

ISL55015

MMIC Silicon Bipolar Broadband Amplifier

FN6284 Rev 3.00 February 6, 2017

The $\underline{\text{ISL55015}}$ 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 include:

- ISL55012 and ISL55015 match a 75Ω source to a 50Ω load
- ISL55014 matches a 50Ω source to a 50Ω load

Ordering Information

PART NUMBER (Notes 1, 2, 3)	PART MARKING (Note 4)	TAPE AND REEL (UNITS)	PACKAGE (RoHS COMPLIANT)	PKG. DWG. #
ISL55015IEZ-T7	ССК	3k	6 Ld SC-70	P6.049B
ISL55015IEZ-EVAL	Evaluation board			

NOTES:

- 1. Refer to TB347 for details on reel specifications.
- 2. These Intersil Pb-free plastic packaged products employ special Pb-free material sets, molding compounds/die attach materials, and 100% matte tin plate plus anneal (e3 termination finish, which is 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.
- For Moisture Sensitivity Level (MSL), please see device information page for ISL55015. For more information on MSL please techbrief TB363.
- 4. The part marking is located on the bottom of the part.

Related Literature

- · For a full list of related documents, visit our website
 - ISL55015 product page

Features

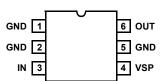
- Input impedance of 75Ω
- Output impedance of 50Ω
- Gain of 13.5dB at 1GHz
- · Noise figure of 4.8dB at 2GHz
- · OIP3 of 31dBm at 1GHz
- · Low input and output return losses
- · Pb-free (RoHS compliant)

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

Pin Configuration

ISL55015 (6 LD SC-70) TOP VIEW



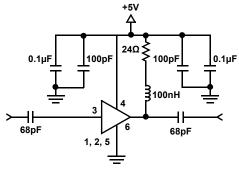


FIGURE 1. TYPICAL APPLICATION CIRCUIT

TABLE 1. KEY DIFFERENCES BETWEEN FAMILY OF PARTS

	IMPEDANCE		GAIN	NOISE FIGURE	
PART #	SOURCE (Ω)	LOAD (Ω)	AT 1GHz (dB)	AT 2GHz (dB)	
ISL55012	75	50	18	4.7	
ISL55014	50	50	17.2	4.3	
ISL55015	75	50	13.5	4.8	

Absolute Maximum Ratings $(T_A = +25 \degree C)$

Supply Voltage from V_{SP} to GND
ESD Rating
Human Body Model (Per MIL-STD-883 Method 3015.7)6000V
Machine Model (Per EIAJ ED-4701 Method C-111)

Thermal Information

Thermal Resistance (Typical)	θ_{JA} (°C/W)	θ _{JC} (°C/W)
6 Ld SC-70 (Notes 5, 6)	255	195
Storage Temperature	6!	5°C to +125°C
Operating Junction Temperature		+135°C
Pb-Free Reflow Profile		see <u>TB493</u>

Recommended Operating Conditions

CAUTION: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

NOTES:

- 5. θ_{JA} is measured with the component mounted on a high-effective thermal conductivity test board in free air. See Tech Brief TB379 for details.
- 6. For $\theta_{\mbox{\scriptsize JC}},$ the "case temp" location is taken at the package top center.

Electrical Specifications V_{SP} = +5V, Z_{RSC} = Z_{LOAD} = 50 Ω , T_A = +25°C, 24 Ω V_{SP} to 0UT, unless otherwise specified.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN (Note 7)	TYP	MAX (Note 7)	UNIT
Supply Voltage	V _{SP}	To operate below 5V, the 24Ω resistor to supply should be reduced	3.0		5.5	V
Small Signal Gain	Gt	1.0GHz	12.3	13.5	14.8	dB
		1.5GHz	11.7	13.3	14.2	dB
		2.0GHz	11.0	12.4	13.5	dB
Output Power at 1dB Compression	P1dB	1.0GHz	16.4	18.1	21.6	dBm
		2.0GHz	15.3	19.4	21.0	dBm
Output Third Order Intercept Point	OIP3	1.0GHz		31.3		dBm
		2.0GHz		28.4		dBm
Output Second Order Intercept Point	0IP2	Input tones at 1.0GHz and 1.1GHz, at Input Power = -15dBm, Output tone 2.1GHz		47		dBm
3dB Bandwidth	BW	3dB below Gain at 500MHz		2.9		GHz
Input Return Loss	IRL	1.0GHz Z _{RSC} = 75Ω, Z _{LOAD} = 50Ω		20.2		dB
Output Return Loss	ORL	1.0GHz Z _{RSC} = 75Ω, Z _{LOAD} = 50Ω		21.4		dB
Reverse Isolation	RISOL	2.0GHz		18.9		dB
Noise Figure	NF	2.0GHz		4.8		dB
Device Operating Current	ID		54	62.5	69	mA

NOTE:

7. Parameters with MIN and/or MAX limits are 100% tested at +25 °C, unless otherwise specified. Temperature limits established by characterization and are not production tested.



Device Test Setup

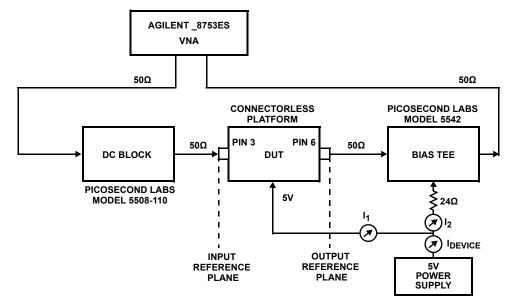


FIGURE 2. DEVICE TEST SETUP

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

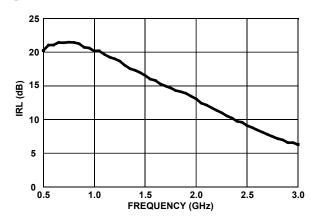


FIGURE 3. INPUT RETURN LOSS vs FREQUENCY

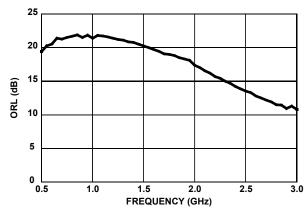


FIGURE 4. OUTPUT RETURN LOSS vs FREQUENCY

Typical Performance Curves 500 environment

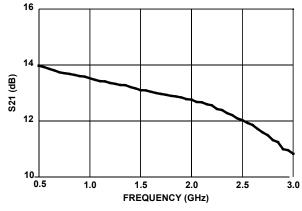


FIGURE 5. |S21| vs FREQUENCY

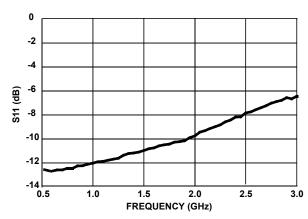
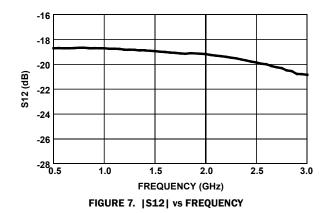
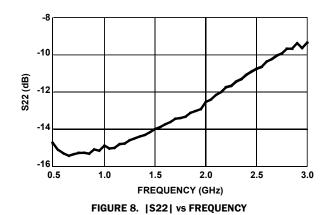
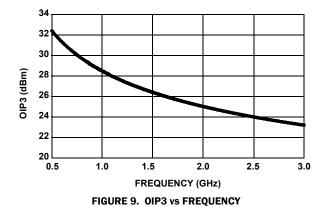


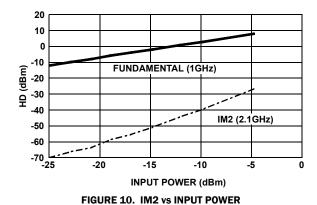
FIGURE 6. |S11| vs FREQUENCY

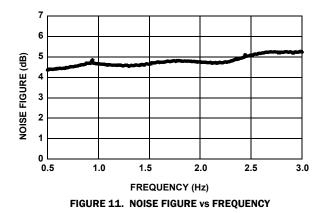
Typical Performance Curves 500 environment (Continued)

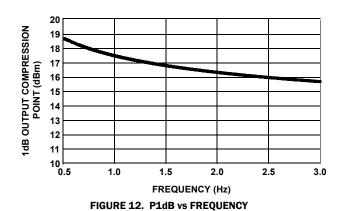












Typical Performance Curves 500 environment (Continued)

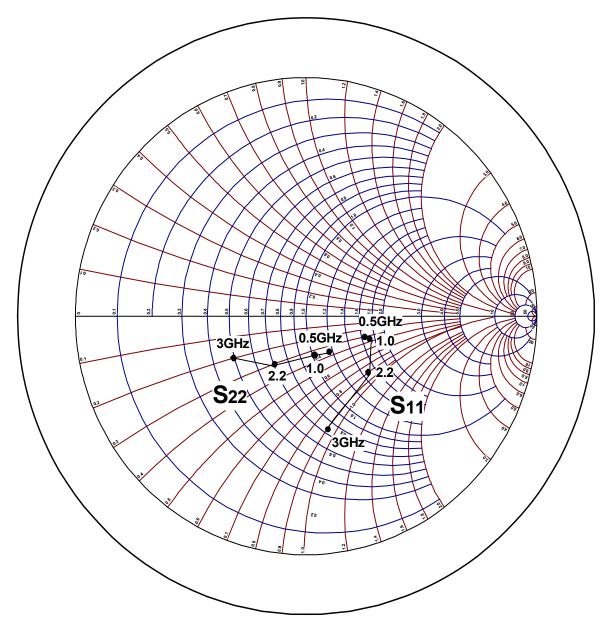


FIGURE 13. S11 AND S22 vs FREQUENCY

Revision History The revision history provided is for informational purposes only and is believed to be accurate, but not warranted. Please visit our website to make sure you have the latest revision.

DATE	REVISION	CHANGE
February 6, 2017	FN6284.3	Removed mention of obsolete part ISL55013. On page 1: Updated Ordering Information table - added ISL55015IEZ-EVAL and added column for tape & reel quantity. Added Related Literature and Table of Differences. Thermal Resistance on page 2: Moved Storage Temperature and Operating Junction Temperature from Abs Max to Thermal Information section. Added Recommended Operating Conditions section and moved Ambient Operating Temperature to this section from Abs Max. Added Revision History and About Intersil sections.

About Intersil

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For the most updated datasheet, application notes, related documentation, and related parts, see the respective product information page found at www.intersil.com.

For a listing of definitions and abbreviations of common terms used in our documents, visit: www.intersil.com/glossarv.

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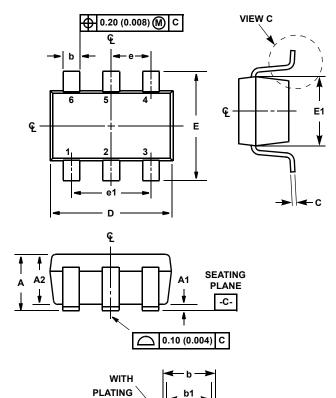
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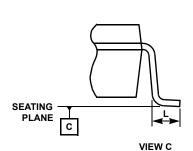
For information regarding Intersil Corporation and its products, see www.intersil.com



Small Outline Transistor Plastic Packages (SC70-6)



BASE METAL



P6.049B

6 LEAD SMALL OUTLINE TRANSISTOR PLASTIC PACKAGE

	MILLIM		
SYMBOL	MIN	MAX	NOTES
Α	0.80	1.00	-
A1	0.000	0.09	-
A2	0.80	0.91	-
b	0.15	0.30	-
b1	0.15	0.25	-
С	0.08	0.25	6
c1	0.10	0.15	6
D	1.85	2.25	3
E	2.30 BSC		-
E1	1.15	1.35	3
е	0.65	-	
e1	1.30 Ref		-
L	0.21	0.44	4
N	(5	

Rev. 0 4/07

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.

For the most recent package outline drawing, see P6.049B.