

RJK0653DPB

Silicon N Channel Power MOS FET Power Switching

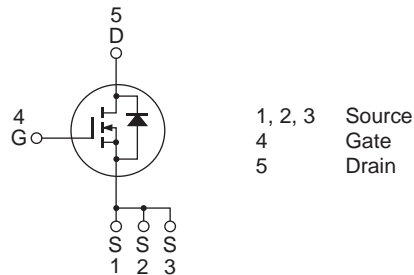
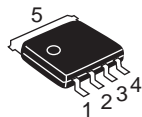
R07DS0078EJ0102
(Previous: REJ03G1760-0101)
Rev.1.02
Jul 30, 2010

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 3.8 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Pb-free
- Halogen-free

Outline

RENESAS Package code: PTZZ0005DA-A
(Package name: LFPAK)



Application

- Switching Mode Power Supply

Absolute Maximum Ratings

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

| Item | Symbol | Ratings | Unit |
|--|---------------------------------|-------------|---------------------------|
| Drain to source voltage | V_{DSS} | 60 | V |
| Gate to source voltage | V_{GSS} | ± 20 | V |
| Drain current | I_D | 45 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | 180 | A |
| Body-drain diode reverse drain current | I_{DR} | 45 | A |
| Avalanche current | I_{AP} ^{Note 2} | 22.5 | A |
| Avalanche energy | E_{AR} ^{Note 2} | 38 | mJ |
| Channel dissipation | P_{ch} ^{Note3} | 65 | W |
| Channel to Case Thermal Resistance | θ_{ch-C} | 1.92 | $^\circ\text{C}/\text{W}$ |
| Channel temperature | T_{ch} | 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 $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$
 3. $T_c = 25^\circ\text{C}$

This product is for the low voltage drive ($\leq 10\text{V}$).
 If the driving voltage is over 10 V under normal conditions, please use the product for high gate to source cutoff voltage ($V_{GS(off)}$) which characteristics has been improved.

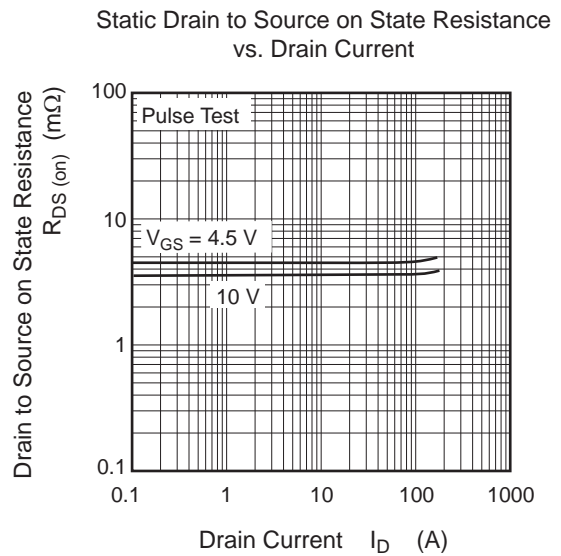
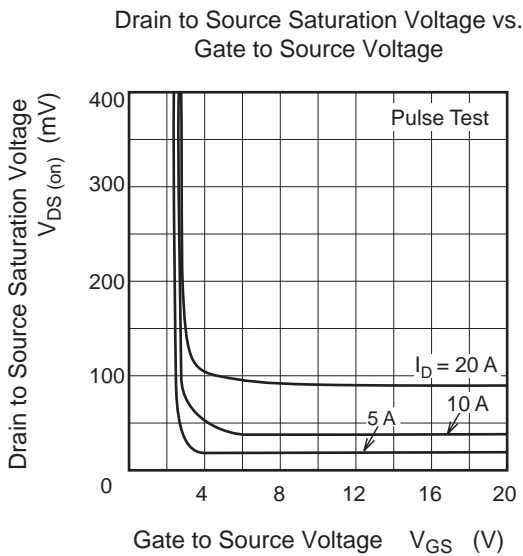
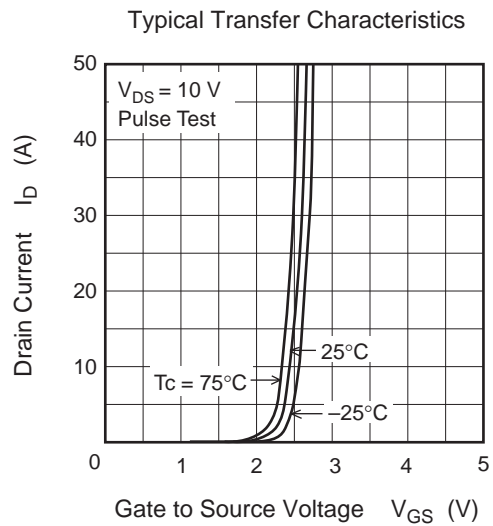
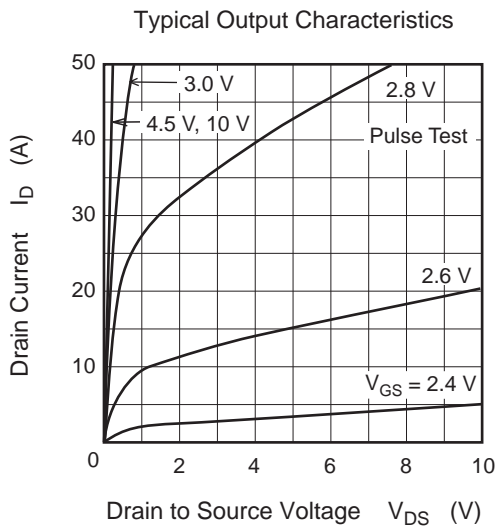
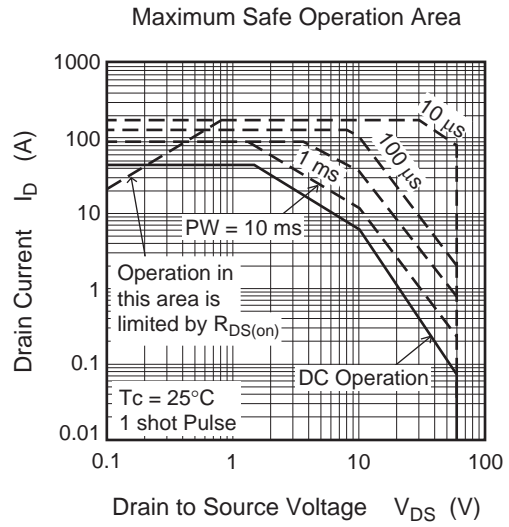
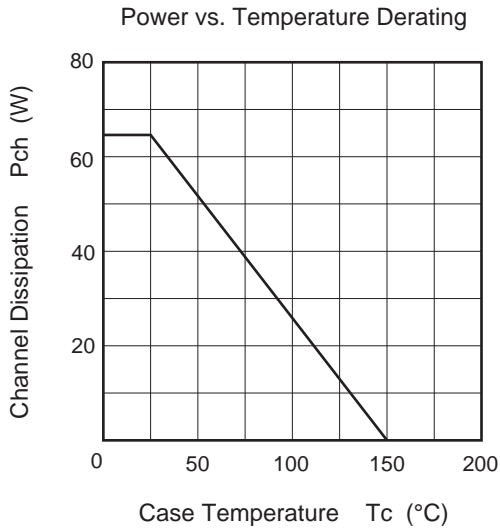
Electrical Characteristics

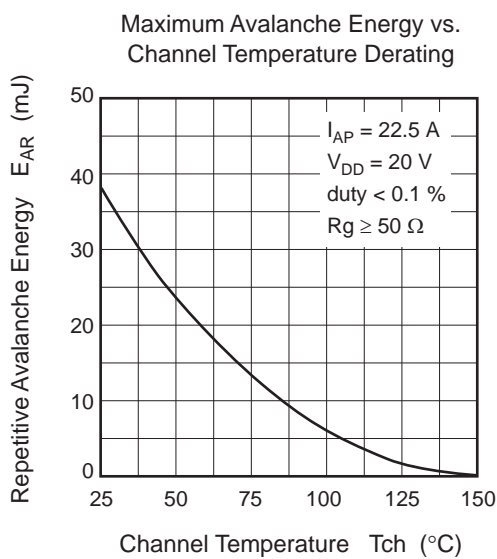
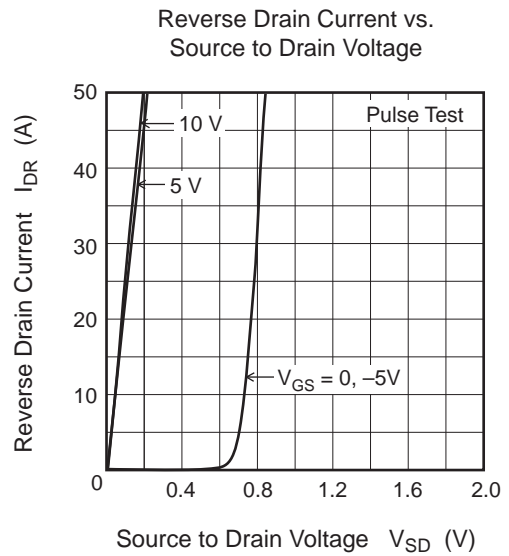
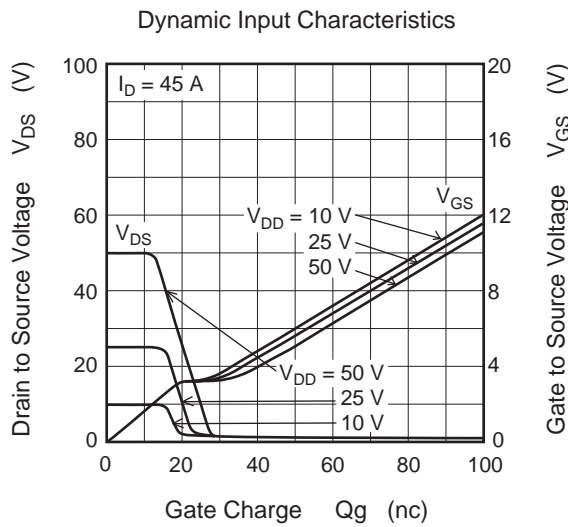
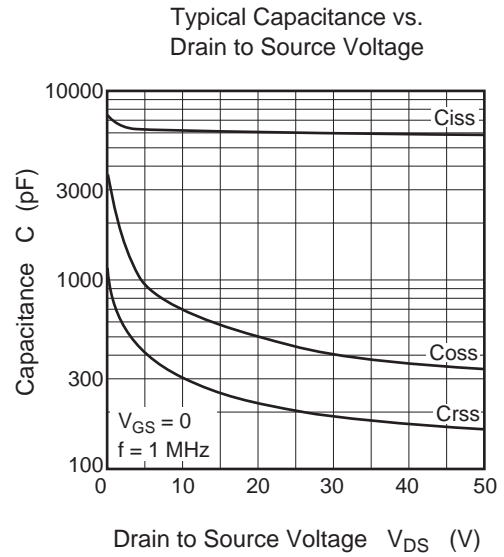
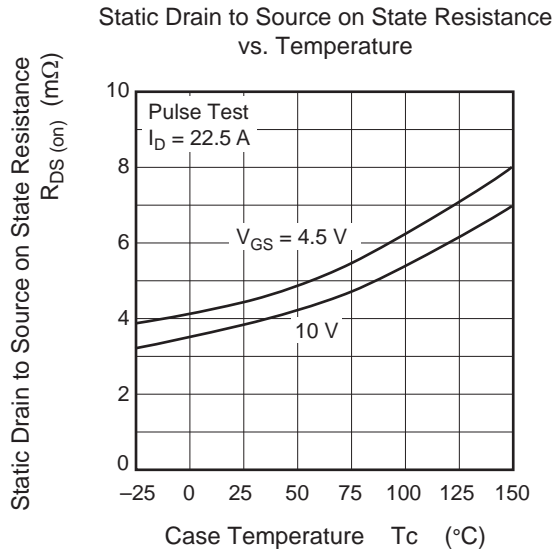
(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|-----|------|-----------|------------------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 60 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0 \text{ V}$ |
| Gate to source leak current | I_{GSS} | — | — | ± 0.1 | μA | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 1.2 | — | 2.5 | V | $V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 3.8 | 4.8 | $\text{m}\Omega$ | $I_D = 22.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 4.5 | 6.1 | $\text{m}\Omega$ | $I_D = 22.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | — | 110 | — | S | $I_D = 22.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4} |
| Input capacitance | C_{iss} | — | 6100 | — | pF | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 700 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 300 | — | pF | |
| Gate Resistance | R_g | — | 0.5 | — | Ω | |
| Total gate charge | Q_g | — | 42 | — | nC | $V_{DD} = 25 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 45 \text{ A}$ |
| Gate to source charge | Q_{gs} | — | 20 | — | nC | |
| Gate to drain charge | Q_{gd} | — | 11.8 | — | nC | |
| Turn-on delay time | $t_{d(on)}$ | — | 14 | — | ns | $V_{GS} = 10 \text{ V}$, $I_D = 22.5 \text{ A}$, $V_{DD} \cong 30 \text{ V}$, $R_L = 1.33 \Omega$, $R_g = 4.7 \Omega$ |
| Rise time | t_r | — | 8.3 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 68 | — | ns | |
| Fall time | t_f | — | 14 | — | ns | |
| Body-drain diode forward voltage | V_{DF} | — | 0.83 | 1.1 | V | $I_F = 45 \text{ A}$, $V_{GS} = 0 \text{ V}$ ^{Note4} |
| Body-drain diode reverse recovery time | t_{rr} | — | 40 | — | ns | $I_F = 45 \text{ A}$, $V_{GS} = 0 \text{ V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ |

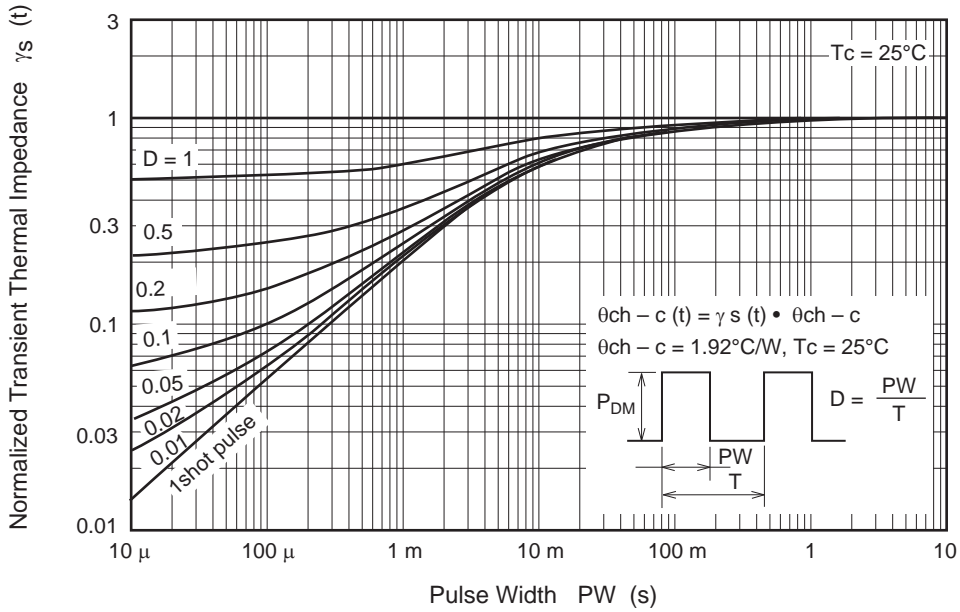
Notes: 4. Pulse test

Main Characteristics

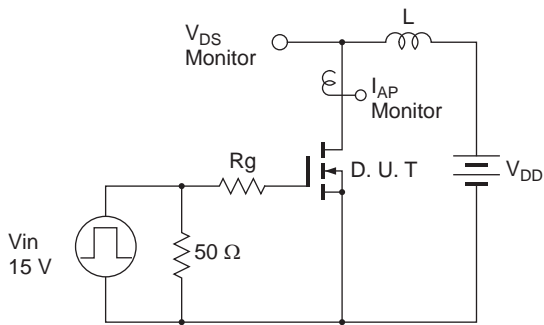




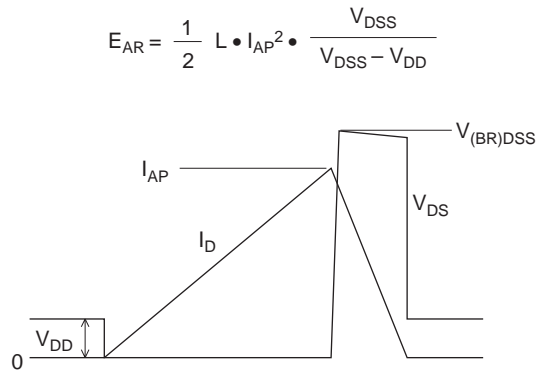
Normalized Transient Thermal Impedance vs. Pulse Width



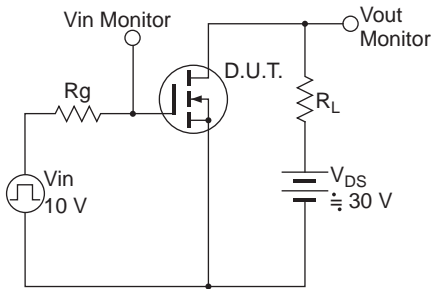
Avalanche Test Circuit



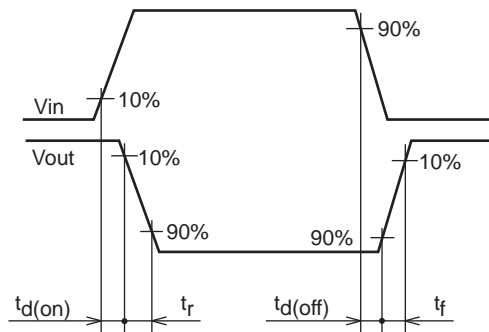
Avalanche Waveform



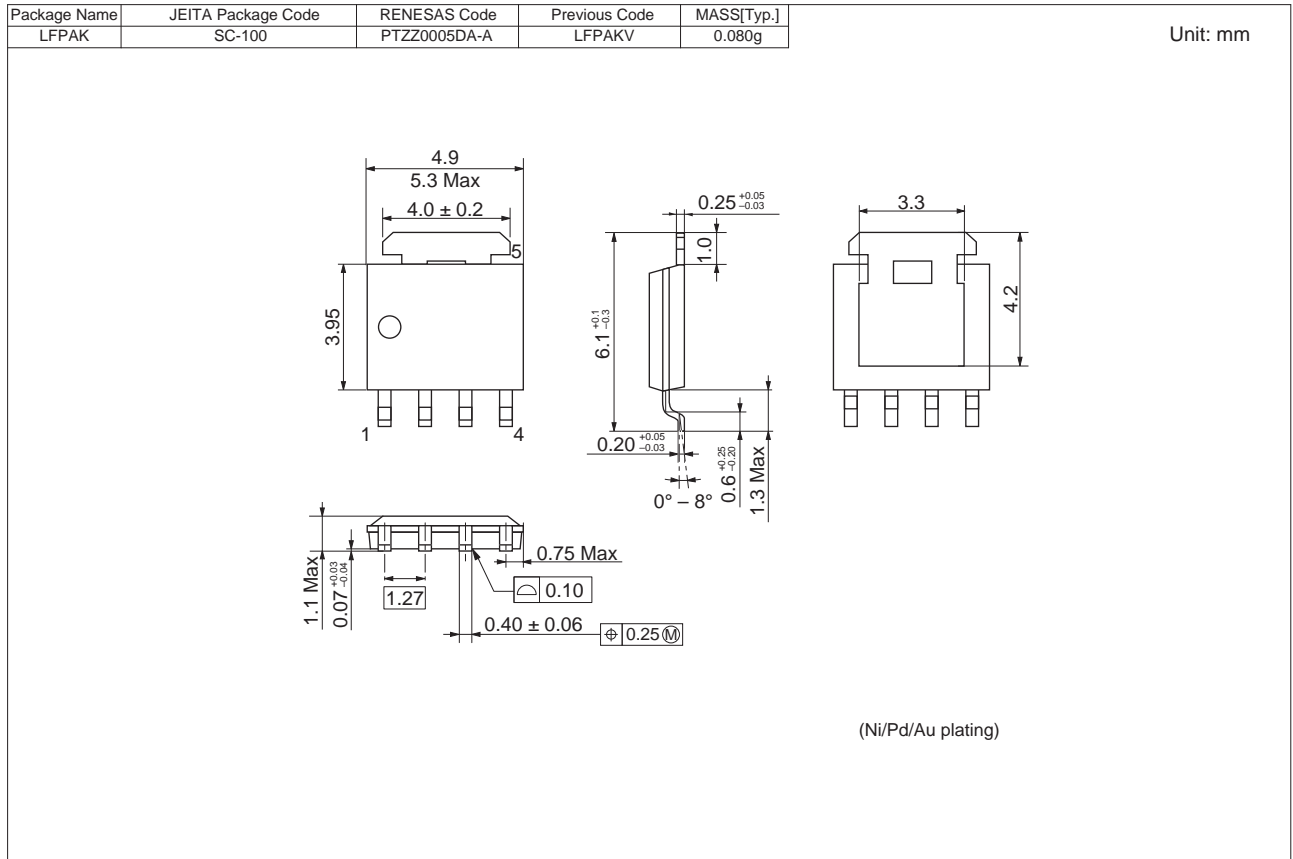
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

| Part No. | Quantity | Shipping Container |
|------------------|----------|--------------------|
| RJK0653DPB-00-J5 | 2500 pcs | Taping |

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