RoHS
Compliant

NPN Silicon High-Frequency Transistor

Qualified per MIL-PRF-19500/398

DESCRIPTION

This 2N3866(A) silicon VHF-UHF amplifier transistor is military qualified up to the JANS level for high-reliability applications. It is also available in a top hat leaded TO-205AD package.

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

FEATURES

- JEDEC registered 2N3866 number
- JAN, JANTX, JANTXV and JANS qualifications also available per MIL-PRF-19500/398
- RoHS compliant

APPLICATIONS / BENEFITS

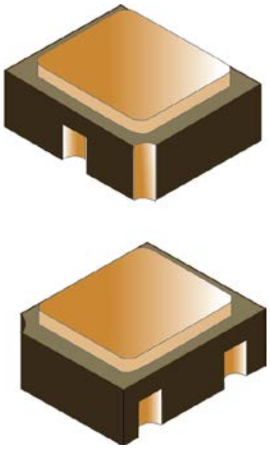
- Ceramic UB package
- Lightweight
- Military and other high-reliability applications

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

Parameters / Test Conditions	Symbol	Value	Unit
Junction & Storage Temperature	T_J, T_{stg}	-65 to +200	°C
Thermal Resistance Junction-to-Case	$R_{ΘJC}$	60	ºC/W
Thermal Resistance Junction-to-Ambient	$R_{ΘJA}$	325	ºC/W
Collector – Emitter Voltage	V_{CEO}	30	V
Collector – Base Voltage	V_{CBO}	60	V
Emitter - Base Voltage	V_{EBO}	3.5	V
Total Power Dissipation (1) @ T_A = +25 ºC (1)	P_T	0.5	W
Collector Current	I_C	0.4	A

Notes: 1. Derated linearly 3.08 mW/°C for T_A > +25 °C

Qualified Levels:
JAN, JANTX, JANTXV and JANS



UB Package

Also available in:

TO-205AD (TO-39) package
(leaded)
2N3866(A)

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

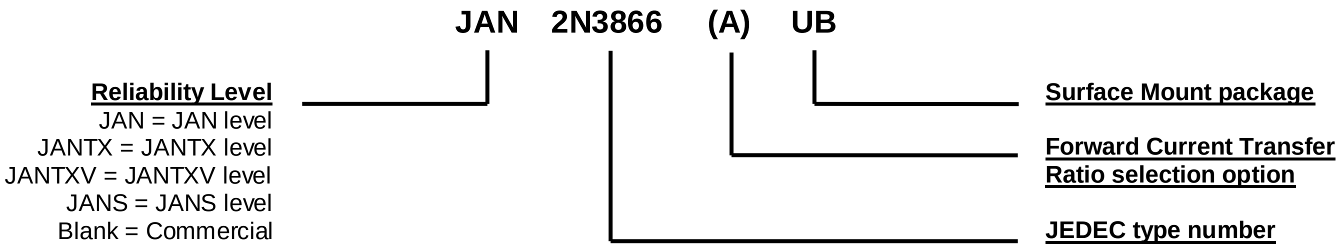
MSC – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:
www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Ceramic.
- TERMINALS: Gold plating over nickel under plate.
- MARKING: Part number, date code, manufacturer's ID.
- TAPE & REEL option: Standard per EIA-418D. Consult factory for quantities.
- WEIGHT: Less than 0.04 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE



JAN 2N3866 (A) UB

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

Surface Mount package

Forward Current Transfer Ratio selection option

JEDEC type number

SYMBOLS & DEFINITIONS

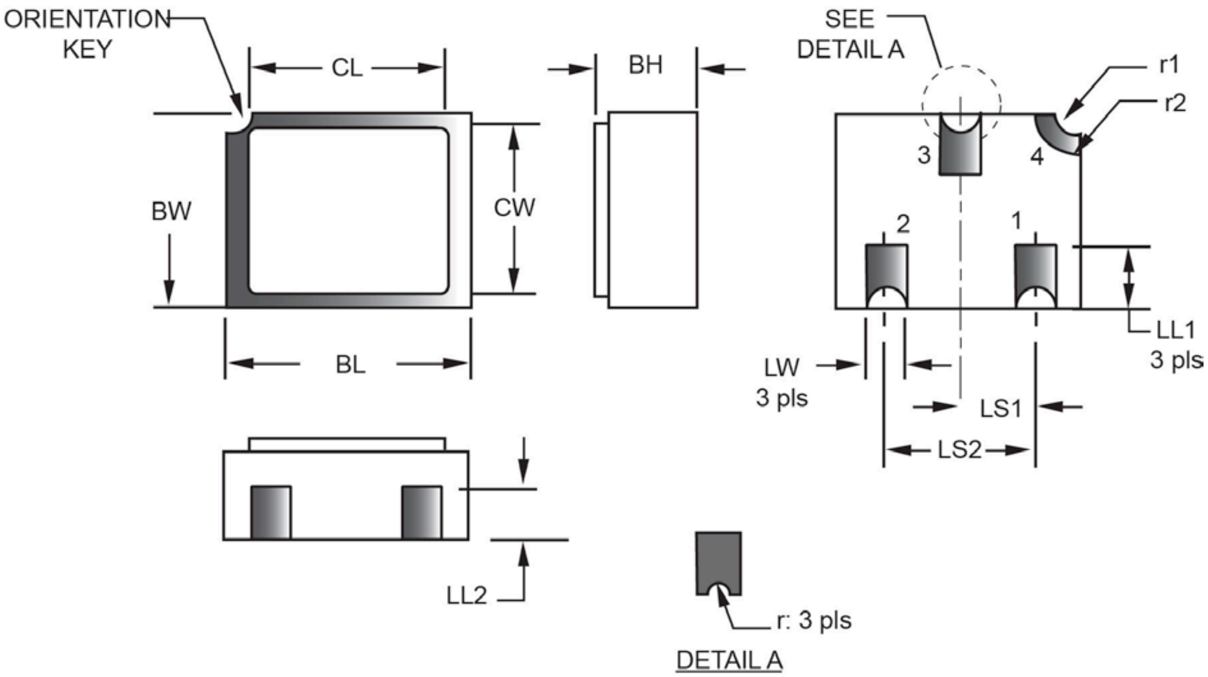
Symbol	Definition
I_B	Base current: The value of the dc current into the base terminal.
I_C	Collector current: The value of the dc current into the collector terminal.
V_{BE}	Base-emitter voltage: The dc voltage between the base and the emitter.
V_{CB}	Collector-base voltage: The dc voltage between the 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_{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_{CC}	Collector-supply voltage: The supply voltage applied to a circuit connected to the collector.
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 °C, unless otherwise noted

Characteristics	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage I_C = 5 mA	$V_{(BR)CEO}$	30		V
Collector-Base Breakdown Voltage I_C = 100 µA	$V_{(BR)CBO}$	60		V
Emitter-Base Breakdown Voltage I_E = 100 µA	$V_{(BR)EBO}$	3.5		V
Collector-Emitter Cutoff Current V_{CE} = 28 V	I_{CEO}		20	µA
Collector-Emitter Cutoff Current V_{CE} = 55 V	I_{CES1}		100	µA
ON CHARACTERISTICS (1)				
Forward-Current Transfer Ratio I_C = 50 mA, V_{CE} = 5.0 V 2N3866UB 2N3866AUB I_C = 360 mA, V_{CE} = 5.0 V 2N3866UB 2N3866AUB	h_{FE}	15 25 5 8	200 200	
Collector-Emitter Saturation Voltage I_C = 100 mA, I_B = 10 mA	$V_{CE(sat)}$		1.0	V
Collector-Emitter Cutoff Current – High Temp Operation V_{CE} = 55 V, T_A = +150 ºC	I_{CES2}		2.0	mA
Forward-Current Transfer Ratio – Low Temperature Operation 2N3866UB V_{CE} = 5.0 V, I_C = 50 mA, T_A = -55 ºC 2N3866AUB	h_{FE3}	7 12		
DYNAMIC CHARACTERISTICS				
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio 2N3866UB 2N3866AUB I_C = 50 mA, V_{CE} = 15 V, f = 200 MHz	$\|h_{FE}\|$	2.5 4.0	8.0 7.5	
Output Capacitance V_{CB} = 28 V, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{obo}		3.5	pF
POWER OUTPUT CHARACTERISTICS				
Power Output V_{CC} = 28 V; P_{in} = 0.15 W; f = 400 MHz * V_{CC} = 28 V; P_{in} = 0.075 W; f = 400 MHz * * See Figure 4 on MIL-PRF-19500/398	P_{1out} P_{2out}	1.0 0.5	2.0	W
Collector Efficiency V_{CC} = 28 V; P_{in} = 0.15 W; f = 400 MHz V_{CC} = 28 V; P_{in} = 0.075 W; f = 400 MHz	n1 n2	45 40		%
Clamp Inductive Collector-Emitter Breakdown Voltage V_{BE} = -1.5 V, I_C = 40 mA	$V_{(BR)CEX}$	55		Vdc

(1) Pulse Test: pulse width = 300 µs, duty cycle ≤ 2.0%

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		**LS1**	0.035	0.040	0.89	1.02	
BL	0.115	0.128	2.92	3.25		**LS2**	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		**r1**	-	0.012	-	0.31	
LL1	0.022	0.038	0.56	0.96		**r2**	-	0.022	-	0.56	
LL2	0.017	0.035	0.43	0.89							

NOTES:

1. Dimensions are in inches. Millimeters are given for information only.
2. Hatched areas on package denote metallized areas.
3. Lid material: Kovar.
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.