

MMIC Silicon Bipolar Broadband Amplifier

The ISL55015 is a high performance gain block featuring a Darlington configuration using high f_T transistors and excellent thermal performance. They are an ideal choice for DVB-S LNB cable receiver applications.

Other members of the family includes:

ISL55012 and ISL55015 match a 75Ω source to a 50Ω load.
ISL55013 and ISL55014 match a 50Ω source to a 50Ω load.

Ordering Information

| PART NUMBER (Note) | PART MARKING | TAPE & REEL | PACKAGE (Pb-Free) | PKG. DWG. # |
|-----------------------|--------------|-------------|-------------------|-------------|
| ISL55015IEZ-T7 | CCK | 7" (3k pcs) | 6 Ld SC-70 | P6.049A |

NOTE: Intersil Pb-free plus anneal products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

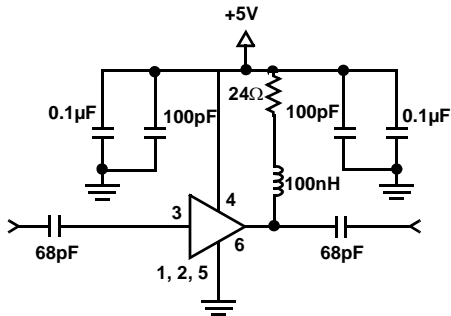
Features

- Input impedance of 75Ω
- Output impedance of 50Ω
- Gain of 13.5dB @1GHz
- Noise figure of 4.8dB @2GHz
- OIP3 of 31dBm @1GHz
- Low input and output return losses
- Pb-free plus anneal available (RoHS compliant)

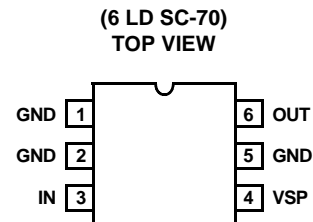
Applications

- LNB and LNB-T (HDTV) amplifiers
- IF gain blocks for satellite and terrestrial STBs
- PA driver amplifier
- Wireless data, satellite
- Bluetooth/WiFi
- Satellite locator and signal strength meters

Typical Application Circuit



Pinout



Absolute Maximum Ratings ($T_A = +25^\circ\text{C}$)

Supply Voltage from VSP to GND 6V
 Input Voltage $V_{S+} +0.3\text{V}$ to GND -0.3V
 Ambient Operating Temperature -40°C to $+85^\circ\text{C}$
 Storage Temperature -65°C to $+125^\circ\text{C}$
 Operating Junction Temperature $+135^\circ\text{C}$
 ESD Rating
 Human Body Model (Per MIL-STD-883 Method 3015.7) . . . 6000V
 Machine Model (Per EIAJ ED-4701 Method C-111) 300V

Thermal Information

Thermal Resistance (Typical) θ_{JA} ($^\circ\text{C}/\text{W}$)
 6 Lead SC-70 200

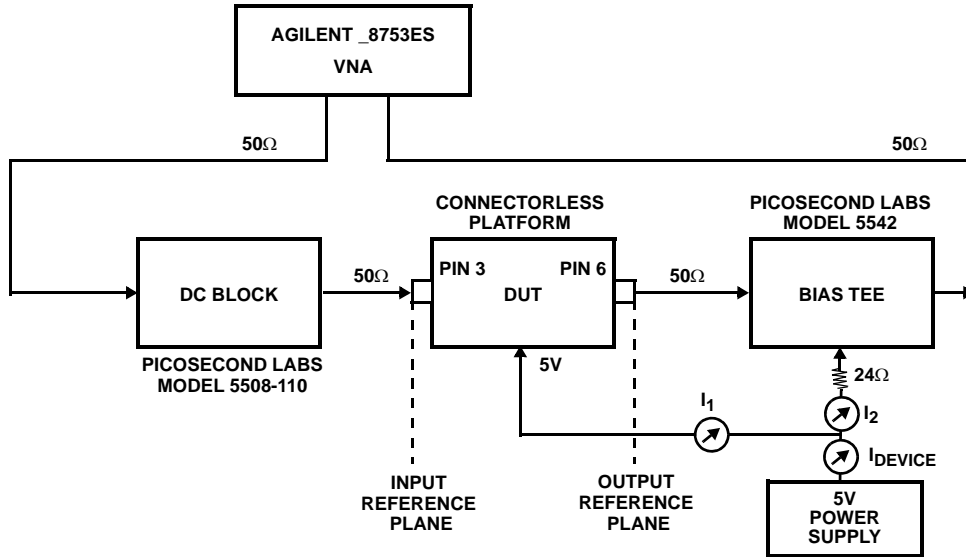
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typ values are for information purposes only.

Electrical Specifications $V_{SP} = +5\text{V}$, $Z_{RSC} = Z_{LOAD} = 50\Omega$, $T_A = +25^\circ\text{C}$, 24Ω V_{SP} to OUT, unless otherwise specified.

| PARAMETER | DESCRIPTION | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------|-------------------------------------|--|------|------|------|------|
| Vsp | Supply Voltage | To operate below 5V, the 24Ω resistor to supply should be reduced | 3.0 | | 5.5 | V |
| Gt | Small Signal Gain | 1.0GHz | 12.3 | 13.5 | 14.8 | dB |
| | | 1.5GHz | 11.7 | 13.3 | 14.2 | dB |
| | | 2.0GHz | 11 | 12.4 | 13.5 | dB |
| P1dB | Output Power at 1dB Compression | 1.0GHz | 16.3 | 18.1 | 19.8 | dBm |
| | | 2.0GHz | 15.2 | 17.4 | 19.2 | dBm |
| OIP3 | Output Third Order Intercept Point | 1.0GHz | | 31.3 | | dBm |
| | | 2.0GHz | | 28.4 | | dBm |
| OIP2 | Output Second Order Intercept Point | Input tones at 1.0GHz and 1.1GHz, at Power = 15dBm, Output tone 2.1GHz | | 47 | | dBm |
| BW | 3dB Bandwidth | 3dB below Gain @ 500MHz | | 2.9 | | GHz |
| IRL | Input Return Loss | 1.0GHz $Z_{RSC} = 75\Omega$, $Z_{LOAD} = 50\Omega$ | | 20.2 | | dB |
| ORL | Output Return Loss | 1.0GHz $Z_{RSC} = 75\Omega$, $Z_{LOAD} = 50\Omega$ | | 21.4 | | dB |
| RISOL | Reverse Isolation | 2.0GHz | | 18.9 | | dB |
| NF | Noise Figure | 2.0GHz | | 4.8 | | dB |
| ID | Device Operating Current | | 54 | 62.5 | 69 | mA |

Device Test Setup



Typical Performance Curves $Z_{RSC} = 75\Omega$, $Z_{LOAD} = 50\Omega$

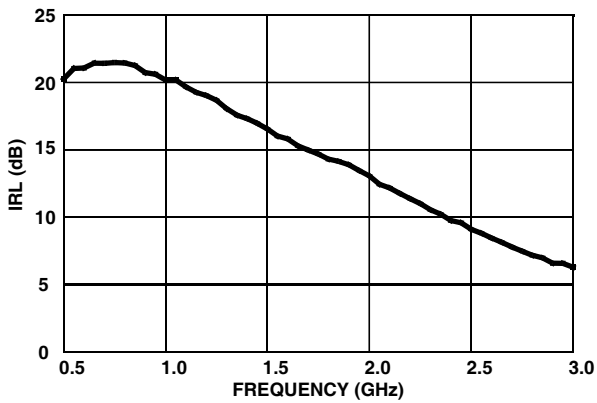


FIGURE 1. INPUT RETURN LOSS vs FREQUENCY

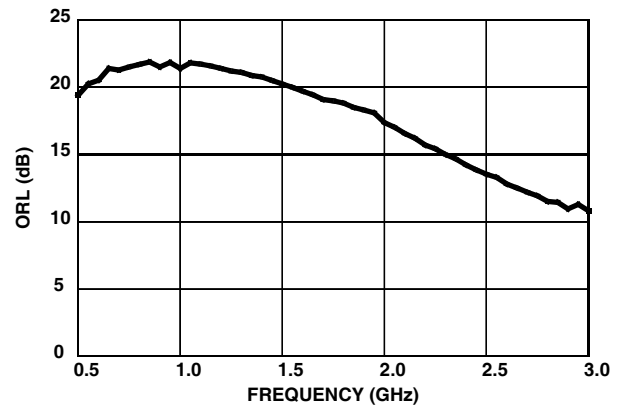


FIGURE 2. OUTPUT RETURN LOSS vs FREQUENCY

Typical Performance Curves 50Ω ENVIRONMENT

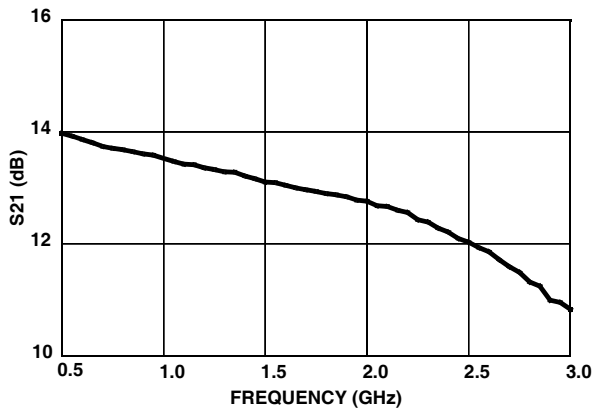


FIGURE 3. |S21| vs FREQUENCY

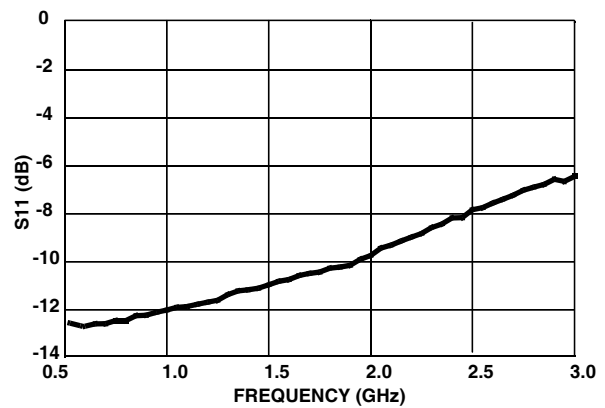


FIGURE 4. |S11| vs FREQUENCY

Typical Performance Curves 50Ω ENVIRONMENT (Continued)

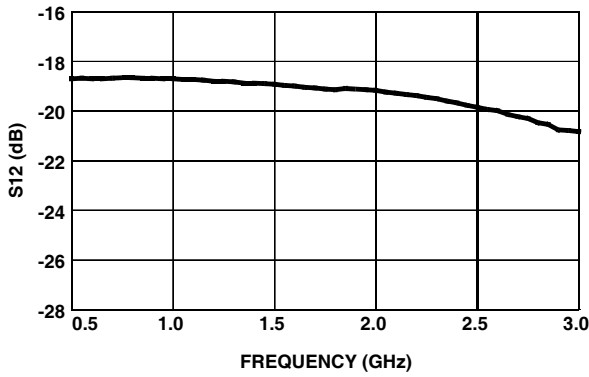


FIGURE 5. |S12| vs FREQUENCY

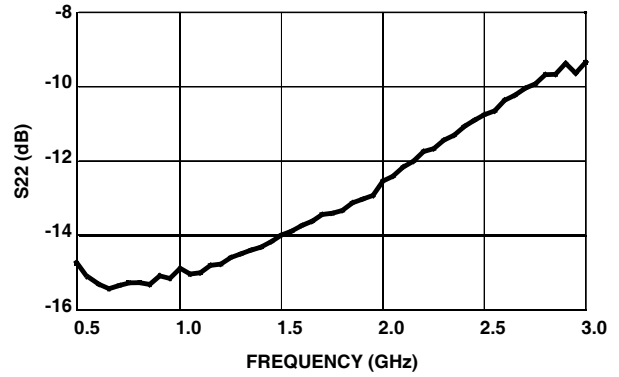


FIGURE 6. |S22| vs FREQUENCY

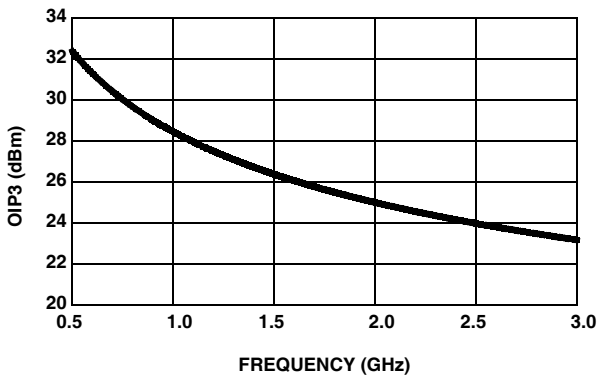


FIGURE 7. OIP3 vs FREQUENCY

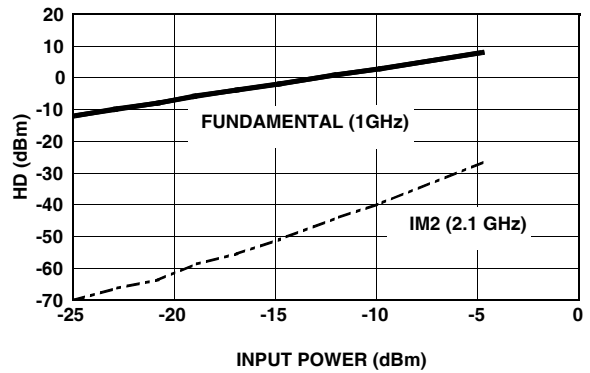


FIGURE 8. IM2 vs INPUT POWER

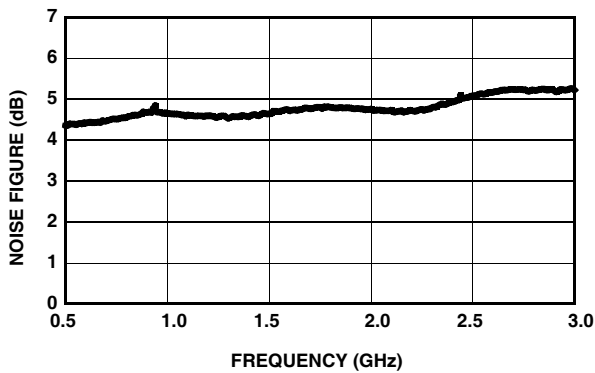


FIGURE 9. NOISE FIGURE vs FREQUENCY

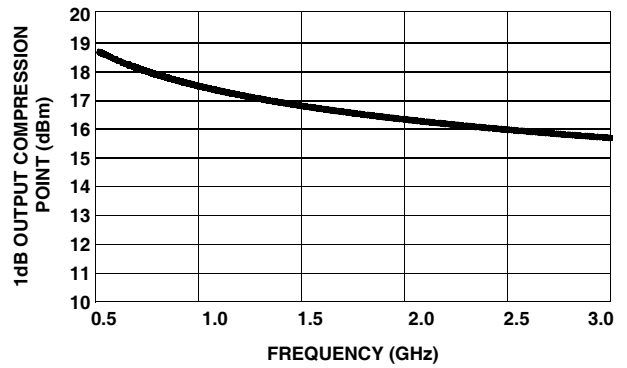


FIGURE 10. P1dB vs FREQUENCY

Typical Performance Curves 50Ω ENVIRONMENT (Continued)

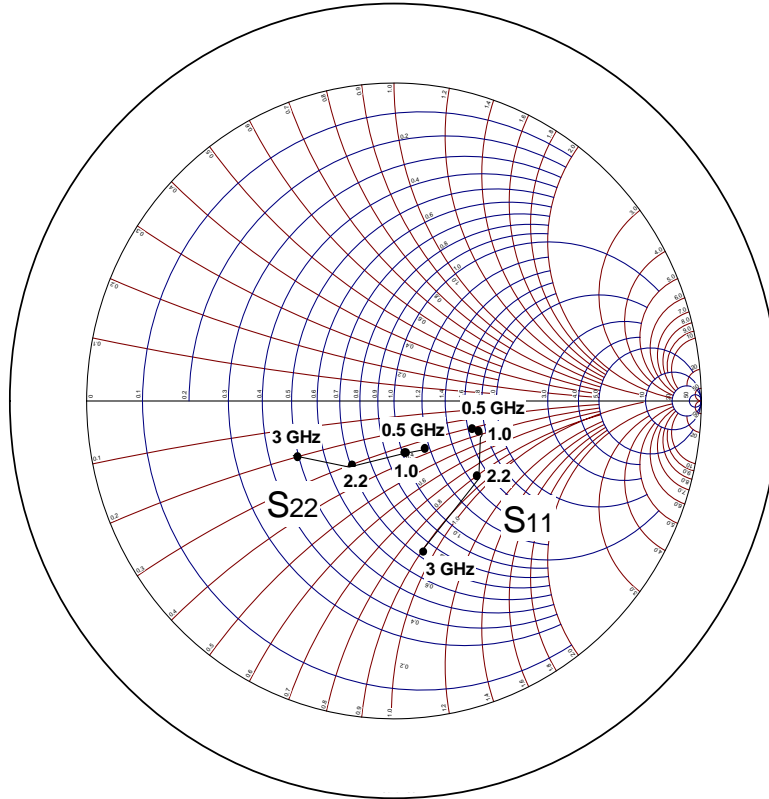
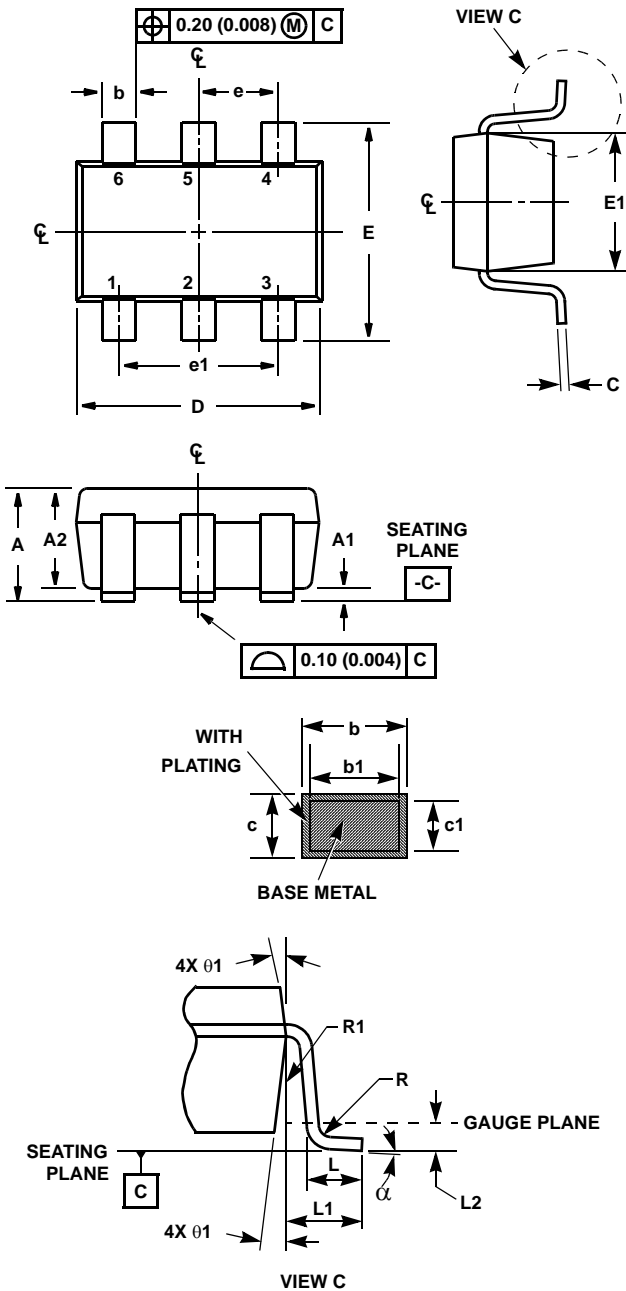


FIGURE 11. S11 AND S22 vs FREQUENCY

Small Outline Transistor Plastic Packages (SC70-6)



P6.049A

6 LEAD SMALL OUTLINE TRANSISTOR PLASTIC PACKAGE

| SYMBOL | INCHES | | MILLIMETERS | | NOTES |
|----------|------------|-------|-------------|------|-------|
| | MIN | MAX | MIN | MAX | |
| A | 0.031 | 0.039 | 0.80 | 1.00 | - |
| A1 | 0.001 | 0.004 | 0.025 | 0.10 | - |
| A2 | 0.034 | 0.036 | 0.85 | 0.90 | - |
| b | 0.006 | 0.012 | 0.15 | 0.30 | - |
| b1 | 0.006 | 0.010 | 0.15 | 0.25 | - |
| c | 0.004 | 0.008 | 0.10 | 0.20 | 6 |
| c1 | 0.004 | 0.006 | 0.10 | 0.15 | 6 |
| D | 0.073 | 0.085 | 1.85 | 2.15 | 3 |
| E | 0.084 BSC | | 2.1 BSC | | - |
| E1 | 0.045 | 0.053 | 1.15 | 1.35 | 3 |
| e | 0.0256 Ref | | 0.65 Ref | | - |
| e1 | 0.0512 Ref | | 1.30 Ref | | - |
| L | 0.010 | 0.018 | 0.26 | 0.46 | 4 |
| L1 | 0.016 Ref. | | 0.400 Ref. | | - |
| L2 | 0.006 BSC | | 0.15 BSC | | - |
| N | 6 | | 6 | | 5 |
| R | 0.004 | - | 0.10 | - | - |
| α | 0° | 8° | 0° | 8° | - |

Rev. 0 7/05

NOTES:

1. Dimensioning and tolerance per ASME Y14.5M-1994.
2. Package conforms to EIAJ SC70 and JEDEC MO203AB.
3. Dimensions D and E1 are exclusive of mold flash, protrusions, or gate burrs.
4. Footlength L measured at reference to gauge plane.
5. "N" is the number of terminal positions.
6. These Dimensions apply to the flat section of the lead between 0.08mm and 0.15mm from the lead tip.
7. Controlling dimension: MILLIMETER. Converted inch dimensions are for reference only

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