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# ISOLATION TRANSFORMERS FOR 10BASE-T

## For Adapter Cards, MAUs, Hubs, and Motherboard Applications



-  Meets IEEE 802.3 specification
-  Available with common mode chokes for EMI suppression
-  Through hole, auto-insertable, 16-pin DIP package

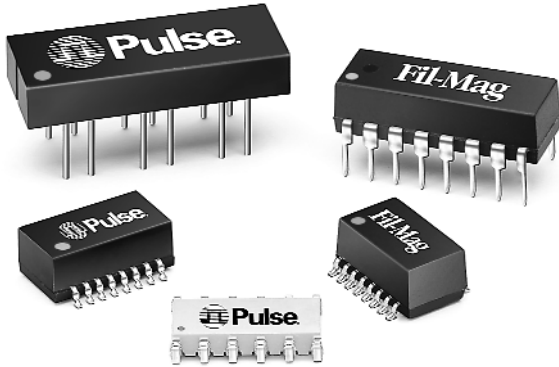
### Electrical Specifications @ 25°C — Operating Temperature 0°C to 70°C




Part <sup>2</sup> Number	Turns Ratio (±5%)		Primary Pins	Common Mode Choke	Sine Wave Inductance OCL <sup>1</sup> (μH MIN)	Interwinding Capacitance C <sub>ww</sub> <sup>1</sup> (pF MAX)	Leakage Inductance L <sub>L</sub> <sup>1</sup> (μH MAX)	DCR (Ω MAX)	Hipot (Vrms)	Schem.	Mech	
	Transmit	Receive										
<b>SURFACE MOUNT<sup>2</sup></b>											pages 6-7	pages 8-9
23Z128SM	1CT:1.414CT	1CT:1CT	6-8/1-3		200	15	0.5	0.4	2000	T4	SMT5	
23Z356SM	1CT:1.414CT	1CT:1CT	6-8/1-3	X	200	12	0.5	0.6	2000	T7	SMT5	
23Z467SM	1CT:2CT	1CT:1CT	6-8/1-3	X	140	12	0.2	0.6	2000	T7	SMT5	
E2023 <sup>4</sup>	1CT: 2.5CT	1CT: 1CT	6-8/1-3	X	200	15	0.5	0.4	2000	T10	SMT4	
E4001	1CT:2CT	1CT:1CT	6-8/1-3	X	112	8	0.3	0.8	3000	T5	SMT4	
EX2024 <sup>3</sup>	1CT: 2.5CT	1CT:1CT	6-8/1-3	X	350	30	0.8	0.6	2000	T10	SMT4	
PE-65454	1:1.414	1:1	3-4/1-2		140	12	0.2	0.4	2000	T1	SMT2	
PE-65726	1CT:1CT	1CT:1CT	1-3/6-8		200	10	0.2	0.3	2000	T4	SMT4	
PE-65745	1CT: 1.414CT	1CT:1CT	6-8/1-3		140	12	0.2	0.3	1500	T4	SMT4	
PE-68023	1CT:2CT	1CT:1CT	1-3/6-8	X	200	12	0.3	1.0	1500	T6	SMT4	
PE-68041	1CT:2CT	1CT:1CT	6-8/1-3		112	8	0.3	0.5	1500	T4	SMT4	
PE-68048	1CT: 1.414CT	1CT:1CT	6-8/1-3	X	110	15	0.4	1.0	1500	T5	SMT4	
PE-68052	2CT:1CT	1CT:1CT	1-3/6-8	X	140	12	0.3	1.0	1500	T6	SMT4	
PE-68810	—	1:1 (4X)	1-2/3-4		140	12	0.2	0.4	2000	T3	SMT4	
PE-68820	1:1.414 (4X)	—	1-2/3-4 5-6/7-8		40	12	0.2	0.4	2000	T3	SMT4	
<b>THROUGH HOLE</b>											pages 6	page 10
23Z128	1CT: 2CT	1CT:1CT	6-8/1-3		140	15	0.5	0.4	2000	T4	TH3	
PE-65263	1CT:1CT	1CT:1CT	1-3/6-8		200	15	0.25	0.3	2000	T4	TH4	

1. OCL, C<sub>ww</sub> and L<sub>L</sub> are measured at 20 mVrms, 100 kHz.
2. For Tape & Reel packaging, add the suffix "T" to the end of the part number when ordering. e.g. E2023T.
3. Part numbers denoted "EX" are extended temperature parts -40°C to 85°C, electrical specifications @ 25°C.
4. E2023NL is the RoHS compliant version of E2023.

# ISOLATION TRANSFORMERS FOR ETHERNET

## AUI Transformers



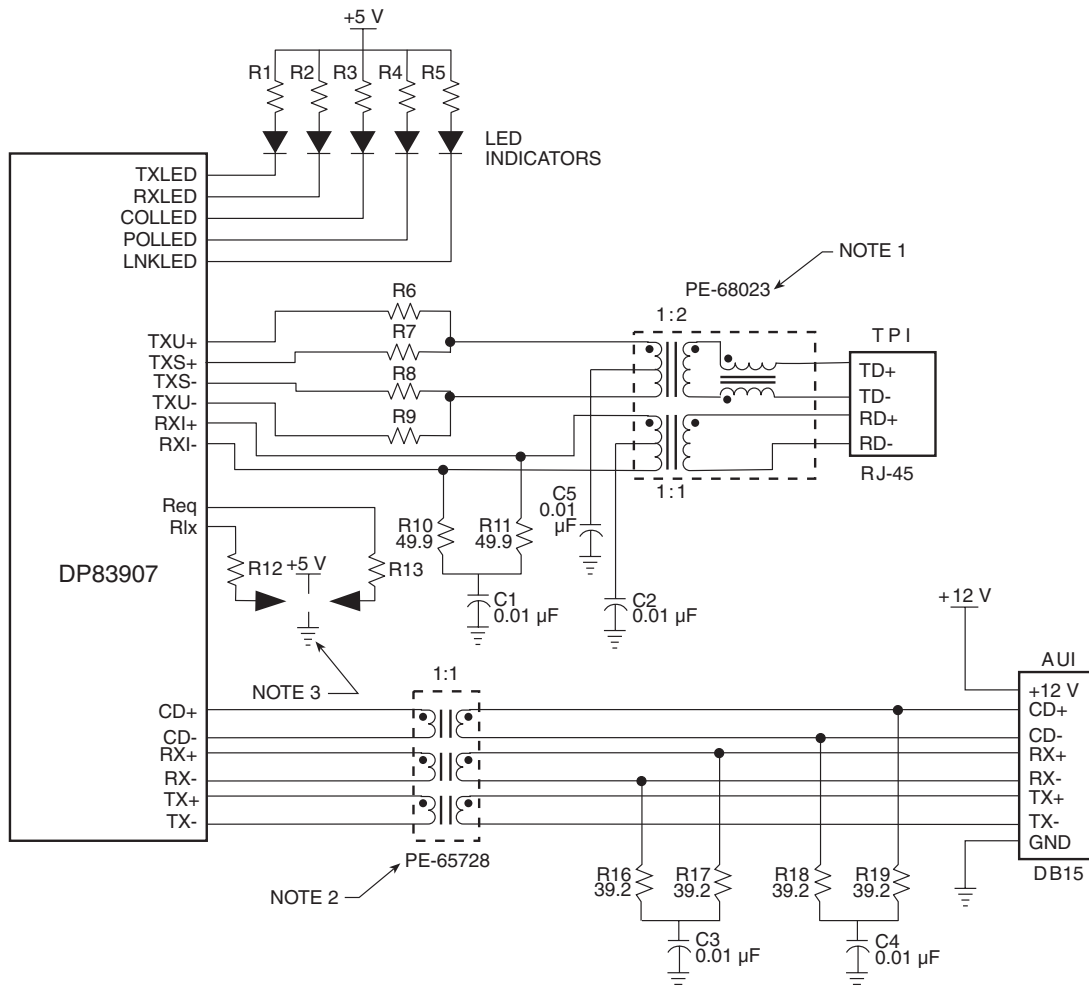
-  Low leakage inductance and coupling capacitance for faster rise times
-  Small form factor, 50 mil lead spacing
-  Through hole, auto-insertable, 16-pin DIP package

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

Part Number <sup>3</sup>	Turns Ratio (±5%)	Primary Pins	Primary Sine Wave OCL <sup>1</sup> (μH ±20%)	Primary ET-Constant (V-μs MIN)	Rise Time <sup>2</sup> (ns MAX)	Interwinding Capacitance C <sub>ww</sub> <sup>1</sup> (pF MAX)	Leakage Inductance L <sub>L</sub> <sup>1</sup> (μH MAX)	DCR (Ω MAX)	Schem.	Mech.	Hipot (Vrms)
<b>SURFACE MOUNT<sup>3</sup></b>										page 6	pages 8-9
23Z90SM	1:1	1-2/4-5/7-8	75	2.4	3.0	10	0.20	0.20	T2	SMT5	2000
23Z91SM	1:1	1-2/4-5/7-8	100	2.4	3.0	10	0.20	0.30	T2	SMT5	2000
23Z108SM <sup>5</sup>	1:1	1-2/4-5/7-8	350	2.5	3.5	16	0.30	0.35	T2	SMT5	2000
PE-65723	1:1	1-2/4-5/7-8	75	1.8	3.0	8	0.20	0.30	T2	SMT4	2000
PE-65727	1:1	1-2/4-5/7-8	150	1.2	3.0	12	0.20	0.30	T2	SMT4	2000
PE-65728	1:1	1-2/4-5/7-8	100	1.8	3.0	9	0.20	0.30	T2	SMT4	2000
<b>THROUGH HOLE</b>										pages 6	page 9-10
PE-64102	1:1	1-2/4-5/7-8	75	2.1	3.0	10	0.20	0.20	T2	TH4	500
PE-64103	1:1	1-2/4-5/7-8	100	2.1	3.0	10	0.20	0.30	T2	TH4	500
PE-64104	1:1	1-2/4-5/7-8	150	2.1	3.5	12	0.20	0.30	T2	TH4	500
PE-64108	1:1	1-2/4-5/7-8	100	2.1	3.5	10	0.25	0.40	T2	TH2	2000
PE-64109	1:1	1-2/4-5/7-8	150	3.0	3.0	15	0.20	0.45	T2	TH2	2000
PE-64502	1:1	1-2/4-5/7-8	75	2.1	3.0	10	0.20	0.20	T2	TH4	2000
PE-64503	1:1	1-2/4-5/7-8	100	2.1	3.0	10	0.20	0.30	T2	TH4	2000

1. OCL, C<sub>ww</sub> and L<sub>L</sub> are measured at 20 mVrms, 100 kHz.
2. Rise time is measured in 75 Ω systems.
3. For Tape & Reel packaging, add a suffix "T" to the end of the part number when ordering. e.g. PE-65723T.

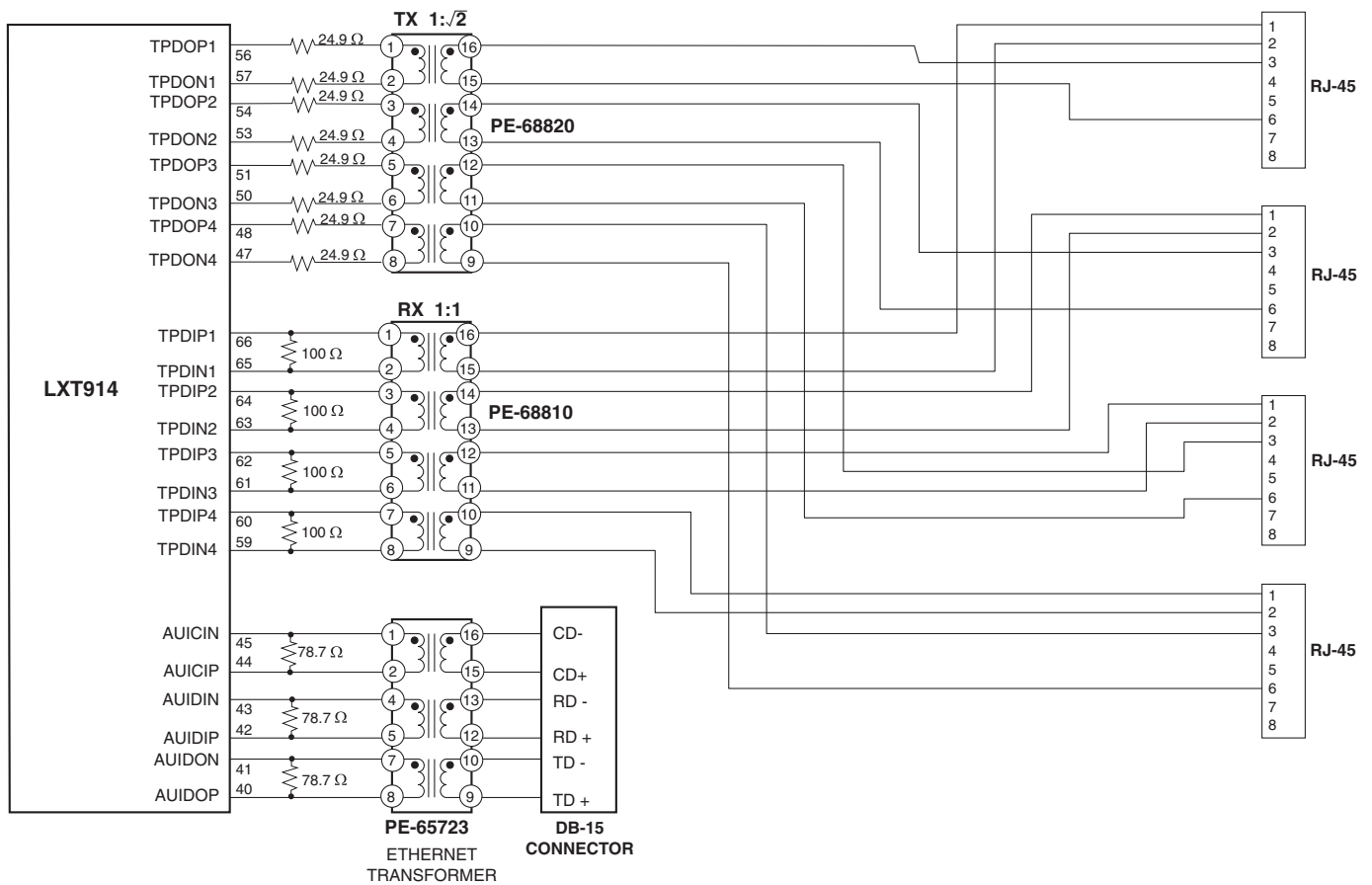
## Typical Application Circuit



**NOTES:**

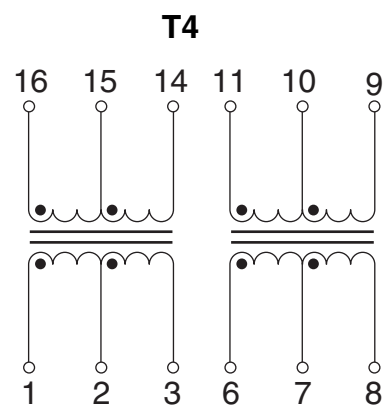
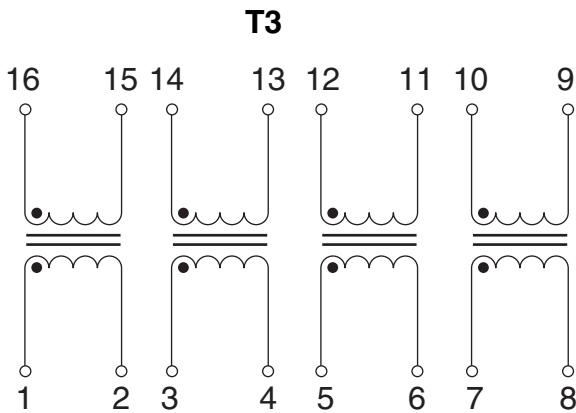
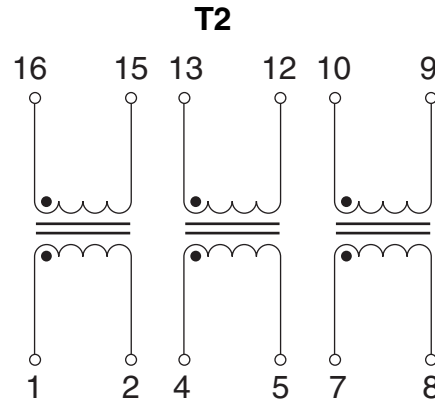
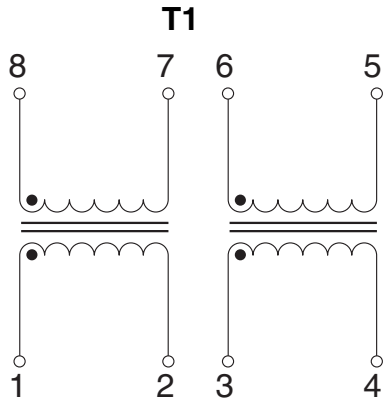
1. Connections at pins 12 and 13 apply to PE-68023 only. These are test points. **Do not ground.**
2. For specific information, see pages 2 and 3 in this catalog.
3. For specific connection, refer to National's Application Notes.

## Typical 10Base-T Application Circuit



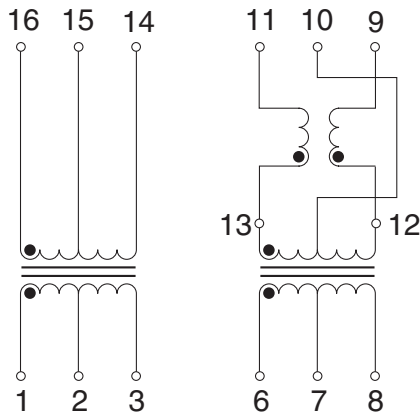
## Schematics

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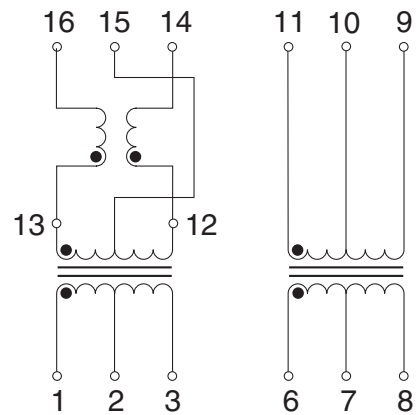


## Schematics (continued)

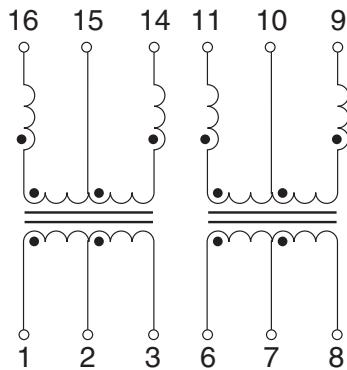
**T5**



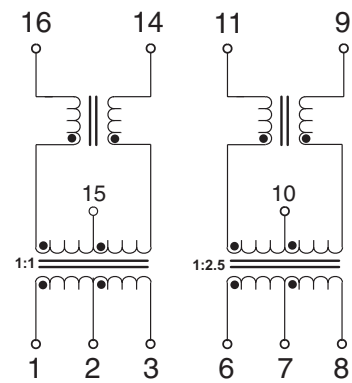
**T6**



**T7**



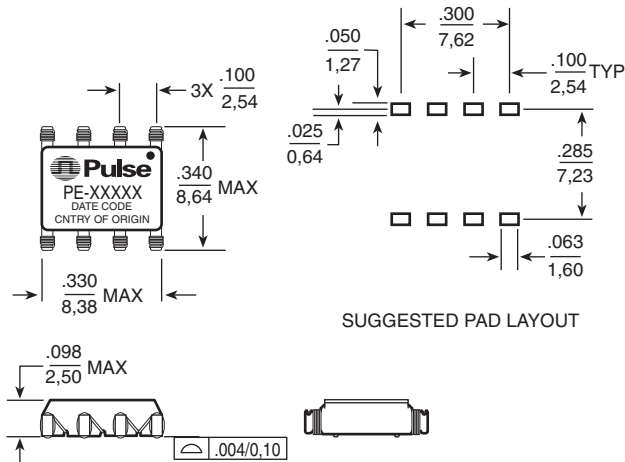
**T10**



PINS 4, 5, 12 AND 13 NOT CONNECTED.

## Surface Mount Mechanicals

### SMT2



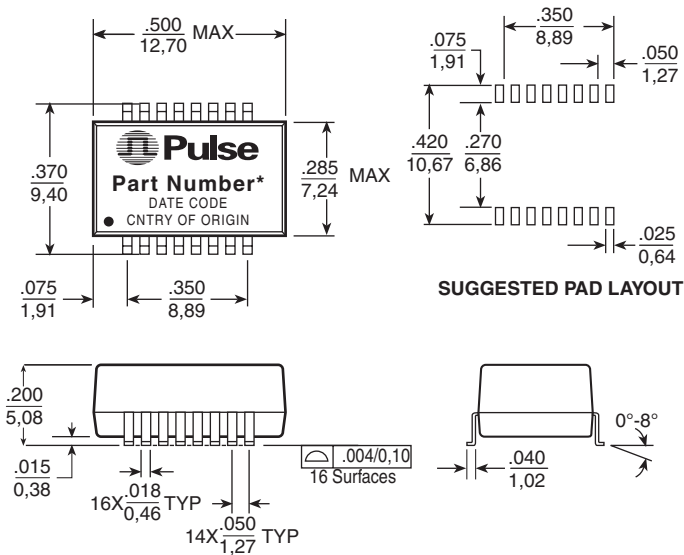
Dimensions:  $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are  $\pm \frac{.010}{0,25}$

Weight .....0.22 grams  
 Tube ..... .60/tube  
 Tape & Reel ..... .1500/reel

### SMT4

\*PE-6XXXX, EXXX, EX2XXX



Dimensions:  $\frac{\text{Inches}}{\text{mm}}$

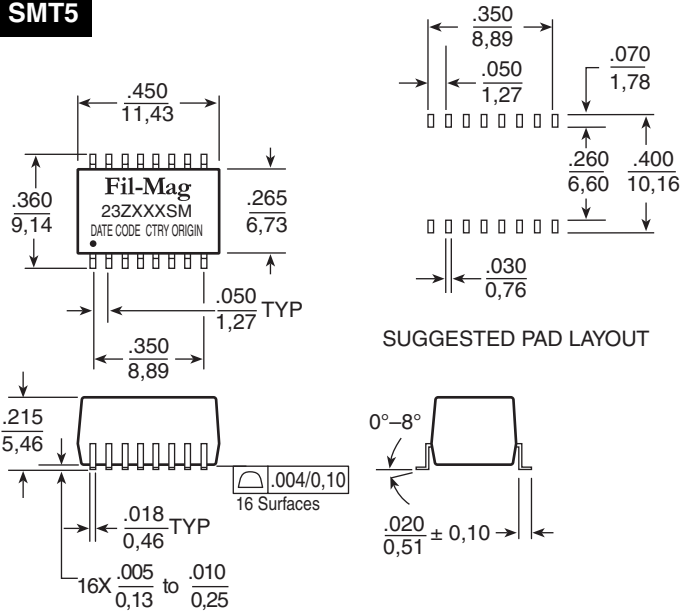
Unless otherwise specified, all tolerances are  $\pm \frac{.010}{0,25}$

Weight .....0.82 grams  
 Tube ..... .40/tube  
 Tape & Reel ..... .900/reel



## Surface Mount Mechanicals *(continued)*

### SMT5



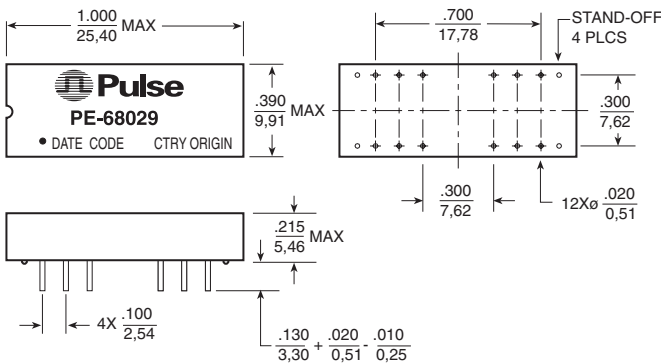
Dimensions:  $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are  $\pm \frac{.005}{0,13}$

Weight ..... .085 grams  
 Tube ..... .50/tube  
 Tape & Reel ..... .750/reel

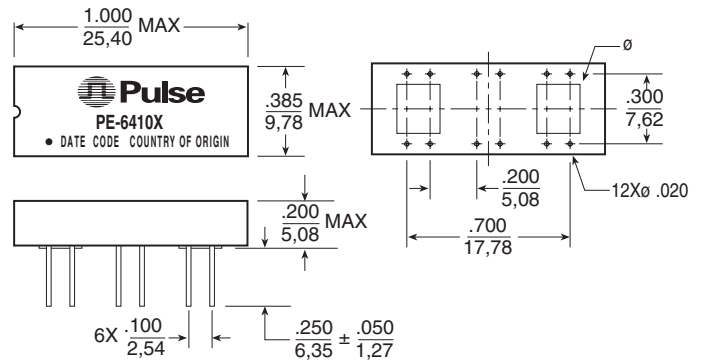
## Through Hole Mechanicals

### TH1



Weight ..... .217 grams  
 Tube ..... .20/tube

### TH2

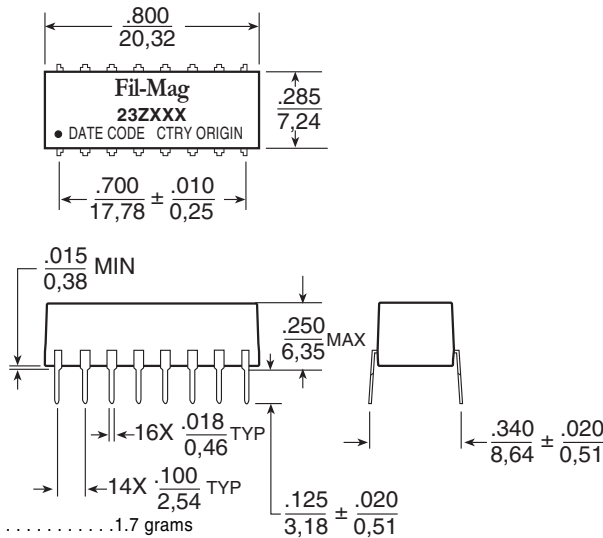


Weight ..... .218 grams  
 Tube ..... .20/tube

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

## Through Hole Mechanicals - *continued*

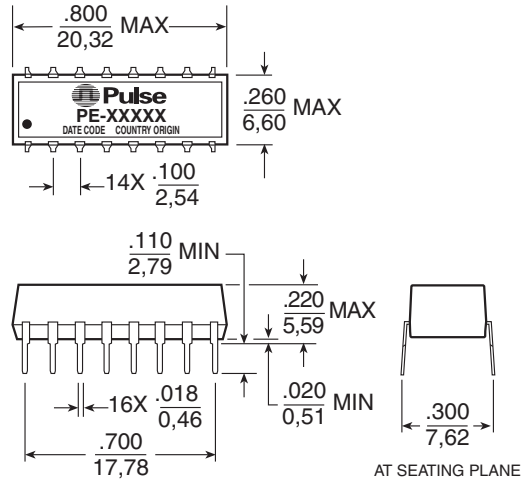
**TH3**



**Dimensions:**  $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are  $\pm \frac{.005}{0,13}$

**TH4**



**Dimensions:**  $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are  $\pm \frac{.010}{0,25}$

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