

ES612 ESD Tester (HBM, HMM, MM)



1. Description

The model ES612 ESD Tester is a 2 Pin tester designed for the evaluation of devices at both wafer level and package level. The tester is designed to carry HBM, HMM and MM ESD standards. Determination of ESD failure thresholds is made easy using one of the external DC characterization measurement capabilities.

The pulse source design and pulse source delivery method ensure waveform performance directly at the device under test. Current waveforms can be automatically captured and analyzed for each ESD event. In addition, voltage waveforms can be captured and used to determine the turn-on level of protection circuit. They can also be used as a means of failure determination, as the DC characterizations show changes after ESD events.

2. Features

- Low Parasitic HBM/HMM/MM tester with high quality pulses
- Very configurable and expandable
- Friendly for probe station
- Large Touch Panel and Firmware Upgradable
- Optional Software Controlled Automated Pulse and Failure Measurement
- Optional Pulsed IV and DC IV Characterization

3. Applications

- General device level ESD test for wafer, packaged, PCB and system devices
- HBM module meets ANSI/ESDA/JEDEC JS-001-2017, MIL-STD-883 and MIL-STD-750
- HMM module meets ANSI/ESD SP5.6-2019, 50 Ohm Method
- MM module meets ANSI/ESD STM5.2-2019

4. Specifications

ES612 Controller Options

Parameters	ES612-2K	ES612-4K	ES612-6K	ES612-8K	ES612-12K	ES612-20K	Unit
Output voltage	± 10 ~ 2000	± 10 ~ 4000	± 10 ~ 6000	± 10 ~ 8000	± 10 ~ 12000	± 10 ~ 20000	V
Output voltage step	1V up to 500V, 10V up to 2 kV	1V up to 500V, 10V up to 4 kV	1V up to 500V, 10V up to 6 kV	1V up to 500V, 10V up to 8 kV	1V up to 500V, 10V up to 12 kV	1V up to 500V, 10V up to 20 kV	V, kV
Output voltage precision	Better than ± 1 % ± 5 V						%
Dimensions	347 X 300 X 145						mm
Weight	5	6	6	6	6	7	kg
V and I Measurement	Passive voltage and current probes						
Supported Oscilloscopes	Majority models from Keysight, Tektronix, LeCroy.						
Supported SMU	Keithley 24xx/26xx series SMU.						

**HBM External Human Body Model Module
(Per ANSI/ESDA/JEDEC JS-001-2017)**

Parameters	HBM-2K	HBM-4K	HBM-6K	HBM -8K	HBM -12K	HBM -20K	Unit
Output voltage	± 10 ~ 2000	± 10 ~ 4000	± 10 ~ 6000	± 10 ~ 8000	± 10 ~ 12000	± 10 ~ 20000	V
Discharge RC Value	C: 100 pF ± 10%, R: 1.5kΩ ± 1%						
Short Load Peak Current I_{ps}	0.67A ± 10 % per kV						ns
Short Load Rise Time Tr_s	2 < Tr _s < 10						ns
Short Load Decay Time T_{ds}	130 < T _{ds} < 170						ns
Short Load Ringing I_{rs}	< 15% of I _{ps}						
500 Ω Load Peak Current I_{pr}	I _{pr} /I _{ps} ≥ 63%						

500 Ω Load Rise Time Trr	$5 < T_{rr} < 25$	ns
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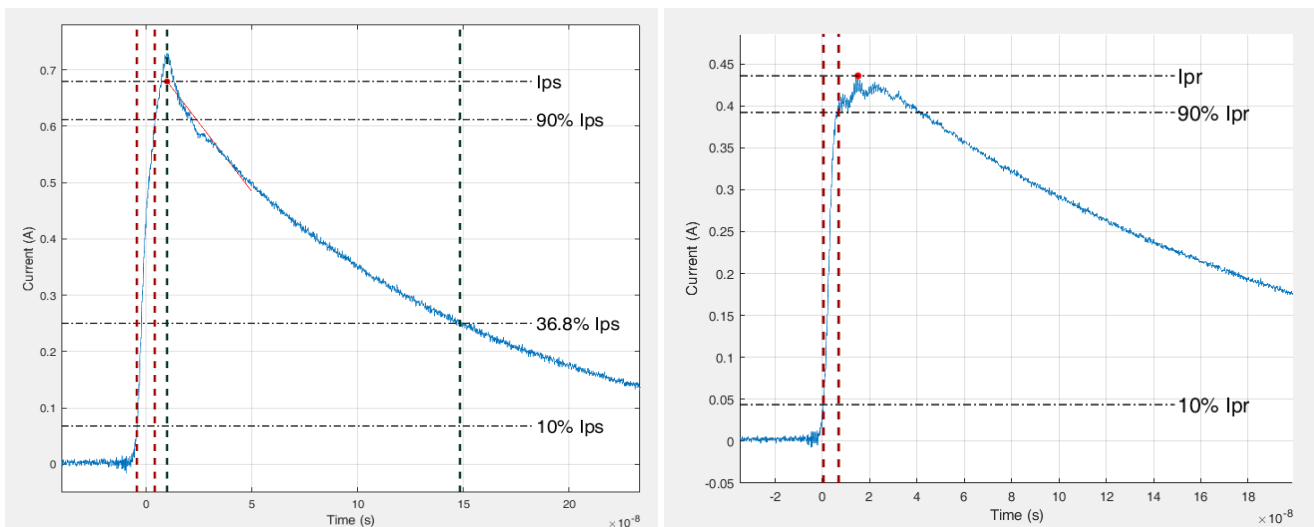
**HMM External Human Metal Model Module
(Per ANSI/ESD SP5.6-2019)**

Parameters	HMM-24K	Unit	Comments
HMM first peak current	90	A	3.75 A per 1 kV $\leq \pm 10\%$ IEC 61000-4-2 (R=330Ω, C=150pF)
HMM current @ 30 ns	48	A	$\leq \pm 10\%$ (better than $\pm 30\%$ IEC)
HMM current @ 60 ns	24	A	$\leq \pm 10\%$ (better than $\pm 30\%$ IEC)

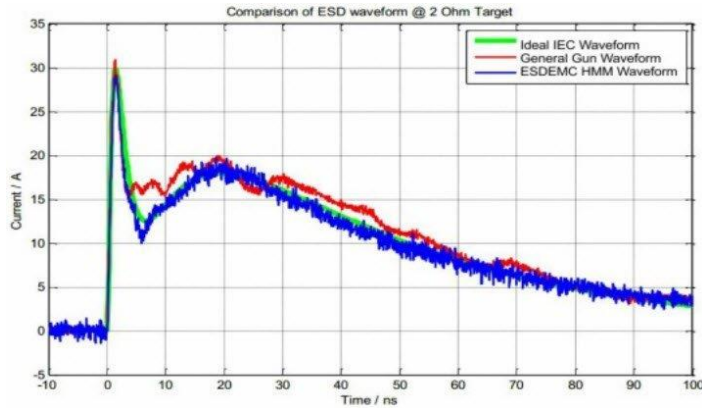
**MM External Machine Model Module
(Per ANSI/ESD STM5.2-2019)**

Parameters	MM-2K	Unit	Comments
Output Voltage	$\pm 10 \sim 2000$	V	
Discharge RC Value	C: 200 pF, R: 0 Ω		
Short Load Peak Current I_{p1}	$1.75 \pm 10\%$ per 100V	A	Tolerance may be different if socket is used
Short Load I_{p2}	$67\% \sim 90\%$ of I_{p1}	A	
Short Load Pulse Period t_{pm}	$66 < t_{pm} < 90$	ns	
500 Ω Load Peak Current I_{pr}	0.85 – 1.2	A	@400V condition per standard
500 Ω Load I_{100}	0.23 – 0.4	A	@400V condition per standard
500 Ω Load I_{200}	30 -50% of measured I_{100}	A	

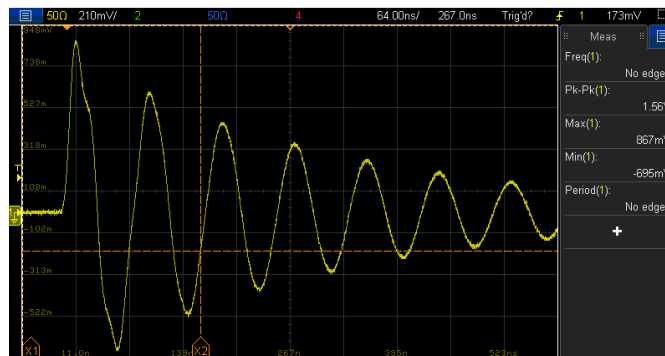
Typical HBM Waveform for +1000V short and 500Ω



Typical HMM Waveform



Typical MM Waveform



5. Ordering Information

Line	Part # or Option #	Description
ESD Tester		
1.1	ES612-2K	ES612 ESD Tester, Max 2kV, RS232 SCPI Supported
	ES612-4K	ES612 ESD Tester, Max 4kV, RS232 SCPI Supported
	ES612-6K	ES612 ESD Tester, Max 6kV, RS232 SCPI Supported
	ES612-8K	ES612 ESD Tester, Max 8kV, RS232 SCPI Supported
	ES612-12K	ES612 ESD Tester, Max 12kV, RS232 SCPI Supported
	ES612-20K	ES612 ESD Tester, Max 20kV, RS232 SCPI Supported
1.2	ES612-HBM-2	Human Body Model 2 Pin Module, 2kV
	ES612-HBM-4	Human Body Model 2 Pin Module, 4kV
	ES612-HBM-6	Human Body Model 2 Pin Module, 6kV
	ES612-HBM-8	Human Body Model 2 Pin Module, 8kV
	ES612-HBM-12	Human Body Model 2 Pin Module, 12kV

	ES612-HBM-20	Human Body Model 2 Pin Module, 20kV
1.3	ES612-HMM-8	Human Metal Model 2 Pin Module, 8kV equivalent HMM
	ES612-HMM-24	Human Metal Model 2 Pin Module, 24kV equivalent HMM
	ES612-HMM-36	Human Metal Model 2 Pin Module, 36kV equivalent HMM
1.4	ES612-MM-2	Machine Model 2 Pin Tester Module, 2kV
	ES612-MM-4	Machine Model 2 Pin Tester Module, 4kV
Accessories		
2.1	CT-002-T	Current Probe 1kHz to 2 GHz
2.2	ES62X-CMPS	Compact Manual Probe Station
2.3	XYZM	XYZ Micropositioner, XYZ travel 500 mils with 0.01mm per step
2.4	XYZM-HBM	HBM Probe Arm Assembly
2.5	XYZM-HMM	HMM Probe Arm Assembly (47.5R)
2.6	HBM-TC0.3	0.3 mm Pitch Test Clip for Packaged IC Probe
2.7	HBM-TC2.5	2.54 mm Pitch Test Clip for PCB Probing (default conf include 1 set)
2.8	XYZM-PP048	048 Pogopin for package level test (pack of 20)
2.9	XYZM-TN1	Tungsten Needles – 5 mils sharp tip, for wafer level test (pack of 10)
Third Party		
3.1	KSMU2400	SMU, 200V, 1A, 20W, Single Channel (For device DC automation failure check))
3.2	OSC-1G	1 GHz BW, 5Gs/S, 4Ch Oscilloscope