

## Ø 7.5 mm Film Dielectric Trimmers

### MAXIMUM CONTACT RESISTANCE:

10 mΩ

### MINIMUM INSULATION RESISTANCE:

10000 MΩ

### CATEGORY TEMPERATURE RANGE:

#### PP

- 40 to + 70 °C

#### PE, PC, PTFE, PET

- 40 to + 85 °C

### CLIMATIC CATEGORY (IEC 60068):

#### PP

40/070/21

#### PE, PC, PTFE, PET

40/085/21

### MINIMUM STORAGE TEMPERATURE:

- 55 °C

### RELATED SPECIFICATION:

IEC 60418-1 and 4

### EFFECTIVE ANGLE OF ROTATION:

180°

### OPERATING TORQUE:

 $C_{max} < 33 \text{ pF}$ 

1 to 15 mNm

 $C_{max} \geq 33 \text{ pF}$ 

1 to 25 mNm

### MAXIMUM AXIAL THRUST:

2 N

### FEATURES

- Housing diameter 7.5 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



### 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), polyethylene (PE), polycarbonate (PC), polytetrafluorethylene (PTFE), or polyethyleneterephthalate (PET) 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 (see dimensional outlines). 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.

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

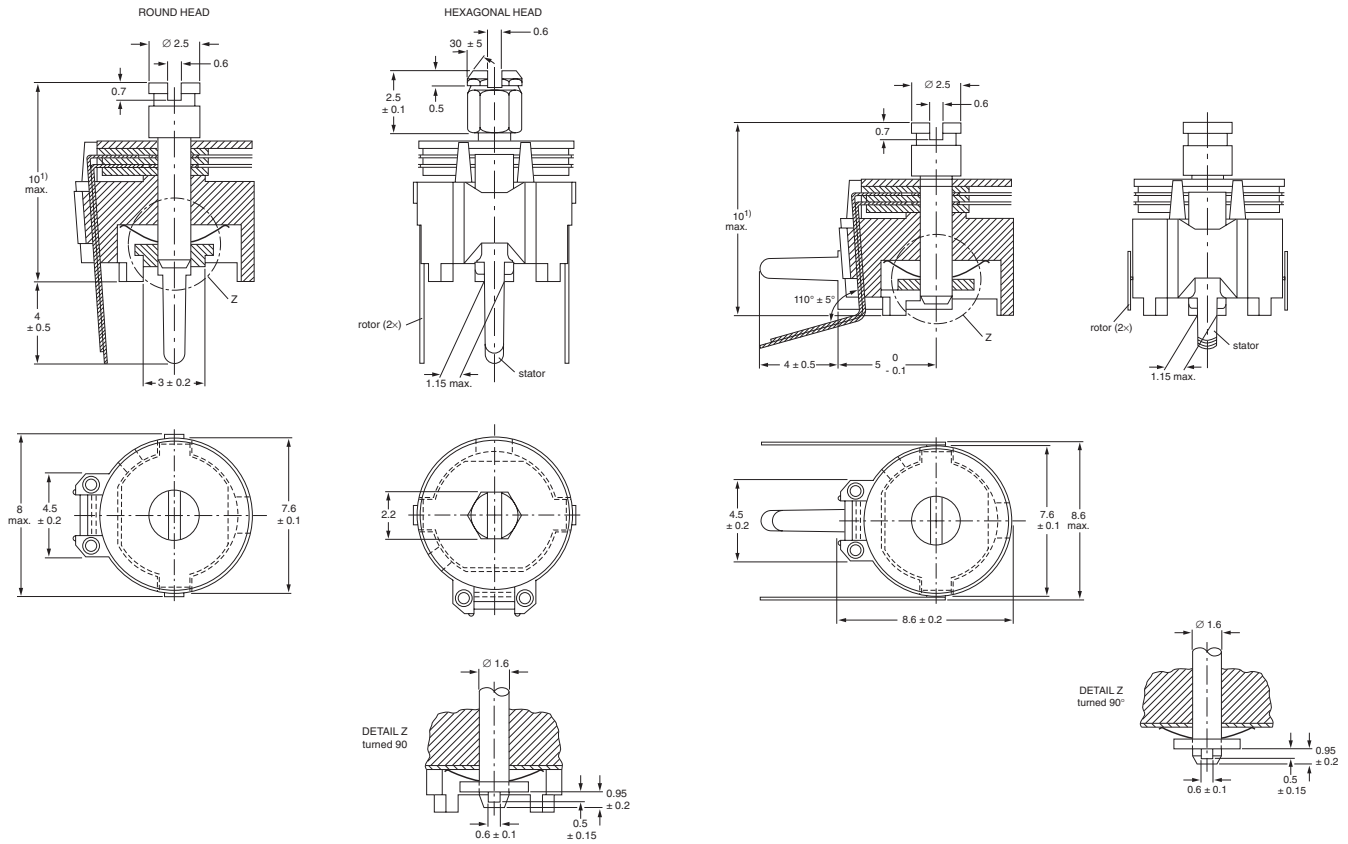
1.4/5.5 to 3/50 pF

### RATED VOLTAGE (DC):

250 V

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

500 V



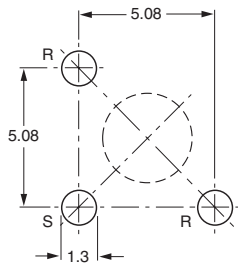
Trimmers 2281 808 ..... series, vertical version

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

Dimensions in millimeters.

**ADJUSTMENT**

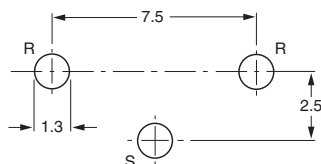
For top adjustment a screwdriver or trimming key can be used; for bottom adjustment a key is required as shown below



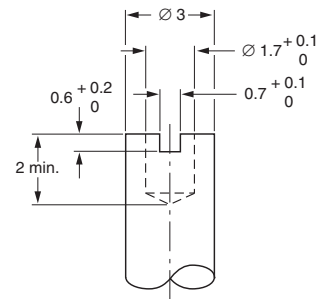
R = rotor, S = stator.

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

Hole pattern



R = rotor, S = stator



Bottom adjustment key



## ORDERING INFORMATION

$C_{min}/C_{max}$ (pF)	CATALOG NUMBER 2281 808 ..... OR BFC2 808 .....*			
	VERTICAL VERSION			HORIZONTAL VERSION
	ROUND HEAD		HEXAGONAL HEAD	ROUND HEAD
	TOP AND BOTTOM ADJUSTMENT	TOP ADJUSTMENT ONLY	TOP AND BOTTOM ADJUSTMENT	TOP AND BOTTOM ADJUSTMENT
1.4/5.5	11558	00004	–	51558
2/9	00018	–	–	–
2/10	11109	00005	17109	51109
2/10	–	11004	–	–
2/15	11159	–	–	–
2/18	00016	–	–	–
2.5/20	–	11006	–	–
2.5/22	11229	00006	17229	51229
2.5/27	11279	–	–	51279
3/33	11339	–	–	–
3/40	11409	–	17409	51409
3/50	11509	–	17509	51509

## 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 quantity (SPQ) see Electrical Data Table.

## ELECTRICAL DATA

GUARANTEED MAX. $C_{min}/$ MIN. $C_{max}$ AT 200 kHz (pF)	SPINDLE	SHAPE OF HEAD	FIG.	ADJ. MODE	DIEL.	TAN $\delta$ AT $C_{max} \times 10^{-4}$		TEMP. COEFF. ( $10^{-6}/K$ )	MIN. $f_{res}$ at $C_{max}$ (MHz)	COL. OF BASE	SPQ	CATALOG NUMBER 2281 ... .. or BFC2 ... ..*
						1 MHz	100 MHz					
1.4/5.5	vertical	round	1	top + bottom	PE	$\leq 10$	$\leq 25$	$-250 \pm 350$	850	grey	1400	.... 808 11558
			1	top							1400	.... 808 00004
	horizontal	round	2	top + bottom							1200	.... 808 51558
2/9	vertical	round	1	top + bottom	PTFE	$\leq 10$	$\leq 15$	$-150 \pm 800$	400	yellow	1400	.... 808 00018
2/10	vertical	round	1	top + bottom	PP	$\leq 10$	$\leq 25$	$-250 \pm 800$	480	yellow	1400	.... 808 11109
			1	top							1400	.... 808 00005
		hexag.	1	top							1400	.... 808 17109
	horizontal	round	2	top + bottom							1200	.... 808 51109
	vertical	round	1	top							PC	$\leq 70$
2/15	vertical	round	1	top + bottom	PP	$\leq 10$	$\leq 25$	$-250 \pm 600$	450	blue	1400	.... 808 11159
2/18	vertical	round	1	top + bottom	PTFE	$\leq 10$	$\leq 15$	$-250 \pm 350$	350	green	1400	.... 808 00016
2.5/20	vertical	round	1	top	PET	$\leq 160$	–	$0 \pm 1100$	250	green	1000	.... 808 11006
2.5/22	vertical	round	1	top + bottom	PP	$\leq 10$	$\leq 25$	$-200 \pm 500$	350	green	1400	.... 808 11229
			1	top							1400	.... 808 00006
	vertical	hexag.	1	top							1400	.... 808 17229
	horizontal	round	2	top + bottom							1200	.... 808 51229
2.5/27	vertical	round	1	top + bottom	PC	$\leq 70$	–	$-50 \pm 500$	350	red	1400	.... 808 11279
	horizontal	round	2	top + bottom							1200	.... 808 51279
3/33	vertical	round	1	top + bottom	PP	$\leq 10$	–	$-250 \pm 350$	300	brown	1400	.... 808 11339
3/40	vertical	round	1	top + bottom	PC	$\leq 70$	–	$-50 \pm 400$	300	violet	1400	.... 808 11409
	vertical	hexag.	1	top							1400	.... 808 17409
	horizontal	round	2	top + bottom							1200	.... 808 51409
3/50	vertical	round	1	top + bottom	PC	$\leq 70$	–	$-50 \pm 500$	250	black	1400	.... 808 11509
	vertical	hexag.	1	top							1400	.... 808 17509
	horizontal	round	2	top + bottom							1200	.... 808 51509

\* 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	$\Delta C/C: \leq 1\%$ for $C_{max} < 40$ pF; $\Delta C/C: \leq 2.5\%$ for $C_{max} \geq 40$ pF
19		thrust	axial thrust of 2 N	$\Delta C/C: \leq 0.3\%$
21		robustness of terminations:		
21.1	Ua	tensile	1 N	no damage
21.2	Ub	bending	1 cycle	no damage
22	Na	rapid change of temperature	1 cycle; 0.5 hours at lower and 0.5 hours at upper category temperature	$\Delta C/C: \leq 2\%$
23	T	soldering:		
	Ta	solderability	solder bath immersion 3 mm; 235 °C; 2 s	good wetting no mechanical damage
	Tb	resistance to heat	solder bath: 260 °C; 10 s	no mechanical damage
24	Eb	impact bump	4000 ± 10 bumps; 40 g; 6 ms	$\Delta C/C: \leq 0.6\%$ ; no mechanical damage
25	Fc	vibration	frequency 10 to 55 Hz; amplitude 0.35 mm; 1.5 hours	$\Delta C/C: \leq 0.6\%$ ; no mechanical damage
26		climatic sequence:		
26.1	B	dry heat	16 hours at upper category temperature	$\Delta C/C: \leq 4$ $\tan \delta: \leq 10 \times 10^{-4}$ for $C_{max} < 27$ pF; $\tan \delta: \leq 70 \times 10^{-4}$ for $C_{max} \geq 27$ pF; $\tan \delta: \leq 80 \times 10^{-4}$ for $C_{max} \geq 40$ pF $R_{ins}: \geq 10000$ MΩ; rotor contact R: ≤ 10 mΩ
26.2	D	damp heat accelerated, first cycle	1 cycle; 24 hours; + 40 °C; 95 to 100% RH	voltage proof: 500 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: 1 to 15 mNm for $C_{max} < 33$ pF; 1 to 25 mNm for $C_{max} \geq 33$ pF
27	Ca	damp heat steady state	21 days; + 40 °C; 90 to 95% RH	$\Delta C/C: \leq 5\%$ $\tan \delta: \leq 30 \times 10^{-4}$ for $C_{max} < 27$ pF; $\tan \delta: \leq 70 \times 10^{-4}$ for $C_{max} \geq 27$ pF; $\tan \delta: \leq 80 \times 10^{-4}$ for $C_{max} \geq 40$ pF $R_{ins}: \geq 10000$ MΩ; rotor contact R: ≤ 10 mΩ voltage proof: 500 V for 1 minute visual examination: no mechanical damage operating torque: 1 to 15 mNm for $C_{max} < 33$ pF; 1 to 25 mNm for $C_{max} \geq 33$ pF
29		mechanical endurance	10 cycles	$\Delta C/C: \leq 1.5\%$ $\Delta C/C$ after axial thrust: ≤ 0.3 %; rotor contact R: ≤ 10 mΩ voltage proof: 500 V for 1 minute visual examination: no mechanical damage operating torque: 1 to 15 mNm for $C_{max} < 33$ pF; 1 to 25 mNm for $C_{max} \geq 33$ pF



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