HIGH VOLTAGE FAST SWITCHING NPN POWER TRANSISTOR APT13003

General Description

The APT13003 series are high voltage, high speed switching NPN Power transistors specially designed for off-line switch mode power supplies with low output power.

The APT13003 series are available in TO-92 package.

Features

- High Switching Speed
- High Collector-Emitter Voltage
- Low Cost
- Standard and Ammo Packing TO-92 Package

Applications

- Battery Chargers for Mobile Phone of BCD Solution

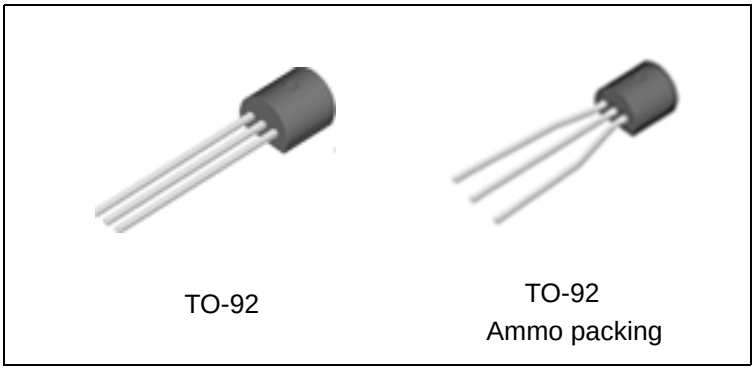


Figure 1. Package Types of APT13003/13003A

Pin Configuration

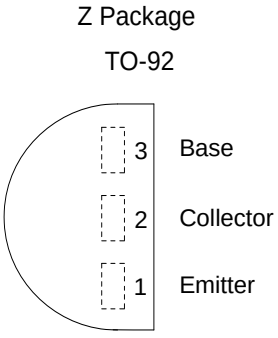
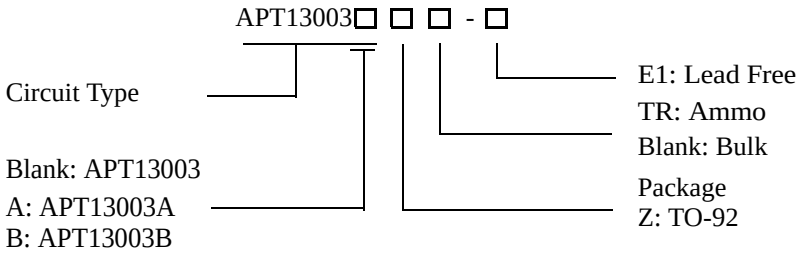


Figure 2. Pin Configurations of APT13003/13003A (Top View)

HIGH VOLTAGE FAST SWITCHING NPN POWER TRANSISTOR **APT13003**

Ordering Information



Package	Condition	Part Number	Marking ID	Packing Type
TO-92	V_{CEO}≥480V	APT13003BZ-E1	13003BZ-E1	Bulk
		APT13003BZTR-E1	13003BZ-E1	Ammo
	V_{CEO}≥490V	APT13003Z-E1	13003Z-E1	Bulk
		APT13003ZTR-E1	13003Z-E1	Ammo
	V_{CEO}≥570V	APT13003AZ-E1	13003AZ-E1	Bulk
		APT13003AZTR-E1	13003AZ-E1	Ammo

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

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)	APT13003B	V_{CEO}	480	V
	APT13003		490	
	APT13003A		570	
Emitter-Base Voltage (I_C=0)		V_{EBO}	9	V
Collector Current		I_C	1.5	A
Collector Peak Current (Pulse) (Note 2)		I_{CM}	3	A
Base Current		I_B	0.75	A
Base Peak Current (Pulse) (Note 2)		I_{BM}	1.5	A
Power Dissipation, T_A=25°C		P_{TOT}	1.1	W
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.

Note 2: Pulse test for Pulse Width < 5ms, Duty Cycle ≤ 10%.

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance (Junction-to-Ambient)	$R_{\theta JA}$	113.6	$^oC/W$

Electrical Characteristics

(T_C=25^{o}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)	V_{CEO} (sus)	I_C=100μA	APT13003B	480			V
			APT13003	490			
			APT13003A	570			
Collector-Emitter Saturation Voltage (Note 3)	V_{CE} (sat)	I_C=0.5A, I_B=0.1A				0.35	V
		I_C=1.0A, I_B=0.25A				1.0	
Base-Emitter Saturation Voltage (Note 3)	V_{BE} (sat)	I_C=0.5A, I_B=0.1A				1.0	V
		I_C=1.0A, I_B=0.25A				1.2	
DC Current Gain (Note 3)	h_{FE}	I_C=0.5A, V_{CE}=2V		10		30	
		I_C=1.0A, V_{CE}=2V		5		25	
Output Capacitance	C_{ob}	V_{CB}=10V, f=0.1MH$_Z$			16		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.1A		4			MHz
Turn-on Time with Resistive Load	ton	I_C=1A, V_{CC}=125V, I_{B1}=0.2A, I_{B2}=-0.2A, T_P=25μS			0.25	1	μs
Storage Time with Resistive Load	ts				1.32	3	
Fall Time with Resistive Load	tf				0.23	0.4	

Note 3: Pulse test for Pulse Width ≤ 300μs , Duty Cycle ≤ 2%.

Typical Performance Characteristics

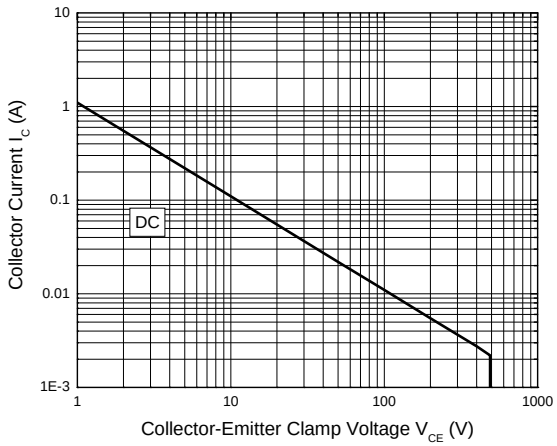


Figure 3. Safe Operating Areas

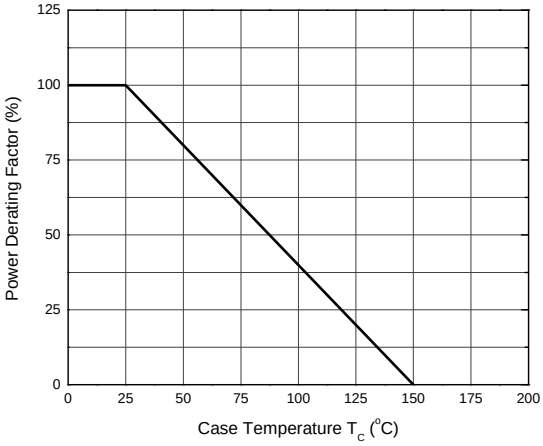


Figure 4. Power Derating Curve

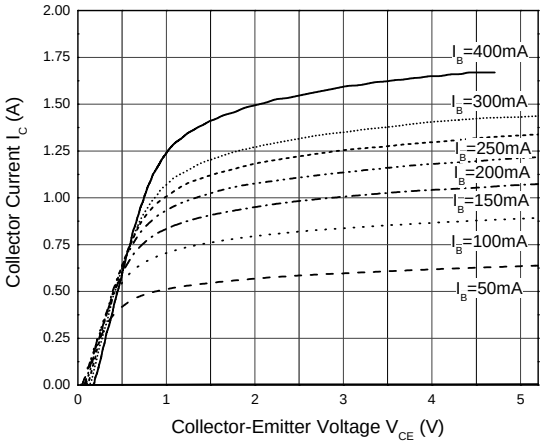


Figure 5. Static Characteristics

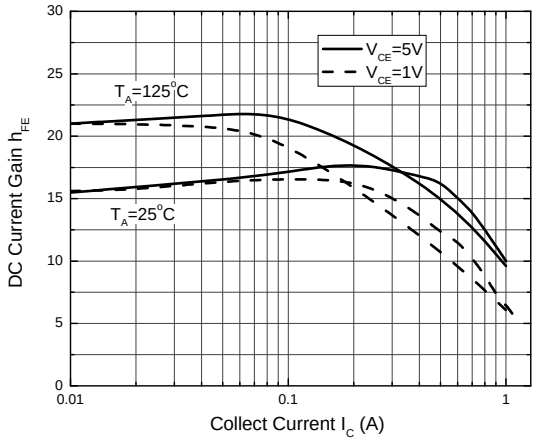


Figure 6. DC Current Gain

Typical Performance Characteristics (Continued)

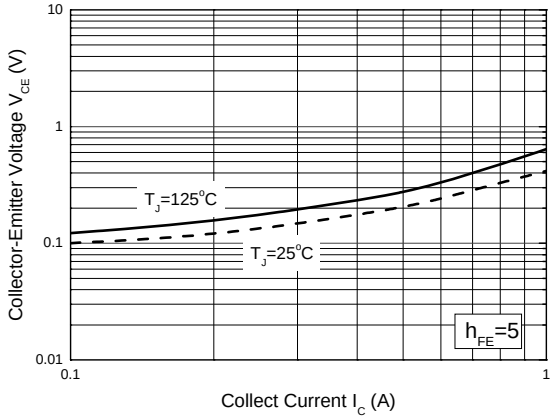


Figure 7. Collector-Emitter Saturation Voltage

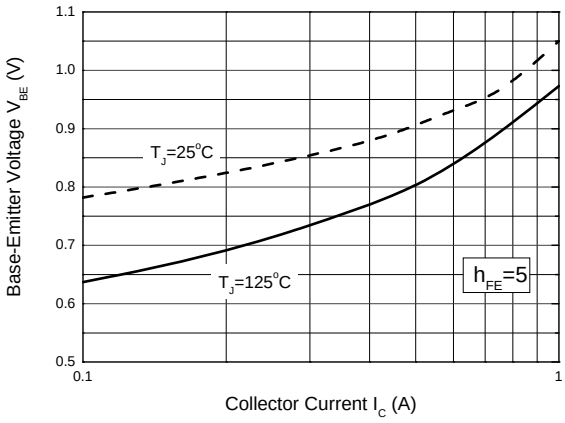


Figure 8. Base-Emitter Saturation Voltage

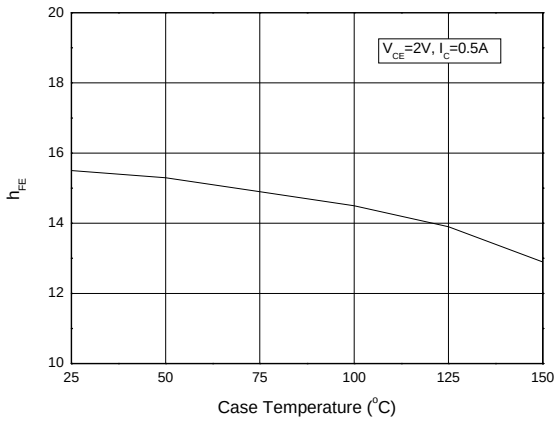
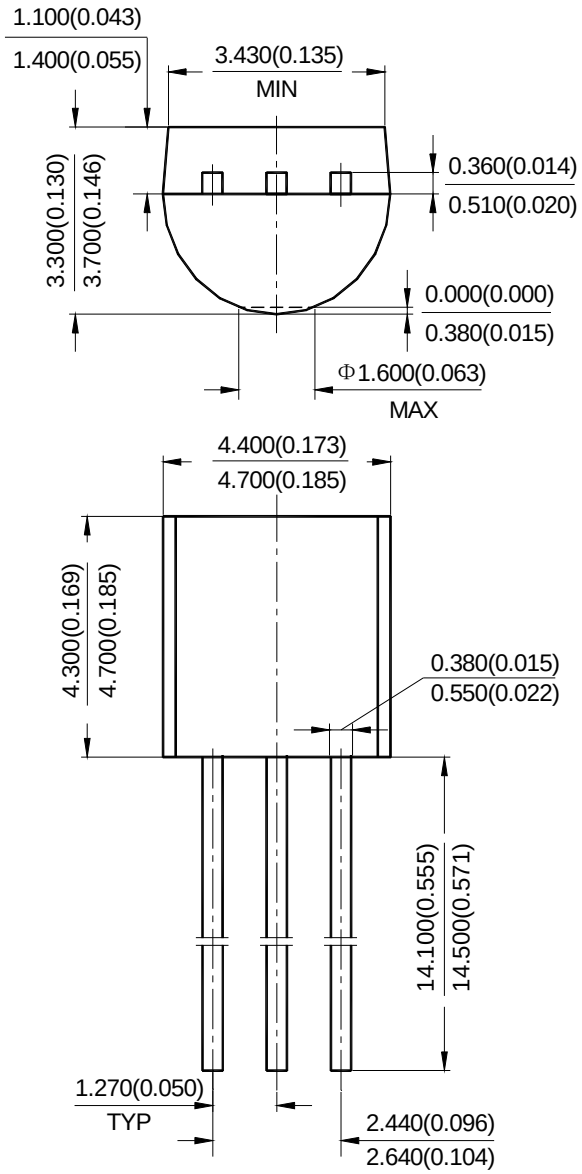


Figure 9. h_{FE} vs. Case Temperature

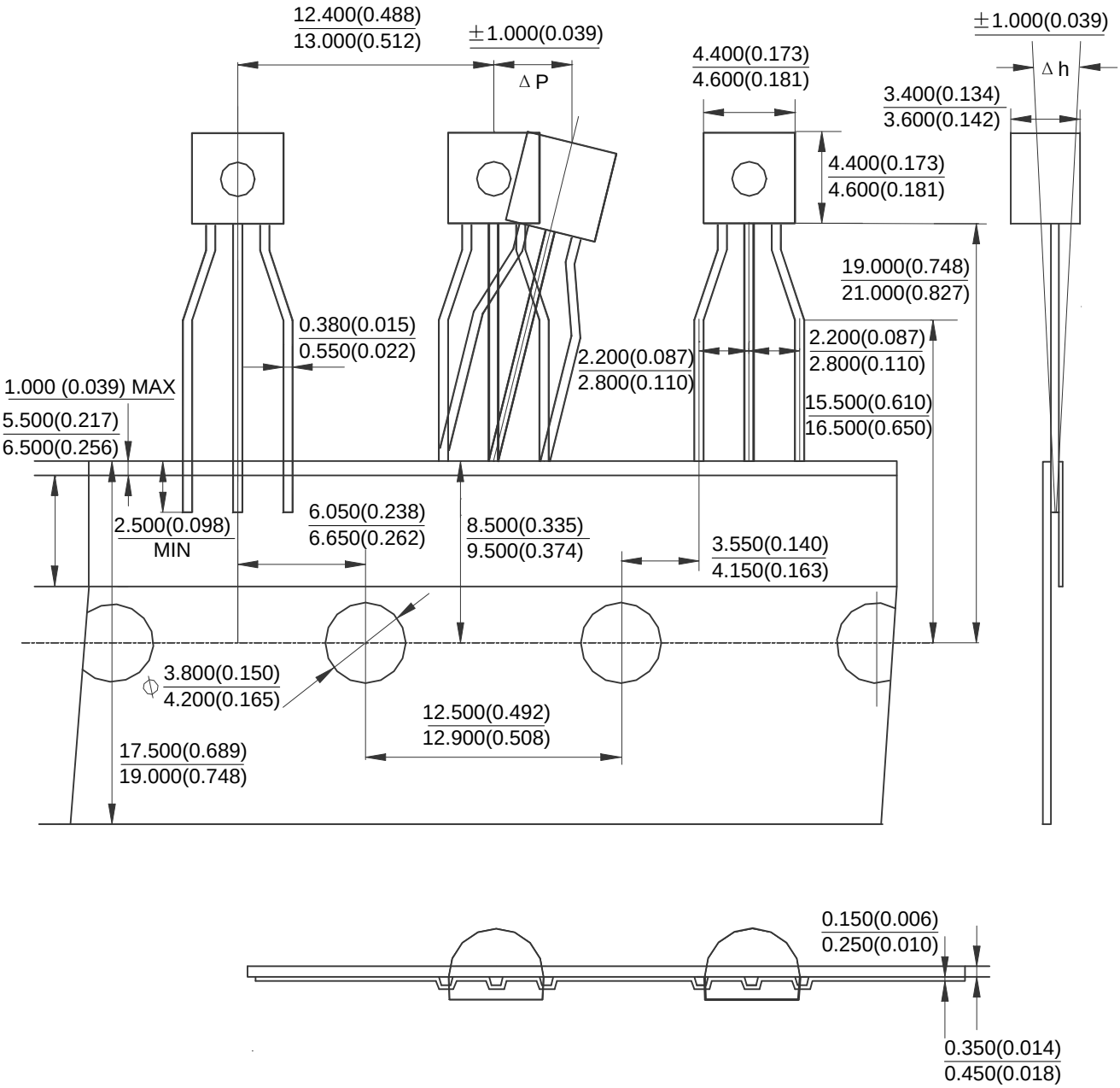
Mechanical Dimensions

TO-92 **Unit: mm(inch)**



Mechanical Dimensions

TO-92 Ammo Packing **Unit: mm(inch)**



BCD Semiconductor Manufacturing Limited

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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
Room E, 5F, Noble Center, No.1006, 3rd Fuzhong Road, Futian District, Shenzhen, 518026, 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