

# HIGH POWER TRAVELING WAVE TUBE FOR GROUND TERMINALS LD7213, LD7213L

**14 GHz, 300 W CW, CONDUCTION COOLING,  
HIGH POWER GAIN, FLAT GAIN VARIATION**

### GENERAL DESCRIPTION

The NEC LD7213 and LD7213L are PPM-focused traveling wave-tubes designed for use as final amplifiers in the earth-to-satellite communications transmitter.

These are capable of delivering an output power of 300 W over the range of 14.0 to 14.5 GHz and 13.75 to 14.5 GHz.

They provide a high power gain of 55 dB at 300 W output, and flat gain variation of 1.5 dB at any power level. LD7213 is fully compatible with TH3759K.



### FEATURES

- High Power Gain  
The power gain is typically 58 dB at small signal level and 55 dB at 300 W level.
- Simple Cooling System  
The tubes are conduction-cooled, so that the cooling systems are greatly simplified.
- PPM (Periodic Permanent Magnet) Focusing  
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 advanced impregnated cathodes 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 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 .....	LD7213 : 14.0 to 14.5 GHz
	LD7213L : 13.75 to 14.5 GHz
Cathode .....	Indirectly heated, Impregnated
Heater Voltage .....	6.1 V
Heater Current .....	1.05 A

**MECHANICAL**

Dimensions .....	See Outline
Focusing .....	Periodic Permanent Magnet
Electrical Connections .....	AMP861647-8
RF Connections	
Input .....	SMA Female
Output .....	Mates with UBR-120 Flange
Mounting Position .....	Any
Weight .....	5 kg approx.
Cooling .....	Conduction

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

**ELECTRICAL**

	Min.	Max.	Unit
Heater Voltage .....	5.5	6.3	V
Heater Surge Current .....	-	2.5	A
Heater Current .....	-	1.6	A
Heater Warm-up Time .....	180	-	s
Collector Voltage .....	3.5	4.6	kVdc
Helix Voltage .....	8.2	9.0	kVdc
Cathode Current .....	-	260	mAdc
Helix Current .....	-	10	mAdc
Collector Dissipation .....	-	1.2	kW
Helix Dissipation .....	-	50	W
RF Drive Power .....	-	5	mW
Reflected Power .....	-	10	W
Load VSWR .....	-	2 : 1	

**MECHANICAL**

Ambient Temperature .....	-40	+95	°C
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**TYPICAL OPERATION (Note 2, 3 and 5)**

Frequency .....	LD7213 : 14.0 to 14.5 GHz	
	LD7213L : 13.75 to 14.5 GHz	
Output power .....	300	W
Heater Voltage (Note 4) .....	6.1	V
Heater Current .....	1.05	A
Helix Voltage .....	8.4	kV
Helix Current .....	3	mA
Collector Voltage .....	4	kV
Cathode Current .....	230	mA
Power Gain		
at 15 W .....	58	dB
at 300 W .....	55	dB
Gain Variation (at 15 W) .....	LD7213 : 1.5 dB/500 MHz	
	LD7213L : 1.5 dB/750 MHz	
Gain Slope (at 15 W) .....	0.01	dB/MHz
AM-PM Conversion		
at 15 W .....	0.7	°/dB
at 300 W .....	3	°/dB
3rd Order Intermodulation		
(two equal carriers, 20 W total) .....	-30	dBc

**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.

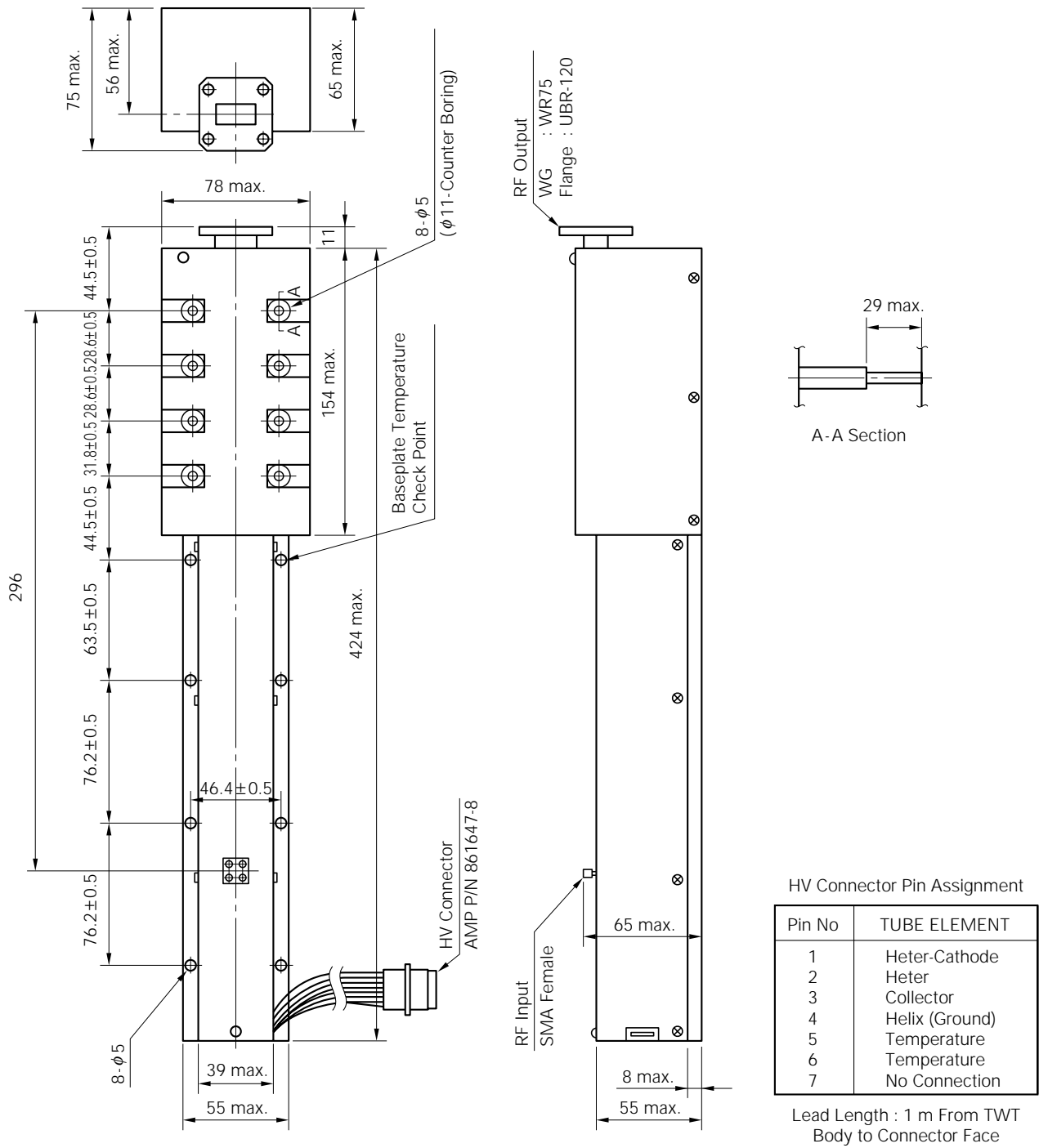
**Note 2 :** The tube body is at ground potential in operation.

**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.

LD7213, LD7213L OUTLINE (Unit in mm)



HV Connector Pin Assignment

Pin No	TUBE ELEMENT
1	Heter-Cathode
2	Heter
3	Collector
4	Helix (Ground)
5	Temperature
6	Temperature
7	No Connection

Lead Length : 1 m From TWT Body to Connector Face

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