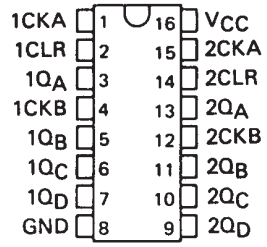
- Dual Versions of the Popular '90A, 'LS90 and '93A, 'LS93
- '390, 'LS390 . . . Individual Clocks for A and B Flip-Flops Provide Dual ÷ 2 and ÷ 5 Counters
- '393, 'LS393 . . . Dual 4-Bit Binary Counter with Individual Clocks
- All Have Direct Clear for Each 4-Bit Counter
- Dual 4-Bit Versions Can Significantly Improve System Densities by Reducing Counter Package Count by 50%
- Typical Maximum Count Frequency . . . 35 MHz
- Buffered Outputs Reduce Possibility of Collector Commutation

description

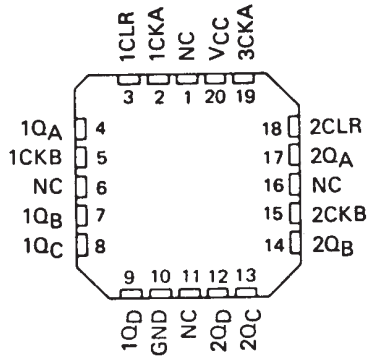
Each of these monolithic circuits contains eight master-slave flip-flops and additional gating to implement two individual four-bit counters in a single package. The '390 and 'LS390 incorporate dual divide-by-two and divide-by-five counters, which can be used to implement cycle lengths equal to any whole and/or cumulative multiples of 2 and/or 5 up to divide-by-100. When connected as a bi-quinary counter, the separate divide-by-two circuit can be used to provide symmetry (a square wave) at the final output stage. The '393 and 'LS393 each comprise two independent four-bit binary counters each having a clear and a clock input. N-bit binary counters can be implemented with each package providing the capability of divide-by-256. The '390, 'LS390, '393, and 'LS393 have parallel outputs from each counter stage so that any submultiple of the input count frequency is available for system-timing signals.

Series 54 and Series 54LS circuits are characterized for operation over the full military temperature range of −55°C to 125°C; Series 74 and Series 74LS circuits are characterized for operation from 0°C to 70°C.

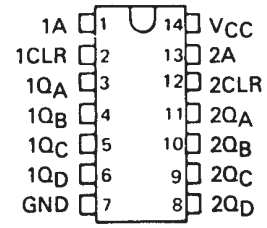
SN54390, SN54LS390 . . . J OR W PACKAGE
SN74390 . . . N PACKAGE
SN74LS390 . . . D OR N PACKAGE
(TOP VIEW)



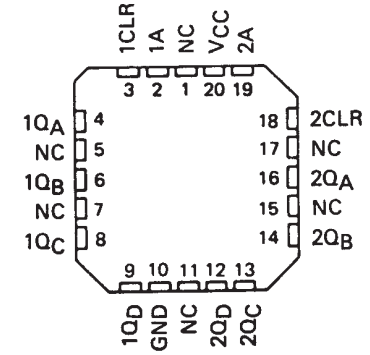
SN54LS390 . . . FK PACKAGE
(TOP VIEW)



SN54393, SN54LS393 . . . J OR W PACKAGE
SN74393 . . . N PACKAGE
SN74LS393 . . . D OR N PACKAGE
(TOP VIEW)



SN54LS393 . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

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.

Copyright © 1988, Texas Instruments Incorporated

FUNCTION TABLES

'390, 'LS390 BCD COUNT SEQUENCE (EACH COUNTER) (See Note A)

COUNT	OUTPUT			
	Q_D	Q_C	Q_B	Q_A
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H

'390, 'LS390 BI-QUINARY (5-2) (EACH COUNTER) (See Note B)

COUNT	OUTPUT			
	Q_A	Q_D	Q_C	Q_B
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	H	L	L	L
6	H	L	L	H
7	H	L	H	L
8	H	L	H	H
9	H	H	L	L

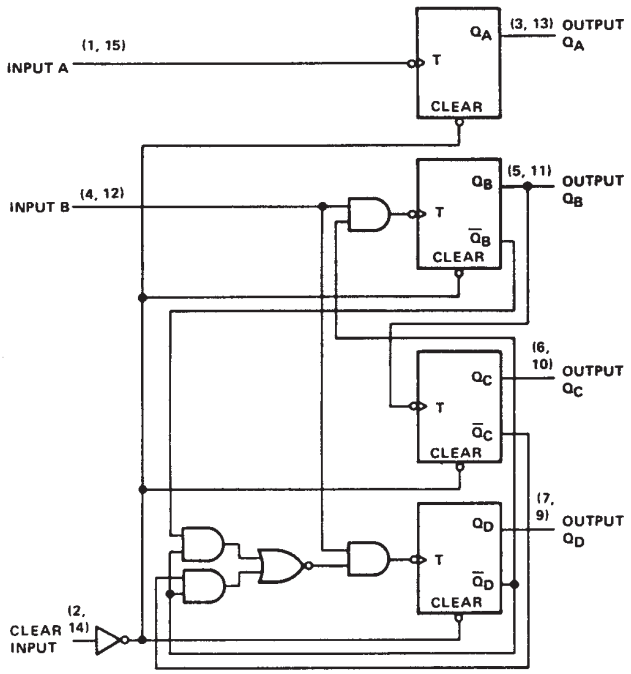
'393, 'LS393 COUNT SEQUENCE (EACH COUNTER)

COUNT	OUTPUT			
	Q_D	Q_C	Q_B	Q_A
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H
10	H	L	H	L
11	H	L	H	H
12	H	H	L	L
13	H	H	L	H
14	H	H	H	L
15	H	H	H	H

NOTES: A. Output Q_A is connected to input B for BCD count.
B. Output Q_D is connected to input A for bi-quinary count.
C. H = high level, L = low level.

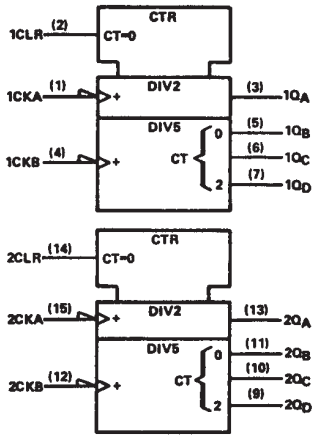
logic diagrams (positive logic)

'390, 'LS390

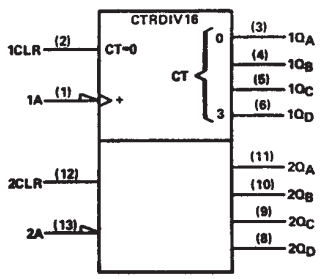


logic symbols†

'390, 'LS390



'393, 'LS393

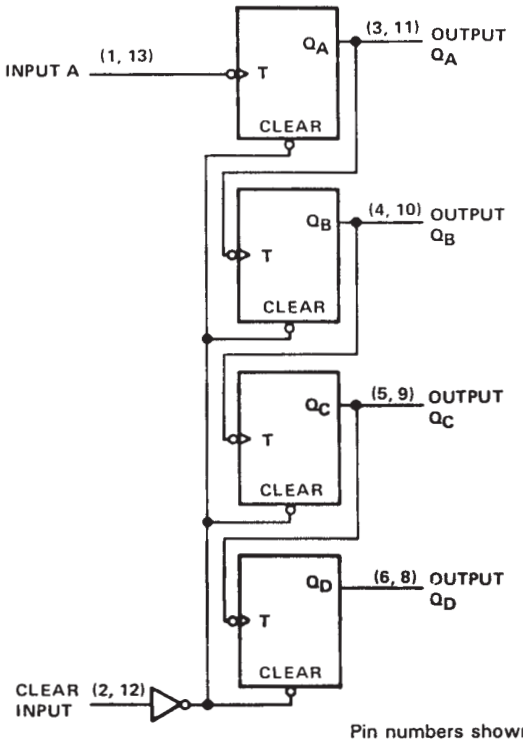


†These symbols are in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, N, and W packages.

logic diagrams (continued)

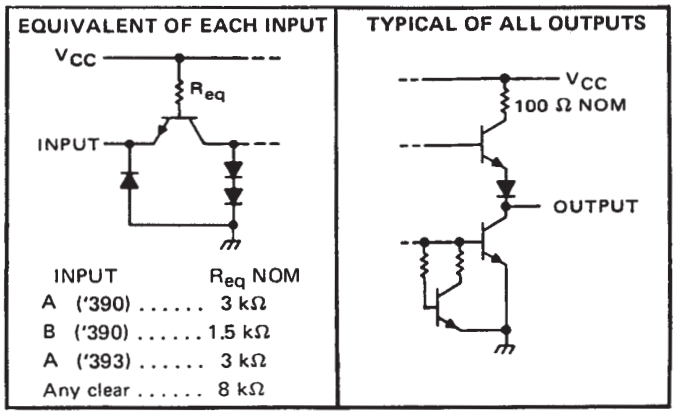
'393, 'LS393



Pin numbers shown are for D, J, N and W packages.

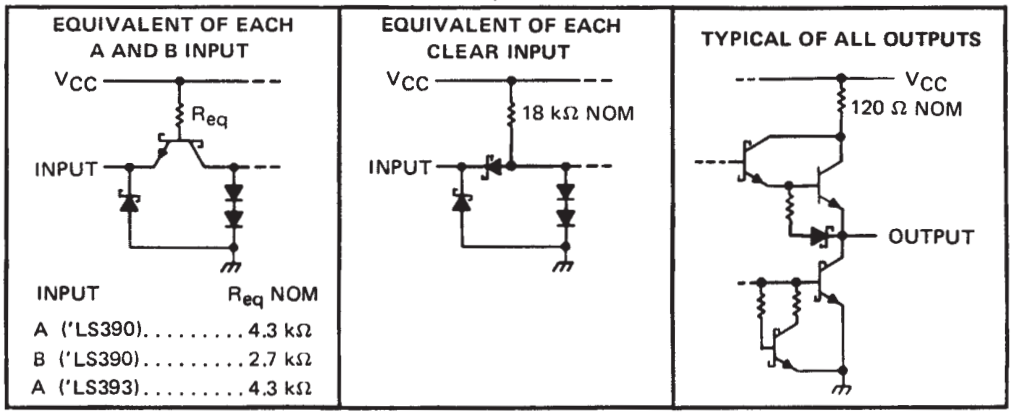
schematics of inputs and outputs

'390, '393



INPUT	R_{eq} NOM
A ('390)	3 kΩ
B ('390)	1.5 kΩ
A ('393)	3 kΩ
Any clear	8 kΩ

'LS390, 'LS393



INPUT	R_{eq} NOM
A ('LS390)	4.3 kΩ
B ('LS390)	2.7 kΩ
A ('LS393)	4.3 kΩ

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage . . . . . 5.5 V
Operating free-air temperature range: SN54390, SN54393 . . . . . −55°C to 125°C
SN74390, SN74393 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

		SN54390 SN54393			SN74390 SN74393			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}		4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}				−800			−800	μA
Low-level output current, I_{OL}				16			16	mA
Count frequency, f_{count}	A input	0		25	0		25	MHz
	B input	0		20	0		20	
Pulse width, t_w	A input high or low	20			20			ns
	B input high or low	25			25			
	Clear high	20			20			
Clear inactive-state setup time, t_{su}		25↓			25↓			ns
Operating free-air temperature, T_A		−55		125	0		70	°C

↓ The arrow indicates that the falling edge of the clock pulse is used for reference.

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

PARAMETER			TEST CONDITIONS†		'390 MIN	'390 TYP‡	'390 MAX	'393 MIN	'393 TYP‡	'393 MAX	UNIT
V_{IH}	High-level input voltage				2			2			V
V_{IL}	Low-level input voltage						0.8			0.8	V
V_{IK}	Input clamp voltage		V_{CC} = MIN, I_I = −12 mA				−1.5			−1.5	V
V_{OH}	High-level output voltage		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = 0.8 V, I_{OH} = −800 μA		2.4	3.4		2.4	3.4		V
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = 0.8 V, I_{OL} = 16 mA¶			0.2	0.4		0.2	0.4	V
I_I	Input current at maximum input voltage		V_{CC} = MAX, V_I = 5.5 V				1			1	mA
I_{IH}	High-level input current	Clear	V_{CC} = MAX, V_I = 2.4 V				40			40	μA
		Input A					80			80	
		Input B					120				
I_{IL}	Low-level input current	Clear	V_{CC} = MAX, V_I = 0.4 V				−1			−1	mA
		Input A					−3.2			−3.2	
		Input B					−4.8				
I_{OS}	Short-circuit output current§		V_{CC} = MAX	SN54'	−20		−57	−20		−57	mA
				SN74'	−18		−57	−18		−57	
I_{CC}	Supply current		V_{CC} = MAX, See Note 2			42	69		38	64	mA

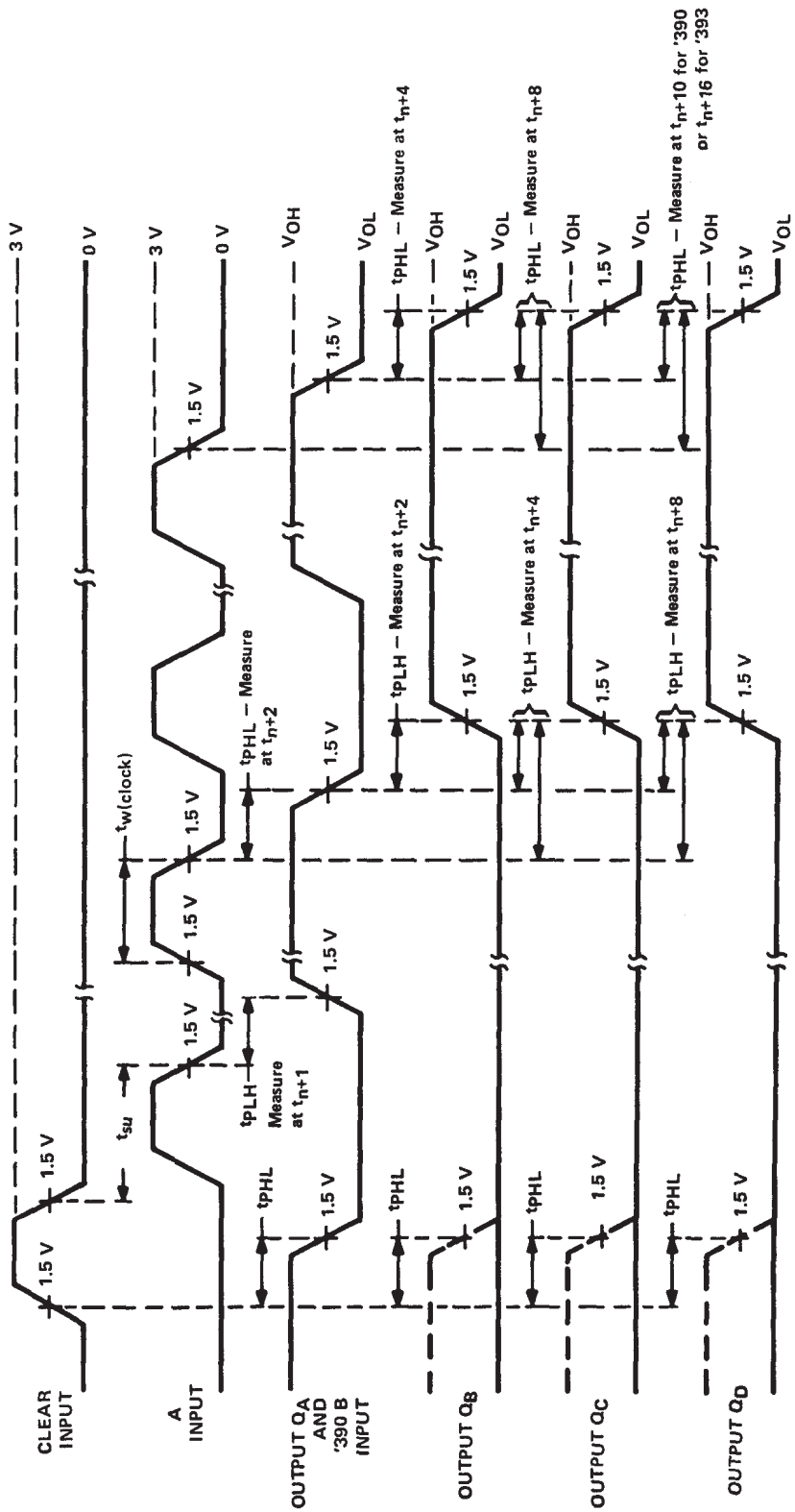
† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ Not more than one output should be shorted at a time.
¶ The Q_A outputs of the '390 are tested at I_{OL} = 16 mA plus the limit value for I_{IL} for the B input. This permits driving the B input while maintaining full fan-out capability.
NOTE 2: I_{CC} is measured with all outputs open, both clear inputs grounded following momentary connection to 4.5 V, and all other inputs grounded.

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'390			'393			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
f_{max}	A	Q_A	C_L = 15 pF, R_L = 400 Ω, See Note 3 and Figure 1	25	35		25	35		MHz
	B	Q_B		20	30					
t_{PLH}	A	Q_A			12	20		12	20	ns
t_{PHL}					13	20		13	20	
t_{PLH}	A	Q_C of '390 Q_D of '393			37	60		40	60	ns
t_{PHL}					39	60		40	60	
t_{PLH}	B	Q_B			13	21				ns
t_{PHL}					14	21				
t_{PLH}	B	Q_C			24	39				ns
t_{PHL}					26	39				
t_{PLH}	B	Q_D			13	21				ns
t_{PHL}					14	21				
t_{PHL}	Clear	Any			24	39		24	39	ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

PARAMETER MEASUREMENT INFORMATION



NOTE A: Input pulses are supplied by a generator having the following characteristics $t_r \leq 5$ ns, $t_f \leq 5$ ns, PRR = 1 MHz, duty cycle = 50%, $Z_{out} \approx 50$ ohms.

FIGURE 1

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Clear input voltage . . . . . 7 V
Any A or B clock input voltage . . . . . 5.5 V
Operating free-air temperature range: SN54LS390, SN54LS393 . . . . . −55°C to 125°C
SN74LS390, SN74LS393 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

		SN54LS390 SN54LS393			SN74LS390 SN74LS393			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}		4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}				−400			−400	μA
Low-level output current, I_{OL}				4			8	mA
Count frequency, f_{count}	A input	0		25	0		25	MHz
	B input	0		12.5	0		12.5	
Pulse width, t_w	A input high or low	20			20			ns
	B input high or low	40			40			
	Clear high	20			20			
Clear inactive-state setup time, t_{su}		25↓			25↓			ns
Operating free-air temperature, T_A		−55		125	0		70	°C

↓ The arrow indicates that the falling edge of the clock pulse is used for reference.

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

PARAMETER			TEST CONDITIONS†		SN54LS'			SN74LS'			UNIT
					MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH}	High-level input voltage				2			2			V
V_{IL}	Low-level input voltage						0.7			0.8	V
V_{IK}	Input clamp voltage		V_{CC} = MIN, I_I = −18 mA				−1.5			−1.5	V
V_{OH}	High-level output voltage		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = V_{IL}max, I_{OH} = −400 μA		2.5	3.4		2.7	3.4		V
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = 0.8 V,	I_{OL} = 4 mA¶		0.25	0.4		0.25	0.4	V
				I_{OL} = 8 mA¶					0.35	0.5	
I_I	Input current at maximum input voltage	Clear	V_{CC} = MAX	V_I = 7 V			0.1			0.1	mA
		Input A		V_I = 5.5 V			0.2			0.2	
		Input B					0.4			0.4	
I_{IH}	High-level input current	Clear	V_{CC} = MAX, V_I = 2.7 V				0.02			0.02	mA
		Input A					0.1			0.1	
		Input B					0.2			0.2	
I_{IL}	Low-level input current	Clear	V_{CC} = MAX, V_I = 0.4 V				−0.4			−0.4	mA
		Input A					−1.6			−1.6	
		Input B					−2.4			−2.4	
I_{OS}	Short-circuit output current§		V_{CC} = MAX		−20		−100	−20		−100	mA
I_{CC}	Supply current		V_{CC} = MAX, See Note 2	'LS390		15	26		15	26	mA
				'LS393		15	26		15	26	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.
¶ The Q_A outputs of the 'LS390 are tested at I_{OL} = MAX plus the limit value for I_{IL} for the clock B input. This permits driving the clock B input while maintaining full fan-out capability.

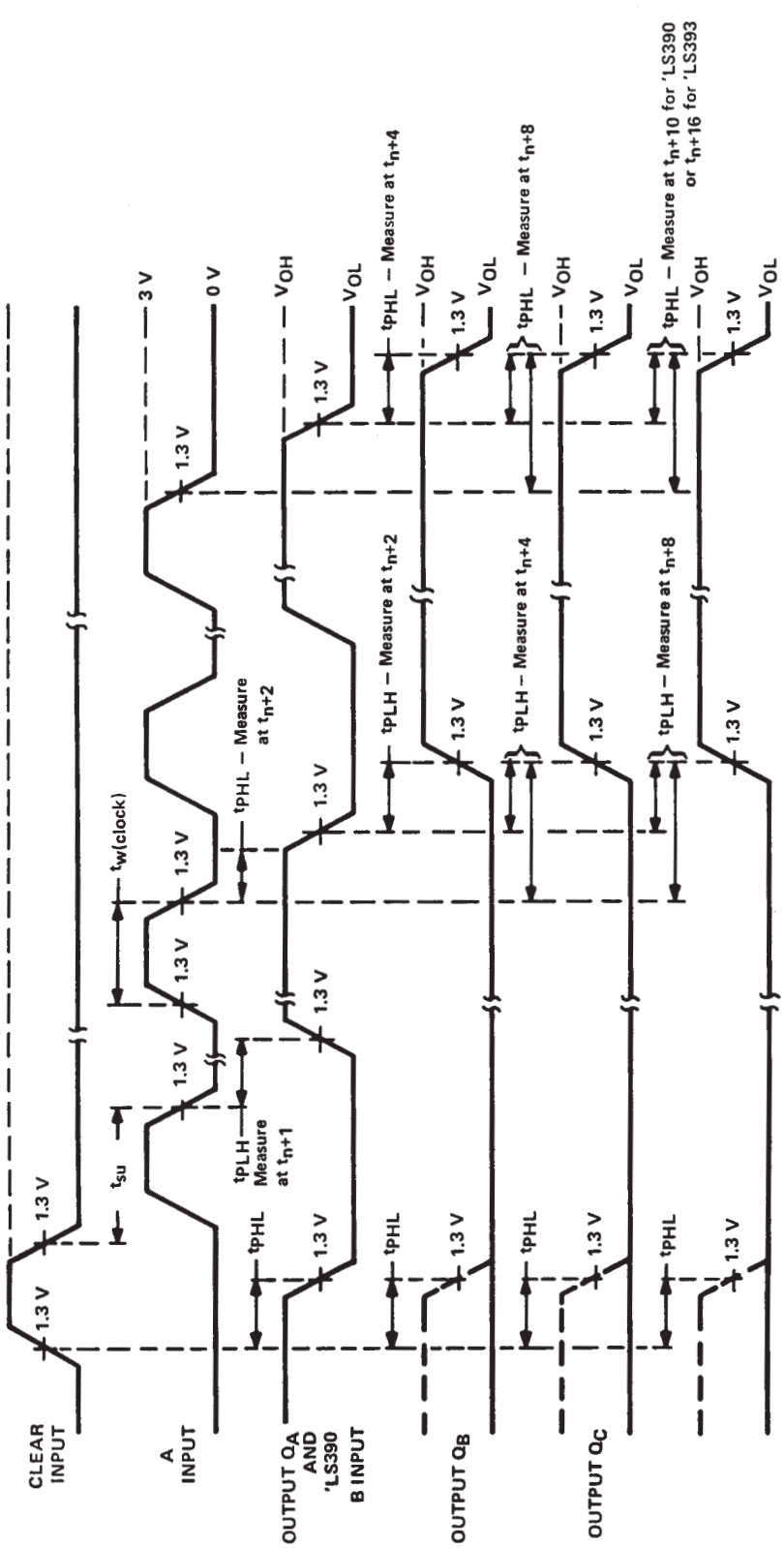
NOTE 2: I_{CC} is measured with all outputs open, both clear inputs grounded following momentary connection to 4.5 V, and all other inputs grounded.

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS390			'LS393			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
f_{max}	A	Q_A	C_L = 15 pF, R_L = 2 kΩ, See Note 4 and Figure 2	25	35		25	35		MHz
	B	Q_B		12.5	20					
t_{PLH}	A	Q_A			12	20		12	20	ns
t_{PHL}					13	20		13	20	
t_{PLH}	A	Q_C of 'LS390 Q_D of 'LS393			37	60		40	60	ns
t_{PHL}					39	60		40	60	
t_{PLH}	B	Q_B			13	21				ns
t_{PHL}					14	21				
t_{PLH}	B	Q_C			24	39				ns
t_{PHL}					26	39				
t_{PLH}	B	Q_D			13	21				ns
t_{PHL}					14	21				
t_{PHL}	Clear	Any			24	39		24	39	ns

NOTE 4: Load circuits and voltage waveforms are shown in Section 1.

PARAMETER MEASUREMENT INFORMATION



VOLTAGE WAVEFORMS

NOTE A: Input pulses are supplied by a generator having the following characteristics $t_r \leq 15$ ns, $t_f \leq 6$ ns, PRR = 1 MHz, duty cycle = 50 %, $Z_{out} \approx 50$ ohms.

FIGURE 2

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/ Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
7802601EA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Call TI	
7802601FA	ACTIVE	CFP	W	16	1	TBD	Call TI	Call TI	
7802601FA	ACTIVE	CFP	W	16	1	TBD	Call TI	Call TI	
JM38510/32701B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
JM38510/32701B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
JM38510/32701BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
JM38510/32701BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
JM38510/32702B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
JM38510/32702B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
JM38510/32702BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
JM38510/32702BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
JM38510/32702BDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	
JM38510/32702BDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	
JM38510/32702SCA	ACTIVE	CDIP	J	14	25	TBD	A42	N / A for Pkg Type	
JM38510/32702SCA	ACTIVE	CDIP	J	14	25	TBD	A42	N / A for Pkg Type	
JM38510/32702SDA	ACTIVE	CFP	W	14	25	TBD	A42	N / A for Pkg Type	
JM38510/32702SDA	ACTIVE	CFP	W	14	25	TBD	A42	N / A for Pkg Type	
M38510/32701B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
M38510/32701B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
M38510/32701BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
M38510/32701BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
M38510/32702B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
M38510/32702B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
M38510/32702BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
M38510/32702BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
M38510/32702BDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	
M38510/32702BDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	
M38510/32702SCA	ACTIVE	CDIP	J	14	25	TBD	A42	N / A for Pkg Type	
M38510/32702SCA	ACTIVE	CDIP	J	14	25	TBD	A42	N / A for Pkg Type	
M38510/32702SDA	ACTIVE	CFP	W	14	25	TBD	A42	N / A for Pkg Type	

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/ Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
M38510/32702SDA	ACTIVE	CFP	W	14	25	TBD	A42	N / A for Pkg Type	
SN54393J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI	
SN54393J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI	
SN54LS390J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
SN54LS390J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
SN54LS393J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SN54LS393J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SN74390N	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	
SN74390N	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	
SN74393N	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI	
SN74393N	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI	
SN74393N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI	
SN74393N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI	
SN74LS390D	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390D	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390DE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390DE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390DG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390DG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS390N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS390N3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	
SN74LS390N3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	
SN74LS390NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS390NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS390NSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/ Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
SN74LS390NSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390NSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390NSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390NSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS390NSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI	
SN74LS393J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI	

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/ Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
SN74LS393N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS393N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS393N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI	
SN74LS393N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI	
SN74LS393NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS393NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74LS393NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393NSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LS393NSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SNJ54393J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI	
SNJ54393J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI	
SNJ54393W	OBSOLETE	CFP	W	14		TBD	Call TI	Call TI	
SNJ54393W	OBSOLETE	CFP	W	14		TBD	Call TI	Call TI	
SNJ54LS390FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
SNJ54LS390FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
SNJ54LS390J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
SNJ54LS390J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
SNJ54LS390W	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type	
SNJ54LS390W	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type	
SNJ54LS393FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
SNJ54LS393FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
SNJ54LS393J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SNJ54LS393J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SNJ54LS393W	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/ Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
SNJ54LS393W	ACTIVE	CFP	W	14	1	TBD	A42	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.
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.

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 SN54393, SN54LS390, SN54LS393, SN54LS393-SP, SN74393, SN74LS390, SN74LS393 :

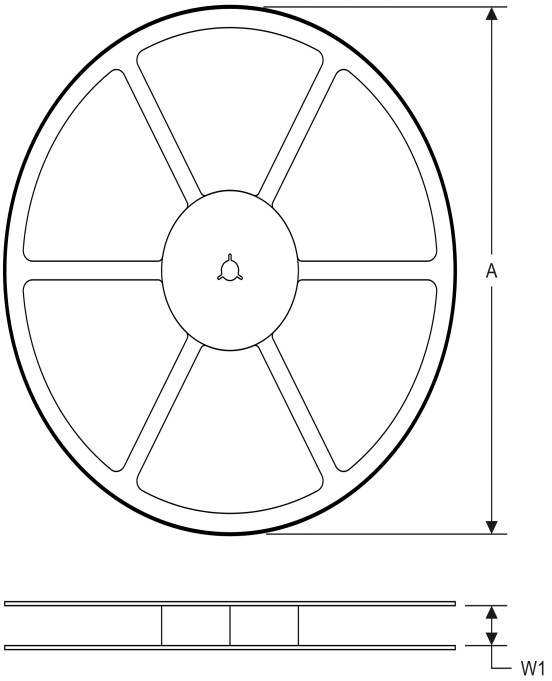
- Catalog: SN74393, SN74LS390, SN74LS393, SN54LS393
- Military: SN54393, SN54LS390, SN54LS393
- Space: SN54LS393-SP

NOTE: Qualified Version Definitions:

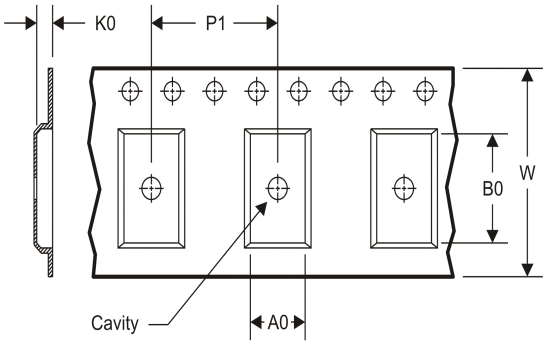
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



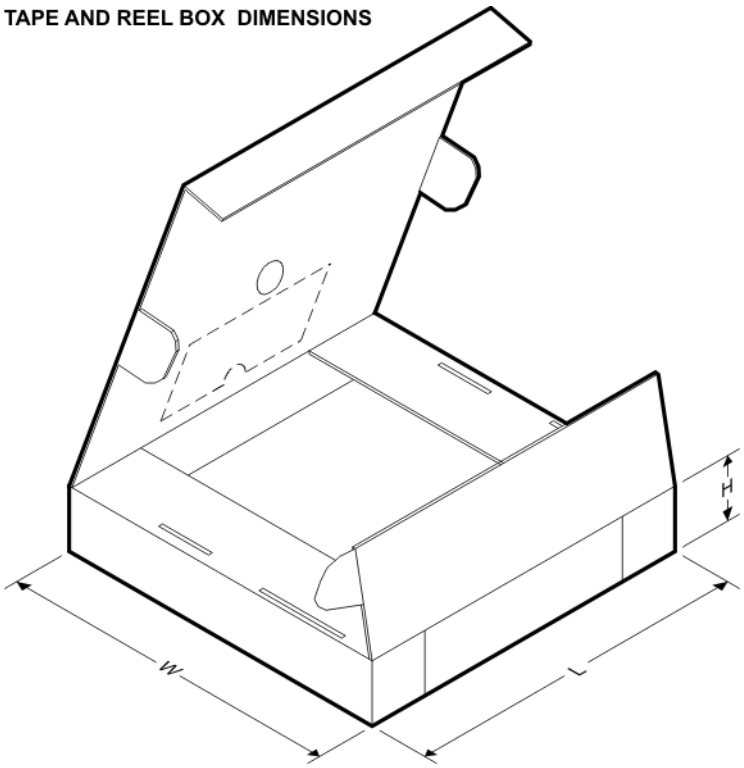
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

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
SN74LS390NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74LS393DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LS393NSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS



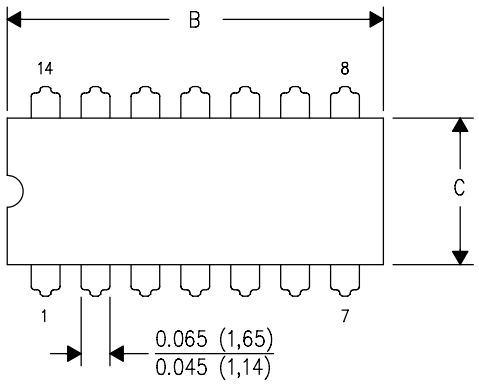
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LS390NSR	SO	NS	16	2000	367.0	367.0	38.0
SN74LS393DR	SOIC	D	14	2500	367.0	367.0	38.0
SN74LS393NSR	SO	NS	14	2000	367.0	367.0	38.0

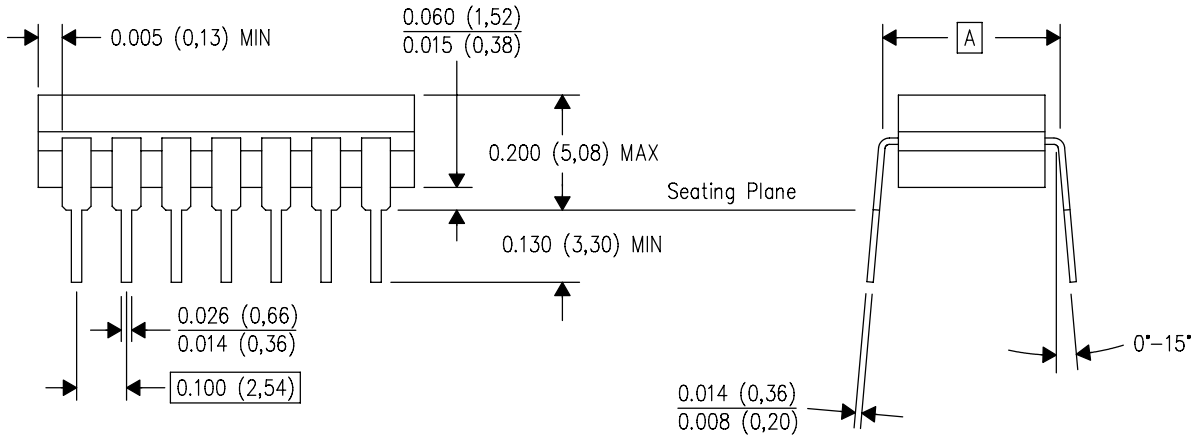
J (R–GDIP–T**)

14 LEADS SHOWN

CERAMIC DUAL IN–LINE PACKAGE



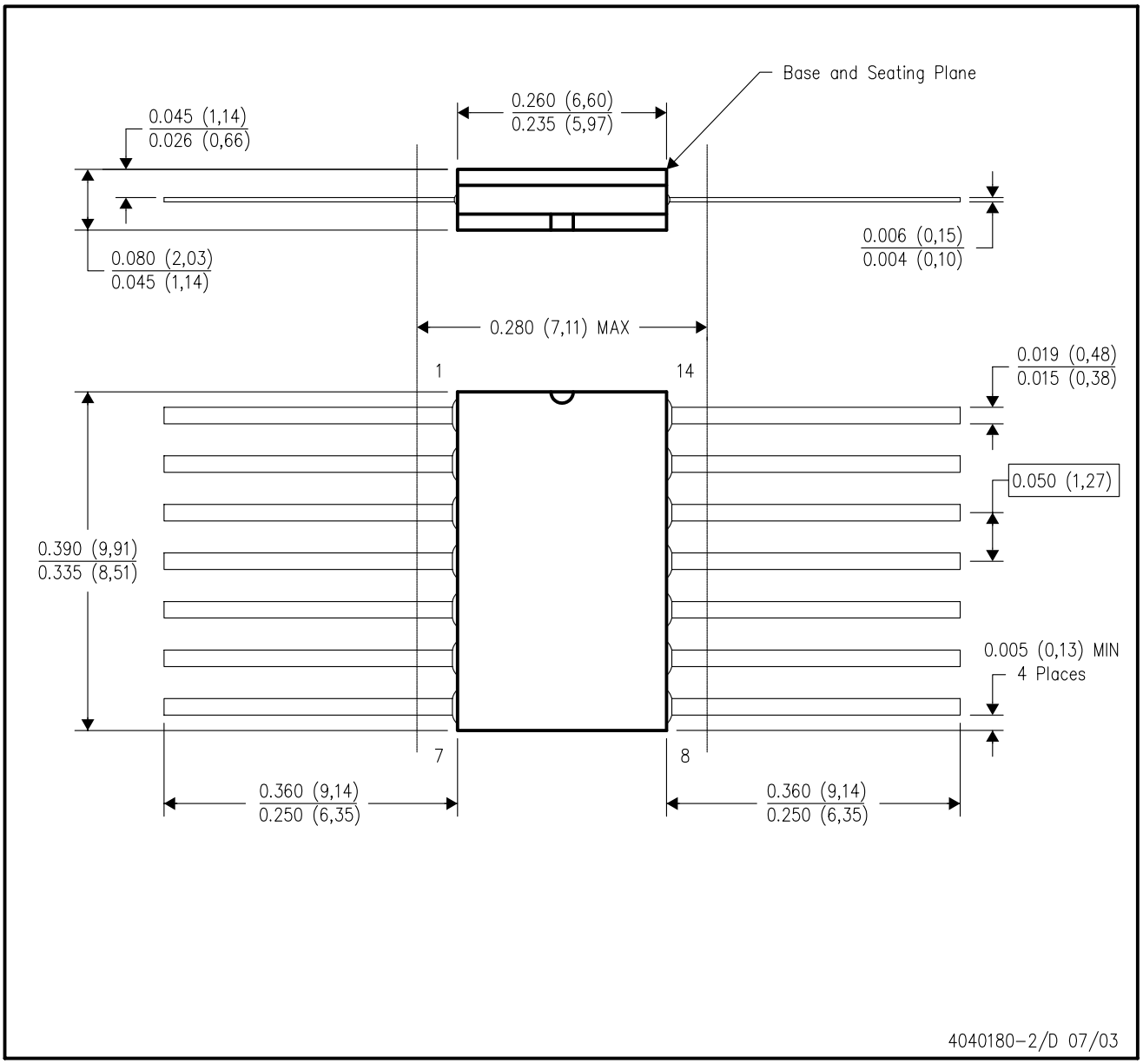
DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

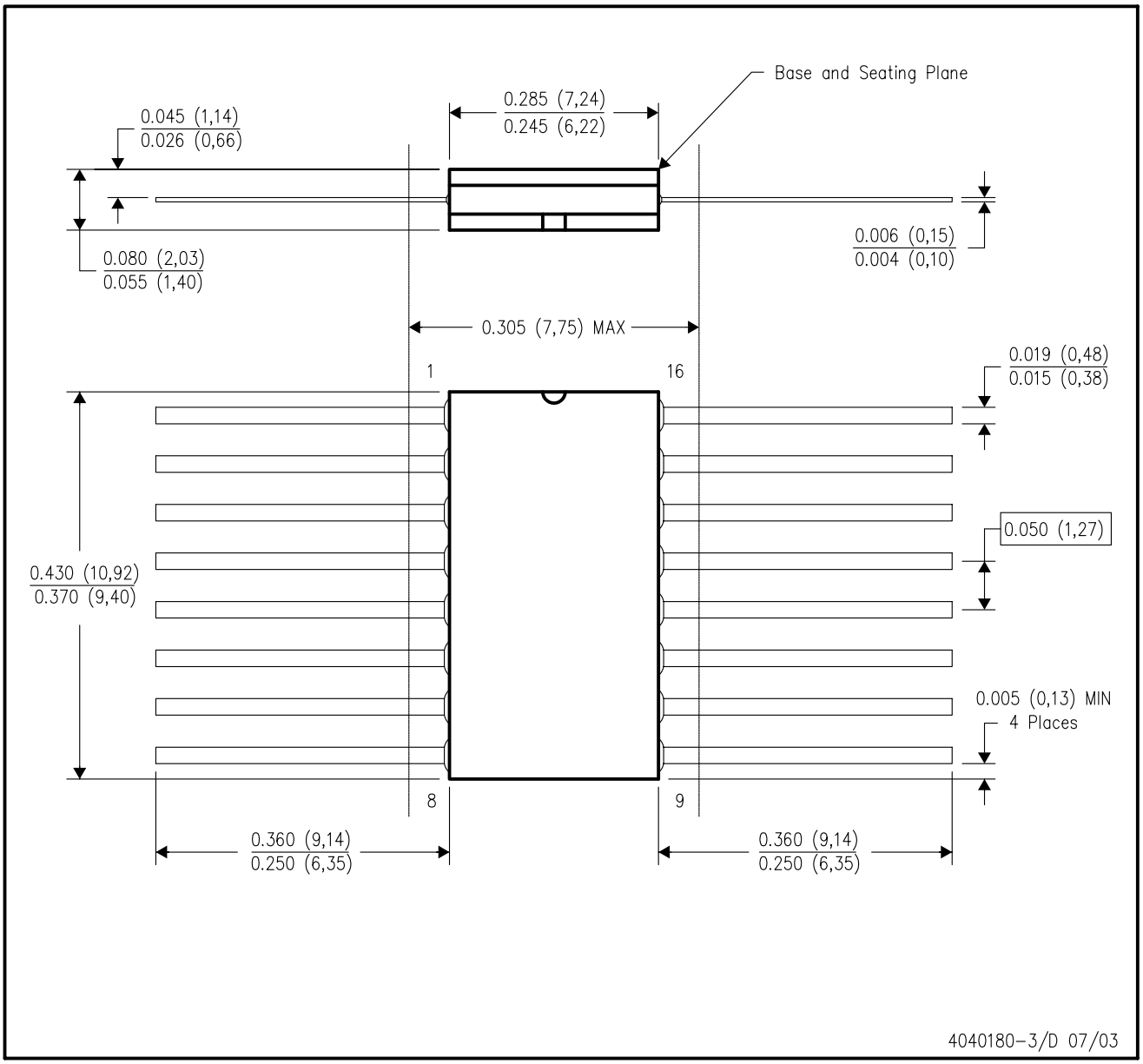
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls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

W (R–GDFP–F14) CERAMIC DUAL FLATPACK



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP1–F14 and JEDEC MO–092AB

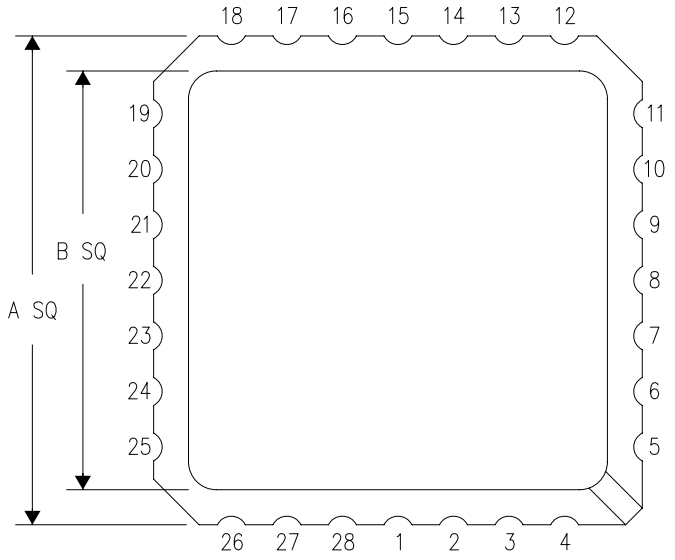
W (R–GDFP–F16) CERAMIC DUAL FLATPACK



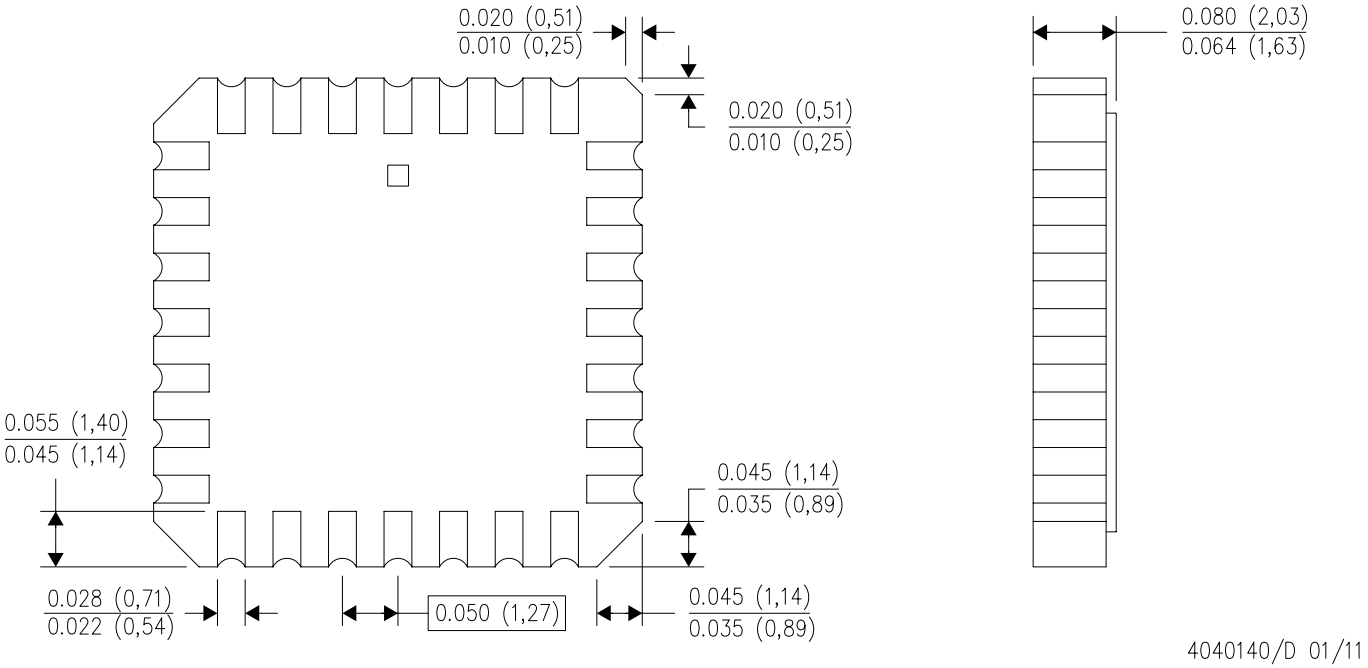
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP1–F16 and JEDEC MO–092AC

FK (S–CQCC–N**) LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.740 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)



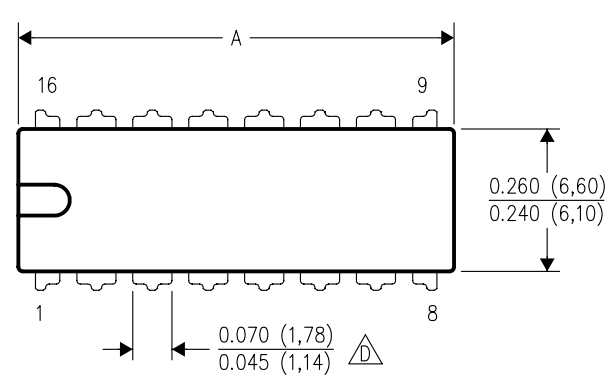
4040140/D 01/11

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a metal lid.
D. Falls within JEDEC MS–004

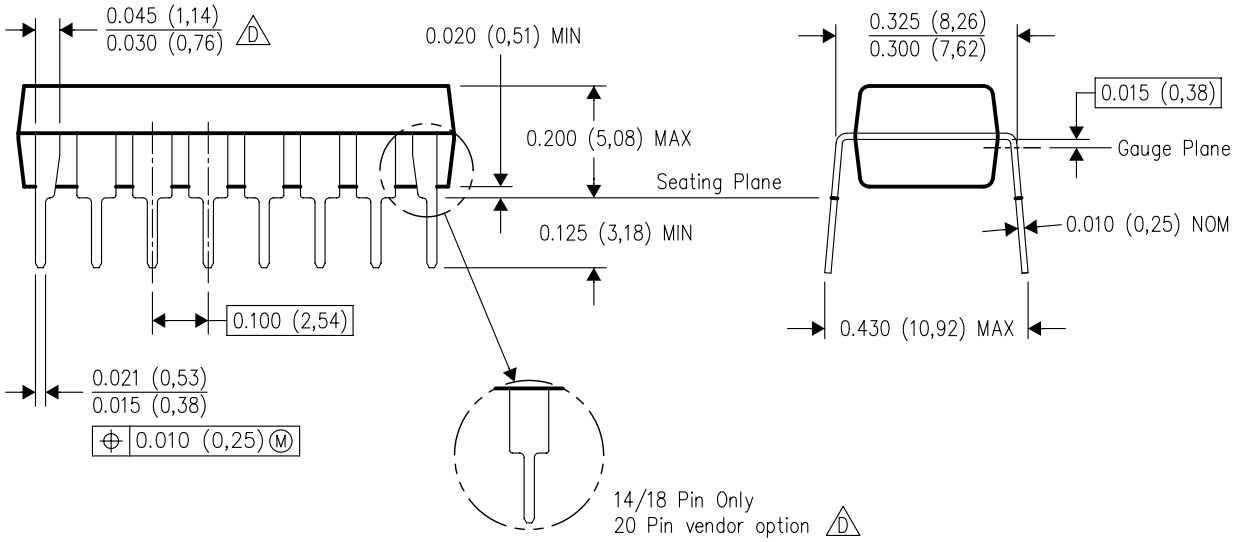
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN



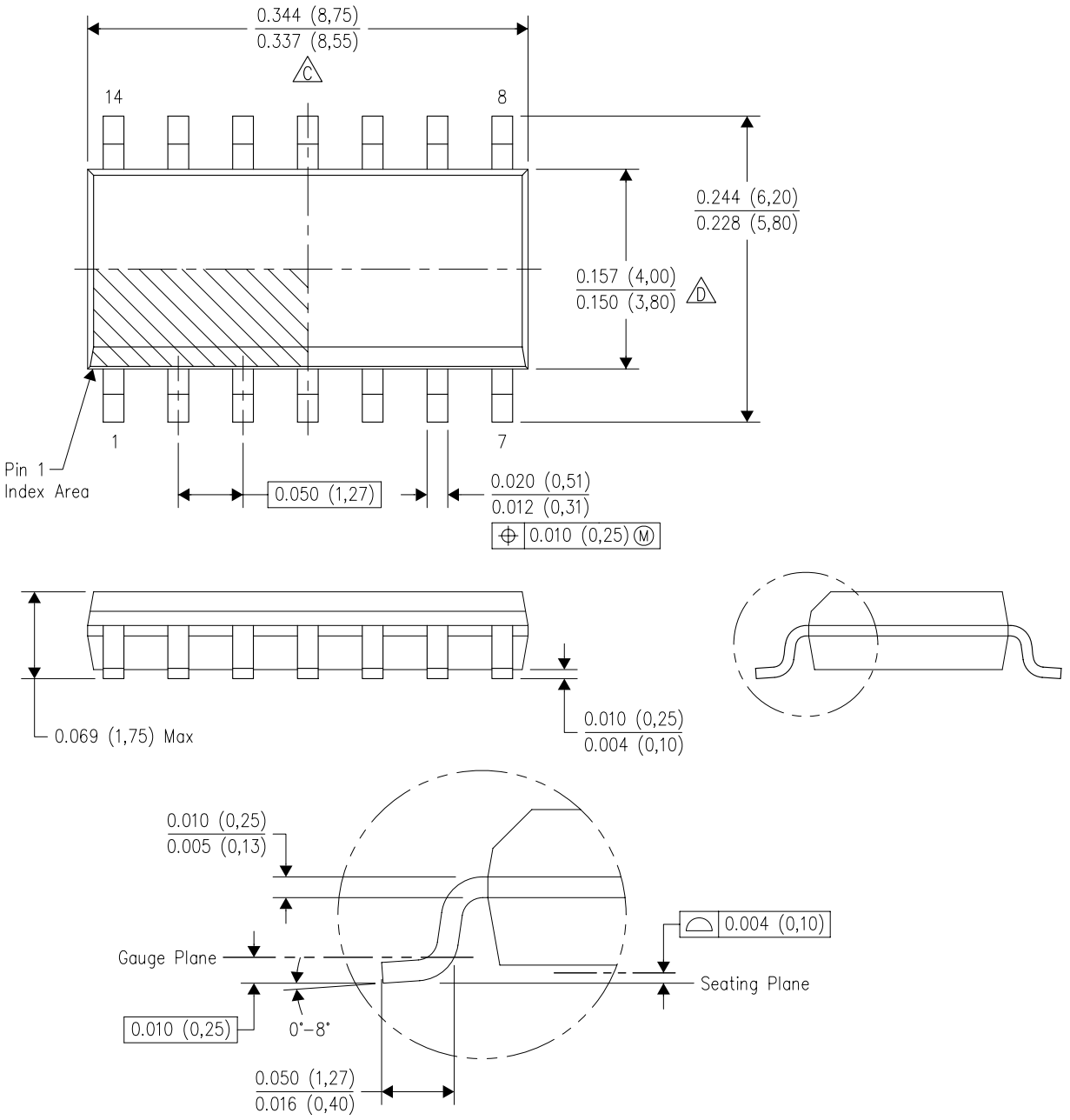
DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



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.

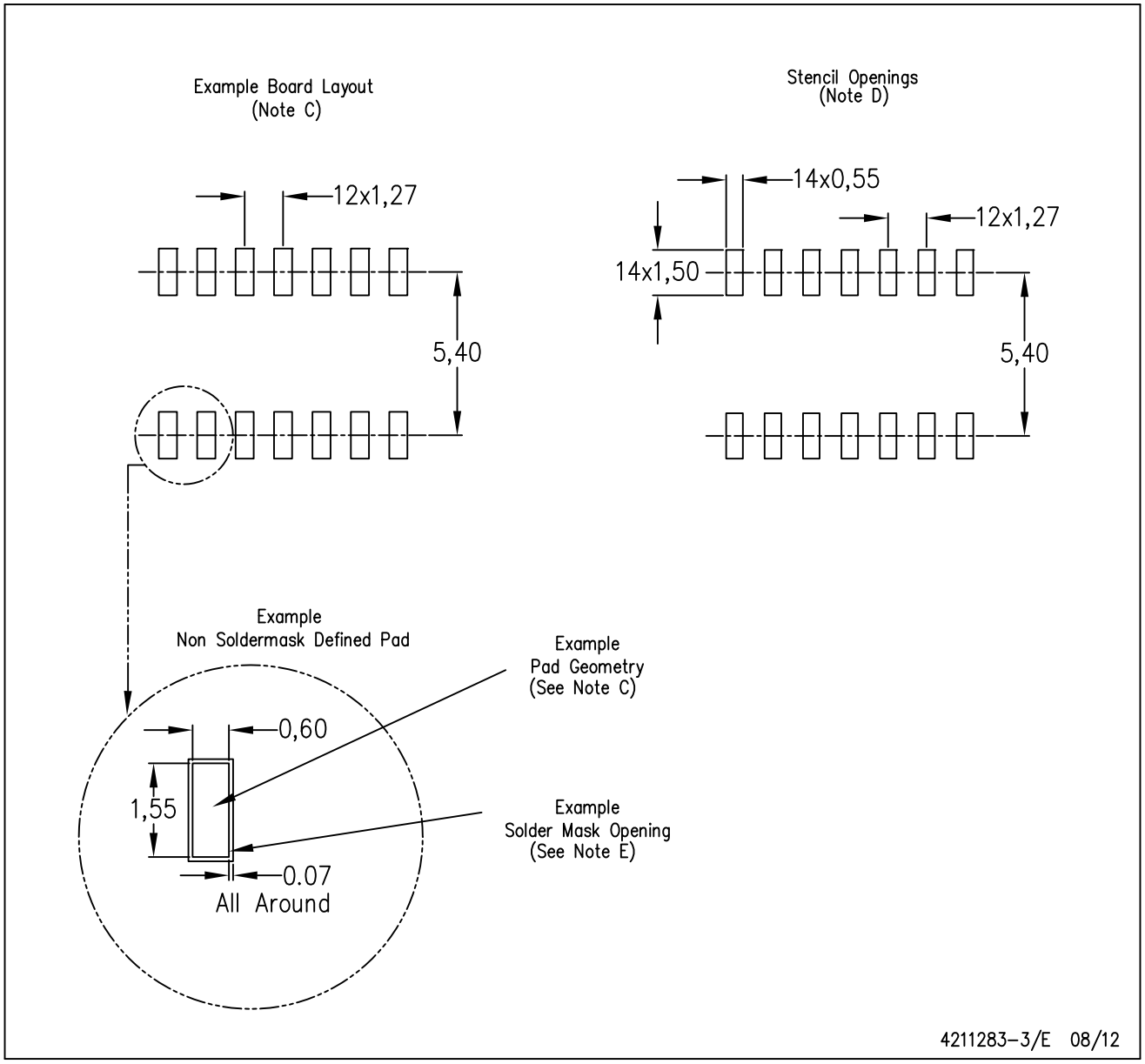
D (R–PDSO–G14) PLASTIC SMALL OUTLINE



4040047–5/M 06/11

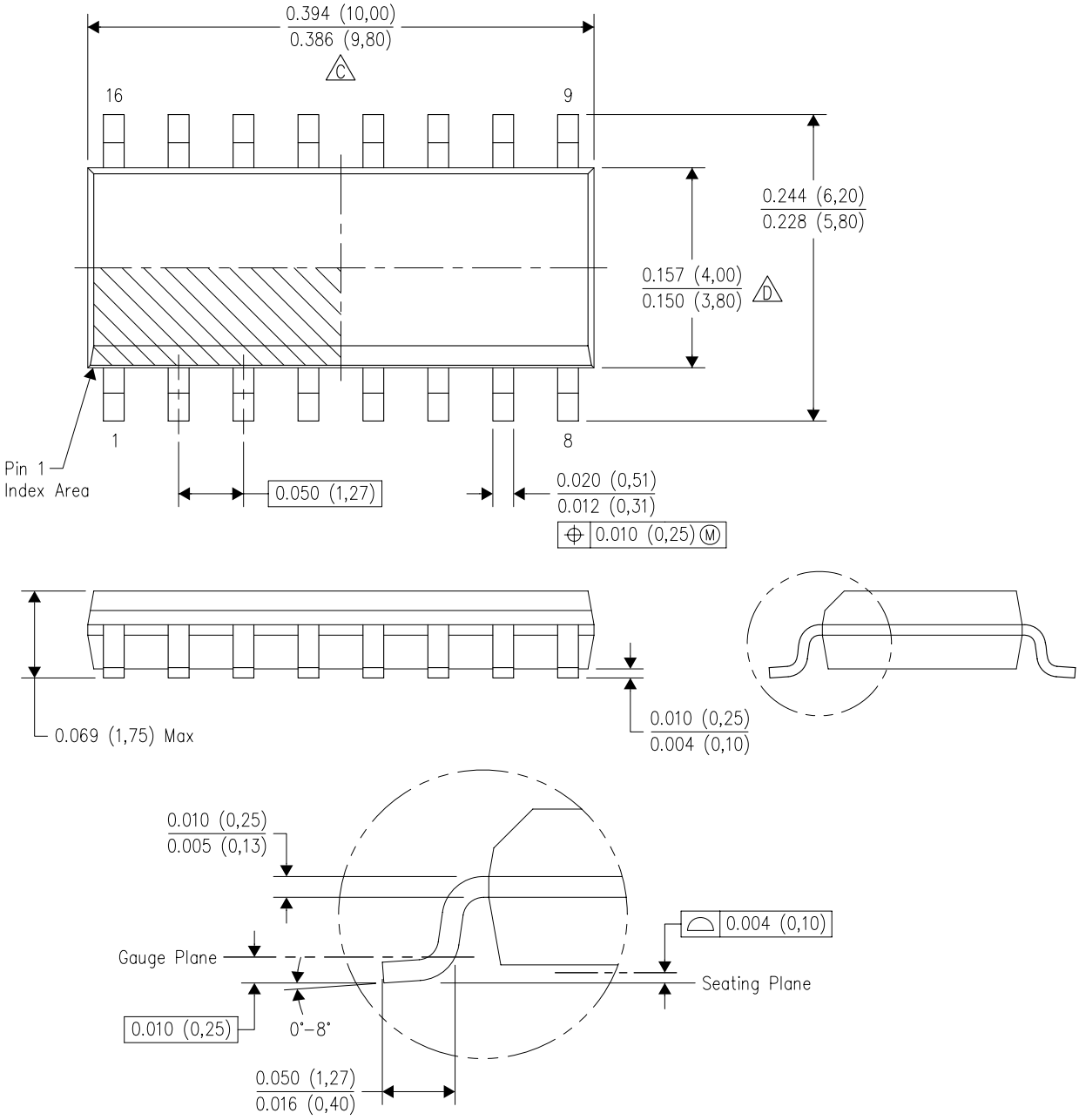
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
E. Reference JEDEC MS–012 variation AB.

D (R–PDSO–G14) PLASTIC SMALL OUTLINE



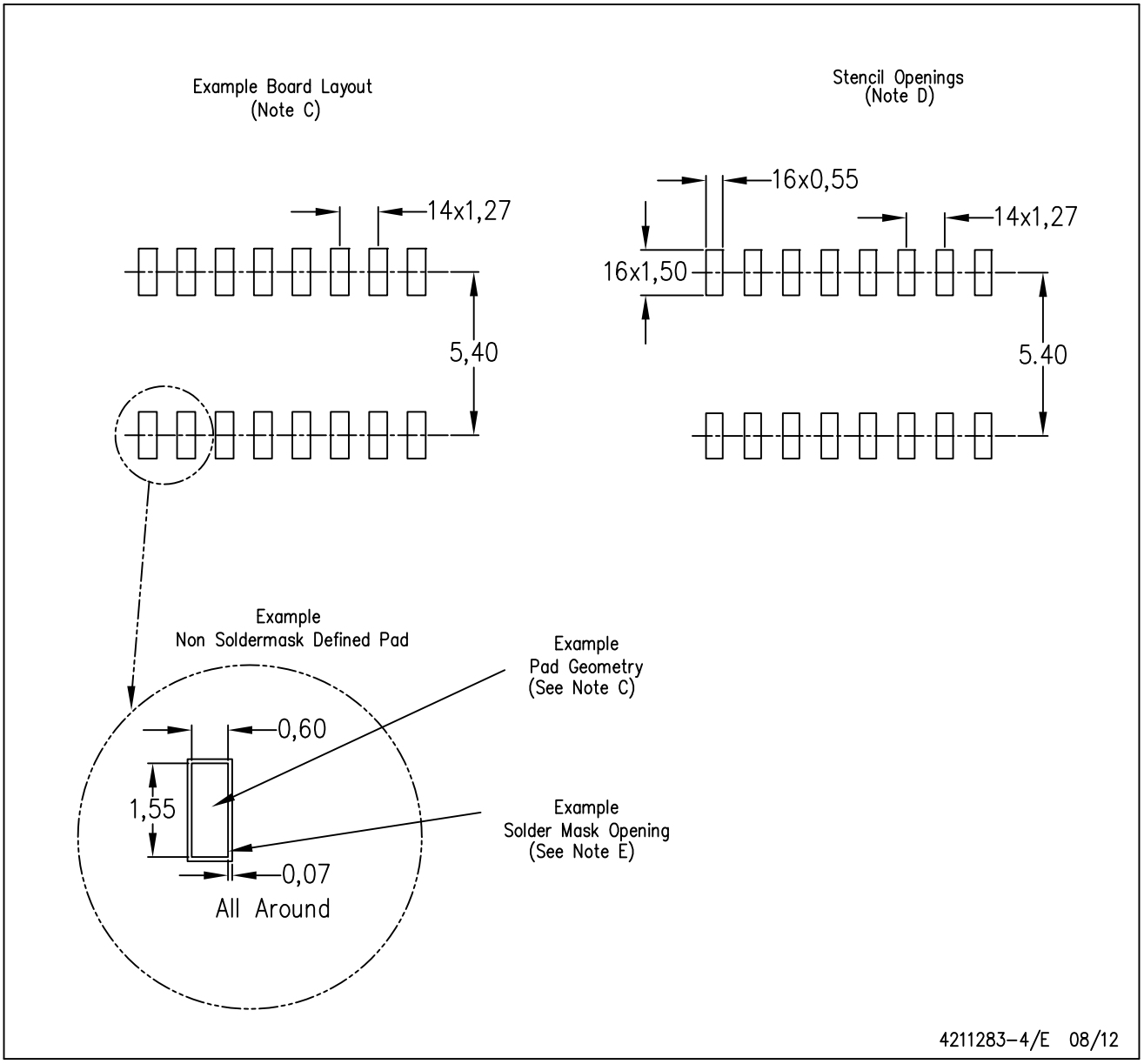
NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC–7351 is recommended for alternate designs.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact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

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.

D (R–PDSO–G16) PLASTIC SMALL OUTLINE

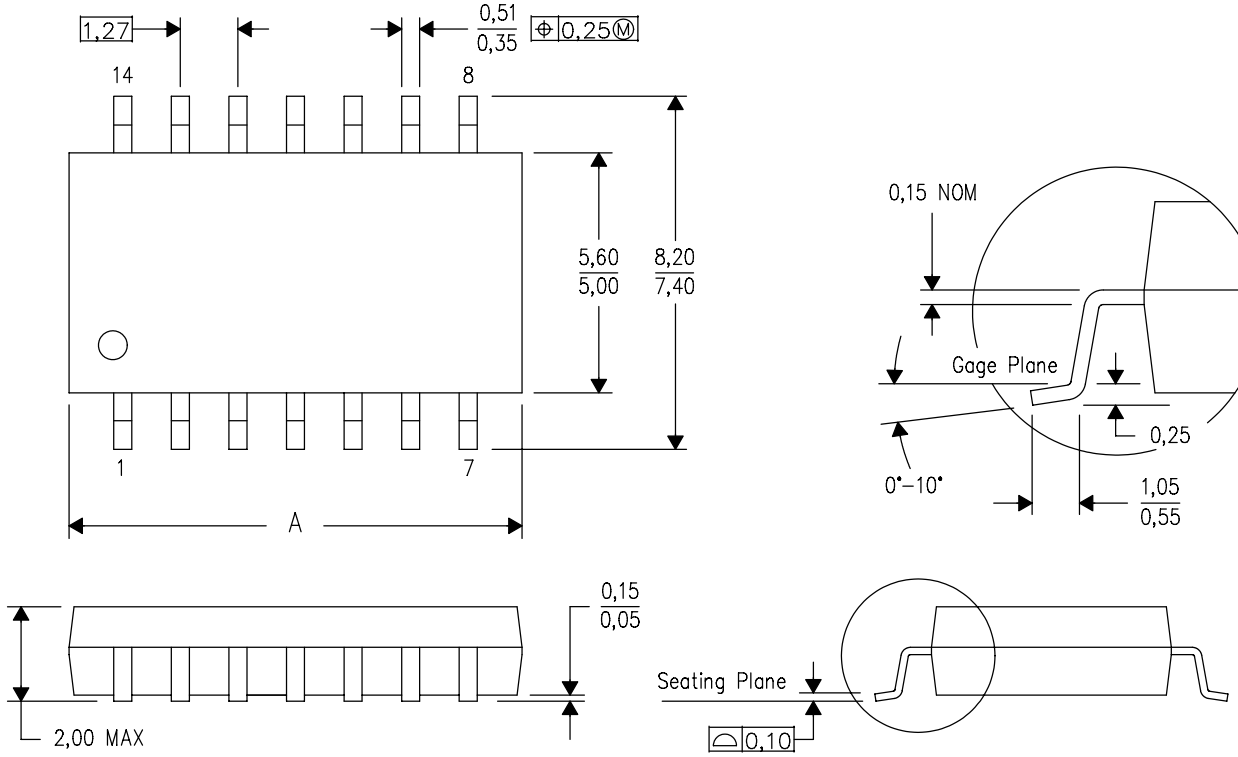


NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC–7351 is recommended for alternate designs.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact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

MECHANICAL DATA

NS (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14-PINS SHOWN



DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

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.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46C and to discontinue any product or service per JESD48B. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

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 which meet ISO/TS16949 requirements, mainly for automotive use. Components which have not been so designated are neither designed nor intended for automotive use; and TI will not be responsible for any failure of such components to meet such requirements.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Mobile Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9