

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

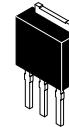
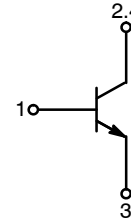
SPECIFICATIONS

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

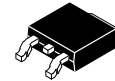
Parameter	Symbol	Conditions	Ratings	Unit
Collector to Base Voltage	V_{CBO}	–	100	V
Collector to Emitter Voltage	V_{CES}	–	100	V
Collector to Emitter Voltage	V_{CEO}	–	60	V
Emitter to Base Voltage	V_{EBO}	–	6.5	V
Collector Current	I_C	–	3	A
Collector Current (Pulse)	I_{CP}	–	5	A
Collector Current	I_B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

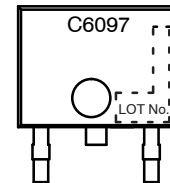
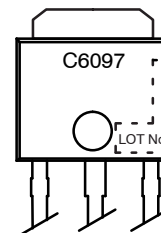


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MARKING DIAGRAM



ORDERING INFORMATION

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

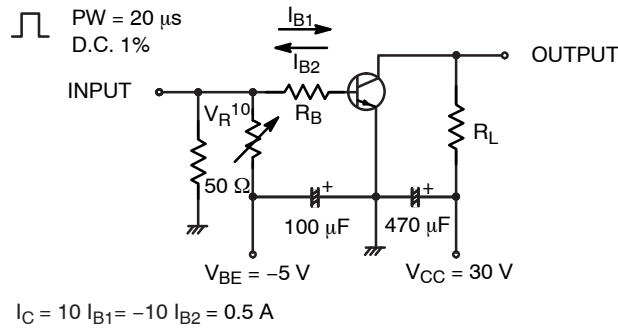
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS (at $T_a = 25^\circ\text{C}$)

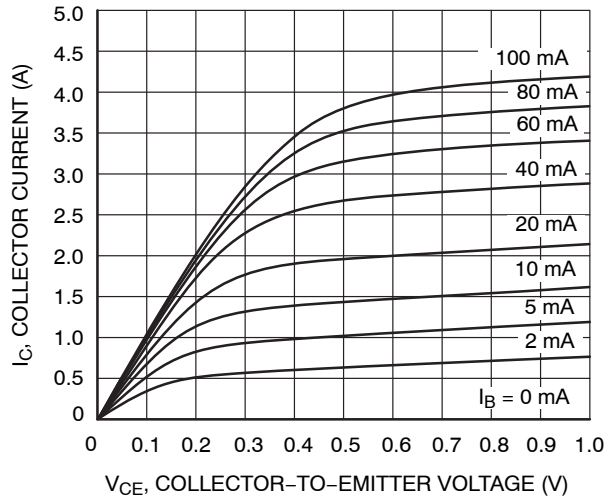
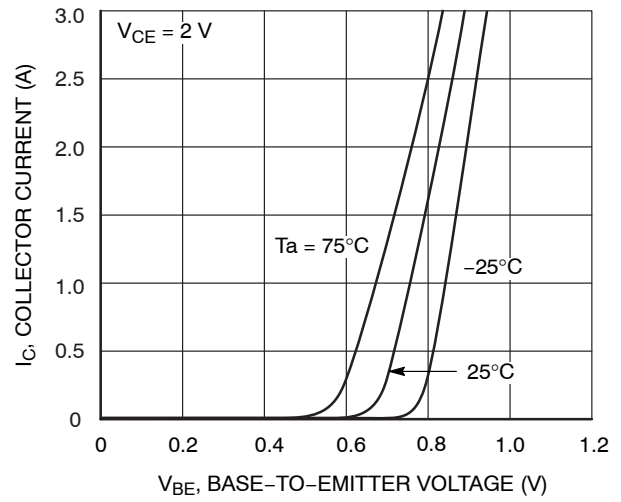
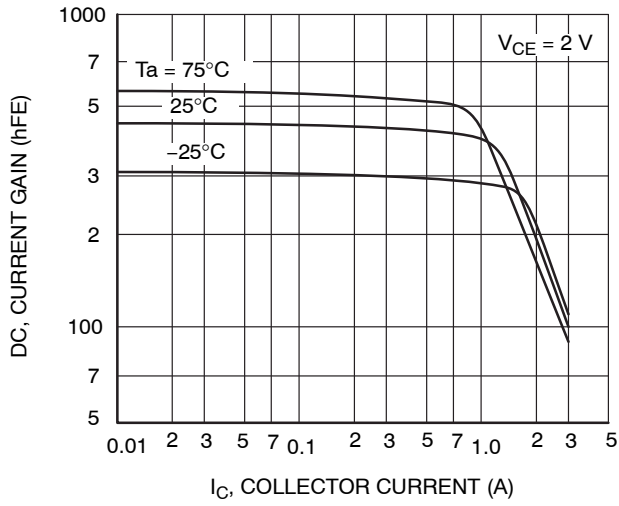
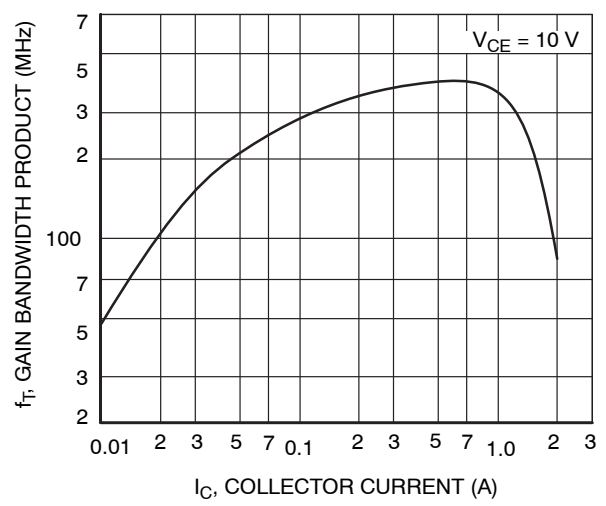
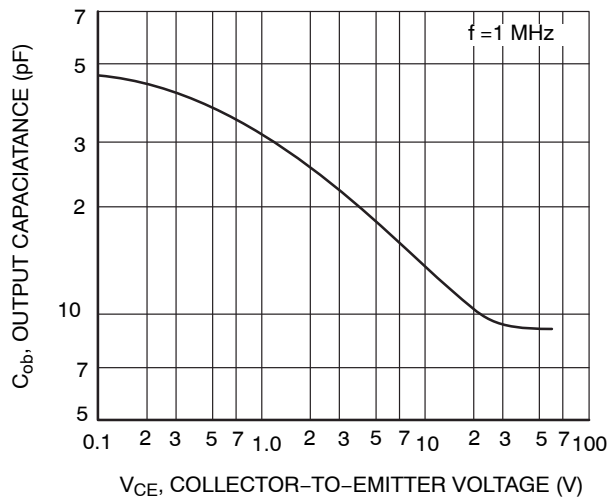
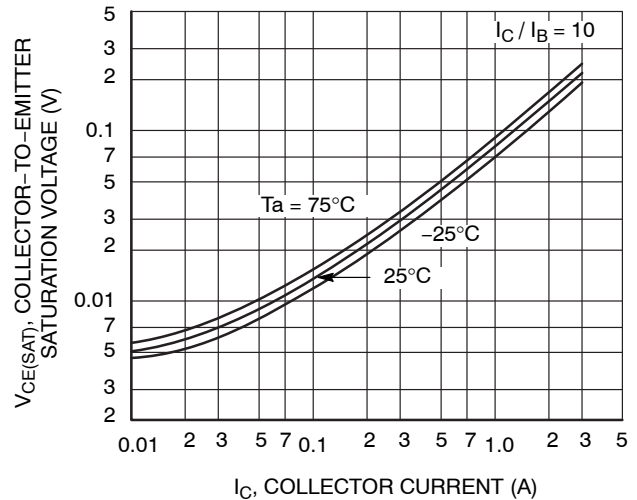
Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	$V_{CB} = 50\text{ V}, I_E = 0\text{ A}$	–	–	1	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 4\text{ V}, I_C = 0\text{ A}$	–	–	1	μA
DC Current Gain	h_{FE}	$V_{CE} = 2\text{ V}, I_C = 100\text{ mA}$	300	–	600	
Gain–Bandwidth 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	$V_{(BR)CBO}$	$I_C = 10\text{ }\mu\text{A}, I_E = 0\text{ A}$	100	–	–	V
Collector to Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C = 100\text{ }\mu\text{A}, R_{BE} = 0\text{ }\Omega$	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	$V_{(BR)EBO}$	$I_E = 10\text{ }\mu\text{A}, I_C = 0\text{ A}$	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. $C_{ob} - V_{CE}$ Figure 6. $V_{CE(sat)} - I_C$

TYPICAL CHARACTERISTICS (continued)

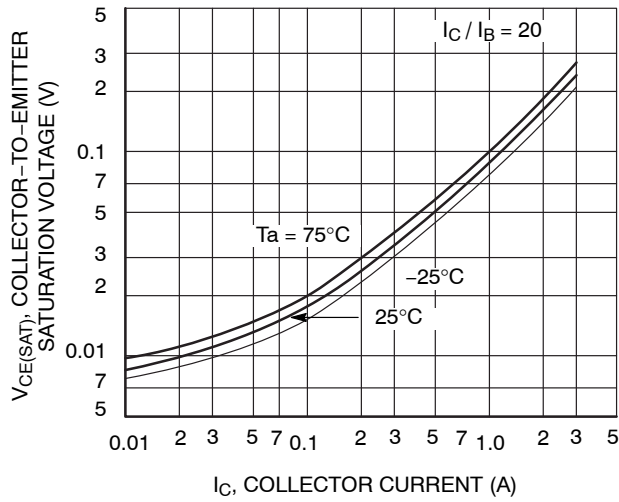
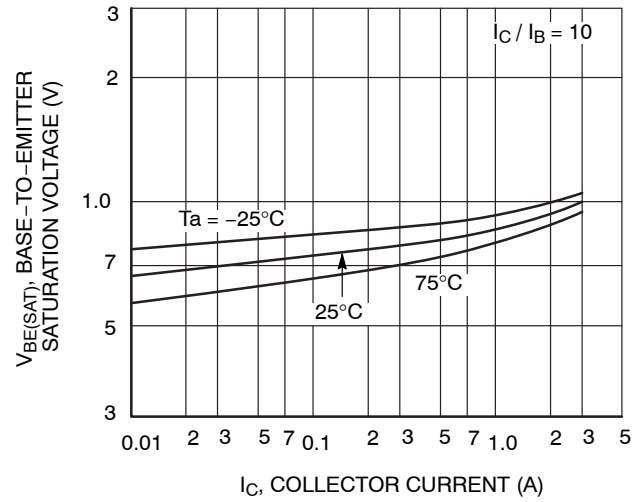
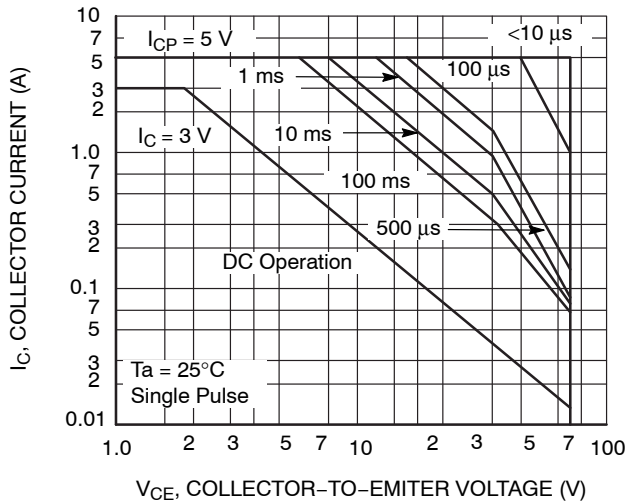
Figure 7. $V_{CE(sat)} - I_C$ Figure 8. $V_{BE(sat)} - I_C$ 

Figure 9. ASO

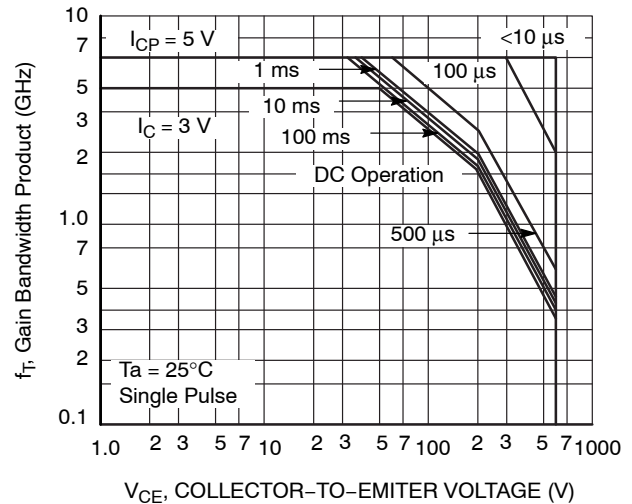
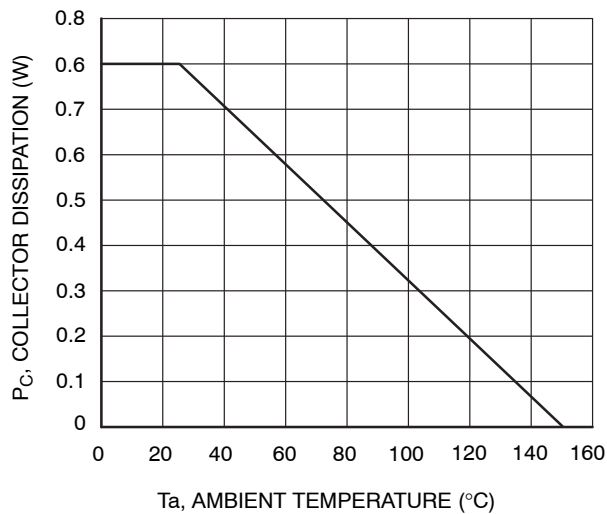
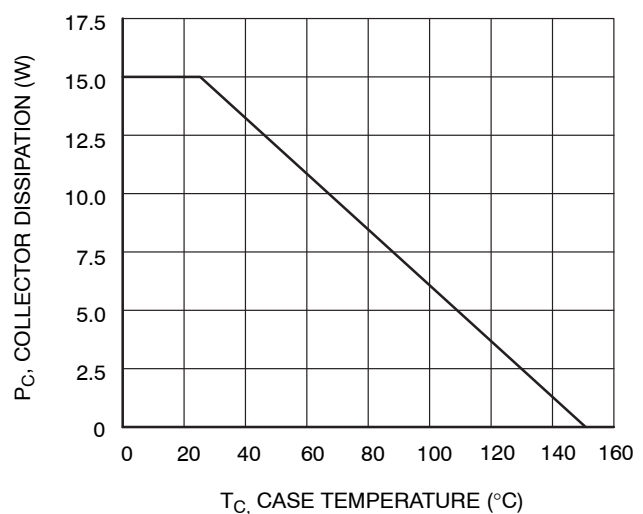
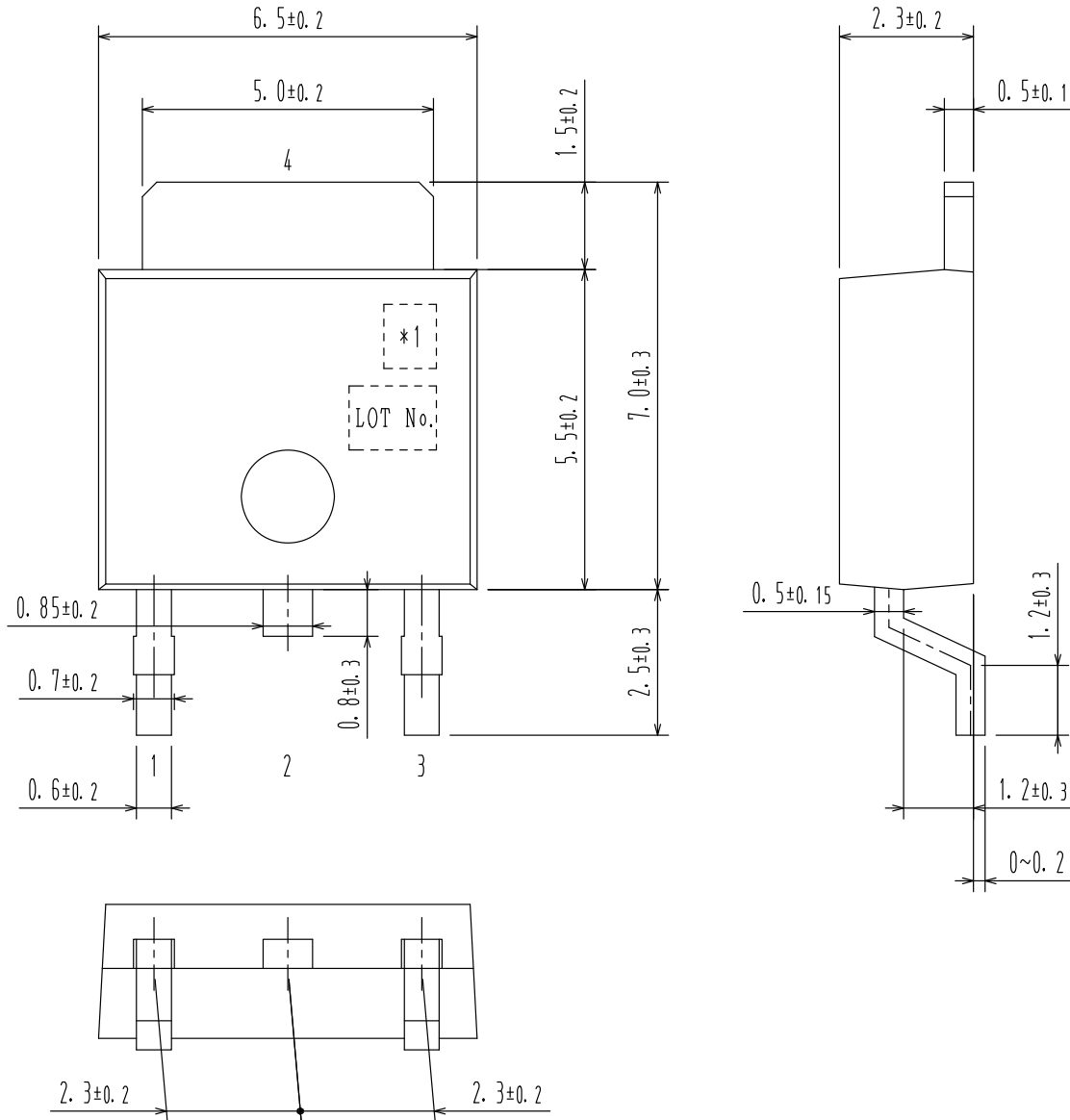


Figure 10. ASO

Figure 11. $P_C - T_a$ Figure 12. $P_C - T_C$

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Pin 2 is idle pin with electrical
designation only carried.

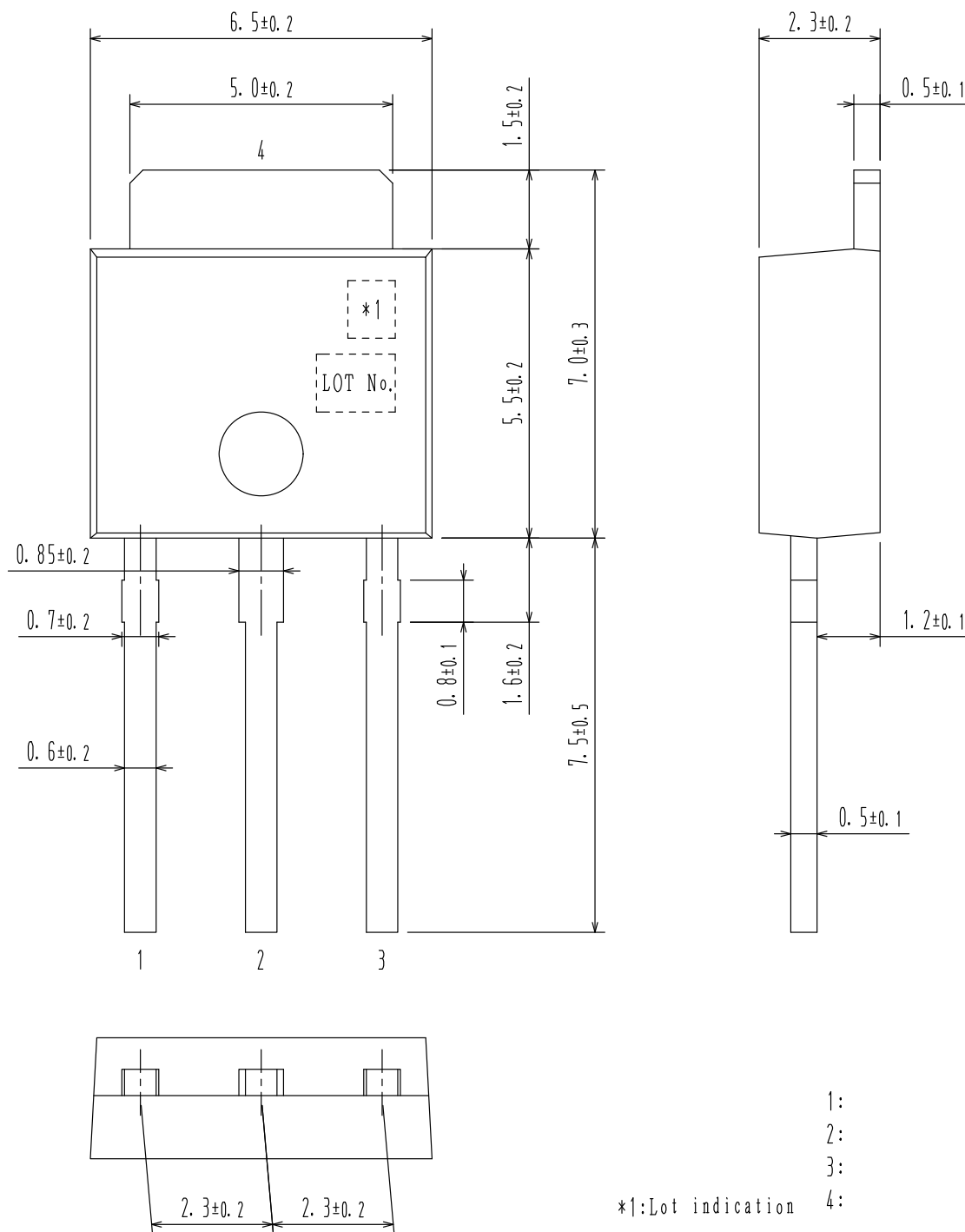
1:
2:
3:
*1: Lot indication 4:

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