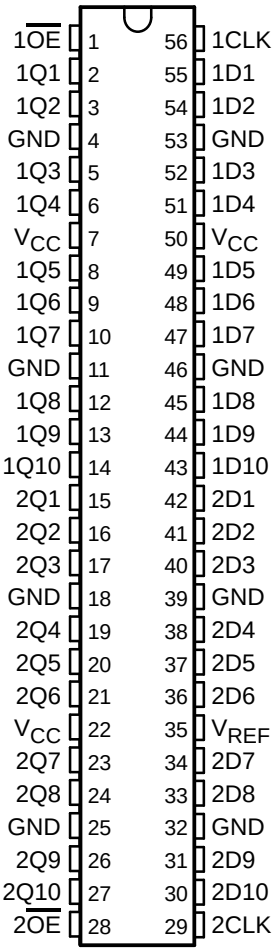
- ***EPIC*-II*B*™ (Enhanced-Performance Implanted CMOS) Submicron Process**
- **Members of the Texas Instruments *Widebus*™ Family**
- **Provides GTL Signals Levels on Both Inputs and Outputs**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**
- **Distributed V_{CC} and GND Pin Configuration Minimizes High-Speed Switching Noise**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **Packaged in Plastic 300-mil Shrink Small-Outline and Thin Shrink Small-Outline Packages**

DGG OR DL PACKAGE
(TOP VIEW)



description

The SN74GTL16821 has 20 single-bit flip-flops which are designed to provide terminated GTL logic levels.

The device can be used as two 10-bit flip-flops or one 20-bit flip-flop. The 20 flip-flops are edge-triggered D-type flip-flops. The SN74GTL16821 provides true data at the Q outputs on the positive transition of the clock (CLK) input.

The output-enable ($\overline{OE}$) input can be used to place the outputs in a high state.The output-enable input does not affect the internal operation of the flip-flops. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

The SN74GTL16821 is available in TI's shrink small-outline package (DL), which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

The SN74GTL16821 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each flip-flop)

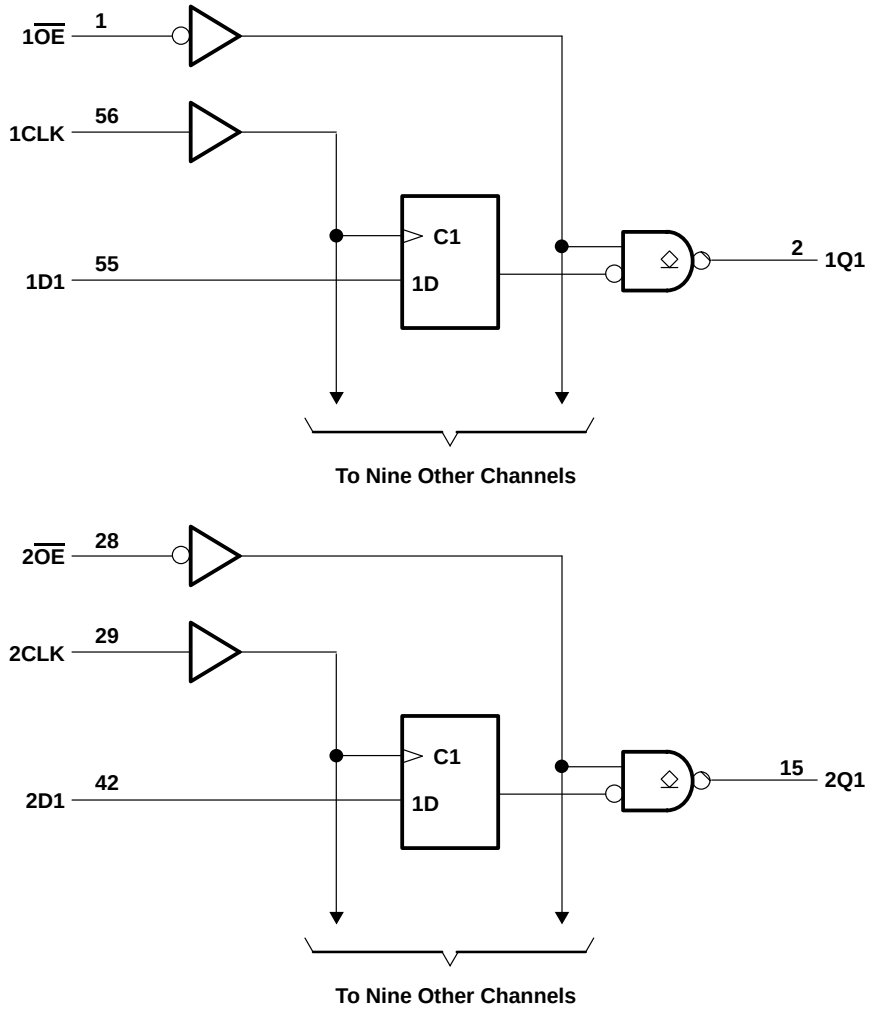
INPUTS			OUTPUT
$\overline{OE}$	CLK	D	Q
L	↑	H	H
L	↑	L	L
L	L	X	Q_0
H	X	X	Z

PRODUCT PREVIEW

EPIC-IIB and Widebus are trademarks of Texas Instruments Incorporated.

PRODUCT PREVIEW

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC}	–0.5 V to 4.6 V
Input voltage range, V_I (see Note 1)	–0.5 V to 4.6 V
Current into any output in the low state, I_O	80 mA
Input clamp current, I_{IK} ($V_I < 0$)	–50 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > 0$)	±50 mA
Continuous current through V_{CC} or GND pins	±100 mA
Maximum power dissipation at T_A = 55°C (in still air): DGG package	1 W
DL package	1 W
Storage temperature range	–65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

recommended operating conditions

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	3		3.6	V
V_{REF}	Supply voltage	2/3 V_{CC} – 2%	0.8	2/3 V_{CC} + 2%	V
V_I	Input voltage	0		V_{CC}	V
V_{OH}	High-level output voltage			3.6	V
V_{IH}	High-level input voltage	V_{REF} +50 mV			V
V_{IL}	Low-level input voltage			V_{REF} – 50 mV	V
I_{IK}	Input clamp current			–18	mA
I_{OL}	Low-level output current			40	mA
T_A	Operating free-air temperature	0		70	°C

electrical characteristics over recommended operating free-air temperature range, V_{REF} = 0.8 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}		V_{CC} = 3 V,	I_I = –18 mA			–1.2	V
V_{OL}		V_{CC} = 3 V,	I_{OL} = 40 mA			0.4	V
I_I		V_{CC} = 3 V	V_I = V_{CC}			5	µA
			V_I = 0			–5	
I_{OH}		V_{CC} = 3 V,	V_{OH} = 3.6 V				µA
I_{CC}	Outputs high	V_{CC} = 3 V, V_I = V_{CC} or GND	I_O = 0,				mA
	Outputs low						
C_i		Per IEEE1194.0-1991			4		pF
C_o		Per IEEE1194.0-1991			6		pF

† All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

PRODUCT PREVIEW

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Certain applications using semiconductor products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications").

TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.