



## Low Power NPN Silicon Transistor

*Qualified per MIL-PRF-19500/391*

Qualified Levels:  
JAN, JANTX,  
JANTXV, and JANS

### DESCRIPTION

This 2N3700 NPN transistor comes in a hermetically sealed metal TO-18 package and is military qualified for high-reliability applications.

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

### FEATURES

- JEDEC registered 2N3700 number.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/391.
- Rad hard levels are also available per MIL-PRF-19500/391. (See RHA datasheet for [JANS 2N3700](#).)
- RoHS compliant versions available (commercial grade only).

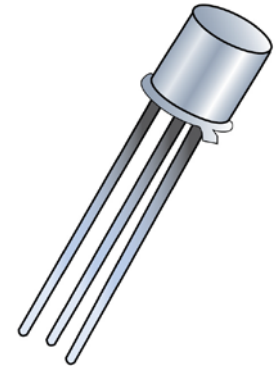
### APPLICATIONS / BENEFITS

- Leaded, hermetically sealed TO-18 package.
- Lightweight.
- Low power.
- Military and other high-reliability applications.

### MAXIMUM RATINGS @ T<sub>A</sub> = +25 °C unless otherwise noted.

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T <sub>J</sub> and T <sub>STG</sub>	-65 to +200	°C
Thermal Impedance Junction-to-Ambient	R <sub>θJA</sub>	325	°C/W
Thermal Impedance Junction-to-Case	R <sub>θJC</sub>	150	°C/W
Collector-Emitter Voltage	V <sub>CEO</sub>	80	V
Collector-Base Voltage	V <sub>CBO</sub>	140	V
Emitter-Base Voltage	V <sub>EBO</sub>	7.0	V
Collector Current	I <sub>C</sub>	1.0	A
Total Power Dissipation:	@ T <sub>A</sub> = +25 °C <sup>(1)</sup>	0.5	W
	@ T <sub>C</sub> = +25 °C <sup>(2)</sup>	1.0	

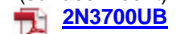
- Notes:**
1. Derate linearly 2.85 mW/°C for T<sub>A</sub> ≥ +25 °C.
  2. Derate linearly 10.3 mW/°C for T<sub>C</sub> ≥ +25 °C.



### TO-18 (TO-206AA) Package

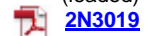
Also available in:

**UB package**  
(surface mount)



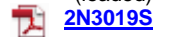
[2N3700UB](#)

**TO-39 (TO-205AD)**  
(leaded)



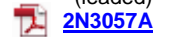
[2N3019](#)

**TO-5 package**  
(leaded)



[2N3019S](#)

**TO-46 (TO-206AB)**  
(leaded)



[2N3057A](#)

**MSC – Lawrence**

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

**MSC – Ireland**

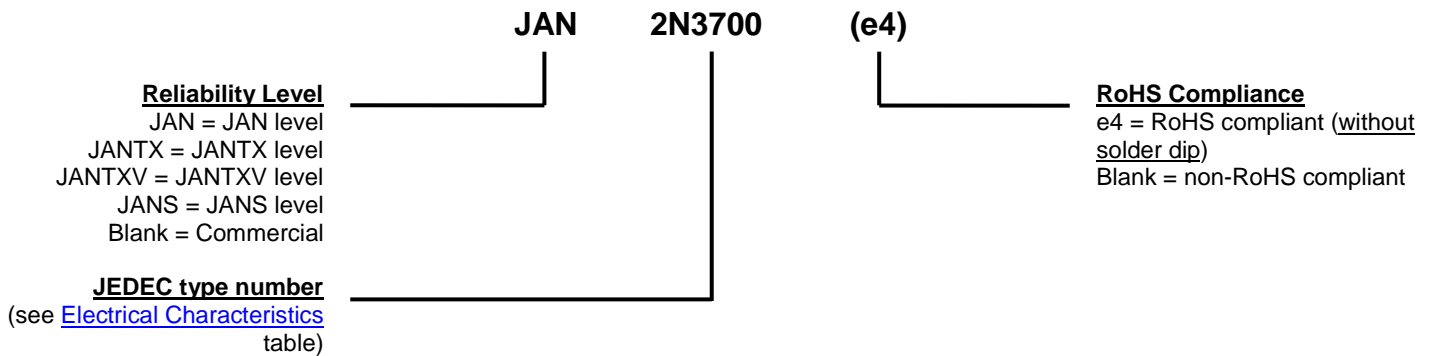
Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

**Website:**

[www.microsemi.com](http://www.microsemi.com)

**MECHANICAL and PACKAGING**

- CASE: Hermetically sealed, nickel plated kovar base, nickel cap.
- TERMINALS: Gold plate over nickel, kovar for JANS. Gold plate over nickel, kovar, solder dipped for JAN, JANTX, and JANTXV.
- MARKING: Part number, date code, manufacturer's ID.
- WEIGHT: Approximately 0.3 grams.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

Symbol	Definition
f	Frequency
$I_B$	Base current (dc)
$I_E$	Emitter current (dc)
$T_A$	Ambient temperature
$T_C$	Case temperature
$V_{CB}$	Collector to base voltage (dc)
$V_{CE}$	Collector to emitter voltage (dc)
$V_{EB}$	Emitter to base voltage (dc)

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage $I_C = 30\text{ mA}$	$V_{(BR)CEO}$	80		V
Collector-Base Cutoff Current $V_{CB} = 140\text{ V}$	$I_{CBO}$		10	$\mu\text{A}$
Emitter-Base Cutoff Current $V_{EB} = 7\text{ V}$	$I_{EBO1}$		10	$\mu\text{A}$
Collector-Emitter Cutoff Current $V_{CE} = 90\text{ V}$	$I_{CES}$		10	nA
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{ V}$	$I_{EBO2}$		10	nA
<b>ON CHARACTERISTICS</b>				
Forward-Current Transfer Ratio $I_C = 150\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 0.1\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 500\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 1.0\text{ A}, V_{CE} = 10\text{ V}$	$h_{FE}$	100 50 90 50 15	300 300 300 300	
Collector-Emitter Saturation Voltage $I_C = 150\text{ mA}, I_B = 15\text{ mA}$ $I_C = 500\text{ mA}, I_B = 50\text{ mA}$	$V_{CE(sat)}$		0.2 0.5	V
Base-Emitter Saturation Voltage $I_C = 150\text{ mA}, I_B = 15\text{ mA}$	$V_{BE(sat)}$		1.1	V

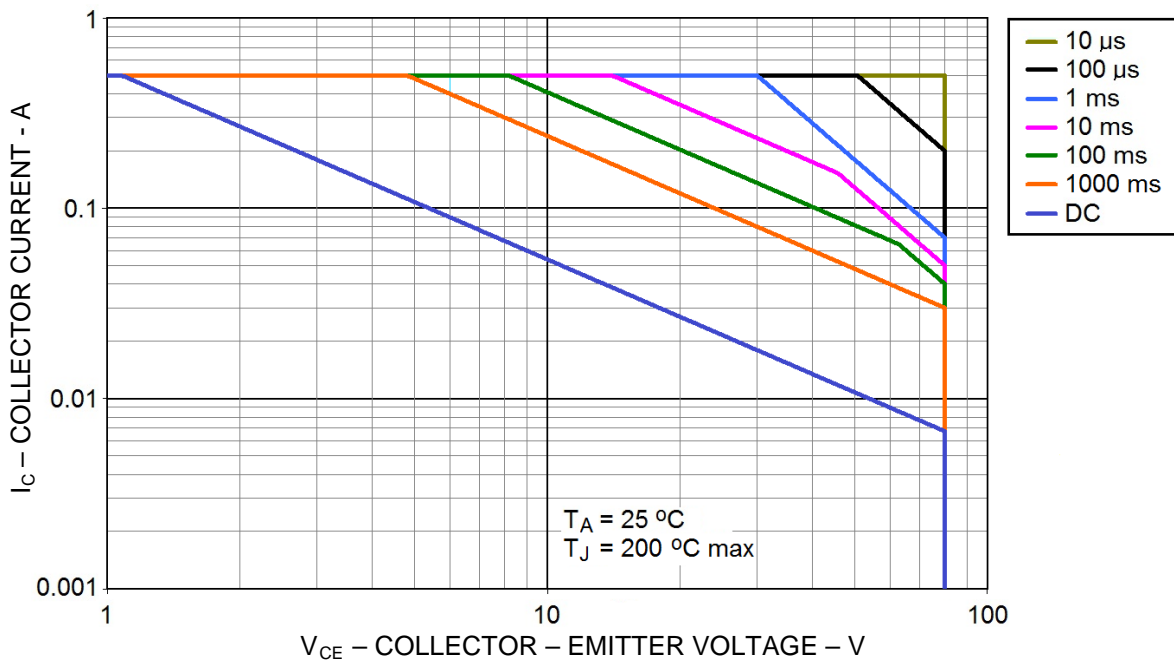
**DYNAMIC CHARACTERISTICS**

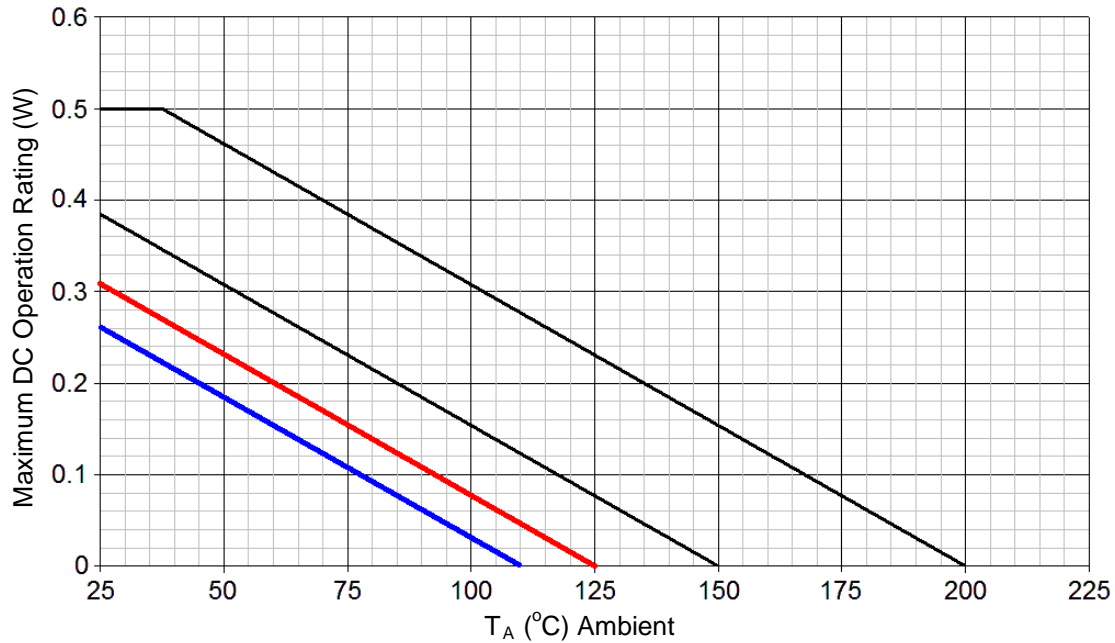
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}, f = 1.0\text{ kHz}$	$h_{fe}$	80	400	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 50\text{ mA}, V_{CE} = 10\text{ V}, f = 20\text{ MHz}$	$ h_{fe} $	5.0	20	
Output Capacitance $V_{CB} = 10\text{ V}, I_E = 0, 100\text{ kHz} \leq f \leq 1.0\text{ MHz}$	$C_{obo}$		12	pF
Input Capacitance $V_{EB} = 0.5\text{ V}, I_C = 0, 100\text{ kHz} \leq f \leq 1.0\text{ MHz}$	$C_{ibo}$		60	pF

**ELECTRICAL CHARACTERISTICS @  $T_A = +25\text{ }^\circ\text{C}$  unless otherwise noted (continued)**
**SAFE OPERATION AREA** (See SOA graph below and [MIL-STD-750, method 3053](#))

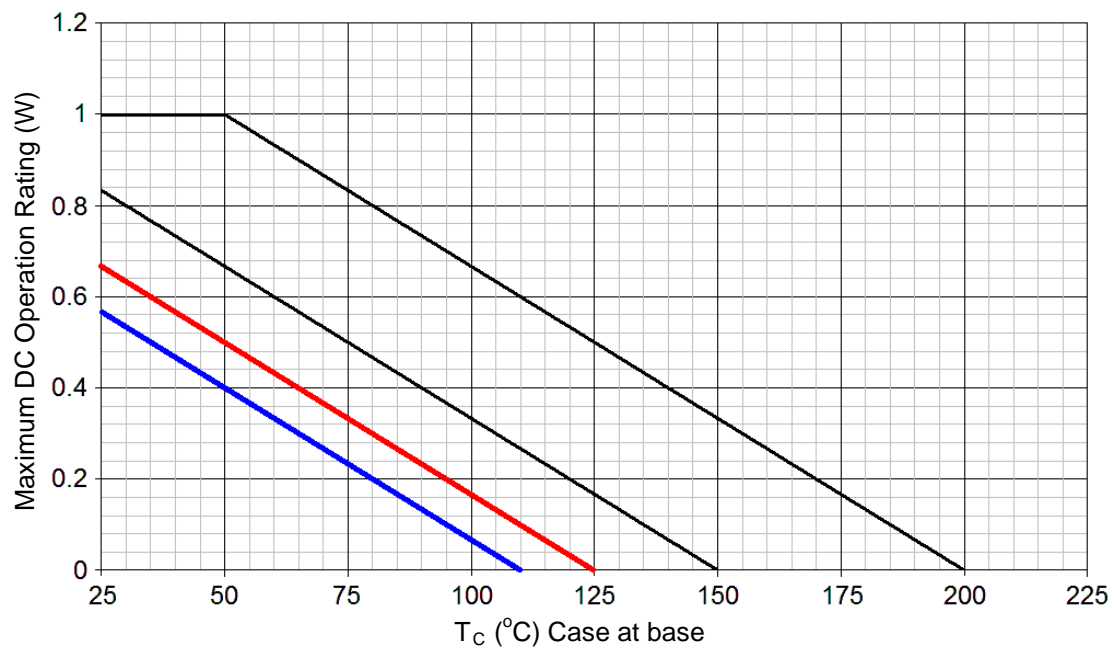
**DC Tests**
 $T_C = 25\text{ }^\circ\text{C}$ , 1 cycle,  $t = 10\text{ ms}$ 

<b>Test 1</b> 2N3700	$V_{CE} = 10\text{ V}$ $I_C = 180\text{ mA}$
<b>Test 2</b> 2N3700	$V_{CE} = 40\text{ V}$ $I_C = 45\text{ mA}$
<b>Test 3</b> 2N3700	$V_{CE} = 80\text{ V}$ $I_C = 22.5\text{ mA}$

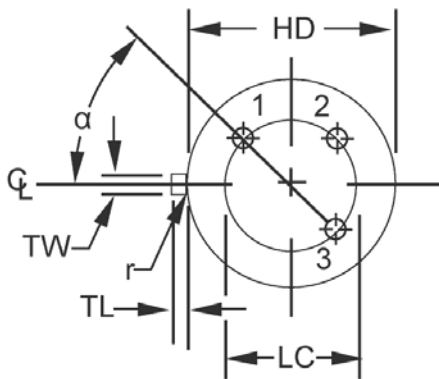
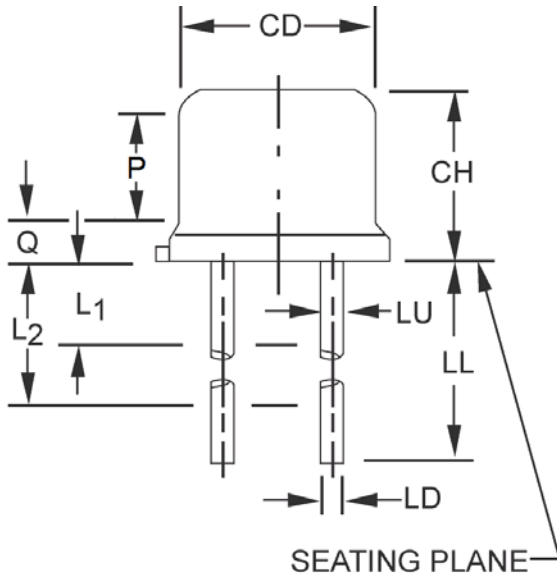
 (1) Pulse Test: Pulse Width =  $300\text{ }\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

Maximum Safe Operating Area @  $T_A = 25\text{ }^\circ\text{C}$

**GRAPHS**


**FIGURE 1**  
Temperature-Power Derating (R<sub>θJA</sub>)  
 Leads = 0.125 inch (3.175mm)



**FIGURE 2**  
Temperature-Power Derating (R<sub>θJC</sub>)

**PACKAGE DIMENSIONS**


Symbol	Dimensions				Note
	Inch		Millimeters		
	Min	Max	Min	Max	
<b>CD</b>	0.178	0.195	4.52	4.95	
<b>CH</b>	0.170	0.210	4.32	5.33	
<b>HD</b>	0.209	0.230	5.31	5.84	
<b>LC</b>	0.100 TP		2.54 TP		6
<b>LD</b>	0.016	0.021	0.41	0.53	7,8
<b>LL</b>	0.500	0.750	12.70	19.05	7,8
<b>LU</b>	0.016	0.019	0.41	0.48	7,8
<b>L1</b>	-	0.050	-	1.27	7,8
<b>L2</b>	0.250	-	6.35	-	7,8
<b>P</b>	0.100	-	2.54	-	
<b>Q</b>	-	0.030	-	0.76	5
<b>TL</b>	0.028	0.048	0.71	1.22	3,4
<b>TW</b>	0.036	0.046	0.91	1.17	3
<b>r</b>	-	0.010	-	0.25	10
<b>α</b>	45° TP		45° TP		6
1, 2, 9, 11, 12					

**NOTES:**

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Beyond r (radius) maximum, TH shall be held for a minimum length of .011 inch (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. This device may be measured by direct methods.
7. Dimension LU applies between L<sub>1</sub> and L<sub>2</sub>. Dimension LD applies between L<sub>2</sub> and LL minimum. Diameter is uncontrolled in L<sub>1</sub> and beyond LL minimum.
8. All three leads.
9. The collector shall be internally connected to the case.
10. Dimension r (radius) applies to both inside corners of tab.
11. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
12. Lead 1 = emitter, lead 2 = base, lead 3 = collector.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microchip:](#)

[Jan2N3700/TR](#) [Jantx2N3700/TR](#) [Jantxv2N3700/TR](#) [2N3700/TR](#) [2N3700](#) [Jan2N3700](#) [Jantxv2N3700](#)



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.