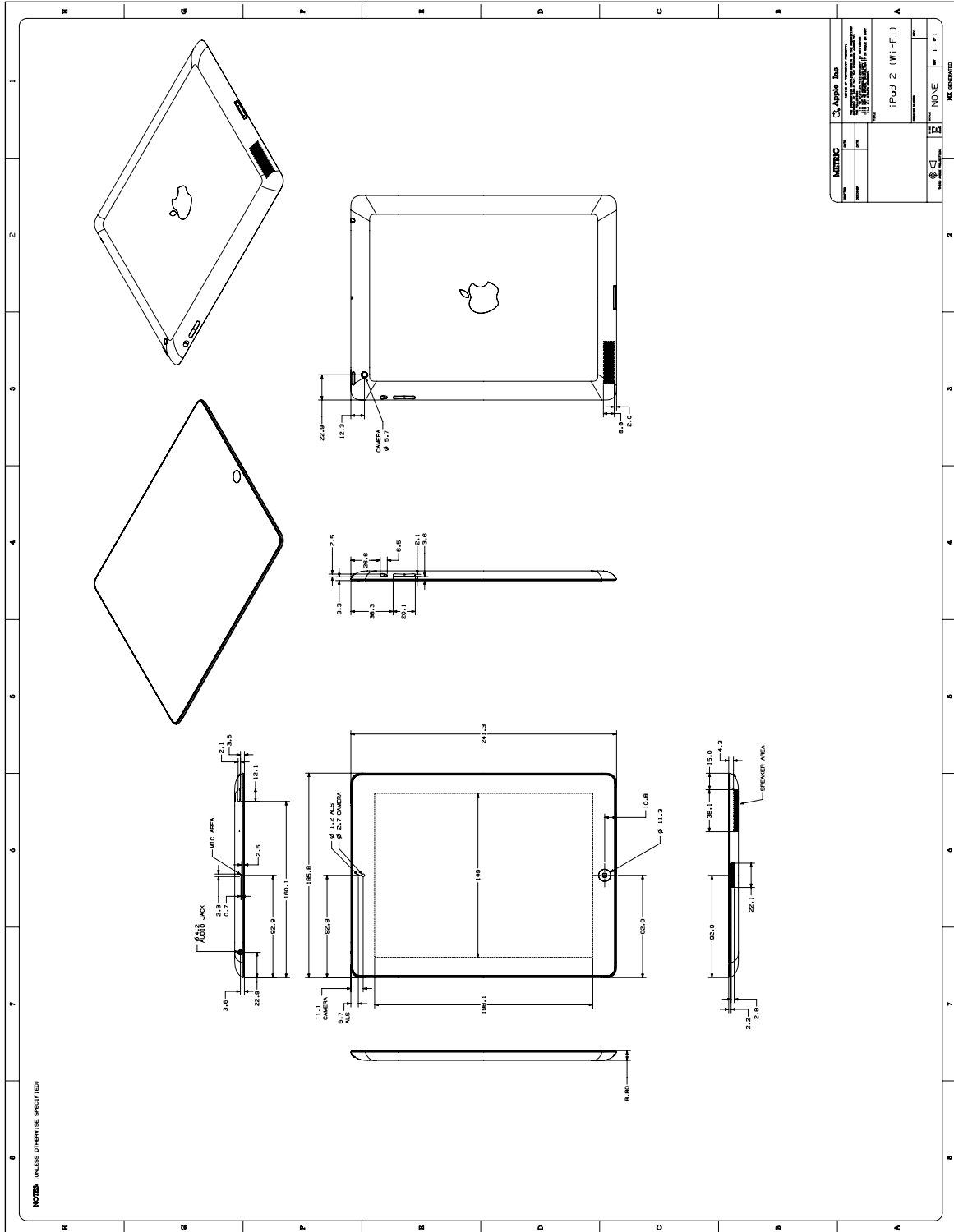
### 3.33 iPad (3rd generation) Wi-Fi + 4G

Figure 3-35 iPad Wi-Fi + 4G (3rd Generation) Dimensional Drawing



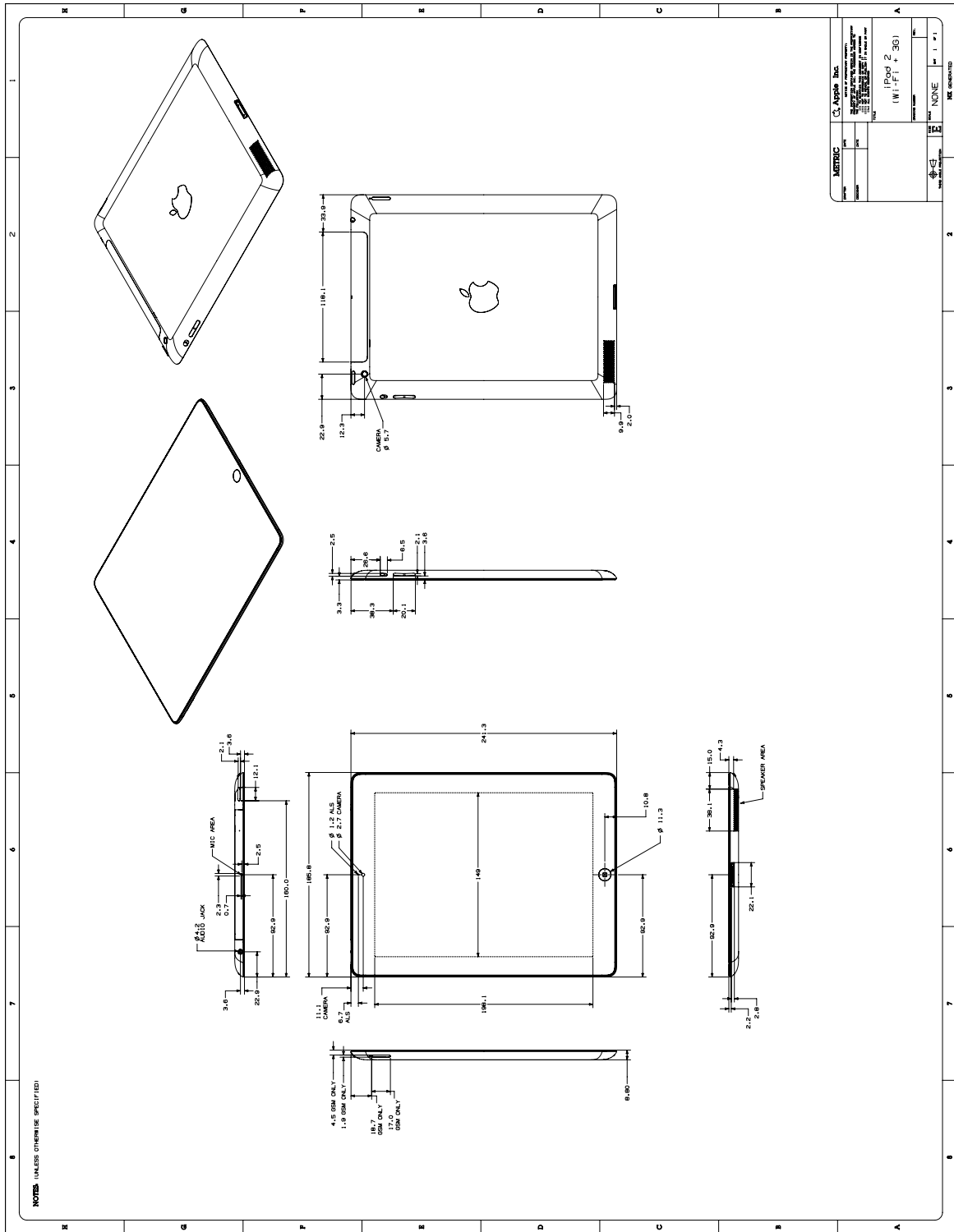
# 3.34 iPad 2 with Wi-Fi

Figure 3-36 iPad 2 with Wi-Fi Dimensional Drawing



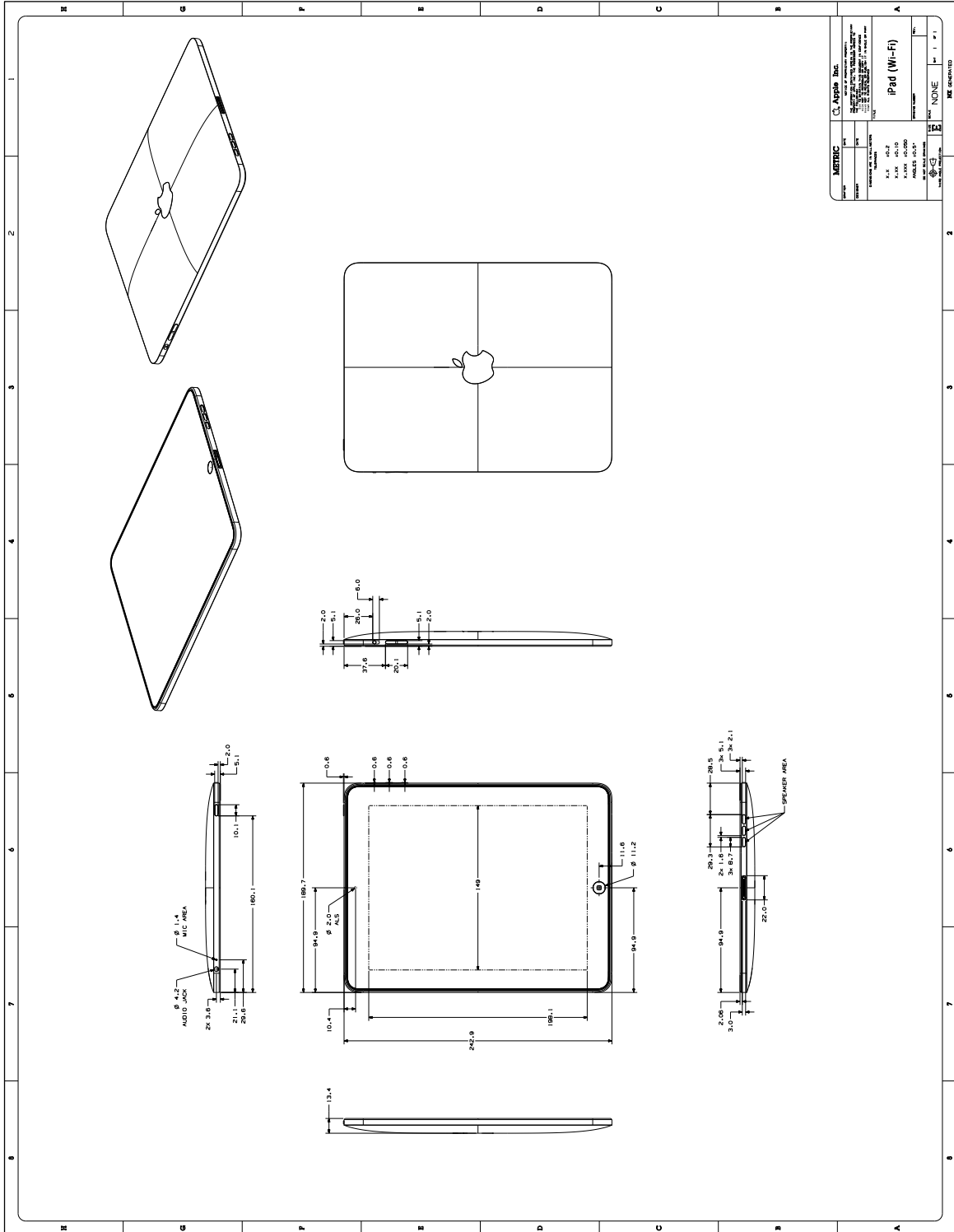
# 3.35 iPad 2 with Wi-Fi + 3G

Figure 3-37 iPad 2 Wi-Fi + 3G Dimensional Drawing



## 3.36 iPad with Wi-Fi

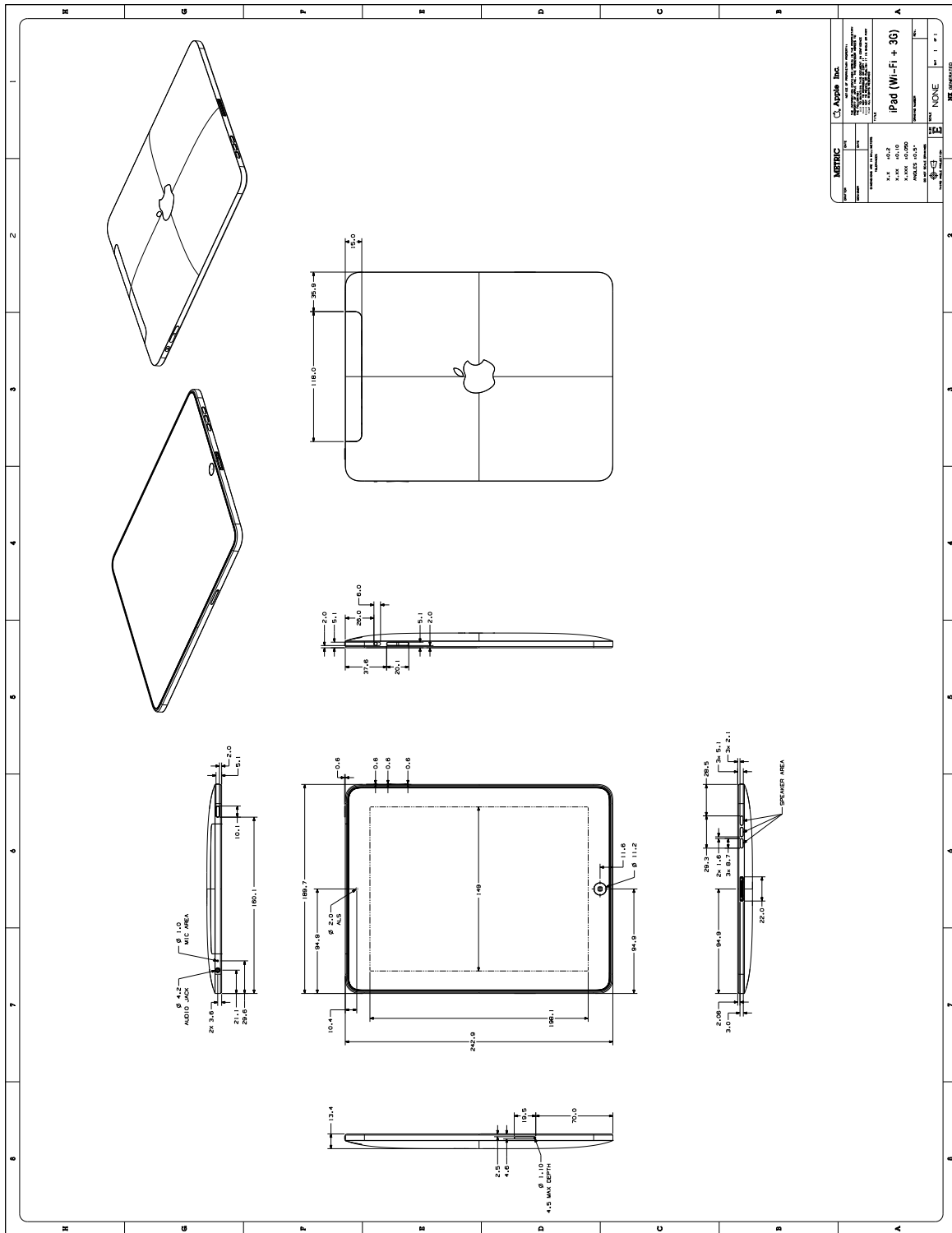
Figure 3-38 iPad Wi-Fi Dimensional Drawing





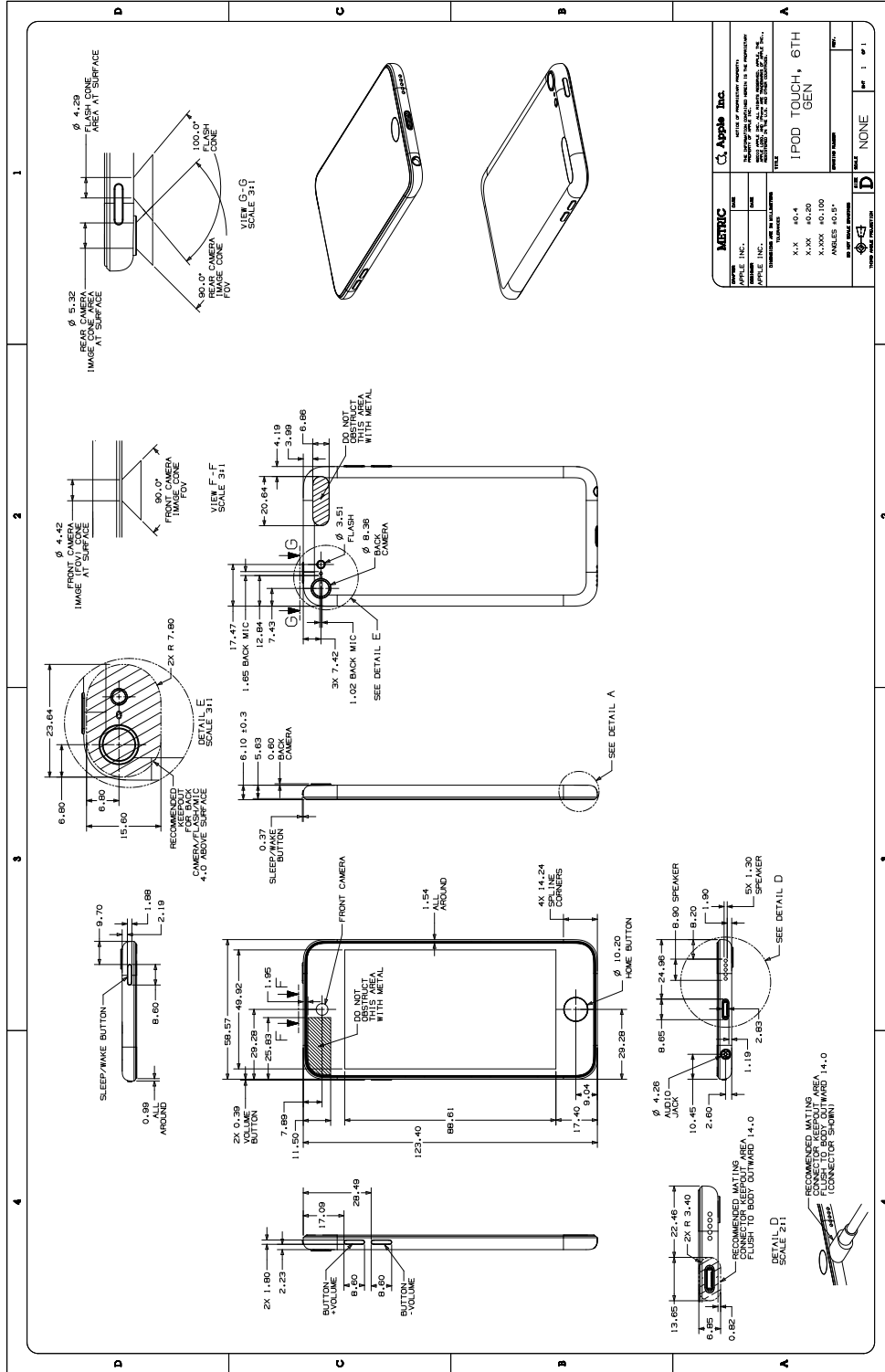
## 3.37 iPad with Wi-Fi + 3G

Figure 3-39 iPad Wi-Fi + 3G Dimensional Drawing



# 3.38 iPod touch (6th generation)

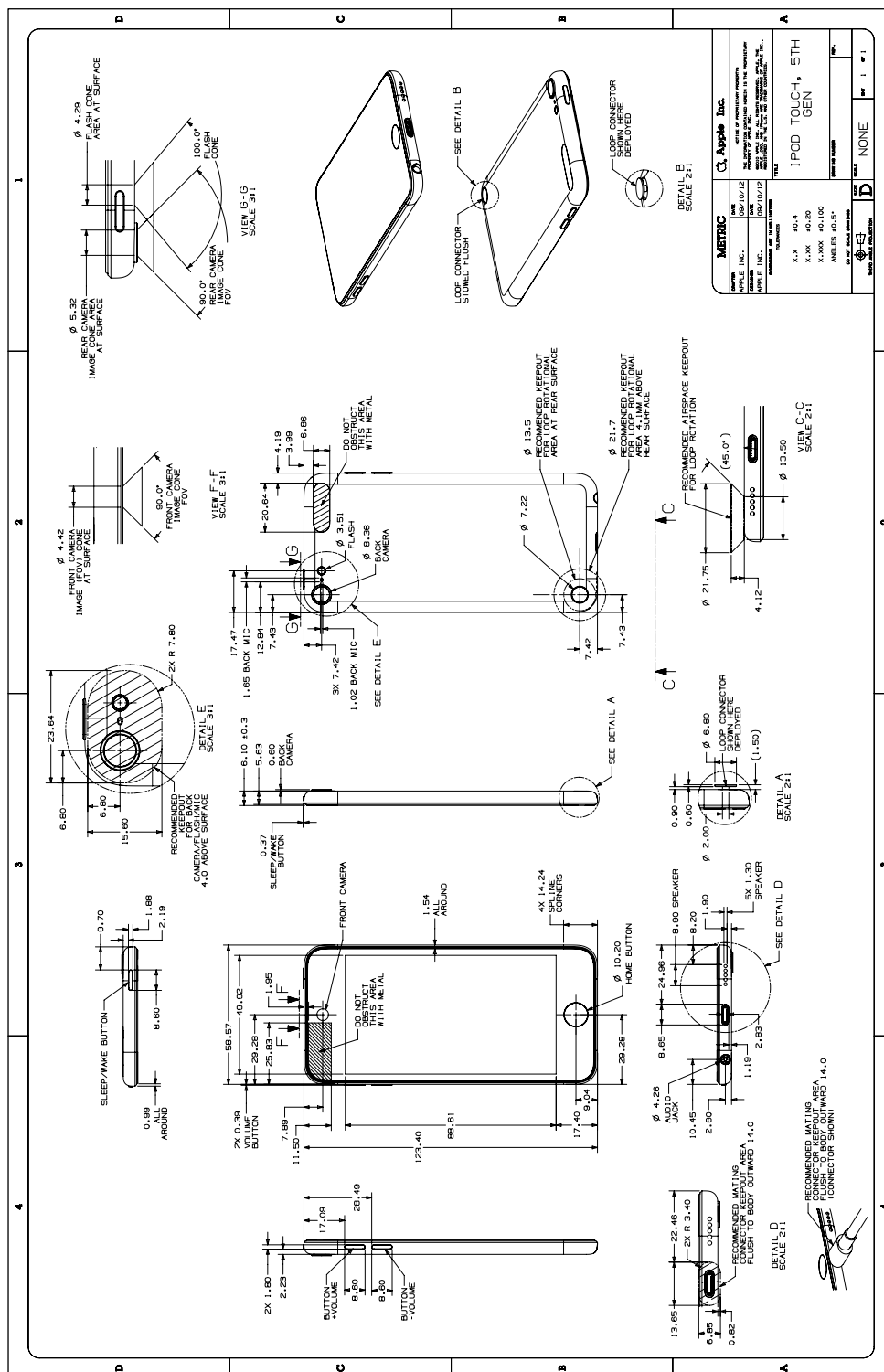
Figure 3-40 iPod touch (6th generation) Dimensional Drawing



<b>Metric</b>		<b>Apple Inc.</b>	
DATE	REV	DESCRIPTION	SCALE
		IPOD TOUCH, 6TH GEN	1:1
X.X ±0.4 X.XX ±0.20 X.XXX ±0.100 ANGLES ±0.5°		TITLE PART NUMBER DRAWING NUMBER REVISIONS DRAWN BY CHECKED BY APPROVED BY	D NONE 1 1

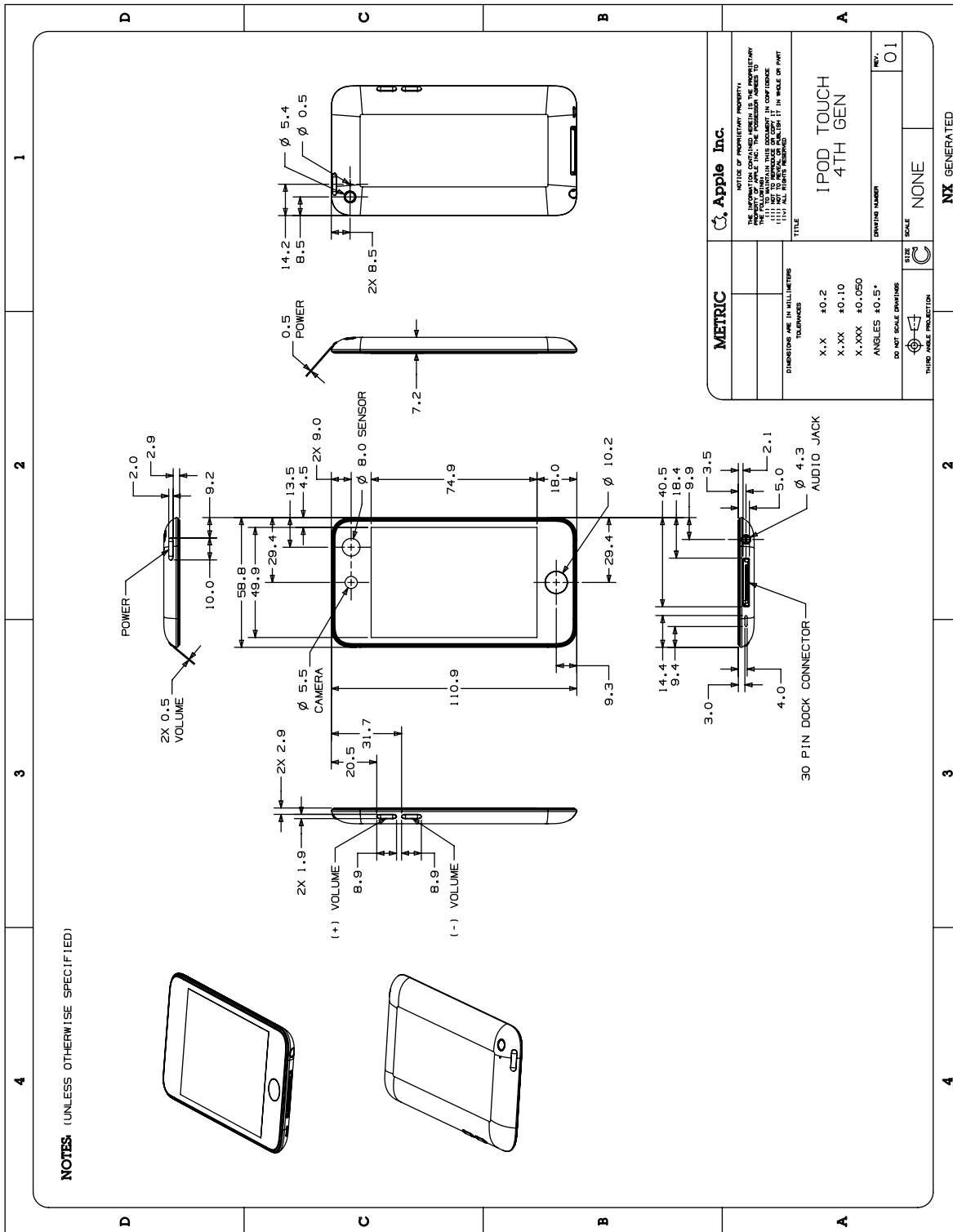
# 3.39 iPod touch (5th generation)

Figure 3-41 iPod touch (5th generation) Dimensional Drawing



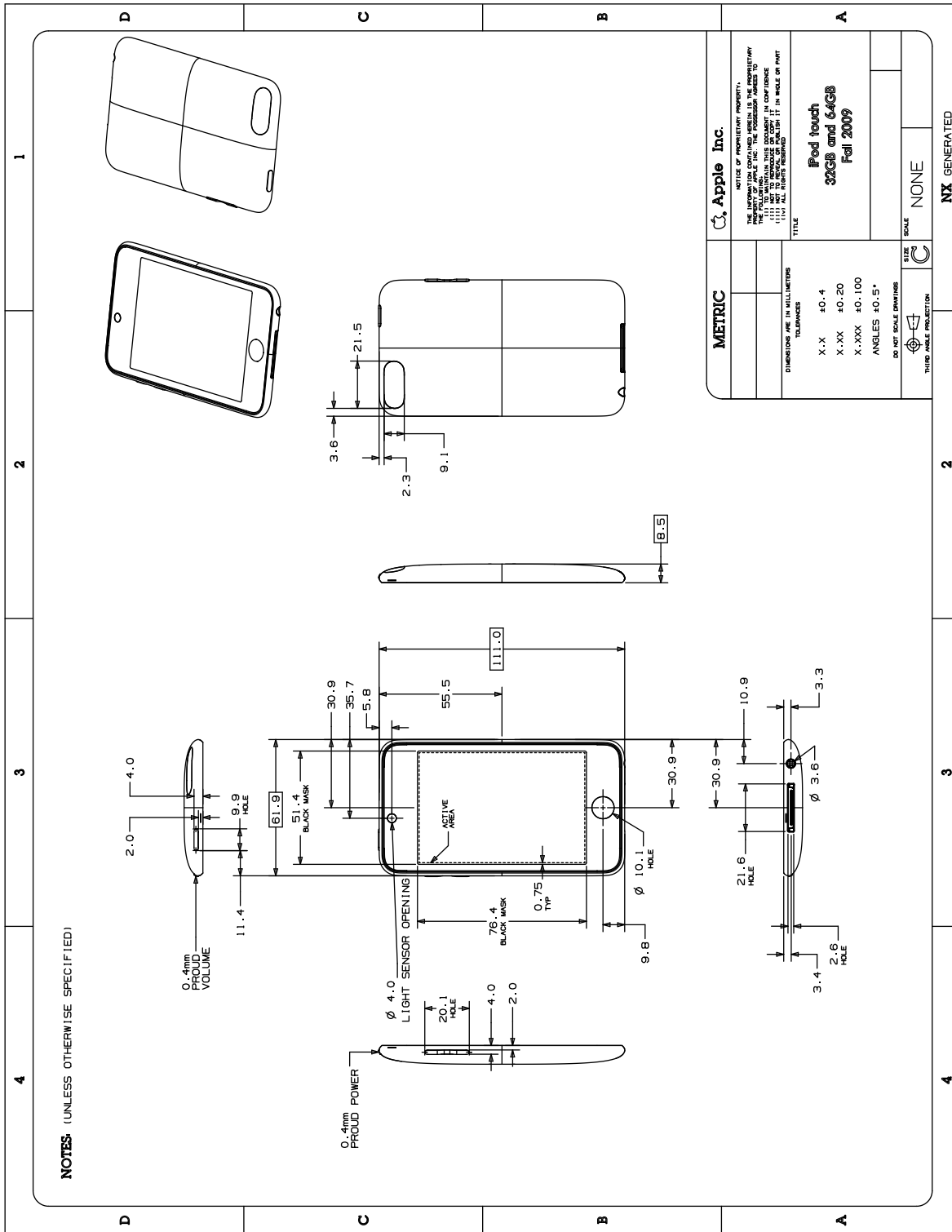
## 3.40 iPod touch (4th generation)

Figure 3-42 iPod touch 4th gen. Dimensional Drawing



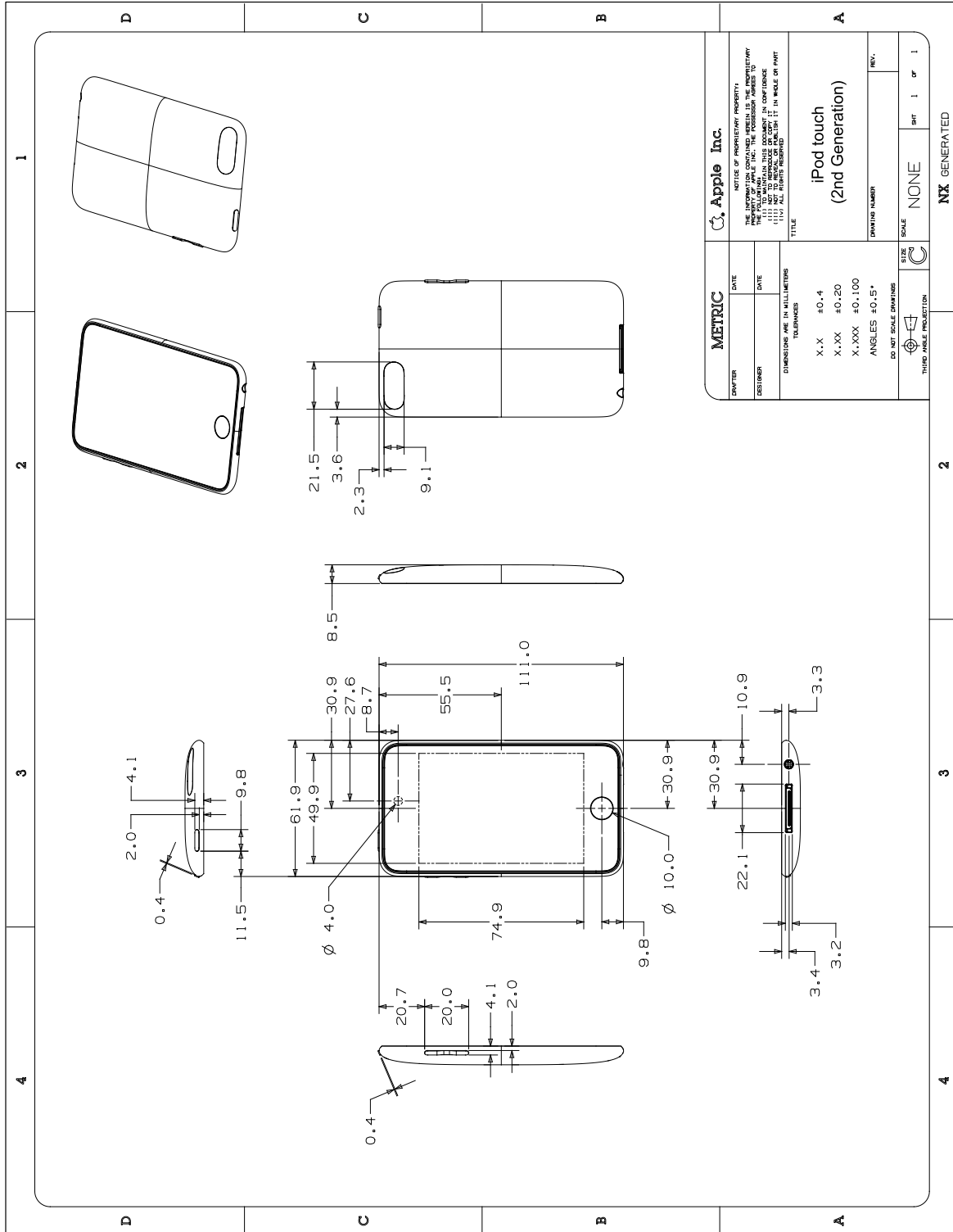
# 3.41 iPod touch (3rd generation)

Figure 3-43 iPod touch 3rd gen. Fall '09 32GB and 64GB Dimensional Drawing



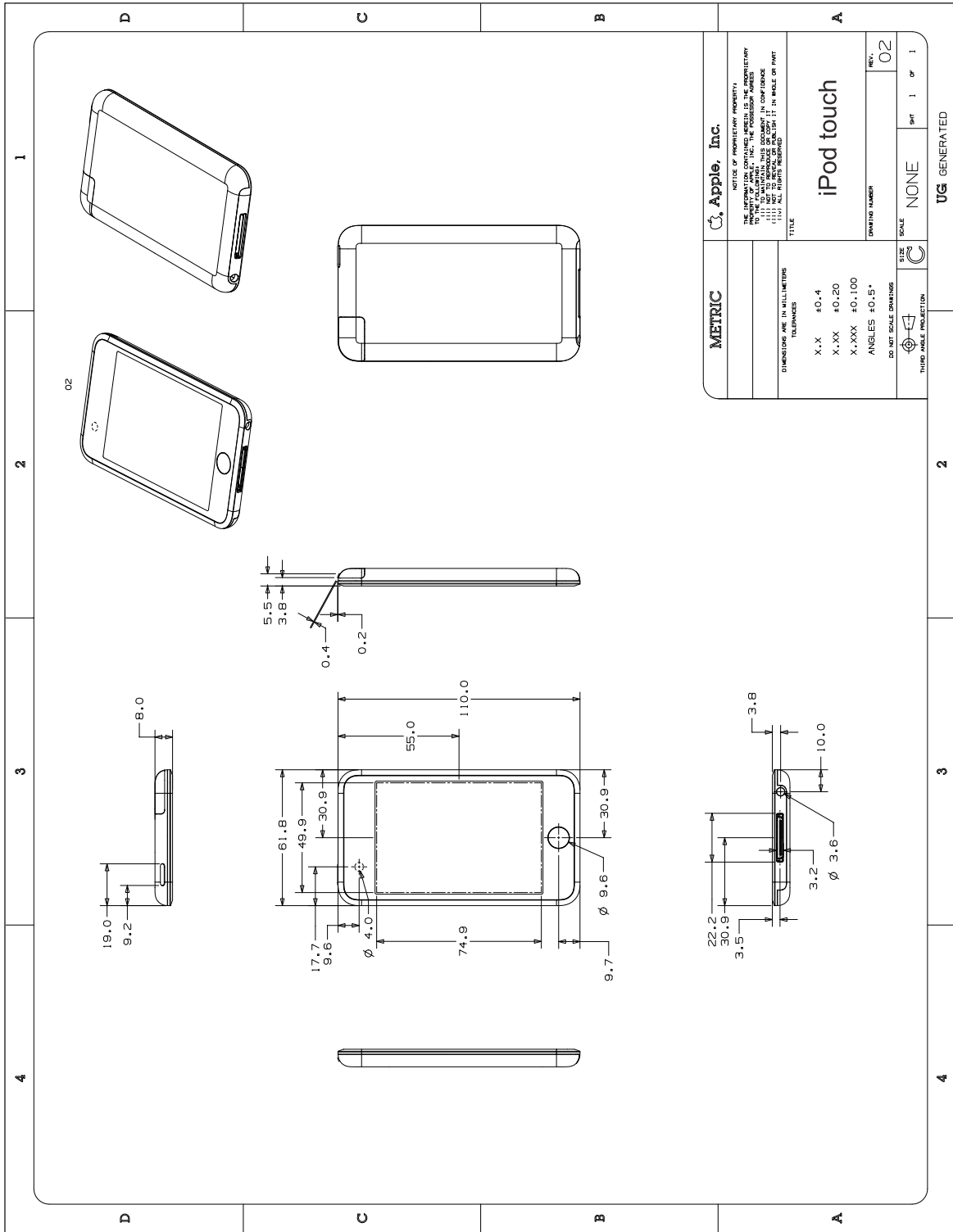
## 3.42 iPod touch (2nd generation)

Figure 3-44 iPod touch 2nd gen. 8GB, 16GB, 32GB Dimensional Drawing



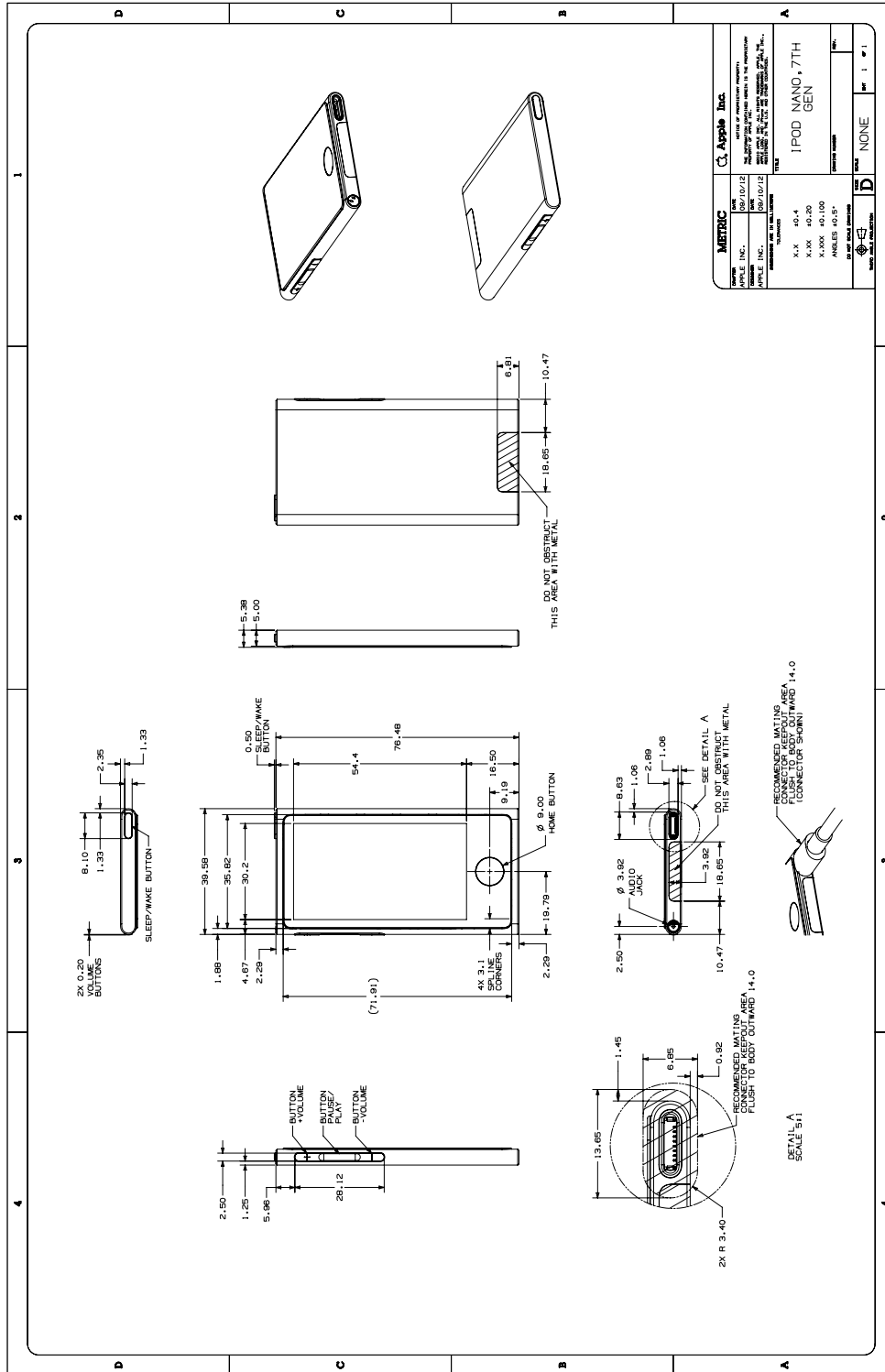
# 3.43 iPod touch

Figure 3-45 iPod touch Dimensional Drawing



# 3.44 iPod nano (7th generation)

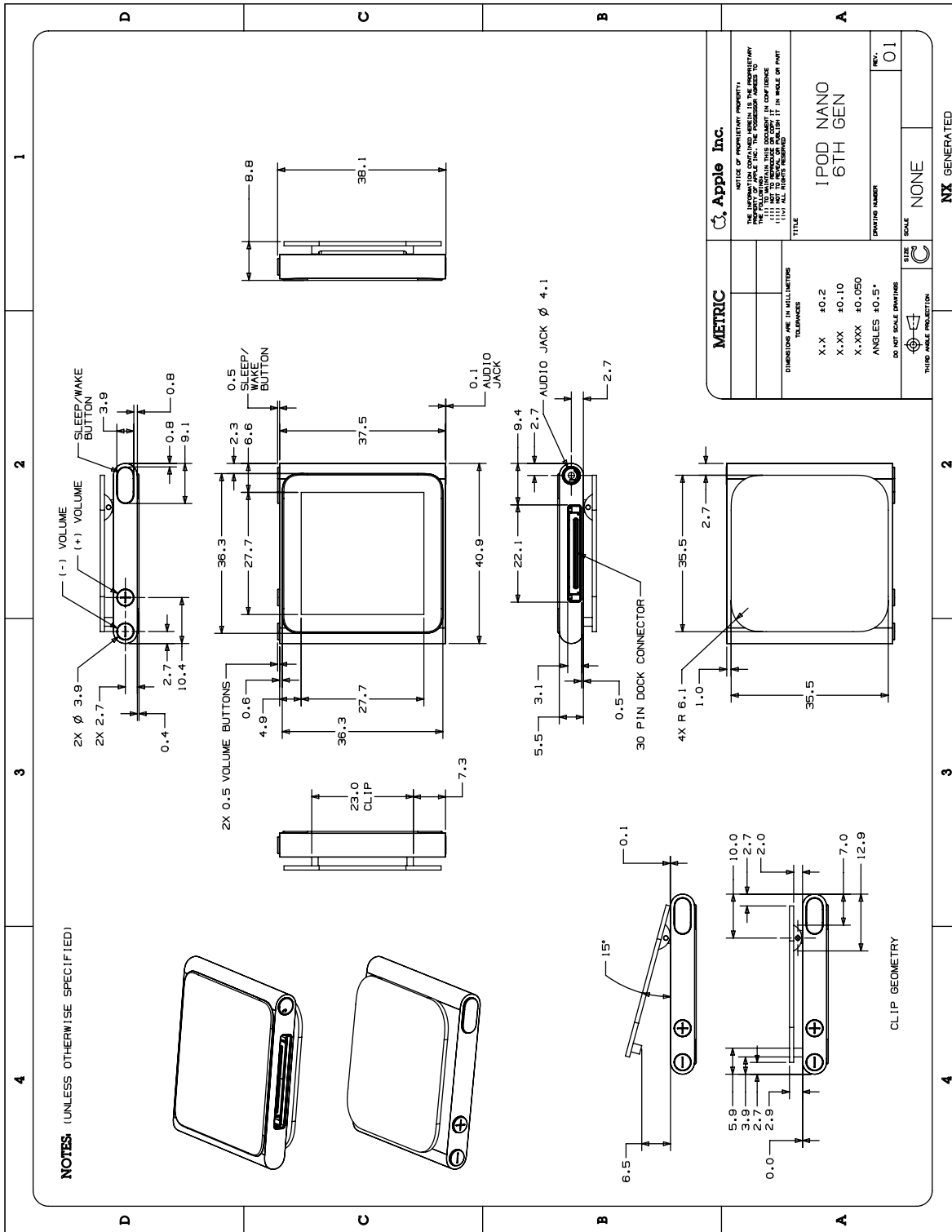
Figure 3-46 iPod nano 7th gen. Dimensional Drawing





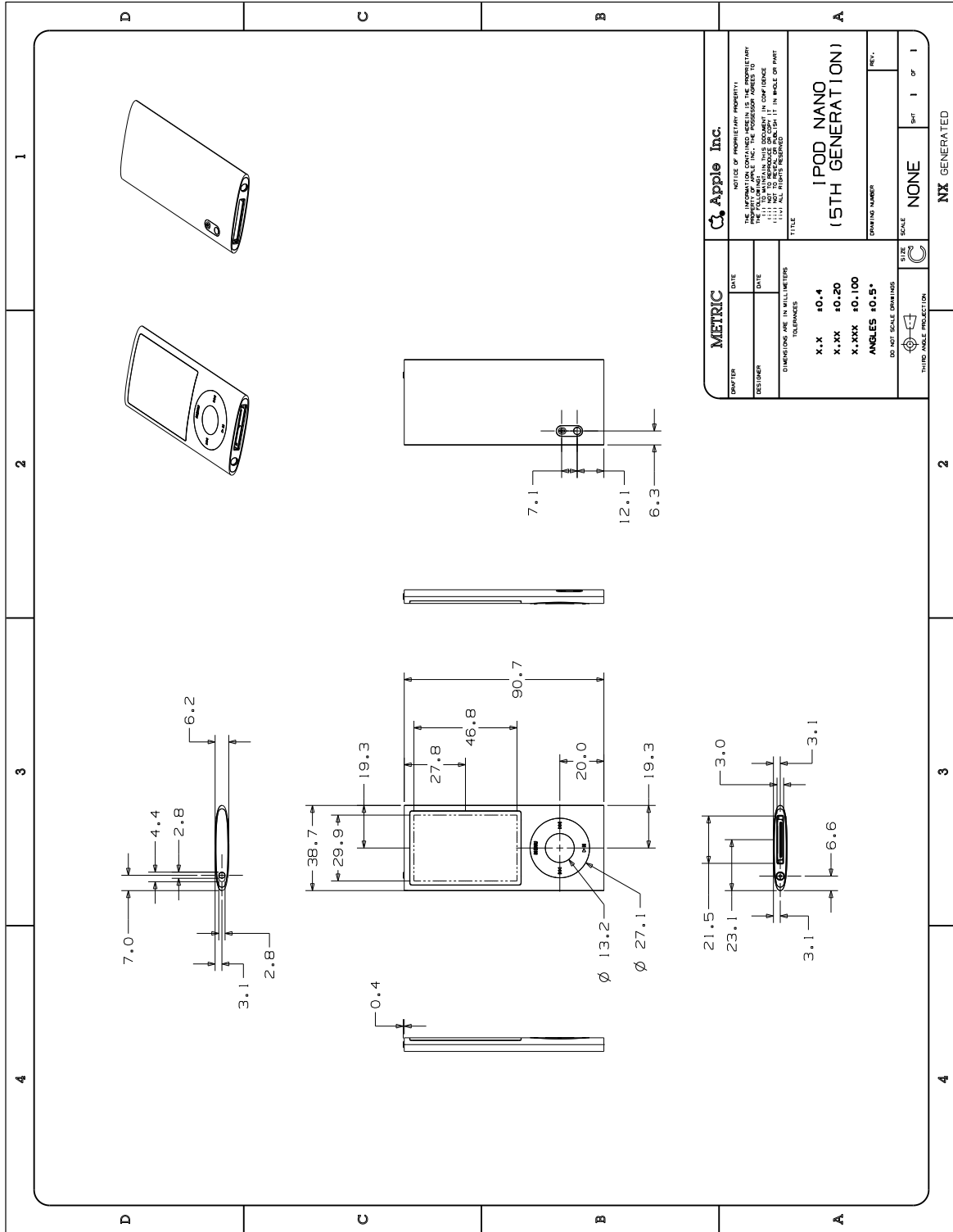
## 3.45 iPod nano (6th generation)

Figure 3-47 iPod nano 6th gen. Dimensional Drawing



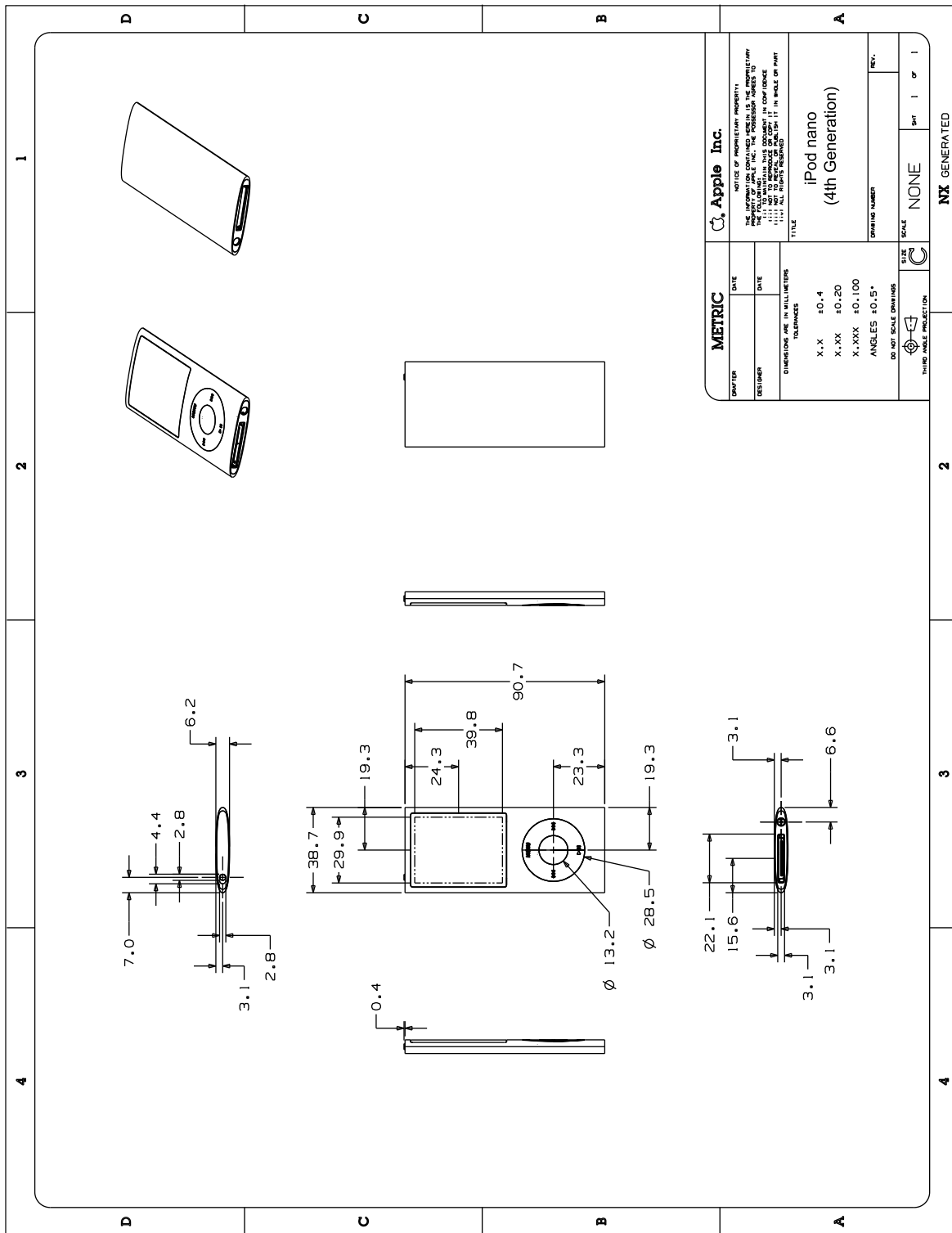
## 3.46 iPod nano (5th generation)

Figure 3-48 iPod nano 5th gen. Dimensional Drawing



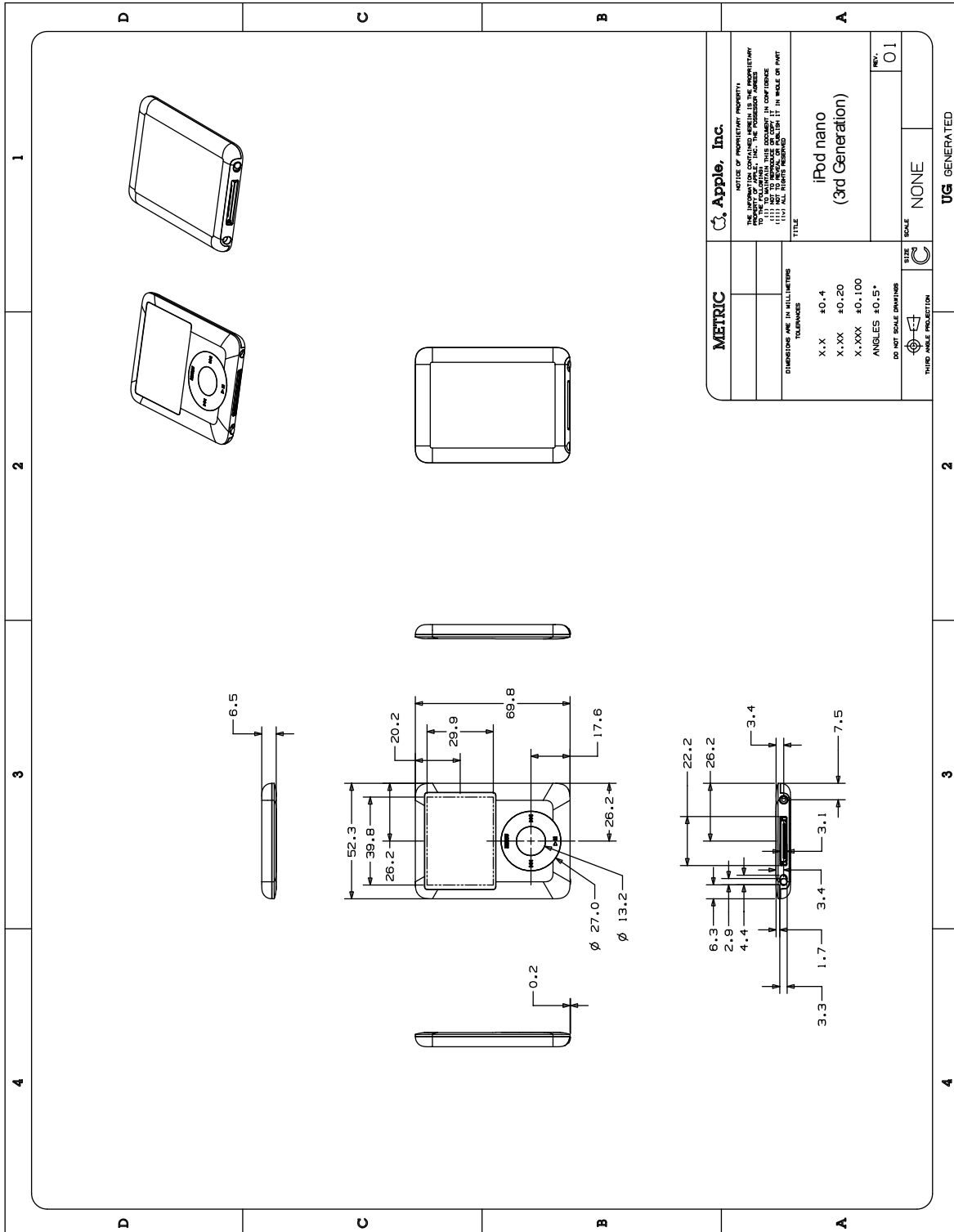
## 3.47 iPod nano (4th generation)

Figure 3-49 iPod nano 4th gen. Dimensional Drawing



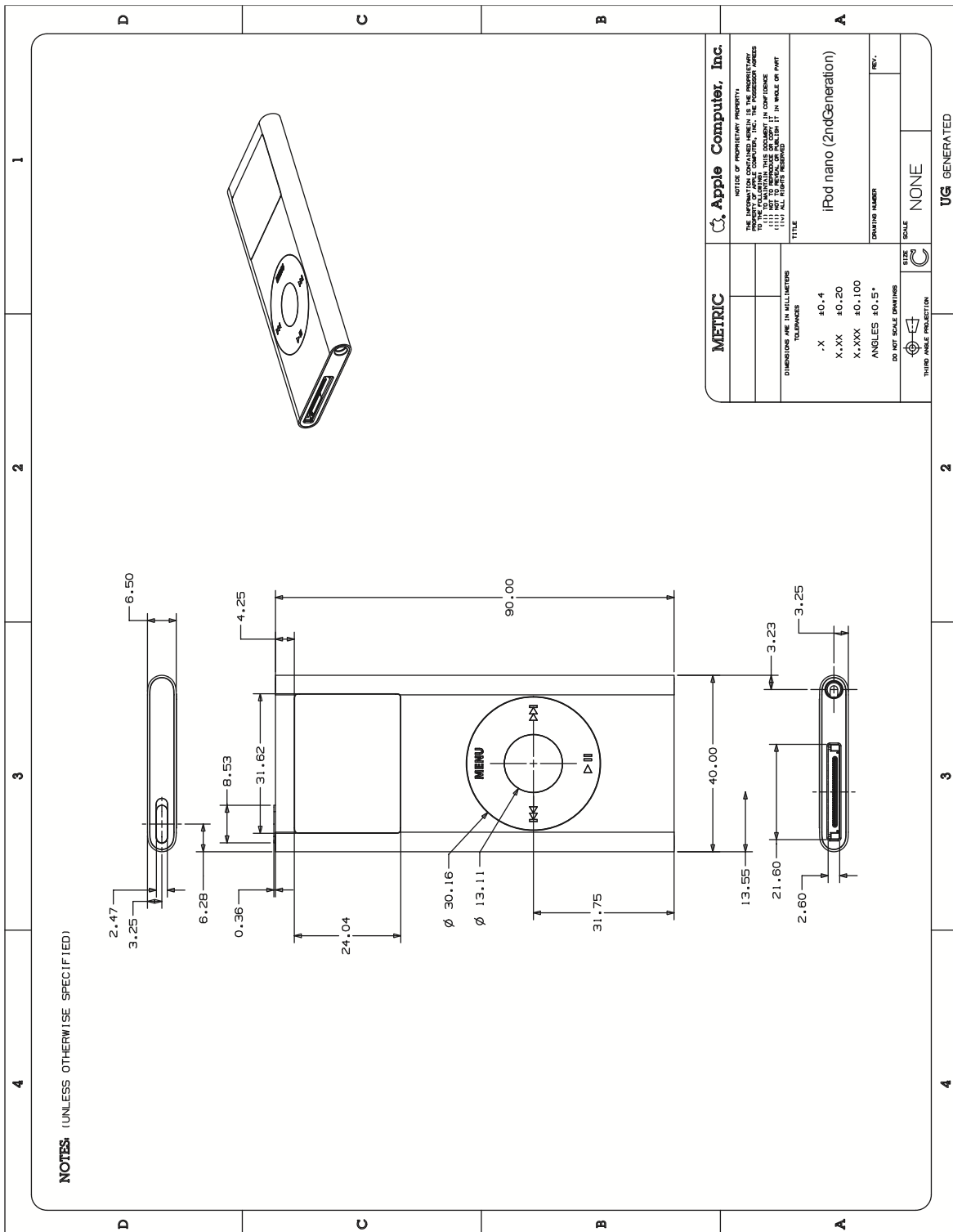
## 3.48 iPod nano (3rd generation)

Figure 3-50 iPod nano 3rd gen. Dimensional Drawing



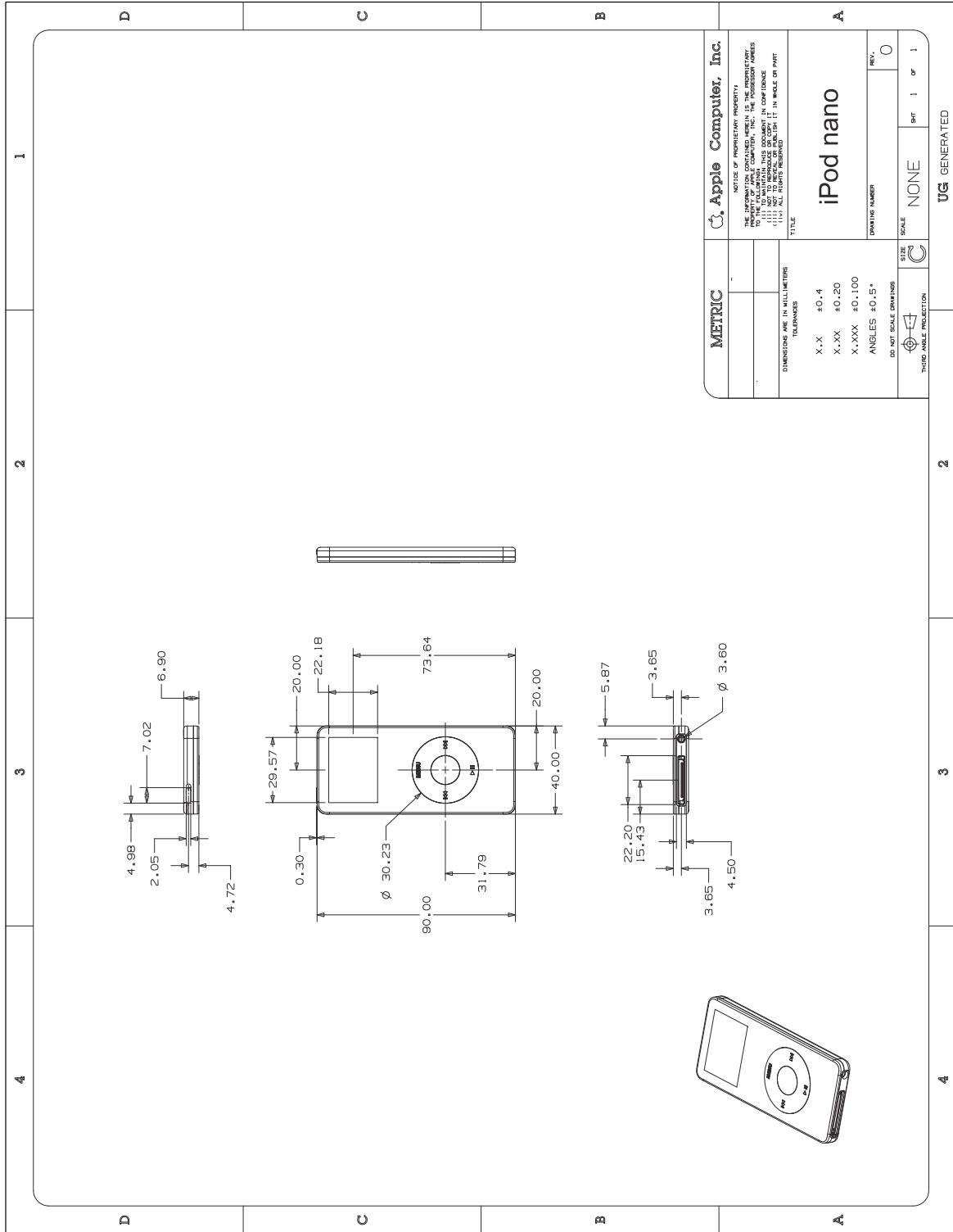
## 3.49 iPod nano (2nd generation)

Figure 3-51 iPod nano 2nd gen. Dimensional Drawing



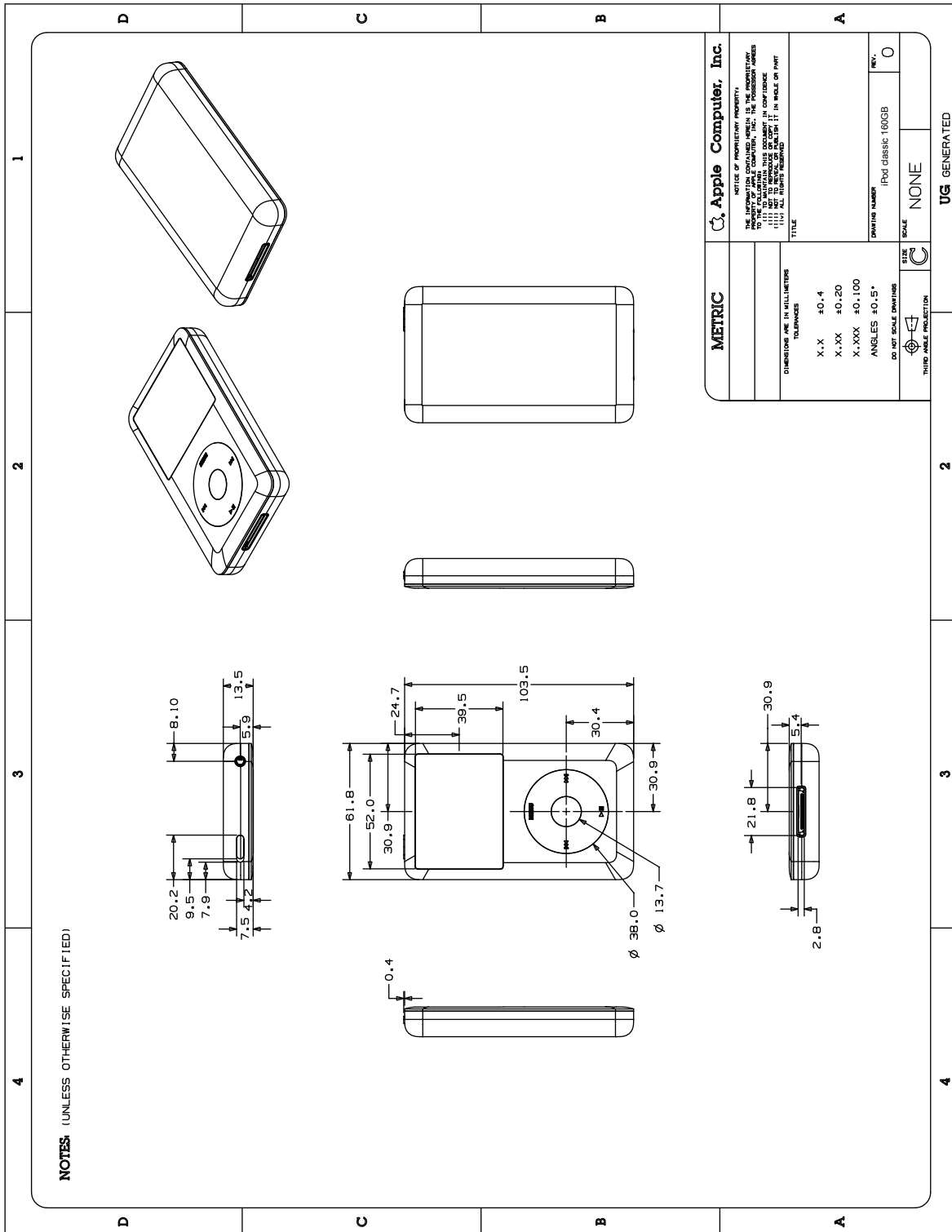
# 3.50 iPod nano

Figure 3-52 iPod nano Dimensional Drawing



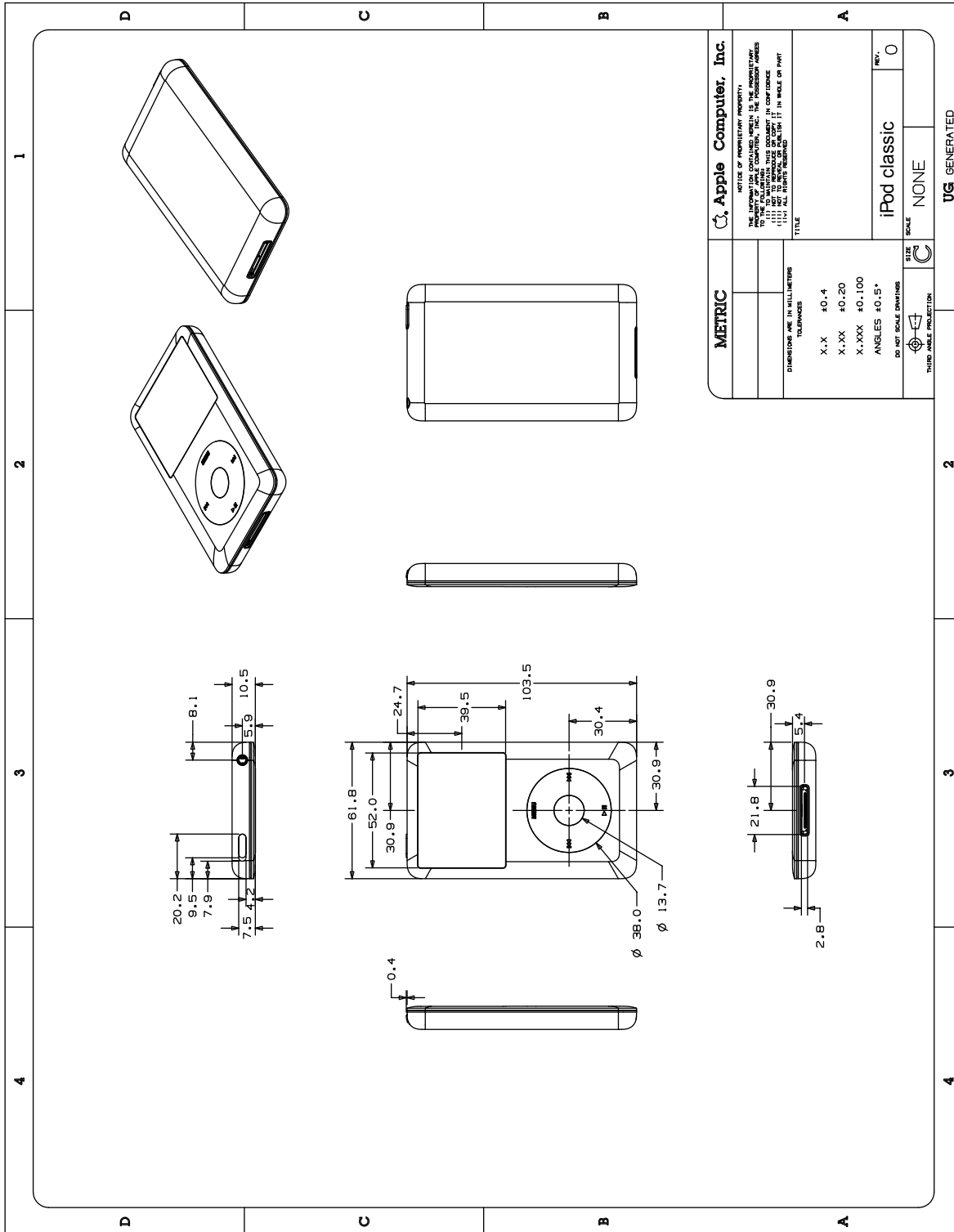
# 3.51 iPod classic 160GB

Figure 3-53 iPod classic 160GB Dimensional Drawing



## 3.52 iPod classic 80GB

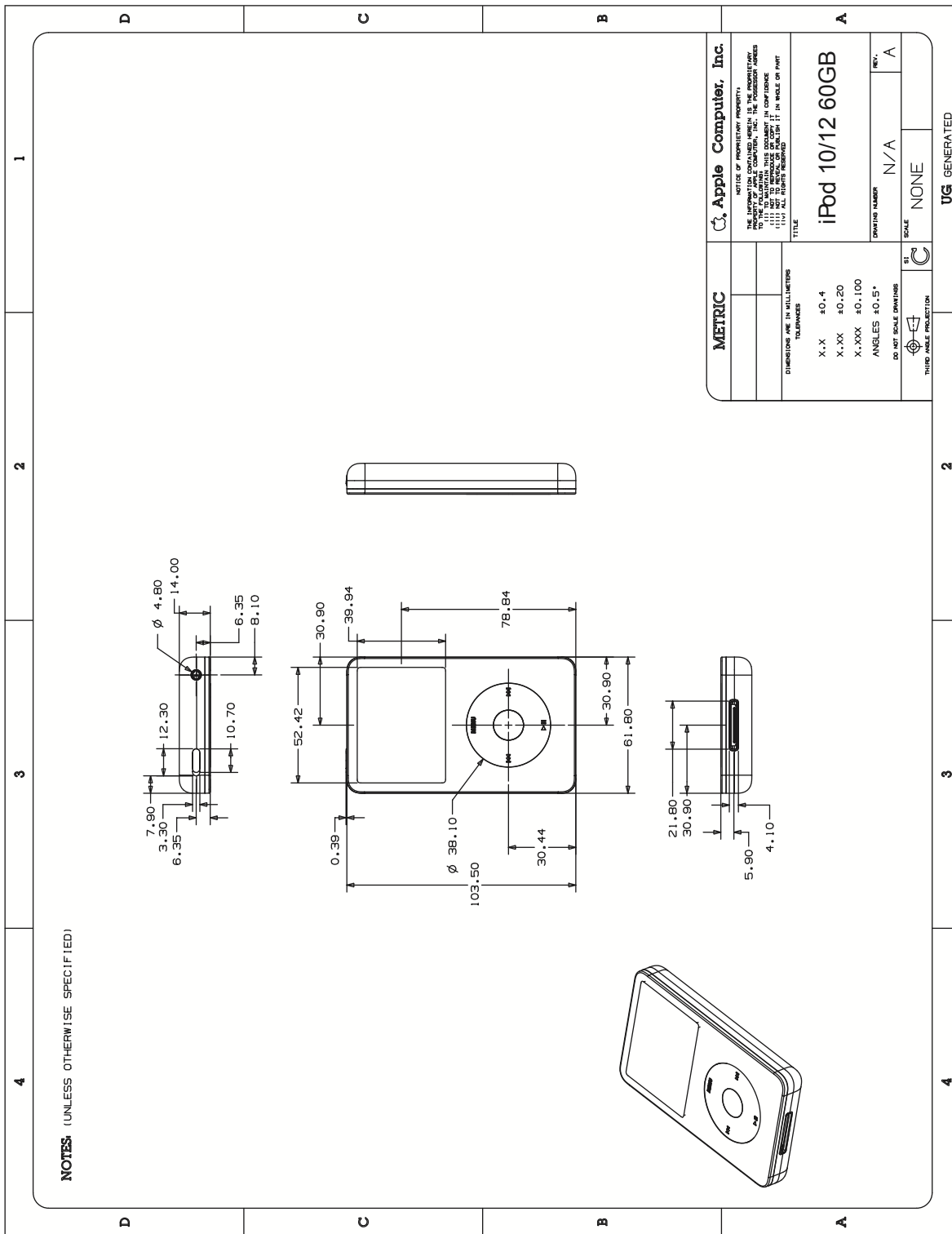
Figure 3-54 iPod classic 80GB Dimensional Drawing





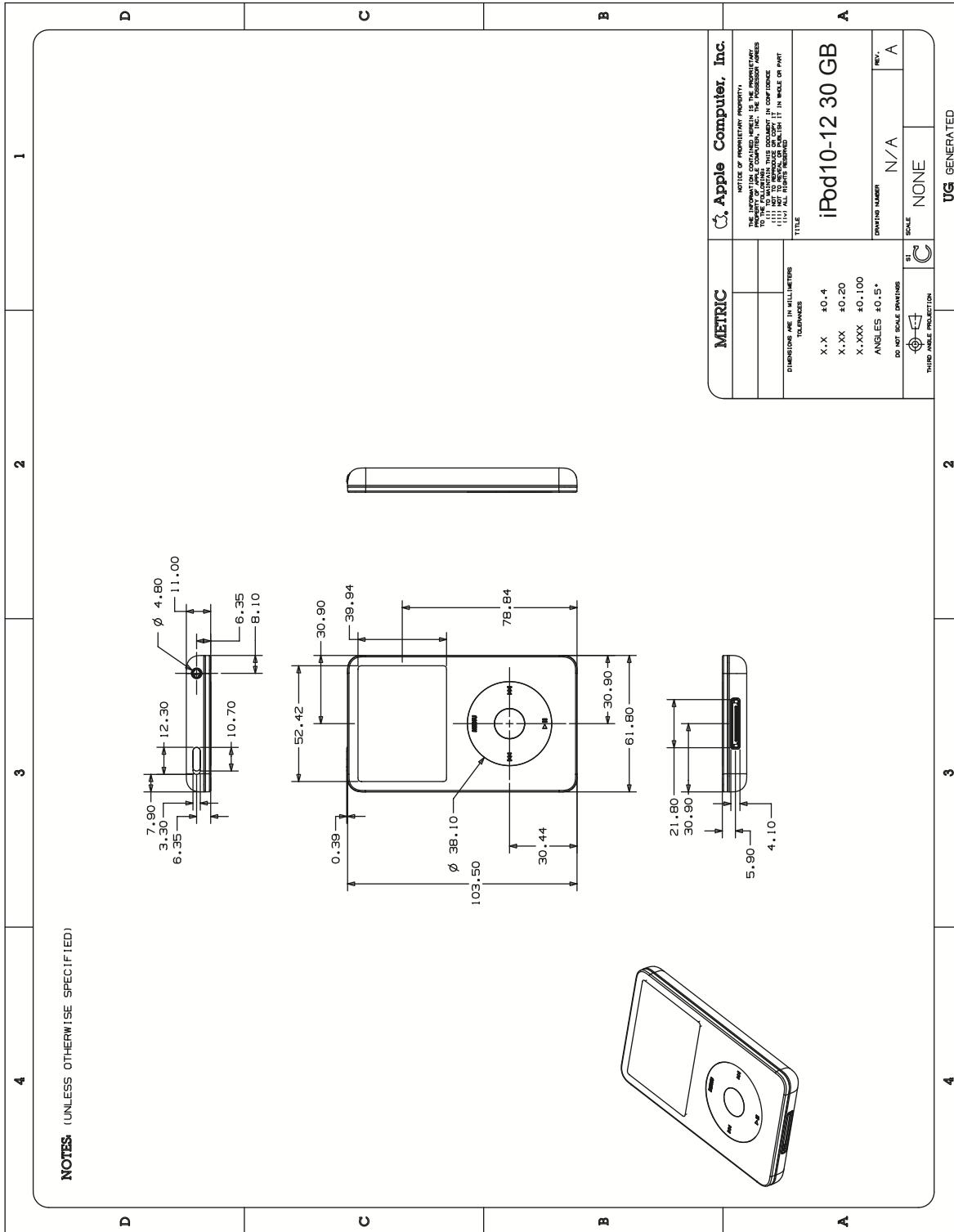
## 3.53 iPod (5th generation) 60GB/80GB

Figure 3-55 iPod 5th gen. 60GB/80GB Dimensional Drawing



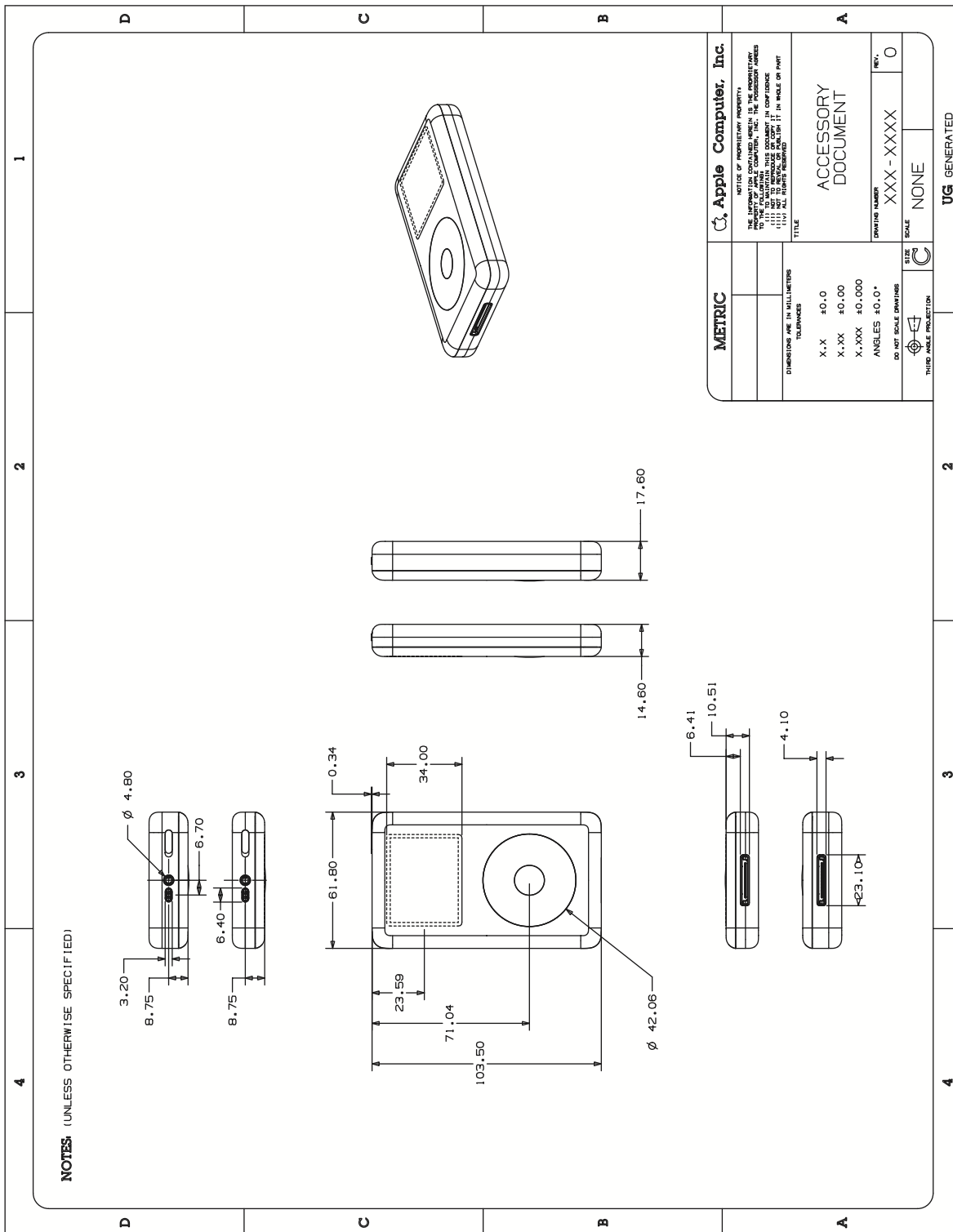
## 3.54 iPod (5th generation) 30GB

Figure 3-56 iPod 5th gen. 30GB Dimensional Drawing



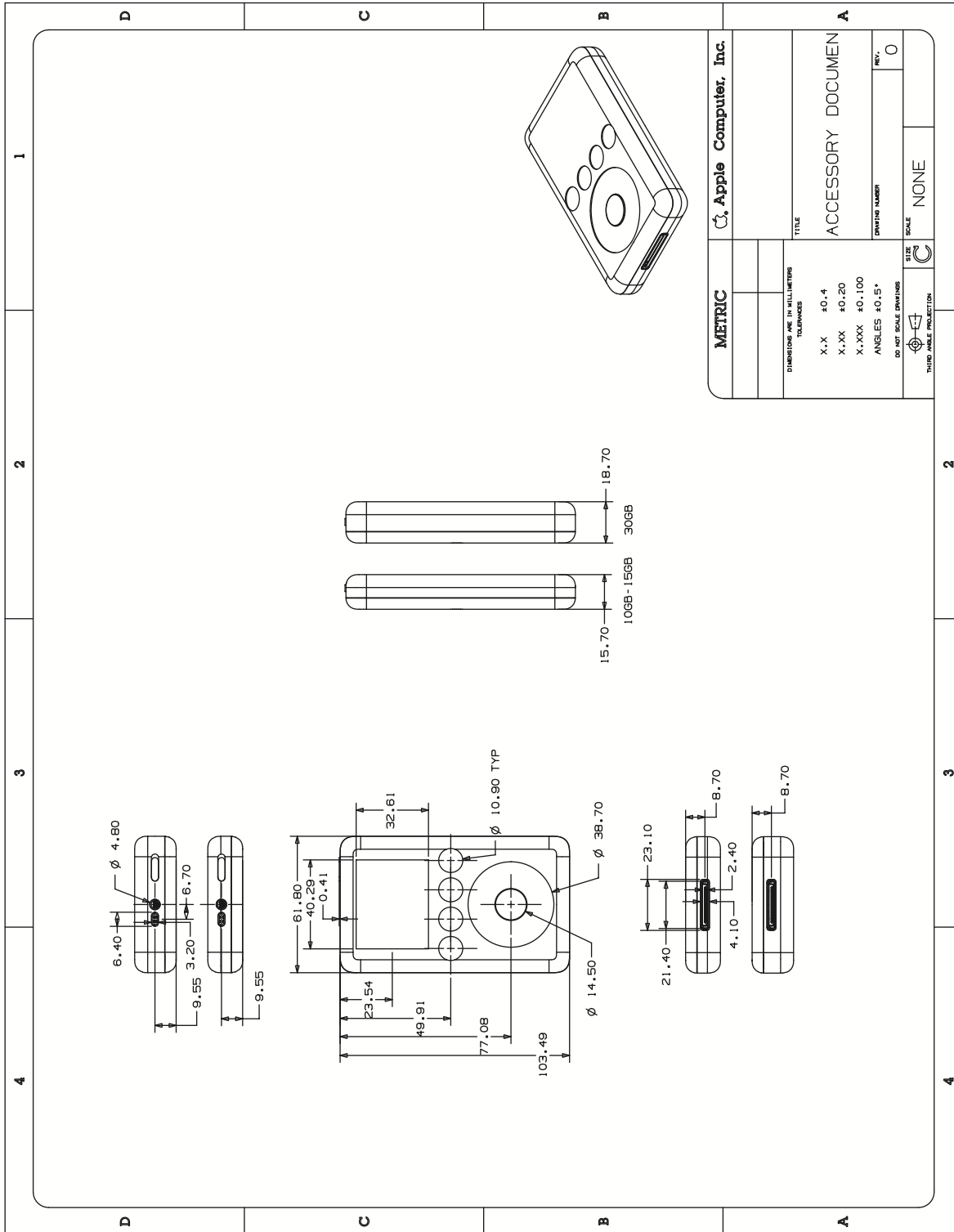
## 3.55 iPod (4th generation)

Figure 3-57 iPod 4th gen. Dimensional Drawing



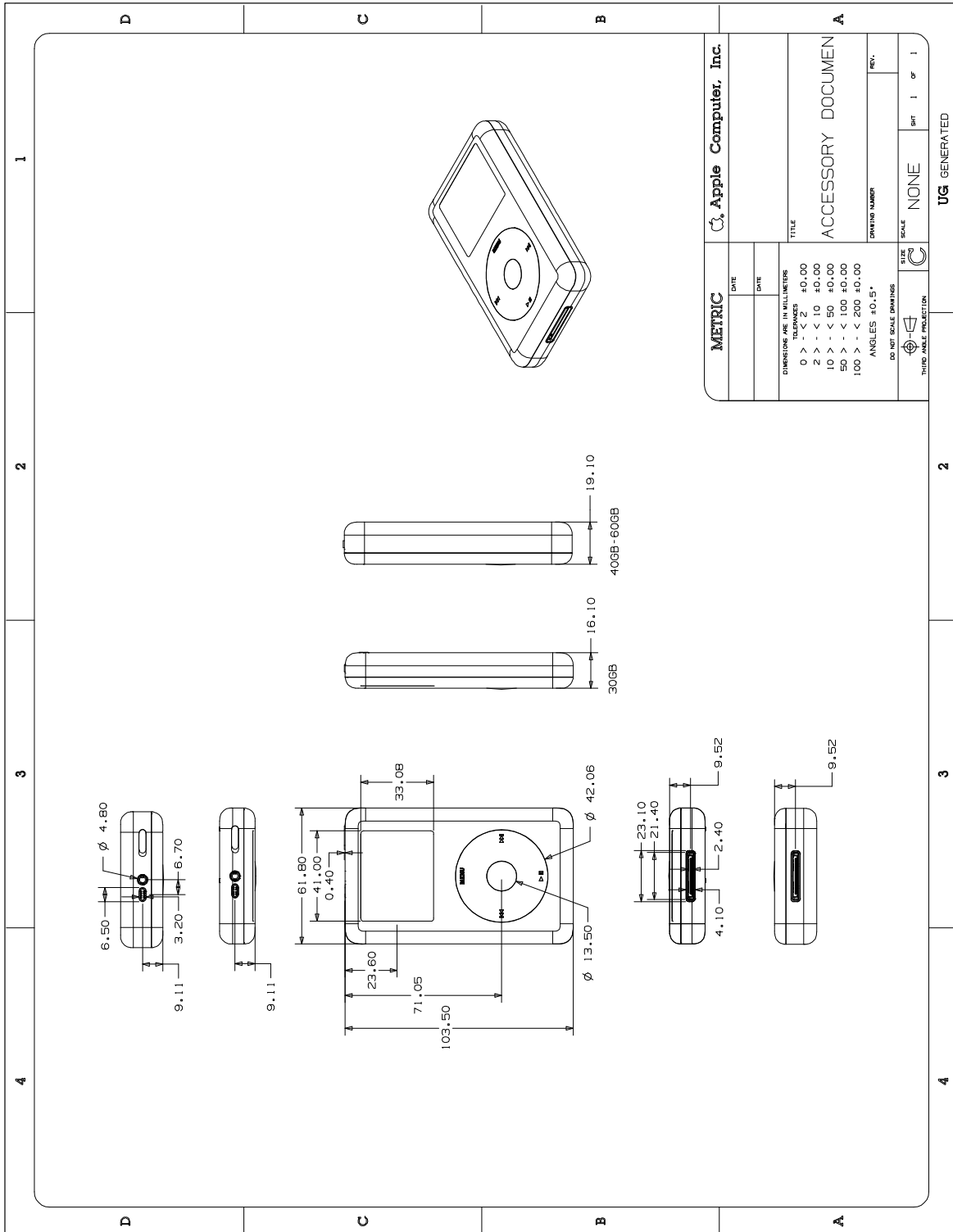
## 3.56 iPod (3rd generation)

Figure 3-58 iPod 3rd gen. Dimensional Drawing



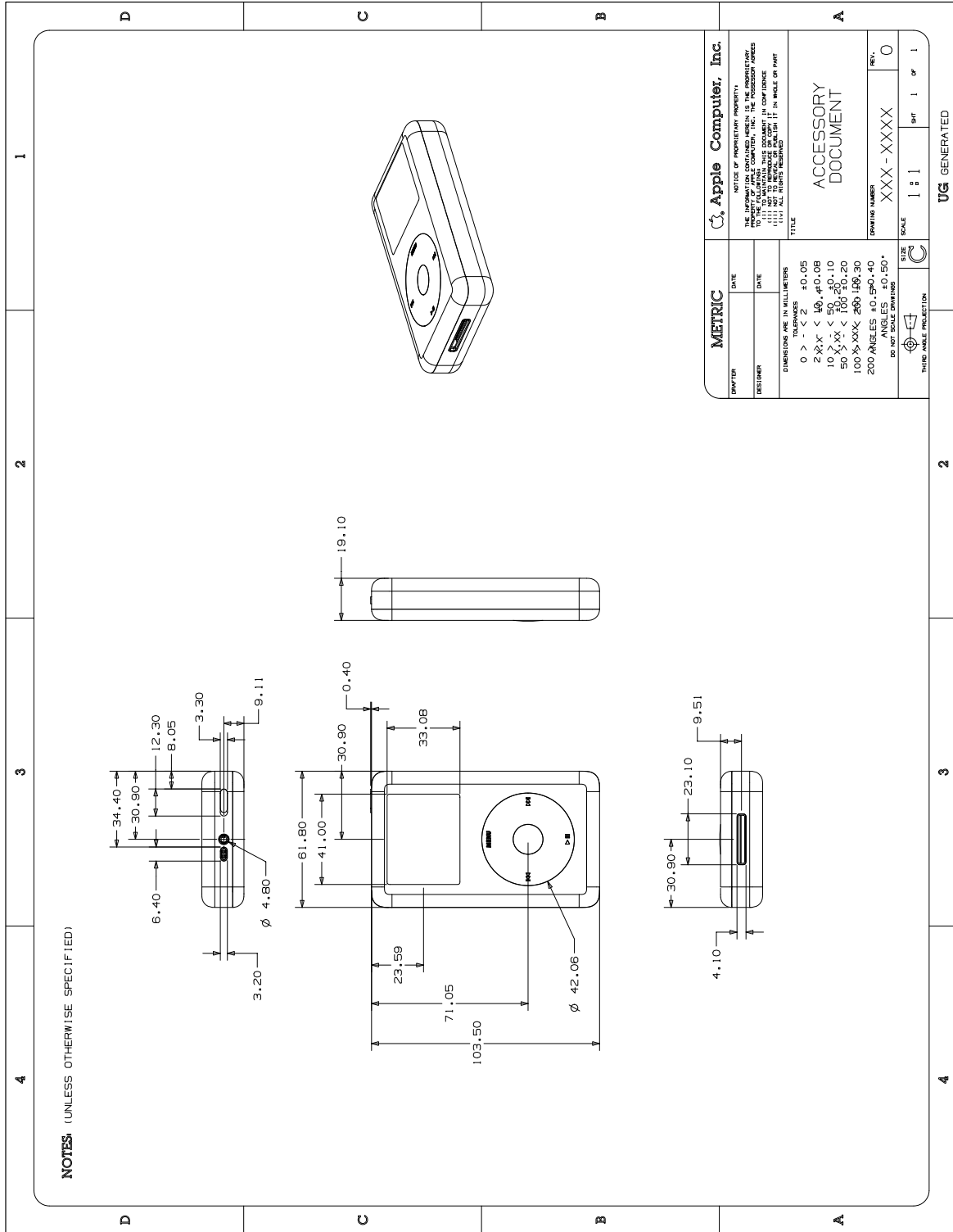
# 3.57 iPod photo 30GB/60GB

Figure 3-59 iPod photo 30/60GB Dimensional Drawing



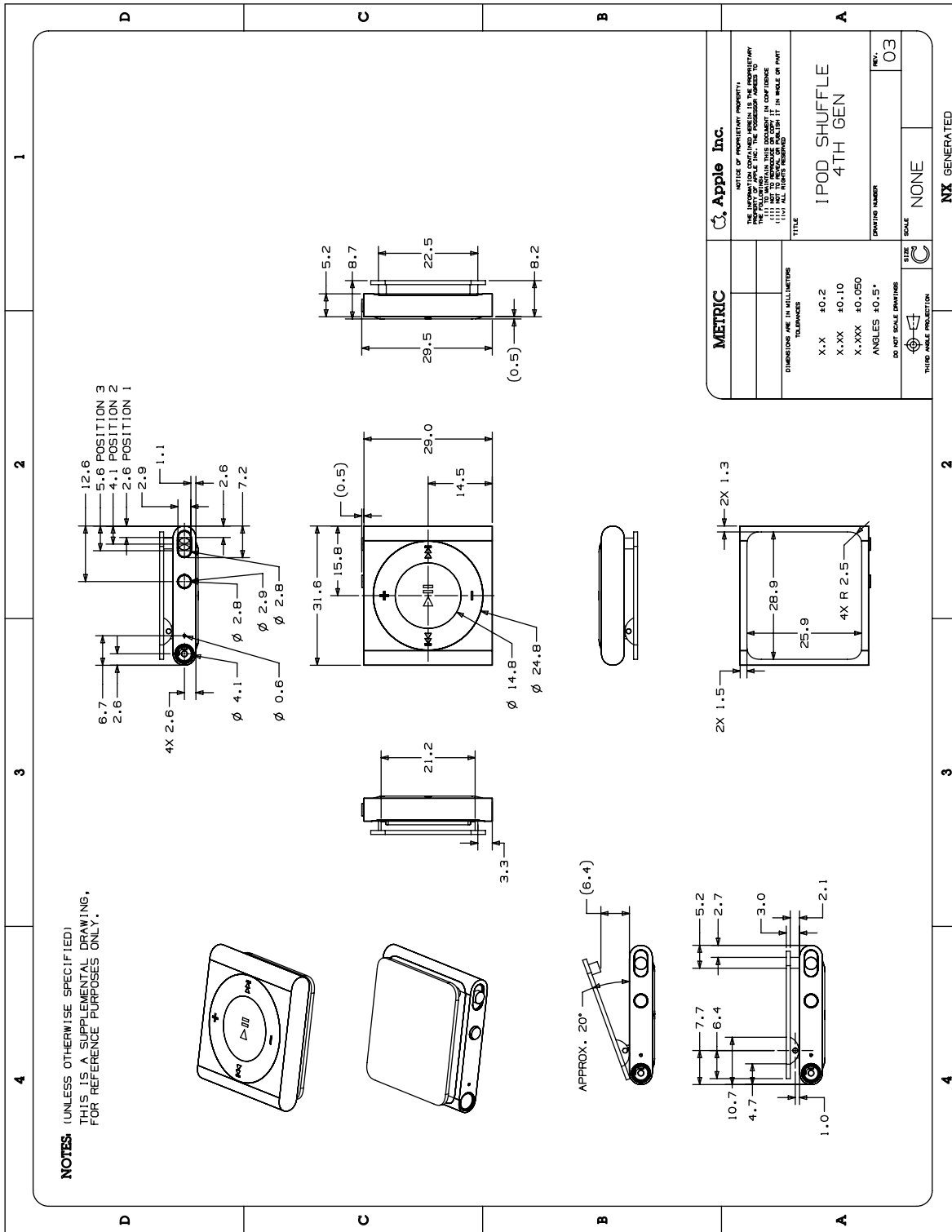
# 3.58 iPod photo

Figure 3-60 iPod photo Dimensional Drawing



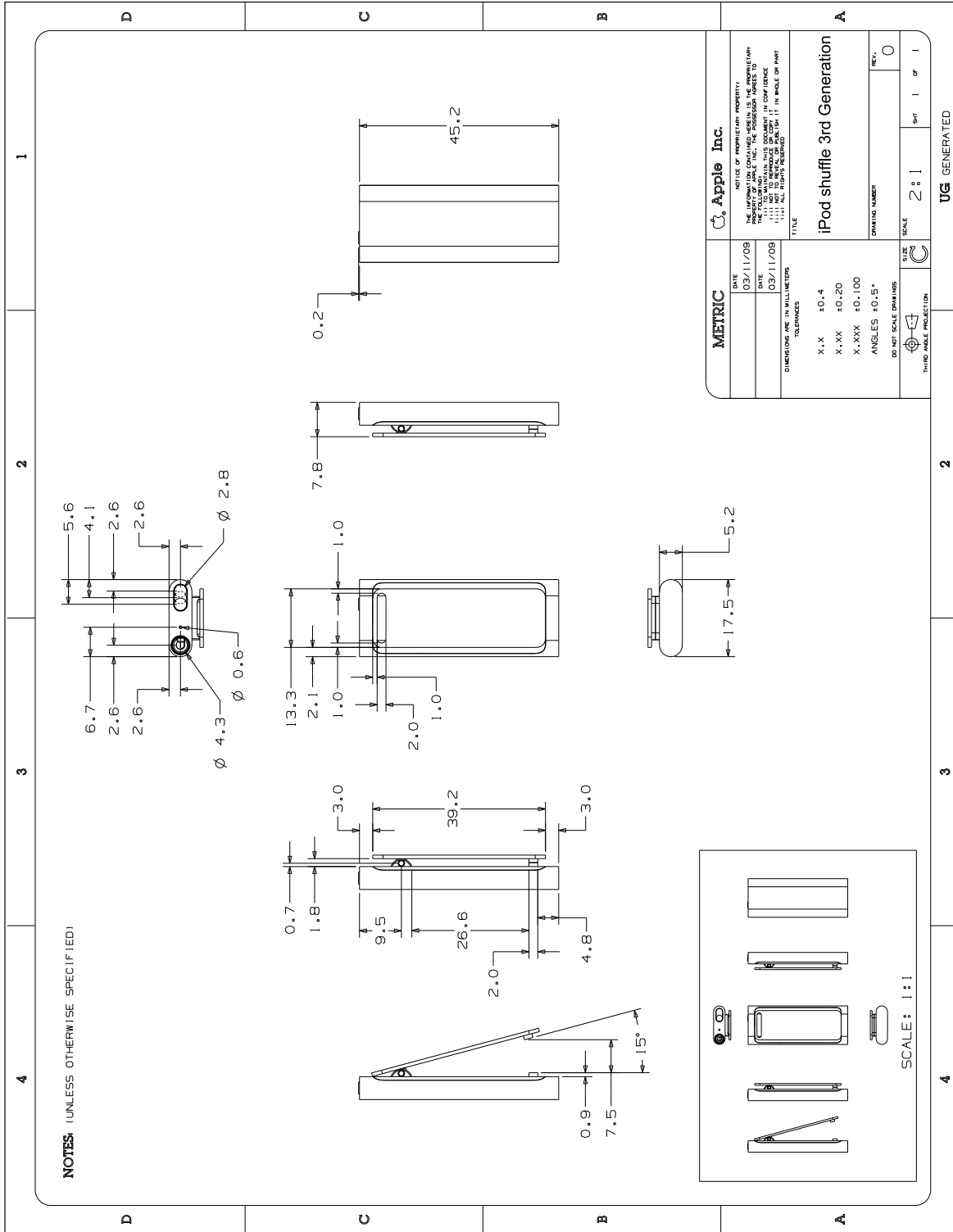
# 3.59 iPod shuffle (4th generation)

Figure 3-61 iPod shuffle 4th gen. Dimensional Drawing



# 3.60 iPod shuffle (3rd generation)

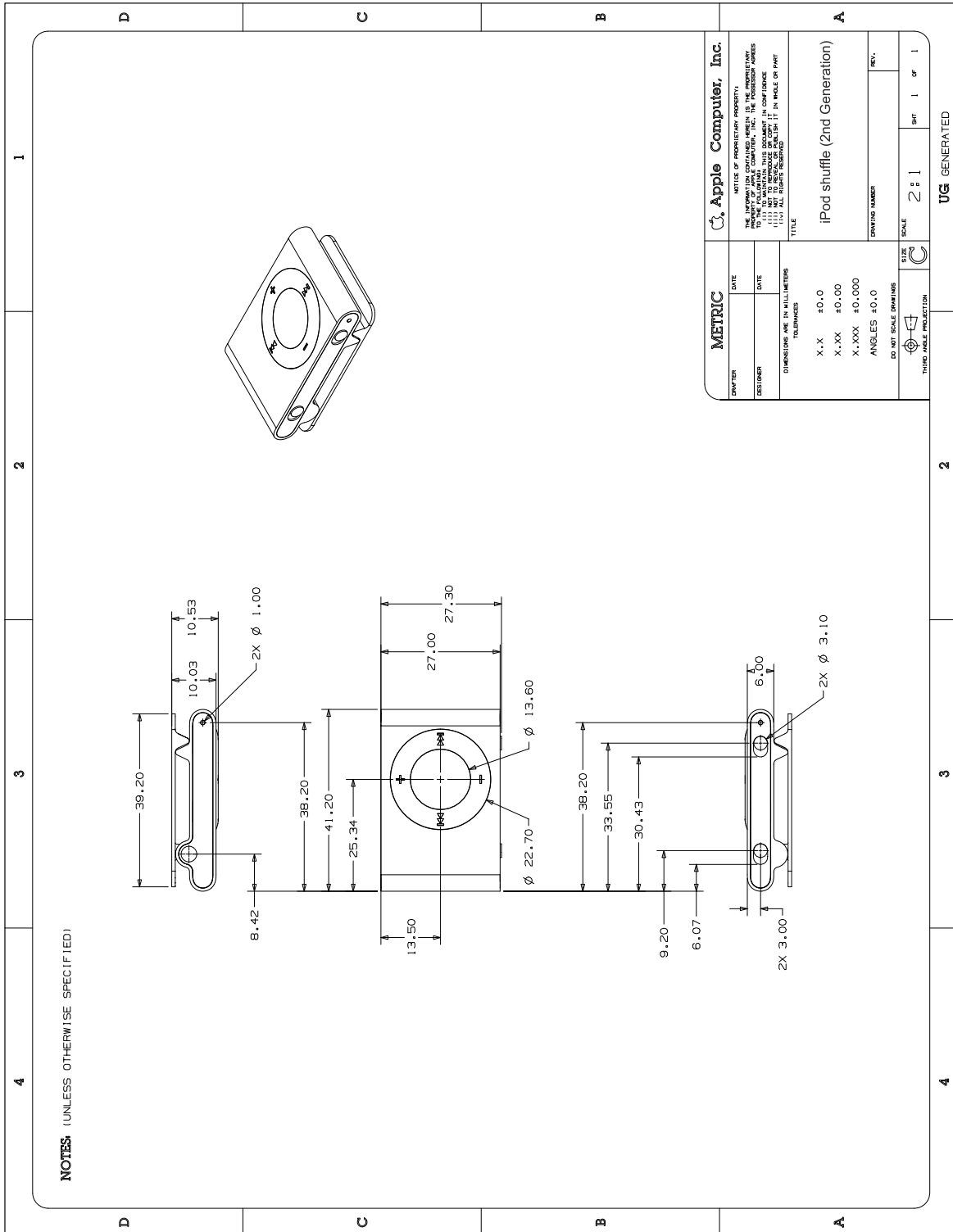
Figure 3-62 iPod shuffle 3rd gen. Dimensional Drawing





# 3.61 iPod shuffle (2nd generation)

Figure 3-63 iPod shuffle 2nd gen. Dimensional Drawing



## 3.62 iPod shuffle

Figure 3-64 iPod shuffle Dimensional Drawing (1 of 2)

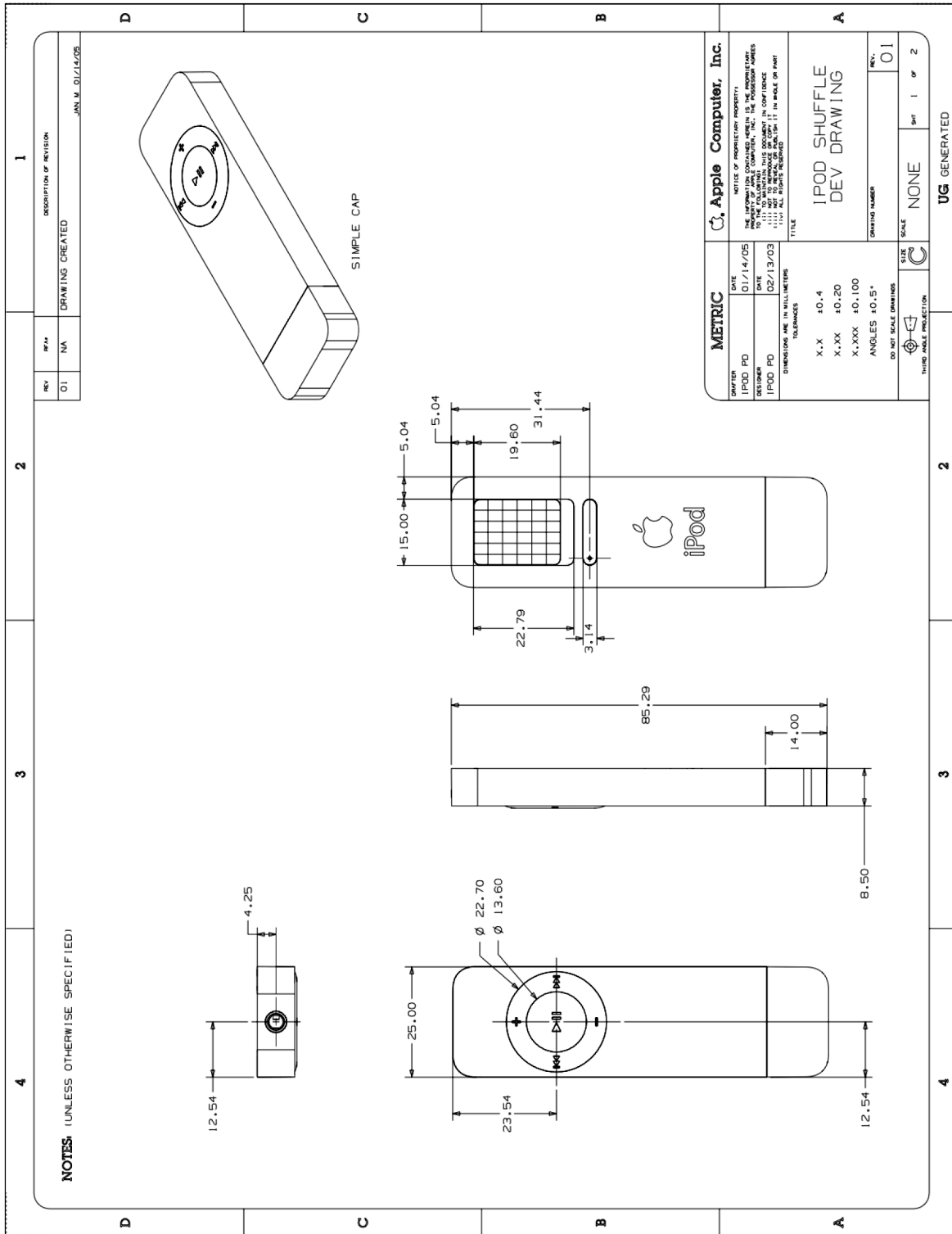
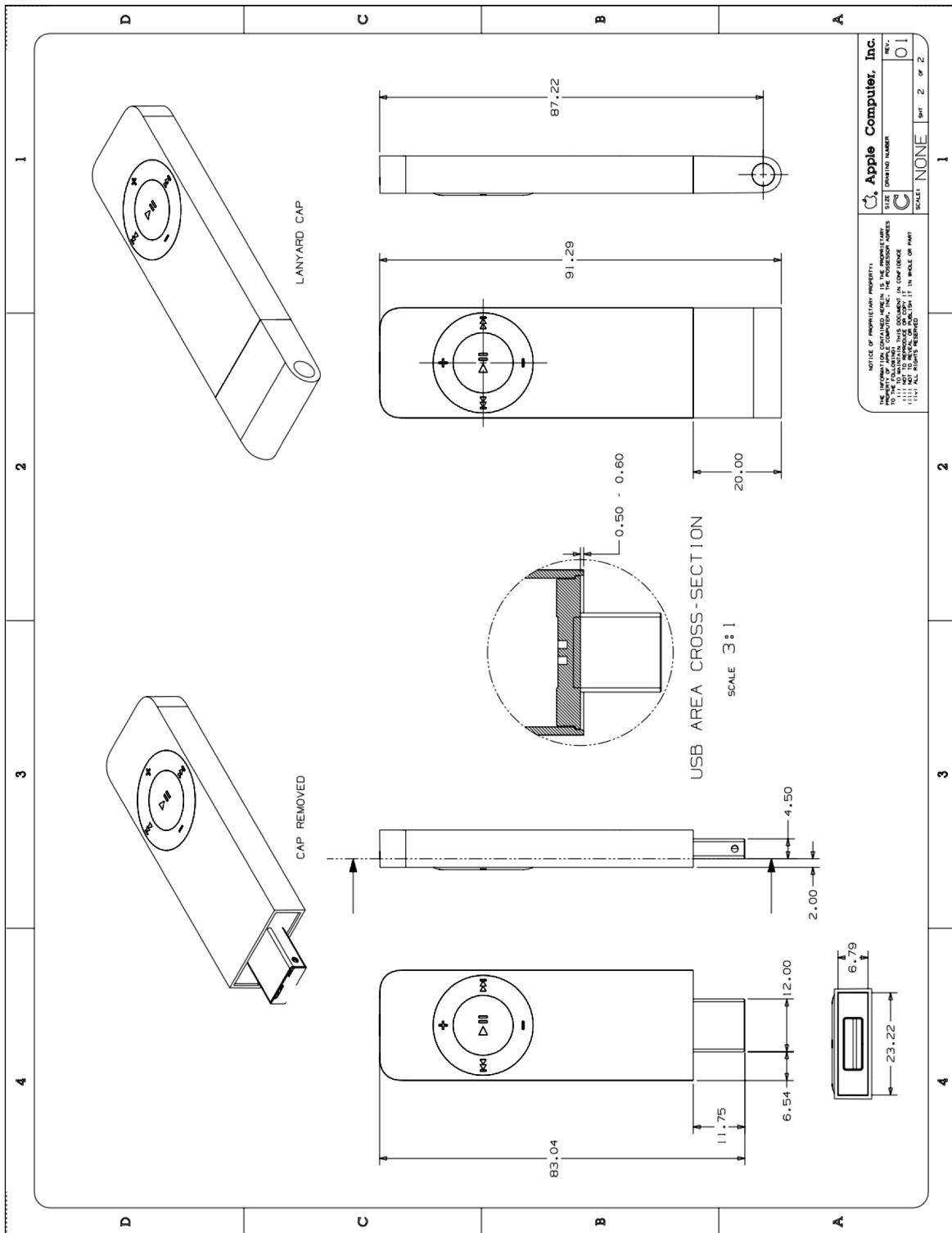
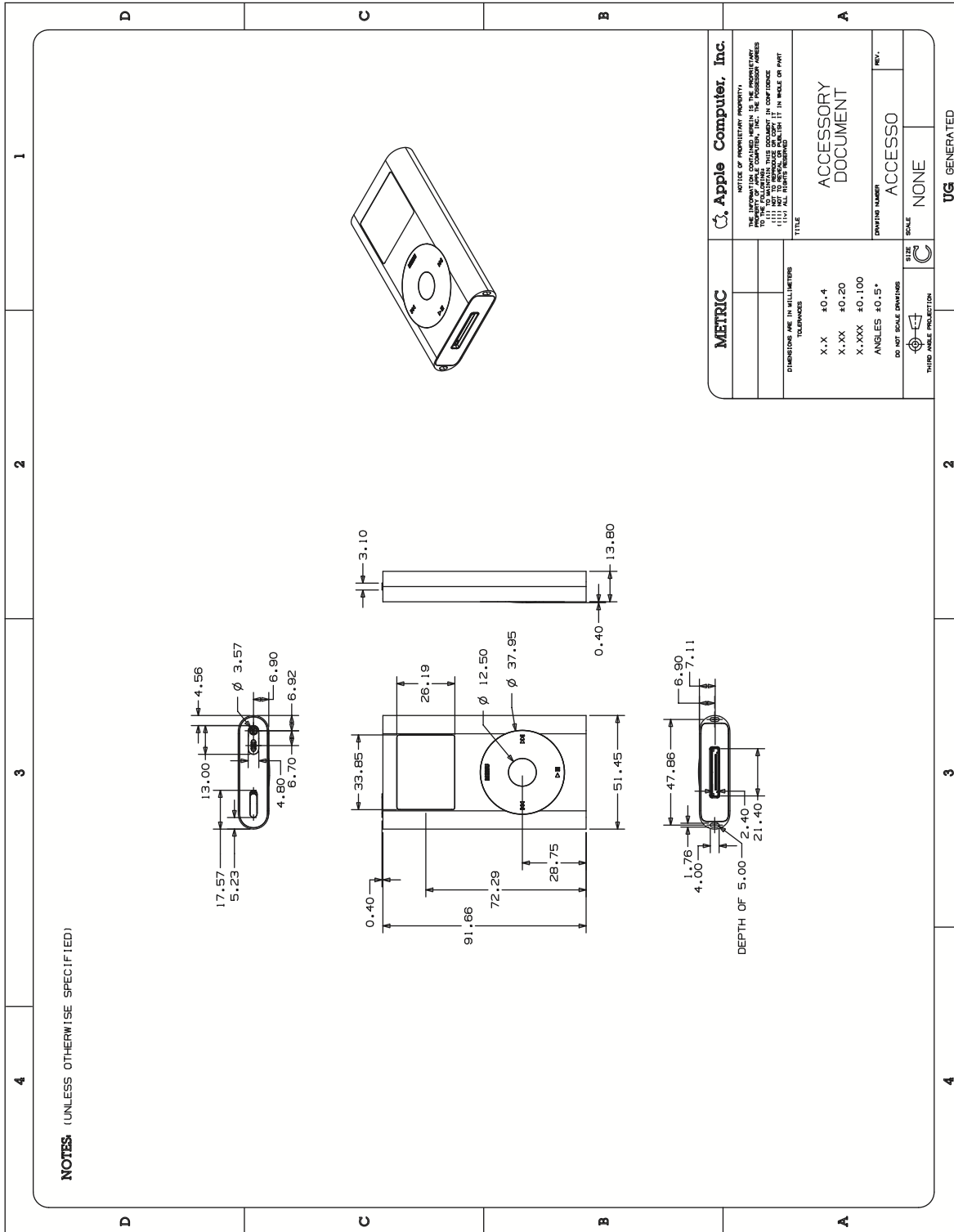


Figure 3-65 iPod shuffle Dimensional Drawing (2 of 2)



## 3.63 iPod mini

Figure 3-66 iPod mini Dimensional Drawing



# Revision History

This chapter describes changes to the Case Design Guidelines for Apple Devices from the previous revision.

## Updated Content

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- [iPhone 5s & iPhone SE](#) (page 27)
- [iPad Pro \(9.7-inch\) with Wi-Fi](#) (page 35)
- [iPad Pro \(9.7-inch\) with Wi-Fi + Cellular](#) (page 36)
- [iPad Pro \(9.7-inch\) Magnet and Hall Effect Sensor Locations](#) (page 37)
- [iPad Pro \(12.9-inch\) Magnet and Hall Effect Sensor Locations](#) (page 41)
- [iPad mini 4 Magnet and Hall Effect Sensor Locations](#) (page 45)



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