

RJH60F6DPQ-A0

Silicon N Channel IGBT
High Speed Power Switching

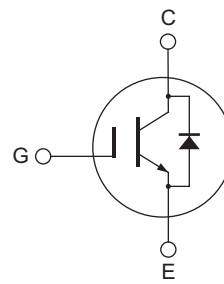
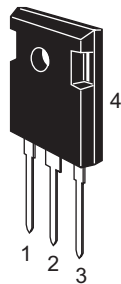
R07DS0327EJ0100
Rev.1.00
Apr 06, 2011

Features

- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.35 \text{ V typ. (at } I_C = 45 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Built in fast recovery diode in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 74 \text{ ns typ. (at } I_C = 30 \text{ A, } V_{CE} = 400 \text{ V, } V_{GE} = 15 \text{ V, } R_g = 5 \Omega, T_a = 25^\circ\text{C, inductive load)}$

Outline

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



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

Absolute Maximum Ratings

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

| Item | Symbol | Ratings | Unit | |
|---|---------------------------------|-------------|--------------------|---|
| Collector to emitter voltage | V_{CES} | 600 | V | |
| Gate to emitter voltage | V_{GES} | ± 30 | V | |
| Collector current | $T_c = 25^\circ\text{C}$ | I_C | 85 | A |
| | $T_c = 100^\circ\text{C}$ | I_C | 45 | A |
| Collector peak current | $i_{c(peak)}$ ^{Note1} | 170 | A | |
| Collector to emitter diode forward peak current | $i_{DF(peak)}$ ^{Note2} | 100 | A | |
| Collector dissipation | P_C | 297.6 | W | |
| Junction to case thermal impedance (IGBT) | θ_{j-c} | 0.42 | $^\circ\text{C/W}$ | |
| Junction to case thermal impedance (Diode) | θ_{j-cd} | 2.0 | $^\circ\text{C/W}$ | |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ | |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ | |

Notes: 1. Pulse width limited by safe operating area.

2. $PW \leq 5 \mu\text{s}$, duty cycle $\leq 1\%$

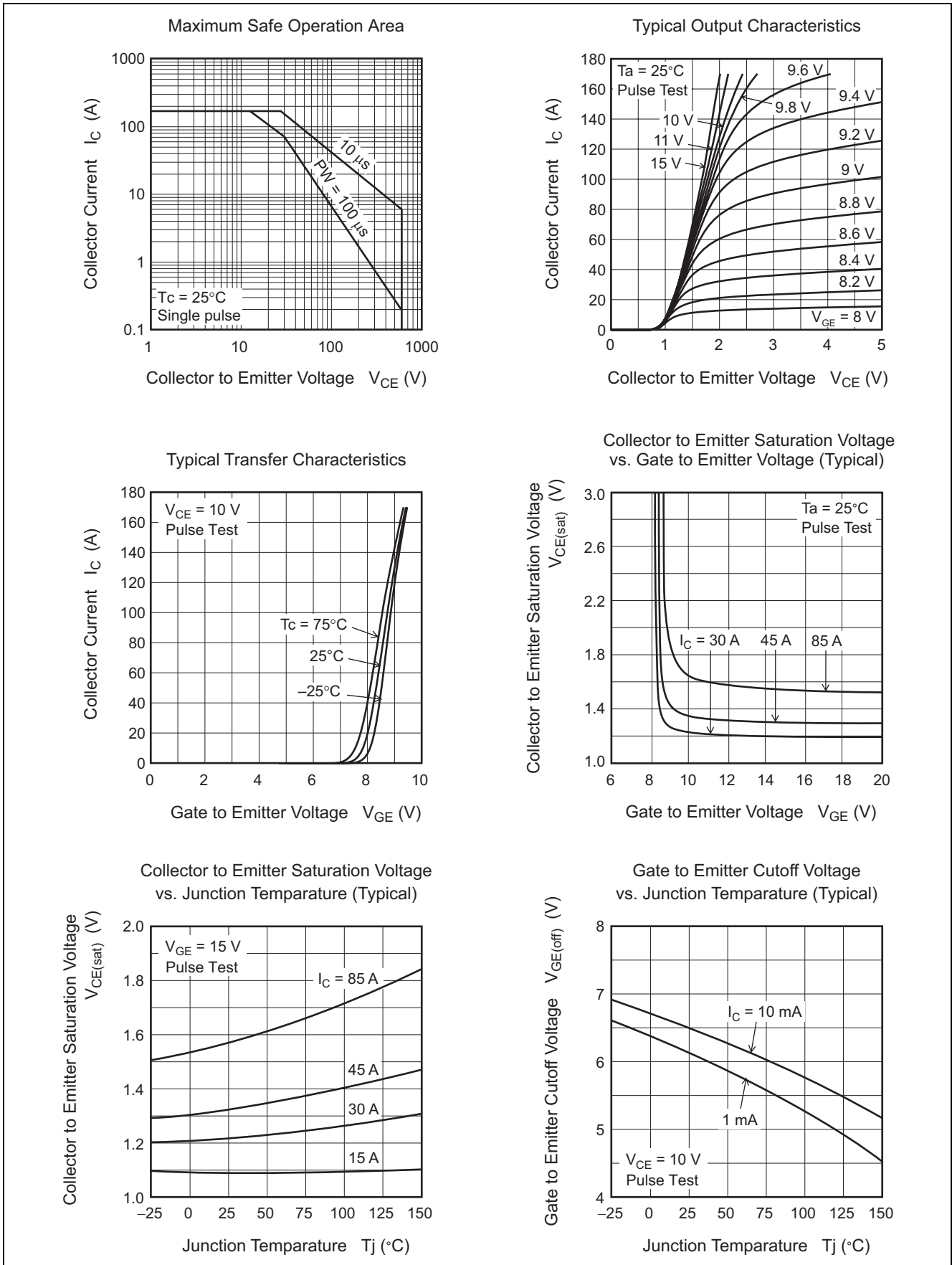
Electrical Characteristics

(T_j = 25°C)

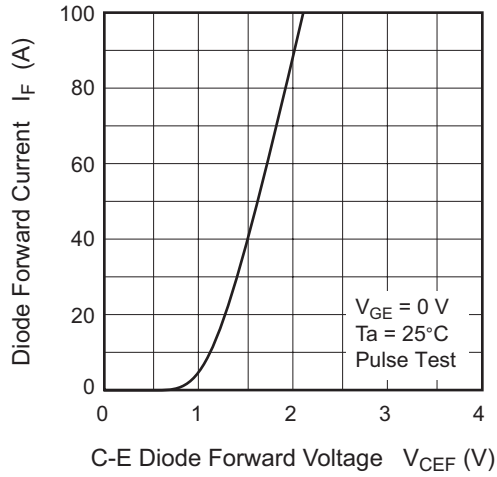
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|----------------------|-----|------|------|------|---|
| Zero gate voltage collector current | I _{CES} | — | — | 100 | μA | V _{CE} = 600V, V _{GE} = 0 |
| Gate to emitter leak current | I _{GES} | — | — | ±1 | μA | V _{GE} = ±30 V, V _{CE} = 0 |
| Gate to emitter cutoff voltage | V _{GE(off)} | 4 | — | 8 | V | V _{CE} = 10V, I _C = 1 mA |
| Collector to emitter saturation voltage | V _{CE(sat)} | — | 1.35 | 1.75 | V | I _C = 45 A, V _{GE} = 15V ^{Note3} |
| Input capacitance | C _{ies} | — | 3800 | — | pF | V _{CE} = 25 V |
| Output capacitance | C _{oes} | — | 150 | — | pF | V _{GE} = 0 V |
| Reverse transfer capacitance | C _{res} | — | 65 | — | pF | f = 1 MHz |
| Switching time | t _{d(on)} | — | 58 | — | ns | I _C = 30 A, |
| | t _f | — | 80 | — | ns | V _{CE} = 400 V, V _{GE} = 15 V |
| | t _{d(off)} | — | 131 | — | ns | R _g = 5 Ω ^{Note3} , |
| | t _r | — | 74 | — | ns | Inductive load |
| C-E diode forward voltage | V _{ECF1} | — | 1.2 | 2.1 | V | I _F = 20 A ^{Note3} |
| | V _{ECF2} | — | 1.5 | — | V | I _F = 40 A ^{Note3} |
| C-E diode reverse recovery time | t _{rr} | — | 90 | — | ns | I _F = 20 A di _F /dt = 100 A/μs |

Notes: 3. Pulse test

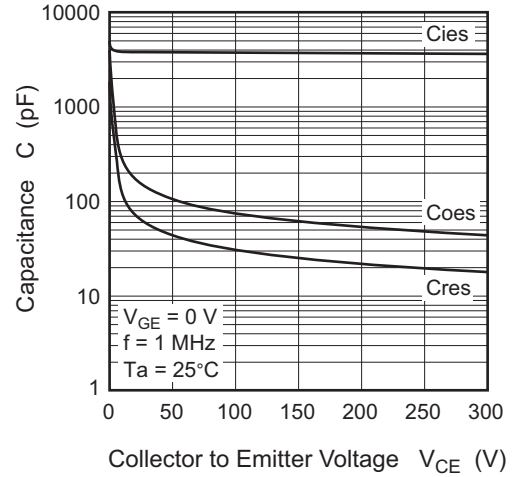
Main Characteristics



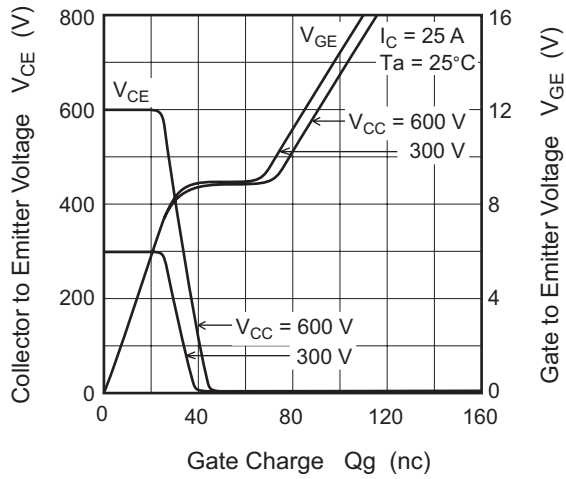
Forward Current vs. Forward Voltage (Typical)



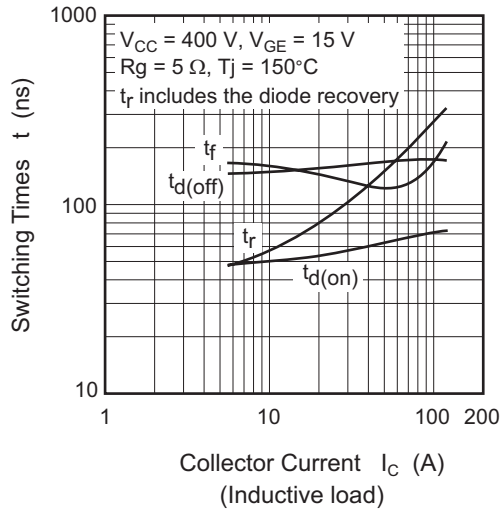
Typical Capacitance vs. Collector to Emitter Voltage



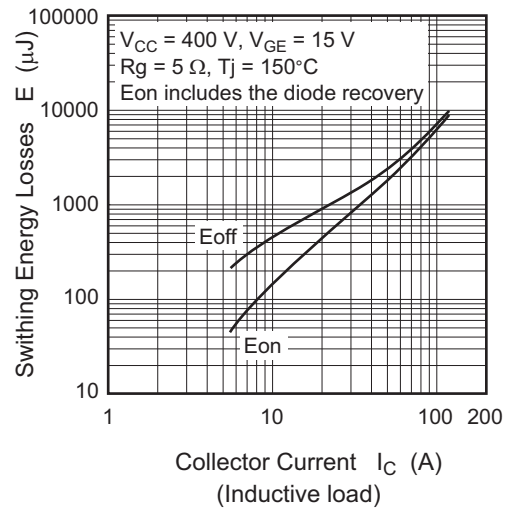
Dynamic Input Characteristics (Typical)



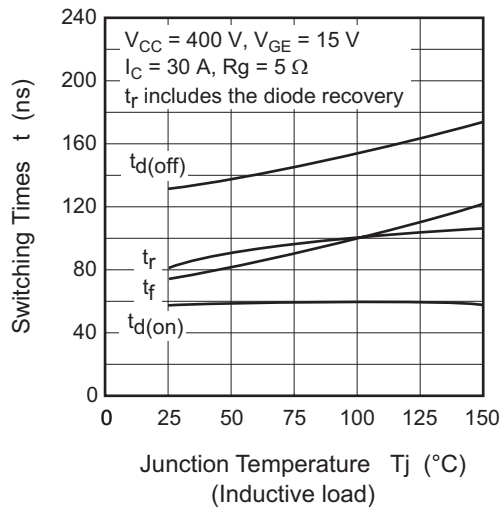
Switching Characteristics (Typical) (1)



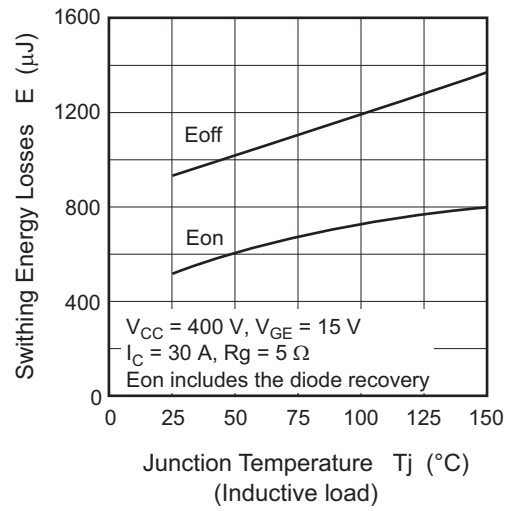
Switching Characteristics (Typical) (2)

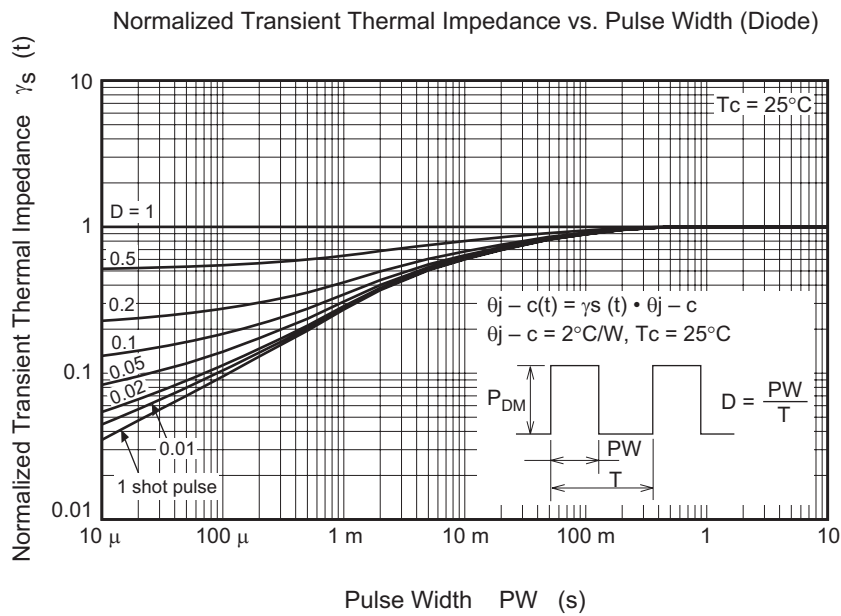
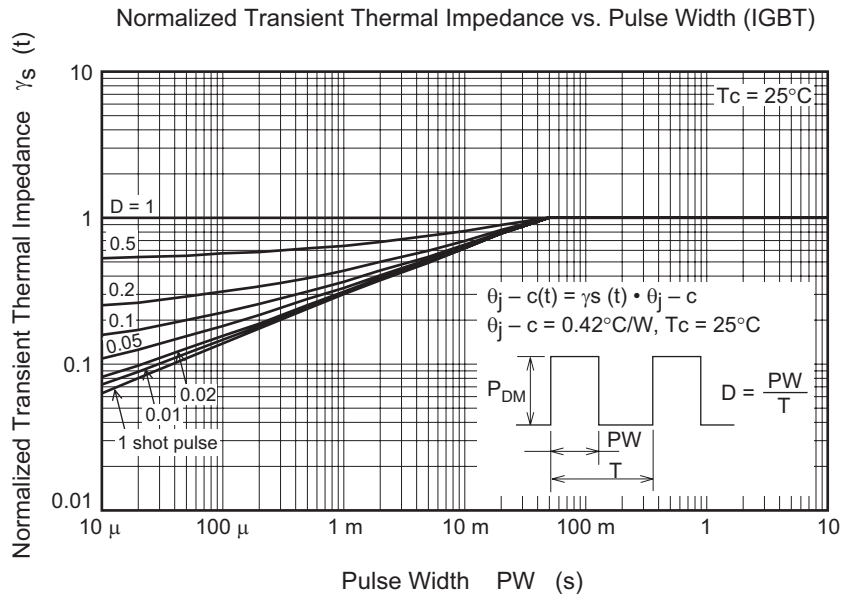


Switching Characteristics (Typical) (3)

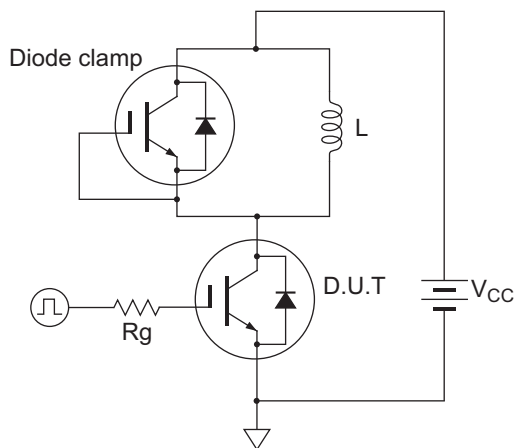


Switching Characteristics (Typical) (4)

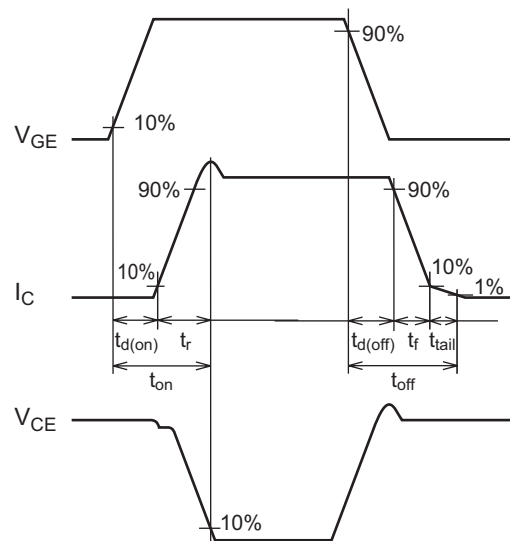




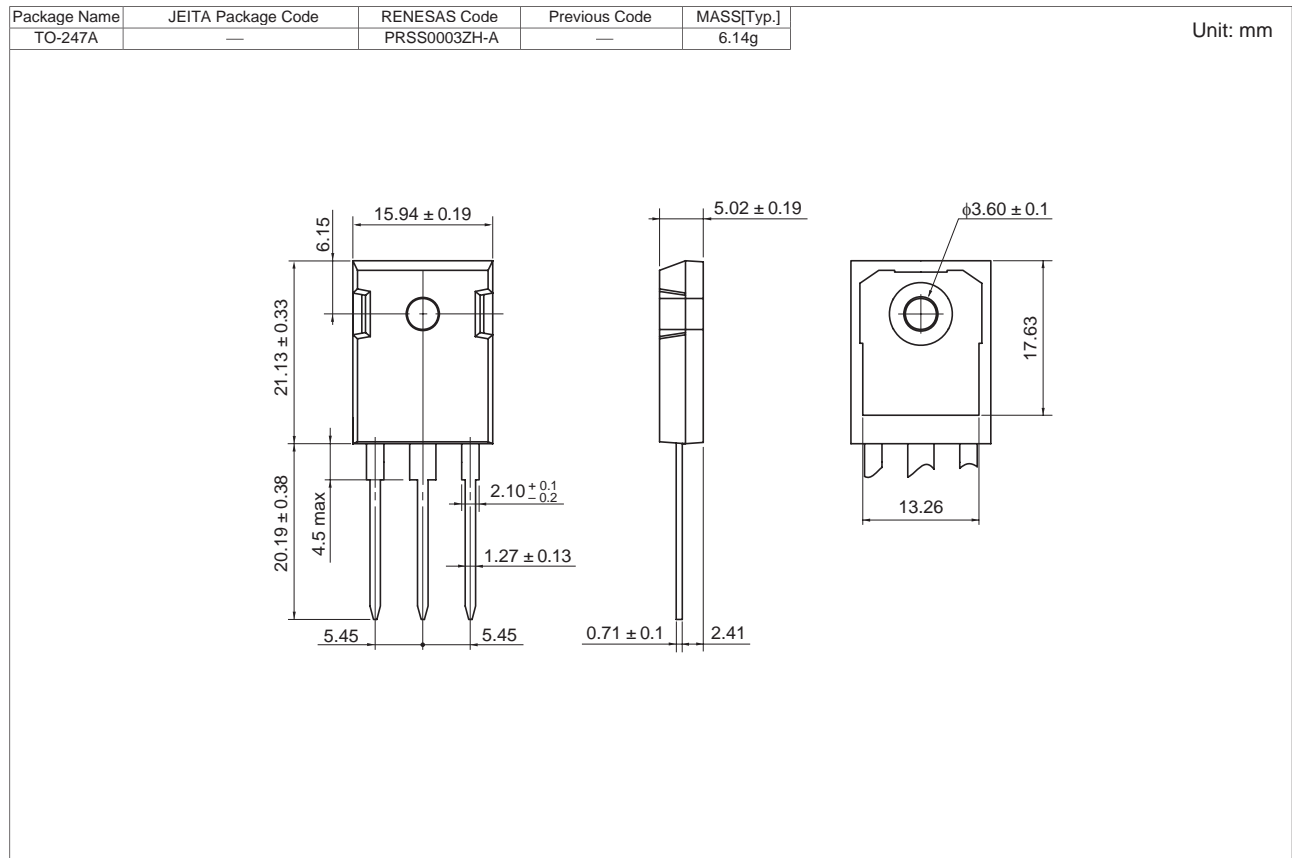
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|----------|--------------------|
| RJH60F6DPQ-A0-T0 | 240 pcs | Box (Tube) |

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