STV7733

320 output dot-matrix display driver

Preliminary Data

Features

- High-voltage, row/column driver IC
- 320, tri-level (high-voltage, medium voltage and ground) power outputs:
  - capable of operating at 90V, absolute max.
  - capable of sinking or sourcing 2mA
  - Hi-Z
- Logic supply range: 2.5V to 3.3V
- Slim shape die for COG, COF and TCP solutions
- Interface:
  - four dual (2-bit) input serial buses: DB_A[1:2], DB_B[1:2], DB_C[1:2] and DB_D[1:2] operating at shift clock frequency of 10MHz, max.
  - three control inputs: shift clock direction (DIR), chip select (/CS) and data latch (/DL)
  - two “all output” stage control inputs: AOC1 and AOC2
- Power supplies:
  - high-voltage for power outputs: 90V, max.
  - logic supply suitable for battery powered applications: 2.5V, min.

Description

The STV7733 device is a low-power, controller/driver IC for dot-matrix displays. Data is encoded on two bits to select one of four possible output states: high level, medium level, ground or high impedance (Hi-Z).

Inputs AOC1 and AOC2 control the all output stages simultaneously to select one of five possible configurations: high level, medium level, ground, Hi-Z or data through.

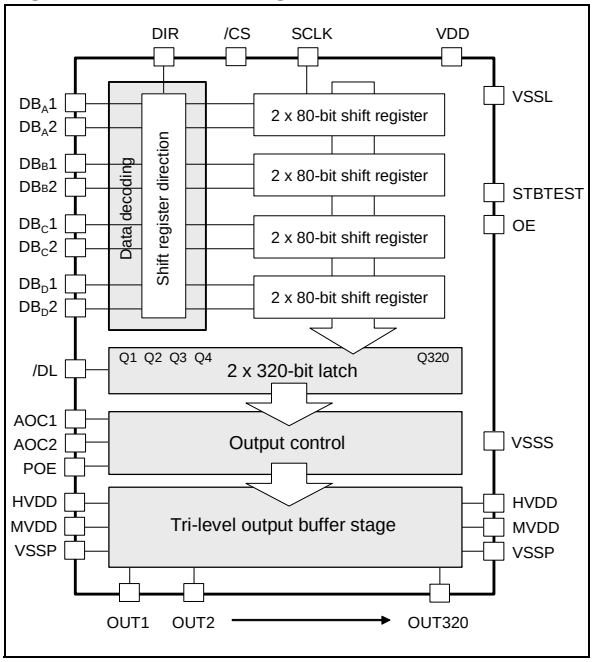
Except for the data through mode, the configuration selected by AOC1 and AOC2 is applied to all outputs at the same time.

The STV7733 communicates with the host controller through an 8-bit parallel interface. The input data bus is organized as four, 2 x 80-bit shift registers operating in parallel at a maximum clock frequency of 10MHz.

Logic inputs are LVCMOS compatible.

The STV7733 is available in bumped die form. Bumped die can be assembled in either a TCP or COG module.

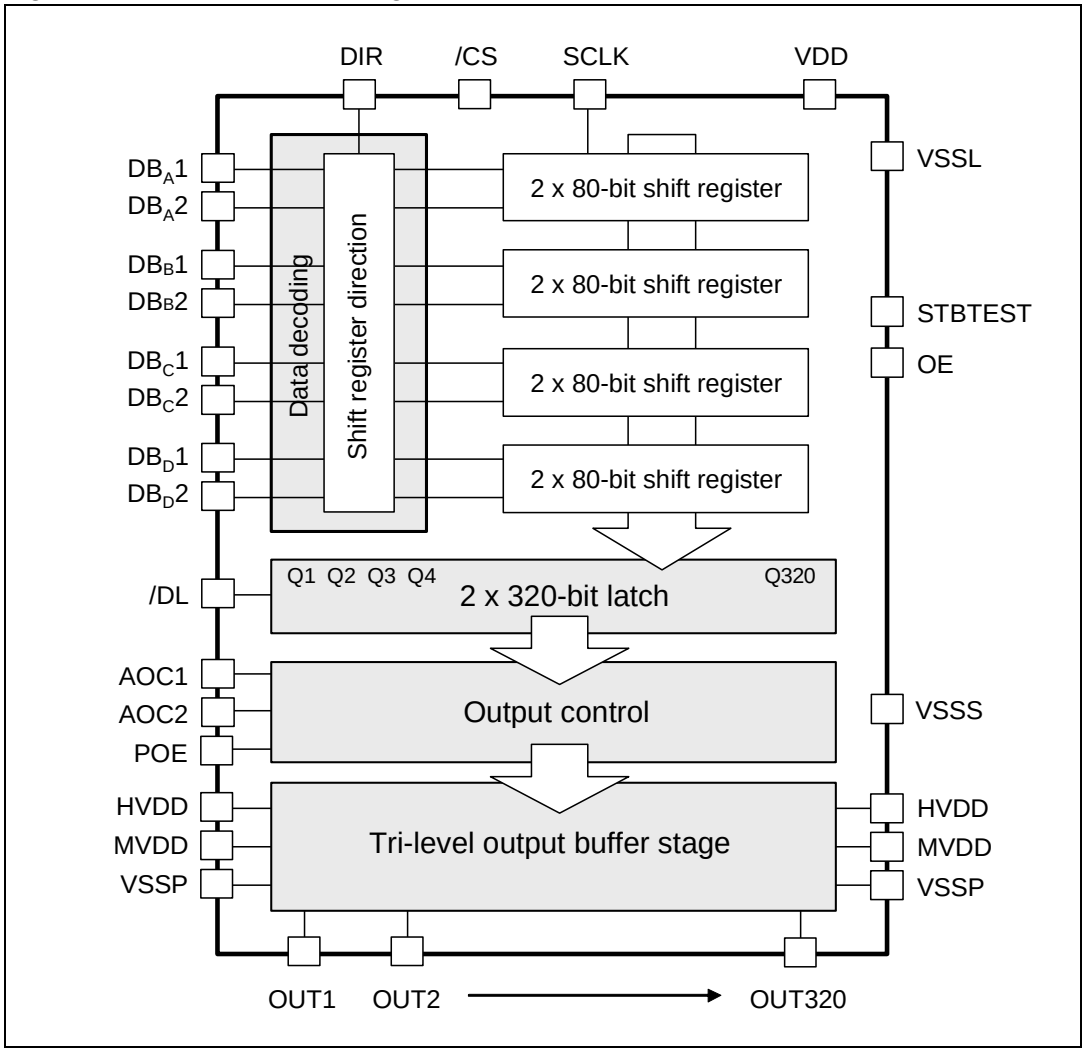
Figure 1. Block diagram



Contents

1 Block diagram

Figure 2. STV7733 block diagram



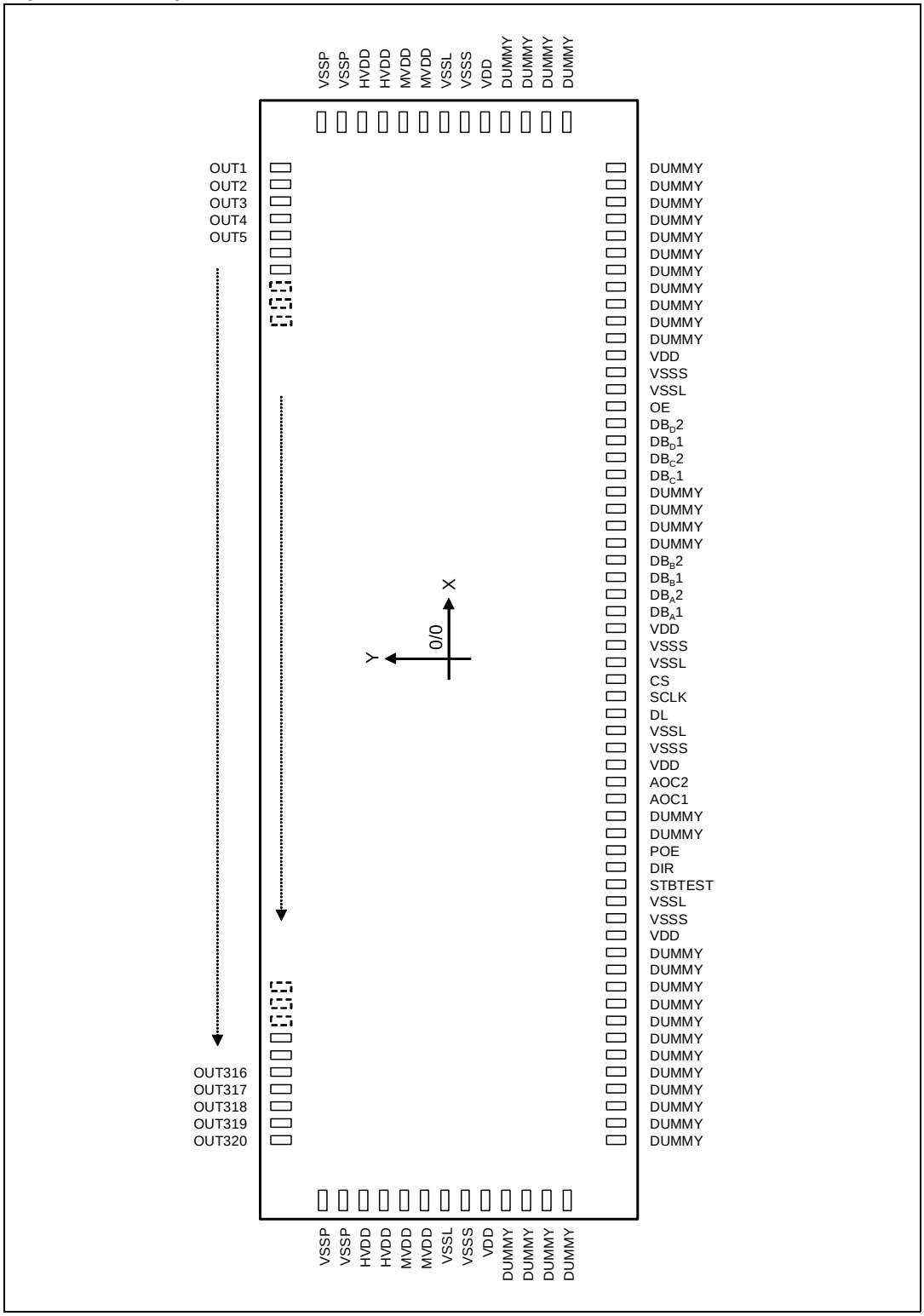
2 Pin description

Table 1. STV7733 pin description

Pin name		Pin type (I/O)	Pin description
Power supplies	HVDD	I	Output buffer - high-voltage supply
	MVDD	I	Output buffer - medium voltage supply
	VSSP	I	Output buffer - ground level
	VDD	I	Logic power supply
	VSSL	I	Logic ground
	VSSS	I	Chip substrate level
Input logic block	DB_A[1:2]	I	Input data bus, 2-bit serial interface
	DB_B[1:2]	I	Input data bus, 2-bit serial interface
	DB_C[1:2]	I	Input data bus, 2-bit serial interface
	DB_D[1:2]	I	Input data bus, 2-bit serial interface
	SCLK	I	Data shift clock
	DIR	I	Shift clock direction
	/CS	I	Chip select (0 = select, 1 = un-select)
	/DL	I	Data latch. Shift register data is transferred to the driver outputs at the falling edge of this pulse.
Power output control	AOC1	I	“All-output” control (all HVDD, all MVDD, all VSSP, data through mode) selection pin
	AOC2	I	“All-output” control (all HVDD, all MVDD, all VSSP, data through mode) selection pin
	POE	I	Power output enable
Power outputs	OUT1to OUT320	O	High-voltage power outputs
Test	STBTEST	I	Must be grounded
	OE	I	Must be grounded

3 Die pinout

Figure 3. Die pinout



4 Data bus configuration

Below, *Table 2* describes the position of the first data sampled by the first rising edge of the SCLK clock. For the first configuration described in *Table 2*, that is, with input DIR = “H”, data on the 2-bit bus DB_A is sampled by the first SCLK clock pulse and appears on power output OUT1. After 80 clock pulses, data on OUT1 will be shifted to OUT317 - on the high-to-low transition of input /DL. Input /CS is the chip select.

Table 2. Data bus configuration

/CS	DIR	Input	Position	SCLK pulse number					Comment
				OUT1	OUT2	…	OUT79	OUT80	
L	H	DB_A[1:2]	OUT	01	05		313	317	Left/Right shift
		DB_B[1:2]	OUT	02	06		314	318	
		DB_C[1:2]	OUT	03	07		315	319	
		DB_D[1:2]	OUT	04	08		316	320	
L	L	DB_A[1:2]	OUT	320	316		08	04	Right/Left shift
		DB_B[1:2]	OUT	319	315		07	03	
		DB_C[1:2]	OUT	318	314		06	02	
		DB_D[1:2]	OUT	317	313		05	01	

Note: Data is transferred from the shift register to a latch block and then on to power output stages on the falling edge of input /DL, see Figure 2.

All output data is stored and held in the latch block on the rising edge of the input /DL, see Figure 2.

5 Power output stage

The power output stage is defined by a set of three switches that can select three different output voltages (HV_{DD}, MV_{DD} or V_{SSP}). These switches can also be all opened to configure the output stage in a high impedance (Hi-Z) mode.

Depending on the configuration of logic inputs AOC1 and AOC2, the power output stage is configured in either a “data through” mode or a “simultaneous” mode. In the “data through” mode (for AOC1 = AOC2 = “L”), the power output stage converts the 2-bit encoded data that was loaded into the latch stage for each column into a high-voltage level that appears on the output pin. When AOC1 and AOC2 are not both “L”, the power outputs can all operate simultaneously - going to V_{SSP}, MV_{DD} or HV_{DD} depending on AOC1 and AOC2 as described below in *Table 3*.

Table 3. Power output truth table

DBn[1]	DBn[2]	POE	AOC1	AOC2	OUTn	Comment
X	X	L	X	X	All Hi-Z	(1)
L	L	H	L	L	Hi-Z	(2)
H	L	H	L	L	V_{SSP}	(2)
H	H	H	L	L	MV_{DD}	(2)
L	H	H	L	L	HV_{DD}	(2)
X	X	H	H	L	All V_{SSP}	(3)
X	X	H	L	H	All MV_{DD}	(3)
X	X	H	H	H	All HV_{DD}	(3)

1. With input POE = “L”, all power outputs are not active, that is, they are all in Hi-Z.
2. Data through mode: each power output depends on the DBn[1:2] value at the falling edge of input /DL.
3. Output simultaneous mode: all power outputs depend on the “H”/”L” input values for AOC1 and AOC2.

6 Absolute maximum ratings

Table 4. Absolute maximum ratings

Symbol	Parameter	Value	Units
V_{DD}	Logic supply range	-0.3, +7	V
HV_{DD}	Driver supply range	-0.3, +90	V
MV_{DD}	Driver supply range	-0.3, + HVdd -10	V
V_{IN}	Logic input voltage range	-0.3, VDD + 0.3	V
I_{POUT}	Driver output current	±5	mA
V_{OUT}	Power output voltage range	-0.3, +90	V
V_{ESD}	ESD susceptibility, Human Body model (100pF discharged through 1.5kohms)	2.0	kV
Tjmax	Maximum junction temperature	100	℃
Tstg	Storage temperature range	-50, +150	℃

7 Electrical characteristics

V_{DD} = 3V, HV_{DD} = 70V, MV_{DD} = 35V, V_{SSP} = 0V, V_{SSL} = 0V, V_{SSS} = 0V, T_{amb} = 25°C, F = 10MHz, unless otherwise specified.

Table 5. Electrical characteristics

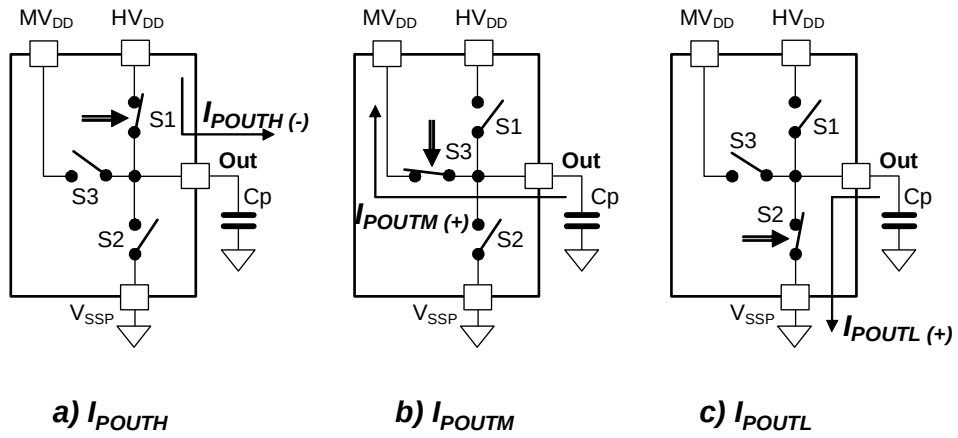
Symbol	Parameter	Min.	Typ.	Max.	Units
Supply					
V_{DD}	V_{DD} supply voltage	2.5	3	3.3	V
I_{DD}	V_{DD} supply current with no clock, all logic inputs set to either 0V or V_{DD} and all power outputs in Hi-Z	-	-	0.5	µA
I_{DD1}	V_{DD} dynamic supply current @ clock frequency = 5MHz (data frequency is 2.5MHz)	-	3	-	mA
I_{DD2}	V_{DD} dynamic supply current @ clock frequency = 100kHz (data frequency = 50kHz(1)	-	0.1	-	mA
HV_{DD}	HV_{DD} supply voltage	15		80	V
MV_{DD}	MV_{DD} supply voltage(2)	15		70	V
I_{PP}	HV_{DD} supply current in steady state	-	-	10	µA
OUT1 to OUT320					
V_{HPOUTH}	Power output high level (voltage difference versus HVDD) @ I_{HPOUTH} = -0.5mA and HV_{DD} = 80V	-	-	-10	V
V_{MPOUTH}	Power output medium level (voltage difference versus MVDD) @ I_{MPOUTH} = + 0.5mA and MV_{DD} = 40V @ I_{MPOUTL} = - 0.5mA and MV_{DD} = 40V	- -	- -	+10 -10	V V
V_{POUTL}	Power output low level @ I_{POUTL} = + 0.5mA	-	-	+10	V
I_{POUTH}	Output current from HV_{DD}, MV_{DD} (see *Figure 4*) 1) HV_{DD} = 80V, MV_{DD} = 40V 2) HV_{DD} = 60V, MV_{DD} = 30V	 -1.42 -0.7		-	 mA mA
I_{POUTM}	Output current from output to MV_{DD} (*Figure 4*) 1) HV_{DD} = 80V and MV_{DD} = 40V 2) HV_{DD} = 60V and MV_{DD} = 30V	 +1.5 +0.7			 mA mA
I_{POUTL}	Output current from output to V_{SSP} @ Vdd=2.5V (*Figure 4*) 1) HV_{DD} = 80V and MV_{DD} = 40V	+1.5		-	mA
I_{HiZ}	Output current during Hi-Z mode @ V_{DD} = 2.5V, HV_{DD} = 80V and MV_{DD} = 40V	-		10	µA

Table 5. Electrical characteristics (continued)

Symbol	Parameter	Min.	Typ.	Max.	Units
SCLK, DIR, /CS, DBn[1:2], /DL, AOC1, AOC2 and POE					
V_{IH}	High level input voltage (% of V_{DD})	70	-	-	%
V_{IL}	Low level input voltage (% of V_{DD})	-	-	30	%
I_{IH}	High level input current @ $V_{IH} > 0.7 \times V_{DD}$	-	-	5	µA
I_{IL}	Low level input current @ $V_{IL} = 0V$	-	-	5	µA

1. This measurement is performed during device evaluation - it is not tested on all devices.
2. HV_{DD} must be greater than MV_{DD} under all conditions.

Figure 4. Sink/source current capability test of power outputs



a) I_{POUTH} *b) I_{POUTM}* *c) I_{POUTL}*

Reminder:
- *Current going into the device is a "sinking" current, considered as "positive"*
- *Current coming out of the device is a "sourcing" current, considered as "negative"*

8 AC timing requirements

V_{DD} = 2.5V to 3.3V, T_{amb} = - 20°C to +70°C,
input signal edge maximum rise and fall times (tr, tf) = 5ns.

Table 6. AC timing requirements

Symbol	Parameter	Min.	Typ.	Max.	Units
t_{SCLK}	Data clock period	100	-	-	ns
t_{WHSCLK}	Clock pulse duration at high level	40	-	-	ns
t_{WLSCLK}	Clock pulse duration at low level	40	-	-	ns
t_{SDAT}	Input data set-up time before low-to-high clock transition	25	-	-	ns
t_{HDAT}	Input data hold-time after low-to-high clock transition	25	-	-	ns
t_{SCS}	/CS set-up time before low-to-high clock transition	40	-	-	ns
t_{HCS}	/CS hold-time after low-to-high clock transition	25	-	-	ns
t_{HDL}	/DL hold-time after low-to-high transition of /CS	25	-	-	ns
t_{DL}	Low level pulse duration	25	-	-	ns
t_{SDL}	/DL set-up time before low-to-high transition of /CS	475			ns

9 AC Timing characteristics

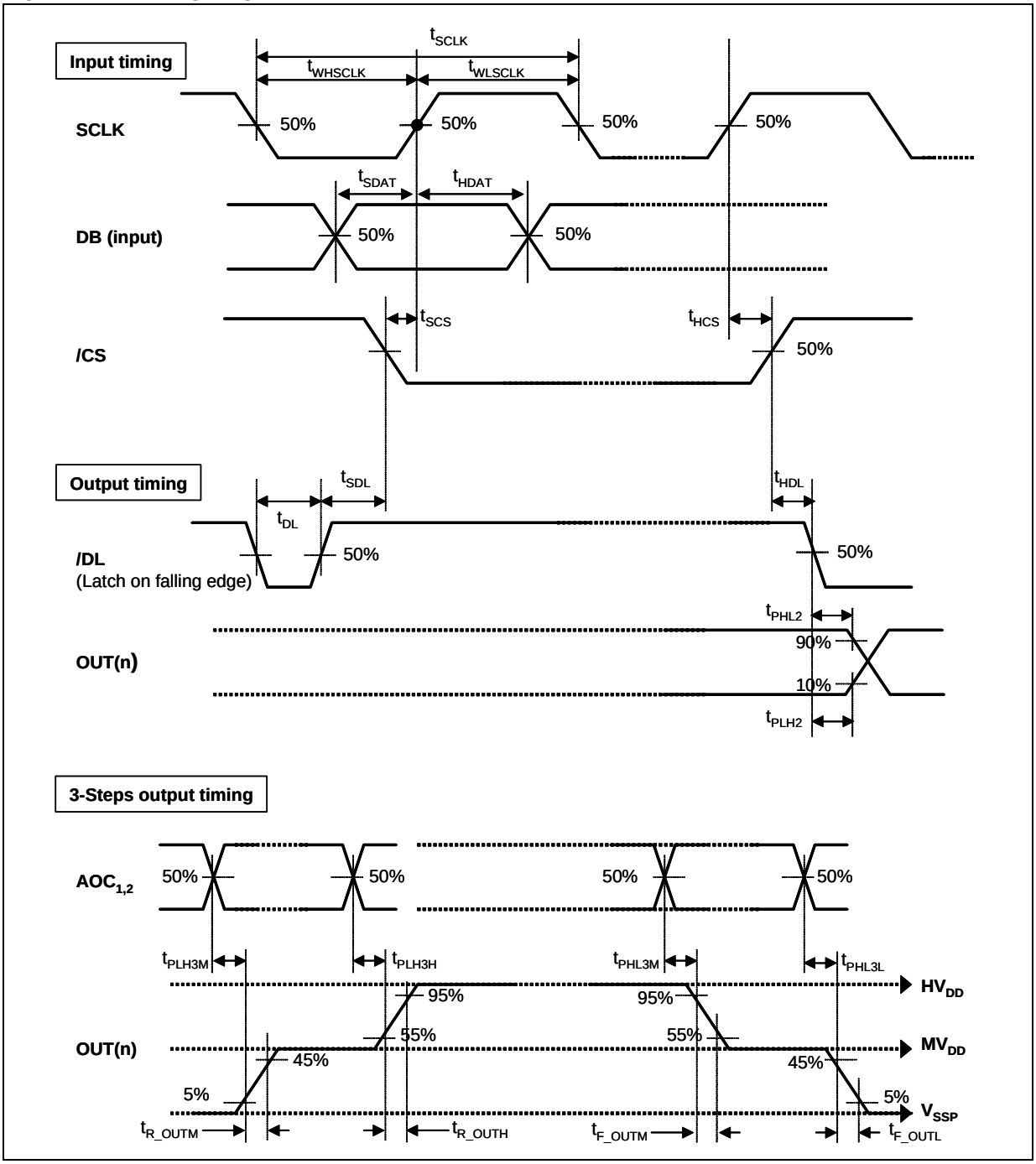
V_{DD} = 3V, HV_{DD} = 70V, MV_{DD} = 35V, V_{SSP} = 0V, V_{SSL} = 0V, V_{SSS} = 0V, T_{amb} = 25°C, F = 5MHz, C_{load} = 10pF, unless otherwise specified (V_{ILMAX} = 0.3 × V_{DD}, V_{IHMIN} = 0.7 × V_{DD}).

Table 7. AC timing characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units
t_{PHL2} t_{PLH2}	Delay between /DL transition and change in level of power output @ V_{DD} = 3V (see *Figure 5*) 1. OUT1 and OUT320 2. OUT160 and OUT161	 - -	 150 500	 250 850	 ns ns
t_{PLH3M} t_{PLH3H} t_{PHL3M} t_{PHL3L}	Delay between $AOC_{1,2}$ transitions and change in level of power output (see *Figure 5*) 1. OUT1 and OUT320 2. OUT160 and OUT161	 - -	 150 500	 250 850	 ns ns
t_{R_OUTM} t_{R_OUTH} t_{F_OUTM} t_{F_OUTL}	Output transition time for one single power output with VDD = 3V, MVDD = 35V and HVDD = 70V (see *Figure 5*) Output rise time from V_{SSP} to MV_{DD} Output rise time from MV_{DD} to HV_{DD} Output fall time from HV_{DD} to MV_{DD} Output fall time from MV_{DD} to V_{SSP}	 - - - -	 400 500 800 200		 ns ns ns ns

10 Timing

Figure 5. Timing diagram



11 Pad dimensions (in microns)/pad positions

The reference (x=0, y=0) is the center of the die. Bump pad pitch: 68µm, minimum (on the power output side of the die).

Table 8. Die size

	Dimension	Units
Die size without scribe		
X	22440	µm
Y	1550	µm
Die size with scribe		
X	22550	µm
Y	1660	µm

Pad placement coordinate values correspond to the center of each bump pad center.

Number of pads: 404

Table 9. Pad placement and bump dimensions (in microns)

Lead pad name	Pad placements		Bump dimensions(1)	
	X	Y	X	Y
OUT320	-10845.9	600.6	51.0	73.1
OUT319	-10777.9	600.6	51.0	73.1
OUT318	-10709.9	600.6	51.0	73.1
OUT317	-10641.9	600.6	51.0	73.1
OUT316	-10573.9	600.6	51.0	73.1
OUT315	-10505.9	600.6	51.0	73.1
OUT314	-10437.9	600.6	51.0	73.1
OUT313	-10369.9	600.6	51.0	73.1
OUT312	-10301.9	600.6	51.0	73.1
OUT311	-10233.9	600.6	51.0	73.1
OUT310	-10165.9	600.6	51.0	73.1
OUT309	-10097.9	600.6	51.0	73.1
OUT308	-10029.9	600.6	51.0	73.1
OUT307	-9961.9	600.6	51.0	73.1
OUT306	-9893.9	600.6	51.0	73.1
OUT305	-9825.9	600.6	51.0	73.1
OUT304	-9757.9	600.6	51.0	73.1
OUT303	-9689.9	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT302	-9621.9	600.6	51.0	73.1
OUT301	-9553.9	600.6	51.0	73.1
OUT300	-9485.9	600.6	51.0	73.1
OUT299	-9417.9	600.6	51.0	73.1
OUT298	-9349.9	600.6	51.0	73.1
OUT297	-9281.9	600.6	51.0	73.1
OUT296	-9213.9	600.6	51.0	73.1
OUT295	-9145.9	600.6	51.0	73.1
OUT294	-9077.9	600.6	51.0	73.1
OUT293	-9009.9	600.6	51.0	73.1
OUT292	-8941.9	600.6	51.0	73.1
OUT291	-8873.9	600.6	51.0	73.1
OUT290	-8805.9	600.6	51.0	73.1
OUT289	-8737.9	600.6	51.0	73.1
OUT288	-8669.9	600.6	51.0	73.1
OUT287	-8601.9	600.6	51.0	73.1
OUT286	-8533.9	600.6	51.0	73.1
OUT285	-8465.9	600.6	51.0	73.1
OUT284	-8397.9	600.6	51.0	73.1
OUT283	-8329.9	600.6	51.0	73.1
OUT282	-8261.9	600.6	51.0	73.1
OUT281	-8193.9	600.6	51.0	73.1
OUT280	-8125.9	600.6	51.0	73.1
OUT279	-8057.9	600.6	51.0	73.1
OUT278	-7989.9	600.6	51.0	73.1
OUT277	-7921.9	600.6	51.0	73.1
OUT276	-7853.9	600.6	51.0	73.1
OUT275	-7785.9	600.6	51.0	73.1
OUT274	-7717.9	600.6	51.0	73.1
OUT273	-7649.9	600.6	51.0	73.1
OUT272	-7581.9	600.6	51.0	73.1
OUT271	-7513.9	600.6	51.0	73.1
OUT270	-7445.9	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT269	-7377.9	600.6	51.0	73.1
OUT268	-7309.9	600.6	51.0	73.1
OUT267	-7241.9	600.6	51.0	73.1
OUT266	-7173.9	600.6	51.0	73.1
OUT265	-7105.9	600.6	51.0	73.1
OUT264	-7037.9	600.6	51.0	73.1
OUT263	-6969.9	600.6	51.0	73.1
OUT262	-6901.9	600.6	51.0	73.1
OUT261	-6833.9	600.6	51.0	73.1
OUT260	-6765.9	600.6	51.0	73.1
OUT259	-6697.9	600.6	51.0	73.1
OUT258	-6629.9	600.6	51.0	73.1
OUT257	-6561.9	600.6	51.0	73.1
OUT256	-6493.9	600.6	51.0	73.1
OUT255	-6425.9	600.6	51.0	73.1
OUT254	-6357.9	600.6	51.0	73.1
OUT253	-6289.9	600.6	51.0	73.1
OUT252	-6221.9	600.6	51.0	73.1
OUT251	-6153.9	600.6	51.0	73.1
OUT250	-6085.9	600.6	51.0	73.1
OUT249	-6017.9	600.6	51.0	73.1
OUT248	-5949.9	600.6	51.0	73.1
OUT247	-5881.9	600.6	51.0	73.1
OUT246	-5813.9	600.6	51.0	73.1
OUT245	-5745.9	600.6	51.0	73.1
OUT244	-5677.9	600.6	51.0	73.1
OUT243	-5609.9	600.6	51.0	73.1
OUT242	-5541.9	600.6	51.0	73.1
OUT241	-5473.9	600.6	51.0	73.1
OUT240	-5405.9	600.6	51.0	73.1
OUT239	-5337.9	600.6	51.0	73.1
OUT238	-5269.9	600.6	51.0	73.1
OUT237	-5201.9	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT236	-5133.9	600.6	51.0	73.1
OUT235	-5065.9	600.6	51.0	73.1
OUT234	-4997.9	600.6	51.0	73.1
OUT233	-4929.9	600.6	51.0	73.1
OUT232	-4861.9	600.6	51.0	73.1
OUT231	-4793.9	600.6	51.0	73.1
OUT230	-4725.9	600.6	51.0	73.1
OUT229	-4657.9	600.6	51.0	73.1
OUT228	-4589.9	600.6	51.0	73.1
OUT227	-4521.9	600.6	51.0	73.1
OUT226	-4453.9	600.6	51.0	73.1
OUT225	-4385.9	600.6	51.0	73.1
OUT224	-4317.9	600.6	51.0	73.1
OUT223	-4249.9	600.6	51.0	73.1
OUT222	-4181.9	600.6	51.0	73.1
OUT221	-4113.9	600.6	51.0	73.1
OUT220	-4045.9	600.6	51.0	73.1
OUT219	-3977.9	600.6	51.0	73.1
OUT218	-3909.9	600.6	51.0	73.1
OUT217	-3841.9	600.6	51.0	73.1
OUT216	-3773.9	600.6	51.0	73.1
OUT215	-3705.9	600.6	51.0	73.1
OUT214	-3637.9	600.6	51.0	73.1
OUT213	-3569.9	600.6	51.0	73.1
OUT212	-3501.9	600.6	51.0	73.1
OUT211	-3433.9	600.6	51.0	73.1
OUT210	-3365.9	600.6	51.0	73.1
OUT209	-3297.9	600.6	51.0	73.1
OUT208	-3229.9	600.6	51.0	73.1
OUT207	-3161.9	600.6	51.0	73.1
OUT206	-3093.9	600.6	51.0	73.1
OUT205	-3025.9	600.6	51.0	73.1
OUT204	-2957.9	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT203	-2889.9	600.6	51.0	73.1
OUT202	-2821.9	600.6	51.0	73.1
OUT201	-2753.9	600.6	51.0	73.1
OUT200	-2685.9	600.6	51.0	73.1
OUT199	-2617.9	600.6	51.0	73.1
OUT198	-2549.9	600.6	51.0	73.1
OUT197	-2481.9	600.6	51.0	73.1
OUT196	-2413.9	600.6	51.0	73.1
OUT195	-2345.9	600.6	51.0	73.1
OUT194	-2277.9	600.6	51.0	73.1
OUT193	-2209.9	600.6	51.0	73.1
OUT192	-2141.9	600.6	51.0	73.1
OUT191	-2073.9	600.6	51.0	73.1
OUT190	-2005.9	600.6	51.0	73.1
OUT189	-1937.9	600.6	51.0	73.1
OUT188	-1869.9	600.6	51.0	73.1
OUT187	-1801.9	600.6	51.0	73.1
OUT186	-1733.9	600.6	51.0	73.1
OUT185	-1665.9	600.6	51.0	73.1
OUT184	-1597.9	600.6	51.0	73.1
OUT183	-1529.9	600.6	51.0	73.1
OUT182	-1461.9	600.6	51.0	73.1
OUT181	-1393.9	600.6	51.0	73.1
OUT180	-1325.9	600.6	51.0	73.1
OUT179	-1257.9	600.6	51.0	73.1
OUT178	-1189.9	600.6	51.0	73.1
OUT177	-1121.9	600.6	51.0	73.1
OUT176	-1053.9	600.6	51.0	73.1
OUT175	-985.9	600.6	51.0	73.1
OUT174	-917.9	600.6	51.0	73.1
OUT173	-849.9	600.6	51.0	73.1
OUT172	-781.9	600.6	51.0	73.1
OUT171	-713.9	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT170	-645.9	600.6	51.0	73.1
OUT169	-577.9	600.6	51.0	73.1
OUT168	-509.9	600.6	51.0	73.1
OUT167	-441.9	600.6	51.0	73.1
OUT166	-373.9	600.6	51.0	73.1
OUT165	-305.9	600.6	51.0	73.1
OUT164	-237.9	600.6	51.0	73.1
OUT163	-169.9	600.6	51.0	73.1
OUT162	-101.9	600.6	51.0	73.1
OUT161	-33.9	600.6	51.0	73.1
OUT160	34.1	600.6	51.0	73.1
OUT159	102.1	600.6	51.0	73.1
OUT158	170.1	600.6	51.0	73.1
OUT157	238.1	600.6	51.0	73.1
OUT156	306.1	600.6	51.0	73.1
OUT155	374.1	600.6	51.0	73.1
OUT154	442.1	600.6	51.0	73.1
OUT153	510.1	600.6	51.0	73.1
OUT152	578.1	600.6	51.0	73.1
OUT151	646.1	600.6	51.0	73.1
OUT150	714.1	600.6	51.0	73.1
OUT149	782.1	600.6	51.0	73.1
OUT148	850.1	600.6	51.0	73.1
OUT147	918.1	600.6	51.0	73.1
OUT146	986.1	600.6	51.0	73.1
OUT145	1054.1	600.6	51.0	73.1
OUT144	1122.1	600.6	51.0	73.1
OUT143	1190.1	600.6	51.0	73.1
OUT142	1258.1	600.6	51.0	73.1
OUT141	1326.1	600.6	51.0	73.1
OUT140	1394.1	600.6	51.0	73.1
OUT139	1462.1	600.6	51.0	73.1
OUT138	1530.1	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT137	1598.1	600.6	51.0	73.1
OUT136	1666.1	600.6	51.0	73.1
OUT135	1734.1	600.6	51.0	73.1
OUT134	1802.1	600.6	51.0	73.1
OUT133	1870.1	600.6	51.0	73.1
OUT132	1938.1	600.6	51.0	73.1
OUT131	2006.1	600.6	51.0	73.1
OUT130	2074.1	600.6	51.0	73.1
OUT129	2142.1	600.6	51.0	73.1
OUT128	2210.1	600.6	51.0	73.1
OUT127	2278.1	600.6	51.0	73.1
OUT126	2346.1	600.6	51.0	73.1
OUT125	2414.1	600.6	51.0	73.1
OUT124	2482.1	600.6	51.0	73.1
OUT123	2550.1	600.6	51.0	73.1
OUT122	2618.1	600.6	51.0	73.1
OUT121	2686.1	600.6	51.0	73.1
OUT120	2754.1	600.6	51.0	73.1
OUT119	2822.1	600.6	51.0	73.1
OUT118	2890.1	600.6	51.0	73.1
OUT117	2958.1	600.6	51.0	73.1
OUT116	3026.1	600.6	51.0	73.1
OUT115	3094.1	600.6	51.0	73.1
OUT114	3162.1	600.6	51.0	73.1
OUT113	3230.1	600.6	51.0	73.1
OUT112	3298.1	600.6	51.0	73.1
OUT111	3366.1	600.6	51.0	73.1
OUT110	3434.1	600.6	51.0	73.1
OUT109	3502.1	600.6	51.0	73.1
OUT108	3570.1	600.6	51.0	73.1
OUT107	3638.1	600.6	51.0	73.1
OUT106	3706.1	600.6	51.0	73.1
OUT105	3774.1	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions(1)	
	X	Y	X	Y
OUT104	3842.1	600.6	51.0	73.1
OUT103	3910.1	600.6	51.0	73.1
OUT102	3978.1	600.6	51.0	73.1
OUT101	4046.1	600.6	51.0	73.1
OUT100	4114.1	600.6	51.0	73.1
OUT99	4182.1	600.6	51.0	73.1
OUT98	4250.1	600.6	51.0	73.1
OUT97	4318.1	600.6	51.0	73.1
OUT96	4386.1	600.6	51.0	73.1
OUT95	4454.1	600.6	51.0	73.1
OUT94	4522.1	600.6	51.0	73.1
OUT93	4590.1	600.6	51.0	73.1
OUT92	4658.1	600.6	51.0	73.1
OUT91	4726.1	600.6	51.0	73.1
OUT90	4794.1	600.6	51.0	73.1
OUT89	4862.1	600.6	51.0	73.1
OUT88	4930.1	600.6	51.0	73.1
OUT87	4998.1	600.6	51.0	73.1
OUT86	5066.1	600.6	51.0	73.1
OUT85	5134.1	600.6	51.0	73.1
OUT84	5202.1	600.6	51.0	73.1
OUT83	5270.1	600.6	51.0	73.1
OUT82	5338.1	600.6	51.0	73.1
OUT81	5406.1	600.6	51.0	73.1
OUT80	5474.1	600.6	51.0	73.1
OUT79	5542.1	600.6	51.0	73.1
OUT78	5610.1	600.6	51.0	73.1
OUT77	5678.1	600.6	51.0	73.1
OUT76	5746.1	600.6	51.0	73.1
OUT75	5814.1	600.6	51.0	73.1
OUT74	5882.1	600.6	51.0	73.1
OUT73	5950.1	600.6	51.0	73.1
OUT72	6018.1	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT71	6086.1	600.6	51.0	73.1
OUT70	6154.1	600.6	51.0	73.1
OUT69	6222.1	600.6	51.0	73.1
OUT68	6290.1	600.6	51.0	73.1
OUT67	6358.1	600.6	51.0	73.1
OUT66	6426.1	600.6	51.0	73.1
OUT65	6494.1	600.6	51.0	73.1
OUT64	6562.1	600.6	51.0	73.1
OUT63	6630.1	600.6	51.0	73.1
OUT62	6698.1	600.6	51.0	73.1
OUT61	6766.1	600.6	51.0	73.1
OUT60	6834.1	600.6	51.0	73.1
OUT59	6902.1	600.6	51.0	73.1
OUT58	6970.1	600.6	51.0	73.1
OUT57	7038.1	600.6	51.0	73.1
OUT56	7106.1	600.6	51.0	73.1
OUT55	7174.1	600.6	51.0	73.1
OUT54	7242.1	600.6	51.0	73.1
OUT53	7310.1	600.6	51.0	73.1
OUT52	7378.1	600.6	51.0	73.1
OUT51	7446.1	600.6	51.0	73.1
OUT50	7514.1	600.6	51.0	73.1
OUT49	7582.1	600.6	51.0	73.1
OUT48	7650.1	600.6	51.0	73.1
OUT47	7718.1	600.6	51.0	73.1
OUT46	7786.1	600.6	51.0	73.1
OUT45	7854.1	600.6	51.0	73.1
OUT44	7922.1	600.6	51.0	73.1
OUT43	7990.1	600.6	51.0	73.1
OUT42	8058.1	600.6	51.0	73.1
OUT41	8126.1	600.6	51.0	73.1
OUT40	8194.1	600.6	51.0	73.1
OUT39	8262.1	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions(1)	
	X	Y	X	Y
OUT38	8330.1	600.6	51.0	73.1
OUT37	8398.1	600.6	51.0	73.1
OUT36	8466.1	600.6	51.0	73.1
OUT35	8534.1	600.6	51.0	73.1
OUT34	8602.1	600.6	51.0	73.1
OUT33	8670.1	600.6	51.0	73.1
OUT32	8738.1	600.6	51.0	73.1
OUT31	8806.1	600.6	51.0	73.1
OUT30	8874.1	600.6	51.0	73.1
OUT29	8942.1	600.6	51.0	73.1
OUT28	9010.1	600.6	51.0	73.1
OUT27	9078.1	600.6	51.0	73.1
OUT26	9146.1	600.6	51.0	73.1
OUT25	9214.1	600.6	51.0	73.1
OUT24	9282.1	600.6	51.0	73.1
OUT23	9350.1	600.6	51.0	73.1
OUT22	9418.1	600.6	51.0	73.1
OUT21	9486.1	600.6	51.0	73.1
OUT20	9554.1	600.6	51.0	73.1
OUT19	9622.1	600.6	51.0	73.1
OUT18	9690.1	600.6	51.0	73.1
OUT17	9758.1	600.6	51.0	73.1
OUT16	9826.1	600.6	51.0	73.1
OUT15	9894.1	600.6	51.0	73.1
OUT14	9962.1	600.6	51.0	73.1
OUT13	10030.1	600.6	51.0	73.1
OUT12	10098.1	600.6	51.0	73.1
OUT11	10166.1	600.6	51.0	73.1
OUT10	10234.1	600.6	51.0	73.1
OUT9	10302.1	600.6	51.0	73.1
OUT8	10370.1	600.6	51.0	73.1
OUT7	10438.1	600.6	51.0	73.1
OUT6	10506.1	600.6	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
OUT5	10574.1	600.6	51.0	73.1
OUT4	10642.1	600.6	51.0	73.1
OUT3	10710.1	600.6	51.0	73.1
OUT2	10778.1	600.6	51.0	73.1
OUT1	10846.1	600.6	51.0	73.1
VSSP	11142.5	675.5	73.1	51.0
VSSP	11142.5	607.5	73.1	51.0
HVDD	11142.5	505.5	73.1	51.0
HVDD	11142.5	437.5	73.1	51.0
MVDD	11142.5	335.5	73.1	51.0
MVDD	11142.5	267.5	73.1	51.0
VSSL	11142.5	164.7	73.1	51.0
VSSS	11142.5	-107.5	73.1	51.0
VDD	11142.5	-328.9	73.1	51.0
VDD_DUMMY31	11142.5	-428.9	73.1	51.0
VDD_DUMMY30	11142.5	-496.9	73.1	51.0
VDD_DUMMY29	11142.5	-598.9	73.1	51.0
VDD_DUMMY28	11142.5	-666.9	73.1	51.0
VDD_DUMMY27	10273.7	-700.9	51.0	73.1
VDD_DUMMY26	10001.7	-700.9	51.0	73.1
VDD_DUMMY25	9729.7	-700.9	51.0	73.1
VDD_DUMMY24	9457.7	-700.9	51.0	73.1
VDD_DUMMY23	9185.7	-700.9	51.0	73.1
VDD_DUMMY22	8913.7	-700.9	51.0	73.1
VDD_DUMMY21	8641.7	-700.9	51.0	73.1
VDD_DUMMY20	8369.7	-700.9	51.0	73.1
VDD_DUMMY19	8097.7	-700.9	51.0	73.1
VDD_DUMMY18	7825.7	-700.9	51.0	73.1
VDD_DUMMY17	7276.9	-700.9	51.0	73.1
VDD	6383.4	-700.9	51.0	73.1
VSSS	6169.1	-700.9	51.0	73.1
VSSL	5897.0	-700.9	51.0	73.1
OE	5527.6	-700.9	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions(1)	
	X	Y	X	Y
DBD2	5157.7	-700.9	51.0	73.1
DBD1	4787.7	-700.9	51.0	73.1
DBC2	4417.8	-700.9	51.0	73.1
DBC1	4047.9	-700.9	51.0	73.1
DBC1_DUMMY2	3684.5	-700.9	51.0	73.1
DBC1_DUMMY1	2873.6	-700.9	51.0	73.1
DBB2_DUMMY2	2049.7	-700.9	51.0	73.1
DBB2_DUMMY1	1298.3	-700.9	51.0	73.1
DBB2	380.7	-700.9	51.0	73.1
DBB1	12.6	-700.9	51.0	73.1
DBA2	-355.4	-700.9	51.0	73.1
DBA1	-732.9	-700.9	51.0	73.1
VDD	-801.0	-700.9	51.0	73.1
VSSS	-1015.3	-700.9	51.0	73.1
VSSL	-1287.4	-700.9	51.0	73.1
/CS	-2180.9	-700.9	51.0	73.1
SCLK	-2473.8	-700.9	51.0	73.1
/DL	-2766.7	-700.9	51.0	73.1
VSSL	-2834.8	-700.9	51.0	73.1
VSSS	-3106.9	-700.9	51.0	73.1
VDD	-3321.2	-700.9	51.0	73.1
AOC2	-3389.2	-700.9	51.0	73.1
AOC1	-3682.1	-700.9	51.0	73.1
AOC1_DUMMY1	-4378.2	-700.9	51.0	73.1
POE_DUMMY1	-5131.9	-700.9	51.0	73.1
POE	-5989.1	-700.9	51.0	73.1
DIR	-6282.0	-700.9	51.0	73.1
STBTEST	-6574.9	-700.9	51.0	73.1
VSSL	-6643.0	-700.9	51.0	73.1
VSSS	-6915.1	-700.9	51.0	73.1
VDD	-7129.4	-700.9	51.0	73.1
VDD_DUMMY16	-7406.3	-700.9	51.0	73.1
VDD_DUMMY15	-7678.3	-700.9	51.0	73.1

Table 9. Pad placement and bump dimensions (in microns) (continued)

Lead pad name	Pad placements		Bump dimensions[1]	
	X	Y	X	Y
VDD_DUMMY14	-7950.3	-700.9	51.0	73.1
VDD_DUMMY13	-8222.3	-700.9	51.0	73.1
VDD_DUMMY12	-8494.3	-700.9	51.0	73.1
VDD_DUMMY11	-8766.3	-700.9	51.0	73.1
VDD_DUMMY10	-9038.3	-700.9	51.0	73.1
VDD_DUMMY9	-9310.3	-700.9	51.0	73.1
VDD_DUMMY8	-9582.3	-700.9	51.0	73.1
VDD_DUMMY7	-9854.3	-700.9	51.0	73.1
VDD_DUMMY6	-10398.2	-700.9	51.0	73.1
VDD_DUMMY5	-10942.2	-700.9	51.0	73.1
VDD_DUMMY4	-11142.6	-666.9	73.1	51.0
VDD_DUMMY3	-11142.6	-598.9	73.1	51.0
VDD_DUMMY2	-11142.6	-496.9	73.1	51.0
VDD_DUMMY1	-11142.6	-428.9	73.1	51.0
VDD	-11142.6	-328.9	73.1	51.0
VSSS	-11142.6	-107.5	73.1	51.0
VSSL	-11142.6	164.7	73.1	51.0
MVDD	-11142.6	267.5	73.1	51.0
MVDD	-11142.6	335.5	73.1	51.0
HVDD	-11142.6	437.5	73.1	51.0
HVDD	-11142.6	505.5	73.1	51.0
VSSP	-11142.6	607.5	73.1	51.0
VSSP	-11142.6	675.5	73.1	51.0

1. Tolerance: +/- 3µm

12 Ordering information

Table 10. Order codes

Part numbers	Description
STV7733/BMP	Tested and usawn bump wafer (u = die)
STV7733/WPB3	Gold bumped dice

13 Revision history

Table 11. Document revision history

Date	Revision	Changes
29-May-2007	1	Initial release

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com