



ON Semiconductor®

<http://onsemi.com>

# 2SA2012

## Bipolar Transistor -30V, -5A, Low VCE(sat) PNP Single PCP

### Applicaitons

- Relay drivers, lamp drivers, motor drivers, flash

### Features

- Adoption of MBIT processes
- Low collector to emitter saturation voltage
- Ultrasmall-sized package permitting applied sets to be made small and slim
- High allowable power dissipation
- Large current capacity

### Specifications

**Absolute Maximum Ratings** at Ta=25°C

| Parameter                    | Symbol | Conditions | Ratings | Unit |
|------------------------------|--------|------------|---------|------|
| Collector to Base Voltage    | VCBO   |            | -30     | V    |
| Collector to Emitter Voltage | VCEO   |            | -30     | V    |
| Emitter to Base Voltage      | VEBO   |            | -5      | V    |
| Collector Current            | IC     |            | -5      | A    |
| Collector Current (Pulse)    | ICP    |            | -8      | A    |

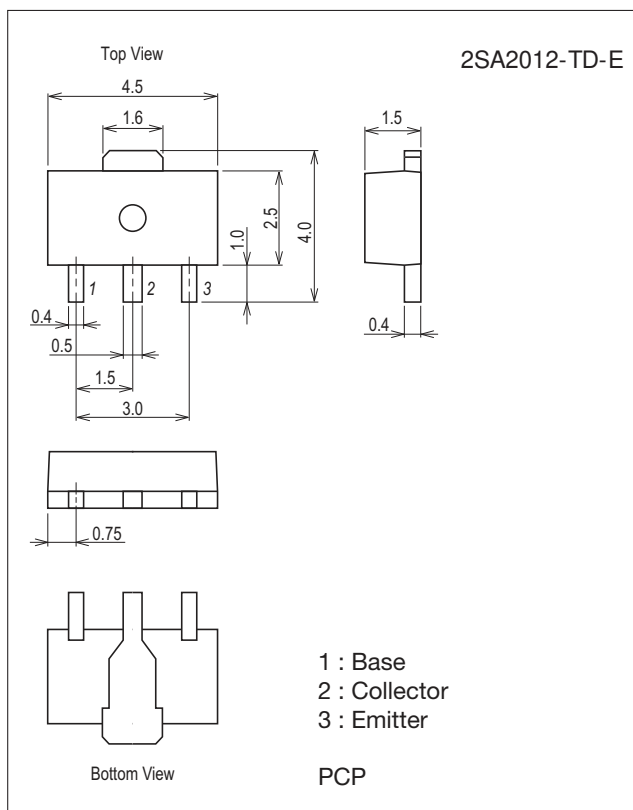
Continued on next page.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

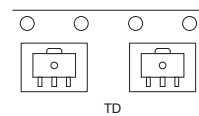
7007B-004



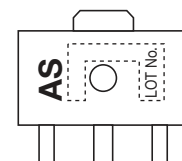
### Product & Package Information

- Package : PCP
- JEITA, JEDEC : SC-62, SOT-89, TO-243
- Minimum Packing Quantity : 1,000 pcs./reel

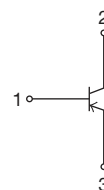
### Packing Type: TD



### Marking



### Electrical Connection



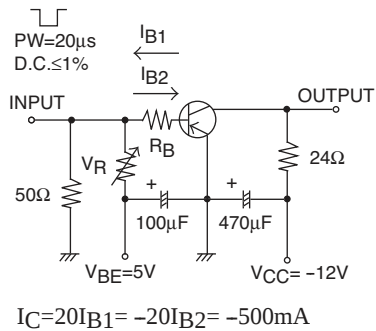
Continued from preceding page.

| Parameter             | Symbol    | Conditions                                                    | Ratings     | Unit               |
|-----------------------|-----------|---------------------------------------------------------------|-------------|--------------------|
| Base Current          | $I_B$     |                                                               | -600        | mA                 |
| Collector Dissipation | $P_C$     | When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm) | 1.3         | W                  |
|                       |           | $T_C=25^{\circ}\text{C}$                                      | 3.5         | W                  |
| Junction Temperature  | $T_J$     |                                                               | 150         | $^{\circ}\text{C}$ |
| Storage Temperature   | $T_{stg}$ |                                                               | -55 to +150 | $^{\circ}\text{C}$ |

### Electrical Characteristics at $T_a=25^{\circ}\text{C}$

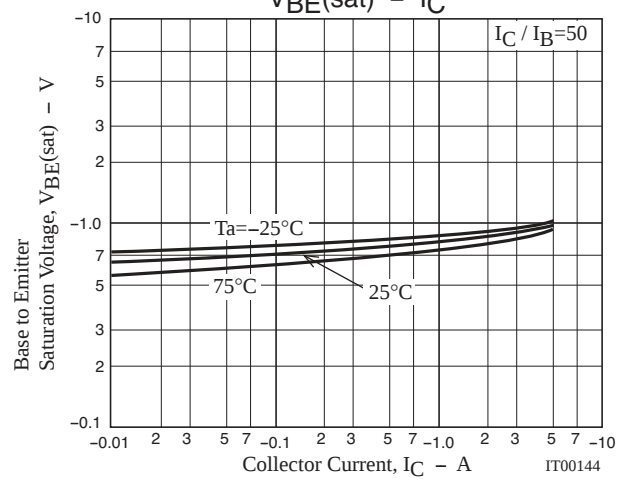
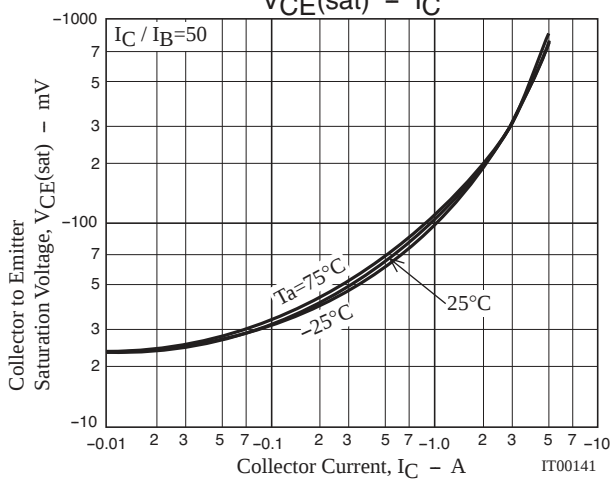
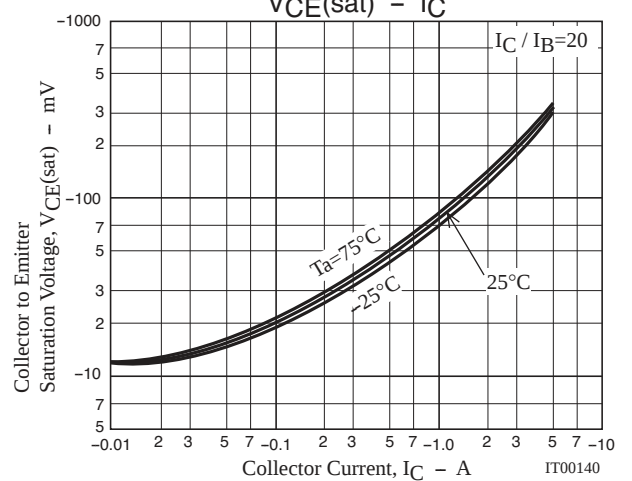
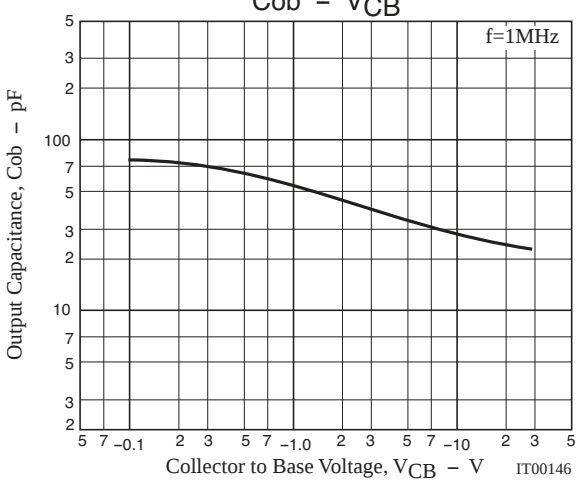
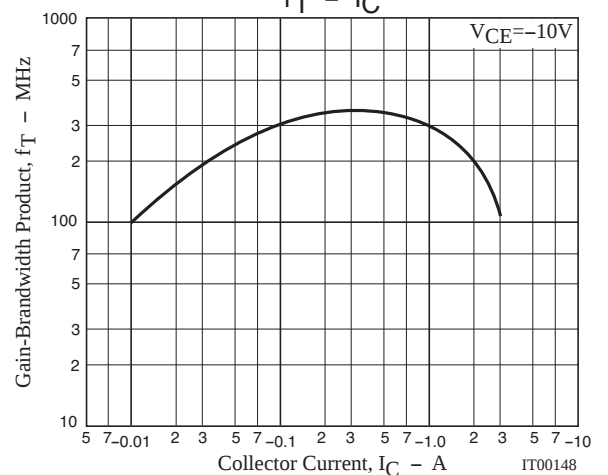
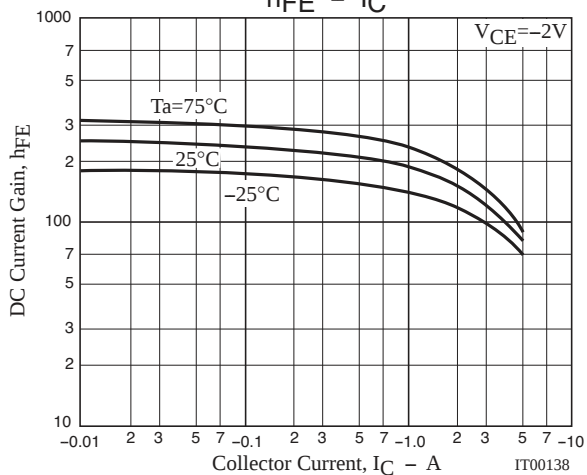
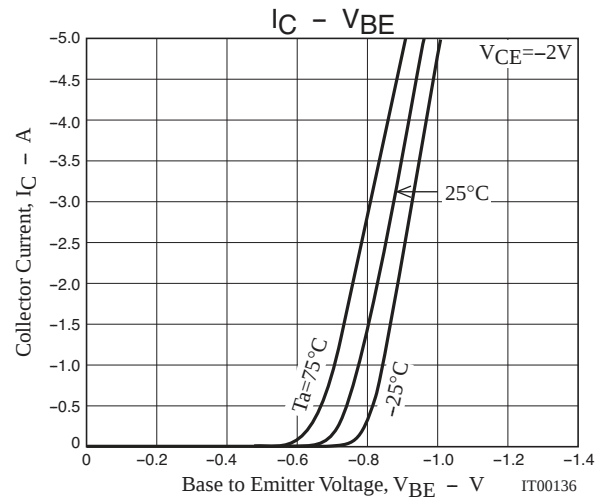
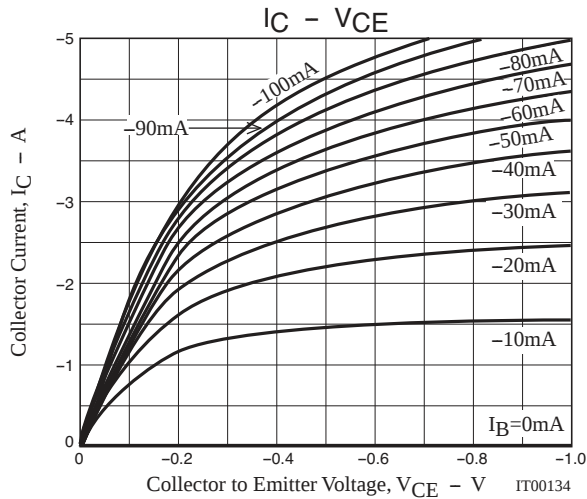
| Parameter                               | Symbol         | Conditions                                 | Ratings |       |      | Unit          |
|-----------------------------------------|----------------|--------------------------------------------|---------|-------|------|---------------|
|                                         |                |                                            | min     | typ   | max  |               |
| Collector Cutoff Current                | $I_{CBO}$      | $V_{CB}=-30\text{V}$ , $I_E=0\text{A}$     |         |       | -0.1 | $\mu\text{A}$ |
| Emitter Cutoff Current                  | $I_{EBO}$      | $V_{EB}=-4\text{V}$ , $I_C=0\text{A}$      |         |       | -0.1 | $\mu\text{A}$ |
| DC Current Gain                         | $h_{FE}$       | $V_{CE}=-2\text{V}$ , $I_C=-500\text{mA}$  | 200     |       | 560  |               |
| Gain-Bandwidth Product                  | $f_T$          | $V_{CE}=-10\text{V}$ , $I_C=-500\text{mA}$ |         | 350   |      | MHz           |
| Output Capacitance                      | $C_{ob}$       | $V_{CB}=(-)10\text{V}$ , $f=1\text{MHz}$   |         | 30    |      | pF            |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)1}$ | $I_C=-1.5\text{A}$ , $I_B=-30\text{mA}$    |         | -140  | -210 | mV            |
|                                         | $V_{CE(sat)2}$ | $I_C=-2.5\text{A}$ , $I_B=-125\text{mA}$   |         | -170  | -260 | mV            |
| Base to Emitter Saturation Voltage      | $V_{BE(sat)}$  | $I_C=-1.5\text{A}$ , $I_B=-30\text{mA}$    |         | -0.83 | -1.2 | V             |
| Collector to Base Breakdown Voltage     | $V_{(BR)CBO}$  | $I_C=-10\mu\text{A}$ , $I_E=0\text{A}$     | -30     |       |      | V             |
| Collector to Emitter Breakdown Voltage  | $V_{(BR)CEO}$  | $I_C=-1\text{mA}$ , $R_{BE}=\infty$        | -30     |       |      | V             |
| Emitter to Base Breakdown Voltage       | $V_{(BR)EBO}$  | $I_E=-10\mu\text{A}$ , $I_C=0\text{A}$     | -5      |       |      | V             |
| Turn-ON Time                            | $t_{on}$       | See specified Test Circuit.                |         | 50    |      | ns            |
| Storage Time                            | $t_{stg}$      |                                            |         | 270   |      | ns            |
| Fall Time                               | $t_f$          |                                            |         | 25    |      | ns            |

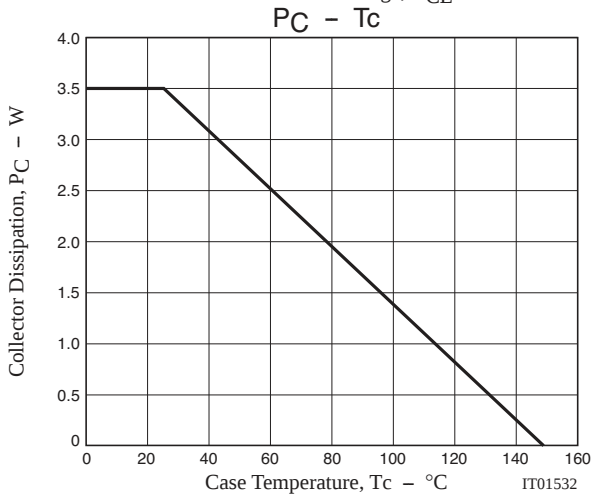
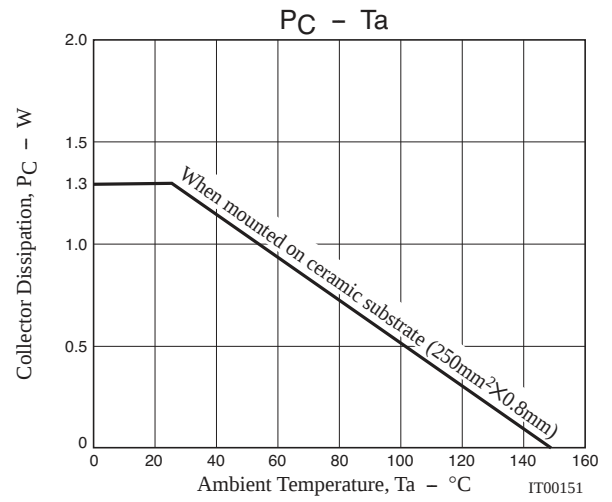
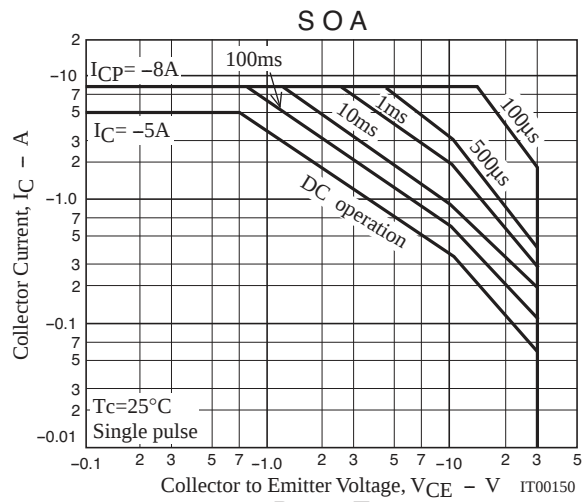
### Switching Time Test Circuit



### Ordering Information

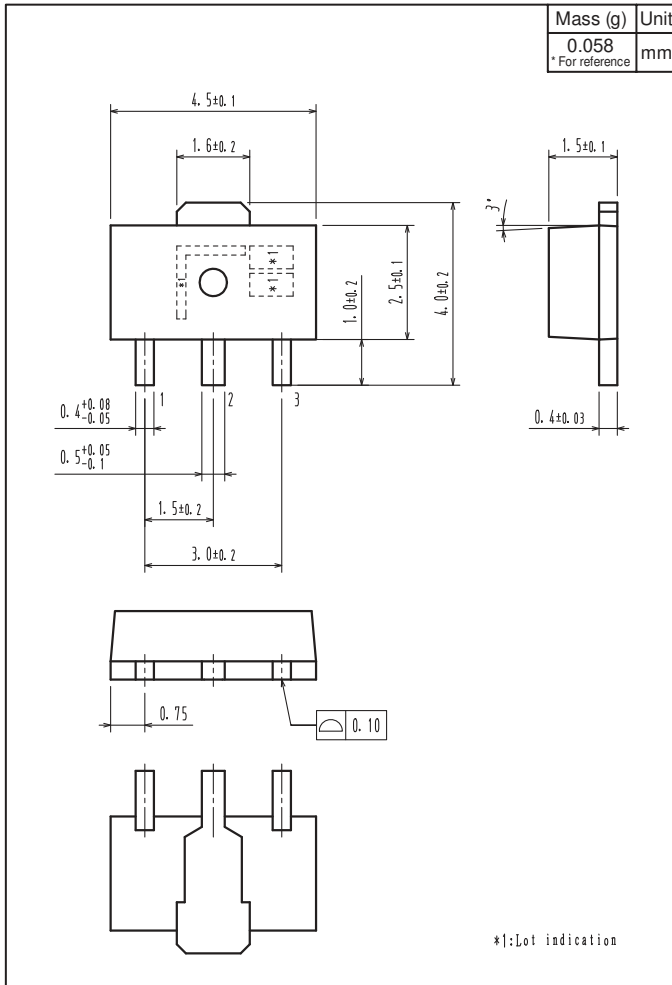
| Device       | Package | Shipping       | memo    |
|--------------|---------|----------------|---------|
| 2SA2012-TD-E | PCP     | 1,000pcs./reel | Pb Free |



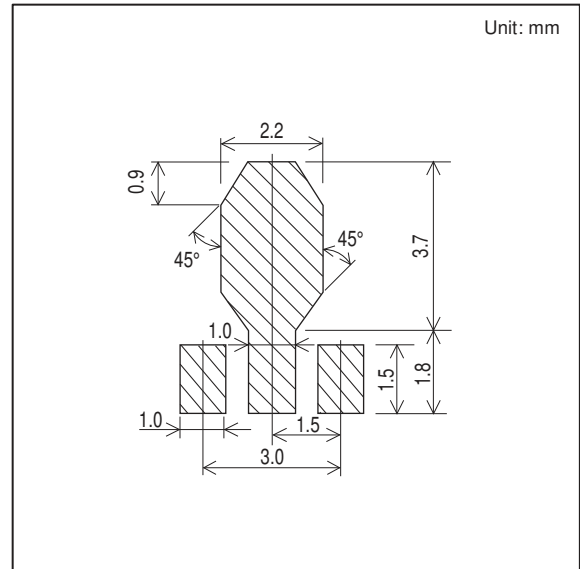


## Outline Drawing

2SA2012-TD-E



## Land Pattern Example



ON Semiconductor and the ON logo 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](http://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.