



Attributes:

```
mainnodes: vi_e vi_o vo_e vo_o g
digital_nodes: phi_e
rparms: ron=1e-3 roff=100M c=10p tc=10n rd=1e18
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Description:

SC_SPGC_2.ece is a single phase grounded capacitor (SPGC) element which is commonly used block in the bi-phase switched capacitor (SC) circuits. The circuit diagram of SPGC is shown in Fig. a. It consists of two switches and one capacitor (ignore R_{dl} connected between vi_o and vo_o), and it is a two-port element. The z-domain (small-signal) equivalent circuit is shown in Fig. b, which is a four-port.

As the same file contains time-domain and frequency-domain descriptions, the number of ports in both is made equal. It is the reason that SPGC is realized as four-port element in time-domain, and unused ports/nodes are connected with low-value resistance (R_{dl}). In z-domain unused ports are connected to high-value resistance (R_{dh}).

vi_e and vi_o are input nodes. vo_e and vo_o are output nodes. ϕ_e (ϕ_e) and ϕ_o (ϕ_o) are digital nodes, and it should be connected to clock signal. ron is switch on resistance and $roff$ is switch off resistance. tc is clock period. c is capacitance value and rd is high value resistance (R_{dh}). R_{dl} is internally set to 1Ω .