SN54AC573, SN74AC573 OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

SCAS542D - OCTOBER 1995 - REVISED OCTOBER 2003

- 2-V to 6-V V_{CC} Operation
- Inputs Accept Voltages to 6 V
- Max t_{pd} of 9 ns at 5 V
- 3-State Outputs Drive Bus Lines Directly

description/ordering information

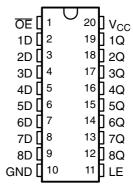
These 8-bit latches feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. The devices are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The eight latches are D-type transparent latches. When the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is taken low, the Q outputs are latched at the logic levels set up at the D Inputs.

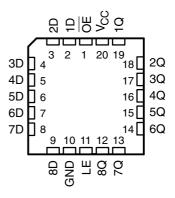
A buffered output-enable (\overline{OE}) input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines in a bus-organized system without need for interface or pullup components.

OE does not affect the internal operations of the latches. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

SN54AC573 . . . J OR W PACKAGE SN74AC573 . . . DB, DW, N, NS, OR PW PACKAGE (TOP VIEW)



SN54AC573 . . . FK PACKAGE (TOP VIEW)



ORDERING INFORMATION

T _A	PACKAGI	Εt	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube	SN74AC573N	SN74AC573N
-40°C to 85°C	0010 DW	Tube	SN74AC573DW	40570
	SOIC - DW	Tape and reel	SN74AC573DWR	AC573
	SOP - NS	Tape and reel	SN74AC573NSR	AC573
	SSOP – DB	Tape and reel	SN74AC573DBR	AC573
	TSSOP – PW	Tube	SN74AC573PW	AC573
	1350P - PW	Tape and reel	SN74AC573PWR	AC573
	CDIP – J	Tube	SNJ54AC573J	SNJ54AC573J
-55°C to 125°C	CFP – W	Tube	SNJ54AC573W	SNJ54AC573W
	LCCC - FK	Tube	SNJ54AC573FK	SNJ54AC573FK

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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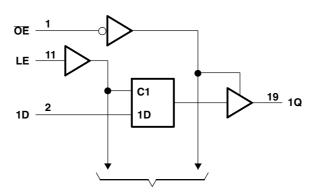
description/ordering information (continued)

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

FUNCTION TABLE (each latch)

	INPUTS	OUTPUT	
OE	LE	D	Q
L	Н	Н	Н
L	Н	L	L
L	L	Χ	Q_0
Н	X	Χ	Z

logic diagram (positive logic)



To Seven Other Channels

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V _{CC}		0.5 V to + 7 V
Input voltage range, V _I (see Note 1)		. $-0.5 \text{ V to V}_{CC} + 0.5 \text{ V}$
Output voltage range, V _O (see Note 1)		$-0.5 \text{ V to V}_{CC} + 0.5 \text{ V}$
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)		±20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > V _{CC}	.)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})		±50 mA
Continuous current through, V _{CC} or GND		±200 mA
Package thermal impedance, θ _{JA} (see Note 2):	: DB package	70°C/W
	DW package	58°C/W
	N package	69°C/W
	NS package	60°C/W
	PW package	83°C/W
Storage temperature range, T _{stg}		–65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 - 2. The package thermal impedance is calculated in accordance with JESD 51-7.



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recommended operating conditions (see Note 3)

			SN54A	C573	SN74AC573		
			MIN	MAX	MIN	MAX	UNIT
V_{CC}	Supply voltage		2	6	2	6	٧
		V _{CC} = 3 V	2.1		2.1		
V_{IH}	High-level input voltage	$V_{CC} = 4.5 \text{ V}$	3.15		3.15		V
		$V_{CC} = 5.5 \text{ V}$	3.85		3.85		
		V _{CC} = 3 V		0.9		0.9	
V_{IL}	Low-level input voltage	$V_{CC} = 4.5 \text{ V}$		1.35		1.35	V
		V _{CC} = 5.5 V		1.65		1.65	
V_{I}	Input voltage		0,4	V_{CC}	0	V_{CC}	٧
Vo	Output voltage		00	V_{CC}	0	V _{CC}	V
		V _{CC} = 3 V	70/	-12		-12	
l _{OH}	High-level output current	V _{CC} = 4.5 V	0	-24		-24	mA
		$V_{CC} = 5.5 \text{ V}$		-24		-24	
		V _{CC} = 3 V		12		12	
I_{OL}	Low-level output current	$V_{CC} = 4.5 \text{ V}$		24		24	mA
		V _{CC} = 5.5 V		24		24	
Δt/Δν	Input transition rise or fall rate			8		8	ns/V
T _A	Operating free-air temperature		-55	125	-40	85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

			T,	_λ = 25°C	SN54	AC573	SN74A	C573	
PARAMETER	TEST CONDITIONS	v _{cc}	MIN	TYP MA	X MIN	MAX	MIN	MAX	UNIT
		3 V	2.9		2.9		2.9		
	$I_{OH} = -50 \mu A$	4.5 V	4.4		4.4		4.4		
		5.5 V	5.4		5.4		5.4		
V _{OH}	$I_{OH} = -12 \text{ mA}$	3 V	2.58		2.48		2.48		V
	04 m 4	4.5 V	3.94		3.8		3.8		
	$I_{OH} = -24 \text{ mA}$	5.5 V	4.94		4.8	N.	4.8		
	$I_{OH} = -75 \text{ mA}^{\dagger}$	5.5 V			3.85	N.	3.85		
		3 V		0	.1	0.1		0.1	
	$I_{OL} = 50 \mu A$	4.5 V		0	.1 8	0.1		0.1	
		5.5 V		0	.1	0.1		0.1	
V _{OL}	I _{OL} = 12 mA	3 V		0.0	66	0.44		0.44	V
		4.5 V		0.0	6 ^Q	0.44		0.44	
	$I_{OL} = 24 \text{ mA}$	5.5 V		0.0	86	0.44		0.44	
	I _{OL} = 75 mA	5.5 V				1.65		1.65	
lį	V _I = V _{CC} or GND	5.5 V		±0	.1	±1		±1	μΑ
l _{OZ}	V _O = V _{CC} or GND	5.5 V		±0.2	.5	±5		±2.5	μΑ
Icc	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V		_	4	80		40	μΑ
C _i	V _I = V _{CC} or GND	5 V		5					pF

[†] Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.



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timing requirements over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

		$T_A = 2$	25°C	SN54A	C573	SN74A	C573	
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
t _w	Pulse duration, LE high	6		8	10.70	7		ns
t _{su}	Setup time, data before LE↓	3.5		5	11/5	4		ns
t _h	Hold time, data after LE↓	2		3		2		ns

timing requirements over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

		$T_A = 2$	25°C	SN54A	C573	SN74A	C573	
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
t _w	Pulse duration, LE high	4		6	J. N	5		ns
t _{su}	Setup time, data before LE↓	3		4.5	11/2	3.5		ns
t _h	Hold time, data after LE \downarrow	2		3		2		ns

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

DADAMETED	FROM	то	$T_A = 2$	25°C	SN54A	C573	SN74A	C573	
PARAMETER	(INPUT)	(OUTPUT)	MIN	MAX	MIN	MAX	MIN	MAX	UNIT
t _{PLH}	2	•	2.5	13	1.5	16.5	2	15	
t _{PHL}	D	Q	2.5	12	1.5	15.5	2	14	ns
t _{PLH}		•	2.5	13	1.5	16.5	2	15	
t _{PHL}	LE	Q	2.5	12	1.5	15.5	2	14	ns
t _{PZH}	0	0	2.5	11	1.5	13.5	2	12	20
t _{PZL}	OE	Q	2.5	11	7. 5	14	2	12.5	ns
t _{PHZ}	ŌĒ	Q	2.5	12.5	1.5	15	2	13.5	ns
t_{PLZ}	OE .	3	2.5	9.5	1.5	12	2	10.5	115

switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

DADAMETED	FROM	то	T _A = 2	T _A = 25°C		C573	SN74A	C573	UNIT	
PARAMETER	(INPUT)	(OUTPUT)	MIN	MAX	MIN	MAX	MIN	MAX	UNIT	
t _{PLH}	ſ	•	2.5	10	1.5	13	2	11.5		
t _{PHL}	D	Q	2.5	9.5	1.5	12.5	2	11	ns	
t _{PLH}		•	2.5	9.5	1.5	12.5	2	11		
t _{PHL}	LE	Q	2.5	8.5	1.5	11.5	2	10	ns	
t _{PZH}	<u> </u>	0	2.5	9	1.5	11.5	2	10		
t _{PZL}	ŌĒ	Q	2.5	8.5	7. 5	11	2	9.5	ns	
t _{PHZ}	ŌĒ	Q	2.5	11	1.5	13.5	2	12	ns	
t _{PLZ}	OE	3	2.5	8	1.5	10.5	2	9	115	

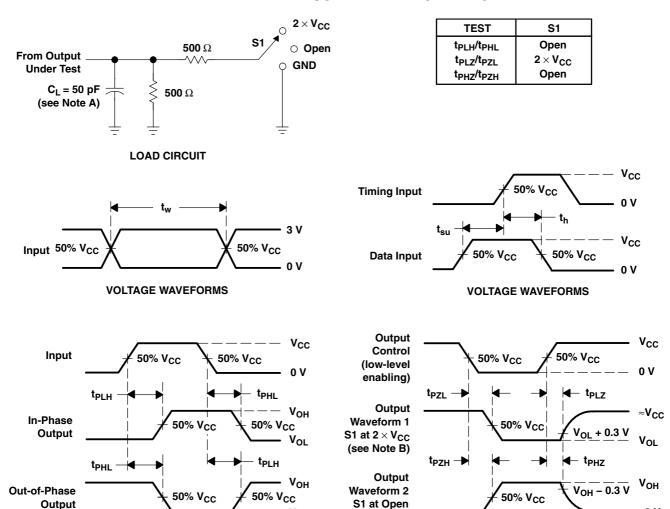
operating characteristics, V_{CC} = 5 V, T_A = 25°C

	PARAMETER	TEST CO	TYP	UNIT	
C _{pd}	Power dissipation capacitance	$C_L = 50 \text{ pF},$	f = 1 MHz	25	pF



VOLTAGE WAVEFORMS

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and jig capacitance.

VOLTAGE WAVEFORMS

- B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_O = 50~\Omega$, $t_f \leq$ 2.5 ns, $t_f \leq$ 2.5 ns.

(see Note B)

D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms





10-Jun-2014

PACKAGING INFORMATION

Orderable Device	Status	Package Type		Pins		Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
SN74AC573DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI	-40 to 85		
SN74AC573DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74AC573N	Samples
SN74AC573NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74AC573N	Samples
SN74AC573NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573PWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573PWLE	OBSOLETE	TSSOP	PW	20		TBD	Call TI	Call TI	-40 to 85		
SN74AC573PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573PWRE4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples
SN74AC573PWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC573	Samples



PACKAGE OPTION ADDENDUM

10-Jun-2014

(1) The marketing status values are defined as follows:

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ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

- (3) MSL, Peak Temp. The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- (6) Lead/Ball Finish Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION





		Dimension designed to accommodate the component width
		Dimension designed to accommodate the component length
		Dimension designed to accommodate the component thickness
	W	Overall width of the carrier tape
ľ	P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

All differisions are florifinal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AC573DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74AC573DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74AC573NSR	so	NS	20	2000	330.0	24.4	9.0	13.0	2.4	4.0	24.0	Q1
SN74AC573PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AC573DBR	SSOP	DB	20	2000	367.0	367.0	38.0
SN74AC573DWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74AC573NSR	SO	NS	20	2000	367.0	367.0	45.0
SN74AC573PWR	TSSOP	PW	20	2000	367.0	367.0	38.0

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- D. Falls within JEDEC MS-013 variation AC.



PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
 C. Publication IPC-7351 is recommended for alternate design.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



NOTES: A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.

D. Falls within JEDEC MO-150

MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have not been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

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