

# Bipolar Transistor

60 V, 3 A, Low  $V_{CE(sat)}$ , NPN Single TP/TP-FA

## 2SC6097

### Features

- Adoption of FBET, MBIT Process
- Low Collector-to-Emitter Saturation Voltage
- High Allowable Power Dissipation
- Large Current Capacity
- High-Speed Switching

### Applications

- DC / DC Converter, Relay Drivers, Lamp Drivers, Motor Drivers, Inverter

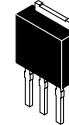
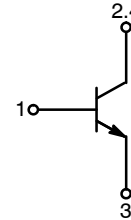
### SPECIFICATIONS

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

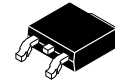
Parameter	Symbol	Conditions	Ratings	Unit
Collector to Base Voltage	$V_{CBO}$	-	100	V
Collector to Emitter Voltage	$V_{CES}$	-	100	V
Collector to Emitter Voltage	$V_{CEO}$	-	60	V
Emitter to Base Voltage	$V_{EBO}$	-	6.5	V
Collector Current	$I_C$	-	3	A
Collector Current (Pulse)	$I_{CP}$	-	5	A
Collector Current	$I_B$	-	600	mA
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.

### ELECTRICAL CONNECTION

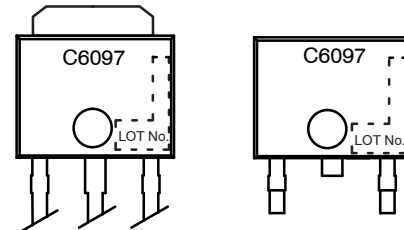


IPAK / TP  
CASE 369AJ



DPAK / TP-FA  
CASE 369AH

### MARKING DIAGRAM



### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
2SC6097-E	SC-64, TO-251	500 / Bulk Bag
2SC6097-TL-E	SC-63, TO-252	700 / Tape & Reel

<sup>†</sup>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](#).

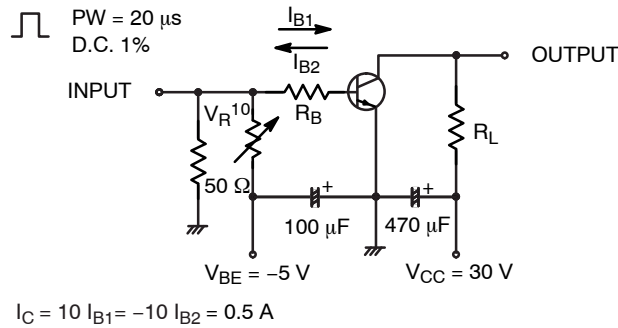
# 2SC6097

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

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 50 \text{ V}, I_E = 0 \text{ A}$	-	-	1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 4 \text{ V}, I_C = 0 \text{ A}$	-	-	1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 2 \text{ V}, I_C = 100 \text{ mA}$	300	-	600	
Gain-Bandwidth Product	$f_T$	$V_{CE} = 10 \text{ V}, I_C = 500 \text{ mA}$	-	390	-	MHz
Output Capacitance	$C_{ob}$	$V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$	-	18	-	pF
Collector to Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C = 1 \text{ A}, I_B = 50 \text{ mA}$	-	100	150	mV
	$V_{CE(sat)2}$	$I_C = 1 \text{ A}, I_B = 100 \text{ mA}$	-	90	135	mV
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 1 \text{ A}, I_B = 100 \text{ mA}$	-	0.84	1.2	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10 \mu\text{A}, I_E = 0 \text{ A}$	100	-	-	V
Collector to Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C = 100 \mu\text{A}, R_{BE} = 0 \Omega$	100	-	-	V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1 \text{ mA}, R_{BE} = \infty$	60	-	-	V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10 \mu\text{A}, I_C = 0 \text{ A}$	6.5	-	-	V
Turn-On Time	$t_{on}$	See specified Test Circuit	-	35	-	ns
Storage Time	$t_{stg}$		-	680	-	ns
Fall Time	$t_f$		-	24	-	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.

### Switching Time Test Circuit



TYPICAL CHARACTERISTICS

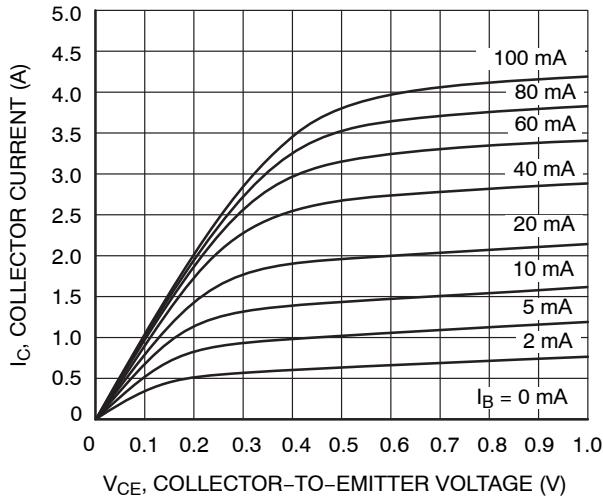


Figure 1.  $I_C - V_{CE}$

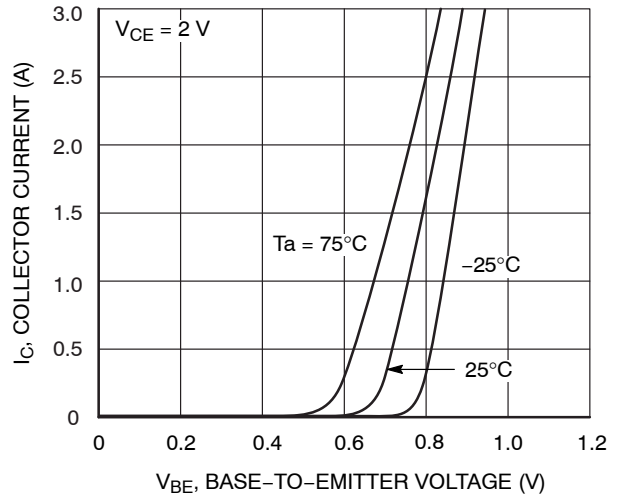


Figure 2.  $I_C - V_{BE}$

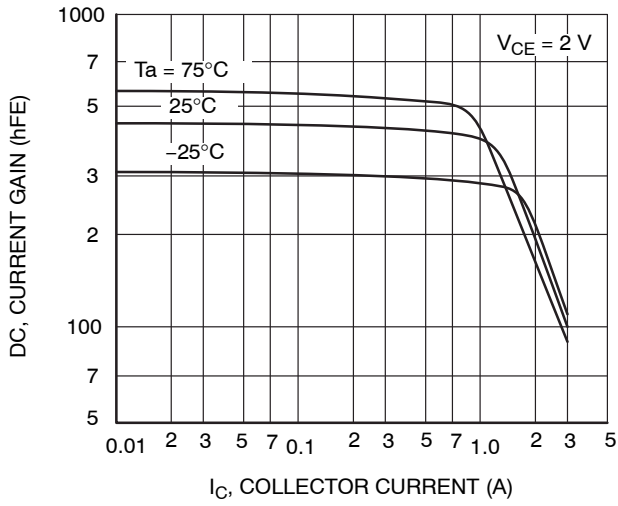


Figure 3.  $H_{FE} - I_C$

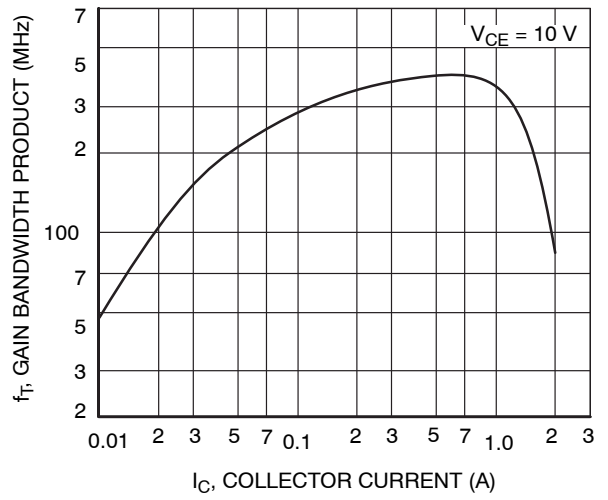


Figure 4.  $f_T - I_C$

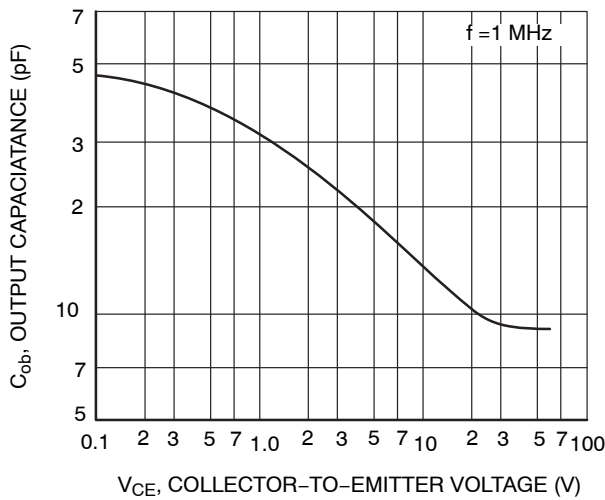


Figure 5.  $C_{ob} - V_{CB}$

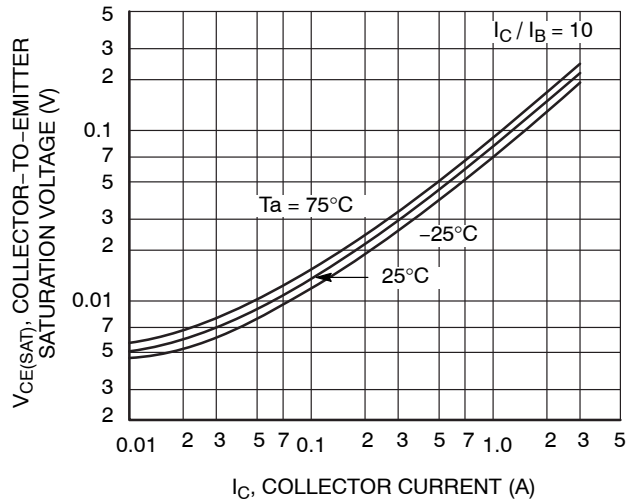


Figure 6.  $V_{CE(sat)} - I_C$

TYPICAL CHARACTERISTICS (continued)

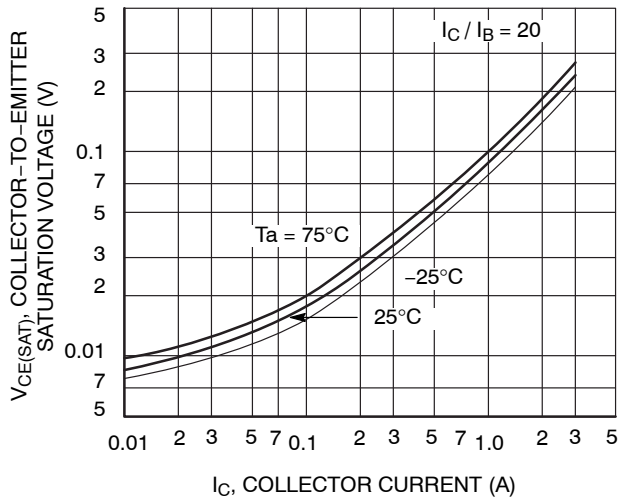


Figure 7.  $V_{CE(sat)} - I_C$

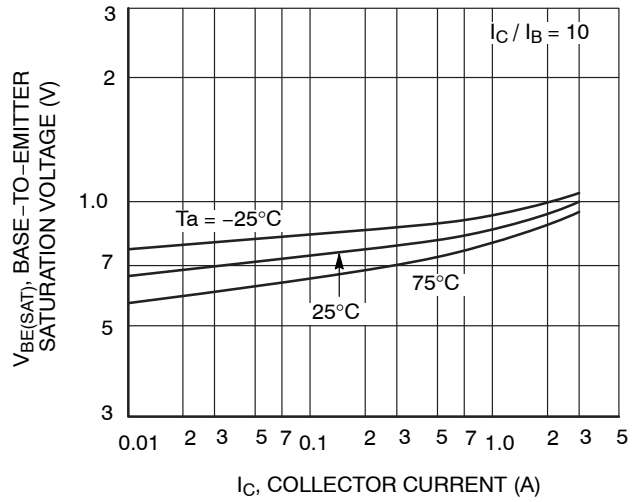


Figure 8.  $V_{BE(sat)} - I_C$

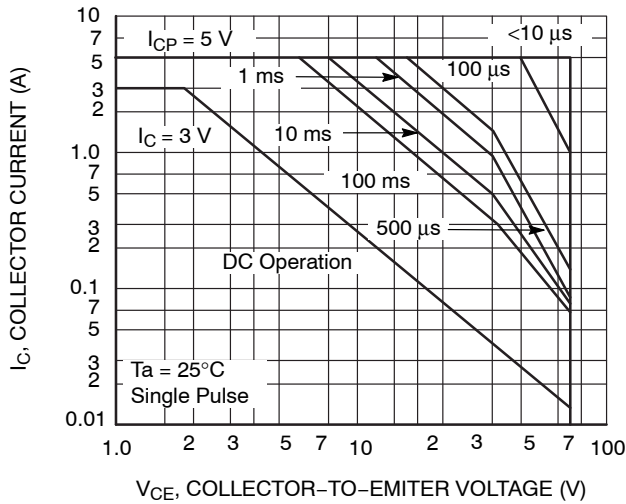


Figure 9. ASO

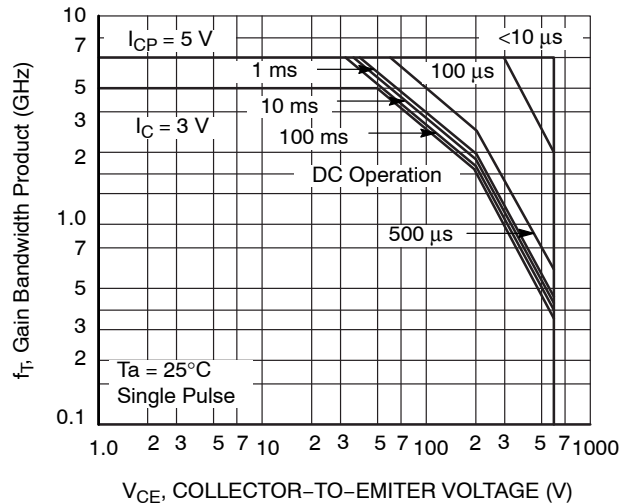


Figure 10. ASO

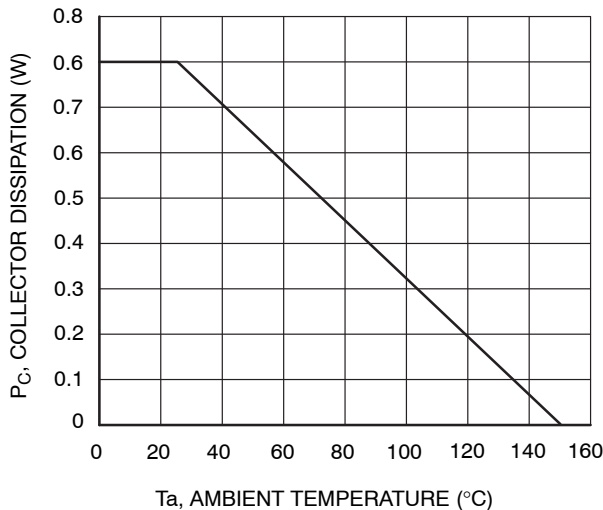


Figure 11.  $P_C - T_a$

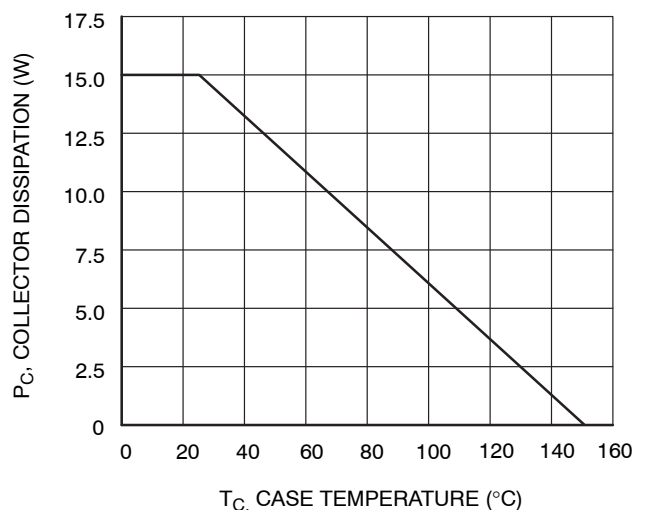
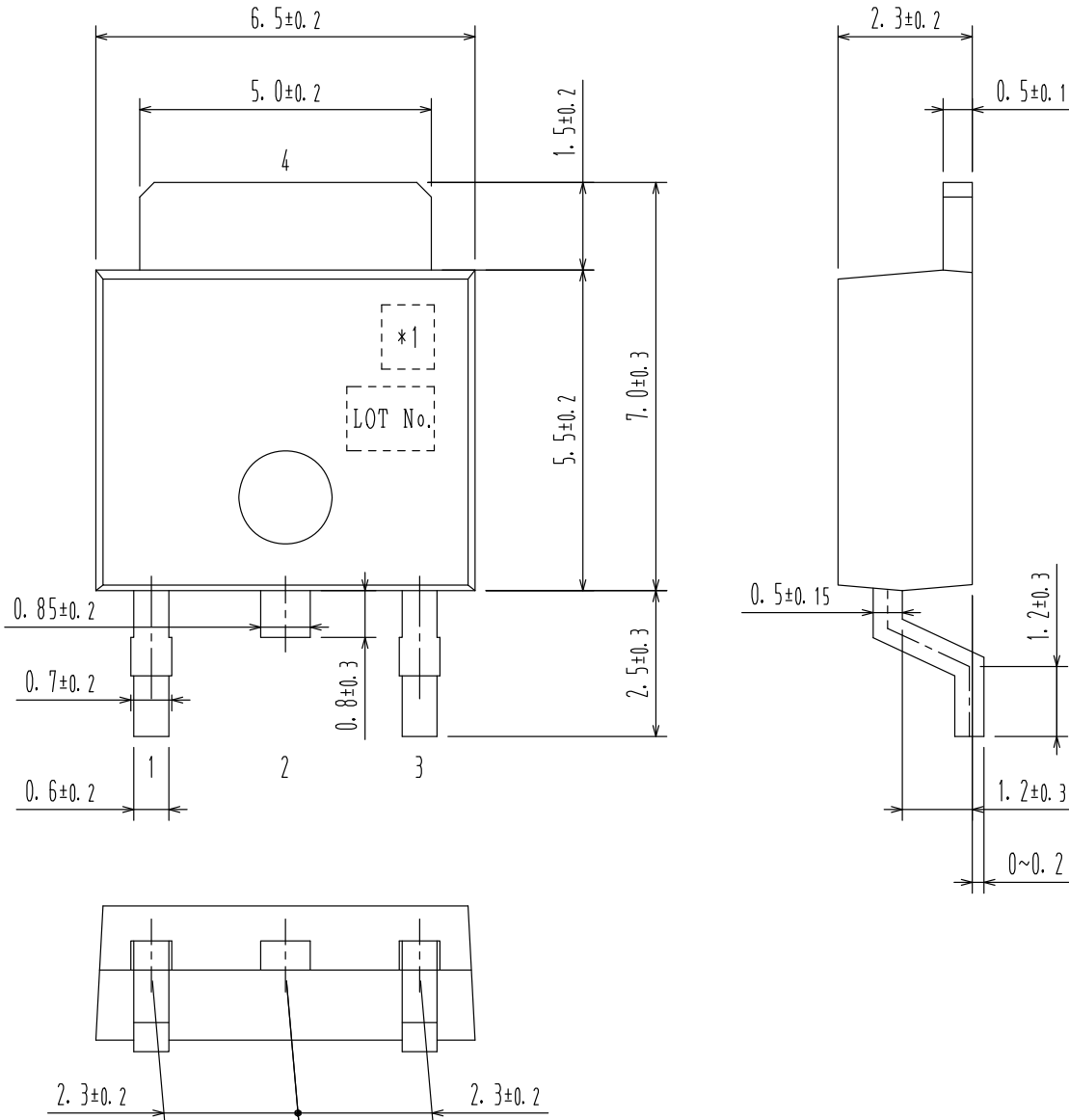


Figure 12.  $P_C - T_C$

**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:

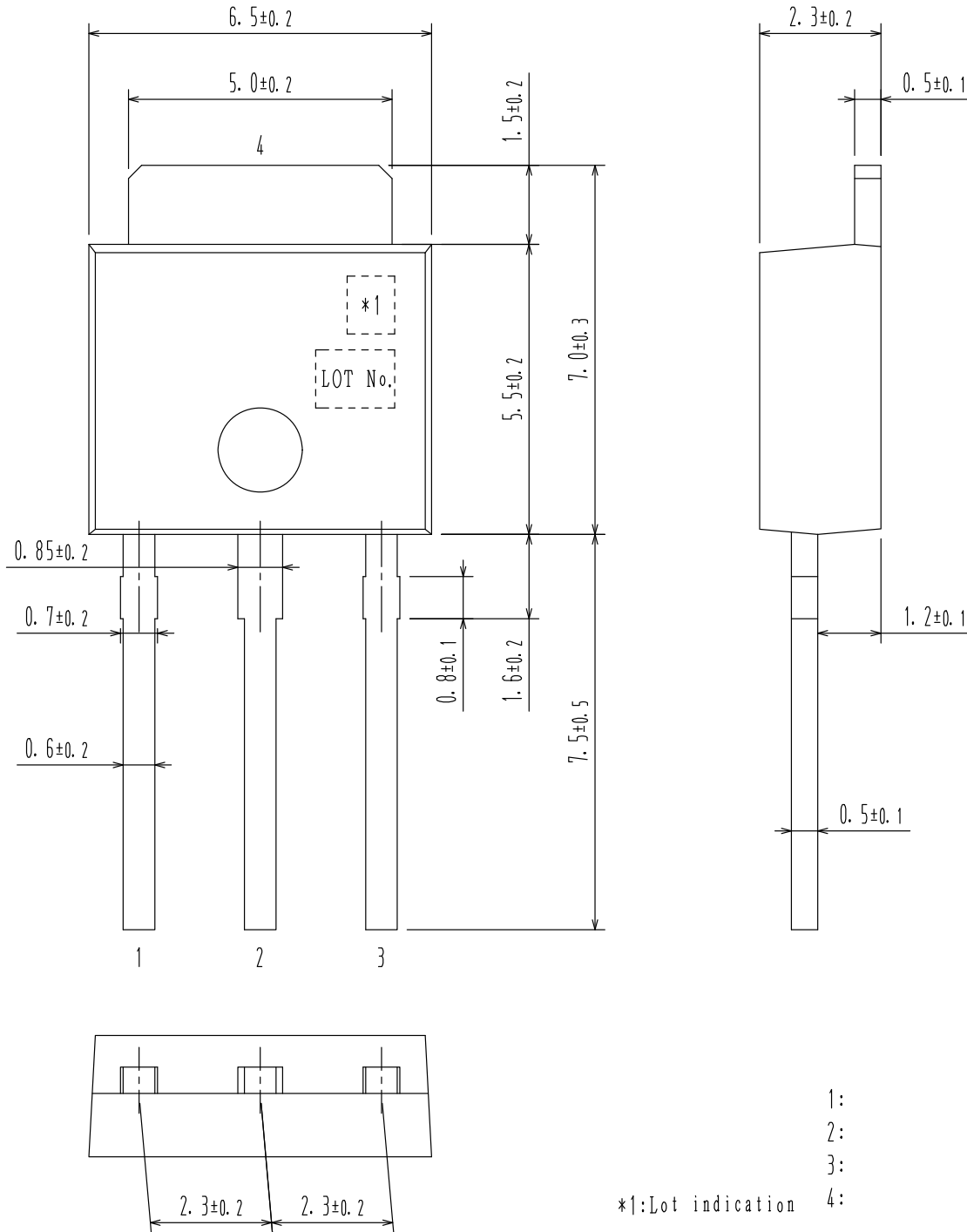
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**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**

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

DATE 30 JAN 2012



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

\*1: Lot indication

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