16-Ch/Dual 8-Ch High-Performance CMOS Analog Multiplexers

DESCRIPTION

The DG406B is a 16-channel single-ended analog multiplexer designed to connect one of sixteen inputs to a common output as determined by a 4-bit binary address. The DG407B selects one of eight differential inputs to a common differential output. Break-before-make switching action protects against momentary shorting of inputs.

An on channel conducts current equally well in both directions. In the off state each channel blocks voltages up to the power supply rails. An enable (EN) function allows the user to reset the multiplexer/demultiplexer to all switches off for stacking several devices. All control inputs, address (A_x) and enable (EN) are TTL compatible over the full specified operating temperature range.

Applications for the DG406B, DG407B include high speed data acquisition, audio signal switching and routing, ATE systems, and avionics. High performance and low power dissipation make them ideal for battery operated and remote instrumentation applications.

Designed in the 44 V silicon-gate CMOS process, the absolute maximum voltage rating is extended to 44 V, allowing operation with ± 20 V supplies. Additionally single (12 V) supply operation is allowed. An epitaxial layer prevents latchup.

FEATURES

Pb-free Available

RoHS* Available

- Low on-resistance - $R_{DS(on)}$: 45 Ω
- Low charge injection - Q: 11 pC
- Fast transition time - t_{TRANS}: 115 ns
- Low power: 0.2 mW
- Single supply capability
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

BENEFITS

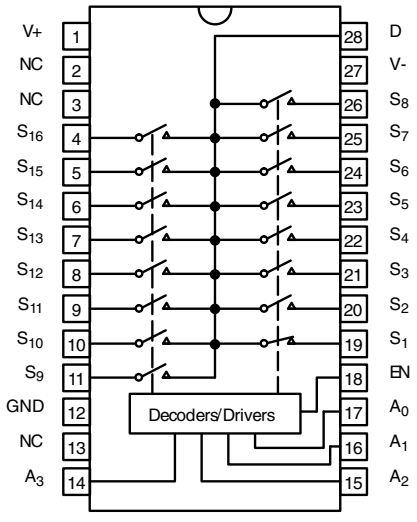
- Higher accuracy
- Reduced glitching
- Improved data throughput
- Reduced power consumption
- Increased ruggedness
- Wide supply ranges: ± 5 V to ± 20 V

APPLICATIONS

- Data acquisition systems
- Audio signal routing
- Medical instrumentation
- ATE systems
- Battery powered systems
- High-rel systems
- Single supply systems

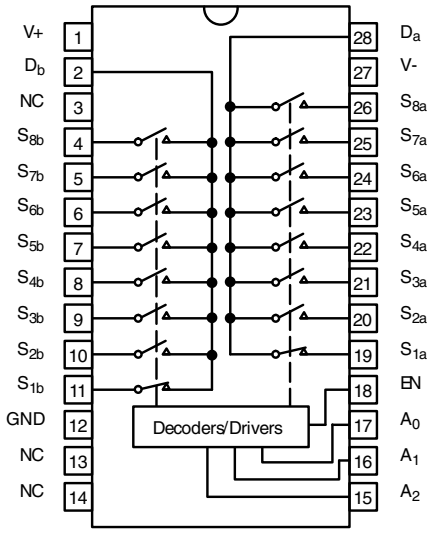
FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION

DG406B SOIC Wide-Body



Top View

DG407B SOIC Wide-Body



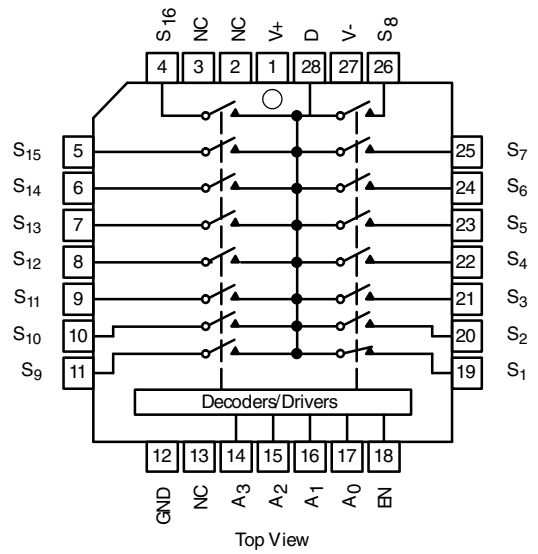
Top View

For technical questions, contact: analogswitchtechsupport@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

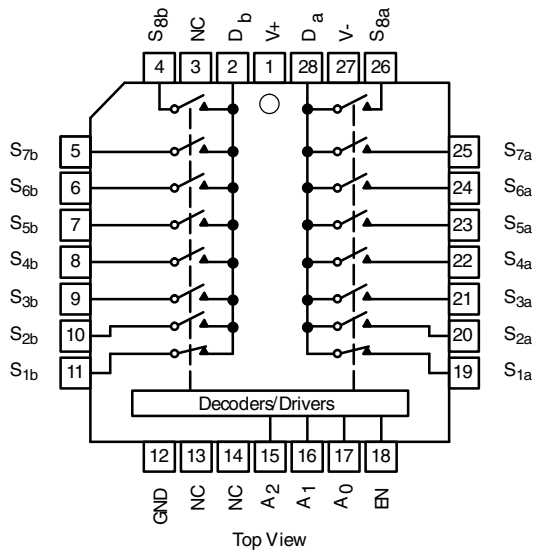
FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION

DG406B PLCC



Top View

DG407B PLCC



Top View

TRUTH TABLE (DG406B)					
A_3	A_2	A_1	A_0	EN	ON SWITCH
X	X	X	X	0	None
0	0	0	0	1	1
0	0	0	1	1	2
0	0	1	0	1	3
0	0	1	1	1	4
0	1	0	0	1	5
0	1	0	1	1	6
0	1	1	0	1	7
0	1	1	1	1	8
1	0	0	0	1	9
1	0	0	1	1	10
1	0	1	0	1	11
1	0	1	1	1	12
1	1	0	0	1	13
1	1	0	1	1	14
1	1	1	0	1	15
1	1	1	1	1	16

TRUTH TABLE (DG407B)				
A_2	A_1	A_0	EN	ON SWITCH
X	X	X	0	None
0	0	0	1	1
0	0	1	1	2
0	1	0	1	3
0	1	1	1	4
1	0	0	1	5
1	0	1	1	6
1	1	0	1	7
1	1	1	1	8

Notes

- Logic “0” = $V_{AL} \leq 0.8$ V
- Logic “1” = $V_{AH} \geq 2.4$ V
- X = do not care

ORDERING INFORMATION (DG406B)		
TEMP. RANGE	PACKAGE	PART NUMBER
-40 °C to +85 °C	28-pin PLCC	DG406BDN-T1-E3
	28-pin widebody SOIC	DG406BDW-E3, DG406BDW-T1-E3

ORDERING INFORMATION (DG407B)		
TEMP. RANGE	PACKAGE	PART NUMBER
-40 °C to +85 °C	28-pin PLCC	DG407BDN-T1-E3
	28-pin widebody SOIC	DG407BDW-E3, DG407BDW-T1-E3

Note

- -T1 indicates tape and reel, -E3 indicates lead (Pb)-free and RoHS-compliant, NO -E3 indicates standard tin/lead finish

For technical questions, contact: analogswitchtechsupport@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ABSOLUTE MAXIMUM RATINGS			
PARAMETER		**LIMIT**	**UNIT**
Voltages referenced to V-	V+ to V- [e]	44	V
	GND to V-	-25	
Digital inputs [a], V_S, V_D		(V-) - 2 to (V+) + 2 or 20 mA, whichever occurs first	
Current (any terminal)		30	mA
Peak current, S or D (pulsed at 1 ms, 10 % duty cycle max.)		100	
Storage temperature		-65 to +150	°C
Power dissipation (package) [b]	28-pin plastic PLCC [c]	450	mW
	28-pin widebody SOIC [d]	450	mW

Notes

a. Signals on S_X, D_X or IN_X exceeding V+ or V- will be clamped by internal diodes. Limit forward diode current to maximum current ratings
b. All leads soldered or welded to PC board
c. Derate 8.3 mW/°C above 75 °C
d. Derate 6 mW/°C above 75 °C
e. Also applies when V- = GND

SPECIFICATIONS								
PARAMETER		**SYMBOL**	**TEST CONDITIONS UNLESS OTHERWISE SPECIFIED** **V+ = 15 V, V- = -15 V** **V_{AL} = 0.8 V, V_{AH} = 2.4 V [f]**	**TEMP. [b]**	**TYP. [c]**	**D SUFFIX -40 °C to +85 °C**		**UNIT**
						MIN. [d]	**MAX. [d]**	
Analog Switch								
Analog signal range [e]		V_{ANALOG}		Full	-	-15	15	V
Drain-source on-resistance		$R_{DS(on)}$	V_D = ± 10 V, I_S = -10 mA sequence each switch on	Room	45	-	60	Ω
				Full	45	-	74	
$R_{DS(on)}$ matching between channels [g]		$\Delta R_{DS(on)}$	V_D = ± 10 V	Room	5	-	-	%
Source off leakage current		$I_{S(off)}$	V_S = ± 10 V, V_D = ± 10 V, V_{EN} = 0 V	Room	-	-0.5	0.5	nA
				Full	-	-5	5	
Drain off leakage current	DG406B	$I_{D(off)}$	V_D = ± 10 V, V_S = ± 10 V, V_{EN} = 0 V	Room	-	-1	1	
				Full	-	-40	40	
	DG407B			Room	-	-1	1	
				Full	-	-20	20	
Drain on leakage current	DG406B	$I_{D(on)}$	V_S = V_D = ± 10 V sequence each switch on	Room	-	-1	1	
				Full	-	-40	40	
	DG407B			Room	-	-1	1	
				Full	-	-20	20	
Digital Control								
Logic high input voltage		V_{INH}		Full	-	2.4	-	V
Logic low input voltage		V_{INL}		Full	-	-	0.8	
Logic high input current		I_{AH}	V_A = 2.4 V, 15 V	Full	-	-1	1	µA
Logic low input current		I_{AL}	V_{EN} = 0 V, 2.4 V, V_A = 0 V	Full	-	-1	1	
Logic input capacitance		C_{in}	f = 1 MHz	Room	6	-	-	pF

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

SPECIFICATIONS

PARAMETER		SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 15 V, V- = -15 V V_{AL} = 0.8 V, V_{AH} = 2.4 V [f]	TEMP. [b]	TYP. [c]	D SUFFIX -40 °C to +85 °C MIN. [d]	 MAX. [d]	UNIT
Dynamic Characteristics								
Transition time		t_{TRANS}	see figure 2	Room	115	-	148	ns
				Full	-	-	161	
Break-before-make interval		t_{OPEN}	see figure 4	Room	39	10	-	
				Full	-	21	-	
Enable turn-on time		$t_{ON(EN)}$	see figure 3	Room	75	-	107	
				Full	-	-	123	
Enable turn-off time		$t_{OFF(EN)}$		Room	50	-	88	
				Full	-	-	94	
Charge injection		Q	C_L = 1 nF, V_S = 0 V, R_S = 0 Ω	Room	11	-	-	pC
Off isolation [h]		OIRR	V_{EN} = 0 V, R_L = 50 Ω, f = 1 MHz	Room	-86	-	-	dB
Source off capacitance		$C_{S(off)}$	V_{EN} = 0 V, V_S = 0 V, f = 1 MHz	Room	6	-	-	pF
Drain off capacitance	DG406B	$C_{D(off)}$	V_{EN} = 0 V, V_D = 0 V, f = 1 MHz	Room	108	-	-	
	DG407B			Room	54	-	-	
Drain on capacitance	DG406B	$C_{D(on)}$		Room	114	-	-	
	DG407B			Room	57	-	-	
Power Supplies								
Positive supply current		I+	V_{EN} = V_A = 0 V or 5 V	Room	23	-	30	µA
				Full	-	-	75	
Negative supply current		I-		Room	-0.02	-1	-	
				Full	-	-10	-	
Positive supply current		I+	V_{EN} = 2.4 V, V_A = 0 V	Room	28	-	500	
				Full	-	-	700	
Negative supply current		I-		Room	-0.01	-20	-	
				Full	-	-20	-	

Notes

a. Guaranteed by ± 15 V leakage test, not production tested
b. Room = 25 °C, full = as determined by the operating temperature suffix
c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing
d. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this datasheet
e. Guaranteed by design, not subject to production test
f. V_{IN} = input voltage to perform proper function
g. $\Delta R_{DS(on)} = R_{DS(on)}$ max. - $R_{DS(on)}$ min.
h. Worst case isolation occurs on channel 4 due to proximity to the drain pin

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

SPECIFICATIONS (single supply)								
PARAMETER		**SYMBOL**	**TEST CONDITIONS UNLESS OTHERWISE SPECIFIED** **V+ = 15 V, V- = -15 V** **V_{AL} = 0.8 V, V_{AH} = 2.4 V [f]**	**TEMP. [b]**	**TYP. [c]**	**D SUFFIX -40 °C to +85 °C**		**UNIT**
						MIN. [d]	**MAX. [d]**	
Analog Switch								
Analog signal range [e]		V_{ANALOG}		Full	-	0	12	V
Drain-source on-resistance		$R_{DS(on)}$	V_D = 3 V, I_S = -1 mA sequence each switch on	Room	78	-	100	Ω
$R_{DS(on)}$ matching between channels [g]		$\Delta R_{DS(on)}$		Room	5	-	-	%
Source off leakage current [a]		$I_{S(off)}$	V_D = 10 V or 0.5 V, V_S = 0.5 V or 10 V, V_{EN} = 0 V	Room	-	-0.5	0.5	nA
Drain off leakage current	DG406B	$I_{D(off)}$		Room	-	-1	1	
	DG407B			Room	-	-1	1	
Drain on leakage current	DG406B	$I_{D(on)}$	V_S = V_D = ± 10 V sequence each switch on	Room	-	-1	1	
	DG407B			Room	-	-1	1	
Dynamic Characteristics								
Transition time		t_{TRANS}	V_{S1} = 8 V, V_{S8} = 0 V, V_{IN} = 2.4 V	Room	130	-	163	ns
Enable turn-on time		$t_{ON(EN)}$	V_{INH} = 2.4 V, V_{INL} = 0 V, V_{IN} = 5 V	Room	93	-	125	
Enable turn-off time		$t_{OFF(EN)}$		Room	63	-	94	
Charge injection		Q	C_L = 1 nF, V_S = 6 V, R_S = 0 Ω	Room	9	-	-	pC
Power Supplies								
Positive supply current		I+	V_{EN} = 0 V or 5 V, V_A = 0 V or 5 V	Room	13	-	30	µA
				Full	-	-	75	
Positive supply current		I+		Room	-0.01	-20	-	
				Full	-	-20	-	

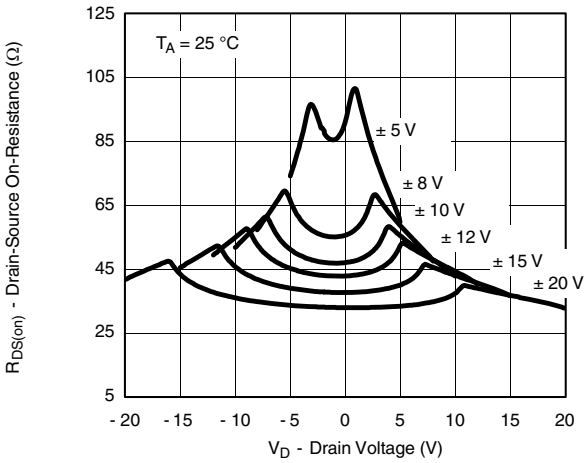
Notes

a. Guaranteed by ± 15 V leakage test, not production tested
b. Room = 25 °C, full = as determined by the operating temperature suffix
c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing
d. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this datasheet
e. Guaranteed by design, not subject to production test
f. V_{IN} = input voltage to perform proper function
g. $\Delta R_{DS(on)} = R_{DS(on)}$ max. - $R_{DS(on)}$ min.
h. Worst case isolation occurs on channel 4 due to proximity to the drain pin

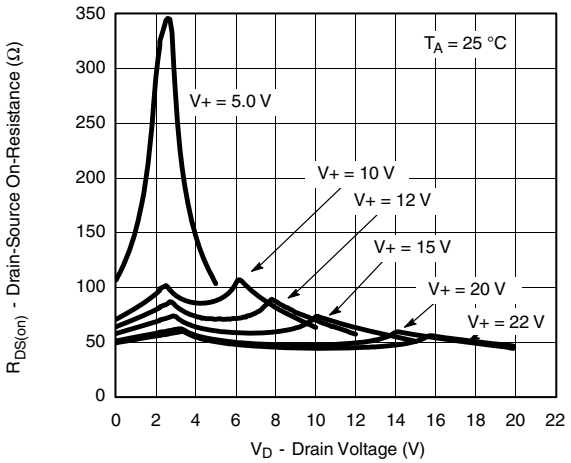
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

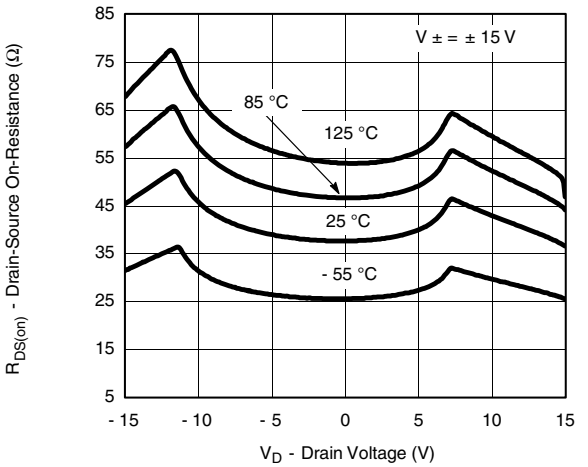
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



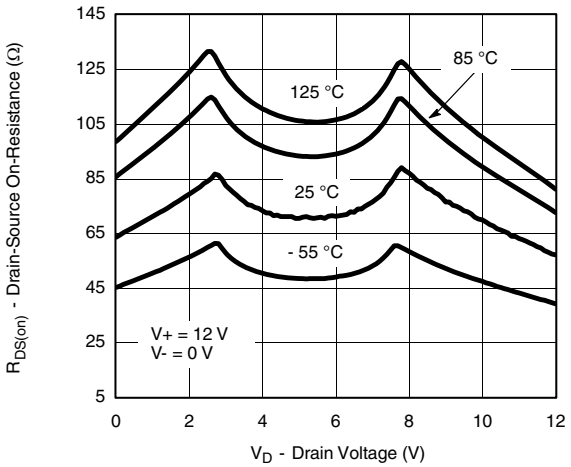
On-Resistance vs. V_D and Dual Supply Voltage



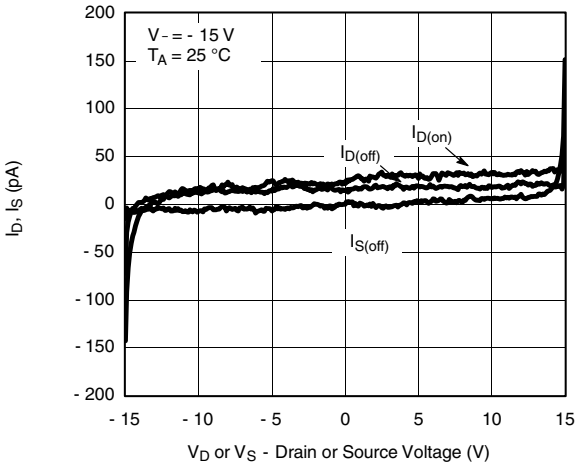
On-Resistance vs. V_D and Unipolar Supply Voltage



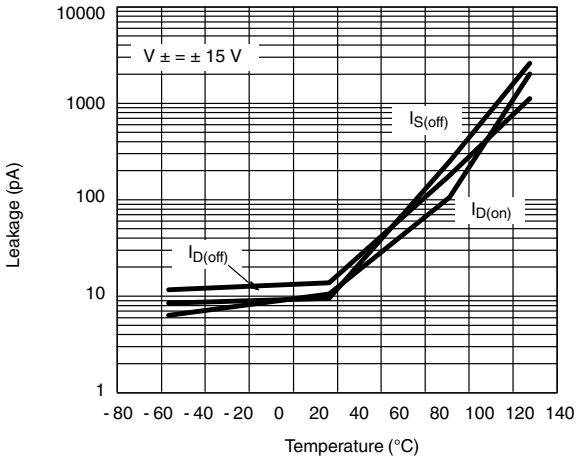
On-Resistance vs. V_D and Temperature



On-Resistance vs. V_D and Temperature



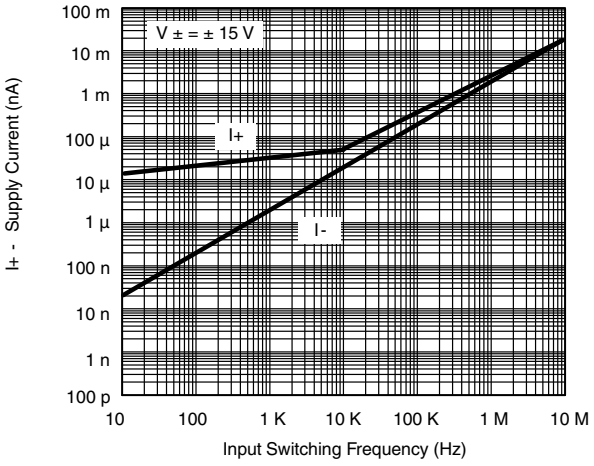
Leakage vs. Analog Voltage



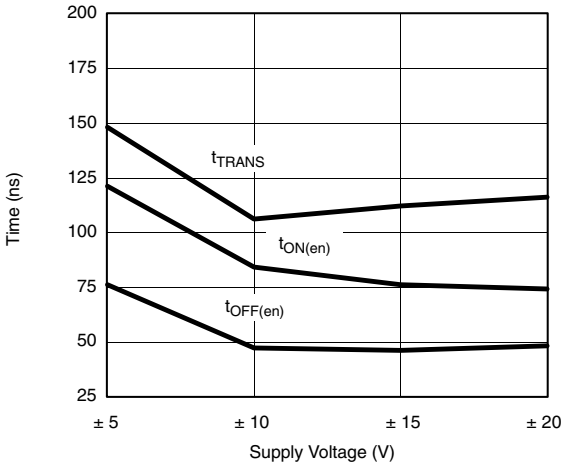
Leakage vs. Current

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

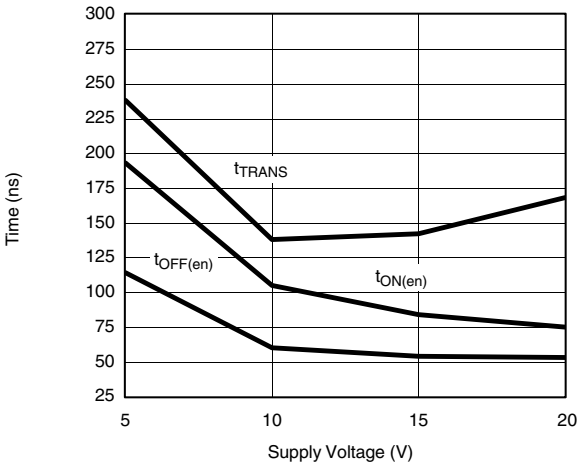
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



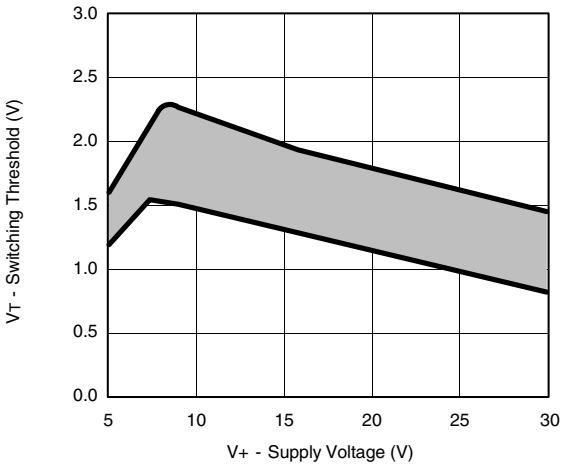
Supply Current vs. Input Switching Frequency



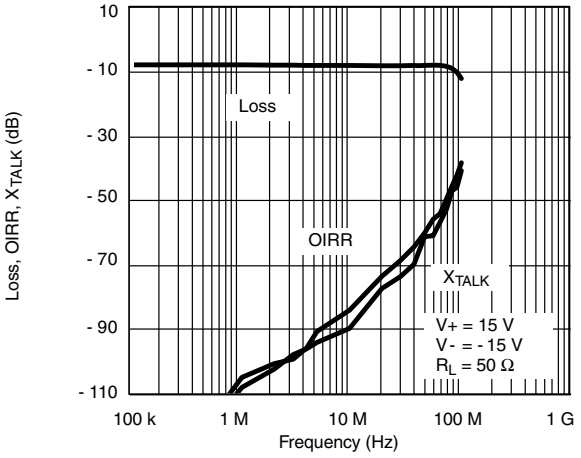
Switching Time vs. Bipolar Supplies



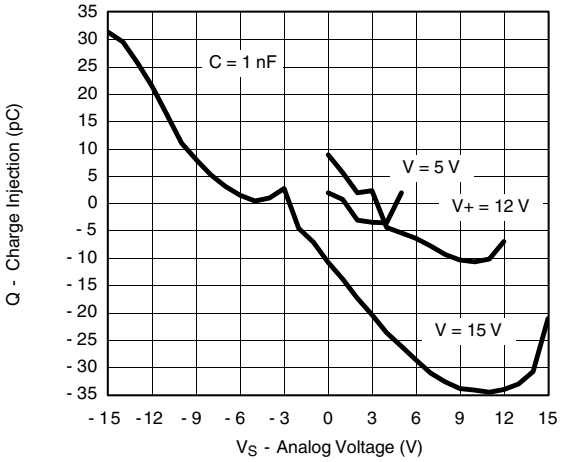
Switching Time vs. Single Supplies



Switching Threshold vs. Supply Voltage



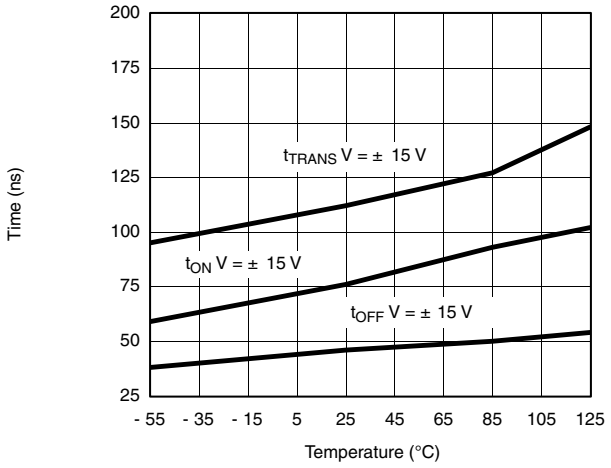
Insertion Loss, Off -Isolation Crosstalk vs. Frequency



Charge Injection vs. Analog Voltage

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



Switching Time vs. Temperature

SCHEMATIC DIAGRAM (typical channel)

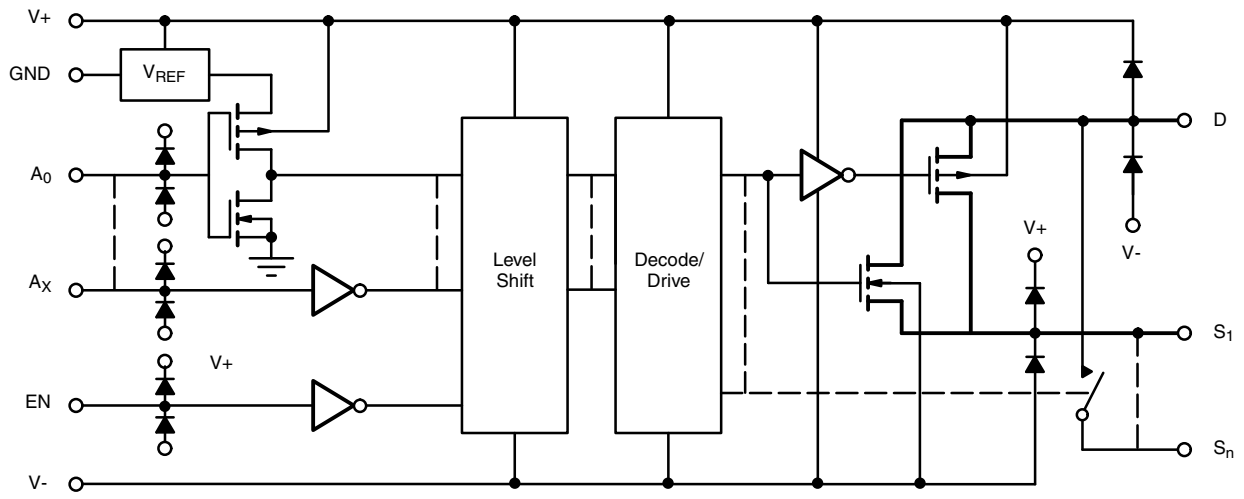


Fig. 1

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

TEST CIRCUITS

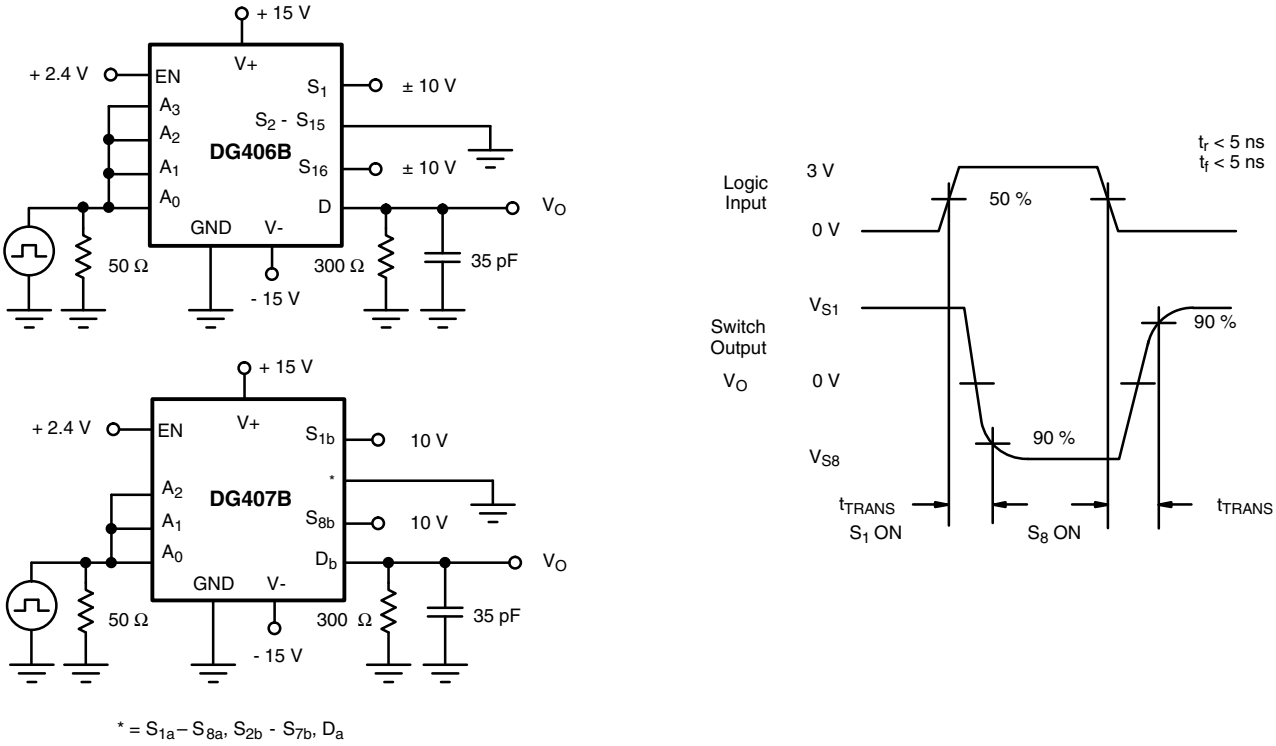


Fig. 2 - Transition Time

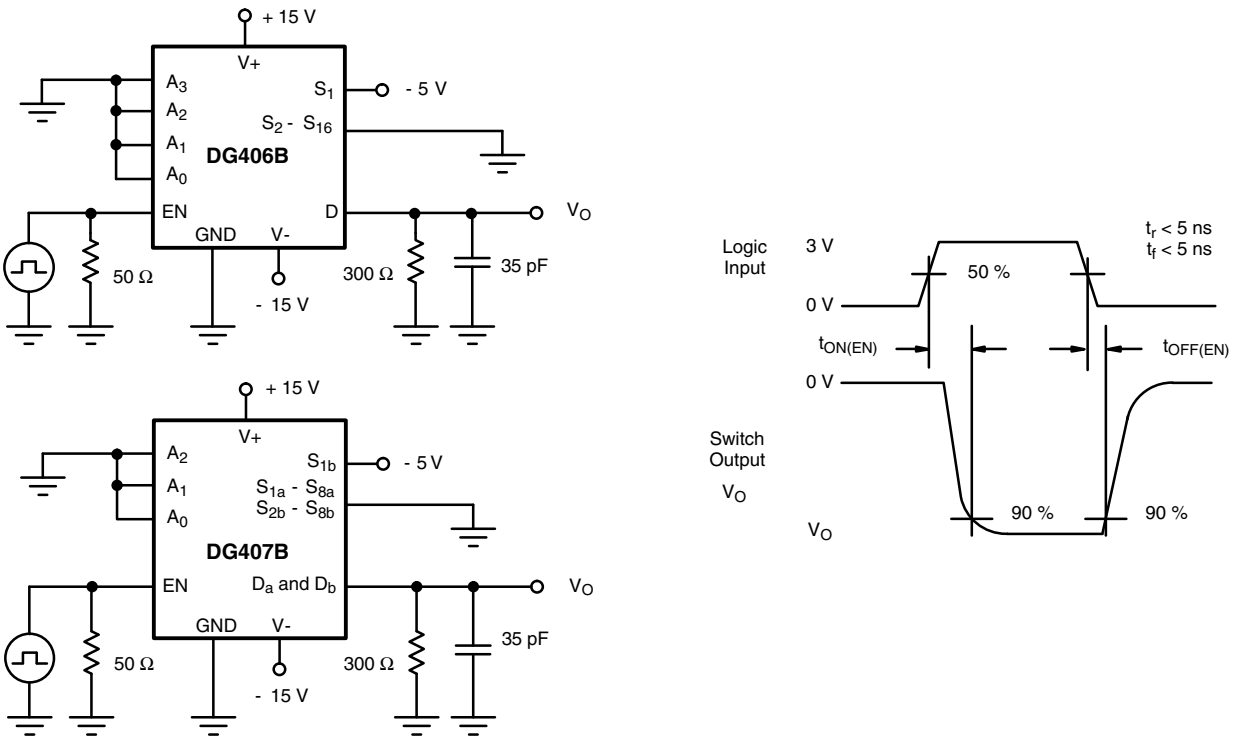


Fig. 3 - Enable Switching Time

For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

TEST CIRCUITS

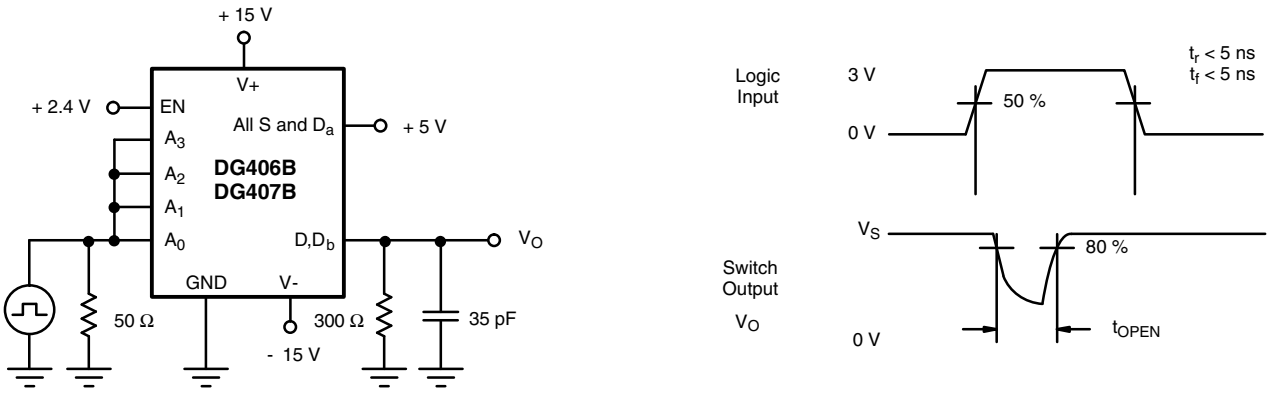


Fig. 4 - Break-Before-Make Interval

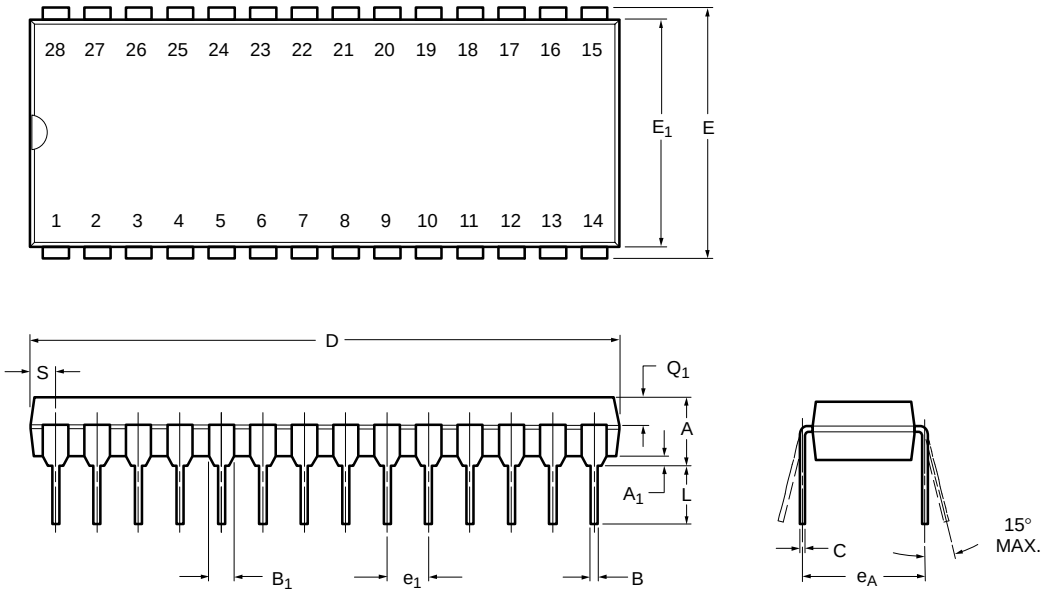
For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

PRODUCT SUMMARY				
Part number	DG406B	DG406B	DG407B	DG407B
Status code	2	2	2	2
Configuration	16:1 x 1	16:1 x 1	8:1 x 2	8:1 x 2
Single supply min. (V)	5	5	5	5
Single supply max. (V)	40	40	40	40
Dual supply min. (V)	5	5	5	5
Dual supply max. (V)	20	20	20	20
On-resistance (Ω)	45	45	45	45
Charge injection (pC)	11	11	11	11
Source on capacitance (pF)	114	114	57	57
Source off capacitance (pF)	6	6	6	6
Leakage switch on typ. (nA)	-	-	-	-
Leakage switch off max. (nA)	0.5	0.5	0.5	0.5
-3 dB bandwidth (MHz)	-	-	-	-
Package	PLCC-28	SO-28 (wide)	PLCC-28	SO-28 (wide)
Functional circuit / applications	Multi purpose, instrumentation, medical and healthcare	Multi purpose, instrumentation, medical and healthcare	Multi purpose, instrumentation, medical and healthcare	Multi purpose, instrumentation, medical and healthcare
Interface	Parallel	Parallel	Parallel	Parallel
Single supply operation	Yes	Yes	Yes	Yes
Dual supply operation	Yes	Yes	Yes	Yes
Turn on time max. (ns)	148	148	148	148
Crosstalk and off isolation	-86	-86	-86	-86

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 www.vishay.com/ppg?72552.

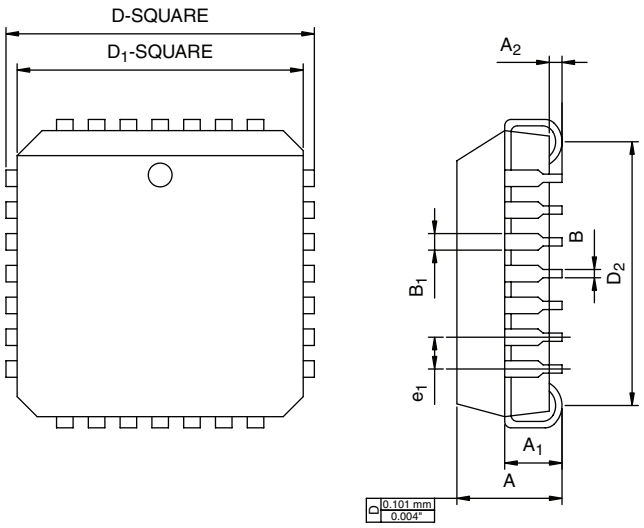
For technical questions, contact: analogswitchtechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

PDIP: 28-LEAD



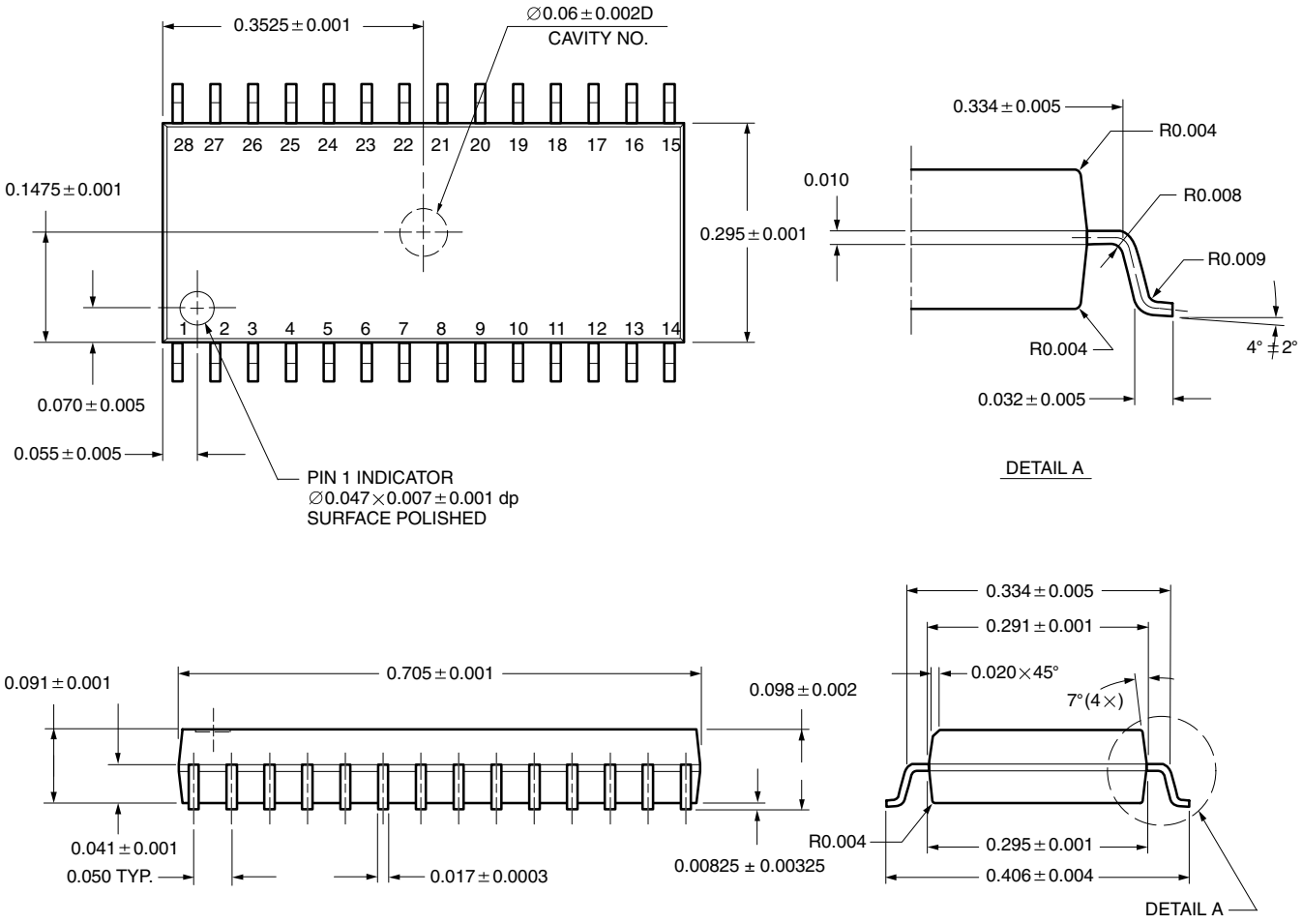
Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	2.29	5.08	0.090	0.200
A_1	0.39	1.77	0.015	0.070
B	0.38	0.56	0.015	0.022
B_1	0.89	1.65	0.035	0.065
C	0.204	0.30	0.008	0.012
D	35.10	39.70	1.380	1.565
E	15.24	15.88	0.600	0.625
E_1	13.21	14.73	0.520	0.580
e_1	2.29	2.79	0.090	0.110
e_A	14.99	15.49	0.590	0.610
L	2.60	5.08	0.100	0.200
Q_1	0.95	2.345	0.0375	0.0925
S	0.995	2.665	0.0375	0.105
ECN: S-03946—Rev. F, 09-Jul-01 DWG: 5488				

PLCC: 28-LEAD



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.20	4.57	0.165	0.180
A_1	2.29	3.04	0.090	0.120
A_2	0.51	-	0.020	-
B	0.331	0.553	0.013	0.021
B_1	0.661	0.812	0.026	0.032
D	12.32	12.57	0.485	0.495
D_1	11.430	11.582	0.450	0.456
D_2	9.91	10.92	0.390	0.430
e_1	1.27 BSC		0.050 BSC	
ECN: T09-0766-Rev. D, 28-Sep-09 DWG: 5491				

SOIC (WIDE-BODY): 28-LEADS



All Dimensions In Inches

ECN: E11-2209-Rev. D, 01-Aug-11
DWG: 5850

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2026 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000