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RoHS
Available on commercial versions

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. (See RHA datasheet for JANS_2N3700UB.)
- RoHS compliant versions available (commercial grade only).

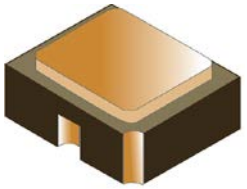
APPLICATIONS / BENEFITS

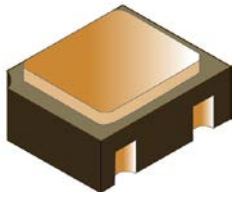
- Ceramic UB surface mount package.
- Lightweight.
- Low power.
- Military and other high-reliability applications.

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	$R_{\Theta JA}$	325	°C/W
Thermal Impedance Junction-to-Solder Pad	$R_{\Theta JSP}$	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 $T_A \geq$ +25 °C.





UB Package

Also available in:

TO-18 (TO-206AA)
(leaded)
2N3700

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

MECHANICAL and PACKAGING

- CASE: Ceramic.
- TERMINALS: Gold plating over nickel under plate (hot solder dip optional for military).
- 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

JAN 2N3700 UB (e4)

Reliability Level
JAN = JAN level
JANTX = JANTX level
JANTXV = JANTXV level
JANS = JANS level
Blank = Commercial

JEDEC type number
(see Electrical Characteristics table)

RoHS Compliance
e4 = RoHS compliant (gold plating without solder dip option)
Blank = non-RoHS compliant

Surface Mount Package

SYMBOLS & DEFINITIONS

Symbol	Definition
f	Frequency
I_B	Base current (dc)
I_E	Emitter current (dc)
T_A	Ambient temperature
T_C	Case temperature
T_{SP}	Solder pad 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 °C, unless otherwise noted

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

DYNAMIC CHARACTERISTICS

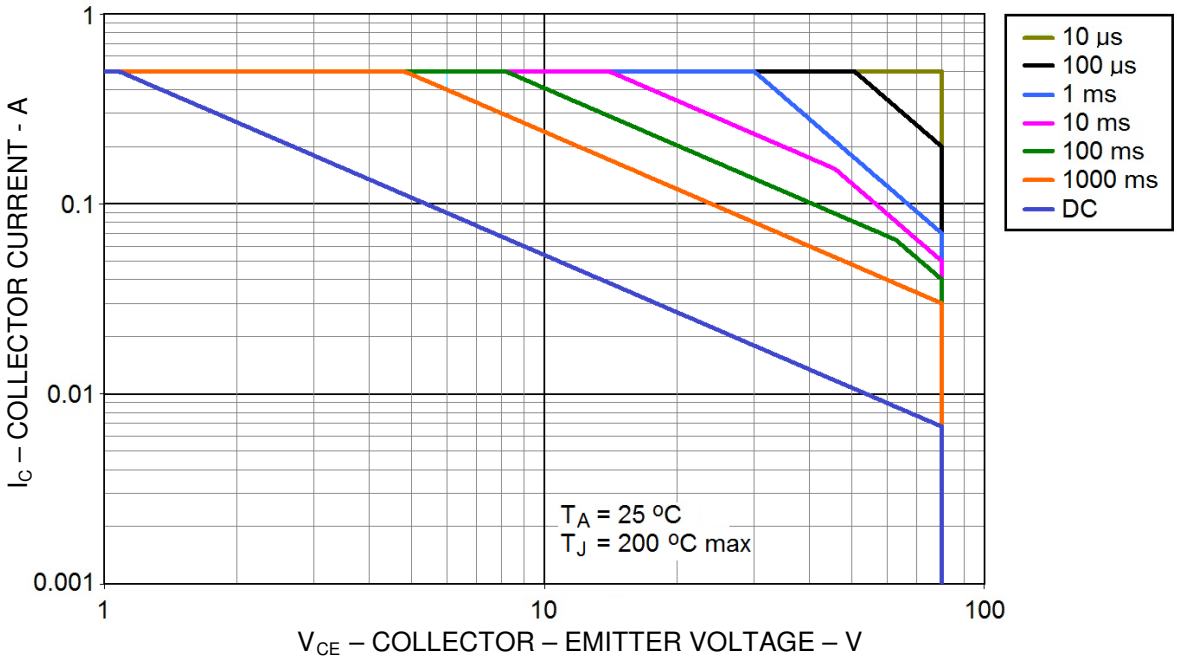
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz	h_{fe}	80	400	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 50 mA, V_{CE} = 10 V, f = 20 MHz	$\|h_{fe}\|$	5.0	20	
Output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

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

SAFE OPERATION AREA (See SOA graph below and MIL-STD-750, method 3053)

DC Tests	
T_C = 25 °C, 1 cycle, t = 10 ms	
Test 1	V_{CE} = 10 V
2N3700UB	I_C = 180 mA
Test 2	V_{CE} = 40 V
2N3700UB	I_C = 45 mA
Test 3	V_{CE} = 80 V
2N3700UB	I_C = 22.5 mA

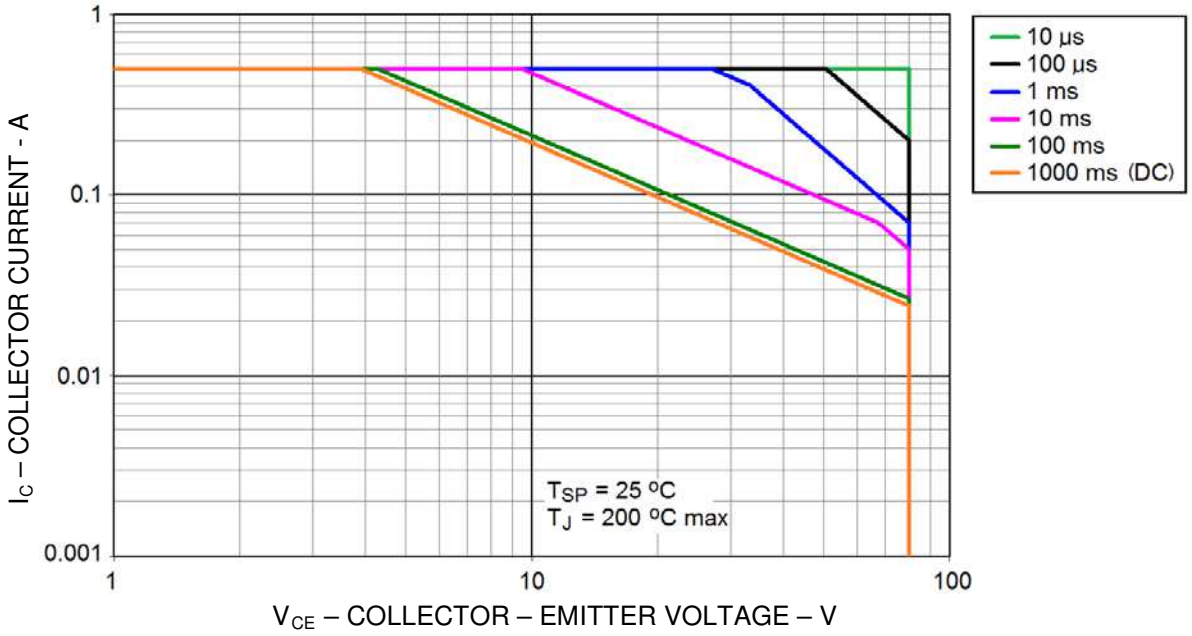
(1) Pulse Test: Pulse Width = 300 µs, duty cycle ≤ 2.0%.



Maximum Safe Operating Area @ T_A = 25 ºC

See additional SOA graph on next page.

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



Maximum Safe Operating Area (T_{SP} = 25°C)

GRAPHS

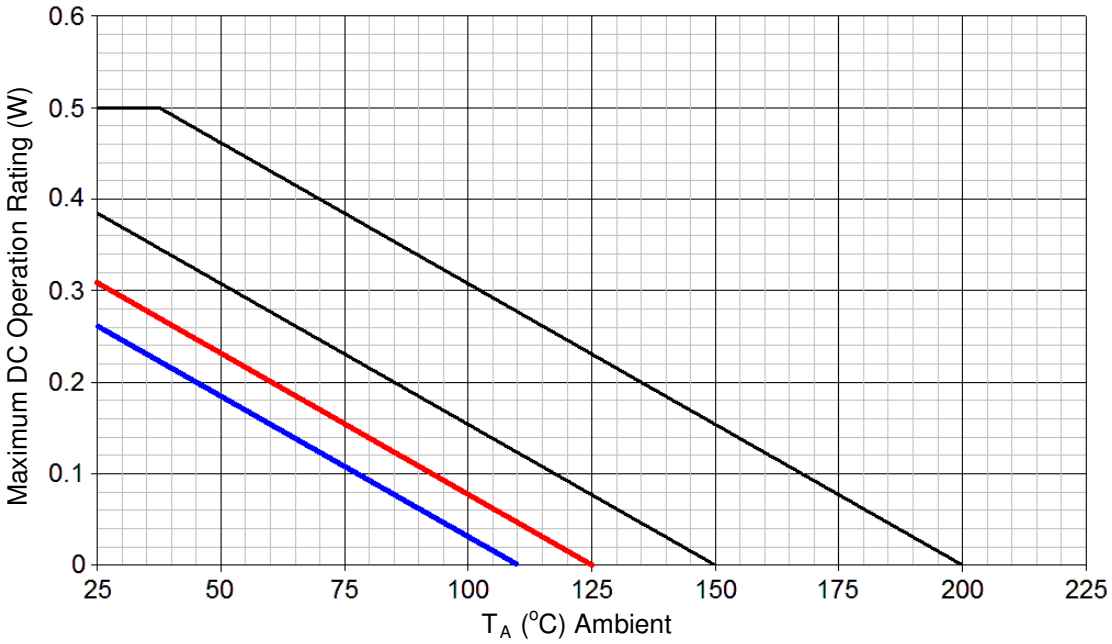


FIGURE 1
Temperature-Power Derating ($R_{\Theta JA}$)

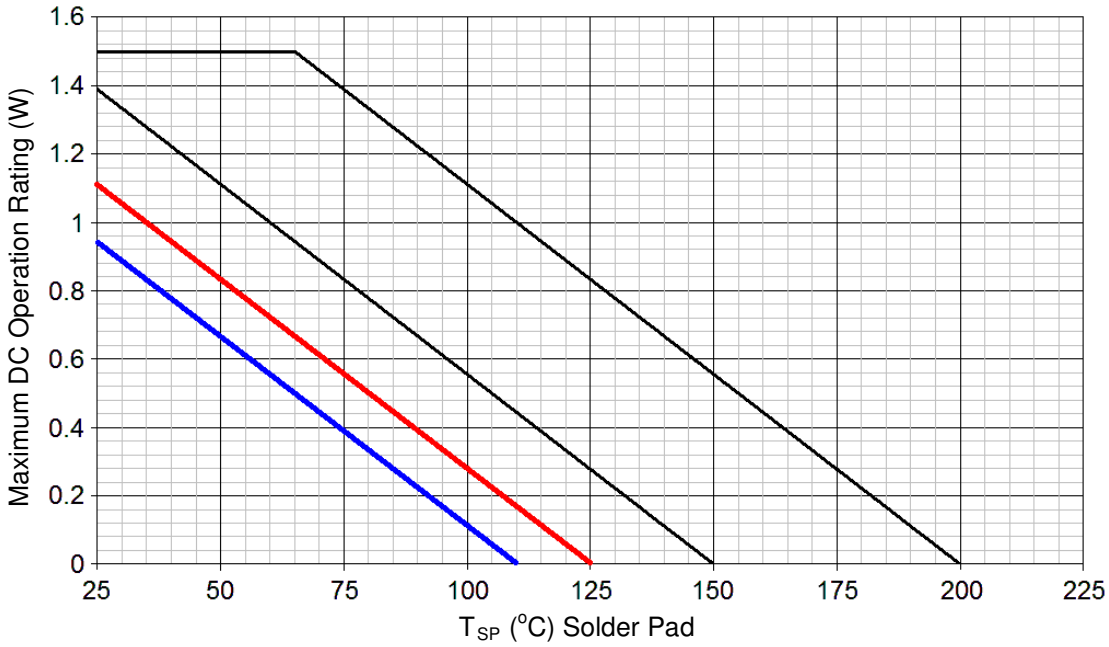
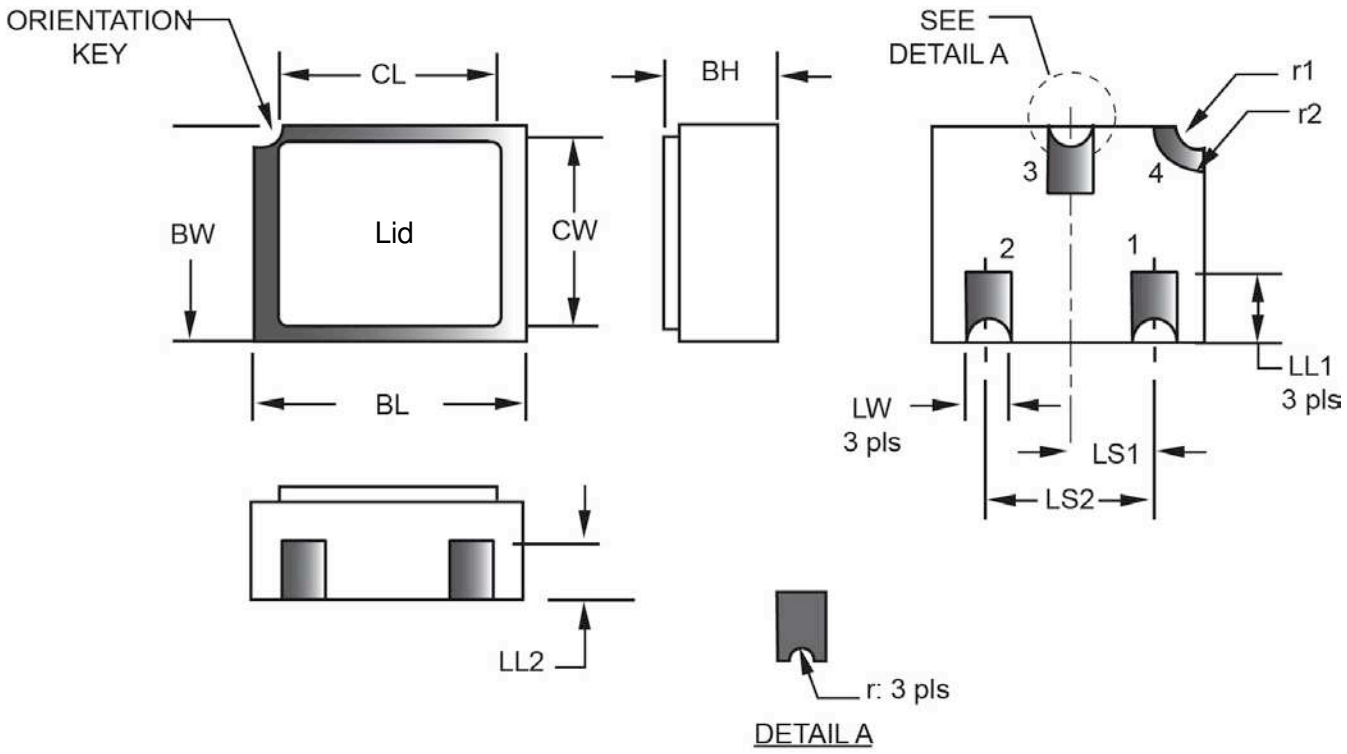


FIGURE 2
Temperature-Power Derating ($R_{\Theta JSP}$)

PACKAGE DIMENSIONS



Symbol	Dimensions				Note	Symbol	Dimensions				Note
	Inch		Millimeters				Inch		Millimeters		
	Min	Max	Min	Max			Min	Max	Min	Max	
BH	0.046	0.056	1.17	1.42		**LS_1**	0.035	0.039	0.89	0.99	
BL	0.115	0.128	2.92	3.25		**LS_2**	0.071	0.079	1.80	2.01	
BW	0.085	0.108	2.16	2.74		**LW**	0.016	0.024	0.41	0.61	
CL	-	0.128	-	3.25		**r**	-	0.008	-	0.20	
CW	-	0.108	-	2.74		**r_1**	-	0.012	-	0.31	
LL_1	0.022	0.038	0.56	0.96		**r_2**	-	.022	-	0.56	
LL_2	0.017	0.035	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 Φx symbology.