SN54LS253, SN54S253, SN74LS253, SN74S253 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

SDLS147 - SEPTEMBER 1972 - REVISED MARCH 1988

- Three-State Version of SN54/74LS153, SN54/74S153
- Schottky-Diode-Clamped Transistors
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to Serial Conversion
- Fully Compatible with Most TTL Circuits
- Low Power Dissipation

'LS253 . . . 35 mW Typical 'S253 . . . 225 mW Typical

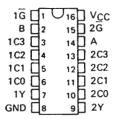
description

Each of these Schottky-clamped data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, binary decoding data selection to the AND-OR gates. Separate output control inputs are provided for each of the two four-line sections.

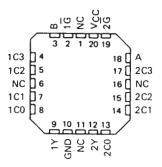
The three-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state) the low-impedance of the single enabled output will drive the bus line to a high or low logic level.

SN54LS253, SN54S253 . . . J OR W PACKAGE SN74LS253, SN74S253 . . . D OR N PACKAGE

(TOP VIEW)



SN54LS253, SN54S253 . . . FK PACKAGE (TOP VIEW)



NC-No internal connection

FUNCTION TABLE

1	ECT UTS		DATA	INPUTS		OUTPUT CONTROL	ОUТРUТ
В	Α	CO	C1	C2	C3	G	Υ
X	X	X	X	X	X	Н	Z
L	L	L	X	X	Х	L	L
L	L	Н	×	X	X	L	н
L	н	×	L	X	X	L	L
L	H	X	Н	X	X	L	н
Н	Ĺ	×	X	L	X	L	L
н	L	×	X	Н	X	L	н
H	Н	×	X	X	L	L	L
Н	Н	X	×	X	Н	L	Н

Address inputs A and B are common to both sections.

H = high fevel, L = low level, X = irrelevant, Z = high impedance (off)

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

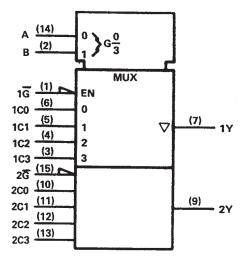
Supply voltage, VCC (see Note 1)	7 V
Input voltage: 'LS253	7 V
'\$253	5.5 V
Off-state output voltage	
Operating free-air temperature range: SN54LS253, SN54S253	125°C
SN74LS253, SN74S253 0°C t	
Storage temperature range – 65°C to	150°C

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

TEXAS INSTRUMENTS

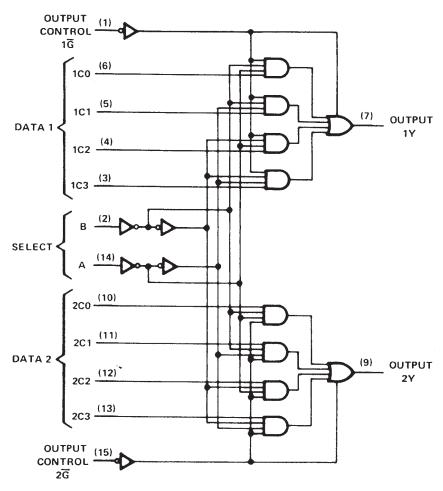
SDLS147 - SEPTEMBER 1972 - REVISED MARCH 1988

logic symbol†



[†] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

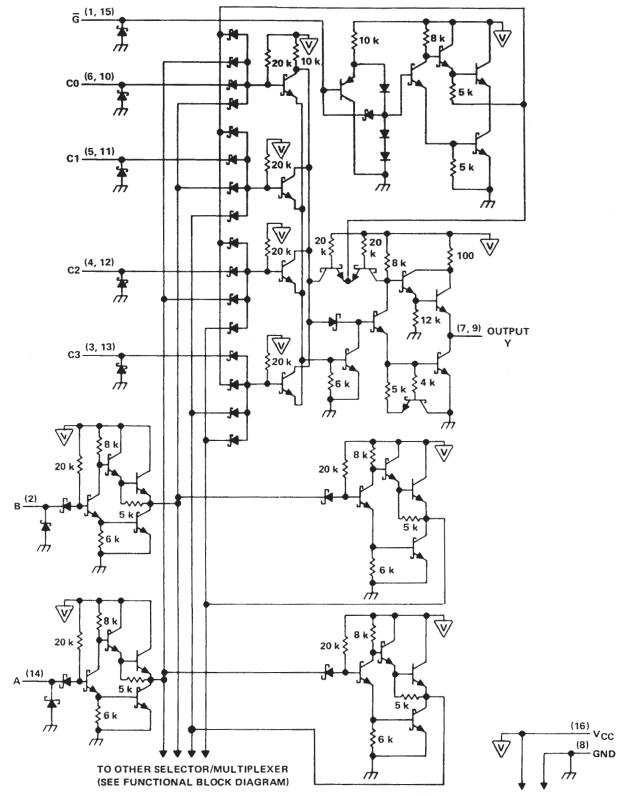
logic diagram (positive logic)



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



schematic (each selector/multiplexer, and the common select section)



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



SN54LS253, SN54S253, SN74LS253, SN74S253 **DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS** WITH 3-STATE OUTPUTS

SDLS147 – SEPTEMBER 1972 – REVISED MARCH 1988

recommended operating conditions

		S	SN54LS253			N74LS2	253	UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	UNII
Vcc	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
VIH	High-level input voltage	2			2			V
VIL	Low-level input voltage			0.7			0.8	V
ТОН	High-level output current			-1			2.6	mA
IOL	Low-level output current			4			8	mA
TA	Operating free-air temperature	- 55		125	0		70	°c

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

PARAMETER		TEST CONDITI	onet		S	N54LS2	53	SN74LS253				
FANAMETEN		1521 CONDITI	ONS		MIN	TYP \$	MAX	MIN	TYP‡	MAX	UNIT	
VIK	V _{CC} = MIN,	$I_1 = -18 \text{ mA}$					- 1.5			1.5	V	
VOH	V _{CC} = MIN,	V _{IH} = 2 V,	VIL = MAX,	1 _{OH} = MAX	2.4	3.4		2.4	3.1		V	
VOL VCC = MIN	Voc = MIN	V _{IH} = 2 V,	V - 1444 V	IOL = 4 mA		0.25	0.4		0.25	0.4		
	ACC - MIIA'	VIH - 2 V,	VIL = MAX	IOL = 8 mA		****			0.25	0.5		
IOZ VCC = MA	V _{CC} = MAX,	MAX, V _{IH} = 2 V		V _O = 2.7 V			20			20	— μΑ	
102	VCC - WAX,			V _O = 0.4 V			- 20			20		
11	V _{CC} = MAX,	V ₁ = 7 V					0.1			0.1	mΑ	
IH	V _{CC} = MAX,	V ₁ = 2.7 V					20			20	μА	
le.	V _{CC} = MAX,	V ₁ = 0.4 V		Ğ			- 0.2			- 0.2		
116	VCC - MAX,	V - 0,4 V	All other	- 0.4					- 0.4	,mA		
los§	V _{CC} = MAX				- 30		- 130	- 30		- 130	mA	
loo	V _{CC} = MAX,	See Note 2		Condition A		7	12		7	12		
¹cc	VCC IMAX,	A CC - MAY' See More 5		Condition B		8.5	14		8.5	14	mA	

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

NOTE 2: I_{CC} is measured with the outputs open under the following conditions:

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
^t PLH	Data				17	25		
tPHL.	Data	_ '			13	20	ns	
^t PLH	Select	_	$C_L = 15 pF$, $R_L = 2 k\Omega$,		30	45		
^t PHL	Select	'	See Note 3		21	32	ns	
^t PZH	Output	_			15	28	28 23	
^t PZL	Control	'			15	23		
^t PHZ	Output	_	$C_L = 5 pF$, $R_L = 2 k\Omega$,		27	41		
^t PLZ	Control		See Note 3		18	27	ns	

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



[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ} \text{C}$.

[§] Not more than one output should be shorted at a time, and duration for the short-circuit should exceed one second.

A. All inputs grounded.

B. Output control at 4.5 V, all inputs grounded.

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recommended operating conditions

			SN54S253		SN74S253				
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT	
VCC	Supply voltage	4.5	5	5.5	4.75	5	5.25	V	
VIH	High-level input voltage	2			2			V	
VIL	Low-level input voltage			0.8			0.8	V	
ЮН	High-level output current			-2			- 6.5	mA	
IOL	Low-level output current			20			20	mA	
TA	Operating free-air temperature	- 55		125	0		70	°c	

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

PARAMETER			TEST CONDIT	TIONST		MIN	TYP‡	MAX	UNIT
VIK	VCC = MIN,	I ₁ = - 18 mA						-1.2	V
Voн	VCC = MIN,	V _{1H} = 2 V,	V _{1L} = 0.8 V,	IOH = MAX	Series 54S	2,5	3,4		V
TON	VCC Willy,	VIH - 2 V,	VIL - 0.8 V,	TOH - WIAX	Series 74S	2.7	3.4		1 °
VOL	VCC = MIN,	VIH = 2 V,	VIL = 0.8 V,	IOL = 20 mA				0.5	V
loz	OZ VCC = MAX, VIH = 2 V				V _O = 2.4 V			50	
-02	VCC IMAX,	VIH - 2 V			V _O = 0.5 V			- 50	μΑ
11	V _{CC} = MAX,	V1 = 5.5 V						1	mA
ΊΗ	V _{CC} = MAX,	V _I = 2.7 V						50	μΑ
111	Vcc = MAX,	VI = 0.5 V			G = 0.8 V			- 2	
7164	VCC - WAX,	V1 - 0.5 V			G = 2 V			- 0.25	mA
los§	V _{CC} = MAX	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			1	- 40	••••	- 100	mA
¹cc	V _{CC} = MAX,	See Note 2			Condition A		45	70	
	VCC = WAX,	ACC - MAY' See More 5					65	85	mA

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

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

NOTE 2: I_{CC} is measured with the outputs open under the following conditions:

- A. All inputs grounded.
- B. Output control at 4.5 V, all inputs grounded.

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CON	DITIONS	MIN TYP	MAX	UNIT
^t PLH	Data	~			6	9	
^t PHL	Data	'			6	9	ns
^t PLH	Select		R _L = 280 Ω , See Note 3	C _L = 15 pF	11.5	18	ns
^t PHL]	'		o_ ,o p.	12	18	
^t PZH	Output				11	16.5	
^t PZL	Control	'		12	18	ns	
^t PHZ	Output	_	R _L = 280 Ω,	C _L = 5 pF	6.5	9.5	
tPLZ	Control		See Note 3		10	15	ns

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



[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ} \text{C}$.





.com 6-Jun-2005

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	n MSL Peak Temp ⁽³⁾
76017012A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
7601701EA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
7601701EA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
7601701FA	ACTIVE	CFP	W	16	1	TBD	Call TI	Level-NC-NC-NC
7601701FA	ACTIVE	CFP	W	16	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30908B2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30908B2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30908BEA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30908BEA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30908BFA	ACTIVE	CFP	W	16	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30908BFA	ACTIVE	CFP	W	16	1	TBD	Call TI	Level-NC-NC-NC
SN54LS253J	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
SN54LS253J	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
SN74LS253D	ACTIVE	SOIC	D	16	40	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253D	ACTIVE	SOIC	D	16	40	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253DE4	ACTIVE	SOIC	D	16	40	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253DE4	ACTIVE	SOIC	D	16	40	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253DR	ACTIVE	SOIC	D	16	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253DR	ACTIVE	SOIC	D	16	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253DRE4	ACTIVE	SOIC	D	16	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253DRE4	ACTIVE	SOIC	D	16	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN74LS253J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN74LS253N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS253N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS253N3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS253N3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74LS253NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS253NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS253NSR	ACTIVE	SO	NS	16	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253NSR	ACTIVE	SO	NS	16	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS253NSRE4	ACTIVE	SO	NS	16	2000	Pb-Free	CU NIPDAU	Level-2-260C-1 YEAR
	76017012A 7601701EA 7601701EA 7601701FA 7601701FA 7601701FA JM38510/30908B2A JM38510/30908BEA JM38510/30908BEA JM38510/30908BFA JM38510/30908BFA SN54LS253J SN54LS253J SN74LS253D SN74LS253DE4 SN74LS253DR SN74LS253DRE4 SN74LS253DR SN74LS253N SN74LS253N SN74LS253N SN74LS253N SN74LS253NS SN74LS253NS	76017012A ACTIVE 7601701EA ACTIVE 7601701EA ACTIVE 7601701FA ACTIVE 7601701FA ACTIVE 7601701FA ACTIVE JM38510/30908B2A ACTIVE JM38510/30908BEA ACTIVE JM38510/30908BFA ACTIVE JM38510/30908BFA ACTIVE JM38510/30908BFA ACTIVE SN54LS253J ACTIVE SN54LS253J ACTIVE SN74LS253D ACTIVE SN74LS253DE4 ACTIVE SN74LS253DE4 ACTIVE SN74LS253DR ACTIVE SN74LS253DRE4 ACTIVE SN74LS253DRE4 ACTIVE SN74LS253J OBSOLETE SN74LS253J OBSOLETE SN74LS253N ACTIVE SN74LS253N ACTIVE SN74LS253N3 OBSOLETE SN74LS253NE4 ACTIVE SN74LS253NSR ACTIVE SN74LS253NSR ACTIVE	Type 76017012A ACTIVE LCCC 7601701EA ACTIVE CDIP 7601701EA ACTIVE CDIP 7601701FA ACTIVE CFP 7601701FA ACTIVE CFP 7601701FA ACTIVE CFP JM38510/30908B2A ACTIVE LCCC JM38510/30908BEA ACTIVE CDIP JM38510/30908BEA ACTIVE CDIP JM38510/30908BFA ACTIVE CFP JM38510/30908BFA ACTIVE CDIP SN54LS253J ACTIVE CDIP SN54LS253J ACTIVE CDIP SN74LS253D ACTIVE SOIC SN74LS253D ACTIVE SOIC SN74LS253DE4 ACTIVE SOIC SN74LS253DRA ACTIVE SOIC SN74LS253DRE4 ACTIVE SOIC SN74LS253DRE4 ACTIVE SOIC SN74LS253N ACTIVE PDIP SN74LS253N3 OBSOLETE CDIP	76017012A ACTIVE LCCC FK 7601701EA ACTIVE CDIP J 7601701EA ACTIVE CDIP J 7601701EA ACTIVE CDIP J 7601701FA ACTIVE CFP W JM38510/30908B2A ACTIVE LCCC FK JM38510/30908BEA ACTIVE CDIP J JM38510/30908BEA ACTIVE CDIP J JM38510/30908BEA ACTIVE CDIP J JM38510/30908BFA ACTIVE CDIP J SN54LS253J ACTIVE CDIP J SN54LS253J ACTIVE CDIP J SN74LS253D ACTIVE SOIC D SN74LS253D ACTIVE SOIC D SN74LS253DE4 ACTIVE SOIC D SN74LS253DRE4 ACTIVE SOIC D SN74LS253DRE4 ACTIVE SOIC D SN74LS253J OBSOLETE CDIP J	76017012A ACTIVE LCCC FK 20 7601701EA ACTIVE CDIP J 16 7601701EA ACTIVE CDIP J 16 7601701FA ACTIVE CDIP J 16 7601701FA ACTIVE CFP W 16 7601701FA ACTIVE CFP W 16 JM38510/30908B2A ACTIVE LCCC FK 20 JM38510/30908BEA ACTIVE CDIP J 16 JM38510/30908BFA ACTIVE CDIP J 16 JM38510/30908BFA ACTIVE CFP W 16 SN54LS253J ACTIVE CFP W 16 SN54LS253J ACTIVE CDIP J 16 SN74LS253D ACTIVE SOIC D 16 SN74LS253DE4 ACTIVE SOIC D 16 SN74LS253DRE4 ACTIVE SOIC D 16 SN74LS253DRE4	Type Drawing Oty 76017012A ACTIVE LCCC FK 20 1 7601701EA ACTIVE CDIP J 16 1 7601701EA ACTIVE CDIP J 16 1 7601701FA ACTIVE CFP W 16 1 7601701FA ACTIVE LCCC FK 20 1 JM38510/30908BEA ACTIVE LCCC FK 20 1 JM38510/30908BFA ACTIVE CDIP J 16 1 SN54LS253J ACTIVE CFP W 16 1 SN54LS253D ACTIVE CDIP J 16 40 SN74LS253DE4 ACTIVE SOIC D 16 40 <td> Type</td> <td> Type Drawing</td>	Type	Type Drawing



PACKAGE OPTION ADDENDUM

6-Jun-2005

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
						(RoHS)		Level-1-235C-UNLIM
SN74LS253NSRE4	ACTIVE	SO	NS	16	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74S253N	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SN74S253N	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
SNJ54LS253FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS253FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS253J	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS253J	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS253W	ACTIVE	CFP	W	16	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS253W	ACTIVE	CFP	W	16	1	TBD	Call TI	Level-NC-NC-NC

(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) 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.

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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14 LEADS SHOWN



- 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-F16)

CERAMIC DUAL FLATPACK



- 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**)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



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



- 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



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- D. Falls within JEDEC MS-012 variation AC.



MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- 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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