

RJK03N6DPA

30V, 40A, 3.8mΩmax.

Built in SBD N Channel Power MOS FET

High Speed Power Switching

R07DS0787EJ0200

Rev.2.00

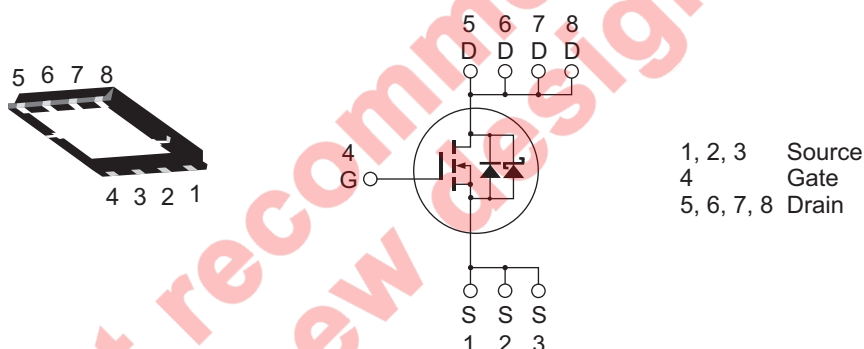
Feb 12, 2013

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
- Pb-free
- Halogen-free

Outline

RENESAS Package code: PWSN0008DE-A
(Package name: WPAK(3F))



Absolute Maximum Ratings

(Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|--|-----------------------------------|-------------|------|
| Drain to source voltage | V_{DSS} | 30 | V |
| Gate to source voltage | V_{GSS} | ±20 | V |
| Drain current | I_D | 40 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note 1} | 160 | A |
| Body-drain diode reverse drain current | I_{DR} | 40 | A |
| Avalanche current | I_{AP} ^{Note 2} | 14 | A |
| Avalanche energy | E_{AS} ^{Note 2} | 19.6 | mJ |
| Channel dissipation | P_{ch} ^{Note 3} | 35 | W |
| Channel to case thermal impedance | θ_{ch-c} ^{Note 3} | 3.57 | °C/W |
| Channel temperature | T_{ch} | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

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

2. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

3. $T_c = 25^\circ C$

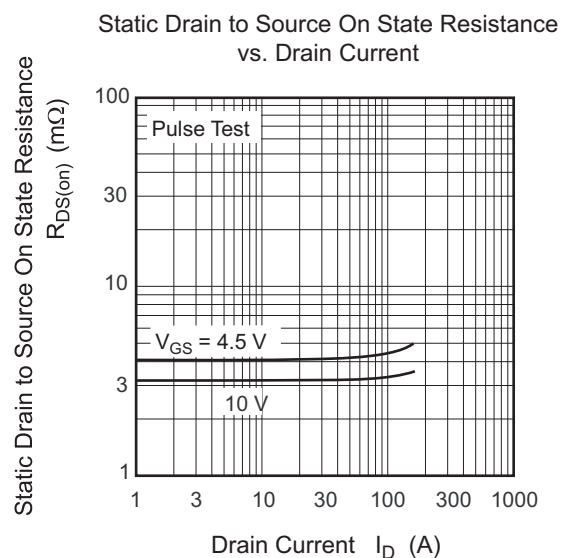
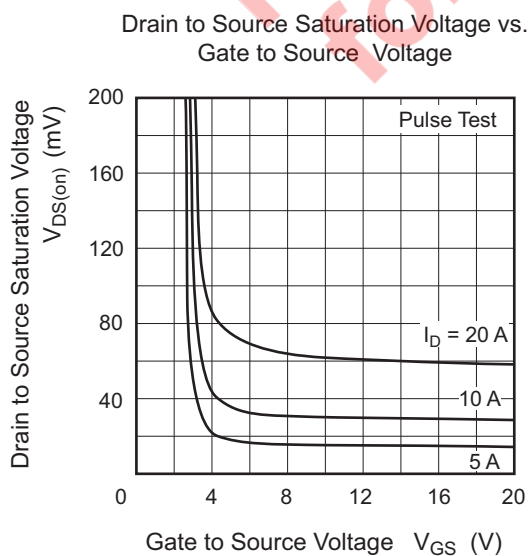
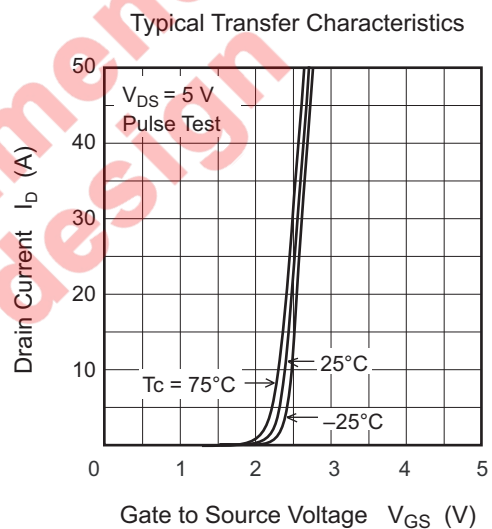
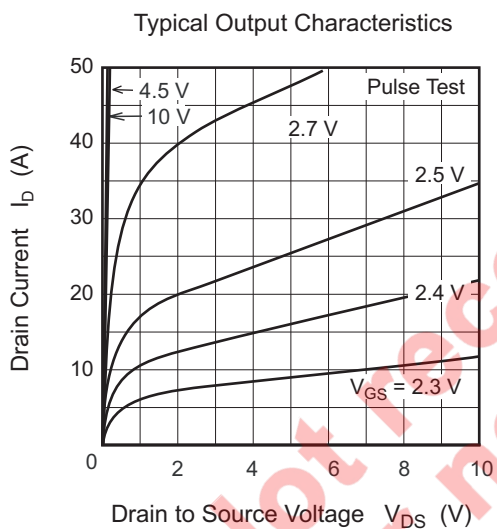
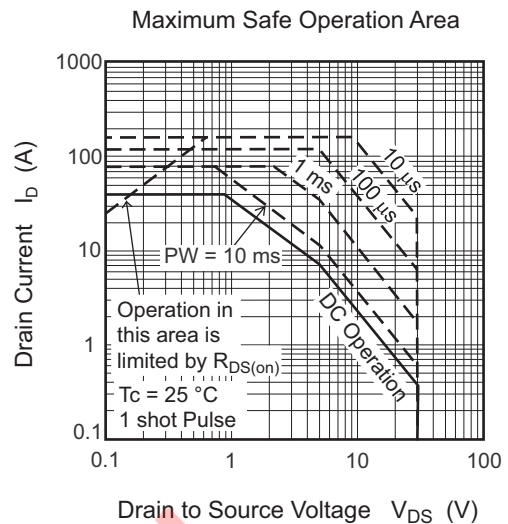
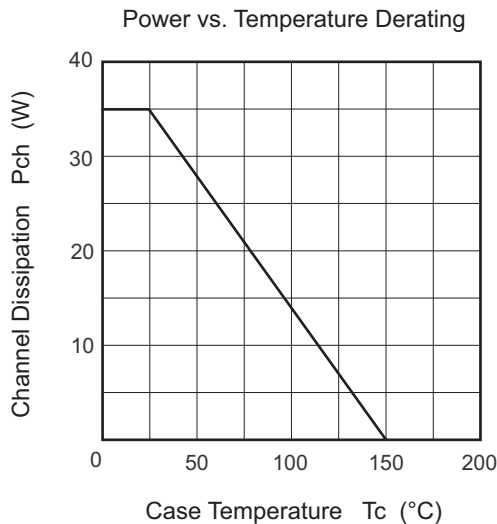
Electrical Characteristics

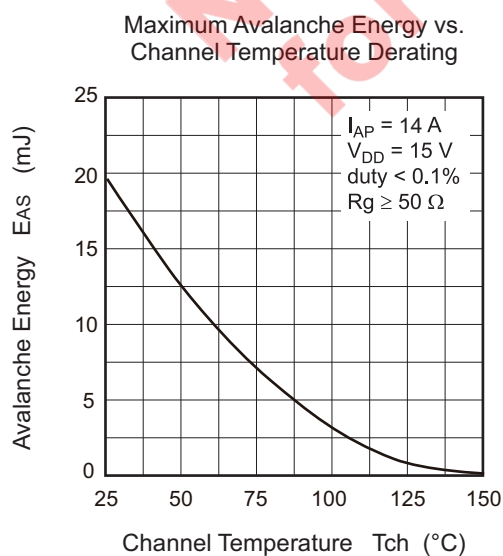
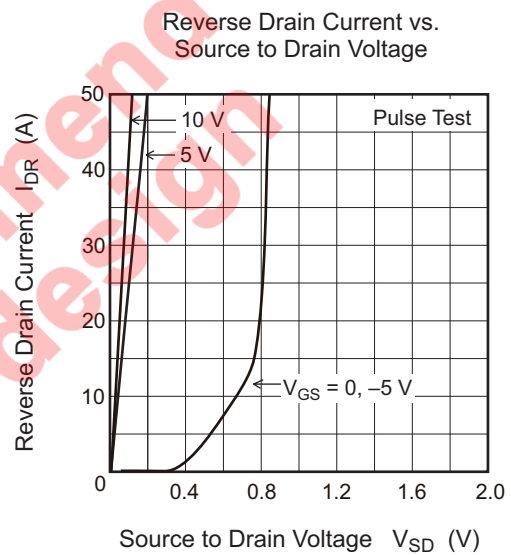
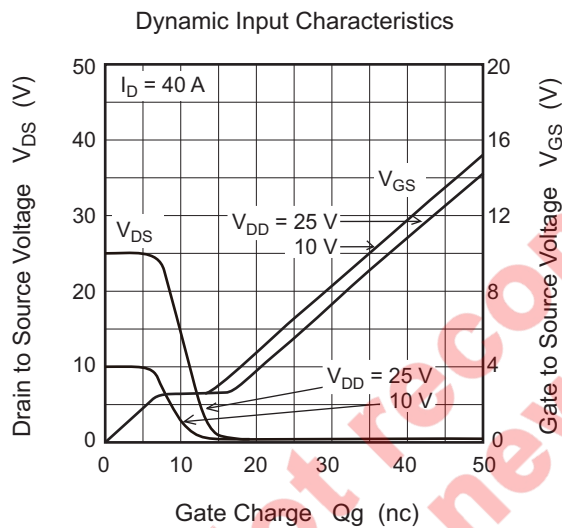
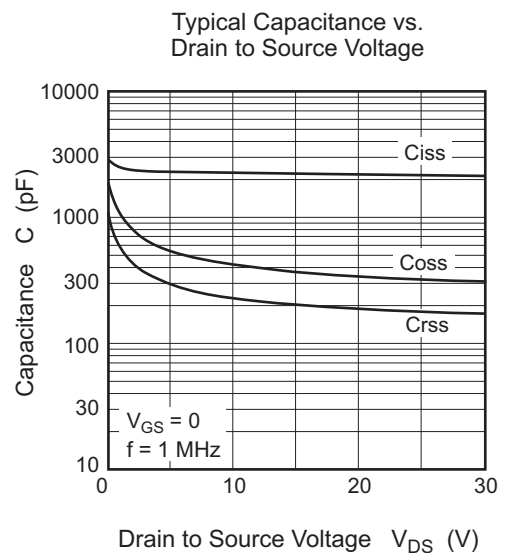
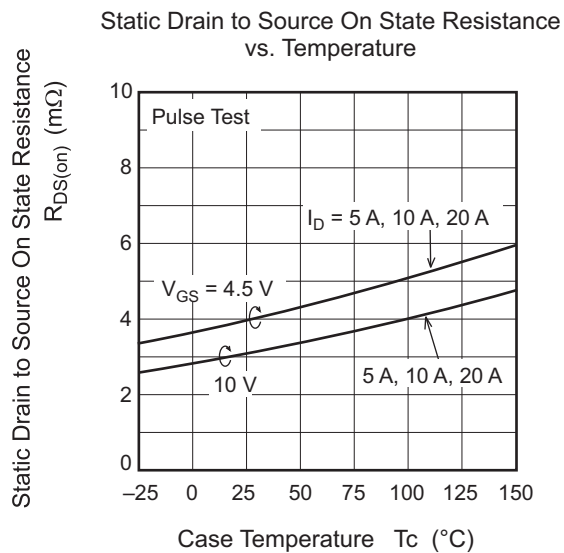
(Ta = 25°C)

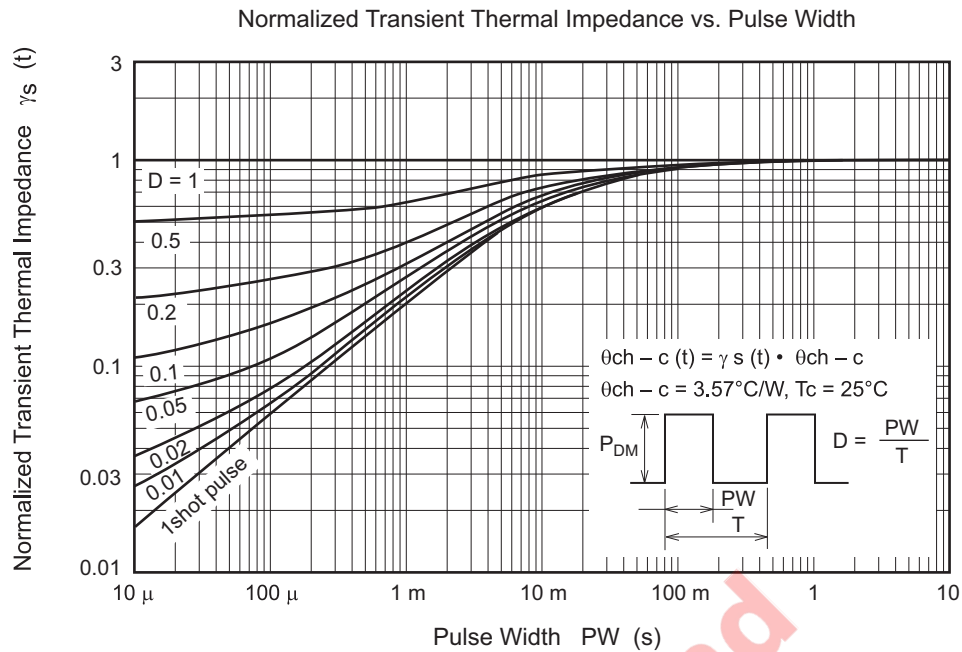
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|-----|------|-----------|------------------|--|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 30 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 0.5 | μA | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 1 | mA | $V_{DS} = 24 \text{ V}$, $V_{GS} = 0$ |
| 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 | $R_{DS(on)}$ | — | 3.1 | 3.8 | $\text{m}\Omega$ | $I_D = 20 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 4.0 | 5.2 | $\text{m}\Omega$ | $I_D = 20 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | — | 72 | — | S | $I_D = 20 \text{ A}$, $V_{DS} = 5 \text{ V}$ ^{Note4} |
| Input capacitance | C_{iss} | — | 2300 | 3220 | pF | $V_{DS} = 10 \text{ V}$ |
| Output capacitance | C_{oss} | — | 410 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 240 | — | pF | $f = 1 \text{ MHz}$ |
| Gate Resistance | R_g | — | 2.1 | 4.2 | Ω | |
| Total gate charge | Q_g | — | 19.0 | — | nC | $V_{DD} = 10 \text{ V}$ |
| Gate to source charge | Q_{gs} | — | 7.2 | — | nC | $V_{GS} = 4.5 \text{ V}$ |
| Gate to drain charge | Q_{gd} | — | 6.0 | — | nC | $I_D = 40 \text{ A}$ |
| Turn-on delay time | $t_{d(on)}$ | — | 4.1 | — | ns | $V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$ |
| Rise time | t_r | — | 3.2 | — | ns | $V_{DD} \cong 10 \text{ V}$ |
| Turn-off delay time | $t_{d(off)}$ | — | 45.7 | — | ns | $R_L = 0.5 \Omega$ |
| Fall time | t_f | — | 15.2 | — | ns | $R_g = 4.7 \Omega$ |
| Body-drain diode forward voltage | V_{DF} | — | 0.41 | — | V | $I_F = 2 \text{ A}$, $V_{GS} = 0$ ^{Note4} |
| Body-drain diode reverse recovery time | t_{rr} | — | 7.7 | — | ns | $I_F = 40 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 500 \text{ A}/\mu\text{s}$ |

Notes: 4. Pulse test

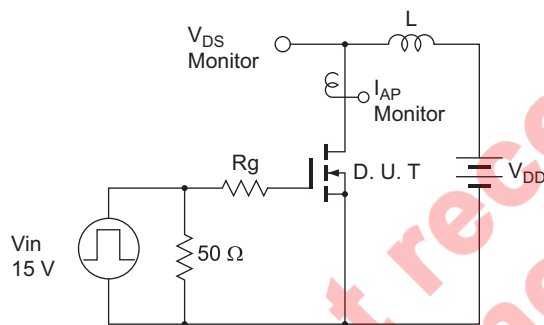
Main Characteristics



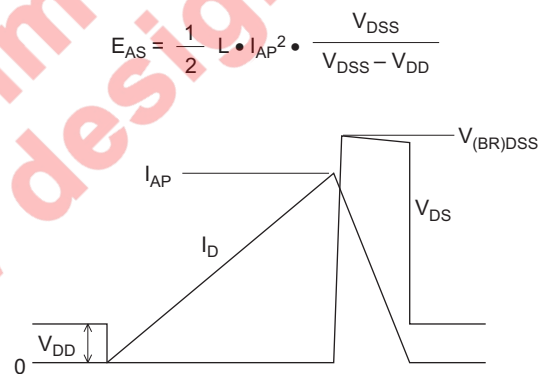




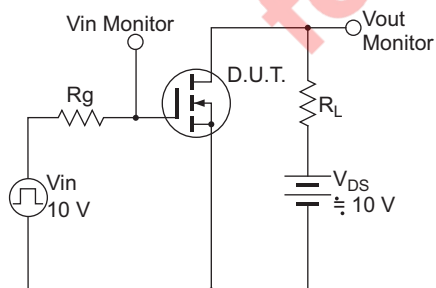
Avalanche Test Circuit



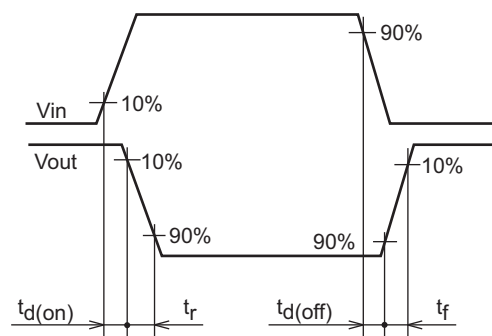
Avalanche Waveform



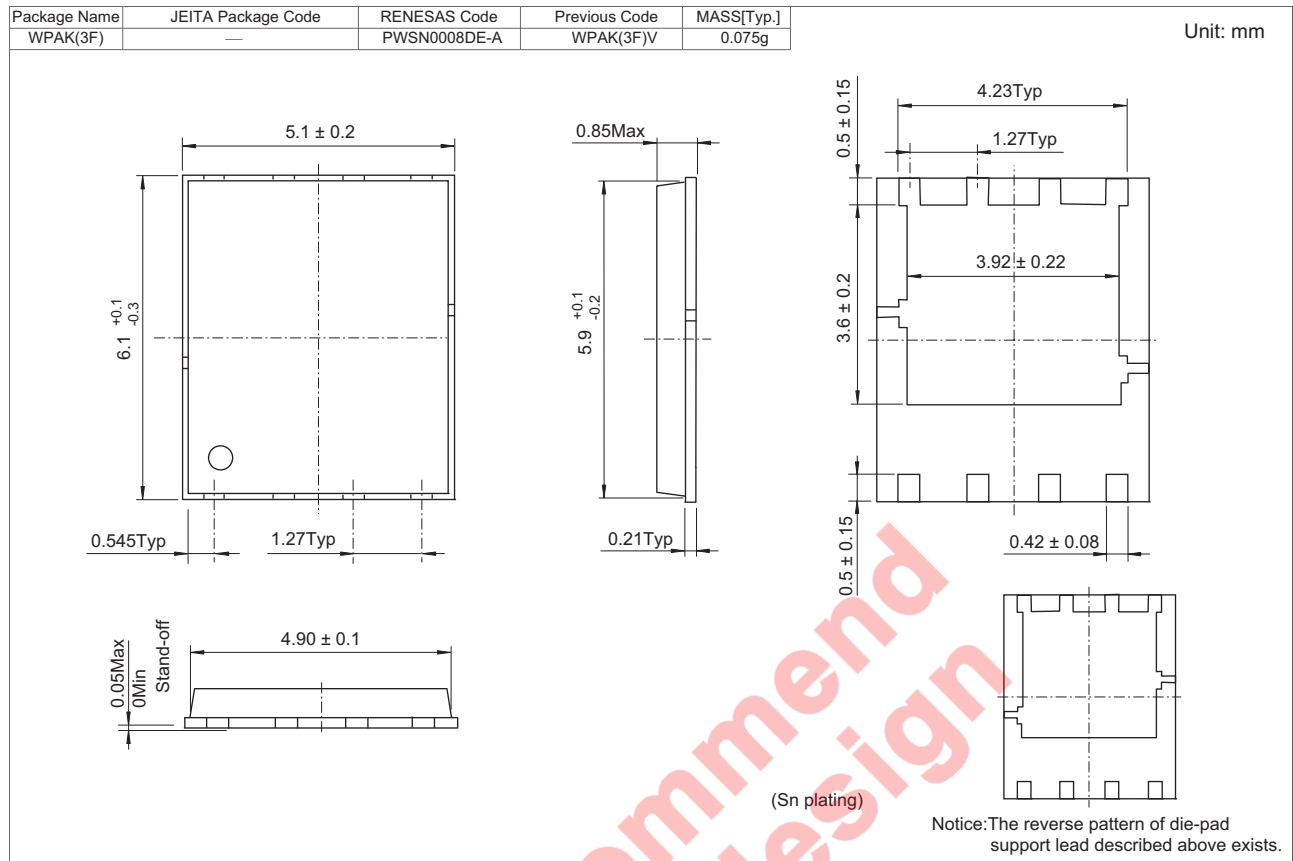
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|----------|--------------------|
| RJK03N6DPA-00-J5A | 3000 pcs | Taping |

Note: The symbol of 2nd "-" is occasionally presented as "#".

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