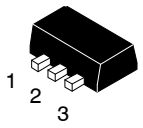
# Bipolar Transistor

## 20 V, 5 A, Low $V_{CE}$(sat), NPN Single PCP

# 2SD1628




**SOT−89 / PCP−1**
**CASE 419AU**

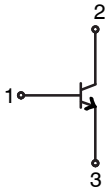
### Features

- Low Saturation Voltage
- High $h_{FE}$
- Large Current Capacity
- Very Small Size Making it Easy to Provide High−Density Small−Sized Hybrid IC's
- These Devices are Pb−Free and are RoHS Compliant

### Applications

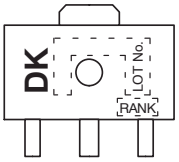
- Strobe DC−DC Converters, Relay Drivers, Hammer Drivers, Lamp Drivers, Motor Drivers

### ELECTRICAL CONNECTION




1: Base
2: Collector
3: Emitter

### MARKING DIAGRAM




### SPECIFICATIONS

**ABSOLUTE MAXIMUM RATINGS** at Ta = 25°C

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector to Base Voltage | $V_{CBO}$ | 60 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | 20 | V |
| Emitter to Base Voltage | $V_{EBO}$ | 6 | V |
| Collector Current | $I_C$ | 5 | A |
| Collector Current (Pulse) | $I_{CP}$ | 8 | A |
| Collector Dissipation | $P_C$ | 500 | mW |
| | | 1.5 (Note 1) | W |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature | $T_{STG}$ | −55 to +150 | °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.

1. When mounted on ceramic substrate (250 $mm^2$ x 0.8 mm).

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| 2SD1628G−TD−E | PCP (Pb−Free) | 1000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

**ELECTRICAL CHARACTERISTICS** at $T_A$ = 25°C

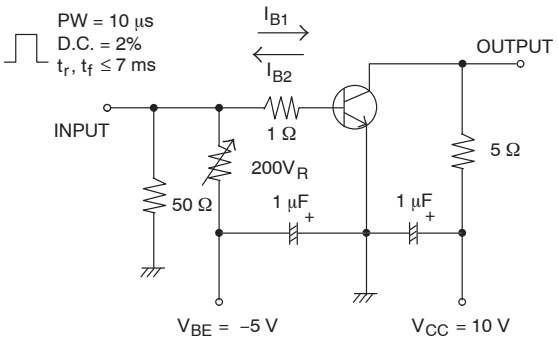
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$ = 50 V, $I_E$ = 0 A | | | 100 | nA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$ = 5 V, $I_C$ = 0 A | | | 100 | nA |
| DC Current Gain | $h_{FE}1$ | $V_{CE}$ = 2 V, $I_C$ = 0.5 A | 120* | | 560* | |
| | $h_{FE}2$ | $V_{CE}$ = 2 V, $I_C$ = 3 A | 95 | | | |
| Gain−Bandwidth Product | $f_T$ | $V_{CE}$ = 10 V, $I_C$ = 50 mA | | 120 | | MHz |
| Output Capacitance | Cob | $V_{CB}$ = 10 V, f = 1 MHz | | 45 | | pF |
| Collector to Emitter Saturation Voltage | $V_{CE}$(sat) | $I_C$ = 3 A, $I_B$ = 60 mA | | | 500 | mV |
| Base to Emitter Saturation Voltage | $V_{BE}$(sat) | $I_C$ = 3 A, $I_B$ = 60 mA | | | 1.5 | V |
| Turn−On Time | $t_{on}$ | See specified Test Circuit | | 30 | | ns |
| Storage Time | $t_{stg}$ | | | 300 | | ns |
| Fall Time | $t_f$ | | | 40 | | ns |

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.

*The 2SD1628 is classified by 0.5 A $h_{FE}$ as follows :

| Rank | E | F | G |
|---|---|---|---|
| $h_{FE}$ | 120 to 200 | 160 to 320 | 280 to 560 |

**Switching Time Test Circuit**




$I_C$ = 10 $I_{B1}$ = −10 $I_{B2}$ = 2 A

## TYPICAL CHARACTERISTICS

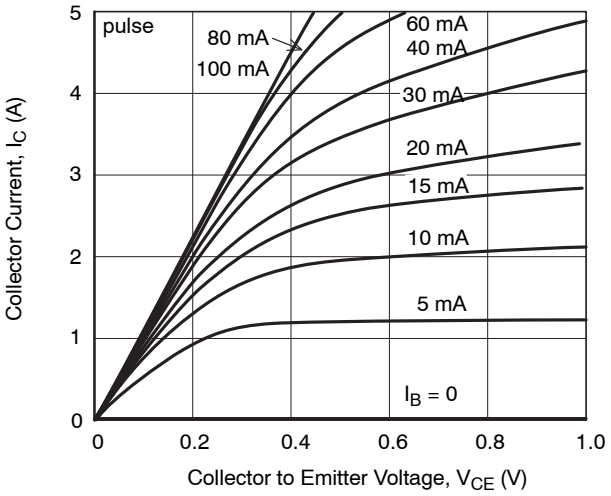



**Figure 1. $I_C$ – $V_{CE}$**

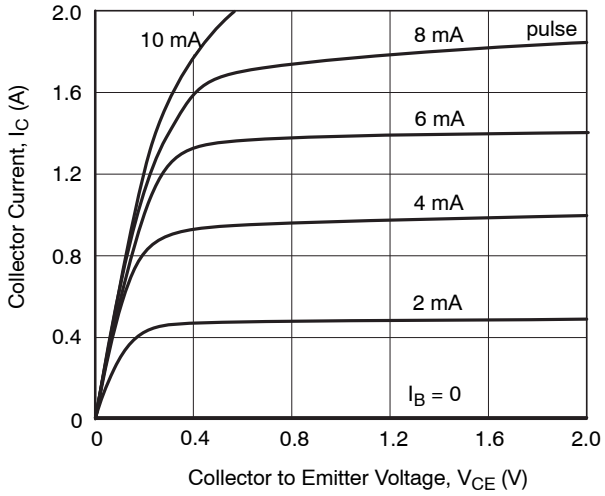



**Figure 2. $I_C$ – $V_{CE}$**

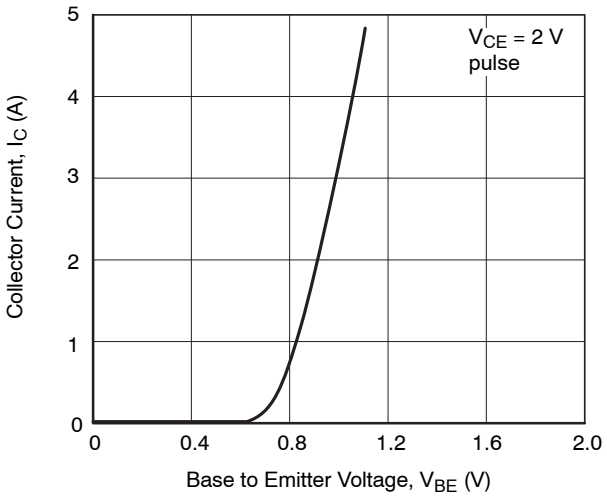



**Figure 3. $I_C$ – $V_{BE}$**

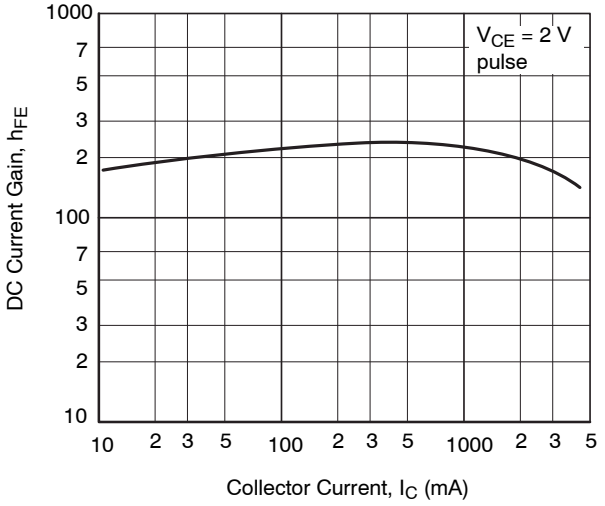



**Figure 4. $h_{FE}$ – $I_C$**

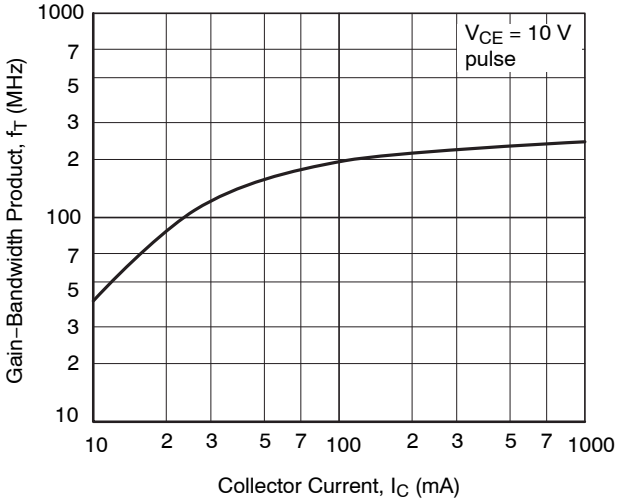



**Figure 5. $f_T$ – $I_C$**

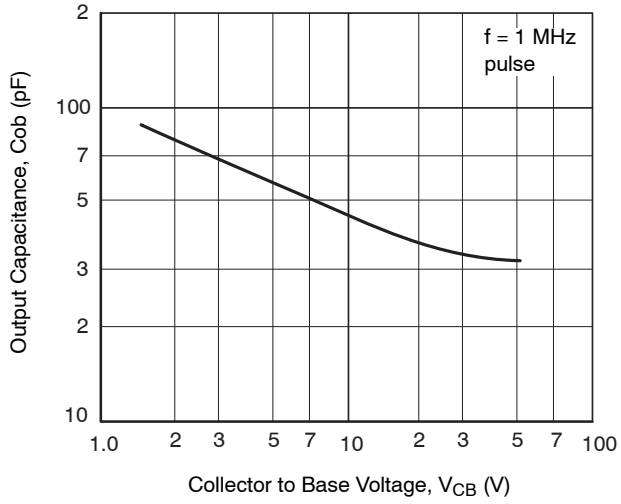



**Figure 6. Cob – $V_{CB}$**

## TYPICAL CHARACTERISTICS (continued)

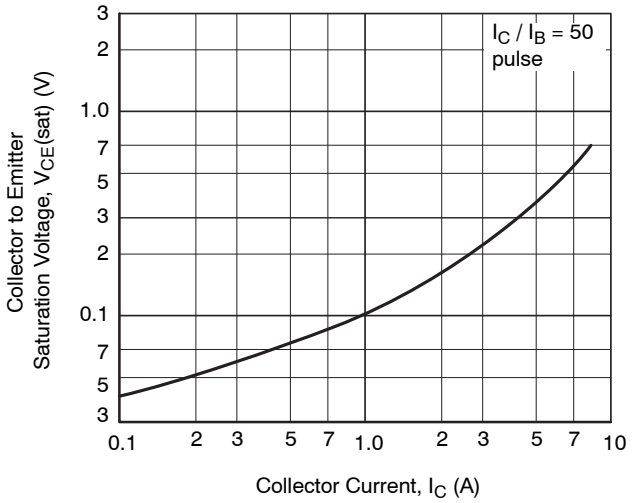



**Figure 7. $V_{CE(sat)}$ – $I_C$**

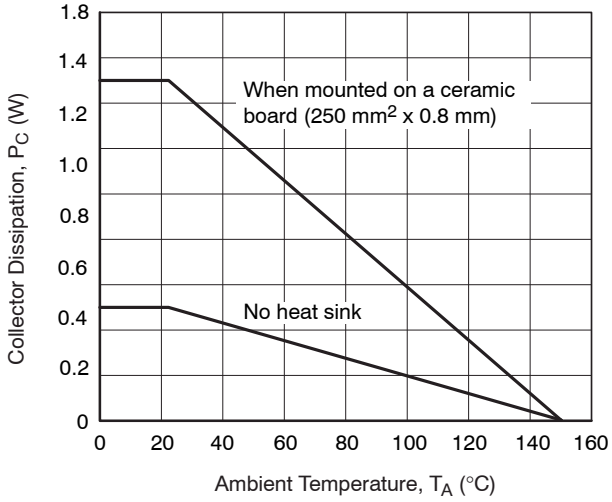



**Figure 8. $P_C$ – $T_A$**

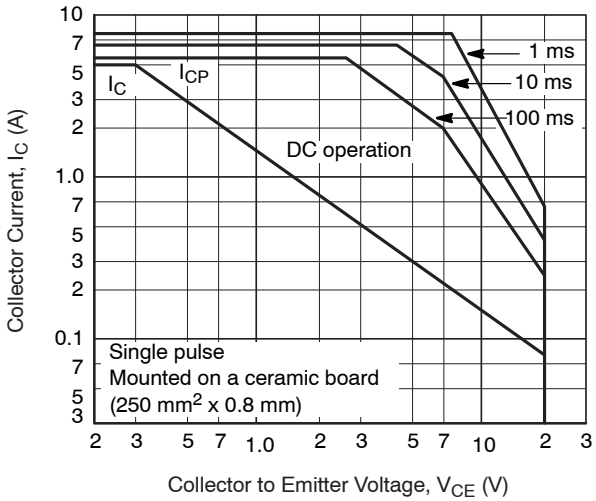
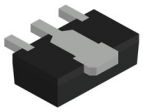
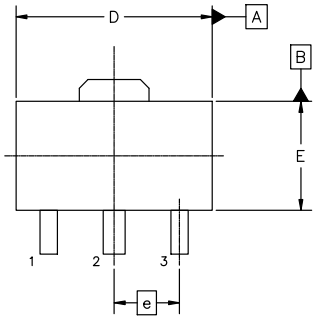



**Figure 9. SOA**

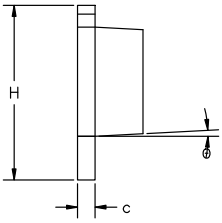


**SOT−89 4.50x2.50x1.50 1.50P**
CASE 419AU
ISSUE A

DATE 21 MAY 2025



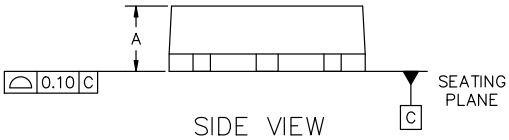

TOP VIEW



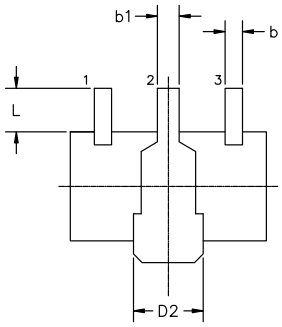

END VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS INCLUDES LEAD FINISH.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

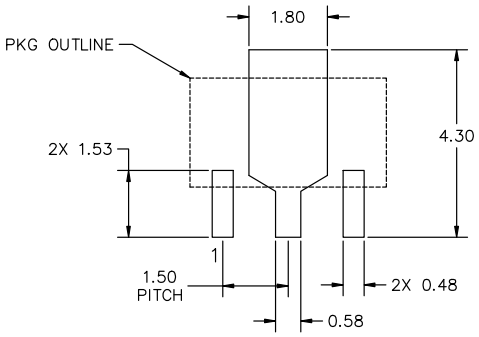
| MILLIMETERS | | | |
|---|---|---|---|
| DIM | MIN | NOM | MAX |
| A | 1.40 | 1.50 | 1.60 |
| b | 0.35 | 0.40 | 0.48 |
| b1 | 0.40 | 0.50 | 0.55 |
| c | 0.37 | 0.40 | 0.43 |
| D | 4.40 | 4.50 | 4.60 |
| D2 | 1.40 | 1.60 | 1.80 |
| E | 2.40 | 2.50 | 2.60 |
| e | 1.50 BSC | | |
| H | 3.80 | 4.00 | 4.20 |
| L | 0.80 | 1.00 | 1.20 |
| θ | 0° | −−− | 3° |




SIDE VIEW




BOTTOM VIEW




RECOMMENDED MOUNTING FOOTPRINT

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

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|---|---|---|---|
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