



## RAM FAMILY EXPRESS

- Standard Temperature Range
- Extended Temperature Range  
-40°C - +85°C Available
- 168 (±8) Hour Burn-In Available
- Inspected to 0.1% AQL

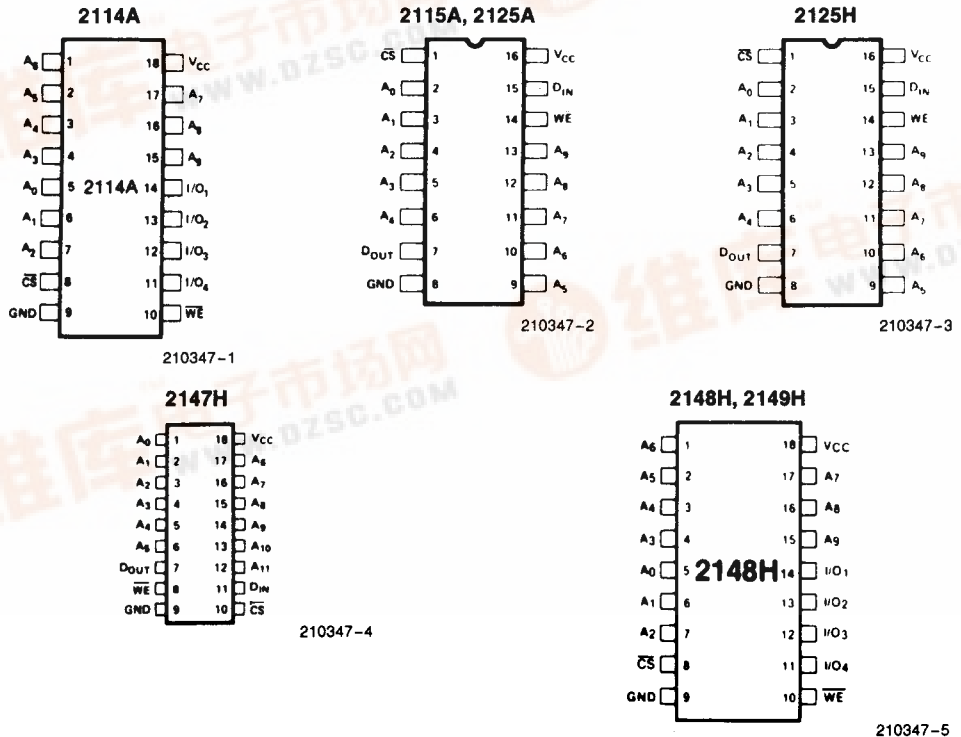
The Intel EXPRESS RAM family is a series of random-access memories which have received additional processing to enhance product operating temperature range and infant mortality. EXPRESS processing is available for several densities of RAM, allowing the choice of appropriate memory size to match system applications.

EXPRESS RAM product is available with 168 (±8) hour, 125°C dynamic burn-in using Intel's standard bias configuration. This process exceeds or meets most industry specifications of burn-in.

The standard EXPRESS RAM operating temperature range is 0°C to 70 or 75°C. Extended operating temperature range (-40°C to +85°) EXPRESS product is available. EXPRESS products plus military grade RAMs (-55°C to +125°C) provide the most complete choice of standard and extended temperature range RAMs available.

Like all Intel RAMs, the EXPRESS RAM family is inspected to 0.1% electrical AQL. This may allow the user to reduce or eliminate incoming inspection testing.

Detailed individual product electrical specifications are available separately in Intel's respective commercial and industrial grade product data sheets.



Pin Configuration

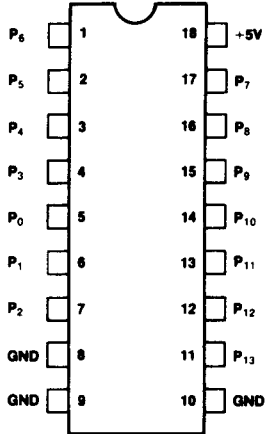




## RAM FAMILY

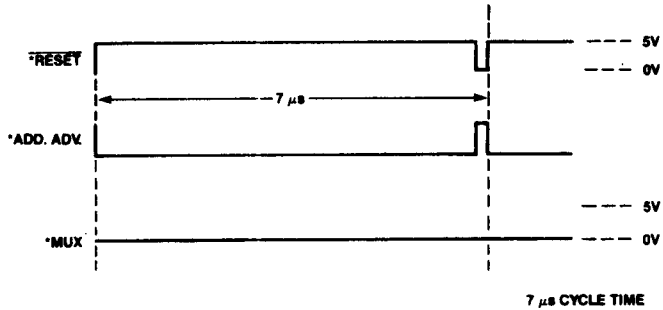
**Table 1. RAM Product Family  
EXPRESS**

| Type        | Organization | Maximum Access (ns) | Power Supply | Operating Temperature (°C) | Burn-In 125°C (± 8 hours) |
|-------------|--------------|---------------------|--------------|----------------------------|---------------------------|
| QD 2114A-4  | 1K x 4       | 200                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QP 2114A-4  | 1K x 4       | 200                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2114A-5  | 1K x 4       | 250                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QP 2114A-5  | 1K x 4       | 250                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2114AL-1 | 1K x 4       | 100                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QP 2114AL-1 | 1K x 4       | 100                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2114AL-2 | 1K x 4       | 120                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QP 2114AL-2 | 1K x 4       | 120                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2114AL-3 | 1K x 4       | 150                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QP 2114AL-3 | 1K x 4       | 150                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2114AL-4 | 1K x 4       | 200                 | 5V ± 10%     | 0 to 70                    | 168                       |
| QP 2114AL-4 | 1K x 4       | 200                 | 5V ± 10%     | 0 to 70                    | 168                       |
| LD 2114A-4  | 1K x 4       | 200                 | 5V ± 10%     | -40 to 85                  | 168                       |
| LD 2114A-5  | 1K x 4       | 250                 | 5V ± 10%     | -40 to 85                  | 168                       |
| LD 2114AL-3 | 1K x 4       | 150                 | 5V ± 10%     | -40 to 85                  | 168                       |
| LD 2114AL-4 | 1K x 4       | 200                 | 5V ± 10%     | -40 to 85                  | 168                       |
| TD 2114A-4  | 1K x 4       | 200                 | 5V ± 10%     | -40 to 85                  | None                      |
| TD 2114A-5  | 1K x 4       | 250                 | 5V ± 10%     | -40 to 85                  | None                      |
| TD 2114AL-3 | 1K x 4       | 150                 | 5V ± 10%     | -40 to 85                  | None                      |
| QD 2115A    | 1K x 1       | 45                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2115A-2  | 1K x 1       | 70                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2115AL   | 1K x 1       | 45                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2115AL-2 | 1K x 1       | 70                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2125A    | 1K x 1       | 45                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2125A-2  | 1K x 1       | 70                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2125AL   | 1K x 1       | 45                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2125AL-2 | 1K x 1       | 70                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2125H-2  | 1K x 1       | 25                  | 5V ± 5%      | 0 to 75                    | 168                       |
| QD 2147H    | 4K x 1       | 70                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2147H-1  | 4K x 1       | 35                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2147H-2  | 4K x 1       | 45                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2147H-3  | 4K x 1       | 55                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2148H    | 1K x 4       | 70                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2148H-3  | 1K x 4       | 55                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD 2148HL   | 1K x 4       | 70                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD2149H     | 1K x 4       | 70                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD2149H-2   | 1K x 4       | 45                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD2149H-3   | 1K x 4       | 55                  | 5V ± 10%     | 0 to 70                    | 168                       |
| QD2149HL    | 1K x 4       | 70                  | 5V ± 10%     | 0 to 70                    | 168                       |



210347-6

| Supply          | Voltages | Tolerances | Pwr-Up Seq. | Current Device | Noise Levels |
|-----------------|----------|------------|-------------|----------------|--------------|
| V <sub>CC</sub> | +5V      | ±0.25V     | 1           | 70 mA          | ±0.25V       |
| V <sub>IL</sub> | 0.0V     | ±0.5V      |             |                |              |
| V <sub>IH</sub> | 5.0V     | ±1.0V      |             |                |              |

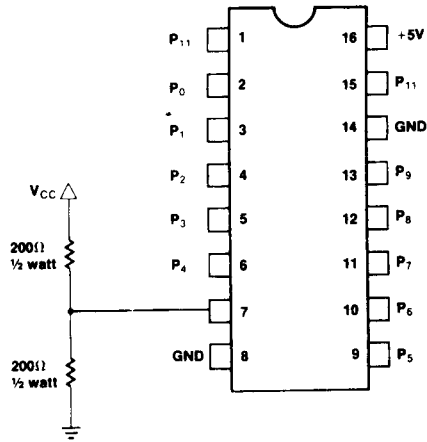


7 μs CYCLE TIME

2114/2148/2149  
TIMING DIAGRAM

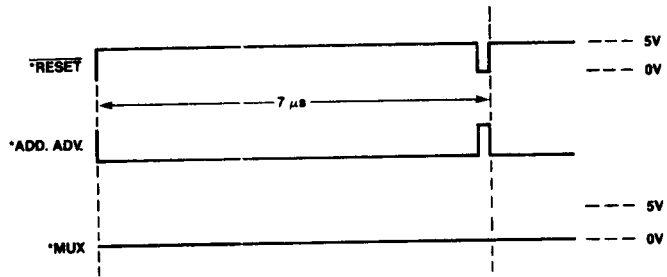
210347-7

Figure 1. 2114A, 2148H, 2149H Burn-In Configuration



210347-8

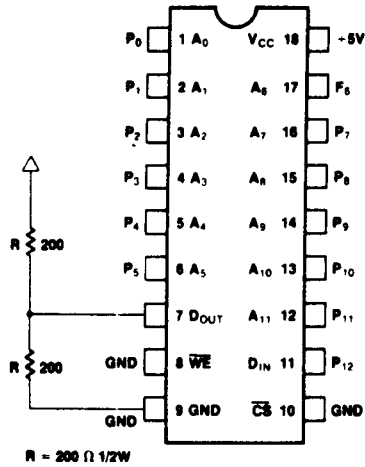
| Supply          | Voltages | Tolerances | Pwr-Up Seq. | Current Device | Noise Levels |
|-----------------|----------|------------|-------------|----------------|--------------|
| V <sub>CC</sub> | +5V      | ±0.25V     | 1st         | 75 mA          | ±0.25V       |
| V <sub>IL</sub> | 0.0V     | ±0.5V      |             |                |              |
| V <sub>IH</sub> | 5.0V     | ±1.0V      |             |                |              |



2115/2125 TIMING DIAGRAM  
7 μs CYCLE TIME

210347-9

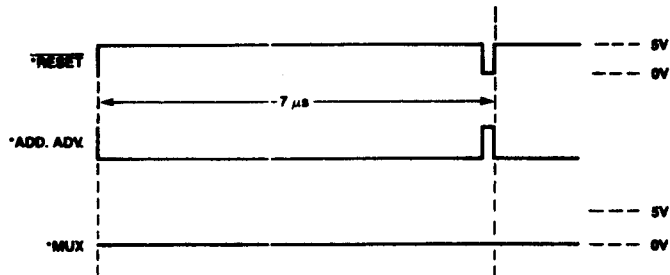
Figure 2. 2115, 2125 Burn-in Configuration



R = 200 Ω 1/2W

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| Supply          | Voltages | Tolerances | Pwr-Up Seq. | Current Device | Noise Levels |
|-----------------|----------|------------|-------------|----------------|--------------|
| V <sub>CC</sub> | +5V      | ±0.25V     | 1           | 125 mA         | ±0.25V       |
| V <sub>IL</sub> | 0.0V     | ±0.5V      |             |                |              |
| V <sub>IH</sub> | 5.0V     | ±1.0V      |             |                |              |



2147H  
TIMING DIAGRAM  
7 μs CYCLE TIME

210347-11

Figure 3. 2147H Burn-In Configuration