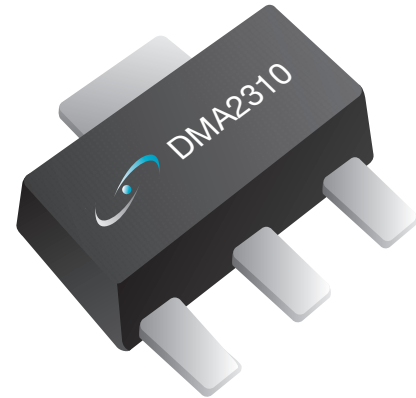


DOCSIS® 3.1 Upstream Amplifier IC



Key Features

- Provides push-pull amplifier performance as a 75-Ohm Single-Ended I/O amplifier IC (no baluns required)
- Compliant to DOCSIS® 3.1 PHY to >200 MHz upstream (US)
- Typical Gain = 14.5 dB \pm 0.5 dB (5 to 210 MHz)
- OIP2 > +70 dBm (100 MHz)
- OIP3 > +40 dBm (100 MHz)
- >40 dB MER (DOCSIS® 3.1 OFDM)
- Single Power Supply Input (+8.5 Vdc)
- Operating Current = 180 mA Typical (Pdiss \approx 1.5 Wdc) @ +8.5 Vdc
- Advanced GaAs Amplifier Technology
- Industry Standard SOT-89 SMT Package

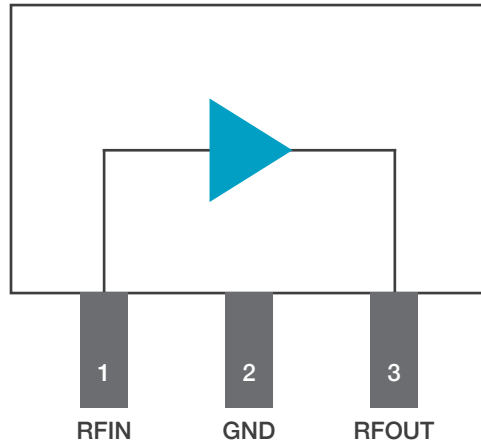
Applications

- DOCSIS® 3.0/3.1 HFC/FTTx/RFoG Network House/Drop Amplifiers
- DOCSIS® 3.0/3.1 HFC/FTTx/RFoG Network Downstream to 210 MHz
- DOCSIS® 3.1 (D3.1) Full Duplex (FD) Applications to >100 MHz
- DOCSIS® Set-Top-Gateway (DSG), Home/SOHO Wireless Gateway Router
- Return Path Optical Receivers (RPORs)

Product Description

The DMA2310 is a general purpose, low-cost, high-linearity RF amplifier IC. Employing an amplifier die manufactured on an advanced GaAs process, this linear CATV amplifier is a single-ended, ultra-linear amplifier ideal for high data rate broadband systems. Designed for use as an easily cascadable 75 Ω gain block, its gain flatness of better than \pm 0.5 dB from 5 MHz to 210 MHz combined with an OIP2 of >+70 dBm and an OIP3 of >+40 dBm at 100 MHz, make this part ideal for cable TV and infrastructure IF applications. No baluns are required and the part is available in a small outline, low profile SMT package.

Functional Block Diagram



Package Pin Out

Pin Number	Description	Description
1	RF _{IN}	RF Input, 75 Ω. External blocking capacitor is required. Refer to evaluation board (EVB) bill of material (BOM).
2	GND	Ground connection. Use via holes as close to ground lead as possible to reduce lead inductance (L).
3	RF _{OUT} /V _{dd}	RF Output, 75 Ω. DC voltage is present on this pin. External DC blocking capacitor is required.
4	GND	Ground connection. Use via holes as close to ground lead as possible to reduce lead inductance (L).

Absolute Minimum and Maximum Ratings

Parameter	Min	Max	Units
Supply	0	+15	Vdc
RF Power at the Input	-	+7	dBm
Case Operating Temperature Range, T _c	-40	+110	°C
Storage Temperature	-65	+150	°C
Soldering Temperature	-	+260	°C
Soldering Time	-	5	seconds

Stresses more than the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Operating Ranges

Parameter	Min	Typ	Max	Units
RF Input/Output Frequency	5		210	MHz
Supply Voltage	+8	+8.5	+12	V _{DC}
Case Temperature, T _c	-40	-	+85	°C

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the Electrical Specification.

Electrical Specifications

(Ta = +25 °C, Vdd = +8 VDC, f = as stated below, 75 Ω Input/Output)

Parameter	Min	Typ	Max	Units	Comments
Gain	13	14.5	15	dB	See Note 1; 5 to 210 MHz
Gain Slope	-	0.5	-	dB	See Note 1; 5 to 210 MHz
Gain Flatness	-	-	± 0.25	dB	F = 5 to 210 MHz
Noise Figure (NF)	-	2.8	3.0	dB	F = 5 to 210 MHz
Input Return Loss (IRL)	-	-20	-18	dB	F = 5 to 210 MHz
Output Return Loss (ORL)	-	-25	-20	dB	F = 5 to 210 MHz
Tx Modulation Error Ratio (MER)	-	-44	-40	dB	See Note 2
Tx Error Vector Magnitude (EVM)	-	0.4	0.6	%RMS	See Note 2
IIP3	-	+29.5	-	dBm	See Note 1; F = 100 MHz
OIP3	-	+44	-	dBm	See Note 1; F = 100 MHz
OIP2	-	+70	-	dBm	See Note 1; F = 100 MHz
OP1dB	-	+25	-	dBm	See Note 1; ±0.5 dBm; F = 5 to 210 MHz
Supply Current	-	180	-	mA	@ +8.5 Vdc

Notes: All specifications as measured using Duet evaluation assembly.

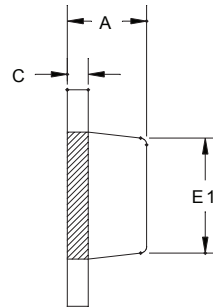
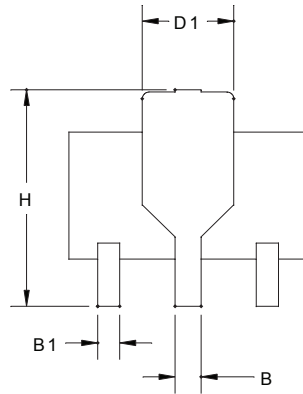
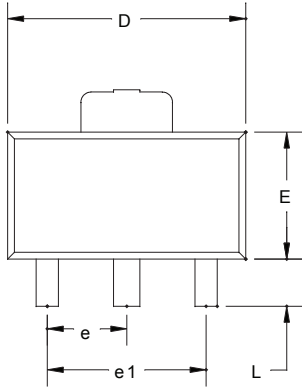
1. Measured in application circuit.
2. Measured IAW Data-Over-Cable Service Interface Specifications (DOCSIS®) Downstream RF Interface Specification, CM-SP-DRFI-I16-170111 in the frequency range 5 to 210 MHz.

Multi-Carrier Distortion Data

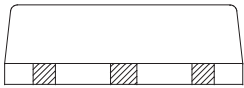
(Typical at +24 °C Ambient Temperature)

XMOD	CTB	CSO+	CSO-	Unit	Notes
≤ -75	-78	-76	-80	dBc	; @200.25 MHz 17 PAL-D channels FLAT; +10 dBmV/ch RF input

Package Dimensions



	MIN	MAX
A	0.055	0.063
B	0.017	0.022
B1	0.014	0.019
C	0.014	0.017
D	0.173	0.181
E	0.066	0.070
E1	0.090	0.086
e	0.059	
e1	0.118	
H	0.155	0.167
L	0.029	0.041



Note:

1. Top package angle is $9^\circ +1^\circ / -2^\circ$ tolerance bottom package angle is 3° max.
2. Package corner radius is 5 mils max on all corners.
3. Shiny package finish on all sides except top side finish is minimum matte of 10 - 14 VDI

Note: all dimensions in inches

Ordering Information

Order Number	Temperature Range	Package Description	Component Packaging
DMA2310P0	-40 to +85 °C	SOT-89-3	Waffle Pack, 1 to 100 each
DMA2310V0	-40 to +85 °C	SOT-89-3	1500 each, T&R
DMA2310PCBA	-40 to +85 °C	75Ω I/O Evaluation Board (EVB) with F-Type PCB Edge Connectors	EVB Kit with five (5) piece IC sample ESD bag

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