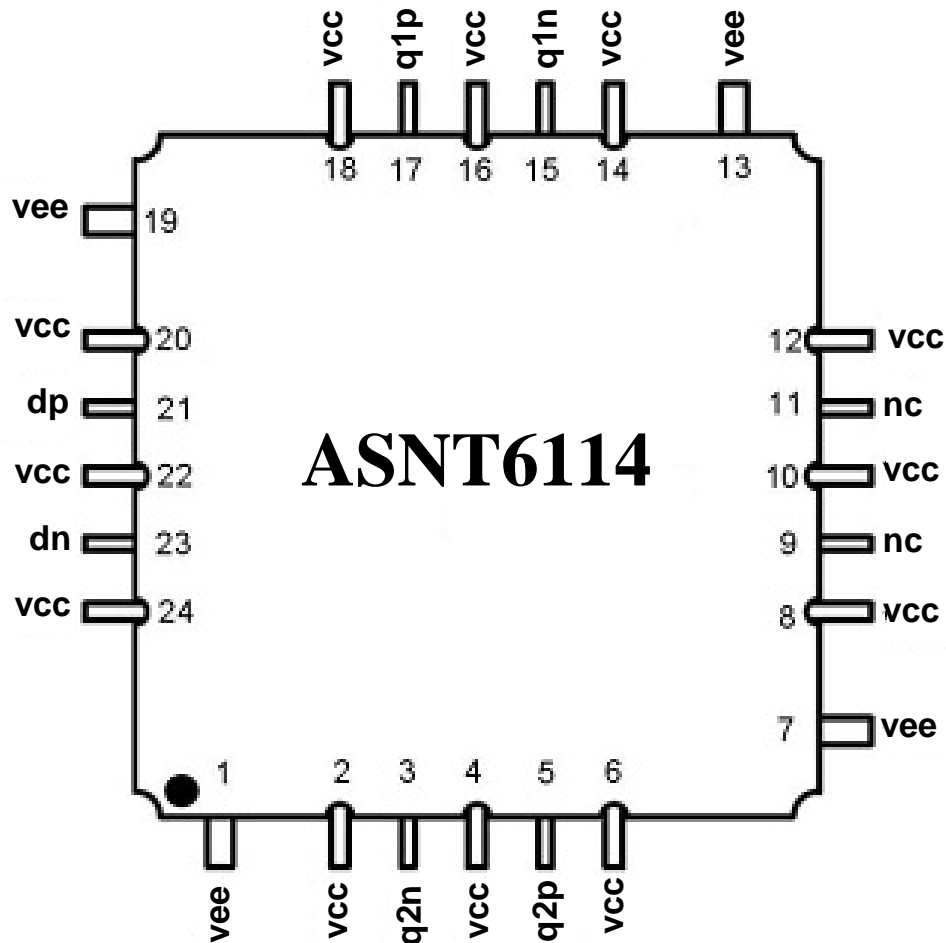




ASNT6114-KMC DC-25GHz 1-to-2 Analog Signal Splitter

- DC to 25GHz broadband linear signal splitter
- One differential CML-type input port and two phase-matched differential CML-type output ports
- Differential input linearity range up to 800mV p-p
- Differential gain of approximately 0dB
- Low jitter and limited temperature variation over industrial temperature range
- Single +3.3V or -3.3V power supply
- Power consumption: 660mW
- Fabricated in SiGe for high performance, yield, and reliability
- Custom CQFP 24-pin package





DESCRIPTION

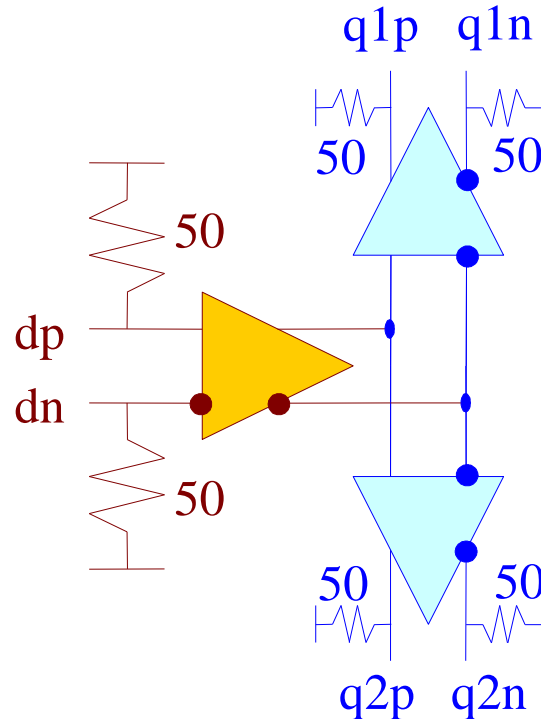


Fig. 1. Functional Block Diagram

The temperature stable ASNT6114-KMC 1-to-2 analog signal splitter is intended for use in high-speed interleaved ADCs or similar systems. The IC shown in Fig. 1 can receive a broad-band analog signal at its differential input dp/dn and effectively distribute it to two separate phase matched differential outputs $q1p/q1n$, $q2p/q2n$ with a nominal gain of $0dB$.

The part's I/O's support the CML logic interface with on chip 50Ω termination to VCC and may be used differentially, AC/DC coupled, single-ended, or in any combination (also see POWER SUPPLY CONFIGURATION). In the DC-coupling mode, the input signal's common mode voltage should comply with the specifications shown in ELECTRICAL CHARACTERISTICS. In the AC-coupling mode, the input termination provides the required common mode voltage automatically. The differential DC signaling mode is recommended for optimal performance. In particular, the specified output common-mode voltage level is guaranteed only in case of external single-ended 50Ω DC termination to VCC .

POWER SUPPLY CONFIGURATION

The part can operate with either negative supply ($VCC = 0.0V = \text{ground}$ and $VEE = -3.3V$), or positive supply ($VCC = +3.3V$ and $VEE = 0.0V = \text{ground}$). In case of the positive supply, all I/Os need AC termination when connected to any devices with 50Ω termination to ground. In any case, the input common mode voltage level is shifted down from VCC by a certain voltage ΔV_{ICM} as specified in

ELECTRICAL CHARACTERISTICS. To have the input common mode voltage equal to ground, a floating negative supply scheme detailed in Fig. 2 should be used.

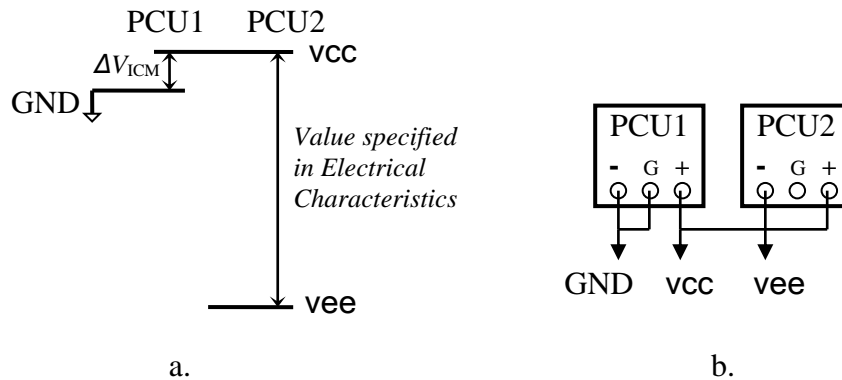


Fig. 2. Floating Negative Supply Scheme: Potential Diagram (a) and Schematic (b)

For the best performance, the external 50Ω terminations of the outputs should be connected to vcc, but not to ground!

Different PCB layouts will be needed for each different power supply combination.

All the characteristics detailed below assume vcc = 0.0V and vee = -3.3V.

ABSOLUTE MAXIMUM RATINGS

Caution: Exceeding the absolute maximum ratings shown in Table 1 may cause damage to this product and/or lead to reduced reliability. Functional performance is specified over the recommended operating conditions for power supply and temperature only. AC and DC device characteristics at or beyond the absolute maximum ratings are not assumed or implied. All min and max voltage limits are referenced to ground (assumed vcc).

Table 1. Absolute Maximum Ratings

| Parameter | Min | Max | Units |
|-----------------------------|----------|----------|-------|
| Supply Voltage (vee) | | -3.6 | V |
| Power Consumption | | 0.75 | W |
| DC Input Voltage | vcc-0.55 | vcc-0.35 | V |
| RF Input Voltage Swing (SE) | | 0.4 | V |
| Case Temperature | | +90 | °C |
| Storage Temperature | -40 | +100 | °C |
| Operational Humidity | 10 | 98 | % |
| Storage Humidity | 10 | 98 | % |



TERMINAL FUNCTION

| TERMINAL | | | DESCRIPTION |
|---------------------------------|-------------------------------------|---------------|--|
| Name | No. | Type | |
| dp | 21 | CML input | Differential high speed data inputs with internal SE 500hm termination to vcc |
| dn | 23 | | |
| q1p | 17 | CML output | Differential high speed data outputs with internal SE 500hm termination to vcc. Require external SE 500hm termination to vcc |
| q1n | 15 | | |
| q2p | 5 | | |
| q2n | 3 | output | |
| Supply and Termination Voltages | | | |
| Name | Description | | Pin Number |
| vcc | Positive power supply (+3.3V or 0) | | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 |
| vee | Negative power supply (0V or -3.3V) | | 1, 7, 13, 19 |
| n/c | Not connected pins | | 9, 11 |

ELECTRICAL CHARACTERISTICS

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|---------------------------------------|----------|----------|---------|-------------|------------------------------------|
| General Parameters | | | | | |
| vee | -3.1 | -3.3 | -3.5 | V | ±6% |
| vcc | | 0.0 | | V | External ground |
| I _{vee} | | 200 | | mA | |
| Power consumption | | 660 | | mW | |
| Junction temperature | -25 | 50 | 125 | °C | |
| Input Analog (dp/dn) | | | | | |
| Bandwidth | DC | | 25 | GHz | -3dB |
| Common mode voltage level | vcc-0.55 | vcc-0.5 | vcc-0.4 | mV | |
| Voltage swing, pk-pk | | | 400 | mV | Single ended |
| Input Noise Density | | 1.5 | | nV/sqrt(Hz) | |
| S11 | | -17 | | dB | at 3GHz |
| | | -15 | | dB | at 10GHz |
| | | -10 | | dB | at 20GHz |
| Output Analog (q1p/q1n, q2p/q2n) | | | | | |
| Common mode level | | vcc-0.55 | | V | With external 500hm DC termination |
| S22 | | -8 | | dB | DC to 30GHz |
| Small Signal Differential Gain | | 0 | | dB | at 10GHz |
| Output referred 1dB Compression Point | | 2.1 | | dBm | Single-Ended, 20GHz |
| THD | | 0.2 | | % | |



PACKAGE INFORMATION

The chip die is housed in a custom 24-pin CQFP package shown in Fig. 3. The package provides a center heat slug located on its back side to be used for heat dissipation. ADSANTEC recommends for this section to be soldered to the VCC plain, which is ground for a negative supply, or power for a positive supply.

The part's identification label is ASNT6114-KMC. The first 8 characters of the name before the dash identify the bare die including general circuit family, fabrication technology, specific circuit type, and part version while the 3 digits after the underscore represent the package's manufacturer, type, and pin out count.

This device complies with the Restriction of Hazardous Substances (RoHS) per 2011/65/EU for all ten substances.

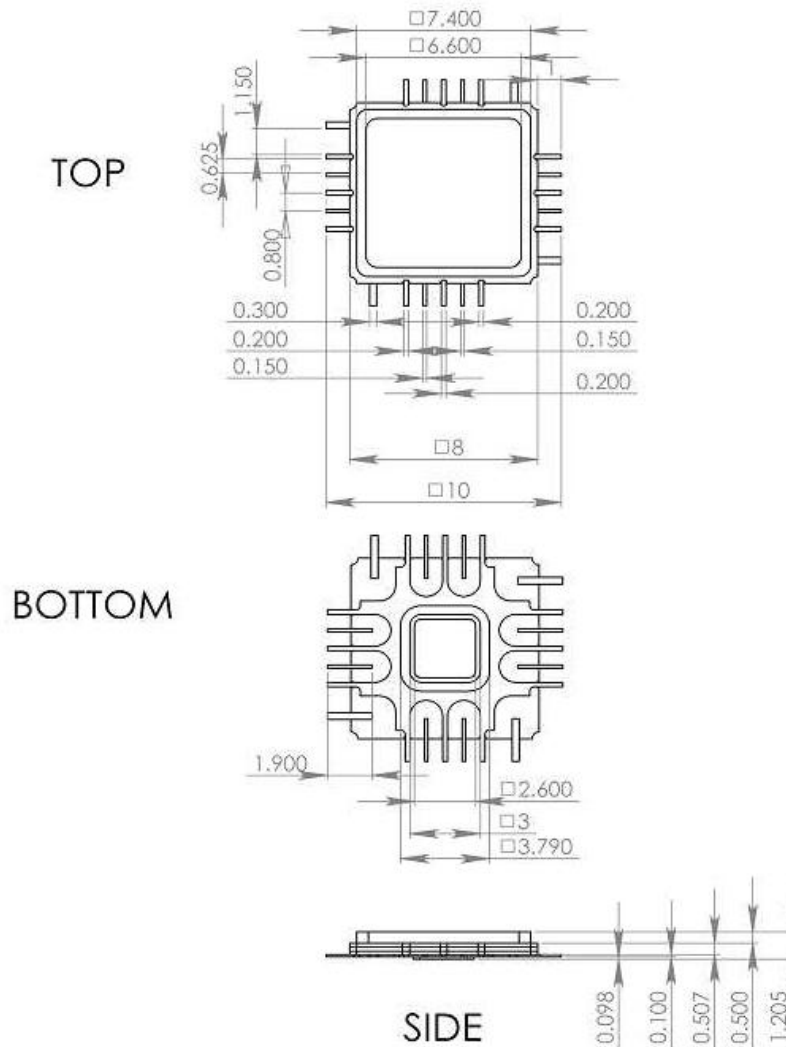


Fig. 3. CQFP 24-Pin Package Drawing (All Dimensions in mm)



REVISION HISTORY

| Revision | Date | Changes |
|----------|---------|---|
| 1.6.2 | 05-2020 | Updated Package Information |
| 1.5.2 | 08-2019 | Corrected pinout diagram Corrected Terminal Functions table |
| 1.4.2 | 07-2019 | Updated Letterhead |
| 1.4.1 | 11-2017 | Corrected Absolute Maximum RF input voltage swing Added Absolute Maximum DC input voltage Corrected specifications for input common mode voltage level Added specifications for input voltage swing Corrected 1dB compression point |
| 1.3.1 | 05-2015 | Revised Package Information section |
| 1.2.1 | 01-2015 | Corrected Power Supply Configuration section Expanded S11 information |
| 1.1.1 | 03-2013 | Corrected description Corrected absolute maximum ratings Updated electrical characteristics table Added package mechanical drawing Corrected format |
| 1.0 | 03-2012 | First release |