

ORDERING INFORMATION

Temp. Range	Package	Part Number
- 40 °C to 85 °C	16-pin plastic DIP	DG441DJ
		DG441DJ-E3
	16-pin narrow SOIC	DG442DJ
		DG442DJ-E3
		DG441DY
		DG441DY-E3
		DG441DY-T1
		DG441DY-T1-E3
		DG442DY
		DG442DY-E3
		DG442DY-T1
		DG442DY-T1-E3

ABSOLUTE MAXIMUM RATINGS

Parameter		Limit	Unit
V+ to V-		44	V
GND to V-		25	
Digital Inputs ^a , V _S , V _D		(V-) - 2 to (V+) + 2 or 30 mA, whichever occurs first	
Continuous Current (any terminal)		30	mA
Current, S or D (pulsed at 1 ms, 10 % duty cycle)		100	
Storage Temperature	(AK suffix)	- 65 to 150	°C
	(DJ, DY suffix)	- 65 to 125	
Power Dissipation (Package) ^b	16-pin plastic DIP ^c	450	mW
	16-pin CerDIP ^d	900	
	16-pin narrow SOIC ^d	900	
	LCC-20 ^d	1200	

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 6 mW/°C above 75 °C.

d. Derate 12 mW/°C above 75 °C.

SCHEMATIC DIAGRAM Typical Channel

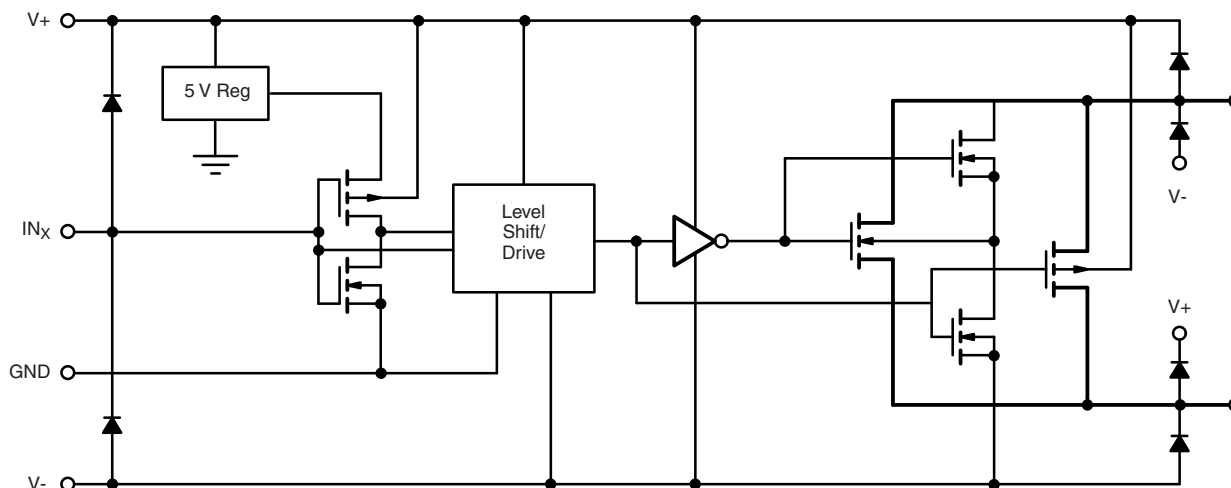


Figure 1.

**SPECIFICATIONS^a** (Dual Supplies)

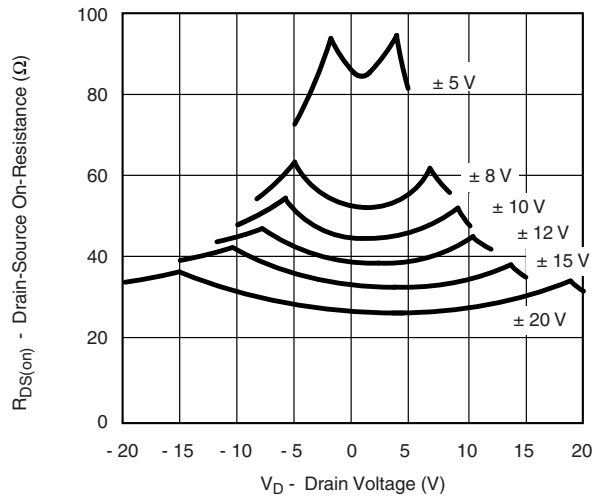
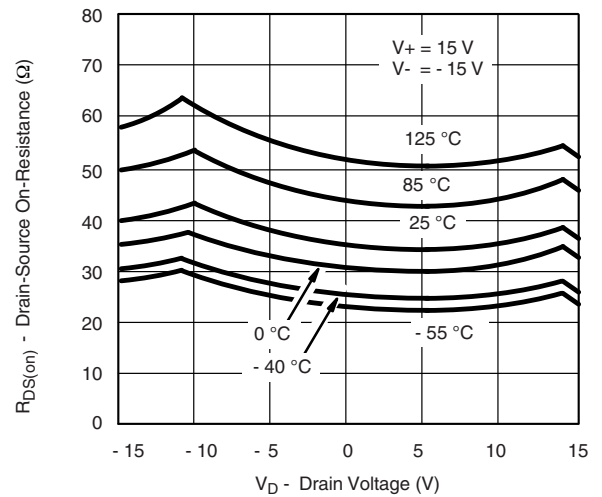
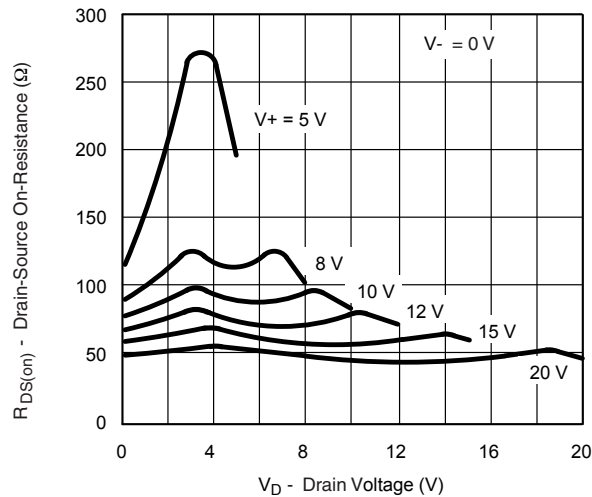
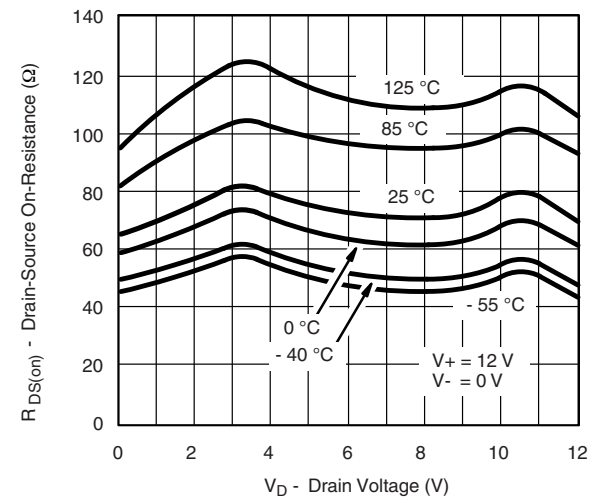
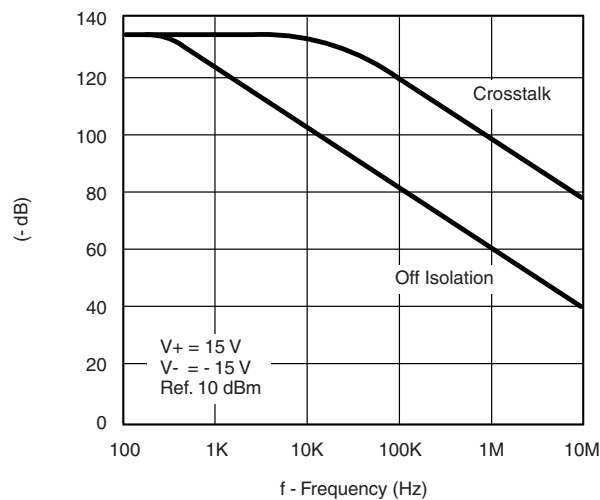
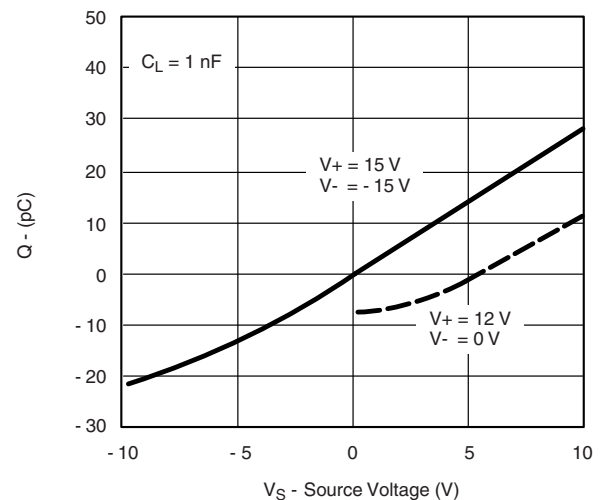
			Test Conditions Unless Otherwise Specified V ₊ = 15 V, V ₋ = - 15 V V _{IN} = 2.4 V, 0.8 V ^f			A Suffix - 55 °C to 125 °C		D Suffix - 40 °C to 85 °C		
Parameter		Symbol		Temp. ^b	Typ. ^c	Min. ^d	Max. ^d	Min. ^d	Max. ^d	Unit
Analog Switch										
Analog Signal Range ^e	V _{ANALOG}			Full		- 15	15	- 15	15	V
Drain-Source On-Resistance	R _{DS(on)}		I _S = - 10 mA, V _D = ± 8.5 V V ₊ = 13.5 V, V ₋ = - 13.5 V	Room Full	50		85 100		85 100	Ω
On-Resistance Match Between Channels ^e	ΔR _{DS(on)}		I _S = - 10 mA, V _D = ± 10 V V ₊ = 15 V, V ₋ = - 15 V	Room Full			4 5		4 5	
Switch Off Leakage Current	I _{S(off)}		V ₊ = 16.5, V ₋ = - 16.5 V V _D = ± 15.5 V, V _S = ± 15.5 V	Room Full	± 0.01	- 0.5 - 20	0.5 20	- 0.5 - 5	0.5 5	nA
	I _{D(off)}			Room Full	± 0.01	- 0.5 - 20	0.5 20	- 0.5 - 5	0.5 5	
Channel On Leakage Current	I _{D(on)}		V ₊ = 16.5 V, V ₋ = - 16.5 V V _S = V _D = ± 15.5 V	Room Full	± 0.08	- 0.5 - 40	0.5 40	- 0.5 - 10	0.5 10	
Digital Control										
Input Current V _{IN} Low	I _{IL}		V _{IN} under test = 0.8 V, All Other = 2.4 V	Full	- 0.01	- 500	500	- 500	500	nA
Input Current V _{IN} High	I _{IH}		V _{IN} under test = 2.4 V All Other = 0.8 V	Full	0.01	- 500	500	- 500	500	
Dynamic Characteristics										
Turn-On Time		t _{ON}	R _L = 1 kΩ, C _L = 35 pF V _S = ± 10 V See Figure 2	Room	150		250		250	ns
Turn-Off Time	DG441	t _{OFF}		Room	90		120		120	
	DG442			Room	110		210		210	
Charge Injection ^e		Q	C _L = 1 nF, V _S = 0 V V _{gen} = 0 V, R _{gen} = 0 Ω	Room	- 1					pC
Off Isolation ^e		OIRR	R _L = 50 Ω, C _L = 5 pF f = 1 MHz	Room	60					dB
Crosstalk (Channel-to-Channel)		X _{TALK}		Room	100					
Source Off Capacitance ^e		C _{S(off)}	f = 1 MHz	Room	4					pF
Drain Off Capacitance ^e		C _{D(off)}		Room	4					
Channel On Capacitance ^e		C _{D(on)}	V _{ANALOG} = 0 V	Room	16					
Power Supplies										
Positive Supply Current		I ₊	V ₊ = 16.5 V, V ₋ = - 16.5 V V _{IN} = 0 or 5 V	Full	15		100		100	μA
Negative Supply Current		I ₋		Room Full	- 0.0001	- 1 - 5		- 1 - 5		
Ground Current		I _{GND}		Full	- 15	- 100		- 100		

SPECIFICATIONS ^a (Single Supply)									
Parameter	Symbol	Test Conditions Unless Otherwise Specified V ₊ = 12 V, V ₋ = 0 V V _{IN} = 2.4 V, 0.8 V ^f	Temp. ^b	Typ. ^c	A Suffix - 55 °C to 125 °C		D Suffix - 40 °C to 85 °C		Unit
					Min. ^d	Max. ^d	Min. ^d	Max. ^d	
Analog Switch									
Analog Signal Range ^e	V _{ANALOG}		Full		0	12	0	12	V
Drain-Source On-Resistance	R _{DS(on)}	I _S = - 10 mA, V _D = 3 V, 8 V V ₊ = 10.8 V	Room Full	100		160 200		160 200	Ω
Dynamic Characteristics									
Turn-On Time	t _{ON}	R _L = 1 kΩ, C _L = 35 pF V _S = 8 V See Figure 2	Room	300		450		450	ns
Turn-Off Time	t _{OFF}		Room	60		200		200	
Charge Injection	Q	C _L = 1nF, V _{gen} = 6 V, R _{gen} = 0 Ω	Room	2					pC
Power Supplies									
Positive Supply Current	I ₊	V ₊ = 13.2 V, V ₋ = 0 V V _{IN} = 0 or 5 V	Full	15		100		100	μA
Negative Supply Current	I ₋		Room Full	- 0.0001	- 1 - 100		- 1 - 100		
Ground Current	I _{GND}		Full	- 15	- 100		- 100		

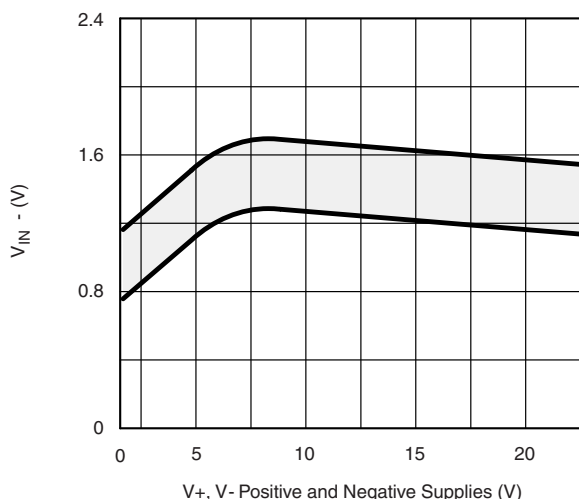
Notes:

- Refer to PROCESS OPTION FLOWCHART.
- Room = 25 °C, Full = as determined by the operating temperature 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 datasheet.
- Guaranteed by design, not subject to production test.
- V_{IN} = input voltage to perform proper function.

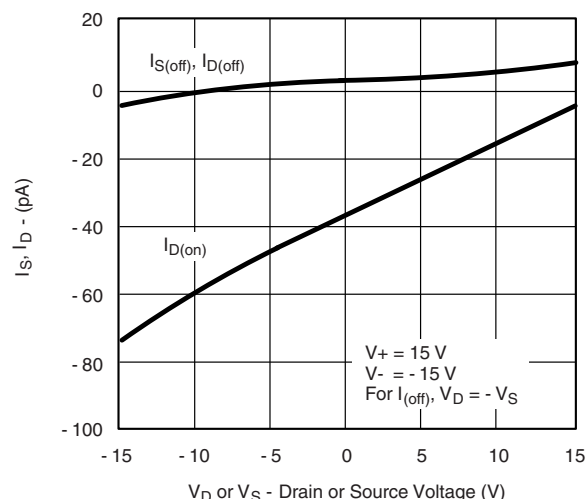
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

 $R_{DS(on)}$ vs. V_D and Power Supply Voltage

 $R_{DS(on)}$ vs. V_D and Temperature

 $R_{DS(on)}$ vs. V_D and Unipolar Power Supply Voltage

 $R_{DS(on)}$ vs. V_D and Temperature (Single 12-V Supply)

Crosstalk and Off Isolation vs. Frequency

Charge Injection vs. Source Voltage

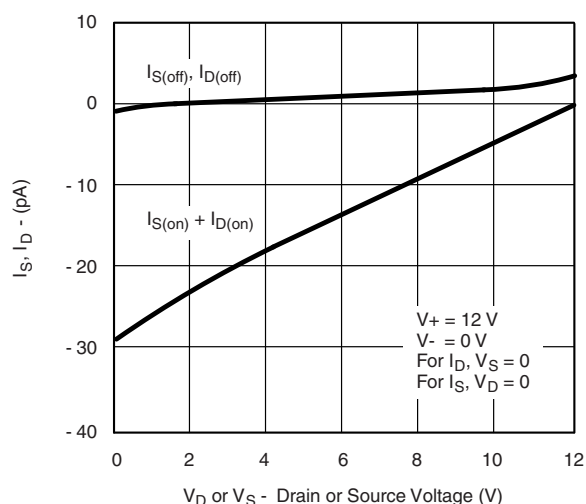
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



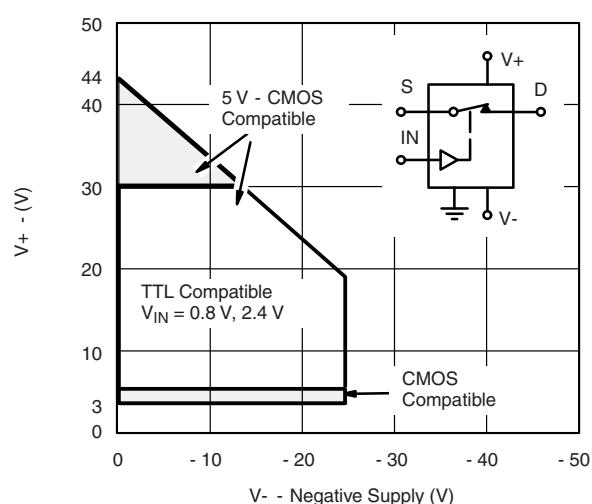
Switching Threshold vs. Supply Voltage



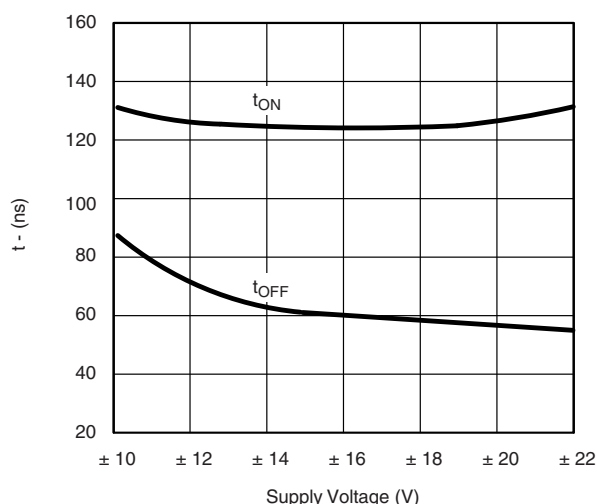
Source/Drain Leakage Currents



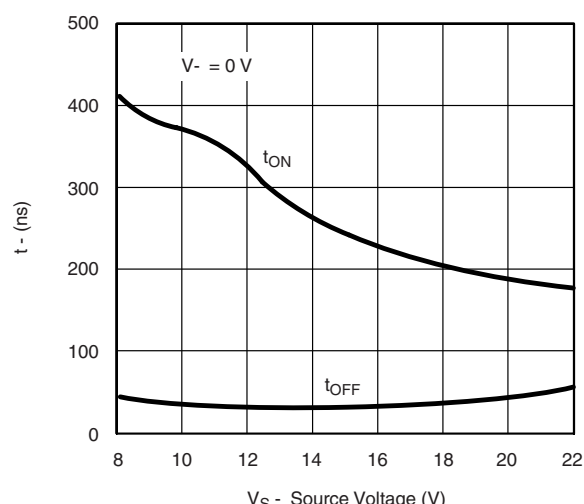
Source/Drain Leakage Currents (Single 12 V Supply)



Operating Voltage

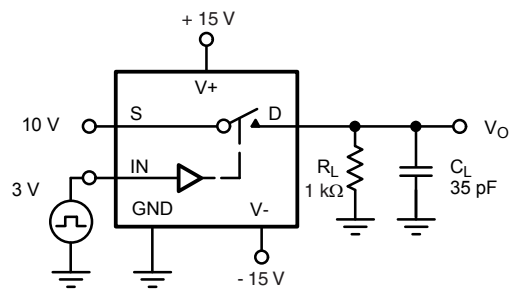


Switching Time vs. Power Supply Voltage

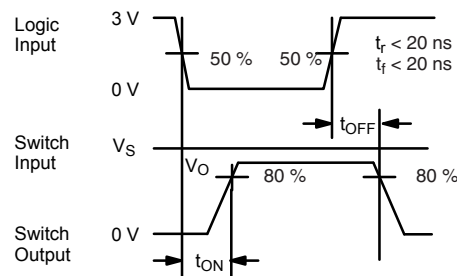


Switching Time vs. Power Supply Voltage

TEST CIRCUITS

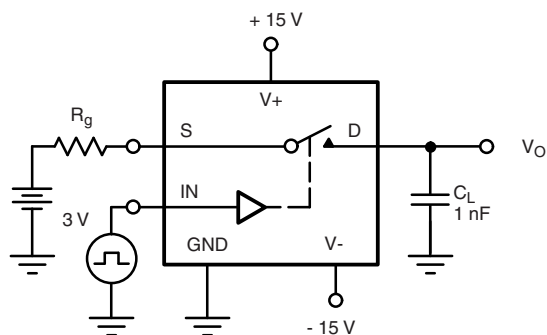


C_L (includes fixture and stray capacitance)



Note: Logic input waveform is inverted for DG442.

Figure 2. Switching Time



$C = 1$ mF tantalum in parallel with 0.01 mF ceramic

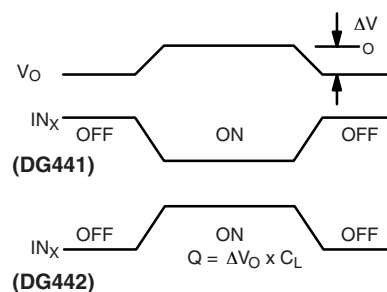
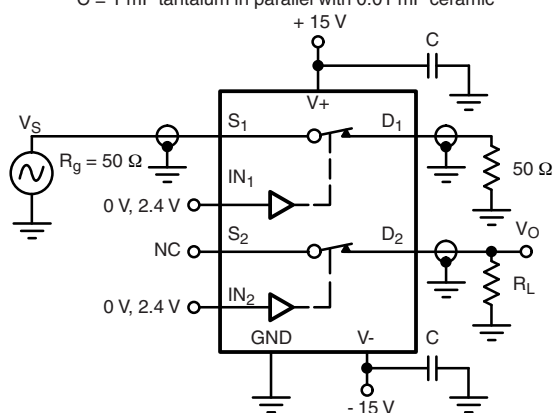
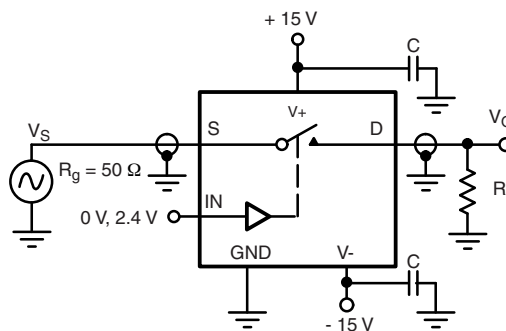


Figure 3. Charge Injection



$X_{\text{TALK}} \text{ Isolation} = 20 \log \left| \frac{V_S}{V_O} \right|$
 $C = \text{RF bypass}$

Figure 4. Crosstalk



$\text{Off Isolation} = 20 \log \left| \frac{V_S}{V_O} \right|$

Figure 5. Off Isolation

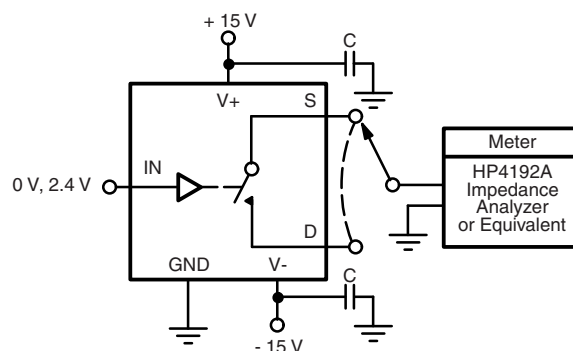


Figure 6. Source/Drain Capacitances

APPLICATIONS

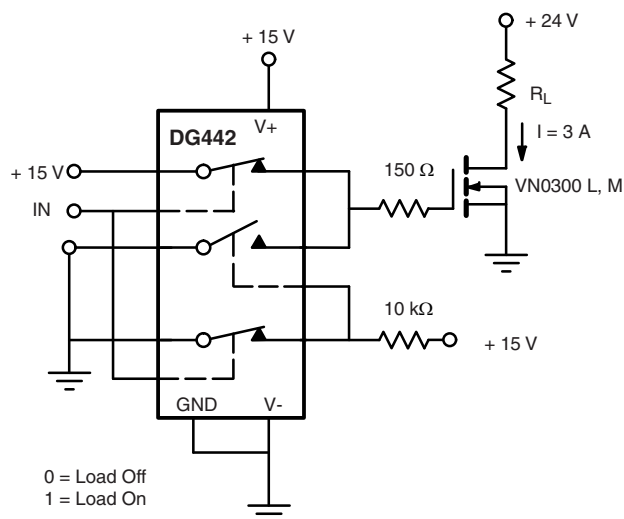


Figure 7. Power MOSFET Driver

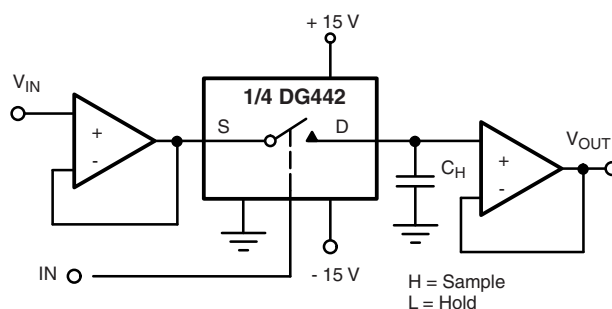


Figure 8. Open Loop Sample-and-Hold

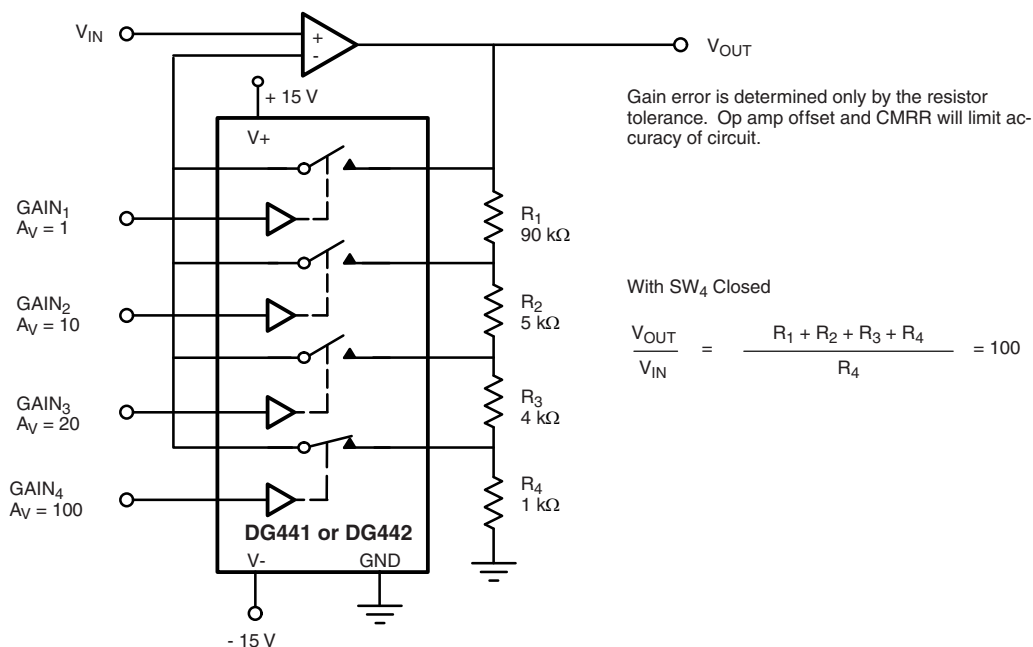


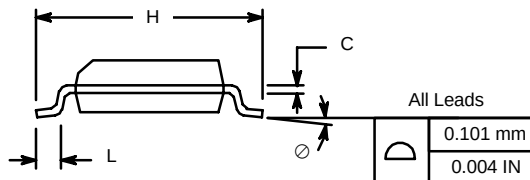
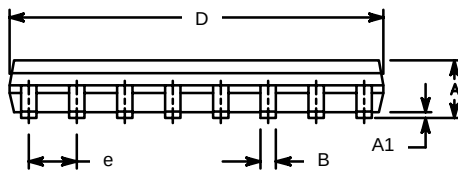
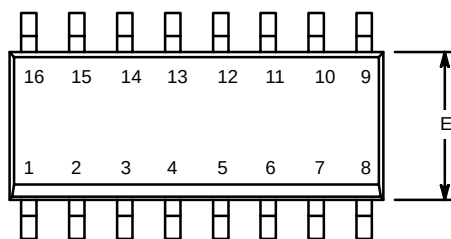
Figure 9. Precision-Weighted Resistor Programmable-Gain Amplifier

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SOIC (NARROW): 16-LEAD

JEDEC Part Number: MS-012

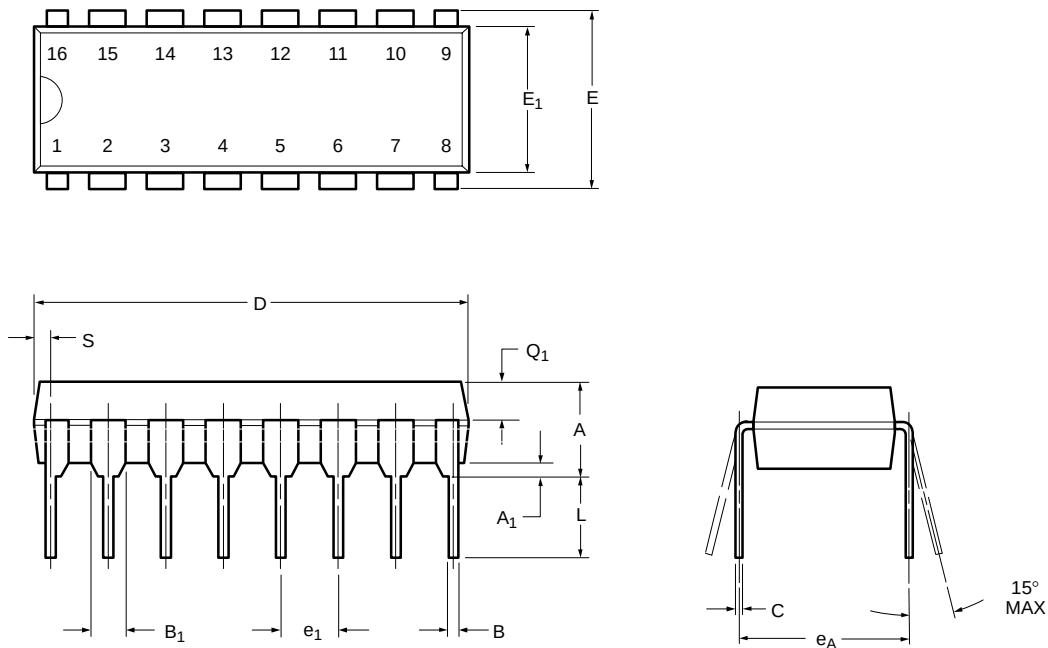


Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.38	0.51	0.015	0.020
C	0.18	0.23	0.007	0.009
D	9.80	10.00	0.385	0.393
E	3.80	4.00	0.149	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.50	0.93	0.020	0.037
Ø	0°	8°	0°	8°

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



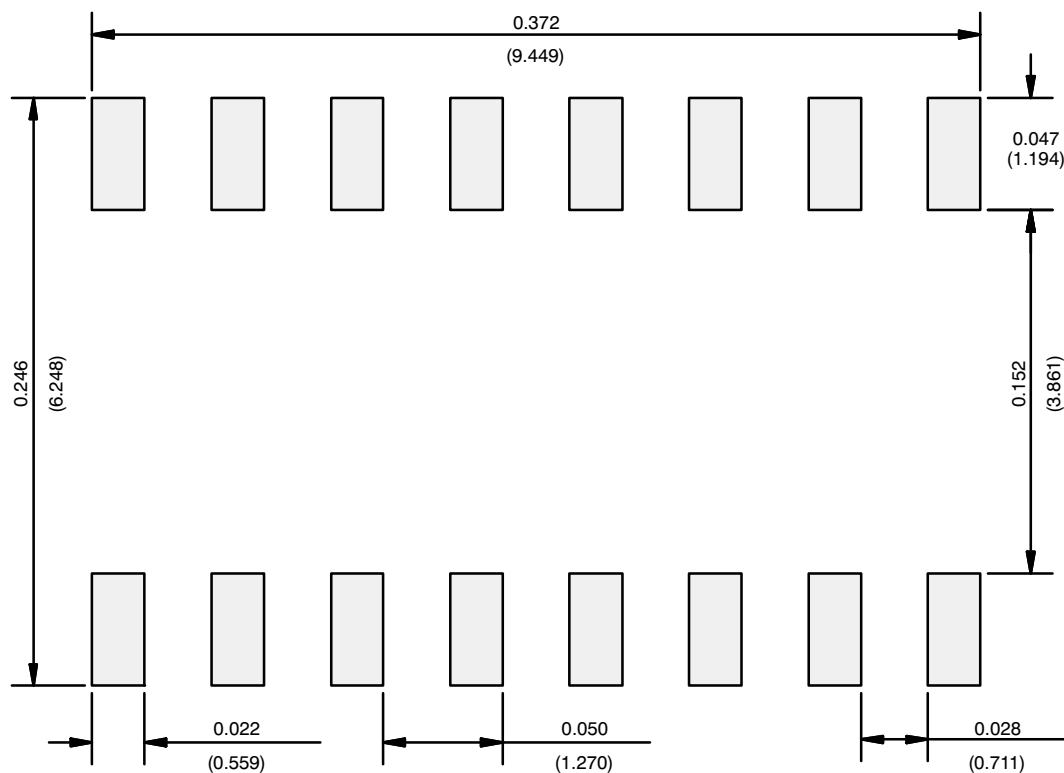
PDIP: 16-LEAD



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

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

RECOMMENDED MINIMUM PADS FOR SO-16



Recommended Minimum Pads
Dimensions in Inches/(mm)

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