

3469674 FAIRCHILD SEMICONDUCTOR

84D 27478 D

**FAIRCHILD**

A Schlumberger Company

**1N658/FDLL658**

General Purpose Diodes

T-01-09

- BV... 120 V (MIN) @ 100  $\mu$ A
- V<sub>F</sub>... 1.0 V (MAX) @ 100 mA

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

Storage Temperature Range  
Maximum Operating Junction Temperature  
Lead Temperature

-65°C to +200°C  
+175°C  
+200°C

**Power Dissipation (Note 2)**

Maximum Total Dissipation at 25°C Ambient  
Linear Derating Factor (from 25°C)

500 mW  
3.33 mW/°C

**Maximum Voltage and Currents**

WIV Working Inverse Voltage  
I<sub>O</sub> Average Rectified Current  
I<sub>F</sub> Forward Current Steady State  
I<sub>F</sub>(surge) Peak Forward Surge Current  
Pulse Width = 1.0s  
Pulse Width = 1.0 $\mu$ s

100 V  
200 mA  
500 mA  
1.0 A  
4.0 A

**PACKAGES**

1N658 DO-35  
FDLL658 LL-34

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1400 family.

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

| SYMBOL          | CHARACTERISTIC        | MIN | MAX      | UNITS         | TEST CONDITIONS                                                                                                                           |
|-----------------|-----------------------|-----|----------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| V <sub>F</sub>  | Forward Voltage       |     | 1.0      | V             | I <sub>F</sub> = 100 mA                                                                                                                   |
| I <sub>R</sub>  | Reverse Current       |     | 50<br>25 | nA<br>$\mu$ A | V <sub>R</sub> = 50 V<br>V <sub>R</sub> = 60 V, T <sub>A</sub> = 150°C                                                                    |
| BV              | Breakdown Voltage     | 120 |          | V             | I <sub>R</sub> = 100 $\mu$ A                                                                                                              |
| t <sub>rr</sub> | Reverse Recovery Time |     | 300      | ns            | V <sub>R</sub> = 40 V, I <sub>F</sub> = 5.0 mA,<br>R <sub>L</sub> = 2.0 k $\Omega$ , C <sub>L</sub> = 10 pF,<br>Recovery to 80 k $\Omega$ |

**NOTES:**

1. The maximum ratings 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 operations.
3. For product family characteristic curves, refer to Chapter 4, D1.

**FAIRCHILD**

A Schlumberger Company

**1N659/660/661**  
**FDLL659/660/661**

General Purpose Diodes

T-01-09

- $V_F \dots 1.0 \text{ V (MAX) @ } 6.0 \text{ mA}$
- $t_{rr} \dots 300 \text{ ns (MAX)}$

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

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

**Power Dissipation (Notes 2)**

|                                           |            |
|-------------------------------------------|------------|
| Maximum Total Dissipation at 25°C Ambient | 500 mW     |
| Linear Derating Factor (from 25°C)        | 3.33 mW/°C |

**Maximum Voltage and Currents**

|                       |                              | 1N659  | 1N660  | 1N661  |
|-----------------------|------------------------------|--------|--------|--------|
| WIV                   | Working Inverse Voltage      | 50 V   | 100 V  | 200 V  |
| $I_O$                 | Average Rectified Current    | 200 mA | 200 mA | 200 mA |
| $I_F$                 | Forward Current Steady State | 500 mA | 500 mA | 500 mA |
| $I_{f(\text{surge})}$ | Peak Forward Surge Current   |        |        |        |
|                       | Pulse Width = 1.0s           | 1.0 A  | 1.0 A  | 1.0 A  |
|                       | Pulse Width = 1.0 $\mu$ s    | 4.0 A  | 4.0 A  | 4.0 A  |

**PACKAGES**

|         |       |
|---------|-------|
| 1N659   | DO-35 |
| 1N660   | DO-35 |
| 1N661   | DO-35 |
| FDLL659 | LL-34 |
| FDLL660 | LL-34 |
| FDLL661 | LL-34 |

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1200 family.

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

| SYMBOL   | CHARACTERISTIC        | 1N659 |     | 1N660 |     | 1N661 |     | UNITS   | TEST CONDITIONS                                                                                                            |
|----------|-----------------------|-------|-----|-------|-----|-------|-----|---------|----------------------------------------------------------------------------------------------------------------------------|
|          |                       | MIN   | MAX | MIN   | MAX | MIN   | MAX |         |                                                                                                                            |
| $V_F$    | Forward Voltage       |       | 1.0 |       | 1.0 |       | 1.0 | V       | $I_F = 6.0 \text{ mA}$                                                                                                     |
| $I_R$    | Reverse Current       |       | 5.0 |       | 5.0 |       | 10  | $\mu$ A | $V_R = 50 \text{ V}$                                                                                                       |
|          |                       |       | 25  |       | 50  |       | 100 | $\mu$ A | $V_R = 100 \text{ V}$                                                                                                      |
|          |                       |       |     |       |     |       |     | $\mu$ A | $V_R = 200 \text{ V}$                                                                                                      |
|          |                       |       |     |       |     |       |     | $\mu$ A | $V_R = 50 \text{ V}, T_A = 100^\circ\text{C}$                                                                              |
|          |                       |       |     |       |     |       |     | $\mu$ A | $V_R = 100 \text{ V}, T_A = 100^\circ\text{C}$                                                                             |
|          |                       |       |     |       |     |       |     | $\mu$ A | $V_R = 200 \text{ V}, T_A = 100^\circ\text{C}$                                                                             |
| BV       | Breakdown Voltage     | 60    |     | 120   |     | 240   |     | V       | $I_R = 100 \mu\text{A}$                                                                                                    |
| $t_{rr}$ | Reverse Recovery Time |       | 300 |       | 300 |       | 300 | ns      | $V_r = 35 \text{ V}, I_t = 30 \text{ mA}, R_L = 2.0 \text{ k}\Omega$<br>$C_L = 10 \text{ pF}$ , Recovery to 400 k $\Omega$ |

**NOTES:**

- The maximum ratings 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 operations.
- For product family characteristic curves, refer to Chapter 4, D4 for 1N659, 4, D1 for 1N660 and 1N661.

**FAIRCHILD**

A Schlumberger Company

**1N746 through 1N759** T-11-11  
500 mW Silicon Linear Diodes**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**Storage Temperature Range  
Maximum Junction Operating Temperature  
Lead Temperature-65°C to +200°C  
+175°C  
+260°C**PACKAGES**

All Devices

DO-35

**Power Dissipation (Note 2)**Maximum Total Power Dissipation at 25°C Ambient  
Linear Power Derating Factor (from 25°C)500 mW  
3.33 mW/°C**ELECTRICAL CHARACTERISTICS (25°C Ambient unless otherwise noted)**

| SYMBOL         | Z <sub>Z</sub>                                                        | V <sub>Z</sub>                                                   | I <sub>R</sub>                                     |        | TC                                                         |
|----------------|-----------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------|--------|------------------------------------------------------------|
| Characteristic | Maximum<br>Zener<br>Impedance<br>(Note 4)<br>(I <sub>Z</sub> = 20 mA) | Nominal<br>Zener Voltage<br>(Note 3)<br>(I <sub>Z</sub> = 20 mA) | Maximum Reverse<br>Current (V <sub>R</sub> = 1.0V) |        | Typical<br>Temperature<br>Coefficient<br>of V <sub>Z</sub> |
|                |                                                                       |                                                                  | @25°C                                              | @150°C |                                                            |
| UNIT           | Ω                                                                     | V                                                                | μA                                                 | μA     | %/°C                                                       |
| 1N746          | 28.0                                                                  | 3.3                                                              | 10.0                                               | 30.0   | -0.070                                                     |
| 1N747          | 24.0                                                                  | 3.6                                                              | 10.0                                               | 30.0   | -0.065                                                     |
| 1N748          | 23.0                                                                  | 3.9                                                              | 10.0                                               | 30.0   | -0.060                                                     |
| 1N749          | 22.0                                                                  | 4.3                                                              | 2.0                                                | 30.0   | -0.055                                                     |
| 1N750          | 19.0                                                                  | 4.7                                                              | 2.0                                                | 30.0   | -0.043                                                     |
| 1N751          | 17.0                                                                  | 5.1                                                              | 1.0                                                | 20.0   | ±0.030                                                     |
| 1N752          | 11.0                                                                  | 5.6                                                              | 1.0                                                | 20.0   | ±0.028                                                     |
| 1N753          | 7.0                                                                   | 6.2                                                              | 0.1                                                | 20.0   | +0.045                                                     |
| 1N754          | 5.0                                                                   | 6.8                                                              | 0.1                                                | 20.0   | +0.050                                                     |
| 1N755          | 6.0                                                                   | 7.5                                                              | 0.1                                                | 20.0   | +0.058                                                     |
| 1N756          | 8.0                                                                   | 8.2                                                              | 0.1                                                | 20.0   | +0.062                                                     |
| 1N757          | 10.0                                                                  | 9.1                                                              | 0.1                                                | 20.0   | +0.068                                                     |
| 1N758          | 17.0                                                                  | 10.0                                                             | 0.1                                                | 20.0   | +0.075                                                     |
| 1N759          | 30.0                                                                  | 12.0                                                             | 0.1                                                | 20.0   | +0.077                                                     |

**NOTES:**

- These ratings are limiting values above which the serviceability of the diode may be impaired.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
- Type numbers without suffix A have ±10% tolerance on nominal V<sub>Z</sub>.  
Type numbers with suffix A have ±5% tolerance on nominal V<sub>Z</sub>.
- The Zener impedance Z<sub>Z</sub> is derived by superimposing a 60 Hz 2 mA (RMS) signal on the 20 mA I<sub>Z</sub> test current.
- For product family characteristic curves, refer to Chapter 4, D13

**FAIRCHILD**

A Schlumberger Company

**1N/FDLL914/A/B/916/A/B****1N/FDLL4148/4149/4446****1N/FDLL4447/4448/4449**

High Conductance Ultra Fast

Switching Diodes T-03-D9

- $t_{rr}$ ... 4.0 ns (MAX)

- BV... 100 V (MIN)

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

Storage Temperature Range

Max Junction Operating Temperature

Lead Temperature

-65° to +200°C

+175°C

+260°C

**Power Dissipation (Note 2)**

Maximum Total Dissipation at 25°C

Linear Derating Factor (from 25°C)

500 mW

3.33 mW/°C

**Maximum Voltage and Currents**

WIV

Working Inverse Voltage

 $I_O$ 

Average Rectified Current

 $I_F$ 

DC Forward Current

 $I_F$ 

Recurrent Peak Forward Current

 $I_F(\text{surge})$ 

Peak Forward Surge Current

Pulse Width = 1.0 s

Pulse Width = 1.0  $\mu$ s

75 V

200 mA

300 mA

400 mA

1.0 A

4.0 A

**PACKAGES**

1N914 DO-35

1N916 DO-35

1N914A DO-35

1N914B DO-35

1N916A DO-35

1N916B DO-35

1N4148 DO-35

1N4149 DO-35

1N4446 DO-35

1N4447 DO-35

1N4448 DO-35

1N4449 DO-35

FDLL914 LL-34

FDLL916 LL-34

FDLL914A LL-34

FDLL914B LL-34

FDLL916A LL-34

FDLL916B LL-34

FDLL4148 LL-34

FDLL4149 LL-34

FDLL4446 LL-34

FDLL4447 LL-34

FDLL4448 LL-34

FDLL4449 LL-34

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1200 family.

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

| SYMBOL   | CHARACTERISTIC        | MIN          | MAX             | UNITS                    | TEST CONDITIONS                                                 |
|----------|-----------------------|--------------|-----------------|--------------------------|-----------------------------------------------------------------|
| BV       | Breakdown Voltage     | 100<br>75    |                 | V<br>V                   | $I_R = 100 \mu A$<br>$I_R = 5.0 \mu A$                          |
| $I_R$    | Reverse Current       |              | 25<br>50<br>5.0 | nA<br>$\mu A$<br>$\mu A$ | $V_R = 20 V$<br>$V_R = 20 V, T_A = 150^\circ C$<br>$V_R = 75 V$ |
| $V_F$    | Forward Voltage       | 0.62<br>0.63 | 0.72<br>0.73    | V<br>V                   | $I_F = 5.0 mA$<br>$I_F = 5.0 mA$                                |
|          |                       |              | 1.0             | V                        | $I_F = 10 mA$                                                   |
|          |                       |              | 1.0             | V                        | $I_F = 20 mA$                                                   |
|          |                       |              | 1.0             | V                        | $I_F = 30 mA$                                                   |
|          |                       |              | 1.0             | V                        | $I_F = 100 mA$                                                  |
|          |                       |              |                 |                          |                                                                 |
| $t_{rr}$ | Reverse Recovery Time |              | 4.0             | ns                       | $I_F = 10 mA, V_R = 6.0 V$<br>$R_L = 100 \Omega$ Rec. to 1.0 mA |

**NOTES:**

- Maximum ratings 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.
- For family characteristic curves, refer to Chapter 4, D4.

FAIRCHILD SEMICONDUCTOR

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3469674 FAIRCHILD SEMICONDUCTOR

84D 27482 D

1N/FDLL914/A/B/916/A/B

1N/FDLL4148/4149/4446

1N/FDLL4447/44448/4449

T.03-09

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

| SYMBOL   | CHARACTERISTIC                | MIN                                              | MAX | UNITS | TEST CONDITIONS                                                                  |
|----------|-------------------------------|--------------------------------------------------|-----|-------|----------------------------------------------------------------------------------|
| C        | Capacitance                   | 1N914, 1N914A                                    | 4.0 | pF    | $V_R = 0$ , $f = 1$ MHz                                                          |
|          |                               | 1N914B, 1N4148                                   |     |       |                                                                                  |
|          |                               | 1N4446, 1N4447                                   |     |       |                                                                                  |
|          |                               | 1N916, 1N916A                                    | 2.0 | pF    | $V_R = 0$ , $f = 1$ MHz                                                          |
|          |                               | 1N916B, 1N4149<br>1N4448, 1N4449                 |     |       |                                                                                  |
| $V_{fr}$ | Peak Forward Recovery Voltage | 1N914, 1N916<br>1N914B, 1N916B<br>1N4448, 1N4449 | 2.5 | V     | 50 mA Peak Square Wave,<br>0.1 $\mu$ s pulse width,<br>5 kHz - 100 kHz rep. rate |
| RE       | Rectification Efficiency      | 1N914A, 1N914B<br>1N916A, 1N916B                 | 45  | %     | 2.0 V rms, $f = 100$ MHz                                                         |

**FAIRCHILD**

A Schlumberger Company

**1N957 through 1N973** T-11-11500 mW Silicon Planar  
Zener Diodes**ABSOLUTE MAXIMUM RATINGS** (Note 1)**PACKAGES**

All Devices

DO-35

**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

500 mW

Linear Power Derating Factor (from 25°C)

3.33 mW/°C

**ELECTRICAL CHARACTERISTICS** (25°C Ambient)

| SYMBOL          | V <sub>Z</sub>                                              | Z <sub>Z</sub>                                                | I <sub>ZT</sub> | Z <sub>ZK</sub>                                                    | I <sub>ZK</sub> | I <sub>R</sub>                                    | V <sub>RT</sub>                      |                                      |                                     | TC                                                         | I <sub>ZM</sub>                         |
|-----------------|-------------------------------------------------------------|---------------------------------------------------------------|-----------------|--------------------------------------------------------------------|-----------------|---------------------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|------------------------------------------------------------|-----------------------------------------|
| Characteristics | Nominal<br>Zener<br>Voltage<br>(Note 3)<br>@I <sub>ZT</sub> | Maximum<br>Zener<br>Impedance<br>(Note 4)<br>@I <sub>ZT</sub> | Test<br>Current | Maximum<br>Zener Knee<br>Impedance<br>(Note 4)<br>@I <sub>ZK</sub> | Test<br>Current | Maximum<br>Reverse<br>Current<br>@V <sub>RT</sub> | . Test Voltage                       |                                      |                                     | Typical<br>Temperature<br>Coefficient<br>of V <sub>Z</sub> | Maximum<br>Zener<br>Current<br>(Note 5) |
|                 |                                                             |                                                               |                 |                                                                    |                 |                                                   | ± 20%<br>V <sub>Z</sub><br>Tolerance | ± 10%<br>V <sub>Z</sub><br>Tolerance | ± 5%<br>V <sub>Z</sub><br>Tolerance |                                                            |                                         |
| UNIT            | V                                                           | Ω                                                             | mA              | Ω                                                                  | mA              | μA                                                | V                                    | V                                    | V                                   | %/°C                                                       | mA                                      |
| 1N957           | 6.8                                                         | 4.5                                                           | 18.5            | 700                                                                | 1.0             | 150                                               | 4.4                                  | 4.9                                  | 5.2                                 | +0.050                                                     | 47                                      |
| 1N958           | 7.5                                                         | 5.5                                                           | 16.5            | 700                                                                | 0.5             | 75                                                | 4.8                                  | 5.4                                  | 5.7                                 | +0.058                                                     | 42                                      |
| 1N959           | 8.2                                                         | 6.5                                                           | 15.0            | 700                                                                | 0.5             | 50                                                | 5.2                                  | 5.9                                  | 6.2                                 | +0.062                                                     | 38                                      |
| 1N960           | 9.1                                                         | 7.5                                                           | 14.0            | 700                                                                | 0.5             | 25                                                | 5.8                                  | 6.6                                  | 6.9                                 | +0.068                                                     | 35                                      |
| 1N961           | 10.0                                                        | 8.5                                                           | 12.5            | 700                                                                | 0.25            | 10                                                | 6.4                                  | 7.2                                  | 7.6                                 | +0.072                                                     | 32                                      |
| 1N962           | 11.0                                                        | 9.5                                                           | 11.5            | 700                                                                | 0.25            | 5.0                                               | 7.0                                  | 8.0                                  | 8.4                                 | +0.073                                                     | 28                                      |
| 1N963           | 12.0                                                        | 11.5                                                          | 10.5            | 700                                                                | 0.25            | 5.0                                               | 7.6                                  | 8.6                                  | 9.1                                 | +0.076                                                     | 26                                      |
| 1N964           | 13.0                                                        | 13.0                                                          | 9.5             | 700                                                                | 0.25            | 5.0                                               | 8.3                                  | 9.4                                  | 9.9                                 | +0.079                                                     | 24                                      |
| 1N965           | 15.0                                                        | 16.0                                                          | 8.5             | 700                                                                | 0.25            | 5.0                                               | 9.6                                  | 10.8                                 | 11.4                                | +0.082                                                     | 21                                      |
| 1N966           | 16.0                                                        | 17.0                                                          | 7.8             | 700                                                                | 0.25            | 5.0                                               | 10.2                                 | 11.5                                 | 12.2                                | +0.083                                                     | 19                                      |
| 1N967           | 18.0                                                        | 21.0                                                          | 7.0             | 750                                                                | 0.25            | 5.0                                               | 11.5                                 | 13.0                                 | 13.7                                | +0.085                                                     | 17                                      |
| 1N968           | 20.0                                                        | 25.0                                                          | 6.2             | 750                                                                | 0.25            | 5.0                                               | 12.8                                 | 14.4                                 | 15.2                                | +0.086                                                     | 15                                      |
| 1N969           | 22.0                                                        | 29.0                                                          | 5.6             | 750                                                                | 0.25            | 5.0                                               | 14.0                                 | 15.8                                 | 16.7                                | +0.087                                                     | 14                                      |
| 1N970           | 24.0                                                        | 33.0                                                          | 5.2             | 750                                                                | 0.25            | 5.0                                               | 15.4                                 | 17.3                                 | 18.2                                | +0.088                                                     | 13                                      |
| 1N971           | 27.0                                                        | 41.0                                                          | 4.6             | 750                                                                | 0.25            | 5.0                                               | 17.2                                 | 19.4                                 | 20.6                                | +0.090                                                     | 11                                      |
| 1N972           | 30.0                                                        | 49.0                                                          | 4.2             | 1000                                                               | 0.25            | 5.0                                               | 19.2                                 | 21.6                                 | 22.8                                | +0.091                                                     | 10                                      |
| 1N973           | 33.0                                                        | 58.0                                                          | 3.8             | 1000                                                               | 0.25            | 5.0                                               | 21.1                                 | 23.8                                 | 25.1                                | ±0.092                                                     | 9.2                                     |

**NOTES**

- These ratings are limiting values above which the serviceability of the diode may be impaired.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
- Type numbers without suffix have ±20% tolerance on nominal V<sub>Z</sub>.  
Type numbers with suffix A have ±10% tolerance on nominal V<sub>Z</sub>.  
Type numbers with suffix B have ±5% tolerance on nominal V<sub>Z</sub>.
- The Zener impedances Z<sub>Z</sub> and Z<sub>ZK</sub> are derived by superimposing a 60 Hz signal on test currents I<sub>ZT</sub> and I<sub>ZK</sub>, having an RMS value of 10% of the d.c. value of I<sub>ZT</sub> and I<sub>ZK</sub> respectively.
- Maximum Zener Current (I<sub>ZM</sub>) is based on the maximum Zener voltage of a 20% tolerance unit.
- For product family characteristic curves, refer to Chapter 4, D13.

3469674 FAIRCHILD SEMICONDUCTOR

84D 27484 D1

**FAIRCHILD**

A Schlumberger Company

**1N3064/4305/4454 T-03-09**  
**FDLL3064/4305/4454**Ultra Fast Low  
Capacitance Diodes

- C...2.0 pF @  $V_R = 0$ ,  $f = 1.0$  MHz
- $t_{rr}$ ...4.0 ns @  $I_F = 10$  mA,  $I_R = 10$  mA,  $V_R = 1.0$  V
- BV...75 V (MIN)

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

Storage Temperature Range

-65°C to +200°C

Max Junction Operating Temperature

+175°C

Lead Temperature

+260°C

**Power Dissipation (Note 2)**

Maximum Total Dissipation at 25°C

500 mW

Linear Derating Factor (from 25°C)

3.33 mW/°C

**Maximum Voltages and Currents**

WIV

Working Inverse Voltage

50 V

 $I_O$ 

Average Rectified Current

100 mA

 $I_F$ 

Forward Current Steady State

300 mA

 $I_F$ 

Recurrent Peak Forward Current

400 mA

 $I_F$  (surge)

Peak Forward Surge Current

1.0 A

Pulse Width = 1.0 s

4.0 A

Pulse Width = 1.0  $\mu$ s**PACKAGES**

1N3064 DO-35

1N4305 DO-35

1N4454 DO-35

FDLL3064 LL-34

FDLL4305 LL-34

FDLL4454 LL-34

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1200 family.

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

| SYMBOL              | CHARACTERISTIC                                   | MIN                                        | MAX        | UNITS    | TEST CONDITIONS                                                        |
|---------------------|--------------------------------------------------|--------------------------------------------|------------|----------|------------------------------------------------------------------------|
| V <sub>F</sub>      | Forward Voltage                                  | 0.610                                      | 0.710      | V        | I <sub>F</sub> = 2.0 mA                                                |
|                     |                                                  | 0.550                                      | 0.650      | V        | I <sub>F</sub> = 1.0 mA                                                |
|                     |                                                  | 0.505                                      | 0.575      | V        | I <sub>F</sub> = 250 μA                                                |
|                     |                                                  |                                            | 1.0        | V        | I <sub>F</sub> = 10 mA                                                 |
|                     |                                                  | 0.70                                       | 0.85       | V        | I <sub>F</sub> = 10 mA                                                 |
|                     |                                                  | 1N3064 }<br>1N4454 }<br>1N4305 }           |            |          |                                                                        |
| I <sub>R</sub>      | Reverse Current                                  |                                            | 0.1<br>100 | μA<br>μA | V <sub>R</sub> = 50 V<br>V <sub>R</sub> = 50 V, T <sub>A</sub> = 150°C |
| BV                  | Breakdown Voltage                                | 75                                         |            | V        | I <sub>R</sub> = 5.0 μA                                                |
| t <sub>rr</sub>     | Reverse Recovery Time (Note 3)                   | 1N4305<br>1N3064 }<br>1N4305 }<br>1N4454 } | 2.0        | ns       | I <sub>F</sub> = 10 mA, V <sub>R</sub> = 6.0 V, R <sub>L</sub> = 100 Ω |
|                     |                                                  |                                            | 4.0        | ns       | I <sub>F</sub> = I <sub>r</sub> = 10 mA, R <sub>L</sub> = 100 Ω,       |
|                     |                                                  |                                            |            |          | V <sub>R</sub> = 1.0 V                                                 |
|                     |                                                  |                                            |            |          |                                                                        |
| C                   | Capacitance                                      |                                            | 2.0        | pF       | V <sub>R</sub> = 0, f = 1.0 MHz                                        |
| RE                  | Rectification Efficiency (Note 4)                | 45                                         |            | %        | f = 1.0 MHz                                                            |
| ΔV <sub>F</sub> /°C | Forward Voltage Temperature Coefficient (Note 5) |                                            | 3.0        | mV/°C    |                                                                        |

**NOTES:**

- The maximum ratings 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.
- Recovery to 1.0 mA.
- Rectification efficiency is defined as the ratio of dc load voltage to peak rf input voltage to the detector circuit, measured with 2.0 V rms input to the circuit. Load resistance 5.0  $\Omega$ , load capacitance 20 pF.
- This value for  $\Delta V_F / ^\circ$ C is a typical value not a minimum or maximum.
- For product family characteristic curves, refer to Chapter 4, D4.

**FAIRCHILD**

A Schlumberger Company

**1N3070/4938****FDLL3070/4938**

T-03-09

High Speed High  
Conductance Diodes

- BV...200 V (MIN)
- I<sub>R</sub>...100 nA (MAX)

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

Storage Temperature Range  
Max Junction Operating Temperature  
Lead Temperature

-65°C to +200°C  
+175°C  
+260°C

**Power Dissipation (Note 2)**

Maximum Total Dissipation at 25°C Ambient  
Linear Derating Factor (from 25°C)

500 mW  
3.33 mW/°C

**Maximum Voltage and Currents**

|                        |                                 |        |
|------------------------|---------------------------------|--------|
| WIV                    | Working Inverse Voltage         | 175 V  |
| I <sub>O</sub>         | Average Rectified Current       | 200 mA |
| I <sub>F</sub>         | Forward Current Steady State DC | 500 mA |
| I <sub>f</sub>         | Recurrent Peak Forward Current  | 600 mA |
| I <sub>f</sub> (surge) | Peak Forward Surge Current      |        |
|                        | Pulse Width = 1.0 s             | 1.0 A  |
|                        | Pulse Width = 1.0 μs            | 4.0 A  |

**PACKAGES**

|          |       |
|----------|-------|
| 1N3070   | DO-35 |
| 1N4938   | DO-35 |
| FDLL3070 | LL-34 |
| FDLL4938 | LL-34 |

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1400 family.

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

| SYMBOL          | CHARACTERISTIC                    | MIN | MAX        | UNITS    | TEST CONDITIONS                                                          |
|-----------------|-----------------------------------|-----|------------|----------|--------------------------------------------------------------------------|
| I <sub>R</sub>  | Reverse Current                   |     | 100<br>100 | nA<br>μA | V <sub>R</sub> = 175 V<br>V <sub>R</sub> = 175 V, T <sub>A</sub> = 150°C |
| BV              | Breakdown Voltage                 | 200 |            | V        | I <sub>R</sub> = 100 μA                                                  |
| V <sub>F</sub>  | Forward Voltage                   |     | 1.0        | V        | I <sub>F</sub> = 100 mA                                                  |
| C               | Capacitance                       |     | 5.0        | pF       | V <sub>R</sub> = 0, f = 1.0 MHz                                          |
| t <sub>rr</sub> | Reverse Recovery Time (Note 3)    |     | 50         | ns       | I <sub>F</sub> = I <sub>r</sub> = 30 mA, R <sub>L</sub> = 100Ω           |
| RE              | Rectification Efficiency (Note 4) | 35  |            | %        | f = 100 MHz                                                              |

**NOTES:**

- The maximum ratings 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.
- Recovery to 1.0 mA.
- Rectification efficiency is defined as the ratio of dc load voltage to peak rf input voltage to the detector circuit, measured with 2.0 V rms input to the circuit. Load resistance: 5.0 kΩ, load capacitance 20 pF.
- 1N3070 and 1N4938 are electrically and mechanically identical.
- For product family characteristic curves, refer to Chapter 4, D1.

**FAIRCHILD**

A Schlumberger Company

**1N3595/6099** *T<sub>2</sub> 01-09***FDLL3595/6099**High Conductance Low  
Leakage Diodes

- BV... 150 V (MIN) @ 100  $\mu$ A
- V<sub>F</sub>... 1.0 V @ 200 mA

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

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

**Power Dissipation (Note 2)**

|                                           |            |
|-------------------------------------------|------------|
| Maximum Total Dissipation at 25°C Ambient | 500 mW     |
| Linear Derating Factor (From 25°C)        | 3.33 mW/°C |

**Maximum Voltage and Currents**

|                        |                                 |        |
|------------------------|---------------------------------|--------|
| WIV                    | Working Inverse Voltage         | 125 V  |
| I <sub>O</sub>         | Average Rectified Current       | 200 mA |
| I <sub>F</sub>         | Forward Current Steady State    | 500 mA |
| I <sub>F</sub>         | Peak Repetitive Forward Current | 600 mA |
| i <sub>F</sub> (surge) | Peak Forward Surge Current      |        |
|                        | Pulse Width = 1.0 s             | 1.0 A  |
|                        | Pulse Width = 1.0 $\mu$ s       | 4.0 A  |

**PACKAGES**

|          |       |
|----------|-------|
| 1N3595   | DO-35 |
| 1N6099   | DO-35 |
| FDLL3595 | LL-34 |
| FDLL6099 | LL-34 |

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1500 family.

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

| SYMBOL          | CHARACTERISTIC        | MIN  | MAX  | UNITS   | TEST CONDITIONS                                                                 |
|-----------------|-----------------------|------|------|---------|---------------------------------------------------------------------------------|
| V <sub>F</sub>  | Forward Voltage       | 0.83 | 1.0  | V       | I <sub>F</sub> = 200 mA                                                         |
|                 |                       | 0.79 | 0.92 | V       | I <sub>F</sub> = 100 mA                                                         |
|                 |                       | 0.75 | 0.88 | V       | I <sub>F</sub> = 50 mA                                                          |
|                 |                       | 0.65 | 0.80 | V       | I <sub>F</sub> = 10 mA                                                          |
|                 |                       | 0.60 | 0.75 | V       | I <sub>F</sub> = 5.0 mA                                                         |
|                 |                       | 0.52 | 0.68 | V       | I <sub>F</sub> = 1.0 mA                                                         |
| I <sub>R</sub>  | Reverse Current       |      | 1.0  | nA      | V <sub>R</sub> = 125 V                                                          |
|                 |                       |      | 300  | nA      | V <sub>R</sub> = 30 V, T <sub>A</sub> = 125°C                                   |
|                 |                       |      | 500  | nA      | V <sub>R</sub> = 125 V, T <sub>A</sub> = 125°C                                  |
|                 |                       |      | 3.0  | $\mu$ A | V <sub>R</sub> = 125 V, T <sub>A</sub> = 150°C                                  |
| t <sub>rr</sub> | Reverse Recovery Time |      | 3.0  | $\mu$ s | I <sub>F</sub> = 10 mA, V <sub>r</sub> = 3.5 V, R <sub>L</sub> = 1.0 k $\Omega$ |
| C               | Capacitance           |      | 8.0  | pF      | V <sub>R</sub> = 0, f = 1.0 MHz                                                 |
| BV              | Breakdown Voltage     | 150  |      | V       | I <sub>R</sub> = 100 $\mu$ A                                                    |

**NOTES:**

- The maximum ratings 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.
- 1N3595 and 1N6099 are electrically and mechanically identical.
- For product family characteristic curves, refer to Chapter 4, D2.

**FAIRCHILD**

A Schlumberger Company

# 1N3600/FDLL3600 T-03-09

## 1N4150/FDLL4150

## 1N4450/FDLL4450

### High Conductance Ultra Fast Diodes

- $t_{rr} \dots 4.0 \text{ ns (MAX)}$
- $V_F \dots 1.0 \text{ V (MAX) @ 200 mA}$

**ABSOLUTE MAXIMUM RATINGS (Note 1)****Temperatures**

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

**Power Dissipation (Note 2)**

|                                             |            |
|---------------------------------------------|------------|
| Max Total Power Dissipation at 25°C Ambient | 500 mW     |
| Linear Derating Factor (from 25°C)          | 3.33 mW/°C |

**PACKAGES**

|          |       |
|----------|-------|
| 1N3600   | DO-35 |
| 1N4150   | DO-35 |
| 1N4450   | DO-35 |
| FDLL3600 | LL-34 |
| FDLL4150 | LL-34 |
| FDLL4450 | LL-34 |

If you need this device in the SOT package, an electrical equivalent is available. See FDSO1200 family.

| Maximum Voltages and Currents |                                 | 1N3600 | 1N4150 | 1N4450 |
|-------------------------------|---------------------------------|--------|--------|--------|
| WIV                           | Working Inverse Voltage         | 50 V   | 50 V   | 30 V   |
| $I_O$                         | Average Rectified Current       | 200 mA | 200 mA | 200 mA |
| $I_F$                         | DC Forward Current              | 400 mA | 400 mA | 400 mA |
| $I_f$                         | Recurrent Peak Forward Current  | 600 mA | 600 mA | 600 mA |
| $I_f(\text{surge})$           | Peak Forward Surge Current      |        |        |        |
|                               | Pulse Width = 1.0 s             | 1.0 A  | 1.0 A  | 1.0 A  |
|                               | Pulse Width = 1.0 $\mu\text{s}$ | 4.0 A  | 4.0 A  | 4.0 A  |

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

| SYMBOL   | CHARACTERISTIC                    | 1N3600<br>1N4150                     |                                     | 1N4450                       |                                     | UNITS                                      | TEST CONDITIONS                                                                                                                                                                        |
|----------|-----------------------------------|--------------------------------------|-------------------------------------|------------------------------|-------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |                                   | MIN                                  | MAX                                 | MIN                          | MAX                                 |                                            |                                                                                                                                                                                        |
| BV       | Breakdown Voltage                 | 75                                   |                                     | 40                           |                                     | V<br>V                                     | $I_R = 5.0 \mu\text{A}$<br>$I_R = 5.0 \mu\text{A}$                                                                                                                                     |
| $I_R$    | Reverse Current                   |                                      | 100<br>100                          |                              | 50<br>50                            | nA<br>nA<br>$\mu\text{A}$<br>$\mu\text{A}$ | $V_R = 50 \text{ V}$<br>$V_R = 30 \text{ V}$<br>$V_R = 50 \text{ V}, T_A = 150^\circ\text{C}$<br>$V_R = 30 \text{ V}, T_A = 150^\circ\text{C}$                                         |
| $V_F$    | Forward Voltage                   | 0.54<br>0.66<br>0.76<br>0.82<br>0.87 | 0.62<br>0.74<br>0.86<br>0.92<br>1.0 | 0.42<br>0.52<br>0.64<br>0.80 | 0.54<br>0.64<br>0.76<br>0.92<br>1.0 | V<br>V<br>V<br>V<br>V                      | $I_F = 0.1 \text{ mA}$<br>$I_F = 1.0 \text{ mA}$<br>$I_F = 10 \text{ mA}$<br>$I_F = 50 \text{ mA}$<br>$I_F = 100 \text{ mA}$<br>$I_F = 200 \text{ mA}$                                 |
| C        | Capacitance                       |                                      | 2.5                                 |                              | 4.0                                 | pF                                         | $V_R = 0, f = 1.0 \text{ MHz}$                                                                                                                                                         |
| $t_{rr}$ | Reverse Recovery Time<br>(Note 3) |                                      | 4.0<br>6.0                          |                              | 4.0                                 | ns<br>ns<br>ns                             | $I_f = I_r = 10 \text{ mA to } 200 \text{ mA}, R_L = 100 \Omega$<br>$I_f = I_r = 10 \text{ mA}, R_L = 100 \Omega$<br>$I_f = I_r = 200 \text{ mA to } 400 \text{ mA}, R_L = 100 \Omega$ |
| $t_{fr}$ | Forward Recovery Time             |                                      | 10                                  |                              |                                     | ns                                         | $I_f = 200 \text{ mA}, t_r = 0.4 \text{ ns}, V_{fr} = 1.0 \text{ V}$                                                                                                                   |

**NOTES:**

- Maximum ratings 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.
- Recovery to 0.1  $I_f$ .
- For family characteristic curves, refer to Chapter 4, D4.

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