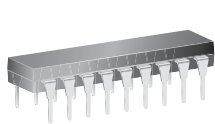


DABiC-5 8-Bit Serial Input Latched Sink Drivers

Features and Benefits

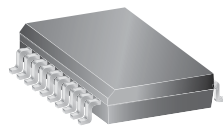
- 3.3 to 5 V logic supply range
- Power-on reset (POR)
- To 10 MHz data input rate
- CMOS, TTL compatible inputs
- -40°C operation available
- Low-power CMOS logic and latches
- Schmitt trigger inputs for improved noise immunity
- High-voltage current-sink outputs
- Internal pull-up/pull-down resistors
- Output transient-protection diodes
- Single or split supply operation

Packages:



Package A
18-pin DIP

Package LW 18- and 20-pin
Wide Body SOIC



Not to scale

Description

The merging of low-power CMOS logic and bipolar output power drivers using the proprietary DABiC-5 fabrication process permit the A6841 integrated circuits to be used in a wide variety of peripheral power driver applications. Each device has an eight-bit CMOS shift register and CMOS control circuitry, eight CMOS data latches, and eight bipolar current-sinking Darlington output drivers. The 500 mA, NPN Darlington outputs, with integral transient-suppression diodes, are suitable for use with relays, solenoids, and other inductive loads.

All package variations of the A6841 offer premium performance with a minimum output-breakdown voltage rating of 50 V (35 V sustaining). All drivers can be operated with a split supply where the negative supply is up to -20 V .

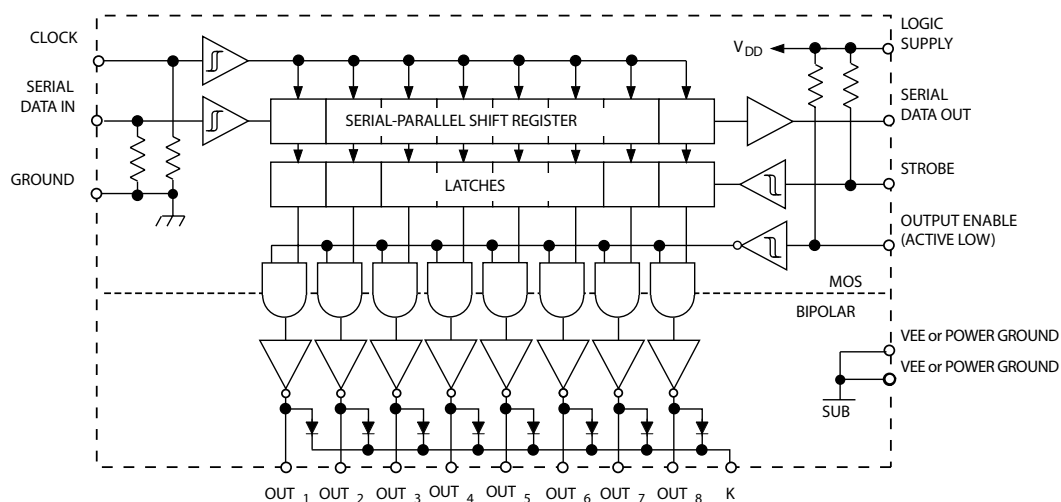
The CMOS inputs are compatible with standard CMOS logic levels. TTL circuits may require the use of appropriate pull-up resistors. By using the serial data output, drivers can be cascaded for interface applications requiring additional drive lines.

The A6841 is provided in an 18-pin plastic DIP (suffix A) and a 20-pin SOICW (suffix LW) package (replacing the 18-pin version SOICW). Two temperature ranges are provided, -20°C to 85°C (range S) and -40°C to 85°C (range E). These devices are lead (Pb) free, with 100% matte tin plated leadframes.

Applications include:

- Relays
- Solenoids
- Inductive loads

Functional Block Diagram



Selection Guide

Part Number	Package	Packing	Ambient
A6841EA-T	18-pin DIP	21 pieces per tube	-40°C to 85°C
A6841ELW-T ^{1,2}	18-pin wide body SOIC	41 pieces per tube	
A6841ELWTR-T ^{1,2}	18-pin wide body SOIC	1000 pieces per reel	
A6841ELW-20-T	20-pin wide body SOIC	37 pieces per tube	
A6841ELWTR-20-T	20-pin wide body SOIC	1000 pieces per reel	
A6841SA-T	18-pin DIP	21 pieces per tube	-20°C to 85°C
A6841SLW-T ^{1,2}	18-pin wide body SOIC	41 pieces per tube	
A6841SLWTR-T ^{1,2}	18-pin wide body SOIC	1000 pieces per reel	
A6841SLW-20-T	20-pin wide body SOIC	37 pieces per tube	
A6841SLWTR-20-T	20-pin wide body SOIC	1000 pieces per reel	

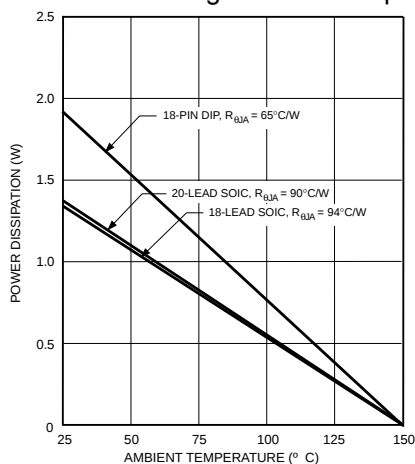
¹18-pin SOIC variants are pin-for-pin compatible with the 20-pin SOIC variants that are replacing them. The 20-pin variants have two additional pins, at one end, which are not internally connected. The 18-pin variants are being discontinued due to limited demand.

²Certain variants cited in this footnote are in production but have been determined to be LAST TIME BUY. This classification indicates that the product is obsolete and notice has been given. Sale of this device is currently restricted to existing customer applications. The variants should not be purchased for new design applications because of obsolescence in the near future. Samples are no longer available. Status date change April 30, 2007. Deadline for receipt of LAST TIME BUY orders is August 24, 2007. These variants include: A6841ELW-T, A6841ELWTR-T, A6841SLW-T, and A6841SLWTR-T.

Absolute Maximum Ratings*

Characteristic	Symbol	Notes	Rating	Units
Logic Supply Voltage	V_{DD}		7	V
Emitter Supply Voltage	V_{EE}		-20	V
Input Voltage Range	V_{IN}		-0.3 to $V_{DD} + 0.3$	V
Output Voltage	V_{CE}		50	V
	$V_{CE(SUS)}$	For inductive load applications	35	V
Continuous Output Current	I_{OUT}	Each output	500	mA
Operating Ambient Temperature	T_A	Range E	-40 to 85	°C
		Range S	-20 to 85	°C
Maximum Junction Temperature	$T_J(max)$		150	°C
Storage Temperature	T_{stg}		-55 to 150	°C

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

Allowable Package Power Dissipation, P_D 

ELECTRICAL CHARACTERISTICS¹ Unless otherwise noted: $T_A = 25^\circ\text{C}$, $V_{EE} = 0\text{ V}$, logic supply operating voltage $V_{DD} = 3.0\text{ to }5.5\text{ V}$

Characteristic	Symbol	Test Conditions	$V_{dd} = 3.3\text{ V}$			$V_{dd} = 5\text{ V}$			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Output Leakage Current	I_{CEX}	$V_{OUT} = 50\text{ V}$	–	–	10	–	–	10	μA
Output Sustaining Voltage	$V_{CE(SUS)}$	$I_{OUT} = 350\text{ mA}$, $L = 3\text{ mH}$	35	–	–	35	–	–	V
Collector–Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_{OUT} = 100\text{ mA}$	–	–	1.1	–	–	1.1	V
		$I_{OUT} = 200\text{ mA}$	–	–	1.3	–	–	1.3	V
		$I_{OUT} = 350\text{ mA}$	–	–	1.6	–	–	1.6	V
Input Voltage	$V_{IN(1)}$		2.2	–	–	3.3	–	–	V
	$V_{IN(0)}$		–	–	1.1	–	–	1.7	V
Input Resistance	R_{IN}		50	–	–	50	–	–	k Ω
Serial Data Output Voltage	$V_{OUT(1)}$	$I_{OUT} = -200\text{ }\mu\text{A}$	2.8	3.05	–	4.5	4.75	–	V
	$V_{OUT(0)}$	$I_{OUT} = 200\text{ }\mu\text{A}$	–	0.15	0.3	–	0.15	0.3	V
Maximum Clock Frequency ²	f_c		10	–	–	10	–	–	MHz
Logic Supply Current	$I_{DD(1)}$	One output on, OE = L, ST = H	–	–	2.0	–	–	2.0	mA
	$I_{DD(0)}$	All outputs off, OE = H, ST = H, P1 through P8 = L	–	–	100	–	–	100	μA
Clamp Diode Leakage Current	I_r	$V_r = 50\text{ V}$	–	–	50	–	–	50	μA
Clamp Diode Forward Voltage	V_f	$I_f = 350\text{ mA}$	–	–	2	–	–	2	V
Output Enable-to-Output Delay	$t_{dis(BQ)}$	$V_{CC} = 50\text{ V}$, $R_1 = 500\text{ }\Omega$, $C_1 \leq 30\text{ pF}$	–	–	1.0	–	–	1.0	μs
	$t_{en(BQ)}$	$V_{CC} = 50\text{ V}$, $R_1 = 500\text{ }\Omega$, $C_1 \leq 30\text{ pF}$	–	–	1.0	–	–	1.0	μs
Strobe-to-Output Delay	$t_{p(STH-QL)}$	$V_{CC} = 50\text{ V}$, $R_1 = 500\text{ }\Omega$, $C_1 \leq 30\text{ pF}$	–	–	1.0	–	–	1.0	μs
	$t_{p(STH-QH)}$	$V_{CC} = 50\text{ V}$, $R_1 = 500\text{ }\Omega$, $C_1 \leq 30\text{ pF}$	–	–	1.0	–	–	1.0	μs
Output Fall Time	t_f	$V_{CC} = 50\text{ V}$, $R_1 = 500\text{ }\Omega$, $C_1 \leq 30\text{ pF}$	–	–	1.0	–	–	1.0	μs
Output Rise Time	t_r	$V_{CC} = 50\text{ V}$, $R_1 = 500\text{ }\Omega$, $C_1 \leq 30\text{ pF}$	–	–	1.0	–	–	1.0	μs
Clock-to-Serial Data Out Delay	$t_{p(CH-SQX)}$	$I_{OUT} = \pm 200\text{ }\mu\text{A}$	–	50	–	–	50	–	ns

¹Positive (negative) current is defined as conventional current going into (coming out of) the specified device pin.

²Operation at a clock frequency greater than the specified minimum value is possible but not warranted.

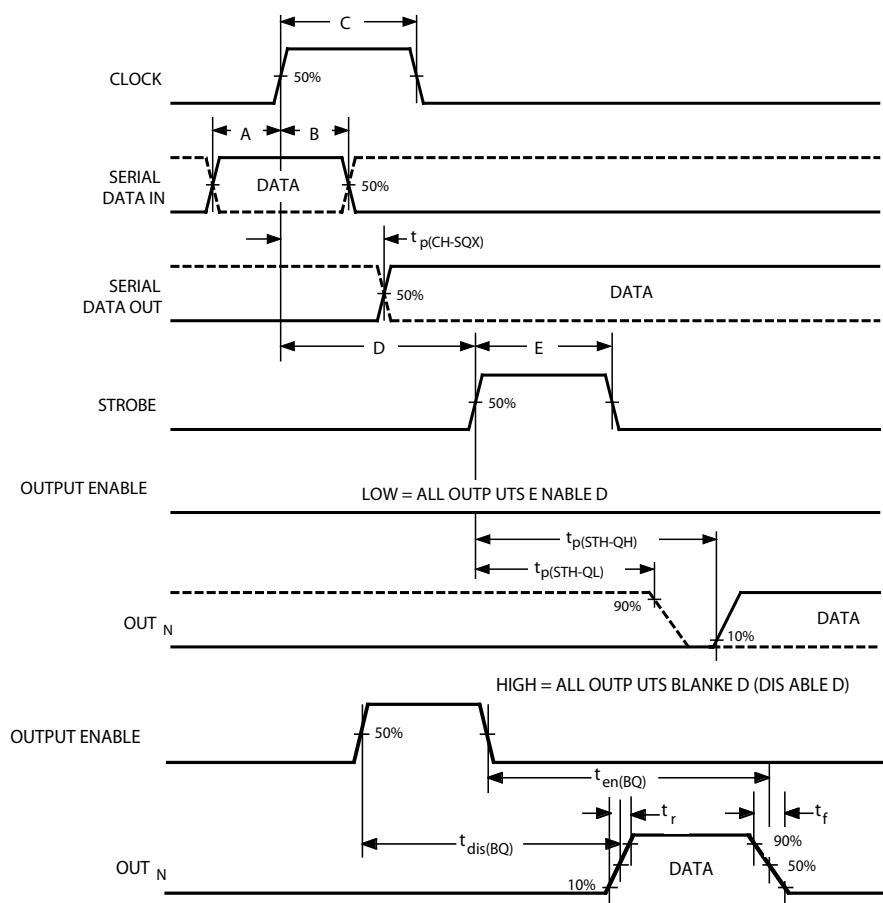
Truth Table

Serial Data Input	Clock Input	Shift Register Contents						Serial Data Output	Strobe Input	Latch Contents						Output Enable Input	Output Contents					
		I_1	I_2	I_3	...	I_8				I_1	I_2	I_3	...	I_8			I_1	I_2	I_3	...	I_8	
H		H	R_1	R_2	...	R_7	R_7															
L		L	R_1	R_2	...	R_7	R_7															
X		R_1	R_2	R_3	...	R_8	R_8															
		X	X	X	...	X	X	L		R_1	R_2	R_3	...	R_8								
		P_1	P_2	P_3	...	P_8	P_8	H		P_1	P_2	P_3	...	P_8	L		P_1	P_2	P_3	...	P_8	
										X	X	X	...	X	H		H	H	H	...	H	

L = Low Logic Level
H = High Logic Level
X = Irrelevant

P = Present State
R = Previous State

Timing Requirements and Specifications (Logic Levels are V_{DD} and Ground)



Key	Description	Symbol	Time (ns)
A	Data Active Time Before Clock Pulse (Data Set-Up Time)	$t_{su(D)}$	25
B	Data Active Time After Clock Pulse (Data Hold Time)	$t_{h(D)}$	25
C	Clock Pulse Width	$t_{w(CH)}$	50
D	Time Between Clock Activation and Strobe	$t_{su(C)}$	100
E	Strobe Pulse Width	$t_{w(STH)}$	50

NOTE: Timing is representative of a 10 MHz clock. Higher speeds may be attainable; operation at high temperatures will reduce the specified maximum clock frequency.

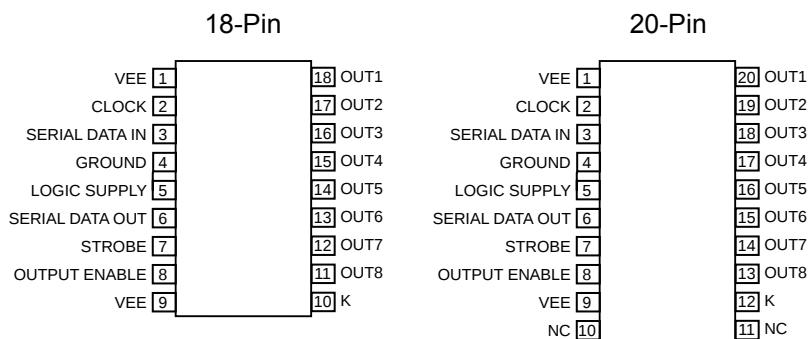
Powering-on with the inputs in the low state ensures that the registers and latches power-on in the low state (POR).

Serial Data present at the input is transferred to the shift register on the logical 0 to logical 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 OUTPUT ENABLE input be high during serial data entry.

When the OUTPUT ENABLE input is high, all of the output buffers are disabled (OFF). The information stored in the latches or shift register is not affected by the OUTPUT ENABLE input. With the OUTPUT ENABLE input low, the outputs are controlled by the state of their respective latches.

Pin-out Diagrams

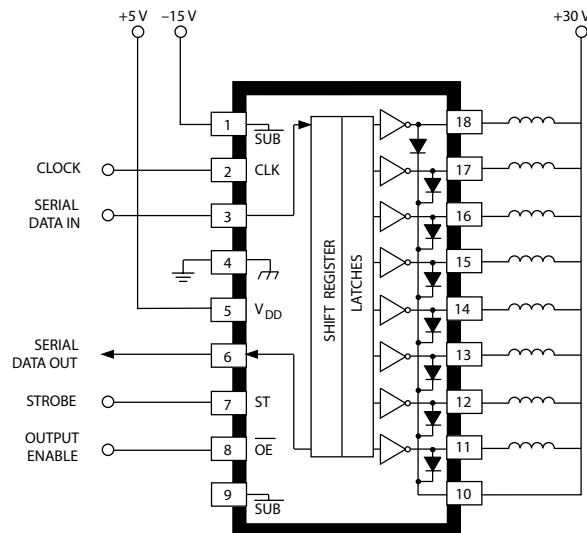


The 18-pin and 20-pin packages are electrically identical. They share common terminal assignments, except for the two NC pins on the 20-pin variant.

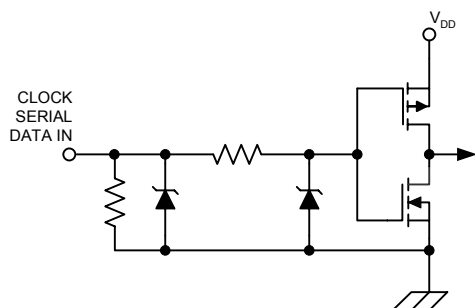
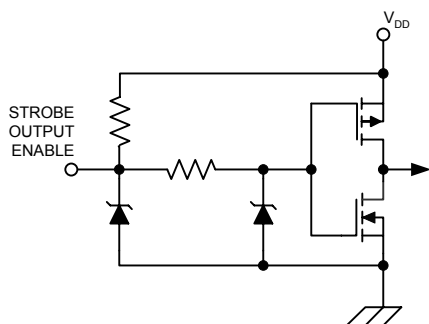
Terminal List Table

Name	Description	Pin	
		18-pin	20-pin
VEE	Power Ground to substrate	1, 9	1, 9
CLOCK	Clock	2	2
SERIAL DATA IN	Serial Data In	3	3
GROUND	Logic Ground	4	4
VDD	Logic Supply	5	5
SERIAL DATA OUT	Serial Data Out, for cascading devices	6	6
STROBE	Strobe	7	7
OUTPUT ENABLE	Output Enable (active low)	8	8
K	Common to +V _L , for inductive loads	10	12
NC	Not internally connected	—	10, 11
OUT8	Sink Output 8	11	13
OUT7	Sink Output 7	12	14
OUT6	Sink Output 6	13	15
OUT5	Sink Output 5	14	16
OUT4	Sink Output 4	15	17
OUT3	Sink Output 3	16	18
OUT2	Sink Output 2	17	19
OUT1	Sink Output 1	18	20

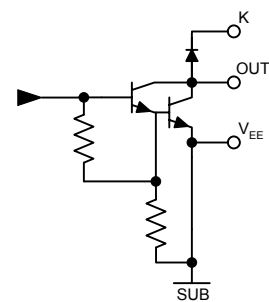
Typical Application
Relay/solenoid driver using split supply

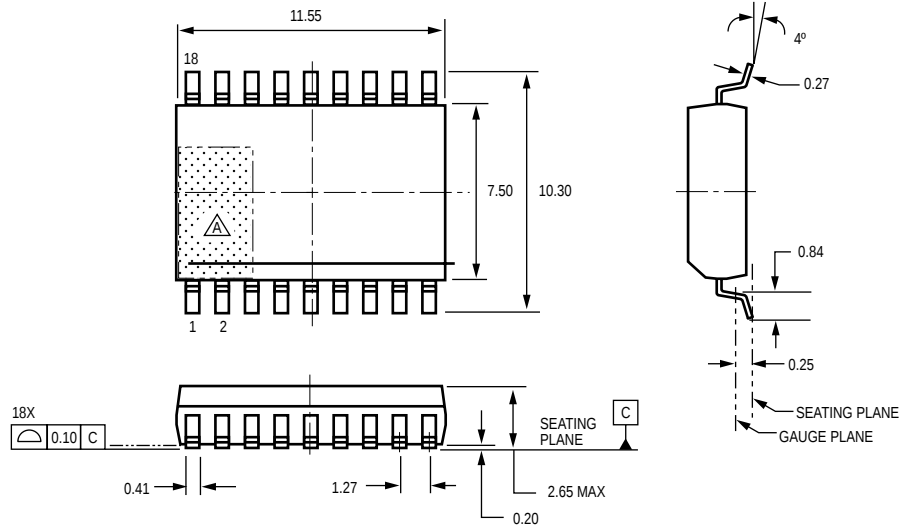


Typical Input Circuits



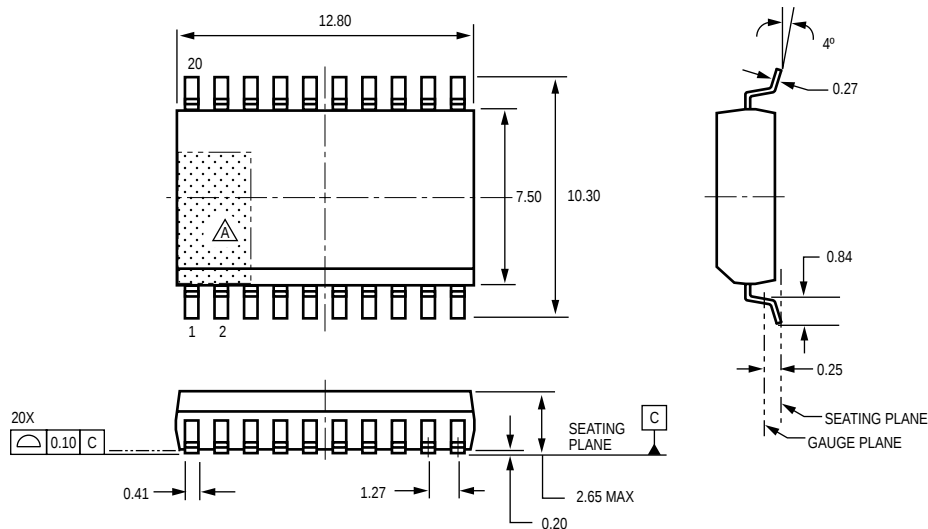
Typical Output Driver



Package LW**18-pin Wide Body SOIC**

All dimensions nominal, not for tooling use
 Dimensions in millimeters
 (reference JEDEC MS-013 AB)
 Dimensions exclusive of mold flash, gate burrs, and dambar protrusions
 Exact case and lead configuration at supplier discretion within limits shown

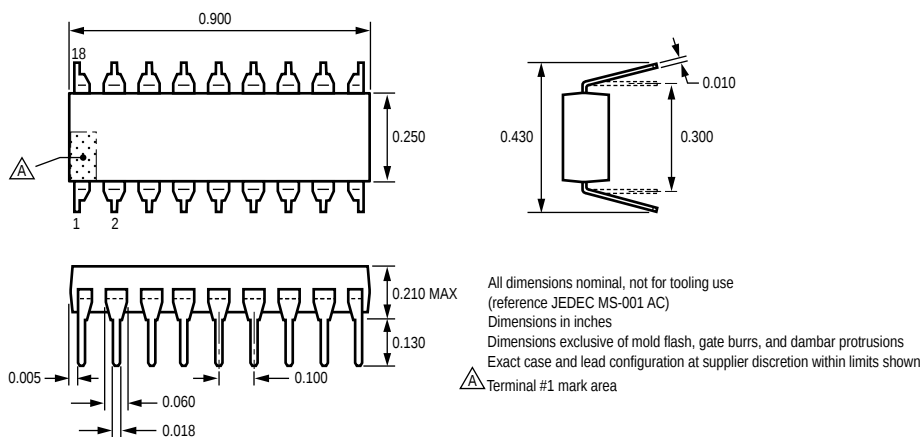
△ Terminal #1 mark area

20-pin Wide Body SOIC

All dimensions nominal, not for tooling use
 Dimensions in millimeters
 (reference JEDEC MS-013 AC)
 Dimensions exclusive of mold flash, gate burrs, and dambar protrusions
 Exact case and lead configuration at supplier discretion within limits shown

△ Terminal #1 mark area

Package A
18-pin DIP



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