



DWF_dp_absval function

Absolute Value

Version, STAR and Download Information: [IP Directory](#)

Description

The DWF_dp_absval function returns the absolute value (magnitude) of argument a. Argument a and the return value are signed (two's complement). The signed return value can be converted to an unsigned to prevent overflow. Overflow occurs for the value $\text{DWF_dp_absval}(-2^{\text{width}-1}) = 2^{\text{width}-1}$, which cannot be represented as a signed number of width bits.

Table 1-1 Function Names

Function Name	Description
DWF_dp_absval ^a	VHDL/Verilog signed (two's complement) absolute value

a. A similar function DWF_absval exists for DesignWare Building Blocks component DW01_absval. However, function DWF_dp_absval is likely to give better QoR, especially if used inside a larger datapath context.

Table 1-2 Argument Description

Argument Name	Type	Width	Description
a	Vector	width	Input data
DWF_dp_absval	Vector	width	Return value

Table 1-3 Parameter Description (Verilog)

Parameter	Values	Description
width	≥ 1	Word length of input a and return value

Verilog Include File: DW_dp_absval_function.inc

Functional Description

```
z[width-1:0] = DWF_dp_absval (a[width-1:0])
z[width-1:0] = a[width-1:0] if a[width-1:0] >= 0
               = -a[width-1:0] else
```

For more about DesignWare datapath functions, refer to [Arithmetic – Datapath Functions Overview](#).

Related Topics

- [Arithmetic – Datapath Functions Overview](#)
- [DesignWare Building Block IP Documentation Overview](#)

VHDL Example

```
library IEEE, DWARE;
use IEEE.std_logic_1164.all;
use IEEE.numeric_std.all;
use DWARE.DW_dp_functions.all;
-- DWARE.DW_dp_functions_arith package if IEEE.std_logic_arith is used

entity DWF_dp_absval_test is
  port (a, b, c : in  signed(7 downto 0);
        z       : out signed(15 downto 0));
end DWF_dp_absval_test;

architecture rtl of DWF_dp_absval_test is
begin
  z <= DWF_dp_absval (a * b) + c;
end rtl;
```

Verilog Example

```
module DWF_dp_absval_test (a, b, c, z);

  input  signed  [7:0] a, b, c;
  output signed [15:0] z;

  // Passes the parameter to the function
  parameter width = 16;

  // add "$SYNOPSISYS/dw/sim_ver" to the search path for simulation
  `include "DW_dp_absval_function.inc"

  assign z = DWF_dp_absval (a * b) + c;

endmodule
```

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