

EET 131 Unit 3 Reading Transistor Theory & Switches

| Sec # | Topics | Pages to Read | # of Pg |
|-------|---|--|---------------------|
| 4-1 | Structure | | 1 |
| 4-2 | Operation | | 2 ½ |
| 4-6 | Transistor Pkg. & Terminal ID | | 2 ¾ |
| 4-7 | Testing Transistor with DMM | 191 bottom ½, 192 bottom ¼ and 193 | 1 ¾ |
| 4-3 | B, h_{FE} B _{DC} vs I _C and Temp | 169 bottom ¼ thru 171 top ¼ 177 bottom ½ | 1 ½ ½ |
| 4-3 | Transistor Data Sheets | 180 middle 3 paragraphs, & 181 | 1 ¼ |
| 4-3 | IV Curves – Transistor SW operate in the Cutoff & Saturation Regions | 173 bottom ¾ thru 176 top ¾ | 3 ½ |
| 11-9 | The Photo Transistor | 559 and 560 | 2 |
| 11-11 | Opto Couplers | 563 Yellow box & 1 st par below 564 top 1/3 & Fig 11-56 (a) 564 Voltage Isolation & 565 top ¼ | 1 ¼ |
| 4-5 | The Transistor SW Transistor Saturation (ON) Calculations A simple Transistor LED SW | 184 bottom ¾ thru 186 top ¼ 176 bottom ¼ , 177 top ½ 186 bottom ¾ , 187 top ¼ | 2 ¾ 1 |
| 11-9 | Phototransistor-Transistor Relay SW | 561 | 1 |
| | Ch 4 Review | 204, and 205 top ½ | 1 ½ |
| | | Total # of Pages = | 24 ¼ |

Transistor Operation

Let's see how a transistor operates by the mechanism of Emitting, Diffusion, and Collection.

Here's how a transistor operates:

- 1) The Emitter region Emits Electrons (majority carriers) which "see" a Positive potential (V_B) in the Base region thus they are attracted into the Base region.
- 2) Because the Base region is thin, only a few e^- Recombine in the Base region causing a small BE current (I_B) to flow.
- 3) Most Emitter Electrons spread out (or diffuse) toward the Positive (Collector – Base) Junction.
- 4) They are then Collected toward the large Positive (V_C) at the Collector terminal.

Note: that V_C is much greater than V_B , thus more Electrons are attracted toward the Collector compared to the Base.

Optional Reading

| Sec # | Topics | Pages to Read | # of Pg |
|-------|---|---|-----------------------------------|
| 4-7 | Troubleshooting an Alarm Transistor switch circuit | 197 bottom $\frac{3}{4}$, 198 - 1 st Paragraph 199 Basic Schematic Only 201 Schematic of 3 Zones Only | 1 $\frac{3}{4}$ |
| | Troubleshooting Transistors in Circuits | 190 bottom $\frac{1}{4}$, 191 top $\frac{1}{2}$ 192 top $\frac{3}{4}$, 195, 196 top $\frac{1}{2}$ | 3Pg. |
| | | Total # of Pages = | 4 $\frac{3}{4}$ |