



SERIES A/SM SURFACE MOUNT and PLUG-IN

Hi Reliability and Ultra-Miniature

SERIES A: Low Profile 0.5" x 0.5" x 0.3" Height! ...up to 1.25 Watts
SERIES SM: Low Profile 0.5" x 0.5" x 0.340" Height! ...up to 1.25 Watts
ALSO: New Series AT/DT 0.200 height - up to 0.75 Watts. (See table of contents)

This series of unregulated DC-DC converters are produced in an ultra-miniature encapsulated package. 178 different models are available. The units feature single and dual outputs. They will operate over the temperature range of -25° C to +70° C. No heat sink is required.

FEATURES

- Up to 1.25 watt output at 70° C ambient
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Ultra-miniature size (0.3" Height)
- 5 input voltage ranges 5, 12, 24, 28 and 48V DC
- 100 megohm @ 500V DC isolation
- Input/output isolation
- Single and dual output
- No heat sink required
- Up to 250V Output

Options Available

- Per Mil Std. 883
- Expanded operating temp (-55° C to +85° C)
- Stabilization Bake (125° C ambient)
- Temperature Cycle (-55° C to +125° C)
- Hi Temp, full power burn in (100% power, 125° C case temp)

TYPICAL CHARACTERISTICS:

Test conditions: 25° C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT.

Input voltage range:

5V models 4 to 6.5V DC
 12V models 9 to 15V DC
 24V models 17 to 28V DC
 28V models 21 to 32V DC
 48V models 25 to 50V DC

Output Voltage Tolerance at Full Load:

5V models ± 0.25V
 9V models ± 0.3V
 12V & 15V models ± 0.4V
 24V & 28V models ± 0.5V
 48V models ± 0.7V
 100V, 150V, 200V & 250V models ± 3.0V

Converter frequency: 20 - 40 KHz

Output temperature coefficient:

0.05%/°C for 5V output
 0.04%/°C for 12V & 15V output
 0.02%/°C for 24, 28, 48, 100, 150, 200 and 250 volt outputs

Operating temperature: -25° C to +70° C ambient. No heat sink is required.

Storage temperature: -55° C to +125° C

Isolation: 100 megohms min. @ 500V DC, for 3.3 to 48 VDC out 100 megohms min. @ 1000 VDC for 100 - 250 VDC out.

SERIES A/SM - SINGLE OUTPUT

PICO Plug-In Part Number	PICO Surface Mount Part Number	Input Volt. (V DC)	Output Volt. (V DC)	Max. Load Current (mA)	Max. Output Power (watts)	Eff. @ Full Load Typical (%)	Input Current Full Load Typical (mA)	Output Voltage Ripple @ Full Load* (Vp-p max)	No Load Current Typical (mA)	Full Load Output Voltage Tolerance (V DC)	Price (US \$)
5A3.3S	5SM3.3S	5	3.3	303	1.00	60	333	0.20	80	±0.2	60.51
5A5S	5SM5S	5	5	200	1.00	66	303	0.20	65	±0.25	60.51
5A5.2S	5SM5.2S	5	5.2	192	1.00	66	303	0.20	65	±0.25	60.51
5A9S	5SM9S	5	9	139	1.25	73	342	0.15	80	±0.3	60.51
5A12S	5SM12S	5	12	104	1.25	73	342	0.15	80	±0.4	60.51
5A15S	5SM15S	5	15	83	1.25	75	333	0.12	90	±0.4	60.51
5A24S	5SM24S	5	24	52	1.25	75	333	0.10	90	±0.5	60.51
5A28S	5SM28S	5	28	45	1.25	74	338	0.10	90	±0.5	60.51
5A48S	5SM48S	5	48	26	1.25	77	325	0.10	90	±0.7	60.51
5A100S†	5SM100S†	5	100	12.5	1.25	78	321	0.90	**	±3.0	85.73
5A150S†	5SM150S†	5	150	8.3	1.25	76	329	0.90	**	±4.5	85.73
5A200S†	5SM200S†	5	200	6.25	1.25	75	333	0.90	**	±6.0	85.73
5A250S†	5SM250S†	5	250	5	1.25	75	333	0.90	**	±7.5	85.73
12A3.3S	12SM3.3S	12	3.3	303	1.00	60	139	0.20	26	±0.2	60.51
12A5S	12SM5S	12	5	200	1.00	66	126	0.20	24	±0.25	60.51
12A5.2S	12SM5.2S	12	5.2	192	1.00	66	126	0.20	24	±0.25	60.51
12A9S	12SM9S	12	9	139	1.25	74	141	0.15	26	±0.3	60.51
12A12S	12SM12S	12	12	104	1.25	76	137	0.15	26	±0.4	60.51
12A15S	12SM15S	12	15	83	1.25	78	134	0.15	26	±0.4	60.51
12A24S	12SM24S	12	24	52	1.25	78	134	0.15	26	±0.5	60.51
12A28S	12SM28S	12	28	45	1.25	77	135	0.15	26	±0.5	60.51
12A48S	12SM48S	12	48	26	1.25	80	130	0.20	26	±0.7	60.51
12A100S†	12SM100S†	12	100	12.5	1.25	80	130	0.90	**	±3.0	85.73
12A150S†	12SM150S†	12	150	8.3	1.25	79	132	0.90	**	±4.5	85.73
12A200S†	12SM200S†	12	200	6.25	1.25	78	134	0.90	**	±6.0	85.73
12A250S†	12SM250S†	12	250	5	1.25	75	139	0.90	**	±7.5	85.73
15A3.3S	15SM3.3S	15	3.3	303	1.00	60	111	0.20	22	±0.2	60.51
15A5S	15SM5S	15	5	200	1.00	66	101	0.20	20	±0.25	60.51
15A5.2S	15SM5.2S	15	5.2	192	1.00	66	101	0.20	20	±0.25	60.51
15A9S	15SM9S	15	9	139	1.25	74	113	0.15	20	±0.3	60.51
15A12S	15SM12S	15	12	104	1.25	76	110	0.15	20	±0.4	60.51
15A15S	15SM15S	15	15	83	1.25	78	107	0.15	20	±0.4	60.51
15A24S	15SM24S	15	24	52	1.25	78	107	0.15	20	±0.5	60.51
15A28S	15SM28S	15	28	45	1.25	77	108	0.15	20	±0.5	60.51
15A48S	15SM48S	15	48	26	1.25	80	104	0.20	20	±0.7	60.51
15A100S†	15SM100S†	15	100	12.5	1.25	80	104	0.90	**	±3.0	85.73
15A150S†	15SM150S†	15	150	8.3	1.25	79	105	0.90	**	±3.0	85.73
15A200S†	15SM200S†	15	200	6.25	1.25	78	107	0.90	**	±3.0	85.73
15A250S†	15SM250S†	15	250	5	1.25	75	111	0.90	**	±3.0	85.73
24A3.3S	24SM3.3S	24	3.3	303	1.00	60	69	0.20	16	±0.2	60.51
24A5S	24SM5S	24	5	200	1.00	66	43	0.20	13	±0.25	60.51
24A5.2S	24SM5.2S	24	5.2	192	1.00	66	43	0.20	13	±0.25	60.51
24A9S	24SM9S	24	9	139	1.25	72	72	0.20	15	±0.3	60.51
24A12S	24SM12S	24	12	104	1.25	75	69	0.20	15	±0.4	60.51
24A15S	24SM15S	24	15	83	1.25	75	69	0.20	15	±0.4	60.51
24A24S	24SM24S	24	24	52	1.25	78	67	0.20	15	±0.5	60.51
24A28S	24SM28S	24	28	45	1.25	77	68	0.20	15	±0.5	60.51

24A100S†	24SM48S	24	48	26	1.25	78	67	0.25	16	±0.7	60.51
24A150S†	24SM100S†	24	100	12.5	1.25	76	69	0.90	**	±3.0	85.73
24A200S†	24SM150S†	24	150	8.3	1.25	73	71	0.90	**	±4.5	85.73
24A250S†	24SM200S†	24	200	6.25	1.25	73	71	0.90	**	±6.0	85.73
	24SM250S†	24	250	5	1.25	70	74	0.90	**	±7.5	85.73
28A3.3S	28SM3.3S	28	3.3	303	1.00	60	59	0.20	15	±0.2	60.51
28A5S	28SM5S	28	5	200	1.00	66	54	0.20	12	±0.25	60.51
28A5.2S	28SM5.2S	28	5.2	192	1.00	66	54	0.20	12	±0.25	60.51
28A9S	28SM9S	28	9	139	1.25	72	62	0.20	14	±0.3	60.51
28A12S	28SM12S	28	12	104	1.25	72	62	0.20	14	±0.4	60.51
28A15S	28SM15S	28	15	83	1.25	73	61	0.20	14	±0.4	60.51
28A24S	28SM24S	28	24	52	1.25	76	59	0.20	14	±0.5	60.51
28A28S	28SM28S	28	28	45	1.25	76	59	0.20	14	±0.5	60.51
28A48S	28SM48S	28	48	26	1.25	77	58	0.25	15	±0.7	60.51
28A100S†	28SM100S†	28	100	12.5	1.25	75	60	0.90	**	±3.0	85.73
28A150S†	28SM150S†	28	150	8.3	1.25	76	59	0.90	**	±4.5	85.73
28A200S†	28SM200S†	28	200	6.25	1.25	75	60	0.90	**	±6.0	85.73
28A250S†	28SM250S†	28	250	5	1.25	70	64	0.90	**	±7.5	85.73
48A3.3S	48SM3.3S	48	3.3	303	1.00	60	35	0.20	5	±0.2	64.95
48A5S	48SM5S	48	5	200	1.00	66	32	0.25	6	±0.25	64.95
48A5.2S	48SM5.2S	48	5.2	192	1.00	66	32	0.25	6	±0.25	64.95
48A9S	48SM9S	48	9	139	1.25	72	36	0.25	8	±0.3	64.95
48A12S	48SM12S	48	12	104	1.25	73	36	0.25	8	±0.4	64.95
48A15S	48SM15S	48	15	83	1.25	72	36	0.25	8	±0.4	64.95
48A24S	48SM24S	48	24	52	1.25	76	34	0.25	9	±0.5	64.95
48A28S	48SM28S	48	28	45	1.25	76	34	0.25	9	±0.5	64.95

* For units with output voltages up to 48 volts, ripple is measured with 10µF, 75 volt high quality tantalum capacitor which is required across the output.
 * For units with output voltage of 100-250 volts use a 0.1µF, 500 volt capacitor which is required across output, and maintain at least 10% of rated load to prevent a voltage surge.
 ** Maintain minimum 10% of rated load to prevent a voltage surge

SERIES A/SM - DUAL OUTPUT											
PICO Plug-In Part Number	PICO Surface Mount Part Number	Input Volt. (V DC)	Output Volt. (V DC)	Max. Load Current (mA)	Max. Output Power (watts)	Eff. @ Full Load Typical (%)	Input Current Full Load Typical (mA)	Output Voltage Ripple @ Full Load* (Vp-p max)	No Load Current Typical (mA)	Full Load Output Voltage Tolerance (V DC)	Price (US \$)
5A5D	5SM5D	5	±5	100	0.5	66	303	0.20	65	±0.25	68.41
5A9D	5SM9D	5	±9	69	0.625	73	342	0.15	80	±0.3	68.41
5A12D	5SM12D	5	±12	52	0.625	73	342	0.15	80	±0.4	68.41
5A15D	5SM15D	5	±15	42	0.625	75	333	0.12	90	±0.4	68.41
5A24D	5SM24D	5	±24	26	0.625	75	333	0.10	90	±0.5	68.41
5A28D	5SM28D	5	±28	22	0.625	74	338	0.10	90	±0.5	68.41
5A48D	5SM48D	5	±48	13	0.625	77	325	0.10	90	±0.7	68.41
12A5D	12SM5D	12	±5	100	0.5	66	126	0.20	24	±0.25	68.41
12A9D	12SM9D	12	±9	69	0.625	74	141	0.15	26	±0.3	68.41
12A12D	12SM12D	12	±12	52	0.625	76	137	0.15	26	±0.4	68.41
12A15D	12SM15D	12	±15	42	0.625	78	134	0.15	26	±0.4	68.41
12A24D	12SM24D	12	±24	26	0.625	78	134	0.15	26	±0.5	68.41
12A28D	12SM28D	12	±28	22	0.625	77	135	0.15	26	±0.5	68.41
12A48D	12SM48D	12	±48	13	0.625	80	130	0.20	26	±0.7	68.41
15A5D	15SM5D	15	±5	100	0.5	66	101	0.20	20	±0.25	68.41
15A9D	15SM9D	15	±9	69	0.625	74	113	0.15	20	±0.3	68.41
15A12D	15SM12D	15	±12	52	0.625	76	110	0.15	20	±0.4	68.41
15A15D	15SM15D	15	±15	42	0.625	78	107	0.15	20	±0.4	68.41
15A24D	15SM24D	15	±24	26	0.625	78	107	0.15	20	±0.5	68.41
15A28D	15SM28D	15	±28	22	0.625	77	108	0.15	20	±0.5	68.41
15A48D	15SM48D	15	±48	13	0.625	80	104	0.20	20	±0.7	68.41
24A5D	24SM5D	24	±5	100	0.5	66	63	0.20	13	±0.25	68.41
24A9D	24SM9D	24	±9	69	0.625	72	72	0.20	15	±0.3	68.41
24A12D	24SM12D	24	±12	52	0.625	75	69	0.20	15	±0.4	68.41
24A15D	24SM15D	24	±15	42	0.625	75	69	0.20	15	±0.4	68.41
24A24D	24SM24D	24	±24	26	0.625	78	67	0.20	15	±0.5	68.41
24A28D	24SM28D	24	±28	22	0.625	77	68	0.20	15	±0.5	68.41
24A48D	24SM48D	24	±48	13	0.625	78	67	0.25	16	±0.7	68.41
28A5D	28SM5D	28	±5	100	0.5	66	54	0.20	12	±0.25	68.41
28A9D	28SM9D	28	±9	69	0.625	72	62	0.20	14	±0.3	68.41
28A12D	28SM12D	28	±12	52	0.625	72	62	0.20	14	±0.4	68.41
28A15D	28SM15D	28	±15	42	0.625	73	61	0.20	14	±0.4	68.41
28A24D	28SM24D	28	±24	26	0.625	76	59	0.20	14	±0.5	68.41
28A28D	28SM28D	28	±28	22	0.625	76	59	0.20	14	±0.5	68.41
28A48D	28SM48D	28	±48	13	0.625	77	58	0.25	15	±0.7	68.41
48A5D	48SM5D	48	±5	100	0.5	66	32	0.25	6	±0.25	73.43
48A9D	48SM9D	48	±9	69	0.625	72	36	0.25	8	±0.3	73.43
48A12D	48SM12D	48	±12	52	0.625	73	36	0.25	8	±0.4	73.43
48A15D	48SM15D	48	±15	42	0.625	72	36	0.25	8	±0.4	73.43
48A24D	48SM24D	48	±24	26	0.625	76	34	0.25	9	±0.5	73.43
48A28D	48SM28D	48	±28	22	0.625	76	34	0.25	9	±0.5	73.43

* For units with output voltages up to 48 volts, ripple is measured with 10µF, 75 volt high quality tantalum capacitor which is required across each output.
 Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York
 Delivery--stock to one week for sample orders.

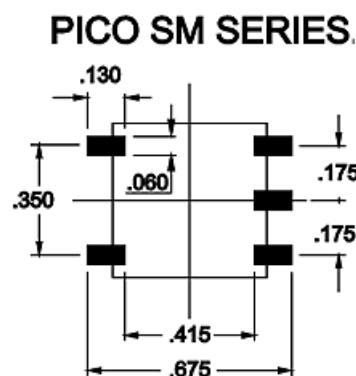
Series A/SM Single Output FOR OUTPUT VOLTAGES OF 48VDC and BELOW		
<p>Series A Single Output 48 VDC and below</p> <p>HV Units .440" height</p>	<p>Typical Weight: 3.5 Grams</p> <p>Larger Size Schematic</p>	<p>Series SM Single Output 48 VDC and below</p> <p>HV Units .440" height</p>

Larger Size Drawing		Larger Size Drawing
Series A/SM Single Output +FOR OUTPUT VOLTAGES OF 100 VDC and ABOVE		
Series A Single Output 100 VDC and above 	Typical Weight: 3.5 Grams 	Series SM Single Output 100 VDC and above
Series A/SM Dual Output		
Series A Dual Output 	Typical Weight: 3.5 Grams 	Series SM Dual Output
Larger Size Drawing	Larger Size Schematic	Larger Size Drawing

Note: White Dot on top unit indicates + input.

SINGLE & DUAL 12V - 5V 	SINGLE & DUAL 5V - 48V
Larger Size Graph	Larger Size Graph
SINGLE & DUAL 5V - 5V 	SINGLE & DUAL 12V - 48V
Larger Size Graph	Larger Size Graph

**RECOMMENDED LAND PATTERN DIMENSIONS
SERIES SM**



For immediate engineering assistance or to place an order:
Call Toll Free: 800-431-1064

PICO Electronics, Inc.

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