

Features

- Analog Switch Voltage: 3.3V, 5V, 10V, $\pm 5V$
- Low ON-State Resistance:
 - typical 50 Ω at $V_s = \pm 4.5V$ or 9V
 - typical 60 Ω at $V_s = 4.5V$
 - typical 300 Ω at $V_s = 3V$
- Bandwidth: 200 MHz
- Fast switching times: $t_{ON} = 60ns$, $t_{OFF} = 50ns$
- Break-Before-Make Switching
- Operation Temperature Range: $-40^{\circ}C$ to $125^{\circ}C$

Applications

- Industry control systems
- Battery-powered systems
- Audio Signal Routing
- Instrumentation

Description

The TPW4053 is a three single-pole dual-throw analog switch (SPDT) suitable for use in analog or digital multiplexer/demultiplexer applications. The switch features three digital select inputs (S0, S1 and S2), to control three independent switch. The digital enable input (/E), turn off the switches When /E is HIGH.

The device is designed on an enhanced process that provides lower power dissipation yet gives high switching speeds. These devices can operate equally well as either multiplexers or demultiplexers and have an input range that extends to the supplies. All channels exhibit break-before-make switching action, preventing momentary shorting when switching channels.

Switch Selection Guide

| Product | Switch Configuration | Supply Voltage(V) | Ron(OHM) | Bandwidth(MHz) | Package |
|----------|----------------------|-------------------|----------|----------------|---------------------------|
| TPW4051 | 8:1 | 12 | 50 | 200 | SOIC-16, TSSOP-16, QFN-16 |
| TPW4052 | (4:1)*2 | 12 | 50 | 200 | SOIC-16, TSSOP-16 |
| TPW4053 | (2:1)*3 | 12 | 50 | 200 | SOIC-16, TSSOP-16 |
| TPW3111 | 1:1 | 5.5 | 1 | 100 | SC70-5 |
| TPW3115 | 1:1 | 5.5 | 5 | 250 | SC70-5, SOT23-5 |
| TPW4157 | 2:1 | 5.5 | 1 | 100 | SC70-6 |
| TPW3157A | 2:1 | 5.5 | 2 | 100 | SC70-6 |
| TPW3221 | (2:1)*2 | 5.5 | 1 | 100 | MSOP-10 |
| TPW3223 | (2:1)*2 | 5.5 | 1 | 100 | QFN-10, 1.4*1.8mm |

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Revision History

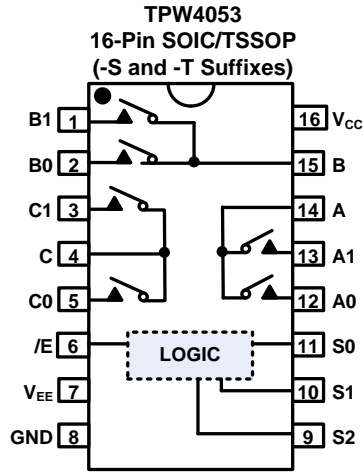
| Date | Revision | Notes |
|------------|----------|--|
| 2018/8/8 | Rev.Pre | Pre-Release Version |
| 2019/3/4 | Rev.0 | Initial Version |
| 2019/10/2 | Rev.0.01 | HBM: 2KV -> 1KV |
| 2019/12/25 | Rev.0.02 | Correct test conditions of RON and switch leakage to follow the product test(Product test is not changed): all of "0V" -> "VEE"; On Resistance Match between Channels at 3 to 3.6V Vcc: -> remove; On Resistance Match between Channels at 9 to 11V Vcc: VIS = 3.5V -> VIS = 1V; On Resistance Match between Channels at 4.5 to 5.5V Vcc, Vee = -4.5V to 5.5V: VIS = 3.5V -> VIS = -3.5V |
| 2020/1/14 | Rev.0.03 | Correct the "P0" information of TR in Tape and Reel Information |
| 2023/4/11 | Rev. A.0 | Updated the Ron max value @ VCC = 3.0 ~ 3.6V |

Order Information

| Order Number | Operating Temperature Range | Package | Marking Information | MSL | Transport Media, Quantity |
|--------------|-----------------------------|--------------|---------------------|-----|---------------------------|
| TPW4053-SR | -40 to 125°C | 16-Pin SOIC | W4053 | 3 | Tape and Reel, 2500 |
| TPW4053-TR | -40 to 125°C | 16-Pin TSSOP | W4053 | 3 | Tape and Reel, 3000 |

Pin Configuration, Description and Functional Table ^{Note 1}

TPW4053



Pin Description

| Pin No. | Pin Name | Input / Output | Description | Pin No. | Pin Name | Input / Output | Description |
|---------|-----------------|----------------|-----------------------------|---------|-----------------|----------------|----------------------------|
| 1 | B1 | Input / Output | Channel B1 input or output | 9 | S2 | Input | Control Input |
| 2 | B0 | Input / Output | Channel B0 input or output | 10 | S1 | Input | Control Input |
| 3 | C1 | Input / Output | Channel C1 input or output | 11 | S0 | Input | Control Input |
| 4 | C | Input / Output | C Common input or output | 12 | A0 | Input / Output | Channel A0 input or output |
| 5 | C0 | Input / Output | Channel C0 input or output | 13 | A1 | Input / Output | Channel A1 input or output |
| 6 | /E | Input | Enable switches, active low | 14 | A | Input / Output | A Common input or output |
| 7 | V _{EE} | | Negative Power Input | 15 | B | Input / Output | B Common input or output |
| 8 | GND | | Ground | 16 | V _{CC} | | Positive Power Input |

Functional Table

| /E, Enable | S2 | S1 | S0 | ON Channel |
|------------|----|----|----|------------|
| L | L | L | L | C0, B0, A0 |
| L | L | L | H | C0, B0, A1 |
| L | L | H | L | C0, B1, A0 |
| L | L | H | H | C0, B1, A1 |
| L | H | L | L | C1, B0, A0 |
| L | H | L | H | C1, B0, A1 |
| L | H | H | L | C1, B1, A0 |
| L | H | H | H | C1, B1, A1 |
| H | X | X | X | None |

X = Don't care

Absolute Maximum Ratings ^{Note 1}

| Parameters | Rating |
|---------------------------------------|------------------------------------|
| Supply Voltage, $V_{CC} - V_{EE}$ | -0.5V to 13V |
| Supply Voltage, $V_{CC} - GND$ | -0.5V to 13V |
| Supply Voltage, $V_{EE} - GND$ | -6.5V to 0.5V |
| Analog Switch Voltage | $V_{EE} - 0.5V$ to $V_{CC} + 0.5V$ |
| Analog Switch Current | $\pm 25mA$ |
| Analog Switch Diode Current | $\pm 20mA$ |
| Digital Input Voltage, /E, S2, S1, S0 | GND to $V_{CC} + 0.5V$ |
| Digital Input Diode Current | $\pm 20mA$ |
| Maximum Junction Temperature | 150°C |
| Storage Temperature Range | -65 to 150°C |
| Lead Temperature (Soldering, 10 sec) | 260°C |

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

ESD Rating

| Symbol | Parameter | Condition | Minimum Level | Unit |
|--------|--------------------------|------------------------|---------------|------|
| HBM | Human Body Model ESD | ANSI/ESDA/JEDEC JS-001 | 1 | kV |
| CDM | Charged Device Model ESD | ANSI/ESDA/JEDEC JS-002 | 1 | kV |

Thermal Information

| Package Type | θ_{JA} | θ_{JC} | Unit |
|--------------|---------------|---------------|------|
| 16-Pin SOIC | 100 | 50 | °C/W |
| 16-Pin TSSOP | 150 | 60 | °C/W |

Recommended Operating Conditions ^{Note 1}

Over operating temperature range

| Parameters | Min | Max | Unit |
|---|----------|----------|------|
| Supply Voltage, $V_{CC} - V_{EE}$ | 3 | 12 | V |
| Supply Voltage, $V_{CC} - GND$ ^{Note2} | 3 | 12 | V |
| Supply Voltage, $V_{EE} - GND$ ^{Note2} | -6 | 0 | V |
| Select Input Voltage | 0 | V_{CC} | V |
| Input Transition Rise and Fall Rate | | 100 | ns/V |
| Switch I/O Port Voltage | V_{EE} | V_{CC} | V |
| Operating Temperature Range | -40 | 125 | °C |

Note 1: Select input must be held HIGH or LOW and it must not float.

Note 2: The voltage of V_{CC} , V_{EE} need be in the range of $V_{CC}-V_{EE}$

Electrical Characteristics

Single Supply, $V_{CC} = 4.5$ to $5.5V$, $V_{EE} = 0V$, $GND = 0V$, unless otherwise noted.

| Symbol | Parameter | Conditions | V_{CC} (V) | 25°C | -40°C to 85°C | -40°C to 125°C | Limit | Unit |
|--------------------------------|---------------------------------------|--|-----------------|-----------|------------------|-------------------|-------|----------|
| Power Supply | | | | | | | | |
| I_{CC} | Quiescent Supply Current | $V_{IN} = 0V$ or V_{CC} | 5.5 | 4 | 6 | 8 | Max | μA |
| Digital Input | | | | | | | | |
| V_{IH} | Input Voltage High | | | | 2.0 | 2.0 | Min | V |
| V_{IL} | Input Voltage Low | | | | 0.8 | 0.8 | Max | V |
| I_{IN} | Control Input Leakage | $V_{IN} = 0V$ or V_{CC} | 5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Analog Switch | | | | | | | | |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 4.5 | 60 | | | Typ | Ω |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 4.5 | 100 | 130 | 150 | Max | Ω |
| ΔR_{ON} | On Resistance Match between Channels | $I_{OUT} = 1mA$, $V_{IS} = 2.5V$ | 4.5 | 20 | 30 | 35 | Max | Ω |
| $R_{FLAT(ON)}$ | On Resistance Flatness | $I_{OUT} = 1mA$ | 4.5 | 60 | 80 | 80 | Max | Ω |
| $I_{CH(OFF)}$ | Switch OFF Leakage Current on Channel | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{COM(OFF)}$ | Switch OFF Leakage Current on Common | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{(ON)}$ | Switch ON Leakage Current | $V_{IS} = V_{EE}$ or V_{CC} | 5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Dynamic Characteristics | | | | | | | | |
| t_{PHL} , t_{PLH} | Switch IN to OUT time | $C_L = 50pF$ | 4.5 | 5 | | | Typ | ns |
| t_{ON} | Switch turn-on time | $C_L = 50pF$ | 4.5 | 60 | | | Max | ns |
| t_{OFF} | Switch turn-off time | $C_L = 50pF$ | 4.5 | 50 | | | Max | ns |
| | OFF-Isolation | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 5 | -70 | | | Typ | dB |
| | Crosstalk in channel | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 5 | -70 | | | Typ | dB |
| | Crosstalk in control | Between control and any switch; $R_L = 600\Omega$; $f = 1MHz$; E or Sn square wave between V_{CC} and GND | 5 | 110 | | | Typ | mV |
| BW | Bandwidth | $R_L = 50\Omega$ | 5 | 200 | | | Typ | MHz |
| THD | Total Harmonic Distortion | $R_L = 10k\Omega$, $f = 1kHz$ | 5 | 0.05 | | | Typ | % |
| Capacitance | | | | | | | | |
| C_{IN} | Switch Input Capacitance | | 5 | 5 | | | Typ | pF |
| C_{COM} | Common Output Capacitance | | 5 | 10 | | | Typ | pF |
| C_{PD} | Power Dissipation Capacitance | | 5 | 50 | | | Typ | pF |

(1). Test data is based on bench test and design simulation

Single Supply, $V_{CC} = 3$ to $3.6V$, $V_{EE} = 0V$, $GND = 0V$, unless otherwise noted.

| Symbol | Parameter | Conditions | V_{CC} (V) | 25°C | -40°C to 85°C | -40°C to 125°C | Limit | Unit |
|--------------------------------|---------------------------------------|--|-----------------|-----------|------------------|-------------------|-------|----------|
| Power Supply | | | | | | | | |
| I_{CC} | Quiescent Supply Current | $V_{IN} = 0V$ or V_{CC} | 3.6 | 4 | 6 | 8 | Max | μA |
| Digital Input | | | | | | | | |
| V_{IH} | Input Voltage High | | | | 2.0 | 2.0 | Min | V |
| V_{IL} | Input Voltage Low | | | | 0.8 | 0.8 | Max | V |
| I_{IN} | Control Input Leakage | $V_{IN} = 0V$ or V_{CC} | 3.6 | | ± 1 | ± 1 | Max | μA |
| Analog Switch | | | | | | | | |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 3 | 200 | | | Typ | Ω |
| $R_{ON}^{(1)}$ | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 3 | 300 | 330 | 350 | Max | Ω |
| $R_{FLAT(ON)}$ | On Resistance Flatness | $I_{OUT} = 1mA$ | 3 | 100 | | | Typ | Ω |
| $I_{CH(OFF)}$ | Switch OFF Leakage Current on Channel | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 3.6 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{COM(OFF)}$ | Switch OFF Leakage Current on Common | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 3.6 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{(ON)}$ | Switch ON Leakage Current | $V_{IS} = V_{EE}$ or V_{CC} | 3.6 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Dynamic Characteristics | | | | | | | | |
| t_{PHL} , t_{PLH} | Switch IN to OUT time | $C_L = 50pF$ | 3 | 5 | | | Typ | ns |
| t_{ON} | Switch turn-on time | $C_L = 50pF$ | 3 | 70 | | | Max | ns |
| t_{OFF} | Switch turn-off time | $C_L = 50pF$ | 3 | 60 | | | Max | ns |
| | OFF-Isolation | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 3.3 | -70 | | | Typ | dB |
| | Crosstalk | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 3.3 | -70 | | | Typ | dB |
| | Crosstalk in control | Between control and any switch; $R_L = 600\Omega$; $f = 1MHz$; E or Sn square wave between V_{CC} and GND | 3.3 | 110 | | | Typ | mV |
| BW | Bandwidth | $R_L = 50\Omega$ | 3.3 | 200 | | | Typ | MHz |
| THD | Total Harmonic Distortion | $R_L = 10k\Omega$, $f = 1kHz$ | 3.3 | 0.2 | | | Typ | % |
| Capacitance | | | | | | | | |
| C_{IN} | Switch Input Capacitance | | 3.3 | 5 | | | Typ | pF |
| C_{COM} | Common Output Capacitance | | 3.3 | 10 | | | Typ | pF |
| C_{PD} | Power Dissipation Capacitance | | 3.3 | 50 | | | Typ | pF |

(1). Test data is based on bench test and design simulation

Single Supply, $V_{CC} = 9V$ to $11V$, $V_{EE} = 0V$, $GND = 0V$, unless otherwise noted.

| Symbol | Parameter | Conditions | V_{CC} (V) | 25°C | -40°C to 85°C | -40°C to 125°C | Limit | Unit |
|--------------------------------|---------------------------------------|--|-----------------|-----------|------------------|-------------------|-------|----------|
| Power Supply | | | | | | | | |
| I_{CC} | Quiescent Supply Current | $V_{IN} = 0V$ or V_{CC} | 9 | 8 | 12 | 16 | Max | μA |
| Digital Input | | | | | | | | |
| V_{IH} | Input Voltage High | | | | 2.4 | 2.4 | Min | V |
| V_{IL} | Input Voltage Low | | | | 0.8 | 0.8 | Max | V |
| I_{IN} | Control Input Leakage | $V_{IN} = 0V$ or V_{CC} | 11 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Analog Switch | | | | | | | | |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 9 | 50 | | | Typ | Ω |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 9 | 80 | 95 | 105 | Max | Ω |
| ΔR_{ON} | On Resistance Match between Channels | $I_{OUT} = 1mA$, $V_{IS} = 1V$ | 9 | 15 | 25 | 30 | Max | Ω |
| $R_{FLAT(ON)}$ | On Resistance Flatness | $I_{OUT} = 1mA$ | 9 | 30 | 40 | 40 | Max | Ω |
| $I_{CH(OFF)}$ | Switch OFF Leakage Current on Channel | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 11 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{COM(OFF)}$ | Switch OFF Leakage Current on Common | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 11 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{(ON)}$ | Switch ON Leakage Current | $V_{IS} = V_{EE}$ or V_{CC} | 11 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Dynamic Characteristics | | | | | | | | |
| t_{PHL} , t_{PLH} | Switch IN to OUT time | $C_L = 50pF$ | 9 | 5 | | | Typ | ns |
| t_{ON} | Switch turn-on time | $C_L = 50pF$ | 9 | 60 | | | Max | ns |
| t_{OFF} | Switch turn-off time | $C_L = 50pF$ | 9 | 50 | | | Max | ns |
| | OFF-Isolation | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 10 | -70 | | | Typ | dB |
| | Crosstalk | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 10 | -70 | | | Typ | dB |
| | Crosstalk in control | Between control and any switch; $R_L = 600\Omega$; $f = 1MHz$; E or Sn square wave between V_{CC} and GND | 10 | 220 | | | Typ | mV |
| BW | Bandwidth | $R_L = 50\Omega$ | 10 | 200 | | | Typ | MHz |
| THD | Total Harmonic Distortion | $R_L = 10k\Omega$, $f = 1kHz$ | 10 | 0.03 | | | Typ | % |
| Capacitance | | | | | | | | |
| C_{IN} | Switch Input Capacitance | | 10 | 5 | | | Typ | pF |
| C_{COM} | Common Output Capacitance | | 10 | 10 | | | Typ | pF |
| C_{PD} | Power Dissipation Capacitance | | 10 | 50 | | | Typ | pF |

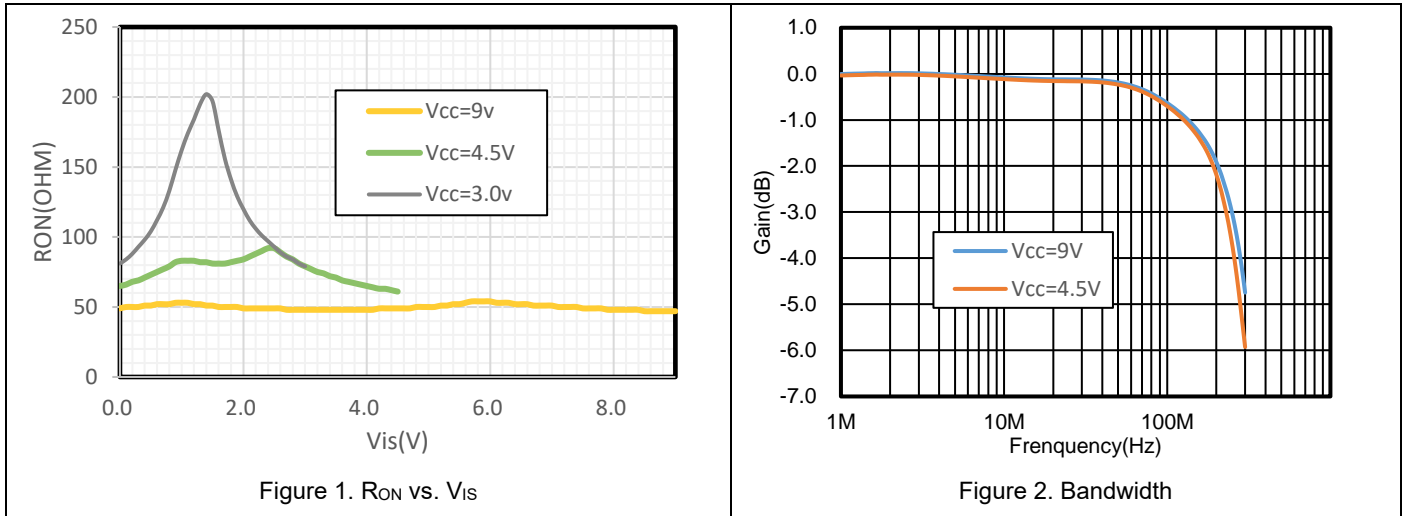
(1). Test data is based on bench test and design simulation

Dual Supply, $V_{CC} = 4.5$ to $5.5V$, $V_{EE} = -4.5$ to $5.5V$, $GND = 0V$, unless otherwise noted.

| Symbol | Parameter | Conditions | V_{CC} $/V_{EE}(V)$ | 25°C | -40°C to 85°C | -40°C to 125°C | Limit | Unit |
|--------------------------------|---------------------------------------|--|--------------------------|-----------|------------------|-------------------|-------|----------|
| Power Supply | | | | | | | | |
| I_{CC} | Quiescent Supply Current | $V_{IN} = 0V$ or V_{CC} | 5.5/-5.5 | 8 | 12 | 16 | Max | μA |
| Digital Input | | | | | | | | |
| V_{IH} | Input Voltage High | | | | 70%* V_{CC} | 70%* V_{CC} | Min | V |
| V_{IL} | Input Voltage Low | | | | 30%* V_{CC} | 30%* V_{CC} | Max | V |
| I_{IN} | Control Input Leakage | $V_{IN} = 0V$ or V_{CC} | 5.5/-5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Analog Switch | | | | | | | | |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 4.5/-4.5 | 50 | | | Typ | Ω |
| R_{ON} | | $I_{OUT} = 1mA$, $V_{IS} = V_{EE}$ or V_{CC} | 4.5/-4.5 | 80 | 95 | 105 | Max | Ω |
| ΔR_{ON} | On Resistance Match between Channels | $I_{OUT} = 1mA$, $V_{IS} = -3.5V$ | 4.5/-4.5 | 15 | 25 | 30 | Max | Ω |
| $R_{FLAT(ON)}$ | On Resistance Flatness | $I_{OUT} = 1mA$ | 4.5/-4.5 | 30 | 40 | 40 | Max | Ω |
| $I_{CH(OFF)}$ | Switch OFF Leakage Current on Channel | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$ | 5.5/-5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{COM(OFF)}$ | Switch OFF Leakage Current on Common | $V_{IS} = V_{EE}$, $V_{OS} = V_{CC}$; or $V_{IS} = V_{CC}$, $V_{OS} = V_{EE}$, | 5.5/-5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| $I_{(ON)}$ | Switch ON Leakage Current | $V_{IS} = V_{EE}$ or V_{CC} | 5.5/-5.5 | ± 0.4 | ± 1 | ± 1 | Max | μA |
| Dynamic Characteristics | | | | | | | | |
| t_{PHL} , t_{PLH} | Switch IN to OUT time | $C_L = 50pF$ | 4.5/-4.5 | 5 | | | Typ | ns |
| t_{ON} | Switch turn-on time | $C_L = 50pF$ | 4.5/-4.5 | 60 | | | Max | ns |
| t_{OFF} | Switch turn-off time | $C_L = 50pF$ | 4.5/-4.5 | 50 | | | Max | ns |
| | OFF-Isolation | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 5/-5 | -70 | | | Typ | dB |
| | Crosstalk | $f = 1MHz$, $R_L = 50\Omega$, $C_L = 10pF$ | 5/-5 | -70 | | | Typ | dB |
| | Crosstalk in control | Between control and any switch; $R_L = 600\Omega$; $f = 1MHz$; E or Sn square wave between V_{CC} and GND | 5/-5 | 220 | | | Typ | mV |
| BW | Bandwidth | $R_L = 50\Omega$ | 5/-5 | 100 | | | Typ | MHz |
| THD | Total Harmonic Distortion | $R_L = 10k\Omega$, $f = 1kHz$ | 5/-5 | 0.03 | | | Typ | % |
| Capacitance | | | | | | | | |
| C_{IN} | Switch Input Capacitance | | 5/-5 | 5 | | | Typ | pF |
| C_{COM} | Common Output Capacitance | | 5/-5 | 10 | | | Typ | pF |
| C_{PD} | Power Dissipation Capacitance | | 5/-5 | 50 | | | Typ | pF |

(1). Test data is based on bench test and design simulation

Typical Performance Characteristics



Test Circuit and Waveforms

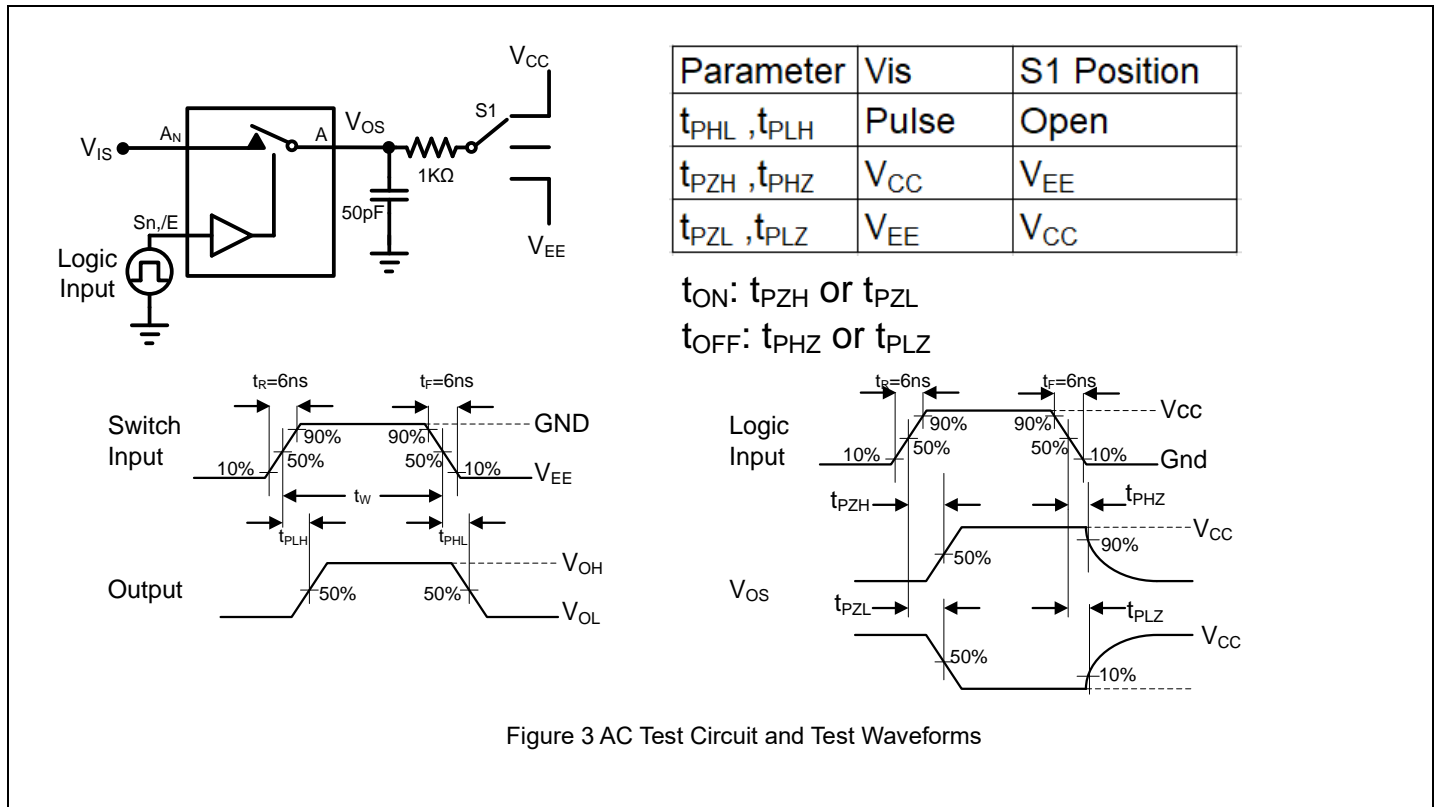


Figure 3 AC Test Circuit and Test Waveforms

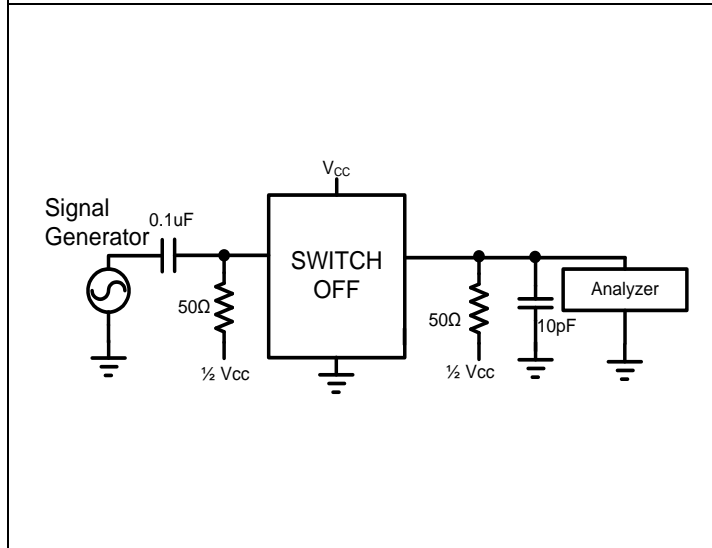


Figure 4 Off Isolation

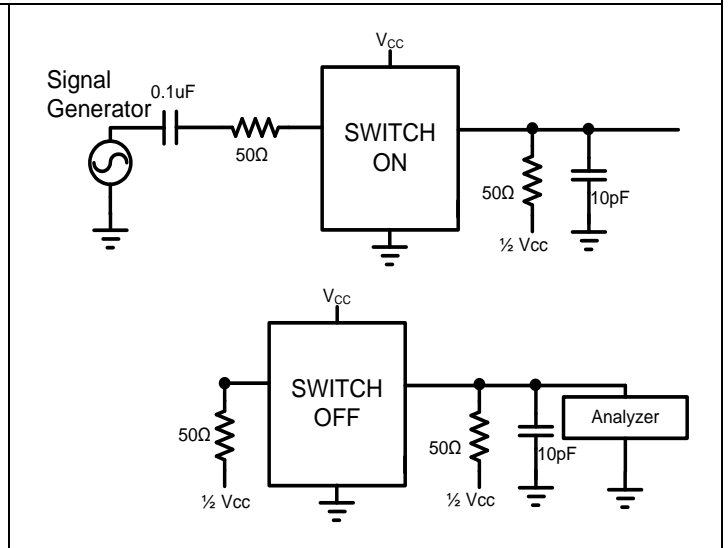
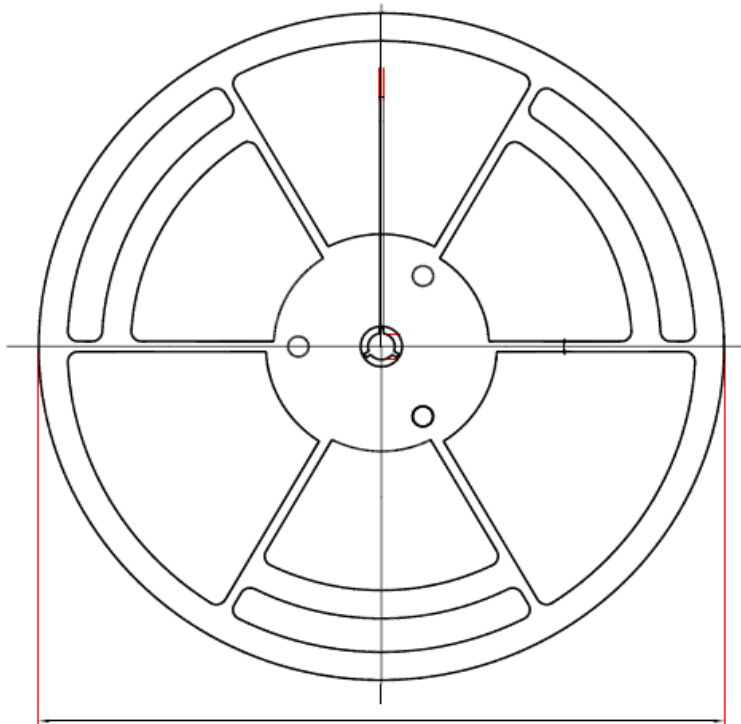


Figure 5 Crosstalk

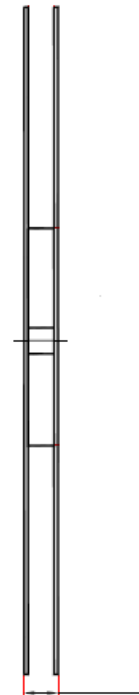
Application Information

A 0.1- μ F bypass capacitor on V_{CC} and GND is recommended to prevent power disturbance, another 0.1- μ F bypass capacitor on V_{EE} and GND is also recommended if the V_{EE} is not connected to GND.

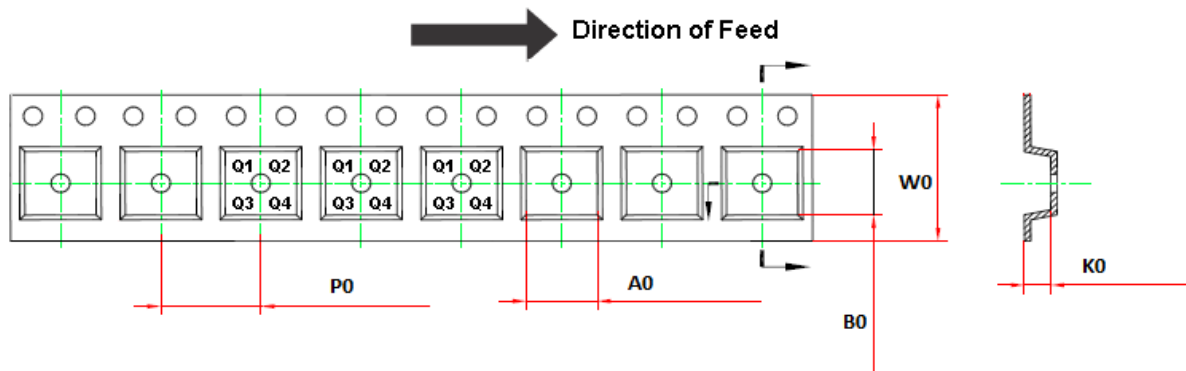
Tape and Reel Information



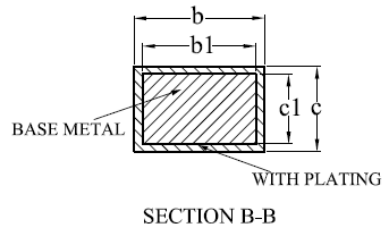
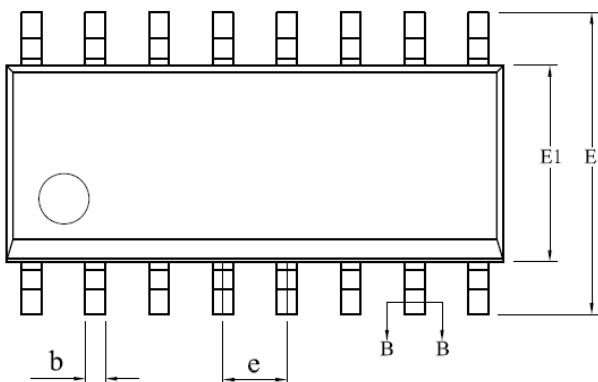
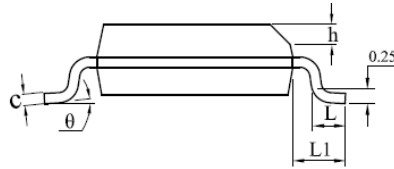
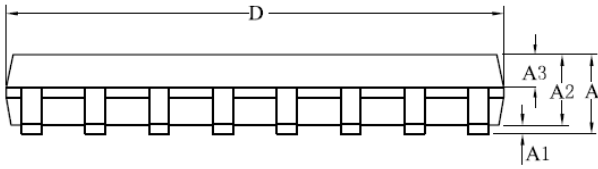
D1: Reel Diameter



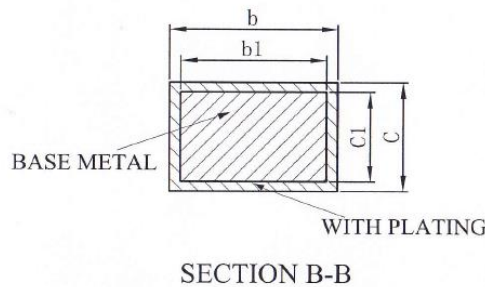
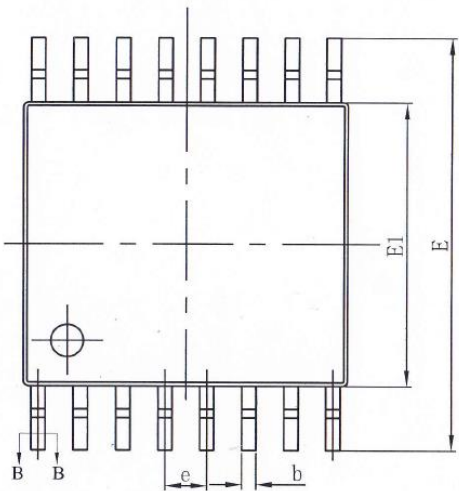
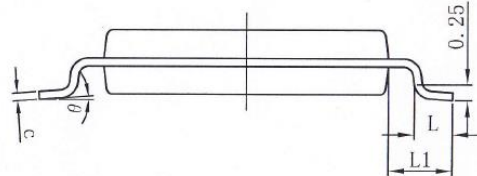
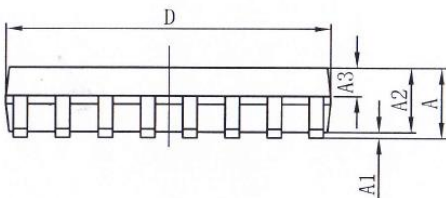
W1: Reel Width



| Order Number | Package | D1 | W1 | A0 | B0 | K0 | P0 | W0 | Pin1 Quadrant |
|--------------|----------|-----|------|---------|----------|---------|---------|----------|------------------|
| TPW4053-SR | SOIC-16 | 330 | 21.6 | 6.7±0.1 | 10.4±0.1 | 2.1±0.1 | 8.0±0.1 | 16.0±0.3 | Q1 |
| TPW4053-TR | TSSOP-16 | 330 | 17.6 | 6.8±0.1 | 5.4±0.1 | 1.3±0.1 | 8.0±0.1 | 12.0±0.1 | Q1 |

Package Outline Dimensions
SOIC-16


| SYMBOL | MILLIMETER | | |
|--------|------------|------|-------|
| | MIN | NOM | MAX |
| A | — | — | 1.75 |
| A1 | 0.10 | — | 0.225 |
| A2 | 1.30 | 1.40 | 1.50 |
| A3 | 0.60 | 0.65 | 0.70 |
| b | 0.39 | — | 0.47 |
| b1 | 0.38 | 0.41 | 0.44 |
| c | 0.20 | — | 0.24 |
| c1 | 0.19 | 0.20 | 0.21 |
| D | 9.80 | 9.90 | 10.00 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27BSC | | |
| h | 0.25 | — | 0.50 |
| L | 0.50 | — | 0.80 |
| L1 | 1.05REF | | |
| theta | 0 | — | 8° |

TSSOP-16


| SYMBOL | MILLIMETER | | |
|--------|------------|------|------|
| | MIN | NOM | MAX |
| A | — | — | 1.20 |
| A1 | 0.05 | — | 0.15 |
| A2 | 0.90 | 1.00 | 1.05 |
| A3 | 0.39 | 0.44 | 0.49 |
| b | 0.20 | — | 0.28 |
| b1 | 0.19 | 0.22 | 0.25 |
| c | 0.13 | — | 0.17 |
| c1 | 0.12 | 0.13 | 0.14 |
| D | 4.90 | 5.00 | 5.10 |
| E | 6.20 | 6.40 | 6.60 |
| E1 | 4.30 | 4.40 | 4.50 |
| e | 0.65BSC | | |
| L | 0.45 | 0.60 | 0.75 |
| L1 | 1.00BSC | | |
| theta | 0 | — | 8° |

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