

## FEATURES

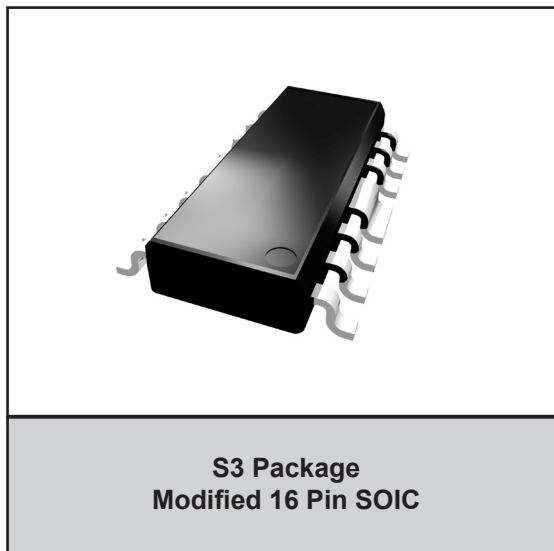
- 12 dB Gain
- +5 V Nominal Supply Voltage
- High Linearity
- Low Noise Figure: 2.7 dB (typ)
- Characterized at +25 dBmV output power
- Wide Band operation to beyond 1 GHz
- -40 to +85 °C
- RoHS-Compliant Package Option

## APPLICATIONS

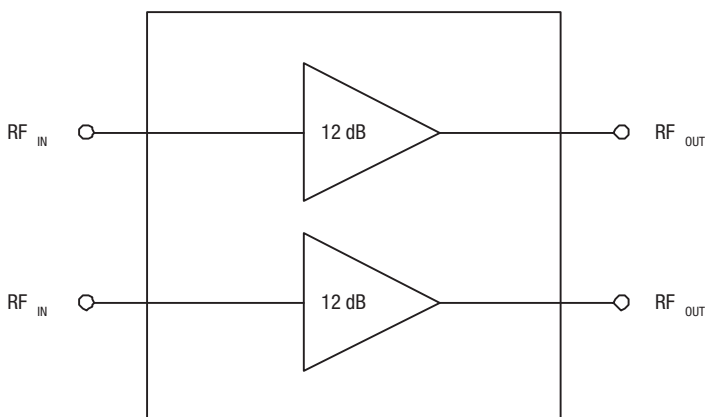
- Driver Amplifier
- CATV - Distribution / Drop Amplifiers
- Set Top Boxes
- Home Gateway

## PRODUCT DESCRIPTION

The ABA3100 is a monolithic IC intended for use in applications requiring high linearity, such as Cellular Telephone Base Station Driver Amplifiers, CATV Fiber Receiver and Distribution Amplifiers, CATV Drop Amplifiers, CATV Set Top Boxes and Home Gateways.



Offered in a modified 16 lead surface mount SOIC package, it is well suited for use in amplifiers where small size, reduced component count, and high reliability are important.



**Figure 1: Block Diagram**

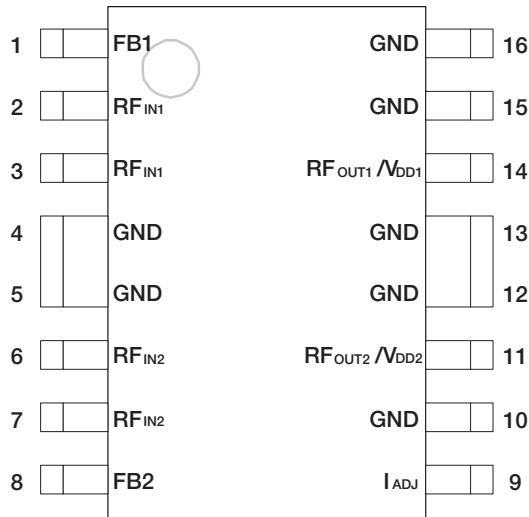


Figure 2: Pinout Diagram

Table 1: Pin Description

| PIN | NAME              | DESCRIPTION               | PIN | NAME                                 | DESCRIPTION                                   |
|-----|-------------------|---------------------------|-----|--------------------------------------|-----------------------------------------------|
| 1   | FB1               | Feedback for Amplifier A1 | 9   | I <sub>ADJ</sub>                     | Current Adjust                                |
| 2   | RF <sub>IN1</sub> | RF Input of Amplifier A1  | 10  | GND                                  | Ground                                        |
| 3   | RF <sub>IN1</sub> | RF Input of Amplifier A1  | 11  | RF <sub>OUT2</sub> V <sub>DD2</sub>  | RF output and V <sub>DD</sub> of Amplifier A2 |
| 4   | GND               | Ground                    | 12  | GND                                  | Ground                                        |
| 5   | GND               | Ground                    | 13  | GND                                  | Ground                                        |
| 6   | RF <sub>IN2</sub> | RF Input of Amplifier A2  | 14  | RF <sub>OUT1</sub> /V <sub>DD1</sub> | RF Output and V <sub>DD</sub> of Amplifier A1 |
| 7   | RF <sub>IN2</sub> | RF Input of Amplifier A2  | 15  | GND                                  | Ground                                        |
| 8   | FB2               | Feedback for Amplifier A2 | 16  | GND                                  | Ground                                        |

## ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

| PARAMETER                            | MIN  | MAX  | UNITS           |
|--------------------------------------|------|------|-----------------|
| Analog Supply (pins 11, 14)          | 0    | +12  | V <sub>DC</sub> |
| RF Power at Inputs (pins 2, 3, 6, 7) | -    | +10  | dBm             |
| Storage Temperature                  | - 65 | +150 | °C              |
| Soldering Temperature                | -    | 260  | °C              |
| Soldering Time                       | -    | 5.0  | Sec.            |

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.

Notes:

1. Pins 1, 2, 3, 6, 7 and 8 should be AC-coupled. No external DC bias should be applied.
2. Pin 9 should be AC-grounded. No external DC bias should be applied.

Table 3: Operating Ranges

| PARAMETER                                    | MIN  | TYP | MAX  | UNITS           |
|----------------------------------------------|------|-----|------|-----------------|
| RF Input / Output Frequency                  | 50   | -   | 1000 | MHz             |
| Analog Supply: V <sub>DD</sub> (pins 11, 14) | +4.5 | +5  | +9   | V <sub>DC</sub> |
| Case Temperature: T <sub>A</sub>             | -40  | -   | +85  | °C              |

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<sub>A</sub> = +25 °C, V<sub>DD</sub> = + 5 VDC, Test System = 75Ω)**

| PARAMETER                                             | MIN | TYP | MAX | UNITS | COMMENTS          |
|-------------------------------------------------------|-----|-----|-----|-------|-------------------|
| Gain                                                  | 11  | 12  | 13  | dB    |                   |
| Noise Figure                                          | -   | 2.5 | 3.0 | dB    | 50 MHz - 350 MHz  |
|                                                       | -   | 2.7 | 3.5 | dB    | 350 MHz - 550 MHz |
|                                                       | -   | 3.2 | 4.0 | dB    | 550 MHz - 860 MHz |
| Input/Output Return Loss                              | 10  | 18  | -   | dB    |                   |
| CSO <sup>(1)</sup>                                    |     | -72 |     | dBc   |                   |
| CTB <sup>(1)</sup>                                    |     | -75 |     | dBc   |                   |
| 2nd Order Input Intercept Point (OIP2) <sup>(2)</sup> |     | +60 |     | dBm   |                   |
| 3rd Order Input Intercept Point (OIP3) <sup>(2)</sup> |     | +35 |     | dBm   |                   |
| Thermal Resistance                                    | -   | -   | 33  | □/W   |                   |
| Current Consumption <sup>(3,4)</sup>                  | 120 | 150 | 170 | mA    |                   |

Notes:

(1) 132 channels, +25 dBmV per channel (measured at the output), 6 MHz channel spacing.

(2) Two tones: 397 MHz and 403 MHz, +4 dBm per tone.

(3) Characterized with I<sub>ADJ</sub> pin floating.

(4) Adding a shunt resistor from the I<sub>ADJ</sub> pin to ground will lower current, but with some decrease in performance.

## PERFORMANCE DATA

Figure 3: Typical Gain (S21) vs. Frequency

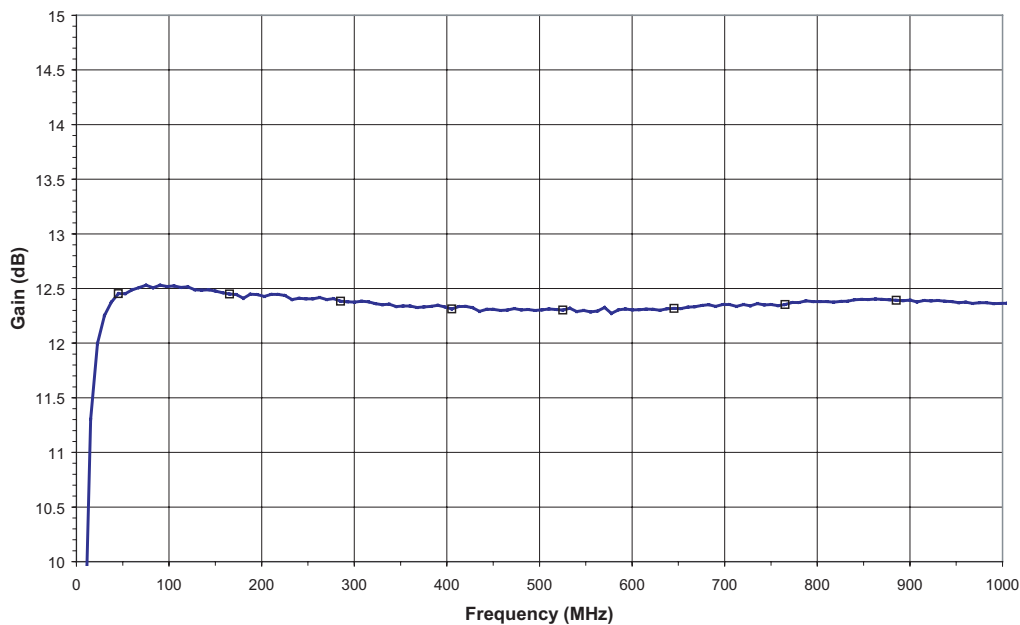
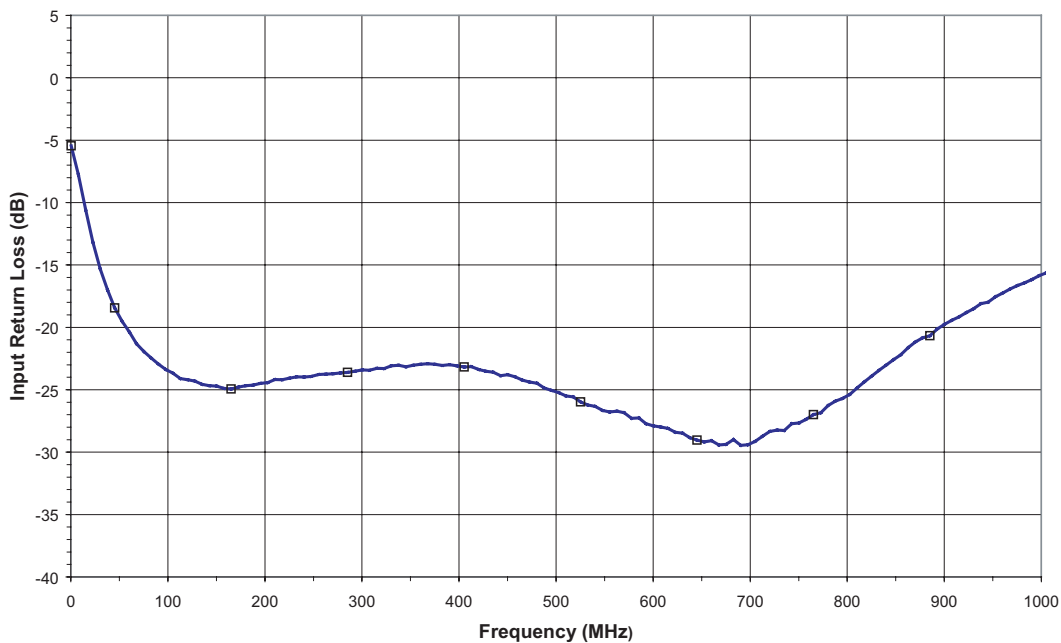


Figure 4: Typical Input Return Loss (S11) vs. Frequency



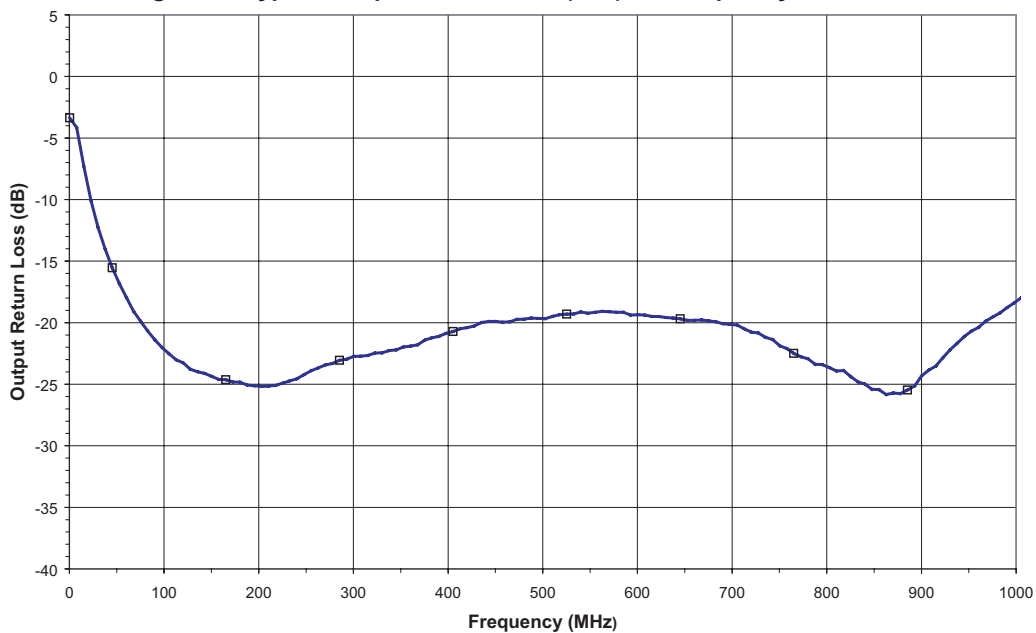
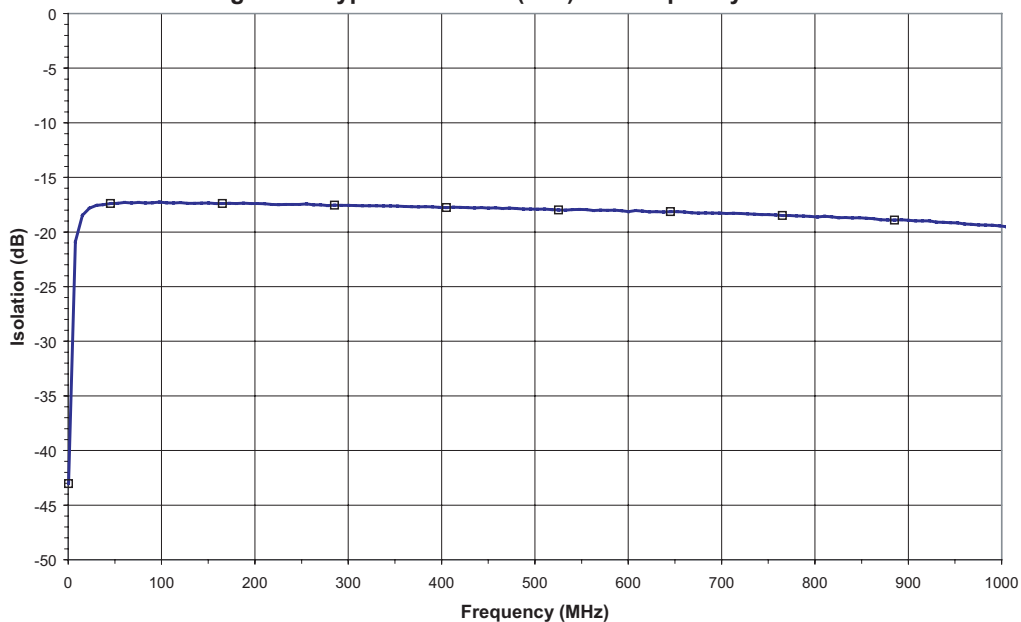
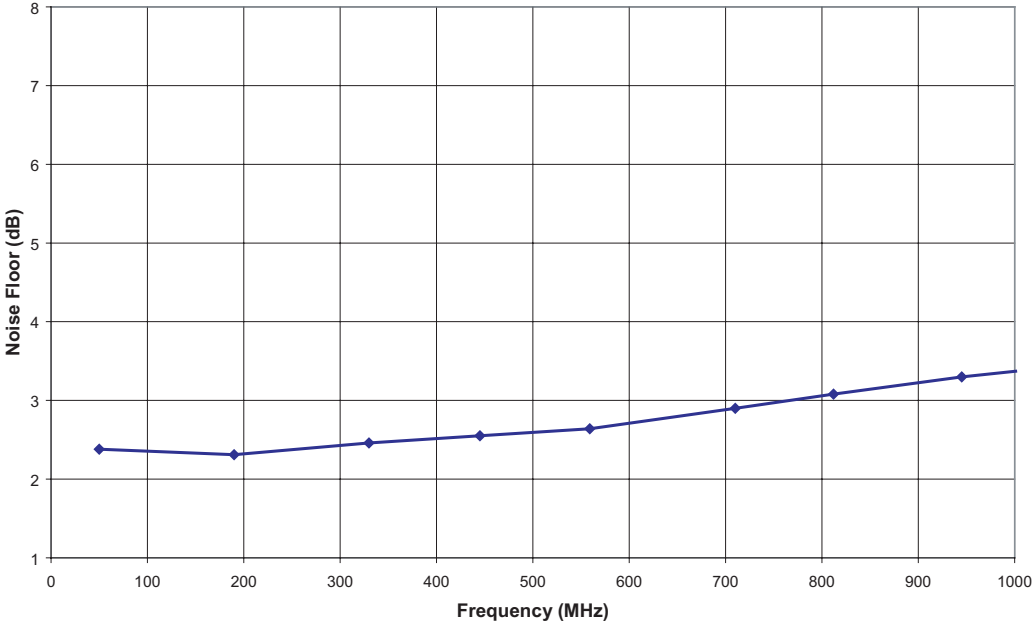
**Figure 5: Typical Output Return Loss (S22) vs. Frequency****Figure 6: Typical Isolation (S12) vs. Frequency**

Figure 7: Typical Noise Figure vs. Frequency



## APPLICATION INFORMATION

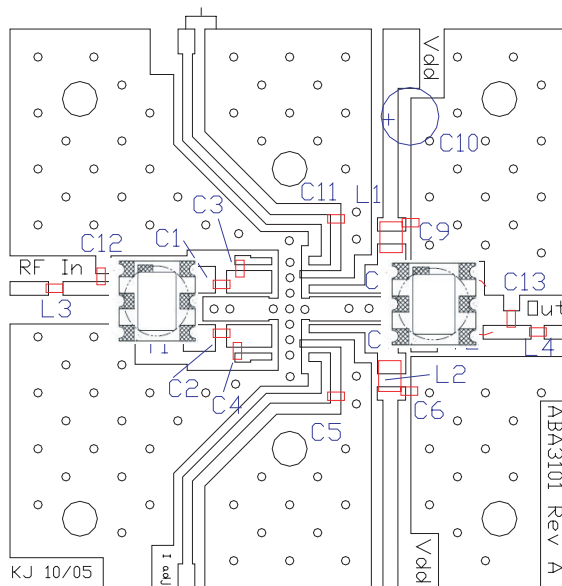
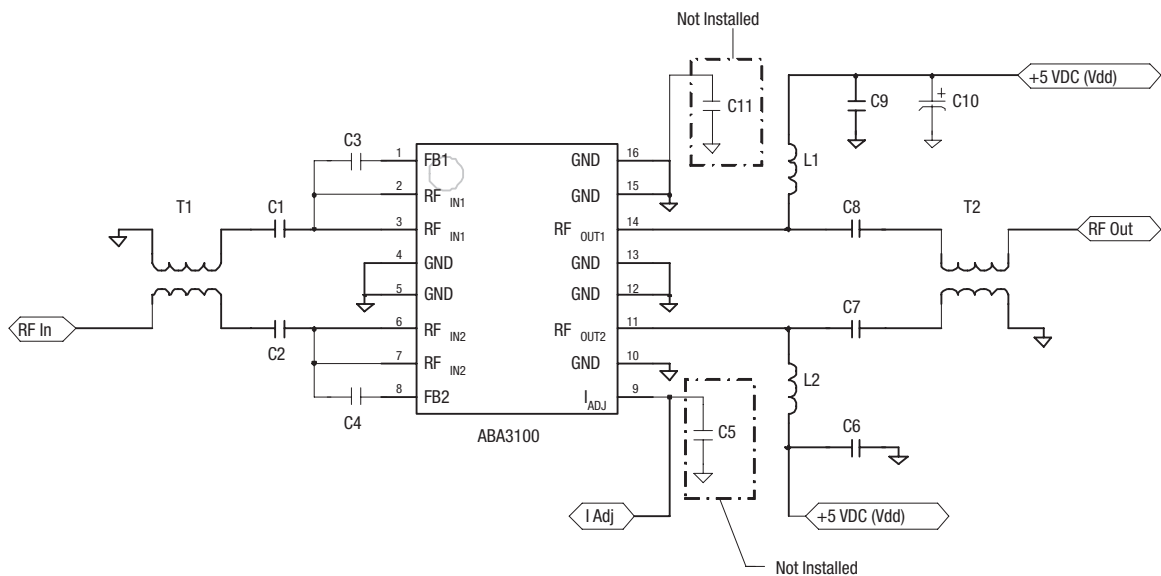


Figure 8: Evaluation Board Layout



\* Connecting a resistor from  $I_{ADJ}$  to ground lowers current; normal operation is with  $I_{ADJ}$  floating.

Figure 9: Evaluation Board Schematic

Table 5: Evaluation Board Parts List

| ITEM          | DESCRIPTION                     | QTY | VENDOR                          | VENDOR PART NUMBER |
|---------------|---------------------------------|-----|---------------------------------|--------------------|
| C1-C4, C6, C9 | 0.01uF CHIP CAP.                | 6   | MURATA                          | GRM39X7R1103K25V   |
| C7, C8        | 470 pF CHIP CAP.                | 2   | MURATA                          | GRM39COG471J25V    |
| C10           | 47 uF ELEC. CAP.                | 1   | DIGI-KEY CORP                   | P5275-ND           |
| C5, C11       | (not installed)                 |     |                                 |                    |
| L1, L2        | 390 nH CHIP INDUCTOR            | 2   | COILCRAFT                       | 1008CS-391XKBC     |
| CONNECTORS    | 75 $\square$ N MALE PANEL MOUNT | 2   | PASTERNAK ENTERPRISES           | PE4504             |
| T1, T2        | BALUN                           | 2   | PULSE ENGINEERING               | CX2024             |
|               | PCB                             | 1   | STANDARD PRINTED CIRCUITS, INC. | EBSTA-111899       |

## Notes:

1. "N" Connector center pin should be approximately 80 mils in length.
2. Connector tabs must be reduced by 150 mils.
3. Device must be soldered on PC board.

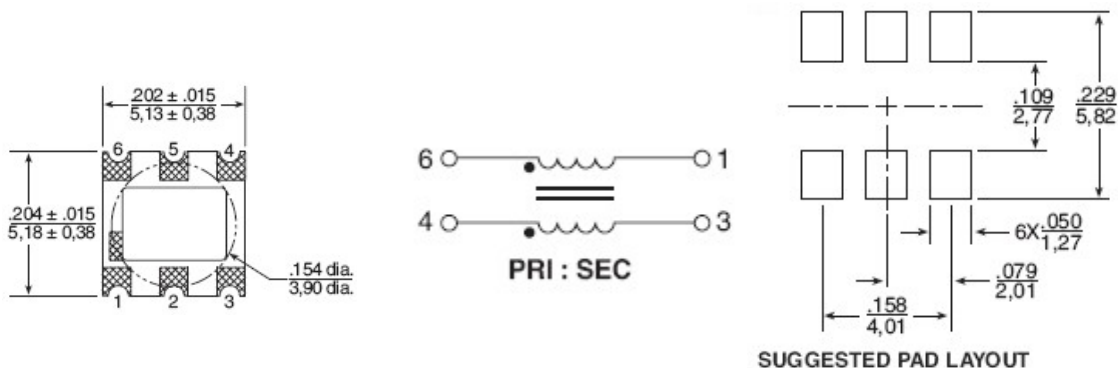
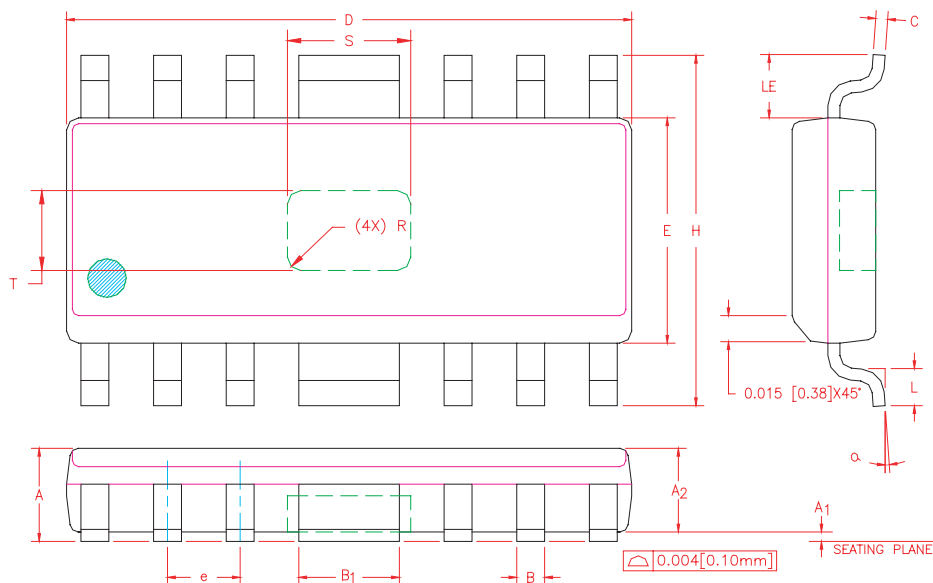


Figure 10: Pulse CX 2024 Balun

## Note:

1. Consult Pulse Engineering data sheet for more details.

## PACKAGE OUTLINE



| SYMBOL | INCHES     |       | MILLIMETERS |       | NOTE |
|--------|------------|-------|-------------|-------|------|
|        | MIN.       | MAX.  | MIN.        | MAX.  |      |
| A      | 0.058      | 0.068 | 1.47        | 1.73  |      |
| A1     | 0.000      | 0.004 | 0.00        | 0.10  | 7    |
| A2     | 0.054      | 0.065 | 1.37        | 1.65  |      |
| B      | 0.013      | 0.020 | 0.33        | 0.50  |      |
| B1     | 0.062      | 0.070 | 1.58        | 1.78  |      |
| C      | 0.008      | 0.010 | 0.20        | 0.25  | 4    |
| D      | 0.380      | 0.400 | 9.66        | 10.16 | 2    |
| E      | 0.150      | 0.160 | 3.81        | 4.06  | 3    |
| e      | 0.050 BSC  |       | 1.27 BSC    |       |      |
| H      | 0.226      | 0.244 | 5.74        | 6.20  |      |
| L      | 0.016      | 0.040 | 0.41        | 1.02  |      |
| LE     | 0.030      | —     | 0.76        | —     |      |
| α      | 0°         | 8°    | 0°          | 8°    |      |
| S      | 0.070      | 0.100 | 1.78        | 2.54  | 6    |
| T      | 0.040      | 0.070 | 1.02        | 1.78  | 6    |
| R      | 0.015 REF. |       | 0.38 REF.   |       | 6    |

## NOTES:

1. CONTROLLING DIMENSION: INCHES
2. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED 0.006 [0.15mm] PER SIDE.
3. DIMENSION "E" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED 0.010 [0.25mm] PER SIDE.
4. MAXIMUM LEAD TWIST/SKEW TO BE  $\pm 0.005$  [0.13mm].
5. LEAD THICKNESS AFTER PLATING TO BE 0.013 [0.33mm] MAXIMUM.
6. DIMENSIONS "S", "T" AND "R" INDICATE EXPOSED SLUG AREA.
7. A1 STAND OFF IS MEASURED FROM BOTTOM OF HEAT SLUG TO THE SEATING PLANE.

Figure 11: S3 Package Outline - Modified 16 Pin SOIC

NOTES

## ORDERING INFORMATION

| ORDER NUMBER | TEMPERATURE RANGE | PACKAGE DESCRIPTION                    | COMPONENT PACKAGING                |
|--------------|-------------------|----------------------------------------|------------------------------------|
| ABA3100S3TR  | -40 to +85 °C     | Modified 16 Pin SOIC                   | 3,500 piece Tape and Reel          |
| ABA3100S3P0  | -40 to +85 °C     | Modified 16 Pin SOIC                   | Plastic tubes (50 pieces per tube) |
| ABA3100RS3P1 | -40 to +85 °C     | RoHS-Compliant<br>Modified 16 Pin SOIC | 3,500 piece Tape and Reel          |

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