HIGH VOLTAGE FAST SWITCHING NPN POWER TRANSISTOR APT13005

General Description

The APT13005 series are high voltage, high speed, high efficiency switching transistor, and it is specially designed for off-line switch mode power supplies with low output power.

The APT13005 series is available in TO-220-3, TO-220-3(2), and TO-220F-3 packages.

Features

- High Switching Speed
- High Collector-Emitter Voltage: 700V
- Low Cost
- High Efficency

Applications

- Battery Chargers for Mobile Phone
- Power Supply for DVD/STB

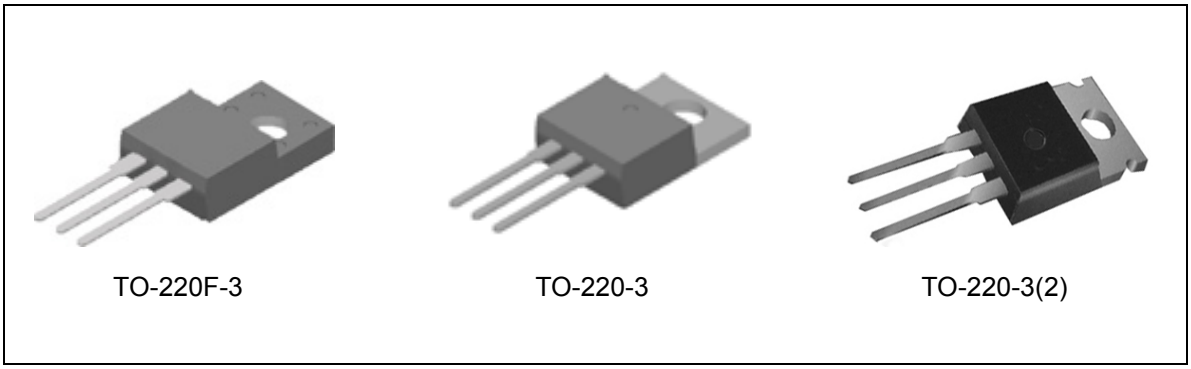


Figure 1. Package Types of APT13005

Pin Configuration

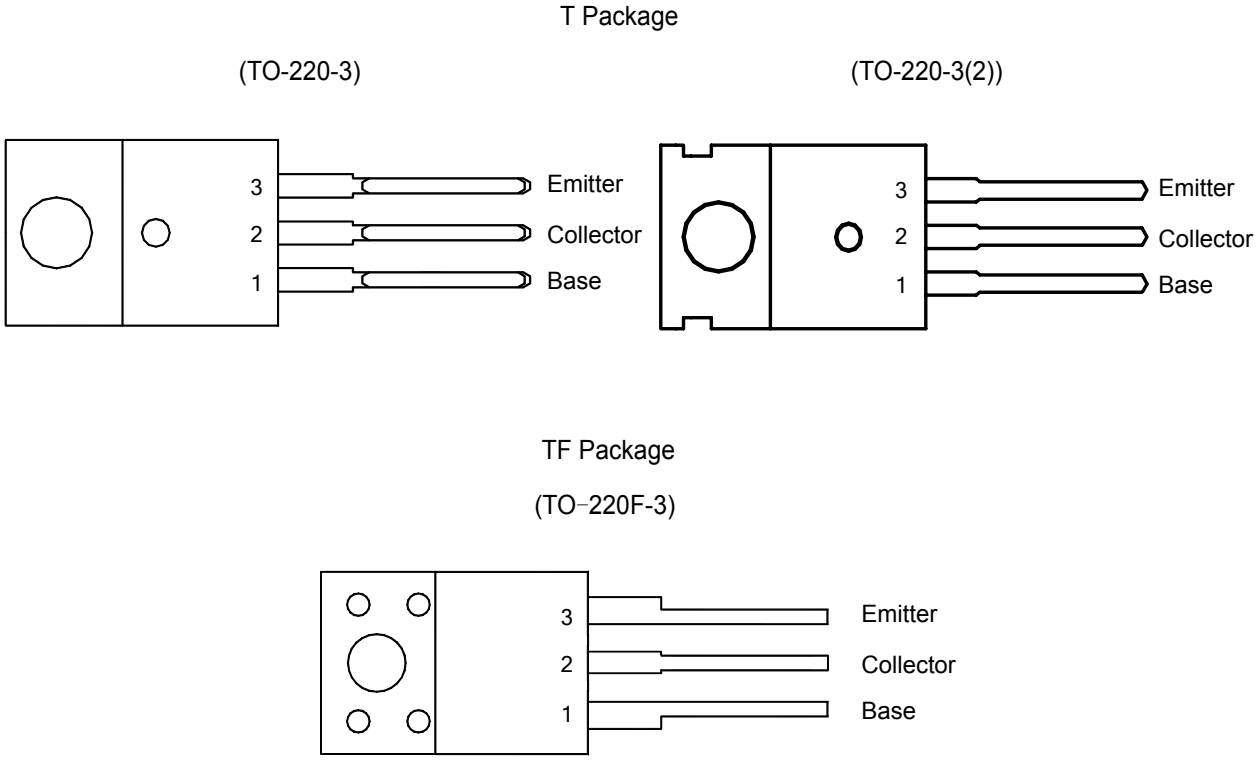


Figure 2. Pin Configuration of APT13005(front view)

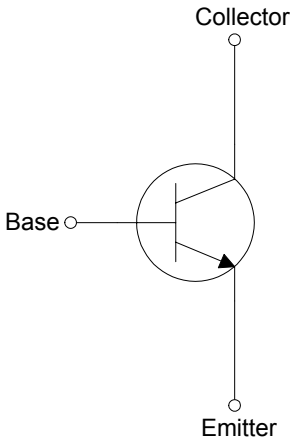
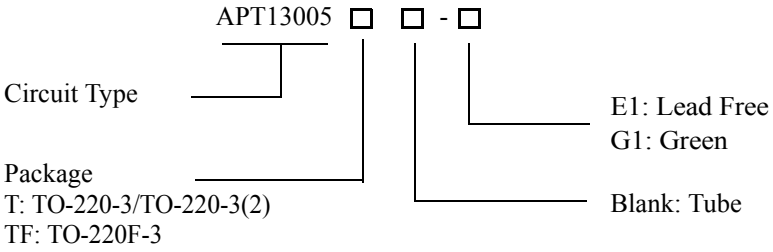


Figure 3. Internal Structure of APT13005

Ordering Information



Package	Part Number		Marking ID		Packing Type
	Lead Free	Green	Lead Free	Green	
TO-220-3/ TO-220-3(2)	APT13005T-E1	APT13005T-G1	APT13005T-E1	APT13005T-G1	Tube
TO-220F-3	APT13005TF-E1	APT13005TF-G1	APT13005TF-E1	APT13005TF-G1	Tube

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

Absolute Maximum Ratings (Note 1)

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage (V_{BE}=0)		V_{CES}	700	V
Collector-Emitter Voltage (I_B=0)		V_{CEO}	450	V
Emitter-Base Breakdown Voltage (I_C=0)		V_{EBO}	9	V
Collector Current		I_C	4	A
Collector Peak Current		I_{CM}	8	A
Base Current		I_B	2	A
Base Peak Current		I_{BM}	4	A
Power Dissipation, T_C=25°C	TO-220-3/ TO-220-3 (2)	P_{TOT}	75	W
	TO-220F-3		28	
Operating Junction Temperature			150	°C
Storage Temperature Range			-65 to 150	°C

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Thermal Characteristics

Parameter	Symbol	Condition		Value	Unit
Maximum Thermal Resistance	θ_{JC}	Junction to Case	TO-220-3/ TO-220-3(2)	1.67	°C/W
			TO-220F-3	4.5	

Electrical Characteristics

(T_C=25°C, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector Cut-off Current (V_{BE}=-1.5V)	I_{CEV}	V_{CE}=700V			10	μA
Collector-Emitter Sustaining Voltage (I_B=0) (Note 2)	V_{CEO} (sus)	I_C=100μA	450			V
Collector-Emitter Saturation Voltage	V_{CE}(sat)	I_C=1.0A, I_B=0.2A			0.3	V
		I_C=2.0A, I_B=0.5A			0.6	
		I_C=4.0A, I_B=1.0A			0.9	
Base-Emitter Saturation Voltage	V_{BE}(sat)	I_C=1.0A, I_B=0.2A			1.1	V
		I_C=2.0A, I_B=0.5A			1.3	
DC Current Gain (Note 2)	h_{FE}	I_C=1.0A, V_{CE}=5.0V	15		35	
		I_C=2.0A, V_{CE}=5.0V	8		35	
Turn -on Time with Resistive Load	ton	I_C=2A, V_{CC}=125V I_{BI}=0.4A, I_{B2}=-0.4V			0.8	μs
Storage Time with Resistive Load	ts				4.5	μs
Fall Time with Resistive Load	tf				0.9	μs
Output Capacitance	C_{OB}	V_{CB}=10V, f=0.1MHz		45		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.5A	4			MHz

Note 2: Pulse test for Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Typical Performance Characteristics

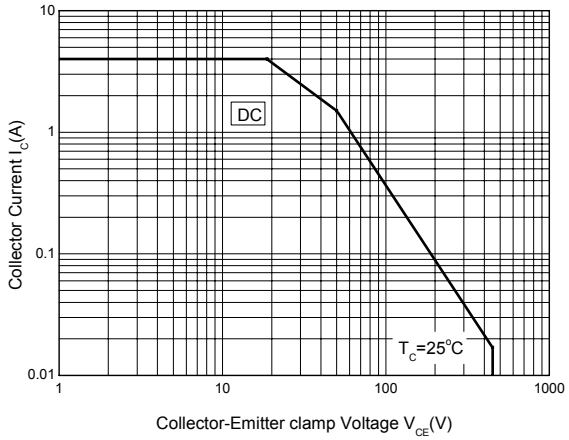


Figure 4. Safe Operating Areas
(TO-220-3/TO-220-3(2) Package)

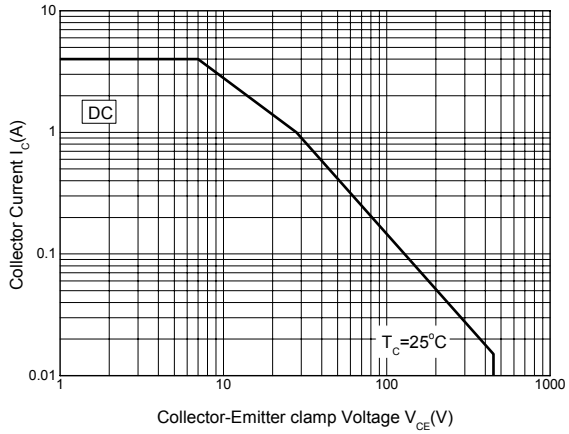


Figure 5. Safe Operating Areas (TO-220F-3 Package)

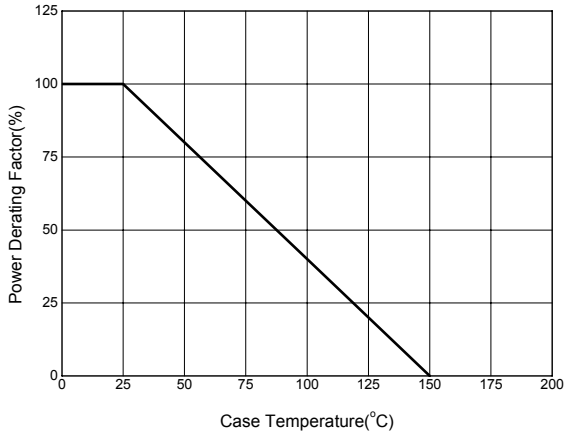


Figure 6. Power Derating Curve

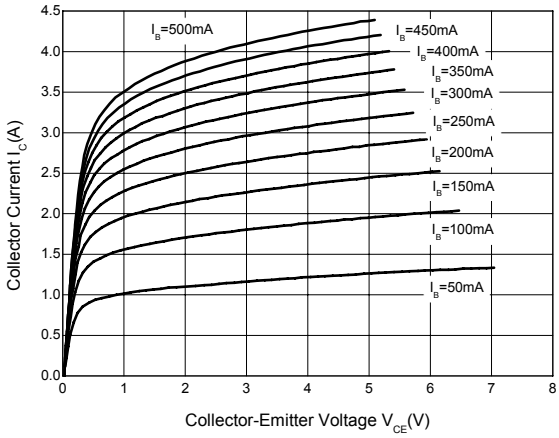


Figure 7. Static Characterstics

Typical Performance Characteristics (Continued)

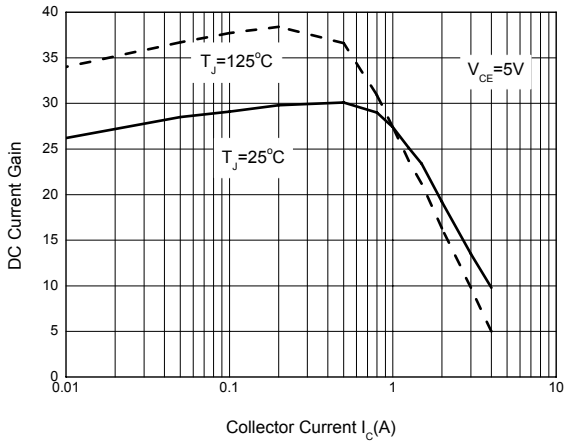


Figure 8. DC Current Gain

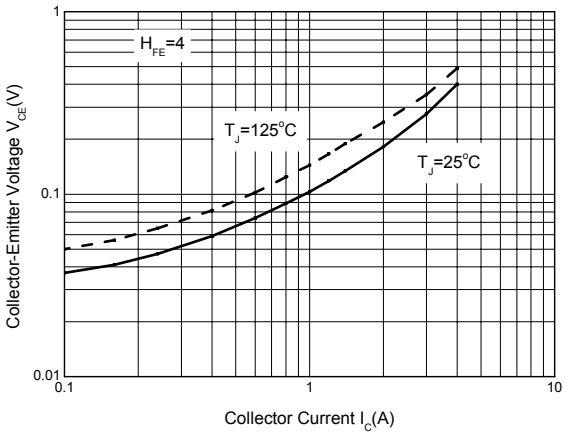


Figure 9. Collector-Emitter Saturation Region

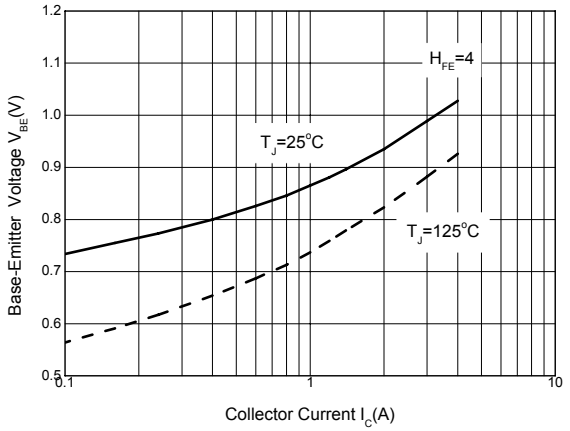
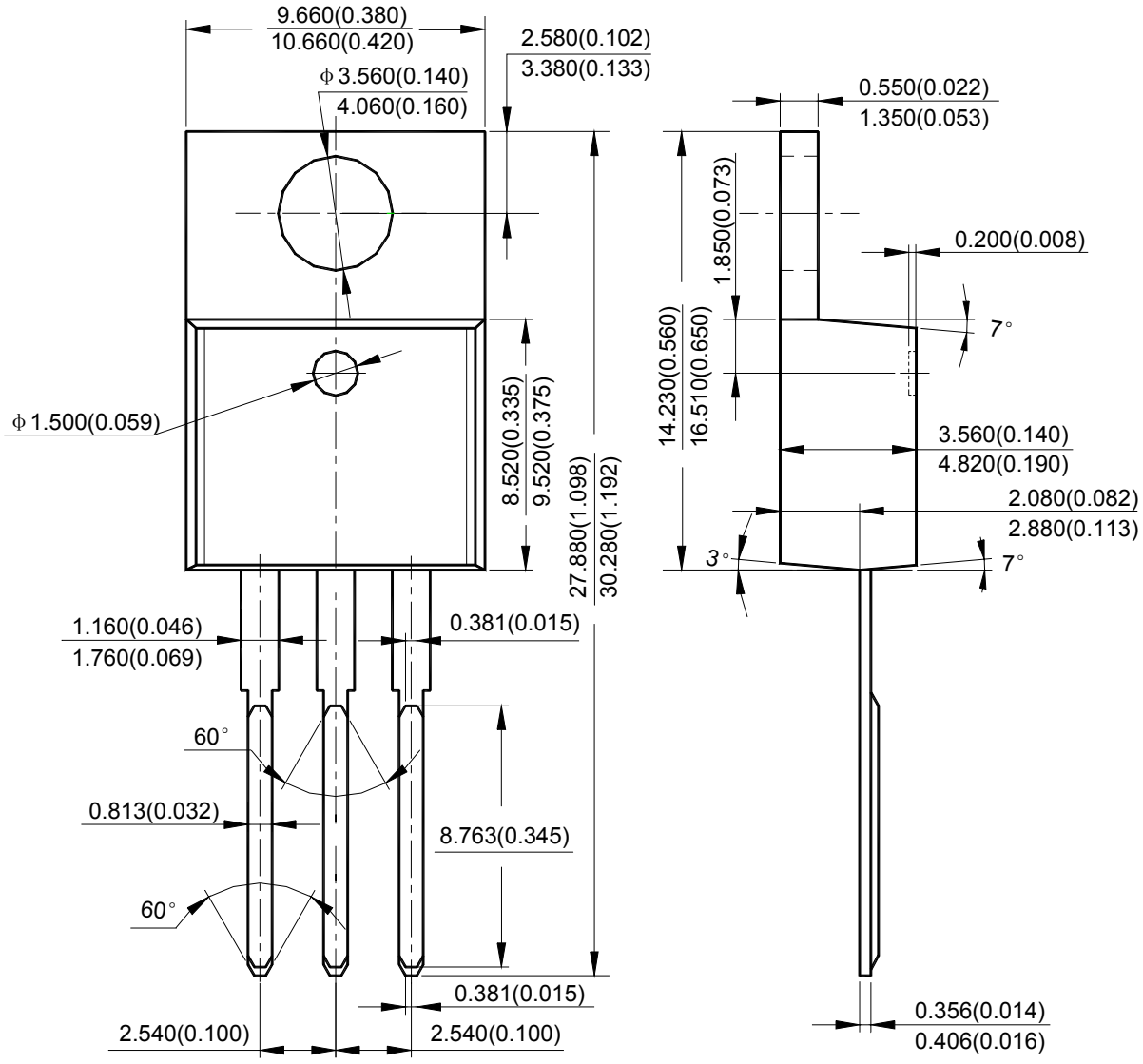


Figure 10. Base-Emitter Saturation Voltage

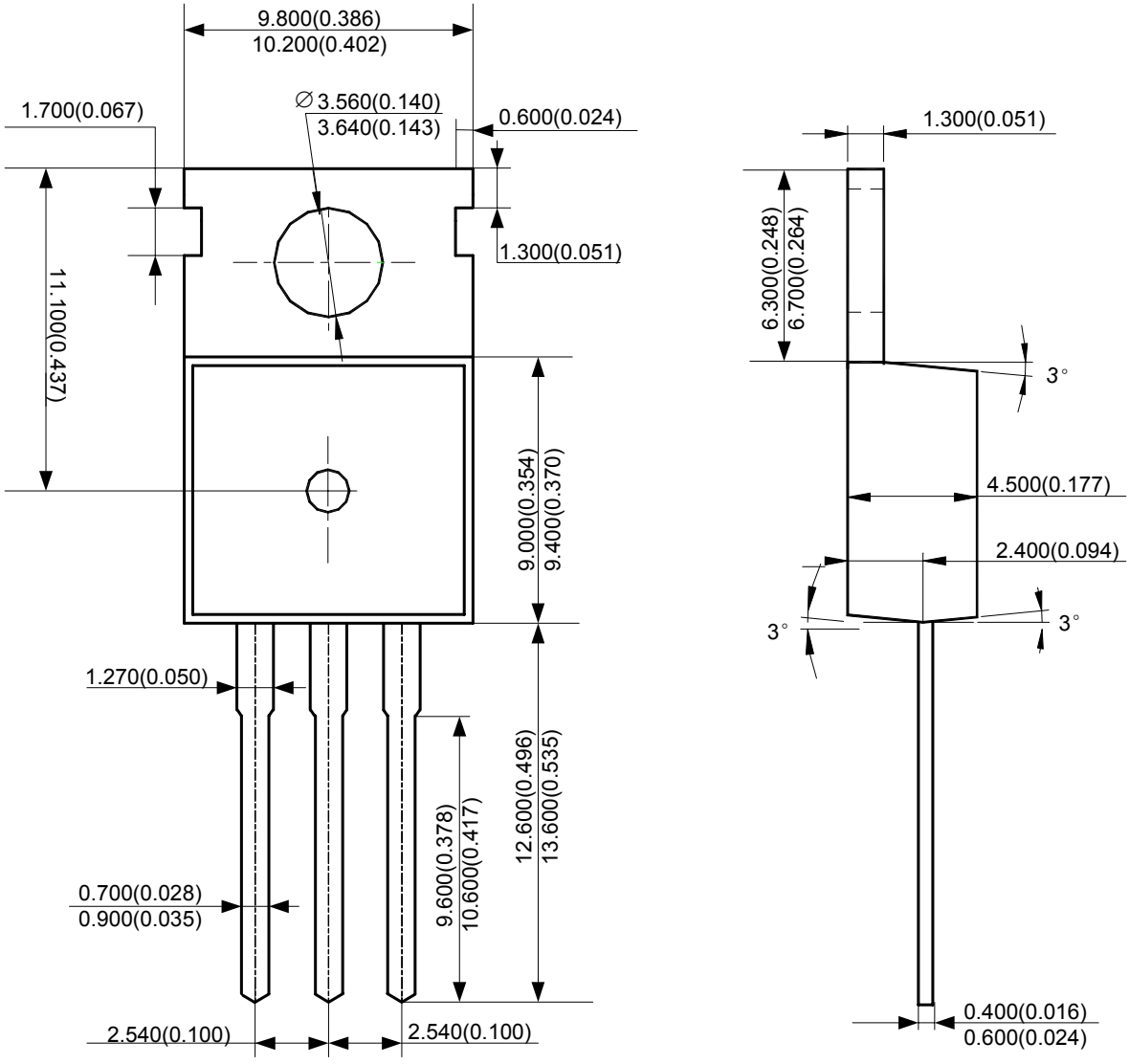
Mechanical Dimensions

TO-220-3 **Unit: mm(inch)**



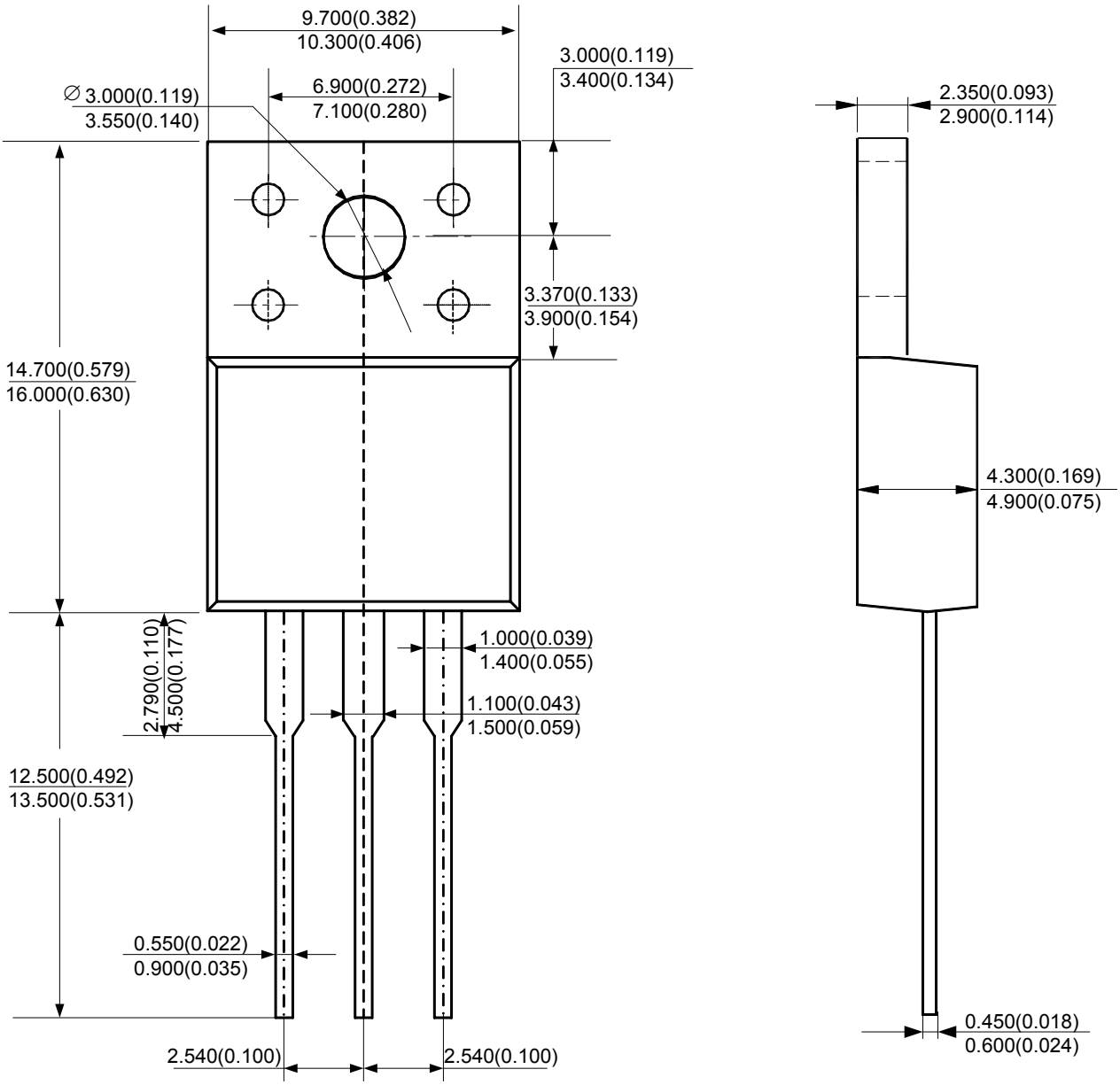
Mechanical Dimensions (Continued)

TO-220-3 (2) **Unit: mm(inch)**



Mechanical Dimensions (Continued)

TO-220F-3 **Unit: mm(inch)**





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MAIN SITE

- Headquarters
BCD Semiconductor Manufacturing Limited
No. 1600, Zi Xing Road, Shanghai ZiZhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab
Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.
800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office
Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office
Unit A Room 1203, Skyworth Bldg., Gaoxin Ave.1.S., Nanshan District, Shenzhen, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office
BCD Semiconductor (Taiwan) Company Limited
4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office
BCD Semiconductor Corp.
30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788