

CD74HC137, CD74HCT137, CD54HC237, CD74HC237, CD74HCT237

High-Speed CMOS Logic, 3- to 8-Line Decoder/Demultiplexer with Address Latches

Features

- **Select One of Eight Data Outputs**
 - Active Low for CD74HC137 and CD74HCT137
 - Active High for 'HC237 and CD74HCT237
- **I/O Port or Memory Selector**
- **Two Enable Inputs to Simplify Cascading**
- **Typical Propagation Delay of 13ns at $V_{CC} = 5V$, 15pF, $T_A = 25^\circ C$ (CD74HC237)**
- **Fanout (Over Temperature Range)**
 - Standard Outputs 10 LSTTL Loads
 - Bus Driver Outputs 15 LSTTL Loads
- **Wide Operating Temperature Range . . . $-55^\circ C$ to $125^\circ C$**
- **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 CD74HC137, CD74HCT137, 'HC237, and CD74HCT237 are high speed silicon gate CMOS decoders well suited to memory address decoding or data routing applications. Both circuits feature low power consumption usually associated with CMOS circuitry, yet have speeds comparable to low power Schottky TTL logic.

Both circuits have three binary select inputs (A_0 , A_1 and A_2) that can be latched by an active High Latch Enable (LE) signal to isolate the outputs from select-input changes. A "Low" LE makes the output transparent to the input and the circuit functions as a one-of-eight decoder. Two Output Enable inputs (\overline{OE}_1 and OE_0) are provided to simplify cascading and to facilitate demultiplexing. The demultiplexing function is accomplished by using the A_0 , A_1 , A_2 inputs to select the desired output and using one of the other Output Enable inputs as the data input while holding the other Output Enable input in its active state. In the CD74HC137 and CD74HCT137 the selected output is a "Low"; in the 'HC237 and CD74HCT237 the selected output is a "High".

Ordering Information

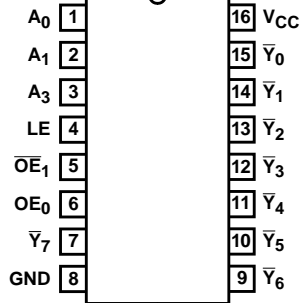
PART NUMBER	TEMP. RANGE ($^\circ C$)	PACKAGE
CD54HC237F3A	-55 to 125	16 Ld CERDIP
CD74HC137E	-55 to 125	16 Ld PDIP
CD74HC137PW	-55 to 125	16 Ld TSSOP
CD74HC137PWR	-55 to 125	16 Ld TSSOP
CD74HC137PWT	-55 to 125	16 Ld TSSOP
CD74HC237E	-55 to 125	16 Ld PDIP
CD74HC237M	-55 to 125	16 Ld SOIC
CD74HC237MT	-55 to 125	16 Ld SOIC
CD74HC237M96	-55 to 125	16 Ld SOIC
CD74HC237NSR	-55 to 125	16 Ld SOP
CD74HC237PW	-55 to 125	16 Ld TSSOP
CD74HC237PWR	-55 to 125	16 Ld TSSOP
CD74HC237PWT	-55 to 125	16 Ld TSSOP
CD74HCT137E	-55 to 125	16 Ld PDIP
CD74HCT137MT	-55 to 125	16 Ld SOIC
CD74HCT137M96	-55 to 125	16 Ld SOIC
CD74HCT237E	-55 to 125	16 Ld PDIP

NOTE: When ordering, use the entire part number. The suffixes 96 and R denote tape and reel. The suffix T denotes a small-quantity reel of 250.

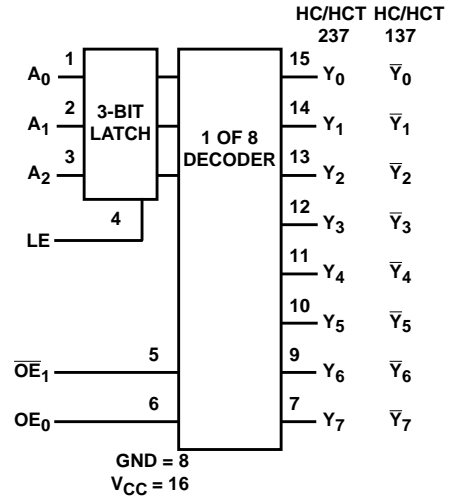
CD74HC137, CD74HCT137, CD54HC237, CD74HC237, CD74HCT237

Pinout

CD54HC237 (CERDIP)
 CD74HC137 (PDIP, TSSOP)
 CD74HCT137 (PDIP, SOIC)
 CD74HC237 (PDIP, SOIC, SOP, TSSOP)
 CD74HCT237 (PDIP)
 TOP VIEW



Functional Diagram



'HC137, 'HCT137 TRUTH TABLE

INPUTS						OUTPUTS							
LE	OE ₀	OE ₁	A ₂	A ₁	A ₀	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆	Y ₇
X	X	H	X	X	X	H	H	H	H	H	H	H	H
X	L	X	X	X	X	H	H	H	H	H	H	H	H
L	H	L	L	L	L	L	H	H	H	H	H	H	H
L	H	L	L	L	H	H	L	H	H	H	H	H	H
L	H	L	L	H	L	H	H	L	H	H	H	H	H
L	H	L	L	H	H	H	H	H	L	H	H	H	H
L	H	L	H	L	L	H	H	H	H	L	H	H	H
L	H	L	H	L	H	H	H	H	H	H	L	H	H
L	H	L	H	H	L	H	H	H	H	H	H	L	H
L	H	L	H	H	H	H	H	H	H	H	H	H	L
H	H	L	X	X	X	Depends upon the address previously applied while LE was at a logic low.							

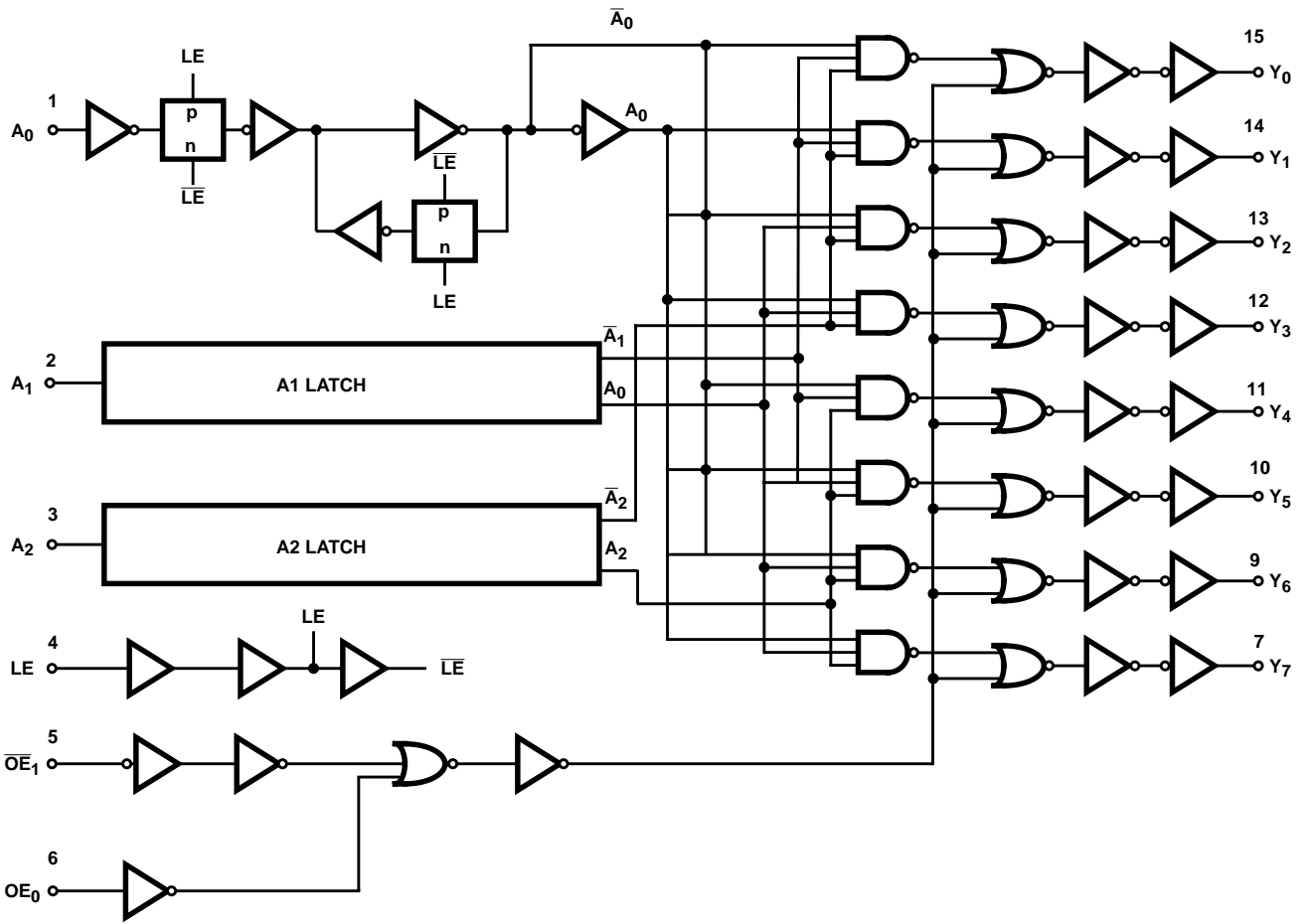
H = High Voltage Level, L = Low Voltage Level, X = Don't Care

'HC237, 'HCT237 TRUTH TABLE

INPUTS						OUTPUTS							
LE	OE ₀	OE ₁	A ₂	A ₁	A ₀	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆	Y ₇
X	X	H	X	X	X	L	L	L	L	L	L	L	L
X	L	X	X	X	X	L	L	L	L	L	L	L	L
L	H	L	L	L	L	H	L	L	L	L	L	L	L
L	H	L	L	L	H	L	H	L	L	L	L	L	L
L	H	L	L	H	L	L	L	H	L	L	L	L	L
L	H	L	L	H	H	L	L	L	H	L	L	L	L
L	H	L	H	L	L	L	L	L	L	H	L	L	L
L	H	L	H	L	H	L	L	L	L	L	H	L	L
L	H	L	H	H	L	L	L	L	L	L	L	H	L
L	H	L	H	H	H	L	L	L	L	L	L	L	H
H	H	L	X	X	X	Depends upon the address previously applied while LE was at a logic low.							

H = High Voltage Level, L = Low Voltage Level, X = Don't Care

Functional Block Diagram



CD74HC137, CD74HCT137, CD54HC237, CD74HC237, CD74HCT237

Absolute Maximum Ratings

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

Thermal Information

Package Thermal Impedance, θ_{JA} (see Note 1):	
E (PDIP) Package	67°C/W
M (SOIC) Package	73°C/W
NS (SOP) Package	64°C/W
PW (TSSOP) Package	108°C/W
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)	

Operating Conditions

Temperature Range (T_A)	-55°C to 125°C
Supply Voltage Range, V_{CC}	
HC Types2V 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)

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:

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

DC Electrical Specifications

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	
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_{OH}	V_{IH} or V_{IL}	-	-	-	-	-	-	-	-	-	V
			-4	4.5	3.98	-	-	3.84	-	3.7	-	V
			-5.2	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_{OL}	V_{IH} or V_{IL}	-	-	-	-	-	-	-	-	-	V
			4	4.5	-	-	0.26	-	0.33	-	0.4	V
			5.2	6	-	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	I_I	V_{CC} or GND	-	6	-	-	± 0.1	-	± 1	-	± 1	μA

CD74HC137, CD74HCT137, CD54HC237, CD74HC237, CD74HCT237

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
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			-4	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			4	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
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:

- 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
All	1.5

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

Prerequisite For Switching Specifications

PARAMETER	SYMBOL	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										
A _n to LE Setup Time	t _{SU}	2	50	-	-	65	-	75	-	ns
		4.5	10	-	-	13	-	15	-	ns
		6	9	-	-	11	-	13	-	ns
A _n to LE Hold Time	t _H	2	30	-	-	40	-	45	-	ns
		4.5	6	-	-	8	-	9	-	ns
		6	5	-	-	7	-	8	-	ns

CD74HC137, CD74HCT137, CD54HC237, CD74HC237, CD74HCT237

Prerequisite For Switching Specifications (Continued)

PARAMETER	SYMBOL	V _{CC} (V)	25°C			-40°C TO 85°C		-55°C TO 125°C		UNITS
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
LE Pulse Width	t _W	2	50	-	-	65	-	75	-	ns
		4.5	10	-	-	13	-	15	-	ns
		6	9	-	-	1	-	13	-	ns
HCT TYPES										
An to LE Setup Time	t _{SU}	4.5	10	-	-	13	-	15	-	ns
An to LE Hold Time	t _H	4.5	7	-	-	9	-	11	-	ns
CD74HCT137										
CD74HCT237	t _H	4.5	5	-	-	5	-	5	-	ns
LE Pulse Width	t _W	4.5	10	-	-	13	-	15	-	ns

Switching Specifications 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 CD74HC137, CD74HCT137 An to any \bar{Y}	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	180	-	225	-	270	ns
			4.5	-	-	36	-	45	-	54	ns
			6	-	-	31	-	38	-	46	ns
Propagation Delay 'HC237, CD74HCT237 An to any Y	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	160	-	200	-	240	ns
			4.5	-	-	32	-	40	-	48	ns
			6	-	-	27	-	34	-	41	ns
Address to Output CD74HC137	t _{PLH} , t _{PHL}	C _L = 15pF	5	5	15	-	-	-	-	ns	
'HC237	t _{PLH} , t _{PHL}	C _L = 15pF	5	-	13	-	-	-	-	ns	
OE ₀ to any \bar{Y} or Y	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	145	-	180	-	220	ns
			4.5	-	-	29	-	36	-	44	ns
			6	-	-	25	-	31	-	38	ns
OE ₁ to any \bar{Y} or Y	t _{TLH} , t _{THL}	C _L = 50pF	2	-	-	145	-	180	-	220	ns
			4.5	-	-	29	-	36	-	44	ns
			6	-	-	25	-	31	-	38	ns
LE to any \bar{Y} or Y	t _{TLH} , t _{THL}	C _L = 50pF	2	-	-	190	-	240	-	285	ns
			4.5	-	-	38	-	48	-	57	ns
			6	-	-	32	-	41	-	48	ns
Power Dissipation Capacitance, (Notes 3, 4) CD74HC137	C _{PD}	C _L = 15pF	5	-	19	-	-	-	-	pF	
	C _{PD}	C _L = 15pF	5	-	23	-	-	-	-	pF	
Output Transition Time	t _{TLH} , t _{THL}	C _L = 50pF	2	-	-	75	-	95	-	110	ns
			4.5	-	-	15	-	19	-	22	ns
			6	-	-	13	-	16	-	19	ns
Input Capacitance	C _I	-	-	-	10	-	10	-	10	pF	

CD74HC137, CD74HCT137, CD54HC237, CD74HC237, CD74HCT237

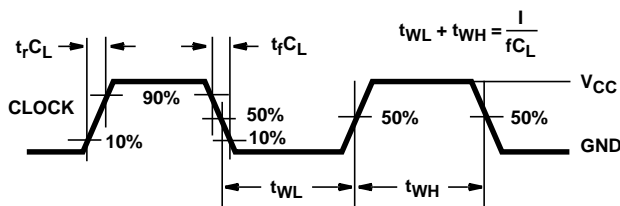
Switching Specifications Input $t_r, t_f = 6\text{ns}$ (Continued)

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	
HCT TYPES											
Propagation Delay An to any \bar{Y} or Y Address to Output	t_{PLH}, t_{PHL}	$C_L = 50\text{pF}$	4.5	-	-	38	-	48	-	57	ns
	t_{PLH}, t_{PHL}	$C_L = 15\text{pF}$	5	-	16	-	-	-	-	-	ns
OE_0 to any Y (HC137)	t_{PLH}, t_{PHL}	$C_L = 50\text{pF}$	4.5	-	-	35	-	44	-	53	ns
OE_0 to any \bar{Y} (HC237)	t_{PLH}, t_{PHL}	$C_L = 50\text{pF}$	4.5	-	-	33	-	41	-	60	ns
\overline{OE}_1 to any \bar{Y} (HC137)	t_{TLH}, t_{THL}	$C_L = 50\text{pF}$	4.5	-	-	37	-	46	-	56	ns
\overline{OE}_1 to any \bar{Y} (HC237)	t_{TLH}, t_{THL}	$C_L = 50\text{pF}$	4.5	-	-	35	-	44	-	53	ns
LE to any Y (HC137)	t_{TLH}, t_{THL}	$C_L = 50\text{pF}$	4.5	-	-	44	-	55	-	66	ns
LE to any \bar{Y} (HC237)	t_{TLH}, t_{THL}	$C_L = 50\text{pF}$	4.5	-	-	42	-	53	-	63	ns
Power Dissipation Capacitance, (Notes 3, 4)											
CD74HC137	C_{PD}	$C_L = 15\text{pF}$	5	-	19	-	-	-	-	-	pF
'HC237	C_{PD}	$C_L = 15\text{pF}$	5	-	23	-	-	-	-	-	pF
Output Transition Time	t_{TLH}, t_{THL}	$C_L = 50\text{pF}$	4.5			15		19		22	ns
Input Capacitance	C_i	-	-	-	-	10	-	10	-	10	pF

NOTES:

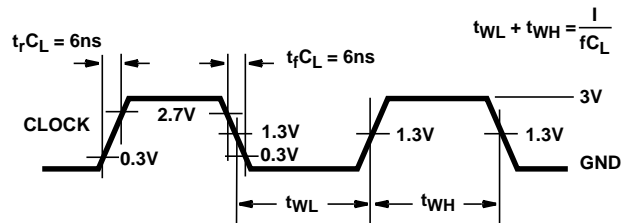
- C_{PD} is used to determine the dynamic power consumption, per gate.
- $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$ where: f_i = Input Frequency, C_L = Output Load Capacitance, V_{CC} = Supply Voltage.

Test Circuits and Waveforms



NOTE: Outputs should be switching from 10% V_{CC} to 90% V_{CC} in accordance with device truth table. For f_{MAX} , input duty cycle = 50%.

FIGURE 1. HC CLOCK PULSE RISE AND FALL TIMES AND PULSE WIDTH



NOTE: Outputs should be switching from 10% V_{CC} to 90% V_{CC} in accordance with device truth table. For f_{MAX} , input duty cycle = 50%.

FIGURE 2. HCT CLOCK PULSE RISE AND FALL TIMES AND PULSE WIDTH

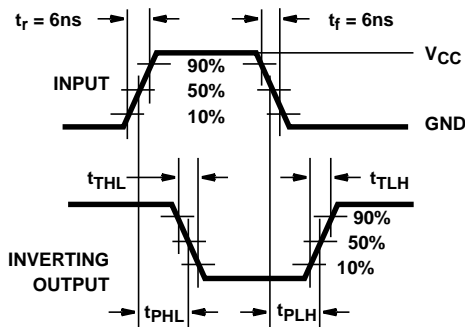


FIGURE 3. HC AND HCU TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

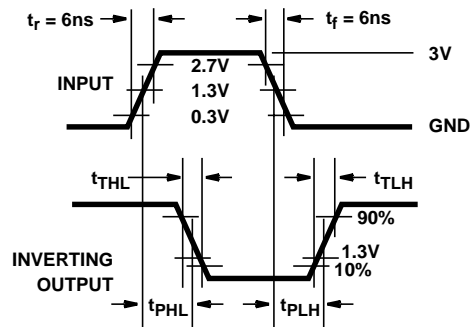


FIGURE 4. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

Test Circuits and Waveforms (Continued)



FIGURE 5. HC SETUP TIMES, HOLD TIMES, REMOVAL TIME, AND PROPAGATION DELAY TIMES FOR EDGE TRIGGERED SEQUENTIAL LOGIC CIRCUITS



FIGURE 6. HCT SETUP TIMES, HOLD TIMES, REMOVAL TIME, AND PROPAGATION DELAY TIMES FOR EDGE TRIGGERED SEQUENTIAL LOGIC CIRCUITS

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
5962-8860601EA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8860601EA CD54HC237F3A	Samples
CD54HC237F	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	CD54HC237F	Samples
CD54HC237F3A	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8860601EA CD54HC237F3A	Samples
CD74HC137E	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC137E	Samples
CD74HC137PW	OBSOLETE	TSSOP	PW	16		TBD	Call TI	Call TI	-55 to 125	HJ137	
CD74HC137PWR	ACTIVE	TSSOP	PW	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HJ137	Samples
CD74HC237DYYR	ACTIVE	SOT-23-THIN	DYY	16	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HJ237	Samples
CD74HC237E	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC237E	Samples
CD74HC237EE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC237E	Samples
CD74HC237M	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-55 to 125	HC237M	
CD74HC237M96	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU SN	Level-1-260C-UNLIM	-55 to 125	HC237M	Samples
CD74HC237NSR	ACTIVE	SO	NS	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC237M	Samples
CD74HC237PWR	ACTIVE	TSSOP	PW	16	2000	RoHS & Green	NIPDAU SN	Level-1-260C-UNLIM	-55 to 125	HJ237	Samples
CD74HC237PWT	OBSOLETE	TSSOP	PW	16		TBD	Call TI	Call TI	-55 to 125	HJ237	
CD74HCT137E	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HCT137E	Samples
CD74HCT137M96	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT137M	Samples
CD74HCT137MT	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-55 to 125	HCT137M	
CD74HCT237E	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74HCT237E	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 ≤ 1000 ppm threshold. Antimony trioxide based flame retardants must also meet the ≤ 1000 ppm 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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

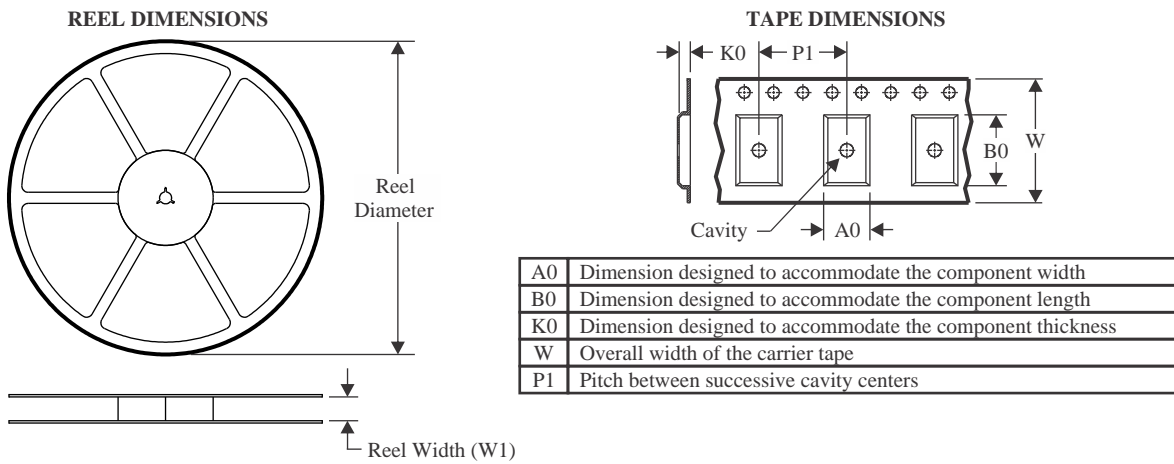
OTHER QUALIFIED VERSIONS OF CD54HC237, CD74HC237 :

● Catalog : [CD74HC237](#)

● Military : [CD54HC237](#)

NOTE: Qualified Version Definitions:

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

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
CD74HC137PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
CD74HC237DYYR	SOT-23-THIN	DYY	16	3000	330.0	12.4	4.8	3.6	1.6	8.0	12.0	Q3
CD74HC237M96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
CD74HC237NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
CD74HC237PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
CD74HC237PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
CD74HCT137M96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74HC137PWR	TSSOP	PW	16	2000	356.0	356.0	35.0
CD74HC237DYR	SOT-23-THIN	DYY	16	3000	336.6	336.6	31.8
CD74HC237M96	SOIC	D	16	2500	356.0	356.0	35.0
CD74HC237NSR	SO	NS	16	2000	356.0	356.0	35.0
CD74HC237PWR	TSSOP	PW	16	2000	356.0	356.0	35.0
CD74HC237PWR	TSSOP	PW	16	2000	356.0	356.0	35.0
CD74HCT137M96	SOIC	D	16	2500	353.0	353.0	32.0

TUBE


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
CD74HC137E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HC137E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HC237E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HC237E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HC237EE4	N	PDIP	16	25	506	13.97	11230	4.32
CD74HC237EE4	N	PDIP	16	25	506	13.97	11230	4.32
CD74HCT137E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HCT137E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HCT237E	N	PDIP	16	25	506	13.97	11230	4.32
CD74HCT237E	N	PDIP	16	25	506	13.97	11230	4.32

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- 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 0.006 (0,15) each side.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 - E. Reference JEDEC MS-012 variation AC.



4220204/A 02/2017

NOTES:

1. All linear dimensions are in millimeters. Any 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 0.25 mm per side.
5. Reference JEDEC registration MO-153.

EXAMPLE BOARD LAYOUT

PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

4220204/A 02/2017

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.

EXAMPLE STENCIL DESIGN

PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220204/A 02/2017

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.

MECHANICAL DATA

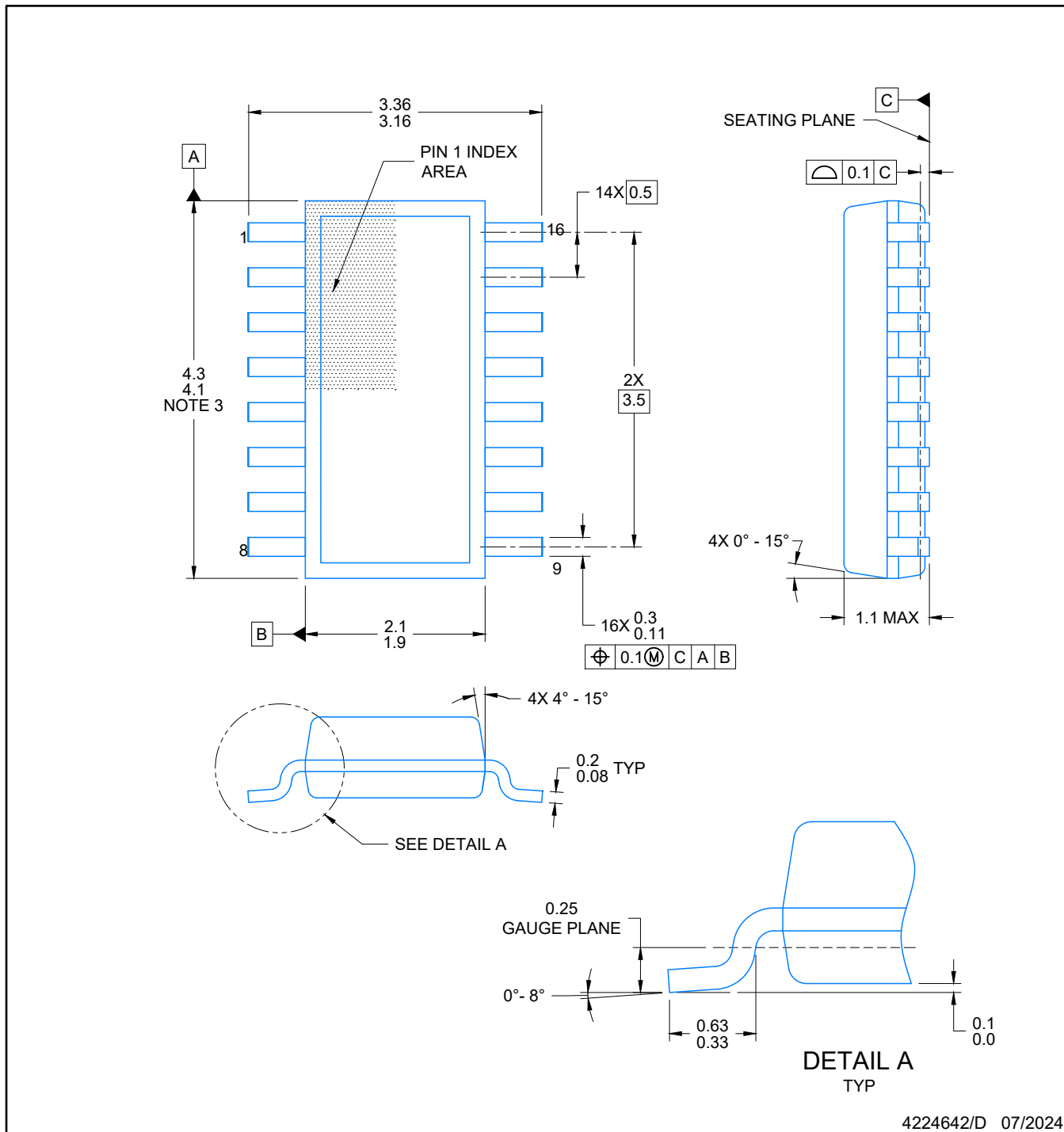
NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-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.



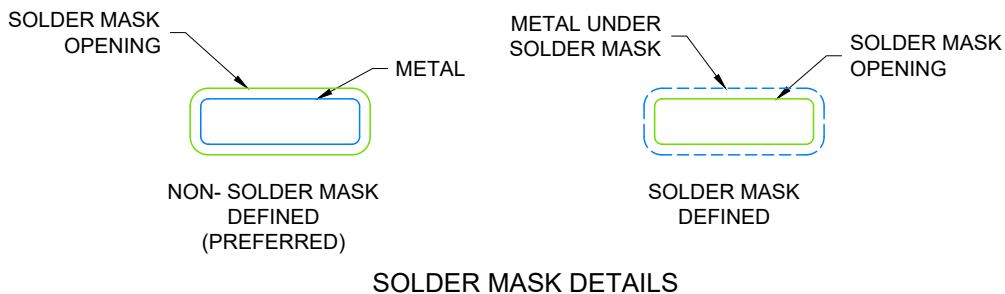
4224642/D 07/2024

NOTES:

1. All linear dimensions are in millimeters. Any 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 per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.50 per side.
5. Reference JEDEC Registration MO-345, Variation AA



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X



4224642/D 07/2024

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: 20X

4224642/D 07/2024

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.

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.

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.

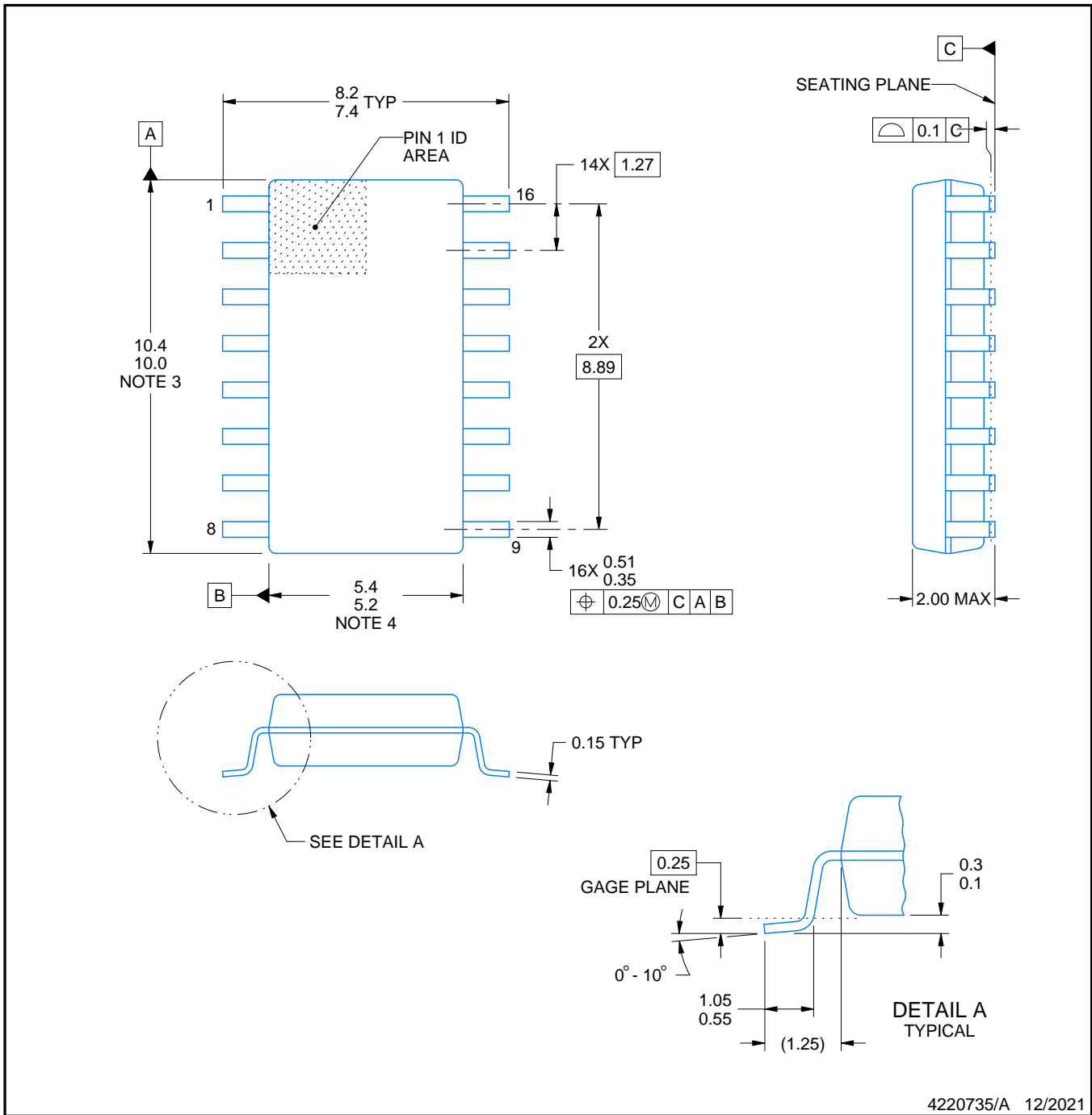


PACKAGE OUTLINE

NS0016A

SOP - 2.00 mm max height

SOP



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 0.25 mm, per side.

EXAMPLE BOARD LAYOUT

NS0016A

SOP - 2.00 mm max height

SOP



SOLDER MASK DETAILS

4220735/A 12/2021

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.

6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

NS0016A

SOP - 2.00 mm max height

SOP



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:7X

4220735/A 12/2021

NOTES: (continued)

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

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2024, Texas Instruments Incorporated