

HCS-03

HandyCore-Serial

Data Sheet

2008. 10. 31

SYD-2306-1E

Version 1.1

Production Information



Copyright

Status Information

The status of this data sheet is Production Information.

HandyWave products data sheets progress according to the following format:

Advance Information

Information for designers concerning HandyWave product in development. All values specified are the target values of the design. Minimum and maximum values specified are only given as guidance to the final specification limits and must not be considered as the final values.

All detailed specifications including pin-outs and electrical specifications may be changed by HandyWave without notice.

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Pin-out and mechanical dimension specifications finalized. All values specified are the target values of the design. Minimum and maximum values specified are only given as guidance to the final specification limits and must not be considered as the final values.

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Final Data Sheet including the guaranteed minimum and maximum limits for the electrical specifications.

Production Data Sheets supersede all previous document versions.

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HCS-03, Data Sheet, SYD-2306-1E, Version 1.1, Production Information, 2008. 10. 31.

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1. Introduction

1.1. General Descriptions

The HCS-03 from HandyWave is an embedded module for ready-to-use short-range wireless connectivity solution. It provides the most economic and powerful way of cable replacement for the serial communication systems including RS-232, RS-422, and RS-485.

1.2. Key Features

- Supports Bluetooth Serial Port Profile and Generic Access Profile
- No need of external host and software
- Supports configuration of the local device and the remote device via Over-the-Air
- Supports up to 100 meter (Line of Sight)
- Supports Point-to-Point and Point-to-Multipoint Topology
- Supports the firmware upgrade locally
- Support an internal chip antenna or an external antenna with SMA connector
- RoHS Compliance

1.3. Key Specifications

- Standard: Bluetooth Specification Version 1.2 and/or above
- Operation Frequency: 2.4GHz ISM Band
- Transmitted Power: Max 18 / Typical 16dBm (Class 1)
- Received Sensitivity: better than -85dBm
- Power Supply: DC 3.3V
- Operation Temperature: -20 ~ 70 °C
- Baud Rate: 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 115.2Kbps and up to 3Mbps
- UART Signal Level: TTL 3.3V
- Dimension: 13mm x 13mm x 1.6mm (LGA 36Pin)

1.4. Record of changes

Table 1-1 Record of changes

Revision	Date	Reason for change
1.0	2008. 04. 22	Original publication of Production Information Data Sheet (HandyWave reference SYD-2306-1E)
1.1	2008. 10. 31	2.9 Package Information: Inserted the Shield CAN types. 2.10 Ordering Information: Added the Shield CAN types in the ordering information.

1.5. Acronyms and Definitions

Table 1-2 Acronyms and Definitions

Acronym	Definition
ANT	Antenna
BlueCore	A series of Bluetooth chip from CSR
CSR	Cambridge Silicon Radio
DFU	Device Firmware Upgrade
HandyPort	A brand name of wireless serial adapter from HandyWave
HCS	HandyCore Serial
I2C	I-square-C
LNA	Low Noise Amplifier
MOQ	Minimum Order Quantity
PA	Power Amplifier
PCM	Pulse Code Modulation
PIO	Programmable Input Output
SPI	Serial Peripheral Interface
TBD	To Be Determined
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus

2. Specifications

2.1. Hardware Overview

The HCS-03 is based on the BC04-External from CSR. And it consists of a power port, an antenna port, interfaces, a crystal and a flash memory. The HCS-03 uses a UART, PIOs, and a SPI interfaces and it does not use a USB, a PCM, and an I2C interfaces.

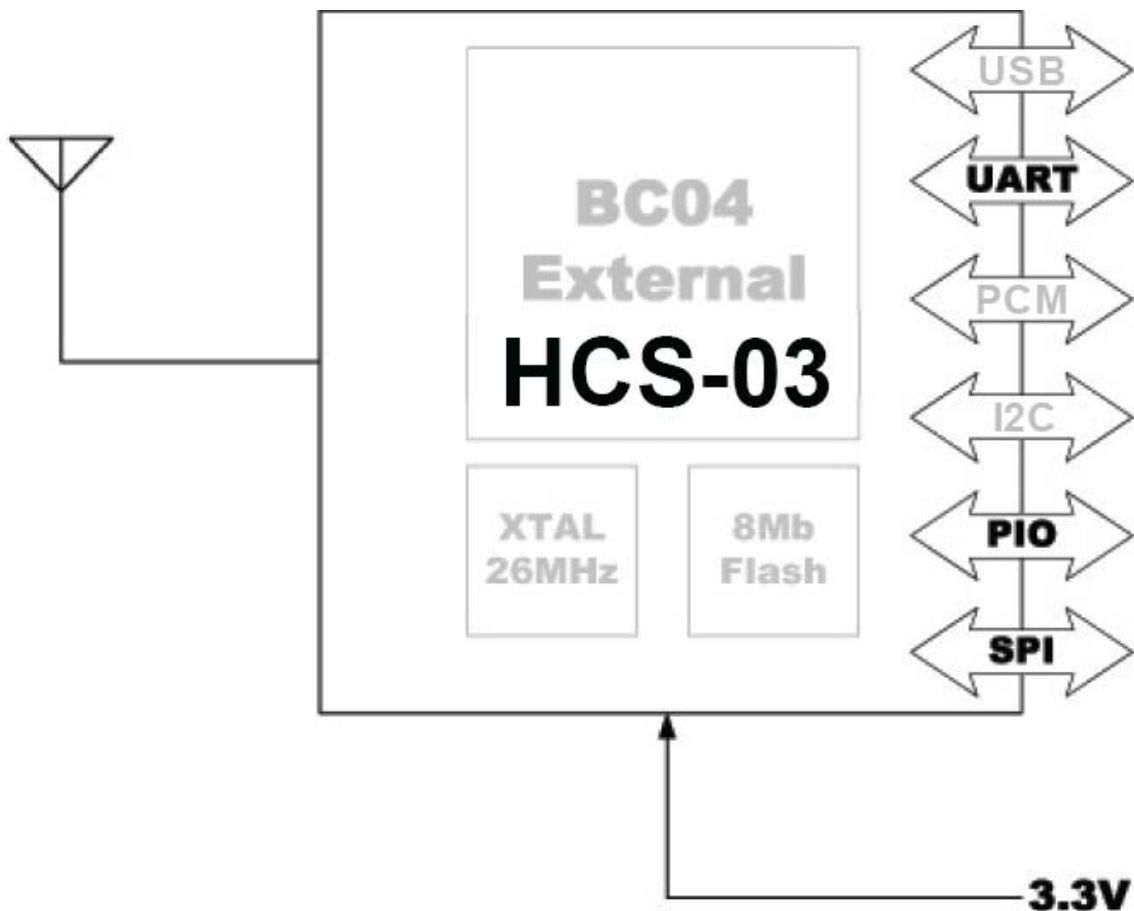


Figure 2-1 HCS-03 Hardware Configuration

2.2. HCS-03 Pin-out and Outline

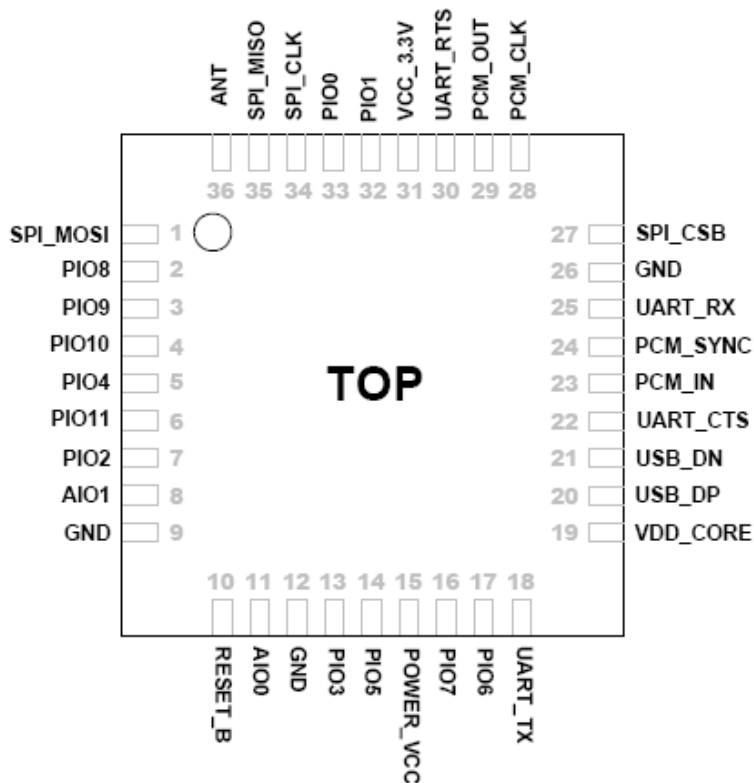


Figure 2-2 HCS-03 Pin-out

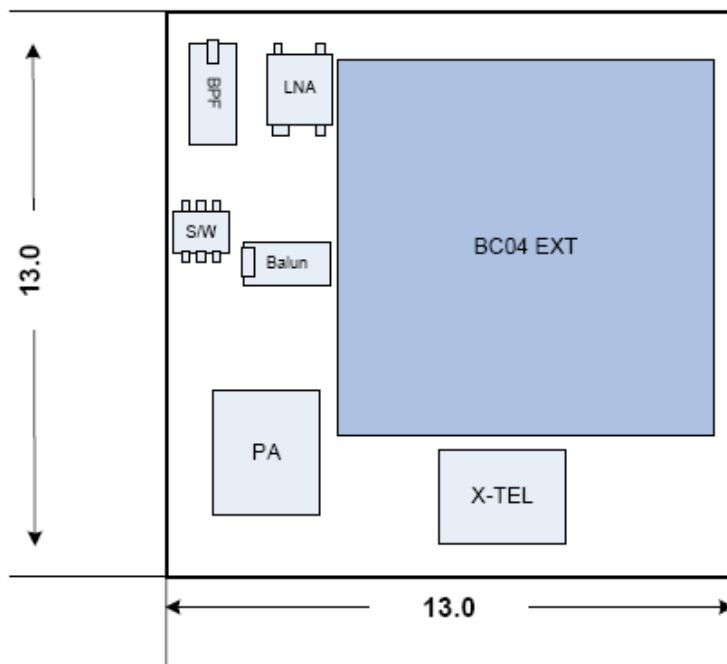


Figure 2-3 HCS-03 Outline

2.3. Terminal Functions

Table 2-1 Radio Functions

Function	Pin Name	Pin No.	Direction	Description
Radio	ANT	36	O	RF connection to antenna
	PIO0	33	O	Control output for external LNA
	PIO1	32	O	Control output for external PA

Table 2-2 Power Suppliers Functions

Function	Pin Name	Pin No.	Direction	Description
Power Suppliers	VCC_3.3V	31	I	DC input voltage for operation
	POWER_VCC	15	I	DC input voltage for operation
	VDD_CORE	19	O	Positive supply for internal digital circuit
	GND	9, 12, 26	N/A	Ground
	RESETB	10	I	Reset if low. Input debounced so must be low for >5ms to cause a reset

Table 2-3 UART Interfaces

Function	Pin Name	Pin No.	Direction	Description
UART Interface	UART_TXD	18	O	UART data output
	UART_RXD	25	I	UART data input
	UART_RTS	30	O	UART Request To Send, active low
	UART_CTS	22	I	UART Clear To Send, active low

Table 2-4 SPI Interfaces

Function	Pin Name	Pin No.	Direction	Description
SPI Interface	SPI_CSB	27	I	Chip select for Synchronous Serial Interface, active low
	SPI_CLK	34	I	SPI clock
	SPI_MISO	35	O	SPI data output
	SPI_MOSI	1	I	SPI data input

Table 2-5 PIO Interfaces

Function	Pin Name	Pin No.	Direction	Description
PIO Interface	PIO2	7	I/O	Programmable input/output line
	PIO3	13	I/O	Programmable input/output line
	PIO4	5	I/O	Programmable input/output line
	PIO5	14	I/O	Programmable input/output line
	PIO6	17	I/O	Programmable input/output line
	PIO7	16	I/O	Programmable input/output line
	PIO8	2	I/O	Programmable input/output line
	PIO9	3	I/O	Programmable input/output line
	PIO10	4	I/O	Programmable input/output line
	PIO11	6	I/O	Programmable input/output line

Table 2-6 Others

Function	Pin Name	Pin No.	Direction	Description
PCM Interface	PCM_OUT	29	O	Synchronous data output
	PCM_IN	23	I	Synchronous data input
	PCM_CLK	28	I/O	Synchronous data clock
	PCM_SYNC	24	I/O	Synchronous data sync
USB Interface	USB_DN	21	I/O	USB data minus
	USB_DP	20	I/O	USB plus
Others	AIO0	11	I/O	General purpose analogue interface
	AIO1	8	I/O	General purpose analogue interface

2.4. HCS-03 Dimensions

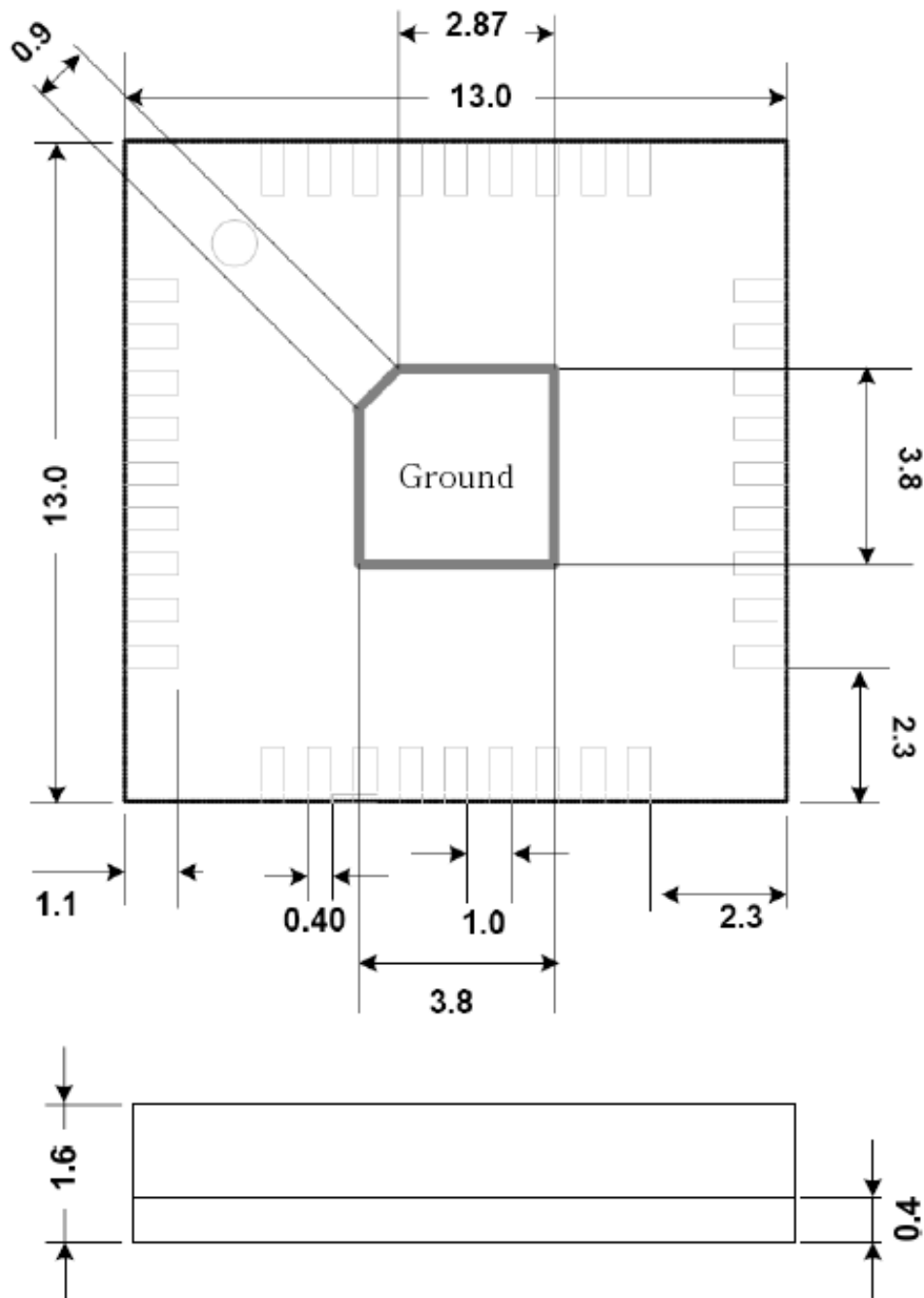


Figure 2-4 HCS-03 Dimensions

2.6. Electrical Characteristics

Table 2-7 Electrical Characteristics

Absolute Maximum Ratings		
Rating	Min	Max
Storage Temperature	-40℃	+85℃
Operating Temperature Range	-20℃	+70℃
Supply Voltage: VCC	+3.0V	+3.7V
Other Terminal Voltage	VCC – 0.4V	VCC + 0.4V
Recommended Operating Conditions		
Operating Condition	Min	Max
Operating Temperature Range	-20℃	+70℃
Supply Voltage: VCC	+3.0V	+3.3V
Supply Voltage: POWER_VCC	+3.0V	+3.3V

2.7. Power Consumption

Table 2-8 Power Consumption

Operation Mode	Role	UART Rate	Average	Unit
Inquiring	-	N/A	46	mA

2.8. Radio Characteristics

Table 2-9 Transmitter Performance

Transmitter Performance					
Parameter	Condition	Min	Typ	Max	Unit
Output Power	Normal	-	16	18	dBm
Power Density	Normal	14	15	18	dBm
Power Control	Normal8	2	4	8	dBm
Frequency Range	Normal	2400	-	2483.5	MHz
20dB Bandwidth	Normal	-	926	930	KHz
Adjacent Characteristics	$\pm 2\text{Mz}$	-	-35	-20	dBm
	$\pm 3\text{Mz}$	-	-45	-40	dBm
	$\pm 4\text{Mz}$	-	-50	-40	dBm
Modulation Characteristics	$\Delta F1_{\text{avg}}$	160	165	170	KHz
	$\Delta F2_{\text{max}}$	153	160		KHz
	$\Delta F2_{\text{avg}} / \Delta F1_{\text{max}}$	98	100	-	%
Initial Carrier Frequency Tolerance	Normal	-20	2	20	KHz
Carrier Frequency Drift	One slot packet (DH1)	-15		20	KHz
	Three slot packet (DH3)	-15		20	KHz
	Five slot packet (DH5)	-15		20	KHz

Table 2-10 Transceiver Performance

Transceiver Performance					
Parameter	Condition	Min	Typ	Max	Unit
Out-of-Band Spurious Emissions	30MHz ~ 1MHz	-	-	-36	dBm
	1GHz ~ 12.75GHz	-	-	-30	dBm
	1.8GHz ~ 5.3GHz	-	-	-47	dBm
	5.1GHz ~ 5.3GHz	-	-	-47	dBm

Table 2-11 Receiver Performance

Receiver Performance					
Parameter	Condition	Min	Typ	Max	Unit
Sensitivity Level	Single slot packets	-85	-87	-	dBm
	Multi slot packets	-85	-87	-	dBm
C/I Performance	C/I _{co-channel}	-	-	11	dB
	C/I _{1MHz} (Adjacent channel selectivity)	-	-	0	dB
	C/I _{2MHz} (Adjacent channel selectivity)	-	-	-30	dB
	C/I _{≥3MHz} (Adjacent channel selectivity)	-	-	-40	dB
Blocking Performance	30MHz ~ 2000MHz	-10			dBm
	2000MHz ~ 2400MHz	-27			dBm
	2500MHz ~ 3000MHz	-27			dBm
	3000MHz ~ 12.75MHz	-10			dBm
Intermodulation Performance	N=5	-39	-		dBm
Maximum Input Level		-20	-17		dBm

2.9. Package Information

A tray is used for containing the HCS-03. The size information is as follows:

- Tray Dimension: 13.5 x 31.5 x 7 (mm)
- 160ea/Tray

There are two shield can types. The dimension of L type is 15.0 x 27.7 x 2.5 (mm). The dimension of S type is 17.8 x 17.8 x 2.5 (mm).

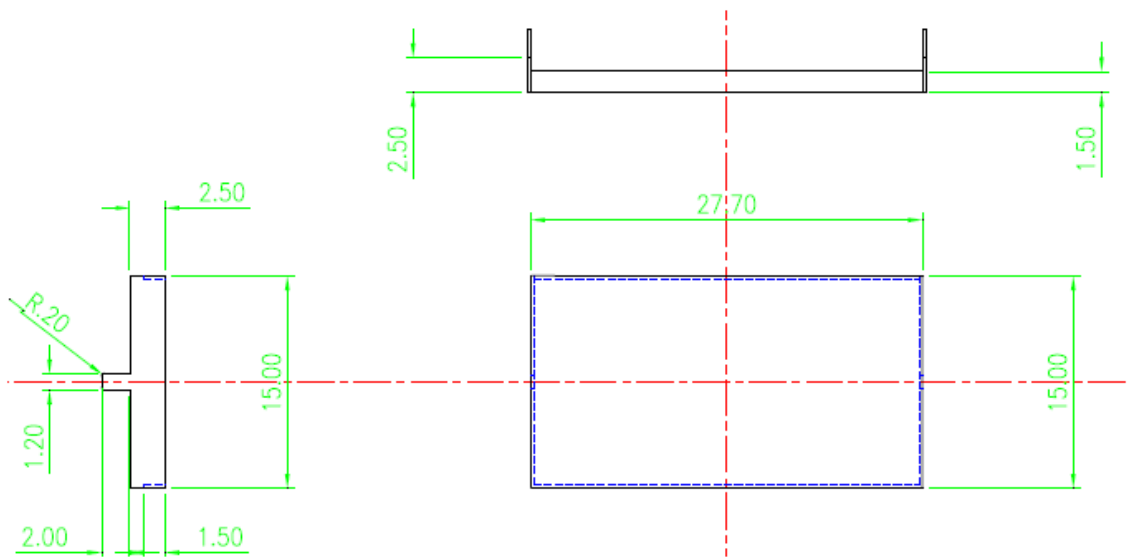


Figure 2-6 15.0 x 27.7 x 2.5 (mm) L type Shield CAN

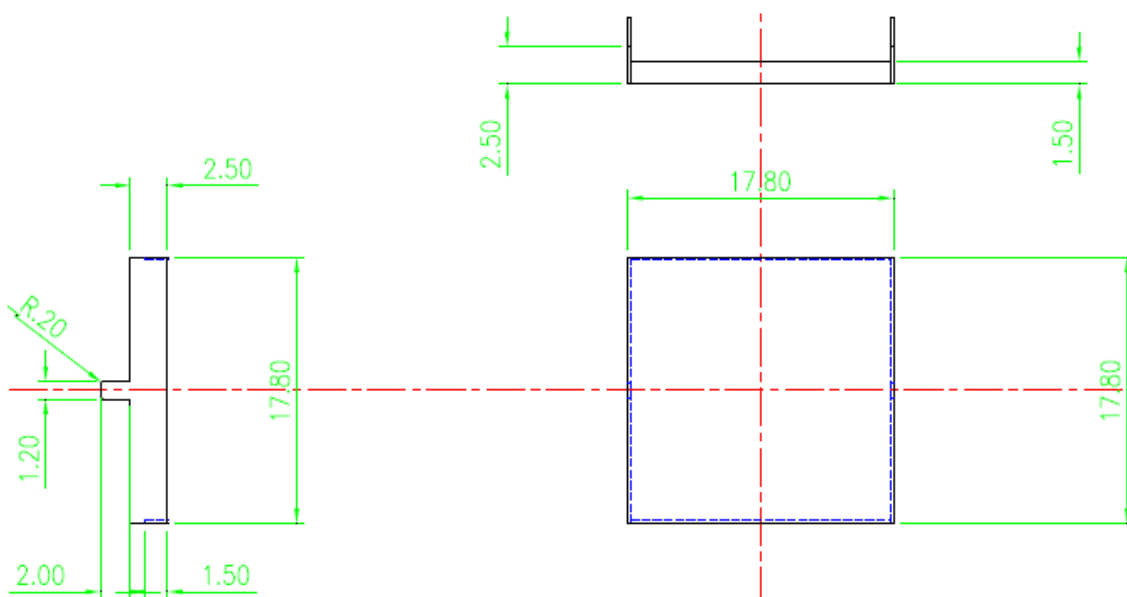


Figure 2-7 17.8 x 17.8 x 2.5 (mm) S type Shield CAN

2.10. Ordering Information

Table 2-12 Ordering Information

Package			Order Number
Item	Size (mm)	Shipment Method	
HCS-03 Sample with L CAN	N/A	N/A	HCS-03-S-L
HCS-03 Sample with S CAN	N/A	N/A	HCS-03-S-S
HCS-03 with Chip Antenna & L CAN	13.5 x 31.5 x 7	Tray	HCS-03-C-L
HCS-03 with Chip Antenna & S CAN	13.5 x 31.5 x 7	Tray	HCS-03-C-S
HCS-03 with 1dB Antenna & L CAN	13.5 x 31.5 x 7	Tray	HCS-03-E1-L
HCS-03 with 1dB Antenna & S CAN	13.5 x 31.5 x 7	Tray	HCS-03-E1-S
HCS-03 with 2dB Antenna & L CAN	13.5 x 31.5 x 7	Tray	HCS-03-E2-L
HCS-03 with 2dB Antenna & S CAN	13.5 x 31.5 x 7	Tray	HCS-03-E2-S
HCS-03 with 4dB Antenna & L CAN	13.5 x 31.5 x 7	Tray	HCS-03-E4-L
HCS-03 with 4dB Antenna & S CAN	13.5 x 31.5 x 7	Tray	HCS-03-E4-S

MOQ:

- HCS-03-S: 10ea
- Others: 100ea

2.11. Contact Information

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