RJP65T43DPQ-A0

650V - 30A - IGBT
Application: Power Factor Correction circuit

R07DS1376EJ0101
Rev. 1.01
Jul 11, 2017

Features

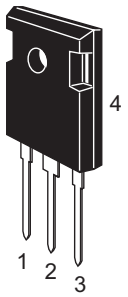
- Low collector to emitter saturation voltage
  $V_{CE(sat)}$ = 1.8 V typ. (at I_C = 20 A, V_{GE} = 15 V, Ta = 25°C)
- Trench gate and thin wafer technology (G7H series)
- High speed switching
  t_f = 45 ns typ. (at V_{CC} = 400V, V_{GE} = 15V, IC=20A, Rg = 10Ω, Ta = 25°C, Inductive load)
- Operation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

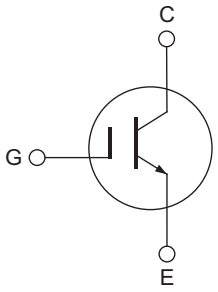
Key Nominal Performance

Type	V_{CES}	I_C	$V_{CE(sat)}$, Ta=25°C	Tj	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

(Tc = 25°C)

Item		Symbol	Ratings	Unit
Collector to emitter voltage		V_{CES}	650	V
Gate to emitter voltage		V_{GES}	±30	V
Collector current	Tc = 25 °C	I_C	60	A
	Tc = 100 °C	I_C	30	A
Collector peak current		$i_{C(peak)}$ Note1	150	A
Collector dissipation		P_C	150	W
Junction to case thermal resistance		θj-c	1.0	°C/W
Junction temperature		Tj Note2	175	°C
Storage temperature		Tstg	–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.

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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	Qg	—	69	—	nC	V_{CE} = 400 V V_{GE} = 15V Ic= 20A
Gate to emitter charge	Qge	—	10	—	nC	
Gate to collector charge	Qgc	—	30	—	nC	
Input capacitance	Cies	—	1550	—	pF	V_{CE} = 25 V V_{GE} = 0 f = 1 MHz
Output capacitance	Coes	—	37	—	pF	
Reveres transfer capacitance	Cres	—	26	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	V_{CC} = 400 V V_{GE} = 15 V, I_C = 20 A Rg = 10 Ω, T_C = 25 °C Inductive load Note4
Rise time	t_r	—	20	—	ns	
Turn-off delay time	$t_{d(off)}$	—	105	—	ns	
Fall time	t_f	—	45	—	ns	
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 V_{GE} = 15 V, I_C = 20 A Rg = 10 Ω, T_C = 150°C Inductive load Note4
Rise time	t_r	—	20	—	ns	
Turn-off delay time	$t_{d(off)}$	—	115	—	ns	
Fall time	t_f	—	45	—	ns	
Turn-on loss energy	E_{on}	—	0.28	—	mJ	
Turn-off loss energy	E_{off}	—	0.53	—	mJ	

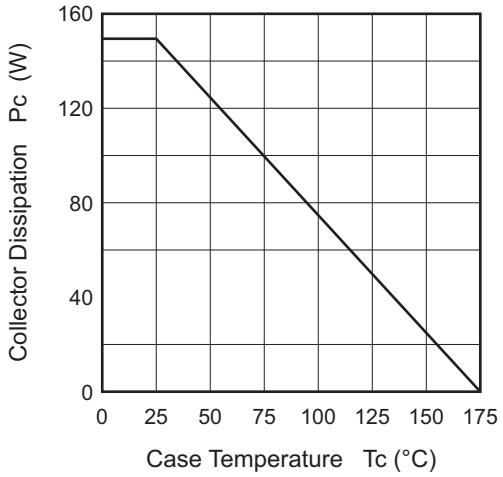
Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

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.

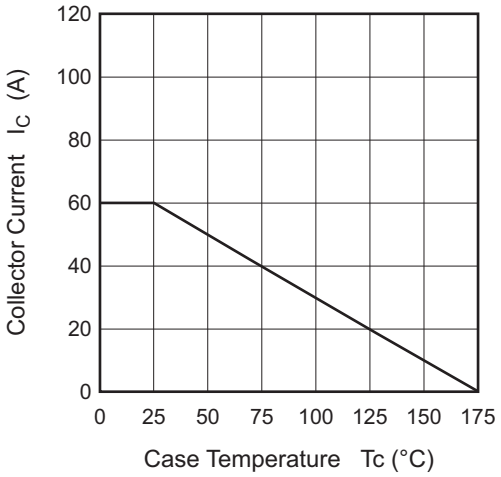
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Main Characteristics

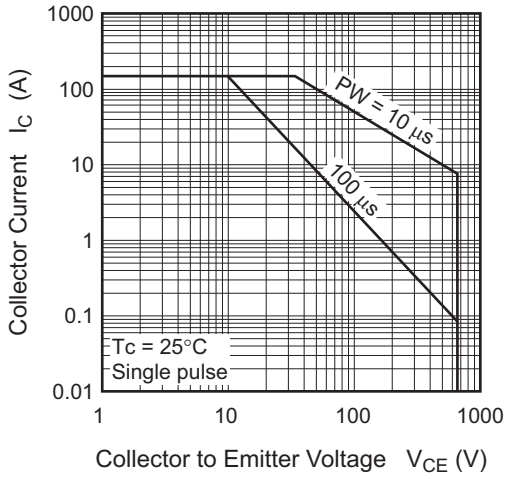
Collector Dissipation vs. Case Temperature



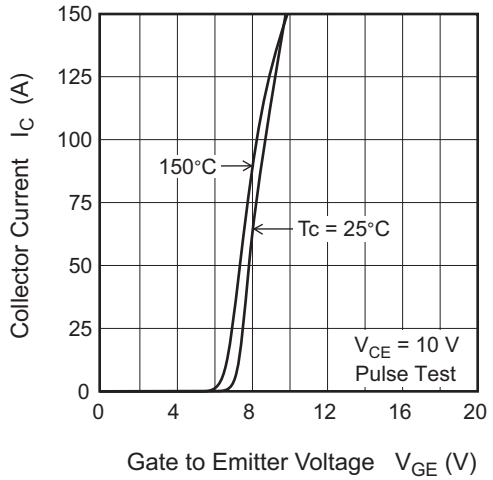
Maximum DC Collector Current vs. Case Temperature



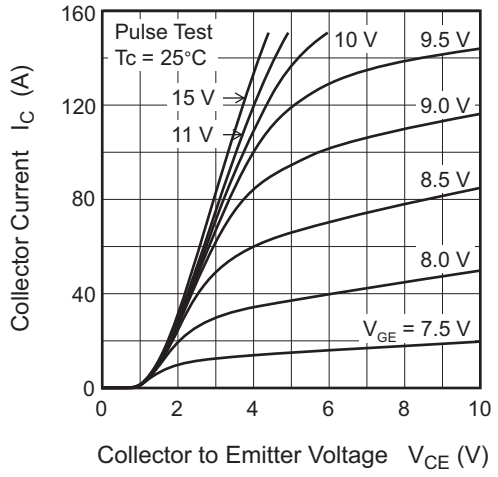
Maximum Safe Operation Area



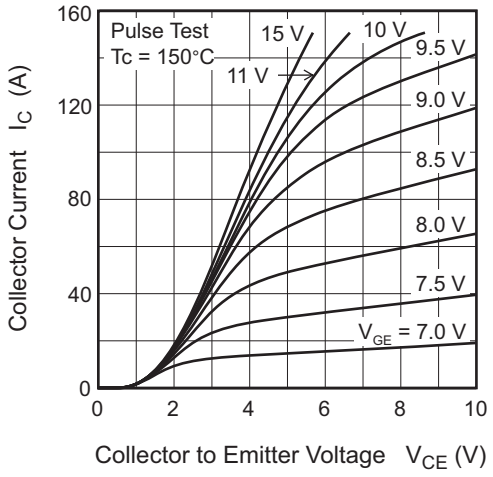
Typical Transfer Characteristics



Typical Output Characteristics

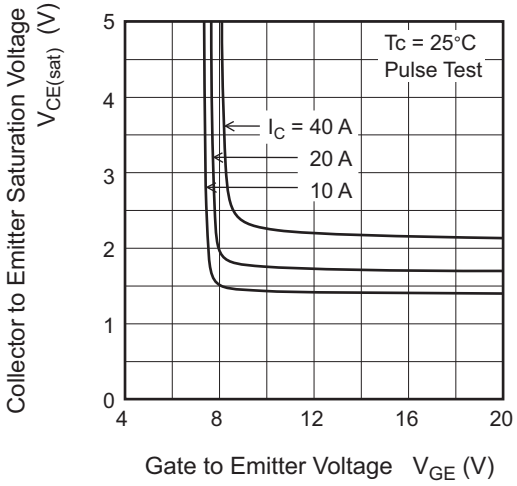


Typical Output Characteristics

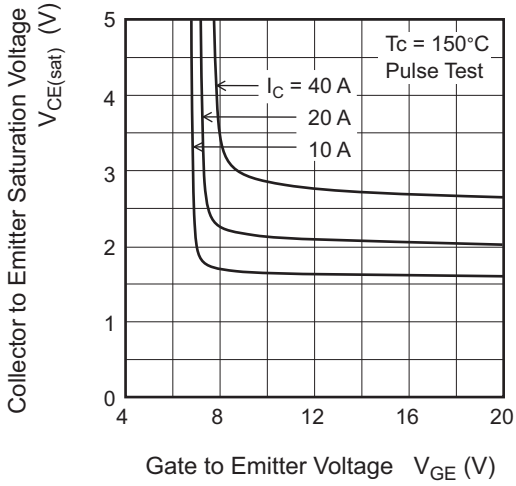


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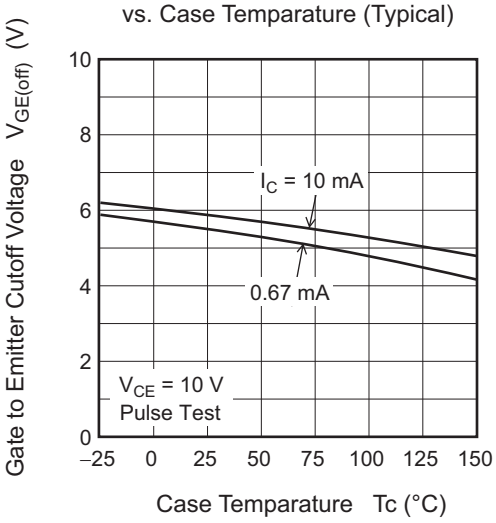
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage (Typical)



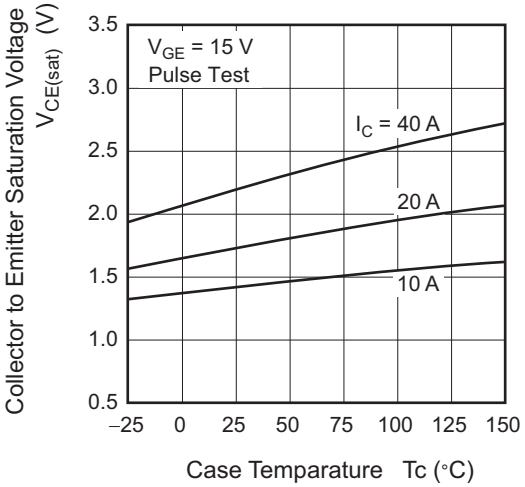
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage (Typical)



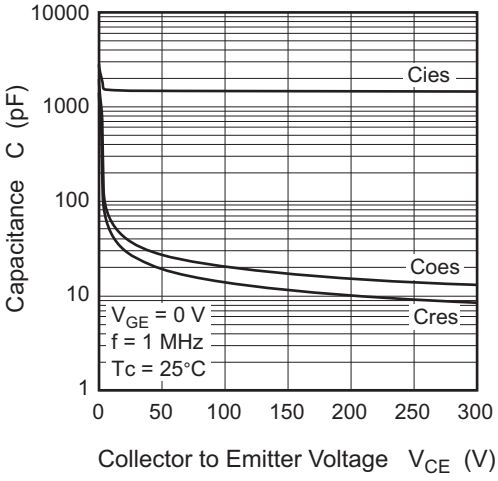
Gate to Emitter Cutoff Voltage vs. Case Temparature (Typical)



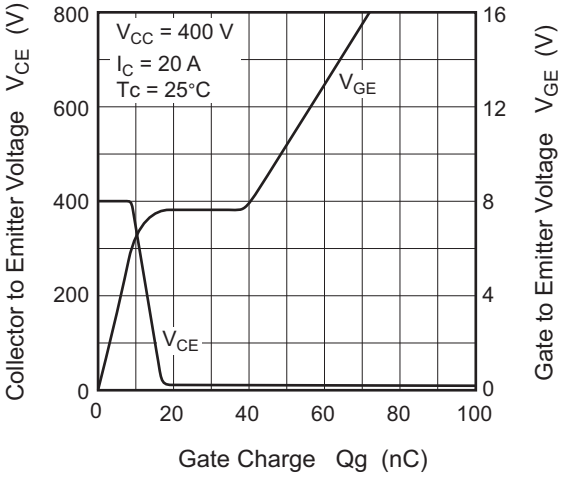
Collector to Emitter Saturation Voltage vs. Case Temparature (Typical)



Typical Capacitance vs. Collector to Emitter Voltage

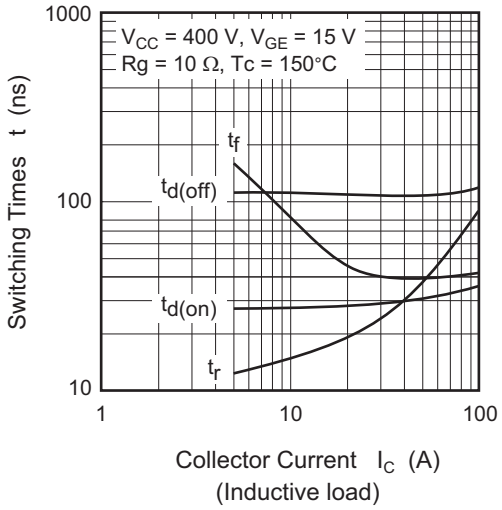


Dynamic Input Characteristics (Typical)

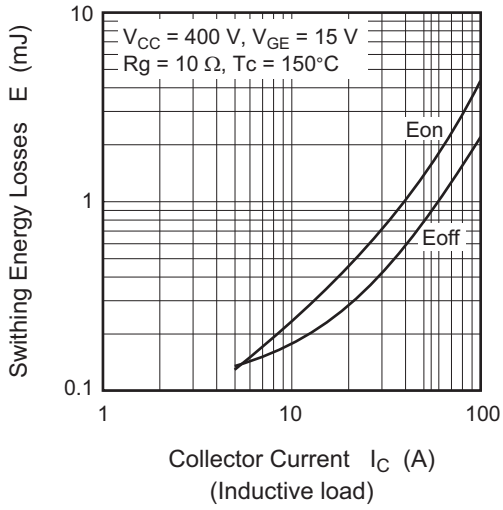


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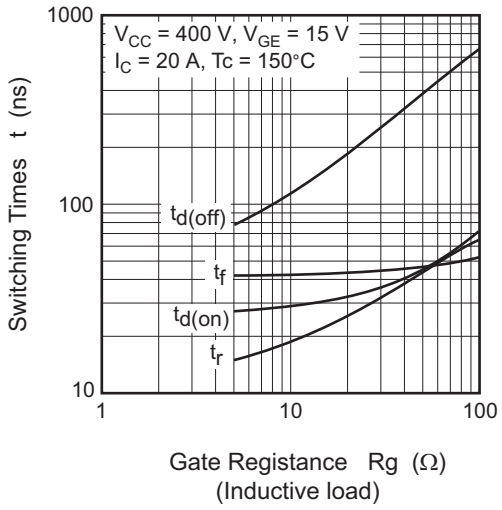
Switching Characteristics (Typical) (1)



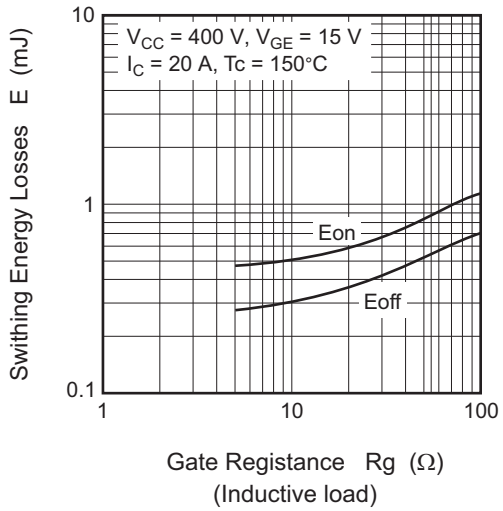
Switching Characteristics (Typical) (2)



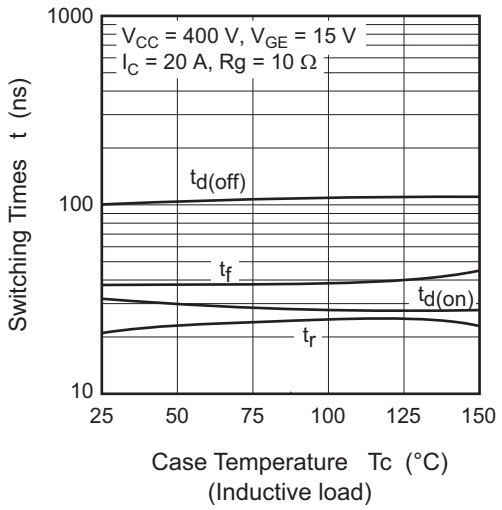
Switching Characteristics (Typical) (3)



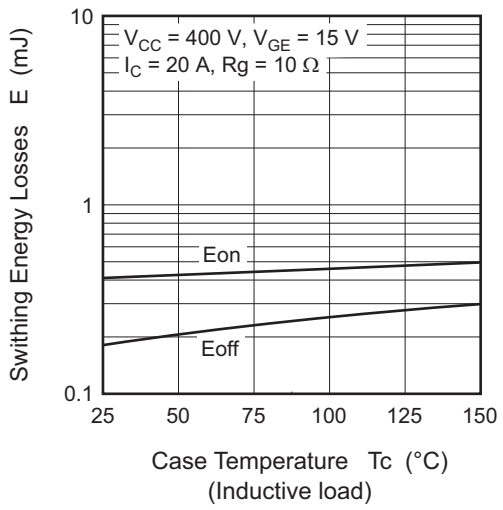
Switching Characteristics (Typical) (4)



Switching Characteristics (Typical) (5)

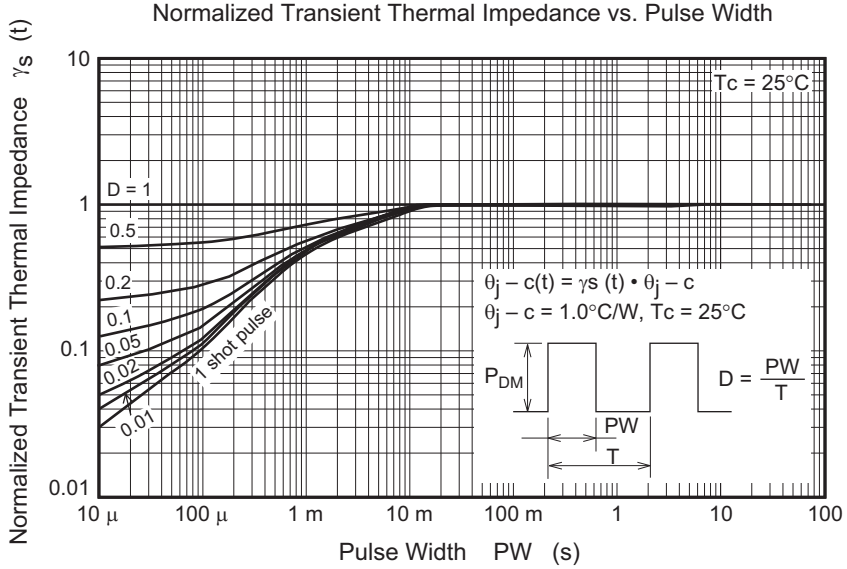


Switching Characteristics (Typical) (6)

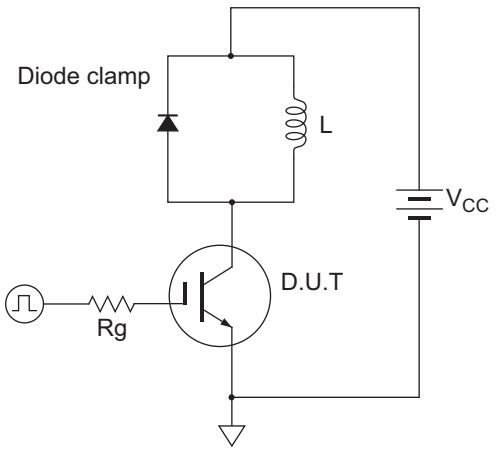


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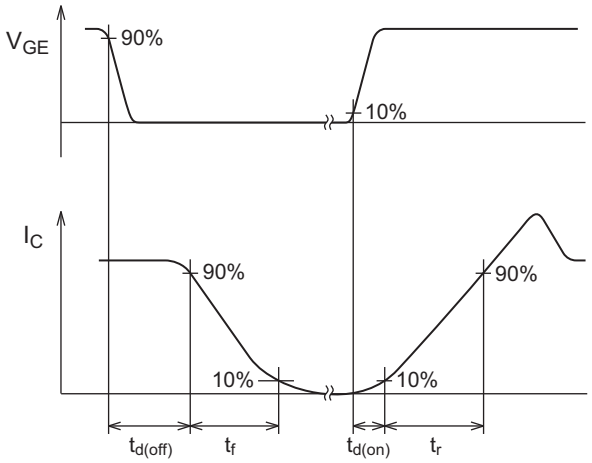
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform

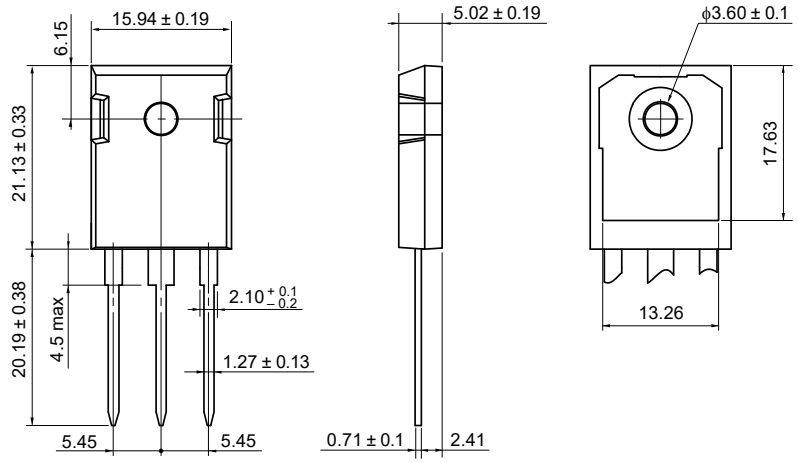


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Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-247A	-	PRSS0003ZH-A	-	6.14g

Unit: mm



Ordering Information

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

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(Rev.3.0-1 November 2016)

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