

±6 kV ANSI/ESDA/JEDEC 2-Pin HBM Tester HBM-S1-B

Advanced TLP/HMM/HBM Solutions



1 Features

- ±6 kV Human-Body-Model (HBM) 2-pin tester probehead according ANSI/ESDA/JEDEC JS-001 standard with C=100 pF, R=1.5 kΩ discharge network
- Optionally available upgrade for all HPPI TLP-3010C, 4010C, 8010A/C, and TLP-12010A/C hardware systems and software (upgrade on request)
- **True HBM** – the classical discharge network of the HBM-S1-B according the normative standard ensures compliant waveforms for all load conditions
- Suppression of trailing pulses
- Integrated charge removal resistor
- Integrated DUT voltage and DUT current sensor for real time voltage and current monitoring
- Integrated DC test DUT switch
- Integrated hardware 50 Ω trigger output for high speed digital oscilloscopes
- Integrated overvoltage protection of voltage sense, current sense and DC test interfaces for oscilloscope and SMU protection during high voltage HBM testing
- Fast and efficient HBM measurements including transient waveform data management using the standard HPPI TLP software
- Compact size 145 mm x 82.5 mm x 44 mm

2 Description

The HBM-S1-B is a 2-pin HBM test probehead according ANSI/ESDA/JEDEC JS-001 standard with C=100 pF, R=1.5 kΩ discharge network up to ±6 kV. The HBM-S1-B can be used as an optional extension (upgrade on request) for all HPPI TLP-3010C, 4010C, 8010A/C, and TLP-12010A/C pulse generators to provide VF-TLP/TLP/HMM and HBM in a single test system. All modes are operated using the same software for efficient and fast transient waveform and data management as well as automatic probe station control for measurement of wafer statistics. The software provides also a JEDEC HBM verification test procedure including automated report generation in order to check the compliance of the HBM pulse unit with the normative standard Fig. 1, and Fig. 2(a) respectively, show the schematic diagram of the HBM-S1-B and its typical output pulse waveforms at 6 kV, short circuit and 500 Ω load. Fig. 2(b) shows the output signal on a longer time axis of 2 ms with no trailing pulses.

All functions for DUT current sense, DUT voltage sense and DC test are integrated. The current sensor is located at the high potential side of the pulse output in order to catch the total DUT current¹. The integrated hardware 50 Ω trigger output for high speed digital oscilloscopes ensures reliable triggering for all load (DUT) conditions. This is especially important for automatic waferlevel measurements.

Fig. 1 shows a typical 2-pin measurement setup, which can be configured for wafer-level as well as package level measurements. Also a Kelvin-setup can be applied in order to measure the DUT voltage accurately.

¹A current sensor located at the low potential side (GND-side) of the pulse output may miss potential substrate/chuck DUT currents.

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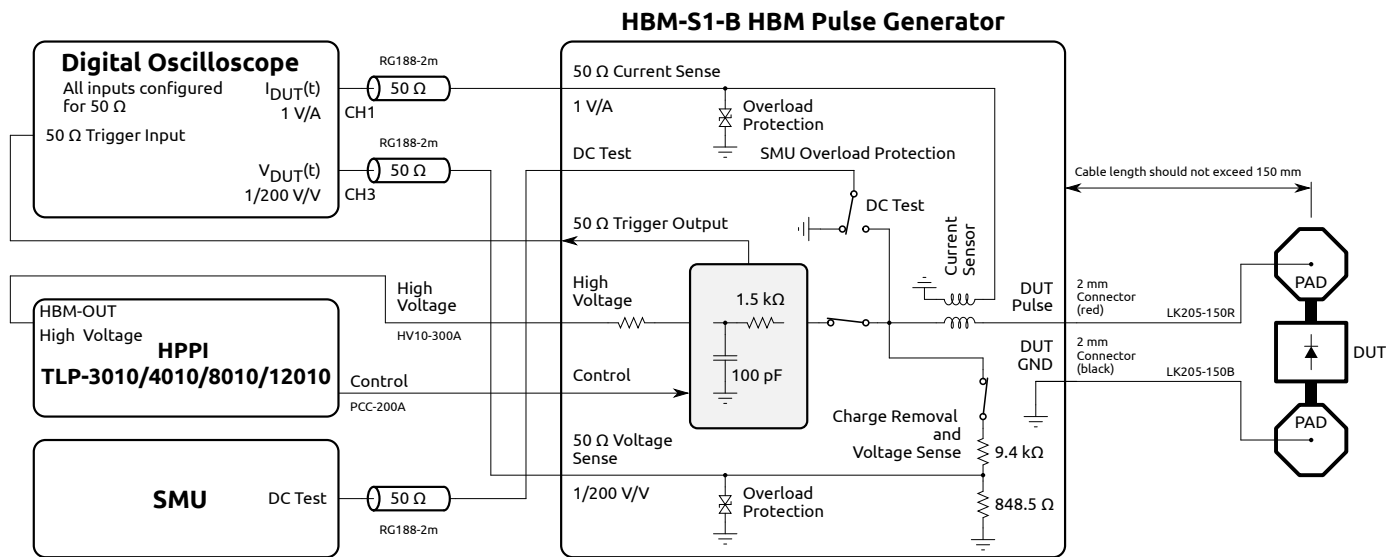


Figure 1: Typical HBM measurement setup using the HBM-S1-B.

3 Electrical Characteristics

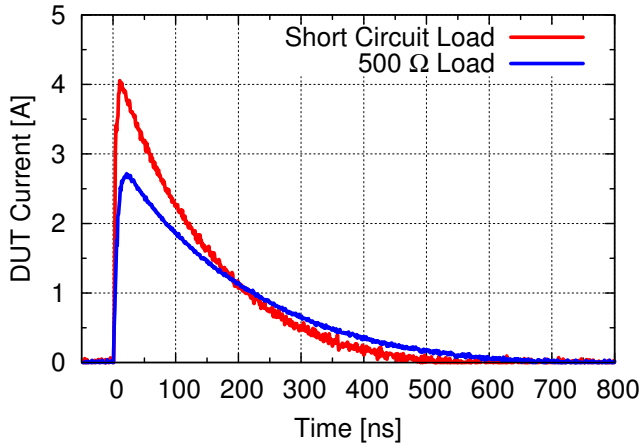
Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
Compliant to HBM standard	ANSI/ESDA/JEDEC JS-001 (C=100 pF, R=1.5 kΩ)					
Maximum HBM test voltage	$V_{HBM,max}$	-6.0		+6.0	kV	
Minimum HBM test voltage	$V_{HBM,min}$	-100		+100	V	at limited specifications
HBM test voltage step size	V_{Δ}		1		V	digital programmable
DUT voltage range	V_{DUT}	-1.2		+1.2	kV	open load condition
DUT current range	I_{DUT}	-4		+4	A	according to ±6 kV HBM
Charge removal resistance	R_{CR}		10		kΩ	Voltage sense output to be terminated with 50 Ω
Voltage sense output sensitivity	k_V		$\frac{1}{200}$		V/V	±10 % into a 50 Ω load
Maximum voltage sense output voltage	$V_{max,V}$	-8		+8	V	internally clamped by a bi-directional TVS diode
Current sense output sensitivity	k_I		1		V/A	±3 % into a 50 Ω load
Maximum current sense output voltage	$V_{max,I}$	-8		+8	V	internally clamped by a bi-directional TVS diode
Internal current sensor series load impedance	Z_{CS}		50		mΩ	current sense output to be terminated with 50 Ω
Trigger Output Voltage	V_{TR}		1		V _P	50 Ω
Pulse repetition frequency	f_p		1	5	Hz	state dependent, digital programmable.
Supply voltage	V_{DC}		12		V	DC (5-pin control connector)
Supply current	I_{DC}			0.5	A	DC (5-pin control connector)
Physical dimensions		145 x 82.5 x 44			mm ³	

Table 1: HBM-S1-B electrical characteristics

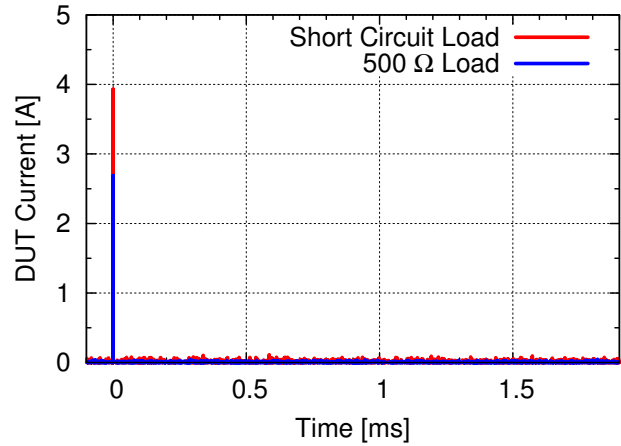
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3.1 Output Pulse Transient Waveforms



(a) Short circuit and 500 Ω output current at 6 kV.



(b) DUT current at 6 kV HBM. Long (2 ms) time axis shows no trailing pulses.

Figure 2: Typical DUT output current waveforms

4 Physical Dimensions

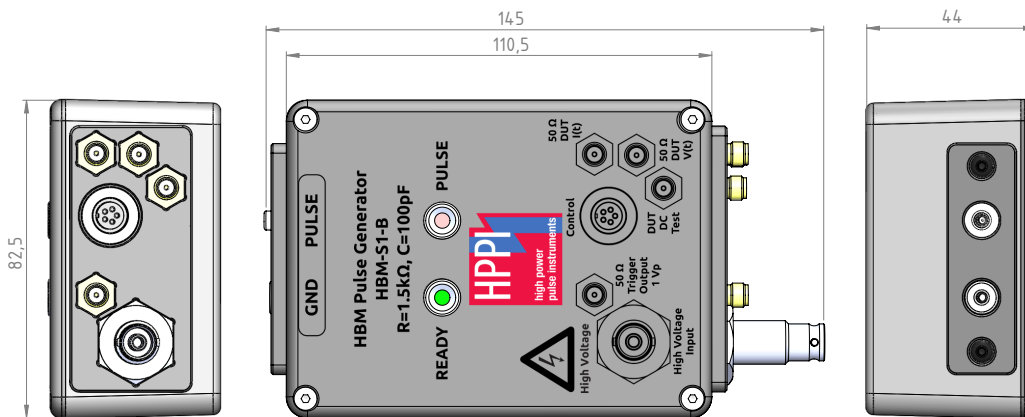


Figure 3: HBM-S1-B physical dimensions in [mm].

5 Ordering Information

Pos.	Description	Part No.
01	±6 kV ANSI/ESDA/JEDEC 2-Pin HBM Tester	HBM-S1-B

General

The product data contained in this data-sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application. Our products are solely intended to be commercially used internally and should not be sold to consumers. This data-sheet is describing the specifications of our products for which a warranty is being granted by HPPI GmbH. Any such warranty is granted exclusively pursuant the terms and conditions of the respective supply agreement. There will be no guarantee of any kind for the product and its specifications. For further information on technology, specific applications of our product, delivery terms, conditions and prices please contact HPPI:

High Power Pulse Instruments GmbH
 Stadlerstrasse 6A
 D-85540 Haar, Germany
 Phone : +49 (0)89 8780698 - 440
 Fax : +49 (0)89 8780698 - 444
 E-Mail : info@hppi.de

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