

RJK03N0DPA

30V, 45A, 2.4mΩmax.

Built in SBD N Channel Power MOS FET

High Speed Power Switching

R07DS0781EJ0200

Rev.2.00

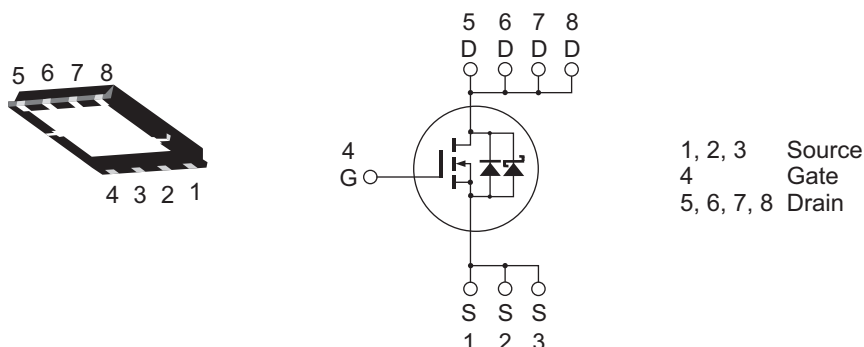
Feb 12, 2013

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}	±12	V
Drain current	I_D	45	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	180	A
Body-drain diode reverse drain current	I_{DR}	45	A
Avalanche current	I_{AP} ^{Note 2}	19	A
Avalanche energy	E_{AS} ^{Note 2}	36.1	mJ
Channel dissipation	P_{ch} ^{Note 3}	45	W
Channel to case thermal impedance	θ_{ch-c} ^{Note 3}	2.78	°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. $T_c = 25^\circ C$

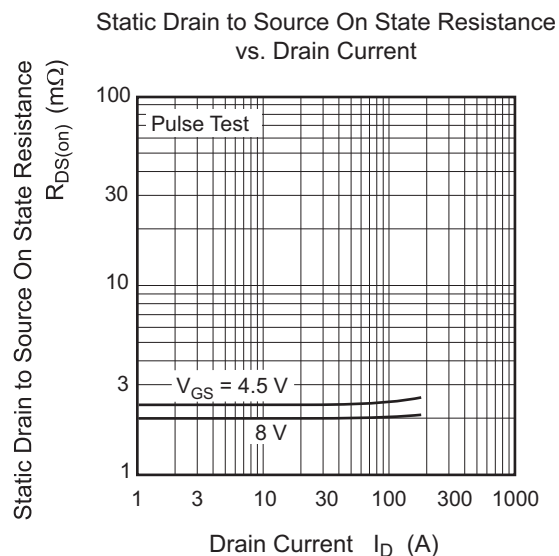
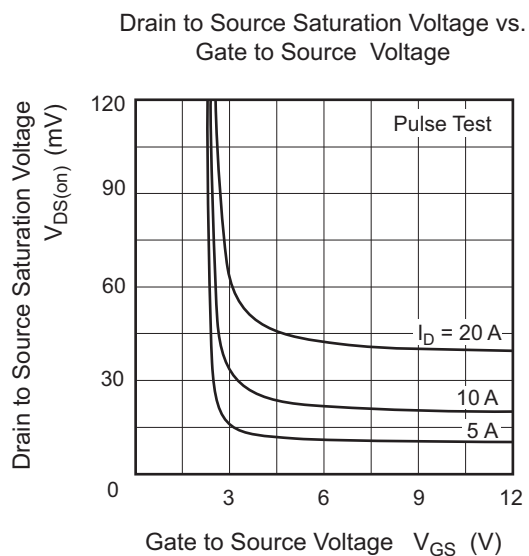
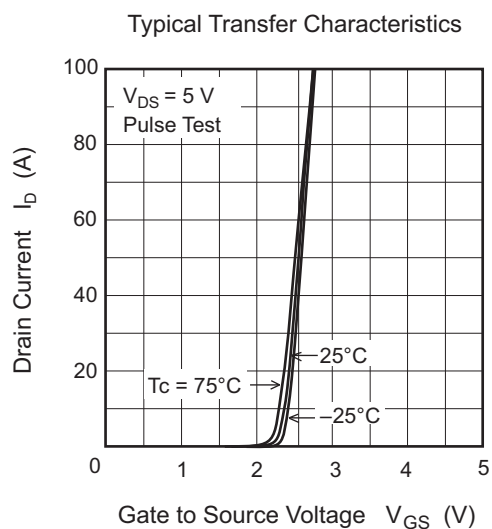
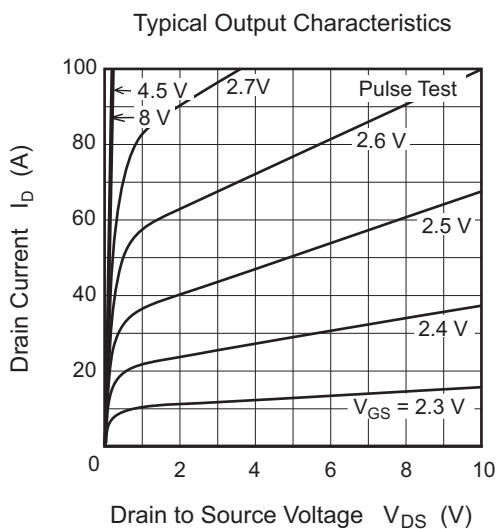
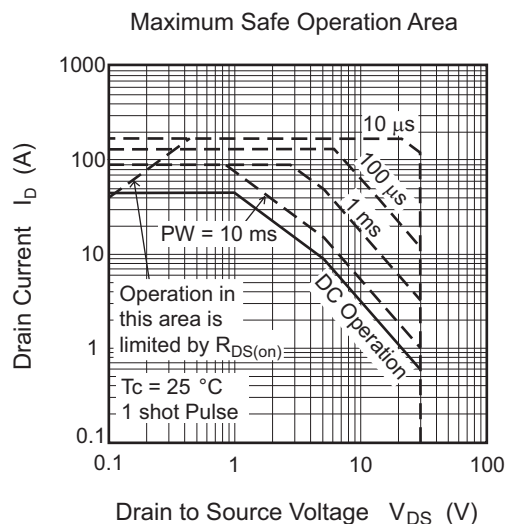
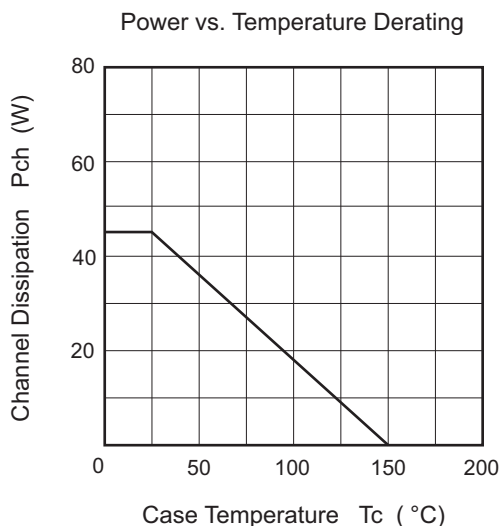
Electrical Characteristics

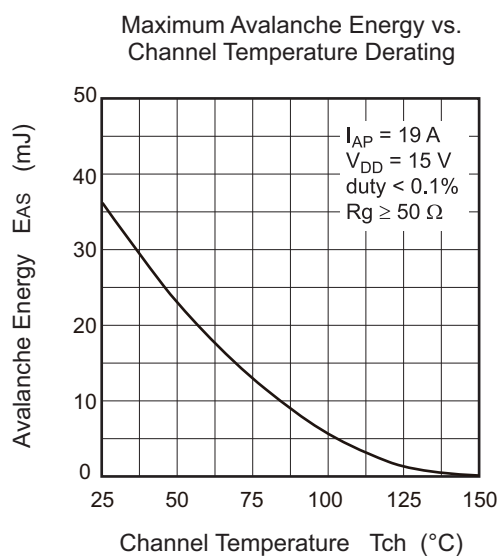
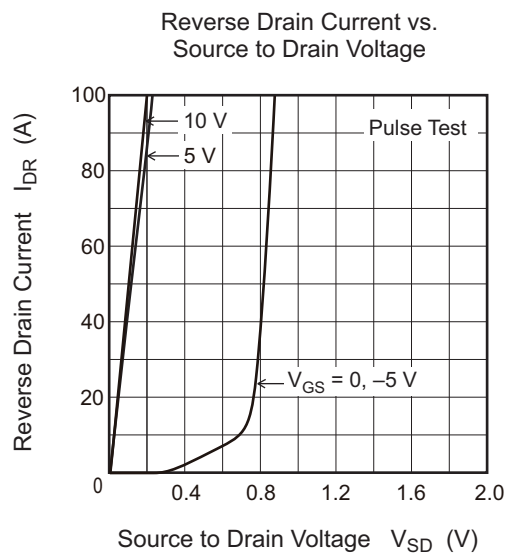
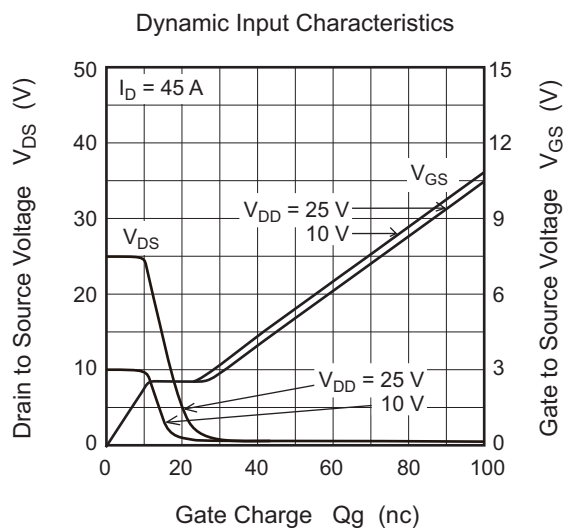
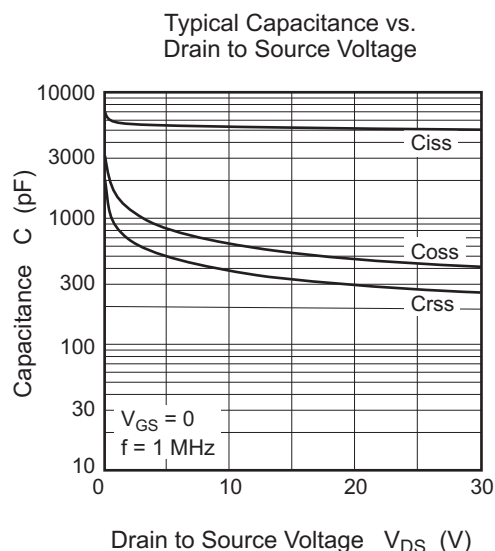
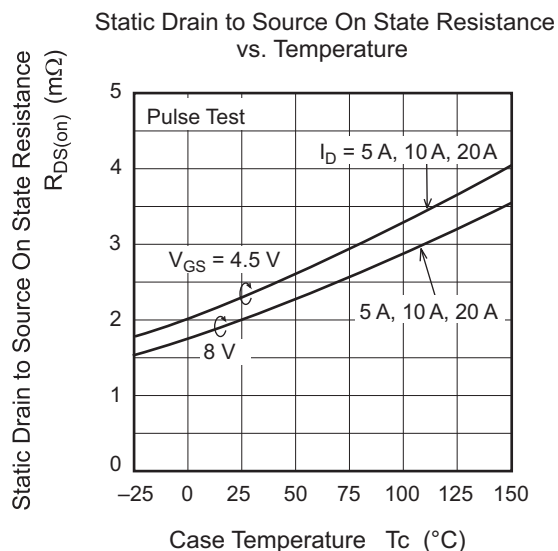
(Ta = 25°C)

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	$V_{GS} = \pm 12 \text{ V}$, $V_{DS} = 0$
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	$R_{DS(on)}$	—	2.0	2.4	$\text{m}\Omega$	$I_D = 22.5 \text{ A}$, $V_{GS} = 8.0 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	2.3	2.9	$\text{m}\Omega$	$I_D = 22.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	132	—	S	$I_D = 22.5 \text{ A}$, $V_{DS} = 5 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	5280	7390	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	625	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	390	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	R_g	—	1.5	3.0	Ω	
Total gate charge	Q_g	—	42	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	12.1	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	12.4	—	nC	$I_D = 45 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	10.1	—	ns	$V_{GS} = 8 \text{ V}$, $I_D = 22.5 \text{ A}$
Rise time	t_r	—	6.2	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	92.4	—	ns	$R_L = 0.44 \Omega$
Fall time	t_f	—	26.1	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.40	—	V	$I_F = 2 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	9.1	—	ns	$I_F = 45 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 500 \text{ A}/\mu\text{s}$

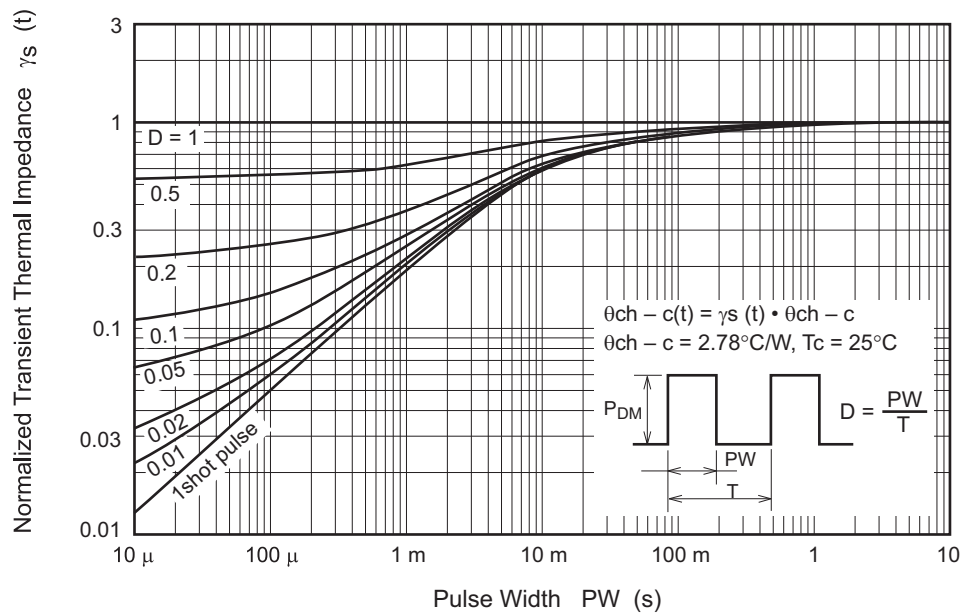
Notes: 4. Pulse test

Main Characteristics

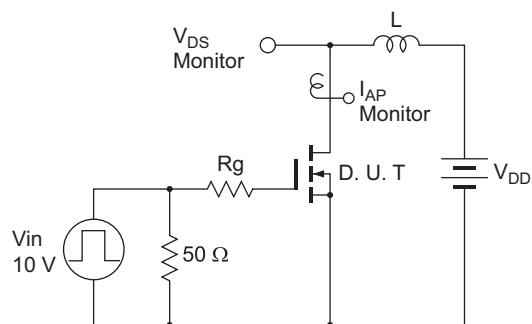




Normalized Transient Thermal Impedance vs. Pulse Width

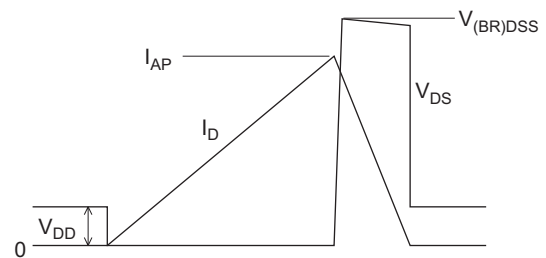


Avalanche Test Circuit

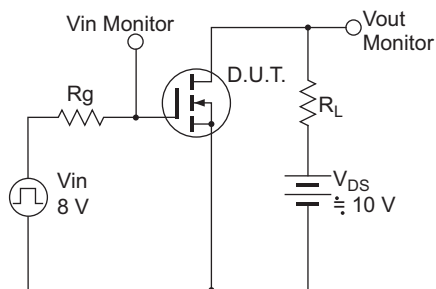


Avalanche Waveform

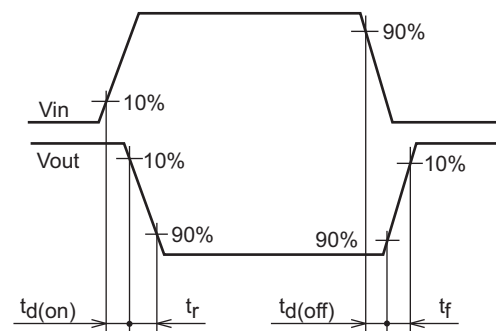
$$E_{AS} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



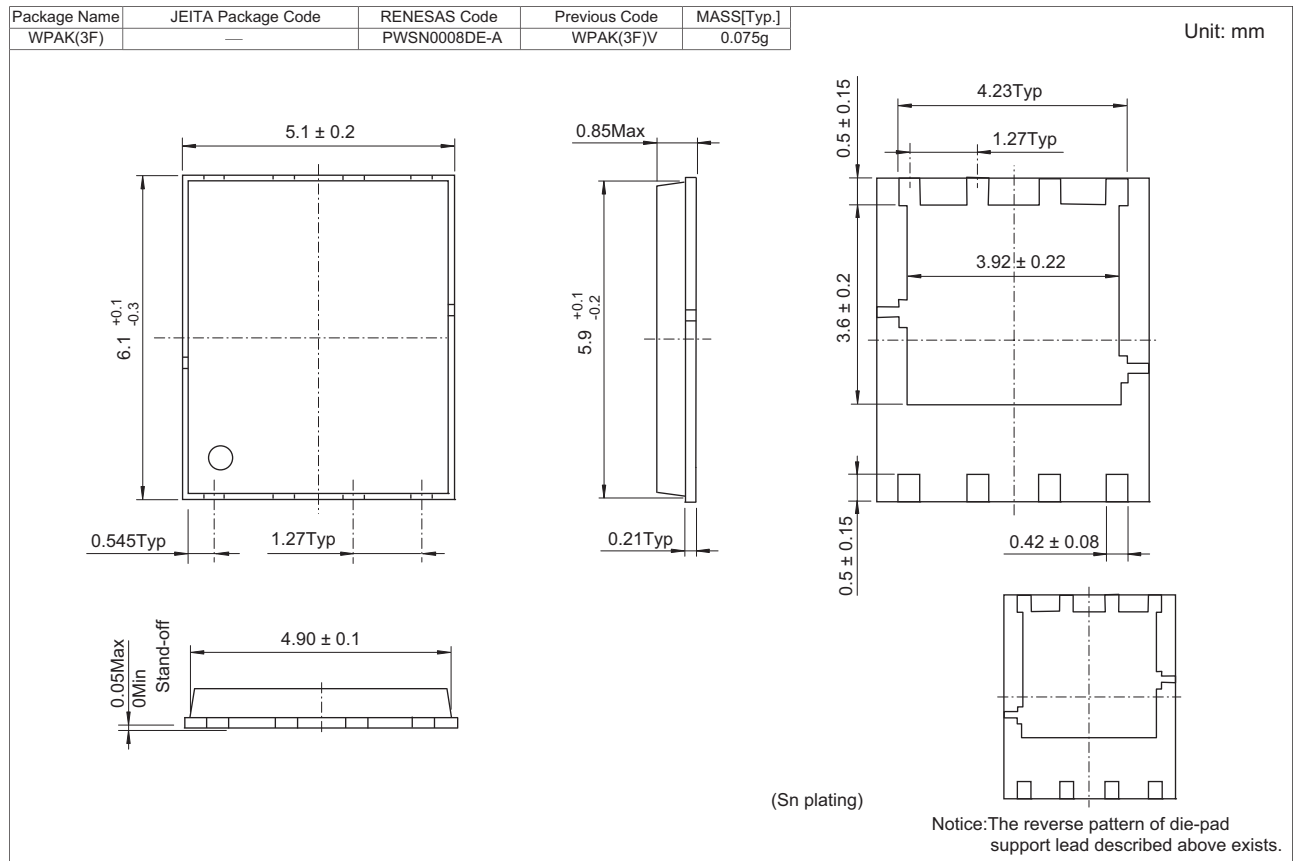
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK03N0DPA-00-J5A	3000 pcs	Taping

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

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