

RJK0393DPA

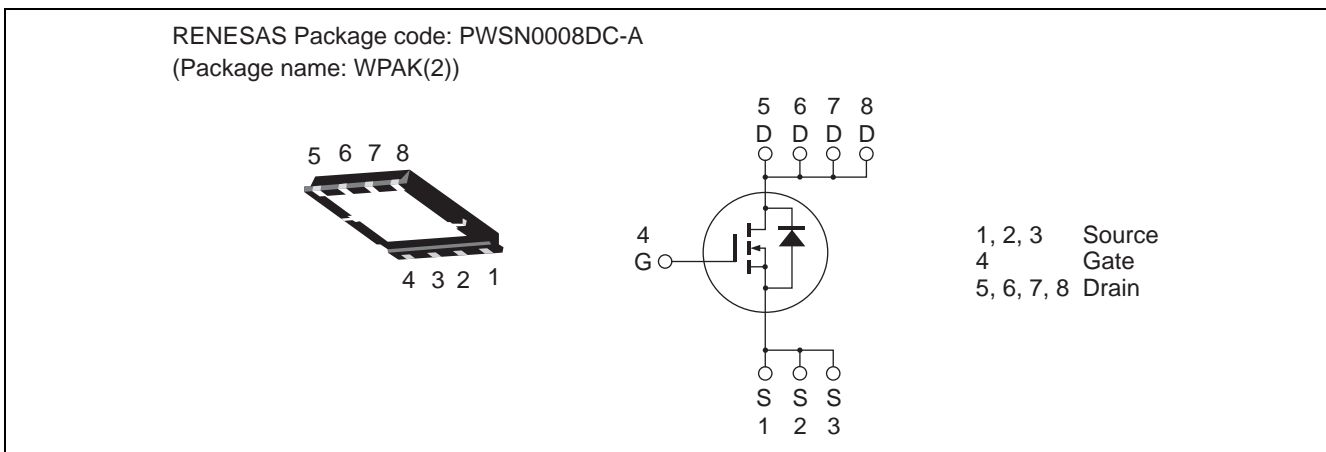
Silicon N Channel Power MOS FET Power Switching

REJ03G1784-0220
Rev.2.20
May 21, 2010

Features

- High speed switching
- Capable of 4.5V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 3.3 \text{ m}\Omega$ 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}	30	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	40	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	160	A
Body-drain diode reverse drain current	I_{DR}	40	A
Avalanche current	I_{AP} ^{Note 2}	16	A
Avalanche energy	E_{AR} ^{Note 2}	25.6	mJ
Channel dissipation	P_{ch} ^{Note3}	40	W
Channel to case thermal impedance	θ_{ch-C}	3.13	$^\circ\text{C/W}$
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. $T_c = 25^\circ\text{C}$

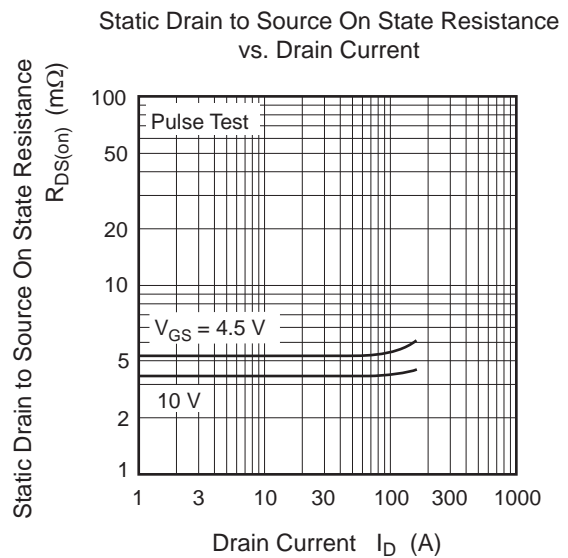
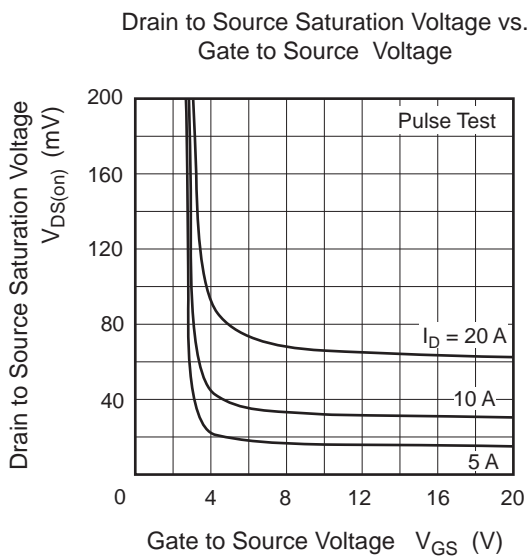
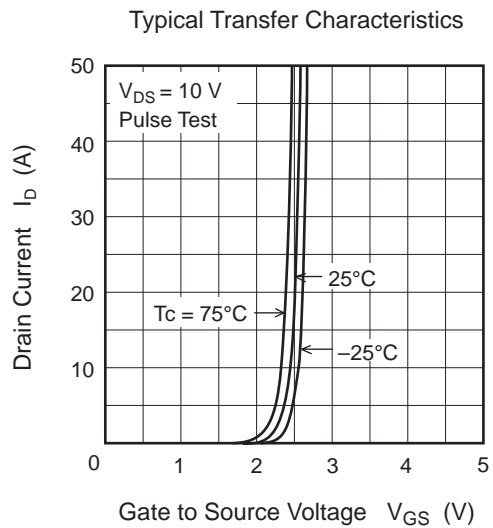
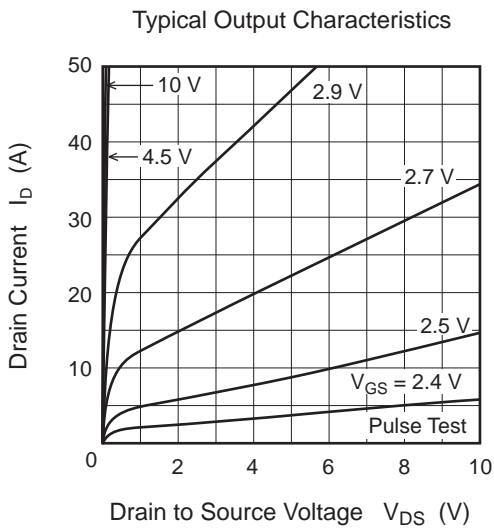
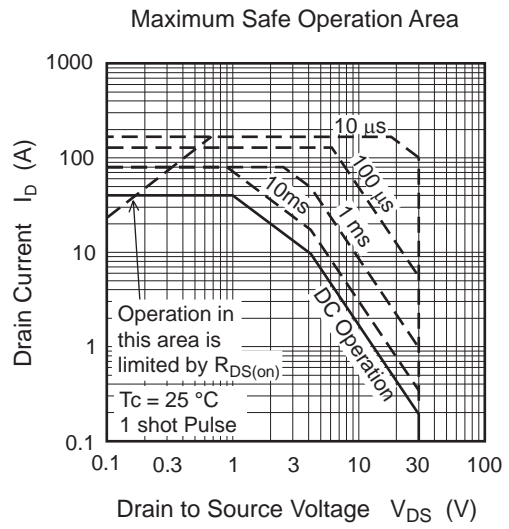
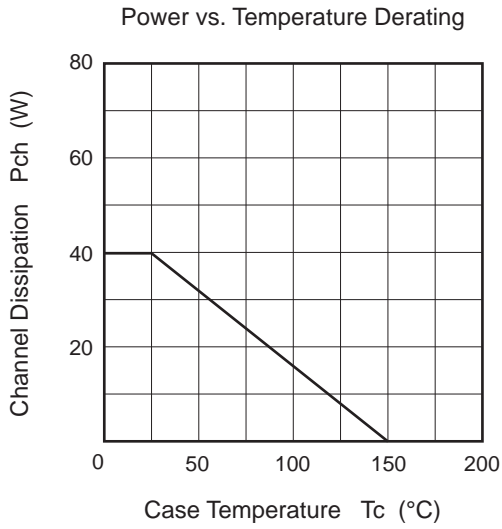
Electrical Characteristics

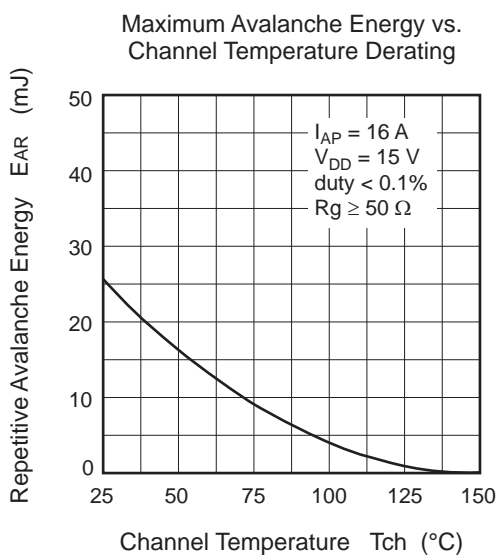
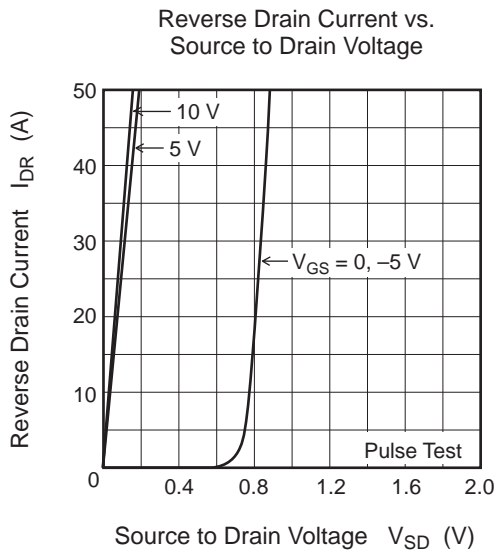
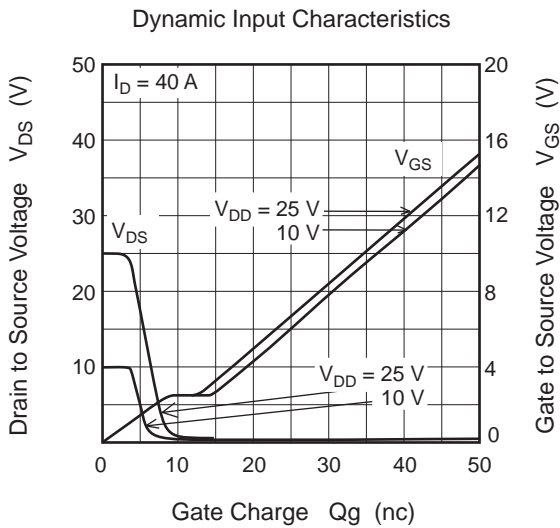
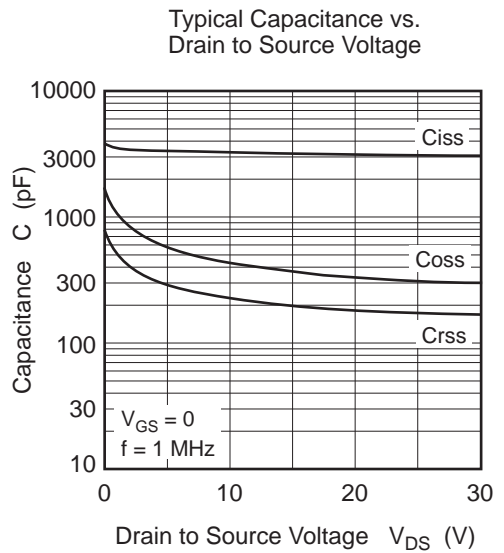
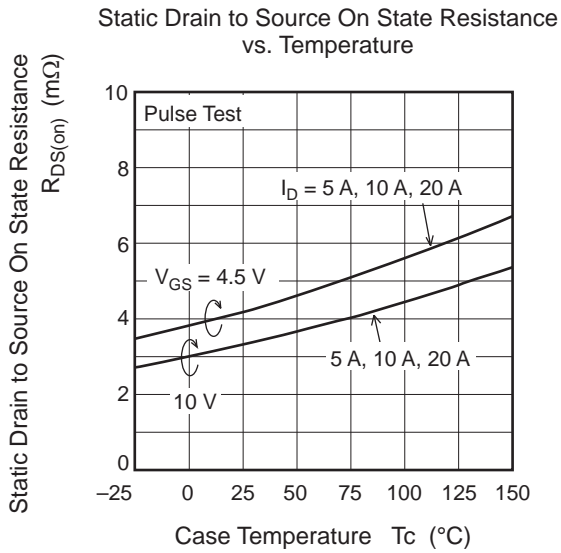
(Ta = 25°C)

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	$R_{DS(on)}$	—	3.3	4.3	$\text{m}\Omega$	$I_D = 20 \text{ A}, V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	4.2	5.9	$\text{m}\Omega$	$I_D = 20 \text{ A}, V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	100	—	S	$I_D = 20 \text{ A}, V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	3270	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	430	—	pF	
Reverse transfer capacitance	C_{rss}	—	225	—	pF	
Gate Resistance	R_g	—	1.4	—	Ω	
Total gate charge	Q_g	—	21	—	nC	$V_{DD} = 10 \text{ V}, V_{GS} = 4.5 \text{ V},$ $I_D = 40 \text{ A}$
Gate to source charge	Q_{gs}	—	9.5	—	nC	
Gate to drain charge	Q_{gd}	—	4.7	—	nC	
Turn-on delay time	$t_{d(on)}$	—	13.2	—	ns	$V_{GS} = 10 \text{ V}, I_D = 20 \text{ A},$
Rise time	t_r	—	6.0	—	ns	$V_{DD} \cong 10 \text{ V}, R_L = 0.5 \Omega,$
Turn-off delay time	$t_{d(off)}$	—	52	—	ns	$R_g = 4.7 \Omega$
Fall time	t_f	—	7.1	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.83	1.08	V	$I_F = 40 \text{ A}, V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	23.5	—	ns	$I_F = 40 \text{ A}, V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

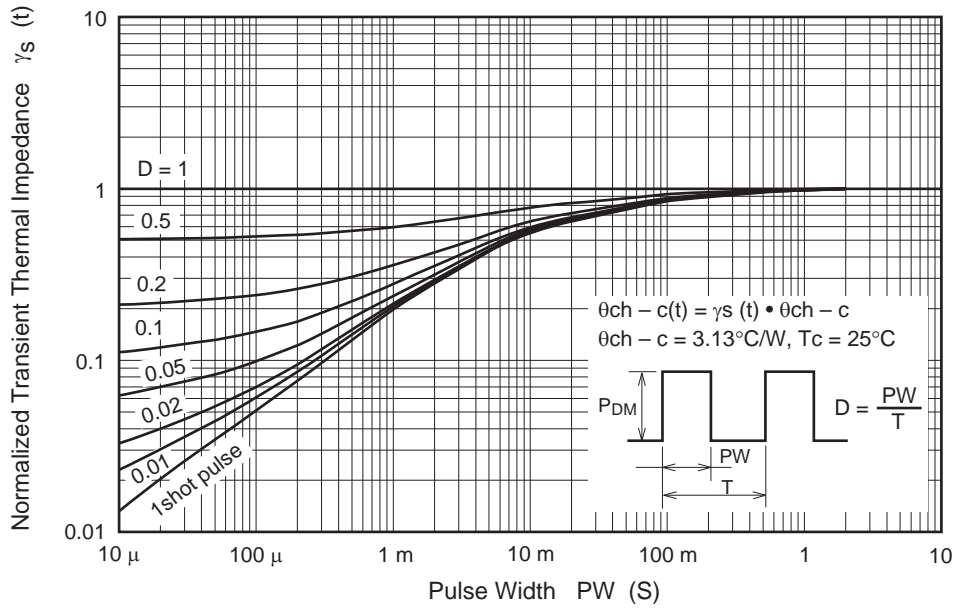
Notes: 4. Pulse test

Main Characteristics

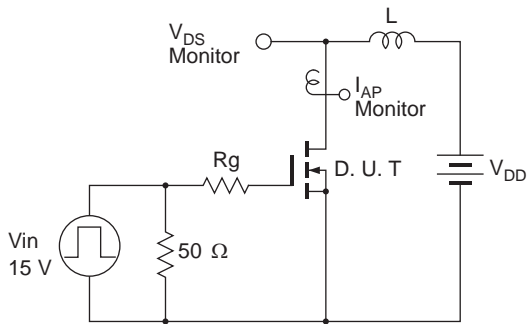




Normalized Transient Thermal Impedance vs. Pulse Width

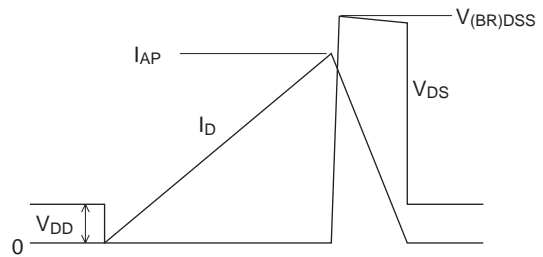


Avalanche Test Circuit

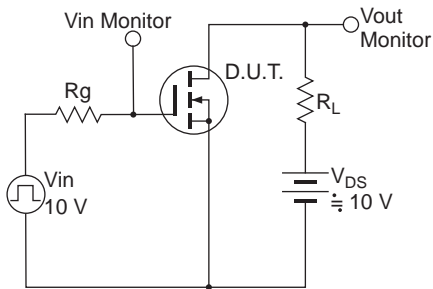


Avalanche Waveform

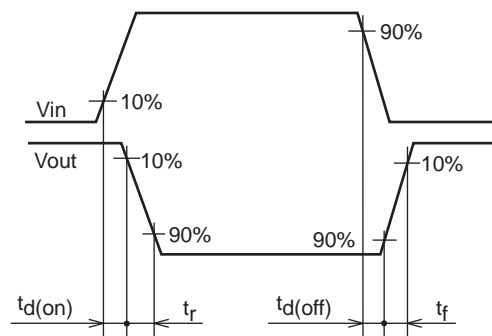
$$E_{AR} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



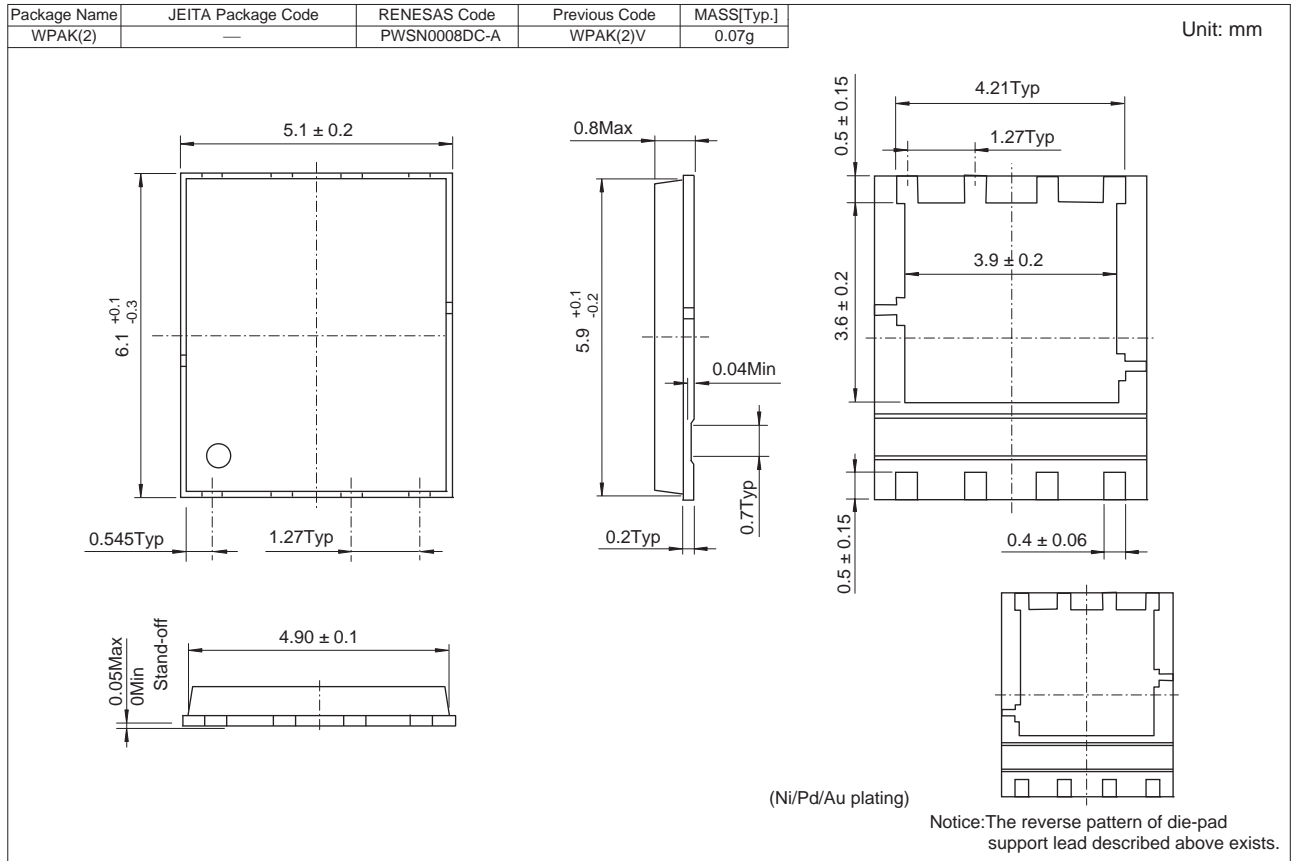
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part No.	Quantity	Shipping Container
RJK0393DPA-00-J53	3000 pcs	Taping

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