Lead-free Green

# 2DB1689

## LOW $V_{CE(SAT)}$ PNP SURFACE MOUNT TRANSISTOR

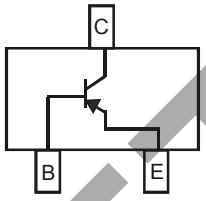
## Features

- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Voltage
- Ideal for Low Power Amplification and Switching
- Complementary NPN Type Available (2DD2652)
- Ultra-Small Surface Mount Package
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green Device" (Note 2)**

## Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Alloy42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (approximate)

Top View




Device Schematic

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -15 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -12 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -6 | V |
| Collector Current - Continuous | $I_C$ | -1.5 | A |
| Peak Pulse Collector Current | $I_{CM}$ | -3 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 3) @ $T_A$ = 25°C | $P_D$ | 300 | mW |
| Thermal Resistance, Junction to Ambient (Note 3) @ $T_A$ = 25°C | $R_{\theta JA}$ | 417 | °C/W |
| Power Dissipation (Note 4) @ $T_A$ = 25°C | $P_D$ | 500 | mW |
| Thermal Resistance, Junction to Ambient (Note 4) @ $T_A$ = 25°C | $R_{\theta JA}$ | 250 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Conditions |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -15 | — | — | V | $I_C$ = -10μA, $I_E$ = 0 |
| Collector-Emitter Breakdown Voltage (Note 5) | $V_{(BR)CEO}$ | -12 | — | — | V | $I_C$ = -1mA, $I_B$ = 0 |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -6 | — | — | V | $I_E$ = -10μA, $I_C$ = 0 |
| Collector Cut-Off Current | $I_{CBO}$ | — | — | -0.1 | μA | $V_{CB}$ = -15V, $I_E$ = 0 |
| Emitter Cut-Off Current | $I_{EBO}$ | — | — | -0.1 | μA | $V_{EB}$ = -6V, $I_C$ = 0 |
| **ON CHARACTERISTICS (Note 5)** | | | | | | |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | -110 | -200 | mV | $I_C$ = -500mA, $I_B$ = -25mA |
| DC Current Gain | $h_{FE}$ | 270 | — | 680 | — | $V_{CE}$ = -2V, $I_C$ = -200mA |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | | |
| Output Capacitance | $C_{obo}$ | — | 8.5 | — | pF | $V_{CB}$ = -10V, $I_E$ = 0, f = 1MHz |
| Current Gain-Bandwidth Product | $f_T$ | — | 300 | — | MHz | $V_{CE}$ = -2V, $I_C$ = -100mA, f = 100MHz |

Notes:
1. No purposefully added lead.
2. Diode's Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
3. Device mounted on FR-4 PCB with minimum recommended pad layout.
4. Device mounted on FR-4 PCB with 1 inch$^2$ copper pad layout.
5. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

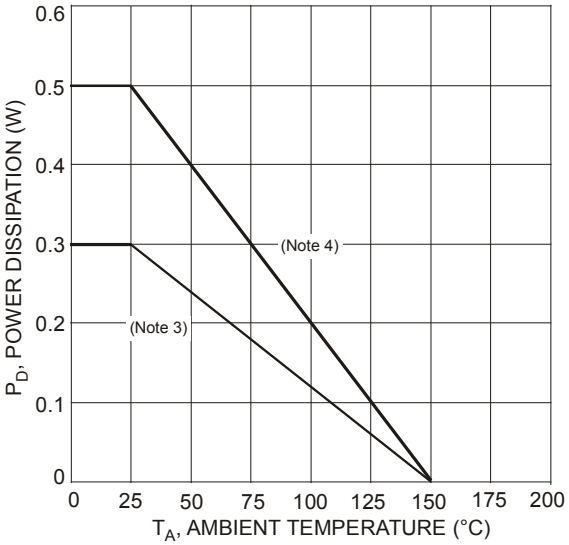



Fig. 1 Power Dissipation vs. Ambient Temperature

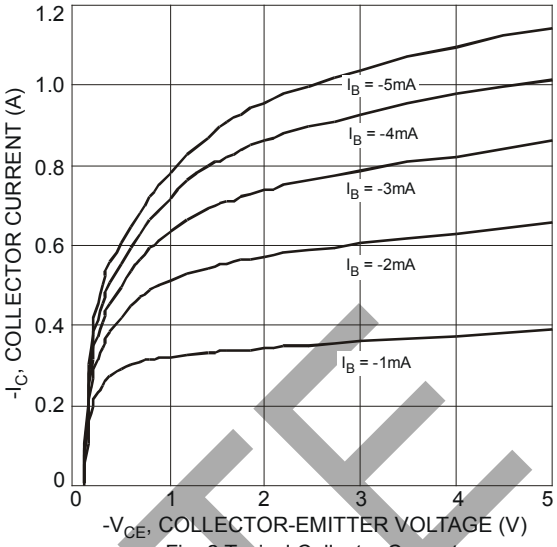



Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

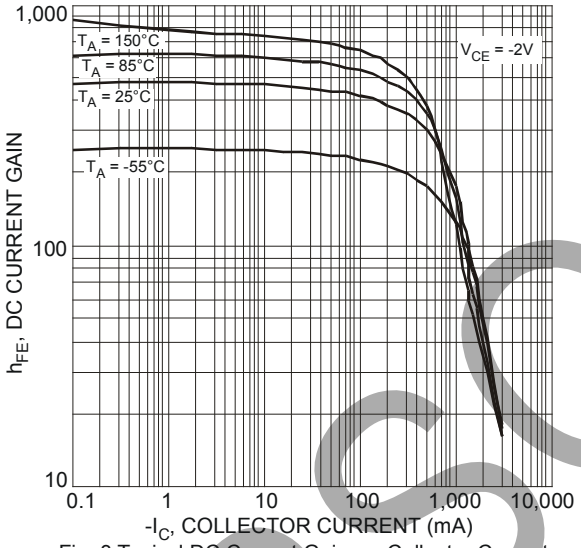



Fig. 3 Typical DC Current Gain vs. Collector Current

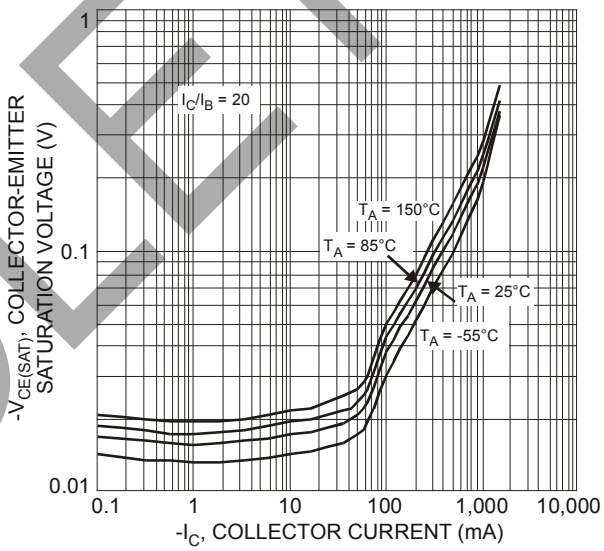



Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

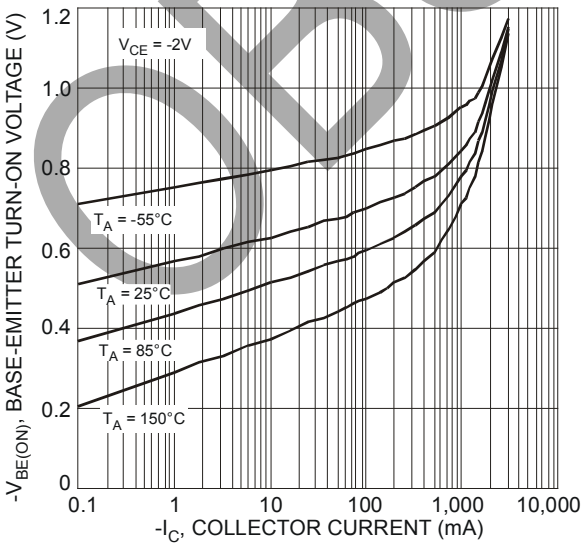



Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

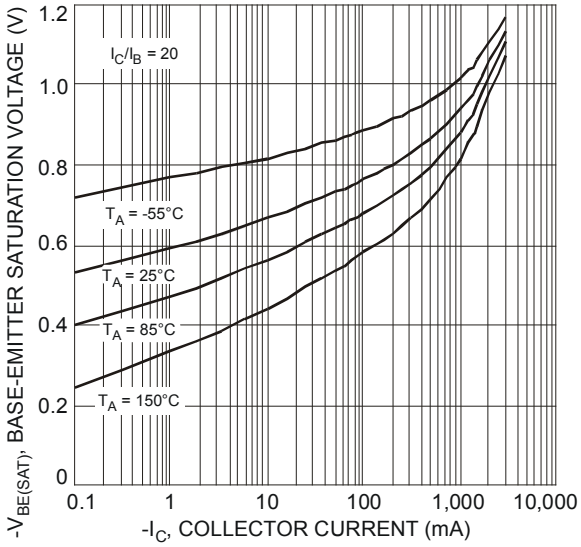



Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

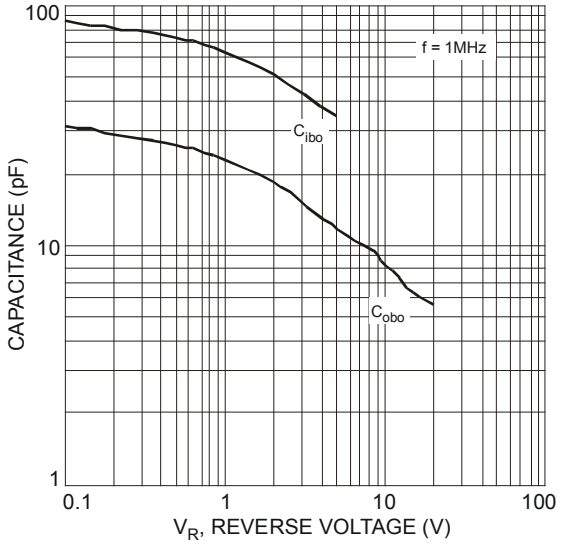


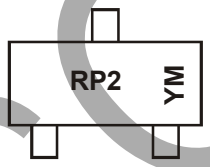

Fig. 7 Typical Capacitance Characteristics

## Ordering Information (Note 6)

| Part Number | Case | Packaging |
|---|---|---|
| 2DB1689-7 | SOT-323 | 3000/Tape & Reel |

Notes: 6. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information



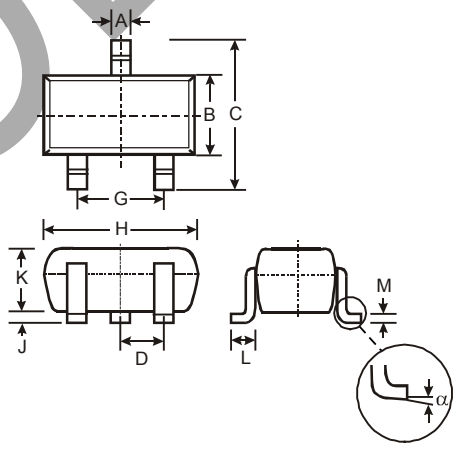

RP2 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: V = 2008)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Code | V | W | X | Y | Z | A | B | C |

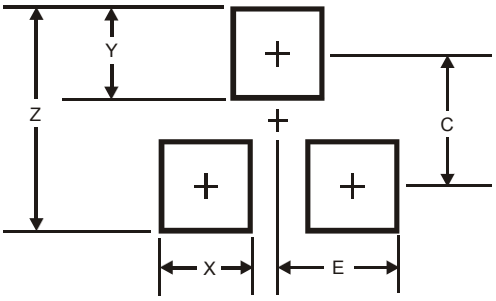
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

## Package Outline Dimensions




| SOT-323 | | | |
|---|---|---|---|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | - | - | 0.65 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.0 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 1.00 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **Z** | 2.8 |
| **X** | 0.7 |
| **Y** | 0.9 |
| **C** | 1.9 |
| **E** | 1.0 |

**IMPORTANT NOTICE**

1. DIODES INCORPORATED AND ITS SUBSIDIARIES ("DIODES") MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes products. Diodes products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of the Diodes products for their intended applications, (c) ensuring their applications, which incorporate Diodes products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.

3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.

4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.

5. Diodes products are provided subject to Diodes' Standard Terms and Conditions of Sale (https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

6. Diodes products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.

7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.

8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.



**www.diodes.com**

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** Bipolar Transistors - BJT ***category:***

***Click to view products by*** Diodes Incorporated ***manufacturer:***

Other Similar products are found below :

619691C MCH4017-TL-H BC546/116 BC557/116 BSW67A NTE187A NTE195A NTE2302 NTE2330 NTE63 C4460 2SA1419T-TD-H 2SA1721-O(TE85L,F) 2SA2126-E 2SB1204S-TL-E 2SC5488A-TL-H 2SD2150T100R SP000011176 2N2369ADCSM 2SC2412KT146S 2SC5490A-TL-H 2SD1816S-TL-E 2SD1816T-TL-E CMXT2207 TR CPH6501-TL-E MCH4021-TL-E US6T6TR 732314D CMXT3906 TR CPH3121-TL-E CPH6021-TL-H 873787E UMX21NTR EMT2T2R MCH6102-TL-E FP204-TL-E NJL0302DG 2N3583 2N3879 2SA1434-TB-E 2SC3143-4-TB-E 2SD1621S-TD-E 30A02MH-TL-E NSV40301MZ4T1G NTE13 NTE15 NTE16001 NTE16006 NTE26 NTE320