

SERIES LR

DC-DC CONVERTERS

Wide Input Range/up to 3.33:1
Isolated Regulated up to 5 Watt
DC-DC Converters
Fully Regulated
All Units Shielded

This series of high efficiency, wide input range, encapsulated regulators come in 90 different models. These units feature a 500 VOLT DC input to output isolation in both single and dual output models. The LR Series will operate over a temperature range of -25° C to +70° C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

TYPICAL CHARACTERISTICS:

- **Test conditions:** 25° C ambient.
- **Operating temperature:** -25° C to +70° C ambient.
- **Output voltage tolerance:** $\pm 1\%$ at typical input voltage
- **Output voltage temperature coefficient:** 0.02%/°C
- **Storage temperature:** -55° C to +125° C
- **Short circuit protection:** Temporary
- **Operating frequency:** 40 KHz, typ.

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)

FEATURES

- Voltage regulation over input range of

Unit	Low	High
LRE	5V	15V
LRF	8V	24V
LRA	18V	36V
LRB	36V	60V
LRC	18V	60V

- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads)
- Line regulation = Typical values
- 5-15V DC = $\pm 1.5\%$
- 8-24V DC = $\pm 1.5\%$
- 18-36V DC = $\pm 1.0\%$
- 36-60V DC = $\pm 1.0\%$
- 18-60V DC = $\pm 1.5\%$
- High efficiency - up to 80%
- Will operate over a temperature range of -25° C to +70° C with no heat sink or electrical derating
- 6 sided shielding
- Isolation - 100 megohms at 500 volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (-) input, will disable the unit, allowing for remote shutdown.

SERIES LR - SINGLE OUTPUT

PICO Part Number	Input Volt. Range	Output Volt. DC	Max. Load Current (mA)	Max. Output Power (watts)	Eff. @ Full Load Typical (%)*	Input Current Full Load Typical (mA)*	Output Volt. Ripple@ Full LD. 1-1 MHz BW mv p-p	Output Volt. Tolerance (± %)*	** V LD. Reg. 25%-100% Load (± %)*	Line Regulation (± %)*	Price (US \$)
LRE2S	5-15	2	1000	2	68	294	150	1.50	3.50	3.50	154.28
LRE3.3S	5-15	3.3	910	3	75	400	200	1.00	3.00	2.75	154.28
LRE5S	5-15	5	600	3	78	385	150	0.75	1.50	2.00	154.28
LRE5.2S	5-15	5.2	576	3	78	385	150	0.75	1.50	2.00	154.28
LRE9S	5-15	9	444	4	78	515	125	0.50	1.25	1.50	154.28
LRE12S	5-15	12	333	4	79	505	125	0.50	1.25	1.25	154.28
LRE15S	5-15	15	267	4	79	505	125	0.50	1.25	1.25	154.28
LRE24S	5-15	24	167	4	80	500	125	0.50	1.00	1.25	154.28
LRE28S	5-15	28	143	4	80	500	125	0.50	1.00	1.00	154.28
LRE48S	5-15	48	83	4	80	500	175	0.50	1.00	1.00	154.28
LRE100S	5-15	100	40	4	80	500	200	0.50	1.00	1.00	207.28
LRF2S	8-24	2	1500	3	69	272	150	1.50	3.50	3.00	154.28
LRF3.3S	8-24	3.3	1212	4	75	333	200	1.00	3.00	2.75	154.28
LRF5S	8-24	5	1000	5	78	400	150	0.75	1.50	2.00	154.28
LRF5.2S	8-24	5.2	961	5	78	400	150	0.75	1.50	2.00	154.28
LRF9S	8-24	9	556	5	78	400	125	0.50	1.25	1.50	154.28
LRF12S	8-24	12	417	5	79	395	125	0.50	1.25	1.25	154.28
LRF15S	8-24	15	333	5	79	395	125	0.50	1.25	1.25	154.28
LRF24S	8-24	24	208	5	80	390	125	0.50	1.00	1.25	154.28
RF28S	8-24	28	179	5	80	390	125	0.50	1.00	1.00	154.28
LRF48S	8-24	48	104	5	80	390	175	0.50	1.00	1.00	154.28
LRF100S	8-24	100	50	5	80	390	200	0.50	1.00	1.00	207.28

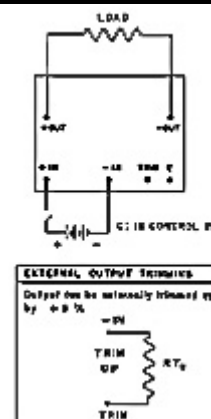
LRA2S	18-36	2	1500	3	69	161	150	1.50	4.00	2.00	154.28
LRA3.3S	18-36	3.3	1212	4	76	195	150	1.00	3.00	1.50	154.28
LRA5S	18-36	5	1000	5	76	245	100	0.75	2.00	0.75	154.28
LRA5.2S	18-36	5.2	961	5	76	245	100	0.75	2.00	0.75	154.28
LRA9S	18-36	9	556	5	76	245	100	0.50	2.00	0.50	154.28
LRA12S	18-36	12	417	5	77	240	100	0.50	2.00	0.50	154.28
LRA15S	18-36	15	333	5	79	235	100	0.50	1.50	0.50	154.28
LRA24S	18-36	24	208	5	80	230	100	0.50	1.50	0.25	154.28
LRA28S	18-36	28	179	5	80	230	100	0.50	1.50	0.25	154.28
LRA48S	18-36	48	104	5	80	230	150	0.50	1.00	0.25	154.28
LRA100S	18-36	100	50	5	80	230	200	0.50	1.00	0.50	207.28
LRB2S	36-60	2	1500	3	67	93	150	1.50	4.00	2.00	182.33
LRB3.3S	36-60	3.3	1212	4	74	113	150	1.00	3.00	1.50	182.33
LRB5S	36-60	5	1000	5	74	140	100	0.75	1.25	0.50	182.33
LRB5.2S	36-60	5.2	961	5	74	140	100	0.75	1.25	0.50	182.33
LRB9S	36-60	9	556	5	74	140	100	0.50	1.00	0.25	182.33
LRB12S	36-60	12	417	5	74	140	100	0.50	1.00	0.25	182.33
LRB15S	36-60	15	333	5	76	135	100	0.50	1.00	0.25	182.33
LRB24S	36-60	24	208	5	76	135	100	0.50	0.75	0.25	182.33
LRB28S	36-60	28	179	5	76	135	100	0.50	0.75	0.25	182.33
LRB48S	36-60	48	104	5	76	135	150	0.50	0.75	0.25	182.33
LRB100S	36-60	100	50	5	78	135	200	0.50	1.00	0.50	244.96
LRC2S	18-60	2	1500	3	67	115	150	1.50	4.00	2.50	196.36
LRC3.3S	18-60	3.3	1212	4	74	139	150	1.00	3.00	1.75	196.36
LRC5S	18-60	5	1000	5	76	170	100	0.75	2.00	1.25	196.36
LRC5.2S	18-60	5.2	961	5	76	170	100	0.75	2.00	1.25	196.36
LRC9S	18-60	9	556	5	76	170	100	0.50	1.00	0.75	196.36
LRC12S	18-60	12	417	5	76	170	100	0.50	1.00	0.75	196.36
LRC15S	18-60	15	333	5	77	165	100	0.50	1.00	0.75	196.36
LRC24S	18-60	24	208	5	78	165	100	0.50	0.75	0.50	196.36
LRC28S	18-60	28	179	5	78	165	100	0.50	0.75	0.50	196.36
LRC48S	18-60	48	104	5	78	165	150	0.50	0.75	0.50	196.36
LRC100S	18-60	100	50	5	78	165	200	0.50	1.00	0.50	264.15

* Measurements taken with input voltage set at mid value.

** 10% minimum load required.

Larger Size Drawing

Use 50 K Ohm trim pot rated 1/4 Watt between trim pin and negative input. Trim down to raise output voltage to a maximum of 5%. Do not go beyond 5%. Reducing the resistance value further could damage the module.



Larger Size Schematic

SERIES LR - DUAL OUTPUT											
PICO Part Number	Input Volt. Range	Output Volt. DC Per Output	Max. Load Current (mA) Per Output	Max. Output Power (watts) Per Output	Eff. @ Full Load Typical (%)*	Input Current Full Load Typical (mA)*	Output Volt. Ripple@ Full LD. 1-1 MHz BW mv p-p	Output Volt. Tolerance (± %)*	** V LD. Reg. 25%-100% Load (± %)*	Line Regulation (± %)*	Price (US \$)
LRE5D	5-15	5	300	1.5	78	385	150	0.75	1.50	2.00	189.34
LRE9D	5-15	9	222	2.0	78	515	125	0.50	1.25	1.50	189.34
LRE12D	5-15	12	167	2.0	79	505	125	0.50	1.25	1.25	189.34
LRE15D	5-15	15	134	2.0	79	505	125	0.50	1.25	1.25	189.34
LRE24D	5-15	24	84	2.0	80	500	125	0.50	1.00	1.25	189.34
LRE28D	5-15	28	72	2.0	80	500	125	0.50	1.00	1.00	189.34
LRE48D	5-15	48	42	2.0	80	500	175	0.50	1.00	1.00	203.50

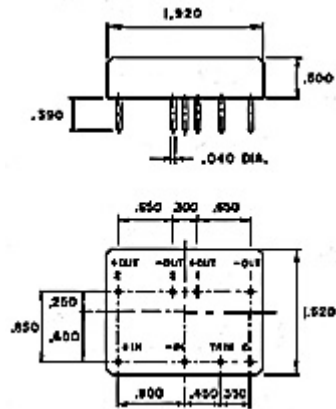
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PICO Part Number	Input Volt. Range	Output Volt. DC Per Output	Max. Load Current (mA) Per Output	Max. Output Power (watts) Per Output	Eff. @ Full Load Typical (%)*	Input Current Full Load Typical (mA)*	Output Volt. Ripple@ Full LD. 1-1 MHz BW mv p-p	Output Volt. Tolerance (± %)*	** V LD. Reg. 25%-100% Load (± %)*	Line Regulation (± %)*	Price (US \$)
LRE5D	5-15	5	300	1.5	78	385	150	0.75	1.50	2.00	189.34
LRE9D	5-15	9	222	2.0	78	515	125	0.50	1.25	1.50	189.34
LRE12D	5-15	12	167	2.0	79	505	125	0.50	1.25	1.25	189.34
LRE15D	5-15	15	134	2.0	79	505	125	0.50	1.25	1.25	189.34
LRE24D	5-15	24	84	2.0	80	500	125	0.50	1.00	1.25	189.34
LRE28D	5-15	28	72	2.0	80	500	125	0.50	1.00	1.00	189.34
LRE48D	5-15	48	42	2.0	80	500	175	0.50	1.00	1.00	203.50

LRF5D	8-24	5	500	2.5	78	400	150	0.75	1.50	2.00	189.34
LRF9D	8-24	9	278	2.5	78	400	125	0.50	1.25	1.50	189.34
LRF12D	8-24	12	208	2.5	79	395	125	0.50	1.25	1.25	189.34
LRF15D	8-24	15	167	2.5	79	395	125	0.50	1.25	1.25	189.34
LRF24D	8-24	24	104	2.5	80	390	125	0.50	1.00	1.25	189.34
LRF28D	8-24	28	89	2.5	80	390	125	0.50	1.00	1.00	189.34
LRF48D	8-24	48	52	2.5	80	390	175	0.50	1.00	1.00	203.50
LRA5D	18-36	5	500	2.5	76	245	100	0.75	2.00	0.75	189.34
LRA9D	18-36	9	278	2.5	76	245	100	0.50	2.00	0.50	189.34
LRA12D	18-36	12	208	2.5	77	240	100	0.50	2.00	0.50	189.34
LRA15D	18-36	15	167	2.5	79	235	100	0.50	1.50	0.50	189.34
LRA24D	18-36	24	104	2.5	80	230	100	0.50	1.50	0.25	189.34
LRA28D	18-36	28	89	2.5	80	230	100	0.50	1.50	0.25	189.34
LRA48D	18-36	48	52	2.5	80	230	150	0.50	1.00	0.25	203.50
LRB5D	36-60	5	500	2.5	74	140	100	0.75	1.25	0.50	217.40
LRB9D	36-60	9	278	2.5	74	140	100	0.50	1.00	0.25	217.40
LRB12D	36-60	12	208	2.5	74	140	100	0.50	1.00	0.25	217.40
LRB15D	36-60	15	167	2.5	76	135	100	0.50	1.00	0.25	217.40
LRB24D	36-60	24	104	2.5	76	135	100	0.50	0.75	0.25	217.40
LRB28D	36-60	28	89	2.5	76	135	100	0.50	0.75	0.25	217.40
LRB48D	36-60	48	52	2.5	76	135	150	0.50	0.75	0.25	233.65
LRC5D	18-60	5	500	2.5	75	170	100	0.75	2.00	1.25	231.42
LRC9D	18-60	9	278	2.5	75	170	100	0.50	1.00	0.75	231.42
LRC12D	18-60	12	208	2.5	75	170	100	0.50	1.00	0.75	231.42
LRC15D	18-60	15	167	2.5	77	165	100	0.50	1.00	0.75	231.42
LRC24D	18-60	24	104	2.5	78	165	100	0.50	0.75	0.50	231.42
LRC28D	18-60	28	89	2.5	78	165	100	0.50	0.75	0.50	231.42
LRC48D	18-60	48	52	2.5	78	165	150	0.50	0.75	0.50	248.72

* Measurements taken with input voltage set at mid value.

**10% minimum load required.

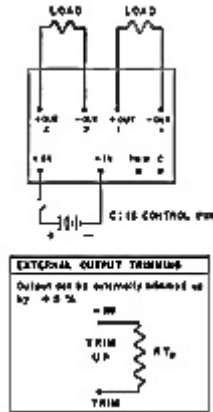
Series LR - Dual Output



Typical Weight: 65 grams

[Larger Size Drawing](#)

Use 50 K Ohm trim pot rated 1/4 Watt between trim pin and negative input. Trim down to raise output voltage to a maximum of 5%. Do not go beyond 5%. Reducing the resistance value further could damage the module.



[Larger Size Schematic](#)

Ordering Instructions:

- No minimum.

Net 30 days F.O.B. Pelham, NY

Delivery--stock to one wee for sample orders.

For immediate engineering assistance or to place an order:

Call Toll Free: 800-431-1064

PICO Electronics, Inc.

143 Sparks Ave. Pelham, NY 10803

Tel: 914-738-1400 or Fax: 914-738-8225

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