



Descriptions

The WAS7227Q-10/TR is a bidirectional low-power dual port, high-speed, USB 2.0 analog switch with integrated protection for USB Type-C™ systems. The device is configured as a dual 2:1 or 1:2 switch. It is optimized for use with the USB 2.0 DP/DM lines in a USB Type-C™ system. The device is capable of true isolation. Even when COM+/- overrides VCC, very little current will flow back to the supply.

The WAS7227Q-10/TR has low bit-to-bit skew and high channel-to-channel noise isolation, and is compatible with various standards, such as high-speed USB 2.0 (480Mbps). Each switch is bidirectional and offers little or no attenuation of the high-speed signals at the outputs. Its bandwidth is wide enough to pass high-speed USB 2.0 differential signals (480 Mb/s) with good signal integrity.

GPIO control of SEL 1.8V logic compatible. The WAS7227Q-10/TR is available in QFN1418(WQF-10 (1.4x1.8)) with Pb-free and Halogen-free making it a perfect candidate for mobile and space constrained applications.

Order Information

| Package | | Part Number | Top-Side Marking |
|---------------------------|---------------|----------------|------------------|
| QFN1418(WQFN-10(1.4x1.8)) | Tape and Reel | WAS7227Q-10/TR | A26 /GYW |

Features

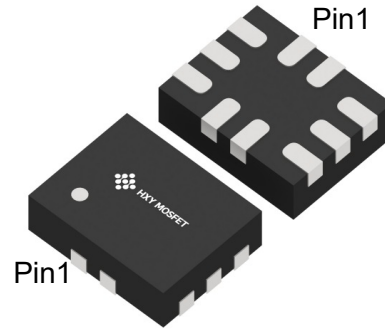
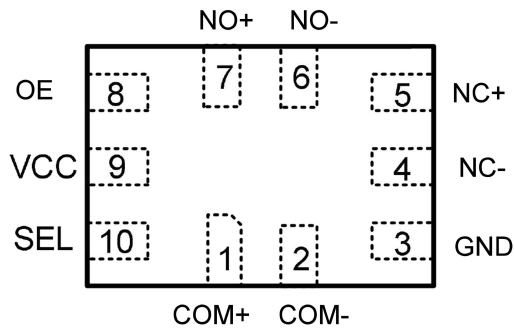
- Pin-to-Pin FSUSB42, NX3DV42, WAS7227, SGM7227, RS2228, BL1532
- Low On-resistance, Ron=1.5Ω when VCC =5V
- 1.8V Logic Compatible Control Pin
- COM+/- Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- High Off-Isolation: -100dB @ 100KHz
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth (-3dB @800MHz) Suitable for USB2.0 High-Speed Routing
- Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)

Applications

- Anywhere a USB Type-C™ or Micro-B Connector is Used
- Mobile Phones, Tablets and Notebooks



Pin Configuration



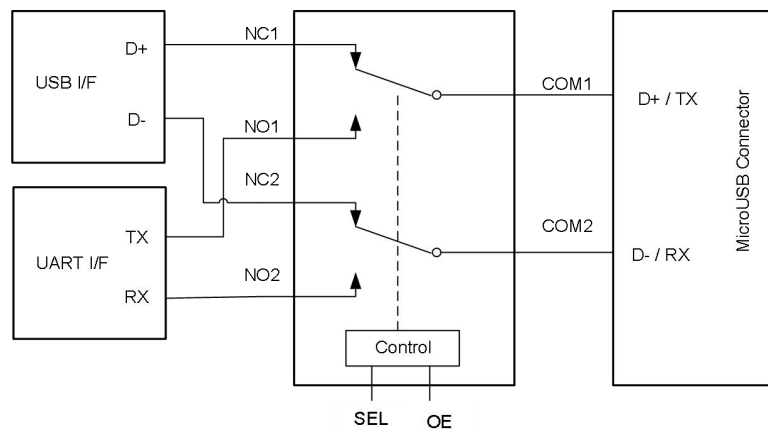
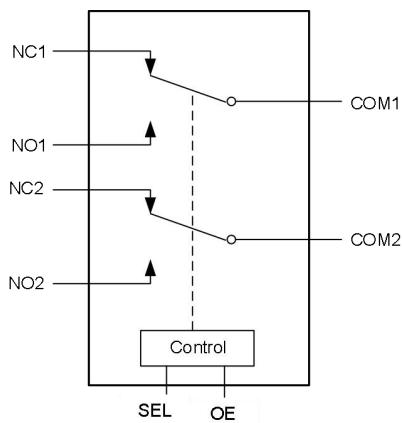
QFN1418(WQFN-10(1.4x1.8))

Functions and Pin Configuration

| Pin Number | Symbol | Descriptions |
|------------|------------------|---|
| 1,2 | COM _x | Common Signal Ports |
| 3 | OE | Active Low |
| 8 | GND | Ground |
| 4,5 | NC _x | Analog/Digital Signal Ports (Normally closed) |
| 6,7 | NO _x | Analog/Digital Signal Ports (Normally open) |
| 9 | VCC | Single Power Supply |
| 10 | SEL | Logic Input Selection |

Function Descriptions

| Input SEL | Function |
|-----------|-----------------------|
| 0 | NC1=COM1 and NC2=COM2 |
| 1 | NO1=COM1 and NO2=COM2 |





Absolute Maximum Ratings ⁽¹⁾

| Parameter | Symbol | Value | Unit |
|---|------------------|------------|------|
| Supply Voltage | V _{CC} | -0.3 ~ 6.5 | V |
| Control Input Voltage | V _{IN} | -0.3 ~ 6.5 | V |
| Continuous Current Through NO, NC, COM | | ±100 | mA |
| Peak Current Through NO, NC, COM (pulsed at 1ms 50% duty cycle) | | ±200 | mA |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |
| Junction Temperature under Bias | T _J | 150 | °C |
| Lead Temperature (Soldering, 10 seconds) | T _L | 260 | °C |
| Power Dissipation | P _D | 250 | mW |

Recommend operating ratings ⁽²⁾

| Parameter | Symbol | Value | Unit |
|--------------------------|------------------|------------|------|
| Supply Voltage Operating | V _{CC} | 1.5 ~ 5.5 | V |
| Control Input Voltage | V _{IN} | -0.3 ~ 5.5 | V |
| Input Signal Voltage | V _{COM} | -0.3 ~ 5.5 | V |
| Operating Temperature | T _A | -40 ~ 85 | °C |
| Thermal Resistance | R _{θJA} | 360 | °C/W |

Note:

1. "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.

Capacitance (T_a=25°C, V_{CC}=3.3V, unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|------------------|------------|------|------|------|------|
| Off capacitance | C _{OFF} | F=100KHz | | 5 | | pF |
| On capacitance | C _{ON} | F=100KHz | | 7 | | pF |



DC Electronics Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)

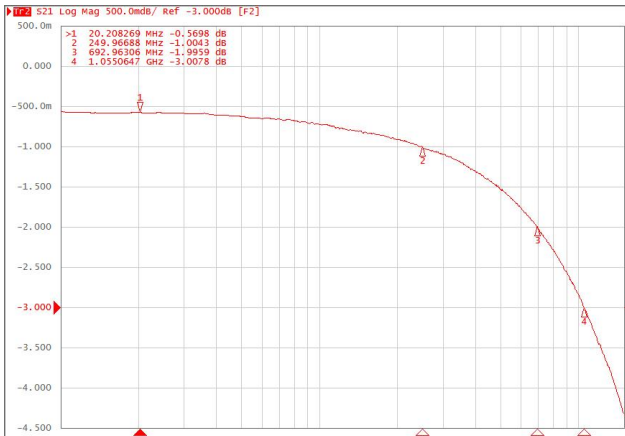
| Parameter | Symbol | Conditions | Min. | Typ. | Max | Unit |
|--|--------------------|--|------|------|------|------|
| Input logic high level | V _{IH} | V _{CC} : 3.3 ~ 5.5V | 1.6 | | | V |
| | | V _{CC} : 1.5 ~ 3.3V | 1.4 | | | V |
| Input logic low level | V _{IL} | V _{CC} : 3.3 ~ 5.5V | | | 0.6 | V |
| | | V _{CC} : 1.5 ~ 3.3V | | | 0.4 | V |
| Supply quiescent current | I _{CC} | I _{COM} =0, V _{IN} =0 or V _{IN} =V _{CC} | | | 1.0 | uA |
| Increase in I _{CC} per input | I _{CC} T | I _{COM} =0, V _{CC} =4.5V V _{IN} >1.8 or V _{IN} <0.5 | | | 1.0 | uA |
| Off state leakage from COM _x to NC _x (or NO _x) | I _{COMx} | V _{COM} = 5.5V , V _{NC(or NO)} = 0V | | | ±2.0 | uA |
| On-Resistance | R _{ON1} | V _{COM} =0 ~ 0.5V, I _{COM} =30mA | | 3.0 | 3.5 | Ω |
| | R _{ON2} | V _{COM} =0.5 ~ 2.0V, I _{COM} =30mA | | 3.6 | 3.9 | Ω |
| | R _{ON3} | V _{COM} =2.0 ~ 4.0V, I _{COM} =30mA | | 2.5 | 3.5 | Ω |
| | R _{ON4} | V _{COM} =4.0 ~ 5.5V, I _{COM} =30mA | | 1.5 | 1.8 | Ω |
| On-Resistance Flatness | R _{FLAT1} | V _{COM} =0 ~ 0.5V, I _{COM} =30mA | | 0.7 | | Ω |
| | R _{FLAT2} | V _{COM} =0.5 ~ 2.0V, I _{COM} =30mA | | 0.5 | | Ω |
| | R _{FLAT3} | V _{COM} =2.0 ~ 4.0V, I _{COM} =30mA | | 1.6 | | Ω |
| | R _{FLAT4} | V _{COM} =4.0 ~ 5.5V, I _{COM} =30mA | | 0.3 | | Ω |
| On-Resistance Matching Between Channels | Δ R _{ON} | V _{COM} =0~5.5V, I _{COM} =30mA, | | 0.1 | 0.2 | Ω |

AC Electronics Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)

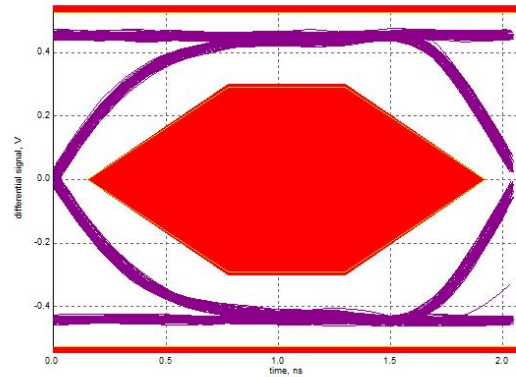
| Parameter | Symbol | Conditions | Min. | Typ. | Max | Unit |
|---------------------------|-------------------|---|------|------|-----|------|
| Turn-On Time | T _{ON} | V _{COM} =1.5V, C _L =35pF, R _L =50Ω | | 200 | | ns |
| Turn-Off Time | T _{OFF} | V _{COM} =1.5V, C _L =35pF, R _L =50Ω | | 200 | | ns |
| Break-Before-Make time | T _B BM | V _{COM} =1.5V, C _L =35pF, R _L =50Ω | | 500 | | ns |
| -3dB Bandwidth | BW | R _L =50Ω, C _L =0pF | | 800 | | MHz |
| Off isolation | OIRR | F=1KHz, R _L =50Ω | | -81 | | dB |
| | | F=10KHz, R _L =50Ω | | -80 | | dB |
| Crosstalk | Xtalk | F=1KHz, R _L =50Ω | | -83 | | dB |
| | | F=10KHz, R _L =50Ω | | -82 | | dB |
| Total Harmonic Distortion | THD | F=20Hz to 20KHz V _{COM} =600mVp-p @R _L =32Ω, | | -80 | | dB |



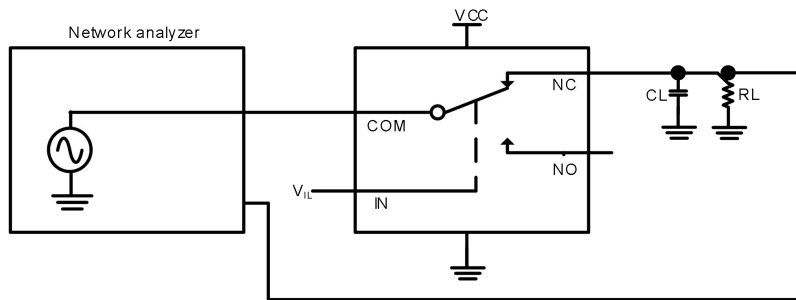
Typical Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)



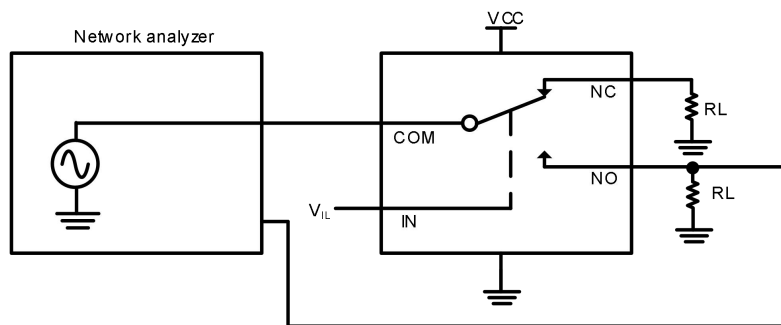
Bandwidth



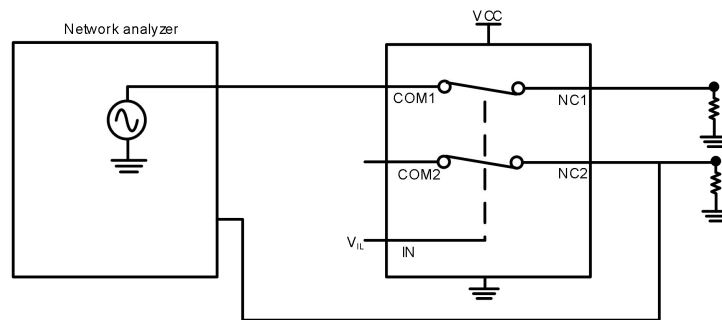
Eye Diagram (480Mbps)



Bandwidth



Off isolation

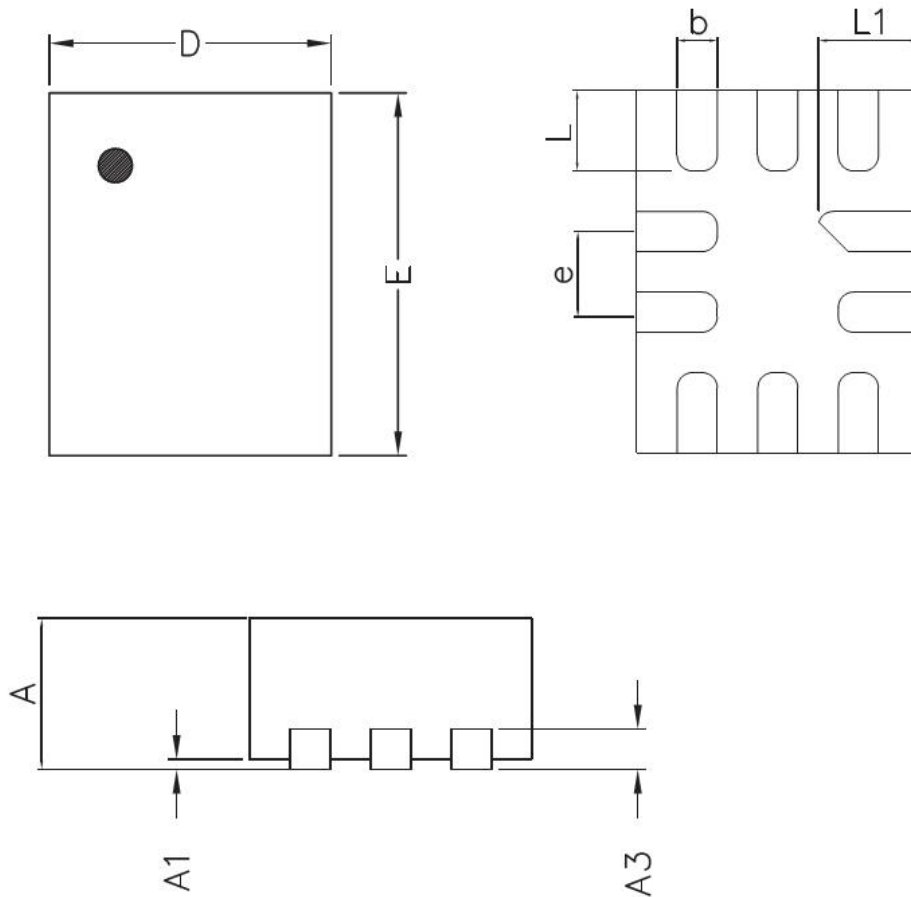


Crosstalk



Package Outline Dimensions

QFN1418(WQFN-10(1.4x1.8))



| Symbol | Dimension in Millimeters | |
|--------|--------------------------|-------|
| | Min. | Max. |
| A | 0.450 | 0.550 |
| A1 | 0.000 | 0.050 |
| A3 | 0.152 Ref. | |
| D | 1.350 | 1.450 |
| E | 1.750 | 1.850 |
| b | 0.150 | 0.250 |
| e | 0.400 Typ. | |
| L | 0.350 | 0.450 |
| L1 | 0.450 | 0.550 |



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