NS350 v33 Trusted Cryptography Module 2.0

Data brief Revision 1.00

Key Features

- Compliant to GM/T 0012-2020 Trusted computing – Trusted computing interface specification of trusted cryptography module
- I2C Interface, fast mode (400kbs)
- Enhanced (-40~+85°C)
- QFN16 and QFN32 package
- 1.8 V or 3.3 V supply voltage range
- Active shield and environmental sensors
- Monitoring of environmental parameters (power, temperature)
- Hardware and software protection against fault injection
- Random Number Generator (RNG) implemented according the requirements of GM/T 0062
- 24 PCRs (SM3)
- SM2, SM3, SM4
- Full personalization Endorsement Key (EK) certificates
- Field Upgrade - allows secure firmware updates

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1 Scope

1.1 Device Information

The NS350 v33 is a cost-effective and high-performance Trusted Cryptography Module 2.0 (TCM 2.0) targeting PCs, server platforms and embedded systems. It is available in QFN32 package.

Table 1 Part Number

Part Number	Firmware Version	Description
NS350-KQBR-x10	33.05	Enhanced temperature range (-40~+85°C) TCM 2.0 profile, I2C interface, QFN32-package, Tape & Reel delivery

Note: x as customer-specific letter: A, D, G, H, I, J, L, M, N, R, S, V, or T

1.2 Scope and purpose

This document describes the NS350 v33 TCM2.0 together with its features and functionality. It is primarily intended for system developers.

2 Pin Description

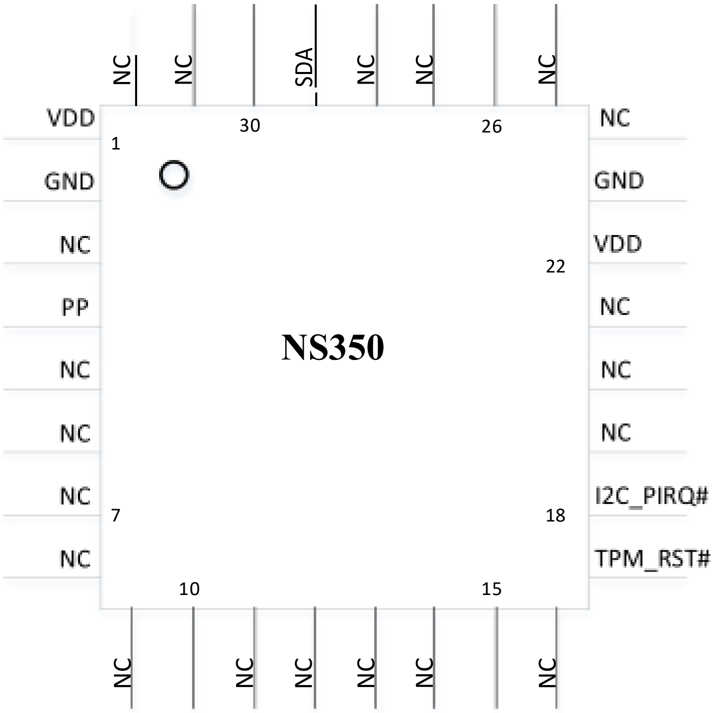


Figure 1 Pinout of NS350 v33 (Top View)

Table 2 I/O Signals

Pin Name	Pin Number	Type	Description
VDD	1, 22	I	Power Supply All VDD pins must be connected externally and should be bypassed to GND via 100 nF capacitors. This is a 3.3 volt or 1.8V DC power rail supplied by the motherboard to the module
GND	2, 23	I	Ground All GND pins must be connected externally. Zero volts. Expected to be connected to main motherboard ground
TPM_RST#	17	I	TPM_RST#: Active Low, internal weak pull up
I2C_PIRQ#	18	O	I2C_PIRQ#: Optional location for I2C PIRQ#, active low, open drain.
SDA	29	I/O	I2C Data pin
SCL	30	O	I2C Clock pin
NC	3,5,6,7,8,9,		No Connected (can be connected externally)

	11,12,13,14, 15,16,19,20, 21,24,25,26, 27,28,31,32		
PP	4	I	This pin may be left unconnected; Physical Presence, active high, internal pull-down. Used to indicate Physical Presence to the function
GPIO	10	I/O	This pin may be left unconnected; Input by default, internal pull up; It can be controlled via trusted GPIO functionality

Notes:

1. *I - input only, O - output only*
2. *All pins must have the power at the same time in the whole life time when be used, include all VDD pins and IO pins*

3 Typical Schematic

Figure 2 shows the typical schematic for the NS350 v33. The power supply pins should be bypassed to GND with capacitors located close to the device.

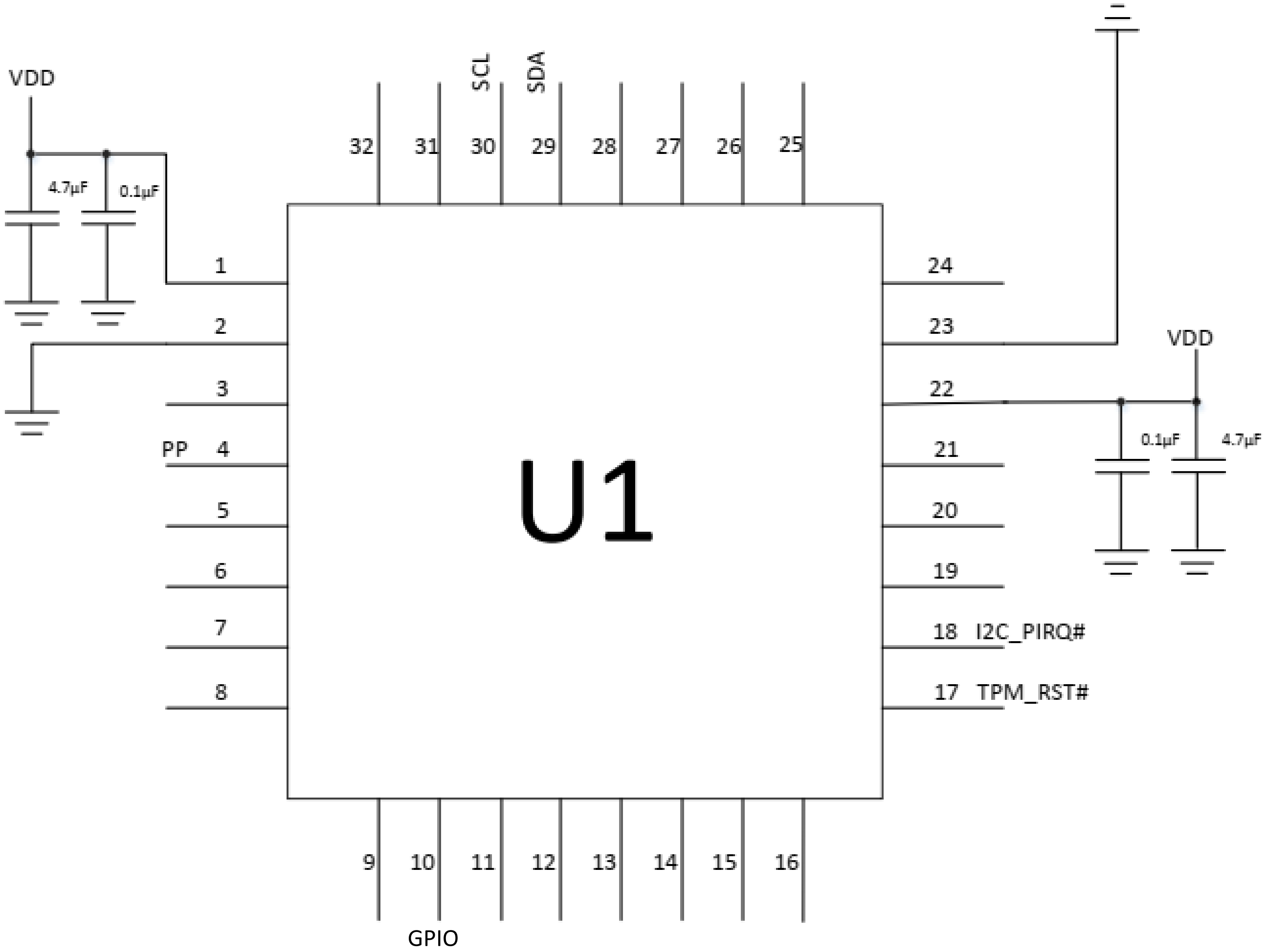


Figure 2 Typical Schematic

4 Package Information

4.1 Package Dimensions

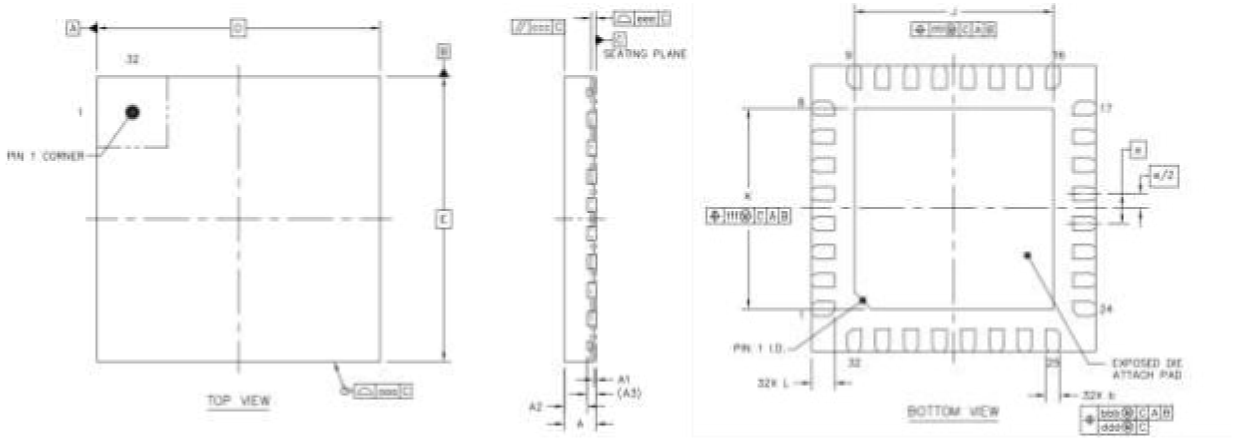
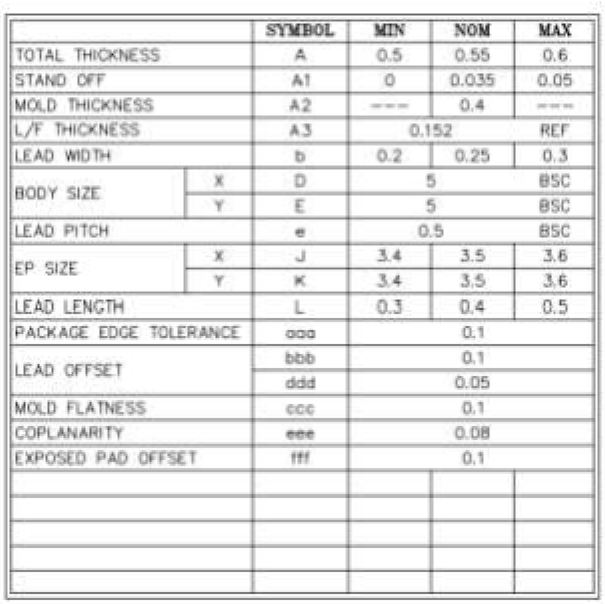


Figure 3 Package Symbol

Table 3 Symbol and Dimension



		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.5	0.55	0.6
STAND OFF		A1	0	0.035	0.05
MOLD THICKNESS		A2	---	0.4	---
L/F THICKNESS		A3	0.152		REF
LEAD WIDTH		b	0.2	0.25	0.3
BODY SIZE	X	D	5		BSC
	Y	E	5		BSC
LEAD PITCH		e	0.5		BSC
EP SIZE	X	J	3.4	3.5	3.6
	Y	K	3.4	3.5	3.6
LEAD LENGTH		L	0.3	0.4	0.5
PACKAGE EDGE TOLERANCE		aaa	0.1		
LEAD OFFSET		bbb	0.1		
		ddd	0.05		
MOLD FLATNESS		ccc	0.1		
COPLANARITY		eee	0.08		
EXPOSED PAD OFFSET		fff	0.1		

Notes:

1. *Coplanarity applies to leads, corner leads and die attach pad.*
2. *Total thickness not include SAW BURR.*

4.2 Packing Type

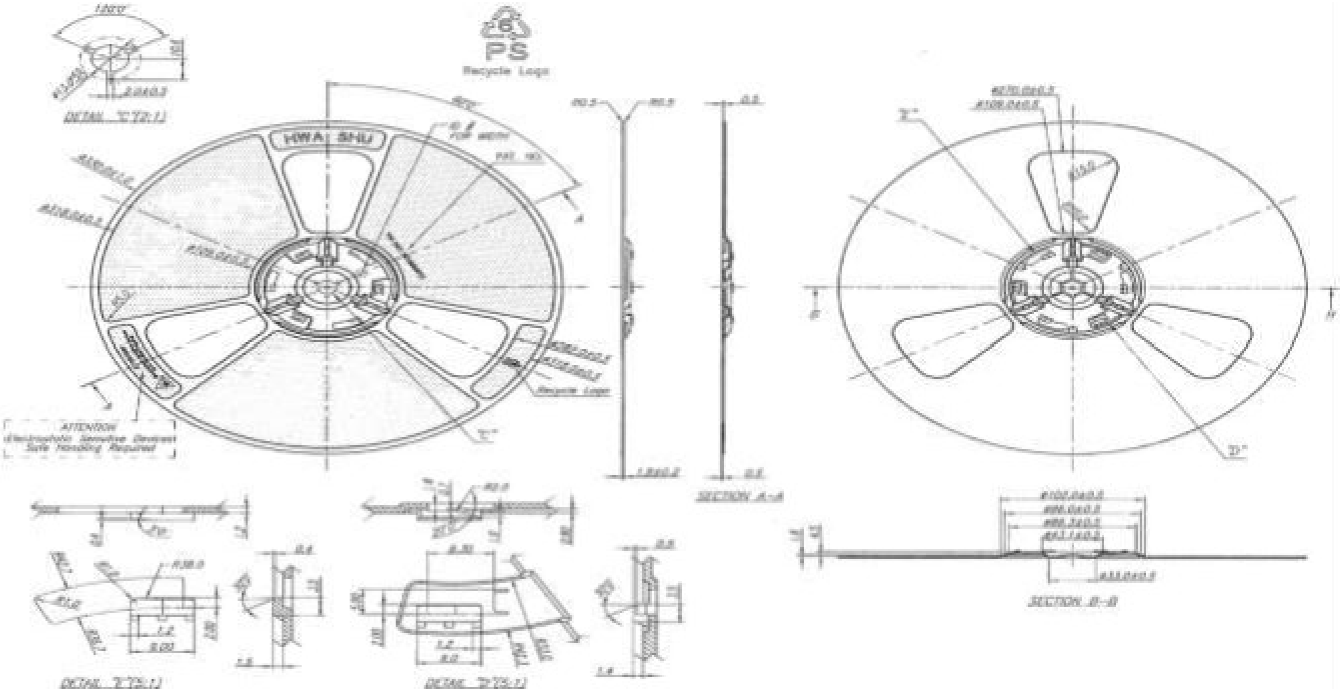


Figure 4 Reel diagram

Tape & Reel (reel diameter 330mm), 3000 pcs. per reel.

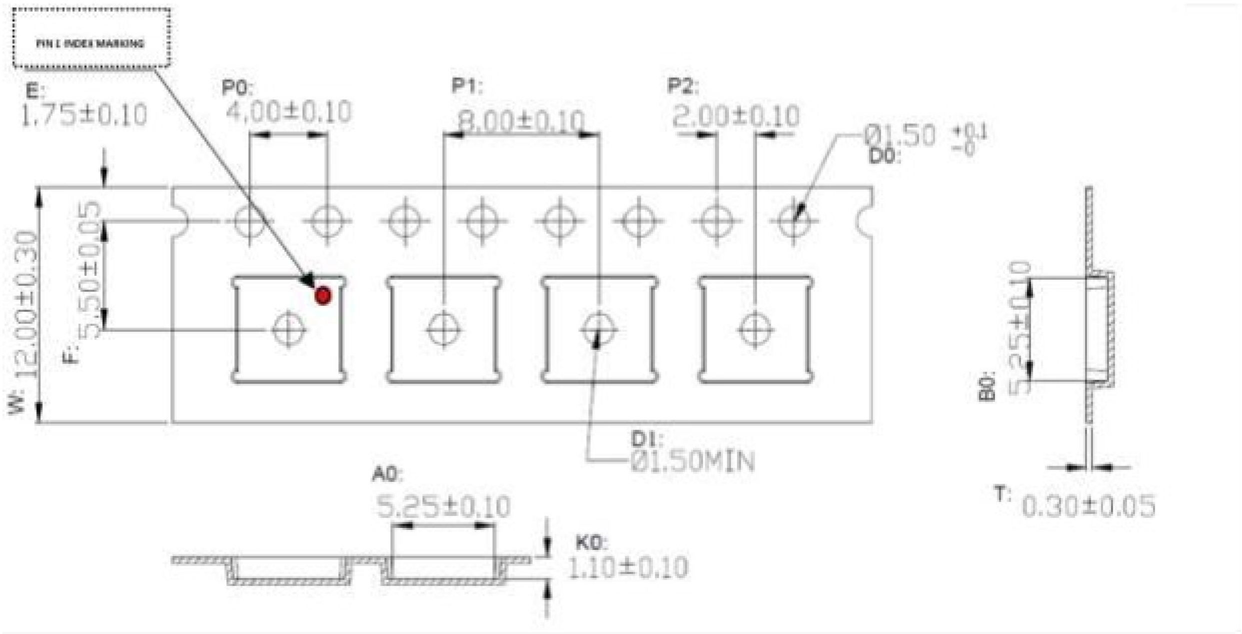


Figure 5 Packing Type

4.3 Recommended footprint

Figure shows the recommended footprint for the package.

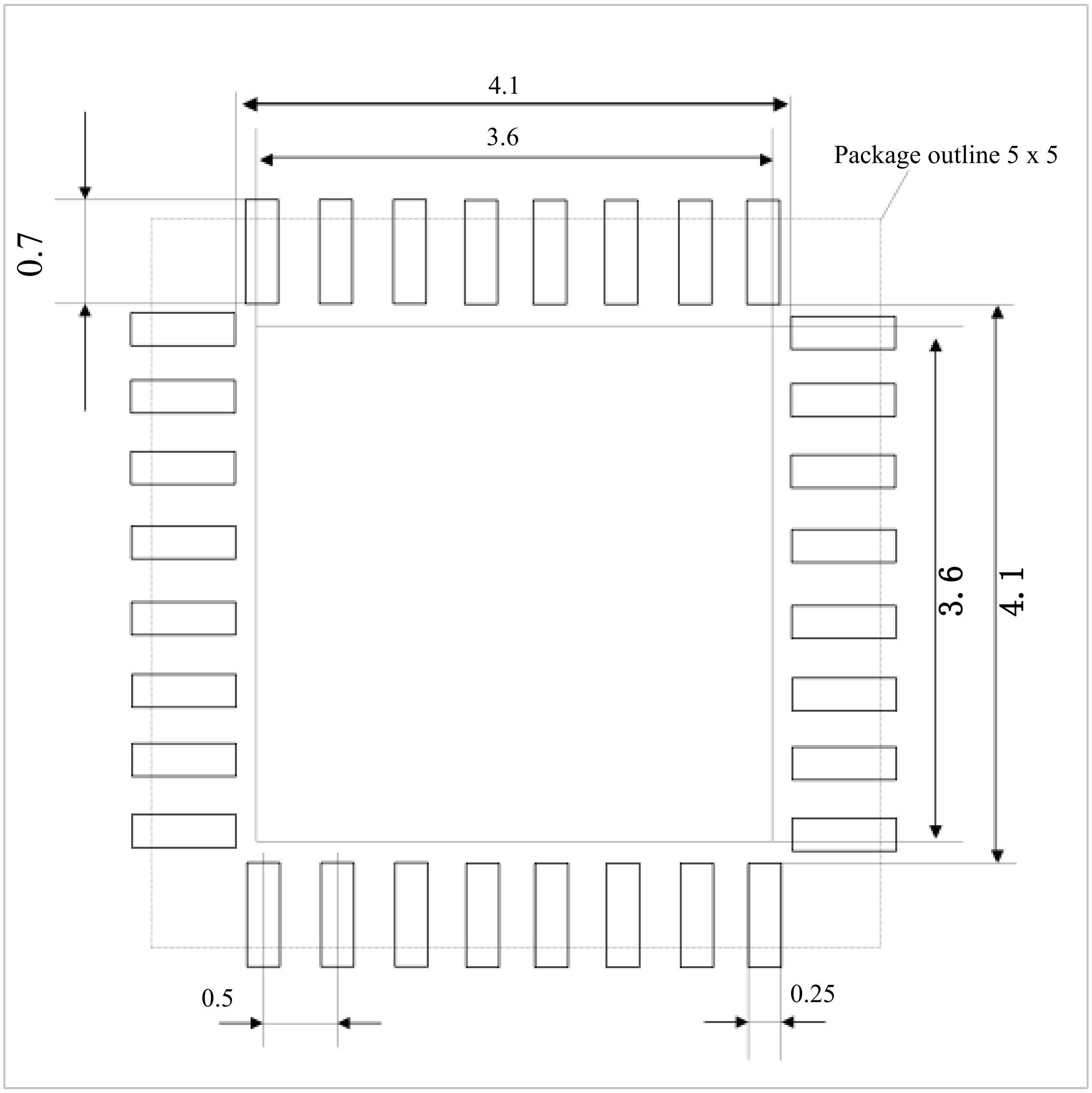


Figure 6 Recommended Footprint

4.4 Chip Marking

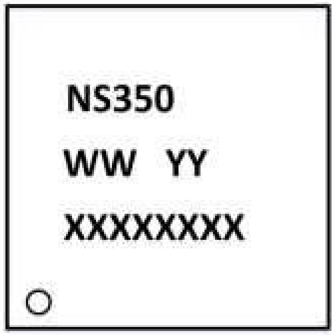


Figure 7 chip Marking

Description

(1) Line 1 - Hardware Technology name

NS350 is the name of the hardware technology.

(2) Line 2 - Device model

WW=BI means support temperature from -40˚C to 85˚C, I2C interface.

YY is the symbol for firmware version.

Table 4 symbol and firmware version

Symbol	Firmware version
YY = 03	33.05

(3) Line 3 - Device information

XXXXXXXX is production lot number.

XX(Reserved)+X[Year]+XX[Week]+XXX[Wafer Lot Number. 000~999].

(4) #1 Pin Position Mark

"○" indicates the position of #1 pin.

5. Revision History

Revision	Date	Description
1.00	2024-03-29	First released

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