RFAM3790

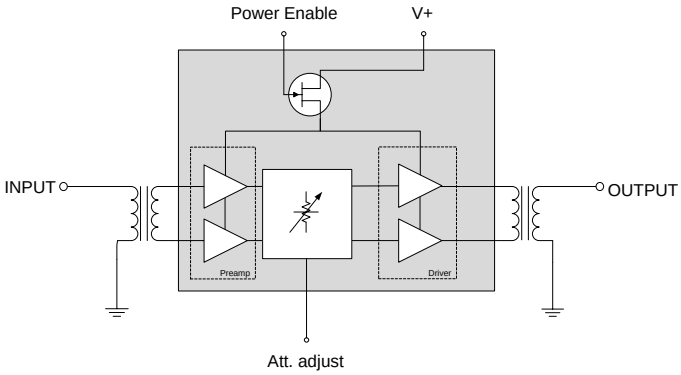
45-1218MHZ GAAS EDGE QAM INTEGRATED AMPLIFIER

Product Description

The RFAM3790 is an Integrated Edge QAM Amplifier Module. The part employs GaAs pHEMT die, GaAs MESFET die, a 20dB range variable attenuator and a power enable feature, has high output capability, and is operated from 45MHz to 1218MHz. It provides excellent linearity and superior return loss performance with low noise and optimal reliability.

9 pin, 11.0 mm x 11.0 mm x 1.375 mm package

Functional Block Diagram



Product Features

- Excellent Linearity
- Extremely High Output Capability
- Voltage Controlled Attenuator
- Power Enable Featrure
- Extremely Low Distortion
- Optimal Reliability
- Low Noise
- Unconditionally Stable Under all Terminations
- 28.5 dB Typical Gain at 1218MHz
- 410mA Typical at 12VDC

Applications

- 45MHz to 1218MHz Downstream Edge QAM RF Modulators
- Headend Equipment

Ordering Information

Part No.	Description
RFAM3790SB	Sample bag 5 pcs
RFAM3790SQ	Sample bag 25 pcs
RFAM3790SR	7” Reel with 100 pcs
RFAM3790TR7	7” Reel with 250 pcs
RFAM3790TR13	13” Reel with 750 pieces
RFAM3790PCBA-410	Fully assembled Evaluation Board
RFAM3790PCK-410	Fully assembled Evaluation Board with sample bag

Absolute Maximum Ratings

Parameter	Value / Range
DC Supply over-voltage (5 minutes)	+14 V
Storage Temperature	−40 to 110 °C
Operating Mounting Base Temperature	−30 to 110 °C

Operation of this device outside the parameter ranges given above may cause permanent damage.

Electrical Specifications

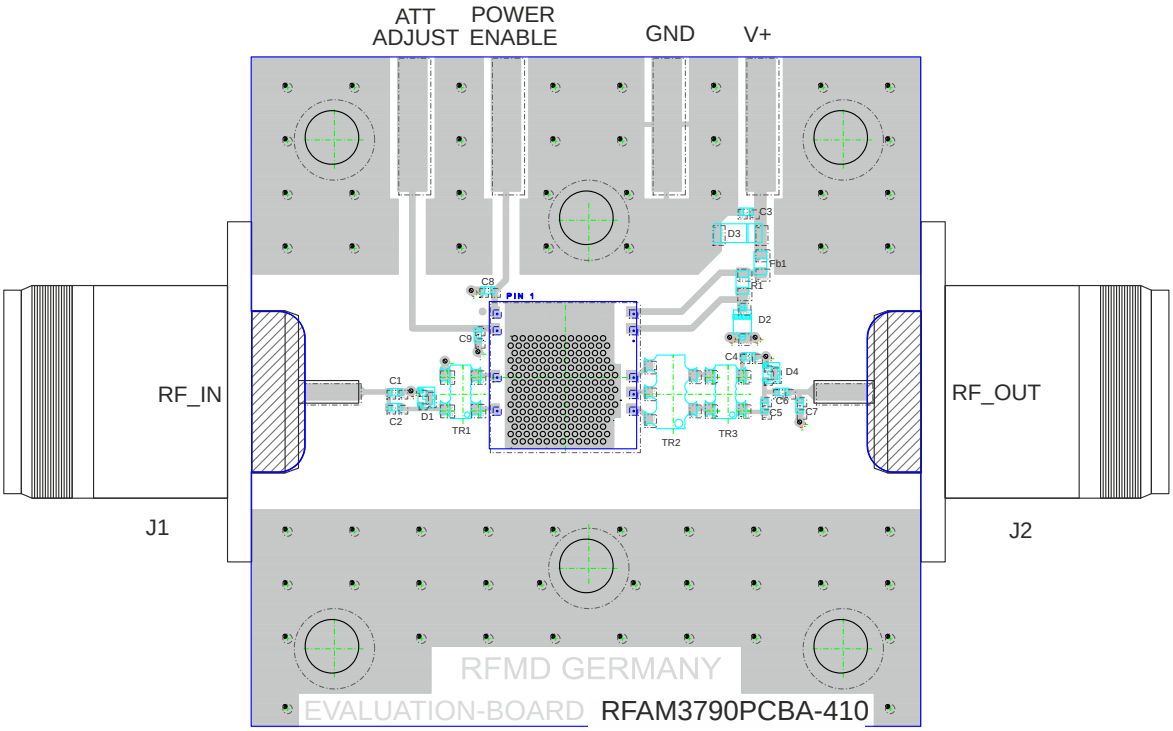
Parameter	Conditions (V+=12V, TMB=30°C, ZS=ZL=75Ω, ATT=0dB)	Min	Typ	Max	Unit
Power Gain	f=45MHz		27.0		dB
	f=1218MHz	27.5	28.5	29.5	dB
Slope [1]	f=45MHz to 1218MHz	0.5	1.5	2.5	dB
Flatness of Frequency Response	f=45MHz to 1218MHz (Peak to Valley)		0.5	1.0	dB
Input Return Loss	f=45MHz to 1003MHz	18			dB
	f=1003MHz to 1218MHz	16			dB
Output Return Loss	f=45MHz to 1003MHz	15			dB
	f=1003MHz to 1218MHz	15			dB
Noise Figure	f=50MHz to 1218MHz		4.0	5.0	dB
Total Current Consumption (DC)			410	450	mA
Attenuator	**V+=12V, TMB=30°C, ZS=ZL=75Ω**				
Attenuator Range	Attenuator Voltage 0V to 12V	0 to 20			dB
Power Enable/Disable	**V+=12V, TMB=30°C, ZS=ZL=75Ω**				
	Logic high (3.3V) applied to power enable pin [2]		Amp enabled		
	Logic low (0V) applied to power enable pin [3]		Amp disabled		

Electrical Specifications –continued-

Parameter	Conditions (V+=12V, TMB=30°C, ZS=ZL=75Ω, ATT=0dB)	Min	Typ	Max	Unit
Distortion					
Adjacent Channel Power Ratio (ACPR); N=4 contiguous 256QAM channels	Channel Power = 58dBmV; Adjacent channel up to 750 kHz from channel block edge			-58	dBc
	Channel Power = 58dBmV; Adjacent channel (750 kHz from channel block edge to 6MHz from channel block edge)			-60	dBc
	Channel Power = 58dBmV; Next-adjacent channel (6 MHz from channel block edge to 12 MHz from channel block edge)			-63	dBc
	Channel Power = 58dBmV; Third-adjacent channel (12 MHz from channel block edge to 18 MHz from channel block edge)			-65	dBc
2nd Order Harmonic (HD2); N=1 256QAM channel	Channel Power = 66dBmV; In each of 2N contiguous 6 MHz channels coinciding with 2nd harmonic components (up to 1000MHz);			-63	dBc
3rd Order Harmonic (HD3); N=1 256QAM channel	Channel Power = 66dBmV; In each of 3N contiguous 6 MHz channels coinciding with 3rd harmonic components (up to 1000MHz);			-63	dBc
CTB	V_O=46dBmV, flat, 79 analog channels plus 75 digital channels (-6dB offset) [4], [6]		-67		dBc
XMOD			-60		dBc
CSO			-70		dBc
CIN			64		dB
CTB	V_O=45dBmV, flat, 79 analog channels plus 111 digital channels (-6dB offset) [5], [6]		-67		dBc
XMOD			-61		dBc
CSO			-70		dBc
CIN			65		dB

1. The slope is defined as the difference between the gain at the start frequency and the gain at the stop frequency.
2. Logic high is defined as power enable voltage >2V
3. Logic low is defined as power enable voltage <0.4V
4. 79 analog channels, NTSC frequency raster: 55.25MHz to 547.25MHz, +46dBmV flat output level, plus 75 digital channels, -6dB offset relative to the equivalent analog carrier.
5. 79 analog channels, NTSC frequency raster: 55.25MHz to 547.25MHz, +45dBmV flat output level, plus 111 digital channels,-6dB offset relative to the equivalent analog carrier.
6. Composite Second Order (CSO) - The CSO parameter (both sum and difference products) is defined by ANSI/SCTE 6.
   Composite Triple Beat (CTB) - The CTB parameter is defined by ANSI/SCTE 6.
   Cross Modulation (XMOD) - Cross modulation (XMOD) is defined by ANSI/SCTE 58, measured at baseband (selective voltmeter method), referenced to 100% modulation of the carrier being tested
   Carrier to Intermodulation Noise (CIN) - The CIN parameter is defined by ANSI/SCTE 17 (Test procedure for carrier to noise).

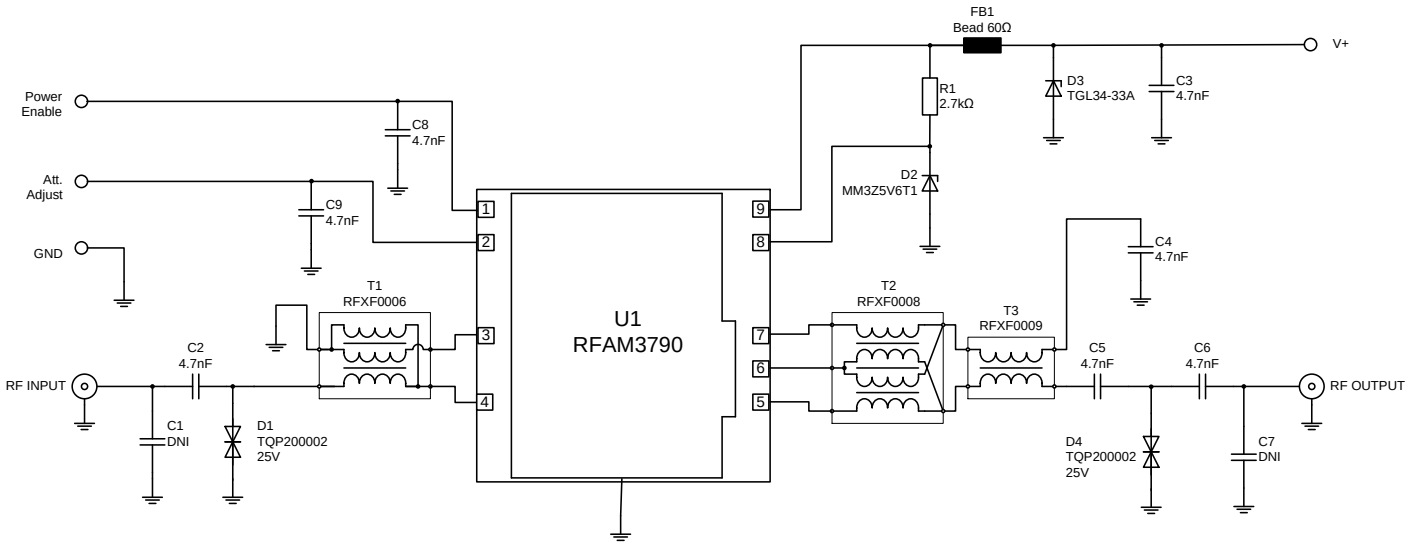
Evaluation Board Assembly Drawing



Note:

The ground plane of the RFAM3790 module should be soldered onto a board equipped with as many thermal vias as possible. Underneath this thermal via array a heat sink with thermal grease needs to be placed which is able to dissipate the complete module DC power. In any case the modul backside temperature should not exceed 110°C.

Evaluation Board Schematic

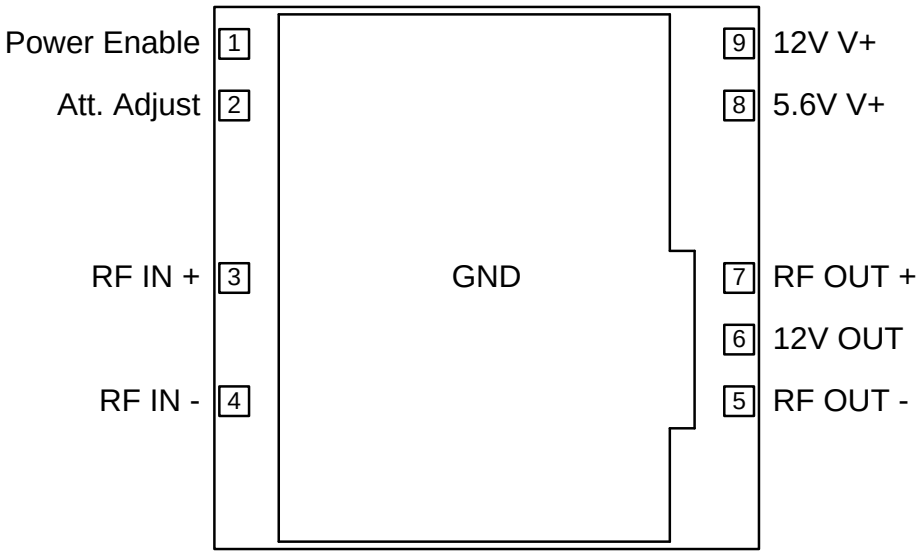


Evaluation Board Bill of Materials (BOM)

Reference Des.	Value	Description	Manuf.	Part Number
C1, C7	DNI	optional to improve matching in application		
C2, C3, C4, C5, C6, C8, C9	4.7nF	Capacitor, X7R, 50V, 10%, 0402	various	
R1	2.7kΩ	Resistor, TK200, 5%, 0603	various	
FB1	60Ω @ 100MHz	Impedance Bead, DCR 0.1Ohm, 800mA	Taiyo Yuden	BK 1608HS600-T
D1, D4	25V	Diode, ESD Protection	QORVO	TQP200002
D2	5.6V	Diode, Zener, 200mW	On Semiconductor	MM3Z5V6T1G
D3	33V	Diode, Transient Suppressor, 5%	Diotec	TGL34-33A
T1	1:1	Transformer	QORVO	RFXF0006
T2	2.8:1	Transformer	QORVO	RFXF0008
T3	1:1	Transformer	QORVO	RFXF0009
U1		Amplifier	QORVO	RFAM3790

Notes:

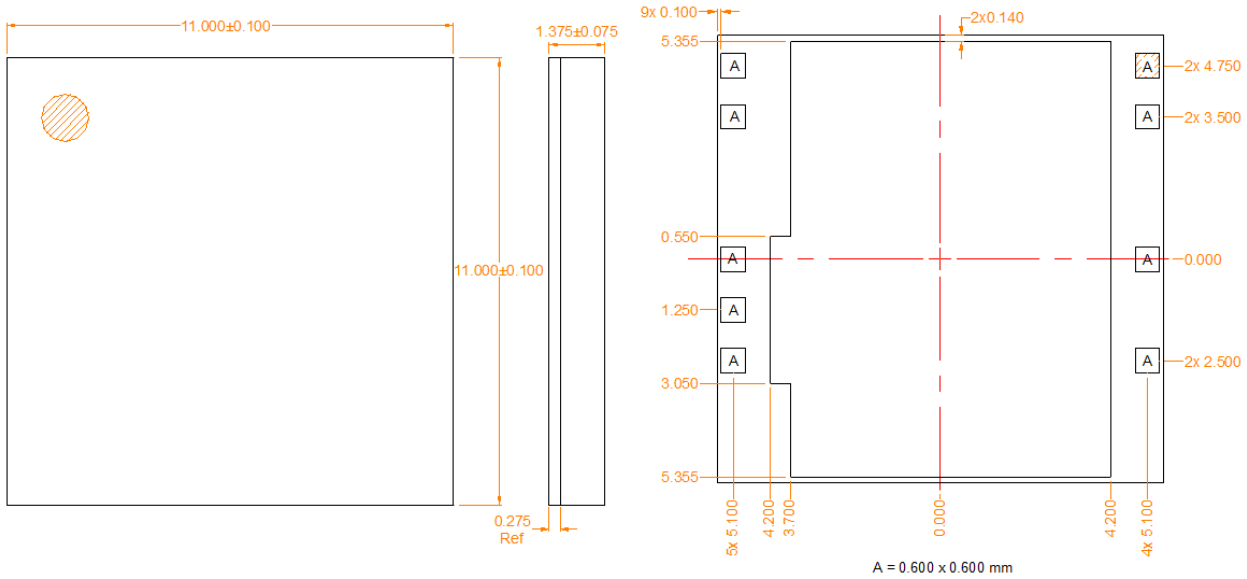
Pin Configuration



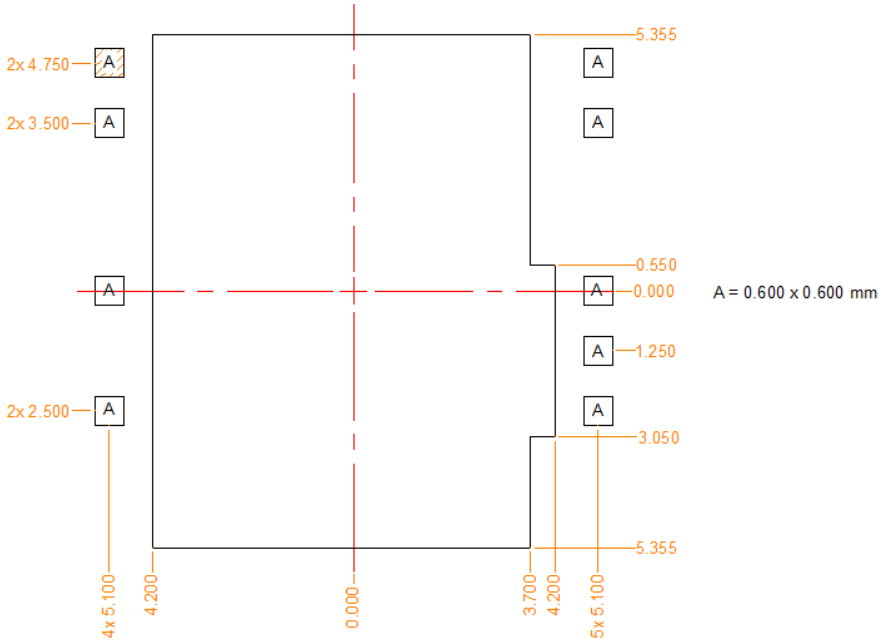
Pin Description

Pin No.	Label	Description
1	**Power Enable**	Logic Level (3.3V) Power Enable Control
2	**Att. Adjust**	Voltage Adjustable Attenuator
3	**RF IN (+)**	RF AMP Positive Input
4	**RF IN (-)**	RF AMP Negative Input
5	**RF OUT (-)**	RF AMP Negative Output
6	**12V Out**	12V Output
7	**RF OUT (+)**	RF AMP Positive Output
8	**5.6V V+**	Supply Voltage 5.6V
9	**12V V+**	Supply Voltage 12V

Package Outline Drawing (Dimensions in millimeter)



PCB metal land pattern (Dimensions in millimeter)



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B	ANSI/ESDA/JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	Class C3	ANSI/ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020

Caution!
ESD-Sensitive Device

Solderability

Compatible with both lead-free (260°C max. reflow temp.) and tin/lead (245°C max. reflow temp.) soldering processes.
Solder profiles available upon request.

Contact plating: NiPdAu

RoHS Compliance

This part is compliant with 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Halogen Free (Chlorine, Bromine)

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notice

The information contained herein is believed to be reliable; however, Qorvo makes no warranties regarding the information contained herein and assumes no responsibility or liability whatsoever for the use of the information contained herein. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for Qorvo products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information. **THIS INFORMATION DOES NOT CONSTITUTE A WARRANTY WITH RESPECT TO THE PRODUCTS DESCRIBED HEREIN, AND QORVO HEREBY DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO SUCH PRODUCTS WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

Without limiting the generality of the foregoing, Qorvo products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Copyright 2016 © Qorvo, Inc. | Qorvo is a registered trademark of Qorvo, Inc.

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А