

RJK0394DPA

Silicon N Channel Power MOS FET Power Switching

REJ03G1785-0210

Rev.2.10

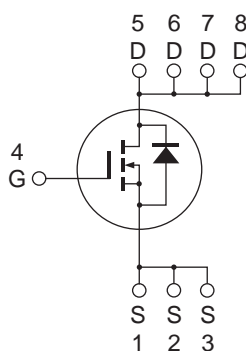
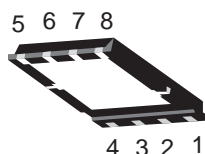
May 12, 2010

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 4.1 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Pb-free
- Halogen-free

Outline

RENESAS Package code: PWSN0008DC-A
(Package name: WPAK(2))



1, 2, 3 Source
4 Gate
5, 6, 7, 8 Drain

Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	30	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	35	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	140	A
Body-drain diode reverse drain current	I_{DR}	35	A
Avalanche current	I_{AP} ^{Note 2}	14	A
Avalanche energy	E_{AR} ^{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	$^\circ\text{C/W}$
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

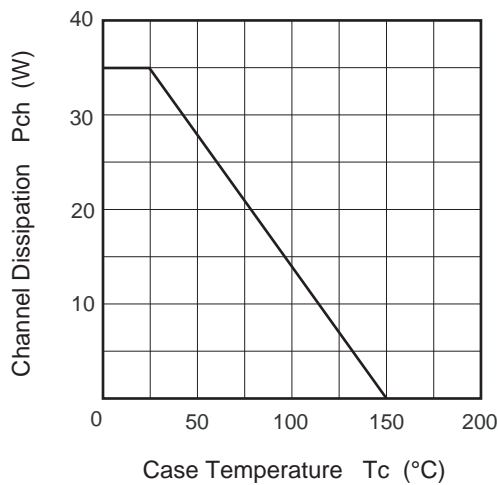
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
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	$R_{DS(on)}$	—	4.1	5.3	$\text{m}\Omega$	$I_D = 17.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	5.3	7.4	$\text{m}\Omega$	$I_D = 17.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	95	—	S	$I_D = 35 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	2430	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	320	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	170	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	R_g	—	1.4	—	Ω	
Total gate charge	Q_g	—	15.5	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	7.1	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	3.7	—	nC	$I_D = 35 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	13.0	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 17.5 \text{ A}$
Rise time	t_r	—	5.2	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	45	—	ns	$R_L = 0.57 \Omega$
Fall time	t_f	—	6.2	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.83	1.08	V	$I_F = 35 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	22	—	ns	$I_F = 35 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

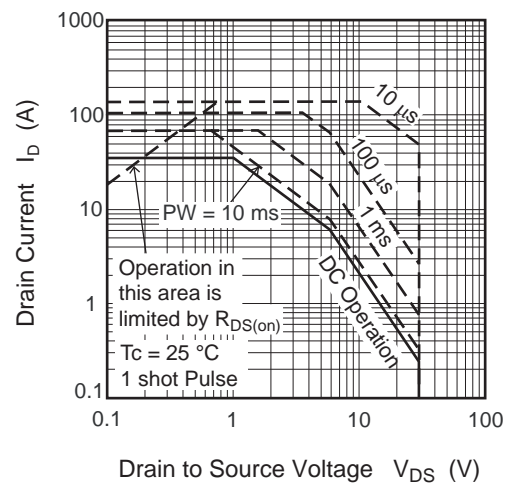
Notes: 4. Pulse test

Main Characteristics

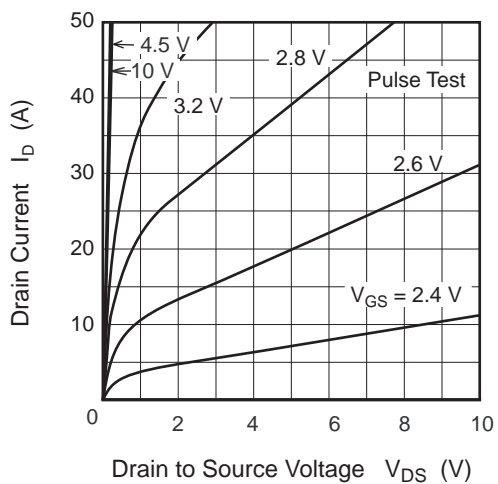
Power vs. Temperature Derating



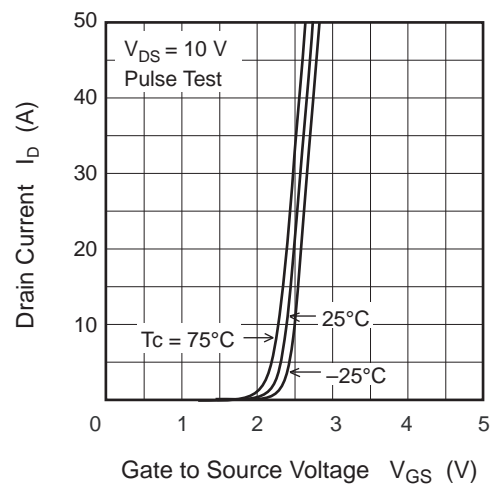
Maximum Safe Operation Area



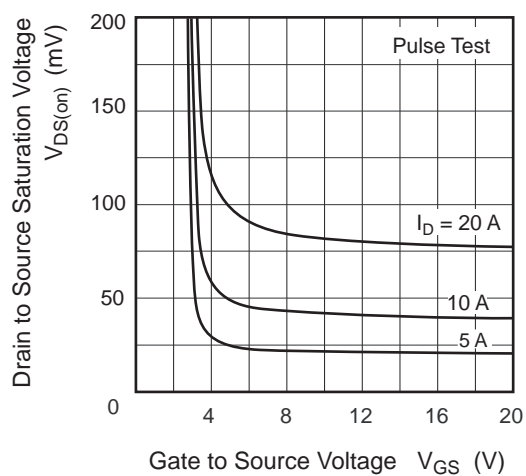
Typical Output Characteristics



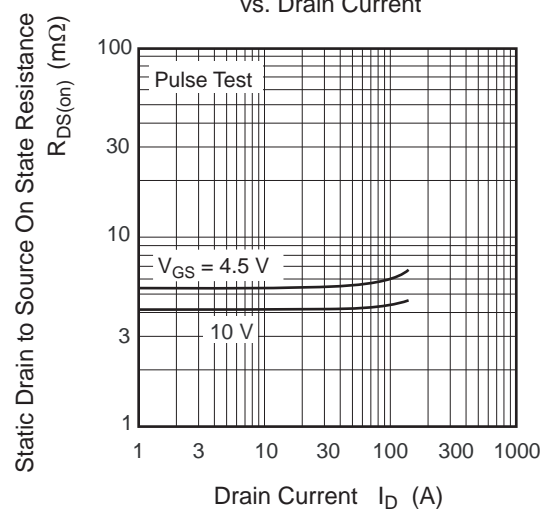
Typical Transfer Characteristics

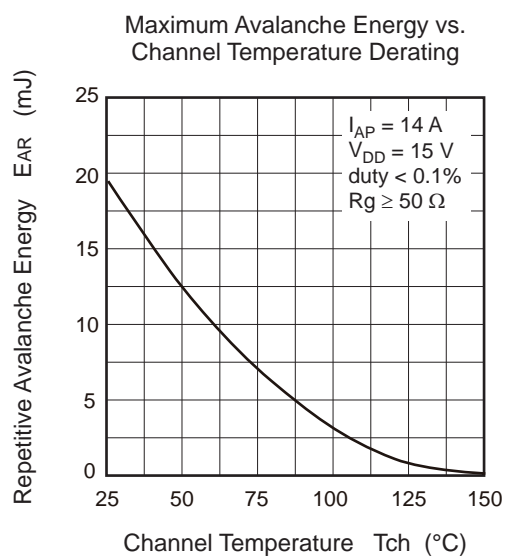
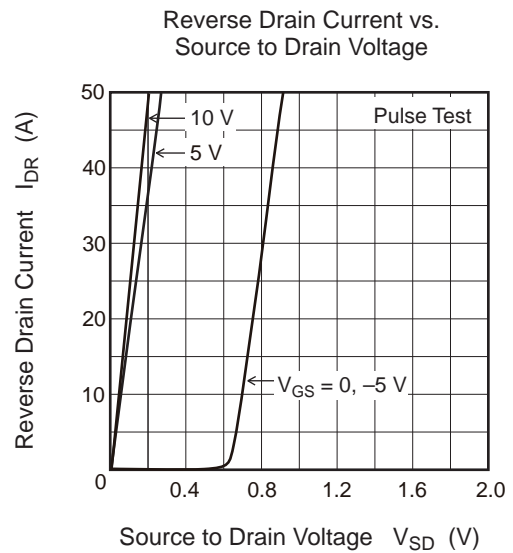
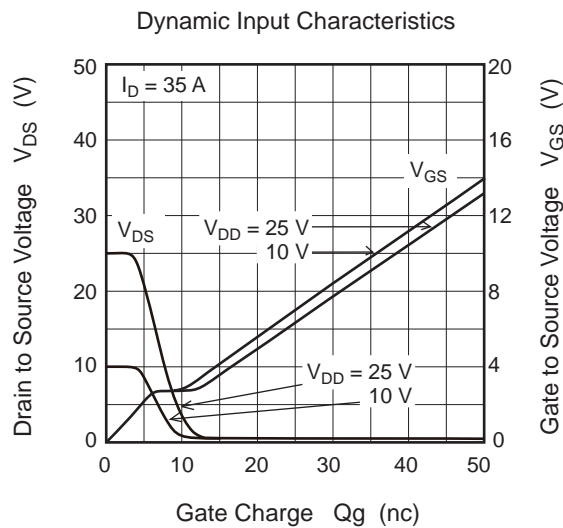
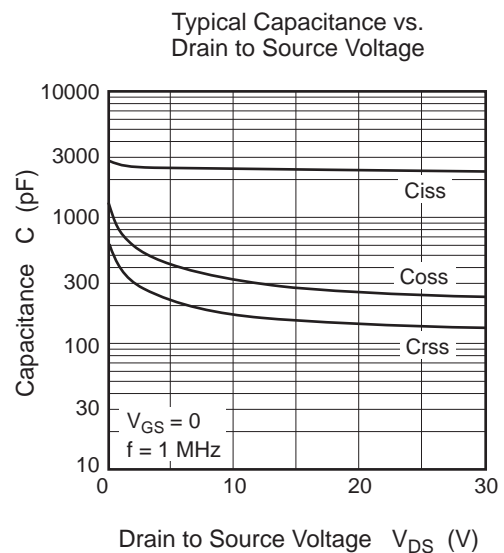
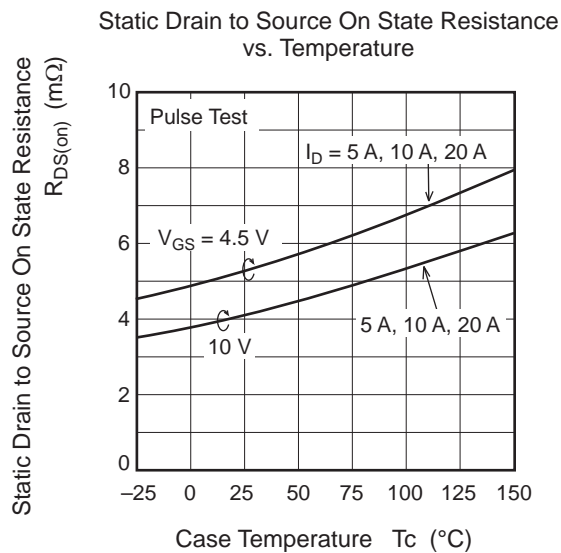


Drain to Source Saturation Voltage vs. Gate to Source Voltage

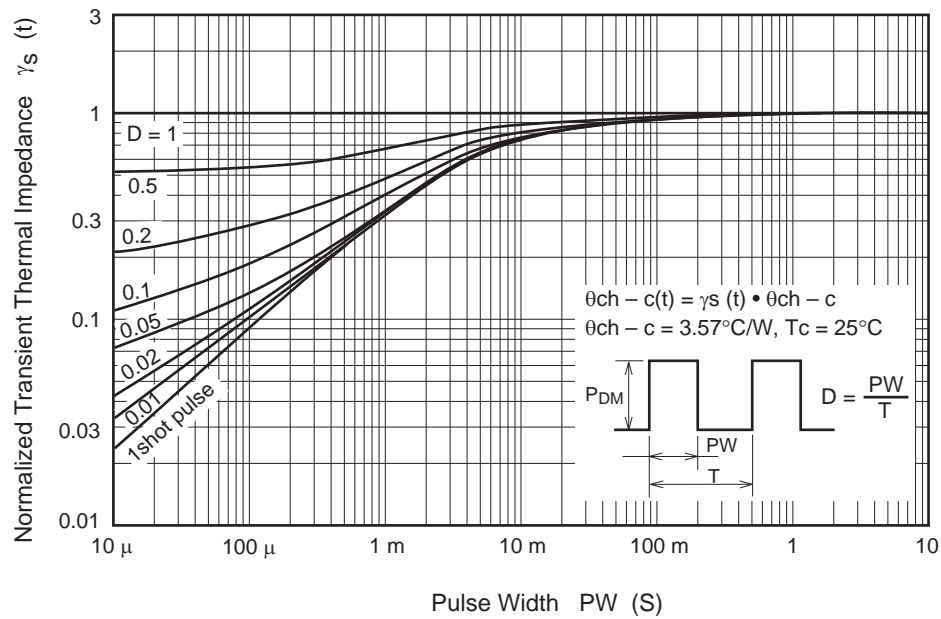


Static Drain to Source On State Resistance vs. Drain Current

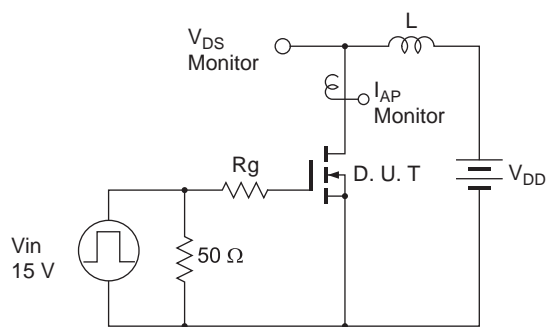




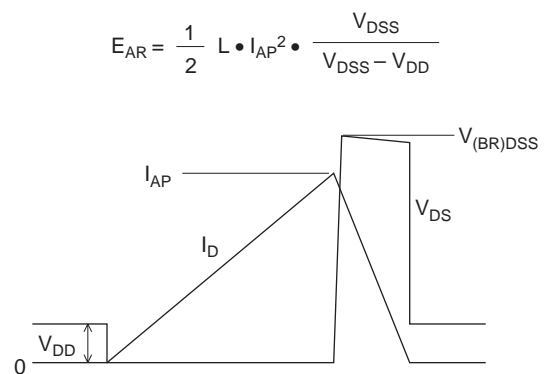
Normalized Transient Thermal Impedance vs. Pulse Width



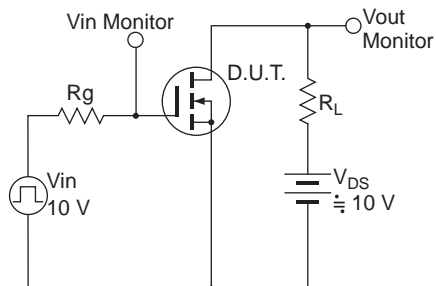
Avalanche Test Circuit



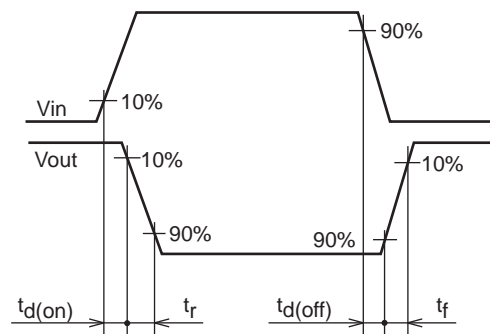
Avalanche Waveform



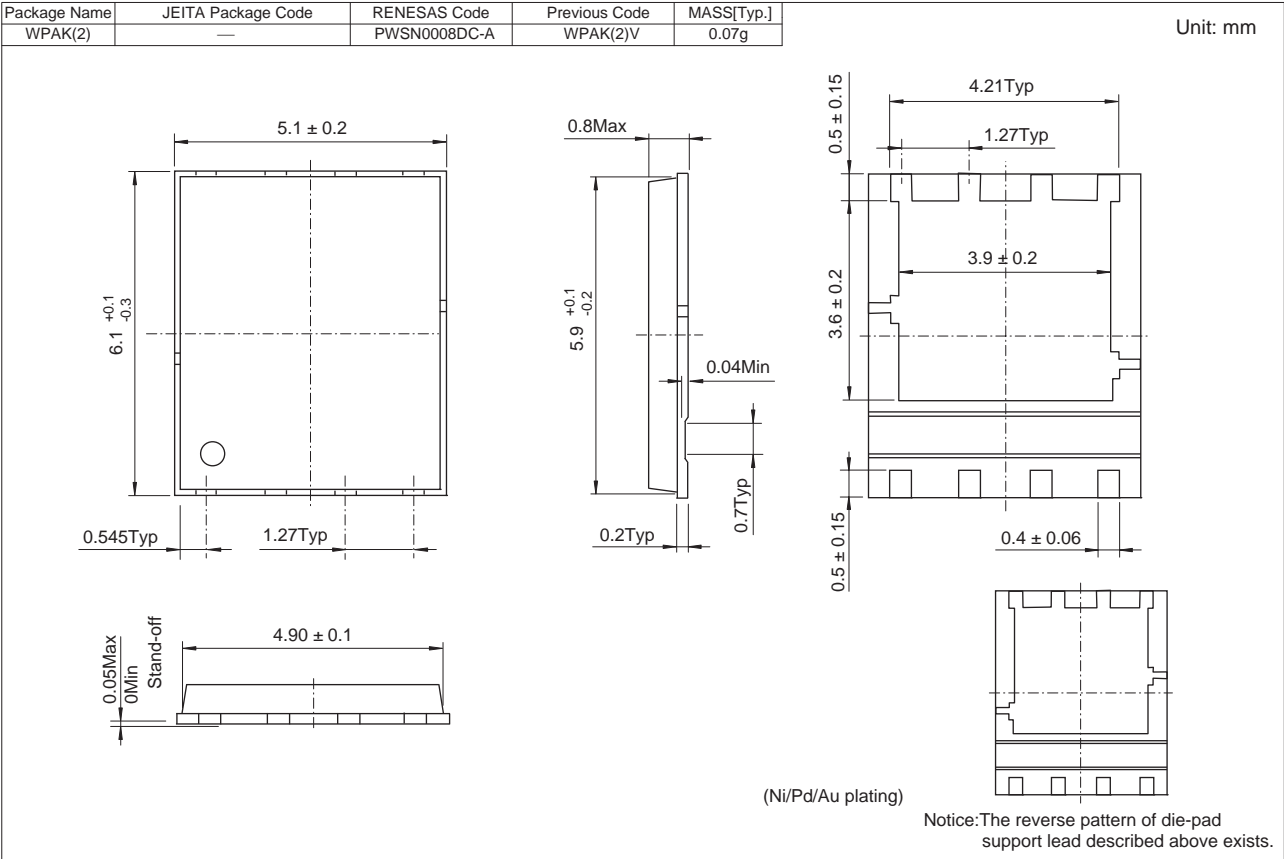
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part No.	Quantity	Shipping Container
RJK0394DPA-00-J53	3000 pcs	Taping

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