

RADIATION HARDENED 16:1 ANALOG MULTIPLEXER

NGCL3571

Introduction

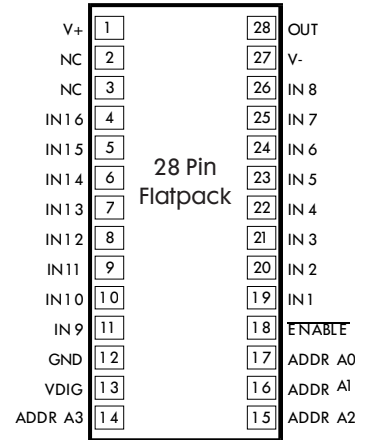
This is the subject of this data sheet. However, other members of this device family are discussed in this paragraph for reference. Data sheets are available for the NGCL3590, NGCL3571, and NGCP3580. The NGCL3571/3580/3590 series is a family of radiation hardened 16:1 Analog Multiplexers designed by the Northrop Grumman Advanced Technology Center, Baltimore, MD, using 5V, 10V and 30V CMOS technologies on Silicon On Insulator (SOI) starting material. The NGCL3571 and NGCL3590 use a low voltage (10V / 5V) process and feature CMOS analog switches. The NGCP3580 uses a high voltage (30V) process and features PMOS analog switches. CMOS analog switches result in rail to rail operation with minimal variation in switch impedance. CMOS switches offer the advantage of low switch impedance (<500 Ohms) and fast access time (<500 ns) over temperature, voltage and radiation level. All switches maintain high OFF state impedance even under power down conditions for redundant applications. SOI technology coupled with special design techniques makes this part immune to latch-up. Part has no latched data and is not subject to Single Event Upset (SEU) failures.

Features

- 10V CMOS using SOI starting material
- Recommended Operating Voltages
 - $V_+ - V_- = 10V$, $V_{dig} = +5V$ ($\pm 10\%$)
 - [$V_- = 0V$, $V_+ = +10V$ or $V_- = -5V$, $V_+ = +5V$]
- Total Dose up to 300 krad (Si)
- No Single Event Upset (SEU) effects (no latched data)
- CMOS analog switching allows rail to rail operation and low switch impedance
- < 500 Ohm nominal CMOS switch impedance
- < 1000 Ohm worst case CMOS switch impedance
- Break before make switching
- < 500 ns access time over temperature and post rad
- > 100 MOhm OFF switch impedance
- High OFF state impedance maintained under powered down conditions - ideal for redundant applications
- Low power dissipation: <100 μA standby current
- > 1kV electrostatic discharge protection (Human Body Model)
- Available in 28 pin flatpacks or bare die
- Full military operating temperature range, screened to specific test methods for commercial, Class B, or modified Hi Rel.

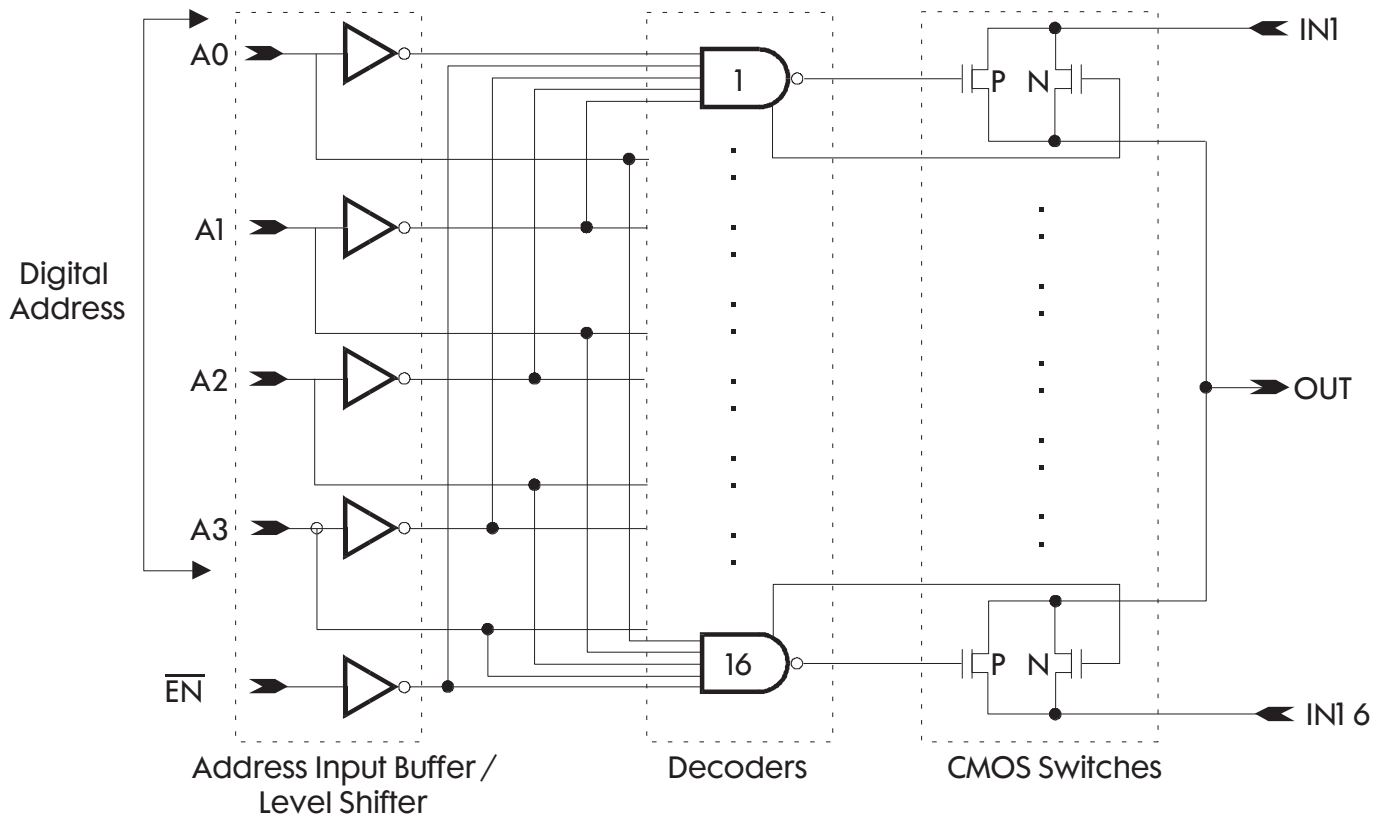
Absolute Maximum Ratings

	NGCL3571	UNITS
Supply Voltage, V+ to V-	15	volts
Supply Voltage, V+ to GND	7.5	volts
Supply Voltage, VDIG to GND	7.5	volts
Digital input overvoltage range min	-0.5	
Digital input overvoltage range max	$V_{DIG} + 0.5$	volts
Analog input overvoltage range min	V- minus 10	volts
Analog input overvoltage range max	V+ plus 10	volts
Storage Temperature		
Min	-65	deg C
Max	150	deg C



Pinout
(Top View)

Functional Diagram



DC Operating Characteristics: NGCL3571

Recommended Operating Conditions: $V_+ - V_- = 10V(+/- 10\%)$ [$V_- = 0V, V_+ = +10V$ or $V_- = -5V, V_+ = +5V$] ($V_{dig} = +5V, V_{+/-} = -10\%$)

Symbol	Description	25C Max	-55 to +125C Max (Note 2)	Units
$I_{SUPPLY+}$	V+ supply current	500	500	μA
$I_{SUPPLY-}$	V- supply current	500	500	μA
I_{STBY+}	V+ standby current	500	500	μA
I_{STBY-}	V- standby current	500	500	μA
I_{AH}	input leakage	1	1	μA
I_{AL}	input leakage	1	1	μA
$I_{S(OFF)-}$	leakage into source of off switch $-v_{in}$	50	500	nA
$I_{S(OFF)+}$	leakage into source of off switch $+v_{in}$	50	500	nA
$I_{S(OFF, Poweroff)}$	leakage into source of off switch, $V_+ = V_- = 0$	50	500	nA
$I_{S(OFF) OV+}$	Isoff with overvoltage	1000	1000	nA
$I_{S(OFF) OV-}$	Isoff with overvoltage	N/A (Note 1)	N/A (Note 1)	nA
$I_{D(OFF) OV+}$	leakage into drain of off switch with overvoltage	1	10	μA
$I_{D(OFF) OV-}$	leakage into drain of off switch with overvoltage	N/A (Note 1)	N/A (Note 1)	μA
$I_{D(OFF) +}$	leakage into drain of off switch	50	5000	nA
$I_{D(OFF) -}$	leakage into drain of off switch	50	5000	nA
$I_{D(ON) +}$	leakage from on driver into switch $+v_{in}$	50	5000	nA
$I_{D(ON) -}$	leakage from on driver into switch $-v_{in}$	50	5000	nA
$R_{DS(ON) 5}$	switch on resistance $+v_{in}$	1000	1000	ohms
$R_{DS(ON) 0}$	switch on resistance $-v_{in}$	1000	1000	ohms
$R_{DS(ON) -5}$	switch on resistance $v_{in} = 0$	1000	1000	ohms

Note 1: The NGCL3571 does not allow undervoltage operation and maximum recommended undervoltage condition is 0.5 V below V_- .

Note 2: Deliverable die are not tested cold and hot. Performance over temperature is guaranteed by design. Die from each wafer are sampled and tested over temperature in packages during the Class K screening.

AC Operating Characteristics: NGCL3571

Guaranteed but not tested

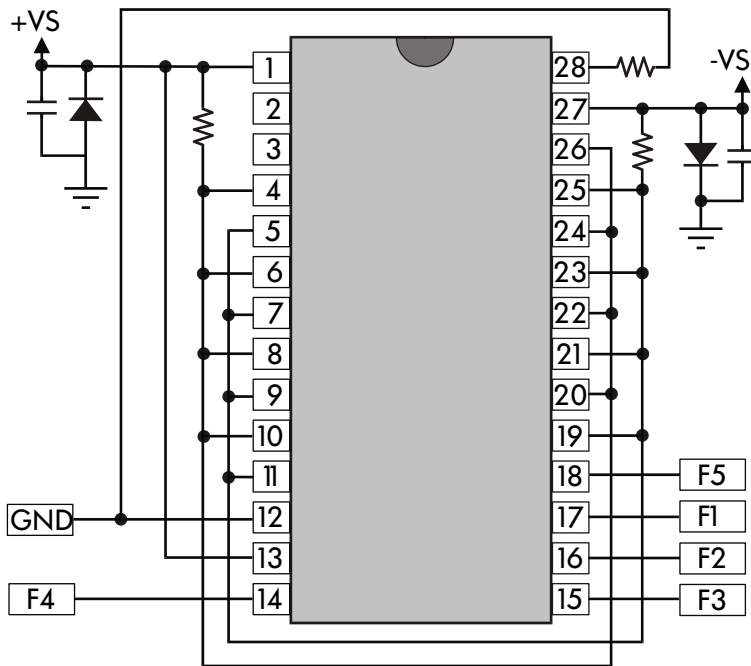
Recommended Operating Conditions: $V+ - V- = 10 \pm 10\%$ [$V- = 0V$, $V+ = +10V$ or $V- = -5V$, $V+ = +5V$] ($V_{dig} = +5V \pm 10\%$)

Symbol	Description	Conditions	-55 to +125C Limits		Type 25C	Units
			Min	Max		
C_A	capacitance, digital Input	$V+ = V- = 0V$ $f = 1MHz$, $T_A = 25C$		7	1	pF
$C_{S(off)}$	capacitance, channel Input	$V+ = V- = 0V$ $f = 1MHz$, $T_A = 25C$		5	3	pF
$C_{D(off)}$	capacitance, channel output	$V+ = V- = 0$ $f = 1MHz$, $T_A = 25C$		50	30	pF
V_{ISO}	off isolation, input or output	$V_{O_{EN}} = 4V$, $f = 200kHz$ $C_L = 7pF$, $R_L = 1k$ $V_S = 3V_{rms}$, $T_A = 25C$	-45		-59	dB
t_D	break before make time delay	$C_L = 50pF$, $R_L = 1k$	25		50	ns
t_{ON}	prop delay, address inputs to I/O channels	$C_L = 50pF$, $R_L = 10M$		0.6	0.4	μs
t_{OFF}	prop delay, address inputs to I/O channels	$C_L = 50pF$, $R_L = 10M$		0.6	0.4	μs
$t_{ON(EN)}$	prop delay, enable to I/O channels	$C_L = 50pF$, $R_L = 1k$		0.4	0.2	μs
$t_{OFF(EN)}$	prop delay, enable to I/O channels	$C_L = 50pF$, $R_L = 1k$		0.6	0.4	μs

Truth Table

A3	A2	A1	A0	\overline{ENABLE}	ON CHANNEL
X	X	X	X	H	NONE
L	L	L	L	L	1
L	L	L	H	L	2
L	L	H	L	L	3
L	L	H	H	L	4
L	H	L	L	L	5
L	H	L	H	L	6
L	H	H	L	L	7
L	H	H	H	L	8
H	L	L	L	L	9
H	L	L	H	L	10
H	L	H	L	L	11
H	L	H	H	L	12
H	H	L	L	L	13
H	H	L	H	L	14
H	H	H	L	L	15
H	H	H	H	L	16

Dynamic Burn-In Circuit



NOTES:

+VS = +5.5V ± 0.25V, -VS = -5.5V ± 0.25V

R = 1k Ω ± 5%

C1 = C2 = 0.01 μF ±10%, 1 each per socket min

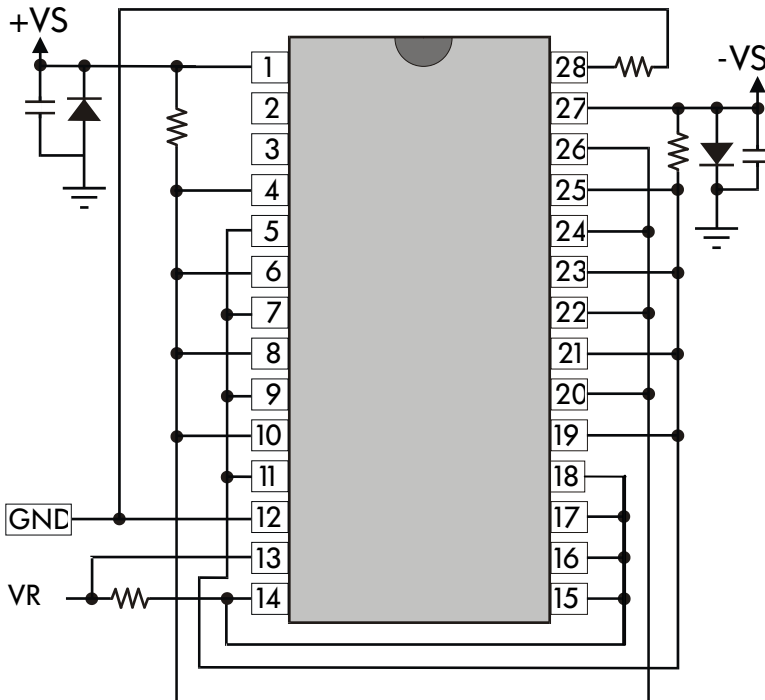
D1 = D2 = IN4002, 1 each per board minimum

Input Signals: square wave, 50% duty cycle, 0V to 5V peak ±10%

F1 = 100kHz; F2 = F1/2; F3 = F1/4; F4 = F1/8;

F5 = F1/16

Static Burn-In Circuit



NOTES:

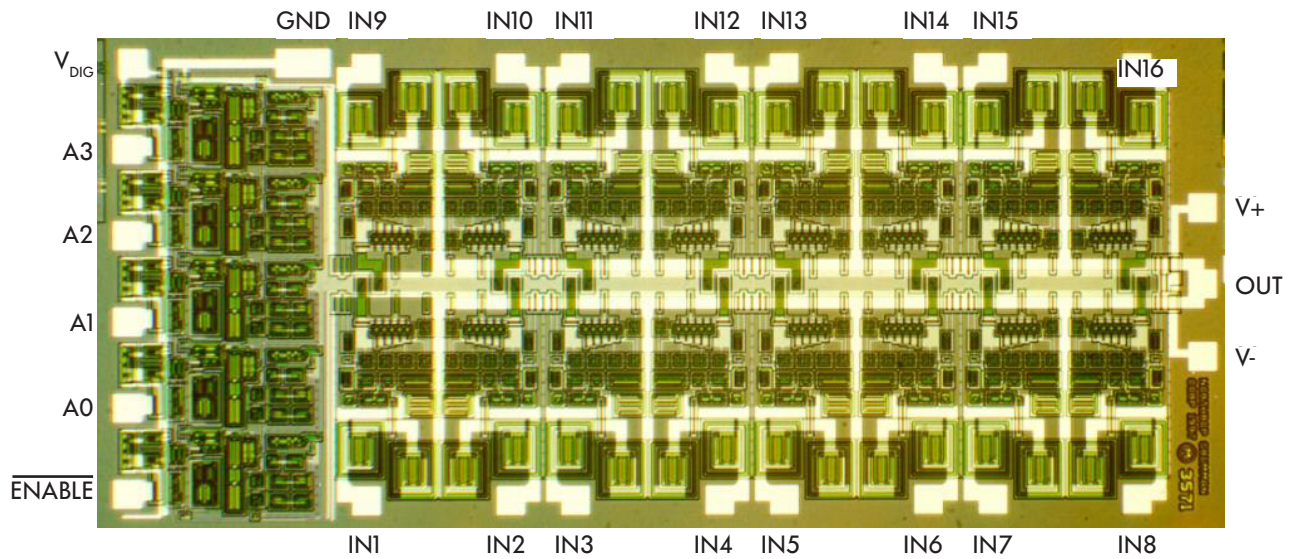
R = 1k Ω ± 5%, 1/4 W

C1 = C2 = 0.01 μF minimum, 1 each per socket minimum

+VS = +5.5V ± 0.25V, -VS = -5.5V ± 0.2

VR = +5.5V ± 0.25V

Die Pad Locations



Structural Information

Die Dimensions..... 86 x 200 x 20 mils

Metallization

Type.....TiW/Al/Ti
 Thickness.....9.8 kÅ ± 1kÅ

Glassivation

Type.....SiO₂
 Thickness.....8k Å ± 1 kÅ
 ProcessPCB 40 RH

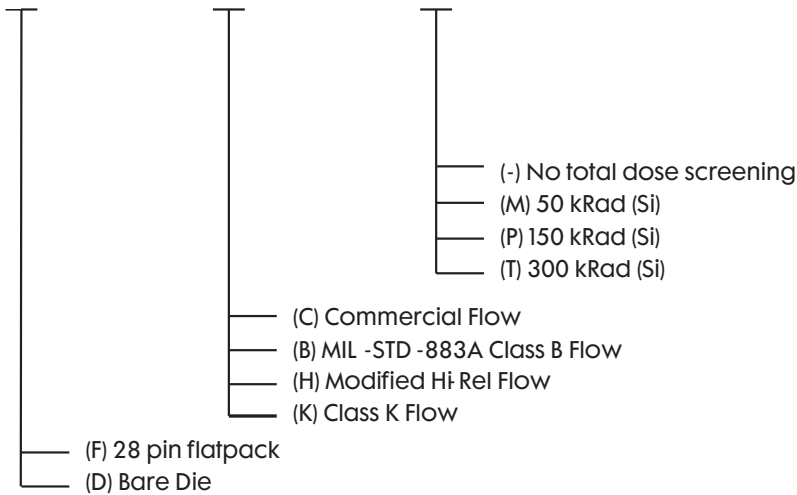
Die Attach

MaterialGold Eutectic
 Temperature400°C
 Lead Temperature <275°C
 (10 sec soldering)

Ordering Information

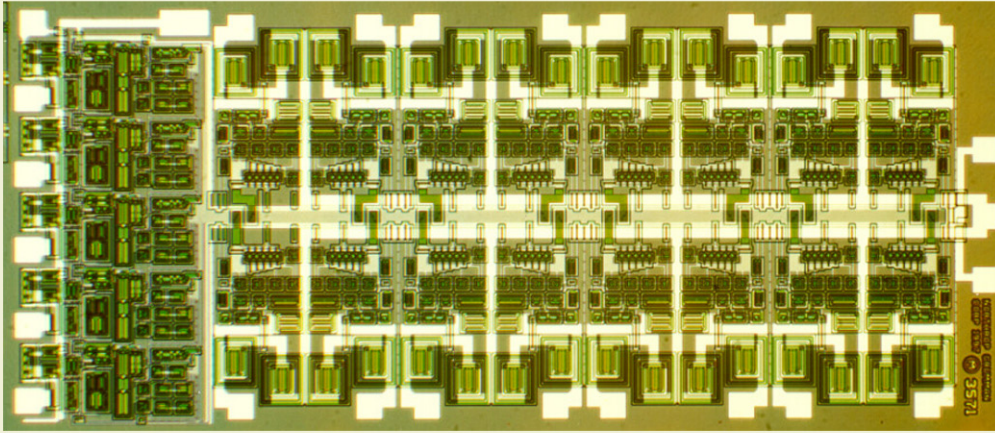
To order the Northrop Grumman radiation hardened 16:1 Analog Multiplexer, use the following part numbers.

NGCL3571



Distribution is Unlimited; #21-0465; Dated 03/17/21
 Specifications and features subject to change without notice.
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 MS-214-AMG-0813
 CS-16550-002 BWI | 2021

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RADIATION HARDENED 16:1 ANALOG MULTIPLEXER

NGCL3590

Introduction

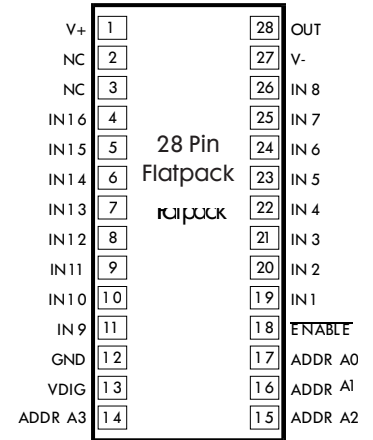
The NGCL3590 is the subject of this data sheet. However, other members of this device family are discussed in this paragraph for reference. Data sheets are available for the NGCL3571, NGCL3590, and NGCP3580. NGC3571/3580/3590 series is a family of radiation hardened 16:1 Analog Multiplexers designed by the Northrop Grumman Advanced Technology Center, Baltimore MD, using 5V, 10V and 30V CMOS technologies on Silicon On Insulator (SOI) starting material. The NGCL3571 / NGCL3590 use a low voltage (10V / 5V) process and feature CMOS analog switches. The NGCP3580 uses a high voltage (30V) process and features PMOS analog switches. CMOS analog switches result in rail to rail operation with minimal variation in switch impedance. CMOS switches offer the advantage of low switch impedance (<500 Ohms) and fast access time (<500 ns) over temperature, voltage and radiation level. All switches maintain high OFF state impedance even under power down conditions for redundant applications. SOI technology coupled with special design techniques makes this part immune to latch-up. Part has no latched data and is not subject to Single Event Upset (SEU) failures.

Features

- 5 V CMOS using SOI starting material
- Recommended Operating Voltages
V+ = +5V, Vdig = +5V, V- = 0V (+/- 10%)
- Total Dose up to 300 krad (Si)
- No Single Event Upset (SEU) effects (no latched data)
- CMOS analog switching allows rail to rail operation and low switch impedance.
- < 700 Ohm nominal CMOS switch impedance
- < 1000 Ohm worst case CMOS switch impedance
- Break before make switching
- < 500 ns access time over temperature and post rad
- > 100 MOhm OFF switch impedance
- High OFF state impedance maintained under powered down conditions - ideal for redundant applications
- Low power dissipation: <100 μ A standby current
- > 1kV electrostatic discharge protection (Human Body Model)
- Available in 28 pin flatpacks or bare die
- Full military operating temperature range, screened to specific test methods for commercial, Class B, or modified Hi Rel.

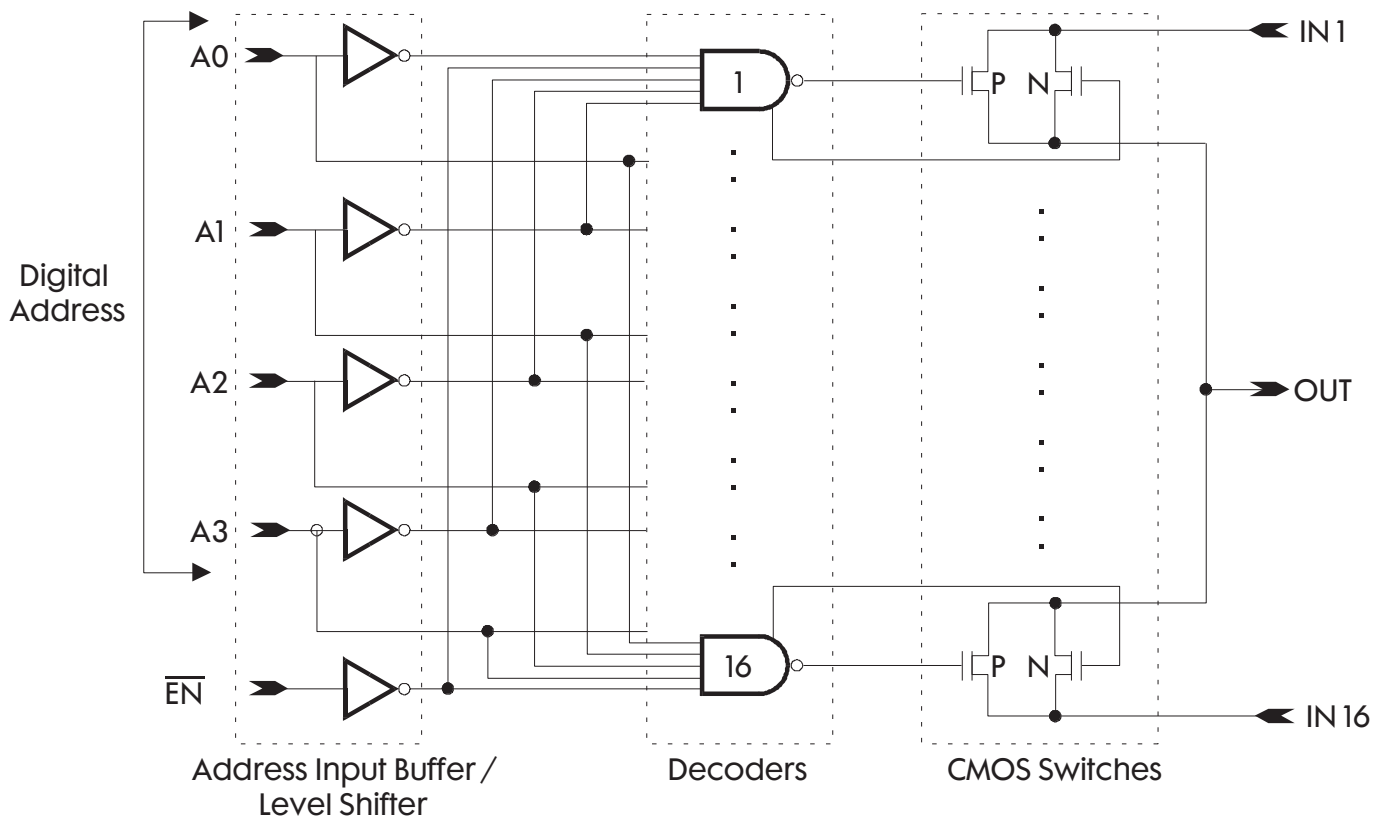
Absolute Maximum Ratings

	NGCL3590	UNITS
Supply Voltage, V+ to V-	7.5	volts
Supply Voltage, V+ to GND	7.5	volts
Supply Voltage, VDIG to GND	7.5	volts
Digital input overvoltage range min	-0.5	
Digital input overvoltage range max	$V_{DIG} + 0.5$	volts
Analog input overvoltage range min	V- minus 0.5	volts
Analog input overvoltage range max	V+ plus 2.5	volts
Storage Temperature		
Min	-65	deg C
Max	150	deg C



Pinout
(Top View)

Functional Diagram



DC Operating Characteristics: NGCL3590

Recommended Operating Conditions: $V_+ = +5\text{ V}$, $V_{\text{dig}} = +5\text{ V}$, $V_- = 0\text{ V}$ (+/-10%)

Symbol	Description	25C Max	-55 to +125C Max (Note 3)	Units
$I_{\text{SUPPLY}+}$	V+ supply current	500	500	μA
$I_{\text{SUPPLY}-}$	V- supply current	500	500	μA
$I_{\text{STBY}+}$	V+ standby current	500	500	μA
$I_{\text{STBY}-}$	V- standby current	500	500	μA
I_{AH}	input leakage	1	1	μA
I_{AL}	input leakage	1	1	μA
$I_{\text{S(OFF)-}}$	leakage into source of off switch $-v_{\text{in}}$	50	50	nA
$I_{\text{S(OFF)+}}$	leakage into source of off switch $+v_{\text{in}}$	50	50	nA
$I_{\text{S(OFF, Poweroff)}}$	leakage into source of off switch, $v_+ = v_- = 0$	50	50	nA
$I_{\text{S(OFF) OV+}}$	Isoff with overvoltage	1000	1000	nA
$I_{\text{S(OFF) OV-}}$	Isoff with overvoltage	N/A (Note 1)	N/A (Note 1)	nA
$I_{\text{D(OFF) OV+}}$	leakage into drain of off switch with overvoltage	1	10	μA
$I_{\text{D(OFF) OV-}}$	leakage into drain of off switch with overvoltage	N/A (Note 1)	N/A (Note 1)	μA
$I_{\text{D(OFF) +}}$	leakage into drain of off switch	50	5000	nA
$I_{\text{D(OFF) -}}$	leakage into drain of off switch	50	5000	nA
$I_{\text{D(ON) +}}$	leakage from on driver into switch $+v_{\text{in}}$	50	5000	nA
$I_{\text{D(ON) -}}$	leakage from on driver into switch $-v_{\text{in}}$	50	5000	nA
$R_{\text{DS(ON) }5}$	switch on resistance $+v_{\text{in}}$	1000	1000	ohms
$R_{\text{DS(ON) }0}$	switch on resistance $-v_{\text{in}}$	1000	1000	ohms
$R_{\text{DS(ON) }-5}$	switch on resistance $v_{\text{in}} = 0$	N/A	N/A	ohms
$R_{\text{DS(ON) }0}$ Delta	% Nominal $R_{\text{DS(ON) }0} \leq R_{\text{DS(ON) }0}$ (Max Measurement) $-R_{\text{DS(ON) }0}$ (Min Measurement)	10 (Note 2)	N/A	%

Note 1: The NGCL3590 does not allow undervoltage operation and maximum recommended undervoltage condition is 0.5 V below V-.

Note 2: Parameter not evaluated and is guaranteed by design

Note 3: Deliverable die are not tested cold and hot. Performance over temperature is guaranteed by design. Die from each wafer are sampled and tested over temperature in packages during the Class K screening.

AC Operating Characteristics: NGCL3590

Guaranteed by design but not tested

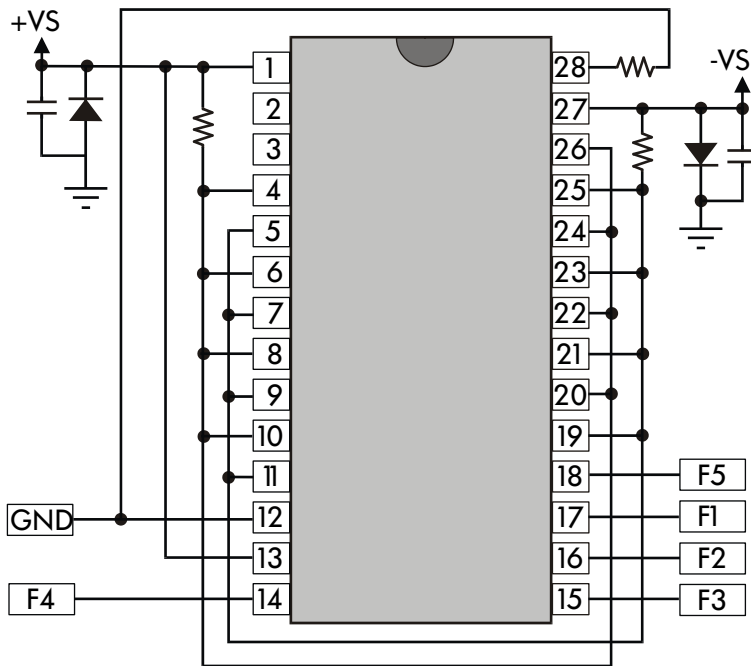
Recommended Operating Conditions: Vdig = 5V +/-10%, V+5V +/- 10%, V- = 0V

Symbol	Description	Conditions	-55 to +125C Limits		Type 25C	Units
			Min	Max		
C _A	capacitance, digital Input	V+=V=0V f=1MHz, TA=25C		7	1	pF
C _{S(off)}	capacitance, channel Input	V+=V=0V f=1MHz, TA=25C		5	3	pF
C _{D(OFF)}	capacitance, channel output	V+=V=0 f=1MHz, TA=25C		50	30	pF
V _{ISO}	off isolation, input or output	V _{O_{EN}} =4V, f=200kHz CL=7pF, RL=1k VS=3Vrms, TA=25C	-45		-60	dB
t _D	break before make time delay	CL=50pF, RL=1k	25		50	ns
t _{ON}	prop delay, address inputs to I/O channels	CL=50pF, RL=10M		0.6	0.4	μs
t _{OFF}	prop delay, address inputs to I/O channels	CL=50pF, RL=10M		0.6	0.4	μs
t _{ON(EN)}	prop delay, enable to I/O channels	CL=50pF, RL=1k		0.4	0.2	μs
t _{OFF(EN)}	prop delay, enable to I/O channels	CL=50pF, RL=1k		0.6	0.4	μs

Truth Table

A3	A2	A1	A0	ENABLE	ON CHANNEL
X	X	X	X	H	NONE
L	L	L	L	L	1
L	L	L	H	L	2
L	L	H	L	L	3
L	L	H	H	L	4
L	H	L	L	L	5
L	H	L	H	L	6
L	H	H	L	L	7
L	H	H	H	L	8
H	L	L	L	L	9
H	L	L	H	L	10
H	L	H	L	L	11
H	L	H	H	L	12
H	H	L	L	L	13
H	H	L	H	L	14
H	H	H	L	L	15
H	H	H	H	L	16

Dynamic Burn-In Circuit



NOTES :

+VS = +5.5V \pm 0.25V, -VS = 0V \pm 0.25V

R = 1k Ω \pm 5%

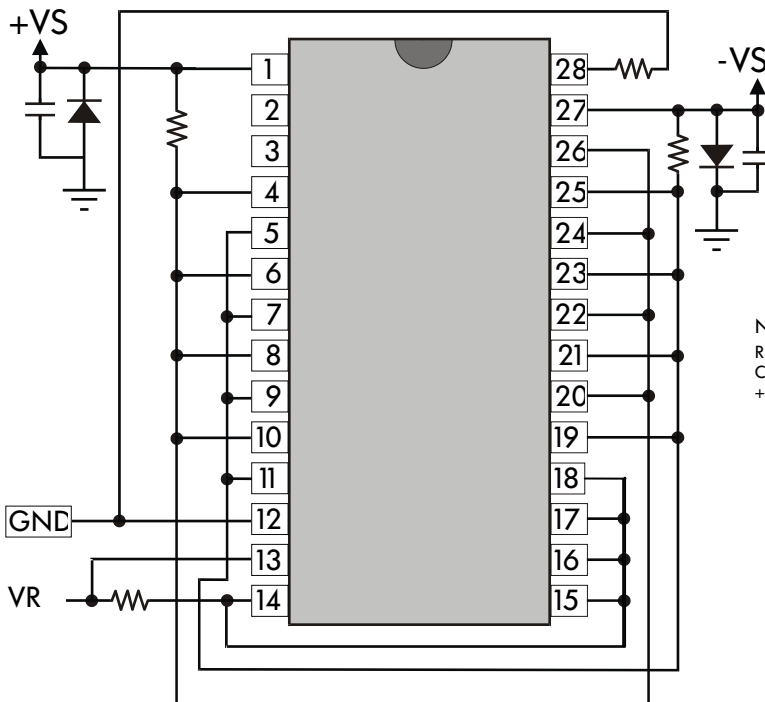
C1 = C2 = 0.01 μ F \pm 10%, 1 each per socket minimum

D1 = D2 = IN4002, 1 each per board minimum

Input Signals: square wave, 50% duty cycle, 0V to 5V peak \pm 10%

F1 = 100kHz; F2 = F1/2; F3 = F1/4; F4 = F1/8; F5 = F1/16

Static Burn-In Circuit



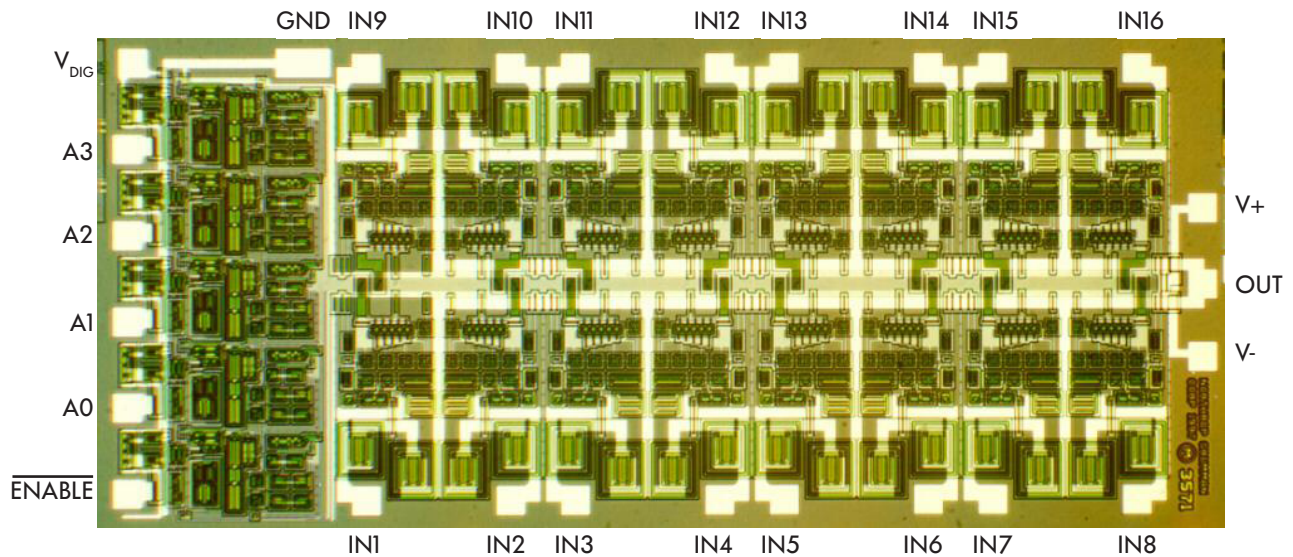
NOTES :

R = 1k Ω \pm 5%, 1/4 W

C1 = C2 = 0.01 μ F minimum, 1 each per socket, minimum

+VS = +5.5V \pm 0.25V, -VS = 0V \pm 0.25V, VR = +5.5V \pm 0.25V

Die Pad Locations



Structural Information

Die Dimensions..... 86 x 200 x 20 mils

Metallization

Type.....TiW/Al/Ti
 Thickness.....9.8 kÅ ± 1 kÅ

Glassivation

Type.....SiO₂
 Thickness.....8k Å ± 1 kÅ
 ProcessPCB 40 RH (with 5V gate oxide process module)

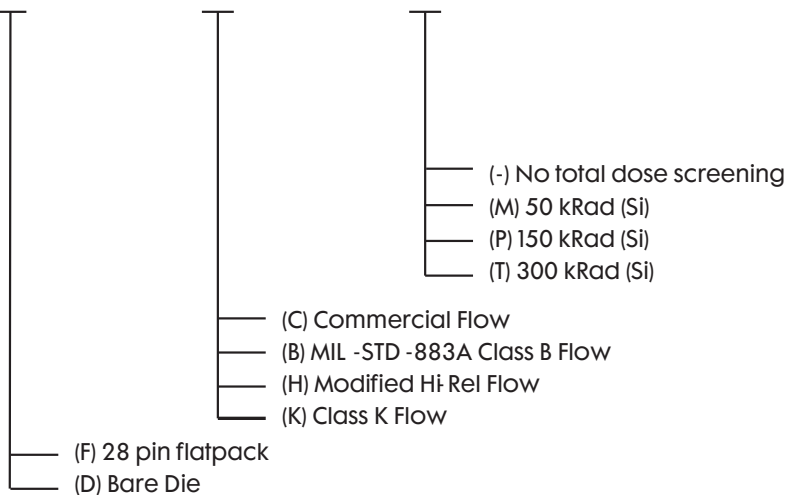
Die Attach

MaterialGold Eutectic
 Temperature400°C
 Lead Temperature <275°C
 (10 sec soldering)

Ordering Information

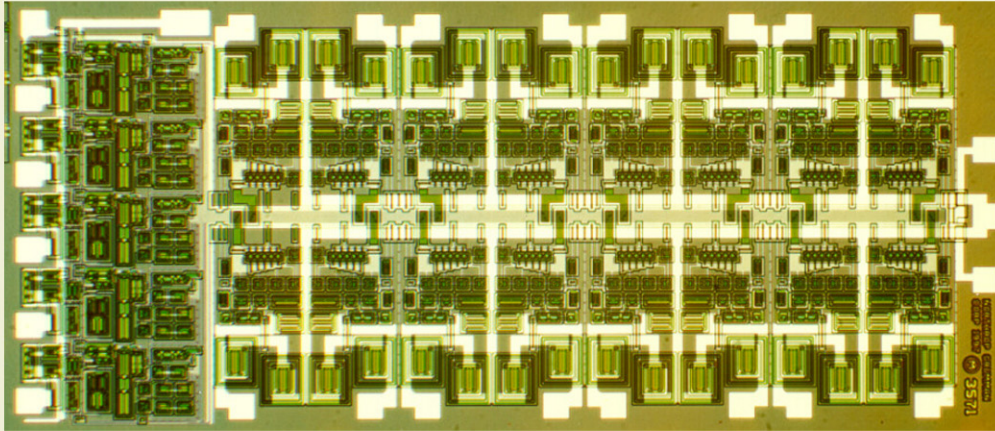
To order the Northrop Grumman radiation hardened 16:1 Analog Multiplexer, use the following part numbers.

NGCL3590



Distribution is Unlimited; #21-0465; Dated 03/17/21
 Specifications and features subject to change without notice.
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For more information, please contact:
 Northrop Grumman Corporation
 Mission Systems
 Email: ATLFoundry@ngc.com



RADIATION HARDENED 16:1 ANALOG MULTIPLEXER

NGCP3580

Introduction

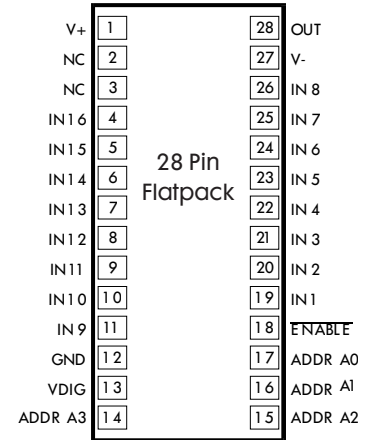
The NGCP3580 is the subject of this data sheet. However, other members of this device family are discussed in this paragraph for reference. Data sheets are available for the NGCL3571, NGCL3590, and NGCP3580. NGC3571/3580/3590 series is a family of radiation hardened 16:1 Analog Multiplexers designed by the Northrop Grumman Advanced Technology Center, Baltimore, MD, using 5V, 10V and 30V CMOS technologies on Silicon On Insulator (SOI) starting material. The NGCL3571 and NGCL3590 use a low voltage (10V / 5V) process and feature CMOS analog switches. The NGCP3580 uses a high voltage (30V) process and features PMOS analog switches. All switches maintain high OFF state impedance even under power down conditions for redundant applications. SOI technology coupled with special design techniques makes this part immune to latch-up. Part has no latched data and is not subject to Single Event Upset (SEU) failures.

Features

- CMOS using SOI starting material
- Recommended Operating Voltages
 $V_+ = 15V$, $V_{dig} = +5V$, $V_- = -15V$ (+/-10%)
- Total Dose up to 300 krad (Si)
- No Single Event Upset (SEU) effects (no latched data)
- < 800 Ohm nominal PMOS switch impedance
- < 1500 Ohm worst case PMOS switch impedance
- Break before make switching
- < 500 ns access time over temperature and post rad
- > 100 MOhm OFF switch impedance
- High OFF state impedance maintained under powered down conditions - ideal for redundant applications
- Low power dissipation: <100 μA standby current
- > 1kV electrostatic discharge protection (Human Body Model)
- Available in 28 pin flatpacks or bare die
- Full military operating temperature range, screened to specific test methods for commercial, Class B, or modified Hi Rel.

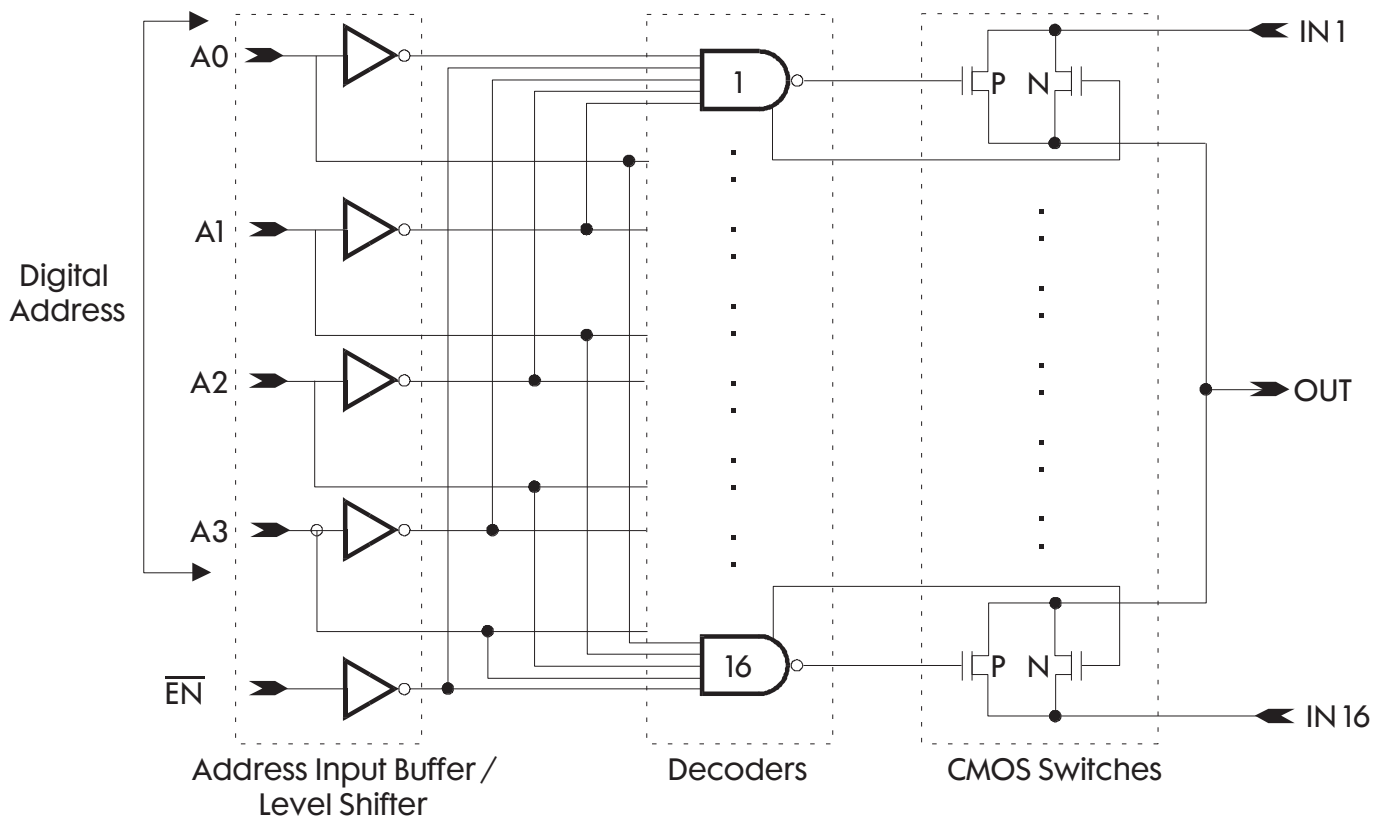
Absolute Maximum Ratings

	NGCP3580	UNITS
Supply Voltage, V+ to V-	40	volts
Supply Voltage, V+ to GND	20	volts
Supply Voltage, VDIG to GND	7.5	volts
Digital input overvoltage range min	-0.5	
Digital input overvoltage range max	$V_{DIG} + 0.5$	volts
Analog input overvoltage range min	V- minus 10	volts
Analog input overvoltage range max	V+ plus 10	volts
Storage Temperature		
Min	-65	deg C
Max	150	deg C



Pinout
(Top View)

Functional Diagram



DC Operating Characteristics: NGCP3580

Recommended Operating Conditions: $V_+ = +15 \pm 10\%V$, $V_- = -15 \pm 10\%V$, $V_{dig} = +5 \pm 10\%V$

Symbol	Description	25C Max	-55 to +125C Max (Note 1)	Units
$I_{SUPPLY+}$	V+ supply current	500	500	μA
$I_{SUPPLY-}$	V- supply current	500	500	μA
I_{STBY+}	V+ standby current	500	500	μA
I_{STBY-}	V- standby current	500	500	μA
I_{AH}	input leakage	1	1	μA
I_{AL}	input leakage	1	1	μA
$-I_{S(OFF)-}$	leakage into source of off switch $-v_{in}$	50	500	nA
$+I_{S(OFF)+}$	leakage into source of off switch $+v_{in}$	50	500	nA
$I_{S(OFF, POWEROFF)}$	leakage into source of off switch, $v_+ = v_- = 0$	50	2000	nA
$I_{S(OFF)OV+}$	Isoff with overvoltage	1	20	μA
$I_{S(OFF)OV-}$	Isoff with overvoltage	1	1	μA
$I_{D(OFF)OV+}$	leakage into drain of off switch with overvoltage	1	30	μA
$I_{D(OFF)OV-}$	leakage into drain of off switch with overvoltage	1	10	μA
$I_{D(OFF)+}$	leakage into drain of off switch	50	5000	nA
$I_{D(OFF)-}$	leakage into drain of off switch	50	5000	nA
$I_{D(ON)+}$	leakage from on driver into switch $+v_{in}$	50	5000	nA
$I_{D(ON)-}$	leakage from on driver into switch $-v_{in}$	50	5000	nA
$R_{DS(ON)15}$	switch on resistance $+v_{in}$	800	800	ohms
$R_{DS(ON)5}$	switch on resistance $v_{in}=5$	1500	1500	ohms
$R_{DS(ON)0}$	switch on resistance $v_{in}=0$	1500	1500	ohms

Note 1: Deliverable die are not tested cold and hot. Performances over temperature are guaranteed by design. Die from each wafer are sampled over temperature in packages during the Class K screening.

AC Operating Characteristics: NGCP3580

Guaranteed by design but not tested

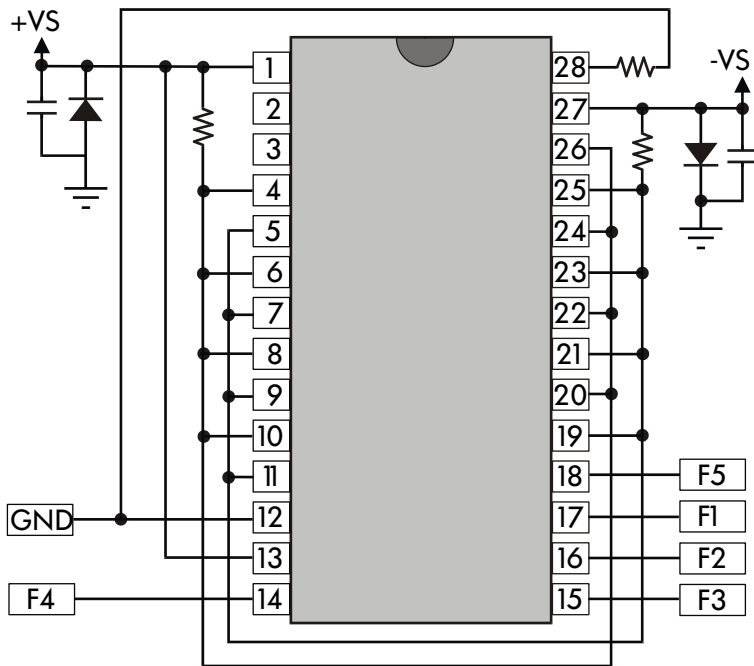
Recommended Operating Conditions: $V_+ = +15V \pm 10\%$, $V_- = -15V \pm 10\%$, $V_{dig} = +5V \pm 10\%$

Symbol	Description	Conditions	-55 to +125C Limits		Type 25C	Units
			Min	Max		
C_A	capacitance, digital input	$V_+ = V_- = OV$ $f = 1MHz$, $T_A = 25C$		7	1	pF
$C_{S(off)}$	capacitance, channel input	$V_+ = V_- = OV$ $f = 1MHz$, $T_A = 25C$		5	3	pF
$C_{D(off)}$	capacitance, channel output	$V_+ = V_- = O$ $f = 1MHz$, $T_A = 25C$		50	30	pF
V_{ISO}	off isolation, input or output	$V_{O_{EN}} = 4V$, $f = 200kHz$ $CL = 7pF$, $RL = 1k$ $VS = 3V_{rms}$, $T_A = 25C$	-45		-59	dB
t_o	break before make time delay	$CL = 50pF$, $RL = 1k$	25		50	ns
t_{ON}	prop delay, address inputs to I/O channels	$CL = 50pF$, $RL = 10M$		0.6	0.4	μs
t_{OFF}	prop delay, address inputs to I/O channels	$CL = 50pF$, $RL = 10M$		0.6	0.4	μs
$t_{ON(EN)}$	prop delay, enable to I/O channels	$CL = 50pF$, $RL = 1k$		0.4	0.2	μs
$t_{OFF(EN)}$	prop delay, enable to I/O channels	$CL = 50pF$, $RL = 1k$		0.6	0.4	μs

Truth Table

A3	A2	A1	A0	\overline{ENABLE}	ON CHANNEL
X	X	X	X	H	NONE
L	L	L	L	L	1
L	L	L	H	L	2
L	L	H	L	L	3
L	L	H	H	L	4
L	H	L	L	L	5
L	H	L	H	L	6
L	H	H	L	L	7
L	H	H	H	L	8
H	L	L	L	L	9
H	L	L	H	L	10
H	L	H	L	L	11
H	L	H	H	L	12
H	H	L	L	L	13
H	H	L	H	L	14
H	H	H	L	L	15
H	H	H	H	L	16

Dynamic Burn-In Circuit



NOTES:

+VS = +16.5V \pm 0.25V, -VS = -16.5V \pm .025V

R = 1k Ω \pm 5%

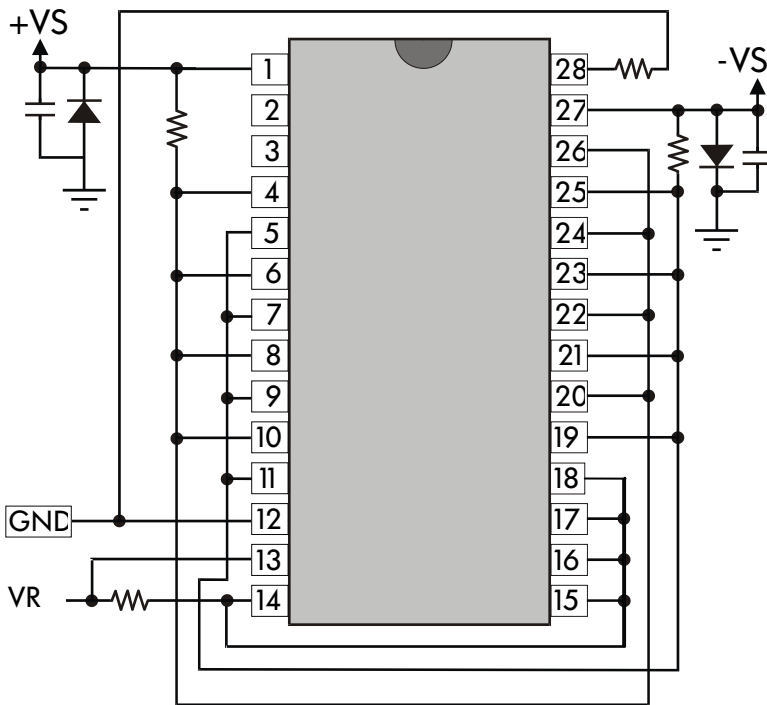
C1 = C2 = 0.01 μ F \pm 10%, 1 each per socket min

D1 = D2 = IN4 002, 1 each per board minimum

Input Signals: square wave, 50% duty cycle,
0V to 5V peak \pm 10%

F1 = 100kHz; F2 = F1/2; F3 = F1/4; F4 = F1/8; F5 = F1/16

Static Burn-In Circuit



NOTES:

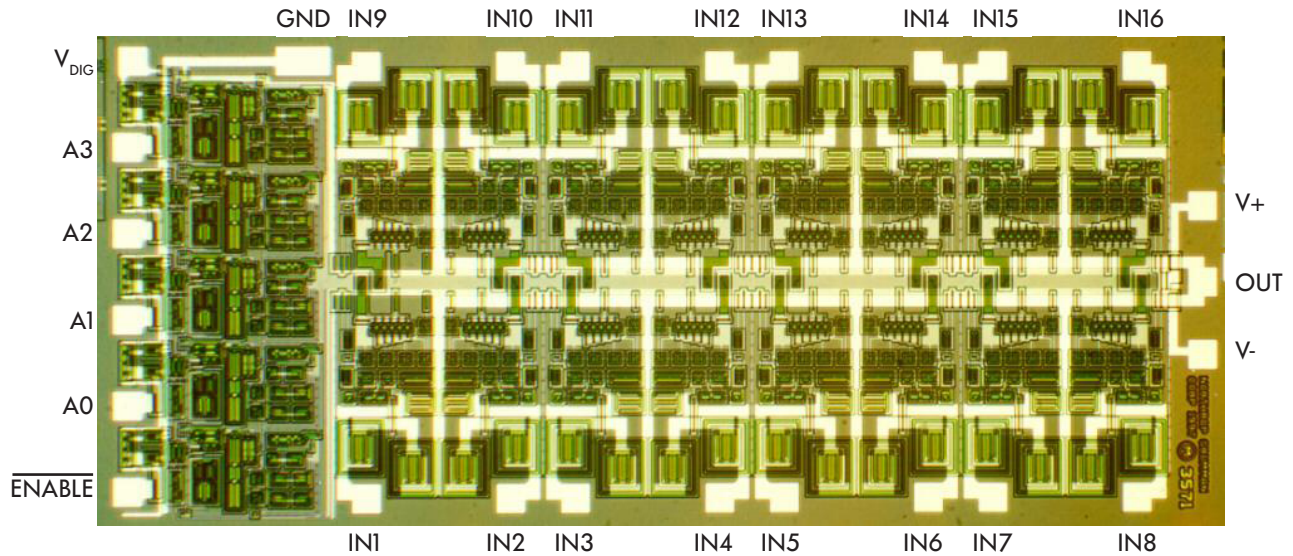
R = 1k Ω \pm 5%, 1/4 W

C1 = C2 = 0.01 μ F minimum, 1 each per socket, minimum

+VS = +16.5V \pm 0.25V, -VS = -16.5V \pm 0.25V,

VR = +5.5V \pm 0.25V

Die Pad Locations



Structural Information

Die Dimensions..... 86 x 200 x 20 mils

Metallization

Type.....TiW/Al/Ti
 Thickness.....9.8 kÅ ± 1 kÅ

Glassivation

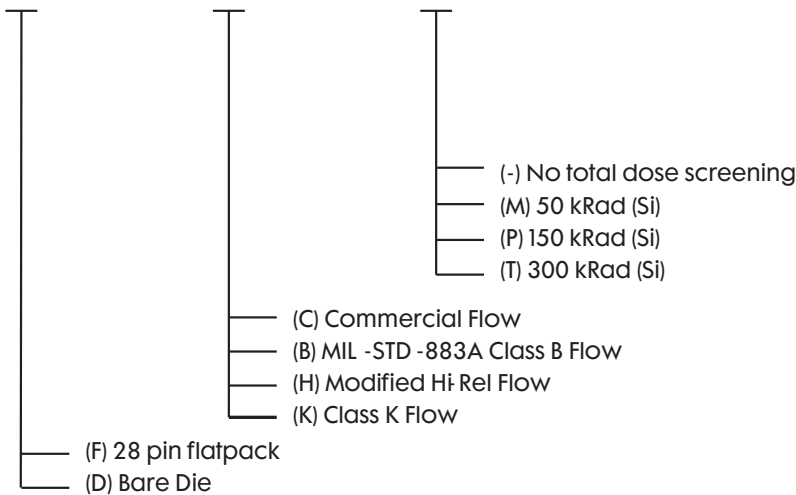
Type.....SiO₂
 Thickness.....8k Å ± 1 kÅ
 Process.....PCB 40 RH

Die Attach

MaterialGold Eutectic
 Temperature400°C
 Lead Temperature <275°C
 (10 sec soldering)

Ordering Information

To order the Northrop Grumman radiation hardened 16:1 Analog Multiplexer, use the following part numbers.
 NGCP3580



Distribution is Unlimited; #21-0465; Dated 03/17/21
 Specifications and features subject to change without notice.
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