

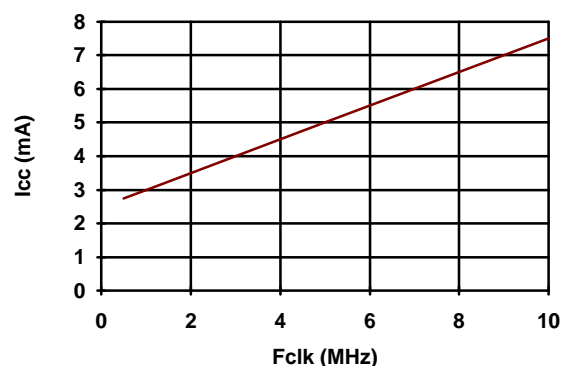
### Power Consumption versus CPU Clock for the H8/300 Family

As expected, the power supply current  $I_{cc}$  required for the operation of the controller depends upon the speed at which the controller operates, its mode of operation, and the supply voltage at which the chip operates.

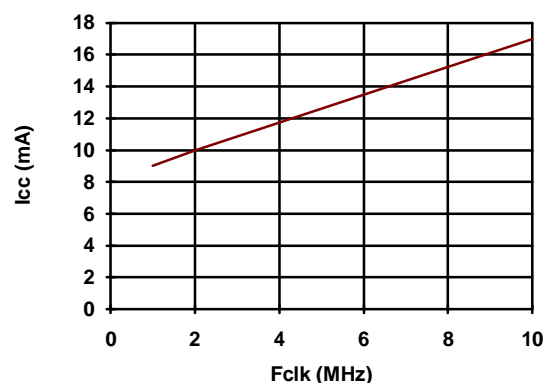
All 5V-powered H8/300 controllers are guaranteed to run between 0.5MHz and 10MHz internal clock frequency; as the operation speed increases, so does the current consumption. All H8/300 controllers, except the H8/310 and the H8/3101, can run in either one of the 3 normal modes of operation or in the so-called sleep condition, which is a software-triggered mode in which the CPU halts but the rest of the chip remains active, meaning the internal clock is still ticking. Generally, the current required during the sleep mode operation is approximately half the current consumed in the normal operating conditions at CPU speeds exceeding 5MHz. The H8/310 runs in only one mode of operation, and does not have power management features. The H8/3101 can run in either a normal mode of operation or in a sleep mode in which the CPU, internal clock, and on-chip supporting functions halt, so power consumption will only depend upon the leakage current. Last but not least, the H8/329, H8/330, and H8/338 families are also capable to run at 3V at a maximum internal frequency of 5MHz, thus offering additional power savings as well.

Several graphs showing the relationship between  $I_{cc}$  (normal mode power supply current),  $I_{sleep}$  (sleep mode power supply current), and the CPU clock frequency can be seen below. It is important to note that these graphs represent empirical values obtained by measurement of a selected batch of ICs, and do not indicate guaranteed values. These measurements were taken under the following conditions:  $V_{cc}=5.0V \pm 10\%$  (or  $3.0V \pm 10\%$ ),  $V_{ss}=0V$ ,  $V_{ILmax}=0.5V$ ,  $Temp=25deg.C$ , all output pins in the no-load state, and all MOS input pull-ups off.

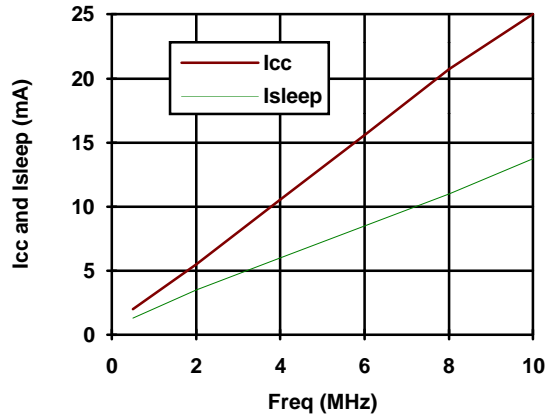
**H8/3101 current consumption ( $I_{sleep} = 50\mu A$   
at all frequencies)**



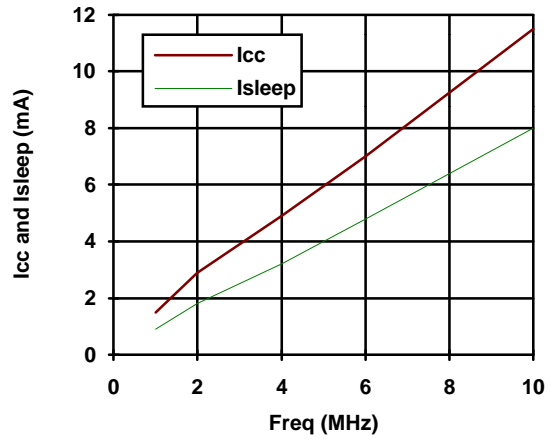
**H8/310 current consumption (no sleep mode)**



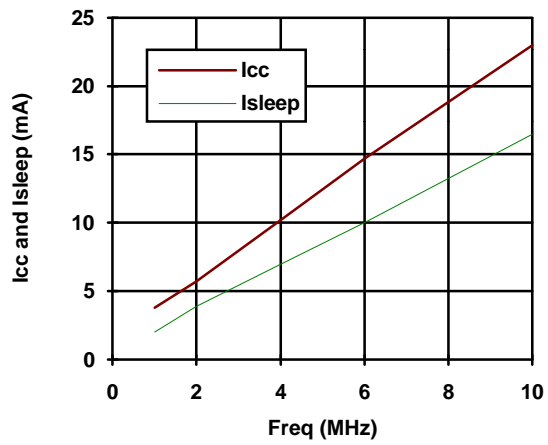
H8/320-series current consumption



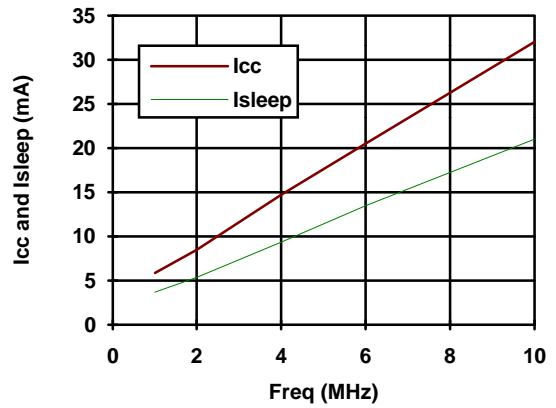
H8/330 current consumption at Vcc = 3V



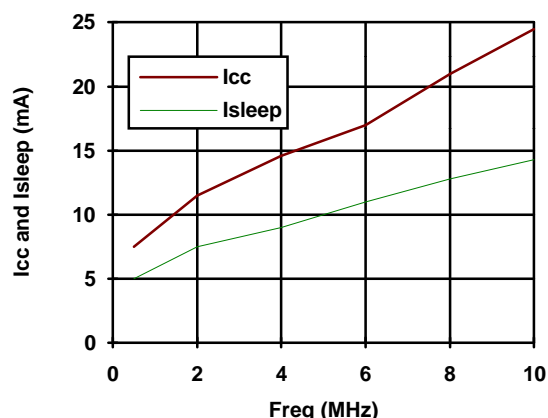
H8/330 current consumption at Vcc = 5V



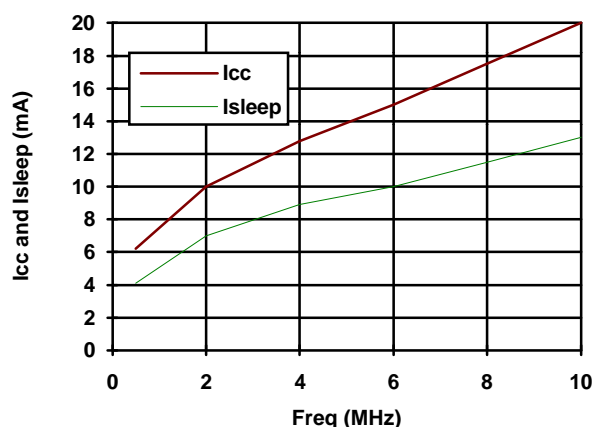
H8/350 current consumption



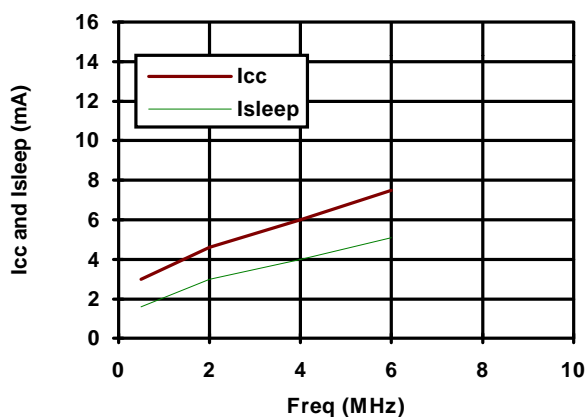
H8/338 current consumption at Vcc = 5V



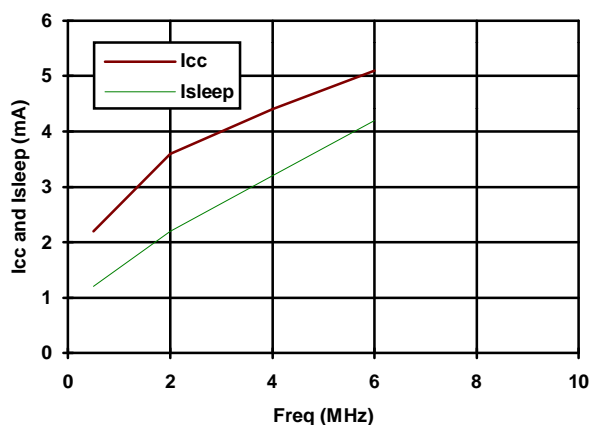
H8/329 ZTAT current consumption at Vcc = 5V



H8/338 current consumption at Vcc = 3V



H8/329 ZTAT current consumption at Vcc = 3V



**Note:** The current dissipation during the hardware and software standby modes for the H8/320, H8/330, and H8/350 is greatly reduced to a few microamps (see the hardware manuals for each part) and does not depend upon the CPU frequency. The reason for such a drastic reduction is the fact that during the standby modes, the internal CPU oscillator ceases to tick, and therefore halts the on-chip supporting modules operation.

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