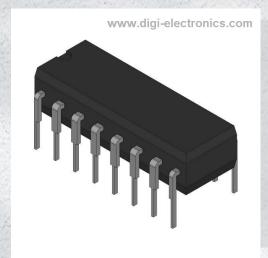


SN75115NE4 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number SN75115NE4-DG

Manufacturer Texas Instruments

Manufacturer Product Number SN75115NE4

Description IC DUAL DIFFERENTIAL

Detailed Description Interface, Integrated Circuits (ICs)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.



Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
SN75115NE4	Texas Instruments
Series:	Product Status:
•	Active

Environmental & Export classification

ECCN:	HTSUS:
EAR99	8542.39.0001

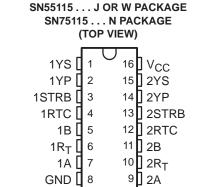
SN55115, SN75115 DUAL DIFFERENTIAL RECEIVERS

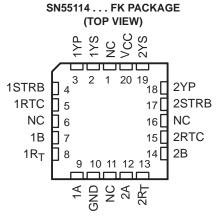
SLLS072D - SEPTEMBER 1973 - REVISED MAY 1998

- Choice of Open-Collector or Active Pullup (Totem-Pole) Outputs
- Single 5-V Supply
- Differential Line Operation
- Dual-Channel Operation
- TTL Compatible
- ±15-V Common-Mode Input Voltage Range
- Optional-Use Built-In 130-Ω Line-Terminating Resistor
- Individual Frequency-Response Controls
- Individual Channel Strobes
- Designed for Use With SN55113, SN75113, SN55114, and SN75114 Drivers
- Designed to Be Interchangeable With National DS9615 Line Receivers

description

The SN55115 and SN75115 dual differential line receivers are designed to sense small differential signals in the presence of large common-mode noise. These devices give TTL-compatible output signals as a function of the differential input voltage. The open-collector output configuration permits the wire-ANDing of similar TTL outputs (such as SN5401/SN7401) or other SN55115/SN75115 line receivers. This permits a level of logic to be implemented without extra delay.





NC - No internal connection

The output stages are similar to TTL totem-pole outputs, but with sink outputs, 1YS and 2YS, and the corresponding active pullup terminals, 1YP and 2YP, available on adjacent package pins. The frequency response and noise immunity may be provided by a single external capacitor. A strobe input is provided for each channel. With the strobe in the low level, the receiver is disabled and the outputs are forced to a high level.

The SN55115 is characterized for operation over the full military temperature range of -55° C to 125°C. The SN75115 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE

STRB	DIFF INPUT (A AND B)	OUTPUT (YP AND YS TIED TOGETHER)
L	Х	Н
Н	L	Н
Н	Н	L

 $H = V_I \ge V_{IH}$ min or V_{ID} more positive than V_{T+} max $L = V_I \le V_{IL}$ max or V_{ID} more negative than V_{T-} max X = irrelevant



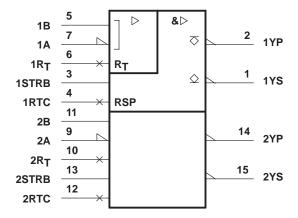
Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



SN55115, SN75115 DUAL DIFFERENTIAL RECEIVERS

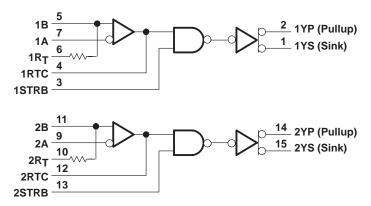
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logic symbol†



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

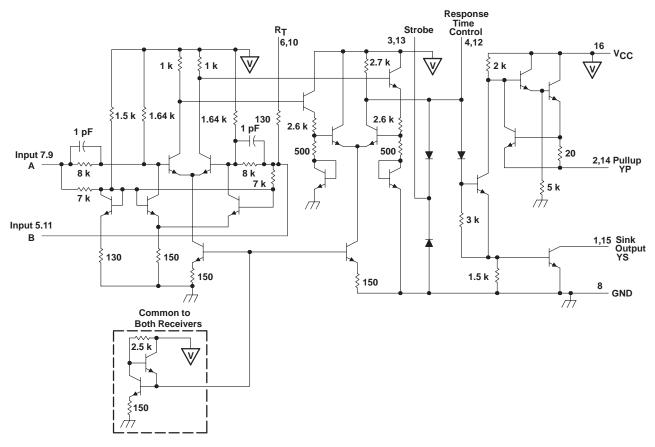
logic diagram (positive logic)





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schematic (each receiver)



Resistor values are nominal and in ohms.

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

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

Supply voltage, V _{CC} (see Note 1)	
Input voltage V _I (A, B, and R _T)	
Input voltage V _I (STRB)	5.5 V
Off-state voltage applied to open-collector outputs	14 V
Continuous total power dissipation	See Dissipation Rating Table
Storage temperature range, T _{stq}	–65°C to 150°C
Case temperature for 60 seconds: FK package	
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J or W package	ge 300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: N package	

[†] 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.

NOTE 1: All voltage values, except differential input voltage, are with respect to network ground terminal.



SN55115, SN75115 DUAL DIFFERENTIAL RECEIVERS

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DISSIPATION RATING TABLE

PACKAGE	T _A ≤ 25°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†	1375 mW	11.0 mW/°C	880 mW	275 mW
N	1150 mW	9.2 mW/°C	736 mW	_
w†	1000 mW	8.0 mW/°C	640 mW	200 mW

[†] In the FK, J, and W packages, SN55115 chips are either silver glass or alloy mounted. SN75115 chips are glass mounted.

recommended operating conditions

		SN55115		SN75115			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Supply voltage, V _{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level input voltage at STRB, $V_{\mbox{\scriptsize IH}}$	2.4			2.4			V
Low-level input voltage at STRB, V _{IL}			0.4			0.4	V
High-level output current, IOH			-5			-5	mA
Low-level output current, IOL			15			15	mA
Operating free-air temperature, T _A	-55		125	0		70	°C



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

	DADAMETED	TE6:		SN55115		SN75115			UNIT		
	PARAMETER	IES	r conditions†		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	UNII
V _{IT+} §	Positive-going threshold voltage	V _O = 0 .4 V,	I _{OL} = 15 mA,	V _{IC} = 0			500			500	mV
V _{IT} _§	Negative-going threshold voltage	V _O = 2 .4 V,	$I_{OH} = -5 \text{ mA},$	VIC = 0	-500¶			-500¶			mV
VICR	Common-mode input voltage range	V _{ID} = ±1 V			+15 to -15	+24 to -19		+15 to -15	+24 to -19		V
		.,	.,	$T_A = MIN$	2.2			2.4			
Vон	High-level ouput voltage	$V_{CC} = MIN,$ $I_{OH} = -5 \text{ mA}$	$V_{ID} = -0.5 V$,	$T_A = 25^{\circ}C$	2.4	3.4		2.4	3.4		V
		1011		$T_A = MAX$	2.4			2.4			
VOL	Low-level output voltage	$V_{CC} = MIN,$ $I_{OL} = 15 \text{ mA}$	$V_{ID} = -0.5 V$,			0.22	0.4		0.22	0.45	V
		., .,,,	.,	$T_A = MIN$			-0.9			-0.9	
ηL	Low-level input current	V _{CC} = MAX, Other input at 5.5		T _A = 25°C		-0.5	-0.7		-0.5	-0.7	mA
		Other input at o.		$T_A = MAX$			-0.7			-0.7	
ISH	High-level strobe	V _{CC} = MIN,	$V_{ID} = -0.5 V$,	T _A = 25°C			2			5	μА
'5П	current	V _{strobe} = 4.5 V		$T_A = MAX$			5			10	μπ
I _{SL}	Low-level strobe current	$V_{CC} = MAX,$ $V_{strobe} = 0.4 V$	$V_{ID} = 0.5 V,$	T _A = 25°C		-1.15	-2.4		-1.15	-2.4	mA
I(RTC)	Response-time- control current	$V_{CC} = MAX,$ $V_{RC} = 0$	$V_{ID} = 0.5 V,$	T _A = 25°C	-1.2	-3.4		-1.2	-3.4		mA
		V _{CC} = MIN,	V _{OH} = 12 V,	T _A = 25°C			100				
lo (off)	Off-state open-collector	$V_{ID} = -4.5 \text{ V}$		$T_A = MAX$			200				μА
I _O (off)	output current	V _{CC} = MIN,	V _{OH} = 5.25 V,	$T_A = 25^{\circ}C$						100	μΑ
		$V_{ID} = -4.75 \text{ V}$		$T_A = MAX$						200	
R _T	Line-terminating resistance	V _{CC} = 5 V		T _A = 25°C	77	130	167	74	130	179	Ω
los	Supply-circuit output current#	$V_{CC} = MAX,$ $V_{O} = 0$	$V_{ID} = -0.5 V,$	T _A = 25°C	-15	-40	-80	-14	-40	-100	mA
Icc	Supply current (both receivers)	$V_{CC} = MAX,$ $V_{IC} = 0$	$V_{ID} = 0.5 V,$	T _A = 25°C		32	50		32	50	mA

[†] Unless otherwise noted, V_{Strobe} = 2.4 V. All parameters with the exception of off-state open-collector output current are measured with the active pullup connected to the sink output.



[‡] All typical values are at $V_{CC} = 5$ V, $T_A = 25$ °C, and $V_{IC} = 0$.

[§] Differential voltages are at the B input terminal with respect to the A input terminal.

The algebraic convention, in which the less positive (more negative) limit is designated as minimum, is used in this data sheet for threshold voltages only.

[#]Only one output should be shorted to ground at a time, and duration of the short circuit should not exceed one second.

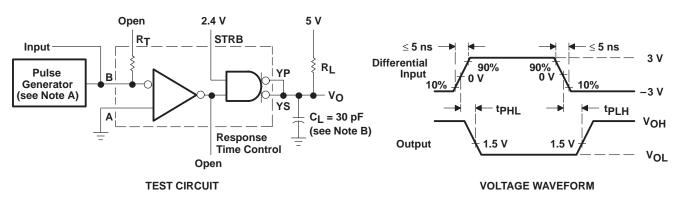
SN55115, SN75115 DUAL DIFFERENTIAL RECEIVERS

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switching characteristics, V_{CC} = 5 V, C_L = 30 pF, T_A = 25°C

	PARAMETER	TEST CONDI	s	N55115		SN75115			UNIT	
	FARAMETER	TEST CONDI	MIN	TYP	MAX	MIN	TYP	MAX	UNIT	
^t PLH	Propagation delay time, low-to-high level output	$R_L = 3.9 \text{ k}\Omega$, Se	ee Figure 1		18	50		18	75	ns
tPHL	Propagation delay time, high-to-low level output	R _L = 390 Ω, Se	ee Figure 1		20	50		20	75	ns

PARAMETER MEASUREMENT INFORMATION



NOTES: A. The pulse generator has the following characteristics: $Z_O = 50 \ \Omega$, PRR $\leq 500 \ kHz$, $t_W \leq 100 \ ns$, duty cycle = 50%.

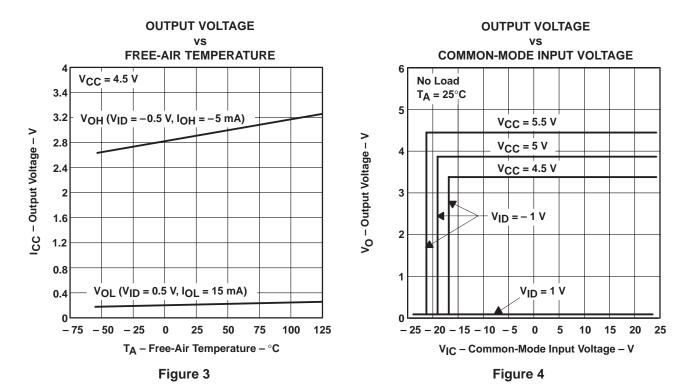
B. C_L includes probe and jig capacitance.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS[†]

INPUT CURRENT vs INPUT VOLTAGE 6 VCC = 5 V Input Not Under Test at 0 V 4 TA = 25°C 2 -4 -6 -25 -20 -15 -10 -5 0 5 10 15 20 25

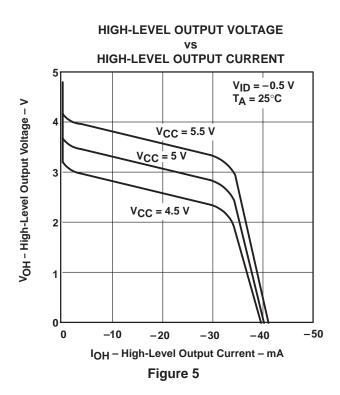
V_I – Input Voltage – V Figure 2

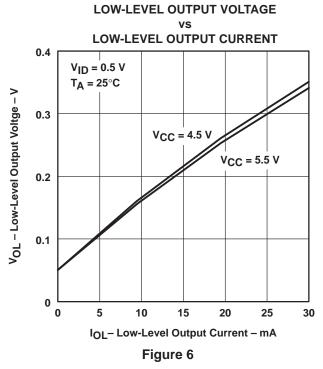


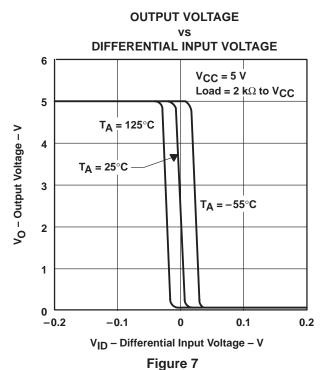
[†] Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55115 circuits only. These parameters were measured with the active pullup connected to the sink output.



TYPICAL CHARACTERISTICS







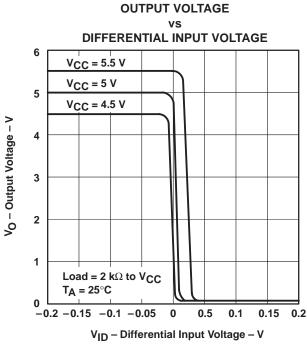
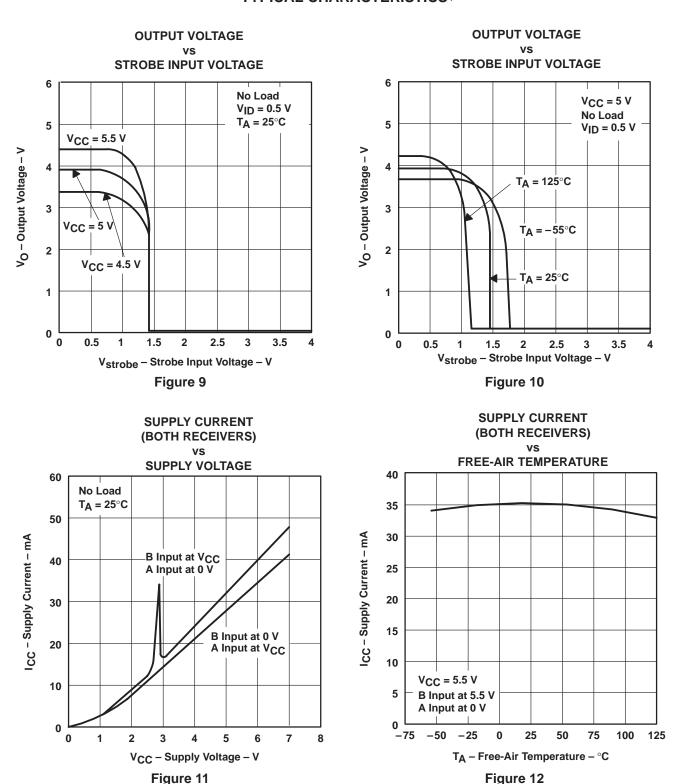


Figure 8

TYPICAL CHARACTERISTICS†

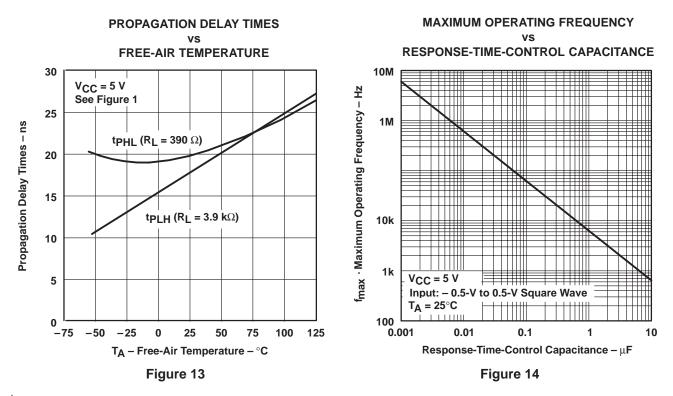


[†] Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55115 circuits only. These parameters were measured with the active pullup connected to the sink output.

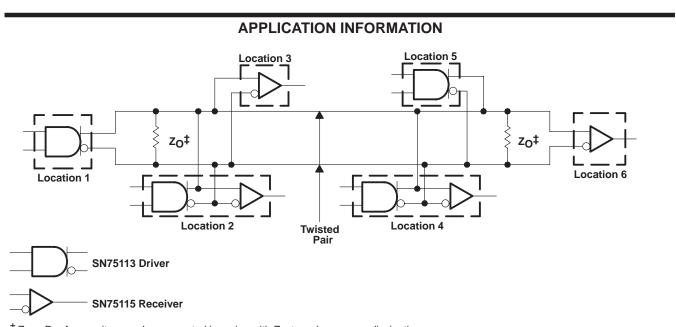


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TYPICAL CHARACTERISTICS[†]



[†] Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55115 circuits only. These parameters were measured with the active pullup connected to the sink output.



 \ddagger Z_O = R_T. A capacitor may be connected in series with Z_O to reduce power dissipation.

Figure 15. Basic Party-Line or Data-Bus Differential Data Transmission





PACKAGE OPTION ADDENDUM

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead finish/ Ball material	MSL Peak Temp	Op Temp (°C)	Device Marking (4/5)	Samples
5962-88745012A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 88745012A SNJ55 115FK	Samples
5962-8874501FA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8874501FA SNJ55115W	Samples
JM38510/10404BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510 /10404BEA	Samples
M38510/10404BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510 /10404BEA	Samples
SN55115J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN55115J	Samples
SN75115D	ACTIVE	SOIC	D	16	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75115	Samples
SN75115DR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75115	Samples
SN75115N	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	SN75115N	Samples
SN75115NE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	SN75115N	Samples
SN75115NSR	ACTIVE	SOP	NS	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75115	Samples
SNJ55115FK	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 88745012A SNJ55 115FK	Samples
SNJ55115J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SNJ55115J	Samples
SNJ55115W	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8874501FA SNJ55115W	Samples

⁽¹⁾ The marketing status values are defined as follows: **ACTIVE:** Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

SN75115NE4 Texas Instruments IC DUAL DIFFERENTIAL



PACKAGE OPTION ADDENDUM

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(2) RoHS: TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (CI) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

- (3) MSL, Peak Temp. The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- (6) Lead finish/Ball material Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF SN55115, SN75115:

Catalog: SN75115

Military: SN55115

NOTE: Qualified Version Definitions:

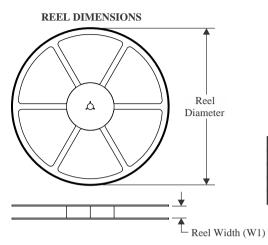
- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications



PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION





A0	Dimension designed to accommodate the component width
В0	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

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN75115DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN75115NSR	SOP	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1



PACKAGE MATERIALS INFORMATION

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN75115DR	SOIC	D	16	2500	340.5	336.1	32.0
SN75115NSR	SOP	NS	16	2000	356.0	356.0	35.0



PACKAGE MATERIALS INFORMATION

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TUBE



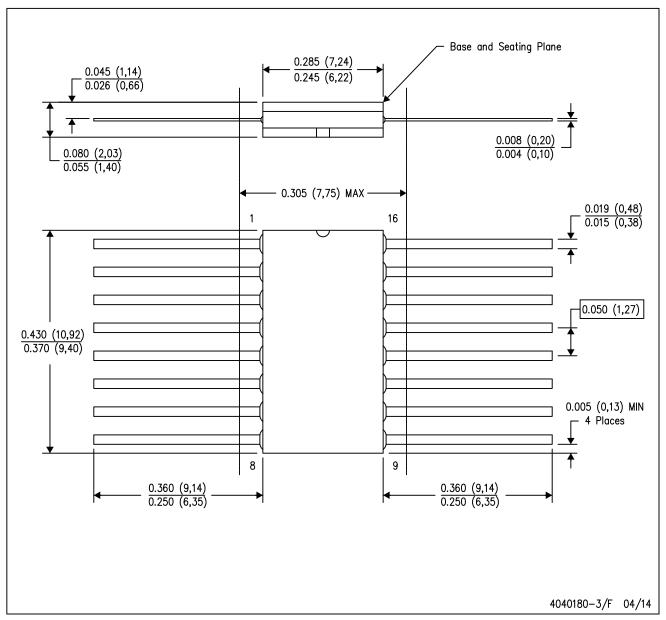
*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)	
5962-88745012A	FK	LCCC	20	55	506.98	12.06	2030	NA	
5962-8874501FA	W	CFP	16	25	506.98	26.16	6220	NA	
SN75115D	D	SOIC	16	40	507	8	3940	4.32	
SN75115N	N	PDIP	16	25	506	13.97	11230	4.32	
SN75115NE4	N	PDIP	16	25	506	13.97	11230	4.32	
SNJ55115FK	FK	LCCC	20	55	506.98	12.06	2030	NA	
SNJ55115W	W	CFP	16	25	506.98	26.16	6220	NA	

MECHANICAL DATA

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 GDFP2-F16



GENERIC PACKAGE VIEW

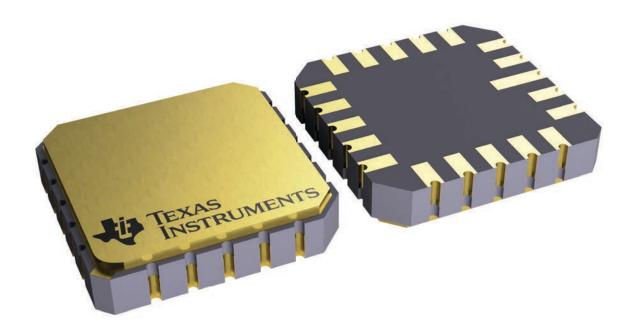
FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

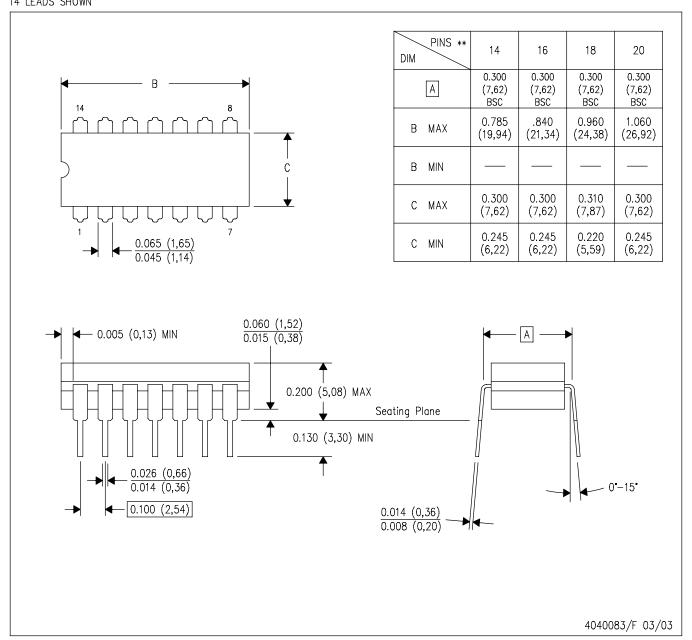
This image is a representation of the package family, actual package may vary. Refer to the product data sheet for package details.



J (R-GDIP-T**)

CERAMIC DUAL IN-LINE PACKAGE

14 LEADS SHOWN



NOTES:

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

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

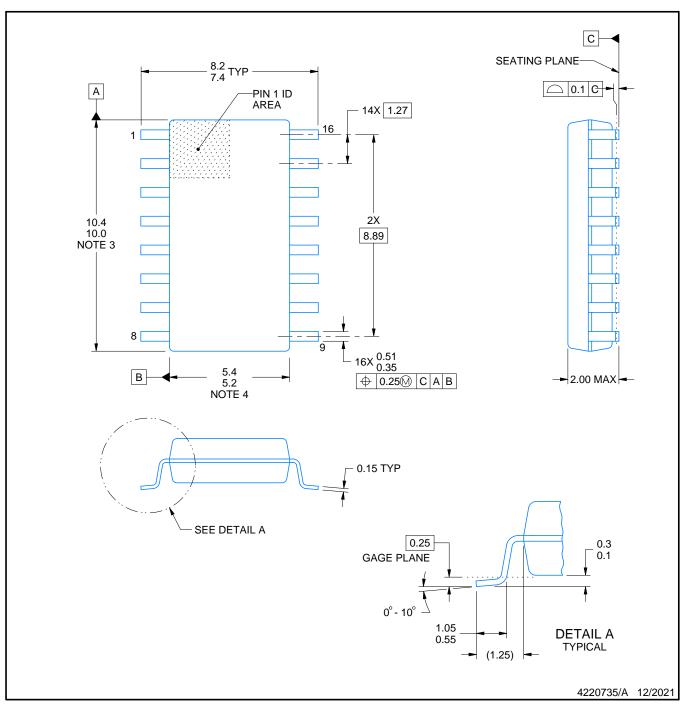
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



PACKAGE OUTLINE

SOP - 2.00 mm max height

SOP



NOTES:

NS0016A

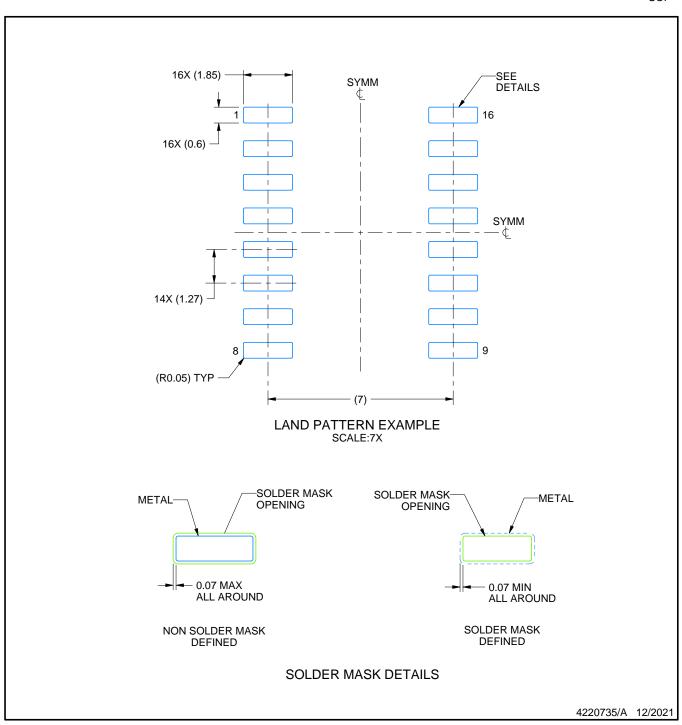
- 1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing
- per ASME Y14.5M.

 2. This drawing is subject to change without notice.

 3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
- 4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm, per side.



SOF

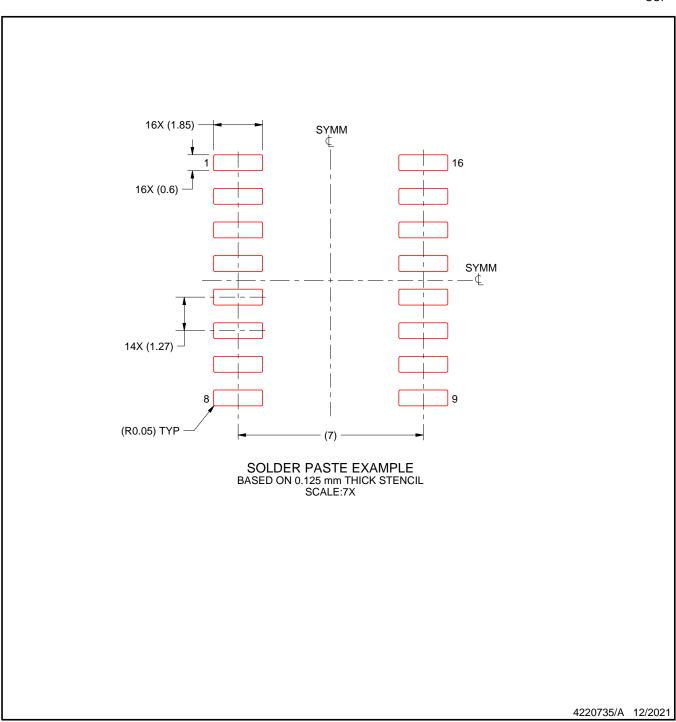


NOTES: (continued)

- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOF



NOTES: (continued)

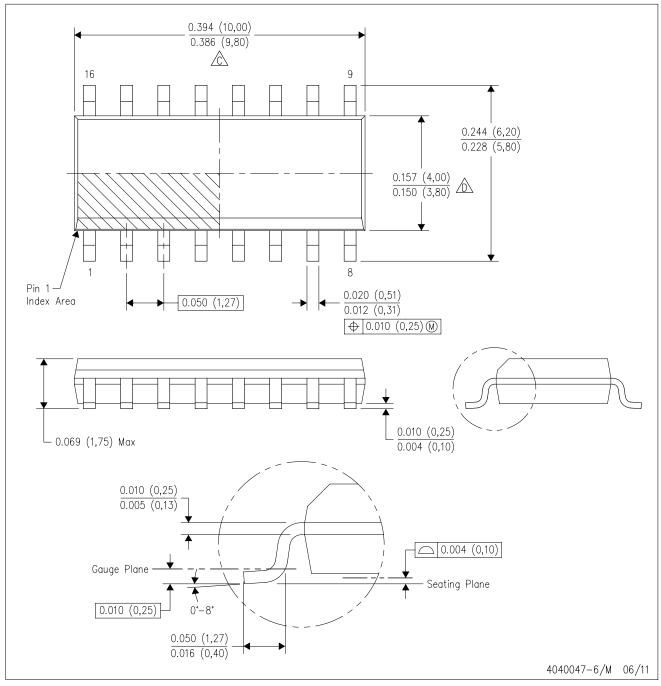
- 7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 8. Board assembly site may have different recommendations for stencil design.



MECHANICAL DATA

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.
- 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.
- 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.

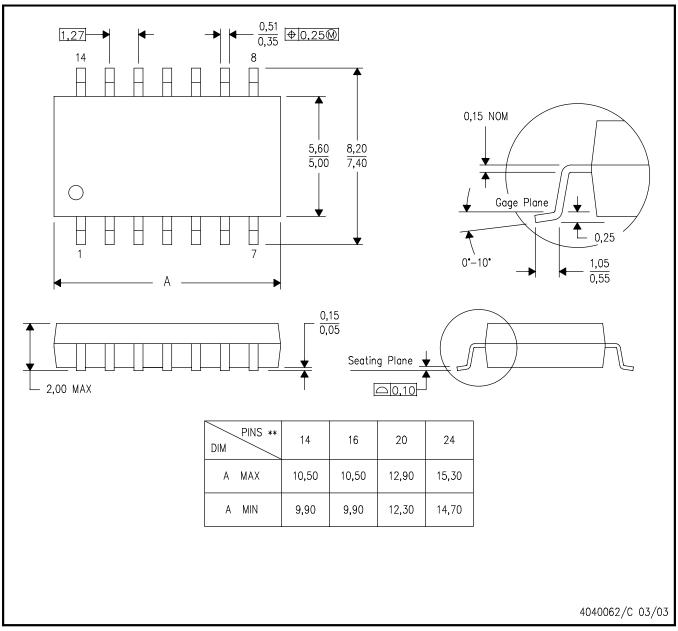


MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



NOTES:

- 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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