

SN54AS867, SN54AS869

SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869

SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

SDAS115C – DECEMBER 1982 – REVISED JANUARY 1995

description (continued)

The SN54AS867 and SN54AS869 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS867A, SN74ALS869, SN74AS867, and SN74AS869 are characterized for operation from 0°C to 70°C .

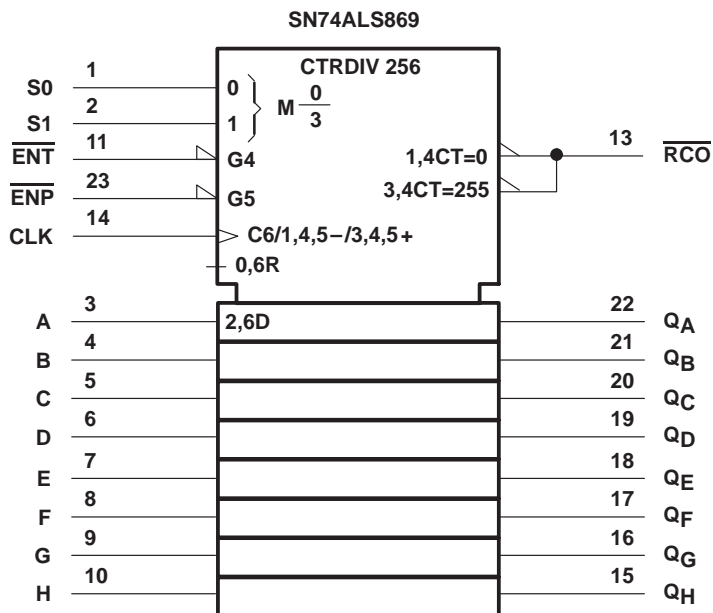
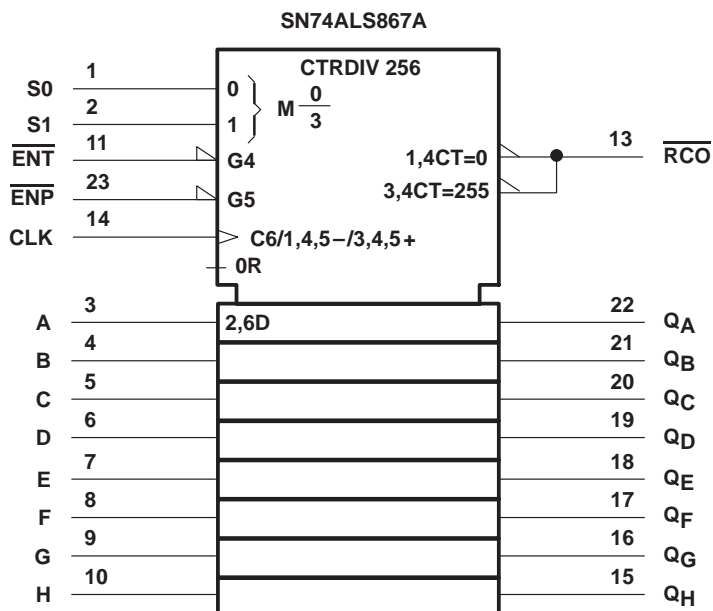
FUNCTION TABLE

S1	S0	FUNCTION
L	L	Clear
L	H	Count down
H	L	Load
H	H	Count up

SN54AS867, SN54AS869
SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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logic symbols†

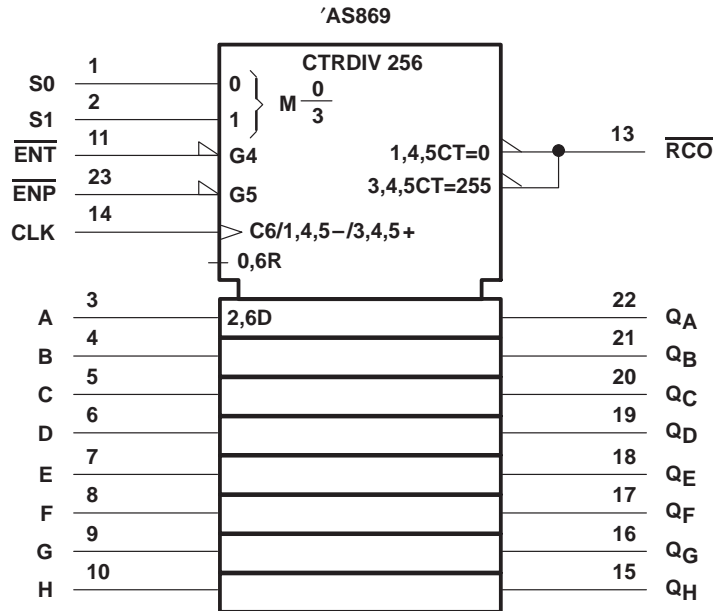
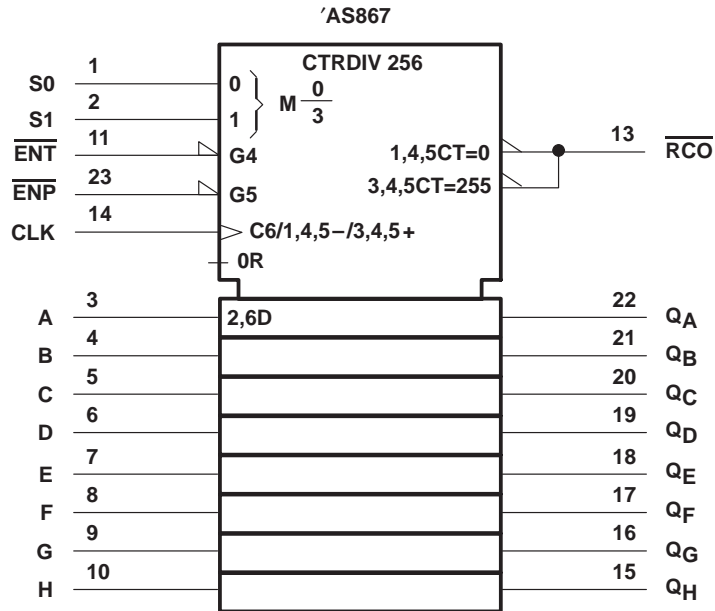


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the DW, JT, and NT packages.

SN54AS867, SN54AS869
 SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
 SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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logic symbols (continued)†

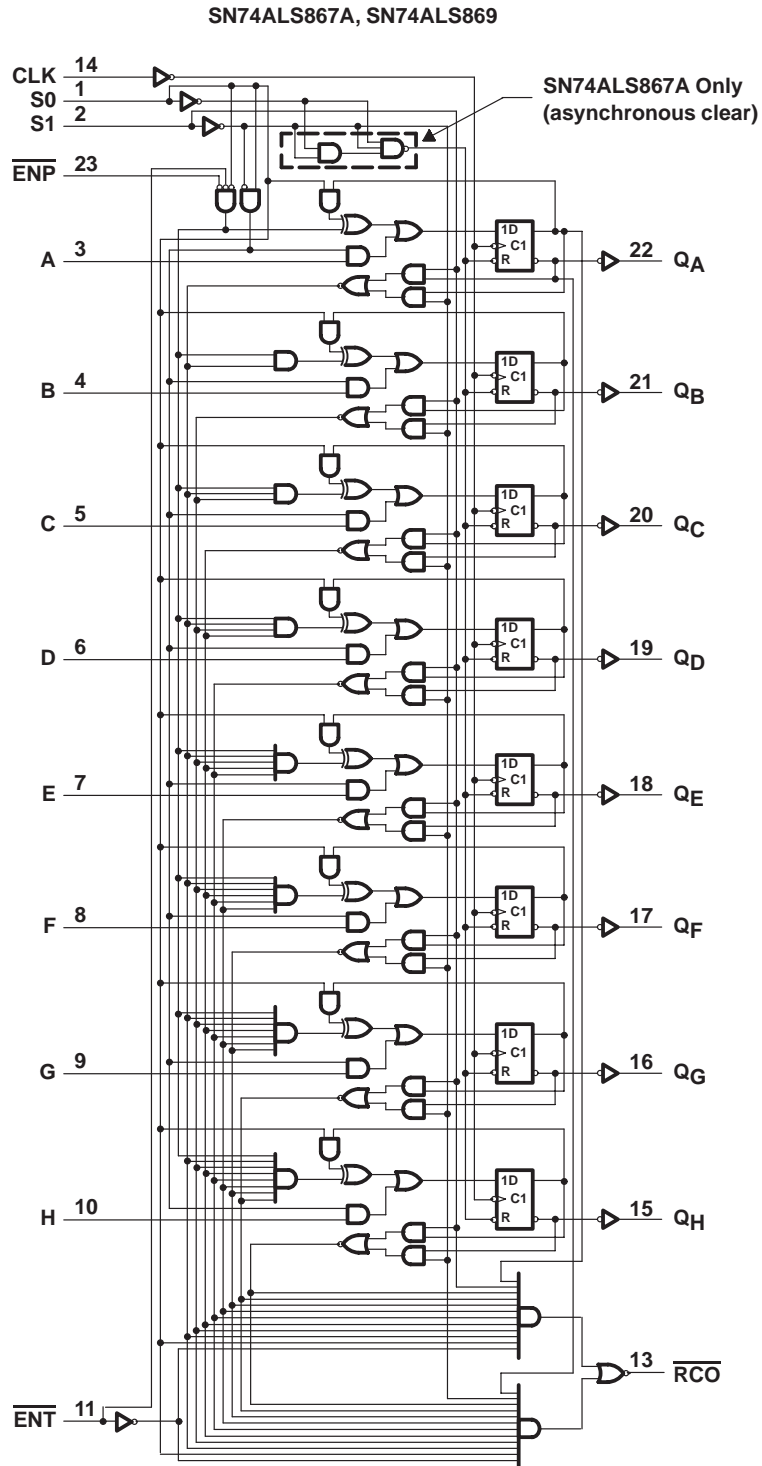


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
 Pin numbers shown are for the DW, JT, and NT packages.

SN54AS867, SN54AS869
 SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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logic diagram (positive logic)

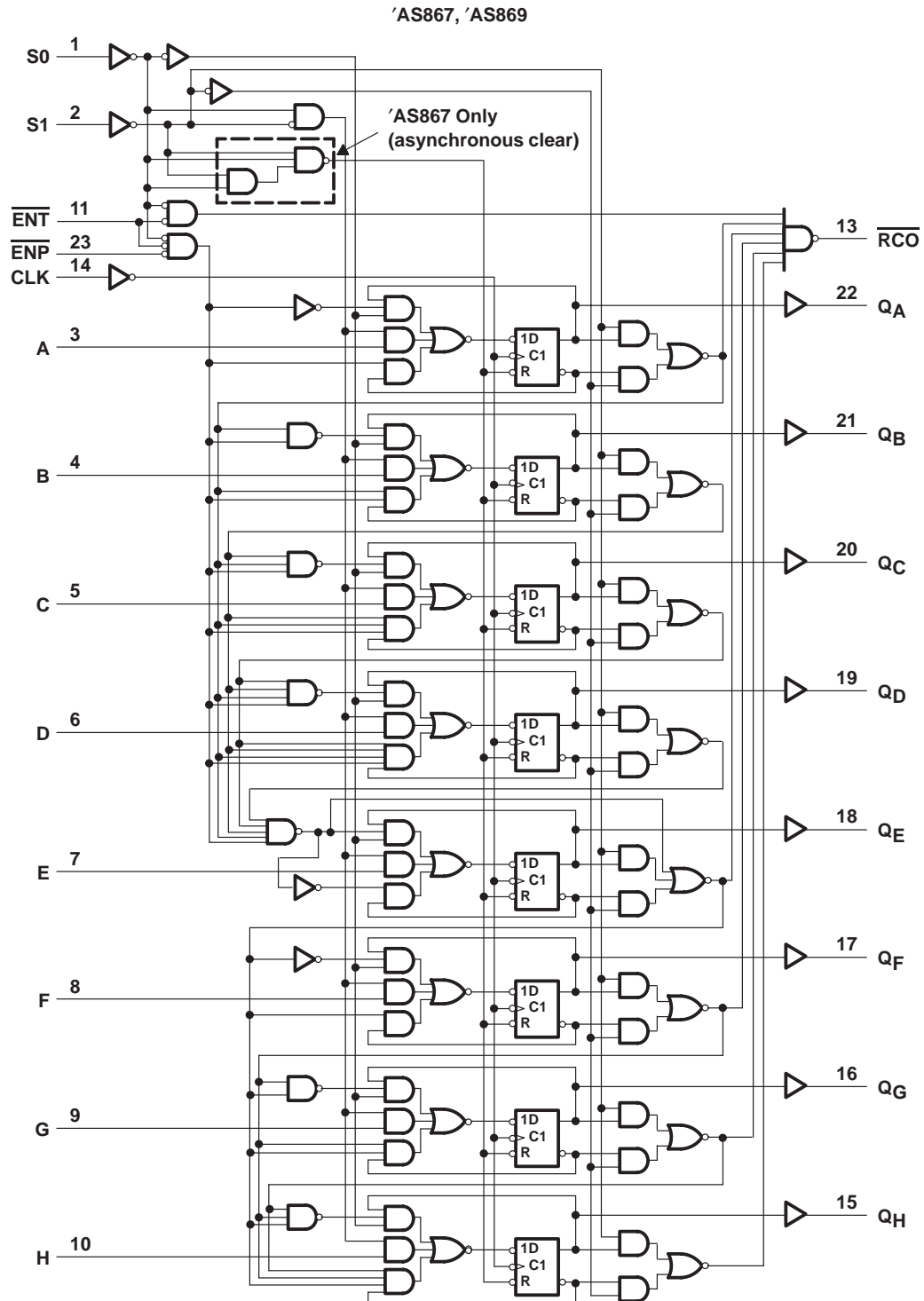


Pin numbers shown are for the DW, JT, and NT packages.

SN54AS867, SN54AS869
SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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logic diagram (positive logic)



Pin numbers shown are for the DW, JT, and NT packages.

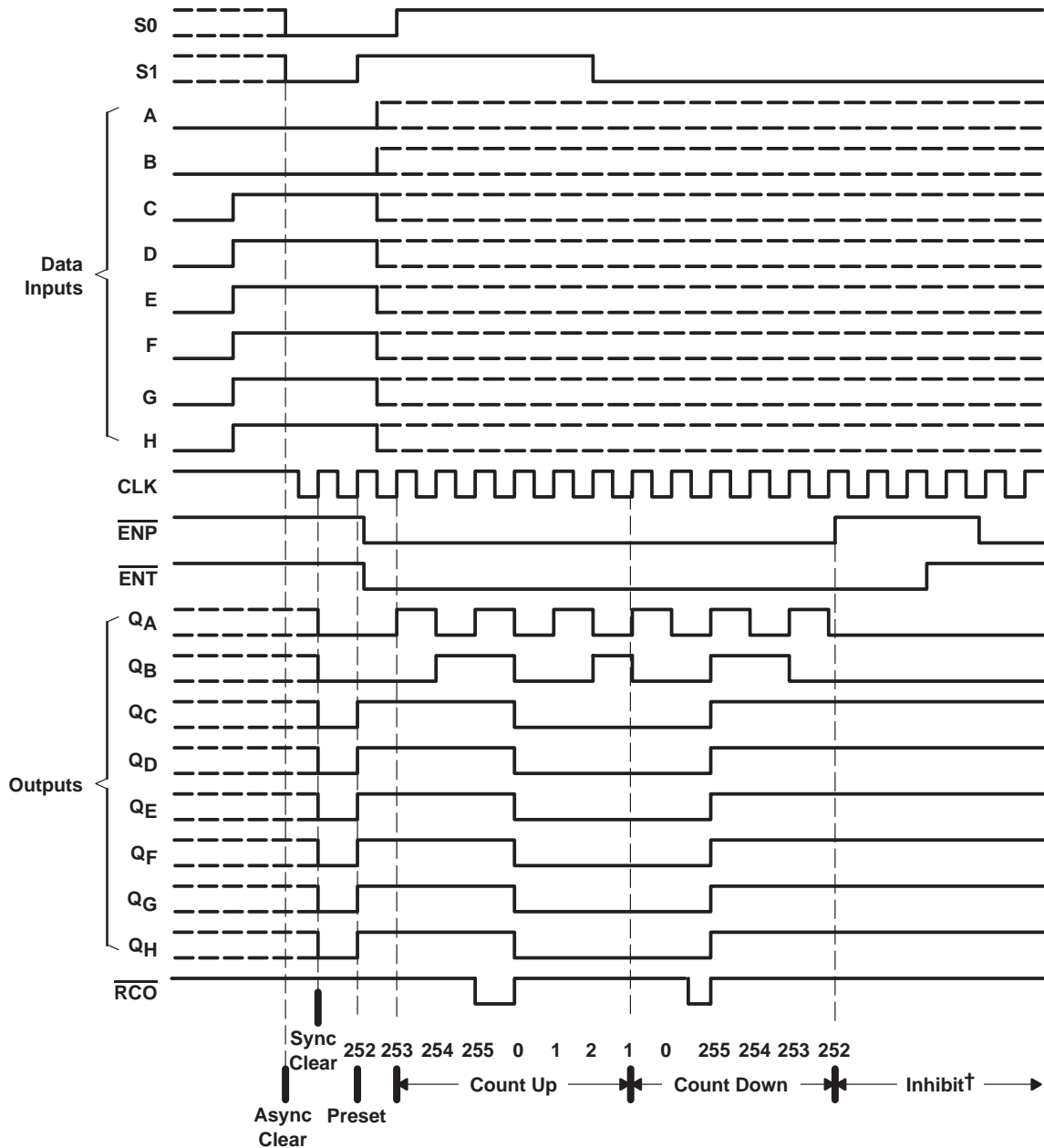


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typical clear, preset, count, and inhibit sequences

The following sequence is illustrated below:

1. Clear outputs to zero (SN74ALS867A and 'AS867 are asynchronous; SN74ALS869 and 'AS869 are synchronous.)
2. Preset to binary 252
3. Count up to 253, 254, 255, 0, 1, and 2
4. Count down to 1, 0, 255, 254, 253, and 252
5. Inhibit



† ENT and ENP both must be low for counting to occur.

SN54AS867, SN54AS869
SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A : SN74ALS867A	0°C to 70°C
Storage temperature range	-65°C to 150°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.

recommended operating conditions

		SN74ALS867A			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
I_{OH}	High-level output current			-0.4	mA
I_{OL}	Low-level output current			8	mA
f_{clock}	Clock frequency	0		35	MHz
$t_{w(clock)}$	Pulse duration, CLK high or low	14			ns
$t_{w(clear)}$	Pulse duration of clear pulse, S0 and S1 low	10			ns
t_{su}	Setup time before CLK↑	Data inputs A–H	10		ns
		\overline{ENP} or \overline{ENT}	15		
		S0 low and S1 high (load)	12		
		S0 high and S1 low (count down)	12		
		S0 and S1 high (count up)	12		
t_h	Hold time after CLK↑	S0 high after S1↑ or S1 high after S0↑	3		ns
		Data inputs A–H	0		
T_A	Operating free-air temperature	0		70	°C

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

PARAMETER	TEST CONDITIONS	SN74ALS867A			UNIT
		MIN	TYP‡	MAX	
V_{IK}	$V_{CC} = 4.5 V$, $I_I = -18 mA$			-1.2	V
V_{OH}	$V_{CC} = 4.5 V$ to $5.5 V$, $I_{OH} = -0.4 mA$	$V_{CC} - 2$			V
V_{OL}	$V_{CC} = 4.5 V$	$I_{OL} = 4 mA$	0.25	0.4	V
		$I_{OL} = 8 mA$	0.35	0.5	
I_I	$V_{CC} = 5.5 V$, $V_I = 7 V$			0.1	mA
I_{IH}	$V_{CC} = 5.5 V$, $V_I = 2.7 V$			20	μA
I_{IL}	$V_{CC} = 5.5 V$, $V_I = 0.4 V$			-0.2	mA
$I_{O§}$	$V_{CC} = 5.5 V$, $V_O = 2.25 V$	-30		-112	mA
I_{CC}	$V_{CC} = 5.5 V$		28	45	mA

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

§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .



SN54AS867, SN54AS869
 SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX†		UNIT
			SN74ALS867A		
			MIN	MAX	
f _{max}			35		MHz
t _{PLH}	CLK	\overline{RCO}	4	14	ns
t _{PHL}			4	14	
t _{PLH}	CLK	Any Q	3	16	ns
t _{PHL}			3	16	
t _{PLH}	\overline{ENT}	\overline{RCO}	3	14	ns
t _{PHL}			2	9	
t _{PHL}	S0 or S1 (clear mode)	Any Q	8	26	ns
t _{PLH}	S0 or S1 (count up/down)	\overline{RCO}	4	16	ns
t _{PHL}			4	16	
t _{PLH}	S0 or S1 (clear mode)	\overline{RCO}	4	16	ns

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

SN54AS867, SN54AS869
SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A : SN74ALS869	0°C to 70°C
Storage temperature range	-65°C to 150°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.

recommended operating conditions

		SN74ALS869			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
I_{OH}	High-level output current			-0.4	mA
I_{OL}	Low-level output current			8	mA
f_{clock}	Clock frequency	0		35	MHz
$t_{w(clock)}$	Pulse duration, CLK high or low	14			ns
t_{su}	Setup time before CLK↑	Data inputs A–H	10		ns
		\overline{ENP} or \overline{ENT}	15		
		S0 and S1 low (clear)	13		
		S0 low and S1 high (load)	13		
		S0 high and S1 low (count down)	13		
		S0 and S1 high (count up)	13		
t_h	Hold time after CLK↑	S0 high after S1↑ or S1 high after S0↑	3		ns
		Data inputs A–H	0		
T_A	Operating free-air temperature	0		70	°C

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

PARAMETER	TEST CONDITIONS	SN74ALS869			UNIT
		MIN	TYP‡	MAX	
V_{IK}	$V_{CC} = 4.5 V$, $I_I = -18 mA$			-1.2	V
V_{OH}	$V_{CC} = 4.5 V$ to $5.5 V$, $I_{OH} = -0.4 mA$	$V_{CC} - 2$			V
V_{OL}	$V_{CC} = 4.5 V$	$I_{OL} = 4 mA$	0.25	0.4	V
		$I_{OL} = 8 mA$	0.35	0.5	
I_I	$V_{CC} = 5.5 V$, $V_I = 7 V$			0.1	mA
I_{IH}	$V_{CC} = 5.5 V$, $V_I = 2.7 V$			20	μA
I_{IL}	$V_{CC} = 5.5 V$, $V_I = 0.4 V$			-0.2	mA
I_{O}^{\S}	$V_{CC} = 5.5 V$, $V_O = 2.25 V$	-30		-112	mA
I_{CC}	$V_{CC} = 5.5 V$		28	45	mA

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

§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .



SN54AS867, SN54AS869
 SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX†		UNIT
			SN74ALS869		
			MIN	MAX	
f _{max}			35		MHz
t _{PLH}	CLK	$\overline{\text{RCO}}$	4	14	ns
t _{PHL}			4	14	
t _{PLH}	CLK	Any Q	3	16	ns
t _{PHL}			3	16	
t _{PLH}	$\overline{\text{ENT}}$	$\overline{\text{RCO}}$	3	14	ns
t _{PHL}			2	9	
t _{PLH}	S1 (count up/down)	$\overline{\text{RCO}}$	4	15	ns
t _{PHL}			4	15	
t _{PLH}	S0 (clear/load)	$\overline{\text{RCO}}$	4	16	ns
t _{PHL}			4	12	

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

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SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
SYNCHRONOUS 8-BIT UP/DOWN COUNTERS

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

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A : SN54AS867	–55°C to 125°C
SN74AS867	0°C to 70°C
Storage temperature range	–65°C to 150°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.

recommended operating conditions

		SN54AS867			SN74AS867			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			–2			–2	mA
I_{OL}	Low-level output current			20			20	mA
f_{clock}^*	Clock frequency	0		40	0		50	MHz
$t_{w(clock)}^*$	Pulse duration, CLK high or low	12.5			10			ns
$t_{w(clear)}^*$	Pulse duration of clear pulse, S0 and S1 low	12.5			10			ns
t_{su}^*	Setup time before CLK↑	Data inputs A–H	5		4			ns
		\overline{ENP} or \overline{ENT}	9		8			
		S0 low and S1 high (load)	11		10			
		S0 and S1 low (clear)	11		10			
		S0 high and S1 low (count down)	42		40			
		S0 and S1 high (count up)	42		40			
t_h^*	Hold time after CLK↑			Data inputs A–H	0		0	ns
t_{skew}^*	Skew time between S0 and S1 (maximum to avoid inadvertent clear)			8			7	ns
T_A	Operating free-air temperature	–55		125	0		70	°C

* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data but is not production tested.



SN54AS867, SN54AS869
SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	SN54AS867		SN74AS867		UNIT				
		MIN	TYP†	MAX	MIN		TYP†	MAX		
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2		-1.2	V			
V_{OH}	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $I_{OH} = -2\text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$		V			
V_{OL}	$V_{CC} = 4.5\text{ V}$		$I_{OL} = 20\text{ mA}$, V_{IL} on $\overline{ENT} = 0.7\text{ V}$	0.34	0.5		V			
						0.34		0.5		
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$			0.1		0.1	mA			
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$			40		40	μA			
				20		20				
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$			-4		-4	mA			
				-2		-2				
$I_{O\ddagger}$	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$	-30		-112		-30		-112	mA	
I_{CC}	$V_{CC} = 5.5\text{ V}$			134	195			134	195	mA

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

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = \text{MIN to MAX}\S$				UNIT
			SN54AS867		SN74AS867		
			MIN	MAX	MIN	MAX	
f_{max}^*			40		50		MHz
t_{PLH}	CLK	\overline{RCO}	5	31	5	22	ns
t_{PHL}			6	19	6	16	
t_{PLH}	CLK	Any Q	3	12	3	11	ns
t_{PHL}			4	16	4	15	
t_{PLH}	\overline{ENT}	\overline{RCO}	3	19	3	10	ns
t_{PHL}			5	21	5	17	
t_{PLH}	\overline{ENP}	\overline{RCO}	5	16	5	14	ns
t_{PHL}			5	21	5	17	
t_{PHL}	Clear (S0 or S1 low)	Any Q	7	23	7	21	ns

* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data but is not production tested.

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



SN54AS867, SN54AS869
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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A : SN54AS869	–55°C to 125°C
SN74AS869	0°C to 70°C
Storage temperature range	–65°C to 150°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.

recommended operating conditions

		SN54AS869			SN74AS869			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.7			0.8	V
I_{OH}	High-level output current			–2			–2	mA
I_{OL}	Low-level output current			20			20	mA
f_{clock}^*	Clock frequency			40			45	MHz
$t_w(\text{clock})^*$	Pulse duration, CLK high or low	12.5			11			ns
t_{su}^*	Setup time before CLK↑	Data inputs A–H	6		5			ns
		\overline{ENP} or \overline{ENT}	10		9			
		S0 low and S1 high (load)	13		11			
		S0 and S1 low (clear)	13		11			
		S0 high and S1 low (count down)	52		50			
		S0 and S1 high (count up)	52		50			
t_h^*	Hold time after CLK↑	Data inputs A–H	0		0			ns
T_A	Operating free-air temperature	–55		125	0		70	°C

* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data but is not production tested.



SN54AS867, SN54AS869
SN74ALS867A, SN74ALS869, SN74AS867, SN74AS869
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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	SN54AS869		SN74AS869		UNIT	
		MIN	TYP†	MAX	MIN		TYP†
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2		-1.2	V
V_{OH}	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $I_{OH} = -2\text{ mA}$				$V_{CC} - 2$		V
	$V_{CC} = 4.5\text{ V}$, $I_{OH} = -2\text{ mA}$			$V_{CC} - 2^*$			
V_{OL}	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 20\text{ mA}$, V_{IL} on $\overline{ENT} = 0.7\text{ V}$	0.34	0.5			V
					0.34	0.5	
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$			0.1		0.1	mA
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$	\overline{ENT}		40		40	μA
		Other inputs		20		20	
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$	\overline{ENT}		-4		-4	mA
		Other inputs		-2		-2	
$I_{O\ddagger}$	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$	-30		-112	-30	-112	mA
I_{CC}	$V_{CC} = 5.5\text{ V}$		134	195		134 195	mA

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

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = \text{MIN to MAX}^\S$				UNIT
			SN54AS869		SN74AS869		
			MIN	MAX	MIN	MAX	
f_{max}^*			40		45		MHz
t_{PLH}	CLK	\overline{RCO}	6	35	6	35	ns
t_{PHL}			6	20	6	18	
t_{PLH}	CLK	Any Q	3	12	3	11	ns
t_{PHL}			4	16	4	15	
t_{PLH}	\overline{ENT}	\overline{RCO}	3	25	3	15	ns
t_{PHL}			6	21	6	17	
t_{PLH}	\overline{ENP}	\overline{RCO}	5	27	5	19	ns
t_{PHL}			6	21	6	18	

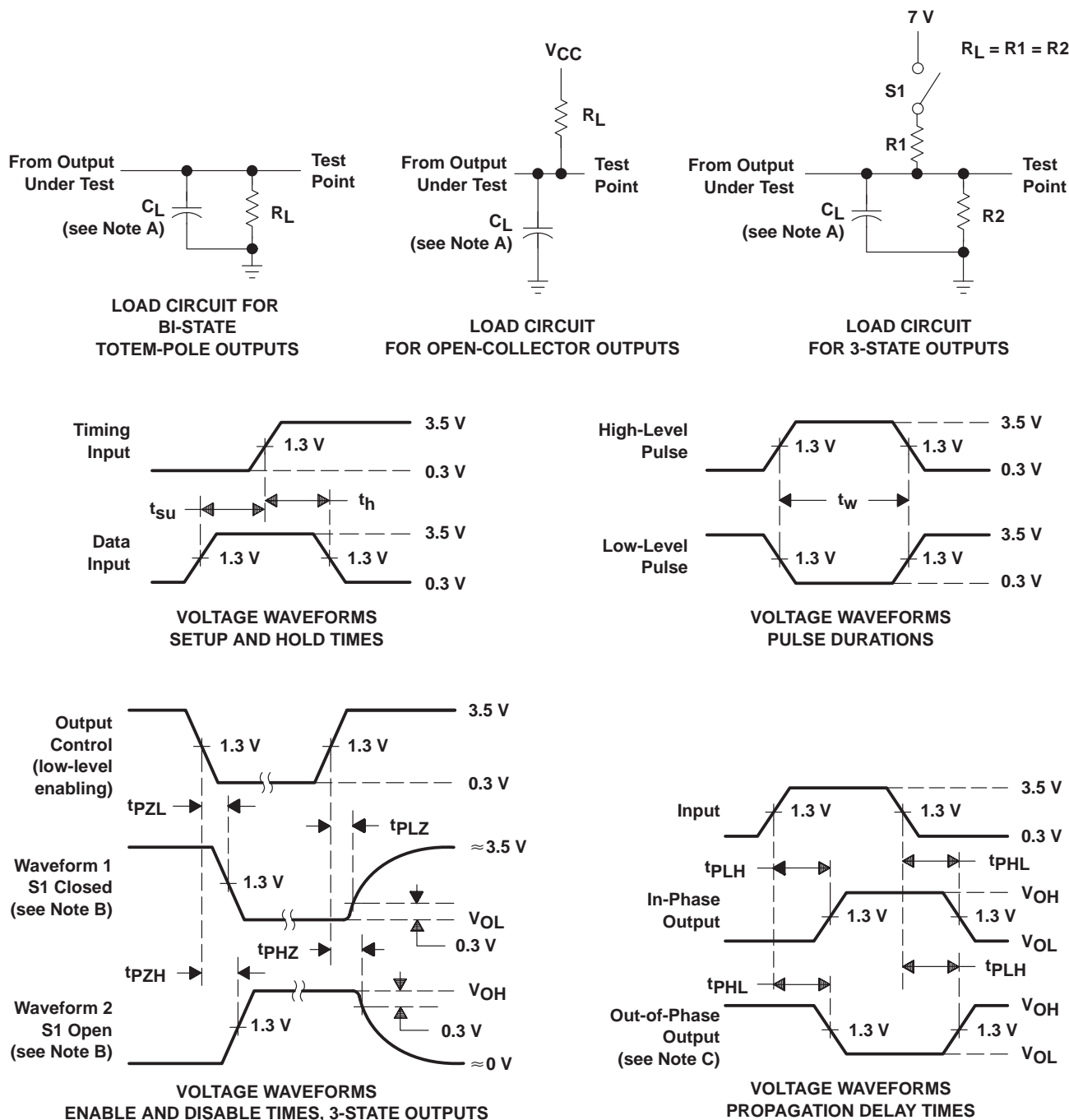
* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data but is not production tested.

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

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PARAMETER MEASUREMENT INFORMATION
 SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A. C_L includes probe and jig capacitance.
 B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
5962-8952601LA	ACTIVE	CDIP	JT	24	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	5962-8952601LA SNJ54AS869JT	Samples
5962-8966801LA	ACTIVE	CDIP	JT	24	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	5962-8966801LA SNJ54AS867JT	Samples
SN54AS867JT	ACTIVE	CDIP	JT	24	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	SN54AS867JT	Samples
SN54AS869JT	ACTIVE	CDIP	JT	24	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	SN54AS869JT	Samples
SN74ALS867ADW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS867A	Samples
SN74ALS869DW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS869	Samples
SN74ALS869DWE4	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS869	Samples
SN74AS867DW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	0 to 70	AS867	Samples
SN74AS869DW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	0 to 70	AS869	Samples
SNJ54AS867JT	ACTIVE	CDIP	JT	24	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	5962-8966801LA SNJ54AS867JT	Samples
SNJ54AS869JT	ACTIVE	CDIP	JT	24	1	TBD	SNPB	N / A for Pkg Type	-55 to 125	5962-8952601LA SNJ54AS869JT	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.

OBSELETE: TI has discontinued the production of the device.

(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 (Cl) 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 SN54AS867, SN54AS869, SN74AS867, SN74AS869 :

● Catalog: [SN74AS867](#), [SN74AS869](#)

● Military: [SN54AS867](#), [SN54AS869](#)

NOTE: Qualified Version Definitions:

● Catalog - TI's standard catalog product

● Military - QML certified for Military and Defense Applications

JT (R-GDIP-T**)

CERAMIC DUAL-IN-LINE

24 LEADS SHOWN



- 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.
 E. Falls within MIL STD 1835 GDIP3-T24, GDIP4-T28, and JEDEC MO-058 AA, MO-058 AB

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