Diode Specifications

Diode Specifications

- Forward voltage V_F
- Maximum forward current I_F
- Reverse saturation current I_S
- Reverse voltage
  - Peak Repetitive Reverse Voltage V_{RRM} (or)
  - Peak Inverse Voltage PIV
- Maximum power dissipation
- Operating temperature range

Diode Specifications

- Forward Voltage (V_F) – Forward conducting junction voltage or barrier potential
  - 0.3 V for Ge, 0.7 V for Si

- Average Forward Current (I_F) – The maximum allowable value of dc forward current for a diode.
  - If exceeds this value diode will overheat and gets destroyed

Diode Specifications

- Peak Repetitive Reverse Voltage V_{RRM}
  - V_{RRM} is the maximum reverse voltage that a diode can withstand.
  - When $V_R > V_{RRM}$, diode reverse current (I_R) increases rapidly as the depletion layer breaks down.

- Forward Power Dissipation ($P_{D(max)}$) – The maximum possible power dissipation of the forward-biased diode.

$$P_{D(\max)} = V_F I_F$$

Diode Specification Sheets

FAIRCHILD

November 2014

1N4001 - 1N4007
General-Purpose Rectifiers

Features

- Low Forward Voltage Drop
- High Surge Current Capability

DO-41
COLOR BAND DENOTES CATHODE

Ordering Information

Part Number	Top Mark	Package	Packing Method
1N4001	1N4001	DO-204AL (DO-41)	Tape and Reel
1N4002	1N4002	DO-204AL (DO-41)	Tape and Reel
1N4003	1N4003	DO-204AL (DO-41)	Tape and Reel
1N4004	1N4004	DO-204AL (DO-41)	Tape and Reel
1N4005	1N4005	DO-204AL (DO-41)	Tape and Reel
1N4006	1N4006	DO-204AL (DO-41)	Tape and Reel
1N4007	1N4007	DO-204AL (DO-41)	Tape and Reel

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value							Unit
		1N 4001	1N 4002	1N 4003	1N 4004	1N 4005	1N 4006	1N 4007	
V_{RRM}	Peak Repetitive Reverse Voltage	50	100	200	400	600	800	1000	V
$I_{F(AV)}$	Average Rectified Forward Current .375 " Lead Length at T_A = 75°C	1.0							A
I_{FSM}	Non-Repetitive Peak Forward Surge Current 8.3 ms Single Half-Sine-Wave	30							A
I^2t	Rating for Fusing (t < 8.3 ms)	3.7							A^2sec
T_{STG}	Storage Temperature Range	-55 to +175							°C
T_J	Operating Junction Temperature	-55 to +175							°C

1N4001 - 1N4007 — General-Purpose Rectifiers

1N4001, 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007

Axial Lead Standard Recovery Rectifiers

This data sheet provides information on subminiature size, axial lead mounted rectifiers for general−purpose low−power applications.

Features

- Shipped in Plastic Bags, 1000 per bag
- Available Tape and Reeled, 5000 per reel, by adding a "RL" suffix to the part number
- Available in Fan−Fold Packaging, 3000 per box, by adding a "FF" suffix to the part number
- Pb−Free Packages are Available

Mechanical Characteristics

- Case: Epoxy, Molded
- Weight: 0.4 gram (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds, 1/16 in. from case
- Polarity: Cathode Indicated by Polarity Band

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor®

http://onsemi.com

LEAD MOUNTED RECTIFIERS
50−1000 VOLTS
DIFFUSED JUNCTION

CASE 59−10
AXIAL LEAD
PLASTIC

MARKING DIAGRAM

A = Assembly Location
1N400x = Device Number
x = 1, 2, 3, 4, 5, 6 or 7
YY = Year
WW = Work Week
• = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

Diode Specification Sheets

FAIRCHILD

November 2014

1N4001 - 1N4007 — G

1N4001 - 1N4007
General-Purpose Rectifiers

1N4001, 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007

Axial Lead Standard Recovery Rectifiers

ON Semiconductor®

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value							Unit
		1N 4001	1N 4002	1N 4003	1N 4004	1N 4005	1N 4006	1N 4007	
V_{RRM}	Peak Repetitive Reverse Voltage	50	100	200	400	600	800	1000	V
$I_{F(AV)}$	Average Rectified Forward Current .375 " Lead Length at T_A = 75°C	1.0							A
I_{FSM}	Non-Repetitive Peak Forward Surge Current 8.3 ms Single Half-Sine-Wave	30							A
I^2t	Rating for Fusing (t < 8.3 ms)	3.7							A^2sec
T_{STG}	Storage Temperature Range	-55 to +175							°C
T_J	Operating Junction Temperature	-55 to +175							°C

I^2t	Rating for Fusing (t < 8.3 ms)	3.7	A^2sec
T_{STG}	Storage Temperature Range	-55 to +175	°C
T_J	Operating Junction Temperature	-55 to +175	°C

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

www.fairchildsemi.com

October, 2012 – Rev. 13

1

Publication Order Number:
1N4001/D

Diode Specification Sheets

FAIRCHILD

November 2014

1N4001 - 1N4

1N4001, 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007

ON

Thermal Characteristics

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
P_D	Power Dissipation	3.0	W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	°C/W

Electrical Characteristics

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Value	Unit
V_F	Forward Voltage	I_F = 1.0 A	1.1	V
I_{rr}	Maximum Full Load Reverse Current, Full Cycle	T_A = 75°C	30	µA
I_R	Reverse Current at Rated V_R	T_A = 25°C	5.0	µA
		T_A = 100°C	50	
C_T	Total Capacitance	V_R = 4.0 V, f = 1.0 MHz	15	pF

T_{STG}	Storage Temperature Range	-55 to +175	°C
T_J	Operating Junction Temperature	-55 to +175	°C

Reference Manual, SOLDERRM/D.

www.fairchildsemi.com

October, 2012 – Rev. 13

1

Publication Order Number:
1N4001/D

Diode Specification Sheets

1N4001, 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007

MAXIMUM RATINGS

Rating	Symbol	1N4001	1N4002	1N4003	1N4004	1N4005	1N4006	1N4007	Unit
†Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	50	100	200	400	600	800	1000	V
†Non−Repetitive Peak Reverse Voltage (halfwave, single phase, 60 Hz)	V_{RSM}	60	120	240	480	720	1000	1200	V
†RMS Reverse Voltage	$V_{R(RMS)}$	35	70	140	280	420	560	700	V
†Average Rectified Forward Current (single phase, resistive load, 60 Hz, T_A = 75°C)	I_O	1.0							A
†Non−Repetitive Peak Surge Current (surge applied at rated load conditions)	I_{FSM}	30 (for 1 cycle)							A
Operating and Storage Junction Temperature Range	T_J T_{stg}	−65 to +175							°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.
†Indicates JEDEC Registered Data

THERMAL CHARACTERISTICS

Rating	Symbol	Max	Unit
Maximum Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	Note 1	°C/W

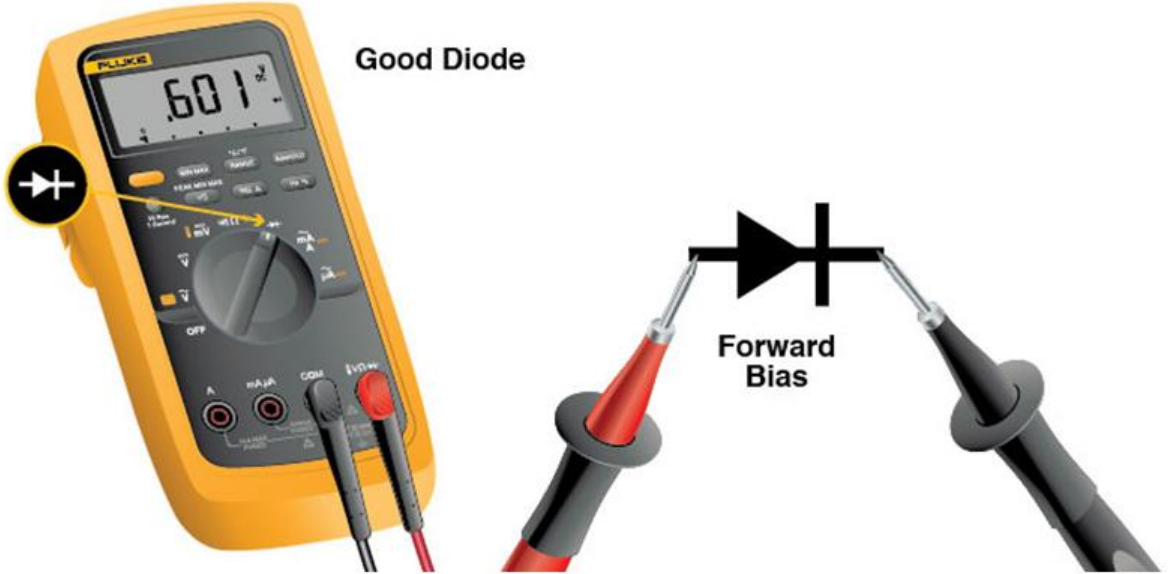
ELECTRICAL CHARACTERISTICS†

Rating	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage Drop, (i_F = 1.0 Amp, T_J = 25°C)	v_F	0.93	1.1	V
Maximum Full−Cycle Average Forward Voltage Drop, (I_O = 1.0 Amp, T_L = 75°C, 1 inch leads)	$V_{F(AV)}$	–	0.8	V
Maximum Reverse Current (rated DC voltage) (T_J = 25°C) (T_J = 100°C)	I_R	 0.05 1.0	 10 50	μA
Maximum Full−Cycle Average Reverse Current, (I_O = 1.0 Amp, T_L = 75°C, 1 inch leads)	$I_{R(AV)}$	–	30	μA

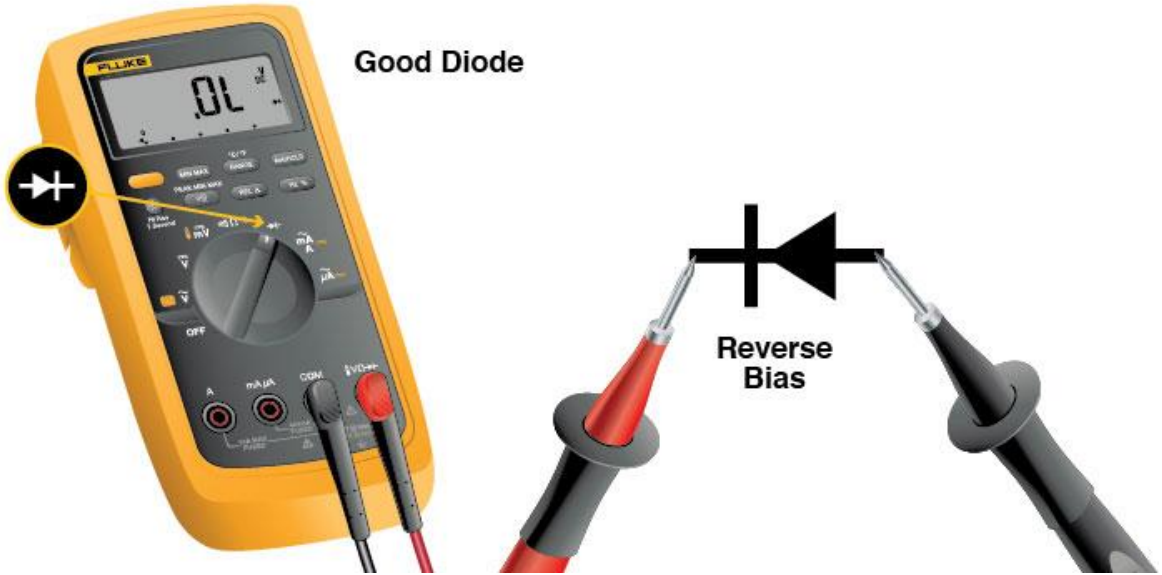
†Indicates JEDEC Registered Data

Diode Testing

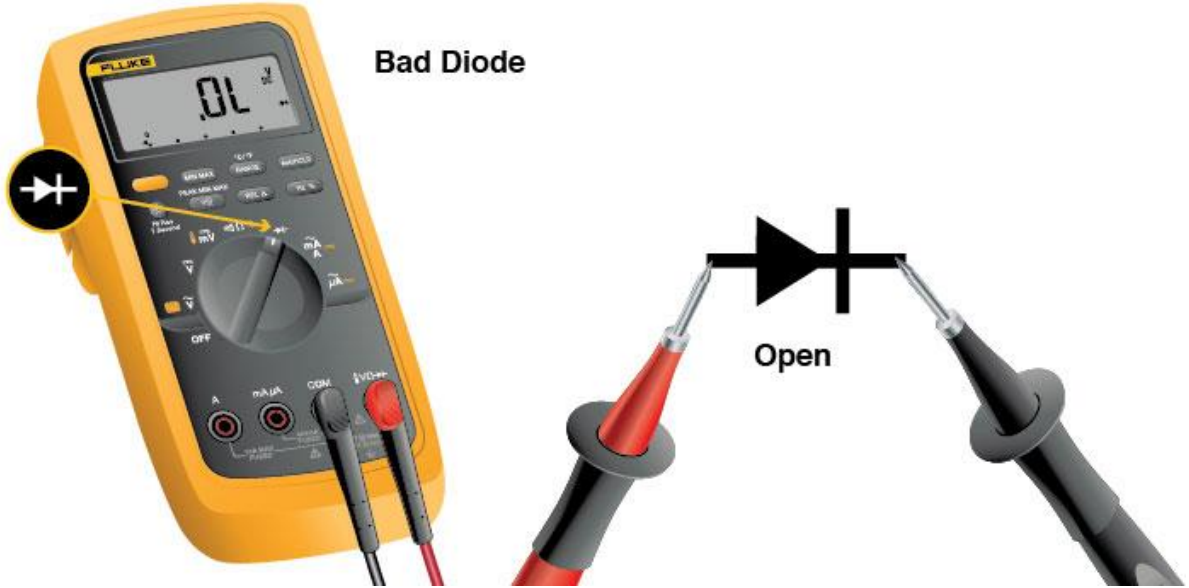
Diode Testing



Diode Testing



Diode Testing



Types of Diodes