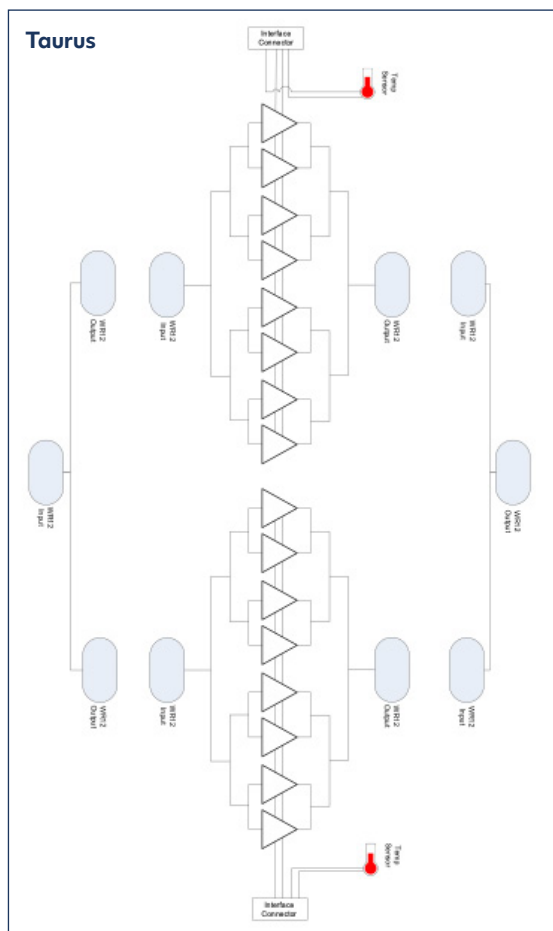


Features

- 81-86GHz High Power Amplifier
- High linearity supports 256QAM modulation
- Full 5GHz bandwidth
- Saturated powers up to $>+39\text{dBm}$
- $>20\text{dB}$ gain
- Suitable for commercial or military applications

E-Band Amplifier Block Diagram



Description

Filtronic's range of Cerus & Taurus amplifiers provide market leading linear mmW power. Available in single to N-way configurations, the Cerus power amplifiers deliver unparalleled performance for long range E-Band communications.

Taurus amplifiers efficiently combine the power of two Cerus amplifiers, almost doubling the available output power.

Each Taurus module contains two Cerus 8 E-Band amplifier modules which each contain 8x Filtronic GaAs pHEMT PA MMICs performance matched and power combined in waveguide to deliver maximum power.

An integrated temperature sensor provides users with accurate amplifier temperature data, and optional control circuitry facilitates functions including mute control and alarms.

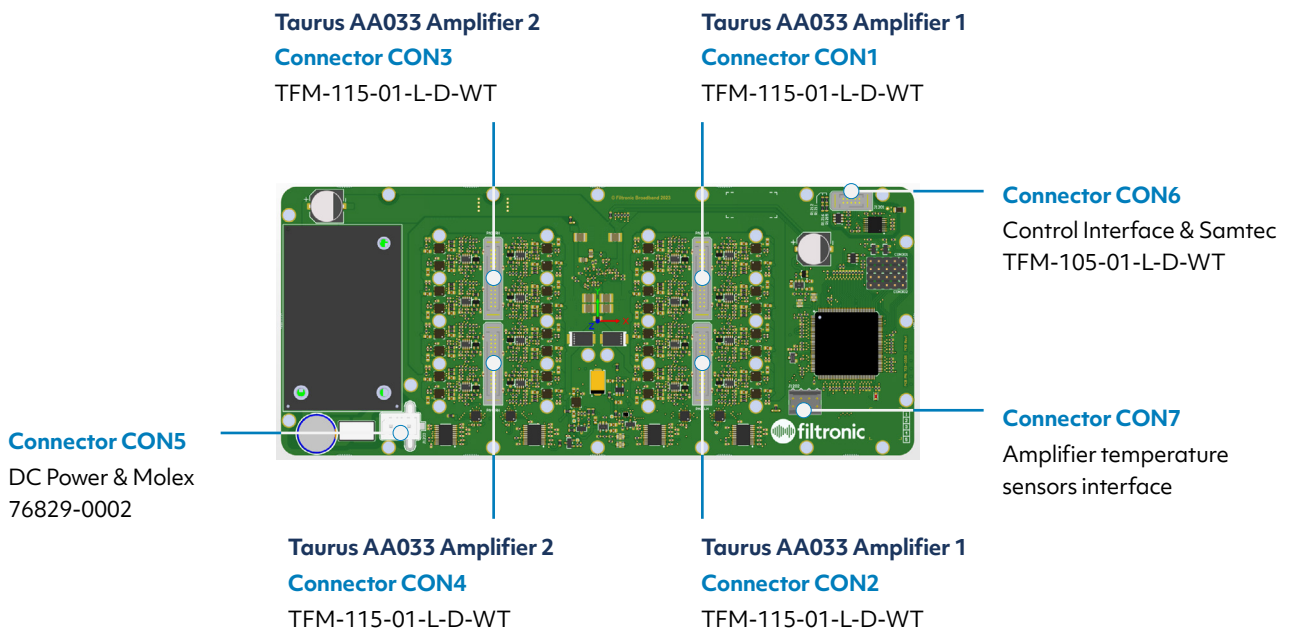
- Proven system performance
 - Demonstrated in systems supporting 256QAM
- Field proven technology
 - $>80,000$ Filtronic millimetre wave transceivers deployed worldwide.

AA033 Outline Specification

Over baseplate operating temperature -40 to +60C
All RF parameters referenced to waveguide output port.

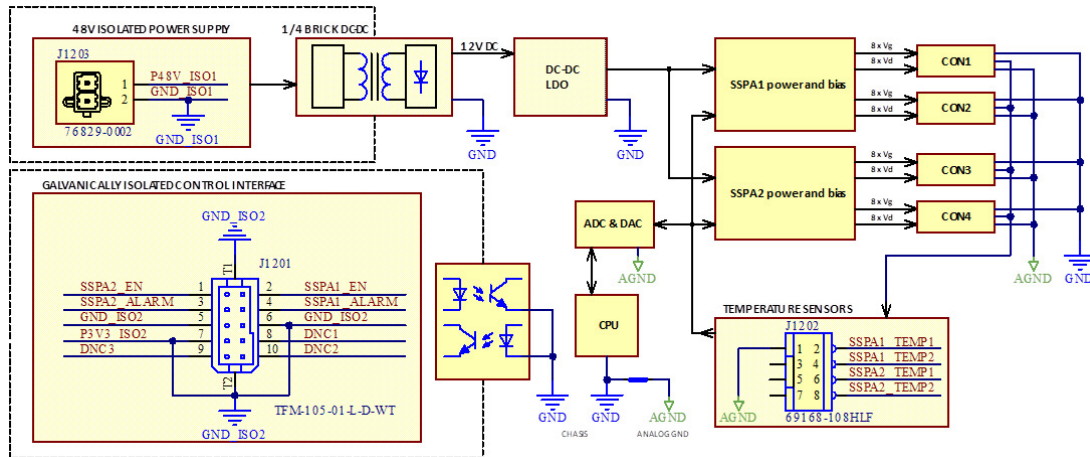
Parameter	Min	Typ.	Max	Units
Tx Frequency	81		86	GHz
Bandwidth			5.0	GHz
Small Signal Gain		21		dB
P SAT		+38		dBm
OIP3 @ +33dBm		42		dBm
Absolute maximum RF input power			+26	dBm
Supply voltage 1	34	48	72	V
Supply current 1		2	2.2	A
Size		111 x 81 x 40		mm
Weight		600		g
Interface	Waveguide input & output: WR12 DC connectors TFM-115-01-L-D-WT (without CTRL board)			

726-0883-V1 Dual Taurus Control Board & Cable Looms



Note: Supplied with 4x Samtec SFSDT-15-28-G-08.00-DR-NDX cable looms for connection from Con 1 to 4 to two AA033 amplifiers.

726-0883-V1 Control Board Block Diagram



Connector CON5 pin-out

48V DC power input. Fully isolated.

Pin NO.	Name	Type	Description
1	48V	Power input	48V input supply
2	GND (Isolated)	Ground	Ground

Connector CON6 pin-out

Control interface.

Pin NO.	Name	Type	Description
1	Amplifier 1 Enable	Input	3V3 Enable High
2	Amplifier 2 Enable	Input	3V3 Enable High
3	Amplifier 1 Alarm	Output	Active high alarm output with 3.3V voltage level. Alarm activates if the HPA temperature exceeds 75°C (±5°C) or internal fault is detected.
4	Amplifier 2 Alarm	Output	Active high alarm output with 3.3V voltage level. Alarm activates if the HPA temperature exceeds 75°C (±5°C) or internal fault is detected.
5	GND	Ground	Ground
6	GND	Ground	Ground
7	P3V3	Input	3V3 DC input
8	Spare	Spare	Do not connect
9	ID0	Output	State bits (3V3 CMOS logic) 00 = Fault 11 = Operational

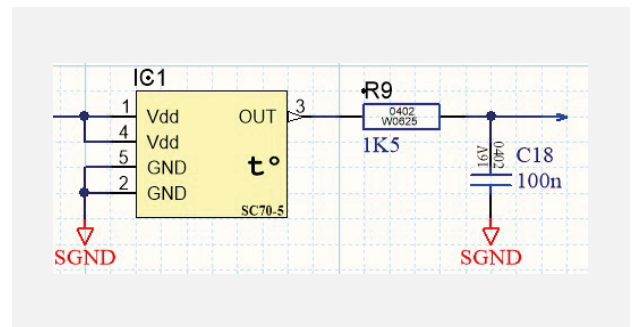
Connector CON7 pin-out

Amplifier temperature sensors interface.

Pin NO.	Name	Type	Description
1	GND	Ground	Ground
2	Amplifier 1A Temp	Output	Amplifier 1A Temperature sensor output
3	Spare	Spare	Do not connect
4	Amplifier 1B Temp	Output	Amplifier 1B Temperature sensor output
5	Spare	Spare	Do not connect
6	Amplifier 2A Temp	Output	Amplifier 2A Temperature sensor output
7	Spare	Spare	Do not connect
8	Amplifier 2B Temp	Output	Amplifier 2B Temperature sensor output

AA033 Temperature sensor

The HPA assembly contains a temperature sensor with analogue output. There is a low pass filter at the output. When measuring the output voltage make sure that the input impedance of the meter is high enough to avoid measurement errors.



Temperature sensor transfer function

The transfer function of the temperature sensor can be approximated with the following polynomial, where x is the measured voltage in mV and T is the temperature in °C.

$$T = a_0 + a_1 * x + a_2 * x^2$$

$$a_0 = 181.765094640206$$

$$a_1 = 0.10716443871271$$

$$a_2 = 5.62383764920053e-06$$

The maximum absolute approximation error in the temperature range -45 to +90° is ±0.23°C.

Typical accuracy of the temperature sensor in the range -50°C to 0C is ±0.25°C

Typical accuracy of the temperature sensor in the range 0°C to 90C is ±0.7°C

Maximum temperature error in the range -50°C to 75C is ±2.0°C

If the temperature exceeds 75±2° the alarm output will become active. There is no over temperature protection and the unit will still continue to operate. It is up to the end user to make sure the amplifier does not exceed its absolute maximum ratings.

The look-up table shown below provides the temperature versus the voltage of **TEMP_SENSOR** line.

Temperature sensor transfer table

Temp (°C)	Vout (mV)	Temp (°C)	Vout (mV)	Temp (°C)	Vout (mV)	Temp (°C)	Vout (mV)	Temp (°C)	Vout (mV)
[°C]	[mV]	[°C]	[mV]	[°C]	[mV]	[°C]	[mV]	[°C]	[mV]
-50	1955	-20	1727	10	1486	40	1242	70	991
-49	1949	-19	1719	11	1478	41	1234	71	983
-48	1942	-18	1711	12	1470	42	1225	72	974
-47	1935	-17	1703	13	1462	43	1217	73	966
-46	1928	-16	1695	14	1454	44	1209	74	957
-45	1921	-15	1687	15	1446	45	1201	75	949
-44	1915	-14	1679	16	1438	46	1192	76	941
-43	1908	-13	1671	17	1430	47	1184	77	932
-42	1900	-12	1663	18	1421	48	1176	78	924
-41	1892	-11	1656	19	1413	49	1167	79	915
-40	1885	-10	1648	20	1405	50	1159	80	907
-39	1877	-9	1639	21	1397	51	1151	81	898
-38	1869	-8	1631	22	1389	52	1143	82	890
-37	1861	-7	1623	23	1381	53	1134	83	881
-36	1853	-6	1615	24	1373	54	1126	84	873
-35	1845	-5	1607	25	1365	55	1118	85	865
-34	1838	-4	1599	26	1356	56	1109	86	856
-33	1830	-3	1591	27	1348	57	1101	87	848
-32	1822	-2	1583	28	1340	58	1093	88	839
-31	1814	-1	1575	29	1332	59	1084	89	831
-30	1806	0	1567	30	1324	60	1076	90	822
-29	1798	1	1559	31	1316	61	1067	91	814
-28	1790	2	1551	32	1308	62	1059	92	805
-27	1783	3	1543	33	1299	63	1051	93	797
-26	1775	4	1535	34	1291	64	1042	94	788
-25	1767	5	1527	35	1283	65	1034	95	779
-24	1759	6	1519	36	1275	66	1025	96	771
-23	1751	7	1511	37	1267	67	1017	97	762
-22	1743	8	1502	38	1258	68	1008	98	754
-21	1735	9	1494	39	1250	69	1000	99	745

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