

BERZIET UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ENEE 3102

Electronics Laboratory

Experiment.3 Prelab

The Transistor Biasing and the DC Parameters

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The Transistor Biasing:

1. PNP transistor
2. With DC Power supply (4V)



1. Reverse connection of the supply.



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1. NPN Transistor
2. With DC Power supply (4V) (reverse polarity)

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The base-collector junction is reversed biased and the emitter-base junction is forward biased

Ie here = -Ie in the PNP circuit

Ic here = -Ic in the PNP circuit

II. The Transistor DC Parameters:

1. Input Characteristic:

VCE=0V



The Result:



VCE=0.2V



The Result:



VCE=0.4V



The Result:



|  |  |  |
| --- | --- | --- |
| VCE | IB[uA] | VBE[V] |
| 0 | 0 | 156.25n |
| 0 | 5 | 487.223m |
| 0 | 10 | 515.282m |
| 0 | 15 | 543.341m |
| 0.2 | 0 | 156.25n |
| 0.2 | 5 | 619.747m |
| 0.2 | 10 | 637.104m |
| 0.2 | 15 | 653.901m |
| 0.4 | 0 | 156.250n |
| 0.4 | 5 | 619.747m |
| 0.4 | 10 | 637.104m |
| 0.4 | 15 | 653.901m |

**B: Reverse Voltage Characteristic:**

IB=2.5uA





IB=5uA



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IB=15uA

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|  |  |  |
| --- | --- | --- |
| IB[uA] | VCE | VBE[V] |
| 2.5 | 0 | 472.414m |
| 2.5 | 0.5 | 589.542m |
| 2.5 | 2 | 589.544m |
| 2.5 | 5 | 589.547m |
| 2.5 | 15 | 589.557m |
| 5 | 0 | 486.444m |
| 5 | 0.5 | 621.314m |
| 5 | 2 | 621.321m |
| 5 | 5 | 621.333m |
| 5 | 15 | 621.372m |
| 15 | 0 | 543.341m |
| 15 | 0.5 | 656.812m |
| 15 | 2 | 656.842m |
| 15 | 5 | 657.471m |
| 15 | 15 | 657.656m |

**C: The output Characteristics:**

IB=2.5uA





IB=5uA





IB=15uA





|  |  |  |
| --- | --- | --- |
| IB[uA] | VCE | IC[mA] |
| 2.5 | 0 | -0.0023827 |
| 2.5 | 0.5 | 0.516 |
| 2.5 | 2 | 0.524 |
| 2.5 | 5 | 0.540 |
| 2.5 | 15 | 0.594 |
| 5 | 0 | -0.0047920 |
| 5 | 0.5 | 1.0745 |
| 5 | 2 | 1.0912 |
| 5 | 5 | 1.1245 |
| 5 | 15 | 1.2351 |
| 15 | 0 | 0.014429 |
| 15 | 0.5 | 3.4171 |
| 15 | 2 | 3.4699 |
| 15 | 5 | 3.6142 |
| 15 | 15 | 3.9661 |

**D:Forward Current Transfer Characteristic:**







|  |  |  |
| --- | --- | --- |
| VCE | IB[uA] | IC[mA] |
| 2.5 | 0 | 0.0010425 |
| 2.5 | 5 | 1.0968 |
| 2.5 | 10 | 2.3306 |
| 2.5 | 15 | 3.4873 |
| 5 | 0 | 0.0010203 |
| 5 | 5 | 1.1245 |
| 5 | 10 | 2.35 |
| 5 | 15 | 3.6142 |
| 15 | 0 | 0.0010150 |
| 15 | 5 | 1.2351 |
| 15 | 10 | 2.6222 |
| 15 | 15 | 3.9661 |

VCE=2.5V



VCE=5V



VCE=15V

