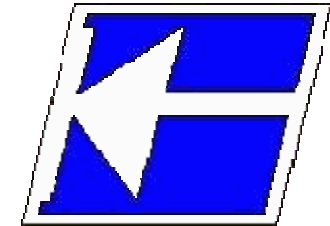


Centro Federal de Educação Tecnológica de Santa Catarina

Departamento de Eletrônica

Eletrônica Básica



Características dos Diodos

e

Análise de Circuitos Simples com Diodos

Prof. Clóvis Antônio Petry.

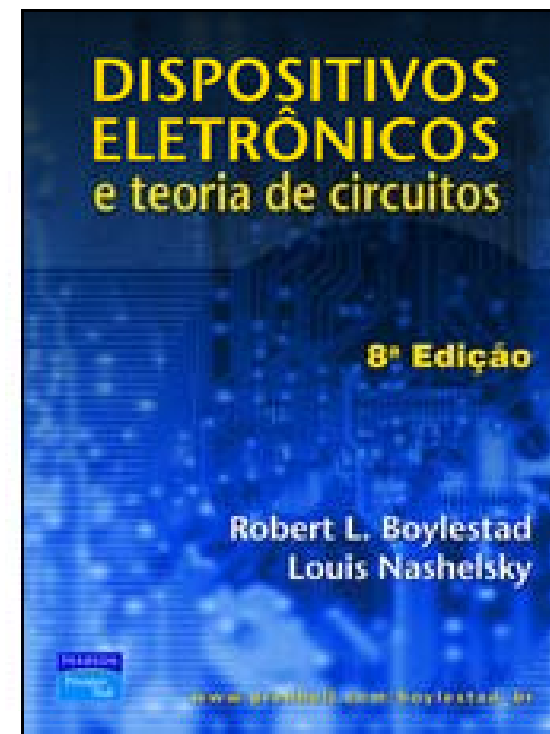
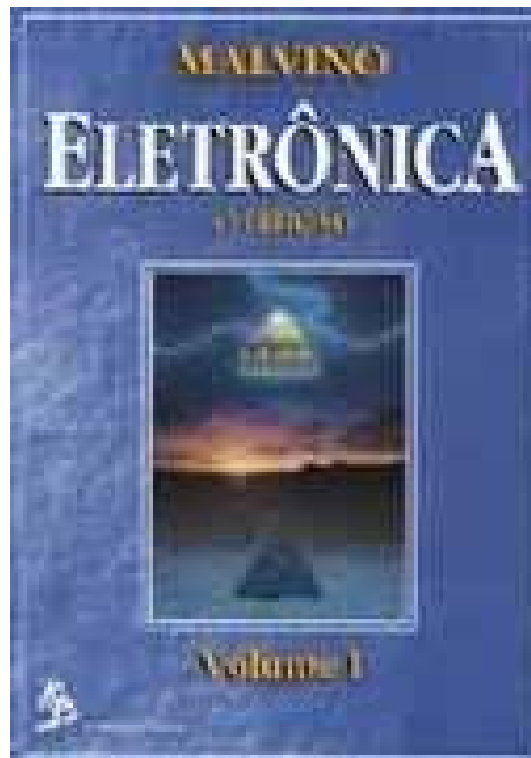
Florianópolis, agosto de 2007.

Nesta aula

Seqüência de conteúdos:

1. Características dos diodos;
2. Análise de circuitos com diodos, introdução.

Bibliografia



Características dos diodos

As principais características (grandezas) são:

1. Corrente máxima direta (I_F ou I_o);
2. Tensão de ruptura reversa:
 - VRRM = Tensão de pico inverso repetitivo;
 - VRWM = Tensão de pico inverso de trabalho;
 - VR = Tensão de bloqueio CC.
3. Queda de tensão direta (v_F);
4. Corrente reversa máxima (I_R).
5. Entre outras

Características dos diodos

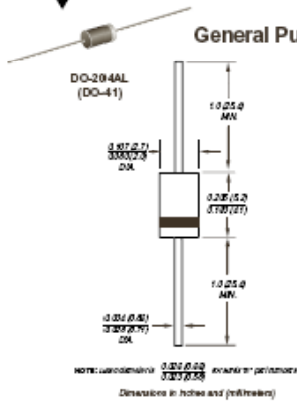


1N4001 thru 1N4007

Vishay Semiconductors
formerly General Semiconductor

Reverse Voltage
50 to 1000V
Forward Current 1.0A

General Purpose Plastic Rectifier



Features

- Plastic package has Underwriters Laboratories Flammability Classification 94V-0
- Construction utilizes void-free molded plastic technique
- Low reverse leakage
- High forward surge capability
- High temperature soldering guaranteed: 350°C/10 seconds, 0.375" (9.5mm) lead length, 5 lbs. (2.3kg) tension

Mechanical Data

Case: JEDEC DO-204AL, molded plastic body
Terminals: Plated axial leads, solderable per MIL-STD-750, Method 2026
Polarity: Color band denotes cathode end
Mounting Position: Any
Weight: 0.012 oz., 0.3 g

Maximum Ratings & Thermal Characteristics

Parameter	Symbol	Ratings at 25°C ambient temperature unless otherwise specified.							Unit
		1N4001	1N4002	1N4003	1N4004	1N4005	1N4006	1N4007	
Maximum repetitive peak reverse voltage	V_{RRM}	50	100	200	400	600	800	1000	V
* Maximum RMS voltage	V_{RMS}	35	70	140	280	420	560	700	V
* Maximum DC blocking voltage	V_{DC}	50	100	200	400	600	800	1000	V
* Maximum average forward rectified current 0.375" (9.5mm) lead length at $T_A = 75^\circ\text{C}$	$I_{F(AV)}$	1.0							A
* Peak forward surge current 8.3ms single half sine-wave superimposed on rated load (JEDEC Method) $T_A = 75^\circ\text{C}$	I_{FSM}	30							A
* Maximum full load reverse current, full cycle average 0.375" (9.5mm) lead length $T_L = 75^\circ\text{C}$	$I_{R(AV)}$	30							μA
Typical thermal resistance ⁽¹⁾	$R_{\theta JA}$ $R_{\theta JL}$	50 25							$^\circ\text{C/W}$
* Maximum DC blocking voltage temperature	T_A	+150							V
* Operating junction and storage temperature range	T_J, T_{STG}	-50 to +175							$^\circ\text{C}$

Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.			
Maximum instantaneous forward voltage at 1.0A	V_F	1.1	V
* Maximum DC reverse current at rated DC blocking voltage $T_A = 25^\circ\text{C}$	I_R	5.0	μA
at rated DC blocking voltage $T_A = 125^\circ\text{C}$	I_R	50	μA
Typical junction capacitance at 4.0V, 1MHz	C_J	15	pF

Note: (1) Thermal resistance from junction to ambient at 0.375" (9.5mm) lead length, R.C.S. mounted. * JEDEC registered values

Bulletin PD-35731 rev. C 12/03

International
IOR Rectifier

MUR820
MURB820
MURB820-1

Ultrafast Rectifier

Features

- Ultrafast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature

$t_{rr} = 25\text{ns}$
 $I_{F(AV)} = 8\text{Amp}$
 $V_{RM} = 200\text{V}$

Description/Applications

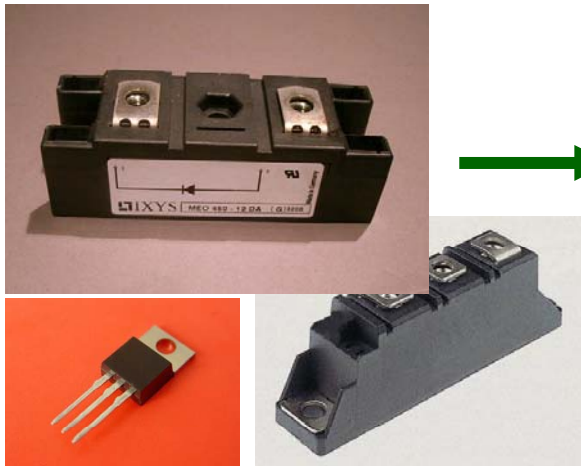
International Rectifier's MUR... series are the state of the art ultra fast recovery rectifiers specifically designed with optimized performance of forward voltage drop and ultra fast recovery time. The planar structure and the platinum dopant life time control, guarantee the best overall performance, ruggedness and reliability characteristics. These devices are intended for use in the output rectifier of stage of SMPS, UPS, DC-DC converters as well as free-wheeling diode in low voltage inverters and chopper motor drives. Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

Absolute Maximum Ratings

Parameters	Max	Units
V_{RRM} Peak Repetitive Peak Reverse Voltage	200	V
$I_{F(AV)}$ Average Rectified Forward Current	8	A
I_{FSM} Total Device, (Rated V_F), $T_C = 150^\circ\text{C}$	30	A
I_{RM} Non Repetitive Peak Surge Current	100	A
I_{FM} Peak Repetitive Forward Current (Rated V_F , Square wave, 20 kHz), $T_C = 150^\circ\text{C}$	8	A
T_A, T_{STG} Operating Junction and Storage Temperature	-55 to 175	$^\circ\text{C}$



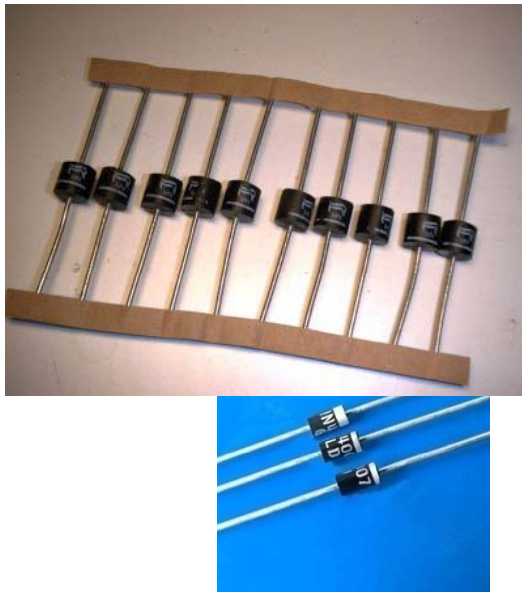
Características dos diodos



Diodos de potência

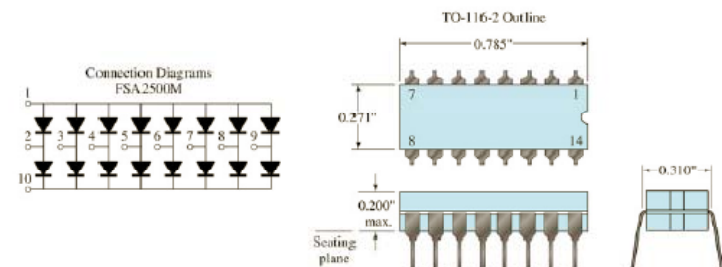


Diodos de sinal

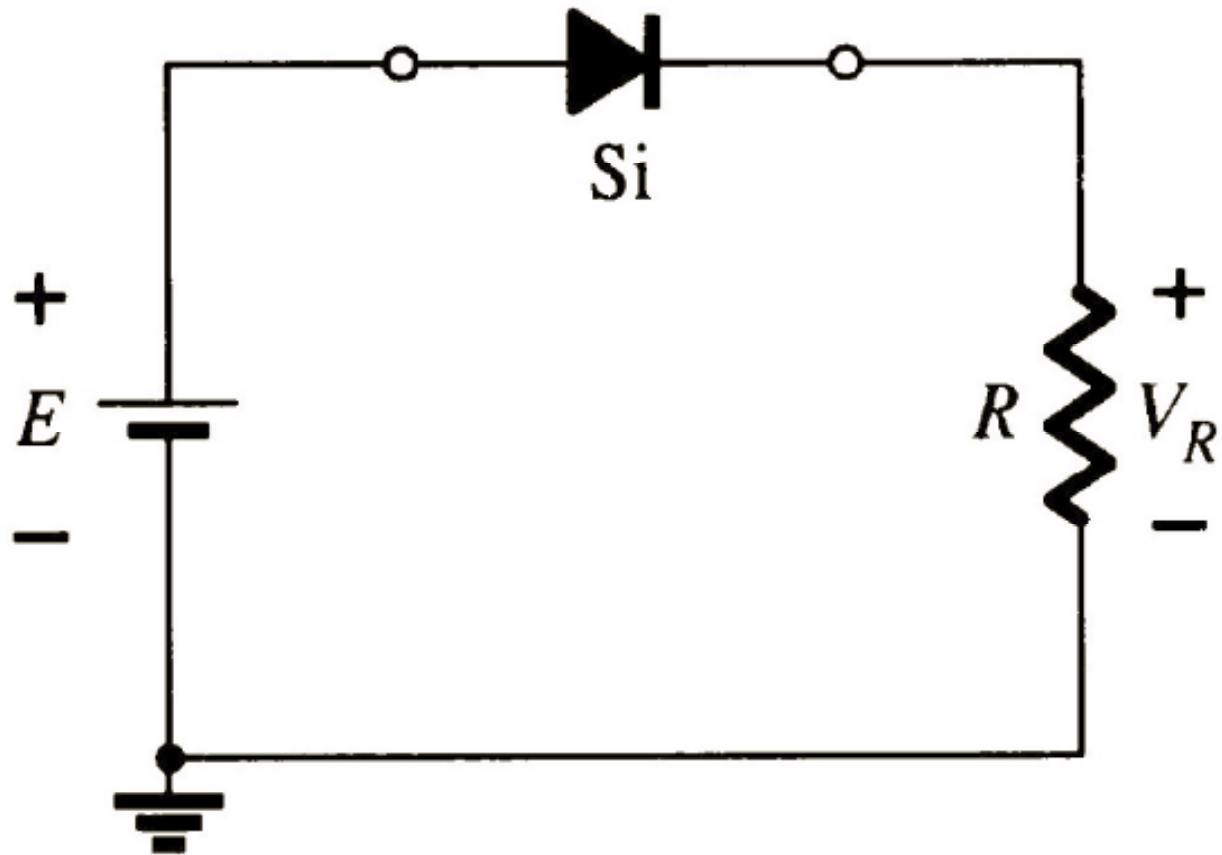


Diodos de uso geral

Circuitos integrados de diodos



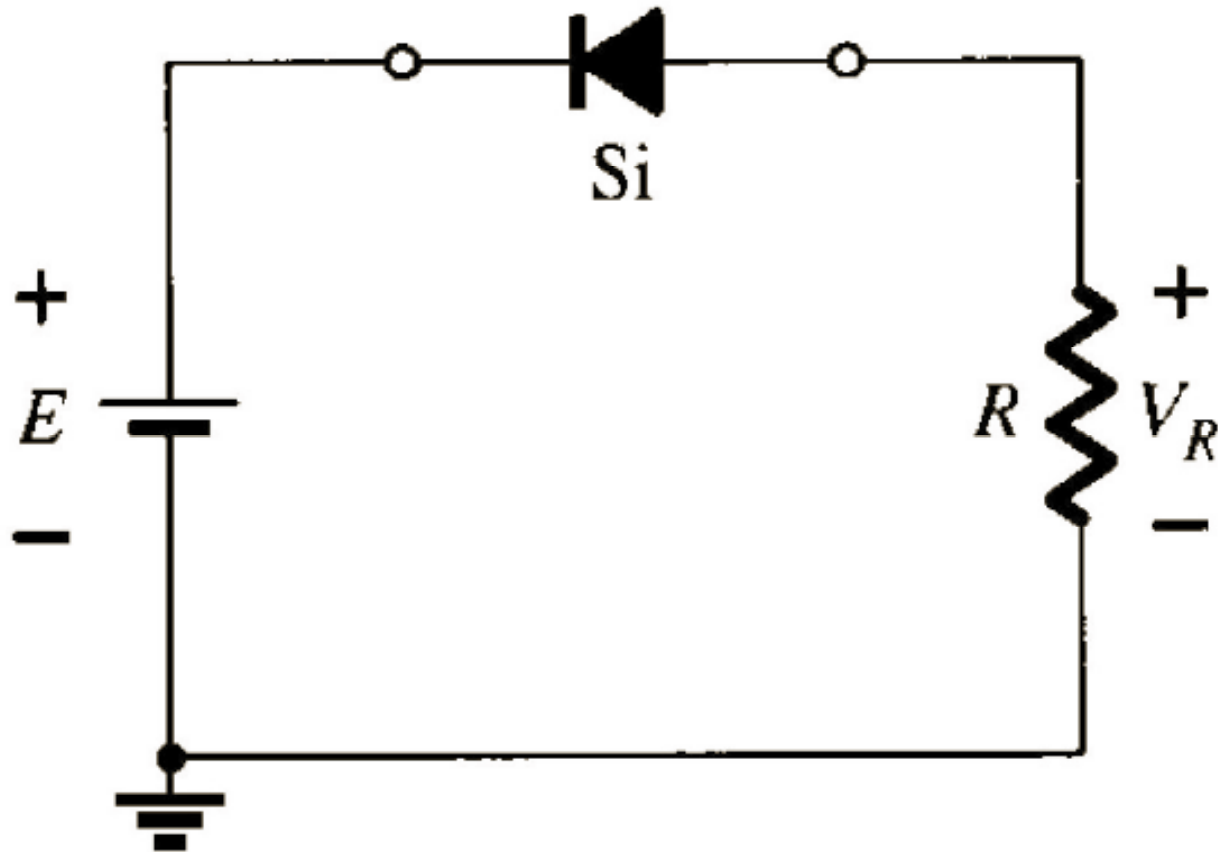
Análise de circuitos com diodos



Determine a tensão e a corrente na carga para diversos valores de E e R :

- $E = 5 \text{ V}$ e $R = 1 \text{ k}\Omega$;
- $E = 10 \text{ V}$ e $R = 1 \text{ k}\Omega$;
- $E = 10 \text{ V}$ e $R = 10 \text{ k}\Omega$.

Análise de circuitos com diodos



Considerando que o diodo do circuito é o 1N4001, para qual tensão da bateria (E) o diodo entrará em condução reversa?

Exercícios

Exercícios selecionados:

1. Lista capítulo 3 do Malvino;
2. Entre outros

Na próxima aula

Seqüência de conteúdos:

1. Análise de circuitos com diodos;
2. Identificação de diodos;
3. Testes com diodos.