

# ARTESYN LGA50D STANDARD PROFILE SERIES

Dual O/P Non-isolated 50 A Digital  
DC/DC Converter



LGA50D-01DADJJ



LGA50D-01DADJSBJ

Advanced Energy's Artesyn LGA50D is a non-isolated DC-DC converter that is designed for cost and space sensitive applications.

This non-isolated unit offers two independent and configurable 25 amp, 50 watt outputs, which can also be combined to a single configurable 50 amp, 100 watt output. With a footprint of 1 x 0.5 inches or 25.4 x 12.5 mm.

## SPECIAL FEATURES

- Two-phase design
- Dual or single output configuration possible
- High efficiency up to 95.5%
- Small size 1" x 0.5" x 0.48" (LxWxH)
- No minimum load requirement
- Wide operating temperature range
- Exceptional power density
- Analog or digital control
- Automatic loop compensation
- IPC9592B compliant @ Vin = 12 Vdc
- Tape and reel packaging
- Reflow compatible
- Possible to stack up to 4 for 200 A
- I-mon and T-mon supported
- Two (2) variants supported:
  - Block pin termination
  - Solder bump termination
- Two year shelf life

## SAFETY

- Designed to meet IEC62368-1

## DATA SHEET

### Total Current:

50 A (single)  
25 A (dual)

### Input Voltage:

7.5 - 14 Vdc

### Variable Output:

0.6 - 5.0 V  
(standard profile)



## ELECTRICAL SPECIFICATIONS

| Input   |   |       |
|---|---|-------|
| Input voltage range                               | 7.5 -14 Vdc (0.6 Vo ≤ Vo ≤ 3.3 Vo)<br>10 - 14 Vdc (3.3 Vo < Vo ≤ 5.0 Vo) @ 800 KHz    |       |
| Max input current                                 | 20 A  |       |
| Input capacitor (internal)                        | 28.2 μF   |       |
| Input capacitor (external) minimum                | 88 μF (See Note 1, Page 2)  |       |
| Input capacitor (external)                        | 208 μF (See Note 1, Page 2)   |       |
| Output  |   |       |
| Independent output 1 and 2                        | Standard profile  |       |
| 0.6 - 1 V   | 25 A V  |       |
| 1.8 V   | 22.5 A  |       |
| 2.5 V   | 20 A  |       |
| 3.3 V   | 17.5 A  |       |
| 5.0 V   | 12 A  |       |
| Combined output 1 and 2                           | Standard profile  |       |
| 0.6 - 1 V   | 50 A  |       |
| 1.8 V   | 45 A  |       |
| 2.5 V   | 40 A  |       |
| 3.3 V   | 35 A  |       |
| 5.0 V   | 24 A  |       |
| Efficiency<br>@ Vin=12 V, Freq=571 KHz & Ta=25 °C | Standard profile  |       |
|   | Min   | Nom   |
| 1.0 V   | 87.5%   | 88.2% |
| 1.8 V   | 91%   | 92.2% |
| 2.5 V   | 92.5%   | 93.7% |
| 3.3 V   | 93.5%   | 94.6% |
| 5.0 V   | 94%   | 95.5% |
| Max output power                                  | 120 W   |       |
| Output capacitor (external) required              | 2,200 μF, dual O/P mode Vo1 & Vo2<br>2,400 μF in single O/P mode (See Note 2, Page 2) |       |

| Control and ambient temperatures |   |
|----------------------------------|---|
| Operating ambient temperature    | -40 °C to +85 °C  |
| Storage temperatures             | -40 °C to +125 °C   |
| Switching frequency              | JJ&JSBJ: 571 KHz @ 0.6 Vo ≤ Vo ≤ 3.3 Vo<br>800 KHz @ 3.3 Vo < Vo ≤ 5 Vo |

## Note 1:

Minimum: 4 x 22 μF/16 V ceramic cap (C2012X6S1C226M125AC or equivalent)

Recommended: 1 x 120 μF/16 V polymer caps (APXS160ARA121MH 70G or equivalent) + 4 x 22 μF/16 V ceramic cap (C2012X6S1C226M125AC or equivalent)

## Note 2:

Dual mode (2 outputs): 2 x 680 μF/6.3 V Polymer Tan caps (T530X687M006ATE010 or equivalent) + 8 x 100 μF/6.3 V ceramic caps (GRM32EC80J107ME20L or equivalent) + 4 x 10 μF/10 V ceramic caps (GRM31CR71A106KA01L or equivalent)

Single mode (1 output): 2 x 680 μF/6.3 V Polymer Tan caps (T530X687M006ATE010 or equivalent) + 10 x 100 μF/6.3 V ceramic caps (GRM32EC80J107ME20L or equivalent) + 4 x 10 μF/10 V ceramic caps (GRM31CR71A106KA01L or equivalent)

## MODEL NUMBERS

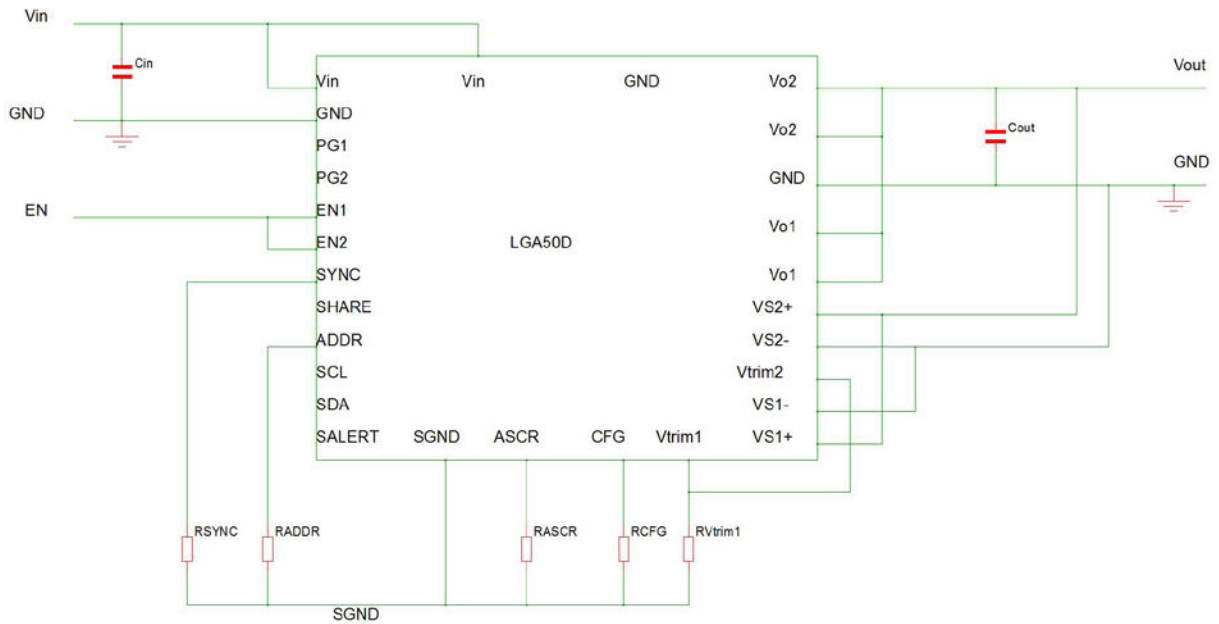
| Model Number     | Input Voltage | Output Voltage Set Point | Output Current | Efficiency |
|------------------|---------------|--------------------------|----------------|------------|
| LGA50D-01DADJJ   | 7.5 - 14 Vdc  | 0.6 - 5.0 V              | 50 A max       | See table  |
| LGA50D-01DADJSBJ | 7.5 - 14 Vdc  | 0.6 - 5.0 V              | 50 A max       | See table  |

## ORDERING INFORMATION

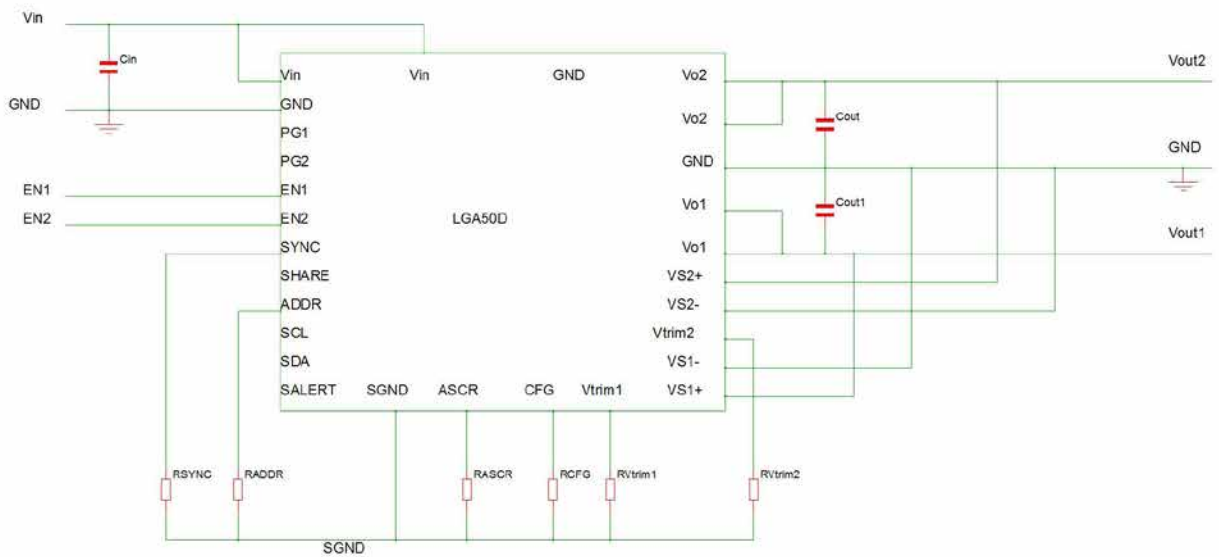
| Product Family | Rated Output Current        | Performance | Input Voltage                    | Number of Outputs | Output Type       | Pin Termination Type                                      | Protection Mode | RoHS Compliance              |
|----------------|-----------------------------|-------------|----------------------------------|-------------------|-------------------|---|-----------------|------------------------------|
| LGA            | 50                          | D           | - 01                             | D                 | ADJ               | Blank, SB   | Blank           | J                            |
| Series Name    | Rated output current = 50 A | Digital POL | 7.5 - 14.0 V input voltage range | Dual Outputs      | Adjustable output | Blank = Standard metal-block<br>SB = Standard solder bump | Blank; Latching | Pb free (RoHS 6/6 compliant) |

BLOCK DIAGRAMS

Single Unit, Single O/P Configuration

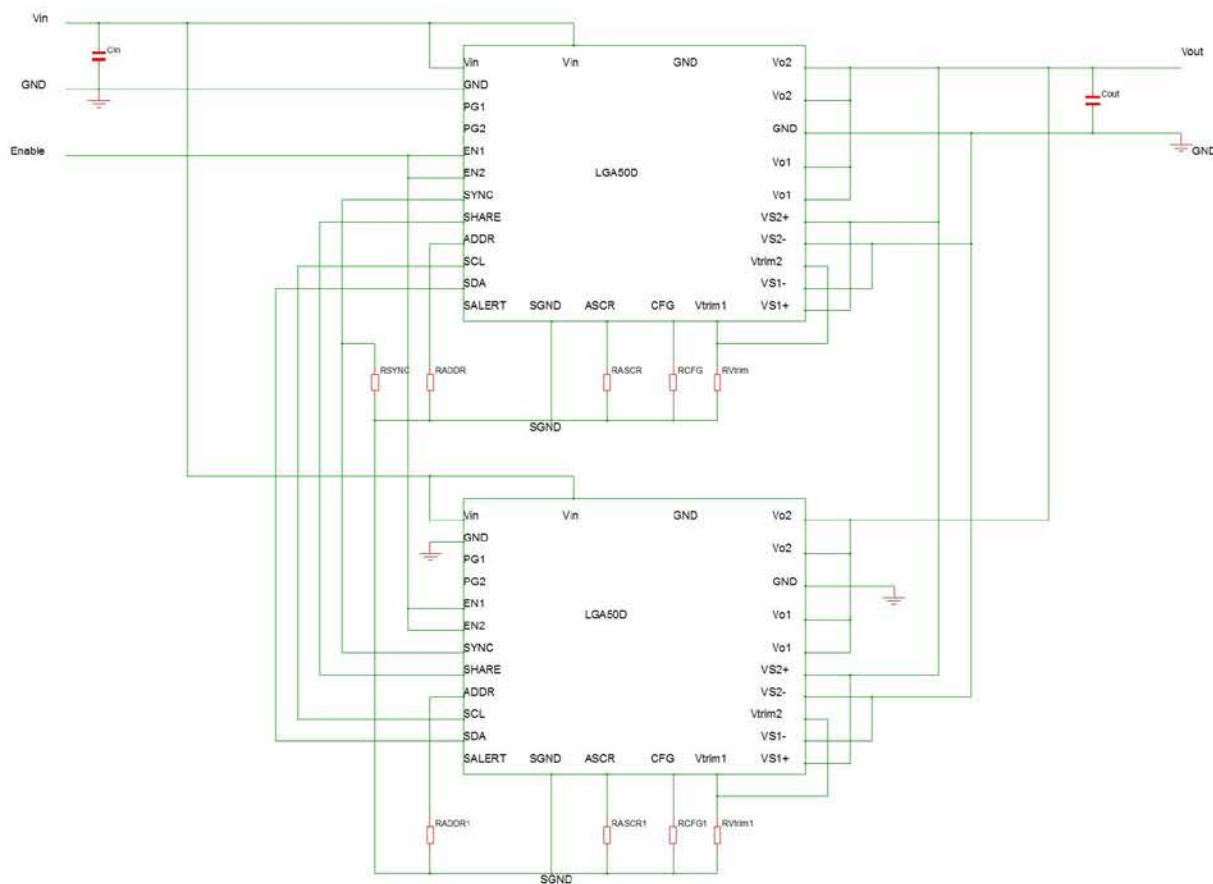


Single Unit, Dual O/P Configuration



## BLOCK DIAGRAMS (CONTINUED)

## Two Units, Single O/P Configuration

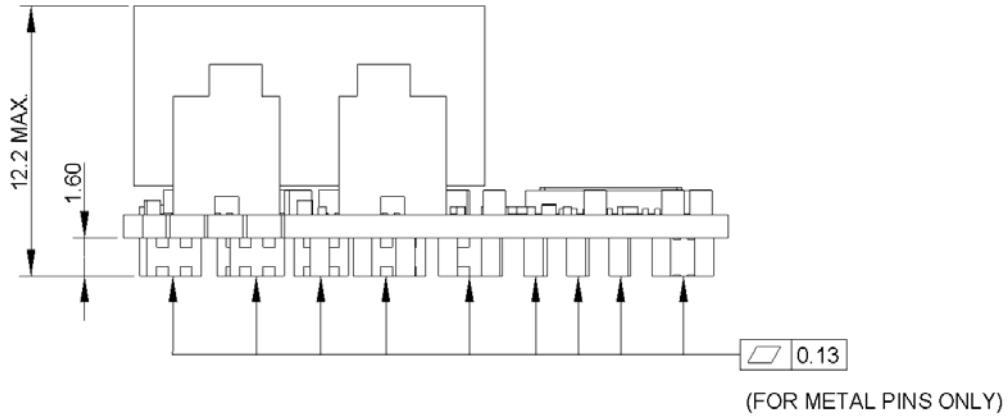


Pin Assignments Single Output

| Pin # | Function | Pin # | Function |
|-------|----------|-------|----------|
| 1     | Vin      | 15    | CFG      |
| 2     | GND      | 16    | Vtrim1   |
| 3     | PG1      | 17    | VS1+     |
| 4     | PG2      | 18    | VS1-     |
| 5     | EN1      | 19    | Vtrim2   |
| 6     | EN2      | 20    | VS2-     |
| 7     | SYNC     | 21    | VS2+     |
| 8     | SHARE    | 22    | Vo1      |
| 9     | ADDR     | 23    | Vo1      |
| 10    | SCL      | 24    | GND      |
| 11    | SDA      | 25    | Vo2      |
| 12    | SALERT   | 26    | Vo2      |
| 13    | SGND     | 27    | GND      |
| 14    | ASCRCFG  | 28    | Vin      |

MECHANICAL DRAWINGS

Side view of standard profile metal-block pin termination type (LGA50D-01DADJJ)

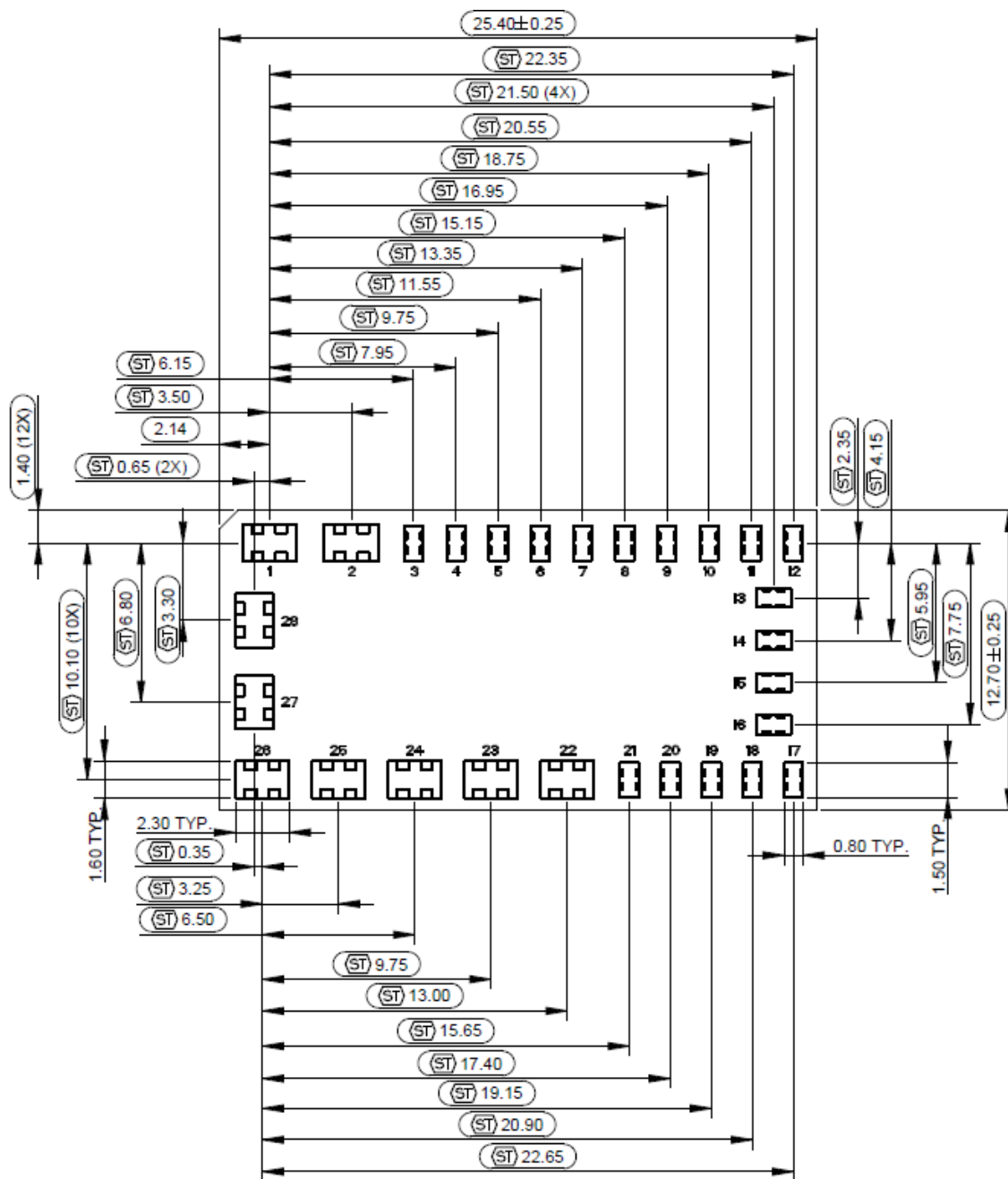


Side view of standard profile solder bump termination type (LGA50D-01DADJSBJ)



MECHANICAL DRAWINGS (CONTINUED)

For standard metal-block pin termination (LGA50D-01DADJJ)

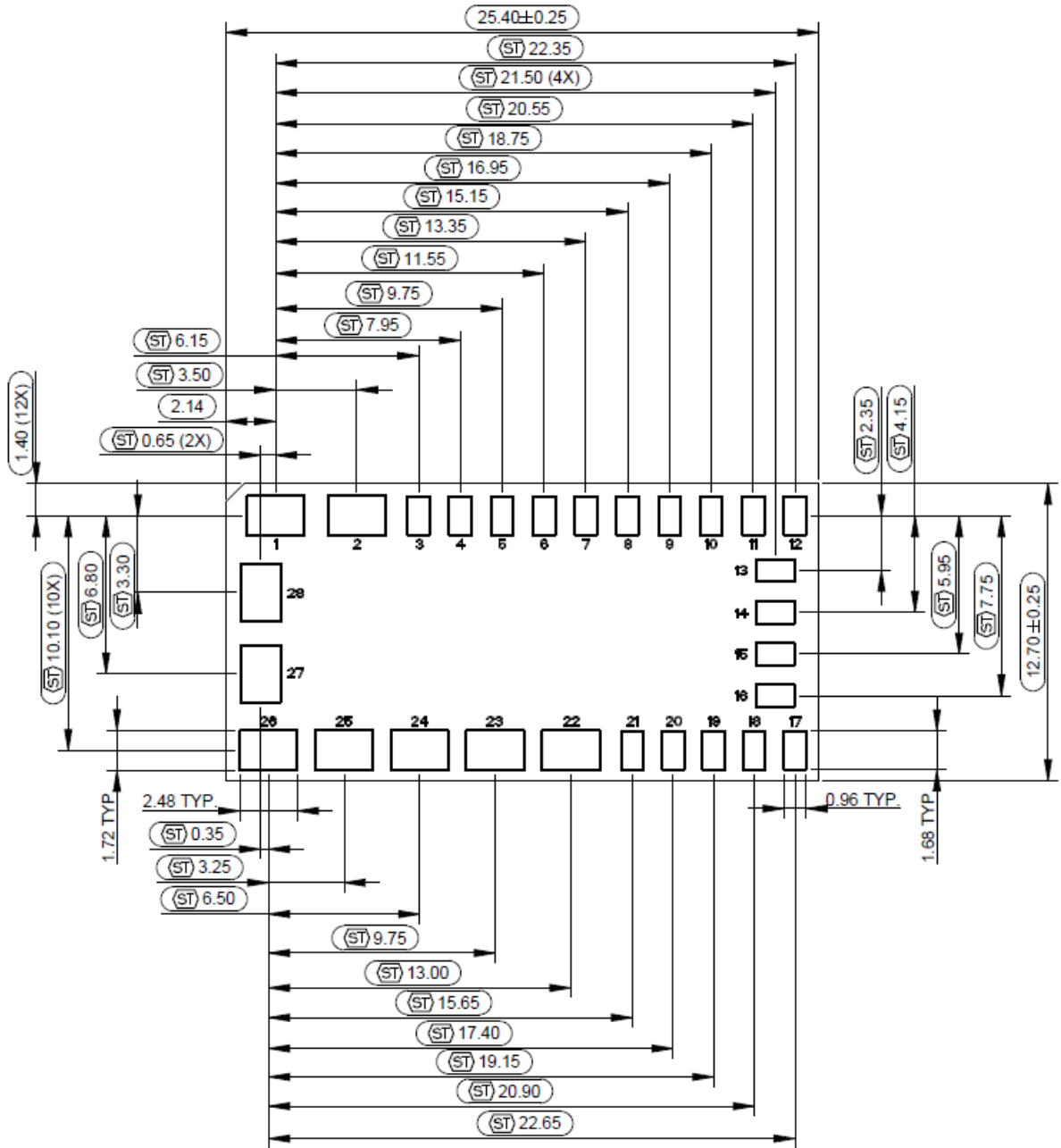


FOOTPRINT DRAWING OF METAL PINS (BOTTOM VIEW)

Dimensions are in millimeters  
Tolerances: Decimal .XX ±0.25

MECHANICAL DRAWINGS (CONTINUED)

For standard solder bump termination (LGA50D-01DADJSBJ)



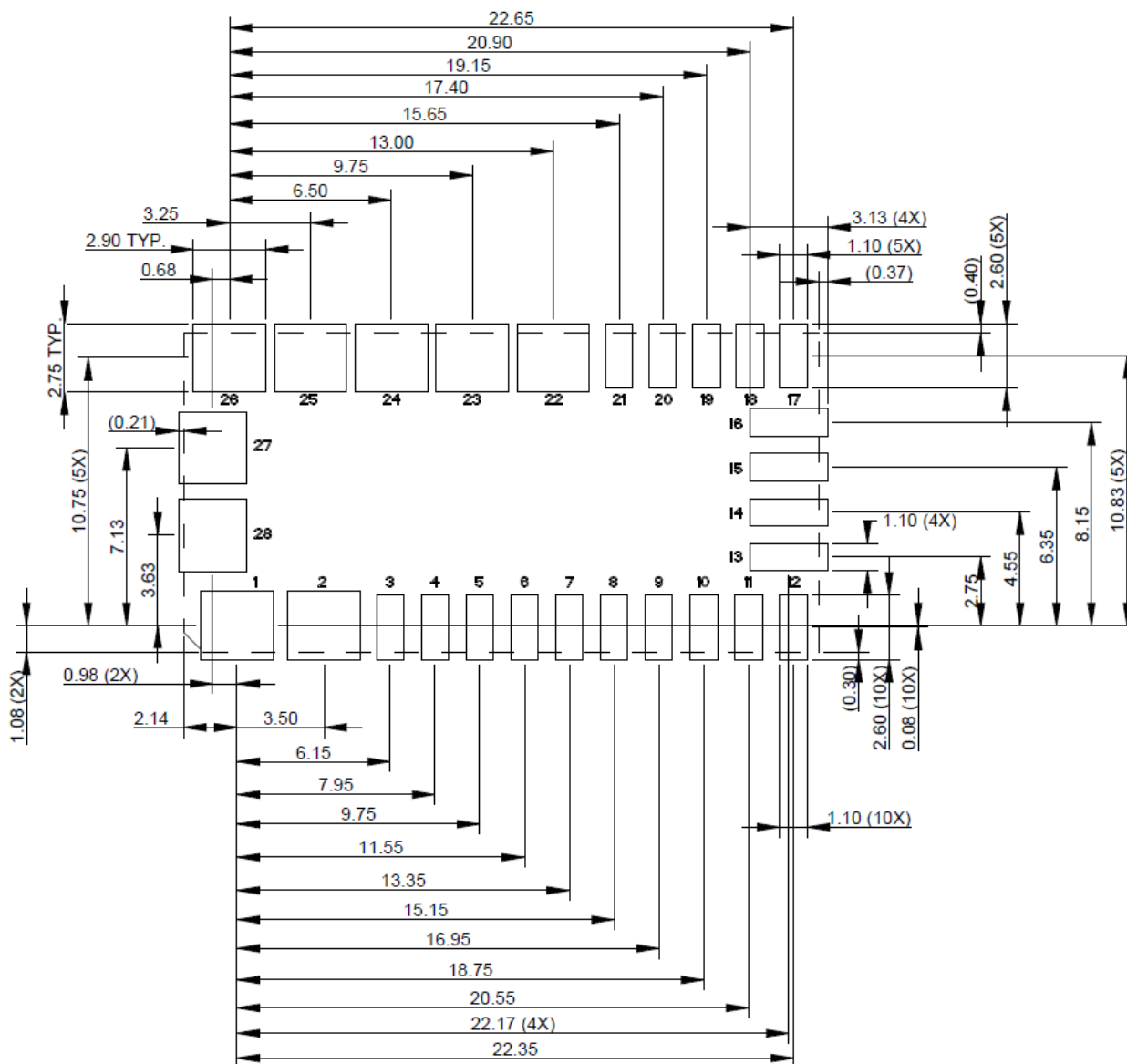
FOOTPRINT DRAWING OF SOLDER BUMP (BOTTOM VIEW)

Dimensions are in millimeters  
Tolerances: Decimal .XX  $\pm 0.25$



MECHANICAL DRAWINGS (CONTINUED)

Proposed solder pad macros (TBC after Artesyn Internal qualification) for standard solder bump termination (LGA50D-01DADJSBJ). It is adopted for standard metal-block pin termination (LGA50D-01DADJJ)



PROPOSED PAD LAYOUT

Dimensions are in millimeters  
 Tolerances: Decimal .XX ±0.25  
 Dotted line represents LGA50D module outline



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## ABOUT ADVANCED ENERGY

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Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE

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