

T-57-11

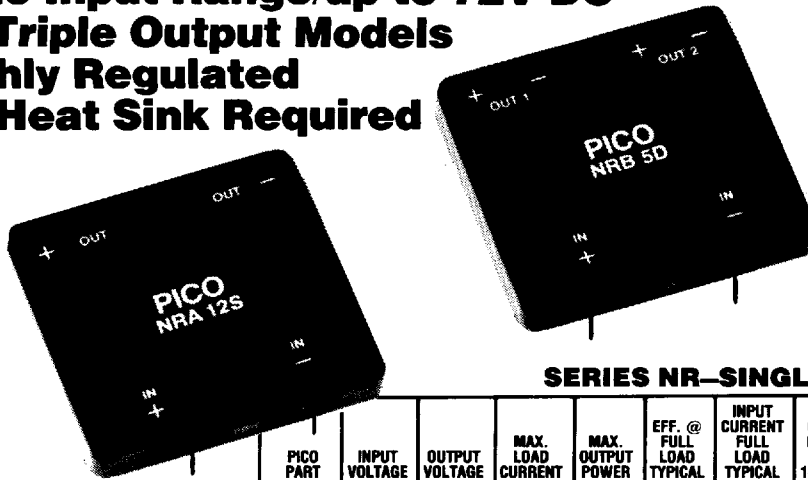
# SERIES NR

**Isolated Regulated up to 30 Watt DC-DC Converters**  
**Wide Input Range/up to 72V DC**  
**30 Triple Output Models**  
**Highly Regulated**  
**No Heat Sink Required**

**No Heat Sink or Electrical Derating Required**

**Low Profile Less Than 0.5" Height**

● 30 Triple Output Models  
 ● 72 V Input Voltage  
 ● 0.2% Line Regulation  
 ● Continuous Short Circuit Protection



## SERIES NR-SINGLE OUTPUT

| PICO PART NUMBER | INPUT VOLTAGE RANGE | OUTPUT VOLTAGE DC | MAX. LOAD CURRENT mA | MAX. OUTPUT POWER (watts) | EFF. @ FULL LOAD TYPICAL (%)* | INPUT CURRENT FULL LOAD TYPICAL (mA)* | OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p | OUT VOLT TOLERANCE (± %)* | V LD. REG. 10%-100% LOAD † (± %)* | LINE REGULATION (± %)* | PRICE 1-24 |
|------------------|---------------------|-------------------|----------------------|---------------------------|-------------------------------|---------------------------------------|--|---------------------------|-----------------------------------|------------------------|------------|
| NRA5S            | 18-36               | 5                 | 4000                 | 20                        | 78                            | 1068                                  | 50   | 0.5                       | 0.3                               | 0.2                    | 260.00     |
| NRA9S            | 18-36               | 9                 | 2777                 | 25                        | 80                            | 1302                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 260.00     |
| NRA12S           | 18-36               | 12                | 2083                 | 25                        | 81                            | 1286                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 260.00     |
| NRA15S           | 18-36               | 15                | 1666                 | 25                        | 83                            | 1255                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 260.00     |
| NRA24S           | 18-36               | 24                | 1042                 | 25                        | 84                            | 1240                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 260.00     |
| NRA28S           | 18-36               | 28                | 893                  | 25                        | 85                            | 1225                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 260.00     |
| NRB5S            | 36-72               | 5                 | 4400                 | 22                        | 78                            | 588                                   | 50   | 0.5                       | 0.3                               | 0.2                    | 289.00     |
| NRB9S            | 36-72               | 9                 | 2777                 | 25                        | 83                            | 628                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 289.00     |
| NRB12S           | 36-72               | 12                | 2083                 | 25                        | 83                            | 628                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 289.00     |
| NRB15S           | 36-72               | 15                | 2000                 | 30                        | 85                            | 735                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 289.00     |
| NRB24S           | 36-72               | 24                | 1250                 | 30                        | 86                            | 727                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 289.00     |
| NRB28S           | 36-72               | 28                | 1071                 | 30                        | 87                            | 718                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 289.00     |

**FEATURES:**

- 30 triple output models
- Voltage regulation over input of LOW HI  
 NRA 18V 36V  
 NRB 36V 72V
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads
- Line regulation = Typical values  
 18-36V DC = 0.2%  
 36-72V DC = 0.2%
- High efficiency—up to 87
- Will operate over a ambient temperature range of -25°C to +70°C with no heat sink or electrical derating required.
- Short circuit protection
- Current limited
- 6 sided shielding
- Isolation—100 megohms at 500 Volts DC
- Screw inserts for mounting

† 10% minimum load required.

## SERIES NR-DUAL OUTPUT

| PICO PART NUMBER | INPUT VOLTAGE RANGE | OUTPUT VOLTAGE 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)* | OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p | OUT VOLT TOLERANCE (± %)* | V LD. REG. 25%-100% LOAD † (± %)* | LINE REGULATION (± %)* | PRICE 1-24 |
|------------------|---------------------|------------------------------|---------------------------------|--------------------------------------|-------------------------------|---------------------------------------|--|---------------------------|-----------------------------------|------------------------|------------|
| NRA5D            | 18-36               | ± 5                          | 2000                            | 10.0                                 | 78                            | 1068                                  | 50   | 0.5                       | 0.3                               | 0.2                    | 310.00     |
| NRA9D            | 18-36               | ± 9                          | 1390                            | 12.5                                 | 80                            | 1302                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 310.00     |
| NRA12D           | 18-36               | ±12                          | 1042                            | 12.5                                 | 81                            | 1286                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 310.00     |
| NRA15D           | 18-36               | ±15                          | 833                             | 12.5                                 | 83                            | 1255                                  | 50   | 0.5                       | 0.2                               | 0.2                    | 310.00     |
| NRB5D            | 36-72               | ± 5                          | 2200                            | 11.0                                 | 78                            | 588                                   | 50   | 0.5                       | 0.3                               | 0.2                    | 339.00     |
| NRB9D            | 36-72               | ± 9                          | 1390                            | 12.5                                 | 80                            | 651                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 339.00     |
| NRB12D           | 36-72               | ±12                          | 1042                            | 12.5                                 | 82                            | 635                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 339.00     |
| NRB15D           | 36-72               | ±15                          | 833                             | 12.5                                 | 84                            | 620                                   | 50   | 0.5                       | 0.2                               | 0.2                    | 339.00     |

\*Measurements taken with input voltage set at mid value.

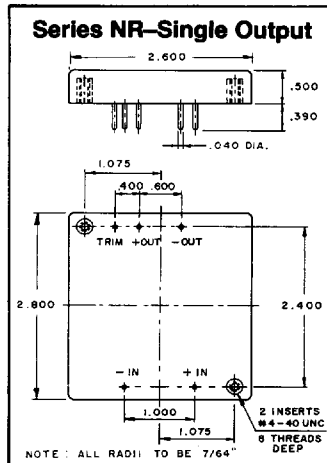
† 10% minimum load required.

**Delivery—stock to one week**

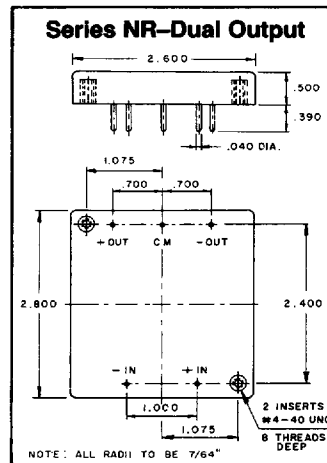
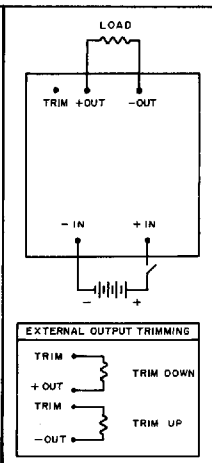
**PICO Electronics, Inc.**

453 N. MacQuesten Pkwy.  
 Mt. Vernon, N.Y. 10552

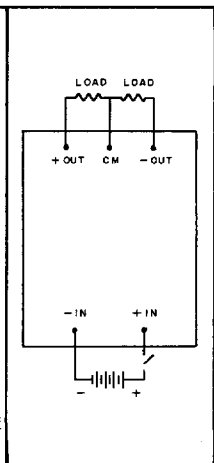
914-699-5514  
 FAX 914-699-5565



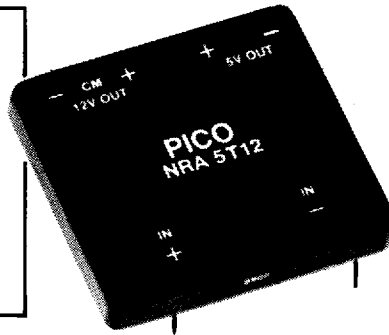
Typical Weight: 175 Grams



Typical Weight: 175 Grams



This series of high efficiency wide input range, encapsulated regulators come in 50 different models including 30 Triple Output Models to ease board designs. These units feature a 500 Volt DC input to output isolation in both single, dual and triple output models. The NR Series will operate over an ambient 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.



# SERIES NR T-57-11

**TYPICAL CHARACTERISTICS:**  
**Test conditions:** 25°C ambient  
**Operating temperature:** -25°C to +70°C, ambient  
**Output voltage tolerance:** 0.5% main outputs  
**Output voltage temperature coefficient:** 0.01%/°C  
**Storage temperature:** -55°C to 125°C  
**Short circuit protection:** Continuous  
**Operating frequency:** 30 Khtz, typ.

## SERIES NR TRIPLE OUTPUT

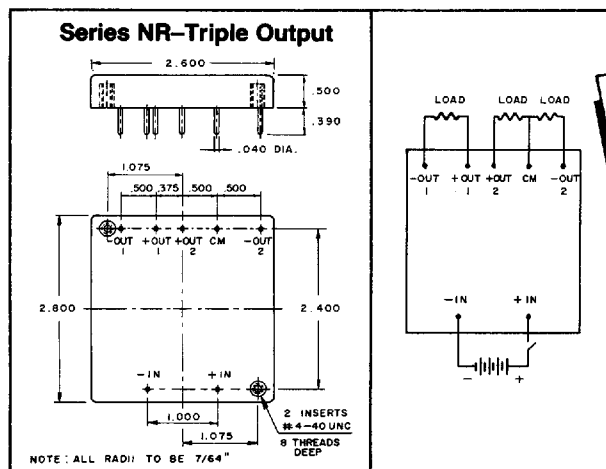
| PICO PART NUMBER | INPUT VOLTAGE RANGE | MAIN OUTPUT VOLTAGE      |                             |                                  |                                |  | AUXILIARY OUTPUT VOLTAGE     |                                 |                                      |                                     |  | EFF. @ FULL LOAD TYPICAL (%)* | INPUT CURRENT FULL LOAD TYPICAL (mA)* | PRICE 1-24 |
|------------------|---------------------|--------------------------|-----------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|--------------------------------------|-------------------------------------|--|-------------------------------|---------------------------------------|------------|
|                  |                     | OUTPUT VOLTAGE DC OUTPUT | MAX. LOAD CURRENT mA OUTPUT | MAX. OUTPUT POWER (watts) OUTPUT | V LD. REG. 25%-100% LOAD (±%)* | OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p | OUTPUT VOLTAGE DC PER OUTPUT | MAX. LOAD CURRENT mA PER OUTPUT | MAX. OUTPUT POWER (watts) PER OUTPUT | VOLT. LOAD REG. 25%-100% LOAD (±%)* | OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p |                               |                                       |            |
| NRA5T12          | 18-36               | 5                        | 3000                        | 15                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 78                            | 1068                                  | 360.00     |
| NRA5T15          | 18-36               | 5                        | 3000                        | 15                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 78                            | 1068                                  | 360.00     |
| NRA9T5           | 18-36               | 9                        | 2220                        | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 80                            | 1302                                  | 360.00     |
| NRA9T12          | 18-36               | 9                        | 2220                        | 20                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 80                            | 1302                                  | 360.00     |
| NRA9T15          | 18-36               | 9                        | 2220                        | 20                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 80                            | 1302                                  | 360.00     |
| NRA12T5          | 18-36               | 12                       | 1660                        | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 81                            | 1286                                  | 360.00     |
| NRA12T15         | 18-36               | 12                       | 1660                        | 20                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 81                            | 1286                                  | 360.00     |
| NRA15T5          | 18-36               | 15                       | 1330                        | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 83                            | 1255                                  | 360.00     |
| NRA15T12         | 18-36               | 15                       | 1330                        | 20                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 83                            | 1255                                  | 360.00     |
| NRA24T5          | 18-36               | 24                       | 830                         | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 84                            | 1240                                  | 360.00     |
| NRA24T12         | 18-36               | 24                       | 830                         | 20                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 84                            | 1240                                  | 360.00     |
| NRA24T15         | 18-36               | 24                       | 830                         | 20                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 84                            | 1240                                  | 360.00     |
| NRA28T5          | 18-36               | 28                       | 714                         | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 85                            | 1225                                  | 360.00     |
| NRA28T12         | 18-36               | 28                       | 714                         | 20                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 85                            | 1225                                  | 360.00     |
| NRA28T15         | 18-36               | 28                       | 714                         | 20                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 85                            | 1225                                  | 360.00     |
| NRB5T12          | 36-72               | 5                        | 3400                        | 17                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 78                            | 588                                   | 389.00     |
| NRB5T15          | 36-72               | 5                        | 3400                        | 17                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 78                            | 588                                   | 389.00     |
| NRB9T5           | 36-72               | 9                        | 2220                        | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 80                            | 651                                   | 389.00     |
| NRB9T12          | 36-72               | 9                        | 2220                        | 20                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 80                            | 651                                   | 389.00     |
| NRB9T15          | 36-72               | 9                        | 2220                        | 20                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 80                            | 651                                   | 389.00     |
| NRB12T5          | 36-72               | 12                       | 1660                        | 20                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 84                            | 620                                   | 389.00     |
| NRB12T15         | 36-72               | 12                       | 1660                        | 20                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 84                            | 620                                   | 389.00     |
| NRB15T5          | 36-72               | 15                       | 1667                        | 25                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 85                            | 735                                   | 389.00     |
| NRB15T12         | 36-72               | 15                       | 1667                        | 25                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 85                            | 735                                   | 389.00     |
| NRB24T5          | 36-72               | 24                       | 1042                        | 25                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 86                            | 727                                   | 389.00     |
| NRB24T12         | 36-72               | 24                       | 1042                        | 25                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 86                            | 727                                   | 389.00     |
| NRB24T15         | 36-72               | 24                       | 1042                        | 25                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 86                            | 727                                   | 389.00     |
| NRB28T5          | 36-72               | 28                       | 893                         | 25                               | 0.2                            | 50   | ± 5                          | 500                             | 2.5                                  | 5                                   | 50   | 87                            | 718                                   | 389.00     |
| NRB28T12         | 36-72               | 28                       | 893                         | 25                               | 0.2                            | 50   | ±12                          | 208                             | 2.5                                  | 5                                   | 50   | 87                            | 718                                   | 389.00     |
| NRB28T15         | 36-72               | 28                       | 893                         | 25                               | 0.2                            | 50   | ±15                          | 167                             | 2.5                                  | 5                                   | 50   | 87                            | 718                                   | 389.00     |

**Common Characteristics**  
 Main Output Voltage Tolerance ±0.5%\*  
 Main Line Regulation ±0.2%\*

**Common Characteristics**  
 Auxiliary Output Voltage Tolerance ±4%\*  
 Auxiliary Line Regulation ±0.2%\*

\*10% minimum load required.

\*Measurements taken with input voltage set at mid value.



Typical Weight: 175 Grams

**30 Triple Output Models**

**Delivery—stock to one week**

- OPTIONS AVAILABLE**
- 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)

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

**PICO Electronics, Inc.**

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