



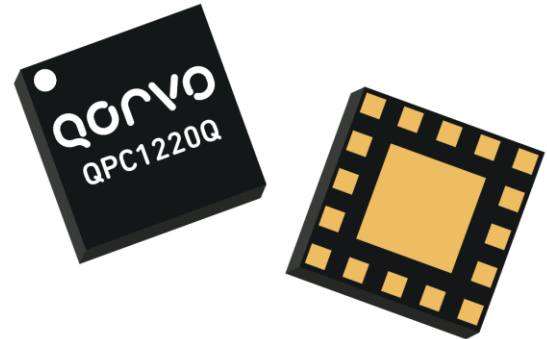
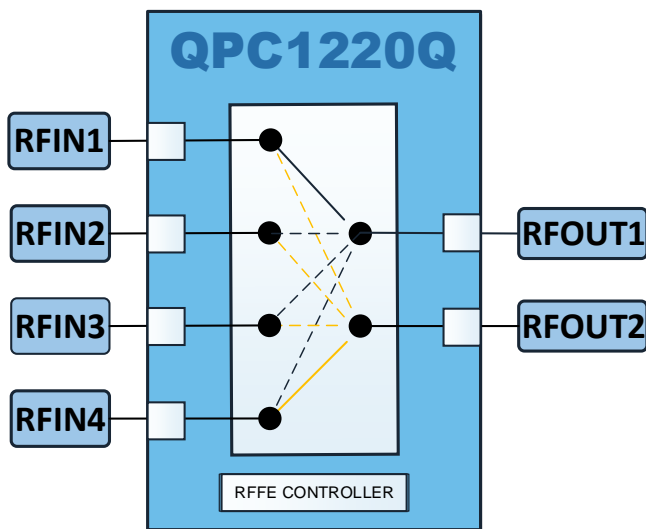
# QPC1220Q

## BROADBAND HIGH LINEARITY DP4T ROUTING SWITCH

### Product Overview

The QPC1220Q is a low loss, high linearity dual-pole four-throw addressable switch with performance optimized for transfer routing applications. The QPC1220Q integrates a serial control system compatible with the RFFE standard. The select lines (SID) provide USID addressability and up to two placements of the QPC1220Q on the same design. The QPC1220Q runs off a single VIO voltage supply and is packaged in a 16 pin compact 2.0mm x 2.0mm x 0.52mm size device. This offers designers a compact, easy-to-use, switch component for quick integration into multimode, multi-band systems.

### Functional Block Diagram



16 Pin 2.0 x 2.0 X 0.52 mm<sup>3</sup> Module

### Key Features

- Qualified to AEC-Q100 Grade 2
- Excellent Insertion Loss and Isolation performance
- High Linearity
- RFFE 2.1 Control Interface
- Broadband Performance Suitable for Multiple Air Interfaces including 5G applications, usable up to 6GHz
- Slave ID for Multiple Placements on the Same Board
- Very Low Current Consumption
- DC blocking capacitors not required in typical applications
- Single VIO supply

### Applications

- Automotive Telematics
- Cellular Band Applications
- 5G routing
- Multi-Mode GSM, CDMA, WCDMA, and LTE Applications

### Ordering Information

Part Number	Description
QPC1220QDK	Design Kit
QPC1220QSB	Sample Bag with 5 pcs
QPC1220QSR	Sample Reel with 100 pcs
QPC1220QTR13	10,000 piece 13" Reel

### Absolute Maximum Ratings

Parameter	Conditions	Rating
Storage Temperature		-40 to +125 °C
V <sub>IO</sub> , SDATA, SCLK, & SID		2.15 V
Maximum Input Power	Momentary Infrequent Occurrence, 1:1 VSWR, 50% DC, +105°C	+37.0 dBm
	CW Power, 1:1 VSWR, 100%DC, +25°C, Continuous Operation	+37.0 dBm
	CW Power, 1:1 VSWR, 50% DC, +105°C, Continuous Operation	+34.5 dBm
	CW Power, 1:1 VSWR, 100%DC, +105°C, Continuous Operation	+32.5 dBm
Hot-Switching Input Power	CW Power, 1:1 VSWR, 50% DC, -40 to +105C, 100uS Dwell time	+34.0 dBm

Operation of this device outside the parameter ranges given above may cause permanent damage.

### Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Ambient Temperature <sup>1</sup>	-40	25	+105	°C
V <sub>IO</sub> Interface Supply Voltage High	1.65	1.8	1.95	V
V <sub>IO</sub> Interface Supply Voltage Low	0	0	0.45	V
V <sub>IO</sub> current		36	60	uA
V <sub>IO</sub> current, LPM		4.3	10	uA
SDATA, SCLK – Voltage High	0.8 x V <sub>IO</sub>	1.8	V <sub>IO</sub>	V
SDATA, SCLK – Voltage Low	0.00	0.00	0.2 x V <sub>IO</sub>	V
Switching Time -- Switch RF path from 10% to 90%		5.1	6.5	µs

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

<sup>1</sup>Case temperature allows 10°C max rise over Ambient.

### Electrical Specifications<sup>(1)</sup>

Test conditions unless otherwise stated: all unused RF ports terminated in 50Ω, Input and Output = 50Ω, T = 25°C,  
V<sub>IO</sub>/SDATA/SCLK/SID = 1.8 V / 0 V

PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
<b>Insertion Loss</b>					
RFOUT1/2-RFIN1/2/3/4	617 MHz to 960 MHz		0.4	0.75	dB
RFOUT1/2-RFIN1/2/3/4	1427 MHz to 2200 MHz		0.5	0.85	dB
RFOUT1/2-RFIN1/2/3/4	2300 MHz to 2690 MHz		0.5	0.95	dB
RFOUT1/2-RFIN1/2/3/4	3300 MHz to 4200 MHz		0.75		dB
RFOUT1/2-RFIN1/4*	*(UHB matching circuit)		0.75		dB
RFOUT1/2-RFIN1/2/3/4	4400 MHz to 5000 MHz		1.2		dB
RFOUT1/2-RFIN1/4*	*(UHB matching circuit)		0.85		dB
RFOUT1/2-RFIN1/2/3/4	5100 MHz to 6000 MHz		1.65		dB
RFOUT1/2-RFIN1/4*	*(UHB matching circuit)		1.05		dB
PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
<b>Isolation</b>					
Active RFIN1/2/3/4 to RFOUT1, measure RFIN1/2/3/4 to RFOUT2	617 MHz to 960 MHz	29	43		dB
	1427 MHz to 2200 MHz	26	36.5		dB
	2300 MHz to 2690 MHz	22	34		dB
Active RFIN1/2/3/4 to RFOUT2, measure RFIN1/2/3/4 to RFOUT1	3300 MHz to 4200 MHz		31.5		dB
	4400 MHz to 5000 MHz		31		dB
	5100 MHz to 6000 MHz		29		dB
PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
<b>Harmonics</b>					
2 <sup>nd</sup> Harmonic	Freq = 699-787, 814-915MHz; P <sub>IN</sub> = 36dBm; Test Freq = 824MHz @ 35dBm		-67.5	-54	dBm
3 <sup>rd</sup> Harmonic			-48.5	-41	dBm
2 <sup>nd</sup> Harmonic	Freq = 1710-1980MHz; P <sub>IN</sub> = 33dBm; Test Freq = 1910MHz @ 33dBm		-59	-51	dBm
3 <sup>rd</sup> Harmonic			-59.5	-41	dBm
2 <sup>nd</sup> Harmonic	Freq = 2300-2690MHz; P <sub>IN</sub> = 26dBm; Test Freq = 2500MHz @ 26dBm		-71	-51	dBm
3 <sup>rd</sup> Harmonic			-81.5		dBm
PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
<b>IMD2</b>					
	f1=20dBm f2=-15dBm: f1=1950MHz f2=4090MHz		-112		dBm
<b>IMD3</b>					
	f1=20dBm f2=-15dBm: f1=1950MHz f2=1760MHz		-114.5		dBm



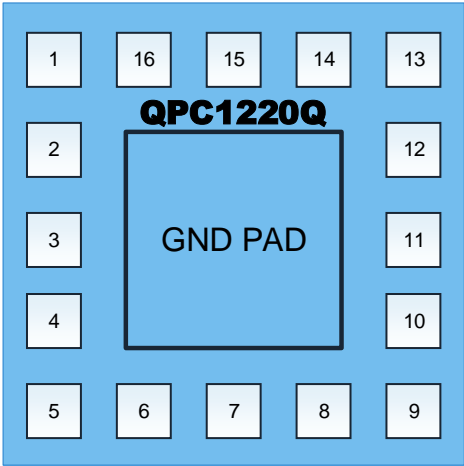
QPC1220Q

BROADBAND HIGH LINEARITY DP4T ROUTING SWITCH

PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
VSWR					
Input/Output VSWR	617 MHz to 960 MHz		1.15		:1
	1427 MHz to 2200 MHz		1.2		:1
	2300 MHz to 2690 MHz		1.25		:1
	3300 MHz to 4200 MHz *(UHB matching circuit)		1.55		:1
			1.25		:1
	4400 MHz to 5000 MHz *(UHB matching circuit)		2.1		:1
			1.25		:1
	5100 MHz to 6000 MHz *(UHB matching circuit)		2.55		:1
			1.3		:1

<sup>1</sup> Recommended EVB schematic/ layout /PCB /BOM should be followed in order to achieve specified performance.

Pin Configuration and Description



TOP VIEW

Pin-out Description

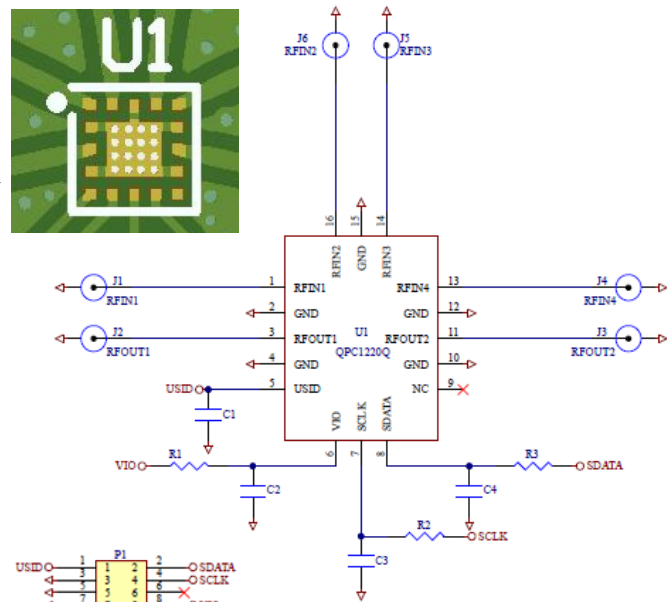
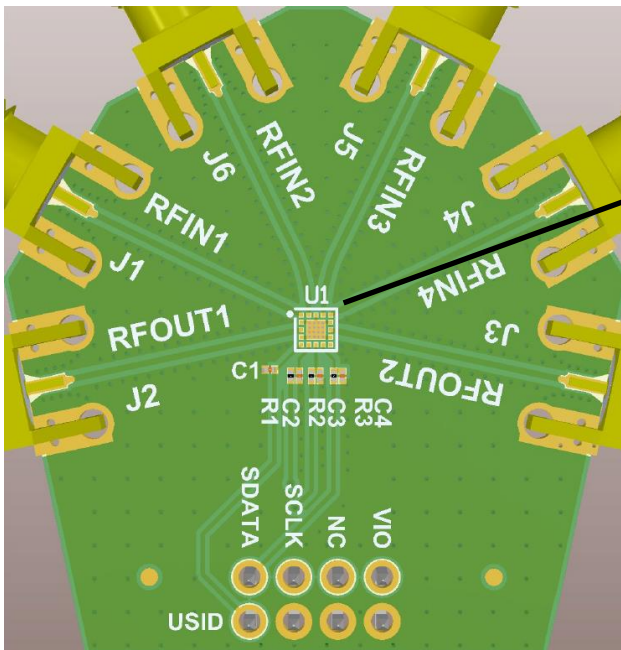
PIN	LABEL	DESCRIPTION
1	RFIN1	RF I/O
2	GND	Ground
3	RFOUT1	RF I/O
4	GND	Ground
5	USID	USID configurable Address input
6	VIO	RF FE Power Supply
7	SCLK	RF FE Clock Signal
8	SDATA	RF FE Data Signal
9	N/C	N/C. (Can be grounded.)
10	GND	Ground
11	RFOUT2	RF I/O
12	GND	Ground
13	RFIN4	RF I/O
14	RFIN3	RF I/O
15	GND	Ground
16	RFIN2	RF I/O
GND PAD	GND PAD	Ground

## Evaluation Board PCB Information

Layer	Name	Material	Thickness	Constant	Board Layer	Stack
1	Top Overlay					
2	Top Solder	Solder Resist	0.40mil	3.5		
3	Top Layer	Copper	1.40mil			
4	Dielectric1	RD4003	8.00mil	3.66		
5	Signal Layer 1	Copper	1.40mil			
6	Dielectric 3	FR-4	42.00mil	4.26		
7	Signal Layer 2	Copper	1.40mil			
8	Dielectric 2	FR-4	8.00mil	4.26		
9	Bottom Layer	Copper	1.40mil			
10	Bottom Solder	Solder Resist	0.40mil	3.5		
11	Bottom Overlay					

TOTAL THICKNESS: .062+/- 10%

## Evaluation Board



**Additional Application Notes:**

DC blocking caps are typically not required. If external voltage is applied to RF pins then an external DC block should be added in series.

Bypass capacitors should be placed as close to the DUT as possible. The bypass caps should be less than 0.3 inches away from edge of DUT. VIO requires a bypass cap.

Multitple 6 to 8 mil diameter drilled vias are to be placed under the DUT in the GND pad, recommend at least 5 vias. The vias serve to dissipate heat as well as provide an RF common ground.

Unused RF pins should be terminated in 50 ohms.



QPC1220Q

BROADBAND HIGH LINEARITY DP4T ROUTING SWITCH

Evaluation Board BOM

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Item No	Material#	Rev	Qty	Ref Des	Description
130	291026	A	1		PCB, QPC1220Q
110	287325	A	2	C1,C2	CAP, 0.01uF, 10%, 16V, X7R, 0201
20	21253		3	R1, R2, R3	RES, 0 OHM, 5%, 1/20W, 0201
50	262452		6	J1, J2, J3, J4, J5, J6	CONN, SMA, EL MINI FLT 0.068" SPE-000303
40	274947	A	1	P1	CONN, HDR, SHRD, RT-ANG, 2x4, 0.100"
60	4XXX1		2	C3, C4	NOT POPULATED ITEM-1

## Application for Ultra High Band(UHB) Operation

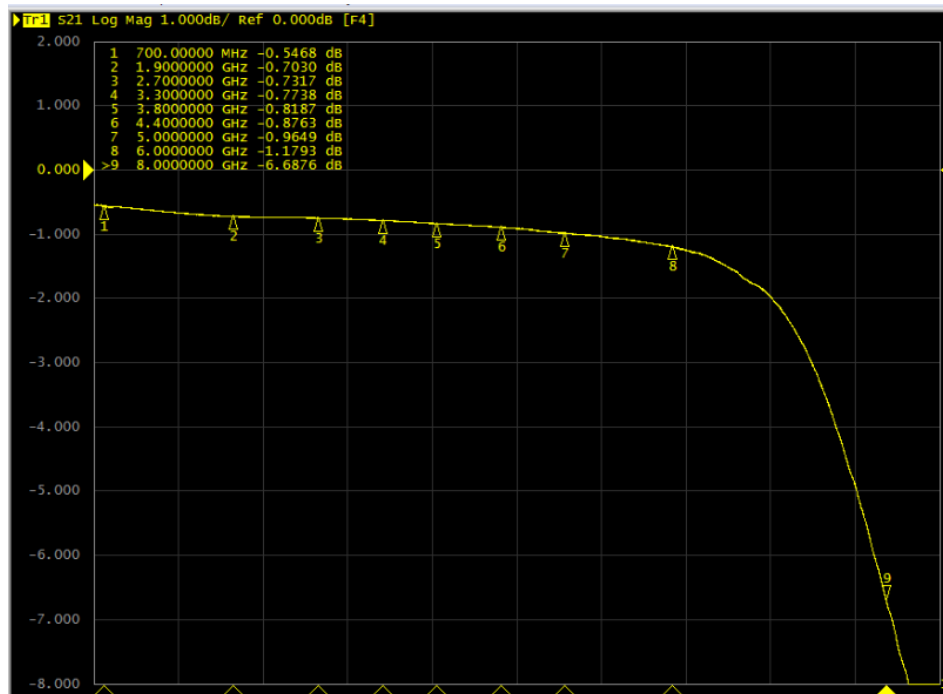
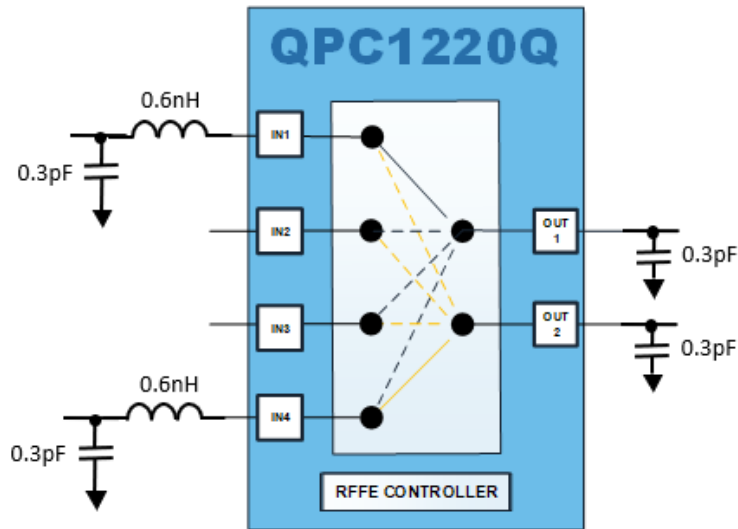
In order to improve performance from 3 to 6GHz, a matching circuit can be implemented.

Test results indicate the lowest IL path is RFIN1 to RFOUT2.

The lowest IL paths for antenna swapping are RFIN1 or RFIN4 for UHB operation.

Recommend high-Q SMDs in 01005 or 0201 package size.

Unused RF ports should be terminated in 50 ohms.





### Register Configuration

#### Register 0x0000 – Output\_Cross\_CTRL

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W/M
7:1	SPARE	Reserved for future use	0x00	No	0	R/W/M
0	Output_Cross	Enable DPDT output Switch to cross mode, 0x0: DPDT Direct operating mode 0x1: DPDT output cross operating mode	0x0	No	0	R/W/M
<i>Note 1: See Truth Table for example of operation</i>						
<i>Note 2: Use Trigger[0] along with Triggers[1] and/or [2]</i>						

#### Register 0x0001 – SW\_CTRL

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W/M
7:6	SPARE	Reserved for future use	0x0	No	0	R/W/M
5:4	SW_Connect_Ind[1:0]	Indicate switch connect sequence from bit0 to bit 3	0x0	No	0	R/W/M
		00: one port connect to output1,output2 isolation				
		01: Lower bit in bit0 to bit3 connect to output1				
		10: Higher bit in bit0 to bit3 connect to output1				
		11: one port connect to output2,output1 isolation				
Input Ports Select						
3:0	Input_Sel[3:0]	Enables DP4T input Port. Each bit is a dedicated input port.	0x0	No	0	R/W/M
		Bit0 <=>input1				
		Bit1 <=>input2				
		Bit2 <=>input3				
		Bit3 <=>input4				
<i>Note 1: See Truth Table for example of operation</i>						
<i>Note 2: Use Trigger[0] along with Triggers[1] and/or [2]</i>						

#### Register 0x001A – RFFE\_STATUS

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7	UDR_RST	Setting this bit initiates a software reset <i>Note: On software reset, this register and all User Defined registers (UDRs) are reset. This bit reads as 0.</i>	0	No	No	W
6	CMD_FR_P_ERR	Command Frame received with a parity error	0	No	No	R/W
5	CMD_LEN_ERR	Command Sequence received with an incorrect length	0	No	No	R/W
4	ADDR_FR_P_ERR	Address Frame received with a parity error	0	No	No	R/W
3	DATA_FR_P_ERR	Data Frame received with a parity error	0	No	No	R/W
2	RD_INVLD_ADDR	Read Command Sequence received with an invalid address	0	No	No	R/W
1	WR_INVLD_ADDR	Write Command Sequence received with an invalid address	0	No	No	R/W
0	BID_GID_ERR	Read Command Sequence received with a BSID or GSID	0	No	No	R/W
<i>Note: Reading this register resets this register.</i>						

### Register 0x001B — GSID

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7:4	GSID0[3:0]	Group Slave ID0	0x0	No	No	R/W
3:0	GSID1[3:0]	Group Slave ID1	0x0	No	No	R/W

### Register 0x001C — PM\_TRIG

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7	PWR_MODE[1]	0: Normal Operation 1: Low Power - Antenna in isolation	1	B/G	No	R/W
6	PWR_MODE[0]	0: ACTIVE 1: STARTUP - Reset all registers to default settings <i>Note: Setting PWR_MODE to STARTUP is identical to a hardware reset initiated by the VIO signal.</i>	0	B/G	No	R/W
5:3	TriggerMask[2:0]	Setting bit TriggerMask[N] disables Trigger[N] TriggerMask[N] updates <u>before</u> Trigger[N] is processed  <i>Note: When Trigger[N] is disabled, writing to a register associated with Trigger[N] sends data directly to that register. If a register is associated with multiple triggers, then all associated triggers must be disabled to allow direct writes to the associated register.</i>	0b000	No	No	R/W
2:0	Trigger[2:0]	Setting bit Trigger[N] loads Trigger[N]'s associated registers  <i>Note 1: When Trigger[N] is enabled, writing to a register associated with Trigger[N] sends data to that register's shadow. Setting the Trigger[N] bit loads data from shadow. All triggers are processed immediately and simultaneously and then cleared. Trigger[0], [1], and [2] will always read as 0. Note 2: Use Trigger[0] along with Triggers[1] and/or [2]</i>	0b000	B/G	No	W

### Register 0x001D — PRODUCT\_ID

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7:0	PROD_ID[7:0]	Lower eight bits of Product Number  <i>Note: These are read-only registers. However, as part of the special programming sequence for writing USID, a write command sequence is performed on one or both registers, but does not update them. See MIPI 6.6.2 for details.</i>	0x1E	No	No	R

### Register 0x001E – MANUFACTURER\_ID

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7:0	MFG_ID[7:0]	Lower eight bits of MIPI Manufacturer ID <i>Note: These are read-only registers. However, as part of the special programming sequence for writing USID, a write command sequence is performed on one or both registers, but does not update them. See MIPI 6.6.2 for details.</i>	0xC6	No	No	R

### Register 0x001F – MAN\_USID

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W						
7:4	MFG_ID[11:8]	Upper four bits of MIPI Manufacturer ID <i>Note: This is a read-only register. However, as part of the special programming sequence for writing USID, a write command sequence is performed on this register, but does not update it. See MIPI 6.6.2 for details.</i>	0x3	No	No	R						
Programmable Unique Slave ID												
The default value at reset is selected via pin SID0.												
3:0	USID[3:0]	<table><tr><th>SID0</th><th>USID</th></tr><tr><td>0</td><td>0x6</td></tr><tr><td>1</td><td>0x7</td></tr></table>	SID0	USID	0	0x6	1	0x7	0x6	No	No	R/W
SID0	USID											
0	0x6											
1	0x7											
<i>Note: USID is only writeable using a special programming sequence. See MIPI 6.6.2 for details.</i>												

### Register 0x0020 – EXT\_PRODUCT\_ID

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7:0	PROD_ID[15:8]	Upper eight bits of Product Number <i>Note: These are read-only registers. However, as part of the special programming sequence for writing USID, a write command sequence is performed on one or both registers, but does not update them. See MIPI 6.6.2 for details.</i>	0x00	No	No	R
7:6	MAJOR_REV[1:0]	Major Revisions - all layer	0b00	No	No	R
5:4	MINOR_REV[1:0]	Minor Revisions - metal only	0b00	No	No	R
3:0	MISC_REV[3:0]	Misc Revisions - mask variants	0b0001	No	No	R
<i>Note: The REVISION_ID register contains this product's revision number which is set by Qorvo according to manufacture date. The value may change throughout the product life cycle.</i>						

### Register 0x0022 — GSID0-1

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7:4	GSID0[3:0]	Group Slave ID0	0x0	No	No	R/W
3:0	GSID1[3:0]	Group Slave ID1	0x0	No	No	R/W

### Register 0x0023 — UDR\_RST

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7	UDR_RST	Setting this bit initiates a software reset <i>Note: On software reset, this register and all User Defined registers (UDRs) are reset. This bit will always read as 0.</i>	0	B/G	No	W
6:0	RESERVED		0x00	No	No	R

### Register 0x0024 — ERR\_SUM

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7	SPARE	Reserved for future use	0	No	No	R/W
6	CMD_FR_P_ERR	Command Frame received with a parity error	0	No	No	R/W
5	CMD_LEN_ERR	Command Sequence received with an incorrect length	0	No	No	R/W
4	ADDR_FR_P_ERR	Address Frame received with a parity error	0	No	No	R/W
3	DATA_FR_P_ERR	Data Frame received with a parity error	0	No	No	R/W
2	RD_INVLD_ADDR	Read Command Sequence received with an invalid address	0	No	No	R/W
1	WR_INVLD_ADDR	Write Command Sequence received with an invalid address	0	No	No	R/W
0	BID_GID_ERR	Read Command Sequence received with a BSID or GSID	0	No	No	R/W

*Note: Reading this register resets this register.*

### Register 0x002C — TEST\_PATT

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
7:0	TEST_PATT[7:0]	Test Pattern	0xD2	No	No	R

### Register 0x002D — EXT\_TRIG\_MASK

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
		Setting bit TriggerMask[N] disables Trigger[N] If using an Extended Write to update both TriggerMask and Trigger, than TriggerMask[N] updates <u>before</u> Trigger[N] is processed				
7:0	TriggerMask[10:3]	<i>Note: When Trigger[N] is disabled, writing to a register associated with Trigger[N] sends data directly to that register. If a register is associated with multiple triggers, then <u>all associated triggers</u> must be disabled to allow direct writes to the associated register.</i>	0x00	No	No	R/W

### Register 0x002E — EXT\_TRIG

Bit(s)	Field Name	Description	Reset	B/G	Trig	R/W
		Setting bit Trigger[N] loads Trigger[N]'s associated registers				
7:0	Trigger[10:3]	<i>Note: When Trigger[N] is enabled, writing to a register associated with Trigger[N] sends data to that register's shadow. Setting the Trigger[N] bit loads data from shadow. <u>All triggers</u> are processed immediately and simultaneously and then cleared. Trigger[10 - 3] will always read as 0.</i>	0x00	B/G	No	W

### Truth Table

Reg_00			Reg_01				RFOUT1	RFOUT2
0	5	4	3	2	1	0		
0	0	0	0	0	0	0	Isolation	Isolation
0	0	0	0	0	0	1	RFIN1	Isolation
0	0	0	0	0	1	0	RFIN2	Isolation
0	0	0	0	1	0	0	RFIN3	Isolation
0	0	0	1	0	0	0	RFIN4	Isolation
0	0	1	0	0	1	1	RFIN1	RFIN2
0	0	1	0	1	0	1	RFIN1	RFIN3
0	0	1	0	1	1	0	RFIN2	RFIN3
0	0	1	1	0	0	1	RFIN1	RFIN4
0	0	1	1	0	1	0	RFIN2	RFIN4
0	0	1	1	1	0	0	RFIN3	RFIN4
0	1	0	0	0	1	1	RFIN2	RFIN1
0	1	0	0	1	0	1	RFIN3	RFIN1
0	1	0	0	1	1	0	RFIN3	RFIN2
0	1	0	1	0	0	1	RFIN4	RFIN1
0	1	0	1	0	1	0	RFIN4	RFIN2
0	1	0	1	1	0	0	RFIN4	RFIN3
0	1	1	0	0	0	1	Isolation	RFIN1
0	1	1	0	0	1	0	Isolation	RFIN2
0	1	1	0	1	0	0	Isolation	RFIN3
0	1	1	1	0	0	0	Isolation	RFIN4

Reg_00			Reg_01				RFOUT1	RFOUT2
0	5	4	3	2	1	0		
1	0	0	0	0	0	0	Isolation	Isolation
1	0	0	0	0	0	1	Isolation	RFIN1
1	0	0	0	0	1	0	Isolation	RFIN2
1	0	0	0	1	0	0	Isolation	RFIN3
1	0	0	1	0	0	0	Isolation	RFIN4
1	0	1	0	0	1	1	RFIN2	RFIN1
1	0	1	0	1	0	1	RFIN3	RFIN1
1	0	1	0	1	1	0	RFIN3	RFIN2
1	0	1	1	0	0	1	RFIN4	RFIN1
1	0	1	1	0	1	0	RFIN4	RFIN2
1	0	1	1	1	0	0	RFIN4	RFIN3
1	1	0	0	0	1	1	RFIN1	RFIN2
1	1	0	0	1	0	1	RFIN1	RFIN3
1	1	0	0	1	1	0	RFIN2	RFIN3
1	1	0	1	0	0	1	RFIN1	RFIN4
1	1	0	1	0	1	0	RFIN2	RFIN4
1	1	0	1	1	0	0	RFIN3	RFIN4
1	1	1	0	0	0	1	RFIN1	Isolation
1	1	1	0	0	1	0	RFIN2	Isolation
1	1	1	0	1	0	0	RFIN3	Isolation
1	1	1	1	0	0	0	RFIN4	Isolation

### Power On and Off Sequence

It is very important that the user adheres to the correct timing sequences in order to avoid damaging the device. Figures are NOT drawn to scale.

1. Once VIO is powered down to 0V, wait a minimum of 10  $\mu$ s to reapply power to VIO. (see Figure: Digital Supply Detail)

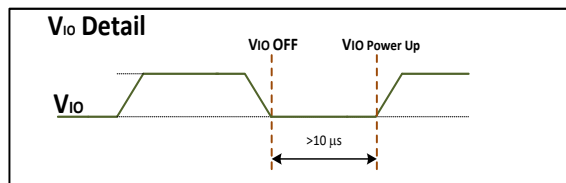


Figure: Digital Supply Detail

2. VIO must be applied for a minimum of 120 ns before sending SDATA/SCLK to ensure correct data transmission. (see Figure: RF Power-Up Detail)
3. VIO must be applied for a minimum of 15  $\mu$ s before applying RF power. (see Figure: Digital Signal / RF Power-On Detail)
4. Wait a minimum of 6.5  $\mu$ s after RFFE bus is idle to apply an RF signal. (see Figure: RF Power-Up Detail)

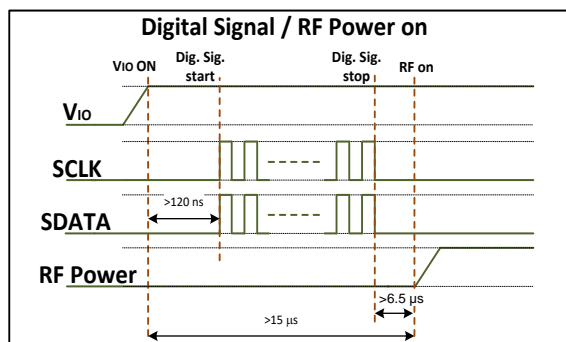


Figure: Digital Signal / RF Power-On Detail

5. RF power must not be applied during switching events. To ensure this, remove RF power before completing a register write that will change the switch mode. (see Figure: Switch Event Timing)

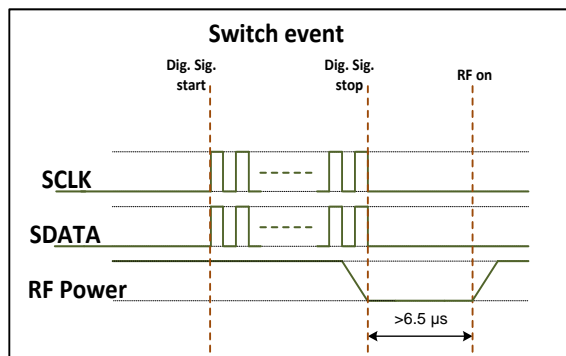


Figure: Switch Event Timing

6. If "Low Power Mode" is utilized, there must be a delay of 10  $\mu$ s before exiting "Low Power Mode". (see Figure: Low-Power Mode Exit Timing)

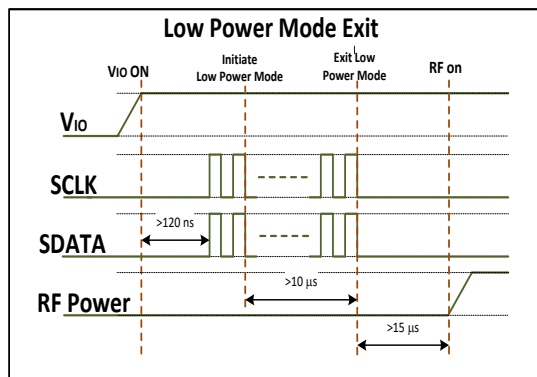


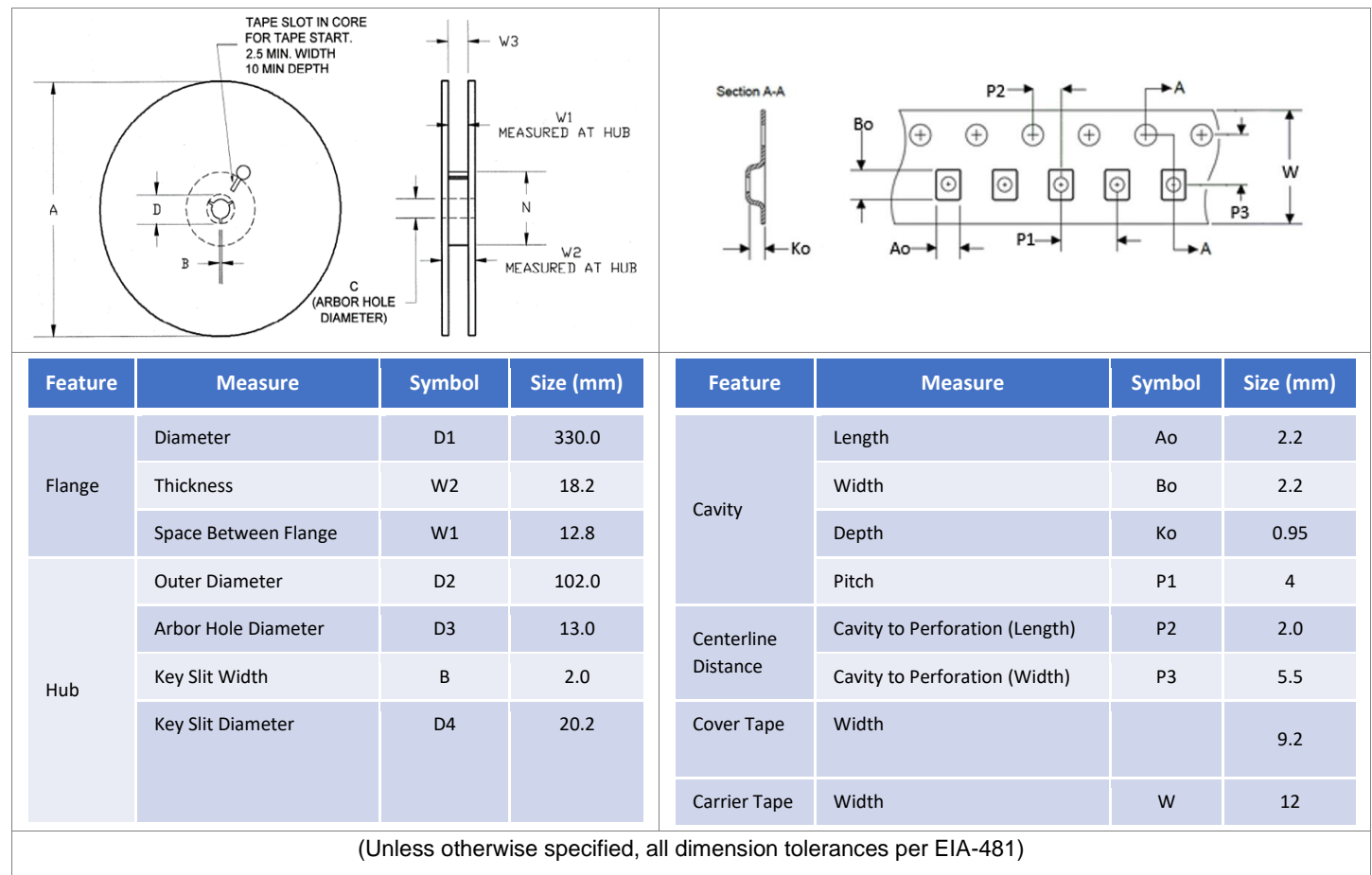
Figure: Low-Power Mode Exit Timing

Figure 1: Design of the microchip package. The figure consists of three views: TOP VIEW, SIDE VIEW, and BOTTOM VIEW. The TOP VIEW shows a square package with dimensions  $2.00 \pm 0.10$  mm on all sides. A PIN 1 is indicated at the top-left corner. The SIDE VIEW shows a package height of  $0.520 \pm 0.060$  mm. The BOTTOM VIEW shows the underside of the package with a central square pad ( $0.850$  mm x  $0.850$  mm) and a surrounding ring of 16 smaller pads ( $0.425$  mm x  $0.425$  mm). A legend indicates that green represents the mask and gold represents Ni/Au plating.

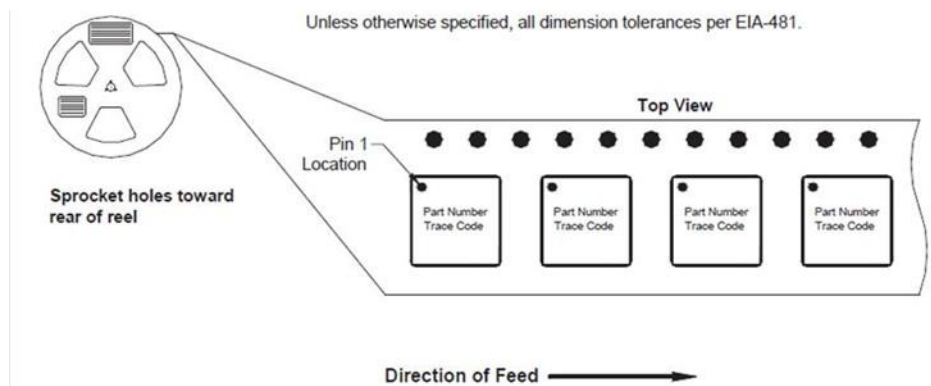




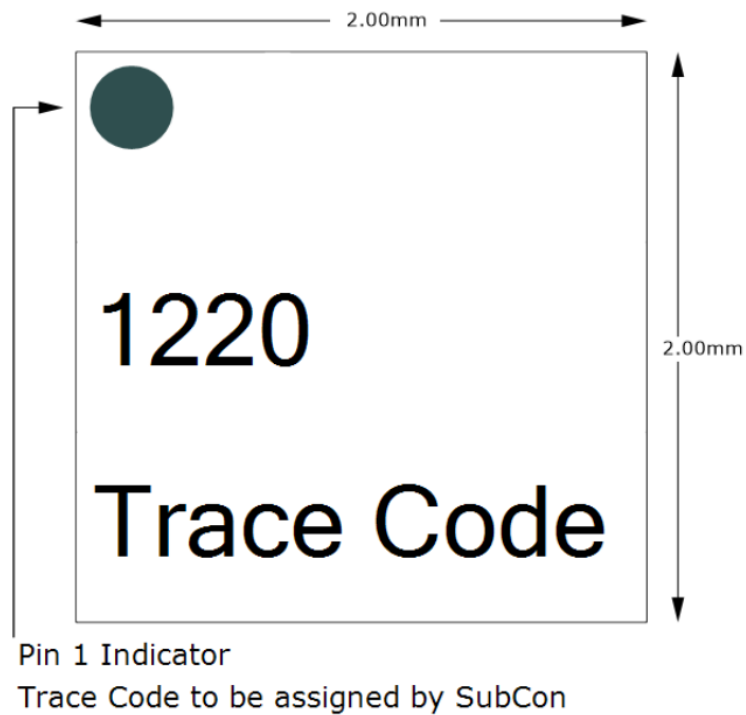
Tape and Reel Information



Part on Reel Orientation



## Marking Diagram



### Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 2	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3	ANSI/ESD/JEDEC JS-002
MSL – Moisture Sensitivity Level	MSL3	IPC/JEDEC J-STD-020



Caution!

ESD sensitive device

### Solderability

Compatible with both lead-free (260 °C max. reflow temperature) and tin/lead (245 °C max. reflow temperature) soldering processes.  
Package lead plating: Electrolytic plated Au over Ni

### RoHS Compliance

This part is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- SVHC Free
- PFOS Free



# QPC1220Q BROADBAND HIGH LINEARITY DP4T ROUTING SWITCH

## Detailed Revision History

Revision	Description
Rev 2/18/2019	Preliminary datasheet
5/17/19	Updated 5GHz break in specs; added pin configuration
8/12/19	Updated DS for auto requirements; added Hot switching spec
9/11/19	Updated UHB application circuit and IL measurements for typicals
11/6/19	Updated per matched circuit testing
11/11/19	Updated plating
12/4/19	Added notes on preliminary
12/6/19	Updated IMD specs, VIO current , Release REV A.
2/24/20	Updated to REV B with RVTM test limits
5/12/20	Updated the T&R info for 12mm tape width, REV C; added Case temp note
Rev D	Updated application notes
RevE, 8/26//20	Added the Classification to document; Added Notes about Trigger[0] needing Trigger [1] or [2]
RevF 11/27/20	Cleaned up for LPR, reduced classification to unrestricted, rounded specs to 0.05dB increments, Updated ESD/MSL
2/22/21	Rev G Release. Updated from final PT runs. Took off min/max for all but LTE bands

## Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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