



# 0.25-Ω CMOS, 1.65-V to 4.3-V, Dual DPDT Analog Switch

## FEATURES

- Low Voltage Operation (1.65 V to 4.3 V)
- Low On-Resistance -  $r_{ON}$ : 0.25 Ω @ 2.7 V
- Fast Switching:  $t_{ON} = 28$  ns  
 $t_{OFF} = 17$  ns
- QFN-16 (3x3) Package
- Latch-Up Current >300 mA (JESD78)

## BENEFITS

- Reduced Power Consumption
- High Accuracy
- Reduce Board Space
- TTL/1.8-V Logic Compatible
- High Bandwidth

## APPLICATIONS

- Cellular Phones
- Speaker Headset Switching
- Audio and Video Signal Routing
- PCMCIA Cards
- Battery Operated Systems

## DESCRIPTION

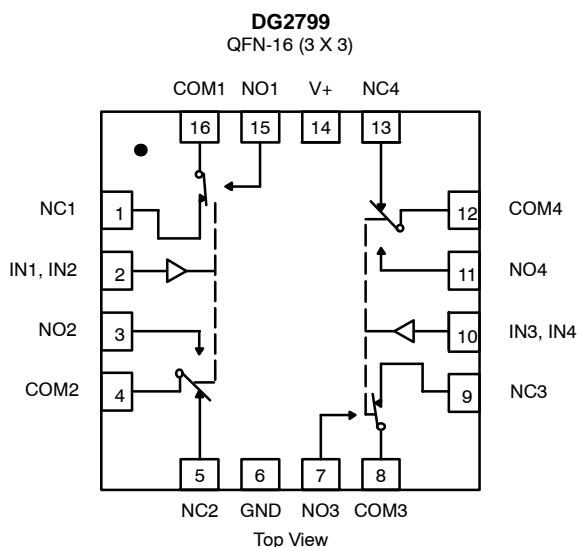
The DG2799 is a dual double-pole/double-throw monolithic CMOS analog switch designed for high performance switching of analog signals. Combining low power, high speed, low on-resistance and small physical size, the DG2799 is ideal for portable and battery powered applications requiring high performance and efficient use of board space.

The DG2799 is built on Vishay Siliconix's low voltage process. An epitaxial layer prevents latchup. Break-before-make is guaranteed.

The switch conducts equally well in both directions when on, and blocks up to the power supply level when off.

As a committed partner to the community and the environment, Vishay Siliconix manufactures this product with the lead (Pb)-free device terminations. For analog switching products manufactured in QFN packages, the lead (Pb)-free "-E3/E4" suffix is being used as a designator. Lead (Pb)-free QFN products purchased at any time will have either a nickel-palladium-gold device termination or a 100% matte tin device termination. The different lead (Pb)-free materials are interchangeable and meet all JEDEC standards for reflow and MSL rating.

## FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



**NOTE:**

Underside exposed pad has no device electrical connection. It is recommended that no electrical connection is made to it.

| TRUTH TABLE |                 |                 |
|-------------|-----------------|-----------------|
| Logic       | NC1, 2, 3 and 4 | NO1, 2, 3 and 4 |
| 0           | ON              | OFF             |
| 1           | OFF             | ON              |

| ORDERING INFORMATION |                                      |                   |
|----------------------|--------------------------------------|-------------------|
| Temp Range           | Package                              | Part Number       |
| -40 to 85°C          | 16-Pin QFN (3 x 3 mm)<br>Variation 2 | DG2799DN-T1—E3/E4 |

**ABSOLUTE MAXIMUM RATINGS**

Reference to GND

|                                                     |                      |
|-----------------------------------------------------|----------------------|
| V+ .....                                            | -0.3 to +5.0 V       |
| IN, COM, NC, NO <sup>a</sup> .....                  | -0.3 to (V+ + 0.3 V) |
| Current (Any terminal except NO, NC or COM) .....   | 30 mA                |
| Continuous Current (NO, NC, or COM) .....           | ±300 mA              |
| Peak Current .....                                  | ±500 mA              |
| (Pulsed at 1 ms, 10% duty cycle)                    |                      |
| Storage Temperature (D Suffix) .....                | -65 to 150°C         |
| Package Solder Reflow Conditions <sup>d</sup> ..... |                      |
| 16-Pin QFN (3 x 3 mm) .....                         | 250°C                |

Power Dissipation (Packages)<sup>b</sup>

|                           |         |
|---------------------------|---------|
| QFN-16 <sup>c</sup> ..... | 1385 mW |
|---------------------------|---------|

- Notes:
- Signals on NC, NO, or COM or IN exceeding V+ will be clamped by internal diodes. Limit forward diode current to maximum current ratings.
  - All leads welded or soldered to PC Board.
  - Derate 17.3 mW/°C above 70°C
  - Manual soldering with iron is not recommended for leadless components. The QFN is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper lip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions 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.

| SPECIFICATIONS (V+ = 1.8 V)                                  |                                                         |                                                                                                          |                           |                       |                  |                  |      |     |    |
|--------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------|-----------------------|------------------|------------------|------|-----|----|
| Parameter                                                    | Symbol                                                  | Test Conditions<br>Otherwise Unless Specified<br>V+ = 1.8 V, V <sub>IN</sub> = 0.4 or 1.1 V <sup>e</sup> | Temp <sup>a</sup>         | Limits<br>-40 to 85°C |                  |                  | Unit |     |    |
|                                                              |                                                         |                                                                                                          |                           | Min <sup>b</sup>      | Typ <sup>c</sup> | Max <sup>b</sup> |      |     |    |
| <b>Analog Switch</b>                                         |                                                         |                                                                                                          |                           |                       |                  |                  |      |     |    |
| Analog Signal Range <sup>d</sup>                             | V <sub>NO</sub> , V <sub>NC</sub> ,<br>V <sub>COM</sub> |                                                                                                          | Full                      | 0                     |                  | V+               | V    |     |    |
| On-Resistance                                                | r <sub>ON</sub>                                         | V+ = 1.8 V, V <sub>COM</sub> = 0.2 V/0.9 V, I <sub>NO</sub> , I <sub>NC</sub> = 100 mA                   | Room<br>Full              |                       | 0.47             | 1.3<br>1.4       | Ω    |     |    |
| <b>Digital Control</b>                                       |                                                         |                                                                                                          |                           |                       |                  |                  |      |     |    |
| Input High Voltage                                           | V <sub>INH</sub>                                        |                                                                                                          | Full                      | 1.1                   |                  |                  | V    |     |    |
| Input Low Voltage                                            | V <sub>INL</sub>                                        |                                                                                                          | Full                      |                       |                  | 0.4              |      |     |    |
| Input Capacitance                                            | C <sub>in</sub>                                         |                                                                                                          | Full                      |                       | 6                |                  | pF   |     |    |
| Input Current                                                | I <sub>INL</sub> or I <sub>INH</sub>                    | V <sub>IN</sub> = 0 or V+                                                                                | Full                      | -1                    |                  | 1                | μA   |     |    |
| <b>Dynamic Characteristics</b>                               |                                                         |                                                                                                          |                           |                       |                  |                  |      |     |    |
| Turn-On Time                                                 | t <sub>ON</sub>                                         | V <sub>NO</sub> or V <sub>NC</sub> = 1.5 V, R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 35 pF                | Room<br>Full              |                       | 62               | 94<br>97         | ns   |     |    |
| Turn-Off Time                                                | t <sub>OFF</sub>                                        |                                                                                                          | Room<br>Full              |                       | 24               | 52<br>55         |      |     |    |
| Break-Before-Make Time                                       | t <sub>d</sub>                                          |                                                                                                          | Full                      | 8                     |                  |                  |      |     |    |
| Charge Injection <sup>d</sup>                                | Q <sub>INJ</sub>                                        | C <sub>L</sub> = 1 nF, V <sub>GEN</sub> = 0 V, R <sub>GEN</sub> = 0 Ω                                    | Room                      |                       | 66               |                  | pC   |     |    |
| Off-Isolation <sup>d</sup>                                   | OIRR                                                    | R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 100 kHz                                                | Room                      |                       | -74              |                  | dB   |     |    |
| Crosstalk <sup>d</sup>                                       | X <sub>TALK</sub>                                       |                                                                                                          | Room                      |                       | -74              |                  |      |     |    |
| N <sub>O</sub> , N <sub>C</sub> Off Capacitance <sup>d</sup> | C <sub>NO(off)</sub>                                    | V <sub>IN</sub> = 0 or V+, f = 1 MHz                                                                     | Room                      |                       | 108              |                  | pF   |     |    |
|                                                              | C <sub>NC(off)</sub>                                    |                                                                                                          | Room                      |                       | 108              |                  |      |     |    |
| Channel-On Capacitance <sup>d</sup>                          | C <sub>NO(on)</sub>                                     |                                                                                                          | Room                      |                       | 240              |                  |      |     |    |
|                                                              | C <sub>NC(on)</sub>                                     |                                                                                                          | Room                      |                       | 240              |                  |      |     |    |
| <b>Power Supply</b>                                          |                                                         |                                                                                                          |                           |                       |                  |                  |      |     |    |
| Power Supply Current                                         | I+                                                      |                                                                                                          | V <sub>IN</sub> = 0 or V+ | Full                  |                  |                  |      | 1.0 | μA |



| SPECIFICATIONS (V+ = 3 V)                                    |                                                      |                                                                                                  |                   |                       |                  |                  |      |     |   |
|--------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------|-----------------------|------------------|------------------|------|-----|---|
| Parameter                                                    | Symbol                                               | Test Conditions<br>Otherwise Unless Specified<br>V+ = 3 V, ±10%, VIN = 0.5 or 1.4 V <sup>e</sup> | Temp <sup>a</sup> | Limits<br>–40 to 85°C |                  |                  | Unit |     |   |
|                                                              |                                                      |                                                                                                  |                   | Min <sup>b</sup>      | Typ <sup>c</sup> | Max <sup>b</sup> |      |     |   |
| <b>Analog Switch</b>                                         |                                                      |                                                                                                  |                   |                       |                  |                  |      |     |   |
| Analog Signal Range <sup>d</sup>                             | V <sub>NO</sub> , V <sub>NC</sub> , V <sub>COM</sub> |                                                                                                  | Full              | 0                     |                  | V+               | V    |     |   |
| On-Resistance                                                | r <sub>ON</sub>                                      | V+ = 2.7 V, V <sub>COM</sub> = 0.2 V/1.5 V, I <sub>NO</sub> , I <sub>NC</sub> = 100 mA           | Room Full         |                       | 0.3              | 0.45<br>0.55     | Ω    |     |   |
| r <sub>ON</sub> Flatness <sup>d</sup>                        | r <sub>ON</sub> Flatness                             | V+ = 2.7 V<br>V <sub>COM</sub> = 0 to V+, I <sub>NO</sub> , I <sub>NC</sub> = 100 mA             | Room              |                       | 0.07             | 0.15             |      |     |   |
| r <sub>ON</sub> Match <sup>d</sup>                           | Δr <sub>ON</sub>                                     |                                                                                                  | Room              |                       | 0.05             |                  |      |     |   |
| Switch Off Leakage Current                                   | I <sub>NO(off)</sub> , I <sub>NC(off)</sub>          | V+ = 3.3 V, V <sub>NO</sub> , V <sub>NC</sub> = 0.3 V/3.0 V<br>V <sub>COM</sub> = 3.0 V/0.3 V    | Room Full         | –1<br>–10             |                  | 1<br>10          | nA   |     |   |
|                                                              | I <sub>COM(off)</sub>                                |                                                                                                  | Room Full         | –1<br>–10             |                  | 1<br>10          |      |     |   |
| Channel-On Leakage Current                                   | I <sub>COM(on)</sub>                                 | V+ = 3.3 V, V <sub>NO</sub> , V <sub>NC</sub> = V <sub>COM</sub> = 0.3 V/3.0 V                   | Room Full         | –1<br>–10             |                  | 1<br>10          |      |     |   |
| <b>Digital Control</b>                                       |                                                      |                                                                                                  |                   |                       |                  |                  |      |     |   |
| Input High Voltage                                           | V <sub>INH</sub>                                     |                                                                                                  | Full              | 1.4                   |                  |                  | V    |     |   |
| Input Low Voltage                                            | V <sub>INL</sub>                                     |                                                                                                  | Full              |                       |                  | 0.5              |      |     |   |
| Input Capacitance                                            | C <sub>in</sub>                                      |                                                                                                  | Full              |                       | 6                |                  | pF   |     |   |
| Input Current                                                | I <sub>INL</sub> or I <sub>INH</sub>                 | V <sub>IN</sub> = 0 or V+                                                                        | Full              | –1                    |                  | 1                | μA   |     |   |
| <b>Dynamic Characteristics</b>                               |                                                      |                                                                                                  |                   |                       |                  |                  |      |     |   |
| Turn-On Time                                                 | t <sub>ON</sub>                                      | V <sub>NO</sub> or V <sub>NC</sub> = 1.5 V, R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 35 pF        | Room Full         |                       | 28               | 57<br>60         | ns   |     |   |
| Turn-Off Time                                                | t <sub>OFF</sub>                                     |                                                                                                  | Room Full         |                       | 17               | 45<br>47         |      |     |   |
| Break-Before-Make Time                                       | t <sub>d</sub>                                       |                                                                                                  | Full              | 1                     |                  |                  |      |     |   |
| Charge Injection <sup>d</sup>                                | Q <sub>INJ</sub>                                     | C <sub>L</sub> = 1 nF, V <sub>GEN</sub> = 0 V, R <sub>GEN</sub> = 0 Ω                            | Room              |                       | 160              |                  | pC   |     |   |
| Off-Isolation <sup>d</sup>                                   | OIRR                                                 | R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 100 kHz                                        | Room              |                       | –75              |                  | dB   |     |   |
| Crosstalk <sup>d</sup>                                       | X <sub>TALK</sub>                                    |                                                                                                  | Room              |                       | –75              |                  |      |     |   |
| N <sub>O</sub> , N <sub>C</sub> Off Capacitance <sup>d</sup> | C <sub>NO(off)</sub>                                 | V <sub>IN</sub> = 0 or V+, f = 1 MHz                                                             | Room              |                       | 102              |                  | pF   |     |   |
|                                                              | C <sub>NC(off)</sub>                                 |                                                                                                  | Room              |                       | 102              |                  |      |     |   |
| Channel-On Capacitance <sup>d</sup>                          | C <sub>NO(on)</sub>                                  |                                                                                                  | Room              |                       | 234              |                  |      |     |   |
|                                                              | C <sub>NC(on)</sub>                                  |                                                                                                  | Room              |                       | 234              |                  |      |     |   |
| <b>Power Supply</b>                                          |                                                      |                                                                                                  |                   |                       |                  |                  |      |     |   |
| Power Supply Range                                           | V+                                                   |                                                                                                  |                   |                       | 2.7              |                  |      | 3.3 | V |
| Power Supply Current                                         | I+                                                   | V <sub>IN</sub> = 0 or V+                                                                        | Full              |                       |                  | 1.0              | μA   |     |   |

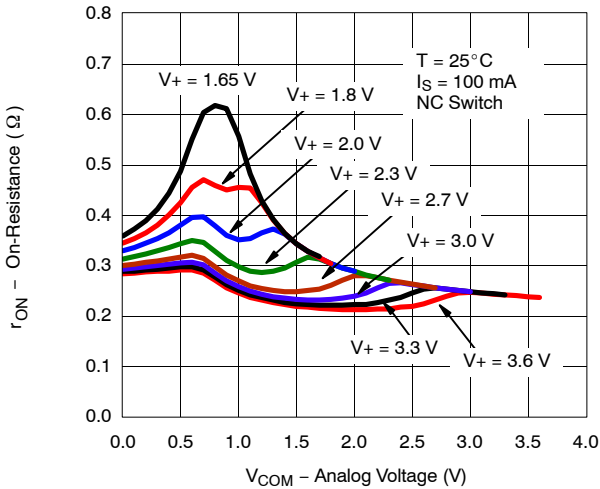
| SPECIFICATIONS (V <sub>+</sub> = 4.3 V)                      |                                                         |                                                                                                                      |                   |                       |                  |                  |      |
|--------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|------------------|------------------|------|
| Parameter                                                    | Symbol                                                  | Test Conditions<br>Otherwise Unless Specified<br>V <sub>+</sub> = 4.3 V, V <sub>IN</sub> = 0.5 or 1.6 V <sup>e</sup> | Temp <sup>a</sup> | Limits<br>–40 to 85°C |                  |                  | Unit |
|                                                              |                                                         |                                                                                                                      |                   | Min <sup>b</sup>      | Typ <sup>c</sup> | Max <sup>b</sup> |      |
| <b>Analog Switch</b>                                         |                                                         |                                                                                                                      |                   |                       |                  |                  |      |
| Analog Signal Range <sup>d</sup>                             | V <sub>NO</sub> , V <sub>NC</sub> ,<br>V <sub>COM</sub> |                                                                                                                      | Full              | 0                     |                  | V <sub>+</sub>   | V    |
| On-Resistance                                                | r <sub>ON</sub>                                         | V <sub>+</sub> = 4.3 V, V <sub>COM</sub> = 0.5 V/2.1 V, I <sub>NO</sub> , I <sub>NC</sub> = 100 mA                   | Room<br>Full      |                       | 0.29             | 0.43<br>0.53     | Ω    |
| r <sub>ON</sub> Flatness <sup>d</sup>                        | r <sub>ON</sub><br>Flatness                             | V <sub>+</sub> = 4.3 V<br>V <sub>COM</sub> = 0 to V <sub>+</sub> , I <sub>NO</sub> , I <sub>NC</sub> = 100 mA        | Room              |                       | 0.07             | 0.15             |      |
| r <sub>ON</sub> Match <sup>d</sup>                           | Δr <sub>ON</sub>                                        |                                                                                                                      | Room              |                       | 0.05             |                  |      |
| Switch Off Leakage Current <sup>d</sup>                      | I <sub>NO(off)</sub> ,<br>I <sub>NC(off)</sub>          | V <sub>+</sub> = 4.3 V, V <sub>NO</sub> , V <sub>NC</sub> = 0.3 V/4.0 V<br>V <sub>COM</sub> = 4.0 V/0.3 V            | Room<br>Full      | –10<br>–100           |                  | 10<br>100        | nA   |
|                                                              | I <sub>COM(off)</sub>                                   |                                                                                                                      | Room<br>Full      | –10<br>–100           |                  | 10<br>100        |      |
| Channel-On Leakage Current <sup>d</sup>                      | I <sub>COM(on)</sub>                                    | V <sub>+</sub> = 4.3 V, V <sub>NO</sub> , V <sub>NC</sub> = V <sub>COM</sub> = 0.3 V/4.0 V                           | Room<br>Full      | –10<br>–100           |                  | 10<br>100        |      |
| <b>Digital Control</b>                                       |                                                         |                                                                                                                      |                   |                       |                  |                  |      |
| Input High Voltage                                           | V <sub>INH</sub>                                        |                                                                                                                      | Full              | 1.6                   |                  |                  | V    |
| Input Low Voltage                                            | V <sub>INL</sub>                                        |                                                                                                                      | Full              |                       |                  | 0.5              |      |
| Input Capacitance                                            | C <sub>in</sub>                                         |                                                                                                                      | Full              |                       | 6                |                  | pF   |
| Input Current                                                | I <sub>INL</sub> or I <sub>INH</sub>                    | V <sub>IN</sub> = 0 or V <sub>+</sub>                                                                                | Full              | –1                    |                  | 1                | μA   |
| <b>Dynamic Characteristics</b>                               |                                                         |                                                                                                                      |                   |                       |                  |                  |      |
| Charge Injection <sup>d</sup>                                | Q <sub>INJ</sub>                                        | C <sub>L</sub> = 1 nF, V <sub>GEN</sub> = 0 V, R <sub>GEN</sub> = 0 Ω                                                | Room              |                       | 320              |                  | pC   |
| Off-Isolation <sup>d</sup>                                   | OIRR                                                    | R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 100 kHz                                                            | Room              |                       | –73              |                  | dB   |
| Crosstalk <sup>d</sup>                                       | X <sub>TALK</sub>                                       |                                                                                                                      | Room              |                       | –73              |                  |      |
| N <sub>O</sub> , N <sub>C</sub> Off Capacitance <sup>d</sup> | C <sub>NO(off)</sub>                                    | V <sub>IN</sub> = 0 or V <sub>+</sub> , f = 1 MHz                                                                    | Room              |                       | 100              |                  | pF   |
|                                                              | C <sub>NC(off)</sub>                                    |                                                                                                                      | Room              |                       | 100              |                  |      |
| Channel-On Capacitance <sup>d</sup>                          | C <sub>NO(on)</sub>                                     |                                                                                                                      | Room              |                       | 230              |                  |      |
|                                                              | C <sub>NC(on)</sub>                                     |                                                                                                                      | Room              |                       | 230              |                  |      |
| <b>Power Supply</b>                                          |                                                         |                                                                                                                      |                   |                       |                  |                  |      |
| Power Supply Range                                           | V <sub>+</sub>                                          |                                                                                                                      |                   |                       |                  | 4.3              | V    |
| Power Supply Current                                         | I <sub>+</sub>                                          | V <sub>IN</sub> = 0 or V <sub>+</sub>                                                                                | Full              |                       |                  | 1.0              | μA   |

Notes:

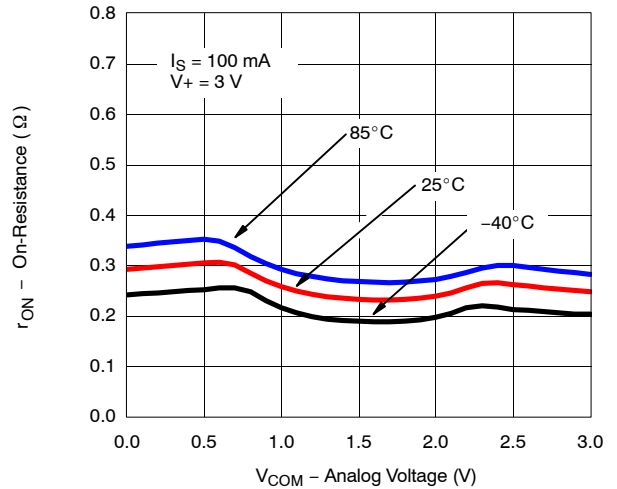
- Room = 25°C, Full = as determined by the operating suffix.
- Typical values are for design aid only, not guaranteed nor subject to production testing.
- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- Guarantee by design, not subjected to production test.
- V<sub>IN</sub> = input voltage to perform proper function.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

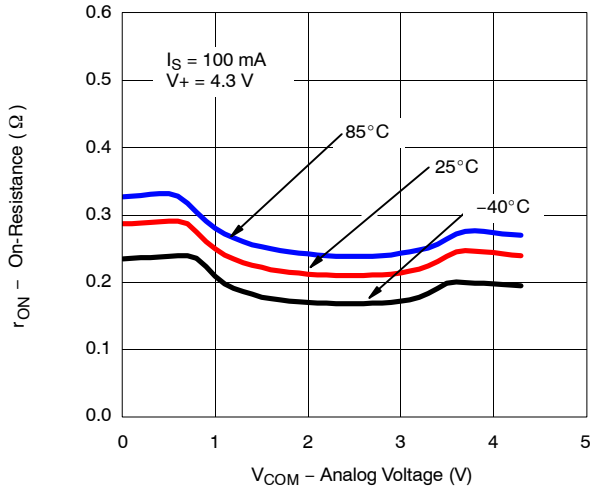
**$r_{ON}$  vs.  $V_{COM}$  and Supply Voltage**



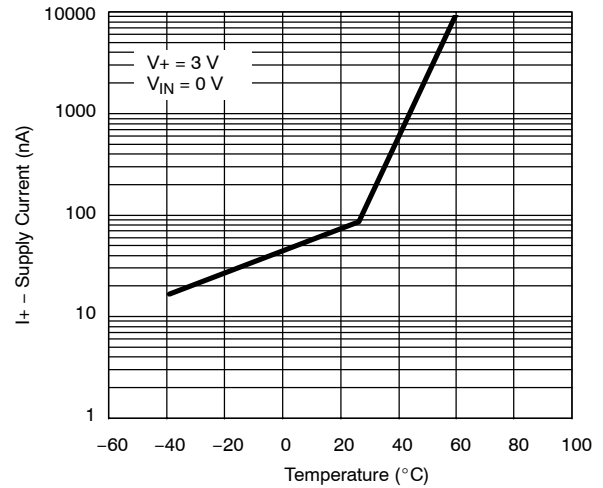
**$r_{ON}$  vs. Analog Voltage and Temperature**



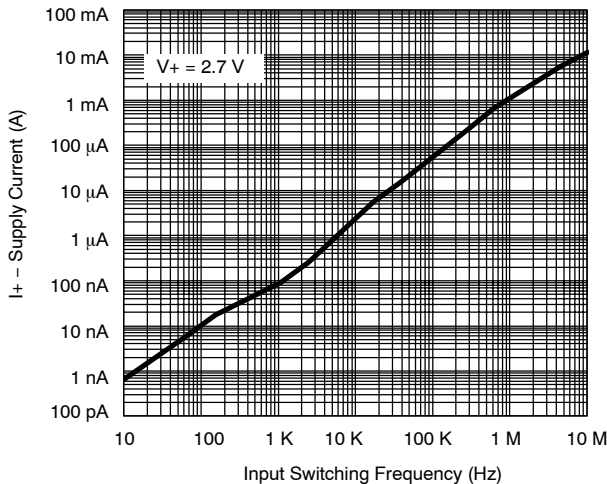
**$r_{ON}$  vs. Analog Voltage and Temperature**



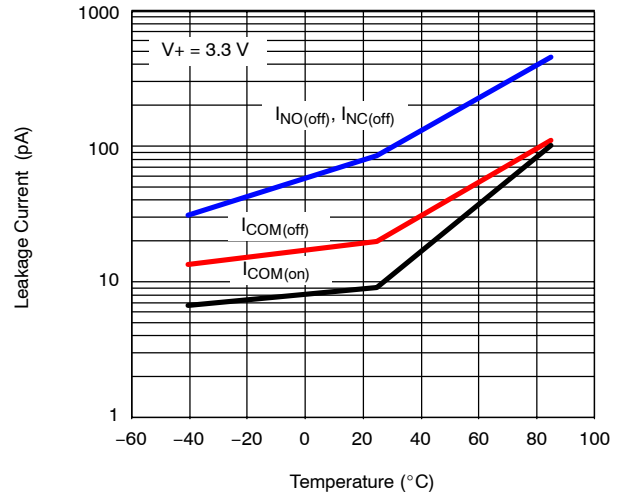
**Supply Current vs. Temperature**



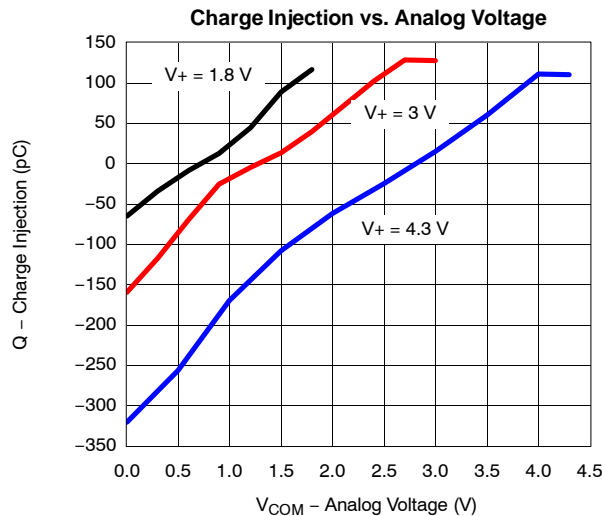
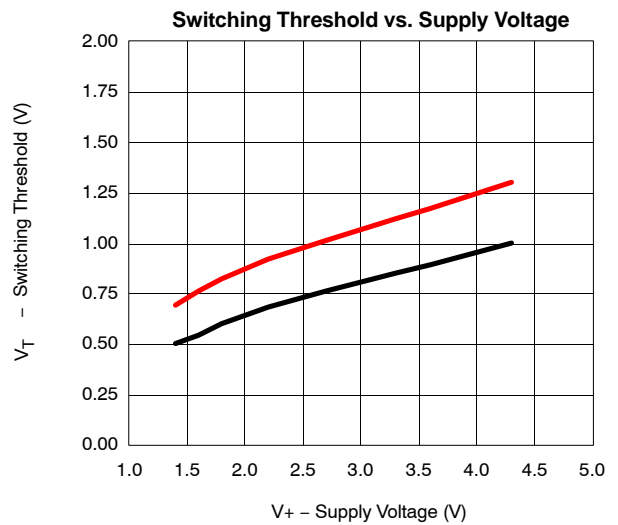
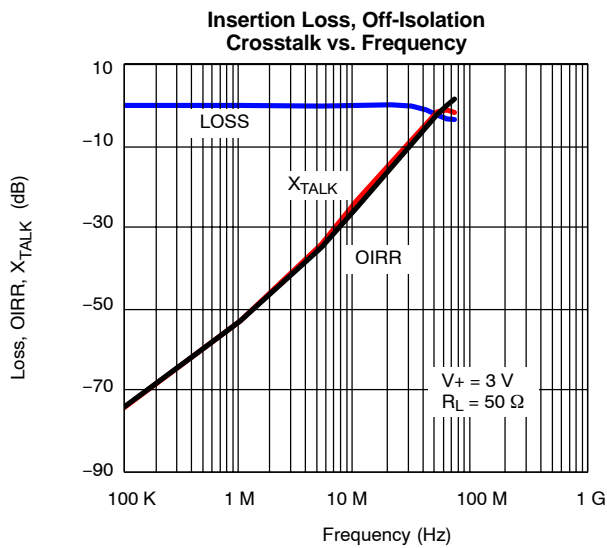
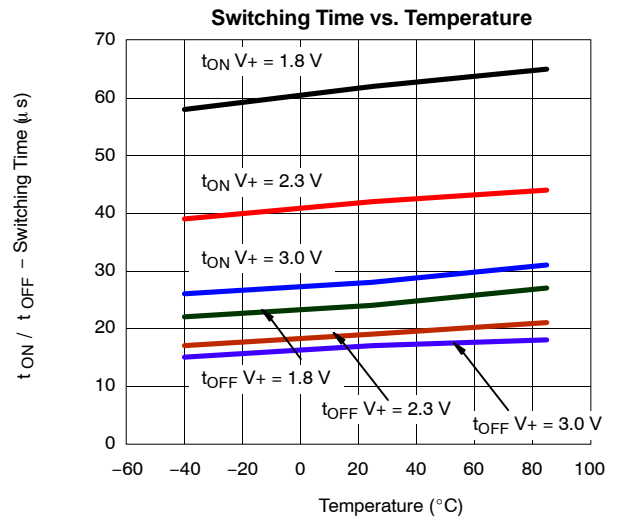
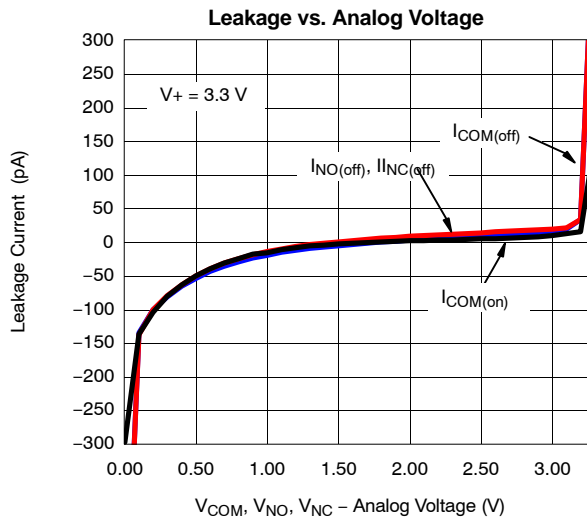
**Supply Current vs. Input Switching Frequency**



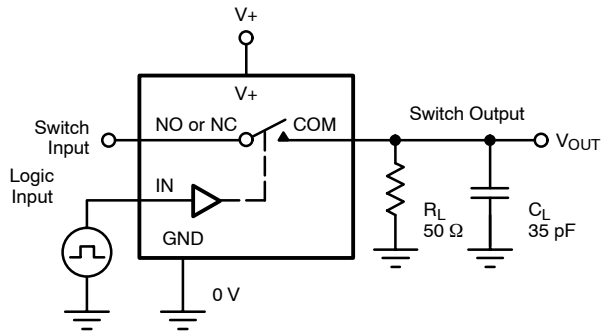
**Leakage Current vs. Temperature**



**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

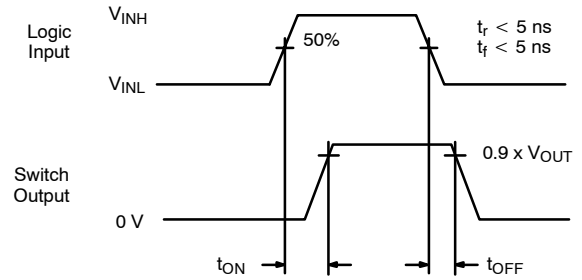


TEST CIRCUITS



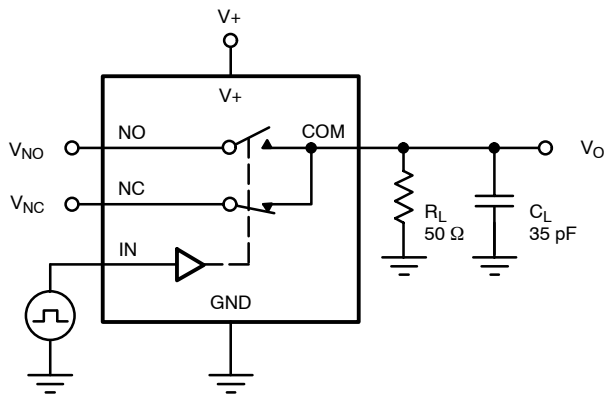
$C_L$  (includes fixture and stray capacitance)

$$V_{OUT} = V_{COM} \left( \frac{R_L}{R_L + R_{ON}} \right)$$



Logic "1" = Switch On  
Logic input waveforms inverted for switches that have the opposite logic sense.

Figure 1. Switching Time



$C_L$  (includes fixture and stray capacitance)

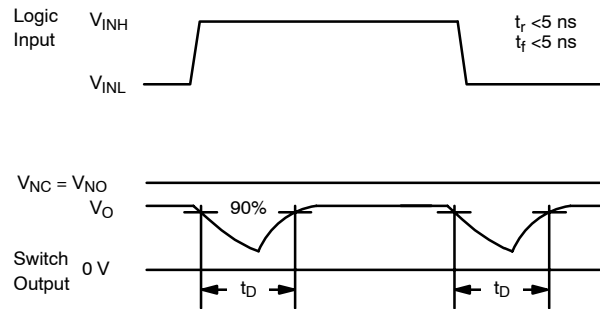
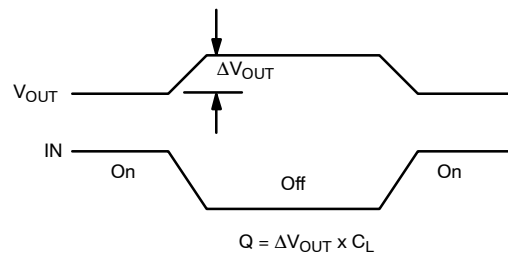
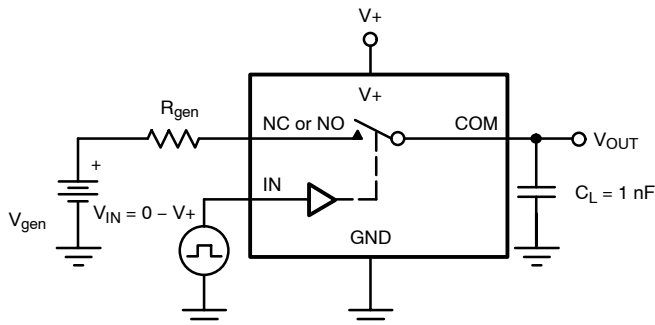


Figure 2. Break-Before-Make Interval



IN depends on switch configuration: input polarity determined by sense of switch.

Figure 3. Charge Injection

TEST CIRCUITS

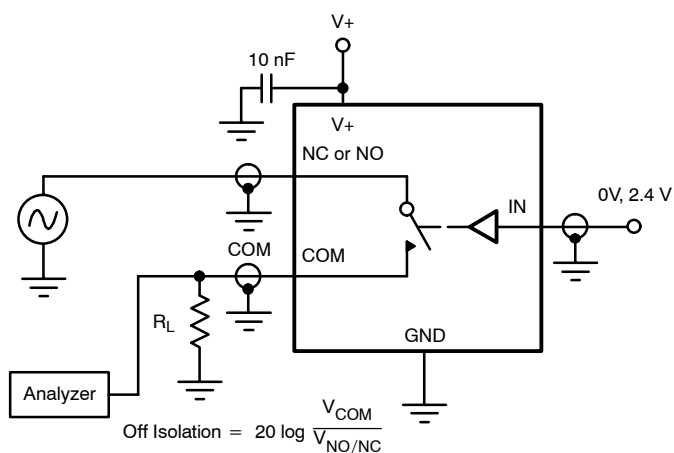


Figure 4. Off-Isolation

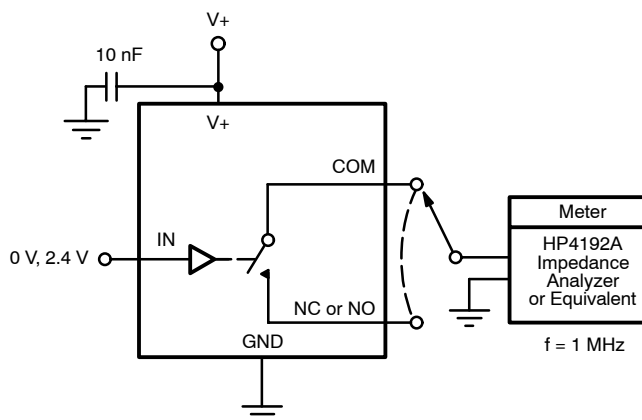


Figure 5. Channel Off/On Capacitance

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?73162>.



## 射频和天线设计培训课程推荐

易迪拓培训([www.edatop.com](http://www.edatop.com))由数名来自于研发第一线的资深工程师发起成立,致力并专注于微波、射频、天线设计研发人才的培养;我们于 2006 年整合合并微波 EDA 网([www.mweda.com](http://www.mweda.com)),现已发展成为国内最大的微波射频和天线设计人才培养基地,成功推出多套微波射频以及天线设计经典培训课程和 ADS、HFSS 等专业软件使用培训课程,广受客户好评;并先后与人民邮电出版社、电子工业出版社合作出版了多本专业图书,帮助数万名工程师提升了专业技术能力。客户遍布中兴通讯、研通高频、埃威航电、国人通信等多家国内知名公司,以及台湾工业技术研究院、永业科技、全一电子等多家台湾地区企业。

易迪拓培训课程列表: <http://www.edatop.com/peixun/rfe/129.html>



### 射频工程师养成培训课程套装

该套装精选了射频专业基础培训课程、射频仿真设计培训课程和射频电路测量培训课程三个类别共 30 门视频培训课程和 3 本图书教材;旨在引领学员全面学习一个射频工程师需要熟悉、理解和掌握的专业知识和研发设计能力。通过套装的学习,能够让学员完全达到和胜任一个合格的射频工程师的要求...

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课程网址: <http://www.edatop.com/peixun/ads/13.html>



### HFSS 学习培训课程套装

该套课程套装包含了本站全部 HFSS 培训课程,是迄今国内最全面、最专业的 HFSS 培训教程套装,可以帮助您从零开始,全面深入学习 HFSS 的各项功能和在多个方面的工程应用。购买套装,更可超值赠送 3 个月免费学习答疑,随时解答您学习过程中遇到的棘手问题,让您的 HFSS 学习更加轻松顺畅...

课程网址: <http://www.edatop.com/peixun/hfss/11.html>

## CST 学习培训课程套装

该培训套装由易迪拓培训联合微波 EDA 网共同推出,是最全面、系统、专业的 CST 微波工作室培训课程套装,所有课程都由经验丰富的专家授课,视频教学,可以帮助您从零开始,全面系统地学习 CST 微波工作的各项功能及其在微波射频、天线设计等领域的设计应用。且购买该套装,还可超值赠送 3 个月免费学习答疑...

课程网址: <http://www.edatop.com/peixun/cst/24.html>



## HFSS 天线设计培训课程套装

套装包含 6 门视频课程和 1 本图书,课程从基础讲起,内容由浅入深,理论介绍和实际操作讲解相结合,全面系统的讲解了 HFSS 天线设计的全过程。是国内最全面、最专业的 HFSS 天线设计课程,可以帮助您快速学习掌握如何使用 HFSS 设计天线,让天线设计不再难...

课程网址: <http://www.edatop.com/peixun/hfss/122.html>

## 13.56MHz NFC/RFID 线圈天线设计培训课程套装

套装包含 4 门视频培训课程,培训将 13.56MHz 线圈天线设计原理和仿真设计实践相结合,全面系统地讲解了 13.56MHz 线圈天线的工作原理、设计方法、设计考量以及使用 HFSS 和 CST 仿真分析线圈天线的具体操作,同时还介绍了 13.56MHz 线圈天线匹配电路的设计和调试。通过该套课程的学习,可以帮助您快速学习掌握 13.56MHz 线圈天线及其匹配电路的原理、设计和调试...

详情浏览: <http://www.edatop.com/peixun/antenna/116.html>



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- ※ 成立于 2004 年,10 多年丰富的行业经验,
- ※ 一直致力并专注于微波射频和天线设计工程师的培养,更了解该行业对人才的要求
- ※ 经验丰富的一线资深工程师讲授,结合实际工程案例,直观、实用、易学

### 联系我们:

- ※ 易迪拓培训官网: <http://www.edatop.com>
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