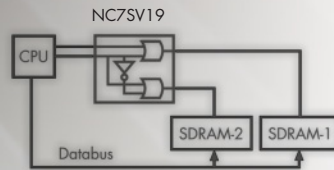
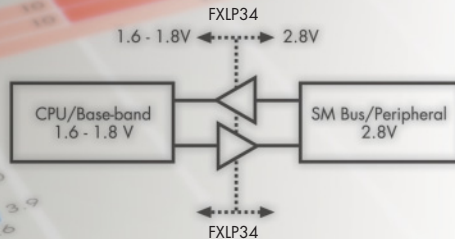
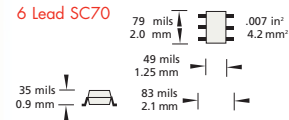


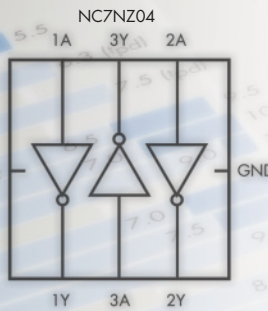
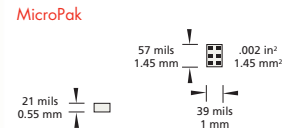
# Logic Selection Guide



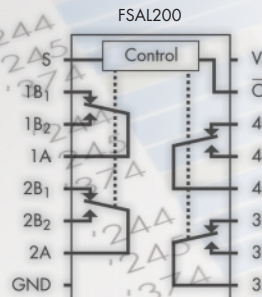
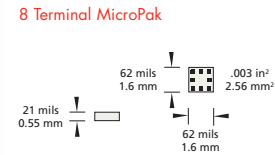
Decoder/Demultiplexer combines high speed at low voltages in MicroPak™ and SC70



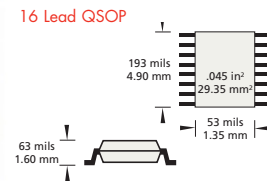
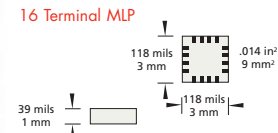
FXL Series Translators for 1.0V-3.6V Logic Levels in MicroPak and SC70



Triple-Bit Logic in MicroPak 8 and US8



Quad Analog SPDT Switches



Across the board. Around the world.™

**FAIRCHILD**  
SEMICONDUCTOR®

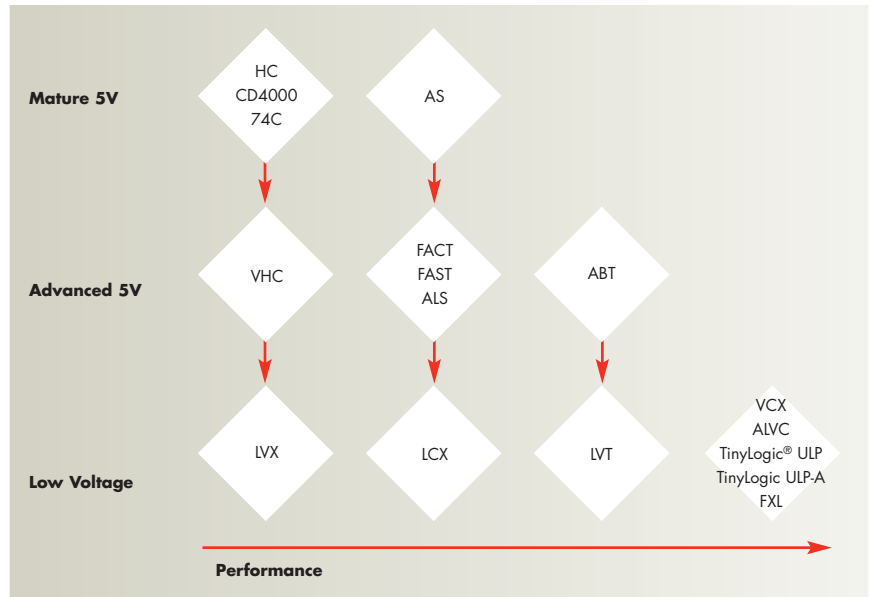
Optoelectronics  
Interface & Logic  
Discrete  
Analog

# Logic Selection Guide

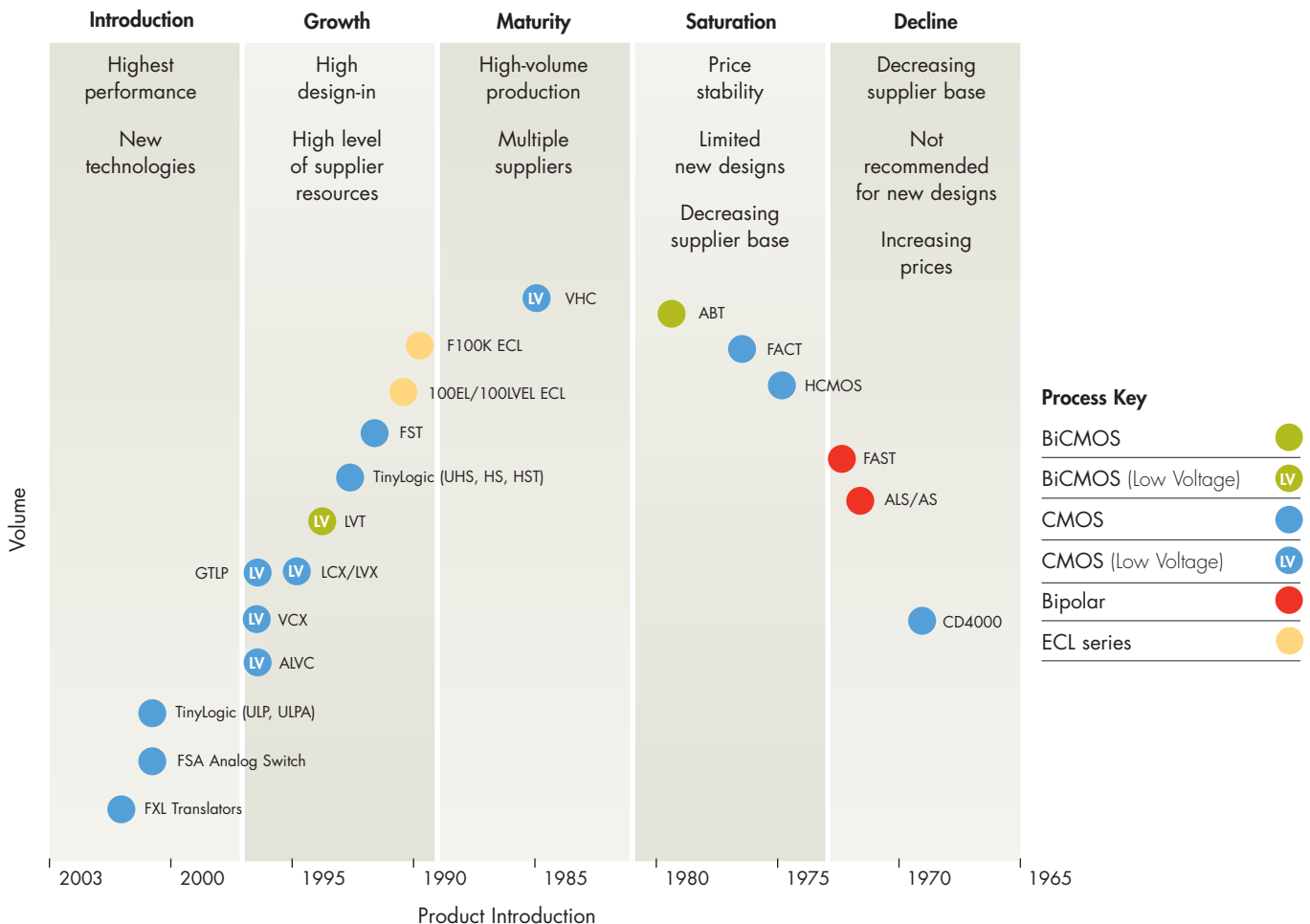
## How to use this guide

The data on this page (page 2) give an historic overview of Fairchild's available logic families. The Quick Reference Attributes charts on page 3 may be a good first step if a particular type performance needs emphasis. The Family Specifications Comparison chart on page 4 lists general performance by operating voltage. Propagation Delay and Power Consumption are then further detailed in charts on page 5. The Product Portfolio and Description chart on page 6 summarizes the functions that are available within each of the logic families. The packaging table (page 7) provides dimensions for all packages, and their availability by logic family.

## Logic Migration and Low-Voltage Transition



## Product Life Cycle



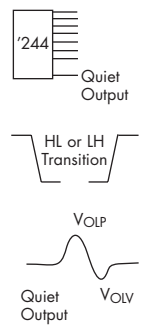
## Quick Reference Attributes for Logic

Process Tech.	High Speed	Low Noise	Low-Static Power	High Drive	Low Voltage	Board Space	Analog Signal Video Signal	Logic Level Translation
<b>BiCMOS 5V</b>	ABT			ABT				
<b>BiCMOS 3V</b>	LVT			LVT	LVT			
<b>CMOS 5V</b>	TinyLogic UHS	TinyLogic HS/HST	TinyLogic HS/HST			TinyLogic HS/HST		
			UHS					
		FACT QS	FACT					
	FACT	HC/HCT	FACT QS					
	FS	VHC/VHCT	HC/HCT					
		FST (Fairchild Switch)	VHC/VHCT					
		GTL		GTL		FXL Translators	FSA (Analog Switch)	FST (Fairchild Switch)
<b>CMOS LV</b>	VCX	LVX	LCX		LCX	TinyLogic UHS		FXL Translators
	LCX	TinyLogic HS	LVX		LVX			VCX Translators
	TinyLogic UHS		VCX		VCX			FXLP Translators
	TinyLogic ULP-A	TinyLogic ULP	TinyLogic HS/UHS		ALVC			
			TinyLogic ULP		TinyLogic ULP	TinyLogic ULP		
	GTL	GTL	TinyLogic ULP-A	GTL	TinyLogic ULP-A	TinyLogic ULP-A		
<b>Bipolar</b>	FASTr	ALS		FASTr				
		FAST						
<b>ECL</b>	F100K ECL							
	100 EL / LVEL Series ECL							

## Noise\*

	VOLP (V)	VOV (V)		
<b>BiCMOS</b>				
ABT	0.6	-1.0		
LVT/LVTH	3.3V	0.8		
<b>CMOS</b>				
ULP	1.8V	**		
<b>CROSSVOLT™</b>	VCX* (16)	1.8V	0.2	-0.2
		2.5V	0.6	-0.6
		3.3V	0.8	-0.8
	LCX (16)	2.5V	0.3	-0.3
		3.3V	0.4	-0.5
	LCX (8)	2.5V	0.5	-0.5
		3.3V	0.7	-0.7
	LVX		0.3	-0.2
	AC	1.6	-1.5	
	ACQ	0.9	-0.6	
ACT	1.6	-1.6		
ACTQ	0.9	-0.5		
VHC	0.6	-0.6		
VHCT	0.7	-0.7		
HC	0.5	-0.3		
HCT	0.5	-0.3		
<b>Bipolar</b>				
FASTr	0.8	-0.8		
FAST	0.6	-0.3		
AS	0.8	-1.4		
ALS	0.2	-0.5		

### Notes



\* '244' function, C<sub>LOAD</sub> = 50pF, R<sub>L</sub> = 500 Ω, seven outputs switching, minimum input skew, typical values

\*\* No overshoot/undershoot ringing evident for oscilloscope measurements

° C<sub>LOAD</sub> = 30pF

‡ 16612 function

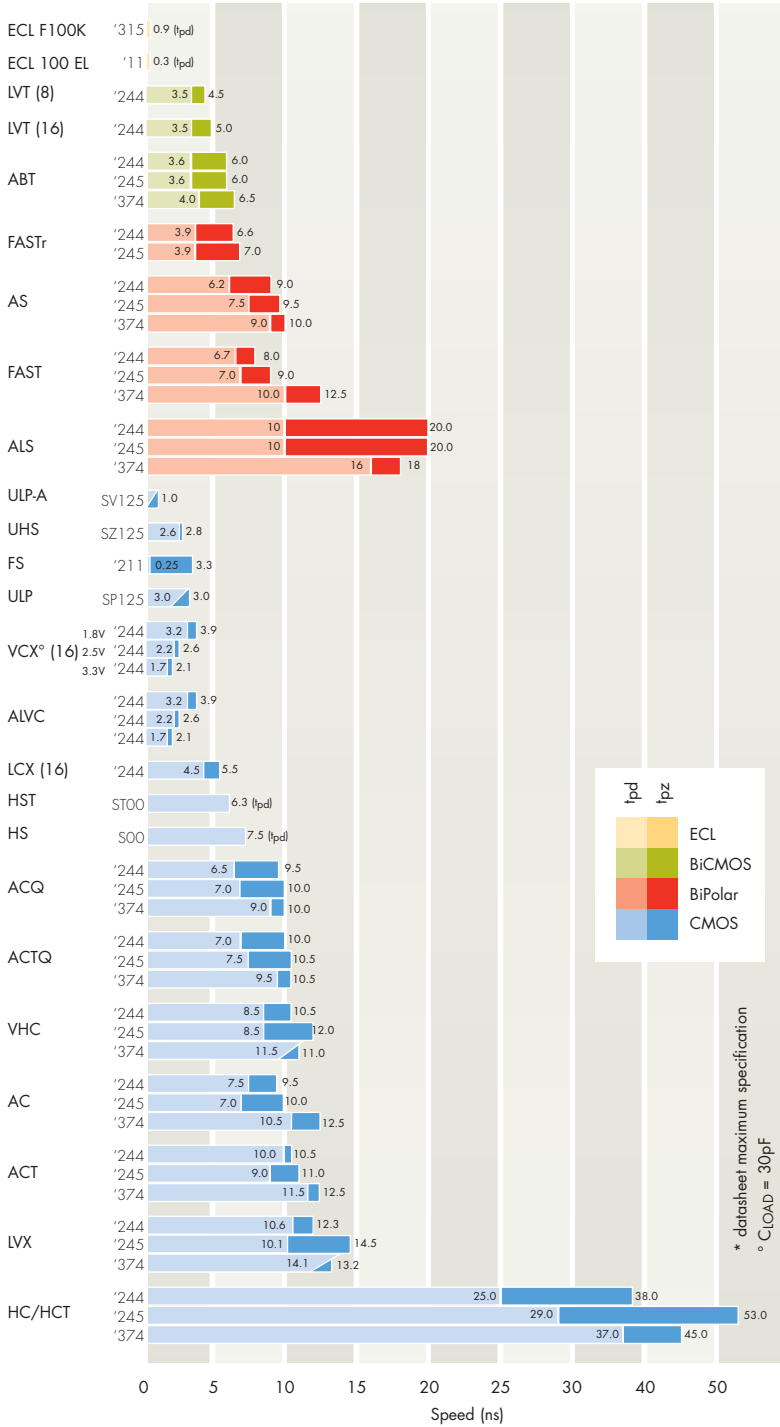
## Quick Reference Attributes for Analog Switches

Part	Configuration	R <sub>ON</sub> (Ω)	Supply Voltage (V <sub>CC</sub> )	R <sub>ON</sub> (Ω) Flatness	Bandwidth (MHz)	THD	Packages
FSA66	SPST	5.0	1.65V - 5.5V	6.0	250	0.011%	SC70, MicroPak, SOT23
FSAT66	SPST	7.0	1.65V - 5.5V	6.0	250	0.011%	SC70, MicroPak, SOT23
FSA3157	SPDT	5.0	1.65V - 5.5V	6.0	250	0.011%	SC70, MicroPak
FSA4157	SPDT	1.0	1.65V - 5.5V	0.2	350	0.003%	SC70, MicroPak
FSA266	Dual SPST	7.0	1.65V - 5.5V	6.0	300	0.016%	US8, MicroPak
FSAU3157	SPDT	5.0	1.65V - 5.5V	6.0	250	0.011%	SC70, MicroPak
FSA4684A	Dual SPDT	1.0	1.65V - 5.5V	0.2	350	0.003%	MicroPak
FSAV330	Quad SPDT Video Switch	7.0	4.0V - 5.5V		300		TSSOP, QSOP, SOIC
FSAL200	Quad 2:1 Mux/Demux (SPDT) LAN Switch	6.0	3.0V - 5.5V	3.0	300		QSOP, MLP
FSA3357	SP3T	6.0	1.65V - 5.5V	5.0	250	0.010%	US8, MicroPak
74VHC4051	8 Channel Mux	30.0	2.0V - 6.0V	N/A	35	0.008%	TSSOP, SOIC, PDIP
74VHC4052	Dual 4 Channel Mux	30.0	2.0V - 6.0V	N/A	35	0.008%	TSSOP, SOIC, PDIP
74VHC4051	Triple 2 Channel Mux	30.0	2.0V - 6.0V	N/A	35	0.008%	TSSOP, SOIC, PDIP
74VHC4066	Quad SPST	30.0	2.0V - 12.0V	N/A	100	0.008%	TSSOP, SOIC, PDIP

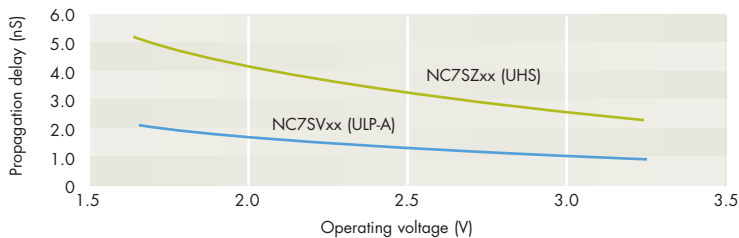
## Family Specification Comparison\*

	Technology	Specified Power Supply**	Speed †	Drive ††	Supply Current †	Notes
		Nominal V <sub>CC</sub>	t <sub>PD</sub>	I <sub>OL</sub> / I <sub>OH</sub>	I <sub>CC</sub>	
<b>Sub 3 Volt</b>						
TinyLogic® ULP ∅∅	CMOS	0.9 / 1.2 / 1.5 / 1.8 / 2.5 / 3.3V	7ns	-2.6µA / 2.6µA	5µA	* *244 function used unless otherwise noted
TinyLogic® ULP-A ∅∅	CMOS	0.9 / 1.2 / 1.5 / 1.8 / 2.5 / 3.3V	3ns	-24µA / 24µA	5µA	** except for ECL and HC
VCX ∅∅∅	CMOS	1.2 / 1.5 / 1.8 / 2.5 / 3.3V	2.5 / 3.2ns	-24mA / 24mA	20µA	‡ input levels recognized by the device
ALVC	CMOS	1.8 / 2.5 / 3.3V	3.0ns	-24µA / 24µA	20µA	‡‡ input levels the device is capable of driving
<b>3 Volt</b>						
TinyLogic® UHS ∅∅	CMOS	1.65 / 2.5 / 3.3 / 5V	4.5ns	-32mA / 32mA	20µA	† maximum specification at maximum specified V <sub>CC</sub>
LCX (8)	CMOS	2.5 / 3.3V	6.5ns	-24mA / 24mA	10µA	†† at maximum specified V <sub>CC</sub>
LCX (16)	CMOS	2.5 / 3.3V	4.5ns	-24mA / 24mA	20µA	° 7407 used for specifications
LVT (8)	BiCMOS	3.3V	3.5ns	-32mA / 64mA	5mA	∞ CD4010 used for specifications
LVT (16)	BiCMOS	3.3V	3.5ns	-32mA / 64mA	5mA	∅∅ NAND Gate (00) function for data
LVX (8)	CMOS	3.3V	12.0ns	-4mA / 4mA	40µA	∅∅∅ C <sub>LOAD</sub> = 30pF
<b>3Volt - 5 Volt</b>						
VHC	CMOS	3.3 / 5V	8.5ns	-8mA / 8mA	40µA	
HC	CMOS	2 / 4.5 / 6V	25ns	-6mA / 6mA	80µA	
TinyLogic® HS ∅∅	CMOS	2.0 / 3.0 / 4.5 / 6V <sup>∞∞</sup>	21ns	-2.6mA / 2.6mA	10µA	
AC	CMOS	3.3 / 5V	7.5ns	-24mA / 24mA	80µA	
ACQ	CMOS	3.3 / 5V	6.5ns	-24mA / 24mA	80µA	
GTP	CMOS	3.3 / 5V		-48mA / 48mA	5mA	
<b>5 Volt</b>						
VHCT	CMOS	5V	9.5ns	-8mA / 8mA	40µA	
HCT	CMOS	5V	25ns	-6mA / 6mA	80µA	
FST Fairchild Switch	CMOS	4.0 - 5.5V	0.25ns	N/A	3µA	
FASTr™	BiPolar	5V	3.9ns	-15mA / 64mA	75mA	
FAST®	BiPolar	5V	6.5ns	-15mA / 64mA	90mA	
AS	BiPolar	5V	6.2ns	-15mA / 64mA	90mA	
ALS	BiPolar	5V	10ns	-15mA / 24mA	27mA	
F100K	ECL	-5.7 to -4.2V	1.55ns	-1.8V into 50Ω	-65mA	
100 EVL	ECL	-5.5 to -4.2V	0.385ns	-1.8V into 50Ω	-36mA	
100 LEVEL	ECL	-3.0 to -3.8V	0.435ns	-1.8V into 50Ω	-30mA	
ACT	CMOS	5V	10.0ns	-24mA / 24mA	80µA	
ACTQ	CMOS	5V	7.0ns	-24mA / 24mA	80µA	
ABT	BiCMOS	5V	3.6ns	-32mA / 64mA	30mA	
TinyLogic® HST ∅∅	CMOS	4.5 / 5 / 5.5V	30ns	-2.0mA / 2.0mA	10µA	
<b>15 Volt</b>						
74C	CMOS	3 - 15V	70ns	-14mA / 12mA	300µA	
CD4K <sup>∞∞</sup>	CMOS	3 - 15V	40ns	-1.25mA / 8mA	3µA	

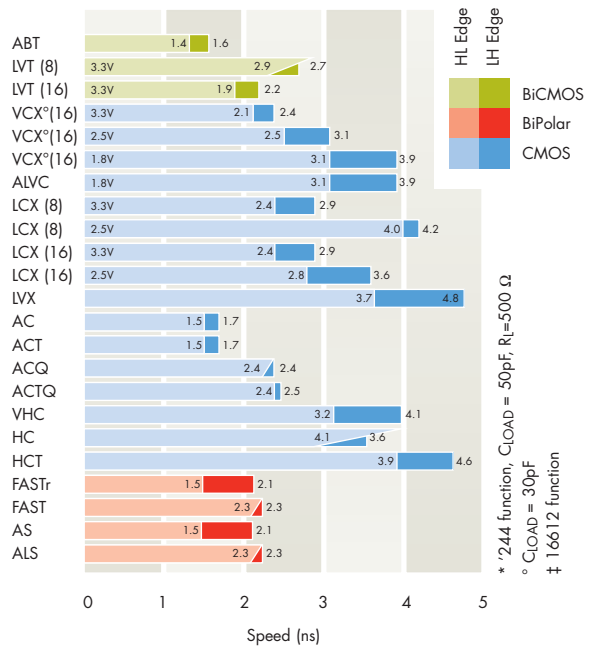
## Propagation Delay\*



## TinyLogic ULP-A and UHS Series Propagation Delay



## Output Rise and Fall Time\*



## Dynamic Current Consumption\* (mA)

1MHz 10MHz 35MHz 70MHz 90MHz

	1MHz	10MHz	35MHz	70MHz	90MHz
<b>BiCMOS</b>					
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
<b>CMOS</b>					
VCX (16)	9.9	61.9	146.8	253.7	312.7
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
AC	3.9	38.9	105.5	352.8	404.2
ACQ	5.4	52.3	139.5	206.0	218.5
VHC	3.1	30.8	103.0	180.7	192.1
HC	3.8	37.9	132.0	181.5	—
<b>Bipolar</b>					
FAST	42.9	69.4	136.6	221.1	246.8
FASTr	38.6	58.0	94.5	198.2	232.4
ALS	14.1	41.0	126.7	240.2	393.8

\* '244 function, multiple outputs switching @ 50pF, C<sub>LOAD</sub>  
All figures represent typical performance values.

## Dynamic Current Consumption\* (mA) TinyLogic Families

10MHz 30MHz 50MHz 70MHz 90MHz

	10MHz	30MHz	50MHz	70MHz	90MHz
<b>CMOS</b>					
ULP	0.31	0.81	1.18	1.58	1.98
ULP-A	0.56	1.52	2.37	3.16	4.07
HS	0.31	0.93	1.53	—	—
UHS	0.86	2.59	4.25	5.91	7.56
HST	0.29	0.88	1.48	—	—

\* '244 function, multiple outputs switching @ 50pF, C<sub>LOAD</sub>  
All figures represent typical performance values.

## Product Portfolio and Description

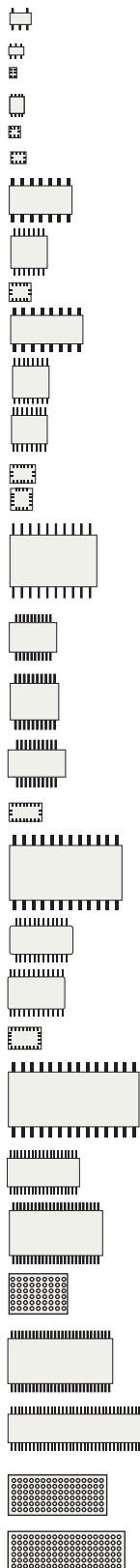
		Buffers / Line Drivers	Transceivers	Registers / Flip-Flops	Latches	Counters	Multiplexers	Comparators	Parity Generator / Checker	Decoders / Demultiplexers	FIFOs / Arithmetic Functions	Gates	Video Support	Voltage Translators	25Ω Series Resistor	Bus Switches	Boundary Scan (IEEE 1149.1)	16- 18- 32-bit Functions	8- 10- 12-bit Functions	1-bit Functions	
<b>BiCMOS</b>																					
ABT		●	●	●	●			●						●		●	●	●	●	●	• High speed, high drive and low noise for superior system performance
LVT		●	●	●	●									●			●	●			• High-speed, high-drive logic for 3.3V applications
<b>CMOS</b>																					
CROSSVOLT™	VCX	●	●	●	●								●	●			●	●	**		• High-speed CMOS enables interoperability between 3.3V and 2.5V systems, with 3.6V-tolerant inputs and outputs
	ALVC	●	●	●	●								●					●	●		• Alternative to VCX
	LCX	●	●	●	●	●				●			●	●				●	●	**	• 5V-tolerant inputs and outputs • Ideal for 3.3V applications requiring balanced drive capability, high speed, and low noise
	L VX	●	●	●	●	●	●			●			●	●	●				●		
	FACT™ AC/ACT	●	●	●	●	●	●	●	●	●	●	●	●						●		• General-purpose/broad-portfolio AC MOS family
	FACT Quiet Series™ ACQ/ACTQ	●	●	●	●				●			●						●	●	●	• Family extension specifically designed for noise-sensitive applications. Proprietary circuitry guarantees low EMI and low device-generated noise.
	Fairchild Switch (FST/FSA)					●						●	●	●	●			●	●	●	• High-speed, high-impedance, low-resistance, undershoot-protected switches • Low R <sub>ON</sub> Analog Switches
	VHC/VHCT	●	●	●	●	●			●			●						●	**		• The natural migration for HCMOS users who need more speed for their low-power, low-noise, low-drive applications • Offered in fine-pitch packages
	HC/HCT	●	●	●	●	●	●			●	●							●	**		• Low CMOS device-generated noise and EMI available in the moderate-speed performance range • Not recommended for new designs
	74C	●		●	●	●			●		●							●			• Application-specific, high-voltage CMOS products for high-noise environments
	CD4K	●		●	●	●			●		●							●			• Standard high-voltage CMOS products for high-noise environments
TinyLogic®	HS	●		●		●						●									• General-purpose single-, dual- and triple-gate logic
	HST											●									• TTL-compatible single-, dual- and triple-gate logic
	UHS	●		●	●	●						●			●						• High-performance single- and dual-gate logic with 5V over-voltage tolerance on inputs and outputs
	ULP / ULP-A	●		●	●	●															• Ultra-low power/voltage single-, dual- and triple-gate logic
	FXL Translators													●				●	●	●	• Logic level translation within range 0.9V - 3.6V
	GTLP	●	●										●								• Single-ended, open-drain transceiver technology for heavily loaded backplanes
<b>Bipolar</b>																					
	FASTrT™	●	●	●	●									●				●	●		• Fast TTL logic available • A speed-improved, design-enhanced version of FAST®
	FAST®	●	●	●	●	●	●	●	●	●	●	●		●				●			• Optimal speed-to-power portfolio of Advanced Schottky TTL families
	AS	●	●	●	●	●	●	●	●	●	●	●						●			• A high-speed, high-drive TTL family • Not recommended for new designs
	ALS	●	●	●	●	●	●	●	●	●	●	●						●			• Low-output noise and low power consumption for an advanced TTL logic family
<b>ECL</b>																					
	F100K Series	●	●	●	●	●	●	●	●	●	●	●	●					●			• ECL with low power and excellent price/performance • Socket replacement of F100K 100 Series
	100EL / LEVEL Series	●	●										●								• 1.0 - 2.0 GHZ • Specified as EclINPST™ replacement

\* Trademark of ON Semiconductor

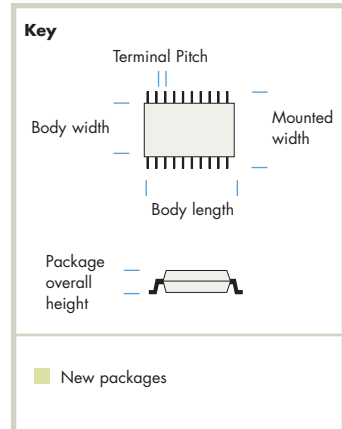
\*\* See TinyLogic HS, UHS and ULP-A for 1-bit families with similar performance to HC, VHC, LCX and VCX.

# Packaging

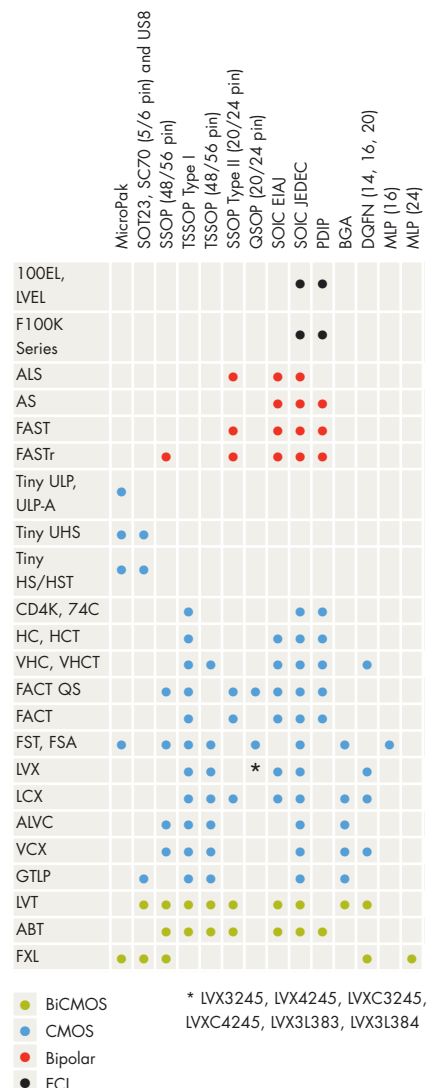
Actual size



Term. Count	Package (Code)	Units: Millimeters (Inches)						Mounted Area
		Mounted width	Body width	Body length	Overall height	Terminal Pitch		
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 (0.035)	0.65 (0.026)	4.20 (0.007)	
6	MicroPak (XX)	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)	
16	MLP (MP)	3.0 (0.118)	3.0 (0.118)	3.0 (0.118)	1.0 (0.039)	0.50 (0.020)	9.0 (0.014)	
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)	0.65 (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)	
28	SOIC (WM)	10.30 (0.40)	7.49 (0.295)	18.10 (0.770)	2.5 (0.098)	1.27 (0.050)	186.43 (0.308)	
40	QVSOP (QSP)	6.0 (0.236)	3.90 (0.153)	9.90 (0.389)	2.0 (0.078)	0.50 (0.019)	59.40 (0.092)	
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 (0.020)	113.0 (0.175)	
80	QVSOP (QSP)	6.0 (0.236)	3.90 (0.153)	20.5 (0.807)	2.0 (0.078)	0.50 (0.019)	123.0 (0.190)	
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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