

Knob Potentiometer with Switch



The P16S is a revolutionary concept in panel mounted potentiometers. This unique design consists of a knob driving and incorporating a cermet potentiometer. Only the mounting hardware and terminals are situated on the back side of the panel reducing to a minimum the required clearance.

FEATURES

- **P16S** - Version for military, professional and industrial applications (cermet)
1 W at 40 °C
- **PA16S** - Version for professional audio applications (conductive plastic)
0.5 W at 40 °C
- Compact (integrated)
- Detent and electric cut off at beginning of travel
- Fully sealed and panel sealed
- Metallic or plastic knob options
- Custom knob on request
- Test according to CECC 41000 or IEC 60393-1
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



DIMENSIONS in millimeters (± 0.5 mm)		
<p>P16SNP</p>	<p>P16SNM</p>	<p>PANEL CUTOUT</p>

ELECTRICAL SPECIFICATIONS		
	P16S	PA16S
Resistive Element	Cermet	Conductive plastic
Electrical Travel	220° ± 10°	220° ± 10°
Power Rating Chart		
Circuit Diagram		
Taper		
Resistance Range	Linear Law 22 Ω to 10 MΩ Logarithmic Laws 100 Ω to 2.2 MΩ	1 kΩ to 1 MΩ 470 Ω to 500 kΩ
Standard Series e3	1 - 2.2 - 4.7 and on request 1 - 2 - 5	1 - 2.2 - 4.7
Tolerance	Standard ± 20 % On Request ± 10 %	± 20 % ± 10 % (1 kΩ to 100 kΩ)
Power Rating	Linear 1 W at + 40 °C 0.5 W at + 40 °C Logarithmic	0.5 W at + 40 °C 0.25 W at + 40 °C
Temperature Coefficient (Typical)	± 150 ppm/°C	± 500 ppm/°C
Dielectric Strength (RMS)	2500 V	2500 V
Limiting Element Voltage (Linear Law)	350 V	350 V
Contact Resistance Variation	3 % Rn or 3 Ω	2 % Rn or 3 Ω
End Resistance (Typical)	1 Ω	1 Ω
Insulation Resistance (500 V _{DC})	10 ⁶ MΩ	10 ⁶ MΩ



MECHANICAL SPECIFICATIONS	
Mechanical Travel	300° ± 5°
Operating Torque	2 Ncm typical
End Stop Torque	25 Ncm maximum
Max. Tightening Torque of Mounting Nut	250 Ncm maximum
Unit Weight	4.5 g typical

ENVIRONMENTAL SPECIFICATIONS		
	Metallic Knob	Plastic Knob
Temperature Range	- 40 °C to 125 °C	- 40 °C to 85 °C
Climatic Category	40/100/56	40/85/56
Sealing	Sealed container and panel sealed	
Protection Grades	IP67	

SWITCH ELECTRICAL AND MECHANICAL SPECIFICATIONS		
ON/OFF Switch	Actuation in counter clockwise position (between terminal a and terminal b)	
Switching Current	P16S	100 mA max.
	PA16S	1 mA max.
Switch Actuation Torque	4 Ncm min.	
Switch Actuation Travel	30° ± 5°	
Dielectric Strength Terminal to Terminal (RMS)	1000 V	
Insulation Resistance between Contacts	10 ⁶ MΩ	
Switch Mechanical Endurance	10 000 cycles	
1 Cycle	ON-OFF-ON	

MARKING
<ul style="list-style-type: none"> Ohmic value code, tolerance, code and taper Manufacturing date code

PACKAGING
<ul style="list-style-type: none"> Carton box of 20 pieces

CONTROL KNOB
<p>Black metallic knob (NM). Black plastic knob (NP). For white and blue color see ordering information. Other dimensions, shapes, colors of control knobs are manufactured on request - please consult Vishay. Other reference marks (shapes, colors) and legends can be printed on plastic knob on request - please consult Vishay.</p>

P16S STANDARD RESISTANCE ELEMENT						
STANDARD RESISTANCE VALUES	LINEAR TAPER			LOG. TAPER		
	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
Ω	W	V	mA	W	V	mA
22	1	4.69	213			
47	1	6.85	146			
100	1	10	100	0.5	7.1	71
220	1	14.8	67.4	0.5	10.5	48
470	1	21.7	46.1	0.5	15.3	32.6
1K	1	31.6	31.6	0.5	22.4	22.4
2.2K	1	46.9	21.3	0.5	33.2	15.1
4.7K	1	68.5	14.6	0.5	48.5	10.3
10K	1	100	10	0.5	70.7	7.07
22K	1	148	6.74	0.5	105	4.77
47K	1	217	4.61	0.5	153	3.26
100K	1	316	3.16	0.5	224	2.24
220K	0.56	350	1.59	0.5	332	1.51
470K	0.26	350	0.75	0.26	350	0.74
1M	0.12	350	0.35	0.12	350	0.35
2.2M	0.05	350	0.16	0.056	350	0.16
4.7M	0.02	350	0.07			
10M	0.01	350	0.012			

PA16S STANDARD RESISTANCE ELEMENT DATA						
STANDARD RESISTANCE VALUES	LINEAR TAPER			LOG. TAPER		
	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 70 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
Ω	W	V	mA	W	V	mA
470				0.25	10.8	23.1
1K	0.5	22.4	22.4	0.25	15.8	16
2.2K	0.5	33.2	15.1	0.25	23.5	11
4.7K	0.5	48.5	10.3	0.25	34.3	7
10K	0.5	70.7	7.07	0.25	50.0	5.0
22K	0.5	105	4.77	0.25	74	3.4
47K	0.5	153	3.26	0.25	108	2.3
100K	0.5	224	2.24	0.25	158	1.6
220K	0.5	332	1.51	0.25	235	1.1
470K	0.26	350	0.74	0.25	343	0.7
1M	0.12	350	0.35			



PERFORMANCE				
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS		
		$\Delta R_T/R_T$ (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	OTHER
Electrical Endurance	1000 h at rated power 90'/30' cycle at + 40 °C	± 5 %	-	Insulation resistance: > 10 ⁴ MΩ Contact res. variation: < 2 % Rn
Damp Heat, Steady State	56 days 40 °C, 93 % HR	± 2 %	± 1 %	Insulation resistance: > 10 ⁴ MΩ
Mechanical Endurance	50 000 cycles	± 5 %	-	Contact res. variation: < 2 % Rn
Shock	50 g's at 11 ms 3 successive shocks in 3 dimensions	± 0.2 %	± 0.5 %	-
Vibration	10 Hz to 55 Hz 0.75 mm or 10 g's during 6 h	± 0.2 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 0.5 \%$

ORDERING INFORMATION																	
P	1	6	S	N	P	2	2	3	M	A	B	1	5				
MODEL	STYLE			OHMIC VALUE			TOLERANCE	TAPER			PACKAGING CODE	SPECIAL NUMBER					
P16S = Cermet PA16S = Conductive plastic	NM : Metallic black NP : Plastic black WM : Metallic white WP : Plastic white BP : Plastic blue			223 = 22 kΩ for ohmic value range see electrical specification			M = ± 20 % On request: K = ± 10 %	A : Linear L : Clockwise logarithmic F : Inverse clockwise logarithmic			B15 = Box of 20 pieces	(If applicable) Given by Vishay for custom design					

PART NUMBER DESCRIPTION (for information only)								
P16S	NP	22 kΩ	20 %	A		BO20		e3
MODEL	STYLE	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SPECIAL	LEAD (Pb)-FREE