

## 16 Ω, Low Charge Injection and Leakage, +12 V / +5 V / +3 V / ± 5 V Quad SPST Switches

### DESCRIPTION

The DG441LE, DG442LE monolithic quad single-pole-single-throw analog switches are designed to provide high speed, low error switching of analog signals. The DG441LE has a normally closed function. The DG442LE has a normally open function.

The DG441LE, DG442LE feature low charge injection of a few picocoulombs over the full analog switch range. Combining low on resistance ( $16 \Omega$ , typ.), low parasitic capacitance ( $C_{D(ON)}$  15 pF), and fast switching speed ( $t_{ON}$ , 18 ns, typ.), the devices are ideal for data acquisition, sample-and-hold, and ADC input circuit designs.

The DG441LE, DG442LE operate on single and dual supplies. Single supply voltage ranges from 3 V to 16 V while dual supply operation is recommended with  $\pm 3$  V to  $\pm 8$  V. Each switch conducts equally well in both direction when on, and blocks input voltages up to the supply levels when off.

The DG441LE, DG442LE are available in 16 lead TSSOP, SOIC, and PDIP packages.

### FEATURES

- 3 V to 16 V single supply or  $\pm 3$  V to  $\pm 8$  V dual supply
- On-resistance  $R_{DS(on)}$ :  $16 \Omega$
- Fast switching  $t_{ON}$ : 18 ns, typ.
- Low parasitic capacitance:  
 $C_{D(ON)}$ : 15 pF  
 $C_{S(OFF)}$ : 5 pF
- Less than 8 pC charge injection over the full signal swing range
- Low leakage:  $< 10$  pA, typ.
- TTL, CMOS compatible
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
Available

**HALOGEN FREE**  
Available

### 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.

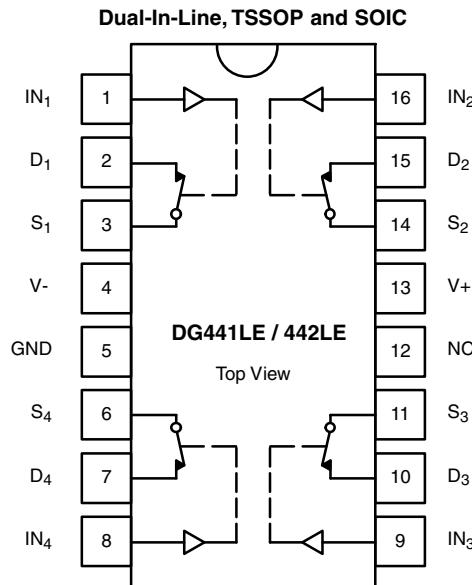
### BENEFITS

- Wide operation voltage range
- Low signal errors and distortion
- Fast switching time
- Minimized switching glitch

### APPLICATIONS

- Automatic test equipment
- Process control and automation
- Data acquisition systems
- Meters and instruments
- Medical and healthcare systems
- Communication systems
- Audio and video signal routing
- Relay replacement
- Battery powered systems

### FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



### TRUTH TABLE

LOGIC	DG441LE	DG442LE
0	On	Off
1	Off	On

 Logic "0"  $\leq 0.8$  V

 Logic "1"  $\geq 2.4$  V

<b>ORDERING INFORMATION</b>				
TEMP. RANGE	CONFIGURATION	PACKAGE	PART NUMBER	MIN. ORDER / PACK. QUANTITY
-40 °C to +85 °C Lead (Pb)-free	DG441LE	16-pin TSSOP	DG441LEDQ-GE3	Tube 360 units
			DG441LEDQ-T1-GE3	Tape and reel, 3000 units
		16-pin SOIC	DG441LEDY-GE3	Tube 500 units
			DG441LEDY-T1-GE3	Tape and reel, 2500 units
	DG442LE	16-pin PDIP	DG441LEDJ-GE3	Tube 500 units
		16-pin TSSOP	DG442LEDQ-GE3	Tube 360 units
			DG442LEDQ-T1-GE3	Tape and reel, 3000 units
		16-pin SOIC	DG442LEDY-GE3	Tube 500 units
			DG442LEDY-T1-GE3	Tape and reel, 2500 units
		16-pin PDIP	DG442LEDJ-GE3	Tube 500 units

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
V+ to V-		-0.3 to +18	V
GND to $V_A$		18	
Digital Inputs <sup>a</sup> $V_S, V_D$		GND -0.3 to ( $V_+$ ) + 0.3 or 30 mA, whichever occurs first	
Continuous Current (any terminal)		30	mA
Current, S or D (pulsed 1 ms, 10 % duty cycle)		100	
Storage Temperature	(DQ, DY suffix)	-65 to +125	°C
	(AK suffix)	-65 to +150	
Power Dissipation (packages) <sup>b</sup>	16-pin TSSOP <sup>c</sup>	450	mW
	16-pin narrow body SOIC <sup>d</sup>	650	
	16-pin CerDIP <sup>e</sup>	900	
ESD Human Body Model (HBM); per ANSI / ESDA / JEDEC® JS-001		2500	V
Latch Up Current, per JESD78D		400	mA

**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 welded or soldered to PC board.
- c. Derate 7 mW/°C above 75 °C.
- d. Derate 7.6 mW/°C above 75 °C.
- e. Derate 12 mW/°C above 75 °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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

<b>SPECIFICATIONS <sup>a</sup></b> (single supply 12 V)										
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS UNLESS OTHERWISE SPECIFIED</b> $V_+ = 12 \text{ V}$ , $V_- = 0 \text{ V}$ $V_{IN} = 2.4 \text{ V}$ , $0.8 \text{ V}^f$	<b>TEMP.<sup>b</sup></b>	<b>TYP.<sup>c</sup></b>	<b>A SUFFIX LIMITS</b>		<b>D SUFFIX LIMITS</b>		<b>UNIT</b>	
					<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>	<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>		
<b>Analog Switch</b>										
Analog Signal Range <sup>e</sup>	$V_{ANALOG}$		Full	-	0	12	0	12	V	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_+ = 10.8 \text{ V}$ , $V_- = 0 \text{ V}$ $I_S = 10 \text{ mA}$ , $V_D = 2 \text{ V} / 9 \text{ V}$	Room	16	-	26	-	26	$\Omega$	
			Full	-	-	40	-	35		
On-Resistance Match Between Channels <sup>e</sup>	$\Delta R_{DS(on)}$	$I_S = 10 \text{ mA}$ , $V_D = 9 \text{ V}$	Room	0.1	-	0.5	-	0.5		
Switch Off Leakage Current	$I_{S(off)}$	$V_D = 1 \text{ V} / 11 \text{ V}$ , $V_S = 11 \text{ V} / 1 \text{ V}$	Room	-	-1	1	-1	1	$nA$	
	$I_{D(off)}$		Full	-	-15	15	-10	10		
			Room	-	-1	1	-1	1		
			Full	-	-15	15	-10	10		
Channel On Leakage Current	$I_{D(on)}$	$V_S = V_D = 11 \text{ V} / 1 \text{ V}$	Room	-	-1	1	-1	1	$\mu A$	
			Full	-	-15	15	-10	10		
<b>Digital Control</b>										
Input Current, $V_{IN}$ Low	$I_{IL}$	$V_{IN}$ under test = 0.8 V	Full	0.01	-1.5	1.5	-1	1	$\mu A$	
Input Current, $V_{IN}$ High	$I_{IH}$	$V_{IN}$ under test = 2.4 V	Full	-	-1.5	1.5	-1	1		
<b>Dynamic Characteristics</b>										
Turn-On Time	$t_{ON}$	$R_L = 300 \Omega$ , $C_L = 35 \text{ pF}$ $V_S = 5 \text{ V}$ , see figure 2	Room	18	-	60	-	60	$ns$	
			Full	-	-	80	-	70		
Turn-Off Time	$t_{OFF}$		Room	18	-	35	-	35		
			Full	-	-	50	-	45		
Charge Injection <sup>e</sup>	$Q$	$V_g = 0 \text{ V}$ , $R_g = 0 \Omega$ , $C_L = 10 \text{ nF}$	Room	6.6	-	-	-	-	pC	
Off Isolation <sup>e</sup>	OIRR	$R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , $f = 1 \text{ MHz}$	Room	68.4	-	-	-	-	$dB$	
Channel-to-Channel Crosstalk <sup>e</sup>	$X_{TALK}$		Room	114	-	-	-	-		
Source Off Capacitance <sup>e</sup>	$C_{S(off)}$	$f = 1 \text{ MHz}$	Room	5	-	-	-	-	$pF$	
Drain Off Capacitance <sup>e</sup>	$C_{D(off)}$		Room	6	-	-	-	-		
Channel On Capacitance <sup>e</sup>	$C_{D(on)}$		Room	15	-	-	-	-		
<b>Power Supplies</b>										
Positive Supply Current	$I_+$	$V_{IN} = 0 \text{ V or } 12 \text{ V}$	Full	0.03	-	1.5	-	1	$\mu A$	
Negative Supply Current	$I_-$		Room	-	-1	-	-1	-		
Ground Current	$I_{GND}$		Full	0.002	-7.5	-	-5	-		
			Full	0.002	-1.5	-	-1	-		

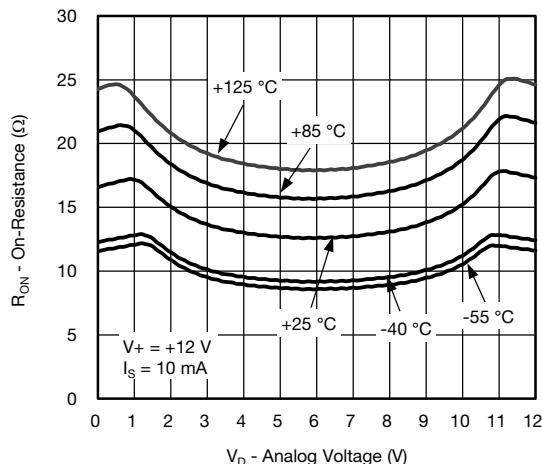
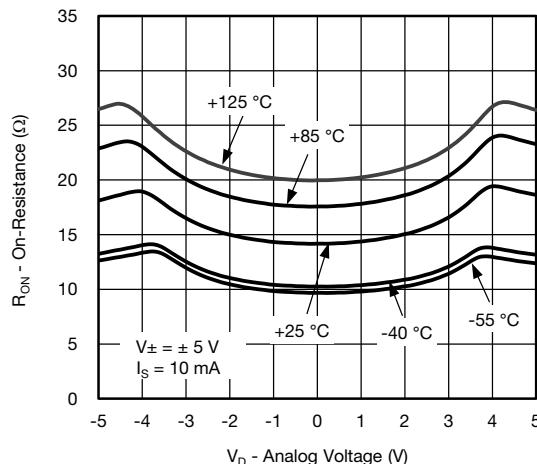
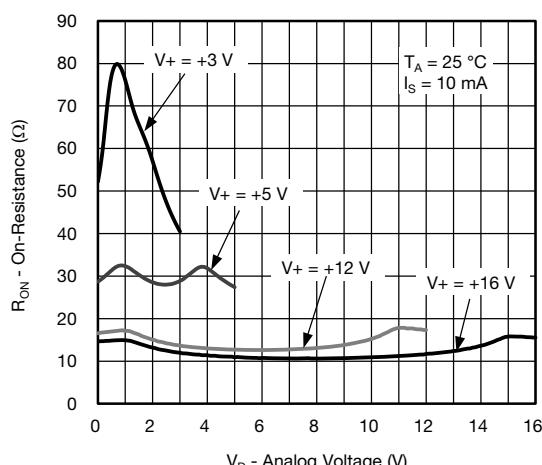
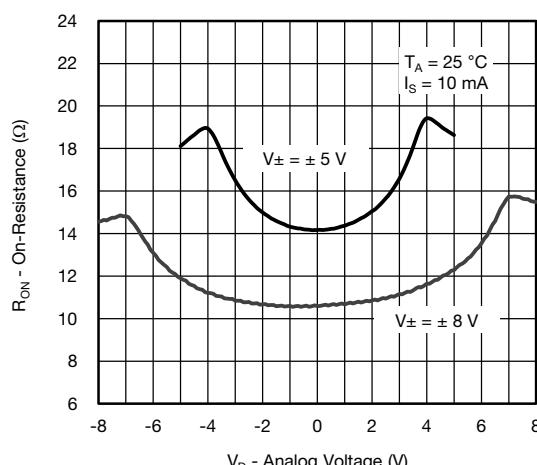
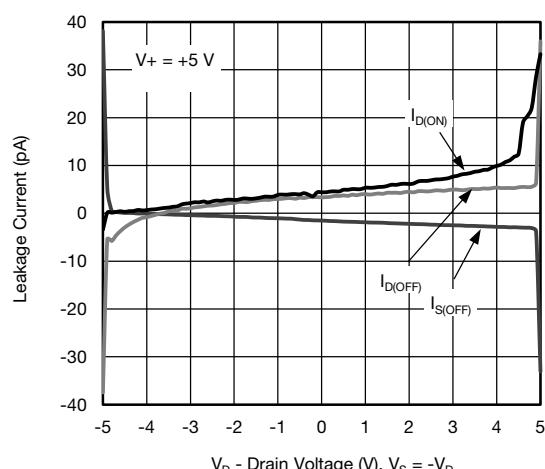
<b>SPECIFICATIONS <sup>a</sup></b> (dual supply $\pm 5$ V)									
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS UNLESS OTHERWISE SPECIFIED</b> $V_+ = 5$ V, $V_- = -5$ V $V_{IN} = 2.4$ V, $0.8$ V <sup>f</sup>	<b>TEMP.<sup>b</sup></b>	<b>TYP.<sup>c</sup></b>	<b>A SUFFIX LIMITS</b>		<b>D SUFFIX LIMITS</b>		<b>UNIT</b>
					<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>	<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>	
<b>Analog Switch</b>									
Analog Signal Range <sup>e</sup>	$V_{ANALOG}$		Full	-	-5	5	-5	5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_+ = 5$ V, $V_- = -5$ V $I_S = 10$ mA, $V_D = \pm 3.5$ V	Room	18	-	30	-	30	$\Omega$
On-Resistance Match Between Channels <sup>e</sup>	$\Delta R_{DS(on)}$	$I_S = 10$ mA, $V_D = \pm 3.5$ V	Room	0.1	-	0.5	-	0.5	
Switch Off Leakage Current <sup>g</sup>	$I_{S(off)}$	$V_+ = 5.5$ V, $V_- = -5.5$ V $V_D = \pm 4.5$ V, $V_S = \pm 4.5$ V	Room	-	-1	1	-1	1	$nA$
	$I_{D(off)}$		Full	-	-15	15	-10	10	
			Room	-	-1	1	-1	1	
			Full	-	-15	15	-10	10	
Channel On Leakage Current <sup>g</sup>	$I_{D(on)}$	$V_+ = 5.5$ V, $V_- = -5.5$ V $V_S = V_D = \pm 4.5$ V	Room	-	-1	1	-1	1	
<b>Digital Control</b>									
Input Current, $V_{IN}$ Low <sup>e</sup>	$I_{IL}$	$V_{IN}$ under test = 0.8 V	Full	0.05	-1.5	1.5	-1	1	$\mu A$
Input Current, $V_{IN}$ High <sup>e</sup>	$I_{IH}$	$V_{IN}$ under test = 2.4 V	Full	0.05	-1.5	1.5	-1	1	
<b>Dynamic Characteristics</b>									
Turn-On Time	$t_{ON}$	$R_L = 300$ $\Omega$ , $C_L = 35$ pF $V_S = \pm 3.5$ V, see figure 2	Room	42	-	65	-	65	$ns$
Turn-Off Time	$t_{OFF}$		Full	-	-	90	-	75	
Charge Injection <sup>e</sup>	$Q$		Room	34	-	45	-	45	
Off Isolation <sup>e</sup>	$OIRR$		Full	-	-	65	-	55	
Channel-to-Channel Crosstalk <sup>e</sup>	$X_{TALK}$	$R_L = 50$ $\Omega$ , $C_L = 5$ pF, $f = 1$ MHz	Room	5.8	-	-	-	-	pC
Source Off Capacitance <sup>e</sup>	$C_{S(off)}$		Room	68.4	-	-	-	-	$dB$
Drain Off Capacitance <sup>e</sup>	$C_{D(off)}$		Room	113	-	-	-	-	
Channel On Capacitance <sup>e</sup>	$C_{D(on)}$		Room	5	-	-	-	-	$pF$
<b>Power Supplies</b>									
Positive Supply Current <sup>e</sup>	$I_+$	$V_{IN} = 0$ V or 5 V	Full	0.002	-	1.5	-	1	$\mu A$
Negative Supply Current <sup>e</sup>	$I_-$		Room	-0.002	-1	-	-1	-	
Ground Current <sup>e</sup>	$I_{GND}$		Full	-	-7.5	-	-5	-	
			Full	-0.002	-1.5	-	-1	-	

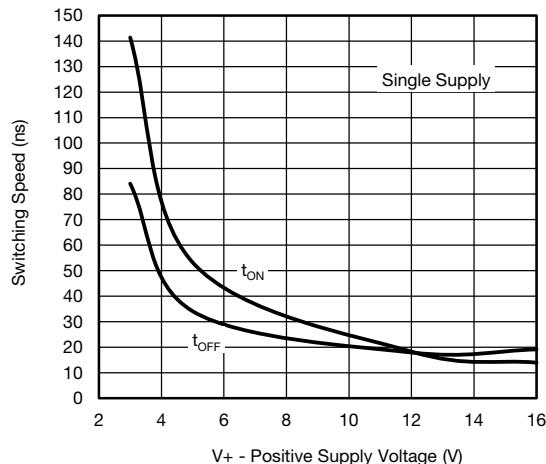
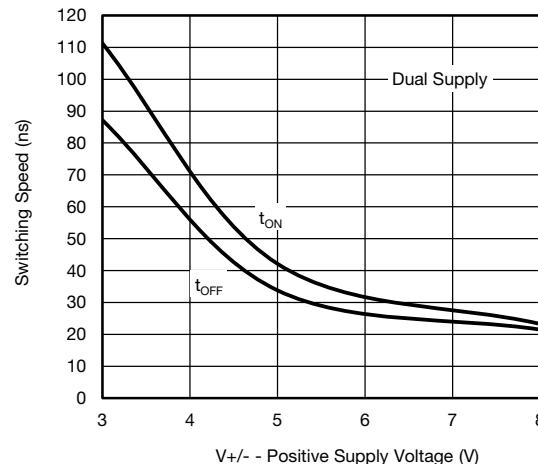
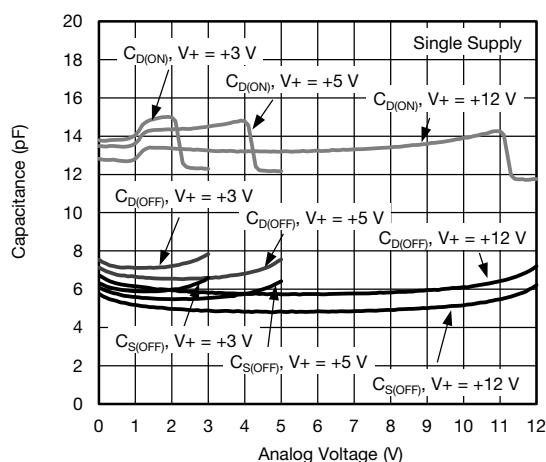
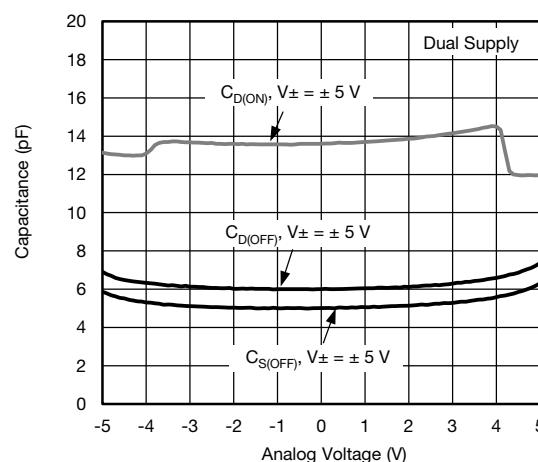
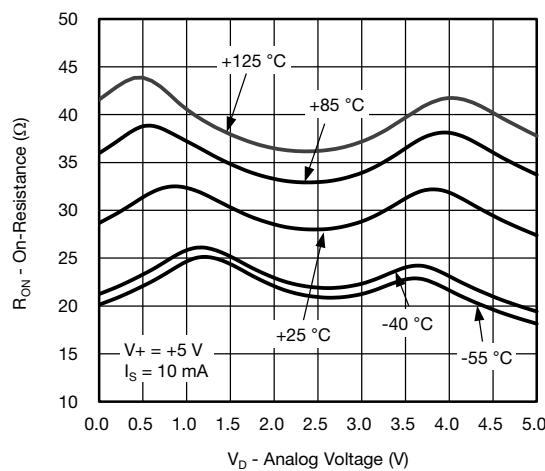
<b>SPECIFICATIONS <sup>a</sup></b> (single supply $\pm 5\text{ V}$ )										
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS UNLESS OTHERWISE SPECIFIED</b> $V_+ = 5\text{ V}$ , $V_- = 0\text{ V}$ $V_{IN} = 2.4\text{ V}$ , $0.8\text{ V}^f$	<b>TEMP.<sup>b</sup></b>	<b>TYP.<sup>c</sup></b>	<b>A SUFFIX LIMITS</b>		<b>D SUFFIX LIMITS</b>		<b>UNIT</b>	
					<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>	<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>		
<b>Analog Switch</b>										
Analog Signal Range <sup>e</sup>	$V_{ANALOG}$		Full	-	-	5	-	5	V	
Drain-Source On-Resistance <sup>e</sup>	$R_{DS(on)}$	$V_+ = 4.5\text{ V}$ $I_S = 5\text{ mA}$ , $V_D = 1\text{ V}$ , $3.5\text{ V}$	Room	36	-	50	-	50	$\Omega$	
			Full	-	-	88	-	75		
On-Resistance Match Between Channels <sup>e</sup>	$\Delta R_{DS(on)}$	$I_S = 10\text{ mA}$ , $V_D = 3.5\text{ V}$	Room	0.5	-	1	-	1		
<b>Dynamic Characteristics</b>										
Turn-On Time <sup>e</sup>	$t_{ON}$	$R_L = 300\ \Omega$ , $C_L = 35\text{ pF}$ $V_S = 3.5\text{ V}$ , see figure 2	Room	53	-	70	-	70	ns	
			Hot	-	-	90	-	80		
Turn-Off Time <sup>e</sup>	$t_{OFF}$		Room	34	-	50	-	50		
			Hot	-	-	70	-	60		
Charge Injection <sup>e</sup>	Q	$V_g = 0\text{ V}$ , $R_g = 0\ \Omega$ , $C_L = 10\text{ nF}$	Room	3.3	-	-	-	-	pC	
<b>Power Supplies</b>										
Positive Supply Current <sup>e</sup>	$I_+$	$V_{IN} = 0\text{ V}$ or $5\text{ V}$	Full	10	-	200	-	100	$\mu\text{A}$	
Negative Supply Current <sup>e</sup>	$I_-$		Room	-0.002	-1	-	-1	-		
			Full	-	-7.5	-	-5	-		
Ground Current <sup>e</sup>	$I_{GND}$		Full	-10	-200	-	-100	-		

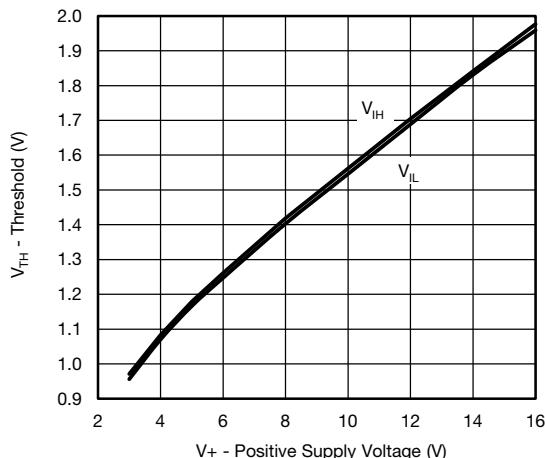
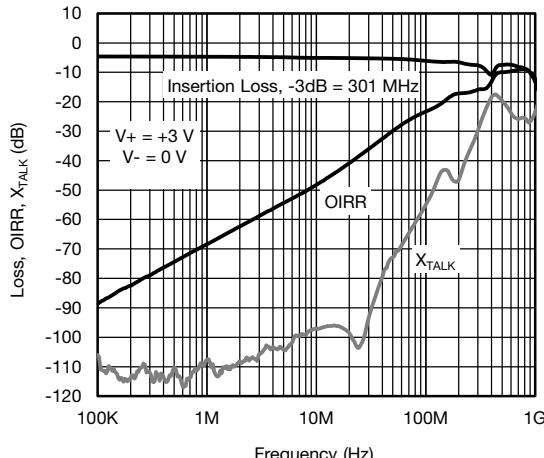
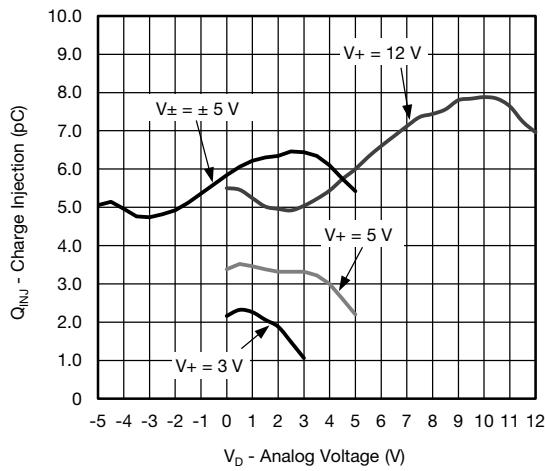
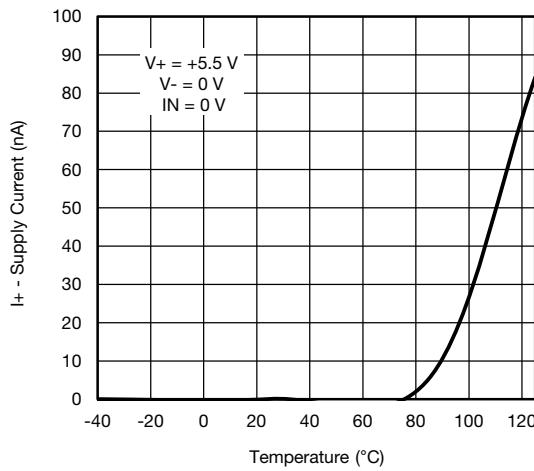
<b>SPECIFICATIONS <sup>a</sup></b> (single supply 3 V)									
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS UNLESS OTHERWISE SPECIFIED</b> $V_+ = 3 \text{ V}$ , $V_- = 0 \text{ V}$ $V_{IN} = 0.4 \text{ V}^f$	<b>TEMP.<sup>b</sup></b>	<b>TYP.<sup>c</sup></b>	<b>A SUFFIX LIMITS</b>		<b>D SUFFIX LIMITS</b>		<b>UNIT</b>
					<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>	<b>MIN.<sup>d</sup></b>	<b>MAX.<sup>d</sup></b>	
<b>Analog Switch</b>									
Analog Signal Range <sup>e</sup>	$V_{ANALOG}$		Full	-	0	3	0	3	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_+ = 2.7 \text{ V}$ , $V_- = 0 \text{ V}$ $I_S = 5 \text{ mA}$ , $V_D = 0.5 \text{ V}$ , $2.2 \text{ V}$	Room	106	-	130	-	130	$\Omega$
On-Resistance Match Between Channels <sup>e</sup>	$\Delta R_{DS(on)}$	$I_S = 5 \text{ mA}$ , $V_D = 2.2 \text{ V}$	Room	1	-	3	-	3	
Switch Off Leakage Current <sup>g</sup>	$I_{S(off)}$	$V_+ = 3.3 \text{ V}$ , $V_- = 0 \text{ V}$ $V_D = 1 \text{ V}$ , $2 \text{ V}$ , $V_S = 2 \text{ V}$ , $1 \text{ V}$	Room	-	-1	1	-1	1	nA
	$I_{D(off)}$		Full	-	-15	15	-10	10	
			Room	-	-1	1	-1	1	
			Full	-	-15	15	-10	10	
Channel On Leakage Current <sup>g</sup>	$I_{D(on)}$	$V_+ = 3.3 \text{ V}$ , $V_- = 0 \text{ V}$ $V_S = V_D = 1 \text{ V}$ , $2 \text{ V}$	Room	-	-1	1	-1	1	
<b>Digital Control</b>									
Input Current, $V_{IN}$ Low <sup>e</sup>	$I_{IL}$	$V_{IN}$ under test = 0.4 V	Full	0.005	-1.5	1.5	-1	1	$\mu\text{A}$
Input Current, $V_{IN}$ High <sup>e</sup>	$I_{IH}$	$V_{IN}$ under test = 2.4 V	Full	0.005	-1.5	1.5	-1	1	
<b>Dynamic Characteristics</b>									
Turn-On Time	$t_{ON}$	$R_L = 300 \Omega$ , $C_L = 35 \text{ pF}$ $V_S = 1.5 \text{ V}$ , see figure 2	Room	141	-	200	-	200	ns
Turn-Off Time	$t_{OFF}$		Full	-	-	220	-	210	
Charge Injection <sup>e</sup>	Q		Room	84	-	120	-	120	
Off Isolation <sup>e</sup>	OIRR		Full	-	-	140	-	130	
Channel-to-Channel Crosstalk <sup>e</sup>	$X_{TALK}$	$R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , $f = 1 \text{ MHz}$	Room	68	-	-	-	-	dB
Source Off Capacitance <sup>e</sup>	$C_{S(off)}$		Room	107	-	-	-	-	
Drain Off Capacitance <sup>e</sup>	$C_{D(off)}$		Room	6	-	-	-	-	pF
Channel On Capacitance <sup>e</sup>	$C_{D(on)}$		Room	7	-	-	-	-	
			Room	15	-	-	-	-	

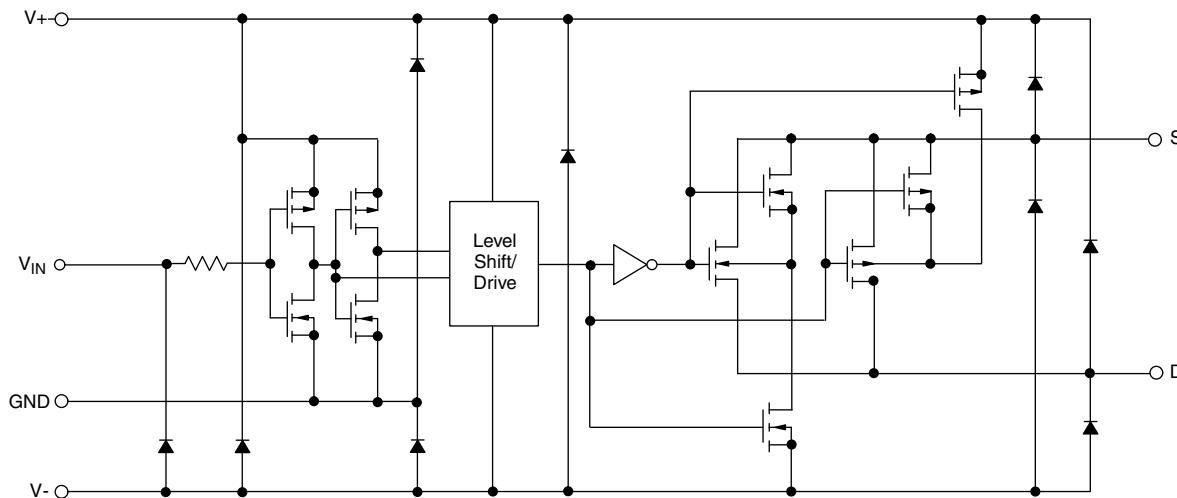
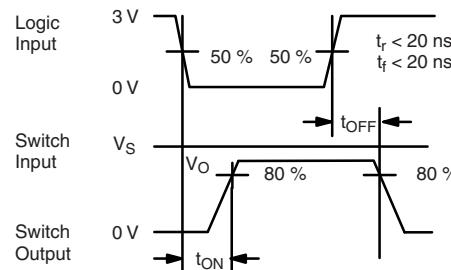
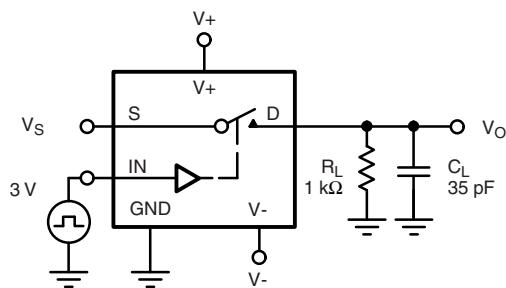
**Notes**

- a. Refer to PROCESS OPTION FLOWCHART.
- 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. Leakage parameters are guaranteed by worst case test conditions and not subject to test.

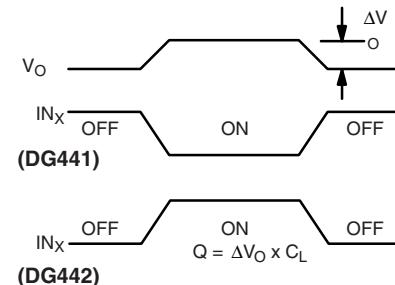
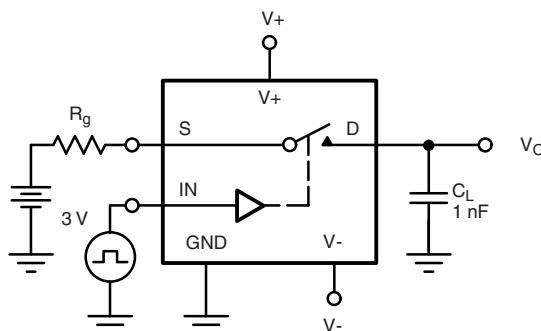
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

**R<sub>DS(on)</sub>** vs. Analog Voltage and Temperature

**R<sub>DS(on)</sub>** vs. Drain Voltage and Temperature

**R<sub>DS(on)</sub>** vs. Analog Voltage

**R<sub>DS(on)</sub>** vs. Analog Voltage

**Leakage Current vs. Drain Voltage  
(Dual Supply)**

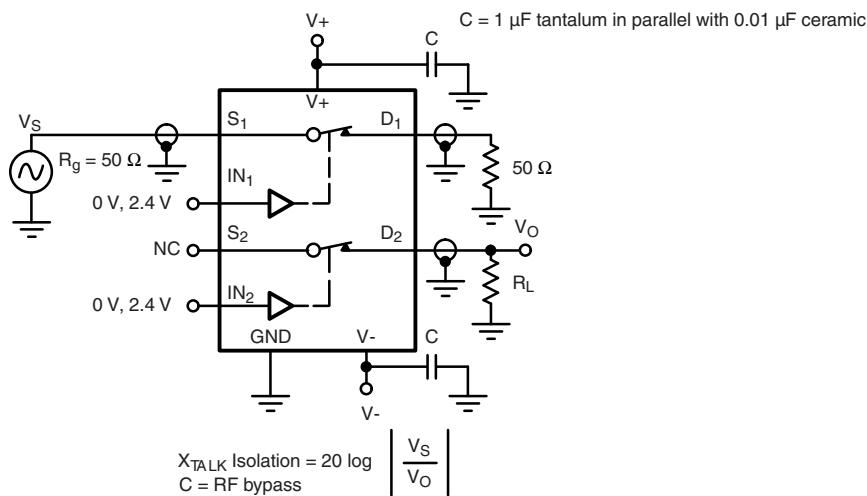
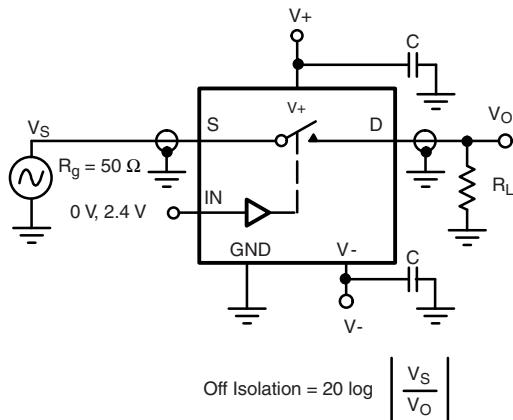
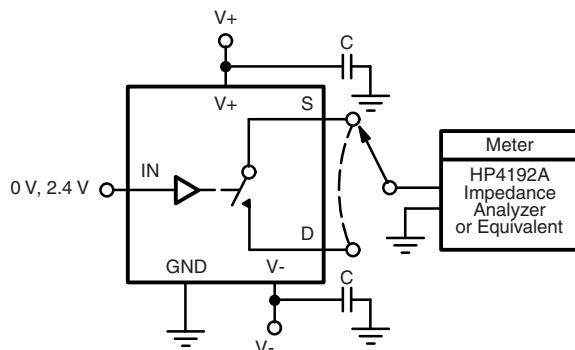
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

**Switching Time vs. Single Supply**

**Switching Time vs. Dual Supply**

**Capacitance vs. Analog Voltage  
(Single Supply)**

**Capacitance vs. Analog Voltage  
(Dual Supply)**

**R<sub>DS(on)</sub> vs. Analog Voltage and Temperature**

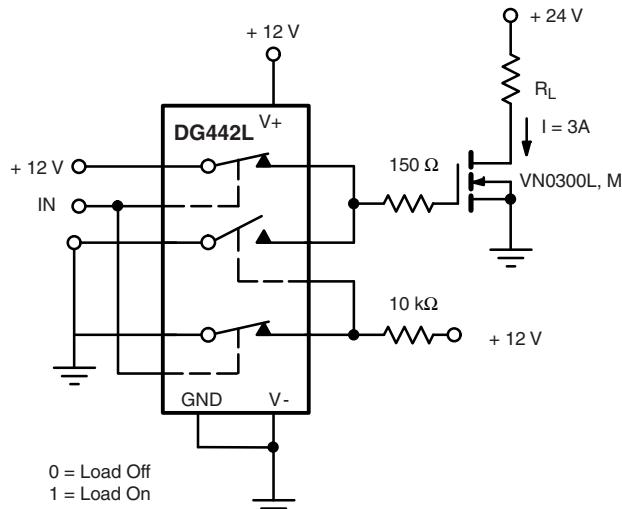
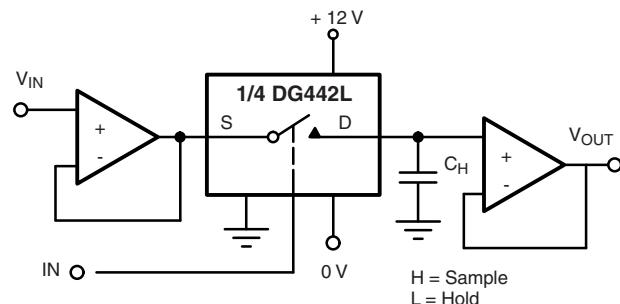
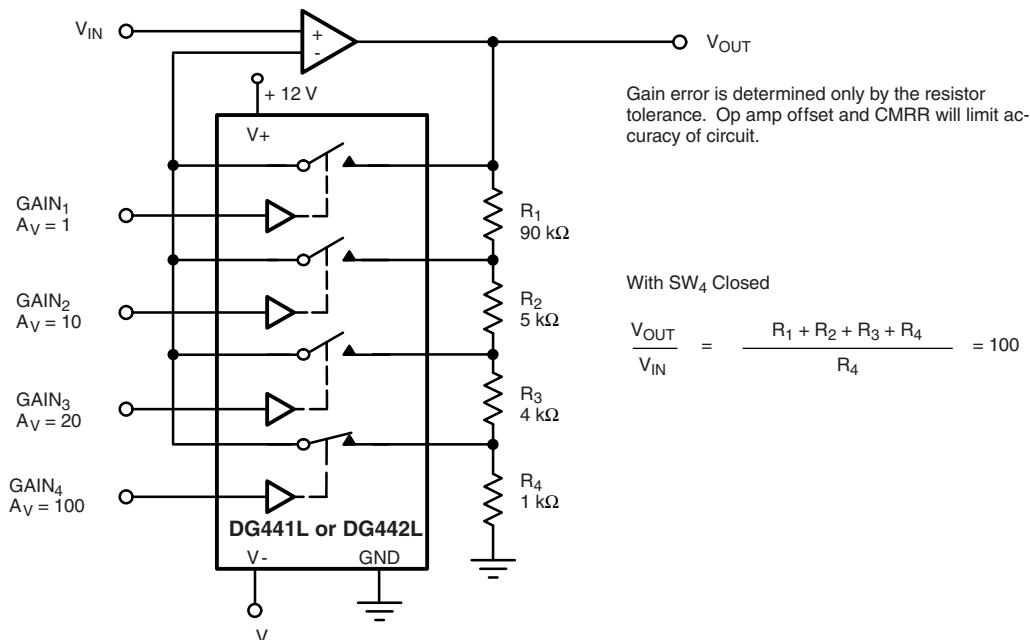
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

**Input Threshold vs. Single Supply Voltage**

**Insertion Loss, Off Isolation and Crosstalk vs. Frequency (Single Supply)**

**Charge Injection vs. Analog Voltage**

**Supply Current vs. Temperature**

**SCHEMATIC DIAGRAM** (typical channel)

**Fig. 1**
**TEST CIRCUITS**


Note: Logic input waveform is inverted for DG442.

**Fig. 2 - Switching Time**

**Fig. 3 - Charge Injection**

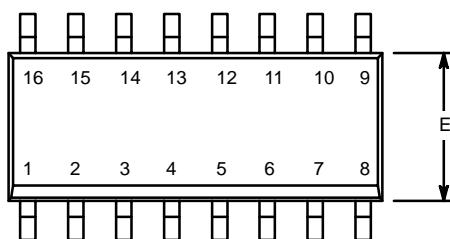
**TEST CIRCUITS**

**Fig. 4 - Crosstalk**

**Fig. 5 - Off Isolation**

**Fig. 6 - Source / Drain Capacitances**

**APPLICATIONS**

**Fig. 7 - Power MOSFET Driver**

**Fig. 8 - Open Loop Sample-and-Hold**

**Fig. 9 - Precision-Weighted Resistor Programmable-Gain Amplifier**

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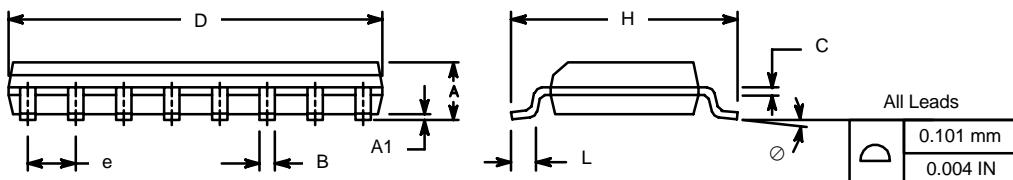
**SOIC (NARROW): 16-LEAD**

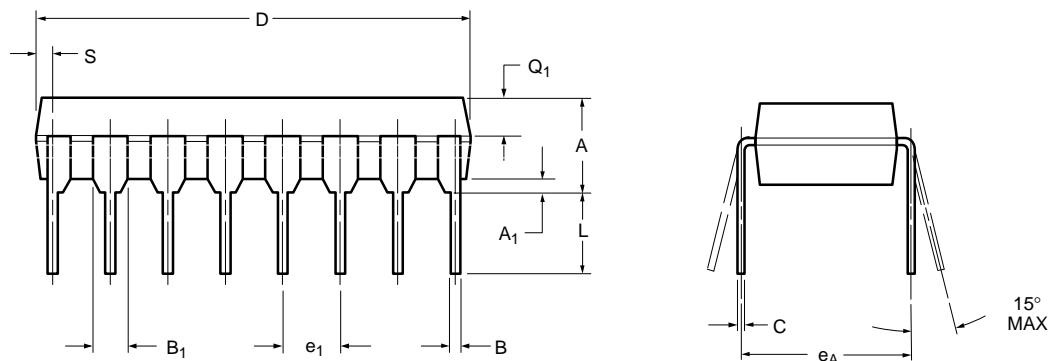
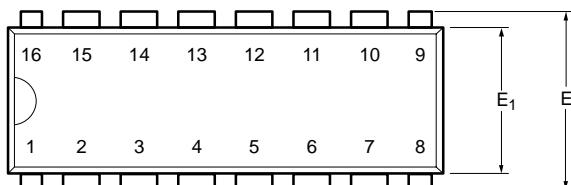
JEDEC Part Number: MS-012



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
<b>A</b>	1.35	1.75	0.053	0.069
<b>A<sub>1</sub></b>	0.10	0.20	0.004	0.008
<b>B</b>	0.38	0.51	0.015	0.020
<b>C</b>	0.18	0.23	0.007	0.009
<b>D</b>	9.80	10.00	0.385	0.393
<b>E</b>	3.80	4.00	0.149	0.157
<b>e</b>	1.27 BSC		0.050 BSC	
<b>H</b>	5.80	6.20	0.228	0.244
<b>L</b>	0.50	0.93	0.020	0.037
$\emptyset$	0°	8°	0°	8°

ECN: S-03946—Rev. F, 09-Jul-01  
DWG: 5300

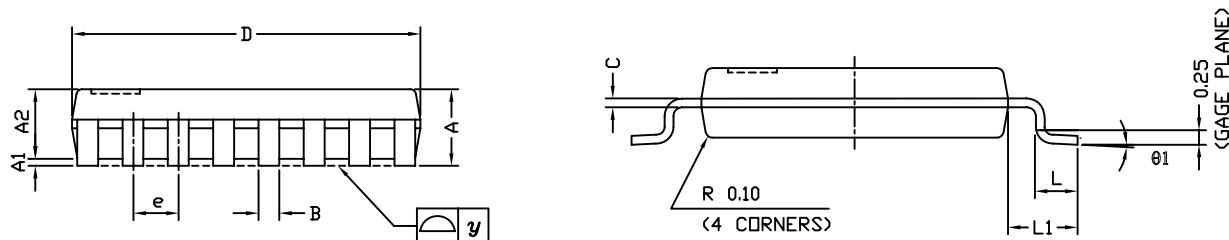
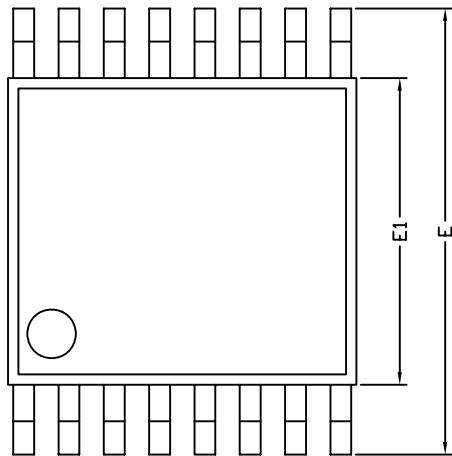


**PDIP: 16-LEAD**


Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
<b>A</b>	3.81	5.08	0.150	0.200
<b>A<sub>1</sub></b>	0.38	1.27	0.015	0.050
<b>B</b>	0.38	0.51	0.015	0.020
<b>B<sub>1</sub></b>	0.89	1.65	0.035	0.065
<b>C</b>	0.20	0.30	0.008	0.012
<b>D</b>	18.93	21.33	0.745	0.840
<b>E</b>	7.62	8.26	0.300	0.325
<b>E<sub>1</sub></b>	5.59	7.11	0.220	0.280
<b>e<sub>1</sub></b>	2.29	2.79	0.090	0.110
<b>e<sub>A</sub></b>	7.37	7.87	0.290	0.310
<b>L</b>	2.79	3.81	0.110	0.150
<b>Q<sub>1</sub></b>	1.27	2.03	0.050	0.080
<b>S</b>	0.38	1.52	.015	0.060

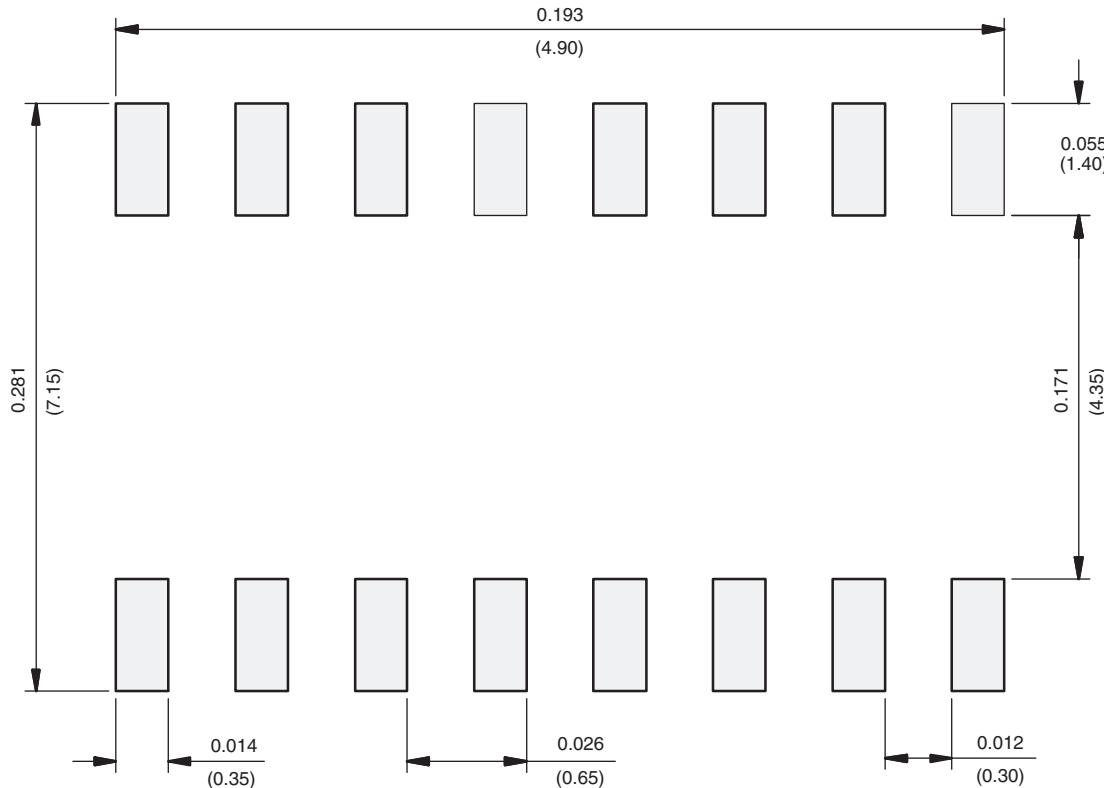
ECN: S-03946—Rev. D, 09-Jul-01  
DWG: 5482

### TSSOP: 16-LEAD



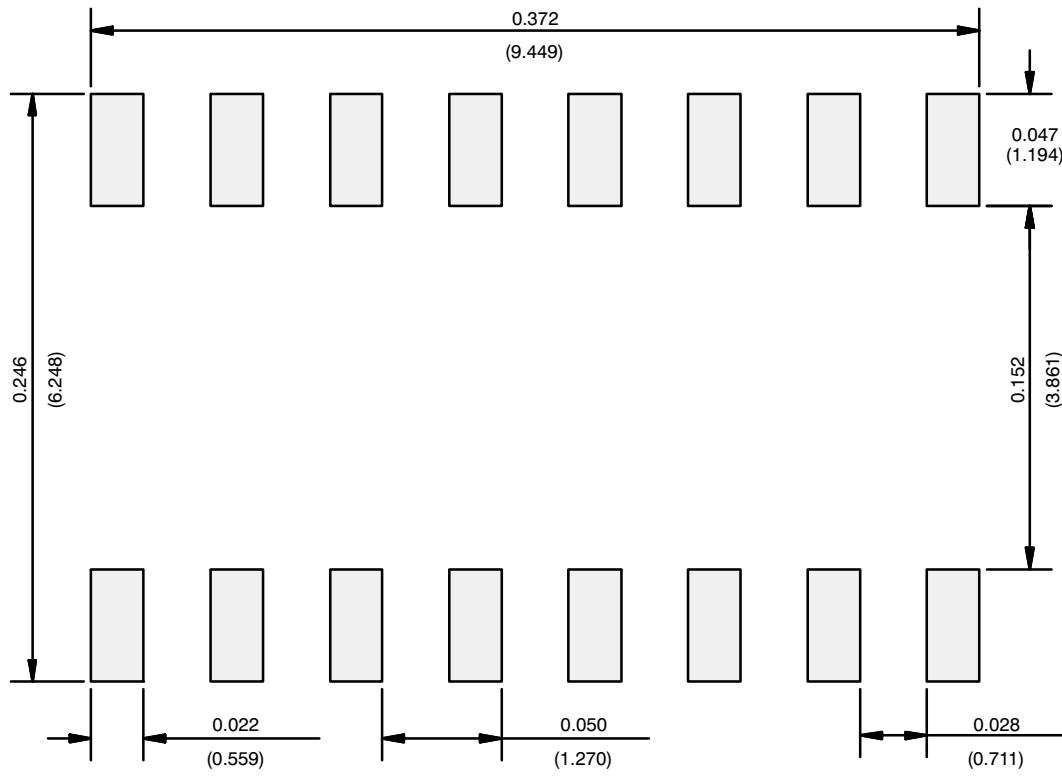
Symbols	DIMENSIONS IN MILLIMETERS		
	Min	Nom	Max
A	-	1.10	1.20
A1	0.05	0.10	0.15
A2	-	1.00	1.05
B	0.22	0.28	0.38
C	-	0.127	-
D	4.90	5.00	5.10
E	6.10	6.40	6.70
E1	4.30	4.40	4.50
e	-	0.65	-
L	0.50	0.60	0.70
L1	0.90	1.00	1.10
y	-	-	0.10
θ1	0°	3°	6°

ECN: S-61920-Rev. D, 23-Oct-06  
DWG: 5624

**RECOMMENDED MINIMUM PAD FOR TSSOP-16**

Recommended Minimum Pads  
Dimensions in inches (mm)

## RECOMMENDED MINIMUM PADS FOR SO-16



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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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