

RJK0208DPA

Silicon N Channel Power MOS FET with Schottky Barrier Diode Power Switching

REJ03G1924-0200

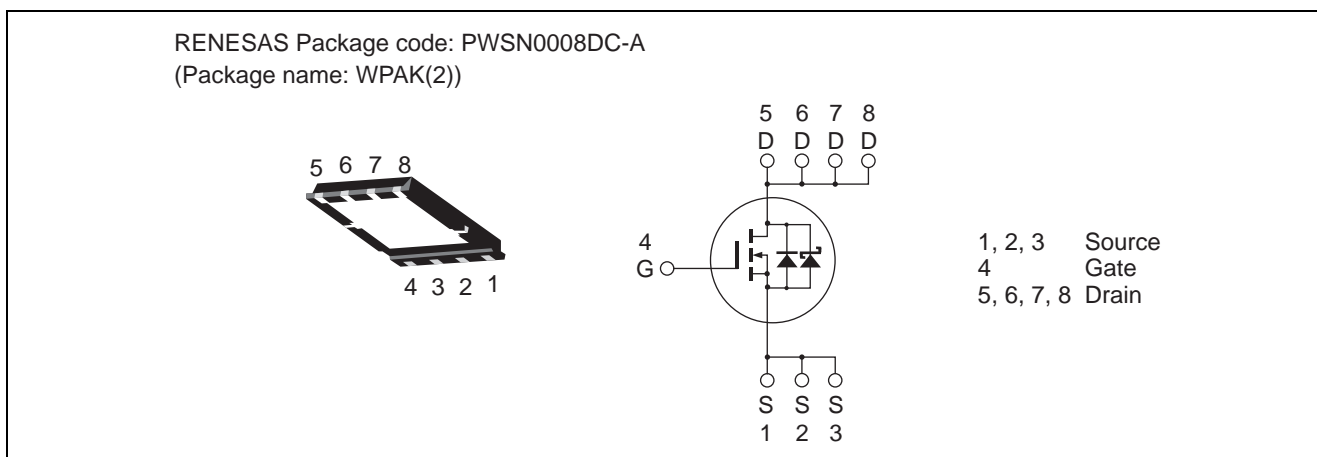
Rev.2.00

Apr 27, 2010

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 1.6 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Pb-free
- Halogen-free

Outline



Absolute Maximum Ratings

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

| Item | Symbol | Ratings | Unit |
|--|-----------------------------------|-------------|---------------------------|
| Drain to source voltage | V_{DSS} | 25 | V |
| Gate to source voltage | V_{GSS} | ± 20 | V |
| Drain current | I_D | 65 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note 1} | 260 | A |
| Body-drain diode reverse drain current | I_{DR} | 65 | A |
| Avalanche current | I_{AP} ^{Note 2} | 29 | A |
| Avalanche energy | E_{AR} ^{Note 2} | 105 | mJ |
| Channel dissipation | P_{ch} ^{Note 3} | 60 | W |
| Channel to case thermal impedance | θ_{ch-c} ^{Note 3} | 2.08 | $^\circ\text{C}/\text{W}$ |
| 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. $T_c = 25^\circ\text{C}$

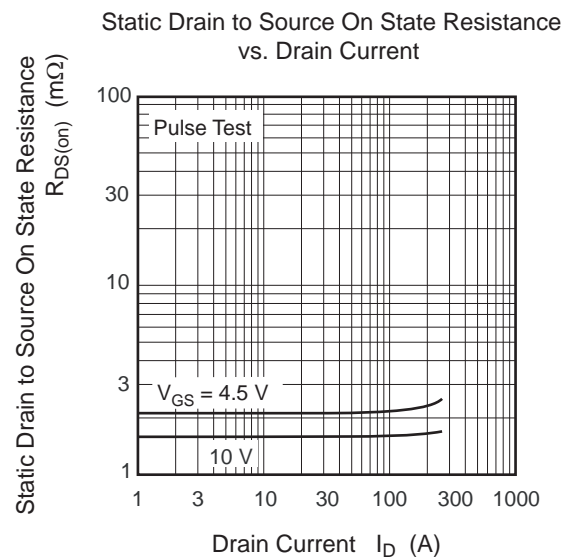
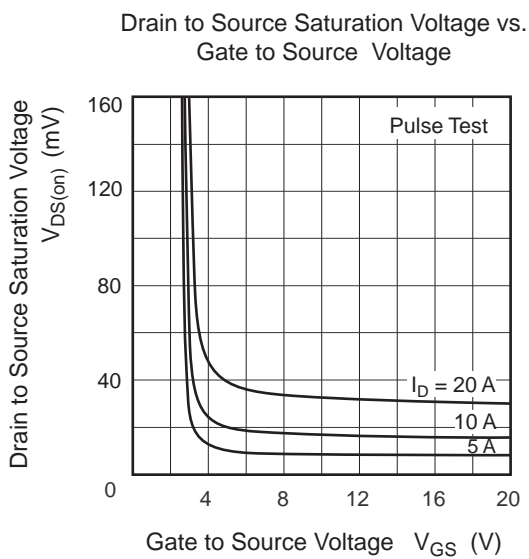
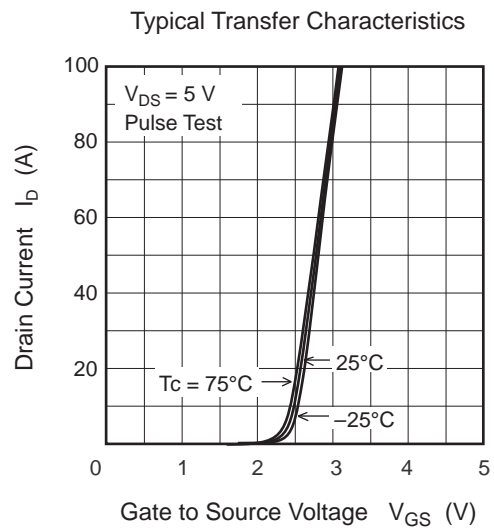
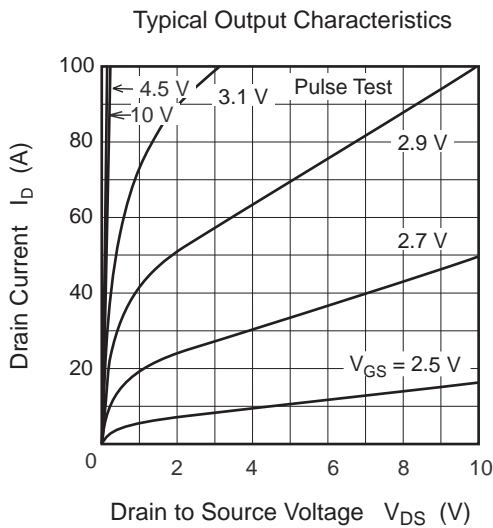
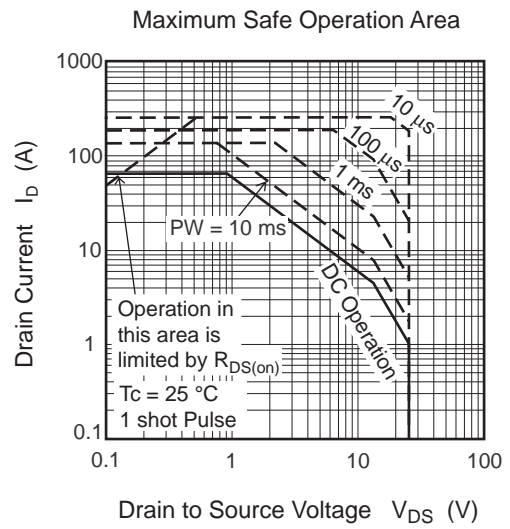
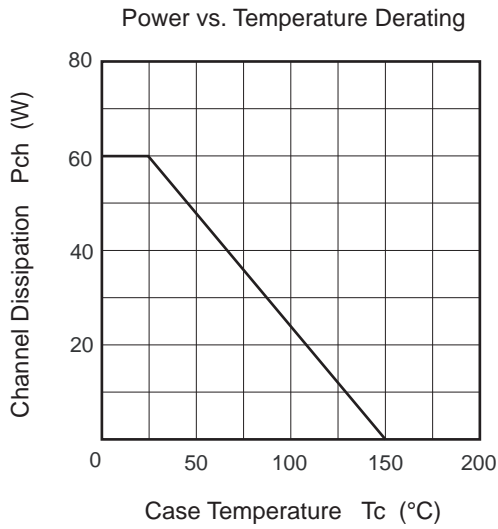
Electrical Characteristics

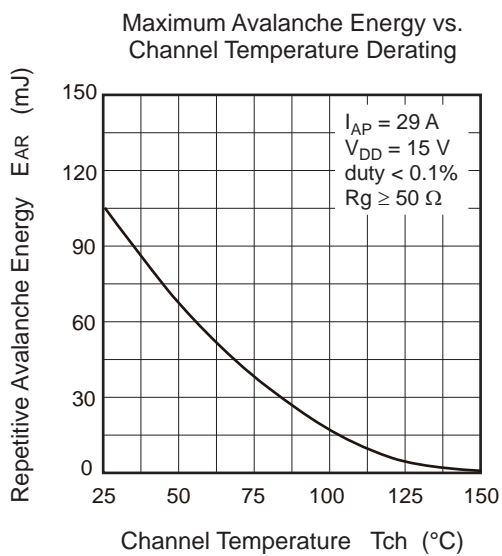
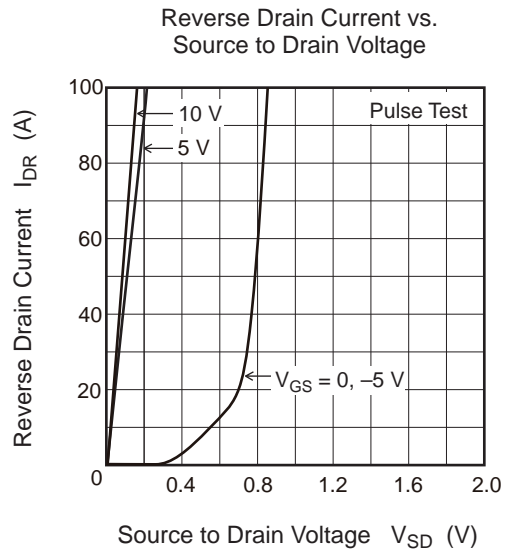
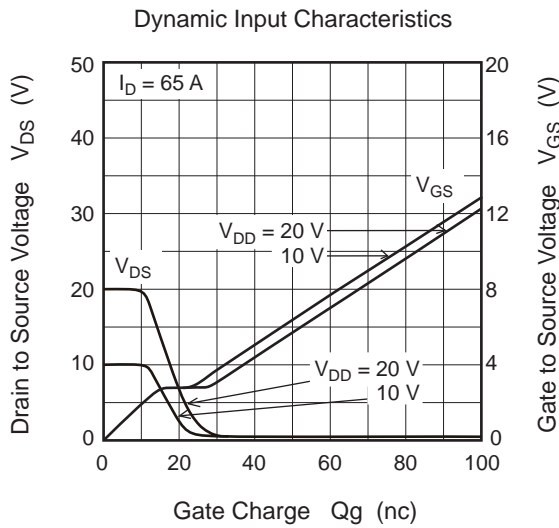
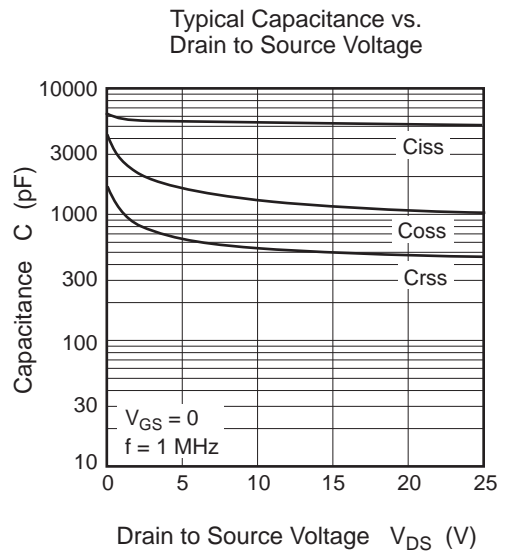
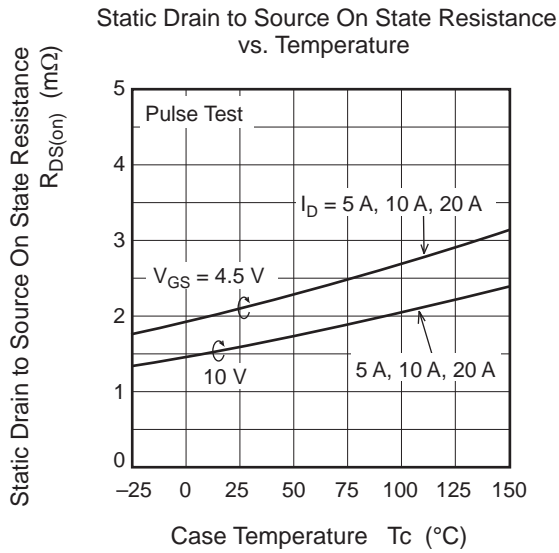
(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|-----|------|-----------|------------------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 25 | — | — | V | $I_D = 10 \text{ mA}, V_{GS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 0.5 | μA | $V_{GS} = \pm 20 \text{ V}, V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 1 | mA | $V_{DS} = 25 \text{ V}, V_{GS} = 0$ |
| 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 | $R_{DS(on)}$ | — | 1.6 | 2.0 | $\text{m}\Omega$ | $I_D = 32.5\text{A}, V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 2.1 | 2.7 | $\text{m}\Omega$ | $I_D = 32.5\text{A}, V_{GS} = 4.5 \text{ V}$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | — | 125 | — | S | $I_D = 32.5\text{A}, V_{DS} = 5 \text{ V}$ ^{Note4} |
| Input capacitance | C_{iss} | — | 5350 | 7490 | pF | $V_{DS} = 10 \text{ V}$ |
| Output capacitance | C_{oss} | — | 1290 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 530 | — | pF | $f = 1 \text{ MHz}$ |
| Gate Resistance | R_g | — | 1.6 | 3.2 | Ω | |
| Total gate charge | Q_g | — | 36.0 | — | nC | $V_{DD} = 10 \text{ V}$ |
| Gate to source charge | Q_{gs} | — | 15.3 | — | nC | $V_{GS} = 4.5 \text{ V}$ |
| Gate to drain charge | Q_{gd} | — | 10.0 | — | nC | $I_D = 65 \text{ A}$ |
| Turn-on delay time | $t_{d(on)}$ | — | 21 | — | ns | $V_{GS} = 10 \text{ V}, I_D = 32.5 \text{ A}$ |
| Rise time | t_r | — | 8 | — | ns | $V_{DD} \cong 10 \text{ V}$ |
| Turn-off delay time | $t_{d(off)}$ | — | 80 | — | ns | $R_L = 0.31\Omega$ |
| Fall time | t_f | — | 17 | — | ns | $R_g = 4.7 \Omega$ |
| Body-drain diode forward voltage | V_{DF} | — | 0.39 | — | V | $I_F = 2 \text{ A}, V_{GS} = 0$ ^{Note4} |
| Body-drain diode reverse recovery time | t_{rr} | — | 45 | — | ns | $I_F = 65 \text{ A}, V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ |

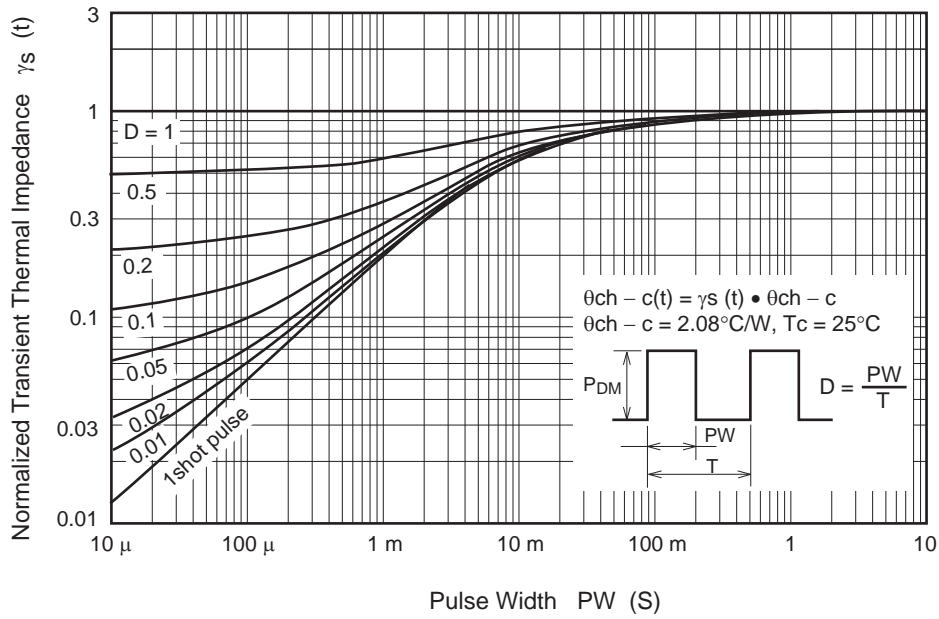
Notes: 4. Pulse test

Main Characteristics

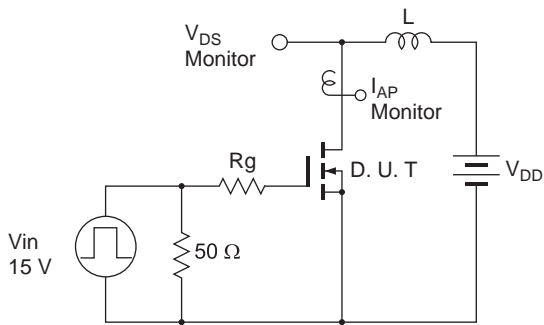




Normalized Transient Thermal Impedance vs. Pulse Width

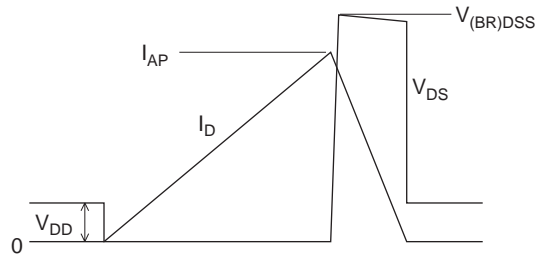


Avalanche Test Circuit

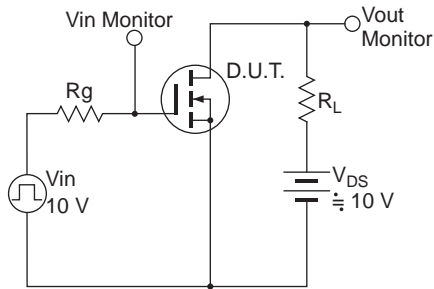


Avalanche Waveform

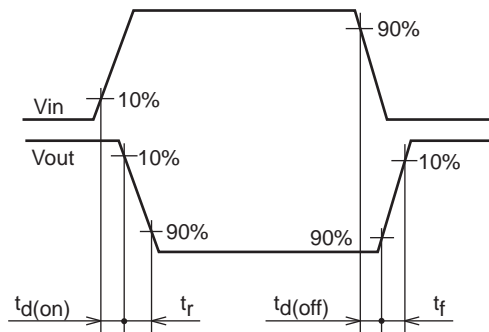
$$E_{AR} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



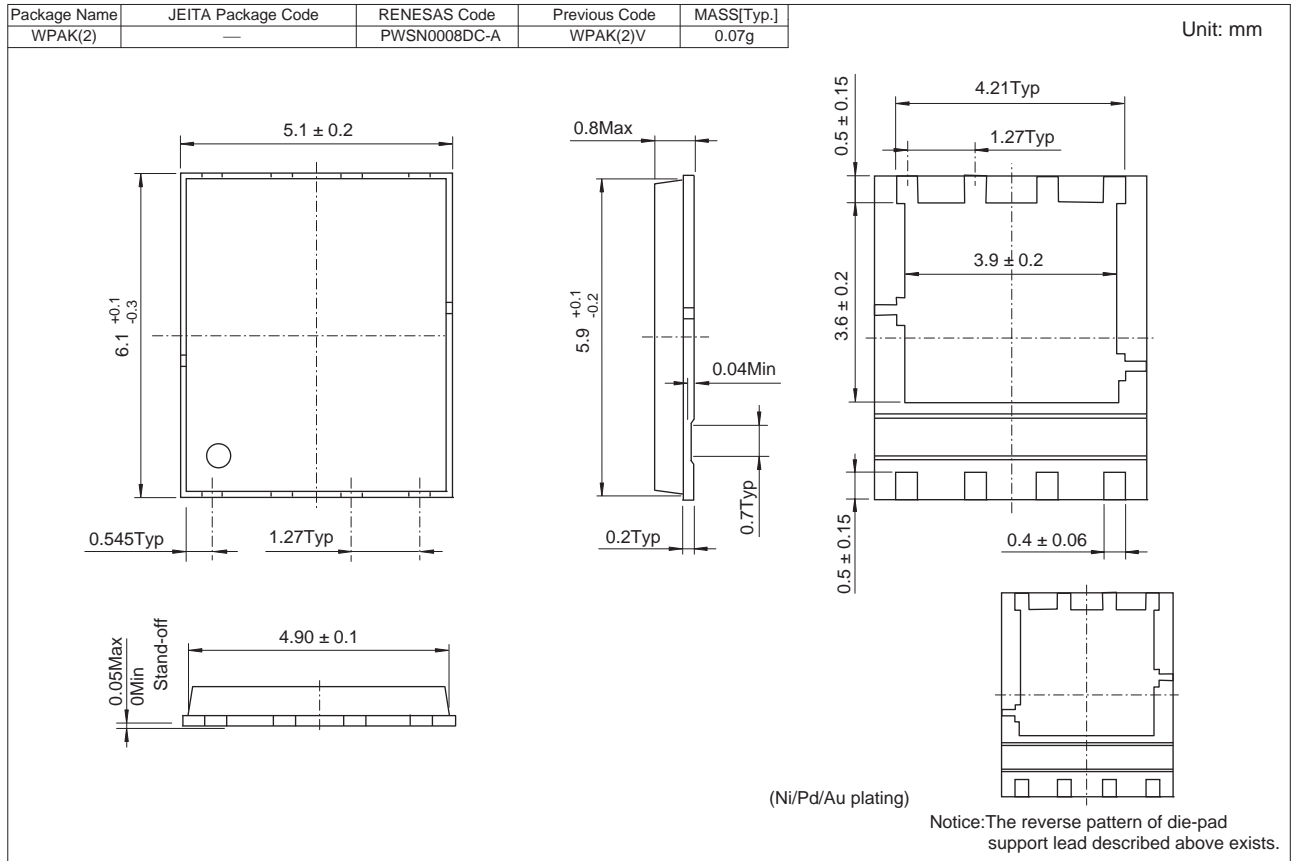
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

| Part No. | Quantity | Shipping Container |
|-------------------|----------|--------------------|
| RJK0208DPA-00-J53 | 3000 pcs | Taping |

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