



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



BD787G (NPN), BD788G (PNP)

Complementary Plastic Silicon Power Transistors

These devices are designed for lower power audio amplifier and low current, high-speed switching applications.

Features

- Low Collector–Emitter Sustaining Voltage
- High Current–Gain – Bandwidth Product
- These Devices are Pb–Free and are RoHS Compliant*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|-------------|---------------------------|
| Collector–Emitter Voltage | V_{CEO} | 60 | Vdc |
| Collector–Base Voltage | V_{CBO} | 80 | Vdc |
| Emitter Base Voltage | V_{EBO} | 6.0 | Vdc |
| Collector Current – Continuous | I_C | 4.0 | Adc |
| Collector Current – Peak | I_{CM} | 8.0 | Adc |
| Base Current – Continuous | I_B | 1.0 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 15 0.12 | W mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | –65 to +150 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--------------------------------------|-----------------|------|---------------------------|
| Thermal Resistance, Junction–to–Case | $R_{\theta JC}$ | 8.34 | $^\circ\text{C}/\text{W}$ |

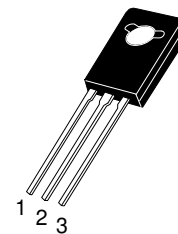
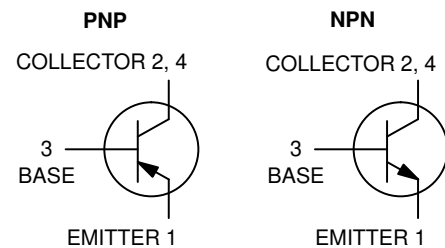
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

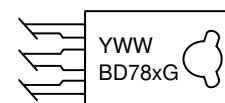
<http://onsemi.com>

4 AMPERES POWER TRANSISTORS COMPLEMENTARY SILICON 60 VOLTS, 15 WATTS



TO-225
CASE 77-09
STYLE 1

MARKING DIAGRAM



Y = Year
WW = Work Week
BD78x = Device Code
x = 7 or 8
G = Pb–Free Package

ORDERING INFORMATION

| Device | Package | Shipping |
|--------|---------------------|---------------|
| BD787G | TO-225 (Pb–Free) | 500 Units/Box |
| BD788G | TO-225 (Pb–Free) | 500 Units/Box |

BD787G (NPN), BD788G (PNP)

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

| Characteristic | Symbol | Min | Max | Unit |
|--|----------------|-----------------------|--------------------------|-------------------------|
| OFF CHARACTERISTICS | | | | |
| Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 10\text{ mAdc}$, $I_B = 0$) | $V_{CEO(sus)}$ | 60 | – | Vdc |
| Collector Cutoff Current ($V_{CE} = 20\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) | I_{CEO} | – | 100 | μAdc |
| Collector Cutoff Current ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 40\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 125^\circ\text{C}$) | I_{CEX} | – – | 1.0 0.1 | μAdc mAdc |
| Emitter Cutoff Current ($V_{EB} = 6.0\text{ Vdc}$, $I_C = 0$) | I_{EBO} | – | 1.0 | μAdc |
| ON CHARACTERISTICS (Note 1) | | | | |
| DC Current Gain ($I_C = 200\text{ mAdc}$, $V_{CE} = 3.0\text{ Vdc}$) ($I_C = 1.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$) ($I_C = 2.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$) ($I_C = 4.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$) | h_{FE} | 40 25 20 5.0 | 250 – – – | – |
| Collector–Emitter Saturation Voltage ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$) ($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$) ($I_C = 2.0\text{ Adc}$, $I_B = 200\text{ mAdc}$) ($I_C = 4.0\text{ Adc}$, $I_B = 800\text{ mAdc}$) | $V_{CE(sat)}$ | – – – – | 0.4 0.6 0.8 2.5 | Vdc |
| Base–Emitter Saturation Voltage ($I_C = 2.0\text{ Adc}$, $I_B = 200\text{ mAdc}$) | $V_{BE(sat)}$ | – | 2.0 | Vdc |
| Base–Emitter On Voltage ($I_C = 2.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$) | $V_{BE(on)}$ | – | 1.8 | Vdc |
| DYNAMIC CHARACTERISTICS | | | | |
| Current–Gain – Bandwidth Product ($I_C = 100\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 10\text{ MHz}$) | f_T | 50 | – | MHz |
| Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_C = 0$) BD787G ($f = 0.1\text{ MHz}$) BD788G | C_{ob} | – – | 50 70 | pF |
| Small–Signal Current Gain ($I_C = 200\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$) | h_{fe} | 10 | – | – |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

*Indicates JEDEC Registered Data

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

BD787G (NPN), BD788G (PNP)

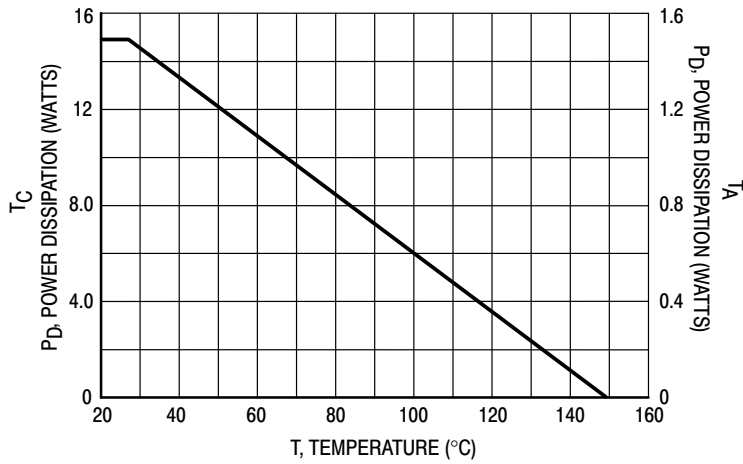


Figure 1. Power Derating

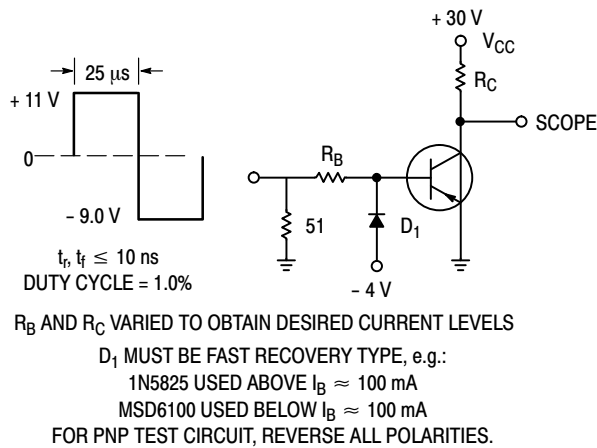


Figure 2. Switching Time Test Circuit

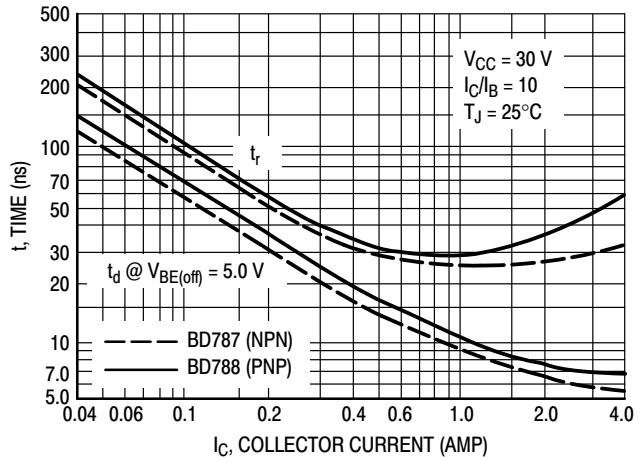


Figure 3. Turn-On Time

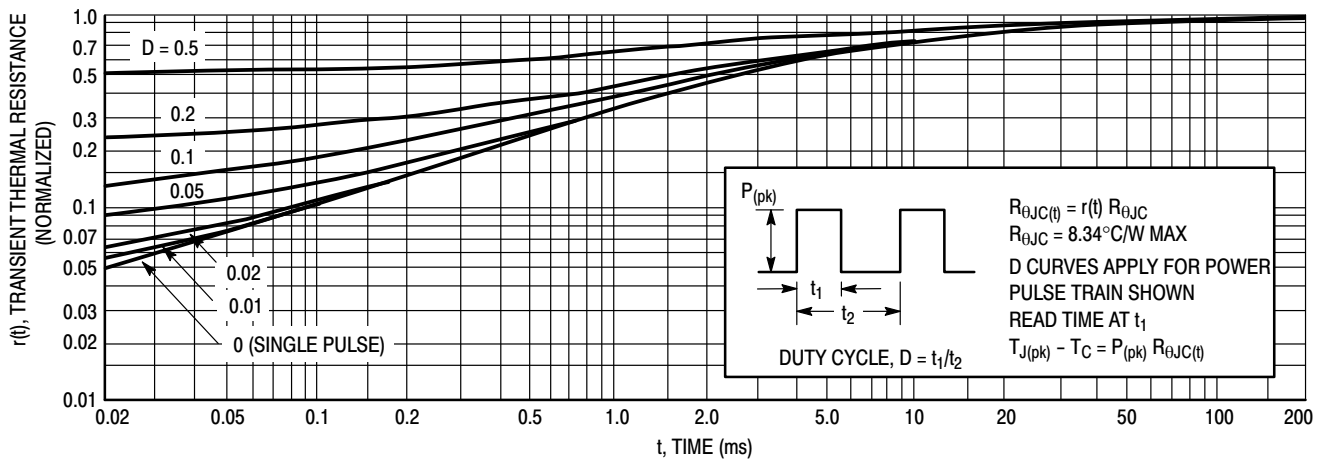


Figure 4. Thermal Response

BD787G (NPN), BD788G (PNP)

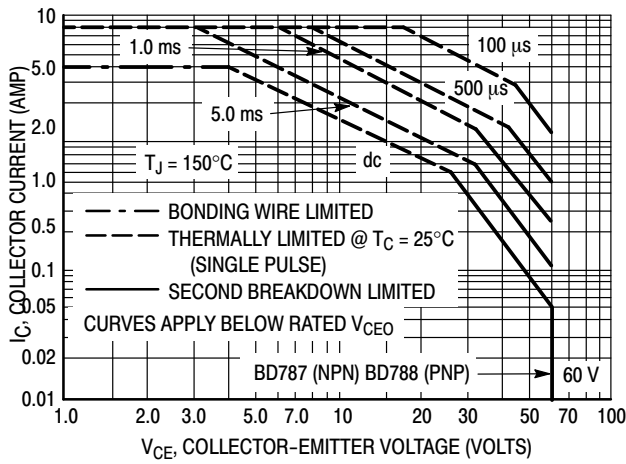


Figure 5. Active Region Safe Operating Area

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

The data of Figure 5 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$, $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

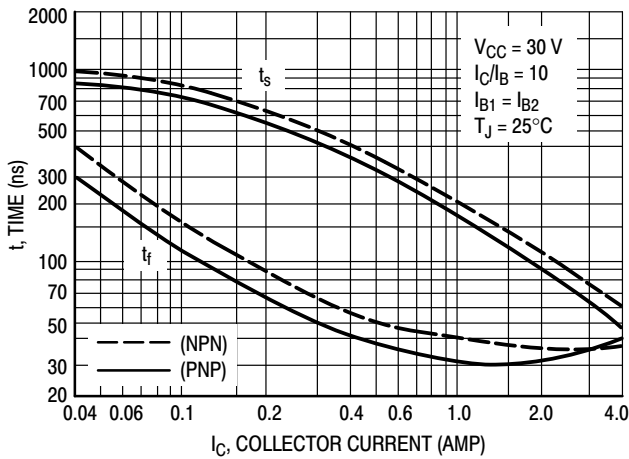


Figure 6. Turn-Off Time

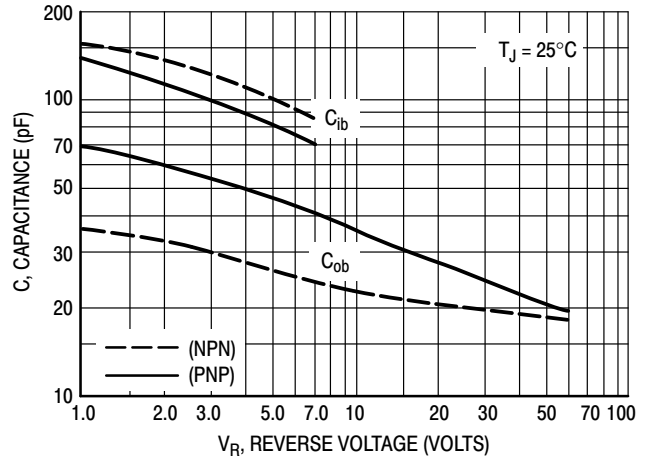


Figure 7. Capacitance

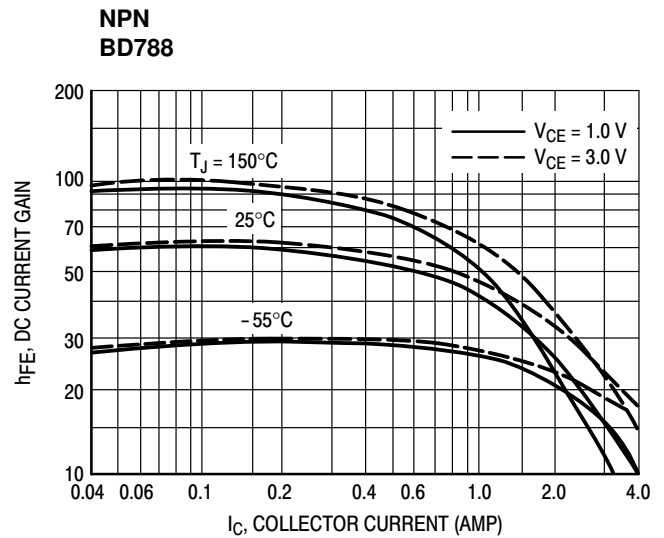
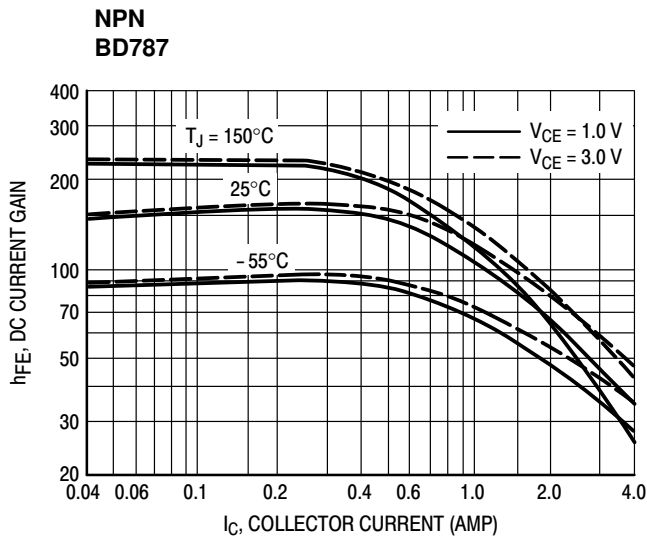


Figure 8. DC Current Gain

BD787G (NPN), BD788G (PNP)

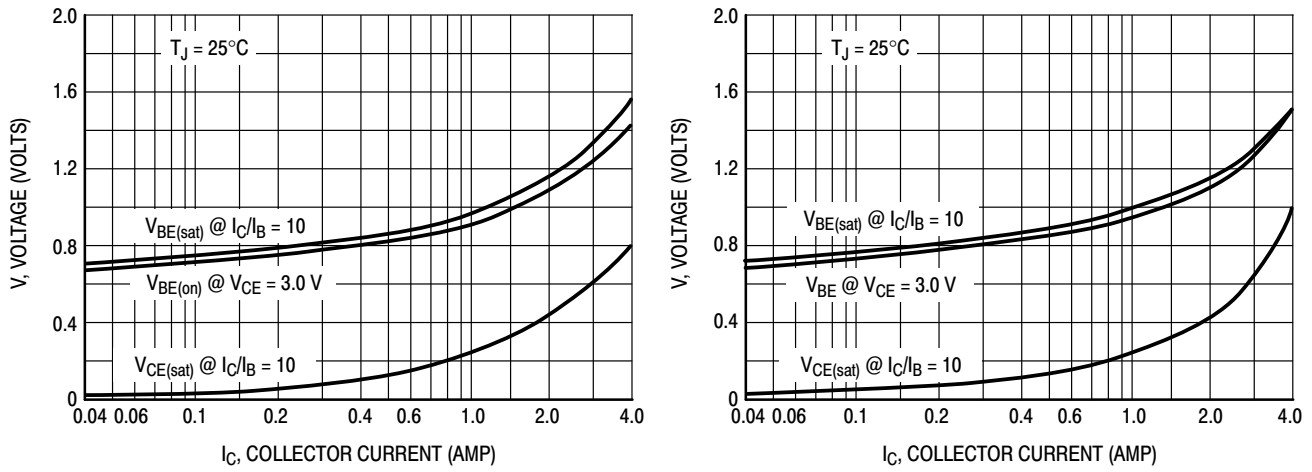


Figure 9. "On" Voltages

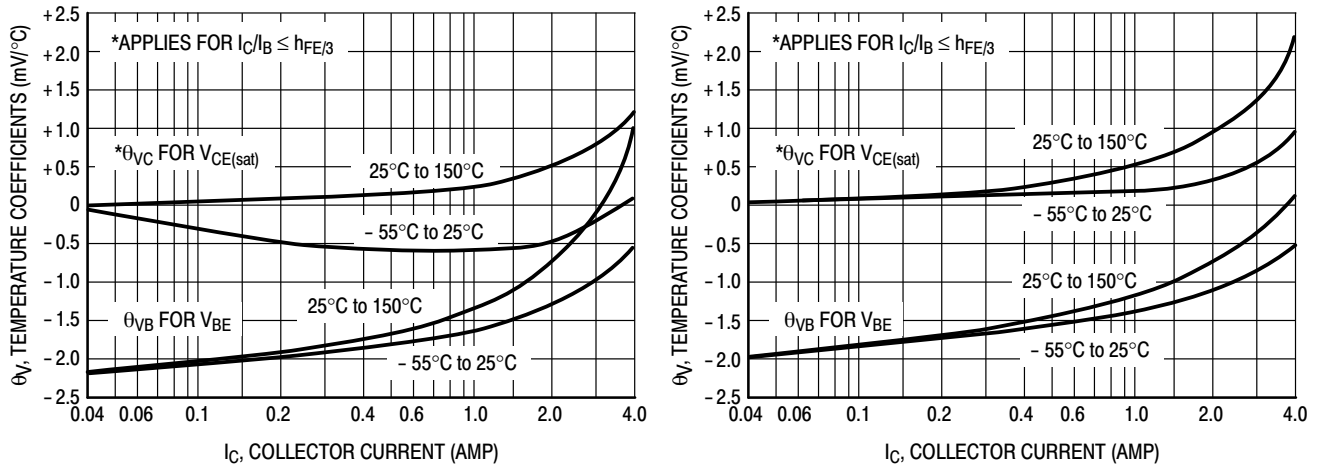
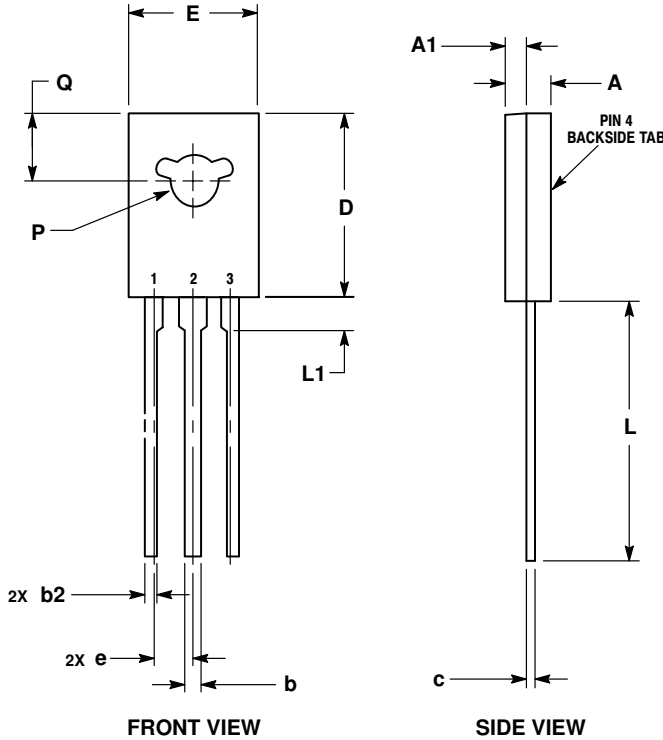
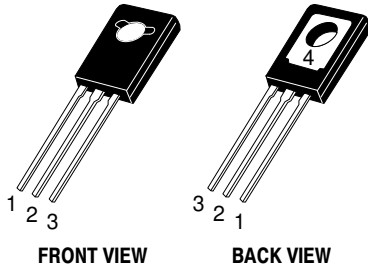


Figure 10. Temperature Coefficients

BD787G (NPN), BD788G (PNP)

PACKAGE DIMENSIONS

TO-225
CASE 77-09
ISSUE AC



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | MIN | MAX |
| A | 2.40 | 3.00 |
| A1 | 1.00 | 1.50 |
| b | 0.60 | 0.90 |
| b2 | 0.51 | 0.88 |
| c | 0.39 | 0.63 |
| D | 10.60 | 11.10 |
| E | 7.40 | 7.80 |
| e | 2.04 | 2.54 |
| L | 14.50 | 16.63 |
| L1 | 1.27 | 2.54 |
| P | 2.90 | 3.30 |
| Q | 3.80 | 4.20 |

- STYLE 1:
PIN 1. EMITTER
2., 4. COLLECTOR
3. BASE

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. 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: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative