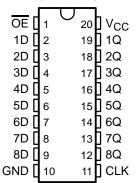
SN54AHC574, SN74AHC574 OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

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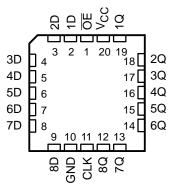
- Operating Range 2-V to 5.5-V V_{CC}
- 3-State Outputs Drive Bus Lines Directly
- Latch-Up Performance Exceeds 250 mA Per JESD 17

SN54AHC574...J OR W PACKAGE SN74AHC574...DB, DGV, DW, N, NS, OR PW PACKAGE (TOP VIEW)



- **ESD Protection Exceeds JESD 22**
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

SN54AHC574 . . . FK PACKAGE (TOP VIEW)



description/ordering information

The 'AHC574 devices are octal edge-triggered D-type flip-flops that feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. These devices are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

On the positive transition of the clock (CLK) input, the Q outputs are set to the logic levels of the data (D) inputs.

A buffered output-enable (\overline{OE}) input places the eight outputs in either a normal logic state (high or low) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and the increased drive provide the capability to drive bus lines without interface or pullup components.

ORDERING INFORMATION

TA	PACKA	GET	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube	SN74AHC574N	SN74AHC574N
	SOIC - DW	Tube	SN74AHC574DW	AHC574
	3010 - DW	Tape and reel	SN74AHC574DWR	A110374
–40°C to 85°C	SOP – NS	Tape and reel	SN74AHC574NSR	AHC574
40 0 10 03 0	SSOP – DB	Tape and reel	SN74AHC574DBR	HA574
	TSSOP – PW	Tube	SN74AHC574PW	HA574
	1330F = FW	Tape and reel	SN74AHC574PWR	11A374
	TVSOP – DGV	Tape and reel	SN74AHC574DGVR	HA574
	CDIP – J	Tube	SNJ54AHC574J	SNJ54AHC574J
–55°C to 125°C	CFP – W	Tube	SNJ54AHC574W	SNJ54AHC574W
	LCCC – FK	Tube	SNJ54AHC574FK	SNJ54AHC574FK

[†]Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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description/ordering information (continued)

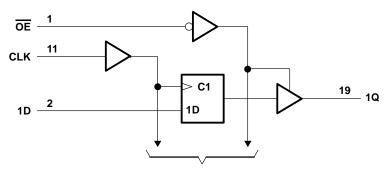
OE does not affect internal operations of the flip-flop. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

FUNCTION TABLE (each flip-flop)

	INPUTS	OUTPUT	
ŌE	CLK	D	Q
L	1	Н	Н
L	\uparrow	L	L
L	H or L	Χ	Q_0
н	X	Χ	Z

logic diagram (positive logic)



To Seven Other Channels

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

Supply voltage range, V _{CC}		–0.5 V to 7 V
Input voltage range, V _I (see Note 1)		–0.5 V to 7 V
Output voltage range, VO (see Note 1)		$-0.5 \text{ V to V}_{CC} + 0.5 \text{ V}$
Input clamp current, I_{IK} ($V_I < 0$)		—20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > V _{CO}	C)	±20 mA
Continuous output current, $I_O(V_O = 0 \text{ to } V_{CC})$	_	±25 mA
Continuous current through V _{CC} or GND		±75 mA
Package thermal impedance, θ _{JA} (see Note 2)	: DB package	70°C/W
	DGV package	92°C/W
	DW package	58°C/W
	N package	69°C/W
	NS package	60°C/W
	PW package	
Storage temperature range, T _{stg}		–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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51-7.



recommended operating conditions (see Note 3)

			SN54A	HC574	SN74A	HC574	UNIT	
			MIN	MAX	MIN	MAX	UNII	
Vсс	Supply voltage		2	5.5	2	5.5	V	
		V _{CC} = 2 V	1.5		1.5			
VIН	High-level input voltage	V _{CC} = 3 V	2.1		2.1		V	
		V _{CC} = 5.5 V	3.85		3.85			
		V _{CC} = 2 V		0.5		0.5		
VIL	Low-level input voltage	V _{CC} = 3 V		0.9		0.9	V	
		V _{CC} = 5.5 V		1.65		1.65		
٧ı	Input voltage	-	0	5.5	0	5.5	V	
٧o	Output voltage		0	VCC	0	VCC	V	
		V _{CC} = 2 V		-50		-50	μΑ	
IOH	High-level output current	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		-4		-4	mA	
		$V_{CC} = 5 V \pm 0.5 V$		-8		-8	IIIA	
		V _{CC} = 2 V		50		50	μΑ	
lOL	Low-level output current	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		4		4	A	
		$V_{CC} = 5 V \pm 0.5 V$		8		8	mA	
4+/4>4	Input transition rise or fall rate	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		100		100	20/1/	
Δt/Δv	Input transition rise or fall rate	$V_{CC} = 5 V \pm 0.5 V$		20		20	ns/V	
TA	Operating free-air temperature		-55	125	-40	85	°C	

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

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

DADAMETED	TEST CONDITIONS	Vac	T,	ղ = 25°C	;	SN54A	HC574	SN74AHC574		UNIT
PARAMETER	TEST CONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	ONII
		2 V	1.9	2		1.9		1.9		
	IOH = -50 μA	3 V	2.9	3		2.9		2.9		
Voн		4.5 V	4.4	4.5		4.4		4.4		V
	I _{OH} = -4 mA	3 V	2.58			2.48		2.48		
	I _{OH} = -8 mA	4.5 V	3.94			3.8		3.8		
		2 V			0.1		0.1		0.1	
	I _{OL} = 50 μA	3 V			0.1		0.1		0.1	
VOL		4.5 V			0.1		0.1		0.1	V
	I _{OL} = 4 mA	3 V			0.36		0.5		0.44	
	I _{OL} = 8 mA	4.5 V			0.36		0.5		0.44	
lį	V _I = 5.5 V or GND	0 V to 5.5 V			±0.1		±1*		±1	μΑ
IOZ	$V_O = V_{CC}$ or GND	5.5 V			±0.25		±2.5		±2.5	μΑ
ICC	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		40		40	μΑ
C _i	$V_I = V_{CC}$ or GND	5 V		3	10				10	pF
Co	$V_O = V_{CC}$ or GND	5 V		3						pF

^{*} On products compliant to MIL-PRF-38535, this parameter is not production tested at $V_{CC} = 0 \text{ V}$.



SN54AHC574, SN74AHC574 **OCTAL EDGÉ-TRIGGERED D-TYPE FLIP-FLOPS** WITH 3-STATE OUTPUTS

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timing requirements over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

		T _A = 25°C		SN54AHC574		SN74AI	HC574	UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
t _W	Pulse duration, CLK high or low	5		5		5		ns
t _{su}	Setup time, data before CLK↑	3.5		3.5		3.5		ns
t _h	Hold time, data after CLK↑	1.5		1.5		1.5		ns

timing requirements over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

		T _A = 2	25°C	°C SN54AHC574		SN74AI	HC574	UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
t _W	Pulse duration, CLK high or low	5		5		5		ns
t _{su}	Setup time, data before CLK↑	3		3		3		ns
t _h	Hold time, data after CLK↑	1.5		1.5		1.5		ns

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	то	LOAD	T,	_A = 25°C	;	SN54A	HC574	SN74A	HC574	UNIT
PARAMETER	(INPUT)	(OUTPUT)	CAPACITANCE	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
4	•		C _L = 15 pF	80*	125*		65*		65		MHz
fmax			C _L = 50 pF	50	75		45		45		IVITIZ
t _{PLH}	CLK	Q	C: - 15 pE		8.5*	13.2*	1*	15.5*	1	15.5	ns
t _{PHL}	GLK	g	C _L = 15 pF		8.5*	13.2*	1*	15.5*	1	15.5	115
^t PZH	ŌĒ	Q	C _I = 15 pF		8.2*	12.8*	1*	15*	1	15	ns
tPZL	OE	g	CL = 15 pr		8.2*	12.8*	1*	15*	1	15	115
^t PHZ	ŌĒ	Q	C _I = 15 pF		8.5*	13*	1*	15*	1	15	ns
t _{PLZ}	OE	ď	OL = 13 pr		8.5*	13*	1*	15*	1	15	115
^t PLH	CLK	Q	C _I = 50 pF		11	16.7	1	19	1	19	ns
^t PHL	CLK	ď	CL = 30 pr		11	16.7	1	19	1	19	115
^t PZH	ŌĒ	Q	C _I = 50 pF		10.7	16.3	1	18.5	1	18.5	ns
tPZL	OE	g	CL = 50 pr		10.7	16.3	1	18.5	1	18.5	115
^t PHZ	ŌĒ	Q	C _I = 50 pF		11	15	1	17	1	17	ns
^t PLZ	OE	y	CL = 30 μF		11	15	1	17	1	17	115
tsk(o)			C _L = 50 pF		•	1.5**				1.5	ns

^{*} On products compliant to MIL-PRF-38535, this parameter is not production tested.

^{**} On products compliant to MIL-PRF-38535, this parameter does not apply.

SN54AHC574, SN74AHC574 OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

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switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	то	LOAD	T,	4 = 25°C	;	SN54A	HC574	SN74AI	HC574	UNIT
PARAMETER	(INPUT)	(OUTPUT)	CAPACITANCE	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNII
f			C _L = 15 pF	130*	180*		110*		110		MHz
f _{max}			C _L = 50 pF	85	115		75		75		IVITIZ
t _{PLH}	CLK	Q	C _I = 15 pF		5.6*	8.6*	1*	10*	1	10	ns
^t PHL	CLK	Q	CL = 13 pr		5.6*	8.6*	1*	10*	1	10	115
^t PZH	ŌE	Q	C _I = 15 pF		5.9*	9*	1*	10.5*	1	10.5	ns
tPZL	OE	ų ,	CL = 15 pr		5.9*	9*	1*	10.5*	1	10.5	115
^t PHZ	ŌĒ	Q	C _I = 15 pF		5.5*	9*	1*	10.5*	1	10.5	ns
t _{PLZ}	OE	ų ,	CL = 13 pr		5.5*	9*	1*	10.5*	1	10.5	115
^t PLH	CLK	Q	C _I = 50 pF		7.1	10.6	1	12	1	12	ns
^t PHL	CLK	Q	CL = 30 pr		7.1	10.6	1	12	1	12	115
^t PZH	ŌĒ	Q	C _I = 50 pF		7.4	11	1	12.5	1	12.5	ns
t _{PZL}	OE	ų ,	CL = 30 pr		7.4	11	1	12.5	1	12.5	115
^t PHZ	ŌĒ	Q	C: - 50 pF		7.1	10.1	1	11.5	1	11.5	ns
tPLZ	OE .		C _L = 50 pF		7.1	10.1	1	11.5	1	11.5	115
tsk(o)			C _L = 50 pF			1**				1	ns

^{*} On products compliant to MIL-PRF-38535, this parameter is not production tested.

noise characteristics, V_{CC} = 5 V, C_L = 50 pF, T_A = 25°C (see Note 4)

	PARAMETER	SN74AI	UNIT	
	PARAMETER	MIN	MAX	UNII
V _{OL(P)}	Quiet output, maximum dynamic V _{OL}		0.8	V
V _{OL(V)}	Quiet output, minimum dynamic V _{OL}		-0.8	V
VOH(V)	Quiet output, minimum dynamic VOH	4.2		V
V _{IH(D)}	High-level dynamic input voltage	3.5		V
V _{IL(D)}	Low-level dynamic input voltage		1.5	V

NOTE 4: Characteristics are for surface-mount packages only.

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

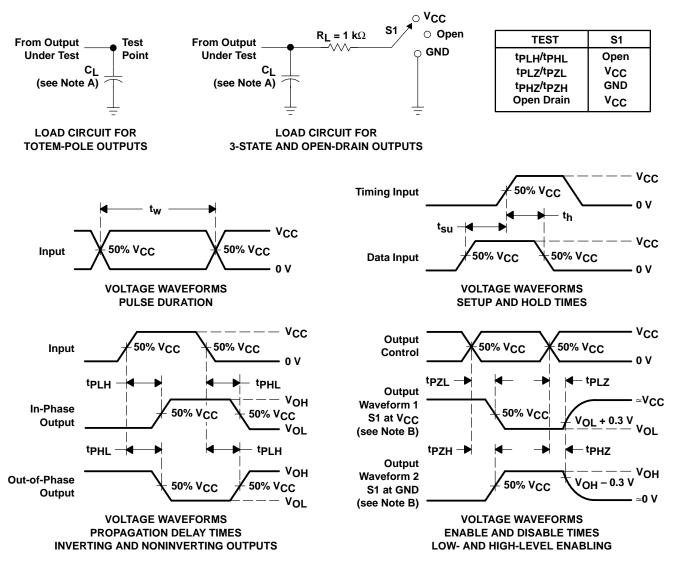
	PARAMETER	TEST C	ONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance	No load,	f = 1 MHz	28	pF



^{**} On products compliant to MIL-PRF-38535, this parameter does not apply.

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PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_I 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. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, Z_O = 50 Ω , t_f \leq 3 ns, t_f \leq 3 ns.
- D. The outputs are measured one at a time with one input transition per measurement.
- E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms







6-Jun-2005

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-9685401Q2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
5962-9685401QRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
5962-9685401QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Level-NC-NC-NC
SN74AHC574DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI
SN74AHC574DBR	ACTIVE	SSOP	DB	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74AHC574DBRE4	ACTIVE	SSOP	DB	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR
SN74AHC574DGVR	ACTIVE	TVSOP	DGV	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74AHC574DGVRE4	ACTIVE	TVSOP	DGV	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74AHC574DW	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR
SN74AHC574DWE4	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR
SN74AHC574DWR	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR
SN74AHC574DWRE4	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR
SN74AHC574N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74AHC574NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74AHC574NSR	ACTIVE	so	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74AHC574NSRE4	ACTIVE	SO	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74AHC574PW	ACTIVE	TSSOP	PW	20	70	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74AHC574PWE4	ACTIVE	TSSOP	PW	20	70	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74AHC574PWLE	OBSOLETE	TSSOP	PW	20		TBD	Call TI	Call TI
SN74AHC574PWR	ACTIVE	TSSOP	PW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74AHC574PWRE4	ACTIVE	TSSOP	PW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SNJ54AHC574FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54AHC574J	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54AHC574W	ACTIVE	CFP	W	20	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.



PACKAGE OPTION ADDENDUM

6-Jun-2005

(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-F20)

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 GDFP2-F20



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.



DGV (R-PDSO-G**)

24 PINS SHOWN

PLASTIC SMALL-OUTLINE



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 per side.

D. Falls within JEDEC: 24/48 Pins – MO-153 14/16/20/56 Pins – MO-194

DW (R-PDSO-G20)

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-013 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.



DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 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.

D. Falls within JEDEC MO-150

PW (R-PDSO-G**)

14 PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



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.

D. Falls within JEDEC MO-153

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