

9-Bit Odd/Even Parity Generator/Checker

High-Performance Silicon-Gate CMOS

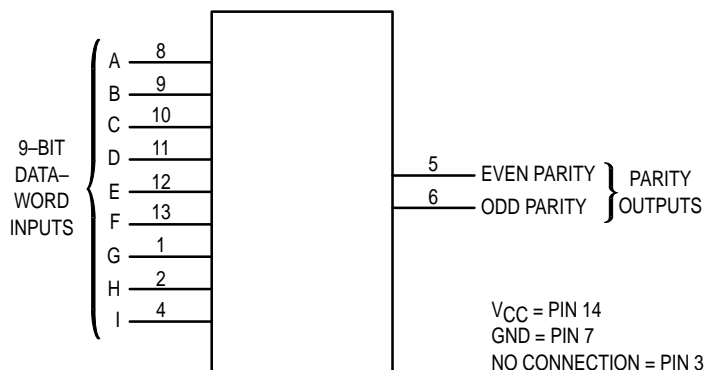
The MC74HC280 is identical in pinout to the LS280. The device inputs are compatible with standard CMOS outputs; with pullup resistors, they are compatible with LSTTL outputs.

This circuit consists of 9 data-bit inputs (A through I) and 2 outputs (Even Parity and Odd Parity) to allow both odd and even parity applications. Words greater than 9-bits can be accommodated by cascading other HC280 devices.

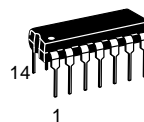
This device can be used in systems utilizing the LS180 parity generator/checker. Although the HC280 does not have expander inputs, the corresponding function is provided by an input at pin 4 and the absence of any connection at pin 3. This permits the HC280 to be substituted for the LS180 to produce a similar function, even if the HC280s are mixed with existing LS180s. NOTE: Pullup resistors must be used on the LS180 outputs to interface with the HC280.

- Output Drive Capability: 10 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2 to 6 V
- Low Input Current: 1 μ A
- High Noise Immunity Characteristic of CMOS Devices
- In Compliance with the Requirements Defined by JEDEC Standard No. 7A
- Chip Complexity: 226 FETs or 56.5 Equivalent Gates

LOGIC DIAGRAM



MC74HC280



N SUFFIX
PLASTIC PACKAGE
CASE 646-06

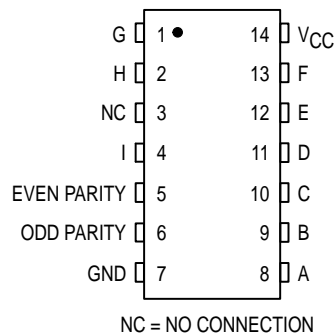


D SUFFIX
SOIC PACKAGE
CASE 751A-03

ORDERING INFORMATION

MC74HCXXXN Plastic
MC74HCXXXD SOIC

PIN ASSIGNMENT



FUNCTION TABLE

Number of Inputs A through I That are High	Outputs	
	Even Parity	Odd Parity
0, 2, 4, 6, 8	H	L
1, 3, 5, 7, 9	L	H



MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	– 0.5 to + 7.0	V
V_{in}	DC Input Voltage (Referenced to GND)	– 1.5 to $V_{CC} + 1.5$	V
V_{out}	DC Output Voltage (Referenced to GND)	– 0.5 to $V_{CC} + 0.5$	V
I_{in}	DC Input Current, per Pin	± 20	mA
I_{out}	DC Output Current, per Pin	± 25	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins	± 50	mA
P_D	Power Dissipation in Still Air Plastic DIP† SOIC Package†	750 500	mW
T_{stg}	Storage Temperature	– 65 to + 150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds (Plastic DIP or SOIC Package)	260	°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{in} and V_{out} should be constrained to the range $GND \leq (V_{in} \text{ or } V_{out}) \leq V_{CC}$. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

† Derating — Plastic DIP: – 10 mW/°C from 65° to 125°C
SOIC Package: – 7 mW/°C from 65° to 125°C

For high frequency or heavy load considerations, see Chapter 2 of the Motorola High-Speed CMOS Data Book (DL129/D).

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	2.0	6.0	V
V_{in}, V_{out}	DC Input Voltage, Output Voltage (Referenced to GND)	0	V_{CC}	V
T_A	Operating Temperature, All Package Types	– 55	+ 125	°C
t_r, t_f	Input Rise and Fall Time (Figure 1) $V_{CC} = 2.0 \text{ V}$ $V_{CC} = 4.5 \text{ V}$ $V_{CC} = 6.0 \text{ V}$	0 0 0	1000 500 400	ns

DC ELECTRICAL CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter	Test Conditions	V_{CC} V	Guaranteed Limit			Unit
				– 55 to 25°C	≤ 85°C	≤ 125°C	
V_{IH}	Minimum High-Level Input Voltage	$V_{out} = 0.1 \text{ V or } V_{CC} - 0.1 \text{ V}$ $ I_{out} \leq 20 \mu\text{A}$	2.0 4.5 6.0	1.5 3.15 4.2	1.5 3.15 4.2	1.5 3.15 4.2	V
V_{IL}	Maximum Low-Level Input Voltage	$V_{out} = 0.1 \text{ V or } V_{CC} - 0.1 \text{ V}$ $ I_{out} \leq 20 \mu\text{A}$	2.0 4.5 6.0	0.3 0.9 1.2	0.3 0.9 1.2	0.3 0.9 1.2	V
V_{OH}	Minimum High-Level Output Voltage	$V_{in} = V_{IH} \text{ or } V_{IL}$ $ I_{out} \leq 20 \mu\text{A}$	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	1.9 4.4 5.9	V
		$V_{in} = V_{IH} \text{ or } V_{IL}$ $ I_{out} \leq 4.0 \text{ mA}$ $ I_{out} \leq 5.2 \text{ mA}$	4.5 6.0	3.98 5.48	3.84 5.34	3.70 5.20	
V_{OL}	Maximum Low-Level Output Voltage	$V_{in} = V_{IH} \text{ or } V_{IL}$ $ I_{out} \leq 20 \mu\text{A}$	2.0 4.5 6.0	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	V
		$V_{in} = V_{IH} \text{ or } V_{IL}$ $ I_{out} \leq 4.0 \text{ mA}$ $ I_{out} \leq 5.2 \text{ mA}$	4.5 6.0	0.26 0.26	0.33 0.33	0.40 0.40	
I_{in}	Maximum Input Leakage Current	$V_{in} = V_{CC} \text{ or GND}$	6.0	± 0.1	± 1.0	± 1.0	μA
I_{CC}	Maximum Quiescent Supply Current (per Package)	$V_{in} = V_{CC} \text{ or GND}$ $I_{out} = 0 \mu\text{A}$	6.0	8	80	160	μA

NOTE: Information on typical parametric values can be found in Chapter 2 of the Motorola High-Speed CMOS Data Book (DL129/D).

AC ELECTRICAL CHARACTERISTICS ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			- 55 to 25°C	≤ 85°C	≤ 125°C	
t _{PLH} , t _{PHL}	Maximum Propagation Delay, Data Inputs to Parity Outputs (Figures 1 and 2)	2.0 4.5 6.0	205 41 35	255 51 43	310 62 53	ns
t _{TLH} , t _{THL}	Maximum Output Transition Time, Any Output (Figures 1 and 2)	2.0 4.5 6.0	75 15 13	95 19 16	110 22 19	ns
C _{in}	Maximum Input Capacitance	—	10	10	10	pF

NOTES:

- For propagation delays with loads other than 50 pF, see Chapter 2 of the Motorola High-Speed CMOS Data Book (DL129/D).
- Information on typical parametric values can be found in Chapter 2 of the Motorola High-Speed CMOS Data Book (DL129/D).

C _{PD}	Power Dissipation Capacitance (Per Package)*	Typical @ 25°C, V _{CC} = 5.0 V	pF
		60	

* Used to determine the no-load dynamic power consumption: $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$. For load considerations, see Chapter 2 of the Motorola High-Speed CMOS Data Book (DL129/D).

PIN DESCRIPTIONS**INPUTS****A, B, C, D, E, F, G, H, I (Pins 8–13, 1, 2, 4)**

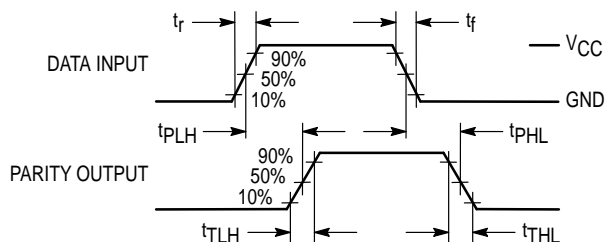
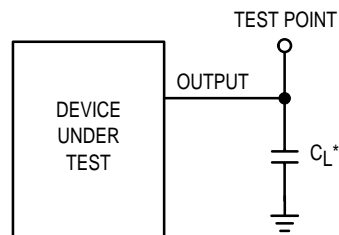
Nine-bit data-word inputs. The data word placed on these pins is checked for even or odd parity.

OUTPUTS**Even Parity (Pin 5)**

Even-parity output. This pin goes high if the data word has even parity and low if the data word has odd parity.

Odd Parity (Pin 6)

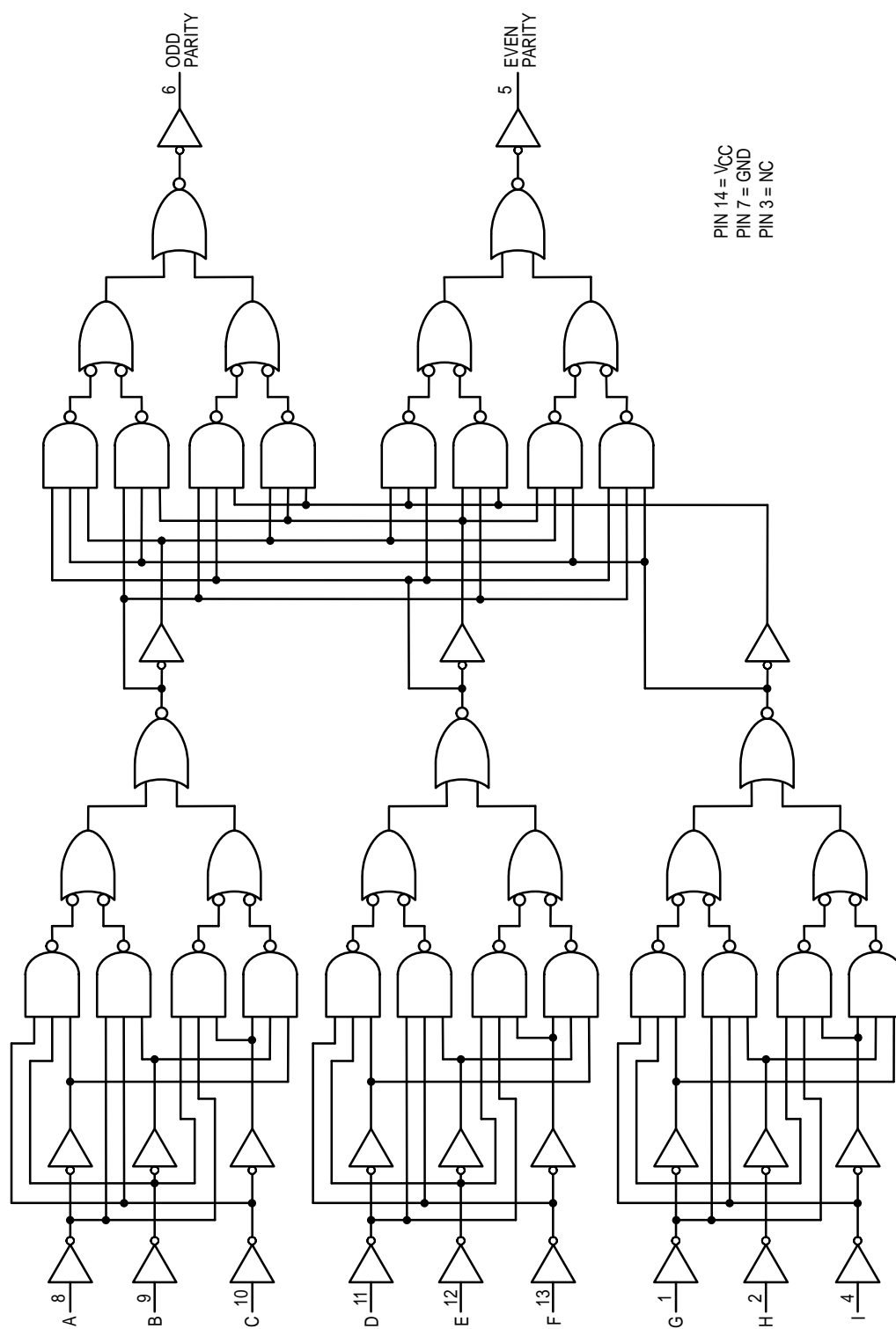
Odd-parity output. This pin goes high if the data word has odd parity and low if the data word has even parity.

**Figure 1. Switching Waveforms**

* Includes all probe and jig capacitance

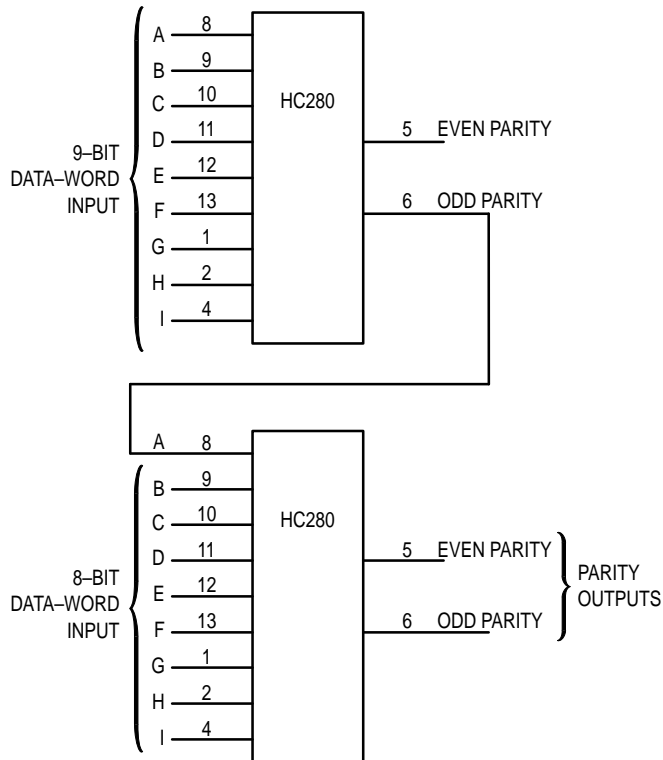
Figure 2. Test Circuit

EXPANDED LOGIC DIAGRAM

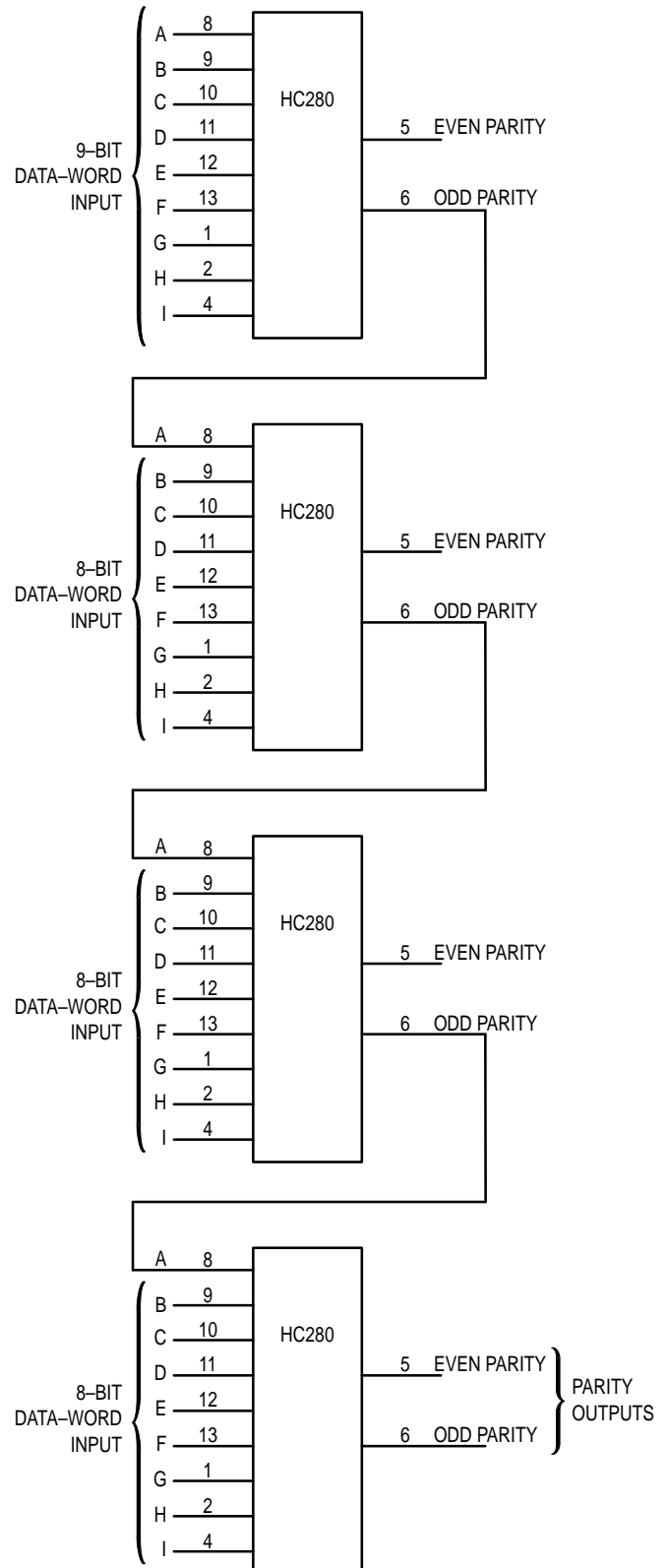


TYPICAL APPLICATIONS

**CASCADED 17-BIT ODD/EVEN PARITY
GENERATOR/CHECKER**

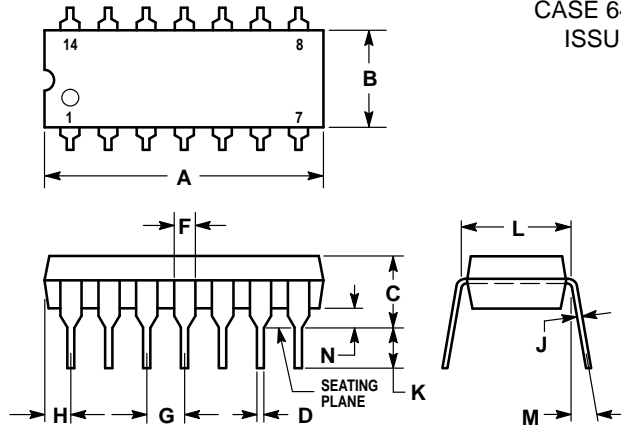


**CASCADED 33-BIT ODD/EVEN PARITY
GENERATOR/CHECKER**



OUTLINE DIMENSIONS

N SUFFIX
PLASTIC DIP PACKAGE
CASE 646-06
ISSUE L

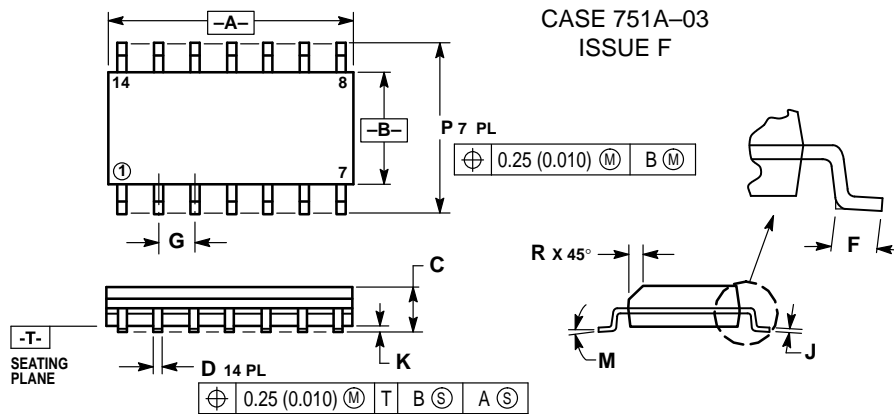


NOTES:

- LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
- DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
- DIMENSION B DOES NOT INCLUDE MOLD FLASH.
- ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	19.56
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.300 BSC		7.62 BSC	
M	0°	10°	0°	10°
N	0.015	0.039	0.39	1.01


D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751A-03
ISSUE F



NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETER.
- DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
- DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

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