

PNP General-Purpose Transistor, 60 V

PN2907A

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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$

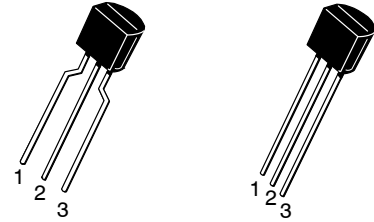
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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

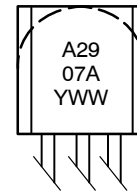
3. PCB size: FR-4 76 x 114 x 1.57 mm³ (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.



TO-92 3 4.825x4.76
LEADFORMER
CASE 135AR

TO-92 3 4.825x4.76
CASE 135AN

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.

PN2907A

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Max	Unit
--------	-----------	------------	-----	-----	------

OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (Note 4)	$I_C = -10\text{ mA}, I_B = 0$	-60	-	V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -10\text{ }\mu\text{A}, I_E = 0$	-60	-	V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\text{ }\mu\text{A}, I_C = 0$	-5.0	-	V
I_{BL}	Base Cut-Off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$	-	-50	nA
I_{CEX}	Collector Cut-Off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$	-	-50	nA
I_{CBO}	Collector Cut-Off Current	$V_{CB} = -50\text{ V}, I_E = 0$	-	-0.02	μA
		$V_{CB} = -50\text{ V}, I_E = 0, T_A = 150^\circ\text{C}$	-	-20	

ON CHARACTERISTICS

h_{FE}	DC Current Gain	$I_C = -0.1\text{ mA}, V_{CE} = -10\text{ V}$	75	-	
		$I_C = -1.0\text{ mA}, V_{CE} = -10\text{ V}$	100	-	
		$I_C = -10\text{ mA}, V_{CE} = -10\text{ V}$	100	-	
		$I_C = -150\text{ mA}, V_{CE} = -10\text{ V}$ (Note 4)	100	300	
		$I_C = -500\text{ mA}, V_{CE} = -10\text{ V}$ (Note 4)	50	-	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage (Note 4)	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$	-	-0.4	V
		$I_C = -500\text{ mA}, I_B = -50\text{ mA}$	-	-1.6	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$ (Note 4)	-	-1.3	V
		$I_C = -500\text{ mA}, I_B = -50\text{ mA}$	-	-2.6	

SMALL SIGNAL CHARACTERISTICS

f_T	Current Gain – Bandwidth Product	$I_C = -50\text{ mA}, V_{CE} = -20\text{ V}, f = 100\text{ MHz}$	200	-	MHz
C_{ob}	Output Capacitance	$V_{CB} = -10\text{ V}, I_E = 0, f = 100\text{ kHz}$	-	8.0	pF
C_{ib}	Input Capacitance	$V_{EB} = -2.0\text{ V}, I_C = 0, f = 100\text{ kHz}$	-	30	pF

SWITCHING CHARACTERISTICS

t_{on}	Turn-On Time	$V_{CC} = -30\text{ V}, I_C = -150\text{ mA}, I_{B1} = -15\text{ mA}$	-	45	ns
t_d	Delay Time		-	10	ns
t_r	Rise Time		-	40	ns
t_{off}	Turn-Off Time	$V_{CC} = -6.0\text{ V}, I_C = -150\text{ mA}, I_{B1} = I_{B2} = -15\text{ mA}$	-	100	ns
t_s	Storage Time		-	80	ns
t_f	Fall Time		-	30	ns

4. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2.0\%$.

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

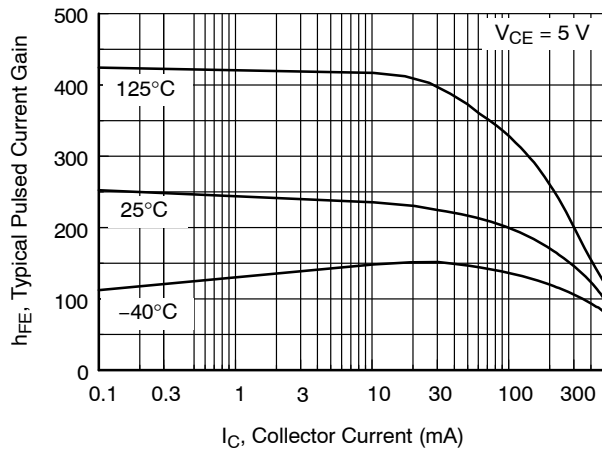


Figure 1. Typical Pulsed Current Gain vs. Collector Current

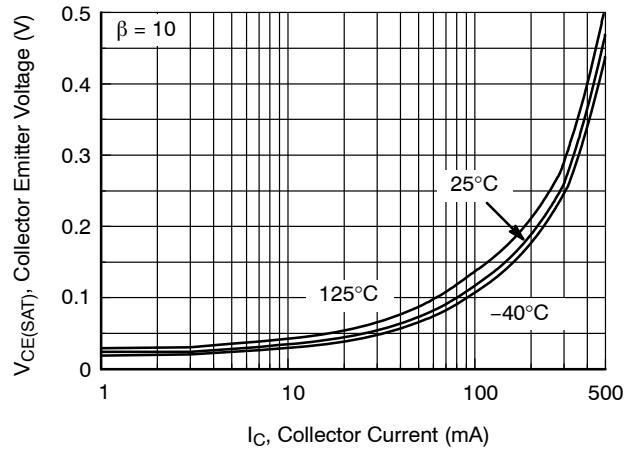


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

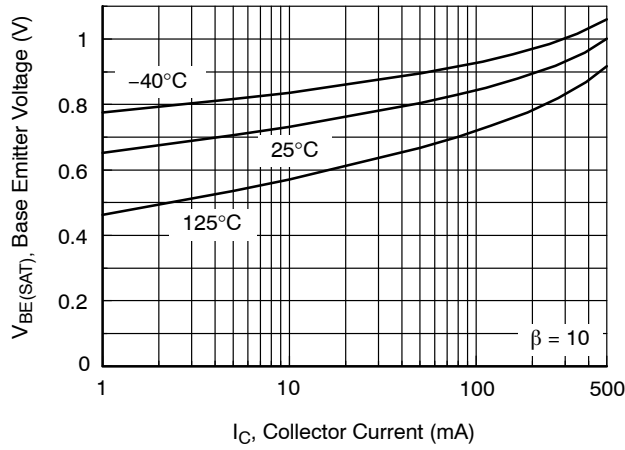


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

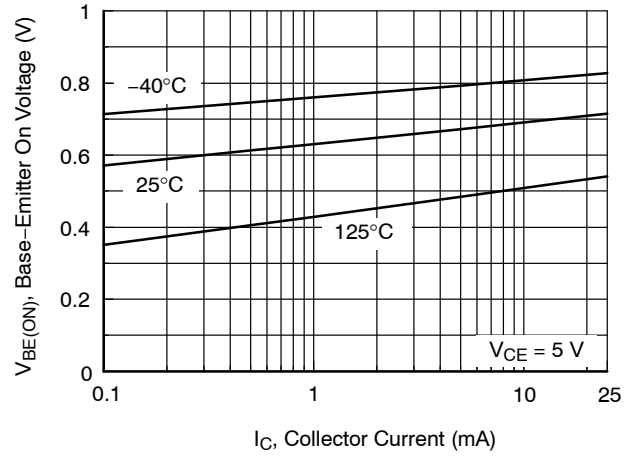


Figure 4. Base-Emitter On Voltage vs. Collector Current

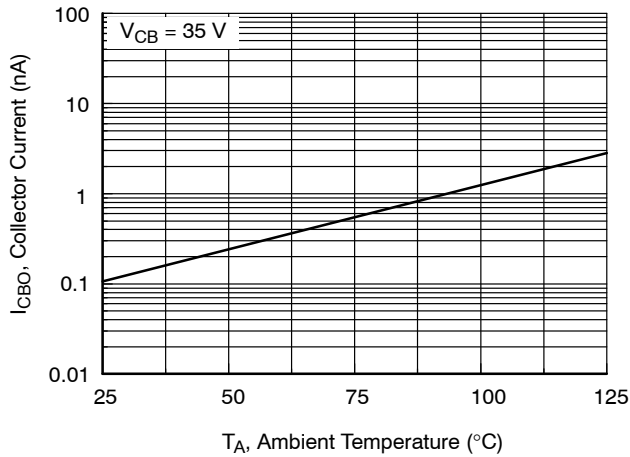


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

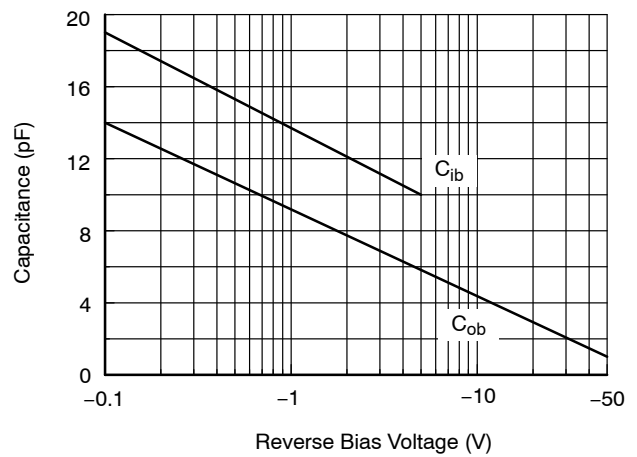


Figure 6. Input and Output Capacitance vs. Reverse Voltage

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

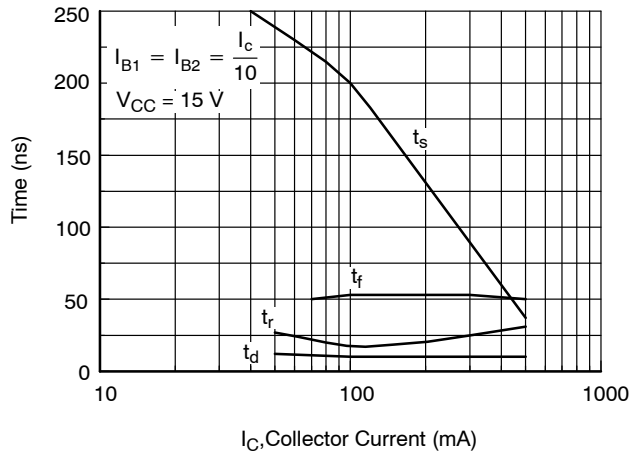


Figure 7. Switching Times vs. Collector Current

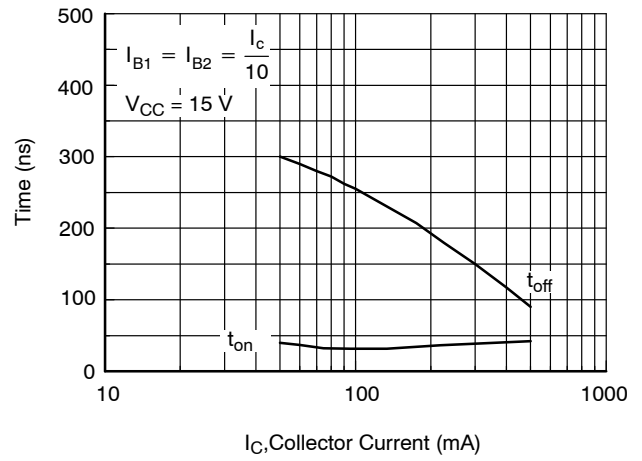


Figure 8. Turn-On and Turn-Off Times vs. Collector Current

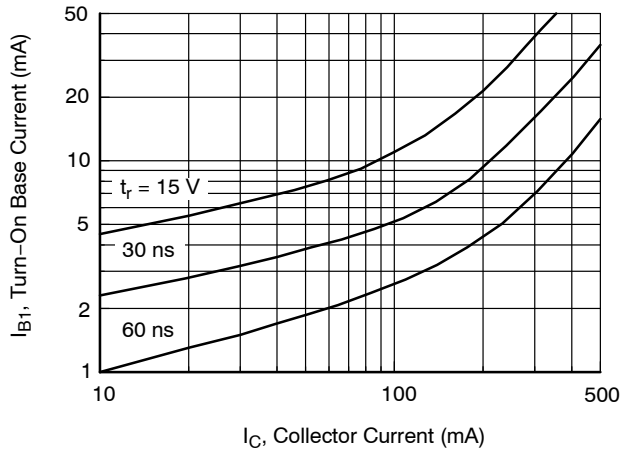


Figure 9. Rise Time vs. Collector and Turn-On Base Currents

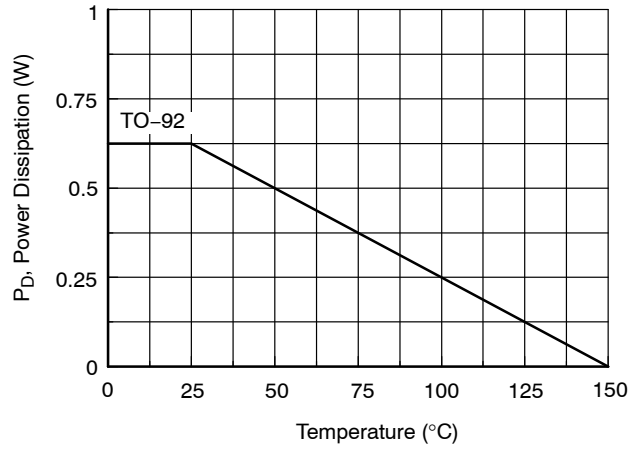


Figure 10. Power Dissipation vs. Ambient Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (f = 1.0 kHz)

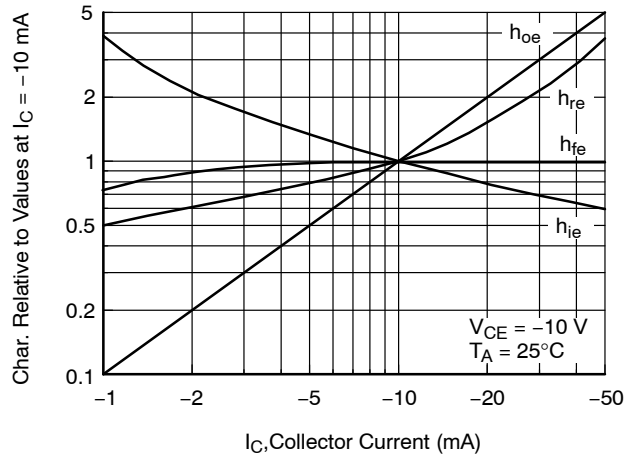


Figure 11. Common Emitter Characteristics

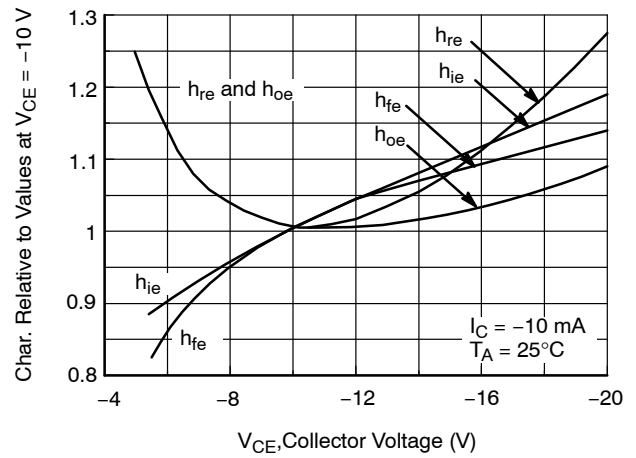


Figure 12. Common Emitter Characteristics

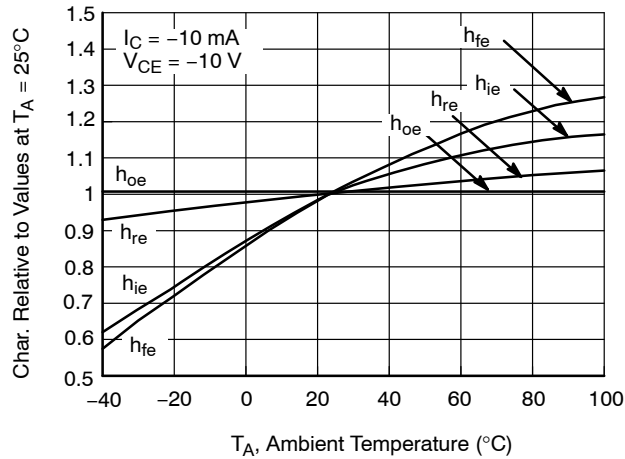
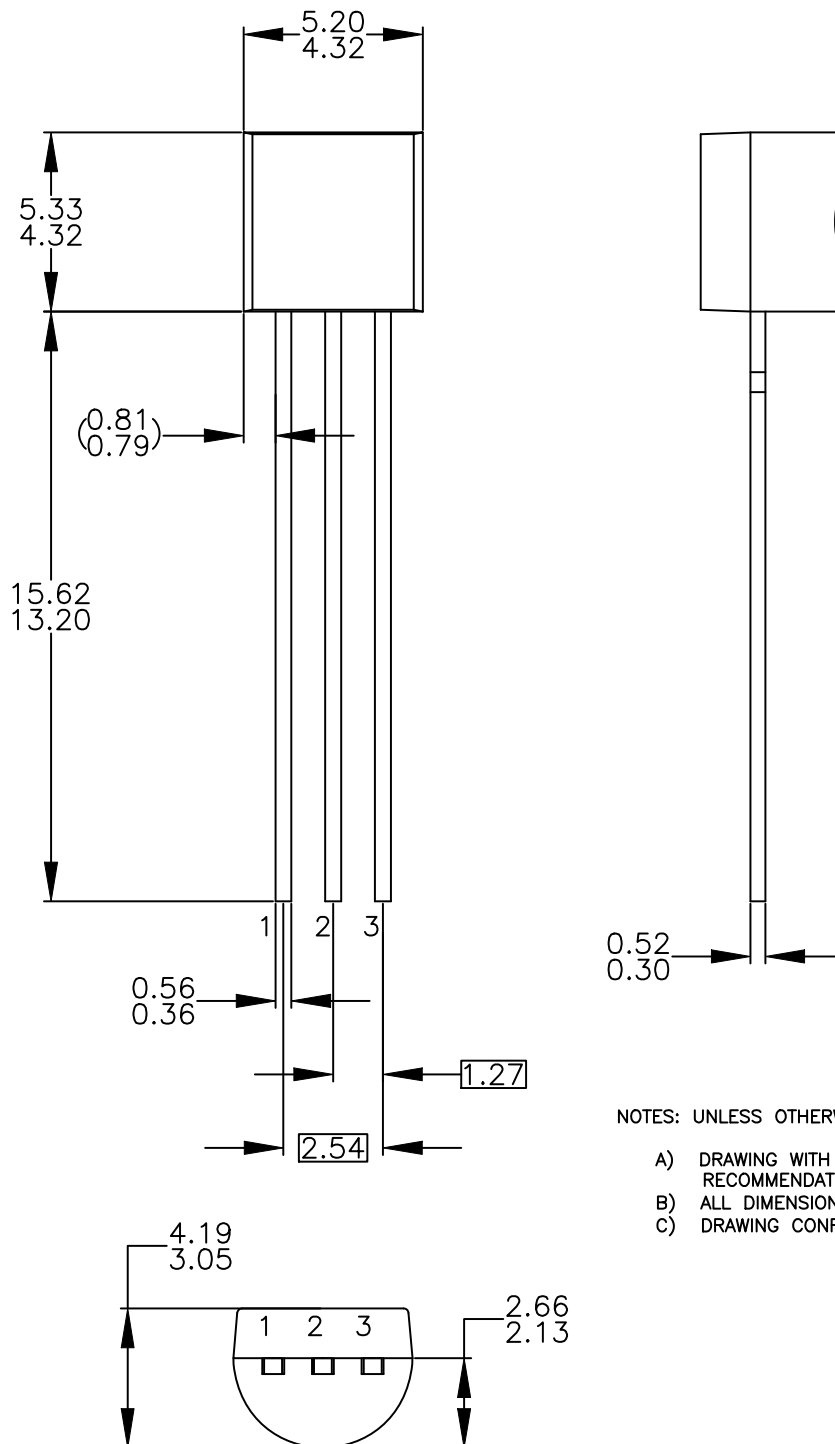


Figure 13. Common Emitter Characteristics

TO-92 3 4.825x4.76
CASE 135AN
ISSUE O

DATE 31 JUL 2016



NOTES: UNLESS OTHERWISE SPECIFIED

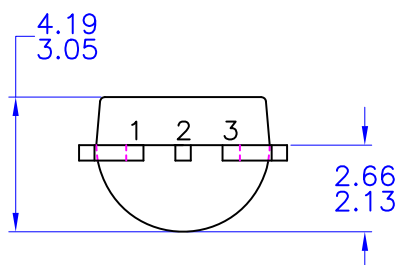
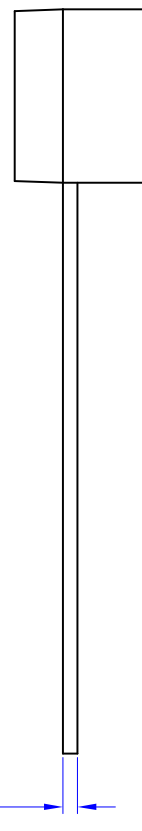
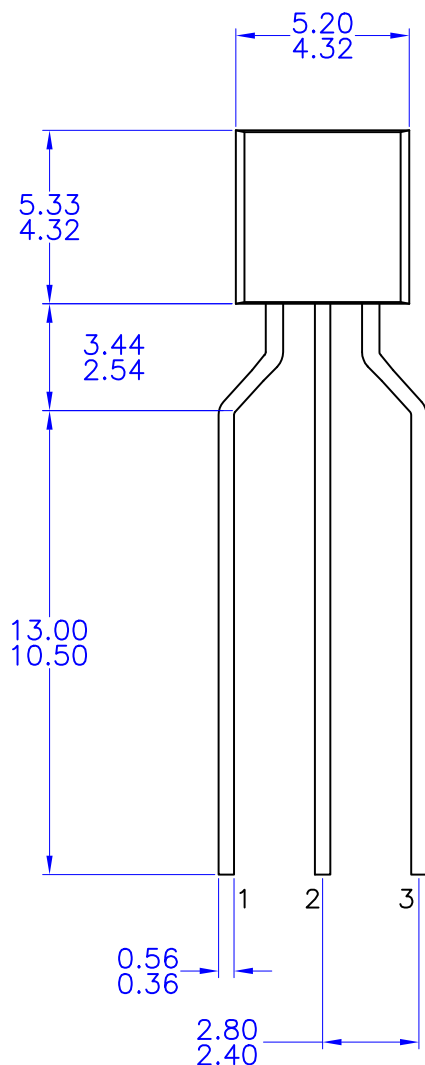
- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-2009.

DOCUMENT NUMBER:	98AON13880G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TO-92 3 4.825X4.76	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

TO-92 3 4.83x4.76 LEADFORMED
CASE 135AR
ISSUE O

DATE 30 SEP 2016



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994

DOCUMENT NUMBER:	98AON13879G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TO-92 3 4.83X4.76 LEADFORMED	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales