

# 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 screened to MIL-PRF-38535 Class V, or Class B requirements.

## 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

## Levels Available

- MIL-PRF-38535 Class B
- MIL-PRF-38535 Class V

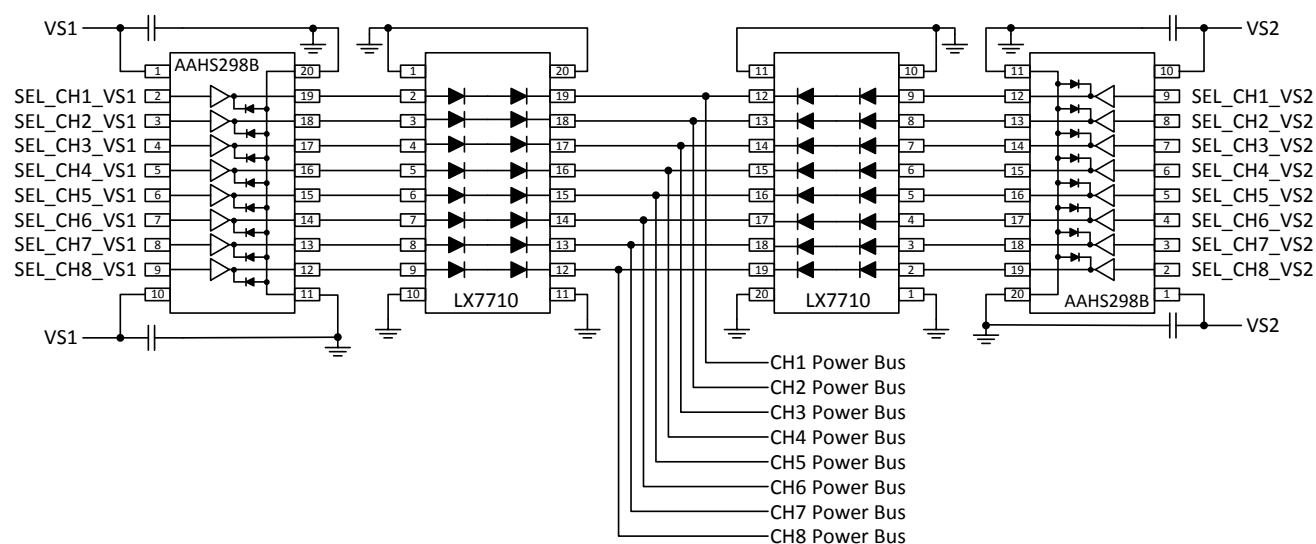


Figure 1 · Product Highlight of Redundant Switchable Power Bus

## Pin Configuration and Pinout

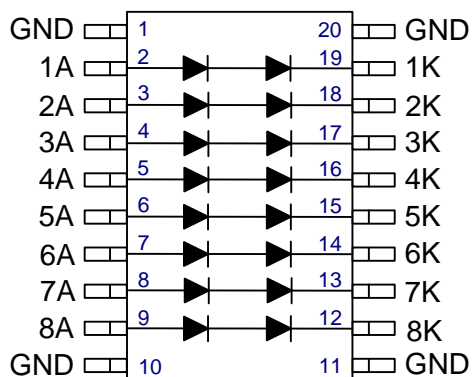


Figure 2 · LX7710 Pinout

## Ordering Information

Junction Temperature	Type	Package	Part Number	Packaging Type
-55°C to 150°C	Flat Hermetic	CSOIC 20L	LX7710MDWC-ES	Tray
			LX7710MDWC-EQ	
			LX7710MDWC-EV	
<div>-ES = Engineering samples</div> <div>-EQ = Microsemi's flow that follows MIL-PRF-38535 requirements for Class B processing.</div> <div>-EV = Microsemi's "Equivalent V" flow that follows MIL-PRF-38535 requirements for Class V processing.</div>				

## 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.

Pin Number	Pin Designator	Description
8	7A	This power input pin connects to the anode of the diode for channel 7.
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

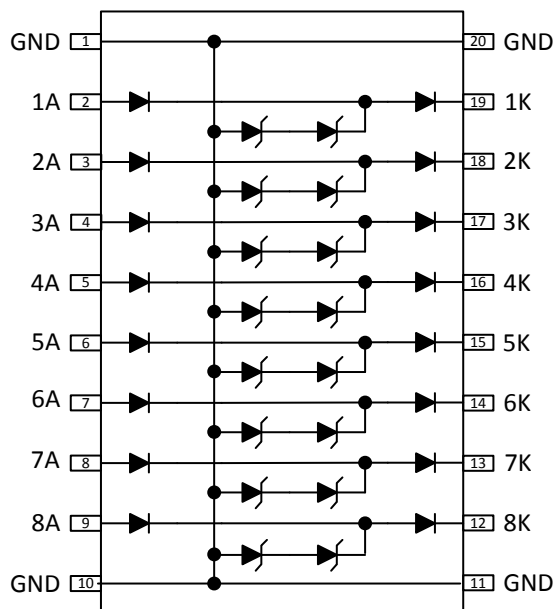


Figure 3 · Top Level Block Diagram of LX7710

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, $\theta_{JC}$	2.24	°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  $T_J = 25^\circ\text{C}$ . 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	125			
$V_{BR\_A-G}$	ESD Breakdown	$I_R = 10\mu\text{A}$ ; anode to GND	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	$V_R = 75\text{V}$ ; 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

## Typical Application

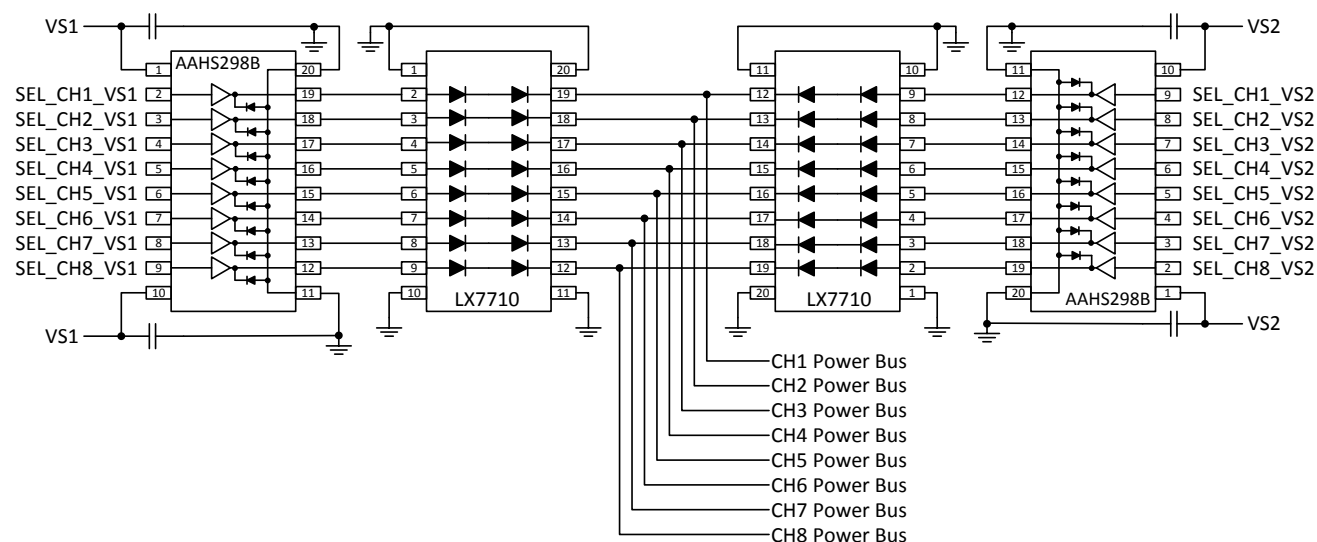


Figure 4 · LX7710 Typical Application

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

## Typical Performance Curves

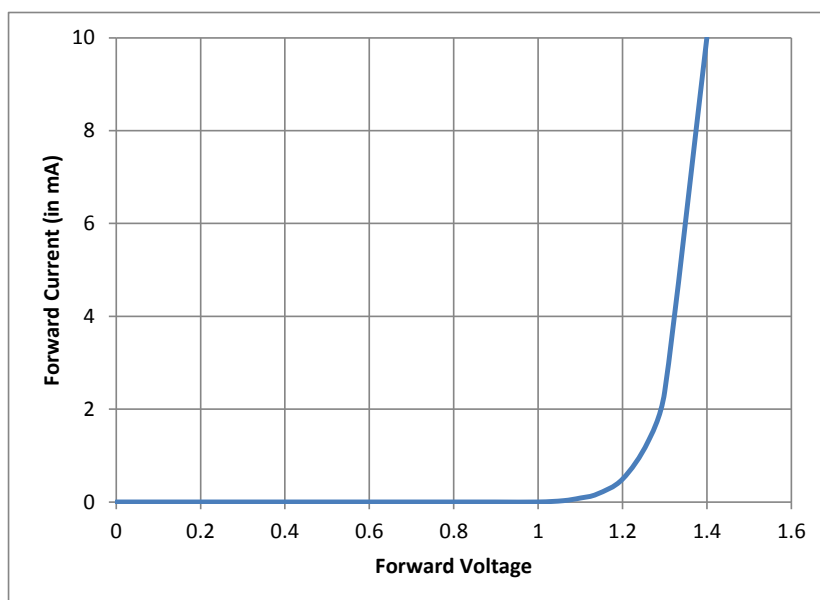


Figure 5 · Forward Characteristics : Measured A to K (two diodes in series)

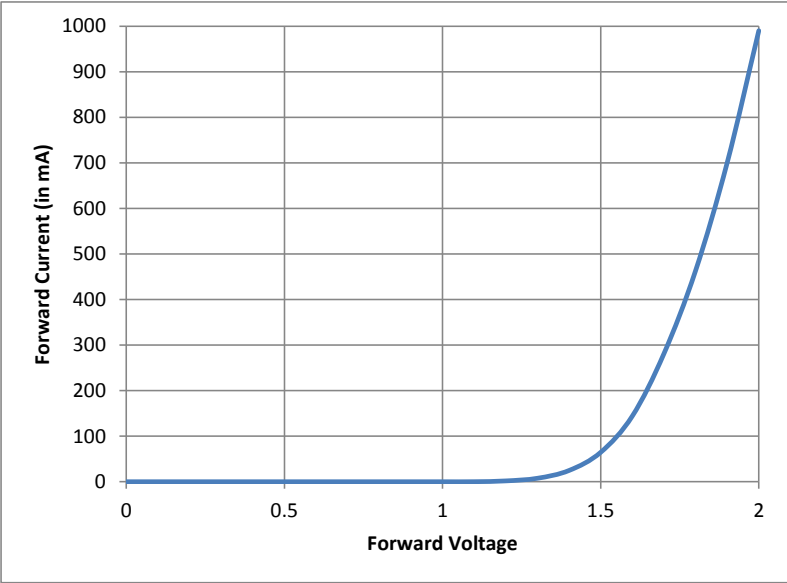
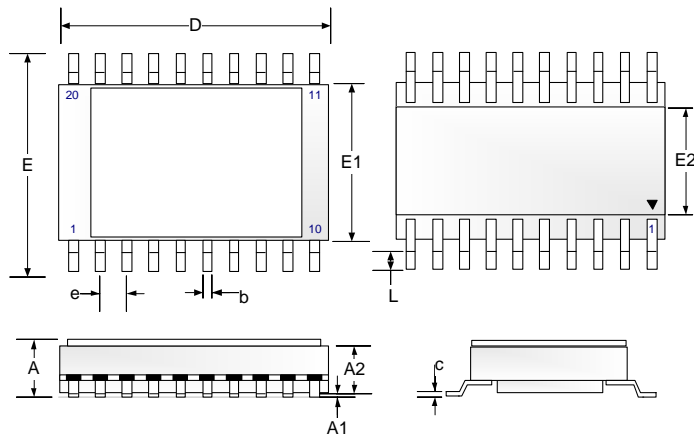


Figure 6 · Forward Characteristics : Measured A to K (two diodes in series)

## 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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