**Lampiran- lampiran**

## Lampiran 1. Data sheet IC TL431,BC547,BC557

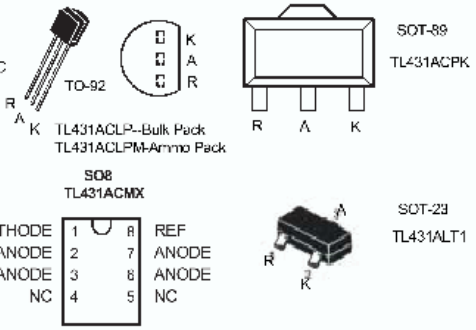
- IC TL431

**TL431A** — **Adjustable Precision Shunt Regulator**

**FEATURES**

- Programmable Output Voltage to 40V
- Low Dynamic Output Impedance 0.2Ω
- Sink Current Capability of 0.1 mA to 100 mA
- Equivalent Full-Range Temperature Coefficient of 50 ppm/°C
- Temperature Compensated for Operation over Full Rated Operating Temperature Range
- Low Output Noise Voltage
- Fast Turn on Respons
- TO-92 or SOT-23 and SOT-89 ,SO8packages

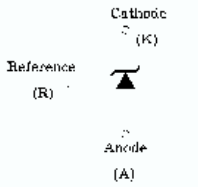
**PIN CONNECTIONS**



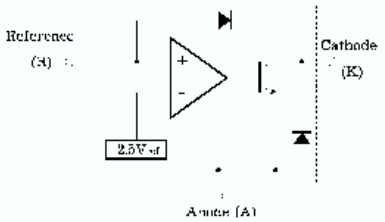

**DESCRIPTION**

The TL431A is a three-terminal adjustable regulator series with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between Vref (approximately 2.5 volts) and 36 volts with two external resistors. These devices have a typical dynamic output impedance of 0.2Ω. Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.
The TL431A is characterized for operation from -0°C to +70°C.

**SYMBOL**




**FUNCTIONAL BLOCK DIAGRAM**




**ABSOLUTE MAXIMUM RATINGS**

(Operating temperature range applies unless otherwise specified)

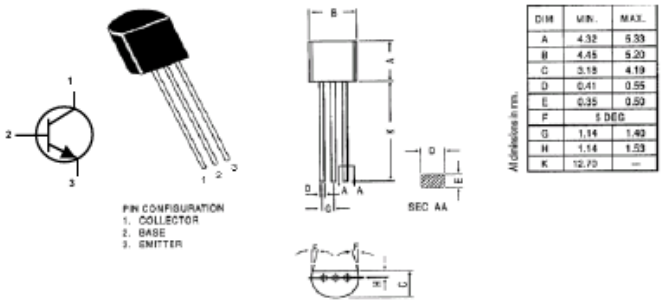
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Cathode Voltage | $V_{KA}$ | 40 | V |
| Cathode Current Range (Continuous) | $I_K$ | 100 ~ 150 | mA |
| Reference Input Current Range | $I_{REF}$ | 0.05 ~ 10 | mA |
| Power Dissipation at 25°C:<br>TO – 92 Package ($R_{\theta JA}$ = 178°C/W)<br>SOT 23 3 Package ($R_{\theta JA}$ = 625°C/W) | $P_D$ | <br>0.7<br>0.2 | <br>W<br>W |
| Junction Temperature Range | $T_J$ | 0 ~ 150 | °C |
| Operating Temperature Range | $T_A$ | 0 ~ 70 | °C |
| Storage Temperature Range | $T_{stg}$ | -65 ~ +150 | °C |

- Transistor BC 547

RECTRON
RECTIFIER SPECIALISTS

**BC546**
**BC547**
**BC548**

## NPN Silicon Planar Epitaxial Transistors




| DIM | MIN. | MAX. |
|---|---|---|
| A | 4.32 | 5.33 |
| B | 4.45 | 5.20 |
| C | 3.18 | 4.19 |
| D | 0.41 | 0.55 |
| E | 0.35 | 0.50 |
| F | 5 DEG | |
| G | 1.14 | 1.40 |
| H | 1.14 | 1.53 |
| K | 12.70 | — |

All dimensions in mm.

**TO-92 SMD Package**

**Absolute Maximum Ratings** (Ta = 25 °C unless specified otherwise)

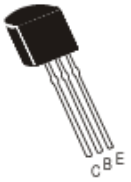
| DESCRIPTION | SYMBOL | BC546 | BC547 | BC548 | UNITS |
|---|---|---|---|---|---|
| Collector Base Voltage | $V_{CBO}$ | 80 | 50 | 30 | V |
| Collector Emmitter Voltage ($V_{BE}$ = 0V) | $V_{CES}$ | 80 | 50 | 30 | V |
| Collector Emitter Voltage | $V_{CEO}$ | 65 | 45 | 30 | V |
| Emitter Base Voltage | $V_{EBO}$ | 6 | 6 | 5 | V |
| Collector Current (DC)<br>Collector Current - Peak | $I_C$<br>$I_{CM}$ | | 100<br>200 | | mA |
| Emitter Current - Peak | $I_{EM}$ | | 200 | | mA |
| Base Current - Peak | $I_{BM}$ | | 200 | | mA |
| Total power dissipation up to $T_{amb}$ = 25 °C | $P_{tot}$ | | 500 | | mW |
| Storge Temperature | Tstg | | -55 to +150 | | °C |
| Junction Temperature | Tj | | 150 | | °C |
| *Thermal Resistance* | | | | | |
| From junction to ambient | $R_{th(j-a)}$ | | 250 | | °C/W |

- Transistor BC557

Continental Device India Limited
An ISO/TS 16949, ISO 9001 and ISO 14001 Certified Company

## PNP SILICON PLANAR EPITAXIAL TRANSISTORS

**BC556, A, B,**
**BC557, A, B, C**
**BC558, A, B, C**




**TO-92**
**Plastic Package**
For Lead Free Parts, Device Part # will be Prefixed with "T"

**Amplifier Transistors**

**ABSOLUTE MAXIMUM RATINGS ($T_a$=25°C)**

| DESCRIPTION | SYMBOL | BC556 | BC557 | BC558 | UNITS |
|---|---|---|---|---|---|
| Collector Emitter Voltage | $V_{CEO}$ | 65 | 45 | 30 | V |
| Collector Emitter Voltage | $V_{CES}$ | 80 | 50 | 30 | V |
| Collector Base Voltage | $V_{CBO}$ | 80 | 50 | 30 | V |
| Emitter Base Voltage | $V_{EBO}$ | 5 | | | V |
| Collector Current Continuous | $I_C$ | 100 | | | mA |
| Collector Current Peak | $I_{CM}$ | 200 | | | mA |
| Base Current Peak | $I_{BM}$ | 200 | | | mA |
| Emitter Current Peak | $I_{EM}$ | 200 | | | mA |
| Power Dissipation at $T_a$=25°C | $P_D$ | 500 | | | mW |
| Derate Above 25°C | | 4.0 | | | mW/°C |
| Storage Temperature | $T_{stg}$ | - 65 to +150 | | | °C |
| Junction Temperature | $T_j$ | 150 | | | °C |

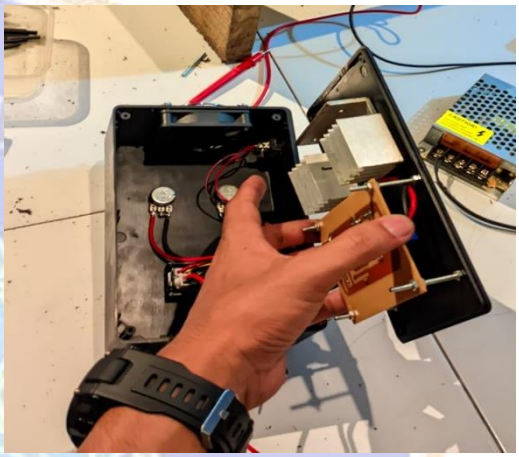
**THERMAL RESISTANCE**

| | | | |
|---|---|---|---|
| Junction to Ambient in free air | $R_{th\ (j-a)}$ | 250 | °C/W |

**ELECTRICAL CHARACTERISTICS ($T_a$=25°C unless specified otherwise)**

| DESCRIPTION | SYMBOL | TEST CONDITION | BC556 | BC557 | BC558 | UNITS |
|---|---|---|---|---|---|---|
| Collector Emitter Voltage | $V_{CEO}$ | $I_C$=2mA, $I_B$=0 | >65 | >45 | >30 | V |
| Collector Base Voltage | $V_{CBO}$ | $I_C$=100µA, $I_E$=0 | >80 | >50 | >30 | V |
| Emitter Base Voltage | $V_{EBO}$ | $I_E$=100µA, $I_C$=0 | | >5.0 | | V |
| Collector Cut Off Current | $I_{CBO}$ | $V_{CB}$=30V, $I_E$=0 **ALL** | | <15 | | nA |
| | | $V_{CB}$=30V, $I_E$=0, Tj=150°C **ALL** | | <5.0 | | µA |
| Collector Cut Off Current | $I_{CES}$ | $V_{CE}$=80V, $V_{BE}$=0 | <15 | | | nA |
| | | $V_{CE}$=50V, $V_{BE}$=0 | | <15 | | nA |
| | | $V_{CE}$=30V, $V_{BE}$=0 | | | <15 | nA |
| | | $V_{CE}$=80V, $V_{EB}$=0, $T_j$=125°C | <4.0 | | | µA |
| | | $V_{CE}$=50V, $V_{EB}$=0, $T_j$=125°C | | <4.0 | | µA |
| | | $V_{CE}$=30V, $V_{EB}$=0, $T_j$=125°C | | | <4.0 | µA |

## Lampiran 2. Dokumentasi Pembuatan Alat



# RIWAYAT HIDUP

Ketut Budi Arimbawa lahir di Jinengdalem pada tanggal 20 Juni 2002. Penulis lahir dari pasangan suami istri Bapak Wayan Somayasa dan Ibu Komang Sukemi. Penulis berkebangsaan Indonesia dan beragama Hindu. Kini penulis beralamat di Desa Jinengdalem Banjar Dinas Gambang, Kecamatan Buleleng, Kabupaten Buleleng, Provinsi Bali. Penulis menyelesaikan pendidikan dasar di SD Negeri 2 Jinengdalem dan lulus pada tahun 2015. Kemudian penulis melanjutkan di SMP Negeri 5 Singaraja dan lulus pada tahun 2018. Pada tahun 2021, penulis lulus dari SMK Negeri 3 Singaraja jurusan Teknik Audio Video dan melanjutkan ke Diploma IV Jurusan Teknologi Industri Program Studi Teknologi Rekayasa Sistem Elektronika di Universitas Pendidikan Ganesha. Pada semester akhir tahun 2024 penulis telah menyelesaikan Tugas Akhir yang berjudul "Rancang Bangun *Solar Charger Controller* Dengan *Series Regulator* Untuk Sistem Penggerak Motor Listrik Perahu Nelayan". Selanjutnya, mulai tahun 2024 sampai dengan penulisan menulis skripsi ini, penulis masih terdaftar sebagai mahasiswa Program Studi Diploma IV Teknologi Rekayasa Sistem Elektronika di Universitas Pendidikan Ganesha.