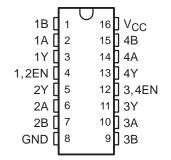
SLLS010D - JUNE 1986 - REVISED MAY 1995

- Meet or Exceed the Requirements of ANSI Standards EIA/TIA-422-B and EIA/TIA-423-A
- Meet ITU Recommendations V.10 and V.11
- Designed to Operate Up to 20 Mbaud
- -7 V to 7 V Common-Mode Input Voltage Range With 200-mV Sensitivity
- 3-State TTL-Compatible Outputs
- High Input Impedance . . . 12 kΩ Min
- Input Hysteresis . . . 120 mV Typ
- Single 5-V Supply Operation
- Low Supply Current Requirement 35 mA Max
- Improved Speed and Power Consumption Compared to MC3486

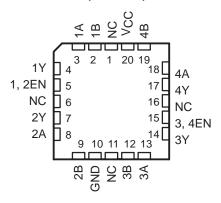
description

The SN55ALS195 and SN75ALS195 are four differential line receivers with 3-state outputs designed using advanced low-power Schottky technology. This technology provides combined improvements in die design, tooling production, and wafer fabrication, which in turn, provide lower power consumption and permit much higher data throughput than other designs. The devices meet the specifications of ANSI Standards EIA/TIA-422-B and EIA/TIA-423-A and ITU Recommendations V.10 and V.11. The 3-state outputs permit direct connection to a bus-organized system with a fail-safe design that ensures the outputs will always be high if the inputs are open.

SN55ALS195 . . . J OR W PACKAGE SN75ALS195 . . . J OR N PACKAGE[†] (TOP VIEW)



SN55ALS195...FK PACKAGE (TOP VIEW)



NC – No internal connection † For surface-mount package, see the SN75ALS199.

The devices are optimized for balanced multipoint bus transmission at rates up to 20 megabits per second. The input features high input impedance, input hysteresis for increased noise immunity, and an input sensitivity of ± 200 mV over a common-mode input voltage range of ± 7 V. The devices also feature an active-high enable function for each of two receiver pairs. The SN55ALS195 and SN75ALS195 are designed for optimum performance when used with the SN55ALS194 and SN75ALS194 quadruple differential line drivers.

The SN55ALS195 is characterized for operation over the full military temperature range of -55° C to 125° C. The SN75ALS195 is characterized for operation from 0° C to 70° C.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

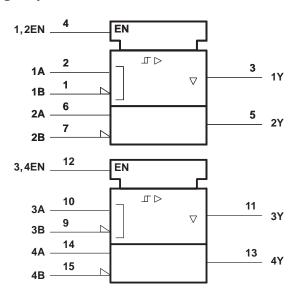


FUNCTION TABLE (each receiver)

DIFFERENTIAL INPUTS A-B	ENABLE EN	OUTPUT Y
V _{ID} ≥ 0.2 V	Н	Н
$-0.2 \text{V} < \text{V}_{\text{ID}} < 0.2 \text{V}$	Н	?
V _{ID} ≤ − 0.2 V	Н	L
X	L	Z
Open	Н	Н

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

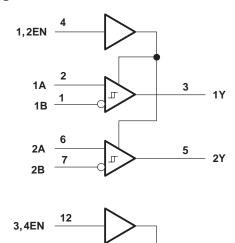
logic symbol†

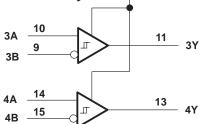


[†] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

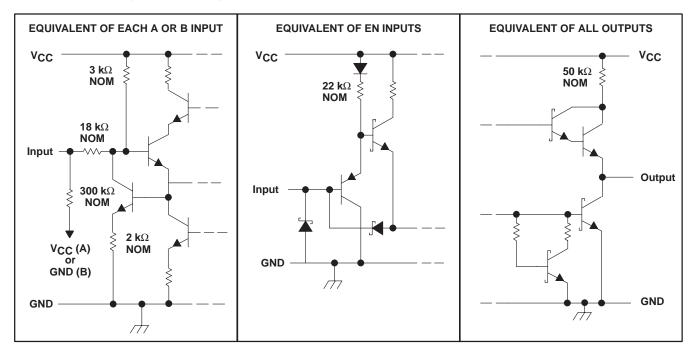
Pin numbers shown are for the J, N, and W packages.

logic diagram





schematics of inputs and outputs



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

Supply voltage, V _{CC} (see Note 1)	
Input voltage, A or B inputs, V _I	
Differential input voltage, V _{ID} (see Note 2)	±15 V
Enable input voltage, V _I	7 V
Low-level output current, I _{OL}	50 mA
Continuous total dissipation	. See Dissipation Rating Table
Operating free-air temperature range, T _A : SN55ALS195	– 55°C to 125°C
SN75ALS195	0°C to 70°C
Storage temperature range, T _{stq}	– 65°C to 150°C
Case temperature for 60 seconds, T _C : FK package	
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J, N, or W pa	ackage 300°C

[†] Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. All voltage values, except differential input voltage, are with respect to network ground terminal.
 - 2. Differential-input voltage is measured at the noninverting input with respect to the corresponding inverting input.

DISSIPATION RATING TABLE

PACKAGE	$T_{\mbox{\scriptsize A}} \le 25^{\circ}\mbox{\scriptsize C}$ POWER RATING	DERATING FACTOR ABOVE T _A = 25°C	T _A = 70°C POWER RATING	T _A = 125°C POWER RATING
FK	1375 mW	11.0 mW/°C	880 mW	275 mW
J (SN55ALS195)	1375 mW	11.0 mW/°C	880 mW	275 mW
J (SN75ALS195)	1025 mW	8.2 mW/°C	656 mW	N/A
N	1150 mW	9.2 mW°C	736 mW	N/A
W	1000 mW	8.0 mW/°C	640 mW	200 mW



SN55ALS195, SN75ALS195 QUADRUPLE DIFFERENTIAL LINE RECEIVERS

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recommended operating conditions

	SN55ALS195		SN75ALS195			UNIT	
	MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Supply voltage, V _{CC}	4.5	5	5.5	4.75	5	5.25	V
Common-mode input voltage, V _{IC}			±7			±7	V
Differential input voltage, V _{ID}			±12			±12	V
High-level input voltage, V _{IH}	2			2			V
Low-level input voltage, V _{IL}			0.8			0.8	V
High-level output current, IOH			-400			-400	μΑ
Low-level output current, IOL			16			16	mA
Operating free-air temperature, T _A	-55		125	0		70	°C

electrical characteristics over recommended ranges of common-mode input voltage, supply voltage, and operating free-air temperature (unless otherwise noted)

	PARAMETER	TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT	
V _{IT+}	Positive-going input threshold voltage						200	mV
V _{IT} _	Negative-going input threshold voltage				-200§			mV
V _{hys}	Hysteresis voltage (V _{IT+} – V _{IT} _)					120		mV
VIK	Enable-input clamp voltage	$V_{CC} = MIN,$	$I_{ } = -18 \text{ mA}$				-1.5	V
Vон	High-level output voltage	V _{CC} = MIN, See Figure 1	V _{ID} = 200 mV,	$I_{OH} = -400 \mu A,$	2.5	3.6		V
VOL Low-level output voltage	Low lovel output voltage	V _{CC} = MIN,	I _{OL} = 8 mA				0.45	V
	Low-level output voltage	V _{ID} = - 200 mV, See Figure 1	I _{OL} = 16 mA				0.5	V
IOZ High-impedance-state output current	High-impedance-state	$V_{CC} = MAX,$ $V_{O} = 2.7 \text{ V}$	V _{IL} = 0.8 V,	$V_{ID} = -3 V$,			20	4
	output current	$V_{CC} = MAX,$ $V_{O} = 0.5 V$	V _{IL} = 0.8 V,	V _{ID} = 3 V,			-20	μΑ
١.	Line input current	Other input at 0 V, See Note 3 $\frac{V_{CC} = MIN}{V_{CC} = MAX}$	$V_{CC} = MIN,$	V _I = 15 V		0.7	1.2	mA
11	Line input current		V _I = −15 V		-1	-1.7	IIIA	
1	High lovel enable input current	V00 - MAY	V _{IH} = 2.7 V				20	
ΊΗ	High-level enable-input current	VCC = MAX	V _{IH} = 5.25 V				100	μΑ
I _{IL}	Low-level enable-input current	$V_{CC} = MAX$,	V _{IL} = 0.4 V				-100	μΑ
rį	Input resistance				12	18		kΩ
los	Short-circuit output current	V _{CC} = MAX, See Note 4	V _{ID} = 3 V,	V _O = 0,	-15	-78	-130	mA
ICC	Supply current	$V_{CC} = MAX,$	Outputs disabled			22	35	mA

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



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

[§] The algebraic convention, in which the less positive limit is designated minimum, is used in this data sheet for threshold voltage levels only. NOTES: 3. Refer to ANSI Standards EIA/TIA-422-B and EIA/TIA-423-A for exact conditions.

^{4.} Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, C_L = 15 pF, T_A = 25°C

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
^t PLH	Propagation delay time, low- to high-level output	Vin = 0 to 3 V Soo Figure 2		15	22	ns
tPHL	Propagation delay time, high- to low-level output	V _{ID} = 0 to 3 V, See Figure 2		15	22	ns
^t PZH	Output enable time to high level	See Figure 3		13	25	ns
tPZL	Output enable time to low level	See rigule 3		10	25	115
tPHZ	Output disable time from high level	See Figure 3		19	25	no
tPLZ	Output disable time from low level	See Figure 3		17	22	ns

PARAMETER MEASUREMENT INFORMATION

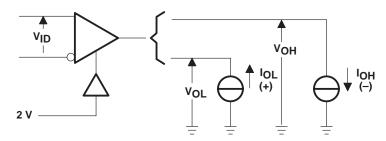
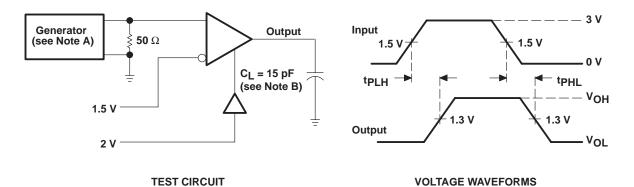


Figure 1. V_{OH}, V_{OL}

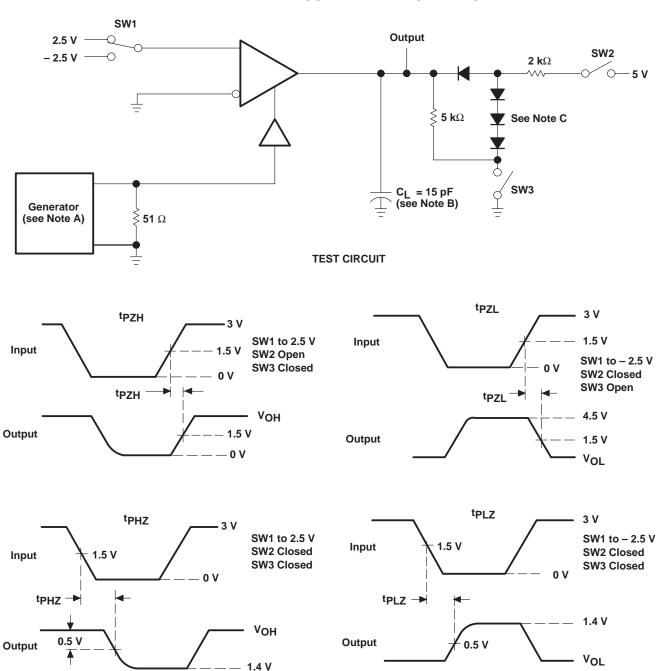


NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR \leq 1 MHz, duty cycle \leq 50%, Z_O = 50 Ω , $t_f \leq$ 6 ns, $t_f \leq$ 6 ns.

B. C_L includes probe and jig capacitance.

Figure 2. Test Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION



VOLTAGE WAVEFORMS

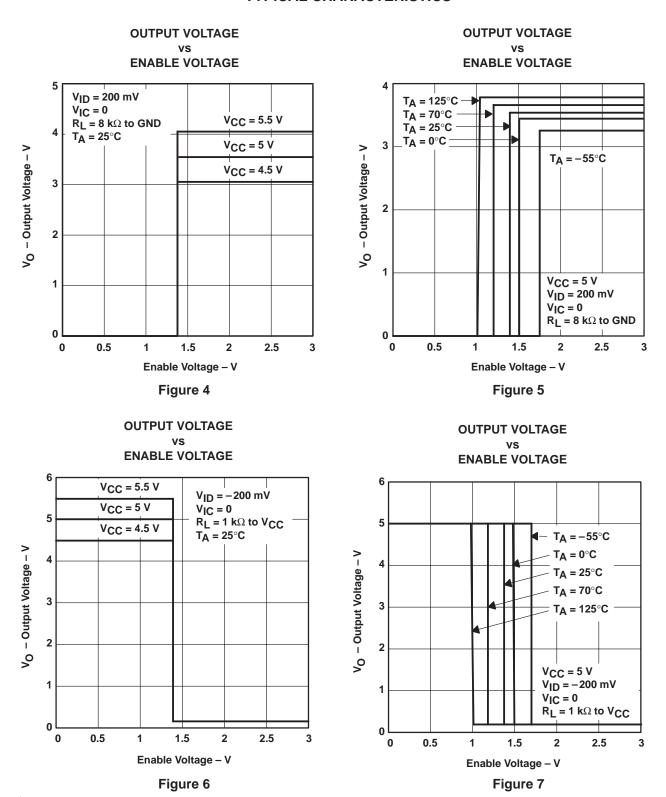
NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR \leq 1 MHz, duty cycle \leq 50%, $Z_O = 50 \Omega$, $t_f \leq 6$ ns, $t_f \leq 6$ ns.

- B. C_L includes probe and jig capacitance.
- C. All diodes are 1N3064 or equivalent.

Figure 3. Test Circuit and Voltage Waveforms

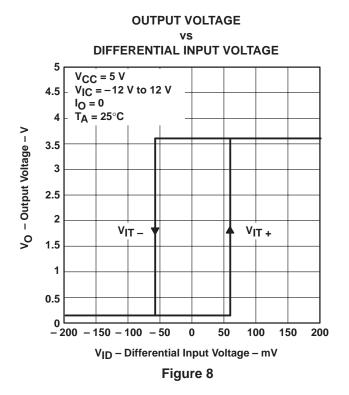


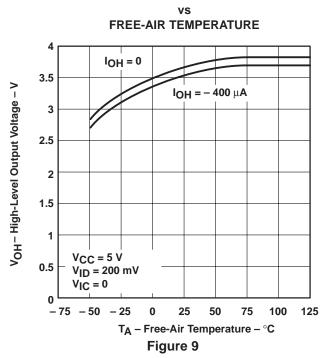
TYPICAL CHARACTERISTICS†



† Data for temperatures below 0°C and above 70°C, and below 4.75 V and above 5.25 V, are applicable to SN55ALS195 circuits only.

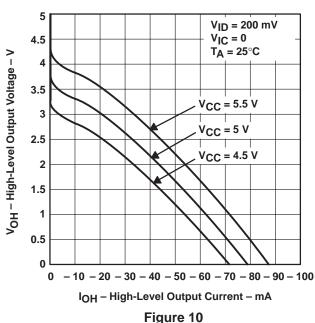
TYPICAL CHARACTERISTICS[†]



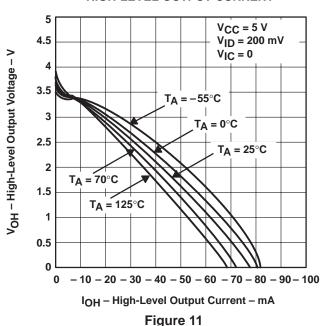


HIGH-LEVEL OUTPUT VOLTAGE

HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT



HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT



† Data for temperatures below 0°C and above 70°C, and below 4.75 V and above 5.25 V, are applicable to SN55ALS195 circuits only.



TYPICAL CHARACTERISTICS[†]

LOW-LEVEL OUTPUT VOLTAGE FREE-AIR TEMPERATURE

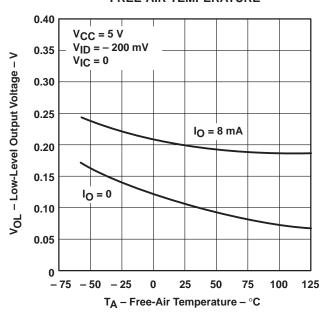
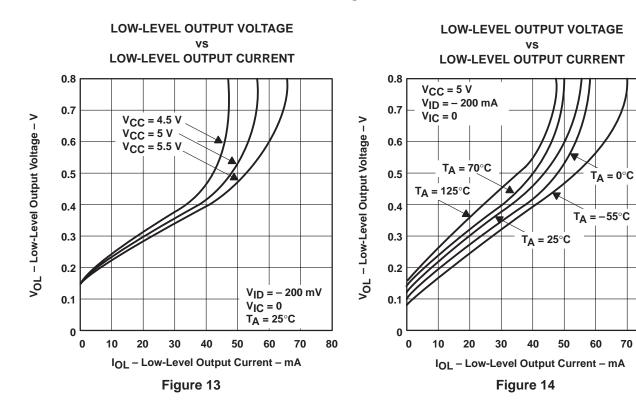


Figure 12



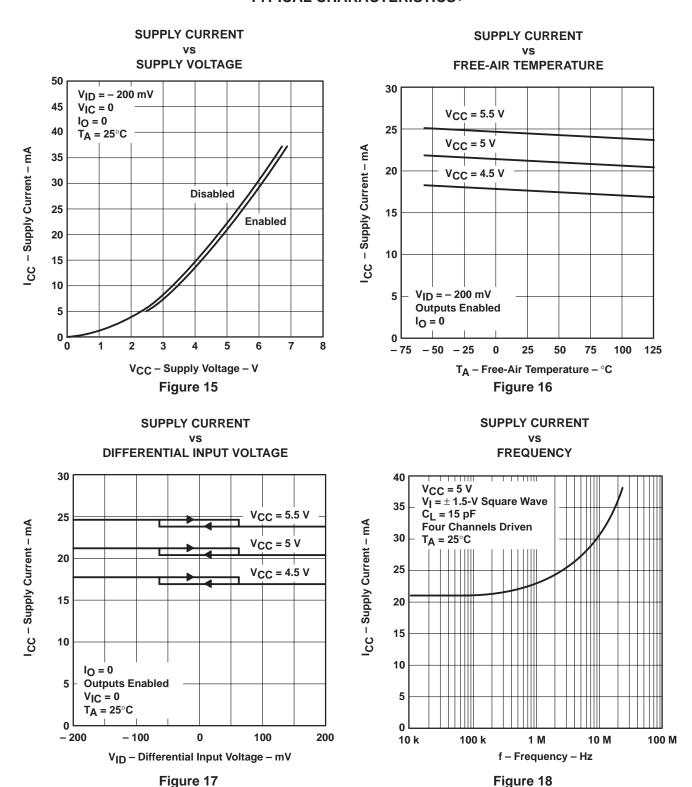
[†] Data for temperatures below 0°C and above 70°C, and below 4.75 V and above 5.25 V, are applicable to SN55ALS195 circuits only.



70

80

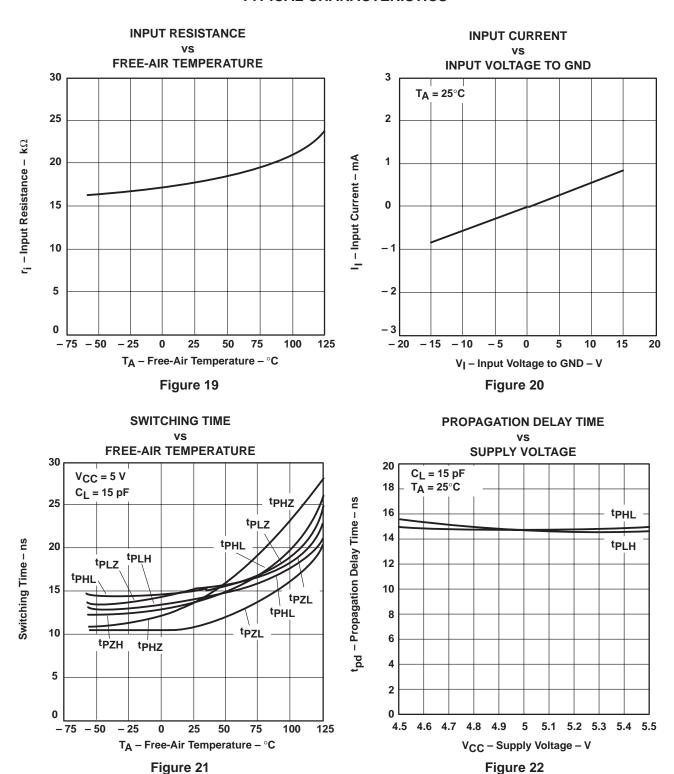
TYPICAL CHARACTERISTICS†



[†] Data for temperatures below 0°C and above 70°C, and below 4.75 V and above 5.25 V, are applicable to SN55ALS195 circuits only.



TYPICAL CHARACTERISTICS[†]



† Data for temperatures below 0°C and above 70°C, and below 4.75 V and above 5.25 V, are applicable to SN55ALS195 circuits only.







i.com 18-Sep-2008

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins P	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
SN55ALS195J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN75ALS195J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN75ALS195N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN75ALS195NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SNJ55ALS195FK	OBSOLETE	LCCC	FK	20		TBD	Call TI	Call TI
SNJ55ALS195J	OBSOLETE	CDIP	J	16	•	TBD	Call TI	Call TI
SNJ55ALS195W	OBSOLETE	CFP	W	16	•	TBD	Call TI	Call TI

(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.

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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**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- 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



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



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