

RJP65T43DPQ-A0

650V - 30A - IGBT

Application: Power Factor Correction circuit

R07DS1376EJ0101

Rev. 1.01

Jul 11, 2017

Features

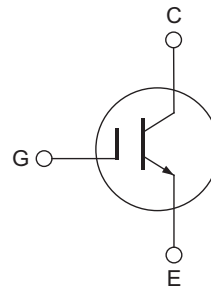
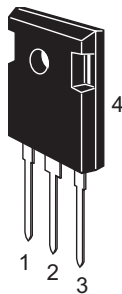
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.8 \text{ V typ. (at } I_C = 20 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Trench gate and thin wafer technology (G7H series)
- High speed switching
 $t_f = 45 \text{ ns typ. (at } V_{CC} = 400\text{V, } V_{GE} = 15\text{V, } I_C = 20\text{A, } R_g = 10\Omega, T_a = 25^\circ\text{C, Inductive load)}$
- Operation frequency ($20\text{kHz} \leq f < 100\text{kHz}$)
 Rating of collector current $I_C = 30\text{A (at } T_c = 100^\circ\text{C)}$
- Not guarantee short circuit withstand time

Key Nominal Performance

Type	V _{CEs}	I _c	V _{CE(sat)} , T _a =25°C	T _j	Marking	Package
RJP65T43DPQ-A0	650V	20A	1.8V	175°C	RJP65T43	TO-247A

Outline

RENESAS Package code: PRSS0003ZH-A
 (Package name: TO-247A)



1. Gate
2. Collector
3. Emitter
4. Collector

Absolute Maximum Ratings

(T_c = 25°C)

Item	Symbol	Ratings	Unit
Collector to emitter voltage	V _{CEs}	650	V
Gate to emitter voltage	V _{GES}	±30	V
Collector current	T _c = 25 °C	I _c	60
	T _c = 100 °C	I _c	30
Collector peak current	i _{c(peak)} ^{Note1}	150	A
Collector dissipation	P _c	150	W
Junction to case thermal resistance	θ _{j-c}	1.0	°C/W
Junction temperature	T _j ^{Note2}	175	°C
Storage temperature	T _{stg}	-55 to +150	°C

Note: Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect a reliability even if it are 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

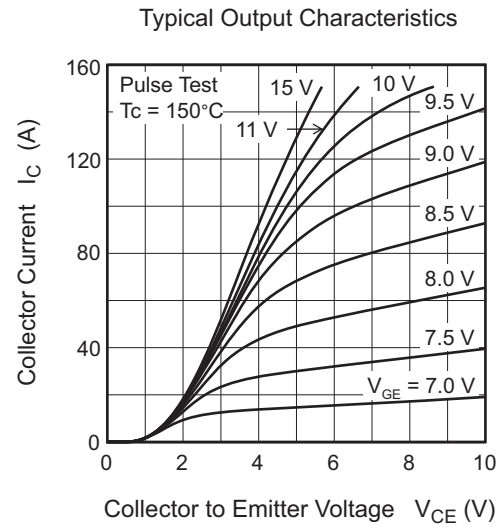
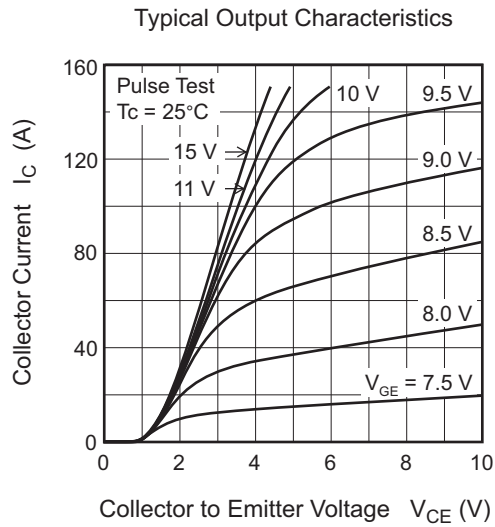
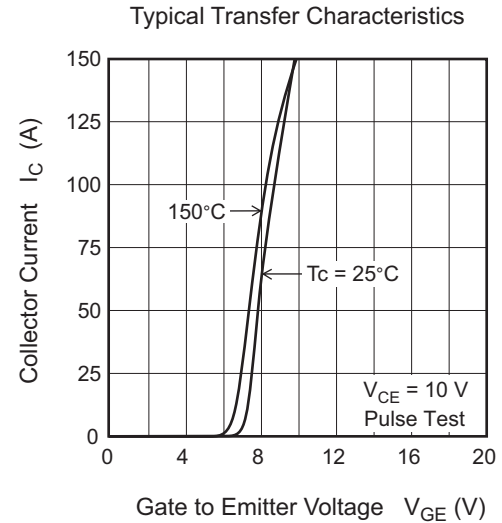
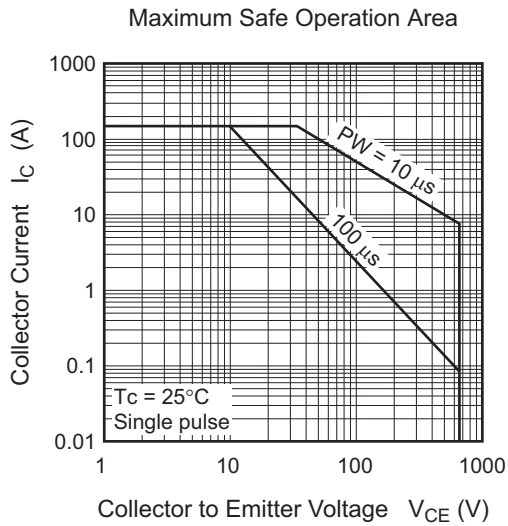
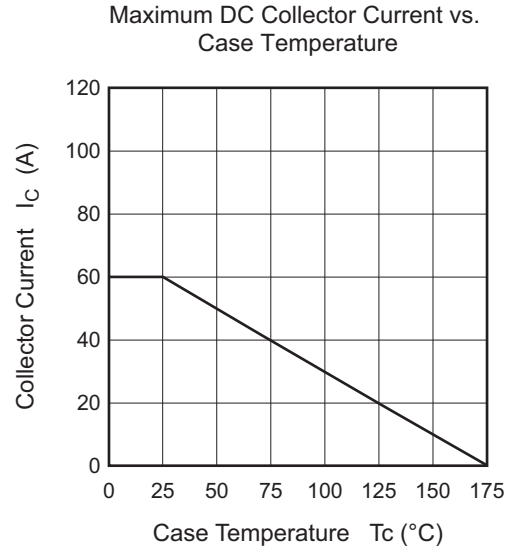
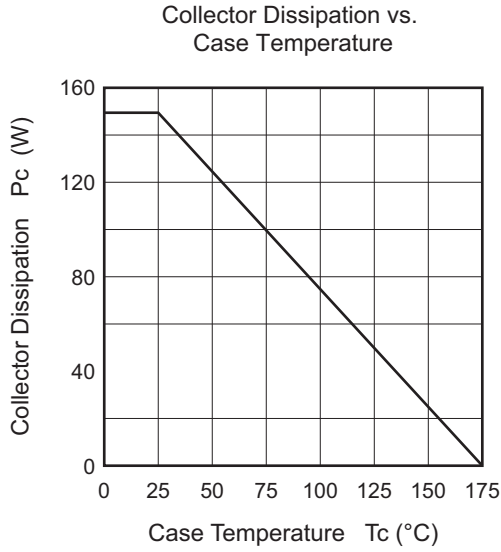
(Ta = 25°C)

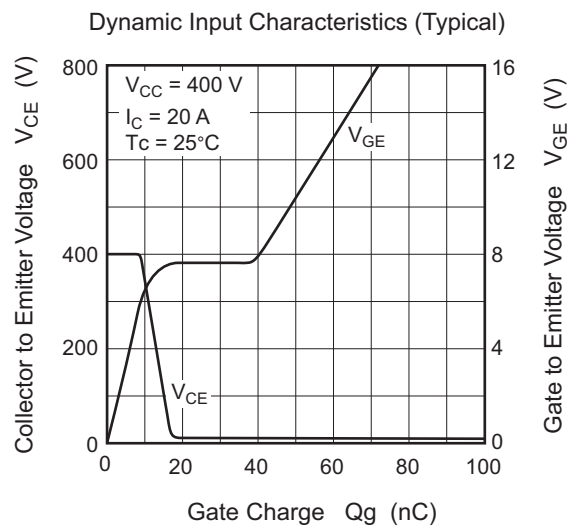
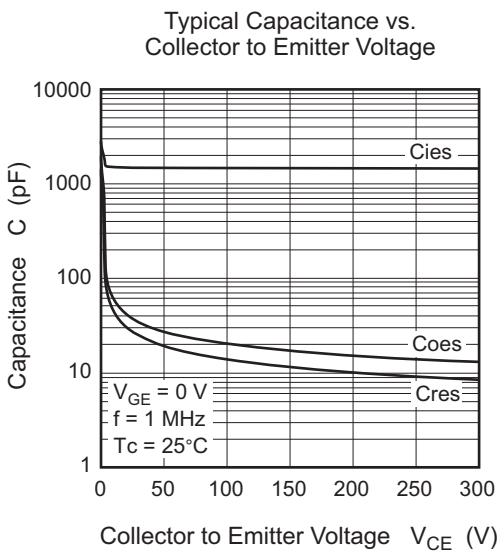
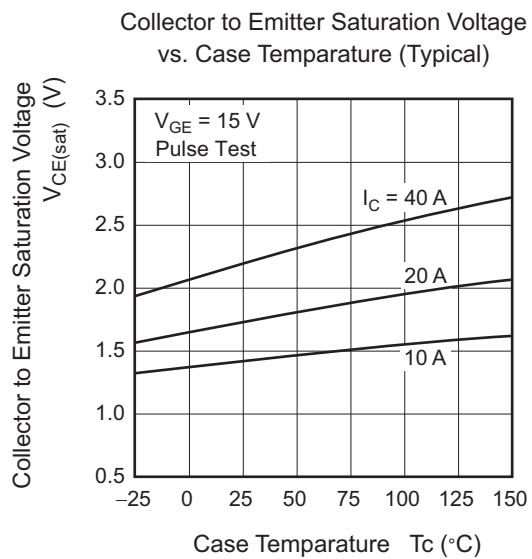
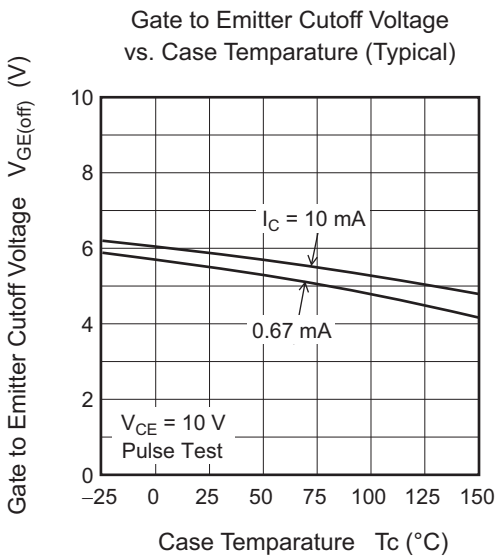
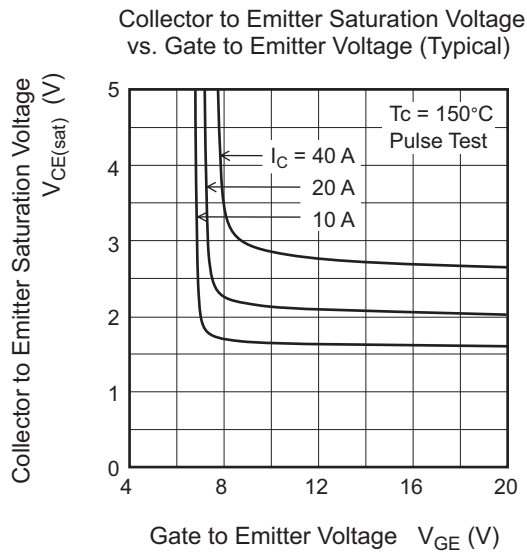
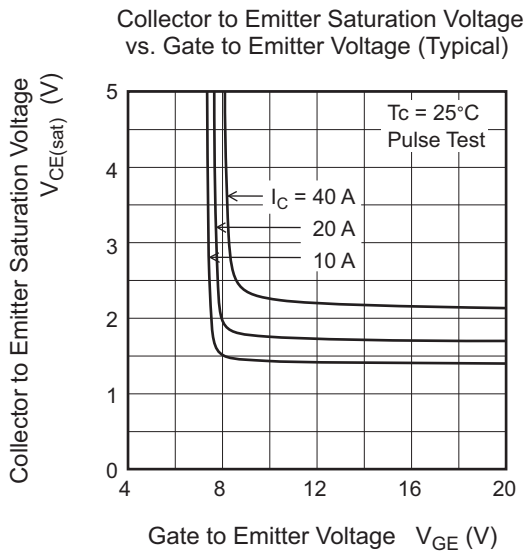
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I _{CES}	—	—	1	μA	V _{CE} = 650 V, V _{GE} = 0
Gate to emitter leak current	I _{GES}	—	—	±1	μA	V _{GE} = ±30 V, V _{CE} = 0
Gate to emitter cutoff voltage	V _{GE(off)}	4.0	—	7.0	V	V _{CE} = 10V, I _C = 0.67 mA
Collector to emitter saturation voltage	V _{CE(sat)}	—	1.8	2.4	V	I _C = 20 A, V _{GE} = 15V ^{Note3}
Total gate charge	Q _g	—	69	—	nC	V _{CE} = 400 V
Gate to emitter charge	Q _{ge}	—	10	—	nC	V _{GE} = 15V
Gate to collector charge	Q _{gc}	—	30	—	nC	I _C = 20A
Input capacitance	C _{ies}	—	1550	—	pF	V _{CE} = 25 V
Output capacitance	C _{oes}	—	37	—	pF	V _{GE} = 0
Reveres transfer capacitance	C _{res}	—	26	—	pF	f = 1 MHz
Turn-on delay time	t _{d(on)}	—	35	—	ns	V _{CC} = 400 V
Rise time	t _r	—	20	—	ns	V _{GE} = 15 V, I _C = 20 A
Turn-off delay time	t _{d(off)}	—	105	—	ns	R _g = 10 Ω, T _C = 25 °C
Fall time	t _f	—	45	—	ns	Inductive load ^{Note4}
Turn-on loss energy	E _{on}	—	0.17	—	mJ	
Turn-off loss energy	E _{off}	—	0.13	—	mJ	
Turn-on delay time	t _{d(on)}	—	32	—	ns	V _{CC} = 400 V
Rise time	t _r	—	20	—	ns	V _{GE} = 15 V, I _C = 20 A
Turn-off delay time	t _{d(off)}	—	115	—	ns	R _g = 10 Ω, T _C = 150°C
Fall time	t _f	—	45	—	ns	Inductive load ^{Note4}
Turn-on loss energy	E _{on}	—	0.28	—	mJ	
Turn-off loss energy	E _{off}	—	0.53	—	mJ	

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

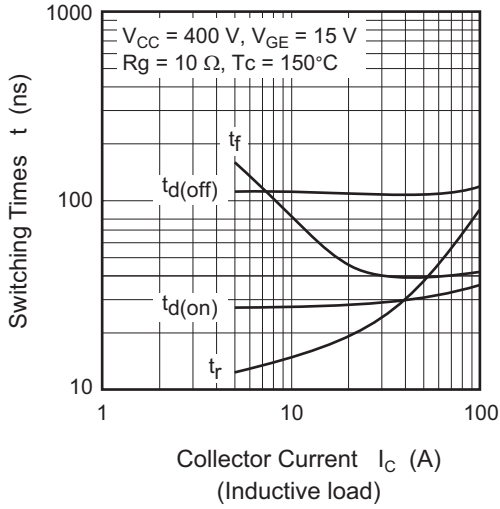
2. Please use this device in the thermal conditions which the junction temperature does not exceed 175°C. Renesas IGBT Application Note is disclosed about reliability test and application condition up to 175°C.
3. Pulse test
4. Switching time test circuit and waveform are shown below.

Main Characteristics

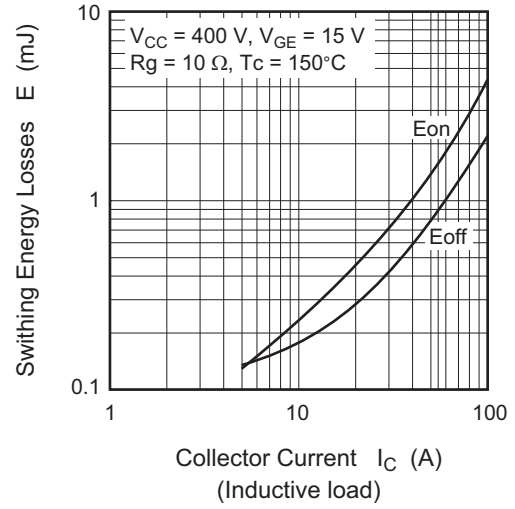




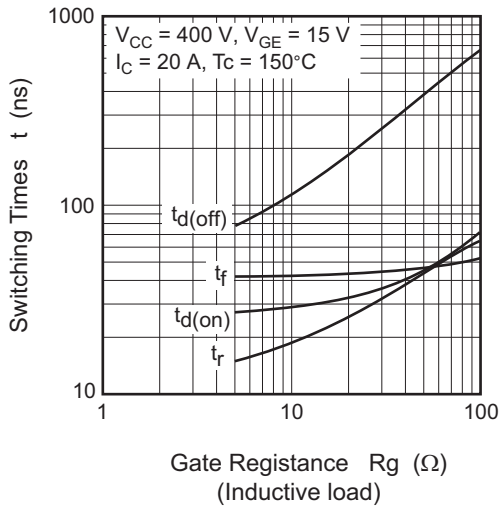
Switching Characteristics (Typical) (1)



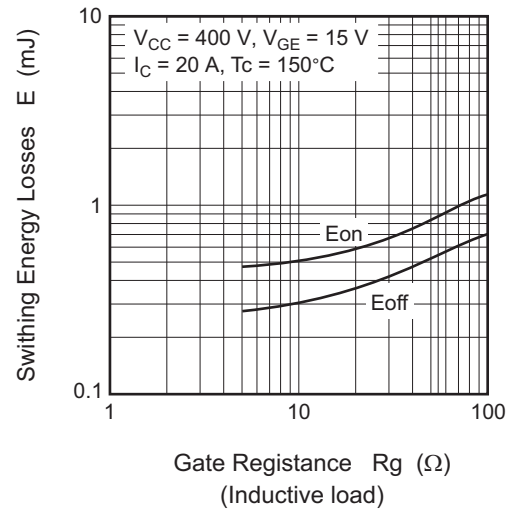
Switching Characteristics (Typical) (2)



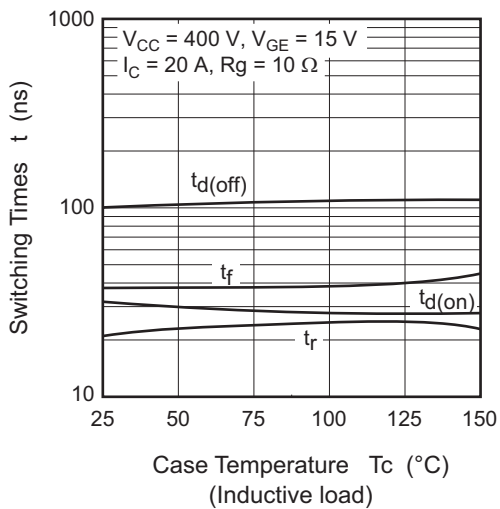
Switching Characteristics (Typical) (3)



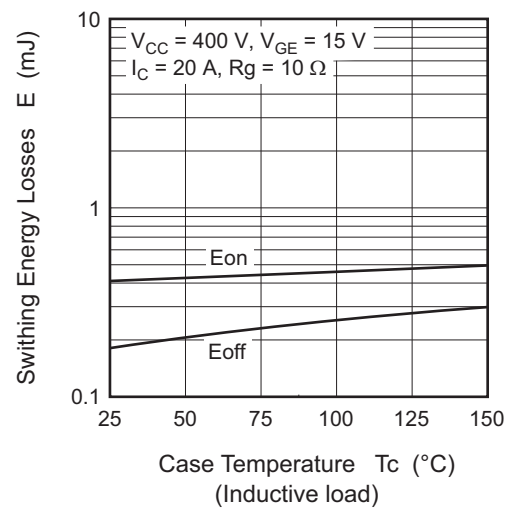
Switching Characteristics (Typical) (4)

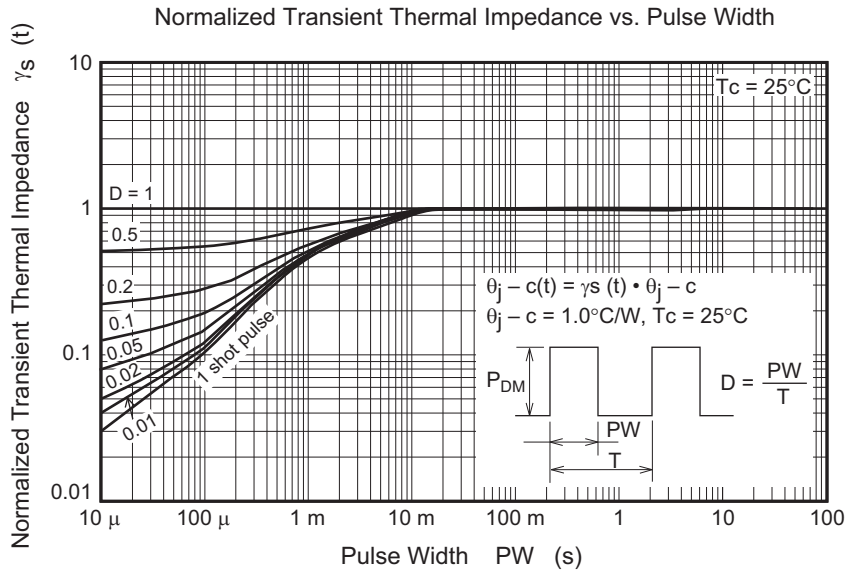


Switching Characteristics (Typical) (5)

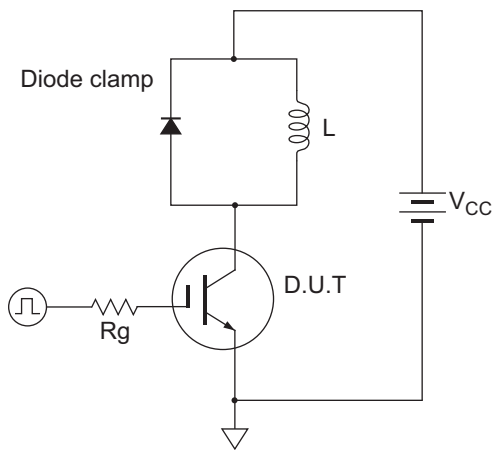


Switching Characteristics (Typical) (6)

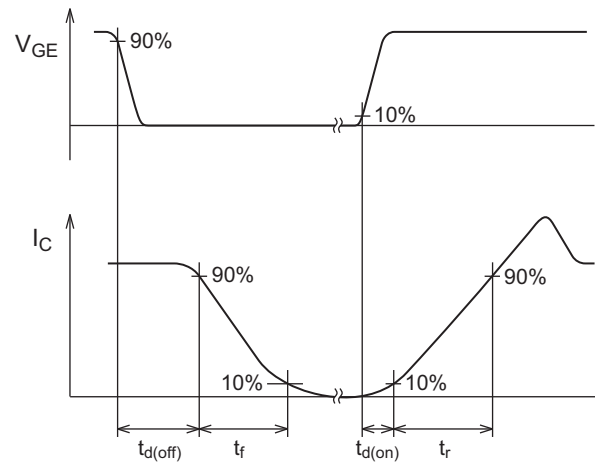




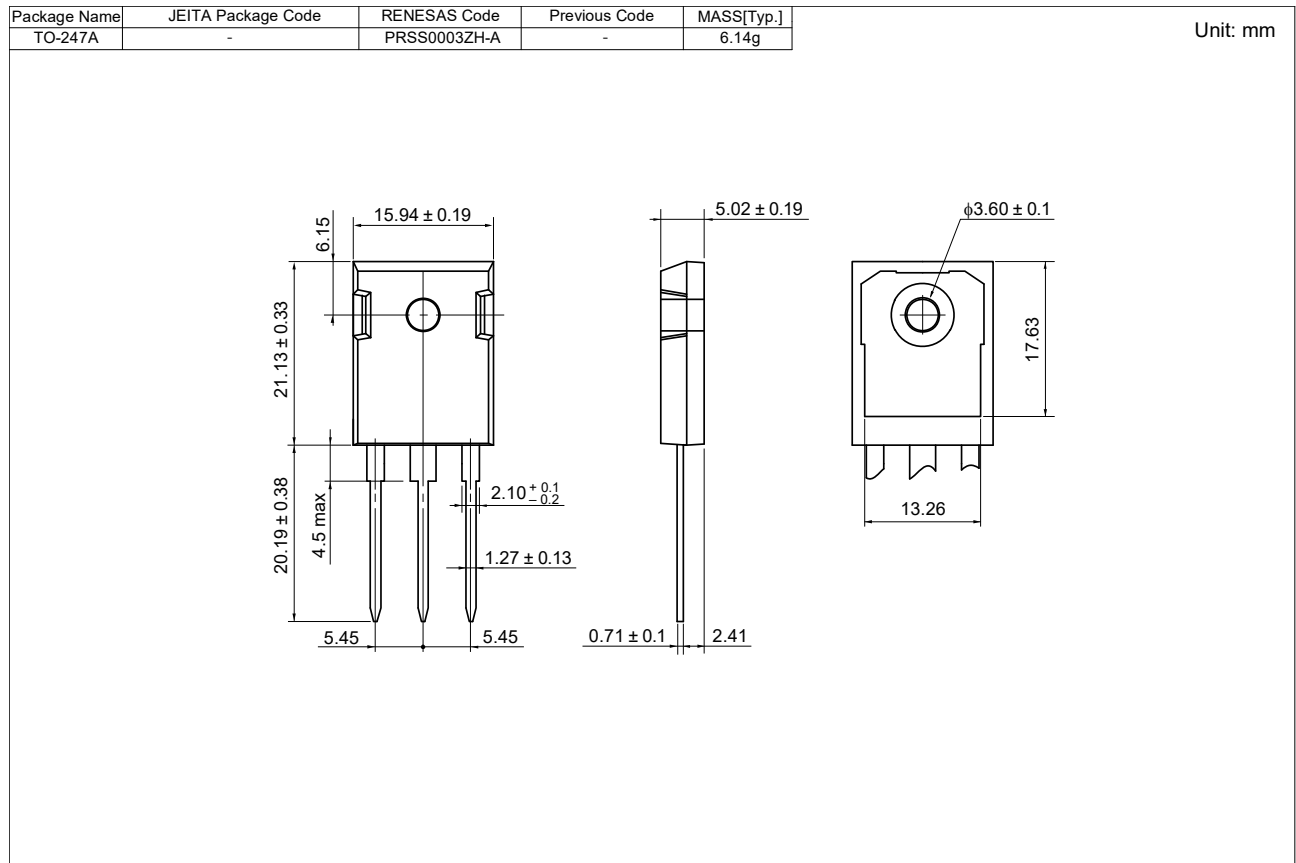
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJP65T43DPQ-A0#T2	240 pcs	Box (Tube)

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other disputes involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawing, chart, program, algorithm, application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics products.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc.
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.
Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (space and undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.
6. When using the Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat radiation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions or failure or accident arising out of the use of Renesas Electronics products beyond such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please ensure to implement safety measures to guard them against the possibility of bodily injury, injury or damage caused by fire, and social damage in the event of failure or malfunction of Renesas Electronics products, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures by your own responsibility as warranty for your products/system. Because the evaluation of microcomputer software alone is very difficult and not practical, please evaluate the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please investigate applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive carefully and sufficiently and use Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall not use Renesas Electronics products or technologies for (1) any purpose relating to the development, design, manufacture, use, stockpiling, etc., of weapons of mass destruction, such as nuclear weapons, chemical weapons, or biological weapons, or missiles (including unmanned aerial vehicles (UAVs)) for delivering such weapons, (2) any purpose relating to the development, design, manufacture, or use of conventional weapons, or (3) any other purpose of disturbing international peace and security, and you shall not sell, export, lease, transfer, or release Renesas Electronics products or technologies to any third party whether directly or indirectly with knowledge or reason to know that the third party or any other party will engage in the activities described above. When exporting, selling, transferring, etc., Renesas Electronics products or technologies, you shall comply with any applicable export control laws and regulations promulgated and administered by the governments of the countries asserting jurisdiction over the parties or transactions.
10. Please acknowledge and agree that you shall bear all the losses and damages which are incurred from the misuse or violation of the terms and conditions described in this document, including this notice, and hold Renesas Electronics harmless, if such misuse or violation results from your resale or making Renesas Electronics products available any third party.
11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.
(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.3.0-1 November 2016)



SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

Renesas Electronics America Inc.

2801 Scott Boulevard Santa Clara, CA 95050-2549, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

Room 1709, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100191, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, P. R. China 200333
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited

Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852-2886-9022

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.

Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.

No.777C, 100 Feet Road, HAL II Stage, Indiranagar, Bangalore, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.

12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141