±6 kV Solid-State 2-Pin HBM Pulse Generator HBM-SST-10A

Advanced TLP/HMM/HBM Solutions

1 Features

- **Solid-State ±30 V to ±6 kV** Human-Body-Model (HBM) 2-pin tester according ANSI/ESDA/JEDEC JS-001 standard with C=100 pF, R=1.5 kΩ discharge network
- Optionally available upgrade for all HPPI TLP-xxx10A/C hardware systems and software (upgrade on request)
- **True HBM** – the classical discharge network of the HBM-SST-10A according the normative standard ensures compliant waveforms for all load conditions
- Switchable 10 kΩ 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 tester software
- Size 275 mm x 175 mm x 67 mm

2 Description

The HBM-SST-10A is a ±6 kV 2-pin HBM pulse module according ANSI/ESDA/JEDEC JS-001 standard with C=100 pF, R=1.5 kΩ discharge network, based on solid state GaN and MOS discharge switch technology in order to overcome all known disadvantages of classical relay-based HBM pulse units.

The HBM-SST-10A can be used as an optional extension (upgrade on request) for all HPPI TLP-xxx10A/C pulse generators to provide VF-TLP/TLP/HMM and HBM in a single test system. As an alternative a stand-alone HBM test system can be configured using the HV-CU10-A high voltage controller.

The HBM-SST-10A pulse module is controlled by USB using the standard HPPI tester software for efficient and fast transient waveform and data management as well as automatic probe station control for measurement of wafer statistics.

Fig. 1 show the application schematic diagram of the HBM-SST-10A, which can be configured for wafer-level as well as package-level measurements. Both measurement methods, 2-wire and 4-wire Kelvin-type, are possible.

All functions for DUT current sense, DUT voltage sense and DC test are integrated inside pulse module. An 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.

High Power Pulse Instruments GmbH
Internet: https://www.hppi.de/
E-mail: info@hppi.de

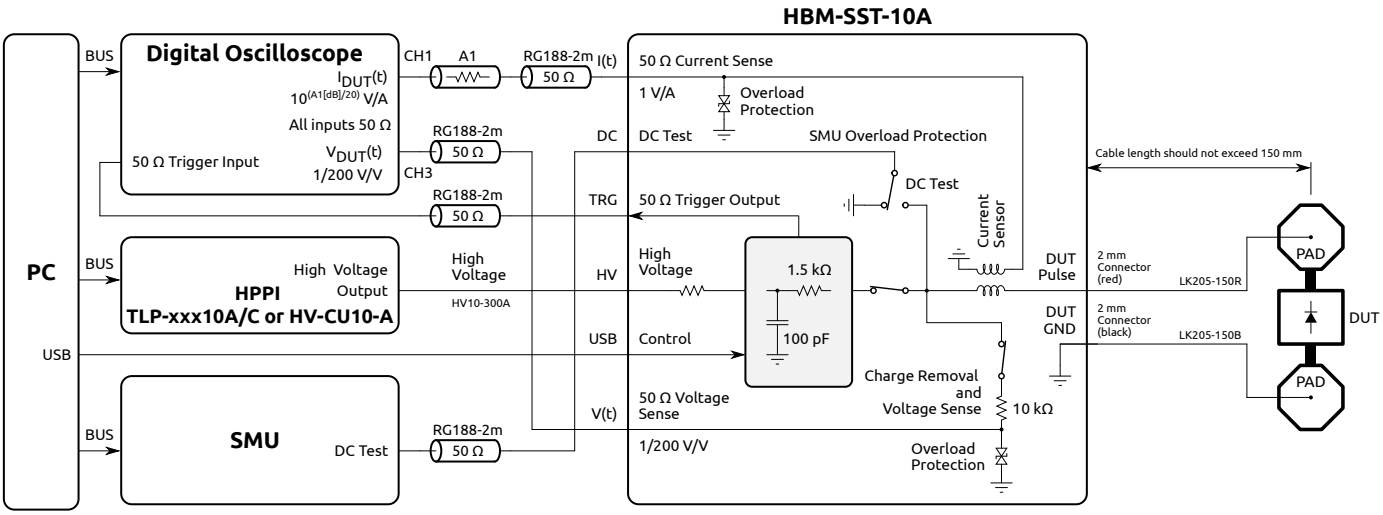

Figure 1: Typical HBM measurement setup using the HBM-SST-10A pulse generator

3 Specifications

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		+6	kV	
Minimum HBM test voltage	$V_{HBM,min}$	−30		+30	V	
HBM test voltage step size	V_{Δ}		1		V	digital programmable
DUT voltage range	V_{DUT}	−1.2		+1.2	kV	open load[1]
DUT current range	I_{DUT}	−4		+4	A	according to ±6 kV HBM
Charge removal resistance	R_{CR}		10		kΩ	±5 %, switchable, voltage sense output to be terminated with 50 Ω
Voltage sense output sensitivity	k_V		1/200		V/V	±10 %, voltage sense output to be terminated with 50 Ω
Maximum voltage sense output voltage	$V_{max,V}$	−10		+10	V	internally clamped by a bi-directional TVS diode
Current sense output sensitivity	k_I		1		V/A	±5 %, current sense output to be terminated with 50 Ω
Maximum current sense output voltage	$V_{max,I}$	−4		+4	V	according to ±6 kV HBM
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	to be terminated with 50 Ω
Pulse repetition frequency	f_p		2	5	Hz	state dependent, digital programmable.
Digital control interface	-	USB			-	Industrial isolated and EMI/ESD protected USB 2.0 interface
Supply voltage	V_{DC}		12		V	DC, external power adapter
Supply current	I_{DC}			2	A	DC, external power adapter
Physical dimensions		275 x 175 x 67			mm^3	

[1] the internal voltage sense oscilloscope overload protection starts clamping at 6 V onward which results in clipped voltage sensor readout at >1.2 kV DUT voltage.

Table 1: HBM-SST-10A specifications

3.1 Output Pulse Transient Waveforms

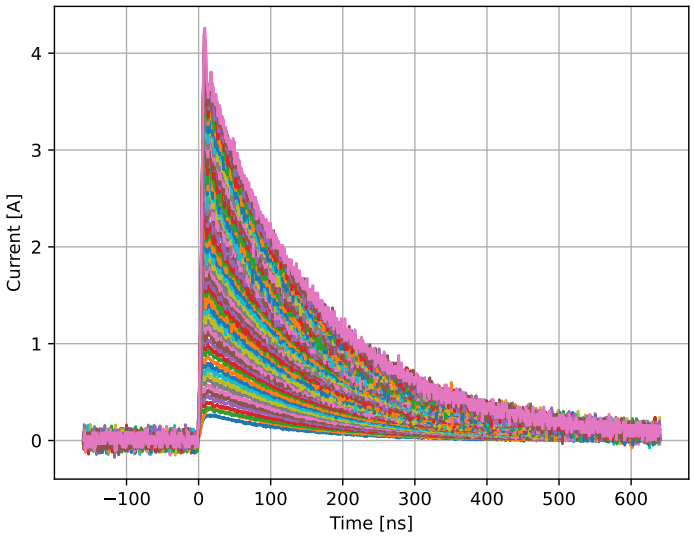

Figure 2: Measured 6 kV current sweep (short circuit)

4 Dimensions

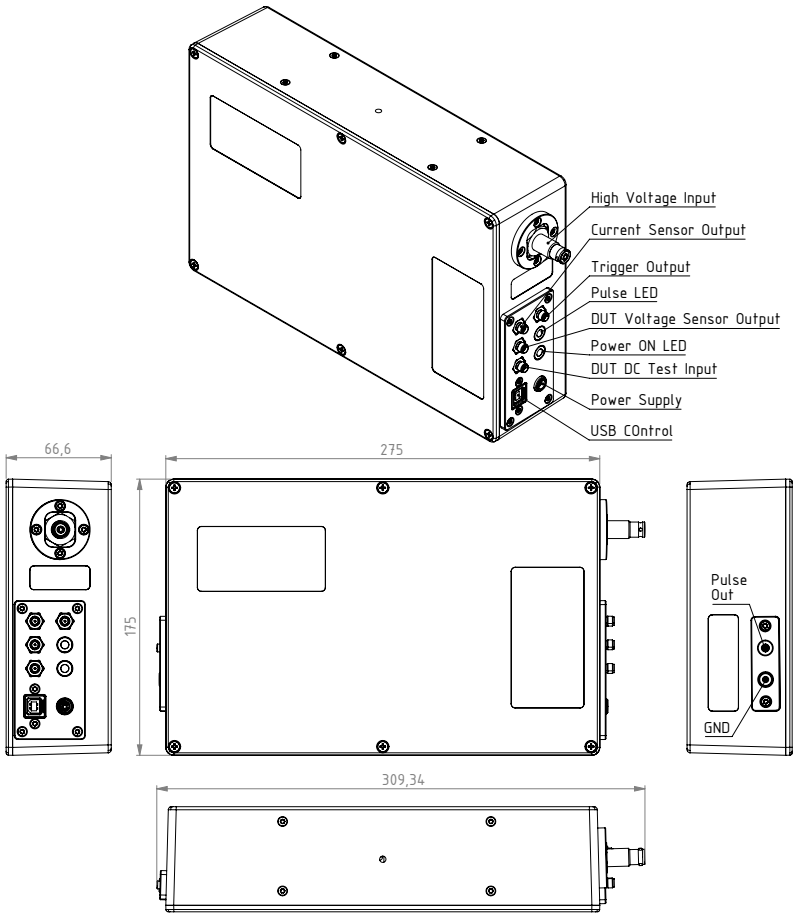

Figure 3: HBM-SST-10A physical dimensions in [mm].

4.1 Pulse Module Assembly Kit

Fig. 4 shows the HBM-SST-10A pulse module mounted on an optional assembly kit (example). To be customized according requirements.

Figure 4: AK-HBM-SST-10A assembly kit (optional)

5 Ordering Information

Pos.	Description	Part No.
01	±6 kV Solid-State 2-Pin HBM Pulse Generator, including: • mains power adapter • USB control cable • 4 pcs. RG188 SMA (m/m) cables, 2 m length • 150 mm DUT cables • 250 mm DUT cables • 6 dB attenuator	HBM-SST-10A
02	Assembly kit (optional), to be customized	AK-HBM-SST-10A

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

Due to technical requirements our products and/or their application may be harmful. For information please read carefully the manual or contact HPPI. Safety notes in the manual will inform you about possible risks that result from any foreseeable application of our products. Changes of this data-sheet are reserved.