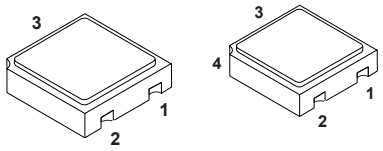
2N2484HR

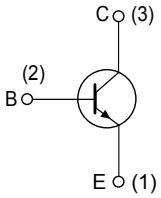
Datasheet

Rad-Hard 50 V, 0.5 A NPN bipolar transistor



LCC-3 **UB**

Pin 4 in UB is connected to the metallic lid.



DS10450

Product status link
2N2484HR

Features

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

- Hermetic packages
- ESCC qualified

Description

The 2N2484HR is a silicon planar NPN transistor specifically designed and housed in hermetic packages for aerospace and Hi-Rel applications. It is available in the ESCC qualification system (ESCC 5000 compliance). In case of discrepancies between this datasheet and the relevant agency specification, the latter takes precedence.

Product summary

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 $T_{amb} \leq 25$ °C	LCC-3 and UB LCC-3 and UB(1)	0.36 0.73	W
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
RthJA	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 °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 V		10	nA
		V_{CB} = 45 V, T_{amb} = 150 °C		10	µA
I_{EBO}	Emitter-base cut-off current (I_C = 0)	V_{EB} = 5 V		10	nA
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = 10 µA	60		V
$V_{(BR)CEO}$ [2]	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10 mA	60		V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_C = 10 µA	6		V
$V_{CE(sat)}$ [2]	Collector-emitter saturation voltage	I_C = 1 mA, I_B = 0.1 mA		0.35	V
h_{FE} [2]	DC current gain	I_C = 1 µA, V_{CE} = 5 V	30		
		I_C = 10 µA, V_{CE} = 5 V	100	500	
		I_C = 100 µA, V_{CE} = 5 V	175	550	
		I_C = 1 mA, V_{CE} = 5 V	250	650	
		I_C = 10 mA, V_{CE} = 5 V		800	
		I_C = 10 µA, T_{amb} = -55 °C, V_{CE} = 5 V	20		
h_{fe}	High frequency, current gain 1	I_C = 50 µA, f = 5 MHz, V_{CE} = 5 V	3		
	High frequency, current gain 2	I_C = 500 µA, f = 30 MHz, V_{CE} = 5 V	2		
C_{obo}	Output capacitance, (I_E = 0)	V_{CB} = 5 V, I_B = 0.1 mA		6	pF
C_{ibo}	Input capacitance	V_{EB} = 0.5 V, I_C = 0 A, f = 1 MHz		6	V
h_{FE}	Small signal current gain	I_C = 1 mA, V_{CE} = 5 V, f = 1 kHz	150		900
h_{ie}	Small signal input impedance	I_C = 1 mA, V_{CE} = 5 V, f = 1 kHz	3.5	24	kΩ
h_{oc}	Small signal output impedance	I_C = 1 mA, V_{CE} = 5 V, f = 1 kHz		40	µmho
h_{re}	Small signal reverse voltage transfer ratio	I_C = 1 mA, V_{CE} = 5 V, f = 1 kHz		800	10^{-6}
N_{FW}	Wide-Band noise	I_C = 10 µA, V_{CE} = 5 V, R_S = 10 kΩ		3	dB
NF_{N1}	Spot noise figure	V_{CE} = 5 V, I_C = 10 µA R_S = 10 kΩ, f = 100 Hz, power BW = 200 Hz		10	dB
NF_{N2}		V_{CE} = 5 V, I_C = 10 µA R_S = 10 kΩ, f = 1 Hz, power BW = 20 Hz		3	
NF_{N3}		V_{CE} = 5 V, I_C = 10 µA R_S = 10 kΩ, f = 10 Hz, power BW = 2 Hz		2	

1. *Measurement performed on a sample basis, LTPD 7 or less.*
2. *Pulse measurement: Pulse width ≤ 300 µs, duty cycle ≤ 1.0 %*

3 Test circuits

Figure 1. **Circuit for electrical measurements**

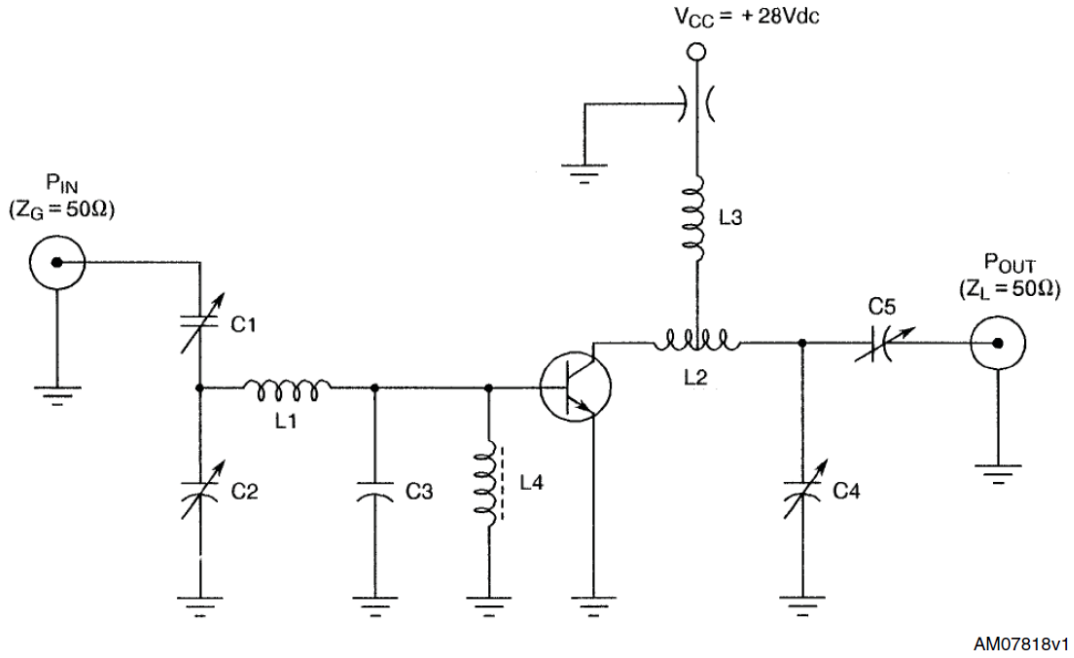


Table 4. **List of components**

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

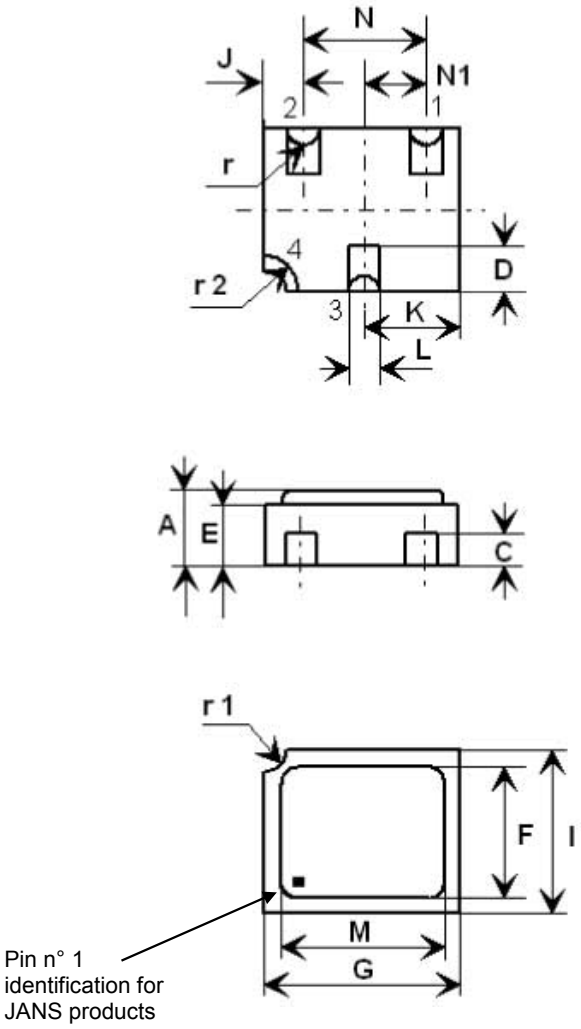
1. *For optimum performance, C3 should be mounted as close as possible to the base lead.*

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

Pad 1: emitter
Pad 2: base
Pad 3: collector

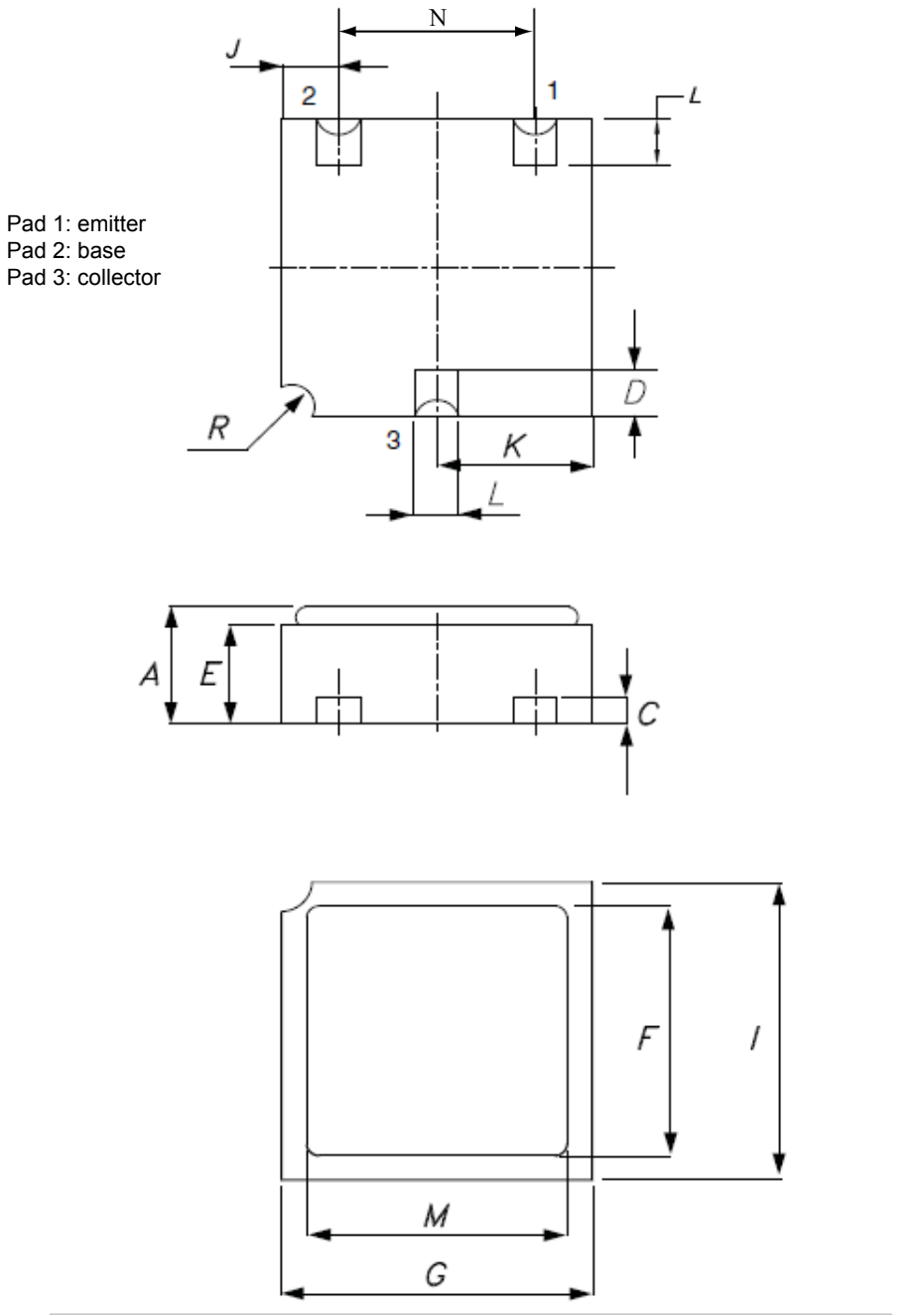


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Table 6. **LCC-3 package mechanical data**

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	Package	Mass	Lead finish	Marking[1]	Packing
2N2484UB1	-	Engineering model	UB	0.6 g	Gold	2N2484UB1	WafflePack
SOC24841	-		LCC-3		Gold	SOC24841	
2N2484UBG	5201/001/06	ESCC Flight	UB		Gold	520100106	
2N2484UBT	5201/001/07		UB		Solder Dip	520100107	
SOC2484HRG	5201/001/04		LCC-3		Gold	520100104	
SOC2484HRT	5201/001/05		LCC-3		Solder Dip	520100105	

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 in formation 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.

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