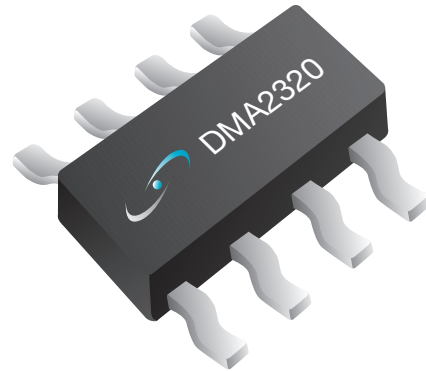


# 5 to 210 MHz Push-Pull CATV Return Path Amplifier IC



## Key Features

- Doubles RF output power versus a single-ended (SE) amplifier IC with 6-dB better even order distortion
- Compliant to DOCSIS® 3.1 PHY to 210 MHz upstream (US)
- Typical Gain = 14.5 dB (5 to 210 MHz)
- OIP2 > +70 dBm and OIP3 > +44 dBm (100 MHz)
- >52 dB MER (DOCSIS® 3.1 OFDM, 5 to 210 MHz)
- Single Power Supply Input (+8 to +12Vdc)
- Operating Current = 360 mA Maximum (Pdiss < 3 Wdc) @ +8 Vdc
- Advanced GaAs Amplifier Technology
- Industry Standard small-footprint SOIC-8 with Exposed Pad (EP) SMT Package

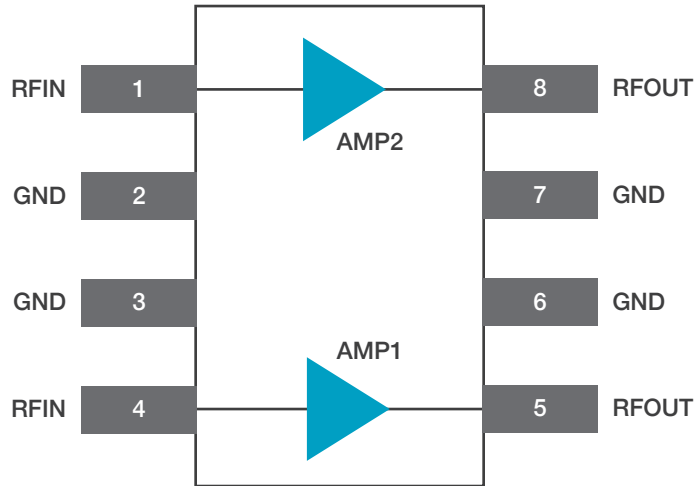
## Applications

- DOCSIS® 3.0/3.1 HFC/FTTx/RFoG Network House/Drop and MDU/MTU Amplifiers (to +34 dBmV/ch)
- DOCSIS® 3.0/3.1 HFC/FTTx/RFoG Network Upstream to 210-MHz
- DOCSIS® Set-Top-Gateway (DSG), Home/SOHO Wireless Gateway Router
- Return Path Optical Receivers (RPORs)

## Product Description

The DMA2320 is a general purpose, low-cost, high-linearity push-pull (PP) RF amplifier IC. Employing two complimentary amplifier die manufactured on an advanced GaAs process, this linear CATV amplifier is ideal for high data rate broadband systems. Its gain flatness of better than  $\pm 0.5$  dB from 5 MHz to 210 MHz combined with an OIP2 of >+70 dBm and OIP3 of >+44 dBm at 100 MHz, make this part ideal for cable TV and infrastructure IF applications. The part is available in a small outline, low profile SMT package.

**Functional Block Diagram**



**Package Pin Out**

Pin Number	Description	Notes
1	RF Input	From externally connected balun. Gate Voltage (Vg) for “AMP 2” (upper in package) amplifier die may also be applied on this Pin.
2	Ground	
3	Ground	
4	RF Input	From externally connected balun. Gate Voltage (Vg) for “AMP 1” (lower in package) amplifier die may also be applied on this Pin.
5	RF Output	Also includes Vdd for “AMP 1” (lower in package) amplifier die. Connects to external balun.
6	Ground	
7	Ground	
8	RF Output	Also includes Vdd for “AMP 2” (upper in package) amplifier die. Connects to external balun.
Backside Paddle	RF and DC Ground	Vias are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation. A 0.35 mm (#80/.0135”) diameter bit is recommended for drilling via holes and a final plated thru diameter of 0.25 mm (0.010”).

### 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 <sub>c</sub>	-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	+12	V <sub>DC</sub>
Case Temperature, T <sub>c</sub>	-40	-	+100	°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	14	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	-	dB	F = 5 to 1218 MHz
Input Return Loss (IRL)	-	-22	-20	dB	F = 5 to 210 MHz
Output Return Loss (ORL)	-	-25	-20	dB	F = 5 to 210 MHz
Tx Modulation Error Ratio (MER)	52	-	-	dB	See Note 2
Tx Error Vector Magnitude (EVM)	-	-	0.2	%RMS	See Note 2
IIP3	-	+29.5	-	dBm	See Note 1; F = 5 to 210 MHz
OIP3	-	+44	-	dBm	See Note 1; F = 5 to 210 MHz
OIP2	-	+70	-	dBm	See Note 1; F = 5 to 210 MHz
OP1dB	+27	-	-	dBm	See Note 1; ±0.5 dBm; F = 5 to 210 MHz
Supply Current	-	-	360	mA	@ +8 Vdc

Notes: All specifications as measured using Duet evaluation assembly.

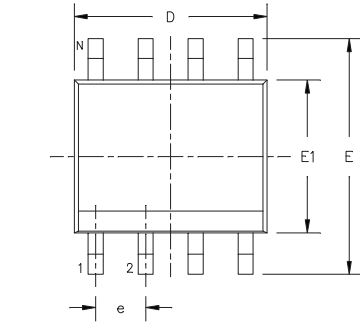
1. Measured in application circuit.
2. Measured IAW Data-Over-Cable Service Interface Specifications (DOCSIS®) Downstream RF Interface Specification, CM-SP-DRFI-116-170111.

## Multi-Carrier Distortion Data

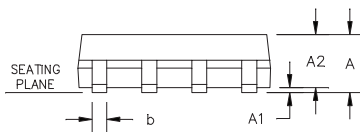
(Typical at +24 °C Ambient Temperature)

XMOD	CTB	CSO+	CSO-	Unit	Notes
≤ -75	-78	-82	-86	dBc	; @200.25 MHz 17 channels PAL-D FLAT; +19.5 dBmV/ch RFin

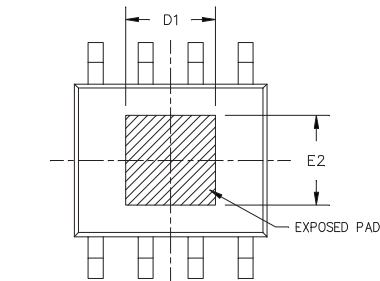
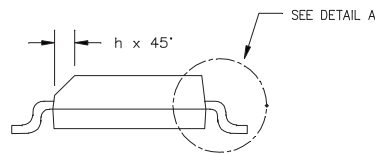
**Package Dimensions**



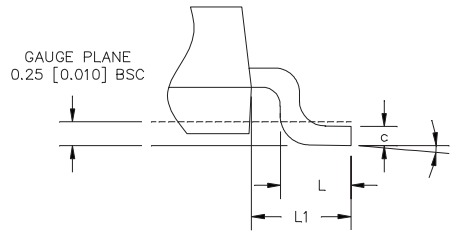
TOP VIEW



SIDE VIEW



BOTTOM VIEW



DETAIL A

SYM	DIMENSION IN INCHES			DIMENSION IN MM		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.056	0.058	0.061	1.42	1.47	1.55
A1	0.001	0.004	0.005	0.025	0.102	0.127
A2	0.051	0.054	0.057	1.30	1.37	1.45
b	0.014	0.016	0.020	0.36	0.41	0.51
c	0.007	0.008	0.010	0.18	0.20	0.25
D	0.191	0.193	0.195	4.85	4.90	4.95
E1	0.151	0.153	0.155	3.84	3.89	3.94
E	0.234	0.240	0.244	5.94	6.10	6.20
e	0.050			1.27		
L	0.020	0.027	0.032	0.51	0.69	0.81
L1	0.042	0.044	0.046	1.07	1.12	1.17
Ø	0"	-	8"	0"	-	8"
h	0.011	0.015	0.019	0.28	0.38	0.48
D1	0.080	-	0.090	2.03	-	2.29
E2	0.080	-	0.090	2.03	-	2.29

- NOTES:
1. DIMENSION D DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. DIMENSION E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
  2. COPLANARITY APPLIES TO THE TERMINALS. COPLANARITY SHALL NOT EXCEED 0.003" [0.08 mm].
  3. BASED FROM JEDEC MS-012 VARIATION AA.

### Ordering Information

Order Number	Temperature Range	Package Description	Component Packaging
DMA2320P0	-40 to +85 °C	10 x 4 x 1.7 mm SMT BW-16	Gel Pak, 1 to 100 each
DMA2320V0	-40 to +85 °C	10 x 4 x 1.7 mm SMT BW-16	1500 each, T&R
DMA2320PCBA	-40 to +85 °C	75 Ω 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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