

BD676, BD676A, BD678, BD678A, BD680, BD680A, BD682, BD682T



ON Semiconductor®

<http://onsemi.com>

Plastic Medium-Power Silicon PNP Darlington

This series of plastic, medium-power silicon PNP Darlington transistors can be used as output devices in complementary general-purpose amplifier applications.

Features

- High DC Current Gain –
 $h_{FE} = 750$ (Min) @ $I_C = 1.5$ and 2.0 Adc
- Monolithic Construction
- BD676, 676A, 678, 678A, 680, 680A, 682 are complementary with BD675, 675A, 677, 677A, 679, 679A, 681
- BD678, 678A, 680, 680A are equivalent to MJE 700, 701, 702, 703
- Pb-Free Package are Available*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|-----------------------|--------------------------|
| Collector-Emitter Voltage BD676, BD676A BD678, BD678A BD680, BD680A BD682 | V_{CEO} | 45 60 80 100 | Vdc |
| Collector-Base Voltage BD676, BD676A BD678, BD678A BD680, BD680A BD682 | V_{CB} | 45 60 80 100 | Vdc |
| Emitter-Base Voltage | V_{EB} | 5.0 | Vdc |
| Collector Current | I_C | 4.0 | Adc |
| Base Current | I_B | 0.1 | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 40 0.32 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 3.13 | $^\circ\text{C}/\text{W}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

4.0 AMP DARLINGTON POWER TRANSISTORS PNP SILICON 45, 60, 80, 100 VOLT, 40 WATT



TO-225AA
CASE 77
STYLE 1

MARKING DIAGRAMS



BD6xx = Device Code
xx = 76, 76A, 78, 78A,
80, 80A, 82, or 82T

Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

BD676, BD676A, BD678, BD678A, BD680, BD680A, BD682, BD682T

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|--|--|------------|-----------------------|------------------|---------------|
| Collector–Emitter Breakdown Voltage (Note 1) ($I_C = 50\text{ mA}$, $I_B = 0$) | BD676, 676A BD678, 678A BD680, 680A BD682 | BV_{CEO} | 45 60 80 100 | – – – – | Vdc |
| Collector Cutoff Current ($V_{CE} = \text{Half Rated } BV_{CEO}$, $I_B = 0$) | | I_{CEO} | – | 500 | μA |
| Collector Cutoff Current ($V_{CB} = \text{Rated } BV_{CEO}$, $I_E = 0$) ($V_{CB} = \text{Rated } BV_{CEO}$, $I_E = 0$, $T_C = 100^\circ\text{C}$) | | I_{CBO} | – – | 0.2 2.0 | mA |
| Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$) | | I_{EBO} | – | 2.0 | mA |

ON CHARACTERISTICS

| | | | | | |
|---|--|---------------|------------|------------|--------|
| DC Current Gain (Note 1) ($I_C = 1.5\text{ A}$, $V_{CE} = 3.0\text{ Vdc}$) ($I_C = 2.0\text{ A}$, $V_{CE} = 3.0\text{ Vdc}$) | BD676, 678, 680, 682 BD676A, 678A, 680A | h_{FE} | 750 750 | – – | – – |
| Collector–Emitter Saturation Voltage (Note 1) ($I_C = 1.5\text{ A}$, $I_B = 30\text{ mA}$) ($I_C = 2.0\text{ A}$, $I_B = 40\text{ mA}$) | BD678, 680, 682 BD676A, 678A, 680A | $V_{CE(sat)}$ | – – | 2.5 2.8 | Vdc |
| Base–Emitter On Voltage (Note 1) ($I_C = 1.5\text{ A}$, $V_{CE} = 3.0\text{ Vdc}$) ($I_C = 2.0\text{ A}$, $V_{CE} = 3.0\text{ Vdc}$) | BD678, 680, 682 BD676A, 678A, 680A | $V_{BE(on)}$ | – – | 2.5 2.5 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | |
|---|----------|-----|---|---|
| Small–Signal Current Gain ($I_C = 1.5\text{ A}$, $V_{CE} = 3.0\text{ Vdc}$, $f = 1.0\text{ MHz}$) | h_{fe} | 1.0 | – | – |
|---|----------|-----|---|---|

1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

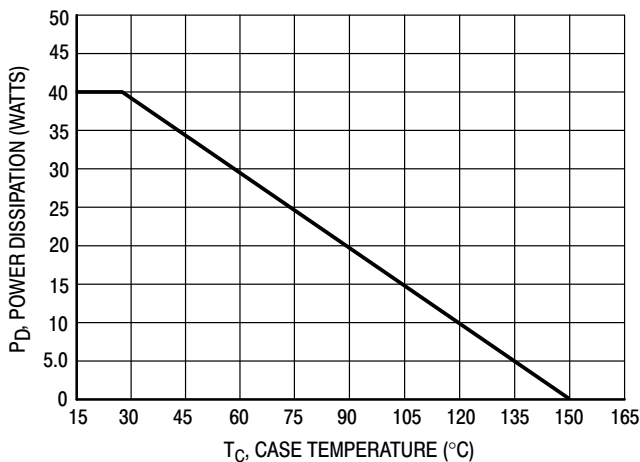


Figure 1. Power Temperature Derating

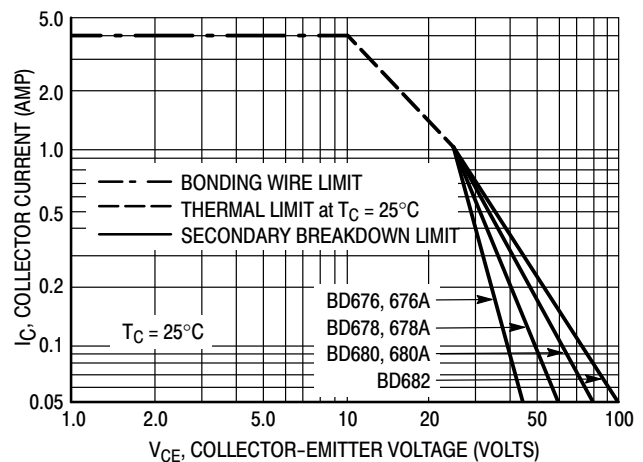


Figure 2. DC Safe Operating Area

There are two limitations on the power handling ability of a transistor average junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; e.g., the transistor must not be subjected to greater dissipation than the curves indicate.

At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.

BD676, BD676A, BD678, BD678A, BD680, BD680A, BD682, BD682T

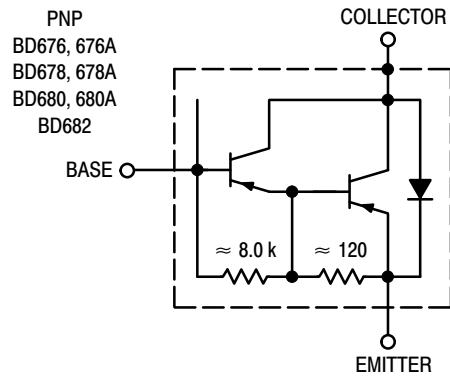


Figure 3. Darlington Circuit Schematic

ORDERING INFORMATION

| Device | Package | Shipping |
|---------|-----------------------|-----------------|
| BD676 | TO-225AA | 500 Units / Box |
| BD676G | TO-225AA (Pb-Free) | 500 Units / Box |
| BD676A | TO-225AA | 500 Units / Box |
| BD676AG | TO-225AA (Pb-Free) | 500 Units / Box |
| BD678 | TO-225AA | 500 Units / Box |
| BD678G | TO-225AA (Pb-Free) | 500 Units / Box |
| BD678A | TO-225AA | 500 Units / Box |
| BD678AG | TO-225AA (Pb-Free) | 500 Units / Box |
| BD680 | TO-225AA | 500 Units / Box |
| BD680G | TO-225AA (Pb-Free) | 500 Units / Box |
| BD680A | TO-225AA | 500 Units / Box |
| BD680AG | TO-225AA (Pb-Free) | 500 Units / Box |
| BD682 | TO-225AA | 500 Units / Box |
| BD682G | TO-225AA (Pb-Free) | 500 Units / Box |
| BD682T | TO-225AA | 50 Units / Rail |
| BD682TG | TO-225AA (Pb-Free) | 50 Units / Rail |

BD676, BD676A, BD678, BD678A, BD680, BD680A, BD682, BD682T

PACKAGE DIMENSIONS

TO-225AA
CASE 77-09
ISSUE Z



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.425 | 0.435 | 10.80 | 11.04 |
| B | 0.295 | 0.305 | 7.50 | 7.74 |
| C | 0.095 | 0.105 | 2.42 | 2.66 |
| D | 0.020 | 0.026 | 0.51 | 0.66 |
| F | 0.115 | 0.130 | 2.93 | 3.30 |
| G | 0.094 BSC | | 2.39 BSC | |
| H | 0.050 | 0.095 | 1.27 | 2.41 |
| J | 0.015 | 0.025 | 0.39 | 0.63 |
| K | 0.575 | 0.655 | 14.61 | 16.63 |
| M | 5° TYP | | 5° TYP | |
| Q | 0.148 | 0.158 | 3.76 | 4.01 |
| R | 0.045 | 0.065 | 1.15 | 1.65 |
| S | 0.025 | 0.035 | 0.64 | 0.88 |
| U | 0.145 | 0.155 | 3.69 | 3.93 |
| V | 0.040 | --- | 1.02 | --- |

STYLE 1:

- PIN 1. EMITTER
2. COLLECTOR
3. BASE

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.