NEC

MEDIUM POWER TRAVELING WAVE TUBE FOR GROUND TERMINALS

LD7710

14GHz, 40 W CW PPM FOCUSING, MINIMUM SIZE

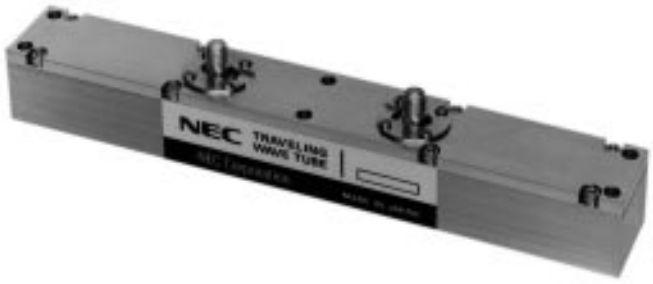
GENERAL DESCRIPTION

The NEC LD7710 is a PPM focused traveling wave tube designed for final amplifier tube in the earth-to-satellite communication's transmitter.

This is capable of delivering an output power of 40 W over the range of 13.75 to 14.5 GHz.

It provides a mid power gain of 26 dB at 40 W level.

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



FEATURES

○ Lightweight, Compact and Efficient

The tube has a dual-depressed collectors and is designed to operate at high efficiency across the power output range. It features state-of-the-art techniques to optimize size and efficiency.

○ Low Distortion

Distortion is a very important factor in multiplex digital signals transmission. NEC has developed techniques for the correction of non-linear distortion of gain and phase generated in a TWT. As a result, the TWT has an optimum performance across a broad power range and is ideally suited for multi-carrier transmission systems.

○ Right Power Gain for Minimum Size

The power gain is designed into 26 dB at 40 W level in order to keep the tube length minimum.

○ Simple Cooling System

The tube is conduction cooled, so that the cooling system is 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 the low operating temperature for long life. The TWT is designed to have a lifetime of 100,000 hours or more.

○ Microdischarge Free

The tube is carefully designed to be free from microdischarge in the electron gun for long time operation, therefore it is suitable for digital communication services.

For safety 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	13.75 to 14.5 GHz
Output Power	40 W
Heater Voltage	6.3 V
Heater Current	0.81 A
Heater Surge Current	2.5 A
Type of Cathode	Indirect-Heated Impregnated
Cathode Warm-up Time	180 s

MECHANICAL

Dimensions	See Outline Drawing
Weight	350 g approx.
Focusing	Periodic Permanent Magnet
Mounting Position	Any
Cooling	Conduction
Electrical Connections	Flying Leads
Heater, Heater-Cathode, Helix, Collector-1, Collector-2	
RF Connections	
Input	SMA-Female
Output	SMA-Female

ABSOLUTE RATINGS (Note 1, 2 and 3)

ELECTRICAL

	Min.	Max.	Unit
Heater Voltage	6.0	6.6	V
Heater Surge Current	–	2.5	A
Heater Current	–	1.2	A
Heater Warm-up Time	180	–	s
Helix Voltage	2.95	3.45	kVdc
Helix Current	–	5.0	mAdc
Collector-1 Voltage	1.6	2.0	kVdc
Collector-1 Current	–	70	mAdc
Collector-2 Voltage	0.8	1.0	kVdc
Collector-2 Current	–	110	mAdc
Drive Power	–	23	dBm
Load VSWR	–	1.5 : 1	–

MECHANICAL

	Min.	Max.	Unit
Heat Sink Temperature	–30	+90	˚C
Storage Temperature	–40	+90	˚C

TYPICAL OPERATION (Note 2, 3 and 5)

			Unit
Frequency		13.75 to 14.5	GHz
Saturated Output Power		45	W
Heater Voltage (Note 4)		6.3	V
Heater Current		0.81	A
Helix Voltage		3.2	kVdc
Helix Current		2.0	mAdc
Collector-1 Voltage		1.8	kVdc
Collector-1 Current		55	mAdc
Collector-2 Voltage		0.9	kVdc
Collector-2 Current		43	mAdc
Cathode Current		100	mAdc
Power Gain	at 4 W	34	dB
	at 40 W	29	dB
Gain Variation	at 4 W	2.5	dB/750 MHz
Gain Slope	at 4 W	0.02	dB/MHz
AM-PM Conversion	at 40 W	3.5	deg./dB
3rd Order Intermodulation			
(two equal carriers, 8 W total)	.....	–29	dBc
Overall Efficiency	.....	31	%

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 for a contractual specification.

LD7710 OUTLINE (Unit in mm)