CLASIFICACION DE LOS DIODOS

- Material
  - Ge
  - Si
  - As Ga

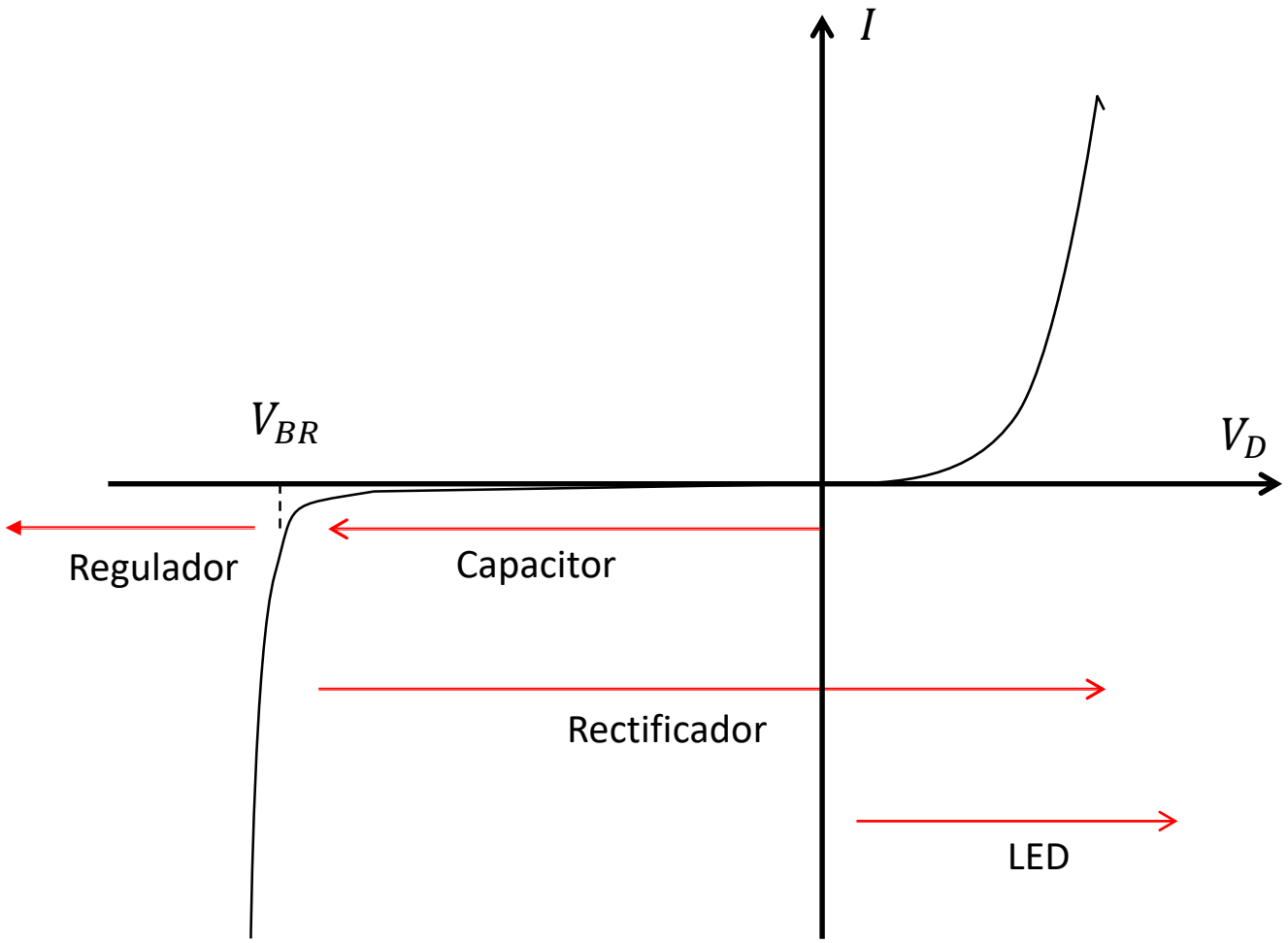
- Potencia
  - Señal (P < 1 watt)
  - Potencia (P > 1 watt)

- Función en los circuitos
  - Rectificador
  - Regulador (Zener)
  - Capacitor (Varicap)
  - Emisor de luz (LED)
  - Fotodetector

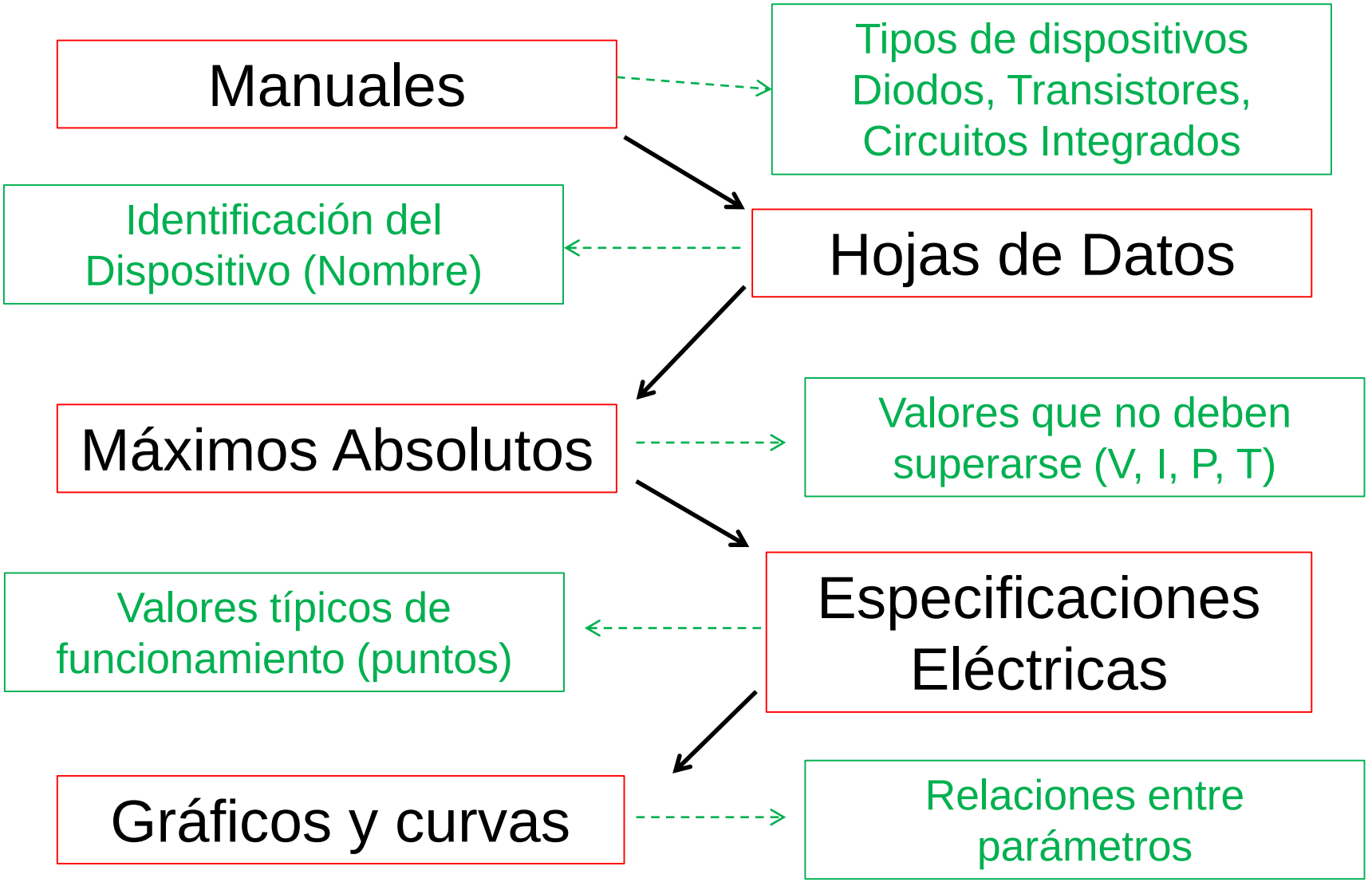
Rectificador → Velocidad de conmutación

- Normal
- Rápido
- Ultrarrápido
- Schottky

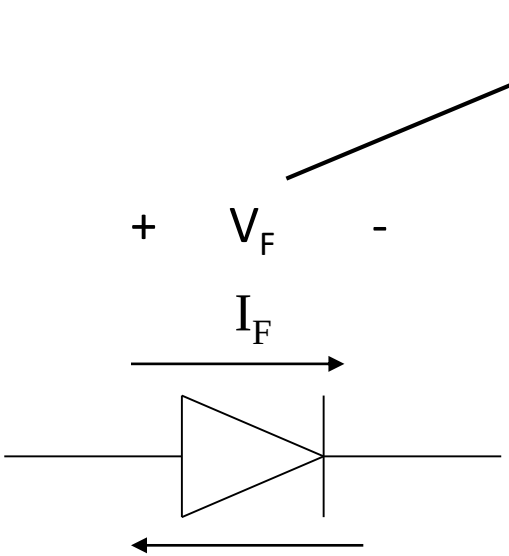
ZONA DE FUNCIONAMIENTO DE CADA TIPO DE DIODO



ESPECIFICACION DE DISPOSITIVOS SEMICONDUCTORES



Convenciones de tensiones y corrientes



V

1°	2°	3°

↓

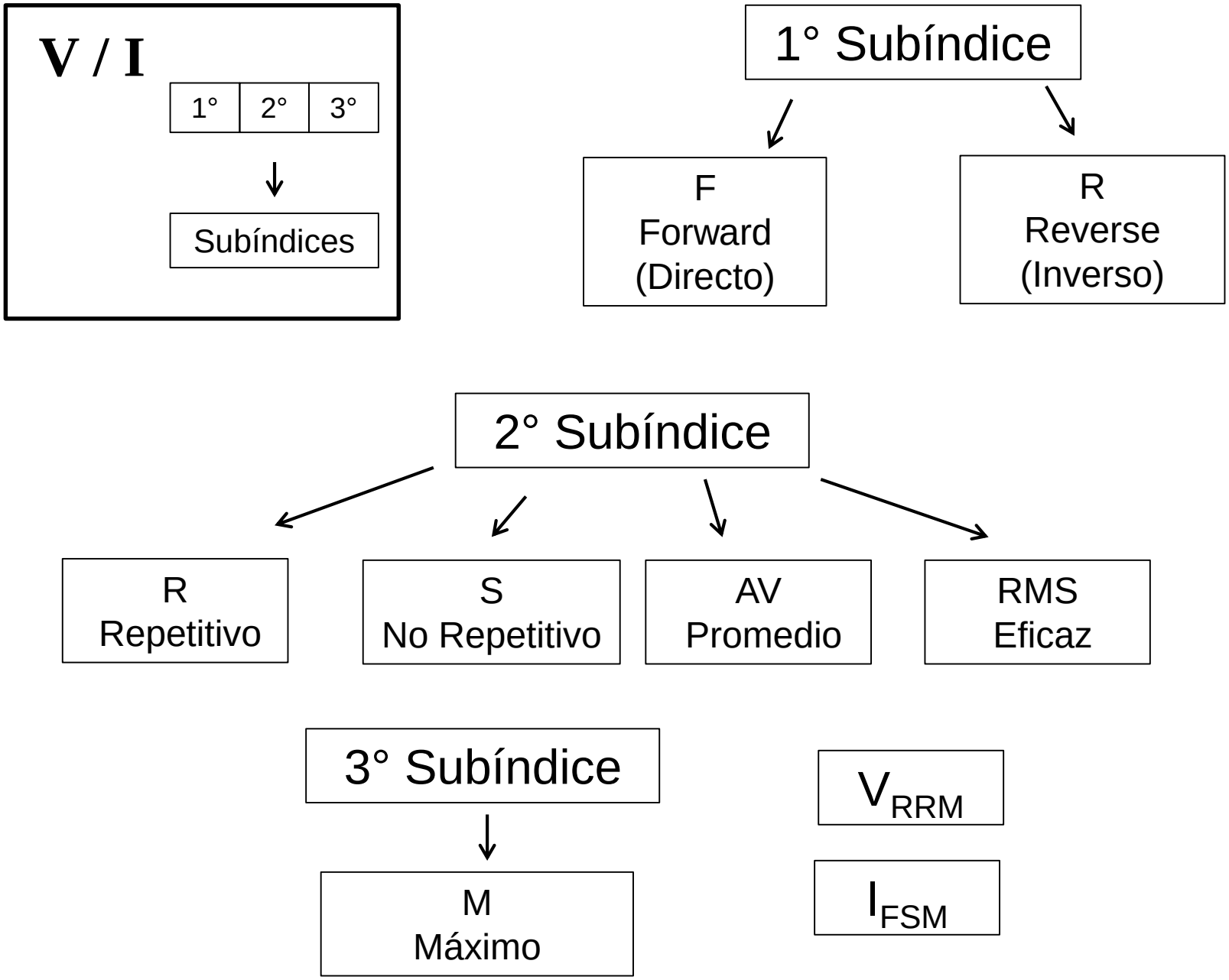
Subíndices

I

1°	2°	3°

↓

Subíndices


V / I
1°
2°
3°
Subíndices
1° Subíndice
F
Forward
(Directo)
R
Reverse
(Inverso)
2° Subíndice
R
Repetitivo
S
No Repetitivo
AV
Promedio
RMS
Eficaz
3° Subíndice
M
Máximo
V_{RRM}
I_{FSM}

FAIRCHILD
SEMICONDUCTOR®

1N4001 - 1N4007

Features

- Low forward voltage drop.
- High surge current capability.

DO-41
COLOR BAND DENOTES CATHODE

General Purpose Rectifiers (Glass Passivated)

Absolute Maximum Ratings*

T_A = 25°C unless otherwise noted

Symbol	Parameter	Value							Units
		4001	4002	4003	4004	4005	4006	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 @ T_A = 75°C	1.0							A
I_{FSM}	Non-repetitive Peak Forward Surge Current 8.3 ms Single Half-Sine-Wave	30							A
T_{stg}	Storage Temperature Range	-55 to +175							°C
T_J	Operating Junction Temperature	-55 to +175							°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

Electrical Characteristics

T_A = 25°C unless otherwise noted

Symbol	Parameter	Device							Units
		4001	4002	4003	4004	4005	4006	4007	
V_F	Forward Voltage @ 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 @ rated V_R T_A = 25°C T_A = 100°C	5.0 500							µA µA
C_T	Total Capacitance V_R = 4.0 V, f = 1.0 MHz	15							pF

Thermal Characteristics

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

Typical Characteristics

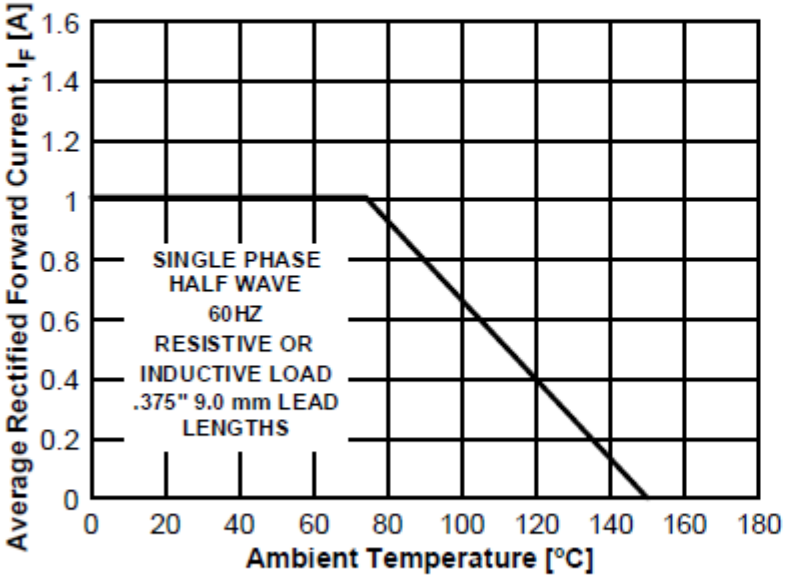


Figure 1. Forward Current Derating Curve

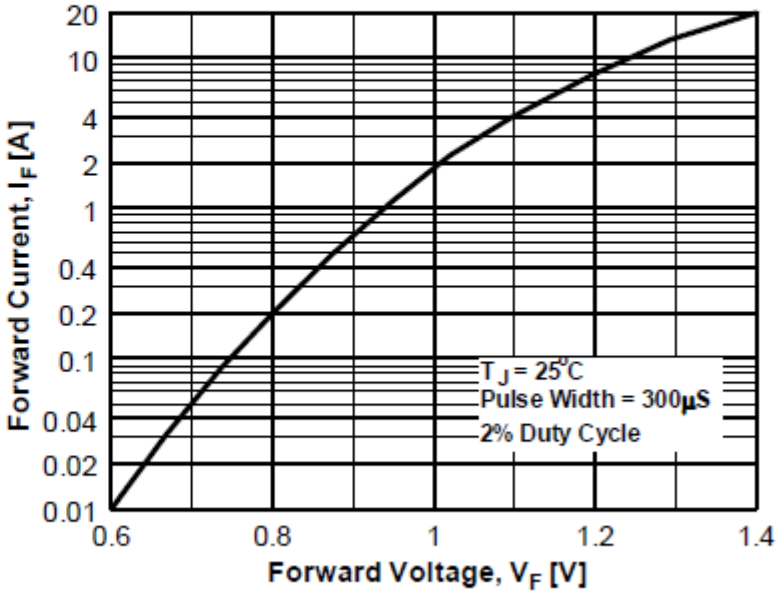


Figure 2. Forward Voltage Characteristics

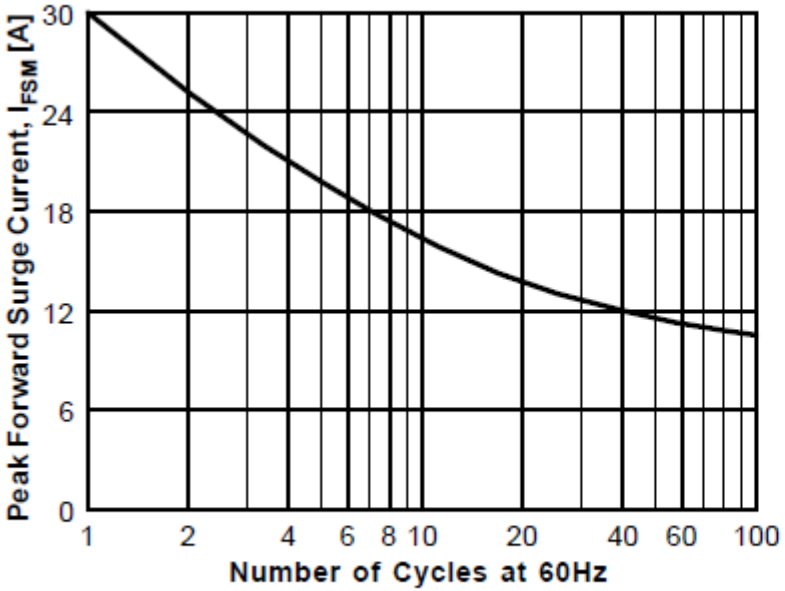


Figure 3. Non-Repetitive Surge Current

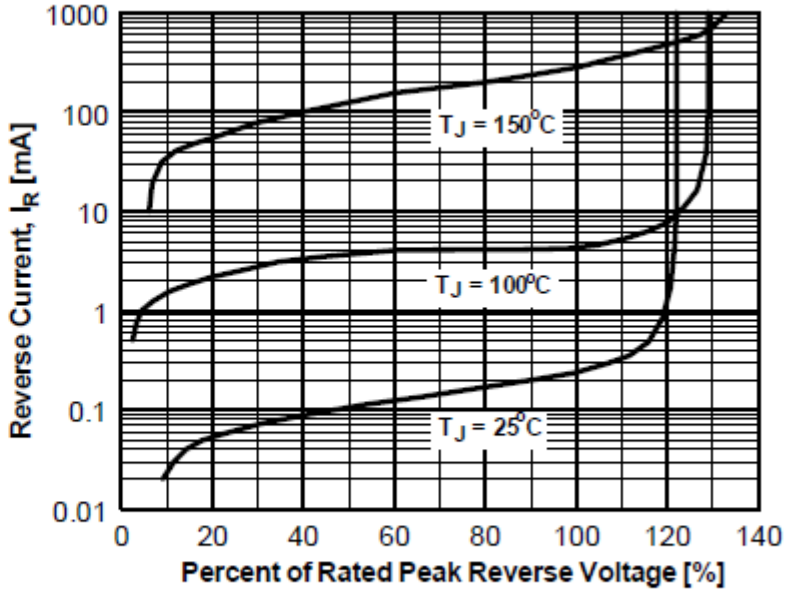
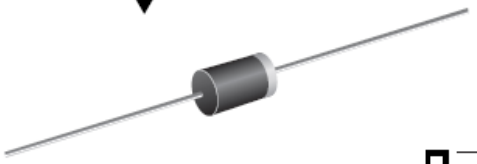


Figure 4. Reverse Current vs Reverse Voltage

1N4001 thru 1N4007

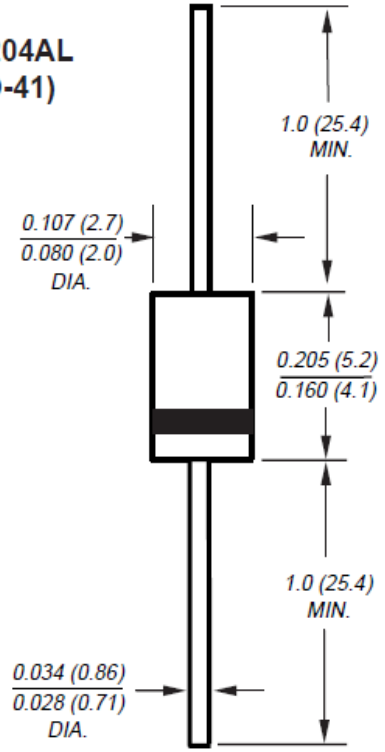
Vishay Semiconductors
formerly General Semiconductor

General Purpose Plastic Rectifier



Reverse Voltage
50 to 1000V
Forward Current 1.0A

DO-204AL
(DO-41)



NOTE: *Lead diameter is* 0.026 (0.66) / 0.023 (0.58) *for suffix "E" part numbers*

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

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symb.	1N 4001	1N 4002	1N 4003	1N 4004	1N 4005	1N 4006	1N 4007	Unit
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°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°C	I_{FSM}	30							A
* Maximum full load reverse current, full cycle average 0.375" (9.5mm) lead length T_L = 75°C	$I_{R(AV)}$	30							µA
Typical thermal resistance[1]	$R_{\theta JA}$ $R_{\theta JL}$	50 25							°C/W
* Maximum DC blocking voltage temperature	T_A	+150							V
* Operating junction and storage temperature range	T_J, T_{STG}	–50 to +175							°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°C T_A = 125°C	I_R	5.0 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, P.C.B. mounted *JEDEC registered values

Ratings and Characteristic Curves (T_A = 25°C unless otherwise noted)

Fig. 1 – Forward Current Derating Curve

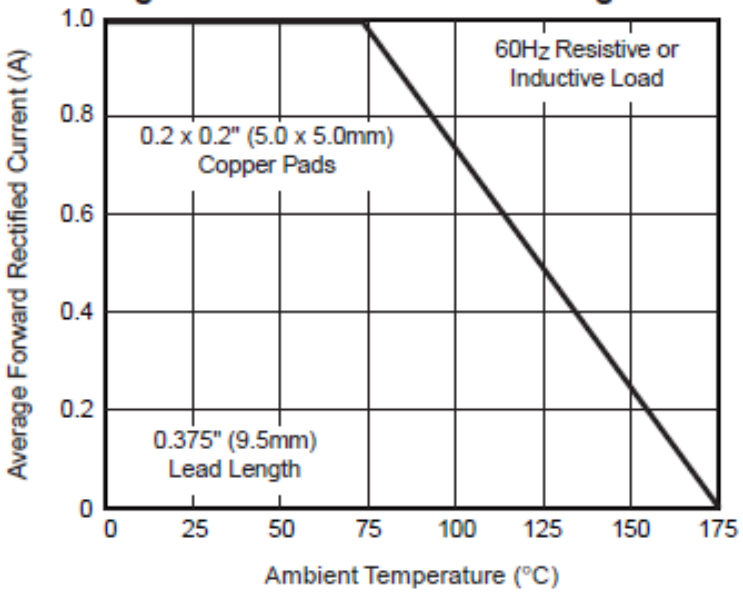


Fig. 2 – Maximum Non-Repetitive Peak Forward Surge Current

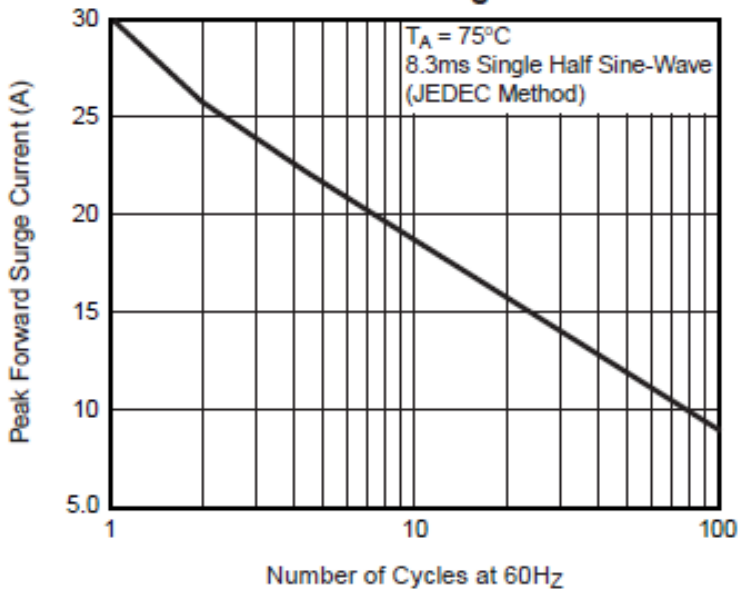


Fig. 3 – Typical Instantaneous Forward Characteristics

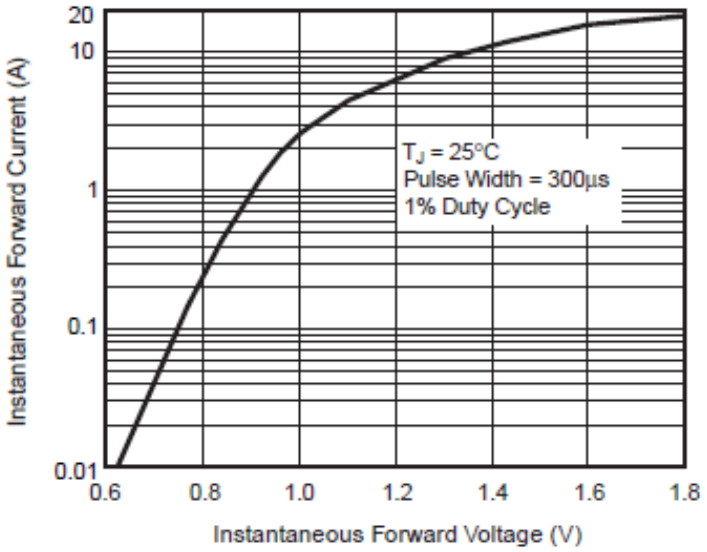


Fig. 4 – Typical Reverse Characteristics

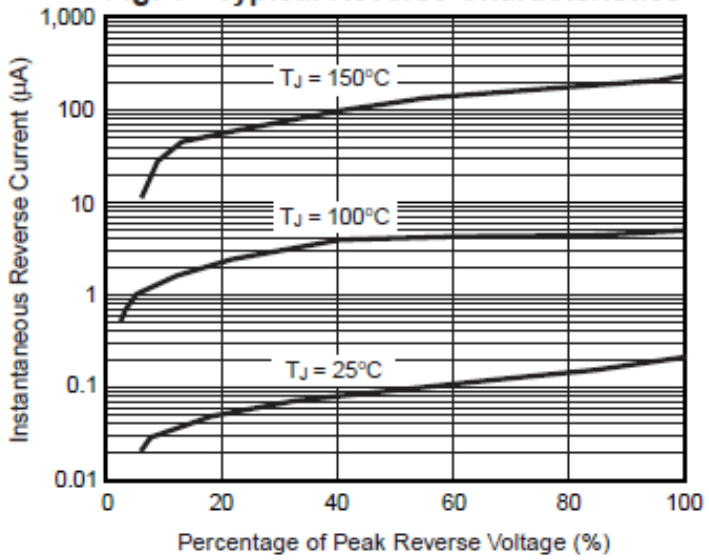


Fig. 5 – Typical Junction Capacitance

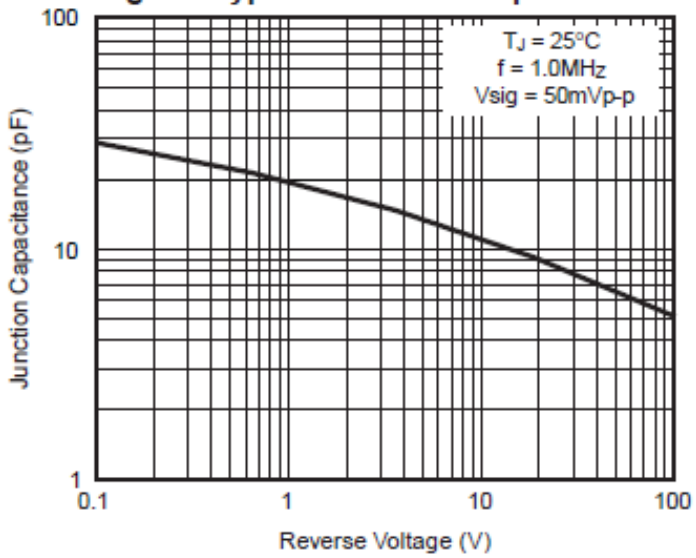
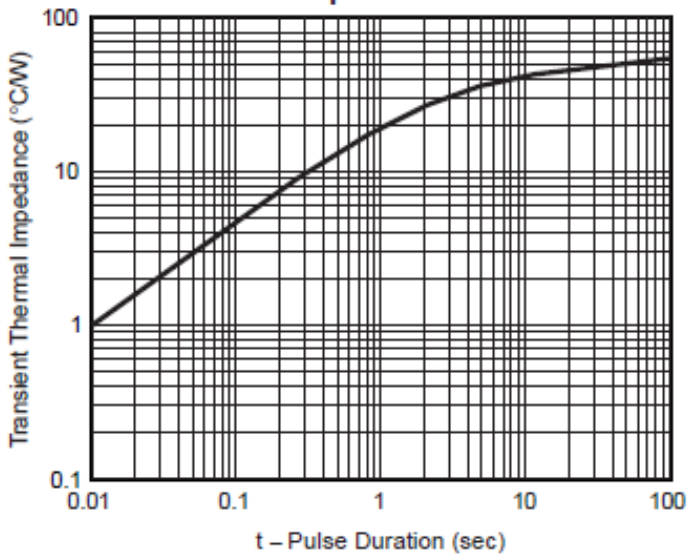


Fig. 6 – Typical Transient Thermal Impedance



Silicon Power Zener Diodes

Features

- Silicon Planar Power Zener Diodes
- For use in stabilizing and clipping circuits with high power rating.
- Standard Zener voltage tolerance suffix "A" for ± 5 % tolerance. Other Zener voltages and tolerances are available upon request.

Applications

Voltage stabilization

Mechanical Data

Case: DO-41 Glass Case

Weight: approx. 350 mg

Packaging Codes/Options:

TR / 5k per 13 " reel , 25k/box

TAP / 5k per Ammo mag. (52 mm tape), 25k/box

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Power dissipation	$T_{amb} \leq 50$ °C	P_{Diss}	1	W
Z-current		I_Z	P_V/V_Z	mA
Junction temperature		T_j	200	°C
Storage temperature range		T_{stg}	- 65 to + 200	°C
Junction ambient	l = 9.5 mm (3/8 "), T_L = constant	R_{thJA}	100	K/W

1N4728A to 1N4764A

Vishay Semiconductors

Electrical Characteristics

1N4728A...1N4764A

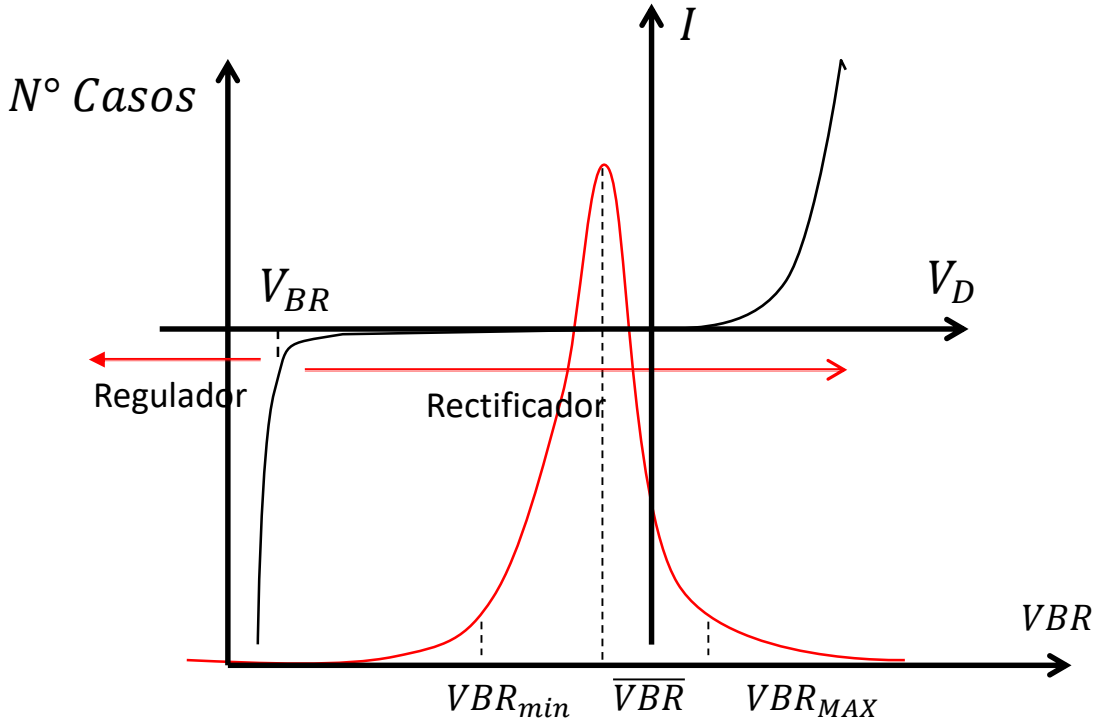
Partnumber	Nominal Zener Voltage[1]	Test Current	Maximum Dynamic Impedance			Maximum Reverse Leakage Current		Surge curent	Maximum Regulator Current[2]
	V_Z @ I_{ZT}	I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R	Test Voltage V_R	I_R @ T_{amb} = 25 °C	I_{ZM} @ T_{amb} = 50 °C
	V	mA	Ω	Ω	mA	µA	V	mA	mA
1N4728A	3.3	76	10	400	1	100	1	1380	276
1N4729A	3.6	69	10	400	1	100	1	1260	252
1N4730A	3.9	64	9	400	1	50	1	1190	234
1N4731A	4.3	58	9	400	1	10	1	1070	217
1N4732A	4.7	53	8	500	1	10	1	970	193
1N4733A	5.1	49	7	550	1	10	1	890	178
1N4734A	5.6	45	5	600	1	10	2	810	162
1N4735A	6.2	41	2	700	1	10	3	730	146
1N4736A	6.8	37	0.5	700	1	10	4	660	133
1N4737A	7.5	34	0	700	0.5	10	5	605	121
1N4738A	8.2	31	0.5	700	0.5	10	6	550	110
1N4739A *	9.1	28	0	700	0.5	10	7	500	100
1N4740A *	10	25	7	700	0.25	10	7.6	454	91
1N4741A *	11	23	8	700	0.25	5	8.4	414	83
1N4742A *	12	21	9	700	0.25	5	9.1	380	76
1N4743A *	13	19	10	100	0.25	5	9.9	344	69
1N4744A *	15	17	14	700	0.25	5	11.4	304	61
1N4745A *	16	15.5	16	700	0.25	5	12.2	285	57
1N4746A *	18	14	20	750	0.25	5	13.7	250	50
1N4747A *	20	12.5	22	750	0.25	5	15.2	225	45
1N4748A *	22	11.5	23	750	0.25	5	16.7	205	41
1N4749A *	24	10.5	25	750	0.25	5	18.2	190	38
1N4750A *	27	9.5	35	750	0.25	5	20.6	170	34
1N4751A *	30	8.5	40	1000	0.25	5	22.8	150	30

Diodo Rectificador
vs
Diodo Regulador (ZENER)

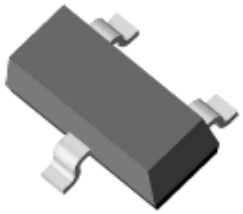
- La misma fabricación

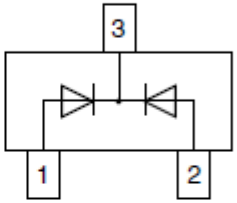
- Distintas zonas de trabajo
  - Rectificador $|V_{BR}| > V_D$
  - Regulador $|V_{BR}| < V_D$

- Distintas especificaciones en
  - Máximos Absolutos
  - Características Eléctricas



Dual Varicap Diode





18108

MECHANICAL DATA

Case: SOT-23

Weight: approx. 8.1 mg

Packaging codes/options:
08/3 k per 7" reel (8 mm tape), 15 k/box

FEATURES

- Silicon epitaxial planar diode
- Common cathode
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Find out more about Vishay's Automotive Grade Product requirements at: www.vishay.com/applications

AUTOMOTIVE GRADE

Pb-free

e3

RoHS COMPLIANT

GREEN (5-2008)**

APPLICATIONS

- Tuning of separate resonant circuits
- Push-pull circuits in FM range
- Especially for car radios

PARTS TABLE

PART	TYPE DIFFERENTIATION	ORDERING CODE	TYPE MARKING	REMARKS
BB814-1-V-GH	V_{RRM} = 20 V, C_{D2} = 43 pF to 45.5 pF	BB814-1-V-GH-08	SG1	Tape and reel
BB814-2-V-GH	V_{RRM} = 20 V, C_{D2} = 44.5 pF to 46.5 pF	BB814-2-V-GH-08	SG2	Tape and reel

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITIONS**	**SYMBOL**	**VALUE**	**UNIT**
Repetitive peak reverse voltage		V_{RRM}	20	V
Reverse voltage		V_R	18	V
Forward current		I_F	50	mA

THERMAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITIONS**	**SYMBOL**	**VALUE**	**UNIT**
Junction temperature		T_j	125	°C
Storage temperature range		T_{stg}	- 55 to + 150	°C

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITIONS**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Reverse current	V_R = 16 V		I_R			20	nA
	V_R = 16 V, T_j = 60 °C		I_R			200	nA
Diode capacitance (1)	V_R = 2 V	BB814-1-V-GH	C_{D2}	43		45.5	pF
		BB814-2-V-GH	C_{D2}	44.5		46.5	pF
	V_R = 8 V	BB814-1-V-GH	C_{D8}	19.1		21.95	pF
		BB814-2-V-GH	C_{D8}	19.75		22.70	pF
Capacitance ratio	V_R = 2 V, 8 V, f = 1 MHz		C_{D2}/C_{D8}	2.05		2.25	
Series resistance	C_D = 38 pF, f = 100 MHz		R_s			0.5	Ω

Note

(1) In the reverse voltage range of V_R = (2 V to 8 V) for diodes 4 taped in sequence the max. deviation is 3 %

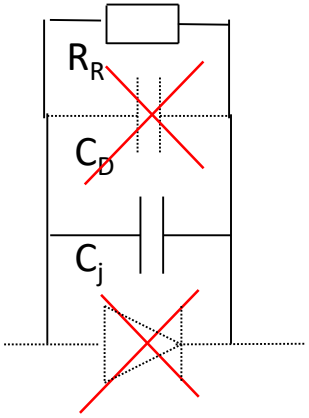
Capacidad de Juntura (Cj)
vs
Capacidad de Difusión (CD)

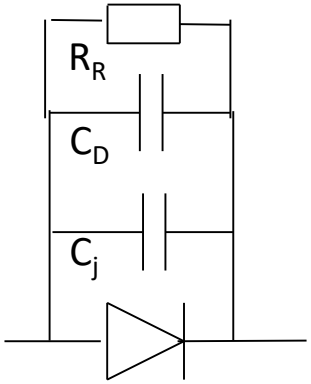
$C_j \sim pF\ (10^{-12})$

$C_D \sim \mu F\ (10^{-6})$

C_j esta presente siempre en polarización directa e inversa

C_D solo esta presente en polarización directa

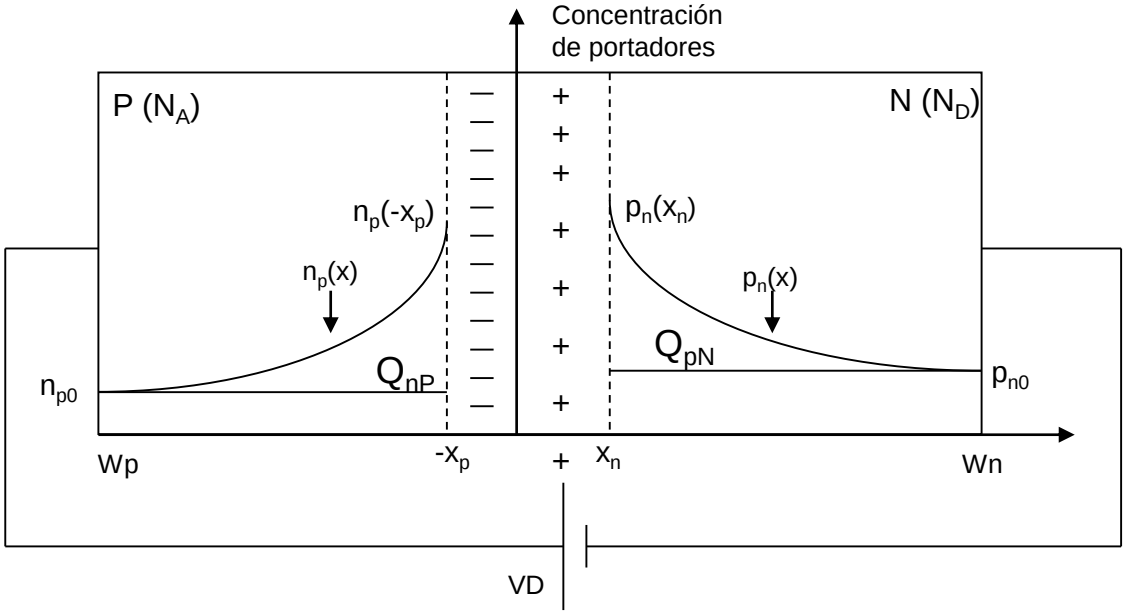


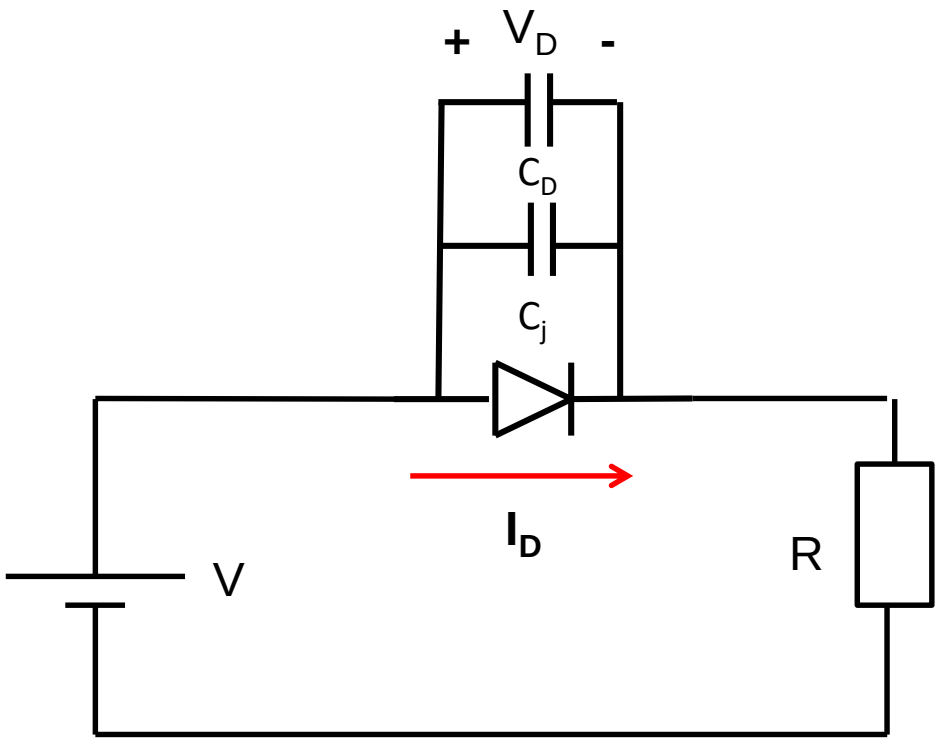


Q (Factor de calidad)= $\omega C_j R_R$

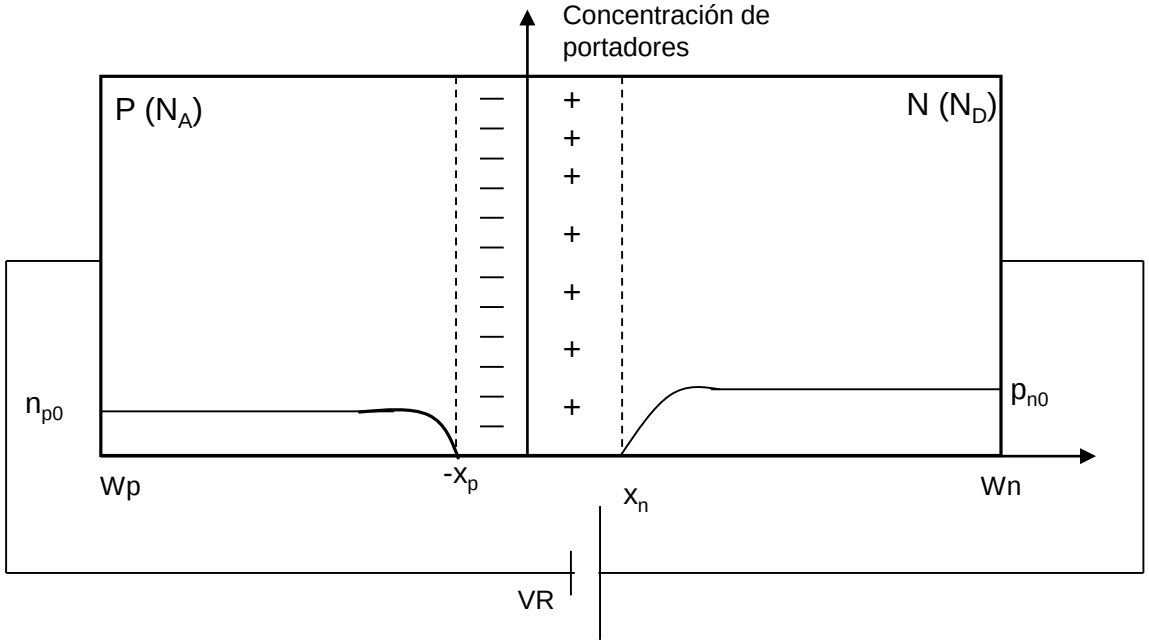
Q (Factor de calidad)= $\omega(C_D + C_j)(R_R \| r_d)$

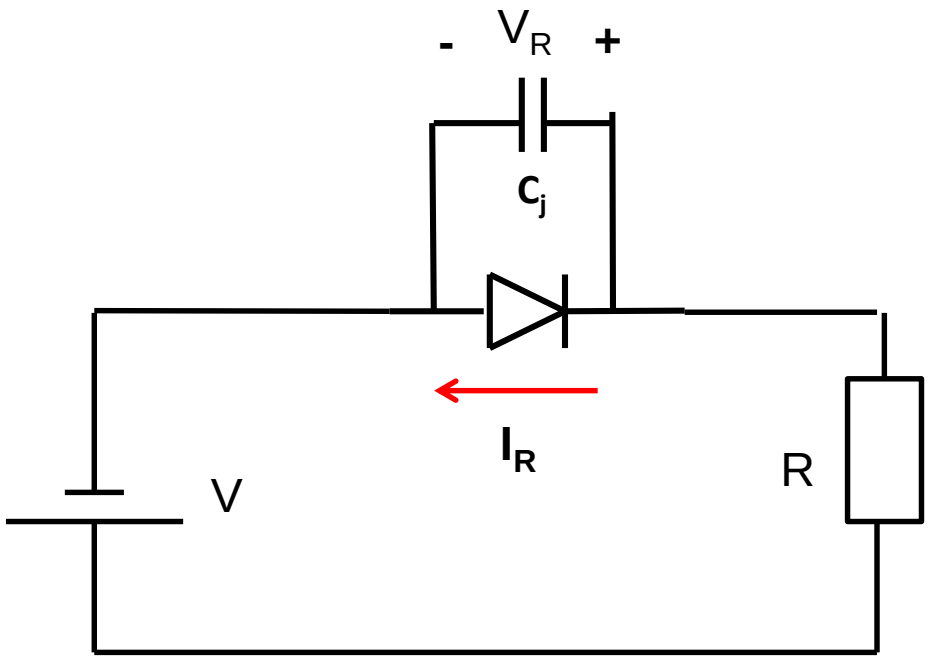
DIRECTA


Concentración
de portadores
P (N_A)
N (N_D)
n_p(-x_p)
n_p(x)
p_n(x_n)
p_n(x)
Q_nP
Q_pN
n_p0
p_n0
Wp
-x_p
x_n
Wn
VD

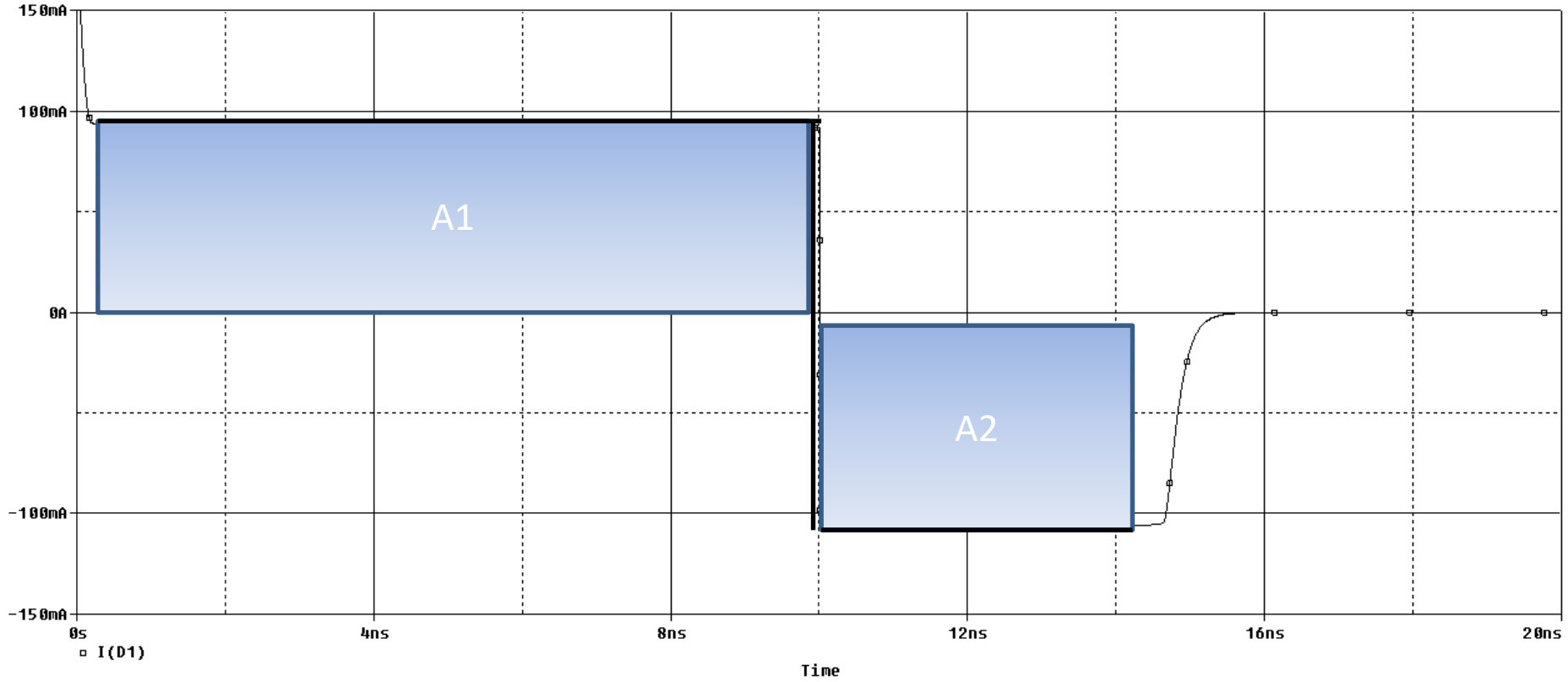

+ V_D -
C_D
C_j
I_D
V
R

INVERSA


Concentración de portadores
P (N_A)
N (N_D)
n_{p0}
p_{n0}
Wp
$-x_p$
x_n
Wn
VR


- V_R +
C_j
I_R
V
R

MAXIMA FRECUENCIA DE RECTIFICACION



Debe ser A1 >> A2

$$\frac{T}{2} \gg t_{rr} \qquad \frac{T}{2} = 10t_{rr} \qquad T = 20t_{rr} \qquad f = \frac{1}{T}$$

$$f_{max} \leq \frac{1}{20t_{rr}}$$

Tiempo de recuperación t_{rr}