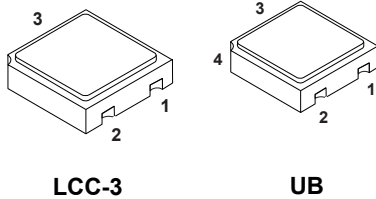
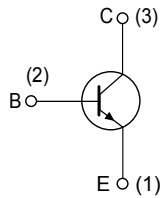


High reliability 50 V, 0.5 A NPN transistor


LCC-3
UB

Pin 4 in UB is connected to the metallic lid.



DS10450

Features

V_{ce0}	$I_C(\text{max.})$	H_{FE} at 10 V, 150 mA	$T_j(\text{max.})$
60 V	0.5 A	> 250	200 °C

- Hermetic packages
- ESCC qualified

Description

This bipolar transistor is qualified as per ESCC 5201/001 specification and designed to operate under severe environment conditions.

Available in LCC-3 and UB hermetic packages, it is specifically recommended for space and harsh environment applications and suitable for low current and high precision circuits such preamplifiers, oscillators, current mirror configuration.

In case of discrepancies between this datasheet and the relevant agency specification, the latter takes precedence.

Product summary

Product status link
2N2484HR

Product summary			
Part-number	Qualification system	Agency specification	Package
2N2484UBx	ESCC	5201/001	UB
SOC2484HRx			LCC-3

Note: See [Table 7](#) for ordering information.

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit	
V_{CBO}	Collector-base voltage ($I_E = 0$)	60	V	
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	60	V	
V_{EBO}	Emitter-base voltage ($I_C = 0$)	6	V	
I_C	Collector current	0.5	A	
P_{TOT}	Total dissipation at $T_{amb} \leq 25\text{ °C}$	LCC-3 and UB	0.36	W
		LCC-3 and UB ⁽¹⁾	0.73	
T_{OP}	Operating temperature range	-65 to 200	°C	
T_J	Max. operating junction temperature	200	°C	

1. When mounted on a 15 x 15 x 0.6 mm ceramic substrate.

Table 2. Thermal data

Symbol	Parameter	LCC-3 and UB Value	Unit
R_{thJA}	Thermal resistance junction-ambient (max)	486	°C/W
	Thermal resistance junction-ambient (max)	240 ⁽¹⁾	

1. When mounted on a 15 x 15 x 0.6 mm ceramic substrate.

2 Electrical characteristics

Table 3. Electrical characteristics ($T_{amb} = 25\text{ °C}$ unless otherwise specified)

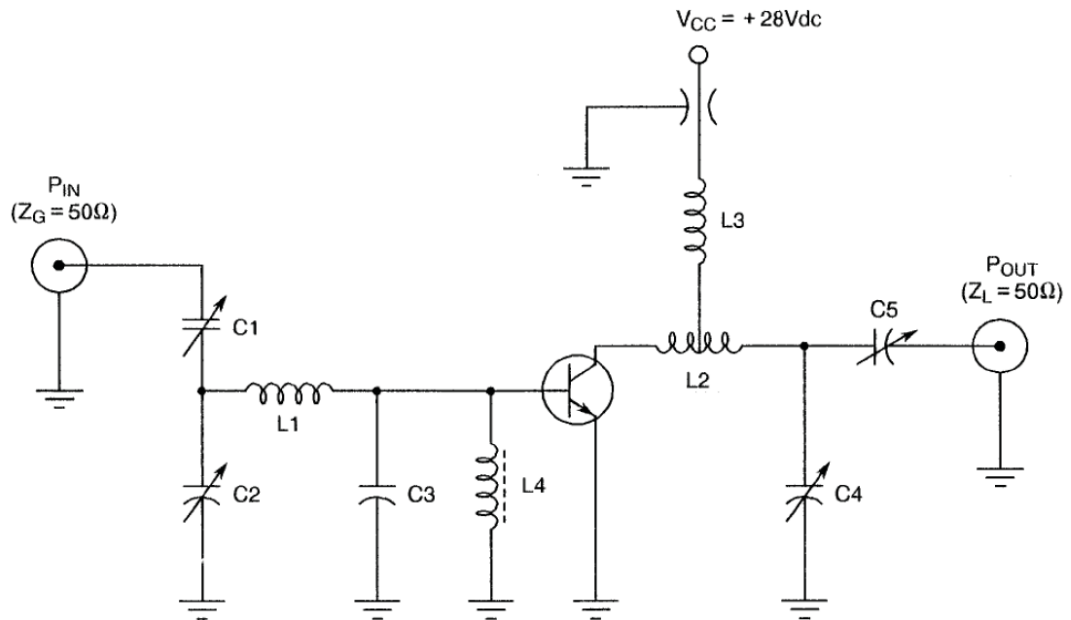
Symbol	Parameter	Test conditions ⁽¹⁾	Min.	Max.	Unit
I_{CBO}	Collector-base cut-off current ($I_E = 0$)	$V_{CB} = 45\text{ V}$		10	nA
		$V_{CB} = 45\text{ V}, T_{amb} = 150\text{ °C}$		10	μA
I_{EBO}	Emitter-base cut-off current ($I_C = 0$)	$V_{EB} = 5\text{ V}$		10	nA
$V_{(BR)CBO}$	Collector-base breakdown voltage ($I_E = 0$)	$I_C = 10\text{ }\mu\text{A}$	60		V
$V_{(BR)CEO}^{(2)}$	Collector-emitter breakdown voltage ($I_B = 0$)	$I_C = 10\text{ mA}$	60		V
$V_{(BR)EBO}$	Emitter-base breakdown voltage ($I_C = 0$)	$I_C = 10\text{ }\mu\text{A}$	6		V
$V_{CE(sat)}^{(2)}$	Collector-emitter saturation voltage	$I_C = 1\text{ mA}, I_B = 0.1\text{ mA}$		0.35	V
$h_{FE}^{(2)}$	DC current gain	$I_C = 1\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$	30		
		$I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$	100	500	
		$I_C = 100\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$	175	550	
		$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}$	250	650	
		$I_C = 10\text{ mA}, V_{CE} = 5\text{ V}$		800	
		$I_C = 10\text{ }\mu\text{A}, T_{amb} = -55\text{ °C}, V_{CE} = 5\text{ V}$	20		
h_{fe}	High frequency, current gain 1	$I_C = 50\text{ }\mu\text{A}, f = 5\text{ MHz}, V_{CE} = 5\text{ V}$	3		
	High frequency, current gain 2	$I_C = 500\text{ }\mu\text{A}, f = 30\text{ MHz}, V_{CE} = 5\text{ V}$	2		
C_{obo}	Output capacitance, ($I_E = 0$)	$V_{CB} = 5\text{ V}, I_B = 0.1\text{ mA}$		6	pF
C_{ibo}	Input capacitance	$V_{EB} = 0.5\text{ V}, I_C = 0\text{ A}, f = 1\text{ MHz}$		6	V
h_{FE}	Small signal current gain	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$	150		900
h_{ie}	Small signal input impedance	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$	3.5	24	k Ω
h_{oc}	Small signal output impedance	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$		40	μmho
h_{re}	Small signal reverse voltage transfer ratio	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$		800	10^{-6}
N_{FW}	Wide-Band noise	$I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}, R_S = 10\text{ k}\Omega$		3	dB
N_{FN1}	Spot noise figure	$V_{CE} = 5\text{ V}, I_C = 10\text{ }\mu\text{A}$ $R_S = 10\text{ k}\Omega, f = 100\text{ Hz}, \text{power BW} = 200\text{ Hz}$		10	
N_{FN2}		$V_{CE} = 5\text{ V}, I_C = 10\text{ }\mu\text{A}$ $R_S = 10\text{ k}\Omega, f = 1\text{ Hz}, \text{power BW} = 20\text{ Hz}$		3	dB
N_{FN3}		$V_{CE} = 5\text{ V}, I_C = 10\text{ }\mu\text{A}$ $R_S = 10\text{ k}\Omega, f = 10\text{ Hz}, \text{power BW} = 2\text{ Hz}$		2	

1. Measurement performed on a sample basis, LTPD 7 or less.

2. Pulse measurement: Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 1.0\%$

3 Test circuits

Figure 1. Circuit for electrical measurements



AM07818v1

Table 4. List of components

Component	Description
C1, C2, C5	3.0 - 35 pF
C3 ⁽¹⁾	24 pF
C4	0.4 - 7.0 pF
L1	Straight piece n° 16 bare tin wire, 5/8 inch long
L2	3 turns n° 16 wire, 1/4 inch ID, 5/16 inch long
L3	1 turn n° 18 wire, 1/4 inch ID, 1/4 inch long
L4	Ferrite rf choke, Z = 450 Ω

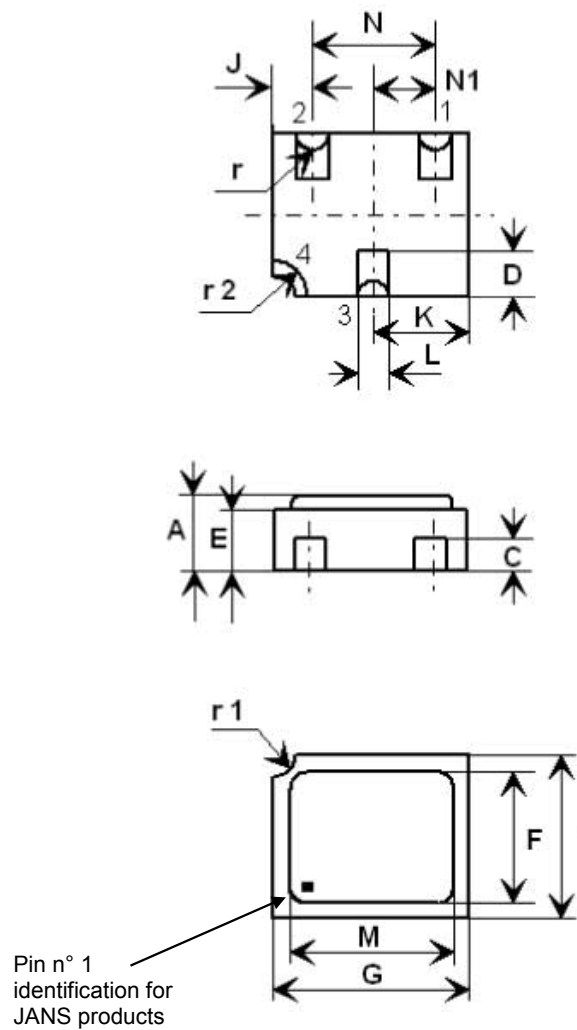
1. For optimum performance, C3 should be mounted as close as possible to the base lead.

4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

4.1 UB package information

Figure 2. UB package outline



- Pad 1: Emitter
- Pad 2: Base
- Pad 3: Collector
- Pad 4: Shielding connected to the lid

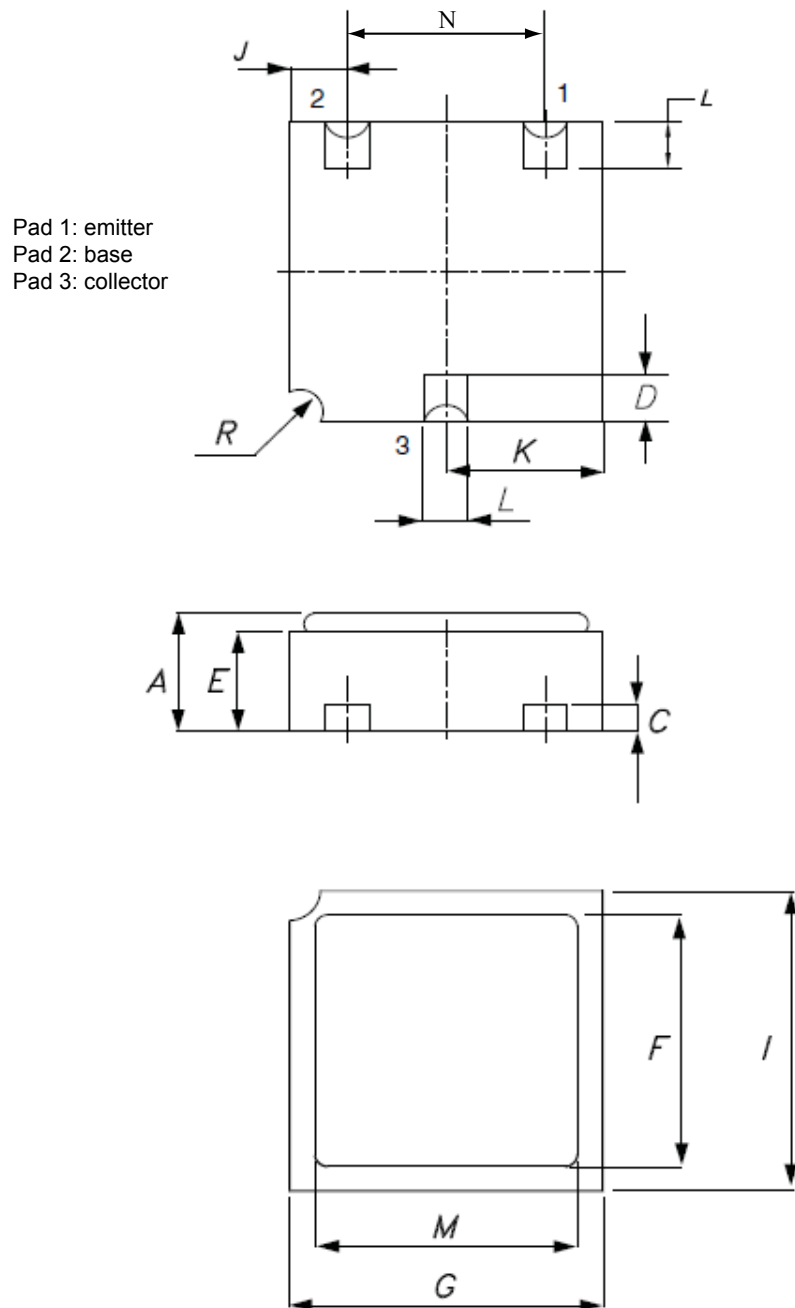
8206487 rev.6

Table 5. UB package mechanical data

Symbols	Dimensions in mm			Dimensions in inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.16		1.42	0.045		0.056
C	0.46	0.51	0.56	0.018	0.020	0.022
D	0.56	0.76	0.96	0.024	0.030	0.036
E	0.92	1.02	1.12	0.036	0.040	0.044
F	1.95	2.03	2.11	0.077	0.080	0.083
G	2.92	3.05	3.18	0.115	0.120	0.125
I	2.41	2.54	2.67	0.095	0.100	0.105
J	0.42	0.57	0.72	0.0165	0.0225	0.0285
K	1.37	1.52	1.67	0.054	0.060	0.066
L	0.41	0.51	0.61	0.016	0.020	0.024
M	2.46	2.54	2.62	0.097	0.100	0.103
N	1.81	1.91	2.01	0.071	0.075	0.079
N1	0.91	0.96	1.02	0.036	0.038	0.040
r		0.20			0.008	
r1		0.30			0.012	
r2		0.56			0.022	

4.2 LCC-3 package information

Figure 3. LCC-3 package outline



0041211 rev.14

Table 6. LCC-3 package mechanical data

Symbols	Dimensions in mm			Dimensions in inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.16		1.42	0.046		0.056
C	0.45	0.50	0.56	0.018	0.020	0.022
D	0.60	0.56	0.96	0.024	0.022	0.038
E	0.91	1.01	1.12	0.036	0.040	0.044
F	1.95	2.03	2.11	0.077	0.080	0.083
G	2.92	3.05	3.17	0.115	0.120	0.125
I	2.41	2.54	2.66	0.095	0.100	0.105
J	0.42	0.57	0.72	0.0165	0.0225	0.0285
K	1.37	1.52	1.67	0.054	0.060	0.066
L	0.40	0.50	0.60	0.016	0.020	0.024
M	2.46	2.54	2.62	0.097	0.100	0.103
N	1.80	1.90	2.00	0.071	0.075	0.079
R		0.30			0.012	

5 Ordering information

Table 7. Ordering information

Part number	Agency specification	Quality level	Radiation level	Package	Mass	Lead finish	Marking ⁽¹⁾	Packing	
2N2222AUB1	-	Engineering model	-	UB	0.6 g	Gold	2N2222AUB1	WafflePack	
SOC2222A1	-	Engineering model	-	LCC-3			SOC2222A1		
2N2222ARUBG	5201/002/11R	ESCC	100 krad	UB		Gold	520100211R		Tape and reel
2N2222ARUBT	5201/002/12R					Solder Dip	520100212R		
2N2222ARUBTW	5201/002/12R					Gold	520100211	WafflePack	
2N2222AUBG	5201/002/11		Solder Dip			520100212			
2N2222AUBT	5201/002/12		Gold			520100204R	Tape and reel		
SOC2222ARHRG	5201/002/04R		Solder Dip			520100205R			
SOC2222ARHRT	5201/002/05R		LCC-3	100 krad		Solder Dip	520100205R	WafflePack	
SOC2222ARHRTW	5201/002/05R					Gold	520100204		
SOC2222AHRG	5201/002/04					Solder Dip	520100205	Tape and reel	
SOC2222AHRT	5201/002/05			Solder Dip		520100205			
SOC2222AHRTW	5201/002/05	-		-					

1. Specific marking only. The full marking includes in addition: For the Engineering Models: ST logo, date code; country of origin (FR). For ESCC flight parts: ST logo, date code, country of origin (FR), ESA logo, serial number of the part within the assembly lot.

Contact ST sales office for information about specific conditions for products in die form.



6 Other information

6.1 Traceability information

The date code information is structured as described in the table below.

Table 8. Date codes

Model	Date code
EM	3yywwN
ESCC	yywwN

1. yy = year, ww = week number, N = lot index in the week.

6.2 Documentation

Table 9. Documentation provided for each type of product

Quality level	Radiation level	Documentation
Engineering model	-	Certificate of conformance
ESCC	-	Certificate of conformance ESCC qualification maintenance lot reference

Revision history

Table 10. Document revision history

Date	Revision	Changes
09-Jul-2010	1	Initial release.
26-Feb-2013	2	Updated: Table 1: Device summary and Table 11: Order codes.
01-Apr-2014	3	Updated: Table 1: Device summary and Table 11: Order codes. Minor text changes.
15-Mar-2021	4	Removed TO-18 package information. Minor text changes in the document title and description on the cover page.
11-Oct-2021	5	Updated Description.

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