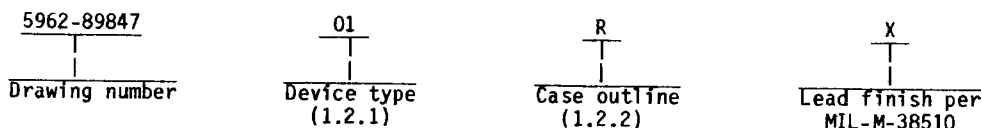


1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	54ACT241	Octal buffer/line driver with three-state outputs, TTL compatible inputs
02	54ACT11241	Octal buffer/line driver with three-state outputs, TTL compatible inputs

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
L	D-9 (24-lead, 1.280" x .310" x .200"), dual-in-line package
R	D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package
S	F-9 (20-lead, .540" x .300" x .100"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package
3	C-4 (28-terminal, .460" x .460" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range 1/	- - - - -	-0.5 V dc to +6.0 V dc
DC input voltage 1/	- - - - -	-0.5 V dc to $V_{CC} + 0.5$ V dc
DC output voltage 1/	- - - - -	-0.5 V dc to $V_{CC} + 0.5$ V dc
Clamp diode current	- - - - -	±20 mA
DC output current (per pin)	- - - - -	±50 mA
DC V_{CC} or GND current (per pin)	- - - - -	±100 mA
Storage temperature range	- - - - -	-65°C to +150°C
Maximum power dissipation, (P_D)	- - - - -	500 mW
Lead temperature (soldering, 10 seconds)	- - - - -	+300°C
Thermal resistance, junction-to-case (θ_{JC})	- - - - -	See MIL-M-38510, appendix C
Junction temperature (T_J) 2/	- - - - -	+175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	- - - - -	+4.5 V dc to +5.5 V dc
Input voltage range	- - - - -	0.0 V dc to V_{CC}
Output voltage range	- - - - -	0.0 V dc to V_{CC}
Case operating temperature range (T_C)	- - - - -	-55°C to +125°C
Input rise or fall times:		
$V_{CC} = 4.5$ V, 5.5 V	- - - - -	8 ns/V

1/ Unless otherwise specified, all voltages are referenced to GND.

2/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions in accordance with method 5004 of MIL-STD-883.

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawing (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full case operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C < T _C < +125°C unless otherwise specified		Device type	Group A subgroups	Limits		Unit
						Min	Max	
High level output voltage	V _{OH}	V _{IN} = 2.0 V or 0.8 V I _{OH} = -50 μA <u>1/</u>	V _{CC} = 4.5 V	A11	1, 2, 3	4.4		V
			V _{CC} = 5.5 V			5.4		
		V _{IN} = 2.0 V or 0.8 V I _{OH} = -24 mA <u>1/</u>	V _{CC} = 4.5 V			3.7		
			V _{CC} = 5.5 V			4.7		
		V _{IN} = 2.0 V or 0.8 V I _{OH} = -50 mA <u>1/</u>	V _{CC} = 5.5 V			3.85		
Low level output voltage	V _{OL}	V _{IN} = 2.0 V or 0.8 V I _{OL} = 50 μA <u>1/</u>	V _{CC} = 4.5 V	A11	1, 2, 3		0.1	V
			V _{CC} = 5.5 V				0.1	
		V _{IN} = 2.0 V or 0.8 V I _{OL} = 24 mA <u>1/</u>	V _{CC} = 4.5 V				0.5	
			V _{CC} = 5.5 V				0.5	
		V _{IN} = 2.0 V or 0.8 V I _{OL} = 50 mA <u>1/</u>	V _{CC} = 5.5 V				1.65	
High level input voltage	V _{IH}	<u>2/</u>	V _{CC} = 4.5 V	A11	1, 2, 3	2.0		V
			V _{CC} = 5.5 V			2.0		
Low level input voltage	V _{IL}	<u>2/</u>	V _{CC} = 4.5 V	A11	1, 2, 3		0.8	V
			V _{CC} = 5.5 V				0.8	
Input leakage current	I _{IL}	V _{IN} = 0.0 V	V _{CC} = 5.5 V	A11	1, 2, 3		-1.0	μA
	I _{IH}	V _{IN} = 5.5 V					1.0	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _C < +125°C unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Maximum I _{CC} input current TTL inputs high	ΔI _{CC}	V _{CC} = 5.5 V, one input at 3.4 V, other inputs at GND or V _{CC}	A11	1, 2, 3		1.6	mA
Quiescent current	I _{CCH}	V _{IN} = V _{CC} or GND, V _{CC} = 5.5 V	A11	1, 2, 3		160	μA
	I _{CCL}					160	
	I _{CCZ}					160	
Off-state output leakage current	I _{OZH}	V _{IN} = 2.0 V or 0.8 V, V _{CC} = 5.5 V, V _{OUT} = V _{CC} or GND	A11	1, 2, 3		10.0	μA
	I _{OZL}					-10.0	
Input capacitance	C _{IN}	See 4.3.1c	A11	4		8.0	pF
Power dissipation capacitance	C _{PD}	See 4.3.1c 3/	A11	4		70	pF
Functional tests		Tested at V _{CC} = 4.5 V and repeated at V _{CC} = 5.5 V, see 4.3.1d	A11	7, 8			
Propagation delay time, A to Y	t _{PHL}	V _{CC} = 4.5 V, R _L = 500Ω, C _L = 50 pF, see figure 3 4/	01	9 10, 11	1.0 1.0	9.0 10.0	ns
			02	9 10, 11	1.5 1.5	8.5 9.5	
	t _{PLH}		01	9 10, 11	1.0 1.0	9.0 10.0	ns
			02	9 10, 11	1.5 1.5	9.0 10.7	

See footnotes at end of table.

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* U. S. GOVERNMENT PRINTING OFFICE: 1986-549-904

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _C < +125°C unless otherwise specified	Device type	Group A subgroups	Limits		Unit	
					Min	Max		
Output enable time, OE, OE to Y	tpZH	V _{CC} = 4.5 V, R _L = 500Ω, C _L = 50 pF, see figure 3 4/	01	9 10, 11	1.0 1.0	9.0 11.5	ns	
			02	9 10, 11	1.5 1.5	11.3 13.0		
	tpZL		01	9 10, 11	1.0 1.0	10.0 12.5	ns	
			02	9 10, 11	1.5 1.5	11.5 11.9		
Output disable time, OE, OE to Y	tpHZ		01	9 10, 11	1.0 1.0	10.5 12.5	ns	
			02	9 10, 11	1.5 1.5	10.6 11.4		
	tpLZ		01	9 10, 11	1.0 1.0	10.5 12.5	ns	
			02	9 10, 11	1.5 1.5	11.2 12.0		

1/ The V_{OH} and V_{OL} tests will be tested at V_{CC} = 4.5 V. V_{CC} = 5.5 V will be guaranteed, if not tested to the limits in table I. Limits shown apply to operation at V_{CC} = 5.0 V ± 0.5 V. Transmission driving tests are performed at V_{CC} = 5.5 V with a 2 ms duration maximum.

2/ The V_{IH} and V_{IL} tests are not required, and shall be used as forcing functions for the V_{OH} and V_{OL} tests.

3/ Power dissipation capacitance (C_{PD}), determines the dynamic power consumption, P_D = (C_{PD} + C_L) V_{CC}² f, and the dynamic current consumption (I_S) is, I_S = (C_{PD} + C_L) V_{CC} f.

4/ AC limits at V_{CC} = 5.5 V are equal to limits at V_{CC} = 4.5 V and guaranteed by testing at V_{CC} = 4.5 V. Minimum ac guaranteed for V_{CC} = 5.5 V by guardbanding V_{CC} = 4.5 V limits to 1.5 ns (minimum).

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3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 (C_{IN} and C_{PD} measurements) shall be measured only for the initial test and after process or design changes which may affect capacitance. Test all applicable pins on five devices with zero failures.

d. Subgroup 7 and 8 tests shall verify the truth table as specified in figure 2 herein.

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Device type	01		02	
Case outlines	R, S, and 2		L	3
Terminal number	Terminal symbol			
1	OE1	1Y1	NC	
2	1A1	2Y1	V _{CC}	
3	4Y2	3Y1	4A1	
4	2A1	4Y1	3A1	
5	3Y2	GND	2A1	
6	3A1	GND	1A1	
7	2Y2	GND	OE1	
8	4A1	GND	NC	
9	1Y2	1Y2	1Y1	
10	GND	2Y2	2Y1	
11	1A2	3Y2	3Y1	
12	4Y1	4Y2	4Y1	
13	2A2	OE2	GND	
14	3Y1	4A2	GND	
15	3A2	3A2	NC	
16	2Y1	2A2	GND	
17	4A2	1A2	GND	
18	1Y1	V _{CC}	1Y2	
19	OE2	V _{CC}	2Y2	
20	V _{CC}	4A1	3Y2	
21	---	3A1	4Y2	
22	---	2A1	NC	
23	---	1A1	OE2	
24	---	OE1	4A2	
25	---	---	3A2	
26	---	---	2A2	
27	---	---	1A2	
28	---	---	V _{CC}	

NC = No connection

FIGURE 1. Terminal connections.

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Device types 01 and 02

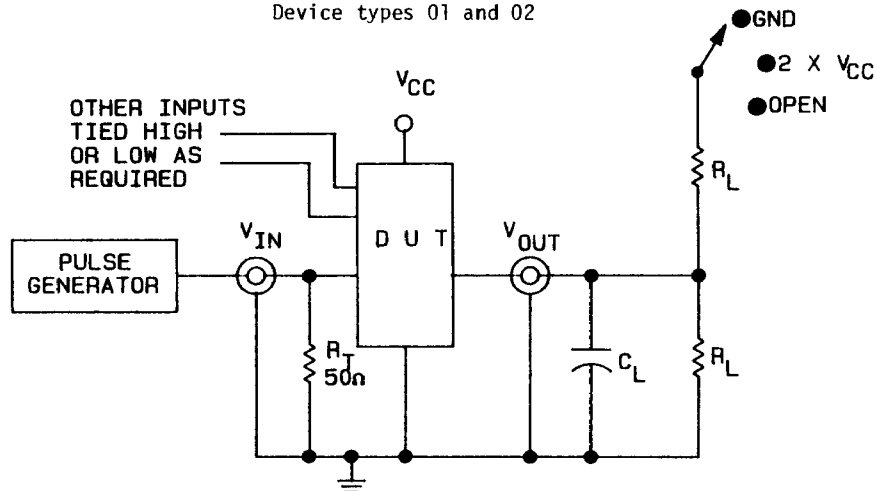
Inputs			Output
OE1	OE2	A	Y
L	H	L	L
L	H	H	H
H	L	X	Z

H = High voltage level
 L = Low voltage level
 Z = High impedance
 X = Irrelevant

FIGURE 2. Truth table.

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Device types 01 and 02



Preferred method

GND = t_{PHZ} and t_{PZH}
 $2 \times V_{CC}$ = t_{PLZ} and t_{PZL}
 Open = t_{PLH} and t_{PHL}

Alternate method

Open = t_{PHZ} , t_{PZH} , t_{PLH} , and t_{PHL}
 $2 \times V_{CC}$ = t_{PLZ} and t_{PZL}

NOTE: $R_T = 50\Omega$, $C_L = 50 \text{ pF}$, $R_L = 500\Omega$, or equivalent.

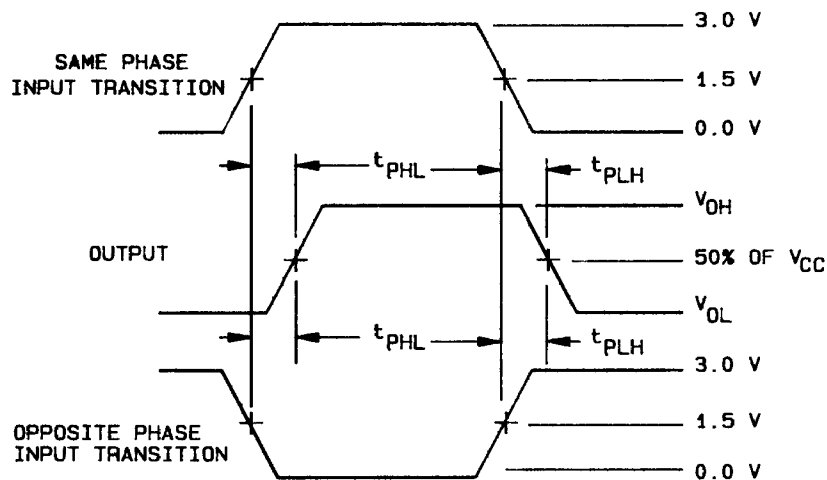


FIGURE 3. Test circuit and switching waveforms.

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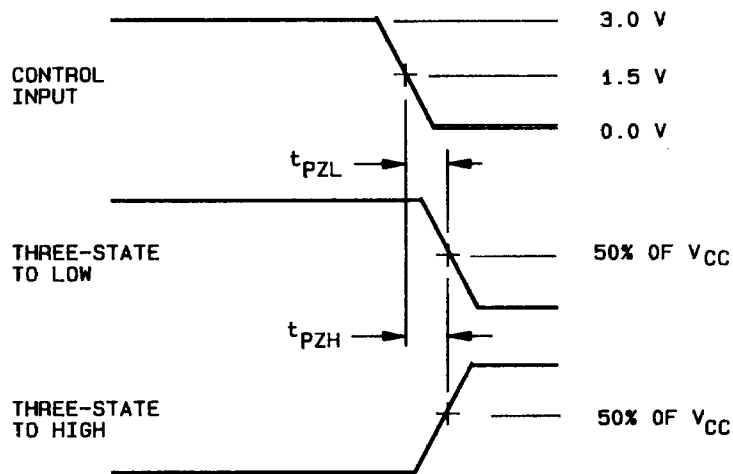
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ENABLE TIMES



DISABLE TIMES

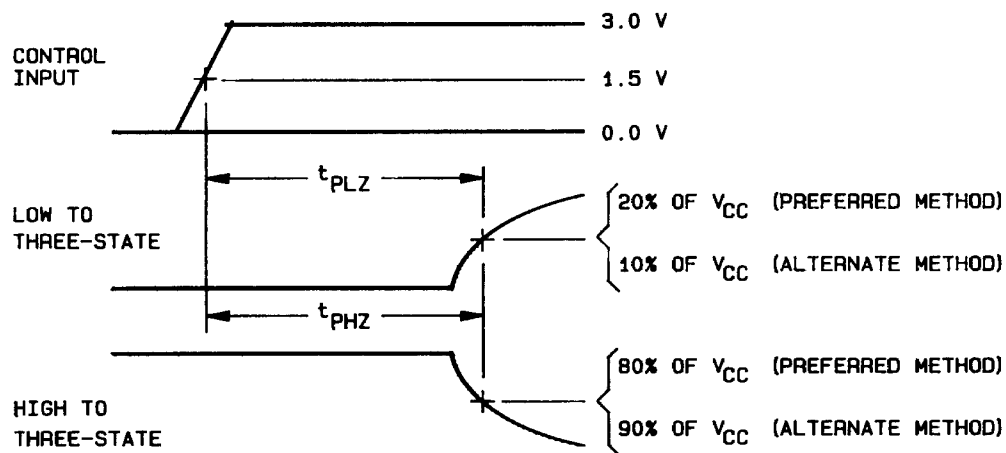


FIGURE 3. Test circuit and switching waveforms - Continued.

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4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*,2,3,7,8,9
Group A test requirements (method 5005)	1,2,3,4,7,8, 9,10,11
Groups C and D end-point electrical parameters (method 5005)	1,2,3

*PDA applies to subgroup 1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

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6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. Additional sources will be added to MIL-BUL-103 as they become available. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS. The approved sources of supply listed below are for information purposes only and are current only to the date of the last action of this document.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>
5962-8984701RX	27014	54ACT241DMQB
5962-8984701SX	27014	54ACT241FMQB
5962-89847012X	27014	54ACT241LMQB
5962-8984702LX	01295	SNJ54ACT11241JT
5962-89847023X	01295	SNJ54ACT11241FK

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

01295

27014

Vendor name
and address

Texas Instruments, Incorporated
P.O. Box 60448
Midland, TX 79711-0448

National Semiconductor
333 Western Avenue
South Portland, ME 04106

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