

# ISL55010

MMIC Silicon Bipolar Broadband Amplifier

NOT RECOMMENDED FOR NEW DESIGNS  
NO RECOMMENDED REPLACEMENT  
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FN6217  
Rev 0.00  
May 22, 2006

The ISL55005, ISL55007, ISL55008 and ISL55009, ISL55010, ISL55011 constitute a family of high performance gain blocks 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.

ISL55005, ISL55007, ISL55008 offer higher OIP3 performance while the ISL55009, ISL55010, ISL55011 offer lower operating supply currents.

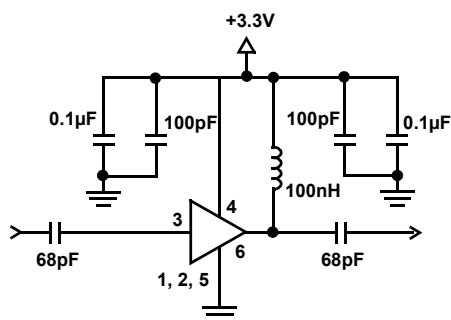
ISL55005 and ISL55009 match a  $75\Omega$  source to a  $50\Omega$  load. ISL55007 and ISL55010 match a  $75\Omega$  source to a  $75\Omega$  load. ISL55008 and ISL55011 match a  $50\Omega$  source to a  $50\Omega$  load.

## Ordering Information

| PART NUMBER<br>(Note) | PART MARKING | TAPE & REEL | PACKAGE<br>(Pb-Free) | PKG. DWG. # |
|-----------------------|--------------|-------------|----------------------|-------------|
| ISL55010IEZ-T7        | CBG          | 7" (3k pcs) | 6 Ld SC-70           | P6.049      |

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.

## Typical Application Circuit



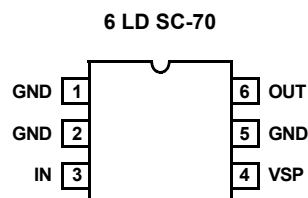
## Features

- Input impedance of  $75\Omega$
- Output impedance of  $75\Omega$
- Noise figure of 3.7dB
- OIP3 of 11dBm
- Low supply current of 14mA
- Low input and output return losses
- Pb-free plus anneal available (RoHS compliant)

## Applications

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

## Pinout



### Absolute Maximum Ratings (T<sub>A</sub> = 25°C)

|                                |                                   |
|--------------------------------|-----------------------------------|
| Supply Voltage from VSP to GND | 6V                                |
| Input Voltage                  | $V_{S+} + 0.3V$ to GND $-0.3V$    |
| Power Dissipation              | See Packaging Information Section |
| Ambient Operating Temperature  | $-40^{\circ}C$ to $+85^{\circ}C$  |

|  |                 |
|--|-----------------|
| Storage Temperature                              | -65°C to +125°C |
| Operating Junction Temperature                   | +125°C          |
| ESD Rating                                       |                 |
| Human Body Model (Per MIL-STD-883 Method 3015.7) | 3000V           |
| Machine Model (Per EIAJ ED-4701 Method C-111)    | 300V            |

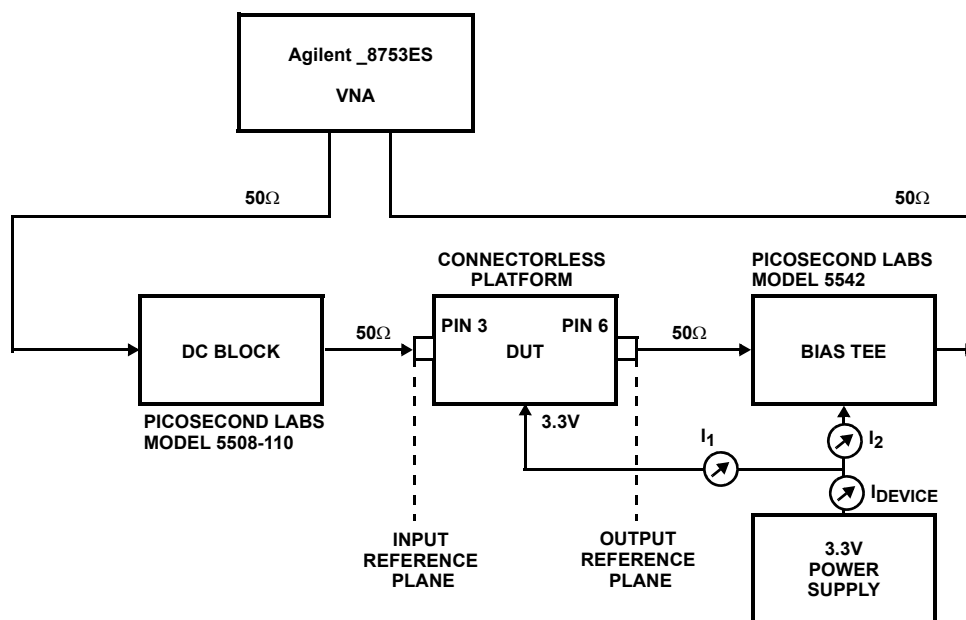
**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

**IMPORTANT NOTE:** All parameters having Min/Max specifications are guaranteed. Typ values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore:  $T_J = T_C = T_A$

**Electrical Specifications** VSP = +3.3V, Zrsc = Zload = 50Ω, TA = 25°C, unless otherwise specified.

| PARAMETER | DESCRIPTION                        | CONDITIONS                     | MIN  | TYP  | MAX  | UNIT |
|-----------|------------------------------------|--------------------------------|------|------|------|------|
| Gt        | Small Signal Gain                  | 1.0GHz                         | 13.8 | 14.8 | 15.8 | dB   |
|           |                                    | 1.5GHz                         | 13.6 | 14.6 | 15.6 | dB   |
|           |                                    | 2.0GHz                         | 13.4 | 14.4 | 15.4 | dB   |
| P1dB      | Output Power at 1dB Compression    | 1.0GHz                         | -0.1 | 1.2  | 2.5  | dBm  |
|           |                                    | 2.0GHz                         | -0.7 | 0.8  | 2.3  | dBm  |
| OIP3      | Output Third Order Intercept Point | 1.0GHz                         |      | 11.2 |      | dBm  |
|           |                                    | 2.0GHz                         |      | 10.9 |      | dBm  |
| BW        | 3dB Bandwidth                      | 3dB below Gain @ 500MHz        |      | 3.4  |      | GHz  |
| IRL       | Input Return Loss                  | 1.0GHz Zrsc = 75Ω, Zload = 75Ω |      | 13.3 |      | dB   |
| ORL       | Output Return Loss                 | 1.0GHz Zrsc = 75Ω, Zload = 75Ω |      | 12.5 |      | dB   |
| RISOL     | Reverse Isolation                  | 2.0GHz                         |      | 20.6 |      | dB   |
| NF        | Noise Figure                       | 2.0GHz                         |      | 3.7  |      | dB   |
| ID        | Device Operating Current           |                                | 11.5 | 13.6 | 15.5 | mA   |

## Device Test Setup



### Typical Performance Curves $Z_{src} = 75\Omega$ , $Z_{load} = 75\Omega$

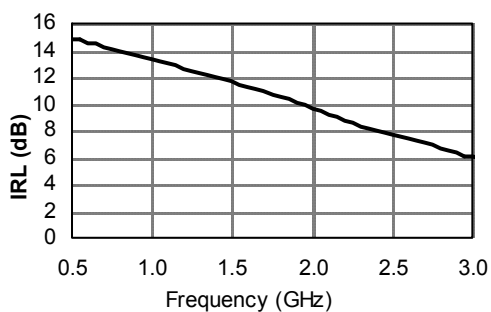


FIGURE 1. INPUT RETURN LOSS vs FREQUENCY

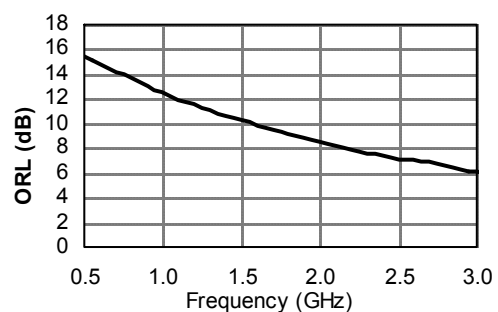


FIGURE 2. OUTPUT RETURN LOSS vs FREQUENCY

### Typical Performance Curves 50 $\Omega$ environment

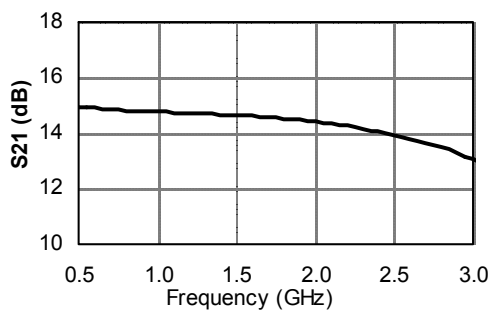


FIGURE 3. |S21| vs FREQUENCY

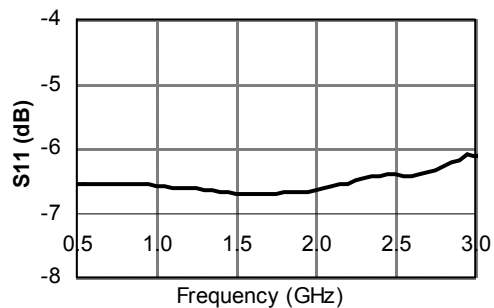


FIGURE 4. |S11| vs FREQUENCY

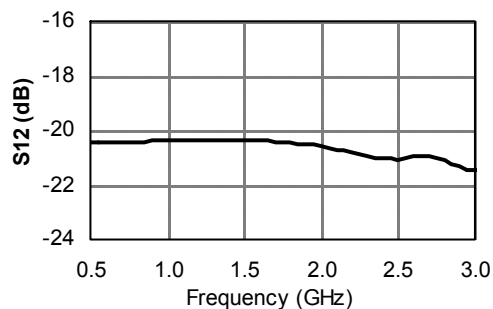


FIGURE 5. |S12| vs FREQUENCY

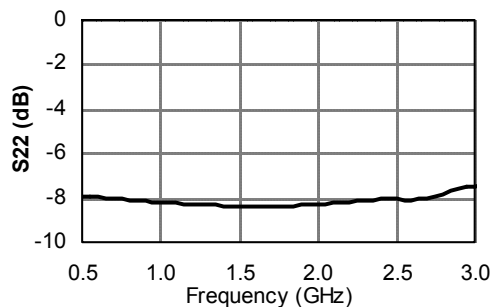


FIGURE 6. |S22| vs FREQUENCY

## Typical Performance Curves 50 $\Omega$ environment (Continued)

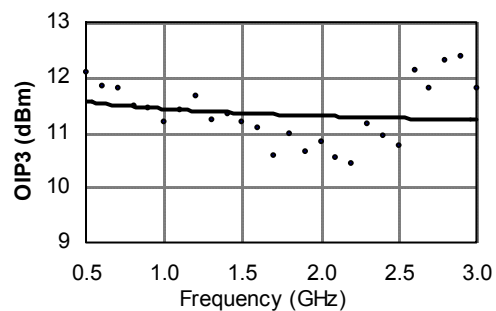


FIGURE 7. OIP3 vs FREQUENCY

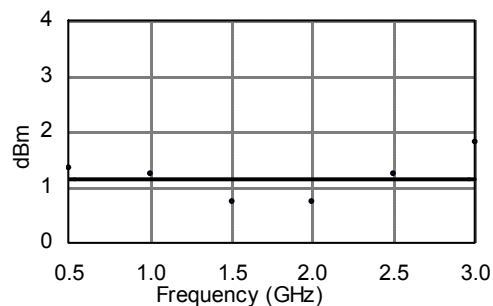


FIGURE 8. P1dBm vs FREQUENCY

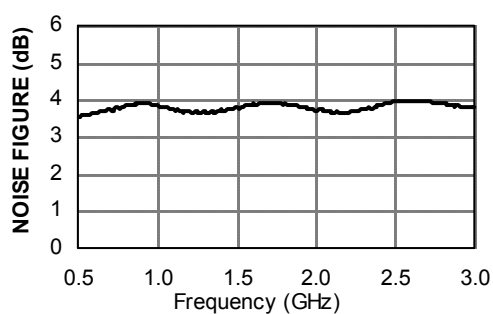


FIGURE 9. NOISE FIGURE vs FREQUENCY

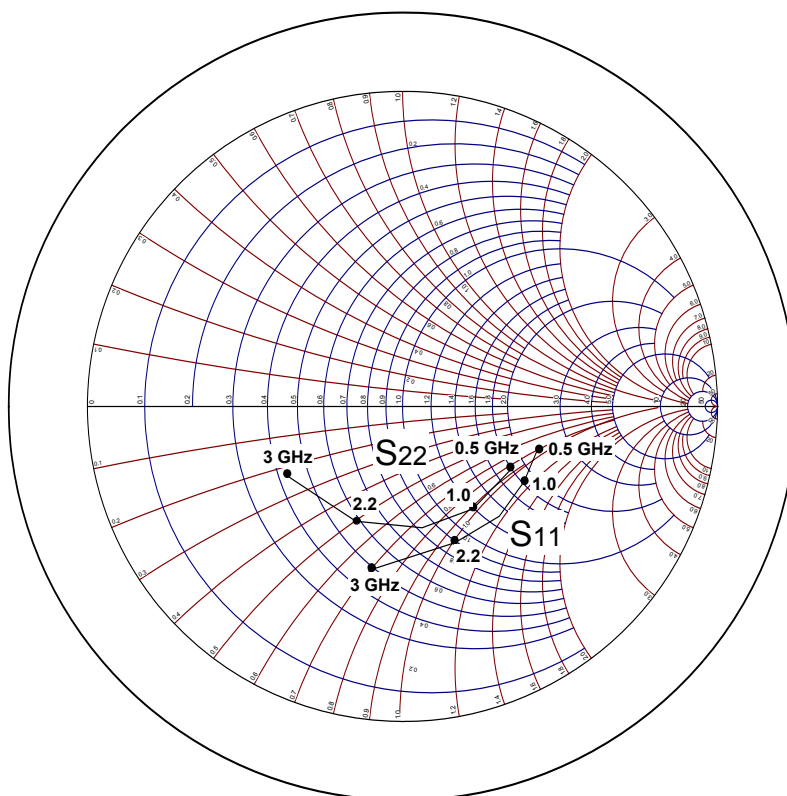


FIGURE 10. S11 AND S22 vs FREQUENCY

## Packaging Information

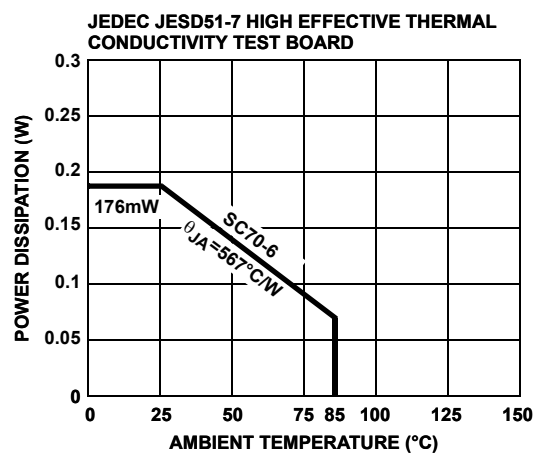
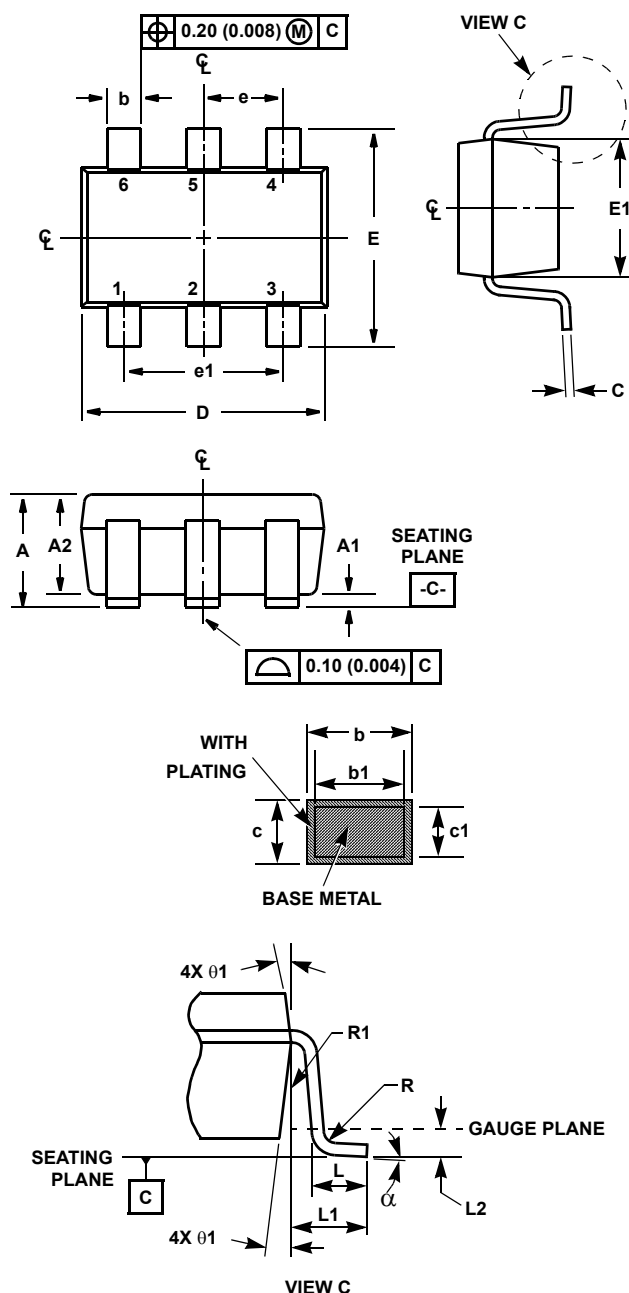


FIGURE 11. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

### Small Outline Transistor Plastic Packages (SC70-6)



**P6.049**

### 6 LEAD SMALL OUTLINE TRANSISTOR PLASTIC PACKAGE

| SYMBOL   | INCHES     |       | MILLIMETERS |      | NOTES |
|----------|------------|-------|-------------|------|-------|
|          | MIN        | MAX   | MIN         | MAX  |       |
| A        | 0.031      | 0.043 | 0.80        | 1.10 | -     |
| A1       | 0.000      | 0.004 | 0.00        | 0.10 | -     |
| A2       | 0.031      | 0.039 | 0.00        | 1.00 | -     |
| b        | 0.006      | 0.012 | 0.15        | 0.30 | -     |
| b1       | 0.006      | 0.010 | 0.15        | 0.25 |       |
| c        | 0.003      | 0.009 | 0.08        | 0.22 | 6     |
| c1       | 0.003      | 0.009 | 0.08        | 0.20 | 6     |
| D        | 0.073      | 0.085 | 1.85        | 2.15 | 3     |
| E        | 0.071      | 0.094 | 1.80        | 2.40 | -     |
| 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       | 0.017 Ref. |       | 0.420 Ref.  |      |       |
| L2       | 0.006 BSC  |       | 0.15 BSC    |      |       |
| N        | 6          |       | 6           |      | 5     |
| R        | 0.004      | -     | 0.10        | -    |       |
| R1       | 0.004      | 0.010 | 0.15        | 0.25 |       |
| $\alpha$ | 0°         | 8°    | 0°          | 8°   | -     |

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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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