# VESTIGIAL SIDEBAND FILTERS

## For Professional Applications

Replaces August 1992, version CT3447-1.2

DS5513-1.0 January 2002

Dynex Semiconductor's range of Surface Acoustic Wave filters provide IF filtering for most current TV systems. The filters are designed for use in TV modulators and transposers, and are available without sound, with one sound channel, or with stereo sound.

## FEATURES

- Filters for System B/G, I, M & K TV Standards
- Linear Phase Characteristics
- Low Amplitude and Group Delay Ripple
- Sidelobe Levels Better Than 50dB
- Hermetically Sealed Package

| FILTER | SYSTEM | SOUND | REMARKS | PACKAGE STYLE |
|---|---|---|---|---|
| DW1401-G | B/G | None | | A |
| DW1404-G | B/G | 1 | | A |
| DW1406-G | B/G | None | | A |
| DW1408-G | B/G | Stereo | | A |
| DW1409-G | B/G | Stereo | | D |
| DW1411-G | B/G | | | A |
| DW2501-G | B/G | None | | A |
| DW1502-I | I | 1 | | A |
| DW1503-I | I | 1 | | A |
| DW1505-I | I | 1 | | A |
| DW9231-I | I | 1 | NICAM Sound Filter | D |
| DW9232-I | I | None | NICAM Vision Filter | D |
| DW1603-M | M | None | | D |
| DW1605-M | M | 1 | | D |
| DW1701-K | K | None | | A |
| DW1702-K | K | 1 | | A |

## ELECTRICAL CHARACTERISTICS

Test Conditions (unless otherwise stated):
Temperature = +23°C ±2°C
Load and source impedances = 50Ω

| SYSTEM B/G FILTERS | DW1401-G | | DW1404-G | | DW1406-G | | DW1408-G | | DW1409-G | | DW1411-G | | DW2501-G | | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Typ | Max | Typ | Max | Typ | Max | Typ | Max | Typ | Max | Typ | Max | Typ | Max | |
| Passband | 34.4 to 39.4 | | 33.65 to 38.9 | | 34.4 to 39.4 | | 33.15 to 38.9 | | 33.65 to 39.15 | | 33.15 to 39.65 | | | | MHz |
| Insertion Loss | 29 | 32 | 29 | 32 | 30 | 32 | 29 | 32 | 29 | 32 | 24 | 33 | 28 | | dB |
| Passband Ripple | ±0.3 | ±0.5 | ±0.4 | ±0.5 | ±0.15 | ±0.2 | | ±0.2 | | ±0.5 | | ±0.4 | | ±0.5 | dB |
| Group Delay Ripple | 45 | 60 | 50 | 60 | 40 | 50 | | 40 | | 40 | | 48 | | 50 | ns p-p |
| Sound | None | | 1 Channel | | None | | Stereo | | Stereo | | | | | | - |

| SYSTEM I FILTERS | DW1502-I | | DW1503-I | | DW1505-I | | DW9231-I | | DW9232-I | | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Typ | Max | Typ | Max | Typ | Max | Typ | Max | Typ | Max | |
| Passband | 34.25 to 41.25 | | 33.4 to 40.9 | | | | 33.55 to 38.9 | | 32.1 to 33.0 | | MHz |
| Insertion Loss | 29 | 30 | 29 | 30 | 29 | 30 | | 30 | | 30 | dB |
| Passband Ripple | ±0.15 | ±0.25 | ±0.15 | ±0.2 | | ±0.5 | | ±0.3 | | ±0.3 | dB |
| Group Delay Ripple | 30 | 40 | 30 | 40 | | 60 | | 40 | | 40 | ns p-p |
| Sound | 1 Channel | | None | | 1 Channel | | 1 Channel | | None | | - |

| SYSTEM M FILTERS | DW1603-M | | DW1605-M | | Units |
|---|---|---|---|---|---|
| | Typ | Max | Typ | Max | |
| Passband | 42.17 to 46.25 | | 40.75 to 46.5 | | MHz |
| Insertion Loss | 30 | 32 | 26 | 29 | dB |
| Passband Ripple | | ±0.5 | | ±0.5 | dB |
| Group Delay Ripple | | 50 | | 40 | ns p-p |
| Sound | None | | 1 Channel | | - |

| SYSTEM K FILTERS | DW1701-K | | DW1702-K | | Units |
|---|---|---|---|---|---|
| | Typ | Max | Typ | Max | |
| Passband | 30.5 to 38.25 | | 29.0 to 38.5 | | MHz |
| Insertion Loss | 25 | 26 | 32 | 26 | dB |
| Passband Ripple | ±0.5 | | ±0.5 | | dB |
| Group Delay Ripple | | 40 | | 40 | ns p-p |
| Sound | None | | 1 Channel | | - |

## ABSOLUTE MAXIMUM RATINGS

Storage and Operating Temperature = -10°C to +70°C
Maximum Voltage = See Operating Note 1
Input Power = +20dBm

## OPERATING NOTES

### 1. Coupling Capacitors

Although there is no DC path within the SAW filter it is advisable to keep any applied DC voltage to <100mV.

Prolonged exposure to voltages in excess of this may adversely affect the life of the filter. Short-term exposure to voltages up to 30 volts should not cause any problems.

### 2. Temperature Effects

The characteristics of SAW filters of this type behave in a simple predictable manner with temperature. The temperature coefficient of frequency is -90ppm/°C. For example the rejection at 45°C and 40.15MHz will be the same as that at 25°C and 40.22MHz.

### 3. Mounting Precautions

In order to achieve the quoted rejections it is important to prevent excessive direct breakthrough signals. Normal high frequency precautions such as the use of continuous ground plane and short component leads are necessary. It is most important that the SAW filter is well grounded. All the earth leads on the package should be connected to the ground plane by short connections - plated through holes are ideal.

Direct breakthrough signals produce two main effects:

- Specified out of band rejections not achieved
- Passband ripple is excessive

A simple method to check that the grounding is adequate is to connect the package directly to the ground plane temporarily, and check that the frequency response does not change.

## PLOTS

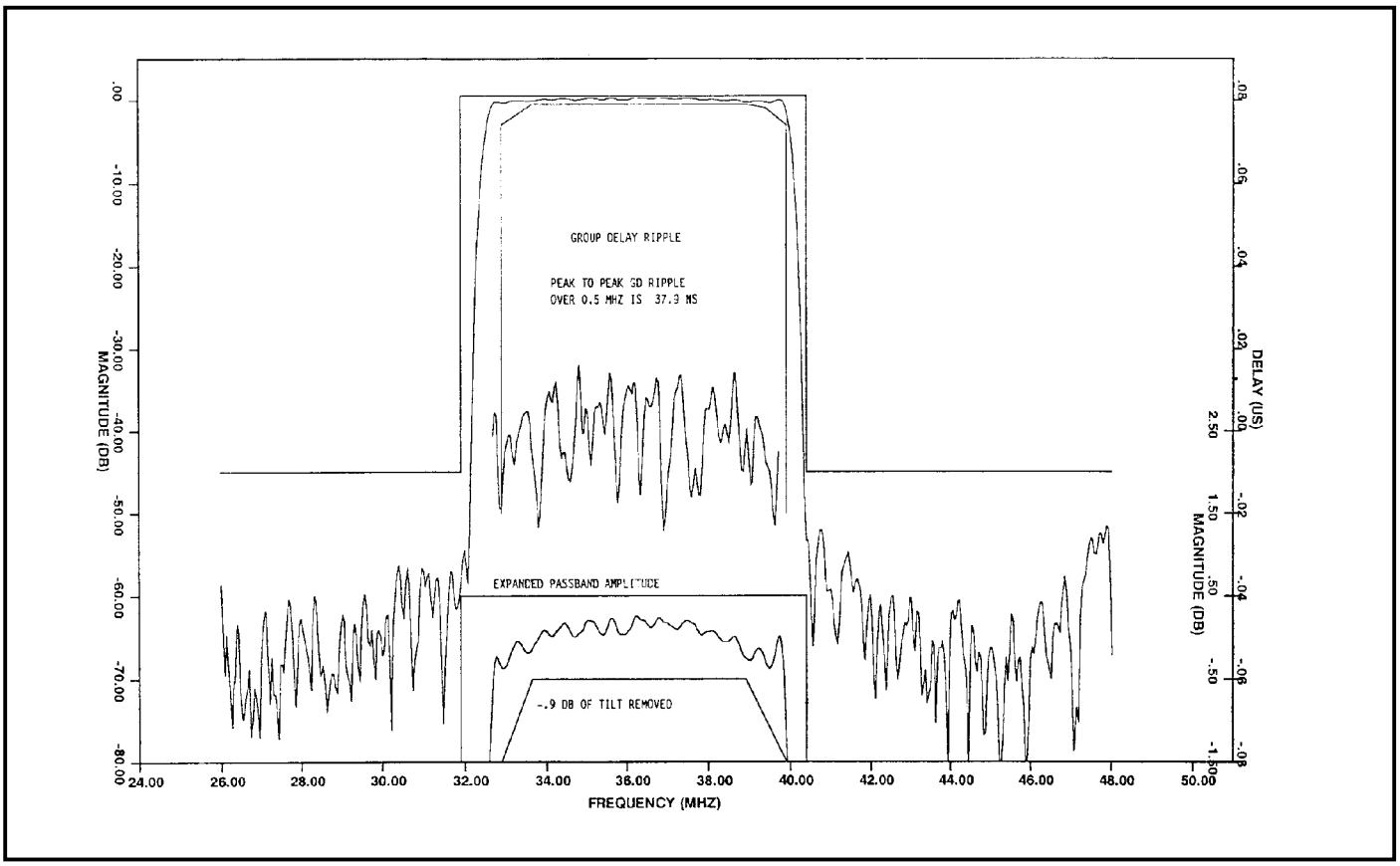



**Fig.1 - DW1404-G**

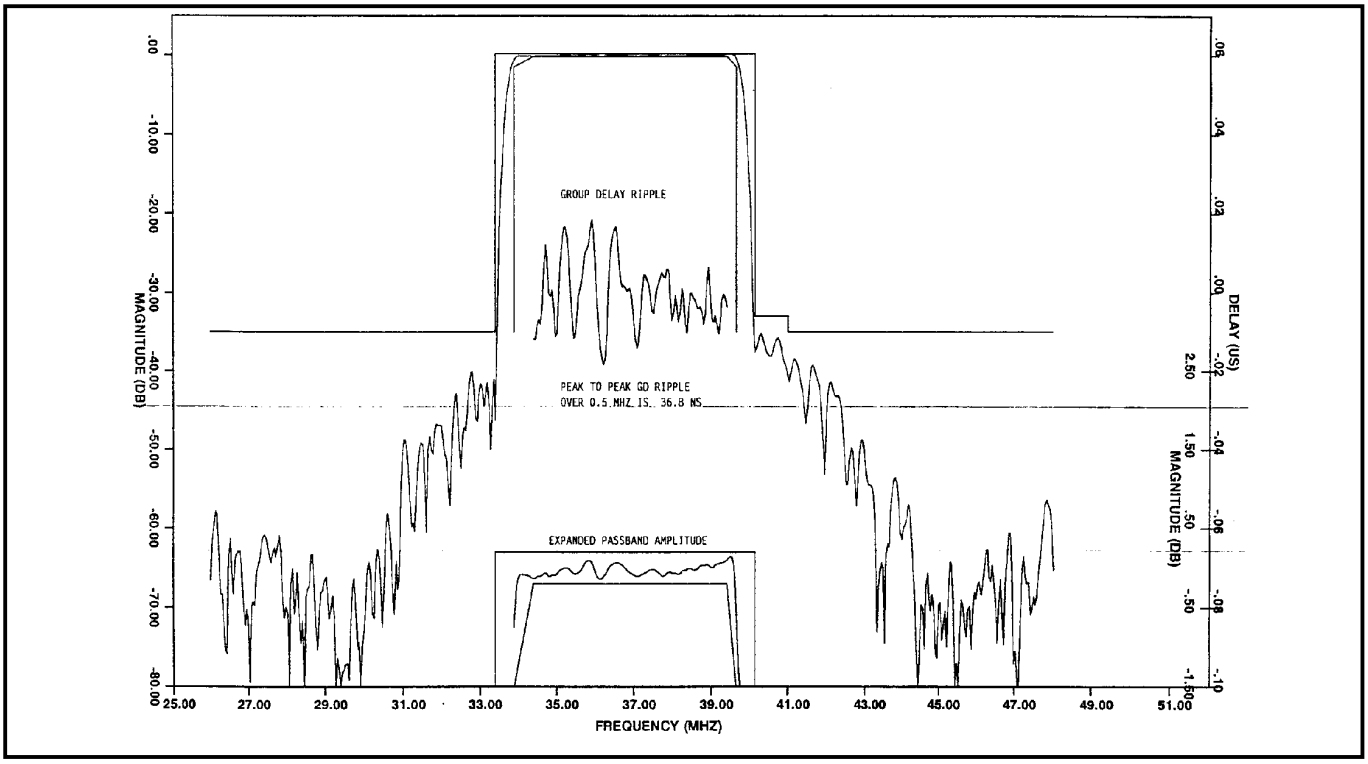



**Fig.2 - DW1406-G**

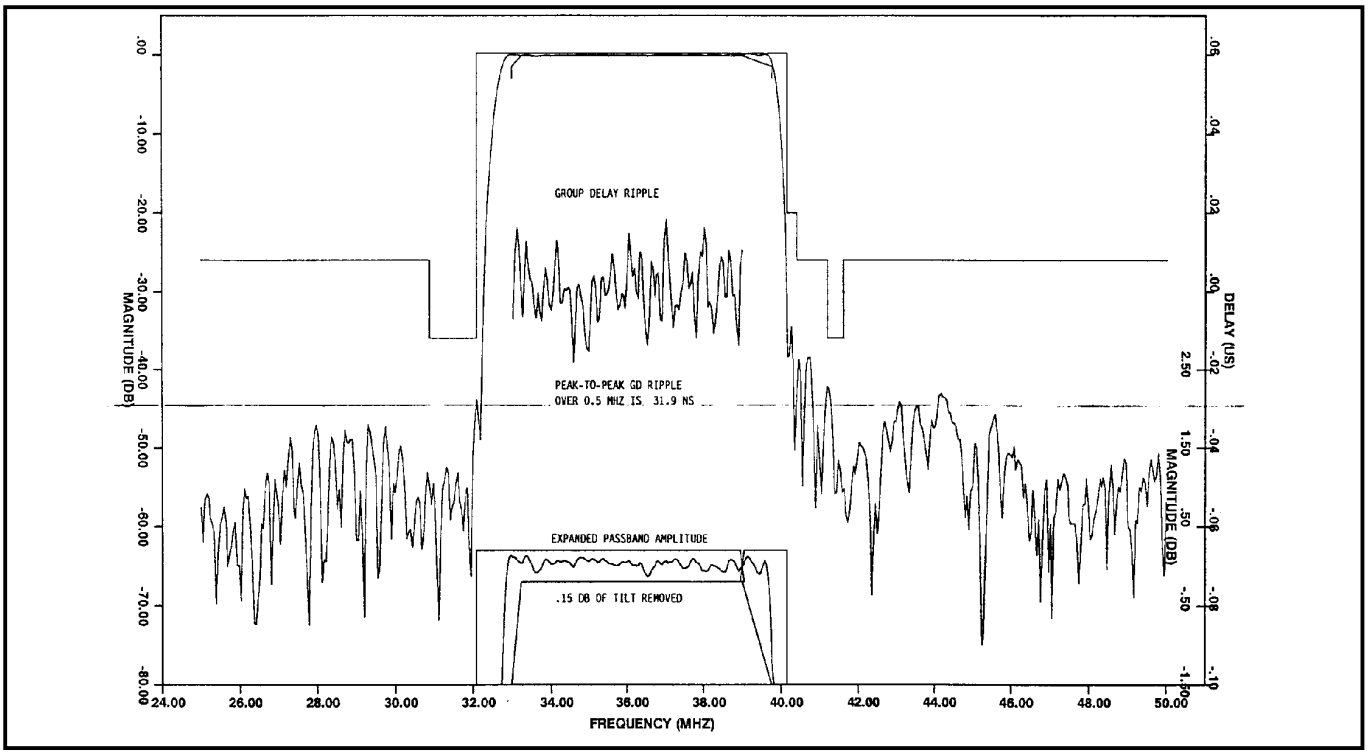



**Fig.3 - DW1408-G**

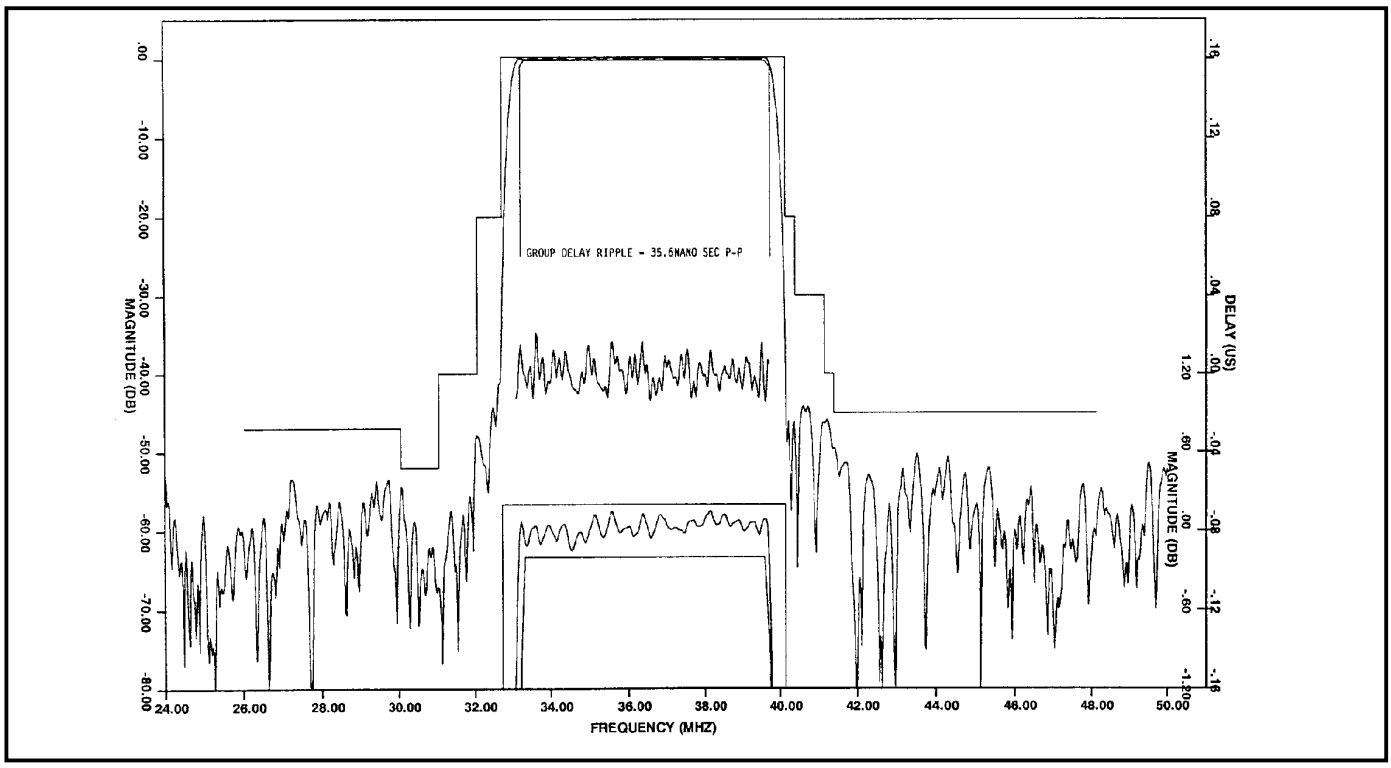



**Fig.4 - DW1411-G**

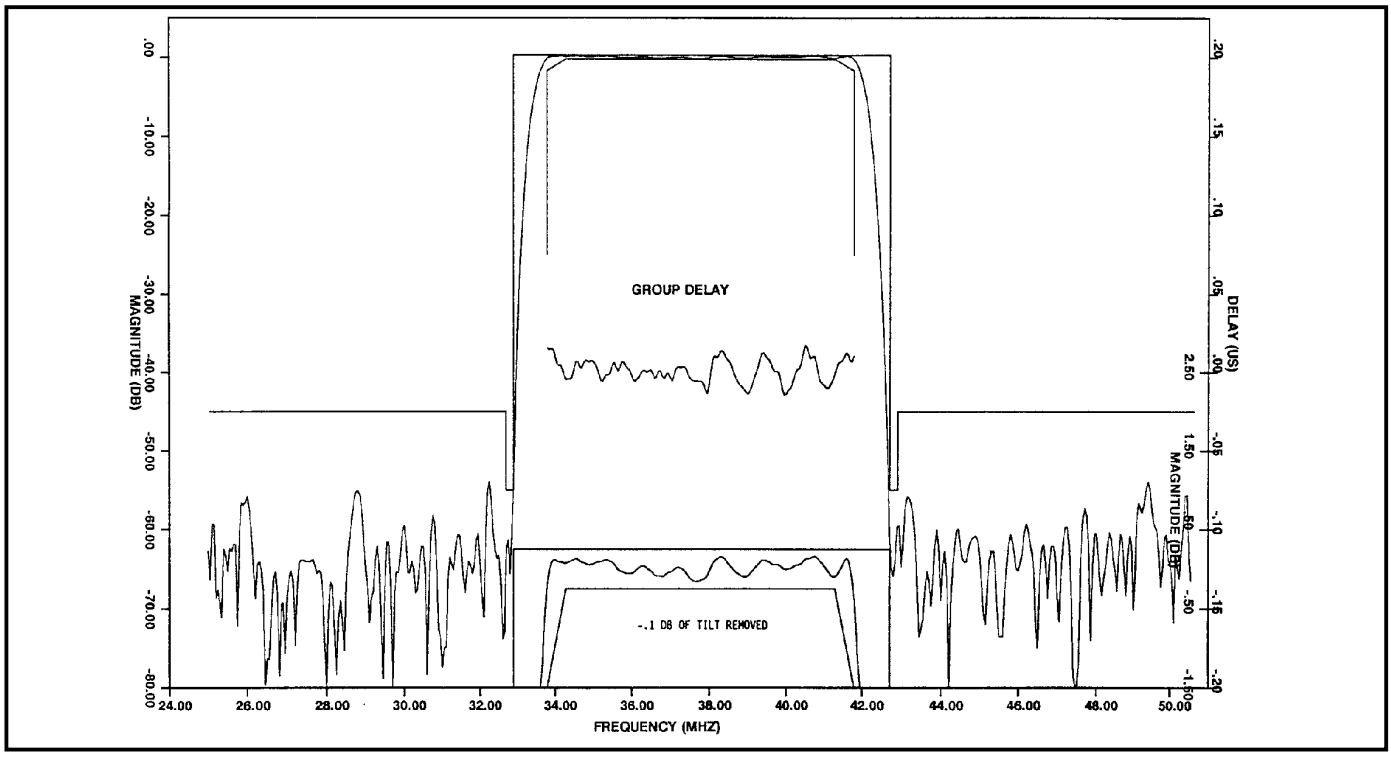



**Fig.5 - DW1502-I**

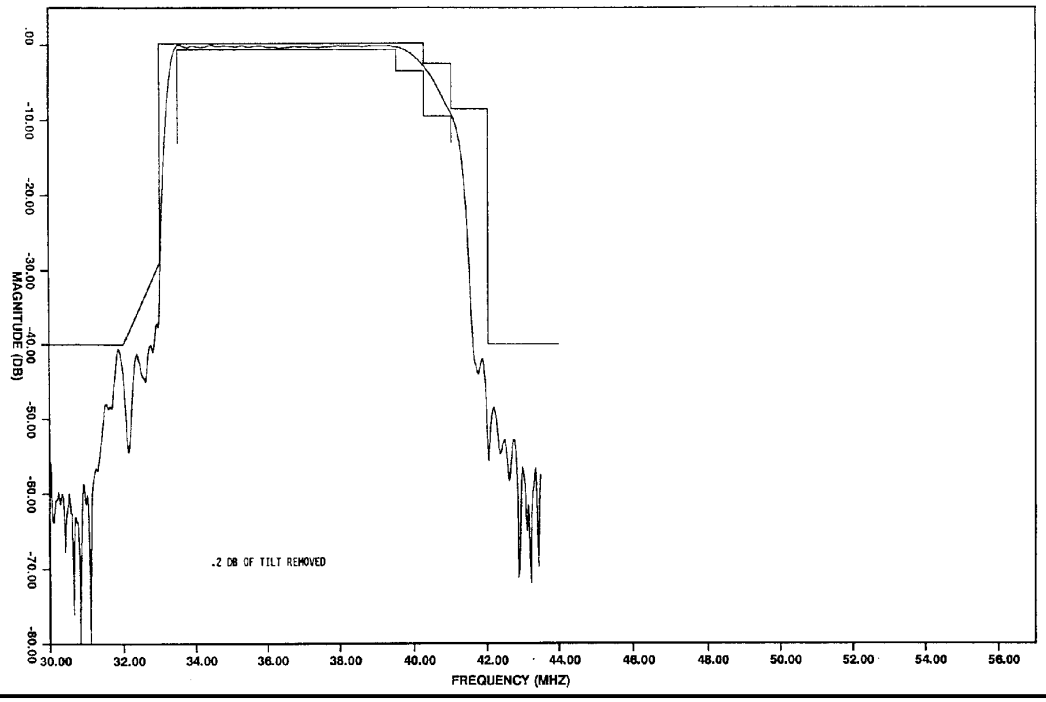
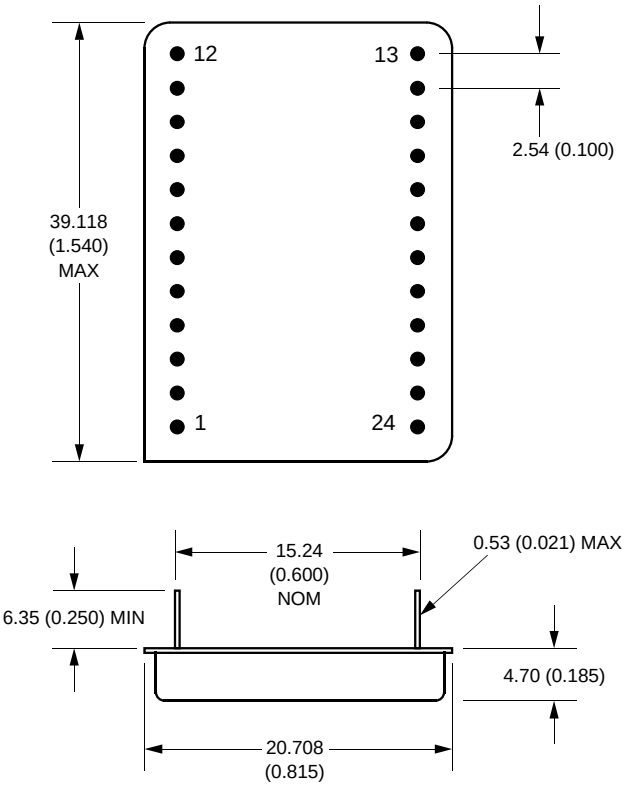



**Fig. 6 - DW1503-I**

## PACKAGE DETAILS

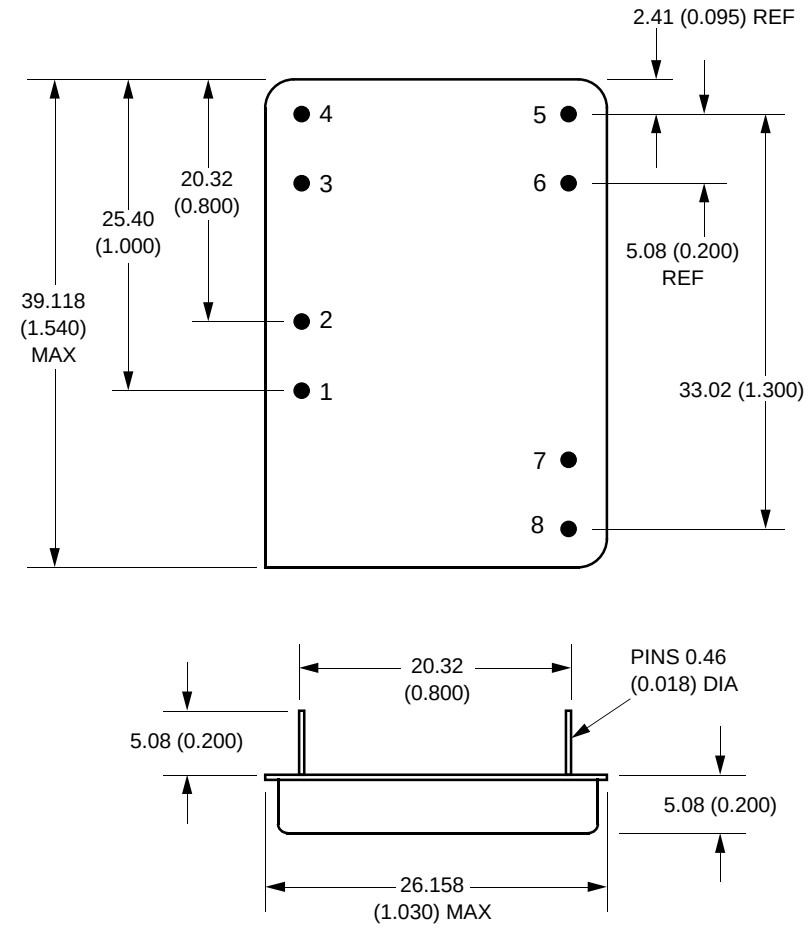
| | |
|---|---|
| 2 | Gnd |
| 3 | Input |
| 4, 10, 11, 12, 14 | Gnd |
| 15 | Output |
| 16, 22, 23, 24 | Gnd |

**Note:** BP1121 only - Input Pin 1
Output Pin 12




**Package Type A**

| | |
|---|---|
| 1 | Input |
| 2, 3, 4 | Gnd |
| 5 | Output |
| 6, 7, 8 | Gnd |




**Package Type D**

DYNEX SEMICONDUCTOR

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**Target Information:** This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

**Preliminary Information:** The product is in design and development. The datasheet represents the product as it is understood but details may change.

**Advance Information:** The product design is complete and final characterisation for volume production is well in hand.

**No Annotation:** The product parameters are fixed and the product is available to datasheet specification.