

sylvania microwave devices

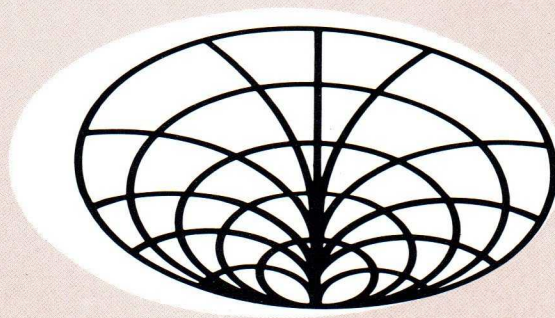


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introduction

This catalog contains data on all microwave devices produced by Sylvania Electric Products Inc. Detailed technical information is provided for microwave tubes, diodes, and other microwave components.

The rapid referencing system used in this catalog will enable you to locate any device readily. The system provides three different methods for locating a particular device in the catalog. For example, if you are interested in C-band Klystrons, you may consult either the *Table of Contents*, the *Frequency Index*, or the *Numerical Index*.

The *Table of Contents* directs you to a particular section which covers all types of klystrons.

The *Frequency Index*, appearing in the front of the catalog, lists all products according to the frequency range in which they operate. All klystrons operating in the C-band frequency range are listed under the C-band section of the *Frequency Index*.

The *Numerical Index* at the end of the catalog lists all Sylvania microwave products by type numbers and shows the page numbers on which they appear.

Sylvania's facilities and experience in the design, development, and manufacture of microwave devices are described briefly in appropriate sections of the catalog. Field engineering offices, sales information, and warranty policies are listed in Section VI.

the company the facilities

Sylvania is one of the largest producers in the electronics industry. Including all of the divisions, the company has 40 plants and 30 laboratories which are located in 14 states. The company has over 28,000 employees, with an engineering and scientific staff of more than 3200.

In addition to microwave devices, Sylvania is active in many other phases of electronics development and manufacturing. These are divided among 9 separate divisions. Although each division is completely separated from the others, all provide assistance for one another in the exchange of technical data and materials.

Sylvania's diversified product line includes cathode ray tubes, electroluminescent panels, receiving tubes, systems, omegatrons, nickel-cadmium batteries, lasers, subminiature tubes, television tubes, semiconductors, light bulbs, fluorescent lighting, and many other products.

Sylvania's Microwave Device Division (MDD) has plants in Mountain View, California and Williamsport, Pennsylvania. Each of these locations specializes in device development and production as follows:

Mountain View, California

Traveling-wave
Tubes

Backward-wave
Oscillators
(helix types)

Klystrons

Microwave
Phototubes

Williamsport, Pennsylvania

Magnetrons

Backward-wave
Oscillators
(interdigital types)

"Rocket"
Planar Triodes

Water Loads

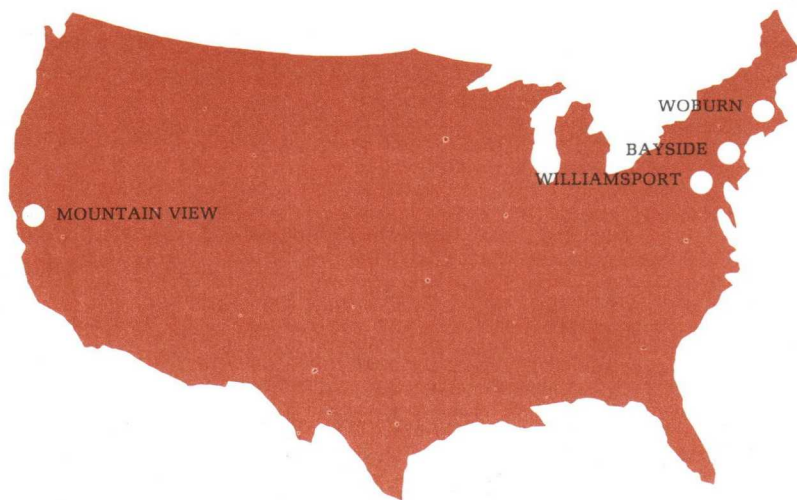
Waveguide
Windows

Microwave diodes are produced by the Semiconductor Division in Woburn, Massachusetts. Sylvania gas lasers are manufactured at the General Telephone & Electronics Laboratories, Bayside, Long Island, New York. All of these plants contain the most modern equipment available for producing highly reliable microwave devices.

Each MDD plant is completely staffed with engineering and supporting personnel. Product improvements, model changes, and special customer designs are rapidly executed from the design stages, through testing, to the final product.

Production areas include elaborate exhaust systems for minimizing contaminated air, as well as air conditioning for temperature and humidity control in assembly areas. Specially constructed "clean rooms" are used for assembly and processing operations requiring the utmost cleanliness and atmosphere control (dust content less than one-millionth that of normal atmosphere).

Sylvania's production of reliable, high-performance microwave devices is achieved by one of the industry's most advanced systems of quality control. MDD is one of the limited number of microwave facilities in the country which has been approved for in-plant qualification testing to MIL specifications. Manufacturing methods, processes, and techniques have been especially developed to meet the unique requirements of devices operating at microwave frequencies.



frequency index

TYPE NO.	FREQUENCY, Gc	DESCRIPTION
UHF (to 1.0 Gc) (300 MM)		
MICROWAVE DIODES		
1N830	0.1	Detector
1N830A	0.1	Detector
1N25	1.0	Mixer
1N25A	1.0	Mixer
1N25B	1.0	Mixer
1N79	Up to 4.0	Meter rectifier
1N358	1.0-12.4	Detector
1N358A	1.0-12.4	Detector
1N369A	1.0-12.4	Detector
1N630	1.0-12.4	Detector

TRAVELING-WAVE TUBES

SYT-4307	0.5-1.0	10 mW; 19 db max. NF
SYT-4383	0.5-1.0	2 kw pk
SYT-4319	1-2	15 mW
SYT-4267	1-2	15 mW
SYT-4320	1-2	2 W
SYT-4327	1-2	2 W
SYT-4268	1-2	1 W
SYT-4391	1-2	1 kw pk
SYT-538	1-2	1 kw pk; solenoid focused
SYT-4308	1-2	10 mW; 15 db max. NF
SYT-4424	1-2	1 W
SYT-4446	1-2	100 W CW
6752	1-2	2 W; solenoid focused
SYT-620B	1-2	2 W; solenoid focused

MICROWAVE PHOTOTUBES

SYD-4301A	1-2	S-1 photocathode
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KLYSTRONS

6BM6	0.55-3.8	40-170 mW CW
6BM6A	0.55-3.8	40-170 mW CW
5837	0.55-3.8	40-170 mW CW

PLANAR TRIODES

2C36	4.0 max.	pulse and CW oscillator
2C37	3.3 max.	CW oscillator or amplifier
5767/6481	3.3 max.	CW oscillator
5768	3.3 max.	CW amplifier
6503	5.75 max.	CW and pulse oscillator

L-BAND (1 to 2 Gc) (300-150 MM)

MICROWAVE DIODES

1N25	1.0	Mixer
1N25A	1.0	Mixer
1N25B	1.0	Mixer
1N79	up to 4.0	Meter Rectifier
1N358	1.0-12.4	Detector
1N358A	1.0-12.4	Detector
1N369A	1.0-12.4	Detector
1N630	1.0-12.4	Detector
D4168	2.0	Tunnel Diode

TRAVELING-WAVE TUBES

SYT-4307	0.5-1.0	10 mW; 19 db max. NF
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TYPE NO.	FREQUENCY, Gc	DESCRIPTION
SYT-4319	1-2	15 mW
SYT-4383	0.5-1.0	2 kw pk
SYT-4267	1-2	15 mW
SYT-4320	1-2	2 W
SYT-4327	1-2	2 W
SYT-4268	1-2	1 W
SYT-4424	1-2	1 W
SYT-4446	1-2	100 W CW
SYT-4391	1-2	1 kw pk
SYT-538	1-2	1 kw pk; solenoid focused
SYT-4325	2-4	10 mW
SYT-4326	2-4	frequency memory
SYT-4261	2-4	10 mW
SYT-4260	2-4	1 W
SYT-956L	2-4	2 W
SYT-4421	2-4	2 W
SYT-4447	2-4	100 W CW
SYT-533	2-4	1 kw pk; solenoid focused
SYT-4392	2-4	1 kw pk
SYT-4308	1-2	10 mW; 15 db max. NF
SYT-4309	2-4	10 mW; 15 db max. NF
6752	1-2	2 W; solenoid focused
SYT-620B	1-2	2 W; solenoid focused
6559	2-4	2 W; solenoid focused
SYT-534B	2-4	2 W; solenoid focused

BACKWARD-WAVE OSCILLATORS

SYB-4400	2.0-4.0	Interdigital; 100 mW
SYB-4403	2.0-4.0	Interdigital; 100 mW
SYB-4404	2.0-4.0	Interdigital; 80 mW

MICROWAVE PHOTOTUBES

SYD-4301A	1-2	S-1 photocathode
SYD-4302A	2-4	S-1 photocathode

KLYSTRONS

6BM6	0.55-3.8	40-170 mW CW
6BM6A	0.55-3.8	40-170 mW CW
5837	0.55-3.8	40-170 mW CW
6BL6	1.4-6.5	30-250 mW CW
5836	1.4-6.5	30-250 mW CW

PLANAR TRIODES

2C36	4.0 max.	pulse and CW oscillator
2C37	3.3 max.	CW oscillator or amplifier
5767/6481	3.3 max.	CW oscillator
5768	3.3 max.	CW amplifier
6503	5.75 max.	CW and pulse oscillator

S-BAND (2 to 4 Gc) (150-75 MM)

MICROWAVE DIODES

1N358	1.0-12.4	Detector
1N358A	1.0-12.4	Detector
1N369A	1.0-12.4	Detector
1N630	1.0-12.4	Detector
1N79	up to 4.0	Detector
1N358	1.0-12.4	Detector
D4168	2.0	Tunnel Diode

frequency index CONTINUED

TYPE NO.	FREQUENCY, Gc	DESCRIPTION	TYPE NO.	FREQUENCY, Gc	DESCRIPTION
1N21C	3.06	Mixer	SYT-4374	4-8	1 W
1N831	3.06	Mixer	SYT-4372	4-8	10 mW
1N21D	3.06	Mixer	SYT-4387	4-8	1 kw pk
D4188C	3.06	Mixer	SYT-620B	1-2	2 W; solenoid focused
D4188D	3.06	Mixer	SYT-4393	4-8	1 kw pk
D4188E	3.06	Mixer	6752	1-2	2 W; solenoid focused
1N21WE	3.06	Mixer	SYT-4342	4-8	10 mW; 15 db max. NF
D4188F	3.06	Mixer	SYT-4446	1-2	100 W CW
1N3655	3.06	Mixer	SYT-4448	4-8	100 W CW
1N3655A	3.06	Mixer	BACKWARD-WAVE OSCILLATORS		
1N21E	3.06	Mixer	SYB-4293A	2.3-4.1	Interdigital; 100 mW
1N831A	3.06	Mixer	SYB-4400	2.0-4.0	Interdigital; 100 mW
1N21F	3.06	Mixer	SYB-4401	2.7-5.4	Interdigital; 30 mW
D4975	4.0	Tunnel Diode	SYB-4402	2.7-5.4	Interdigital; 30 mW
D4976	3.0	Tunnel Diode	SYB-4403	2.0-4.0	Interdigital; 100 mW
D5075	4.0	Tunnel Diode	SYB-4404	2.0-4.0	Interdigital; 80 mW
D5076	3.0	Tunnel Diode	SYB-4405	2.9-3.3	Interdigital; 150 mW
1N1132	3.0-12.0	Mixer	SYB-4406	3.7-5.5	Interdigital; 150 mW
1N32	3.295	Detector	SYB-4407	3.7-5.5	Interdigital; 100 mW
1N369	3.0-12.4	Detector	MICROWAVE PHOTOTUBES		
1N1610	3.0-12.4	Detector	SYD-4301A	1-2	S-1 photocathode
TRAVELING-WAVE TUBES			SYD-4302A	2-4	S-1 photocathode
SYT-4325	2-4	10 mW	SYD-4303A	4-8	S-1 photocathode
SYT-4326	2-4	10 mW	KLYSTRONS		
SYT-4261	2-4	10 mW	6BM6	0.55-3.8	40-170 mW CW
SYT-4260	2-4	1 W	6BM6A	0.55-3.8	40-170 mW CW
SYT-956L	2-4	2 W	5837	0.55-3.8	40-170 mW CW
SYT-956M	2.5-3.8	1 W	6BL6	1.4-6.5	30-250 mW CW
SYT-956N	2.5-4.0	0.5-2.0 W	5836	1.4-6.5	30-250 mW CW
SYT-956P	2.95-3.05	2-4 W	SYK-4203A	4-14	50 mW CW
SYT-538	1-2	1 kw pk; solenoid focused	PLANAR TRIODES		
SYT-4308	1-2	10 mW; 15 db max. NF	2C36	4.0 max.	pulse and CW oscillator
SYT-4319	1-2	15 mW	2C37	3.3 max.	CW oscillator or amplifier
SYT-4309	2-4	10 mW; 15 db max. NF	5767/6481	3.3 max.	CW oscillator
SYT-4267	1-2	15 mW	5768	3.3 max.	CW amplifier
SYT-534B	2-4	2 W; solenoid focused	6503	5.75 max.	CW and pulse oscillator
SYT-4320	1-2	2 W	WAVEGUIDE WINDOWS		
SYT-4168	2.5-4.0	10 mW; solenoid focused	SYW-4231	2.6-4.0	WR-284
SYT-4327	1-2	2 W	SYW-4230	4.0-5.8	WR-187
SYT-4171	2.5-4.0	2 W; solenoid focused	C-BAND (4 to 8 Gc) (75-37.5 MM)		
SYT-4268	1-2	1 W	MICROWAVE DIODES		
6559	2-4	2 W; solenoid focused	1N358	1.0-12.4	Detector
SYT-4391	1-2	1 kw pk	1N358A	1.0-12.4	Detector
SYT-4424	1-2	1 W	1N369	3.0-12.4	Detector
SYT-4421	2-4	2 W	1N369A	1.0-12.4	Detector
SYT-4278	4-8	1 W	1N1132	3.0-12.0	Mixer
SYT-4429	3-15	250 mW	1N1610	3.0-12.4	Detector
SYT-533	2-4	1 kw pk; solenoid focused	1N630	1.0-12.4	Detector
SYT-4392	2-4	1 kw pk	D4971	7.0	Tunnel Diode
SYT-4447	2-4	100 W CW	D4972	6.0	Tunnel Diode
SYT-4281	4-8	10 mW	D4973	7.0	Tunnel Diode
SYT-4378	2.7-3.5	5 kw pk			

frequency index CONTINUED

TYPE NO.	FREQUENCY, Gc	DESCRIPTION	TYPE NO.	FREQUENCY, Gc	DESCRIPTION
D4974	5.0	Tunnel Diode	SYT-4168	2.5-4.0	10 mW; solenoid focused
D4975	4.0	Tunnel Diode	SYT-4172	8-11	2 W; solenoid focused
D4975A	7.0	Tunnel Diode	SYT-4169	8-11	10 mW; solenoid focused
D4976A	5.0	Tunnel Diode	SYT-4447	2-4	100 W CW
D4976B	8.0	Tunnel Diode	SYT-4448	4-8	100 W CW
D5071	7.0	Tunnel Diode	BACKWARD-WAVE OSCILLATORS		
D5072	6.0	Tunnel Diode	SYB-4293A	2.3-4.1	Interdigital; 100 mW
D5073	7.0	Tunnel Diode	SYB-4400	2.0-4.0	Interdigital; 100 mW
D5074	5.0	Tunnel Diode	SYB-4401	2.7-5.4	Interdigital; 30 mW
D5075	4.0	Tunnel Diode	SYB-4402	2.7-5.4	Interdigital; 30 mW
D5075A	7.0	Tunnel Diode	SYB-4403	2.0-4.0	Interdigital; 100 mW
D5076A	5.0	Tunnel Diode	SYB-4404	2.0-4.0	Interdigital; 80 mW
D5076B	8.0	Tunnel Diode	SYB-4406	3.7-5.5	Interdigital; 150 mW
D4168A	4.0	Tunnel Diode	SYB-4407	3.7-5.5	Interdigital; 100 mW
D4168B	6.0	Tunnel Diode	MICROWAVE PHOTOTUBES		
D4168C	8.0	Tunnel Diode	SYD-4302A	2-4	S-1 photocathode
			SYD-4303A	4-8	S-1 photocathode
			SYD-4304A	8-12.5	S-1 photocathode
TRAVELING-WAVE TUBES			KLYSTRONS		
SYT-4260	2-4	1 W	6BL6	1.4-6.5	30-250 mW CW
SYT-4281	4-8	10 mW	5836	1.4-6.5	30-250 mW CW
SYT-956L	2-4	2 W	SK-720F	5.925-6.225	CW; 1.3 watts; metal
SYT-4278	4-8	1 W	SK-220F	5.925-6.225	CW; 1 watt; metal
SYT-956N	2.5-4.0	0.5-2.0 W	SK-720E	6.125-6.425	CW; 1.3 watts; metal
SYT-4372	4-8	10 mW	SK-220E	6.125-6.425	CW; 1 watt; metal
SYT-4374	4-8	1 W	SK-720G	6.425-6.575	CW; 1.3 watts; metal
SYT-4282	7-12.4	5 mW	SK-220G	6.425-6.575	CW; 1 watt; metal
SYT-4421	2-4	2 W	SK-720D	6.575-6.875	CW; 1.3 watts; metal
SYT-4273	7-12.4	1 W	SK-220D	6.575-6.875	CW; 1 watt; metal
SYT-4373	7-12.4	5 mW	SK-720C	6.875-7.125	CW; 1.3 watts; metal
SYT-4375	7-12.4	1 W	SK-220C	6.875-7.125	CW; 1 watt; metal
SYT-4347	5-11	1 W	SK-720B	7.125-7.425	CW; 1.3 watts; metal
SYT-4353	7-11	10 W	SK-220B	7.125-7.425	CW; 1 watt; metal
SYT-956R	4.4-5.0	1 W	SK-720A	7.425-7.750	CW; 1.3 watts; metal
SYT-4387	4-8	1 kw pk	SK-220A	7.425-7.750	CW; 1 watt; metal
SYT-4393	4-8	1 kw pk	SK-720Z	7.750-8.100	CW; 1.3 watts; metal
SYT-4342	4-8	10 mW; 15 db max. NF	SK-220Z	7.750-8.100	CW; 1 watt; metal
SYT-4343	8-12.4	5 mW; 15 db max. NF	SK-221H	5.250-5.560	CW; 40mW; metal
SYT-4363	8-12	Frequency memory	SK-221K	5.860-6.160	CW; 35mW; metal
SYT-4429	3-15	250 mW	SK-221F	5.985-6.285	CW; 35mW; metal
SYT-4325	2-4	10 mW	SK-221E	6.285-6.585	CW; 35mW; metal
SYT-4326	2-4	Frequency memory	SK-221D	6.705-7.005	CW; 35mW; metal
SYT-4261	2-4	10 mW	SK-221C	6.955-7.255	CW; 35mW; metal
SYT-4388	7-12	1 kw pk	SK-221B	7.255-7.555	CW; 35mW; metal
SYT-4394	7-12	1 kw pk	SK-221A	7.750-7.850	CW; 35mW; metal
SYT-591	8-12	1 kw pk; solenoid focused	SK-722F	5.925-6.225	CW; 1.3 watts; metal
SYT-533	2-4	1 kw pk; solenoid focused	SK-222F	5.925-6.225	CW; 1 watt; metal
SYT-4392	2-4	1 kw pk	SK-722E	6.125-6.425	CW; 1.3 watts; metal
SYT-4309	2-4	10 mW; 15 db max. NF	SK-222E	6.125-6.425	CW; 1 watt; metal
SYT-4369	7-10	100 W CW	SK-722G	6.425-6.575	CW; 1.3 watts; metal
6559	2-4	2 W; solenoid focused	SK-222G	6.425-6.575	CW; 1 watt; metal
SYT-534B	2-4	2 W; solenoid focused	SK-722D	6.575-6.875	CW; 1.3 watts; metal
SYT-4171	2.5-4.0	2 W; solenoid focused	SK-222D	6.575-6.875	CW; 1 watt; metal

frequency index CONTINUED

TYPE NO.	FREQUENCY, Gc	DESCRIPTION
SK-722C	6.875-7.125	CW; 1.3 watts; metal
SK-222C	6.875-7.125	CW; 1 watt; metal
SK-722B	7.125-7.425	CW; 1.3 watts; metal
SK-222B	7.125-7.425	CW; 1 watt; metal
SK-722A	7.425-7.750	CW; 1.3 watts; metal
SK-222A	7.425-7.750	CW; 1 watt; metal
SK-722Z	7.750-8.100	CW; 1.3 watts; metal
SK-222Z	7.750-8.100	CW; 1 watt; metal
6468	6.125-6.425	CW X-26 type
6469	6.575-6.875	CW X-26 type
6470	7.125-7.425	CW X-26 type
K-839B	7.125-7.425	CW X-26 type
K-840B	6.575-6.875	CW X-26 type
K-841B	6.125-6.425	CW X-26 type
K-4008	5.300-6.300	CW X-26 type
K-4009	5.300-6.600	CW X-26 type
K-4010	5.800-7.125	CW X-26 type
K-4011	6.3-7.5	CW X-26 type
SYK-4203A	4-14	50 mW CW

PLANAR TRIODES

2C36	4.0 max.	CW and pulse oscillator
6503	5.75 max.	CW and pulse oscillator

WAVEGUIDE WATER LOADS

SYZ-4361	7.05-10.0	400 kw pk
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WAVEGUIDE WINDOWS

SYW-4231	2.6-4.0	WR-284
SYW-4230	4.0-5.8	WR-187
SYW-4228	7.0-10.0	WR-112
SYW-4360	7.85-8.5	WR-90

X-BAND (8 to 12.5 Gc) (37.5-24 MM)

MICROWAVE DIODES

1N358A	1.0-12.4	Detector
1N358	1.0-12.4	Detector
1N369A	1.0-12.4	Detector
1N369	3.0-12.4	Detector
1N1132	3.0-12.0	Mixer
1N1610	3.0-12.4	Detector
1N23C	9.375	Mixer
1N149	9.375	Mixer
1N23D	9.375	Mixer
1N23E	9.375	Mixer
1N23F	9.375	Mixer
D4181C	9.375	Mixer
D4181D	9.375	Mixer
D4181E	9.375	Mixer
D4160	9.375	Mixer
1N2510	10.0	Mixer
1N832	9.375	Mixer
1N23WE	9.375	Mixer
1N832A	9.375	Mixer
1N286	10-22	Mixer
1N286A	10-22	Mixer

TYPE NO.	FREQUENCY, Gc	DESCRIPTION
1N630	1.0-12.4	Detector
1N1611	9.0	Detector
1N1611A	9.0	Detector
1N31	9.375	Detector
1N31A	9.375	Detector
1N76	9.375	Detector
1N76A	9.375	Detector
1N833	9.375	Detector
1N833A	9.375	Detector
1N2926	10-21	Detector
1N2926A	10-21	Detector
D4919	9.375	Detector
D4972A	11.0	Tunnel Diode
D4973A	11.0	Tunnel Diode
D4974A	9.0	Tunnel Diode
D4975B	10.0	Tunnel Diode
D4976B	8.0	Tunnel Diode
D5072A	11.0	Tunnel Diode
D5073A	11.0	Tunnel Diode
D5074A	9.0	Tunnel Diode
D5075B	10.0	Tunnel Diode
D5076B	8.0	Tunnel Diode
D4168C	8.0	Tunnel Diode
D4168D	10.0	Tunnel Diode

MAGNETRONS

6027	9.375 ± 0.03	22 kw
SYM-4380	9.375 ± 0.03	22 kw
SYM-4242	9.375 ± 0.03	23 kw
4J52A	9.375 ± 0.03	85 kw
4J50	9.375 ± 0.03	175 kw
4J50A	9.375 ± 0.03	175 kw
2J42	9.375 ± 0.03	9.5 kw
2J42H	9.375 ± 0.03	9.5 kw
SYM-4450	9.05-10.0	11 kw
SYM-4398	9.375 ± 0.03	26 kw
SYM-4340	9.7 ± 0.03	110 kw
7503	9.3-9.5	0.14 kw
SYM-4264	9.6-10.0	22 kw
6543	8.5-9.6	75 kw
7008	8.5-9.6	220 kw
7692	9.2-9.55	220 kw
7692A	8.55-9.65	220 kw
SYM-4164B	8.5-9.6	220 kw
7006	9.0-9.6	220 kw
SYM-4310	8.5-9.4	220 kw
SYM-4385	8.5-9.6	75 kw
SYM-4371	8.5-9.6	270 kw
SYM-4397	9.05-10.0	350 kw

TRAVELING-WAVE TUBES

SYT-4372	4-8	10 mW
SYT-4282	7.0-12.4	5 mW
SYT-4347	5-11	1 W

frequency index CONTINUED

TYPE NO.	FREQUENCY, Gc	DESCRIPTION	TYPE NO.	FREQUENCY, Gc	DESCRIPTION
SYT-4273	7.0-12.4	1 W	SYW-586	8.49-9.6	WR-90
SYT-4353	7-11	10 W	SYW-4254	8.0-12.4	WR-90
SYT-4373	7.0-12.4	5 mW	SYW-4227	8.2-12.4	WR-90
SYT-4387	4-8	1 kw pk	SYW-4225	12.4-18.0	WR-62
SYT-4393	4-8	1 kw pk	SYW-4360	7.85-8.5	WR-90
SYT-4388	7-12	1 kw pk	SYW-4287	8.7-8.9	WR-90
SYT-4394	7-12	1 kw pk	SYW-4215	8.4-9.6	WR-90
SYT-591	8-12	1 kw pk	SYW-4359	8.2-12.4	WR-90
SYT-4341	8.5-9.2	1 megawatt pk	SYW-4351	10.7-11.7	WR-90
SYT-4278	4-8	1 W	SYW-4288	10.7-11.7	WR-90
SYT-4369	7-10	100 W CW	SYW-4358	10.7-11.7	WR-90
SYT-4428	8.5-9.5	1 kw CW	KU-BAND (12.5 to 18 Gc) (24-16.7 MM)		
SYT-4448	4-8	100 W CW	MICROWAVE DIODES		
SYT-4429	3-15	250 mW	1N78	16.0	Mixer
SYT-4281	4-8	10 mW	1N918	16.0	Mixer
SYT-4342	4-8	10 mW; 15 db max. NF	D4082	16.0	Mixer
SYT-4343	8-12.4	5 mW; 15 db max. NF	1N78A	16.0	Mixer
SYT-4172	8-11	2 W; solenoid focused	D4082A	16.0	Mixer
SYT-4169	8-11	10 mW; solenoid focused	1N78B	16.0	Mixer
SYT-4363	8-12	Frequency memory	D4082B	16.0	Mixer
BACKWARD-WAVE OSCILLATORS			1N3205	16.0	Mixer
SYB-4408	8.2-12.4	Interdigital; 20 mW	1N78C	16.0	Mixer
SYB-4352	12.4-18	helix; 20 mW	D4081	16.0	Mixer
MICROWAVE PHOTOTUBES			1N78D	16.0	Mixer
SYD-4303A	4-8	S-1 photocathode	D4081A	16.0	Mixer
SYD-4304A	8.0-12.5	S-1 photocathode	1N286	10-22	Mixer
SYD-4300A	11-20	S-1 photocathode	1N286A	10-22	Mixer
KLYSTRONS			D4194	16.0	Detector
SK-720Z	7.750-8.100	CW; 1.3 watts; metal	D4194A	16.0	Detector
SK-220Z	7.750-8.100	CW; 1 watt; metal	1N2926	10-21	Detector
SK-722Z	7.750-8.100	CW; 1.3 watts; metal	1N2926A	10-21	Detector
SK-222Z	7.750-8.100	CW; 1 watt; metal	D4971A	13.0	Tunnel Diode
SYK-4203A	4-14	50 mW CW	D4971B	18.0	Tunnel Diode
SYK-4312	10.525	20 mW CW	D4972B	17.0	Tunnel Diode
SYK-4313	10.525	50 mW CW	D4973B	17.0	Tunnel Diode
SYK-4331	10.525	50 mW CW	D4974B	14.0	Tunnel Diode
SYK-4332	10.525	50 mW CW	D4975C	18.0	Tunnel Diode
SYK-4333	10.525	20 mW CW	D4976C	14.0	Tunnel Diode
SYK-4333A	10.525	20 mW CW	D5071A	13.0	Tunnel Diode
SYK-4334	9.345	25 mW CW	D5071B	18.0	Tunnel Diode
SYK-4339	9.375	25 mW CW	D5072B	17.0	Tunnel Diode
SYK-4379	12.24	20 mW CW	D5073B	17.0	Tunnel Diode
WAVEGUIDE WATER LOADS			D5074B	14.0	Tunnel Diode
SYZ-4361	7.05-10.0	400 kw pk	D5075C	18.0	Tunnel Diode
SYZ-4365	12.4-18.0	140 kw pk	D5076C	14.0	Tunnel Diode
SYZ-4425	8.2-12.4	400 kw pk	MAGNETRONS		
WAVEGUIDE WINDOWS			SYM-4370	13.325 ± 0.03	0.048 kw
SYW-4196A	8.1-8.4	Special	7208B	15.5-17.5	120 kw
SYW-4228	7.0-10.0	WR-112	SYM-4362	16.0-17.0	75 kw
SYW-4346	8.2-9.63	WR-90	SYM-4328	15.5-17.5	105 kw
SYW-4232	8.0-10.0	Special	SYM-4426	16.0-17.0	35 kw
			SYM-4451	15.5-17.5	40 kw

frequency index CONTINUED

TYPE NO.	FREQUENCY, Gc	DESCRIPTION
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SYM-4419	16.5	90 kw
SYM-4417	15.5-17.5	115 kw

BACKWARD-WAVE OSCILLATORS

SYB-4352	12.4-18	Helix; 20 mW
SYB-4289	18-26.5	Helix; 5 mW

TRAVELING-WAVE TUBES

SYT-4429	3-15	250 mW
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MICROWAVE PHOTOTUBES

SYD-4300A	11-20	S-1 Photocathode
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KLYSTRONS

SYK-4335	13.295	20 mW CW
SYK-4203A	4-14	50 mW CW
SYK-4389	13.35	20 mW CW

WAVEGUIDE WATER LOADS

SYZ-4365	12.4-18.0	140 kw pk
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WAVEGUIDE WINDOWS

SYW-4225	12.4-18.0	WR-62
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K-BAND (18 to 26.5 Gc) (16.7-11.3 MM)

MICROWAVE DIODES

1N286	10-22	Mixer
1N286A	10-22	Mixer
1N26	23.984	Mixer
D4175	23.984	Mixer
1N26A	23.984	Mixer
D4175A	23.984	Mixer
1N26B	23.984	Mixer
1N26C	23.984	Mixer
D4089	23.984	Mixer
D4195	24.0	Detector
D4195A	24.0	Detector
1N2926	10-21	Detector
1N2926A	10-21	Detector
D4971B	18.0	Tunnel Diode
D4973C	26.0	Tunnel Diode
D4974C	25.0	Tunnel Diode
D4975C	18.0	Tunnel Diode
D5071B	18.0	Tunnel Diode
D5073C	26.0	Tunnel Diode
D5074C	25.0	Tunnel Diode
D5075C	18.0	Tunnel Diode

MAGNETRONS

7449A	24.0 ± 0.2	36 kw
SYM-4316	24.0 ± 0.2	26 kw
6551	24.0 ± 0.2	45 kw

BACKWARD-WAVE OSCILLATORS

SYB-4352	12.4-18	Helix; 20 mW
SYB-4289	18-26.5	Helix; 5 mW

TYPE NO.	FREQUENCY, Gc	DESCRIPTION
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MICROWAVE PHOTOTUBES

SYD-4300A	11-20	S-1 Photocathode
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WAVEGUIDE WATER LOADS

SYZ-4365	12.4-18.0	140 kw pk
SYZ-4366	22.0-25.0	50 kw pk

WAVEGUIDE WINDOWS

SYW-4225	12.4-18.0	WR-62
Ka-Band (26.5 to 40 Gc) (11.3-7.5 MM)		
1N53	34.86	Mixer
D4136	34.86	Mixer
1N53A	34.86	Mixer
D4136A	34.86	Mixer
1N53B	34.86	Mixer
D4136B	34.86	Mixer
1N53C	34.86	Mixer
1N53D	34.86	Mixer
D4196	35.0	Detector
D4196A	35.0	Detector
1N446	26-40	Detector
D4074	40-80	Detector
D4074A	40-80	Detector
D4971C	32.0	Tunnel Diode
D4972C	27.0	Tunnel Diode
D5071C	32.0	Tunnel Diode
D5072C	27.0	Tunnel Diode

MAGNETRONS

8366	33.2 ± 0.2	32 kw
7619	34.86 ± 0.348	32 kw
SYM-4218	34.86 ± 0.348	24 kw
SYM-4158	34.86 ± 0.348	105 kw
SYM-4064A	34.85 ± 0.15	75 kw
SYM-4306	34.7-35.0	55 kw
SYM-4350	34.86 ± 0.348	2.5 kw

BACKWARD-WAVE OSCILLATORS

SYB-4289	18-26.5	Helix; 5 mW
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WAVEGUIDE WATER LOADS

SYZ-4367	32.0-37.0	30 kw pk
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WAVEGUIDE WINDOWS

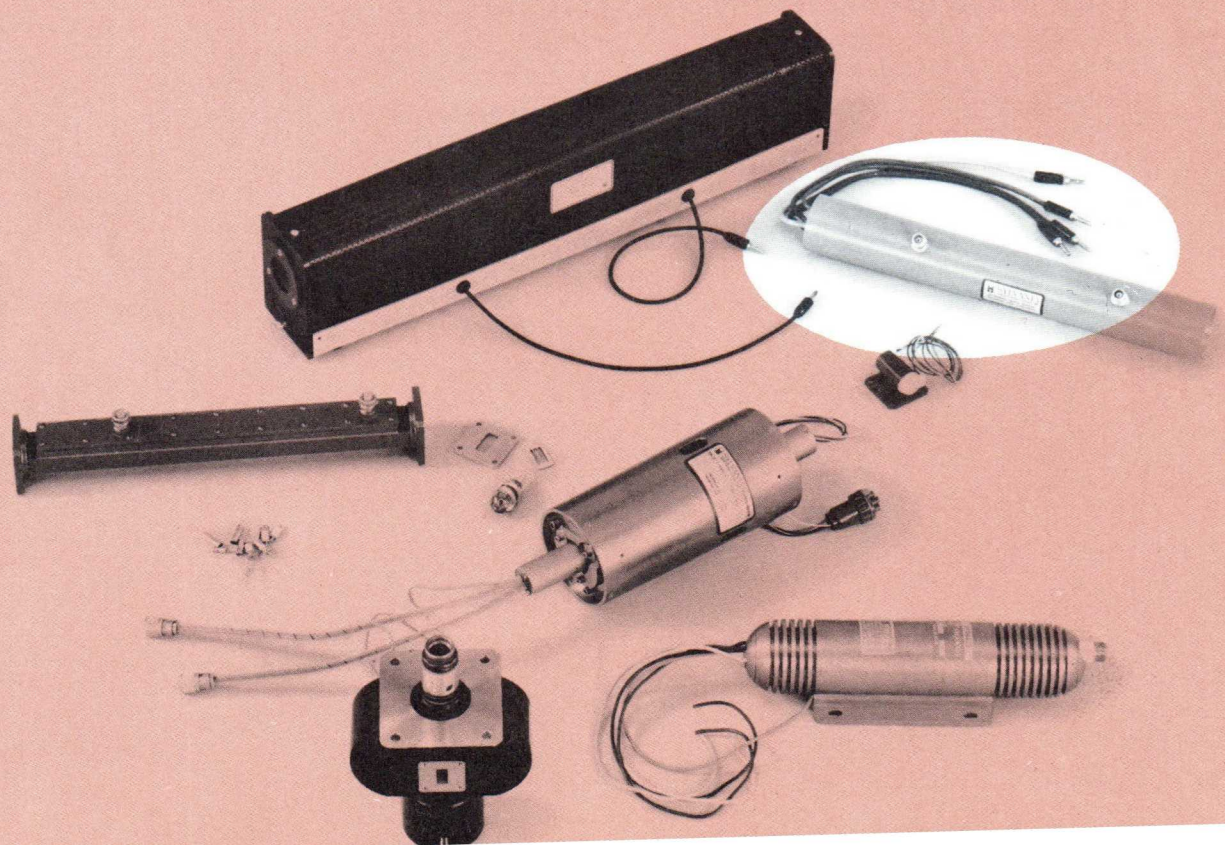
SYW-4223	32.0-37.0	WR-28
SYW-4330	34.6-35.2	WR-28

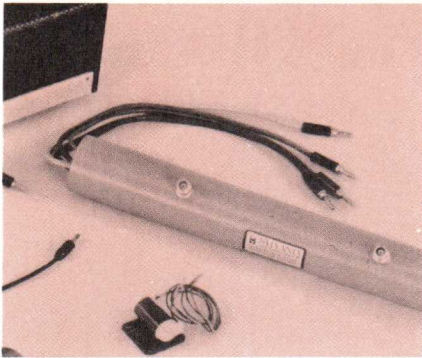
MILLIMETER (40 Gc and up) (7.5 MM and below)

MICROWAVE DIODES

1N446	26-40	Detector
D4074	40-80	Detector
D4074A	40-80	Detector

traveling-wave tubes





Sylvania traveling-wave tubes provide frequency coverage from 500 Mc to 15 Gc. In PPM-focused tubes, CW power levels up to 100 watts and peak power levels up to 5 kilowatts are available. Solenoid-focused tubes are also available, from low-level metal/ceramic types to the prototype 1.8-megawatt centipede tube. Except where noted as tentative data, the specifications listed in the following pages represent guaranteed performance over the indicated frequency ranges.

For ground-based or airborne equipment requiring broad bandwidth and high sensitivity, Sylvania medium-noise-figure tubes operate from P-band through X-band with maximum noise figures of 15 db (19 db in P-band). These tubes meet the environmental requirements of MIL-E-5400 Class II.

This catalog lists the first available PPM-focused tube capable of providing 100 watts CW power in

X-band. Designed for primary application in high-power ECM systems, this tube has a total package weight of 2 pounds.

Pulsed tubes with PPM focusing and power output levels up to 5 kilowatts are also available. They provide a compact lightweight source of drive power for multimegawatt TWT or klystron amplifiers, and can also be used as final amplifiers.

The versatility designed into Sylvania TWT's permits any given tube to be adapted to a wide range of specifications. Sylvania's quick-reaction service has been set up to provide standard TWT's or special-purpose variations, in any quantities from engineering samples to long high-rate production runs.

Price and delivery information on any tube shown in these pages can be obtained from the nearest Sylvania sales office.

MILITARY TYPES These traveling-wave tubes provide full frequency, gain, and power performance under the environmental conditions of MIL-E-5400, Class II.

TYPE NO.	FREQUENCY Gc	MIN. PWR. OUT.	MIN. GAIN db ¹	TYP. HELIX V.	MAX. CATHODE CURRENT mA _{dc}	DIAM. INCHES ²	LENGTH INCHES ²	WEIGHT POUNDS ²	OPERATING TEMP.	OPERATION
SYT-4319	1-2	15 mW	35	250	10	1½ ₃₂ , 2	16	3½	-55 to +72°C	CW or pulsed
SYT-4320	1-2	2 W	35	600	60	1½ ₃₂ , 2	16¾	4	-55 to +72°C	CW or pulsed
SYT-4327 ⁵	1-2	2 W	50	600	50	1, 2	19	4½	-54 to +95°C	CW or pulsed
SYT-4424 ⁵	1-2	1 W	40	525	40	1¼	14	2¾	-55 to +72°C	CW or pulsed
SYT-4325 ³	2-4	10 mW	35	470	6	1⅞	14¼	3	-55 to +72°C	CW or pulsed
SYT-4326	2-4	10 mW	Note 4	500	6	1⅞, 2 ¹⁵ / ₃₂	14¼	3	-55 to +95°C	CW or pulsed
SYT-956L ³	2-4	2 W	37	850	55	1¾	14½	3	-55 to +72°C	CW or pulsed
SYT-4421 ⁵	2-4	2 W	40	900	50	1¼	12	2½	-55 to +72°C	CW or pulsed
SYT-956M ³	2.5-3.8	1 W	50	840-1000	—	1¾	—	—	-54 to +71°C	CW or pulsed
SYT-956N ³	2.5-4.0	0.5-2.0W	37	825-950	—	1¾	—	—	-54 to +95°C	CW or pulsed
SYT-956P ³	2.95-3.05	2-4	40	850-950	—	1¾	—	—	-54 to +71°C	CW or pulsed
SYT-4372	4-8	10 mW	35	750	3	2¼	15½	3	-55 to +72°C	CW or pulsed
SYT-4374	4-8	1 W	30	2000	40	1¼	12½	3	-55 to +72°C	CW or pulsed
SYT-4375	7-12.4	1 W	30	2500	35	1¼	12½	3	-55 to +72°C	CW or pulsed
SYT-4373	7-12.4	5 mW	35	1150	3	2¼	15⅞	3¼	-55 to +72°C	CW or pulsed
SYT-4347 ⁵	5-11	1 W	60	2800	25	1¼	16½	4	-54 to +95°C	CW or pulsed
SYT-4353 ⁵	7-11	10 W	40	2900	60	1¼	12	3	-54 to +95°C	CW or pulsed
SYT-4429 ⁵	3-15	250 mW	35	2800	25	1¼	16½	4	-54 to +95°C	CW or pulsed

NOTES

1. Small Signal gain.
2. Dimensions and weight include integral magnets.
3. Gridded.
4. Type SYT-4326 has frequency memory capability when combined

with suitable delay-line and coupling devices. Small signal gain, small signal suppression, and overdrive characteristics are determined by specific system design.

5. Tentative data—subject to revision.

GENERAL-PURPOSE TYPES These tubes provide similar electrical performance but over a narrower temperature range in comparison to the military types in the preceding listings. They offer the equipment designer significant savings in applications where the ability to operate through large temperature variations is not a requirement.

TYPE NO.	FREQUENCY Gc	MIN. PWR. OUT.	MIN. GAIN db ¹	TYP. HELIX v.	MAX. CATHODE CURRENT mAdc	DIAM. INCHES ²	LENGTH INCHES ²	WEIGHT POUNDS ²	OPER. TEMP.	OPERATION
SYT-4267	1-2	15 mW	35	250	10	1¼, 2¼	16 ⁹ / ₁₆	3½	0 to +55°C Note 3	CW or Pulsed
SYT-4268	1-2	1 W	30	600	55	1¼, 2¼	16½	4	0 to +55°C Note 3	CW or Pulsed
SYT-4261	2-4	10 mW	35	450	5	1¼, 2¼	15 ¹ / ₁₆	3	0 to +55°C Note 3	CW or Pulsed
SYT-4260	2-4	1 W	30	825	50	1¼, 2¼	13 ⁷ / ₈	3	0 to +55°C Note 3	CW or Pulsed
SYT-4281	4-8	10 mW	35	750	3	2¼	15½	3¼	0 to +55°C Note 3	CW or Pulsed
SYT-4278	4-8	1 W	30	2050	50	1¼	12½	3	0 to +55°C Note 3	CW or Pulsed
SYT-4282	7-12.4	5 mW	35	1150	3	2¼	15½	3¼	0 to +55°C Note 3	CW or Pulsed
SYT-4273	7-12.4	1 W	30	2500	50	1¼	12½	3	0 to +55°C Note 3	CW or Pulsed
SYT-4363	8-12	—	Note 4	1160	3	2¼	14	3	—	—

NOTES

1. Small signal gain
2. Dimensions and weight include integral magnets.
3. Tubes capable of meeting MIL-E-5400 Class II temperature requirements can be made available.

4. Type SYT-4363 has frequency memory capability when combined with suitable delay-line and coupling devices. Small signal gain, small signal suppression, and overdrive characteristics are determined by specific system design.

POWER TUBES Sylvania high-power traveling-wave amplifier tubes are of rugged metal-ceramic construction for long life. Dependable operation is assured by the use of proven designs and manufacturing techniques. These tubes provide coverage of the full range of power-frequency combinations. With few exceptions, Sylvania power traveling-wave tubes utilize periodic permanent-magnet focusing structures.

TYPE NO.	FREQUENCY Gc	MIN. PWR. OUT.	MIN. GAIN ² db	TYP. HELIX V. kvdc	MAX. DUTY CYCLE	MAX. CATHODE CURRENT AMP.	DIAM. INCHES	LENGTH INCHES	WEIGHT POUNDS	COOLING	OPERATION
SYT-4383 ¹	0.5-1.0	2 Kw pk	30	9.5	0.01	2.0	4 ³	40 ³	50 ³	Forced Air	Pulsed
SYT-4391 ⁴	1-2	1 Kw pk	30	9.0	0.01	1.75	4 ³	25 ³	25 ³	Forced Air	Pulsed
SYT-538 ⁵	1-2	1 Kw pk	35	8.0	0.011	2.7	1½ ⁶	18½ ⁶	2 ⁶	Forced Air	Pulsed
SYT-4446	1-2	100 W CW	30	2.7	CW	350 mA	2 ³	24 ³	4 ³	Forced Air	CW
SYT-533	2-4	1 Kw pk	35	8.4	0.022	2.2	1½ ⁶	14¼ ⁶	2 ⁶	Forced Air	Pulsed
SYT-4392 ¹	2-4	1 Kw pk	30	9.0	0.02	1.75	4 ³	18 ³	15 ³	Forced Air	Pulsed
SYT-4378	2.7-3.5	5 Kw pk	34	14.5	0.002	4.5	4 ³	20 ³	12 ³	Forced Air	Pulsed
SYT-4447 ⁴	2-4	100 W CW	30	3.5	CW	260 mA	2 ³	15 ³	3 ³	Forced Air	CW
SYT-4387 ¹	4-8	1 Kw pk	30	9.5	0.01	1.75	3½ ³	14 ³	10 ³	Forced Air	Pulsed
SYT-4393 ¹	4-8	1 Kw pk	30	9.5	0.01	1.75	2 ³	14 ³	2 ³	Forced Air	Pulsed
SYT-4448 ⁴	4-8	100 W CW	30	4.0	CW	240 mA	2 ³	12 ³	2 ³	Forced Air	CW
SYT-4369	7-10	100 W CW	30	5.6	CW	150 mA	2 ³	12½ ³	2 ³	Forced Air	CW
SYT-4388 ¹	7-12	1 Kw pk	30	9.5	0.01	1.75	3½ ³	14 ³	10 ³	Forced Air	Pulsed
SYT-4394 ¹	7-12	1 Kw pk	30	9.5	0.01	1.75	2 ³	14 ³	2 ³	Forced Air	Pulsed
SYT-591	8-12	1 Kw pk	36	8.9	0.01	2.2	1½ ⁶	11½ ⁶	1½ ⁶	Forced Air	Pulsed
SYT-4428 ⁴	8.5-9.5	1 Kw CW	40	10	CW	1.4	6 ⁶	7 ⁶	40 ⁶	Water	CW
SYT-4341 ^{1,7}	8.5-9.2	1 Mw pk	30	130	0.001	30	—	32 ⁶	100 ⁶	Water	Pulsed

NOTES

1. Tentative date—subject to revision.
2. Small signal gain.
3. Dimensions and weight include integral magnets.
4. Under development.
5. Glass barrel.
6. Dimensions and weight do not include solenoid.
7. Data represent typical performance. Inquiries for specific design modifications are invited.

MEDIUM NOISE FIGURE TUBES Covering the full frequency range from 0.5 Gc to 12.4 Gc, Sylvania medium-noise amplifiers provide r-f performance equivalent to that of conventional TWT's, and offer a substantially lower noise figure. They are ideally suited for airborne or ground-based equipment requiring both broad bandwidth and high sensitivity.

TYPE NO.	FREQUENCY Gc	MIN. PWR. OUT.	MIN. GAIN db ¹	TYP. HELIX Vdc	MAX. NOISE FIGURE	MAX. CATHODE CURRENT mA _{dc}	DIAM. INCHES ²	LENGTH INCHES ²	WEIGHT POUNDS ²	OPERATING TEMP.
SYT-4307	0.5-1.0	10 mW	35	90-250	19 db	10	3	18	6	0 to +55°C Note 3
SYT-4308	1-2	10 mW	30	250	15 db	5	2¼	17½	4	-55 to +72°C
SYT-4309	2-4	10 mW	30	450	15 db	4	2¼	17½	4	-55 to +72°C
SYT-4342	4-8	10 mW	30	700	15 db	3	2¼	15½	3¼	-55 to +72°C
SYT-4343	8-12.4	5 mW	25	1150	15 db	2.5	2¼	15½	3¼	-55 to +72°C

NOTES

1. Small signal gain.

2. Dimensions and weight include integral magnets.

3. Tubes capable of meeting MIL-E-5400 class II temperature requirements can be made available.

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SOLENOID FOCUSED TYPES Many of these rugged solenoid-focused tubes were developed to meet the stringent specifications of modern supersonic aircraft for the U.S. Air Force. The performance and reliability of these tubes have been proved by years of operation in airborne systems.

TYPE NO.	FREQUENCY Gc	MIN. PWR. OUT.	MIN. GAIN db	TYP. HELIX V.	DIAM. INCHES ³	LENGTH INCHES ³	WEIGHT POUNDS ³
6752	1-2	2 W	37	600	1¼	16	1½
SYT-620B ¹	1-2	2 W	37	600	1¼	16	1½
6559	2-4	2 W	37	825	1	15½	1
SYT-4171 ²	2.5-4.0	2 W	38	900	1	16	1¼
SYT-4168 ²	2.5-4.0	10 mW	36	425	1	16½	1¼
SYT-534B ¹	2-4	2 W	33	800	1	15½	1
SYT-4172 ²	8-11	2 W	36	2700	1.8, 0.5	11½	1
SYT-4169 ²	8-11	10 mW	36	1150	1	14½	1

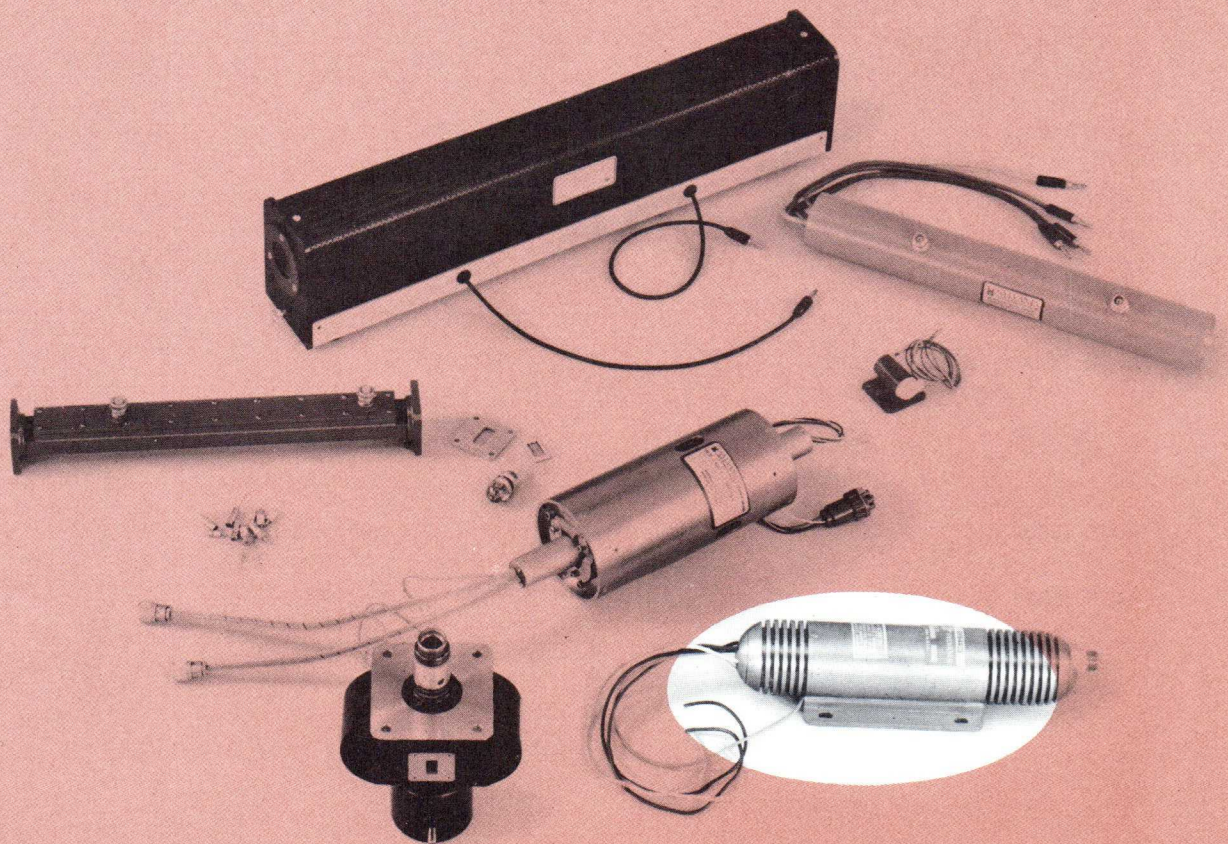
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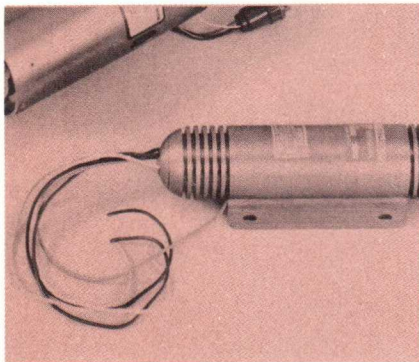
1. Glass barrel.

2. Metal-ceramic construction.

3. Dimensions and weight do not include focusing solenoid.

backward-wave oscillators





Sylvania backward-wave oscillators include helix types in Ku and K bands, and interdigital types in S, C, and X bands. All types include permanent magnet focusing. These tubes are used as swept oscillators in test equipment, and local oscillators in radar receivers and other signal-generating equipment.

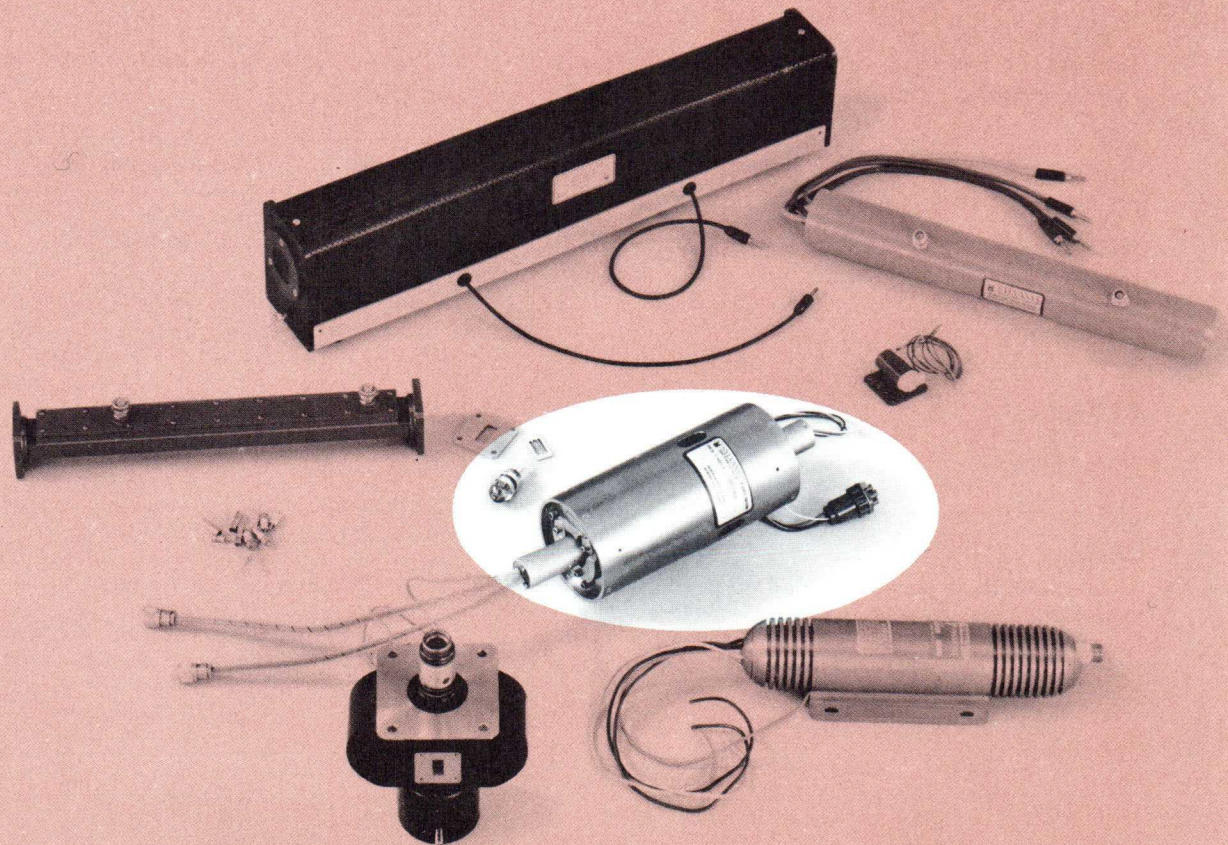
INTERDIGITAL TYPES

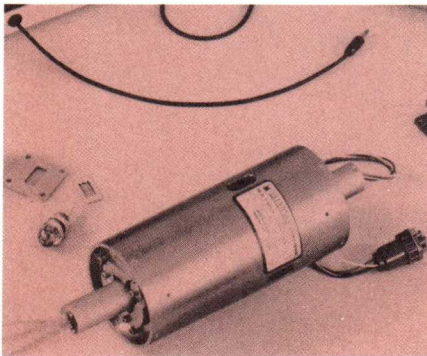
TYPE NO.	FREQUENCY (Gc)	MIN PO (mw)	DELAY LINE VOLTAGE (Vdc)	COOLING
SYB-4293A	2.3 - 4.1	100	215-1450	Ambient
SYB-4400	2.0 - 4.0	100	155-1350	Ambient
SYB-4401	2.7 - 5.4	30	150-1400	Ambient
SYB-4402	2.7 - 5.4	30	150-1400	Forced Air
SYB-4403	2.0 - 4.0	100	155-1350	Ambient
SYB-4404	2.0 - 4.0	80	155-1350	Forced Air
SYB-4405	2.9 - 3.3	150	400-625	Ambient
SYB-4406	3.7 - 5.5	150	350-1500	Ambient
SYB-4407	3.7 - 5.5	100	350-1500	Forced Air
SYB-4408	8.2 - 12.4	20	150-1450	Ambient

HELIX TYPES

TYPE NO.	CLASS	FREQUENCY Gc	MIN PO (mw)	HELIX VOLTAGE Vdc	TUBE LENGTH INCHES	TUBE DIAMETER INCHES	WEIGHT POUNDS
SYB-4352	0	12.4 - 18	20	300 - 1300	4 7/8	3 3/4	5 1/2
SYB-4289	0	18 - 26.5	5	300 - 1250	4 7/8	3 3/4	5 1/2

microwave phototubes





The Sylvania microwave phototube is a new type of microwave-optical receiving element capable of detecting and demodulating light signals carrying broadband microwave modulation. As a broadband optical receiver, it responds to microwave-amplitude-modulated light signals, using either coherent or incoherent light, with an output which directly reproduces the modulation envelope of the light over a video bandwidth covering approximately the frequency range of the tube (see below). In an optical superheterodyne receiver, the microwave phototube can

be used in conjunction with a laser local oscillator as the mixer and i-f sections of the receiver.

The tube permits demonstration for the first time of the feasibility of broadband communications systems employing optical masers and microwave light modulators.

Principal research applications for the microwave phototube include the study of coherent light emission from solid-state lasers, and measurements of natural modulation, multimoding, frequency pulling, and spectral width.

MICROWAVE PHOTOTUBES The electrical characteristics of Sylvania microwave phototubes are summarized below. Data are tentative and subject to revision as design refinements are made.

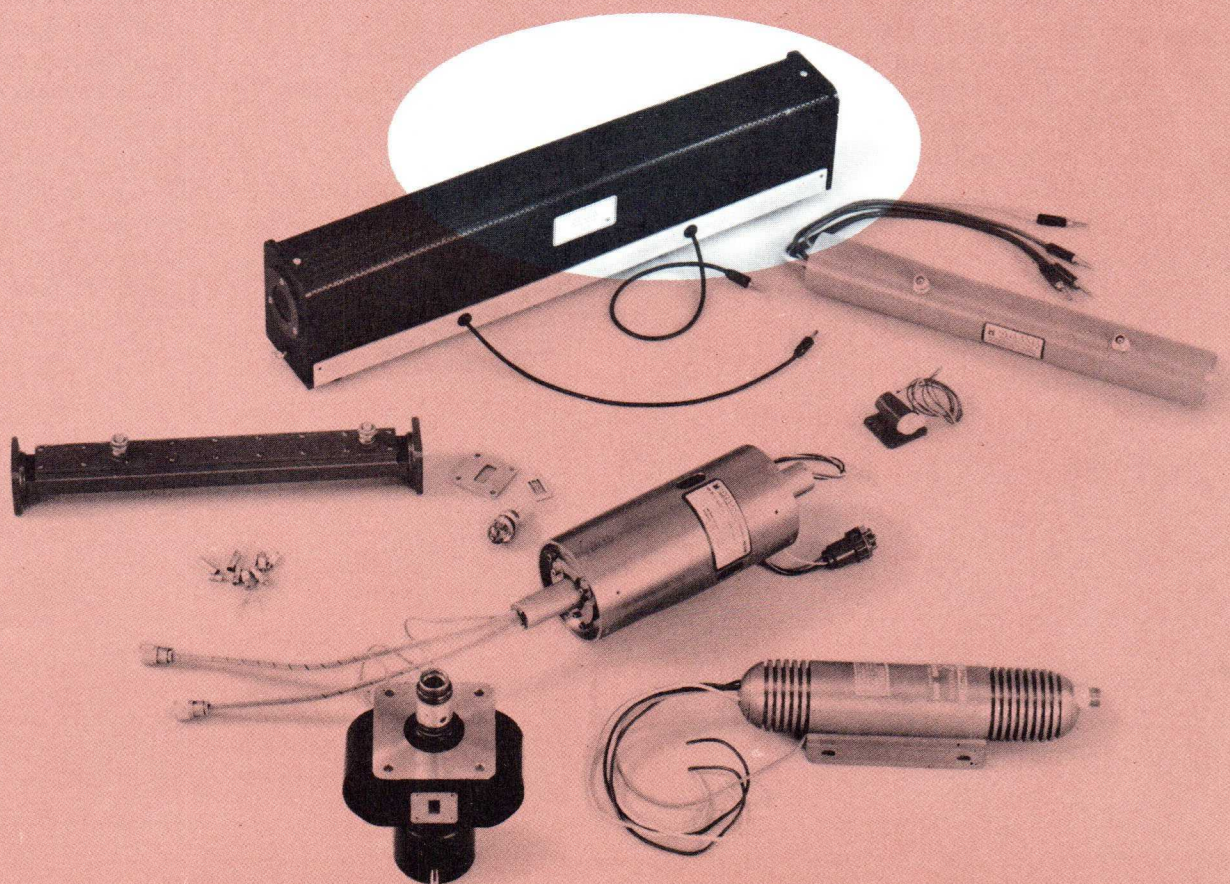
TYPE	FREQUENCY Gc	TYPE OF CATHODE	R-f POWER OUTPUT	HELIX VOLTAGE-Vdc
SYD-4301A	1-2	S-1 ¹	Note 2	220
SYD-4302A	2.5-4.0	S-1 ¹	Note 2	400
SYD-4303A ³	4-8	S-1 ¹	—	—
SYD-4304A	8-11	S-1 ¹	Note 2	900
SYD-4300A	11-20	S-1 ¹	Note 2	2900

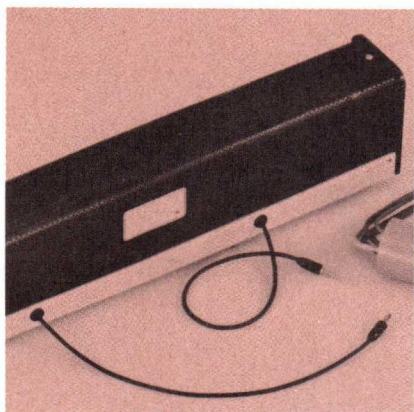
NOTES

1. S-1 photocathode provides greatest sensitivity. At wavelength of ruby laser (6943 Å), sensitivity of S-1 cathode is at least one order of magnitude greater than that of conventional cathode.
2. Power output is a function of the output power level of the laser.

- When operated with a pulsed ruby laser, Sylvania phototubes provide sufficient drive power for low-level TWT amplifiers. L- and S-band tubes are capable of driving an oscilloscope directly.
3. C-band phototubes are planned for future development.

gas lasers





Sylvania is currently producing three types of continuous-wave gas lasers. They are the SGL-62-111A, the SGL-62-111B and the SGL-63-100.

SGL-62-111A and SGL-62-111B

The SGL-62-111A and SGL-62-111B operate in the visible and infrared regions and are basically alike. The two models differ only in the method of mounting and support, the design of adjustment and alignment controls, and the materials used in the support structure.

The sealed-off quartz gas discharge tube, with external optics, allows complete versatility in experimentation with optical configuration and cavity geometry. The optics can be exchanged without disturbing the gas discharge tube or its fill. Confocal hemispherical, or planar optics can be employed. Access to the resonant cavity between the mirrors, but outside the laser

tube, permits experimentation in this interesting region of the laser.

The Brewster angle windows decrease losses by reflections and permit a higher gain per pass of the light beam resulting in higher power output. The all-quartz construction insures higher optical and dimensional stability. As a result of meticulous care in processing, extremely clean gas fill is maintained within the tube, insuring long life stability. The sealed-off tube eliminates the need for gas filling or vacuum pumping apparatus.

The output of the laser is in the milliwatt range at output wavelengths as determined by the reflectors used. Both models use the same gas discharge tube, mirrors, and RF generators.

The SGL-62-111B makes use of an Invar frame which provides greater thermal and mechanical stability. Resonator alignment on the SGL-62-111B is achieved by use of a high resolution manipulator system operating on one reflector. Axial alignment of the gas discharge tube is achieved by a micro-manipulator attached to each gas discharge tube support. The length of the resonator cavity is adjusted by means of a precision carriage.

The resonator support for the SGL-62-111B laser may also be used for optical measurements as a 100 ± 2.5 cm Fabry-Perot Interferometer. Removal of the gas tube and the

use of two planar mirrors as the resonant reflectors accomplishes this conversion.

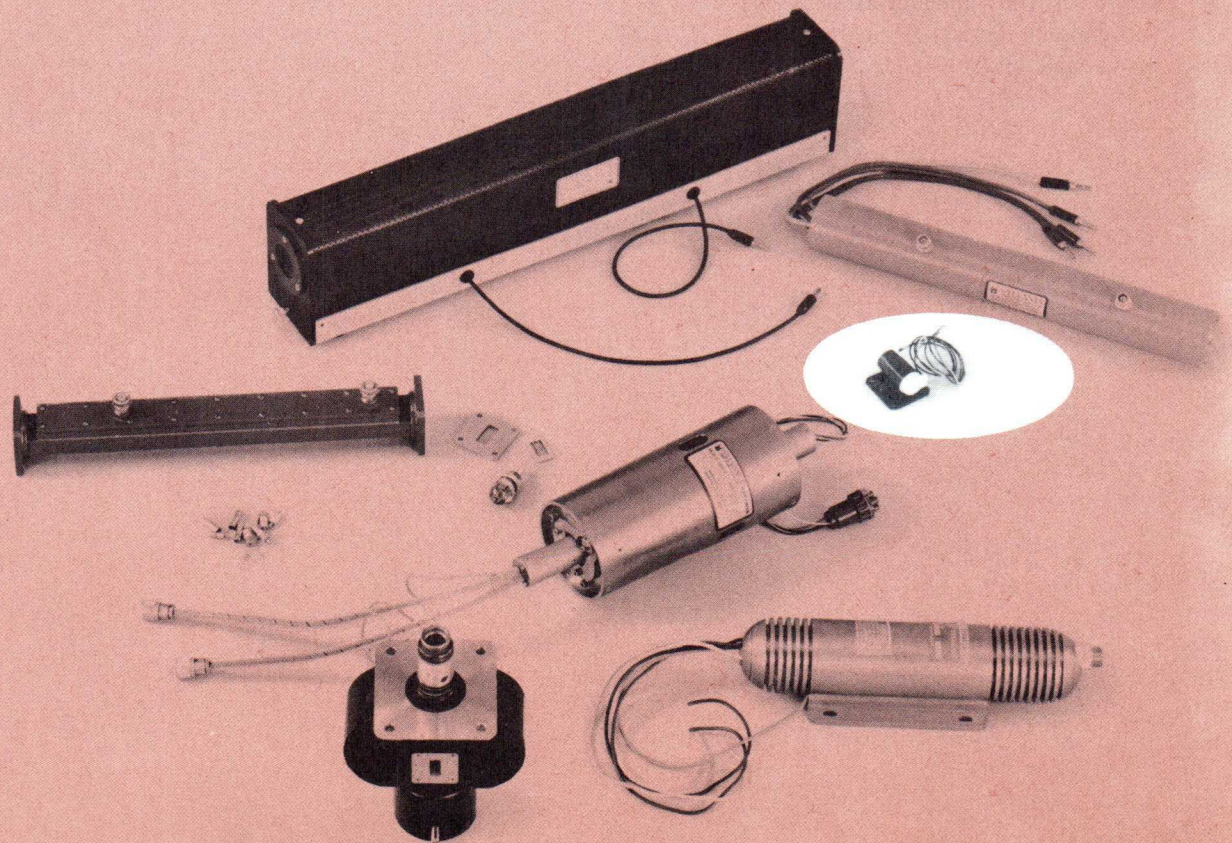
SGL-63-100

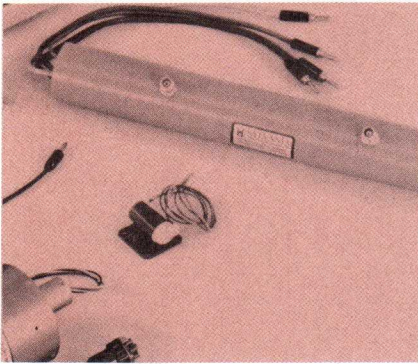
The Sylvania SGL-63-100 gas laser is a compact source of continuous radiation in the visible region at 6328\AA , designed for use as a signal source. It is intended for investigating the application of lasers to communications, ranging, metrology, and surveillance systems, and for studying the chemical and physical properties of materials.

All of the high-quality construction features of the SGL-61-111 series are retained in the SGL-63-100 laser. The all-quartz gas discharge tube with Brewster angle windows is of the same precision design and is processed with the same meticulous care as are the SGL-62-111 tubes. These tubes have operated for thousands of hours with no degradation of performance and without refill.

The SGL-63-100 laser, built around a 50-cm optical cavity, provides output power in the milliwatt range. Supplied with a hemispherical optical geometry, the unit generates a divergent output beam which can be collimated. The laser weighs less than 10 pounds, exclusive of supporting stand and separate power supply. A self-contained, crystal-controlled power supply drives the laser at 27.1 Mc.

klystrons





Sylvania reflex klystrons provide long, reliable service in receiver local oscillators, low-power transmitters, traffic monitoring and control radar, laboratory test equipment, and airborne weather radars.

Advanced fabrication techniques plus the industry's most highly developed quality control system permit 6000-hour warranties on all microwave communications oscillators and X-26 types, and 18-month warranties on disc-seal klystrons. With this extended coverage, Sylvania klystrons offer greater operating economy to the equipment user.

Further information about any tube on these pages, or the design of tubes for your specific application, is available from the nearest Sylvania sales office.

BROADBAND DISC SEAL KLYSTRONS

TYPE	DESCRIPTION	REFLECTOR MODE	FREQUENCY Mc	RESONATOR VOLTAGE Vdc	REFLECTOR VOLTAGE Vdc	CATHODE CURRENT mA _{dc}	HEATER VOLTAGE V	CW POWER OUTPUT mW	CONTROL ELECTRODE VOLTAGE DURING OPERATION (NOTE 1) Vdc	CONTROL ELECTRODE BIAS VOLTAGE Vdc	PULSED POWER OUTPUT mW
6BM6	Note 3	1 $\frac{3}{4}$	550-2300	325	- 235 (1500 Mc)	21	6.3	170 (1500 Mc)	0	-	
		2 $\frac{3}{4}$	1100-3000	325	- 220 (2200 Mc)	21	6.3	100 (2200 Mc)	0	-	
		3 $\frac{3}{4}$	1500-3800	325	- 210 (3000 Mc)	21	6.3	40 (3000 Mc)	0	-	
6BM6A	Note 3	1 $\frac{3}{4}$	550-2300	325	- 235 (1500 Mc)	21	6.3	170 (1500 Mc)	0	-300	See Note
		2 $\frac{3}{4}$	1100-3000	325	- 220 (2200 Mc)	21	6.3	100 (2200 Mc)	0	-300	2
		3 $\frac{3}{4}$	1500-3800	325	- 220 (3000 Mc)	21	6.3	40 (3000 Mc)	0	-300	
5837	Note 3	1 $\frac{3}{4}$	550-2300	325	- 235 (1500 Mc)	23	6.3	170 (1500 Mc)	+ 10	-10	See Note
		2 $\frac{3}{4}$	1100-3000	325	- 220 (2200 Mc)	23	6.3	100 (2200 Mc)	+ 10	-10	2
		3 $\frac{3}{4}$	1500-3800	325	- 210 (2200 Mc)	23	6.3	40 (3000 Mc)	+ 10	-10	
6BL6	Note 3	1 $\frac{3}{4}$	1400-4000	325	- 230 (2500 Mc)	26	6.3	250 (2500 Mc)	0	-	
		2 $\frac{3}{4}$	2100-4600	325	- 140 (3200 Mc)	26	6.3	125 (3200 Mc)	0	-	
		3 $\frac{3}{4}$	3000-6500	325	- 200 (5000 Mc)	26	6.3	30 (5000 Mc)	0	-	
5836	Note 3	1 $\frac{3}{4}$	1400-4000	325	- 230 (2500 Mc)	26	6.3	250 (2500 Mc)	+ 10	-10	See Note
		2 $\frac{3}{4}$	2100-4600	325	- 140 (3200 Mc)	26	6.3	125 (3200 Mc)	+ 10	-10	2
		3 $\frac{3}{4}$	3000-6500	325	- 200 (5000 Mc)	26	6.3	30 (5000 Mc)	+ 10	-10	

NOTES

1. In pulsed operation of pulsed types, the control electrode voltage is pulsed from the indicated bias level to the indicated operating voltage. Pulse repetition rate: 40 to 4000 pps. Minimum pulse duration: 0.5 μ sec.
2. Pulsed power output is not more than 1.5 db below the corresponding CW output.
3. Disc seal construction. Maximum seal temperature: 175°C. For use with an external cavity.

KLYSTRONS

MICROWAVE COMMUNICATIONS OSCILLATORS New SK-720 and SK-722 Gold Brand klystrons, now available in quantity, provide an inexpensive means of raising the power level of existing equipment. These tubes are direct replace-

ments for SK-220 and SK-222 types and require no circuit modification to achieve 1 watt minimum r-f power output. Sylvania Gold Brand klystrons are designed for 10,000-hour life expectancy.

TYPE	DESCRIP- TION	RESONATOR VOLTAGE Vdc	REFLECTOR VOLTAGE Vdc	MAX. CATHODE CURRENT mAdc	HEATER VOLTAGE V	CW POWER OUTPUT		MIN. ELECTRONIC TUNING RANGE-MC	COOLING	OUTPUT FLANGE MATES WITH
						Min.	Avg.			
SK-720A, B, C, D, E, F, G, Z	Note 4	750	-250 to -400	80	6.3	1.0 W	1.3 W	28	FA	UG-343A/U choke
SK-722A, B, C, D, E, F, G, Z	Note 5	750	-250 to -400	80	6.3	1.0 W	1.3 W	28	Cond.	CMR-137 flange
SK-220A, B, C, D, E, F, G, Z	Note 6	750	-250 to -400	80	6.3	0.7 W	1.0 W	28	FA	UG-343A/U choke
SK-222A, B, C, D, E, F, G, Z	Note 7	750	-250 to -400	80	6.3	0.7 W	1.0 W	28	Cond.	CMR-137 flange
SK-221A, B, C, D, E, F, G, K	Note 6	300	-75 to -115	30	6.3	25 mW	35 mW	25	Conv.	UG-343A/U choke
SK-221H	Note 8	250	-120 to -170	35	6.3	20 mW	40 mW	25	Cond., Conv.	CMR-159 flange

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MECHANICAL TUNING RANGE

—	—	SK-221H	5250-5560 Mc	—	—
—	—	SK-221K	5860-6160 Mc	—	—
SK-720/SK-220F	5925-6225 Mc	SK-221F	5985-6285 Mc	SK-722/SK-222F	5925-6225 Mc
SK-720/SK-220E	6125-6425 Mc	SK-221E	6285-6585 Mc	SK-722/SK-222E	6125-6425 Mc
SK-720/SK-220G	6425-6575 Mc	SK-221G	6505-6705 Mc	SK-722/SK-222G	6425-6575 Mc
SK-720/SK-220D	6575-6875 Mc	SK-221D	6705-7005 Mc	SK-722/SK-222D	6575-6875 Mc
SK-720/SK-220C	6875-7125 Mc	SK-221C	6955-7255 Mc	SK-722/SK-222C	6875-7125 Mc
SK-720/SK-220B	7125-7425 Mc	SK-221B	7255-7555 Mc	SK-722/SK-222B	7125-7425 Mc
SK-720/SK-220A	7425-7750 Mc	SK-221A	7750-7850 Mc	SK-722/SK-222A	7425-7750 Mc
SK-720/SK-220Z	7750-8100 Mc	—	—	SK-722/SK-222Z	7750-8100 Mc

NOTES

4. Premium quality Gold Brand type.
Metal construction, CW operation. External integral cavity. Single screw tuning.
5. Premium quality Gold Brand type.
Metal construction, CW operation. External integral cavity. Single screw tuning.

6. Metal construction, CW operation.
External integral cavity. Single screw tuning.
7. Metal construction, CW operation.
External integral cavity. Single screw tuning.
8. Metal construction, CW operation.
External integral cavity. Single screw tuning.

KLYSTRONS

X-26 SERIES X-26 klystrons have achieved wide usage as local oscillator and transmitter tubes in microwave relay equipment. They are no longer specified in new systems, having been replaced by the higher-performance SK-220

and SK-720 series, but are used primarily as replacement tubes. These tubes operate with 6.3-volt heaters and are fitted with waveguide outputs mating with UG-343A/U or UG-344/U flanges.

TYPE	DESCRIP- TION	REFLECTOR MODE	FREQUENCY RANGE Mc	RESONATOR VOLTAGE Vdc	REFLECTOR VOLTAGE Vdc	CATHODE CURRENT mA _{dc}	CW POWER OUTPUT mW
6468	Note 9	3 $\frac{3}{4}$	6125-6425	750	-250 to -400	80 (max.)	1 W
		5 $\frac{3}{4}$	6125-6425	500	-50 to -150	48 (max.)	100
6469	Note 9	3 $\frac{3}{4}$	6575-6875	750	-250 to -400	80 (max.)	1 W
		5 $\frac{3}{4}$	6575-6875	500	-50 to -150	48 (max.)	100
6470	Note 9	3 $\frac{3}{4}$	7125-7425	750	-250 to -400	80 (max.)	1 W
		5 $\frac{3}{4}$	7125-7425	500	-50 to -150	48 (max.)	100
K-839B	Note 9	3 $\frac{3}{4}$	7125-7425	750	-250 to -400	80 (max.)	1 W
K-840B	Note 9	3 $\frac{3}{4}$	6575-6875	750	-250 to -400	80 (max.)	1 W
K-841B	Note 9	3 $\frac{3}{4}$	6125-6425	750	-250 to -400	80 (max.)	1 W
K-4008	Note 9	3 $\frac{3}{4}$	5900-6300	750	-280 to -380	70	900-1200
		4 $\frac{3}{4}$	5700-6300	500	-140 to -215	42	200-360
		4 $\frac{3}{4}$	5300-5800	300	-160 to -220	18	50-100
		5 $\frac{3}{4}$	5300-6000	300	-60 to -150	18	20-60
K-4009	Note 9	3 $\frac{3}{4}$	6000-6600	750	-260 to -390	70	900-1300
		4 $\frac{3}{4}$	5900-6500	500	-130 to -210	42	170-330
		4 $\frac{3}{4}$	5300-5900	300	-150 to -210	18	40-100
		5 $\frac{3}{4}$	5300-6200	300	-60 to -150	18	20-60
K-4010	Note 9	3 $\frac{3}{4}$	6500-7125	750	-260 to -390	70	950-1400
		4 $\frac{3}{4}$	6200-6900	500	-120 to -200	42	160-360
		4 $\frac{3}{4}$	5800-6200	300	-140 to -180	18	60-100
		5 $\frac{3}{4}$	5800-6600	300	-70 to -130	18	20-60
K-4011	Note 9	3 $\frac{3}{4}$	6875-7500	750	-240 to -360	70	800-1400
		4 $\frac{3}{4}$	6800-7425	500	-135 to -190	42	200-330
		4 $\frac{3}{4}$	6300-6700	300	-150 to -185	18	60-90
		5 $\frac{3}{4}$	6300-7125	300	-80 to -150	18	20-50

NOTES

9. Metal construction, CW operation. Internal cavity. Single screw tuning.

METAL-CERAMIC KLYSTRONS Sylvania metal-ceramic klystrons are rugged, weatherproof reflex oscillators which are available either with or without integral cavities. The basic tube, when used with a tunable external cavity, operates over the frequency range 4 to 14 Gc in 5 modes. It is particularly adapted for use in signal generators, spectrum analyzers, and other local oscillator applications where broad-band frequency coverage is needed.

For applications requiring tubes with integral cavities,

various frequencies and power levels are available. The tabulation below shows a representative selection of types operating in X and Ku bands. These tubes are fitted with flying leads for mounting flexibility and have molded end caps for high resistance to severe environmental conditions. They are suitable for use in speedtiming radar systems and as local oscillators in airborne weather radars, in airborne doppler navigational devices, in plasma research, and as parametric amplifier pumps.

TYPE	REFLECTOR MODE	FREQ. RANGE Gc	RESONATOR VOLTAGE Vdc	REFLECTOR VOLTAGE Vdc	CATHODE CURRENT mAdc	HEATER VOLTAGE V	CW POWER OUTPUT mW	ELECTRONIC TUNING RANGE Mc
CAVITY REQUIRED								
SYK-4203A	3 $\frac{3}{4}$	4-10	350	220 @ 7 Gc	40	6.3	60	15
	4 $\frac{3}{4}$	5-11.5	—	—	—	6.3	—	—
	5 $\frac{3}{4}$	6-12.5	350	175 @ 9 Gc	40	6.3	70	20
	6 $\frac{3}{4}$	7-13.5	—	—	—	6.3	—	—
	7 $\frac{3}{4}$	8-14	350	140 @ 11.5 Gc	40	6.3	50	25

METAL-CERAMIC KLYSTRONS (continued)

TYPE	DESCRIP- TION	FREQ. Gc	RESO- NATOR VOLTAGE Vdc	REFLECTOR VOLTAGE Vdc	MAX. CATHODE CURRENT mA _{dc}	HEATER VOLTAGE V	CW POWER OUTPUT-mW		MIN. ELECTRONIC TUNING RANGE Mc	OUTPUT FLANGE MATES WITH
							Min.	Avg.		
INTEGRAL CAVITY										
SYK-4312	Note 10	10.525	300	-150 to -200	55	6.3	20	40	15	UG-39/U and UG-135/U
SYK-4313	Note 10	10.525	300	-160 to -180	55	6.3	50	60	25	UG-39/U and UG-135/U
SYK-4331	Note 10	10.525	300	-150 to -200	55	6.3	50	55	25	UG-39/U and UG-135/U
SYK-4332	Note 10	10.525	325	-125 to -200	55	6.3	50	65	25	UG-39/U and UG-135/U
SYK-4333	Note 11	10.525	250	-25 to -90	55	6.3	20	25	15	UG-39/U and UG-135/U
SYK-4333A	Note 12	10.525	250	-25 to -90	55	6.3	20	25	15	UG-39/U and UG-135/U
SYK-4334	Note 13	9.345	350	-170 to -240	55	6.3	25	40	20	UG-39/U and UG-135/U
SYK-4335	Note 14	13.295	300	-75 to -115	55	6.3	20	25	20	UG-419/U
SYK-4339	Note 13	9.375	250	-125 to -175	55	6.3	25	40	20	UG-39/U and UG-135/U
SYK-4389	Note 15	13.350	400	-75 to -130	55	6.3	20	40	30	UG-419/U
SYK-4379	Note 10	12.24	400	-50 to -110	50	6.3	20	30	20	UG-39/U

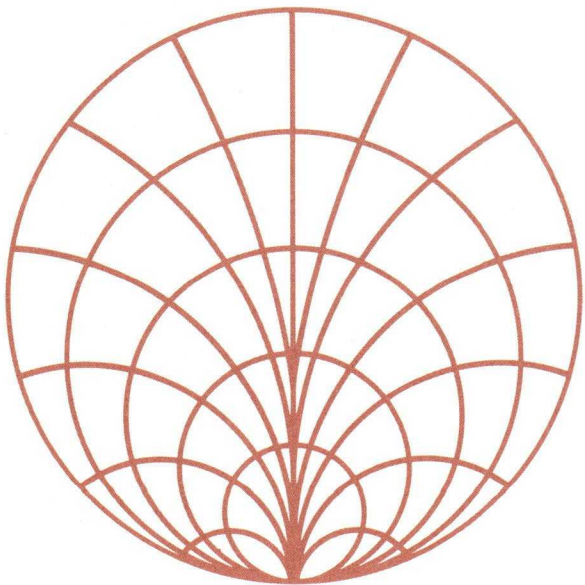
NOTES

10. Ruggedized construction.

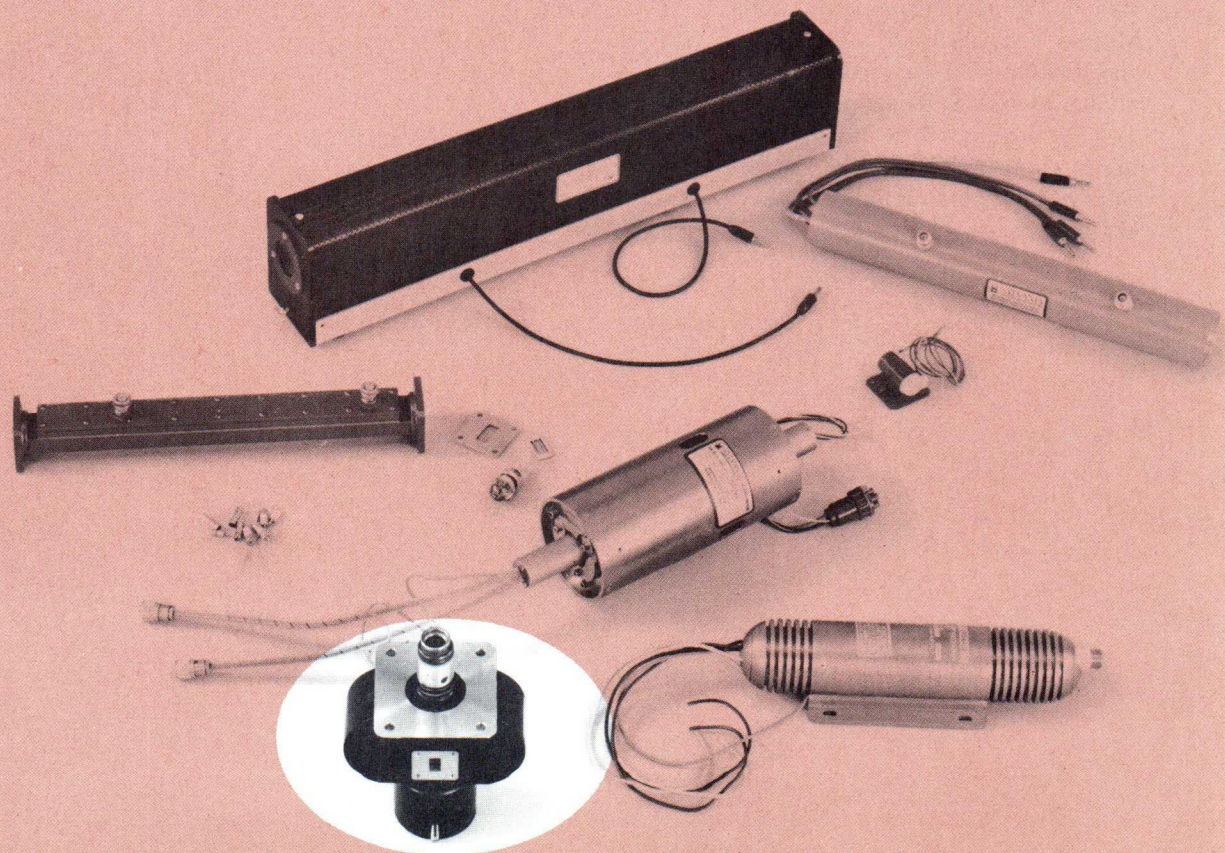
11. Ruggedized construction.

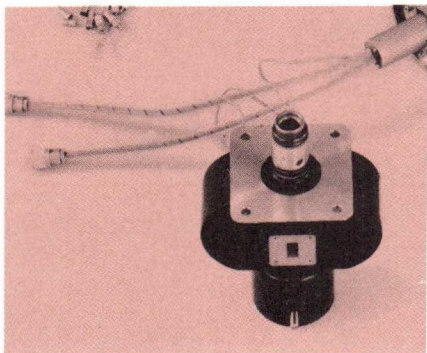
12. Ruggedized construction with 8-pin octal base.

13. Ruggedized construction with frequency trimmer to allow ± 50 Mc adjustment.14. Ruggedized construction with frequency trimmer to allow ± 30 Mc adjustment.15. Ruggedized construction with frequency trimmer to allow ± 55 Mc adjustment.



magnetrons





The magnetron product line of the Microwave Device Division consists of pulsed types in the low-to-medium power category, and tunable and fixed frequency types in X, Ku, K, and Ka bands. In X-band, Sylvania offers magnetrons ranging in peak power from 100 watts (beacon applications) to 220 kilowatts for use in airborne radar fire control equipment. The X-band tunable group also includes the 22-kilowatt type SYM-4264 and the 75-kilowatt type 6543.

All of the magnetrons shown in this catalog are products of the extensive development and production facilities at Williamsport, Pennsylvania. In addition to the types shown, a number of magnetrons, M-type backward-wave oscillators, and crossed-field forward-wave amplifiers are under development.

For further information on these tubes, contact the nearest Sylvania sales office, listed on the back cover of this catalog.

SYLVANIA PULSED MAGNETRONS/X BAND LOW POWER

TYPE NO.	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	PAV (kv)	MAXIMUM RATINGS				TYPICAL OPERATION				NOMINAL POWER OUTPUT (kw)
					PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	
7503	MT	9300-9500	0.37	2	1.15	3.75	1.5	.002	1.45	0.95	0.4	.0004	0.14
											1.0	.002	
2J42	FF	9375 \pm 30	3	6	5.5	82.5	2.5	.0025	5.5	4.5	1.0	.002	9.5
											2.0	.001	
2J42H	FF	9375 \pm 30	3	6	5.5	70	2.5	.002	5.15	4.5	0.45	.00036	9.5
SYM-4450 ²	MT	9050-10,000	5	5	9	45	0.7	.001	4.8	7	0.5	.00075	11
6027	FF	9375 \pm 30	5	8	8	80	2.5	.0025	6.5	3.5	1.0	.002	22
									6.9	7.5		.001	
SYM-4264	MT	9600-10,000	5	8	10	90	2.0	.0015	7.8	8	0.33	.001	22
SYM-4380	FF	9375 \pm 30	3.75	8	8	64	2.2	.001	7	7	2.1	.001	22
SYM-4242	FF	9375 \pm 30	5	8	8	80	2.7	.0025	7.2	7.5	2.5	.001	23
SYM-4398	FF	9375 \pm 30	3.75	9	9	80	2.2	.001	8	8.25	2.1	.001	26

SYLVANIA PULSED MAGNETRONS/X BAND MEDIUM POWER

TUBE TYPE	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	PAV (kv)	MAXIMUM RATINGS				TYPICAL OPERATION				NOMINAL POWER OUTPUT (kw)
					PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	
6543	MT	8500-9600	6	16	15	250	4.5	.0013	15	15	0.375	.0003	75
											1.0	.0007	
											3.2	.001	
SYM-4385 ²	HT	8500-9600	8.5	16	15	250	2.25	.0011	15	15	1.0	.0008	75
4J52A	FF	9375 \pm 30	5	16	15	240	5.5	.0013	15.0	15	0.4	.00065	85
									15.5		5.0	.001	
SYM-4340	FF	9700 \pm 30	7	17	15	306	3.0	.0012	16	15	0.5	.001	110

SYLVANIA PULSED MAGNETRONS/X BAND HIGH POWER

TUBE TYPE	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	MAXIMUM RATINGS					TYPICAL OPERATION				
				PAV (kv)	PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	NOMINAL POWER OUTPUT (kw)
7006	MT	9000-9600	11	23	30	690	3.3	.0013	21.5	27.5	0.12 1.0	.00018 .001	220
SYM-4164B	MT	8500-9600	10	23	30	690	3.3	.0013	21.5	27.5	0.25 2.25	.001	.220
7692	MT	9200-9550	12	23	30	690	3.3	.0013	21.5	27.5	0.575 1.5	.001	220
7692A	MT	8550-9650	12	23	30	690	3.3	.0013	21.5	27.5	0.27 1.0 2.5	.0004 .0008 .00075	220
7008	MT	8500-9600	12	23	30	690	3.3	.0013	21.5	27.5	0.25 0.5 2.5	.001	220
SYM-4310 ²	HT	8500-9400	13.5	23	30	690	2.5	.0013	21.5	27.5	0.25 2.5	.001	220
4J50	FF	9375 \pm 30	10	23	27.5	635	6.0	.002	21.5 22.5	18 27.5	5.5 1.0	.001	175 260
4J50A	FF	9375 \pm 30	10	23	27.5	750	6.0	.001	21.5 22.5	18 27.5	5.5 0.5	.001	175 260
SYM-4371 ^{2,3}	MT	8500-9600	12	23	30	690	3.3	.0013	21.5	27.5	0.25	.001	270
SYM-4397 ²	MT	9050-10,000	15	30	44	1000	3.3	.0012	28	38	1.0	.00075	350

SYLVANIA PULSED MAGNETRONS/K_e BAND

TUBE TYPE	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	MAXIMUM RATINGS					TYPICAL OPERATION				
				PAV (kv)	PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	NOMINAL POWER OUTPUT (kw)
SYM-4370 ²	FF	13,325 \pm 30	1.56	0.9	0.28	63	5.0	.25	0.8	0.24	2.5	.25	0.048

SYLVANIA PULSED MAGNETRONS/Ku BAND

TUBE TYPE	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	MAXIMUM RATINGS					TYPICAL OPERATION				
				PAV (kv)	PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	NOMINAL POWER OUTPUT (kw)
SYM-4426 ²	MT	16,000-17,000	7.5	14	14	272	3.3	.001	12	12	1.0	.001	35
SYM-4451 ²	FS	15,500-17,500	5.5	13	13	169	1.0	.001	12	9.5	0.4	.001	40
SYM-4362	MT	16,000-17,000	7.5	18	18	272	3.3	.001	15-17	16	0.5 1.0 2.0	.001 .001 .001	75
SYM-4419 ²	FF	16,500	6.5	18	18	272	3.3	.001	16	16	1.0	.001	90
SYM-4328 ²	HT	15,500-17,500	11	18	19	272	3.3	.001	16.5	16.5	0.25 3.0	.001	105
SYM-4417 ²	MT	15,500-17,500	7.5	18	18	350	3.3	.001	16	18	1.0	.001	115
7208B	MT	15,500-17,500	14	20	20	350	3.3	.001	16.5-19	19	3.0 0.25	.001 .0007	120 125

35

SYLVANIA PULSED MAGNETRONS/K BAND

TUBE TYPE	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	MAXIMUM RATINGS					TYPICAL OPERATION				
				PAV (kv)	PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	NOMINAL POWER OUTPUT (kw)
SYM-4316	FF	24,000 \pm 200	4	15	20	140	1.0	.001	13.6	8	1.0	.001	26
									14.0	15	0.25	.0005	40
									14.3	20	0.02	.0003	53
6551	FF	24,000 \pm 200	7.5	16	18	270	1.0	.0007	14.0	15	0.15	.0006	45
7449A	FF	24,000 \pm 200	7.3	16	30	200	1.0	.001	14.5	12	1.0	.0005	36
									15.0	25	0.1	.0004	70
									15.2	30	0.02	.0004	80

SYLVANIA PULSED MAGNETRONS/Ka BAND

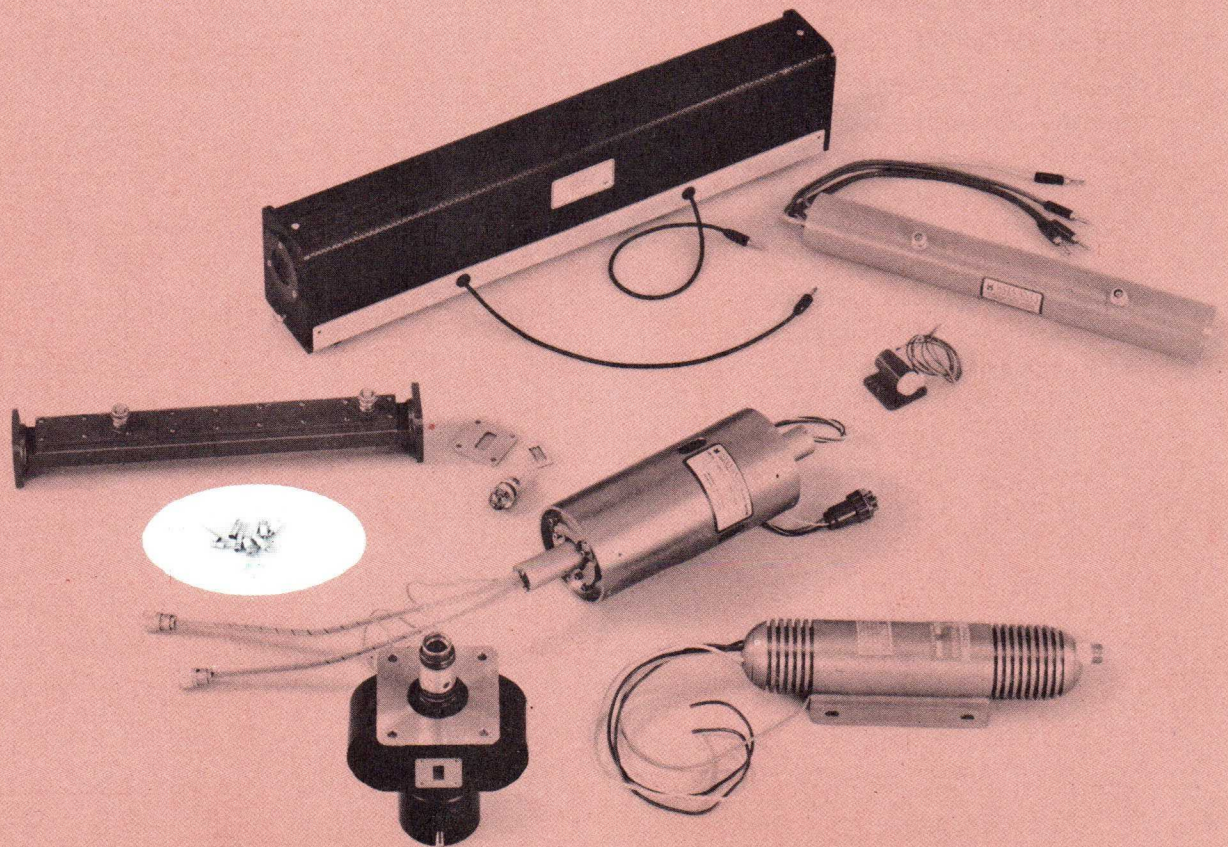
TUBE TYPE	TUNING ¹	FREQUENCY (Mc)	WEIGHT (lbs.)	PAV (kv)	MAXIMUM RATINGS				TYPICAL OPERATION				NOMINAL POWER OUTPUT (kw)
					PEAK ANODE CURRENT (a)	AVG. POWER INPUT (W)	PULSE DURATION (μ s)	DUTY CYCLE	PAV (kv)	PEAK ANODE CURRENT (a)	PULSE DURATION (μ s)	DUTY CYCLE	
SYM-4350²	FF	34,860 \pm 348	1.3	7	4	16	0.6	.001	6.5	3	0.5	.0005	2.5
SYM-4218	FF	34,860 \pm 348	4	13	18	108	1.0	.0006	11.5	13.3 17.5	0.4 0.1	.0006 .0004	24 32
7619	FF	34,860 \pm 348	9	13	25	176	1.0	.001	12.0 12.5 12.8	12 20 25	1.0 0.25 0.1	.001 .00025 .0004	32 50 62.5
8366	FF	33,200 \pm 200	10.5	13	25	176	1.0	.001	12.0 12.5 12.8	12 20 25	1.0 0.25 0.1	.001 .00025 .0004	32 50 62.5
SYM-4306	FS	34,700-35,000	9	21	30	220	1.0	.0008	19.5 20.0 20.5	13.8 20 30	1.0 0.5 0.1	.0008 .0005 .0003	55 82 120
SYM-4064A	FF	34,850 \pm 150	9	22	30	220	1.0	.0008	19.5 20.0 21.0	13.8 20 30	1.0 0.5 0.1	.0008 .0005 .0003	75 100 135
SYM-4158	FF	34,860 \pm 348	27	22	50	220	1.0	.001	21.0	22 43	0.8 0.1	.0005 .0002	105 190

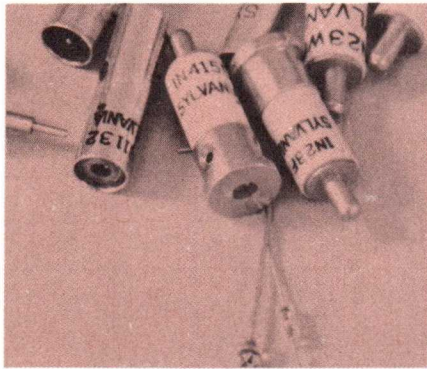
NOTES

1. Tuning: FF = Fixed Frequency
 FS = Frequency Settable
 MT = Mechanically Tuned
 HT = Hydraulically Tuned

2. Tentative Data
 3. High pull magnetron for pulse compression systems.

microwave diodes





In 1942, Sylvania produced its first commercially available microwave diode. Since then, Sylvania has become a world leader both in its contributions to the state of the art and as an unmatched producer of the world's most reliable microwave diode devices.

Sylvania's present manufacturing skills and new product capabilities are a direct result of more than 20 years of time-tested experience . . . experience which over the years, has produced such industry-recognized building-blocks as tripolar crystal design and 32-Gc tunnel diodes.

The two-decade benefits of Sylvania's advanced engineering technology, improved production techniques, and quality-proven reliability are at your service—eager to prove to you that Sylvania "knowmanship" is, and always will be, in pace with today—and a step ahead of tomorrow.

SYLVANIA VIDEO DETECTOR DIODES

H.S.1	TYPE NUMBER			ELECTRICAL CHARACTERISTICS							TEST CONDITIONS		BURNOUT			BASIC TYPE
	POLARITY			FRE- QUENCY BAND	TSS @ BW=10 mc (-dbm)	FM (min)	Eo (mv)	Rv-K ohms (min) (max)	Holder	Freq. mc	Ratings		Test			
	FORWARD	REVERSE	REVERSIBLE								CW mW	Peak @ 1 μ s w	Peak @ 1.0 μ s w			
											RF Power		Pulse Gen.			
x	1N830			100 mc	Detector with rectification efficiency of 65% min.					100	375	15.0		1N830		
x	1N830A			100 mc	Peak inverse voltage 5.0V min.					100	375	15.0		1N830A		
	1N79			Up to S	Meter rectifier					3000	325	7.5		1N79		
	1N358	1N358R		L-X	40	15	15	4.5	18.0	P-9	1K-12.4K	175	.75	.02	1N358	
	1N630	1N630R		L-X	40	15	15	4.5	18.0	P-9	1K-12.4K	175	.75	.02	1N630	
	1N358A	1N358AR		L-X	45	30	30	4.5	18.0	P-9	1K-12.4K	175	.75	.02	1N358A	
	1N369A**	1N369AR**		L-X	40	15	15	4.5	18.0	P-9	1K-12.4K	175	.75	.02	1N369A	
x	1N32†	1N32R	1N2102	S	49††	85		4.0	22.0	152-JAN	3295	375	12.5	.36	1N32	
	1N369**	1N369R**		S-X	40	15	15	4.5	18.0	P-9	3K-12.4K	175	.75	.02	1N369	
	1N1610**	1N1610R**		S-X	40	15	15	4.5	18.0	P-9	3K-12.4K	175	1.0	.16	1N1610	
x	1N1611	1N1611R	D4072	X	51††	130*		1.7*	3.1*	P-7	9000	325	1.0	.16	1N1611	
x	1N1611A	1N1611AR	D4072A	X	53††	220*		1.7*	3.1*	P-7	9000	325	1.0	.16	1N1611A	
	1N31†			X	47††	55		6.0	23.0	118-JAN	9375	175	.75	.02	1N31	
x	1N31A			X	53††	200		3.0	17.0	118-JAN	9375	175	.75	.02	1N31A	
	1N76	1N76R		X	Sonobuoy applications					9375	175	.75	.02	1N76		
	1N76A	1N76AR		X	Sonobuoy applications					9375	175	.75	.02	1N76A		
x	1N833			X	40	15		4.5	18.0	106-JAN	9375	175	.75	.02	1N833	
x	1N833A			X	45			4.5	18.0	106-JAN	9375	175	.75	.02	1N833A	
x	1N3143	1N3143R	1N3778	X	Power Monitor	Characteristics controlled over -20 to +10 dbm power range			106-JAN	9375	325	7.5			1N3778	
x			D4919 ²	X	Power Monitor	Characteristics controlled over -20 to +10 dbm power range			106-JAN	9375	325	7.5			D4919	
	1N2926	1N2926R		X-K	40	15		-	18.0	P-1 & P-2	10K-21K	200	1.5	.02	1N2926	
	1N2926A	1N2926AR		X-K	45	30		-	18.0	P-1 & P-2	10K-21K	200	1.5	.02	1N2926A	
	D4194			Ku	48	100		4.5	18.0	Optimized	16K	200	1.5	.02	D4194	
	D4194A			Ku	51	200		4.5	18.0	Optimized	16K	200	1.5	.02	D4194A	
	D4195			K	48	100		4.5	18.0	Optimized	24K	200	1.5	.02	D4195	
	D4195A			K	51	200		4.5	18.0	Optimized	24K	200	1.5	.02	D4195A	
	D4196			Ka	45	50		4.5	18.0	Optimized	35K	90	0.5	.02	D4196	
	D4196A			Ka	48	100		4.5	18.0	Optimized	35K	90	0.5	.02	D4196A	
	1N446	1N446R		Ka	40	15		3.0	23.0	174-JAN	26K-40K	90	0.5	.02	1N446	
	D4074			Q-W	40	25		-	23.0	Integral	40K-80K	75	0.25	.02	D4074	
	D4074A			Q-W	45	50		-	23.0	Integral	40K-80K	75	0.25	.02	D4074A	

**Built-in DC Return
 †with 50 μ a Bias
 †Available as JAN types which meet all requirements of applicable MIL-E-1/
 - Specifications.

††Calculated
 1Hermetically Sealed
 2Solder Sealed

SYLVANIA MICROWAVE MIXER DIODES

H.S. ²	TYPE NUMBER					FREQUENCY BAND	ELECTRICAL C		
	POLARITY		REVERSIBLE	MATCHED PAIRS ¹			COMPARATIVE** NOISE FIGURE	NF max (Nif=1.5db) db	
	FORWARD	REVERSE		FORWARD PAIR	FORWARD & REVERSE				
x	1N25*	1N25R	D4084	1N25M D4084M	1N25MR D4084MR	L	12.6		
x	1N25A	1N25AR	D4084A	1N25AM D4084AM	1N25AMR D4084AMR	L	10.3		
x	1N25B	1N25BR	D4084B	1N25BM D4084BM	1N25BMR D4084BMR	L	8.3	8.3	
x	1N21C*	1N21CR	1N416C	1N21CM 1N416CM	1N21CMR 1N416CMR	S	8.3		
x	D4186C ³	D4186CR ³	D4188C ³	D4186CM D4188CM	D4186CMR D4188CMR	S	8.3		
x	1N831					S	8.3		
x	1N21D	1N21DR	1N416D	1N21DM 1N416DM	1N21DMR 1N416DMR	S	7.3		
x	D4186D ³	D4186DR ³	D4188D ³	D4186DM D4188DM	D4186DMR D4188DMR	S	7.3		
x	1N21E	1N21ER	1N416E	1N21EM 1N416EM	1N21EMR 1N416EMR	S	7.0	7.0	
x	D4186E ³	D4186ER ³	D4188E ³	1N21EM D4188EM	D4186EMR D4188EMR	S	7.0	7.0	
x			1N21WE*	1N21WEM		S	7.0	7.0	
x	1N831A					S	7.0	7.0	
x	1N21F	1N21FR	1N416F	1N21FM 1N416FM	1N21FMR 1N416FMR	S	6.0	6.0	
x	D4186F ³	D4186FR ³	D4188F ³	D4186FM D4188FM	D4186FMR D4188FMR	S	6.0	6.0	
x	D4180C	D4180CR	1N3655	D4180CM 1N3655M	D4180CMR 1N3655MR	S	8.3		
x	D4180E	D4180ER	1N3655A	D4180EM 1N3655AM	D4180EMR 1N3655AMR	S	7.0	7.0	
	1N1132	1N1132R				S-X	9.5	9.5	
x	1N23C*	1N23CR*	1N415C	1N23CM 1N415CM	1N23CMR 1N415CMR	X	9.5	10.0†	
x	D4187C ³	D4187CR ³	D4189C ³	D4187CM D4189CM	D4187CMR D4189CMR	X	9.5	10.0†	
x	1N832					X	9.5	10.0†	
x	1N149	1N149R		1N149M	1N149MR	X	8.3		
x	1N23D	1N23DR	1N415D	1N23DM 1N415DM	1N23DMR 1N415DMR	X	7.8	8.5†	
x	D4187D ³	D4187DR ³	D4189D ³	D4187DM D4189DM	D4187DMR D4189DMR	X	7.8	8.5†	
x	1N23E	1N23ER	1N415E	1N23EM 1N415EM	1N23EMR 1N415EMR	X	7.5	7.5	
x	D4187E ³	D4187ER ³	D4189E ³	D4187EM D4189EM	D4187EMR D4189EMR	X	7.5	7.5	
x			1N23WE*	1N23WEM		X	7.5	7.5	
x	1N832A					X	7.5	7.5	
x	1N23F	1N23FR	1N415F	1N23FM 1N415FM	1N23FMR 1N415FMR	X	7.0	7.0	
x	D4187F ³	D4187FR ³	D4189F ³	D4187FM D4189FM	D4187FMR D4189FMR	X	7.0	7.0	
x	D4181C	D4181CR	1N3745	1N3745M D4181CM	1N3745MR D4181CMR	X	9.5	9.5	
x	D4181D	D4181DR	1N3746	1N3746M D4181DM	1N3746MR D4181DMR	X	8.5	8.5	
x	D4181E	D4181ER	1N3747	1N3747M D4181EM	1N3747MR D4181EMR	X	7.5	7.5	

ARACTERISTICS				TEST CONDITIONS						BURNOUT				BASIC TYPE
Lc Max db	Nr Max TIMES	Z _{IF} ohms		VSWR	FREQ. Mc	L.O. POWER mw	LOAD RESISTANCE OHMS		HOLDER	Ratings		Tests		
		MIN.	MAX.				dc	ac		CW mW	Peak 1us w	Pulse Generator .05us w	Energy 2.5ns ERGS	
8.0	2.5	100	400		1000	1.25	100	200	235-JAN	750	40	6.5◆		1N25
6.5	2.0	100	300		1000	1.25	100	200	235-JAN	750	40	6.5◆		1N25A
5.5	1.5	100	300		1000	1.25	100	200	235-JAN	750	40	6.5◆		1N25B
5.5	1.5	300††	700††		3060	0.5	100	400	264-JAN	375	15		2.0	1N21C
5.5	1.5	300††	700††		3060	0.5	100	400	264-JAN	375	15		2.0	D4188C
5.5	1.5				3060	0.5	100	400	264-JAN	375	15		2.0	1N831
5.0	1.3	325	475	1.5	3060	0.5	100	400	264-JAN	375	15		2.0	1N21D
5.0	1.3	325	475	1.5	3060	0.5	100	400	264-JAN	375	15		2.0	D4188D
		350	450	1.3	3060	0.5	100	400	264-JAN	375	15		5.0	1N21E
		350	450	1.3	3060	0.5	100	400	264-JAN	375	15		5.0	D4188E
		350	450	1.3	3060	0.5	100	400	264-JAN	375	15	1.0	2.0	1N21WE
					3060	0.5	100	400	264-JAN	375	15		5.0	1N831A
		350	450	1.3	3060	0.5	100	400	264-JAN	375	15		5.0	1N21F
		350	450	1.3	3060	0.5	100	400	264-JAN	375	15		5.0	D4188F
5.5	1.5	300††	700††		3060	0.5	100	400	264-JAN	375	15		10.0	1N3655
		350	450	1.3	3060	0.5	100	400	264-JAN	375	15		10.0	1N3655A
		150	250-	2.0	3K-12K	1.0	100	150	P-9	325	7.5		1.0	1N1132
6.0	2.0	325	475	1.5	9375	1.0	100	400	106-JAN	325	7.5		1.0	1N23C
6.0	2.0	325	475	1.5	9375	1.0	100	400	106-JAN	325	7.5		1.0	D4189C
6.0	2.0				9375	1.0	100	400	106-JAN	325	7.5		1.0	1N832
5.5	1.5	325	475		9375	1.0	100	400	106-JAN	325	7.5		1.0	1N149
5.0	1.7	350	450	1.3	9375	1.0	100	400	106-JAN	325	7.5		1.0	1N23D
5.0	1.7	350	450	1.3	9375	1.0	100	400	106-JAN	325	7.5		1.0	D4189D
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		1.0	1N23E
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		1.0	D4189E
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5	0.5	1.0	1N23WE
					9375	1.0	100	400	106-JAN	325	7.5		1.0	1N832A
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		2.0	1N23F
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		2.0	D4189F
		325	475	1.5	9375	1.0	100	400	106-JAN	325	7.5		5.0	D4181C
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		5.0	D4181D
		335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		5.0	D4181E

SYLVANIA MICROWAVE MIXER DIODES

H.S. ²	TYPE NUMBER					FREQUENCY BAND	COMPARATIVE** NOISE FIGURE	NF max (Nif=1.5db) db
	POLARITY		REVERSIBLE	MATCHED PAIRS ¹				
	FORWARD	REVERSE		FORWARD PAIR	FORWARD & REVERSE			
x	D4160	D4160R		D4160M	D4160MR	X	7.5	7.5
	1N2510	1N2510R		1N2510M	1N2510MR	X	9.5	
	1N78*	1N78R		1N78M	1N78MR	Ku	12.0	
x	1N918					Ku	12.0	
x	D4082	D4082R	—	D4082M	D4082MR	Ku	12.0	
	1N78A	1N78AR	—	1N78AM	1N78AMR	Ku	9.8	
x	D4082A	D4082AR	—	D4082AM	D4082AMR	Ku	9.8	
	1N78B	1N78BR	—	1N78BM	1N78BMR	Ku	8.8	
x	D4082B	D4082BR	—	D4082BM	D4082BMR	Ku	8.8	
x	1N3205	1N3205R	—	1N3205M	1N3205MR	Ku	8.5	8.5
x	1N78C	1N78CR	—	1N78CM	1N78CMR	Ku	8.3	8.3
	D4081	D4081R	—	D4081M	D4081MR	Ku	7.8	7.8
x	1N78D	1N78DR	—	1N78DM	1N78DMR	Ku	7.5	7.5
	D4081A	D4081AR	—	D4081AM	D4081AMR	Ku	7.3	7.3
	1N286		—			X-K	13.1	
	1N286A		—			X-K	11.3	
	1N26*	1N26R	—	1N26M	1N26MR	K	13.1	
x	D4175	D4175R	—	D4175M	D4175MR	K	13.1	
	1N26A	1N26AR	—	1N26AM	1N26AMR	K	11.3	
x	D4175A	D4175AR	—	D4175AM	D4175AMR	K	11.3	
x	1N26B	1N26BR	—	1N26BM	1N26BMR	K	10.0	10.0
x	1N26C	1N26CR	—	1N26CM	1N26CMR	K	9.5	9.5
	D4089	D4089R	—	D4089M	D4089MR	K	9.3	
	1N53*	1N53R	—	1N53M	1N53MR	Ka	13.1	
x	D4136	D4136R	—	D4136M	D4136MR	Ka	13.1	
	1N53A	1N53AR	—	1N53AM	1N53AMR	Ka	11.1	
x	D4136A	D4136AR	—	D4136AM	D4136AMR	Ka	11.1	
	1N53B	1N53BR	—	1N53BM	1N53BMR	Ka	10.0	10.0
x	D4136B	D4136BR	—	D4136BM	D4136BMR	Ka	10.0	10.0
	1N53C	1N53CR	—	1N53CM	1N53CMR	Ka	9.0	9.0
x	1N53D	1N53DR	—	1N53DM	1N53DMR	Ka	9.0	9.0

*Available as JAN types which meet all requirements of applicable MIL-E-1/—Specifications.

¹Matching Criteria
 Lc Δ 0.3 db
 IFZ Δ 25 ohms
 VSWR 1.6 max.

ELECTRICAL CHARACTERISTICS				TEST CONDITIONS					BURNOUT				BASIC TYPE	
Lc Max db	Nr Max TIMES	Z _{IF} ohms		VSWR	FREQ. Mc	L.O. POWER mw	LOAD RESISTANCE OHMS		HOLDER	Ratings		Tests		
		MIN.	MAX.				dc	ac		RF POWER		Pulse Generator .05us w		Energy 2.5ns ERGS
										CW mW	Peak 1us w			
6.0	1.4	335	465	1.3	9375	1.0	100	400	106-JAN	325	7.5		1.0	D4160
6.0	1.5	300	500		10000	1.0	100	400	P-5	325	7.5		1.0	1N2510
7.5	2.5	325	625		16000	1.0	100	500	201-JAN	250	3.0		1.0	1N78
7.5	2.5	325	625		16000	1.0	100	500	201-JAN	250	3.0		1.0	1N918
7.5	2.5	325	625		16000	1.0	100	500	201-JAN	250	3.0	—	1.0	D4082
7.0	1.5	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	1N78A
7.0	1.5	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	D4082A
6.5	1.3	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	1N78B
6.5	1.3	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	D4082B
6.3	1.4	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	1N3205
6.0	1.3	400	565	1.5	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	1N78C
5.7	1.3	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	D4081
5.7	1.3	400	565	1.5	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	1N78D
5.7	1.3	365	565	1.6	16000	1.0	100	500	201-JAN	250	3.0	—	1.0	D4081A
8.5	2.5	250	450	3.0	10K-22K	1.0	100	400	P-3 & P-4	200	1.5	—	0.1	1N286
7.5	2.0	250	450	3.0	10K-22K	1.0	100	400	P-3 & P-4	200	1.5	—	0.1	1N286A
8.5	2.5	300	600		23984	1.0	100	500	107-JAN	200	1.5	—	0.1	1N26
8.5	2.5	300	600		23984	1.0	100	500	107-JAN	200	1.5	—	0.1	D4175
7.5	2.0	300	600	1.6	23984	1.0	100	500	107-JAN	200	1.5	—	0.1	1N26A
7.5	2.0	300	600	1.6	23984	1.0	100	500	107-JAN	200	1.5	—	0.1	D4175A
7.5	1.5	400	600	1.5	23984	1.0	100	500	107-JAN	200	1.5	—	0.3	1N26B
7.5	1.5	400	600	1.5	23984	1.0	100	500	107-JAN	200	1.5	—	0.3	1N26C
6.5	1.5	300	600	1.6	23984	1.0	100	500	107-JAN	200	1.5	—	0.3	D4089
8.5	2.5	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	1N53
8.5	2.5	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	D4136
6.5	2.5	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	1N53A
6.5	2.5	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	D4136A
6.5	2.0	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	1N53B
6.5	2.0	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	D4136B
6.5	2.0	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	1N53C
6.5	2.0	400	800	1.6	34860	1.0	100	500	174-JAN	90	0.5	—	0.3	1N53D

²Hermetically Sealed
³Solder Sealed

**Noise figure calculated (with N_t=1.5 db) for comparison only. For SPECIFIED Noise Figure, see NF column under Electrical Characteristics.

+N^{IF}=2.5 db

††Nominal Range (Not Specified)

◆1.0 microsecond

SYLVANIA TUNNEL DIODES The Sylvania series of germanium microwave tunnel diodes offer a choice of types capable of meeting most tunnel diode requirements. For

example... typical resistive cutoff frequencies from 3 Gc to 32 Gc and peak current range of 2.0 ma to 100 ma. In addition, the tight tolerance held on the peak current aids

TYPE NO.		PEAK CURRENT Ip ma	Ip/Iv		TYPICAL PEAK VOLTAGE Vp mv	TYPICAL VALLEY VOLTAGE Vv mv	TYPICAL FORWARD VOLTAGE Vf mv	TYPICAL NEGATIVE RESISTANCE ri ohms
			min	typical				
D4961	D4971	2.0 ± 0.2	6	8	70	350	530	65
D4961A	D4971A	2.0 ± 0.2	6	8	70	350	530	65
D4961B	D4971B	2.0 ± 0.2	6	8	70	350	530	65
D4961C	D4971C	2.0 ± 0.2	6	8	70	350	530	65
D4962	D4972	5.0 ± 0.5	6	8	75	350	530	26
D4962A	D4972A	5.0 ± 0.5	6	8	75	350	530	26
D4962B	D4972B	5.0 ± 0.5	6	8	75	350	530	26
D4962C	D4972C	5.0 ± 0.5	6	8	75	350	530	26
D4963	D4973	10 ± 1.0	6	8	80	350	540	13
D4963A	D4973A	10 ± 1.0	6	8	80	350	540	13
D4963B	D4973B	10 ± 1.0	6	8	80	350	540	13
D4963C	D4973C	10 ± 1.0	6	8	80	350	540	13
D4964	D4974	20 ± 2.0	6	8	90	350	550	6.5
D4964A	D4974A	20 ± 2.0	6	8	90	350	550	6.5
D4964B	D4974B	20 ± 2.0	6	8	90	350	550	6.5
D4964C	D4974C	20 ± 2.0	6	8	90	350	550	6.5
D4965	D4975	50 ± 5.0	6	8	100	350	570	2.6
D4965A	D4975A	50 ± 5.0	6	8	100	350	570	2.6
D4965B	D4975B	50 ± 5.0	6	8	100	350	570	2.6
D4965C	D4975C	50 ± 5.0	6	8	100	350	570	2.6
D4966	D4976	100 ± 10	6	8	120	350	600	1.3
D4966A	D4976A	100 ± 10	6	8	120	350	600	1.3
D4966B	D4976B	100 ± 10	6	8	120	350	600	1.3
D4966C	D4976C	100 ± 10	6	8	120	350	600	1.3
D5061	D5071	2.0 ± 0.2	6	8	70	350	530	65
D5061A	D5071A	2.0 ± 0.2	6	8	70	350	530	65
D5061B	D5071B	2.0 ± 0.2	6	8	70	350	530	65
D5061C	D5071C	2.0 ± 0.2	6	8	70	350	530	65
D5062	D5072	5.0 ± 0.5	6	8	75	350	530	26
D5062A	D5072A	5.0 ± 0.5	6	8	75	350	530	26
D5062B	D5072B	5.0 ± 0.5	6	8	75	350	530	26
D5062C	D5072C	5.0 ± 0.5	6	8	75	350	530	26
D5063	D5073	10 ± 1.0	6	8	80	350	540	13
D5063A	D5073A	10 ± 1.0	6	8	80	350	540	13
D5063B	D5073B	10 ± 1.0	6	8	80	350	540	13
D5063C	D5073C	10 ± 1.0	6	8	80	350	540	13
D5064	D5074	20 ± 2.0	6	8	90	350	550	6.5
D5064A	D5074A	20 ± 2.0	6	8	90	350	550	6.5
D5064B	D5074B	20 ± 2.0	6	8	90	350	550	6.5
D5064C	D5074C	20 ± 2.0	6	8	90	350	550	6.5
D5065	D5075	50 ± 5.0	6	8	100	350	570	2.6
D5065A	D5075A	50 ± 5.0	6	8	100	350	570	2.6
D5065B	D5075B	50 ± 5.0	6	8	100	350	570	2.6
D5065C	D5075C	50 ± 5.0	6	8	100	350	570	2.6
D5066	D5076	100 ± 10	6	8	120	350	600	1.3
D5066A	D5076A	100 ± 10	6	8	120	350	600	1.3
D5066B	D5076B	100 ± 10	6	8	120	350	600	1.3
D5066C	D5076C	100 ± 10	6	8	120	350	600	1.3
D4168		2	5	8	70	350	530	65
D4168A		2	5	8	70	350	530	65
D4168B		2	5	8	70	350	530	65
D4168C		2	5	8	70	350	530	65
D4168D		2	5	8	70	350	530	65

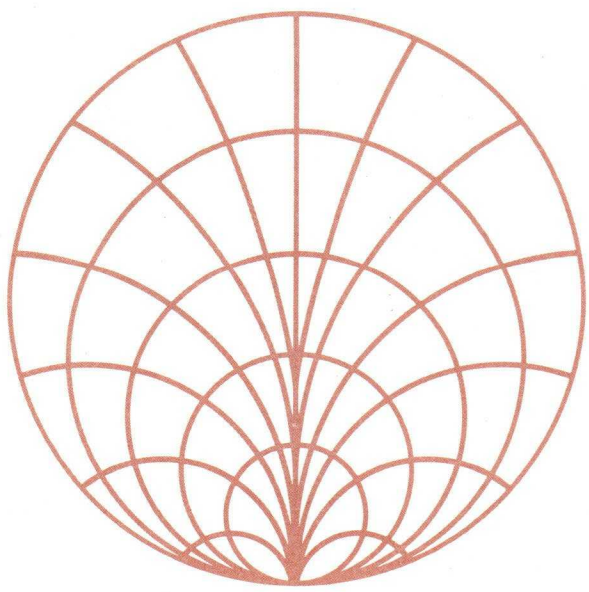
in circuit design considerations where uniform and stable performance is critical.

The high peak current-to-capacitance ratio of these de-

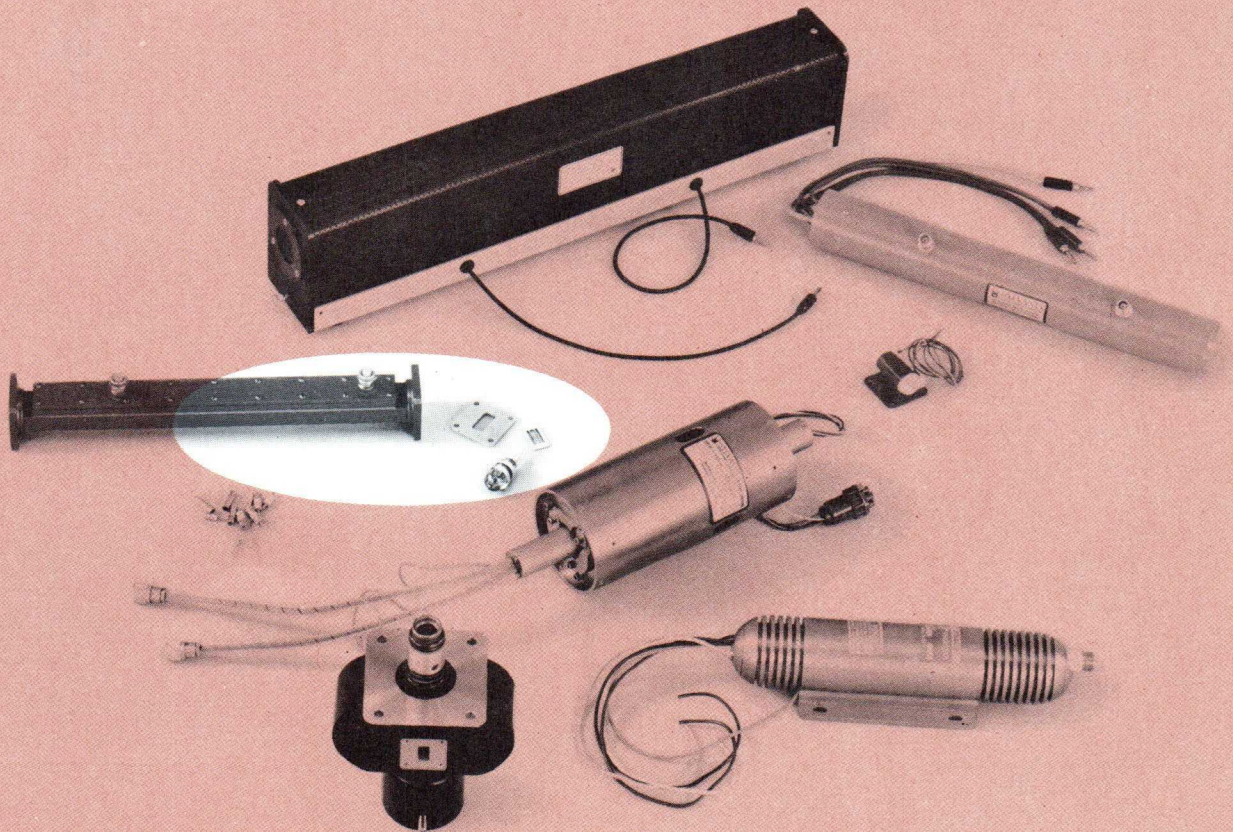
vices insures better performance in such applications as oscillators, amplifiers, frequency converters and high speed switches.

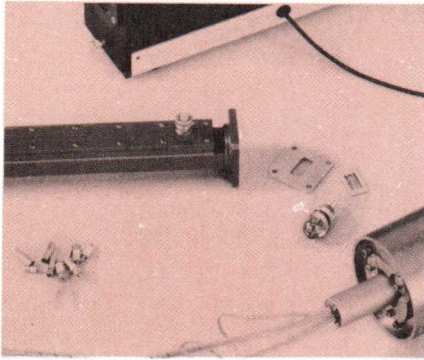
*Frequency of Oscillation (min)

TOTAL CAPACITANCE AT VALLEY, C,		SERIES RESISTANCE, R _s		TYPICAL RESISTIVE CUTOFF FREQUENCY f _c , Gc	TYPICAL RISE TIME t _r , nsec	TYPE NO.	
typical pf	max pf	typical ohm	max ohm				
3.7	5.0	1.0	2.0	7	1.0	D4961	D4971
2.0	3.0	1.5	3.0	13	0.5	D4961A	D4971A
1.4	1.8	2.2	4.0	18	0.4	D4961B	D4971B
1.0	1.2	3.0	6.0	32	0.25	D4961C	D4971C
7.5	10	0.6	1.0	6	0.8	D4962	D4972
3.8	6	0.8	1.5	11	0.4	D4962A	D4972A
2.3	3	1.4	2.5	17	0.25	D4962B	D4972B
1.5	1.8	1.8	3.5	27	0.15	D4962C	D4972C
14	20	0.25	0.4	7	0.7	D4963	D4973
7	10	0.4	0.8	11	0.4	D4963A	D4973A
4	5	0.6	1.2	17	0.2	D4963B	D4973B
2.3	3	1.2	2.0	26	0.1	D4963C	D4973C
27	40	0.2	0.4	5	0.7	D4964	D4974
13	20	0.3	0.6	9	0.35	D4964A	D4974A
7	10	0.45	1.0	14	0.2	D4964B	D4974B
3.5	5	0.7	1.5	25	0.1	D4964C	D4974C
67	100	0.12	0.25	4	0.7	D4965	D4975
32	50	0.2	0.4	7	0.35	D4965A	D4975A
16	25	0.35	0.8	10	0.2	D4965B	D4975B
7.5	10	0.5	1.2	18	0.1	D4965C	D4975C
135	200	0.10	0.25	3	0.7	D4966	D4976
67	100	0.18	0.4	5	0.35	D4966A	D4976A
32	50	0.25	0.6	8	0.2	D4966B	D4976B
14	20	0.4	1.0	14	0.1	D4966C	D4976C
3.4	4.7	1.0	2.0	7	0.9	D5061	D5071
1.7	2.7	1.5	3.0	13	0.4	D5061A	D5071A
1.1	1.5	2.2	4.0	18	0.3	D5061B	D5071B
0.7	0.9	3.0	6.0	32	0.17	D5061C	D5071C
7.2	9	0.6	1.0	6	0.7	D5062	D5072
3.5	5	0.8	1.5	11	0.3	D5062A	D5072A
2.1	2.5	1.4	2.5	17	0.2	D5062B	D5072B
1.2	1.5	1.8	3.5	27	0.12	D5062C	D5072C
13	19	0.25	0.4	7	0.6	D5063	D5073
6	9	0.4	0.8	11	0.3	D5063A	D5073A
3	4	0.6	1.2	17	0.15	D5063B	D5073B
2	2.5	1.2	2.0	26	0.08	D5063C	D5073C
27	40	0.2	0.4	5	0.7	D5064	D5074
13	20	0.3	0.6	9	0.35	D5064A	D5074A
7	10	0.45	1.0	14	0.2	D5064B	D5074B
3.0	4	0.7	1.5	25	0.1	D5064C	D5074C
67	100	0.12	0.25	4	0.7	D5065	D5075
32	50	0.2	0.4	7	0.35	D5065A	D5075A
16	25	0.35	0.8	10	0.2	D5065B	D5075B
7.0	10	0.5	1.2	18	0.1	D5065C	D5075C
135	200	0.10	0.25	3	0.7	D5066	D5076
67	100	0.18	0.4	5	0.35	D5066A	D5076A
32	50	0.25	0.6	8	0.2	D5066B	D5076B
14	20	0.4	1.0	14	0.1	D5066C	D5076C
6		1.0		2*		D4168	
4		1.5		4*		D4168A	
2		2.0		6*		D4168B	
1.3		3.0		8*		D4168C	
0.9		3.5		10*		D4168D	



“rocket” planar triodes
waveguide windows
waveguide water loads





Available for oscillator and amplifier applications, these planar triodes are widely used in local oscillator circuits, microwave links, test equipment and instrumentation, pumps for parametric amplifiers, and speed trap radar.

The following tables contain listings of the most commonly used Sylvania waveguide windows. New or modified window designs can be quickly developed to meet your specific needs.

Sylvania microwave water loads are designed for use as dummy loads or in calorimetric power measurements. These units contain a specially designed plastic insert which can be quickly replaced in the event of damage, without significantly affecting the original VSWR characteristic.

"ROCKET" PLANAR TRIODES

TYPE	MAXIMUM FREQUENCY (Gc)	DESCRIPTION
2C36	4.0	Pulsed & CW oscillator; 1000 W @ 1000 prr; (with internal feedback loop)
2C37	3.3	CW oscillator or amplifier; 450 mW-2 W CW; (2C36 without feedback loop)
2C43	3.5	CW and pulsed oscillator; 12 W plate dissipation
5767/6481	3.3	CW osc. 300 mW-2.0 W; folded discs for lumped-constant or butterfly circuits
5768	3.3	CW amplifier; 16 db gain-9 db noise @ 500 Mc; double-ended
6503	5.75	CW & pulsed oscillator; 25 mW @ CW operation; 1000 W @ 1000 prr

WAVEGUIDE WATER LOADS

TYPE NO.	FREQUENCY (Gc)	AVG.	MAX. DISSIPATION PEAK	GUARANTEED MAX. VSWR
SYZ-4361	7.05-10.0	5.0 KW	400 kw/atmosphere	1.03
SYZ-4425	8.2-12.4	5.0 KW	250 kw/atmosphere	1.04
SYZ-4365	12.4-18.0	2.6 KW	140 kw/atmosphere	1.04
SYZ-4366	22.0-25.0	1500 W	50 kw/atmosphere	1.04
SYZ-4367	32.0-37.0	700 W	30 kw/atmosphere	1.04

FLANGE-MOUNTED MICA WAVEGUIDE WINDOWS

TYPE NO.	FREQUENCY BAND	FREQUENCY RANGE Gc	MAX. VSWR BAND ENDS	PEAK POWER (kw)	MAX. PRESSURE (psig)	WAVEGUIDE TYPE ¹ (EIA)
WAVEGUIDE WINDOWS						
SYW-4231	S	2.6-4.0	1.08	4000	35	WR-284
SYW-4230	C	4.0-5.8	1.08	2000	35	WR-187
SYW-4196A	X	8.1-8.4	1.05	150	30	Special
SYW-4228	X	7.0-10.0	1.10	500	35	WR-112
SYW-4346	X	8.2-9.63	1.05	300	35	WR-90
SYW-4232	X	8.0-10.0	1.08	150	35	Special
SYW-586	X	8.49-9.6	1.15	300	35	WR-90
SYW-4254	X	8.0-12.4	1.10	300	35	WR-90
SYW-4227	X	8.2-12.4	1.10	300	35	WR-90
SYW-4225	Ku	12.4-18.0	1.10	160	35	WR-62
SYW-4223	Ka	32.0-37.0	1.10	40	35	WR-28
SOLDERABLE KOVAR-GLASS WAVEGUIDE WINDOWS						
SYW-4360	X	7.85-8.5	1.08	200	45	WR-90
SYW-4287 ²	X	8.7-8.9	1.10	300	45	WR-90
SYW-4215	X	8.4-9.6	1.08	200	45	WR-90
SYW-4359	X	8.2-12.4	1.25	200	45	WR-90
SYW-4351	X	10.7-11.7	1.10	200	45	WR-90
SYW-4330	Ka	34.6-35.2	1.15	20	30	WR-28
PRESSURE WINDOW-WAVEGUIDE ASSEMBLIES						
SYW-4288	X	10.7-11.7	1.10	200	45	WR-90
SYW-4358	X	10.7-11.7	1.10	200	45	WR-90

Note 1: WAVEGUIDE REFERENCE DATA

EIA DESIGNATION	MILITARY DESIGNATION	EIA DESIGNATION	MILITARY DESIGNATION
WR-28	RG-96/U	WR-112	RG-51/U RG-68/U RG-170/U
WR-62	RG-91/U RG-107/U RG-172/U	WR-187	RG-49/U RG-95/U RG-168/U
WR-90	RG-52/U RG-67/U RG-171/U	WR-284	RG-48/U RG-75/U RG-167/U

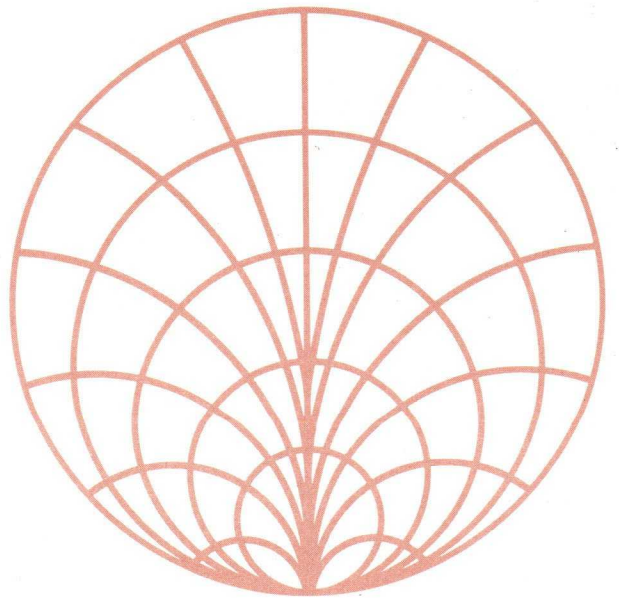
Note 2: Choke flange mounted—nonsolderable.



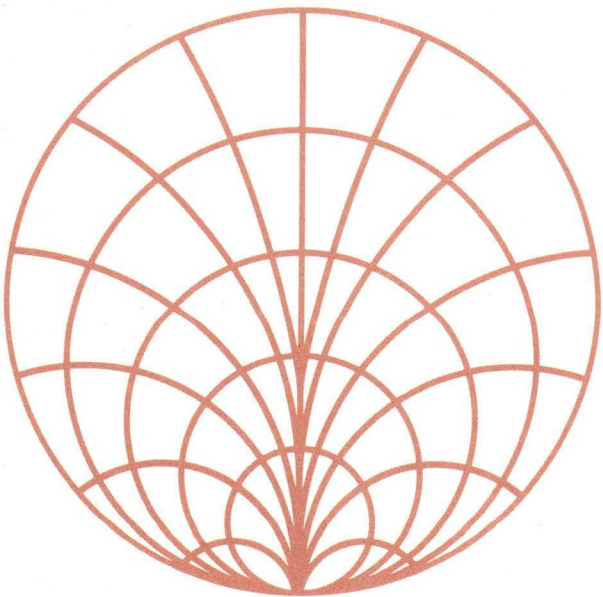
numerical index

Type No.	Page	Type No.	Page	Type No.	Page	Type No.	Page	Type No.	Page	Type No.	Page	Type No.	Page
D-4074	39	D-4966B	44	D-5073A	44	SK-722C	26	SYT-533	15	SYW-4227		1N630	39
D-4074A	39	D-4966C	44	D-5073B	44	SK-722D	26	SYT-534B	16	SYW-4228	50	1N830	39
D-4081	42	D-4971	44	D-5073C	44	SK-722E	26	SYT-538	15	SYW-4230	50	1N830A	39
D-4081A	42	D-4971A	44	D-5074A	44	SK-722F	26	SYT-591	15	SYW-4231	50	1N831	40
D-4082	42	D-4971B	44	D-5074B	44	SK-722G	26	SYT-620B	16	SYW-4232	50	1N831A	40
D-4082A	42	D-4971C	44	D-5074C	44	SK-722Z	26	SYT-956L	13	SYW-4254	50	1N832	40
D-4082B	42	D-4972	44	D-5075	44	SYB-4289	18	SYT-956M	13	SYW-4287	50	1N832A	40
D-4089	42	D-4972A	44	D-5075A	44	SYB-4293A	18	SYT-956N	13	SYW-4288	50	1N833	39
D-4136	42	D-4972B	44	D-5075B	44	SYB-4352	18	SYT-956P	13	SYW-4330	50	1N833A	39
D-4136A	42	D-4972C	44	D-5075C	44	SYB-4400	18	SYT-4168	16	SYW-4346	50	1N918	42
D-4136B	42	D-4973	44	D-5076	44	SYB-4401	18	SYT-4169	16	SYW-4351	50	1N1132	40
D-4160	42	D-4973A	44	D-5076A	44	SYB-4402	18	SYT-4171	16	SYW-4358	50	1N1610	39
D-4168	44	D-4973B	44	D-5076B	44	SYB-4403	18	SYT-4172	16	SYW-4359	50	1N1611	39
D-4168A	44	D-4973C	44	D-5076C	44	SYB-4404	18	SYT-4177	16	SYW-4360	50	1N1611A	39
D-4168B	44	D-4974	44	K-839B	27	SYB-4405	18	SYT-4261	14	SYZ-4361	49	1N2510	42
D-4168C	44	D-4974A	44	K-840B	27	SYB-4406	18	SYT-4267	14	SYZ-4365	49	1N2926	39
D-4168D	44	D-4974B	44	K-841B	27	SYB-4407	18	SYT-4268	14	SYZ-4366	49	1N2026A	39
D-4175	42	D-4974C	44	K-4008	27	SYB-4408	18	SYT-4273	14	SYZ-4367	49	1N3205	42
D-4175A	42	D-4975	44	K-4009	27	SYD-4300A	20	SYT-4278	14	SYZ-4425	49	1N3655	41
D-4181C	40	D-4975A	44	K-4010	27	SYD-4301A	20	SYT-4281	14	1N21C	40	1N3655A	41
D-4181D	40	D-4975B	44	K-4011	27	SYD-4302A	20	SYT-4282	14	1N21D	40	1N3778	39
D-4181E	40	D-4975C	44	SGL-62-111A	22	SYD-4303A	20	SYT-4307	16	1N21E	40	2C36	49
D-4188C	41	D-4976	44	SGL-62-111B	22	SYD-4304A	20	SYT-4308	16	1N21F	40	2C37	49
D-4188D	41	D-4976A	44	SGL-63-100	22	SYK-4203A	28	SYT-4309	16	1N21WE	40	2C43	49
D-4188E	41	D-4976B	44	SK-220A	26	SYK-4312	29	SYT-4319	13	1N23C	40	2J42	33
D-4188F	41	D-4976C	44	SK-220B	26	SYK-4313	29	SYT-4320	13	1N23D	40	2J42H	33
D-4189C	41	D-5061	44	SK-220C	26	SYK-4331	29	SYT-4325	13	1N23E	40	4J50	34
D-4189D	41	D-5061A	44	SK-220D	26	SYK-4332	29	SYT-4326	13	1N23F	40	4J50A	34
D-4189E	41	D-5061B	44	SK-220E	26	SYK-4333	29	SYT-4327	13	1N23WE	40	4J52A	33
D-4189F	41	D-5061C	44	SK-220F	26	SYK-4333A	29	SYT-4341	15	1N25	40	6BL6	25
D-4194	39	D-5062	44	SK-220G	26	SYK-4334	29	SYT-4342	16	1N25A	40	6BM6	25
D-4194A	39	D-5062A	44	SK-220Z	26	SYK-4335	29	SYT-4343	16	1N25B	40	6BM6A	25
D-4195	39	D-5062B	44	SK-221A	26	SYK-4339	29	SYT-4347	13	1N26	42	5767	49
D-4195A	39	D-5062C	44	SK-221B	26	SYK-4379	29	SYT-4353	13	1N26A	42	5768	49
D-4196	39	D-5063	44	SK-221C	26	SYK-4389	29	SYT-4363	14	1N26B	42	5836	25
D-4196A	39	D-5063A	44	SK-221D	26	SYM-4064A	36	SYT-4369	15	1N26C	42	5837	25
D-4919	39	D-5063B	44	SK-221E	26	SYM-4158	36	SYT-4372	13	1N31	39	6027	33
D-4961	44	D-5063C	44	SK-221F	26	SYM-4164B	34	SYT-4373	13	1N31A	39	6468	27
D-4961A	44	D-5064	44	SK-221G	26	SYM-4218	36	SYT-4374	13	1N32	39	6469	27
D-4961B	44	D-5064A	44	SK-221H	26	SYM-4242	33	SYT-4375	13	1N53	42	6470	27
D-4961C	44	D-5064B	44	SK-221K	26	SYM-4264	33	SYT-4378	15	1N53A	42	6481	49
D-4962	44	D-5064C	44	SK-222A	26	SYM-4306	36	SYT-4383	15	1N53B	42	6503	49
D-4962A	44	D-5065	44	SK-222B	26	SYM-4310	34	SYT-4387	15	1N53C	42	6543	33
D-4962B	44	D-5065A	44	SK-222C	26	SYM-4316	35	SYT-4388	15	1N53D	42	6551	35
D-4962C	44	D-5065B	44	SK-222D	26	SYM-4328	35	SYT-4391	15	1N76	39	6559	16
D-4963	44	D-5065C	44	SK-222E	26	SYM-4340	33	SYT-4392	15	1N76A	39	6752	16
D-4963A	44	D-5066	44	SK-222F	26	SYM-4350	36	SYT-4393	15	1N78	42	7006	34
D-4963B	44	D-5066A	44	SK-222G	26	SYM-4362	35	SYT-4394	15	1N78A	42	7008	34
D-4963C	44	D-5066B	44	SK-222Z	26	SYM-4370	34	SYT-4421	13	1N78B	42	7208B	35
D-4964	44	D-5066C	44	SK-720A	26	SYM-4371	34	SYT-4424	13	1N78C	42	7449A	35
D-4964A	44	D-5071	44	SK-720B	26	SYM-4380	33	SYT-4428	15	1N78D	42	7503	33
D-4964B	44	D-5071A	44	SK-720C	26	SYM-4385	33	SYT-4429	13	1N79	39	7619	36
D-4964C	44	D-5071B	44	SK-720D	26	SYM-4397	34	SYT-4446	15	1N149	40	7692	34
D-4965	44	D-5071C	44	SK-720E	26	SYM-4398	33	SYT-4447	15	1N286	42	7692A	34
D-4965A	44	D-5072	44	SK-720F	26	SYM-4417	35	SYT-4448	15	1N286A	42	8366	36
D-4965B	44	D-5072A	44	SK-720G	26	SYM-4419	35	SYW-586	50	1N358	39		
D-4965C	44	D-5072B	44	SK-720Z	26	SYM-4426	35	SYW-4196A	50	1N358A	39		
D-4966	44	D-5072C	44	SK-722A	26	SYM-4450	33	SYW-4215	50	IN369	39		
D-4966A	44	D-5073	44	SK-722B	26	SYM-4451	35	SYW-4223	50	1N369A	39		
								SYW-4225	50	1N446	39		

notes



notes



WARRANTY

SYLVANIA MICROWAVE TUBES

For periods of at least 12 months from shipment, depending upon the tube (see current price list for schedule), Sylvania warrants to purchasers that Sylvania tubes will be free from defects in material and workmanship. If a Sylvania microwave tube fails to operate due to any such defect, during an initial period of operation, full adjustment will be made, and if it so fails during a specified further period of operation, pro rata adjustment will be made, as more particularly set forth in the Schedule.

Adjustment will be made with respect to any such defective tube by Sylvania's repairing it at its facility at its own expense or by replacement or, at Sylvania's option, by issuing cash credit therefor. In no event will any credit issued on account of an adjustment exceed the amount of the net purchase price paid Sylvania for the tube involved, nor will Sylvania be liable for any failure due to improper handling or operation of a tube, nor will Sylvania be liable for any consequential damages.

The return of a tube for warranty adjustment includes authorization to Sylvania to dissect it, if necessary, to determine the cause of failure. Sylvania is not responsible if the tube has been intentionally or accidentally abused, altered, subjected to improper operation, or if the original tube identification is removed, defaced or altered. Sylvania has the right to inspect the conditions of an application if necessary to

determine that tubes are not being misused.

If analysis of the tube indicates that the tube can be repaired and the failure was not the responsibility of Sylvania, the necessary repairs will be made, if authorized by the customer, and the tube returned to the customer at the customer's expense.

Adjustment of a warranty claim with respect to a defective tube will be made only if the warranty card, or the service report originally packed with the tube is returned to Sylvania, together with the tube promptly after the discovery of the defect and within the applicable warranty period set forth in current Price List. When a tube is returned for adjustment, the Sylvania tube service report form packed with tubes must be completed by the purchaser and returned to Sylvania with the tube.

Prior to return to Sylvania of any tube claimed to be defective, approval shall be obtained from a local Sylvania sales representative at the nearest of the sales offices set forth below. Returns, if approved, must be shipped transportation prepaid, to the indicated address. The purchaser will be reimbursed for such transportation charges, if an adjustment is made, at the time of the adjustment. Reshipments of repaired tubes or shipment of replacements shall be at Sylvania's expense, in cases where Sylvania accepts responsibility.

After securing authorization from the local Sylvania sales office, shipments for adjustment should be addressed as follows:

TYPE:

TWT's, BWO's, (Helix types),
Klystrons,
Microwave
Phototubes,

ADDRESS:

Sylvania Electric Products, Inc.
Microwave Device Division
500 Evelyn Avenue, Building 1
Mountain View, California
Attn: Supervisor, Returns and Adjustments.

TYPE:

Magnetrons, Water Loads,
Planar Triodes, Waveguide
Windows,
BWO's (Interdigital).

ADDRESS:

Sylvania Electric Products, Inc.
Microwave Device Division
1035 Westminister Drive
Williamsport, Pennsylvania
Attn: Supervisor, Returns and Adjustments.

NO SHIPMENTS WILL BE ACCEPTED WITHOUT RETURN AUTHORIZATION

Any questions relating to warranty policies and procedures should be referred to the local sales representative.

sylvania sales offices

Eastern Region

BALTIMORE

31 Allegheny Avenue
Baltimore 4, Maryland
Telephone: 301-823-2550

FLORIDA

1520 Edgewater Drive, Suite "C"
Orlando, Florida
Telephone: 305-Cherry 1-9681

GEORGIA

2115 Sylvan Road, S.W.
Atlanta, Georgia
Telephone: 404-POpular 6-3633

MASSACHUSETTS

100 Sylvan Road
Woburn, Massachusetts
Telephone: 617-Wells 3-4784

NEW YORK

1000 Huyler Street
Teterboro, New Jersey
Telephone: ATlas 8-9484
In N.Y.C., Call CHickering 4-8820

NEW YORK (Upstate)

Seneca Falls, New York
Telephone: 315-LOgan 8-5881

PHILADELPHIA

4700 Parkside Avenue
Philadelphia 31, Pennsylvania
Telephone: 215-Greenwood 7-5000

WASHINGTON, D. C.

1120 Connecticut, N.W.
Telephone: 202-Federal 7-6600

Midwest Region

CHICAGO

2001 North Cornell Avenue
Melrose Park, Illinois
Telephone: 312-ESTerbrook 9-2525

DALLAS

100 Fordyce Street
Dallas 2, Texas
Telephone: 214-Riverside 1-4836

DAYTON

333 West First Street
Dayton 2, Ohio
Telephone: 513-223-6227

FORT WAYNE

4740 Coldwater Road
Fort Wayne, Indiana
Telephone: 483-1145

Western Region

LOS ANGELES

6505 East Gayhart Street
Los Angeles 54, California
Telephone: 213-RAymond 3-5371

SAN FRANCISCO

1811 Adrian Road
Burlingame, California
Telephone: 415-OXford 7-3500

CANADA

6233 Cote de Liesse Road
Montreal 9, Quebec, Canada
Telephone: 514-ME 1-4201

INTERNATIONAL

(Microwave Diodes)

21, Rue du Rhone
Geneva, Switzerland

(Tubes and Ferrite Devices)

730 Third Avenue
New York 17, New York
Telephone: 551-1000

SYLVANIA
SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS 

