

# MT-11200 SERIES

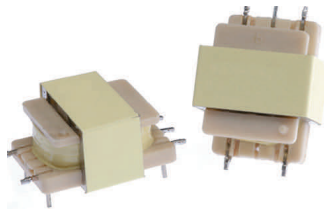
## Thru-Hole Modem Transformers

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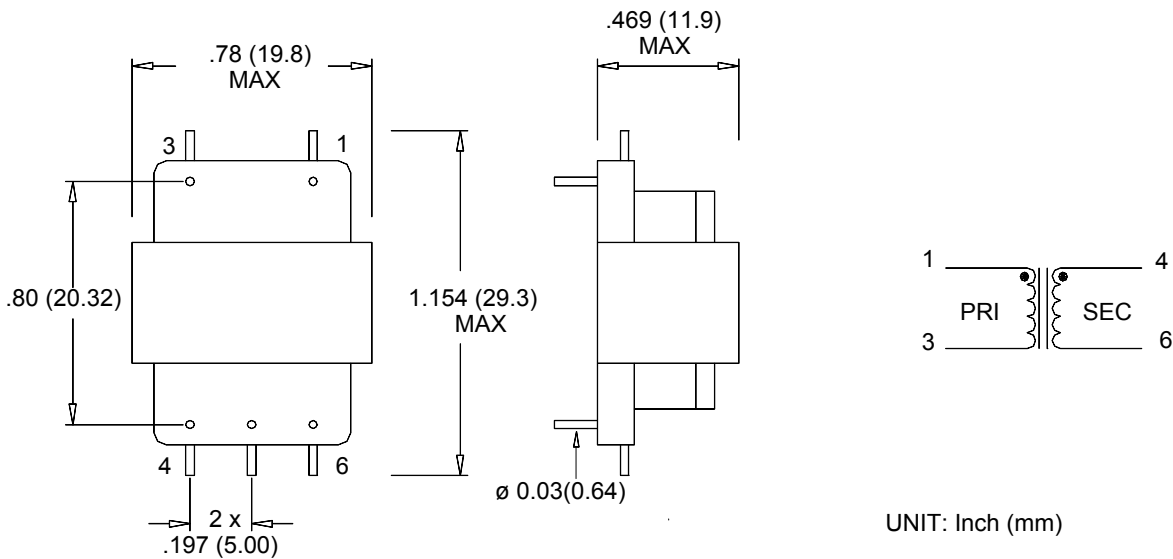


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- Low distortion, specifically for use in V.32 or V.34 applications
- Low profile
- Flat frequency response
- General purpose audio

### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-11200	MT-11220	Unit
Suitable for modem speeds up to:	V.32	V.34	—
Reflects 600 ohms at PRI with R load =	530	374	ohms
D.C. Resistance 20°C±10% PRI	43	108	ohms
D.C. Resistance 20°C±10% SEC	43	120	ohms
Frequency Response 300 to 3500Hz	±0.2	±0.25	dB
Insertion Loss at 1KHz, 20°C max	0.85	2.0±0.25	dB
Return Loss vs. 600ohms at 300Hz min	25	15	dB
Dielectric Test PRI-SEC	1250	1250	VAC
Direct Current PRI max	none	none	mA DC
Turns Ratio (PRI:SEC) ±2%	1:1	1:1	—
Longitudinal Balance 60 to 1000Hz min	60	60	dB
Longitudinal Balance 1000 to 4000Hz min	40	40	dB
Total Harmonic Dist. 600Hz, -10dBm	-71 max	-82 max	dB

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-11200 SERIES

# MT-20100L SERIES

## Low Profile Modem Transformers

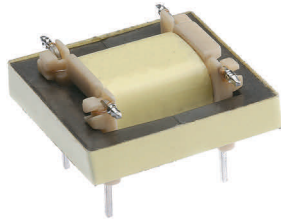
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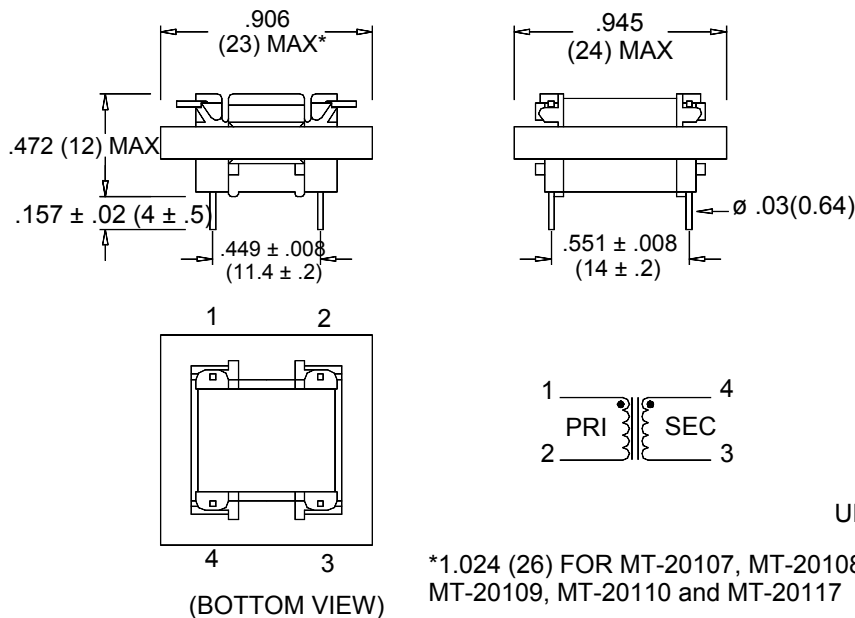
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MT-20100L SERIES



- Small size
- Low profile
- Cost effective

### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-20105	MT-20106	MT-20107	MT-20108	MT-20109	MT-20110	MT-20117	Unit
Suitable for fax/modem speeds up to:	V.29 V.22bis	V.29 V.22bis	V.32bis	V.34	V.29 V.22bis	V.32bis V.34	V.34	—
Reflects 600 ohms at PRI with R load	470	470	374	301	600	412	530	ohms
D.C. Resistance 20°C ±10% PRI	108	108	108	150	25.1	95	43	ohms
D.C. Resistance 20°C ±10% SEC	120	120	120	150	20.3	100	43	ohms
Frequency Response 600 to 3500Hz	±1.0	±0.65	—	—	—	—	—	dB
Frequency Response 300 to 600Hz	±4.0	±2.5	—	—	—	—	—	dB
Frequency Response 200 to 4000Hz	—	—	±0.25	±0.25	±0.5	±0.5	±0.2	dB
Insertion Loss at 1KHz, 20°C	2.5 max	2.0±0.5	2.0±0.25	3.0±0.50	0.75±0.25	1.75±0.25	1.0 max	dB
Return Loss vs. 600 ohms at 1KHz	12 typ.	13 typ.	30 typ.	30 typ.	27 typ.	30 typ.	25 min	dB
Dielectric Test PRI-SEC	1250	1250	1250	1250	1250	1250	1250	VAC
Direct Current PRI max	100	100	none	none	none	none	none	mA DC
Turns Ratio (PRI:SEC) ±2%	1:1	1:1	1:1	1:1	1:1	1:1	1:1	—
Longitudinal Balance 60 to 1000Hz min	60	60	60	60	60	60	60	dB
Longitudinal Balance 1000 to 4000Hz min	40	40	40	40	40	40	40	dB
Total Harmonic Dist 600Hz, -10dBm	-58 typ.	-64 typ.	-76 max	-86 max	-69 typ.	-82 max	-81 typ.	dB

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# MT-20100S SERIES

Standard Telecommunication Transformers

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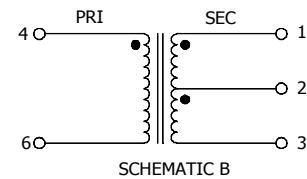
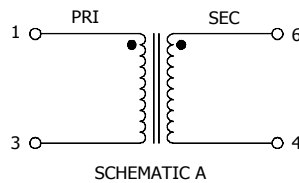
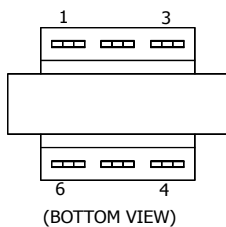
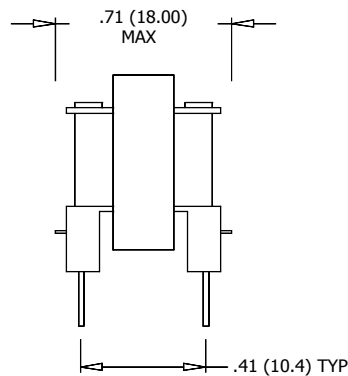
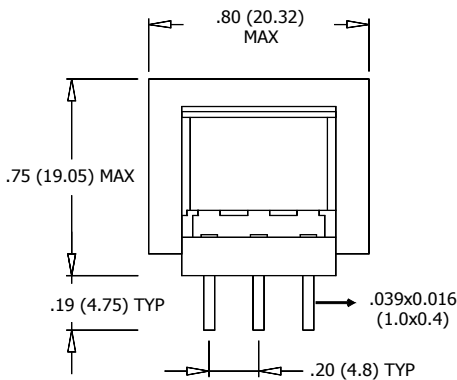


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- Line coupling
- Dielectric strength voltage: 1500Vrms
- Longitudinal balance (dB) ≥ 60
- Frequency response (dB) ± 0.5 (300Hz ~ 3500 Hz)
- Insertion loss (dB) 1.25 max
- Impedance matching ± 10% over entire frequency range
- Distortion : 0.5% max
- D.C. Resistance : ± 10%

Mechanical Dimensions:



Unit: Inch (mm)

Electrical Specification at 20°C

Part Number	Input Impedance (ohms)	Output Impedance (ohms)	Return Loss (dB) min			Inductance 1KHz 1V(Hy)	PRI DCR (ohms)	SEC DCR (ohms)	Schematic
			ERL	SRL Lo	SRL Hi				
MT-20101	900	900	26	24	24	2.0 min	55	78	A
MT-20102	600	900	26	24	24	1.2 min	36	77	A
MT-20103	600	600	26	24	24	1.2 min	51	60	A
MT-20104	600	600CT	20	15	20	0.55 min	36	50	B

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MT-20100S SERIES

# MT-21600 SERIES

Internationally Approved Coupling Transformers

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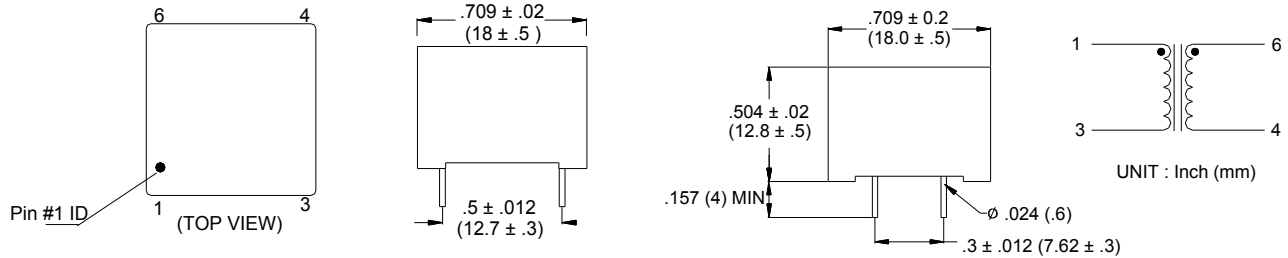
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MT-21600 SERIES



- Reinforced insulation barrier
- Suitable for fax / modem applications. V.29-V.34

Mechanical Dimensions:



Specifications	MT-21617	MT-21618	MT-21619	MT-21620	MT-21621	Unit
Suitable for fax/modem speeds up to:	V.29	V.29	V.32	V.29	V.34	—
D.C. Resistance 20°C ±10% PRI	66	70	67	67	108	ohms
D.C. Resistance 20°C ±10% SEC	66	70	67	67	108	ohms
Frequency Response 200 to 4KHz	±1.0	±1.0	±1.0	±1.0	±4.0	dB
Insertion Loss at 1KHz, 25°C	1.5 max	1.2 max	1.2 typ.	1.2 typ.	2.5 max	dB
Return Loss at 200Hz to 4KHz min	18	14	14	14	14	dB
Dielectric Test PRI-SEC	3750	3750	3750	3750	3750	VAC
Direct Current PRI max	none	none	none	none	none	mA DC
Turns Ratio (PRI:SEC) ±2%	1:1	1:1	1:1	1:1	1:1	—
Longitudinal Balance 60 to 1000Hz min	60	60	60	60	60	dB
Longitudinal Balance 1000 to 4000Hz min	40	40	40	40	40	dB
Total Harmonic Dist 600Hz, -10dBm	-68 typ.	-68 typ.	-76 max	-68 typ.	-82 max	dB

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

# MT-25000THT SERIES

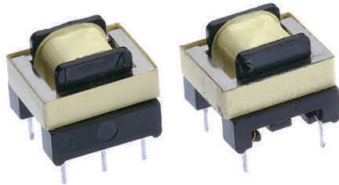
## Pocket/Laptop Modem Transformers

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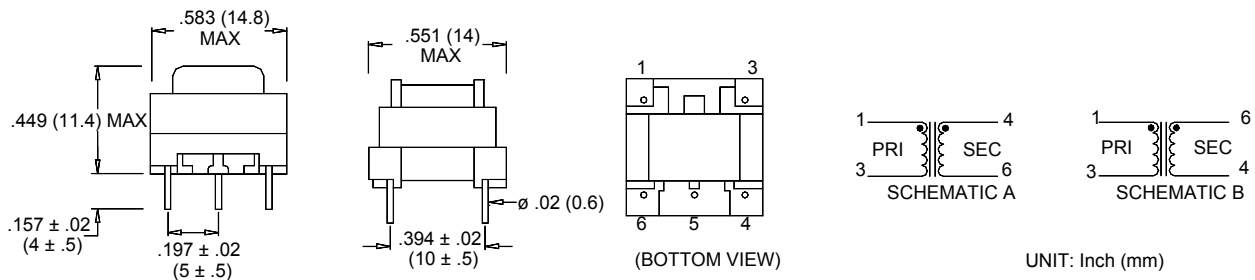


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- Small size, suitable for laptop and pocket modem applications
- Pin-compatible series allows upgrade path for faster modem speeds

### Mechanical Dimensions:



Specifications	MT-25001	MT-25002	MT-25003	MT-25004	MT-25005	MT-25006	MT-25009	MT-25010	Unit
	V.29	V.29							
Suitable for fax/modem speeds up to:			V.32bis	V.32bis	V.34bis	V.34bis	V.32	V.32bis	—
	V.22bis	V.22bis							
Reflects 600 ohms at PRI with R load =	600	600	442	442	348	324	600	402	ohms
D.C. Resistance 20°C ±10% PRI	46.5	52	80	86	152	135	52	105	ohms
D.C. Resistance 20°C ±10% SEC	67.6	59	87	91	151	143	75	105	ohms
Frequency Response 300 to 3500Hz	±0.25	±0.5	±0.25	±0.5	±0.5	±0.25	±0.20	±0.13	dB
Insertion Loss at 1KHz, 25°C max	1.25	1.5	2	2	3.25	3	1.15	2.25	dB
Return Loss vs. 600 ohms at 300Hz	21 min	23 typ.	21 min	22 typ.	20 typ.	35 typ.	22.5 min	26 min	dB
Return Loss vs. BS6305 (a) network	n/a	14 min	n/a	14 min	14 min	n/a	n/a	n/a	dB
Dielectric Test PRI-SEC	1250	3750	1250	3750	3750	1250	1250	1250	VAC
Direct Current PRI max	none	none	none	none	none	none	none	none	mA DC
Turns Ratio (PRI:SEC) ±2%	0.92:1	1:1	1:1	1:1	1:1	1:1	0.92 :1	1:1	—
Longitudinal Balance 60 to 1000Hz min	60	60	60	60	60	60	60	60	dB
Longitudinal Balance 1000 to 4000Hz min	40	40	40	60	60	40	40	40	dB
Total Harmonic Dist 600 Hz, -10dBm	-68 typ.	-68 typ.	-76 max	-76 max	-83.6 typ.	-82 max	-71 max	-76 max	dB
Schematic	B	A	B	A	A	B	B	B	—

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MT-25000THT SERIES

# MT-25000SMD SERIES

## Pocket/Laptop Modem Transformers

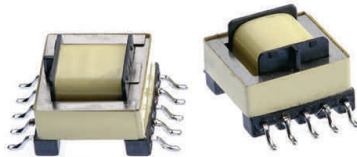
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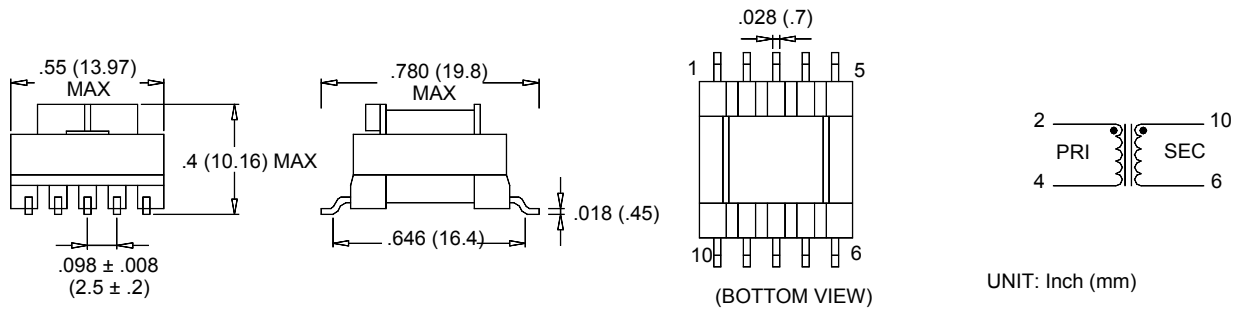
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MT-25000SMD SERIES



- Small size, suitable for laptop and pocket modem applications
- Pin-compatible series allows upgrade path for faster modem speeds

### Mechanical Dimensions:



Specifications	MT-25007	MT-25008	MT-25011	MT-25012	Unit
Suitable for fax/modem speeds up to:	V.34	V.34	V.34	V.32	—
Reflects 600 ohms at PRI with R load =	442	287	442	442	ohms
D.C. Resistance 20°C±10% PRI	82.5	150	82.5	82.5	ohms
D.C. Resistance 20°C±10% SEC	93.4	160	87.5	87.5	ohms
Frequency Response 300 to 3500Hz	±0.25	±0.25	±0.25	±0.25	dB
Insertion Loss at 1KHz, 25°C max	1.75	3.65	1.75	1.75	dB
Return Loss vs. 600 ohms at 300 Hz	25 min	35 typ.	20 min	25 min	dB
Return Loss vs. BS6305 (a) network	n/a	n/a	n/a	n/a	dB
Dielectric Test PRI-SEC	1250	1250	1250	1250	VAC
Direct Current PRI max	none	none	none	none	mA DC
Turns Ratio (PRI:SEC)±2%	1:1	1:1	1:1	1:1	—
Longitudinal Balance 60 to 1000Hz min	60	60	60	60	dB
Longitudinal Balance 1000 to 4000Hz min	40	40	40	40	dB
Total Harmonic Dist. 600 Hz, -10dBm	-76 max	-82 max	-82 max	-76 max	dB

# MT-25100 SERIES

## Surface Mount / PCMCIA Transformers

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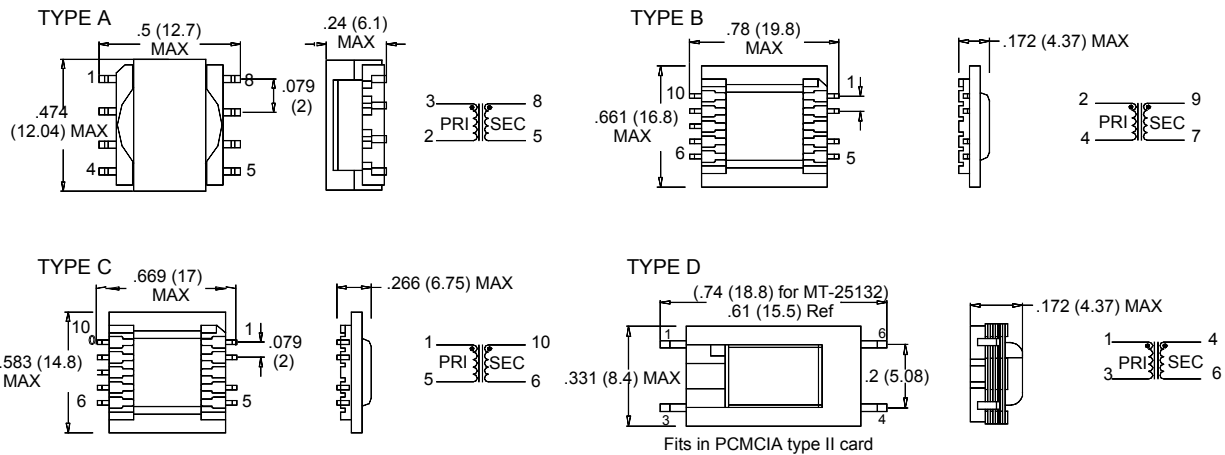


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MT-25100 SERIES



### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-25101	MT-25102	MT-25110	MT-25120	MT-25130	MT-25132	MT-25133	Unit
Suitable for fax/modem speeds up to:	V.32bis	V.32bis	V.29	V.32bis	V.32bis	V.34	V.34	—
Reflects 600 ohms at PRI with R load =	294	294	487	332	301	290	300	ohms
D.C. Resistance 20°C ±10% PRI	156	155	67	132	150	141	140	ohms
D.C. Resistance 20°C ±10% SEC	145	159	85	132	150	171	170	ohms
Frequency Response 300 to 3500Hz	±0.25	±0.25	±0.5	±0.25	±0.15	±0.10	±0.10	dB
Insertion Loss at 1KHz, 25°C	3.15±0.25	3.30±0.25	1.5 max	2.6±0.35	3.3±0.25	3.3±0.25	3.15±0.35	dB
Return Loss vs.600 ohms at 1KHz	25 min	20 min	17 typ.	25 min	25 min	30 min	25 min	dB
Dielectric Test PRI-SEC	1250	1650	1250	1250	1250	1250	1250	VAC
Direct Current PRI max	none	none	none	none	none	none	none	mA DC
Turns Ratio (PRI:SEC) ±2%	1:1	1:1	1:1	1:1	1:1	1:1	1:1	—
Longitudinal Balance 60 to 1000Hz min	60	60	60	60	60	60	60	dB
Longitudinal Balance 1000 to 4000Hz min	40	40	40	40	40	40	40	dB
Total Harmonic Dist. 600Hz, -10dBm	-76 max	-76 max	-60 typ.	-76 max	-76 max	-85 max	-90 max	dB
Type	B	B	A	C	D	D	D	—

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# MT-32900 SERIES

## T-Case Pulse Transformers

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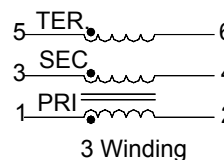
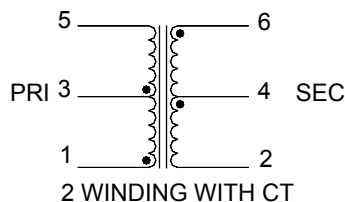
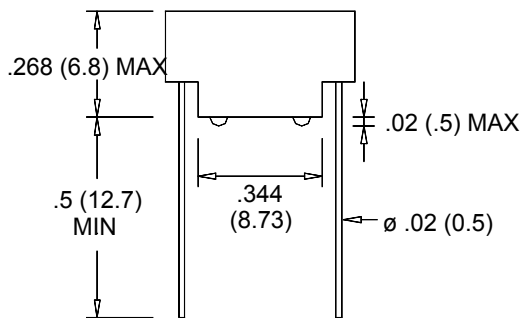
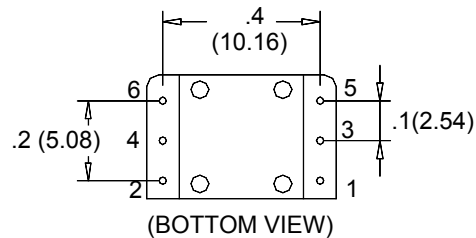
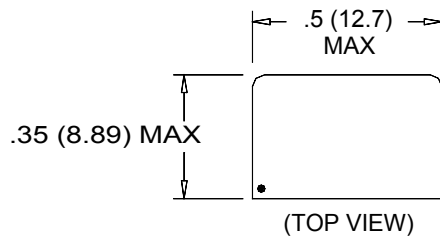
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MT-32900 SERIES



- Small size
- Wide range of inductances and turns ratios available for a variety of circuit applications.

### Mechanical Dimensions:



UNIT: Inch (mm)

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# MT-32900 SERIES



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## T-Case Pulse Transformers

- Rating Range
  - Average Power Rating (40°C Rise) ..... 500mW
  - Dissipation Rating..... 150mW
  - Peak Pulse Voltage .....100 Volts
  - High Potential Test..... 500V DC
  - Insulation Resistance.....10,000Mohms
- Custom designs are available for high reliability and other special applications

### Electrical Specification at 25°C

Part Number	Turns Ratio (±5%)	Primary Sine Wave OCL (uHy min)	Primary ET-Constant (V-us min)	Rise Time (ns max)	Pri/Sec Cw/w (pF max)	Pri/Sec Leakage Inductance (uHy max)	Primary DCR 20°C (ohms max)	Secondary DCR 20°C (ohms max)	Tertiary DCR (ohms max)
MT-32901	1:1:1	5000	25.0	10.5	60	1.3	3.9	3.9	3.9
MT-32902	1:1:1	2000	16.0	8.2	37	0.8	2.5	2.5	2.5
MT-32903	1:1:1	500	8.5	5.3	32	0.4	1.3	1.3	1.3
MT-32904	1:1:1	200	5.0	4.2	18	0.3	0.9	0.9	0.9
MT-32905	1:1:1	50	5.2	5.6	18	0.5	1.3	1.3	1.3
MT-32906	1:1:1	20	3.2	4.1	21	0.4	0.9	0.9	0.9
MT-32907	1:1:1	10	3.7	5.1	22	0.5	0.9	0.9	0.9
MT-32908	2:1:1	5000	25.0	16.0	33	3.6	3.9	2.0	2.0
MT-32909	2:1:1	2000	16.0	11.0	19	1.8	2.5	1.4	1.4
MT-32910	2:1:1	500	8.5	5.6	11	1.1	1.3	0.7	0.7
MT-32911	2:1:1	200	5.0	3.2	8	0.8	0.9	0.5	0.5
MT-32912	2:1:1	20	5.8	7.5	12	1.5	1.3	0.8	0.8
MT-32913	3:1:1	200	5.0	3.6	7	1.1	0.9	0.4	0.4
MT-32914	3:1:1	20	3.2	2.7	6	1.3	0.9	0.4	0.4
MT-32915	4:2:1	2000	16.0	13.0	20	2.5	2.5	1.4	0.8
MT-32916	4:2:1	500	8.5	4.7	13	0.9	1.4	0.8	0.5
MT-32917	4:2:1	200	5.0	3.7	8	0.8	0.9	0.5	0.4
MT-32918	1ct:1ct	2000	16.0	8.2	37	0.8	2.5	2.5	—
MT-32919	1ct:1ct	500	8.5	5.3	32	0.4	1.3	1.3	—
MT-32920	1ct:1ct	200	5.0	4.2	18	0.3	0.9	0.9	—
MT-32921	1ct:1ct	50	5.2	5.6	18	0.5	1.3	1.3	—
MT-32922	1ct:1ct	20	3.2	4.1	21	0.4	0.9	0.9	—
MT-32923	1ct:1ct	10	3.7	5.1	22	0.5	0.9	0.9	—
MT-32924	2ct:1ct	2000	16.0	11.0	19	1.8	2.5	1.4	—
MT-32925	2ct:1ct	500	8.5	5.6	12	1.2	1.4	0.8	—
MT-32926	2ct:1ct	200	5.0	3.2	8	0.8	0.9	0.5	—
MT-32927	2ct:1ct	50	5.2	5.2	12	1.3	1.3	0.7	—
MT-32928	2ct:1ct	20	5.8	7.5	12	1.5	1.3	0.8	—
MT-32929	2ct:1ct	10	3.7	4.5	9	1.5	0.9	0.5	—

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# MT-33200 SERIES

## 6 Pin RF / Pulse Transformers

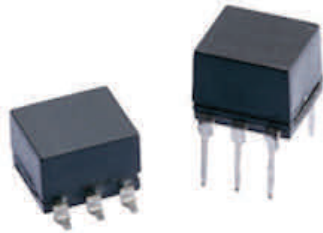
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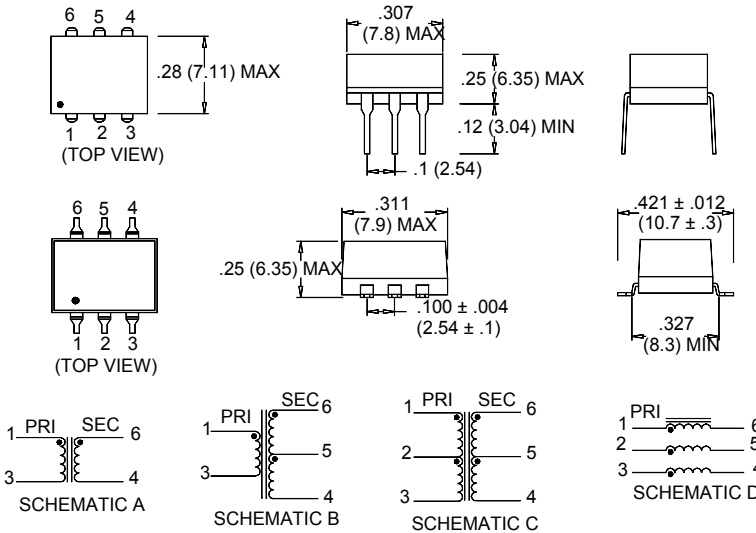
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MT-33200 SERIES



- Designed for use in 50Ω wideband RF and fast rise time pulse applications
- Low leakage inductance, winding capacitance and D.C. Resistance
- Temperature range: Operating : 0°C to +70°C Storage -25°C to +150°C
- High Potential Test.....200Vrms
- Insulation Resistance.....10,000Mohms
- Add S to part number for SMD, ex. (MT-33201S)

### Mechanical Dimensions:



UNIT: Inch (mm)

### Electrical Specification at 25°C

Part Number	Turns Ratio (±5%)	Schematic Figure	Primary Inductance		Rise Time us max	Leakage Inductance uHy max	Cw/w pF max	DCR 20°C (ohms max)		Bandwidth for -3dB Loss		Primary ET-Constant V-us min
			uHy min.	Pulse Width us for 50% Drop				N1	N2	Low Freq. MHz	High Freq. MHz	
MT-33201	1:1	A	80	2.20	2.20	0.15	12	0.20	0.20	0.05	110	2.5
MT-33202	1ct:1ct	C	80	2.20	3.00	0.18	15	0.20	0.20	0.05	90	2.5
MT-33203	1:1ct	B	80	2.20	3.00	0.18	15	0.20	0.20	0.05	90	2.5
MT-33204	1:1:1	D	40	1.10	2.00	0.10	12	0.16	0.16	0.10	150	2.0
MT-33205	1:2	A	40	1.10	3.00	0.14	15	0.20	0.30	0.10	110	2.0
MT-33206	1:2ct	B	40	1.10	3.00	0.14	15	0.20	0.30	0.10	110	2.0
MT-33207	1:1.414	A	80	2.20	4.00	0.30	18	0.20	0.30	0.05	50	2.5
MT-33208	1:1.414ct	B	80	2.20	3.00	0.20	18	0.20	0.30	0.05	80	2.5
MT-33209	1:4	A	20	0.55	6.00	0.10	10	0.20	0.60	0.20	60	1.25
MT-33210	1:4ct	B	20	0.55	6.00	0.10	10	0.20	0.60	0.20	60	1.25
MT-33211	1ct:1ct	C	20	2.20	3.00	0.20	15	0.30	0.30	0.05	90	2.5
MT-33212	2ct:1ct	C	100	1.10	3.50	0.30	18	0.40	0.40	0.10	110	2.5

# MT-40000 SERIES

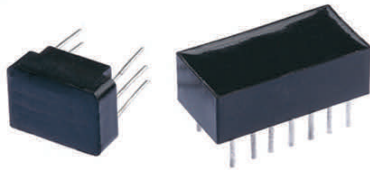
# MINNTRONIX

Wind Up the Best®

T1/E1/CEPT/ISDN Primary Rate Transformers



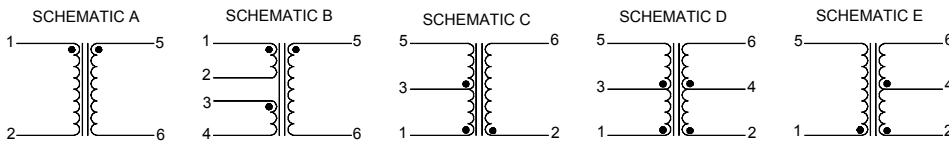
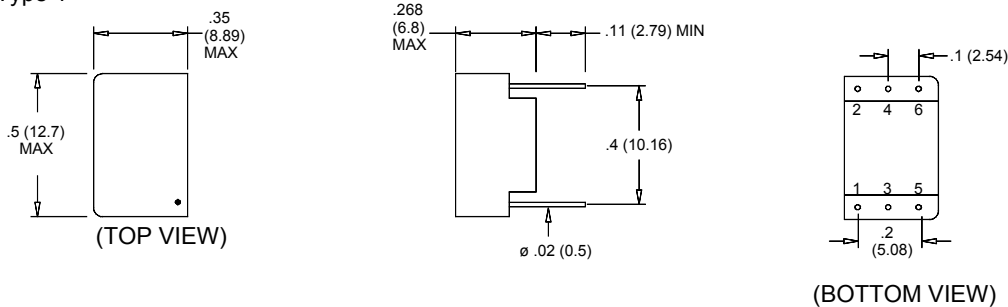
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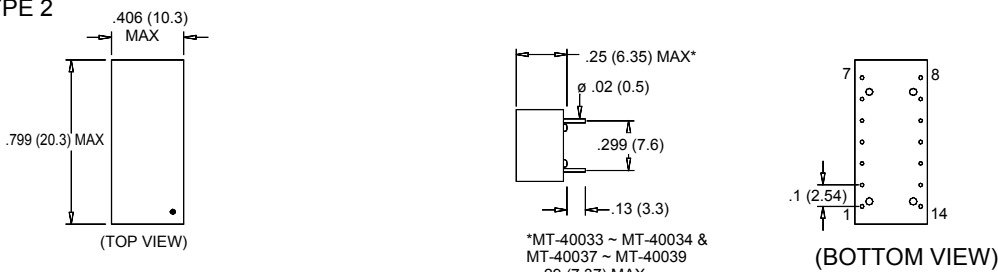
- Compatible with popular ICs. Contact Minntronix for the latest cross-reference information
- Small packages
- Low profile
- 1500Vrms isolation
- Designed to meet CCITT & FCC requirements

Mechanical Dimensions:

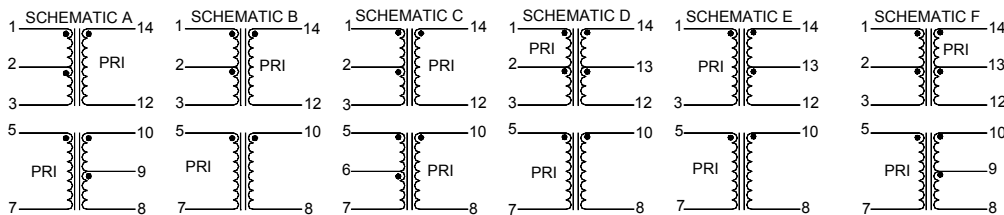
Type 1



TYPE 2



\*MT-40033 ~ MT-40034 &  
 MT-40037 ~ MT-40039  
 = .29 (7.37) MAX



UNIT: Inch (mm)

Specifications on page A12

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-40000 SERIES

# MT-40000 SERIES

## T1/E1/CEPT/ISDN Primary Rate Transformers



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Continued from page A11  
Single Packages—Electrical specifications at 25°C

MT-40000 SERIES

Part Number	Turns Ratio (±5%)	Inductance (mHy min)	C w/w (pF max)	Leakage Inductance (uHy max)	DCR Pri 20°C (ohms max)	DCR Sec 20°C (ohms max)	Type / Schematic	Primary Pins
MT-40001	1:1:1(CT)	1.20	25	0.50	0.70	0.70 & 0.70	1/B	1-2
MT-40002	1:1:1	2.00	40	0.50	0.70	0.70	1/B	1-2
MT-40003	1CT:3CT	1.20	30	0.50	0.70	1.60	1/D	1-5
MT-40004	1:1	1.20	25	0.50	0.70	0.70	1/A	1-2
MT-40005	1:1CT	0.06	23	0.75	0.60	0.60	1/C	2-6
MT-40006	1CT:1	1.20	25	0.80	0.70	0.70	1/C	1-5
MT-40007	1:1.36	1.20	35	0.80	0.70	0.80	1/A	5-6
MT-40008	1:1.26CT	0.06	23	0.75	0.60	0.60	1/C	2-6
MT-40009	1:1:1.58	0.30	30	0.60	0.40 & 0.40	0.60	1/B	1-4(2,3 tie)
MT-40010	1:1:2	0.80	30	0.60	0.40 & 0.40	0.60	1/B	1-4(2,3 tie)
MT-40011	1:1:2.62	0.80	30	0.40	0.40 & 0.40	0.60	1/B	1-4(2,3 tie)
MT-40012	1CT:2CT	1.20	30	0.30-0.55	0.70	1.20	1/D	1-5
MT-40013	2CT:1CT	2.00	30	1.50	0.70	0.40	1/D	1-5
MT-40014	2.53CT:1	2.00	20	1.50	1.00	0.50	1/C	1-5
MT-40015	1:2CT	1.20	40	0.50	0.70	1.20	1/C	2-6
MT-40016	1:2CT	2.00	40	0.50	0.70	1.40	1/C	2-6
MT-40017	1:4CT	0.50	40	1.00	0.50	1.50	1/E	1-5
MT-40018	1:1.14CT	1.20	35	0.80	0.70	0.80	1/E	1-5
MT-40019	1CT:2CT	1.20	30	0.55	0.70	1.20	1/D	1-5
MT-40028	1 : 0.575:0.575	1.50	25	0.80	0.70	0.50	1/B	5-6
MT-40029	1:1.15CT	1.50	35	0.60	0.70	0.90	1/C	2-6
MT-40030	1:1.58CT	1.50	35	0.50	0.70	0.90	1/C	2-6
MT-40031	1:0.5:0.5	1.50	25	1.20	0.70	0.50	1/B	5-6
MT-40032	1:0.633:0.633	1.50	20	1.10	0.70	0.50	1/B	5-6
MT-40035	1:1.36CT	1.20	35	0.80	0.70	0.90	1/E	1-5
MT-40036	1:2.3CT	1.20	35	0.80	0.70	1.20	1/E	1-5
MT-40040	1CT:1CT	1.20	25	0.80	0.80	0.80	1/D	1-5
MT-40041	1:1.36	1.20	35	0.80	0.90	1.20	1/A	5-6
MT-40042	1:1.15CT	1.50	40	0.80	0.90	1.00	1/C	2-6
MT-40043	1CT:2CT	1.20	45	0.60	1.00	2.00	1/D	2-6
MT-40044	1CT:1CT	1.20	50	1.10	1.00	1.00	1/D	1-5

Dual Packages—Electrical specifications at 25°C

Part Number	Turns Ratio (±5%)	Inductance (mHy min)	C w/w (pF max)	Leakage Ind (uHy max)	DCR Pri 20°C (ohms max)	DCR Sec 20°C (ohms max)	Type / Schematic	Primary Pins
MT-40020	1:2CT & 1:2CT	1.20 & 1.20	35 & 35	0.50 & 0.50	0.70 & 0.70	1.20 & 1.20	2/A	14-12, 5-7
MT-40021	1:2CT & 1:1.36CT	1.20 & 1.20	35 & 35	0.50 & 0.80	0.80 & 0.80	1.20 & 1.00	2/B	14-12, 5-7
MT-40022	1:2CT & 1:2CT	2.00 & 2.00	45 & 45	0.60 & 0.60	0.70 & 0.70	1.20 & 1.20	2/C	14-12, 10-8
MT-40023	1CT:2CT & 1:1	1.20 & 1.20	30 & 30	0.55 & 0.50	0.70 & 0.70	1.20 & 0.70	2/D	1-3, 5-7
MT-40024	1.58:2CT & 1.58:1	0.80 & 0.80	30 & 30	0.50 & 0.50	0.60 & 0.60	0.70 & 0.30	2/E	1-3, 5-7
MT-40025	2:2CT & 2:1	0.80 & 0.80	30 & 30	0.60 & 0.60	0.50 & 0.50	0.50 & 0.20	2/E	1-3, 5-7
MT-40026	2.62:2CT & 2.62:1	1.20 & 1.20	30 & 30	0.80 & 0.80	0.60 & 0.60	0.50 & 0.30	2/E	1-3, 5-7
MT-40027	1:1 & 1CT:1	1.20 & 1.20	30 & 30	0.50 & 0.80	0.70 & 0.70	0.70 & 0.70	2/E	14-12, 5-7
MT-40033	1:1.15CT & 1:2CT	1.50 & 1.20	35 & 40	0.60 & 0.50	0.70 & 0.70	1.10 & 1.10	2/A	14-12, 5-7
MT-40034	1:1.58CT & 1:2CT	1.50 & 1.20	35 & 40	0.50 & 0.40	0.70 & 0.70	0.90 & 1.10	2/A	14-12, 5-7
MT-40037	1:1.15CT & 1:2CT	1.50 & 1.20	40 & 60	0.80 & 0.80	0.90 & 0.90	1.10 & 1.70	2/A	14-12, 5-7
MT-40038	1:1.58CT & 1:2CT	1.50 & 1.20	50 & 60	0.80 & 0.80	0.90 & 0.90	1.10 & 1.70	2/A	14-12, 5-7
MT-40039	1CT:2CT & 1:1.36CT	1.20 & 1.20	50 & 50	0.96 & 0.80	1.00 & 1.00	1.70 & 1.20	2/F	14-12, 5-7

# MT-40050 SERIES

## T1/E1/ISDN Primary Transformers

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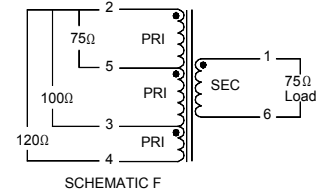
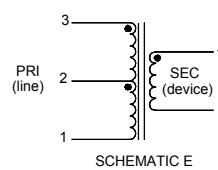
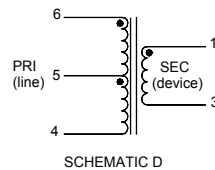
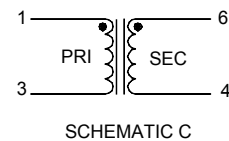
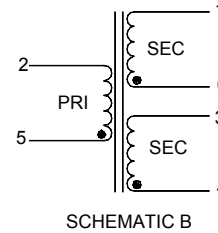
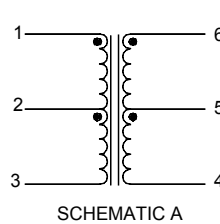
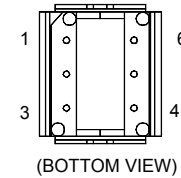
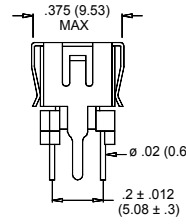
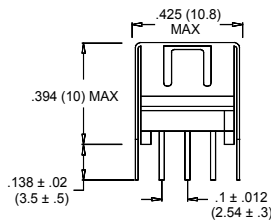
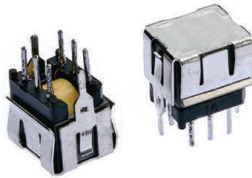
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- Compatible with popular ICs. Contact Minntronix for latest cross-reference information.

### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-40051	MT-40052	MT-40053	MT-40054	MT-40055	MT-40056	MT-40057	MT-40058	Unit
Reflects on PRI = With SEC RL =	100 100	100 400	100 24.9	75/100/120 75	100 200	100	100	100	ohms
Longitudinal balance 1.544MHz	35 min	35 min	35 min		35 min	35 min	35 min	35 min	dB
1MHz				40 min					dB
DC Resistance 20°C PRI	1.0 max	0.6 max	2.0 max	0.95-1.55	0.4 max	0.2 max	0.2 max	0.2 max	ohms
SEC	1.0 max	0.6 max	1.0 max	0.75-1.15	0.6 max	0.5 max	0.5 max	0.5 max	ohms
Insertion Loss 772KHz	0.2 max	0.075 ±0.025	0.125 ±0.025	0.25 max	—	—	—	—	dB
Return Loss 100KHz-1.544MHz	25 min	15 min	—	—	26 min	—	—	—	dB
50KHz-3MHz				20 min					dB
Dielectric Test PRI-SEC	1250	1250	1250	1250	1250	1500	1500	1500	VAC
Turns Ratio (PRI:SEC) ±2%	1:1	1:1.1	2:1	—	1:1.414	1:1.36	1:1	1:1.15	—
Inductance 25°C 10KHz, 0.5V	1.4 min			1.3 min	1.2 min		0.7 min		mHy
1KHz, 0.1V		0.6 min	3 min			0.7 min		0.7 min	mHy
Leakage Inductance 10KHz, 0.1V	1.5 max	.75 max	3 max	0.5 max	—	1.3 max	0.8 max	1.3 max	uHy
Interwinding Capacitance 10KHz	—	35 max	—	45 ref	—	—	—	—	pF
Frequency Response 100KHz-4MHz	—	+0.025/-0.5	±0.25	—	—	—	—	—	dB
50KHz-3MHz	—			±0.15					dB
Schematic	A	B	A	F	C	D	E	D	

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-40050 SERIES

# MT-41500 SERIES

## ISDN S Interface Transformers

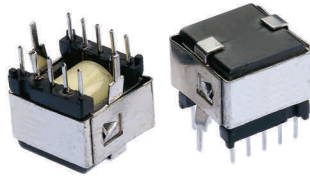
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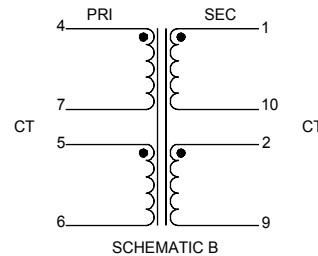
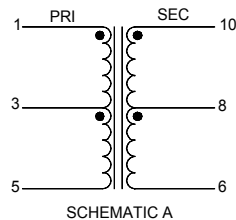
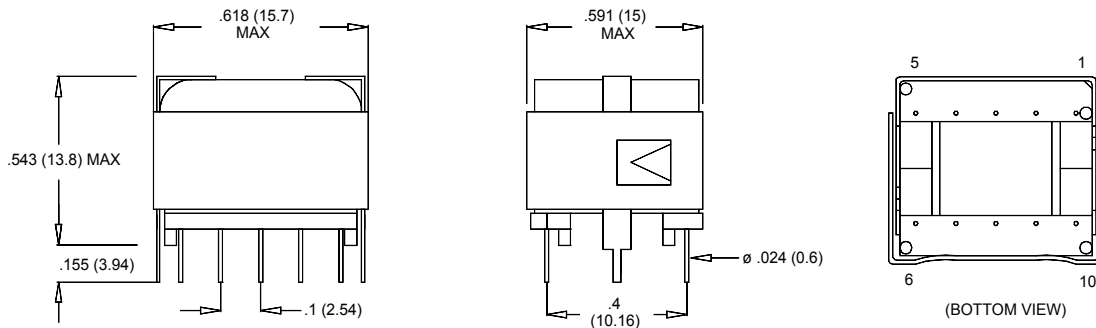
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MT-41500 SERIES



- Compatible with popular ICs. Contact Minntronix for the latest cross-reference information
- External Chip for better shielding/grounding
- Thru-hole design for rugged applications

### Mechanical Dimensions:



UNIT: Inch (mm)

### Electrical Specifications at 25°C

Part Number	Pri Inductance (10KHz) min	Leakage Inductance (10KHz) max	Interwinding Capacitance (10KHz) max	D.C. Resistance (20°C) ohms Max		Turns Ratio ±2% Pri : Sec	Schematic	Dielectric Voltage Pri to Sec
				Pri	Sec			
MT-41501	(30mHy typ.) 22mHy	20uHy	30pF	1.1	2.5	1ct:1ct	A	1500Vrms For 1 min
MT-41502		20uHy	30pF	1.1	1.3	1ct: 1ct	A	
MT-41503		20uHy	30pF	1.1	4.2	1ct:2.5ct	A	
MT-41504		20uHy	30pF	1.1	2.5	1ct:1.8ct	A	
MT-41541	22mHy	20uHy	35pF	6.0	2.8	2.5ct:1ct	B	1000Vrms

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# MT-41550 SERIES

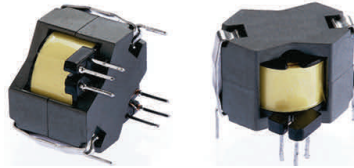
## ISDN S Interface Transformers

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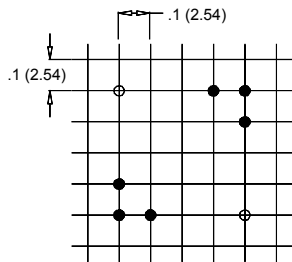
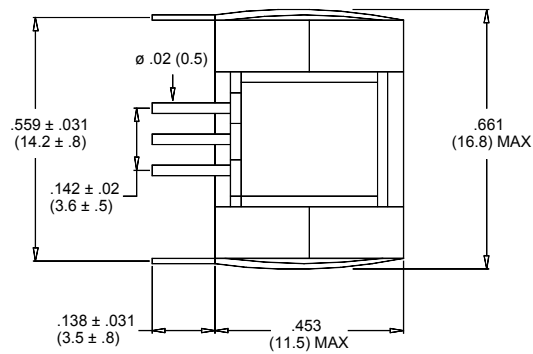
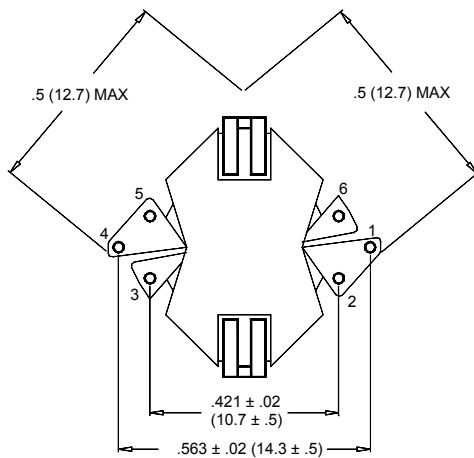


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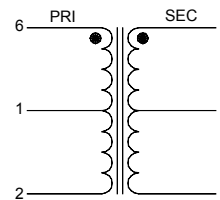


- Compatible with popular ICs. Contact Minntronix for the latest cross-reference information.
- Self-shielding
- Open core for better cooling

### Mechanical Dimensions:



○ Holes for Clip pins .051 (1.3) dia  
 ● Holes for Bobbin pins .039 (1) dia



UNIT: Inch (mm)

### Electrical Specifications at 25°C

Part Number	Pri Inductance (10KHz) min	Leakage Inductance (10KHz) max	Interwinding Capacitance (10KHz) max	DC Resistance (20°C) ohms max		Turns Ratio ±2% Pri : Sec	Dielectric Voltage Pri to Sec
				Pri	Sec		
MT-41551	(30mHy typ.) 20mHy	25uHy	30pF	2.2	4.6	1ct:2ct	1500Vrms For 1 min
MT-41552		25uHy	30pF	2.2	1.5	1ct:1ct	
MT-41553		25uHy	30pF	2.2	9.0	1ct:2.5ct	
MT-41554		25uHy	30pF	2.2	4.0	1ct:1.8ct	

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-41550 SERIES

# MT-41800 SERIES

## ISDN S Interface Transformers

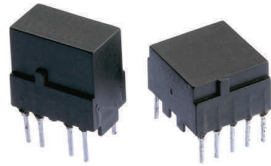
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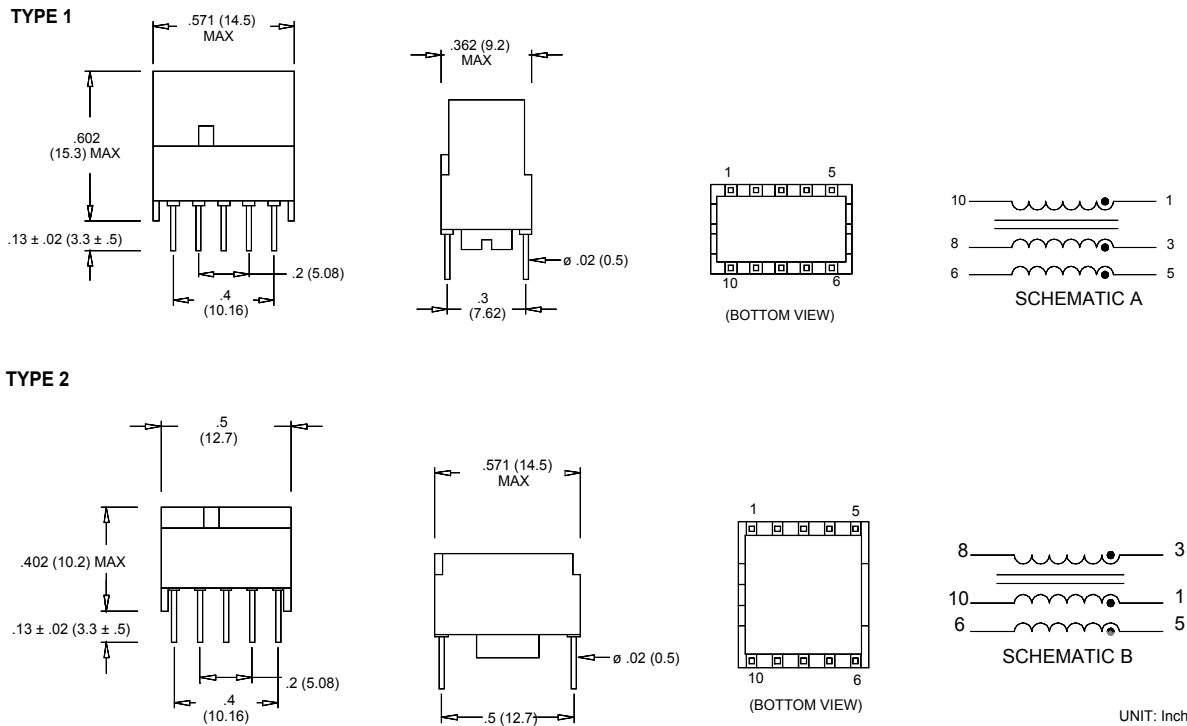
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MT-41800 SERIES



- Molded case
- 1500Vrms Hi-Pot
- Thru-hole mounting for rugged designs
- Encapsulated

### Mechanical Dimensions:



### Electrical Specifications at 25°C

Part Number	Turns Ratio (±2%)	Primary Sine Wave OCL (mHy min)	Pri / Sec Leakage Inductance (uHy max)	Pri / Sec C w/w (pF max)	CMRR Test (pF max)	C w/w (pF)	Primary DCR 20°C (ohms)	Secondary DCR 20°C (ohms)	Case Type	Schematic
MT-41801	4:1:1	30	1.5	30	60	30	1.9	0.3	2	A
MT-41802	4:1:1	30	1.5	30	60	30	1.9	0.3	1	A
MT-41803	4:1:1	30	1.5	30	60	30	1.9	0.3	1	B
MT-41821	4:1:1	30	2.5	30	58	30	3.8	0.6	2	A
MT-41822	4:1:1	30	2.5	30	58	30	3.8	0.6	2	B
MT-41823	4:1:1	30	2.5	30	58	30	3.8	0.6	1	A
MT-41824	4:1:1	30	2.5	30	58	30	3.8	0.6	1	B



# MT-41900 SERIES

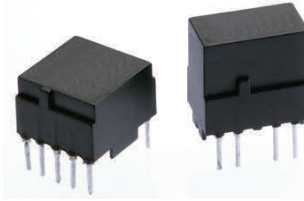
## Common Mode Chokes for ISDN

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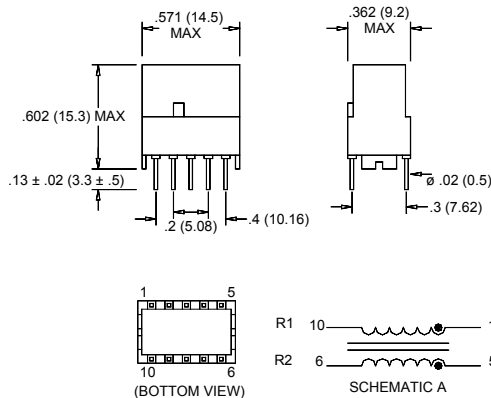


### Symbols

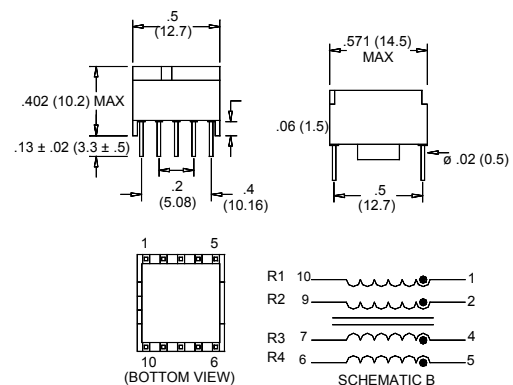
- Ln = Rated Inductance of a winding (tol+50%/-30%) at 10KHz, 100mV
- In = Rated winding current
- Ls = Leakage Inductance of a winding with all other windings shorted (nominal)
- R = DC Resistance of a winding
- Up = Hi-Pot test value VAC, winding to winding

### Mechanical Dimensions:

TYPE 1



TYPE 2



UNIT: Inch (mm)

### Electrical Specifications at 25°C

Part Number	Ln (mHy)	In (mA)	Ls (uHy)	R 20°C (ohms max)	Up (KVrms)	Case Type	Schematic
MT-41901	2*1.7	600	2.0	0.25 (nom)	0.5	1	A
MT-41902	2*12.5	350	1.5	1.5	0.5	1	A
MT-41903	2*28	250	1.0	1.0	0.5	2	A
MT-41904	2*28	250	1.0	1.0	0.5	1	A
MT-41905	2*50	250	1.5	1.3	0.5	1	A
MT-41906	2*70	200	1.0	2.1 (nom)	0.5	1	A
MT-41907	4*1.7	400	2.0	0.25 (nom)	0.5	2	B
MT-41908	4*1.7	400	2.0	0.25 (nom)	0.5	1	B
MT-41909	4*5	300	0.8	0.45 (nom)	0.5	2	B
MT-41910	4*5	300	0.8	0.45 (nom)	0.5	1	B
MT-41911	4*11.5	250	1.5	1.5 (nom)	1.0	2	B
MT-41912	4*11.5	250	1.5	1.5 (nom)	1.0	1	B
MT-41913	4*58	200	1.5	1.0 (nom)	0.5	2	B
MT-41914	4*58	200	1.5	1.0 (nom)	0.5	1	B
MT-41915	4*90	150	2.0	1.8 (nom)	0.5	2	B
MT-41916	4*90	150	2.0	1.8 (nom)	0.5	1	B

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-41900 SERIES

# MT-42000 SERIES

## U-Interface Transformers for ISDN

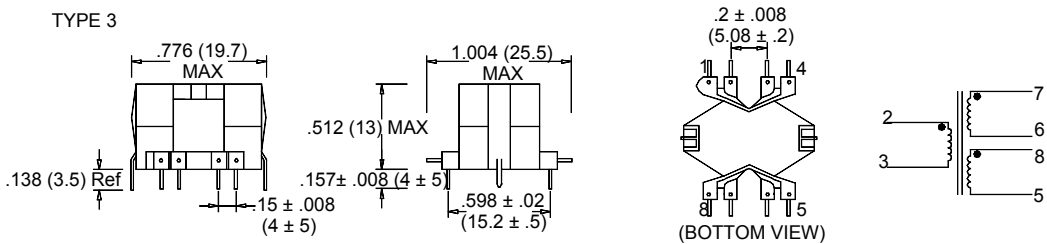
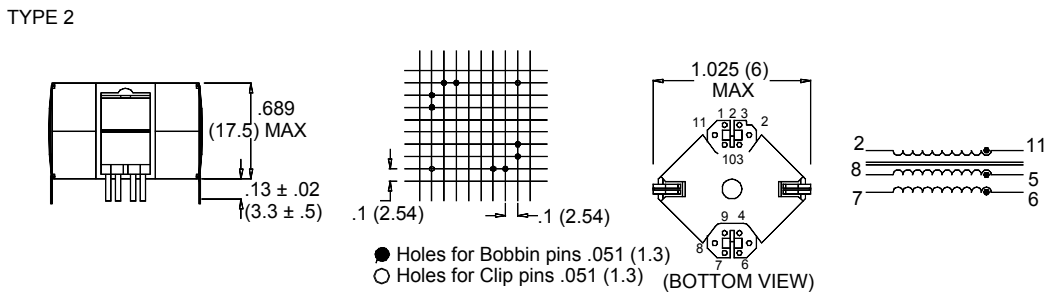
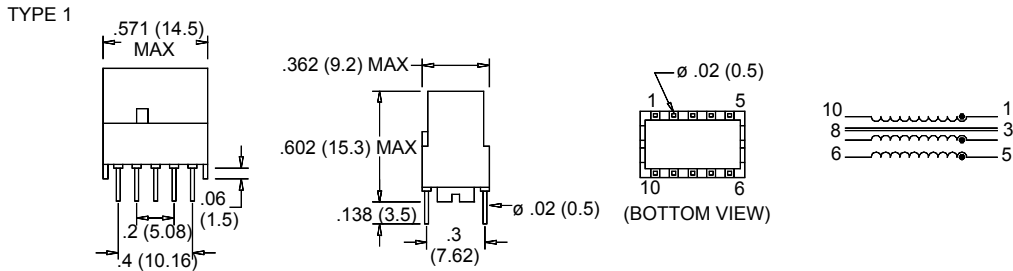
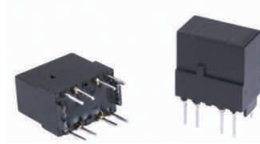
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MT-42000 SERIES



# MT-42000 SERIES

## U-Interface Transformers for ISDN

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### Symbols

Ls = Leakage Inductance of series-connected secondary windings with primary winding shorted (100KHz, 100mV)

Ck = Capacitance between primary and secondary windings (10KHz, 100mV)

Lh = Inductance of secondary windings connected in series (10KHz, 100mV)  
MT-42001 & MT-42002 measured at rated Idc

R1 = D.C. Resistance of individual primary winding (nominal value)

R2,3 = D.C. Resistance of individual secondary windings (nominal value)

Up = Hi-Pot test value VAC, primary to secondary

### Electrical Specifications at 25°C

Part Number	Turns Ratio (±2%)	Idc (mA)	Ls (uHy max)	Ck (pF max)	Lh (mHy)	R1 20°C (ohms)	R2, R3 20°C (ohms)	Up (KVrms)	Type
MT-42001	1:0.66:0.66	40	9	120	6.6±10%	4.0	3.0 (2)	2.0	1
MT-42002	1:0.66:0.66	60	9	150	6.35±12%	3.5	2.4	2.0	1
MT-42003	1:0.66:0.66	60	55	60	14.5±10%	1.8	2.7 (2)	2.0	2
MT-42004	1:0.66:0.66	60	50	75	7.9±10%	1.3	1.9 (2)	2.0	2
MT-42005	1:0.8:0.8	60	90	80	14.5±10%	2.7	2.8 (2)	2.0	2
MT-42006	1:1.25:1.25	60	100	100	14.5±10%	2.7	1.8 (1) (2)	2.0	2
MT-42007	1:0.75:0.75	80	50	—	27±10%	5.5 max	9 max	2.0	2
MT-42008	1:0.75:0.75	30	160	—	80±10%	11.8 max	13.8 max	2.0	2
MT-42009	1:1:1	80	200	300	27±10%	4 max	6 max	2.0	2
MT-42010	1:0.625:0.625	80	60	—	28±10%	5 max	11 max	2.0	2
MT-42011	1:1:1	50	60	90	15±10%	3.05	6.5 (2)	2.0	3

# MT-42050 SERIES

## U-Interface Transformers for ISDN

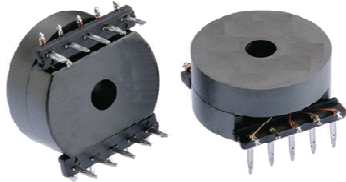
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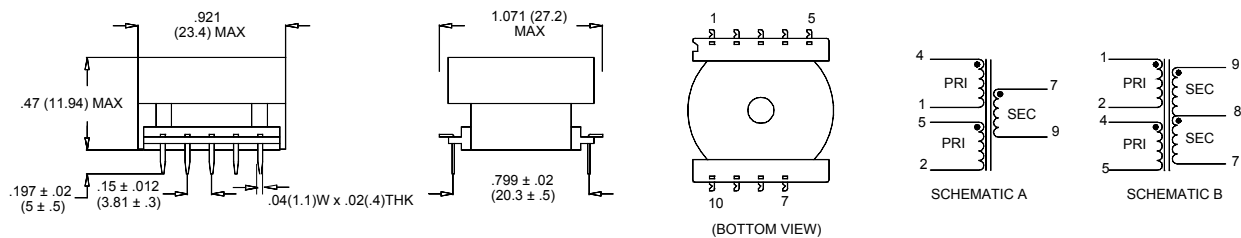
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MT-42050 SERIES



- Meets UL 1459 and 1950
- Meets ANSI TI.601 and ETSI ETR080 standards

### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-42051	MT-42052	MT-42053	MT-42054	Unit
Reflects on PRI =	135	135	135	135	ohms
Reflects on SEC=	30	30	31.6	75	
DC Resistance 20°C PRI max	10.0 series	10.0 series	5.26 series	8 series	ohms
SEC max	3.0	1.6	1.3	12 series	
Frequency Response 2KHz to 200KHz	±0.5	—	—	±0.10	dB
Insertion Loss at 10KHz 25°C	3.5	—	—	—	dB
Return Loss vs. 135 ohms at 10KHz to 25KHz	20 min	20 min	—	30 typ.	dB
Dielectric Test PRI-SEC	1100	1100	1100	1500	VAC
Direct Current PRI max	60	20	60	60	mA DC
Longitudinal Balance 281Hz to 40KHz	—	55 min	—	—	dB
Turns Ratio PRI:SEC ±2%	1.5:1	1.5:1	2:1	1.25:1	—
Total Harmonic Dist 500Hz 5Vp-p	-53.5 typ	-45 typ	—	—	dB
Inductance 1 KHz on PRI	27 ± 5%	27 ± 5%	—	26.5 - 30.0	mHy
10KHz on PRI	—	—	25±10%	26.5 - 30.0	mHy
Leakage Inductance 10KHz	—	—	17 max	—	uHy
100KHz	—	33.5 typ.	—	—	
Interwinding Capacitance 10KHz	—	—	—	150 typ.	pF
Schematic	A	A	A	B	—

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

# MT-42100 SERIES

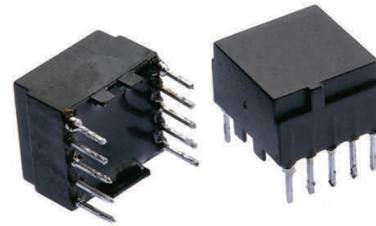
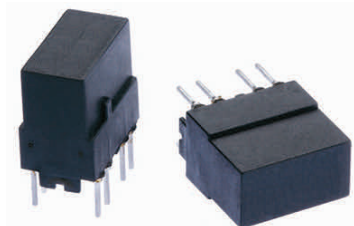
PRI Rate (S2M) Transformers for ISDN

## MINNTRONIX

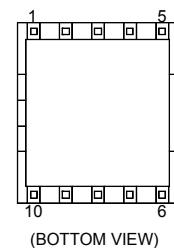
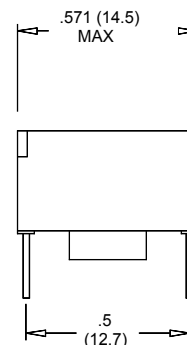
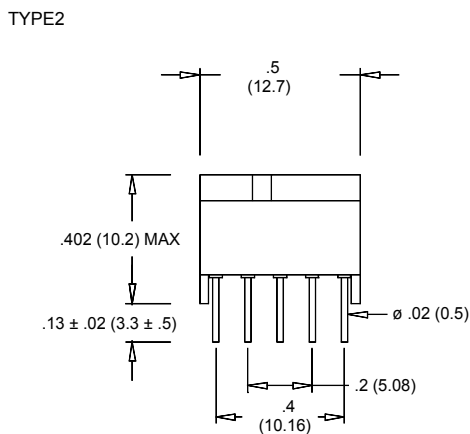
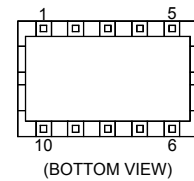
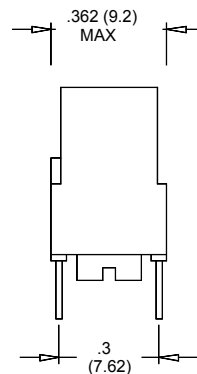
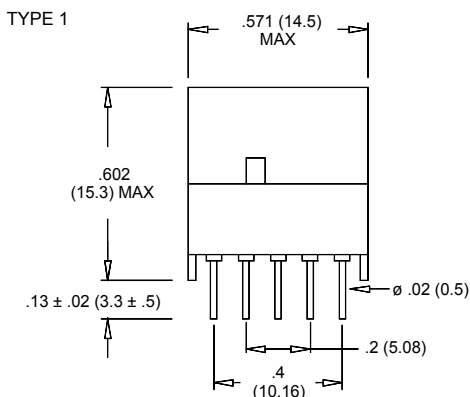
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### Mechanical Dimensions:



UNIT: Inch (mm)

# MT-42100 SERIES

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## PRI Rate (S2M) Transformers for ISDN



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MT-42100 SERIES

Symbols :

Ls = Leakage Inductance of series-connected secondary windings, with primary winding shorted (at 100KHz,100mV)

Ck = Capacitance between each winding (at 10KHz,100mV)

Lh = Inductance of winding (at 10KHz,100mV)

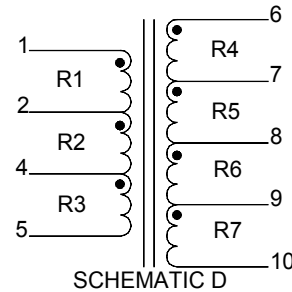
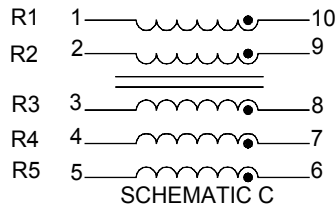
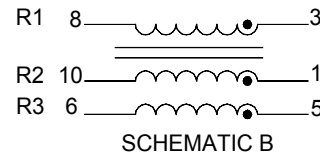
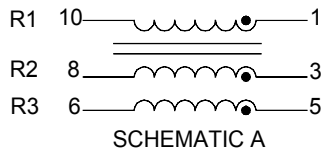
R1 = D.C. Resistance of winding (nominal value) MT-42101,MT-42102 : R1=R2 =R4=R5

R2,3 = D.C. Resistance of winding 2,3 (nominal value)

Up = Hi-Pot Test value, KVAC, 1 to 2 sec, winding 1 to winding 2+3 MT-42101

MT-42102: winding to winding

### Mechanical Dimensions:



UNIT: Inch (mm)

### Electrical Specifications at 25°C

Part Number	Turns Ratio (±2%)	Ls (uHy max)	Ck (pF max)	Lh (mHy min)	R1 20°C (Ohms)	R2,3 20°C (Ohms)	Up (KVrms)	Case Type	Schematic
MT-42101	1.5:1.5:1:1.5:1.5	0.4	10	0.7	0.17	0.11	2.0	2	C
MT-42102	1.5:1.5:1:1.5:1.5	0.4	10	0.7	0.17	0.11	2.0	1	C
MT-42103	2:1:1	0.5	—	2	0.3	0.15	2.0	1	A
MT-42104	5/4/1:2/8/8/2	2.0	—	2	(1)	(1)	2.0	1	D
MT-42105	4 : 1 : 1	0.25	15	12	0.7	0.25	2.0	2	B
MT-42106	4 : 1 : 1	0.25	15	12	0.7	0.25	2.0	1	A
MT-42107	2 : 1 : 1	0.2	15	2	0.3	0.15	2.0	2	B
MT-42108	2 : 1 : 1	0.2	15	2	0.3	0.15	2.0	1	A
MT-42109	1.67 : 1 : 1	0.25	15	2	0.25	0.15	2.0	2	B
MT-42110	1.67 : 1 : 1	0.25	15	2	0.25	0.15	2.0	1	A
MT-42111	2.67 : 1 : 1	0.25	15	5	0.4	0.15	2.0	2	B
MT-42112	2.67 : 1 : 1	0.25	15	5	0.4	0.15	2.0	1	A

Remarks: (1)R1=75mohms, R2=60mohms, R3=24mohms, R4 & R7=80mohms, R5 & R6=220mohms (nominal value)

# MT-42400 SERIES

## ISDN S Interface Isolation Transformers

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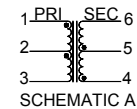
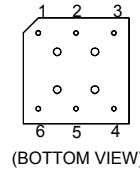
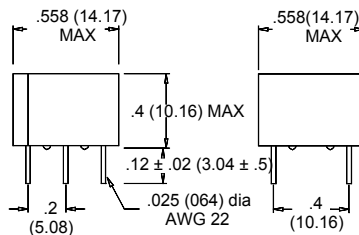
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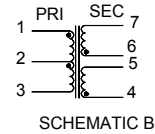
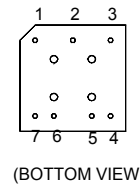
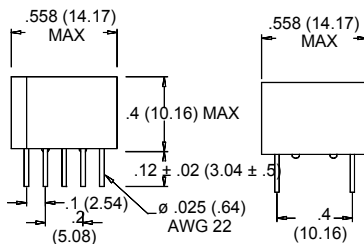
- Provides isolation for line card and terminal
- 2KVrms Hi-Pot Pri/Sec to conform with international safety standards
- 60dB min longitudinal balance 10KHz -300KHz

### Mechanical Dimensions:

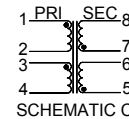
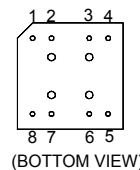
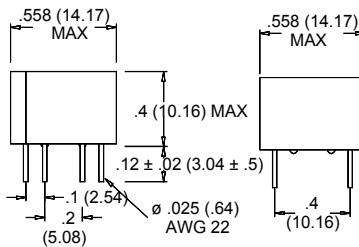
#### TYPE A



#### TYPE B



#### TYPE C



UNIT: Inch (mm)

Part Number	Turns Ratio ±2%	Primary Sine Wave OCL (mHy min)	Pri/Sec Leakage Inductance (uHy max)	Pri/Sec C w/w (pF max)	CD pri (pF max)	Primary DCR 20°C (Ω±25%)	Secondary DCR 20°C (Ω±25%)	Type
MT-42401	1CT:1CT	22	5	100	42	2.4	2.4	A
MT-42402	1CT:1.8CS	22	15	100	160	2.5	4.2	B
MT-42403	1CT:2CT	22	11	100	180	2.4	4.4	A
MT-42404	1CS:2.5CS	22	15-40	100	110	2.5	5.8	C
MT-42405	1CS:2CT	22	15	100	80	2.5	4.3	A
MT-42406	1CT:2.5CS	22	30	100	150	2.5	5.8	B

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-42400 SERIES

# MT-44100 SERIES

## 64 Kbps DS0 Interface Transformers

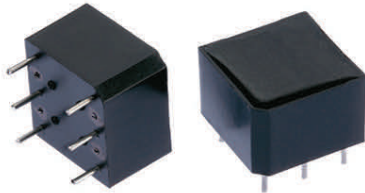
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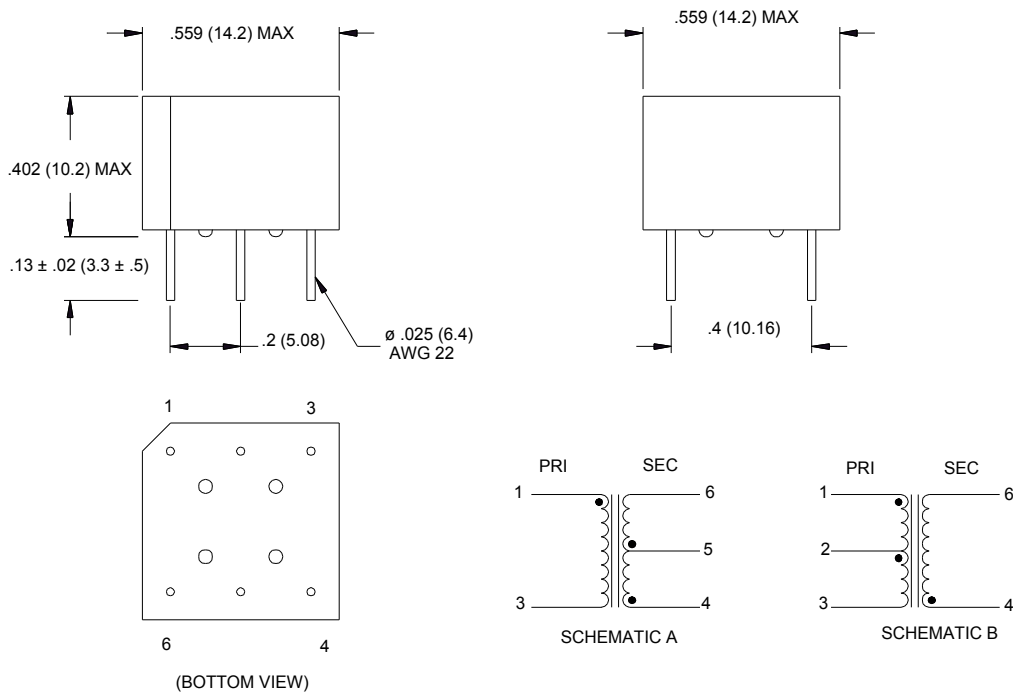
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MT-44100 SERIES



- Compatible with popular ICs
- Small encapsulated package
- Provides 2000Vrms isolation

### Mechanical Dimensions:



UNIT: Inch (mm)

### Electrical Specifications at 25°C

Part Number	Turns Ratio ( $\pm 2\%$ )	Primary Inductance (mHy min)	Cw/w (pF max)	Schematic	Matched to
MT-44100	1:2CT	7.5	130	A	EXAR XR6164
MT-44101	1CT:1	10.0	130	B	PM1 LIU-01



# MT-45000 SERIES

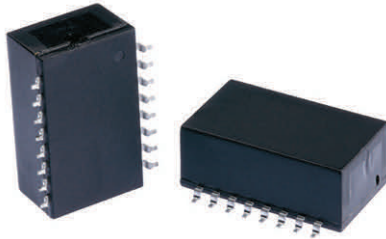
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ISDN S Interface Isolation Transformers Dual, SMD

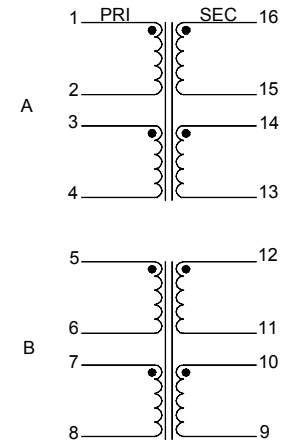
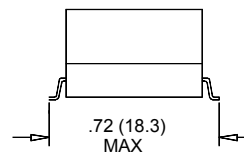
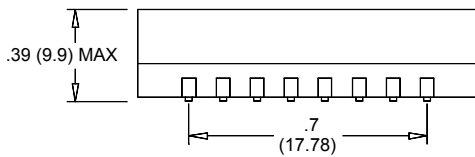
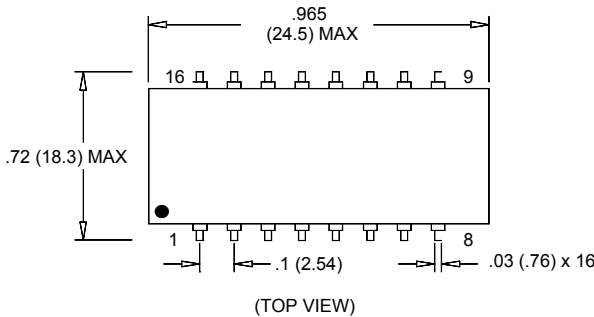


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- 2KVrms isolation voltage
- Excellent longitudinal balance
- Tape & Reel, Tray & Tube packaging options

Mechanical Dimensions:



UNIT: Inch (mm)

Electrical Specifications at 25°C

Part Number	Turns Ratio (±2%)		OCL Pri (mHy min) A and B	LL Sec (uHy max)		Cw/w (pF max) A and B	CD pri (pF max)		DCR Pri 20°C (Ω±25%)		DCR Sec 20°C (Ω±25%)		ΔIdc (mA max)
	A	B		A	B		A	B	A	B	A	B	
MT-45001	1:1	1:2	22	5	15	100	42	80	2.4	2.3	2.4	4.0	1
MT-45002	1:1	1:1	22	5	5	100	42	42	2.4	2.4	2.4	2.4	1
MT-45003	1:1.8	1:1.8	22	15	15	100	140	140	2.5	2.5	4.2	4.2	1
MT-45004	1:2	1:2	22	15	15	100	80	80	2.5	2.5	4.3	4.3	1
MT-45005	1:2.5	1:2.5	22	8-40	8-40	100	110	110	2.5	2.5	5.8	5.8	1
MT-45006	1:2	1:2	22	11	11	100	180	180	2.4	2.4	4.4	4.4	1

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MT-45000 SERIES

# MT-45100A SERIES

## T3/DS3/E3/STS-1 Transformers

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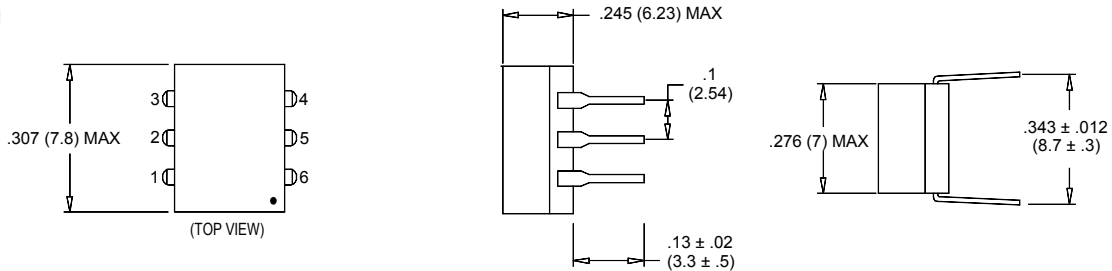
MT-45100A SERIES



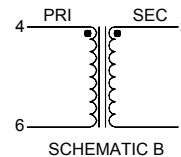
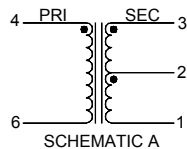
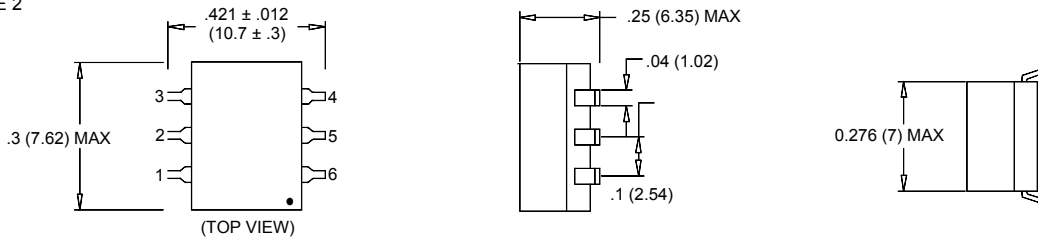
- Developed for use in T3, DS3, E3 and STS-1 interfaces
- Fast rise time, compatible with telecom industry standards
- 1500Vrms isolation

### Mechanical Dimensions:

TYPE 1



TYPE 2



UNIT: Inch (mm)

### Electrical Specifications at 25°C

Part Number	Turns Ratio (±2%)	Primary OCL (uHy min)	LL (uHy max)	Bandwidth (3 dB Typ) (MHz)	Type / Schematic	Primary Pins
MT-45101	1:1.73CT	50	.10	.060-300	1/A	4-6
MT-45102	1:1	40	.06	.200-340	1/B	4-6
MT-45103	1:1	40	.06	.200-340	2/B	4-6
MT-45104	1:2CT	19	.06	.250-500	2/A	4-6
MT-45105	1:2CT	19	.06	.250-500	1/A	4-6

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

# MT-45100B SERIES

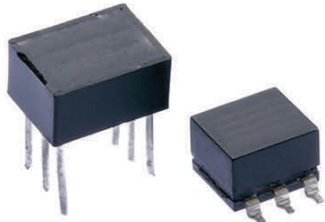
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## T3/DS3/E3/STS-1 Transformers



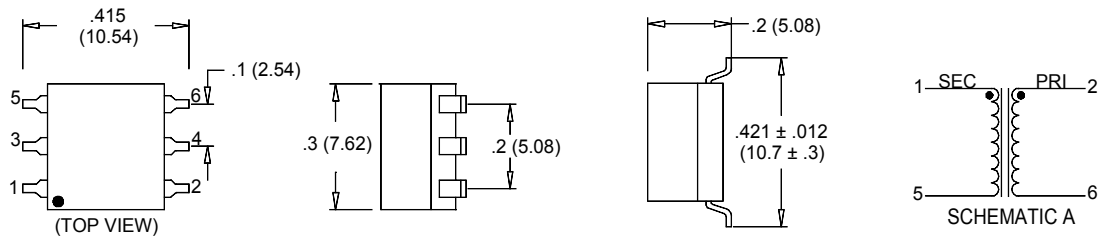
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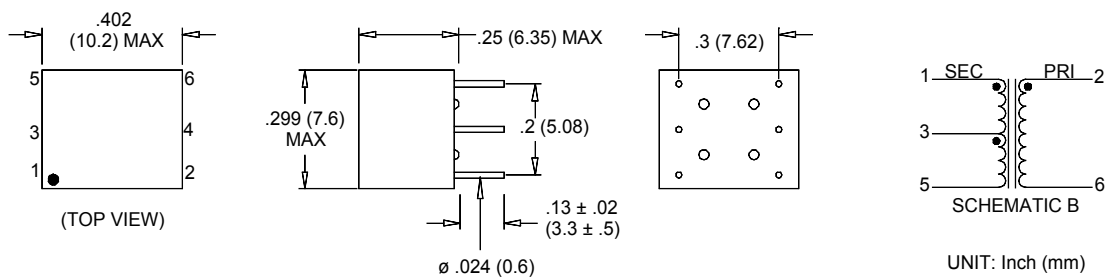
- Developed for use in T3, DS3, E3 & STS-1 interfaces
- Fast rise time, compatible with telecom industry standards
- Thru-Hole & Surface Mount packages available
- 1500Vrms isolation

### Mechanical Dimensions:

TYPE 1



TYPE 2



### Electrical Specifications at 25°C

Part Number	Turns Ratio (±2%)	OCL at 25°C (uHy min)	OCL at 40°C (uHy min)	LL (uHy max)	C w/w (pF max)	Type / Schematic
MT-45106	1:2CT	35	20	.12	10	1/B
MT-45107	1:1	40	30	.12	13	1/A
MT-45108	1:1	40	30	.12	13	2/A
MT-45109	1:2CT	35	20	.12	10	2/B
MT-45110	1:4CT	200	-----	.32	10	2/B

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MT-45100B SERIES

# MT-46000 SERIES

## DDS Pulse Transformers

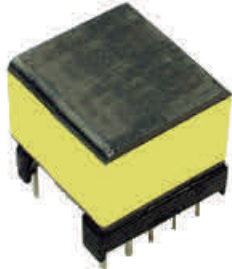
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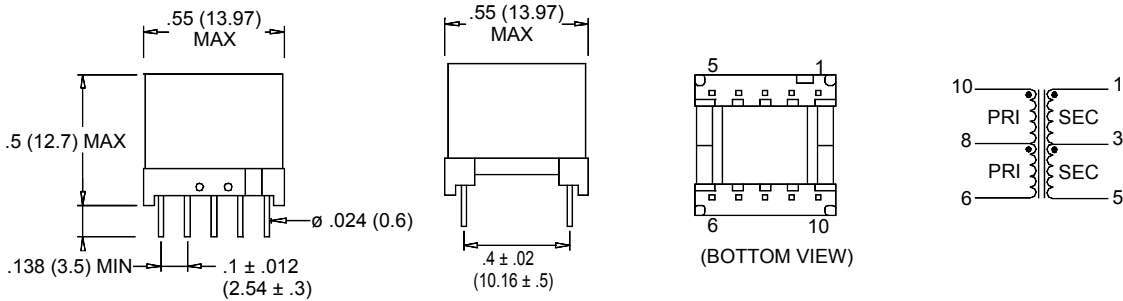
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MT-46000 SERIES

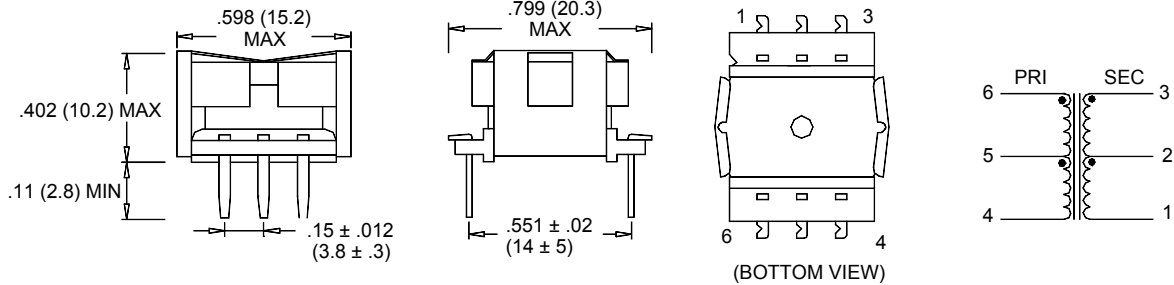


### Mechanical Dimensions:

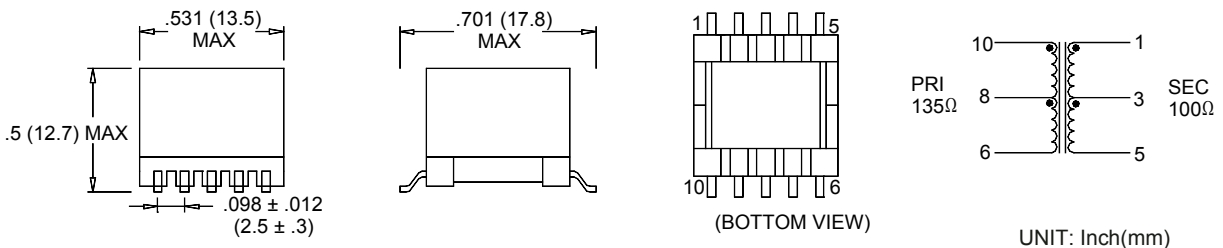
#### TYPE 1



#### TYPE 2



#### TYPE 3



UNIT: Inch(mm)

# MT-46000 SERIES

## DDS Pulse Transformers

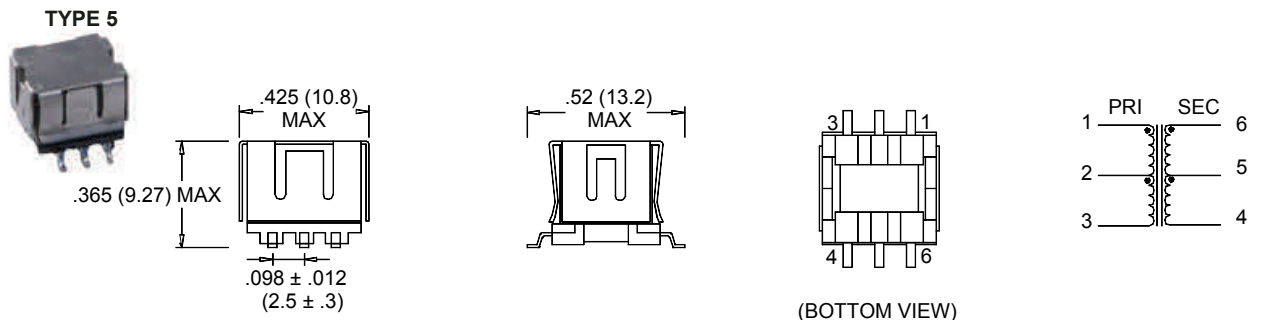
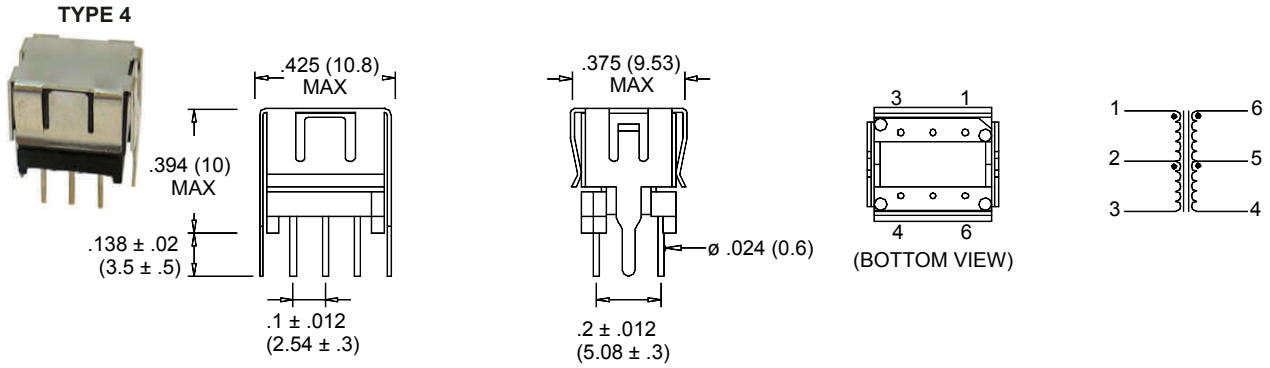
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MT-46000 SERIES



Recommended PCB Layout

UNIT: Inch (mm)

Specifications	MT-46001	MT-46002	MT-46003	MT-46004	MT-46005	MT-46006	MT-46007	Unit
Reflects on PRI =	135	135	135	135	135	135	135	ohms
Reflects on SEC=	100	100	100	100	100	100	100	ohms
Longitudinal Balance, 200-1KHz, min.	60							dB
1K-15KHz, min.	40	40	40	40	40	40	40	
15K-100kHz, min.		35	35	35	35	35	35	
DC Resistance 20° C PRI±10%	16.0-19.5	9.28	9.28	5.12	5.10	2.64	2.64	ohms
SEC±10%	16.0-19.5	9.28	9.28	6.00	6.00	5.37	5.37	
Insertion Loss 10KHz	1.25±0.25	1.0 max	1.0 max	—	—	—	—	dB
Return Loss 100Hz - 100KHz	15 typ.	15 typ.	15 typ.	—	—	—	—	dB
1KHz	32 typ.	32 typ.	—	—	—	—	—	
Dielectric Test PRI-SEC	1250	1875	1875	1250	1250	1875	1875	VAC
Turns Ratio (PRI: SEC) ±2%	1:1	1:1	1:1	1:1	1:1	1:1	1:1	—
Inductance, 1KHz, 1.0V min	200	200	200	40	40	40	40	mHy
Leakage Inductance 10KHz, 0.5V, max	22-43	60	60	40	40	40	40	uHy
Interwinding Capacitance, 10KHz	45 ref	—	—	—	—	—	—	pF
Frequency Response, 100Hz-112KHz	±1.0	±1.0	±1.0	—	—	—	—	dB
200Hz-112KHz								
Type	2	1	3	4	5	3	1	—

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

# MT-47000 SERIES

## HDSL Pulse Transformers



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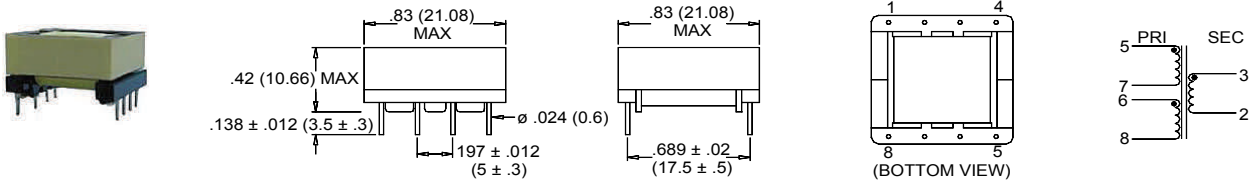


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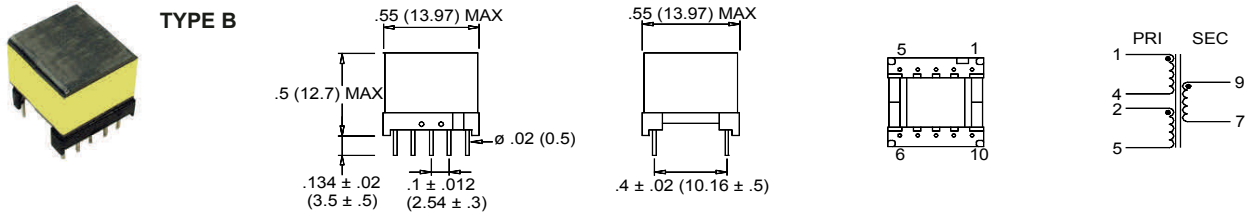
MT-47000 SERIES

### Mechanical Dimensions:

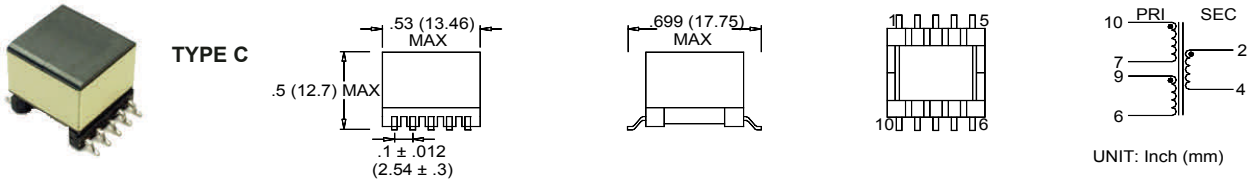
#### TYPE A



#### TYPE B



#### TYPE C



UNIT: Inch (mm)

Specifications		MT-47001	MT-47002	MT-47003	MT-47004	MT-47005	MT-47006	MT-47007	MT-47008	Unit
DC Resistance	Reflects on PRI =	135	135	135	135	135	135	135	135	ohms
	With SEC RL =	25.5	32	32	32	32	32	32	26	ohms
20°C±10%	PRI max	1.0	3.5	2.5	2.5	2.5	4.0	2.5	1.6±10%	ohms
	SEC Max	0.5	2.2	1.0	1.0	1.0	2.3	1.0	0.67±10%	ohms
Insertion Loss	40KHZ		0.43 max	0.5 max		0.5 max	0.5 max	0.5 max		dB
	100KHZ	0.3 max							0.4 max	dB
	200KHZ				0.4 max					dB
Return Loss	9K - 40KHz						16 min.			dB
	20k-80kHz		17 min							dB
	20k-110kHz					17 min.		17 min.	18 min.	dB
	33k-110kHz									dB
	36k-600kHz	16 min.								dB
	40k-200kHz				20 min.					dB
40k-300kHz			16.5 min.						dB	
Dielectric Test	PRI-SEC	1500	1500	1500	1500	1500	1500	1500	1500	VAC
Direct Current	PRI max	60	100	160	160	60	60	60	60	mA DC
Turns Ratio	(PRI: SEC) ± 2%	2.3:1	2:1	2:1	2:1	2:1	2:1	2:1	2.3:1	—
Longitudinal Balance	36 to 300KHz	50 min.								dB
	40 to 200kHz				53 min.					dB
	500 to 150kHz		53 min.			53 min.	53 min.	53 min.		dB
Total Harmonic Distortion	500 to 300 kHz			50 min						dB
	5KHz, 0dBm	-60 max.								dB
	20kHz, 4.5Vp-p		-70 max.			-70 max.	-70 max.	-70 max.		dB
Inductance	40kHz, +14dBm		-70 max.	-70 max.	-70 max.					dB
	1KHz, 1.0V	3.2-4.0							3.7±6%	mHy
	10kHz, 1.0V		5±5%		3±6%	3.5±5%	8±6%	3.5±5%		mHy
Frequency Response	10kHz, 0.1V			2±6%						mHy
	20K to 80KHz	—	±0.07				±0.1			dB
	20k to 110kHz								±0.1	dB
	33k to 110kHz					±0.1		±0.1		dB
Leakage Inductance	40k to 300kHz			±0.1						dB
	100 KHz ,0.1V	—	—	11 max.	—	—	—	—	30 max	uHy
Type		A	B	B	B	B	B	C	B	—

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

# MT-47050 SERIES

## HDSL Pulse Transformers

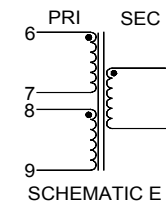
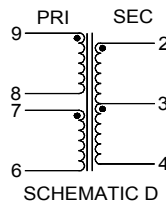
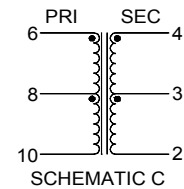
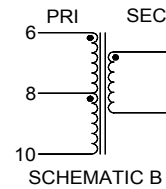
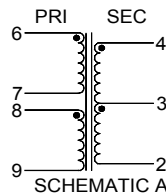
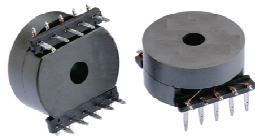
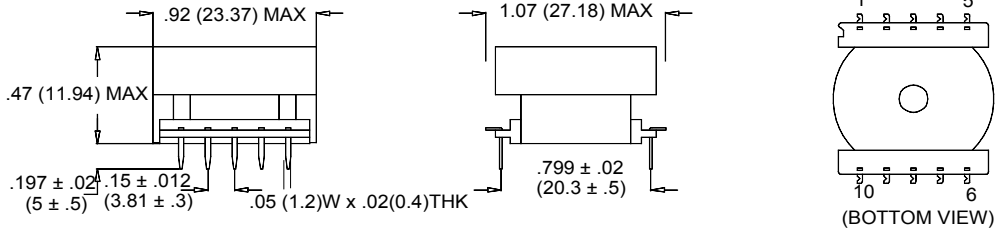
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### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-47051	MT-47052	MT-47053	MT-47054	MT-47055	MT-47056	MT-47057	MT-47058	MT-47059	Unit	
Reflects on PRI =	135	135	135	135	135	135	135	135	135	ohms	
Reflects on SEC =	135	135	40.2	40.2	31	31	32	32	42	ohms	
DC Resistance 20°C ± 10%	PRI SEC	2.44 2.45	2.24 2.25	3.0 max 2.3 max	2.35 max 1.00 max	2.56 0.85	1.46 0.48	2.60 1.30	2.0 1.0	4.20 2.35	ohms
Frequency Response	20K-0KHz							±0.1			
	33k-110kHz							±0.1		dB	
	40k-200kHz					±0.1					
	40k-300kHz	±0.1	±0.1								
Insertion Loss	40KHz							0.40 max	0.40 max		
	100KHz	0.25 max	0.40 max							dB	
	200KHz					0.40 max					
	300KHz							0.40 max			
Return Loss	20K—80KHz							17.0 min			
	33K—110KHz							17.0 min		dB	
	40K—200KHz					20 min.					
	40K—300KHz	20 ref	16 ref					16.5 min.			
Dielectric Test	PRI-SEC	1500	1500	2000	1500	1500	1500	1500	1500	VAC	
Turns Ratio (PRI: SEC) ±2%		1:1	1:1	1.8:1	1.8:1	2:1	2:1	2:1	2:1	1.8:1	
Longitudinal Balance,	200kHz	53 min									
	300 kHz		50 min								
	20k-80kHz							53 min.		dB	
	33k-110kHz							53 min			
	40k-200kHz					53 min			50 min		
	40k-300kHz			50 min	50 min	53 min					
Total Harmonic Dist. 100KHz, 5Vp-p 5KHz		-70 typ.	-70 typ.	-70 max	-70 max	-70 max	-70 max	-70 max	-70 max	-70 max	
Inductance, 1KHz, 1.0V		3.0±3%	2.0±3%	2.92±5%	1.94±5%	3.0±6%	2.0±6%	5.0±5%	3.5±5%	3.6±10%	
Leakage Inductance 100KHz 100mAAC		20 max	20 max			7.5 max	8.0 max			17.5 max	
Schematic		A	A	C	B	D	D	E	E	B	

# MT-48000G SERIES

## G.SHDSL Pulse Transformers

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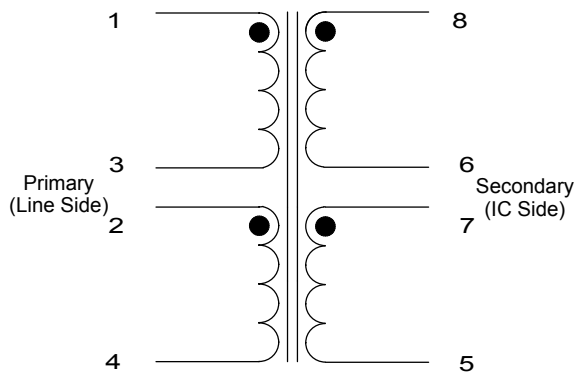
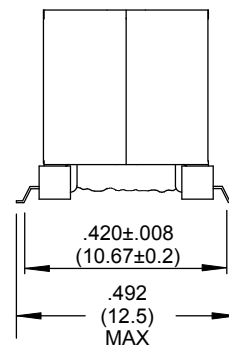
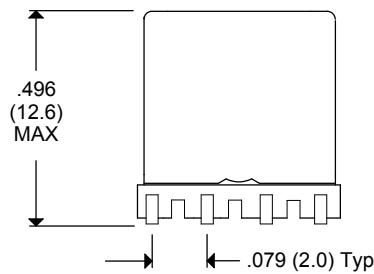
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MT-48000G SERIES

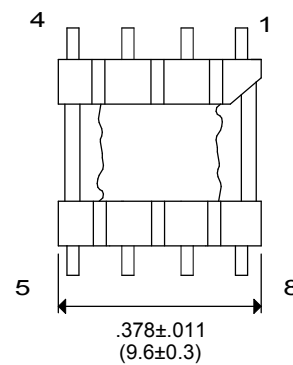


- Small size, uses half the space of competing designs
- Designed for international compliance (IEC60950)
- Designed to meet Telcordia GR-1089 surge test
- Supports popular ICs. Contact Minntronix for the latest cross-reference data

### Mechanical Dimensions:



Schematic



Recommended PCB Layout UNIT: Inch (mm)

Minntronix PN	IC Maker & Description	Line Driver (AFE)	Turns Ratio PRI : SEC	Primary Inductance	Hi-Pot
4806686R	Metalink MtS170/870 Mts 180	MtS141 MtS142	3.7:1	3.0mH	2000VAC
4806687R	Metalink MtS170/870 Mts 180	MtS142	3.0:1	3.0mH	2000VAC
4806844R	Metalink MtS170/870 Mts 180	Mts142	1.8:1	2.75mH	2000VAC

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.



# MT-48000A-THT SERIES

## ADSL Pulse Transformers

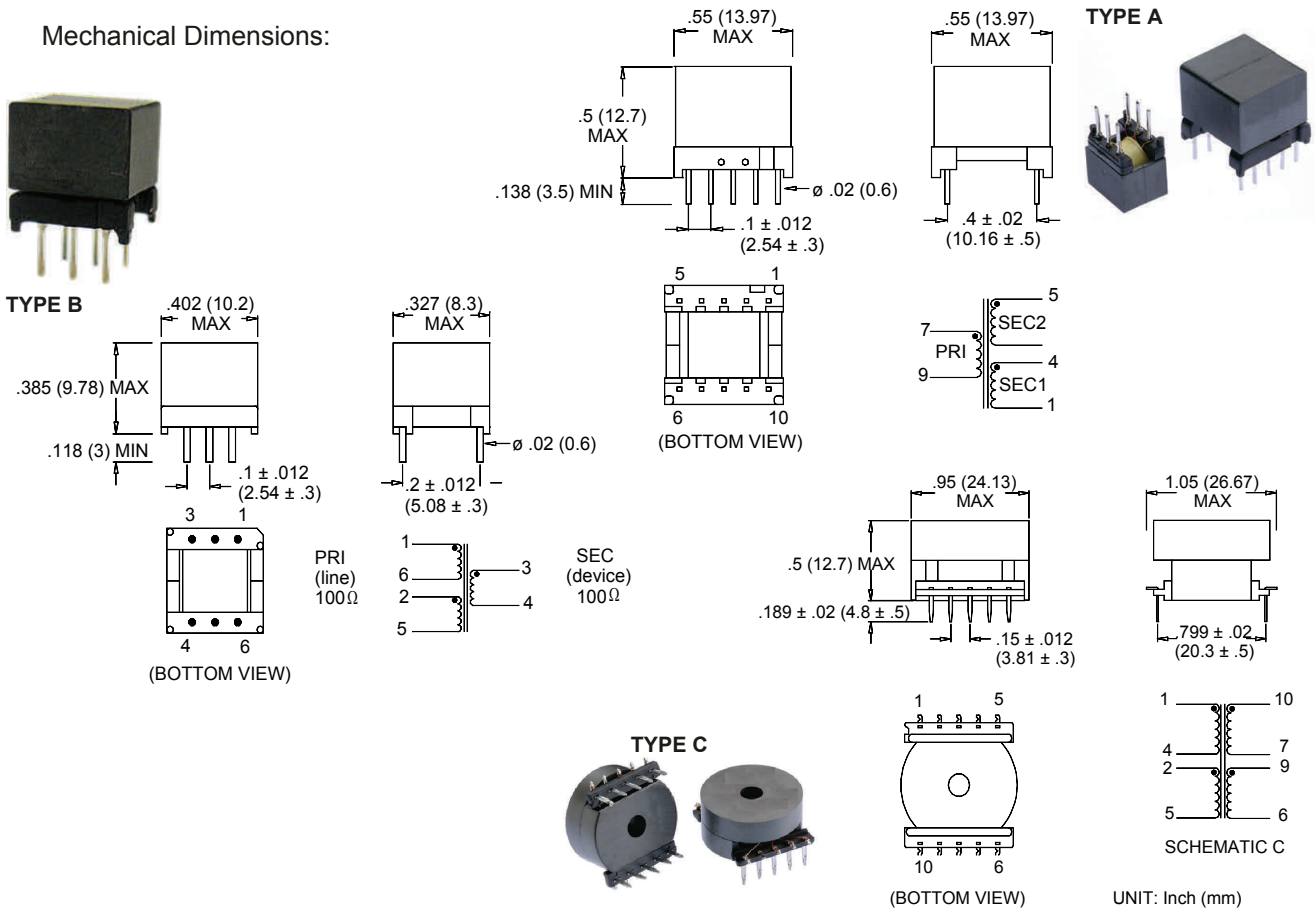
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### Mechanical Dimensions:



Specifications	MT-48001	MT-48002	MT-48003	MT-48004	Unit
DC Resistance 20°C PRI	2.2 max	2.6±10%	2.4 max	1.32±10%	ohms
SEC	1.8 max	2.25±10%	0.32 max	1.12±10%	
Frequency Response 40K to 1.1MHz	± 1.0	—	—	3.0 max	dB
30K to 2MHz					
600K to 2.5MHz					
Insertion Loss 50 KHz 20°C max	1.5	—	—	0.5 max	dB
772KHz					
Dielectric Test PRI-SEC	1500	1250	2000	1875	VAC
Turns Ratio PRI:SEC ±1%	1 : 1	1 : 1	1 : 1	1 : 1	—
Longitudinal Balance 20K to 1.1MHz	50 min	40 min	—	55 min	dB
20K to 1MHz					
Total Harmonic Dist. 20KHz 2Vrms	-100typ.	—	—	-85 min	dB
100KHz 14.4Vp-p					
Inductance 1KHz, 1.0V	368±5%	25.4mHy min	440±5%	407.5±5%	uHy
10KHz, 100mV					
Leakage Inductance 10KHz 100mA AC	11 max	—	15 max	10 max	uHy
100KHz 0.1Vrms					
Return Loss 30K to 1.1MHz	—	10 min	—	—	dB
Type	A	B	C	A	—

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MT-48000A-THT SERIES

# MT-48000A-SMD SERIES

## ADSL Pulse Transformers

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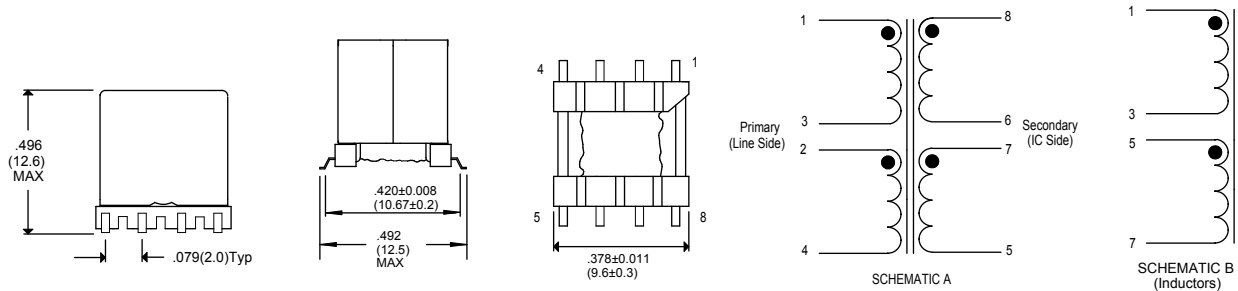
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MT-48000A-SMD SERIES



- Small size, uses half the space of competing designs
- Transformers UL recognized (file E216510)
- Transformers designed to meet Telcordia GR-1089 surge test
- Inductors support both ADSL and VDSL filter applications
- Supports popular ICs. Contact Minntronix for the latest cross-reference data

### Mechanical Dimensions:



IC Maker Part Number	Application	Inductance	Turns Ratio	Schematic	Minntronix PN
Line Interface Transformers—CO					
Alcatel MTK20150, 20450	ADSL/POTS	410uH	2:1	A	4806571R
Alcatel MTK20850	ADSL/POTS	450uH	1.4:1	A	4806572R
Alcatel MTK20850	ADSL/ISDN-B	100uH	1.4:1	A	4806579R
Globespan G7266	ADSL/POTS	475uH	1.4:1	A	4806573R
Globespan G7266	ADSL/ISDN	100uH	1.4:1	A	4806574R
Centillium CT-L53SC08, CT-L63SC08, CT-L73SC08	ADSL/POTS	850uH	1.8:1	A	4806575R
Centillium CT-L53SC08, CT-L63SC08, CT-L73SC08	ADSL/POTS	850uH	1:1	A	4806576R
TIAC5/TNETD5000	ADSL/POTS	400uH	1.9:1	A	4806577R
POTS Splitter Inductors					
Various—ADSL	FILTER	2X4.0mH	1:1	B	4806670R
Various—VDSL (low IWC)	FILTER	2x4.0mH	1:1	B	4806703R

# MT-48000AUDIO SERIES

Digital Audio Transformers for AES/EBU, S/PDIF

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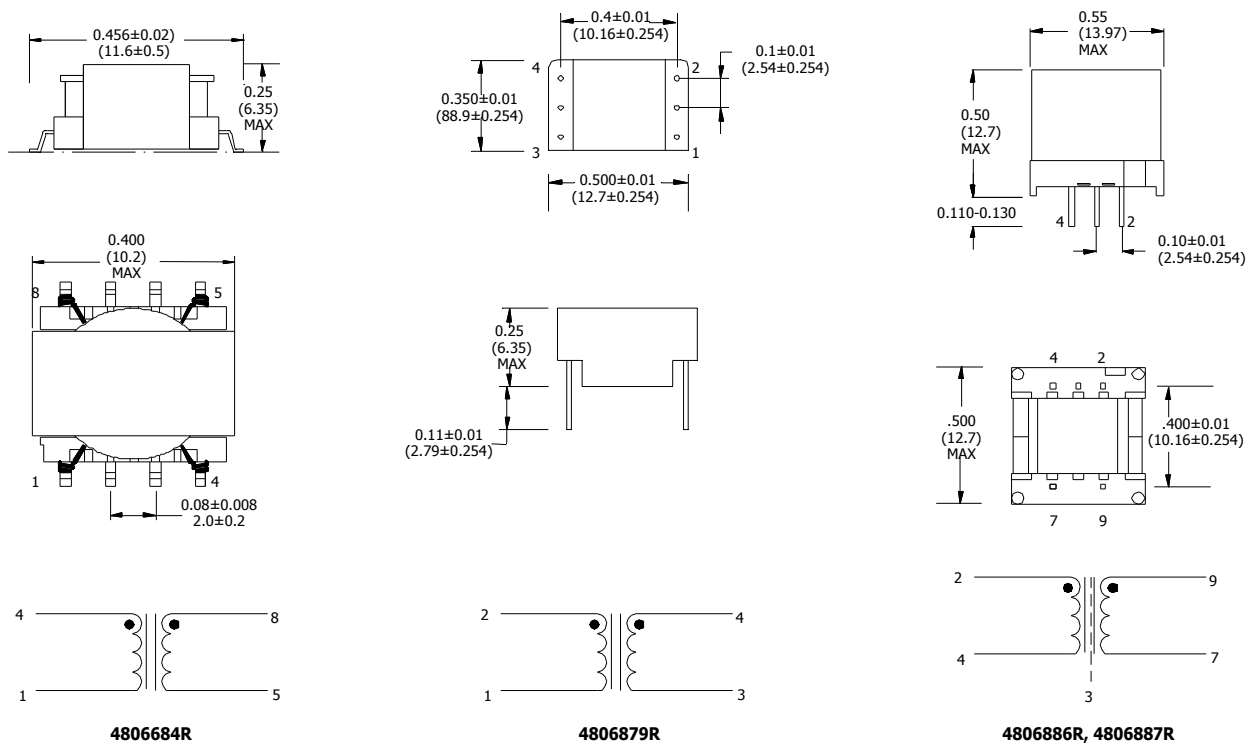


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- Low jitter designs
- Low leakage inductance for fast rise time
- Good common-mode noise rejection (CMRR)
- Supports multiple line impedances
- Supports multiple data rates
- Compatible with ICs made by Crystal/Cirrus, Burr-Brown, Toshiba, Motorola, Yamaha, AKM and others

### Mechanical Dimensions:



Part Number	Application	Turns Ratio PRI : SEC	Min PRI Inductance	Leakage Inductance	Hi-Pot
4806684R	AES/EBU DVD	1:1	300uH	0.7uH max	1500 VAC
4806879R	AES/EBU S/PDIF	1:1	2mH	0.5uH max	2000 VAC
4806886R	AES/EBU	1:1	4mH	3uH typ.	1000 VDC
4806887R	AES-3 S/PDIF	1:2	900uH	0.6uH typ.	1000 VDC

# MT-48050 SERIES

## ADSL Splitter Inductors

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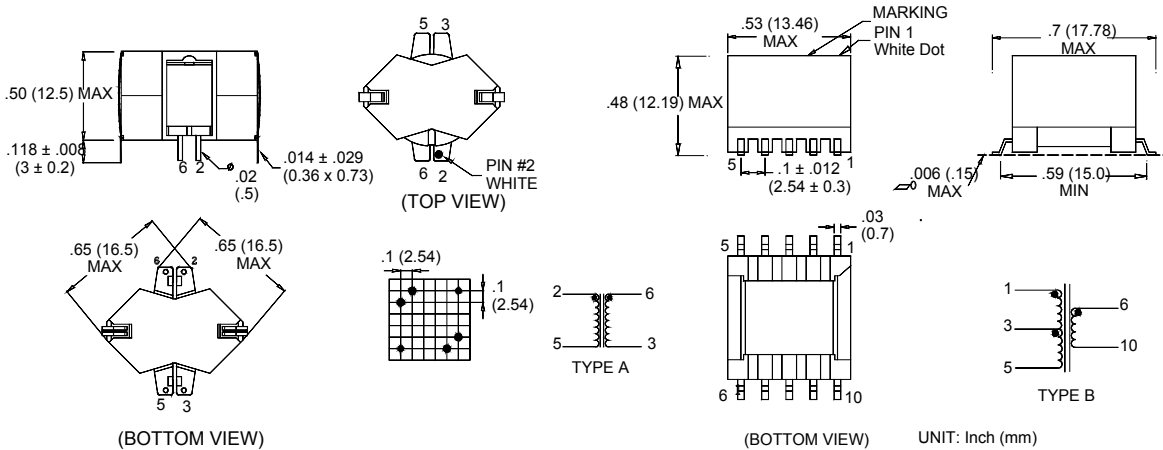
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MT-48050 SERIES

- For use with Alcatel's Dynamite ADSL chipset
- For central office and customer premise applications.
- Operating Temperature Range: -40°C ~ +85°C



### Mechanical Dimensions:



Specifications	MT-48051	MT-48052	Unit
Alcatel Part Number	1AB 06764 0025		
Inductance, 10KHz, 0.1V (0 A) (100mA DC, 25°C) (100mA DC, 85°C) (160mA DC, 25°C)	20±4% 19 min. 18 min	6.5±5%  6.5±10%	mHy
Leakage Inductance, 100KHz, 0.1V	25 max	45 max	uHy
Inter-winding Capacitance, 100KHz, 0.1V	900 max	85 max	pF
D.C. Resistance, 20°C, PRI SEC	4.0 max 4.0 max	5.9±8% 5.9±8%	Ohms
Turns Ratio (PRI:SEC), ±1% 10KHz, 1.0V	1:1	1:1	---
Dielectric Test PRI-SEC	600	1000	VAC
Longitudinal Balance, 30KHz 1.1MHz	---	65 min 45 min	
Type	A	B	---

# MT-49000 SERIES

## SHDSL/HDSL2/HDSL4 Transformers

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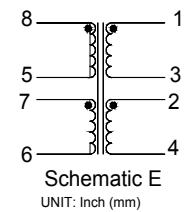
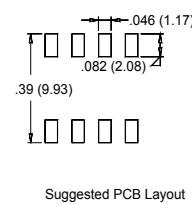
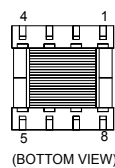
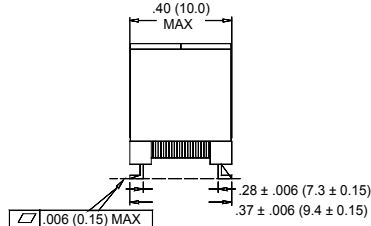
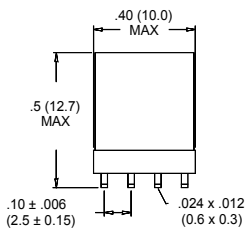
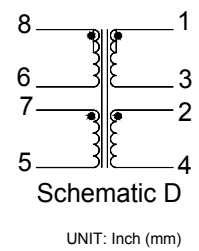
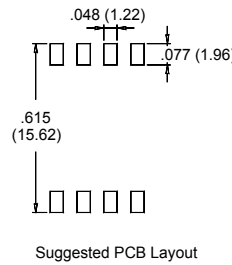
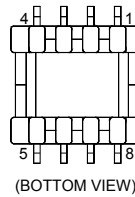
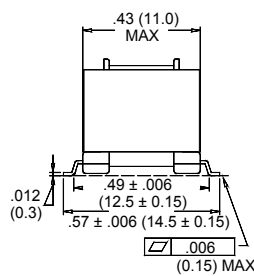
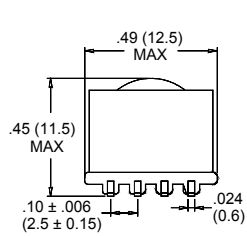
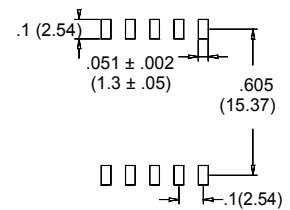
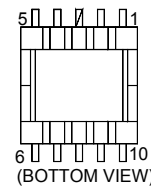
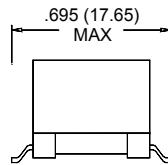
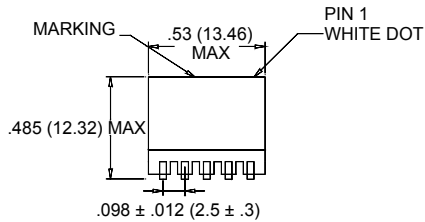
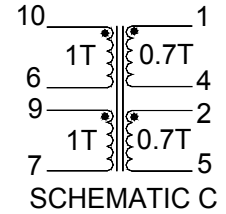
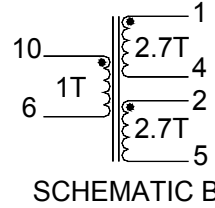
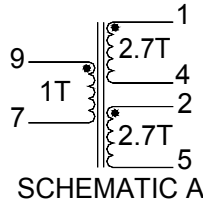
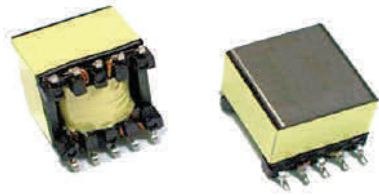
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MT-49000 SERIES

### Mechanical Dimensions:



# MT-49000 SERIES

## SHDSL/HDSL2/HDSL4 Transformers

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MT-49000 SERIES

- Matched to Globespan Virata for CO or CP Selectable SHDSL chipset-G2237
- Designed to meet IEC60950 supplementary insulation requirements at 250V working voltage
- Operating Temperature Range: -40°C ~ +85°C

Specifications	MT-49001	MT-49002	MT-49002A	MT-49003	MT-49003A	Unit
Reflects on PRI =	135	135	135	135	135	ohms
Reflects on SEC =	4.6	4.6	4.6	275.5	275.5	ohms
DC Resistance 20°C PRI max	4.2	4.0	5.2	9.0	9.0	ohms
SEC max	0.35	0.52	0.68	22.0	22.0	
Insertion Loss at 100 KHz	0.52 max	0.70 max	0.75 max	1.5 max.	1.5 max	dB
Return Loss at 20 KHz	14 min	14 min.	14 min			dB
40K to 500KHz	16 min	15 min.	15 min			
Dielectric Test PRI-SEC	1500	1500	1500	1500	1500	V AC
Direct Current PRI max	100	20	20	20	20	mA DC
Turns Ratio PRI:SEC ±2%	5.4:1	5.4:1	5.4:1	0.7:1	0.7:1	
Longitudinal Balance 20 K to 500KHz	55 min	55 min.	55 min	45 min	45 min	dB
Total Harmonic Dist 5KHz 4Vrms 2Vrms	-79 max	-78 max.	-78 max	-82 max	-82 max	dB
Inductance 10KHz 0.1Vrms	2.82-3.18	3.00-3.40	3.00-3.40	3.00-3.50	3.00-3.50	mHy
Interwinding Capacitance 100KHz 0.1Vrms	160.0 max	150.0 max	150.0 max	100.0 max	100.0 max	pF
Leakage Inductance 100KHz 0.1Vrms	15.0 max	16.0 max	20.0 max	15.0 max	15.0 max	uHy
Schematic	A*	D	B	E	C	—

\* UL 60950 Construction E211939

# MT-49050 SERIES

## ADSL Line Transformers

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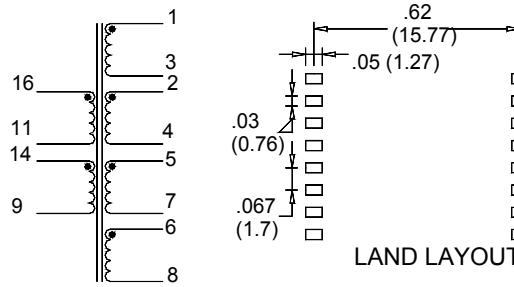
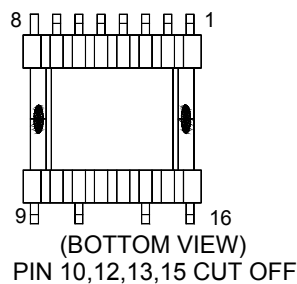
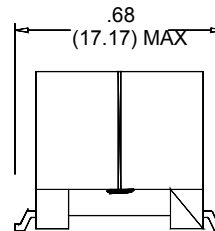
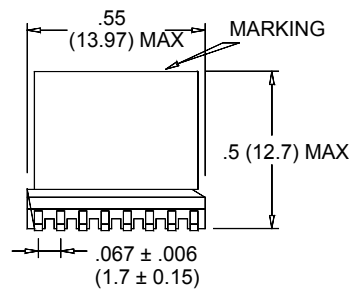
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- Matched to Globespan Virata CPE Café ADSL chipset-DMT Annex A/C
- Designed to meet IEC60950 supplementary insulation requirements at 250V working voltage
- Operating Temperature Range: -40°C ~ +85°C



UNIT: Inch (mm)

Specifications	MT-49051	Unit
Reflects on PRI =	100	Ohms
Reflects on TX =	5.6	Ohms
Reflects on RX =	300	Ohms
D.C. Resistance, 20°C, PRI, max TX, max RX, max	5.0 nom. 1.0 nom. 2.0 nom.	Ohms
Insertion Loss at 30KHz to 150KHz (TX) at 30KHz to 1.1MHz (RX)	0.5 nom	dB
Dielectric Test PRI-TX & RX (0.5mA)	1875	VAC
Turns Ratio (TX:RX:PRI), ±2%	1:2:4	---
Longitudinal Balance, 30KHz to 1104KHz (RX)	40 min.	dB
Total Harmonic Dist., 100KHz, 15Vp-p	-90 max.	dB
Inductance, 100KHz, 0.1Vrms	660-742	uHy
Interwinding Capacitance, 100KHz, 0.1Vrms	25 nom. (Pri:Tx) 25 nom. (Pri:Rx) 25 nom. (TX:Rx)	pF
Leakage Inductance, 100KHz, 0.1Vrms	25 nom. / 32 max. (PRI) 7 nom. (Rx) 3 nom. (Tx)	uHy

Specifications subject to change. Custom versions of any Minntronix Products are available upon request.

MT-49050 SERIES

# MT-49100 SERIES

## VDSL Pulse Transformers

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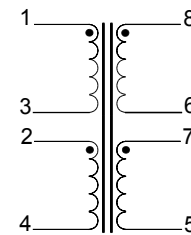
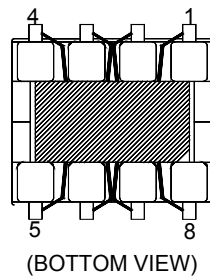
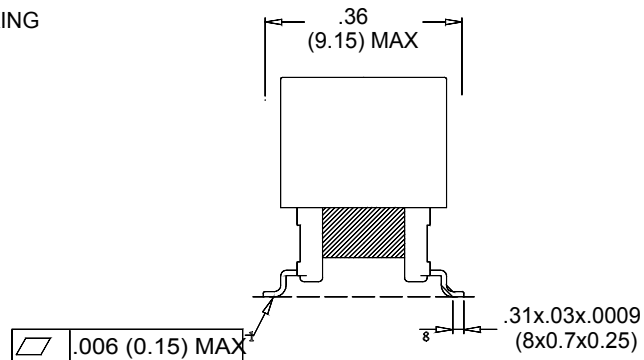
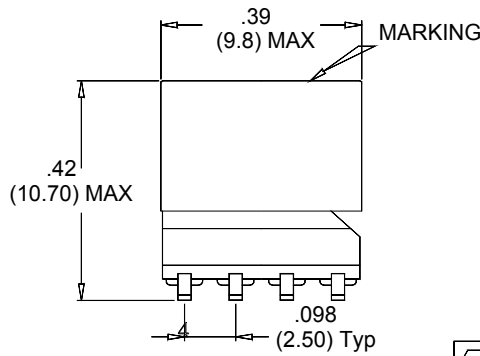
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MT-49100 SERIES



- Matched to Conexant Co & CPE for POTS Population chipset– Accelity, Accelity, I , II
- Designed to meet IEC60950 supplementary insulation requirements at 250V working voltage
- Operating Temperature Range: -40°C ~ +85°C

### Mechanical Dimensions:



UNIT: Inch (mm)

Specifications	MT-49101	Unit
Reflects on PRI =	100	Ohms
Reflects on SEC =	26	Ohms
D.C. Resistance, 20°C, PRI, max	1.0	Ohms
SEC, max	0.5	Ohms
Insertion Loss at 1Mhz reference	.35 max	dB
Dielectric Test PRI-SEC	1500	VAC
Direct Current PRI, maximum	20	mA DC
Turns Ratio (PRI : SEC) ±2%	2 : 1	---
Longitudinal Balance, 100KHz to 12MHz	45 min.	dB
Total Harmonic Dist., 100KHz, 3Vrms	-80 max	dB
Inductance, 10KHz, 0.1Vrms	800±10%	uHy
Interwinding Capacitance, 100KHz, 0.1Vrms	100 max.	pF
Leakage Inductance, 100KHz, 0.1Vrms	1.5 max.	uHy

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# MT-49150 SERIES

## VDSL Filters Splitter Inductors

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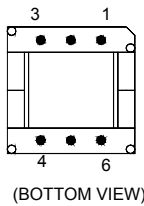
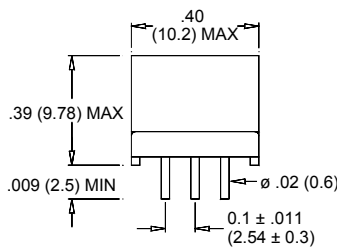
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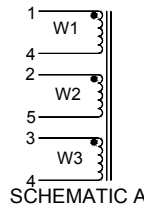
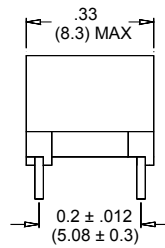


- Whether for VDSL over POTS applications
- Good attenuation characteristics
- Operating Temperature Range: -30°C ~ +70°C

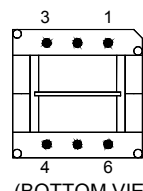
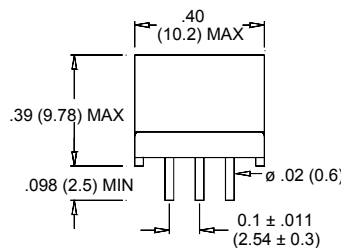


(BOTTOM VIEW)

UNIT: Inch (mm)

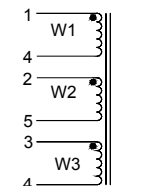
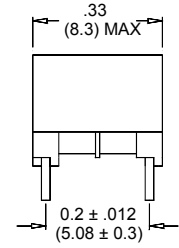


SCHEMATIC A



(BOTTOM VIEW)

UNIT: Inch (mm)



SCHEMATIC C

Specifications	MT-49151	MT-49152	MT-49153	MT-49154	Unit
Reflects on	135	135	135	135	ohms
Inductance, 10KHz, 50mVrms (W1)	480±4%	580±4%	105±4%	504±4%	uHy
(W2)	86.7±4%	126±4%	103±4%	95±4%	
(W3)	86.7±4%	126±4%		92±4%	
D.C. Resistance, 20°C, W1, max	2.3	3.0	1.6	2.6	ohms
W2+W3, max	2.8	3.3		2.2	
W1+W2, max					
Dielectric Test, W2—W3, 50Hz, 1 sec	500	500	500	500	VAC
Direct Current PRI, maximum	80	80	80	80	mA DC
Turns Ratio (PRI : SEC), ±2%	2.38:1:1	2.17:1:1	1.025:1	1.03:2.29:1	---
Total Harmonic Dist. 50KHz, 3Vrms	-80 max.	-80 max.	-80 max.	-80 max.	dB
Schematic	A	A	B	C	---

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MT-49150 SERIES

# MT-62100 SERIES

Very Low Profile-Condensed Board Space  
Coupling and Hybrid Transformers

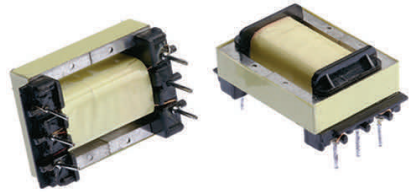
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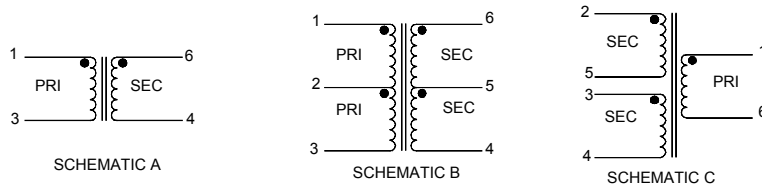
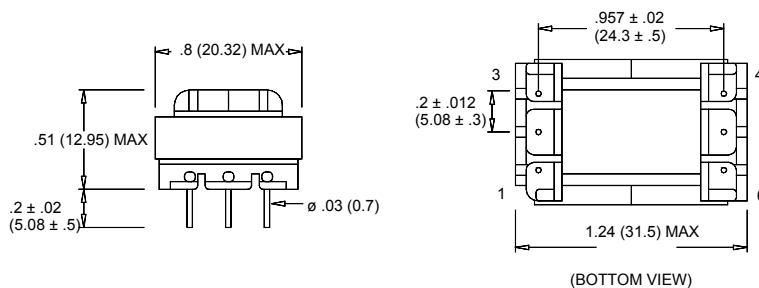
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MT-62100 SERIES



- General purpose
- Audio & modem transformers
- Low distortion
- Economical

### Mechanical Dimensions



UNIT: Inch (mm)

Specifications	MT-62107	MT-62108	MT-62109	MT-62110	MT-62111	MT-62112	MT-62113	UNIT
Suitable for fax/modem speeds up to:	V.22bis	V.22bis	V.22bis	V.22bis	V.32bis	V.32bis	V.34	
Reflects 600 ohms at PRI with R Load	600	600	600	600 / 600	464	464	365	ohms
DC Resistance 20°C±10% PRI	75	75	75	75	80±15%	80±15%	150	ohms
DC Resistance 20°C±10% SEC	100	100	100	170	100±15%	100±15%	140	ohms
Frequency Response 300 to 3500Hz	±2.5	±2.5	±2.5	±2.5	±1.5	±2.0	±2.0	dB
Insertion Loss at 1.8KHz 20°C	1.7 ref	1.7 ref	1.7 ref	—	—	—	—	dB
Insertion Loss at 1.0KHz 20°C	—	—	—	1.6 ref	2.0 max	2.0 max	3.0 max	
Return Loss vs. 600 ohms at 1.8KHz	14 min	14 min	14 min	—	—	—	—	
Return Loss vs. 600 ohms at 1KHz	—	—	—	14 min	—	—	—	dB
Return Loss vs. 600 ohms at 300Hz	—	—	—	—	8.0 typ.	7.7 typ.	7.0 typ.	
Dielectric Test PRI-SEC	1500	1500	1500	1500	1250	1250	1250	VAC
Direct Current PRI, max	90	90	90	50	90	80	80	mA DC
Turns Ratio (PRI:SEC) ±2%	1:1.04	1:1.04	1:1.04	1:1.41	0.958:1	0.958:1	1:1	
Longitudinal Balance 60 to 1000Hz	60	60	60	60	60	60	60	dB
Longitudinal Balance 1000 to 4000Hz	40	40	40	40	40	40	40	dB
Total Harmonic Dist 600Hz -10dBm	.5%	.5%	.5%	.5%	-70 max	-76 max	-82 max	dB
Schematic	A	B	C	C	A	A	A	

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# MT-83000 SERIES

Isolation Transformers for Ethernet Applications

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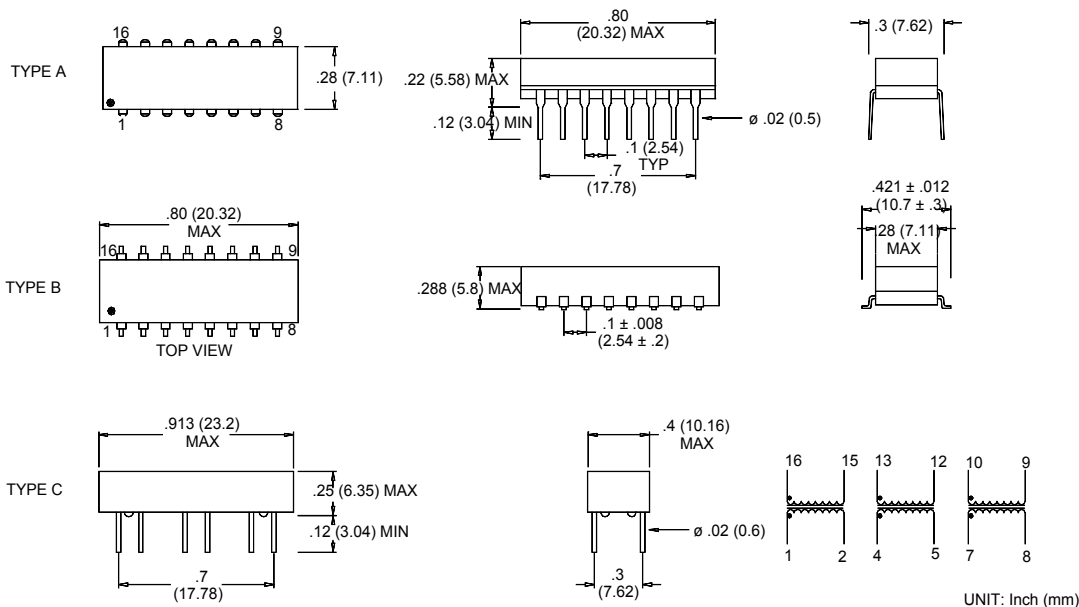


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- IEEE 802.3 (10Base2, 10Base5) & ECMA compatible
- Low profile packages 16 pin pattern
- Low leakage inductance & winding capacitance for fast rise time
- More economical than discrete transformers, three transformers per package
- High isolation voltages to comply with international safety requirements for LANs (ECMA 97)
- Auto-insertable
- Add 'A, B or C' for Type (83001A)

## Mechanical Dimensions



## Electrical Specifications at 25°C

Part Number	Turns Ratio (±5%)	Sine Wave Inductance (uHy±25%)	Pulse Inductance (uHy min)	Primary ET Constant (V·us min)	Rise Time (ns max)	Pri / Sec Cw/w (pF max)	Pri-Sec Leakage Inductance (uHy max)	DCR 20°C (Ω max)	Hi-Pot (Vrms)	Type
MT-83001	1:1	35	28	1.8	3.0	8	0.20	0.20	500	A/B
MT-83002	1:1	50	40	2.1	3.0	9	0.20	0.20	500	A/B
MT-83003	1:1	75	60	2.1	3.0	10	0.20	0.20	500	A/B
MT-83004	1:1	100	80	2.1	3.0	10	0.20	0.30	500	A/B
MT-83005	1:1	150	120	2.1	3.0	12	0.20	0.30	500	A/B
MT-83006	1:1	35	28	1.8	3.5	8	0.25	0.30	2000	C
MT-83007	1:1	50	40	2.2	3.5	9	0.25	0.30	2000	C
MT-83008	1:1	75	60	2.4	3.5	10	0.25	0.30	2000	C
MT-83009	1:1	100	80	2.1	3.5	10	0.25	0.40	2000	C
MT-83010	1:1	150	120	3.0	3.5	14	0.25	0.50	2000	C
MT-83011	1:1	75	60	2.1	3.0	10	0.20	0.20	2000	A/B
MT-83012	1:1	100	80	2.1	3.0	10	0.20	0.30	2000	A/B

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MT-83000 SERIES

# MT-83100 SERIES

## 16 Pin DIP Transformers

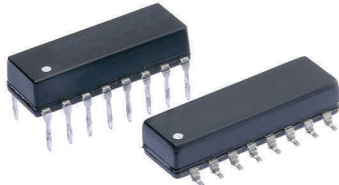
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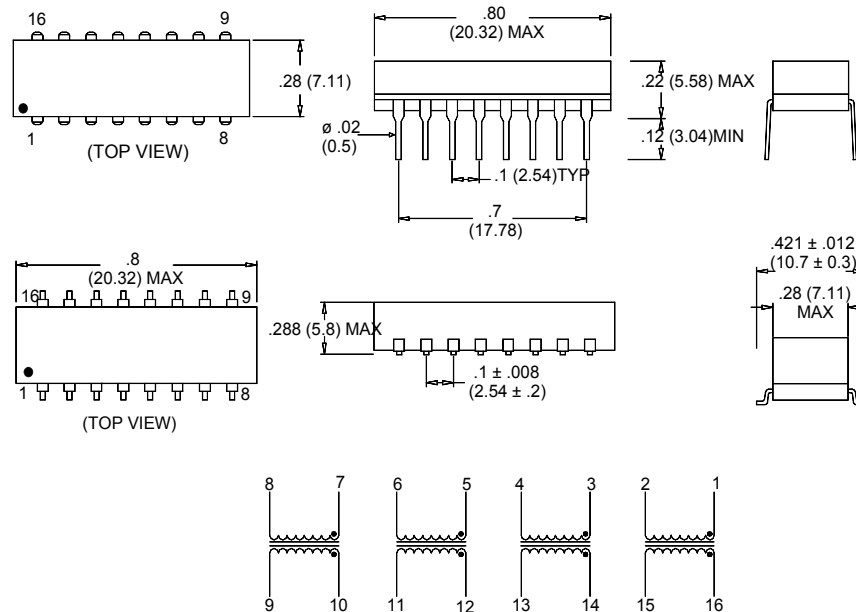
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MT-83100 SERIES



- Low Leakage Inductance, Winding Capacitance & DC Resistance.
- More economical than discrete transformers, four transformers per package.
- Rating Range per Package:  
 Average Power Rating (40°C rise).....250mw  
 Dissipation Rating.....75mw  
 Peak Pulse Voltage.....50 volts  
 Dielectric Strength.....200Vrms  
 Insulation Resistance.....10,000Mohms
- SMD or thru-hole package optional
- Add an 'S' for SMT (MT-83101S)

### Mechanical Dimensions



### Electrical Specifications at 25°C

UNIT: Inch (mm)

Part Number	Turns Ratio (±5%)	Primary Sine Wave OCL (uHy±20%)	Primary MT-Constant (V·us min)	Pri / Sec Cw/w (pF max)	Pri-Sec Leakage Inductance (uHy max)	Primary DCR 20°C (ohms max)	Secondary DCR 20°C (ohms max)
MT-83101	1:1	20	1.5	6	0.35	0.30	0.30
MT-83102	1:1	35	2.5	9	0.40	0.35	0.35
MT-83103	1:1	70	2.1	10	0.35	0.30	0.30
MT-83104	1:1	140	3.0	15	0.45	0.45	0.45
MT-83105	1:1	350	4.3	25	0.60	0.70	0.70
MT-83106	2:1	14	1.5	5	0.60	0.30	0.15
MT-83107	2:1	35	2.5	6	0.70	0.35	0.18
MT-83108	2:1	70	2.1	7	0.60	0.30	0.15
MT-83109	2:1	140	3.0	10	0.80	0.45	0.23
MT-83110	2:1	350	4.3	13	1.00	0.70	0.35

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