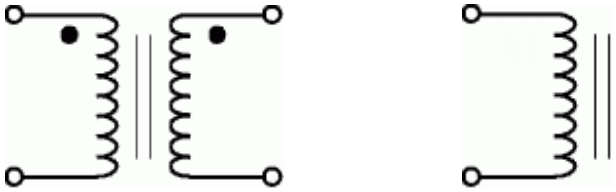
Rhombus
Industries Inc.
*Transformers & Magnetic Products*

# *Audio Transformers & Inductors for Telecommunications*



*PRODUCTS INCLUDE...*

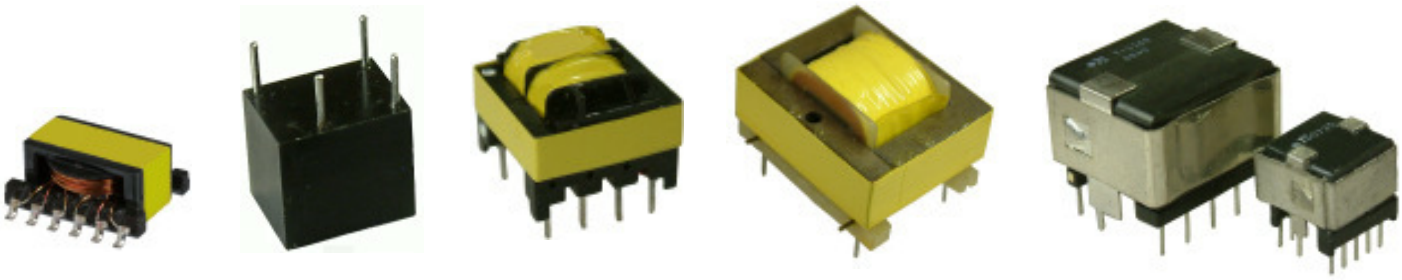
**Transformers**

**Voice & Data Coupling**

**Line Matching**

**Hybrids**

**Inductors**



**www.rhombus-ind.com**

**Tel: 714-836-0960 • FAX: 714-836-0969 • sales@rhombus-ind.com**

# Rhombus Industries Inc.

*Transformers & Magnetic Products*

Founded in 1970, Rhombus Industries Incorporated is a privately owned corporation and a leading designer and manufacturer of transformers and magnetic products. Our headquarters is located in Santa Ana, California and includes engineering, research and development, prototype manufacturing capabilities, marketing and extensive in-house testing capabilities. All product is manufactured at our privately owned and operated subassembly operation located in Thailand. Insuring the accuracy, consistency, and overall quality of Rhombus products is of primary concern. All of our products are designed and built to meet the most demanding reliability requirements. We have an extensive quality control program which incorporates statistical process control and is also in strict compliance with MIL-I-45208.

For over 45 years, Rhombus has gained unique experience in providing quality components and innovative designs for users of magnetic products. Rhombus welcomes custom designs tailored to unique customer requirements. Our dedicated employees look forward to proving to you that Rhombus offers the price, delivery and application support advantages that can address your most critical needs.

## *Audio Transformers & Inductors for Telecommunications*

Table of Contents



For additional product offerings ask for specific Data Sheets or refer to our other Catalogs:

*Transformers & Magnetics for Data Communications* • *Magnetic Components* • *Delay Lines*



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# PCMCIA Modem Transformers

*T-33003/T-33004 Compatible with 56 kb/s Technologies*

Impedance matching transformers for telecommunications.

**Ideal for PCMCIA Type II data/fax modem cards**

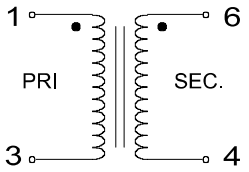
V.32 bis/V.17 14400 bps applications

Longitudinal Balance is 60dB minimum

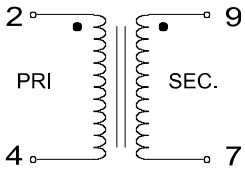
Designed to meet FCC Part 68

Custom Designs Available

Schematic Style "B"




Schematic Style "C"

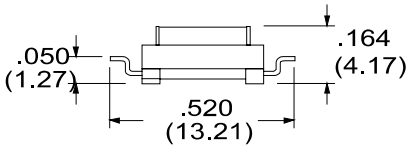


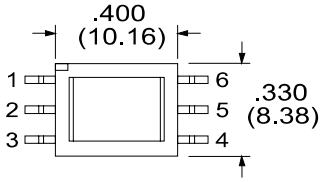

Electrical Specifications at 25°C

| Parameter | | T-33001 | T-33002 | T-33003 | T-33004 | Units |
|---|---|---|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>346 | 600<br>346 | 600<br>392 | 600<br>294 | Ω<br>Ω |
| Turns Ratio | ± 2% | 1:1 | 1:1 | 1:1 | 1:1 | |
| Direct Current in Pri. (DCI) | maximum | 0 | 0 | 0 | 0 | mA |
| DC Resistance | PRI. ± 10%<br>SEC. ± 10% | 127<br>150 | 127<br>150 | 105<br>112 | 180<br>156 | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 3.3 | 3.3 | 2.35 | 2.7 | dB |
| Return Loss | min., 300 Hz to 3.5 kHz | 25 | 25 | 20 | 30 | dB |
| Longitudinal Balance | minimum | 60<br>200Hz - 4kHz | 60<br>200Hz - 4kHz | 60<br>300Hz - 3.5kHz | 60<br>300Hz - 3.5kHz | dB |
| Frequency Response | 300 Hz to 3.5 kHz | ± 0.25 | ±0.25 | ± 0.25 | ±0.25 | dB |
| Total Harmonic Distortion | typ. 600 Hz, -10 dBm | -76 | -76 | -76 | -83 | dB |
| Isolation | minimum | 1000 | 1000 | 1650 | 1000 | $V_{RMS}$ |
| Schematic Style | | B | B | C | C | |

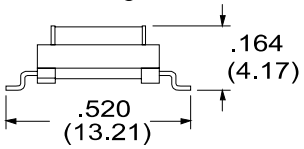
Dimensions in Inches (mm)

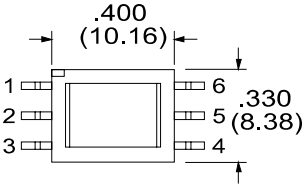
T-33001 Package



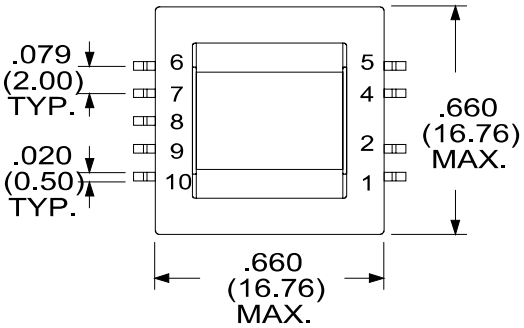



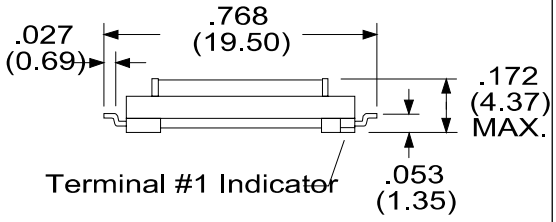

T-33002 Package




T-33003 & T-33004 Package



# Pocket / Laptop Modem Couplers

*Small Size -- High Isolation*

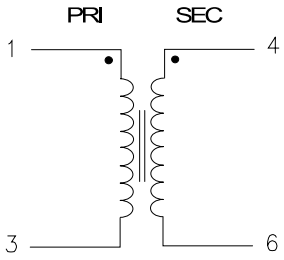
Designed for laptop and pocket modem applications.
Suitable for modem speeds from V.22 to V.34, V.Fast
Ideal for a variety of voice and data interconnect networks
Designed to meet FCC part 68.

Electrical Specifications at 25°C

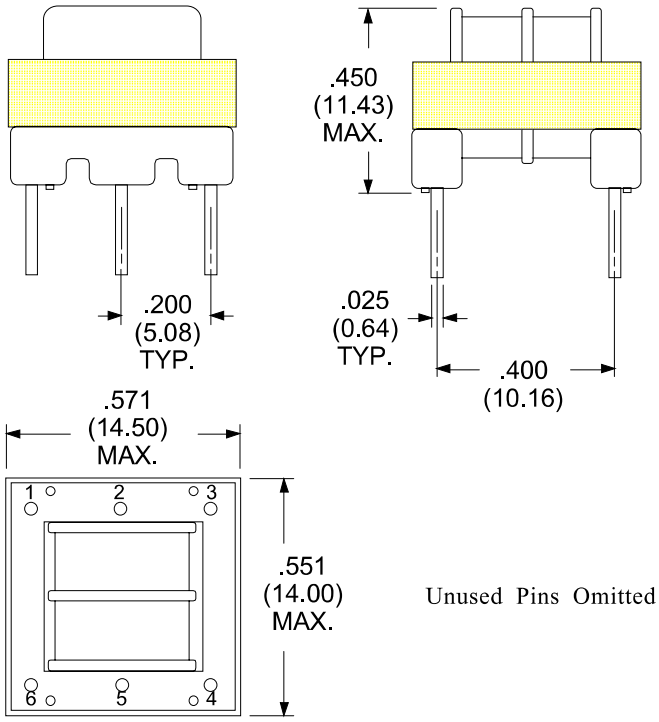
| Part Number | Impedance Pri. Ω | Impedance Sec. Ω | Insertion Loss (1) (dB) | DCR Pri. (Ω) | DCR Sec. (Ω) | Frequency Response (2) ( ± dB ) | Hi-Pot (VAC) | Modem Speed |
|---|---|---|---|---|---|---|---|---|
| T-35100 | 600 | 600 | 1.25 | 46.5 | 67.6 | 0.25 | 1250 | V.29 |
| T-35101 (4) | 600 | 600 | 1.50 | 52.0 | 59.0 | 0.50 | 3750 | V.29 |
| T-35102 (4) | 600 | 600 | 1.25 | 46.5 | 67.6 | 0.25 | 1250 | V.32 |
| T-35103 (4) | 600 | 475 | 1.50 | 59.0 | 80.0 | 0.50 | 3750 | V.32 |
| T-35104 (4) | 600 | 442 | 2.00 | 80.0 | 87.0 | 0.25 | 3750 | V.32bis |
| T-35105 (4) | 600 | 442 | 2.00 | 86.0 | 91.0 | 0.50 | 3750 | V.32bis |
| T-35106 (4) | 600 | 348 | 3.25 | 152 | 151 | 0.50 | 3750 | V.34 |

1. Typical Insertion Loss (IL) in dB at 0 mADC, 0 dBm & 1kHz.
2. Typical Frequency Response (FR) from 0.3 to 3.5kHz.
3. Suitable for Modem speeds from V.29 to V.fast.
4. Except P/N T-35100, these are built to meet BABT creepage and clearance requirements.

Schematic Diagram




Dimensions in inches (mm)



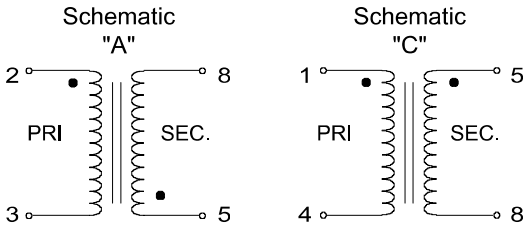

Unused Pins Omitted

# Modem Coupling & Voiceband Transformers

Low Distortion

Low Profile /SMD Versions

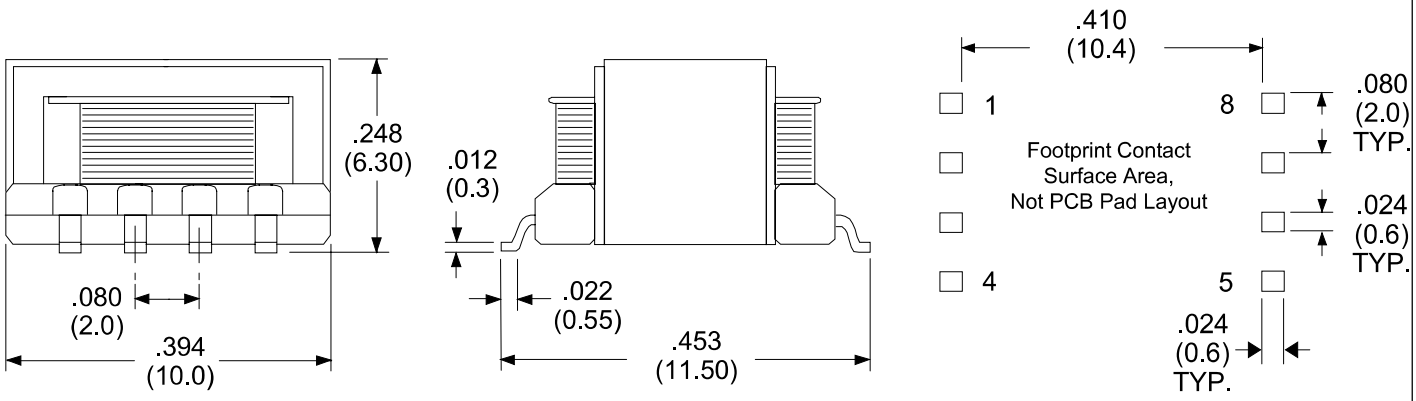
Most Parts Listed are Suitable for V.32 Applications




Electrical Specifications at 25°C

| Parameter | | T-33000 | T-843 | Units |
|---|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>487 | 600<br>600 | Ω<br>Ω |
| Turns Ratio | ± 2% | 1:1 | 1:1 | |
| Direct Current in Pri. (DCI) | maximum | 0 | 0 | mA |
| DC Resistance | PRI.<br>SEC. | 67 ± 10%<br>85 ± 10% | 55 ± 10%<br>43 ± 10% | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 1.5 | 1.0 | dB |
| Return Loss | min., 300 Hz to 3.5 kHz | 25 | 20 | dB |
| Longitudinal Balance | minimum | 60<br>60Hz - 1kHz | -- | dB |
| Frequency Response | 300 Hz to 3.5 kHz | ± 0.5 | ± 0.7 | dB |
| Total Harmonic Distortion | typ. 600 Hz, -10 dBm | -60 | -- | dB |
| Isolation | minimum | 1250 | 150 | $V_{RMS}$ |
| Schematic Style | | A | C | |

Package for T-33000 & T-843




Dimensions in Inches (mm)

# Modem Coupling & Voiceband Transformers

Low Distortion

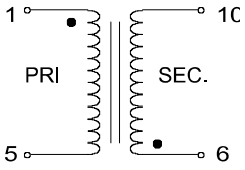
Low Profile /SMD Versions

Most Parts Listed are Suitable for V.32 Applications

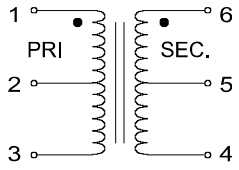
Electrical Specifications at 25°C

| Parameter | | T-31103 | T-531 | Units |
|---|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>365 | 600<br>470 | Ω<br>Ω |
| Turns Ratio | ± 2% | 1:1 | 1:1 | |
| Direct Current in Pri. (DCI) | maximum | 0 | 0 | mA |
| DC Resistance | PRI.<br>SEC. | 118 ± 10%<br>118 ± 10% | 68 max.<br>102 max. | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 2.15 | 1.2 | dB |
| Return Loss | min., 300 Hz to 3.5 kHz | 25 | 30 | dB |
| Longitudinal Balance | minimum | 60<br>200Hz - 1kHz | 60<br>200Hz - 4kHz | dB |
| Frequency Response | 300 Hz to 3.5 kHz | ±0.25 | ±0.25 | dB |
| Isolation | minimum | 1100 | 1100 | $V_{RMS}$ |
| Schematic Style | | B | D | |

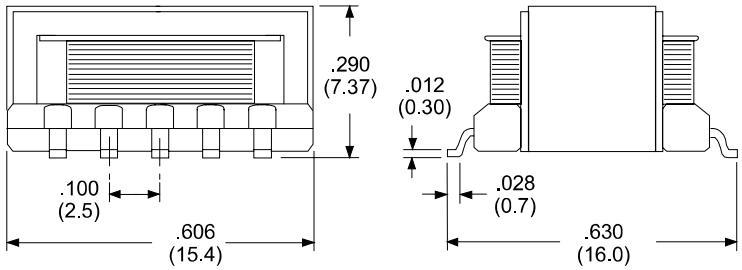
Schematic "B"

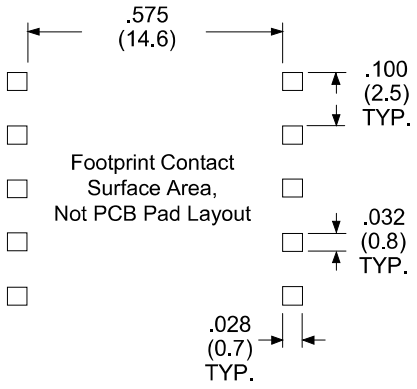


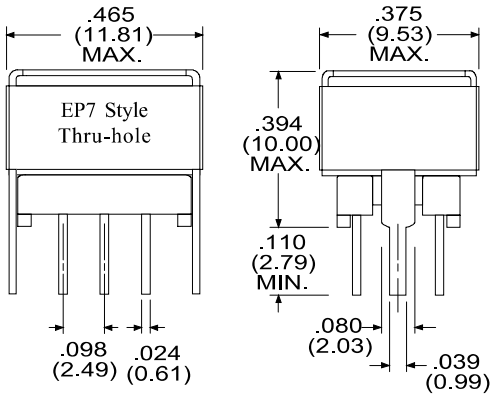

Schematic "D"

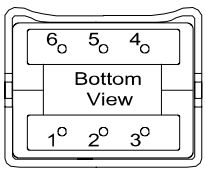



Package for T-31103



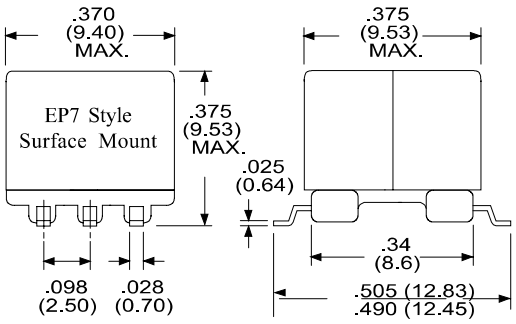




Package for T-531

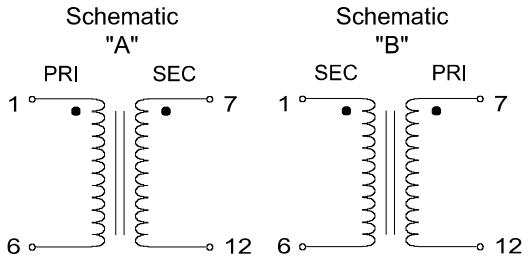
Dimensions in Inches (mm)

Package for T-531SM



# Low Profile Modem Coupling and Voiceband Transformers

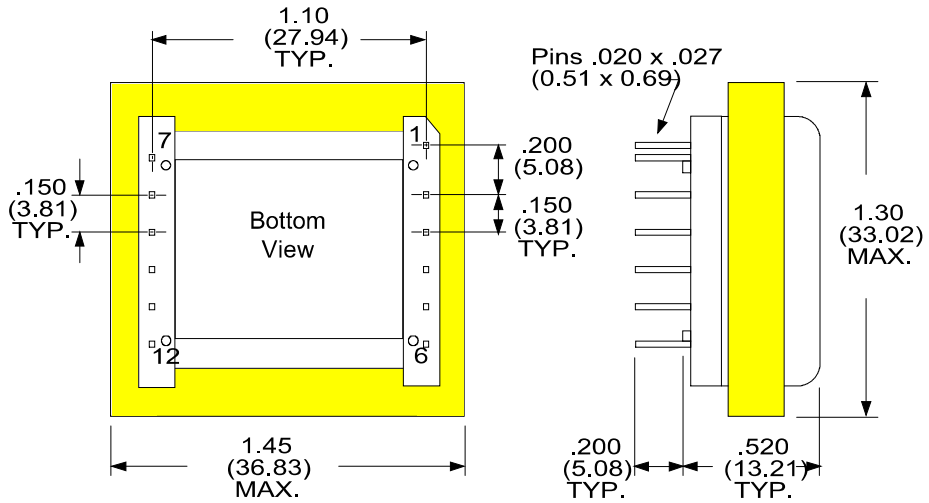
- Low Distortion
- Isolation is 1500$V_{RMS}$ Min.
- Designed to meet FCC part 68
- Frequency Range: 300Hz to 3500Hz
- Low Profile Package
- Custom Designs Available




Electrical Specifications at 25°C

| Parameter | | T-31104 | T-31105 | T-31106 | Units |
|---|---|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>530 | 600<br>600 | 600<br>470 | Ω<br>Ω |
| Turns Ratio | | 1:1 | 1:1 | 1:1 | |
| Direct Current in Pri. (DCI) | maximum | 70 | 60 | 80 | mA |
| DC Resistance | PRI. ± 10%<br>SEC. ± 10% | 70<br>81 | 75<br>80 | 62.4<br>60.1 | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 1.3 | 2.0 | 1.3 | dB |
| Return Loss | min., @ 300 Hz | 25 | 20 | 20 | dB |
| Longitudinal Balance | min., 200Hz to 4kHz | 60 | 60 | 60 | dB |
| Frequency Response | 300 Hz to 3.5 kHz | ± 0.2 | ±0.5 | ± 1.0 | dB |
| Isolation | minimum | 1500 | 1500 | 1500 | $V_{RMS}$ |
| Schematic Style | | A | B | A | |

Dimensions in Inches (mm)






Data subject to change without notice.

Consult factory for other values & Custom Designs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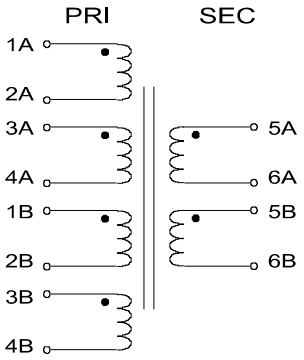
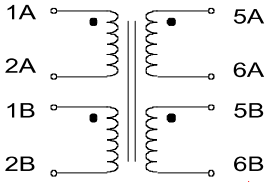
# Modem Coupling and Voiceband Transformers

- Low Distortion
- Isolation is 1500$V_{RMS}$ Min.
- Designed to meet FCC part 68
- Frequency Range: 300Hz to 3500Hz
- Low Profile Package
- Custom Designs Available

Schematic "C"

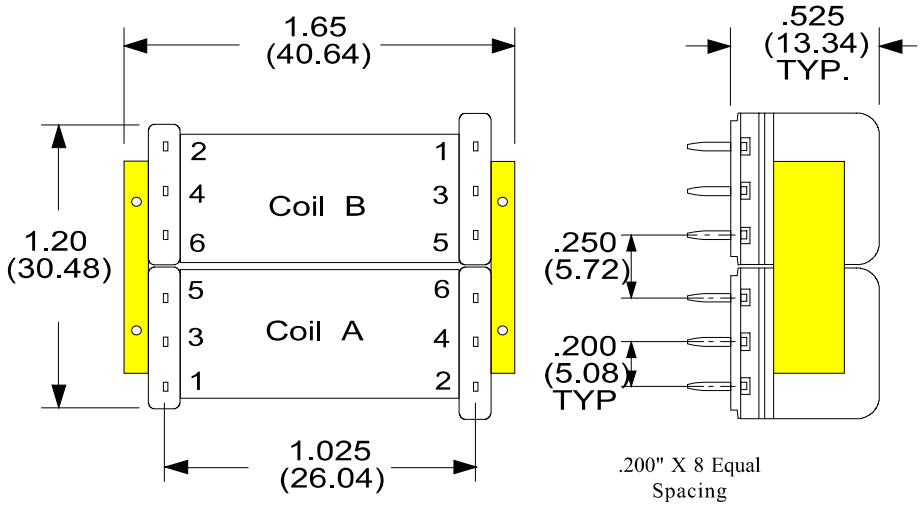



Schematic "D"




Electrical Specifications at 25°C

| Parameter | | T-31107 | T-31108 | Units |
|---|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>365 | 600<br>470 | Ω<br>Ω |
| Turns Ratio | | 1:1 | 1:1 | |
| Direct Current in Pri. (DCI) | maximum | 80 | 80 | mA |
| DC Resistance | PRI. ± 10%<br>SEC. ± 10% | 95<br>180 | 95<br>180 | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 2.0 | 2.1 | dB |
| Return Loss | min., @ 300 Hz | 15 | 26 | dB |
| Longitudinal Balance | min., 200Hz to 4kHz | 60 | 60 | dB |
| Frequency Response | 300 Hz to 3.5 kHz | ± 0.25 | ± 0.25 | dB |
| Isolation | minimum | 1500 | 1500 | $V_{RMS}$ |
| Schematic Style | | C | D | |




.200" X 8 Equal Spacing

Split-Bobbin Style Package

.250" x 2 Equal Spacing

# Multi-Purpose Voice & Data Coupling Transformers

Impedance matching transformers for telecommunications.

Ideal for a variety of voice and data inter-connect networks

Isolation is 1500 $V_{RMS}$ minimum
Longitudinal Balance is 60dB minimum
Frequency range: 300Hz to 3400Hz
Designed to meet FCC part 68
Custom Designs Available

## Dry / Economy

Electrical Specifications at 25°C

| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (1) (dB) | Frequency Response (dB) | Return Loss (2) (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-30600 | 600 / 600 | 0.0 | 2.0 | 0.5 | 26 | 65 | 85 | A |
| T-30601 | 600 / 600CT | 0.0 | 2.0 | 0.5 | 26 | 65 | 85 | B |
| T-30602 | 600CT / 600CT | 0.0 | 2.0 | 0.5 | 26 | 65 | 85 | C |
| T-30603 | 600 / 900 | 0.0 | 2.0 | 0.5 | 26 | 65 | 105 | A |
| T-30604 | 600 / 900CT | 0.0 | 2.0 | 0.5 | 26 | 65 | 105 | B |
| T-30605 | 900 / 900 | 0.0 | 2.0 | 0.5 | 26 | 85 | 105 | A |
| T-30606 | 900 / 900CT | 0.0 | 2.0 | 0.5 | 26 | 85 | 105 | B |
| T-31300 | 600 / 600 | 0.0 | 1.0 | 0.5 | 20 | 25 | 35 | A |
| T-31301 | 600 / 600CT | 0.0 | 1.0 | 0.5 | 20 | 25 | 35 | B |
| T-31302 | 600CT / 600CT | 0.0 | 1.0 | 0.5 | 20 | 25 | 35 | C |
| T-31303 | 600 / 900 | 0.0 | 1.0 | 1.0 | 20 | 25 | 40 | A |
| T-31304 | 900 / 900 | 0.0 | 1.0 | 1.0 | 20 | 35 | 40 | A |

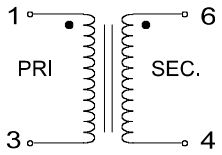
## Dry / High Performance

Electrical Specifications at 25°C

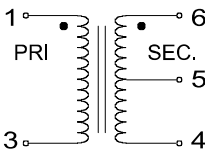
| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (1) (dB) | Frequency Response (dB) | Return Loss (2) (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-31350 | 600 / 600 | 0.0 | 0.85 | 0.25 | 20 | 25 | 35 | A |
| T-31351 | 600 / 600CT | 0.0 | 0.85 | 0.25 | 20 | 25 | 35 | B |
| T-31352 | 600CT / 600CT | 0.0 | 0.85 | 0.25 | 20 | 25 | 35 | C |
| T-31353 | 600 / 900 | 0.0 | 0.85 | 0.25 | 20 | 25 | 40 | A |
| T-31354 | 900 / 900 | 0.0 | 0.85 | 0.25 | 20 | 30 | 40 | A |

1. Insertion Loss measured at 1 KHz
2. Return Loss measured at 300 Hz

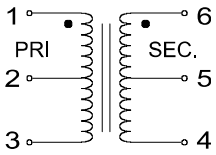
Schematic "A"



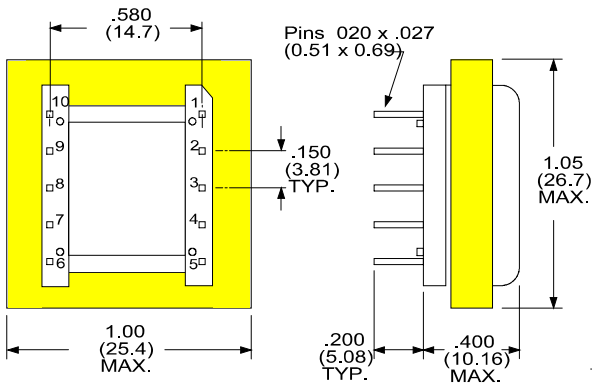

Schematic "B"



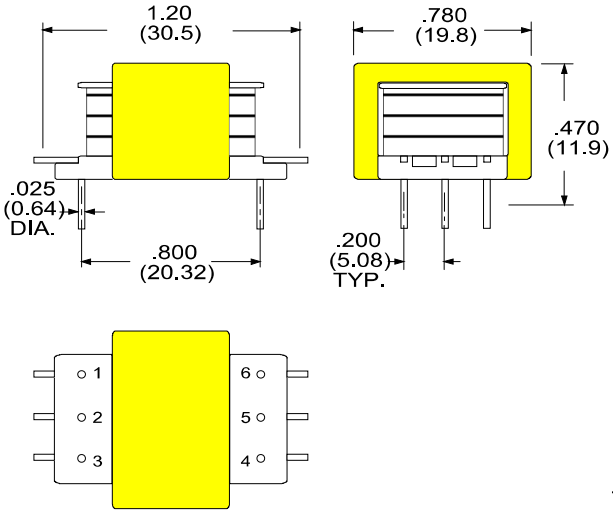

Schematic "C"




T-3060X Package per Table Above




T-313XX Package per Table Above




Dimensions in Inches (mm)
Unused Pins Omitted as Per Schematic

# Voice & Data Coupling Transformers

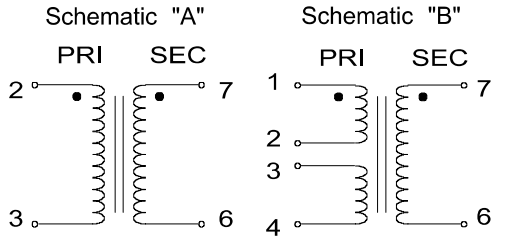
## Impedance Matching Transformers for Telecommunications

- Low Distortion
- May be used in V.32 applications
- Isolation is 1500 $V_{RMS}$ min.
- Frequency 300Hz to 3500Hz
- Designed to meet FCC part 68
- Custom Designs Available

**Secondary load 600 Ω with DC in Pri.**

| Part Number | Impedance PRI. ( Ω ) | Impedance SEC. ( Ω ) | Turns Ratio ± 2% | DCl max. (mA) | Insertion Loss (1) (dB) | Return (2) Loss (dB) | THD (3) (dB) | DCR PRI. ( Ω ) | DCR SEC. ( Ω ) | Frequency (4) Response ( ± dB ) | Schematic Style / Pkg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T-31000 | 600 | 600 | 1:1 | 80 | 1.50 | 11.5 | -65 | 55.0 | 65.0 | 0.5 | A / 8-pin |
| T-31001 | 600 | 600 | 1:1.127 | 80 | 1.00 | 14.5 | -65 | 55.0 | 70.0 | 0.5 | B / 8-pin |
| T-31002 | 600 | 600 | 1:1.127 | 80 | 1.30 | 12.5 | -53 | 67.0 | 76.0 | 0.5 | B / 8-pin |
| T-31003 | 900 | 600 | 1:0.817 | 80 | 1.55 | 11.0 | -65 | 76.0 | 92.0 | 0.5 | A / 8-pin |
| T-31004 | 900 | 600 | 1:0.817 | 80 | 1.60 | 10.5 | -53 | 76.0 | 92.0 | 0.5 | A / 8-pin |
| T-31005 | 900 | 600 | 1:0.942 | 80 | 1.20 | 12.5 | -65 | 83.0 | 126 | 0.5 | B / 8-pin |
| T-31006 | 900 | 600 | 1:0.942 | 80 | 1.30 | 11.0 | -53 | 83.0 | 126 | 0.5 | B / 8-pin |
| T-31010 | 600 | 600 | 1:1 | 80 | 1.20 | 13.0 | -53 | 66.2 | 82.2 | 0.5 | C / 12-pin |
| T-31011 | 600 | 600 | 1:1.125 | 80 | 1.25 | 16.0 | -59 | 76.0 | 86.0 | 0.5 | D / 12-pin |
| T-31012 | 900 | 600 | 1:.0816 | 80 | 1.50 | 9.5 | -53 | 82.8 | 85.4 | 0.5 | C / 12-pin |
| T-31013 | 900 | 600 | 1:0.946 | 80 | 1.55 | 12.0 | -53 | 90.0 | 110 | 0.5 | D / 12-pin |
| T-31014 | 600 | 600 | 1:1 | 80 | 1.20 | 13.0 | -53 | 66.0 | 82.0 | 0.5 | D / 12-pin |

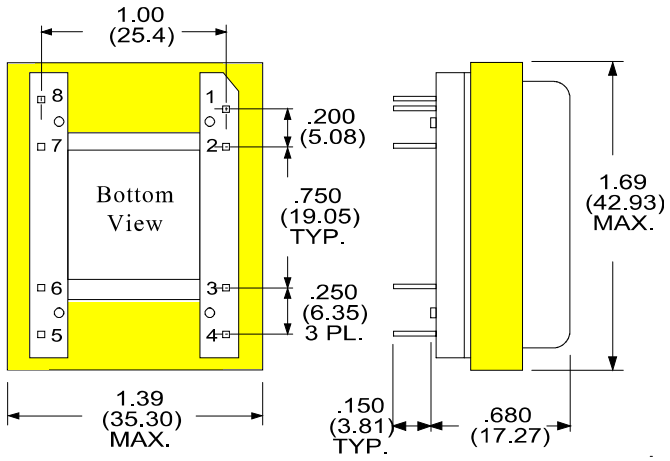
1. Insertion Loss measured at 1 KHz
2. Return Loss measured at 300 Hz
3. Total Harmonic Distortion measured at 0 dBm & 300 Hz
4. Frequency Response measured from 300 Hz to 3500 Hz



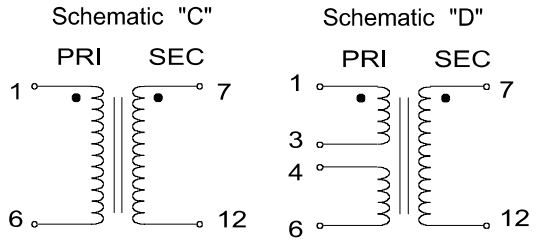

Dimensions in Inches (mm)

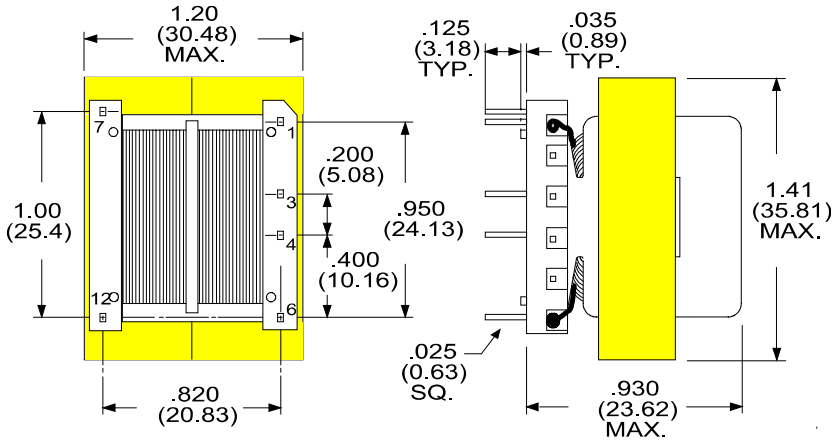
Unused Pins Omitted as per Schematic

8-Pin Package ( T-31000 to T-31006 )




12-Pin Package ( T-31010 to T-31014 )



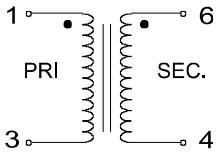

**A20**

# High Isolation Multi-Purpose Audio Transformers

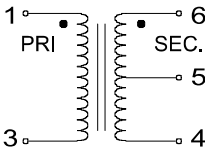
*Ideal for a variety of Voice and Data interconnect network applications*

- 3000 $V_{RMS}$ minimum Isolation
- Longitudinal Balance is 60dB minimum
- Frequency range: 300Hz to 3400Hz
- Designed to meet FCC part 68
- Materials used in construction of this component meet or exceed UL Class B and can operate up to 130°C

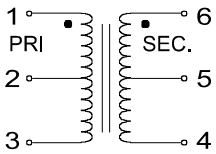
Schematic "A"




Schematic "B"




Schematic "C"




## Dry / High Performance

Electrical Specifications at 25°C

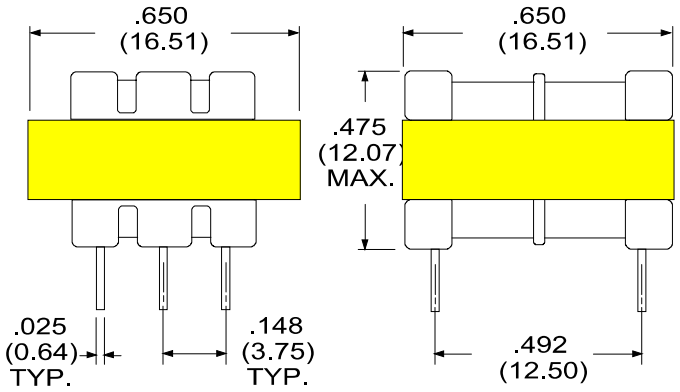
| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (1) (dB) | Frequency Response (dB) | Return Loss (2) (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-30700 | 600 / 600 | 0.0 | 1.5 | 0.3 | 20 | 45 | 45 | A |
| T-30701 | 600 / 600CT | 0.0 | 1.5 | 0.3 | 20 | 45 | 45 | B |
| T-30702 | 600CT / 600CT | 0.0 | 1.5 | 0.3 | 20 | 45 | 45 | C |
| T-30703 | 600 / 900 | 0.0 | 1.5 | 0.5 | 20 | 45 | 55 | A |
| T-30704 | 900 / 900 | 0.0 | 1.5 | 0.5 | 20 | 55 | 55 | A |

## Dry / Economy

Electrical Specifications at 25°C

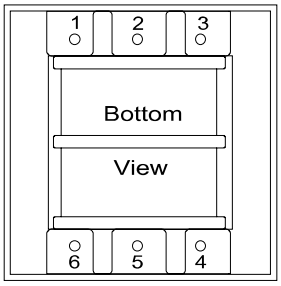
| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (1) (dB) | Frequency Response (dB) | Return Loss (2) (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-30750 | 600 / 600 | 0.0 | 1.7 | 0.5 | 20 | 45 | 45 | A |
| T-30751 | 600 / 600CT | 0.0 | 1.7 | 0.5 | 20 | 45 | 45 | B |
| T-30752 | 600CT / 600CT | 0.0 | 1.7 | 0.5 | 20 | 45 | 45 | C |
| T-30753 | 600 / 900 | 0.0 | 1.7 | 0.7 | 20 | 45 | 55 | A |
| T-30754 | 900 / 900 | 0.0 | 1.7 | 0.7 | 20 | 55 | 55 | A |

1. Insertion Loss measured at 1 KHz
2. Return Loss measured at 300 Hz




Dimensions in Inches (mm)

Unused Pins Omitted as Per Schematic




**A20**

# Low Cost Multi-Purpose Audio Transformers

Impedance matching transformers for telecommunications.

Ideal for a variety of voice and data interconnect networks

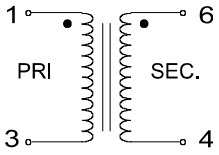
Isolation is 1500 $V_{RMS}$ minimum
Longitudinal Balance is 60dB minimum
Frequency range: 300Hz to 3400Hz
Designed to meet FCC part 68
Custom Designs Available

Electrical Specifications at 25°C

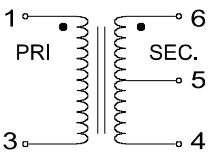
| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion [1] Loss (dB) | Frequency Response (dB) | Return [2] Loss (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-30000 | 600 / 600 | 0.0 | 1.25 | 0.5 | 26 | 30 | 40 | A |
| T-30001 | 600 / 600CT | 0.0 | 1.25 | 0.5 | 26 | 30 | 40 | B |
| T-30007 | 600CT / 600CT | 0.0 | 1.25 | 0.5 | 26 | 30 | 40 | C |
| T-30002 | 600 / 900 | 0.0 | 1.25 | 0.5 | 26 | 30 | 73 | A |
| T-30003 | 900 / 900 | 0.0 | 1.25 | 0.5 | 26 | 40 | 53 | A |
| T-30004 | 600 / 600 | 80 | 2.0 | 3.0 | 9.0 | 65 | 85 | A |
| T-30005 | 600 / 600CT | 80 | 2.0 | 3.0 | 9.0 | 65 | 85 | B |
| T-30050 | 600 / 600 | 0.0 | 0.4 | 0.25 | 26 | 13 | 16 | A |
| T-30051 | 600 / 600CT | 0.0 | 0.4 | 0.25 | 26 | 13 | 16 | B |
| T-30057 | 600CT / 600CT | 0.0 | 0.4 | 0.25 | 26 | 13 | 16 | C |
| T-30052 | 600 / 900 | 0.0 | 0.5 | 0.25 | 26 | 13 | 23 | A |
| T-30053 | 900 / 900 | 0.0 | 0.5 | 0.25 | 26 | 19 | 23 | A |
| T-30054 | 600 / 600 | 80 | 2.0 | 3.0 | 9.0 | 57 | 75 | A |
| T-30055 | 600 / 600CT | 80 | 2.0 | 3.0 | 9.0 | 57 | 75 | B |

1. Insertion Loss measured at 1 kHz.
2. Return Loss measured at 300 Hz.

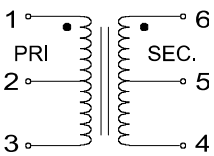
Schematic "A"

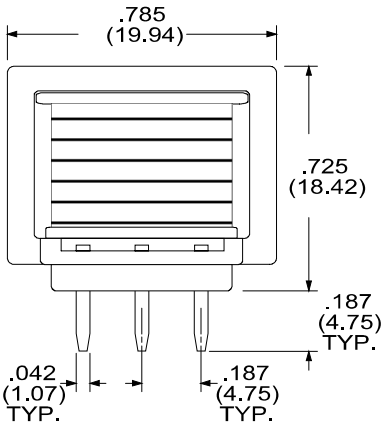


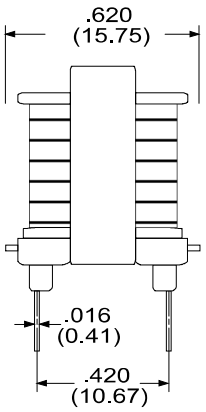

Schematic "B"




Schematic "C"




Dimensions in Inches (mm)

Unused Pins Omitted as Per Schematic

# Miniature Multi-Purpose Audio Transformers

Impedance matching transformers for telecommunications.

Ideal for a variety of voice and data inter-connect networks

Isolation is 1500 $V_{RMS}$ minimum
Longitudinal Balance is 60dB minimum
Frequency range: 300Hz to 3400Hz
Designed to meet FCC part 68
Custom Designs Available

## Dry / High Performance

Electrical Specifications at 25°C

| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) | Frequency Response (dB) | Return Loss (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-35200 | 600 / 600 | 0.0 | 1.5 | 0.7 | 26 | 48 | 65 | A |
| T-35201 | 600 / 600CT | 0.0 | 1.5 | 0.7 | 26 | 48 | 65 | B |
| T-35202 | 600CT / 600CT | 0.0 | 1.5 | 0.7 | 26 | 48 | 65 | C |
| T-35203 | 600 / 900 | 0.0 | 1.7 | 0.3 | 20 | 48 | 94 | A |
| T-35204 | 900 / 900 | 0.0 | 1.9 | 0.4 | 20 | 114 | 146 | A |

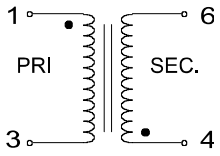
## Dry / Economy

Electrical Specifications at 25°C

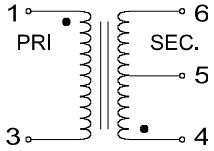
| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) | Frequency Response (dB) | Return Loss (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-35250 | 600 / 600 | 0.0 | 1.5 | 1.2 | 26 | 50 | 55 | A |
| T-35251 | 600 / 600CT | 0.0 | 1.5 | 1.2 | 26 | 50 | 55 | B |
| T-35252 | 600 / 900 | 0.0 | 1.6 | 1.2 | 20 | 50 | 95 | A |
| T-35253 | 900 / 900 | 0.0 | 1.6 | 1.2 | 20 | 75 | 95 | A |
| T-35254 | 600 / 600 | 80 | 2.5 | 1.25 | 9.0 | 68 | 85 | A |
| T-35255 | 600 / 600CT | 80 | 2.5 | 1.25 | 9.0 | 68 | 85 | B |

1. Insertion Loss measured at 1 kHz.
2. Return Loss measured at 300 Hz.

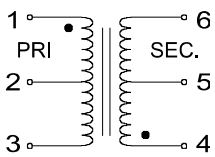
Schematic "A"



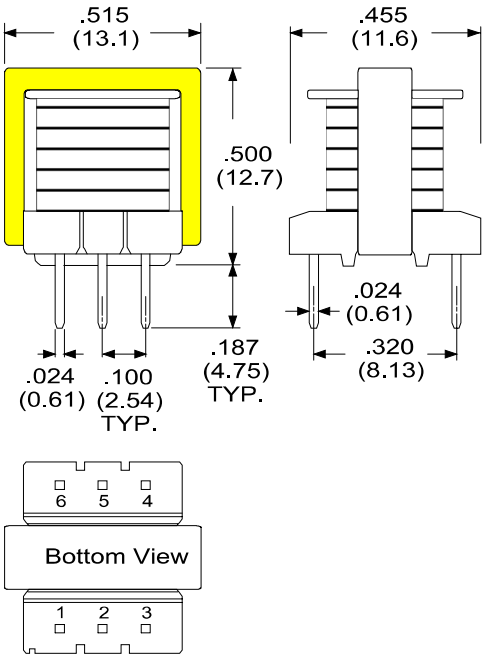

Schematic "B"




Schematic "C"

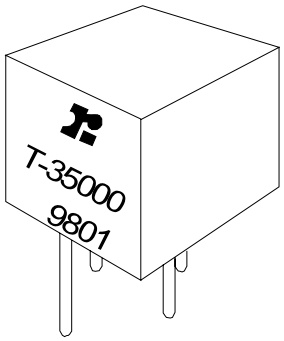



Dimensions in Inches (mm)
Unused Pins Omitted as Per Schematic



# *Mini* Audio Transformers

## Ideal for use in Input, Interface, Isolation & Output Impedance Matching Applications




Electrical Specifications at 25°C

| Part Number | Pri. Impedance (Ω) | Sec. Impedance (Ω) | Pri. DCR (Ω) | Sec. DCR (Ω) | L (1) (H) |
|---|---|---|---|---|---|
| T-35000 | 1600 | 3.2 | 186 | 0.8 | 1.27 |
| T-35001 | 1500 | 600 | 160 | 95 | 1.19 |
| T-35002 | 1200 | 3.2 | 125 | 0.7 | 0.95 |
| T-35003 | 1000 | 1000 | 80 | 100 | 0.80 |
| T-35004 | 1000 | 600 | 85 | 95 | 0.80 |
| T-35005 | 1000 | 50 | 87 | 8 | 0.80 |
| T-35006 | 900 | 600 | 75 | 95 | 0.72 |
| T-35007 | 600 | 600 | 70 | 95 | 0.48 |
| T-35008 | 600 | 250 | 54 | 26 | 0.48 |
| T-35009 | 600 | 8 | 60 | 1.5 | 0.48 |
| T-35010 | 600 | 3.2 | 60 | 0.7 | 0.48 |
| T-35011 | 500 | 600 | 65 | 95 | 0.40 |
| T-35012 | 500 | 50 | 55 | 8 | 0.40 |
| T-35013 | 320 | 3.2 | 35 | 0.7 | 0.25 |
| T-35014 | 300 | 600 | 38 | 98 | 0.24 |
| T-35015 | 150 | 12 | 16 | 2.1 | 0.12 |
| T-35016 | 120 | 3.2 | 12 | 0.4 | 0.10 |
| T-35017 | 300 | 12 | 38 | 2.5 | 0.24 |
| T-35018 | 600 | 600 | 32 | 87 | 0.48 |
| T-35019 | 10000 | 125 | 453 | 26 | 7.96 |
| T-35020 | 600 | 600 | 35 | 58 | 0.48 |

1. Inductance measured at 10 kHz and 100 mV.

Impedance matching transformers for telecommunications.

Ideal for a variety of voice and data interconnect networks.

Operating temperature range: 0°C to 105°C.

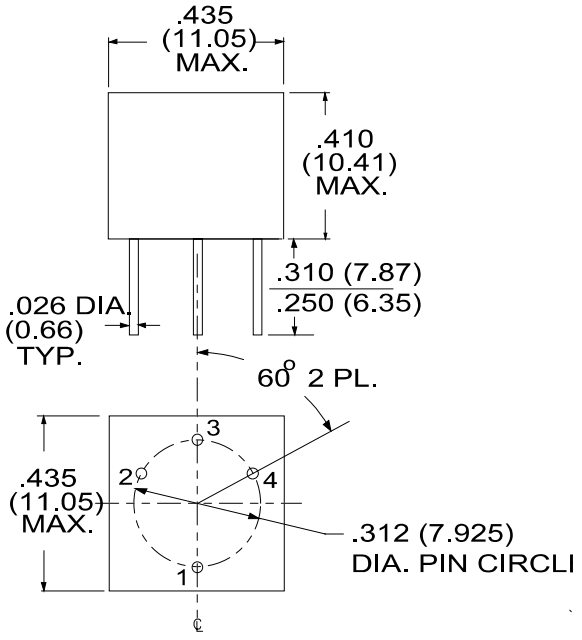
Encapsulated Package

Isolation is 500 $V_{RMS}$ minimum.

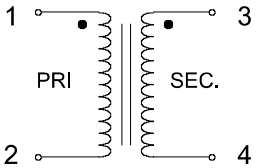
Frequency Response: 300 to 3500Hz ±3dB.

Insulation Resistance is 100 $V_{DC.}$

Dimensions in inches (mm)




Schematic

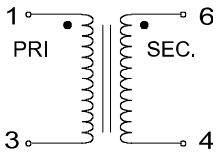


# Encapsulated Multi-Purpose Audio Transformers

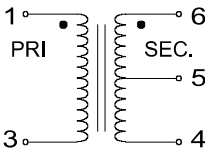
*Ideal for a variety of Voice and Data interconnect network applications*

- 3000 $V_{RMS}$ minimum Isolation
- Longitudinal Balance is 60dB minimum
- Frequency range: 300Hz to 3400Hz
- Designed to meet FCC part 68
- Materials used in construction of this component meet or exceed UL Class B and can operate up to 130°C

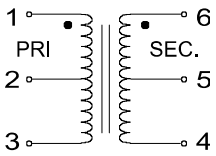
Schematic "A"




Schematic "B"




Schematic "C"




## Dry / High Performance

Electrical Specifications at 25°C

| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) | Frequency Response (dB) | Return Loss (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-30800 | 600 / 600 | 0.0 | 1.5 | 0.3 | 20 | 45 | 45 | A |
| T-30801 | 600 / 600CT | 0.0 | 1.5 | 0.3 | 20 | 45 | 45 | B |
| T-30802 | 600CT / 600CT | 0.0 | 1.5 | 0.3 | 20 | 45 | 45 | C |
| T-30803 | 600 / 900 | 0.0 | 1.5 | 0.5 | 20 | 45 | 55 | A |
| T-30804 | 900 / 900 | 0.0 | 1.5 | 0.5 | 20 | 55 | 55 | A |

## Dry / Economy

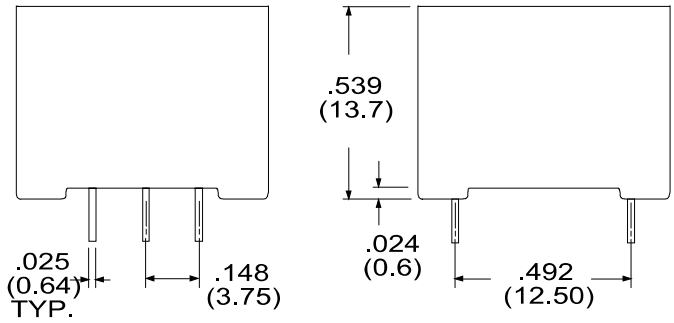
Electrical Specifications at 25°C

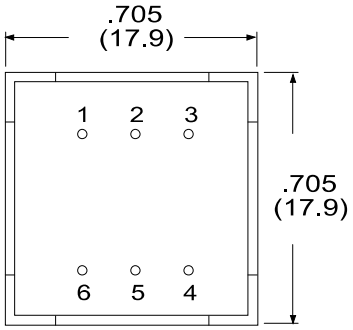
| Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) | Frequency Response (dB) | Return Loss (dB) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) | Schem. Style |
|---|---|---|---|---|---|---|---|---|
| T-30850 | 600 / 600 | 0.0 | 1.7 | 0.5 | 20 | 45 | 45 | A |
| T-30851 | 600 / 600CT | 0.0 | 1.7 | 0.5 | 20 | 45 | 45 | B |
| T-30852 | 600CT / 600CT | 0.0 | 1.7 | 0.5 | 20 | 45 | 45 | C |
| T-30853 | 600 / 900 | 0.0 | 1.7 | 0.7 | 20 | 45 | 55 | A |
| T-30854 | 900 / 900 | 0.0 | 1.7 | 0.7 | 20 | 55 | 55 | A |

1. Insertion Loss measured at 1 kHz.
2. Return Loss measured at 300 Hz.

Dimensions in Inches (mm)

Unused Pins Omitted as Per Schematic



# Self-Shielded Audio Transformers

Using EP Geometry cores, these transformers provide excellent shielding.

Isolation is 1500 Vrms minimum

Longitudinal Balance is 60dB min.

Frequency range: 300Hz to 3400Hz

Electrical Specifications at 25°C

| Thru-hole EP7 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30400 | 600 / 600 | 0.0 | 0.7 | 0.50 | 18 | 31 | 39 |

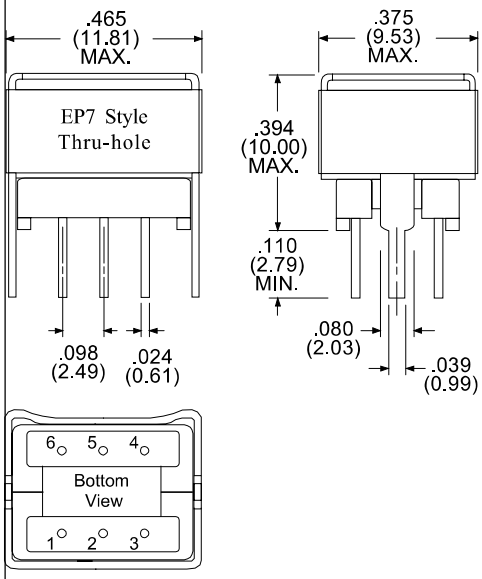
Electrical Specifications at 25°C

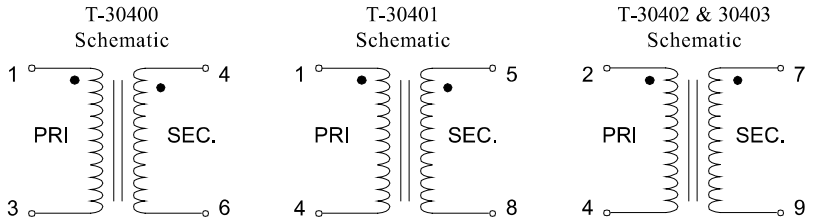
| Thru-hole EP10 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30401 | 600 / 600 | 0.0 | 0.9 | 0.50 | 21 | 34 | 43 |

Electrical Specifications at 25°C

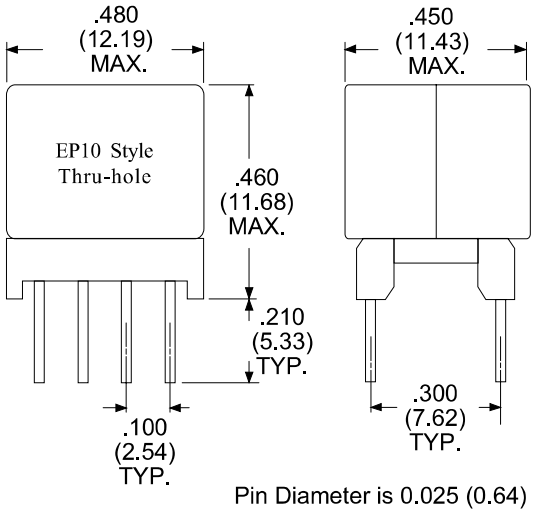
| Thru-hole EP13 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30402 | 600 / 600 | 0.0 | 1.0 | 0.25 | 26 | 36 | 47 |
| T-30403 | 900 / 900 | 0.0 | 1.0 | 0.25 | 26 | 44 | 58 |

1. Insertion Loss measured at 1 kHz.
2. Return Loss measured at 300 Hz.

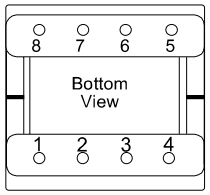


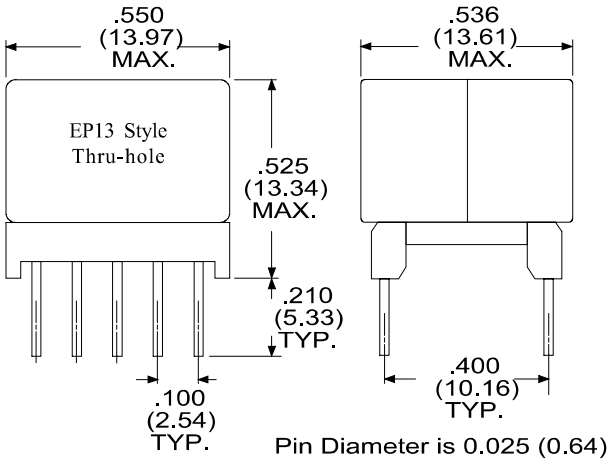




Dimensions in Inches (mm)

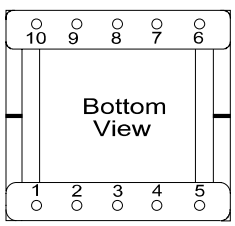



Pin Diameter is 0.025 (0.64)




Pin Diameter is 0.025 (0.64)



# Self-Shielded Audio Transformers

Using EP Geometry cores, these transformers provide excellent shielding.

Isolation is 1500 Vrms minimum

Longitudinal Balance is 60dB min.

Frequency range: 300Hz to 3400Hz

Electrical Specifications at 25°C

| Surface Mount EP7 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30400G | 600 / 600 | 0.0 | 0.7 | 0.50 | 18 | 31 | 39 |

Electrical Specifications at 25°C

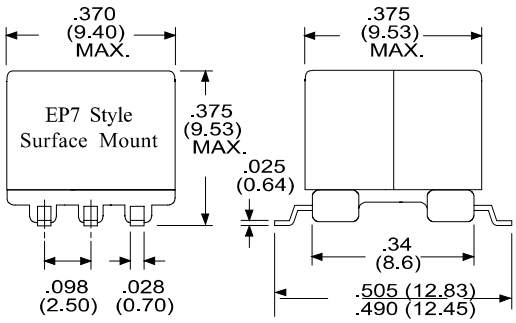
| Surface Mount EP10 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30401G | 600 / 600 | 0.0 | 0.9 | 0.50 | 21 | 34 | 43 |

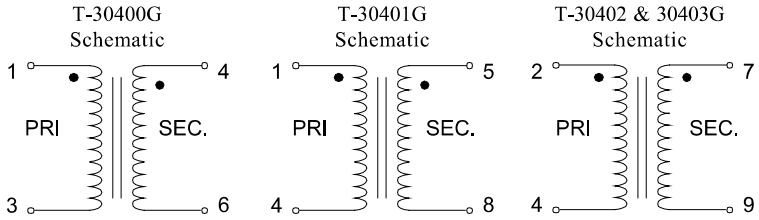
Electrical Specifications at 25°C

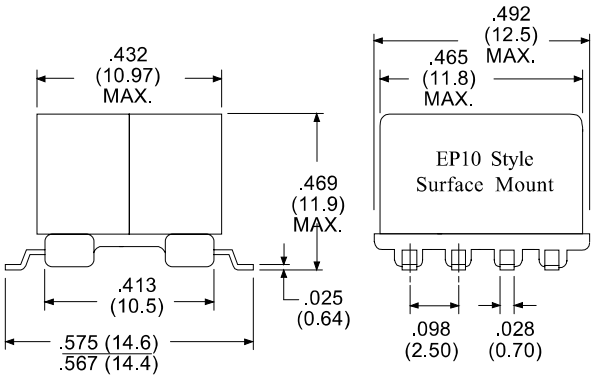
| Surface Mount EP13 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30402G | 600 / 600 | 0.0 | 1.0 | 0.25 | 26 | 36 | 47 |
| T-30403G | 900 / 900 | 0.0 | 1.0 | 0.25 | 26 | 44 | 58 |

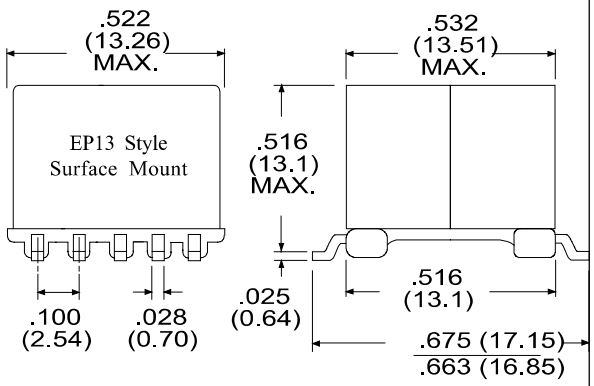
1. Insertion Loss measured at 1 kHz.
2. Return Loss measured at 300 Hz.

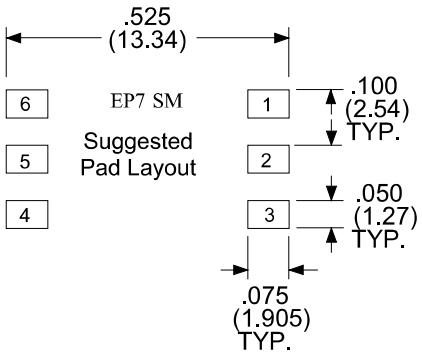
Dimensions in Inches (mm)

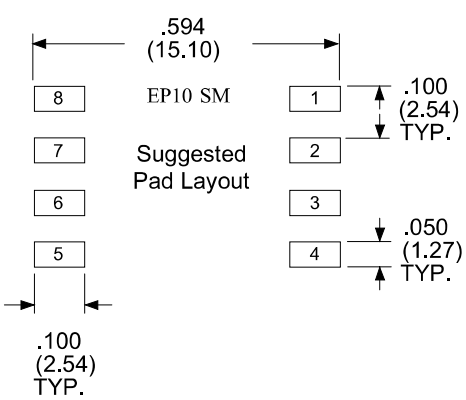


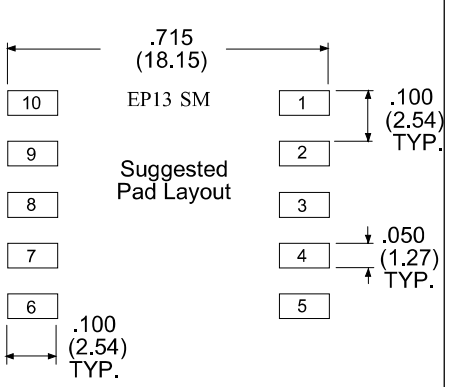




**A20**

# Self-Shielded Audio Transformers

Built with Ferrite EP Geometry cores, these transformers provide excellent shielding.

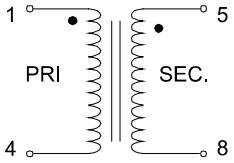
Isolation is 1500 Vrms minimum

Longitudinal Balance is 60dB minimum

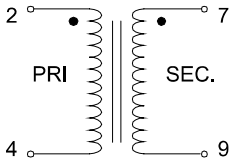
Frequency range: 300Hz to 3400Hz

Custom Designs Available

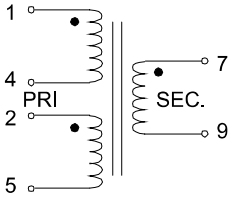
T-30404 & 30405 Schematic




T-30406 & 30408 Schematic




T-30407 & 30409 Schematic




Electrical Specifications at 25°C

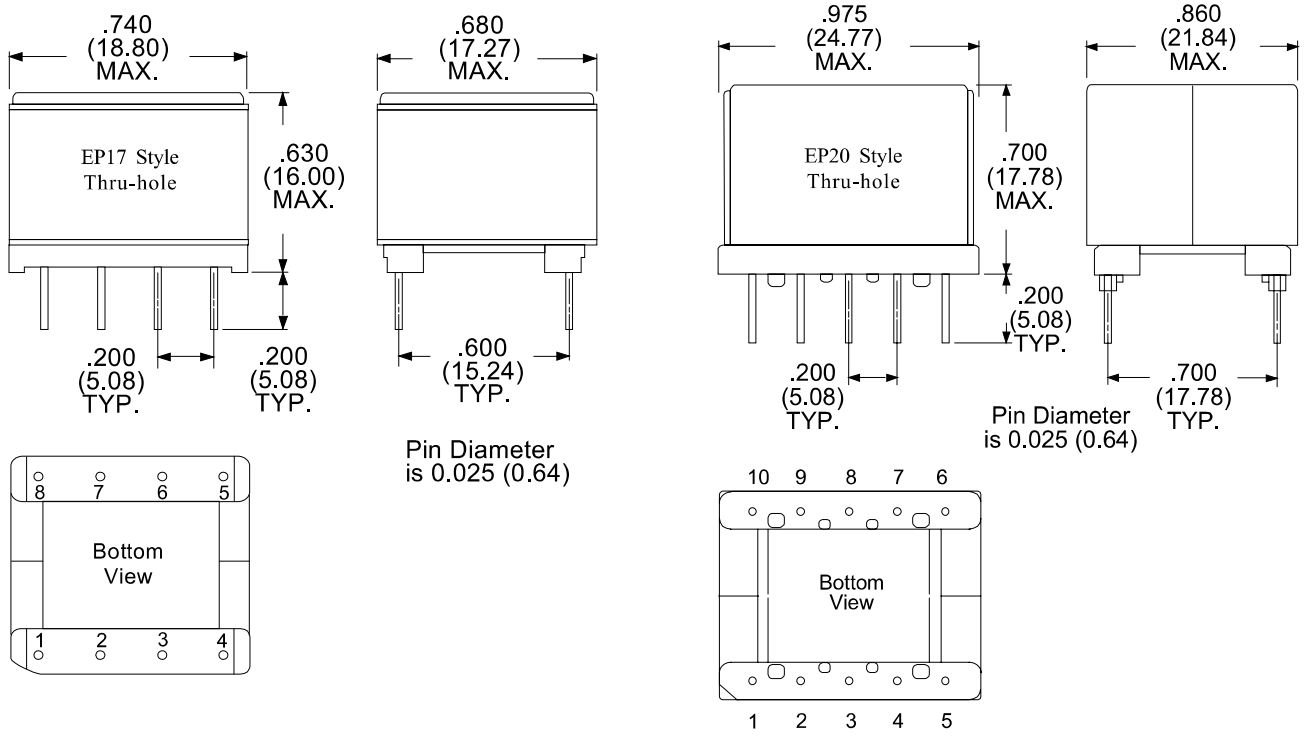
| Thru-hole EP17 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30404 | 600 / 600 | 2.5 | 1.0 | 0.25 | 26 | 45 | 58 |
| T-30405 | 900 / 900 | 2.5 | 1.0 | 0.25 | 26 | 55 | 71 |

Electrical Specifications at 25°C

| Thru-hole EP20 Style Part Number | Impedance (Ohms) | UNBAL. DC (mA) | Insertion Loss (dB) (1) | Frequency Response (dB) | Return Loss (dB) (2) | Pri. DCR max. (Ω) | Sec. DCR max. (Ω) |
|---|---|---|---|---|---|---|---|
| T-30406 | 600 / 600 | 5.0 | 0.8 | 0.25 | 26 | 27 | 36 |
| T-30407 | 600CT / 600 | 5.0 | 0.8 | 0.25 | 26 | 27 | 36 |
| T-30408 | 600 / 900 | 5.0 | 0.8 | 0.25 | 26 | 27 | 44 |
| T-30409 | 900CT / 600 | 5.0 | 0.8 | 0.25 | 26 | 33 | 36 |

1. Insertion Loss measured at 1 kHz.
2. Return Loss measured at 300 Hz.

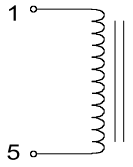
Dimensions in Inches (mm)



# *Very Low Profile* Tax Filters

- Attenuates 12 or 16 kHz signals to telco equipment by more than 25 dB.
- Uses standard-value capacitor for either 12 or 16 kHz resonance
- Designed to provide 25 dB minimum attenuation at 12 or 16 kHz.

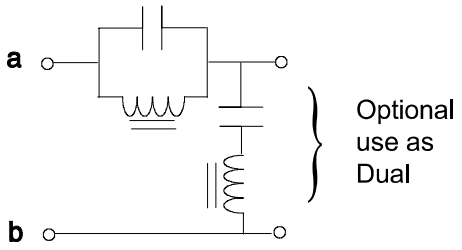
Schematic Diagram




Electrical Specifications at 25° C

| Part Number | Inductance [1] ±5% (mH) | D.C. Resistance Max. (Ω) | D.C. Current Max. (mA) | Hi-Pot Min. (VAC) | Attenuates 12 or 16 kHz |
|---|---|---|---|---|---|
| F-3551 | 2.58 | 14.0 | 70 | 1250 | 12 kHz, *Parallel* L with C=68 nF |
| F-3552 | 1.44 | 10.0 | 90 | 1250 | 16 kHz, *Parallel* L with C=68 nF |
| F-3553 | 7.96 | 28.0 | 70 | 1250 | 12 kHz, *Series* L with C=22 nF |
| F-3554 | 4.52 | 20.0 | 90 | 1250 | 16 kHz, *Series* L with C=22 nF |

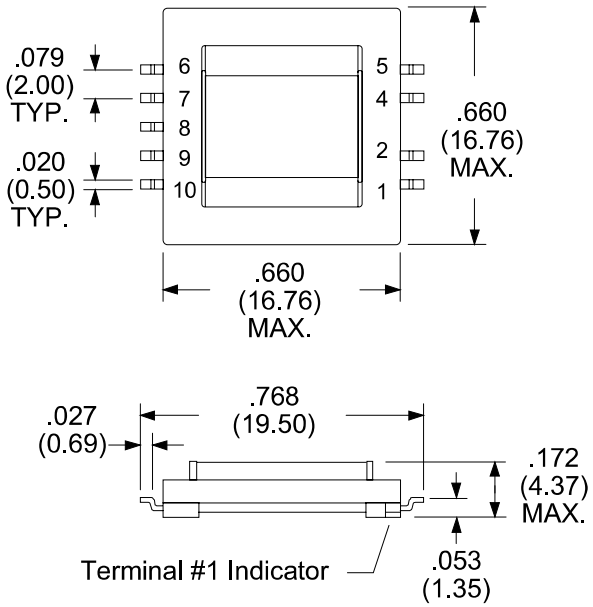
1. Tested at 10KHz and 100 $mV_{RMS}$




Use of F-3551 inductor in a parallel LC configuration followed by a F-3553 in a series configuration to provide more than 40 dB attenuation of tax pulse signals

Use of F-3552 inductor in a parallel LC configuration followed by a F-3554 in a series configuration to provide more than 40 dB attenuation of tax pulse signals

Physical Dimensions inches (mm)



# Tax Pulse Filter Inductor

Single Inductance

Vary capacitor value for 12 KHz or 16 KHz

Rhombus Part Number: **F-3503**

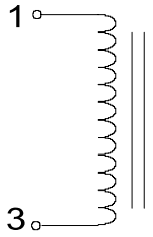
Materials used in the construction of this component meet or exceed UL Class B and can be operated up to 130°C

Electrical Specifications at 25° C

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Inductance (Pins 1-3) | 6.19 | 6.52 | 6.84 | mH |
| D.C. Resistance | 10.5 | 12.05 | 13.6 | Ω |
| Current | | | 70 | mADC |
| "12 KHz" Capacitor | 25.0 | 27.0 | 28.0 | nF |
| "16 KHz" Capacitor | 14.0 | 15.0 | 15.7 | nF |
| Single LC attenuation | | 25 | | dB |
| Dual LC attenuation | | 40 | | dB |

1. Tested at 10KHz and 100 $mV_{RMS}$

Schematic




Physical Dimensions in inches (mm)

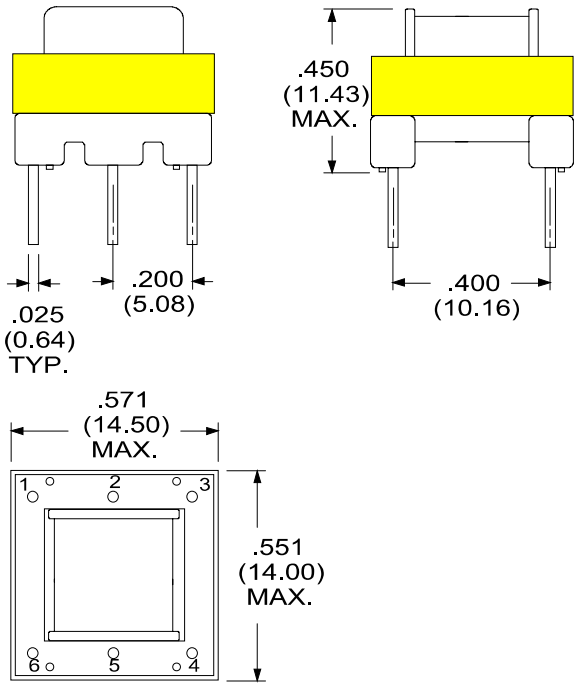



Table #1

**"Tax Pulse" Frequencies for various countries:**

| Country | Frequency |
|---|---|
| Austria | 12 kHz |
| Belgium | 16 kHz |
| Switzerland | 12 kHz |
| Germany | 16 kHz |
| Denmark | 12 kHz |
| Spain | 12 kHz |
| France | 12 kHz |
| Great Britain | 50 Hz* |
| Greece | 16 kHz |
| Italy | 12 kHz |
| Ireland | 12 kHz |
| Israel | 16 kHz |
| Norway | 16 kHz |
| Netherlands | 50 Hz* |
| Portugal | 12 kHz |
| Sweden | 12 kHz |
| Finland | 16 kHz |
| Turkey | 12 kHz |
| Yugoslavia | 16 kHz |
| Australia | 12 kHz |
| Czechoslovakia | 16 kHz |

*Common-mode (longitudinal) signal

# 12 or 16 kHz Tax Pulse Filter

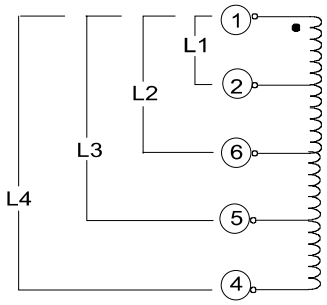
- Attenuates 12 or 16 kHz signals to telco equipment by more than 25 dB.
- Use two F-3501 inductors, one in a parallel LC configuration followed by one in a series configuration, to provide more than 40 dB attenuation of tax pulse signals.

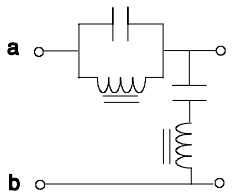
Electrical Specifications at 25° C

| P/N F-3501 Section (Pins) | Inductance ±5% (mH) | D.C. Resistance Max. (Ω) | D.C. Current Max. (mA) | Dielectric Min. (VAC) | Attenuates 12kHz or 16 kHz |
|---|---|---|---|---|---|
| L1 (1-2) | 1.44 | 2.30 | 90 | 1250 | 16 kHz, *Parallel* L1 with C=68 nF |
| L2 (1-6) | 2.58 | 3.25 | 70 | 1250 | 12 kHz, *Parallel* L2 with C=68 nF |
| L3 (1-5) | 4.52 | 6.35 | 90 | 1250 | 16 kHz, *Series* L3 with C=22 nF |
| L4 (1-4) | 7.96 | 10.7 | 70 | 1250 | 12 kHz, *Series* L4 with C=22 nF |

1. Tested at 10KHz and 100 $mV_{RMS}$

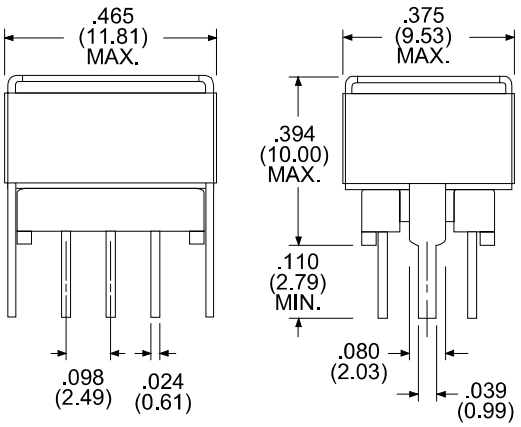
Schematic Diagram for P/N F-3501



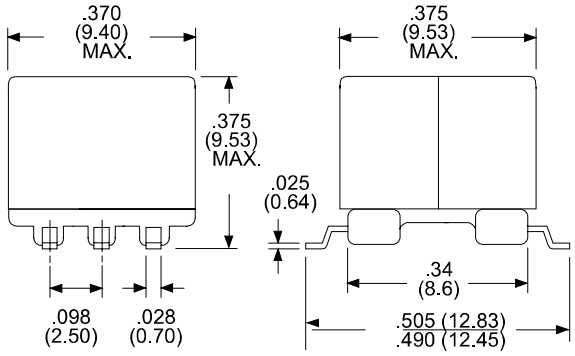




Optional use as Dual

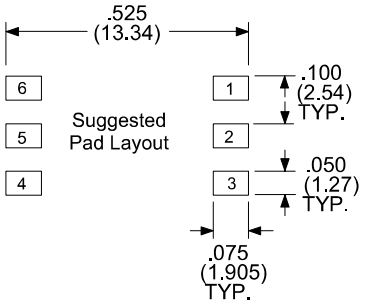
P/N F-3501
Thru-hole Package




P/N F-3501G
Surface Mount Package




Surface Mount version Available on Tape & Reel




A20

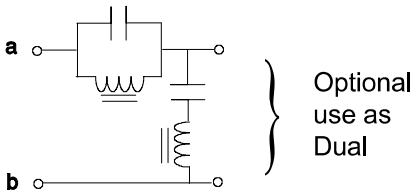
# 12 or 16 kHz Tax Pulse Filter

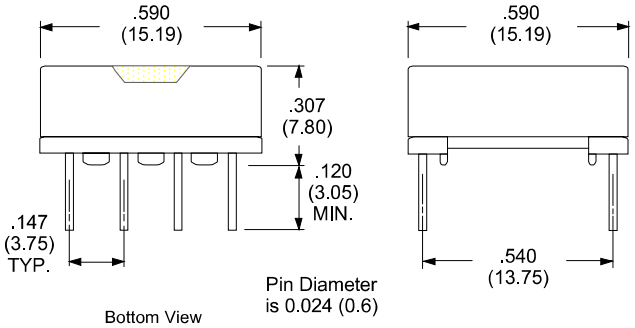
- Attenuates 12 or 16 kHz signals to telco equipment by more than 25 dB.
- Use two F-3504 inductors, one in a parallel LC configuration followed by one in a series configuration, to provide more than 40 dB attenuation of tax pulse signals.

Electrical Specifications at 25° C

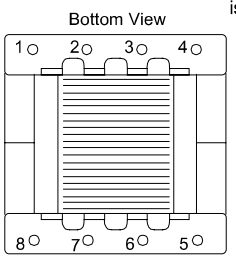
| P/N F-3504 Section (Pins) | Inductance ±5% (mH) | D.C. Resistance Max. (Ω) | D.C. Current Max. (mA) | Dielectric Min. (VAC) | Attenuates 12kHz or 16 kHz |
|---|---|---|---|---|---|
| L1 (1-3) | 1.44 | 2.30 | 90 | 1250 | 16 kHz, *Parallel* L1 with C=68 nF |
| L2 (1-10) | 2.58 | 3.25 | 70 | 1250 | 12 kHz, *Parallel* L2 with C=68 nF |
| L3 (1-8) | 4.52 | 6.35 | 90 | 1250 | 16 kHz, *Series* L3 with C=22 nF |
| L4 (1-6) | 7.96 | 10.7 | 70 | 1250 | 12 kHz, *Series* L4 with C=22 nF |

1. Tested at 10KHz and 100 $mV_{RMS}$

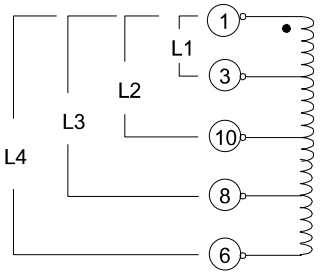


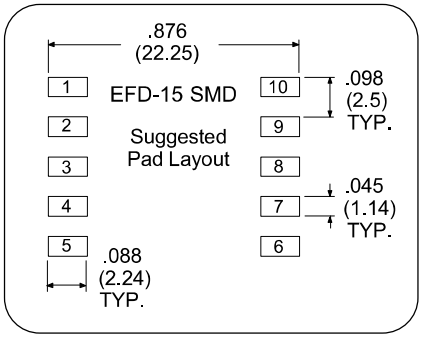

P/N F-3504
EFD-15 Thru-hole Package

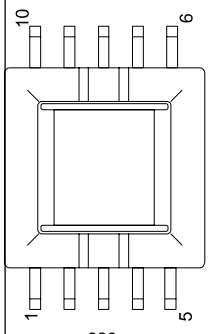


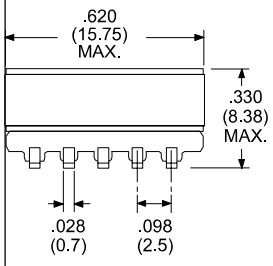

Schematic Diagram P/N F-3504



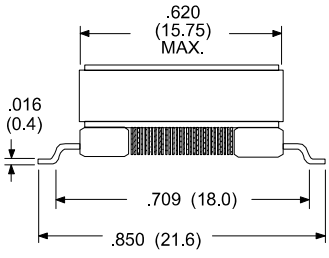

Physical Dimensions in Inches (mm)

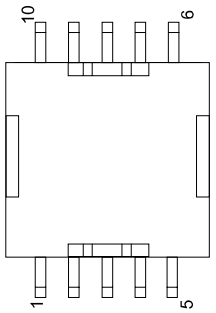


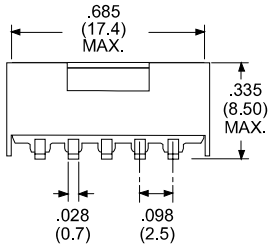



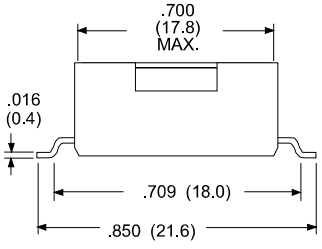

P/N F-3504G
EFD-15 Surface Mount
Package



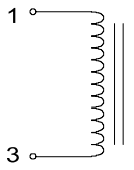




P/N F-3504GCP
EFD-15 Surface Mount
with Pick-&-Place Cap

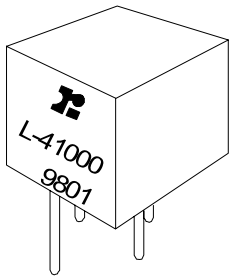


# Miniature Encapsulated Inductors

Schematic




**Encapsulated**
**Multi-Purpose**
**High Inductance / Low Bias**
**Low Inductance / High Bias**
**Other Values Available**




### High Inductance / Low Bias

| Part Number | L [1] ( H ) | Q | DCR ( Ω ) | DCI ( mA ) |
|---|---|---|---|---|
| L-41000 | 6.0 | 2.0 | 522 | .912 |
| L-41001 | 3.5 | 1.9 | 267 | 1.18 |
| L-41002 | 1.25 | 1.8 | 180 | 2.00 |
| L-41003 | 0.3 | 1.7 | 40 | 4.23 |
| L-41004 | 0.1 | 1.7 | 15 | 7.00 |

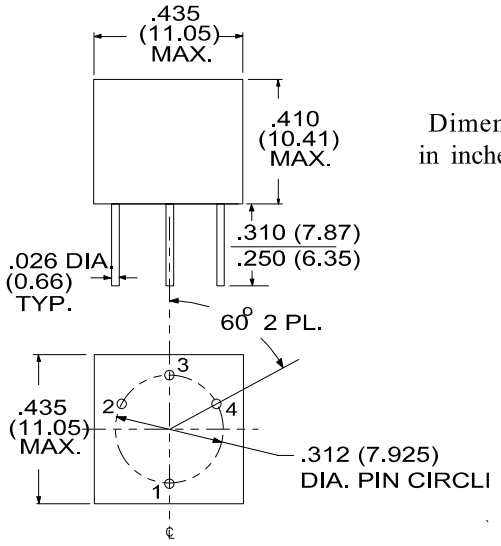
1. Tested at 10KHz and 100 $mV_{RMS}$

### Low Inductance / High Bias

| Part Number | L [1] ( mH ) | Q | DCR ( Ω ) | DCI ( mA ) |
|---|---|---|---|---|
| L-41050 | 600 | 5.2 | 447 | 29 |
| L-41051 | 400 | 5.1 | 300 | 41 |
| L-41052 | 150 | 5.1 | 117 | 60 |
| L-41053 | 35 | 5.0 | 26.0 | 125 |
| L-41054 | 0.8 | 5.0 | 0.65 | 840 |

1. Tested at 10KHz and 100 $mV_{RMS}$

Dimensions in inches (mm)



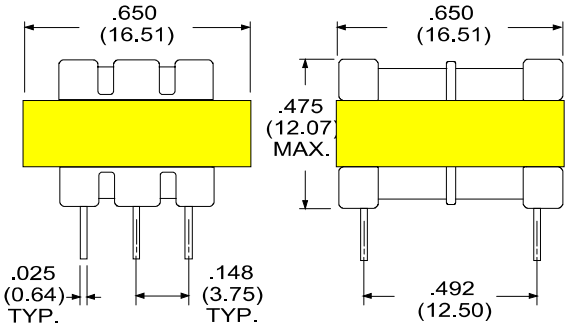

## DUAL AUDIO INDUCTORS

**3000 $V_{RMS}$ Isolation between inductors**

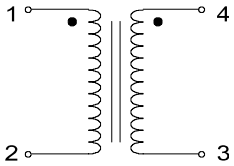
| Part Number | L [1] ( mH ) | DCR ( Ω ) | DCI ( A ) |
|---|---|---|---|
| L-41101 | 1 | 0.74 | 1.0 |
| L-41102 | 5 | 1.95 | .580 |
| L-41103 | 10 | 4.45 | .420 |
| L-41104 | 20 | 11.3 | .250 |
| L-41105 | 50 | 27.0 | .165 |

1. Tested at 10KHz and 100 $mV_{RMS}$

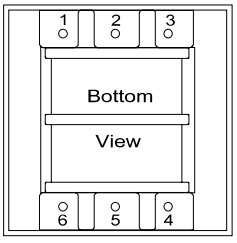
Dimensions in inches (mm)




Schematic




*See data sheets for additional information*



# High Bias / High L Audio Frequency Inductors

Electrical Specifications at 25 °C

| Part Number | L (1) ±20% ( H ) | Q typ. | DCR typ. ( Ω ) | DCI max. ( mA ) | Schematic |
|---|---|---|---|---|---|
| L-593 | 0.1 | 7.10 | 6.0 | 160 | Single |
| L-594 | 0.1 | 7.10 | 6.0 | 160 | Dual |
| L-595 | 0.3 | 7.35 | 16.5 | 95 | Single |
| L-596 | 0.3 | 7.35 | 16.5 | 95 | Dual |
| L-597 | 0.7 | 8.10 | 35.0 | 58 | Single |
| L-598 | 0.7 | 8.10 | 35.0 | 58 | Dual |
| L-599 | 1.4 | 8.79 | 59.7 | 45 | Single |
| L-600 | 1.4 | 8.79 | 59.7 | 45 | Dual |
| L-601 | 2.0 | 10.00 | 190.0 | 26 | Single |
| L-602 | 2.0 | 10.00 | 190.0 | 26 | Dual |

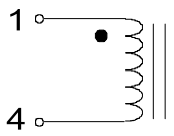
1. Tested at 10KHz and 100 $mV_{RMS}$

Dual Inductors are tested in a series. With pins 2 & 3 shorted, they are the equivalent to a single inductor. *See data sheets for further details*

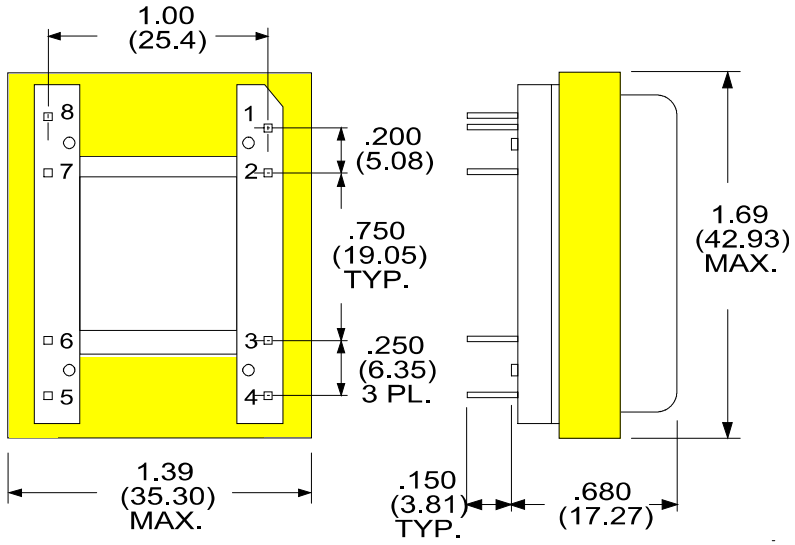
Multi-Purpose Applications:

- Battery Feed
- Holding Coil
- Surge Retard Coil

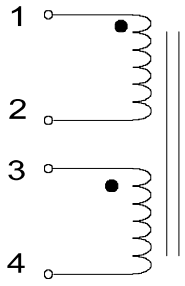
Single Inductor Schematic Diagram




Dimensions in Inches (mm)



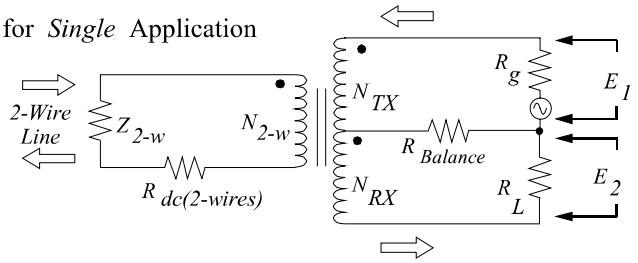

Dual Inductor Schematic Diagram



# HYBRIDS

## Single Configuration

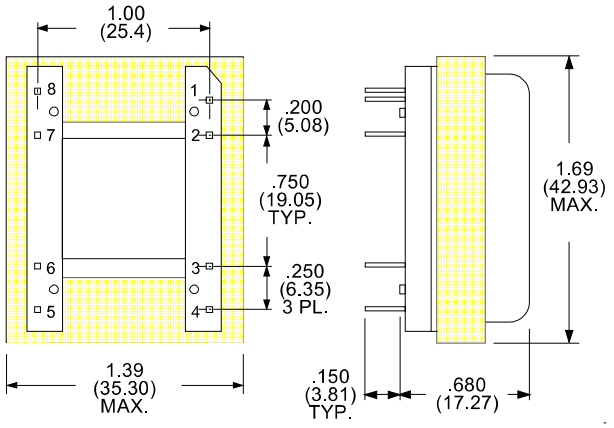
Schematic for *Single* Application



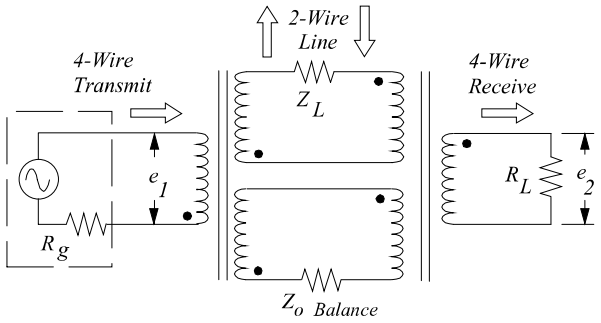

Electrical Specifications at 25°C

| Parameter -- *Single Hybrid* | | T-31201 | Units |
|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>1200 | Ω<br>Ω |
| Turns Ratio | | 0.613 : 1 | |
| Direct Current in Pri. (DCI) | maximum | 90 | mA |
| DC Resistance | PRI. ± 10%<br>SEC. ± 10% | 80<br>197 | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 4.5 | dB |
| Return Loss | Typ., @ 1 kHz | 25 | dB |
| Longitudinal Balance | min., @ 1 kHz | 60 | dB |
| Frequency Response | 300 Hz to 3.5 kHz | ± 0.50 | dB |
| Isolation | minimum | 1250 | $V_{RMS}$ |

Package for *Single* Hybrid P/N T-31201
Dimensions in Inches (mm)




Schematic for *Dual* Application: 2 each of P/N T-31202

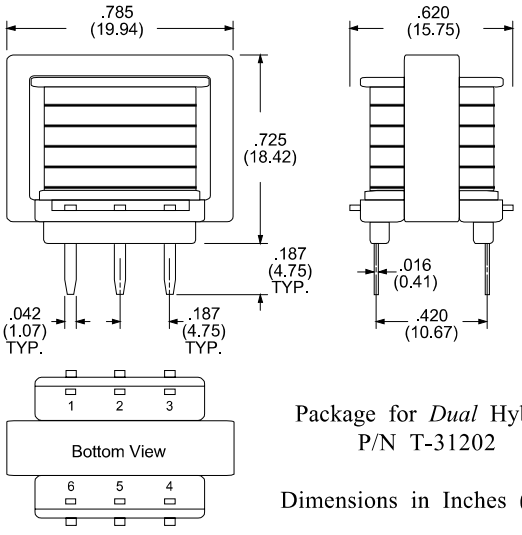



## Dual Configuration

Electrical Specifications at 25°C

| Parameter -- *Dual Hybrid* * | | T-31202 | Units |
|---|---|---|---|
| Impedance<br>R Load | PRI.<br>SEC. | 600<br>1200 | Ω<br>Ω |
| Turns Ratio | | 0.660 : 1 | |
| Direct Current in Pri. (DCI) | maximum | 0 | mA |
| DC Resistance | PRI. ± 10%<br>SEC. ± 10% | 58<br>82 | Ω<br>Ω |
| Insertion Loss | max., ref. 1 kHz | 3.85 | dB |
| Return Loss | min., @ 1 kHz | 25 | dB |
| Longitudinal Balance<br>Longitudinal Balance | min., @ 200Hz to 1kHz<br>min., @ 1 kHz to 4 kHz | 60<br>40 | dB<br>dB |
| Frequency Response | 300 Hz to 3.5 kHz | ± 0.50 | dB |
| Isolation | minimum | 1500 | $V_{RMS}$ |

* *Dual* Applications require 2 each of P/N T-31202




Package for *Dual* Hybrid
P/N T-31202

Dimensions in Inches (mm)

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