

Product Features

Frequency: 20MHz~700MHz
Noise Figure: 1.0dB@300MHz
Gain: 16.2dB@300MHz
Output Third-Order Interception:
42.3dBm@300MHz
Output Power for 1dB Compression:
24.0dBm@300MHz
Supply Current:100mA~160mA@Vdd=+5V
Package: Compatible with SMO-8C

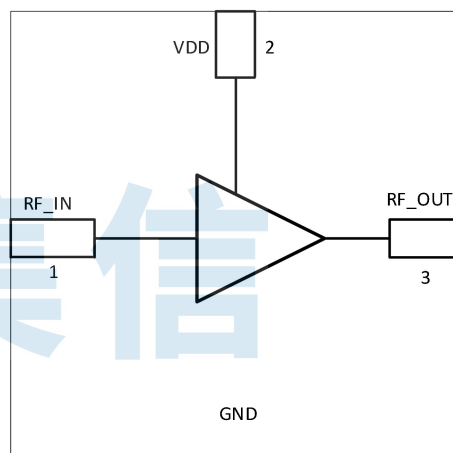
General Description

BR8123AFF is a surface-mount, PCB substrate-based anti-blocking amplifier with a shielded metal enclosure, which covers a frequency range of 20MHz~700MHz. At the 300MHz, the amplifier typically offers a gain of 16.2dB, an output IP3 of 42.3dBm and a noise figure of 1.0dB under the condition of +5V power supply. The product delivers excellent gain flatness across a wide frequency band, combined with high linearity, making it suitable for high-performance transceiver systems.

Applications

Ultrashort-Wave Application
Large Dynamic Range Receiver
Anti-Blocking Amplification System

Functional Block Diagram



Ordering Information

Part Number	Package	Description
BR8123AFF	Compatible SMO-8C	20MHz ~ 700MHz Anti-Blocking Amplifier

Electrical Specifications

Parameter	Min.	Typ.	Max.	Units	Test Condition
Gain	-	16.2	-	dB	300MHz
Output Power for 1dB Compression	-	24.0	-	dBm	300MHz
Output Third-Order Intercept	-	42.3	-	dBm	300MHz
Noise Figure	-	0.99	-	dB	300MHz
Input Return Loss	-	-19.5	-	dB	300MHz
Output Return Loss	-	-18.6	-	dB	300MHz
Reverse Isolation	-	-21.2	-	dB	300MHz
Supply Voltage	-	5	-	V	-
Supply Current	100	130	160	mA	-

Test Conditions: Vdd=+5V, OIP3 spacing=1MHz, Pout=+10dBm/100kHz, TA=+25°C

Absolute Maximum Ratings

Maximum Operating Voltage (Vdd): +9V

Maximum RF Input Power:

+17dBm (+5V Supply Voltage)

ESD Rating: Class 1C (< 1500V)

Recommended Operating Conditions

Supply Voltage: +5V

Supply Current: 100mA~160mA

Operating Temperature: -55°C ~ +85°C

Storage Temperature: -65°C ~ +125°C

Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and, exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING

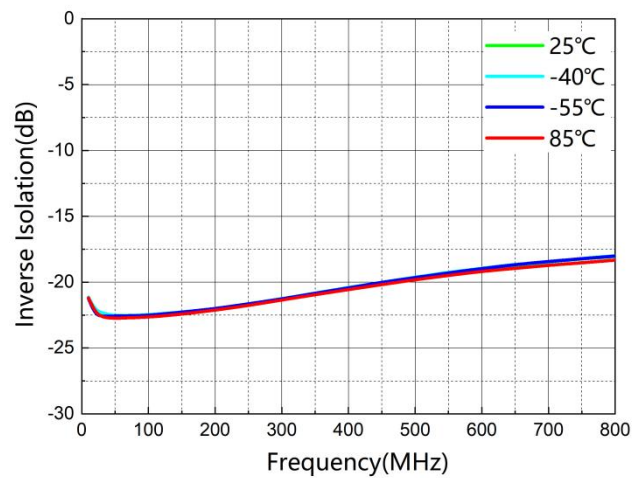
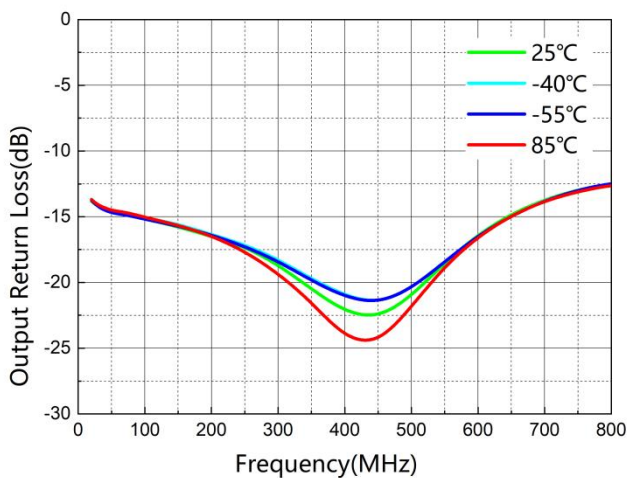
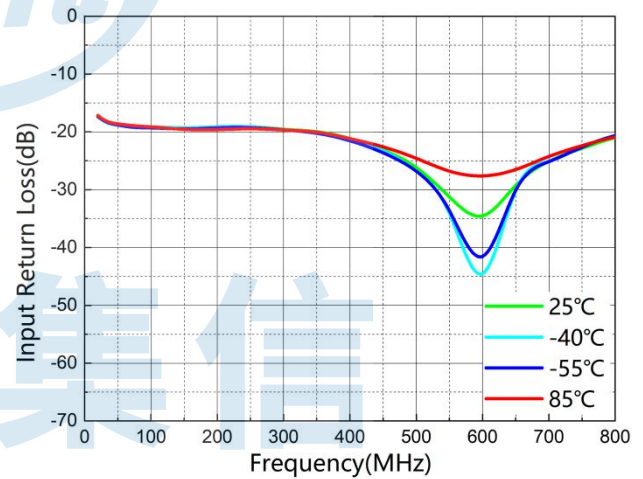
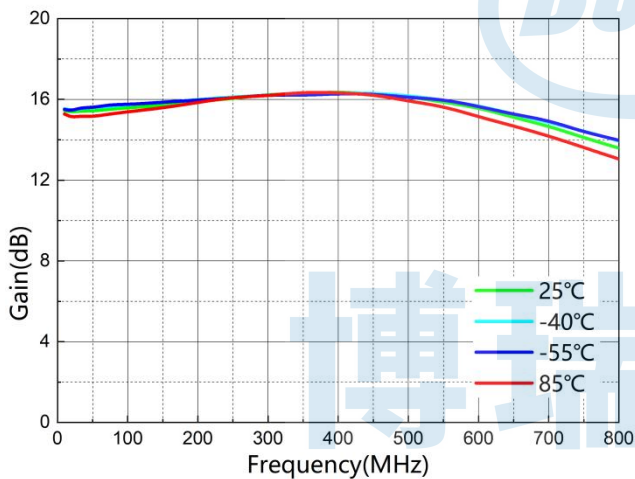


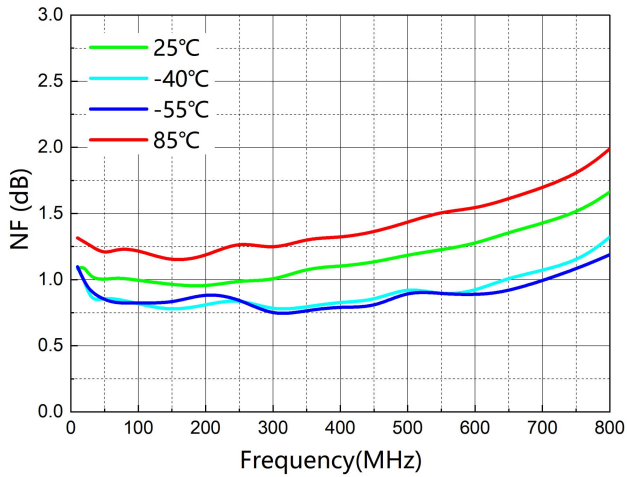
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Typical Performance (EVB test results at +5V supply voltage)

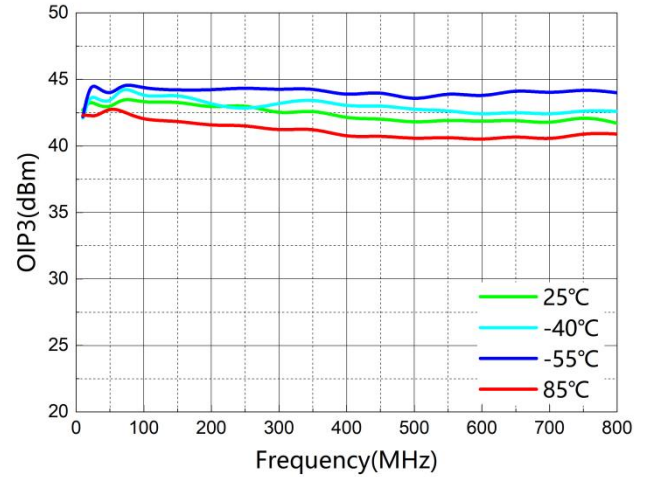
Parameter	Typ.									Units
Frequency	20	50	100	200	300	400	500	600	700	MHz
Gain	15.4	15.4	15.6	15.9	16.2	16.4	16.1	15.6	14.7	dB
Input Return Loss	-17.4	-18.6	-19.2	-19.3	-19.5	-21.1	-26.2	-34.5	-25.1	dB
Output Return Loss	-13.8	-14.6	-15.2	-16.5	-18.6	-22.3	-21.1	-16.4	-13.7	dB
Isolation	-22.2	-22.5	-22.5	-22.0	-21.3	-20.4	-19.6	-19.0	-18.5	dB
Input Power for 1dB Compression	9.4	9.2	9.0	9.0	8.7	8.7	9.0	9.6	10.6	dBm
Output Power for 1dB Compression	23.7	23.6	23.6	23.9	24.0	24.0	24.1	24.2	24.2	dBm
Output Third-Order Interception	43.4	42.8	43.2	42.8	42.3	42.0	41.7	41.8	41.6	dBm
Noise Figure	1.10	1.00	1.00	0.95	0.99	1.10	1.19	1.27	1.40	dB

Test Conditions: Vdd=+5V, I=130mA, OIP3 spacing=1MHz, Pout=+10dBm/1tone, TA=+25°C

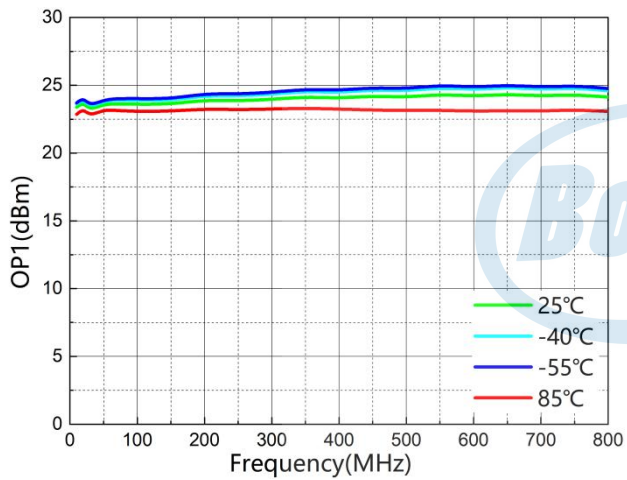




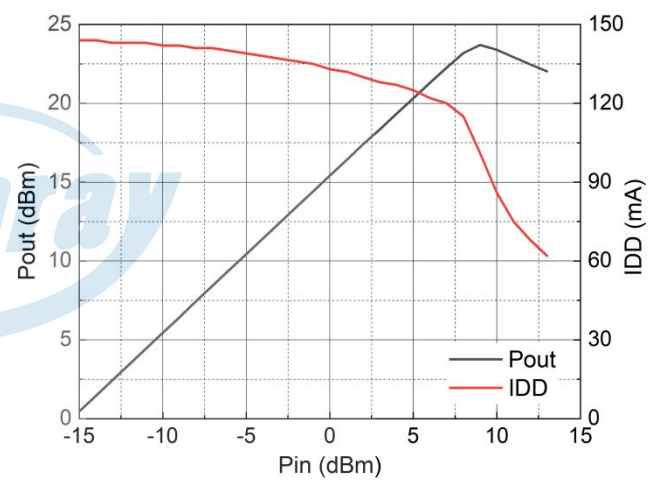
Noise Figure vs. Freq.



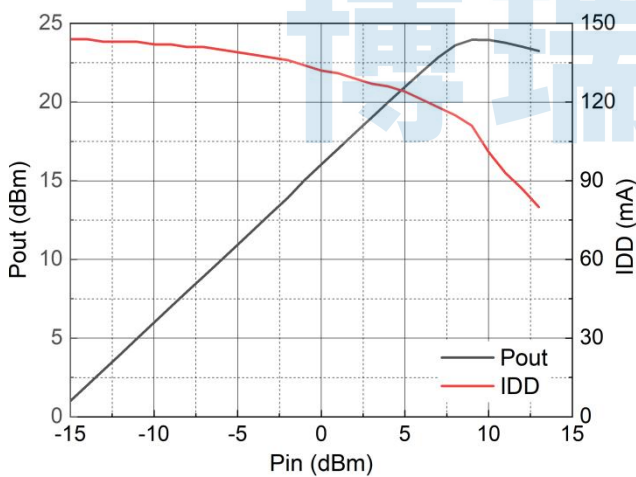
Output Third-Order Interception vs. Freq.



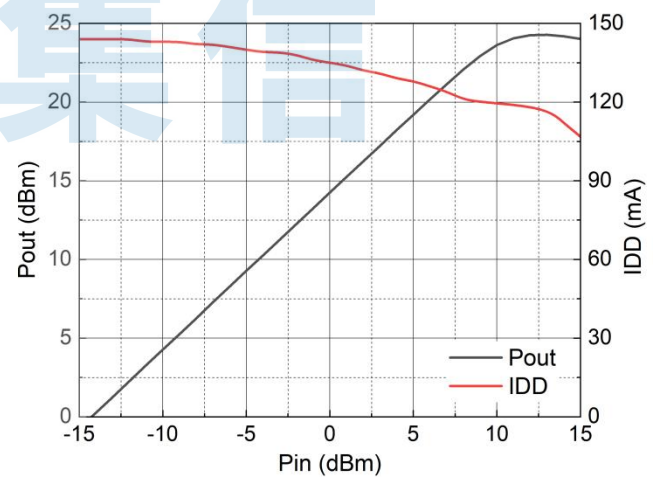
Output Power for 1dB Compression vs. Freq.



P_{out} , IDD vs P_{in} at 100MHz



P_{out} , IDD vs P_{in} at 400MHz

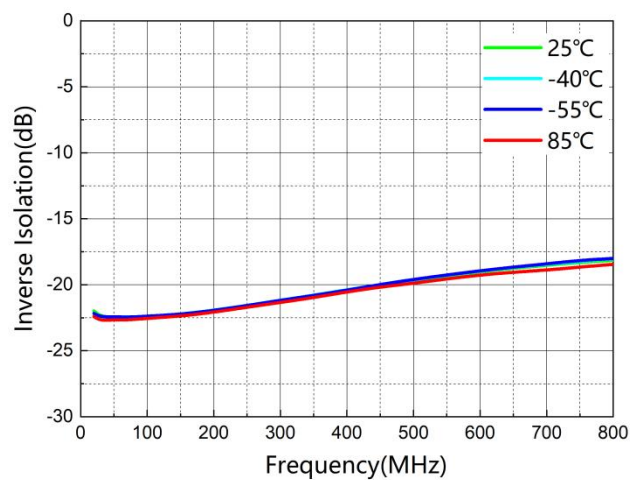
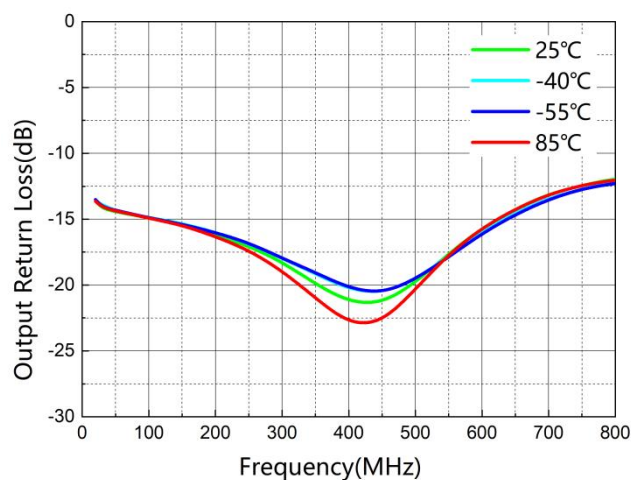
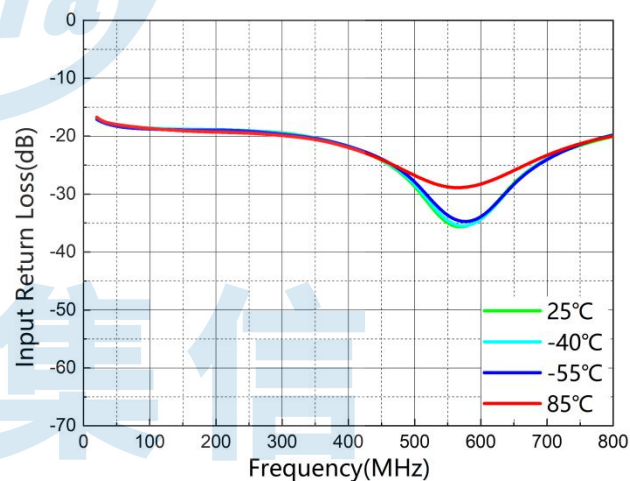
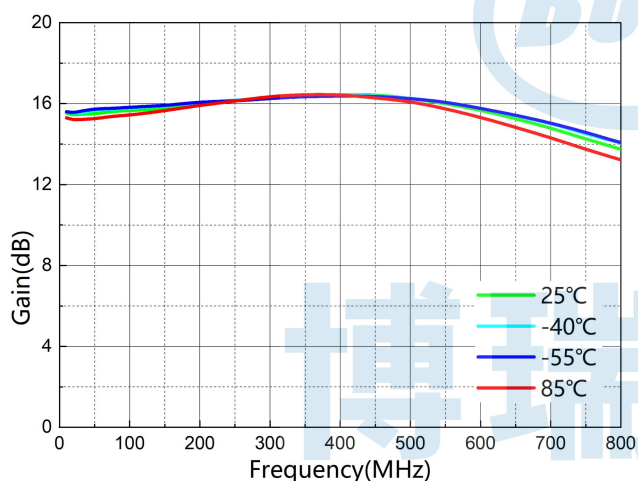


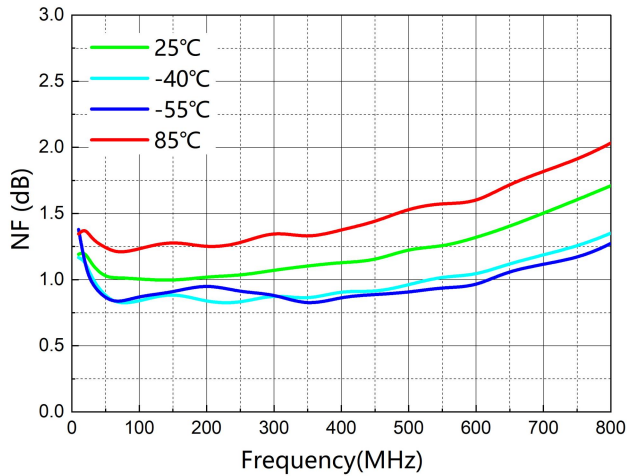
P_{out} , IDD vs P_{in} at 700MHz

Typical Performance (EVB test results at +6V supply voltage)

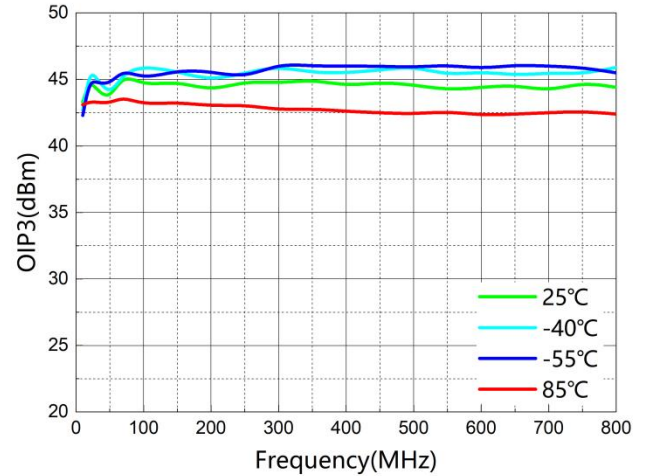
Parameters	Typ.									Units
Frequency	20	50	100	200	300	400	500	600	700	MHz
Gain	15.5	15.5	15.7	16.0	16.3	16.4	16.3	15.7	14.8	dB
Input Return Loss	-17.1	-18.3	-18.7	-18.9	-19.3	-21.6	-27.9	-35.2	-23.6	dB
Output Return Loss	-13.6	-14.4	-14.9	-16.2	-18.2	-21.3	-19.8	-15.7	-13.1	dB
Isolation	-22.0	-22.5	-22.4	-22.0	-21.2	-20.5	-19.7	-19.0	-18.5	dB
Input Power for 1dB Compression	10.8	10.6	10.3	10.3	10.1	10.0	10.2	10.9	11.7	dBm
Output Power for 1dB Compression	25.2	25.1	25.0	25.3	25.4	25.4	25.5	25.5	25.5	dBm
Output Third-Order Interception	44.9	43.4	44.5	44.1	44.7	44.5	44.6	44.4	44.1	dBm
Noise Figure	1.21	1.01	1.01	1.02	1.07	1.13	1.24	1.32	1.57	dB

Test Condition: Vdd=+6V, I=180mA, OIP3 spacing=1MHz, Pout=+10dBm/tone, TA=+25°C

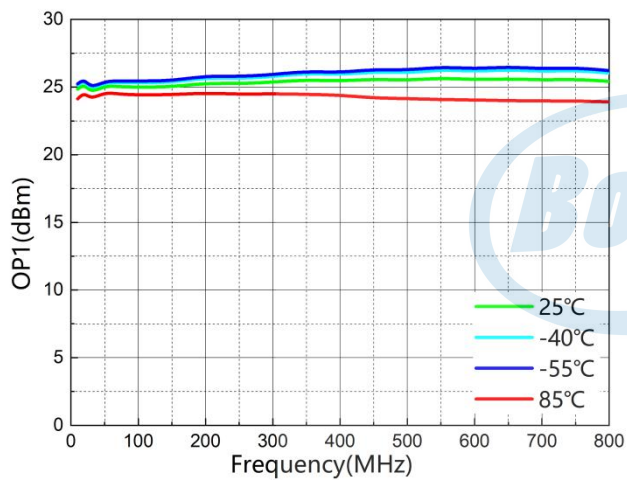




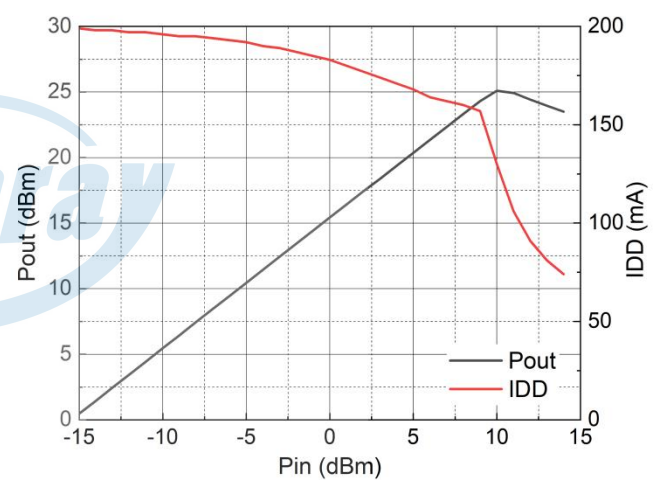
Noise Figure vs. Freq.



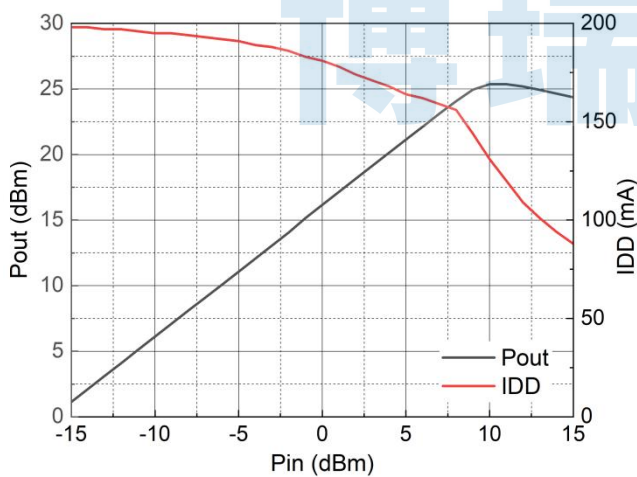
Output Third-Order Interception vs. Freq.



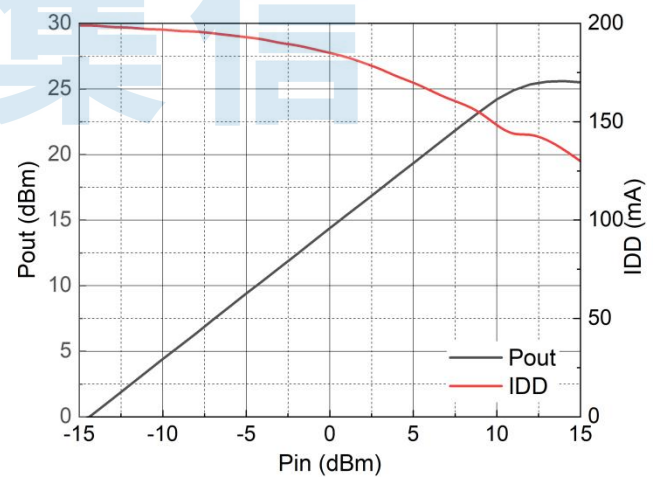
Output Power for 1dB Compression vs. Freq.



P_{out} , IDD vs. P_{in} at 100MHz



P_{out} , IDD vs. P_{in} at 400MHz

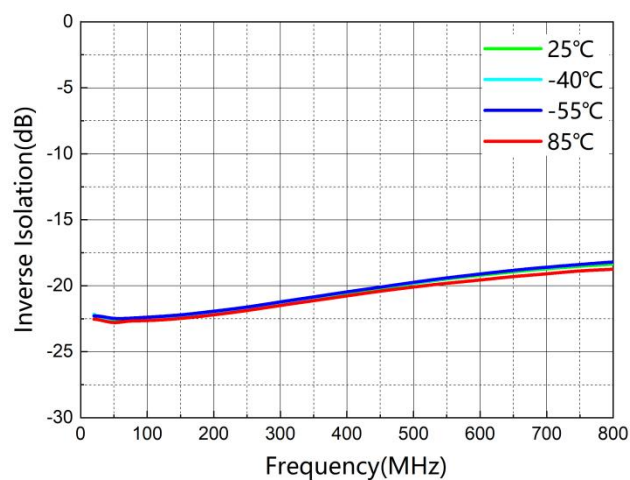
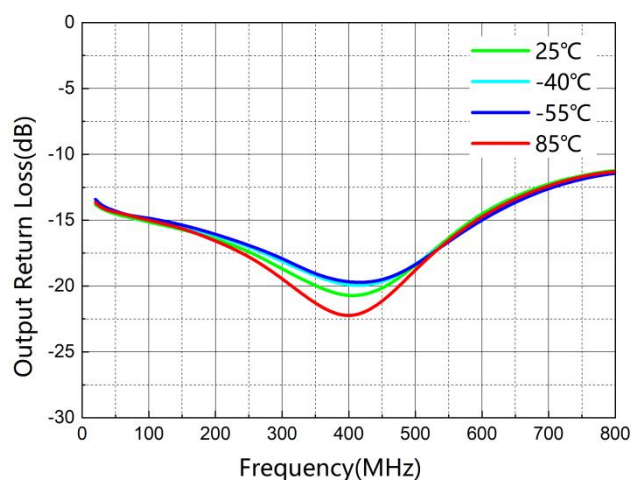
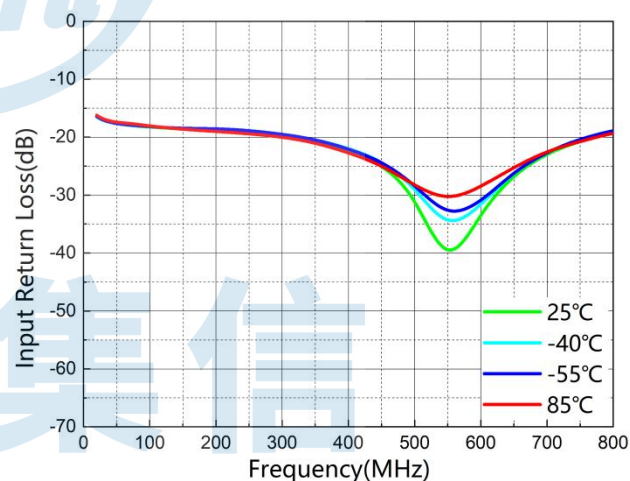
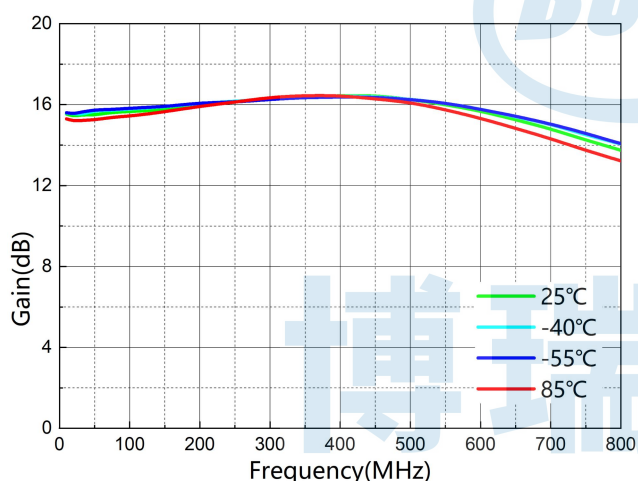


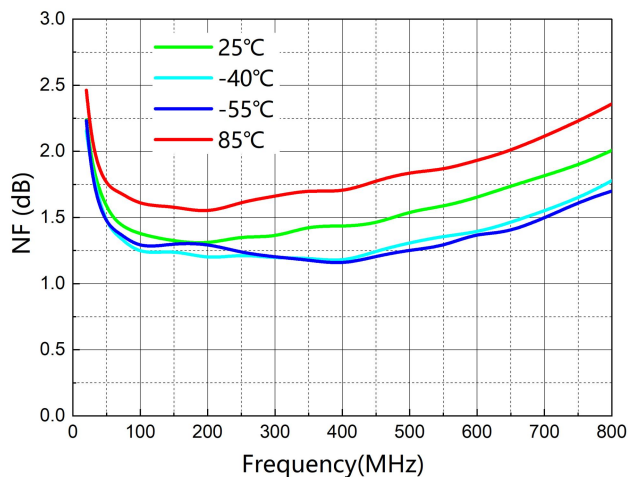
P_{out} , IDD vs. P_{in} at 700MHz

Typical Performance (EVB test results at +9V supply voltage)

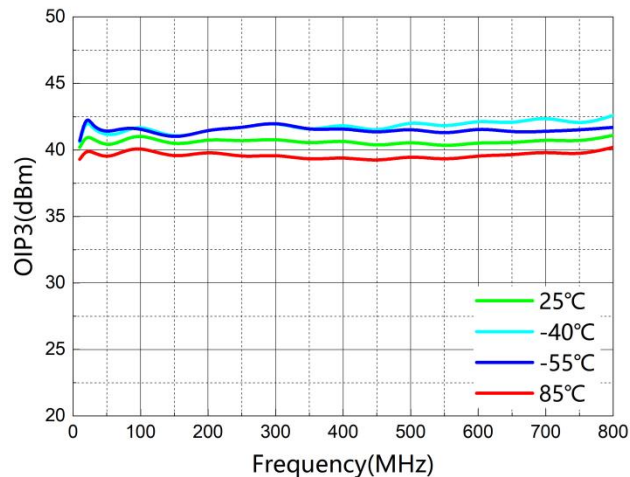
Parameters	Typ.									Units
Frequency	20	50	100	200	300	400	500	600	700	MHz
Gain	15.5	15.5	15.7	16.0	16.3	16.4	16.3	15.7	14.8	dB
Input Return Loss	-16.4	-17.6	-18.2	-18.6	-19.5	-22.1	-29.7	-32.8	-22.7	dB
Output Return Loss	-13.8	-14.6	-15.2	-16.4	-18.7	-21.0	-18.5	-14.4	-12.2	dB
Isolation	-22.3	-22.5	-22.5	-22.1	-21.4	-20.5	-19.8	-19.2	-18.7	dB
Input Power for 1dB Compression	14.3	13.9	13.4	13.3	13.1	12.9	13.1	13.5	14.2	dBm
Output Power for 1dB Compression	28.7	28.4	28.1	28.3	28.4	28.4	28.4	28.2	28.0	dBm
Output Third-Order Interception	41.1	40.3	41.3	40.9	40.9	40.8	40.7	40.6	40.8	dBm
Noise Figure	2.24	1.56	1.37	1.30	1.35	1.43	1.55	1.65	1.90	dB

Test Conditions: Vdd=+9V, I=257mA, OIP3 spacing=1MHz, Pout=+10dBm/tone, TA=+25°C

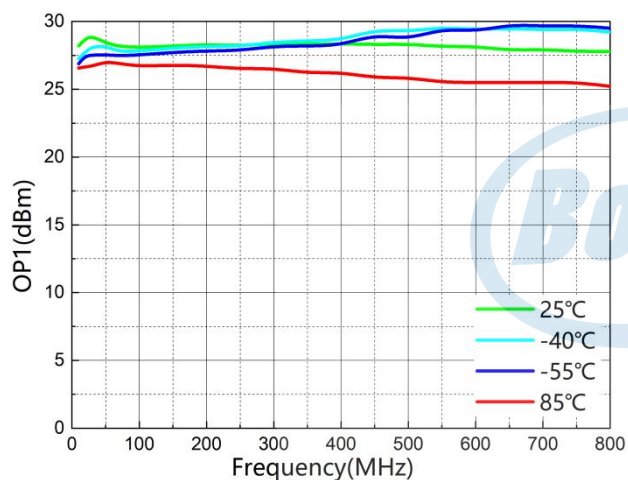




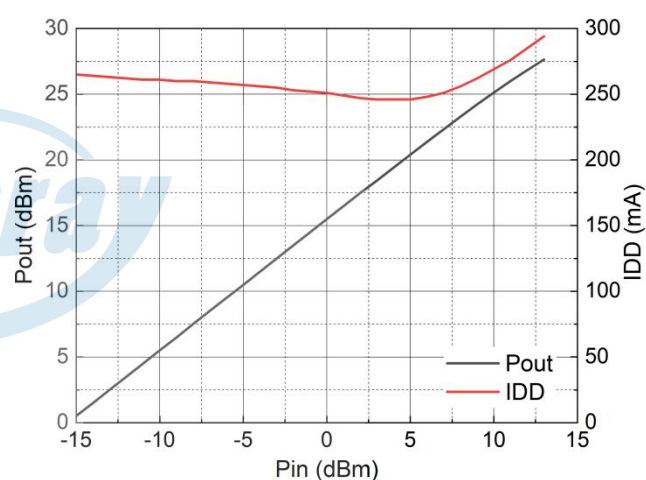
Noise Figure vs. Freq.



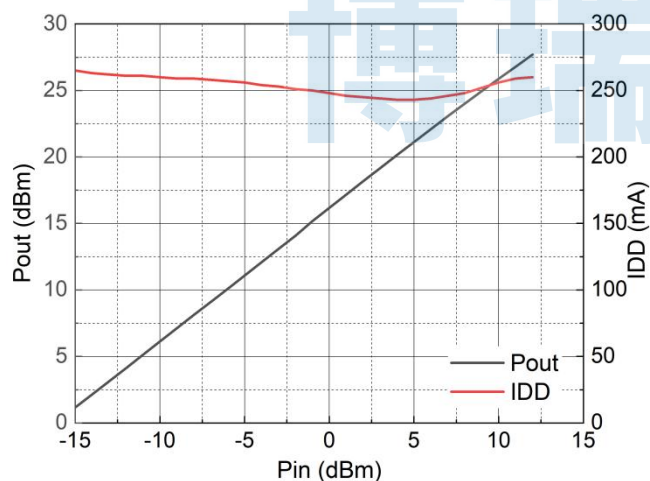
Output Third-Order Interception vs. Freq.



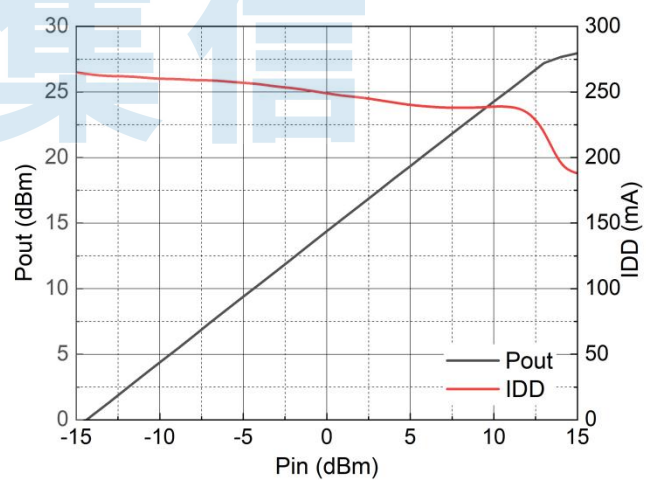
Output Power for 1dB Compression vs. Freq.



P_{out}, IDD vs. P_{in} at 100MHz

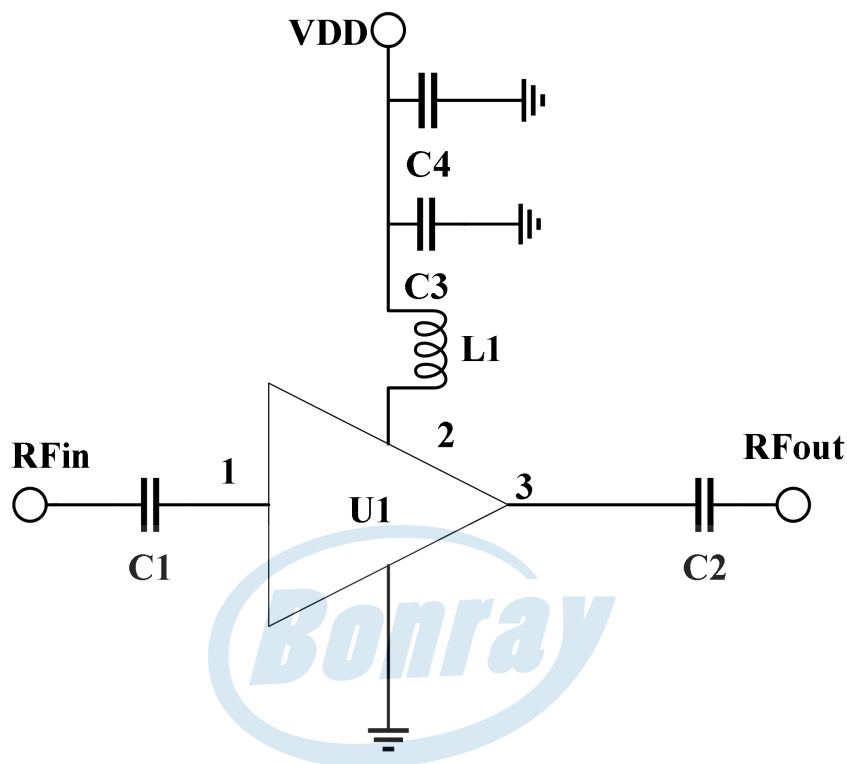


P_{out}, IDD vs. P_{in} at 400MHz



P_{out}, IDD vs. P_{in} at 700MHz

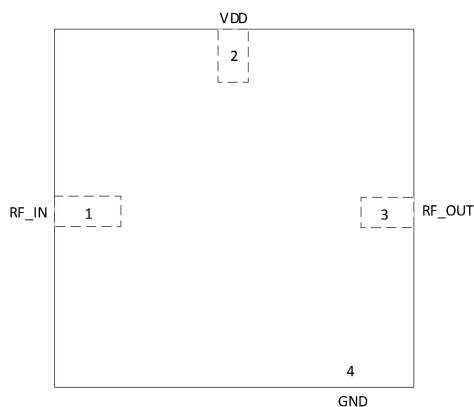
Typical Application Schematic



Bill of Material

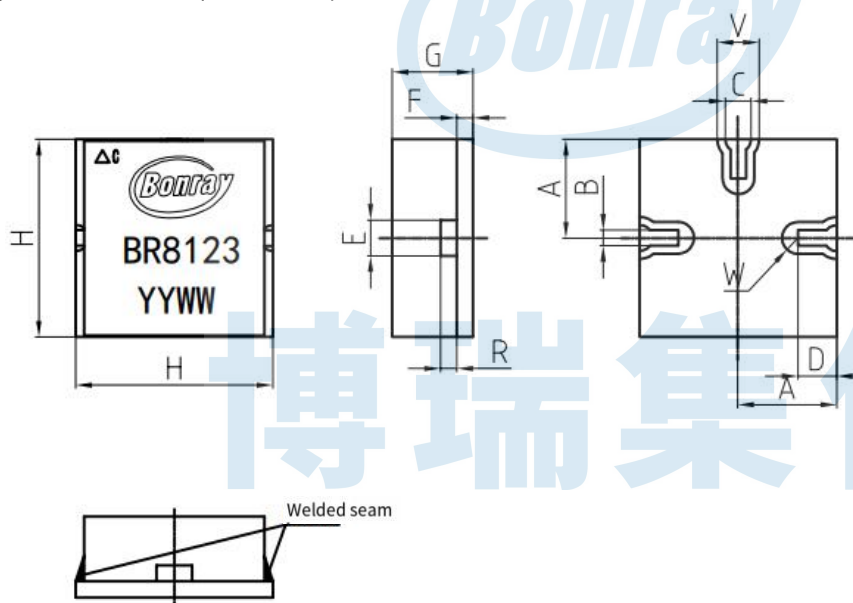
Reference Designator	Package	Value	P/N
U1	Compatible with SMO-8C	Anti-blocking amplifier	BR8123AFF
L1	0603	3.3 uH	1008AF-332X_EC
C1, C2	0402	10nF	GRM155R71H103JA88D
C3	0402	1nF	GRM1555C1H102JA01D
C4	0402	1uF	C1005X5R1V105K050BC

Pin Configuration and Description



Pin number	Pin name	Description
1	RFin	RF input pin. The pin is AC coupled
2	VDD	Power supply pin.
3	RFout	RF output pin. The pin is AC Coupled
4	GND	Ground pin. The pin must be connected to the RF/DC ground.

Package Dimensions (unit: mm)

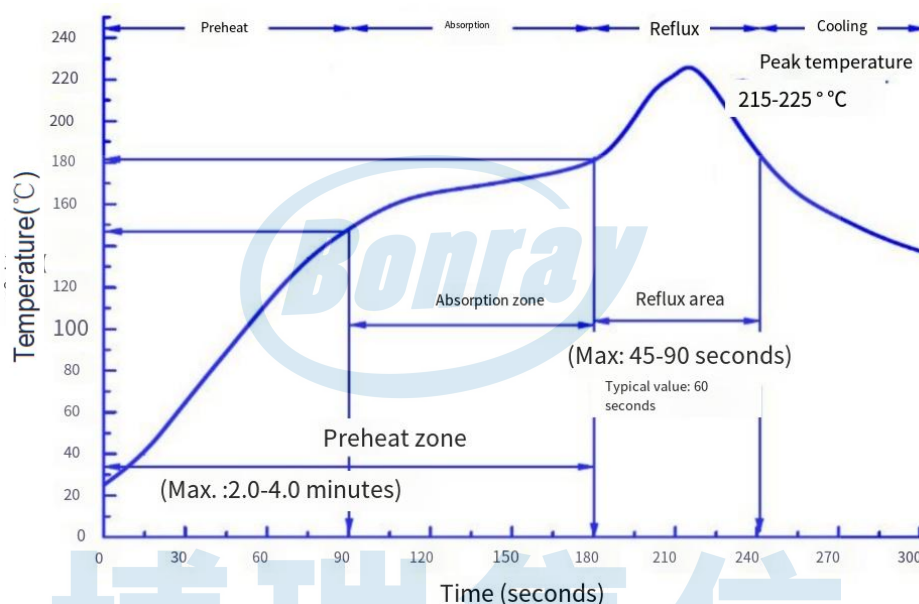


Numbering	Min.	Typ.	Max.
B	0.9	1.0	1.1
C	1.5	1.6	1.7
D	2.3	2.4	2.5
E	3.2	3.4	3.6
F	—	1.0	—
G	4.8	5.0	5.2
H	12.1	12.2	12.3
R	0.8	1.0	1.2
V	2.2	2.4	2.6
W	—	0.99	—

Notes: Pin4 is a GND connection and must be soldered. The solderable area is a 12.2mm × 12.2mm rectangle excluding the pin keep-out zones.

Handling Precautions:

1. The product is an ESD-sensitive device. Proper electrostatic protection measures must be implemented during transportation, assembly, and operation.
2. The component is classified as Moisture Sensitivity Level 3 (MSL3). Storage, handling, transportation, and packaging must comply with IPC/JEDEC J-STD-033 standards.
3. Ensure reliable grounding by connecting both the GND pin and the bottom metallized pad to the system ground plane.
4. Recommended assembly method: SMT (Surface Mount Technology) with Sn63/Pb37 solder paste (melting point: 183°C). Refer to the attached reflow temperature profile for process parameters.



The provided reflow temperature profile is a general recommendation. Actual parameters may vary depending on the substrate and reflow oven performance. The measured substrate temperature during reflow must not exceed the maximum assembly temperature specified in the absolute maximum ratings.

5. If rework or repair is necessary, the device must be baked according to Section 1 requirements prior to any heating process to prevent thermal damage. The total number of reflow and rework cycles shall not exceed three (3).
6. Customers must evaluate environmental conditions to determine if protective coating is required. For applications exposed to salt spray or corrosive environments, conformal coating (e.g., acrylic, silicone) must be applied after soldering and cleaning to enhance environmental resistance.
7. Due to the circuit architecture, dynamic current increases significantly near output power of 1dB Compression. To prevent interference with other ICs on the system board, it is recommended to power this device with a dedicated LDO (Low Dropout Regulator) capable of >400mA output current.
8. For operation at supply voltages $\geq 7V$, a thermal pad (exposed copper area) must be added on the PCB underside, aligned with a structural heatsink (PCB window opening to contact the chassis); Optional front-side heatsink implementation should be determined by system-level thermal simulation results.