

# HIGH POWER TRAVELING WAVE TUBE FOR GROUND TERMINALS LD7202 SERIES

14 GHz, 600 W CW, PPM FOCUSING, HIGH POWER GAIN

## GENERAL DESCRIPTION

NEC LD7202 series of PPM-focused traveling wave tubes are designed for use as final amplifiers tube in the earth-to-satellite communications transmitter.

These are capable of delivering an output power of 600W over the range of 12.75 to 14.5 GHz and provide a high power gain of 52 dB at 600 W output power.

Furthermore, they are of rugged and reliable design offering long-life service.

The LD7202 is fully compatible with TH3591B.



## FEATURES

- High Power Gain  
The power gain is typically 52 dB at 600 W level.
- Simple Cooling System  
The tubes are forced-air-cooled, so that the cooling systems are greatly simplified.
- PPM Focusing  
All the tubes are PPM (Periodic Permanent Magnet)-focused, eliminating entirely the focusing power supplies and interlock circuits.
- Rugged Construction  
The tubes are designed to be rugged, therefore they are suitable for transportable systems.
- Long Life and High Stability  
The tubes employ an advanced impregnated cathode with a low operating temperature for long life.
- Microdischarge Free  
The tubes are carefully designed to be free from microdischarge in the electron gun for long term operation, therefore they are suitable for use in digital communication service.

**For safe use of microwave tubes, refer to NEC document "Safety instructions to all personnel handling electron tubes" (ET0048EJ\*V\*UM00)**

The information in this document is subject to change without notice.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**

Frequency	
LD7202, LD7202A, LD7202B .....	14.0 to 14.5 GHz
LD7202L .....	13.75 to 14.5 GHz
LD7202W .....	12.75 to 13.25 GHz, 13.75 to 14.5 GHz
Output Power .....	600 W
Heater Voltage .....	6.3 V
Heater Current .....	1.4 A
Type of Cathode .....	Indirectly heated, Impregnated
Cathode Warm-up Time .....	300 s

**MECHANICAL**

Dimensions .....	See Outline
Weight .....	6.0 kg approx.
Focusing .....	Periodic Permanent Magnet
Mounting Position .....	Any
Electrical Connections .....	See Outline Drawing
RF Connections	
Input .....	SMA-Female
Output .....	Mates with UBR-120 Flange
Thermal Switch Connections .....	See Outline Drawing
Cooling .....	Forced Air

**ABSOLUTE RATINGS (Note 2, 3 and 4)**

**ELECTRICAL**

	Min.	Max.	Unit
Heater Voltage .....	5.5	6.5	V
Heater Surge Current .....	-	4.5	A
Heater Current .....	-	3	A
Heater Warm-up Time .....	300	-	s
Collector Voltage* .....	4.75	6.2	kV
Collector Current .....	-	425	mA
Helix Voltage .....	10.25	10.75	kV
Helix Current .....	-	12	mA
Anode Voltage .....	5.5	6.5	kV
Anode Current .....	-	0.5	mA
Collector Dissipation .....	-	2.4	kW
RF Drive Power .....	-	20	mW
Output Power .....	-	670	W
Load VSWR** .....	-	1.15:1	

\* The voltage between a helix and a collector must not exceed 8 kV.

\*\* Load VSWR must be met as follows.

In Band .....	1.15 : 1 max.
13.5 to 15.0 GHz .....	1.5 : 1 max. (LD7202, LD7202A, LD7202B)
13.25 to 15.0 GHz .....	1.5 : 1 max. (LD7202L)
12.25 to 15.0 GHz .....	1.5 : 1 max. (LD7202W)
15.0 to 16.0 GHz .....	1.8 : 1 max.
16.0 to 17.0 GHz .....	2.2 : 1 max.

**MECHANICAL**

	Min.	Max.	Unit
Air Flow of Collector .....	252	-	kg/hr
Ambient Temperature (Operation) .....	-10	+50	°C
Storage Temperature .....	-40	+80	°C

**TYPICAL OPERATION (Note 4 and 5)**

		Unit
Frequency		
LD7202/A/B .....	14.0 to14.5	GHz
LD7202L .....	13.75 to14.5	GHz
LD7202W .....	12.75 to13.25, 13.75 to14.5	GHz
Output Power .....	600	W
Heater Voltage (Note 5) .....	6.3	V
Heater Current .....	1.4	A
Helix Voltage .....	10.5	kV
Helix Current .....	3	mA
Collector Voltage .....	5.4	kV
Collector Current .....	360	mA
Anode Voltage .....	5.9	kV
Anode Current .....	0.1	mA
Power Gain		
at 70 W .....	58	dB
at 600 W .....	52	dB
Gain Variation (at Po=70 W)		
LD7202/A/B .....	2	dB/500MHz
LD7202L .....	2.4	dB/750MHz
LD7202W (12.75 to 13.25 GHz) .....	2	dB/500MHz
(13.75 to 14.5 GHz) .....	2.4	dB/750MHz
Gain Slope .....	0.01	dB/MHz
AM-PM Conversion		
at 70 W .....	1.5	deg./dB
at 600 W .....	5	deg./dB
3rd Order Intermodulation .....	-28	dBc
(two equal carriers, 70 W total)		
Cooling Air Flow .....	252	kg/hr
Pressure Drop .....	588	Pa

Note 1 : Absolute rating should not be exceeded under continuous or transient conditions. A single absolute rating may be the limitation and simultaneous operation at more than one absolute rating may not be possible.

Note 2 : The tube helix is at the ground potential in operation.

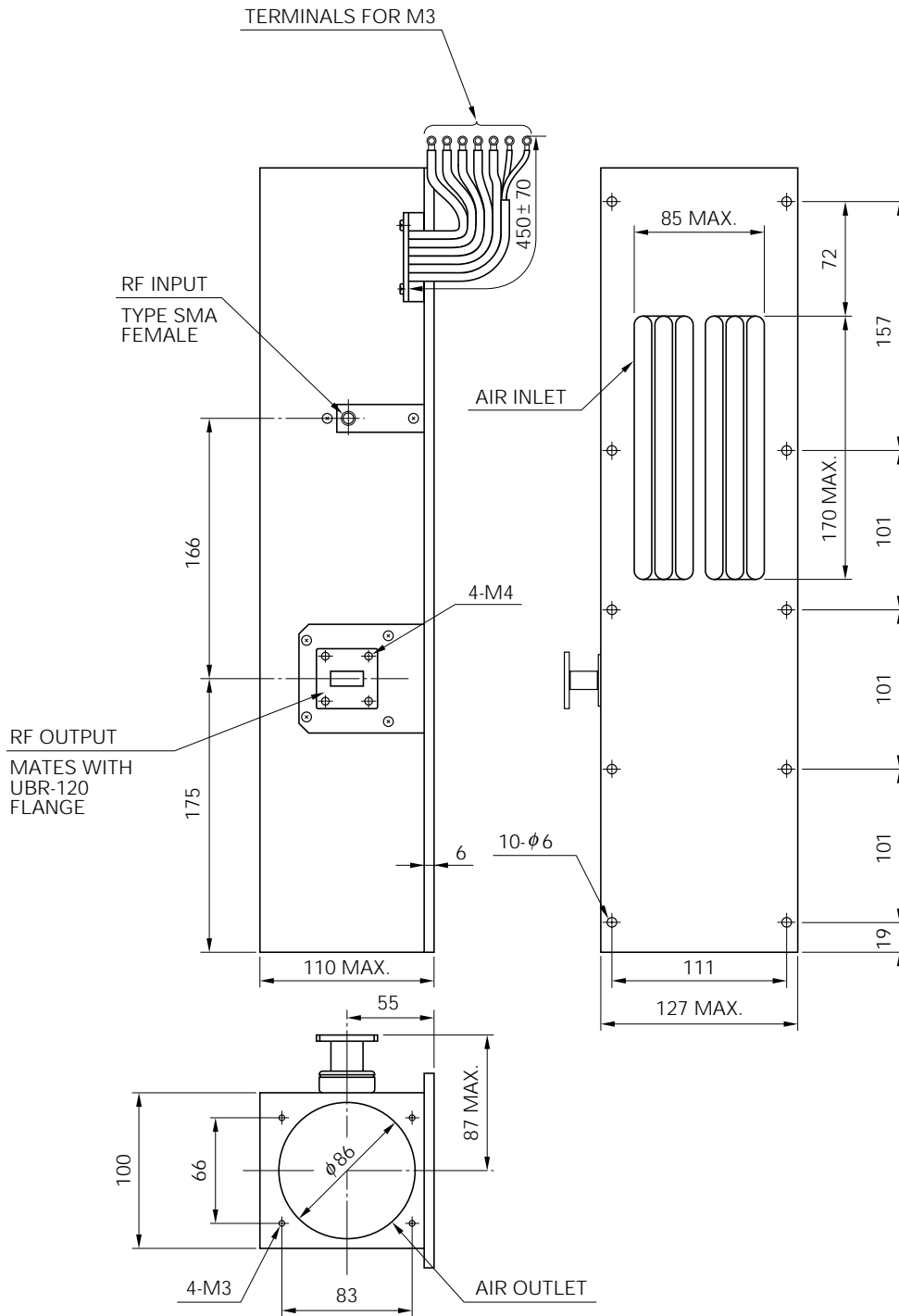
Note 3 : All voltages except heater voltage are referred to the cathode potential except the heater voltage.

Note 4 : The optimum operating parameters are shown on a test performance sheet for each tube.

Note 5 : These characteristics and operating values may be changed as a result of additional information or product improvement. NEC should be consulted before using this information for equipment design.

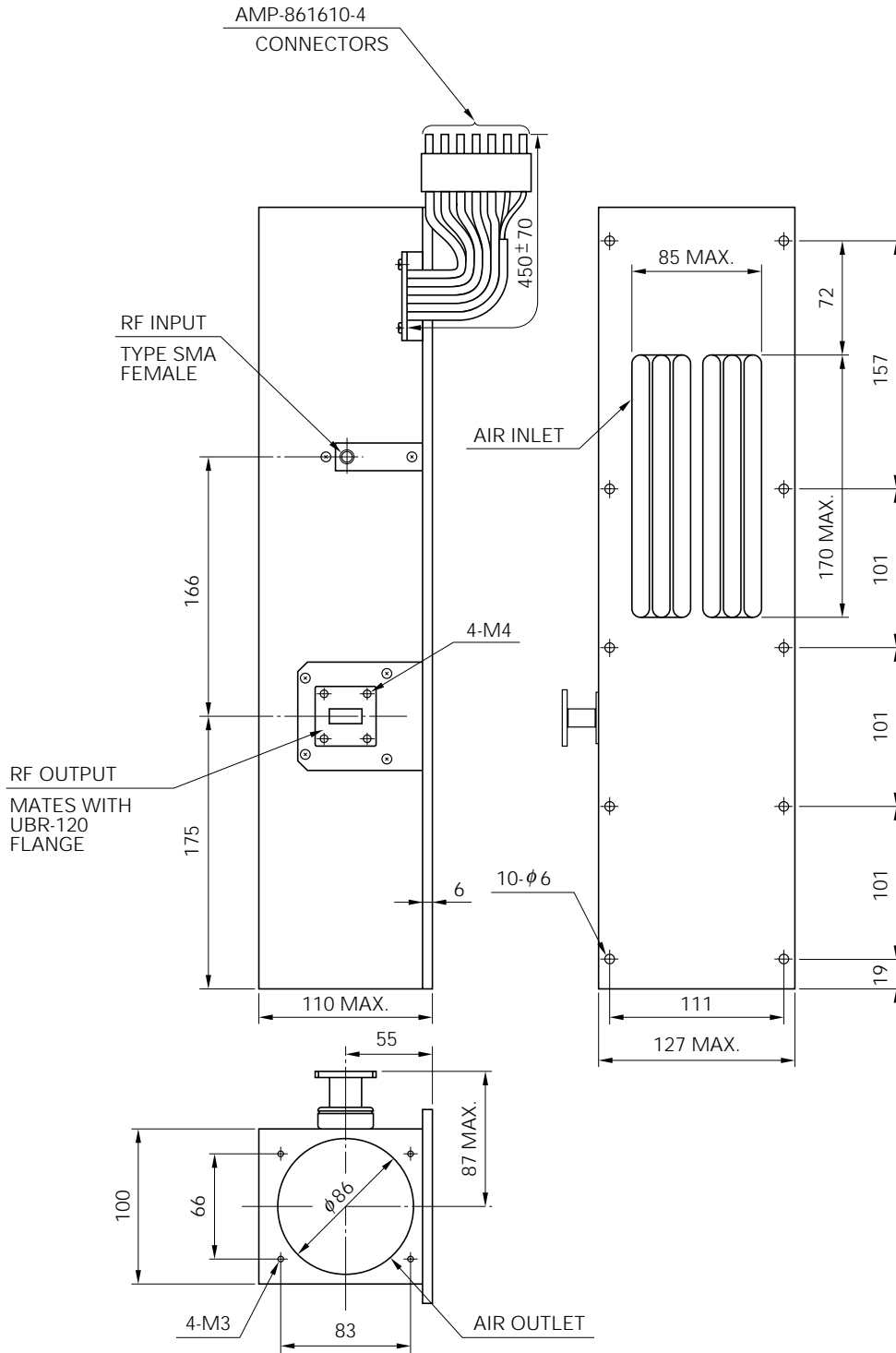
This data sheet should not be referred to a contractual specification.

LD7202, LD7202L, LD7202W OUTLINE DRAWING (Unit in mm)



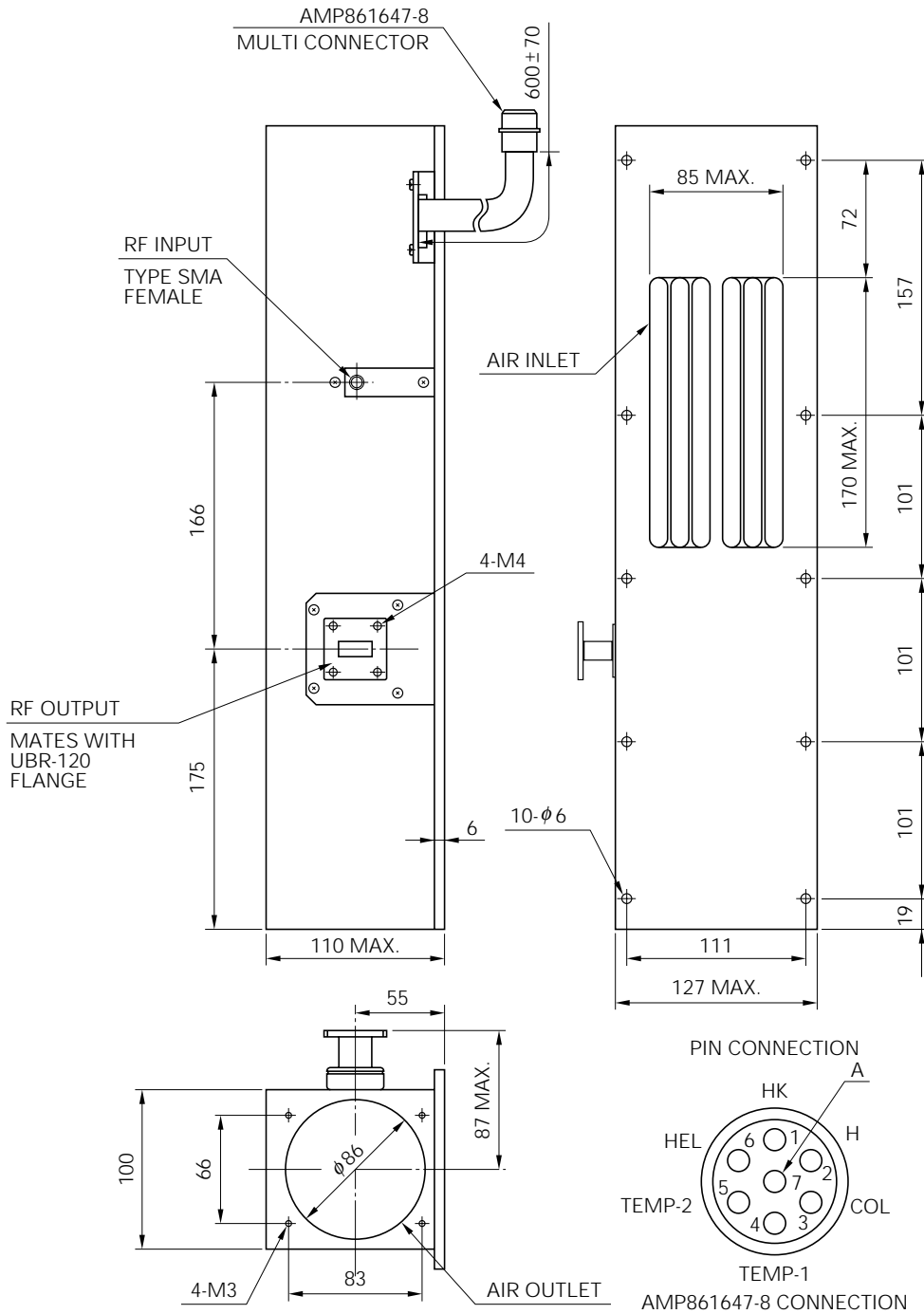
Note. The thermal switch contacts are normally closed.

LD7202A OUTLINE DRAWING (Unit in mm)



Note. The thermal switch contacts are normally closed.

LD7202B OUTLINE DRAWING (Unit in mm)



Note. The thermal switch contacts are normally closed.

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