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ISOLATION TRANSFORMERS FOR 10BASE-T

For Adapter Cards, MAUs, Hubs, and Motherboard Applications



- ⊕ For RoHS part add suffix **NL**⁴
- ⊕ RoHS “**NL**” peak solder rating 260°C, non-RoHS peak solder rating 235°C
- ⊕ 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

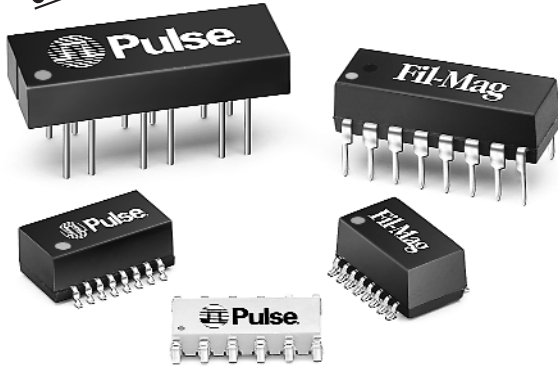
Part Number	RoHS ⁴	Turns Ratio (±5%)		Primary Pins	Common Mode Choke	Sine Wave Inductance OCL ¹ (μH MIN)	Interwinding Capacitance C _{ww} ¹ (pF MAX)	Leakage Inductance L _L ¹ (μH MAX)	DCR (Ω MAX)	Hipot (Vrms)	Schem.	Mech.	
		Transmit	Receive										
SURFACE MOUNT²												pages 6-7	pages 8-9
23Z114SM	5, 6c	1CT:1CT	1CT:1CT	1-3/6-8		200	12	0.3	0.3	2000	T4	SMT5	
23Z128SM	5, 6c	1CT:1.414CT	1CT:1CT	6-8/1-3		200	15	0.5	0.4	2000	T4	SMT5	
23Z356SM	5, 6c	1CT:1.414CT	1CT:1CT	6-8/1-3	X	200	12	0.5	0.6	2000	T7	SMT5	
23Z435SM	5, 6c	2CT:1CT	1CT:1CT	1-3/6-8		100	10	0.4	0.5	2000	T4	SMT5	
23Z467SM	5, 6c	1CT:2CT	1CT:1CT	6-8/1-3	X	140	12	0.2	0.6	2000	T7	SMT5	
E2023	NL ^{6a}	1CT: 2.5CT	1CT: 1CT	6-8/1-3	X	200	15	0.5	0.4	2000	T10	SMT4	
E4001	5, 6c	1CT:2CT	1CT:1CT	6-8/1-3	X	112	8	0.3	0.8	3000	T5	SMT4	
E4005	5, 6c	1CT: 2.5CT	1CT: 1CT	6-8/1-3	X	200	10	0.4	0.5	1500	T10	SMT4	
E5017	5, 6c	1CT:1CT	1CT:1CT	1-3/6-8	X	200	10	0.25	1.0	1500	T6	SMT4	
EX2024 ³	5, 6a	1CT: 2.5CT	1CT:1CT	6-8/1-3	X	350	30	0.8	0.6	2000	T10	SMT4	
PE-65454	5, 6a	1:1.414	1:1	3-4/1-2		140	12	0.2	0.4	2000	T1	SMT2	
PE-65726	5, 6c	1CT:1CT	1CT:1CT	1-3/6-8		200	10	0.2	0.3	2000	T4	SMT4	
PE-65745	5, 6c	1CT: 1.414CT	1CT:1CT	6-8/1-3		140	12	0.2	0.3	2000	T4	SMT4	
PE-68023	5, 6c	1CT:2CT	1CT:1CT	1-3/6-8	X	200	12	0.3	1.0	1500	T6	SMT4	
PE-68041	5, 6c	1CT:2CT	1CT:1CT	6-8/1-3		112	8	0.3	0.5	1500	T4	SMT4	
PE-68042	5, 6c	2.828CT:1	1:1	2-4/7-9		200	14	1	0.5	1500	T9	SMT1	
PE-68048	5, 6c	1CT: 1.414CT	1CT:1CT	6-8/1-3	X	110	15	0.4	1.0	1500	T5	SMT4	
PE-68052	5, 6c	2CT:1CT	1CT:1CT	1-3/6-8	X	140	12	0.3	1.0	1500	T6	SMT4	
PE-68810	5, 6c	—	1:1 (4X)	1-2/3-4		140	12	0.2	0.4	2000	T3	SMT4	
PE-68820	5, 6c	1:1.414 (4X)	—	1-2/3-4 5-6/7-8		140	12	0.2	0.4	2000	T3	SMT4	
THROUGH HOLE												pages 6-7	page 10
23Z128	5, 6a	1CT: 2CT	1CT:1CT	6-8/1-3		140	15	0.5	0.4	2000	T4	TH3	
23Z435	5, 6a	2CT:1CT	1CT:1CT	1-3/6-8		80	10	0.4	0.5	2000	T4	TH3	
PE-65263	5, 6a	1CT:1CT	1CT:1CT	1-3/6-8		200	15	0.25	0.3	2000	T4	TH4	

NOTES:

1. OCL, C_{ww} and L_L are measured at 20 mVrms, 100 kHz.
2. For Tape & Reel packaging, add a 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. Add suffix **NL** for RoHS compliant parts, e.g: E2023 changes to E2023**NL** or E2023**NLT** (for Tape & Reel).
5. Contact Pulse for RoHS compliant part availability.
6. MSL=Moisture Sensitivity Level a=1 b=2 c=3 d=4 e=5.

ISOLATION TRANSFORMERS FOR ETHERNET

AUI Transformers



- ⊕ For RoHS part add suffix **NL**⁴
- ⊕ RoHS “NL” peak solder rating 260°C, non-RoHS peak solder rating 235°C
- ⊕ 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

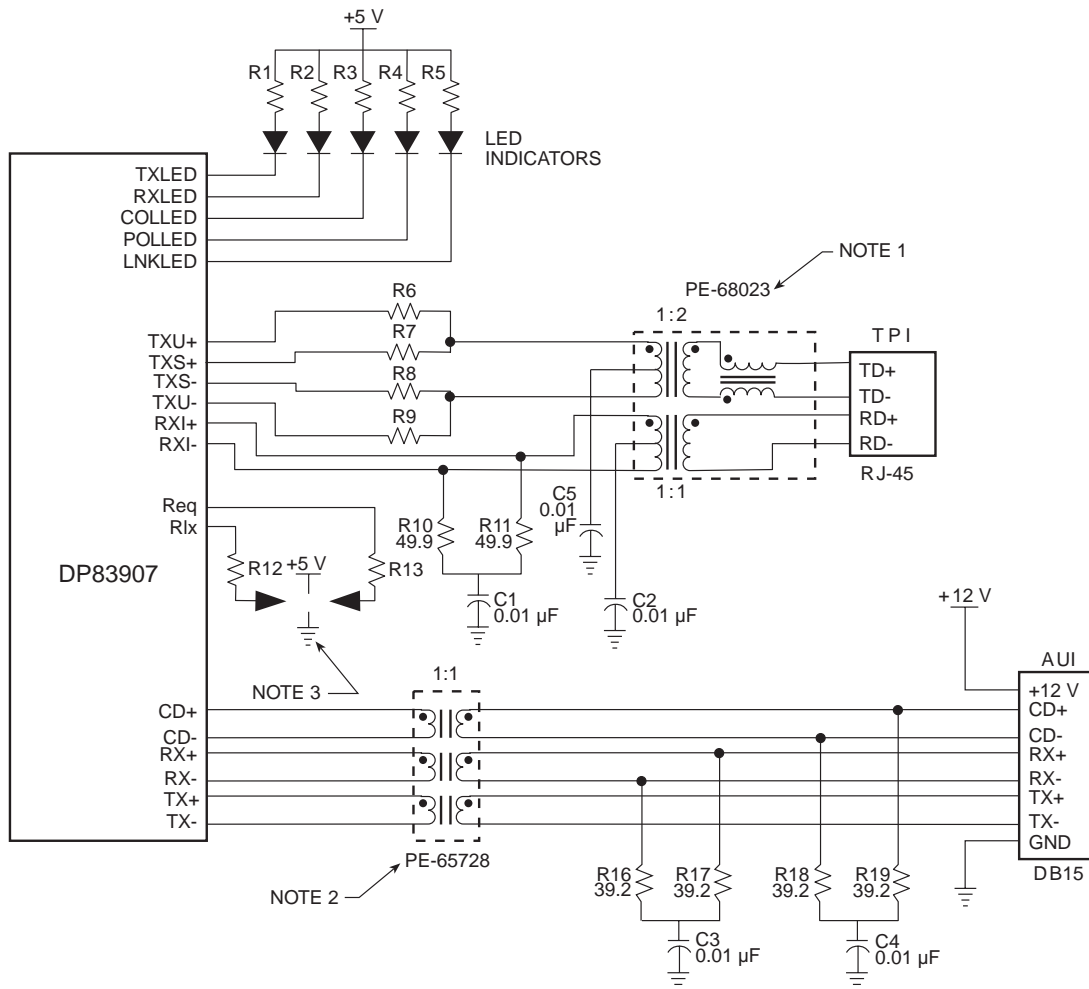
Electrical Specifications @ 25°C — Operating Temperature 0°C to 70°C

Part ³ Number	RoHS ⁴	Turns Ratio (±5%)	Primary Pins	Primary Sine Wave OCL ¹ (μH ±20%)	Primary ET-Constant (V-μs MIN)	Rise Time ² (ns MAX)	Interwinding Capacitance C _{ww} ¹ (pF MAX)	Leakage Inductance L _L ¹ (μH MAX)	DCR (Ω MAX)	Schem.	Mech.	Hipot (Vrms)	
SURFACE MOUNT³												pages 6-7	pages 8-9
23Z90SM	5, 6c	1:1	1-2/4-5/7-8	75	2.4	3.0	10	0.20	0.20	T2	SMT5	2000	
23Z91SM	5, 6c	1:1	1-2/4-5/7-8	100	2.4	3.0	10	0.20	0.30	T2	SMT5	2000	
23Z108SM	5, 6c	1:1	1-2/4-5/7-8	350	2.5	3.5	16	0.30	0.35	T2	SMT5	2000	
E6002	5, 6c	1:1	1-2/4-5/7-8	40 (MIN)	2.1	3.0	8	0.20	0.25	T2	SMT4	2000	
PE-65723	5, 6c	1:1	1-2/4-5/7-8	75	1.8	3.0	8	0.20	0.30	T2	SMT4	2000	
PE-65727	5, 6c	1:1	1-2/4-5/7-8	150	1.2	3.0	12	0.20	0.30	T2	SMT4	2000	
PE-65728	5, 6c	1:1	1-2/4-5/7-8	100	1.8	3.0	9	0.20	0.30	T2	SMT4	2000	
PE-68801	5, 6c	1:1	1-2/3-4/5-6	75	1.8	3.0	12	0.20	0.30	T8	SMT3	2000	
THROUGH HOLE												pages 6-7	page 10
PE-64102	5, 6a	1:1	1-2/4-5/7-8	75	2.1	3.0	10	0.20	0.20	T2	TH4	500	
PE-64103	5, 6a	1:1	1-2/4-5/7-8	100	2.1	3.0	10	0.20	0.30	T2	TH4	500	
PE-64104	5, 6a	1:1	1-2/4-5/7-8	150	2.1	3.5	12	0.20	0.30	T2	TH4	500	
PE-64107	5, 6a	1:1	1-2/4-5/7-8	75	2.4	3.5	10	0.25	0.30	T2	TH2	2000	
PE-64108	5, 6a	1:1	1-2/4-5/7-8	100	2.1	3.5	10	0.25	0.40	T2	TH2	2000	
PE-64109	5, 6a	1:1	1-2/4-5/7-8	150	3.0	3.0	15	0.20	0.45	T2	TH2	2000	
PE-64502	5, 6a	1:1	1-2/4-5/7-8	75	2.1	3.0	10	0.20	0.20	T2	TH4	2000	
PE-64503	5, 6a	1:1	1-2/4-5/7-8	100	2.1	3.0	10	0.20	0.30	T2	TH4	2000	

NOTES:

1. OCL, C_{ww} and L_L 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.
4. Add suffix **NL** for RoHS compliant parts, e.g: 23Z91SM changes to 23Z91SMNL or 23Z91SMNLT (for Tape & Reel).
5. Contact Pulse for RoHS compliant part availability.
6. MSL=Moisture Sensitivity Level a=1 b=2 c=3 d=4 e=5.

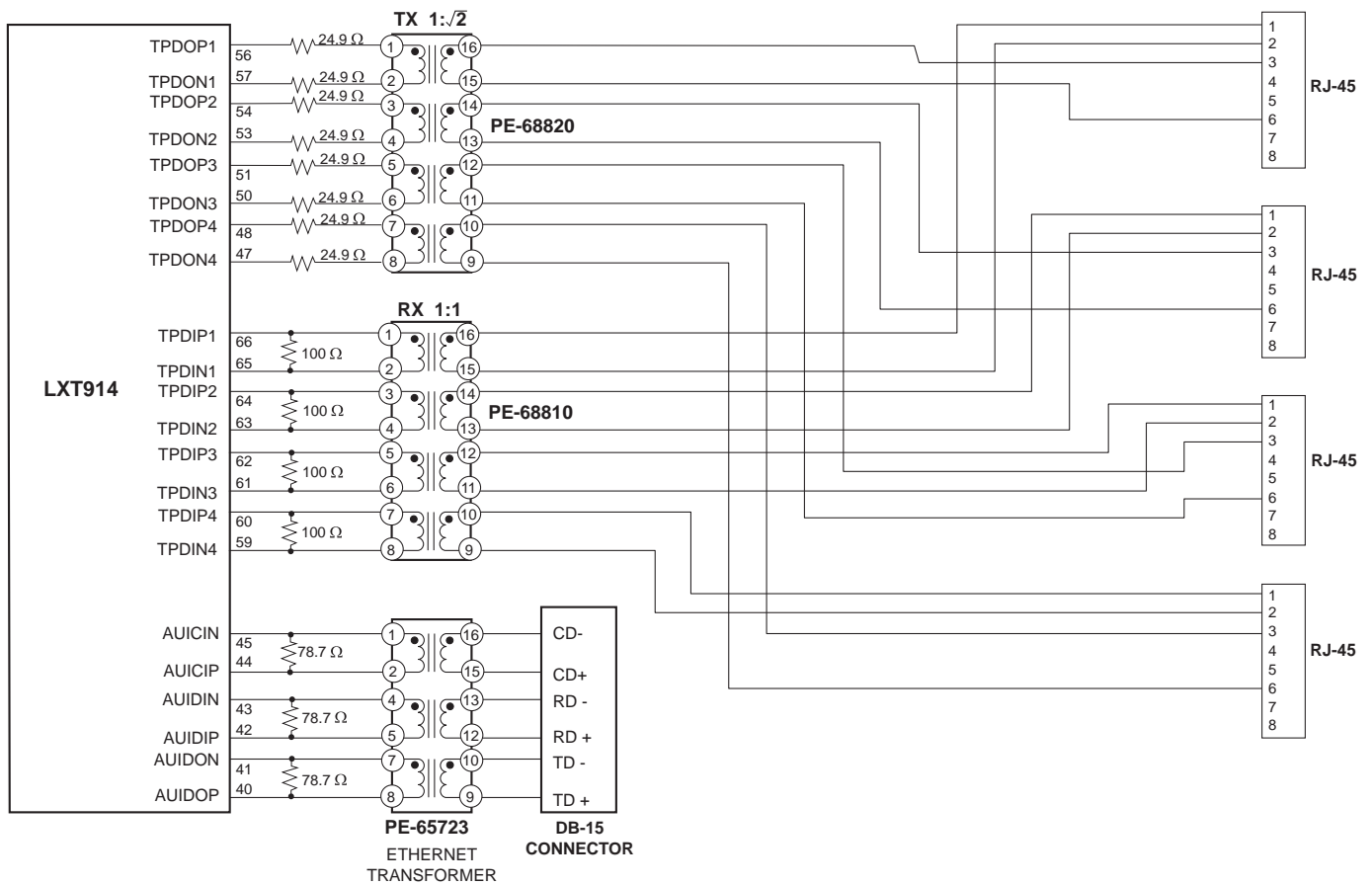
Typical Application Circuit



NOTES:

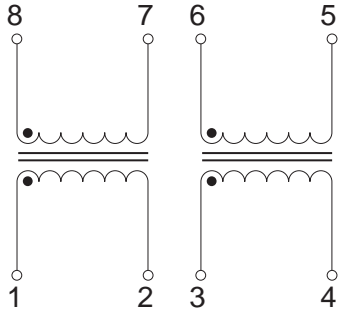
1. Connections at pins 12 and 13 apply to PE-68023 only. These are test points. **Do not ground.**
2. For specific information, see pages 2 and 3 in this catalog.
3. For specific connection, refer to National's Application Notes.

Typical 10Base-T Application Circuit

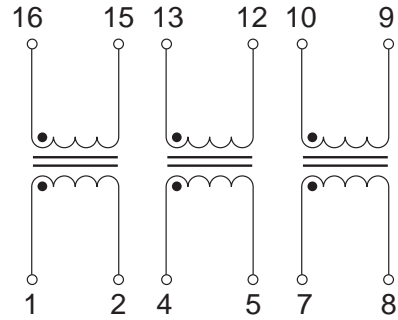


Schematics

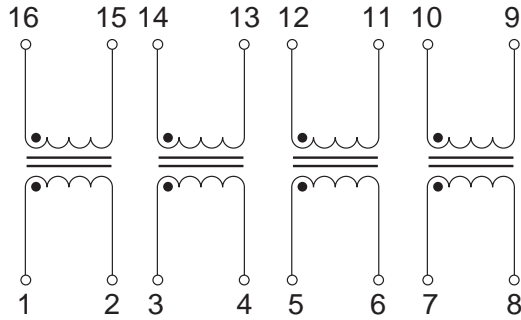
T1



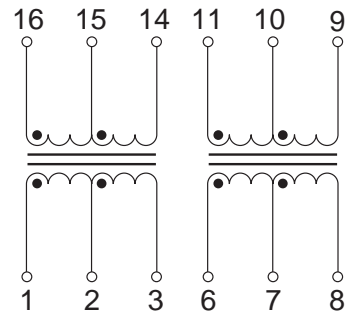
T2



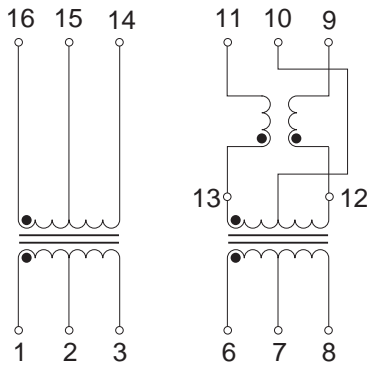
T3



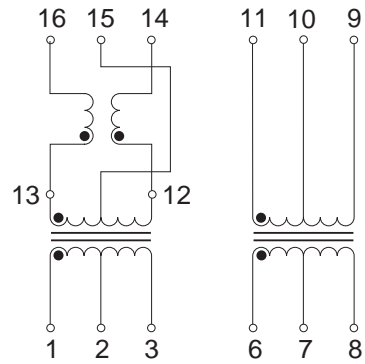
T4



T5

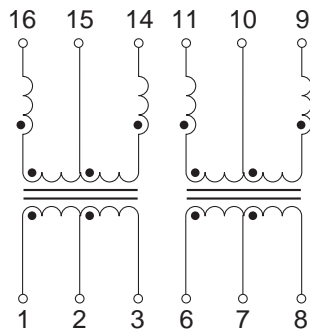


T6

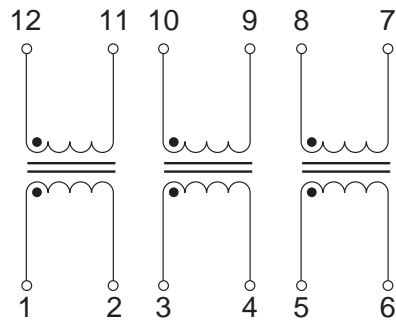


Schematics (continued)

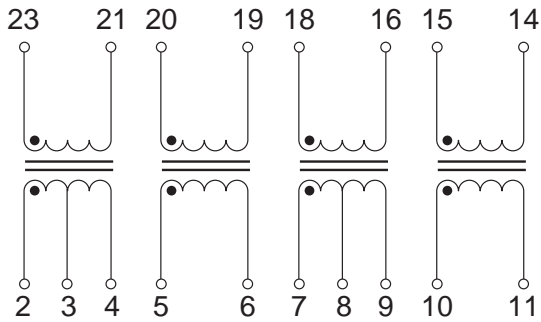
T7



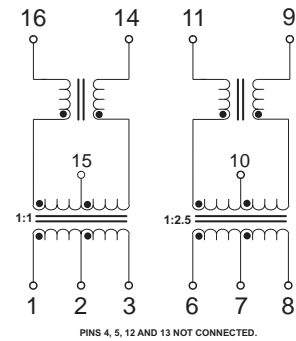
T8



T9

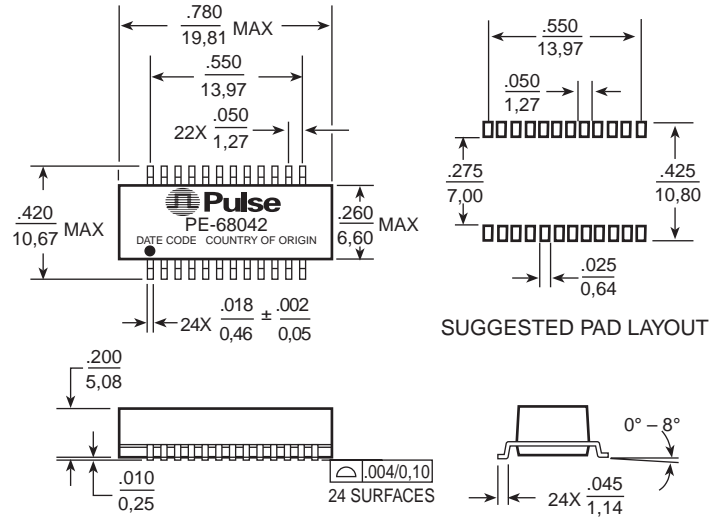


T10



Surface Mount Mechanicals

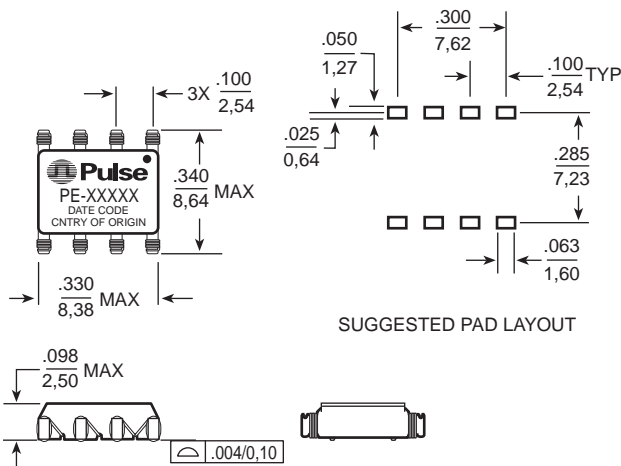
SMT1



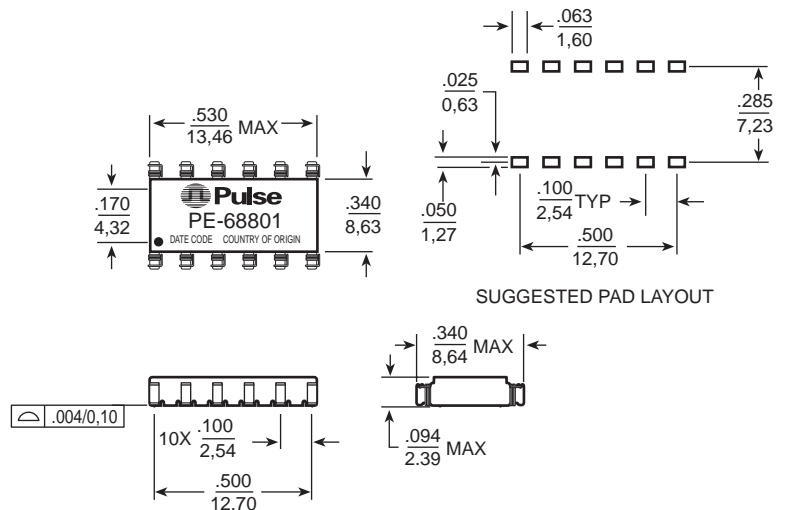
Dimensions: Inches
mm
Unless otherwise specified,
all tolerances are ± .010
0,25

Weight 1.15 grams
Tube25/tube
Tape & Reel350/reel

SMT2



SMT3



Weight022 grams
Tube60/tube
Tape & Reel1500/reel

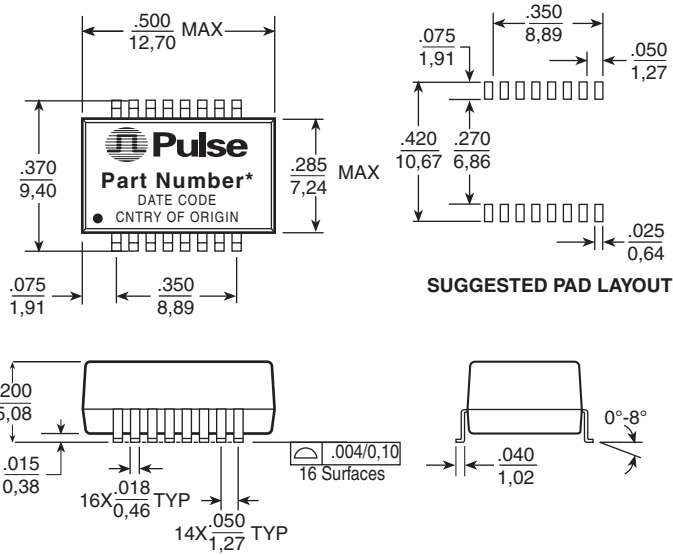
Dimensions: Inches
mm Unless otherwise specified, all tolerances are ± .010
0,25

Weight028 grams
Tube35/tube
Tape & Reel1500/reel

Surface Mount Mechanicals *(continued)*

SMT4

*PE-6XXXX, EXXX, EX2XXX



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

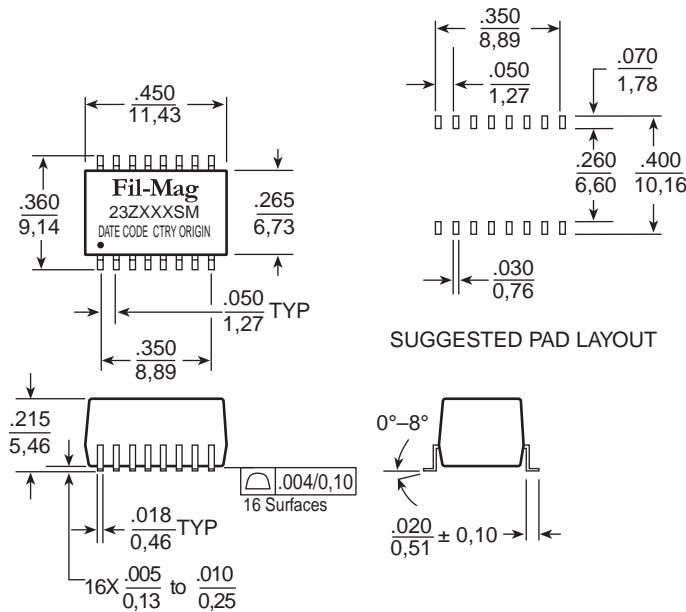
Unless otherwise specified, all tolerances are $\pm \frac{.010}{0,25}$

Weight082 grams

Tube40/tube

Tape & Reel900/reel

SMT5



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

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

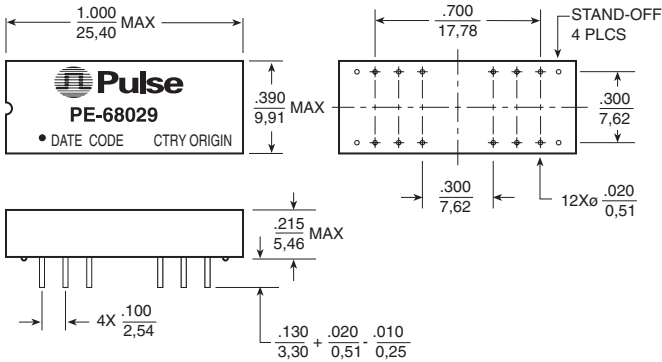
Weight085 grams

Tube50/tube

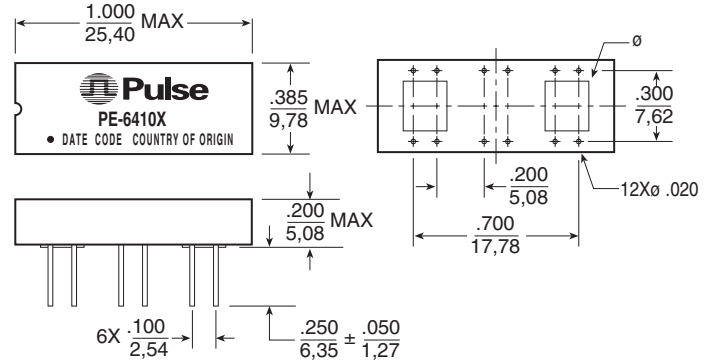
Tape & Reel750/reel

Through Hole Mechanicals

TH1



TH2

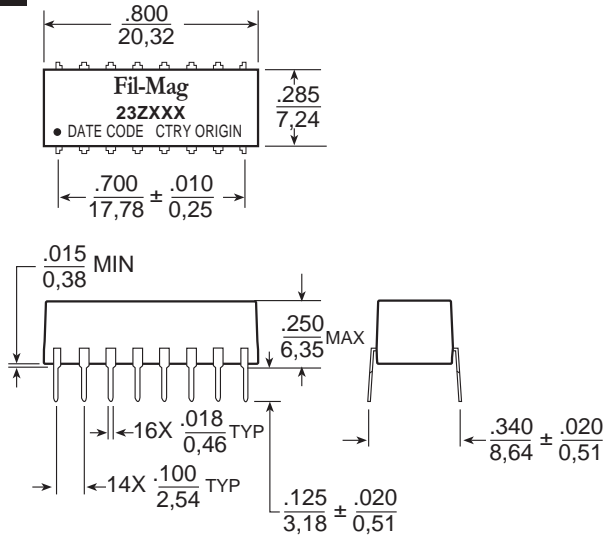


Weight 2.17 grams
 Tube20/tube

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

Weight 2.18 grams
 Tube20/tube

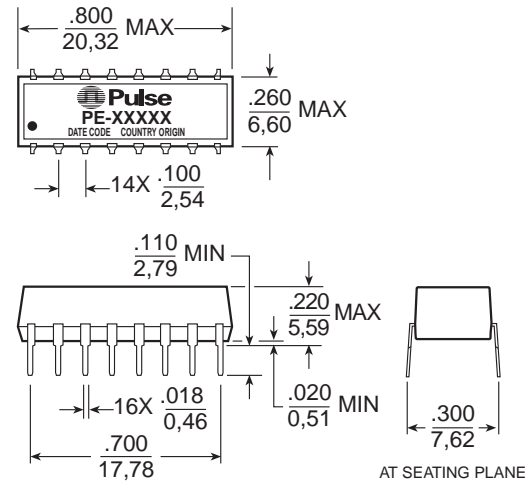
TH3



Weight 1.7 grams
 Tube28/tube

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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