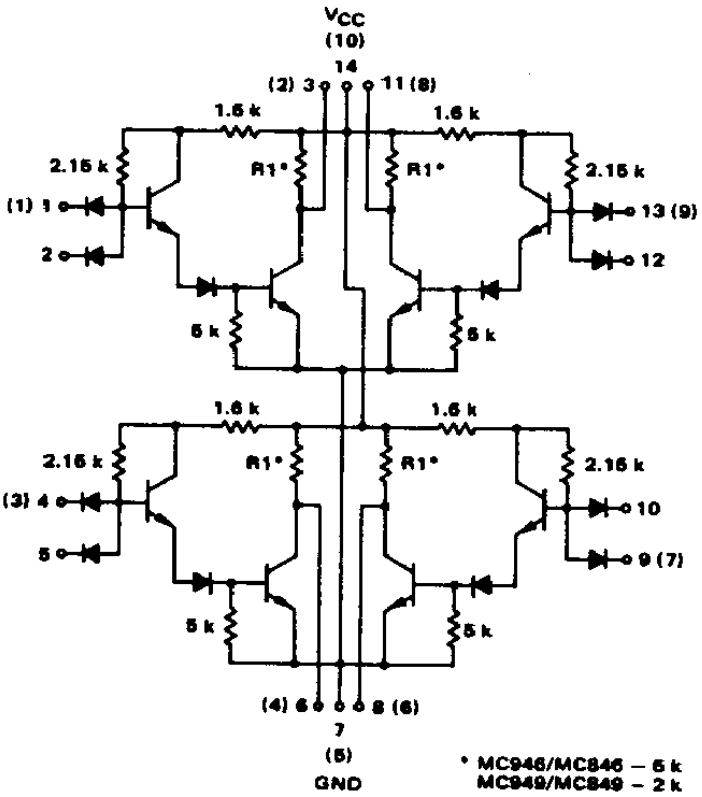
QUAD 2-INPUT "NAND" POWER GATE

MC946F · MC846F, P
MC949F · MC849F, P

QUAD INVERTER

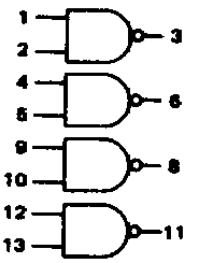
MC946G · MC846G
MC949G · MC849G

This gate element, in the 14-pin flat and dual in-line packages, consists of four 2-input NAND gate circuits. This circuit can be used as a dual 2-input non-inverting gate, or as two bistable circuits when two dual 2-input gates are cross-coupled. Since the metal can (G suffix) has only 10 pins, that circuit consists of four inverters.



Number at end of terminal represents pin number for flat and dual in-line packages. Number in parenthesis indicates pin number for metal can.

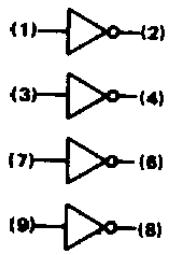
MC946F/MC846F, P
MC949F/MC849F, P



Positive Logic: $3 = \overline{1 + 2}$

Negative Logic: $3 = \overline{1 + 2}$

MC946G/MC846G
MC949G/MC849G



Positive Logic: $2 = \overline{1}$

Negative Logic: $2 = \overline{1}$

Input Loading Factor = 1

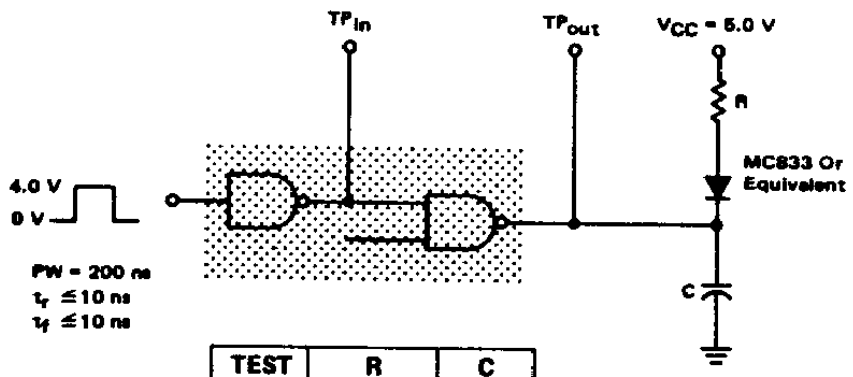
Output Loading Factor:
MC946/MC846 = 8
MC949/MC849 = 7

Total Power Dissipation:

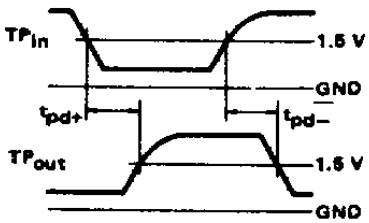
	MC946 MC846	MC949 MC849
Inputs Low	24 mW	24 mW
Inputs High	52 mW	84 mW
50% Duty Cycle	38 mW	54 mW

Propagation Delay Time:
MC946/MC846 = 30 ns typ
MC949/MC849 = 25 ns typ

SWITCHING TIME TEST CIRCUIT AND WAVEFORMS



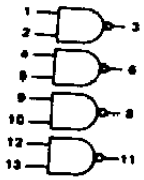
TEST	R	C
t_{pd+}	3.9 k ohms	30 pF
t_{pd-}	400 ohms	50 pF



ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gates are tested in the same manner.

NOTE: Although the test conditions and test limits are the same for devices in ALL available packages, the table shows pin connections for testing only the flat and dual in-line packaged devices. To test devices in the metal can, substitute pin numbers shown in the conversion table below.



PACKAGE	PIN NUMBER												
Flat/Dual In-Line	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Metal Can	1	–	2	3	–	4	5	6	7	–	8	–	9	10

@ Test Temperature		TEST CURRENT / VOLTAGE VALUES													
		mA				Volts									
		I_{OL}		I_{OH}											
		MC946	MC949	MC946	MC949	V_{IL}	V_{IH}	V_F	V_R	V_{CEX}	V_{CC}	V_{CCL}	V_{CCH}	V_{max}	
MC946, MC949	−55°C	11.4	10.4	-0.12	-0.5	1.40	2.10	0	4.00	–	–	4.50	5.50	–	
	+25°C	12.0	11.0	-0.12	-0.5	1.10	2.00	0	4.00	4.50	5.00	4.50	5.50	8.00	
	+125°C	10.8	9.8	-0.12	-0.5	0.80	2.00	0	4.00	–	–	4.50	5.50	–	
		MC846	MC849	MC846	MC849										
MC846, MC849	0°C	12.0	11.0	-0.12	-0.5	1.20	2.00	0.45	4.00	–	–	5.00	5.00	–	
	+25°C	12.0	11.0	-0.12	-0.5	1.10	1.90	0.45	4.00	5.00	5.00	5.00	5.00	8.00	
	+75°C	11.4	10.4	-0.12	-0.5	0.95	1.80	0.50	4.00	–	–	5.00	5.00	–	

Characteristic	Symbol	Pin Under Test	MC946, MC949 TEST LIMITS							MC846, MC849 TEST LIMITS							TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW:											
			−55°C		+25°C		+125°C			0°C		+25°C		+75°C														
			Min	Max	Min	Max	Min	Max	Unit	Min	Max	Min	Max	Min	Max	Unit	I_{OL}	I_{OH}	V_{IL}	V_{IH}	V_F	V_R	V_{CEX}	V_{CC}	V_{CCL}	V_{CCH}	V_{max}	Gnd
Output Voltage	V_{OL}	3	–	0.40	–	0.40	–	0.45	Vdc	–	0.45	–	0.45	–	0.50	Vdc	3	–	–	1,2	–	–	–	–	14	–	–	7
	V_{OH}	3	2.50	–	2.60	–	2.50	–	↓	2.60	–	2.60	–	2.50	–	↓	–	3	1	–	–	–	–	–	↓	–	–	↓
		3	2.50	–	2.60	–	2.50	–		2.60	–	2.60	–	2.50	–		–	3	2	–	–	–	–	–		–	–	
Short-Circuit Current MC946/MC846	I_{SC}	3	–	-1.34	–	-1.34	–	-1.30	mAdc	–	-1.30	–	-1.30	–	-1.25	mAdc	–	–	–	–	–	–	–	–	–	14	–	–	1,3,7
MC949/MC849		3	–	-4.00	–	-4.00	–	-3.90	mAdc	–	-3.90	–	-3.90	–	-3.75	mAdc	–	–	–	–	–	–	–	–	–	14	–	–	1,3,7
Reverse Current	I_R	1	–	2.0	–	2.0	–	5.0	μAdc	–	5.0	–	5.0	–	10	μAdc	–	–	–	–	–	–	–	–	–	14	–	–	2,7
		2	–	2.0	–	2.0	–	5.0	μAdc	–	5.0	–	5.0	–	10	μAdc	–	–	–	–	–	1	–	–	–	14	–	–	1,7
Output Leakage Current	I_{CEX}	3	–	–	–	50	–	–	μAdc	–	–	–	100	–	–	μAdc	–	–	–	–	–	2	–	–	–	14	–	–	1,7
Forward Current	I_F	1	–	-1.60	–	-1.60	–	-1.50	mAdc	–	-1.40	–	-1.40	–	-1.33	mAdc	–	–	–	–	–	–	3,14	–	–	–	–	–	7
		2	–	-1.60	–	-1.60	–	-1.50	mAdc	–	-1.40	–	-1.40	–	-1.33	mAdc	–	–	–	–	1	2	–	–	–	14	–	–	7
Power Drain Current (Total Device) MC946/MC846	I_{PDH}	14	–	–	–	13	–	–	mAdc	–	–	–	16	–	–	mAdc	–	–	–	–	2	1	–	–	–	14	–	–	7
MC949/MC849	I_{PDH}	14	–	–	–	21.4	–	–		–	–	–	26.2	–	–		–	–	–	–	–	–	–	14	–	–	–	–	7
All Types	I_{max}	14	–	–	–	11	–	–	↓	–	–	–	16	–	–	↓	–	–	–	–	–	–	–	14	–	–	–	–	7
Switching Times																	–	–	–	–	–	–	–	–	–	–	–	14	1,4,7,9,12
MC946/MC846	t_{pd+}	1,3	–	–	25	80	–	–	ns	–	–	25	80	–	–	ns	Pulse In	Pulse Out											
	t_{pd-}	1,3	–	–	10	30	–	–	↓	–	–	10	30	–	–	↓	1	3	–	–	–	–	–	14	–	–	–	–	7
MC949/MC849	t_{pd+}	1,3	–	–	15	60	–	–		–	–	15	60	–	–		↓	↓	–	–	–	–	–	↓	–	–	–	–	↓
	t_{pd-}	1,3	–	–	10	30	–	–		–	–	10	30	–	–				–	–	–	–	–		–	–	–		

Pins not listed are left open.

PRODUCT DOCUMENTATION

The three documents listed in the following table are required for a complete description of the DSP56301 and are necessary to design properly with the part. Documentation is available from one of the following locations (see back cover for detailed information):

- A local Motorola distributor
- A Motorola semiconductor sales office
- A Motorola Literature Distribution Center
- The World Wide Web (WWW)

See the **Additional Support** section of the *DSP56300 Family Manual* for detailed information on the multiple support options available to you.

Table 1 DSP56301 Documentation

Name	Description	Order Number
DSP56300 Family Manual	Detailed description of the DSP56300 family processor core and instruction set	DSP56300FM/AD
DSP56301 User's Manual	Detailed functional description of the DSP56301 memory configuration, operation, and register programming	DSP56301UM/AD
DSP56301 Technical Data	DSP56301 features list and physical, electrical, timing, and package specifications	DSP56301/D