

HIGH ISOLATION—SURFACE MOUNT PIN DIODE SWITCHES (MODULES)

SERIES SWX

0.2–2.4GHz

FEATURES

- Full Cellular Frequency Coverage: 200–2400 MHz (Ideal for PCS Applications)
- Thick Film Hybrid Circuitry Sealed in Rugged Ceramic “Surfpac” Packages
- Silicon PIN Diode Design is More Robust and ESD Safe than GaAs Counterparts
- Full Bottom Ground Plane Allows Area Under Switch to be Used for Other Purposes
- Driverless Design Permits Use of Space Saving Common Drivers in Switch Networks
- Easily Integrated with Power Dividers, Microprocessors, Power Supplies and Lightning Protection to Form Multi-throw Switch Matrix Subassemblies

OVERVIEW

The SWX Series incorporates a PIN diode design with a unique sealed surface mount alumina header resulting in high isolation, miniature switch modules with excellent isolation versus insertion loss characteristics from 200–2400 MHz. The switch modules are designed to meet the rigors of cellular and PCS base station RF transmission systems, which are often subject to spikes from RF switching and indirect lightning strikes. Other switches that utilize GaAs diodes are not the best choice in these applications due to their sensitivity to electrostatic discharge (ESD) and because of their inherently limited power handling ability. Silicon PIN diodes are more robust and less sensitive to ESD than their GaAs MMIC counterparts.

The design utilizes thick film hybrid circuitry inside ceramic “Surfpac” packages which were chosen over plastic types due to their lower insertion loss and higher isolation at the higher operating frequencies which are required for PCS service. The switches have been integrated with power dividers, microprocessors, power supplies and lightning protection to form multi-throw switch matrixes. They are compatible with reflow soldering and are suitable for automatic insertion as well. The switches are available as modules on tape and reel or integrated on softboard in a final assembly configuration. A wide range of custom configurations can be specified as well.

The switches are miniature in size (only 0.375[9,53] inches square) and have a full ground plane that allows the circuit board area under the modules to be used for other purposes. All switches in the series are provided without integral drivers, which reduces the amount of space required in switching networks through the use of common drivers.

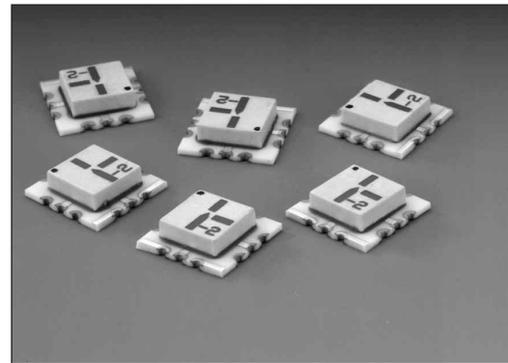
The drivers themselves are available in surface mount packages from many IC vendors. (Recommended driver circuits are shown on the reverse side for PCS applications.) Driver and bias circuit values will largely determine RF switching speed. Bias current will also determine intermodulation characteristics. It is advised that customer furnished bias components be optimized for each band of interest. The switch modules are driven with a single +5VDC supply with CMOS drivers, and a DC bias of 10mA provides low forward loss and –5 VDC for reverse isolation.

Typical performance of the SWX-05 version is shown. Isolation at 2 GHz is 51dB and loss is 0.9dB.

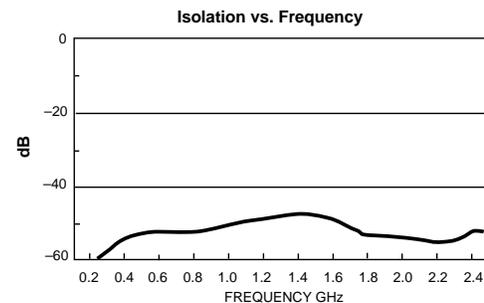
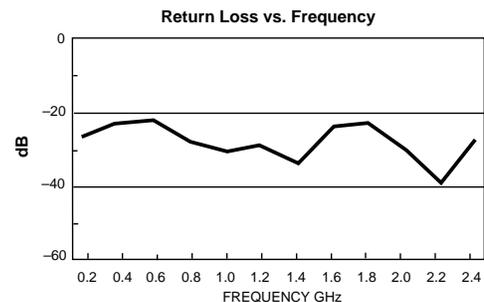
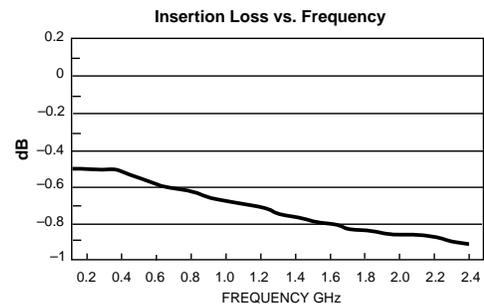
Models SWX-01, 02, and 04 are identical in performance; the outputs are different for ease in layout of multi-throw switch matrixes. Model SWX-05 is shown in configuration #1 layout but can be manufactured in other configurations as well.

ELECTRICAL SPECIFICATIONS

Model No.	Type	Configuration	Ins Loss at 2GHz typical	Isolation at 2GHz typical	Rtn Loss 2GHz typical	RF Power Handling	
						5V Rev. Bias	20V Rev. Bias
SWX-01	SP2T	1	0.60 dB	24.5 dB	20 dB	+20 dBm	+35 dBm
SWX-02	SP2T	2	0.60 dB	24.5 dB	20 dB	+20 dBm	+35 dBm
SWX-03	SP3T	3	0.65 dB	24.5 dB	20 dB	+20 dBm	+35 dBm
SWX-04	SP2T	4	0.60 dB	24.5 dB	20 dB	+20 dBm	+35 dBm
SWX-05	SP2T	1	0.90 dB	51.0 dB	23 dB	+20 dBm	+35 dBm

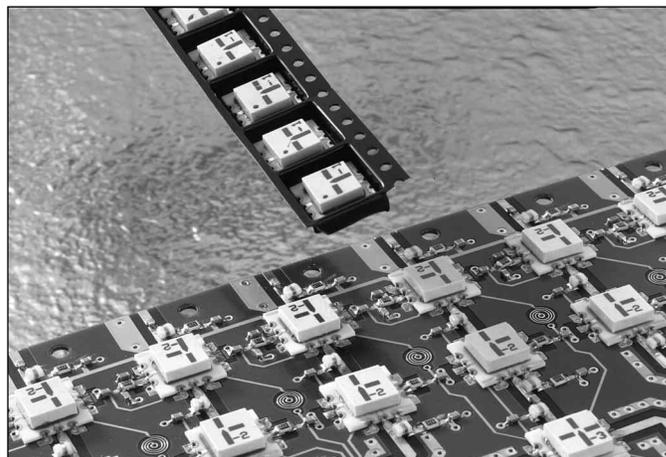
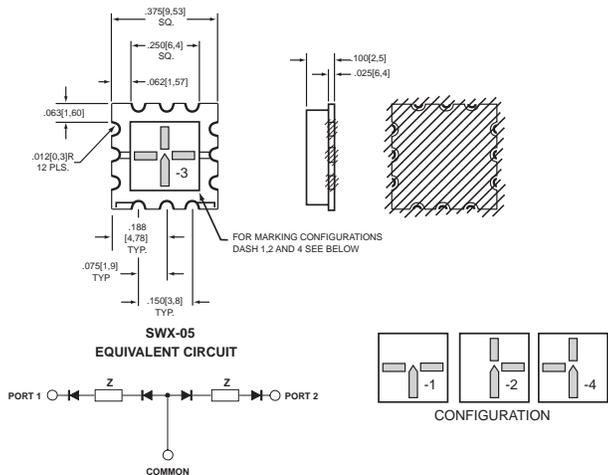


TYPICAL PERFORMANCE OF THE SWX-05



KEY: Inches[Millimeters] .XX ±.03 .XXX ±.010 [.X ±0.8 .XX ±0.25]

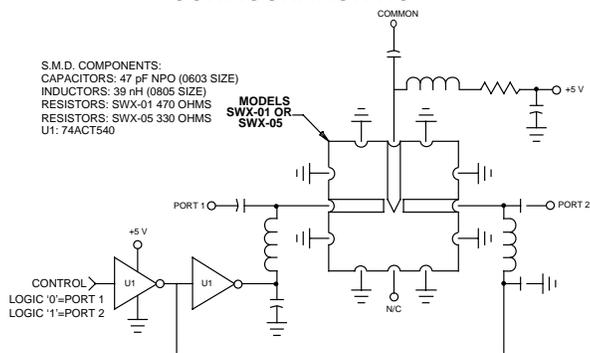
HIGH ISOLATION – SURFACE MOUNT PIN DIODE SWITCH (MODULES) SERIES SWX 0.2–2.4GHz



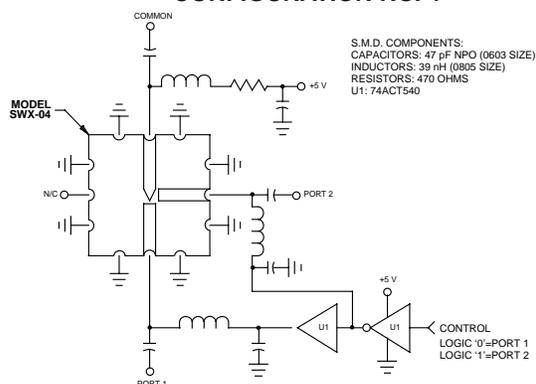
RECOMMENDED SWITCH DRIVER CIRCUITS FOR PCS APPLICATIONS

A recommended switch driver circuit is shown below for each standard SWX type. Component types and values are optimized for use in the PCS band 1.8 - 2.0 GHz. The switch modules operate from 0.2 - 2.4 GHz; it is advised that customers optimize bias components for each band of interest. All components are surface mount.

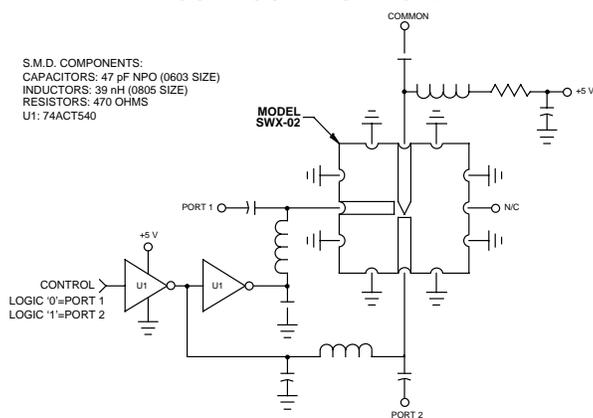
CONFIGURATION NO. 1



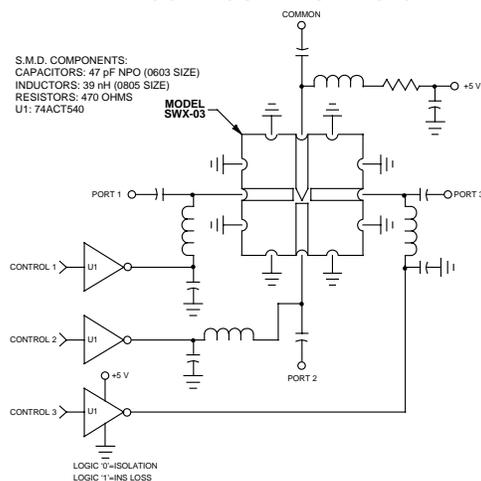
CONFIGURATION NO. 4



CONFIGURATION NO. 2



CONFIGURATION NO. 3



KEY: Inches[Millimeters] .XX ±.03 .XXX ±.010 [.X ±0.8 .XX ±0.25]