Data Sheet | December 6, 2006 | FN6258.0

MMIC Silicon Bipolar Broadband Amplifier

The ISL55012 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. #
ISL55012IEZ-T7	CCG	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.

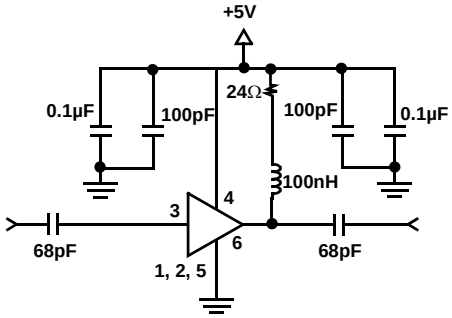
Features

- Input impedance of 75Ω
- Output impedance of 50Ω
- Gain of 18dB @ 1GHz
- Noise figure of 4.7dB @ 2GHz
- OIP3 of 30dBm @ 1GHz
- Low input and output return losses
- Pb-free plus anneal available (RoHS compliant)

Applications

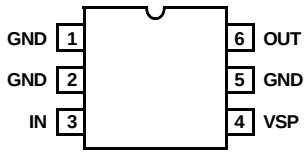
- LNB and LNB-T (HDTV) amplifiers
- IF gain blocks for satellite and terrestrial STBs
- PA driver amplifier
- Wireless data, satellite
- Bluetooth/WiFi
- Satellite locator and signal strength meters

Typical Application Circuit



Pinout

(6 LD SC-70)
TOP VIEW



Absolute Maximum Ratings (T_A = +25°C)

Supply Voltage from VSP to GND 6V
Input Voltage . . . . . V_S+ +0.3V to GND -0.3V
Power Dissipation . . . . . See Packging Information Section
Ambient Operating Temperature . . . . . -40°C to +85°C
Storage Temperature . . . . . -65°C to +125°C
Operating Junction Temperature . . . . . +135°C
ESD Rating
Human Body Model (Per MIL-STD-883 Method 3015.7) . . . 3000V
Machine Model (Per EIAJ ED-4701 Method C-111) 300V

Thermal Information

Thermal Resistance (Typical)	θ_{JA} (°C/W)
6 Ld 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.

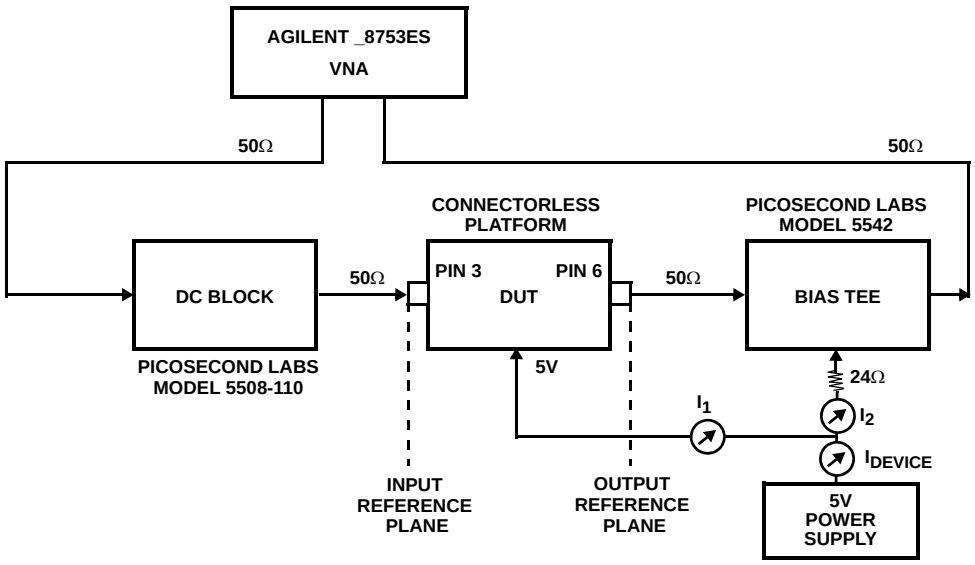
IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typ values are for information purposes only.

Electrical Specifications

Vsp = +5V, Zrsc = Zload = 50Ω, TA = +25°C, 24Ω Vsp 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	17	18.3	19.5	dB
		1.5GHz	16.1	17.4	18.6	dB
		2.0GHz	15.1	16.6	17.6	dB
P1dB	Output Power at 1dB Compression	1.0GHz	16	17.7	19	dBm
		2.0GHz	15.9	17.2	18.9	dBm
OIP3	Output Third Order Intercept Point	1.0GHz		30		dBm
		2.0GHz		27		dBm
OIP2	Output Second Order Intercept Point	Input tones at 1.0GHz and 1.1GHz, at Power = 15dBm, Output tone 2.1GHz		44.2		dBm
BW	3dB Bandwidth	3dB below Gain @ 500MHz		2.4		GHz
IRL	Input Return Loss	1.0GHz Zrsc = 75Ω, Zload = 50Ω		23.5		dB
ORL	Output Return Loss	1.0GHz Zrsc = 75Ω, Zload = 50Ω		21.8		dB
RISOL	Reverse Isolation	2.0GHz		22.4		dB
NF	Noise Figure	2.0GHz		4.7		dB
ID	Device Operating Current		56	63.5	71	mA

Device Test Setup



Typical Performance Curves Z_{src} = 75Ω, Z_{load} = 50Ω

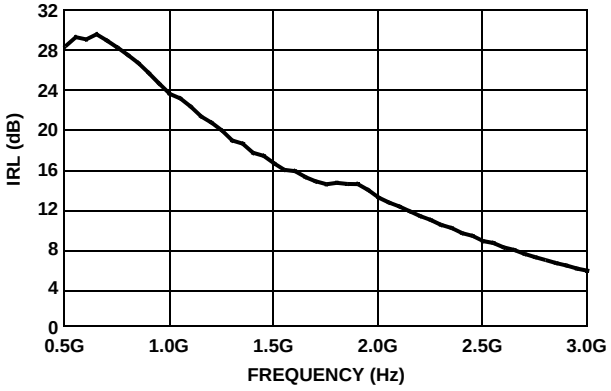


FIGURE 1. INPUT RETURN LOSS vs FREQUENCY

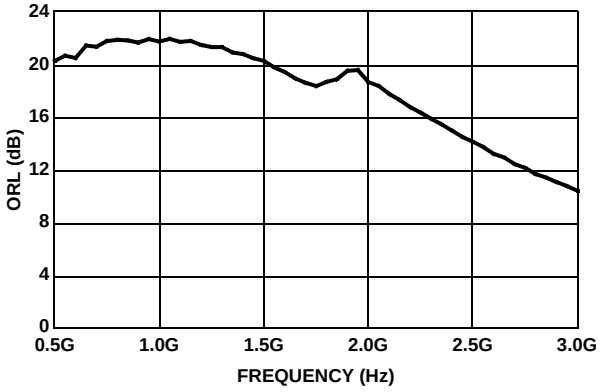


FIGURE 2. OUTPUT RETURN LOSS vs FREQUENCY

Typical Performance Curves 50Ω environment

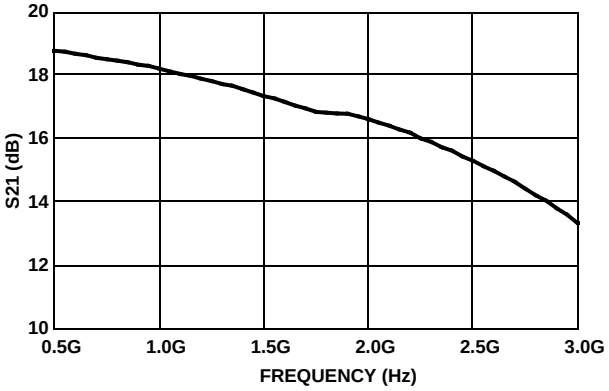


FIGURE 3. |S21| vs FREQUENCY

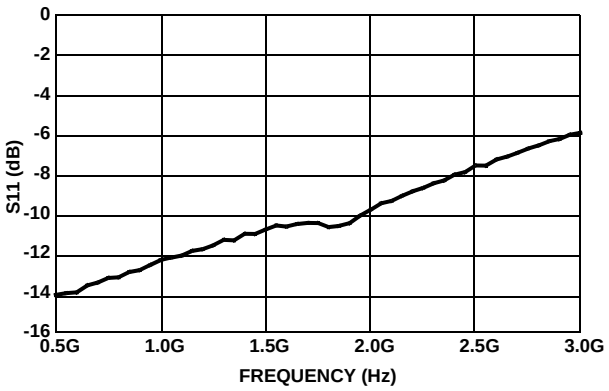


FIGURE 4. |S11| vs FREQUENCY

Typical Performance Curves 50Ω environment (Continued)

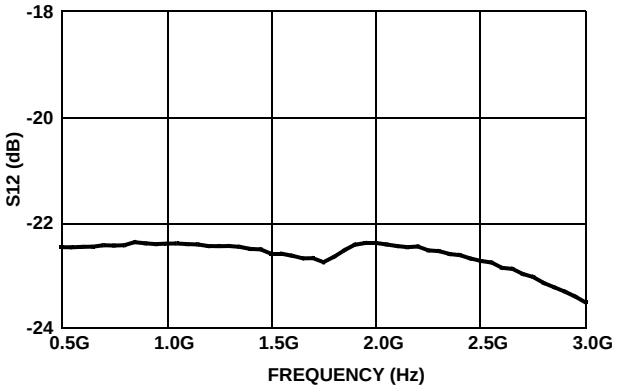


FIGURE 5. |S12| vs FREQUENCY

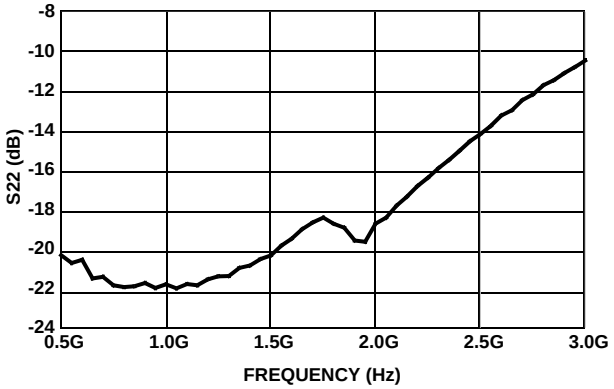


FIGURE 6. |S22| vs FREQUENCY

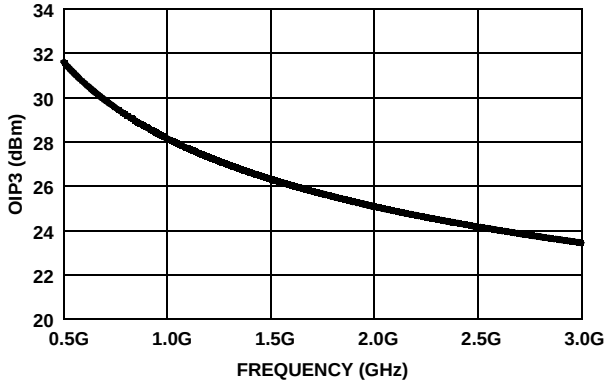


FIGURE 7. OIP3 vs FREQUENCY

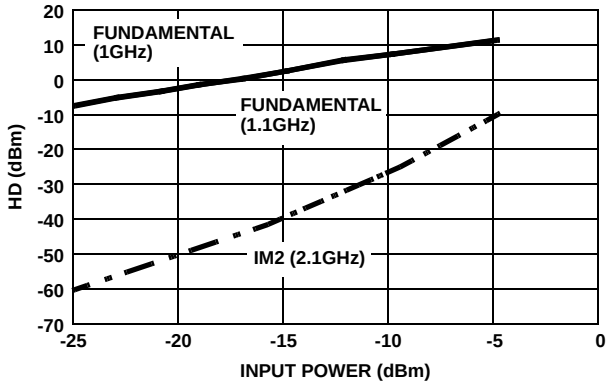


FIGURE 8. IM2 vs INPUT POWER

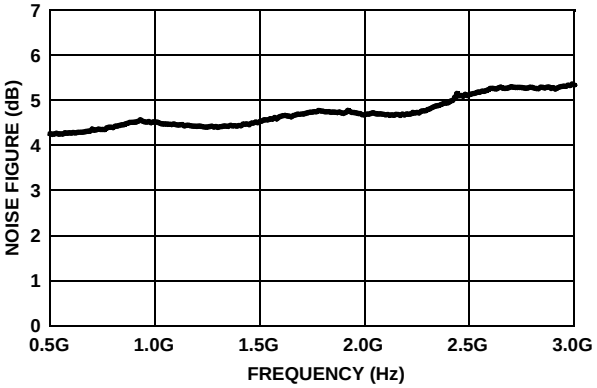


FIGURE 9. NOISE FIGURE vs FREQUENCY

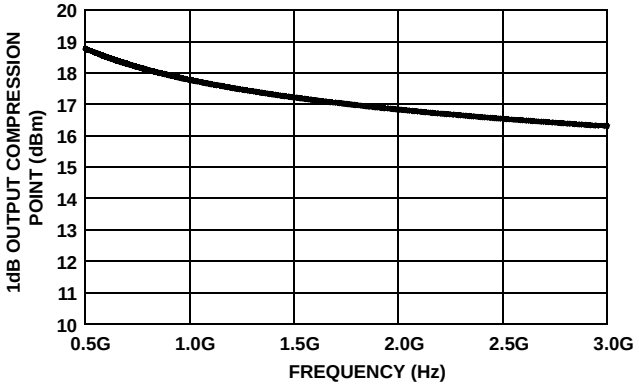


FIGURE 10. P1dB vs FREQUENCY

Typical Performance Curves 50Ω environment (Continued)

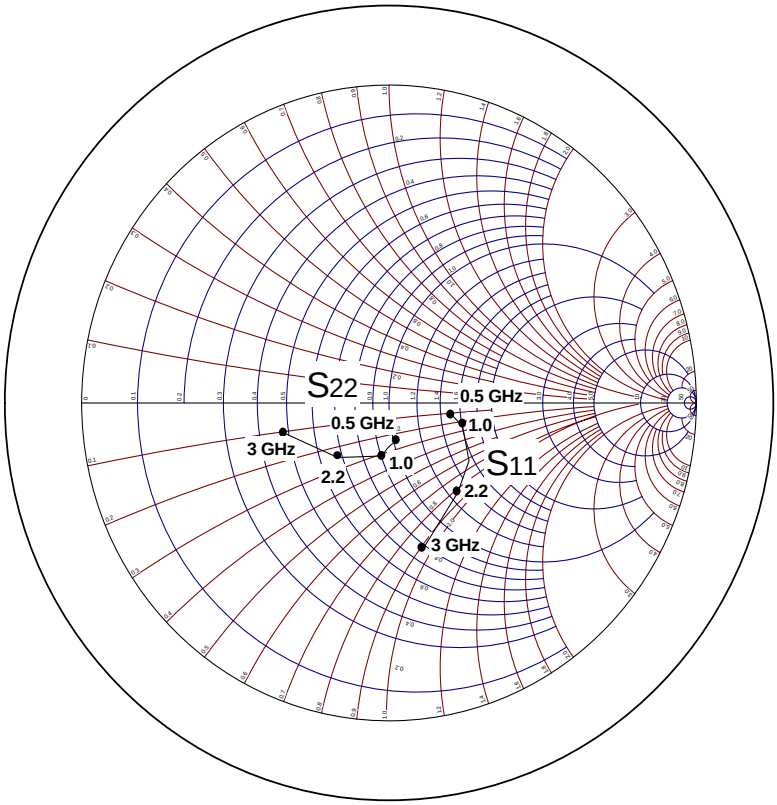
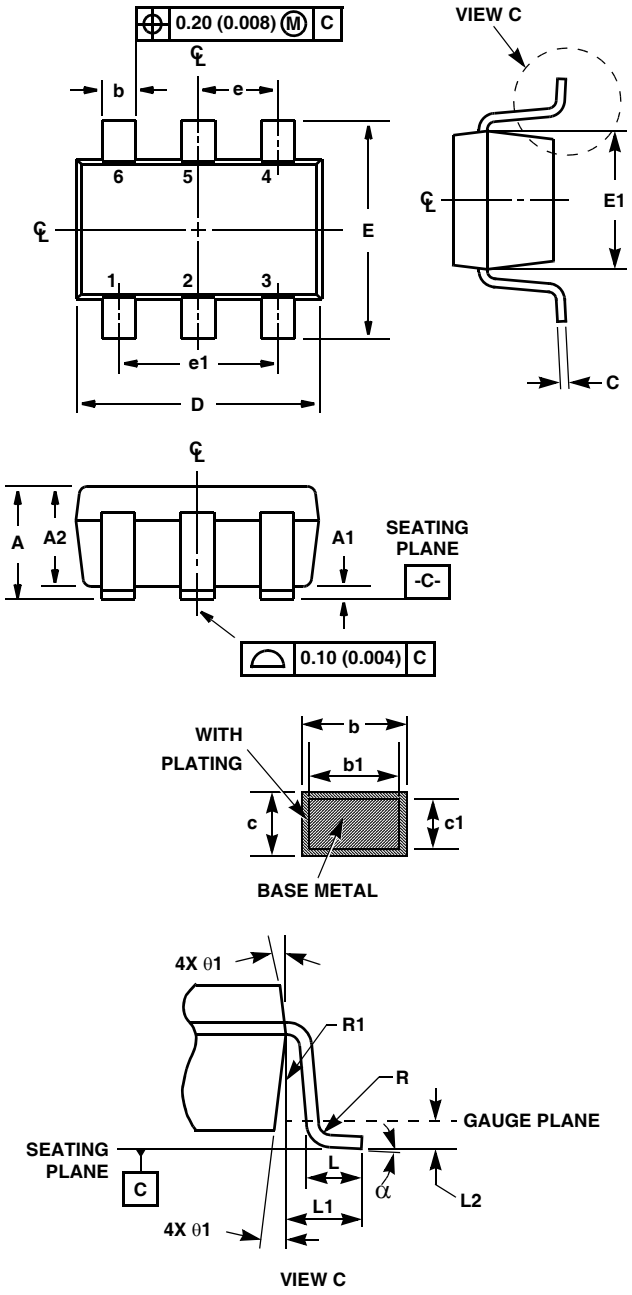


FIGURE 11. S11 AND S22 vs FREQUENCY

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°	-

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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