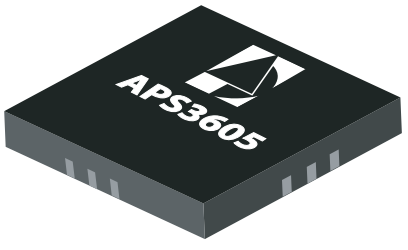
# APS3605

1 GHz Three-way Active Power Splitter

**PRELIMINARY DATA SHEET - Rev 1.4**

## FEATURES

- Single Input, Triple Output Design
- Wideband Operation Beyond 1 GHz
- Supports both Analog TV and Digital TV Lineups
- Nominal 3 dB Gain
- 5.5 dB Typical Noise Figure
- Single +5 V Supply, with Operation Down to +3.3 V
- High Linearity, Low Distortion
- Current Adjust Pin for optimizing distortion performance
- Single-Ended 75 Ohm Inputs/Outputs
- RoHS Compliant Package




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

## APPLICATIONS

- Analog/Digital and All-Digital CATV Set-Top Boxes with Multiple Tuners
- Multiple-Tuner TVs, TV Tuner Cards and Broadband Media Centers

## PRODUCT DESCRIPTION

This APS3605 active splitter from ANADIGICS accepts a broadband RF input from 50 MHz to 1 GHz and splits the signal to provide three 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 three separate output paths that each can drive either analog video, digital video or digital data 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 +5 V, and operable down to +3.3 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.

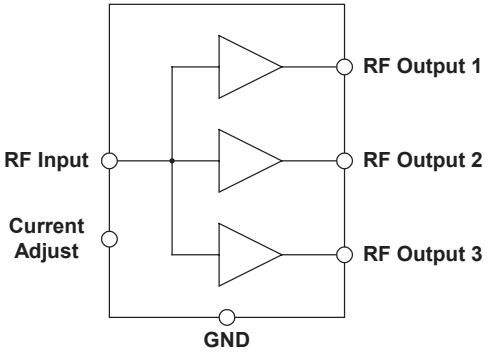



**Figure 1: Functional Block Diagram**

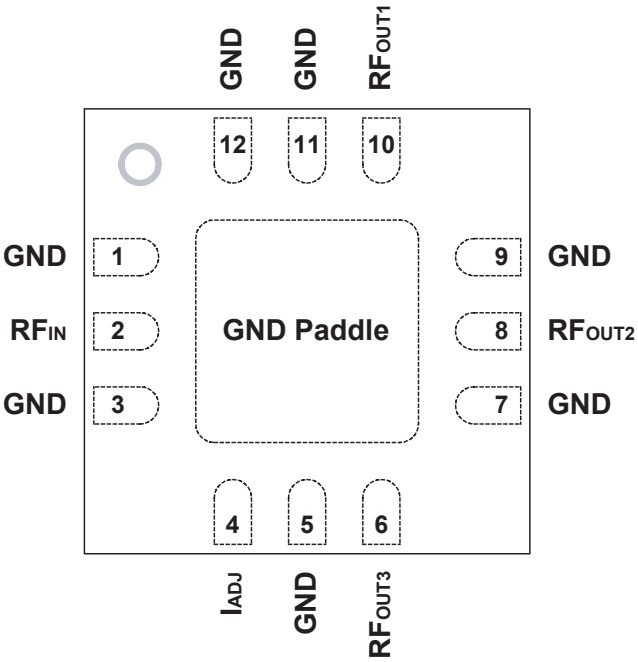



**Figure 2: Pinout (X-ray Top View)**

**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 | $RF_{OUT3}$ | RF Output 3 |
| 7 | GND | Ground |
| 8 | $RF_{OUT2}$ | RF Output 2 |
| 9 | GND | Ground |
| 10 | $RF_{OUT1}$ | RF Output 1 |
| 11 | GND | Ground |
| 12 | GND | Ground |

## ELECTRICAL CHARACTERISTICS

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

| PARAMETER | MIN | MAX | UNIT | COMMENTS |
|---|---|---|---|---|
| Supply Voltage ($V_{CC}$) | 0 | +8 | V | |
| RF Input Power | - | +25 | dBmV | per channel |
| 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 | - | 1000 | MHz | |
| Supply Voltage ($V_{CC}$) | +3.3 | - | +5 | V | |
| RF Input Power ($P_{IN}$) | - | - | +18 | dBmV | per channel |
| 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 for Digital TV**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V, $I_{CC}$ = 100 mA, 75 Ω system, ref. Figure 12)**

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|---|---|---|---|---|---|
| Gain at 100 MHz | 2.0 | 2.7 | - | dB | |
| Noise Figure | - | 5.6 | - | dB | |
| CTB (1) | - | -77 | -66 | dBc | |
| CSO (1) | - | -64 | -58 | dBc | |
| XMOD (1) | - | -66 | - | dBc | |
| RF Isolation<br>Input-Output<br>Output-Output | <br>-<br>- | <br>21<br>25 | <br>-<br>- | dB | |
| Input Return Loss | - | -9 | - | dB | |
| Current Consumption ($I_{CC}$) | 75 | 100 | 130 | mA | |

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

**Table 5: Electrical Specifications for Analog TV**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V, $I_{CC}$ = 135 mA, 75 Ω system, ref. Figure 13)**

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|---|---|---|---|---|---|
| Gain at 100 MHz | - | 2.8 | - | dB | |
| Noise Figure | - | 5.4 | - | dB | |
| CTB (1) | - | -81 | - | dBc | |
| CSO (1) | - | -67 | - | dBc | |
| XMOD (1) | - | -76 | - | dBc | |
| RF Isolation<br>Input-Output<br>Output-Output | <br>-<br>- | <br>21<br>25 | <br>-<br>- | dB | |
| Input Return Loss | - | -9 | - | dB | |
| Current Consumption ($I_{CC}$) | - | 135 | - | mA | |

**The Analog TV electrical specifications are provided for reference only. ANADIGICS does not perform a production screen for, and therefore does not guarantee, such performance.**

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

## PERFORMANCE DATA

**Figure 3: Gain (S21) vs. Frequency ($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V)**

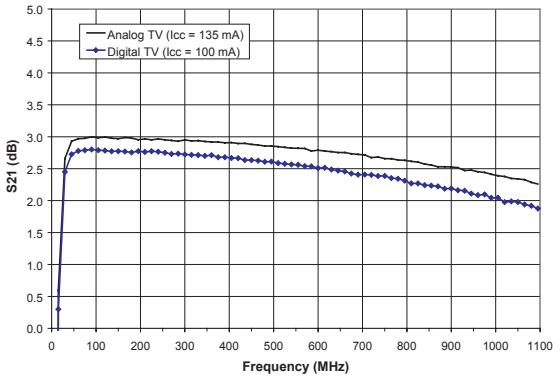



**Figure 4: Input Return Loss (S11) vs. Frequency ($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V)**

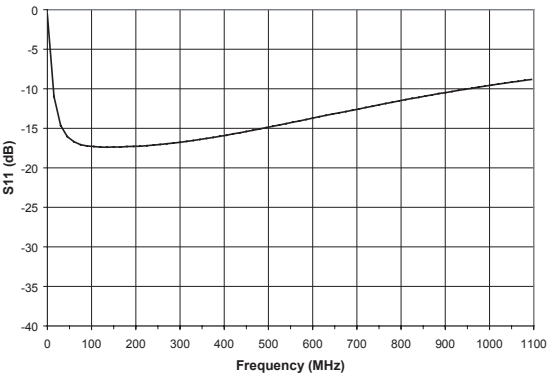



**Figure 5: Reverse Isolation (S12) vs. Frequency ($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V)**

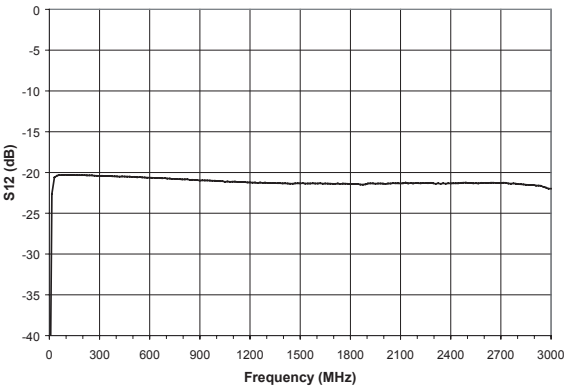



**Figure 6: Output Return Loss (S22) vs. Frequency ($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V)**

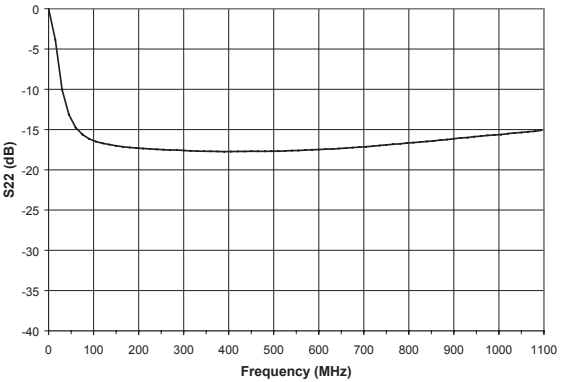



**Figure 7: Noise Figure vs. Frequency ($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V)**

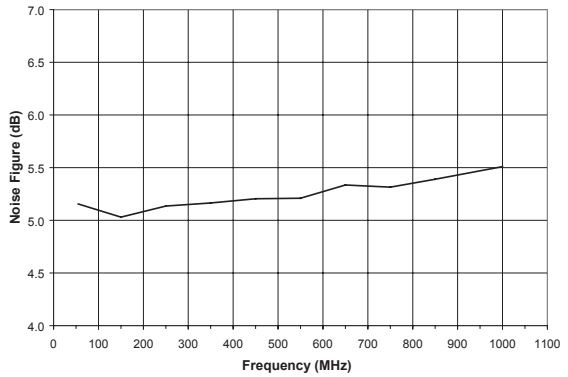



**Figure 8: Port-to-Port Isolation vs. Frequency ($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V)**

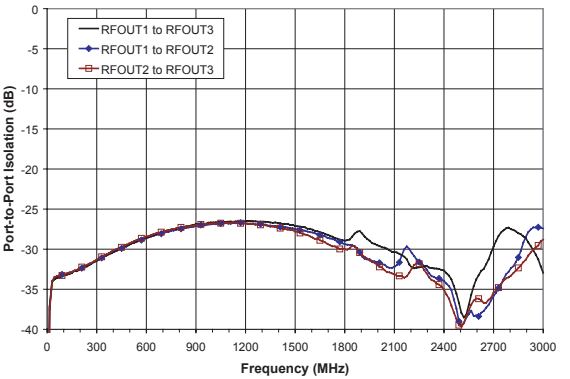


**Figure 9: CTB vs. Frequency**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V, 132 Channels, +15 dBmV Input per Channel)**

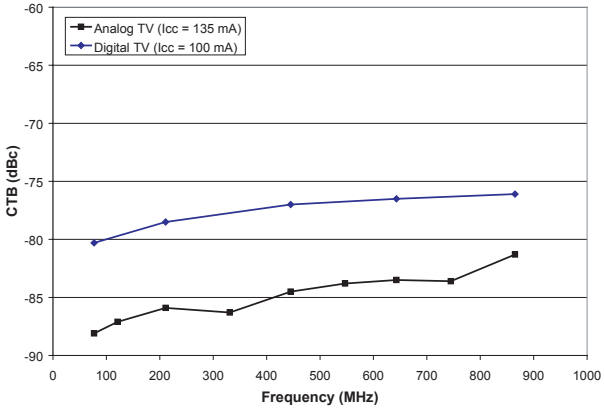



**Figure 10: CSO vs. Frequency**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V, 132 Channels, +15 dBmV Input per Channel)**

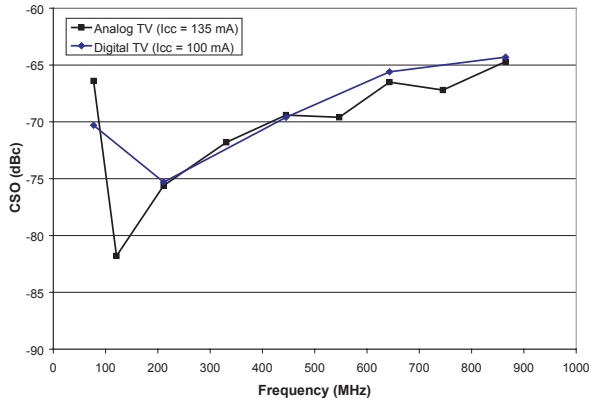
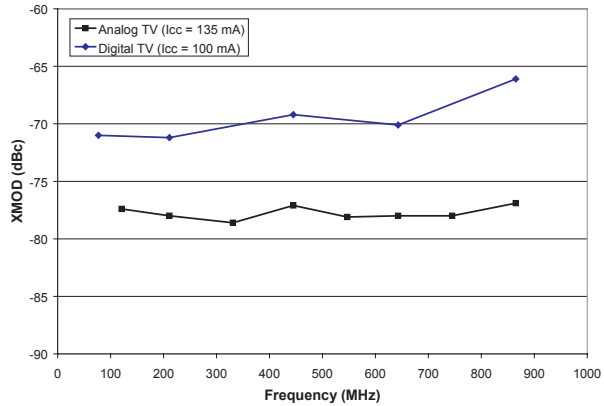



**Figure 11: XMOD vs. Frequency**
**($T_{AMB}$ = +25 °C, $V_{CC}$ = +5 V, 132 Channels, +15 dBmV Input per Channel)**



## APPLICATION INFORMATION

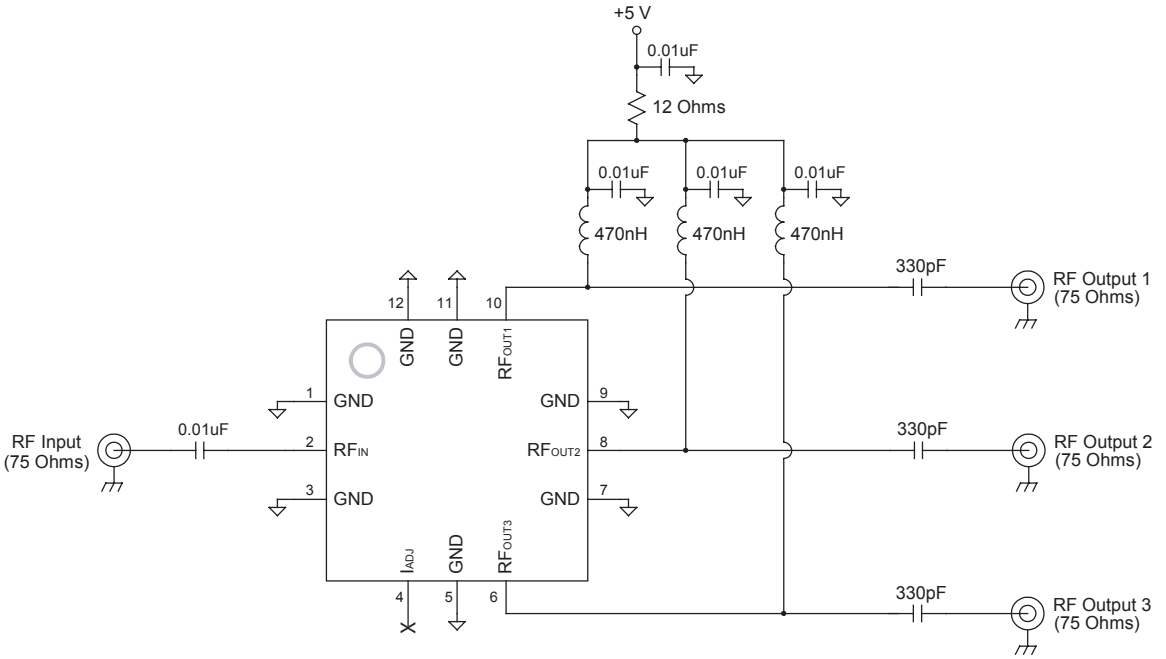



**Figure 12: Digital TV Application Circuit**

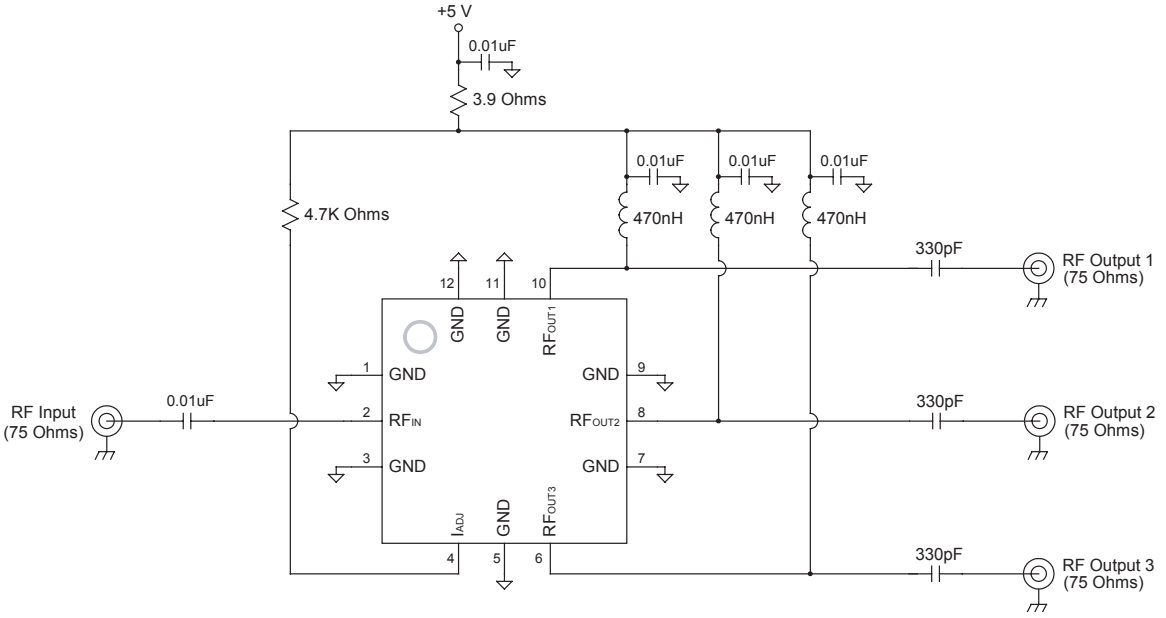
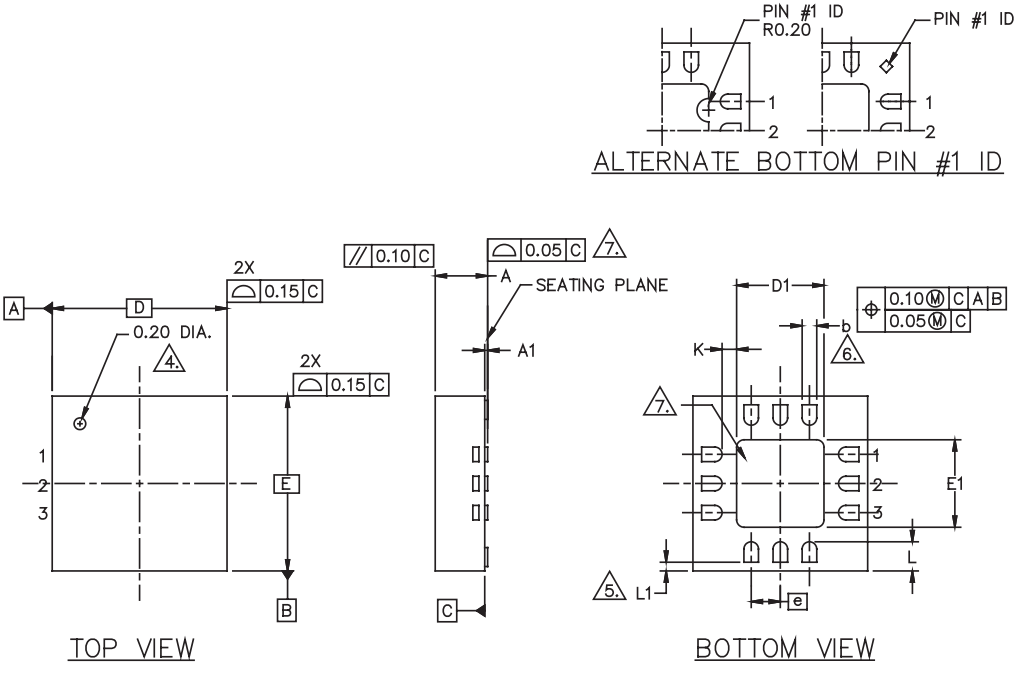



**Figure 13: Analog TV Application Circuit**

The APS3605 remains functional with a supply voltage as low as +3.3 V. Please contact an ANADIGICS sales representative for information regarding electrical performance at lower supply voltages.

## 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 14: S26 Package Outline - 12 Pin 3 mm x 3 mm x 1 mm QFN**

**NOTES**

## NOTES

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## ORDERING INFORMATION

| ORDER NUMBER | TEMPERATURE RANGE | PACKAGE DESCRIPTION | COMPONENT PACKAGING |
|---|---|---|---|
| APS3605RS26Q1 | -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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