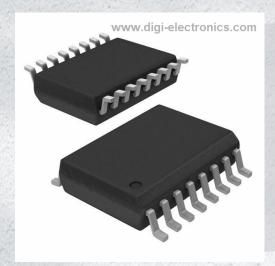


MIC5891YWM-TR Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number MIC5891YWM-TR-DG

Manufacturer Microchip Technology

Manufacturer Product Number MIC5891YWM-TR

Description IC PWR DRIVER BIPOLAR 1:8 16SOIC

Detailed Description Power Switch/Driver 1:8 Bipolar 500mA 16-SOIC



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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MIC5891YWM-TR	Microchip Technology
Series:	Product Status:
	Active
Switch Type:	Number of Outputs:
Latched Driver	8
Ratio - Input:Output:	Output Configuration:
1:8	High Side
Output Type:	Interface:
Bipolar	Strobe, Serial
Voltage - Load:	Voltage - Supply (Vcc/Vdd):
5V ~ 50V	4.5V ~ 15V
Current - Output (Max):	Rds On (Typ):
500mA	
Input Type:	Features:
Non-Inverting	
Fault Protection:	Operating Temperature:
	-55°C ~ 125°C (TA)
Mounting Type:	Supplier Device Package:
Surface Mount	16-SOIC
Package / Case:	Base Product Number:
16-SOIC (0.295", 7.50mm Width)	

Environmental & Export classification

8542.39.0001

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	2 (1 Year)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	



8-Bit Serial-Input Latched Source Driver

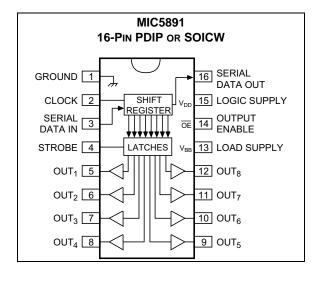
Features

- · High-Voltage, High-Current Outputs
- · Output Transient Protection Diodes
- CMOS-, PMOS-, NMOS-, and TTL-Compatible Inputs
- · 5 MHz Typical Data Input Rate
- · Low-Power CMOS Latches

Applications

- · Alphanumeric and Bar Graph Displays
- · LED and Incandescent Displays
- · Relay and Solenoid Drivers
- · Other High-Power Loads

Package Type



General Description

The MIC5891 latched driver is a high-voltage, high-current integrated circuit comprised of eight CMOS data latches, CMOS control circuitry for the common STROBE and OUTPUT ENABLE, and bipolar Darlington transistor drivers for each latch.

Bipolar/MOS construction provides extremely low power latches with maximum interface flexibility.

The MIC5891 will typically operate at 5 MHz with a 5V logic supply.

The CMOS inputs are compatible with standard CMOS, PMOS, and NMOS logic levels. TTL circuits may be used with appropriate pull-up resistors to ensure a proper logic-high input.

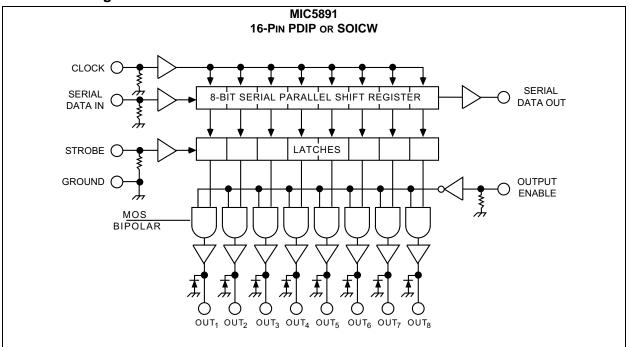
A CMOS serial data output allows additional drivers to be cascaded when more than 8 bits are required.

The MIC5891 has open-emitter outputs with suppression diodes for protection against inductive load transients. The output transistors are capable of sourcing 500 mA and will sustain at least 35V in the on-state.

Simultaneous operation of all drivers at maximum rated current requires a reduction in duty cycle due to package power limitations. Outputs may be paralleled for higher load current capability.

The MIC5891 is available in a 16-pin plastic DIP package (N) and 16-pin wide SOIC package (WM).

Functional Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings † (Note 1, Note 2, Note 3)

Output Voltage (V _{OUT})	+50V
Logic Supply Voltage Range (V _{DD})	
Load Supply Voltage Range (V _{BB})	+5.0V to +50V
Input Voltage Range (V _{IN})	
Continuous Collector Current (I _C)	
Package Power Dissipation	

† Notice: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

- **Note 1:** $T_A = +25^{\circ}C$.
 - 2: Derate at the rate of 20 mW/°C above T_A = +25°C.
 - **3:** Microchip CMOS devices have input-static protection, but are susceptible to damage when exposed to extremely high static electrical charges.

TABLE 1-1: ALLOWABLE DUTY CYCLES

Number of Outputs ON at	Maximum Allowable Duty Cycles at a T _A of:					
I _{OUT} = -200 mA	+50°C	+60°C	+70°C			
8	53%	47%	41%			
7	60%	54%	48%			
6	70%	64%	56%			
5	83%	75%	67%			
4	100%	94%	84%			
3	100%	100%	100%			
2	100%	100%	100%			
1	100%	100%	100%			

TABLE 1-2: ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V _{BB} = 50V, V _{DD} = 5V to 12V; T _A = 25°C, unless noted. (Note 1).							
Parameters Sym. Min. Typ. Max. Units Conditions							
	I _{CEX}	_	_	-50	μA	T _A = +25°C	
Output Leakage Current		_	_	-100	μA	T _A = +85°C	
		_		2.3	٧	$I_{OUT} = -100 \text{ mA}, T_A = +85^{\circ}\text{C}$	
Output Saturation Voltage	V _{CE(SAT)}	_		2.4	٧	$I_{OUT} = -225 \text{ mA}, T_A = +85^{\circ}\text{C}$	
		_	_	2.5	V	$I_{OUT} = -350 \text{ mA}, T_A = +85^{\circ}\text{C}$	
Output Sustaining Voltage	V _{CE(SUS)}	35	_	_	V	I _{OUT} = –350 mA, L = 2 mH	
		3.5	_	V _{DD} +0.3	V	V _{DD} = 5.0V	
Input Voltage	$V_{IN(1)}$ $V_{IN(0)}$	10.5	_	V _{DD} +0.3	V	V _{DD} = 12V	
	- 114(0)	V _{SS} -0.3	_	0.8	V	V _{DD} = 5.0V to 12V	
Input Current	١.		_	120	μΑ	$V_{DD} = V_{IN} = 5.0V$	
input Current	I _{IN(1)}		_	240	μΑ	V _{DD} = 12V	
Input Impedance	7	100	_	_	kΩ	V _{DD} = 5.0V	
input impedance	Z _{IN}	50	_	_	kΩ	V _{DD} = 12V	
Maximum Clock Frequency	f _c	3.3	_	_	MHz	_	
Serial Data Output Resistance	R _{OUT}	_	_	20	kΩ	V _{DD} = 5.0V	
Serial Data Output Resistance		_	_	6.0	kΩ	V _{DD} = 12V	
Turn-On Delay	t _{PLH}	_	_	2.0	μs	Output Enable to Output, I _{OUT} = –350 mA	
Turn-Off Delay	t _{PHL}	_	_	10	μs	Output Enable to Output, I _{OUT} = –350 mA	
		_	_	10	mA	All outputs on, all outputs open	
	I _{BB}	_	_	200	μΑ	All outputs off	
		_	_	100	μΑ	V _{DD} = 5V, all outputs off, inputs = 0V	
Supply Current		_		200	μΑ	V _{DD} = 12V, all outputs off, inputs = 0V	
	I _{DD}	_	_	1.0	mA	V _{DD} = 5V, one output on, inputs = 0V	
		_	_	3.0	mA	V _{DD} = 12V, one output on, inputs = 0V	
Diada Laakaga Current	I _H	_	_	50	μΑ	T _A = +25°C; Max. V _{BB}	
Diode Leakage Current		_	_	100	μA	$T_A = +85^{\circ}C$; Max. V_{BB}	
Diode Forward Voltage	V _F	_	_	2.0	V	I _F = 350 mA; V _{BB} open	

Note 1: Specification for packaged product only.

^{2:} Positive (negative) current is defined as going into (coming out of) the specified device pin.

^{3:} Operation of these devices with standard TTL may require the use of appropriate pull-up resistors.

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Тур.	Max.	Units	Conditions		
Temperature Ranges								
Operating Temperature Range	T _A	-40	_	+85	°C	Note 1		
Storage Temperature Range	T _S	-65	_	+150	°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.

Typical Circuits

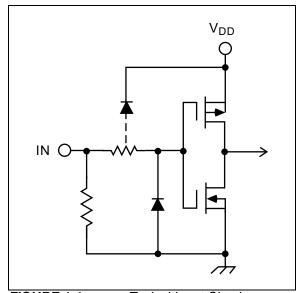


FIGURE 1-1: Typical Input Circuit

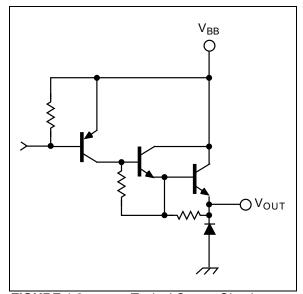


FIGURE 1-2: Typical Output Circuit.

2.0 TYPICAL PERFORMANCE CURVES

Note:

The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.

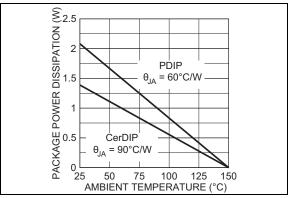


FIGURE 2-1: Allowable Package Power Dissipation vs. Temperature.

3.0 TIMING CONDITIONS

The descriptions of the timing conditions are listed below Figure 3-1.

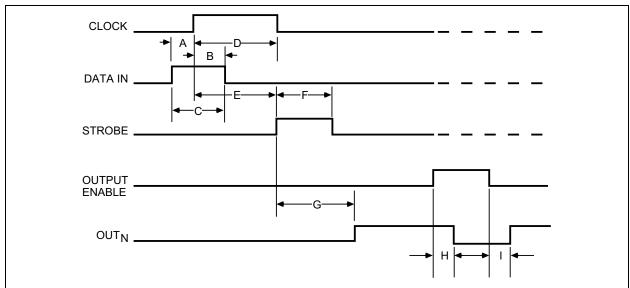


FIGURE 3-1: Timing Conditions.

TABLE 3-1: TIMING CONDITIONS PARAMETERS

V_{DD} = 5.0V, Logic levels are V_{DD} and ground.						
Reference	Parameter	Value				
Α	Minimum data active time before clock pulse (data set-up time)	75 ns				
В	Minimum data active time after clock pulse (data hold time)	75 ns				
С	Minimum data pulse width	150 ns				
D	Minimum clock pulse width	150 ns				
Е	Minimum time between clock activation and strobe	300 ns				
F	Minimum strobe pulse width	100 ns				
G	Typical time between strobe activation and output transition	1.0 µs				
Н	Turn-off delay	See Electrical Characteristics				
	Turn-on delay	See Electrical Characteristics				

TABLE 3-2: TRUTH TABLE

Serial Data	Clock Input	Shift Register Contents	Serial Data	Strobe	Latch Contents	Output Enable	Output Content		
Input		l ₁ l ₂ l ₃ l _{N-1} l _N	Output	Input	l ₁ l ₂ l ₃ l _{N-1} l _N	Eliable	l ₁ l ₂ l ₃ l _{N-1} l _N		
Н		H R ₁ R ₂ R _{N-2} R _{N-1}	R _{N-1}						
L	J	L R ₁ R ₂ R _{N-2} R _{N-1}	R _{N-1}	_	_	_	_		
Х		R ₁ R ₂ R ₃ R _{N-1} R _N	R_N						
		X X X X X	Х	L	R ₁ R ₂ R ₃ R _{N-1} R _N				
_	_	P ₁ P ₂ P ₃ P _{N-1} P _N	P_N	Н	P ₁ P ₂ P ₃ P _{N-1} P _N	L	P ₁ P ₂ P ₃ P _{N-1} P _N		
		_	_	_	X X X X X	Н	LLLLL		

L = Low Logic Level, H = High Logic Level, X = Irrelevant, P = Present State, R = Previous State.

4.0 APPLICATION INFORMATION

Serial data present at the input is transferred into the shift register on the rising edge of the CLOCK input pulse. Additional CLOCK pulses shift data information towards the SERIAL DATA OUTPUT. The serial data must appear at the input prior to the rising edge of the CLOCK input waveform.

The 8 bits present in the shift register are transferred to the respective latches when the STROBE is high (serial-to-parallel conversion). The latches will continue to accept new data as long as the STROBE is held high. Most applications where the latching feature is not used (STROBE tied high) require the OUTPUT ENABLE input to be high during serial data entry.

Outputs are active (controlled by the latch state) when the OUTPUT ENABLE is low. All outputs are low (disabled) when the OUTPUT ENABLE is high. OUTPUT ENABLE does not affect the data in the shift register or latch.

5.0 PACKAGING INFORMATION

5.1 Package Marking Information

16-Pin PDIP*

Example



MICS891YN 1312

16-Pin SOICW*

Example



MICREL MIC5891YWM 1632

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

e3 Pb-free JEDEC® designator for Matte Tin (Sn)

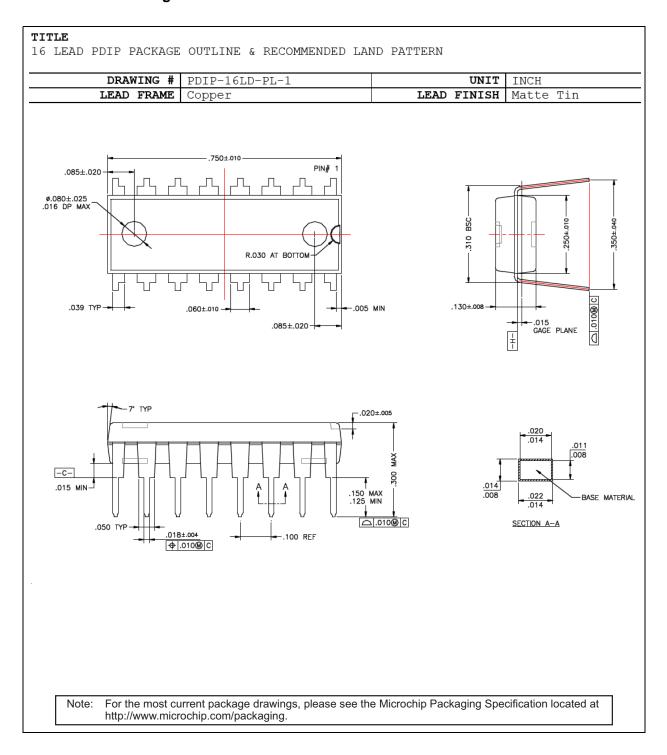
This package is Pb-free. The Pb-free JEDEC designator ((e3)) can be found on the outer packaging for this package.

•, ▲, ▼ Pin one index is identified by a dot, delta up, or delta down (triangle mark).

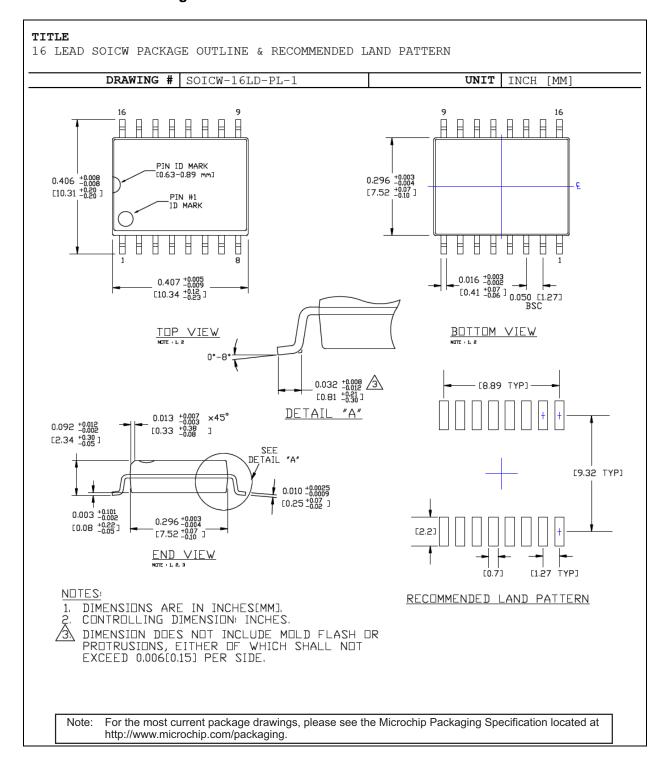
Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

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

16-Lead PDIP Package Outline and Recommended Land Pattern



16-Lead SOICW Package Outline and Recommended Land Pattern



NOTES:

APPENDIX A: REVISION HISTORY

Revision A (October 2016)

- Converted Micrel document MIC5891 to Microchip data sheet DS20005638A.
- · Minor text changes throughout.
- Operating temperature range corrected in the Temperature Specifications section.
- Maximum Saturation Voltage values updated in Table 1-2.
- First Input Current maximum value updated in Table 1-2.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

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

Examples: PART NO. a) MIC5891YN: 8-Bit Serial-Input Latched Source Driver, –40°C to +85°C **Device** Package Media Type Junction Junction Temperature Range, **Temperature Range** 16-Lead PDIP, 25/Tube MIC5891: a) MIC5891YWM: Device: 8-Bit Serial-Input Latched Source Driver 8-Bit Serial-Input Latched Source Driver, -40°C to +85°C Junction Temperature Range, Junction -40°C to +85°C 16-Lead SOICW, 47/Tube Temperature Range: a) MIC5891YWM-TR: 8-Bit Serial-Input Latched Source Driver, –40°C to +85°C Junction Temperature Range, Package: 16-Lead PDIP 16-Lead SOICW, 1,000/Reel WM = 16-Lead SOICW Media Type: 1,000/Reel for WM Package (blank)= 25/Tube for N Package (blank)= 47/Tube for WM Package

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