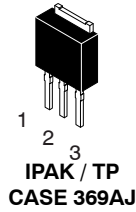


# Bipolar Transistor

(-) $50\text{ V}$ , (-) $2\text{ A}$ , Low  $V_{CE(sat)}$ ,  
(PNP)NPN Single TP/TP-FA

## 2SB1201/2SD1801



IPAK / TP  
CASE 369AJ

DPAK / TP-FA  
CASE 369AH

### Features

- Adoption of FBET, MBIT Processes
- Low Collector-to-Emitter Saturation Voltage
- Small and Slim Package Making it Easy to Make 2SB1201 / 2SD1801 – Used Sets Smaller
- Large Current Capacitance and Wide ASO
- These are Pb-Free Devices

### Applications

- Voltage Regulators, Relay Drivers, Lamp Drivers, Electrical Equipment

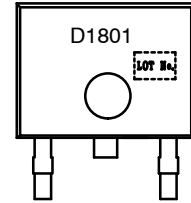
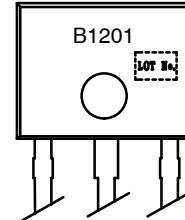
### ABSOLUTE MAXIMUM RATINGS (at $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		(-) $60$	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-) $50$	V
Emitter-to-Base Voltage	$V_{EBO}$		(-) $6$	V
Collector Current	$I_C$		(-) $2$	A
Collector Current (Pulse)	$I_{CP}$		(-) $4$	A
Collector Dissipation	$P_C$		0.8	W
		$T_c = 25^\circ\text{C}$	15	W
Junction Temperature	$T_j$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

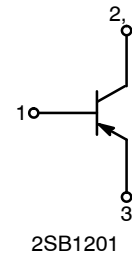
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

NOTE: Specifications ( ): 2SB1201

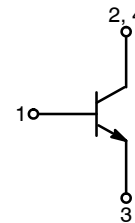
### MARKING DIAGRAMS



### ELECTRICAL CONNECTION



2SB1201



2SD1801

### ORDERING INFORMATION

Device	Package	Shipping†
2SB1201S-E	IPAK / TP (Pb-Free)	500 pcs / Bag
2SB1201S-TL-E	DPAK / TP-FA (Pb-Free)	700 / Tape & Reel
2SB1201T-TL-E	DPAK / TP-FA (Pb-Free)	700 / Tape & Reel
2SD1801S-TL-E	DPAK / TP-FA (Pb-Free)	700 / Tape & Reel
2SD1801S-E	IPAK / TP (Pb-Free)	500 pcs / Bag

†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](#).

# 2SB1201/2SD1801

## ELECTRICAL CHARACTERISTICS (at Ta = 25°C)

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = (-)50\text{ V}, I_E = 0\text{ A}$	-	-	(-)100	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4\text{ V}, I_C = 0\text{ A}$	-	-	(-)100	nA
DC Current Gain	$h_{FE1}$	$V_{CE} = (-)2\text{ V}, I_C = (-)100\text{ mA}$	100*	-	560*	-
	$h_{FE2}$	$V_{CE} = (-)2\text{ V}, I_C = (-)1.5\text{ A}$	40	-	-	-
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)10\text{ V}, I_C = (-)50\text{ mA}$	-	150	-	MHz
Output Capacitance	$C_{ob}$	$V_{CB} = (-)10\text{ V}, f = 1\text{ MHz}$	-	(22)12	-	pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)1\text{ A}, I_B = (-)50\text{ mA}$	-	(-0.3)0.15	(-0.7)0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = (-)1\text{ A}, I_C = (-)50\text{ mA}$	-	(-)0.9	(-)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = (-)10\text{ }\mu\text{A}, I_E = 0\text{ A}$	(-)60	-	-	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = (-)1\text{ mA}, R_{BE} = \infty$	(-)50	-	-	V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = (-)10\text{ }\mu\text{A}, I_C = 0\text{ A}$	(-)6	-	-	V
Turn-ON Time	$t_{on}$	See specified Test Circuit.	-	(60)60	-	ns
Storage Time	$t_{stg}$		-	(450)550	-	ns
Fall Time	$t_f$		-	30	-	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.

NOTE: Specifications ( ): 2SB1201

\*The 2SB1201 / 2SD1801 are classified by 100 mA  $h_{FE}$  as follows :

Table 1.

Rank	R	S	T	U
$h_{FE}$	100 to 200	140 to 280	200 to 400	280 to 560

### Switching Time Test Circuit

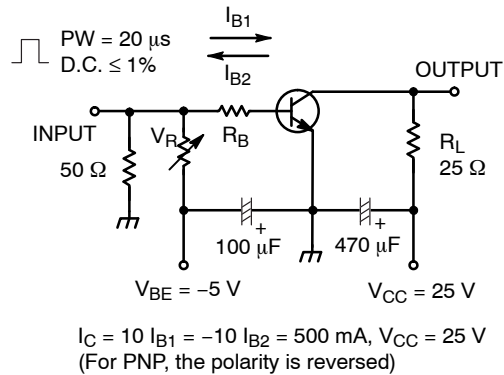
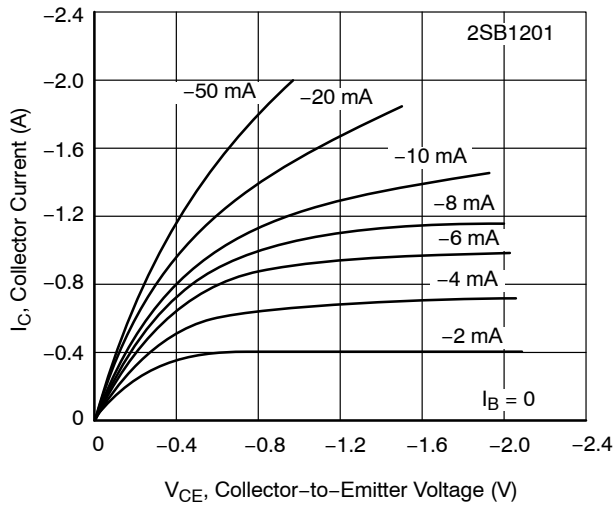
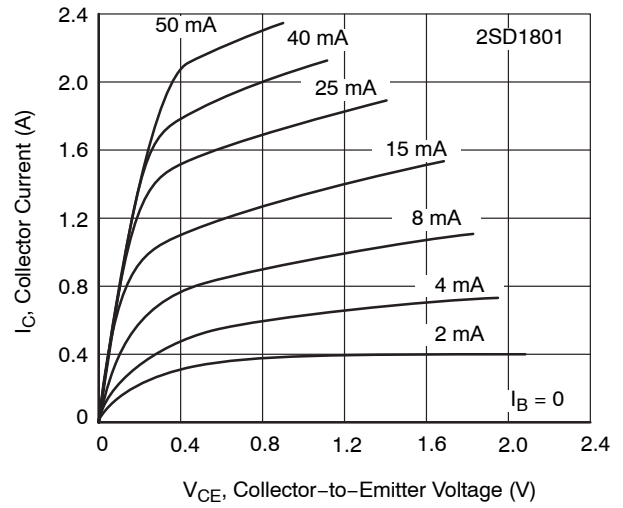


Figure 1. Switching Time Test Circuit

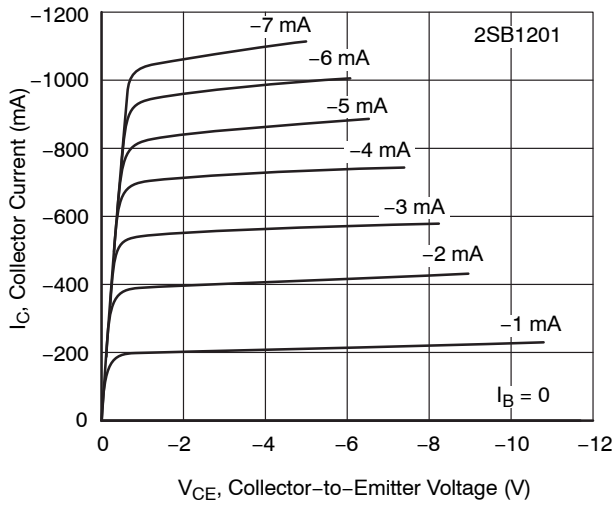
# 2SB1201/2SD1801



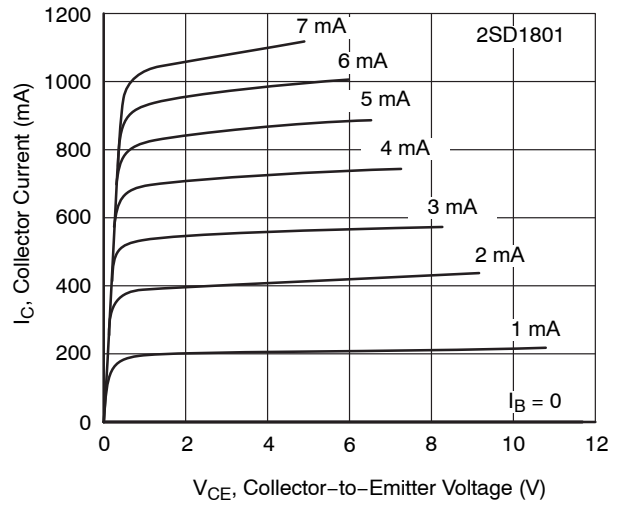
**Figure 2.  $I_C - V_{CE}$**



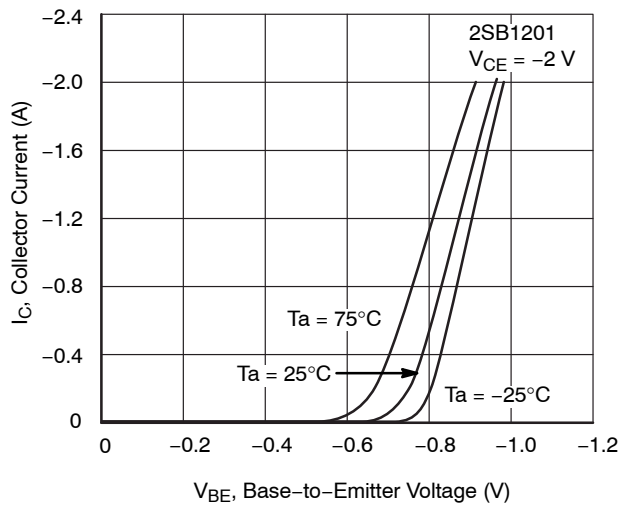
**Figure 3.  $I_C - V_{CE}$**



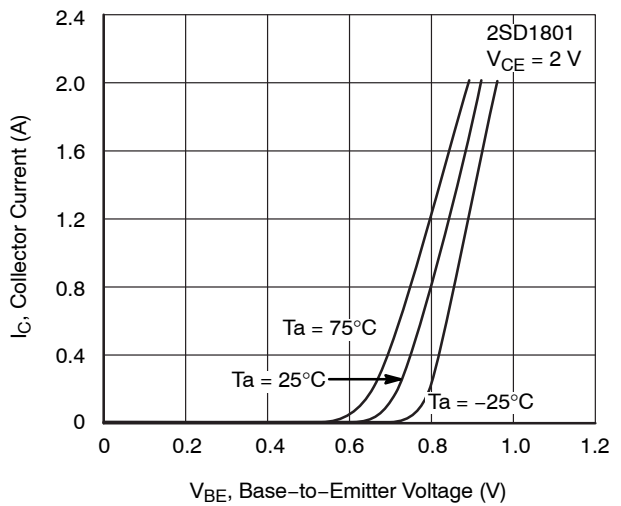
**Figure 4.  $I_C - V_{CE}$**



**Figure 5.  $I_C - V_{CE}$**

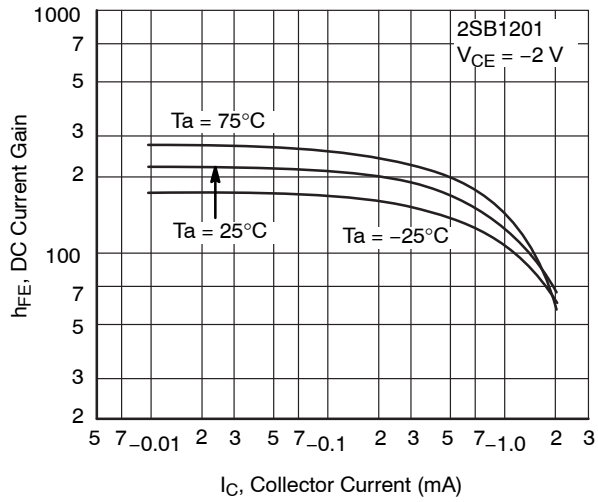


**Figure 6.  $I_C - V_{BE}$**

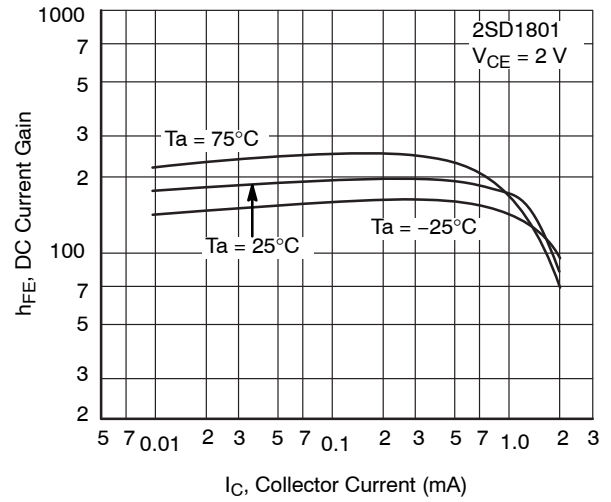


**Figure 7.  $I_C - V_{BE}$**

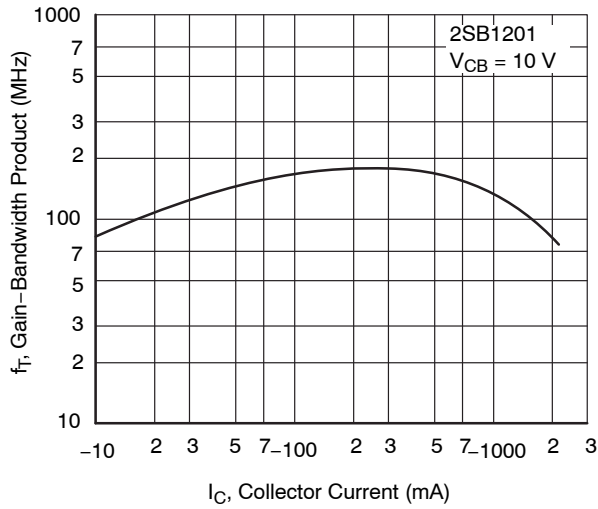
## 2SB1201/2SD1801



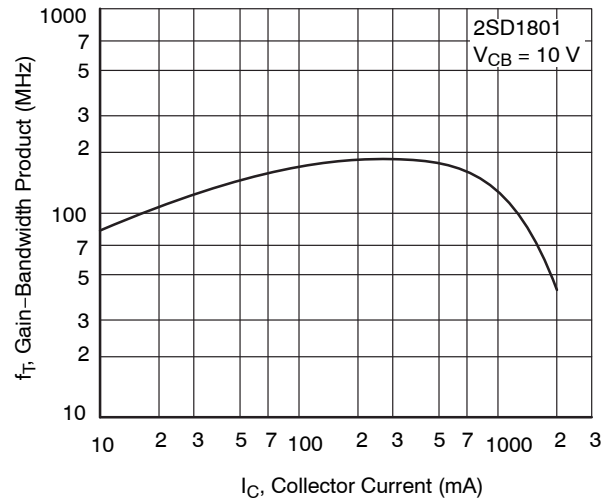
**Figure 8.  $h_{FE} - I_C$**



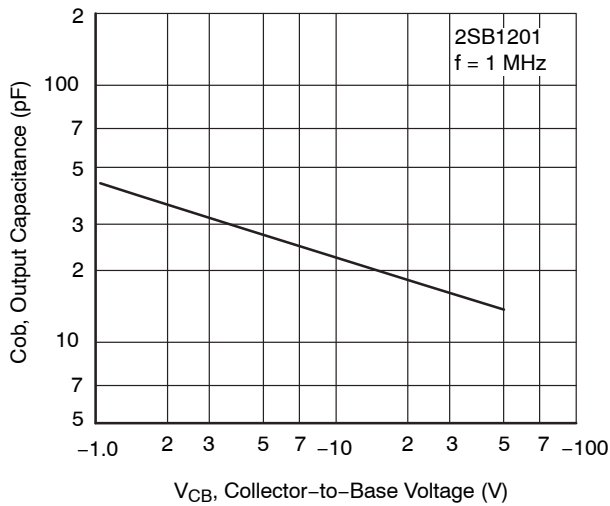
**Figure 9.  $h_{FE} - I_C$**



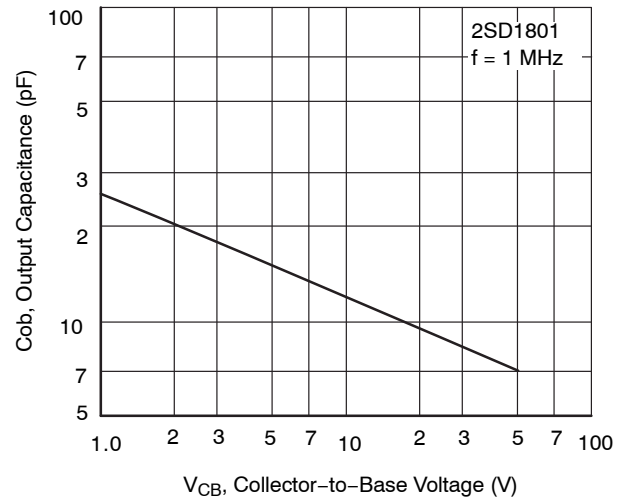
**Figure 10.  $f_T - I_C$**



**Figure 11.  $f_T - I_C$**



**Figure 12.  $C_{ob} - V_{CB}$**



**Figure 13.  $C_{ob} - V_{CB}$**

# 2SB1201/2SD1801

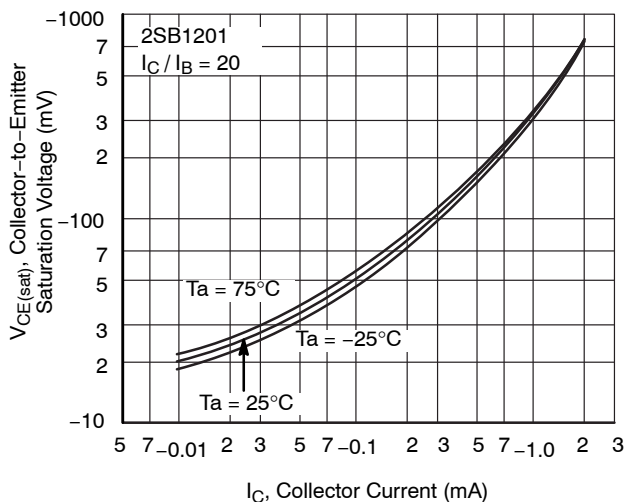


Figure 14.  $V_{CE(sat)} - I_C$

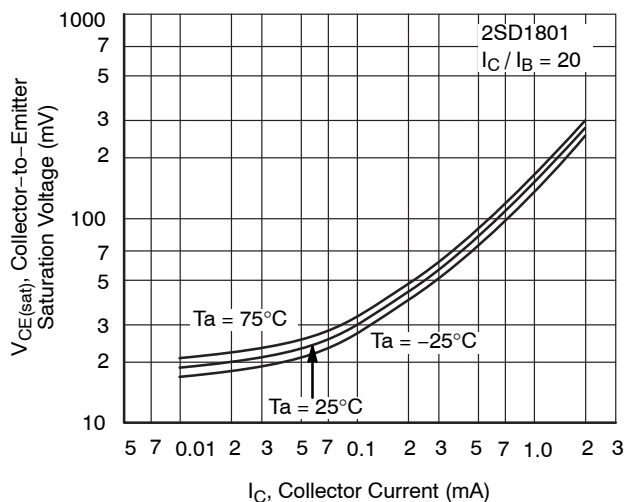


Figure 15.  $V_{CE(sat)} - I_C$

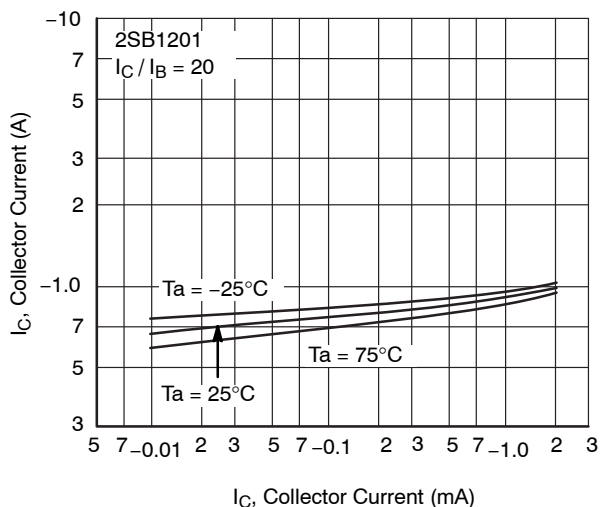


Figure 16.  $V_{BE(sat)} - I_C$

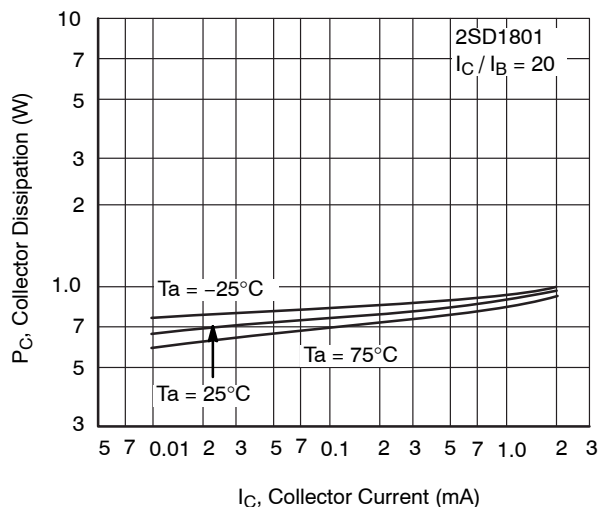


Figure 17.  $V_{BE(sat)} - I_C$

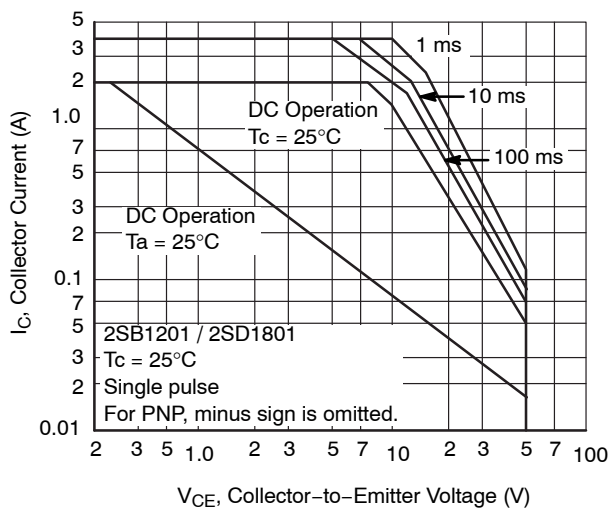


Figure 18. ASO

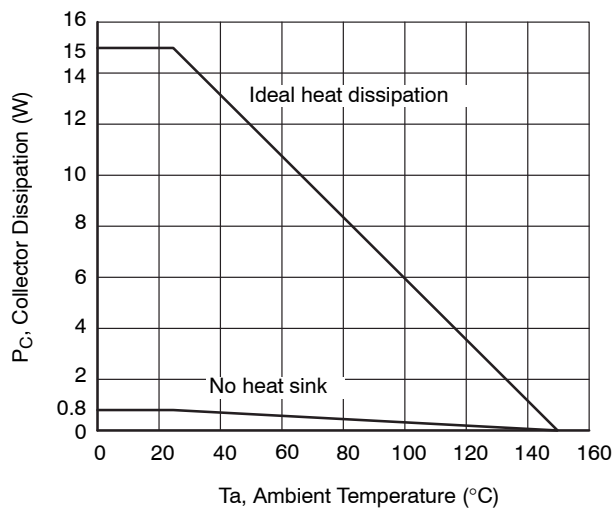
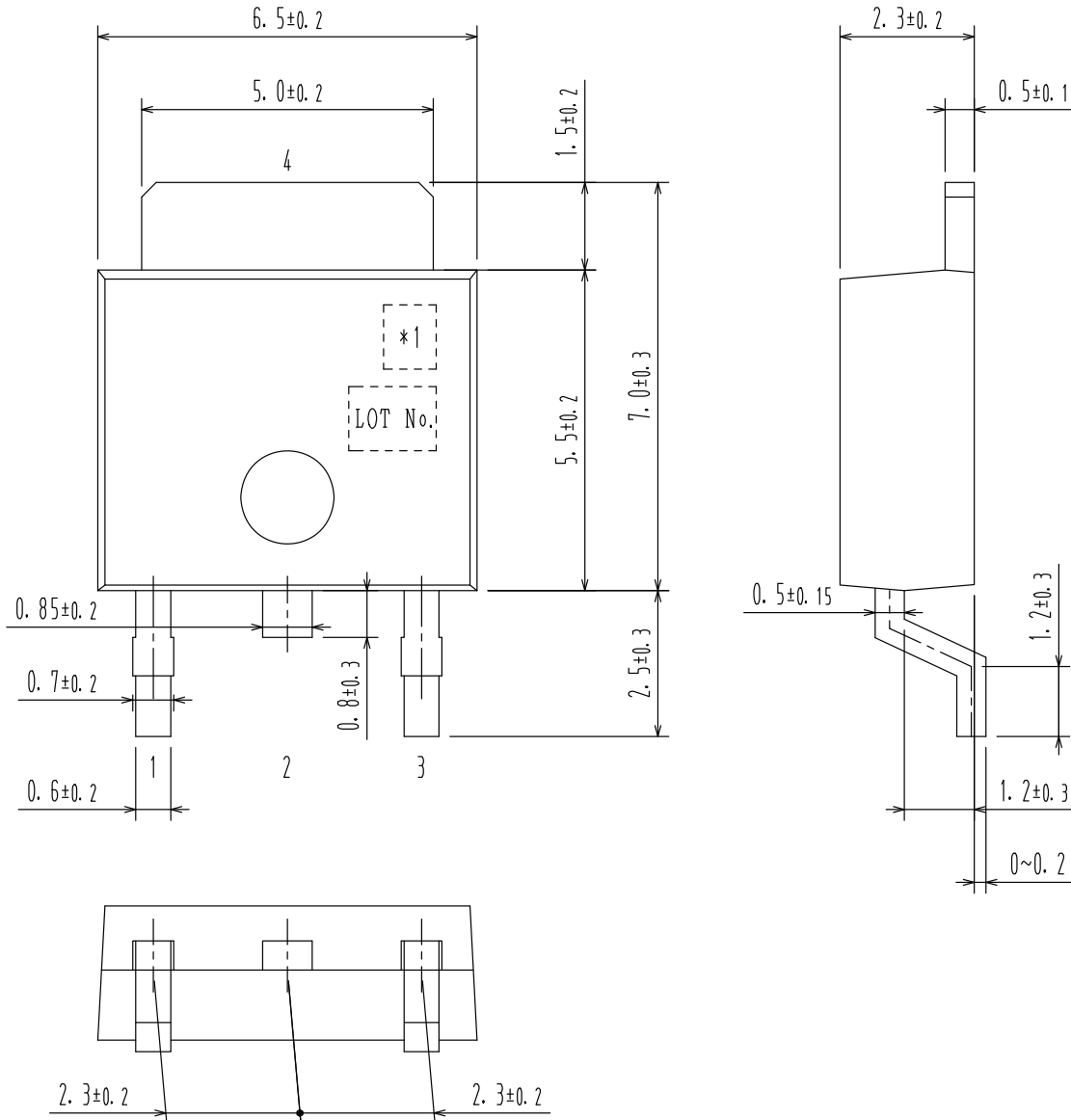


Figure 19.  $P_C - T_a$

**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**

**DPAK / TP-FA**  
**CASE 369AH**  
**ISSUE O**

DATE 30 JAN 2012



Pin 2 is idle pin with electrical designation only carried.

- 1:
- 2:
- 3:
- \*1: Lot indication 4:

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# MECHANICAL CASE OUTLINE

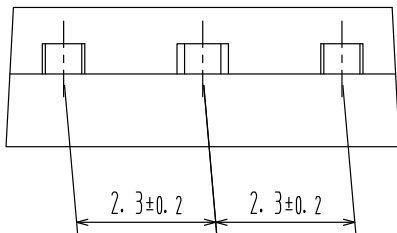
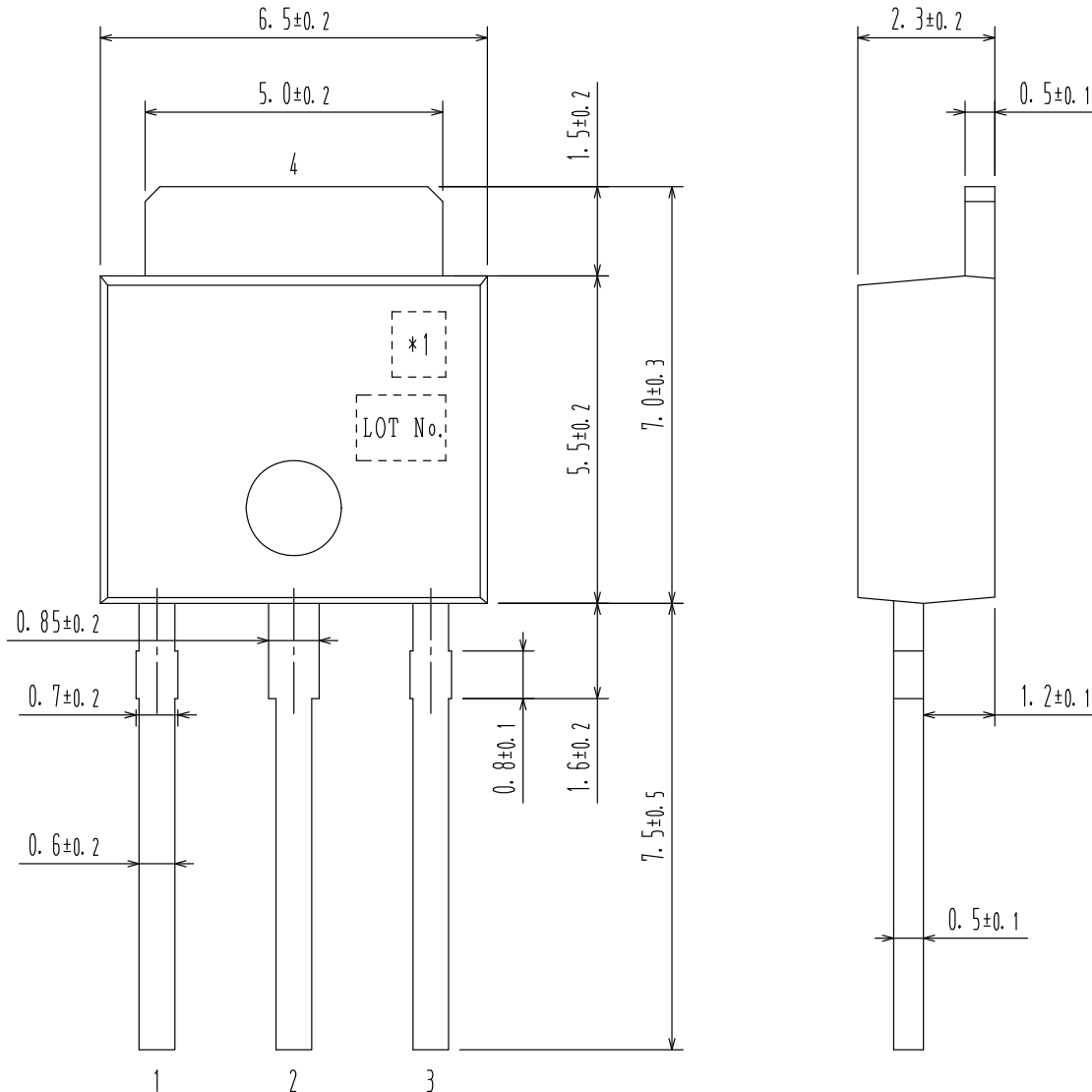
## PACKAGE DIMENSIONS

ON Semiconductor®



**IPAK / TP**  
**CASE 369AJ**  
**ISSUE O**

DATE 30 JAN 2012



- 1:
- 2:
- 3:
- 4:

\*1: Lot indication

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