RoHS Compliant

NPN Silicon High-Frequency Transistor

Qualified per MIL-PRF-19500/398

Qualified Levels:
JAN, JANTX, JANTXV and JANS

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 low profile UB 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

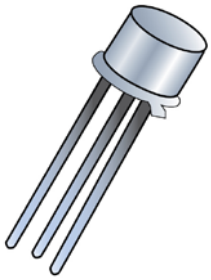
APPLICATIONS / BENEFITS

- Short leaded TO-205AD 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	$R_{\Theta JC}$	60	ºC/W
Thermal Resistance Junction-to-Ambient	$R_{\Theta JA}$	175	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) @ T_C = +25 ºC (2)	P_T	1.0 2.9	W
Collector Current	I_C	0.4	A

Notes: 1. Derated linearly 5.71 mW/°C for T_A > +25 °C
2. Derated at 16.6 mW/°C for T_C > +25 °C



TO-205AD
(formerly TO-39)
Package

Also available in:

UB package
(surface mount)
2N3866(A)UB

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

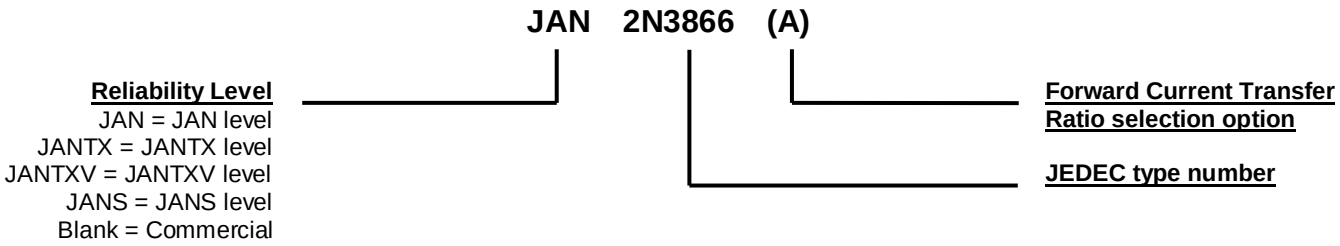
MSC – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:
www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Hermetically sealed, kovar base, nickel cap
- TERMINALS: Gold plate, solder dip (Sn63/Pb37) available upon request. NOTE: Solder dip will eliminate RoHS compliance.
- MARKING: Part number, date code, manufacturer's ID and serial number
- POLARITY: NPN
- WEIGHT: Approximately 1.064 grams
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

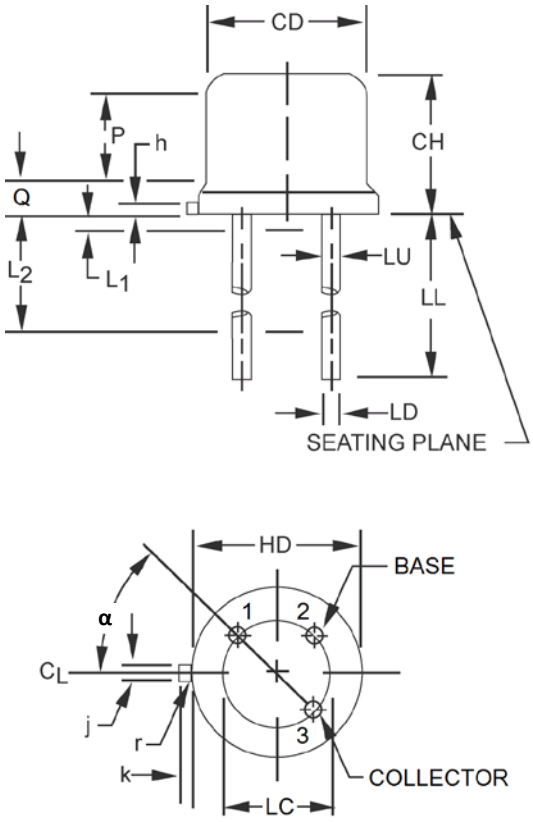
Symbol	Definition
I_B	Base current: The value of the dc current into the base terminal.
I_C	Collector current: The value of the dc current into the collector terminal.
V_{BE}	Base-emitter voltage: The dc voltage between the base and the emitter.
V_{CB}	Collector-base voltage: The dc voltage between the 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 I_C = 360 mA, V_{CE} = 5.0 V	2N3866 2N3866A 2N3866 2N3866A	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 V_{CE} = 5.0 V, I_C = 50 mA, T_A = -55 ºC	2N3866 2N3866A	h_{FE3}	7 12		
DYNAMIC CHARACTERISTICS					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 50 mA, V_{CE} = 15 V, f = 200 MHz	2N3866 2N3866A	$\|h_{FE}\|$	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		V

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

PACKAGE DIMENSIONS



Ltr	Dimensions				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
CD	0.305	0.335	7.75	8.51	
CH	0.240	0.260	6.10	6.60	
HD	0.335	0.370	8.51	9.40	
h	0.009	0.041	0.23	1.04	
j	0.028	0.034	0.71	0.86	3
k	0.029	0.045	0.74	1.14	3, 4
LD	0.016	0.021	0.41	0.53	8, 9
LL	0.500	0.750	12.7	19.05	
LC	0.200 TP		5.08 TP		7
LU	0.016	0.019	0.41	0.48	8, 9
L1	-	0.050	-	1.27	8, 9
L2	0.250	-	6.35	-	8, 9
P	0.100	-	2.54	-	7
Q	-	0.030	-	0.76	5
r	-	0.010	-	0.25	10
α	45° TP		45° TP		7

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for information only.
3. Beyond r (radius) maximum, TL shall be held for a minimum length of 0.011 inch (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. 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.
8. Dimension LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
9. All three leads.
10. The collector shall be internally connected to the case.
11. Dimension r (radius) applies to both inside corners of tab.
12. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.