

NARROWBAND

SP4T SWITCH

HIGH ISOLATION-REFLECTIVE AND ABSORPTIVE 0.02-18 GHz

GENERAL INFORMATION:

Series TN-4 and TN-4-HA switches are medium power devices that operate over commonly used frequency ranges. Carefully selected diodes placed in either series, series-shunt, or shunt configurations produce excellent electrical performance from UHF through KU bands.

GENERAL SPECIFICATIONS:

Frequency Coverage:	0.02 to 18.0 GHz.
RF Impedance:	50 OHMS.
RF Power:	+20 dBm operational. Consult factory for high power options.
DC Requirements:	For switches without drivers, each path requires +60 mA for the "off" condition and -60 mA for the "on" condition. Switches with drivers require +5 volts at +240 mA and -5 volts at -100 mA supplies. Logic is TTL "0" when "on" and "1" when "off". Different supply voltages and logic available if specified at time of order. Operating temperature from -55°C to +85°C.
Temperature Information:	
Switching Speed:	10% to 90% or 90% to 10% of RF. There is an additional 30 nanosec of driver delay.
Environment:	MIL-E-5400, MIL-STD-202, MIL-E-16400 MIL-STD-883 (Special request only).
Connectors:	RF connectors are SMA. Other connectors available (when specified at time of order) include types N, TNC, and BNC. Mating connector supplied for all units with multipin connector; ITT Cannon MDB1-9SSL or equiv.

NOTES:

1. All switches, with drivers, are available with either solder pins, or a multi-pin connector for the drive connection, when specified at time of order. (See "outlines with driver".)
2. When ordering, add suffix for configuration desired to the model number. ('S' for rectangular, 'R' for seven sided.) i.e. TN-410HAR.
3. If driver is required, add "D" to the model number when ordering, i.e. Model TN-410R, with driver, becomes TN-410RD.
4. When ordering, the complete model number should be given. The model number consists of the model number for a standard switch plus the dash number for any options, i.e. Model TN-418RD-1 is a seven sided SP4T reflective switch with driver whose frequency range is 0.7 to 0.8 GHz and a switching speed of 100 nanosec.
5. Any unit listed can be supplied with pins instead of RF connectors. (Consult factory.)

MECHANICAL OUTLINES

Outline	A Inches cm.	B Inches cm.
1	0.71 1.80	1.350 3.429
2	1.00 2.54	2.000 5.080
3	1.25 3.18	2.550 6.477

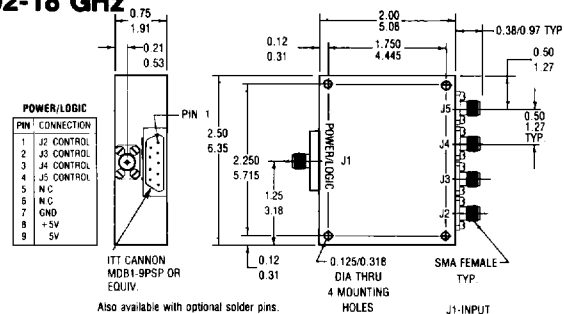
Inches/Centimeters
xx ± 0.3 xxx ± .010/ xx ± .08 xxx ± .025

TYPICAL MODEL NO.

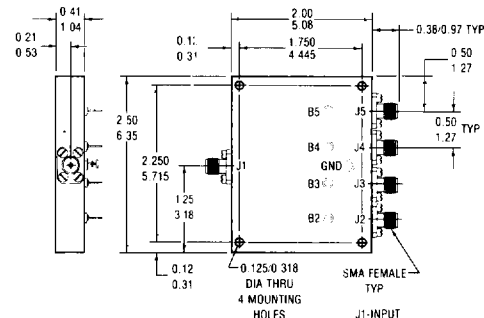
TN - or - XXXHA
Model Series Freq Code
S or R
Pkg Style
D
Driver Option
X
Speed Option
(Note 2) (Note 3) (Note 4)

Hermetic Seal
and MIL STD 883
Screening Available

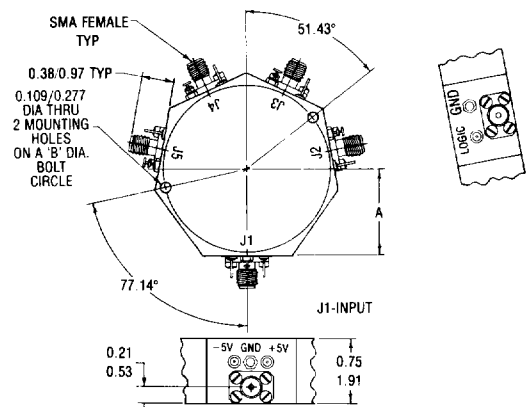
SERIES TN-4/TN-4HA



CONFIGURATION S
OUTLINE WITH DRIVER

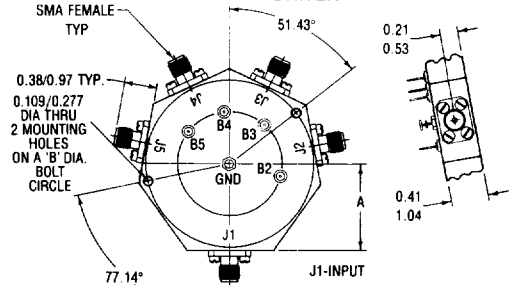


CONFIGURATION S
OUTLINE WITHOUT DRIVER



Also available with optional multi-pin conn. Package thickness will increase to 1.00 ITT Cannon MDB1-9PSP equiv.

CONFIGURATION R
OUTLINE WITH DRIVER



CONFIGURATION R
OUTLINE WITHOUT DRIVER

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ELECTRONICS**

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NARROWBAND

SP4T SWITCH

SERIES TN-4/TN-4-HA

HIGH ISOLATION-REFLECTIVE AND ABSORPTIVE 0.02-18 GHz

ELECTRICAL PERFORMANCE

Power: 1 watt average, 10 watts peak, survival

STANDARD SWITCH							HIGH SPEED OPTION			
Isolation: 60 dB or 80 dB minimum Speed: 2 microsec. maximum							MODEL-1		MODEL-2	
Reflective Model No.	Absorptive Model No.	Frequency Range GHz	Isolation Min. dB	Insertion Loss Max. dB Ref. / Abs.	VSWR† Max.	Config. R Outline Only Ref. / Abs.	Speed Nanosec.	Insertion Loss Max. dB Ref. / Abs.	Speed Nanosec.	Insertion Loss Max. dB Ref. / Abs.
TN-410	TN-410-HA	0.02-0.07	60	0.55 / 0.65	1.40	2 / 2	500	0.60 / 0.70	N/A	N/A
TN-411	TN-412-HA	0.02-0.07	80	0.60 / 0.70	1.40	2 / 2	500	0.65 / 0.75	N/A	N/A
TN-412	TN-413-HA	0.2-0.25	60	0.65 / 0.75	1.40	2 / 2	500	0.70 / 0.80	N/A	N/A
TN-414	TN-415-HA	0.2-0.25	80	0.70 / 0.80	1.40	2 / 2	500	0.75 / 0.85	N/A	N/A
TN-415	TN-416-HA	0.4-0.45	60	0.65 / 0.75	1.40	2 / 2	200	0.70 / 0.80	N/A	N/A
TN-416	TN-418-HA	0.4-0.45	80	0.70 / 0.80	1.40	2 / 2	200	0.75 / 0.85	N/A	N/A
TN-418	TN-419-HA	0.7-0.8	60	0.75 / 0.85	1.40	1 / 2	100	0.80 / 0.90	20	0.85 / 0.95
TN-419	TN-421-HA	0.7-0.8	80	0.80 / 0.90	1.40	1 / 2	100	0.85 / 0.95	20	0.90 / 1.00
TN-421	TN-422-HA	0.95-1.22	60	0.85 / 0.95	1.40	1 / 2	100	0.90 / 1.00	20	0.95 / 1.05
TN-422	TN-424-HA	0.95-1.22	80	0.90 / 1.00	1.40	1 / 2	100	0.95 / 1.05	20	1.00 / 1.10
TN-423	TN-425-HA	1.02-1.10	60	0.85 / 0.95	1.40	1 / 2	100	0.90 / 1.00	20	0.95 / 1.05
TN-425	TN-427-HA	1.02-1.10	80	0.90 / 1.00	1.40	1 / 2	100	0.95 / 1.05	20	1.00 / 1.10
TN-426	TN-428-HA	1.2-1.4	60	0.85 / 0.95	1.40	1 / 2	100	0.90 / 1.00	20	0.95 / 1.05
TN-427	TN-430-HA	1.2-1.4	80	0.90 / 1.00	1.40	1 / 2	100	0.95 / 1.05	20	1.00 / 1.10
TN-429	TN-431-HA	1.5-1.6	60	0.90 / 1.00	1.40	1 / 2	100	0.95 / 1.05	20	1.00 / 1.10
TN-431	TN-433-HA	1.5-1.6	80	1.00 / 1.10	1.40	1 / 2	100	1.05 / 1.15	20	1.10 / 1.20
TN-432	TN-434-HA	1.7-2.4	60	1.00 / 1.10	1.40	1 / 2	100	1.05 / 1.15	20	1.10 / 1.20
TN-433	TN-436-HA	1.7-2.4	80	1.05 / 1.15	1.40	1 / 2	100	1.10 / 1.20	20	1.20 / 1.30
TN-435	TN-437-HA	2.2-2.3	60	1.00 / 1.10	1.40	1 / 2	100	1.05 / 1.15	20	1.10 / 1.20
TN-436	TN-439-HA	2.2-2.3	80	1.05 / 1.15	1.40	1 / 2	100	1.10 / 1.20	20	1.20 / 1.30
TN-437	TN-440-HA	2.9-3.1	60	1.00 / 1.10	1.40	1 / 2	100	1.05 / 1.15	20	1.10 / 1.20
TN-439	TN-442-HA	2.9-3.1	80	1.05 / 1.15	1.40	1 / 3	100	1.10 / 1.20	20	1.20 / 1.30
TN-441	TN-443-HA	3.103.5	60	1.00 / 1.10	1.40	1 / 2	100	1.0% / 1.15	20	1.10 / 1.20
TN-442	TN-445-HA	3.1-3.5	80	1.05 / 1.15	1.40	1 / 3	100	1.10 / 1.20	20	1.20 / 1.30
TN-443	TN-446-HA	3.3-3.7	60	1.00 / 1.10	1.40	1 / 2	100	1.05 / 1.15	20	1.10 / 1.20
TN-445	TN-448-HA	3.3-3.7	80	1.05 / 1.15	1.40	1 / 3	100	1.10 / 1.20	20	1.20 / 1.30
TN-446	TN-449-HA	3.7-4.2	60	1.00 / 1.10	1.40	1 / 2	100	1.05 / 1.15	20	1.10 / 1.20
TN-447	TN-451-HA	3.7-4.2	80	1.05 / 1.15	1.40	1 / 3	100	1.10 / 1.20	20	1.20 / 1.30
TN-449	TN-452-HA	4.2-4.4	60	1.10 / 1.20	1.40	1 / 2	100	1.20 / 1.30	20	1.30 / 1.40
TN-451	TN-454-HA	4.2-4.4	80	1.20 / 1.30	1.40	1 / 3	100	1.30 / 1.40	20	1.40 / 1.50
TN-452	TN-455-HA	4.4-5.0	60	1.20 / 1.30	1.50	1 / 2	100	1.30 / 1.40	20	1.40 / 1.50
TN-453	TN-457-HA	4.4-5.0	80	1.25 / 1.35	1.50	1 / 3	100	1.35 / 1.45	20	1.50 / 1.60
TN-455	TN-458-HA	5.0-5.25	60	1.25 / 1.35	1.50	1 / 2	100	1.35 / 1.45	20	1.50 / 1.60
TN-456	TN-460-HA	5.0-5.25	80	1.30 / 1.40	1.50	1 / 3	100	1.40 / 1.50	20	1.50 / 1.60
TN-457	TN-461-HA	5.4-5.9	60	1.30 / 1.40	1.50	1 / 2	100	1.40 / 1.50	20	1.50 / 1.60
TN-459	TN-463-HA	5.4-5.9	80	1.40 / 1.50	1.50	1 / 3	100	1.50 / 1.60	20	1.60 / 1.70
TN-461	TN-464-HA	5.9-6.4	60	1.40 / 1.50	1.50	1 / 2	100	1.50 / 1.60	20	1.60 / 1.70
TN-462	TN-466-HA	5.9-6.4	80	1.50 / 1.60	1.50	1 / 3	100	1.60 / 1.70	20	1.70 / 1.80
TN-463	TN-467-HA	6.7-7.4	60	1.45 / 1.55	1.50	1 / 2	100	1.60 / 1.70	20	1.70 / 1.80
TN-465	TN-469-HA	6.7-7.4	80	1.55 / 1.65	1.50	1 / 3	100	1.70 / 1.80	20	1.80 / 1.90
TN-466	TN-470-HA	7.1-7.7	60	1.50 / 1.60	1.50	1 / 2	100	1.60 / 1.70	20	1.70 / 1.90
TN-467	TN-472-HA	7.1-7.7	80	1.60 / 1.70	1.50	1 / 3	100	1.70 / 1.80	20	1.80 / 2.00
TN-469	TN-473-HA	8.5-9.6	60	1.60 / 1.70	1.50	1 / 2	100	1.70 / 1.80	20	1.80 / 1.90
TN-471	TN-475-HA	8.5-9.6	80	1.70 / 1.80	1.50	1 / 3	100	1.80 / 1.90	20	1.90 / 2.00
TN-472	TN-476-HA	9.0-9.2	60	1.60 / 1.70	1.50	1 / 2	100	1.70 / 1.80	20	1.80 / 1.90
TN-473	TN-478-HA	9.0-9.2	80	1.70 / 1.80	1.50	1 / 3	100	1.80 / 1.90	20	1.90 / 2.00
TN-475	TN-479-HA	9.3-9.7	60	1.60 / 1.70	1.50	1 / 2	100	1.70 / 1.80	20	1.80 / 1.90
TN-476	TN-481-HA	9.3-9.7	80	1.70 / 1.80	1.50	1 / 3	100	1.80 / 1.90	20	1.90 / 2.00
TN-477	TN-482-HA	9.8-10.4	60	1.60 / 1.70	1.50	1 / 2	100	1.70 / 1.80	20	1.80 / 1.90
TN-479	TN-484-HA	9.8-10.4	80	1.70 / 1.80	1.50	1 / 3	100	1.80 / 1.90	20	1.90 / 2.00
TN-481	TN-485-HA	10.0-10.5	60	1.65 / 1.75	1.50	1 / 2	100	1.80 / 1.90	20	1.90 / 2.00
TN-482	TN-487-HA	10.0-10.5	80	1.75 / 1.85	1.50	1 / 3	100	1.90 / 2.00	20	2.00 / 2.10
TN-483	TN-488-HA	12.0-12.4	60	1.70 / 1.80	1.50	1 / 2	100	1.80 / 1.90	20	1.90 / 2.00
TN-485	TN-489-HA	12.0-12.4	80	1.80 / 1.90	1.50	1 / 2	100	1.90 / 2.00	20	2.00 / 2.10
TN-486	TN-490-HA	13.1-13.5	60	1.80 / 1.90	1.60	1 / 2	100	1.90 / 2.00	20	2.00 / 2.10
TN-487	TN-492-HA	13.1-13.5	80	1.90 / 2.00	1.60	1 / 2	100	2.00 / 2.10	20	2.10 / 2.20
TN-489	TN-493-HA	14.5-15.5	60	1.80 / 1.90	1.60	1 / 2	100	1.90 / 2.00	20	2.00 / 2.10
TN-491	TN-495-HA	14.5-15.5	80	1.90 / 2.00	1.60	1 / 2	100	2.00 / 2.10	20	2.10 / 2.20
TN-493	TN-496-HA	15.0-17.0	60	1.70 / 1.80	1.60	1 / 2	100	1.80 / 1.90	20	1.90 / 2.00
TN-495	TN-497-HA	15.0-17.0	80	1.90 / 2.00	1.60	1 / 2	100	2.00 / 2.10	20	2.10 / 2.20
TN-496	TN-498-HA	16.0-18.0	60	1.90 / 2.00	1.60	1 / 2	100	2.00 / 2.10	20	2.10 / 2.20
TN-498	TN-499-HA	16.0-18.0	80	2.10 / 2.20	1.60	1 / 2	100	2.20 / 2.30	20	2.35 / 2.45

If improvement of any of the electrical specifications listed above is required, consult factory.

† Reflective Switch: VSWR measured in the 'ON' input and 'ON' Output Position.
Absorptive Switch: VSWR measured in the 'ON' Input and 'ON' Output and 'OFF' Output Position.

Insertion Loss measured with input power less than 100 mW.

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