

## Ø 10 mm Film Dielectric Trimmers

### TEST VOLTAGE (DC) FOR 1 MINUTE:

300 V

### MAXIMUM CONTACT RESISTANCE:

10 mΩ

### MINIMUM INSULATION RESISTANCE:

10000 MΩ

### CATEGORY TEMPERATURE RANGE:

#### PP

- 40 to + 70 °C

#### PC, PTFE

- 40 to + 85 °C

### CLIMATIC CATEGORY (IEC 60068):

#### PP

40/070/21

#### PC, PTFE

40/085/21

### MINIMUM STORAGE TEMPERATURE:

- 55 °C

### RELATED SPECIFICATION:

IEC 60418-1 and 4

### EFFECTIVE ANGLE OF ROTATION:

180°

### OPERATING TORQUE:

2 to 25 mNm

### MAXIMUM AXIAL THRUST:

2 N

### FEATURES

- Housing diameter 10 mm
- For a basic grid of 2.54 mm (0.1") or 2.50 mm
- Top and bottom or top adjustment
- Vertical and horizontal versions
- Round or hexagonal head



**RoHS**  
COMPLIANT

### APPLICATIONS

- For consumer and industrial equipment

### DESCRIPTION:

The vanes of the trimmer are stacked on a sturdy plastic base. The color of the base indicates the maximum capacitance (see Electrical Data Table). The dielectric is a film of polypropylene (PP), polycarbonate (PC) or polytetrafluorethylene (PTFE), which supports the vanes in such a way that good stability is ensured and no microphony can occur.

Flux absorption between the vanes is prevented.

Cleaning with solvents is not advised.

Versions are available with either a vertical spindle, or a horizontal spindle.

Both versions have top adjustment by means of a screwdriver or trimming key and bottom adjustment by means of a key.

### QUALITY LEVEL:

Sampling and data evaluation for quality level in accordance with "MIL-STD-105D" and "IEC 60410":

< 0.15 % major defects

< 0.65 % minor defects

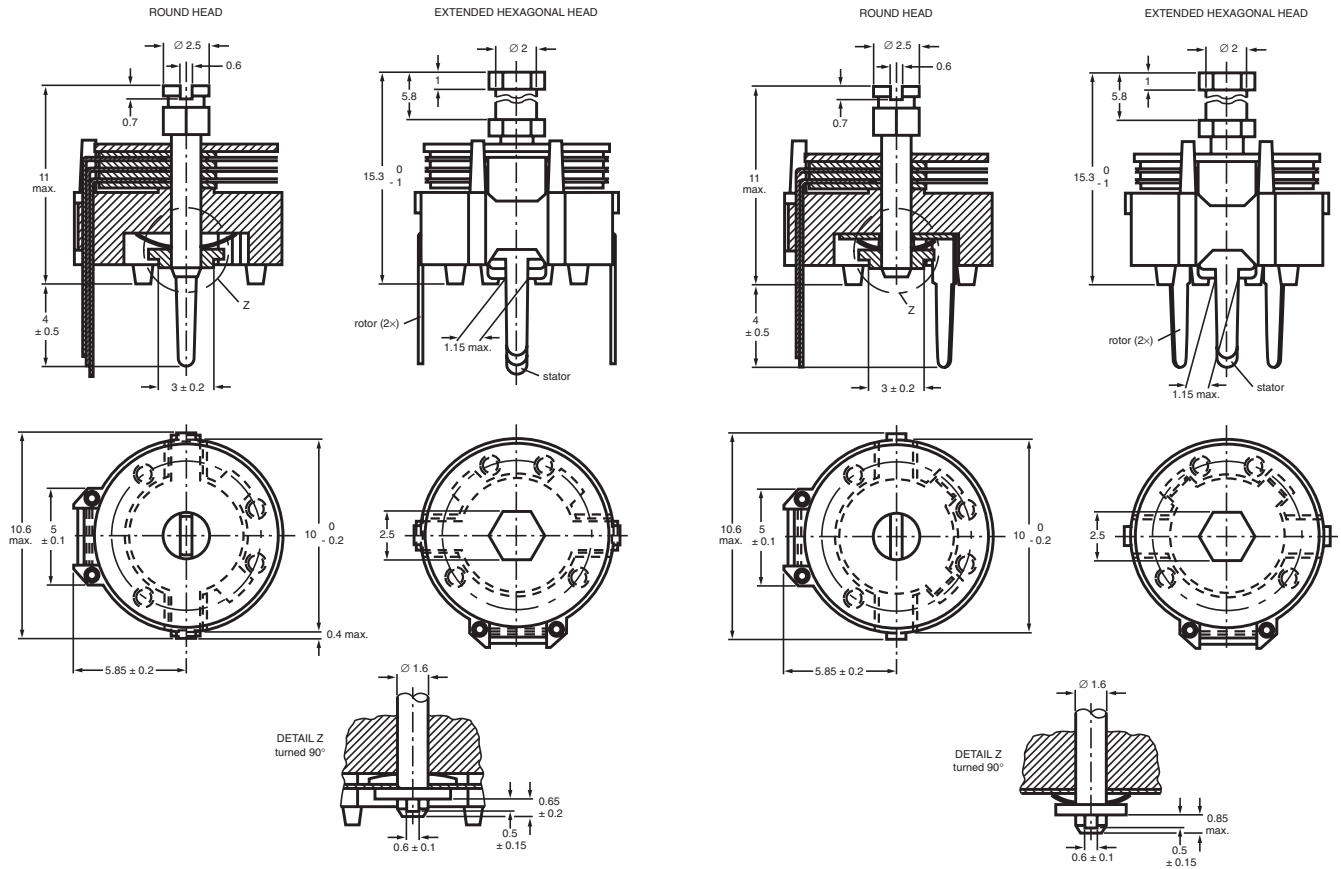
Each capacitor is tested for minimum  $C_{\min}$  and is also subjected to the full test voltage.

### $C_{\min} / C_{\max}$ :

2.5/15 to 7/105 pF

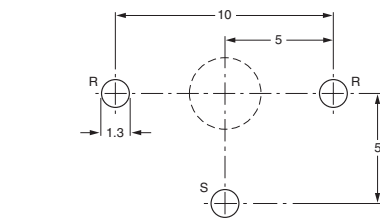
### RATED VOLTAGE (DC):

150 V



Trimmers 2281 808 ..... series, vertical version

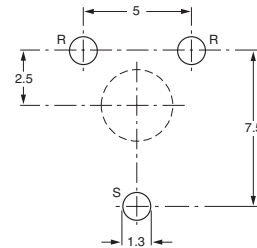
Dimensions in millimeters.



R = rotor, S = stator

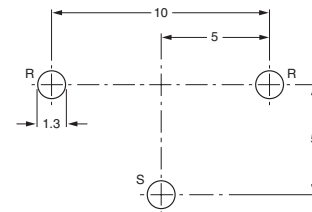
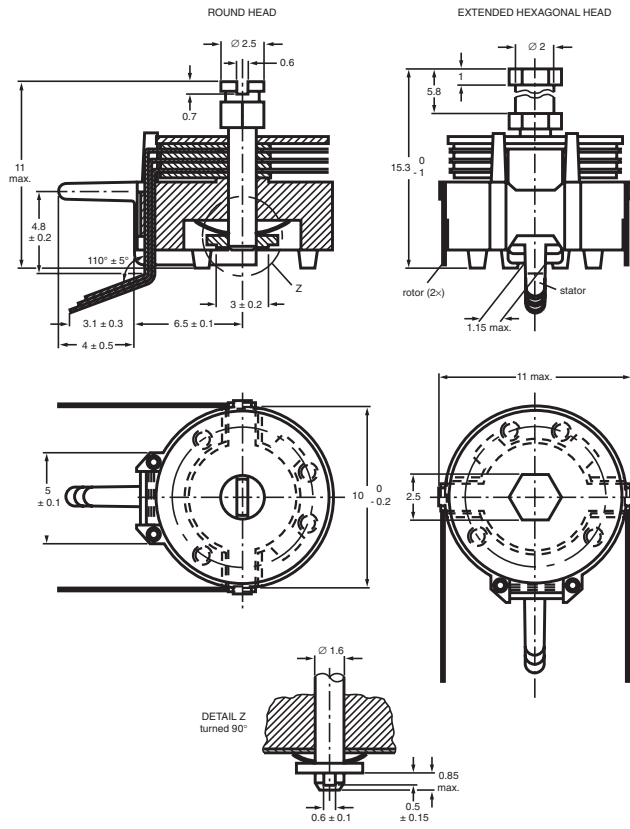
The large hole is for bottom adjustment and the diameter is determined by user's requirements.

Hole pattern



R = rotor, S = stator

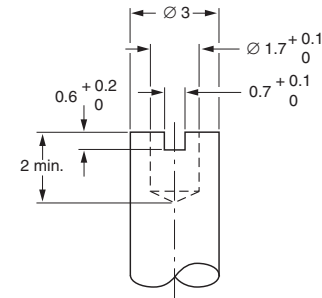
Hole pattern



Hole pattern

**ADJUSTMENT**

For top adjustment a screwdriver or trimming key can be used; for bottom adjustment a key is required as shown below



Bottom adjustment key

Trimmers 2281 808 ..... series, horizontal version

Dimensions in millimeters

**ORDERING INFORMATION**

C <sub>min</sub> /C <sub>max</sub> (pF)	CATALOG NUMBER 2281 808 ..... OR BFC2 808 .....*						
	HORIZONTAL VERSION		VERTICAL VERSION				
	HOLE PATTERN 5 mm × 10 mm		HOLE PATTERN 5 mm × 10 mm		HOLE PATTERN 7.5 mm × 5 mm		
	ROUND HEAD	HEX. HEAD	ROUND HEAD	HEX. HEAD	ROUND HEAD	HEX. HEAD	ROUND HEAD
	TOP AND BOTTOM ADJUSTMENT		TOP AND BOTTOM ADJUSTMENT				TOP ADJUSTMENT
2.5/15	61159	-	31159	-	32159	-	-
3/22.5	61229	-	31229	-	32229	-	-
5.5/40	61409	-	31409	-	32409	-	-
5.5/50	-	-	01029	-	01006	-	-
5.5/65	61659	64659	31659	34659	32659	-	01001
6/80	61809	64809	31809	34809	32809	35809	-
7/105	61101	64101	31101	-	32101	-	-
6/120	-	-	31121	-	-	-	-

\* ordering code for SAP system



**Mounting:**

The trimmer can be mounted on printed-circuit boards with a grid of 2.50 mm or 2.54 mm and a minimum hole diameter of 1.25 mm.

**PACKAGING:**

Bulk packaged in cardboard boxes lined with expanded plastic. For smallest packaging quantities (SPQ) see Electrical Data Table.

**ELECTRICAL DATA**

GUARANTEED MAX. C <sub>min</sub> / MIN. C <sub>max</sub> AT 200 kHz (pF)	SPINDLE	SHAPE OF HEAD	FIG.	ADJ. MODE	DIEL.	TAN δ AT C <sub>max</sub> x 10 <sup>-4</sup>		TEMP. COEFF. (10 <sup>-6</sup> /K)	MIN. f <sub>res</sub> AT C <sub>max</sub> (MHz)	COL. OF BASE	SPQ	CATALOG NUMBER 2281 ... .. or BFC2 ... ..*
						1 MHz	100 MHz					
2.5/15	vertical	round	1	top + bottom	PP	≤ 10	≤ 25	- 200 ± 700	420	blue	800	.... 808 31159
			2								800	.... 808 32159
	3	700	.... 808 61159									
3/22.5	vertical	round	1	top + bottom	PP	≤ 10	≤ 25	- 200 ± 700	200	green	800	.... 808 31229
			2								800	.... 808 32229
	3	700	.... 808 61229									
5.5/40	vertical	round	1	top + bottom	PP	≤ 10	≤ 25	- 200 ± 400	200	grey	800	.... 808 31409
			2								800	.... 808 32409
	3	700	.... 808 61409									
5.5/50	vertical	round	1	top + bottom	PTFE	≤ 10	≤ 25	- 200 ± 400	170	yellow	800	.... 808 01029
			2								800	.... 808 01006
5.5/65	vertical	round	2	top	PP	≤ 10	≤ 25	- 200 ± 500	170	yellow	800	.... 808 01001
		round	1								800	.... 808 31659
		round	2								800	.... 808 32659
	horizontal	hexag.	1	top + bottom							700	.... 808 34659
		round	3								700	.... 808 61659
		hexag.	3								600	.... 808 64659
6/80	vertical	round	1	top + bottom	PC	≤ 70	-	- 50 ± 400	170	red	800	.... 808 31809
		hexag.	1								700	.... 808 34809
		round	2								800	.... 808 32809
	horizontal	hexag.	2								700	.... 808 35809
		round	3								700	.... 808 61809
		hexag.	3								600	.... 808 64809
7/105	vertical	round	1	top + bottom	PC	≤ 70	-	- 50 ± 400	170	violet	800	.... 808 31101
		round	2								800	.... 808 32101
	horizontal	round	3								700	.... 808 61101
		hexag.	3								600	.... 808 64101
6/120	vertical	round	2	top + bottom	PC	≤ 70	-	- 50 ± 400	170	violet	800	.... 808 31121

\* ordering code for SAP system

**TEST PROCEDURES AND REQUIREMENTS**

IEC 60418-1 CLAUSE	IEC 60068 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.2		method of mounting	method A	
14		capacitance drift	after TC measurement	ΔC/C: ≤ 4.5 % for C <sub>max</sub> < 40 pF; ΔC/C: ≤ 2.5 % for C <sub>max</sub> ≥ 40 pF
19		thrust	axial thrust of 2 N	ΔC/C: ≤ 0.3 %
21		robustness of terminations:		
21.1	Ua	tensile	1 N	no damage
21.2	Ub	bending	1 cycle	no damage

IEC 60418-1 CLAUSE	IEC 60068 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS	
22	Na	rapid change of temperature	1 cycle; 0.5 hours at lower and 0.5 hours at upper category temperature	$\Delta C/C: \leq 1.5 \%$	
23	T Ta Tb	soldering: solderability resistance to heat	solder bath immersion 3 mm; 235 °C; 2 s solder bath: 260 °C; 10 s	good wetting no mechanical damage no mechanical damage	
24	Eb	impact bump	4000 ± 10 bumps; 40 g; 6 ms	$\Delta C/C: \leq 0.4 \%$ ; no mechanical damage	
25	Fc	vibration	frequency 10 to 55 Hz; amplitude 0.35 mm; 1.5 hours	$\Delta C/C: \leq 0.8 \%$ ; no mechanical damage	
26	B	climatic sequence:		$\Delta C/C: \leq 3 \%$ for $C_{max} < 80$ pF; $\Delta C/C: \leq 6 \%$ for $C_{max} \geq 80$ pF $\tan \delta: \leq 15 \times 10^{-4}$ for $C_{max} < 80$ pF; $\tan \delta: \leq 80 \times 10^{-4}$ for $C_{max} \geq 80$ pF $R_{ins}: \geq 10000$ M $\Omega$ ; rotor contact R: $\leq 10$ $\Omega$	
26.1		dry heat	16 hours at upper category temperature		
26.2		D	damp heat accelerated, first cycle	1 cycle; 24 hours; + 40 °C; 95 to 100 % RH	voltage proof: 300 V for 1 minute
26.3		Aa	cold	16 hours; - 40 °C	visual examination: no mechanical damage
26.5			damp heat accelerated, remaining cycles	1 cycle; 24 hours; + 40 °C; 95 to 100 % RH	operating torque: 2 to 35 mNm
27	Ca	damp heat steady state	21 days; + 40 °C; 90 to 95 % RH	$\Delta C/C:$ $\leq 3 \%$ for $C_{max} < 100$ pF; $\leq 3 \%$ for $C_{max} \geq 100$ pF $\tan \delta: \leq 20 \times 10^{-4}$ for $C_{max} < 80$ pF; $\tan \delta: \leq 80 \times 10^{-4}$ for $C_{max} \geq 80$ pF $R_{ins}: \geq 10000$ M $\Omega$ ; rotor contact R: $\leq 10$ m $\Omega$ voltage proof: 300 V for 1 minute visual examination: no mechanical damage operating torque: 2 to 35 mNm	
29		mechanical endurance	10 cycles	$\Delta C/C: \leq 1 \%$ $\Delta C/C$ after axial thrust: $\leq 0.4 \%$ ; rotor contact R: $\leq 10$ m $\Omega$ voltage proof: 300 V for 1 minute visual examination: no mechanical damage operating torque: 1.5 to 37 mNm	



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