AMPLIFIER BOARD VA301PWA – Voltage Spike Measurement Test Report

From: Marco Ferretti

To: Adam Sidelsky

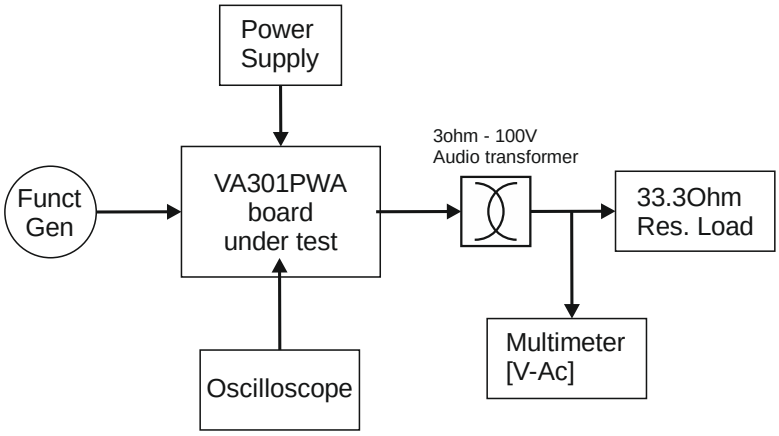
References:

- VA301PWA Schematics Rev. 4.00
- VA301PWA PCB Layout Rev. D
- SLES217D – Texas Instruments TAS5630B Datasheet Rev. March 2015
- SLEA025A – Tesas Instruments Application Note November 203

Test equipment:

- TTi CPX200 power supply
- LeCroy WaveJet 354 oscilloscope
- Agilent 33120A arbitrary function generator
- Agilent 34401A multimeter

Test setup:



Common settings for all measurements:

- Power supply voltage: Vdd = 54,0Vdc (50V nominal +8%)
- Function generator: 1.00Khz sine wave with amplitude set accordingly to have 100Vac on the multimeter for a full power condition (300W) and 0V for the no signal condition

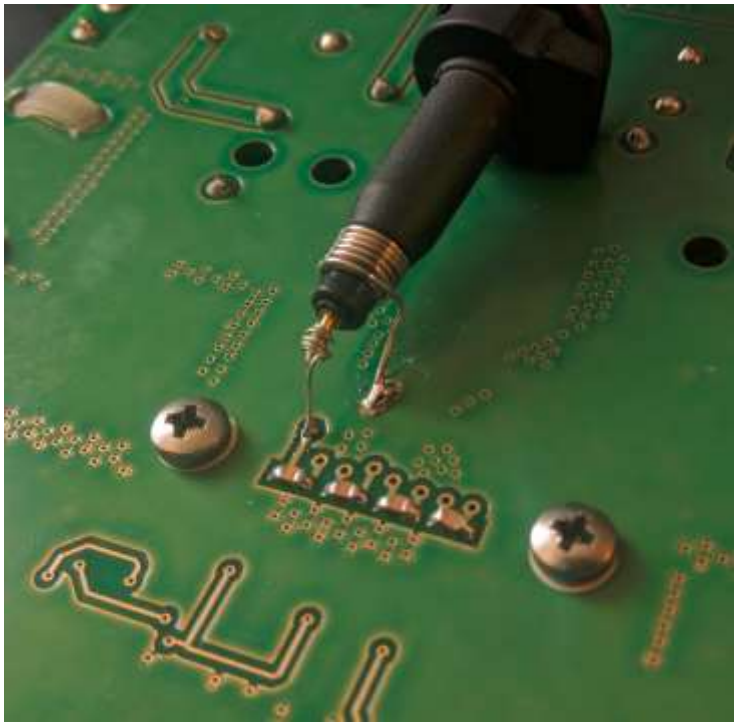
Test schedule and probing

This test report was performed accordingly to the Texas Instruments **SLEA025A** Appication Note. The purpose is to investigate if peak voltages on BSTx and OUTx pins of the **TAS5630B** overshoot the absolute maximum ratings causing a permanent failure of the device.

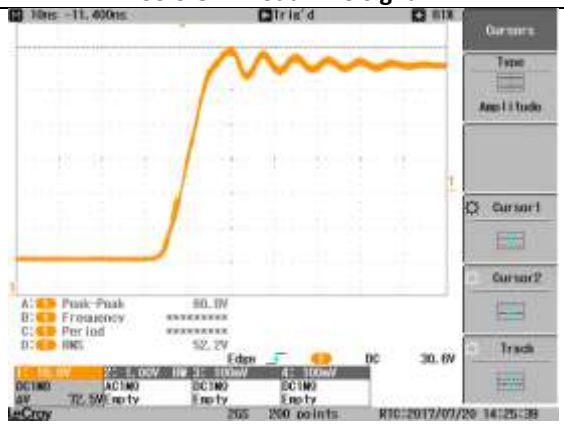
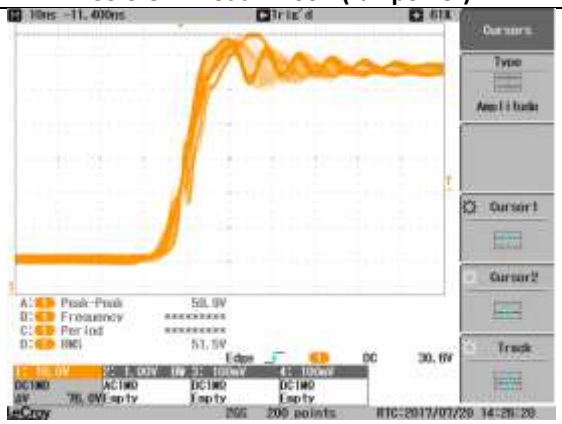
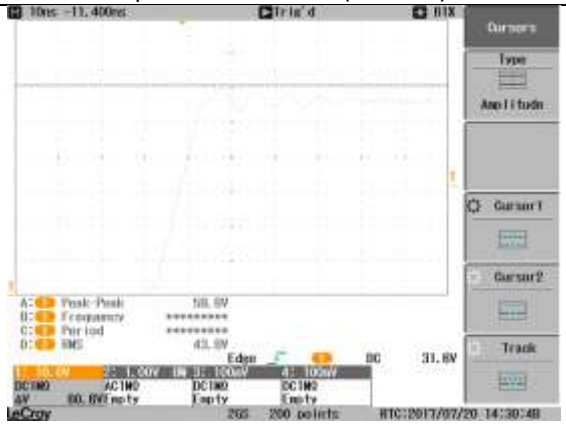
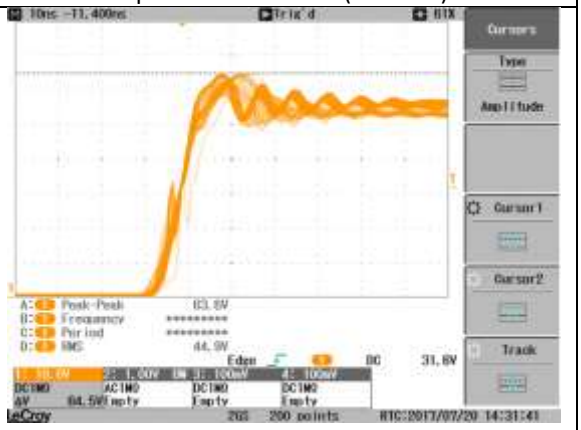
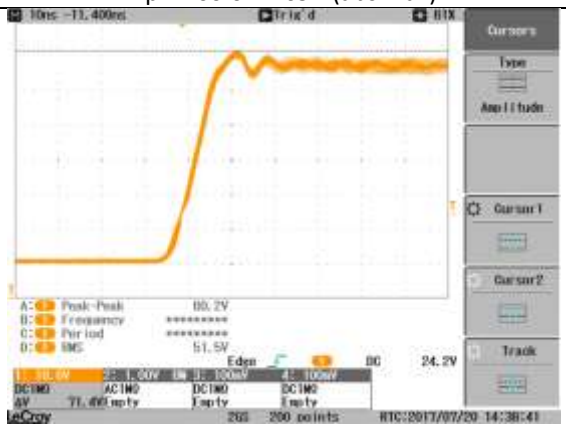
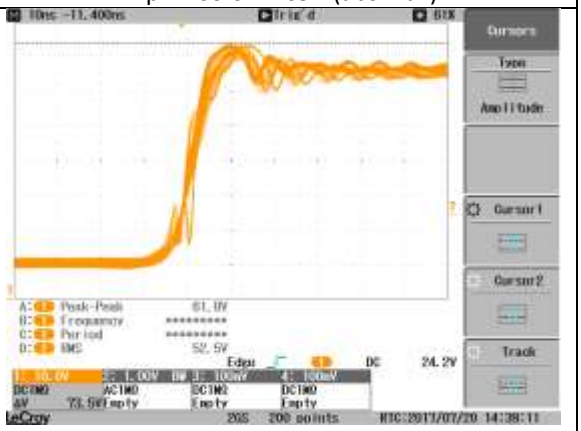
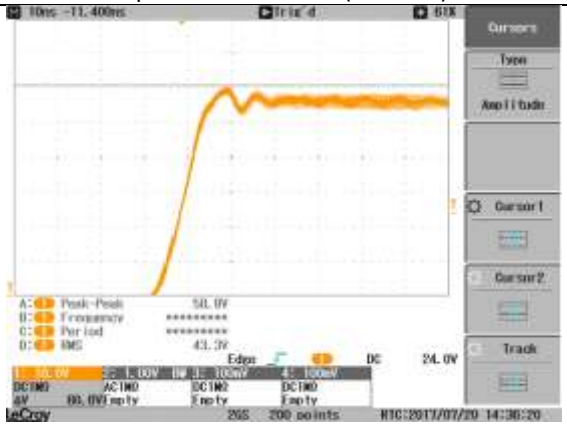
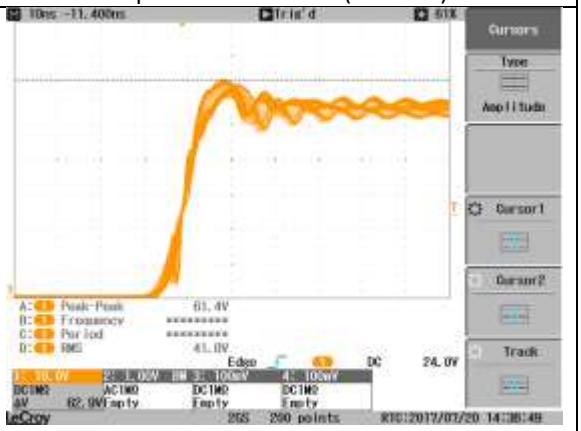
Additional purpose of the test is to compare the behavior of the hand made laboratory prototypes (not subject to device failure) and production specimens that do frequently fail.

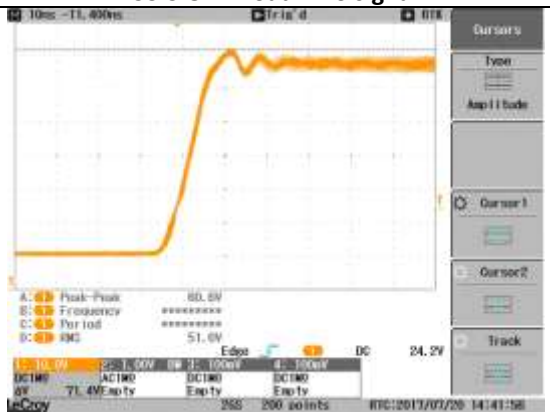
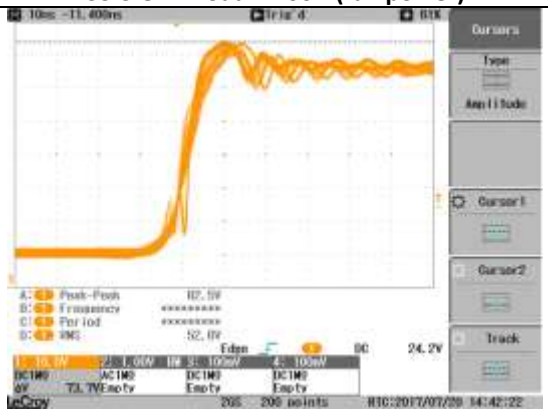
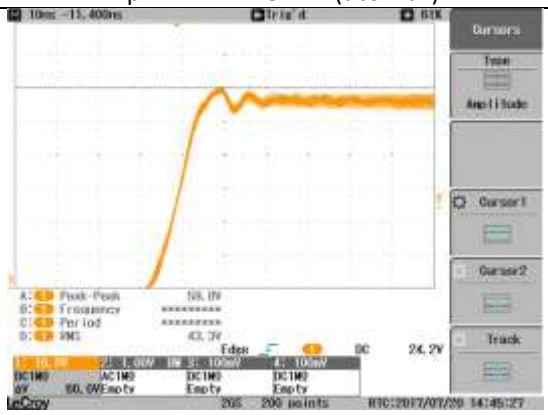
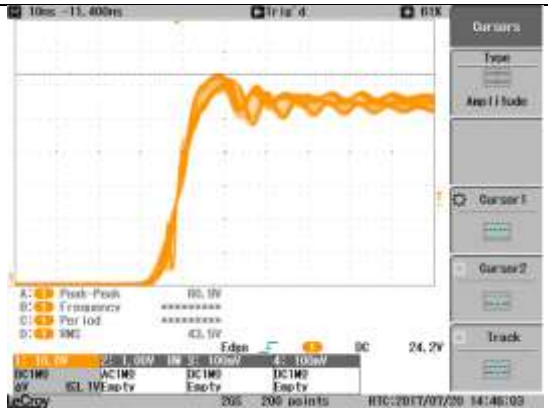
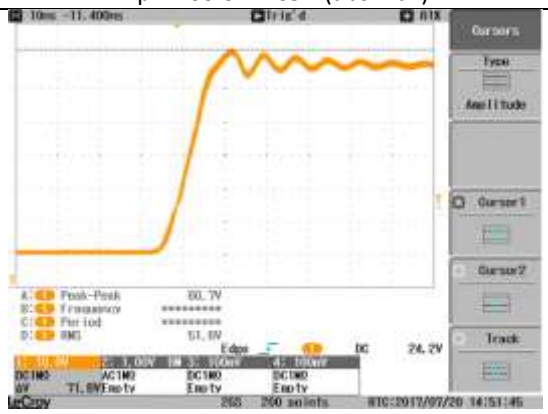
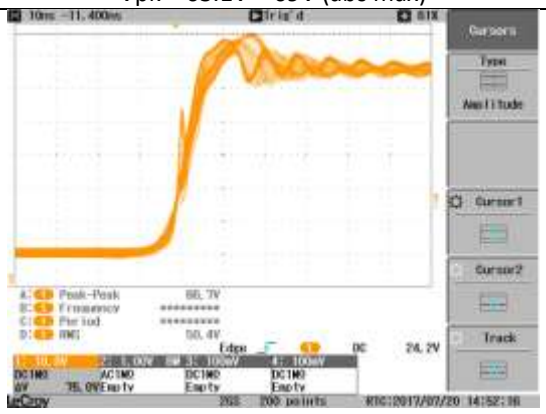
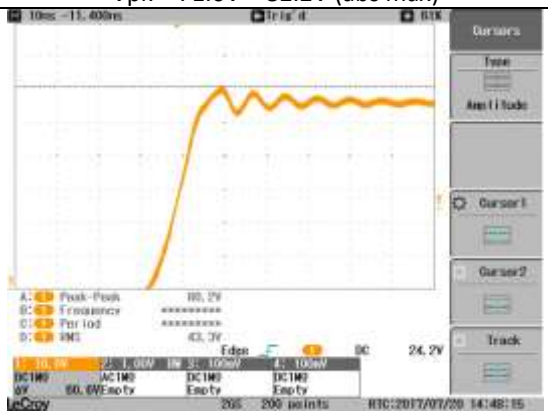
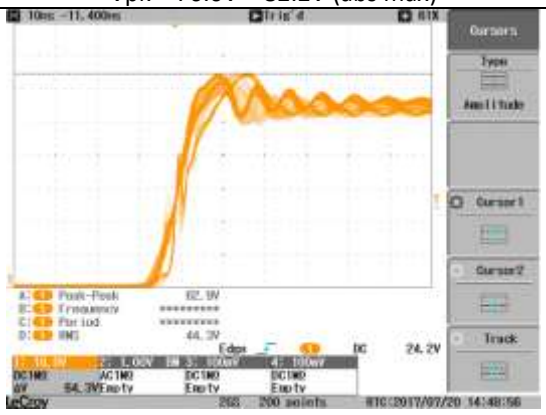
- SPECIMEN A – hand assembled and hand soldered prototype
- SPECIMEN B – mass production, pick&place assembled, reflow and wave soldered. This board has been hand repaired, TAS5630B and bootstrap caps were replaced.
- SPECIMEN C – mass production, pick&place assembled, reflow and wave soldered; as provided by manufacturer.

BSTx and OUTx pins were probed on the bottom side of the PCB, next to C21, C25, C27 and C29 bootstrap capacitors according to the indications given in the SLEA025A application note.



SPECIMEN A Test Results

	33.3 Ohm load – no signal	33.3 Ohm load – 100V (full power)
BST_A	 Vpk = 72.5V < 82.2V (abs max)	 Vpk = 76.0V < 82.2V (abs max)
OUT_A	 Vpk = 60.6V < 69V (abs max)	 Vpk = 60.6V < 69V (abs max)
BST_B	 Vpk = 71.4V < 82.2V (abs max)	 Vpk = 73.5V < 82.2V (abs max)
OUT_B	 Vpk = 60.6V < 69V (abs max)	 Vpk = 62.9V < 69V (abs max)

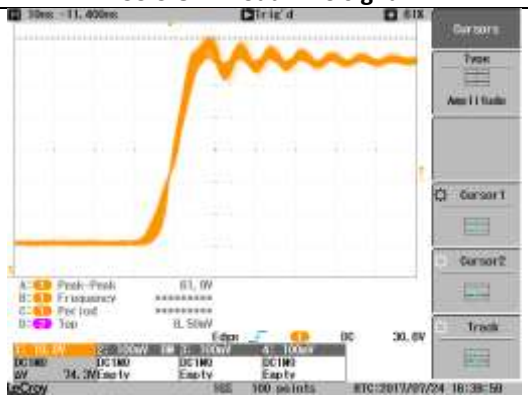
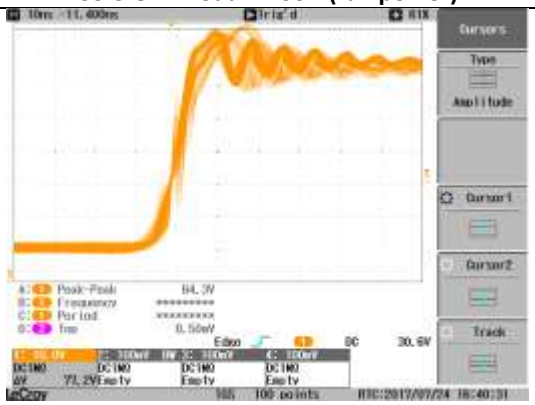
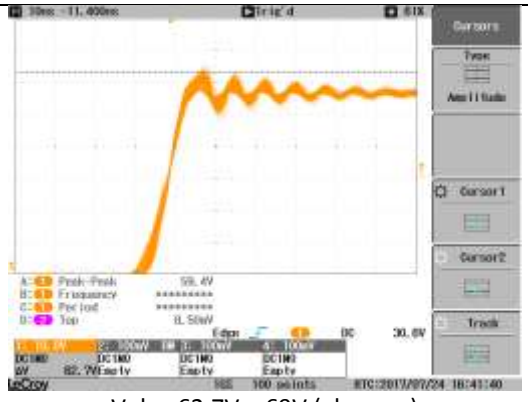
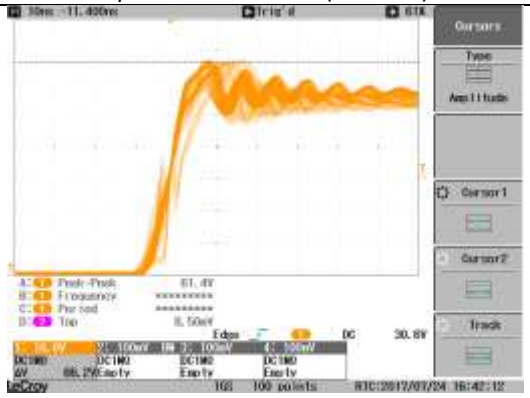
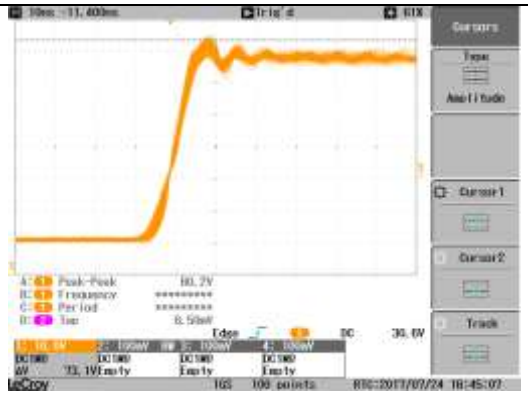
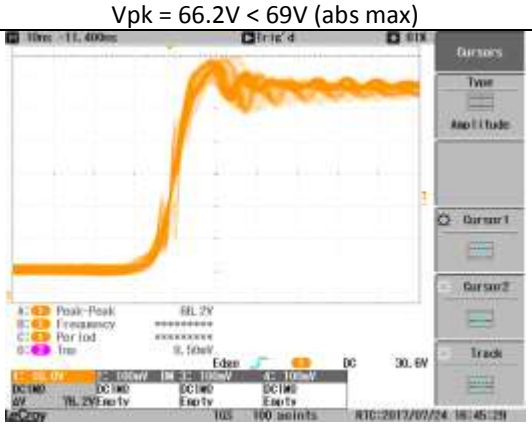
	33.3 Ohm load – no signal	33.3 Ohm load – 100V (full power)
BST_C	 Vpk = 71.4V < 82.2V (abs max)	 Vpk = 73.5V < 82.2V (abs max)
OUT_C	 Vpk = 60.0V < 69V (abs max)	 Vpk = 63.1V < 69V (abs max)
BST_D	 Vpk = 71.6V < 82.2V (abs max)	 Vpk = 76.0V < 82.2V (abs max)
OUT_D	 Vpk = 60.6V < 69V (abs max)	 Vpk = 62.9V < 69V (abs max)

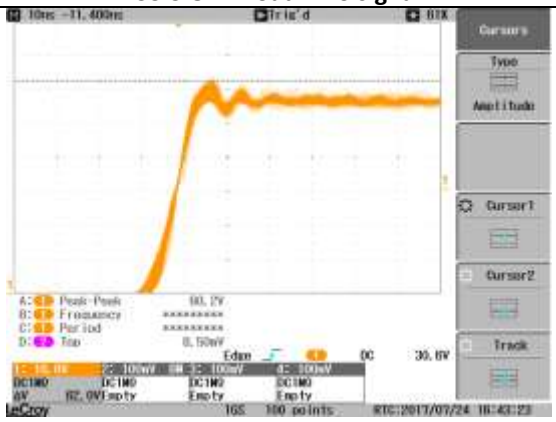
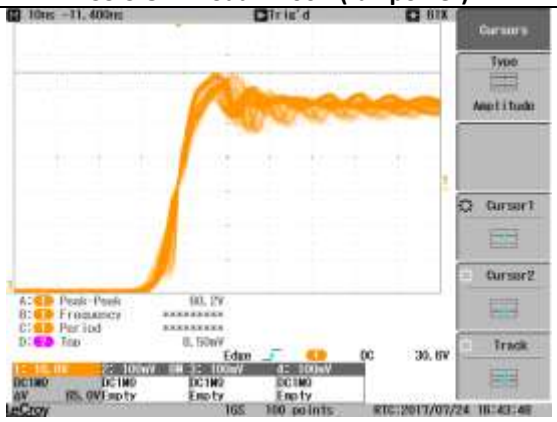
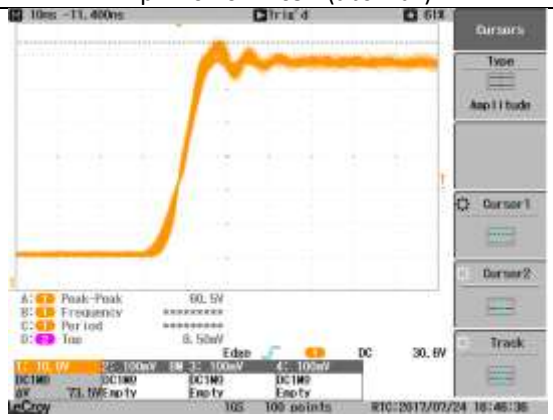
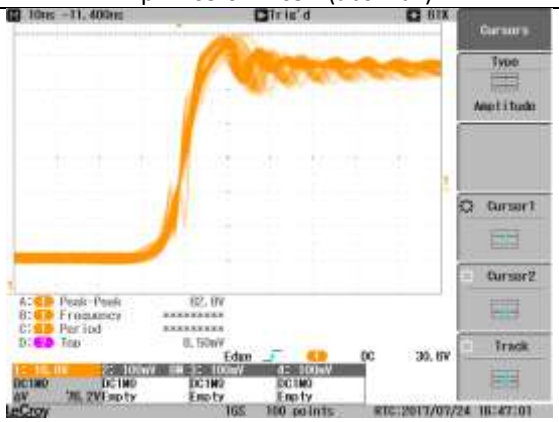
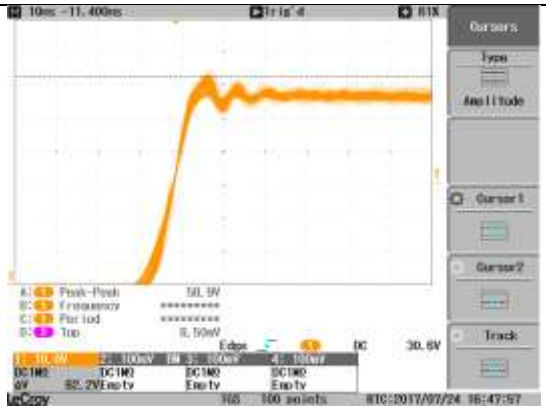
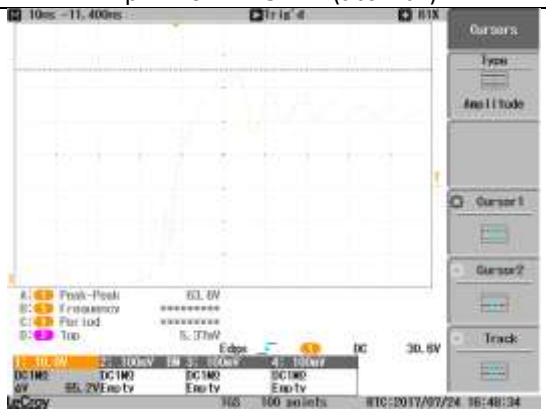
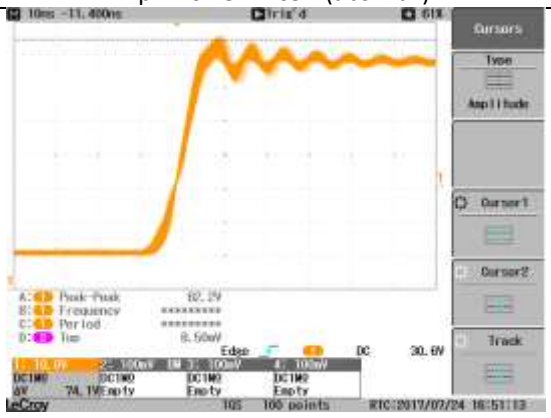
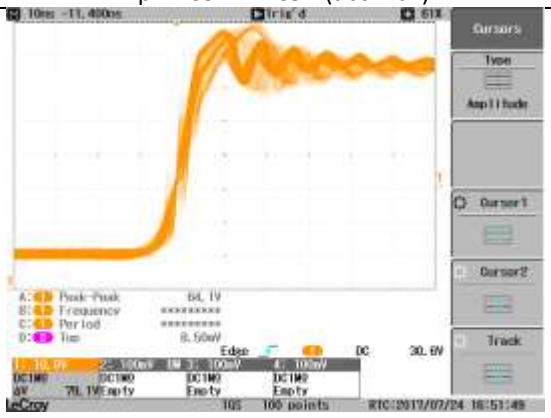
Comments to the measurements:

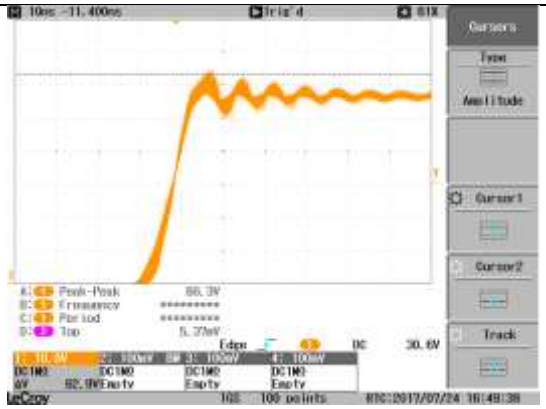
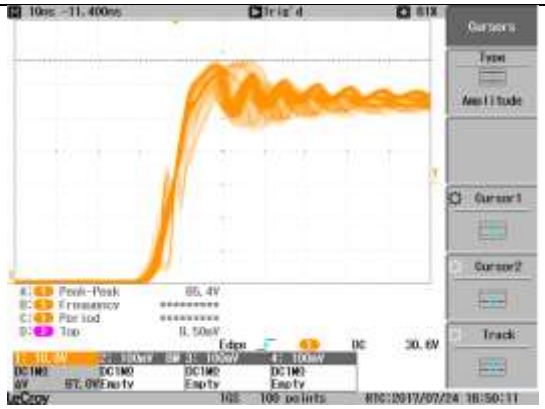
There is no evidence of peaks above the absolute maximum ratings for the TAS5630B. All measurements show there is at least a 5V of safety margin.

There is a non critic amount of ringing that is well damped in both no signal and full power conditions, proving there is no evident sign of parasitics that may degrade the system performance and reliability.

SPECIMEN B Test Results

	33.3 Ohm load – no signal	**33.3 Ohm load – 100V (full power)**
BST_A	 Vpk = 74.3V < 82.2V (abs max)	 Vpk = 77.2V < 82.2V (abs max)
OUT_A	 Vpk = 62.7V < 69V (abs max)	 Vpk = 66.2V < 69V (abs max)
BST_B	 Vpk = 73.2V < 82.2V (abs max)	 Vpk = 76.2V < 82.2V (abs max)

	33.3 Ohm load – no signal	33.3 Ohm load – 100V (full power)
OUT_B	 Vpk = 62.0V < 69V (abs max)	 Vpk = 65.0V < 69V (abs max)
BST_C	 Vpk = 73.5V < 82.2V (abs max)	 Vpk = 76.2V < 82.2V (abs max)
OUT_C	 Vpk = 62.3V < 69V (abs max)	 Vpk = 65.2V < 69V (abs max)
BST_D	 Vpk = 74.1V < 82.2V (abs max)	 Vpk = 79.3V < 82.2V (abs max)

OUT_D	 Vpk = 62.9V < 69V (abs max)	 Vpk = 67.0V < 69V (abs max)

Comments to the measurements:

There is no evidence of peaks above the absolute maximum ratings for the TAS5630B. All measurements show there is at least a 3V of safety margin.

There is a non critic amount of ringing that is well damped in both no signal and full power conditions, proving there is no evident sign of parasitics that may degrade the system performance and reliability.

If compared to Specimen A, specimen B shows slighlity higer peak values, rougly + 2.5V