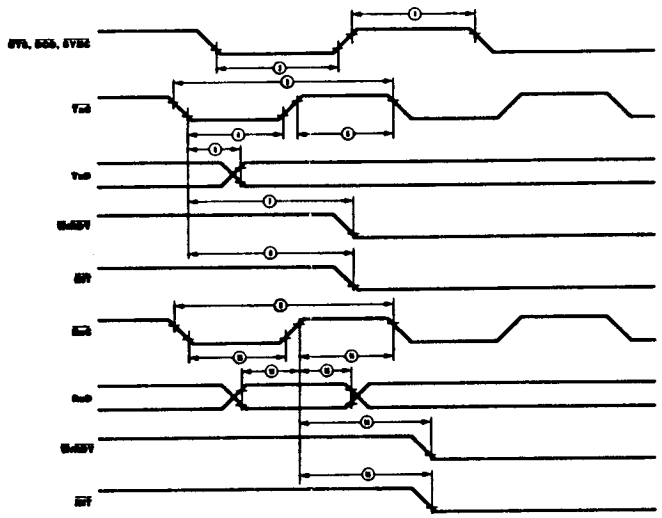
**AC CHARACTERISTICS TIMING** (Continued)

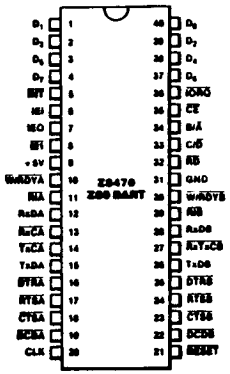


# Zilog

## Z08470 Customer Procurement Spec (CPS)

**GENERAL DESCRIPTION**

The Z80 DART (Dual-Channel Asynchronous Receiver/Transmitter) is a dual-channel multifunction peripheral component that satisfies a wide variety of asynchronous serial data communications requirements in microcomputer systems. The Z80 DART is used as a serial-to-parallel, parallel-to-serial converter/controller in asynchronous applications. In addition, the device also provides modem controls for both channels. In applications where modem controls are not needed, these lines can be used for general-purpose I/O.




**40-Pin Dual-In-Line Package (DIP), Pin Assignments**



Zilog, Inc 1315 Dell Ave., Campbell, California 95008
Telephone (408)370-8000 TWX 910-338-7621

## DC CHARACTERISTICS

| Symbol | Parameter | Min | Max | Unit | Test Condition |
|---|---|---|---|---|---|
| $V_{ILC}$ | Clock Input Low Voltage | −0.3[a] | +0.45[a] | V | |
| $V_{IHC}$ | Clock Input High Voltage | $V_{CC}$ −0.6[a] | +5.5[a] | V | |
| $V_{IL}$ | Input Low Voltage | −0.3[a] | +0.8[a] | V | |
| $V_{IH}$ | Input High Voltage | +2.0[a] | +5.5[a] | V | |
| $V_{OL}$ | Output Low Voltage | | +0.4[a] | V | $I_{OL}$ = 2.0 mA |
| $V_{OH}$ | Output High Voltage | +2.4[a] | | V | $I_{OH}$ = −250 μA |
| $I_L$ | Input/3-State Output Leakage Current | −10[a] | +10[a] | μA | 0.4 < $V_{IN}$ < 2.4V |
| $I_{LPR}$ | RI Pin Leakage Current | −40[a] | +10[a] | μA | 0.4 < $V_{IN}$ < 2.4V |
| $I_{CC}$ | Power Supply Current | | 100[a] | mA | |

$T_A$ = 0°C to 70°C, $V_{CC}$ = +5V ±5%

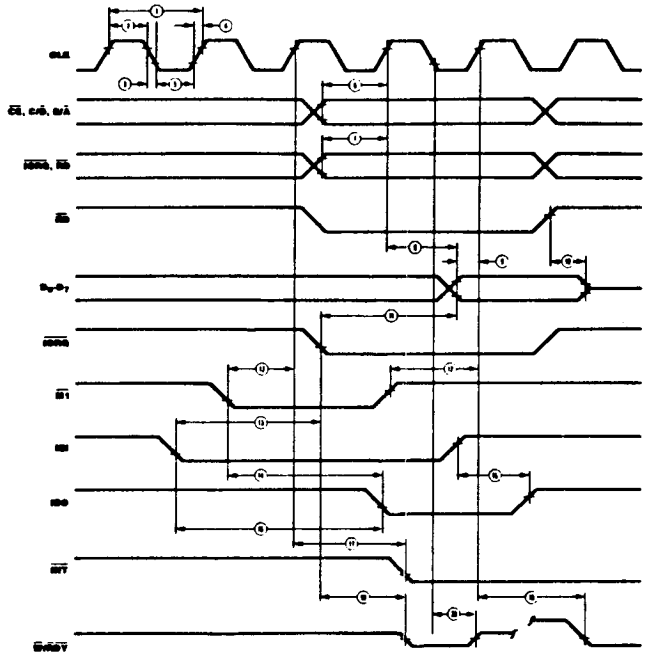
a Tested
b Guaranteed by Design
c Guaranteed by Characterization

## AC CHARACTERISTICS*

| Number | Symbol | Parameter | Z80-4 Min | DART Max | Z80-6 Min | DART Max |
|---|---|---|---|---|---|---|
| 1 | TcC | Clock Cycle Time | 250[a] | 4000[a] | 165[a] | 4000[a] |
| 2 | TwCh | Clock Width (High) | 105[a] | 2000[a] | 70[a] | 2000[a] |
| 3 | TfC | Clock Fall Time | | 30[a] | | 15[a] |
| 4 | TrC | Clock Rise Time | | 30[a] | | 15[a] |
| 5 | TwCl | Clock Width (Low) | 105[a] | 2000[a] | 70[a] | 2000[a] |
| 6 | TsAD(C) | $\overline{CE}$, C/$\overline{D}$, B/$\overline{A}$ to Clock ↑ Setup Time | 145[a] | | 80[a] | |
| 7 | TsCS(C) | $\overline{IORQ}$, $\overline{RD}$ to Clock ↑ Setup Time | 115[a] | | 80[a] | |
| 8 | TdC(DO) | Clock ↑ to Data Out Delay | | 220[a] | | 150[a] |
| 9 | TsDI(C) | Data In to Clock ↑ Setup (Write or M1 Cycle) | 50[a] | | 30[a] | |
| 10 | TdRD(DOz) | $\overline{RD}$ ↑ to Data Out Float Delay | | 110[c] | | 90[c] |
| 11 | TdIO(DOI) | $\overline{IORQ}$ ↓ to Data Out Delay (INTACK Cycle) | | 160[c] | | 100[c] |
| 12 | TsM1(C) | $\overline{M1}$ to Clock ↑ Setup Time | 90[a] | | 75[a] | |
| 13 | TsIEI(IO) | IEI to $\overline{IORQ}$ ↓ Setup Time (INTACK Cycle) | 140[c] | | 120[c] | |
| 14 | TdM1(IEO) | $\overline{M1}$ ↓ to IEO ↓ Delay (interrupt before M1) | | 190[c] | | 160[c] |
| 15 | TdIEI(IEOr) | IEI ↑ to IEO ↑ Delay (after ED decode) | | 100[c] | | 70[c] |
| 16 | TdIEI(IEOf) | IEI ↓ to IEO ↓ Delay | | 100[a] | | 70[a] |
| 17 | TdC(INT) | Clock ↑ to $\overline{INT}$ ↓ Delay | | 200[a] | | 150[a] |
| 18 | TdIO(W/RWf) | $\overline{IORQ}$ ↓ or $\overline{CE}$ ↓ to $\overline{W/RDY}$ ↓Delay (Wait Mode) | | 210[c] | | 175[c] |
| 19 | TdC(W/RFt) | Clock ↑ to $\overline{W/RDY}$ ↓ Delay (Ready Mode) | | 120[a] | | 100[c] |
| 20 | TdC(W/RWz) | Clock ↓ to $\overline{W/RDY}$ Float Delay (Wait Mode) | | 130[c] | | 110[c] |

*Units in nanoseconds (ns).

a Tested
b Guaranteed by Design
c Guaranteed by Characterization



## AC CHARACTERISTICS (Continued)

| Number | Symbol | Parameter | Z80-4 Min | DART Max | Z80-6 Min | DART Max | Notes* |
|---|---|---|---|---|---|---|---|
| 1 | TwPh | Pulse Width (High) | 200[c] | | 200[c] | | 2 |
| 2 | TwPl | Pulse Width (Low) | 200[c] | | 200[c] | | 2 |
| 3 | TcTxC | $\overline{TxC}$ Cycle Time | 400[c] | ∞[c] | 330[c] | ∞[c] | 2 |
| 4 | TwTxCl | $\overline{TxC}$ Width (Low) | 180[c] | ∞[c] | 100[c] | ∞[c] | 2 |
| 5 | TwTxCh | $\overline{TxC}$ Width (High) | 180[c] | ∞[c] | 100[c] | ∞[c] | 2 |
| 6 | TdTxC(TxD) | $\overline{TxC}$ ↓ to TxD Delay | | 300[a] | | 220[a] | 2 |
| 7 | TdTxC(W/RFt) | $\overline{TxC}$ ↓ to $\overline{W/RDY}$ ↓ Delay (Ready Mode) | 5[c] | 9[c] | 5[c] | 9[c] | 1 |
| 8 | TdTxC(INT) | $\overline{TxC}$ ↓ to $\overline{INT}$ ↓ Delay | 5[c] | 9[c] | 5[c] | 9[c] | 1 |
| 9 | TcRxC | $\overline{RxC}$ Cycle Time | 400[c] | ∞[c] | 330[c] | ∞[c] | 2 |
| 10 | TwRxCl | $\overline{RxC}$ Width (Low) | 180[c] | ∞[c] | 100[c] | ∞[c] | 2 |
| 11 | TwRxCh | $\overline{RxC}$ Width (High) | 180[c] | ∞[c] | 100[c] | ∞[c] | 2 |
| 12 | TsRxD(RxC) | RxD to $\overline{RxC}$ ↑ Setup Time (x1 Mode) | 0[c] | | 0[c] | | 2 |
| 13 | ThRxD(RxC) | RxD Hold Time (x1 Mode) | 140[c] | | 100[c] | | 2 |
| 14 | TdRxC(W/RFt) | $\overline{RxC}$ ↑ to $\overline{W/RDY}$ ↓ Delay (Ready Mode) | 10[c] | 13[c] | 10[c] | 13[c] | 1 |
| 15 | TdRxC(INT) | $\overline{RxC}$ ↑ to $\overline{INT}$ ↓ Delay | 10[c] | 13[c] | 10[c] | 13[c] | 1 |

* In all modes, the System Clock rate must be at least five times the maximum data rate. $\overline{RESET}$ must be active a minimum of one complete clock cycle.
1 Units equal to System Clock Periods.
2 Units in nanoseconds (ns).

a Tested
b Guaranteed by Design
c Guaranteed by Characterization