# APS3607

Four-way Active Power Splitter

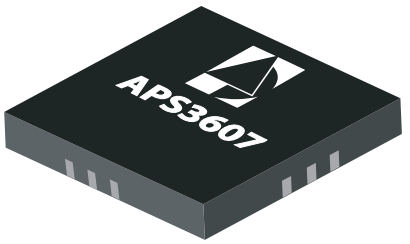
**ADVANCED PRODUCT INFORMATION - Rev 0.2**

## FEATURES

- Single Input, Quadruple Output Design
- Wideband Operation to above 1 GHz
- Nominal 3.2 dB Gain
- 4.7 dB Typical Noise Figure
- Single +3.3V or +5V Supply
- High Linearity, Low Distortion
- Current adjust pin for optimizing distortion performance
- Single-Ended 75 Ohm Inputs/Outputs
- RoHS Compliant Package

## APPLICATIONS

- All-Digital CATV Set-Top Boxes with Multiple Tuners
- Multiple-Tuner TVs and TV Tuner Cards




**S26 Package**
**12 Pin QFN**
**3 mm x 3 mm x 1 mm**

## PRODUCT DESCRIPTION

This APS3607 active splitter from ANADIGICS accepts a broadband RF input from 50 MHz to 1002 MHz and splits the signal to provide four broadband RF outputs with minimal degradation of quality. The single-package surface mount device amplifies the input using highly linear, low noise amplification stages, and couples the amplified signal to four separate output paths that each can drive digital video tuners. The overall linearity of each path is maintained across the entire operating frequency range, ensuring low distortion effects on each output signal.

Requiring a single voltage supply of either +3.3V or +5 V, the active splitter is manufactured using ANADIGICS' highly reliable GaAs MESFET process. The small surface mount QFN packaging makes this device ideal for use in today's set-top boxes, televisions and video tuner cards requiring multiple-tuner solutions.



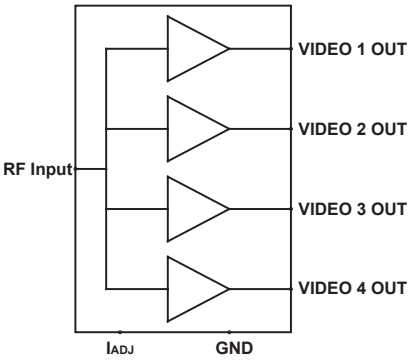



**Figure 1: Functional Block Diagram**

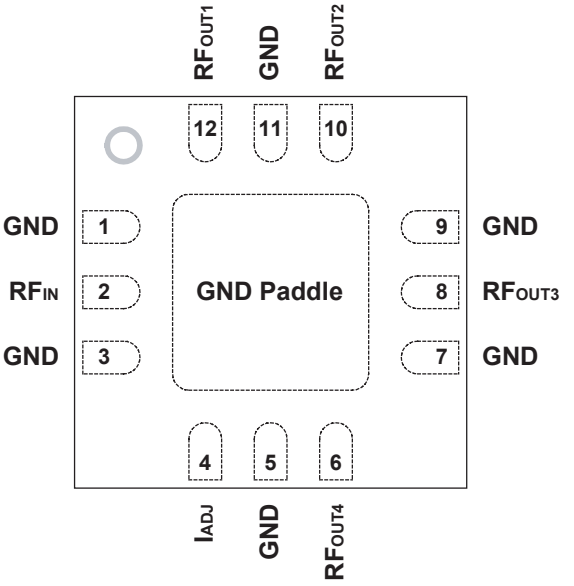



**Figure 2: Pinout (X-ray Top View)**

**Table 1: Pin Description**

| PIN | NAME | DESCRIPTION |
|---|---|---|
| 1 | GND | Ground |
| 2 | $RF_{IN}$ | RF Input |
| 3 | GND | Ground |
| 4 | $I_{ADJ}$ | Current Adjust |
| 5 | GND | Ground |
| 6 | $RF_{OUT4}$ | RF Output 4 |
| 7 | GND | Ground |
| 8 | $RF_{OUT3}$ | RF Output 3 |
| 9 | GND | Ground |
| 10 | $RF_{OUT2}$ | RF Output 2 |
| 11 | GND | Ground |
| 12 | $RF_{OUT1}$ | RF Output 1 |

## ELECTRICAL CHARACTERISTICS



**Table 2: Absolute Minimum and Maximum Ratings**

| PARAMETER | MIN | MAX | UNIT | COMMENTS |
|---|---|---|---|---|
| Supply Voltage ($V_{CC}$) | 0 | +8 | V | |
| RF Input Power | - | +40 | dBmV | per channel<br>132 channel loading |
| ESD Rating | 500<br>1000 | -<br>- | V | Human Body Model, Class 1B<br>Charged Device Model, Class 3 |
| MSL Level | MSL-1 | - | - | |

**Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.**

**Table 3: Operating Ranges**

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|---|---|---|---|---|---|
| Operating Frequency (f) | 50 | - | 1002 | MHz | |
| Supply Voltage ($V_{CC}$) | +3 | - | 5.25 | V | Supplied via output pins |
| RF Input Power ($P_{IN}$) | -15 | - | +15 | dBmV | per channel |
| Current Adjust Pin ($I_{ADJ}$) | 0 | - | +0.5 | V | |
| Case Temperature ($T_C$) | -5 | - | +85 | °C | no damage to device operating over -30 to +95 °C range |



**The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.**

**Table 4: Electrical Specifications**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V, $I_{CC}$ = 130 mA, 75 Ω system)**

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|---|---|---|---|---|---|
| Gain at 50 MHz | 2.7 | 3.2 | - | dB | |
| Noise Figure | - | 4.7 | 5.2 | dB | |
| CTB (1) | - | -70 | -66 | dBc | |
| CSO (1) | - | -66 | -60 | dBc | |
| XMOD (1) | - | -67 | - | dBc | |
| RF Isolation<br>Input-Output<br>Output-Output | <br>-<br>- | <br>25<br>25 | <br>-<br>- | dB | |
| Input Return Loss | - | -15 | - | dB | |
| Power Consumption | - | 700 | - | mW | |

*Notes:*
*(1) 132 channels, +15 dBmV input per channel, 0 dB tilt.*

**Table 5: Electrical Specifications**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +3.3 V, $I_{CC}$ = 130 mA, 75 Ω system)**

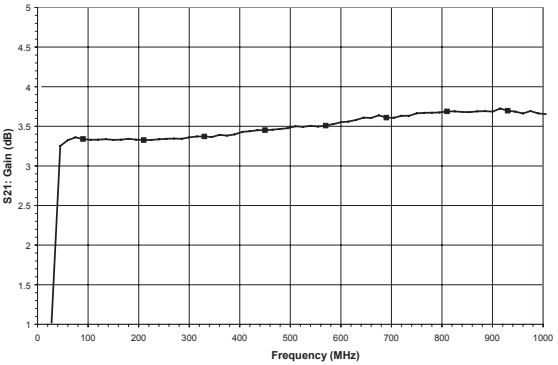
| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|---|---|---|---|---|---|
| Gain at 50 MHz | - | 3.2 | - | dB | |
| Noise Figure | - | 4.7 | - | dB | |
| CTB (1) | - | -70 | - | dBc | |
| CSO (1) | - | -60 | - | dBc | |
| XMOD (1) | - | -67 | - | dBc | |
| RF Isolation<br>Input-Output<br>Output-Output | <br>-<br>- | <br>25<br>25 | <br>-<br>- | dB | |
| Input Return Loss | - | -15 | - | dB | |
| Power Consumption | - | 450 | - | mW | |

*Notes:*
*(1) 132 channels, +18 dBmV input per channel, 0 dB tilt.*

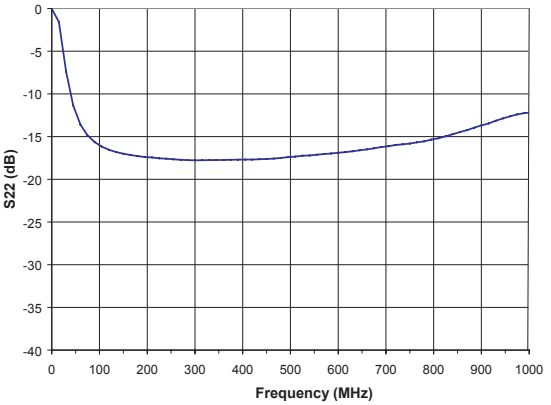
## +5 VOLT DATA

**Test Conditions: 132 channels, 0 dB tilt, +15 dBmV input/channel, $I_{ADJ}$ = GND**

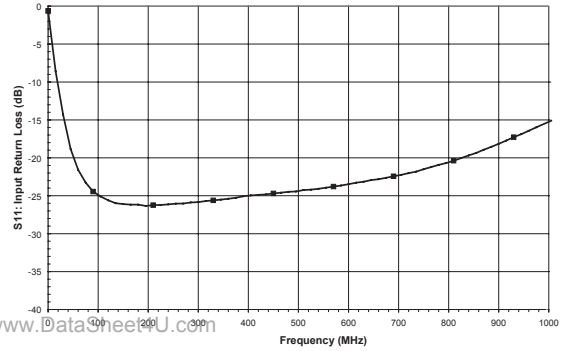
### Figure 3: Gain vs. Frequency




### Figure 4: Output Return Loss vs. Frequency

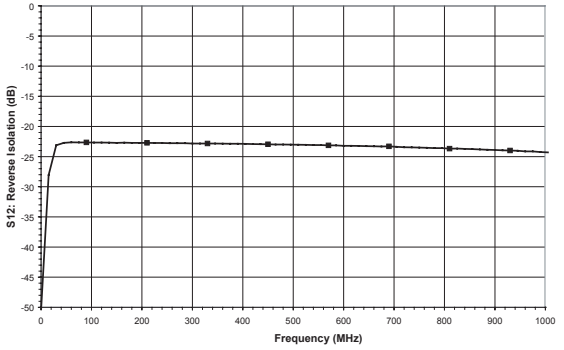



### Figure 5: Input Return Loss vs. Frequency

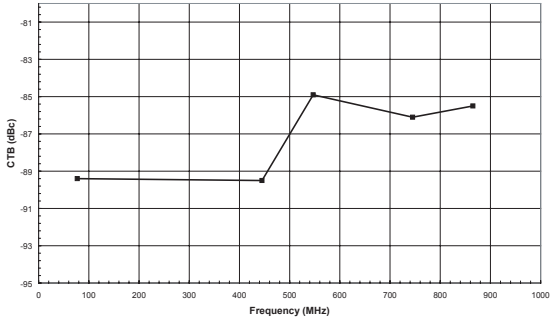




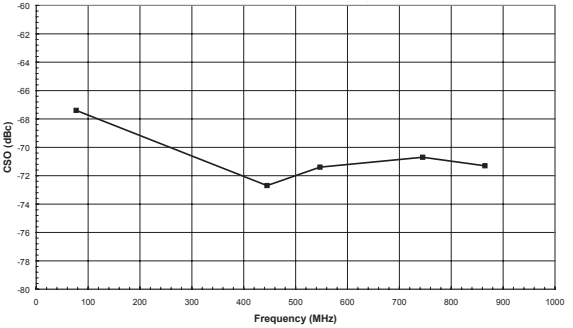

### Figure 6: Reverse Isolation vs. Frequency




### Figure 7: CTB vs. Frequency



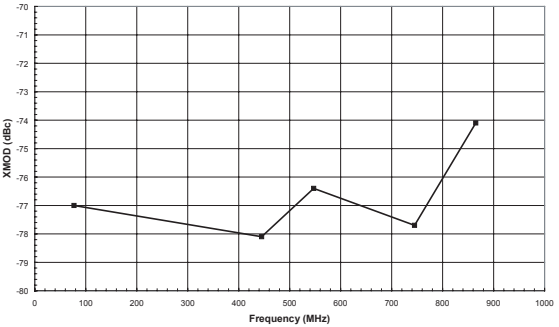

### Figure 8: CSO vs. Frequency



## +5 VOLT DATA (continued)

**Test Conditions: 132 channels, 0 dB tilt, +15 dBmV input/channel, $I_{ADJ}$ = GND**

**Figure 9: XMOD (dBc) vs. Frequency**




## +3.3 VOLT DATA

**Test Conditions: 132 channels, 0 dB tilt, 18 dBmV input/channel, $I_{ADJ}$ = GND**

**Figure 10: Gain vs. Frequency**

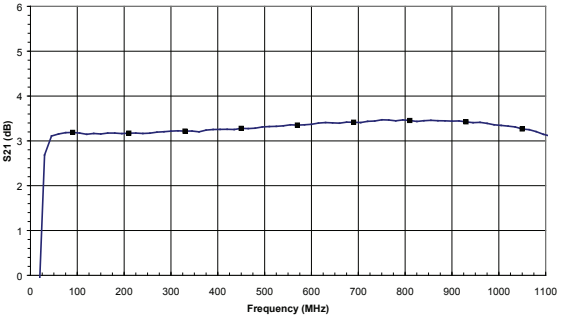



**Figure 11: Output Return Loss vs. Frequency**

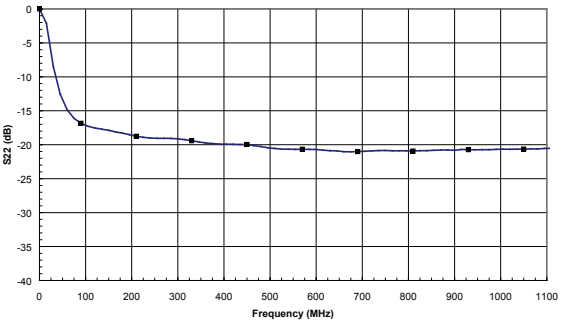





**Figure 12: Input Return Loss vs. Frequency**

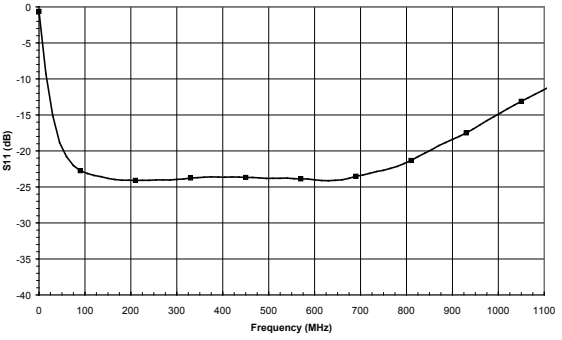
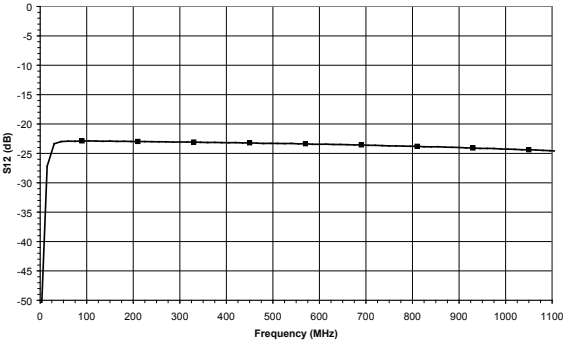



**Figure 13: Reverse Isolation vs. Frequency**



## +3.3 VOLT DATA (continued)

**Test Conditions: 132 channels, 0 dB tilt, 18 dBmV input/channel, $I_{ADJ}$ = GND**

**Figure 14: CTB vs. Frequency**

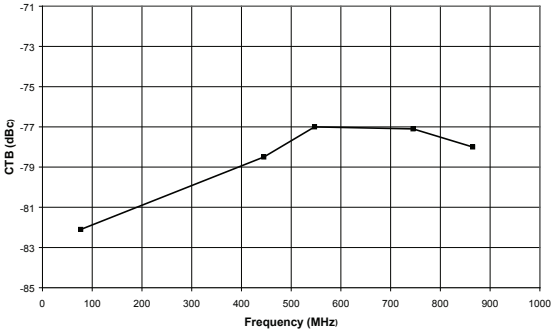



**Figure 15:CSO vs. Frequency**

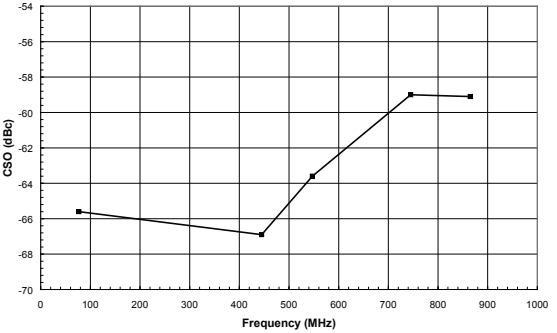



**Figure 16: XMOD (dBc) vs. Frequency**

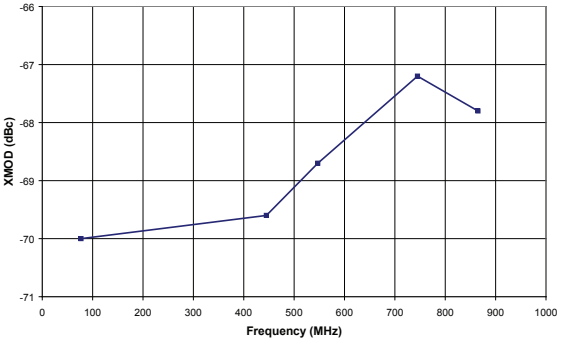
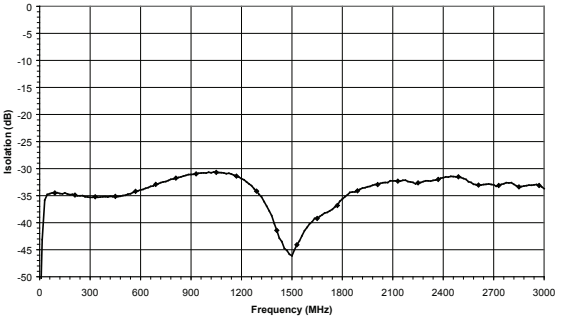



**Figure 17: Output Port-to-Port vs. Frequency**



## APPLICATION INFORMATION



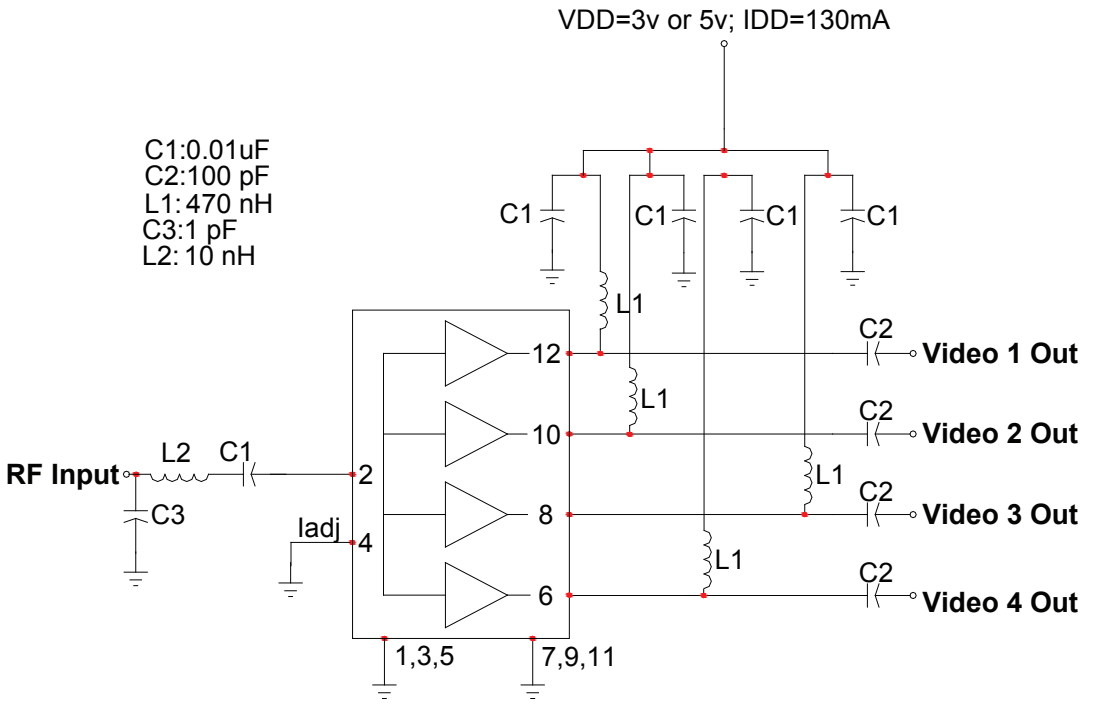



**Figure 10: 4 Way Active Splitter Digital Application Circuit**

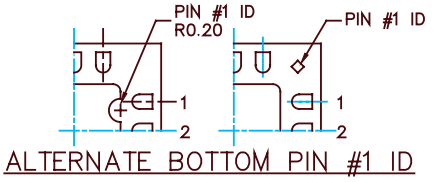


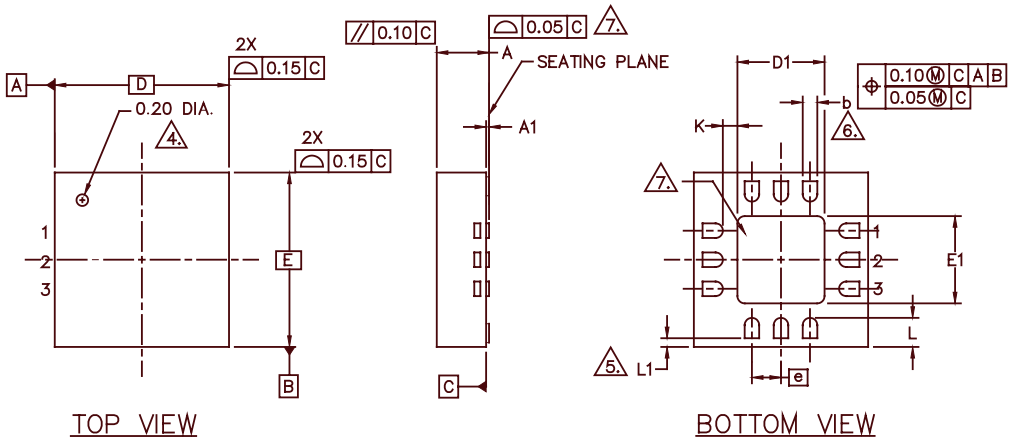
*Note:*

*Application circuits are available for other supply voltages. Contact ANADIGICS broadband engineering for more detail.*

## PACKAGE OUTLINE






| SYMBOL | DIMENSIONS–MM MIN. | MAX. | NOTE | SYMBOL | DIMENSIONS–INCHES MIN. | MAX. | NOTE |
|---|---|---|---|---|---|---|---|
| A | 0.80 | 1.00 | | A | 0.031 | 0.039 | |
| A1 | 0.00 | 0.05 | | A1 | 0.000 | 0.001 | |
| b | 0.18 | 0.30 | | b | 0.007 | 0.011 | |
| D | 3.00 BSC | | | D | 0.118 BSC | | |
| D1 | 1.30 | 1.70 | | D1 | 0.051 | 0.067 | |
| E | 3.00 BSC | | | E | 0.118 BSC | | |
| E1 | 1.30 | 1.70 | | E1 | 0.051 | 0.067 | |
| e | 0.50 BSC | | | e | 0.019 BSC | | |
| K | 0.20 MIN. | | | K | 0.007 MIN. | | |
| L | 0.35 | 0.55 | | L | 0.014 | 0.022 | |
| L1 | | 0.15 MAX. | | L1 | | 0.006 MAX. | |



NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.05 mm.
3. MAXIMUM ALLOWABLE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER MARKED.
5. A MAXIMUM 0.15mm PULL BACK (L1) MAYBE PRESENT. L MINUS L1 TO BE EQUAL TO OR GREATER THAN 0.30mm.
6. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM TERMINAL TIP. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.
7. BILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.
8. REFERENCE JEDEC OUTLINE MO–220.

**Figure 11: S26 Package Outline - 12 Pin 3 mm x 3 mm x 1 mm QFN**

## ORDERING INFORMATION



| ORDER NUMBER | TEMPERATURE RANGE | PACKAGE DESCRIPTION | COMPONENT PACKAGING |
|---|---|---|---|
| APS3607RS26Q1 | -5 °C to +85 °C | RoHS Compliant 12 Pin 3 mm x 3 mm x 1 mm QFN Package | Tape and Reel, 1000 pieces per Reel |

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