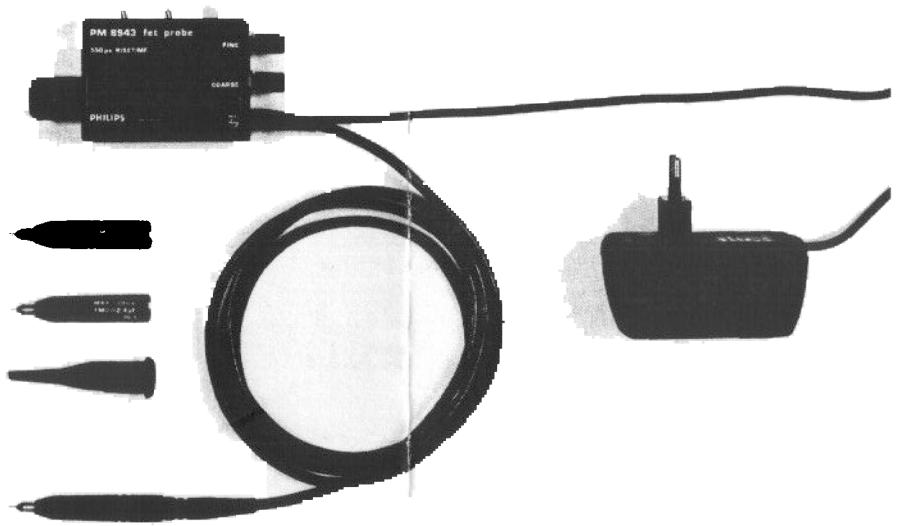

Aktiver FET-Tastkopf PM 8943

- **Übersetzungsverhältnis 1 : 1**
- **Bandbreite 0 ... 650 MHz**
- **Umfangreiches Zubehör serienmäßig**
- **Eingangsimpedanz 1 MΩ // 3,5 pF**
- **Dyn. Bereich von ± 0,6 V, unabhängig von dem ± 5 V-DC-Offset**
- **Kleiner Tastkopf und flexibles Kabel**
- **Geeignet für Meßgeräte mit 50-Ω- oder 1-MΩ-Eingängen**

Belastungsfreie Hochfrequenzmessung

Dieser aktive Tastkopf gestattet Messungen hochfrequenter Signale, ohne dabei den Meßkreis zu belasten.

Der PM 8943 hat ein flexibles Kabel und einen kleinen Tastkopf. Er hat die sehr kleine Eingangskapazität von 3,5 pF und einen dynamischen Bereich von ± 0,6 V, unabhängig von dem ± 5 V-DC-Offset.

Für Signale mit größerer Amplitude stehen zwei Abschwächer zur Verfügung.

Bei Verwendung dieser Abschwächer wird die Eingangskapazität weiter verkleinert: beim 10 : 1-Abschwächer auf 2,2 pF und beim 100 : 1 auf 1,4 pF.

Die Wahl der Kopplung, AC oder DC, wird mit einem Schalter vorgenommen. Es braucht bei AC-Kopplung kein zusätzlicher Kondensator, der die Eingangskapzität vergrößern würde, verwendet werden.

TECHNISCHE DATEN

VERSTÄRKUNG

Anstiegszeit ≤ 0,55 ns

Bandbreite
DC: 0 Hz ... 650 MHz (– 3 dB)
AC: 1 Hz ... 650 MHz (– 3 dB)

Eingangsimpedanz 1 MΩ // 3,5 pF

Dynamischer Bereich ± 0,6 V

Offset-Spannung ± 5 V

Signalverzögerung 8,5 ns

Rauschen ≤ 250 µV
tangential gemessen

Max. Eingangsspannung ± 100 V_s
(Gleich- und Wechselspannung)

Ausgangsbelastung: 50 Ω oder 1 MΩ

Stromversorgung: 100/220 V + 20 %/– 10 %

Abschwächer 10 : 1
Eingangsimpedanz: 1 MΩ // 2,2 pF
Dynamischer Bereich: ± 6 V
Offset-Spannung: ± 50 V

Abschwächer 100 : 1
Eingangsimpedanz: 1 MΩ // 1,4 pF
Dynamischer Bereich: ± 60 V
Offset-Spannung: ± 200 V

BESTELLINFORMATION

PM 8943 Aktiver FET-Tastkopf

GENERAL INFORMATION

Introduction

The PM8943 is an active FET probe with unity gain, intended for use with a 1 Megohm or a 50 ohm oscilloscope input, or other measuring instrument inputs such as frequency counters, etc.

Two add-on attenuators are available as standard accessories to increase the dynamic range of the probe.

The circuits of the probe are powered from the a.c. mains supply.

Fig. 1. FET-probe with accessories

1.2. Technical data

WARNING: Unless otherwise stated, the specifications listed apply for the PM8943 only; i.e. excluding the effects of the measuring oscilloscope or any other instruments used with the PM8943 FET probe.
The properties expressed in numerical values with tolerances stated, are guaranteed by the manufacturer. Numerical values without tolerances are typical and represent the characteristics of an average instrument.

The FET probe PM8943 has been designed and tested in accordance with IEC Publication 348 for Class 1 instruments and has been supplied in a safe condition. This Instruction Manual contains information and warnings which must be followed by the purchaser to ensure safe operation and to retain the instrument in a safe condition.

These data apply after warming-up period of 15 minutes.

1.2.1. Electrical data

characteristics	specified performance			additional Information
	probe only	probe + 10x att.	probe + 100x att.	
1.2.1.1. Attenuation	1x ± 2%	10x ±4%	100x ±4%	probe output connected to nom. 50Ω or 1MΩ oscilloscope input (according to position of output switch).
1.2.1.2. Rise time				probe output connected to 50Ω oscilloscope input.
1.2.1.2.1.	⩽0,55ns	⩽0,55ns	⩽0,55ns	output switch in 50Ω position.
1.2.1.2.2.	Depends on input capacitance of oscilloscope see fig. 3.			probe output connected to 1MΩ oscilloscope input. Output switch in 1MΩ- position.

characteristics	specified performance			additional information
	probe only	**probe+10x att.**	**probe+100x att.**	
1.2.1.3. Bandwidth at −3dB				Probe output connected to 50Ω-oscilloscope input. Output switch in 50Ω-position. AC/DC switch in DC-position.
1.2.1.3.1.	d.c. to ⩾ 650MHz	d.c. to ⩾ 650MHz	d.c. to ⩾ 650MHz	
1.2.1.3.2.	⩽ 1,1Hz to ⩾ 650MHz	⩽ 1,1Hz to ⩾ 650MHz	⩽ 1,1Hz to ⩾ 650MHz	AC/DC-switch in AC-position
1.2.1.3.3.	From d.c. to upper limit depending on input capacitance of oscilloscope. See fig. 3.			Probe output connected to 1MΩ oscilloscope input. Output switch in 1MΩ- position. AC/DC switch in DC - position.
1.2.1.3.4.	From ⩽1,1Hz to upper limit depending on input capacitance of oscilloscope. See fig. 2.			AC/DC-switch in AC- position.
1.2.1.4. Pulse response aberrations (rounding, tilt, overshoot, ringing, reflections)				Measured with voltage step of 0,3ns risetime on oscilloscope of 1GHz - bandwidth. Probe connected to 50Ω- oscilloscope input. Output switch in 50Ω position.
1.2.1.4.1.	⩽± 4%	⩽± 5%	⩽± 5%	During first 5ns following transient;
1.2.1.4.2.	< 2%	< 2%	< 2%	There after.

characteristics	specified performance			additional information
	probe only	probe + 10x att.	probe + 100x att.	
1.2.1.4.3.	⩽ 3%	⩽ 3%	⩽ 3%	Measured with voltage step of 1ns-risetime on oscilloscope of 100MHz bandwidth. Probe output connected to 1MHz oscilloscope input. During first 5ns following transient;
1.2.1.4.4.	⩽ 2%	⩽ 2%	⩽ 2%	There after.
1.2.1.5. Dynamic range	± 0,6V ($1,2V_{p-p}$)	± 0,6V ($12V_{p-p}$)	± 0,6V ($120V_{p-p}$)	
1.2.1.6. Compression at limits of dynamic range	< 5%			Measured with 30mV sine wave (on probe without att.) shifted over specified dynamic range.
1.2.1.7. d.c. Offset range	± 5V	± 50V	± 500V refer to 1.2.1.8.1.	d.c. offset of centre of dynamic range that can be compensated for by means of offset controls.
1.2.1.8. Maximum allowable input voltage.				AC/DC - switch in any position.
1.2.1.8.1. up to 20Hz:	± 100V	± 200V	± 200V	d.c. + a.c. peak.
1.2.1.8.2. Derating at higher frequencies	See fig. 4.			a.c. component (peak)
1.2.1.9. d.c. Drift				Refered to input.
1.2.1.9.1.	⩽ 50µV/°C	⩽ 0,5mV/°C	⩽ 5mV/°C	Probe tip assy only
1.2.1.9.2.	⩽ 0,3mV/°C	⩽ 3mV/°C	⩽ 30mV/°C	Probe tip assy + amplifier.
1.2.10. Noise	$0,25mV_{rms}$	$2,5mV_{rms}$	$25mV_{rms}$	Refered to input.

characteristics	specified performance			additional information
	probe only	probe+10x att.	probe+100x att.	
1.2.1.11. Propagation delay.	8,5ns ±0,3ns	8,7ns ±0,3ns	8,7ns ±0,3ns	Measured at 50% points of pulse height. Probe connected to 50Ω oscilloscope input. Output switch in 50Ω-position.
1.2.1.12. Input impedance				Same in DC-and AC-position of switch
1.2.1.12.1. Capacitance (C_p)	3,5pF±20%	2,2pF±20%	1,4pF±20%	Measured at 100MHz
1.2.1.12.2. Resistance (R_p)	1MΩ±2%			Same for AC and DC position
1.2.1.12.3. R_p and X_p = f(freq)	see fig. 2. and fig. 5.			
1.2.1.13. Power requirements				
1.2.1.13.1. Mains (line) voltage	$198V_{rms} \leqslant U_{mains} \leqslant 264V_{rms}$			Range selector in "220V"- position
1.2.1.13.2.	$99V_{rms} \leqslant U_{mains} \leqslant 132V_{rms}$			Range selector in "110V" - position
1.2.1.13.3. Mains frequency	$46Hz \leqslant f_{mains} \leqslant 440Hz$			
1.2.1.13.4. Power consumption	maximum 10VA			

Environmental Data

The environmental data are only valid if the instrument is checked in accordance with the official checking procedures. Details of these procedures and failure criteria are supplied on request by the PHILIPS Organisation in your country, or by N.V.PHILIPS' GLOEILAMPENFABRIEKEN, TEST & MEASURING DEPARTMENT, EINDHOVEN, HOLLAND.

characteristics	specification	additional information
1.2.2.1. Temperature		
– Storage	-40°C to + 70°C	Test procedure IEC 68 tests Ab & Bb; recovery time from -40°C to room temp. = 1 hour.
– Operating:		
Probe tip assembly + amplifier + mains adaptor and accessories	0°C to 45°C	Test procedure IEC 68, tests Ab & Bb; within electrical specification
Probe tip assembly + attenuators and cable	– 10°C to +55°C	Within specification after occasional readjustment.
1.2.2.2. Humidity (non-operating)	21 cycles of damp heat test; temp. 25°C to 40°C; relative humidity 90% to 100%; cycle time, 24 hours	Test procedure conforms to IEC 68Db
1.2.2.3. Altidtude	To 5000m To 15000m	Operating within specs Storage
1.2.2.4. Vibration (operation)	In accordance with IEC 68 FC	Operating
1.2.2.5. Shock (non-operating)	In accordance with IEC 68 Eb	Non operating
1.2.3. Mechanical data		
1.2.3.1. Dimensions	L W H	
– Probe tip assembly	144 12ϕ – mm	
– Compensation box	144 61 30 mm	including connector
– Test cable	1400 – – mm	from amplifier box to probe tip
– Supply cable	1900 – – mm	
– Attenuators	64 11ϕ – mm	
– Carrying case	260 340 62 mm	
1.2.3.2. Weight	1,2kg	probe in carrying case including accessories

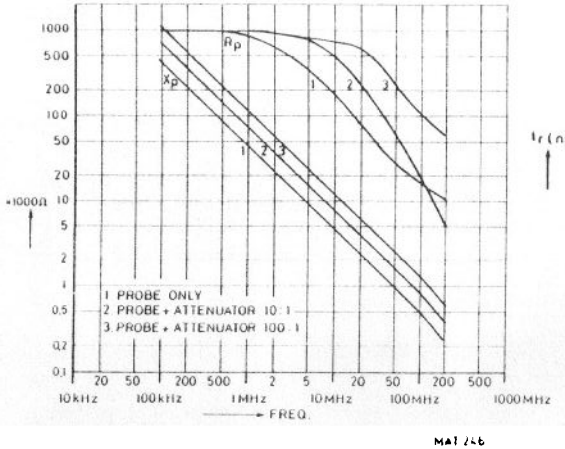

Fig. 2. Input resistance (R_p) and reactance (X_p) versus frequency

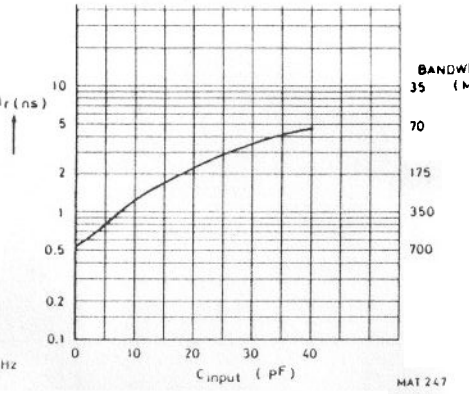

Fig. 3. Rise time versus oscilloscope - input impedance

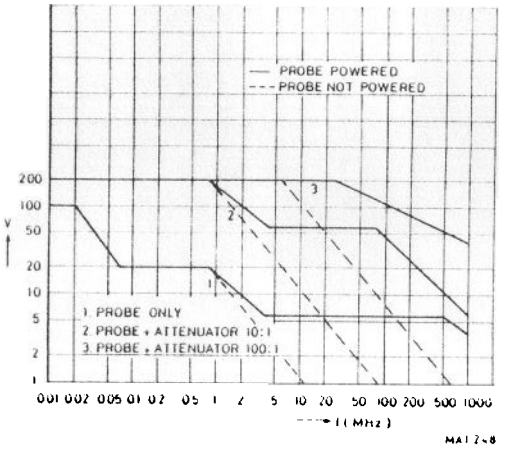

Fig. 4. Max. input voltage derating versus frequency

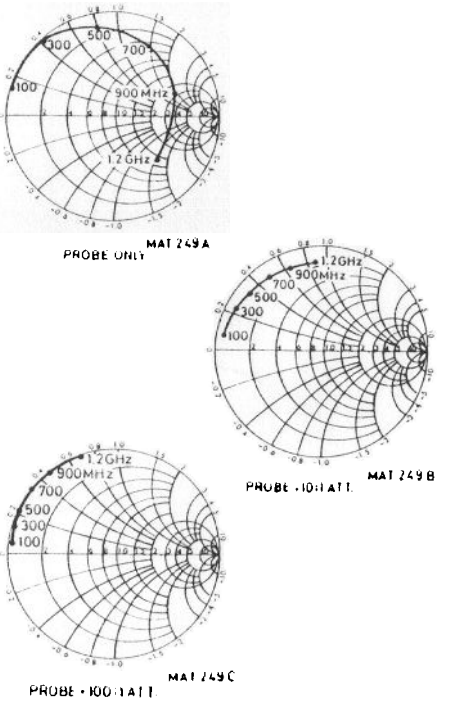

Fig. 5. Input admittance at h.f. (Centre value : 20 ms)