

ES612A ESD Tester (HBM, HMM, MM)



1. Description

The model ES612A 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 unit can be expanded with our automatic multi-pin device tester and be used as part of your device qualification process.

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 2-pin 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 static IV Characterization

3. Applications

- General device level ESD test for wafer, packaged, PCB and system devices
- HBM module meets ANSI/ESDA/JEDEC JS-001, MIL-STD-883, AEC-Q-101-001 and MIL-STD-750
- HMM module meets ANSI/ESD SP5.6, 50 Ohm Method
- MM module meets ANSI/ESD STM5.2

4. Specifications

ES612A Controller Options

Parameters	ES612A-2K	ES612A-4K	ES612A-6K	ES612A-8K	ES612A-12K	ES612A-20K	ES612A-30K	Unit
Output voltage	± 10 ~ 2k	± 10 ~ 4k	± 10 ~ 6k	± 10 ~ 8k	± 10 ~ 12k	± 10 ~ 20k	± 10 ~ 30k	V
Output voltage step	1V up to 500V, 10V up to max voltage							
Output voltage precision	Better than ± 1 % ± 5 V							%
Dimensions	347 X 300 X 145							mm
Weight	5	6	6	6	6	7	8	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.							

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

Parameters	HBM-2K	HBM-4K	HBM-6K	HBM -8K	HBM -12K	HBM -20K	HBM-30K	Unit
Output voltage	± 10 ~ 2k	± 10 ~ 4k	± 10 ~ 6k	± 10 ~ 8k	± 10 ~ 12k	± 10 ~ 20k	± 10 ~ 30k	V
Discharge RC Value	C: 100 pF ± 10%, R: 1.5kΩ ± 1%							
Short Load Peak Current Ips	0.67A ± 10 % per kV							ns
Short Load Rise Time Trs	2 < Trs < 10							ns
Short Load Decay Time Tds	130 < Tds < 170							ns
Short Load Ringing Irs	< 15% of Ips							
500 Ω Load Peak Current Ipr	Ipr/Ips ≥ 63%							
500 Ω Load Rise Time Trr	5 < Trr < 25							ns

External Human Metal Model (HMM) Module
(Per ANSI/ESD SP5.6)

Parameters	HMM-12K	HMM-24K	HMM-36K	Unit	Comments
HMM first peak current	45	90	135	A	3.75 A per 1 kV ≤ ± 10 % IEC 61000-4-2 (R=330Ω, C=150pF)
HMM current @ 30 ns	24	48	72	A	≤ ± 10 % (better than ±30% IEC)
HMM current @ 60 ns	12	24	36	A	≤ ± 10 % (better than ±30% IEC)

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

Parameters	MM-2K	MM-4K	Unit	Comments
Output Voltage	±10 ~ 2000	±10 ~ 4000	V	
Discharge RC Value	C: 200 pF, R: 0 Ω			
Short Load Peak Current I _{p1}	1.75±10% per 100V		A	Waveforms above 3kV will no longer exhibit linear increase. Tolerance may be different if socket is used
Short Load I _{p2}	67% ~ 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	

ES612-SIV1 Module
Tester Integrated Static IV Module

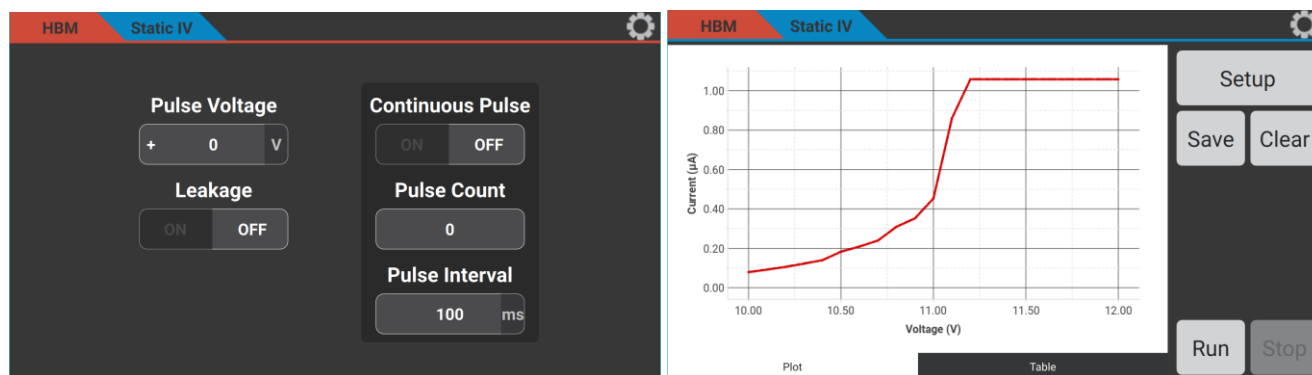
Parameters	ES612-SIV1	Unit	Comments
Source Voltage	0 ~ ±40	V	
Min Step Size	0.1	V	
Accuracy	±1%±50mV		Tolerance may be different
Max Source Current	100	mA	
Measured Current Accuracy	±1%±40nA		



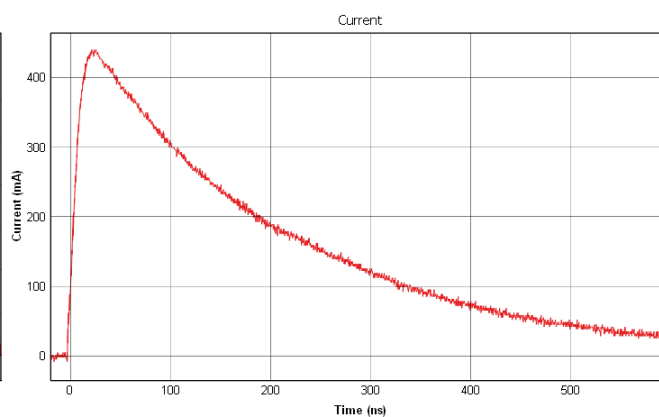
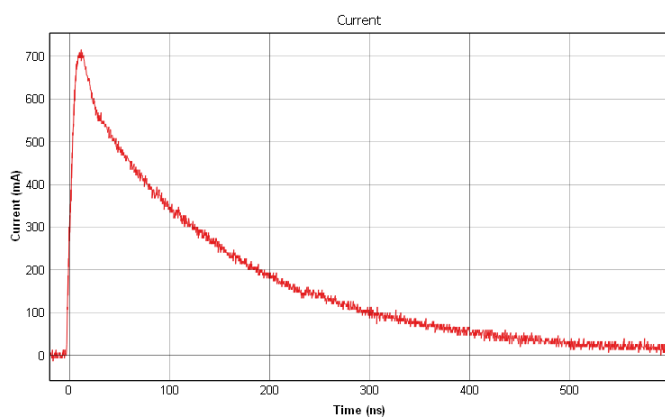
ES612A-HBM Module Front and Back View



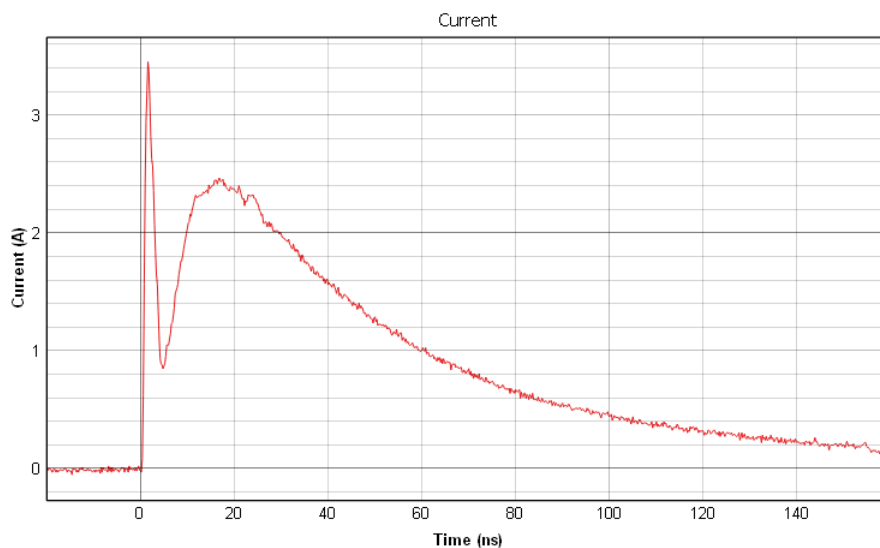
HBM-RE Series Multi-Pin Relay Expansion Module



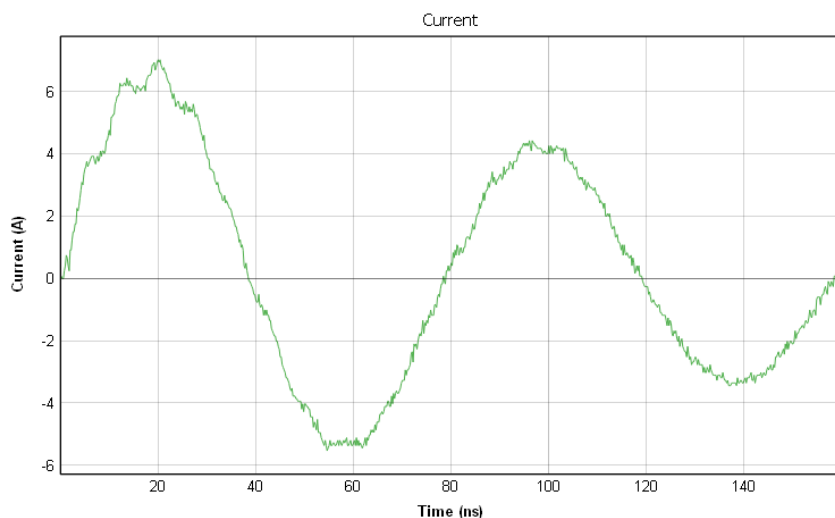
ES612A Touchscreen



Typical +1000V HBM Waveform @ short load (left) and 500 Ω load (right)



Typical +1000V HMM Waveform @ short load



Typical +400V MM Waveform @ short load

5. Ordering Information

Line	Part # or Option #	Description
ESD Tester		
1.1	ES612A-2K	ES612A ESD Tester, Max 2kV, USB Supported
	ES612A-4K	ES612A ESD Tester, Max 4kV, USB Supported
	ES612A-6K	ES612A ESD Tester, Max 6kV, USB Supported
	ES612A-8K	ES612A ESD Tester, Max 8kV, USB Supported
	ES612A-12K	ES612A ESD Tester, Max 12kV, USB Supported
	ES612A-20K	ES612A ESD Tester, Max 20kV, USB Supported
	ES612A-30K	ES612A ESD Tester, Max 30kV, USB Supported
1.2	ES612A-HBM-2	Human Body Model 2 Pin Module, 2kV
	ES612A-HBM-4	Human Body Model 2 Pin Module, 4kV
	ES612A-HBM-6	Human Body Model 2 Pin Module, 6kV
	ES612A-HBM-8	Human Body Model 2 Pin Module, 8kV
	ES612A-HBM-12	Human Body Model 2 Pin Module, 12kV
	ES612A-HBM-20	Human Body Model 2 Pin Module, 20kV
	ES612A-HBM-30	Human Body Model 2 Pin Module, 30kV
1.3	ES612A-HMM-12	Human Metal Model 2 Pin Module, 12kV Equivalent HMM
	ES612A-HMM-24	Human Metal Model 2 Pin Module, 24kV Equivalent HMM
	ES612A-HMM-36	Human Metal Model 2 Pin Module, 36kV Equivalent HMM
1.4	ES612A-MM-2	Machine Model 2 Pin Tester Module, 2kV
	ES612A-MM-4	Machine Model 2 Pin Tester Module, 4kV
1.5	ES612-SIV1	Tester Integrated Static IV Module (Allow DUT failure check without SMU or PC)
Accessories		
2.1	CT-T03-1p0	Current Probe 2kHz to 2 GHz, 1 V/A

2.2	HBM-BA1	HBM Board Level Test Accessories Set, Including Cables, Adapters, Calibration Kit and Current Probe
2.3	MM-BA1	MM Board Level Test Accessories Set, Including Cables, Adapters, Calibration Kit and Current Probe
2.4	ES612A-HBM-WA1	ES612A HBM or MM Wafer Level Test Accessories Set, Including Probe Arms, Needles, and Micro-positioners
2.5	ES612A-HMM-WA1	ES612A HMM Wafer Level Test Accessories Set, Including Probe Arms, Needles, and Micro-positioners
2.6	CMPS-200A	Compact Manual Probe Station
2.7	HBM-TC0.3	0.3 mm Pitch Test Clip for Packaged IC Probe
2.8	XYZM-PP048	048 Pogo-pin 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	KSMU2450	SMU, 200V, 1A, 20W, Single Channel (For device DC automation failure check))
3.2	MISC-OSC-1G	1 GHz Bandwidth, 5Gs/S, 4 Channel Oscilloscope
3.3	MISC-OSC-200M	200 MHz Bandwidth, 2Gsa/s, 4 Channel Oscilloscope
3.4	MISC-OSC-350M	350 MHz Bandwidth, 2Gsa/s, 4 Channel Oscilloscope
Automation Solution		
4.1	HBM-RE64X2	64 Pin Relay Expansion Module for HBM Automation
4.2	HBM-RE128X2	128 Pin Relay Expansion Module for HBM Automation
4.3	HBM-RE256X2	256 Pin Relay Expansion Module for HBM Automation (Obsoleted)
4.4	ES62X-PC-SW1	PC included Automation Software for 2-Pin, Pulse & SMU
4.5	ES62X-PC-SW2	PC included Automation Software for 2-Pin, Pulse, OSC & SMU
4.6	ES62X-PC-SW3	PC included Automation Software for Expansion Module 1 to 1 GND pin test, Pulse, OSC & SMU
4.7	ES62X-PC-SW4	PC included Automation Software for Expansion Module 1 to multi GND pins test, Pulse, OSC & SMU
4.8	ES650-150	Full Automation 2 Pin Low Parasitic Robotic Automation Solution (Unlimited Pin, no need of PCB, PC & full-automation software Included)