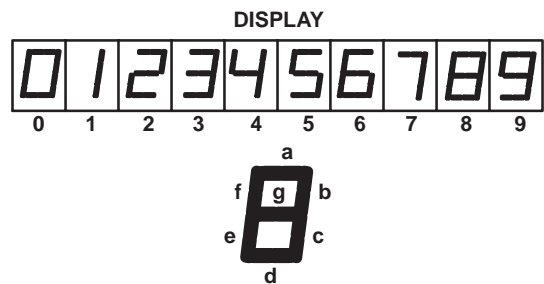
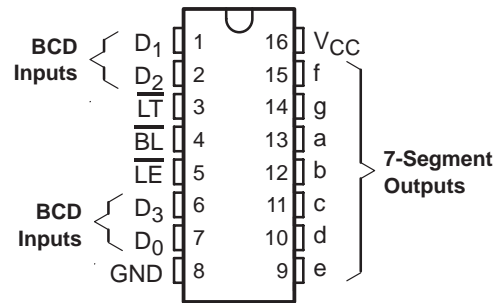


CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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- 2-V to 6-V V_{CC} Operation ('HC4511)
- 4.5-V to 5.5-V V_{CC} Operation (CD74HCT4511)
- High-Output Sourcing Capability
 - 7.5 mA at 4.5 V (CD74HCT4511)
 - 10 mA at 6 V ('HC4511)
- Input Latches for BCD Code Storage
- Lamp Test and Blanking Capability
- Balanced Propagation Delays and Transition Times
- Significant Power Reduction Compared to LSTTL Logic ICs
- 'HC4511
 - High Noise Immunity, N_{IL} or $N_{IH} = 30\%$ of V_{CC} at $V_{CC} = 5$ V
- CD74HCT4511
 - Direct LSTTL Input Logic Compatibility, $V_{IL} = 0.8$ V Maximum, $V_{IH} = 2$ V Minimum
 - CMOS Input Compatibility, $I_I \leq 1$ μ A at V_{OL} , V_{OH}

CD54HC4511 ... F PACKAGE
CD74HC4511 ... E, M, OR PW PACKAGE
CD74HCT4511 ... E PACKAGE
(TOP VIEW)



description/ordering information

The CD54HC4511, CD74HC4511, and CD74HCT4511 are BCD-to-7 segment latch/decoder/drivers with four address inputs (D_0 – D_3), an active-low blanking (\overline{BL}) input, lamp-test (\overline{LT}) input, and a latch-enable (\overline{LE}) input that, when high, enables the latches to store the BCD inputs. When \overline{LE} is low, the latches are disabled, making the outputs transparent to the BCD inputs.

These devices have standard-size output transistors, but are capable of sourcing (at standard V_{OH} levels) up to 7.5 mA at 4.5 V. The HC types can supply up to 10 mA at 6 V.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–55°C to 125°C	PDIP – E	Tube of 25	CD74HC4511E	CD74HC4511E
			CD74HCT4511E	CD74HCT4511E
	SOIC – M	Tube of 40 Reel of 2500 Reel of 250	CD74HC4511M	HC4511M
			CD74HC4511M96	
			CD74HC4511MT	
	TSSOP – PW	Reel of 2000 Reel of 250	CD74HC4511PWR	HJ4511
CD74HC4511PWT				
CDIP – F	Tube of 25	CD54HC4511F3A	CD54HC4511F3A	

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



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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FUNCTION TABLE

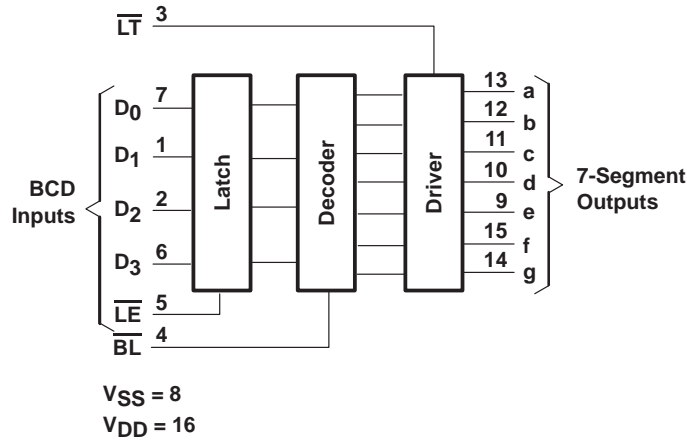
INPUTS								OUTPUTS							
\overline{LE}	\overline{BL}	\overline{LT}	D ₃	D ₂	D ₁	D ₀		a	b	c	d	e	f	g	DISPLAY
X	X	L	X	X	X	X		H	H	H	H	H	H	H	8
X	L	H	X	X	X	X		L	L	L	L	L	L	L	Blank
L	H	H	L	L	L	L		H	H	H	H	H	H	L	0
L	H	H	L	L	L	H		L	H	H	L	L	L	L	1
L	H	H	L	L	H	L		H	H	L	H	H	L	H	2
L	H	H	L	L	H	H		H	H	H	H	L	L	H	3
L	H	H	L	H	L	L		L	H	H	L	L	H	H	4
L	H	H	L	H	L	H		H	L	H	H	L	H	H	5
L	H	H	L	H	H	L		L	L	H	H	H	H	H	6
L	H	H	L	H	H	H		H	H	H	L	L	L	L	7
L	H	H	H	L	L	L		H	H	H	H	H	H	H	8
L	H	H	H	L	L	H		H	H	H	L	L	H	H	9
L	H	H	H	L	H	L		L	L	L	L	L	L	L	Blank
L	H	H	H	L	H	H		L	L	L	L	L	L	L	Blank
L	H	H	H	H	L	L		L	L	L	L	L	L	L	Blank
L	H	H	H	H	L	H		L	L	L	L	L	L	L	Blank
L	H	H	H	H	H	L		L	L	L	L	L	L	L	Blank
L	H	H	H	H	H	H		L	L	L	L	L	L	L	Blank
H	H	H	X	X	X	X		†	†	†	†	†	†	†	†

X = Don't care

† Depends on BCD code previously applied when $\overline{LE} = L$

NOTE: Display is blank for all illegal input codes (BCD > HLLH).

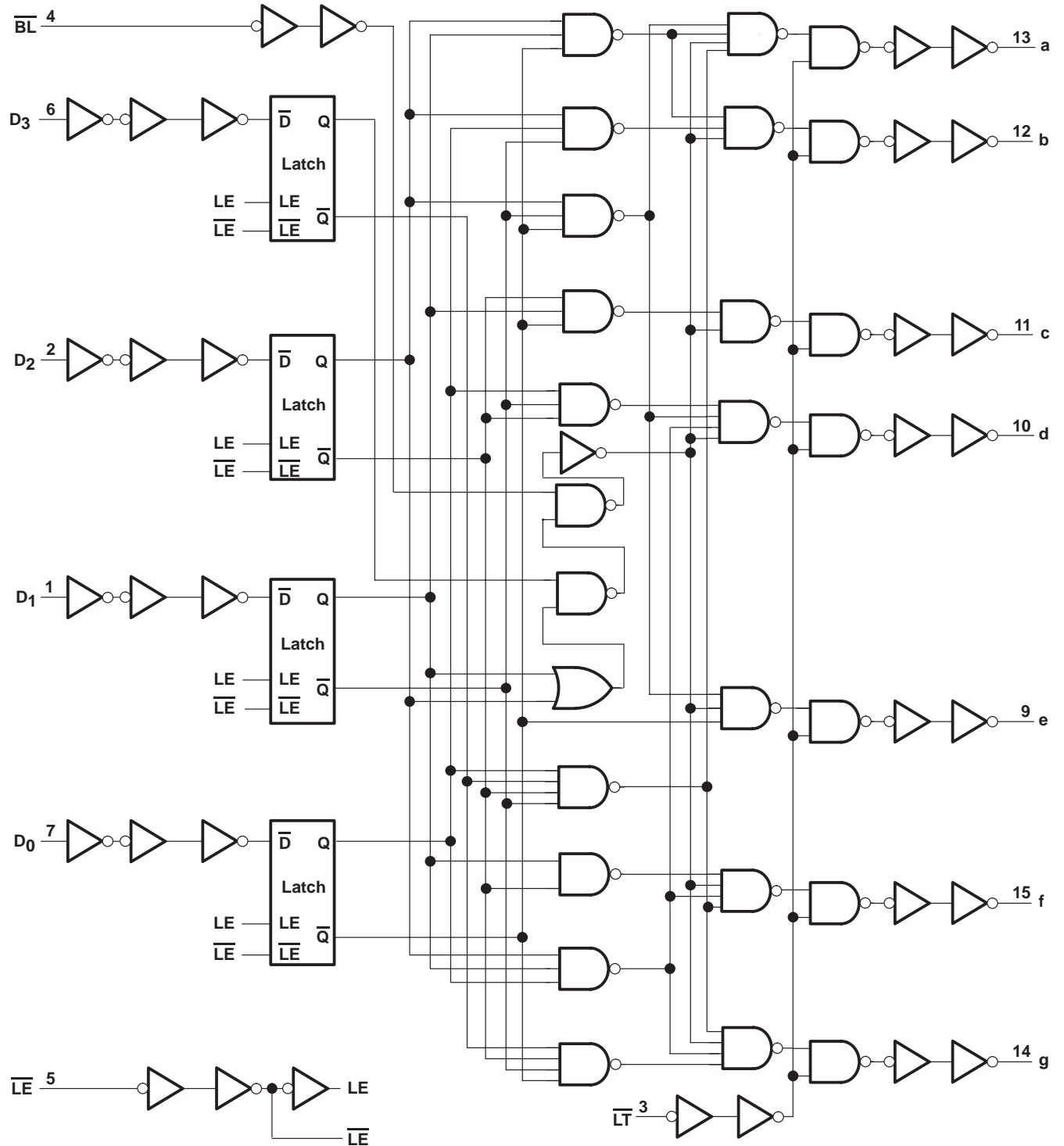
function diagram



CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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logic diagram



CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input diode current, I_{IK} ($V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V) (see Note 1)	±20 mA
Output diode current, I_{OK} ($V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V) (see Note 1)	±20 mA
Continuous output source or sink current per output, I_O ($V_O = 0$ to V_{CC})	±25 mA
Continuous current through V_{CC} or GND	±50 mA
Package thermal impedance, θ_{JA} (see Note 2): E package	67°C/W
M package	73°C/W
PW package	108°C/W
Lead temperature (during soldering):	
At distance $1/16 \pm 1/32$ in (1.59 ± 0.79 mm) from case for 10 s maximum	265°C
Unit inserted into a PC board (minimum thickness $1/16$ in, 1.59 mm), with solder contacting lead tips only	300°C
Storage temperature, T_{stg}	-65 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.

recommended operating conditions for 'HC4511 (see Note 3)

		$T_A = 25^\circ\text{C}$		$T_A = -55^\circ\text{C}$ TO 125°C		$T_A = -40^\circ\text{C}$ TO 85°C		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	2	6	2	6	2	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V		1.5	1.5	1.5		V
		$V_{CC} = 4.5$ V		3.15	3.15	3.15		
		$V_{CC} = 6$ V		4.2	4.2	4.2		
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V		0.5	0.5	0.5		V
		$V_{CC} = 4.5$ V		1.35	1.35	1.35		
		$V_{CC} = 6$ V		1.8	1.8	1.8		
V_I	Input voltage	0	V_{CC}	0	V_{CC}	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	0	V_{CC}	0	V_{CC}	V
t_t	Input transition (rise and fall) time	$V_{CC} = 2$ V		1000	1000	1000		ns
		$V_{CC} = 4.5$ V		500	500	500		
		$V_{CC} = 6$ V		400	400	400		

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.



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recommended operating conditions for CD74HCT4511 (see Note 4)

		T _A = 25°C		T _A = -55°C TO 125°C		T _A = -40°C TO 85°C		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
V _{CC}	Supply voltage	4.5	5.5	4.5	5.5	4.5	5.5	V
V _{IH}	High-level input voltage	2		2		2		V
V _{IL}	Low-level input voltage		0.8		0.8		0.8	V
V _I	Input voltage		V _{CC}		V _{CC}		V _{CC}	V
V _O	Output voltage		V _{CC}		V _{CC}		V _{CC}	V
t _t	Input transition (rise and fall) time		500		500		500	ns

NOTE 4: 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.

'HC4511

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C		T _A = -55°C TO 125°C		T _A = -40°C TO 85°C		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
V _{OH}	V _I = V _{IH} or V _{IL}	I _{OH} = -20 μA	2 V	1.9	1.9	1.9		V	
			4.5 V	4.4	4.4	4.4			
			6 V	5.9	5.9	5.9			
		I _{OH} = -7.5 mA	4.5 V	3.98	3.7	3.84			
		I _{OH} = -10 mA	6 V	5.48	5.2	5.34			
V _{OL}	V _I = V _{IH} or V _{IL}	I _{OL} = 20 μA	2 V	0.1	0.1	0.1	V		
			4.5 V	0.1	0.1	0.1			
			6 V	0.1	0.1	0.1			
		I _{OL} = 4 mA	4.5 V	0.26	0.4	0.33			
		I _{OL} = 5.2 mA	6 V	0.26	0.4	0.33			
I _I	V _I = V _{CC} or 0	6 V		±0.1	±1	±1	μA		
I _{CC}	V _I = V _{CC} or 0, I _O = 0	6 V		8	160	80	μA		
C _i				10	10	10	pF		

CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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CD74HCT4511

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

PARAMETER	TEST CONDITIONS		V _{CC}	T _A = 25°C			T _A = -55°C TO 125°C		T _A = -40°C TO 85°C		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	V _I = V _{IH} or V _{IL}	I _{OH} = -20 μA	4.5 V	4.4			4.4		4.4		V
		I _{OH} = -4 mA		3.98			3.7		3.84		
V _{OL}	V _I = V _{IH} or V _{IL}	I _{OL} = 20 μA	4.5 V	0.1			0.1		0.1		V
		I _{OL} = 4 mA		0.26			0.4		0.33		
I _I	V _I = V _{CC} to GND		5.5 V	±0.1			±1		±1		μA
I _{CC}	V _I = V _{CC} or 0, I _O = 0		5.5 V	8			160		80		μA
ΔI _{CC} †	One input at V _{CC} - 2.1 V, Other inputs at 0 or V _{CC}		4.5 V to 5.5 V	100 360			490		450		μA
C _i				10			10		10		pF

† Additional quiescent supply current per input pin, TTL inputs high, 1 unit load. For dual-supply systems, theoretical worst-case (V_I = 2.4 V, V_{CC} = 5.5 V) specification is 1.8 mA.

HCT INPUT LOADING TABLE

INPUT	UNIT LOADS‡
\overline{LT} , \overline{LE}	1.5
\overline{BL} , D _n	0.3

‡ Unit load is ΔI_{CC} limit specified in electrical characteristics table, e.g., 360 μA maximum at 25°C.

HC4511 timing requirements over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

	V _{CC}	T _A = 25°C		T _A = -55°C TO 125°C		T _A = -40°C TO 85°C		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t _w Pulse duration, \overline{LE} low	2 V	80		120		100		ns
	4.5 V	16		24		20		
	6 V	14		20		17		
t _{su} Setup time, BCD inputs before \overline{LE} ↑	2 V	60		90		75		ns
	4.5 V	12		18		15		
	6 V	10		15		13		
t _h Hold time, BCD inputs before \overline{LE} ↑	2 V	3		3		3		ns
	4.5 V	3		3		3		
	6 V	3		3		3		



CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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'HC4511

switching characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	V _{CC}	T _A = 25°C			T _A = -55°C TO 125°C		T _A = -40°C TO 85°C		UNIT		
					MIN	TYP	MAX	MIN	MAX	MIN	MAX			
t _{pd}	D _n	Output	C _L = 50 pF	2 V		300		450		375	ns			
				4.5 V		60		90		75				
				6 V		51		77		64				
			C _L = 15 pF	5 V		25								
				LE	Output	C _L = 50 pF	2 V		270			405		340
							4.5 V		54			81		68
	6 V		46					69		58				
	C _L = 15 pF	5 V		23										
		BL	Output	C _L = 50 pF	2 V		220		330			275		
					4.5 V		44		66			55		
	6 V					37		56		47				
	C _L = 15 pF			5 V		18								
				LT	Output	C _L = 50 pF	2 V		160			240		200
							4.5 V		32			48		40
	6 V		27					41		34				
	C _L = 15 pF	5 V		13										
t _t		Any	C _L = 50 pF	2 V		75		110		95				
				4.5 V		15		22		19				
	6 V				13		19		16					

CD54HC4511, CD74HC4511, CD74HCT4511 BCD-TO-7 SEGMENT LATCH/DECODER/DRIVERS

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CD74HCT4511

timing requirements over recommended operating free-air temperature range $V_{CC} = 4.5\text{ V}$ (unless otherwise noted) (see Figure 2)

		$T_A = 25^\circ\text{C}$		$T_A = -55^\circ\text{C}$ TO 125°C		$T_A = -40^\circ\text{C}$ TO 85°C		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t_w	Pulse duration, \overline{LE} low	16		24		20		ns
t_{su}	Setup time, BCD inputs before $\overline{LE}\uparrow$	16		24		20		ns
t_h	Hold time, BCD inputs before $\overline{LE}\uparrow$	5		5		5		ns

CD74HCT4511

switching characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Figure 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	V_{CC}	$T_A = 25^\circ\text{C}$			$T_A = -55^\circ\text{C}$ TO 125°C		$T_A = -40^\circ\text{C}$ TO 85°C		UNIT	
					MIN	TYP	MAX	MIN	MAX	MIN	MAX		
t_{pd}	D_n	Output	$C_L = 50\text{ pF}$	4.5 V			60		90		75	ns	
			$C_L = 15\text{ pF}$	5 V			25						
	\overline{LE}	Output	$C_L = 50\text{ pF}$	4.5 V					54		81		68
			$C_L = 15\text{ pF}$	5 V			23						
	\overline{BL}	Output	$C_L = 50\text{ pF}$	4.5 V							66		55
			$C_L = 15\text{ pF}$	5 V			18						
\overline{LT}	Output	$C_L = 50\text{ pF}$	4.5 V							50	41		
		$C_L = 15\text{ pF}$	5 V			13							
t_t		Any	$C_L = 50\text{ pF}$	4.5 V				15		22	19	ns	

operating characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TYP	UNIT
$C_{pd}\dagger$	Power dissipation capacitance	'HC4511	114
		CD74HCT4511	110

$\dagger C_{pd}$ is used to determine the dynamic power consumption, per package.

$$P_D = C_{pd} V_{CC}^2 f_i + \sum C_L V_{CC}^2 f_o$$

where: f_i = input frequency

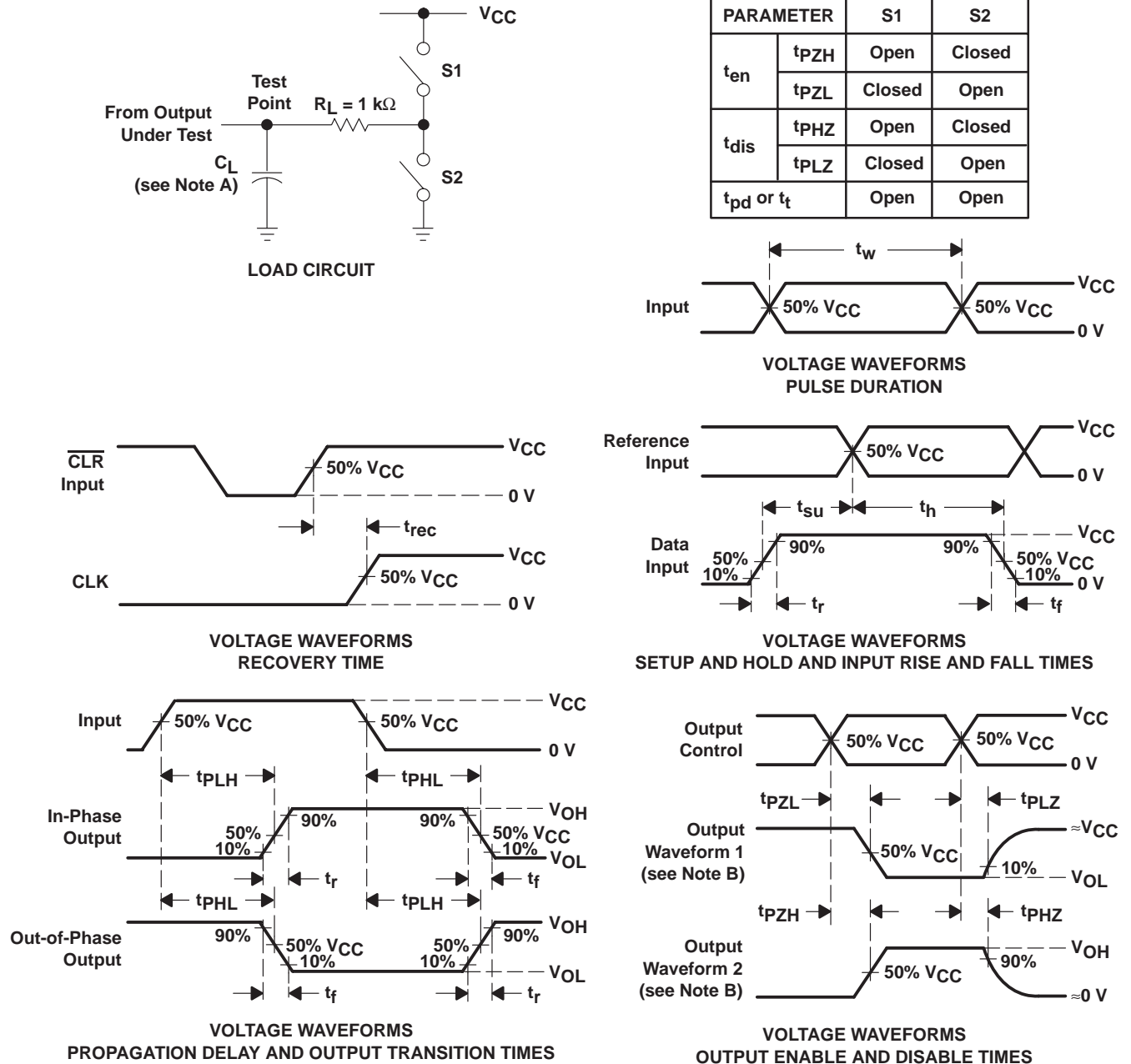
f_o = output frequency

C_L = output load capacitance

V_{CC} = supply voltage



PARAMETER MEASUREMENT INFORMATION – 'HC4511



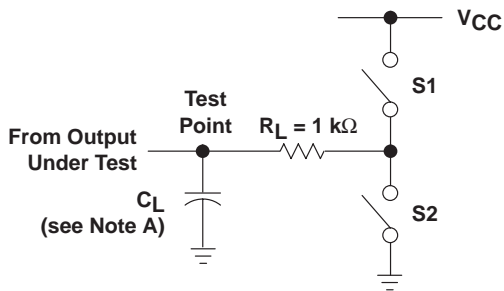
- NOTES:
- A. C_L includes probe and test-fixture capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 - C. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r = 6\text{ ns}$, $t_f = 6\text{ ns}$.
 - D. For clock inputs, f_{max} is measured with the input duty cycle at 50%.
 - E. The outputs are measured one at a time with one input transition per measurement.
 - F. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - G. t_{PZL} and t_{PZH} are the same as t_{en} .
 - H. t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 1. Load Circuit and Voltage Waveforms

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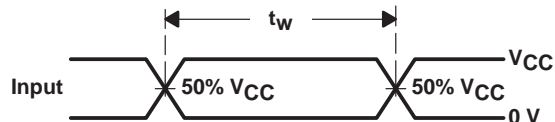
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PARAMETER MEASUREMENT INFORMATION – CD74HCT4511

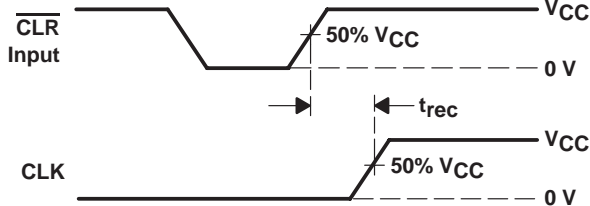


LOAD CIRCUIT

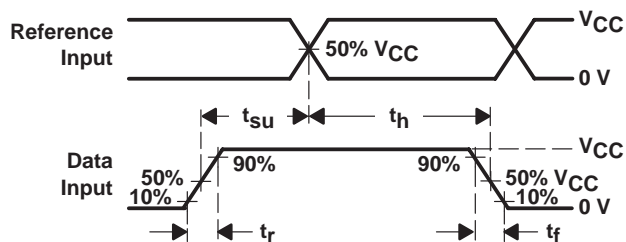
PARAMETER	S1	S2	
t_{en}	t_{PZH}	Open	Closed
	t_{PZL}	Closed	Open
t_{dis}	t_{PHZ}	Open	Closed
	t_{PLZ}	Closed	Open
t_{pd} or t_t	Open	Open	



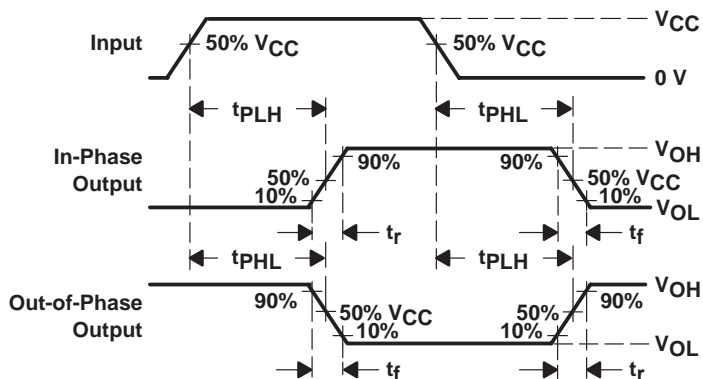
VOLTAGE WAVEFORMS
PULSE DURATION



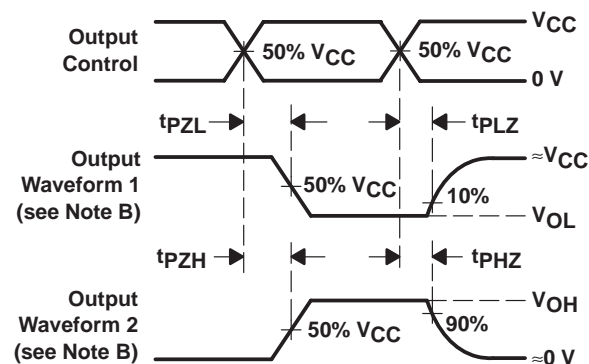
VOLTAGE WAVEFORMS
RECOVERY TIME



VOLTAGE WAVEFORMS
SETUP AND HOLD AND INPUT RISE AND FALL TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY AND OUTPUT TRANSITION TIMES



VOLTAGE WAVEFORMS
OUTPUT ENABLE AND DISABLE TIMES

- NOTES:
- C_L includes probe and test-fixture capacitance.
 - 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.
 - Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r = 6\text{ ns}$, $t_f = 6\text{ ns}$.
 - For clock inputs, f_{max} is measured with the input duty cycle at 50%.
 - The outputs are measured one at a time with one input transition per measurement.
 - t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 2. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-8773301EA	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	N / A for Pkg Type
CD54HC4511F3A	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	N / A for Pkg Type
CD74HC4511E	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HC4511EE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HC4511M	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511M96	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511M96E4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511M96G4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511ME4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511MG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511MT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511MTE4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511MTG4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511PWR	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511PWRE4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511PWRG4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511PWT	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511PWTE4	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC4511PWTG4	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT4511E	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HCT4511EE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type

⁽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.

OBSELETE: 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.

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TAPE AND REEL INFORMATION



QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
CD74HC4511M96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
CD74HC4511PWR	TSSOP	PW	16	2000	330.0	12.4	7.0	5.6	1.6	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74HC4511M96	SOIC	D	16	2500	333.2	345.9	28.6
CD74HC4511PWR	TSSOP	PW	16	2000	346.0	346.0	29.0

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)



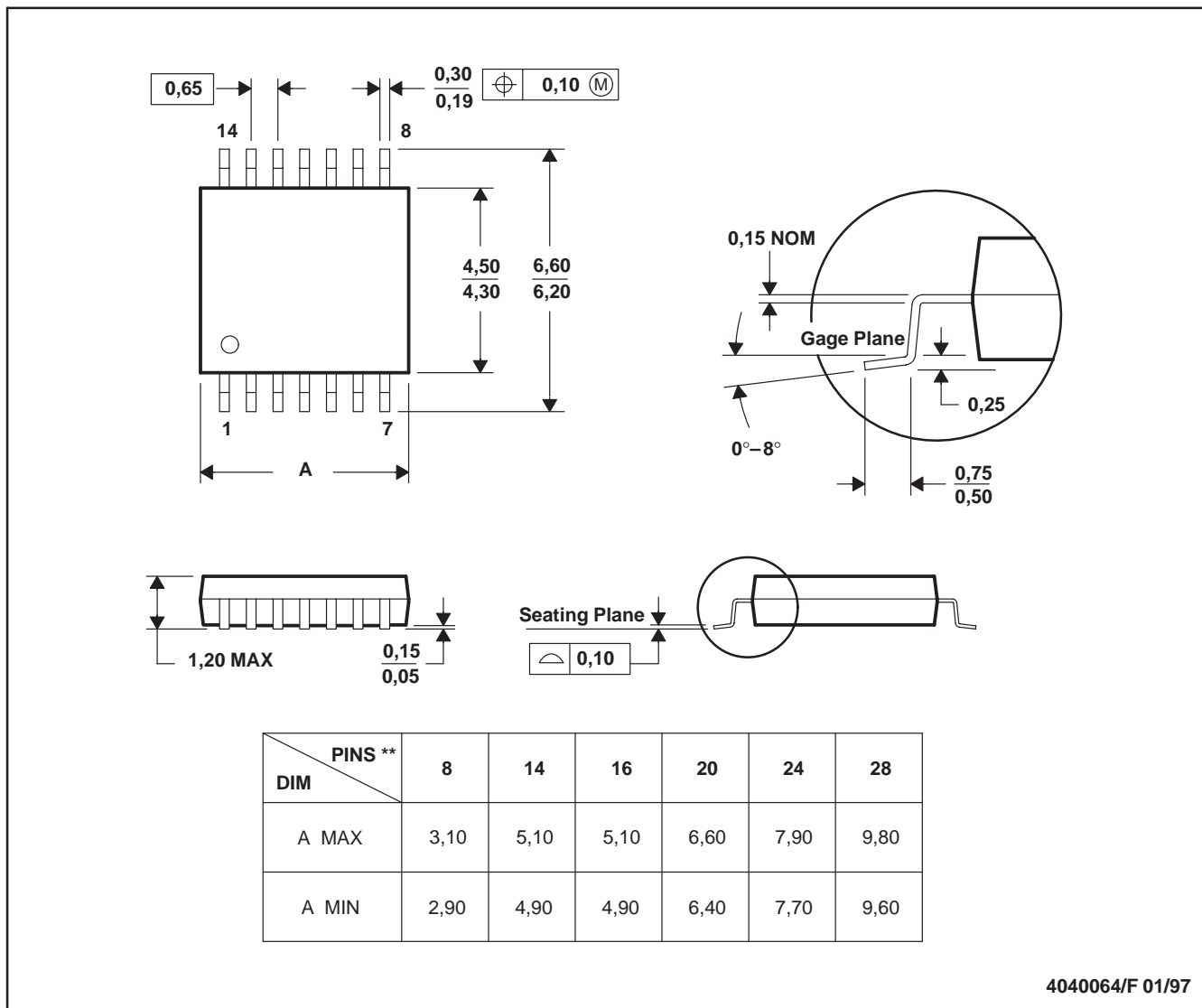
4040083/F 03/03

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

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN

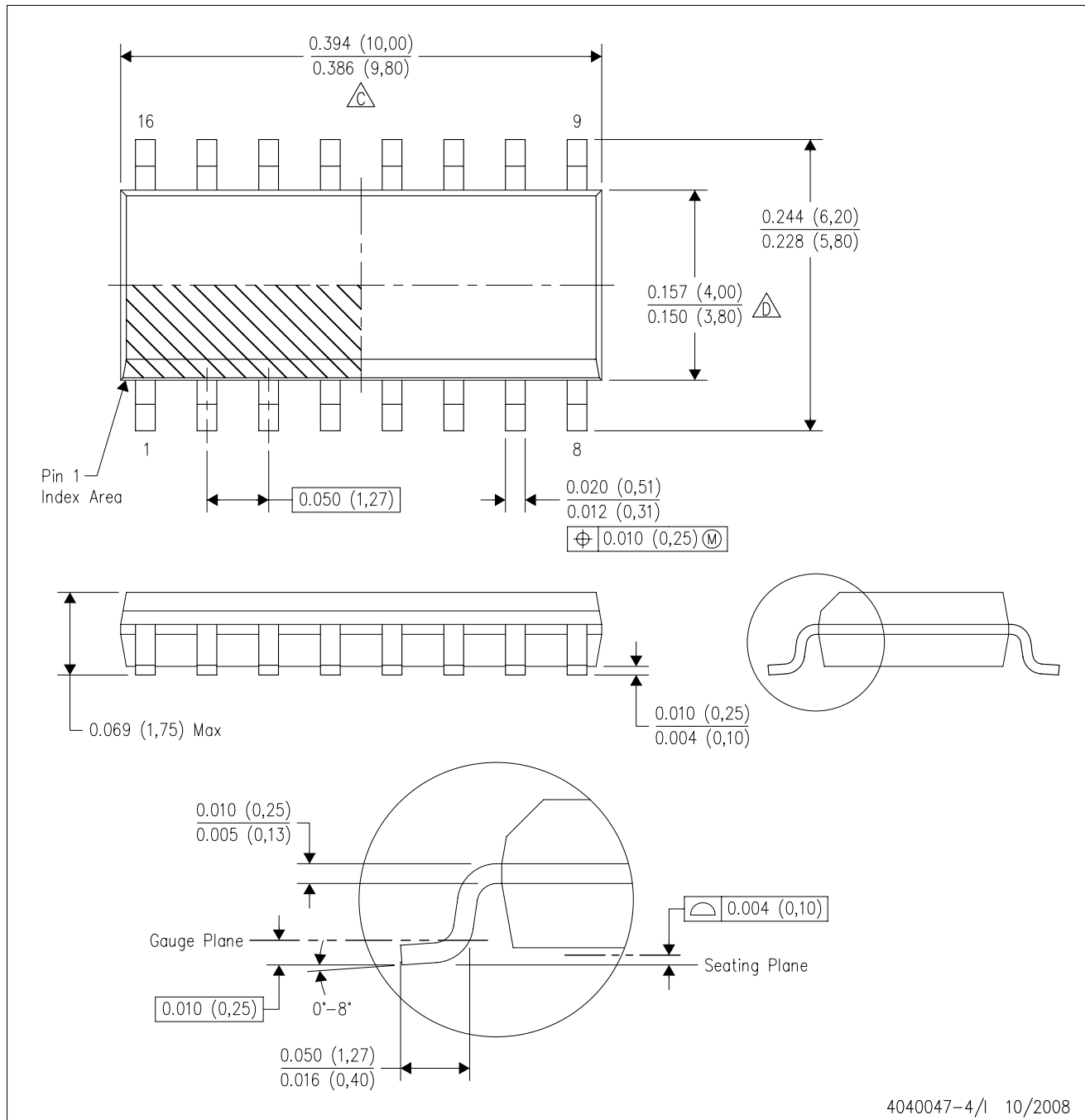


4040064/F 01/97

- 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-153

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - 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 .006 (0,15) per end.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AC.

D(R-PDSO-G16)



4209373/A 03/08

- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Refer to IPC7351 for alternate board 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
 - 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



- NOTES:
- 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.

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