



Logic

SELECTION GUIDE

ABT, LVT

CD4K/74C

CROSSVOLT™
ALVC, LCX, LVX, VCX

FACT

FXL Voltage Translators

HC/HCT

TinyLogic®
HS, HST, UHS, ULP, ULP-A

VHC/VHCT

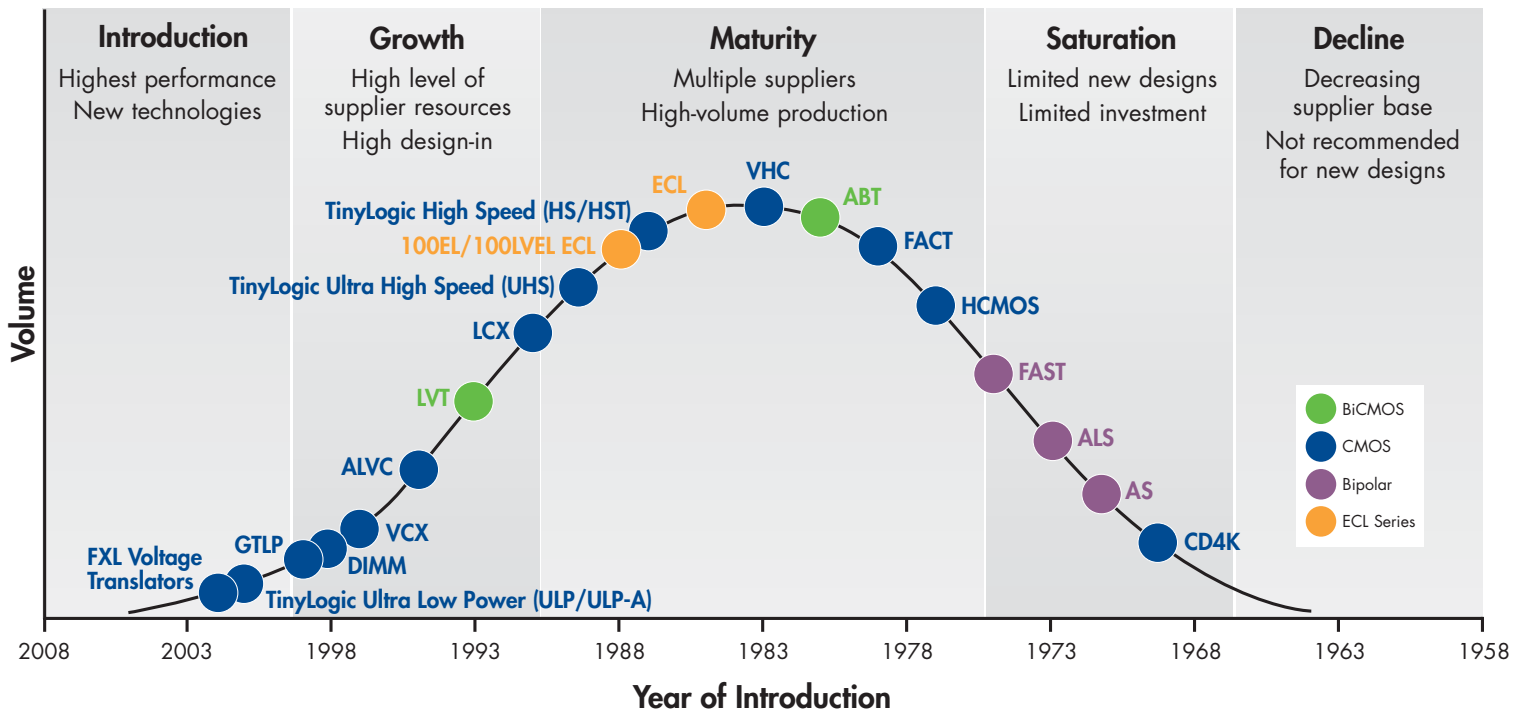
ALS, AS, FAST, FASTr

100EL/LVEL, 300 Series



Fairchild Semiconductor, a long-time, leading global supplier of high performance semiconductors, offers a broad range of logic products to meet your design needs. You will not only find the performance that you want, you will also find the right packaging, whether it is leaded or high density unleaded. For example, our TinyLogic™ family delivers space savings solutions for today's shrinking platforms. In addition, you can be assured that Fairchild offers long-term family support to help extend the life of your designs. With our commitment to providing the best customer support in the industry along with one of the largest portfolio of logic products, Fairchild is the supplier you can rely on now and into the future.

Product Life Cycle



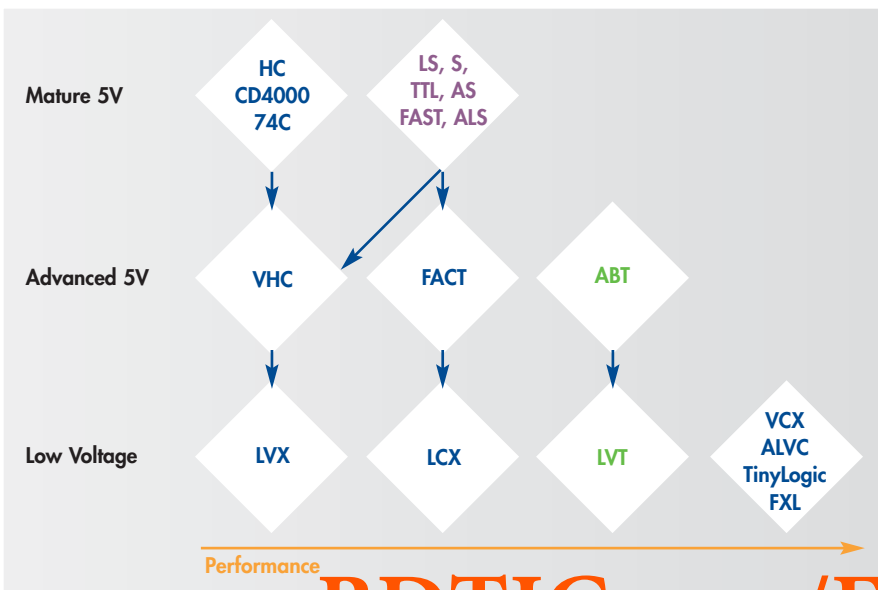
How to Use this Guide

From the quick reference chart, select the attribute that is most important to you—switching speed, power minimization, drive capability, noise immunity, etc.—and note the family. Then consider other criteria to fine-tune your selection.

Quick Reference Chart

Process Technology	High Speed	Low Noise	Low Static Power	High Drive	Low Voltage	Board Space	Voltage Translation
BiCMOS 5V							
	ABT			ABT			
BiCMOS 3V							
	LVT			LVT	LVT		
CMOS 5V							
	FACT	FACT QS	FACT			TinyLogic HS/HST	LVX
	TinyLogic UHS	HC/HCT	FACT QS				
		TinyLogic HS/HST	HC/HCT				
		VHC/VHCT	TinyLogic HS/HST/UHS				
			VHC/VHCT				
CMOS 1.2V-3V							
	LCX	LVX	LCX		ALVC	LCX DQFN	FXL
	TinyLogic UHS	TinyLogic HS	LVX		LCX	TinyLogic UHS/ULP/ULPA	VCX
	TinyLogic ULPA	TinyLogic ULP	VCX		LVX	VCX DQFN	
	VCX		TinyLogic HS/UHS		TinyLogic ULP		
			TinyLogic ULP		VCX		
Bipolar							
	FASTr	ALS		FASTr			
		FAST					
ECL							
	100 EL/LEVEL Series ECL						
	300 Series ECL						

Logic Migration and Low Voltage Transition



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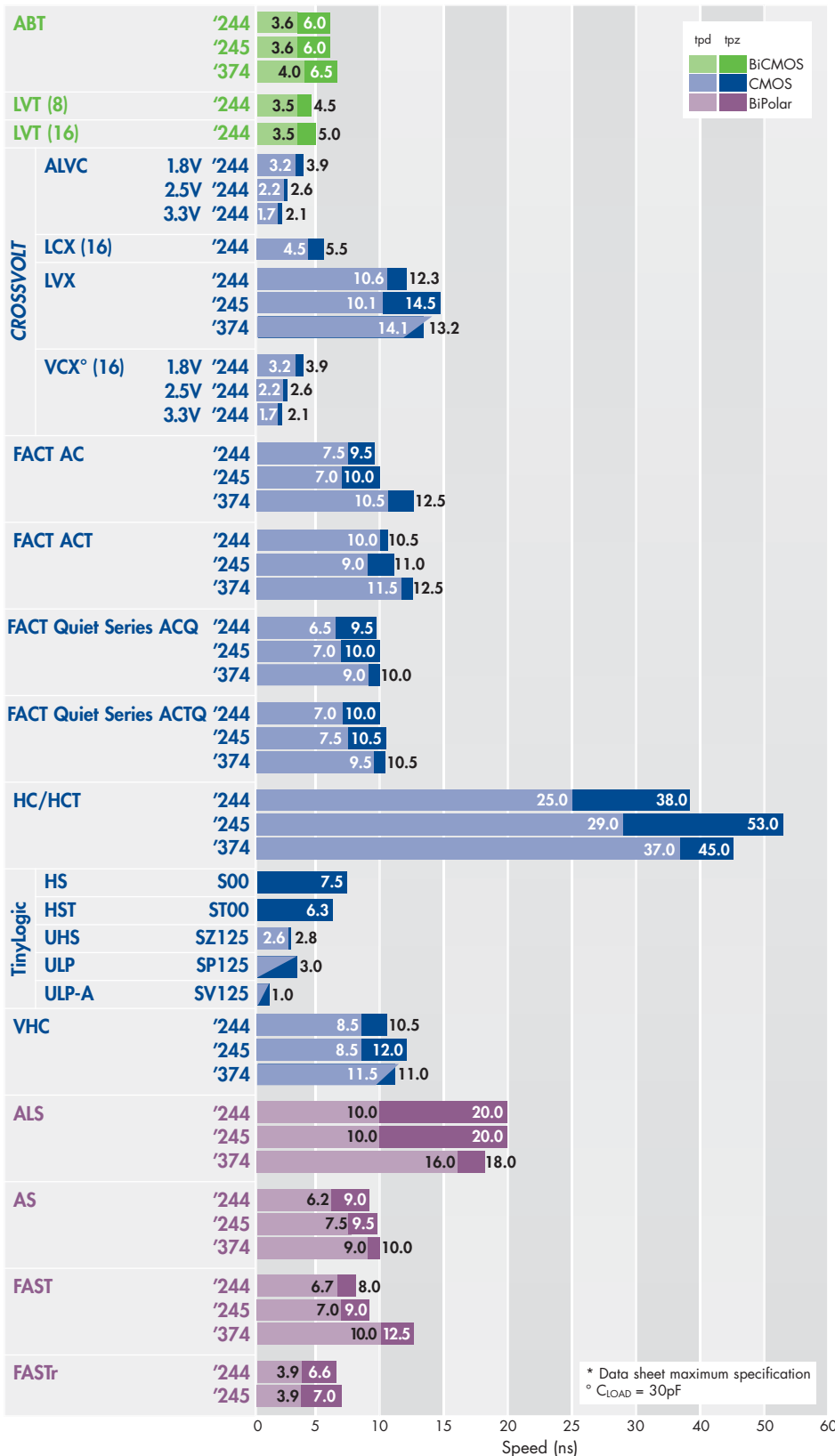
Product Portfolio and Description Chart

	Buffers/Line Drivers	Transceivers	Registers/Flip-Flops	Latches	Counters	Multiplexers	Comparators	Parity Generator/Checker	Decoders/Demultiplexers	FIFOs/Arithmetic Functions	Gates	Video Support	Voltage Translators	25Ω Series Resistor Options	Boundary Scan (IEEE 1149.1)	16- 18- 32-bit Functions	8- 10- 12-bit Functions	1- and 2-bit Functions		
BiCMOS																				
ABT	●	●	●				●						●	●	●	●	●	●	●	<ul style="list-style-type: none"> High-speed, high-drive and low-noise for superior system performance
LVT	●	●	●	●									●	●						<ul style="list-style-type: none"> High-speed, high-drive logic for 3.3V applications
CMOS																				
CD4K	●	●	●	●	●			●												<ul style="list-style-type: none"> Standard high-voltage CMOS products for high-noise environments
CROSSVOLT™	ALVC	●	●	●	●								●							<ul style="list-style-type: none"> Alternative to VCX
	LCX	●	●	●	●	●			●				●							<ul style="list-style-type: none"> 5V-tolerant inputs and outputs Ideal for 3.3V applications requiring balanced drive capability, high-speed, and low-noise
	LVX	●	●	●	●	●			●				●							<ul style="list-style-type: none"> 5V input tolerance allows 5V CMOS to interface with 3.3V systems. Includes specialized, dual-voltage translators and bus switch devices.
	VCX	●	●	●	●					●				●						<ul style="list-style-type: none"> High-speed CMOS enables interoperability between 3.3V and 2.5V systems, with 3.6V-tolerant inputs and outputs
FACT™ AC/ACT	●	●	●	●	●	●	●	●	●	●	●									<ul style="list-style-type: none"> General-purpose/broad-portfolio ACMOS family
FACT Quiet Series™ ACQ/ACTQ	●	●	●	●				●							●	●	●			<ul style="list-style-type: none"> Family extension specifically designed for noise-sensitive applications. Proprietary circuitry guarantees low EMI and low device-generated noise.
FXL Voltage Translators	●	●											●		●					<ul style="list-style-type: none"> Dual supply voltage translation from 1.2V to 3.6V Bi-directional, configurable bi-directional, or uni-directional data direction
HC/HCT	●	●	●	●	●	●			●											<ul style="list-style-type: none"> Low CMOS device-generated noise and EMI available in the moderate-speed performance range Not recommended for new designs
TinyLogic®	HS	●	●			●							●							<ul style="list-style-type: none"> General-purpose single-, dual- and triple-gate logic
	HST												●							<ul style="list-style-type: none"> TTL-compatible single-, dual- and triple-gate logic
	UHS	●	●	●	●	●							●							<ul style="list-style-type: none"> High-performance single- and dual-gate logic with 5V over-voltage tolerance on inputs and outputs
	ULP/ULP-A	●	●	●	●	●														<ul style="list-style-type: none"> Ultra-low power/voltage single-, dual- and triple-gate logic
VHC/VHCT	●	●	●	●	●			●				●								<ul style="list-style-type: none"> The natural migration for HCMOS users who need more speed for their low-power, low-noise, low-drive applications Offered in fine-pitch packages
74C	●	●	●	●	●			●												<ul style="list-style-type: none"> Application-specific, high-voltage CMOS products for high-noise environments
Bipolar																				
ALS	●	●	●	●	●	●	●	●	●	●	●									<ul style="list-style-type: none"> Low-output noise and low power consumption for an advanced TTL logic family
AS	●	●	●	●	●	●	●	●	●	●	●									<ul style="list-style-type: none"> A high-speed, high-drive TTL family Not recommended for new designs
FAST®	●	●	●	●	●	●	●	●	●	●	●			●						<ul style="list-style-type: none"> Optimal speed-to-power portfolio of Advanced Schottky TTL families
FAST™	●	●	●	●										●						<ul style="list-style-type: none"> Fast TTL logic available A speed-improved, design-enhanced version of FAST
ECL																				
F100K Series	●	●	●	●	●	●	●	●	●	●	●	●								<ul style="list-style-type: none"> ECL with low power and excellent price/performance Socket replacement of F100K 100 Series
100EL/LEVEL Series	●	●											●							<ul style="list-style-type: none"> 1.0GHz to 2.0 GHz Specified as EclINPS™* replacement

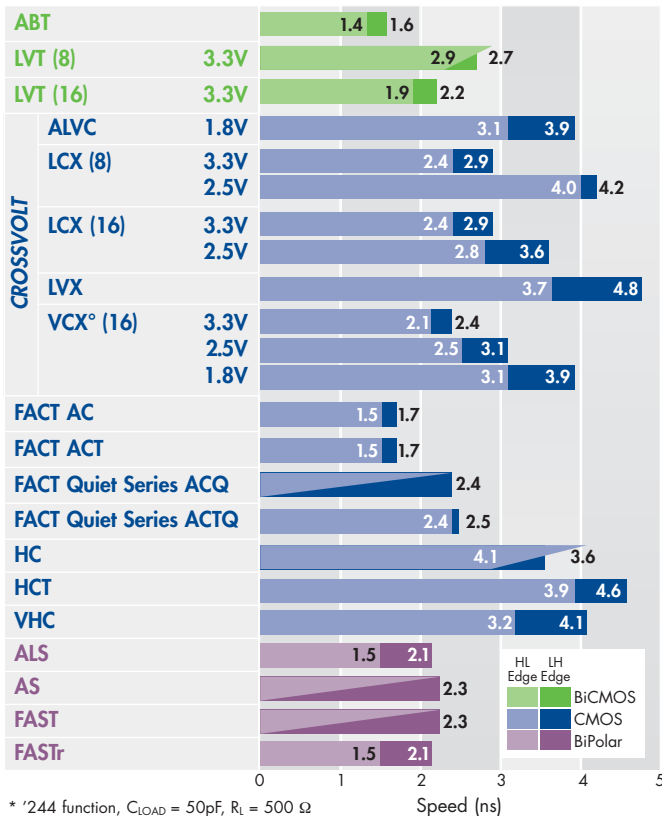
* Trademark of ON Semiconductor

** See TinyLogic HS, UHS and ULP-A for 1- and 2-bit families with similar performance to AVLC, LCX, VCX, HC, and VHC.

Propagation Delay*



Output Rise and Fall Time*



Dynamic Current Consumption* (mA)

	1MHz	10MHz	35MHz	70MHz	90MHz
BiCMOS					
ABT	19.7	43.8	115.9	266.0	303.3
LVT (8)	11.0	29.3	75.8	133.4	170.2
LVT (16)	12.5	90.1	246.2	494.3	580.1
CMOS					
ALVC	9.9	61.9	146.8	253.7	312.7
LCX (8)	2.2	20.9	64.8	146.6	163.1
LCX (16)	6.7	61.9	160.0	294.4	375.1
LVX	2.0	19.4	64.0	100.1	106.3
Vcx (16)	9.9	61.9	146.8	253.7	312.7
FACT AC	3.9	38.9	105.5	352.8	404.2
FACT Quiet Series ACQ	5.4	52.3	139.5	206.0	218.5
HC	3.8	37.9	132.0	181.5	—
VHC	3.1	30.8	103.0	180.7	192.1
Bipolar					
ALS	14.1	41.0	126.7	240.2	393.8
FAST	42.9	69.4	136.6	221.1	246.8
FASTr	38.6	58.0	94.5	198.2	232.4

* '244 function, multiple outputs switching @ 50pF, C_{LOAD}.
All figures represent typical performance values.

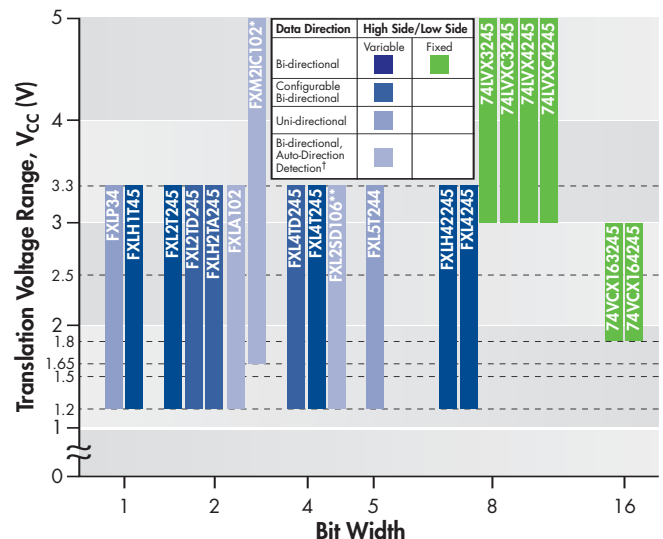
Noise*

	V _{OLP} (V)	V _{OLV} (V)
BiCMOS		
ABT	0.6	-1.0
LVT/LVTH	3.3V	0.8
CMOS		
LCX (8)	2.5V	0.5
LCX (8)	3.3V	0.7
LCX (16)	2.5V	0.3
LCX (16)	3.3V	0.4
LVX		0.3
Vcx° (16)	1.8V	0.2
Vcx° (16)	2.5V	0.6
Vcx° (16)	3.3V	0.8
FACT AC	1.6	-1.5
FACT ACT	1.6	-1.6
FACT Quiet Series ACQ	0.9	-0.6
FACT Quiet Series ACTQ	0.9	-0.5
HC	0.5	-0.3
HCT	0.5	-0.3
TinyLogic ULP	1.8V	**
VHC	0.6	-0.6
VHCT	0.7	-0.7
Bipolar		
ALS	0.2	-0.5
AS	0.8	-1.4
FAST	0.6	-0.3
FASTr	0.8	-0.8

Note: R values are typical at 4.5 Volts

* '244 function, C_{LOAD} = 50pF, R_L = 500Ω, seven outputs switching, minimum input skew, typical values
** No overshoot/undershoot ringing evident for oscilloscope measurements
° C_{LOAD} = 30pF

Voltage Translation



Family Specification Comparison*

	Specified Power Supply** (Nominal V _{CC}) (V)	Compatibility Input† (V _{IL} /V _{IH})	Output†† (V _{OL} /V _{OH})	Input Current† (I _{IL} /I _{IH})	Drive†† (I _{OL} /I _{OH})	Supply Current† (I _{CC})	Speed† (t _{PD}) (ns)
BiCMOS							
ABT	5	TTL	TTL	-5μA/5μA	-32mA/64mA	30mA	3.6
LVT (8)	3.3	TTL,CMOS	TTL,CMOS	-5μA/1μA	-32mA/64mA	5mA	3.5
LVT (16)	3.3	TTL,CMOS	TTL,CMOS	-5μA/1μA	-32mA/64mA	5mA	3.5
CMOS							
CD4K[∞]	3-15	CMOS	TTL, CMOS	10pA	-1.25mA/8mA	3μA	40.0
ALVC	1.8/2.5/3.3	TTL,CMOS	TTL,CMOS	-5μA/5μA	-24μA/24μA	20μA	3.0
CROSSVOLT LCX (8)	2.5/3.3	TTL,CMOS	TTL,CMOS	-5μA/5μA	-24mA/24mA	10μA	6.5
LCX (16)	2.5/3.3	TTL,CMOS	TTL,CMOS	-5μA/5μA	-24mA/24mA	20μA	4.5
LVX (8)	3.3	TTL,CMOS	TTL,CMOS	-1μA/1μA	-4mA/4mA	40μA	12.0
VCX^{∞∞}	1.2/1.5/1.8/2.5/3.3	TTL,CMOS	TTL,CMOS	-5μA/5μA	-24mA/24mA	20μA	2.5/3.2
FACT AC	3.3/5	CMOS	TTL,CMOS	-1μA/1μA	-24mA/24mA	80μA	7.5
FACT ACT	5	TTL,CMOS	TTL,CMOS	-1μA/1μA	-24mA/24mA	80μA	10.0
FACT Quiet Series ACQ	3.3/5	CMOS	TTL,CMOS	-1μA/1μA	-24mA/24mA	80μA	6.5
FACT Quiet Series ACTQ	5	TTL,CMOS	TTL,CMOS	-1μA/1μA	-24mA/24mA	80μA	7.0
HC	2/4.5/6	CMOS	TTL,CMOS	-1μA/1μA	-6mA/6mA	80μA	25.0
HCT	5	TTL, CMOS	TTL, CMOS	-1μA/1μA	-6mA/6mA	80μA	25.0
TinyLogic HS[∞]	2.0/3.0/4.5/6 ^{∞∞}	CMOS	TTL, CMOS	-1μA/1μA	-2.6mA/2.6mA	10μA	21.0
HST[∞]	4.5/5/5.5	TTL, CMOS	TTL, CMOS	-1μA/1μA	-2.0mA/2.0mA	10μA	30.0
UHS[∞]	1.65/2.5/3.3/5	CMOS	TTL, CMOS	-10μA/10μA	-32mA/32mA	20μA	4.5
ULP[∞]	0.9/1.2/1.5/1.8/2.5/3.3	CMOS	TTL, CMOS	-1μA/1μA	-2.6μA/2.6μA	5μA	7.0
ULP-A[∞]	0.9/1.2/1.5/1.8/2.5/3.3	CMOS	TTL, CMOS	-1μA/1μA	-24μA/24μA	5μA	3.0
VHC	3.3/5	CMOS	TTL,CMOS	-1μA/1μA	-8mA/8mA	40μA	8.5
VHCT	5	TTL,CMOS	TTL,CMOS	-1μA/1μA	-8mA/8mA	40μA	9.5
74C	3-15	CMOS	TTL, CMOS	-1μA/1μA	-14mA/12mA	300μA	70.0
Bipolar							
AS	5	TTL	TTL	-1.0mA/20μA	-15mA/64mA	90mA	6.2
ALS	5	TTL	TTL	-0.1mA/20μA	-15mA/24mA	27mA	10.0
FAST	5	TTL	TTL	-150μA/5μA	-15mA/64mA	75mA	3.9
FASTr	5	TTL	TTL	-1.6mA/5μA	-15mA/64mA	90mA	6.5
LS	5	TTL	TTL	-200μA/20μA	-15mA/24mA	54mA	18.0
S	5	TTL	TTL	-200μA/20μA	-15mA/64mA	120μA	9.0
TTL[∞]	5	TTL	TTL	-1.6μA/40μA	-250mA/40mA	41mA	30.0
ECL							
100 EVL	-5.5 to -4.2	ECL	ECL	0.5μA/150μA	-1.8 into 50Ω	-36mA	0.385
100 LEVEL	-3.0 to -3.8	ECL	ECL	0.5μA/150μA	-1.8 into 50Ω	-30mA	0.435
300 Series	-5.7 to -4.2	ECL	ECL	0.5μA/240μA	-1.8 into 50Ω	-65mA	1.55

* '244 function used unless otherwise noted

** except for ECL and HC

‡ input levels recognized by the device

‡‡ input levels the device is capable of driving

† maximum specification at maximum specified V_{CC}

†† at maximum specified V_{CC}

∞ 7407 used for specifications

∞∞ CD4010 used for specifications

∞ NAND Gate (00) function for data

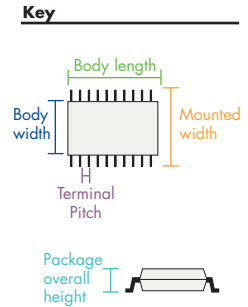
∞∞∞ C_{LOAD} = 30pF

Package Availability

	MicroPak	SOT23, SC70 (5/6 pin) and US8	SSOP (48/56 pin)	TSSOP Type 1	TSSOP (48/56 pin)	SSOP Type II (20/24 pin)	QSOP (20/24 pin)	SOIC EIAJ	SOIC JEDEC	PDiP	BGA	DQFN	MLP
BiCMOS													
ABT			•	•	•	•		•	•	•			
LVT		•	•	•	•	•		•	•		•		
CMOS													
CD4K/74C				•					•	•			
CROSSVOLT	ALVC		•	•	•				•		•		
	LCX			•	•	•		•	•		•	•	
	L VX			•	•			•	•				
	V CX			•	•	•			•		•	•	
FACT				•		•		•	•	•			
FACT QS			•	•		•	•	•	•	•			
Voltage Translators	•	•			•							•	•
HC/HCT				•				•	•	•			
TinyLogic	HS/HST	•	•										
	UHS	•	•										
	ULP/ULP-A	•											
VHC/VHCT				•	•		•	•	•				
Bipolar													
ALS						•		•	•				
AS								•	•	•			
FAST						•		•	•	•			
FASTr			•			•		•	•	•			
LS/S								•	•	•			
TTL									•	•			
ECL													
100EL/LEVEL									•	•			
300 Series									•	•			

Packaging

	Terminal Count	Package (Code)	Mounted Width (mm/in)	Body Width (mm/in)	Body Length (mm/in)	Overall Height (mm/in)	Terminal Pitch (mm/in)	Mounted Area (mm/in)
	5	SOT23 (M5)	2.84/0.112	1.60/0.063	2.92/0.115	1.1/0.043	0.95/0.037	8.29/0.012
	5/6	SC70 (P5) (P6)	2.10/0.083	1.25/0.049	2.0/0.079	0.90/0.03	0.65/0.026	4.20/0.007
	6	MicroPak (L6)	1.0/0.039	1.0/0.039	1.45/0.057	0.55/0.021	0.50/0.020	1.45/0.002
	8	US8 (K8)	3.10/0.122	2.30/0.09	2.0/0.079	0.70/0.027	0.50/0.020	6.20/0.009
	8	MicroPak (L8)	1.60/0.062	1.60/0.062	1.60/0.062	0.55/0.021	0.50/0.020	2.56/0.003
	10	MicroPak (L10)	1.60/0.062	1.60/0.062	2.10/0.083	0.55/0.021	0.50/0.020	3.36/0.005
	14	SOIC (M)	6.0/0.231	3.85/0.153	8.60/0.340	1.50/0.061	1.27/0.050	51.60/0.078
	14	TSSOP (MTC)	6.40/0.252	4.40/0.173	5.0/0.197	1.20/0.047	0.65/0.026	32.0/0.050
	14	DQFN (BQ)	2.5/0.098	2.5/0.098	3.0/0.118	0.80/0.031	0.50/0.020	7.50/0.011
	16	SOIC (M)	6.0/0.231	3.85/0.153	9.90/0.390	1.50/0.061	1.27/0.050	59.40/0.090
	16	TSSOP (MTC)	6.40/0.252	4.40/0.173	5.0/0.197	1.10/0.043	0.65/0.026	32.0/0.050
	16	QSOP (QSC)	5.99/0.236	1.35/0.053	4.90/0.193	1.60/0.063	0.63/0.025	29.35/0.045
	16	DQFN (BQ)	2.50/0.098	2.50/0.098	3.0/0.118	0.80/0.031	0.50/0.020	8.75/0.013
	20	SOIC JEDEC (WM)	10.36/0.408	7.49/0.295	12.80/0.504	2.64/0.104	1.27/0.050	132.70/0.206
	20	TSSOP Type I (MTC)	6.40/0.252	4.39/0.173	6.60/0.260	1.10/0.104	0.65/0.025	132.70/0.206
	20	SSOP Type II (MSA)	7.80/0.307	5.31/0.209	7.19/0.283	2.05/0.081	.065/0.025	56.08/0.087
	20	QSOP (QSC)	5.99/0.236	3.94/0.155	8.69/0.342	1.60/0.063	0.64/0.025	52.05/0.087
	20	DQFN (BQ)	2.5/0.098	2.5/0.098	4.50/0.177	0.80/0.063	0.50/0.020	11.25/0.017
	24	SOIC (WM)	10.30/0.40	7.50/0.295	15.40/0.60	2.50/0.098	1.27/0.050	158.62/0.240
	24	QSOP (QSC)	5.99/0.236	3.89/0.153	8.66/0.341	1.45/0.057	0.63/0.025	51.87/0.080
	24	TSSOP (MTC)	6.40/0.252	4.40/0.173	7.80/0.307	1.10/0.043	0.65/0.026	49.92/0.077
	24	MLP (MP)	3.50/0.138	3.50/0.138	4.50/0.177	0.80/0.063	0.50/0.020	15.75/0.621
	48	TSSOP (MTD)	8.10/0.319	6.10/0.240	12.50/0.492	1.10/0.043	0.50/0.020	101.25/0.157
	54	BGA54 (G)	8.0/0.315	8.0/0.315	5.50/0.217	1.40/0.055	0.80/0.031	44.0/0.683
	56	TSSOP (MTD)	8.10/0.319	6.10/0.240	14.0/0.551	1.10/0.043	0.50 (.020)	113.0/0.175
	96	BGA96 (G)	5.50/0.216	5.50/0.216	13.50/0.531	1.40/0.055	0.80/0.031	74.25/0.115
	114	BGA114 (G)	5.50/0.216	5.50/0.216	16.0/0.630	1.40/0.055	0.80/0.031	88.0/0.136



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POWER MANAGEMENT ICs

AC-DC: Power Factor Correction

- Continuous Conduction Mode (CCM) PFC Controllers
- Critical (CrCM) / Boundary Conduction Mode (BCM) PFC Controllers
- PFC + PWM Combination (Combo) Controllers

Isolated DC-DC

- Green-Mode PWM Controllers
- Integrated Green-Mode PWM Regulators (Green FPS™)
- Integrated PWM Regulators (FPS™)
- Primary-side only CV/CC Controllers
- Standard SMPS PWM Controllers

Non-Isolated DC-DC

- Charge-Pump Converters
- Multi-phase Controllers
- Step-down Controllers (External Switch)
- Step-down Regulators (Integrated Switch)
- Step-up Regulators (Integrated Switch)

Power Drivers

- High Voltage Gate Drivers (HVIC)
- Low-Side Gate Drivers
- Synchronous Rectifier Controllers / Drivers
- Synchronous-Buck / Multi-phase Drivers

Supervisory / Monitor ICs

- Ground Fault Interrupt (GFI) Controllers
- Supervisors + PWM
- Temperature Sensors
- Voltage Supervisors / Detectors / Stabilizers

Voltage Regulators

- LDOs
- Positive Voltage Linear Regulators
- Negative Voltage Linear Regulators
- Shunt Regulators

POWER SEMICONDUCTORS

Diodes & Rectifiers

- Bridge Rectifiers
- Rectifiers
- Schottky Diodes & Rectifiers
- Small Signal Diodes
- Transient Voltage Suppressors
- Zener Diodes

Integrated Power Solutions

- DrMOS FET plus Driver Multi-chip Module
- IGBT Module
- Full Function Load Switches (IntelliMAX™)
- MOSFET/Schottky Combos
- Smart Power Modules (SPM®)
- Smart Switches

Transistors

- BJTs
- IGBT Discrete
- JFETs
- Load Switches
- MOSFETs
- MOSFET/Schottky Combos
- Small Signal Transistors

TRIACs

- TRIACs

LIGHTING AND DISPLAY

- CCFL Ballast IC
- CFL/Lighting Ballast Control IC
- Critical (CrCM)/Boundary Conduction Mode (BCM) PFC Controllers for Lighting
- High Voltage Gate Drivers (HVIC)
- LED Drivers
- PDP Smart Power Module (PDP-SPM™)

SIGNAL PATH ICs

Amplifiers & Comparators

- Audio Amplifiers
- Comparators
- Current Sense Amplifier
- High Performance Amplifiers (>15MHz)
- Operational Amplifiers

Signal Conversion

- Triple Video DACs
- Video Filter Drivers
- Video Switch Matrix/Multiplexers

Interface

- LVDS
- Serializer/Deserializer (µSerDes™)
- USB Transceiver

Switches

- Analog/Audio Switches
- Bus Switches
- USB Switches
- Video Switches

LOGIC | TINYLOGIC®

- Buffers, Drivers, Transceivers
- Flip flops, Latches, Registers
- Gates
- MSI Functions
- Multiplexer/Demultiplexer Encoders/Decoders
- Specialty Logic
- TinyLogic®
- Voltage Level Translators

OPTOELECTRONICS

- Infrared Products
- Optocouplers

For datasheets, application notes, samples and more, please visit: www.fairchildsemi.com