NEC

HIGH POWER TRAVELING WAVE TUBE FOR GROUND TERMINALS

LD7215, LD7215C, LD7215D

6 GHz, 3 kW, HELIX TYPE, PPM FOCUSING, HIGH POWER GAIN, FLAT GAIN VARIATION

GENERAL DESCRIPTION

The NEC LD7215, LD7215C and LD7215D are PPM-focused traveling wave tubes designed for use as the final amplifiers in the earth-to-satellite communications transmitter.

These are capable of delivering an output of 3 kW over the range of 5.85 to 6.425 GHz.

They provide a high power gain of 46 dB at an output power of 3 kW, and flat gain variation of 2.5 dB by LD7215, 1.0 dB by LD7215C and LD7215D at small signal level in the full frequency range.

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

Both LD7215 and LD7215D are fully compatible with TH3640.

FEATURES

- High Power Gain
  The power gain is typically 52 dB at small signal level and 46 dB at 3 kW level.
- Simple Cooling System
  All the tubes are forced-air-cooled, so that the cooling system is greatly simplified.
- PPM Focusing
  The tubes are PPM (Periodic Permanent Magnet) focused, and eliminate entirely the requirement for focusing power supplies and interlock circuits.
- Long Life and High Stability
  The tubes employ 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.

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GENERAL CHARACTERISTICS

ELECTRICAL

Frequency	5.85 to 6.425 GHz
Cathode	Indirectly heated, Impregnated
Heater Voltage	6.3 V
Heater Current	3.9 A

MECHANICAL

Dimensions	See Outline
Focusing	Periodic Permanent Magnet
Electrical Connections	Flying Leads (LD7215, LD7215D) AMP LGH 863023 Plug (LD7215C)
RF Connectors	
Input	Type SMA Female
Output	Mates with CPR 137 Flange
Mounting Position	Vertical (cathode down) or Horizontal
Weight	30 kg approx.
Cooling	Forced Air

ABSOLUTE RATINGS (Note 1, 2, 3 and 4)

ELECTRICAL

	Min.	Max.	
Heater Voltage	6.0	6.6	V
Heater Surge Current	–	8	A
Heater Current	3	5	A
HeaterWarm-up Time	300	–	s
Collector Voltage	8.0	9.5	kV
Helix Voltage	12.5	13.7	kV
Accelerating Anode Voltage	10.0	13.0	kV
Collector Current	–	1.5	A
Helix Current	–	30	mA
Accelerating Anode Current	–0.5	1.0	mA
Collector Dissipation	–	13.3	kW
Helix Dissipation	–	400	W
Reflected Power	–	100	W
Load VSWR	–	1.5:1	

MECHANICAL

Collector Temperature	–	300	°C
Cooling Air Temperature (Inlet)	–20	45	°C
Cooling Air Flow	720	–	kg/hr

TYPICAL OPERATION (Note 1, 3 and 4)

Frequency	6.175	GHz
Heater Voltage (Note 5)	6.3	V
Heater Current	3.9	A
Coilector Voltage	8.25	kV
Helix Voltage	13.5	kV
Accelerating Anode Voltage	11.5	kV
Collector Current	1.35	A
Helix Current	5	mA
Accelerating Anode Current	0.02	mA
Power Gain		
at Small Signal	52	dB
at 3 kW Output	46	dB
Gain Variation (at Small Signal)	2.5/1.0	dB (LD7215/LD7215C, LD7215D)
Gain Slope (at Small Signal)	0.02	dB/MHz
AM-PM Conversion		
at less than 500 W	2	°/dB
at 3 kW Output	3.5	°/dB
3rd Order Intermodulation	–27	dBc
(Two equal carriers, 250 W total)		
Cooling Air Flow	720	kg/hr
Air Pressure Drop	882.6	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.

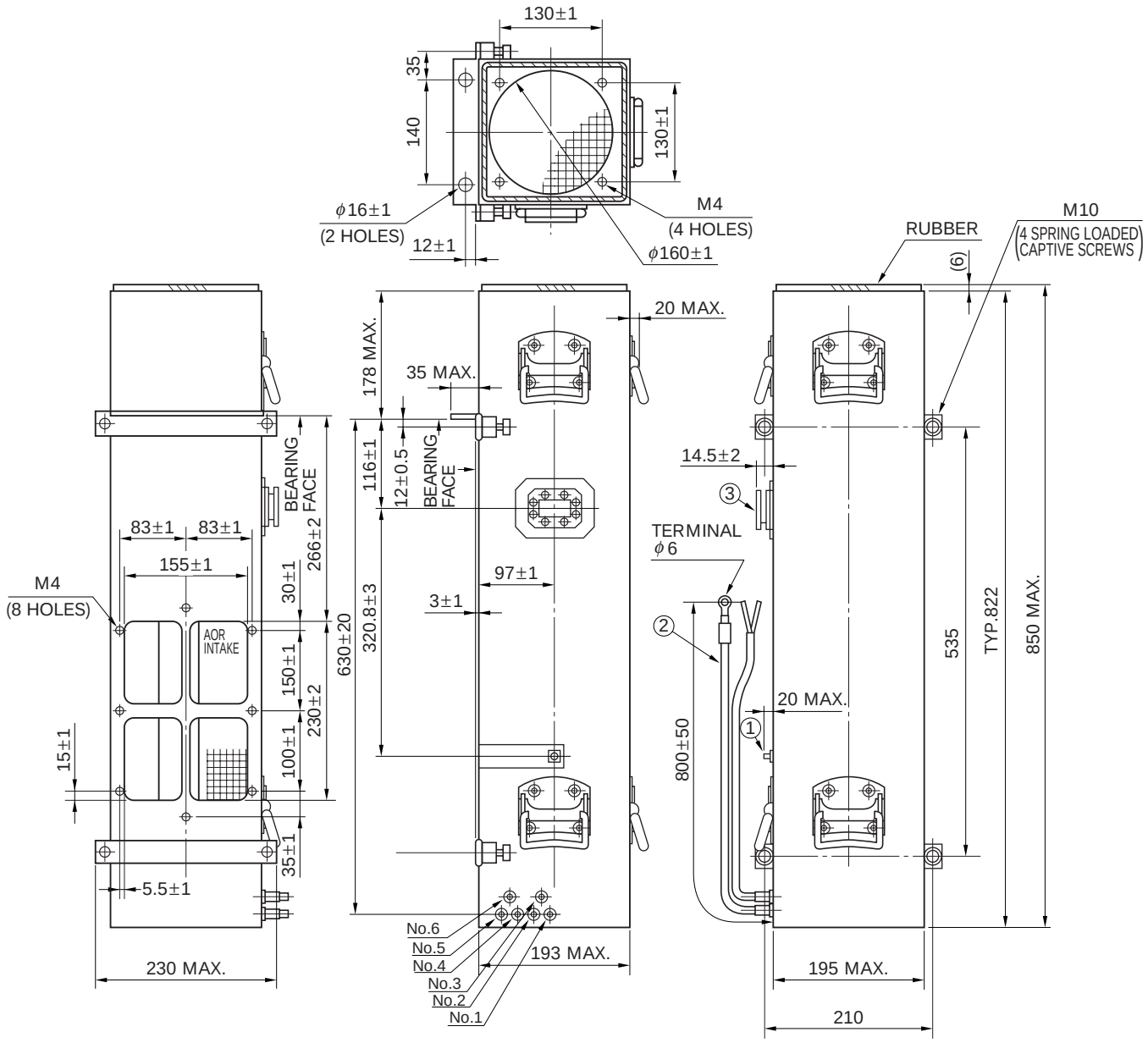
Note 2 : The tube body is at ground potential in operation.

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.

LD7215, LD7215C* and LD7215D OUTLINE (Unit in mm)



LEAD CONNECTIONS

LEAD NO.	ELEMENT	(COLOR)
1	HEATER (–)	(BROWN)
2	HEATER (+), CATHODE	(YELLOW)
3	ANODE	(BLUE)
4	COLLECTOR	(RED)
5	HELIC (GROUND)	(BLACK)
6	THERMALPROTECTION	(GLAY)

①	RF OUTPUT	CPR-137 FLANGE (NO. 10-32 UNF 2B THREADED HOLES)
②	RF INPUT	TYPE SMA FEMALE
③	HIGH VOLTAGE CONNECTIONS	FLYING LEADS WITH φ6 TERMINALS

* LD7215C is electrically connected by AMP LGH 863023 Plug.