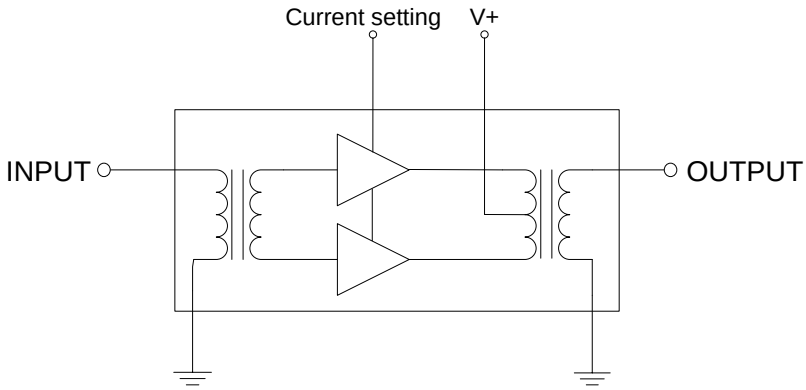
RFMD + TriQuint = Qorvo

RFPD3580

GaAs/GaN Power Doubler Hybrid
45MHz to 1218MHz

Package: SOT-115J

The RFPD3580 is a Hybrid Power Doubler amplifier module. The part employs GaAs pHEMT die and GaN HEMT die and operates from 45MHz to 1218MHz. It provides extremely high output up to 76.8dBmV composite power or 67dBmV virtual level. DC current as well as supply voltage of the device can be externally adjusted for optimum distortion performance versus power consumption over a wide range of output level.



Functional Block Diagram

Features

- Extremely High Output Capability
- Excellent Linearity
- Superior Return Loss Performance
- Optimal Reliability
- Unconditionally Stable Under All Terminations
- 22.5dB Min. Gain at 1218MHz
- 550mA Max.
- Devices works at V+ between 24V and 34V

Applications

- 45MHz to 1218MHz CATV Amplifier Systems
- DOCSIS 3.1 Compliant

Ordering Information

RFPD3580	Box with 50 pieces

Absolute Maximum Ratings

Parameter	Rating	Unit
RF Input Voltage (single tone)	75	dBmV
DC Supply Over-Voltage (5 minutes)	38	V
Storage Temperature	-40 to +100	°C
Operating Mounting Base Temperature	-30 to +100	°C

Caution! ESD sensitive device.

RoHS status based on EU Directive 2011/65/EU .

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

Electrical Specifications

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
General Performance. Test conditions unless otherwise noted: V+ = 34V; TMB = 35°C; ZS = ZL = 75Ω					
Operating Frequency Range	45		1218	MHz	
Power Gain		21.8		dB	f = 45MHz
	22.5	23.0	24.0	dB	f = 1218MHz
Slope[1]	0.5	1.0	2.0	dB	f = 45MHz to 1218MHz
Flatness of Frequency Response			0.8	dB	f = 45MHz to 1218MHz
Input Return Loss	-20			dB	f = 45MHz to 320MHz
	-19			dB	f = 320MHz to 640MHz
	-17			dB	f = 640MHz to 870MHz
	-16			dB	f = 870MHz to 1000MHz
	-15			dB	f = 1000MHz to 1218MHz
Output Return Loss	-20			dB	f = 45MHz to 320MHz
	-19			dB	f = 320MHz to 640MHz
	-18			dB	f = 640MHz to 870MHz
	-17			dB	f = 870MHz to 1000MHz
	-16			dB	f = 1000MHz to 1218MHz
Noise Figure		3.0	4.0	dB	f = 50MHz to 1218MHz
Total Current Consumption (DC)		530.0	550.0	mA	

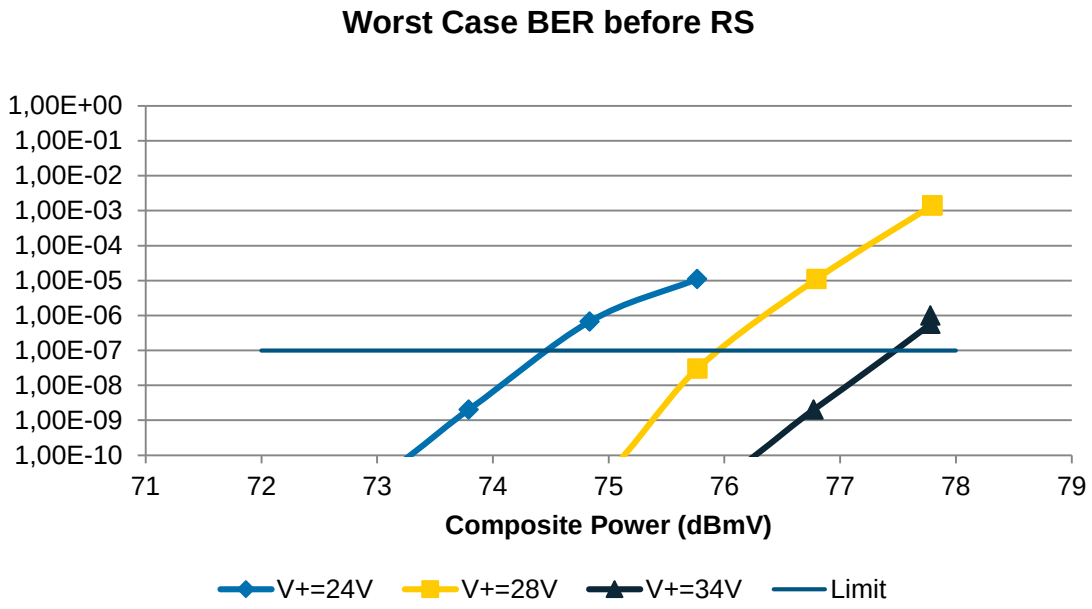
Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Distortion Data 40MHz to 550MHz. Test conditions unless otherwise noted: V+ = 34V; TMB = 35°C; ZS = ZL = 75Ω					
CTB		-80	-73	dBc	VO = 63 dBmV at 1218MHz, 22dB extrapolated tilt, 79 analog channels plus 111 digital channels (-6dB offset)[2][3]
XMOD		-75	-68	dBc	
CSO		-80	-74	dBc	
CIN		58	55	dB	

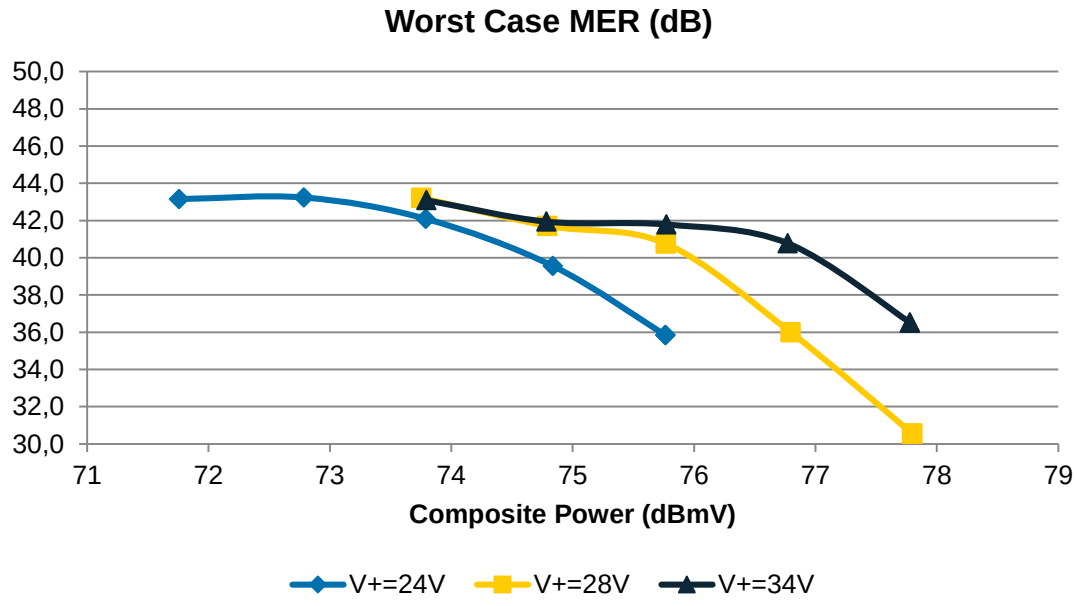
1. The slope is defined as the difference between the gain at the start frequency and the gain at the stop frequency.
2. 79 analog channels, NTSC frequency raster: 55.25MHz to 547.25MHz, +41 dBmV to +50.4 dBmV tilted output level, plus 111 digital channels, -6dB offset relative to the equivalent analog carrier.
3. 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 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).

Power Supply Adjustment

The RFPD3580 can be operated at a power supply voltage V+ between 24V and 34V to provide maximum required linearity performance at minimum power consumption. Maximum output capability can be adjusted between 73.8dBmV composite power (= 58dBmV actual level at fmax equivalent to 64dBmV virtual level) at V+ = 24V and 76.8dBmV composite power (= 61dBmV actual level at fmax equivalent to 67dBmV virtual level) at V+ = 34V under a pure digital loading (190 channels QAM256) with 22dB tilt.

Test Condition: T_{MB} = 35°C; $Z_S = Z_L$ = 75Ω, 22dB tilt, 190 digital channels (QAM256 ITU-T J.83 Annex B)

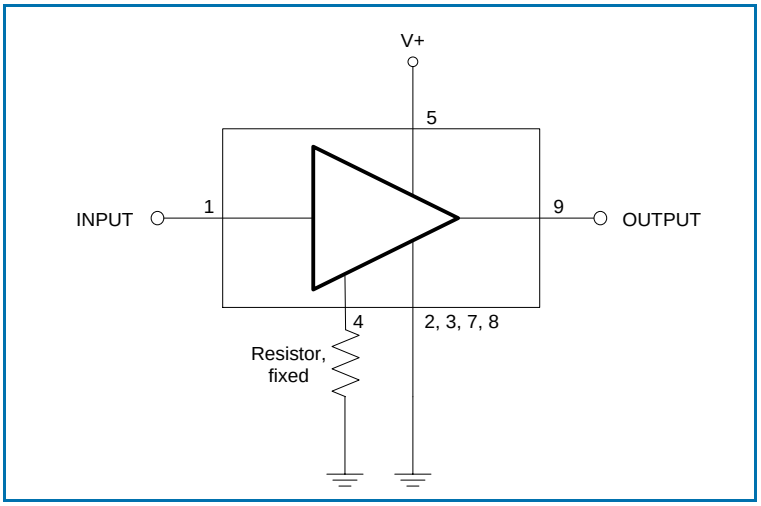


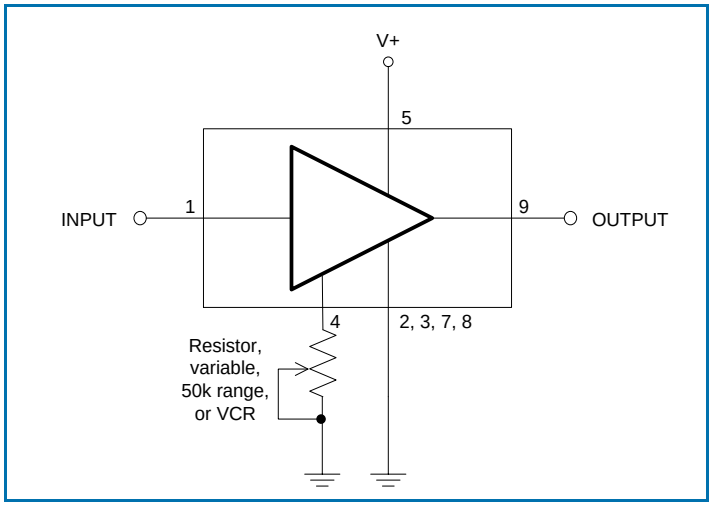


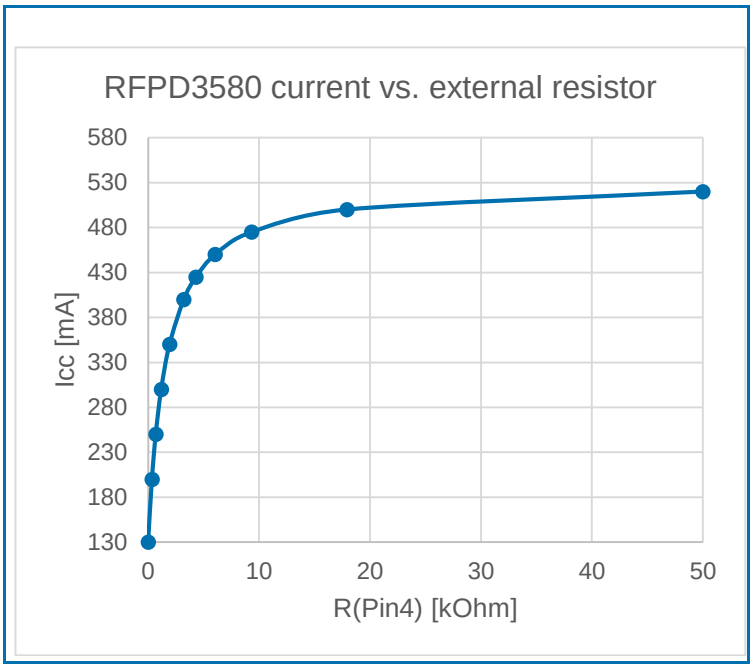
Current Adjustment Using Hybrid Pin 4

The RFPD3580 can be operated over a wide range of current to provide maximum required performance with minimum current consumption. A single external resistor connected between pin 4 and GND allows variation of current between 530mA and 130mA (typ.). Within the recommended range of current between 530mA and 430mA gain (S21) change is less than 0.2dB and noise figure change is less than 0.1dB. If pin 4 is not connected the device operates at maximum current, see table below.

Examples of connecting pin 4:





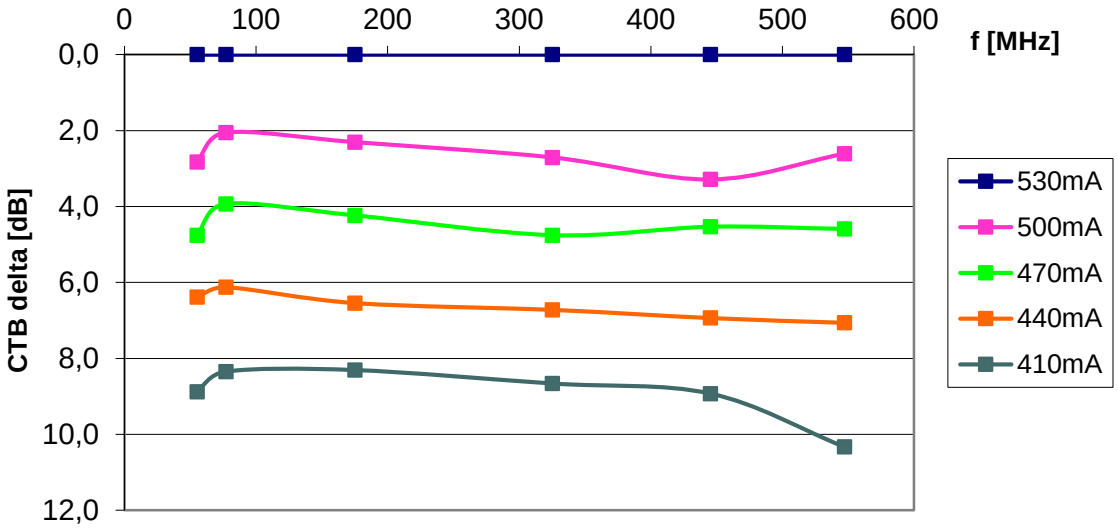


Device current [mA], typical	External resistor [Ω]
530	Open
520	50k
500	18k
475	9k3
425	4k3
400	3k9
350	1k9
250	700
130	0 (short)
	V+ = 34V; T_{MB} = 35°C; $Z_S = Z_L$ = 75Ω

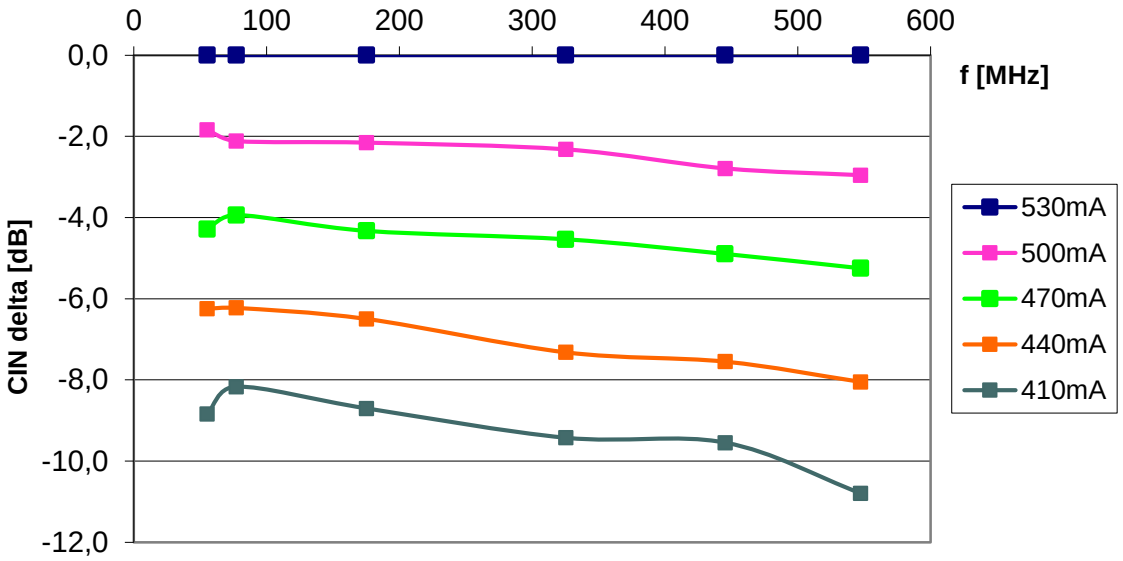
Change of Distortion Performance Over Current

Test Condition: V+=34V, T_{MB} = 35°C; $Z_S = Z_L$ = 75Ω ,V_O = 63.0dBmV at 1215MHz, 22dB extrapolated tilt, 79 analog channels plus 111 digital channels (-6dB offset)

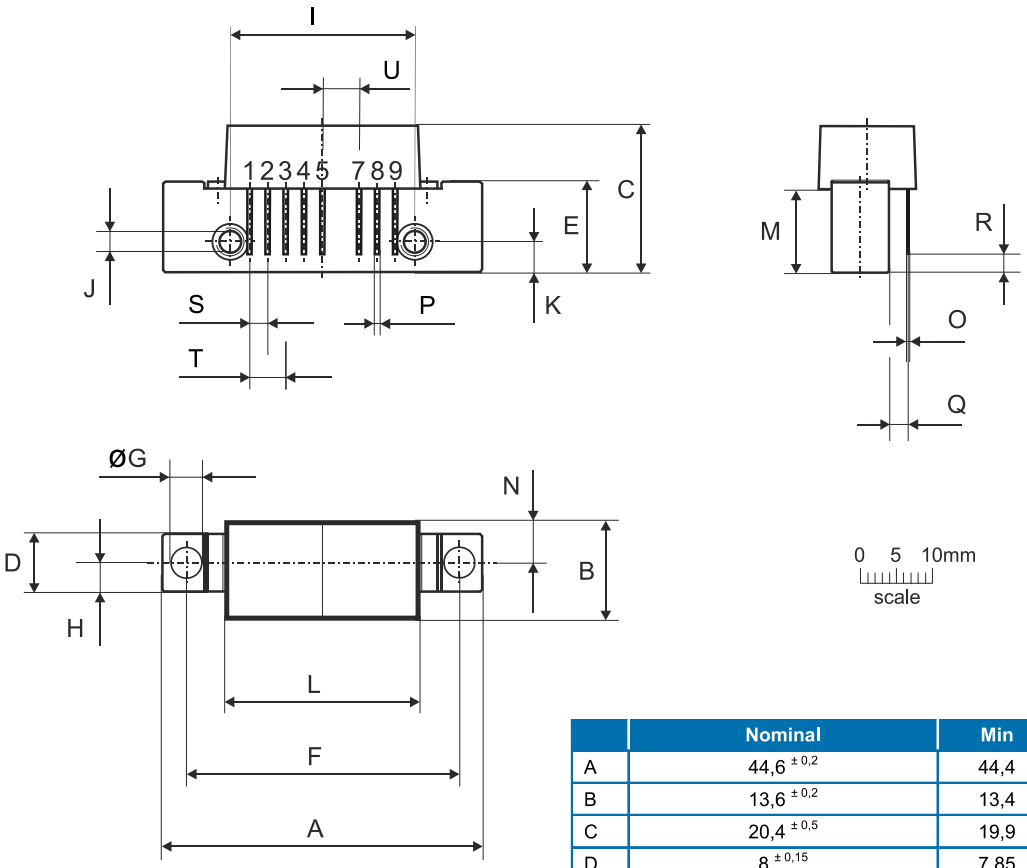
CTB change over device current, typical values



CIN change over device current, typical values



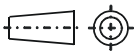
Package Drawing (Dimensions in millimeters)



	Nominal	Min	Max
A	44,6 ± 0,2	44,4	44,8
B	13,6 ± 0,2	13,4	13,8
C	20,4 ± 0,5	19,9	20,9
D	8 ± 0,15	7,85	8,15
E	12,6 ± 0,15	12,45	12,75
F	38,1 ± 0,2	37,9	38,3
G	4 +0,2 / -0,05	3,95	4,2
H	4 ± 0,2	3,8	4,2
I	25,4 ± 0,2	25,2	25,6
J	UNC 6-32	-	-
K	4,2 ± 0,2	4,0	4,4
L	27,2 ± 0,2	27,0	27,4
M	11,6 ± 0,5	11,1	12,1
N	5,8 ± 0,4	5,4	6,2
O	0,25 ± 0,02	0,23	0,27
P	0,45 ± 0,03	0,42	0,48
Q	2,54 ± 0,3	2,24	2,84
R	2,54 ± 0,5	2,04	3,04
S	2,54 ± 0,25	2,29	2,79
T	5,08 ± 0,25	4,83	5,33
U	5,08 ± 0,25	4,83	5,33

Notes:

European Projection



Pinning:

Pin	Name
1	Input
2-3	GND
4	CURRENT SETTING
5	V+
6	
7-8	GND
9	Output