

## SERIES M and MV MILITARY DC-DC CONVERTERS

All Military Components  
Hi Reliability - Ultra-Miniature  
Isolated DC-DC Converters  
-55°C +85°C Ambient Operating Temperature

Up to 500V DC Output Now Available  
Low Profile 1.250" x 0.5" x 0.3" ht. up to 1.25 Watts  
Selected MIL-STD-883 environmental screening available

This series of unregulated DC-DC converters are encapsulated in an ultra-miniature 5 sided shielding package. 125 different models are available. The units feature single and dual outputs. They will operate over the temperature range of -55° C to +85° C. No heat sink is required.

- Diodes JAN TX
- Transformers manufactured to MIL-PRF-27, GRADE 5, CLASS S
- Capacitors MIL-C-39003, S Level, MIL-C-55681, S Level
- Resistors MIL-R-39008, S Level, MIL-PRF-39017, S LEVEL
- Transistors Hermetically Sealed, Screened per MIL-S-19500, Table II, JAN TX

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### FEATURES

- All MIL components
- Up to 500V DC Output
- -55° C to +85° C ambient operating temp.
- Up to 1.25 watts output at 85° C ambient
- Ultra-miniature size (0.3" Height)
- 5 input voltage ranges 5, 12, 15, 24 and 28V DC
  - Series M: 100 megohm @ 500V DC
  - Series MV: 100 Megohms @ 1K V DC
- Input/output isolation
- Single and dual output
- No heat sink required
- Shielded
- 24 Pin Dip compatible

### OPTIONS AVAILABLE PER MIL-STD-883

- Stabilization Bake
- Temperature Cycle
- Hi Temperature Burn In 160 Hours at Full Power

### 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
  - 15V models: 12 to 18V DC
  - 24V models: 17 to 28V DC
  - 28V models: 21 to 32V 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
- **Converter frequency:** 20 to 40 KHz
- **Output temperature coefficient:** 0.05%/°C for 5V and 9V outputs. 0.02%/°C for 12, 15, 24, 28, 48V outputs.
- **Operating temperature:** -55° C to +85° C ambient. No heat sink is required. No electrical derating required.
- **Storage temperature:** -55° C to +125° C
- **Isolation:**
  - Series M: 100 megohms min. @ 500V DC
  - Series MV: 100 Megohms @ 1K V DC

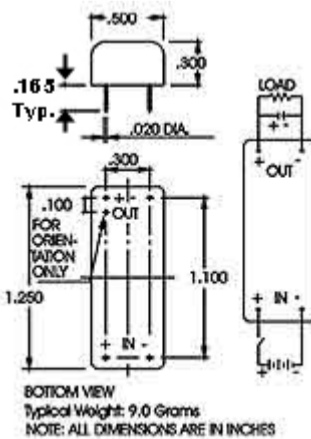
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## SERIES M - SINGLE OUTPUT

PICO 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 Volt. Ripple @ Full Load* (Vp-p max)	No Load Current Typical (mA)	Full Load Output Voltage Tolerance (V DC)	Price (US \$)
5M3.3S	5	3.3	303	1.00	60	333	0.20	80	±0.2	378.27
5M5S	5	5	200	1.00	65	308	0.20	65	±0.25	378.27
5M5.2S	5	5.2	192	1.00	65	308	0.20	65	±0.25	335.75
5M9S	5	9	139	1.25	71	352	0.15	80	±0.3	378.27
5M12S	5	12	104	1.25	74	338	0.15	80	±0.4	378.27
5M15S	5	15	83	1.25	74	338	0.12	90	±0.4	378.27
5M24S	5	24	52	1.25	77	325	0.10	90	±0.5	378.27
5M28S	5	28	45	1.25	76	329	0.10	90	±0.5	378.27
5M48S	5	48	26	1.25	77	325	0.10	90	±0.7	378.27
12M3.3S	12	3.3	303	1.00	60	139	0.20	26	±0.2	378.27
12M5S	12	5	200	1.00	67	124	0.15	40	±0.25	378.27
12M5.2S	12	5.2	192	1.00	67	124	0.15	40	±0.25	378.27
12M9S	12	9	139	1.25	74	141	0.15	40	±0.3	378.27
12M12S	12	12	104	1.25	76	137	0.12	40	±0.4	378.27
12M15S	12	15	83	1.25	76	137	0.12	40	±0.4	378.27
12M24S	12	24	52	1.25	78	134	0.08	40	±0.5	378.27
12M28S	12	28	45	1.25	80	130	0.08	40	±0.5	378.27
12M48S	12	48	26	1.25	80	130	0.08	40	±0.7	378.27
15M3.3S	15	3.3	303	1.0	60	111	0.20	25	±0.2	378.27
15M5S	15	5	200	1.0	67	100	0.15	35	±0.25	378.27
15M5.2S	15	5.2	192	1.0	67	100	0.15	35	±0.25	378.27
15M9S	15	9	139	1.25	74	113	0.15	35	±0.3	378.27
15M12S	15	12	104	1.25	76	110	0.12	35	±0.4	378.27
15M15S	15	15	83	1.25	76	110	0.12	35	±0.4	378.27
15M24S	15	24	52	1.25	78	107	0.08	35	±0.5	378.27
15M28S	15	28	45	1.25	80	104	0.08	35	±0.5	378.27
15M48S	15	48	26	1.25	80	104	0.08	35	±0.7	378.27
24M3.3S	24	3.3	303	1.00	60	69	0.20	16	±0.2	378.27
24M5S	24	5	200	1.00	67	62	0.15	13	±0.25	378.27
24M5.2S	24	5.2	192	1.00	67	62	0.15	13	±0.25	378.27
24M9S	24	9	139	1.25	74	70	0.15	15	±0.3	378.27
24M12S	24	12	104	1.25	75	69	0.10	15	±0.4	378.27
24M15S	24	15	83	1.25	78	67	0.10	15	±0.4	378.27
24M24S	24	24	52	1.25	82	64	0.10	15	±0.5	378.27
24M28S	24	28	45	1.25	79	66	0.10	15	±0.5	378.27
24M48S	24	48	26	1.25	80	65	0.07	16	±0.7	378.27
28M3.3S	28	3.3	303	1.00	60	59	0.20	15	±0.2	378.27
28M5S	28	5	200	1.00	68	53	0.15	12	±0.25	378.27
28M5.2S	28	5.2	192	1.00	68	53	0.15	12	±0.25	378.27
28M9S	28	9	139	1.25	76	59	0.15	14	±0.3	378.27
28M12S	28	12	104	1.25	78	57	0.12	14	±0.4	378.27
28M15S	28	15	83	1.25	79	57	0.10	14	±0.4	378.27
28M24S	28	24	52	1.25	81	55	0.09	14	±0.5	378.27
28M28S	28	28	45	1.25	81	55	0.09	14	±0.5	378.27
28M48S	28	48	26	1.25	80	56	0.09	15	±0.7	378.27

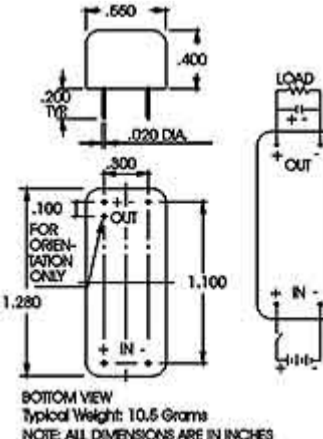
\* The ripple is measured with 10µF, 75 volt high quality tantalum capacitor which is required across each output.

### M SINGLE SERIES



Larger Size Drawing [1]

### MV SINGLE SERIES



Larger Size Schematic [2]

## SERIES MV - High Voltage to 500VDC

PICO 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 Volt. Ripple @ Full Load* (Vp-p max)	Full Load** Output Voltage Tolerance (%)	Price (US \$)
5MV100	5	100	12.50	1.25	78	321	0.90	±3	451.73
5MV150	5	150	8.30	1.25	76	329	0.90	±3	451.73
5MV200	5	200	6.25	1.25	75	333	0.90	±3	451.73
5MV250	5	250	5.00	1.25	75	333	0.90	±3	451.73
5MV300	5	300	4.16	1.25	70	357	1.20	±3	542.09
5MV350	5	350	3.57	1.25	70	357	1.20	±3	542.09
5MV400	5	400	3.12	1.25	70	357	1.20	±3	542.09
5MV450	5	450	2.77	1.25	70	357	1.50	±3	542.09
5MV500	5	500	2.50	1.25	70	357	1.50	±3	542.09
12MV100	12	100	12.50	1.25	80	130	0.90	±3	451.73
12MV150	12	150	8.30	1.25	79	132	0.90	±3	451.73
12MV200	12	200	6.25	1.25	78	134	0.90	±3	451.73
12MV250	12	250	5.00	1.25	75	139	0.90	±3	451.73
12MV300	12	300	4.16	1.25	75	139	1.20	±3	542.09
12MV350	12	350	3.57	1.25	75	139	1.20	±3	542.09
12MV400	12	400	3.12	1.25	75	139	1.20	±3	542.09
12MV450	12	450	2.77	1.25	75	139	1.50	±3	542.09
12MV500	12	500	2.50	1.25	75	139	1.50	±3	542.09
15MV100	15	100	12.50	1.25	80	104	0.90	±3	451.73
15MV150	15	150	8.30	1.25	79	105	0.90	±3	451.73
15MV200	15	200	6.25	1.25	78	107	0.90	±3	451.73
15MV250	15	250	5.00	1.25	75	111	0.90	±3	451.73
15MV300	15	300	4.16	1.25	75	111	1.20	±3	542.09
15MV350	15	350	3.57	1.25	75	111	1.20	±3	542.09
15MV400	15	400	3.12	1.25	75	111	1.20	±3	542.09
15MV450	15	450	2.77	1.25	75	111	1.50	±3	542.09
15MV500	15	500	2.50	1.25	75	111	1.50	±3	542.09
24MV100	24	100	12.50	1.25	76	69	0.90	±3	451.73
24MV150	24	150	8.30	1.25	73	71	0.90	±3	451.73
24MV200	24	200	6.25	1.25	73	71	0.90	±3	451.73
24MV250	24	250	5.00	1.25	70	74	0.90	±3	451.73
24MV300	24	300	4.16	1.25	73	71	1.20	±3	542.09
24MV350	24	350	3.57	1.25	73	71	1.20	±3	542.09
24MV400	24	400	3.12	1.25	73	71	1.20	±3	542.09
24MV450	24	450	2.77	1.25	73	71	1.50	±3	542.09
24MV500	24	500	2.50	1.25	73	71	1.50	±3	542.09
28MV100	28	100	12.50	1.25	75	60	0.90	±3	451.73
28MV150	28	150	8.30	1.25	76	59	0.90	±3	451.73
28MV200	28	200	6.25	1.25	75	60	0.90	±3	451.73
28MV250	28	250	5.00	1.25	70	64	0.90	±3	451.73
28MV300	28	300	4.16	1.25	73	61	1.20	±3	542.09
28MV350	28	350	3.57	1.25	73	61	1.20	±3	542.09
28MV400	28	400	3.12	1.25	73	61	1.20	±3	542.09
28MV450	28	450	2.77	1.25	73	61	1.50	±3	542.09
28MV500	28	500	2.50	1.25	73	61	1.50	±3	542.09

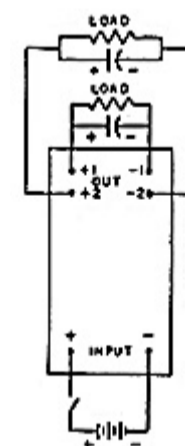
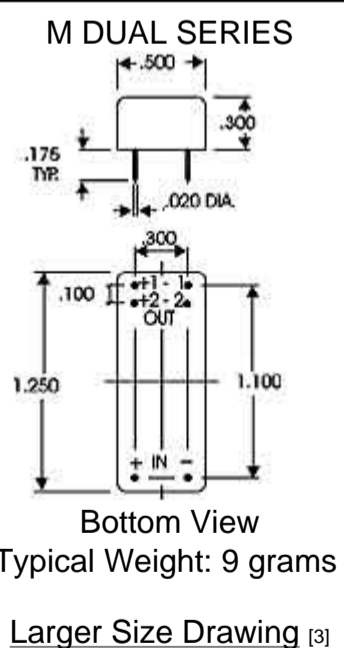
\* The ripple is measured with 0.1μF, 1000 volt DC capacitor which is required across the output and maintain at least 10% of load at all times to prevent voltage surge.

\*\*For tighter tolerances, consult factory

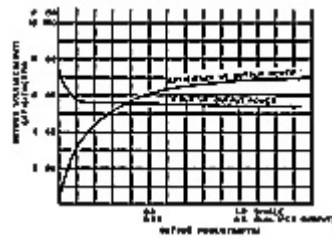
## SERIES M - DUAL OUTPUT

PICO Part Number	Input Volt. (V DC)	Dual Output Volt. (V DC)	Max. Load Current Per Output (mA)	Max. Output Power Per Output (watts)	Eff. @ Full Load Typical (%)	Input Current Full Load Typical (mA)	Output Volt. Ripple @ Full Load* (Vp-p max)	No Load Current Typical (mA)	Full Load Output Voltage Tolerance (V DC)	Price (US \$)
5M5D	5	5	100	0.500	65	308	0.20	65	±0.25	447.52
5M9D	5	9	69	0.625	71	352	0.15	80	±0.3	447.52
5M12D	5	12	52	0.625	74	338	0.15	80	±0.4	447.52
5M15D	5	15	42	0.625	74	338	0.12	90	±0.4	447.52
5M24D	5	24	26	0.625	77	325	0.10	90	±0.5	447.52
5M28D	5	28	22	0.625	76	329	0.10	90	±0.5	447.52
5M48D	5	48	13	0.625	77	325	0.10	90	±0.7	447.52
12M5D	12	5	100	0.500	67	124	0.15	40	±0.25	447.52
12M9D	12	9	69	0.625	74	141	0.15	40	±0.3	447.52
12M12D	12	12	52	0.625	76	137	0.12	40	±0.4	447.52
12M15D	12	15	42	0.625	76	137	0.12	40	±0.4	447.52
12M24D	12	24	26	0.625	78	134	0.08	40	±0.5	447.52
12M28D	12	28	22	0.625	80	130	0.08	40	±0.5	447.52
12M48D	12	48	13	0.625	80	130	0.05	40	±0.7	447.52
15M5D	15	5	100	0.500	67	100	0.15	35	±0.25	447.52
15M9D	15	9	69	0.625	74	113	0.15	35	±0.3	447.52
15M12D	15	12	52	0.625	76	110	0.12	35	±0.4	447.52
15M15D	15	15	42	0.625	76	110	0.12	35	±0.4	447.52
15M24D	15	24	26	0.625	78	107	0.08	35	±0.5	447.52
15M28D	15	28	22	0.625	80	104	0.08	35	±0.5	447.52
15M48D	15	48	13	0.625	80	104	0.05	35	±0.7	447.52
24M5D	24	5	100	0.500	67	62	0.15	13	±0.25	447.52
24M9D	24	9	69	0.625	74	70	0.15	15	±0.3	447.52
24M12D	24	12	52	0.625	75	69	0.10	15	±0.4	447.52
24M15D	24	15	42	0.625	78	67	0.10	15	±0.4	447.52
24M24D	24	24	26	0.625	82	64	0.10	15	±0.5	447.52
24M28D	24	28	22	0.625	79	66	0.10	15	±0.5	447.52
24M48D	24	48	13	0.625	80	65	0.07	16	±0.7	447.52
28M5D	28	5	100	0.500	68	53	0.15	12	±0.25	447.52
28M9D	28	9	69	0.625	76	59	0.15	14	±0.3	447.52
28M12D	28	12	52	0.625	78	57	0.12	14	±0.4	447.52
28M15D	28	15	42	0.625	79	57	0.10	14	±0.4	447.52
28M24D	28	24	26	0.625	81	55	0.09	14	±0.5	447.52
28M28D	28	28	22	0.625	81	55	0.09	14	±0.5	447.52
28M48D	28	48	13	0.625	80	56	0.09	15	±0.7	447.52

\* The ripple is measured with 10µF, 75 volt high quality tantalum capacitor which is required across each output.

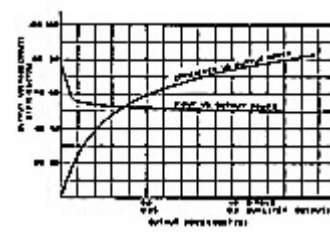


SERIES M SINGLE & DUAL 24V - 5V



Larger Size Graph [5]

SERIES M SINGLE & DUAL 28V - 48V



Larger Size Graph [6]

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

**PICO Electronics, Inc.**

143 Sparks Ave. Pelham, NY 10803-1810  
Tel: 914-738-1400 or Fax: 914-738-8225

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