

DC-DC Converter Transformers Series

PICO

5-48V Input, Up to 300V Output, Up to 40W, DC-DC Converter Transformer

Electronics, Inc.

PRODUCT OVERVIEW

Pico DC-DC converter transformers are ultra-miniature in size as the energy driver to the switch-mode power supplies. They are power efficient in reducing core losses and able to be used in a wide variety of energy conversion applications. These are designed to maximum performance at low switching operating frequency and minimal losses. The electrical rectification process of these components are designed for bridge, dual-bridge, and full wave circuit configurations. Though, they are certainly not limited to these topologies.

Typical applications:

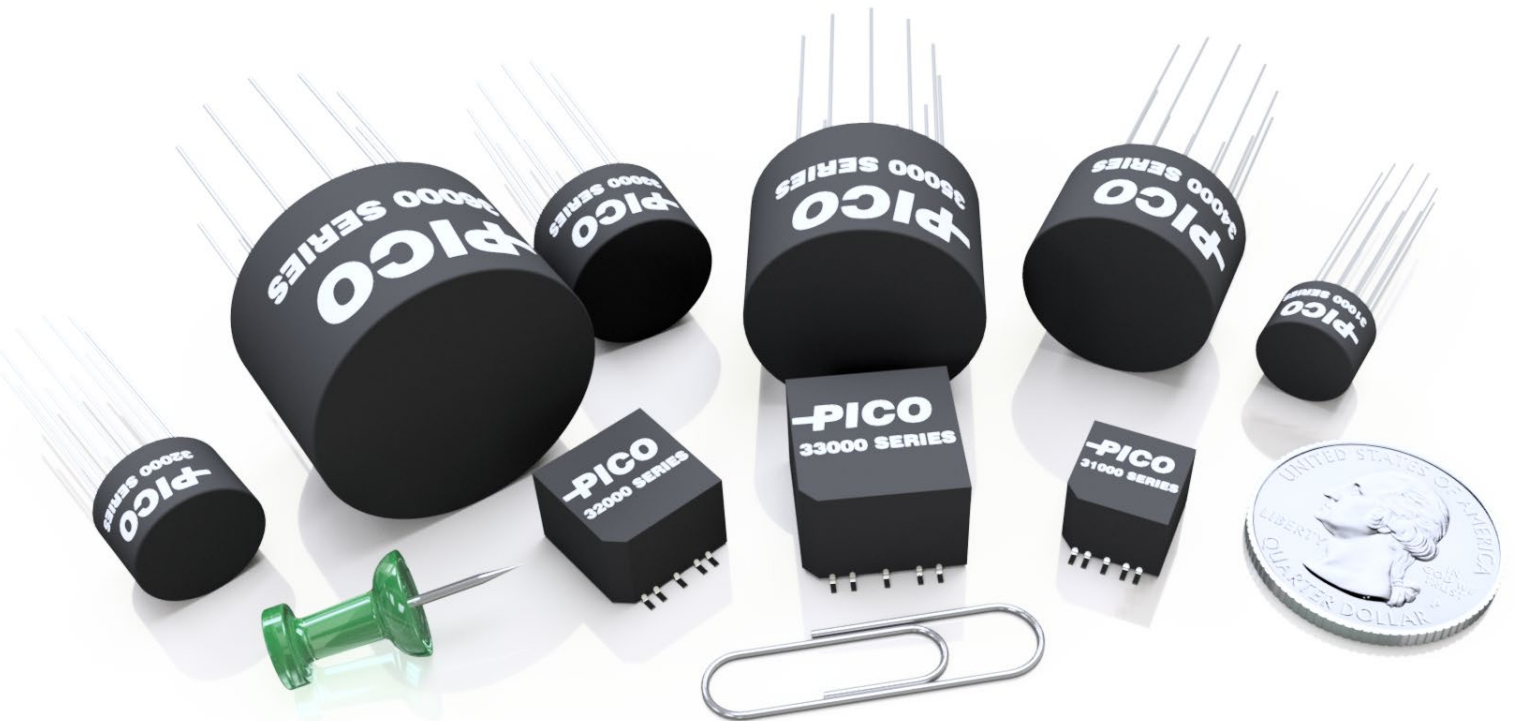
- Servers & Data Processing
- Telecommunication
- Switches
- Aviation Power Systems
- Automation
- EVs
- Medical Equipment

FEATURES

- Extreme resistance to impact, shock, and vibration
- Manufactured to MIL-PRF-27, Class S, Grade 5
- High reliability for space and mission critical applications
- Ultra miniature in size and minimalistic design
- Design layouts in through-hole or surface mount types

Contact Pico for part number of available options:

- Screening and qualification criteria to flight standard
- Fully RoHS compliant or with exemption 7(a)
- Modifications to mechanical design and electrical characteristics
- Custom new design and parameters



SPECIFICATIONS - 5V INPUT

Part Number		Output Voltage			Max. Output Power		Typical Switching Frequency		
Through Hole	Surface Mount	Bridge [VDC]	Full Wave [VDC]	Dual Bridge [VDC]	-55°C to +105°C [W]	-55°C to +70°C [W]	Self Saturated [kHz]	Square Wave Driven ⁽¹⁾	
								Min. [kHz]	Max [kHz]
31021	31420	10	5	±5	1.5	3	15	30	60
31041	31440	12	6	±6	1.5	3	15	30	60
31061	31460	28	14	±14	1.5	3	15	30	60
31081	31480	48	24	±24	1.5	3	20	40	60
31101	31500	100	50	±50	1.5	3	20	40	60
32106	32505	10	5	±5	3	4.5	15	30	60
32126	32525	12	6	±6	3	4.5	15	30	60
32146	32545	28	14	±14	3	4.5	15	30	60
32166	32565	48	24	±24	3	4.5	20	40	60
32186	32585	100	50	±50	3	4.5	20	40	60
32189	32588	150	75	±75	3	-	10	30	60
32192	32591	200	100	±100	3	-	10	30	60
32195	32594	300	150	±150	3	-	10	30	60
33104	33503	10	5	±5	5	7.5	10	20	50
33124	33523	12	6	±6	5	7.5	10	20	50
33144	33543	28	14	±14	5	7.5	10	20	50
33164	33563	48	24	±24	5	7.5	10	20	50
33184	33583	100	50	±50	5	7.5	10	20	50
33187	33586	150	75	±75	5	-	10	30	60
33190	33589	200	100	±100	5	-	10	30	60
33193	33592	300	150	±150	5	-	10	30	60
34501	-	10	5	±5	10	14	10	20	40
34521	-	28	14	±14	10	14	10	20	40
34541	-	48	24	±24	10	14	10	20	40

Note 1: Lower Switching Frequency may be used at lower output power.

SPECIFICATIONS - 12V INPUT

Part Number		Output Voltage			Max. Output Power		Typical Switching Frequency		
Through Hole	Surface Mount	Bridge [VDC]	Full Wave [VDC]	Dual Bridge [VDC]	-55°C to +105°C [W]	-55°C to +70°C [W]	Self Saturated [kHz]	Square Wave Driven ⁽¹⁾	
								Min. [kHz]	Max [kHz]
31121	31520	12	6	±6	1.5	3	15	30	60
31141	31540	24	12	±12	1.5	3	15	30	60
31161	31560	28	14	±14	1.5	3	15	30	60
31181	31580	48	24	±24	1.5	3	20	40	60
31201	31600	100	50	±50	1.5	3	20	40	60
32206	32605	12	6	±6	3	4.5	15	30	60
32226	32625	24	12	±12	3	4.5	15	30	60
32246	32645	28	14	±14	3	4.5	15	30	60
32266	32665	48	24	±24	3	4.5	20	40	60
32286	32685	100	50	±50	3	4.5	20	40	60
32289	32688	150	75	±75	3	-	10	30	60
32292	32691	200	100	±100	3	-	10	30	60
32295	32694	300	150	±150	3	-	10	30	60
33204	33603	12	6	±6	5	7.5	10	30	60
33224	33623	28	14	±14	5	7.5	10	30	60
33244	33643	48	24	±24	5	7.5	10	40	60
33264	33663	100	50	±50	5	7.5	10	40	60
33267	33666	150	75	±75	5	-	10	30	60
33270	33669	200	100	±100	5	-	10	30	60
33273	33672	300	150	±150	5	-	10	30	60
34561	-	24	12	±12	10	14	15	30	50
34581	-	28	14	±14	10	14	15	30	50
34601	-	48	24	±24	10	14	15	30	50
34604	-	100	50	±50	7.5	-	10	30	60
34607	-	150	75	±75	7.5	-	10	30	60
34610	-	200	100	±100	7.5	-	10	30	60
34613	-	300	150	±150	7.5	-	10	30	60
35110	-	24	12	±12	17	25	-	30	60
35130	-	28	14	±14	17	25	-	30	60
35150	-	48	24	±24	17	25	-	30	60

Note 1: Lower Switching Frequency may be used at lower output power.

SPECIFICATIONS - 24V INPUT

Part Number		Output Voltage			Max. Output Power		Typical Switching Frequency		
Through Hole	Surface Mount	Bridge [VDC]	Full Wave [VDC]	Dual Bridge [VDC]	-55°C to +105°C [W]	-55°C to +70°C [W]	Self Saturated [kHz]	Square Wave Driven ⁽¹⁾ Min. [kHz]	Max [kHz]
31221	31620	10	5	±5	1.5	3	15	30	60
31241	31640	28	14	±14	1.5	3	15	30	60
31261	31660	48	24	±24	1.5	3	20	40	60
31281	31680	100	50	±50	1.5	3	20	40	60
32306	32705	10	5	±5	3	4.5	15	30	60
32326	32725	28	14	±14	3	4.5	15	30	60
32346	32745	48	24	±24	3	4.5	20	40	60
32366	32765	100	50	±50	3	4.5	20	40	60
32369	32768	150	75	±75	3	-	10	30	60
32372	32771	200	100	±100	3	-	10	30	60
32375	32774	300	150	±150	3	-	10	30	60
33284	33683	10	5	±5	5	7.5	15	30	60
33304	33703	28	14	±14	5	7.5	15	30	60
33324	33723	48	24	±24	5	7.5	20	40	60
33344	33743	100	50	±50	5	7.5	20	40	60
33347	33746	150	75	±75	5	-	10	30	60
33350	33749	200	100	±100	5	-	10	30	60
33353	33752	300	150	±150	5	-	10	30	60
34621	-	28	14	±14	10	14	15	30	50
34641	-	48	24	±24	10	14	15	30	50
34644	-	100	50	±50	7.5	-	10	30	60
34647	-	150	75	±75	7.5	-	10	30	60
34650	-	200	100	±100	7.5	-	10	30	60
34653	-	300	150	±150	7.5	-	10	30	60
35170	-	24	12	±12	17	25	-	30	60
35190	-	28	14	±14	17	25	-	30	60
35210	-	48	24	±24	17	25	-	30	60
36710	-	48	24	±24	25	40	-	30	60
36730	-	56	28	±28	25	40	-	30	60

Note 1: Lower Switching Frequency may be used at lower output power.

SPECIFICATIONS - 48V INPUT

Part Number		Output Voltage			Max. Output Power		Typical Switching Frequency		
Through Hole	Surface Mount	Bridge [VDC]	Full Wave [VDC]	Dual Bridge [VDC]	-55°C to +105°C [W]	-55°C to +70°C [W]	Self Saturated [kHz]	Square Wave Driven ⁽¹⁾ Min. [kHz]	Max [kHz]
31301	31700	24	12	±12	1.5	3	15	30	60
31321	31720	48	24	±24	1.5	3	15	40	60
31341	31740	100	50	±50	1.5	3	20	40	60
31361	31760	150	75	±75	1.5	3	20	40	60
32386	32785	24	12	±12	3	4.5	15	30	60
32406	32805	48	24	±24	3	4.5	20	40	60
32426	32825	100	50	±50	3	4.5	20	40	60
32446	32845	150	75	±75	3	4.5	20	40	60
32449	32848	200	100	±100	3	4.5	10	30	60
32452	32851	300	150	±150	3	4.5	10	30	60
33364	33763	24	12	±12	5	7.5	15	30	60
33384	33783	48	24	±24	5	7.5	20	40	60
33404	33803	100	50	±50	5	7.5	20	40	60
33424	33823	150	75	±75	5	7.5	20	40	60
33427	33826	200	100	±100	5	-	10	30	60
33430	33829	300	150	±150	5	-	10	30	60
34661	-	24	12	±12	10	14	15	30	50
34681	-	48	24	±24	10	14	15	30	50
34701	-	56	28	±28	10	14	15	30	50
34704	-	100	50	±50	7.5	-	10	30	60
34707	-	150	75	±75	7.5	-	10	30	60
34710	-	200	100	±100	7.5	-	10	30	60
34713	-	300	150	±150	7.5	-	10	30	60
35230	-	24	12	±12	17	25	-	30	60
35250	-	48	24	±24	17	25	-	30	60
35270	-	56	28	±28	17	25	-	30	60
36750	-	48	24	±24	25	40	-	30	60
36770	-	56	28	±28	25	40	-	30	60
36790	-	100	50	±50	25	40	-	30	60

Note 1: Lower Switching Frequency may be used at lower output power.

SPECIFICATIONS

GENERAL

Parameter	Condition	Min.	Typ.	Max.	Units	
Primary Voltage	5V models	-	5	-	VDC	
	12V models	-	12	-		
	24V models	-	24	-		
	48V models	-	48	-		
Switching Frequency	Square wave driven	20	45	60	kHz	
Output Voltage	Bridge	10	-	300	VDC	
	Full wave	5	-	150		
	Dual bridge	±5	-	±150		
Dielectric Withstanding Voltage	60Hz	200	-	900	V _{RMS}	
Insulation Resistance	300VDC	10	-	-	GΩ	
Size	See mechanical drawings					
Operating Temperature Range	Ambient with temperature rise	-55	-	+130	°C	
Storage Temperature Range	Ambient	-55	-	+105	°C	
Weight	See mechanical drawings					
Case	Through hole models	Epoxy Insulated Metal				
	Surface mount models	Glass Reinforced Polymer				
Potting	Vacuum Impregnated Epoxy					
Box Packaging (W x H x L)	Through hole models	2.35 x 1.29 x 9.45 (59.69 x 32.766 x 240.03)				
Tube Packaging (W x H x L)	Surface mount models	31000 Series	0.77 x 0.49 x 20.0 (19.660 x 12.446 x 508)			inches (mm)
		32000 Series	0.87 x 0.55 x 20.0 (22.098 x 13.97 x 508)			
		33000 Series	0.99 x 0.64 x 20.0 (25.146 x 16.256 x 508)			
Tape & Reel Packaging	Upon request					
Moisture Sensitivity Level	Surface Mount only	Level 3				

OPTIONAL DESIGN CRITERIA

Test	Standard	Description
Vibration	MIL-STD-202	Method 204, Vibration, High Frequency
Shock	MIL-STD-202	Method 213, Shock (Specified Pulse)
Immersion	MIL-STD-202	Method 104, Immersion
Moisture Resistance	MIL-STD-202	Method 106, Moisture Resistance
Flammability	MIL-STD-202	Method 111, Flammability (External Flame)
Thermal Shock	MIL-STD-202	Method 107, Thermal Shock

OPTIONAL SCREENING AND QUALIFICATION

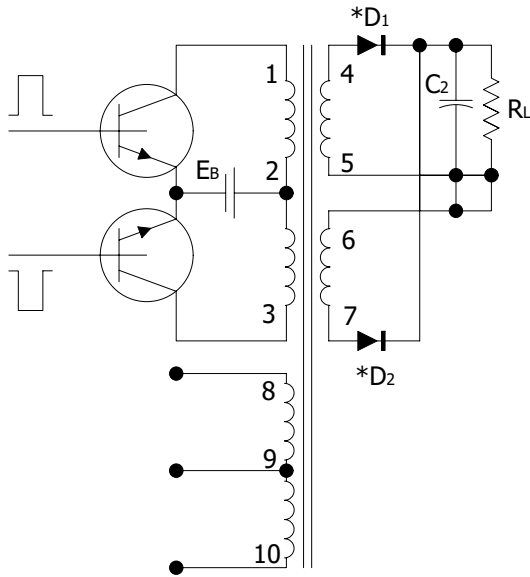
Standard	Screening & Qualification	Test ⁽²⁾
MIL-PRF-27	a.) Group A inspection Level-T - Table VII b.) Qualification inspection, Grade 5 - Table V	I. Thermal Shock II. Vibration III. Burn-in IV. Induced Voltage V. Shock VI. Dielectric Withstanding Voltage (at reduced pressure) VII. Insulation Resistance VIII. Electrical Characteristics IX. Visual and Mechanical Examination (External) X. Life XI. Radiographic Inspection
MIL-STD-981	a.) Group A screening tests – Table VI b.) Group B tests – Table XII, Class S	
EEE-INST-002, Section M1	a.) Magnetics Screening Req. – Table 2 b.) Magnetics Part Qual. – Table 3	

Note 2: Screening and qualification tests are not limited to the options in the chart above. Each standard may also be stringent or exclude certain tests from one another. Please contact Pico for specific application needs and for Pico part number.

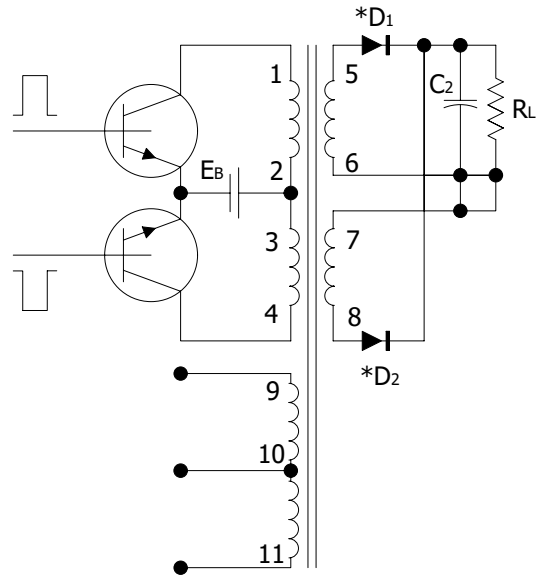
ELECTRICAL SCHEMATIC

LINEAR SWITCHING REFERENCE DESIGN

31000, 32000, & 33000 SERIES



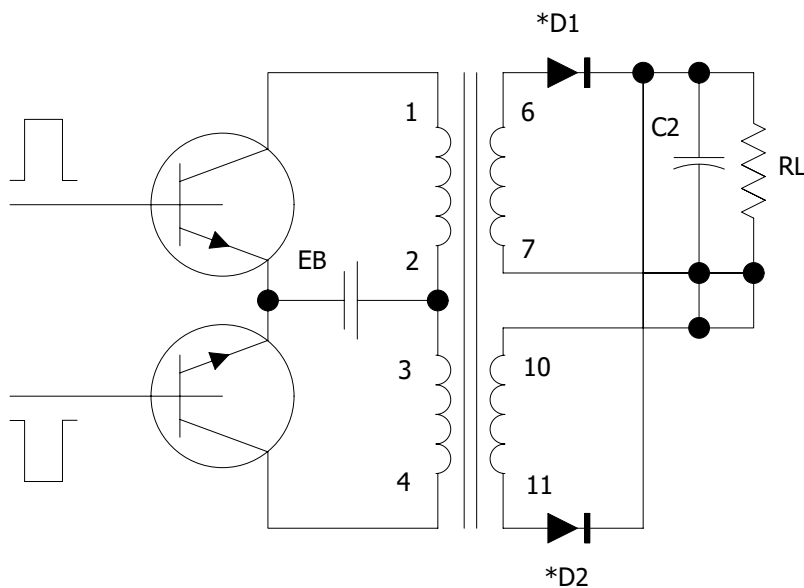
34000 SERIES



NOTES

a. SCHOTTKY OR FAST-SWITCHING DIODES USED

36000 SERIES



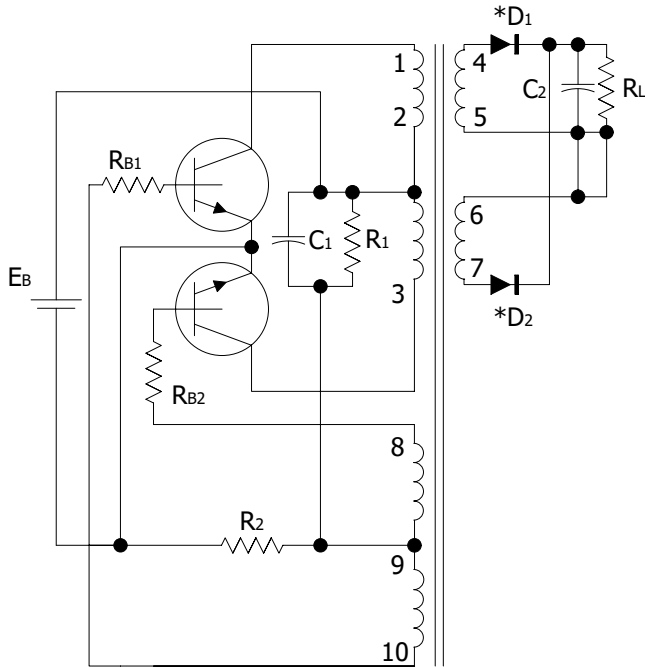
NOTES

a. SCHOTTKY OR FAST-SWITCHING DIODES USED
 b. PINS 5, 8 AND 9 HAVE BEEN OMITTED

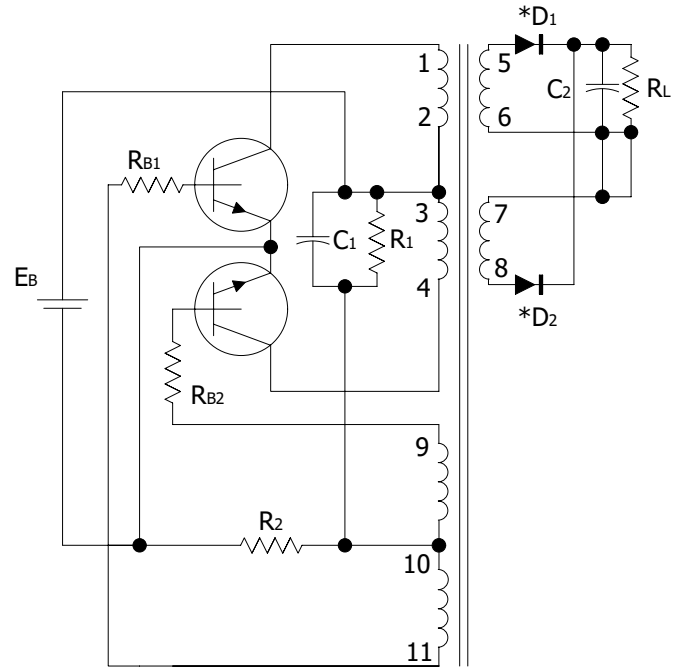
ELECTRICAL SCHEMATIC

SELF-SATURATING REFERENCE DESIGN

31000, 32000, & 33000 SERIES



34000 SERIES

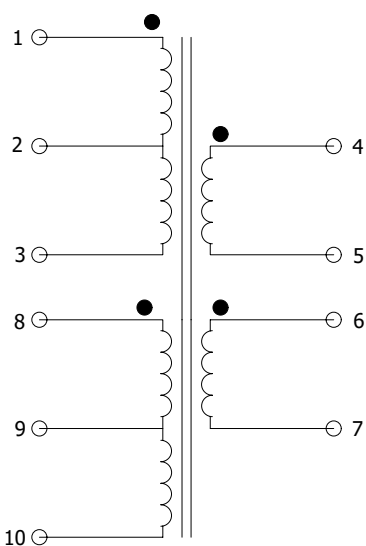


NOTES

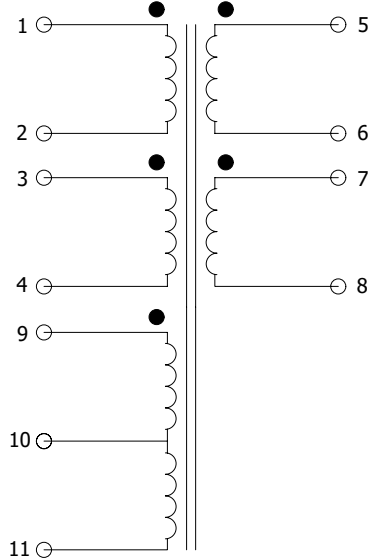
* SCHOTTKY OR FAST-SWITCHING DIODES USED

WIRING DIAGRAM

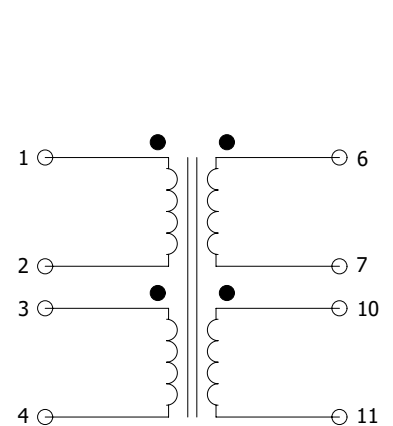
31000, 32000, & 33000 SERIES



34000 SERIES



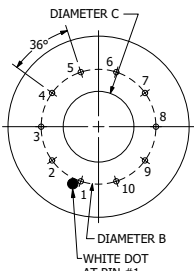
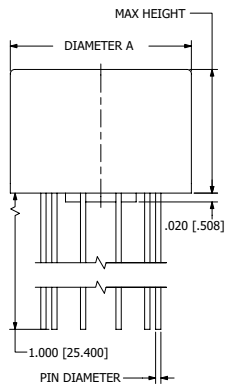
35000 & 36000 SERIES



MECHANICAL DRAWINGS

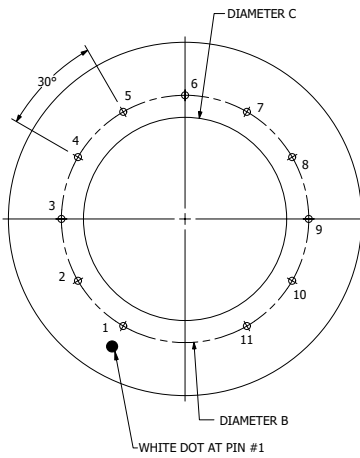
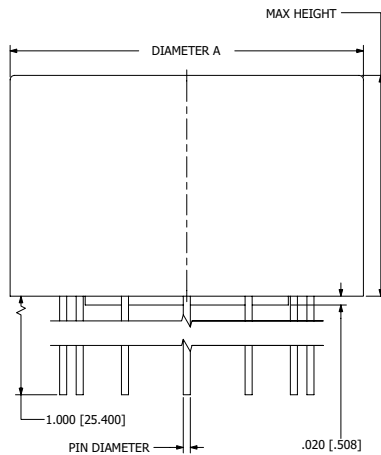
THROUGH HOLE MODELS

FIGURE 1



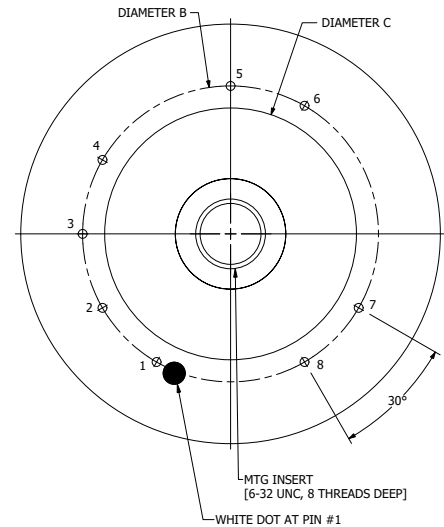
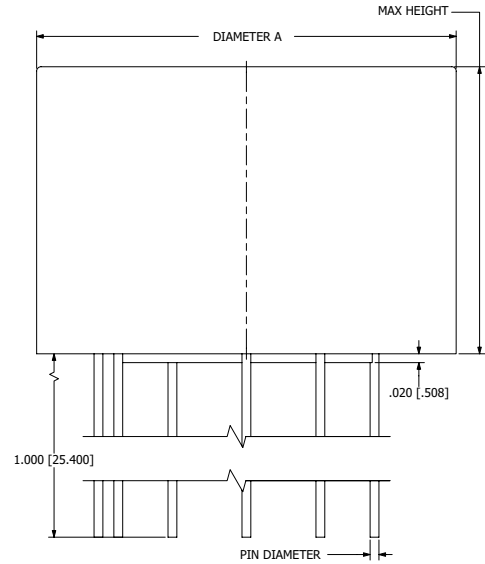
BOTTOM VIEW

FIGURE 2



BOTTOM VIEW

FIGURE 3

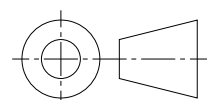


BOTTOM VIEW

Series	Max Height	Dimension				Pin Diameter	Insert	Typ. Weight (grams)	Figure
		A	B	C					
31000	.280 (7.112)	.410 (10.414)	.260 (6.604)	.160 (4.064)	.012 (.305)	-	2.1	1	
32000	.340 (8.636)	.500 (12.700)	.350 (8.890)	.250 (6.350)	.012 (.305)	-	3.5		
33000	.415 (10.541)	.630 (16.002)	.440 (11.176)	.340 (8.636)	.016 (.406)	-	7.1		
34000	.500 (12.700)	.800 (20.320)	.560 (14.224)	.460 (11.684)	.016 (.406)	-	15.1	2	
35000	.650 (16.510)	.950 (24.130)	.670 (17.018)	.570 (14.478)	.020 (.508)	6 - 32 UNC	15.9	3	
36000	.745 (18.923)	1.125 (28.575)	.800 (20.320)	.700 (17.780)	.020 (.508)	6 - 32 UNC	15.9		

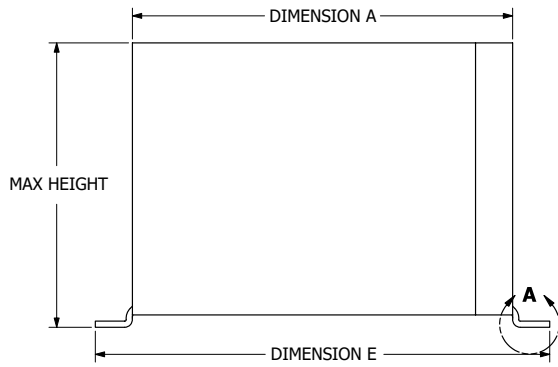
NOTES

- a. ALL DIMENSIONS ARE IN INCHES, [] = MM
- b. TERMINALS ARE CLOCKWISE FROM PIN #1

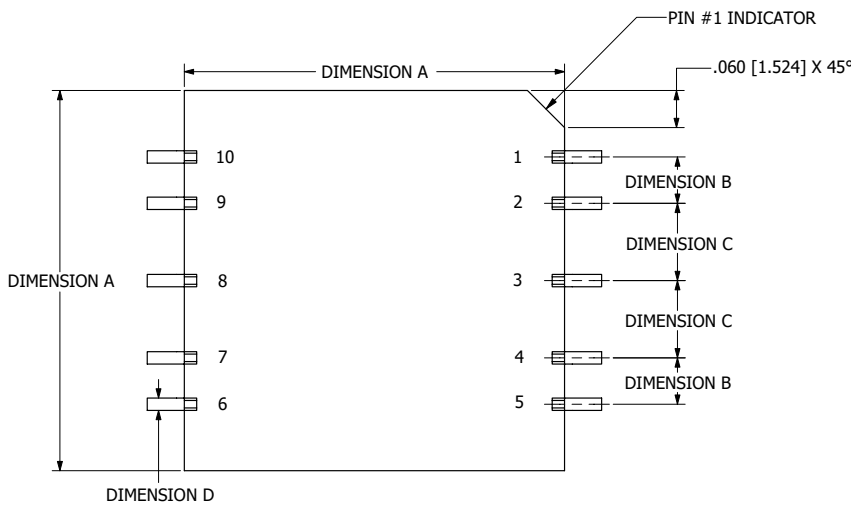
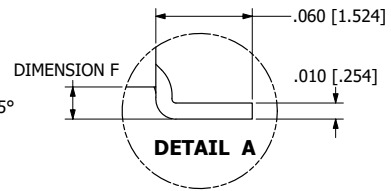


MECHANICAL DRAWINGS

SURFACE MOUNT MODELS



LEAD DETAILS

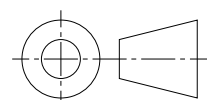


BOTTOM VIEW

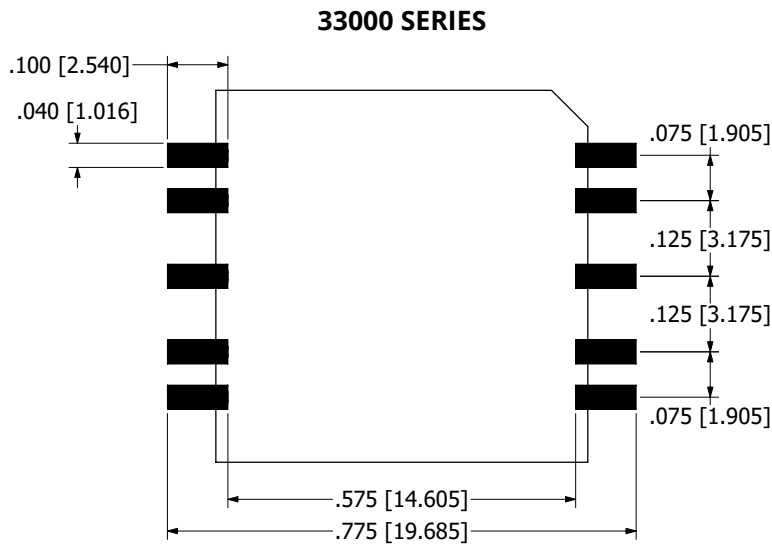
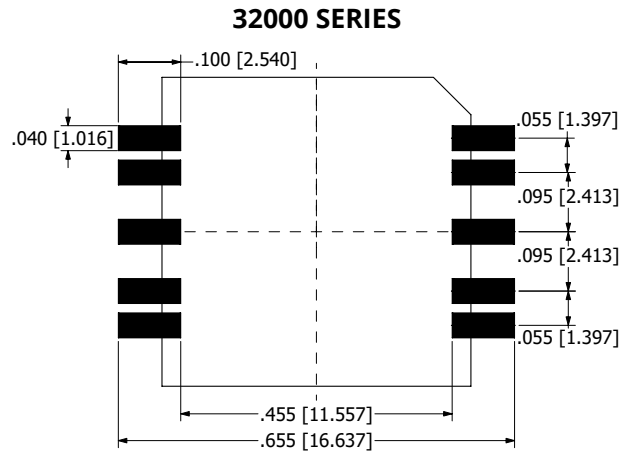
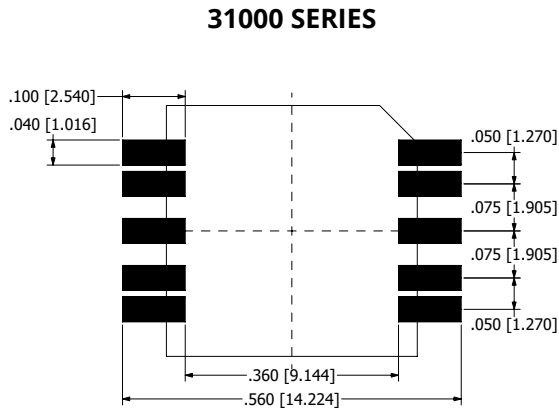
Series	Max Height	Dimension						Weight (grams)
		A	B	C	D	E	F	
31000	.310 (7.87)	.400 (10.16)	.050 (1.27)	.075 (1.91)	.020 (.51)	.520 (13.21)	.012 (.30)	2.0
32000	.365 (9.27)	.495 (12.57)	.055 (1.40)	.095 (2.41)	.020 (.51)	.615 (15.62)	.012 (.30)	3.8
33000	.460 (11.68)	.615 (15.62)	.075 (1.90)	.125 (3.18)	.027 (.69)	.735 (18.67)	.020 (.51)	6.9

NOTES

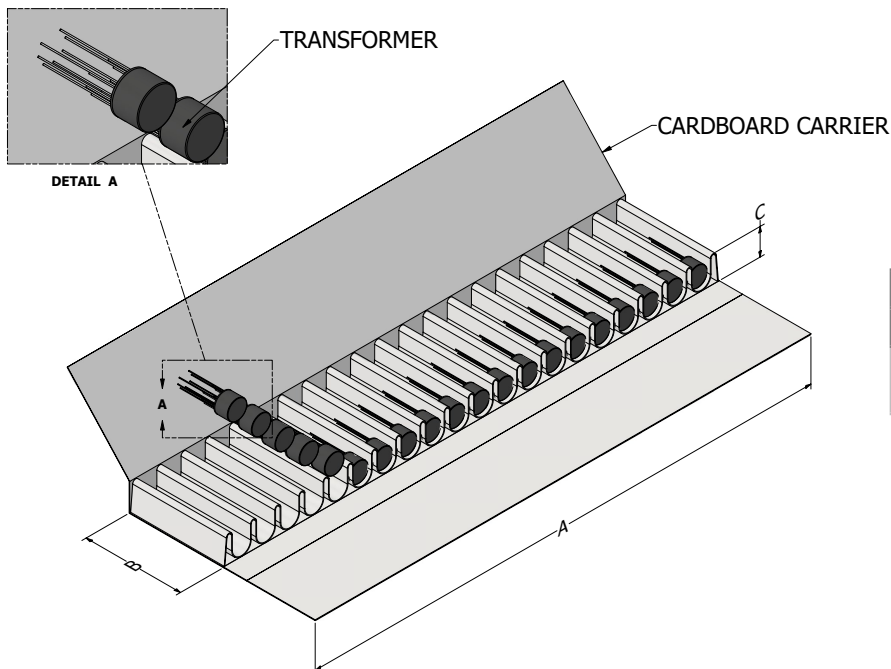
- a. ALL DIMENSIONS ARE IN INCHES, [] = MM
- b. TERMINALS ARE CLOCKWISE FROM PIN #1



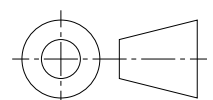
RECOMMENDED LAND PATTERN DIMENSIONS



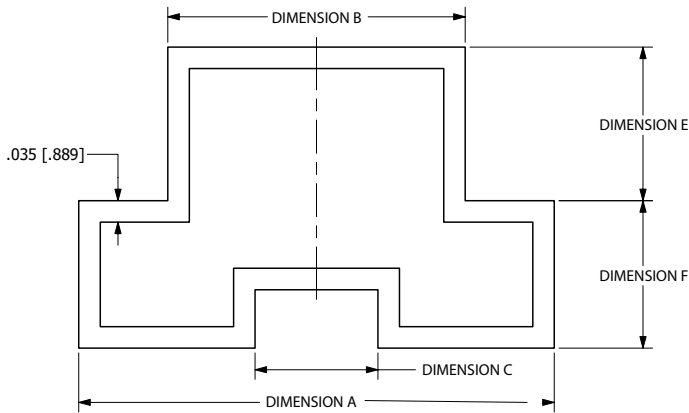
BOX PACKAGING - THROUGH HOLE MODELS



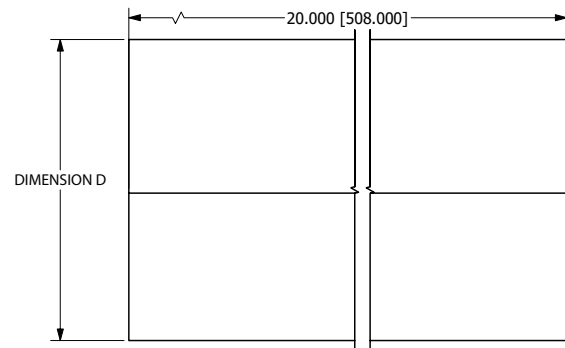
Dimension		
A	B	C
9.45	2.35	1.29
[240.03]	[59.69]	[32.766]



TUBE PACKAGING - SURFACE MOUNT MODELS

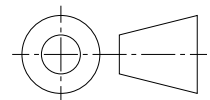
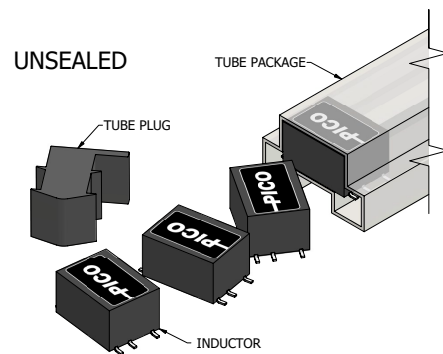
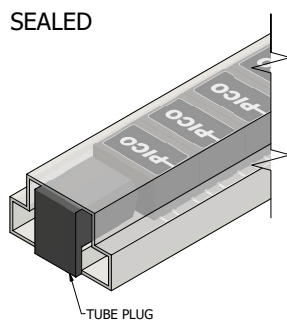


PLAN VIEW



ELEVATION VIEW

Series	Dimension					
	A	B	C	D	E	F
31000	.774 [19.660]	.484 [12.294]	.200 [5.080]	.490 [12.446]	.250 [6.350]	.240 [6.096]
32000	.870 [22.098]	.580 [14.732]	.300 [7.620]	.545 [13.843]	.305 [7.747]	.240 [6.096]
33000	.990 [25.146]	.700 [17.780]	.400 [10.160]	.640 [16.256]	.400 [10.160]	.240 [6.096]



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