# D® DAIEL®

DC-DC Converters
Isolated and Non-Isolated





# **DC-DC Power Products**

Since its founding in 1970, DATEL has established a worldwide reputation as a provider of both standard and custom products designed to meet the ever-changing requirements of military, HI-REL, medical, scientific and industrial applications.

Recognizing the unique needs of each system's power requirements, DATEL has established itself as a supplier

that works with its customers to provide the right solution.

Our standard DC-DC converters range from ½ watt to 700 watts and are offered in a variety of form factors including: encapsulated, open frame, surface mount, chassis mount, PC board mount and enclosed air ventilated.

# **Custom DC-DC Solutions**

If our standard product offering is not the right fit, DATEL's design team can modify an existing product or provide a complete custom design to meet your application's requirements.

Our broad range of processing capabilities, technical knowledge and design experience has made DATEL a

leader in the DC-DC market for more than 45-years. If one of our standard products does not quite fit the

bill, we will work with you to create a custom solution, leaving you secure in the knowledge that the tailored design meets your needs and is produced with the highest quality.

# About this catalog...

In addition to the product offering shown here, DATEL offers a variety of package/pin-out compatible families offering variations such as: different input ranges, lower

power, expanded I/O Isolation, lower cost, etc.

For more information Contact DATEL sales@datel.com / 508 964-5131

# **Contents**







# **Point-of-Load DC-DC Converters**



For point-of-load applications, the PT/PS series of non-isolated DC-DC converters from DATEL provides a regulated user-selectable output voltage that operates over the full industrial temperature range. The Ultra-high efficiency that this series offers is achieved through the use of

synchronous rectification and drive control techniques.

DATEL'S extensive testing and qualification program ensures a reliable point-of-load DC-DC converter for your application. Lower output current models available.

### **FEATURES / AVAILABLE OPTIONS**

- Industry standard open frame thru-hole or SMT footprint
- Programmable output voltage via external resistor
- No minimum load requirement
- Continuous short-circuit and over-current protection
- Fixed switching frequency, Output voltage sequencing
- -40°C to +85°C industrial temperature range
- Negative and positive On/Off logic control, Power Good

- Sense Compensation, Over-temperature protection
- Monotonic start-up with output pre-bias
- UL/IEC/EN60950 available
- Customized versions available

# Contact Datel for other series in a POL footprint

LOWER POWER/COST IN THIS AND OTHER INDUSTRY STANDARD FOOTPRINTS

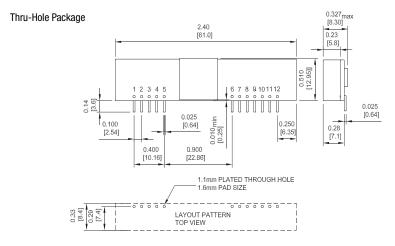
# **PT/PS POL SERIES**

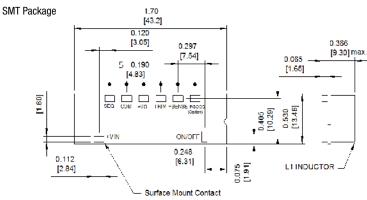
| Power    | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min |                | Etticioney (%) |             |             |             |             | Thru-Hole /<br>SMT | Options <sup>1</sup> | DATEL Part # |         |         |
|----------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|----------------|----------------|-------------|-------------|-------------|-------------|--------------------|----------------------|--------------|---------|---------|
| Watts    | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | 0.7525<br>Vout | 1.2<br>Vout    | 1.5<br>Vout | 1.8<br>Vout | 2.0<br>Vout | 2.5<br>Vout | 3.3<br>Vout        | 5.0<br>Vout          |              |         |         |
| 15 - 100 | 12                          | 6 -14                     | 0.7525 - 5        | 20                       | 0                        | 78             | 84             | 87          | 88          | 89          | 90          | 92                 | 94                   | Thru-Hole    | N, P, G | PT12-20 |
| 15 - 100 | 12                          | 6 -14                     | 0.7525 - 5        | 20                       | 0                        | 78             | 84             | 87          | 88          | 89          | 90          | 92                 | 94                   | SMT          | N, P, G | PS12-20 |

<sup>1.</sup> Options: See Ordering Information on page 10

| PT/PS POL SE | RIES PINOUT    |
|--------------|----------------|
| PIN          | FUNCTION       |
| 1            | +V0            |
| 2            | +V0            |
| 3            | +Sense         |
| 4            | +V0            |
| 5            | Common         |
| 6            | No Pin / PGOOD |
| 7            | Common         |
| 8            | +Vin           |
| 9            | +Vin           |
| 10           | Sequence       |
| 11           | Trim           |
| 12           | ON/OFF         |

| EXTERNAL RESISTOR VAL | UES to PROGRAM VOUT |
|-----------------------|---------------------|
| Vo, set (V)           | Rtrim (KΩ)          |
| 0.7525                | Open                |
| 1.2                   | 22.46               |
| 1.5                   | 13.05               |
| 1.8                   | 90.24               |
| 2                     | 7.417               |
| 2.5                   | 5.009               |
| 3.3                   | 3.122               |
| 5                     | 1.472               |







# 24-Pin DIP DC-DC Converters



DATEL's TF series provides an ultra-wide input voltage range, a precision regulated output, 1500VDC of isolation and operates at industrial temperature range of –40°C to 85°C. All models are suitable for distributed power architectures,

telecommunications, battery operated equipment and industrial applications. DATEL'S extensive testing and qualification program ensures a reliable DC-DC converter for your application.

### **FEATURES**

- Industry-standard footprint
- -40°C to +85°C industrial temperature range
- Positive Logic On/Off control
- Designed for use without tantalum capacitors
- Thru-Hole metal package
- ULVO, short circuit and output over voltage protection
- Meets conductive EMI EN55022 class A without external components

### **AVAILABLE OPTIONS**

- Surface Mount versions available
- CE Mark 2004/108/EC certification
- Customizable Vout and Vin
- UL60950-1, EN60950-1, and IEC60950-1 Safety

# **Contact Datel for other series in 24-pin DIP**

- 2:1 INPUT RANGE, COST SAVING-LOWER POWER
- NON-ISOLATED SERIES
- HIGH 6KV ISOLATION SERIES

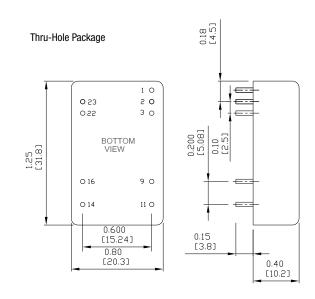
# **TF SERIES**

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>2</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options <sup>1</sup> | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------------------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                    |                      |              |
| 13.2  | 12                          | 9-36                      | 3.30              | 4.0                      | 0                        | 88         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF22S3.3-4   |
| 15    | 12                          | 9-36                      | 5.00              | 3.0                      | 0                        | 90         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF22S5-3     |
| 15    | 12                          | 9-36                      | 12.00             | 1.25                     | 0                        | 90         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF22S12-1.25 |
| 15    | 12                          | 9-36                      | 15.00             | 1.0                      | 0                        | 90         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF22S15-1    |
| 15    | 12                          | 9-36                      | ±12               | ±0.625                   | 0                        | 89         | 75                           | ±0.5%              | ± 1.0%             | NA                   | TF22D12-0.62 |
| 15    | 12                          | 9-36                      | ±15               | ±0.500                   | 0                        | 90         | 75                           | ±0.5%              | ± 1.0%             | NA                   | TF22D15-0.5  |
| 13.2  | 24                          | 18-75                     | 3.30              | 4.0                      | 0                        | 89         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF45S3.3-4   |
| 15    | 24                          | 18-75                     | 5.00              | 3.0                      | 0                        | 90         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF45S5-3     |
| 15    | 24                          | 18-75                     | 12.00             | 1.25                     | 0                        | 90         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF45S12-1.25 |
| 15    | 24                          | 18-75                     | 15.00             | 1.0                      | 0                        | 90         | 75                           | ± 0.2%             | ± 0.5%             | NA                   | TF45S15-1    |
| 15    | 24                          | 18-75                     | ±12               | ±0.625                   | 0                        | 89.5       | 75                           | ±0.5%              | ± 1.0%             | NA                   | TF45D12-0.62 |
| 15    | 24                          | 18-75                     | ±15               | ±0.500                   | 0                        | 90         | 75                           | ±0.5%              | ± 1.0%             | NA                   | TF45D15-0.5  |

Options: See Ordering Information on page 10

<sup>2. 0.1</sup>uF ceramic and 10uF tantalum capacitive load, 20MHz BW

|            | TF SERIES PINOUT |                |  |  |  |  |  |  |  |  |  |
|------------|------------------|----------------|--|--|--|--|--|--|--|--|--|
| Pin        | Single Output    | Dual Output    |  |  |  |  |  |  |  |  |  |
| 1          | Remote On/Off*   | Remote On/Off* |  |  |  |  |  |  |  |  |  |
| 2,3        | -Vin             | -Vin           |  |  |  |  |  |  |  |  |  |
| 4, 5       | NP               | NP             |  |  |  |  |  |  |  |  |  |
| 9          | NP               | Common         |  |  |  |  |  |  |  |  |  |
| 10         | NP               | NP             |  |  |  |  |  |  |  |  |  |
| 11         | NP               | -Vo            |  |  |  |  |  |  |  |  |  |
| 12         | NP               | NP             |  |  |  |  |  |  |  |  |  |
| 13         | NP               | NP             |  |  |  |  |  |  |  |  |  |
| 14         | +Vo              | +Vo            |  |  |  |  |  |  |  |  |  |
| 15         | NP               | NP             |  |  |  |  |  |  |  |  |  |
| 16         | -Vo              | Common         |  |  |  |  |  |  |  |  |  |
| 20, 21, 24 | NP               | NP             |  |  |  |  |  |  |  |  |  |
| 22, 23     | +Vin             | +Vin           |  |  |  |  |  |  |  |  |  |





# 1 x 1 Package DC-DC Converters



DATEL's AA series of DC-DC converters offers up-to 40 watts of output power in an industry-standard 1 x 1 x 0.4" or lower height package. High efficiency, 1500 to 2250VDC isolation and operation over the industrial temperature range of -40°C to +85°C are just some of the features. These modules provide: UVLO (input under voltage lock out), output over-current/

short circuit protection, as well as thermal protection. The standard control functions include remote on/off and adjustable output voltage.

All models are suitable for distributed power architectures, telecommunications, battery operated equipment and industrial applications.

### **FEATURES**

- Industry-standard footprint
- -40°C to +85°C temperature range
- Open frame thru-hole, SMT encapsulated metal/plastic option
- Positive and Negative Logic On/Off control, Trim options
- Regulated outputs, fixed switching frequency
- Low no-load power consumption
- Designed for use without tantalum capacitors
- Meets conductive EMI EN55022 class A without external components
- ULVO, short circuit, over-current and output OV protection

### **AVAILABLE OPTIONS**

- Customizable output voltages
- CE Mark 2004/108/EC certification
- UL60950-1, EN60950-1, and IEC60950-1 safety

# Contact Datel for other series in 1" x 1" footprint

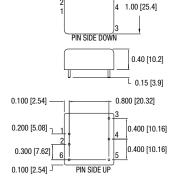
- 2:1 INPUT RANGES
- COST SAVING, LOWER POWER

# **AA SERIES**

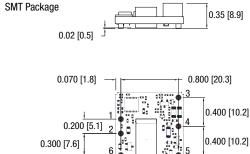
| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>2</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options <sup>1</sup> | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------------------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | mA                       | %          |                              |                    |                    |                      |              |
| 29.7  | 24                          | 9-36                      | 3.3               | 9                        | 0                        | 88         | 20                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA22S3.3-9   |
| 40    | 24                          | 9-36                      | 5                 | 8.0                      | 0                        | 90         | 20                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA22S5-8     |
| 30    | 24                          | 9-36                      | 12                | 2.5                      | 0                        | 89         | 30                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA22S12-2.5  |
| 30    | 24                          | 9-36                      | 15                | 2.0                      | 0                        | 89         | 40                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA22S15-2    |
| 30    | 24                          | 9-36                      | ±12               | ±1.25                    | 0                        | 88         | 100                          | ±0.5               | ±1.0               | S,N,P,T,E            | AA22D12-1.25 |
| 30    | 24                          | 9-36                      | ±15               | ±1.0                     | 0                        | 88         | 100                          | ±0.5               | ±1.0               | S,N,P,T,E            | AA22D15-1    |
| 29.7  | 48                          | 18-75                     | 3.3               | 9.0                      | 0                        | 88         | 20                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA45S3.3-9   |
| 30    | 48                          | 18-75                     | 5                 | 6.0                      | 0                        | 90         | 20                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA45S5-6     |
| 30    | 48                          | 18-75                     | 12                | 2.5                      | 0                        | 89         | 20                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA45S12-2.5  |
| 30    | 48                          | 18-75                     | 15                | 2.0                      | 0                        | 89         | 20                           | ± 0.1%             | ± 0.1%             | S,N,P,T,E            | AA45S15-2    |
| 30    | 48                          | 18-75                     | ±12               | ±1.25                    | 0                        | 88         | 100                          | ±0.5               | ±1.0               | S,N,P,T,E            | AA45D12-1.25 |
| 30    | 48                          | 18-75                     | ±15               | ±1.0                     | 0                        | 89         | 100                          | ±0.5               | ±1.0               | S,N,P,T,E            | AA45D15-1    |

- 1. Options: See Ordering Information on page 10
- 2. 20MHz BW 0.1uF ceramic and 22uF ceramic capacitive load.
   Dual output models: 1uF ceramic and 10uF tantalum.
   Thru-Hole Package

**AA SERIES PINOUT** Single Output **Dual Output** Pin +Vin +Vin 2 -Vin -Vin 3 +Vo +Vo 4 Trim Common 5 -Vo -Vo 6 Remote Remote



1.00 [25.4]



PIN SIDE UP

0.070 [1.8]



# **DOSA-Compatible DC-DC Brick Series**



DATEL offers a full line of thru-hole and surface mountable DOSA-Standard Brick converters. The TB, SB, E,B QB, HB and FB series of open frame and encapsulated isolated 1/32nd,1/16th,1/8th, quarter, half or full-bricks, operate over a 2:1, 4:1 or even 8:1 input voltage range. These DC-DC converters maintain regulation from no load to 700 Watts and meet the Basic Insulation requirements with 1500

to 2250VDC I/O isolation voltage rating. An on-board "Pi" LC filter provides EMI suppression.

All models are suitable for distributed power architectures, telecommunications, battery operated equipment and industrial applications.

Our extensive testing and qualification process ensures reliable DC-DC converter for your application.

### **FEATURES**

- DOSA standard thru-hole or SMT footprints
- Open frame and baseplate models
- On/Off Positive or Negative Logic control
- -40°C to +85°C operation with no derating
- Remote Sense and output voltage trim
- Meets UL94, V-0 flammability rating
- Input differential "Pi" LC-filter, withstands 100V input transients
- OTP, OCP, OVP & UVLO protection Auto-restart
- Meets conductive EMI EN55022 class B with external filter

# **AVAILABLE OPTIONS**

- Customizable input / output available
- 2:1, 4:1 input range models
- Heatsink , customizable packaging
- UL/CSA60950-1, TUV per IEC/EN60950-1, 2nd edition

# **Contact Datel for other DOSA-footprint series**

- INPUT RANGES: 2:1, 4:1 & 8:1 (Half-Brick)
- COST SAVING, LOWER POWER

# **TB-SERIES: 1/32-Brick**

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>2</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options <sup>1</sup> | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------------------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                    |                      |              |
| 14.4  | 24                          | 10-36                     | 1.8               | 8                        | 0                        | 82         | 30                           | ± 0.1%             | ± 0.1 %            | S,N,P,E              | TB22S1.8-8   |
| 19.8  | 24                          | 10-36                     | 3.3               | 6                        | 0                        | 84         | 35                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB22S3.3-6   |
| 20    | 24                          | 10-36                     | 5                 | 4                        | 0                        | 85         | 50                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB22S5-4     |
| 24    | 24                          | 10-36                     | 12                | 2                        | 0                        | 86         | 65                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB22S12-2    |
| 14.4  | 48                          | 18-72                     | 1.8               | 8                        | 0                        | 82         | 30                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB45S1.8-8   |
| 19.8  | 48                          | 18-72                     | 3.3               | 6                        | 0                        | 84         | 35                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB45S3.3-6   |
| 20    | 48                          | 18-72                     | 5                 | 4                        | 0                        | 85         | 50                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB45S5-4     |
| 24    | 48                          | 18-72                     | 12                | 2                        | 0                        | 86         | 65                           | ± 0.1%             | ± 0.1%             | S,N,P,E              | TB45S12-2    |

# SB-SERIES: 1/16 Brick

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>3</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options¹ | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                    |          |              |
| 66    | 24                          | 18-36V                    | 3.3               | 20                       | 0                        | 90         | 40                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB24S3.3-20  |
| 75    | 24                          | 18-36V                    | 5                 | 15                       | 0                        | 92         | 50                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB24S5-15    |
| 84    | 24                          | 18-36V                    | 12                | 7                        | 0                        | 93         | 60                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB24S12-7    |
| 75    | 24                          | 18-36V                    | 15                | 5.5                      | 0                        | 93         | 60                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB24S15-5.5  |
| 50    | 48                          | 36-75V                    | 2.5               | 20                       | 0                        | 89         | 40                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB48S2.5-20  |
| 66    | 48                          | 36-75V                    | 3.3               | 20                       | 0                        | 90         | 40                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB48S3.3-20  |
| 100   | 48                          | 36-75V                    | 5                 | 20                       | 0                        | 92         | 50                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB48S5-20    |
| 99.6  | 48                          | 36-75V                    | 12                | 8.3                      | 0                        | 93         | 60                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB48S12-8.3  |
| 82.5  | 48                          | 36-75V                    | 15                | 5.5                      | 0                        | 93         | 60                           | ± 0.1%             | ± 0.1%             | S,N,P,E  | SB48S15-5.5  |

- 1. Options: See Ordering Information on page 10
- 2. 0.1uF ceramic and 10uF tantalum capacitive load, 20MHz BW
- 3. 1uF ceramic and 10uF tantalum capacitive load, 20MHz BW  $\,$



# **EB-SERIES: 1/8-Brick**

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>2</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options <sup>1</sup> | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------------------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                    |                      |              |
| 99    | 24                          | 18-36V                    | 3.3               | 30                       | 0                        | 91         | 50                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB24S3.3-30  |
| 150   | 24                          | 18-36V                    | 5                 | 30                       | 0                        | 93         | 60                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB24S5-30    |
| 168   | 24                          | 18-36V                    | 12                | 14                       | 0                        | 93         | 65                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB24S12-14   |
| 150   | 24                          | 18-36V                    | 15                | 10                       | 0                        | 93         | 70                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB24S15-10   |
| 99    | 48                          | 36-75V                    | 3.3               | 30                       | 0                        | 91         | 50                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB48S3.3-30  |
| 150   | 48                          | 36-75V                    | 5                 | 30                       | 0                        | 93         | 60                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB48S5-30    |
| 168   | 48                          | 36-75V                    | 12                | 14                       | 0                        | 94         | 65                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB48S12-14   |
| 150   | 48                          | 36-75V                    | 15                | 10                       | 0                        | 93         | 65                           | ± 0.1%             | ± 0.1%             | S,N,P,E,B            | EB48S15-10   |

# **QB-SERIES: 1/4-Brick**

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>3</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options <sup>1</sup> | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------------------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                    |                      |              |
| 99    | 24                          | 9-36V                     | 3.3               | 30                       | 0                        | 86         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB22S3.3-30  |
| 100   | 24                          | 9-36V                     | 5                 | 20                       | 0                        | 86.5       | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB22S5-20    |
| 168   | 24                          | 9-36V                     | 12                | 8.3                      | 0                        | 86.5       | 150                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB22S12-14   |
| 150   | 24                          | 9-36V                     | 24                | 4.17                     | 0                        | 87         | 240                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB22S24-4.1  |
| 99    | 48                          | 18-75V                    | 3.3               | 30                       | 0                        | 88         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB45S3.3-30  |
| 100   | 48                          | 18-75V                    | 5                 | 20                       | 0                        | 88         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB45S5-20    |
| 168   | 48                          | 18-75V                    | 12                | 8.3                      | 0                        | 88         | 150                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB45S12-14   |
| 150   | 48                          | 18-75V                    | 24                | 4.17                     | 0                        | 88         | 240                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | QB45S24-4.1  |

# **HB-SERIES: 1/2-Brick**

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>3</sup><br>(P-P) | Line<br>Regulation | Load<br>Regulation | Options <sup>1</sup> | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|--------------------|----------------------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                    |                      |              |
| 231   | 24                          | 18-36V                    | 3.3               | 70                       | 0                        | 88         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB24S3.3-70  |
| 350   | 24                          | 18-36V                    | 5                 | 70                       | 0                        | 89         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB24S5-70    |
| 350.4 | 24                          | 18-36V                    | 12                | 29.2                     | 0                        | 90.5       | 120                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB24S12-29.2 |
| 350.4 | 24                          | 18-36V                    | 24                | 14.6                     | 0                        | 90.5       | 280                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB24S24-14.6 |
| 231   | 48                          | 36-75V                    | 3.3               | 70                       | 0                        | 89         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB48S3.3-70  |
| 350   | 48                          | 36-75V                    | 5                 | 70                       | 0                        | 91         | 100                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB48S5-70    |
| 350.4 | 48                          | 36-75V                    | 12                | 29.2                     | 0                        | 92.5       | 120                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB48S12-29.2 |
| 350.4 | 48                          | 36-75V                    | 24                | 14.6                     | 0                        | 91.5       | 280                          | ± 0.2%             | ± 0.2%             | S,N,P,E              | HB48S24-14.6 |

# **FB-SERIES: Full-Brick**

| Power | Input<br>Voltage<br>Nominal | Input<br>Voltage<br>Range | Output<br>Voltage | Output<br>Current<br>Max | Output<br>Current<br>Min | Efficiency | Ripple <sup>4</sup><br>(P-P) | Line<br>Regulation | Load <sup>4</sup><br>Regulation | Options¹ | DATEL Part # |
|-------|-----------------------------|---------------------------|-------------------|--------------------------|--------------------------|------------|------------------------------|--------------------|---------------------------------|----------|--------------|
| Watts | Volts                       | Volts                     | Volts             | Amps                     | Amps                     | %          |                              |                    |                                 |          |              |
| 600   | 24                          | 18-36V                    | 12                | 50                       | 0                        | 88         | 120                          | ± 0.2%             | ± 0.5%                          | S,N,P,E  | FB24S12-50   |
| 600   | 24                          | 18-36V                    | 24                | 25                       | 0                        | 89         | 240                          | ± 0.2%             | ± 0.5%                          | S,N,P,E  | FB24S24-25   |
| 600   | 24                          | 18-36V                    | 48                | 12.5                     | 0                        | 91         | 480                          | ± 0.2%             | ± 0.5%                          | S,N,P,E  | FB24S48-12.5 |
| 600   | 48                          | 36-75V                    | 12                | 50                       | 0                        | 90         | 120                          | ± 0.2%             | ± 0.5%                          | S,N,P,E  | FB48S12-50   |
| 600   | 48                          | 36-75V                    | 24                | 25                       | 0                        | 92         | 240                          | ± 0.2%             | ± 0.5%                          | S,N,P,E  | FB48S24-25   |
| 600   | 48                          | 36-75V                    | 48                | 12.5                     | 0                        | 92         | 480                          | ± 0.2%             | ± 0.5%                          | S,N,P,E  | FB48S48-12.5 |

<sup>1.</sup> Options: See Ordering Information on page 10

<sup>2. 1</sup>uF ceramic and 22uF tantalum capacitive load, 20MHz BW

<sup>3. 1</sup>uF ceramic and 10uF tantalum capacitive load, 20MHz BW

<sup>4. 470</sup>uF capacitive load



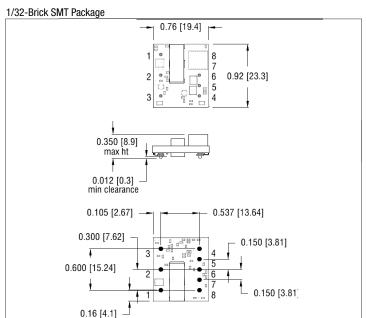
# MECHANICAL DRAWINGS

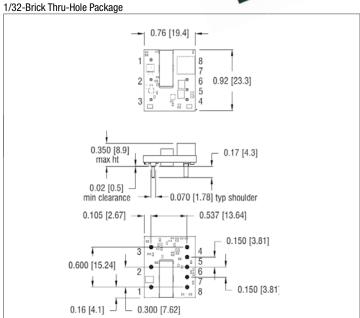
| 1/32 and 1/16- BRICK, DOSA-COMPATIBLE PINOUT |                      |  |
|--|----------------------|--|
| Pin  | FUNCTION             |  |
| 1  | +Vin                 |  |
| 2  | Remote On/Off*       |  |
| 3  | -Vin                 |  |
| 4  | -Vo                  |  |
| 5  | -Sense               |  |
| 6  | Trim                 |  |
| 7  | +Sense               |  |
| 8  | +Vo                  |  |
| 9  | Baseplate (Optional) |  |

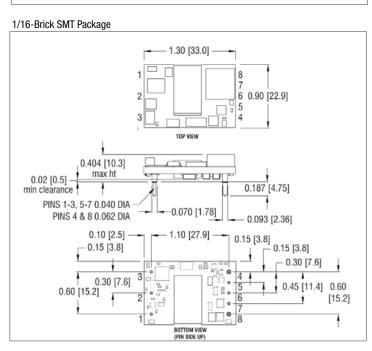


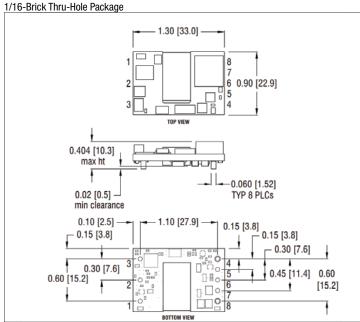














# MECHANICAL DRAWINGS

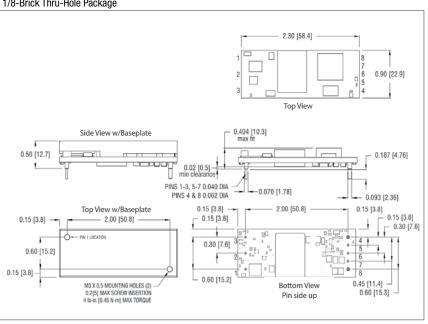
| 1/8 and 1/4-BRICK, DOSA-COMPATIBLE PINOUT |                      |  |
|---|----------------------|--|
| Pin                                       | FUNCTION             |  |
| 1   | +Vin                 |  |
| $\overline{2}$                            | Remote On/Off*       |  |
| 3   | -Vin                 |  |
| 4   | -Vo                  |  |
| 5   | -Sense               |  |
| 6   | Trim                 |  |
| 7   | +Sense               |  |
| 8   | +Vo                  |  |
| 9   | Baseplate (Optional) |  |





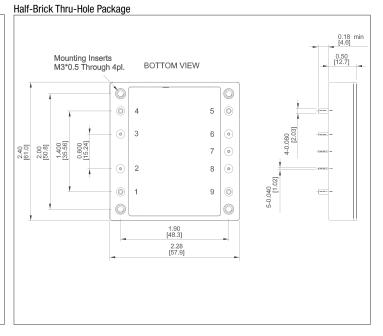
### 1/8-Brick Thru-Hole Package

1/4-Brick Thru-Hole Package



| HALF-BRICK, DOSA-COMPATIBLE PINOUT |                |  |
|------------------------------------|----------------|--|
| Pin                                | FUNCTION       |  |
| 1                                  | +Vin           |  |
| 2                                  | Remote On/Off* |  |
| 3                                  | Case           |  |
| 4                                  | -Vin           |  |
| 5                                  | -Vo            |  |
| 6                                  | -Sense         |  |
| 7                                  | Trim           |  |
| 8                                  | +Sense         |  |
| 9                                  | +Vo            |  |

### [57.9] Mounting Inserts 2.000 M3x0.5 Through 4pl. [50.80] 0 Ф **BOTTOM VIEW** 5 6 **·** 1.45 [36.8] 1.03 [26.2] 0.600 [15.24] 0.600 8-0.300 Ф 0 1.86[47.2] 0.16 [4.1] min. 0.059 0.040 [1.50] [1.02] DIA 2PLACES 0.50

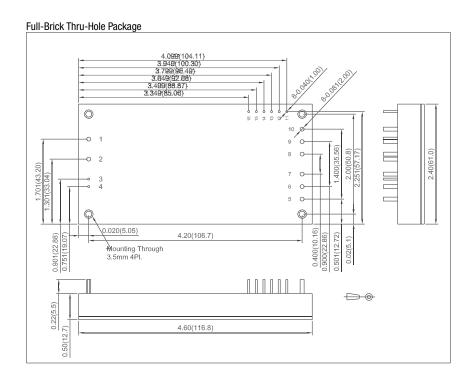




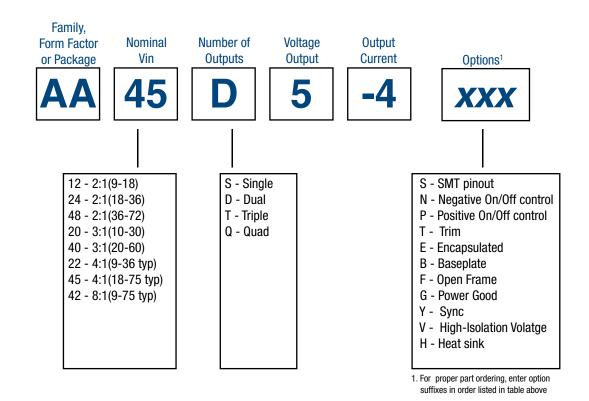
# MECHANICAL DRAWINGS



| FULL-BRICK, DOSA-COMPATIBLE PINOUT |          |  |
|------------------------------------|----------|--|
| Pin                                | FUNCTION |  |
| 1                                  | -Vin     |  |
| 2                                  | +Vin     |  |
| 3                                  | -On/Off  |  |
| 4                                  | +On/Off  |  |
| 5-7                                | +V0      |  |
| 8-10                               | -Vo      |  |
| 11                                 | -Sense   |  |
| 12                                 | +Sense   |  |
| 13                                 | Trim     |  |
| 14                                 | PC/NC    |  |
| 15                                 | IDG      |  |
| 16                                 | AUX      |  |



# PART NUMBER ORDERING INFORMATION





# **DATEL Custom and Special Capabilities**

For 45 years DATEL has been recognized worldwide for its engineering excellence, high-quality products and outstanding customer service, producing both standard and custom products for the most demanding applications in the Military, Aerospace, Airborne, and Medical markets.



- Custom/modified standard products
- High Density multi-layer circuit on Al20 or BeO Ceramic
- Pin-to-pin replacement devices for discontinued products
- Available for low-volume and highvolume applications
- Products guaranteed to be available for long term programs
- Non-RoHS or RoHS equivalent devices

- Special packaging, ceramic, plastic and glass-to-metal seal
- Hermetic seal packaging, CLCC, DIP, Gull Wing, TO, etc.
- Custom screening, testing or temperature ranges
- Special pin-out or footprint
- Custom high-temperature products (-55°C up to +220°C)
- MIL-PRF-38534 certified facility
- Class 8 clean-room assembly and test

# Sole sourced or facing obsolete component issues?

Are you in need for a custom product, new supplier, replacement for an obsolete product or special screening? We welcome these opportunities. Feel free to contact us with your requirements.

At DATEL, we recognize that our success is linked with the success of our customers. ... Our best advertisement is a satisfied customer.



# **Facility Standards**

DATEL is a MIL-PRF-38534 Class H, Class E certified facility, a certification that is held by only 38 facilities throughout the world. In addition to 883 and QL devices, DATEL's commercial and MM grade Multi-Chip Modules are also built in the Class 8 (Class 100,000) clean room located in Mansfield, Massachusetts in the USA. DATEL is also:

- ITAR Registered
- ISO-9001-2008 Registered
- ISO-14001:2004 Certification
- ANSI/ESD S20.20-2007



# **Other products from DATEL**



# **Data Acquisition Products**

DATEL's Data Acquisition/Precision Analog standard and custom products are designed to meet the ever-changing requirements of Military, HI-REL, Medical, Scientific and Industrial applications.

Our System-in-a-Package solutions consist of multi-chip IC's on a custom ceramic substrate. These devices our housed in a variety of space saving hermetic and low cost package option.

DATEL's worldwide recognition in high-performance Data Acquisition components is entering it's 5th decade, driven in large part by our engineering expertise.

# System-in-a-Package technology Standard and custom products

### Sampling A/D Converters

 7 to 24-Bit up to 500MHz sampling rate

### **Digital-to-Analog Converters**

 12,14,16-Bit up to 250MHz conversion rate

### **Multi-Channel Converters**

 Single-package, multi-channel A/D, D/A and Hybrid Data Acquisition Systems (HDAS)

# CCD Signal Processor/Imaging Converters (ADCDS)

• 12, 14,16, 18-Bit ADC and a Correlated Double Sampler for easy interface with CCDs

### **Precision Voltage References**

**Sample/Hold Amplifiers** 

**Linear Voltage Regulators** 

**Clock Drivers** 

Standard Microcircuit
Drawings (SMD) 5962xxx
DLA-certified available

# Military 883 Screening

Our Manufacturing line is audited and certified by DLA as conforming to the MIL-PRF-38534 and MIL-STD-883 military standards. Several screening levels can be provided (commercial, industrial, medical, military, QL and full MIL-883). All assembly and screening is performed on our MIL-883 production lines in our state of the art clean room facility.

# The DATEL Advantage

DATEL has 45-plus years of design and manufacturing expertise in digital and analog products for the Commercial, Industrial, Medical and Military Markets:

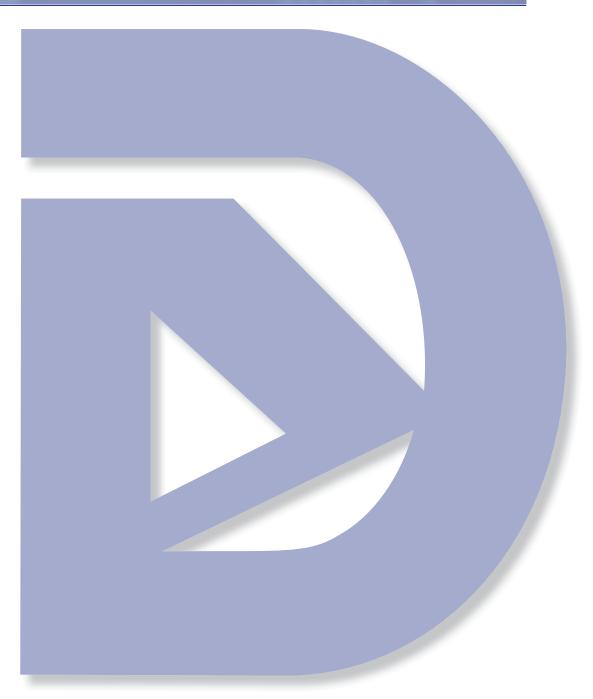
- Standard, special or custom products
- Form-Fit-Function for obsolete products
- Dedication/commitment to customer requirements and satisfaction
- No obsolescence DATEL products are guaranteed to be available for long-term programs
- Low-volume & high-volume applications
- RoHS and Non-RoHS versions available
- Commercial, industrial, medical and military grades are produced in our Mansfield based MIL-PRF-38534 certified facility
- · Hermetically sealed packaging

# High-Density Multi-Layer Circuit on Ceramic

# Thick Film Substrate Services (MIL-PRF-38534 compliant)

- Multi-layer (8 conductors)
- Built on Al<sub>2</sub>O or BeO ceramic
- Thick Film RuO2 resistors
- · Class 8 clean room
- DLA lab suitability
- RoHS and Non-RoHS available

# For more data on our standard products go to www.datel.com or request a copy of our product data book.





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