CD54/74HC540, CD74HCT540, CD54/74HC541, CD54/74HCT541

Data sheet acquired from Harris Semiconductor
SCHS189C

January 1998 - Revised July 2004

High-Speed CMOS Logic
Octal Buffer and Line Drivers, Three-State

Features

- **'HC540, CD74HCT540 . . . . . Inverting**
- **'HC541, 'HCT541 . . . . . Non-Inverting**
- **Buffered Inputs**
- **Three-State Outputs**
- **Bus Line Driving Capability**
- **Typical Propagation Delay = 9ns at V_{CC} = 5V, C_L = 15pF, T_A = 25^oC**
- **Fanout (Over Temperature Range)**
  - **Standard Outputs . . . . . 10 LSTTL Loads**
  - **Bus Driver Outputs . . . . . 15 LSTTL Loads**
- **Wide Operating Temperature Range . . . -55^oC to 125^oC**
- **Balanced Propagation Delay and Transition Times**
- **Significant Power Reduction Compared to LSTTL Logic ICs**
- **HC Types**
  - **2V to 6V Operation**
  - **High Noise Immunity: N_{IL} = 30%, N_{IH} = 30% of V_{CC} at V_{CC} = 5V**
- **HCT Types**
  - **4.5V to 5.5V Operation**
  - **Direct LSTTL Input Logic Compatibility, V_{IL}= 0.8V (Max), V_{IH} = 2V (Min)**
  - **CMOS Input Compatibility, $I_I \leq 1\mu A$ at V_{OL}, V_{OH}**

Description

The 'HC540 and CD74HCT540 are Inverting Octal Buffers and Line Drivers with Three-State Outputs and the capability to drive 15 LSTTL loads. The 'HC541 and 'HCT541 are Non-Inverting Octal Buffers and Line Drivers with Three-State Outputs that can drive 15 LSTTL loads. The Output Enables ($\overline{OE1}$) and ($\overline{OE2}$) control the Three-State Outputs. If either $\overline{OE1}$ or $\overline{OE2}$ is HIGH the outputs will be in the high impedance state. For data output $\overline{OE1}$ and $\overline{OE2}$ both must be LOW.

Ordering Information

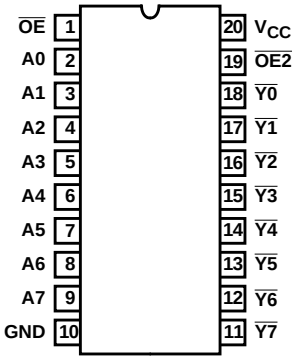
PART NUMBER	TEMP. RANGE (^oC)	PACKAGE
CD54HC540F3A	-55 to 125	20 Ld CERDIP
CD54HC541F3A	-55 to 125	20 Ld CERDIP
CD54HCT541F3A	-55 to 125	20 Ld CERDIP
CD74HC540E	-55 to 125	20 Ld PDIP
CD74HC540M	-55 to 125	20 Ld SOIC
CD74HC540M96	-55 to 125	20 Ld SOIC
CD74HC541E	-55 to 125	20 Ld PDIP
CD74HC541M	-55 to 125	20 Ld SOIC
CD74HC541M96	-55 to 125	20 Ld SOIC
CD74HC541PW	-55 to 125	20 Ld TSSOP
CD74HC541PWR	-55 to 125	20 Ld TSSOP
CD74HCT540E	-55 to 125	20 Ld PDIP
CD74HCT540M	-55 to 125	20 Ld SOIC
CD74HCT540M96	-55 to 125	20 Ld SOIC
CD74HCT541E	-55 to 125	20 Ld PDIP
CD74HCT541M	-55 to 125	20 Ld SOIC
CD74HCT541M96	-55 to 125	20 Ld SOIC

NOTE: When ordering, use the entire part number. The suffix 96 denotes tape and reel.

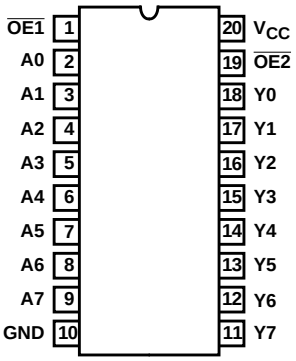
CAUTION: These devices are sensitive to electrostatic discharge. Users should follow proper IC Handling Procedures.

Pinouts

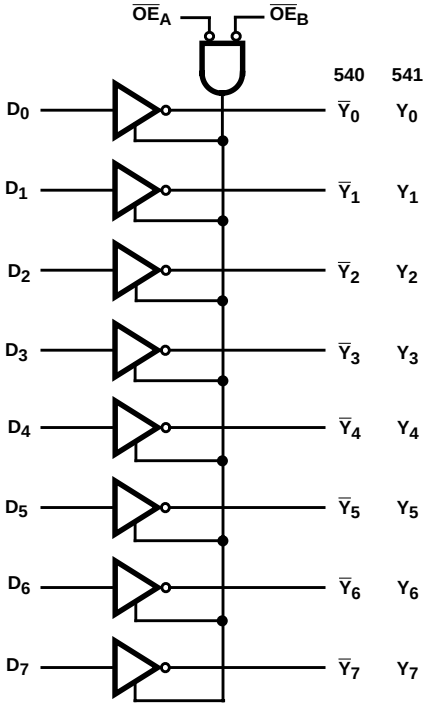
CD54HC540
(CERDIP)
CD74HC540, CD74HCT540
(PDIP, SOIC)
TOP VIEW



CD54HC541, CD54HCT541
(CERDIP)
CD74HC541
(PDIP, SOIC, TSSOP)
CD74HCT541
(PDIP, SOIC)
TOP VIEW



Functional Diagram



TRUTH TABLE

INPUTS			OUTPUTS	
$\overline{OE1}$	$\overline{OE2}$	An	540	541
L	L	H	L	H
H	X	X	Z	Z
X	H	X	Z	Z
L	L	L	H	L

H = HIGH Voltage Level
L = LOW Voltage Level
X= Don't Care
Z = High Impedance

Absolute Maximum Ratings

DC Supply Voltage, V_{CC} . . . . . -0.5V to 7V
DC Input Diode Current, I_{IK}
For V_I < -0.5V or V_I > V_{CC} + 0.5V . . . . . ±20mA
DC Output Diode Current, I_{OK}
For V_O < -0.5V or V_O > V_{CC} + 0.5V . . . . . ±20mA
DC Drain Current, per Output, I_O
For -0.5V < V_O < V_{CC} + 0.5V . . . . . ±35mA
DC Output Source or Sink Current per Output Pin, I_O
For V_O > -0.5V or V_O < V_{CC} + 0.5V . . . . . ±25mA
DC V_{CC} or Ground Current, I_{CC} . . . . . ±50mA

Operating Conditions

Temperature Range, T_A . . . . . -55°C to 125°C
Supply Voltage Range, V_{CC}
HC Types . . . . . 2V to 6V
HCT Types . . . . . 4.5V to 5.5V
DC Input or Output Voltage, V_I, V_O . . . . . 0V to V_{CC}
Input Rise and Fall Time
2V . . . . . 1000ns (Max)
4.5V. . . . . 500ns (Max)
6V . . . . . 400ns (Max)

Thermal Information

Thermal Resistance (Typical, Note 1) θ_{JA} (°C/W)
E (PDIP) Package 69
M (SOIC) Package. 58
PW (TSSOP) Package 83
Maximum Junction Temperature . . . . . 150°C
Maximum Storage Temperature Range . . . . . -65°C to 150°C
Maximum Lead Temperature (Soldering 10s) . . . . . 300°C
(SOIC - Lead Tips Only)

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. The package thermal impedance is calculated in accordance with JESD 51-7.

DC Electrical Specifications

PARAMETER	SYMBOL	TEST CONDITIONS V_I (V)	TEST CONDITIONS I_O (mA)	V_{CC} (V)	25°C MIN	25°C TYP	25°C MAX	-40°C TO 85°C MIN	-40°C TO 85°C MAX	-55°C TO 125°C MIN	-55°C TO 125°C MAX	UNITS
HC TYPES												
High Level Input Voltage	V_{IH}	-	-	2	1.5	-	-	1.5	-	1.5	-	V
				4.5	3.15	-	-	3.15	-	3.15	-	V
				6	4.2	-	-	4.2	-	4.2	-	V
Low Level Input Voltage	V_{IL}	-	-	2	-	-	0.5	-	0.5	-	0.5	V
				4.5	-	-	1.35	-	1.35	-	1.35	V
				6	-	-	1.8	-	1.8	-	1.8	V
High Level Output Voltage CMOS Loads	V_{OH}	V_{IH} or V_{IL}	-0.02	2	1.9	-	-	1.9	-	1.9	-	V
			-0.02	4.5	4.4	-	-	4.4	-	4.4	-	V
			-0.02	6	5.9	-	-	5.9	-	5.9	-	V
High Level Output Voltage TTL Loads			-	-	-	-	-	-	-	-	-	V
			-6	4.5	3.98	-	-	3.84	-	3.7	-	V
			-7.8	6	5.48	-	-	5.34	-	5.2	-	V
Low Level Output Voltage CMOS Loads	V_{OL}	V_{IH} or V_{IL}	0.02	2	-	-	0.1	-	0.1	-	0.1	V
			0.02	4.5	-	-	0.1	-	0.1	-	0.1	V
			0.02	6	-	-	0.1	-	0.1	-	0.1	V
Low Level Output Voltage TTL Loads			-	-	-	-	-	-	-	-	-	V
			6	4.5	-	-	0.26	-	0.33	-	0.4	V
			7.8	6	-	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	I_I	V_{CC} or GND	-	6	-	-	±0.1	-	±1	-	±1	µA

DC Electrical Specifications (Continued)

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	25°C			-40°C TO 85°C		-55°C TO 125°C		UNITS
		V_I (V)	I_O (mA)		MIN	TYP	MAX	MIN	MAX	MIN	MAX	
Quiescent Device Current	I_{CC}	V_{CC} or GND	0	6	-	-	8	-	80	-	160	µA
Three- State Leakage Current	I_{OZ}	V_{IL} or V_{IH}	V_O = V_{CC} or GND	6	-	-	±0.5	-	±5.0	-	±10	µA
HCT TYPES												
High Level Input Voltage	V_{IH}	-	-	4.5 to 5.5	2	-	-	2	-	2	-	V
Low Level Input Voltage	V_{IL}	-	-	4.5 to 5.5	-	-	0.8	-	0.8	-	0.8	V
High Level Output Voltage CMOS Loads	V_{OH}	V_{IH} or V_{IL}	-0.02	4.5	4.4	-	-	4.4	-	4.4	-	V
High Level Output Voltage TTL Loads			-6	4.5	3.98	-	-	3.84	-	3.7	-	V
Low Level Output Voltage CMOS Loads	V_{OL}	V_{IH} or V_{IL}	0.02	4.5	-	-	0.1	-	0.1	-	0.1	V
Low Level Output Voltage TTL Loads			6	4.5	-	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	I_I	V_{CC} and GND	0	5.5	-		±0.1	-	±1	-	±1	µA
Quiescent Device Current	I_{CC}	V_{CC} or GND	0	5.5	-	-	8	-	80	-	160	µA
Three- State Leakage Current	I_{OZ}	V_{IL} or V_{IH}	V_O = V_{CC} or GND	5.5	-	-	±0.5	-	±5.0	-	±10	µA
Additional Quiescent Device Current Per Input Pin: 1 Unit Load	ΔI_{CC} (Note 2)	V_{CC} -2.1	-	4.5 to 5.5	-	100	360	-	450	-	490	µA

NOTE:

2. For dual-supply systems theoretical worst case (V_I = 2.4V, V_{CC} = 5.5V) specification is 1.8mA.

HCT Input Loading Table

INPUT	UNIT LOADS	
	HCT540	HCT541
A0 - A7	1	0.4
$\overline{OE2}$	0.75	0.75
$\overline{OE1}$	1.15	1.15

NOTE: Unit Load is ΔI_{CC} limit specific in DC Electrical Specifications Table, e.g., 360µA max. at 25°C.

Switching Specifications C_L = 50pF, Input t_r, t_f = 6ns

PARAMETER	SYMBOL	TEST CONDITIONS	V_{CC} (V)	25°C			-40°C TO 85°C		-55°C TO 125°C		UNITS
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
HC TYPES											
Propagation Delay Data to Outputs (540)	t_{PLH}, t_{PHL}	C_L = 50pF	2	-	-	110	-	140	-	165	ns
			4.5	-	-	22	-	28	-	33	ns
		C_L = 15pF	5	-	9	-	-	-	-	-	ns
		C_L = 50pF	6	-	-	19	-	24	-	28	ns
Data to Outputs (541)	t_{PLZ}, t_{PHZ}	C_L = 50pF	2	-	-	115	-	145	-	175	ns
			4.5	-	-	23	-	29	-	35	ns
		C_L = 15pF	5	-	9	-	-	-	-	-	ns
		C_L = 50pF	6	-	-	20	-	25	-	30	ns
Output Enable and Disable to Outputs (540)	t_{PLZ}, t_{PHZ}	C_L = 50pF	2	-	-	160	-	200	-	240	ns
			4.5	-	-	32	-	40	-	48	ns
		C_L = 15pF	5	-	13	-	-	-	-	-	ns
		C_L = 50pF	6	-	-	27	-	34	-	41	ns
Output Enable and Disable to Outputs (541)	t_{PLZ}, t_{PHZ}	C_L = 50pF	2	-	-	160	-	200	-	240	ns
			4.5	-	-	32	-	40	-	48	ns
		C_L = 15pF	5	-	14	-	-	-	-	-	ns
		C_L = 50pF	6	-	-	23	-	29	-	35	ns
Output Transition Time	t_{THL}, t_{TLH}	C_L = 50pF	2	-	-	60	-	75	-	90	ns
			4.5	-	-	12	-	15	-	18	ns
			6	-	-	10	-	13	-	15	ns
Input Capacitance	C_I	C_L = 50pF	-	10	-	10	-	10	-	10	pF
Three-State Output Capacitance	C_O	-	-	20	-	20	-	20	-	20	pF
Power Dissipation Capacitance (Notes 3, 4) (540)	C_{PD}	C_L = 15pF	5	-	50	-	-	-	-	-	pF
Power Dissipation Capacitance (Notes 3, 4) (541)	C_{PD}	C_L = 15pF	5	-	48	-	-	-	-	-	pF
HCT TYPES											
Propagation Delay Data to Outputs (540)	t_{PHL}, t_{PLH}	C_L = 50pF	4.5	-	-	24	-	30	-	36	ns
		C_L = 15pF	5	-	9	-	-	-	-	-	ns
Data to Outputs (541)	t_{PHL}, t_{PLH}	C_L = 50pF	4.5	-	-	28	-	35	-	42	ns
		C_L = 15pF	5	-	11	-	-	-	-	-	ns
Output Enable and Disable to Outputs (540, 541)	t_{PLZ}, t_{PHZ}	C_L = 50pF	4.5	-	-	35	-	44	-	53	ns
		C_L = 15pF	5	-	14	-	-	-	-	-	ns
Output Transition Time	t_{TLH}, t_{THL}	C_L = 50pF	4.5	-	-	12	-	15	-	18	ns
Input Capacitance	C_I	C_L = 50pF	-	10	-	10	-	10	-	10	pF

Switching Specifications C_L = 50pF, Input t_r, t_f = 6ns **(Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS	V_{CC} (V)	25°C			-40°C TO 85°C		-55°C TO 125°C		UNITS
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
Three-State Output Capacitance	C_O	-	-	20	-	20	-	20	-	20	pF
Power Dissipation Capacitance (Notes 3, 4) (540, 541)	C_{PD}	C_L = 15pF	5	-	55	-	-	-	-	-	pF

NOTES:

3. C_{PD} is used to determine the dynamic power consumption, per channel.
4. $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$ where f_i = Input Frequency, C_L = Output Load Capacitance, V_{CC} = Supply Voltage.

Test Circuits and Waveforms

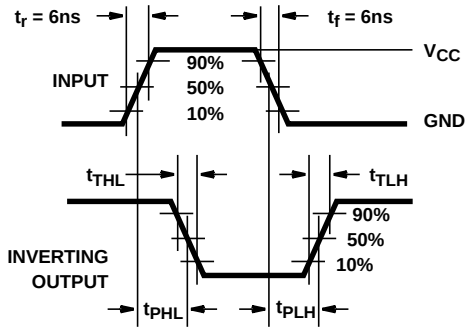


FIGURE 1. HC TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

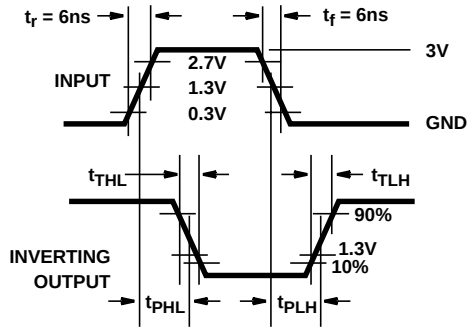


FIGURE 2. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

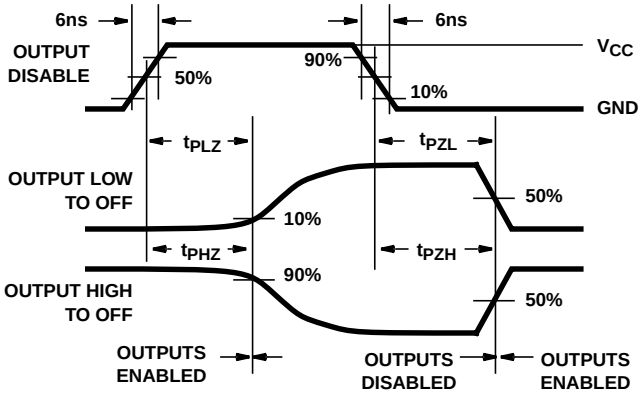


FIGURE 3. HC THREE-STATE PROPAGATION DELAY WAVEFORM

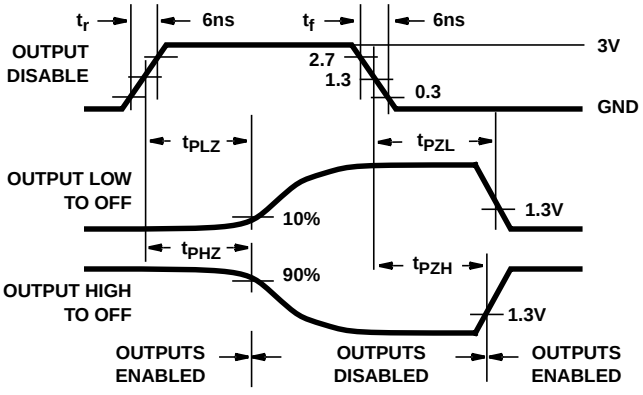
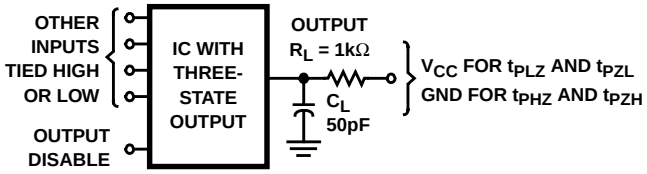


FIGURE 4. HCT THREE-STATE PROPAGATION DELAY WAVEFORM

Test Circuits and Waveforms (Continued)



NOTE: Open drain waveforms t_{PLZ} and t_{PZL} are the same as those for three-state shown on the left. The test circuit is Output R_L = 1kΩ to V_{CC}, C_L = 50pF.

FIGURE 5. HC AND HCT THREE-STATE PROPAGATION DELAY TEST CIRCUIT

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD54HC540F3A	ACTIVE	CDIP	J	20	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	CD54HC540F3A	Samples
CD54HC541F	ACTIVE	CDIP	J	20	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	CD54HC541F	Samples
CD54HC541F3A	ACTIVE	CDIP	J	20	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	CD54HC541F3A	Samples
CD54HCT541F	ACTIVE	CDIP	J	20	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	CD54HCT541F	Samples
CD54HCT541F3A	ACTIVE	CDIP	J	20	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	CD54HCT541F3A	Samples
CD74HC540E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC540E	Samples
CD74HC540M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC540M	Samples
CD74HC540M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC540M	Samples
CD74HC541E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC541E	Samples
CD74HC541EE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC541E	Samples
CD74HC541M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC541M	Samples
CD74HC541M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC541M	Samples
CD74HC541M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC541M	Samples
CD74HC541PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HJ541	Samples
CD74HC541PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HJ541	Samples
CD74HCT540E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HCT540E	Samples
CD74HCT540M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT540M	Samples

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD74HCT540M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT540M	Samples
CD74HCT541E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HCT541E	Samples
CD74HCT541M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT541M	Samples
CD74HCT541M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT541M	Samples
CD74HCT541M96E4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT541M	Samples
CD74HCT541M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT541M	Samples

(1) The marketing status values are defined as follows:
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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(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 finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

OTHER QUALIFIED VERSIONS OF CD54HC540, CD54HC541, CD54HCT541, CD74HC540, CD74HC541, CD74HCT541 :

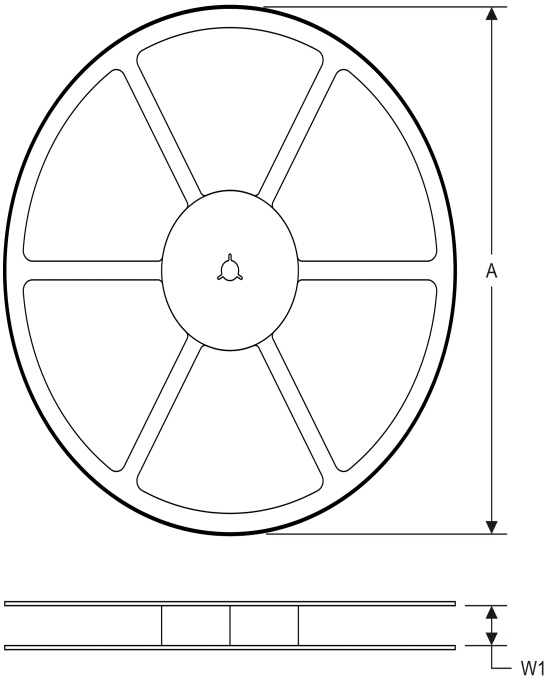
- Catalog: CD74HC540, CD74HC541, CD74HCT541
- Military: CD54HC540, CD54HC541, CD54HCT541

NOTE: Qualified Version Definitions:

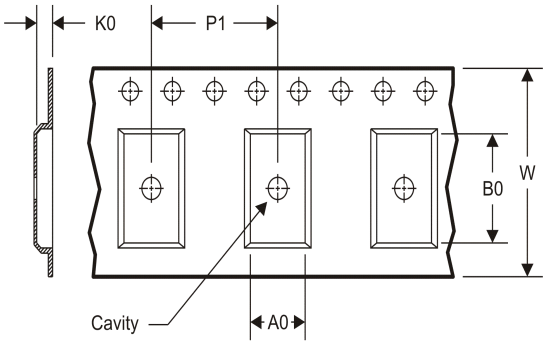
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



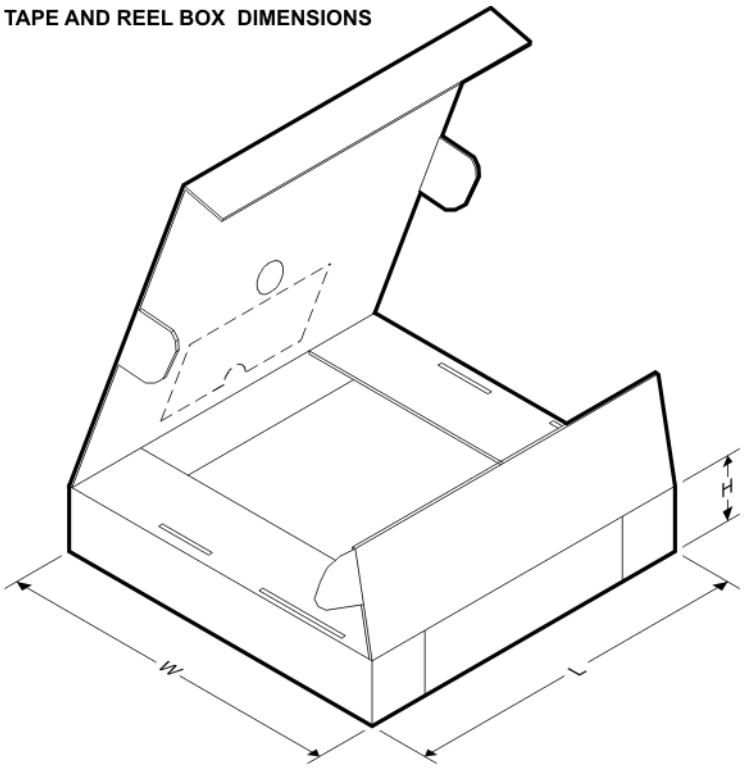
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

TAPE AND REEL INFORMATION

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74HC540M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
CD74HC541M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
CD74HC541PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1
CD74HCT540M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
CD74HCT541M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS



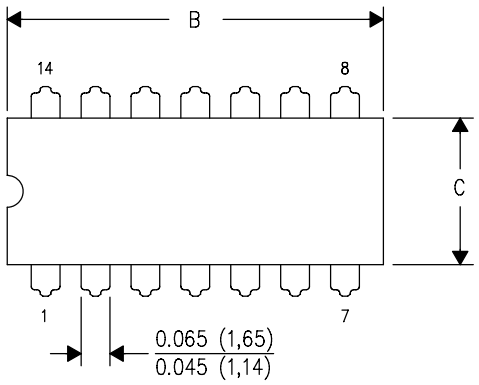
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74HC540M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74HC541M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74HC541PWR	TSSOP	PW	20	2000	367.0	367.0	38.0
CD74HCT540M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74HCT541M96	SOIC	DW	20	2000	367.0	367.0	45.0

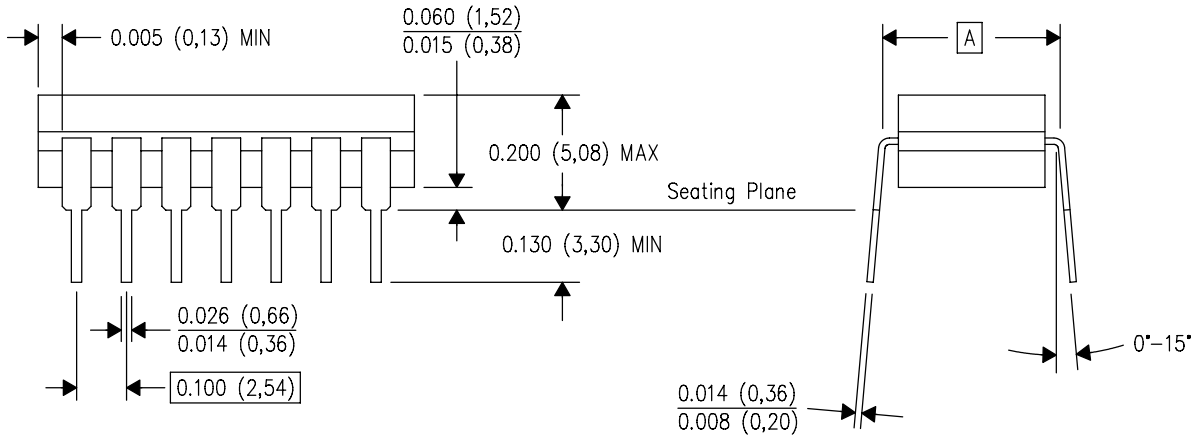
J (R–GDIP–T**)

14 LEADS SHOWN

CERAMIC DUAL IN–LINE PACKAGE



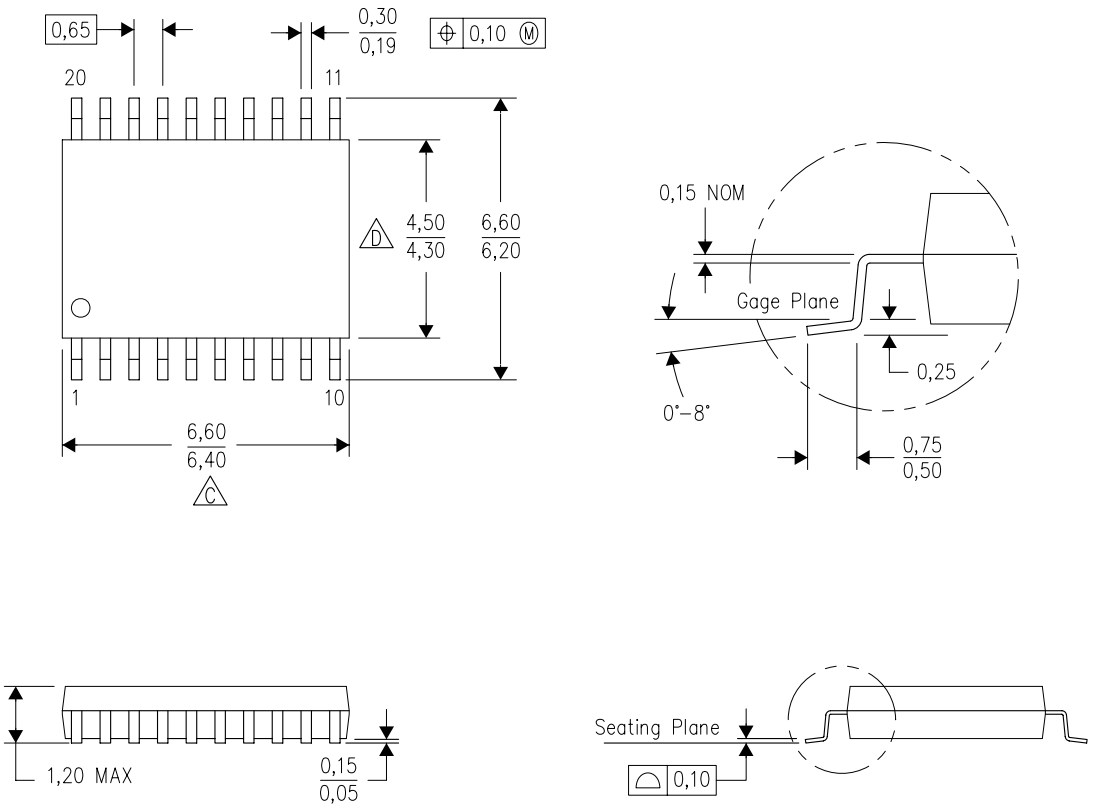
DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls within MIL STD 1835 GDIP1–T14, GDIP1–T16, GDIP1–T18 and GDIP1–T20.

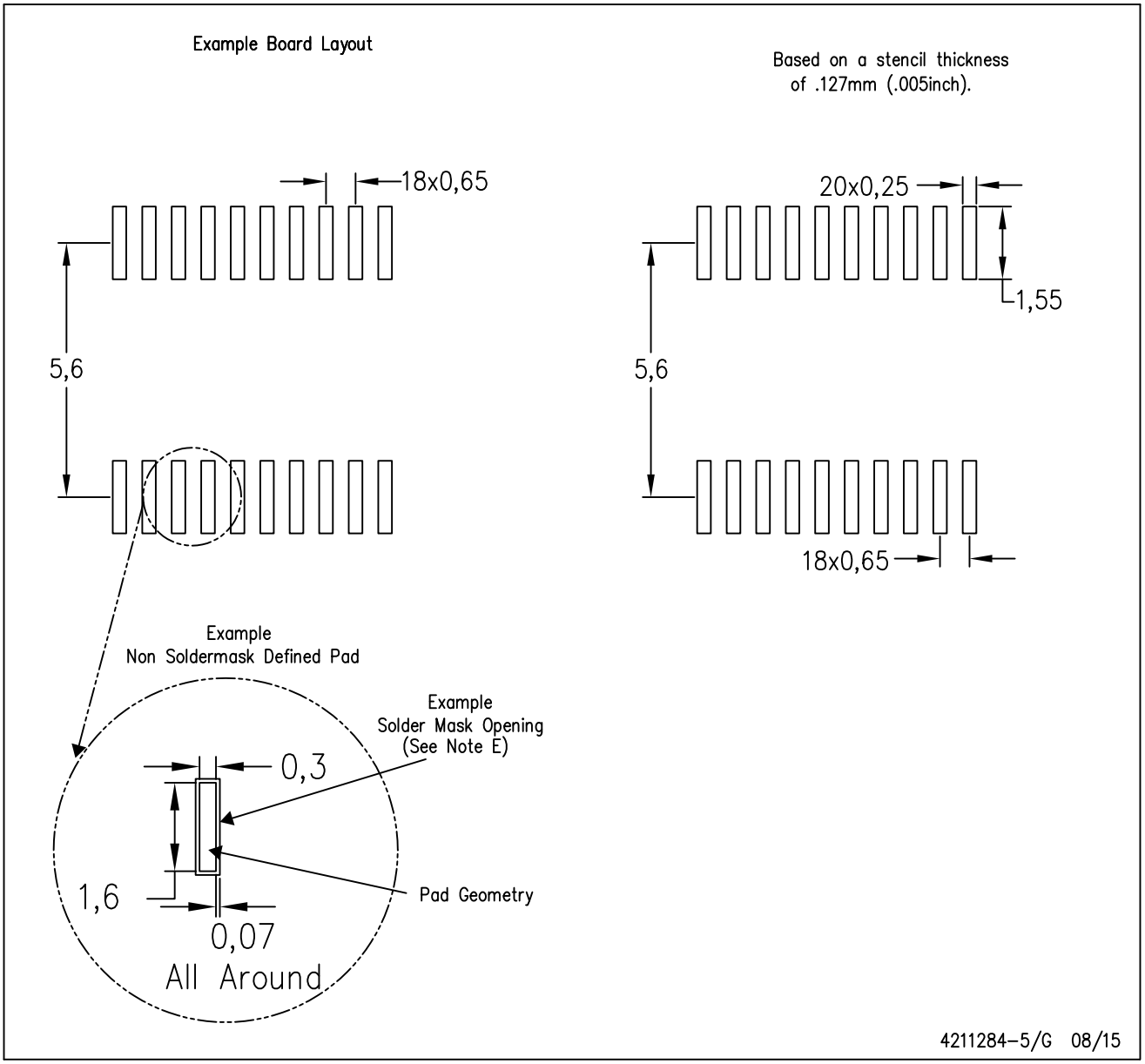
PW (R–PDSO–G20) PLASTIC SMALL OUTLINE



4040064–5/G 02/11

NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
D. 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

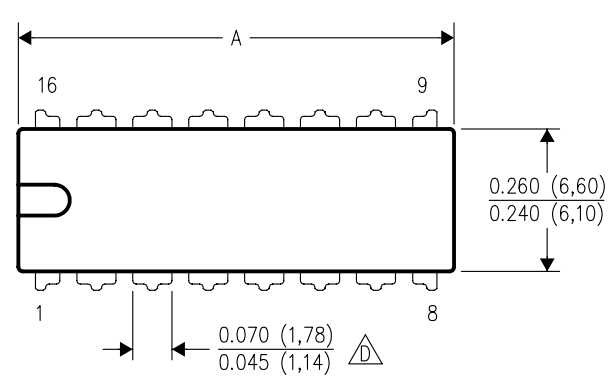


NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC–7351 is recommended for alternate design.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their 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.

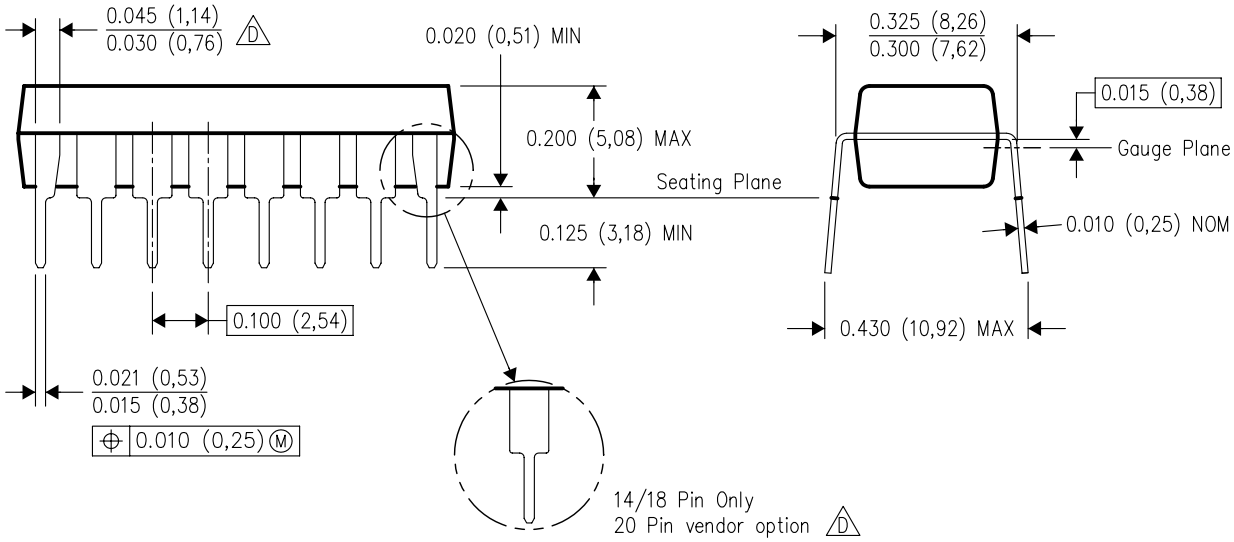
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

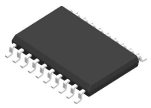


DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



4040049/E 12/2002

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

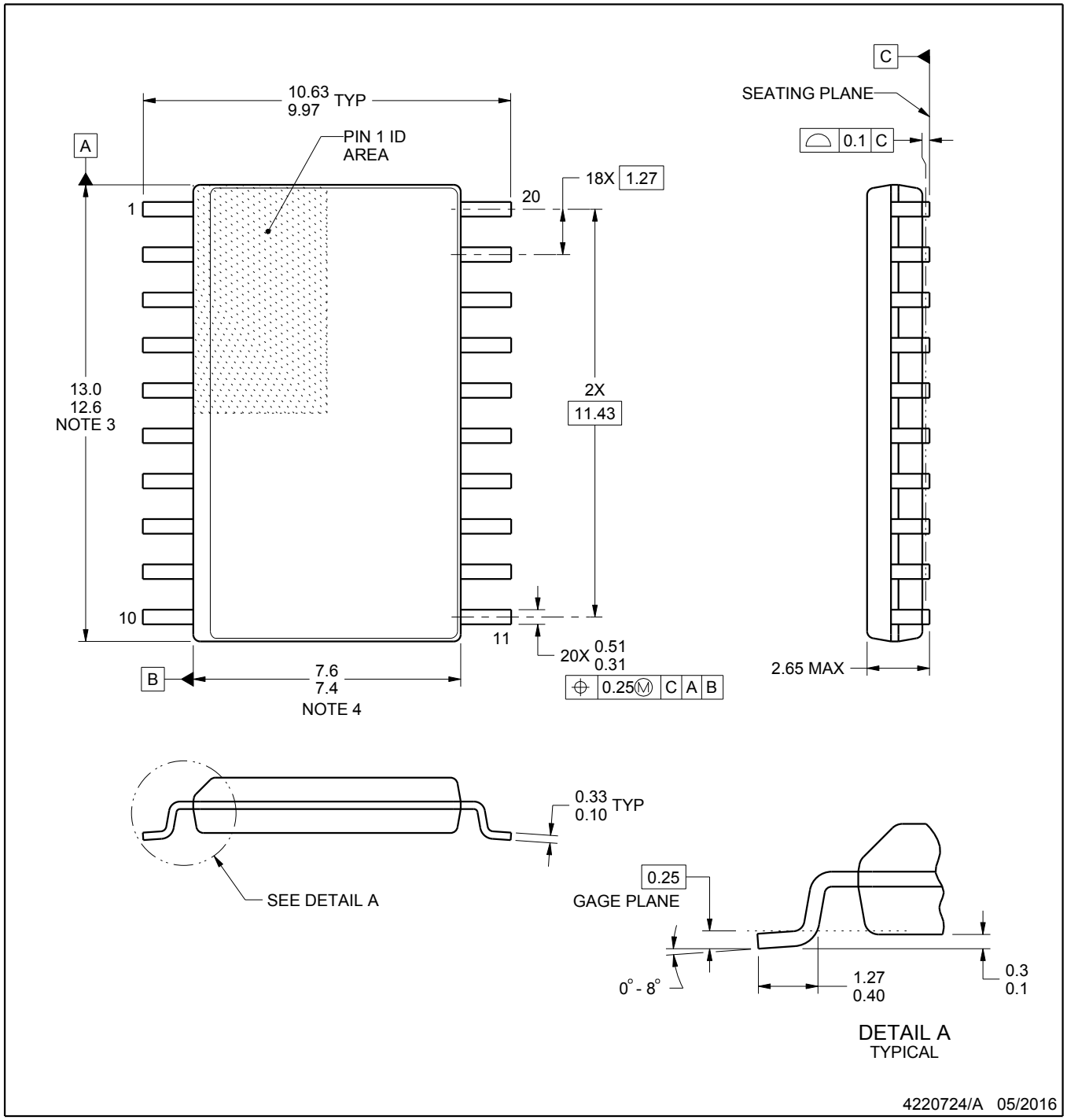


PACKAGE OUTLINE

DW0020A

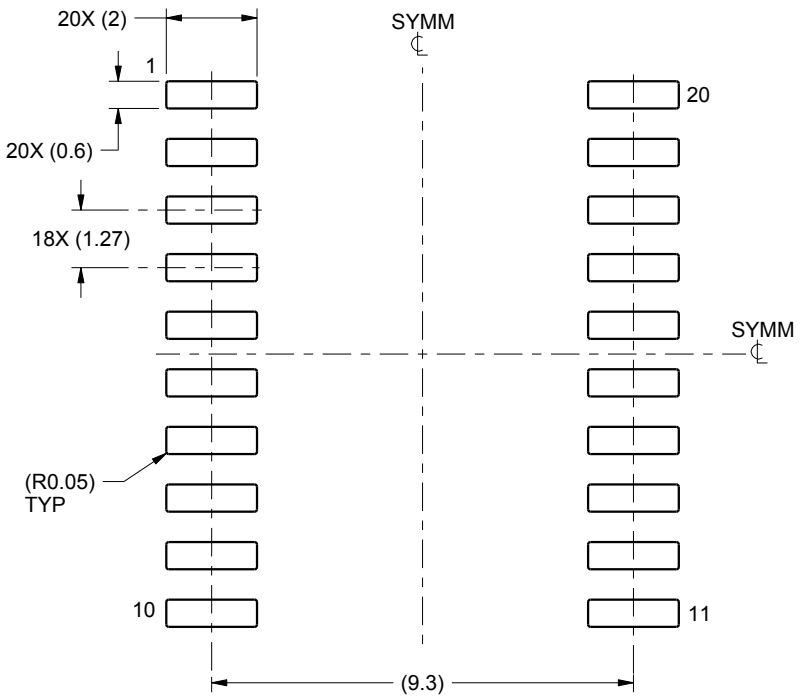
SOIC - 2.65 mm max height

SOIC

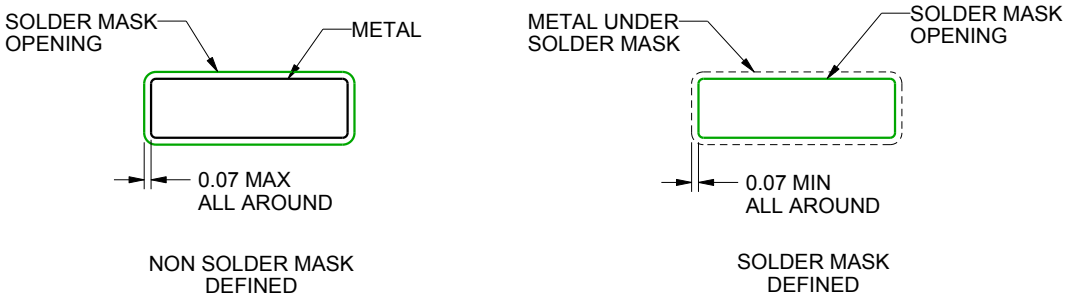


NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.



LAND PATTERN EXAMPLE
SCALE:6X

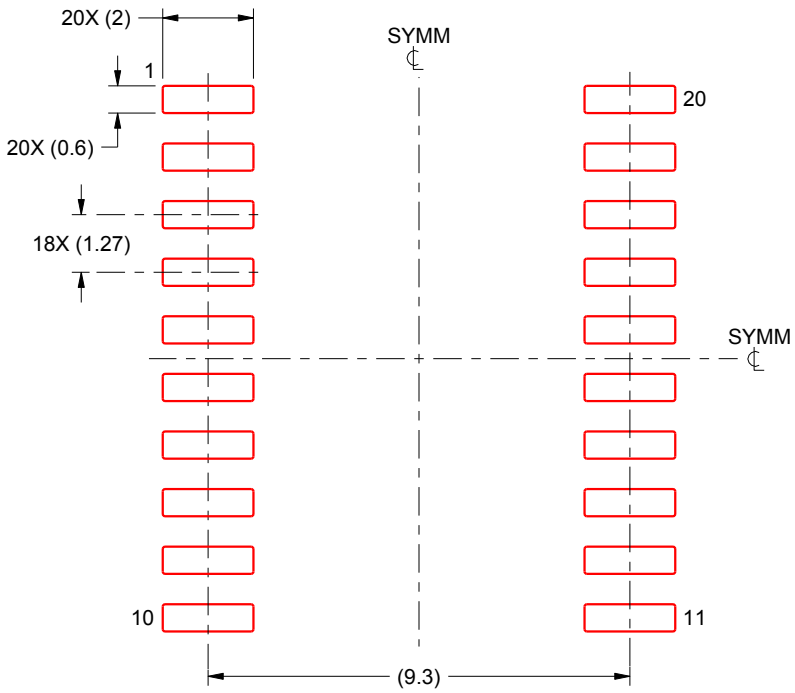


SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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