



# PNP Power Amplifier Silicon Transistor

*Qualified per MIL-PRF-19500/580*

*Qualified Levels:  
JAN, JANTX and  
JANTXV*

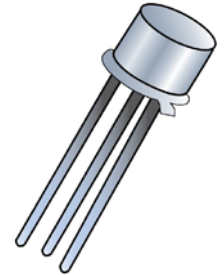
## DESCRIPTION

This family of 2N4234, 2N4235, and 2N4236 silicon transistors are military qualified up to the JANTXV level for high-reliability applications.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

## FEATURES

- JEDEC registered 2N4234 and 2N4236 number
- JAN, JANTX, and JANTXV qualifications available per MIL-PRF-19500/580
- RoHS compliant version available



**TO-205AD**  
(formerly TO-39)  
**Package**

## APPLICATIONS / BENEFITS

- Short leaded TO-205AD package
- Lightweight package
- Military and other high-reliability applications

## MAXIMUM RATINGS @ $T_A = +25\text{ }^\circ\text{C}$ unless otherwise noted

Parameters / Test Conditions	Symbol	Value	Unit	
Junction & Storage Temperature	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$	
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	29	$^\circ\text{C/W}$	
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	175	$^\circ\text{C/W}$	
Total Power Dissipation <sup>(1)</sup>	$P_T$	@ $T_A = 25\text{ }^\circ\text{C}$ <sup>(1)</sup>	1.0	W
		@ $T_C = 25\text{ }^\circ\text{C}$ <sup>(2)</sup>	6.0	
Collector – Emitter Voltage	$V_{CEO}$	2N4234	-40	V
		2N4235	-60	
		2N4236	-80	
Collector – Base Voltage	$V_{CBO}$	2N4234	-40	V
		2N4235	-60	
		2N4236	-80	
Emitter - Base Voltage	$V_{EBO}$	-7.0	V	
Base Current	$I_B$	-0.5	A	
Collector Current	$I_C$	-1.0	A	

**Notes:** 1. Derated linearly by 5.7 mW/ $^\circ\text{C}$  for  $T_A > +25\text{ }^\circ\text{C}$   
2. Derated linearly by 34 mW/ $^\circ\text{C}$  for  $T_C > +25\text{ }^\circ\text{C}$

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**MECHANICAL and PACKAGING**

- CASE: Hermetically sealed, steel base, nickel cap
- TERMINALS: Steel Leads, nickel plated, then solder dipped or RoHS compliant matte-tin available on commercial grade only
- MARKING: Part number, date code, manufacturer's ID and serial number
- POLARITY: PNP
- WEIGHT: Approximately 1.064 grams
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

Symbol	Definition
$I_B$	Base current: The value of the dc current into the base terminal.
$I_C$	Collector current: The value of the dc current into the collector terminal.
$I_E$	Emitter current: The value of the dc current into the emitter terminal.
$T_C$	Case temperature: The temperature measured at a specified location on the case of a device.
$V_{CB}$	Collector-base voltage: The dc voltage between the collector and the base.
$V_{CBO}$	Collector-base voltage, base open: The voltage between the collector and base terminals when the emitter terminal is open-circuited.
$V_{CC}$	Collector-supply voltage: The supply voltage applied to a circuit connected to the collector.
$V_{CE}$	Collector-emitter voltage: The dc voltage between the collector and the emitter.
$V_{CEO}$	Collector-emitter voltage, base open: The voltage between the collector and the emitter terminals when the base terminal is open-circuited.
$V_{EB}$	Emitter-base voltage: The dc voltage between the emitter and the base
$V_{EBO}$	Emitter-base voltage, collector open: The voltage between the emitter and base terminals with the collector terminal open-circuited.

**ELECTRICAL CHARACTERISTICS @  $T_A = +25\text{ }^\circ\text{C}$ , unless otherwise noted**

Characteristics		Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage $I_C = -100\text{ mA}$	2N4234 2N4235 2N4236	$V_{(BR)CEO}$	-40 -60 -80		V
Collector-Emitter Cutoff Current $V_{CB} = -30\text{ V}$ $V_{CB} = -40\text{ V}$ $V_{CB} = -60\text{ V}$	2N4234 2N4235 2N4236	$I_{CEO}$		-1.0 -1.0 -1.0	mA
Collector-Emitter Cutoff Current $V_{CB} = -40\text{ V}, V_{BE} = -1.5\text{ V}$ $V_{CB} = -60\text{ V}, V_{BE} = -1.5\text{ V}$ $V_{CB} = -80\text{ V}, V_{BE} = -1.5\text{ V}$	2N4234 2N4235 2N4236	$I_{CEX}$		-100 -100 -100	nA
Collector-Base Cutoff Current $V_{CB} = -40\text{ V}$ $V_{CB} = -60\text{ V}$ $V_{CB} = -80\text{ V}$	2N4234 2N4235 2N4236	$I_{CBO}$		-100 -100 -100	nA
Emitter-Base Cutoff Current $V_{BE} = -7.0\text{ V}$		$I_{EBO}$		-0.5	mA

**ON CHARACTERISTICS <sup>(3)</sup>**

Forward-Current Transfer Ratio $I_C = -100\text{ mA}, V_{CE} = -1.0\text{ V}$ $I_C = -250\text{ mA}, V_{CE} = -1.0\text{ V}$ $I_C = -500\text{ mA}, V_{CE} = -1.0\text{ V}$		$h_{FE}$	40 30 20	150	
Collector-Emitter Saturation Voltage $I_C = -1.0\text{ A}, I_B = -100\text{ mA}$ $I_C = -500\text{ mA}, I_B = -50\text{ mA}$		$V_{CE(sat)}$		-0.6 -0.4	V
Base-Emitter Saturation Voltage $I_C = -500\text{ mA}, I_B = -50\text{ mA}$ $I_C = -1.0\text{ A}, I_B = -100\text{ mA}$		$V_{BE(sat)}$		-1.1 -1.5	V

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = -100\text{ mA}, V_{CE} = -10\text{ V}, f = 1\text{ MHz}$		$ h_{FE} $	3.0		
Output Capacitance $V_{CB} = -10\text{ V}, I_E = 0, f = 100\text{ MHz}$		$C_{obo}$		100	pF

**ELECTRICAL CHARACTERISTICS @  $T_A = +25\text{ }^\circ\text{C}$ , unless otherwise noted (continued)****SAFE OPERATING AREA****DC Tests** $T_C = +25\text{ }^\circ\text{C}$ , 1 cycle,  $t \geq 0.5\text{ s}$ **Test 1** $V_{CE} = -6.0\text{ V}$ ,  $I_C = -1.0\text{ A}$ **Test 2** $V_{CE} = -12\text{ V}$ ,  $I_C = -500\text{ mA}$ **Test 3** $V_{CE} = -30\text{ V}$ ,  $I_C = -166\text{ mA}$  (2N4234) $V_{CE} = -50\text{ V}$ ,  $I_C = -100\text{ mA}$  (2N4235) $V_{CE} = -70\text{ V}$ ,  $I_C = -71\text{ mA}$  (2N4236)

(3) Pulse Test: Pulse Width =  $300\text{ }\mu\text{s}$ , duty cycle  $\leq 2.0\%$

**PACKAGE DIMENSIONS**


Ltr	Dimensions				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
<b>CD</b>	0.305	0.335	7.75	8.51	
<b>CH</b>	0.240	0.260	6.10	6.60	
<b>HD</b>	0.335	0.370	8.51	9.40	
<b>h</b>	0.009	0.041	0.23	1.04	
<b>j</b>	0.028	0.034	0.71	0.86	3
<b>k</b>	0.029	0.045	0.74	1.14	3, 4
<b>LD</b>	0.016	0.021	0.41	0.53	8, 9
<b>LL</b>	0.500	0.750	12.7	19.05	
<b>LC</b>	0.200 TP		5.08 TP		7
<b>LU</b>	0.016	0.019	0.41	0.48	8, 9
<b>L1</b>	-	0.050	-	1.27	8, 9
<b>L2</b>	0.250	-	6.35	-	8, 9
<b>P</b>	0.100	-	2.54	-	7
<b>Q</b>	-	0.050	-	1.27	5
<b>r</b>	-	0.010	-	0.25	10
<b>α</b>	45° TP		45° TP		7

**NOTES:**

- Dimensions are in inches.
- Millimeters are given for information only.
- Beyond r (radius) maximum, TL shall be held for a minimum length of 0.011 inch (0.28 mm).
- Dimension TL measured from maximum HD.
- Body contour optional within zone defined by HD, CD, and Q.
- CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
- Leads at gauge plane 0.054 +0.001 -0.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within 0.007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
- Dimension LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
- All three leads.
- The collector shall be internally connected to the case.
- Dimension r (radius) applies to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
- Lead 1 = emitter, lead 2 = base, lead 3 = collector.



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