

TC74AC373P,TC74AC373F,TC74AC373FW,TC74AC373FT**Octal D-Type Latch with 3-State Output**

The TC74AC373 is an advanced high speed CMOS OCTAL LATCH with 3-STATE OUTPUT fabricated with silicon gate and double-layer metal wiring C²MOS technology.

It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

These 8-bit D-type latches are controlled by a latch enable input (LE) and a output enable input (\overline{OE}).

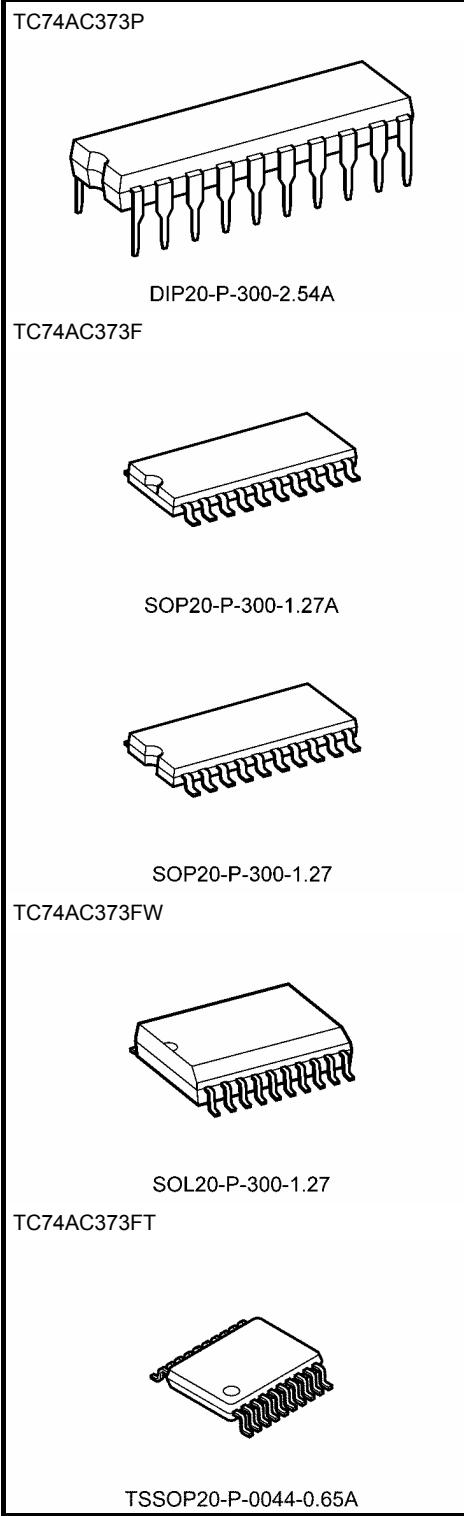
When the \overline{OE} input is high, the eight outputs are in a high impedance state.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Features

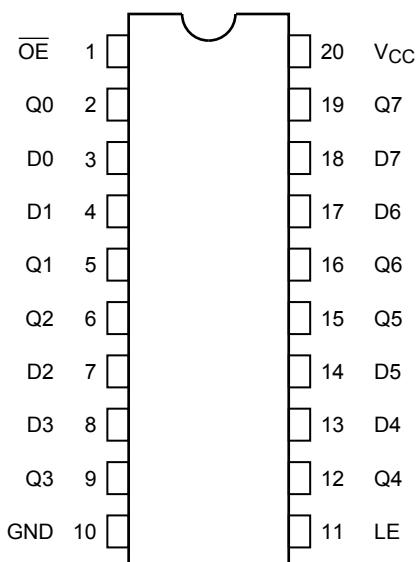
- High speed: $t_{pd} = 4.8$ ns (typ.) at $V_{CC} = 5$ V
- Low power dissipation: $I_{CC} = 8 \mu A$ (max) at $T_a = 25^\circ C$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 24$ mA (min)
Capability of driving 50Ω transmission lines.
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: V_{CC} (opr) = 2 to 5.5 V
- Pin and function compatible with 74F373

Note: xxxFW (JEDEC SOP) is not available in Japan.

**Weight**

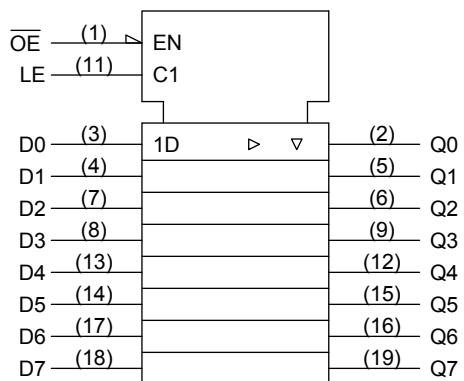
DIP20-P-300-2.54A	: 1.30 g (typ.)
SOP20-P-300-1.27A	: 0.22 g (typ.)
SOP20-P-300-1.27	: 0.22 g (typ.)
SOL20-P-300-1.27	: 0.46 g (typ.)
TSSOP20-P-0044-0.65A	: 0.08 g (typ.)

Pin Assignment



(top view)

IEC Logic Symbol



Truth Table

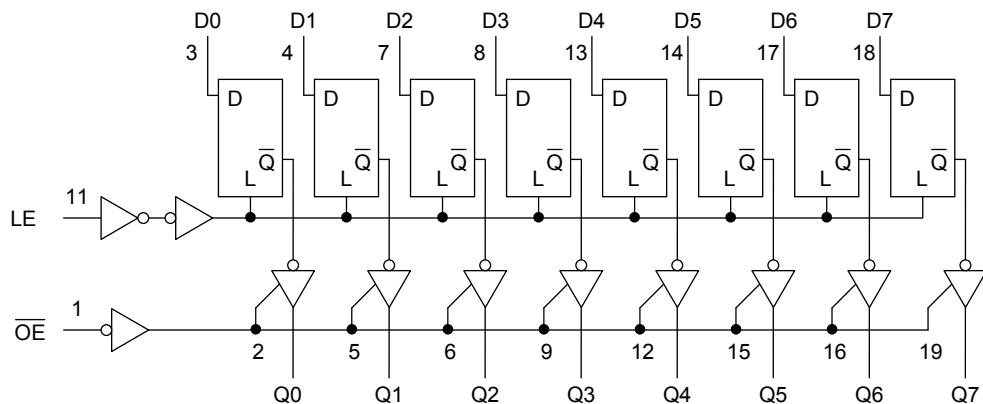
Inputs			Output
OE	LE	D	Q
H	X	X	Z
L	L	X	Q _n
L	H	L	L
L	H	H	H

X: Don't care

Z: High impedance

Q_n: Q outputs are latched at the time when the LE input is taken to a low logic level.

System Diagram



Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to 7.0	V
DC input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
DC output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Input diode current	I_{IK}	± 20	mA
Output diode current	I_{OK}	± 50	mA
DC output current	I_{OUT}	± 50	mA
DC V_{CC} /ground current	I_{CC}	± 200	mA
Power dissipation	P_D	500 (DIP) (Note 2)/180 (SOP/TSSOP)	mW
Storage temperature	T_{STG}	-65 to 150	°C

Note1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Note2: 500 mW in the range of $T_a = -40$ to 65°C . From $T_a = 65$ to 85°C a derating factor of $-10 \text{ mW/}^\circ\text{C}$ should be applied up to 300 mW.

Recommended Operating Conditions (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2.0 to 5.5	V
Input voltage	V_{IN}	0 to V_{CC}	V
Output voltage	V_{OUT}	0 to V_{CC}	V
Operating temperature	T_{OPR}	-40 to 85	°C
Input rise and fall time	dt/dV	0 to 100 ($V_{CC} = 3.3 \pm 0.3 \text{ V}$) 0 to 20 ($V_{CC} = 5 \pm 0.5 \text{ V}$)	ns/V

Note: The recommended operating conditions are required to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND .

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		V _{CC} (V)	Ta = 25°C			Ta = -40 to 85°C		Unit	
					Min	Typ.	Max	Min	Max		
High-level input voltage	V _{IH}	—		2.0	1.50	—	—	1.50	—	V	
				3.0	2.10	—	—	2.10	—		
				5.5	3.85	—	—	3.85	—		
Low-level input voltage	V _{IL}	—		2.0	—	—	0.50	—	0.50	V	
				3.0	—	—	0.90	—	0.90		
				5.5	—	—	1.65	—	1.65		
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -50 µA	2.0	1.9	2.0	—	1.9	—	V	
				3.0	2.9	3.0	—	2.9	—		
				4.5	4.4	4.5	—	4.4	—		
			I _{OH} = -4 mA I _{OH} = -24 mA I _{OH} = -75 mA (Note)	3.0	2.58	—	—	2.48	—		
				4.5	3.94	—	—	3.80	—		
				5.5	—	—	—	3.85	—		
				2.0	—	0.0	0.1	—	0.1		
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 50 µA	3.0	—	0.0	0.1	—	0.1	V	
				4.5	—	0.0	0.1	—	0.1		
			I _{OL} = 12 mA I _{OL} = 24 mA I _{OL} = 75 mA (Note)	3.0	—	—	0.36	—	0.44		
				4.5	—	—	0.36	—	0.44		
				5.5	—	—	—	—	1.65		
3-state output off-state current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND		5.5	—	—	±0.5	—	±5.0	µA	
Input leakage current	I _{IN}	V _{IN} = V _{CC} or GND		5.5	—	—	±0.1	—	±1.0	µA	
Quiescent supply current	I _{CC}	V _{IN} = V _{CC} or GND		5.5	—	—	8.0	—	80.0	µA	

Note: This spec indicates the capability of driving 50 Ω transmission lines.

One output should be tested at a time for a 10 ms maximum duration.

Timing Requirements (input: t_r = t_f = 3 ns)

Characteristics	Symbol	Test Condition			V _{CC} (V)	Ta = 25°C		Ta = -40 to 85°C		Unit
						Limit	Limit	Limit	Limit	
Minimum pulse width (LE)	t _w (H)	—			3.3 ± 0.3	7.0	7.0	ns	ns	ns
					5.0 ± 0.5	5.0	5.0			
Minimum set-up time	t _s	—			3.3 ± 0.3	6.0	6.0	ns	ns	ns
					5.0 ± 0.5	3.5	3.5			
Minimum hold time	t _h	—			3.3 ± 0.3	1.0	1.0	ns	ns	ns
					5.0 ± 0.5	1.0	1.0			

AC Characteristics ($C_L = 50 \text{ pF}$, $R_L = 500 \Omega$, input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40 to 85°C		Unit
			V _{CC} (V)	Min	Typ.	Max	Min	
Propagation delay time (LE-Q)	t _{pLH}	—	3.3 ± 0.3	—	7.7	13.2	1.0	15.0
	t _{pHL}		5.0 ± 0.5	—	6.1	8.7	1.0	10.0
Propagation delay time (D-Q)	t _{pLH}	—	3.3 ± 0.3	—	7.6	12.9	1.0	14.7
	t _{pHL}		5.0 ± 0.5	—	5.8	8.3	1.0	9.5
Output enable time	t _{pZL}	—	3.3 ± 0.3	—	7.6	12.9	1.0	14.7
	t _{pZH}		5.0 ± 0.5	—	6.1	8.7	1.0	10.0
Output disable time	t _{pLZ}	—	3.3 ± 0.3	—	7.0	11.0	1.0	12.5
	t _{pHZ}		5.0 ± 0.5	—	5.4	7.5	1.0	8.5
Input capacitance	C _{IN}	—	—	—	5	10	—	10
Output capacitance	C _{OUT}	—	—	—	10	—	—	—
Power dissipation capacitance	C _{PD}			(Note)	—	38	—	—

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} \cdot I_{CC}/8 \text{ (per latch)}$$

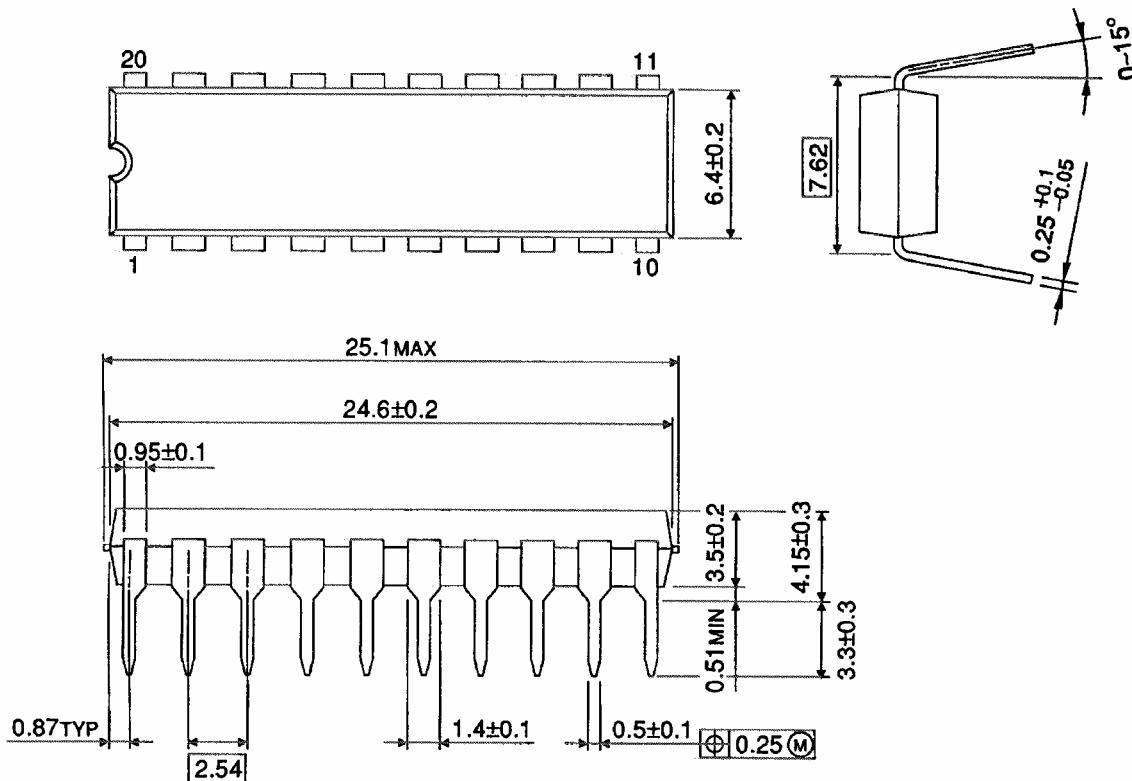
And the total C_{PD} when n pcs. of latch operate can be gained by the following equation:

$$C_{PD}(\text{total}) = 26 + 12 \cdot n$$

Package Dimensions

DIP20-P-300-2.54A

Unit : mm

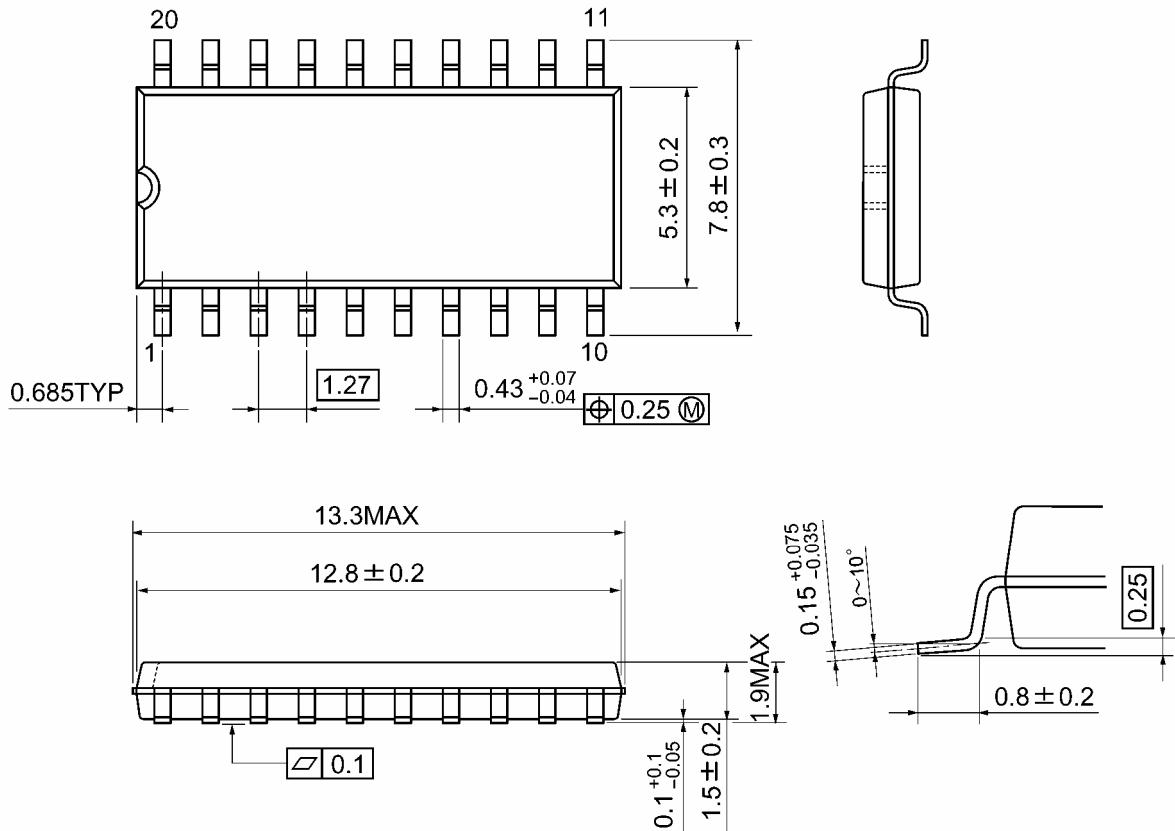


Weight: 1.30 g (typ.)

Package Dimensions

SOP20-P-300-1.27A

Unit: mm

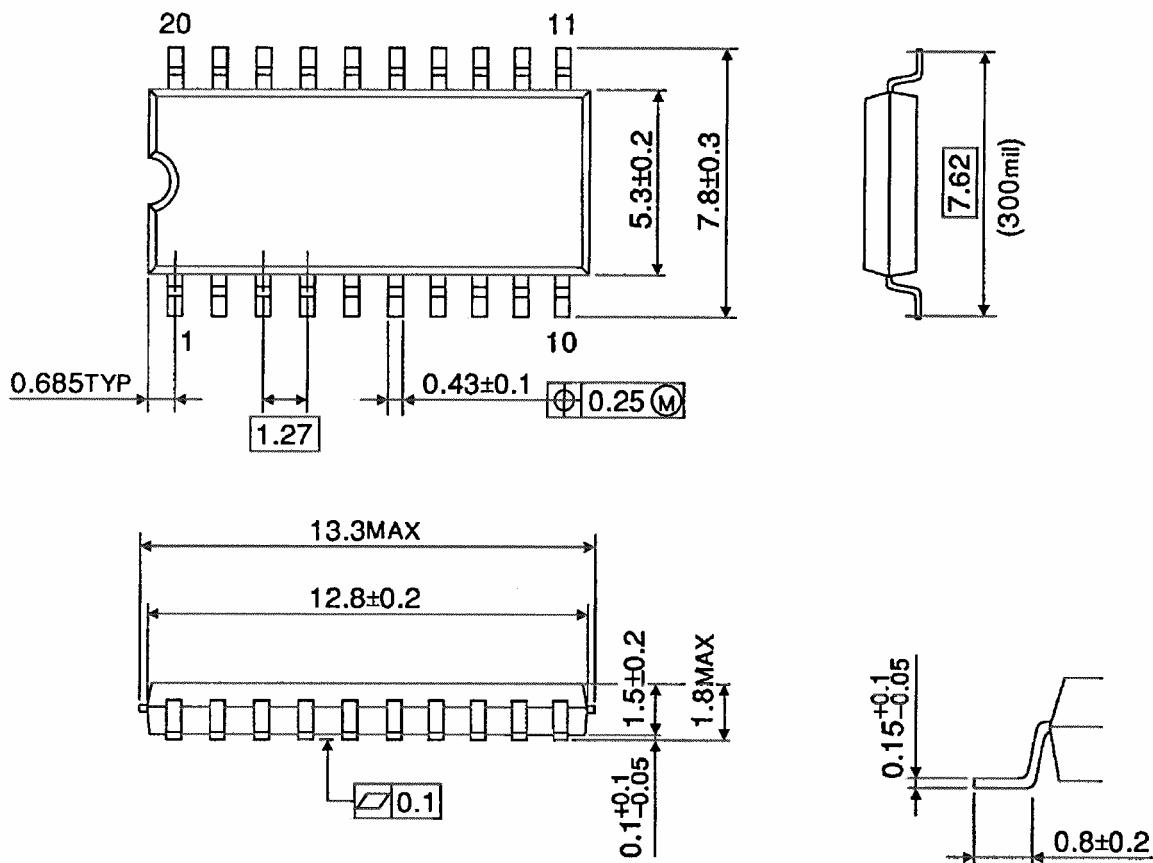


Weight: 0.22 g (typ.)

Package Dimensions

SOP20-P-300-1.27

Unit : mm

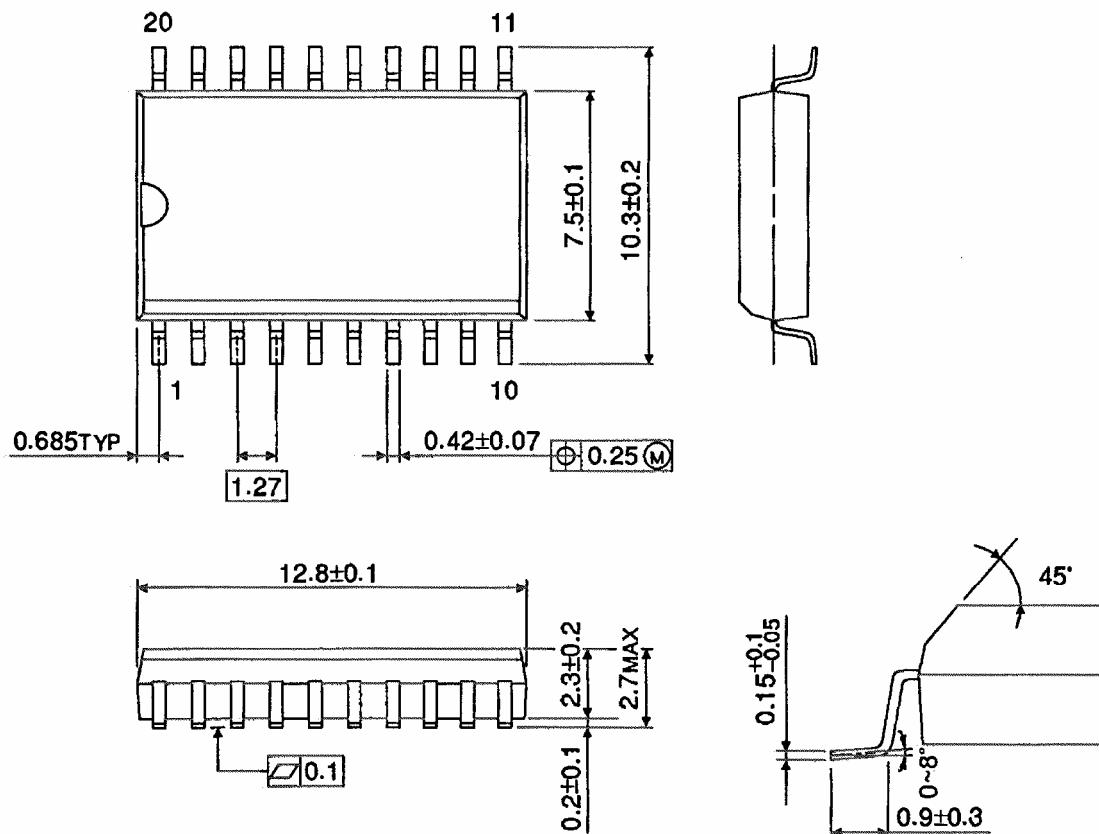


Weight: 0.22 g (typ.)

Package Dimensions (Note)

SOL20-P-300-1.27

Unit : mm



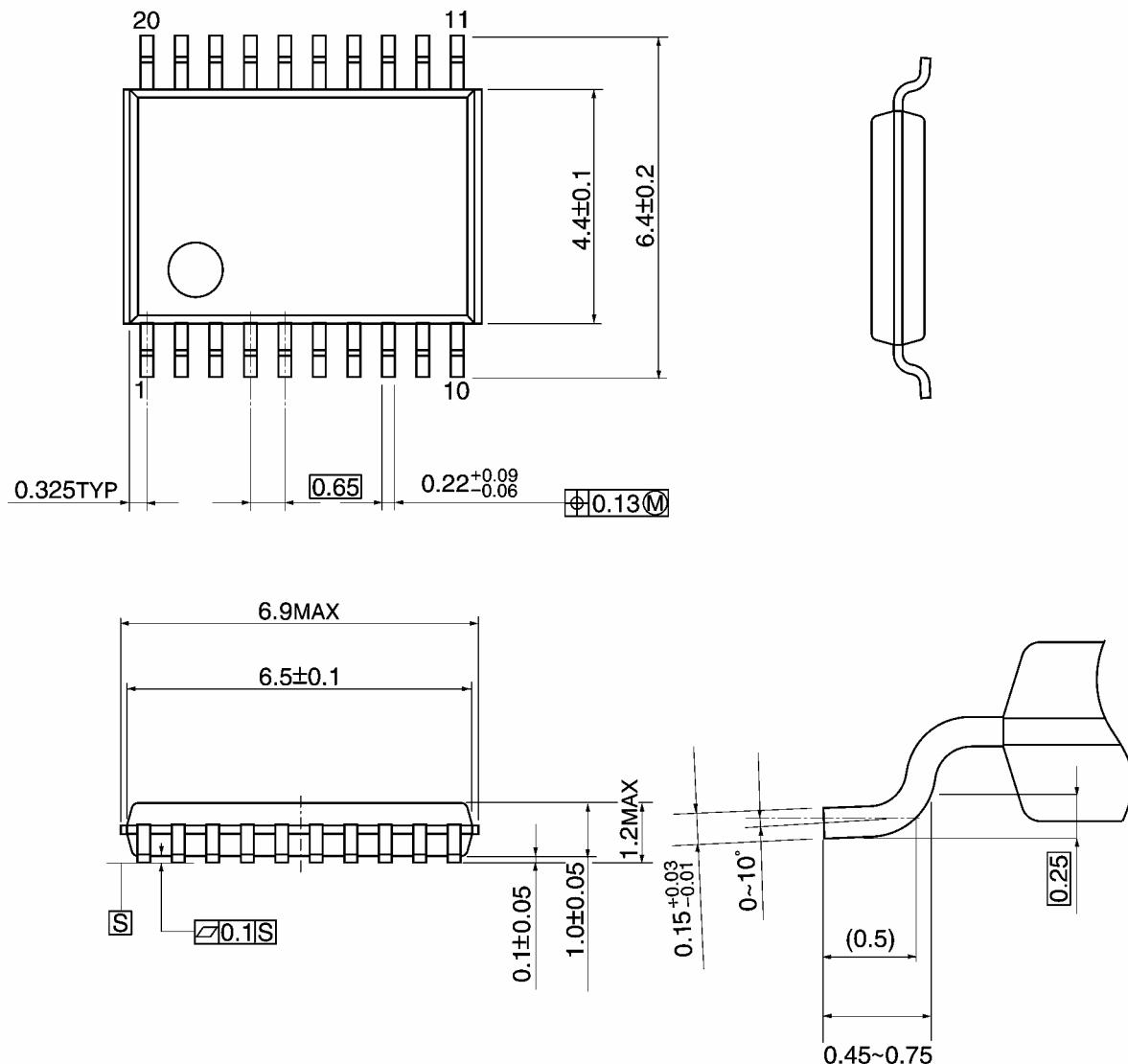
Note: This package is not available in Japan.

Weight: 0.46 g (typ.)

Package Dimensions

TSSOP20-P-0044-0.65A

Unit: mm



Weight: 0.08 g (typ.)

Note: Lead (Pb)-Free Packages**DIP20-P-300-2.54A SOP20-P-300-1.27A TSSOP20-P-0044-0.65A****RESTRICTIONS ON PRODUCT USE**

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