



Low Power NPN Silicon Transistor

Qualified per MIL-PRF-19500/391

*Qualified Levels:
JAN, JANTX,
JANTXV, and JANS*

DESCRIPTION

This 2N3700UB NPN ceramic surface mount device is military qualified for high-reliability applications.

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

FEATURES

- Surface mount equivalent to 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. (Click [here](#) for RHA datasheet.)
- RoHS compliant versions available (commercial grade only).

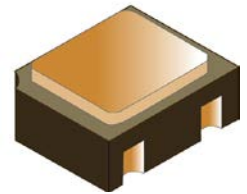
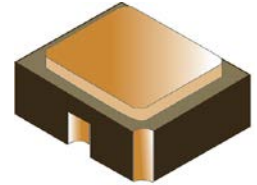
APPLICATIONS / BENEFITS

- Ceramic UB surface mount package.
- Lightweight.
- Low power.
- Military and other high-reliability applications.

MAXIMUM RATINGS @ T_A = +25 °C unless otherwise noted.

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T _J and T _{STG}	-65 to +200	°C
Thermal Impedance Junction-to-Ambient	R _{θJA}	325	°C/W
Thermal Impedance Junction-to-Case	R _{θJSP}	90	°C/W
Collector-Emitter Voltage	V _{CEO}	80	V
Collector-Base Voltage	V _{CBO}	140	V
Emitter-Base Voltage	V _{EBO}	7.0	V
Collector Current	I _C	1.0	A
Total Power Dissipation: @ T _A = +25 °C ⁽¹⁾	P _D	0.5	W


Notes: 1. Derate linearly 6.6 mW/°C for T_A ≥ +25 °C.




UB Package

Also available in:


TO-18 (TO-206AA)

(leadless)
 [2N3700](#)


TO-39 (TO-205AD)

(leadless)
 [2N3019](#)

TO-5 package

(leadless)
 [2N3019S](#)

TO-46 (TO-206AB)

(leadless)
 [2N3057A](#)

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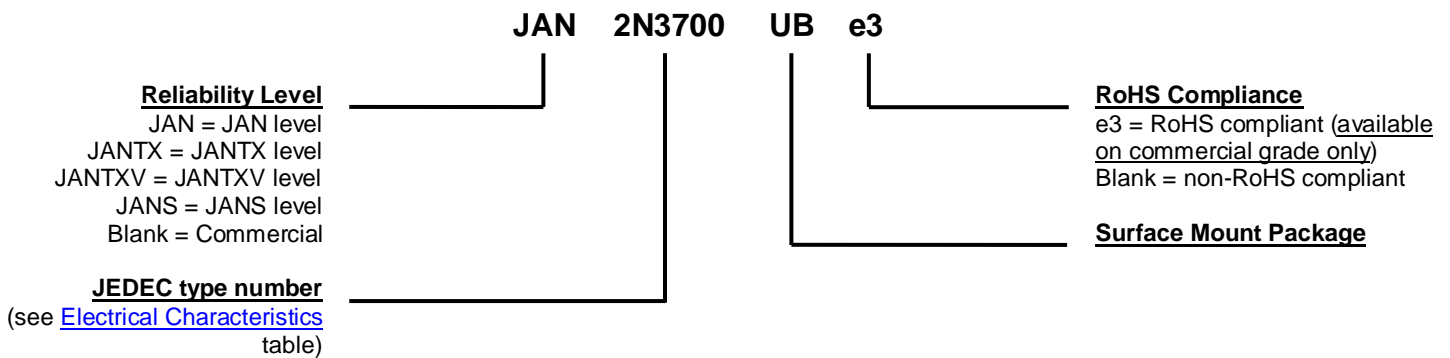
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MECHANICAL and PACKAGING

- CASE: Ceramic.
- TERMINALS: Gold plating over nickel under plate.
- MARKING: Part number, date code, manufacturer's ID.
- TAPE & REEL option: Standard per EIA-481D. Consult factory for quantities.
- WEIGHT: < 0.04 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
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Current $I_C = 30\text{ mA}$	$V_{(BR)CEO}$	80		V
Collector-Base Cutoff Current $V_{CB} = 140\text{ V}$	I_{CBO}		10	μA
Emitter-Base Cutoff Current $V_{EB} = 7\text{ V}$	I_{EBO1}		10	μA
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
ON CHARACTERISTICS				
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

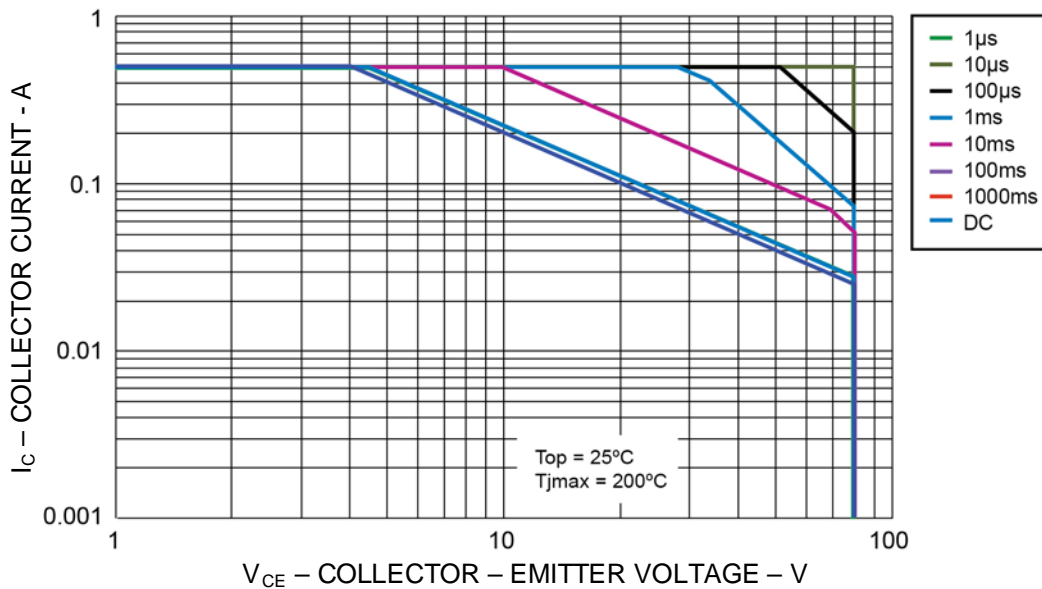
DYNAMIC CHARACTERISTICS

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

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

Test 1 2N3700UB	$V_{CE} = 10\text{ V}$ $I_C = 180\text{ mA}$
Test 2 2N3700UB	$V_{CE} = 40\text{ V}$ $I_C = 45\text{ mA}$
Test 3 2N3700UB	$V_{CE} = 80\text{ V}$ $I_C = 22.5\text{ mA}$

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

Maximum Safe Operating Area (LCC3 at $T_{sp} = 25^\circ\text{C}$)

GRAPHS

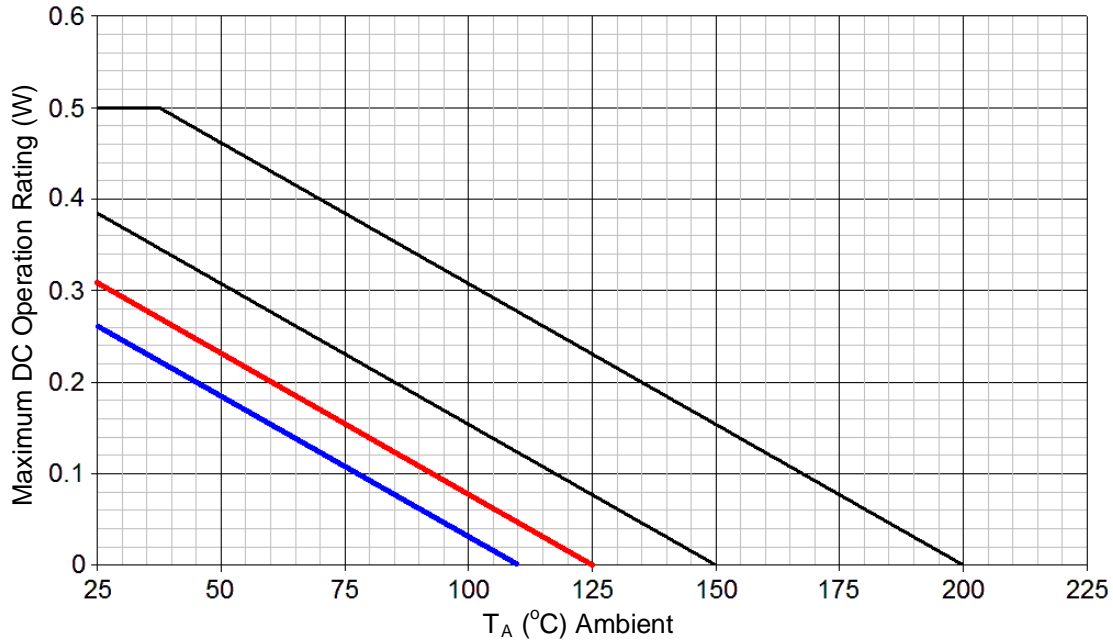


FIGURE 1
Temperature-Power Derating ($R_{\Theta JA}$)

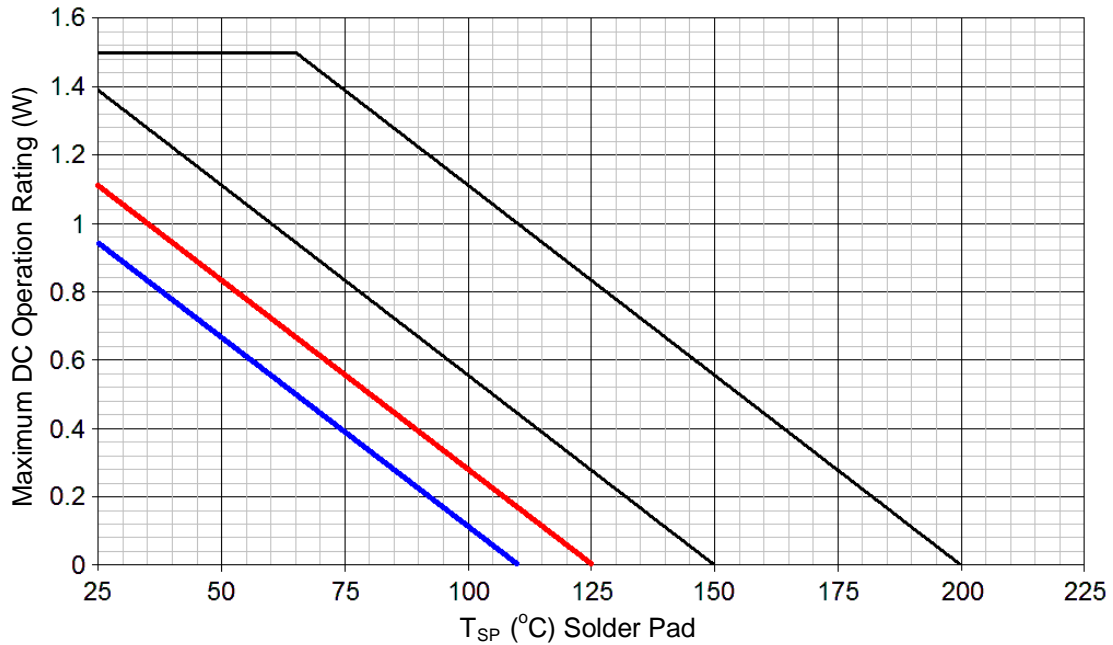
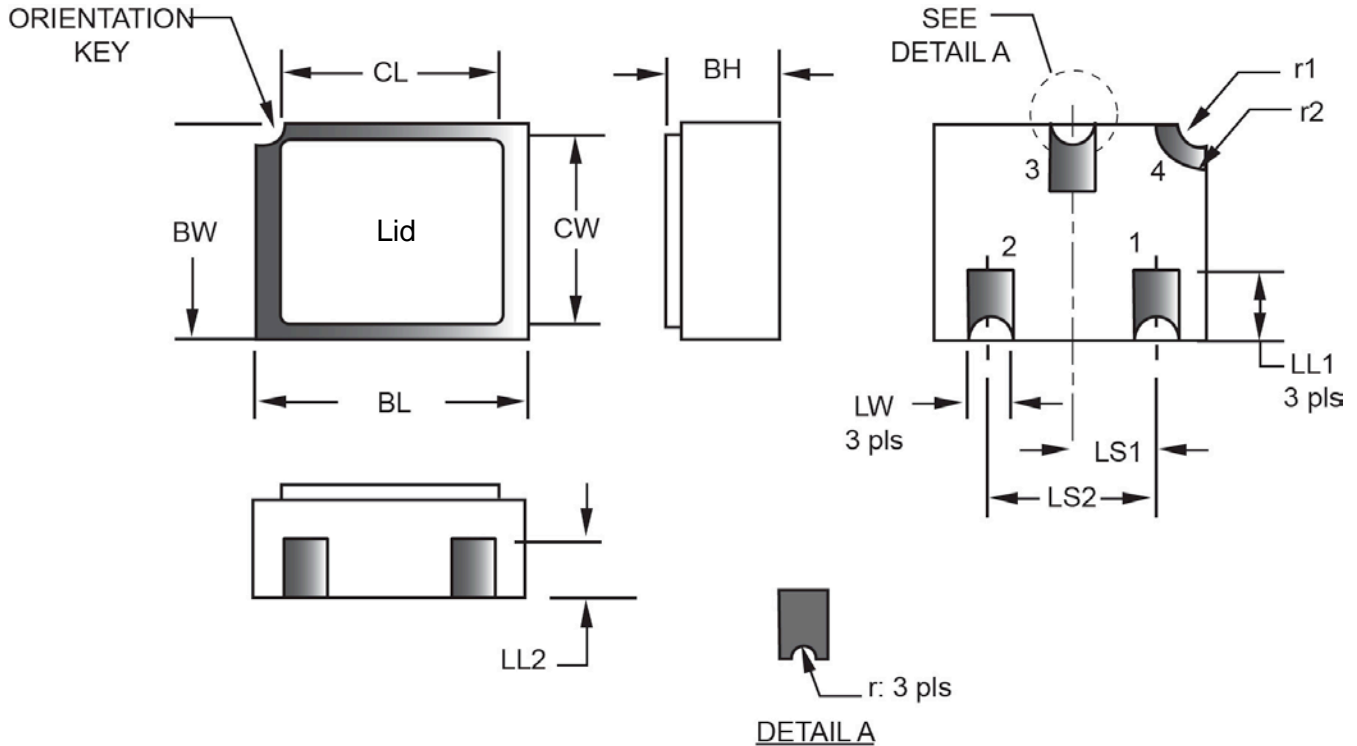


FIGURE 2
Temperature-Power Derating ($R_{\Theta JSP}$)

PACKAGE DIMENSIONS


Symbol	Dimensions				Note	Symbol	Dimensions				Note
	Inch		Millimeters				Inch		Millimeters		
	Min	Max	Min	Max			Min	Max	Min	Max	
BH	.046	.056	1.17	1.42		LS₁	.035	.039	0.89	0.99	
BL	.115	.128	2.92	3.25		LS₂	.071	.079	1.80	2.01	
BW	.085	.108	2.16	2.74		LW	.016	.024	0.41	0.61	
CL		.128		3.25		r		.008		0.20	
CW		.108		2.74		r₁		.012		0.31	
LL₁	.022	.038	0.56	0.96		r₂		.022		0.56	
LL₂	.017	.035	0.43	0.89							

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Hatched areas on package denote metallized areas.
4. Pad 1 = Base, Pad 2 = Emitter, Pad 3 = Collector, Pad 4 = Shielding connected to the lid.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.