

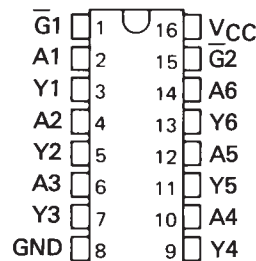
# SN54365A THRU SN54368A, SN54LS365A THRU SN54LS368A SN74365A THRU SN74368A, SN74LS365A THRU SN74LS368A HEX BUS DRIVERS WITH 3-STATE OUTPUTS

DECEMBER 1983—REVISED MARCH 1988

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
  - Choice of True or Inverting Outputs
  - Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
  - Dependable Texas Instruments Quality and Reliability
- '365A, '367A, 'LS365A, 'LS367A True Outputs  
'366A, '368A, 'LS366A, 'LS368A Inverting Outputs

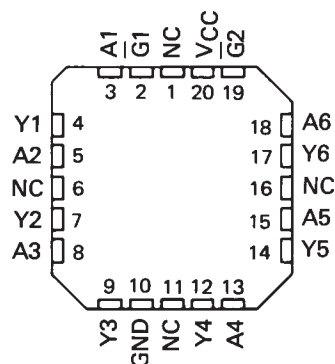
SN54365A, 366A, SN54LS365A, 366A . . . J PACKAGE  
SN74365A, 366A . . . N PACKAGE  
SN74LS365A, SN74LS366A . . . D OR N PACKAGE

(TOP VIEW)



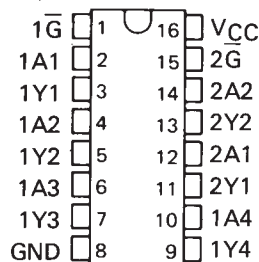
SN54LS365A, SN54LS366A . . . FK PACKAGE

(TOP VIEW)



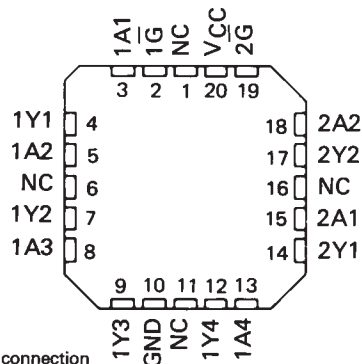
SN54367A, 368A, SN54LS367A, 368A . . . J PACKAGE  
SN74367A, 368A . . . N PACKAGE  
SN74LS367A, SN74LS368A . . . D OR N PACKAGE

(TOP VIEW)



SN54LS367A, SN54LS368A . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

## description

These Hex buffers and line drivers are designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus oriented receivers and transmitters. The designer has choice of selected combinations of inverting and noninverting outputs, symmetrical  $\bar{G}$  (active-low control) inputs.

These devices feature high fan-out, improved fan-in, and can be used to drive terminated lines down to 133 ohms.

The SN54365A thru SN54368A and SN54LS365A thru SN54LS368A are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74365A thru SN74368A and SN74LS365A thru SN74LS368A are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

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PRODUCTION DATA documents contain information 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.

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# SN54365A THRU SN54368A, SN54LS365A THRU SN54LS368A SN74365A THRU SN74368A, SN74LS365A THRU SN74LS368A HEX BUS DRIVERS WITH 3-STATE OUTPUTS

schematics of inputs and outputs

'365A thru '368A



'LS365A thru 'LS368A



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TTL Devices

logic diagrams (positive logic)



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

**SN54365A THRU SN54368A, SN54LS365A THRU SN54LS368A  
SN74365A THRU SN74368A, SN74LS365A THRU SN74LS368A  
HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

logic symbols†



†These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.  
Pin numbers shown are for D, J, and N packages.

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage: '365A, '366A, '367A, '368A	5.5 V
'LS365A, 'LS366A, 'LS367A, 'LS368A	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

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

**SN54365A, SN54367A**  
**SN74365A, SN74367A**  
**HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

**recommended operating conditions**

	SN54365A SN54367A			SN74365A SN74367A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.8			0.8	V
I <sub>OH</sub> High-level output current			-2			-5.2	mA
I <sub>OL</sub> Low-level output current			32			32	mA
T <sub>A</sub> Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS†	SN54365A SN54367A			SN74365A SN74367A			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA			-1.5			-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = MAX	2.4	3.3		2.4	3.1		V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 32 mA			0.4			0.4	V
I <sub>OZ</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, V <sub>O</sub> = 2.4 V			40			40	μA
	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, V <sub>O</sub> = 0.4 V			-40			-40	
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V			1			1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40			40	μA
I <sub>IL</sub>	A Inputs V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V, Either $\bar{G}$ input at 2 V			-40			-40	μA
	$\bar{G}$ Inputs V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V, Both $\bar{G}$ inputs at 0.4 V			-1.6			-1.6	
I <sub>OS</sub> §	V <sub>CC</sub> = MAX			-40			-130	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, Data inputs = 0 V, Output controls = 4.5 V			65			85	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

**switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 50 pF			16	ns
t <sub>PHL</sub>						22	ns
t <sub>PZH</sub>						35	ns
t <sub>PZL</sub>						37	ns
t <sub>PHZ</sub>						11	ns
t <sub>PLZ</sub>						27	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

**SN54366A, SN54368A**  
**SN74366A, SN74368A**  
**HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

**recommended operating conditions**

	SN54366A SN54368A			SN74366A SN74368A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.8			0.8	V
I <sub>OH</sub> High-level output current			-2			-5.2	mA
I <sub>OL</sub> Low-level output current			32			32	mA
T <sub>A</sub> Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS†	SN54366A SN54368A			SN74366A SN74368A			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA			-1.5			-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = MAX	2.4	3.3		2.4	3.1		V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 32 mA			0.4			0.4	V
I <sub>OZ</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, V <sub>O</sub> = 2.4 V			40			40	μA
	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, V <sub>O</sub> = 0.4 V			-40			-40	
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V			1			1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40			40	μA
I <sub>IL</sub>	A Inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V, Either $\bar{G}$ input at 2 V			-40		-40	μA
		V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V, Both $\bar{G}$ inputs at 0.4 V			-1.6		-1.6	
	$\bar{G}$ Inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-1.6		-1.6	mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-40		-130	-40		-130	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, Data inputs = 0 V, Output controls = 4.5 V,		59	77		59	77	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

**switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 50 pF			17	ns	
t <sub>PHL</sub>						16	ns	
t <sub>PZH</sub>						35	ns	
t <sub>PZL</sub>						37	ns	
t <sub>PHZ</sub>			R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 5 pF				11	ns
t <sub>PLZ</sub>							27	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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TTL Devices



**SN54LS365A, SN54LS367A  
SN74LS365A, SN74LS367A  
HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

**recommended operating conditions**

	SN54LS365A SN54LS367A			SN74LS365A SN74LS367A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.7			0.8	V
I <sub>OH</sub> High-level output current			-1			-2.6	mA
I <sub>OL</sub> Low-level output current			12			24	mA
T <sub>A</sub> Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS†	SN54LS365A SN54LS367A		SN74LS365A SN74LS367A		UNIT		
		MIN	TYP‡	MAX	MIN		TYP‡	MAX
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA			-1.5		-1.5	V	
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OH</sub> = MAX	2.4	3.3		2.4	3.1	V	
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OL</sub> = 12 mA		0.25	0.4		0.25	0.4	V
	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 24 mA					0.35	0.5	
I <sub>OZ</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, V <sub>O</sub> = 2.4 V			20		20	μA	
	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, V <sub>O</sub> = 0.4 V			-20		-20		
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V			0.1		0.1	mA	
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V			20		20	μA	
I <sub>IL</sub>	A Inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V, Either $\bar{G}$ input at 2 V			-20		-20	μA
		V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V, Both $\bar{G}$ inputs at 0.4 V			-0.4		-0.4	
	$\bar{G}$ Inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-0.2		-0.2	mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-40		-225	-40		-225	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, Data inputs = 0 V, Output controls = 4.5 V,		14	24		14	24	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

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**SN54LS365A, SN54LS367A**  
**SN74LS365A, SN74LS367A**  
**HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

switching characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$  (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
$t_{PLH}$	Any	Y	$R_L = 667\ \Omega$ , $C_L = 45\ \text{pF}$		10	16	ns	
$t_{PHL}$					9	22	ns	
$t_{PZH}$					19	35	ns	
$t_{PZL}$					24	40	ns	
$t_{PHZ}$			$R_L = 667\ \Omega$ , $C_L = 5\ \text{pF}$				30	ns
$t_{PLZ}$							35	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

**SN54LS366A, SN54LS368A  
SN74LS366A, SN74LS368A  
HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

recommended operating conditions

	SN54LS366A SN54LS368A			SN74LS366A SN74LS368A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.7			0.8	V
I <sub>OH</sub> High-level output current			-1			-2.6	mA
I <sub>OL</sub> Low-level output current			12			24	mA
T <sub>A</sub> Operating free-air temperature	-55		125	0		70	°C

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

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TTL Devices

PARAMETER	TEST CONDITIONS†	SN54LS366A SN54LS368A			SN74LS366A SN74LS368A			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA			-1.5			-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OH</sub> = MAX	2.4	3.3		2.4	3.1		V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OL</sub> = 12 mA		0.25	0.4		0.25	0.4	V
	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 24 mA					0.35	0.5	
I <sub>OZ</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, V <sub>O</sub> = 2.4 V			20			20	μA
	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, V <sub>O</sub> = 0.4 V			-20			-20	
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V			0.1			0.1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V			20			20	μA
I <sub>IL</sub>	A Inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V, Either $\bar{G}$ input at 2 V			-20		-20	μA
		V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V, Both $\bar{G}$ inputs at 0.4 V			-0.4		-0.4	
	$\bar{G}$ Inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-0.2		-0.2	mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-40		-225	-40		-225	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, Data inputs = 0 V, Output controls = 4.5 V,		12	21		12	21	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.



**SN54LS366A, SN54LS368A**  
**SN74LS366A, SN74LS368A**  
**HEX BUS DRIVERS WITH 3-STATE OUTPUTS**

switching characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{ C}$  (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	Any	Y	$R_L = 667\ \Omega$ , $C_L = 45\ \text{pF}$	7		15	ns
$t_{PHL}$				12		18	ns
$t_{PZH}$				18		35	ns
$t_{PZL}$				28		45	ns
$t_{PHZ}$			$R_L = 667\ \Omega$ , $C_L = 5\ \text{pF}$			32	ns
$t_{PLZ}$						35	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
5962-9687802QEA	ACTIVE	CDIP	J	16		TBD	A42	N / A for Pkg Type
5962-9687802QFA	ACTIVE	CFP	W	16		TBD	A42	N / A for Pkg Type
5962-9687802QFA	ACTIVE	CFP	W	16		TBD	A42	N / A for Pkg Type
JM38510/16303BEA	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
JM38510/16303BEA	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
JM38510/16304BEA	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
JM38510/16304BEA	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
JM38510/32201B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
JM38510/32201B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
JM38510/32201BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
JM38510/32201BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
JM38510/32201BFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
JM38510/32201BFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
JM38510/32203B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
JM38510/32203BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203BFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203BFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203SEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203SEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203SFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
JM38510/32203SFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SN54365AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN54365AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN54367AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN54367AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN54368AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN54368AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN54LS365AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SN54LS365AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SN54LS366AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SN54LS366AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SN54LS367AJ	ACTIVE	CDIP	J	16	25	TBD	A42	N / A for Pkg Type
SN54LS367AJ	ACTIVE	CDIP	J	16	25	TBD	A42	N / A for Pkg Type
SN54LS368AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SN54LS368AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SN74365AN	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74365AN	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74366AN	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74366AN	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74367AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN74367AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74368AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74368AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS365AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS365AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS365AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS365AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS365ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS365ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS365ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ANSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ANSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ANSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS365ANSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS366AD	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN74LS366AD	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
SN74LS366ADR	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
SN74LS366ADR	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
SN74LS366AN	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS366AN	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS367AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN74LS367AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN74LS367AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS367AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS367AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS367AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS367ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS367ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS367ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ANSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS367ANSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
						no Sb/Br)		
SN74LS368AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN74LS368AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN74LS368AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS368AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS368AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS368AN3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS368ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS368ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS368ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ANSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ANSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ANSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS368ANSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ54365AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SNJ54365AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SNJ54367AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SNJ54367AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SNJ54367AW	OBSOLETE	CFP	W	16		TBD	Call TI	Call TI
SNJ54367AW	OBSOLETE	CFP	W	16		TBD	Call TI	Call TI
SNJ54368AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SNJ54368AJ	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SNJ54368AW	OBSOLETE	CFP	W	16		TBD	Call TI	Call TI
SNJ54368AW	OBSOLETE	CFP	W	16		TBD	Call TI	Call TI
SNJ54LS365AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS365AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS365AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS365AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS365AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS365AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS366AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS366AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS366AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS366AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS366AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS366AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS367AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS367AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS367AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS367AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS367AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS367AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS368AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS368AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54LS368AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS368AJ	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS368AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type
SNJ54LS368AW	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type

<sup>(1)</sup> 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.

<sup>(2)</sup> 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
SN74LS365ADR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74LS365ANSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74LS367ADR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74LS367ANSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74LS368ADR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74LS368ANSR	SO	NS	16	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)
SN74LS365ADR	SOIC	D	16	2500	333.2	345.9	28.6
SN74LS365ANSR	SO	NS	16	2000	346.0	346.0	33.0
SN74LS367ADR	SOIC	D	16	2500	333.2	345.9	28.6
SN74LS367ANSR	SO	NS	16	2000	346.0	346.0	33.0
SN74LS368ADR	SOIC	D	16	2500	333.2	345.9	28.6
SN74LS368ANSR	SO	NS	16	2000	346.0	346.0	33.0

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.

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



4040140/D 10/96

- 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. The terminals are gold plated.
  - E. Falls within JEDEC MS-004

N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

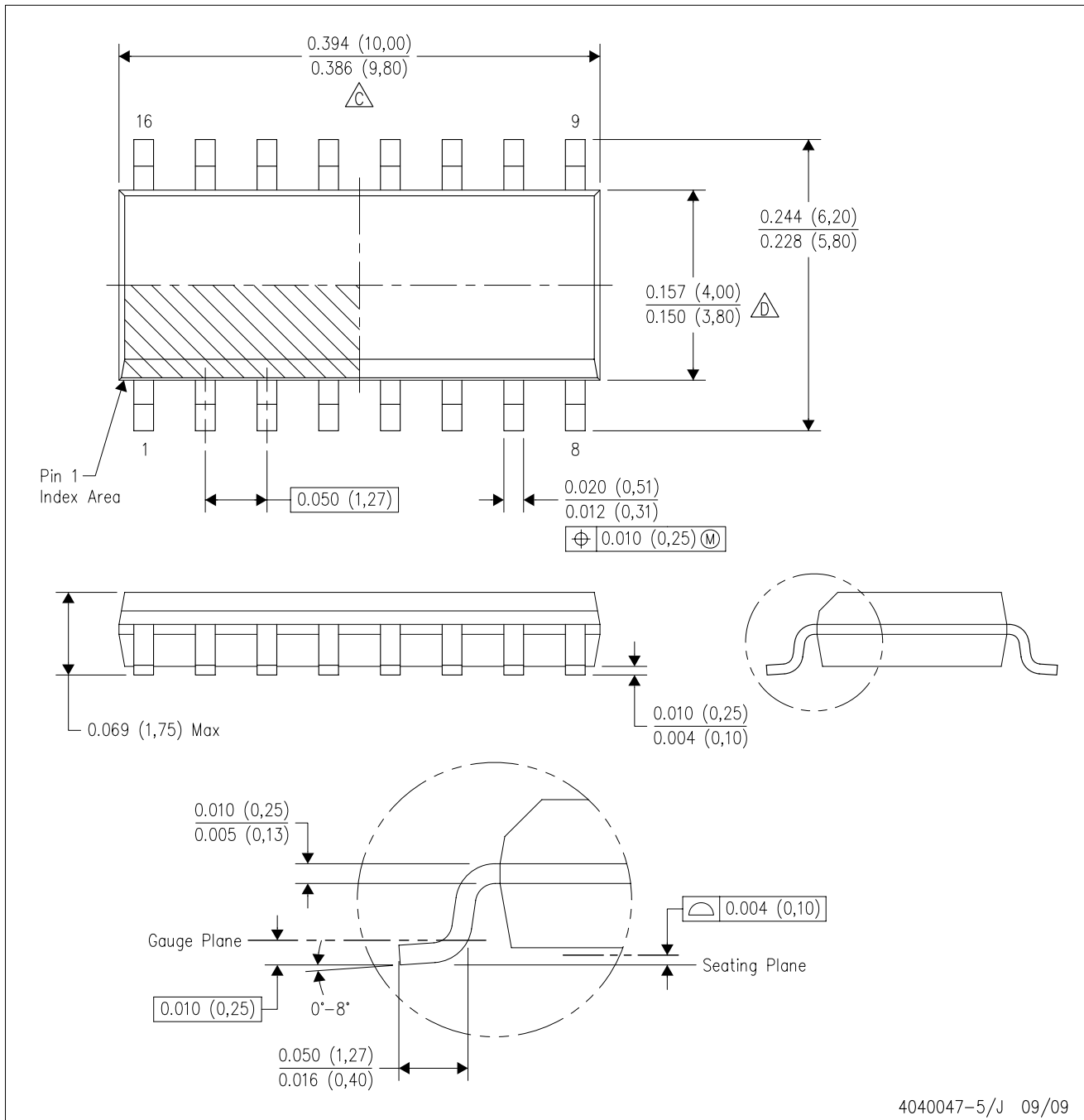
16 PINS SHOWN



- 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.

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE



4040047-5/J 09/09

- 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.

# 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.

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