RBN25N125S1UFWA

1250V - 25A - IGBT

R07DS1499EJ0120
Rev.1.20
Oct.18th.2024

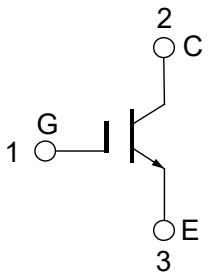
Features

- Renesas generation 8th Trench IGBT
- Low collector to emitter saturation voltage
  $V_{CE(sat)}$ = 1.8 V typ. (at I_C = 25 A, V_{GE} = 15 V, Ta = 25 °C)
- High speed switching
- Short circuit withstands time (10 μs min.)
- Applications: UPS, Welding, photovoltaic inverters, Power converter system
- Unsawn wafer Wafer size = 200 mm
- Quality grade: Standard

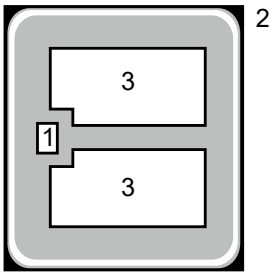
Key performance

Product name	V_{CES}	I_C	Die size	Package
RBN25N125S1UFWA	1250 V	25 A	23.46 mm^2 (4.60 mm x 5.10 mm)	Unsawn wafer

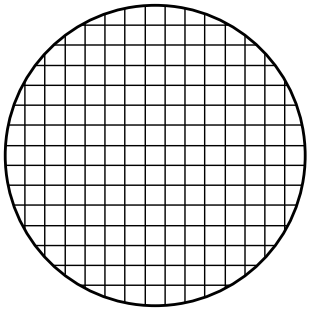
Outline



Die



Wafer



1. Gate
2. Collector (The back)
3. Emitter

Mechanical parameter

Chip size	4.60 x 5.10	mm
Area total	23.46	mm^2
Thickness	0.142 typ.	mm
Wafer size	193.9	mm
Passivation frontside	Polyimide	
Pad metal	AlSi 5.5 μm	
Backside metal	Ni/Au	

Absolute Maximum Ratings

(Tj = 25 °C unless otherwise noted)

Item	Symbol	Ratings	Unit
Collector to emitter voltage	V_{CES}	1250	V
Gate to emitter voltage	V_{GES}	±30	V
Collector current	I_C	— Notes1	A
Junction temperature	T_j Notes2	175 Notes2	°C

Notes: 1. Depends on thermal properties of assembly. Tj = 175 °C.
2. Please use this device in the thermal conditions which the junction temperature does not exceed 175 °C.
3. Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect a reliability even if it is within the absolute maximum ratings. Please consider derating condition for appropriate reliability in reference Renesas Semiconductor Reliability Handbook (Recommendation for Handling and Usage of Semiconductor Devices) and individual reliability data. Especially for V_{CE} condition, recommended operating condition is set up to 80% of V_{CES} based on Renesas reliability test (HTRB) condition.

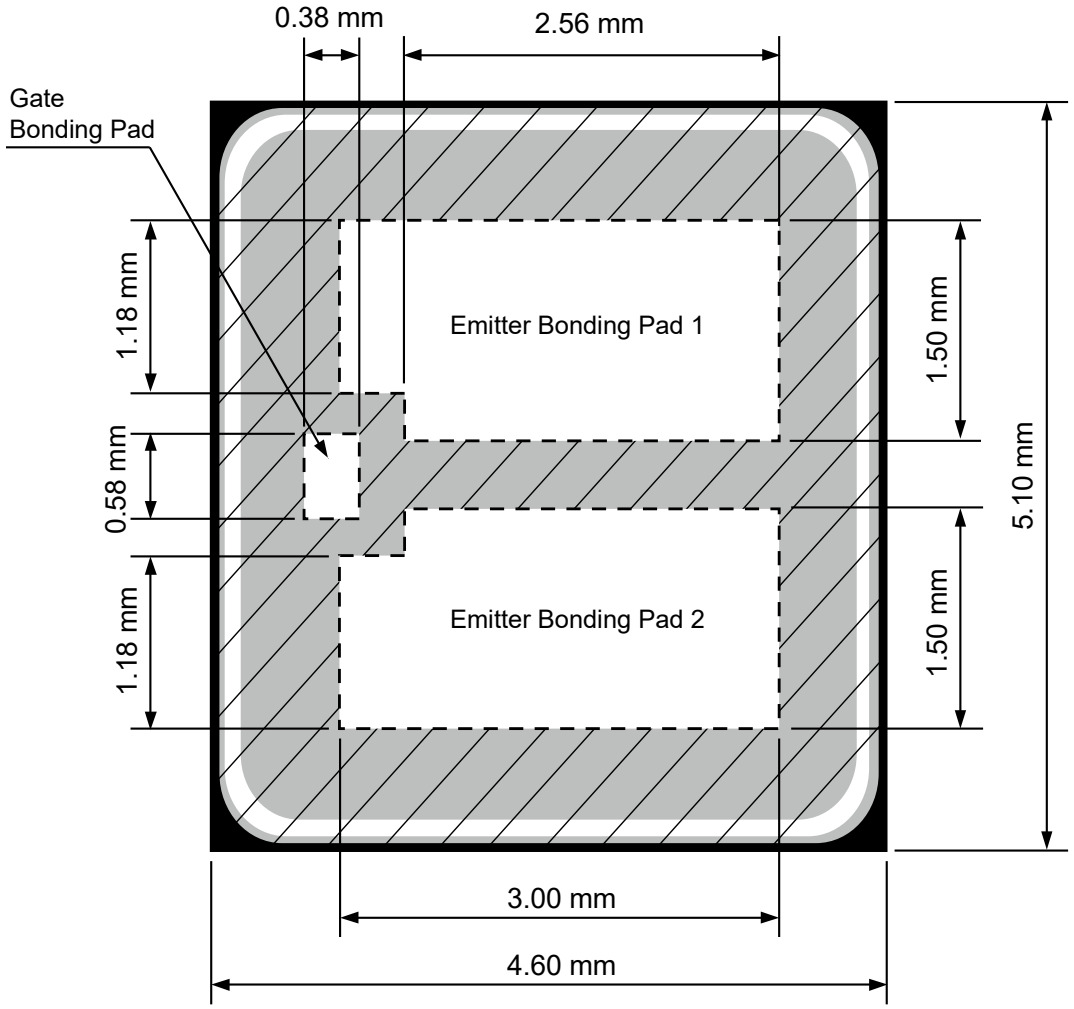
Electrical Characteristics

(Tj = 25 °C unless otherwise noted)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to emitter leakage current	I_{CES}	—	—	10	μA	V_{CE} = 1250 V, V_{GE} = 0 V Notes4
Gate to emitter leakage current	I_{GES}	—	—	±1	μA	V_{GE} = ±30 V, V_{CE} = 0 V Notes4
Gate to emitter threshold voltage	$V_{GE(th)}$	5.3	—	7.1	V	V_{CE} = 10 V, I_C = 0.83 mA Notes4
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.8	2.34	V	I_C = 25 A, V_{GE} = 15 V Notes5, Notes6, Notes7
Input capacitance	C_{ies}	—	1540	—	pF	V_{CE} = 25 V
Output capacitance	C_{oes}	—	78	—	pF	V_{GE} = 0 V
Reverse transfer capacitance	C_{res}	—	12	—	pF	f = 1 MHz Notes6, Notes7
Short circuit withstand time	tsc	10	—	—	μs	V_{CC} ≤ 720 V, V_{GE} = 15 V Tc ≤ 150 °C Notes6, Notes7

Notes: 4. Tested on wafer
5. Pulse test
6. Designed target value on Renesas measurement condition. (Not tested)
7. Characteristic value on TO-247 package
8. Characteristic items prescribed in this document will guarantee the electrical characteristics in chip state but not the characteristic fluctuations or characteristic defects that occur in the processes after assembling.
9. Switching characteristics is depending strongly on module design and mounting technology and can therefore not be specified for a bare die.
10. Please refer to “R07DS1378 RBN25H125S1FPQ-A0 Data sheet” for packaged product datasheet.

Die Dimension



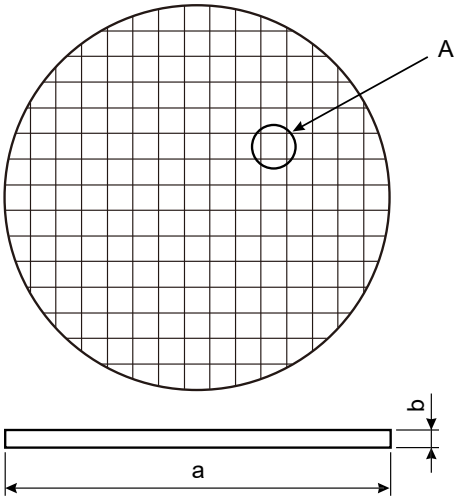
Notes 1:

Illustration	Definition
Part of dotted line	Bonding area
Part of gray	Final passivation

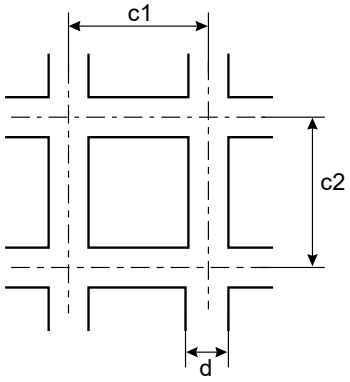
Notes 2: Recognition, target and any other patterns which are not related to IGBT operation, may be changed without notice.

Wafer Dimension

Wafer dimension

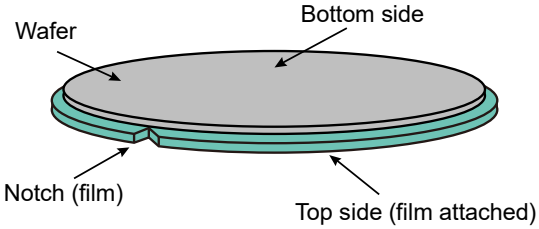


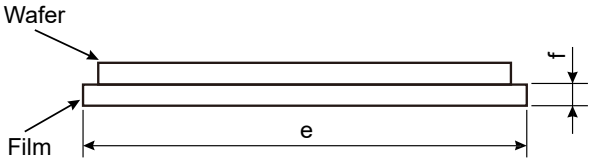
A Enlargement



Item	Symbol	Dimensions (mm)
Wafer diameter	a	193.9
Wafer thickness	b	0.149
Chip pitch	c1	4.60
	c2	5.10
Scribe grid	d	0.076

Outline of film attached Wafer (at delivery)





Film dimension (e) : 200 mm
Film thickness (f) : 0.12 mm to 0.16 mm

Ordering Information

Please contact your Renesas sales representative for sample requests.

Delivery Form	Ordering Part Number	Ordering Quantity Unit
Unsawn wafer	RBN25N125S1UFWA-850#FF0	5740 (5 wafers)
Unsawn wafer	RBN25N125S1UFWA-8F0#FF0	28700 (25 wafers)

Note. The order quantities indicate the maximum quantity of chips for each part number, and the actual quantity of chips shipped will be reduced due to yield. These is also a possibility that the number of wafers may decrease during the manufacturing process. The quantity shipped will be indicated on the label as the number of good chips.

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