

BROADBAND

SP4T SWITCH

HIGH ISOLATION-REFLECTIVE AND ABSORPTIVE 0.02-18 GHz

GENERAL INFORMATION:

Series TB-4 and TB-4-HA broadband switches are medium power devices that operate over relatively wide 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.
Temperature Information:	Operating temperature from -55°C to +85°C.
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. TB-410R.
3. If driver is required, add "D" to the model number when ordering, i.e. Model TB-410HAR, with driver, becomes TB-410HARD.
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 TB-430RD-1 is a seven sided SP4T reflective switch with driver whose frequency range is 0.5 to 1.0 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

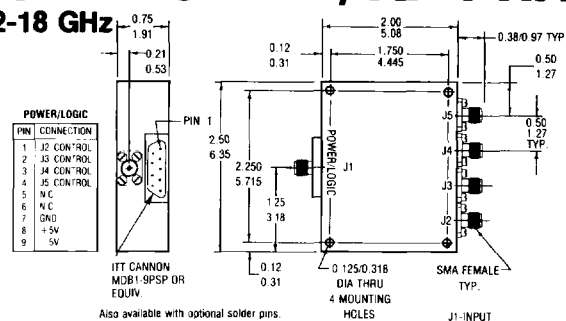
xx ± 0.3 xxx ± .010/ xx ± .08 xxx ± .025

TYPICAL MODEL NO.

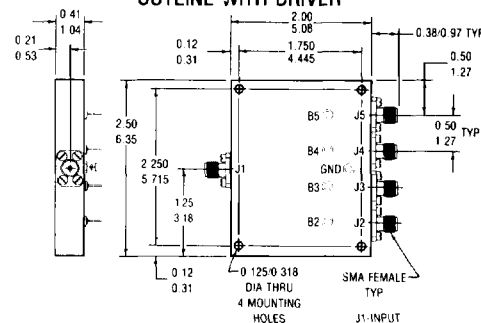
XXX	S		D	X
- or -	or	-	-	-
TB	XXXHA	R		
Model Series	Freq Code	Pkg Style	Driver Option	Speed Option
		(Note 2)	(Note 3)	(Note 4)

Hermetic Seal
and Mil STD 883
Screening Available

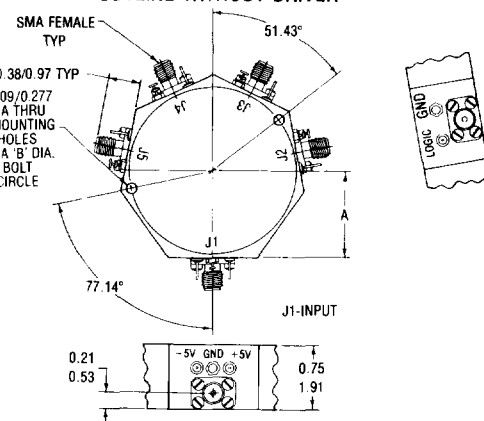
SERIES TB-4/TB-4-HA



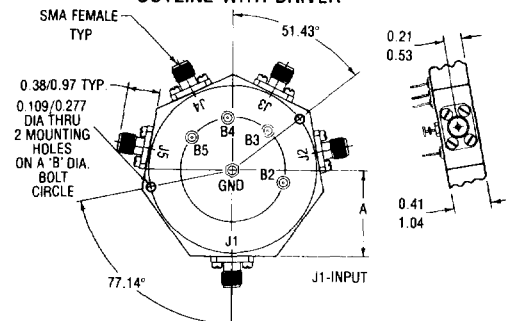
CONFIGURATION S
OUTLINE WITH DRIVER



CONFIGURATION S
OUTLINE WITHOUT DRIVER



CONFIGURATION R
OUTLINE WITH DRIVER



CONFIGURATION R
OUTLINE WITHOUT DRIVER

**KDI/triangle
ELECTRONICS**

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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.
TB-410	TB-410-HA	0.02-0.1	60	0.80 / 0.90	1.75	2 / 2	500	0.85 / 0.95	N/A	N/A
TB-412	TB-411-HA	0.02-0.1	80	0.90 / 1.00	1.75	2 / 2	500	0.95 / 1.05	N/A	N/A
TB-414	TB-412-HA	0.1-1.0	60	1.10 / 1.20	1.75	2 / 2	500	1.15 / 1.25	N/A	N/A
TB-416	TB-415-HA	0.1-1.0	80	1.20 / 1.30	1.75	2 / 2	500	1.25 / 1.35	N/A	N/A
TB-418	TB-419-HA	0.1-2.0	60	1.40 / 1.50	1.75	2 / 2	500	1.45 / 1.55	N/A	N/A
TB-420	TB-422-HA	0.1-2.0	80	1.50 / 1.60	1.75	2 / 2	500	1.55 / 1.65	N/A	N/A
TB-422	TB-423-HA	0.25-0.5	60	1.10 / 1.20	1.75	2 / 2	500	1.15 / 1.25	N/A	N/A
TB-424	TB-426-HA	0.25-0.5	80	1.20 / 1.30	1.75	2 / 2	500	1.25 / 1.35	N/A	N/A
TB-426	TB-427-HA	0.25-1.0	60	1.10 / 1.20	1.75	2 / 2	500	1.15 / 1.25	N/A	N/A
TB-428	TB-428-HA	0.25-1.0	80	1.20 / 1.30	1.75	2 / 2	500	1.25 / 1.35	N/A	N/A
TB-430	TB-431-HA	0.5-1.0	60	1.00 / 1.10	1.75	2 / 2	100	1.10 / 1.20	20	1.20 / 1.30
TB-432	TB-432-HA	0.5-1.0	80	1.10 / 1.20	1.75	2 / 2	100	1.20 / 1.30	20	1.30 / 1.40
TB-434	TB-434-HA	0.5-2.0	60	1.10 / 1.20	1.75	2 / 2	100	1.20 / 1.30	20	1.30 / 1.40
TB-436	TB-435-HA	0.5-2.0	80	1.20 / 1.30	1.75	2 / 2	100	1.30 / 1.40	20	1.40 / 1.50
TB-438	TB-438-HA	1.0-2.0	60	1.00 / 1.10	1.75	1 / 2	100	1.10 / 1.20	20	1.25 / 1.35
TB-440	TB-439-HA	1.0-2.0	80	1.10 / 1.20	1.75	1 / 2	100	1.20 / 1.30	20	1.30 / 1.40
TB-442	TB-442-HA	1.0-4.0	60	1.10 / 1.20	1.75	1 / 2	100	1.20 / 1.30	20	1.30 / 1.40
TB-444	TB-443-HA	1.0-4.0	80	1.20 / 1.30	1.75	1 / 3	100	1.30 / 1.40	20	1.40 / 1.50
TB-446	TB-444-HA	1.0-6.0	60	1.30 / 1.40	1.75	1 / 2	100	1.40 / 1.50	20	1.50 / 1.60
TB-448	TB-446-HA	1.0-6.0	80	1.40 / 1.50	1.75	1 / 3	100	1.50 / 1.60	20	1.60 / 1.70
TB-450	TB-448-HA	1.5-3.0	60	1.00 / 1.10	1.75	1 / 2	100	1.10 / 1.20	20	1.20 / 1.30
TB-452	TB-451-HA	1.5-3.0	80	1.10 / 1.20	1.75	1 / 3	100	1.20 / 1.30	20	1.30 / 1.40
TB-454	TB-452-HA	2.0-4.0	60	1.20 / 1.30	1.75	1 / 2	100	1.30 / 1.40	20	1.40 / 1.50
TB-456	TB-454-HA	2.0-4.0	80	1.30 / 1.40	1.75	1 / 3	100	1.40 / 1.50	20	1.50 / 1.60
TB-458	TB-455-HA	2.0-8.0	60	1.40 / 1.50	1.75	1 / 2	100	1.50 / 1.60	20	1.60 / 1.70
TB-460	TB-458-HA	2.0-8.0	80	1.50 / 1.60	1.80	1 / 3	100	1.60 / 1.70	20	1.70 / 1.80
TB-462	TB-462-HA	3.0-12.0	60	2.60 / 2.70	2.25	1 / 2	100	2.70 / 2.80	20	2.90 / 3.00
TB-464	TB-463-HA	3.0-12.0	80	2.70 / 2.80	2.25	1 / 2	100	2.80 / 2.90	20	3.00 / 3.10
TB-466	TB-466-HA	4.0-8.0	60	1.40 / 1.50	1.80	1 / 2	100	1.50 / 1.60	20	1.60 / 1.70
TB-468	TB-467-HA	4.0-8.0	80	1.50 / 1.60	1.80	1 / 3	100	1.60 / 1.70	20	1.70 / 1.80
TB-470	TB-468-HA	2.0-18.0	60	3.10 / 3.20	2.50	1 / 2	100	3.25 / 3.35	20	3.40 / 3.50
TB-472	TB-471-HA	2.0-18.0	80	3.30 / 3.50	2.50	1 / 2	100	3.50 / 3.60	20	3.60 / 3.70
TB-474	TB-472-HA	5.0-10.0	60	1.80 / 1.90	1.80	1 / 2	100	1.90 / 2.00	20	2.10 / 2.20
TB-476	TB-474-HA	5.0-10.0	80	1.90 / 2.00	1.80	1 / 3	100	2.00 / 2.10	20	2.20 / 2.30
TB-478	TB-475-HA	6.0-12.0	60	2.00 / 2.10	1.80	1 / 2	100	2.10 / 2.20	20	2.30 / 2.40
TB-480	TB-476-HA	6.0-12.0	80	2.10 / 2.20	1.80	1 / 2	100	2.20 / 2.30	20	2.40 / 2.50
TB-482	TB-478-HA	6.0-18.0	60	3.10 / 3.20	2.50	1 / 2	100	3.25 / 3.35	20	3.40 / 3.50
TB-484	TB-479-HA	6.0-18.0	80	3.30 / 3.50	2.50	1 / 2	100	3.50 / 3.60	20	3.60 / 3.70
TB-486	TB-482-HA	7.0-12.4	60	2.10 / 2.20	1.90	1 / 2	100	2.30 / 2.30	20	2.50 / 2.60
TB-488	TB-483-HA	7.0-12.4	80	2.20 / 2.30	1.90	1 / 2	100	2.45 / 2.40	20	2.60 / 2.70
TB-490	TB-484-HA	7.0-18.0	60	3.10 / 3.20	2.50	1 / 2	100	3.25 / 3.35	20	3.40 / 3.50
TB-491	TB-486-HA	7.0-18.0	80	3.30 / 3.50	2.50	1 / 2	100	3.50 / 3.60	20	3.60 / 3.70
TB-493	TB-488-HA	8.0-18.0	60	3.10 / 3.20	2.50	1 / 2	100	3.25 / 3.35	20	3.40 / 3.50
TB-494	TB-491-HA	8.0-18.0	80	3.30 / 3.50	2.50	1 / 2	100	3.50 / 3.60	20	3.60 / 3.70
TB-496	TB-494-HA	12.0-18.0	60	3.10 / 3.20	2.40	1 / 2	100	3.25 / 3.35	20	3.40 / 3.50
TB-497	TB-497-HA	12.0-18.0	80	3.30 / 3.50	2.40	1 / 2	100	3.50 / 3.60	20	3.60 / 3.70

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.