

CA 3600E ≡ CD4007 (MC4007) in *anal. misc* libraries

\* End of zx model

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*.model CA3600E
*14-pin DIP: pin#1 #2 #3 #4 #5 #6 #7 #8 #9 #10 #11 #12 #13 #14
*
.subckt CA3600E-X p01 p02 p03 p04 p05 p06 p07 p08 p09 p10 p11 p12 p13 p14
*
      RCA                      pid=CA3600
*
      89-07-21 pwt

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\* The RCA data sheet was used for this model.

\* BE SURE to keep pin #14 at the most positive potential w.r.t any other pin!  
 \* BE SURE to keep pin # 7 at the most negative potential w.r.t any other pin!

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m_N1 p08 6 p07 p07 nch ; device N1
m_N2 p05 3 p04 p07 nch ; device N2
m_N3 p12 10 p09 p07 nch ; device N3

m_P1 p13 6 p14 p14 pch ; device P1
m_P2 p01 3 p02 p14 pch ; device P2
m_P3 p12 10 p11 p14 pch ; device P3

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\* Input protection circuits from Fig. 34

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rx03 p03 3 r_zap 1 ; input protection on pin #3
dx3p p03 p14 d_zap
di3p 3 p14 d_zap
di3n p07 3 d_zap

rx06 p06 6 r_zap 1 ; input protection on pin #6
dx6p p06 p14 d_zap
di6p 6 p14 d_zap
di6n p07 6 d_zap

rx10 p10 10 r_zap 1 ; input protection on pin #10
dx1p p10 p14 d_zap
di1p 10 p14 d_zap
di1n p07 10 d_zap

d1 p07 p14 d_body ; supply protection diode (D5 in Fig. 34)

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\* MOS characteristics derived as follows:

- \* Id vs Vgs from Fig. 3 and 6 (using Parts as an aid)
- \* output capacitance hand adjusted using simulations
- \* Miller capacitance and output impedance hand adjusted using simulations to match Fig. 10 and 11

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.model nch nmos(Level=1 Tox=300n Uo=600 Kp=20.54u W=144u L=8u Vto= 1.3
+
      Lambda=15m Cbd=4p Cbs=4p Cgdo=1.7n Cgso=1.7n Rs=1 Rd=1)
.model pch pmos(Level=1 Tox=300n Uo=300 Kp=10.32u W=328u L=8u Vto=-1.5
+
      Lambda=15m Cbd=8p Cbs=8p Cgdo=1.7n Cgso=1.7n Rs=1 Rd=1)
.model r_zap res(r=1.73K)
.model d_zap D(Is= 1p Rs=1 N=1 Xti=3 Eg=1.11 Cjo=.01p M=0 Bv=20 Ibv=.1u)
.model d_body D(Is=15n Rs=1 N=1 Xti=3 Eg=1.11 Cjo=10p M=.5 Vj=.75
+
      Fc=.5 Isr=.15n Nr=2 Bv=20 Ibv=100u)
.ends
*$

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