
SCT7650 Surface Capacitive Touch Sensor (with Flat Circuit Cable) Specification

3M Touch Systems

Surface Capacitive Technology

3M Touch Systems Standard Product

Production Status

Flat Touch Sensors

Finger Input

Approved By:



Dick Driscoll
3M Touch Systems
Quality Assurance

3M Touch Systems
501 Griffin Brook Park Drive
Methuen MA 01844
TEL: 978-659-9000
FAX: 978-659-9100

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1.0 Range of Application

This specification applies to all Production Status standard, flat, SCT7650 surface capacitive touch screens with a flex circuit cable and with or without “Light Control Film”.

The Viewing Area* is defined as the transparent region of the touch screen through which the display appears. Achievement of the listed specifications has been demonstrated in monitor integrations where the touch screen is mounted to the monitor frame such that the spacing between the touch screen and monitor screen does not vary due to compression / expansion from touch forces or temperature changes.

* Viewing Area – For actual viewing area dimensions refer to the appropriate marketing drawing.

2.0 Operational and Optical Characteristics

All 3M Touch Systems SCT7650 Surface Capacitive touch sensors have passed verification testing of the following specifications within the Viewing Area.

2.1 Operational Characteristics

Characteristic	Rating
Accuracy – Standard Operating Temperature Range (– 15°C to + 70°C)	
Accuracy – % True Position Accuracy* – (within the Precision Area – the center 94% of the X and Y viewing area dimensions)	Reported touch coordinates are accurate to 99.0% (or better) of true position (based on viewing area dimensions) when linearized and used in conjunction with 3M Touch Systems EX Series Touch Controllers.
Accuracy – Extended Low Operating Temperature Range (– 40°C to – 15°C)	
Accuracy – % True Position Accuracy* – (within the Precision Area – the center 94% of the X and Y viewing area dimensions)	Reported touch coordinates are accurate to 98.5% (or better) of true position (based on viewing area dimensions) when linearized and used in conjunction with 3M Touch Systems EX Series Touch Controllers.
Accuracy – Outside of the Precision Area	
Accuracy – % True Position Accuracy* – (within the Viewing Area; but outside of the Precision Area – the center 94% of the X and Y viewing area dimensions)	Reported touch coordinates are accurate to 97.0% (or better) of true position (based on viewing area dimensions) when linearized and used in conjunction with 3M Touch Systems EX Series Touch Controllers.
*	$\%TruePositionAccuracy = 100\% - \left[\frac{\sqrt{\Delta X^2 + \Delta Y^2}}{ActiveAreaDiagonal} * 100 \right]$
Input Method	Finger (pen available with qualified touch screen, attachments and electronics)
Contact Requirement	5.4 ms for finger input when integrated with an EX Controller.

Characteristic	Rating
Surface Hardness	<p>A Mohs' pick with a hardness rating of 7 or higher is required to induce a scratch which will cause a functional failure.</p> <p>Scratch tests conducted with a GARDCO Balanced Beam Scratch, Adhesion & Mar Tester (model PA-2197A) with a loop stylus demonstrated that greater than 10,500 gm of applied force was required to induce a functional failure. The stylus is made of 1/16 inch tool steel, heat treated to a hardness of Rockwell C 55 – 61. The loop stylus has an outside radius of 0.128 inches and is flash chrome plated with plating thickness of 0.0001 inches to 0.0003 inches. The surface finish of the loop stylus is 8 RMS.</p>

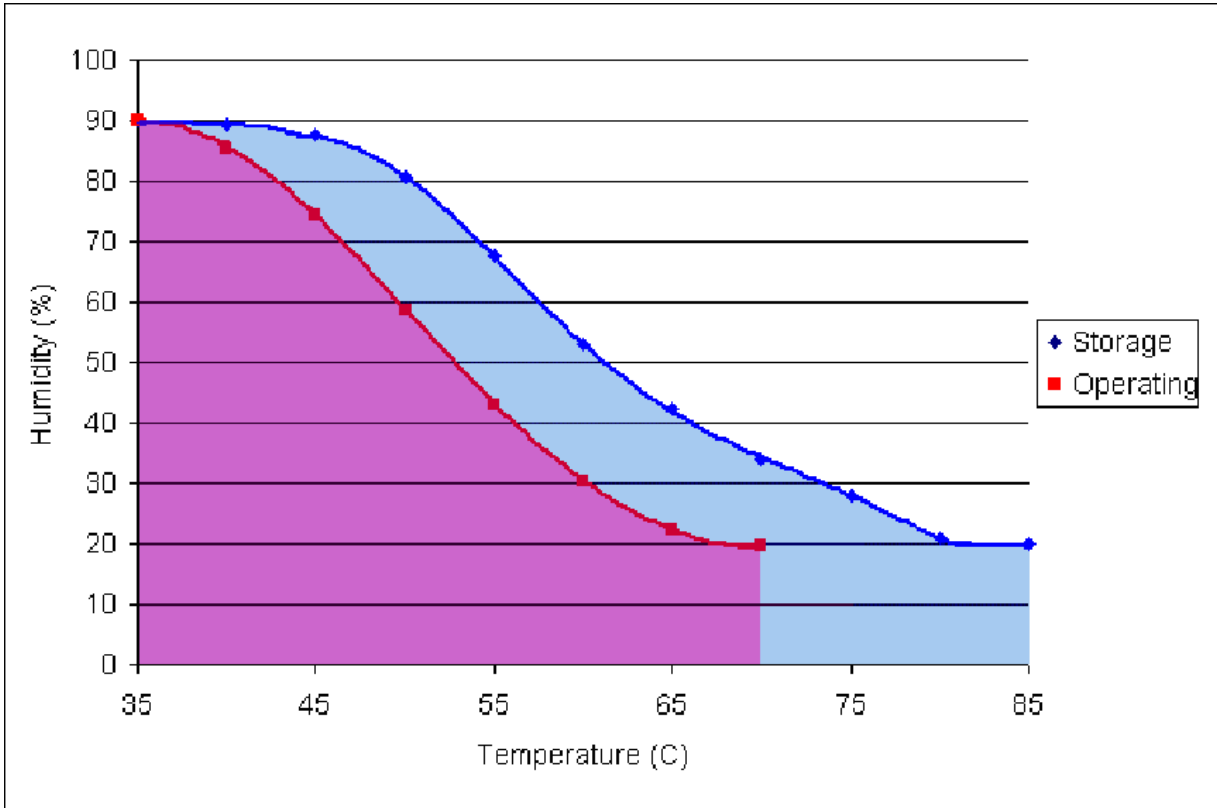
2.2 Optical Characteristics

Out-of-Box Optical Characteristics	SCT7650 (Non-Privacy Sensor) with AG500 Finish	SCT7650 (with 60° Viewing Angle Privacy Film and AG500 Finish)
% Transmission	86.5% ± 2%	65% Typical
Equipment Used: BYK Gardner Haze Gard Plus		

2.3 Operating Environmental Characteristics

Operating Temperature Range	<p>-40°C to +70°C</p> <p>Demonstrated in monitor integrations where the touch sensor is mounted to the monitor frame such that the spacing between the touch sensor and monitor screen does not vary due to compression / expansion from touch forces or temperature changes.</p>
Humidity Resistance	<p>Up to 90% RH from 0°C to +35°C; above +35°C see Figure 1 below.</p> <p>All relative humidity is non-condensing.</p>
Tested per MIL-STD 810F – Environmental Testing Procedures	

Figure 1: Storage and Operating Temperature and Humidity Conditions



3.0 Agency Approvals and Test Standards

3M Touch Systems SCT7650 surface Capacitive touch sensors have passed verification testing and comply with the following agency approvals and test standards within the viewing area.

Agency / Test Standard	Tests Passed
MIL-STD 810F – Environmental Testing Procedures	Humidity: Method 507.4 High temperature: Method 501.4 Low temperature: Method 502.4
ASTM D 1308-02 ^{e1} – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes (24 hour duration spot test); and ASTM F 1598-95 (Re-approved 2002) - Standard Test Method for Determining the Effects of Chemical/Solvent Exposure to a Membrane Switch/Graphic Overlay (Spot Test Method) - (24 hour duration)	5% ammonia, 6% hydrochloric acid, 70% nitric acid, 40% sulfuric acid, acetone, ball point pen, beer, brake fluid, coffee, Coca-Cola®, ethanol, gasoline, grease pencil, lipstick, Lysol®, methyl ethyl ketone, naphtha, rubber cement, stamping ink, tea, toluene, trichloroethylene, white vinegar, Windex® Original, xylene, isopropyl alcohol and water. Diluted chlorine bleach may be used as a sanitizer with free chlorine concentrations up to 1600 PPM (4 oz. per gallon of water) (118 ml per 3.78 liters of water).
Modified MIL-STD-675C - Severe Abrasion Test to functional failure.	Functionality unaffected by severe abrasion per MIL-C-675-C, exceeding number of specified cycles.

Agency / Test Standard	Tests Passed
IPC-2223 sectional design standards for electronics – 5.2.4.1	The touch screen flat cable (tail), tested as specified in ASTM 1683 – Standard Practice for Creasing or Bending Tail Assembly, complies with the IPC standard for an allowable crease. Per IPC-2223: “A crease, if required, shall be formed only one time. Once formed, it shall not be opened again.”
FCC part 15, Class B	Compliant when used in conjunction with a properly grounded EX touch controller.
CE Compliance	Compliant when used in conjunction with a properly grounded EX touch controller.
<ul style="list-style-type: none"> • IEC 61000-4-2 	± 27 kV air and ± 8 kV contact discharge to sensor when used in conjunction with a properly grounded EX touch controller.
<ul style="list-style-type: none"> • EN55022:1998 Class B – EC Emissions Standard 	Compliant when used in conjunction with a properly grounded EX touch controller.
<ul style="list-style-type: none"> • EN 55024:1998 Generic Immunity Standard 	Compliant when used in conjunction with a properly grounded EX touch controller.
UL 60950 / IEC 60950 / EN 60950	All SCT7650 touch sensors are compliant to the requirements of the UL 60950 / IEC 60950 / EN 60950 “Information technology equipment – Safety” standard.
UL , IEC & EN Impact Test (“Steel Ball Drop Test”)	SCT7650 touch sensors are compliant with the impact resistance mechanical strength requirements stated in Section 4.2.5 “Impact Test” of IEC 60950-1 First Edition 2001-10 and of UL 60950 Third Edition.
RoHS Directive	SCT7650 touch sensors are compliant* with the European Union 2002/95/EC Directive on Restriction of Hazardous Substances (RoHS).

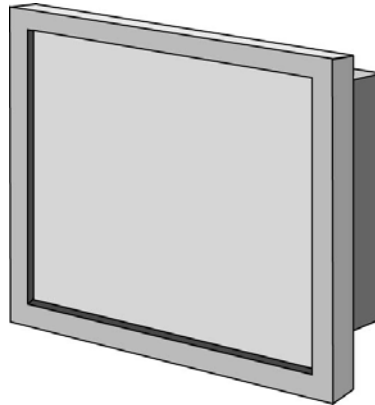
* * European Union RoHS Directive compliant means that the product or part does not contain any of the following substances in excess of the following maximum concentration values in any homogeneous material, unless the substance is in an application that is exempt under RoHS: (a) 0.1% (by weight) for lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers; or (b) 0.01% (by weight) for cadmium. Unless otherwise stated by 3M in writing, this information represents 3M's knowledge and belief based on information provided by third party suppliers to 3M.

4.0 Cosmetic Criteria

The cosmetic criteria listed in section 4.1 are “Out-of-Box” criteria and apply to the “viewing area” only. Upon delivery, all 3M Touch Systems SCT7650 surface capacitive touch sensors have passed final test and inspection and will meet the listed criteria.

4.1 SCT7650 Surface Capacitive Touch Sensors

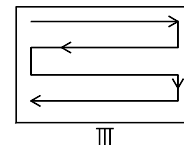
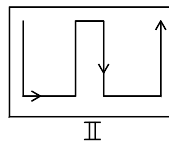
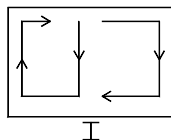
4.1.1 Inspection Technique



Materials required for visual inspection:

Capacitive Inspection Details

- Flat LCD in the “ON” position
 - Brightness (300 - 600 cd/m²)
 - Color Temperature (white)
 - 6500 Deg K x: 0.313+/-0.015 y: 0.319+/-0.015
 - 9300 Deg K x: 0.280+/-0.015 y: 0.290+/-0.015
- 0.06” (1.5 mm) Gap between touch sensor and display
- Operator Inspection Distance -18” (45 cm) from face of touch sensor
- Vertical Transmission Inspection
- Colors Program (provided by 3M) – red, green, blue and white
- Display Inspection one color program cycle time
- Measure all anomalies using template while the touch sensor is on the display and while running the “Colors” program
- Use one of the following patterns to aid the eye.



4.1.2 Viewing Area Anomalies

Upon delivery, SCT7650 surface capacitive touch sensors will have passed final inspection and will comply with the following out-of-box cosmetic criteria within the viewing area while the touch sensor is on the display and while running the “Colors” program.

- All diameters refer to the smallest circle that will totally contain the anomaly.
- A maximum of 5 anomalies within specification are allowed per touch sensor.
- Artifacts measuring less than 0.005 inches are not counted as anomalies.
- Use the Cosmetic Anomaly Overlay (p/n 27316) to measure visual anomalies while the touch sensor is on the display and while running the “Colors” program. The following is an illustration of the overlay – it is not necessarily to scale when printed. For copies of the overlay to use in inspecting touch sensors, please contact 3M Touch Systems.

All Measurements Are In Inches		
Opaque Anomaly	Circular	0.040
	Linear	0.125 X 0.010
Translucent Anomaly	Circular	0.070
	Linear	0.5 X 0.010

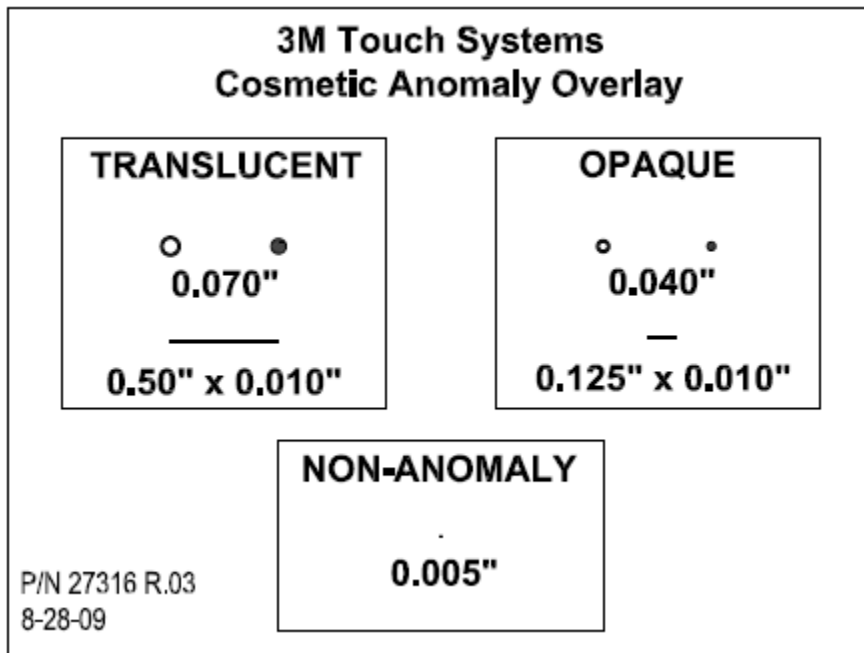


Figure 1

4.1.3 Border (Non-viewing Area) Characteristics

Any artifacts occurring in the border area of the SCT7650 surface capacitive touch sensor are not considered anomalies regardless of dimensions.

4.2 Label Nomenclature

Excluding the 3M Touch Systems Patent Label located on the top surface of the touch sensor, most identification labels are located on the cable. The two key labels are defined below:

Product Number Label

SCTnnnn XX-XXXX-XXX XX-XXXX-XXXX-X RXX XXX

- 1ST Line = Product Code, Glass Thickness, Surface Finish
- 2nd Line = Top Level Model Number (Ref. Marketing Drawing)
- 3rd Line = SKU Part Number (Ref. Marketing Drawing)
- 4th Line: RXX = Touch Sensor Revision Number
- 4th Line: XXX = Internal 3M Touch Systems Designator

14-Digit Serial Number Label

AAAAYMMDDSSSS

- A = The identification number of the machine used to perform linearity test
- Y = The year of manufacture (04=2004, 05=2005, etc.)
- M= The month of manufacture (01=January,..12=December)
- D = The day of the month on which the touch sensor was tested
- S = The sequence number for that touch sensor on that machine

5.0 Storage

Always store the touch sensor in its original shipping container between -50°C and 85°C (up to 90% RH from 0°C to +35°C; above +35°C see Figure 1). Never store touch sensors in an environment where condensation may form.

6.0 Handling and Assembly

This touch sensor contains glass and must be handled with care. Ensure that all work area surfaces are clean and free from small particles that could scratch the touch sensor surface. Dropping or bumping the touch sensor may break the glass. When handling a touch sensor, please follow these instructions fully.



CAUTION

To avoid the risk of glass breakage which may result in minor or moderate injury:

- Wear gloves.
- Handle the touch sensors with care to avoid breaking the glass. Be aware of cracked or broken touch sensors with sharp edges.
- If you need to remove the touch sensor for servicing, do not try to pry the touch sensor off the LCD panel. You may break the glass and injure yourself or others.

1. Never remove the touch sensor from its package by gripping and pulling the touch sensor cable. This may break the cable.
2. Handle the product with gloves to avoid leaving fingerprints or smudges. The transparency of the touch sensor is critical.
3. Once removed from the original package, touch sensors are not to be stacked. The edges may cause scratching.
4. Do not place heavy objects on the touch sensor.
5. Prevent assembly tools from coming into contact with the touch sensor. Whenever possible, use plastic tools.
6. Do not apply undue stress to the cable area (this is the most fragile section).
7. Blow any contaminants from the surface with a filtered de-ionized air source before cleaning with a soft, lint-free cloth dampened with isopropyl alcohol. Ensure that there are no contaminants in the cloth.
8. Prevent any liquids from coming into contact with the edges of the touch sensor.

7.0 Touch Sensor Integration

Complete information on SCT7650 surface capacitive touch sensor integration is available in the *3M™ MicroTouch™ System SCT7650EX Integration Guide* (3M Touch Systems document 36402).

8.0 Warranty Period

3M Touch Systems SCT7650 surface capacitive touch sensors are warranted to meet the specifications listed in section 2.0 “Operational Characteristics” of this Product Specification when used with 3M Touch Systems EX Touch Controllers. For the applicable warranty time period, please refer to the “Terms and Conditions” statements included in your purchase contract.

The cosmetic criteria listed in section 4.0 are “Out-of-Box” criteria. Upon delivery, all 3M Touch Systems SCT7650 surface capacitive touch sensors will meet the listed criteria. Please refer to the “Terms and Conditions” statements included in your purchase contract.