

# 125V Octal Series Diode Pairs Array with Redundancy

## Description

The LX7710 is a diode array that features high breakdown voltage diodes with ESD protection and built-in redundancy. The array contains 8 series connected diode pairs, and is intended for power ORing applications. The series connected diodes are intended to be redundant should one of the diodes fail in a short circuit. Individual diodes within the array have 125V working voltage and can handle up to 700mA of continuous current. ESD protection is also included; the two series ESD diodes have a working voltage of 100V each for a total of 200V. The LX7710 is available in a 20 pin ceramic SOIC package and is QML-V and QML-Q certified.

## Features

- 125V Minimum Breakdown Voltage Even If One Diode in Any String Happens to Fail (redundant)
- 700mA Current Capability per Diode
- Low Leakage Current
- ESD Protected
- Rad-tolerant to a Minimum 100krad(Si) TID and SEL Immunity to a Minimum of 87MeV cm<sup>2</sup>/mg

## Applications

- Power ORing
- Redundant Power Sourcing
- Aerospace Satellite Manufacturers
- Military Power Electronics Control

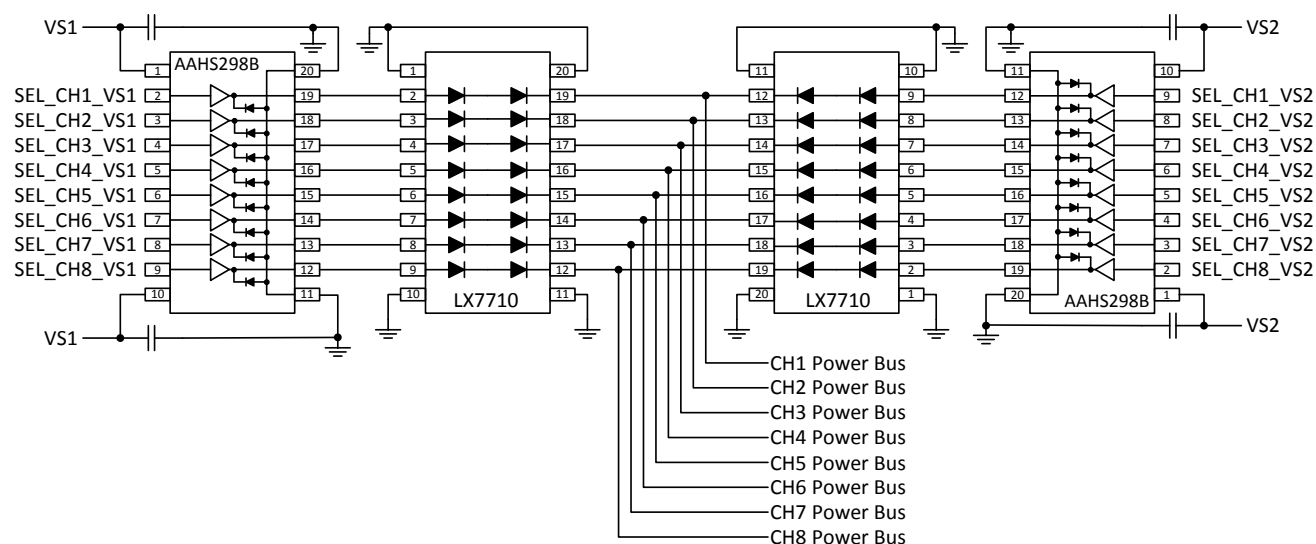


Figure 1 · Product Highlight of Redundant Switchable Power Bus

## Pin Configuration and Pinout

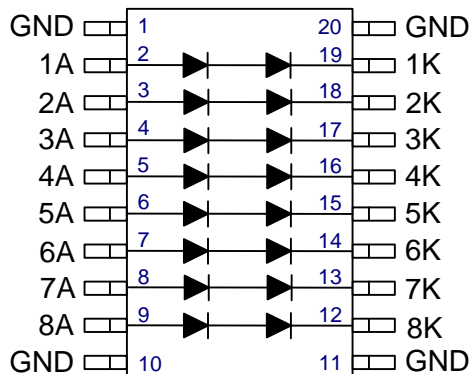


Figure 2 · LX7710 Pinout

## Ordering Information

| Junction Temperature | Type          | Package   | Part Number                         | Flow                | Packaging Type |
|----------------------|---------------|-----------|-------------------------------------|---------------------|----------------|
| -55°C to 150°C       | Flat Hermetic | CSOIC 20L | LX7710MDWC-ES                       | Engineering samples | Tray           |
|                      |               |           | LX7710MDWC-Q<br>SMD 5962-1621001QXC | QML-Q               |                |
|                      |               |           | LX7710MDWC-V<br>SMD 5962-1621001VXC | QML-V               |                |

## Pin Description

| Pin Number | Pin Designator | Description  |
|------------|----------------|--|
| 1          | GND            | This power input pin connects to GND.                                  |
| 2          | 1A             | This power input pin connects to the anode of the diode for channel 1. |
| 3          | 2A             | This power input pin connects to the anode of the diode for channel 2. |
| 4          | 3A             | This power input pin connects to the anode of the diode for channel 3. |
| 5          | 4A             | This power input pin connects to the anode of the diode for channel 4. |
| 6          | 5A             | This power input pin connects to the anode of the diode for channel 5. |
| 7          | 6A             | This power input pin connects to the anode of the diode for channel 6. |
| 8          | 7A             | This power input pin connects to the anode of the diode for channel 7. |

| Pin Number | Pin Designator | Description  |
|------------|----------------|--|
| 9          | 8A             | This power input pin connects to the anode of the diode for channel 8.   |
| 10         | GND            | This power input pin connects to GND.                                    |
| 11         | GND            | This power input pin connects to GND.                                    |
| 12         | 8K             | This power input pin connects to the cathode of the diode for channel 8. |
| 13         | 7K             | This power input pin connects to the cathode of the diode for channel 7. |
| 14         | 6K             | This power input pin connects to the cathode of the diode for channel 6. |
| 15         | 5K             | This power input pin connects to the cathode of the diode for channel 5. |
| 16         | 4K             | This power input pin connects to the cathode of the diode for channel 4. |
| 17         | 3K             | This power input pin connects to the cathode of the diode for channel 3. |
| 18         | 2K             | This power input pin connects to the cathode of the diode for channel 2. |
| 19         | 1K             | This power input pin connects to the cathode of the diode for channel 1. |
| 20         | GND            | This power input pin connects to GND.                                    |

## Block Diagram

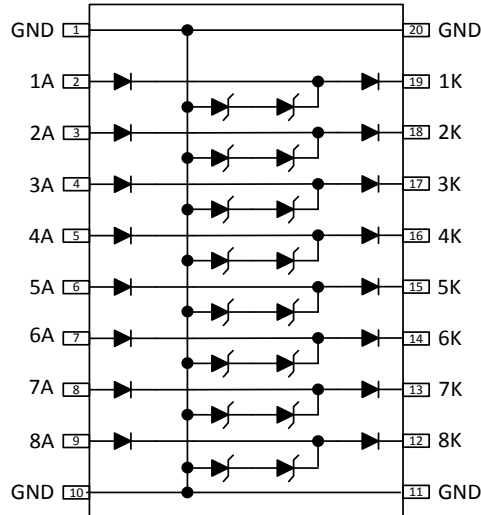


Figure 3 · Top Level Block Diagram of LX7710

Two Zener diodes in series provide redundant ESD protection. They are capable of up to 1A forward current and are suitable for suppressing inductive kickback.

## Absolute Maximum Ratings

**Note:** Stresses above those listed in “ABSOLUTE MAXIMUM RATINGS”, may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exceeding these ratings, even momentarily, can cause immediate damage, or negatively impact long-term operating reliability.

| Parameter  | Min | Max          | Units |
|--|-----|--------------|-------|
| Reverse Voltage per Diode  |     | 140          | V     |
| Reverse Current (into K pin or out of GND pin)                           |     | 100          | μA    |
| Continuous Forward Current   |     | 1            | A     |
| Storage Temperature Range  | -65 | 150          | °C    |
| Operating Junction Temperature Range                                     | -55 | 150          | °C    |
| Peak Lead Solder Temperature (10 seconds)                                |     | 300          | °C    |
| Package Peak Temperature for Solder Reflow (40 seconds maximum exposure) |     | 260 (+0, -5) | °C    |

## Thermal Properties

| Thermal Resistance                                 | Typ | Units                |
|--|-----|----------------------|
| Thermal Resistance-Junction to Case, $\theta_{JC}$ | 3   | $^{\circ}\text{C/W}$ |

**Note:** The  $\theta_{JC}$  number is for conduction only to the ceramic base of the package. It assumes that the ceramic base has a thermal epoxy underneath the ceramic package to exhaust the heat from the package into the PCB, or other mounting surface.

## Electrical Characteristics

Unless otherwise noted, these specifications apply  $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ . Low duty cycle pulse testing is used which keeps junction and case temperatures equal to the ambient temperature.

| Symbol         | Parameter         | Test Condition  | Min  | Typ  | Max  | Units         |
|----------------|-------------------|---|------|------|------|---------------|
| $V_{BR\_G-A}$  | Reverse Breakdown | $I_R = 10\mu\text{A}$ ; GND to anode  | 125  |      |      | V             |
| $V_{BR\_K-A}$  | Reverse Breakdown | $I_R = 10\mu\text{A}$ ; K to A Note:1   | 125  |      |      |               |
| $V_{BR\_A-G}$  | ESD Breakdown     | $I_R = 10\mu\text{A}$ ; anode to GND Note:1                                     | 125  |      |      |               |
| $V_{FWD\_A-K}$ | Forward Voltage   | $I_F = 100\text{mA}$  | 1.49 | 1.54 | 1.61 | V             |
|                |                   | $I_F = 350\text{mA}$  | 1.65 | 1.74 | 1.86 |               |
|                |                   | $I_F = 700\text{mA}$  | 1.80 | 1.92 | 2.08 |               |
|                |                   | $I_F = 700\text{mA}$ at $125^{\circ}\text{C}$                                   | 1.64 | 1.76 | 1.84 |               |
|                |                   | $I_F = 700\text{mA}$ at $-55^{\circ}\text{C}$                                   | 1.91 | 2.07 | 2.24 |               |
| $I_R$          | Reverse Current   | $V_R = 75\text{V}$ at $-55^{\circ}\text{C}$ and $25^{\circ}\text{C}$ ; GND to A |      |      | 100  | nA            |
|                |                   | $V_R = 75\text{V}$ at $125^{\circ}\text{C}$ ; GND to A                          |      |      | 50   | $\mu\text{A}$ |
| C              | Capacitance       | $V_R = 0\text{V}$ at $f = 1\text{MHz}$ ; K to A                                 | 10   | 15   | 30   | pF            |

Note: 1 These are go/no-go tests.

## Typical Application

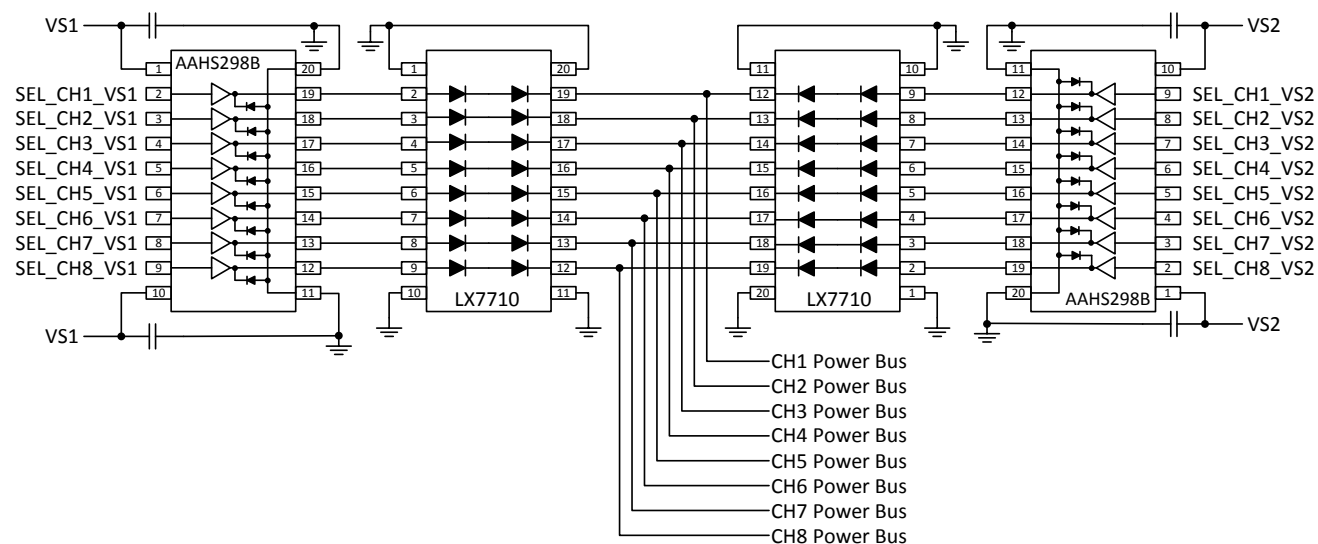


Figure 4 · LX7710 Typical Application

Note: For LX7710, it is necessary to Ground pins 1, 10, 11, and 20 for all applications.

## Typical Performance Curves

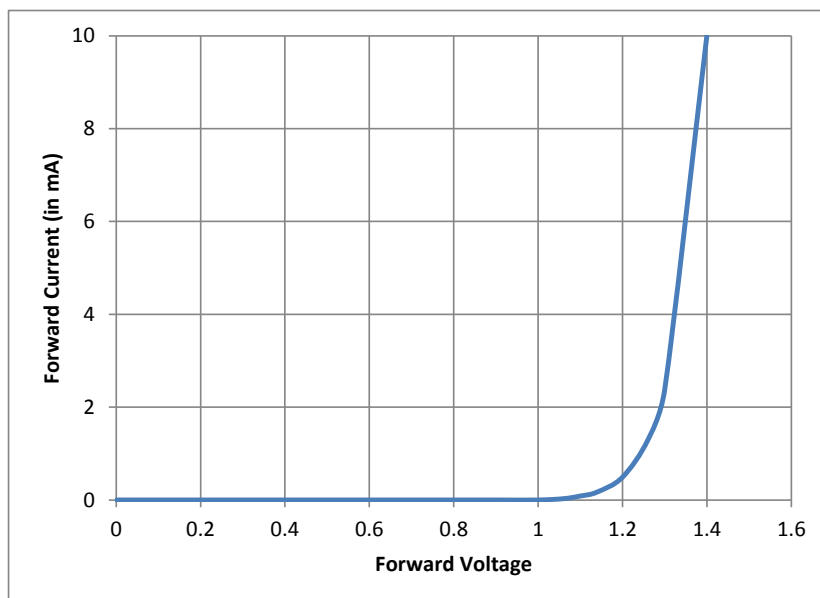


Figure 5 · Forward Characteristics : Measured A to K (two diodes in series)

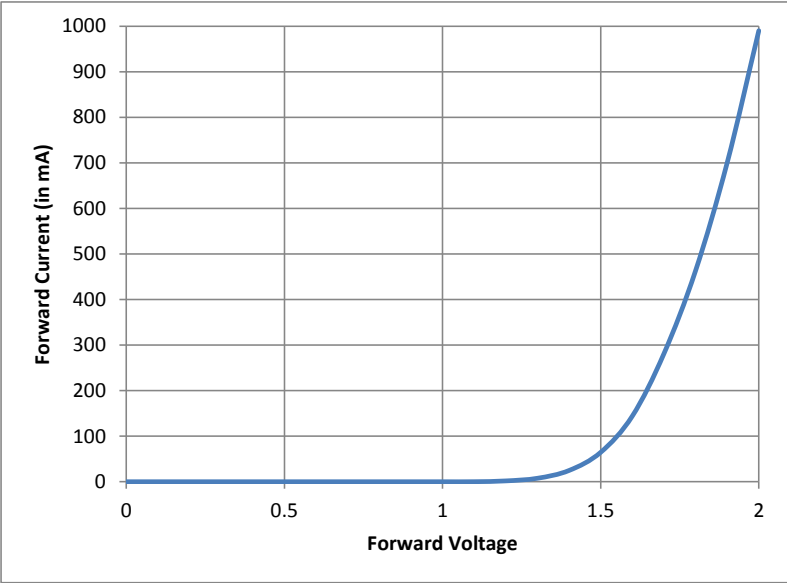
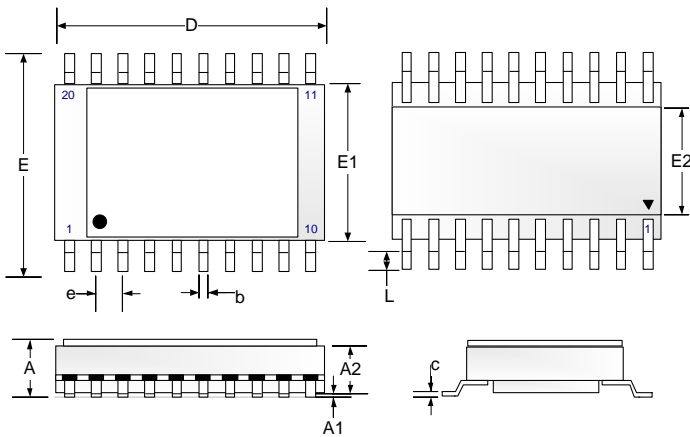


Figure 6 · Forward Characteristics : Measured A to K (two diodes in series)

## Ceramic SOIC 20L Package Outline Dimensions



| Dim | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 2.28        | 2.92  | 0.090     | 0.115 |
| A1  |             | 0.38  |           | 0.015 |
| A2  | 1.78        | 2.41  | 0.070     | 0.095 |
| b   | 0.36        | 0.48  | .0140     | .0190 |
| c   | 0.15        | 0.25  | 0.006     | 0.010 |
| D   | 12.45       | 13.08 | 0.490     | 0.515 |
| E   | 10.16       | 11.18 | 0.400     | 0.440 |
| E1  | 7.24        | 7.62  | 0.285     | 0.300 |
| E2  | 4.70 BSC    |       | 0.185 BSC |       |
| e   | 1.27 BSC    |       | 0.050 BSC |       |
| L   | 0.50        | 0.76  | 0.020     | 0.030 |

**Note:**  
Dimensions are in mm, inches for reference only

Figure 7 · Package Dimensions



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