

반도체의 광전 효과

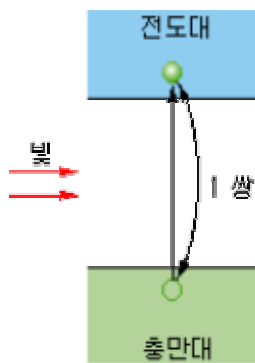
[Hz]

$E=h$ [J]

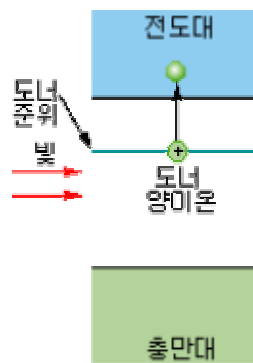
가

,

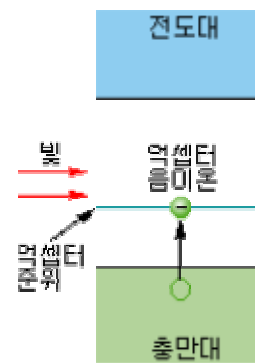
광도전 효과



(a)



(b) n



(c) p

1-45

1-45

(a)

가

(b)

(c)

, n

가,

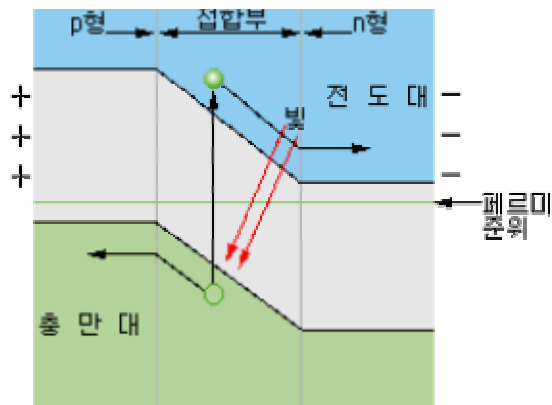
p

가

(photoconductivity effect)

(CdS)

광기전 효과

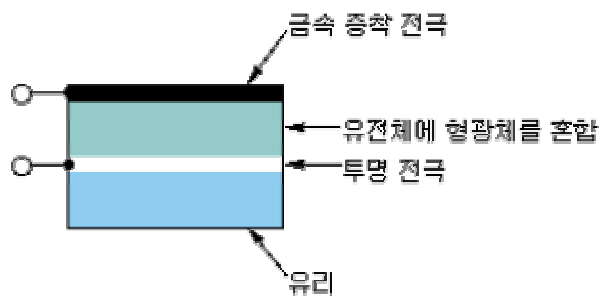


1-46

pn

1-46 p, n .
 (photogalvanic effect) . (photo diode) (phototransistor)
 , 가 .

루미네선스



1-47

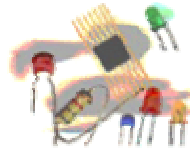
(excitation) ,
 (luminescence) . 가

가

(electroluminescence, EL)

1-

반도체 내의 전자 성질



(Si)

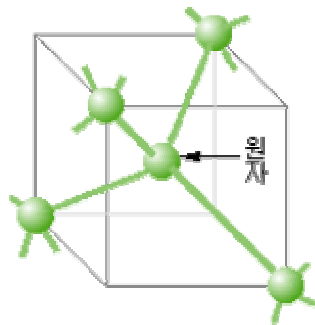
(Ge)

1-35

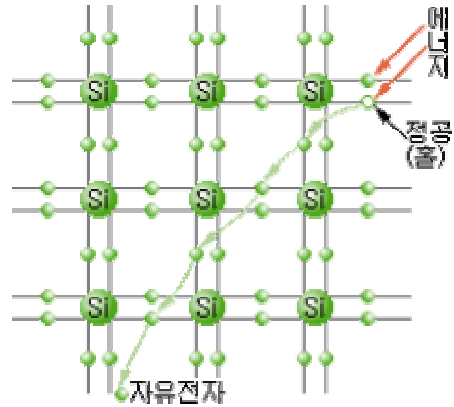
4

가

1-36



1-35 Si

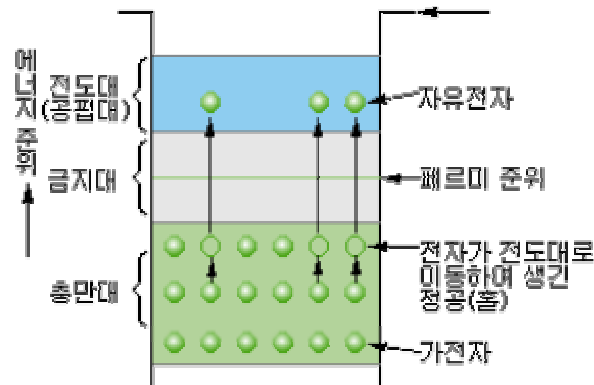


1-36 Si

(intrinsic

semiconductor)

1-37



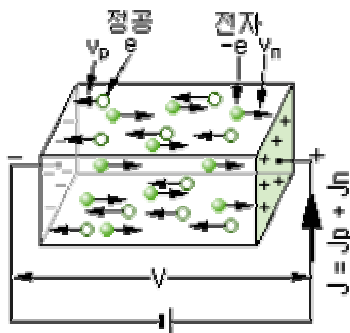
1-37

가 가 , 가
 가 (positive hole) (hole) .
 , 가 ,

1-36

가 가 , 가
 , 가 (+) 가
 (carrier) , 가

반도체의 전기 전도



current)
 current)

(drift
 (diffusion

전기장에 의한 전도

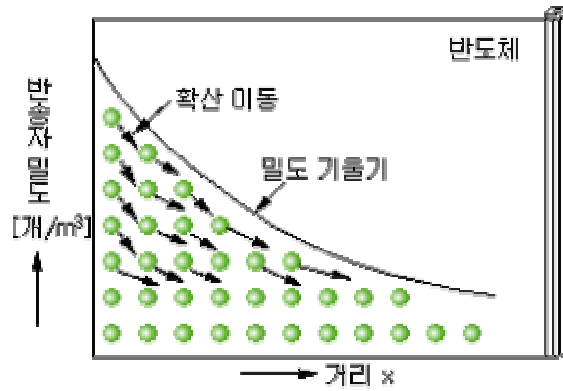
1-42

[V] 가

가

1-42

밀도 기울기에 의한 확산



4-43

1-43

가

가

가

저항률의 온도 특성

, 가

가

가 .

가

가

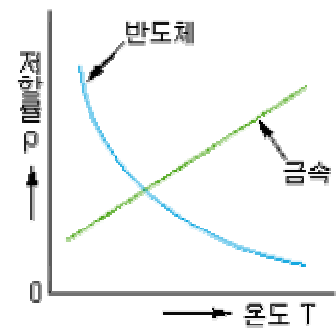
(+) . ,

가 ,

가 가

(-) .

1-44

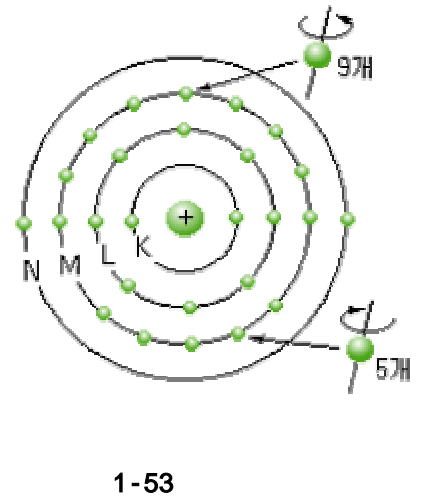


1-44

자성체



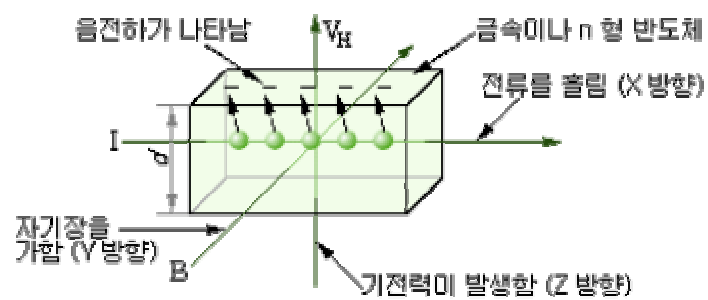
가 , 가
(spin)
가
1-53
가 , M 14 가
9 5
가 4 가 가
가
가
가
가



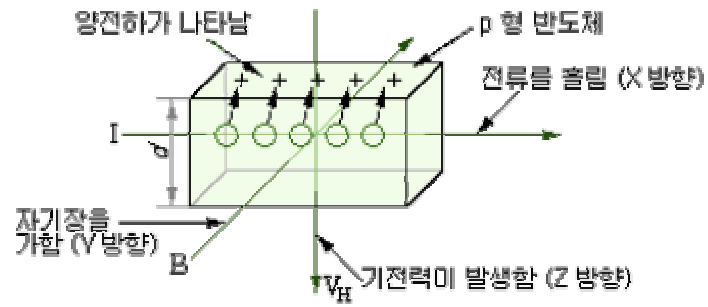
자기장 효과



1-52 , X , Y 가
(Hall effect) , Z
가



(a) n



(b) p

1-52

1-52 (a) , n
 (+) , (-)
 (+) 가
 , (b) p 가 , (a)
 가 , 가 p , n
 가
 , d[m] , B[Wb/m³] , I[A] , R[m³/C] , V_H

$$V_H = R \frac{IB}{d} \text{ [V]} \dots\dots\dots (1-38)$$