

# HIGH POWER TRAVELING WAVE TUBE FOR GROUND TERMINALS LD7249 SERIES

14 GHz, 350 W/400 W CW, CONDUCTION COOLING, HIGH POWER GAIN

## GENERAL DESCRIPTION

NEC LD7249 series of PPM-focused traveling wave tube are designed for use as final amplifiers in the earth-to-satellite communications transmitter.

Two models of the LD7249 series are capable of delivering an output power of 350 W and 400 W over the range of 13.75 to 14.5 GHz and provide a high power gain of more than 47 dB at the rated output power level.

Furthermore, this is of rugged and reliable design offering long-life service.



## FEATURES

- High Power Gain  
The power gain is typically 54 dB at the rated output power level.
- Simple Cooling System  
The tube is conduction-cooled so that the cooling system is greatly simplified.
- PPM Focusing  
The tube is PPM (Periodic Permanent Magnet) -focused, eliminating entirely the focusing power supplies and interlock circuits.
- Rugged Construction  
The tube is designed to be rugged, therefore it is suitable for transportable systems.
- Long Life and High Stability  
The tube employs an advanced impregnated cathode with a low operating temperature for long life.
- Microdischarge Free  
The tube is carefully designed to be free from microdischarge in the electron gun for long term operation, therefore it is suitable for 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 .....	13.75 to 14.5 GHz
Output Power	
LD7249 .....	350 W
LD7249U .....	400 W
Heater Voltage .....	6.3 V
Heater Current .....	1.2 A
Type of Cathode .....	Indirectly heated, Impregnated
Cathode Warm-up Time .....	180 s

**MECHANICAL**

Dimensions .....	See outline
Weight .....	4 kg approx.
Focusing .....	Periodic Permanent Magnet
Mounting Position .....	Any
Electrical Connections .....	Flying Leads
Heater, Heater-Cathode, Helix, Collector-1, Collector-2 and Thermal Protection	(Optionally, the HV lead out let position can be changeable)
RF Connections	
Input .....	Type SMA Female
Output .....	Mates with UBR-120 Flange, Waveguide : WR-75
Cooling .....	Conduction

**ABSOLUTE RATINGS (Note 1, 2 and 3)**

**ELECTRICAL**

	min.	max.	Unit
Heater Voltage .....	6.0	6.6	V
Heater Surge Current .....	-	3.0	A
Heater Current .....	1.0	2.0	A
Heater Warm-up Time .....	180	-	s
Helix Voltage .....	8.0	9.2	kV
Helix Current .....	0	10	mA
Collector-1 Voltage .....	4.0	4.6	kV
Collector-1 Current .....	-	180	mA
Collector-2 Voltage .....	2.3	3.1	kV
Collector-2 Current .....	-	290	mA
Cathode Current .....	200	290	mA
RF Drive Power .....	-	5	mW
Load VSWR .....	-	1.5 : 1	

**MECHANICAL**

	Min.	Max.	Unit
Heat Sink Temperature .....	-40	+115	°C

**ENVIRONMENTAL**

	Min.	Max.	Unit
Ambient Temperature			
Storage .....	-50	+90	°C
Operating .....	-40	+100	°C

**TYPICAL OPERATION (Note 2, 3 and 5)**

	LD7249	LD7249U	Unit
Frequency .....	14.25	14.25	GHz
Output Power .....	350	400	W
Heater Voltage (Note 4) .....	6.3	6.3	V
Heater Current .....	1.2	1.2	A
Helix Voltage .....	8.6	8.8	kV
Helix Current .....	1.5	2.4	mA
Collector-1 Voltage .....	4.3	4.4	kV
Collector-1 Current .....	141	147	mA
Collector-2 Voltage .....	2.7	2.8	kV
Collector-2 Current .....	94	100	mA
Cathode Current .....	237	250	mA
Power Gain			
at 20 W .....	62	58	dB
at 350 W .....	58	54	dB
Gain Variation			
at 20 W .....	0.86	1.02	dB/750MHz
Gain Slope			
at 40 W .....	0.006	0.006	dB/MHz
AM-PM Conversion			
Less than 100 W .....	0.3	0.3	deg./dB
at 350 W .....	2.5	2.5	deg./dB
3rd Order Intermodulation .....	-23	-24	dBc
(two equal carriers, 100 W total)			

**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.

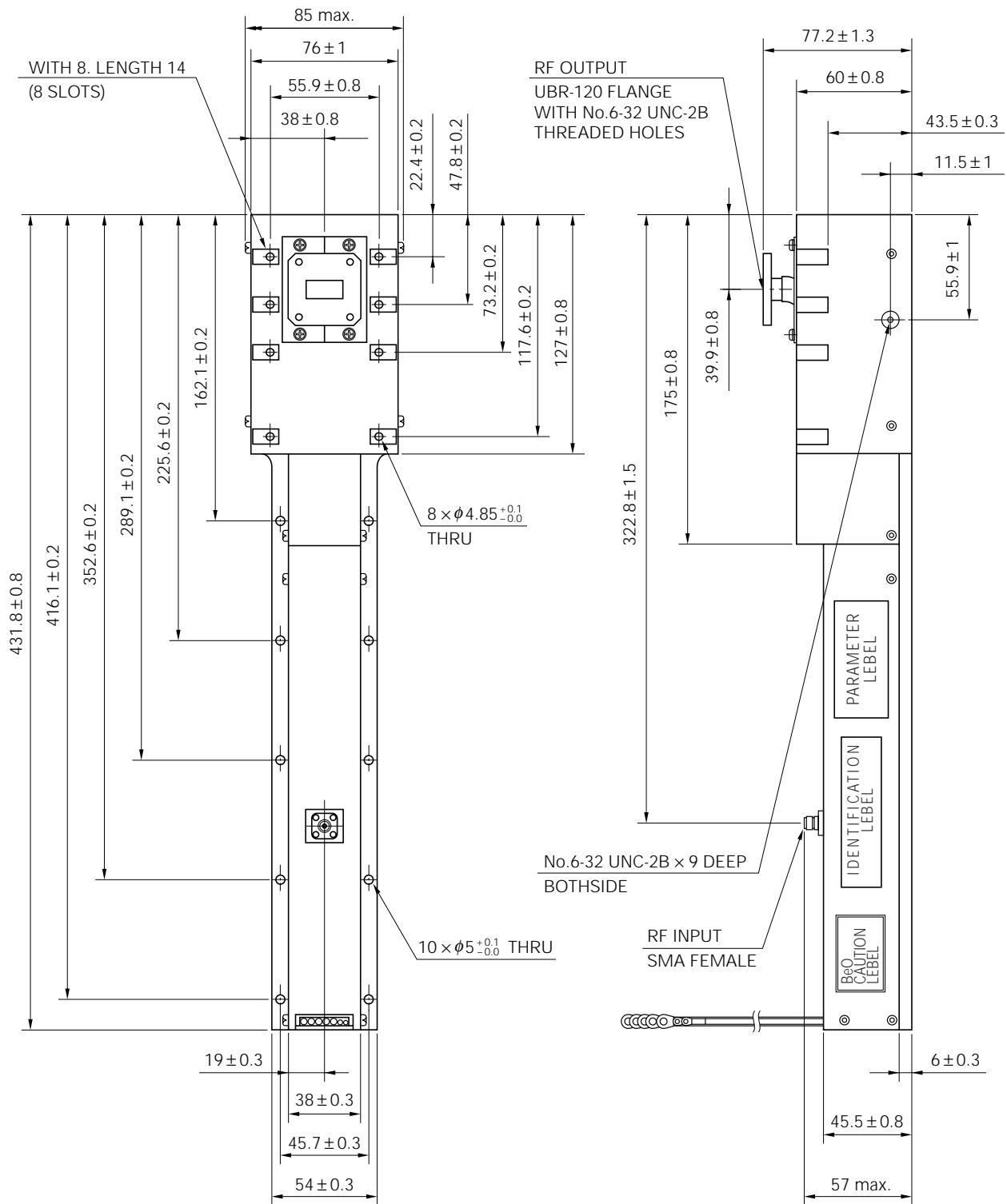
**Note 2 :** The tube body is at ground potential in operation.

**Note 3 :** All voltages 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.

LD7249 OUTLINE (Unit in mm)



LEAD COLOR	LEAD CONECTIONS	LENGTH
BROWN	HEATER	650 mm
YELLOW	HEATER-CATHODE	650 mm
RED	COLLECTOR-1	650 mm
BLUE	COLLECTOR-2	650 mm
BLACK	HILIX (GROUND)	650 mm
BLUE (SLIM CABLE)	THERMAL SWITCH-1	650 mm
GREEN (SLIM CABLE)	THERMAL SWITCH-2	650 mm



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Anti-radioactive design is not implemented in this product.