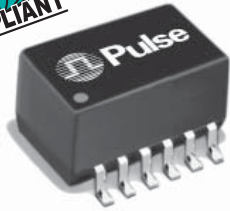


# T1/CEPT/ISDN-PRI TRANSFORMERS

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



- RoHS-6 peak reflow temperature rating: 245°C
- Dual SMT package contains transmit and receive transformers
- Models matched to leading transceiver ICs
- Isolation voltage: 1500 Vrms
- UL recognized

### Electrical Specifications @ 25°C

RoHS-6 Compliant Part Number	Turns Ratio <sup>B</sup> (Pri:Sec ± 2%)	OCL @ 25°C (mH MIN)	LL (µH MAX)	Cw/w (pF MAX)	DCR Pri (Ω MAX)	DCR Sec (Ω MAX)	Package/Schematic	Primary Pins
<b>EXTENDED TEMPERATURE RANGE MODELS<sup>1</sup> – OPERATING TEMPERATURE -40°C TO +85°C</b>								
PE-68841NL	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-68822NL	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-68826NL <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/4	12-10, 4-6
PE-68827NL	1:1CT & 2:1	1.60 & 1.60	1.30 & 1.30	55 & 40	1.10 & 1.10	1.10 & 0.70	AN/5	1-3, 4-6
PE-68828NL	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-68874NL	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-68877NL	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-68884NL	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
<b>STANDARD TEMPERATURE RANGE MODELS – OPERATING TEMPERATURE 0°C TO +70°C</b>								
PE-68861NL	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-68864NL <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-68866NL <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/4	12-10, 4-6
PE-68836NL <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/6	12-10, 9-7

NOTE: To order Tape & Reel packaging add a "T" suffix to the part number (i.e. PE-68861NL becomes PE-68861NLT).

See Pages 6 and 7 for Table Notes.

## Mechanical

## Schematics

**AN**

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

**SUGGESTED PAD LAYOUT**

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

# T1/CEPT/ISDN-PRI TRANSFORMERS

## Dual Surface Mount, 1500Vrms, Small Package



- RoHS-6 peak reflow temperature rating: 245°C
- Dual SMT package contains transmit and receive transformers
- Models matched to leading transceiver ICs
- UL recognized (some parts pending approval)

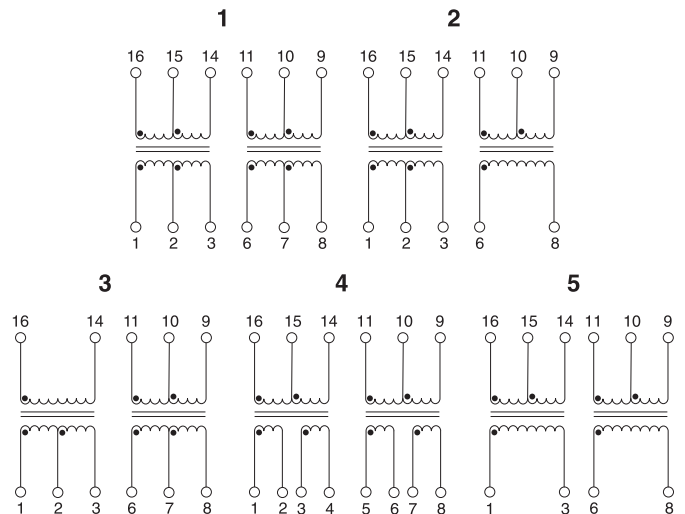
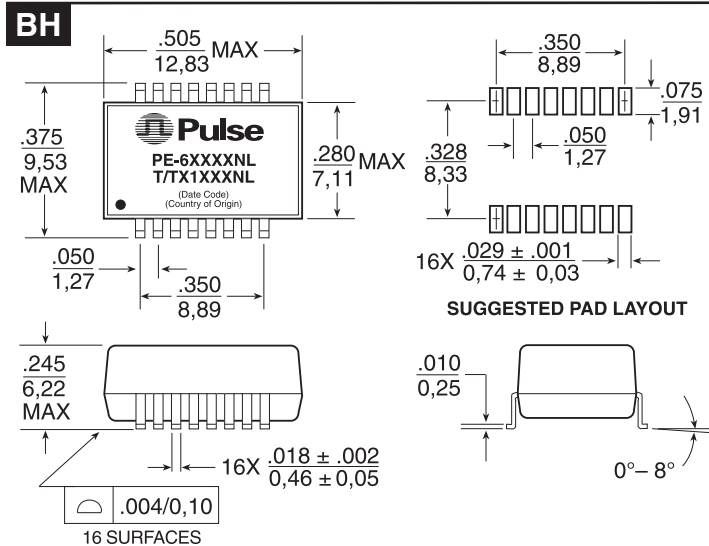
### Electrical Specifications @ 25°C

RoHS-6 Compliant Part Number		Turns Ratio <sup>B</sup> (Pri:Sec ±5%)	OCL (mH MIN)	C <sub>w/w</sub> (pF MAX)	L <sub>L</sub> (μH MAX)	DCR Pri (Ω MAX)	Package/ Schematic	Primary Pins
STD TEMP	EXT TEMP							
PE-65861NL	T1090NL	1CT:2CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1	16-14, 6-8
—	T1091NL	1CT:2CT & 1:1.36CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/2	16-14, 6-8
—	T1076NL	1:1.15CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/3	16-14, 6-8
PE-65870NL	—	1CT:1.15CT & 1CT:1.15CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1	1-3, 6-8
PE-68678NL	T1094NL	1CT:1CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1	16-14, 6-8
PE-68786NL	—	1CT:1.41CT & 1CT:1.41CT	1.00 & 1.00	30 & 30	.60 & .60	0.70 & 0.70	BH/1	16-14, 11-9
T1023NL	—	1CT:1.41CT & 1CT:1.41CT	1.00 & 1.00	30 & 30	.60 & .60	0.70 & 0.70	BH/1	1-3, 11-9
T1021NL <sup>1</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
T1075NL <sup>1</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
T1137NL	TX1287NL	1CT:2.42CT & 1CT:2.42CT	1.20 & 1.20	25 & 25	.60 & .60	0.70 & 0.70	BH/1	1-3, 6-8
—	T1146NL	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
—	TX1188NL	1CT:2CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1	1-3, 6-8
—	TX1089NL	1CT:1CT & 1CT:1CT	1.20 & 1.20	30 & 30	.80 & .80	0.70 & 0.70	BH/1	1-3, 6-8
—	TX1467NL	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. See pages 6 and 7 for table notes.

### Mechanical

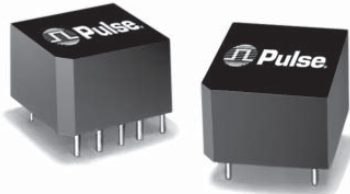
### Schematics








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

# T1/CEPT/ISDN-PRI TRANSFORMERS

## Single Reinforced Insulation, 3 kVrms



-  RoHS-6 peak reflow temperature rating: 245°C
-  Certified for reinforced insulation per UL
-  For T1/CEPT line interfaces
-  Matched to leading transceiver ICs
-  Designed to meet ITU-T G.703

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

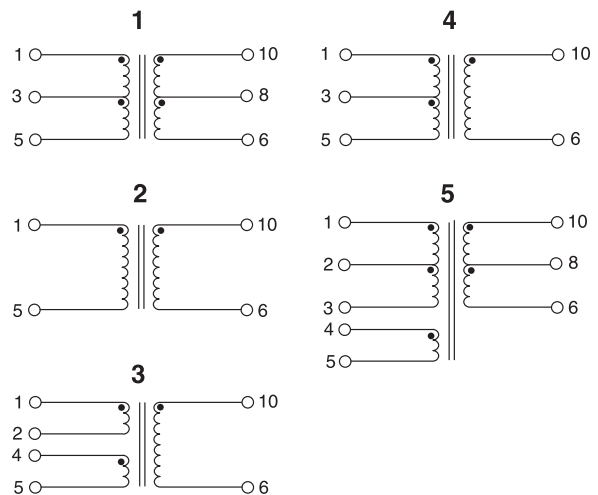
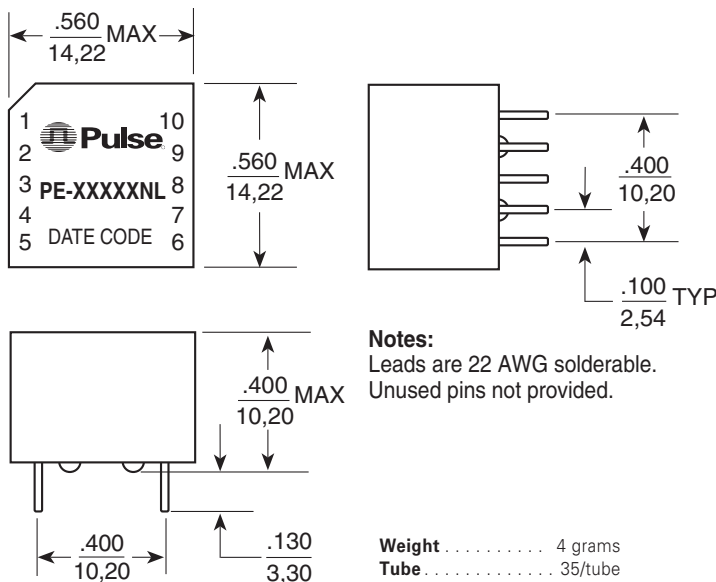
RoHS-6 Compliant Part Number	Turns Ratio <sup>B</sup> (Pri:Sec ±5%)	OCL <sup>B</sup> (mH MIN)	C <sub>w/w</sub> (pF MAX)	L <sub>L</sub> (μH MAX)	DCR Pri (Ω MAX)	DCR Sec (Ω MAX)	Safety Agency Recognition <sup>10</sup>	Package/Schematic	Primary Pins
PE-65830NL	1.27CS:1	.800	15	0.70	0.50	0.35	C,T,U,B	IS/3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

See pages 6 and 7 for table notes.

## Mechanical

## Schematics

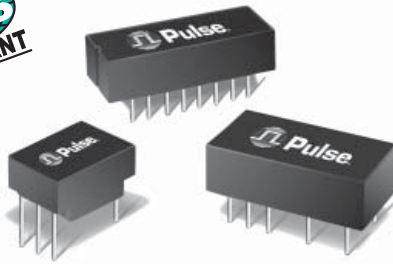
IS









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, 1500Vrms



-  RoHS-6 peak reflow temperature rating: 245°C
-  Extended and standard temperature range
-  Dual and single through hole models available
-  Models matched to leading IC transceivers
-  UL recognized
-  Isolation Voltage: 1500 Vrms MIN

### Electrical Specifications @ 25°C

RoHS-6 Compliant Part Number	Turns Ratio <sup>B</sup> (Pri:Sec ±5%)	OCL @ 25°C (mH MIN)	Cw/w (pF MAX)	LL (μH MAX)	DCR Pri (Ω MAX)	DCR Sec (Ω MAX)	Package/Schematic	Primary Pins
<b>STANDARD TEMPERATURE RANGE SINGLE TRANSFORMERS – OPERATING TEMPERATURE 0°C TO +70°C</b>								
PE-64931NL	1:1:1 (1:2CS)	1.20	25	0.50	0.70	0.70 & 0.70	HC/2	1-2
PE-64933NL	1CT:3CT	1.20	30	0.50	0.70	1.60	HC/4	1-5
PE-64934NL	1:1w	1.20	25	0.50	0.70	0.70	HC/1	1-2
PE-64936NL	1CT:1	1.20	25	0.80	0.70	0.70	HC/3	1-5
PE-64937NL	1:1.36	1.20	35	0.80	0.70	0.80	HC/1	5-6
PE-64940NL	1.26CS:1 (1:1:1.58)	0.30	30	0.60	0.80	0.60	HC/2	1-4
PE-64941NL <sup>D</sup>	1CS:1	0.80	30	0.60	0.80	0.60	HC/2	1-4
PE-64942NL	1CS:1.31	0.80	30	0.40	0.80	0.60	HC/2	1-4
PE-64943NL <sup>A</sup>	1CT:2CT	1.20	30	0.30-0.55	0.70	1.20	HC/4	1-5
PE-65351NL	1:2CT	1.20		0.50	0.70	1.30	HC/3	2-6
PE-65363NL	1:4CT	0.50	40	1.00	0.50	1.50	HC/5	1-5
PE-65379NL	1:1.14CT	1.20	35	0.80	0.70	0.80	HC/5	1-5
PE-65388NL	1:1.15CT	1.50	35	0.60	0.70	0.90	HC/3	2-6
PE-65389NL <sup>E</sup>	1:1/1.26	1.50	40	0.40	0.70	0.90	HC/3	2-6
PE-65415NL	1CT:2CT	1.20	30	0.50	0.70	1.20	HC/4	1-5
PE-65558NL	1:2.3CT	1.20	35	0.80	0.70	1.40	HC/5	1-5
PE-65586NL	1:1.36CT	1.20	35	0.80	0.70	0.90	HC/5	1-5
PE-65755NL	1CT:1CT	1.20	25	0.80	0.80	0.80	HC/4	1-5
PE-68644NL	1CT:1	0.70	20	0.70	0.20	0.80	HC/3	1-5
PE-68645NL	1:1.36CT	0.70	20	0.70	0.50	0.40	HC/5	1-5
T1054NL	1:1.5CT	1.20	30	0.60	0.70	1.00	HC/3	2-6
<b>EXTENDED TEMPERATURE RANGE SINGLE TRANSFORMERS <sup>1</sup> – OPERATING TEMPERATURE -40°C TO +85°C</b>								
PE-65340NL	1:1.36	1.20	35	0.80	0.90	1.20	HC/1	5-6
PE-65770NL	1:1.15CT	1.50	40	0.80	0.90	1.00	HC/3	2-6
PE-65771NL	1CT:2CT	1.20	50	0.60	1.00	2.00	HC/4	2-6
PE-65778NL	1CT:1CT	1.20	40	1.00	1.00	1.00	HC/4	1-5
PE-68600NL	1CT:3CT	1.20	60	0.80	0.90	2.70	HC/4	1-5
PE-68664NL <sup>E</sup>	1:1/1.26	1.50	50	0.80	0.90	1.10	HC/3	2-6
TX1252NL	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**

Notes: Leads are 24 AWG solderable. Unused pins not provided.

Weight ..... 2 grams  
Tube ..... 60/tube

Dimensions:  $\frac{\text{Inches}}{\text{mm}}$  Unless otherwise specified, all tolerances are  $\pm \frac{.010}{0,25}$

# T1/CEPT/ISDN-PRI TRANSFORMERS

## Dual Through Hole, 1500 Vrms

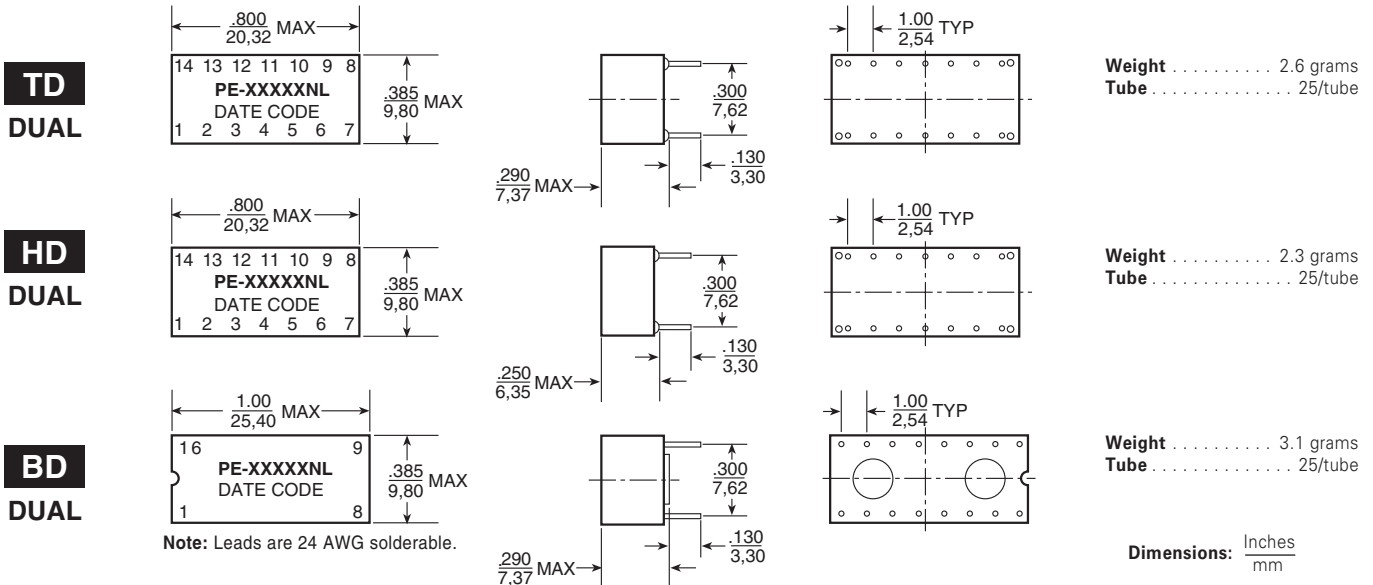


### Electrical Specifications @ 25°C

RoHS-6 Compliant Part Number	Turns Ratio <sup>B</sup> (Pri:Sec ±5%)	OCL @ 25°C (mH MIN)	C <sub>w/w</sub> (pF MAX)	L <sub>L</sub> (μH MAX)	DCR Pri (Ω MAX)	DCR Sec (Ω MAX)	Package/ Schematic	Primary Pins
<b>STANDARD TEMPERATURE RANGE DUAL TRANSFORMERS – OPERATING TEMPERATURE 0°C to +70°C</b>								
PE-64951NL	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-64921NL	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-64953NL	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-64954NL <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-64955NL	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-64956NL	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-64957NL	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-65565NL	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-65566NL <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 1 – OPERATING TEMPERATURE -40°C to +85°C</b>								
PE-65567NL	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-65568NL <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-65774NL	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-68618NL <sup>G</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-64950NL <sup>G</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

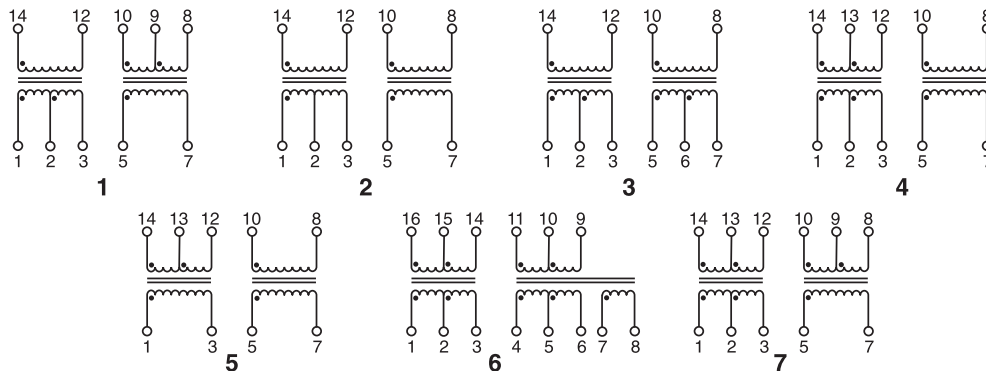
(See Pages 6 and 7 for Table Notes)

## Mechanicals



Unless otherwise specified,  
all tolerances are ±  $\frac{.010}{.025}$

## Schematics





# T1/CEPT/ISDN-PRI TRANSFORMERS

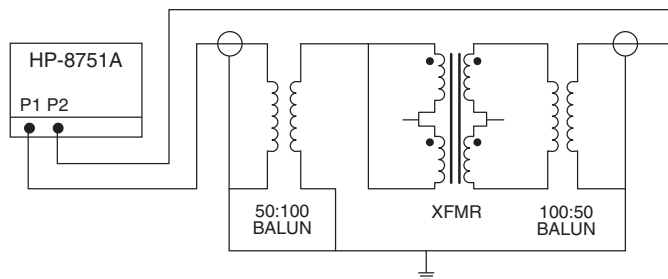
## Transformer Selection Guide



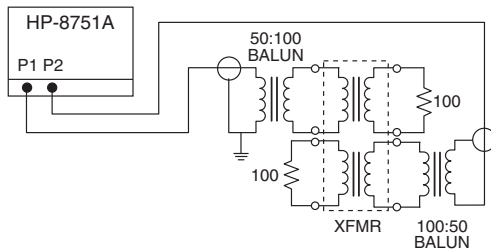
IC Manufacturer/ IC Part Number	Comments	Dual SMT (BH Pkg.)		Dual SMT (AN Pkg.)		Single Through Hole				Dual Through Hole		Single Through Hole			
		Std Temp	Ext Temp	Std Temp	Ext Temp	Standard Temp		Extended Temp		Std Temp	Ext Temp	Reinforced 3 kVRMS			
		TX & RX	TX & RX	TX & RX	TX & RX	TX	RX	TX	RX	TX & RX	TX & RX	TX	RX		
MINDSPEED (CONEXANT)	BT8510	T1/E1	—	—	PE-68868NL	PE-68826NL	PE-65389NL	PE-65351NL	PE-68664NL	PE-65771NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65835NL	
	BT8510	T1/E1	T1021NL	—	T1021NL	PE-68826NL	PE-65389NL	PE-65351NL	PE-68664NL	PE-65771NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65835NL	
	BT8370/5/6	BETTER FL	—	T1091NL	—	PE-68822NL	PE-64937NL	PE-64936NL	PE-65340NL	PE-65771NL	PE-64921NL	PE-65774NL	PE-65832NL	PE-65834NL	
	BT8370/5/6	LOW POWER	—	T1076NL	—	—	PE-65388NL	PE-64936NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65834NL	
CIRRUS LOGIC (CRYSTAL)	61318	120 E1	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64951NL	PE-65568NL	PE-65835NL	PE-65835NL	
	61318	75 E1	—	—	—	—	T1229NL	PE-64936NL	T1229NL	PE-65778NL	—	PE-68646NL	PE-65835NL		
	61577	T1 & E1	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL	
	61304A/5A/535A/574A,/75	T1	—	T1076NL	—	—	PE-65388NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL	
	61304A/5A/535A/574A,/75	75 E1	—	—	—	PE-68826NL	PE-65389NL	PE-65351NL	PE-68664NL	PE-65771NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65835NL	
	61304A/5A/535A/574A,/75	120 E1	—	—	—	PE-68826NL	PE-65389NL	PE-65351NL	PE-68664NL	PE-65771NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65835NL	
	61582, 61583	—	PE-65870NL	—	PE-68874NL	PE-68874NL	PE-65388NL	PE-65388NL	PE-65770NL	PE-65770NL	—	—	PE-65838NL	PE-65838NL	
	61310, 61581	Host	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64951NL	PE-65568NL	PE-65835NL	PE-65835NL	
	61881	—	—	—	—	—	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL	
	61881	—	—	T1076NL	—	—	PE-65388NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL	
	61584/84A	IQ3	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL	
	61584/82/83/A	IQ5	PE-65870NL	—	PE-68874NL	PE-68874NL	PE-65388NL	PE-65388NL	PE-65770NL	PE-65770NL	—	—	PE-65838NL	PE-65838NL	
	MAXIM (DALLAS)	DS2196	—	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64951NL	PE-65568NL	PE-65838NL	PE-65838NL
		DS2151/2152/2153/2154	—	—	T1076NL	—	—	PE-65388NL	PE-64936NL	PE-65770NL	PE-65778NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65834NL
DS2151/2152/2153/2154		—	—	T1091NL	—	PE-68822NL	PE-65586NL	PE-64936NL	PE-65340NL	PE-65778NL	PE-64921NL	PE-65774NL	PE-65832NL	PE-65834NL	
DS2148/Q48		3V	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64921NL	PE-65568NL	PE-65838NL	PE-65838NL	
DS2148/Q48		5V	—	—	—	—	PE-65586NL	PE-64936NL	PE-65340NL	PE-65778NL	PE-64921NL	PE-65774NL	PE-65832NL	PE-65834NL	
DS21352/Q352,DS21354/Q354		—	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64951NL	PE-65568NL	PE-65838NL	PE-65838NL	
DS21552/Q552,DS21554/Q554		—	—	T1076NL	—	—	PE-65388NL	PE-64936NL	PE-65770NL	PE-65778NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65834NL	
DS21552/Qww52,DS21554/Q554		—	—	T1091NL	—	PE-68822NL	PE-65586NL	PE-64936NL	PE-65340NL	PE-65778NL	PE-64921NL	PE-65774NL	PE-65832NL	PE-65834NL	
EXAR		T5683A, 59L91	—	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65415NL	PE-65415NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL
		T5894,T5897,T5997	—	PE-65861NL	T1090NL	PE-65861NL	PE-68841NL	PE-65415NL	PE-65415NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL
	T5791/93/94/95	—	PE-65 866NL	—	PE-68866NL	PE-68826NL	PE-65389NL	PE-64934NL	PE-68664NL	PE-65778NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65834NL	
	T5894,T5897,T5997	—	—	T1091NL	—	PE-68822NL	PE-64937NL	PE-65415NL	PE-65771NL	PE-65340NL	PE-65771NL	PE-64921NL	PE-65774NL	PE-65832NL	
	83L30/34/38	—	PE-65861NL	T1090NL	PE-65861NL	PE-68841NL	PE-65415NL	PE-65415NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL	
	82L34/38	—	—	—	—	—	—	—	—	—	—	—	—	—	
T5684,T7288,82D20	—	—	T1091NL	—	PE-68822NL	PE-64937NL	PE-65351NL	PE-65340NL	PE-65771NL	PE-64921NL	PE-65774NL	PE-65837NL	PE-65835NL		
INFINEON TECHNOLOGIES	PEB 2254/55	E1/T1 & J1	PE-68786NL	—	—	—	—	—	—	—	—	—	PE-68788NL	PE-68788NL	
INTEL (LEVEL ONE)	LXT 300/301	—	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL	
LXT 304/305/307	T1,E1	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL		
LXT 304/305/307	T1	—	T1076NL	—	—	PE-65388NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL		
LXT 304/305/307	75E1,120E1	—	—	PE-68866NL	PE-68826NL	PE-65389NL	PE-65351NL	PE-68664NL	PE-65771NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65835NL		
LX T 304/305/307	DSX-1, D4	—	—	—	—	PE-65588NL	PE-65351NL	—	—	—	—	—	—		
LXT 310/317/318	—	PE-68678NL	T1094NL	—	—	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64954NL	—	PE-65835NL	PE-65834NL		
LXT 312/ 313/ 315	—	—	—	—	—	PE-64933NL	PE-64936NL	PE-68600NL	PE-65778NL	PE-64950NL	—	PE-65836NL	PE-65834NL		
LXT 331	T1,E1	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64954NL	—	PE-65835NL	PE-65834NL		
LXT 331, LXT 332	—	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL		
LXT 331, LXT 332	—	—	—	—	—	PE-65588NL	PE-65351NL	—	—	—	—	—	—		
LXT 331, LXT 332	—	—	T1076NL	—	—	PE-65388NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL		
LXT 334, LXT 335	T1/E1	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL		
LXT 334, LXT 335	120/75 E1	—	T1091NL	—	PE-68822NL	PE-65586NL	PE-65351NL	PE-65340NL	PE-65771NL	PE-64921NL	PE-65771NL	PE-65832NL	PE-65835NL		
LXT 334, LXT 335	75 E1	—	—	PE-68866NL	PE-68826NL	PE-65389NL	PE-65351NL	PE-68664NL	PE-65771NL	PE-65566NL	PE-65568NL	PE-65839NL	PE-65835NL		
LXT 336	—	PE-65861NL	T1090NL	PE-68828NL	PE-68828NL	—	PE-65351NL	—	PE-65778NL	PE-64951NL	—	—	PE-65835NL		
LXT 350, LXT 351, LXT 359	T1,E1	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64954NL	—	PE-65835NL	PE-65834NL		
LXT 350, LXT 351	—	—	T1076NL	—	—	PE-65388NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL		
LXT 350, LXT 351	120 E1	—	—	—	—	PE-65588NL	PE-65351NL	—	—	—	—	—	—		
LXT 360/361/362/363	T1,E1	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64954NL	—	PE-65835NL	PE-65834NL		
LXT 360/361/362/363	—	—	T1076NL	—	—	PE-65388NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL		
LXT 360, LXT361	120 E1	—	—	—	—	PE-65588NL	PE-65351NL	—	—	—	—	—	—		
LXT 380/381/384/386/388	T1/E1	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64936NL	PE-65771NL	PE-65778NL	PE-64954	—	PE-65835NL	PE-65834NL		
LXT 380/381/384/386/388	T1/E1	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-65351NL	PE-65351NL	PE-65771NL	PE-65771NL	PE-64951NL	—	PE-65835NL	PE-65835NL		
LXT 3104, LXT 3108	—	PE-65861NL	T1090NL	PE-68861NL	PE-68841NL	PE-64936NL	PE-64936NL	PE-65778NL	PE-65778NL	PE-64951NL	—	PE-65835NL	PE-65835NL		
LXT 3104, LXT 3108	—	TX1099NL	TX1099NL	—	—	—	—	—	—	—	—	—	—		
LUCENT TECHNOLOGIES	T7288, T290A	CEPT	—	T1091NL	—	PE-68822NL	PE-65586NL	PE-65415NL	PE-65340NL	PE-65771NL	PE-64921NL	PE-65774NL	PE-65832NL	PE-65835NL	
	T7289A	DS1	—	T1076NL	—	—	PE-65379NL	PE-65351NL	PE-65770NL	PE-65771NL	PE-65565NL	PE-65567NL	PE-65838NL	PE-65835NL	
	T7688, T7690, T7698	CEPT	—	—	PE-68884NL	PE-68884NL	PE-65586NL	PE-65586NL	PE-65340NL	PE-65340NL	—	—	PE-65832NL	PE-65832NL	
	T7689, T7690, T7698	DS1	PE-65870NL	—	PE-68874NL	PE-68874NL	PE-65379NL	PE-65379NL	PE-65770NL	PE-65770NL	—	—	PE-65838NL	PE-65838NL	
	T7693,T7697	CEPT	T1137NL	TX1287NL	—	—	—	—	—	—	—	—	—	—	
	TLIU04C1	DS1	PE-65870NL	—	PE-68874NL	PE-68874NL	PE-65379NL	PE-65379NL	PE-65770NL	PE-65770NL	—	—	PE-65838NL	PE-65838NL	
TLIU04C1	CEPT	—	—	PE-68884NL	PE-68884NL	PE-65586NL	PE-65586NL	PE-65340NL	PE-65340NL	—	—	PE-65832NL	PE-65832NL		
ZARLINK	MT9071, MT9076	—	T1137NL	TX1287NL	—	—	—	—	—	—	—	—	—	—	
	MT9074, MT9075	—	PE-68678NL	T1094NL	PE-68877NL	PE-68877NL	PE-65351NL	PE-64934NL	PE-65771NL	PE-65778NL	PE-64954NL	PE-65568NL	PE-65835NL	PE-65834NL	
PMC-SIERRA	PM4318	—	—	T1091NL	—	PE-68822NL	PE-64937NL	PE-65351NL	PE-65340NL	PE-65771NL	PE				

## Application Notes

- 1. 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-68827NL which is 800 μH minimum and PE-65836NL which is 300 μH minimum. All other parameters are specified at +25°C only. Standard temperature range is 0°C to +70°C.
- 2. ET Product** — All coils have an ET product of 10 V-μsec minimum.
- 3. Flammability** — Materials used in the products are recognized as UL94-VO approved. Products meet the requirements of IEC 695-2-2 (Needle Flame Test).
- 4. Balance Characteristics** — The transformers meet the requirements for longitudinal balance of FCC part 68.
- 5. Common Mode Rejection Ratio** — The CMRR for all transformers is better than 50 dB at 1 MHz. A typical test circuit is shown below.



- 6. 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.



- 7. 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			
TX	9 dB	15 dB	11 dB
RX	12 dB	18 dB	14 dB

- 8. 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

- 9. Isolation Voltage** — 100% of transformers are tested during production to the specified isolation voltage level.

- 10. Safety Agency Recognition** — Parts listed as “Recognized” or “Certified” meet Underwriter Laboratories, UL 1459 and UL 1950 per file E133523 (S).

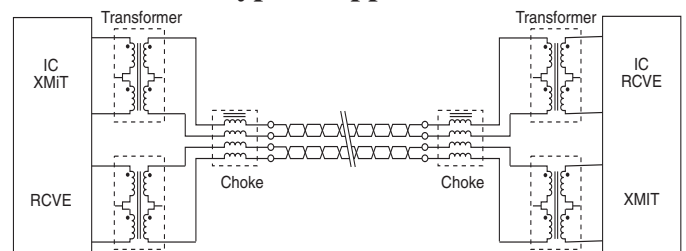
**Transformers with Reinforced Insulation according to IEC950 series PE-68630NL—PE-68788NL (pg. 3) are certified by the following organizations:**

Code	Certificate Information
T	TÜV, EN 60 950/EN 41003, Cert. R9371358, reinforced insulation.
U	UL 1459/UL1950, File E133523 (S), reinforced insulation.

- 11. 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.

- 12. 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 - 6):

- Toleranced leakage inductance: .30 μH min to .55 μH MAX.
- OCL (primary inductance) and LL (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 3 kVrms 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-65837NL	1:1.08	3-5	1:1.36	1 - 5
PE-65839NL	1:1	3-5	1:1.26	1 - 5
PE-68646NL	1:1.58	3-5	1:2	1 - 5
PE-65389NL	1:1	3-5	1:1.26	1 - 5
PE-65566NL	1:1	2-3	1:1.26	1 - 3
PE-65568NL	1:1	2-3	1:1.26	1 - 3
PE-68866NL	1:1	2-3	1:1.26	1 - 3
PE-68826NL	1:1	2-3	1:1.26	1 - 3
PE-68664NL	1:1	3-5	1:1.26	1 - 5
PE-68836NL	1:1	2-3/5-6	1:1.26	1¾ - 6

- Standard packaging for surface mount “AN” and “LA” packages is anti-static tubes. Optional Tape & Reel packaging can be ordered by adding “T” suffix to the part number, (i.e. PE-65866NLT).

- PE-68618NL and PE-64950NL: 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 Ω or 120 Ω with the same transformer). For example T1075NL can be used with the Siemens PEB 2235 to achieve connection to the 75 Ω 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 T1075NL.

# COMMON MODE CHOKES FOR TELECOM APPLICATIONS

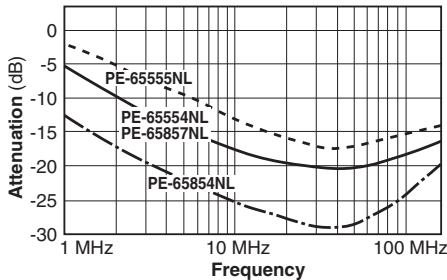
## For EMI Reduction



### Electrical Specifications @ 25°C — Operating Temperature 0°C to 70°C

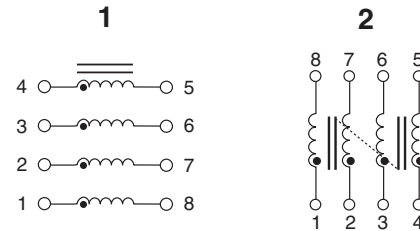
Pulse Part Number	Turns Ratio (±5%)	OCL (μH MIN)	Package/Schematic
<b>HIGH FREQUENCY COMMON MODE CHOKES, 4-LINES</b>			
PE-65554NL	1:1:1:1	24.0	IN/1 (Through Hole)
PE-65555NL	1:1:1:1	8.0	IN/1 (Through Hole)
PE-65854NL	1:1:1:1	47.0	SH/1 (Surface Mount)
PE-65857NL	1:1:1:1	24.0	LA/2 (Surface Mount)

NOTE: For additional Common Mode Chokes, refer to data sheet G002.



Typical common mode attenuation for high-frequency common mode chokes based on a 100 Ω system.

### Schematics



### Mechanicals

#### SH

**SUGGESTED PAD LAYOUT**

#### LA

**SUGGESTED PAD LAYOUT**

#### IN

	SH	LA	IN
<b>Weight</b> . . . . .	0.3 grams	2 grams	2.5 grams
<b>Tape &amp; Reel</b> . . . . .	1500/reel	250/reel	(N/A)
<b>Tube</b> . . . . .	25/tube	30/tube	35/tube

**Dimensions:** Inches / mm

Unless otherwise specified all tolerances are ± .010 / 0.25

### For More Information:

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