

Dual, 5Ω Analog Switches

ABSOLUTE MAXIMUM RATINGS

(Voltages Referenced to GND)

V+ to GND	-0.3V to +44V
V- to GND	+0.3V to -44V
V+ to V-.....	-0.3V to +44V
V _L to GND.....	-0.3V to (V+ + 0.3V)
All Other Pins to GND (Note 1)	(V- - 0.3V) to (V+ + 0.3V)
Continuous Current (COM ₋ , NO ₋ , NC ₋)	±100mA
Peak Current (COM ₋ , NO ₋ , NC ₋)	±300mA
(pulsed at 1ms, 10% duty cycle)	±300mA

Continuous Power Dissipation (T_A = +70°C)

Narrow SO (derate 8.70mW/°C above +70°C)696mW

Narrow DIP (derate 10.53mW/°C above +70°C)842mW

Operating Temperature Ranges

MAX462_C_.....0°C to +70°C

MAX462_E_.....-40°C to +85°C

Storage Temperature Range-65°C to +150°C

Lead Temperature (soldering, 10sec)+300°C

Note 1: Signals on NO₋, NC₋, or COM₋ exceeding V+ or V- are clamped by internal diodes. Limit forward-diode current to maximum current rating.

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.

ELECTRICAL CHARACTERISTICS—Dual Supplies

(V+ = +15V, V- = -15V, V_L = +5V, GND = 0, V_{INH} = +2.4V, V_{INL} = +0.8V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Input Voltage Range (Note 3)	V _{COM-} , V _{NO-} , V _{NC-}			V-		V+	V
On-Resistance	R _{ON}	I _{COM-} = 10mA, V _{NO-} or V _{NC-} = ±10V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	3	5	7	Ω
On-Resistance Match Between Channels (Notes 3, 4)	ΔR _{ON}	I _{COM-} = 10mA, V _{NO-} or V _{NC-} = ±10V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	0.25	0.5	0.7	Ω
On-Resistance Flatness (Notes 3, 5)	R _{FLAT(ON)}	I _{COM-} = 10mA; V _{NO-} or V _{NC-} = -5V, 0, 5V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	0.2	0.5	0.7	Ω
Off-Leakage Current (NO ₋ or NC ₋) (Note 6)	I _{NO-} , I _{NC-}	V _{NO-} or V _{NC-} = ±10V, V _{COM-} = ∓10V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.01	0.5 5	nA
COM ₋ Off-Leakage Current (Note 6)	I _{COM-(OFF)}	V _{COM-} = ±10V, V _{NO-} or V _{NC-} = ∓10V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.01	0.5 5	nA
COM ₋ On-Leakage Current (Note 6)	I _{COM-(ON)}	V _{COM-} = ±10V, V _{NO-} or V _{NC-} = ∓10V or floating	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-1 -10	0.02	1 10	nA
LOGIC INPUT							
Input Current with Input Voltage High	I _{INH}	V _{IN-} = 2.4V		-0.5	0.001	0.5	μA
Input Current with Input Voltage Low	I _{INL}	V _{IN-} = 0.8V		-0.5	0.001	0.5	μA
Logic Input Voltage High	V _{INH}			2.4			V
Logic Input Voltage Low	V _{INL}					0.8	V

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ELECTRICAL CHARACTERISTICS—Dual Supplies (continued)

(V+ = +15V, V- = -15V, VL = +5V, GND = 0, VINH = +2.4V, VINL = +0.8V, TA = TMIN to TMAX, unless otherwise noted. Typical values are at TA = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
POWER SUPPLY							
Power-Supply Range				±4.5		±20.0	V
Positive Supply Current	I+	VIN_ = 0 or 5V	TA = +25°C	-0.5	0.001	0.5	μA
			TA = TMIN to TMAX	-5		5	
Negative Supply Current	I-	VIN_ = 0 or 5V	TA = +25°C	-0.5	0.001	0.5	μA
			TA = TMIN to TMAX	-5		5	
Logic Supply Current	IL	VIN_ = 0 or 5V	TA = +25°C	-0.5	0.001	0.5	μA
			TA = TMIN to TMAX	-5		5	
Ground Current	IGND	VIN_ = 0 or 5V	TA = +25°C	-0.5	0.001	0.5	μA
			TA = TMIN to TMAX	-5		5	
SWITCH DYNAMIC CHARACTERISTICS							
Turn-On Time	tON	VCOM_ = ±10V, Figure 2	TA = +25°C		120	250	ns
			TA = TMIN to TMAX			325	
Turn-Off Time	tOFF	VCOM_ = ±10V, Figure 2	TA = +25°C		90	200	ns
			TA = TMIN to TMAX			275	
Break-Before-Make Time Delay (MAX4622 only)	tD	VCOM_ = ±10V, Figure 3, TA = +25°C		5	25		ns
Charge Injection	Q	CL = 1.0nF, VGEN = 0, RGEN = 0, Figure 4, TA = +25°C			480		pC
Off-Isolation (Note 7)	VISO	RL = 50Ω, f = 1MHz, Figure 5, TA = +25°C			-62		dB
Crosstalk (Note 8)	VCT	RL = 50Ω, f = 1MHz, Figure 6, TA = +25°C			-60		dB
NC_ or NO_ Capacitance	COFF	f = 1MHz, Figure 7, TA = +25°C			34		pF
COM_ Off-Capacitance	CCOM	f = 1MHz, Figure 7, TA = +25°C			34		pF
On-Capacitance	CCOM	f = 1MHz, Figure 8, TA = +25°C			150		pF

MAX4621/MAX4622/MAX4623

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ELECTRICAL CHARACTERISTICS—Single Supply

(V₊ = +12V, V₋ = 0, V_L = +5V, GND = 0, V_{INH} = +2.4V, V_{INL} = +0.8V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Input Voltage Range (Note 3)	V _{COM_} , V _{NO_} , V _{NC_}			GND		V+	V
On-Resistance	R _{ON}	I _{COM_} = 10mA, V _{NO_} or V _{NC_} = 10V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	5.5	8	10	Ω
On-Resistance Match Between Channels (Notes 3, 4)	ΔR _{ON}	I _{COM_} = 10mA, V _{NO_} or V _{NC_} = 10V, T _A = +25°C		0.2	0.5		Ω
On-Resistance Flatness (Notes 3, 5)	R _{FLAT(ON)}	I _{COM_} = 10mA; V _{NO_} or V _{NC_} = 3V, 6V, 9V; T _A = +25°C		0.9	1.3		Ω
NO_ or NC_ Off-Leakage Current (Notes 6, 9)	I _{NO_(OFF)} , I _{NC_(OFF)}	V _{COM_} = 1V, 10V; V _{NO_} or V _{NC_} = 10V, 1V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.01	0.5 5	nA
COM_ Off-Leakage Current (Notes 6, 9)	I _{COM_(OFF)}	V _{COM_} = 10V, 1V; V _{NO_} or V _{NC_} = 1V, 10V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.01	0.5 5	nA
COM_ On-Leakage Current (Notes 6, 9)	I _{COM_(ON)}	V _{COM_} = 10V, 1V; V _{NO_} or V _{NC_} = 10V, 1V, or floating	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-1 -10	0.02	1 10	nA
LOGIC INPUT							
Input Current with Input Voltage High	I _{INH}	V _{IN_} = 2.4V		-0.5	0.001	0.5	μA
Input Current with Input Voltage Low	I _{INL}	V _{IN_} = 0.8V		-0.5	0.001	0.5	μA
Logic Input Voltage High	V _{INH}			2.4			V
Logic Input Voltage Low	V _{INL}					0.8	V
POWER SUPPLY							
Power-Supply Range				4.5		36.0	V
Positive Supply Current	I ₊	V _{IN_} = 0 or 5V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.001	0.5 5	μA
Logic Supply Current	I _L	V _{IN_} = 0 or 5V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.001	0.5 5	μA
Ground Current	I _{GND}	V _{IN_} = 0 or 5V	T _A = +25°C T _A = T _{MIN} to T _{MAX}	-0.5 -5	0.001	0.5 5	μA

Dual, 5Ω Analog Switches

MAX4621/MAX4622/MAX4623

ELECTRICAL CHARACTERISTICS—Single Supply (continued)

(V₊ = +12V, V₋ = 0, V_L = +5V, GND = 0, V_{INH} = +2.4V, V_{INL} = +0.8V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
SWITCH DYNAMIC CHARACTERISTICS						
Turn-On Time (Note 3)	t _{ON}	V _{COM} = 10V, Figure 2	T _A = +25°C		200	350
			T _A = T _{MIN} to T _{MAX}			475
Turn-Off Time (Note 3)	t _{OFF}	V _{COM} = 10V, Figure 2	T _A = +25°C		100	200
			T _A = T _{MIN} to T _{MAX}			300
Break-Before-Make Time Delay (MAX4622 only) (Note 3)	t _D	R _L = 100Ω, C _L = 35pF, Figure 3, T _A = +25°C	10	75		ns
Charge Injection	Q	C _L = 1.0nF, V _{GEN} = 0, R _{GEN} = 0, Figure 4		45		pC
Off-Isolation (Note 7)	V _{ISO}	R _L = 50Ω, f = 1MHz, Figure 5		-62		dB
Crosstalk (Note 8)	V _{CT}	R _L = 50Ω, f = 1MHz, Figure 6		-60		dB

Note 2: The algebraic convention, where the most negative value is a minimum and the most positive value is a maximum, is used in this data sheet.

Note 3: Guaranteed by design.

Note 4: ΔRON = RON_MAX - RON_MIN.

Note 5: Flatness is defined as the difference between the maximum and minimum values of on-resistance as measured over the specified analog signal range.

Note 6: Leakage currents are 100% tested at the maximum-rated hot temperature and guaranteed by correlation at +25°C.

Note 7: Off-isolation = 20log₁₀ [V_{COM} / (V_{NC} or V_{NO})]. V_{COM} = output, V_{NC} or V_{NO} = input to off switch.

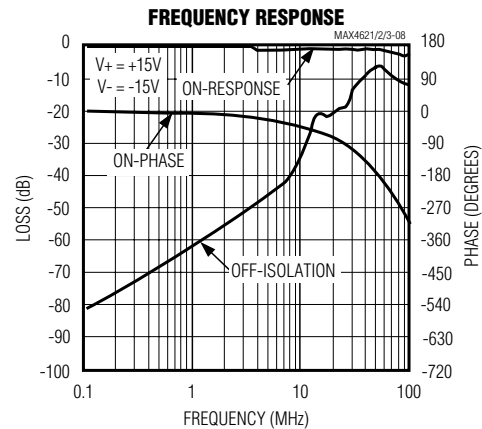
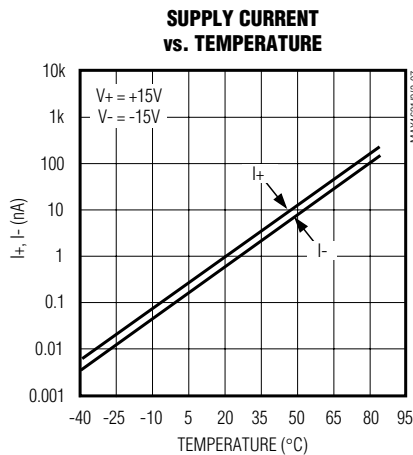
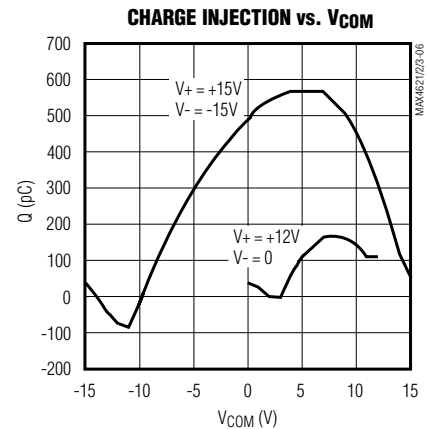
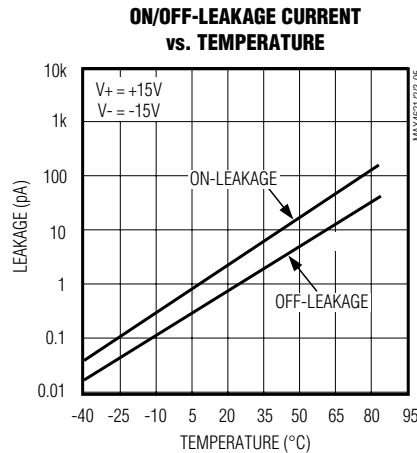
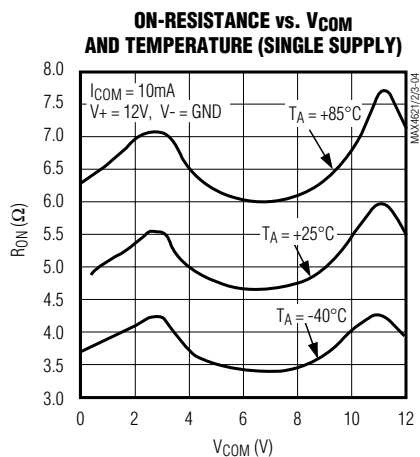
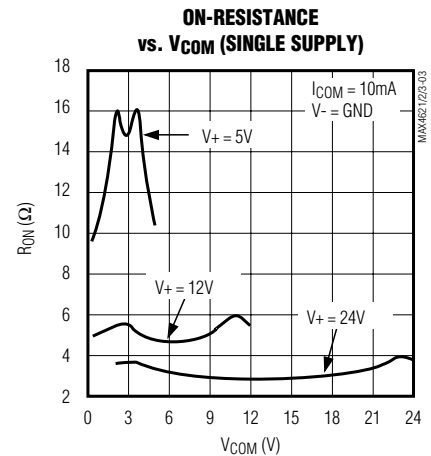
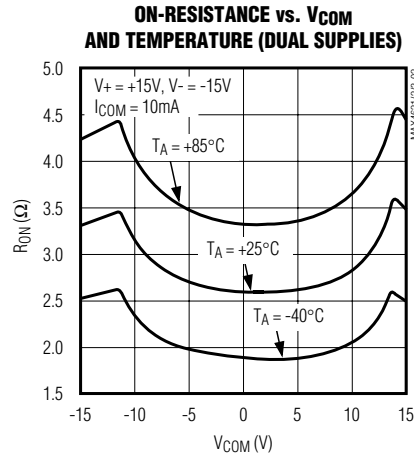
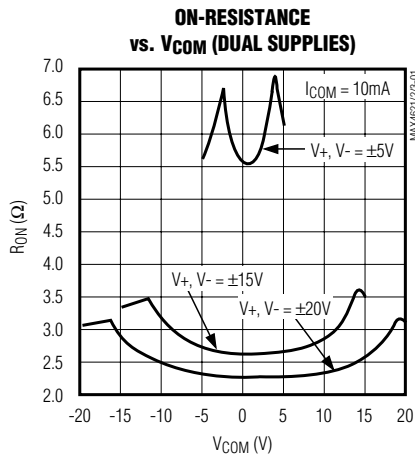
Note 8: Between any two switches.

Note 9: Leakage testing for single-supply operation is guaranteed by testing with dual supplies.

Dual, 5Ω Analog Switches

Typical Operating Characteristics

($T_A = +25^\circ\text{C}$, unless otherwise noted.)



Dual, 5Ω Analog Switches

Pin Description

PIN	NAME	FUNCTION
MAX4621		
1, 8	COM1, COM2	Switch Common Terminal
2–7	N.C.	Not internally connected
9, 16	NO2, NO1	Switch Normally Open Terminal
10, 15	IN2, IN1	Digital Logic Inputs
11	V+	Positive Supply-Voltage Input
12	V _L	Logic Supply-Voltage Input
13	GND	Ground
14	V-	Negative Supply Voltage Input
MAX4622		
1, 3, 6, 8	COM ₋	Switch Common Terminal
2, 7	N.C.	Not internally connected
4, 5, 9, 16	NC ₋ , NO ₋	Switch Normally Closed/Open Terminal
10, 15	IN2, IN1	Digital Logic Inputs
11	V+	Positive Supply-Voltage Input
12	V _L	Logic Supply-Voltage Input
13	GND	Ground
14	V-	Negative Supply Voltage Input
MAX4623		
1, 3, 6, 8	COM ₋	Switch Common Terminal
2, 7	N.C.	Not internally connected
4, 5, 9, 16	NO ₋	Switch Normally Open Terminal
10, 15	IN2, IN1	Digital Logic Inputs
11	V+	Positive Supply-Voltage Input
12	V _L	Logic Supply-Voltage Input
13	GND	Ground
14	V-	Negative Supply Voltage

Applications Information

Operation with Supply Voltages Other than ±15V

The MAX4621/MAX4622/MAX4623 switches operate with ±4.5V to ±18V bipolar supplies and a +4.5V to +36V single supply. In either case, analog signals ranging from V₊ to V₋ can be switched. The *Typical Operating Characteristics* graphs show the typical on-resistance variation with analog signal and supply voltage.

Overvoltage Protection

Proper power-supply sequencing is recommended for all CMOS devices. It is important not to exceed the absolute maximum ratings because stresses beyond the listed ratings may cause permanent damage to the devices. Always sequence V₊ on first, followed by V_L, V₋, and logic inputs. If power-supply sequencing is not possible, add two small signal diodes in series with the supply pins and a Schottky diode between V₊ and V_L (Figure 1). Adding diodes reduces the analog signal range to 1V below V₊ and 1V above V₋, but low switch resistance and low leakage characteristics are unaffected. The difference between V₊ and V₋ should not exceed +44V.

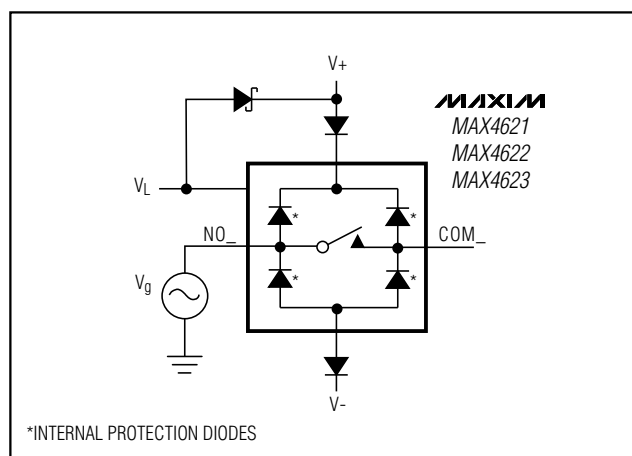


Figure 1. Overvoltage Protection Using Blocking Diodes

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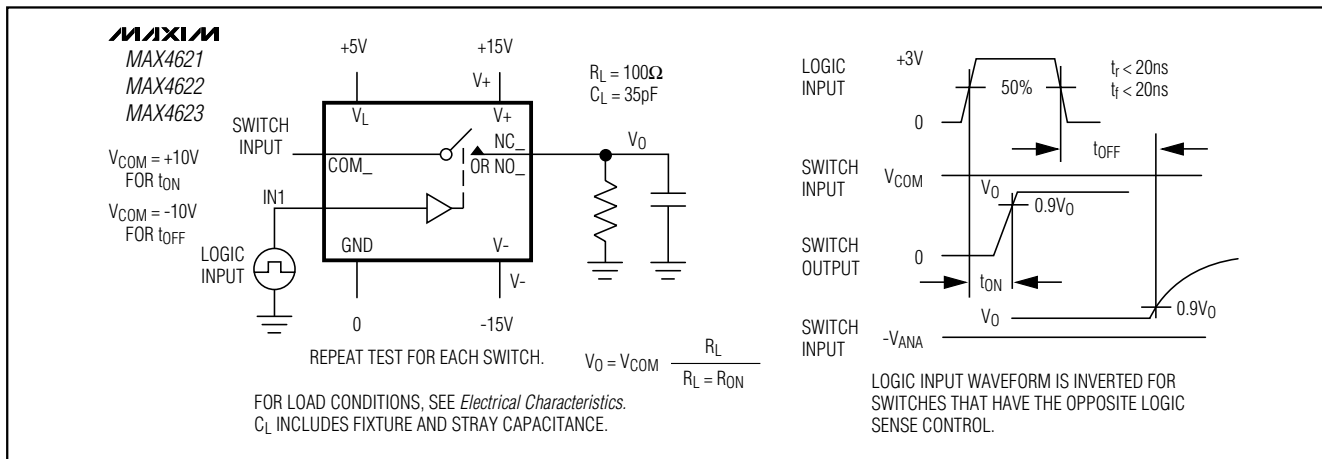


Figure 2. Switching-Time Test Circuit

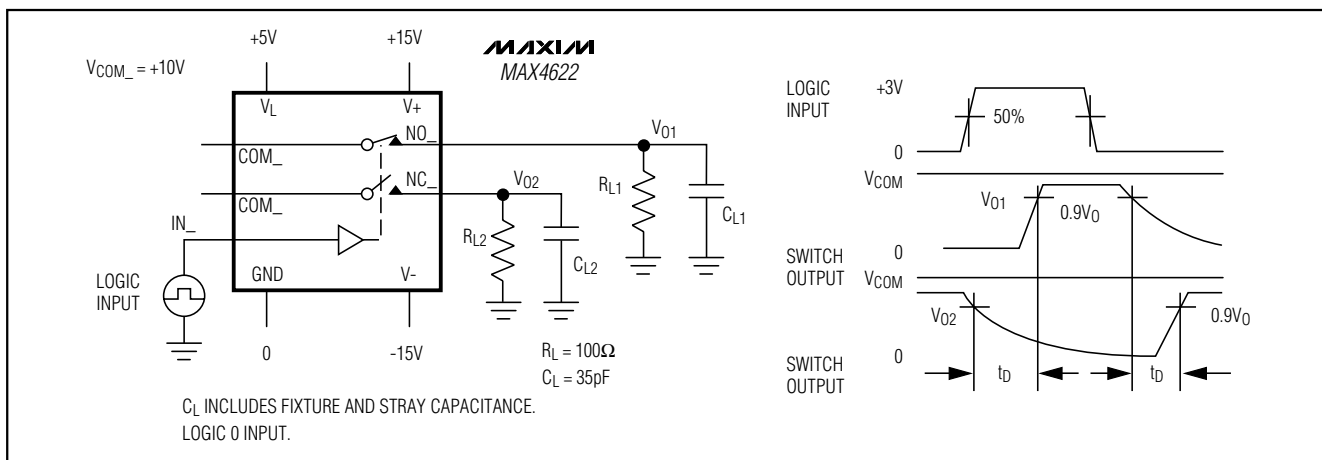


Figure 3. MAX4622 Break-Before-Make Test Circuit

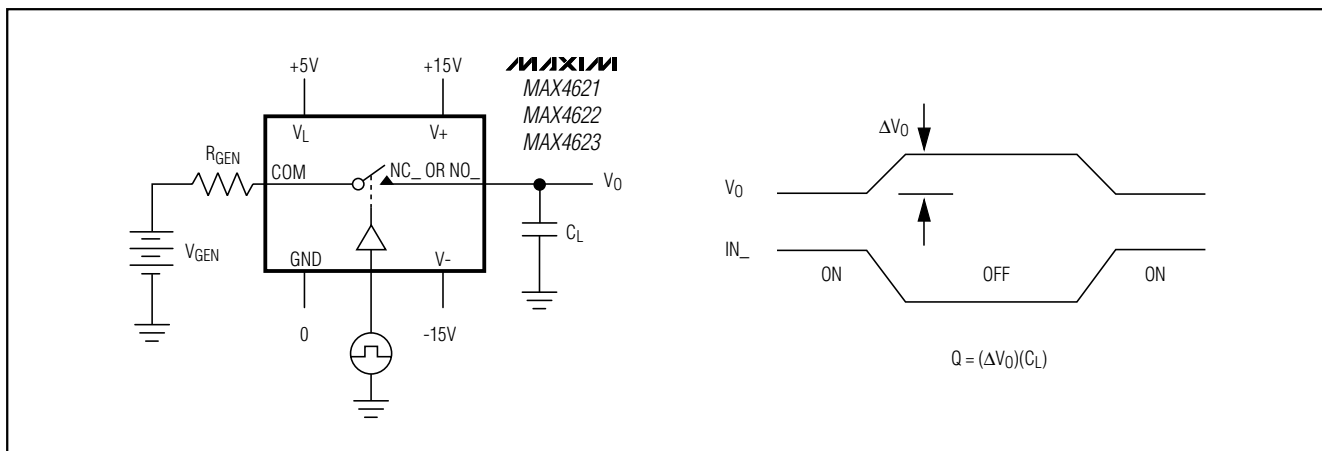


Figure 4. Charge-Injection Test Circuit

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MAX4621/MAX4622/MAX4623

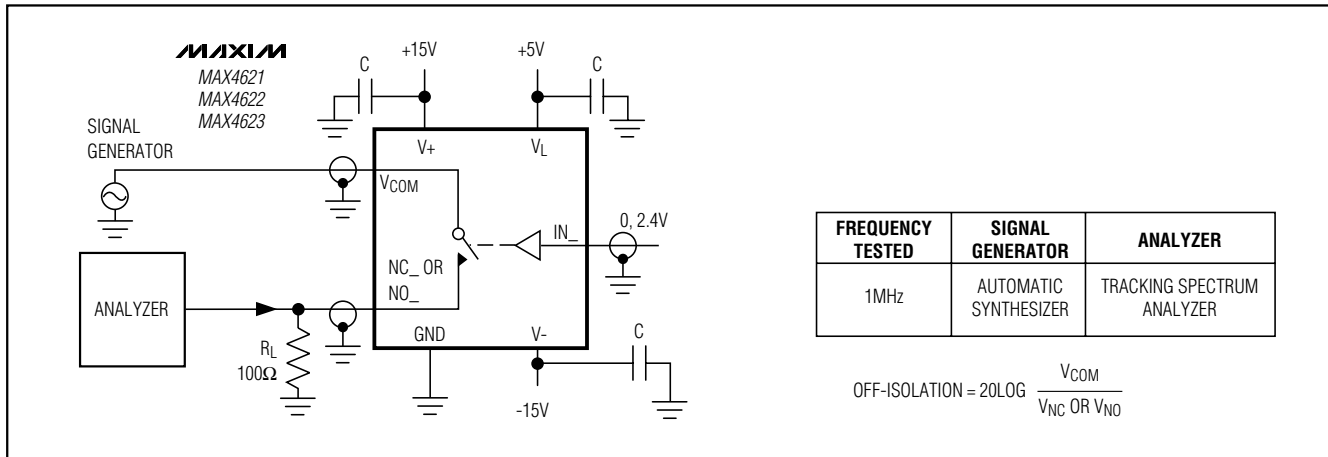


Figure 5. Off-Isolation

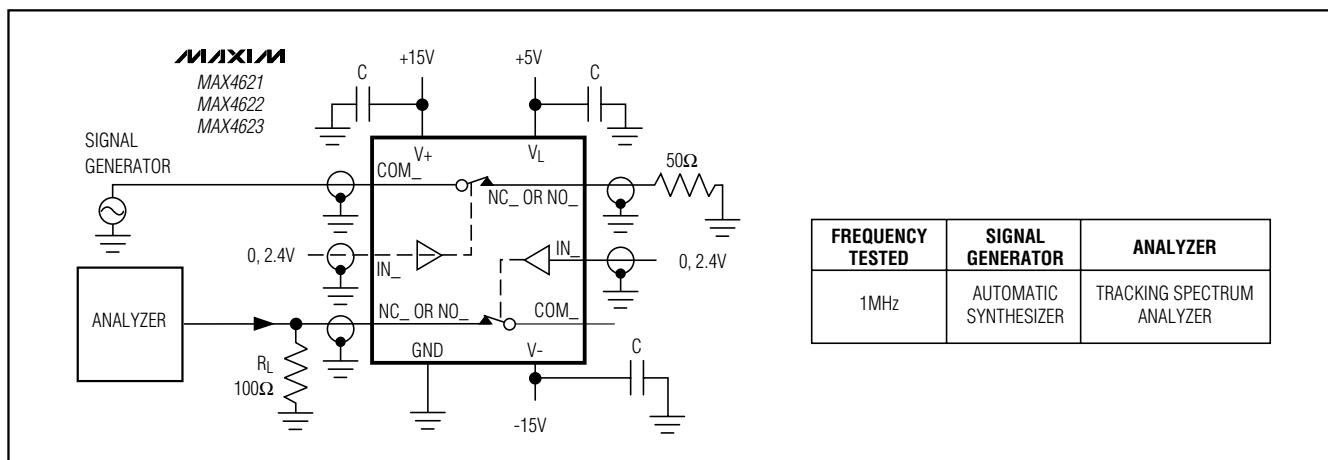


Figure 6. Crosstalk Test Circuit

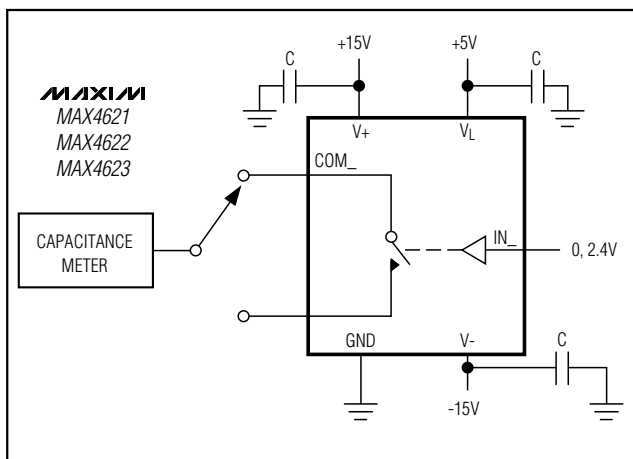


Figure 7. Channel-On Capacitance

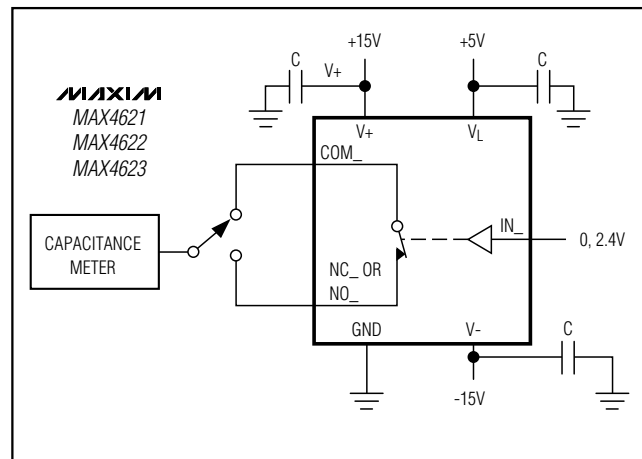


Figure 8. Channel-Off Capacitance

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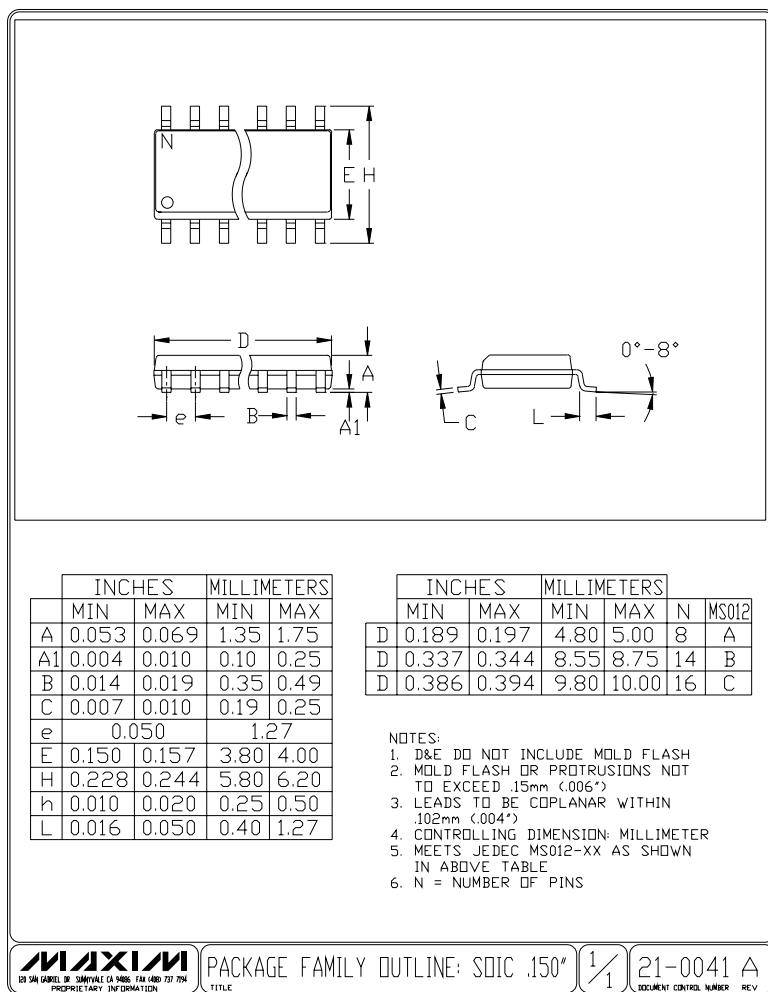
Ordering Information (continued)

PART	TEMP. RANGE	PIN-PACKAGE
MAX4621ESE	-40°C to +85°C	16 Narrow SO
MAX4621EPE	-40°C to +85°C	16 Plastic DIP
MAX4622CSE	0°C to +70°C	16 Narrow SO
MAX4622CPE	0°C to +70°C	16 Plastic DIP
MAX4622ESE	-40°C to +85°C	16 Narrow SO
MAX4622EPE	-40°C to +85°C	16 Plastic DIP
MAX4623CSE	0°C to +70°C	16 Narrow SO
MAX4623CPE	0°C to +70°C	16 Plastic DIP
MAX4623ESE	-40°C to +85°C	16 Narrow SO
MAX4623EPE	-40°C to +85°C	16 Plastic DIP

Chip Information

TRANSISTOR COUNT: 82

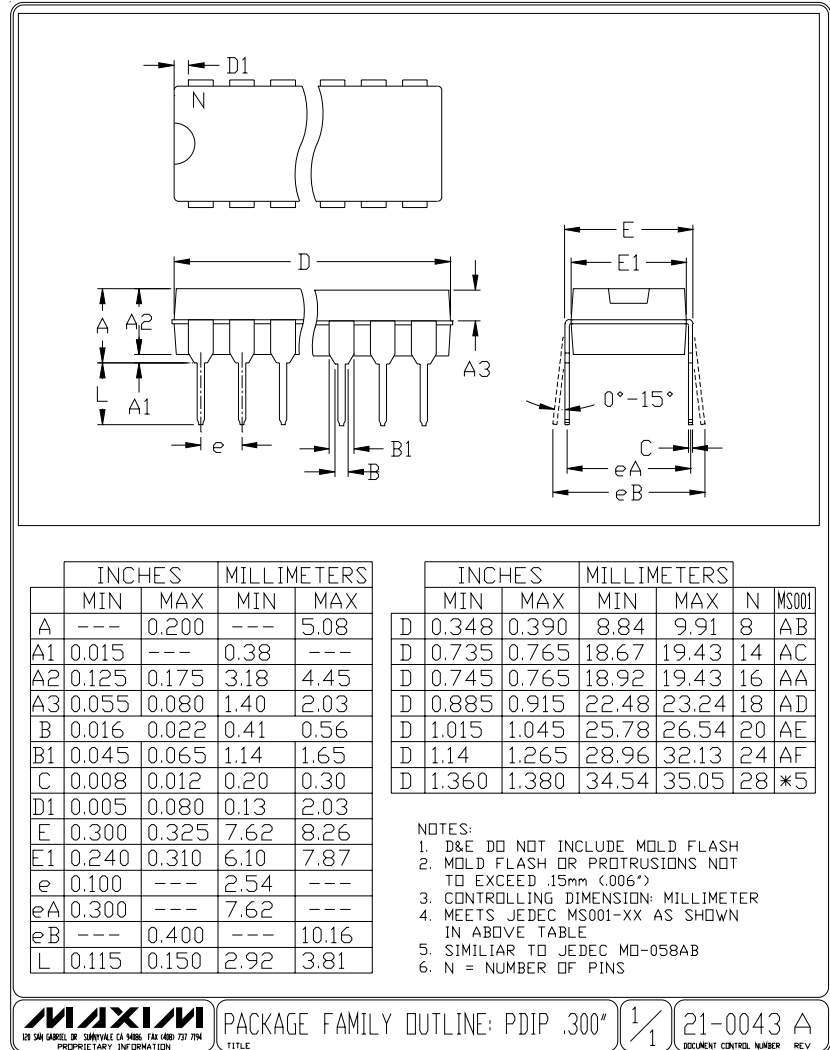
Package Information



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Package Information (continued)

MAX4621/MAX4622/MAX4623



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NOTES

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