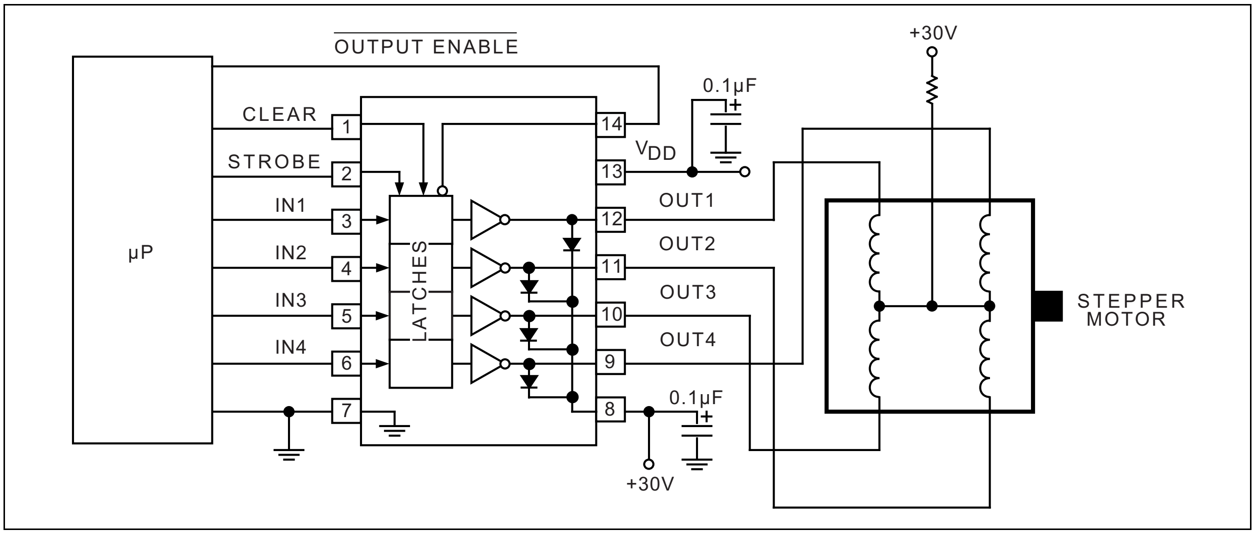
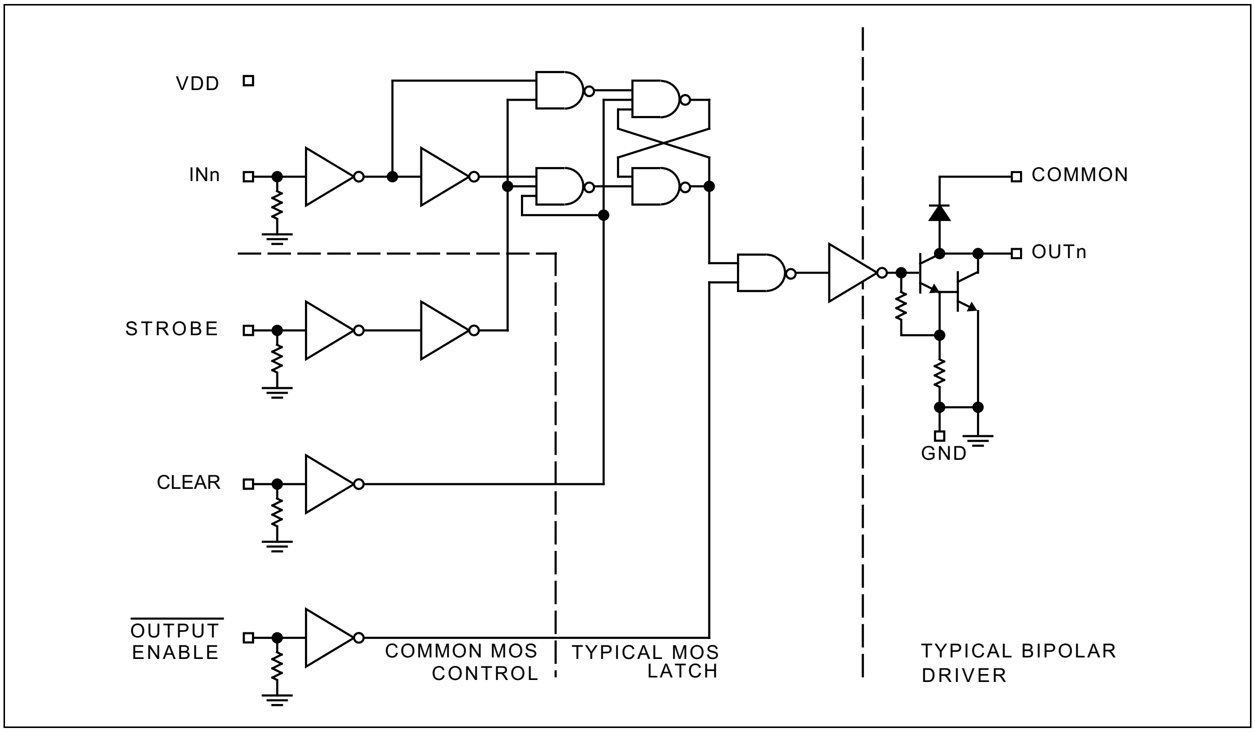
Typical Application Circuit



Functional Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Output Voltage (V_{CE})	+50V
Supply Voltage (V_{DD})	+15V
Input Voltage Range (V_{IN})	–0.3V to V_{DD} + 0.3V
Continuous Collector Current (I_C)	500 mA
ESD Rating (Note 1)	ESD Sensitive

Operating Ratings ††

Package Power Dissipation (P_D)

MIC5800 SOIC	1.0W
Derate above T_A = +25°C	8.5 mW/°C
MIC5801 PLCC	2.25W
Derate above T_A = +25°C	18.2 mW/°C
MIC5801 Wide SOIC	1.4W
Derate above T_A = +25°C	11 mW/°C

† Notice: Exceeding the absolute maximum ratings may damage the device.

†† Notice: The device is not guaranteed to function outside its operating ratings.

Note 1: Microchip CMOS devices have input-static protection, but are susceptible to damage when exposed to extremely high static electrical charges.

ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V_{DD} = 5V, T_A = +25°C, $V_A \le$ +85°C unless otherwise noted. Note 1

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Output Leakage Current	I_{CEX}	—	—	50	µA	V_{CE} = 50V, T_A = +25°C
		—	—	100		V_{CE} = 50V, T_A = +70°C
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.9	1.1	V	I_C = 100 mA
		—	1.1	1.3		I_C = 200 mA
		—	1.3	1.6		I_C = 350 mA, V_{DD} = 7.0V
Input Voltage (Low)	$V_{IN(0)}$	—	—	1.0	V	—
Input Voltage (High)	$V_{IN(1)}$	10.5	—	—	V	V_{DD} = 12V
		8.5	—	—		V_{DD} = 10V
		3.5	—	—		V_{DD} = 5V, Note 2
Input Resistance	R_{IN}	50	200	—	kΩ	V_{DD} = 12V
		50	300	—		V_{DD} = 10V
		50	600	—		V_{DD} = 5V
Supply Current ON (Each Stage)	$I_{DD(ON)}$	—	1.0	2.0	mA	V_{DD} = 12V, Outputs Open
		—	0.9	1.7		V_{DD} = 10V, Outputs Open
		—	0.7	1.0		V_{DD} = 5V, Outputs Open
Supply Current OFF (Total)	$I_{DD(OFF)}$	—	—	200	µA	V_{DD} = 12V, Outputs Open, Inputs = 0V
		—	50	100		V_{DD} = 5V, Outputs Open, Inputs = 0V

Note 1: Specification for packaged product only.

2: Operation of these devices with standard TTL or DTL may require the use of appropriate pull-up resistors to ensure a minimum logic “1”.

ELECTRICAL CHARACTERISTICS (CONTINUED)

Electrical Characteristics: V_{DD} = 5V, T_A = +25°C, $V_A \leq$ +85°C unless otherwise noted. Note 1

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Clamp Diode Leakage Current	I_R	—	—	50	µA	V_R = 50V, T_A = +25°C
		—	—	100		V_R = 50V, T_A = +70°C
Clamp Diode Forward Voltage	V_F	—	1.7	2.0	V	I_F = 350 mA

Note 1: Specification for packaged product only.

2: Operation of these devices with standard TTL or DTL may require the use of appropriate pull-up resistors to ensure a minimum logic “1”.

TRUTH TABLE

IN_N	Strobe	Clear	/OE	OUT_N	
				t – 1	**t**
0	1	0	0	X	OFF
1	1	0	0	X	ON
X	X	1	X	X	OFF
X	X	X	1	X	OFF
X	0	0	0	ON	ON
X	0	0	0	OFF	OFF

Legend: X = Irrelevant; t – 1 = Previous output state; t = Present output state.

Information present at an input is transferred to its latch when the STROBE is high. A high CLEAR input will set all latches to the output OFF condition regardless of the data or STROBE input levels. A high /OE will set all outputs to the off condition, regardless of any other input conditions. When the /OE is low, the outputs depend on the state of their respective latches.

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Storage Temperature Range	T_S	–65	—	+125	°C	—
Operating Temperature Range	T_A	–40	—	+85	°C	—

Note 1: The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction to air (i.e., T_A, T_J, θ_{JA}). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum +125°C rating. Sustained junction temperatures above +125°C can impact the device reliability.

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1 and Table 2-2.

TABLE 2-1: MIC5800 PIN FUNCTION TABLE

Pin Number	Pin Name	Description
1	CLEAR	Resets all latches and turns all outputs OFF (open).
2	STROBE	Input strobe pin. Loads output latches when high.
3, 4, 5, 6	IN_N	Parallel inputs, 1 through 4.
7	GND	Logic and Output Ground pin.
8	COM	Transient suppression diode common cathode pin.
9, 10, 11, 12	OUT_N	Parallel outputs, 4 through 1.
13	VDD	Logic Supply Voltage.
14	/OE	Output Enable. When low, outputs are active. When high, outputs are inactive and device is reset from a fault condition. An undervoltage condition emulates a high OE input.

TABLE 2-2: MIC5801 PIN FUNCTION TABLE

Pin Number SOIC	Pin Number PLCC	Pin Name	Description
1	28	/OE	Output Enable. When low, outputs are active. When high, outputs are inactive and device is reset from a fault condition. An undervoltage condition emulates a high OE input.
2	1	CLEAR	Resets all latches and turns all outputs OFF (open).
3	3	STROBE	Input strobe pin. Loads output latches when high.
4, 5, 6, 7, 8, 9, 10, 11	5, 6, 7, 8, 9, 10, 11, 12	IN_N	Parallel inputs, 1 through 8.
12	15	GND	Logic and Output Ground pin.
13	17	COM	Transient suppression diode common cathode pin.
14, 23	2, 4, 13, 14, 16, 26	NC	No Connection. Leave floating.
15, 16, 17, 18, 19, 20, 21, 22	18, 19, 20, 21, 22, 23, 24, 25	OUT_N	Parallel outputs, 8 through 1.
24	27	VDD	Logic Supply Voltage.

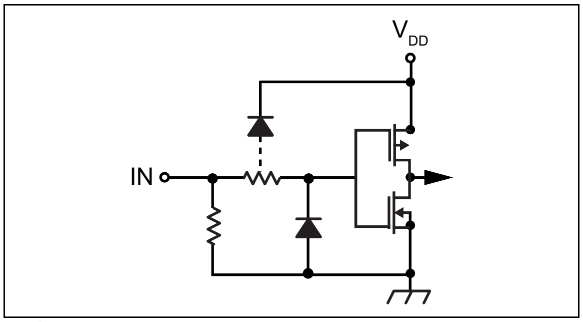


FIGURE 2-1: Typical Input.

3.0 TIMING

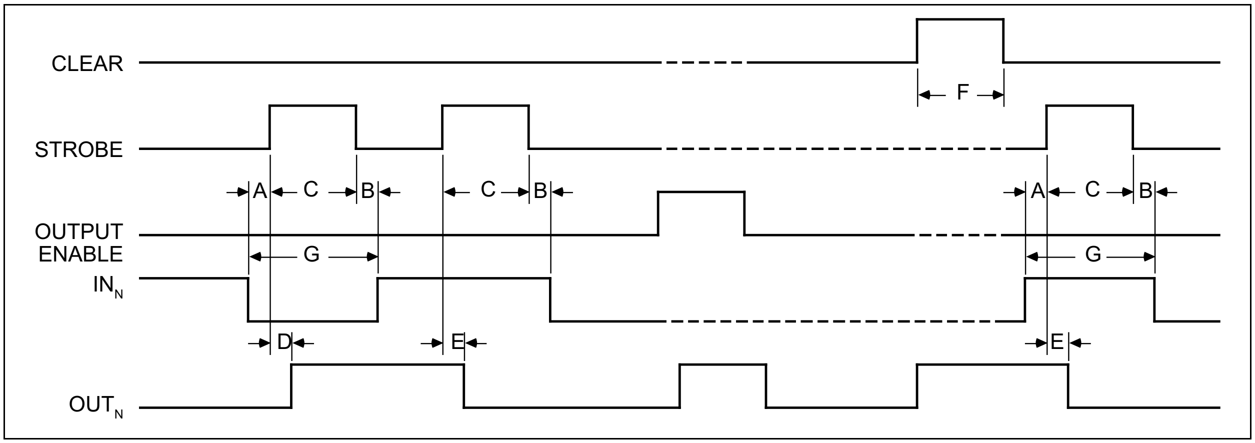


FIGURE 3-1: Timing Diagram.

TABLE 3-1: TIMING CONDITIONS

Characteristics: T_A = +25°C; Logic levels are V_{DD} and Ground; V_{DD} = 5V.			
Condition	**Min.**	**Typ.**	**Max.**
A. Minimum data active time before strobe enabled (data set-up time)	50 ns	—	—
B. Minimum data active time after strobe disabled (data hold time)	50 ns	—	—
C. Minimum strobe pulse width	125 ns	—	—
D. Typical time between strobe activation and output on to off transition	—	500 ns	—
E. Typical time between strobe activation and output off to on transition	—	500 ns	—
F. Minimum clear pulse width	300 ns	—	—
G. Minimum data pulse width	225 ns	—	—

4.0 TYPICAL APPLICATIONS

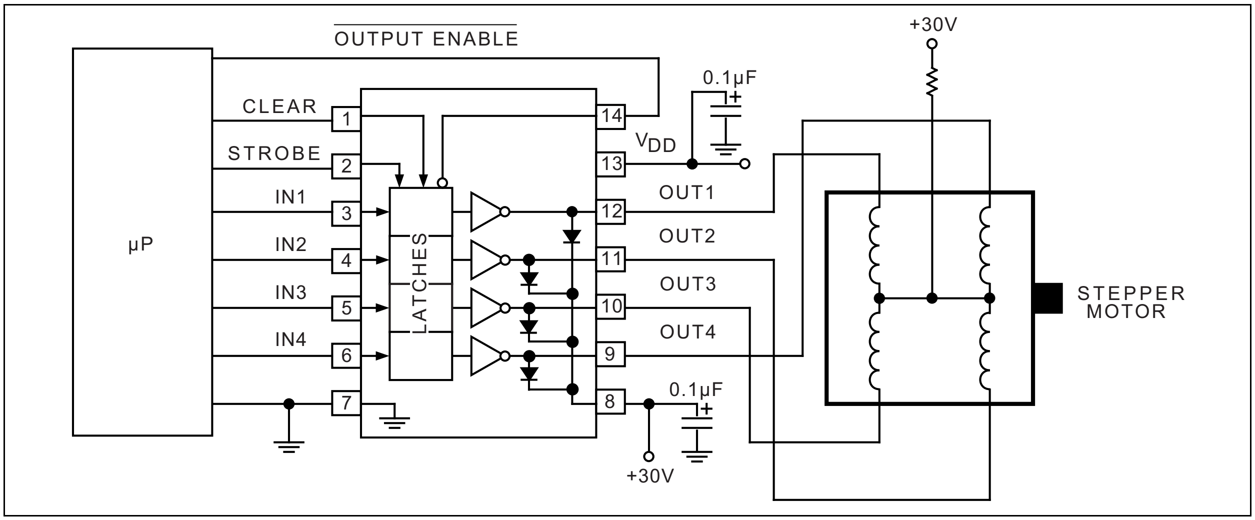


FIGURE 4-1: *MIC5800 Unipolar Stepper-Motor Drive.*

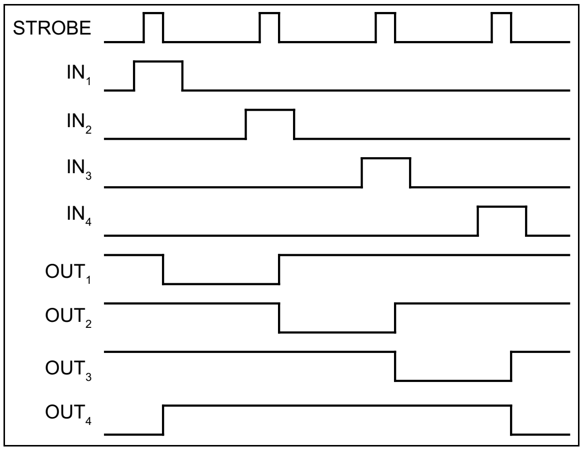


FIGURE 4-2: *Unipolar Wave Drive.*

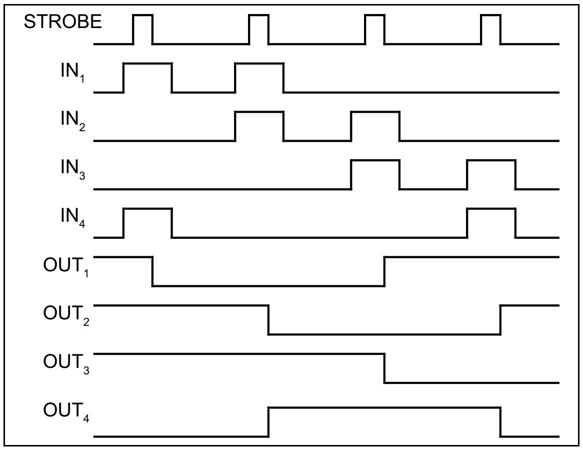
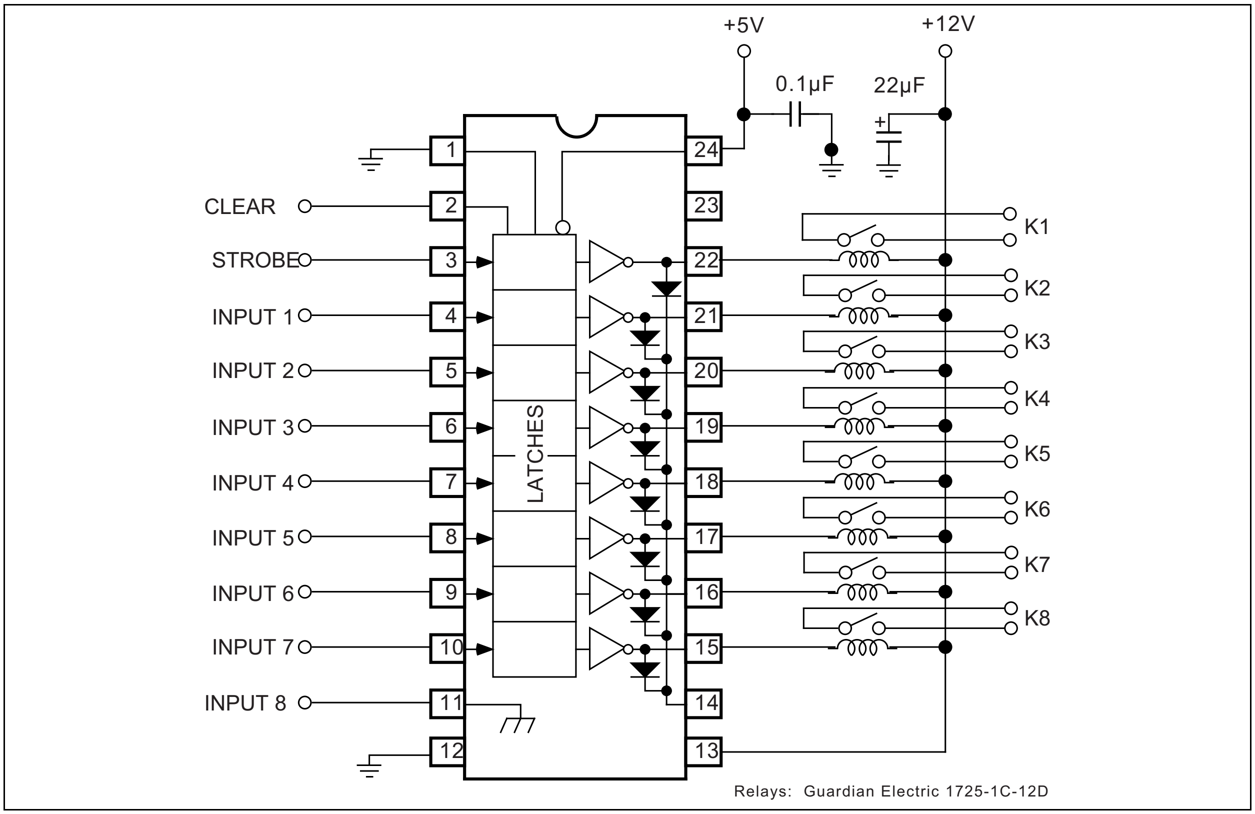
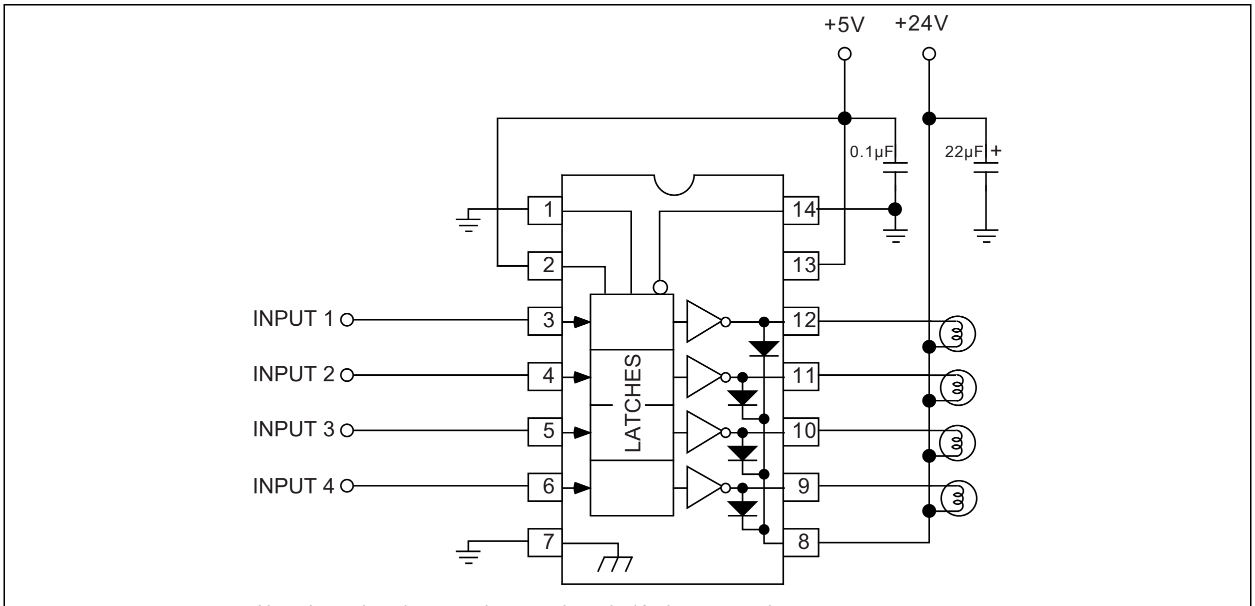


FIGURE 4-3: *Unipolar 2-Phase Drive.*



Relays: Guardian Electric 1725-1C-12D

FIGURE 4-4: *MIC5801 Relay Driver.*



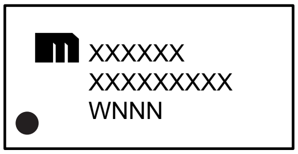
Note: Lamp inrush current is approximately 10× lamp operating current.

FIGURE 4-5: *MIC5800 Incandescent/Halogen Lamp Driver.*

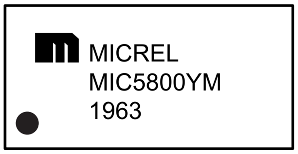
5.0 PACKAGING INFORMATION

5.1 Package Marking Information

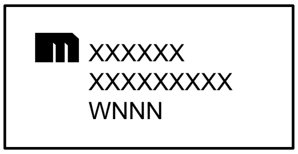
14-Lead SOIC*



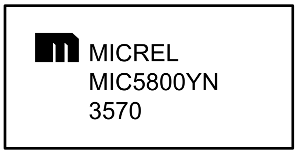
Example



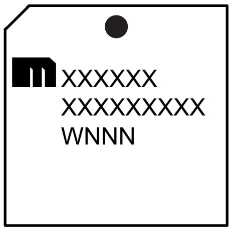
14-Lead PDIP*



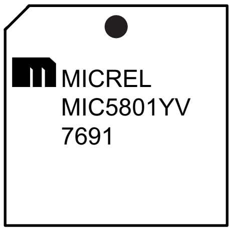
Example



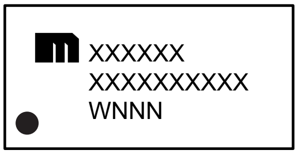
28-Lead PLCC*



Example



24-Lead SOICW*



Example

Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	NNN	Alphanumeric traceability code
	ⓔ3	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator (ⓔ3) can be found on the outer packaging for this package.
	●, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).

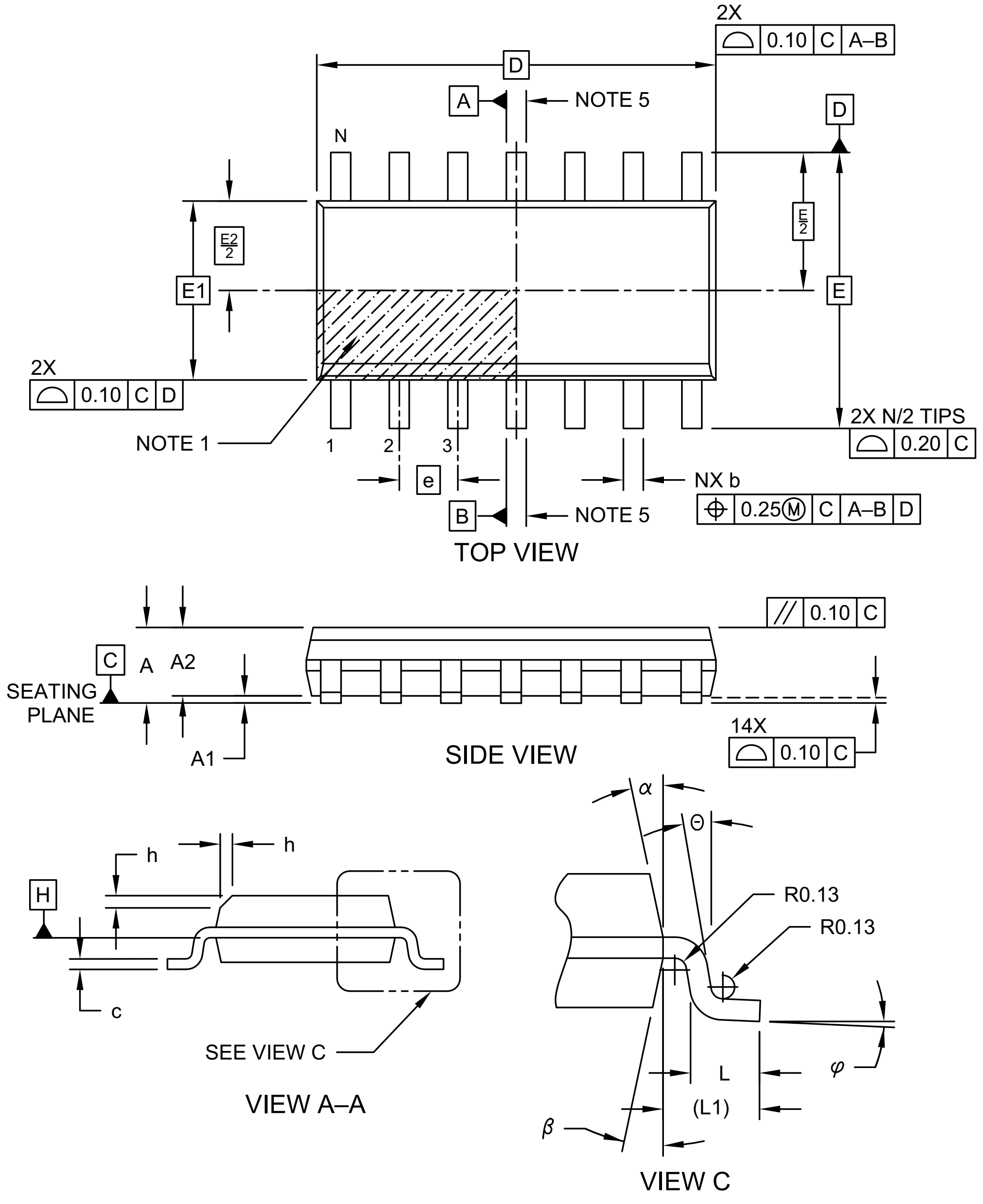
Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

Underbar (_) and/or Overbar (‾) symbol may not be to scale.

14-Lead Plastic Small Outline SOIC Package Outline and Recommended Land Pattern

14-Lead Plastic Small Outline (D3X, UEB, M5B, UEB) - Narrow, 3.90 mm Body [SOIC] Atmel Legacy Global Package Code SVQ

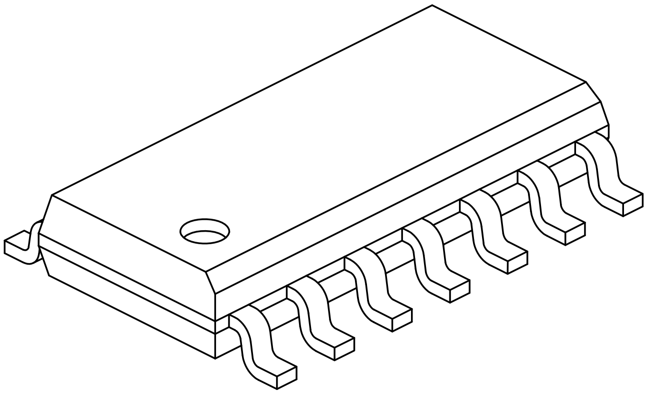
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing No. C04-065-D3X Rev D

14-Lead Plastic Small Outline (D3X, UEB, M5B, UEB) - Narrow, 3.90 mm Body [SOIC] Atmel Legacy Global Package Code SVQ

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		14	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E		6.00 BSC	
Molded Package Width	E1		3.90 BSC	
Overall Length	D		8.65 BSC	
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1		1.04 REF	
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

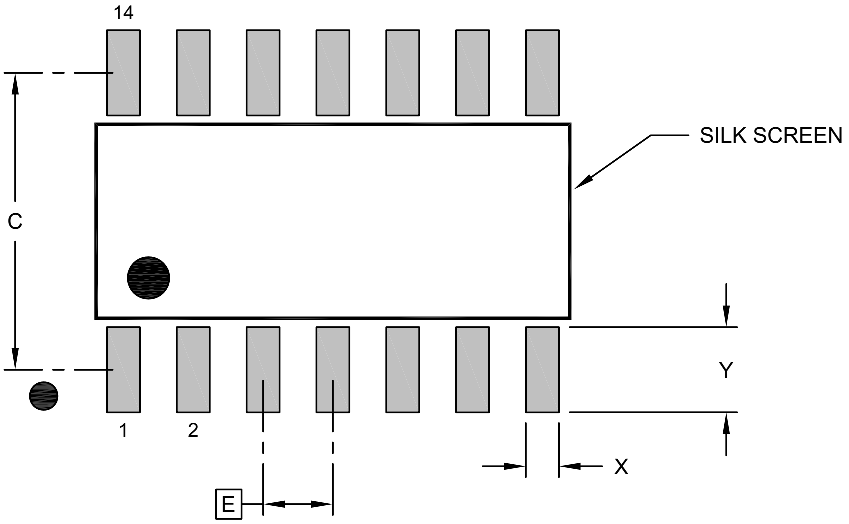
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-065-D3X Rev D Sheet 2 of 2

14-Lead Plastic Small Outline (D3X, UEB, M5B, UEB) - Narrow, 3.90 mm Body [SOIC] Atmel Legacy Global Package Code SVQ

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		5.40	
Contact Pad Width (X14)	X			0.60
Contact Pad Length (X14)	Y			1.55

Notes:

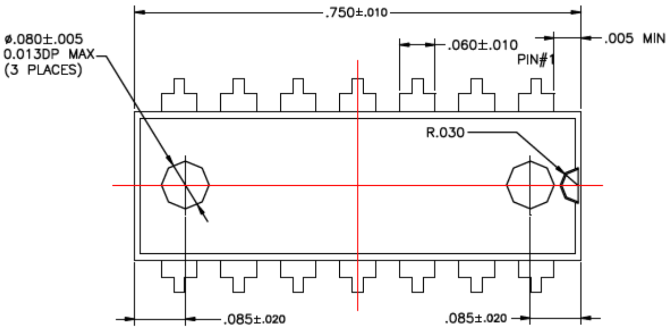
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

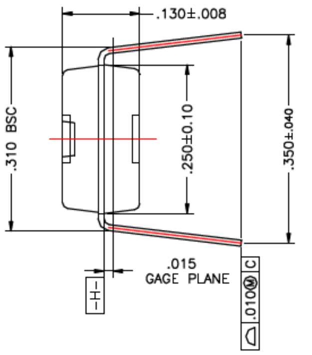
Microchip Technology Drawing No. C04-2065-D3X Rev D

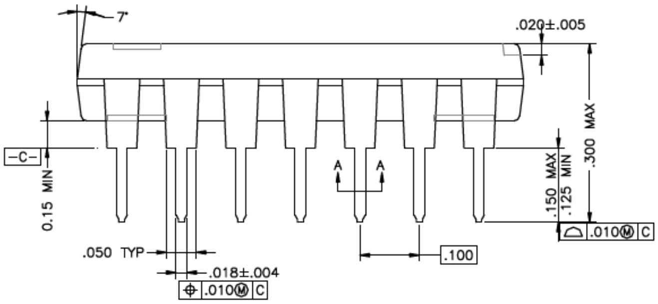
14-Lead PDIP Package Outline and Recommended Land Pattern

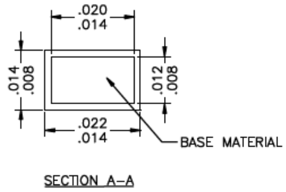
TITLE
14 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-14LD-PL-1	**UNIT**	INCH
LEAD FRAME	Copper	**LEAD FINISH**	Matte Tin









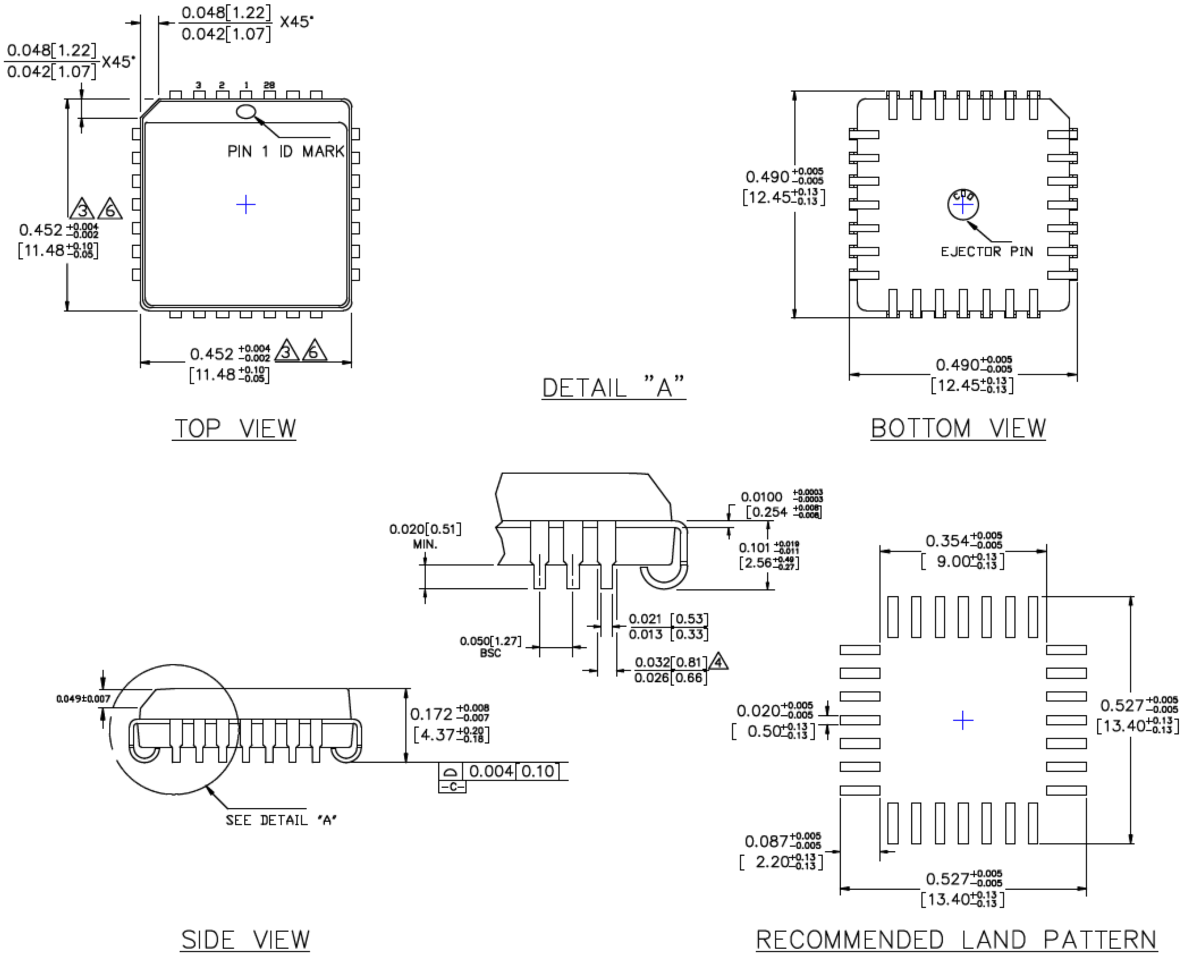
SECTION A–A

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

28-Lead PLCC Package Outline and Recommended Land Pattern

TITLE
28 LEAD PLCC PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PLCC-28LD-PL-1	**UNIT**	INCH [MM]



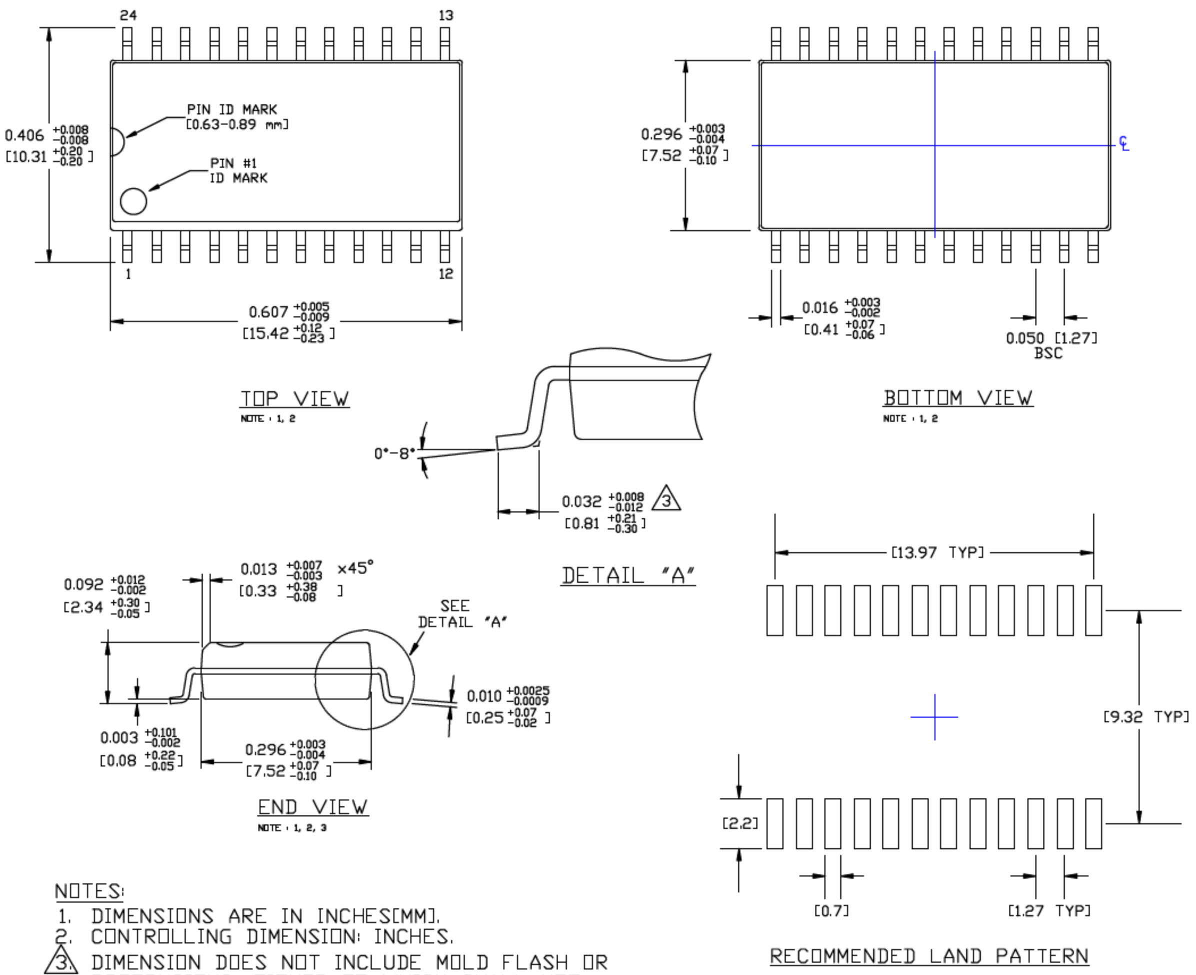
NOTES:
1. DIMENSIONS ARE IN INCHES [MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008 [0.203].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS : MAX/MIN
6. PACKAGE TOP DIMENSION MAY BE SLIGHTLY SMALLER THAN BOTTOM DIMENSION.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

24-Lead SOICW Package Outline and Recommended Land Pattern

TITLE
24 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-24LD-PL-1	**UNIT**	INCH [MM]



NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

APPENDIX A: REVISION HISTORY

Revision A (April 2019)

- Converted Micrel document MIC5800/1 to Microchip data sheet template DS20006184A.
- Minor grammatical text changes throughout.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

Device	**X**	**XX**	**-XX**
Part No.	Junction Temp. Range	Package	Media Type

Device:

MIC5800: 4-Bit Parallel-Input, High-Voltage, High-Current Latched Driver
MIC5801: 8-Bit Parallel-Input, High-Voltage, High-Current Latched Driver

Junction Temperature Range:

Y = –40°C to +85°C, Industrial

Package:

M = 14-Lead SOIC (MIC5800)
N = 14-Lead PDIP (MIC5800)
V = 28-Lead PLCC (MIC5801)
WM = 24-Lead Wide SOIC (MIC5801)

Media Type:

<blank>= 54/Tube (M, MIC5800)
<blank>= 25/Tube (N, MIC5800)
<blank>= 38/Tube (V, MIC5801)
<blank>= 31/Tube (WM, MIC5801)
TR = 750/Reel (V, MIC5801)
TR = 1,000/Reel (WM, MIC5801)
TR = 2,500/Reel (M, MIC5800)

Examples:

a) MIC5800YM:	MIC5800, –40°C to +85°C Temperature Range, 14-Lead SOIC, 54/Tube
b) MIC5800YM-TR:	MIC5800, –40°C to +85°C Temperature Range, 14-Lead SOIC, 2,500/Reel
c) MIC5800YN:	MIC5800, –40°C to +85°C Temperature Range, 14-Lead PDIP, 25/Tube
d) MIC5801YV:	MIC5801, –40°C to +85°C Temperature Range, 28-Lead PLCC, 38/Tube
e) MIC5801YV-TR:	MIC5801, –40°C to +85°C Temperature Range, 28-Lead PLCC, 750/Reel
f) MIC5801YWM:	MIC5801, –40°C to +85°C Temperature Range, 24-Lead Wide SOIC, 31/Tube
g) MIC5801YWM-TR:	MIC5801, –40°C to +85°C Temperature Range, 24-Lead Wide SOIC, 1,000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

NOTES:

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QUALITY MANAGEMENT SYSTEM CERTIFIED BY DNV

═ ISO/TS 16949 ═

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