Silicon – Diode Pair

FA2310E

(Basic Diode FD1389)

75V/150mA

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)**

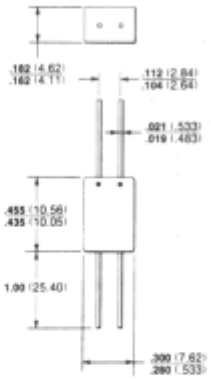
GENERAL DESCRIPTION

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.

PACKAGE OUTLINE

FA2300 SERIES
SUFFIX E



NOTES:
Dumet leads, tin plated
Gold plated leads available
Hermetically sealed glass diodes encapsulated in epoxy
Package weight is 0.95 gram

Package Outline 308

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

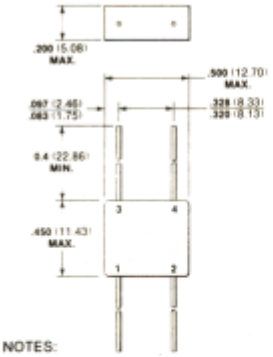
	Basic Diode (See Specification below)	**FD1389**	**FD2389**	**FD3389**	**FD6389**
WIV	Working Inverse Voltage	75 V	150 V	125 V	50 V
I_O	Average Rectified Current	100 mA	100 mA	150 mA	200 mA
I_F	Continuous Forward Current	150 mA	150 mA	225 mA	300 mA
i_f	Recurrent Peak Forward Current	300 mA	300 mA	450 mA	600 mA
$i_{f(surge)}$	Peak Forward Surge Current				
	Pulse width = 1.0 s	1.0 A	1.0 A	1.0 A	1.0 A
	Pulse width = 1.0 μs	4.0 A	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: Encapsulated Pair	Unencapsulated Pair	Encapsulated Quad	Unencapsulated Quad	Bridge (Note 6)
FD1389	10 μA to 1.0 mA		3.0 mV	FA2310E	FA2310U	FA4310E	FA4310U	FA3310
FD1389	10 μA 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 μA to 1.0 mA		3.0 mV	FA2320E	FA2320U	FA4320E	FA4320U	FA3320
FD2389	10 μA 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	10 mA to 100 mA		10 mV	FA2324E	FA2324U	FA4324E	FA4324U	FA3324
FD2389	10 mA to 100 mA		20 mV	FA2325E	FA2325U	FA4325E	FA4325U	FA3325
FD3389	10 μA 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 μA 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

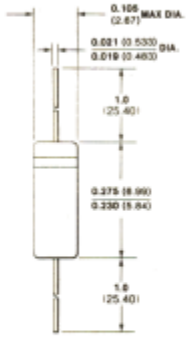
FA3300 SERIES



NOTES:
Dumet leads, tin plated
Gold plated leads available
Hermetically sealed glass diodes encapsulated in epoxy
Leads 1 and 2 are the common anode and cathode terminals respectively. Leads 3 and 4 are the two anode/cathode terminals
Package weight in 1.4 grams

Package Outline 309

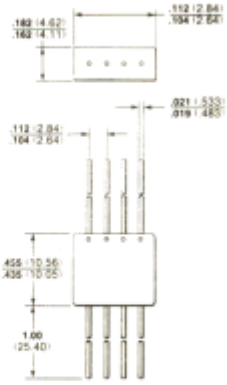
FA2300 SERIES
FA4300 SERIES
SUFFIX U



NOTES:
Dumet leads, tin plated
Gold plated leads available
Hermetically sealed glass package
Package weight is 0.19 gram

Package Outline DO-7

FA4300 SERIES
SUFFIX E



NOTES:
Dumet leads, tin plated
Gold plated leads available
Hermetically sealed glass diodes encapsulated in epoxy
Package weight is 1.5 grams

Package Outline 310

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 V	I_R = 5.0 µA I_R = 100 µA
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°C
V_F	Forward Voltage		 1.000 0.875 0.800 0.725 0.670		1.000 0.925 0.860 0.790 0.740 0.700 0.620 0.610		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 V V V V V V V	I_F = 200 mA I_F = 100 mA I_F = 50 mA I_F = 20 mA I_F = 10 mA I_F = 5.0 mA I_F = 2.0 mA I_F = 1.0 mA
C	Capacitance (Note 5)		2.0		5.0		6.0		3.0	pF	V_R = 0, f = 1 MHz
t_{rr}	Reverse Recovery Time		4.0		 50				 4.0	ns ns ns	$I_f = I_r$ = 10 mA Recover to 1.0 mA $I_f = I_r$ = 30 mA Recover to 1.0 mA $I_f = I_r$ = 200 mA Recover to 20 mA

NOTES:
1. These are Limiting values above which life or satisfactory performance may be impaired
2. These are steady state Limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
3. 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 + 0.064 x 10) nA or 2.64 nA.
4. 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 (≤ 1%) pulse current. Conditions of test are shown in the characteristic curve and test circuit section of this book (see Note 7).
5. 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.
6. For matched bridges, the forward current range specified is per leg. Therefore, twice the current specified is applied to the assembly.
7. 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.

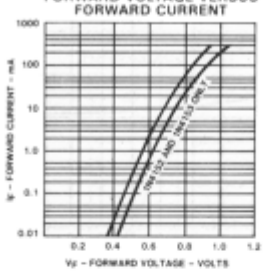
CURVE SET NUMBER D4

HIGH SPEED GENERAL PURPOSE SMALL SIGNAL DIODE

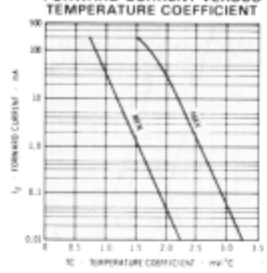
TYPICAL ELECTRICAL CHARACTERISTIC CURVES

AT 25°C AMBIENT TEMPERATURE UNLESS OTHERWISE NOTED

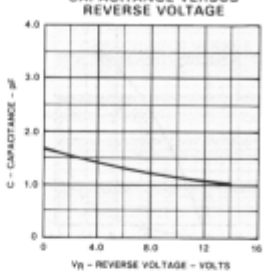
FORWARD VOLTAGE VERSUS FORWARD CURRENT



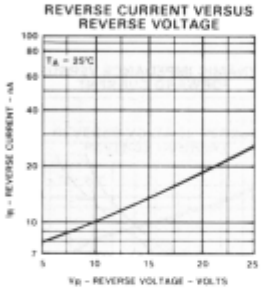
FORWARD CURRENT VERSUS TEMPERATURE COEFFICIENT



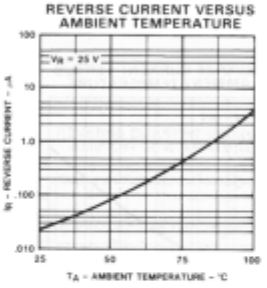
CAPACITANCE VERSUS REVERSE VOLTAGE



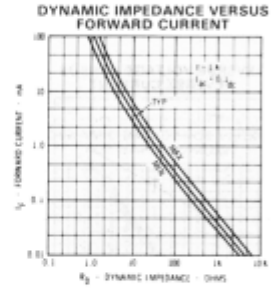
REVERSE CURRENT VERSUS REVERSE VOLTAGE



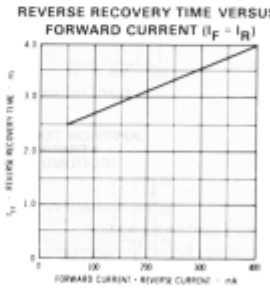
REVERSE CURRENT VERSUS AMBIENT TEMPERATURE



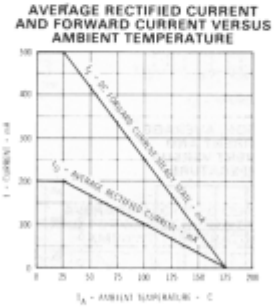
DYNAMIC IMPEDANCE VERSUS FORWARD CURRENT



REVERSE RECOVERY TIME VERSUS FORWARD CURRENT ($I_F = I_R$)



AVERAGE RECTIFIED CURRENT AND FORWARD CURRENT VERSUS AMBIENT TEMPERATURE



POWER DERATING CURVE