



Digital Logic Family Selection Matrix (Sorted by Speed)

| Logic Family | Voltage Nodes, V _{CC} | | | | | | Speed t _{pd} max (ns) | Output Current | | Current Into V _{CC} I _{CC} (mA) | Special Features |
|-----------------------|--------------------------------|------|------|------|------|------|-----------------------------------|----------------------|----------------------|--|--------------------------|
| | 1.2V | 1.5V | 1.8V | 2.5V | 3.3V | 5.0V | | I _{OL} (mA) | I _{OH} (mA) | | |
| GTL | | | | | ● | | TBD | 100 | -24 | 50 | BVCC, H, LFBGA, OEC |
| CBT | | | | | | ● | 0.25 | - | - | 0.003 | 1G, BVCC, H, S, D |
| CBTLV | | | | ■ | ● | | 0.25 | - | - | 0.010 | 1G |
| AVC | ■ | ■ | ■ | ● | ■ | | 1.9 | 8 | -8 | 0.040 | 2G, DOC, H, LFBGA |
| ALB | | | | | ● | | 2 | 25 | -25 | 0.800 | |
| ALVT | | | | ■ | ● | | 2.5 | 64 | -32 | 5 | 2, H, A3S |
| ALVC | | | ■ | ■ | ● | | 3 | 24 | -24 | 0.040 | 1G, 2, H, LFBGA, R |
| ABT | | | | | | ● | 3.5 | 64 | -32 | 0.250 | 2, H, JTAG |
| LVT | | | | ■ | ● | | 3.5 | 64 | -32 | 0.190 | 2, H, JTAG, OVT |
| LVC | | | ■ | ■ | ● | | 4 | 24 | -24 | 0.010 | 1G, 2G, 2, H, LFBGA, OVT |
| TVC | ■ | ■ | ■ | ■ | ■ | ■ | 4 | - | - | - | VC |
| SSTL | | | | ■ | ● | | 4.1 | 20 | -20 | 90 | DDR |
| ABTE | | | | | | ● | 5.2 | 90 | -60 | 48 | BVCC |
| HSTL | | | | | ● | | 5.2 | 24 | -24 | 100 | |
| 74F | | | | | | ● | 6 | 64 | -15 | 120 | |
| GTL | | | | | ● | ■ | 6.3 | 100 | -32 | 80 | BVCC, H, OEC |
| AC | | | | | ■ | ● | 6.5 | 24 | -24 | 0.040 | |
| BCT | | | | | | ● | 6.6 | 64 | -15 | 90 | 2, JTAG |
| FB | | | | | | ● | 7 | 100 | -3 | 120 | BVCC |
| AHC | | | | | ■ | ● | 7.5 | 8 | -8 | 0.040 | 1G |
| AS | | | | | | ● | 7.5 | 64 | -15 | 143 | |
| FCT | | | | | | ● | 7.5 | 64 | -15 | 0.500 | |
| AHCT | | | | | | ● | 7.7 | 8 | -8 | 0.040 | 1G, TTL |
| ACT | | | | | | ● | 8 | 24 | -24 | 0.040 | JTAG, OEC, TTL |

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|------------------------|--------------------------------|------|------|------|------|------|-----------------------------------|----------------------|----------------------|--|------------------|
| | 1.2V | 1.5V | 1.8V | 2.5V | 3.3V | 5.0V | | I _{OL} (mA) | I _{OH} (mA) | | |
| S | | | | | | ● | 9 | 64 | -15 | 180 | |
| ALS | | | | | | ● | 10 | 24 | -15 | 58 | |
| LS | | | | | | ● | 12 | 24 | -15 | 95 | |
| LV | | | | | ● | | 14 | 8 | -8 | 0.020 | |
| HC | | | | | | ● | 21 | 6 | -6 | 0.080 | |
| TTL | | | | | | ● | 22 | 16 | -0.4 | 22 | |
| HCT | | | | | | ● | 30 | 6 | -6 | 0.080 | TTL |
| CD4000 | | | | | | ● | 250 | - | 10 | 0.00025 | HV |

Special Features Available within Logic Family:

| | |
|-----------------------|---|
| 2 | Series Damping Resistors |
| 1G | Single Gates |
| 2G | Dual Gates |
| A3S | Auto 3-State |
| BVCC | BIAS VCC available |
| D | Level-Shifting Diode Available |
| DDR | Meets SSTL_2 Class I and Class II for DDR-SDRAM |
| DOC&trade; | Dynamic Output Control Circuitry |
| H | Bus Hold |
| HV | Operates up to 15 V with a maximum of 20 V |
| I2C | I2C Bus Compatible |
| JTAG | IEEE Std. 1149.1 |
| LFBGA | Low-Profile, Fine-Pitch BGA packaging |
| OEC&trade; | Output Edge-Rate Control |
| OVT | Over Voltage Tolerant |
| R | Damping Resistor on Inputs/Outputs |
| S | Schottky Clamping Diode |
| TTL | TTL Compatible Inputs |
| VC | Voltage Clamp - Operation at any VCC |

DEFINITIONS OF LOGIC FAMILIES

| | |
|-----------------------|---|
| GTL | Gunning Transceiver Logic Plus are reduced-voltage-swing devices that are designed for high-speed interface between cards operating at LVTTTL logic levels and backplanes operating at GTLP signal levels. |
| CBT | Crossbar Technology. CBT can address both of these issues in bus-interface applications. CBT enables a bus-interface device to function as a very fast bus switch, effectively isolating buses when the switch is open and offering very little propagation delay when the switch is closed. |
| CBTLV | Low-Voltage Crossbar Technology. TI has developed the SN74CBTLV family of 3.3-V bus switches to complement its existing SN74CBT family of 5-V bus switches |
| AVC | Advanced Very-Low-Voltage CMOS. The industry's first logic family to achieve maximum propagation delays of less than 2 ns at 2.5 V. |
| ALB | Advanced Low-Voltage BiCMOS. The specially designed 3.3-V ALB family uses the latest 0.6- μ m BiCMOS process technology for bus-interface functions. In addition, ALB provides 25-mA drive at 3.3 V with maximum propagation delays of 2.2 ns, making it one of TI's fastest logic families. The inputs have clamping diodes to eliminate overshoot and undershoot. |
| ALVT | Advanced Low-Voltage BiCMOS Technology. ALVT is a 5-V tolerant, 3.3-V and 2.5-V product using the latest 0.6- μ m BiCMOS technology for advanced bus-interface functions. |
| ALVC | Advanced Low-Voltage CMOS. With typical propagation delays of less than 2 ns, current drive of 24 mA, and static power consumption of 40 μ A for bus-interface functions, designers quickly adopted ALVC for high-speed memory applications. |
| ABT | Advanced BiCMOS Technology. The ABT family is TI's second-generation family of BiCMOS bus-interface products. It is manufactured using the latest 0.8- μ m BiCMOS process and provides high drive up to 64 mA and propagation delays below the 5-ns range, while maintaining very low power consumption. |
| LVT | Low-Voltage BiCMOS Technology. LVT is a 5-V tolerant, 3.3-V product using the latest 0.72- μ m BiCMOS technology with performance specifications ideal for workstation, networking, and telecommunications applications. LVT provides superior performance, delivering 3.5-ns propagation delays at 3.3V (24% faster than 5-V ABT), current drive of 64 mA, and pin-for-pin compatibility with existing ABT families. |
| LVC | Low Voltage CMOS Technology. TI's LVC logic products are specially designed for 3-V power supplies. The LVC family is a high-performance version with 0.8- μ m CMOS process technology, 24-mA current drive, and 6.5-ns maximum propagation delays for driver operations. The LVC family includes both bus-interface and gate functions with 50 different functions planned. |
| TVC | Translation Voltage Clamp. Texas Instruments introduces the Translation Voltage Clamp (TVC) family of devices. The products are designed to protect components that are sensitive to high-state voltage-level overshoots. |
| SSTL | Stub Series Terminated Logic. SSTL is the computer industry's leading choice for next-generation technology in high-speed memory subsystems, adopted by a JEDEC (Joint Electronic Device Engineering Committee) standard and endorsed by major memory module, workstation and PC manufacturers. |
| ABTE | Advanced BiCMOS Technology / Enhanced Transceiver Logic. ABTE has wider noise margins and is backward compatible with existing TTL logic. ABTE devices support the VME64-ETL specification with tight tolerances on skew and transition times. ABTE is manufactured using the latest 0.8- μ m BiCMOS process by providing high drive up to 90 mA. Other features include a bias pin and internal pullup resistors on control pins for maximum live-insertion protection. Bus-hold circuitry eliminates external pull-up resistors on the inputs and series-damping resistors on the outputs to damp reflections. |
| HSTL | High Speed Transceiver Logic. One of TI's low-voltage interface solutions is HSTL. HSTL devices accept a minimal differential input swing from 0.65 V to 0.85 V (nominally) with the outputs driving LVTTTL levels. HSTL is ideally suited for driving an address bus to two banks of memory. The HSTL input levels follow the JESD8-6 standard developed through the Joint Electronic Device Engineering Committee (JEDEC). |
| 74F | Fast Logic. 74F logic is a general-purpose family of high-speed advanced bipolar logic. TI provides over 60 functions, including gates, buffers/drivers, bus transceivers, flip-flops, latches, counters, multiplexers, and demultiplexers in the 74F logic family. |
| GTL | Gunning Transceiver Logic. Gunning Transceiver Logic (GTL) are reduced-voltage-swing, high-speed interface devices between cards operating at LVTTTL logic levels and backplanes operating at GTL/GTL+ signal levels. High-speed backplane operation is a direct result of the reduced output swing (<1V), reduced input threshold levels and output edge control. |
| AC | Advanced CMOS Logic. The ACL family of devices is manufactured in 1- μ m CMOS and has more than 70 functions, including gates, flip-flops, drivers, counters, and transceivers. The ACL family is a reliable, low-power logic family with 24-mA output drive. |
| BCT | BiCMOS Technology. BCT is a family of 8-, 9-, and 10-bit drivers, latches, transceivers, and registered transceivers. Designed specifically for bus-interface applications, BCT offers TTL I/O with high speeds, 64-mA output drive, and very low power in the disabled mode. Over 50 BCT functions are in production now. |
| FB | Backplane Transceiver Logic. The FB series devices are used for high-speed bus applications and are fully compatible with the IEEE 1194.1-1991 (BTL) and IEEE 896-1991 (Futurebus+) standards. These transceivers are available in 7-, 8-, 9-, and 18-bit versions with TTL and BTL translation in performance below 5 ns. Other features include drive up to 100 mA and bias pins for live-insertion applications. |

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|-------------------------------|---|
| <u>AHC</u> | The Advanced High-Speed CMOS (AHC/AHCT) Logic Family from Texas Instruments provides an effortless and reliable migration path for High-Speed CMOS (HC/HCT) users by providing enhanced performance, low noise, broad product selection, with superior availability at the same market price as HCMOS. |
| <u>AS</u> | Advanced Schottky Logic. The AS family of high-performance bipolar logic includes over 90 functions that offer high drive capabilities. |
| <u>FCT</u> | Fast CMOS Technology. The FCT (Fast CMOS Technology) product family is designed for high-current-drive, bus-interface applications. TI has acquired these FCT products from Harris and Cypress. These products complement TI's broad spectrum of logic products. |
| <u>AHCT</u> | The Advanced High-Speed CMOS (AHC/AHCT) Logic Family from Texas Instruments provides an effortless and reliable migration path for High-Speed CMOS (HC/HCT) users by providing enhanced performance, low noise, broad product selection, with superior availability at the same market price as HCMOS. |
| <u>ACT</u> | Advanced CMOS Logic The ACL family of devices is manufactured in 1- μ CMOS and has more than 70 functions, including gates, flip-flops, drivers, counters, and transceivers. The ACL family is a reliable, low -power logic family with 24-mA output drive. |
| <u>S</u> | Schottky Logic. With a wide array of functions, Texas Instruments' (TI) S family continues to offer replacement alternatives for mature systems. These classic line of devices were at the cutting edge of performance upon introduction and continue to deliver excellent value for many of today's designs. As the World Leader in Logic Products, TI is committed to being the last major supplier at every price-performance node. |
| <u>ALS</u> | Advanced Low-Power Schottky Logic. The ALS family provides a full spectrum of over 130 bipolar logic functions. This family, combined with the AS family, can be used to optimize systems through performance budgeting. By using AS in speed-critical paths and ALS where speed is less critical, designers can optimize speed and power performance. |
| <u>LS</u> | Low-Power Schottky Logic. With a wide array of functions, Texas Instruments' (TI) LS family continues to offer replacement alternatives for mature systems. These classic line of devices were at the cutting edge of performance upon introduction and continue to deliver excellent value for many of today's designs. |
| <u>LV</u> | Low-Voltage CMOS Technology. TI's entire LV-A (Low -Voltage CMOS Technology) family offers better flexibility in your 3.3-V or 5-V system. The new LV -A devices (LV00A, LV02A, ...) have improved operating characteristics and new features such as 5-V tolerance, faster performance, and partial power down making it a superior migration path from LV, HC, and VHC. |
| <u>HC</u> | High-Speed CMOS Logic. High-speed CMOS (HCMOS) has dominated the logic marketplace over the past decade by delivering low power and low noise at a low price. With over 100 released devices, Texas Instruments (TI™) is committed to being the last supplier of HCMOS. The HC family offers CMOS-compatible inputs and the HCT family offers TTL-compatible inputs. |
| <u>TTL</u> | Transistor-Transistor Logic |
| <u>HCT</u> | High-Speed CMOS Logic. High-speed CMOS (HCMOS) has dominated the logic marketplace over the past decade by delivering low power and low noise at a low price. The HC family offers CMOS-compatible inputs and the HCT family offers TTL-compatible inputs. |
| <u>CD4000</u> | High voltage CMOS devices. A – 12 V Maximum; B – 18 V Maximum; UB – 18 V Maximum, Unbuffered |