

AscenKorea Inc.

HS2800

GPS 모듈

사양서

Revision: V01

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## 1.기능 소개

### 1.1 제품 개요

(주)아센코리아의 HS2800 는 업계 최고수준의 수신감도(-163dB)와 빠른 초기 수신 시간(TTFF: Time-to-First Fix), 최저의 소비 전력을 구현하고 있으며, 좋지 않은 수신 상황이나 고속 이동 조건에서도 매우 정확한 GPS 수신이 가능한 CSR 의 차세대 SiRFstarIV 칩셋을 적용한 제품입니다.

HS2800 은 SBAS(WAAS, EGNOS, MSAS, QZSS), AGPS 의 기능을 포함하고 다양한 장소와 항법 응용에 지원됩니다. 48 트랙 검증채널로 좀 더 폭 넓은 시스템 설계를 할 수 있습니다.

#### 응용 분야:

- I. 휴대용 기기
- II. 태블릿 PC/PLB/MID
- III. M2M 어플리케이션
- IV. 장비/자산 관리
- V. 보안 산업
- VI. 감시 시스템



## 1.2 주요 특징

- ◆ 고감도: -163dBm
- ◆ 갱신 주기: 최대 5Hz
- ◆ 48 track 검증 채널
- ◆ SBAS(WAAS 또는 EGNOS) 신호 제공
- ◆ 고객 맞춤형 Firmware 지원
- ◆ 전류 소비(@3.3V)
  - 초기 소비 전류: 34mA Typical
  - 동작 시 소비 전류: 31mA Typical
- ◆ Hot Start 시 50~500uA 소요

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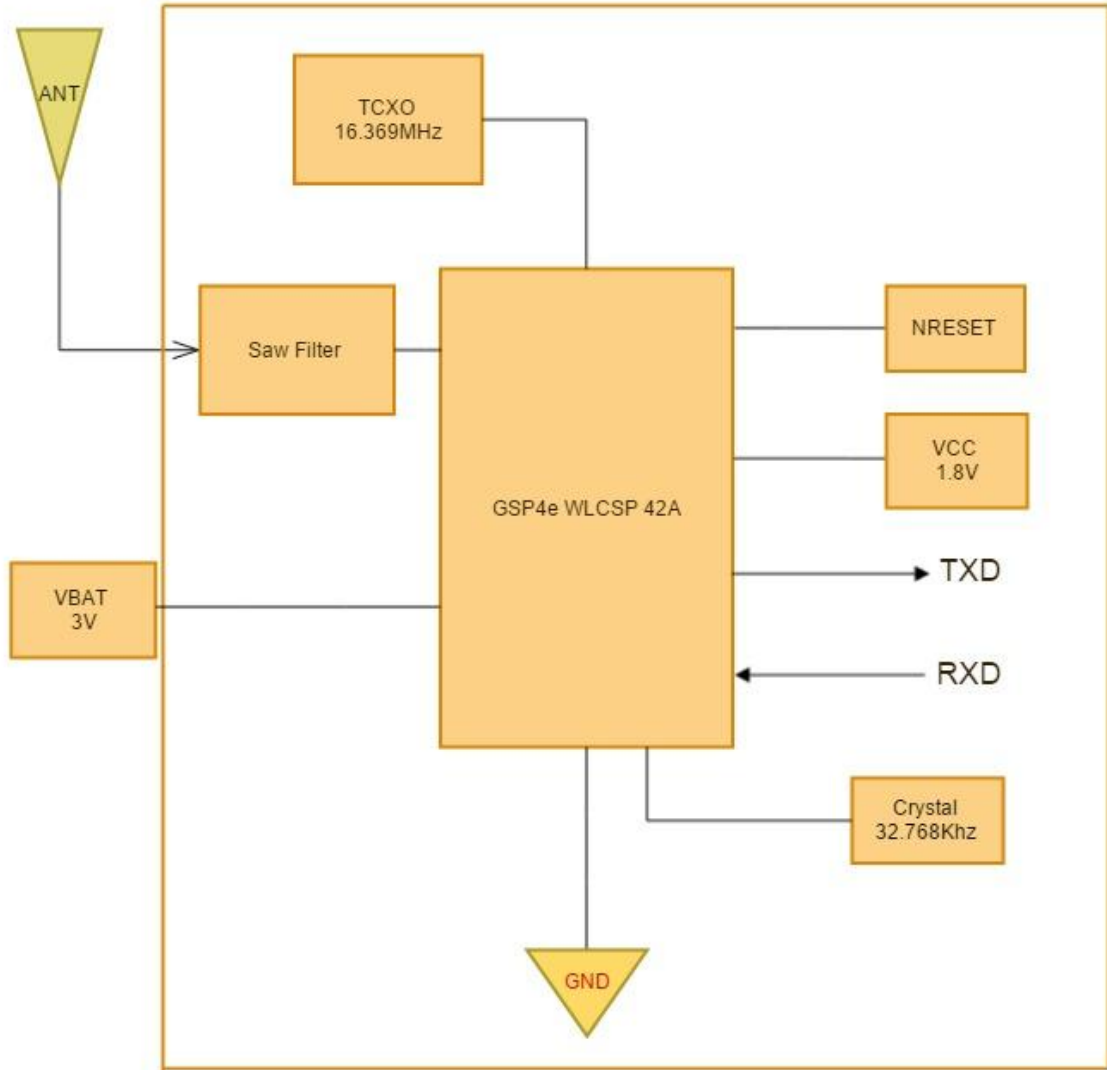
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## 1.3 시스템 블록 다이어그램



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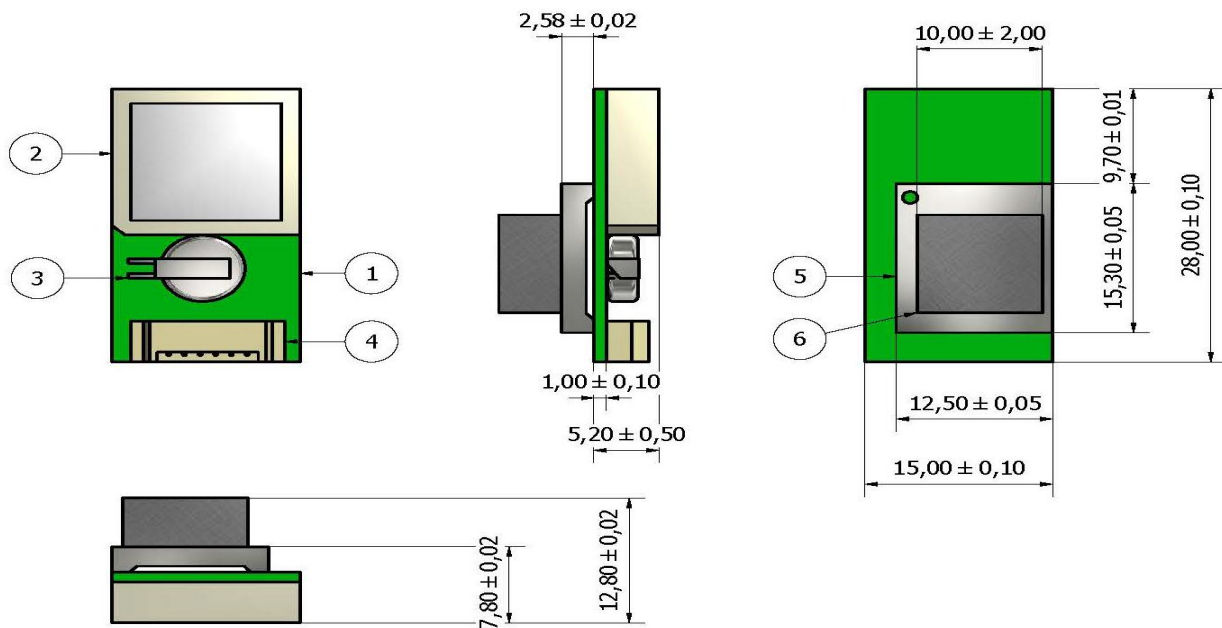
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## 2. 사양

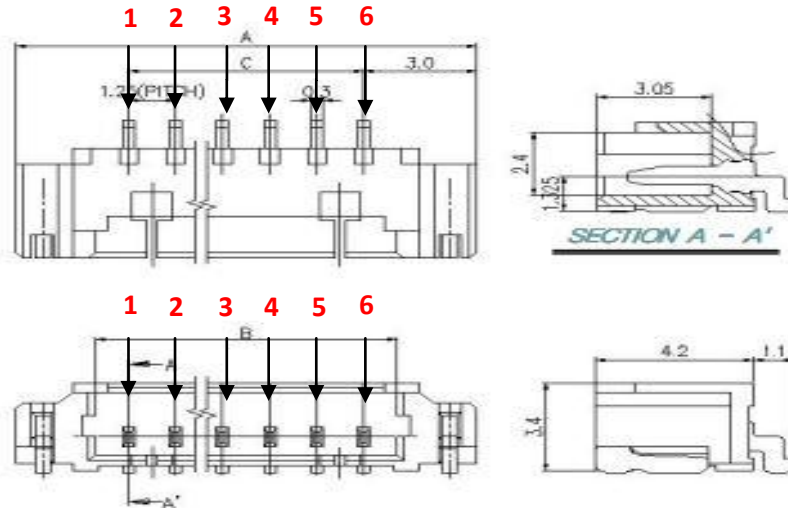
### 2.1 외관 치수



| Part List |    |               |                     | 단위(mm) |
|-----------|----|---------------|---------------------|--------|
| 항목        | 수량 | 부품 번호         | 설명                  |        |
| 1         | 1  | MAIN BOARD    | 28 x 15 x 1T        |        |
| 2         | 1  | PATCH ANTENNA | 15 x 15 x 4T        |        |
| 3         | 1  | BATTERY       | R3.4 x 2.7T         |        |
| 4         | 1  | CONNECTOR     | 12505WR-06          |        |
| 5         | 1  | SHIELD CAN    | 15.3 x 12.5 x 2.58T |        |
| 6         | 1  | EMI GASKET    | 10 X 10 X 5T        |        |

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## 2.2 Pin 구성



## 2.3 Pin 배치

| 핀 번호 | 표시 이름  | I/O | 설명            |
|------|--------|-----|---------------|
| 1    | GND    | -   | 접지            |
| 2    | VCC    | PI  | 메인 전원(5VDC)   |
| 3    | Backup | PI  | 백업 전원(3.3VDC) |
| 4    | NC     | -   | 사용 안함         |
| 5    | TX     | O   | 시리얼 데이터 출력    |
| 6    | RX     | I   | 시리얼 데이터 입력    |

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## 2.4 제품 사양

|                   | Description  |
|-------------------|--|
| GPS Solution      | SIRF IV  |
| 주파수               | L1, 1575.42MHz   |
| 수신감도 <sup>1</sup> | Acquisition: -148dBm, cold start<br>Reacquisition: -160dBm Hot start<br>Tracking: -163dBm                  |
| 채널                | 48 channels  |
| TTF               | Hot start: 1 second typical<br>Warm start: 35 seconds typical<br>Cold start: 35 seconds typical,           |
| 위치 정확도            | Without aid:3.0m (50% CEP)<br>DGPS(SBAS(WAAS,EGNOS,MSAS,QZSS)):2.5m (50% CEP)                              |
| 속도 정확도            | Without aid : 0.1m/s<br>DGPS(SBAS(WAAS,EGNOS,MSAS,GAGAN,QZSS)):0.01m/s<br>Without aid:0.1 m/s <sup>2</sup> |
| 가속도 정확도           | Without aid:0.1 m/s <sup>2</sup><br>DGPS(SBAS(WAAS,EGNOS,MSAS,QZSS)):0.01m/s <sup>2</sup>                  |
| 고도                | Maximum 18,000m (60,000 feet)  |
| 속도                | Maximum 515m/s (1000 knots)  |
| 가속도               | Maximum 4G   |
| 갱신 주기             | 1Hz (default), MAX 5Hz   |
| 통신 속도             | 9600 bps (default)   |
| DGPS              | SBAS(Support) [QZSS,WAAS,EGNOS,MSAS,GAGAN]   |
| AGPS              | Support  |
| 동작 전원             | VCC : 5.0V VBACKUP : 3.3V  |
| 전류 소비             | 34mA acquisition, 32mA tracking<br>*배터리 전원 충전 시 60mA 소비  |
| 동작 온도             | -40 °C to +85 °C (Without Battery)<br>-10 °C to +65 °C   |
| 크기                | 15 x28 x12.7T mm   |

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## 2.5 전원 조건

|       | Symbol  | Min. | Typ. | Max. | Unit |
|-------|---------|------|------|------|------|
| 메인 전원 | VDD     | 4.75 | 5    | 5.25 | V    |
| 백업 전원 | VBACKUP | 3.13 | 3.3  | 3.46 | V    |

## 2.6 동작 조건

|                                 | Condition | Min.       | Typ. | Max. | Unit |
|---------------------------------|-----------|------------|------|------|------|
| Operation supply Ripple Voltage | —         | —          | —    | 50   | mVpp |
| RX TTL H Level                  | —         | 0.75 x VDD | —    | 3.6  | V    |
| RX TTL L Level                  | —         | -0.4       | —    | 0.45 | V    |
| TX TTL H Level                  | —         | 0.75 x VDD | —    | -    | V    |
| TX TTL L Level                  | —         | -          | —    | 0.40 | V    |

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## 3. 프로토콜

### 3.1 NMEA 출력

**Table-1** lists each of the NMEA output sentences specifically developed and defined by SIRF for use within SIRF products

| Table-1: NMEA Output Sentence |  |
|-------------------------------|--|
| Option                        | Description  |
| GGA (1sec)                    | Time, position and fix type data.  |
| GSA (1sec)                    | GPS receiver operating mode, active satellites used in the position solution and DOP values.   |
| GSV (5sec)                    | The number of GPS satellites in view satellite ID numbers, elevation, azimuth, and SNR values. |
| RMC (1sec)                    | Time, date, position, course and speed data. Recommended Minimum Navigation Information.       |

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## RMC—Recommended Minimum Navigation Information

Table-1 contains the values for the following example :

\$GPRMC,161229.487,A,3723.2475,N,12158.3416,W,0.13,309.62,120598, ,\*10<CR><LF>

| Table-1: RMC Data Format |            |         |   |
|--------------------------|------------|---------|---|
| Name                     | Example    | Units   | Description   |
| Message ID               | \$GPRMC    | -       | RMC protocol header   |
| UTC Time                 | 161229.487 | -       | hhmmss.sss  |
| Status                   | A          | -       | A=data valid or V=data not valid  |
| Latitude                 | 3728.3596  | -       | ddmm.mmmm   |
| N/S Indicator            | N          | -       | N=north or S=south  |
| Longitude                | 12016.4438 | -       | dddmm.mmmm  |
| E/W Indicator            | W          | -       | E=east or W=west  |
| Speed over Ground        | 0.13       | Knots   | -   |
| Course over Ground       | 309.62     | Degrees | True  |
| Date                     | 120598     |         | ddmmyy  |
| Magnetic Variation       | -          | Degrees | E=east or W=west  |
| East/West Indicato       | E          | -       | E = east  |
| Mode                     | A          | -       | A = Autonomous<br>D = DGPS<br>E = DR<br>N = Output Data Not Valid<br>R = Coarse Position (3) (4) (5)<br>S = Simulator |
| Checksum                 | *10        | -       | -   |
| <CR> <LF>                | -          | -       | End of message termination  |

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## GGA—Global Positioning System Fixed Data. Time, Position and fix related data

Table-2 contains the values for the following example :

\$GPGGA,002153.000,3342.6618,N,11751.3858,W,1,10,1.2,27.0,M,-34.2,M,,0000\*5E<CR><LF>

| Table-2: GGA Data Format |            |        |  |
|--------------------------|------------|--------|--|
| Name                     | Example    | Units  | Description  |
| Message ID               | \$GPGGA    |        | GGA protocol header  |
| UTC Time                 | 002153.000 |        | hhmmss.sss   |
| Latitude                 | 3342.6618  |        | ddmm.mmmm  |
| N/S Indicator            | N          |        | N=north or S=south   |
| Longitude                | 11751.3858 |        | dddmm.mmmm   |
| E/W Indicator            | E          |        | E=east or W=west   |
| Position Fix indicator   | 1          |        | See Table 2.4  |
| Satellites Used          | 10         |        | Range 0 - 12   |
| HDOP                     | 1.2        |        | Horizontal Dilution of Precision   |
| MSL Altitude             | 27.0       | meters | -  |
| Units                    | M          | meters | -  |
| Geoid Separation         | -34.2      | meters | Geoid-to-ellipsoid separation.<br>Ellipsoid altitude =<br>MSL Altitude + Geoid Separatio |
| Units                    | M          | Meters | -  |
| Age of Diff. Corr..      | -          | Sec    | Null fields when DGPS is not used  |
| Diff. Ref. Station ID    | 0000       | -      | -  |
| Checksum                 | *5E        | -      | -  |
| <CR> <LF>                |            |        | End of message termination   |

| Table-2: Position Fix Indicator |                                |
|---------------------------------|--------------------------------|
| Value                           | Description                    |
| 0                               | Fix not available              |
| 1                               | GPS fix                        |
| 2                               | Differential GPS fix           |
| 3 - 5                           | Not supported                  |
| 6                               | Dead Reckoning Mode, fix valid |

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## GSA—GNSS DOP and Active Satellites

Table-3 contains the values for the following example :

\$GPGSA,A,3,07,02,26,27,09,04,15, , , , , 1.8,1.0,1.5\*33<CR> <LF>

| Table-3: GSA Data Format |         |       |                                  |
|--------------------------|---------|-------|----------------------------------|
| Name                     | Example | Units | Description                      |
| Message ID               | \$GPGSA |       | GSA protocol header              |
| Mode 1                   | A       |       | See Table-2.7                    |
| Mode 2                   | 3       |       | See Table-2.8                    |
| Satellite                | 07      |       | SV on channel 1                  |
| Satellite                | 02      |       | SV on channel 2                  |
| ...                      | ...     | ...   | ...                              |
| Satellite                |         |       | SV on Channel 12                 |
| PDOP                     | 1.8     |       | Position Dilution of Precision   |
| HDOP                     | 1.0     |       | Horizontal Dilution of Precision |
| VDOP                     | 1.5     |       | Vertical Dilution of Precision   |
| Checksum                 | *33     |       |                                  |
| <CR> <LF>                |         |       | End of message termination       |

| Table-3 : Mode 1 |  |
|------------------|--|
| Value            | Description  |
| M                | Manual—forced to operate in 2D or 3D mod           |
| A                | 2D Automatic—allowed to automatically switch 2D/3D |

| Table-3 : Mode 2 |                         |
|------------------|-------------------------|
| Value            | Description             |
| 1                | Fix not available       |
| 2                | 2D (<4 SVs used)        |
| 3                | 3D ( $\geq 4$ SVs used) |

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### GSV—GNSS Satellites in View

Table-7 contains the values for the following example :

```
$GPGSV,2,1,07,07,79,048,42,02,51,062,43,26,36,256,42,27,27,138,42*71
```

```
$GPGSV,2,2,07,09,23,313,42,04,19,159,41,15,12,041,42*41 <CR> <LF>
```

| Table-2: GSV Data Format |         |         |   |
|--------------------------|---------|---------|---|
| Name                     | Example | Units   | Description   |
| Message ID               | \$GPGSV | -       | GSV protocol header                                   |
| Number of Messages       | 2       | -       | Total number of GSV messages to be sent in this group |
| Message Number           | 1       | -       | Message number in this group of GSV messages          |
| Satellites in View       | 07      | -       |   |
| Satellite ID             | 07      | -       | Channel 1 (Range 1 - 32)                              |
| Elevation                | 79      | degrees | Channel 1 (Maximum 90)                                |
| Azimuth                  | 048     | degrees | Channel 1 (True, Range 0 - 359)                       |
| SNR (C/No)               | 42      | dBHz    | Range 0 – 99, (null when not tracking)                |
| ....                     | -       | -       | ....  |
| Satellite ID             | 27      | -       | Channel 4 (Range 1 - 32)                              |
| Elevation                | 27      | degrees | Channel 4 (Maximum 90)                                |
| Azimuth                  | 138     | degrees | Channel 4 (True, Range 0 - 359)                       |
| SNR (C/No)               | 42      | dBHz    | Range 0 - 99, (null when not tracking)                |
| Checksum                 | *71     | -       | -   |
| <CR> <LF>                | -       | -       | End of message termination                            |

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