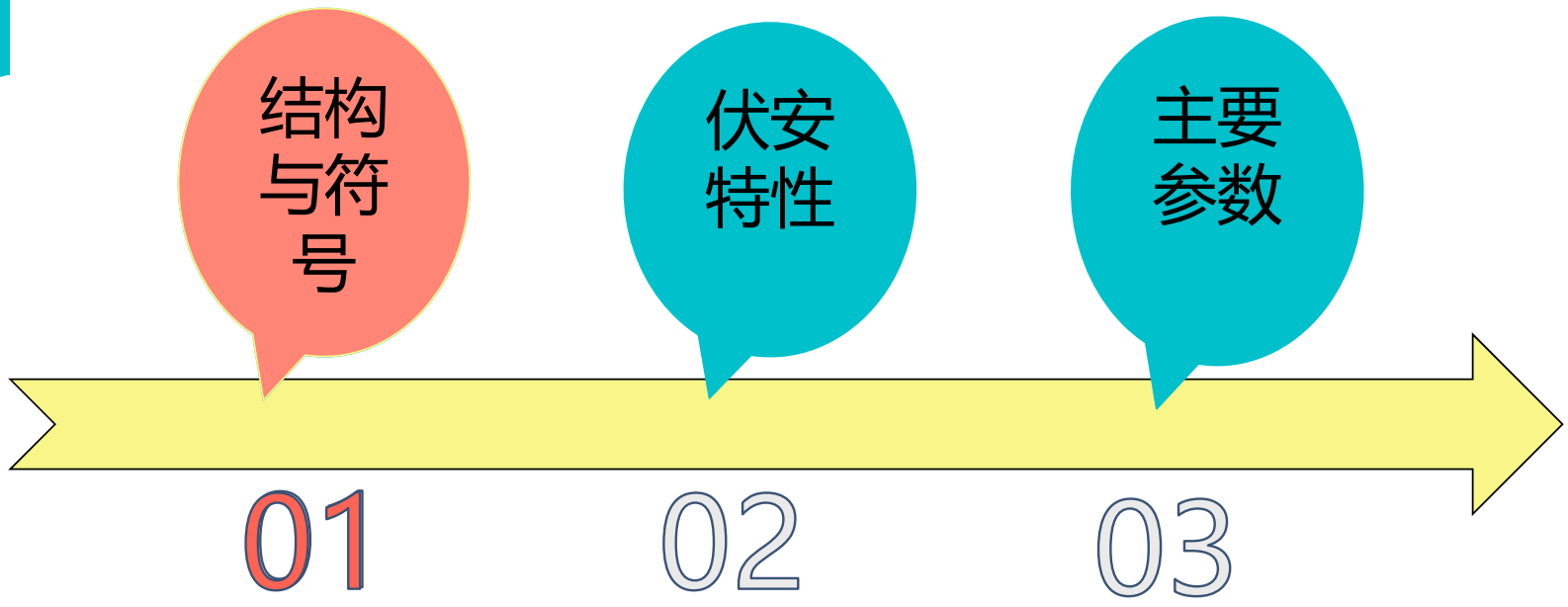
Diode

二 极 管

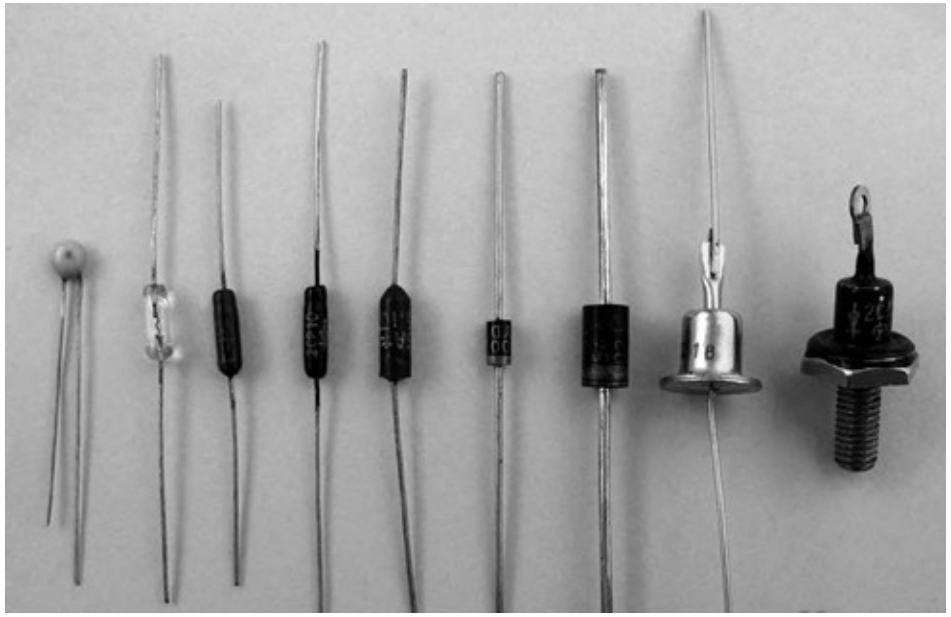
第3章 二极管及其基本电路

第3节 二 极 管

内容



3.3.1 二极管结构与符号

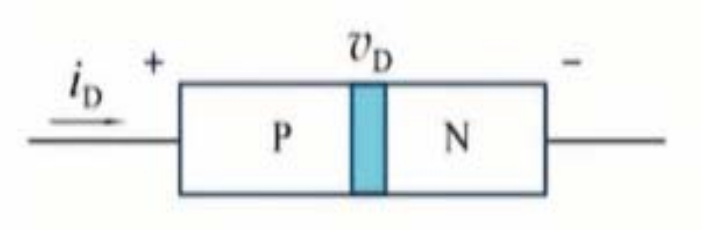


大电流二极管

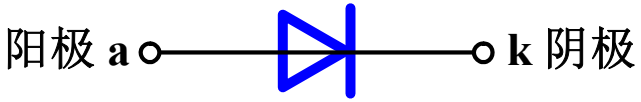
柱形贴片二极管

贴片二极管

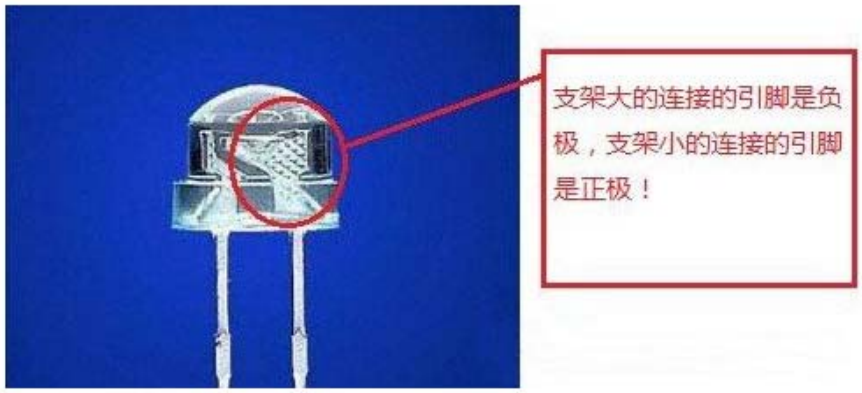
3.3.1 二极管结构与符号



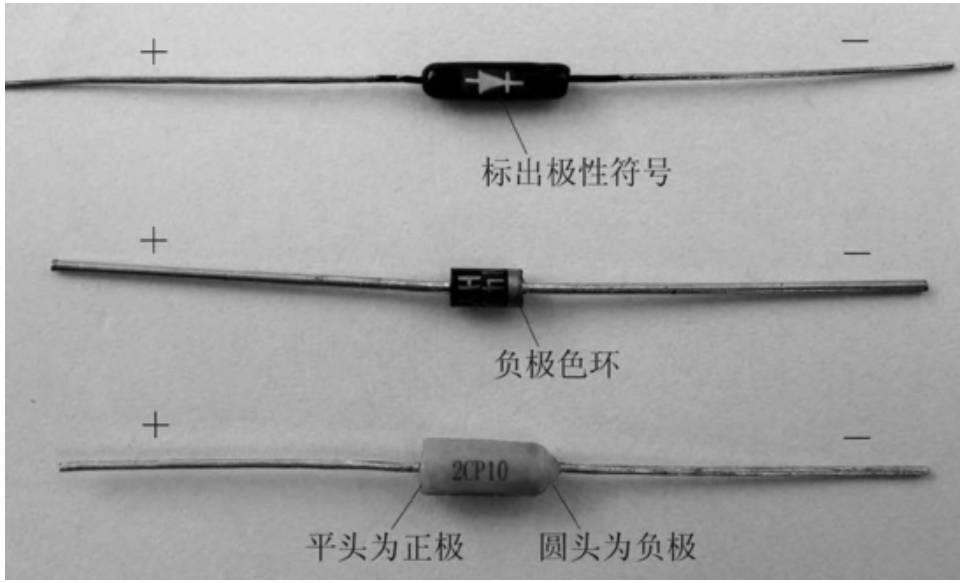
结构示意图



电路符号



长脚为阳极

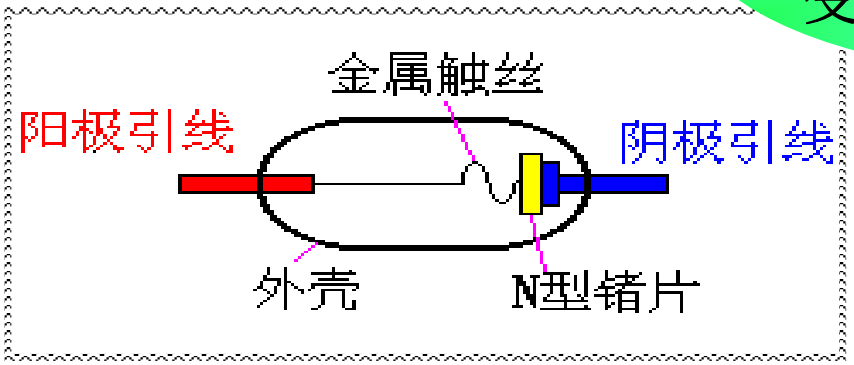


3.3.1 二极管结构与符号

在PN结上加上引线和封装，就成为一个二极管。二极管按结构分有点接触型、面接触型两大类。

(1) 点接触型二极管

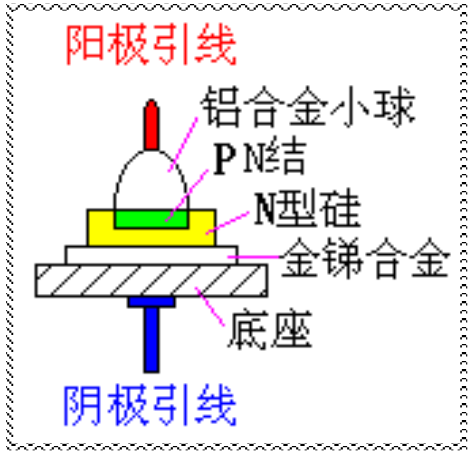
PN结面积小，结电容小，用于检波和变频等高频电路。



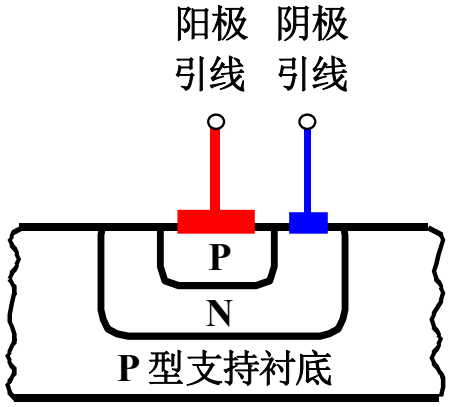
二极管的结构示意图　　(a) 点接触型

(2) 面接触型二极管

PN结面积大，用于工频大电流整流电路。

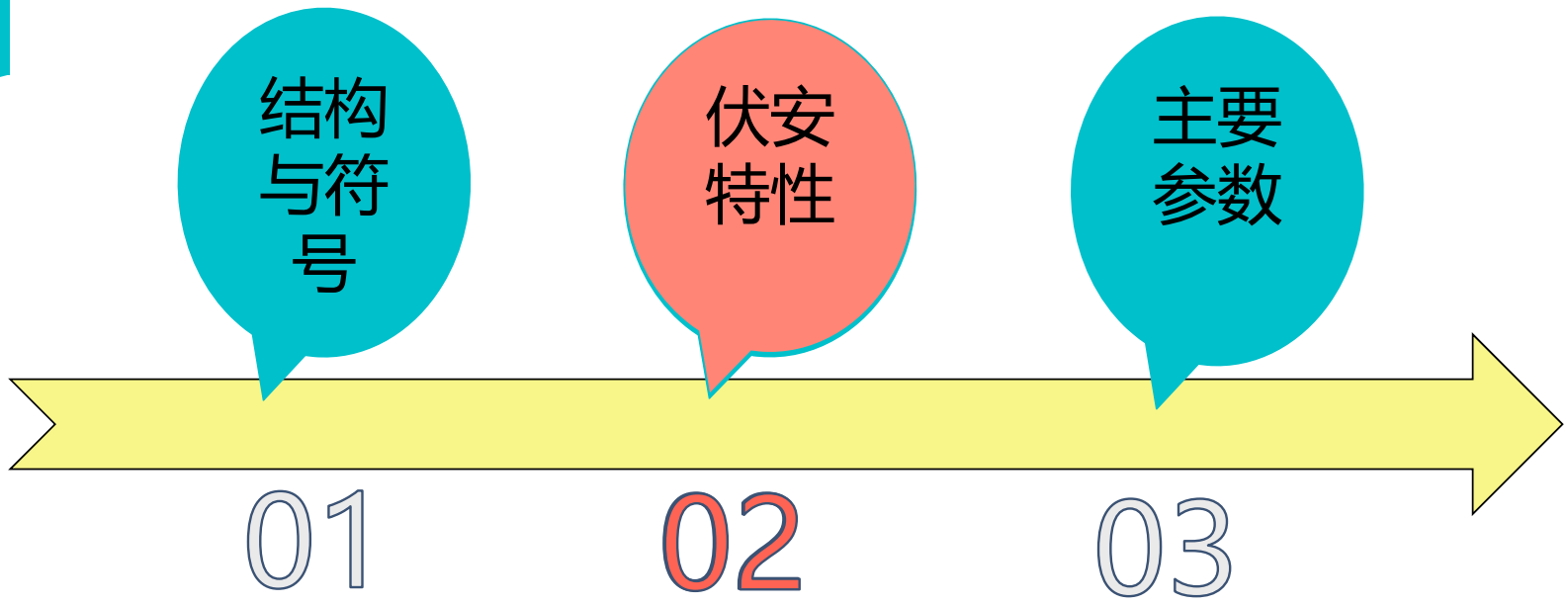


(b) 面接触型



(c) 集成电路中的平面型

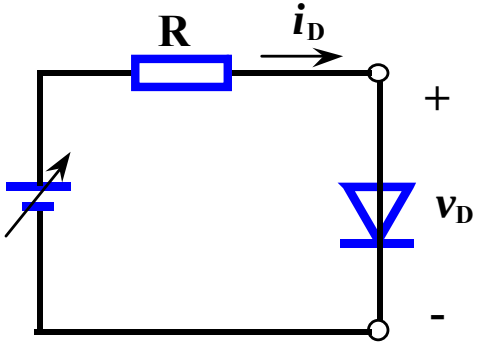
内容

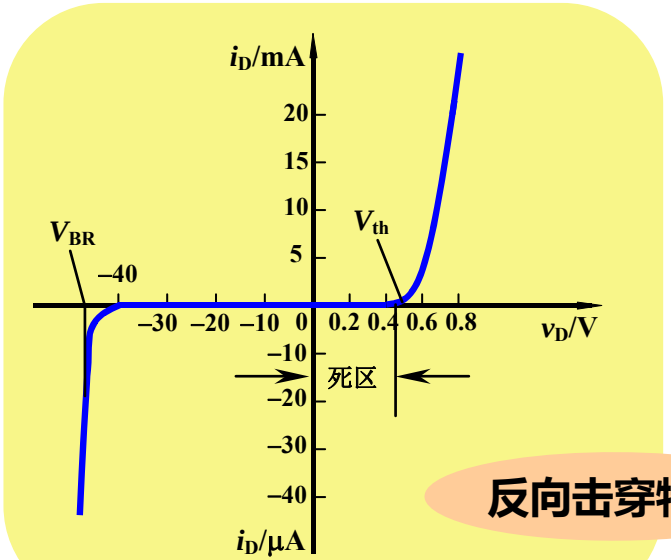


3.3.2 二极管伏安特性

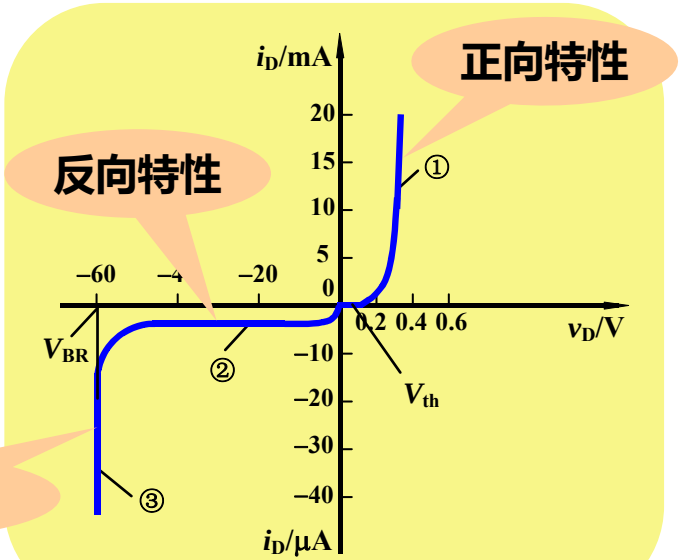
二极管的伏安特性曲线可用下式表示

$$i_D = I_S(e^{v_D/V_T} - 1)$$





硅二极管2CP10的*I*–*V* 特性

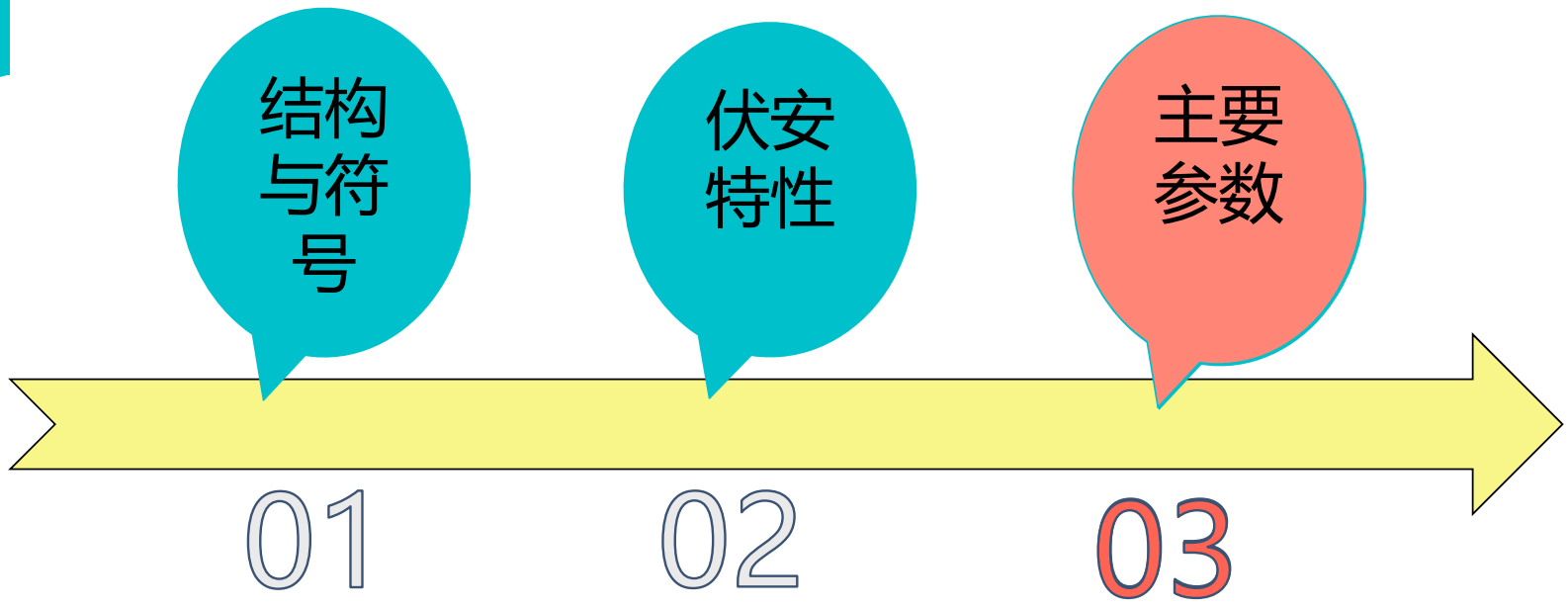


锗二极管2AP15的*I*–*V* 特性

反向击穿特性

V_{th}——门坎电压　V_{BR}——反向击穿电压

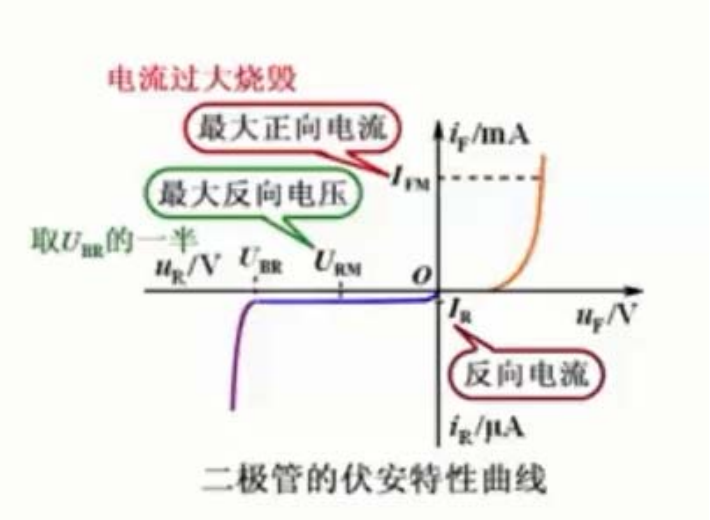
内容



3.3.3 二极管的主要参数

P60

1. 最大整流电流 I_F
2. 反向击穿电压 V_{BR}或最高反向工作电压
3. 反向电流 I_R
4. 极间电容 C_d
5. 反向恢复时间 T_{RR}



二极管的伏安特性曲线

3.3.3 二极管的主要参数

FAIRCHILD
SEMICONDUCTOR®

1N3064
Small Signal Diode

Absolute Maximum Ratings * T_a = 25°C unless otherwise noted

Symbol	Parameter	Value	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage	75	V
$I_{F(AV)}$	Average Rectified Forward Current	300	mA
I_{FSM}	Non-repetitive Peak Forward Surge Current Pulse Width = 1.0 second Pulse Width = 1.0 microsecond	 1.0 4.0	 A A
T_{STG}	Storage Temperature Range	-65 to +200	°C
T_J	Operating Junction Temperature	175	°C

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Max	Units
V_R	Breakdown Voltage	I_R = 5µA	75		V
V_F	Forward Voltage	I_F = 250µA I_F = 1mA I_F = 2mA I_F = 10mA	505 550 610	575 650 710 1.0	mV mV mV V
I_R	Reverse Leakage	V_R = 50V V_R = 50V, T_A = 150°C		100 100	nA µA
C_T	Total Capacitance	V_R = 0, f = 1.0MHz		2	pF
t_{rr}	Reverse Recovery Time	I_F = I_R = 10mA, R_L = 100Ω, I_{rr} = 1mA		4	ns