



## RF and MICROWAVE DISCRETE LOW POWER TRANSISTORS

Qualified per MIL-PRF-19500/343

Qualified Levels:  
JAN, JANTX,  
and JANTXV

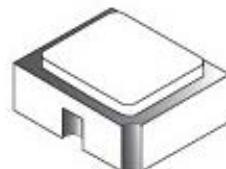
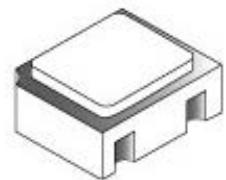
### DESCRIPTION

The 2N2857UB is a military qualified silicon NPN transistor (also available in commercial version), designed for UHF equipment and other high-reliability applications. Common applications include low noise amplifier; oscillator, and mixer applications. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

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

### FEATURES

- Surface mount equivalent to JEDEC registered 2N2857.
- Silicon NPN, UB packaged UHF transistor.
- Maximum unilateral gain = 13 dB (typ) @ 500 MHz.
- JAN, JANTX, and JANTXV military qualified versions available per MIL-PRF-19500/343.
- RoHS compliant version available (commercial grade only).



### UB Package

Also available in:

 **TO-72 Package**  
(axial-leaded)  
[2N2857](#)

### APPLICATIONS / BENEFITS

- Low-power, ultra-high frequency transistor.
- Low-profile ceramic surface mount package.

### MAXIMUM RATINGS @ $T_A = +25^\circ\text{C}$

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	$T_J$ and $T_{STG}$	-65 to +200	$^\circ\text{C}$
Collector-Emitter Voltage	$V_{CEO}$	15	V
Collector-Base Voltage	$V_{CBO}$	30	V
Emitter-Base Voltage	$V_{EBO}$	3	V
Thermal Resistance Junction-to-Ambient	$R_{\text{JJA}}$	400	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-to-Solder Pad	$R_{\text{JSP}}$	210	$^\circ\text{C}/\text{W}$
Steady-State Power Dissipation <sup>(1)</sup>	$P_D$	200	mW
Collector Current	$I_C$	40	mA

**Notes:** 1. Derate linearly 1.14 mW/ $^\circ\text{C}$  for  $T_A > +25^\circ\text{C}$ .

#### 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

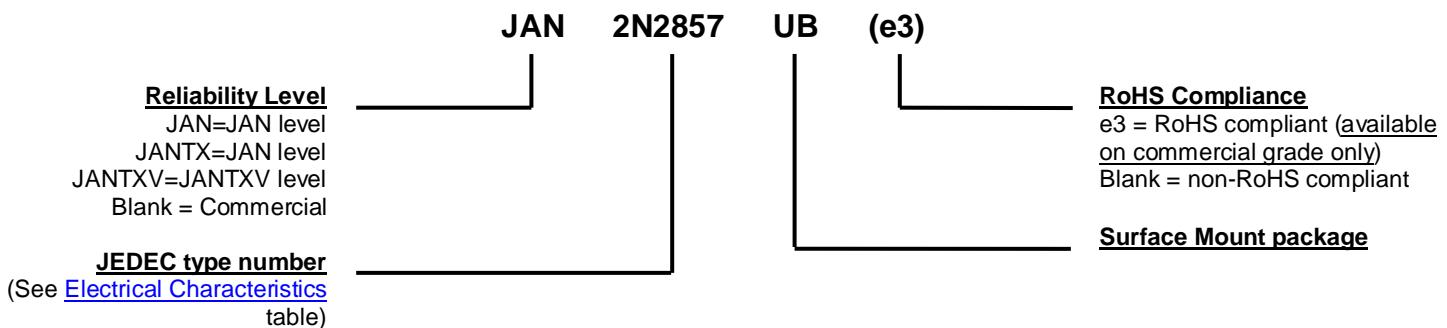
#### Website:

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

### MECHANICAL and PACKAGING

- CASE: Ceramic.
- TERMINALS: Gold plating over nickel underplate. RoHS compliant matte/tin available on commercial grade only.
- MARKING: Part number, date code, manufacturer's ID.
- TAPE & REEL option: Standard per EIA-418D. Consult factory for quantities.
- WEIGHT: < 0.04 Grams.
- See [Package Dimensions](#) on last page.

### PART NOMENCLATURE



### SYMBOLS & DEFINITIONS

Symbol	Definition
$I_C$	Collector current (dc).
$I_B$	Base current (dc).
$T_A$	Ambient or free air temperature.
$T_C$	Case temperature.
$V_{CB}$	Collector to base voltage (dc).
$V_{EB}$	Emitter to base voltage (dc).

**ELECTRICAL CHARACTERISTICS @  $T_C = +25^\circ\text{C}$** 
**OFF CHARACTERISTICS**

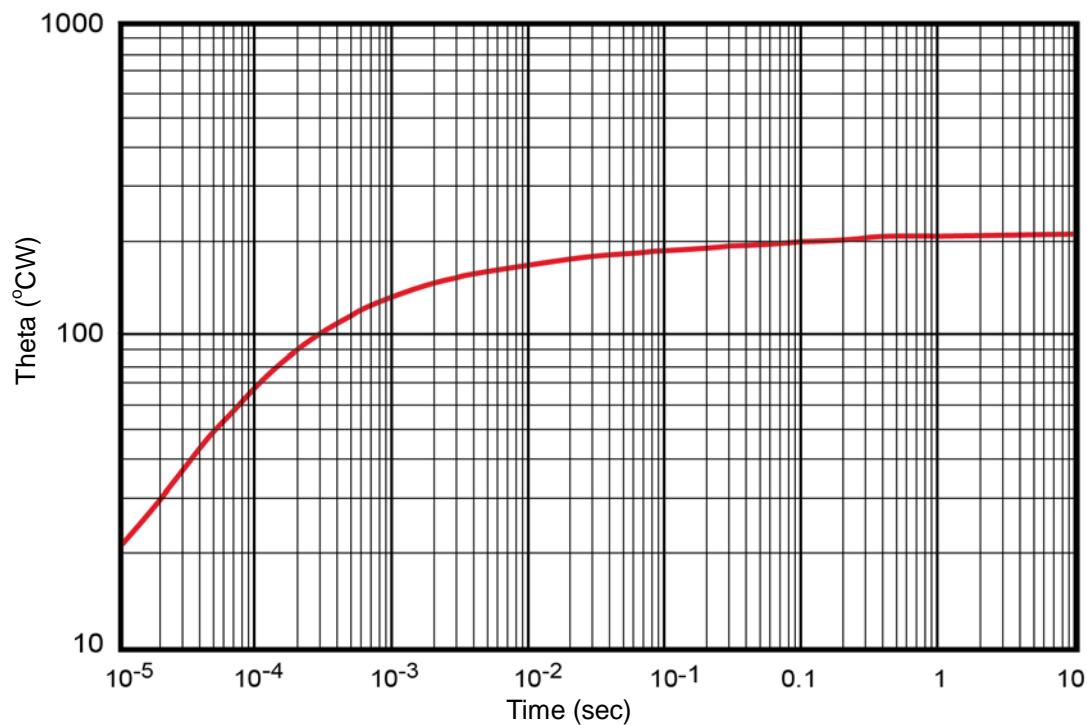
<b>Test Conditions</b>	<b>Symbol</b>	<b>Value</b>			<b>Unit</b>
		<b>Min.</b>	<b>Typ.</b>	<b>Max.</b>	
Collector-Emitter Breakdown Voltage ( $I_C = 3.0 \text{ mA}$ , Bias condition D)	$V_{(\text{BR})\text{CEO}}$	15	-	-	V
Collector to Emitter Cutoff Current ( $V_{CE} = 16 \text{ V}$ , Bias condition C)	$I_{CES}$	-	-	100	nA
Emitter to Base Cutoff Current ( $V_{EB} = 3 \text{ V}$ , Bias condition D)	$I_{EBO}$	-	-	10	$\mu\text{A}$
Collector to Base Cutoff Current ( $V_{CB} = 15 \text{ V}$ , Bias condition D)	$I_{CBO}$	-	-	10	nA

**ON CHARACTERISTICS**

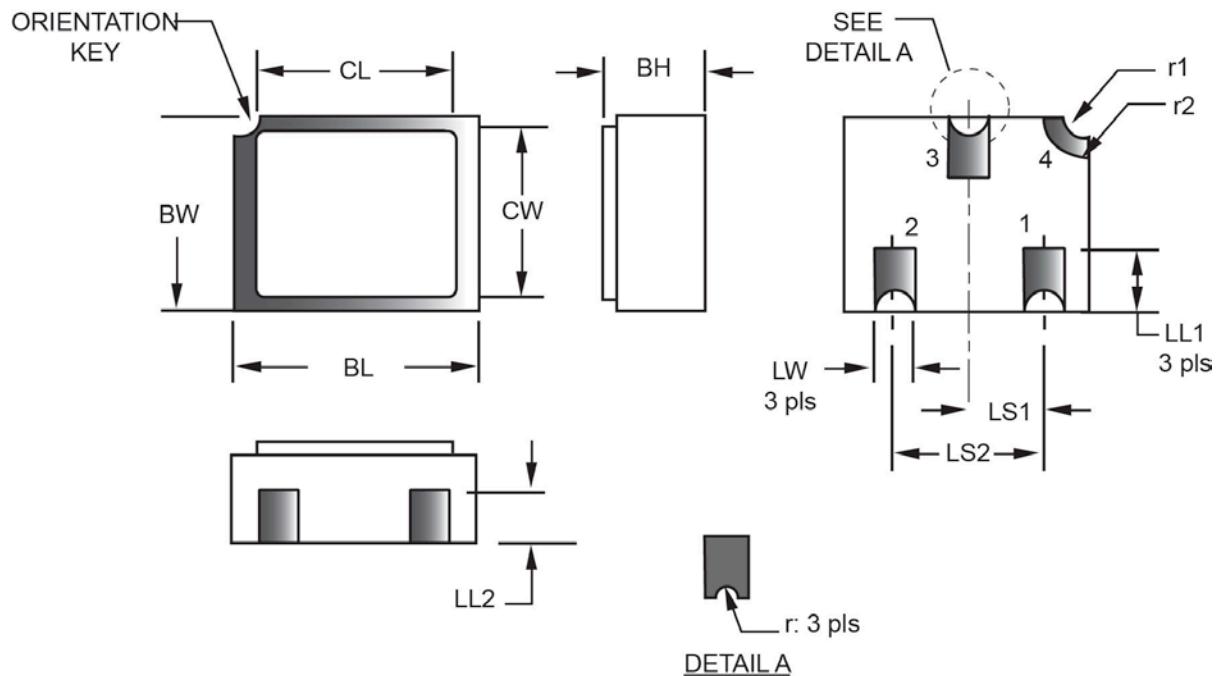
<b>Test Conditions</b>	<b>Symbol</b>	<b>Value</b>			<b>Unit</b>
		<b>Min.</b>	<b>Typ.</b>	<b>Max.</b>	
Forward Current transfer ratio ( $I_C = 3.0 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$ )	$h_{FE}$	30	-	150	
Collector-Emitter Saturation Voltage ( $I_C = 10 \text{ mA}$ , $I_B = 1 \text{ mA}$ )	$V_{CE(\text{sat})}$		-	0.4	V
Base-Emitter Saturation Voltage ( $I_C = 10 \text{ mA}$ , $I_B = 1 \text{ mA}$ )	$V_{BE(\text{sat})}$		-	1.0	V

**DYNAMIC CHARACTERISTICS**

<b>Test Conditions</b>	<b>Symbol</b>	<b>Value</b>			<b>Unit</b>
		<b>Min.</b>	<b>Typ.</b>	<b>Max.</b>	
Magnitude of common emitter small signal short circuit forward current transfer ratio ( $V_{CE} = 6 \text{ V}$ , $I_C = 5 \text{ mA}$ , $f = 100 \text{ MHz}$ )	$ h_{fe} $	10	-	21	
Collector-base time constant ( $I_E = 2.0 \text{ mA}$ , $V_{CB} = 6.0 \text{ V}$ , $f = 31.9 \text{ MHz}$ )	$r_b' C_c$	4	-	15	pF
Collector to Base – feedback capacitance ( $I_E = 0 \text{ mA}$ , $V_{CB} = 10 \text{ V}$ , $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$ )	$C_{cb}$			1.0	pF
Noise Figure (50 Ohms) ( $I_C = 1.5 \text{ mA}$ , $V_{CE} = 6 \text{ V}$ , $f = 450 \text{ MHz}$ , $R_g = 50 \Omega$ )	$F$		4.5		dB
Small Signal Power Gain (common emitter) ( $I_E = 1.5 \text{ mA}$ , $V_{CE} = 6 \text{ V}$ , $f = 450 \text{ MHz}$ )	$G_{pe}$	12.5		21	dB

**GRAPHS**

**FIGURE 1**  
Maximum Thermal Impedance

**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	1.02				
BL	.115	.128	2.92	3.25		LS2	.071	.079	1.80	2.01				
BW	.085	.108	2.16	2.74		LW	0.16	0.24	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	0.97		r2		.022		.056				
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  $\Phi x$  symbology.