

RJH60M3DPE

600 V - 17 A - IGBT

Application: Inverter

R07DS0533EJ0100

Rev.1.00

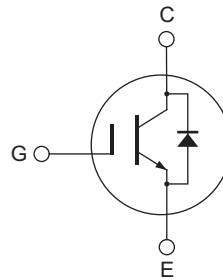
Sep 02, 2011

Features

- Short circuit withstand time (8 μ s typ.)
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.8$ V typ. (at $I_C = 17$ A, $V_{GE} = 15$ V, $T_a = 25^\circ\text{C}$)
- Built in fast recovery diode (100 ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 80$ ns typ. (at $V_{CC} = 300$ V, $V_{GE} = 15$ V, $I_C = 17$ A, $R_g = 5 \Omega$, $T_a = 25^\circ\text{C}$, inductive load)

Outline

RENESAS Package code: PRSS0004AE-B
 (Package name: LDPAK (S)-(1))



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

Absolute Maximum Ratings

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

| Item | Symbol | Ratings | Unit | |
|--|----------------------------------|-------------|-----------------------------|---|
| Collector to emitter voltage / diode reverse voltage | V_{CES} / V_R | 600 | V | |
| Gate to emitter voltage | V_{GES} | ± 30 | V | |
| Collector peak current | $T_c = 25^\circ\text{C}$ | I_C | 35 | A |
| | $T_c = 100^\circ\text{C}$ | I_C | 17 | A |
| Collector peak current | $i_{c(peak)}$ ^{Note1} | 70 | A | |
| Collector to emitter diode forward current | i_{DF} | 17 | A | |
| Collector to emitter diode forward peak current | $i_{DF(peak)}$ ^{Note1} | 70 | A | |
| Collector dissipation | P_C ^{Note2} | 113 | W | |
| Junction to case thermal resistance (IGBT) | θ_{j-c} ^{Note2} | 1.11 | $^\circ\text{C} / \text{W}$ | |
| Junction to case thermal resistance (Diode) | θ_{j-cd} ^{Note2} | 4.2 | $^\circ\text{C} / \text{W}$ | |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ | |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ | |

Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$

2. Value at $T_c = 25^\circ\text{C}$

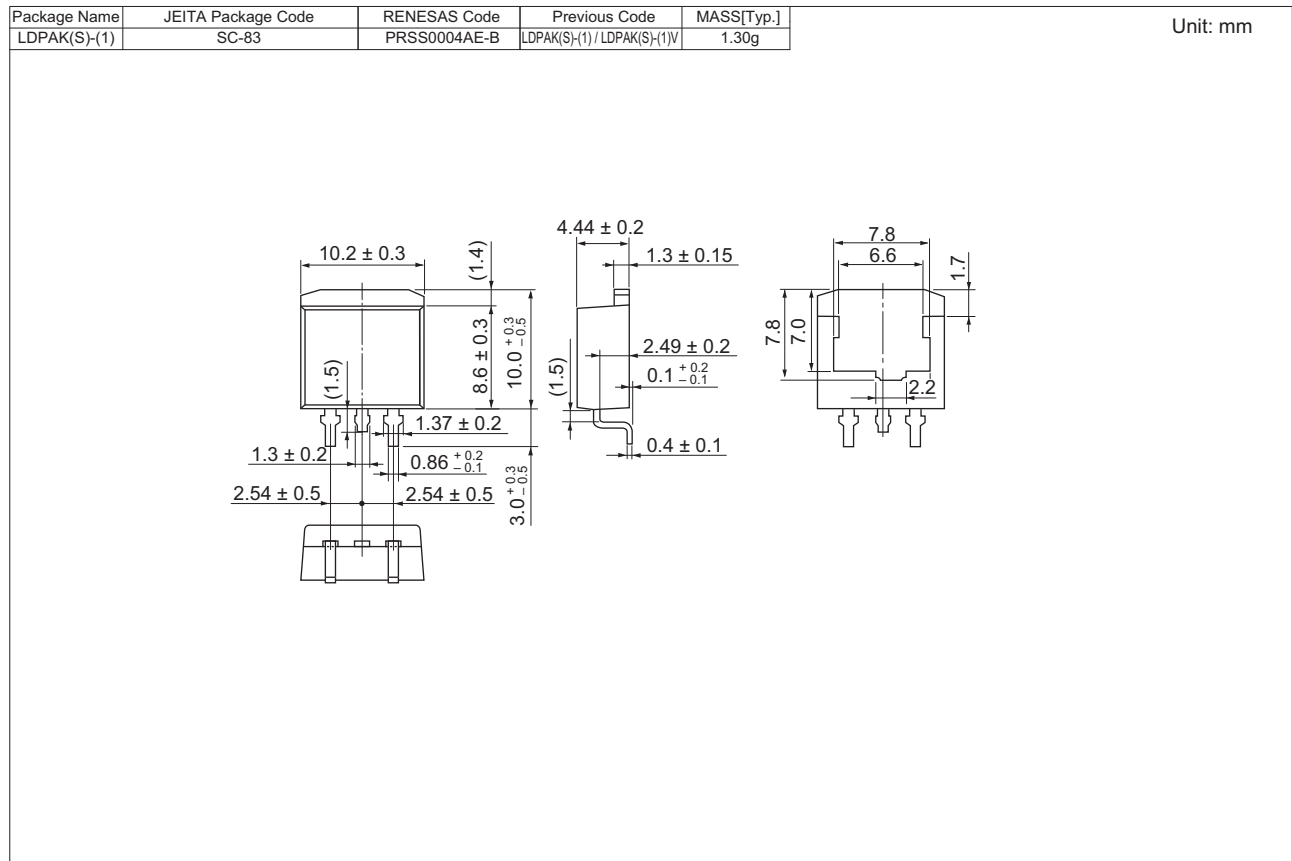
Electrical Characteristics

(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|-----------------|-----|-----|---------|---------------|--|
| Zero gate voltage collector current / Diode reverse current | I_{CES} / I_R | — | — | 5 | μA | $V_{CE} = 600 \text{ V}, V_{GE} = 0$ |
| Gate to emitter leak current | I_{GES} | — | — | ± 1 | μA | $V_{GE} = \pm 30 \text{ V}, V_{CE} = 0$ |
| Gate to emitter cutoff voltage | $V_{GE(off)}$ | 5 | — | 7 | V | $V_{CE} = 10 \text{ V}, I_C = 1 \text{ mA}$ |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | — | 1.8 | 2.3 | V | $I_C = 17 \text{ A}, V_{GE} = 15 \text{ V}$ ^{Note3} |
| | $V_{CE(sat)}$ | — | 2.2 | — | V | $I_C = 35 \text{ A}, V_{GE} = 15 \text{ V}$ ^{Note3} |
| Input capacitance | C_{ies} | — | 900 | — | pF | $V_{CE} = 25 \text{ V}$ |
| Output capacitance | C_{oes} | — | 60 | — | pF | $V_{GE} = 0$ |
| Reverse transfer capacitance | C_{res} | — | 30 | — | pF | $f = 1 \text{ MHz}$ |
| Total gate charge | Q_g | — | 36 | — | nC | $V_{GE} = 15 \text{ V}$ |
| Gate to emitter charge | Q_{ge} | — | 6 | — | nC | $V_{CE} = 300 \text{ V}$ |
| Gate to collector charge | Q_{gc} | — | 16 | — | nC | $I_C = 17 \text{ A}$ |
| Switching time | $t_{d(on)}$ | — | 30 | — | ns | $V_{CC} = 300 \text{ V}, V_{GE} = 15 \text{ V}$ |
| | t_r | — | 15 | — | ns | $I_C = 17 \text{ A}$ |
| | $t_{d(off)}$ | — | 80 | — | ns | $R_g = 5 \Omega$ |
| | t_f | — | 80 | — | ns | Inductive load |
| Short circuit withstand time | t_{sc} | 6 | 8 | — | μs | $T_C = 100 \text{ }^\circ\text{C}$ $V_{CC} \leq 360 \text{ V}, V_{GE} = 15 \text{ V}$ |
| FRD Forward voltage | V_F | — | 1.3 | 1.7 | V | $I_F = 17 \text{ A}$ ^{Note3} |
| FRD reverse recovery time | t_{rr} | — | 100 | — | ns | $I_F = 17 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ |

Notes: 3. Pulse test.

Package Dimension



Ordering Information

| Orderable Part No. | Quantity | Shipping Container |
|--------------------|----------|--------------------|
| RJH60M3DPE-00-J3 | 1000 pcs | Taping |