RJP6831PJWS

750V - 300A - IGBT
Applications: Automotive

R07DS1577EJ0100
Rev.1.00
Nov.22nd.2024

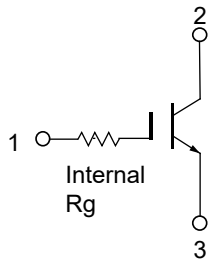
Features

- 750 V Trench & field stop high AE4 technology
- Low collector to emitter saturation voltage
  $V_{CE(sat)}$ = 1.4 V typ. (at I_C = 300 A, V_{GE} = 15 V, Tj = 25 °C)
- Low Switching loss
- Easy paralleling by internal Rg
- AEC Q101 (HTRB, HTGB) qualified
- Applications: Hybrid and electric vehicle inverter

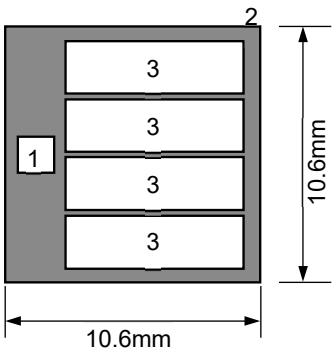
Key performance

Product name	V_{CES}	I_C	Die size	Package
RJP6831PJWS	750 V	300 A	112.4 mm^2 (10.6 mm x 10.6 mm)	Sawn wafer

Outline



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



Thickness: 92.5µm

Mechanical Parameters

Parameter	value
Die size	112.4 mm^2 (10.6 mm x 10.6 mm)
Emitter pad size	See Die Dimension
Gate pad size	1.5 mm x 1.5 mm
Die thickness	92.5 μm
Wafer size	200 mm
Passivation front side	Polyimide
Pad metallization	Ni / Au – 2.5 μm / 0.035 μm
Backside metallization	Ni / Au - 0.6 μm / 0.1 μm
Die attach recommendation	Solder
Wire bond recommendation	Al wire ≤ 500 μm
Recommended storage environment	Stored in original container, in dry air or nitrogen. 15 months after packing, at an ambient temperature of 20 to 30 °C, dew-point under -30 °C

Absolute Maximum Ratings

(Tj = 25 °C unless otherwise noted)

Item		Symbol	Ratings	Unit
Collector to emitter voltage	Tj = -40 °C	V_{CES}	650 Notes1	V
	Tj = 25 °C		750	V
	Tj = 175 °C		750 Notes1	V
Gate to emitter voltage		V_{GES}	±30	V
Collector current		$I_{C(DC)}$	- Notes2	A
Pulse collector current		$I_{C(pulse)}$	900 Notes1, 4	A
Junction temperature		T_j	175 Notes3	°C

Notes: 1. Not subject to product test – verified by design/characterization.
2. Depending on thermal properties of assembly, Tj ≦ 175 °C.
3. AEC-Q101 complaint. HTGB and HTRB are carried out to determine.
4. PW = 10 μs, Duty < 1 %
5. Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect 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.

Electrical Characteristics 1

(Tested on wafer, Ta = 25 °C unless otherwise noted)

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector to emitter breakdown voltage	$V_{(BR)CES}$	I_C = 100 μA, V_{GE} = 0 V	750	—	—	V
Gate to emitter threshold voltage	$V_{GE(th)}$	V_{CE} = 10 V, I_C = 300 mA	5.5	6.5	7.5	V
Collector to emitter leakage current	I_{CES}	V_{CE} = 750 V, V_{GE} = 0 V	—	—	10	μA
Gate to emitter leakage current	I_{GES}	V_{GE} = ±30 V, V_{CE} = 0 V	—	—	±600	nA
Internal gate resistor	Rg	—	2.64	3.30	3.96	Ω

Notes: 6. The characteristic items specified in this table guarantee the electrical characteristics in the wafer state but do not the characteristic fluctuations or characteristic defects that occur in the processes after assembling.

Electrical Characteristics 2

(Not subject to production test, designed target value, Tj = 25 °C unless otherwise noted)

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector to emitter breakdown voltage	$V_{(BR)CES}$	I_C = 100 μA, V_{GE} = 0 V Tj = -40 °C Notes7	650	—	—	V
		I_C = 5 mA, V_{GE} = 0 V Tj = 175 °C Notes7	750	—	—	V
Collector to emitter saturation voltage	$V_{CE(sat)}$	I_C = 300 A V_{GE} = 15 V Notes7	—	1.4	1.7	V
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V f = 1 MHz Notes7	—	10800	—	pF
Output capacitance	C_{oes}		—	650	—	pF
Reverse transfer capacitance	C_{res}		—	220	—	pF

Notes: 7. Designed target value on Renesas measurement condition.

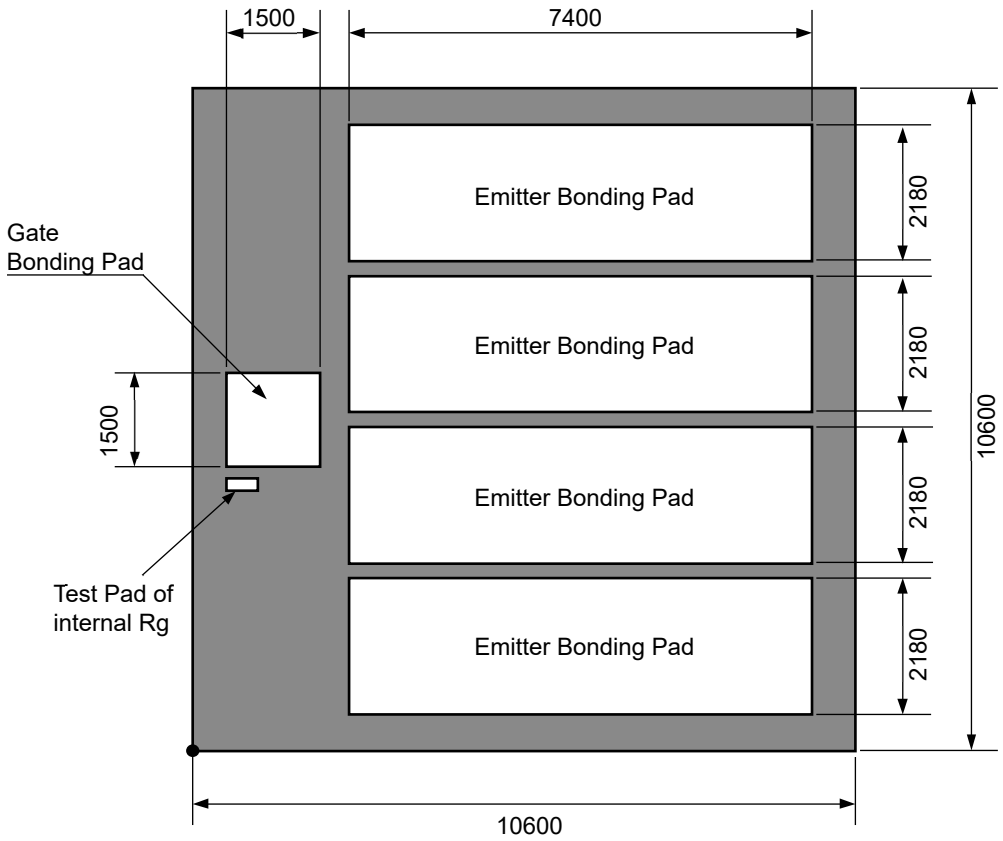
Electrical Characteristics 3

(Not subject to production test, designed target value, Tj = 25 °C unless otherwise noted)

Item	Symbol	Test Conditions	Min	Typ	Max	Unit
Rise time	t_r	V_{CC} = 475 V, I_C = 300 A V_{GE} = 15 V, R_{in} = 5.6 Ω Inductive load Notes8, 9	—	44	—	ns
Fall time	t_f		—	122	—	ns
Short circuit capability	t_{SC}	V_{CC} = 360 V, V_{GE} = 15 V Tj = 150 °C Notes8, 9	6.0	—	—	μs
Short circuit capability (Energy)	E_{SC}	V_{CC} = 500 V, V_{GE} = 18 V Tj = 175 °C Notes8, 9	2.5	—	—	J

Notes: 8. Designed target value on Renesas measurement condition.
9. This value is influenced by parasitic inductance and assembly condition.

Die Dimension



Unit: µm
Die thickness: 92.5 µm
Back side: Collector

Notes 1:

Illustration	Definition
Part of gray	Final passivation (Polyimide)
Part of white	Bonding area (Ni/Au)

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

Ordering Information

Please contact your Renesas sales representative for sample requests.

Delivery Form	Ordering Part Number	Remark
Sawn wafer on foil	RJP6831PJWS-00#W0	

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