

INTEGRATED CIRCUITS

GENERAL PURPOSE

LOGIC

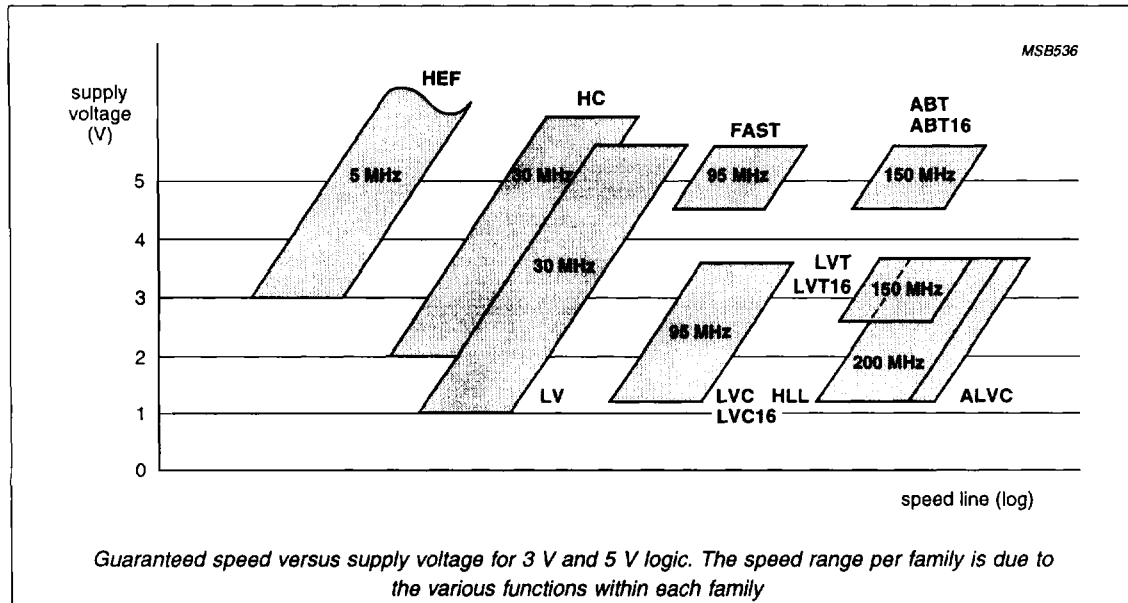
Low-voltage series

FIVE NEW LOW-VOLTAGE LOGIC FAMILIES

Philips has introduced four low-voltage CMOS logic families and one new low-voltage BiCMOS family to complement their existing range of logic ICs: LV-HCMOS, LVC/LVC-A/LVC16, HLL, ALVC and LVT/LVT16. All five families are completely new designs, specifically for 3.3 V operation. LV-HCMOS (Low-voltage, high speed CMOS) logic is a 3.3 V version of our HCMOS family, LVC/LVC-A/LVC16 (Low-voltage CMOS) logic are 3.3 V families compatible with FAST logic. HLL (High speed Low-power Low-voltage) CMOS logic is the worlds fastest 3.3 V TTL-compatible logic, ALVC (Advanced Low-voltage CMOS) is the fastest 16-bit 3.3 V logic with very high speeds and high output drive and very low power consumption. LVT/LVT16 (Low-Voltage Technology) advanced BiCMOS logic are 3.3 V versions of ABT logic.

In summary:

1. **LV-HCMOS**
 - Low Voltage HCMOS
 - A 3.3 V version of our HCMOS series
2. **LVC/LVC-A/LVC16**
 - Low Voltage CMOS
 - 3.3 V, compatible with FAST
3. **HLL**
 - High speed, Low voltage, Low power
 - Low skew, low EMC
4. **ALVC**
 - Advanced Low Voltage CMOS
 - Fastest 3.3 V logic available
5. **LVT/LVT16**
 - Low-Voltage Technology BiCMOS
 - A 3.3 V version of ABT/ABT16



LOGIC

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The complementarity of our low-voltage logic families

Feature	LV	LVC/LVC-A	LVC16	HLL	ALVC	LVT	LVT16
Process	CMOS	CMOS	CMOS	CMOS	CMOS	BiCMOS	BiCMOS
Speed	medium	high	high	very high	very high	very high	very high
Product range	switches gates/FF decoders MUX/DEMUX octals	gates/FF decoders MUX/DEMUX octals	multibyte	octals	multibyte	octals	multibyte
Output drive	low	high	high	high	high	very high	very high
5 V input & output ¹⁾	no	yes	yes	yes	yes	yes	yes
Over-voltage protection	no	no	no	no	no	yes	yes
Live insertion support	no	no	no	no	no	yes	yes
5 V equivalent	HC, LS	F, ACL	F, ACL	FCT-C	FCT16-C	ABT, BCT, FCT-A	ABT16, FCT16-C
Primary applications	glue logic portable eq.	glue logic portable eq. local bus	portable eq. local bus super μ P	portable eq. local bus super μ P	portable eq. local bus super μ P	local bus super μ P backplanes	local bus super μ P backplanes

Note:

¹⁾ See next table for details.

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Key parameters and features comparison of Philips 3 V logic families

	LV	LVC/LVC-A	LVC16	HLL	ALVC	LVT	LVT16
Key parameters							
Nomenclature ¹⁾	74LVxxxX	74LVCxxxX	74LVC16xx xX	74HLL33xxxX	74ALVC16xxxX	74LVTxxxX	74LVT16xxxX
Minimum V_{CC}	V	1.0	1.2	1.2	1.2	2.7	2.7
Maximum V_{CC}	V	3.6	3.6	3.6	3.6	3.6	3.6
Output current I_{OH}/I_{OL}	mA	6/6	24/24	24/24	24/24	32/64	32/64
Quiescent current	μ A	80	20	40	80	40	80
244 propagation delay:							
T_{pd} typ.	ns	9	4.0	4.0	2.1	2.1	2.4
T_{pd} max.	ns	18	5.8	5.8	4.0	4.0	3.6
Max. ground bounce	V	0.5	0.8	0.8	1.0	0.7	0.8
Features							
Full CMOS	✓	✓	✓	✓	✓		
Advanced BICMOS						✓	✓
Drive capability:							
135 Ω	✓						
50 Ω		✓	✓	✓	✓		
35 Ω						✓	✓
Feature size:							
2.0 μ m	✓						
0.8 μ m		✓	✓	✓	✓	✓	✓
0.6 μ m							
Corner supply pins	✓	✓				✓	
Centre supply pins				✓			
Multiple supply/GND pins			✓		✓		✓
TTL level input	✓	✓	✓	✓	✓	✓	✓
TTL level output	✓	✓	✓	✓	✓	✓	✓
5 V input capability		✓ ⁴⁾	✓ ³⁾	✓ ²⁾	✓ ³⁾	✓	✓
Over-voltage protection						✓	✓
Live insertion						✓	✓
Input bus hold		✓ ⁴⁾				✓	✓
Packages:							
DIL	✓						
SO	✓	✓		✓		✓	
SSOP	✓	✓	✓	✓	✓	✓	✓
TSSOP	✓	✓	✓	✓	✓	✓	✓
Application:							
glue logic	✓	✓					
battery-powered	✓	✓	✓	✓	✓		
equipment		✓	✓	✓	✓	✓	✓
local bus			✓	✓	✓	✓	✓
super μ P						✓	✓
backplane						✓	✓
Compatible 5 V families	LS-TTL HC/HCT N74xx	FAST, ALS ACL (Q)FACT	FAST, ALS ACL (Q)FACT	FCT-C	FCT-C	ABT BC/BCT FCT-A	ABT BC/BCT FCT16-C

Notes:

- xxx = function indication; 245 etc.
X = package code: D = SO, DB = SSOP II, PW = TSSOP I, DL = SSOP 48-56, DGG = TSSOP 48-56.
- For transceiver I/O pins $V_{IN,max} = V_{CC} + 0.5$ V.
- For control pins only; other input and output pins: $V_{IN,max} = V_{CC} + 0.5$ V.
- For LVC-A: 5 V tolerance for inputs and outputs; Bus hold as an option.

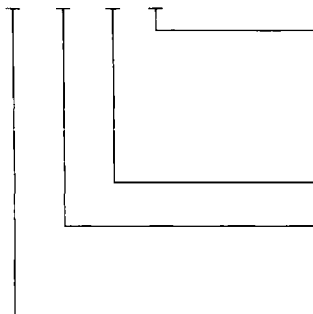
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Type number designation

LV, LVC and LVT Series (74LVxxxx, 74LVCxxxx, 74LVTxxxx)

LV
74 LVC xxx x
LVT



package code:

- A = LVC with 5 V tolerance I/Os
- N = plastic DIL;
- D = plastic mini-pack (SO)
- DB = shrink plastic mini-pack (SSOP), type II
- PW = thin shrink plastic mini-pack (TSSOP), type I

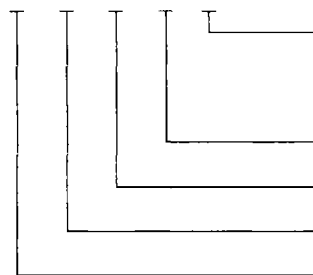
= device code specifying the device function

- LV = LV-HCMOS series
- LVC = Low-voltage CMOS series
- LVT = Low-voltage technology series

74 = commercial operating temperature range -40 to +85 °C
= commercial operating temperature range -40 to +125 °C for LV-HCMOS series

HLL Series (74HL33xxxx)

74 HL 33 xxx x



package code:

- D = plastic mini-pack (SO)
- DB = shrink small plastic mini-pack (SSOP), type II
- PW = thin shrink plastic mini-pack (TSSOP), type I

= device code specifying the device function

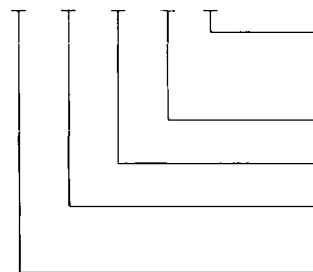
33 = pinout designator; center V_{CC} and GND pins

HL = HLL series

74 = commercial operating temperature range -40 to +85 °C

ALVC Series (74ALVC16xxxx, 74LVT16xxxx)

ALVC
74 LVT 16 xxx x



package code:

- DL = shrink small plastic mini-pack (SSOP), type III
- DGG = thin shrink plastic mini-pack (TSSOP), type II

= device code specifying the device function

16 = dual-byte function

- ALVCH = Advanced low-voltage CMOS series
- LVT = Low-voltage technology series

74 = commercial operating temperature range -40 to +85 °C

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Low-voltage series

Family ratings for the LV series

Limiting values in accordance with the Absolute Maximum System (IEC 134)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+7.0	V
DC input diode current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	I_{IK}	-	20	mA
DC output diode current	$V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V	I_{OK}	-	50	mA
DC output source or sink current	-0.5 V < V_O < $V_{CC} + 0.5$ V				
- standard outputs		I_O	-	25	mA
- bus driver outputs		I_O	-	35	mA
DC V_{CC} or GND current					
- standard outputs		$I_{CC}; I_{GND}$	-	50	mA
- bus driver outputs		$I_{CC}; I_{GND}$	-	70	mA
Storage temperature range		T_{stg}	-65	+150	°C
Power dissipation per package	for temperature range: -40 to +125 °C;				
- plastic DIL	above +70 °C derate linearly by 12 mW/K	P_{tot}	-	750	mW
- plastic mini-pack (SO)	above +70 °C derate linearly by 8 mW/K	P_{tot}	-	500	mW
- plastic shrink small outline (SSOP type II)	above +70 °C derate linearly by 8 mW/K	P_{tot}	-	500	mW
- plastic thin shrink small outline (TSSOP type I)	above +70 °C derate linearly by 8 mW/K	P_{tot}	-	500	mW

Recommended operating conditions for the LV series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	min.	typ.	max.	unit	conditions
DC supply voltage range ¹	V_{CC}	1.0	3.3	5.5	V	
DC input voltage range	V_I	0	-	V_{CC}	V	
DC output voltage range	V_O	0	-	V_{CC}	V	
Operating ambient temperature range in free air	T_{amb}	-40 -40	- -	+85 +125	°C °C	see AC and DC characteristics per device
Input rise and fall times except for Schmitt trigger inputs	$t_r; t_f$	- -	- -	500 200 100	ns/V ns/V ns/V	$V_{CC} = 1.0$ to 2.0 V $V_{CC} = 2.0$ to 2.7 V $V_{CC} = 2.7$ to 3.6 V

Note:

- The LV is guaranteed to function down to $V_{CC} = 1.0$ V (input levels GND or V_{CC}); DC characteristics are guaranteed from $V_{CC} = 1.2$ V to $V_{CC} = 3.6$ V

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DC family characteristics for the LV series

Over recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

parameter	V _{CC} V	symbol	T _{amb} (°C)					unit	conditions		
			-40 to +85			-40 to +125			V _I	other	
			min.	typ.	max.	min.	max.				
HIGH level input voltage	1.2	V _{IH}	0.9	-	-	0.9	-	V			
	2.0		1.4	-	-	1.4	-				
	2.7 .. 3.6		2.0	-	-	2.0	-				
	4.5 .. 5.5		0.7V _{CC}	-	-	0.7V _{CC}	-				
LOW level input voltage	1.2	V _{IL}	-	-	0.3	-	0.3	V			
	2.0		-	-	0.6	-	0.6				
	2.7 .. 3.6		-	-	0.8	-	0.8				
	4.5 .. 5.5		-	-	0.3V _{CC}	-	0.3V _{CC}				
HIGH level output voltage all outputs	1.2	V _{OH}	-	1.2	-	-	-	V	V _{IH} or V _{IL}	-I _O = 100 µA	
	2.0		1.8	2.0	-	1.8	-				
	2.7		2.5	2.7	-	2.5	-				
	3.0		2.8	3.0	-	2.8	-				
	4.5		4.3	4.5	-	4.3	-				
HIGH level output voltage standard	3.0	V _{OH}	2.40	2.82	-	2.20	-	V	V _{IH} or V _{IL}	-I _O = 6 mA -I _O = 10 mA	
	4.5		3.60	4.20	-	-	-				
HIGH level output voltage bus driver	3.0	V _{OH}	2.40	2.82	-	2.20	-	V	V _{IH} or V _{IL}	-I _O = 8 mA -I _O = 16 mA	
	4.5		3.60	4.20	-	-	-				
LOW level output voltage all outputs	1.2	V _{OL}	-	0	0.2	-	0.2	V	V _{IH} or V _{IL}	I _O = 100 µA	
	2.0		-	0	0.2	-	0.2				
	2.7		-	0	0.2	-	0.2				
	3.0		-	0	0.2	-	0.2				
	4.5		-	0	0.2	-	0.2				
LOW level output voltage standard	3.0	V _{OL}	-	0.25	0.4	-	0.5	V	V _{IH} or V _{IL}	I _O = 6 mA I _O = 10 mA	
	4.5		-	0.35	0.55	-	-				
LOW level output voltage bus driver	3.0	V _{OL}	-	0.20	0.4	-	0.5	V	V _{IH} or V _{IL}	I _O = 8 mA I _O = 16 mA	
	4.5		-	0.35	0.55	-	-				
Input leakage current	3.6	I _I	-	-	1.0	-	1.0	µA	V _{CC} or GND		
	5.5		-	-	1.0	-	-				
3-state OFF-state current	3.6	I _{OZ}	-	-	5.0	-	10.0	µA	V _{IH} or V _{IL}	V _O = V _{CC} or GND	
	5.5		-	-	5.0	-	-				
Quiescent supply current	3.6	I _{CC}	-	-	20	-	40	µA	V _{CC} or GND	I _O = 0	
			SSI	-	-	20	-				80
			flip-flops	-	-	20	-				160
			MSI	-	-	500	-				1000
			LSI	-	-	500	-				850
additional quiescent supply current per input	2.7 .. 3.6	ΔI _{CC}	-	-	500	-	850	µA	V _{CC} -0.6V	I _O = 0	

Note: All typical values are measured at T_{amb} = 25°C

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Family ratings for the LVC series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+6.5	V
DC input diode current	$V_I < 0$	I_{IK}	-	-50	mA
DC input voltage	note 2	V_I	-0.5	+5.5	V
DC input voltage range for I/Os		$V_{I/O}$	-0.5	$V_{CC} + 0.5$	V
DC output diode current	$V_O > V_{CC}$ or $V_O < 0$	I_{OK}	-	± 50	mA
DC output voltage	note 2	V_O	-0.5	$V_{CC} + 0.5$	V
DC output source or sink current	$V_O = 0$ to V_{CC}	I_O	-	± 50	mA
DC V_{CC} or GND current		$I_{CC}; I_{GND}$	-	± 100	mA
Storage temperature range		T_{stg}	-60	+150	°C
Power dissipation per package	see data handbook	P_{tot}			

Notes:

- Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended operating conditions for the LVC series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	min.	max.	unit	conditions
DC supply voltage range (for max. speed performance)	V_{CC}	2.7	3.6	V	
DC supply voltage (for low-voltage applications)	V_{CC}	1.2	3.6	V	
DC input voltage range	V_I	0	5.5	V	
DC input voltage range for I/Os	$V_{I/O}$	0	V_{CC}	V	
DC output voltage range	V_O	0	V_{CC}	V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	°C	see AC and DC characteristics per device
Input rise and fall times	$t_r; t_f$	-	20	ns/V	$V_{CC} = 1.2$ to 2.7 V $V_{CC} = 2.7$ to 3.6 V
		-	10	ns/V	

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DC family characteristics for the LVC series

Over recommended operating conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V_{CC} V	symbol	T_{amb} (°C) -40 to +85			unit	conditions	
			min.	typ.	max.		V_I	other
HIGH level input voltage	1.2 2.7 .. 3.6	V_{IH}	V_{CC} 2.0	-	-	V		
LOW level input voltage	1.2 2.7 .. 3.6	V_{IL}	-	-	GND 0.8	V		
HIGH level output voltage	2.7	V_{OH}	$V_{CC} - 0.5$	-	-	V	V_{IH} or V_{IL}	$I_O = -12$ mA $I_O = -100$ μ A $I_O = -18$ mA $I_O = -24$ mA
	3.0		$V_{CC} - 0.2$	V_{CC}	-			
	3.0		$V_{CC} - 0.6$	-	-			
	3.0		$V_{CC} - 1.0$	-	-			
LOW level output voltage	2.7	V_{OL}	-	-	0.40	V	V_{IH} or V_{IL}	$I_O = 12$ mA $I_O = 100$ μ A $I_O = 24$ mA
	3.0		-	-	0.20			
	3.0		-	-	0.55			
Input leakage current	3.6	I_I	-	± 0.1	± 5	μ A	5.5 V or GND	not for I/O pins
Input current for common I/O pins	3.6	I_{IHZ}/I_{ILZ}	-	± 0.1	± 15	μ A	V_{CC} or GND	
3-state output OFF-state current	3.6	I_{OZ}	-	0.1	± 10	μ A	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current	3.6	I_{CC}	-	0.1	20	μ A	V_{CC} or GND	$I_O = 0$
Additional quiescent supply current per control pin	2.7 .. 3.6	ΔI_{CC}	-	5	500	μ A	$V_{CC} - 0.6$ V	$I_O = 0$

Note: All typical values are measured at $V_{CC} = 3.3$ V and $T_{amb} = 25^\circ\text{C}$.

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Family ratings for the LVC-A series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+6.5	V
DC input diode current	$V_I < 0$	I_{IK}	-	-50	mA
DC input voltage	note 2	V_I	-0.5	+6.5	V
DC output diode current	$V_O > V_{CC}$ or $V_O < 0$	I_{OK}	-	± 50	mA
DC output voltage; output HIGH or LOW state	note 2	V_O	-0.5	$V_{CC} + 0.5$	V
DC output voltage; output 3-state	note 2	V_O	-0.5	6.5	V
DC output source or sink current	$V_O = 0$ to V_{CC}	I_O	-	± 50	mA
DC V_{CC} or GND current		$I_{CC}; I_{GND}$	-	± 100	mA
Storage temperature range		T_{stg}	-60	+150	$^{\circ}C$
Power dissipation per package		P_{tot}			
plastic mini-pack (SO)	above +70 $^{\circ}C$ derate linearly with 8 mW/K		-	500	mW
plastic shrink mini-pack (SSOP and TSSOP)	above +60 $^{\circ}C$ derate linearly with 5.5 mW/K		-	500	mW

Notes:

- Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended operating conditions for the LVC-A series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	min.	max.	unit	conditions
DC supply voltage range (for max. speed performance)	V_{CC}	2.7	3.6	V	
DC supply voltage (for low-voltage applications)	V_{CC}	1.2	3.6	V	
DC input voltage range	V_I	0	5.5	V	
DC output voltage range; output HIGH or LOW state	V_O	0	V_{CC}	V	
DC output voltage range; output 3-state	V_O	0	5.5	V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	$^{\circ}C$	see AC and DC characteristics per device
Input rise and fall times	$t_r; t_f$	-	20	ns/V	$V_{CC} = 1.2$ to 2.7 V
		-	10	ns/V	$V_{CC} = 2.7$ to 3.6 V

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DC family characteristics for the LVC-A series

Over recommended operating conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V_{CC} V	symbol	T_{amb} (°C) -40 to +85			unit	conditions	
			min.	typ.	max.		V_I	other
HIGH level input voltage	1.2 2.7 .. 3.6	V_{IH}	V_{CC} 2.0	-	-	V		
LOW level input voltage	1.2 2.7 .. 3.6	V_{IL}	-	-	GND 0.8	V		
HIGH level output voltage	2.7 3.0 3.0 3.0	V_{OH}	$V_{CC} - 0.5$ $V_{CC} - 0.2$ $V_{CC} - 0.6$ $V_{CC} - 0.8$	-	-	V	V_{IH} or V_{IL}	$I_O = -12$ mA $I_O = -100$ μ A $I_O = -18$ mA $I_O = -24$ mA
LOW level output voltage	2.7 3.0 3.0	V_{OL}	-	-	0.40 0.20 0.55	V	V_{IH} or V_{IL}	$I_O = 12$ mA $I_O = 100$ μ A $I_O = 24$ mA
Input leakage current	3.6	I_I	-	± 0.1	± 5	μ A	5.5 V or GND	not for I/O pins
Input current for common I/O pins	3.6	I_{IHZ}/I_{ILZ}	-	± 0.1	± 10	μ A	5.5 V or GND	
3-state OFF-state current	3.6	I_{OZ}	-	0.1	± 10	μ A	V_{IH} or V_{IL}	$V_O = 5.5$ V or GND
Power off leakage current	0.0	I_{off}	-	-	± 100	μ A	V_I or $V_O =$ 5.5 V	
Quiescent supply current	3.6	I_{CC}	-	0.1	20	μ A	V_{CC} or GND	$I_O = 0$
Additional quiescent supply current per control pin	2.7 .. 3.6	ΔI_{CC}	-	5	500	μ A	$V_{CC} -$ 0.6 V	$I_O = 0$
Bushold LOW sustaining current	3.0	I_{BHL}	75	-	-	μ A	0.8 V	notes 2 and 3
Bushold HIGH sustaining current	3.0	I_{BHH}	-75	-	-	μ A	2.0 V	notes 2 and 3
Bushold LOW overdrive current	3.6	I_{BHLO}	450	-	-	μ A		notes 2 and 3
Bushold HIGH overdrive current	3.6	I_{BHHO}	-450	-	-	μ A		notes 2 and 3

Notes:

- All typical values are measured at $V_{CC} = 3.3$ V and $T_{amb} = 25^\circ\text{C}$.
- Control inputs do not have a bushold circuit. Parts with busholds are called LVH-A.
- The specified sustaining current at the data input holds the input below the specified V_I level.
- The specified overdrive current at the data input forces the data input to the opposite logic input state.

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Family ratings for the LVC16 series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+4.6	V
DC input diode current	$V_I < 0$	I_{IK}	-	-50	mA
DC input voltage	for control pins only; note 2	V_I	-0.5	+5.5	V
DC input voltage	for data pins only; note 2	V_I	-0.5	$V_{CC} + 0.5$	V
DC output diode current	$V_O > V_{CC}$ or $V_O < 0$	I_{OK}	-	± 50	mA
DC output voltage	note 2	V_O	-0.5	$V_{CC} + 0.5$	V
DC output source or sink current	$V_O = 0$ to V_{CC}	I_O	-	± 50	mA
DC V_{CC} or GND current		$I_{CC}; I_{GND}$	-	± 100	mA
Storage temperature range		T_{stg}	-60	+150	°C
Power dissipation per package	see data handbook	P_{tot}			



Notes:

- Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended operating conditions for the LVC16 series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	min.	max.	unit	conditions
DC supply voltage range (for max. speed performance)	V_{CC}	2.7	3.6	V	
DC supply voltage (for low-voltage applications)	V_{CC}	1.2	3.6	V	
DC input voltage range	V_I	0	5.5	V	
DC input voltage range	V_I	0	V_{CC}	V	
DC output voltage range	V_O	0	V_{CC}	V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	°C	see AC and DC characteristics per device
Input rise and fall times	$t_r; t_f$	-	20	ns/V	$V_{CC} = 3.6$ V
		-	10	ns/V	$V_{CC} = 1.2$ V

LOGIC

Low-voltage series

INTEGRATED CIRCUITS

GENERAL PURPOSE

DC family characteristics for the LVC16 series

Over recommended operating conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V_{CC} V	symbol	T_{amb} (°C) -40 to +85			unit	conditions	
			min.	typ. ¹	max.		V_I	other
HIGH level input voltage	1.2 2.7 .. 3.6	V_{IH}	V_{CC} 2.0	-	-	V		
LOW level input voltage	1.2 2.7 .. 3.6	V_{IL}	-	-	GND 0.8	V		
HIGH level output voltage	2.7 3.0 3.0	V_{OH}	$V_{CC} - 0.5$ $V_{CC} - 0.2$ $V_{CC} - 0.1$	-	-	V	V_{IH} or V_{IL}	$I_O = -12$ mA $I_O = -100$ μ A $I_O = -24$ mA
LOW level output voltage	2.7 3.0 3.0	V_{OL}	-	-	0.40 0.20 0.55	V	V_{IH} or V_{IL}	$I_O = 12$ mA $I_O = 100$ μ A $I_O = 24$ mA
Input leakage current	3.6	I_I	-	± 0.1	± 5	μ A	5.5 V or GND	for control pins only
Input leakage current	3.6	I_I	-	± 0.1	± 5	μ A	V_{CC} or GND	for data inputs only
Input current for common I/O pins	3.6	I_{IHZ}/I_{ILZ}	-	± 0.1	± 15	μ A	V_{CC} or GND	
3-state OFF-state current	3.6	I_{OZ}	-	0.1	± 10	μ A	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current	3.6	I_{CC}	-	0.2	40	μ A	V_{CC} or GND	$I_O = 0$
Additional quiescent supply current per control pin	2.7 .. 3.6	ΔI_{CC}	-	5	500	μ A	$V_{CC} - 0.6$ V	$I_O = 0$
Additional quiescent supply current per data I/O pin	2.7 .. 3.6	ΔI_{CC}	-	150	750	μ A	$V_{CC} - 0.6$ V	$I_O = 0$
Bushold LOW sustaining current	3.0	I_{BHL}	75	-	-	μ A	0.8 V	for data inputs only ²
Bushold HIGH sustaining current	3.0	I_{BHH}	-75	-	-	μ A	2.0 V	for data inputs only ²
Bushold LOW overdrive current	3.6	I_{BHLO}	450	-	-	μ A		for data inputs only ²
Bushold HIGH overdrive current	3.6	I_{BHHO}	-450	-	-	μ A		for data inputs only ²

Notes:

- All typical values are measured at $V_{CC} = 3.3$ V and $T_{amb} = 25^\circ\text{C}$.
- Control inputs do not have a bushold circuit.

INTEGRATED CIRCUITS

GENERAL PURPOSE

LOGIC

Low-voltage series

Family ratings for the HLL series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+4.6	V
DC input diode current	$V_I < 0$	I_{IK}	-	-50	mA
DC input voltage	note 2	V_I	-0.5	+5.5	V
DC input voltage range for I/Os		$V_{I/O}$		$V_{CC} + 0.5$	V
DC output diode current	$V_O > V_{CC}$ or $V_O < 0$	I_{OK}	-	± 75	mA
DC output voltage	note 2	V_O	-0.5	$V_{CC} + 0.5$	V
DC output source or sink current	$V_O = 0$ to V_{CC}	I_O	-	± 70	mA
DC V_{CC} or GND current		$I_{CC}; I_{GND}$	-	100	mA
Storage temperature range		T_{stg}	-60	+150	°C
Power dissipation per package	see data handbook	-			

Notes:

- Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended operating conditions for the HLL series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	typ.	max.	unit	conditions
DC supply voltage range (for max. speed performance)	V_{CC}	3.0	3.6	V	
DC supply voltage (for low-voltage applications)	V_{CC}	1.2	3.6	V	
DC input voltage range	V_I	0	5.5	V	
DC input voltage range for I/Os	$V_{I/O}$	0	V_{CC}	V	
DC output voltage range	V_O	0	V_{CC}	V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	°C	see AC and DC characteristics per device
Input rise and fall times	$t_r; t_f$	-	20	ns	$V_{CC} = 3.6$ V $V_{CC} = 1.2$ V
		-	50	ns	

LOGIC

Low-voltage series

INTEGRATED CIRCUITS

GENERAL PURPOSE

DC characteristics for the HLL series

Over recommended operation conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V_{CC} V	symbol	T_{amb} (°C)					unit	conditions	
			+25			-40 to +85			V_I	other
			min.	typ.	max.	min.	max.			
HIGH level input voltage	3.6	V_{IH}	-	-	-	2.0	-	V		
LOW level input voltage	3.0	V_{IL}	-	-	-	-	0.8	V		
Hysteresis (all inputs)	3.0 .. 3.6	V_H	-	0.25	-	-	-	V		
HIGH level output voltage	3.0	V_{OH}	$V_{CC}-0.2$	V_{CC}	-	$V_{CC}-0.2$	-	V	V_{IH} or V_{IL}	$I_O = 100 \mu A$ $I_O = -24 mA$
			$V_{CC}-0.4$	-	-	$V_{CC}-0.4$	-	V		
LOW level output voltage	3.0	V_{OL}	-	-	0.2	-	0.2	V	V_{IH} or V_{IL}	$I_O = 100 \mu A$ $I_O = 24 mA$
			-	-	0.4	-	0.4	V		
Input leakage current	3.6	I_I	-	-	-	-	± 5	μA	V_{CC} or GND	
3-state output OFF-state current	3.6	I_{OZ}	-	-	-	-	10	μA	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current	3.6	I_{CC}	-	-	8.0	-	80	μA	V_{CC} or GND	$I_O = 0$

INTEGRATED CIRCUITS

GENERAL PURPOSE

LOGIC

Low-voltage series

Family ratings for the ALVC series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+4.6	V
DC input diode current	$V_I < 0$	I_{IK}	-	-50	mA
DC input voltage	for control pins only; note 2	V_I	-0.5	+5.5	V
DC input voltage	for data pins only; note 2	V_I	-0.5	$V_{CC} + 0.5$	V
DC output diode current	$V_O > V_{CC}$ or $V_O < 0$	I_{OK}	-	± 50	mA
DC output voltage	note 2	V_O	-0.5	$V_{CC} + 0.5$	V
DC output source or sink current	$V_O = 0$ to V_{CC}	I_O	-	± 50	mA
DC V_{CC} or GND current		$I_{CC}; I_{GND}$	-	100	mA
Storage temperature range		T_{stg}	-60	+150	°C
Power dissipation per package	see data handbook	P_{tot}			

Notes:

- Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended operating conditions for the ALVC series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	typ.	max.	unit	conditions
DC supply voltage range (for max. speed performance)	V_{CC}	3.0	3.6	V	
DC supply voltage (for low-voltage applications)	V_{CC}	1.2	3.6	V	
DC input voltage range	V_I	0	5.5	V	
DC input voltage range for I/Os	$V_{I/O}$	0	V_{CC}	V	
DC output voltage range	V_O	0	V_{CC}	V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	°C	see AC and DC characteristics per device
Input rise and fall times	$t_r; t_f$	-	20	ns	$V_{CC} = 3.6$ V
		-	50	ns	$V_{CC} = 1.2$ V

LOGIC

Low-voltage series

INTEGRATED CIRCUITS

GENERAL PURPOSE

DC family characteristics for the ALVC series

Over recommended operating conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V_{CC} V	symbol	T_{amb} (°C) -40 to +85			unit	conditions	
			min.	typ. ¹	max.		V_I	other
HIGH level input voltage	1.2 2.7 .. 3.6	V_{IH}	V_{CC} 2.0	-	-	V		
LOW level input voltage	1.2 2.7 .. 3.6	V_{IL}	-	-	GND 0.8	V		
HIGH level output voltage	2.7 3.0 3.0	V_{OH}	$V_{CC} - 0.5$ $V_{CC} - 0.2$ $V_{CC} - 0.1$	-	-	V	V_{IH} or V_{IL}	$I_O = -12$ mA $I_O = -100$ μ A $I_O = -24$ mA
LOW level output voltage	2.7 3.0 3.0	V_{OL}	-	-	0.40 0.20 0.55	V	V_{IH} or V_{IL}	$I_O = 12$ mA $I_O = 100$ μ A $I_O = 24$ mA
Input leakage current	3.6	I_I	-	± 0.1	± 5	μ A	5.5 V or GND	for control pins only
Input leakage current	3.6	I_I	-	± 0.1	± 5	μ A	V_{CC} or GND	for data inputs only
Input current for common I/O pins	3.6	I_{IHZ}/I_{ILZ}	-	± 0.1	± 15	μ A	V_{CC} or GND	
3-state OFF-state current	3.6	I_{OZ}	-	0.1	± 10	μ A	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current	3.6	I_{CC}	-	0.2	40	μ A	V_{CC} or GND	$I_O = 0$
additional quiescent supply current per control pin	2.7 .. 3.6	ΔI_{CC}	-	5	500	μ A	$V_{CC} - 0.6$ V	$I_O = 0$
additional quiescent supply current per data I/O pin	2.7 .. 3.6	ΔI_{CC}	-	150	750	μ A	$V_{CC} - 0.6$ V	$I_O = 0$
Bushold LOW sustaining current	3.0	I_{BHL}	75	-	-	μ A	0.8 V	for data inputs only ²
Bushold HIGH sustaining current	3.0	I_{BHH}	-75	-	-	μ A	2.0 V	for data inputs only ²
Bushold LOW overdrive current	3.6	I_{BHLO}	450	-	-	μ A		for data inputs only ²
Bushold HIGH overdrive current	3.6	I_{BHHO}	-450	-	-	μ A		for data inputs only ²

Notes:

- All typical values are measured at $V_{CC} = 3.3$ V and $T_{amb} = 25^\circ$ C.
- Control inputs do not have a bushold circuit.

INTEGRATED CIRCUITS

GENERAL PURPOSE

LOGIC

Low-voltage series

Family ratings for the LVT series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)

Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+4.6	V
DC input diode current	$V_i < 0$	I_{iK}	-	-50	mA
DC input voltage	note 3	V_i	-0.5	7	V
DC output diode current	$V_o < 0$	I_{oK}	-	-50	mA
DC output voltage	output in HIGH or OFF state; note 3	V_o	-0.5	7	V
DC output source or sink current	output in LOW state output in HIGH state	I_o	-	128 -64	mA
Storage temperature range		T_{stg}	-65	+150	°C

Notes:

- Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- The temperature capability of a high-performance integrated circuit in conjunction with thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature should not exceed 150°C.
- The input and output negative voltage ratings may be exceeded if the input and output current ratings are observed.



Recommended operating conditions for the LVT series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	typ.	max.	unit	conditions
DC supply voltage	V_{CC}	2.7	3.6	V	
DC input voltage	V_i	0	5.5	V	
HIGH level input voltage	V_{iH}	2.0	-	V	
LOW level input voltage	V_{iL}	-	0.8	V	
HIGH level output current	I_{oH}	-	-32	mA	
LOW level output current	I_{oL}	-	32	mA	
LOW level output current	I_{oL}	0	64	mA	current duty cycle ≤50%, f ≥1 kHz
Input transition rise or fall rate, outputs enabled	$\Delta t/\Delta V$	-	10	ns/V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	°C	

LOGIC

Low-voltage series

INTEGRATED CIRCUITS

GENERAL PURPOSE

DC family characteristics for the LVT series

Over recommended operating conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V _{CC} V	symbol	T _{amb} (°C) -40 to +85			unit	conditions					
			min.	typ. ¹	max.		V _I	other				
Input clamping voltage	2.7	V _{IK}	-	-	1.2	V		I _{IK} = -18 mA				
HIGH level output voltage	2.7	V _{OH}	V _{CC} - 0.2	-	-	V		I _{OH} = -100 μA				
	2.7			2.4	-			I _{OH} = -8 mA				
	3.0			2.0	-			I _{OH} = -32 mA				
LOW level output voltage	2.7	V _{OL}		-	-	V		I _{OL} = 100 μA				
	2.7			-	0.5			I _{OL} = 24 mA				
	3.0			-	0.4			I _{OL} = 16 mA				
	3.0			-	0.5			I _{OL} = 32 mA				
	3.0			-	0.55			I _{OL} = 64 mA				
Power-up output LOW voltage ⁵	3.6	V _{RST}	-	-	0.55	V	V _{CC} or GND	I _O = 1 mA				
Input leakage current												
all pins	0 or 3.6	I _I				μA	5.5 V					
control pins	3.6								-	-	±1	V _{CC} or GND
I/O pins ⁴	3.6								-	-	10	V _{CC}
I/O pins ⁴	3.6								-	-	20	5.5
data pins ⁴	3.6								-	-	1	V _{CC}
data pins ⁴	3.6	-	-	-5	0 V							
Output off current	0	I _{OFF}	-	-	±100	μA		V _I or V _O = 0 to 4.5 V				
Bus hold current A or B outputs	3.0	I _{HOLD}		75	-	μA	0.8 V					
	3.0			-75	-				2.0 V			
Current into an output in the HIGH state when V _O > V _{CC}	3.0	I _{EX}	-	-	125	μA		V _O = 5.5 V				
Quiescent supply current	3.6	I _{CCH}	-	0.13	0.19	mA	V _{CC} or GND	I _O = 0				
Quiescent supply current	3.6	I _{CCL}	-	3	12	mA	V _{CC} or GND	I _O = 0				
Quiescent supply current	3.6	I _{CCZ}	-	0.13	0.19	mA	V _{CC} or GND	I _O = 0				
Additional supply current per input pin ²	3.0 .. 3.6	ΔI _{CC}	-	-	200	μA		one input at V _{CC} - 0.6 V; other inputs at V _{CC} or GND				
Power-up/down 3-state output current ³	≤1.2	I _{PUPD}	-	-	±100	μA	V _{CC} or GND	V _O = 0.5 V to V _{CC} ; OE = don't care				
Input capacitance		C _I	-	4	-	pF	0 or 3 V					
Output capacitance		C _O	-	10	-	pF	0 or 3 V					

Notes:

- All typical values are measured at V_{CC} = 3.3 V and T_{amb} = 25°C.
- This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.
- This parameter is valid for any V_{CC} between 0 V and 1.2 V with a transition time of up to 10 ms. From V_{CC} = 1.2 V to V_{CC} = 3.3 V, a transition time of 100 μs is permitted. This parameter is valid at T_{amb} = 25°C.
- Unused pins at V_{CC} or GND.
- This applies to parts with storage cells. For valid results, data must not be loaded in the flip-flops (or latches) after applying the power.

INTEGRATED CIRCUITS

GENERAL PURPOSE

LOGIC

Low-voltage series

Family ratings for the LVT16 series

Limiting values in accordance with the Absolute Maximum System (IEC 134), (notes 1 and 2)
 Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	+4.6	V
DC input diode current	$V_I < 0$	I_{IK}	-	-50	mA
DC input voltage	note 3	V_I	-0.5	7	V
DC output diode current	$V_O < 0$	I_{OK}	-	-50	mA
DC output voltage	output in HIGH or OFF state; note 3	V_O	-0.5	7	V
DC output source or sink current	output in LOW state output in HIGH state	I_O	-	128 -64	mA
Storage temperature range		T_{stg}	-65	+150	°C

Notes:

1. Stresses beyond those listed 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 under 'recommended operating conditions' is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
2. The temperature capability of a high-performance integrated circuit in conjunction with thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature should not exceed 150°C.
3. The input and output negative voltage ratings may be exceeded if the input and output current ratings are observed.



Recommended operating conditions for the LVT16 series

Voltages are referenced to GND (ground = 0V)

parameter	symbol	typ.	max.	unit	conditions
DC supply voltage	V_{CC}	2.7	3.6	V	
DC input voltage	V_I	0	5.5	V	
HIGH level input voltage	V_{IH}	2.0	-	V	
LOW level input voltage	V_{IL}	-	0.8	V	
HIGH level output current	I_{OH}	-	-32	mA	
LOW level output current	I_{OL}	-	32	mA	
LOW level output current	I_{OL}	0	64	mA	current duty cycle ≤50%, f ≥1 kHz
Input transition rise or fall rate, outputs enabled	$\Delta t/\Delta V$	-	10	ns/V	
Operating ambient temperature range in free air	T_{amb}	-40	+85	°C	

LOGIC

Low-voltage series

INTEGRATED CIRCUITS

GENERAL PURPOSE

DC family characteristics for the LVT16 series

Over recommended operating conditions
 Voltages are referenced to GND (ground = 0 V)

parameter	V _{CC} V	symbol	T _{amb} (°C) -40 to +85			unit	conditions	
			min.	typ. ¹	max.		V _I	other
Input clamping voltage	2.7	V _{IK}	-	-	1.2	V		I _{IK} = -18 mA
HIGH level output voltage	2.7	V _{OH}	V _{CC} - 0.2	-	-	V		I _{OH} = -100 µA
	2.7		2.4	-	-		I _{OH} = -8 mA	
	3.0		2.0	-	-		I _{OH} = -32 mA	
LOW level output voltage	2.7	V _{OL}	-	-	0.2	V		I _{OL} = 100 µA
	2.7		-	-	0.5		I _{OL} = 24 mA	
	3.0		-	-	0.4		I _{OL} = 16 mA	
	3.0		-	-	0.5		I _{OL} = 32 mA	
	3.0		-	-	0.55		I _{OL} = 64 mA	
Power-up output LOW voltage ⁵	3.6	V _{RST}	-	-	0.55	V	V _{CC} or GND	I _O = 1 mA
Input leakage current								
all pins	0 or 3.6	I _I	-	-	10	µA	5.5 V	
control pins	3.6		-	-	±1		V _{CC} or GND	
I/O pins ⁴	3.6		-	-	10		V _{CC}	
I/O pins ⁴	3.6		-	-	20		5.5	
data pins ⁴	3.6		-	-	1		V _{CC}	
data pins ⁴	3.6		-	-	-5		0 V	
Output off current	0	I _{OFF}	-	-	±100	µA		V _I or V _O = 0 to 4.5 V
Bus hold current A or B outputs	3.0	I _{HOLD}	75	-	-	µA	0.8 V	
	3.0		-75	-	-		2.0 V	
Current into an output in the HIGH state when V _O > V _{CC}	3.0	I _{EX}	-	-	125	µA		V _O = 5.5 V
Quiescent supply current	3.6	I _{CCH}	-	-	0.12	mA	V _{CC} or GND	I _O = 0
Quiescent supply current	3.6	I _{CCL}	-	-	6	mA	V _{CC} or GND	I _O = 0
Quiescent supply current	3.6	I _{CCZ}	-	-	0.12	mA	V _{CC} or GND	I _O = 0
Additional supply current per input pin ²	3.0 .. 3.6	ΔI _{CC}	-	-	200	µA		one input at V _{CC} - 0.6 V; other inputs at V _{CC} or GND
Power-up/down 3-state output current ³	≤1.2	I _{PUPD}	-	-	±100	µA	V _{CC} or GND	V _O = 0.5 V to V _{CC} ; OE = don't care
Input capacitance		C _I	-	4	-	pF	0 or 3 V	
Output capacitance		C _O	-	10	-	pF	0 or 3 V	

Notes:

- All typical values are measured at V_{CC} = 3.3 V and T_{amb} = 25°C.
- This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.
- This parameter is valid for any V_{CC} between 0 V and 1.2 V with a transition time of up to 10 ms. From V_{CC} = 1.2 V to V_{CC} = 3.3 V, a transition time of 100 µs is permitted. This parameter is valid at T_{amb} = 25°C.
- Unused pins at V_{CC} or GND.
- This applies to parts with storage cells. For valid results, data must not be loaded in the flip-flops (or latches) after applying the power.

**INTEGRATED CIRCUITS
GENERAL PURPOSE**

**LOGIC
Low-voltage series**

LOW-VOLTAGE SERIES

LV LVC LVC16 HLL ALVC LVT LVT16

AND GATES

08	Quad 2-input AND gate	
11	Triple 3-input AND gate	

COMPLEX GATES

51	Dual 2-wide 2-input AND-OR-invert gate	
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EXCLUSIVE-OR GATES

86	Quad 2-input EXCLUSIVE-OR gate	
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NAND GATES

00	Quad 2-input NAND gate	
03	Quad 2-input NAND gate; open drain	
10	Tripe 3-input NAND gate	
20	Dual 4-input NAND gate	
30	8-input NAND gate	
38	Quad 2-input NAND buffer; open collector	
40	Dual 4-input NAND buffer	

NOR GATES

02	Quad 2-input NOR gate	
27	Triple 3-input NOR gate	

OR GATES

32	Quad 2-input OR gate	
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INVERTERS

04	Hex inverter	
U04	Hex inverter (unbuffered)	

BUFFERS/LINE DRIVERS

125	Quad buffer/line driver; 3-state	
126	Quad buffer/line driver; 3-state	
240	Octal buffer/line driver; 3-state; inverting	
2240A	16-bit buffer/line drivers with 30 Ω termination resistors; 3-state; inverting	
240A	16-bit buffer/line drivers; 3-state; inverting	
241	Octal buffer/line driver; 3-state	
244	Octal buffer/line driver; 3-state	
2244	Octal 30 Ω terminated buffer/line driver; 3-state	
244A	Octal buffer/line driver; 3-state	
2244B	16-bit 30 Ω terminated buffer/line drivers; 3-state	



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244B	16-bit buffer/line drivers; 3-state	
365	Hex buffer/line driver; 3-state	
367	Hex buffer/line driver; 3-state	
368	Hex inverter buffer/driver; 3-state	
540	Dual octal buffer/line driver; 3-state; inverting	
541	Octal buffer/line driver; 3-state	
541A	16-bit buffer/line driver; 3-state	
827	10-bit buffer line driver; non-inverting; 3-state	
827A	20-bit buffer line driver; non-inverting; 3-state	

COUNTERS

161	Presetable synchronous 4-bit binary counter; asynchronous reset	
163	Presetable synchronous 4-bit binary counter; synchronous reset	
191	Presetable synchronous 4-bit binary up/down counter	
193	Presetable synchronous 4-bit binary up/down counter	
269	Presetable synchronous 8-bit bidirectional binary counter	
393	Dual 4-bit binary ripple counter	
579	Octal bidirectional binary counter; common I/O	
4020	14-stage binary ripple counter	
4040	12-stage binary ripple counter	
4060	14-stage binary ripple counter with oscillator	

DECODERS/DEMULPLEXERS

138	3-to-8 line decoder/demultiplexer; inverting	
139	Dual 2-to-4 line decoder/demultiplexer	
154	4-to-16 line decoder/demultiplexer	

D-TYPE PLIP/FLOPS

74	Dual D-type flip-flop with set and reset; pos.-edge trig.	
174	Hex D-type flip-flop with reset; positive-edge trigger	
175	Quad D-type flip-flop with reset; positive edge-trigger	
273	Octal D-type flip-flop with reset; positive edge-trigger	
273A	16-bit D-type flip-flop	
373	Octal D-type transparent latch; 3-state	
373A	16-bit D-type transparent latch; 3-state	
374	Octal D-type flip-flop; positive-edge trigger; 3-state	
374A	16-bit edge triggered D-type flip-flop; 3-state	
377	Octal D-type flip-flop with data enable; pos.-edge trigger	
533	Octal D-type transparent latch; 3-state; inverting	
534	Octal D-type flip-flop; positive-edge trigger; 3-state; inv.	
573	Octal D-type transparent latch; 3-state	
574	Octal D-type flip-flop; positive-edge trigger; 3-state	

JK FLIP-FLOPS

107	Dual JK flip-flop with reset; negative-edge trigger	
109	Dual JK flip-flop with set and reset; positive edge trigger	

**INTEGRATED CIRCUITS
GENERAL PURPOSE**

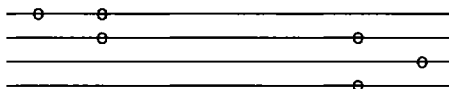
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LOW-VOLTAGE SERIES

LV LVC LVC16 HLL ALVC LVT LVT16

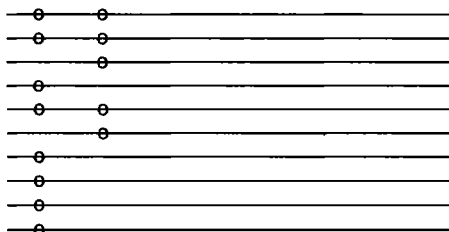
LATCHES

- 259 Octal addressable latch
- 841 10-bit bus interface latch; non-inverting; 3-state
- 841A 20-bit bus interface latch; non-inverting; 3-state
- 843 9-bit bus interface latch; 3-state



MULTIPLEXERS/DEMULTIPLEXERS

- 153 Dual 4-input multiplexer
- 157 Quad 2-input multiplexer
- 158 Quad 2-to-1 data selector/multiplexer; inverting
- 251 8-input multiplexer; 3-state
- 257 Quad 2-input multiplexer; 3-state
- 258 Quad 2-to-1 data selector/multiplexer; inverting; 3-state
- 4051 8-channel analog multiplexer/demultiplexer
- 4052 Dual 4-channel analog multiplexer/demultiplexer
- 4053 Triple 2 channel analog multiplexer/demultiplexer
- 4067 16-channel analog multiplexer/demultiplexer



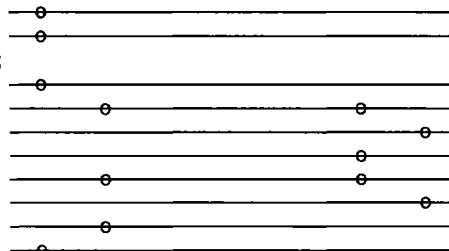
MULTIVIBRATORS

- 123 Dual retriggerable monostable multivibrator with reset



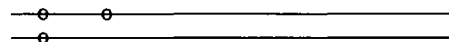
REGISTERS

- 164 Octal serial-in/parallel-out shift register
- 165 Octal parallel in/serial out shift register
- 595 Octal serial-in/serial-out shift register with output latches; 3-state
- 821 10-bit bus interface register; non-inverting; 3-state
- 821A 20-bit bus interface register; non-inverting; 3-state
- 821-1 10-bit bus interface register; non-inverting; 3-state
- 823 9-bit bus interface register; non-inverting; 3-state
- 823A 18-bit bus interface register; non-inverting; 3-state
- 825 Octal bus interface register
- 4094 8-stage shift-and-store bus register



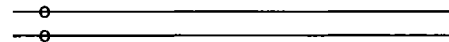
SCHMITT TRIGGERS

- 14 Hex inverting Schmitt trigger
- 132 Quad 2-input NAND Schmitt trigger



SWITCHES

- 4066 Quad bilateral switches
- 4316 Quad bilateral switches; separate analog ground



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TRANSCEIVERS

245	Octal bus transceiver; 3-state	
245-1	Octal 30 Ω terminated transceiver with direction pin; 3-state	
245B	16-bit bus transceiver with direction pin; 3-state	
2245	16-bit 30 Ω terminated transceiver with direction pin; 3-state	
2245B	16-bit 30 Ω terminated transceiver with direction pin; 3-state	
470	16-bit registered transceiver; 3-state	
500	18-bit universal bus transceiver; 3-state	
500A	18-bit universal bus transceiver; 3-state	
501	18-bit universal bus transceiver; 3-state	
501A	18-bit universal bus transceiver; 3-state	
543	Octal registered transceiver; non-inverting; 3-state	
543-1	Octal registered transceiver; non-inverting; 3-state	
2543	Octal 30 Ω terminated registered transceiver; non-inverting; 3-state	
543A	16-bit registered transceiver; 3-state	
544	Octal registered transceiver; inverting; 3-state	
600	18-bit universal bus transceiver; 3-state	
601	18-bit universal bus transceiver; 3-state	
620	Octal bus transceiver; inverting; 3-state	
623	Octal bus transceiver; non-inverting; 3-state	
640	Octal bus transceiver; 3-state; inverting	
646	Octal bus transceiver/register; 3-state	
646A	16-bit bus transceiver; 3-state	
648	Octal bus transceiver/register; 3-state; inverting	
651	Octal transceiver/register; inverting; 3-state	
652	Octal registered bus transceiver	
652A	16-bit bus transceiver/registers; 3-state	
899	16-bit latched transceiver; 3-state	
952	Octal registered transceiver; 3-state	
952A	16-bit registered transceiver; 3-state	
953	Octal registered transceiver; inverting; 3-state	
2952	8-bit transceiver; non-inverting; 3-state	

TRANSLATORS AND TRANSCEIVERS

4245	Octal dual supply translating transceiver; 3-state; 3V/5V level shifter	
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SPECIAL FUNCTIONS

4799	NiMH battery management circuit	
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Note:

All ALVC, ALVC16 and LVT16 devices have double-byte, 18-, or 20-bit functionality.