

Silicon – Diode Pair

FA2360E

(Diode Pair FD6389)

50V/300mA

DATASHEET

OEM – Fairchild

Source: Fairchild Databook 1978

FA SERIES

PAIR, QUAD AND BRIDGE DIODE ASSEMBLIES

SILICON PLANAR EPITAXIAL

- ΔV_F ... Down to 3 mV (MAX)
- ΔI_R ... Down to 10 nA (MAX)

GENERAL DESCRIPTION

The FA series of diode assemblies are pairs, quads and bridges composed of individual glass diodes encapsulated in epoxy packages. The pairs and quads are also available in unencapsulated form, the diodes being securely taped together for shipment.

These assemblies feature very tight matching characteristics over broad temperature and current ranges.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

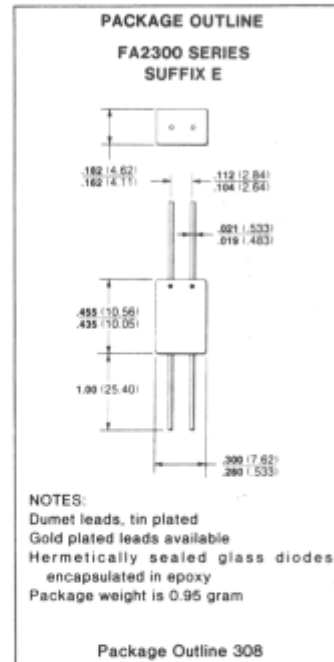
| | |
|--|-----------------|
| Storage Temperature Range | -65°C to +200°C |
| Maximum Junction Operating Temperature | +175°C |
| Lead Temperature | +260°C |

Power Dissipation (Note 2)

| | |
|---|------------|
| Maximum Total Power Dissipation at 25°C Ambient | |
| Each Diode | 250 mW |
| Encapsulated Package | 500 mW |
| Linear Power Derating factor (from 25°C) | |
| Each Diode | 1.67 mW/°C |
| Encapsulated Package | 3.33 mW/°C |

Maximum Voltage and Currents

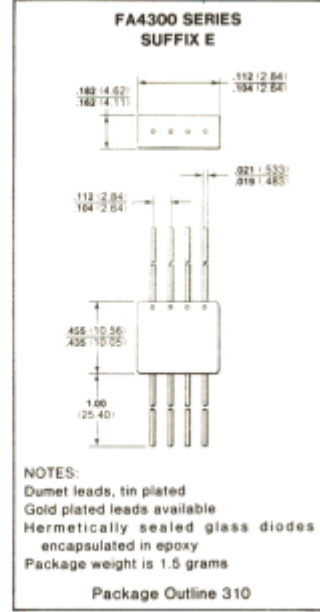
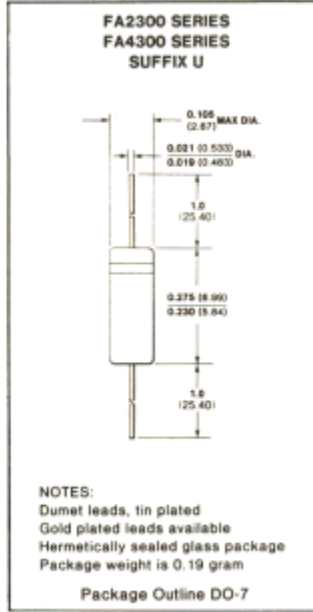
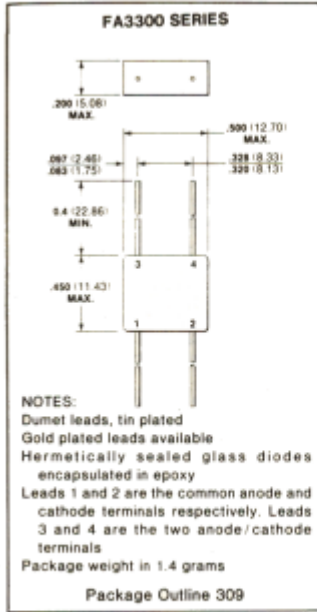
| Basic Diode (See Specification below) | FD1389 | FD2389 | FD3389 | FD6389 |
|---|---------------------------|--------|--------|--------|
| WIV Working Inverse Voltage | 75 V | 150 V | 125 V | 50 V |
| I_O Average Rectified Current | 100 mA | 100 mA | 150 mA | 200 mA |
| I_F Continuous Forward Current | 150 mA | 150 mA | 225 mA | 300 mA |
| i_f Recurrent Peak Forward Current | 300 mA | 300 mA | 450 mA | 600 mA |
| $i_{f(surge)}$ Peak Forward Surge Current | | | | |
| | Pulse width = 1.0 s | 1.0 A | 1.0 A | 1.0 A |
| | Pulse width = 1.0 μ s | 4.0 A | 4.0 A | 4.0 A |



MATCHING CHARACTERISTICS (Apply over temperature range of -55°C to +100°C)

| Basic Diode (See Specification below) | Forward Current Matching Range (Notes 4 & 6) | Reverse Current Match (ΔI_R Maximum) (Note 3) | Forward Voltage Match (ΔV_F Maximum) | Assembly Type Number | | | | |
|---------------------------------------|--|--|---|---------------------------|-----------------------------|---------------------------|-----------------------------|-----------------|
| | | | | Encap- sulated Pair | Unencap- sulated Pair | Encap- sulated Quad | Unencap- sulated Quad | Bridge (Note 6) |
| FD1389 | 10 μ A to 1.0 mA | | 3.0 mV | FA2310E | FA2310U | FA4310E | FA4310U | FA3310 |
| FD1389 | 10 μ A to 1.0 mA | | 10 mV | FA2311E | FA2311U | FA4311E | FA4311U | FA3311 |
| FD1389 | 1.0 mA to 10 mA | | 5.0 mV | FA2312E | FA2312U | FA4312E | FA4312U | FA3312 |
| FD1389 | 1.0 mA to 10 mA | | 15 mV | FA2313E | FA2313U | FA4313E | FA4313U | FA3313 |
| FD2389 | 10 μ A to 1.0 mA | | 3.0 mV | FA2320E | FA2320U | FA4320E | FA4320U | FA3320 |
| FD2389 | 10 μ A to 1.0 mA | | 10 mV | FA2321E | FA4321U | FA4321E | FA4321U | FA3321 |
| FD2389 | 1.0 mA to 10 mA | | 5.0 mV | FA2322E | FA2322U | FA4322E | FA4322U | FA3322 |
| FD2389 | 1.0 mA to 10 mA | | 15 mV | FA2323E | FA2323U | FA4323E | FA4323U | FA3323 |
| FD2389 | 1.0 mA to 10 mA | | 10 mV | FA2324E | FA2324U | FA4324E | FA4324U | FA3324 |
| FD2389 | 10 mA to 100 mA | | 20 mV | FA2325E | FA2325U | FA4325E | FA4325U | FA3325 |
| FD3389 | 10 μ A to 1.0 mA | (2.0 + 0.064 V_R) nA | 10 mV | FA2330E | FA2330U | FA4330E | FA4330U | FA3330 |
| FD3389 | 1.0 mA to 10 mA | (2.0 + 0.064 V_R) nA | 15 mV | FA2331E | FA2331U | FA4331E | FA4331U | FA3331 |
| FD3389 | 10 mA to 100 mA | (2.0 + 0.064 V_R) nA | 20 mV | FA2332E | FA2332U | FA4332E | FA4332U | FA3332 |
| FD3389 | 10 μ A to 1.0 mA | (4.0 + 0.128 V_R) nA | 10 mV | FA2333E | FA2333U | FA4333E | FA4333U | FA3333 |
| FD3389 | 1.0 mA to 10 mA | (4.0 + 0.128 V_R) nA | 15 mV | FA2334E | FA2334U | FA4334E | FA4334U | FA3334 |
| FD3389 | 10 mA to 100 mA | (4.0 + 0.128 V_R) nA | 20 mV | FA2335E | FA2335U | FA4335E | FA4335U | FA3335 |
| FD6389 | 10 mA to 100 mA | | 10 mV | FA2360E | FA2360U | FA4360E | FA4360U | FA3360 |
| FD6389 | 10 mA to 100 mA | | 20 mV | FA2361E | FA2361U | FA4361E | FA4361U | FA3361 |

FAIRCHILD • FA SERIES



BASIC DIODE ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted)

| SYMBOL | CHARACTERISTIC | FD1389 | | FD2389 | | FD3389 | | FD6389 | | UNITS | TEST CONDITIONS |
|----------|-----------------------|--------|------------|--------|--|--------|--|--------|--|---------------|---|
| | | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | | |
| BV | Breakdown Voltage | 100 | | 200 | | 150 | | 75 | | V | $I_R = 5.0 \mu A$ $I_R = 100 \mu A$ |
| I_R | Reverse Current | | 100 100 | | 100 100 | | 1.0 3.0 | | 100 100 | nA μA | $V_R = WIV$ $V_R = WIV, T_A = 150^\circ C$ |
| V_F | Forward Voltage | | | | 1.000 0.925 0.860 0.790 0.740 0.800 0.725 0.670 | | 1.000 0.930 0.880 0.840 0.810 0.770 0.730 0.710 | | 1.000 0.920 0.860 0.790 0.750 0.710 0.670 0.630 | V | $I_F = 200 \text{ mA}$ $I_F = 100 \text{ mA}$ $I_F = 50 \text{ mA}$ $I_F = 20 \text{ mA}$ $I_F = 10 \text{ mA}$ $I_F = 5.0 \text{ mA}$ $I_F = 2.0 \text{ mA}$ $I_F = 1.0 \text{ mA}$ |
| C | Capacitance (Note 5) | | 2.0 | | 5.0 | | 6.0 | | 3.0 | pF | $V_R = 0, f = 1 \text{ MHz}$ |
| t_{rr} | Reverse Recovery Time | | 4.0 | | 50 | | | | 4.0 | ns | $I_F = I_R = 10 \text{ mA}$ Recover to 1.0 mA $I_F = I_R = 30 \text{ mA}$ Recover to 1.0 mA $I_F = I_R = 200 \text{ mA}$ Recover to 20 mA |

- NOTES:
- These are limiting values above which life or satisfactory performance may be impaired.
 - These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
 - The Reverse Current Match (ΔI_R) is the difference in reverse current between the diode having the highest I_R and that having the lowest I_R in a given assembly. The reverse voltage (V_R) in the ΔI_R calculation can be any value up to 125 V. For example, the maximum ΔI_R for an FA2330E at V_R of 10 V is $(2.0 \pm 0.054 \times 10) \text{ nA}$ or 2.84 nA.
 - The Forward Current Matching Ranges between 10 μA and 10 mA may be applied either as a dc current or a pulse current. Above 10 mA, however, the matching characteristics are guaranteed only for low duty cycle ($\leq 1\%$) pulse current. Conditions of test are shown in the characteristic curve and test circuit section of this book (see Note 7).
 - Capacitance cannot be monitored independently on each diode in a bridge configuration. In measuring capacitance in a bridge, the limit is 4/3 that shown in the basic diode electrical characteristics.
 - For matched bridges, the forward current range specified is per leg. Therefore, twice the current specified is applied to the assembly.
 - For product family characteristics curves for the basic diodes used in the assemblies, refer to the following parts of Section 4.
 FD1389 D4
 FD2389 D1
 FD3389 D2
 FD6389 D4
 For test circuits, refer to Chapter 4, D18.

CURVE SET NUMBER D4

HIGH SPEED GENERAL PURPOSE SMALL SIGNAL DIODE

TYPICAL ELECTRICAL CHARACTERISTIC CURVES
AT 25°C AMBIENT TEMPERATURE UNLESS OTHERWISE NOTED

