April 6, 2005

PCN Number: 0502

Subject: ESD Voltage Sensitivity for RT54SX32S, RT54SX72S, RTSX32SU, and RTSX72SU FPGA Devices

Dear Valued Customer,

This PCN provides information for the RT54SX-S (RT54SX32S and RT54SX72S devices) and RTSX-SU (RTSX32SU and RTSX72SU devices) families with regard to the updated Electrostatic Discharge (ESD) Voltage Sensitivity Level.

Recent ESD tests conducted on RTSX32SU devices per MIL-STD-883, TM3015.7 showed the devices passed 75 V ESD only. The RT54SX-S and RTSX-SU families of devices share the same ESD design and equivalent wafer process technology; therefore, the ESD voltage sensitivity will be rated at 75 V for all aforementioned device families. Actel will be publishing an ESD Technical Brief with Handling Guidelines in June 2005.

The ESD classifications for these devices remain at Class 1 (from 0 volt to 1,999 V) per MIL-STD-883, TM3015.7. If you are following ESD handling requirements for Class 1 devices, you will not be affected. The intention of this PCN is to remind you of the importance of enforcing appropriate ESD handling requirements per Class 1 devices. Class 1 devices must be treated as though they could have 0 V ESD sensitivity.

Description

Due to incomplete reporting of the Power and Ground pin ESD results from past ESD tests on RTSX-SU devices, ESD testing was recently repeated on the RTSX32SU devices. Test results show ESD failures at 150 V; however, all tests passed at 75 V.

Failure analysis identified the same input cell transistor failed in each case. This failure occurs only when the positive tester terminal is connected to a GNDQ pin, and the negative tester terminal is connected to a V_{CCI} pin.

Damage to the identified transistor results in a stuck-at-1 failure, which can be detected by JTAG (IEEE 1149.1) boundary scan testing. If you are concerned with parts already integrated on boards, which may have been subjected to handling procedures inconsistent with the 0 V ESD handling requirement, Class 1 boundary scan testing can be used to verify the correct operation of each input cell.

There are four GNDQ pins per device, which are all shown as Ground pins in the datasheet. During the recent ESD testing, all ESD failures found were associated with these GNDQ pins during the GND-V_{CCI} testing. By removing the Ground pin group from the test population, the ESD sensitivity improves to >1000 V. Additional information in regard to the recent ESD testing is

attached as Appendix A with this PCN. Results from additional testing will be appended to this PCN when they become available.

The RT54SX-S and RTSX-SU families of devices share the same ESD design and equivalent wafer process technology; therefore, the ESD voltage sensitivity will be rated at 75 V for all device families listed in Table 1. The following list includes all device part numbers that are associated with this PCN and their equivalent SMD device part numbers.

Table 1: Part Number Reference Table

Device Family	Device Part Number	DSCC SMD Part Number
RT54SX32S	RT54SX32S-CQ256B	5962-0150801QXC
(5962-01508)	RT54SX32S-CQ208B	5962-0150801QYC
	RT54SX32S-1CQ256B	5962-0150802QXC
	RT54SX32S-1CQ208B	5962-0150802QYC
	RT54SX32S-CQ256E	5962-0150803QXC
	RT54SX32S-CQ208E	5962-0150803QYC
	RT54SX32S-1CQ256E	5962-0150804QXC
	RT54SX32S-1CQ208E	5962-0150804QYC
RT54SX72S	RT54SX72S-CQ256B	5962-0151501QXC
(5962-01515)	RT54SX72S-CQ208B	5962-0151501QYC
	RT54SX72S-1CQ256B	5962-0151502QXC
	RT54SX72S-1CQ208B	5962-0151502QYC
	RT54SX72S-CQ256E	5962-0151503QXC
	RT54SX72S-CQ208E	5962-0151503QYC
	RT54SX72S-1CQ256E	5962-0151504QXC
	RT54SX72S-1CQ208E	5962-0151504QYC
RTSX32SU	RTSX32SU-CQ256B	5962-0150805QXC
(5962-01508)	RTSX32SU-CQ208B	5962-0150805QYC

Actel Corporation
2061 Stierlin Court, Mountain View, CA 94043
Phone: 650.318.4200 Fax 650.318.4600

Table 1: Part Number Reference Table

Device Family	Device Part Number	DSCC SMD Part Number
	RTSX32SU-1CQ256B	5962-0150806QXC
	RTSX32SU-1CQ208B	5962-0150806QYC
	RTSX32SU-CQ256E	5962-0150807QXC
	RTSX32SU-CQ208E	5962-0150807QYC
	RTSX32SU-1CQ256E	5962-0150808QXC
	RTSX32SU-1CQ208E	5962-0150808QYC
RTSX72SU	RTSX72SU-CQ256B	5962-0151505QXC
(5962-01515)	RTSX72SU-CQ208B	5962-0151505QYC
	RTSX72SU-1CQ256B	5962-0151506QXC
	RTSX72SU-1CQ208B	5962-0151506QYC
	RTSX72SU-CQ256E	5962-0151507QXC
	RTSX72SU-CQ208E	5962-0151507QYC
	RTSX72SU-1CQ256E	5962-0151508QXC
	RTSX72SU-1CQ208E	5962-0151508QYC

If you have additional questions, please contact the Actel hotline (1-800-262-1060) or your regional FAE for assistance.

Regards,

Actel Corporation

Actel Corporation
2061 Stierlin Court, Mountain View, CA 94043
Phone: 650.318.4200 Fax 650.318.4600