

# T1/CEPT/ISDN-PRI TRANSFORMERS

## Dual Surface Mount, 1500 Vrms, Extended and Standard Temperature Range



- Dual SMT package contains both transmit and receive transformers
- Models matched to leading transceiver ICs
- Isolation voltage: 1500 Vrms
- UL 1459 and UL 1950 recognized
- EN 60950 safety agency approval per BAPT
- Lead-Free versions available upon request

### Electrical Specifications @ 25°C

| Part Number   | Turns Ratio <sup>B</sup><br>(Pri:Sec ± 2%) | OC <sub>L</sub> @ 25°C<br>(mH MIN) | L <sub>L</sub><br>(μH MAX) | C <sub>w/w</sub><br>(pF MAX) | DCR Pri<br>(Ω MAX) | DCR Sec<br>(Ω MAX) | Package/<br>Schematic | Primary<br>Pins |
|---|--|------------------------------------|----------------------------|------------------------------|--------------------|--------------------|-----------------------|-----------------|
| <b>EXTENDED TEMPERATURE RANGE MODELS<sup>1</sup> – OPERATING TEMPERATURE -40°C TO +85°C</b> |  |                                    |                            |                              |                    |                    |                       |                 |
| PE-68841  | 1CT:2CT & 1CT:2CT                          | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.00 & 1.00        | 1.70 & 1.70        | AN/2                  | 12-10, 4-6      |
| PE-68822  | 1CT:2CT & 1:1.36CT                         | 1.60 & 1.60                        | 1.00 & 0.80                | 60 & 55                      | 1.70 & 1.70        | 2.00 & 1.70        | AN/1                  | 12-10, 4-6      |
| PE-68825  | 1:1.15CT & 1CT:2CT                         | 1.60 & 1.60                        | 0.80 & 0.80                | 60 & 50                      | 1.00 & 1.00        | 1.20 & 2.00        | AN/4                  | 12-10, 4-6      |
| PE-68826 <sup>E</sup>   | 1:1/1.26 & 1:2CT                           | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 60                      | 1.00 & 1.00        | 1.10 & 1.70        | AN/5                  | 12-10, 4-6      |
| PE-68827  | 1:1CT & 2:1                                | 1.60 & 1.60                        | 1.30 & 1.30                | 55 & 40                      | 1.10 & 1.10        | 1.10 & 0.70        | AN/6                  | 1-3, 4-6        |
| PE-68828  | 1CT:1CT & 1CT:1CT                          | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.00 & 1.00        | 1.00 & 1.00        | AN/2                  | 1-3, 4-6        |
| PE-68874  | 1CT:1.15CT & 1CT:1.15CT                    | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.20 & 1.20        | 1.40 & 1.40        | AN/2                  | 1-3, 4-6        |
| PE-68877  | 1CT:1CT & 1CT:2CT                          | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.00 & 1.00        | 1.00 & 1.80        | AN/2                  | 1-3, 4-6        |
| PE-68882  | 1CT:1.15CT & 1CT:1CT                       | 1.60 & 1.60                        | 0.80 & 0.80                | 60 & 60                      | 1.20 & 1.20        | 1.40 & 1.20        | AN/2                  | 12-10, 4-6      |
| PE-68884  | 1CT:1.36CT & 1CT:1.36CT                    | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.20 & 1.20        | 1.40 & 1.40        | AN/2                  | 1-3, 4-6        |
| PE-68887  | 1CT:1.41CT & 1CT:1.41CT                    | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.40 & 1.40        | 1.20 & 1.20        | AN/2                  | 12-10, 9-7      |
| PE-68881  | 1CT:2.3CT & 1CT:2CT                        | 1.20 & 1.20                        | 0.80 & 0.80                | 60 & 50                      | 1.20 & 1.20        | 2.10 & 2.10        | AN/2                  | 10-12, 4-6      |
| TX1277  | 1CT:1CT & 1CT:2CT                          | 1.20 & 1.20                        | 0.80 & 0.80                | 50 & 50                      | 1.00 & 1.00        | 1.00 & 1.80        | AN/2                  | 1-3, 4-6        |
| <b>STANDARD TEMPERATURE RANGE MODELS – OPERATING TEMPERATURE 0°C TO +70°C</b>               |  |                                    |                            |                              |                    |                    |                       |                 |
| T1131 <sup>1</sup>  | 1CT:1 & 1:1.36CT                           | 0.70 & 0.70                        | 0.70 & 0.70                | 20 & 20                      | 0.25 & 0.50        | 0.80 & 0.40        | AN/7                  | 1-3, 9-7        |
| PE-68861  | 1CT:2CT & 1CT:2CT                          | 1.20 & 1.20                        | 0.60 & 0.60                | 35 & 35                      | 0.70 & 0.70        | 1.20 & 1.20        | AN/2                  | 12-10, 4-6      |
| PE-68862  | 1CT:2CT & 1:1.36CT                         | 1.20 & 1.20                        | 0.60 & 0.80                | 35 & 37                      | 0.70 & 0.70        | 1.20 & 0.90        | AN/1                  | 12-10, 4-6      |
| PE-68863  | 1:2CT & 1:1.14CT                           | 1.20 & 1.20                        | 0.55 & 0.80                | 40 & 35                      | 0.70 & 0.70        | 1.20 & 0.90        | AN/5                  | 12-10, 4-6      |
| PE-68864 <sup>A</sup>   | 1CT:2CT & 1:1                              | 1.20 & 1.20                        | 0.30-0.55 & 0.80           | 30 & 30                      | 0.70 & 0.70        | 1.20 & 0.70        | AN/3                  | 1-3, 5-6        |
| PE-68865  | 1:1.15CT & 1CT:2CT                         | 1.50 & 1.20                        | 0.80 & 0.60                | 35 & 35                      | 0.70 & 0.70        | 0.90 & 1.20        | AN/4                  | 12-10, 4-6      |
| PE-68866 <sup>E</sup>   | 1:1/1.26 & 1:2CT                           | 1.50 & 1.20                        | 0.40 & 0.50                | 40 & 40                      | 0.70 & 0.70        | 0.90 & 1.20        | AN/5                  | 12-10, 4-6      |
| PE-68869  | 1CT:2CT & 1:1.08CT                         | 1.20 & 1.20                        | 0.60 & 0.60                | 40 & 30                      | 0.70 & 0.70        | 1.10 & 0.90        | AN/1                  | 12-10, 4-6      |
| PE-68836 <sup>E</sup>   | 1:1/1.26 & 1:1/1.26                        | 1.50 & 1.50                        | 0.40 & 0.40                | 45 & 45                      | 0.80 & 0.80        | 1.00 & 1.00        | AN/7                  | 12-10, 9-7      |

NOTE: For Quad Surface Mount packages, refer to data sheet T615. For Reinforced Insulation Models, refer to data sheet T617. For Octal Surface Mount package models, refer to data sheet T622. (See Pages 6 and 7 for Table Notes)

### Mechanical

### Schematics

**AN**

PE-XXXXX  
DATE CODE

**SUGGESTED PAD LAYOUT**






Weight ..... 4.0 grams  
Tape & Reel ..... .250/reel  
Tube ..... .30/tube

**Dimensions:** Inches  
mm  
Unless otherwise specified,  
all tolerances are ± .010  
0,25

# T1/CEPT/ISDN-PRI TRANSFORMERS

## Dual Surface Mount, 1500 Vrms, Small Package



-  Dual SMT package contains both transmit and receive transformers
-  Models matched to leading transceiver ICs
-  UL 1459 and UL 1950 recognized (some parts pending approval)
-  EN 60950 safety agency approval per BABT
-  Lead-Free versions available upon request

### Electrical Specifications @ 25°C

| Part #<br>(STD temp.) | Part #<br>(EXT temp.) | Turns Ratio <sup>B</sup><br>(Pri:Sec ±5%) | OCL<br>(mH MIN) | C <sub>w/w</sub><br>(pF MAX) | L <sub>L</sub><br>(μH MAX) | DCR Pri<br>(Ω MAX) | Package/<br>Schematic | Primary<br>Pins |
|-----------------------|-----------------------|---|-----------------|------------------------------|----------------------------|--------------------|-----------------------|-----------------|
| PE-65861              | T1090                 | 1CT:2CT & 1CT:2CT                         | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 16-14, 6-8      |
| PE-65862              | T1091                 | 1CT:2CT & 1:1.36CT                        | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/2                  | 16-14, 6-8      |
| PE-65865              | T1076                 | 1:1.15CT & 1CT:2CT                        | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/3                  | 16-14, 6-8      |
| PE-65866 <sup>E</sup> | T1092 <sup>E</sup>    | 1:1/1.26 & 1CT:2CT                        | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/3                  | 16-14, 6-8      |
| PE-65870              | T1093                 | 1CT:1.15CT & 1CT:1.15CT                   | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 1-3, 6-8        |
| T1022                 | T1077                 | 1CT:1CT & 1CT:1.5CT                       | 1.20 & 1.20     | 30 & 30                      | .80 & .80                  | 0.70 & 0.70        | BH/1                  | 16-14, 6-8      |
| PE-68678              | T1094                 | 1CT:1CT & 1CT:2CT                         | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 16-14, 6-8      |
| PE-68786              | T1095                 | 1CT:1.41CT & 1CT:1.41CT                   | 1.00 & 1.00     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 16-14, 11-9     |
| T1023                 | T1096                 | 1CT:1.41CT & 1CT:1.41CT                   | 1.00 & 1.00     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 1-3, 11-9       |
| —                     | T1144                 | 1CT:1CT & 1CT:2.4CT                       | 1.00 & 1.00     | 30 & 30                      | .80 & .80                  | 0.85 & 0.85        | BH/1                  | 9-11, 1-3       |
| —                     | T1097                 | 1CT:1CT & 1CT:1.67CT                      | 1.00 & 1.00     | 25 & 25                      | .80 & .80                  | 0.80 & 0.80        | BH/1                  | 6-8, 14-16      |
| T1136                 | —                     | 1CT:1CT & 1CT:1.36CT                      | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 6-8, 1-3        |
| T1121                 | —                     | 1CT:1.5CT & 1CT:1.5CT                     | 1.50 & 1.50     | 40 & 40                      | .80 & .80                  | 0.70 & 0.70        | BH/1                  | 1-3, 6-8        |
| T1122                 | —                     | 1CT:2CT & 1CT:2.3CT                       | 1.20 & 1.20     | 30 & 30                      | .80 & .80                  | 0.90 & 0.90        | BH/1                  | 6-8, 14-16      |
| T1021 <sup>J</sup>    | —                     | 2CT:1/1.26 & 2CT:1/1.26                   | 1.50 & 1.50     | 40 & 40                      | .50 & .50                  | 0.70 & 0.70        | BH/1                  | 1-3, 11-9       |
| T1075 <sup>J</sup>    | —                     | 2CS:1.57/2 & 2CS:1.57/2                   | 1.50 & 1.50     | 40 & 40                      | .50 & .50                  | 0.70 & 0.70        | BH/4                  | 1-2, 5-6        |
| T1190                 | —                     | 1CT:1CT & 1CT:1.36CT                      | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 16-14, 6-8      |
| T1137                 | TX1287                | 1CT:2.42CT & 1CT:2.42CT                   | 1.20 & 1.20     | 25 & 25                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 1-3, 6-8        |
| —                     | T1146                 | 1:2/2.4 & 1:0.79/1                        | 1.00 & 1.00     | 35 & 35                      | 1.00 & 1.00                | 0.80 & 0.80        | BH/5                  | 1-3, 6-8        |
| T1286                 | —                     | 1CT:2.4CT & 1CT:2.4CT                     | 1.20 & 1.20     | 15 & 15                      | .30 & .30                  | 0.30 & 0.30        | BH/1                  | 1-3, 6-8        |
| —                     | TX1317                | 1:2CT & 1:2CS                             | 1.20 & 1.20     | 35 & 35                      | .50 & 1.00                 | 1.00 & 1.00        | BH/6                  | 1-3, 11-9       |
| —                     | TX1189                | 1:1.36CT & 1:2CT                          | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 1.00 & 1.00        | BH/7                  | 16-14, 6-8      |
| —                     | TX1188                | 1CT:2CT & 1CT:2CT                         | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 1-3, 6-8        |
| —                     | TX1187                | 1CT:2CT & 1:1                             | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/8                  | 1-3, 6-8        |
| —                     | TX1088                | 1CT:2CT & 1CT:2.42CT                      | 1.20 & 1.20     | 35 & 35                      | .80 & .80                  | 1.00 & 1.00        | BH/1                  | 1-3, 6-8        |
| —                     | TX1089                | 1CT:1CT & 1CT:1CT                         | 1.20 & 1.20     | 30 & 30                      | .80 & .80                  | 0.70 & 0.70        | BH/1                  | 1-3, 6-8        |
| —                     | TX1098                | 1CT:1.26CT & 1CT:1.26CT                   | 1.20 & 1.20     | 30 & 30                      | .60 & .60                  | 0.70 & 0.70        | BH/1                  | 1-3, 6-8        |
| —                     | TX1099                | 1CT:1:0.8 & 1CT:1:0.8                     | 1.20 & 1.20     | 30 & 30                      | .80 & .80                  | 1.00 & 1.00        | BH/4                  | 16-14, 11-9     |
| —                     | TX1186                | 1CT:1.58:2 & 1:1.65:2                     | 1.20 & 1.20     | 30 & 30                      | .80 & .80                  | 1.00 & 1.00        | BH/9                  | 2-4, 6-7        |
| —                     | TX1467                | 1CT:1:1 & 1CT:1:1                         | 1.20 & 1.20     | 30 & 30                      | .80 & .80                  | 1.00 & 1.00        | BH/4                  | 16-14, 11-9     |

NOTE: Standard (STD) operating temperature range is 0°C to 70°C. Extended (EXT) operating temperature range is -40°C to +85°C. Models are available with unused leads removed. (See Pages 6 and 7 for Table Notes)

### Mechanical

### Schematics

**BH**

**SUGGESTED PAD LAYOUT**

Weight ..... 1.0 grams  
Tape & Reel ..... .600/reel  
Tube ..... .40/tube

**Dimensions:** Inches / mm

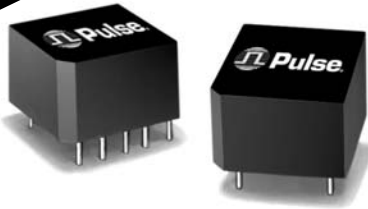
Unless otherwise specified, all tolerances are ± .010 / .025

# T1/CEPT/ISDN-PRI TRANSFORMERS

## Single Reinforced Insulation, 3 KVRms



**REINFORCED  
INSULATION**



- Certified for reinforced insulation per EN 41003/EN 60950, UL 1459 and UL 1950
- For T1/CEPT line interfaces
- Matched to leading transceiver ICs
- Designed to meet ITU-T G.703
- Lead-Free versions available upon request

**Electrical Specifications @ 25°C — Operating Temperature 0°C to 70°C (Unless Otherwise Noted)**

| Part Number           | Turns Ratio <sup>B</sup><br>(±5%) | OCL <sup>B</sup><br>(mH MIN) | C <sub>WWW</sub><br>(pF MAX) | L <sub>L</sub><br>(μH MAX) | DCR<br>Pri<br>(Ω MAX) | DCR<br>Sec<br>(Ω MAX) | Safety<br>Agency<br>Recognition <sup>10</sup> | Package/<br>Schematic | Primary<br>Pins |
|-----------------------|-----------------------------------|------------------------------|------------------------------|----------------------------|-----------------------|-----------------------|---|-----------------------|-----------------|
| PE-65830              | 1.27CS:1                          | .800                         | 15                           | 0.70                       | 0.50                  | 0.35                  | C,T,U,B                                       | IS/3                  | 1-5             |
| PE-65831              | 1CS:1                             | .800                         | 15                           | 0.70                       | 0.50                  | 0.45                  | C,T,U,B                                       | IS/3                  | 1-5             |
| PE-65832              | 1:1.36CT                          | 1.20                         | 35                           | 0.60                       | 0.70                  | 0.90                  | C,T,U,B                                       | IS/4                  | 10-6            |
| PE-65833 <sup>A</sup> | 1CT:2CT                           | 1.20                         | 20                           | 0.30-0.55                  | 0.50                  | 0.90                  | C,T,U,B                                       | IS/1                  | 1-5             |
| PE-65834              | 1:1                               | 1.20                         | 20                           | 0.50                       | 0.50                  | 0.50                  | C,T,U,B                                       | IS/2                  | 1-5             |
| PE-65835              | 1CT:2CT                           | 1.20                         | 15                           | 0.80                       | 0.70                  | 1.10                  | C,T,U,B                                       | IS/1                  | 1-5             |
| PE-65836              | 1CT:3CT:1                         | .600                         | 30                           | 0.80                       | 0.70                  | 1.70                  | C,T,U,B                                       | IS/5                  | 1-3             |
| PE-65837 <sup>E</sup> | 1:1.08/1.36                       | 1.50                         | 20                           | 0.60                       | 0.70                  | 0.90                  | C,T,U,B                                       | IS/4                  | 10-6            |
| PE-65838              | 1:1.14CT                          | 1.50                         | 30                           | 1.00                       | 0.70                  | 0.90                  | C,T,U,B                                       | IS/4                  | 10-6            |
| PE-65839 <sup>E</sup> | 1:1/1.26                          | 1.50                         | 35                           | 0.60                       | 0.70                  | 1.10                  | C,T,U,B                                       | IS/4                  | 10-6            |
| PE-68646 <sup>E</sup> | 1:1.58/2                          | 1.50                         | 20                           | 0.70                       | 0.70                  | 1.20                  | C,T,U,B                                       | IS/4                  | 10-6            |
| PE-68788              | 1CT:1.41CT                        | 1.20                         | 20                           | 0.80                       | 0.60                  | 0.80                  | T,U,B   | IS/1                  | 10-6            |

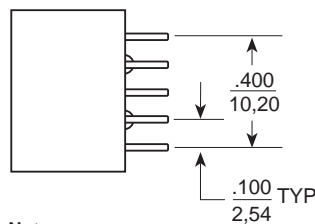
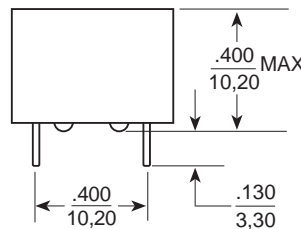
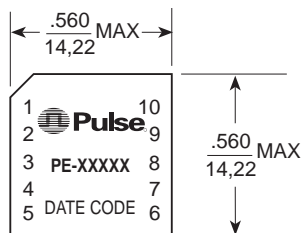
NOTE: For surface mount dual version with reinforced insulation products, refer to data sheet T617.

(See Pages 6 and 7 for Table Notes)

### Mechanical

### Schematics

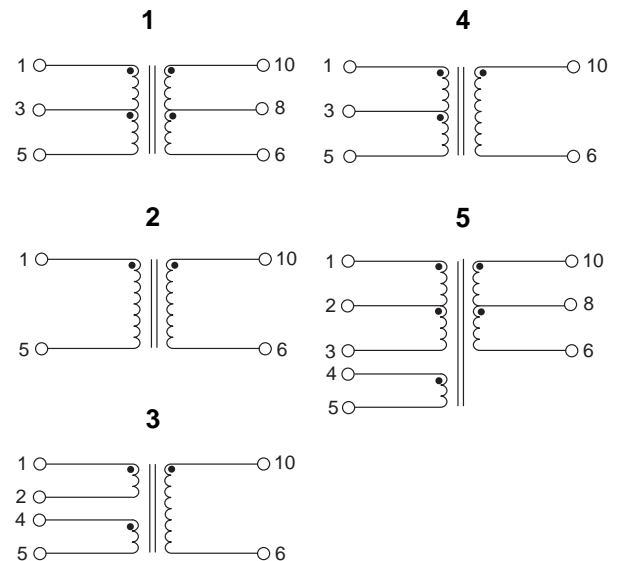
**IS**



**Notes:**  
Leads are 22 AWG solderable.  
Unused pins not provided.

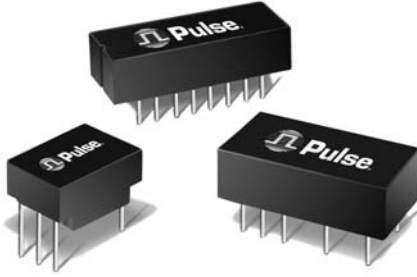
**Weight** ..... 4 grams  
**Tube** ..... .35/tube

**Dimensions:**  $\frac{\text{Inches}}{\text{mm}}$   
Unless otherwise specified,  
all tolerances are  $\pm \frac{.010}{0.25}$



# T1/CEPT/ISDN-PRI TRANSFORMERS

## Single Through Hole, 1500 Vrms



- Extended and standard temperature range
- Dual and single through hole models available
- Models matched to leading transceiver ICs
- Most models UL and BAPT recognized
- Isolation Voltage: 1500 Vrms MIN
- Lead-Free versions available upon request

### Electrical Specifications @ 25°C

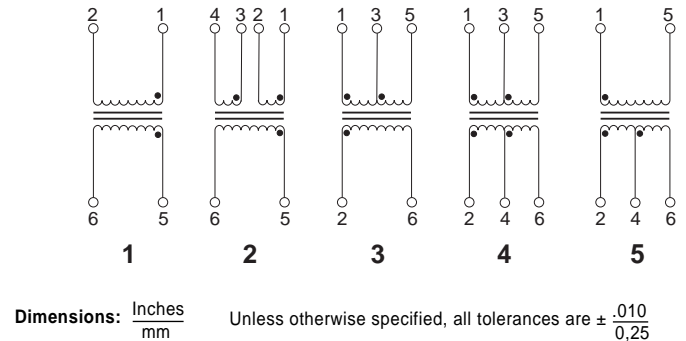
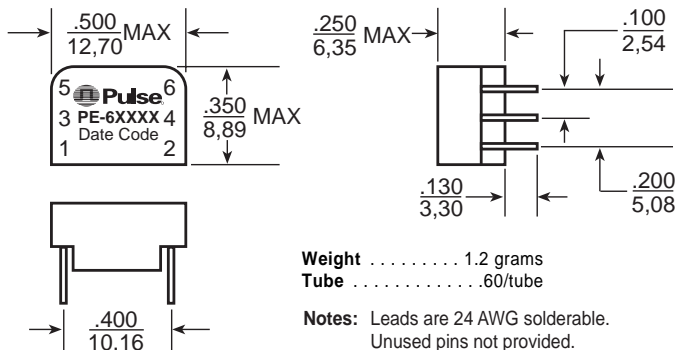
| Part Number  | Turns Ratio <sup>B</sup><br>(Pri:Sec ±5%) | OCL @ 25°C<br>(mH MIN) | C <sub>w/w</sub><br>(pF MAX) | L <sub>L</sub><br>(μH MAX) | DCR Pri<br>(Ω MAX) | DCR Sec<br>(Ω MAX) | Package/<br>Schematic | Primary<br>Pins |
|--|---|------------------------|------------------------------|----------------------------|--------------------|--------------------|-----------------------|-----------------|
| <b>STANDARD TEMPERATURE RANGE SINGLE TRANSFORMERS – OPERATING TEMPERATURE 0°C TO +70°C</b>     |   |                        |                              |                            |                    |                    |                       |                 |
| PE-64931 <sup>G</sup>  | 1:1:1 (1:2CS)                             | 1.20                   | 25                           | 0.50                       | 0.70               | 0.70 & 0.70        | HC/2                  | 1-2             |
| PE-64933   | 1CT:3CT                                   | 1.20                   | 30                           | 0.50                       | 0.70               | 1.60               | HC/4                  | 1-5             |
| PE-64934   | 1:1                                       | 1.20                   | 25                           | 0.50                       | 0.70               | 0.70               | HC/1                  | 1-2             |
| PE-64936   | 1CT:1                                     | 1.20                   | 25                           | 0.80                       | 0.70               | 0.70               | HC/3                  | 1-5             |
| PE-64937   | 1:1.36                                    | 1.20                   | 35                           | 0.80                       | 0.70               | 0.80               | HC/1                  | 5-6             |
| PE-64940   | 1.26CS:1 (1:1:1.58)                       | 0.30                   | 30                           | 0.60                       | 0.80               | 0.60               | HC/2                  | 1-4             |
| PE-64941 <sup>D</sup>  | 1CS:1                                     | 0.80                   | 30                           | 0.60                       | 0.80               | 0.60               | HC/2                  | 1-4             |
| PE-64942   | 1CS:1.31                                  | 0.80                   | 30                           | 0.40                       | 0.80               | 0.60               | HC/2                  | 1-4             |
| PE-64943 <sup>A</sup>  | 1CT:2CT                                   | 1.20                   | 30                           | 0.30-0.55                  | 0.70               | 1.20               | HC/4                  | 1-5             |
| PE-65351 <sup>G</sup>  | 1:2CT                                     | 1.20                   | 40                           | 0.50                       | 0.70               | 1.30               | HC/3                  | 2-6             |
| PE-65363   | 1:4CT                                     | 0.50                   | 40                           | 1.00                       | 0.50               | 1.50               | HC/5                  | 1-5             |
| PE-65379   | 1:1.14CT                                  | 1.20                   | 35                           | 0.80                       | 0.70               | 0.80               | HC/5                  | 1-5             |
| PE-65388   | 1:1.15CT                                  | 1.50                   | 35                           | 0.60                       | 0.70               | 0.90               | HC/3                  | 2-6             |
| PE-65389 <sup>E</sup>  | 1:1/1.26                                  | 1.50                   | 40                           | 0.40                       | 0.70               | 0.90               | HC/3                  | 2-6             |
| PE-65415   | 1CT:2CT                                   | 1.20                   | 30                           | 0.50                       | 0.70               | 1.20               | HC/4                  | 1-5             |
| PE-65558   | 1:2.3CT                                   | 1.20                   | 35                           | 0.80                       | 0.70               | 1.40               | HC/5                  | 1-5             |
| PE-65586   | 1:1.36CT                                  | 1.20                   | 35                           | 0.80                       | 0.70               | 0.90               | HC/5                  | 1-5             |
| PE-65755   | 1CT:1CT                                   | 1.20                   | 25                           | 0.80                       | 0.80               | 0.80               | HC/4                  | 1-5             |
| PE-68644   | 1CT:1                                     | 0.70                   | 20                           | 0.70                       | 0.20               | 0.80               | HC/3                  | 1-5             |
| PE-68645   | 1:1.36CT                                  | 0.70                   | 20                           | 0.70                       | 0.50               | 0.40               | HC/5                  | 1-5             |
| T1054  | 1:1.5CT                                   | 1.20                   | 30                           | 0.60                       | 0.70               | 1.00               | HC/3                  | 2-6             |
| T1249  | 1:1.26CT                                  | 1.20                   | 60                           | 0.80                       | 0.90               | 1.00               | HC/4                  | 2-6             |
| <b>EXTENDED TEMPERATURE RANGE SINGLE TRANSFORMERS 1 – OPERATING TEMPERATURE -40°C TO +85°C</b> |   |                        |                              |                            |                    |                    |                       |                 |
| PE-65340   | 1:1.36                                    | 1.20                   | 35                           | 0.80                       | 0.90               | 1.20               | HC/1                  | 5-6             |
| PE-65770   | 1:1.15CT                                  | 1.50                   | 40                           | 0.80                       | 0.90               | 1.00               | HC/3                  | 2-6             |
| PE-65771   | 1CT:2CT                                   | 1.20                   | 50                           | 0.60                       | 1.00               | 2.00               | HC/4                  | 2-6             |
| PE-65778   | 1CT:1CT                                   | 1.20                   | 40                           | 1.00                       | 1.00               | 1.00               | HC/4                  | 1-5             |
| PE-68600   | 1CT:3CT                                   | 1.20                   | 60                           | 0.80                       | 0.90               | 2.70               | HC/4                  | 1-5             |
| PE-68664 <sup>E</sup>  | 1:1/1.26                                  | 1.50                   | 50                           | 0.80                       | 0.90               | 1.10               | HC/3                  | 2-6             |
| TX1252   | 1CT:1                                     | 1.20                   | 40                           | 1.00                       | 1.00               | 1.00               | HC/3                  | 1-5             |

(See Pages 6 and 7 for Table Notes)

## Mechanical

## Schematics

### HC



# T1/CEPT/ISDN-PRI TRANSFORMERS

## Dual Through Hole, 1500 Vrms



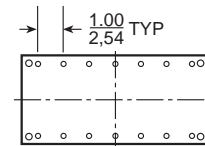
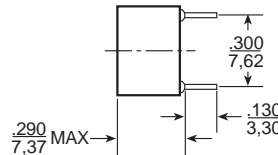
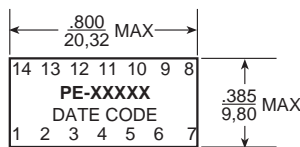
### Electrical Specifications @ 25°C

| Part Number  | Turns Ratio <sup>B</sup><br>(Pri:Sec ±5%) | OCL @ 25°C<br>(mH MIN) | C <sub>w/w</sub><br>(pF MAX) | L <sub>L</sub><br>(μH MAX) | DCR Pri<br>(Ω MAX) | DCR Sec<br>(Ω MAX) | Package/<br>Schematic | Primary<br>Pins |
|--|---|------------------------|------------------------------|----------------------------|--------------------|--------------------|-----------------------|-----------------|
| <b>STANDARD TEMPERATURE RANGE DUAL TRANSFORMERS – OPERATING TEMPERATURE 0°C TO +70°C</b>               |   |                        |                              |                            |                    |                    |                       |                 |
| PE-64951   | 1:2CT & 1:2CT                             | 1.20 & 1.20            | 35 & 35                      | 0.50 & 0.50                | 0.70 & 0.70        | 1.20 & 1.20        | HD/1                  | 14-12, 5-7      |
| PE-64952   | 1:2CT & 1:1.36                            | 1.20 & 1.20            | 35 & 35                      | 0.50 & 0.80                | 0.80 & 0.80        | 1.20 & 1.00        | HD/2                  | 14-12, 5-7      |
| PE-64953   | 1:2CT & 1:2CT                             | 2.00 & 2.00            | 50 & 50                      | 0.60 & 0.60                | 1.00 & 1.00        | 2.00 & 2.00        | HD/3                  | 14-12, 10-8     |
| PE-64954 <sup>A</sup>  | 1CT:2CT & 1:1                             | 1.20 & 1.20            | 30 & 30                      | 0.30-0.55 & 0.50           | 0.70 & 0.70        | 1.20 & 0.70        | HD/4                  | 1-3, 5-7        |
| PE-64955   | 1:1.26CT & 1.58:1                         | 0.80 & 0.80            | 30 & 30                      | 0.50 & 0.50                | 0.60 & 0.60        | 0.70 & 0.30        | HD/5                  | 1-3, 5-7        |
| PE-64956   | 1:1CT & 2:1                               | 0.80 & 0.80            | 30 & 30                      | 0.60 & 0.60                | 0.50 & 0.50        | 0.50 & 0.20        | HD/5                  | 1-3, 5-7        |
| PE-64957   | 1CT:1.31 & 2.62:1                         | 1.20 & 1.20            | 30 & 30                      | 0.80 & 0.80                | 0.60 & 0.60        | 0.50 & 0.30        | HD/5                  | 1-3, 5-7        |
| PE-65565   | 1:1.15CT & 1:2CT                          | 1.50 & 1.20            | 35 & 40                      | 0.60 & 0.50                | 0.70 & 0.70        | 1.10 & 1.30        | TD/1                  | 14-12, 5-7      |
| PE-65566 <sup>E</sup>  | 1:1/1.26 & 1:2CT                          | 1.50 & 1.20            | 40 & 40                      | 0.50 & 0.40                | 0.70 & 0.70        | 0.90 & 1.30        | TD/1                  | 14-12, 5-7      |
| <b>EXTENDED TEMPERATURE RANGE DUAL TRANSFORMERS<sup>1</sup> – OPERATING TEMPERATURE -40°C TO +85°C</b> |   |                        |                              |                            |                    |                    |                       |                 |
| PE-65567   | 1:1.15CT & 1:2CT                          | 1.50 & 1.20            | 40 & 60                      | 0.80 & 0.80                | 0.90 & 0.90        | 1.00 & 1.70        | TD/1                  | 14-12, 5-7      |
| PE-65568 <sup>E</sup>  | 1:1/1.26 & 1:2CT                          | 1.50 & 1.20            | 50 & 60                      | 0.80 & 0.80                | 0.90 & 0.90        | 1.00 & 1.70        | TD/1                  | 14-12, 5-7      |
| PE-65774   | 1CT:2CT & 1:1.36CT                        | 1.20 & 1.20            | 50 & 50                      | 0.96 & 0.80                | 1.00 & 1.00        | 1.70 & 1.20        | TD/7                  | 14-12, 5-7      |
| PE-68618 <sup>H</sup>  | 1CT:1CT & 3CT:1CT:25                      | 1.20 & 32.0            | 40 & 65                      | 0.80 & 0.80                | 1.00 & 3.00        | 1.00 & 1.20        | BD/6                  | 1-3, 11-9       |
| PE-64950 <sup>H</sup>  | 1CT:1CT & 1CT:3CT:1                       | 1.20 & 0.60            | 50 & 50                      | 0.80 & 0.80                | 1.00 & 0.80        | 1.00 & 2.00        | BD/6                  | 1-3, 4-6        |

(See Pages 6 and 7 for Table Notes)

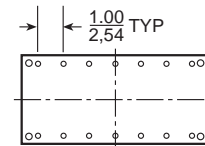
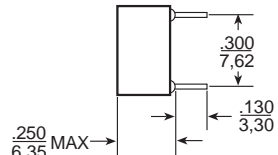
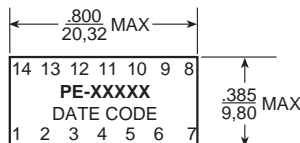
### Mechanicals

**TD  
DUAL**



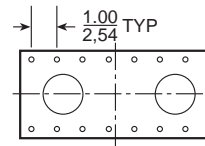
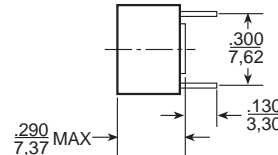
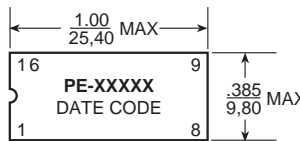
Weight ..... 2.6 grams  
Tube ..... .25/tube

**HD  
DUAL**



Weight ..... 2.3 grams  
Tube ..... .25/tube

**BD  
DUAL**



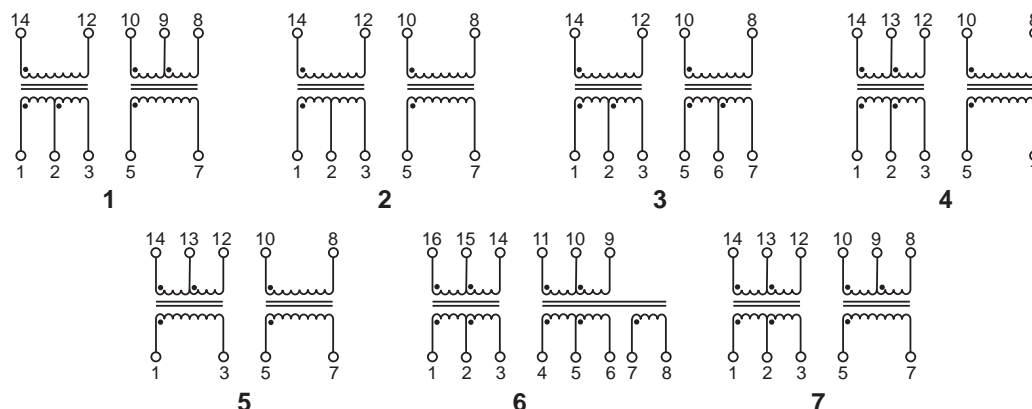
Weight ..... 3.1 grams  
Tube ..... .25/tube

Note: Leads are 24 AWG solderable.

Dimensions: Inches  
mm

Unless otherwise specified all tolerances are ±.010  
0,25

### Schematics



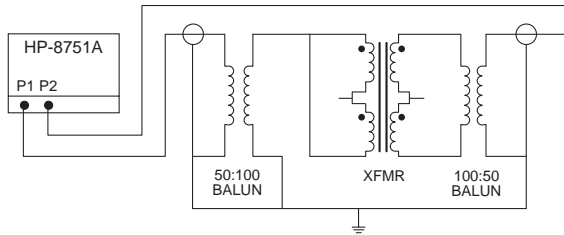


# T1/CEPT/ISDN-PRI TRANSFORMERS

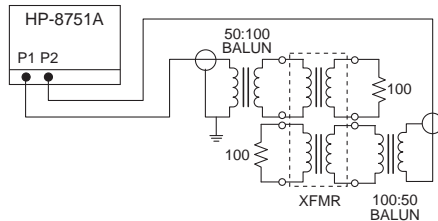
## Application Notes



- Extended Temperature Range Models** — For extended temperature range transformers (-40°C to +85°C operating temperature range), OCL (Open Circuit Inductance for the primary winding) is specified at both -40°C and +25°C. At -40°C, OCL is 600 µH minimum for all low temperature models with the exception of PE-68827 which is 800 µH minimum and PE-65836 which is 300 µH minimum. All other parameters are specified at +25°C only. Standard temperature range is 0°C to +70°C.
- ET Product** — All coils have an ET product of 10 V-µsec minimum.
- Flammability** — Materials used in the products are recognized as UL94-VO approved. Products meet the requirements of IEC 695-2-2 (Needle Flame Test).
- Balance Characteristics** — The transformers meet the requirements for longitudinal balance of FCC part 68.
- Common Mode Rejection Ratio** — the CMRR for all transformers is better than 50 dB at 1 MHz. A typical test circuit is shown below.



- Crosstalk Attenuation** — In the dual packages, which contain transmit and receive transformers side by side, sufficient crosstalk attenuation is achieved by the inherent characteristics of the toroid cores as well as by their proper positioning. The crosstalk attenuation is typically 50 dB or better from 100 KHz to 10 MHz. This result was established with the test circuit shown below.



- Return Loss** — ITU-T G.703 and European national regulatory documents specify minimum return loss levels. The transformers will allow these limits to be complied within the situations where they are applicable.

| Frequency   | 50-100 KHz | 100 KHz-2 MHz | 2-3 MHz |
|-------------|------------|---------------|---------|
| Return Loss |            |               |         |
| XMIT        | 9 dB       | 15 dB         | 11 dB   |
| REC         | 12 dB      | 18 dB         | 14 dB   |

- Surge Voltage Capability** — All transformers and chokes meet surge voltage tests according to the most stringent regulatory documents when system designs include the proper voltage and current suppression devices:

|                       |                           |
|-----------------------|---------------------------|
| Metallic Voltage:     | 800 V peak, 10/560 µsec   |
| Longitudinal Voltage: | 2,400 V peak, 10/700 µsec |

- Isolation Voltage** — 100% of transformers are tested during production to the specified isolation voltage level.
- Safety Agency Recognition** — Parts listed as "Recognized" or "Certified" meet Underwriter Laboratories, UL 1459 and UL 1950 per file E133523 (S).

### British Approvals Board for Telecommunications

BABT BS 6301:1989/BS 415 and BS EN 41003:1991/EN 60 950, supplementary insulation.

### CR/0091

|          |          |          |          |
|----------|----------|----------|----------|
| PE-64933 | PE-65351 | PE-65558 | PE-68600 |
| PE-64934 | PE-65363 | PE-65586 | PE-68644 |
| PE-64936 | PE-65379 | PE-65755 | PE-68645 |
| PE-64937 | PE-65388 | PE-65770 | PE-68664 |
| PE-64943 | PE-65389 | PE-65771 |          |
| PE-65340 | PE-65415 | PE-65778 |          |

Transformers with Reinforced Insulation according to IEC950 series PE-68630—PE-68788 (page 3) are certified by the following organizations:

### Code Certificate Information

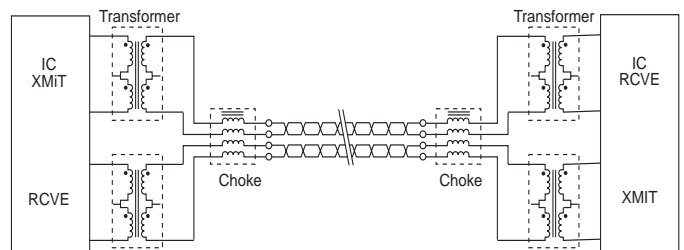
|   |  |
|---|--|
| C | CSA, C22.2 #950 & #225, Cert. LR 76802-3, reinforced insulation. |
| T | TÜV, EN 60 950/EN 41003, Cert. R9371358, reinforced insulation.  |
| U | UL 1459/UL1950, File E133523 (S), reinforced insulation.         |
| B | BABT EN41003/EN60950, Cert. CR0079, reinforced insulation.       |

(Note: Safety Agency approval of surface mount transformers is pending.)

- General Information** — The transformers are specifically designed for use in 1.544 Mbps (T1), 2.048 Mbps (CEPT) and ISDN Primary rate (PRI) interface applications. They are matched to the majority of the line interface transceiver ICs currently available. Use of the proper transformer allows the interface circuit to comply with ITU-T G.703 and other standards regarding pulse waveform, return loss, and balance.

- Common Mode Chokes** — The "high-frequency" 4-lines common mode chokes shown in this data sheet provide an effective means of compliance with national and international regulations on EMI. They are designed to be used in conjunction with Pulse's T1/CEPT transformers as shown in the typical application below. Crosstalk is typically -70 dB at 1 MHz and -55 dB at 10 MHz.

## Typical Application



### NOTES FROM TABLES (pages 1 through 6):

- Toleranced leakage inductance: .30 µH min to .55 µH MAX.
- OCL (primary inductance) and L<sub>L</sub> (leakage inductance) are measured at the primary winding. Turns ratio is specified primary: secondary. (CT = Center Tap; CS = Split Center Tap).
- To make a 1CT:1 ratio from a 1CT:2CT ratio, use only one half of the secondary (2CT) winding.
- For Reinforced 3kVrms Dual SMT Transformers, refer to data sheet T617. For Quad SMT Transformers refer to data sheet T615. For Octal SMT Transformers refer to data sheet T622.
- Dual Ratio Transformers — These transformers have tapped secondary windings to provide two turns ratios (T/R). Use the entire primary winding and connect the secondary pins listed below to obtain the desired turns ratio:

| Part Number | Turns Ratio 1 | Secondary Pins | Turns Ratio 2 | Secondary Pins |
|-------------|---------------|----------------|---------------|----------------|
| PE-65837    | 1:1.08        | 3-5            | 1:1.36        | 1 - 5          |
| PE-65839    | 1:1           | 3-5            | 1:1.26        | 1 - 5          |
| PE-65866    | 1:1           | 2-3            | 1:1.26        | 1 - 3          |
| PE-68646    | 1:1.58        | 3-5            | 1:2           | 1 - 5          |
| PE-65389    | 1:1           | 3-5            | 1:1.26        | 1 - 5          |
| PE-65566    | 1:1           | 2-3            | 1:1.26        | 1 - 3          |
| PE-65568    | 1:1           | 2-3            | 1:1.26        | 1 - 3          |
| PE-68866    | 1:1           | 2-3            | 1:1.26        | 1 - 3          |
| PE-68826    | 1:1           | 2-3            | 1:1.26        | 1 - 3          |
| PE-68664    | 1:1           | 3-5            | 1:1.26        | 1 - 5          |
| PE-68836    | 1:1           | 2-3/5-6        | 1:1.26        | 1-3/4-6        |

- Standard packaging for surface mount "AN" and "LA" packages is anti-static tubes. Optional tray packaging can be ordered by adding "R" suffix to the part number, (i.e. PE-65857R). Optional Tape & Reel packaging can be ordered by adding "T" suffix to the part number, (i.e. PE-65857T).

- PE-64931 and PE-65351 are electrically equivalent, but have different schematics. PE-65351 is both UL 1459 and BABT recognized and is recommended for new designs because the 3S schematic provides greater physical separation between the primary and secondary pins.

- PE-68618 and PE-64950: The fault locate winding is (7-8).
- Safety Agency approvals pending.
- The turns ratio of these devices have been designed, in conjunction with semiconductor vendor recommendations, to allow connections to various terminations (e.g. 75 or 120 Ω with the same transformer). For example T1075 can be used with the Siemens PEB 2235 to achieve connection to the 75 or 120 Ω cable. For 75 Ω termination, the PEB 2235 requires the following turns ratio: 1:1.57 (Tx) and 1:1.26 (Rx) which can be achieved using pins (1-2):(15-16) for Tx and (10-11):(5-8) for Rx. For 120 Ω, the following turns ratio are required: 1:2 (Tx) and 1:1 (Rx), which are pins (1-2):(16-14) for Tx and (9-11):(5-8) for Rx on the T1075.

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