



LISTING NO.: DAI.0913

MET PROJECT NO.: SAF128

REPORT ISSUE DATE: FEBRUARY 1, 1993

NRTL LISTING REPORT

TOUCH MEMORIES MODELS DS1994,
DS1993, DS1992, DS1991, DS1990

FOR

DALLAS SEMICONDUCTOR
4401 S. BELTWOOD PKWY
DALLAS, TX 75244-3292

PREPARED BY:

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February 1, 1993

DALLAS SEMICONDUCTOR
4401 S. Beltwood Pkwy
Dallas, TX 75244-3292

Attention: Mr. Hal Kurkowski

Subject: Touch Memories Models DS1994, DS1993, DS1992,
DS1991, DS1990
MET Project No.: SAF128
Listing No.: DAL0913

Gentlemen:

We have completed our investigation of the Touch Memories Models DS1994, DS1993, DS1992, DS1991, and the DS1990 and that of your manufacturing facility and now find that the products are eligible for product Listing in accordance with this report.

The manufacturing facility will be subject to quarterly follow-up inspections to insure that the Listed products are identical to the representative samples evaluated at our Baltimore laboratory and at the manufacturing facility during the initial factory inspection.

Any and all changes proposed in the Listed products or in the manufacturer's quality control program must first be submitted to our office for evaluation to assure continued Listing status.

Thank you for giving MET the opportunity to perform this service for you. If you have any questions please do not hesitate to contact us.

Very truly yours,

MET LABORATORIES, INC.

Kenton R. McGinnis, Jr.
Project Engineer, Safety Testing

Michael J. Baldwin
Director, Safety Testing



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DALLAS SEMICONDUCTOR
FEBRUARY 1, 1993

PRODUCT COVERED:

Touch Memories

MODELS:

DS1994, DS1993, DS1992, DS1991, DS1990

ELECTRICAL RATINGS:

$V_{MAX} = 15 \text{ V}$ $L_1 = 18 \text{ } \mu\text{H}$
 $I_{MAX} = 10 \text{ mA}$ $C_1 = 0.2 \text{ nF}$

MANUFACTURED BY:

DALLAS SEMICONDUCTOR
4401 S. Beltwood Pkwy
Dallas, TX 75244-3292

PRODUCT DESCRIPTION:

The products covered by this report are designed to allow for storage and retrieval of information by touching the product's enclosure with a wand interface and computer approved under the entity concept and meeting the electrical ratings marked on the products. The products have been approved under the entity concept for use in CLASS I, DIVISION 1, GROUPS A, B, C, and D LOCATIONS.



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I. GENERAL

Tests and evaluations for an MET/NRTL Listing were performed to determine the products compliance with the applicable United States Safety Standard. A review of applicable standards resulted in the selection of the Underwriters Laboratory Standard for Safety # UL 913-Fourth Edition, Intrinsically Safe Apparatus And Associated Apparatus.

Parenthetical numbers following a subject heading within this report refer to the corresponding article number of the aforementioned standard.

The products covered by this report are designed to allow for storage and retrieval of information by touching the product's enclosure with a wand interface and computer approved under the entity concept and meeting the electrical ratings marked on the products. The products have been approved under the entity concept for use in CLASS I, DIVISION 1, GROUPS A, B, C, and D LOCATIONS.



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I. CONSTRUCTION (3.)

GENERAL PRODUCT DESCRIPTION

The enclosure of the Touch Memories is constructed of a stainless steel micro-can having the appearance of a lithium battery and approximate dimensions of the following:

DS1994,DS1993,DS1992,DS1991:	Height	-	0.230 inches
	Diameter	-	0.635 inches
DS1990	Height	-	0.115 inches
	Diameter	-	0.635 inches

The product's interior consists of a silicon die and an internal battery in some of the models. The DS1994, DS1993, DS1992, and the DS1991 contain 3-volt lithium batteries. However, the battery voltage is not accessible through the external surfaces of the Touch Memories.

CREEPAGE AND CLEARANCE DISTANCES (3.1)

Due to the size of the circuitry in the product, the circuit is considered to be a short-circuit. The product was evaluated for compliance to this section for the purpose of determining to what extent spark testing may be necessary. Test results and calculations indicated that the reduced spacings on the circuit boards did not increase the risk of ignition.

ENCAPSULATION (3.2)

Encapsulation is not employed.

FIELD WIRING CONNECTIONS (3.3)

Field wiring of the products is not required.

INTERNAL WIRING CONDUCTORS (3.4)

The product does not employ flexible conductors, only printed circuit board traces. All circuits and connections are located in the intrinsically safe circuits.

PROTECTIVE COMPONENTS (3.5)

None of the following components were employed by the product as protective components: transformers, damping windings, current-limiting resistors, blocking capacitor, shunt protective components, shunt diode barriers, optical isolators.



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MISCELLANEOUS COMPONENTS (3.6)

Derating of Components (3.6.1)

The products do not contain any discrete components other than the circuit die and the lithium batteries employed in the DS1994, DS1993, DS1992, and DS1991.

PORTABLE APPARATUS ENCLOSURES (3.7)

The product's enclosures are made of stainless steel so as to prevent the possibility of sparking.

CELLS AND BATTERIES (3.8)

Enclosure

The 3-volt lithium battery used in the products is enclosed in metal.

Prevention Of Shorting

The battery when installed in the battery holder is prevented from movement. The battery does not have sufficient energy to cause an ignition due to electrical energy or heating effects.

Mounting Of Energy Limiting Components

The products are not provided with energy-limiting components.

Permanence Of The Energy Limiting Components

The products are not provided with energy-limiting components.

Charging Terminals

The products are not provided with rechargeable batteries.



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III. MARKING (4.2)

Product, Manufacturer, and Permitted Use Markings

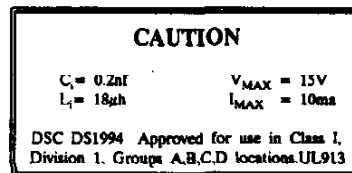
- (1) The products identify the manufacturer, model number, and an indication that the products have been tested to UL #913 or that the products are intrinsically safe.
- (2) The products are also marked with the following where associated with MET approval:

Approved For Use In A Class I, Division 1, GROUPS A,B,C,D Locations

- (3) The products refer the operator to the instruction manual for operating and additional safety instructions.

Battery Powered Apparatus

The product enclosures are sealed and do not allow for battery replacement.





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IV. COMPARISON PROCEDURE FOR DETERMINING SPARK IGNITION CAPABILITY (S.)

Where applicable, a theoretical analysis was performed under normal, one-fault, and two-fault operating conditions. Generally, any circuit, while operating normally or under one fault, with maximum current or voltage levels not greater than 80 percent of the appropriate ignition curve were considered intrinsically safe without spark ignition testing.

Under two-fault operating conditions any circuit with maximum current or voltage levels not greater than 90 percent of the appropriate ignition curve were considered intrinsically safe without spark ignition testing.

Circuits with operating parameters exceeding 90 percent of the appropriate ignition curve and circuits with either available current, open-circuit voltage, or a component value that did not readily match one of the ignition curves were spark ignition tested.

A safety factor was calculated for each analysis point and this was also used in determining circuits in need of testing. This was determined by dividing the ignition energy, current or voltage (from the appropriate ignition curve) by the calculated values.

A circuit with a safety factor greater than or equal to 1.5 for a circuit under normal and one fault conditions may be accepted without further testing. A circuit with a safety factor greater than 1.0 under two fault conditions may be accepted without further testing.



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V. PERFORMANCE TESTS (7.)

Protective Transformers Tests (7.1) - None employed.

Current Limiting Resistor (7.2) - None employed.

Shunt Diode Protective Barrier Tests (7.3) - Not employed.

Optical Isolator Tests (7.4) - Not employed.

Temperature Tests (7.5)

Tests were not performed to determine the maximum temperatures that could be generated by the battery since the worst case conditions were evaluated and tested under short-circuit conditions during the Maximum Temperature Test (4.1).

Small Component Ignition Test (7.6)

See the Temperature Tests comments of this report.

Dielectric Tests (7.7)

This test was not performed because of the types of failures that may occur were not deemed significantly more hazardous than those conditions simulated during spark testing.

Mechanical Tests (7.8)

Not Applicable, the product does not employ partitions.

Drop Test (7.9)

This test was not performed because the worst case failures of the product were considered to be those spark tested.

Dust-Tight Enclosure Test (7.10)

Not Applicable - The product is being approved for Class I Only.

Dust Blanketing Temperature Test (7.11)

Not Applicable - The product is having approved for Class I Only.

Lamp Breakage Test (7.12)

Not Applicable - No lamps are employed by the product.



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Encapsulation Tests (7.13)

Not Applicable - Encapsulation is not employed in the product.

Internal Capacitance or Inductance Test (7.14)

The internal capacitance and inductance of the Touch Memory models under investigation was measured over a wide range of frequencies. The maximum measured inductances and capacitances were doubled and the doubled value was used in marking the products.



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VI. SPARK IGNITION TESTS (8.)

No Spark Ignition testing was performed on the product since an engineering analysis and comparison to the Spark Ignition curves in the standard resulted in determining safe values for the products.



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VII. MANUFACTURER'S RESPONSIBILITIES

In addition to complying with the requirements of the listing agreement, the manufacturer is required to adhere to the following requirements as well:

1. Continue to manufacture the products listed in this report identically to those samples evaluated and tested, and in accordance with this report.
2. Continue to manufacture the products per the DALLAS SEMICONDUCTOR specification drawings. THE DALLAS SEMICONDUCTOR DRAWING LIST IS PROVIDED IN APPENDIX A.
3. Maintain a quality assurance program designed to insure the above and in accordance with any stipulations set forth during the initial factory inspection and any subsequent factory inspections.



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VIII. CONCLUSION

In our opinion, the DALLAS SEMICONDUCTOR products listed in this report, having been evaluated in accordance with the Standard for Safety # UL 913-Fourth Edition, Intrinsically Safe Apparatus and Associated Apparatus, are found to be acceptable for their intended use when installed and operated in accordance with the installation and operating instructions for these products.

Product Listing identification shall be in accordance with one of the following:

1. The MET provided listing label shall be affixed on the bottom outside surface of the telephone product base, within three inches of the product's nameplate.
2. The MET authorized listing mark shall be employed per the agreement for the use of this mark.



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IX. APPENDIX

A. COMPONENTS/DRAWING LIST

To the follow-up inspector:

1. See Component Data Sheets for complete component data information.
2. See the attached DALLAS SEMICONDUCTOR drawing list for other assembly details.

B. QUALITY CONTROL PROGRAM

To the follow-up inspector:

1. Refer to the Quality Assurance Manuals located with the project file.
2. Refer to the project follow-up manual for other details.

C. PHOTOGRAPHS



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APPENDIX A

COMPONENTS/DRAWING LIST:

The following is a list of the approved drawings and revision:

DRAWING TITLE	DRAWING #	REVISION
DS-1990		
PRODUCT REVISION	90-19900-R30	C2
ANODE CUP	87-61989-002	A1
CATHODE CAN	87-61989-001	A1
DS-1991		
PRODUCT REVISION	90-1991S-R30	C2
ANODE CUP	87-61989-002	B
CATHODE CAN	87-61989-001	B
BATTERY (RAYOVAC LITHIUM BR1225)	87-01225-000	*
DS-1992		
PRODUCT REVISION	90-1992L-F50	B5
ANODE CUP	87-61994-002	B
CATHODE CAN	87-61994-002	B
BATTERY (RAYOVAC LITHIUM BR1225)	87-01225-000	*
DS-1993		
PRODUCT REVISION	90-1993L-F50	B5
ANODE CUP	87-61994-002	B
CATHODE CAN	87-61994-001	B
BATTERY (RAYOVAC LITHIUM BR1225)	87-01225-000	*
DS-1994		
PRODUCT REVISION	90-1994L-F50	B5
ANODE CUP	87-61994-002	B
CATHODE CAN	87-61994-001	B
BATTERY (RAYOVAC LITHIUM BR1225)	87-01225-000	*



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APPENDIX B
QUALITY CONTROL PROGRAM

[On File at MET]



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APPENDIX C

PHOTOGRAPHS

[On File at MET]