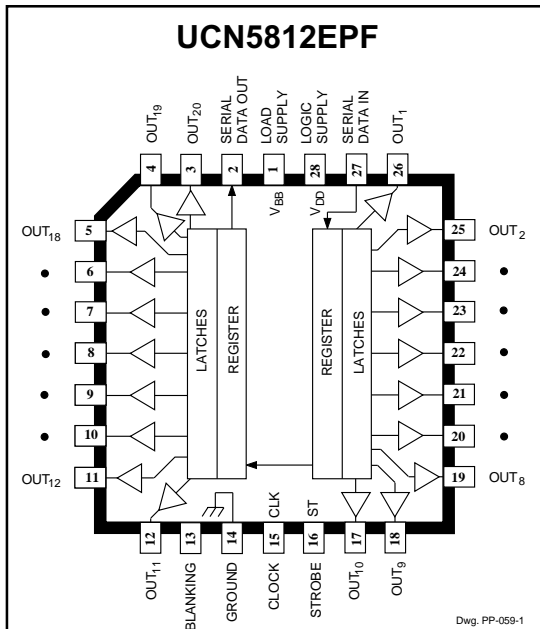


# 5812-F

## BiMOS II 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVERS WITH ACTIVE-DMOS PULL-DOWNS



Dwg. PP-059-1

### ABSOLUTE MAXIMUM RATINGS at $T_A = 25^\circ\text{C}$

Logic Supply Voltage, $V_{DD}$ .....	15 V
Driver Supply Voltage, $V_{BB}$ .....	60 V
Continuous Output Current Range, $I_{OUT}$ .....	-40 to +15 mA
Input Voltage Range, $V_{IN}$ .....	-0.3 V to $V_{DD} + 0.3$ V
Package Power Dissipation, $P_D$ (UCN5812AF).....	3.12 W*
(UCN5812EPF).....	1.84 W†
Operating Temperature Range, $T_A$ .....	-20°C to +85°C
Storage Temperature Range, $T_S$ .....	-55°C to +150°C

\* Derate at rate of 22 mW/°C above  $T_A = +25^\circ\text{C}$

† Derate at rate of 15 mW/°C above  $T_A = +25^\circ\text{C}$

Caution: Allegro CMOS devices have input static protection but are susceptible to damage when exposed to extremely high static electrical charges.

Note that the UCN5812AF (dual in-line package) and UCN5812EPF (PLCC package) are electrically identical and share a common terminal number assignment.

The UCN5812AF/EPF combine a 20-bit CMOS shift register, data latches, and control circuitry with high-voltage bipolar source drivers and active DMOS pull-downs for reduced supply current requirements. Although designed primarily for vacuum-fluorescent displays, the high-voltage, high-current outputs also allow them to be used in other peripheral power driver applications. They are improved versions of the original UCN5812A/EP.

The CMOS shift register and latches allow direct interfacing with microprocessor-based systems. With a 5 V supply, they will operate to at least 3.3 MHz. At 12 V, higher speeds are possible. Especially useful for inter-digit blanking, the BLANKING input disables the output source drives and turns on the DMOS sink drivers. Use with TTL may require the use of appropriate pull-up resistors to ensure an input logic high.

A CMOS serial data output enables cascade connections in applications requiring additional drive lines. Similar devices are available as the UCN5810AF/LWF (10 bits), UCN5811A (12 bits), and UCN5818AF/EPF (32 bits).

The output source drivers are high-voltage pnp-npn Darlingtonts with a minimum breakdown of 60 V and are capable of sourcing up to 40 mA. The DMOS active pull-downs are capable of sinking up to 15 mA.

The UCN5812AF is supplied in a 28-pin dual in-line plastic package with 0.600" (15.24 mm) row spacing. For surface mounting, the UCN5812EPF is furnished in 28-lead plastic chip carrier (quad pack) with 0.050" (1.22 mm) centers. Copper lead-frames, reduced supply current requirements and lower output saturation voltages, allow continuous operation, with all outputs sourcing 25 mA, of the UCN5812AF over the operating temperature range, and the UCN5812EPF up to +75°C. All devices are also available for operation between -40°C and +85°C. To order, change the prefix from 'UCN' to 'UCQ'.

### FEATURES

- High-Speed Source Drivers
- 60 V Source Outputs
- To 3.3 MHz Data Input Rate
- Low Output-Saturation Voltages
- Low-Power CMOS Logic and Latches
- Active DMOS Pull-Downs
- Reduced Supply Current Requirements
- Improved Replacement for TL5812

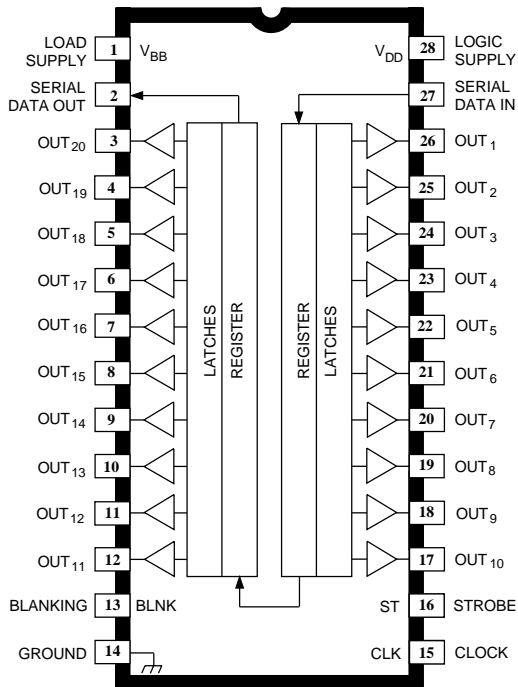
Always order by complete part number, e.g., **UCN5812AF**.



# 5812-F

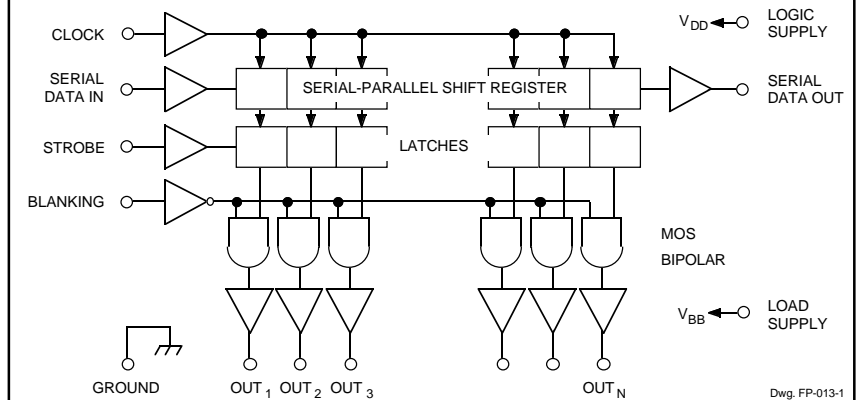
## 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVERS WITH ACTIVE-DMOS PULL-DOWNS

UCN5812AF



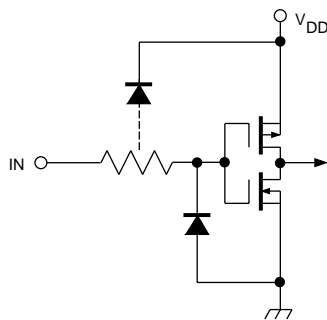
Dwg. PP-029-7

FUNCTIONAL BLOCK DIAGRAM



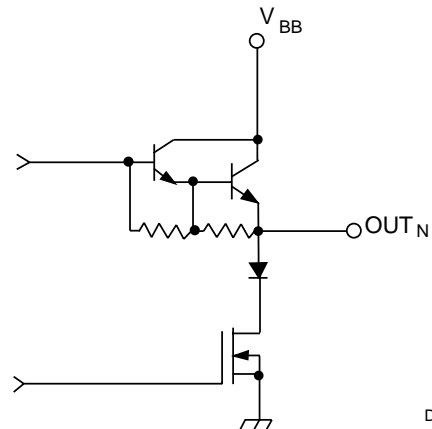
Dwg. FP-013-1

TYPICAL INPUT CIRCUIT



Dwg. EP-010-5

TYPICAL OUTPUT DRIVER



Dwg. No. A-14,219

**5812-F**  
**20-BIT SERIAL-INPUT,**  
**LATCHED SOURCE DRIVERS**  
**WITH ACTIVE-DMOS PULL-DOWNS**

**ELECTRICAL CHARACTERISTICS at  $T_A = +25^\circ\text{C}$ ,  $V_{BB} = 60\text{ V}$  (unless otherwise noted).**

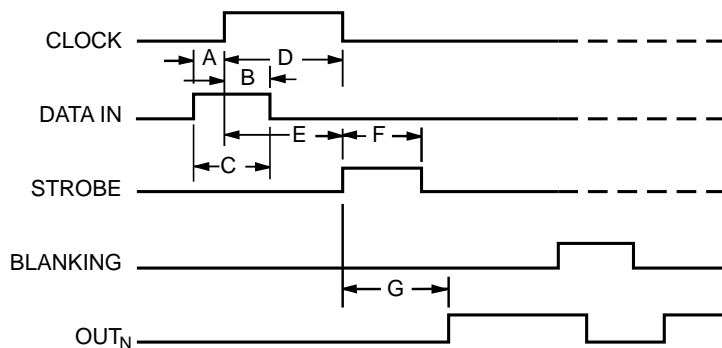
Characteristic	Symbol	Test Conditions	Limits @ $V_{DD} = 5\text{ V}$			Limits @ $V_{DD} = 12\text{ V}$			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Output Leakage Current	$I_{CEX}$	$V_{OUT} = 0\text{ V}$ , $T_A = +70^\circ\text{C}$	—	-5.0	-15	—	-5.0	-15	$\mu\text{A}$
Output Voltage	$V_{OUT(1)}$	$I_{OUT} = -25\text{ mA}$ , $V_{BB} = 60\text{ V}$	58	58.5	—	58	58.5	—	V
	$V_{OUT(0)}$	$I_{OUT} = 1\text{ mA}$	—	2.0	3.0	—	—	—	V
		$I_{OUT} = 2\text{ mA}$	—	—	—	—	2.0	3.5	V
Output Pull-Down Current	$I_{OUT(0)}$	$V_{OUT} = 5\text{ V to }V_{BB}$	2.0	3.5	—	—	—	—	$\text{mA}$
		$V_{OUT} = 20\text{ V to }V_{BB}$	—	—	—	8.0	13	—	$\text{mA}$
Input Voltage	$V_{IN(1)}$		3.5	—	5.3	10.5	—	12.3	V
	$V_{IN(0)}$		-0.3	—	+0.8	-0.3	—	+0.8	V
Input Current	$I_{IN(1)}$	$V_{IN} = V_{DD}$	—	0.05	0.5	—	0.1	1.0	$\mu\text{A}$
	$I_{IN(0)}$	$V_{IN} = 0.8\text{ V}$	—	-0.05	-0.5	—	-0.1	-1.0	$\mu\text{A}$
Serial Data	$V_{OUT(1)}$	$I_{OUT} = -200\ \mu\text{A}$	4.5	4.7	—	11.7	11.8	—	V
	$V_{OUT(0)}$	$I_{OUT} = 200\ \mu\text{A}$	—	200	250	—	100	200	$\text{mV}$
Maximum Clock Frequency	$f_{clk}$		3.3*	—	—	—	—	—	MHz
Supply Current	$I_{DD(1)}$	All Outputs High	—	100	300	—	200	500	$\mu\text{A}$
	$I_{DD(0)}$	All Outputs Low	—	100	300	—	200	500	$\mu\text{A}$
	$I_{BB(1)}$	Outputs High, No Load	—	1.5	4.0	—	1.5	4.0	$\text{mA}$
	$I_{BB(0)}$	Outputs Low	—	10	100	—	10	100	$\mu\text{A}$
Blanking to Output Delay	$t_{PHL}$	$C_L = 30\text{ pF}$ , 50% to 50%	—	2000	—	—	1000	—	ns
	$t_{PLH}$	$C_L = 30\text{ pF}$ , 50% to 50%	—	1000	—	—	850	—	ns
Output Fall Time	$t_f$	$C_L = 30\text{ pF}$ , 90% to 10%	—	1450	—	—	650	—	ns
Output Rise Time	$t_r$	$C_L = 30\text{ pF}$ , 10% to 90%	—	650	—	—	700	—	ns

Negative current is defined as coming out of (sourcing) the specified device pin.

\* Operation at a clock frequency greater than the specified minimum value is possible but not warranted.

# 5812-F

## 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVERS WITH ACTIVE-DMOS PULL-DOWNS



Dwg. No. 12,649A

### TIMING REQUIREMENTS

( $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 5\text{ V}$ , Logic Levels are  $V_{DD}$  and Ground)

- A. Minimum Data Active Time Before Clock Pulse (Data Set-Up Time) ..... **75 ns**
- B. Minimum Data Active Time After Clock Pulse (Data Hold Time) ..... **75 ns**
- C. Minimum Data Pulse Width ..... **150 ns**
- D. Minimum Clock Pulse Width ..... **150 ns**
- E. 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 ..... **500 ns**

Timing is representative of a 3.3 MHz clock. Higher speeds may be attainable with increased supply voltage; operation at high temperatures will reduce the specified maximum clock frequency.

Serial Data present at the input is transferred to the shift register on the logic "0" to logic "1" transition of the CLOCK input pulse. On succeeding CLOCK pulses, the registers 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.

Information present at any register is transferred to the respective latch 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. Applications where the latches are bypassed (STROBE tied high) will require that the BLANKING input be high during serial data entry.

When the BLANKING input is high, the output source drivers are disabled (OFF); the DMOS sink drivers are ON, the information stored in the latches is not affected by the BLANKING input. With the BLANKING input low, the outputs are controlled by the state of their respective latches.

### TRUTH TABLE

Serial Data Input	Clock Input	Shift Register Contents						Serial Data Output	Strobe Input	Latch Contents						Blanking	Output Contents					
		I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	...	I <sub>N-1</sub>	I <sub>N</sub>			R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	...	R <sub>N-1</sub>	R <sub>N</sub>		P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	...	P <sub>N-1</sub>	P <sub>N</sub>
H	┌	H	R <sub>1</sub>	R <sub>2</sub>	...	R <sub>N-2</sub>	R <sub>N-1</sub>	R <sub>N-1</sub>														
L	┐	L	R <sub>1</sub>	R <sub>2</sub>	...	R <sub>N-2</sub>	R <sub>N-1</sub>	R <sub>N-1</sub>														
X	└	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	...	R <sub>N-1</sub>	R <sub>N</sub>	R <sub>N</sub>														
		X	X	X	...	X	X	X	L	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	...	R <sub>N-1</sub>	R <sub>N</sub>							
		P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	...	P <sub>N-1</sub>	P <sub>N</sub>	P <sub>N</sub>	H	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	...	P <sub>N-1</sub>	P <sub>N</sub>	L	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	...	P <sub>N-1</sub>	P <sub>N</sub>
		X	X	X	...	X	X	X	H	L	L	L	...	L	L		L	L	L	...	L	L

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

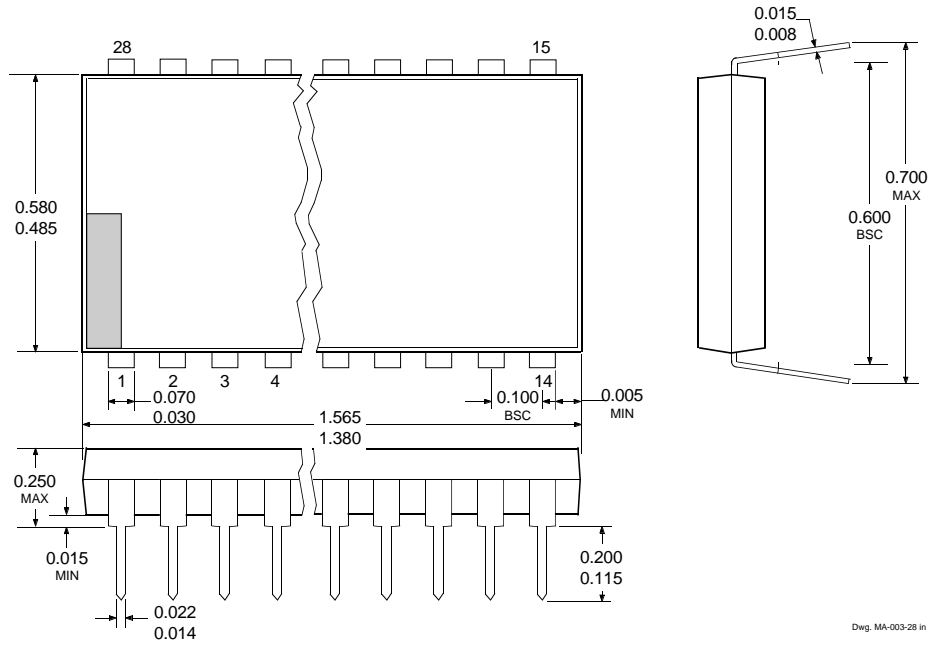


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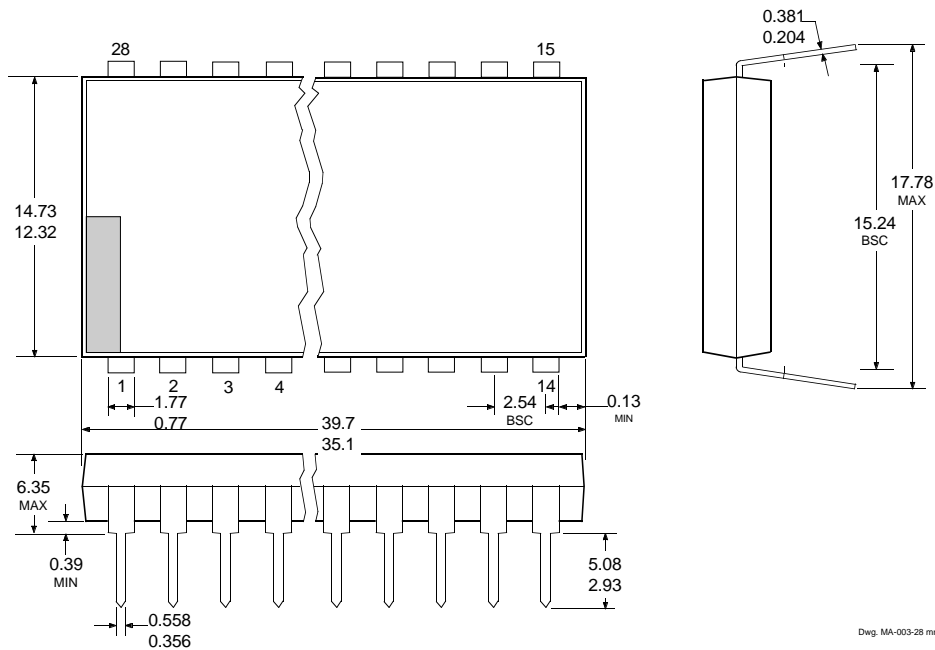
# 5812-F

## 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVERS WITH ACTIVE-DMOS PULL-DOWNS

**UCN5812AF**  
Dimensions in Inches  
(controlling dimensions)



Dimensions in Millimeters  
(for reference only)

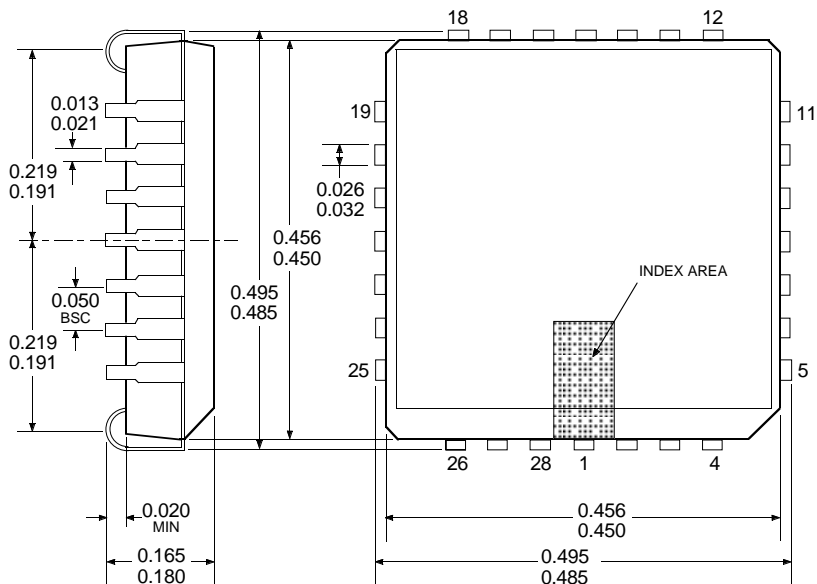


- NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.  
 2. Lead spacing tolerance is non-cumulative.  
 3. Lead thickness is measured at seating plane or below.  
 4. Supplied in standard sticks/tubes of 12 devices.

**5812-F**  
**20-BIT SERIAL-INPUT,**  
**LATCHED SOURCE DRIVERS**  
**WITH ACTIVE-DMOS PULL-DOWNS**

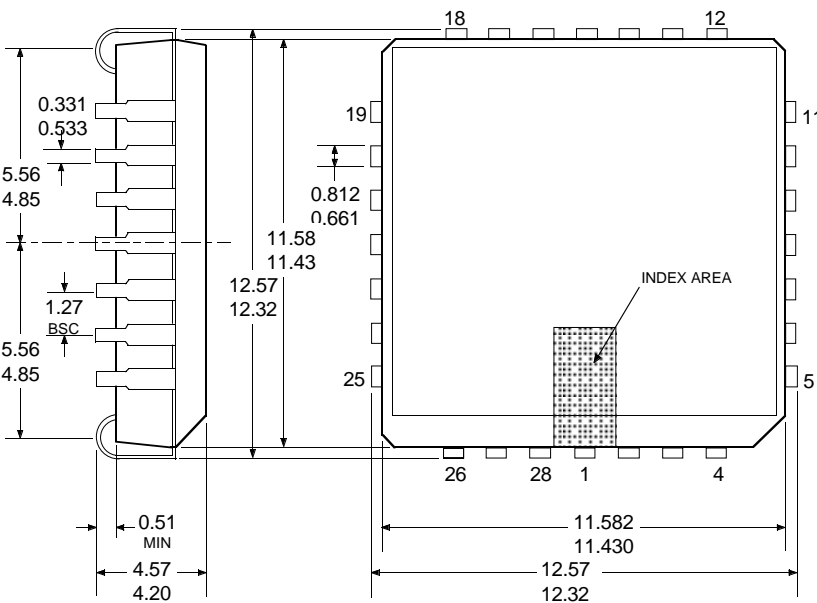
**UCN5812EPF**

Dimensions in Inches  
 (controlling dimensions)



Dwg. MA-005-28A in

Dimensions in Millimeters  
 (for reference only)



Dwg. MA-005-28A mm

- NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.  
 2. Lead spacing tolerance is non-cumulative.  
 3. Supplied in standard sticks/tubes of 38 devices or add "TR" to part number for tape and reel.



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**5812-F**  
**20-BIT SERIAL-INPUT,**  
**LATCHED SOURCE DRIVERS**  
**WITH ACTIVE-DMOS PULL-DOWNS**

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**5812-F**  
**20-BIT SERIAL-INPUT,**  
**LATCHED SOURCE DRIVERS**  
**WITH ACTIVE-DMOS PULL-DOWNS**

**POWER**  
**INTERFACE DRIVERS**

Function	Output Ratings*		Part Number†
<b>SERIAL-INPUT LATCHED DRIVERS</b>			
8-Bit (saturated drivers)	-120 mA	50 V‡	5895
8-Bit	350 mA	50 V	5821
8-Bit	350 mA	80 V	5822
8-Bit	350 mA	50 V‡	5841
8-Bit	350 mA	80 V‡	5842
8-Bit (constant-current LED driver)	75 mA	17 V	6275
8-Bit (constant-current LED driver)	120 mA	24 V	6277
8-Bit (DMOS drivers)	250 mA	50 V	6595
8-Bit (DMOS drivers)	350 mA	50 V‡	6A595
8-Bit (DMOS drivers)	100 mA	50 V	6B595
10-Bit (active pull-downs)	-25 mA	60 V	5810-F and 6810
12-Bit (active pull-downs)	-25 mA	60 V	5811
16-Bit (constant-current LED driver)	75 mA	17 V	6276
20-Bit (active pull-downs)	-25 mA	60 V	5812-F and 6812
32-Bit (active pull-downs)	-25 mA	60 V	5818-F and 6818
32-Bit	100 mA	30 V	5833
32-Bit (saturated drivers)	100 mA	40 V	5832
<b>PARALLEL-INPUT LATCHED DRIVERS</b>			
4-Bit	350 mA	50 V‡	5800
8-Bit	-25 mA	60 V	5815
8-Bit	350 mA	50 V‡	5801
8-Bit (DMOS drivers)	100 mA	50 V	6B273
8-Bit (DMOS drivers)	250 mA	50 V	6273
<b>SPECIAL-PURPOSE DEVICES</b>			
Unipolar Stepper Motor Translator/Driver	1.25 A	50 V‡	5804
Addressable 8-Bit Decoder/DMOS Driver	250 mA	50 V	6259
Addressable 8-Bit Decoder/DMOS Driver	350 mA	50 V‡	6A259
Addressable 8-Bit Decoder/DMOS Driver	100 mA	50 V	6B259
Addressable 28-Line Decoder/Driver	450 mA	30 V	6817

\* Current is maximum specified test condition, voltage is maximum rating. See specification for sustaining voltage limits. Negative current is defined as coming out of (sourcing) the output.

† Complete part number includes additional characters to indicate operating temperature range and package style.

‡ Internal transient-suppression diodes included for inductive-load protection.



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