

# RJP65T54DPM-A0

650V - 30A - IGBT

Application: Partial switching circuit

R07DS1365EJ0110

Rev.1.10

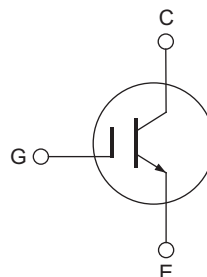
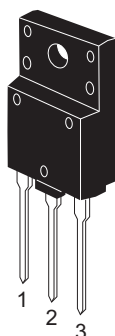
Dec 19, 2016

## Features

- Low collector to emitter saturation voltage  
 $V_{CE(sat)} = 1.35 \text{ V typ. (at } I_C = 30 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Isolated package
- Trench gate and thin wafer technology (G7H series)
- High speed switching
- Operation frequency ( $50\text{Hz} \leq f < 20\text{kHz}$ )
- Not guarantee short circuit withstand time

## Outline

RENESAS Package code: PRSS0003ZP-A  
(Package name: TO-3PFP)



1. Gate
2. Collector
3. Emitter

## Absolute Maximum Ratings

( $T_c = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Collector to emitter voltage	$V_{CES}$	650	V
Gate to emitter voltage	$V_{GES}$	$\pm 30$	V
Collector current	$T_c = 25^\circ\text{C}$	$I_C$	60
	$T_c = 100^\circ\text{C}$	$I_C$	30
Collector peak current	$i_{c(peak)}$ <sup>Note1</sup>	225	A
Collector dissipation	$P_C$	63.5	W
Junction to case thermal resistance	$\theta_{j-c}$	2.35	$^\circ\text{C/W}$
Junction temperature	$T_j$ <sup>Note2</sup>	175	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

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)

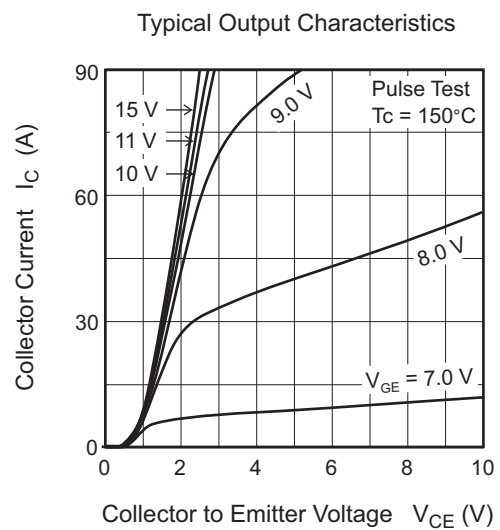
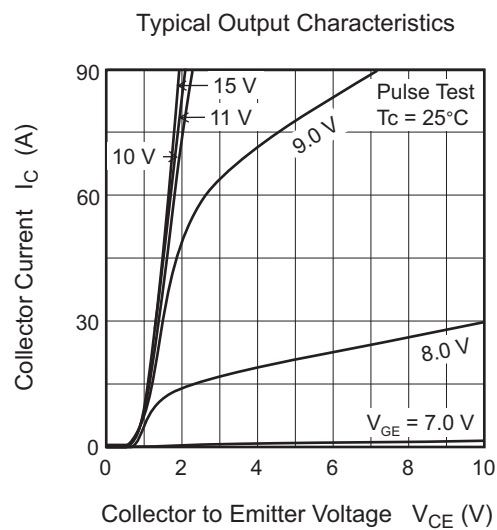
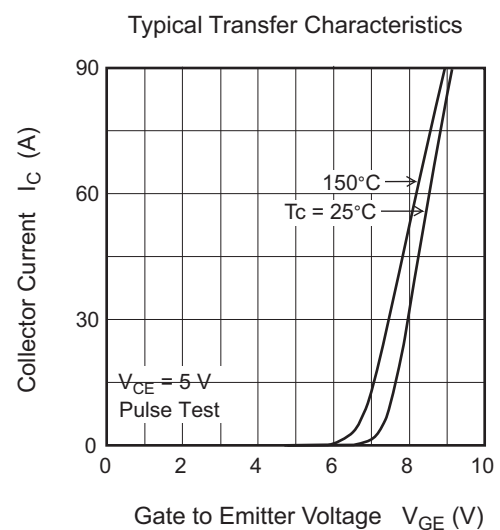
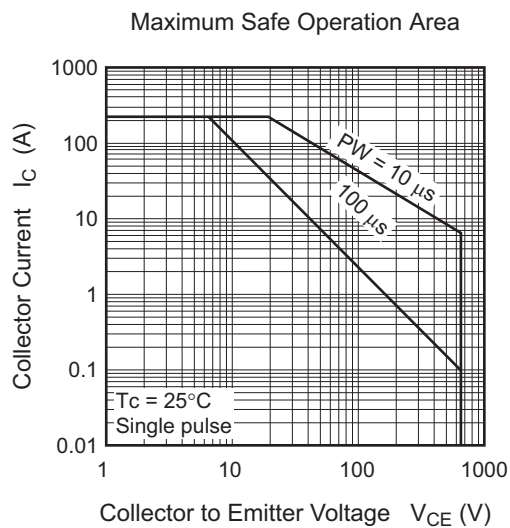
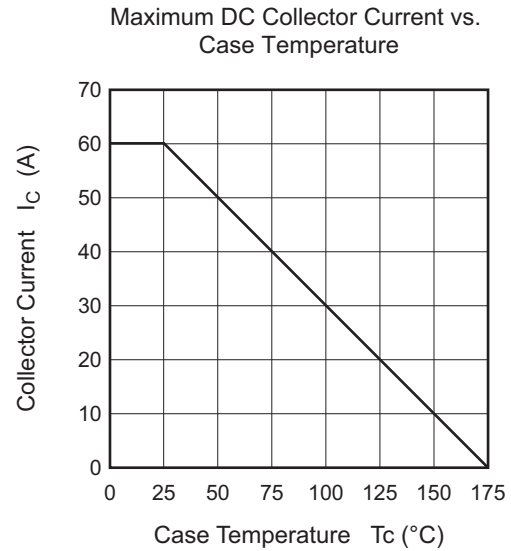
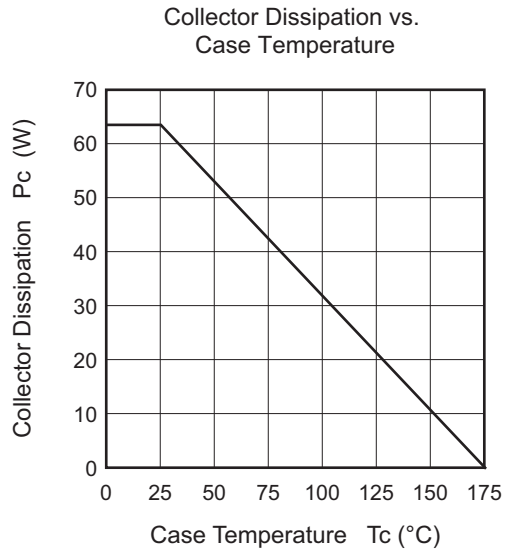
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	$I_{CES}$	—	—	10	$\mu A$	$V_{CE} = 650 V, V_{GE} = 0$
Gate to emitter leak current	$I_{GES}$	—	—	$\pm 1$	$\mu A$	$V_{GE} = \pm 30 V, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	5	—	7	V	$V_{CE} = 10 V, I_C = 1.0 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.35	1.68	V	$I_C = 30 A, V_{GE} = 15 V$ <sup>Note3</sup>
Total gate charge	$Q_g$		72		nC	$V_{CE} = 400 V$ $V_{GE} = 15 V$ $I_C = 30 A$
Gate to emitter charge	$Q_{ge}$		10		nC	
Gate to collector charge	$Q_{gc}$		30		nC	
Input capacitance	$C_{ies}$	—	1400	—	pF	$V_{CE} = 25 V$ $V_{GE} = 0$ $f = 1 MHz$
Output capacitance	$C_{oes}$	—	42	—	pF	
Reverse transfer capacitance	$C_{res}$	—	30	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$V_{CC} = 400 V$ $V_{GE} = 15 V, I_C = 30 A$ $R_g = 10 \Omega, T_C = 25^\circ C$ Inductive load <sup>Note4</sup>
Rise time	$t_r$	—	20	—	ns	
Turn-off delay time	$t_{d(off)}$	—	120	—	ns	
Fall time	$t_f$	—	130	—	ns	
Turn-on loss energy	$E_{on}$	—	0.33	—	mJ	
Turn-off loss energy	$E_{off}$	—	0.76	—	mJ	$V_{CC} = 400 V$ $V_{GE} = 15 V, I_C = 30 A$ $R_g = 10 \Omega, T_C = 150^\circ C$ Inductive load <sup>Note4</sup>
Turn-on delay time	$t_{d(on)}$	—	31	—	ns	
Rise time	$t_r$	—	22	—	ns	
Turn-off delay time	$t_{d(off)}$	—	128	—	ns	
Fall time	$t_f$	—	156	—	ns	
Turn-on loss energy	$E_{on}$	—	0.47	—	mJ	
Turn-off loss energy	$E_{off}$	—	1.04	—	mJ	

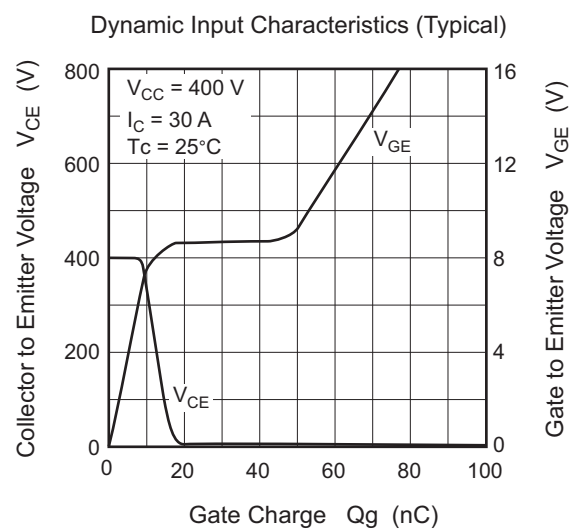
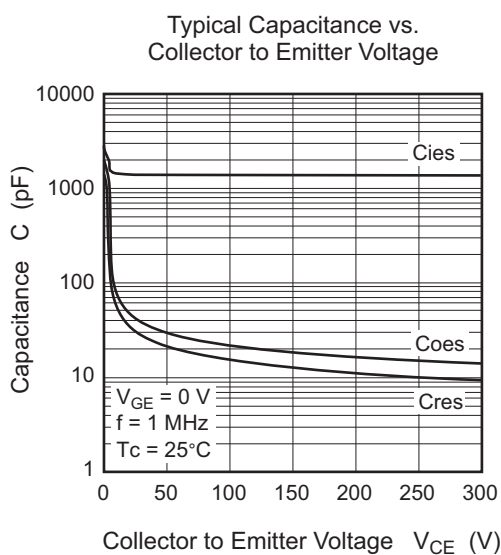
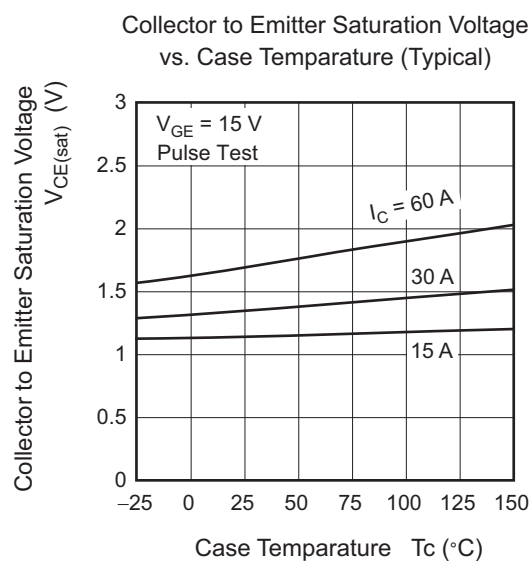
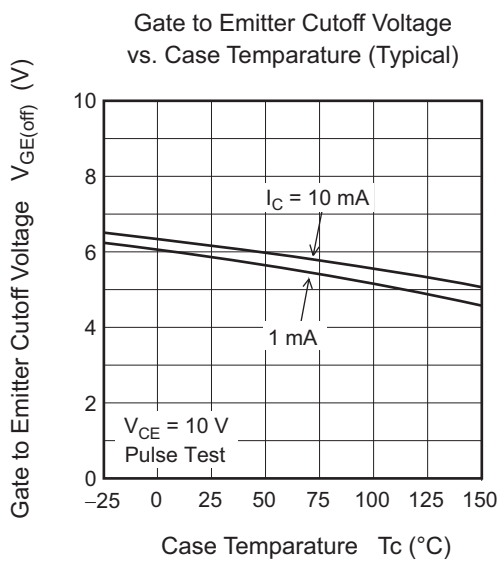
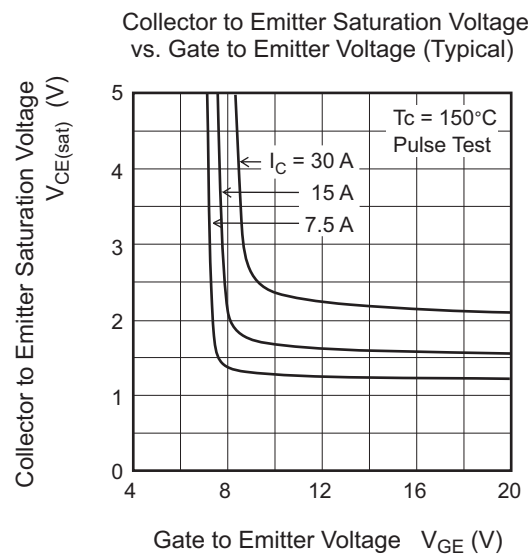
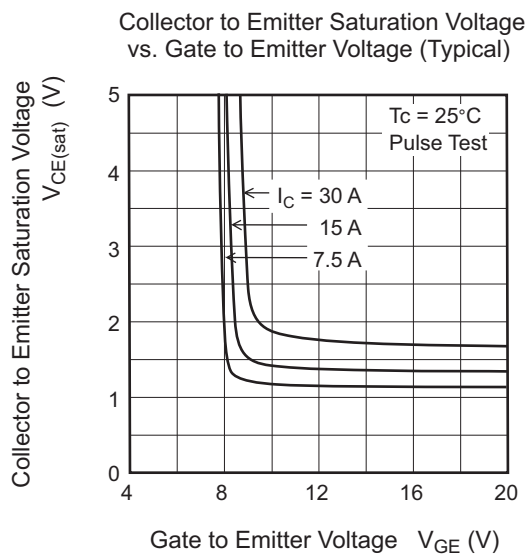
Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$ 2. Please use this device in the thermal conditions which the junction temperature does not exceed 175°C.  
Renesas IGBT Application Note is disclosed about reliability test and application condition up to 175°C.

3. Pulse test

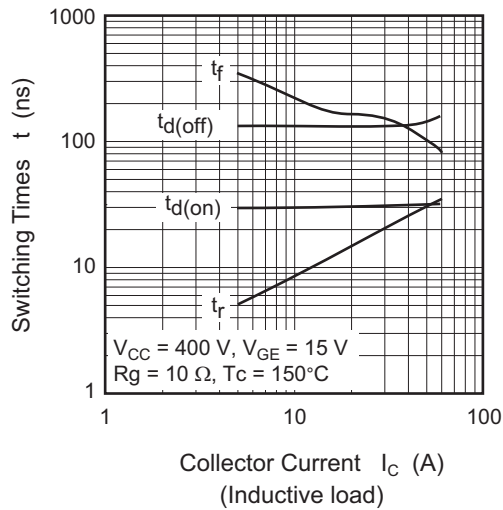
4. Switching time test circuit and waveform are shown below.

## Main Characteristics

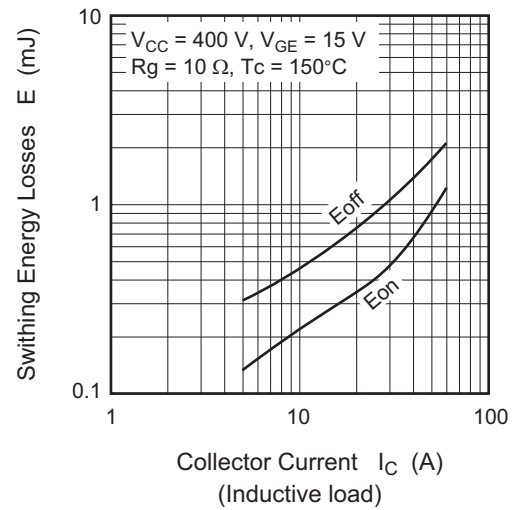




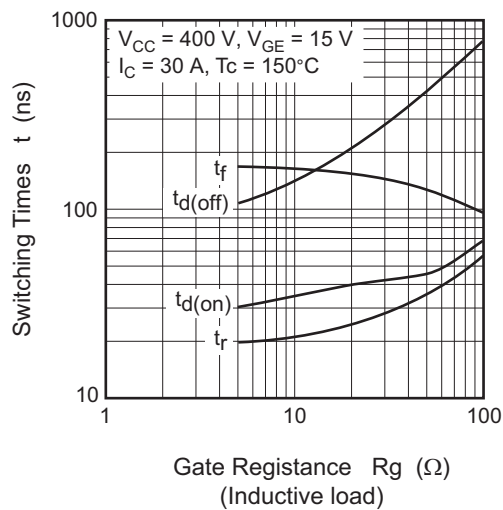
Switching Characteristics (Typical) (1)



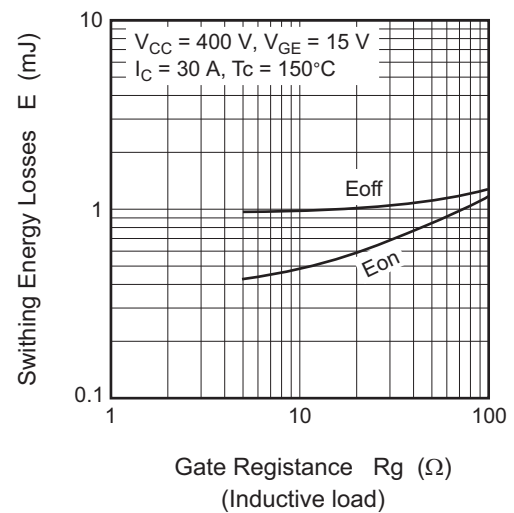
Switching Characteristics (Typical) (2)



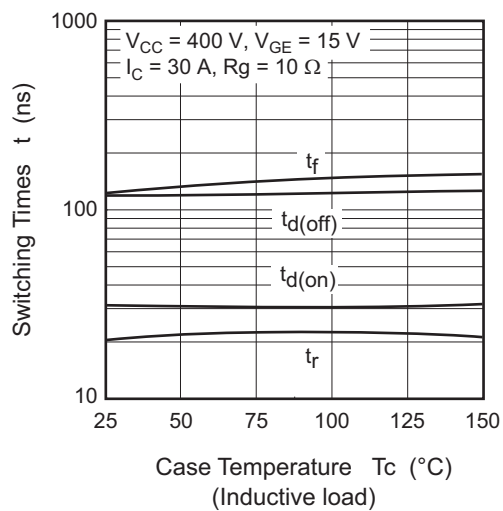
Switching Characteristics (Typical) (3)



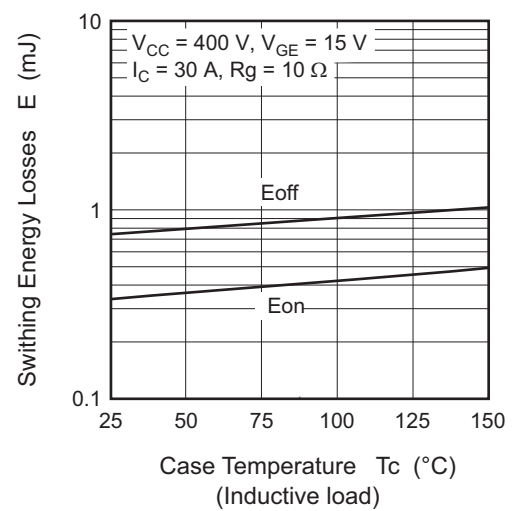
Switching Characteristics (Typical) (4)

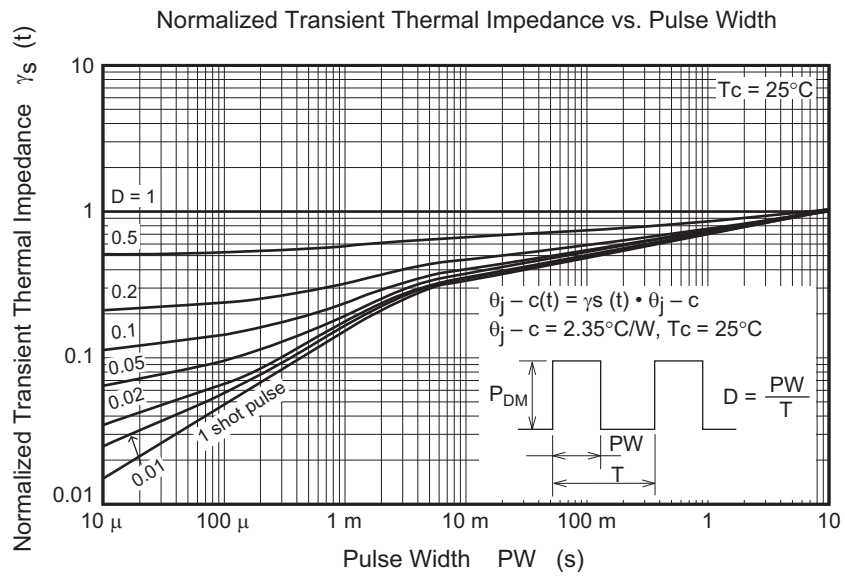


Switching Characteristics (Typical) (5)

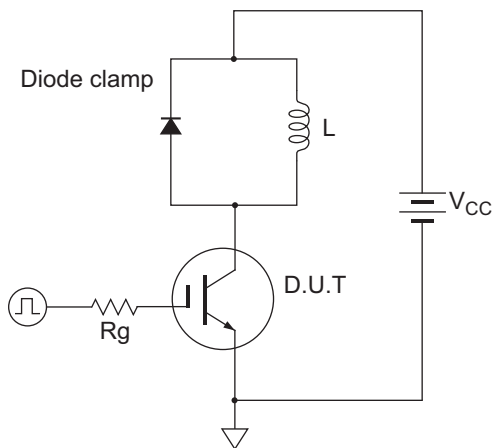


Switching Characteristics (Typical) (6)

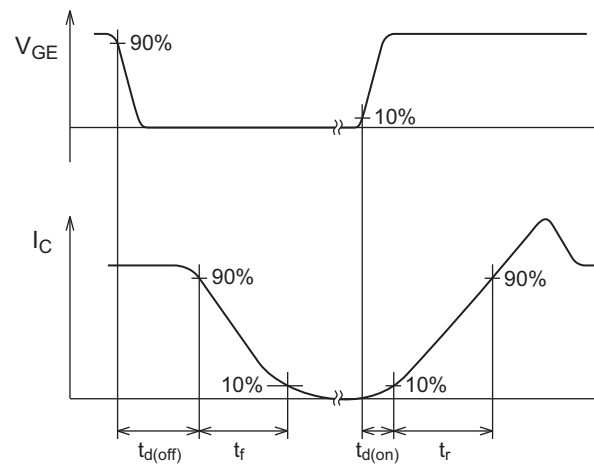




Switching Time Test Circuit



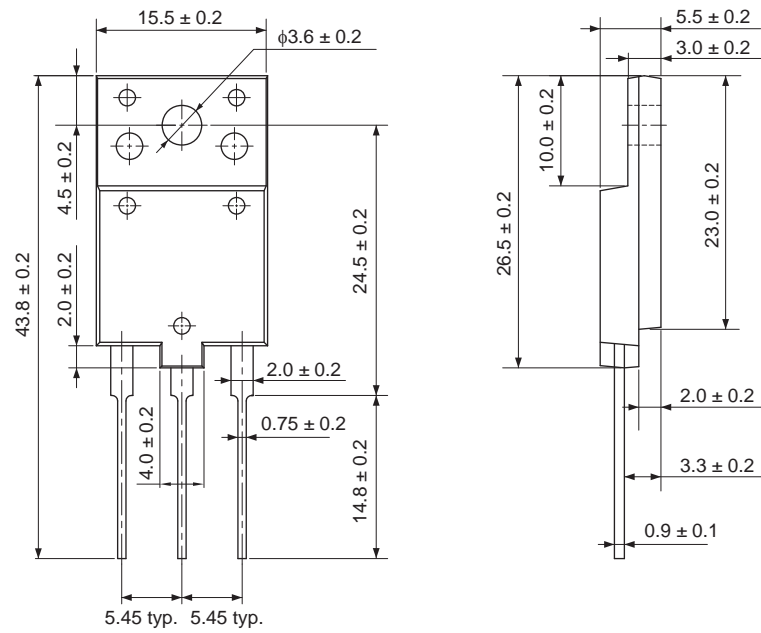
Waveform



## Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3PFP	—	PRSS0003ZP-A	TO-3PFP	5.5g

Unit: mm



## Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJP65T54DPM-A0#T2	1000 pcs	Box (Tube)

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