

DIO321/DIO358/DIO324

1MHz, 40µA, Rail-to-Rail I/O CMOS Amplifier

Features

- Rail-to-Rail Input and Output
- Maxim offset (V_{OS})
DIO321/358/324 @ $\pm 3mV$
DIO321A/358A/324A @ $1mV$
- Unity Gain Stable
- Gain Bandwidth Product: 1MHz
- Very low input bias currents: 5pA
- Wide supply range: 2.0V to 5.5V
- Input Voltage Range:
-0.1V to +5.6V with $V+ = 5.5V$
- Ultra low power: 40µA per channel
- Compact Package best for portable applications

DIO321/321A: SOT23-5 and SC70-5

DIO358/358A: SOIC-8 and MSOP-8

DIO324/324A: SOIC-14 and TSSOP-14

Descriptions

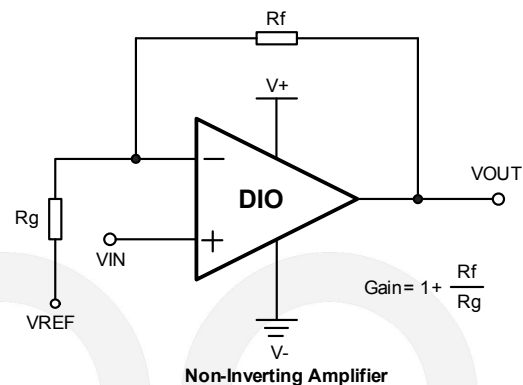
DIO321 (single), DIO358 (dual) and DIO324 (quad) are rail-to-rail CMOS operational amplifiers with ultra low offset. Features include wide input common-mode voltage range and broad output voltage swing with operating supply voltage from 2.0V to 5.5V. Products are fully specified over the extended -40 to $+125^{\circ}C$ temperature range.

DIO321/358/324 provide 1MHz bandwidth consuming ultra low current of 40µA per channel. Very low input bias currents of 5pA enable them ideal for integrators, photodiode amplifiers, and piezoelectric sensors.

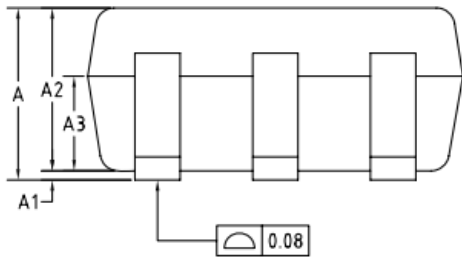
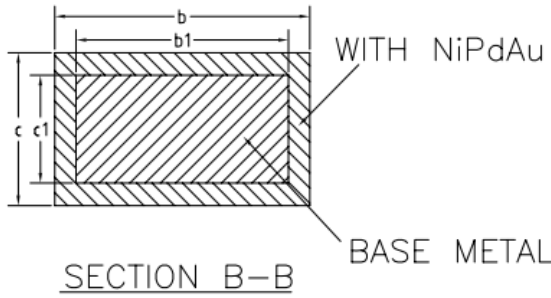
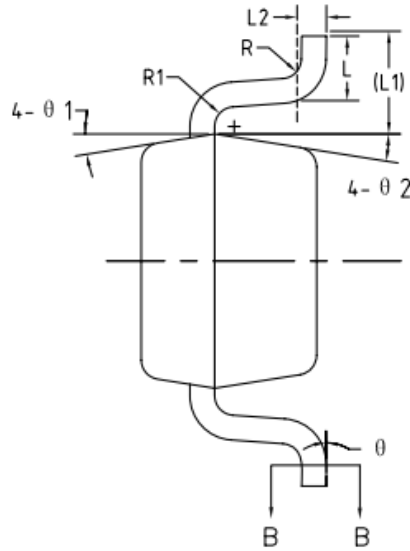
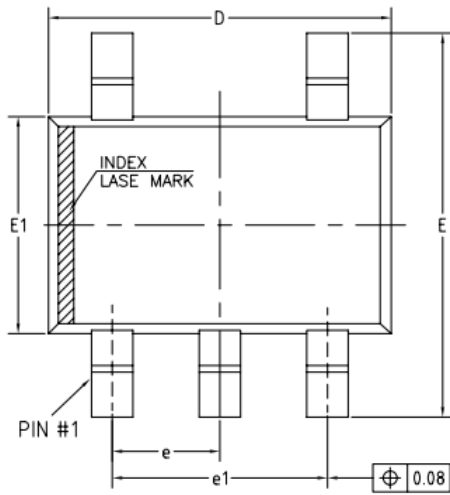
Applications

- ASIC Input or Output Amplifier
- Sensor Interface
- Piezo Electric Transducer Amplifier
- Medical Instrumentation
- Audio Output
- Portable Systems
- Smoke Detectors
- Notebook PC
- Battery-Powered equipment

Typical Application

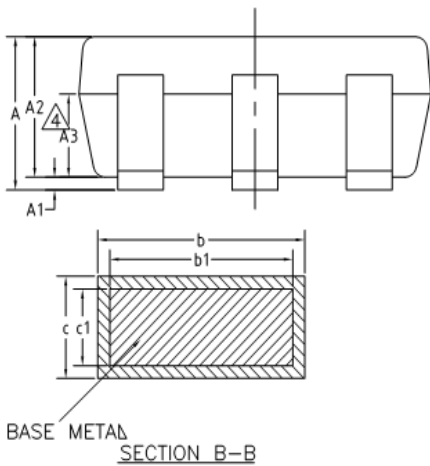
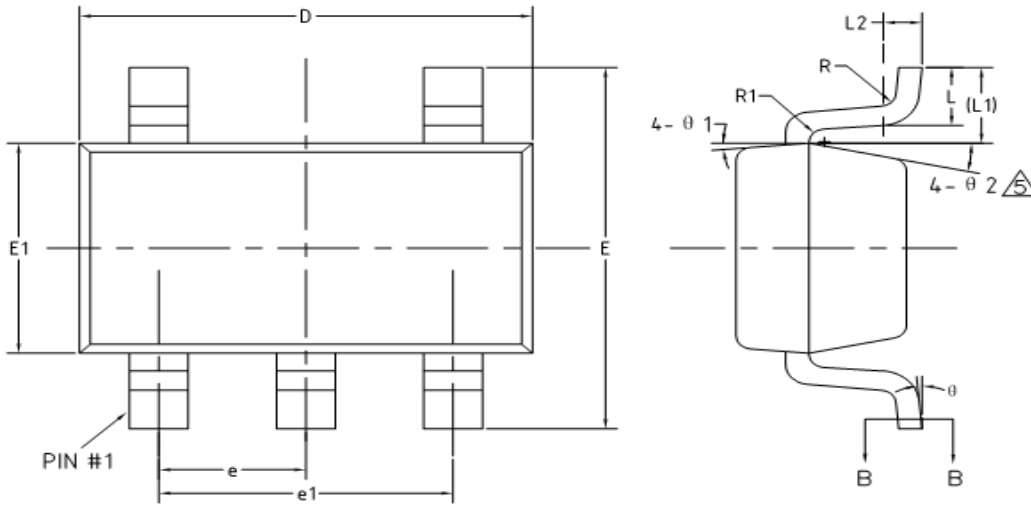


Physical Dimensions: SC70-5

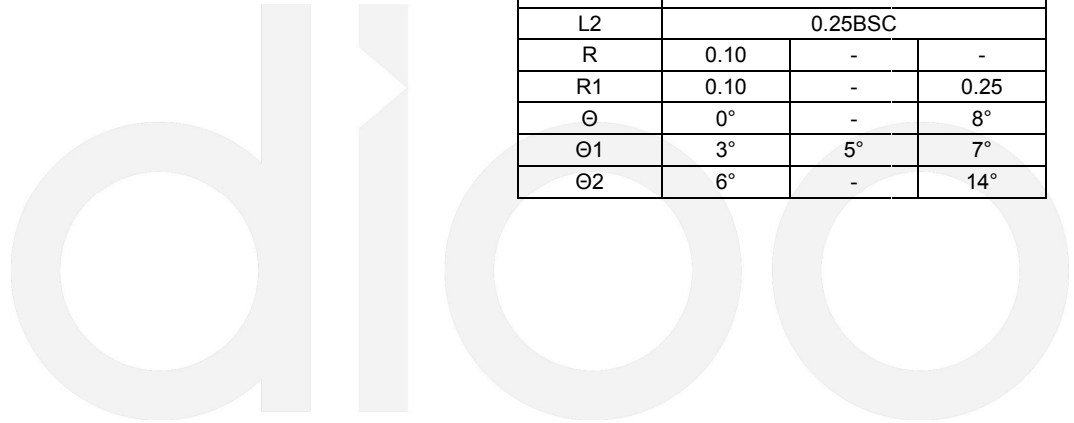


| COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER) | | | |
|--|---------|------|------|
| Symbol | MIN | NOM | MAX |
| A | 0.85 | - | 1.05 |
| A1 | 0 | - | 0.10 |
| A2 | 0.80 | 0.90 | 1.00 |
| A3 | 0.47 | 0.52 | 0.57 |
| b | 0.22 | - | 0.29 |
| b1 | 0.22 | 0.25 | 0.28 |
| c | 0.115 | - | 0.15 |
| c1 | 0.115 | 0.13 | 0.14 |
| D | 2.02 | 2.07 | 2.12 |
| E | 2.20 | 2.30 | 2.40 |
| E1 | 1.25 | 1.30 | 1.35 |
| e | 0.65BSC | | |
| e1 | 1.30BSC | | |
| L | 0.28 | 0.33 | 0.38 |
| L1 | 0.50REF | | |
| L2 | 0.15BSC | | |
| R | 0.10 | - | - |
| R1 | 0.10 | - | 0.25 |
| θ | 0° | - | 8° |
| θ1 | 6° | 9° | 12° |
| θ2 | 6° | 9° | 12° |

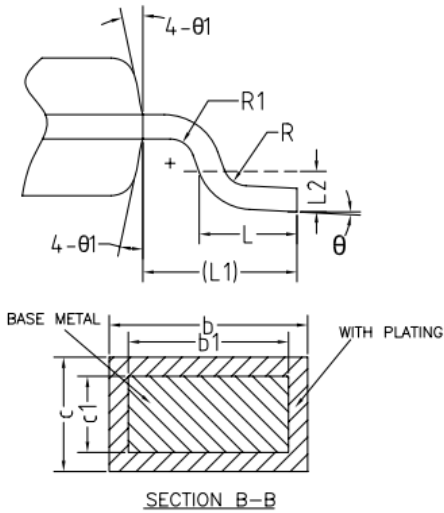
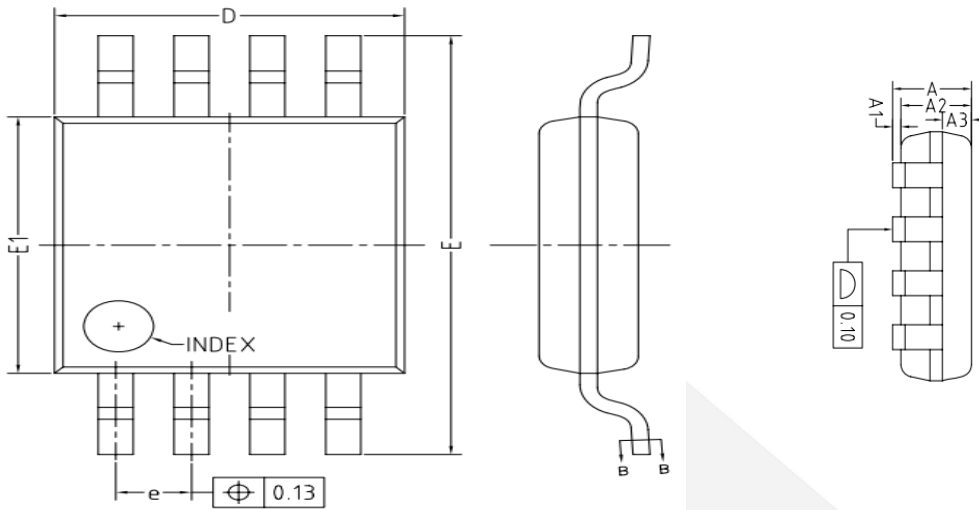
Physical Dimensions: SOT-23-5



| COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER) | | | |
|--|---------|-------|-------|
| Symbol | MIN | NOM | MAX |
| A | - | - | 1.25 |
| A1 | 0 | - | 0.15 |
| A2 | 1.00 | 1.10 | 1.20 |
| A3 | 0.60 | 0.65 | 0.70 |
| b | 0.36 | - | 0.50 |
| b1 | 0.36 | 0.38 | 0.45 |
| c | 0.14 | - | 0.20 |
| c1 | 0.14 | 0.15 | 0.16 |
| D | 2.826 | 2.926 | 3.026 |
| E | 2.60 | 2.80 | 3.00 |
| E1 | 1.526 | 1.626 | 1.726 |
| e | 0.90 | 0.95 | 1.00 |
| e1 | 1.80 | 1.90 | 2.00 |
| L | 0.35 | 0.45 | 0.60 |
| L1 | 0.59REF | | |
| L2 | 0.25BSC | | |
| R | 0.10 | - | - |
| R1 | 0.10 | - | 0.25 |
| θ | 0° | - | 8° |
| θ1 | 3° | 5° | 7° |
| θ2 | 6° | - | 14° |

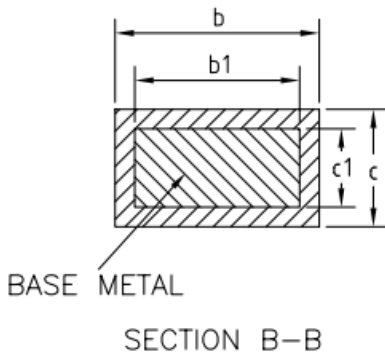
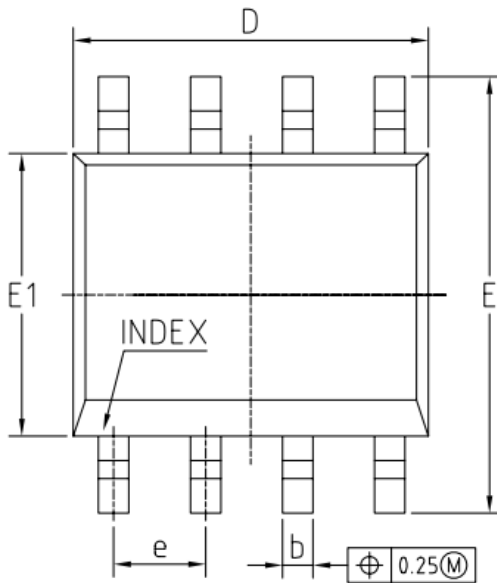
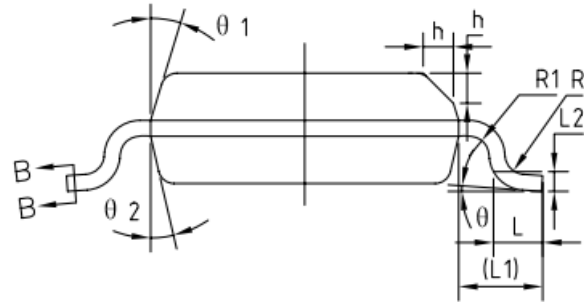
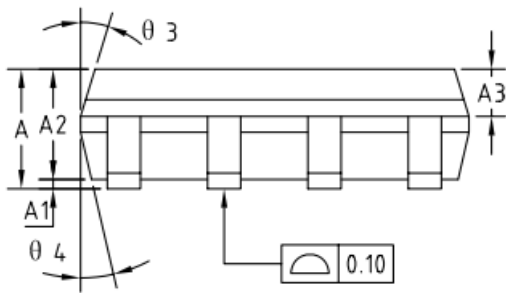


Physical Dimensions: MSOP-8



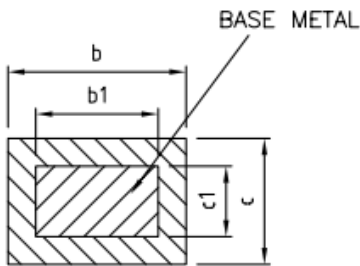
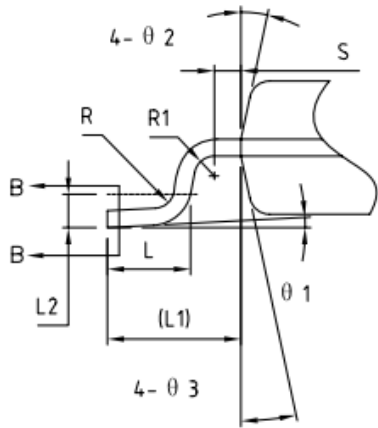
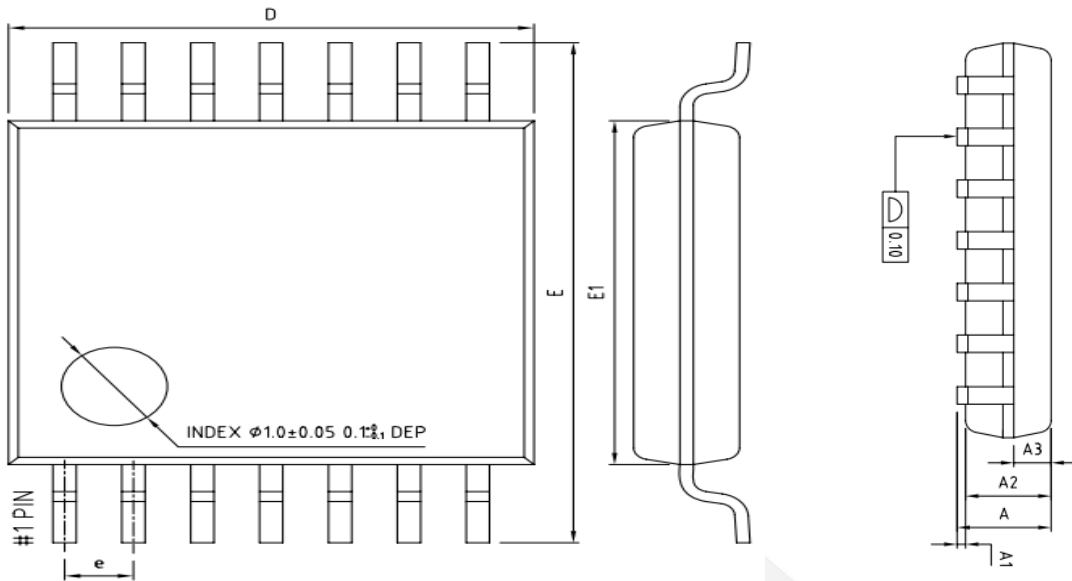
| COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER) | | | |
|--|---------|------|------|
| Symbol | MIN | NOM | MAX |
| A | - | - | 1.10 |
| A1 | 0 | - | 0.15 |
| A2 | 0.75 | 0.85 | 0.95 |
| A3 | 0.25 | 0.35 | 0.39 |
| b | 0.28 | - | 0.37 |
| b1 | 0.27 | 0.30 | 0.33 |
| c | 0.15 | - | 0.20 |
| c1 | 0.14 | 0.15 | 0.16 |
| D | 2.90 | 3.00 | 3.10 |
| E | 4.70 | 4.90 | 5.10 |
| E1 | 2.90 | 3.00 | 3.10 |
| e | 0.55 | 0.65 | 0.75 |
| L | 0.45 | 0.60 | 0.80 |
| L1 | 0.95REF | | |
| L2 | 0.25BSC | | |
| R | 0.07 | - | - |
| R1 | 0.07 | - | - |
| θ | 0° | - | 8° |
| θ1 | 9° | 12° | 15° |

Physical Dimensions: SOIC-8



| COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER) | | | |
|--|---------|------|------|
| Symbol | MIN | NOM | MAX |
| A | 1.35 | 1.55 | 1.75 |
| A1 | 0.10 | 0.15 | 0.25 |
| A2 | 1.25 | 1.40 | 1.65 |
| A3 | 0.50 | 0.60 | 0.70 |
| b | 0.38 | - | 0.51 |
| b1 | 0.37 | 0.42 | 0.47 |
| c | 0.17 | - | 0.25 |
| c1 | 0.17 | 0.20 | 0.23 |
| D | 4.80 | 4.90 | 5.00 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27BSC | | |
| L | 0.45 | 0.60 | 0.80 |
| L1 | 1.04REF | | |
| L2 | 0.25BSC | | |
| R | 0.07 | - | - |
| R1 | 0.07 | - | - |
| h | 0.30 | 0.40 | 0.50 |
| θ | 0° | - | 8° |
| θ1 | 15° | 17° | 19° |
| θ2 | 11° | 13° | 15° |
| θ3 | 15° | 17° | 19° |
| θ4 | 11° | 13° | 15° |

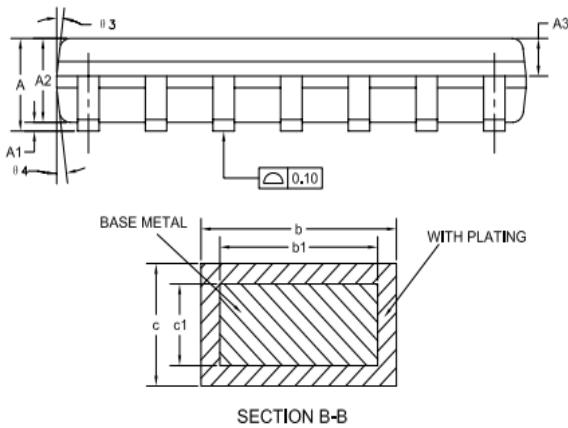
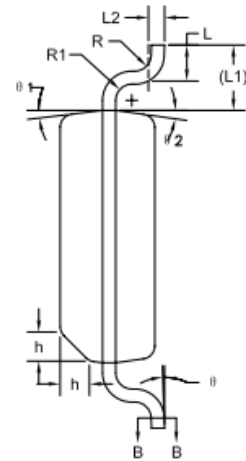
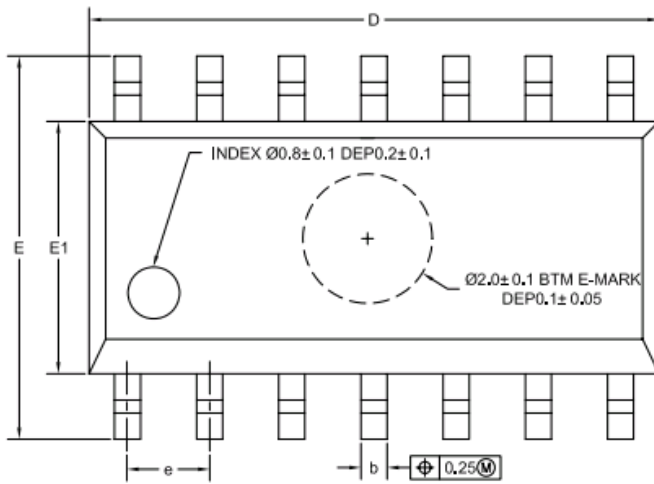
Physical Dimensions: TSSOP-14



SECTION B-B

| COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER) | | | |
|--|---------|------|------|
| Symbol | MIN | NOM | MAX |
| A | - | - | 1.20 |
| A1 | 0.05 | - | 0.15 |
| A2 | 0.90 | 1.00 | 1.05 |
| A3 | 0.34 | 0.44 | 0.54 |
| b | 0.20 | - | 0.28 |
| b1 | 0.20 | 0.22 | 0.24 |
| c | 0.10 | - | 0.19 |
| c1 | 0.10 | 0.13 | 0.15 |
| D | 4.86 | 4.96 | 5.06 |
| E | 6.20 | 6.40 | 6.60 |
| E1 | 4.30 | 4.40 | 4.50 |
| e | 0.65BSC | | |
| L | 0.45 | 0.60 | 0.75 |
| L1 | 1.00REF | | |
| L2 | 0.25BSC | | |
| R | 0.09 | - | - |
| R1 | 0.09 | - | - |
| S | 0.20 | - | - |
| θ1 | 0° | - | 8° |
| θ2 | 10° | 12° | 14° |
| θ3 | 10° | 12° | 14° |

Physical Dimensions: SOIC-14



| COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER) | | | |
|--|------------|------|------|
| Symbol | MIN | NOM | MAX |
| A | 1.35 | 1.60 | 1.75 |
| A1 | 0.10 | 0.15 | 0.25 |
| A2 | 1.25 | 1.45 | 1.65 |
| A3 | 0.55 | 0.65 | 0.75 |
| b | 0.36 | - | 0.49 |
| b1 | 0.35 | 0.40 | 0.45 |
| c | 0.17 | - | 0.25 |
| c1 | 0.17 | 0.20 | 0.23 |
| D | 8.53 | 8.63 | 8.73 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27 (BSC) | | |
| L | 0.45 | 0.60 | 0.80 |
| L1 | 1.04 (RFE) | | |
| L2 | 0.25 (BSC) | | |
| R | 0.07 | - | - |
| R1 | 0.07 | - | - |
| h | 0.30 | 0.40 | 0.50 |
| Θ | 0° | - | 8° |
| Θ1 | 6° | 8° | 10° |
| Θ2 | 6° | 8° | 10° |
| Θ3 | 5° | 7° | 9° |
| Θ4 | 5° | 7° | 9° |