

GaAs IC 4 x 2 Switch Matrix 0.7–3.0 GHz



AS212-93

Applications:

- DBS Switching Applications, Cable Modems, Cable TV

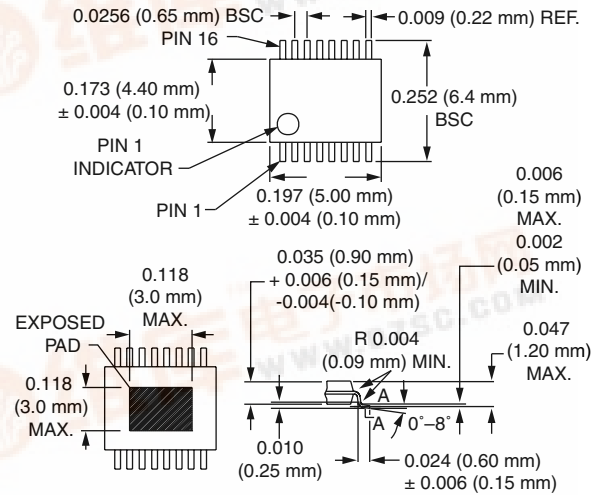
Features

- Four Inputs, Two Output Switches
- Any Input Can Be Directed To Either Output
- Only Requires 4 Control Lines
- Low DC Power Consumption
- Small Low Cost TSSOP-16 Plastic Package
- High Isolation Between Ports

Description

The AS212-93 is an IC FET 4 x 2 matrix switch in a low cost TSSOP-16 exposed paddle plastic package. The exposed paddle should be grounded. The AS212-93 enables 16 states directing any of the four inputs to any of the two outputs. DC block capacitors are required at

TSSOP-16



each RF port. States are selected by 4 positive controls. All ports are absorptive. The AS212-93 switch is suitable for DBS switching applications.

Electrical Specifications at 25°C (0, +5 V)

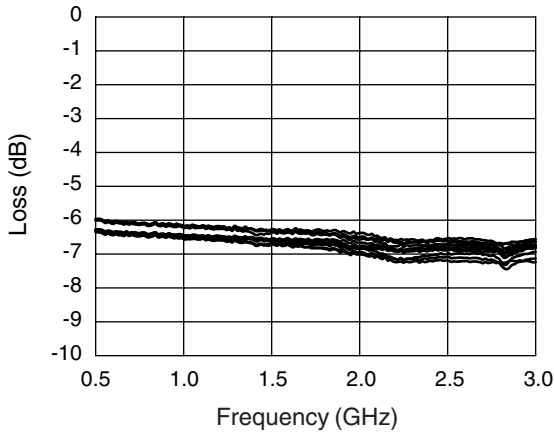
| Parameter ¹ | Frequency | Min. | Typ. | Max. | Unit |
|----------------------------------|-----------|------|------|------|------|
| Insertion Loss | 0.70–0.95 | | 6.50 | 7.00 | dB |
| | 0.95–1.45 | | 6.50 | 7.00 | dB |
| | 1.45–2.15 | | 6.75 | 7.30 | dB |
| | 2.15–3.00 | | 7.00 | 7.50 | dB |
| Insertion Loss Flatness | 0.70–3.00 | | 1.0 | 2.0 | dB |
| Isolation | 0.70–0.95 | 25.0 | 33.0 | | dB |
| | 0.95–1.45 | 23.0 | 28.5 | | dB |
| | 1.45–2.15 | 22.5 | 28.5 | | dB |
| | 2.15–3.00 | 19.5 | 25.5 | | dB |
| Return Loss Insertion Loss State | 0.70–3.00 | 9 | 11 | | dB |
| Return Loss Isolation State | 0.70–3.00 | 9 | 11 | | dB |

Operating Characteristics at 25°C (0, +5 V)

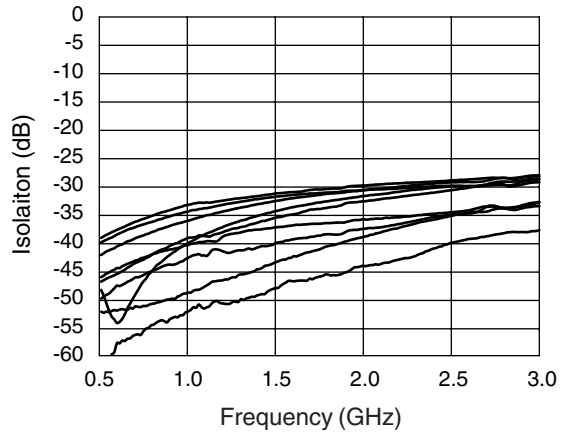
| Parameter | Condition | Min. | Typ. | Max. | Unit |
|--|-------------------|------|------|-----------------|------|
| P ₋₁ dB | 0, +5 V | | 12 | | dBm |
| V _{CC} | @ 400 μA Max. | 4.5 | | 5.5 | V |
| Control Voltages V ₁ , V ₂ , V ₃ , V ₄ | Low @ 50 μA Max. | 0 | | 0.2 | V |
| | High @ 50 μA Max. | 2.5 | | V _{CC} | V |

¹ All measurements made in a 50 Ω system.

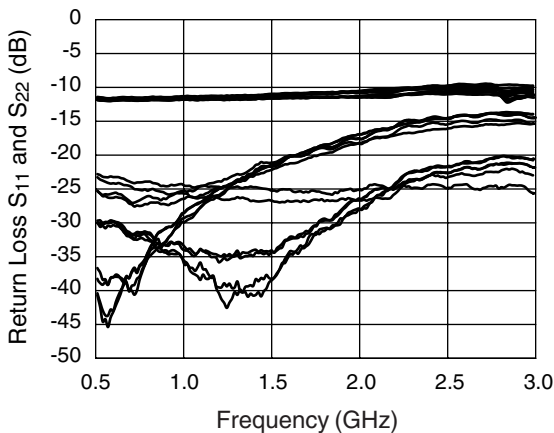
Typical Performance Data (0, +3 V)



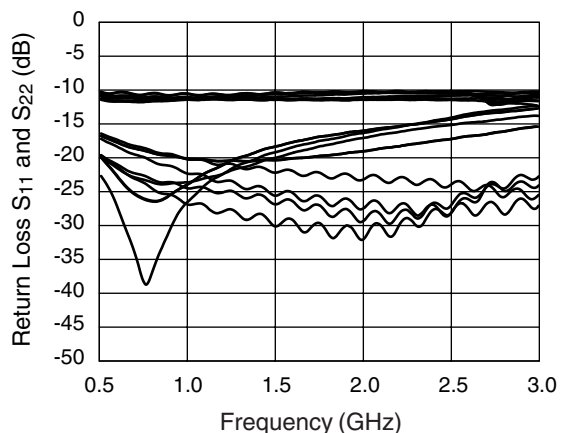
**Typical Insertion Loss
(Various States Shown)**



**Typical Isolation
(Including Worst Case)**



Return Loss Insertion Loss State



Return Loss Isolation State

Absolute Maximum Ratings

| Characteristic | Value |
|-----------------------|---------------|
| RF Input Power | 15 dBm |
| Supply Voltage | +6 V |
| Control voltage | +6 V |
| Operating Temperature | -40 to +85°C |
| Storage Temperature | -65 to +150°C |

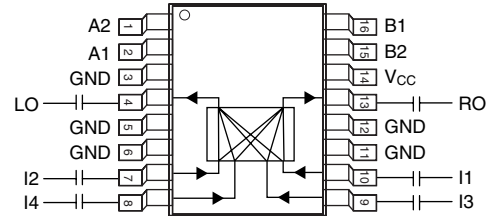
Note: Exceeding these parameters may cause irreversible damage.

Truth Table

| State # | Signal Path (Insertion Loss Path) ¹ | Controls | | | |
|---------|--|-------------------------|----------|--------------------------|----------|
| | | For LO (Left Output) | | For RO (Right Output) | |
| | | SW A1 | SW A2 | SW B1 | SW B2 |
| 0 | I1->LO & I1->RO | 0 | 0 | 0 | 0 |
| 1 | I1->LO & I2->RO | 0 | 0 | 0 | 1 |
| 2 | I1->LO & I3->RO | 0 | 0 | 1 | 0 |
| 3 | I1->LO & I4->RO | 0 | 0 | 1 | 1 |
| 4 | I2->LO & I1->RO | 0 | 1 | 0 | 0 |
| 5 | I2->LO & I2->RO | 0 | 1 | 0 | 1 |
| 6 | I2->LO & I3->RO | 0 | 1 | 1 | 0 |
| 7 | I2->LO & I4->RO | 0 | 1 | 1 | 1 |
| 8 | I3->LO & I1->RO | 1 | 0 | 0 | 0 |
| 9 | I3->LO & I2->RO | 1 | 0 | 0 | 1 |
| 10 | I3->LO & I3->RO | 1 | 0 | 1 | 0 |
| 11 | I3->LO & I4->RO | 1 | 0 | 1 | 1 |
| 12 | I4->LO & I1->RO | 1 | 1 | 0 | 0 |
| 13 | I4->LO & I2->RO | 1 | 1 | 0 | 1 |
| 14 | I4->LO & I3->RO | 1 | 1 | 1 | 0 |
| 15 | I4->LO & I4->RO | 1 | 1 | 1 | 1 |

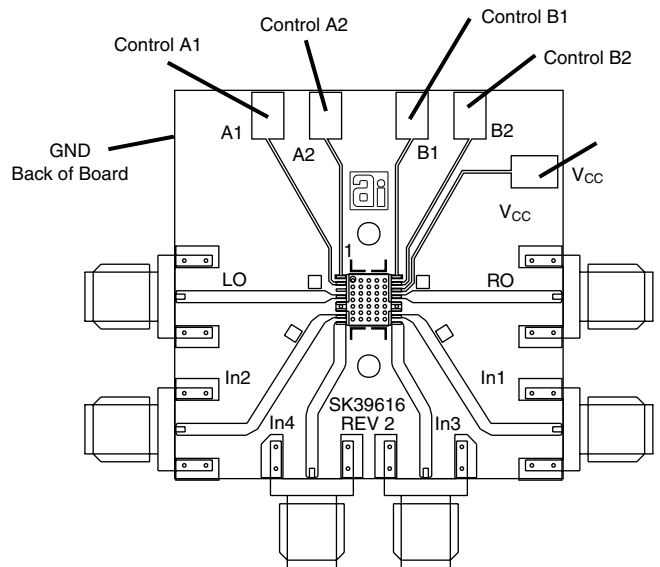
1. All other paths are in isolation.
 "1" = 5 V.
 "0" = 0 V.

Pin Out

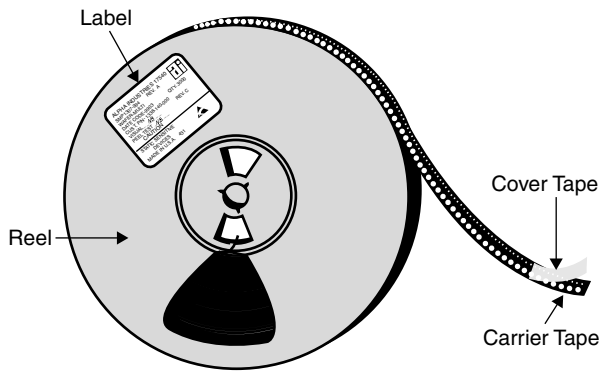


Unused leads and package bottom should be well grounded.
 All paths are bidirectional.

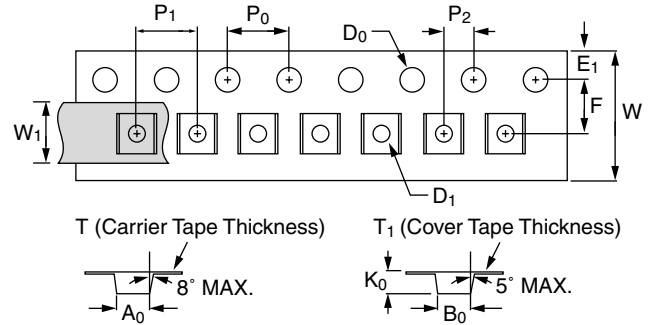
Test Board



Bias V_{CC} before applying bias to control lines.
 Control lines need to be grounded for "0 V".
 Control lines can not be left open circuit.



Tape Dimensions

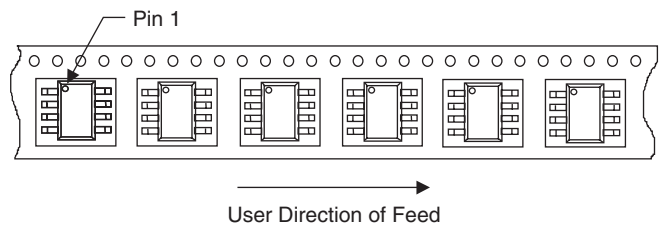


| Description | Symbol | TSSOP-16 |
|--|----------------|------------|
| Cavity | | |
| Length | A ₀ | 0.80±0.10 |
| Width | B ₀ | 5.40±0.10 |
| Depth | K ₀ | 1.60±0.10 |
| Pitch | P ₁ | 8.00±0.10 |
| Bottom Hole Diameter | D ₁ | 1.60±0.10 |
| Perforation | | |
| Diameter | D ₀ | 1.50±0.10 |
| Pitch | P ₀ | 4.00±0.10 |
| Position | E ₁ | 1.75±0.10 |
| Carrier Tape | | |
| Width | W | 12.0±0.30 |
| Thickness | T | 0.30±0.05 |
| Cover Tape | | |
| Width | W ₁ | 9.20±0.10 |
| Tape Thickness | T ₁ | 0.062±0.01 |
| Distance | | |
| Cavity to Perforation (Width Direction) | F | 7.50±0.10 |
| Cavity to Perforation (Length Direction) | P ₂ | 2.00±0.1 |

Note: All dimensions are in mm.

SOIC, MSOP, QSOP, SSOP and TSSOP Devices

8, 10, 14, 16, 20, 28 Leads



| | | |
|------------------------|-------|-------|
| Standard Reel Size | 7" | 13" |
| Standard Reel Quantity | 1,000 | 3,000 |