# NPN BD675 - BD677 - BD679 - BD681
# NPN BD675A - BD677A - BD679A - BD681A

## SILICON DARLINGTON POWER TRANSISTORS

The BD675/A-BD677/A-BD679/A-BD681/A are NPN transistors mounted in Jedec TO-126 plastic package.
They are eptaxial-base transistors in monolithic Darlington circuit for audio and video applications.
PNP complements are BD676/A - BD678/A - BD680/A - BD682/A
Compliance to RoHS.

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Ratings | | Value | Unit |
|---|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | BD675/A | 45 | V |
| | | BD677/A | 60 | |
| | | BD679/A | 80 | |
| | | BD681/A | 100 | |
| $V_{CBO}$ | Collector-Base Voltage | BD675/A | 45 | V |
| | | BD677/A | 60 | |
| | | BD679/A | 80 | |
| | | BD681/A | 100 | |
| $V_{EBO}$ | Emitter-Base Voltage | | 5 | V |
| $I_C$ | Collector Current | $I_C$ | 4 | A |
| | | $I_{CM}$ | 6 | |
| $I_B$ | Base current (peak value) | $I_{BM}$ | 0.1 | A |
| $P_T$ | Total power Dissipation | @ $T_{mb}$ = 25°C | 40 | W |
| $T_J$ | *Junction Temperature* | | 150 | °C |
| $T_{Stg}$ | Storage Temperature | | -65 to +150 | °C |

### THERMAL CHARACTERISTICS

| Symbol | Ratings | Value | Unit |
|---|---|---|---|
| $R_{thJ-mb}$ | Thermal Resistance, Junction to mouting base | 3.12 | K/W |
| $R_{thJ-a}$ | Thermal Resistance, Junction to ambient in free air | 100 | K/W |

# NPN BD675 - BD677 - BD679 - BD681
# NPN BD675A - BD677A - BD679A - BD681A

## ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

| Symbol | Ratings | Test Condition(s) | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CBO}$ | Collector cut-off current | $I_E$=0 , $V_{CB}$= 60 V | BD675/A | - | - | 0,2 | mA |
| | | $I_E$=0 , $V_{CB}$= 80 V | BD677/A | - | - | 0,2 | |
| | | $I_E$=0 , $V_{CB}$= 100 V | BD679/A | - | - | 0,2 | |
| | | $I_E$=0 , $V_{CB}$= 120 V | BD681/A | - | - | 0,2 | |
| | | $I_E$=0 ,$V_{CB}$ = 30V, $T_j$= 150°C | BD675/A | - | - | 2 | |
| | | $I_E$=0 ,$V_{CB}$ = 40V, $T_j$= 150°C | BD677/A | - | - | 2 | |
| | | $I_E$=0 ,$V_{CB}$ = 50V, $T_j$= 150°C | BD679/A | - | - | 2 | |
| | | $I_E$=0 ,$V_{CB}$ = 60V, $T_j$= 150°C | BD681/A | - | - | 2 | |
| $I_{CEO}$ | Collector cut-off current | $I_B$=0 , $V_{CE}$= ½$V_{CEOMAX}$ | BD675/A | - | - | 0,5 | mA |
| | | $I_B$=0 , $V_{CE}$= ½$V_{CEOMAX}$ | BD677/A | - | - | 0,5 | |
| | | $I_B$=0 , $V_{CE}$= ½$V_{CEOMAX}$ | BD679/A | - | - | 0,5 | |
| | | $I_B$=0 , $V_{CE}$= ½$V_{CEOMAX}$ | BD681/A | - | - | 0,5 | |
| $I_{EBO}$ | Emitter cut-offcurrent | $I_C$=0, -$V_{EB}$=5 V | | - | - | 5 | mA |
| $V_{CEO(SUS)}$ | Collector-Emitter sustaning Voltage | $I_B$=0 , $I_C$=50 mA | BD675/A | 45 | - | - | V |
| | | | BD677/A | 60 | - | - | |
| | | | BD679/A | 80 | - | - | |
| | | | BD681/A | 100 | - | - | |
| $V_{CE(SAT)}$ | Collector-Emitter saturation Voltage | BD675, BD677, BD679, BD681<br>$I_C$=1.5 A,$I_B$=30 mA | | - | - | 2,5 | V |
| | | BD675A, BD677A, BD679A, BD681A<br>$I_C$=2 A,$I_B$=40 mA | | - | - | 2.8 | |
| $h_{FE}$ | DC Current Gain | BD675, BD677, BD679, BD681<br>$V_{CE}$=3 V, $I_C$=500 mA | | - | 2200 | - | |
| | | BD675, BD677, BD679, BD681<br>$V_{CE}$=3 V, $I_C$=1,5 A | | 750 | - | - | |
| | | BD675, BD677, BD679, BD681<br>$V_{CE}$=3 V, $I_C$=4 A | | - | 1500 | - | |
| | | BD675A, BD677A, BD679A, BD681A<br>$V_{CE}$=3 V, $I_C$=2 A | | 750 | - | - | |
| $V_{BE}$ | Base-Emitter Voltage(1&2) | BD675, BD677, BD679, BD681<br>$V_{CE}$=3 V, $I_C$=1,5 A | | - | - | 2,5 | V |
| | | BD675A, BD677A, BD679A, BD681A<br>$V_{CE}$=3 V, $I_C$=2 A | | - | - | 2.5 | |
| $h_{fe}$ | Small signal current gain | $V_{CE}$=3 V, $I_C$=1,5 A, f= 1 MHz | | 10 | - | - | |
| $f_{hfe}$ | Ut-off frequency | $V_{CE}$=3 V, $I_C$=1,5 A | | - | 60 | - | kHz |
| $V_F$ | Diode forward voltage | $I_F$=1,5 A | | - | 1,5 | - | V |
| $I_{(SB)}$ | Second-breakdown collector current | -$V_{CE}$=50 V, $t_P$= 20ms,non rep., without heatsink | | 0,8 | - | - | A |

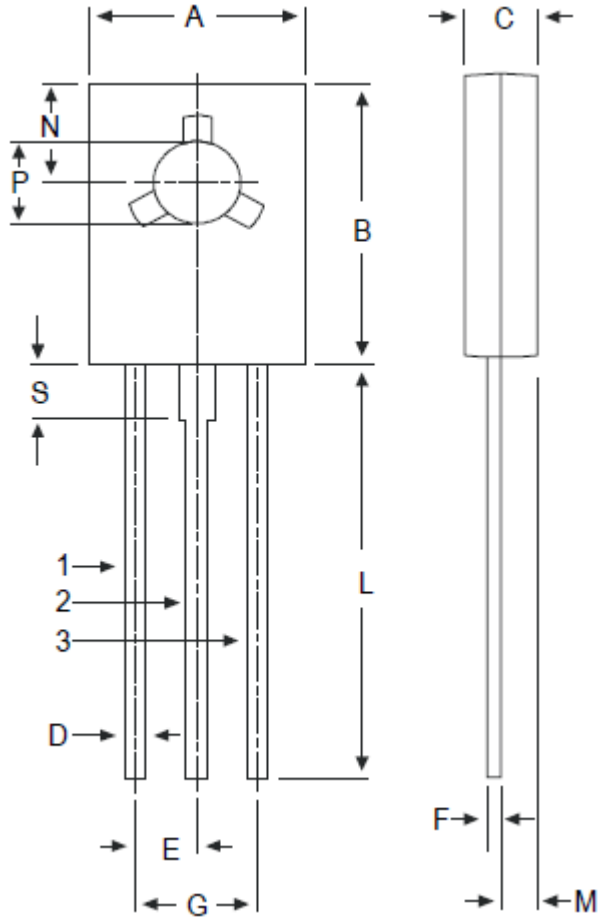
# NPN BD675 - BD677 - BD679 - BD681
# NPN BD675A - BD677A - BD679A - BD681A

| Symbol | Ratings | Test Condition(s) | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $t_{on}$ | Turn-on time | $-I_{con}$= 1,5A, $-I_{bon}$= $I_{boff}$= 6mA, | - | 0,3 | 1.5 | µs |
| $t_{off}$ | Turn-off time | | - | 1,5 | 5 | |

1. Measured under pulse conditions :$t_P$ <300µs, □<2%.
2. $V_{BE}$ decreases by about 3,6 mV/K with increasing temperature.

## MECHANICAL DATA CASE TO-126

| | DIMENSIONS | |
|---|---|---|
| | min | max |
| A | 7.4 | 7.8 |
| B | 10.5 | 10.8 |
| C | 2.4 | 2.7 |
| D | 0.7 | 0.9 |
| E | 2.25 typ. | |
| F | 0.49 | 0.75 |
| G | 4.4 typ. | |
| L | 15.7 typ. | |
| M | 1.27 typ. | |
| N | 3.75 typ. | |
| P | 3.0 | 3.2 |
| S | 2.54 typ. | |




| | |
|---|---|
| Pin 1 : | Emitter |
| Pin 2 : | Collector |
| Pin 3 : | Base |

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