

Series AV & SMV (100-1kV)

1.25W Isolated Proportional High Voltage DC-DC Converter



PRODUCT OVERVIEW

The AV & SMV series are unregulated DC-DC converters in a low profile package, down to 0.400", footprint with up to 1000V single or dual output models. They can operate over the temperature range of -25°C to +70°C without derating, a heat sink or active cooling.



FEATURES

- 1.25W output power
- Output voltage is directly proportional to input voltage
- Up to 1000V output models
- 5 to 28V input models
- Down to 0.400" height
- Through hole or surface mount mounting available
- Input/output isolation
- Single and dual output models
- No heat sink or derating required

Contact Pico for part number of available options:

- Expanded operating temp: -55°C to +85°C
- Select screening per MIL-STD-883:
 - Stabilization Bake
 - Temperature Cycle
 - Burn-In
- Available RoHS Compliant module
- Special Input Voltage, Output Voltage, Isolation Voltage or Output Power
- Tighter Output Voltage Tolerance

28	AV	100	D
INPUT VOLTAGE	MOUNTING TYPE	NOM. OUTPUT VOLTAGE	NUMBER OF OUTPUTS
5 = 5V	AV = THROUGH HOLE	100 = 100V	BLANK = SINGLE OUTPUT
12 = 12V	SMV = SURFACE MOUNT	200 = 200V	D = DUAL OUTPUT
15 = 15V		300 = 300V	
24 = 24V		400 = 400V	
28 = 28V		500 = 500V	
		600 = 600V	
		700 = 700V	
		800 = 800V	
		900 = 900V	
		1000 = 1000V	

MODEL LIST - SINGLE OUTPUT

Pico Part Number		Output Voltage [VDC]	Output Current		Efficiency ⁽³⁾ [%] typ.	Input Current ⁽³⁾ [mA]	Output Ripple ⁽²⁾ [Vp-p]
Through Hole	Surface Mount		Min. ⁽¹⁾ [mA]	Max. [mA]			
5AV100	5SMV100	100	1.25	12.5	78	321	0.9
5AV150	5SMV150	150	0.83	8.3	76	329	0.9
5AV200	5SMV200	200	0.625	6.25	75	333	0.9
5AV250	5SMV250	250	0.5	5	75	333	0.9
5AV300	5SMV300	300	0.416	4.16	70	357	1.2
5AV350	5SMV350	350	0.357	3.57			1.2
5AV400	5SMV400	400	0.312	3.12			1.2
5AV450	5SMV450	450	0.277	2.77			1.5
5AV500	5SMV500	500	0.25	2.5			1.5
5AV600	5SMV600	600	0.208	2.08	70	357	3
5AV700	5SMV700	700	0.179	1.79			
5AV800	5SMV800	800	0.156	1.56			
5AV900	5SMV900	900	0.139	1.39			
5AV1000	5SMV1000	1000	0.125	1.25			
12AV100	12SMV100	100	1.25	12.5	80	130	0.9
12AV150	12SMV150	150	0.83	8.3	79	132	0.9
12AV200	12SMV200	200	0.625	6.25	78	134	0.9
12AV250	12SMV250	250	0.5	5	75	139	0.9
12AV300	12SMV300	300	0.416	4.16	75	139	1.2
12AV350	12SMV350	350	0.357	3.57			1.2
12AV400	12SMV400	400	0.312	3.12			1.2
12AV450	12SMV450	450	0.277	2.77			1.5
12AV500	12SMV500	500	0.25	2.5			1.5
12AV600	12SMV600	600	0.208	2.08	70	149	3
12AV700	12SMV700	700	0.179	1.79			
12AV800	12SMV800	800	0.156	1.56			
12AV900	12SMV900	900	0.139	1.39			
12AV1000	12SMV1000	1000	0.125	1.25			
15AV100	15SMV100	100	1.25	12.5	80	104	0.9
15AV150	15SMV150	150	0.83	8.3	79	105	0.9
15AV200	15SMV200	200	0.625	6.25	78	107	0.9
15AV250	15SMV250	250	0.5	5	75	111	0.9
15AV300	15SMV300	300	0.416	4.16	75	111	1.2
15AV350	15SMV350	350	0.357	3.57			1.2
15AV400	15SMV400	400	0.312	3.12			1.2
15AV450	15SMV450	450	0.277	2.77			1.5
15AV500	15SMV500	500	0.25	2.5			1.5
15AV600	15SMV600	600	0.208	2.08	70	120	3
15AV700	15SMV700	700	0.179	1.79			
15AV800	15SMV800	800	0.156	1.56			
15AV900	15SMV900	900	0.139	1.39			
15AV1000	15SMV1000	1000	0.125	1.25			

MODEL LIST - SINGLE OUTPUT

Pico Part Number		Output Voltage [VDC]	Output Current		Efficiency ⁽³⁾ [%] typ.	Input Current ⁽³⁾ [mA]	Output Ripple ⁽²⁾ [Vp-p]
Through Hole	Surface Mount		Min. ⁽¹⁾ [mA]	Max. [mA]			
24AV100	24SMV100	100	1.25	12.5	76	69	0.9
24AV150	24SMV150	150	0.83	8.3	73	71	0.9
24AV200	24SMV200	200	0.625	6.25	73	71	0.9
24AV250	24SMV250	250	0.5	5	70	74	0.9
24AV300	24SMV300	300	0.416	4.16	73	71	1.2
24AV350	24SMV350	350	0.357	3.57			1.2
24AV400	24SMV400	400	0.312	3.12			1.2
24AV450	24SMV450	450	0.277	2.77			1.5
24AV500	24SMV500	500	0.25	2.5			1.5
24AV600	24SMV600	600	0.208	2.08	70	74	3
24AV700	24SMV700	700	0.179	1.79			
24AV800	24SMV800	800	0.156	1.56			
24AV900	24SMV900	900	0.139	1.39			
24AV1000	24SMV1000	1000	0.125	1.25			
28AV100	28SMV100	100	1.25	12.5	75	60	0.9
28AV150	28SMV150	150	0.83	8.3	76	59	0.9
28AV200	28SMV200	200	0.625	6.25	75	60	0.9
28AV250	28SMV250	250	0.5	5	70	64	0.9
28AV300	28SMV300	300	0.416	4.16	73	61	1.2
28AV350	28SMV350	350	0.357	3.57			1.2
28AV400	28SMV400	400	0.312	3.12			1.2
28AV450	28SMV450	450	0.277	2.77			1.5
28AV500	28SMV500	500	0.25	2.5			1.5
28AV600	28SMV600	600	0.208	2.08	70	64	3
28AV700	28SMV700	700	0.179	1.79			
28AV800	28SMV800	800	0.156	1.56			
28AV900	28SMV900	900	0.139	1.39			
28AV1000	28SMV1000	1000	0.125	1.25			

Note 1: Maintain minimum 10% of rated load on each output to prevent a voltage surge.

Note 2: For ≤500V output models, a 0.1μF, 1kV capacitor is required across the output. For ≥600V output models, a 0.01μF, 3kV capacitor is required across output.

Note 3: Tested at nominal input voltage and full output load.

MODEL LIST - DUAL OUTPUT

Pico Part Number		Output Voltage [±VDC]	Output Current		Efficiency ⁽³⁾ [%] typ.	Input Current ⁽³⁾ [mA]	Output Ripple ⁽⁴⁾ [Vp-p]
Through Hole	Surface Mount		Min. ⁽¹⁾ [±mA]	Max. [±mA]			
5AV100D	5SMV100D	100	0.625	6.25	78	320	0.4
5AV150D	5SMV150D	150	0.417	4.17	78	320	
5AV200D	5SMV200D	200	0.313	3.13	78	320	
5AV250D	5SMV250D	250	0.25	2.5	76	329	
12AV100D	12SMV100D	100	0.625	6.25	80	130	0.4
12AV150D	12SMV150D	150	0.417	4.17	80	130	
12AV200D	12SMV200D	200	0.313	3.13	80	130	
12AV250D	12SMV250D	250	0.25	2.5	80	130	
15AV100D	15SMV100D	100	0.625	6.25	81	103	0.4
15AV150D	15SMV150D	150	0.417	4.17	81	103	
15AV200D	15SMV200D	200	0.313	3.13	79	106	
15AV250D	15SMV250D	250	0.25	2.5	78	107	
24AV100D	24SMV100D	100	0.625	6.25	80	66	0.8
24AV150D	24SMV150D	150	0.417	4.17	80	66	
24AV200D	24SMV200D	200	0.313	3.13	79	66	
24AV250D	24SMV250D	250	0.25	2.5	79	66	
28AV100D	28SMV100D	100	0.625	6.25	79	57	0.8
28AV150D	28SMV150D	150	0.417	4.17	79	57	
28AV200D	28SMV200D	200	0.313	3.13	78	58	
28AV250D	28SMV250D	250	0.25	2.5	76	59	

Note 1: Maintain minimum 10% of rated load on each output to prevent a voltage surge.

Note 3: Tested at nominal input voltage and full output load.

Note 4: 0.1µF, 1kV high quality capacitor is required across each output.

SPECIFICATIONS (Nominal V_{IN} , Full Load, $T_A = +25^{\circ}\text{C}$, 1 hour warm up unless otherwise specified)**INPUT**

Parameter	Condition	Min.	Typ.	Max.	Units
Input Voltage Range	5V input models	4.5	5	5.5	VDC
	12V input models	10.8	12	13.2	
	15V input models	13.5	15	16.5	
	24V input models	21.6	24	26.4	
	28V input models	25.2	28	30.8	

OUTPUT

Parameter	Condition	Min.	Typ.	Max.	Units
Line Regulation	Output voltage is directly proportional to input voltage				
Output Power		0.125	-	1.25	W
Output Voltage Tolerance	Nominal V_{IN} , Full Load	-	-	3	±%

ENVIRONMENTAL

Parameter	Condition	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient without derating	-25	-	+70	°C
Storage Temperature Range	Ambient	-55	-	+125	°C
Temperature Coefficient		-	0.02	-	%/°C
Cooling	Free Air Convection				

GENERAL

Parameter	Condition		Min.	Typ.	Max.	Units
Operating Frequency			20	-	40	kHz
Isolation Voltage	Input to output	≤500V Output models	1000	-	-	VDC
		≥600V output models	1500	-	-	
Insulation Resistance			100	-	-	MΩ
Size (L x W x H)	Through hole	≤500V Output models	0.5 x 0.5 x 0.4 (12.7 x 12.7 x 10.16)			inches (mm)
		≥600V output models	0.5 x 0.5 x 0.5 (12.7 x 12.7 x 12.7)			
	Surface mount	≤500V Output models	0.5 x 0.5 x 0.44 (12.7 x 12.7 x 11.176)			
		≥600V output models	0.5 x 0.5 x 0.54 (12.7 x 12.7 x 13.716)			
Weight	≤500V Output models		-	4	-	grams
	≥600V Output models		-	5	-	
Case	Glass Reinforced Polymer					
Potting	Vacuum Impregnated Epoxy					
Tube Packaging (W x H x L)	Series AV (See drawing)		0.6 x 1.72 x DIM A (15.24 x 43.688 x DIM A)			inches (mm)
	Series SMV	≤500V Output models	0.874 x 0.605 x 20 (22.2 x 15.367 x 508)			
		≥600V Output models	0.874 x 0.715 x 20 (22.2 x 18.161 x 508)			
Tape & Reel Packaging	Upon request					
Moisture Sensitivity Level	IPC / JEDEC J-STD-020, Level 3					

DESIGNED TO MEET

Test	Referenced Standard	Description
Vibration	MIL-STD-202	Method 204, Vibration, High Frequency, Condition D
Shock	MIL-STD-202	Method 213, Shock (Specified Pulse), Condition I
Humidity	MIL-STD-202	Method 106, Moisture Resistance
Altitude	MIL-STD-202	Method 105, Barometric Pressure (Reduced), Condition D

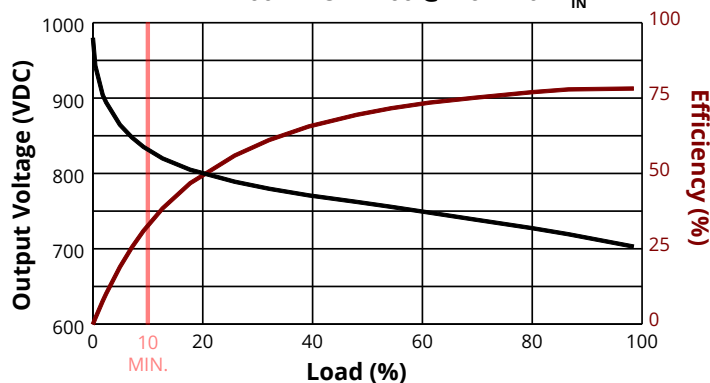
SPECIFICATIONS (Nominal V_{IN} , Full Load, $T_A = +25^\circ\text{C}$, 1 hour warm up unless otherwise specified)

OPTIONS AVAILABLE – CONTACT PICO FOR PART NUMBER

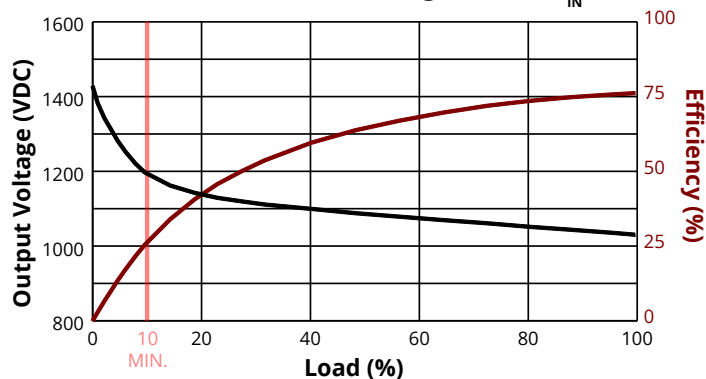
Parameter	Referenced Standard	Description
Stabilization Bake	MIL-STD-883	Referenced Method 1008 Non-operating maximum storage temperature for 24 hours
Temperature Cycle	MIL-STD-883	Referenced Method 1010 Non-operating at temperature extremes, 15 mins/temp, 10 cycles
Burn-In	MIL-STD-883	Referenced Method 1015 Max operating temperature for 160 hours
Expanded Ambient Operating Temperature		-55°C to $+85^\circ\text{C}$
RoHS Compliance		-

DATA CURVES (Nominal V_{IN} , $T_A = +25^\circ\text{C}$, 1 hour warm up unless otherwise specified)

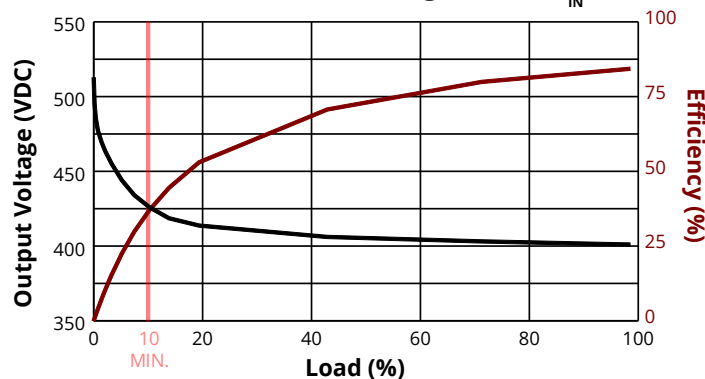
P/N 24AV700 / 24SMV700 @ Nominal V_{IN}



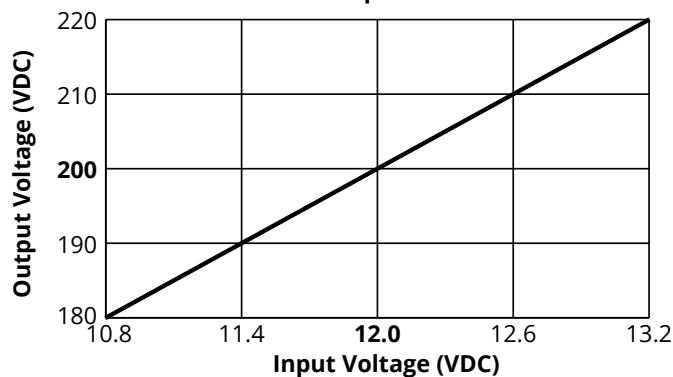
P/N 5AV1000 / 5SMV1000 @ Nominal V_{IN}



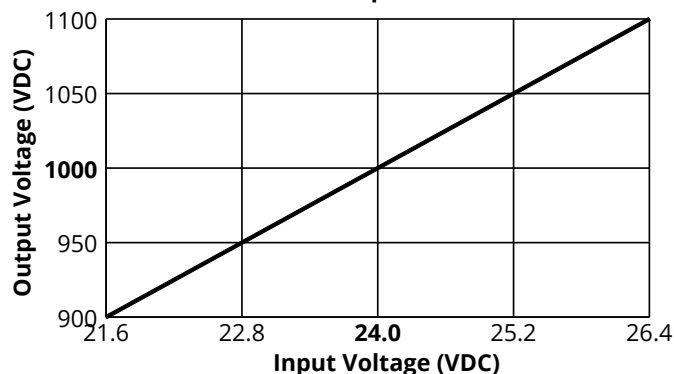
P/N 15AV400 / 15SMV400 @ Nominal V_{IN}

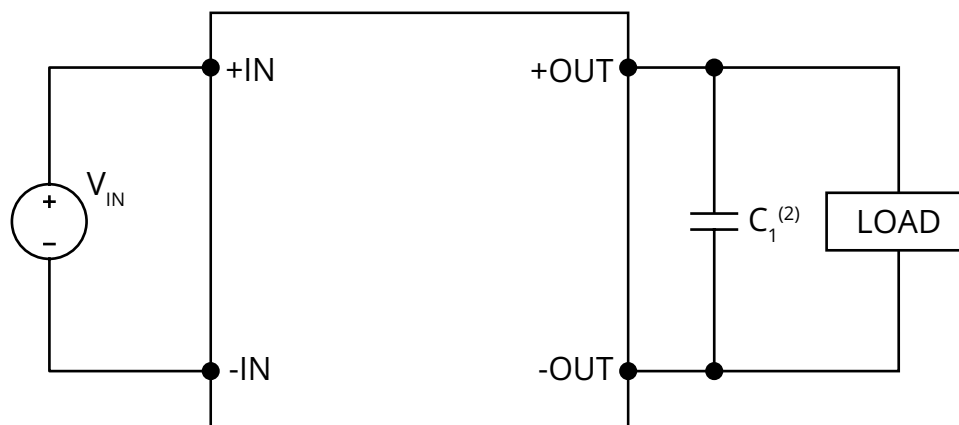


P/N 12AV200 @ Max Output Current / Power

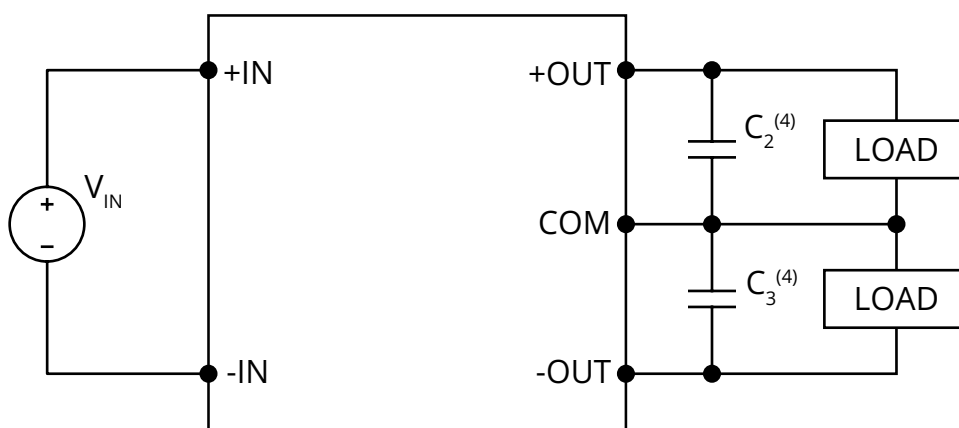


P/N 24AV1000 @ Max Output Current / Power



TYPICAL CONNECTION CIRCUIT**SINGLE OUTPUTS**

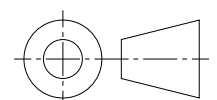
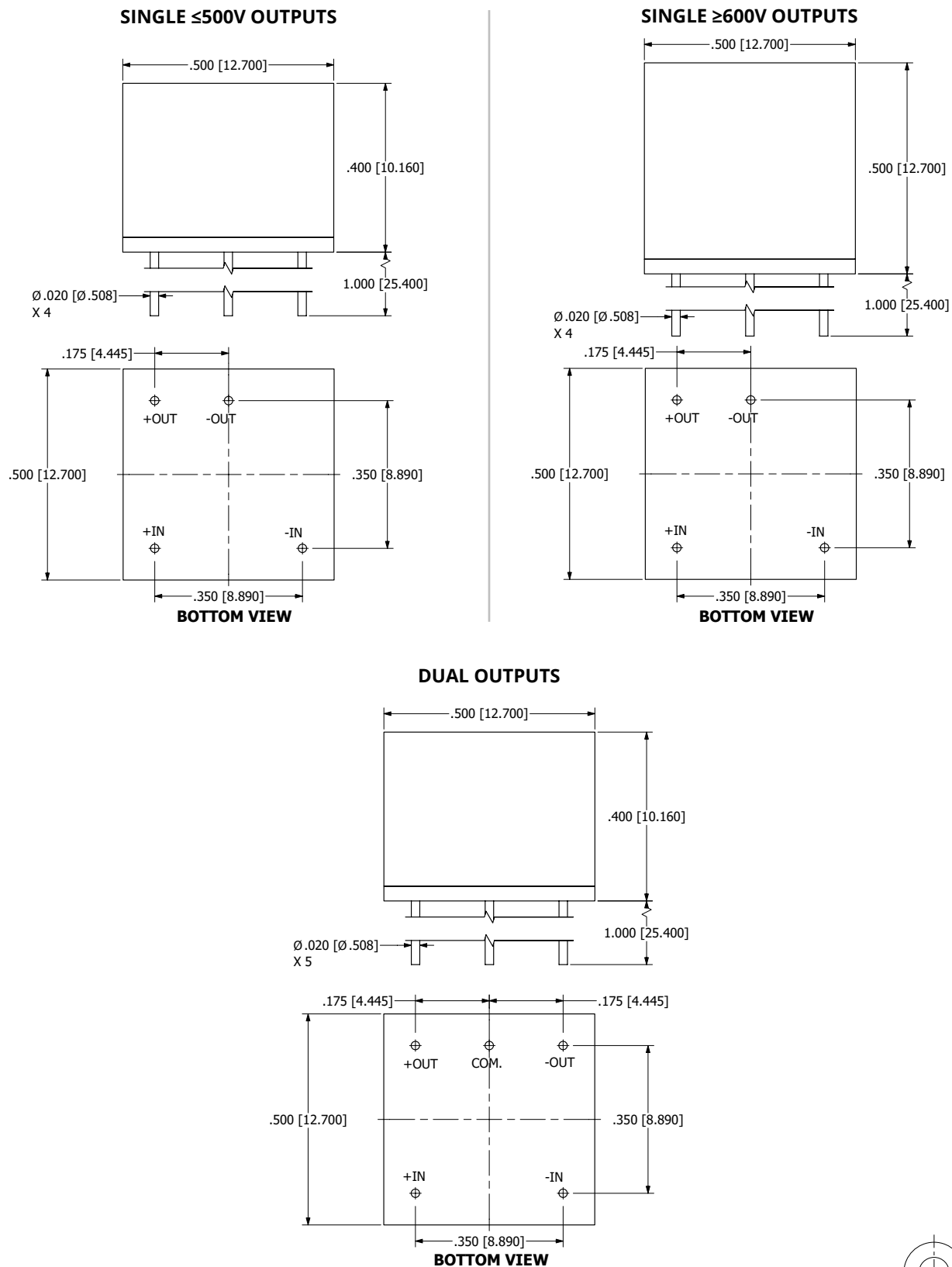
Note 2: For $\leq 500V$ output models, a $0.1\mu F$, 1kV capacitor is required across the output. For $\geq 600V$ output models, a $0.01\mu F$, 3kV capacitor is required across output.

DUAL OUTPUTS

Note 4: $0.1\mu F$, 1kV high quality capacitor is required across each output.

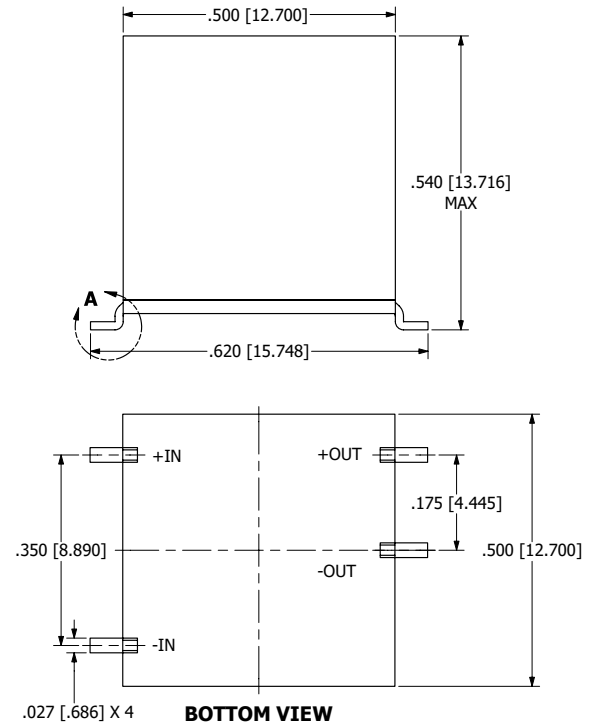
MECHANICAL DRAWINGS

SERIES AV - THROUGH HOLE

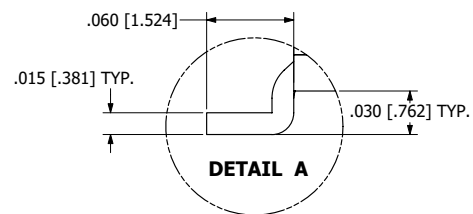
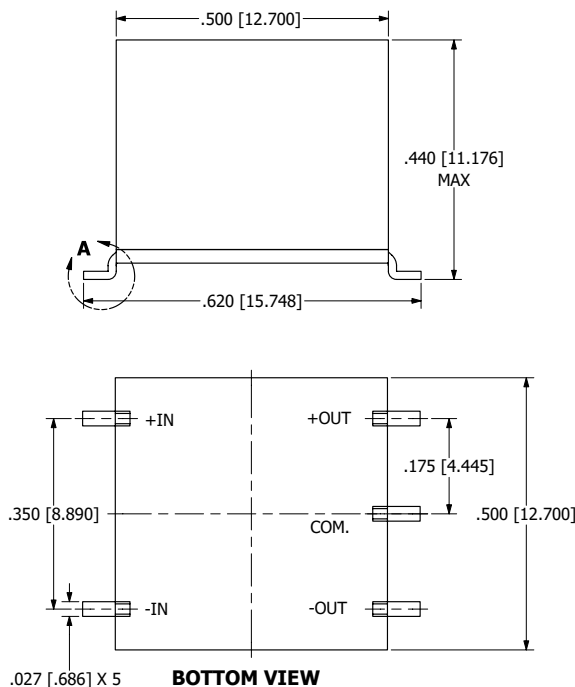


SERIES SM - SURFACE MOUNT

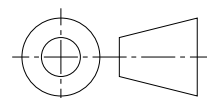
SINGLE $\geq 600\text{V}$ OUTPUTS



LEAD DETAILS

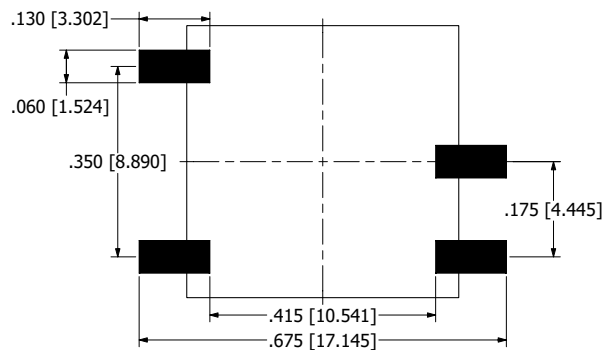


a. ALL DIMENSIONS ARE IN INCHES, [] = MM
b. WHITE DOT ON TOP SIDE INDICATES +IN LOCATION

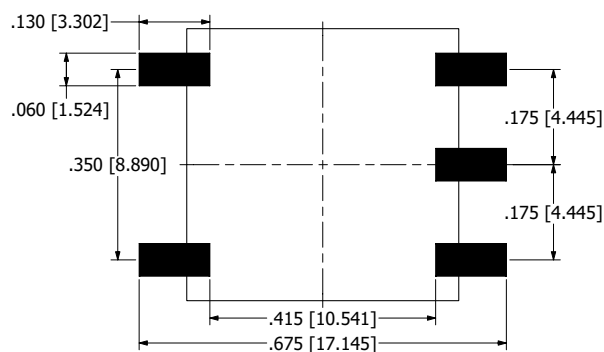


RECOMMENDED LAND PATTERN DIMENSIONS

SERIES SMV - SINGLE OUTPUTS

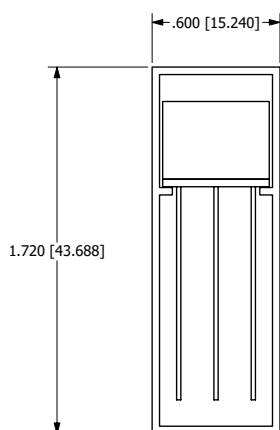


SERIES SMV - DUAL OUTPUTS

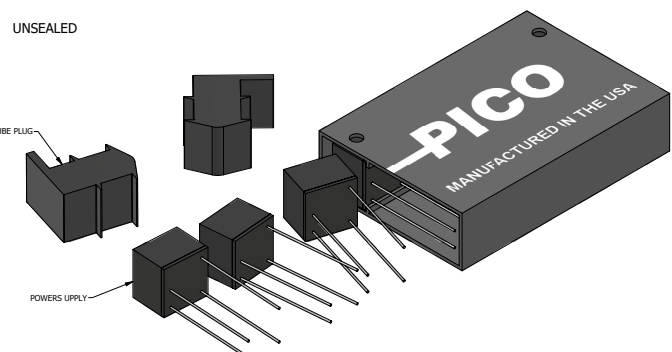
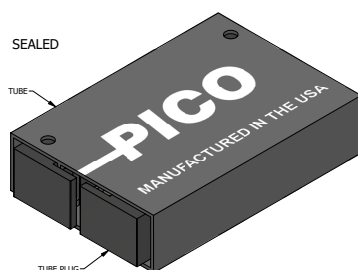
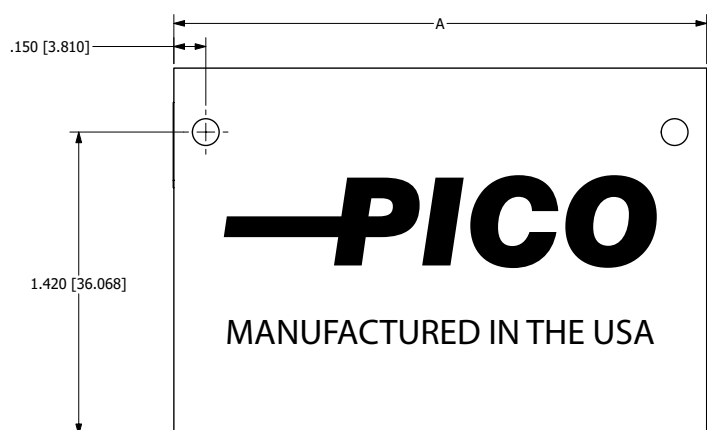


TUBE PACKAGING

SERIES AV - THROUGH HOLE

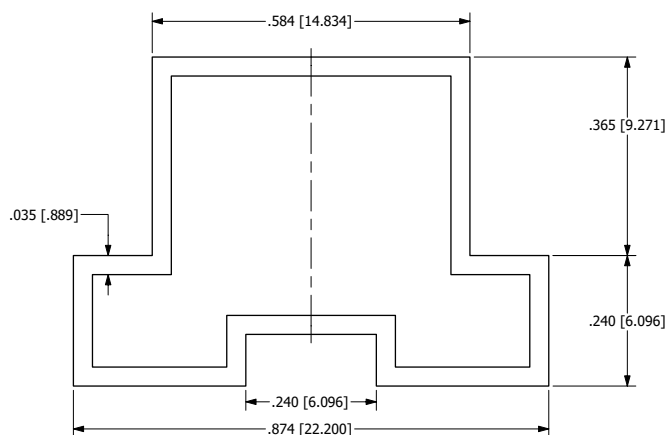


DIMENSION A
4.00 [101.60]
6.50 [165.10]
10.50 [266.70]

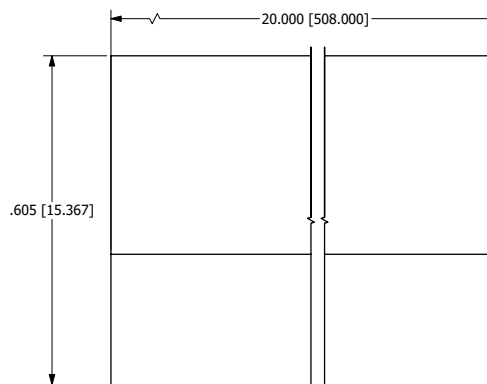


TUBE PACKAGING

SERIES SMV - SURFACE MOUNT, $\leq 500V$ OUTPUTS

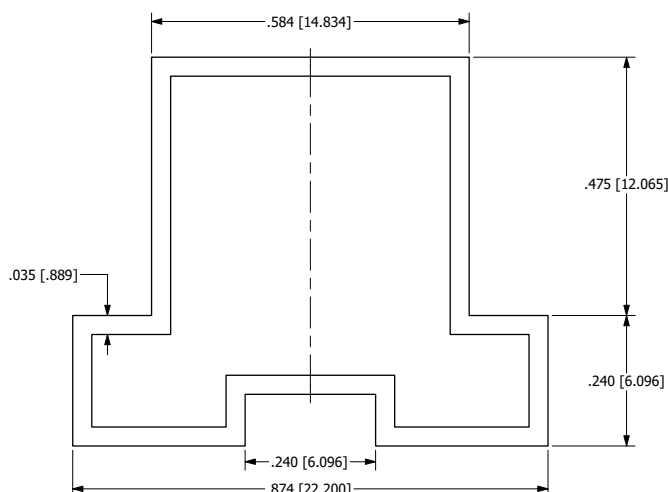


PLAN VIEW

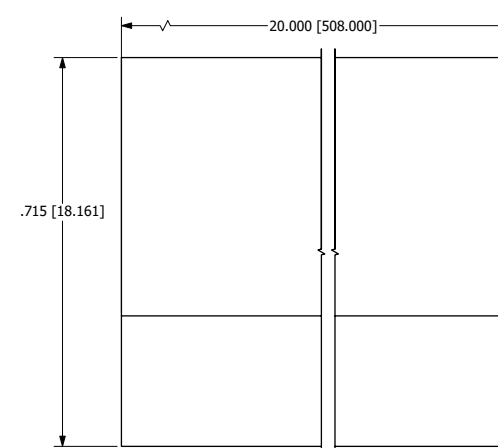


ELEVATION VIEW

SERIES SMV - SURFACE MOUNT, $\geq 600V$ OUTPUTS

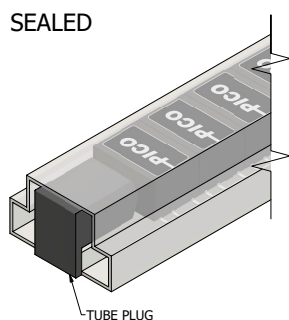


PLAN VIEW

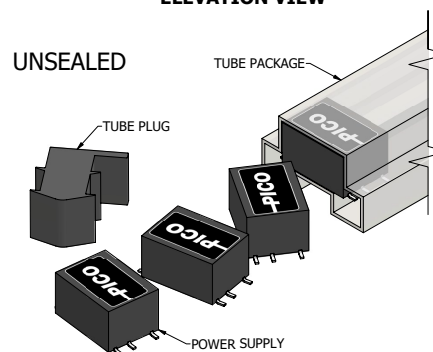


ELEVATION VIEW

SEALED



UNSEALED



Pico warrants each product manufactured by us and sold by us or an authorized representative, to be free from defects in material and workmanship. If properly used, it will perform within its applicable specifications for a period of one year after original shipment. Pico's obligation under this guarantee is limited to repairing or replacing our product to the original purchaser. This warranty is in lieu of all other warranties, express or implied and constitutes fulfillment of our obligations to the purchaser. We do not guarantee that the products can be used for a particular purpose other than those solely covered by the product's specifications. Pico must be notified if the product must meet particular certifications and/or standards. We assume no liability, in any event, for consequential damages, for anticipated or lost profits, incidental damages or loss of time or other losses incurred by the purchaser or any third party in connection with products covered by this warranty or otherwise. The purchaser will indemnify and hold Pico harmless for any damages, losses, costs, etc. from usage not within the product's specifications. Pico must be consulted before usage of its products in a nuclear, radioactive or space environment.

We reserve the right to discontinue products without notice, We reserve the right to make modifications to any existing catalog products without notice, at any time, without the obligation to modify units previously sold.