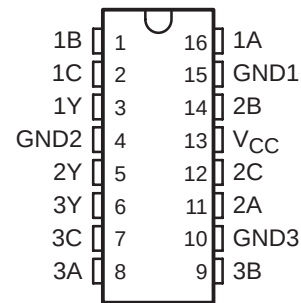


TL52055

WIDE-BANDWIDTH, 2-INPUT, 1-OUTPUT 3-CIRCUIT VIDEO SWITCH

SCDS169A – MAY 2004 – REVISED APRIL 2005

- Functionally Similar to M52055, NJM2283, MM1231, and BA7602
- V_{CC} Operating Range From 4.5 V to 9 V
- Wide Frequency Range (0 dB at 40 MHz, V_{CC} = 5 V)
- Crosstalk (–75 dB at 4.43 MHz)
- BiCMOS Technology
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Performance Tested Per JESD 22
 - 2000-V Human-Body Model (A114-B, Class II)
 - 1000-V Charged-Device Model (C101)
- Applications
 - Digital TV, LCD TV, PDP TV, and CRT TV
 - VCR, Projector, and DVD Player

D OR PW PACKAGE
(TOP VIEW)

description/ordering information

The TL52055 is a wide-bandwidth, 2-input, 1-output, 3-circuit video switch. All inputs are bias types. The select (1C, 2C, 3C) inputs control the signal path of A port and B port. The device can be used for switching separate video signals and component-video signals and is suitable for DTV, LCD, PDP, and other high-quality AV systems. The device provides no loss (0 dB) up to 40 MHz and has a very low crosstalk.

ORDERING INFORMATION

T _A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	SOIC – D	Tube	TL52055D	TL52055
		Tape and reel	TL52055DR	
	TSSOP – PW	Tape and reel	TL52055PWR	ZA055

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE

INPUT C	ON CHANNEL
L	A port to Y port
H	B port to Y port
OPEN	A port to Y port



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

UNLESS OTHERWISE NOTED this document contains PRODUCTION DATA information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

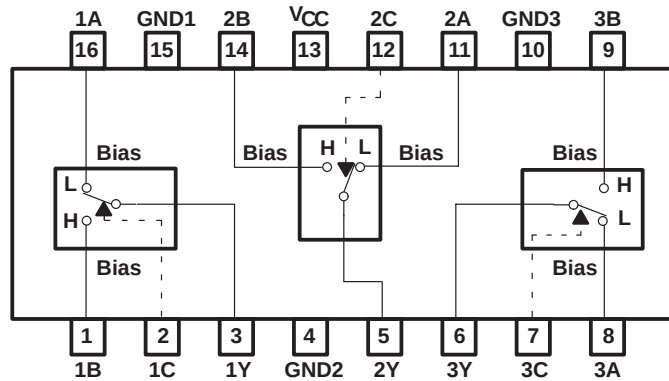
**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2005, Texas Instruments Incorporated

TL52055**WIDE-BANDWIDTH, 2-INPUT, 1-OUTPUT
3-CIRCUIT VIDEO SWITCH**

SCDS169A – MAY 2004 – REVISED APRIL 2005

block diagram**absolute maximum ratings over operating free-air temperature (unless otherwise noted)[†]**Supply voltage range, V_{CC} -0.3 V to 12 VPackage thermal impedance, θ_{JA} (see Note 1): D package 73°C/W

PW package 108°C/W

Storage temperature range, T_{stg} -65°C to 150°C

[†] 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 under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

	MIN	MAX	UNIT
V_{CC} Supply voltage	4.5	9	V
T_A Operating free-air temperature	-40	85	°C

electrical characteristics $V_{CC} = 5\text{ V}/9\text{ V}$, $T_A = 25^\circ\text{C}$ (see Note 2)

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
I_{CC1} Operating current 1	$V_{CC} = 9\text{ V}$, No signal		10.3	14	mA
I_{CC2} Operating current 2	$V_{CC} = 5\text{ V}$, No signal		9.4	12	mA
f_f Frequency bandwidth	$V_{CC} = 5\text{ V}$, $V_{IN} = 1\text{ V}_{P-P}$		40		MHz
G_V Voltage gain	$F_{IN} = 1, 10\text{ MHz}$, $V_{IN} = 1\text{ V}_{P-P}$	-0.6	-0.1	0.4	dB
$G_F^\ddagger$ Flatness of voltage gain	$F_{IN} = 30\text{ MHz}/1\text{ MHz}$, $V_{IN} = 1\text{ V}_{P-P}$		0		dB
$CT_{SW}^\S$ Switch crosstalk	$F_{IN} = 4.43\text{ MHz}$, $V_{IN} = 1\text{ V}_{P-P}$	-75		-60	dB
$CT_{CH}^\P$ Channel crosstalk	$F_{IN} = 4.43\text{ MHz}$, $V_{IN} = 1\text{ V}_{P-P}$	-75		-60	dB
D_G Differential gain	$V_{IN} = 1\text{ V}_{P-P}$, 10-step video signal		0.3		%
D_P Differential phase	$V_{IN} = 1\text{ V}_{P-P}$, 10-step video signal		0.3		deg
V_{OS} Output offset voltage		-10	0	10	mV
Z_I Input impedance			20		k Ω
V_{IH} High-level control input voltage (C inputs)	$V_{CC} = 5\text{ V}$ and 9 V	2		V_{CC}	V
V_{IL} Low-level control input voltage (C inputs)	$V_{CC} = 5\text{ V}$ and 9 V	0		0.8	V

[†] Frequency bandwidth is defined as the maximum frequency, with 0-dB gain.

[‡] G_F is the difference of G_V at 30 MHz and at 1 MHz.

[§] Switch crosstalk is defined as the crosstalk from an ON-channel to an OFF-channel (xA to xB).

[¶] Channel crosstalk is defined as the crosstalk between two ON-channels (1Y to 2Y, 2Y to 3Y).

NOTE 2: All unused inputs of the device must be open or connected to GND through a capacitor to ensure proper device operation.

TL52055**WIDE-BANDWIDTH, 2-INPUT, 1-OUTPUT****3-CIRCUIT VIDEO SWITCH**

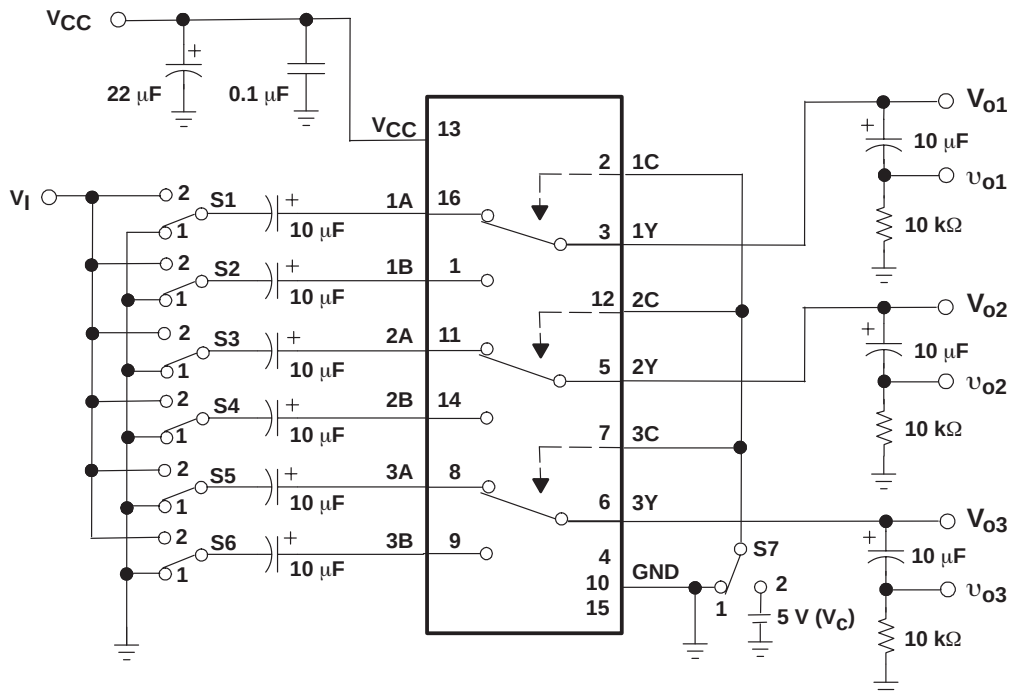
SCDS169A – MAY 2004 – REVISED APRIL 2005

equivalent circuit, $V_{CC} = 5\text{ V}$ (9 V)[†]

PIN NO.	PIN NAME	INSIDE EQUIVALENT CIRCUIT	VOLTAGE	NOTE
16 1 11 14 8 9	1A 1B 2A 2B 3A 3B		2.9 V (5.2 V) [†]	Input
3 5 6	1Y 2Y 3Y		2.1 V (4.4 V) [†]	Output
2 12 7	1C 2C 3C			Control
13	V_{CC}			
15 4 10	GND1 GND2 GND3			

[†] Voltages in parentheses are associated with $V_{CC} = 9\text{ V}$.[‡] V_{BIAS} is an internal voltage source.

PARAMETER MEASUREMENT INFORMATION



SYMBOL	S1	S2	S3	S4	S5	S6	S7	MEASUREMENT POINT
I _{CC1}	1	1	1	1	1	1	1	V _{CC}
I _{CC2}	1	1	1	1	1	1	1	
G _F	2	1	1	1	1	1	1	v ₀₁ , v ₀₂ , v ₀₃
G _V	2	1	1	1	1	1	1	
D _G /D _p	2	1	1	1	1	1	1	
CT _{SW1}	2	1	1	1	1	1	2	v ₀₁
CT _{SW2}	1	2	1	1	1	1	1	
CT _{SW3}	1	1	2	1	1	1	2	v ₀₂
CT _{SW4}	1	1	1	2	1	1	1	
CT _{SW5}	1	1	1	1	2	1	2	v ₀₃
CT _{SW6}	1	1	1	1	1	2	1	
CT _{CH1}	2	1	1	1	1	1	1	v ₀₂ , v ₀₃
	1	2	1	1	1	1	2	
CT _{CH2}	1	1	2	1	1	1	1	v ₀₁ , v ₀₃
	1	1	1	2	1	1	2	
CT _{CH3}	1	1	1	1	2	1	1	v ₀₁ , v ₀₂
	1	1	1	1	1	2	2	
V _{OS}	1	1	1	1	1	1	1/2	V ₀₁ , V ₀₂ , V ₀₃
V _{IH} /V _{IL}	1/2	1/2	1	1	1	1	V _C	V _C

Figure 1. Load Circuit and Test Conditions

TYPICAL CHARACTERISTICS

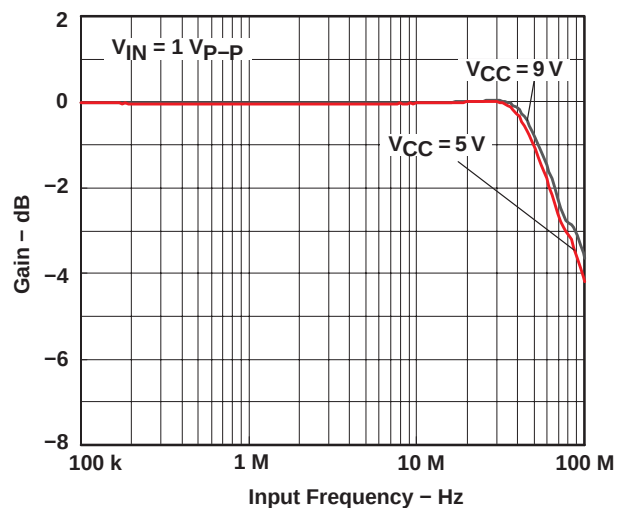


Figure 2. Gain vs Frequency

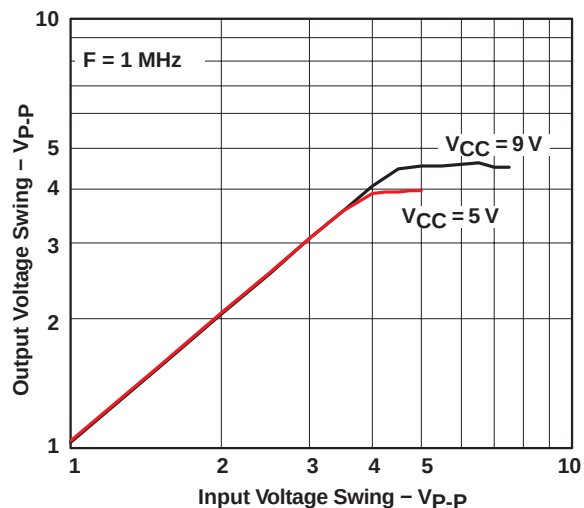


Figure 3. Output Voltage Swing vs Input Voltage Swing

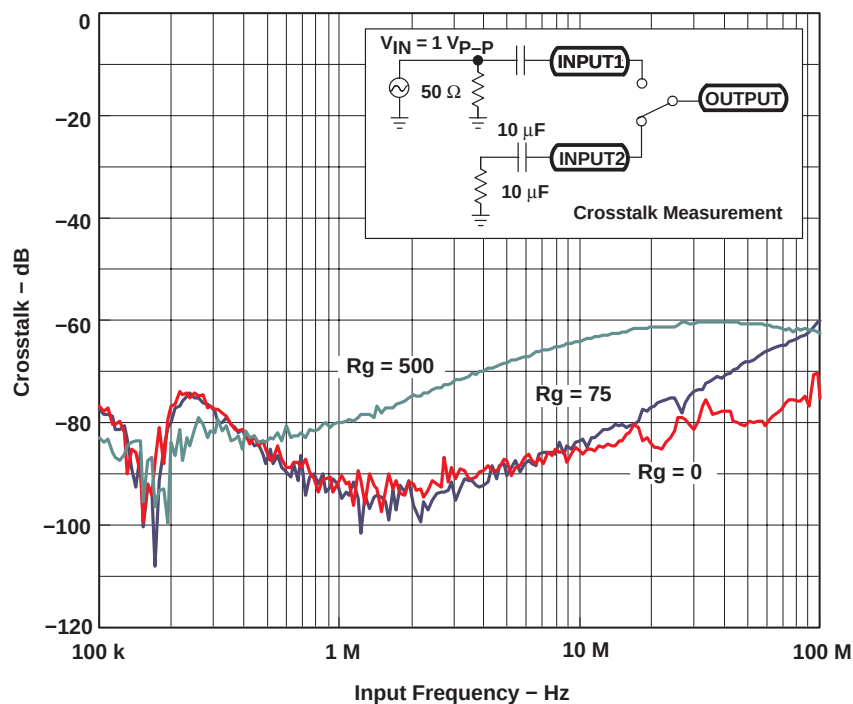


Figure 4. Crosstalk vs Frequency

APPLICATION INFORMATION

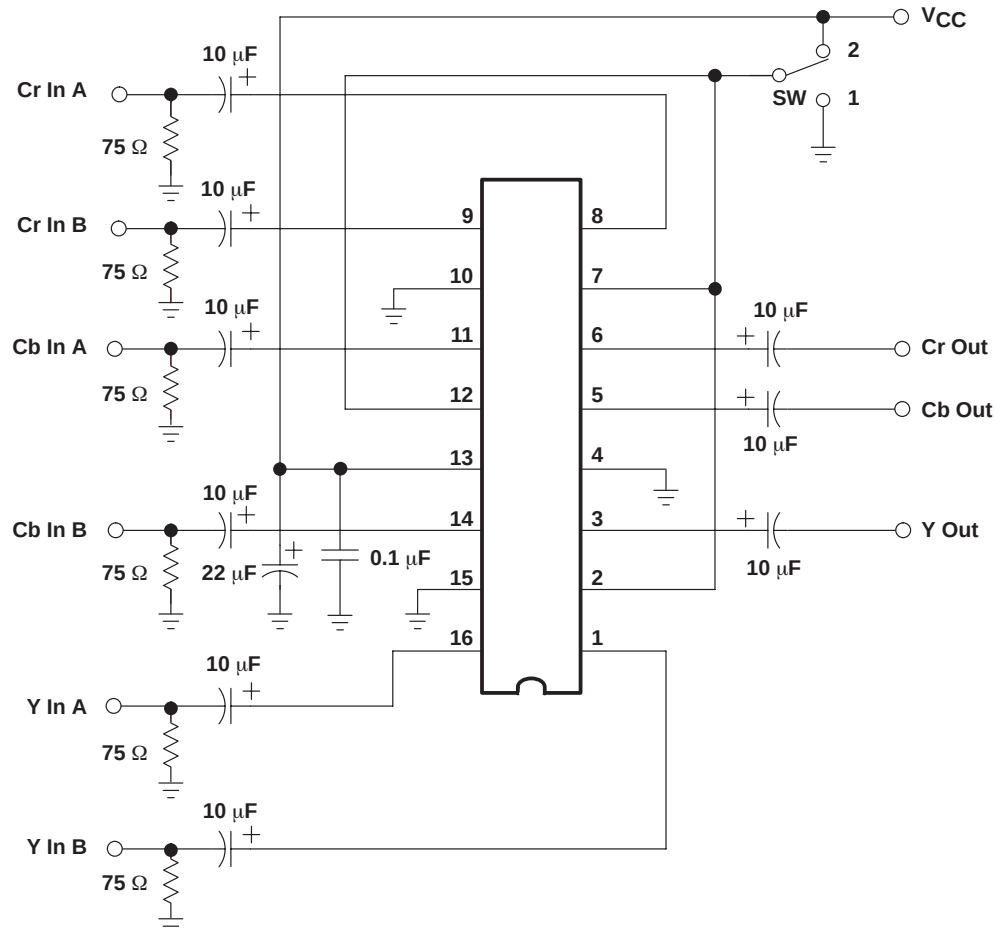


Figure 5. Application of TL52055

Figure 5 shows a typical application of the TL52055 in component-video signaling. Typically, the peak-to-peak amplitude of a component-video signal is less than 1 V. If the frequency of operation is less than 40 MHz, the switch does not cause any loss of signal. Also, due to low crosstalk, there is no degradation of the video switch.

USAGE NOTES

1. When using this device, the output drive current should be 5 mA or less.
2. Voltage applied to the control pins (2, 7, and 12) should be less than the power supply voltage (V_{CC}) and greater than the ground voltage (GND).
3. The types of output pins for this device are emitter follower. The drive current list below is applied inside the device. If the drive performance is insufficient, apply external drive current within the range in step 1.

Power-Supply Voltage (V_{CC})	Drive Current in the Device (standard value)
5 V	1 mA
9 V	1 mA

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
TL52055DR	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85	TL52055	
TL52055DRE4	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		
TL52055DRG4	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		
TL52055PWR	OBSOLETE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85	ZA055	
TL52055PWRE4	OBSOLETE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		
TL52055PWRG4	OBSOLETE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

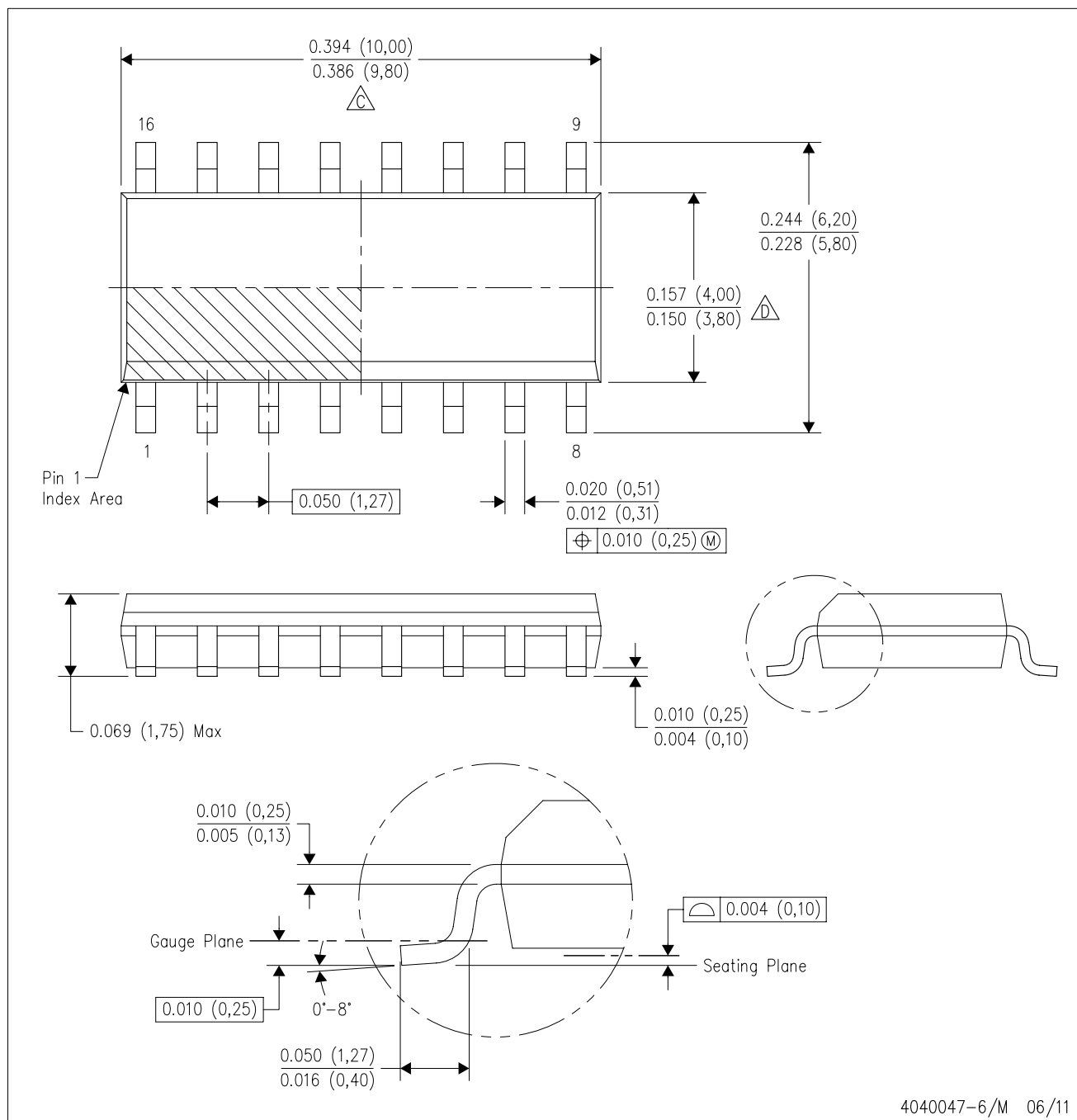
(4) Only one of markings shown within the brackets will appear on the physical device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



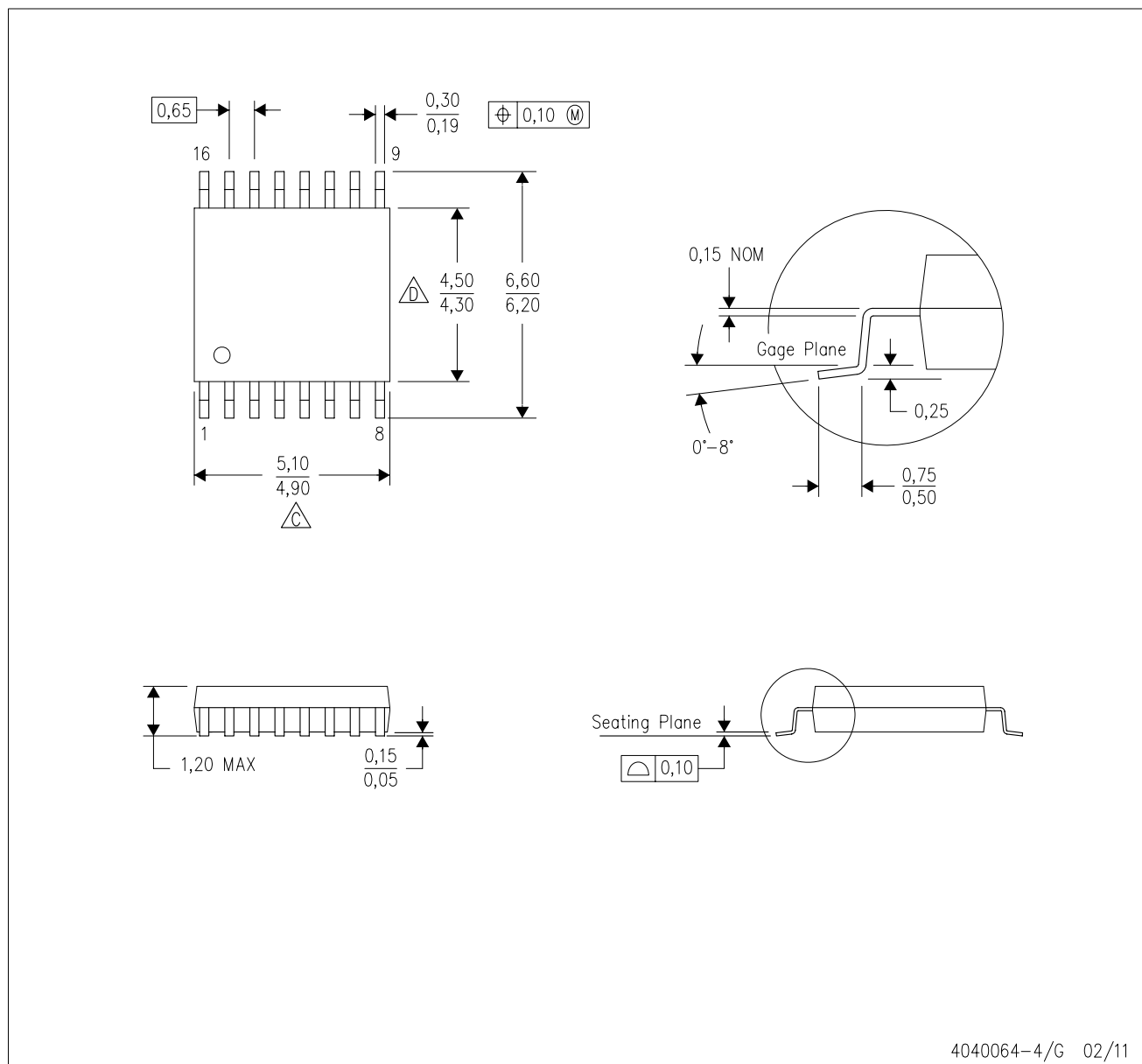
4040047-6/M 06/11

NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AC.

PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
 - E. Falls within JEDEC MO-153

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Applications Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community

e2e.ti.com