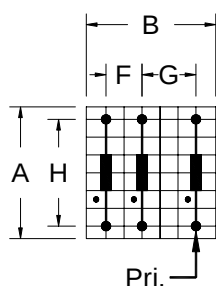




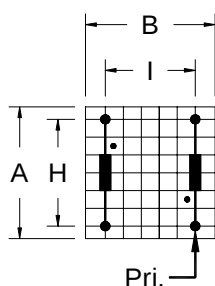
## TL401 Series

- Rated voltage : up to 1000V
- Operating Frequency: 60 kHz max.
- Ignition current up to 3A
- Voltage time integral: 1500V $\mu$ s max.
- Dielectric strength : 4000V<sub>rms</sub>
- Insulation Class : Class B (130°C)
- Vacuum potting
- Ambient temperature (ta): -25°C ~+70°C
- Storage temperature : -40°C ~ +85°C

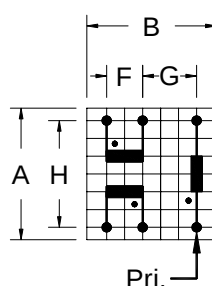
## Schematics Platforms (Type 1)



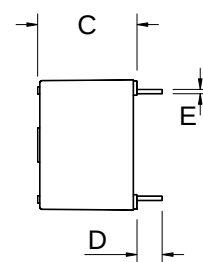
Electrical Schematic A



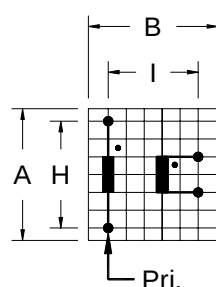
Electrical Schematic B



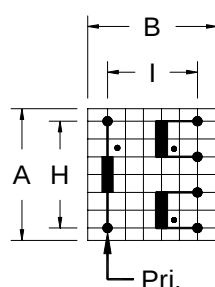
Electrical Schematic C



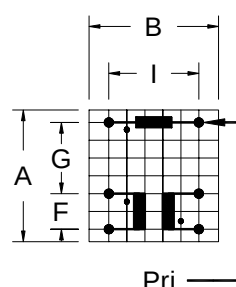
Side View



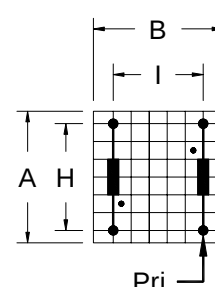
Electrical Schematic D



Electrical Schematic E



Electrical Schematic F



Electrical Schematic G

## Top View

| Product Series | Dimension (mm) |      |      |      |        |       |       |       |       | Electrical Schematic | Weight (g) |
|----------------|----------------|------|------|------|--------|-------|-------|-------|-------|----------------------|------------|
|                | A              | B    | C    | D    | E      | F     | G     | H     | I     |                      |            |
| TL401-13       | 18.6           | 18.3 | 14.0 | 4.0  | SQ.0.5 | 5.0   | 7.5   | 15.0  | 12.5  | A,B,C                | 9.5        |
| TL401-11       | 18.6           | 18.3 | 14.0 | 4.0  | SQ.0.5 | 5.0   | 10.0  | 15.0  | 12.5  | D,E,F,G              | 9.0        |
| Tolerance      | max.           | max. | max. | min. | ± 0.1  | ± 0.2 | ± 0.3 | ± 0.5 | ± 0.5 | --                   | approx.    |

Note: Unused pins are omitted for standard parts.

## Part Number Designation:

TL401-RW-XYZZ

Where R = Core size

(1) EF16 (2) EF20 (3) EF25 (4) EF30

W = No. of bobbin section

(1) Single (2) Double (3) Three

X = No. of winding

Y = Electrical schematic

ZZ = Winding Part no.

| Part Number   | Turns Ratio<br>±2% | Ref. Primary Inductance<br>mH | Ref. Primary Constant, ET<br>V <sub>μs</sub> | Max. Leakage Inductance<br>μH | Ref. Interwinding Capacitance<br>pF | Max. DC Resistance Primary<br>Ω | Max. DC Resistance Secondary 1<br>Ω | Max. DC Resistance Secondary 2<br>Ω | Dielectric Strength<br>Vrms | Electrical Schematic |
|---------------|--------------------|-------------------------------|----------------------------------------------|-------------------------------|-------------------------------------|---------------------------------|-------------------------------------|-------------------------------------|-----------------------------|----------------------|
| TL401-13-3A01 | 1 : 1 : 1          | 2.5                           | 250                                          | 90                            | 10                                  | 0.6                             | 0.6                                 | 0.6                                 | 4000                        | A                    |
| TL401-13-3A02 | 1 : 1 : 1          | 1.5                           | 200                                          | 55                            | 8                                   | 0.4                             | 0.4                                 | 0.4                                 | 4000                        | A                    |
| TL401-13-3A03 | 3 : 1 : 1          | 16.5                          | 400                                          | 50                            | 10                                  | 2.3                             | 0.5                                 | 0.5                                 | 4000                        | A                    |
| TL401-13-3A04 | 1 : 1 : 1          | 2.5                           | 250                                          | 85                            | 7                                   | 0.8                             | 0.8                                 | 0.8                                 | 4000                        | A                    |
| TL401-13-3A05 | 3 : 1 : 1          | 15.0                          | 400                                          | 70                            | 9                                   | 2.8                             | 0.9                                 | 0.9                                 | 4000                        | A                    |
| TL401-13-3A06 | 2 : 1 : 1          | 17.0                          | 410                                          | 140                           | 9                                   | 3.1                             | 1.5                                 | 1.5                                 | 4000                        | A                    |
| TL401-13-3A07 | 1 : 1 : 1          | 1.1                           | 170                                          | 45                            | 6                                   | 0.55                            | 0.55                                | 0.55                                | 4000                        | A                    |
| TL401-13-3A08 | 1 : 1 : 1          | 0.5                           | 120                                          | 20                            | 7                                   | 0.3                             | 0.3                                 | 0.3                                 | 4000                        | A                    |
| TL401-13-3A09 | 1 : 1 : 1          | 1.60                          | 130                                          | 60                            | 5                                   | 0.5                             | 0.5                                 | 0.5                                 | 4000                        | A                    |
| TL401-13-3A10 | 2 : 1 : 1          | 18.2                          | 440                                          | 135                           | 8                                   | 4.6                             | 0.86                                | 0.86                                | 4000                        | A                    |

Note: (1) Primary Inductance measured at 10 kHz, 0.05V. (Sec coils open)

(2) Leakage Inductance measured at the secondary side, short circuit at the primary side.

If there are several secondary coils only one side at the time is connected.

(3) High potential tested for all isolation windings.

| Part Number   | Turns Ratio<br>±2% | Ref. Primary Inductance<br>mH | Ref. Primary Constant, ET<br>Vμs | Max. Leakage Inductance<br>μH | Ref. Interwinding Capacitance<br>pF | Max. DC Resistance Primary<br>Ω | Max. DC Resistance Secondary 1<br>Ω | Max. DC Resistance Secondary 2<br>Ω | Dielectric Strength<br>Vrms | Electrical Schematic |
|---------------|--------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------------|---------------------------------|-------------------------------------|-------------------------------------|-----------------------------|----------------------|
| TL401-13-2B01 | 1 : 1              | 2.2                           | 250                              | 40                            | 8                                   | 0.8                             | 0.8                                 | --                                  | 4000                        | B                    |
| TL401-13-2B02 | 2 : 1              | 7                             | 430                              | 35                            | 7                                   | 2.1                             | 1.1                                 | --                                  | 4000                        | B                    |
| TL401-13-2B03 | 2 : 1              | 17                            | 410                              | 80                            | 9                                   | 3.2                             | 1.6                                 | --                                  | 4000                        | B                    |
| TL401-13-2B04 | 3 : 1              | 12                            | 340                              | 30                            | 8                                   | 2                               | 0.8                                 | --                                  | 4000                        | B                    |
| TL401-13-2B05 | 1 : 1              | 8                             | 500                              | 150                           | 10                                  | 1.2                             | 1.2                                 | --                                  | 4000                        | B                    |
| TL401-13-2B06 | 1 : 1              | 2.5                           | 250                              | 40                            | 8                                   | 0.6                             | 0.6                                 | --                                  | 4000                        | B                    |
| TL401-13-2B07 | 1 : 1              | 8                             | 450                              | 100                           | 10                                  | 1.48                            | 1.48                                | --                                  | 4000                        | B                    |
| TL401-13-2B08 | 1 : 1              | 8                             | 460                              | 100                           | 10                                  | 1.8                             | 1.2                                 | --                                  | 4000                        | B                    |
| TL401-13-2B09 | 2 : 1              | 8                             | 300                              | 40                            | 10                                  | 1.5                             | 0.8                                 | --                                  | 4000                        | B                    |
| TL401-13-2B10 | 2 : 1              | 19                            | 440                              | 85                            | 8                                   | 5.5                             | 0.9                                 | --                                  | 4000                        | B                    |
| TL401-13-2B11 | 3 : 1              | 21                            | 450                              | 35                            | 8                                   | 5                               | 0.7                                 | --                                  | 4000                        | B                    |
| TL401-13-3C01 | 1 : 1 : 1          | 2.5                           | 250                              | 75                            | 7                                   | 0.75                            | 0.75                                | 0.75                                | 4000                        | C                    |
| TL401-13-3C02 | 1 : 1 : 1          | 3.45                          | 280                              | 72                            | 9                                   | 0.65                            | 0.65                                | 0.65                                | 4000                        | C                    |
| TL401-13-3C03 | 3 : 1 : 1          | 19                            | 450                              | 70                            | 8                                   | 5                               | 0.7                                 | 0.7                                 | 4000                        | C                    |
| TL401-11-2D01 | 1 : 1.3            | 0.20                          | 72                               | 1.2                           | 11                                  | 0.12                            | 0.18                                | --                                  | 5000                        | D                    |
| TL401-11-2D02 | 1 : 1              | 1.70                          | 200                              | 5                             | 25                                  | 0.32                            | 0.26                                | --                                  | 3750                        | D                    |
| TL401-11-2D03 | 1 : 1              | 1.40                          | 180                              | 3                             | 20                                  | 0.3                             | 0.32                                | --                                  | 4000                        | D                    |
| TL401-11-3E01 | 1 : 1.3 : 1.3      | 0.2                           | 72                               | 1.2                           | 12                                  | 0.2                             | 0.3                                 | 0.3                                 | 5000                        | E                    |
| TL401-11-3E02 | 1 : 1 : 1          | 2.50                          | 260                              | 5                             | 25                                  | 0.5                             | 0.65                                | 0.65                                | 3200                        | E                    |
| TL401-11-3F01 | 1 : 1 : 1          | 0.82                          | 150                              | 2                             | 22                                  | 0.25                            | 0.35                                | 0.45                                | 4200                        | F                    |
| TL401-11-3F02 | 1 : 1.3 : 1 : 1    | 1.88                          | 220                              | 4                             | 20                                  | 0.52                            | 0.45                                | 0.45                                | 4000                        | F                    |
| TL401-11-3F03 | 1.4 : 1 : 1        | 2.10                          | 230                              | 4                             | 20                                  | 0.55                            | 0.4                                 | 0.4                                 | 4000                        | F                    |
| TL401-11-3F04 | 1 : 1.2 : 1.2      | 1.20                          | 180                              | 3                             | 22                                  | 0.43                            | 0.4                                 | 0.6                                 | 4000                        | F                    |
| TL401-11-3F05 | 1 : 1 : 1          | 1.8                           | 220                              | 2.5                           | 23                                  | 0.415                           | 0.35                                | 0.48                                | 3100                        | F                    |
| TL401-11-3F06 | 1 : 1 : 1          | 0.32                          | 90                               | 0.8                           | 20                                  | 0.07                            | 0.12                                | 0.16                                | 4400                        | F                    |
| TL401-11-2G01 | 1 : 1              | 2.5                           | 250                              | 3                             | 80                                  | 0.62                            | 0.75                                | --                                  | 3200                        | G                    |
| TL401-11-2G02 | 1 : 1              | 2.5                           | 260                              | 3                             | 60                                  | 0.7                             | 0.7                                 | --                                  | 3200                        | G                    |
| TL401-11-2G03 | 2 : 1              | 2.5                           | 260                              | 4                             | 50                                  | 1.0                             | 0.3                                 | --                                  | 3200                        | G                    |
| TL401-11-2G04 | 3 : 1              | 5                             | 360                              | 5                             | 40                                  | 1.2                             | 0.3                                 | --                                  | 3200                        | G                    |

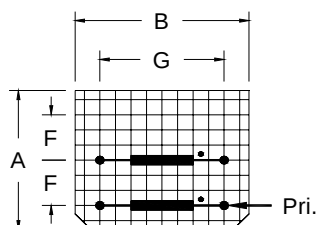
Note: (1) Primary Inductance measured at 10 kHz, 0.05V. (Sec coils open)

(2) Leakage Inductance measured at the secondary side, short circuit at the primary side.

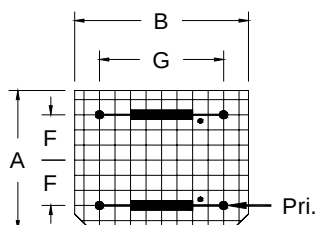
If there are several secondary coils only one side at the time is connected.

(3) High potential tested for all isolation windings.

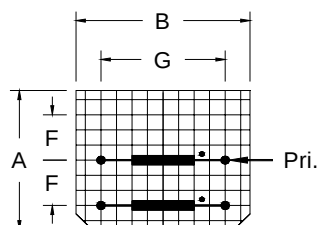
## Schematics Platforms (Type 2)



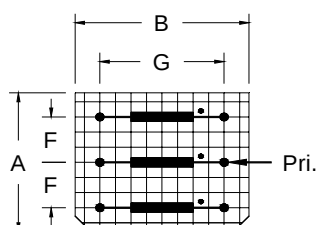
Electrical Schematic A



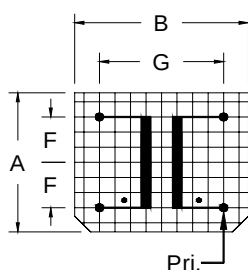
Electrical Schematic B



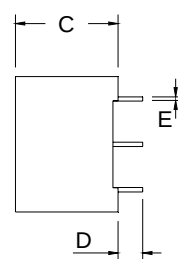
Electrical Schematic C



Electrical Schematic D

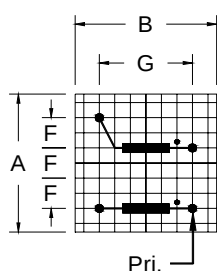


Electrical Schematic E

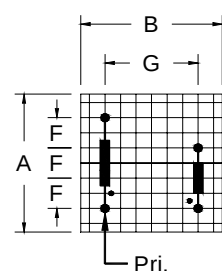


Side View

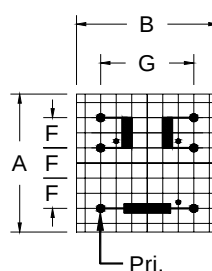
Top View



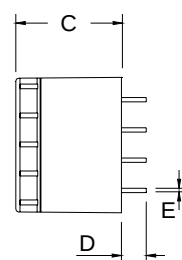
Electrical Schematic F



Electrical Schematic G



Electrical Schematic H



Side View

Top View

| Product Series | Dimension (mm) |      |      |      |         |       |       | Electrical Schematic | Weight (g) |
|----------------|----------------|------|------|------|---------|-------|-------|----------------------|------------|
|                | A              | B    | C    | D    | E       | F     | G     |                      |            |
| TL401-23       | 23.0           | 28.0 | 17.0 | 4.0  | SQ.0.64 | 7.5   | 20.0  | A,B,C,D,E            | 20         |
| TL401-21       | 22.8           | 22.8 | 17.5 | 4.0  | SQ.0.64 | 5.0   | 15.0  | F,G,H                | 17         |
| Tolerance      | max.           | max. | max. | min. | ± 0.1   | ± 0.3 | ± 0.5 | --                   | approx.    |

Note: Unused pins are omitted for standard parts.

| Part Number   | Turns Ratio<br>±2% | Ref. Primary Inductance<br>mH | Ref. Primary Constant, ET<br>Vμs | Max. Leakage Inductance<br>μH | Ref. Interwinding Capacitance<br>pF | Max. DC Resistance Primary<br>Ω | Max. DC Resistance Secondary 1<br>Ω | Max. DC Resistance Secondary 2<br>Ω | Dielectric Strength<br>Vrms | Electrical Schematic |
|---------------|--------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------------|---------------------------------|-------------------------------------|-------------------------------------|-----------------------------|----------------------|
| TL401-23-2A01 | 1 : 1              | 7.70                          | 650                              | 85                            | 7                                   | 1.15                            | 1.15                                | --                                  | 4000                        | A                    |
| TL401-23-2A02 | 1 : 1              | 2.10                          | 300                              | 30                            | 6                                   | 0.55                            | 0.55                                | --                                  | 4000                        | A                    |
| TL401-23-2B01 | 1 : 1              | 2.90                          | 370                              | 80                            | 5                                   | 0.6                             | 0.6                                 | --                                  | 4000                        | B                    |
| TL401-23-2C01 | 1 : 1              | 5.0                           | 500                              | 85                            | 6                                   | 1.2                             | 1.2                                 | --                                  | 4000                        | C                    |
| TL401-23-2C02 | 1 : 1              | 3.0                           | 380                              | 55                            | 8                                   | 0.6                             | 0.6                                 | --                                  | 4000                        | C                    |
| TL401-23-2C03 | 1 : 1              | 28.0                          | 1100                             | 56                            | 30                                  | 1.9                             | 2.2                                 | --                                  | 2500                        | C                    |
| TL401-23-3D01 | 3 : 1 : 1          | 121                           | 1550                             | 270                           | 10                                  | 17                              | 3.5                                 | 3.5                                 | 4000                        | D                    |
| TL401-23-3D02 | 1 : 1 : 1          | 8                             | 600                              | 230                           | 8                                   | 1.5                             | 1.5                                 | 1.5                                 | 4000                        | D                    |
| TL401-23-3D03 | 1 : 1 : 1          | 2.0                           | 300                              | 80                            | 7                                   | 0.55                            | 0.55                                | 0.55                                | 4000                        | D                    |
| TL401-23-3D04 | 3 : 1 : 1          | 15.0                          | 520                              | 70                            | 8                                   | 2                               | 0.55                                | 0.55                                | 4000                        | D                    |
| TL401-23-3D05 | 1 : 1 : 1          | 3                             | 380                              | 90                            | 9                                   | 0.6                             | 0.6                                 | 0.6                                 | 4000                        | D                    |
| TL401-23-2E01 | 1 : 1              | 3                             | 380                              | 5                             | 80                                  | 0.9                             | 0.9                                 | --                                  | 6000                        | E                    |
| TL401-21-2F01 | 1 : 1              | 3.8                           | 420                              | 7                             | 35                                  | 0.45                            | 0.5                                 | --                                  | 4000                        | F                    |
| TL401-21-2F02 | 2 : 1              | 5.2                           | 500                              | 9                             | 26                                  | 0.5                             | 0.25                                | --                                  | 4000                        | F                    |
| TL401-21-2F03 | 3 : 1              | 4.7                           | 480                              | 9                             | 25                                  | 0.45                            | 0.15                                | --                                  | 4000                        | F                    |
| TL401-21-2F04 | 1 : 1              | 0.31                          | 130                              | 0.9                           | 20                                  | 0.1                             | 0.1                                 | --                                  | 4000                        | F                    |
| TL401-21-2G01 | 3 : 1              | 1.68                          | 280                              | 6                             | 22                                  | 0.155                           | 0.066                               | --                                  | 3200                        | G                    |
| TL401-21-3H01 | 1 : 1 : 1          | 3.5                           | 420                              | 6                             | 39                                  | 0.8                             | 0.8                                 | 0.8                                 | 4000                        | H                    |
| TL401-21-3H02 | 2 : 1 : 1          | 5.1                           | 500                              | 8                             | 31                                  | 0.55                            | 0.2                                 | 0.25                                | 4000                        | H                    |
| TL401-21-3H03 | 1 : 1 : 1          | 0.36                          | 130                              | 0.6                           | 23                                  | 0.09                            | 0.1                                 | 0.1                                 | 4000                        | H                    |

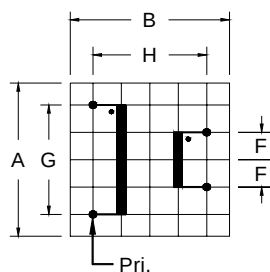
Note: (1) Primary Inductance measured at 10 kHz, 0.05V. (Sec coils open)

(2) Leakage Inductance measured at the secondary side, short circuit at the primary side.

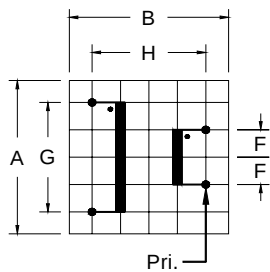
If there are several secondary coils only one side at the time is connected.

(3) High potential tested for all isolation windings.

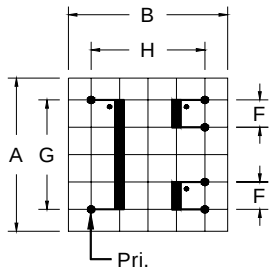
## Schematics Platforms (Type 3)(Part I)



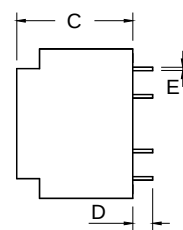
Electrical Schematic A



Electrical Schematic B



Electrical Schematic C



Top View

Side View

| Product Series | Dimension (mm) |      |      |      |         |       |       |       | Weight (g) |
|----------------|----------------|------|------|------|---------|-------|-------|-------|------------|
|                | A              | B    | C    | D    | E       | F     | G     | H     |            |
| TL401-31(I)    | 28.0           | 28.0 | 21.0 | 4.0  | SQ.0.64 | 5.0   | 20.0  | 20.0  | 40         |
| Tolerance      | max.           | max. | max. | min. | ± 0.1   | ± 0.2 | ± 0.3 | ± 0.5 | approx.    |

Note: Unused pins are omitted for standard parts.

| Part Number   | Turns Ratio<br>±2% | Ref. Primary Inductance<br>mH | Ref. Primary Constant, ET<br>Vμs | Ref. Leakage Inductance<br>μH | Ref. Interwinding Capacitance<br>pF | Max. DC Resistance Primary<br>Ω | Max. DC Resistance Secondary 1<br>Ω | Max. DC Resistance Secondary 2<br>Ω | Dielectric Strength<br>Vrms | Electrical Schematic |
|---------------|--------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------------|---------------------------------|-------------------------------------|-------------------------------------|-----------------------------|----------------------|
| TL401-31-2A01 | 1 : 1              | 2.2                           | 500                              | 5                             | 38                                  | 0.4                             | 0.4                                 | --                                  | 4000                        | A                    |
| TL401-31-2A02 | 1 : 1              | 12.3                          | 1100                             | 12                            | 50                                  | 0.7                             | 0.8                                 | --                                  | 4000                        | A                    |
| TL401-31-2A03 | 2 : 1              | 7.0                           | 2500                             | 90                            | 45                                  | 1.0                             | 0.5                                 | --                                  | 4000                        | A                    |
| TL401-31-2A04 | 2 : 1              | 80.0                          | 7600                             | 950                           | 65                                  | 6.0                             | 1.9                                 | --                                  | 4000                        | A                    |
| TL401-31-2A05 | 4 : 1              | 140                           | 8800                             | 1100                          | 45                                  | 12.3                            | 1.3                                 | --                                  | 4000                        | A                    |
| TL401-31-2A06 | 1.5 : 1            | 95                            | 10500                            | 1600                          | 53                                  | 13.5                            | 7.1                                 | --                                  | 4000                        | A                    |
| TL401-31-2B01 | 3 : 1              | 9.7                           | 1000                             | 12                            | 31                                  | 0.6                             | 0.2                                 | --                                  | 4000                        | B                    |
| TL401-31-3C01 | 1 : 1 : 1          | 2.45                          | 500                              | 2.5                           | 35                                  | 0.4                             | 0.4                                 | 0.4                                 | 4000                        | C                    |
| TL401-31-3C02 | 2 : 1 : 1          | 12.6                          | 1100                             | 14.5                          | 40                                  | 0.9                             | 0.4                                 | 0.4                                 | 4000                        | C                    |
| TL401-31-3C03 | 1 : 1 : 1          | 12.8                          | 1100                             | 14.5                          | 50                                  | 0.85                            | 0.85                                | 0.85                                | 4000                        | C                    |
| TL401-31-3C04 | 3 : 1 : 1          | 5.1                           | 1120                             | 16.5                          | 32                                  | 0.6                             | 0.2                                 | 0.2                                 | 4000                        | C                    |

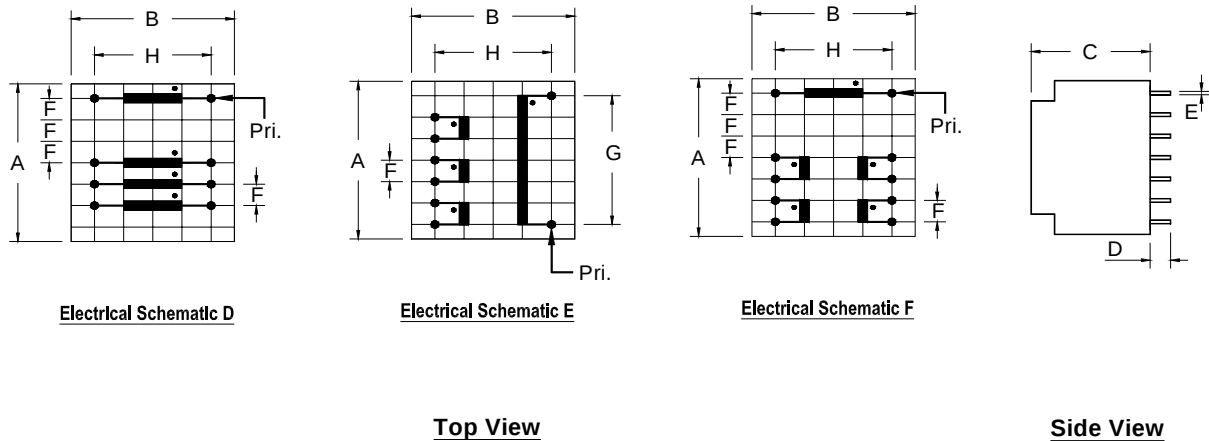
Note: (1) Primary Inductance measured at 10 kHz, 0.05V. (Sec coils open)

(2) Leakage Inductance measured at the secondary side, short circuit at the primary side.

If there are several secondary coils only one side at the time is connected.

(3) High potential tested for all isolation windings.

### Schematics Platforms (Type 3)(Part II)



| Product Series | Dimension (mm) |      |      |      |         |       |       |       | Weight (g) |
|----------------|----------------|------|------|------|---------|-------|-------|-------|------------|
|                | A              | B    | C    | D    | E       | F     | G     | H     |            |
| TL401-31(II)   | 28.0           | 28.0 | 21.0 | 4.0  | SQ.0.64 | 3.81  | 22.86 | 20.0  | 40         |
| Tolerance      | max.           | max. | max. | min. | ± 0.1   | ± 0.2 | ± 0.3 | ± 0.5 | approx.    |

Note: Unused pins are omitted for standard parts.

| Part Number   | Turns Ratio<br>±2%        | Ref. Primary Inductance<br>mH | Ref. Primary Constant, ET<br>Vμs | Ref. Leakage Inductance<br>μH | Ref. Interwinding Capacitance<br>pF | Max. DC Resistance Primary<br>Ω | Max. DC Resistance Secondary 1 & 2<br>Ω | Max. DC Resistance Secondary 3 & 4<br>Ω | Electrical Schematic |
|---------------|---------------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------------------------------------|----------------------|
| TL401-31-4D01 | 1 : 1 : 1 : 1             | 3.6                           | 720                              | 2.8                           | 29                                  | 0.20                            | 1.5                                     | 1.5                                     | D                    |
| TL401-31-4D02 | 1 : 1.2 : 1.2 : 1.2       | 3.6                           | 720                              | 2.5                           | 31                                  | 0.22                            | 1.8                                     | 1.8                                     | D                    |
| TL401-31-4D03 | 2 : 1 : 1 : 1             | 14.4                          | 1440                             | 18.5                          | 30                                  | 0.45                            | 1.6                                     | 1.6                                     | D                    |
| TL401-31-4D04 | 3 : 1 : 1 : 1             | 19.4                          | 1672                             | 18.9                          | 24                                  | 0.52                            | 1.3                                     | 1.3                                     | D                    |
| TL401-31-4E01 | 2 : 1 : 1 : 1             | 14.4                          | 1440                             | 11.0                          | 33                                  | 0.45                            | 1.7                                     | 1.7                                     | E                    |
| TL401-31-4E02 | 3 : 1 : 1 : 1             | 19.4                          | 1672                             | 20.0                          | 22                                  | 0.52                            | 1.3                                     | 1.3                                     | E                    |
| TL401-31-5F01 | 1 : 1 : 1 : 1 : 1         | 3.6                           | 720                              | 1.9                           | 65                                  | 0.25                            | 1.4                                     | 1.7                                     | F                    |
| TL401-31-5F02 | 1 : 1.2 : 1.2 : 1.2 : 1.2 | 3.6                           | 720                              | 1.8                           | 63                                  | 0.25                            | 1.7                                     | 2.0                                     | F                    |
| TL401-31-5F03 | 2 : 1 : 1 : 1 : 1         | 14.4                          | 1440                             | 9.5                           | 60                                  | 0.5                             | 1.4                                     | 1.8                                     | F                    |
| TL401-31-5F04 | 3 : 1 : 1 : 1 : 1         | 19.4                          | 1672                             | 15.0                          | 46                                  | 0.57                            | 1.1                                     | 1.5                                     | F                    |

Note: (1) Primary Inductance measured at 10 kHz, 0.05V. (Sec coils open)

(2) Leakage Inductance measured at the secondary side, short circuit at the primary side.

If there are several secondary coils only one side at the time is connected.

(3) Dielectric strength tested for all isolation windings 4kVrms.