

# DIO3303

## 3:1 USB 2.0 High-Speed (480Mbps) USB Switch

### Features

- Low Ron at USB channel:
- Low USB Con: 6.8pF
- USB Switch -3dB Bandwidth: 720MHz
- High Crosstalk and Off-isolation
- Voltage Supply Operation: 2.7V to 4.4V
- 5.25V Tolerant on COM Pin
- Green Packaged: DQFN-12
- 4kV HBM ESD Rating, 2kV CDM ESD Rating

### Descriptions

The DIO3303 is a SP3T (Single Pole/Triple Throw) switch capable of handling 3 different USB 2.0 high-speed data signal inputs with compliance of USB 2.0 high speed signal eye pattern.

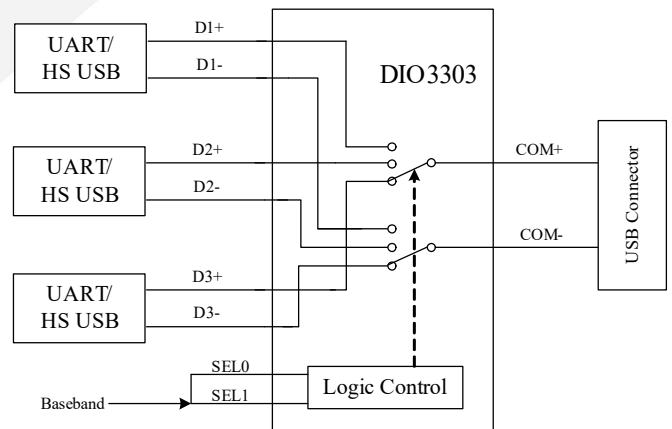
DIO3303 can also handle all USB1.1/2.0 full-speed and UART signals as well with minimum additive distortion.

It is available in DQFN-12 packages, and operates over a temperature range of -40°C to 85°C.

### Applications

- Cell Phones
- PDAs and MP3s
- Portable Instrumentation
- Battery Powered Communications
- Computer Peripherals

### Block Diagram



### Ordering Information

Order Part Number	Top Marking	Green	T <sub>A</sub>	Package	
DIO3303LN12	YWHC	Yes	-40 to +85°C	DQFN 1.8*1.8-12	Tape & Reel, 3000

## Pin Assignment

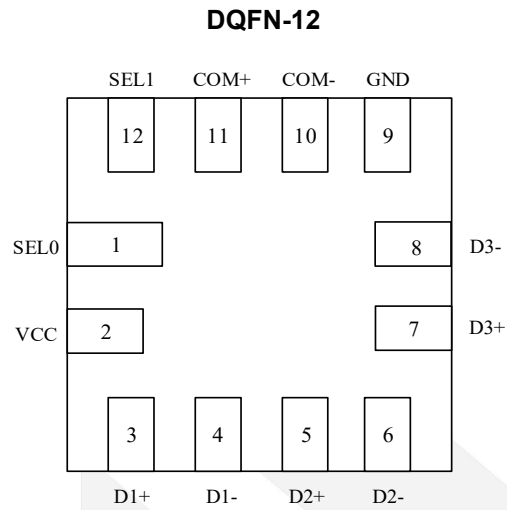


Figure1 Top View

## Pin Descriptions

Pin Name	Direction	Description
Vcc	P	Power Supply
GND	P	Ground
D1+	I/O	HS/UART Channel 1, D+ Signal
D1-	I/O	HS/UART Channel 1, D- Signal
D2+	I/O	HS/UART Channel 2, D+ Signal
D2-	I/O	HS/UART Channel 2, D- Signal
D3+	I/O	HS/UART Channel 3, D+ Signal
D3-	I/O	HS/UART Channel 3, D- Signal
COM+	I/O	COM+ Signal, and share D1+, D2+, D3+
COM-	I/O	COM- Signal, and share D1-, D2-, D3-
SEL0/SEL1	I	Switch selection pins

## Truth Table

SEL 1	SEL 0	D1+, D1-	D2+, D2-	D3+, D3-
0	0	OFF	OFF	OFF
0	1	ON	OFF	OFF
1	0	OFF	ON	OFF
1	1	OFF	OFF	ON



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### Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Rating" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply Voltage	-0.5	6.0	V
V <sub>SW</sub>	USB/UART input I/O Voltage	-0.5	6.0	V
	Other Channels	-0.5	6.0	
I <sub>IK</sub>	DC input Diode current	-50		mA
I <sub>SW</sub>	USB/UART I/O Current		50	mA
	Other Channels		50	
I <sub>PEAK</sub>	I/O Peak Current		150	mA
T <sub>STG</sub>	Storage Temperature	-65	+150	°C
ESD	HBM, JEDEC: JESD22-A114		4	kV
	CDM, JEDEC: JESD22-C101		2	

### Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified to ensure optimal performance to the datasheet specifications. DIOO does not Recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply voltage	2.7	4.4	V
V <sub>SW</sub>	USB/UART I/O voltage	0	4	V
T <sub>A</sub>	Operating Temperature	-40	85	°C



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## DC Electrical Characteristics

All typical value are at  $T_A = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Vcc(V)	Temp	Min.	Typ.	Max.	Unit
				( $^\circ\text{C}$ )				
$V_{IH}$	Input voltage high		3.2 to 4.4	full	1.4			V
$V_{IL}$	Input voltage low		3.2 to 4.4	full			0.6	V
$I_{IN}$	Control input leakage	$V_{SW} = 0$ to $V_{CC}$	4.4	full	-1		1	$\mu\text{A}$
$I_{OZ}$	Off state leakage	$0 \leq D_n, \text{COM} \leq 3.6\text{V}$	4.4	full	-2		2	$\mu\text{A}$
$I_{OFF}$	Power-Off leakage current(All I/O ports)	$V_{SW} = 0\text{V}$ to $4.4\text{V}$ , $V_{CC} = 0\text{V}$	0	full			10	$\mu\text{A}$
$R_{ONUSB}$	HS USB switch on Resistance	$V_{SW}=0.4\text{V}$ , $I_{ON}=8\text{mA}$	3.2 to 4.4	full		3.5	6	$\Omega$
$T_{BBM}$	Break Before Make Time		3.2 to 4.4	full		190		$\mu\text{s}$
$R_{TERM}$	Internal Termination Res.		3.2 to 4.2	full		1		k $\Omega$
$I_{CCSL}$	Battery Supply Sleep Mode Average Current	Static Current, SEL=0	3.2 to 4.2	full			1	$\mu\text{A}$
$I_{CC}$	Battery Supply Active Mode Average Current		3.2 to 4.2	full		60	100	$\mu\text{A}$
$I_{CCT}$	Increase in $I_{CC}$ current per control voltage and $V_{CC}$	$V_{CTRL}=2.8\text{V}$ , $V_{CC}=4.4\text{V}$	3.2 to 4.2	full		3	8	$\mu\text{A}$
		$V_{CTRL}=1.8\text{V}$ , $V_{CC}=4.4\text{V}$	3.2 to 4.2	full		8	10	$\mu\text{A}$



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## AC Electrical Characteristics

All typical value are for Vcc = 3.8V at 25°C unless otherwise specified.

Symbol	Parameter		Conditions	Vcc(V)	Temp	Min.	Typ.	Max.	Unit
					(°C)				
OIRR	USB Rejection Dn± to COM±		R <sub>L</sub> =50Ω, f=1MHz	3.8	25°C		-85		dB
			R <sub>L</sub> =50Ω, f=240MHz				-36		
Xtalk	Active Channel COM+ to COM-	USB/ UART	R <sub>L</sub> =50Ω, f=1MHz	3.8	25°C		-75		dB
			R <sub>L</sub> =50Ω, f=240MHz				-36		
BW	HS USB Channel -3dB bandwidth		R <sub>L</sub> =50Ω, C <sub>L</sub> =0pF	3.8	25°C		720		MHz
			R <sub>L</sub> =50Ω, C <sub>L</sub> =5pF				550		MHz

## Capacitance

Symbol	Parameter	Conditions	Temp	Min.	Typ.	Max.	Unit
			(°C)				
C <sub>IN</sub>	Control Pin input Capacitance	V <sub>CC</sub> =0V	25°C		1.5		pF
C <sub>ON</sub>	USB Mode on Capacitance	V <sub>CC</sub> =3.8V, f=1MHz	25°C		6.8		
C <sub>OFF</sub>	USB Mode off capacitance	V <sub>CC</sub> =3.8V	25°C		4.0		



### Eye Pattern Compliance

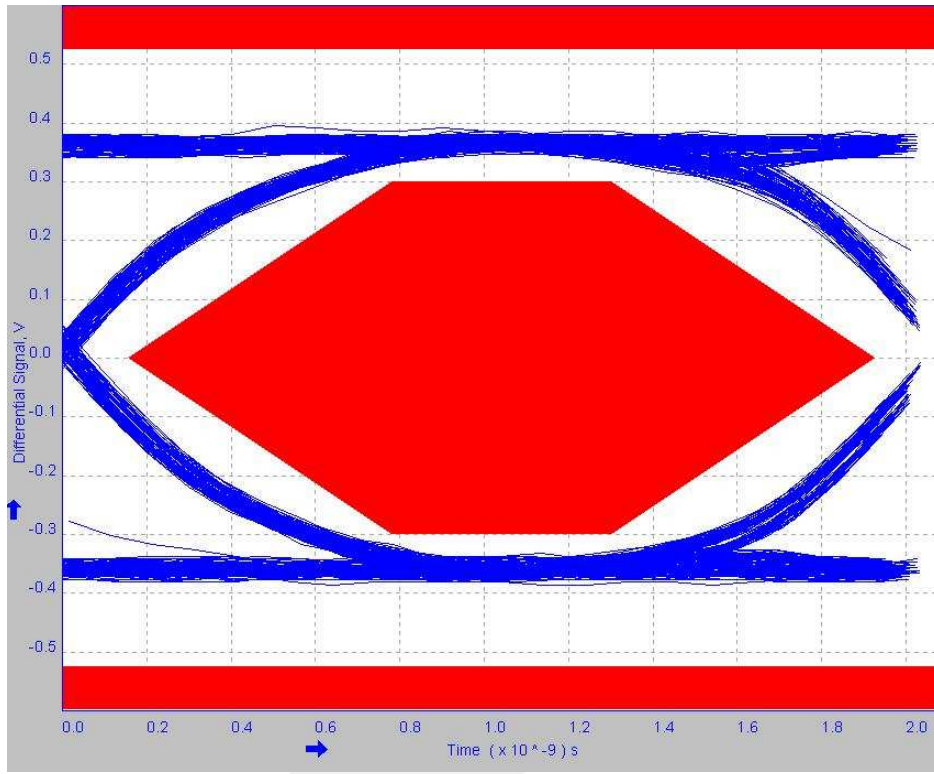


Figure 3. Eye Pattern 480MHz USB Signal with Switch



## CONTACT US

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