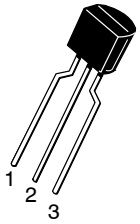
PNP General-Purpose Transistor, 60 V

PN2907A



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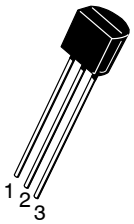

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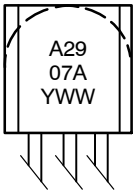
Description

The PN2907A is 60 V PNP bipolar transistor designed for use as a general−purpose amplifier or switch in applications that require up to 500 mA. The NPN complementary type is the PN2222A.

Features

- High DC Current Gain (h_{FE}) Range: 100 ~ 300
- High−Current Gain Bandwidth Product (f_T): 200 MHz (Minimum)
- Maximum Turn−On Time (t_{on}): 45 ns
- Maximum Turn−Off Time (t_{off}): 100 ns
- This is a Pb−Free Device

MARKING DIAGRAM



2907A = Specific Device Code
A = Assembly Site
Y = Year of Production
WW = Work Week Number

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted) (Note 1, 2)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector−Emitter Voltage	−60	V
V_{CBO}	Collector−Base Voltage	−60	V
V_{EBO}	Emitter−Base Voltage	−5.0	V
I_C	Collector Current − Continuous	−800	mA
T_J, T_{STG}	Operating and Storage Junction Temperature Range	−55 to +150	°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.

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady−state limits. **onsemi** should be consulted on applications involving pulsed or low−duty cycle operations.

THERMAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Symbol	Parameter	**Max** (Note 3)	Unit
P_D	Total Device Dissipation	625	mW
	Derate Above 25°C	5.0	mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	°C/W

3. PCB size: FR−4 76 x 114 x 1.57 mm^3 (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Max	Unit
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector−Emitter Breakdown Voltage (Note 4)	I_C = −10 mA, I_B = 0	−60	–	V
$V_{(BR)CBO}$	Collector−Base Breakdown Voltage	I_C = −10 μA, I_E = 0	−60	–	V
$V_{(BR)EBO}$	Emitter−Base Breakdown Voltage	I_E = −10 μA, I_C = 0	−5.0	–	V
I_{BL}	Base Cut−Off Current	V_{CE} = −30 V, V_{EB} = −0.5 V	–	−50	nA
I_{CEX}	Collector Cut−Off Current	V_{CE} = −30 V, V_{EB} = −0.5 V	–	−50	nA
I_{CBO}	Collector Cut−Off Current	V_{CB} = −50 V, I_E = 0	–	−0.02	μA
		V_{CB} = −50 V, I_E = 0, T_A = 150°C	–	−20	
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = −0.1 mA, V_{CE} = −10 V	75	–	
		I_C = −1.0 mA, V_{CE} = −10 V	100	–	
		I_C = −10 mA, V_{CE} = −10 V	100	–	
		I_C = −150 mA, V_{CE} = −10 V (Note 4)	100	300	
		I_C = −500 mA, V_{CE} = −10 V (Note 4)	50	–	
V_{CE}(sat)	Collector−Emitter Saturation Voltage (Note 4)	I_C = −150 mA, I_B = −15 mA	–	−0.4	V
		I_C = −500 mA, I_B = −50 mA	–	−1.6	
V_{BE}(sat)	Base−Emitter Saturation Voltage	I_C = −150 mA, I_B = −15 mA (Note 4)	–	−1.3	V
		I_C = −500 mA, I_B = −50 mA	–	−2.6	
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain − Bandwidth Product	I_C = −50 mA, V_{CE} = −20 V, f = 100 MHz	200	–	MHz
C_{ob}	Output Capacitance	V_{CB} = −10 V, I_E = 0, f = 100 kHz	–	8.0	pF
C_{ib}	Input Capacitance	V_{EB} = −2.0 V, I_C = 0, f = 100 kHz	–	30	pF
SWITCHING CHARACTERISTICS					
t_{on}	Turn−On Time	V_{CC} = −30 V, I_C = −150 mA, I_{B1} = −15 mA	–	45	ns
t_d	Delay Time		–	10	ns
t_r	Rise Time		–	40	ns
t_{off}	Turn−Off Time	V_{CC} = −6.0 V, I_C = −150 mA, I_{B1} = I_{B2} = −15 mA	–	100	ns
t_s	Storage Time		–	80	ns
t_f	Fall Time		–	30	ns

4. Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2.0%.

ORDERING INFORMATION

Part Number	Top Mark	Package	Shipping†
PN2907ABU	2907A	TO−92 3 4.825x4.76 (Pb−Free)	10000 Units / Bulk
PN2907ATF		TO−92 3 4.825x4.76 LEADFORMER (Pb−Free)	2000 / Tape & Reel
PN2907ATFR			
PN2907ATA			2000 Units / Fan−Fold
PN2907ATAR			

†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.

TYPICAL PERFORMANCE CHARACTERISTICS

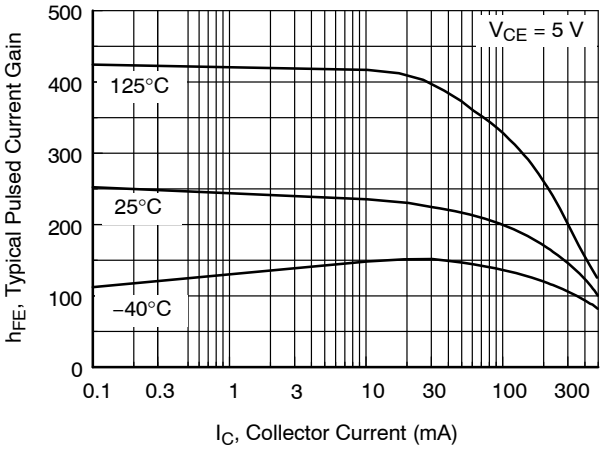

Figure 1. Typical Pulsed Current Gain vs. Collector Current

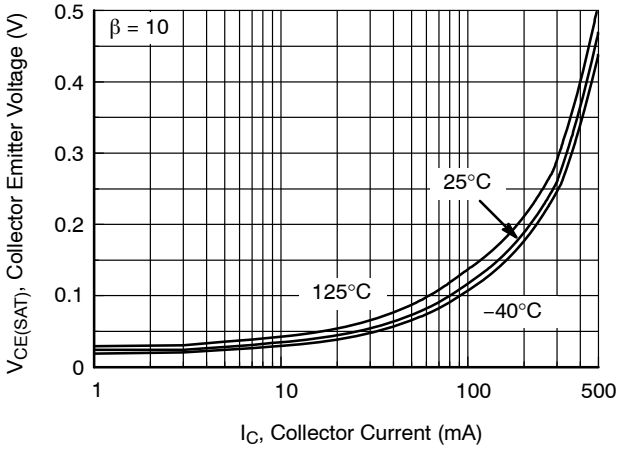

Figure 2. Collector− Emitter Saturation Voltage vs. Collector Current

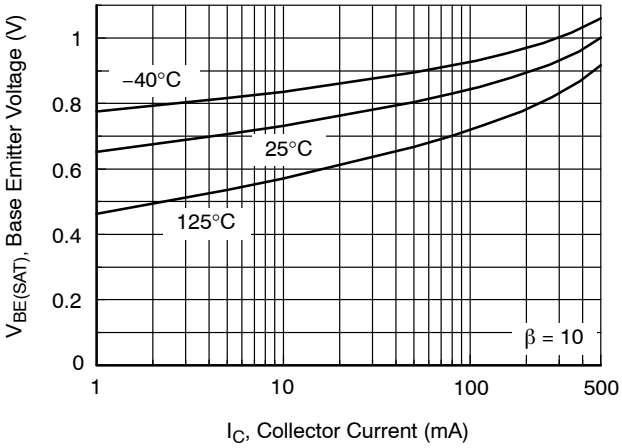

Figure 3. Base−Emitter Saturation Voltage vs. Collector Current

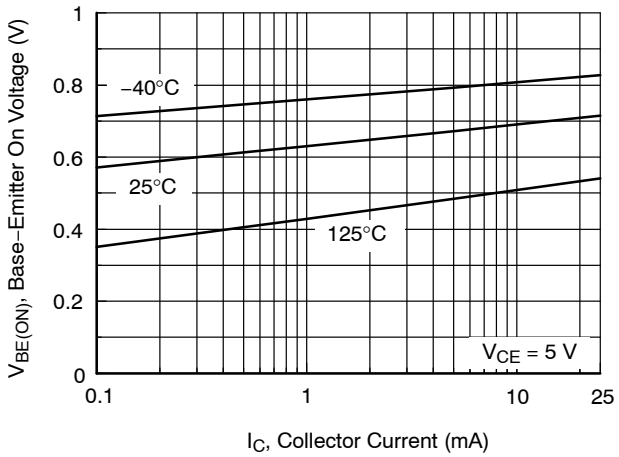

Figure 4. Base−Emitter On Voltage vs. Collector Current

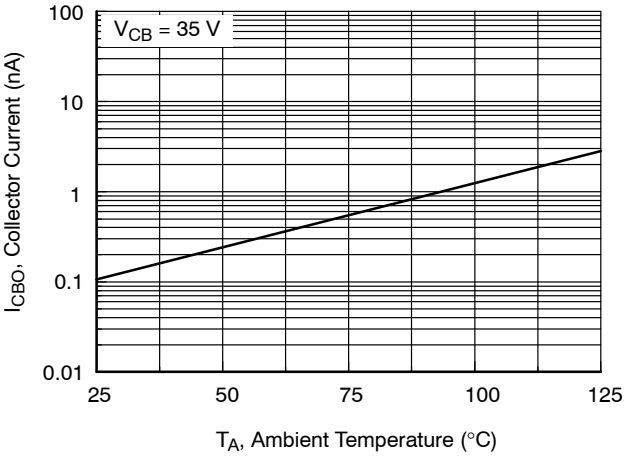

Figure 5. Collector Cut−Off Current vs. Ambient Temperature

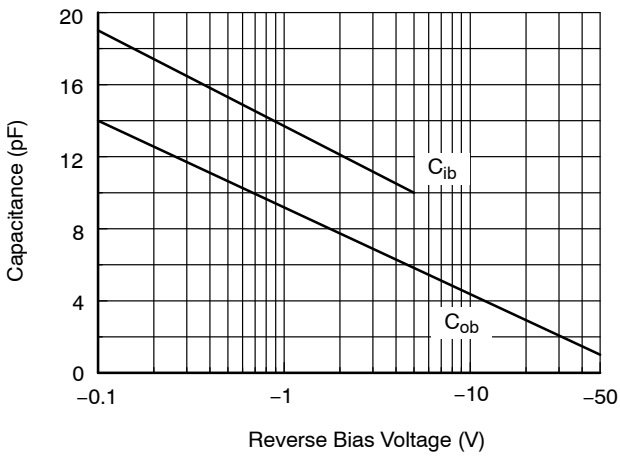

Figure 6. Input and Output Capacitance vs. Reverse Voltage

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

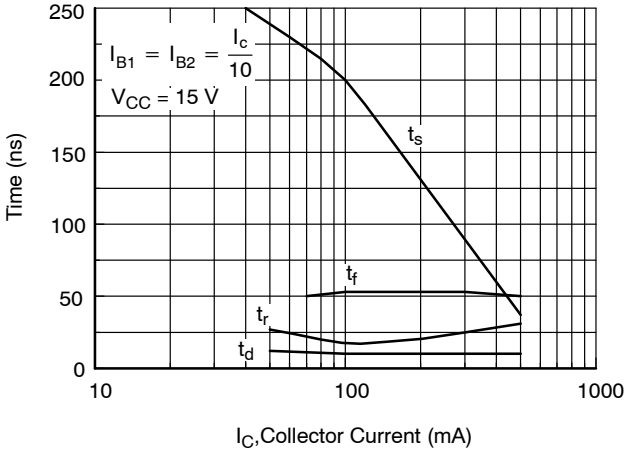

Figure 7. Switching Times vs. Collector Current

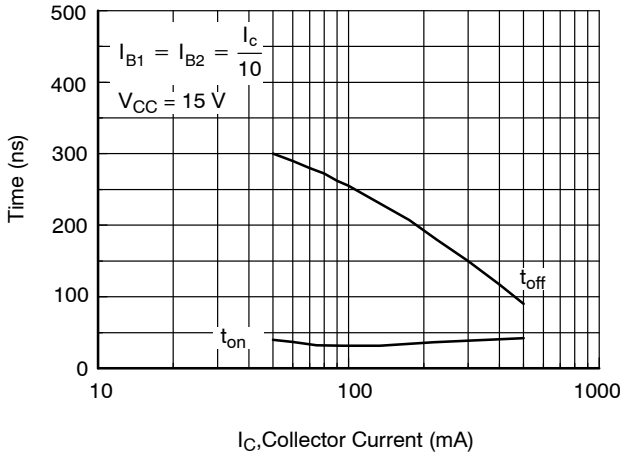

Figure 8. Turn−On and Turn−Off Times vs. Collector Current

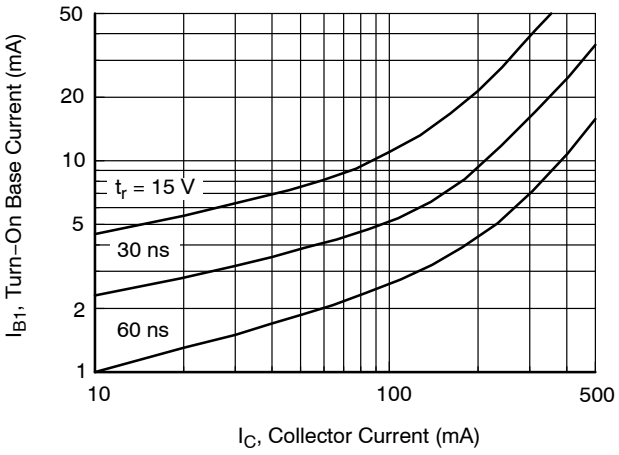

Figure 9. Rise Time vs. Collector and Turn−On Base Currents

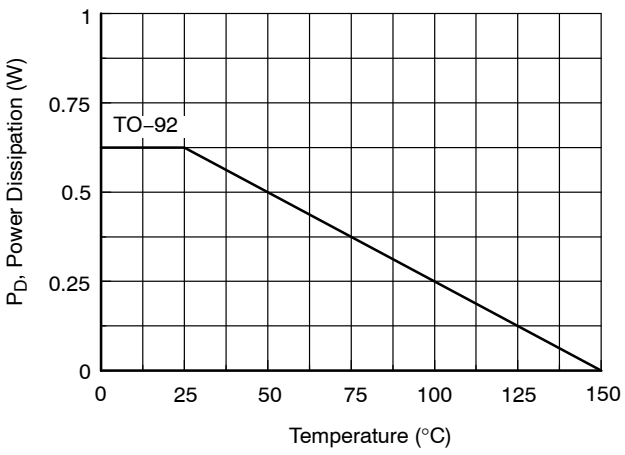

Figure 10. Power Dissipation vs. Ambient Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (f = 1.0 kHz)

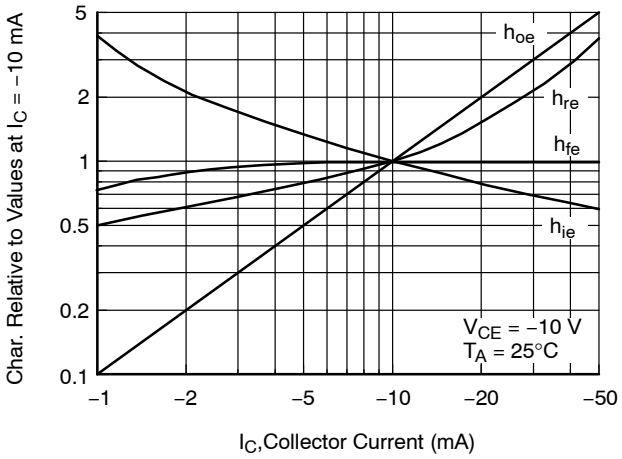

Figure 11. Common Emitter Characteristics

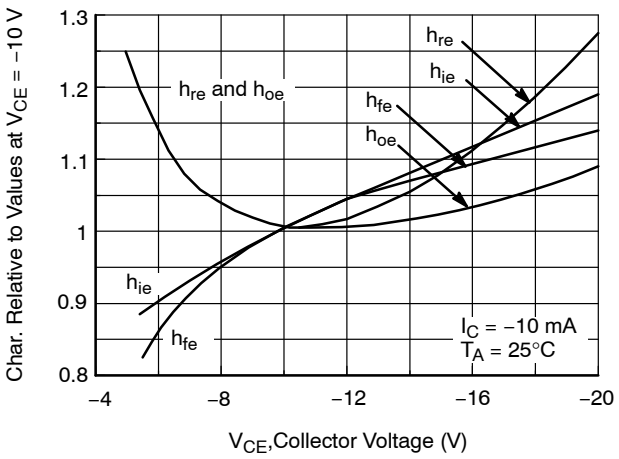

Figure 12. Common Emitter Characteristics

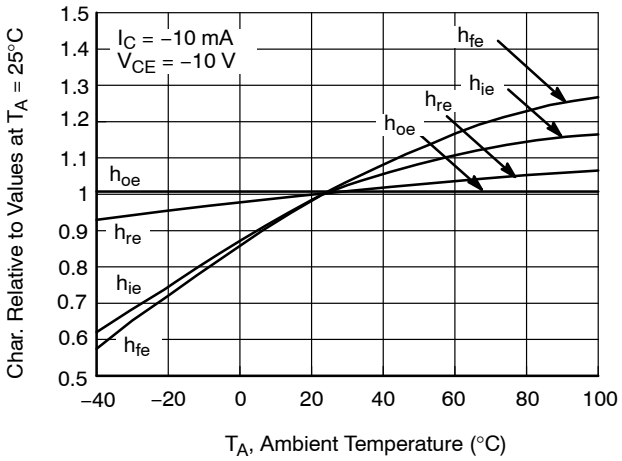

Figure 13. Common Emitter Characteristics

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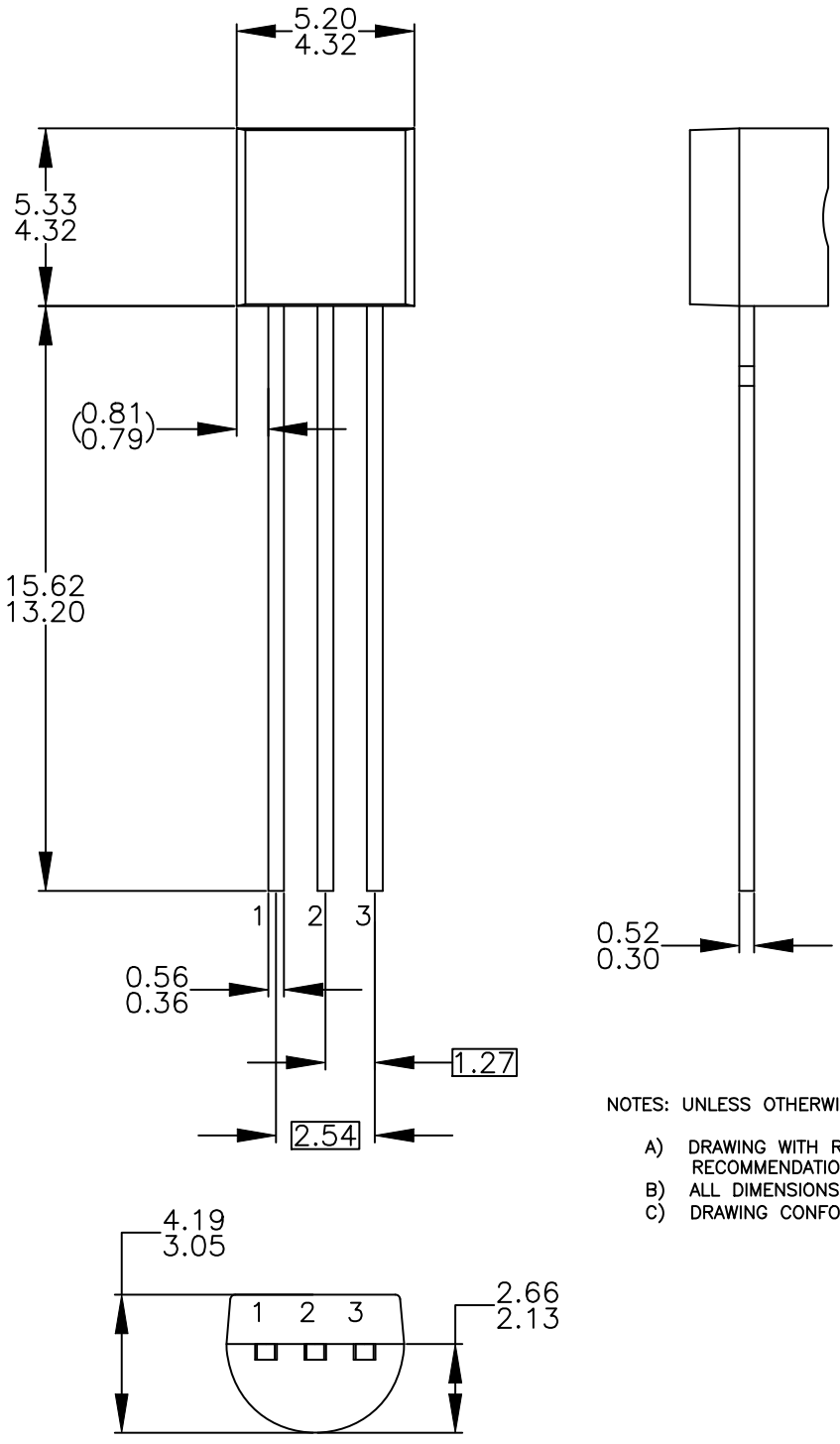

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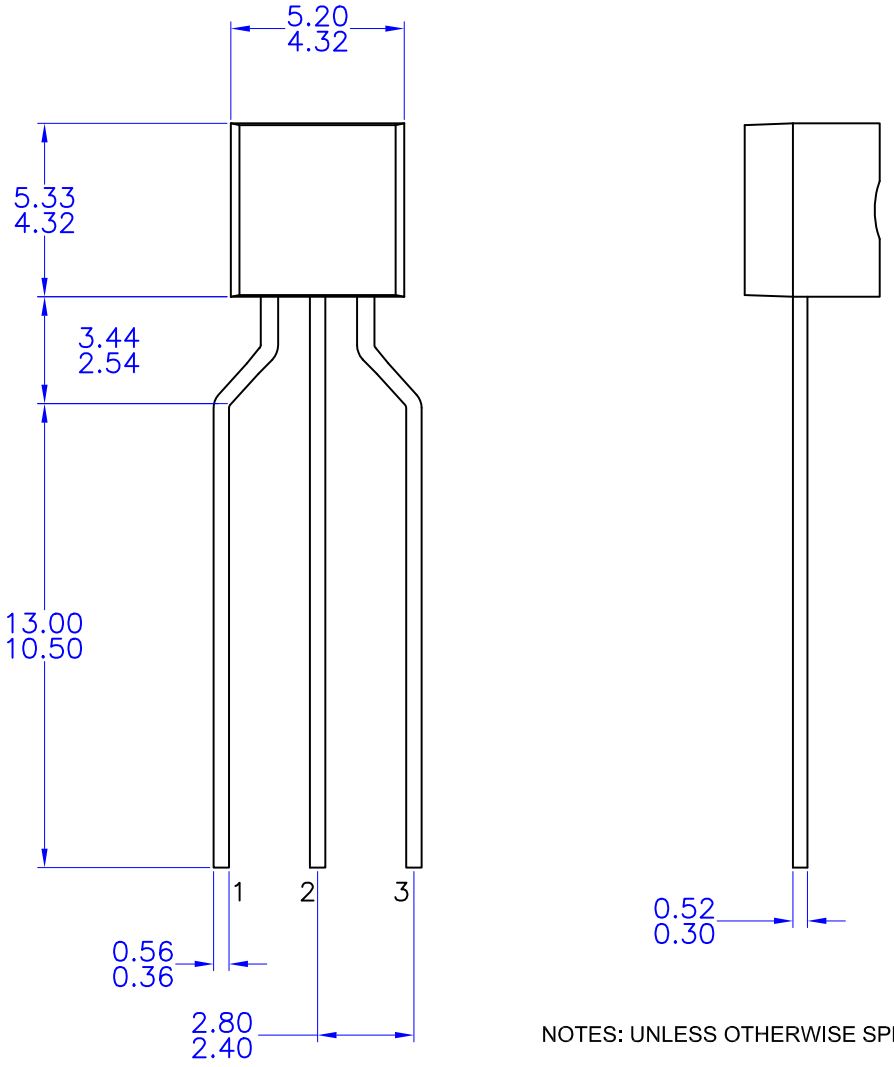

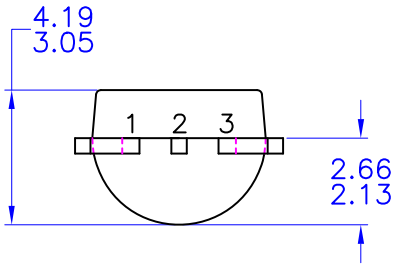

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