NEC

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)

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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

TYPICAL OPERATION (Note 2, 3 and 5)

Frequency	LD7213 : 14.0 to 14.5 GHz	
	LD7213L : 13.75 to 14.5 GHz	
Outoput 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.

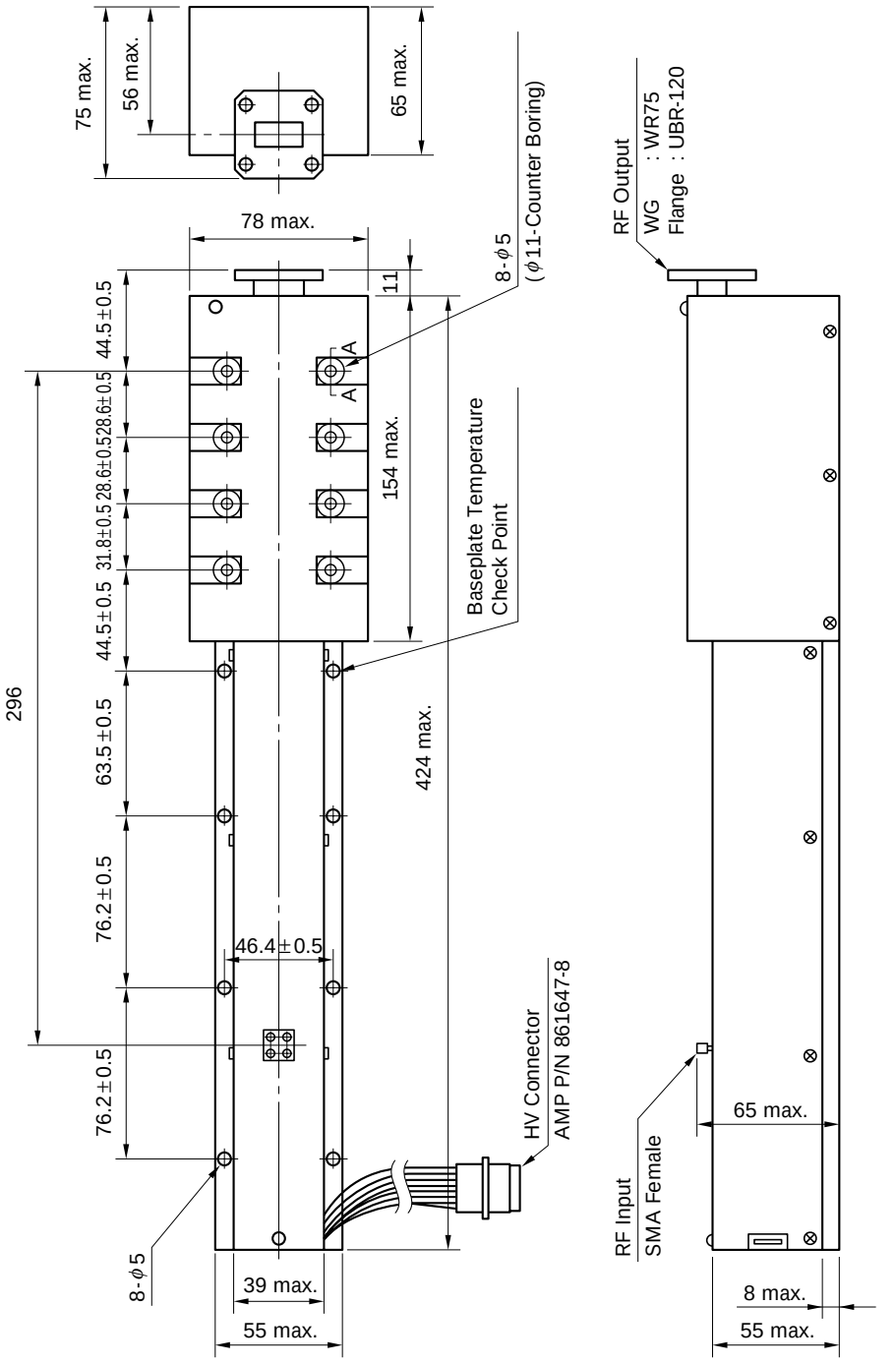
Note 2 : The tube body is at ground potential in operation.

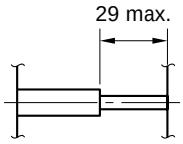
Note 3 : All voltages are referred to the cathode potential except the heater voltage.

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)





A-A Section

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