

# RJK03E5DPA

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

REJ03G1929-0210

Rev.2.10

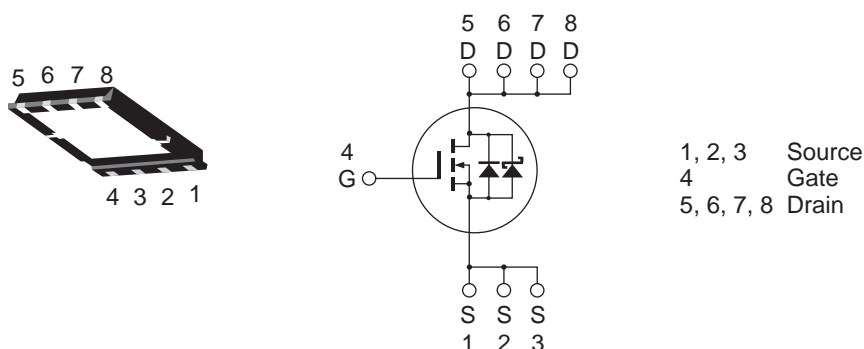
May 20, 2010

### Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)} = 3.2 \text{ m}\Omega$  typ. (at  $V_{GS} = 8 \text{ V}$ )
- Pb-free
- Halogen-free

### Outline

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



### 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	$V_{GSS}$	$\pm 12$	V
Drain current	$I_D$	40	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	160	A
Body-drain diode reverse drain current	$I_{DR}$	40	A
Avalanche current	$I_{AP}$ <sup>Note 2</sup>	15	A
Avalanche energy	$E_{AR}$ <sup>Note 2</sup>	22.5	mJ
Channel dissipation	$P_{ch}$ <sup>Note 3</sup>	35	W
Channel to case thermal impedance	$\theta_{ch-c}$ <sup>Note 3</sup>	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

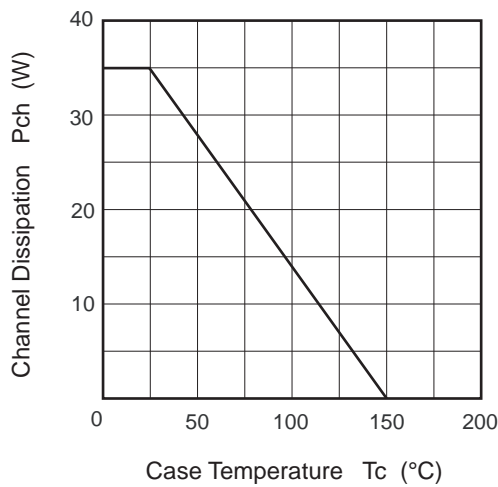
(Ta = 25°C)

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	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 12 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	mA	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$
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	$R_{DS(on)}$	—	3.2	3.9	$\text{m}\Omega$	$I_D = 20 \text{ A}$ , $V_{GS} = 8.0 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	3.8	4.7	$\text{m}\Omega$	$I_D = 20 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	—	98	—	S	$I_D = 20 \text{ A}$ , $V_{DS} = 5 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	3370	4720	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	400	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	250	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	$R_g$	—	1.8	3.6	$\Omega$	
Total gate charge	$Q_g$	—	25.5	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	$Q_{gs}$	—	8.5	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	6.8	—	nC	$I_D = 40 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	16	—	ns	$V_{GS} = 8 \text{ V}$ , $I_D = 20 \text{ A}$
Rise time	$t_r$	—	7	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	63	—	ns	$R_L = 0.5 \Omega$
Fall time	$t_f$	—	10	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	$V_{DF}$	—	0.39	—	V	$I_F = 2 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	26	—	ns	$I_F = 40 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

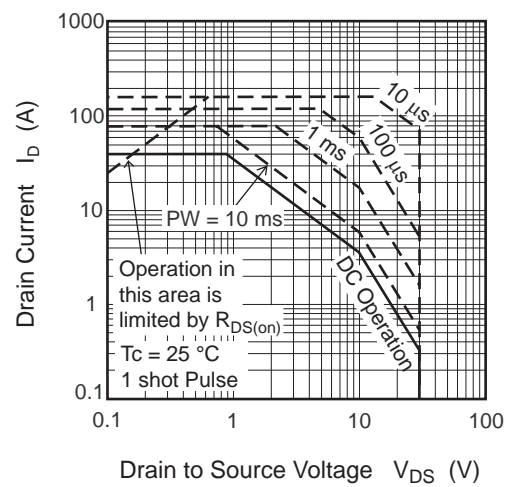
Notes: 4. Pulse test

## Main Characteristics

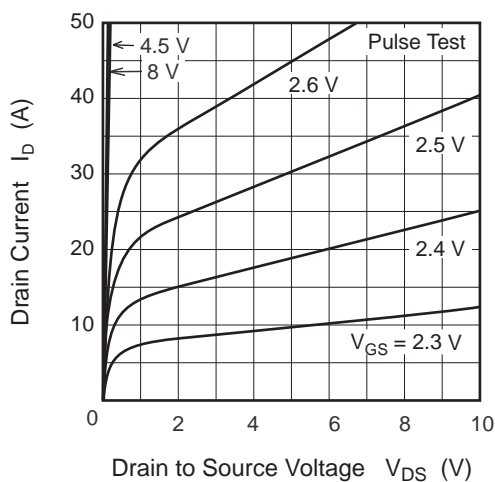
Power vs. Temperature Derating



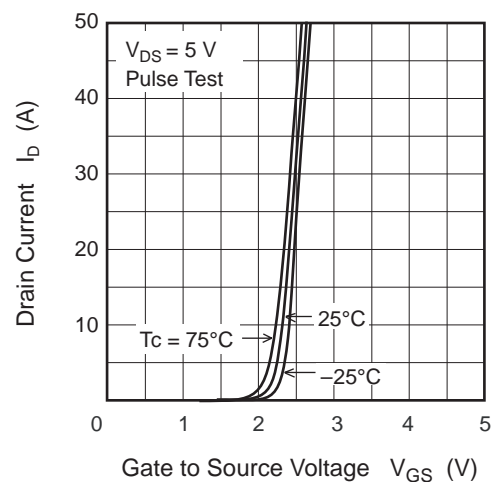
Maximum Safe Operation Area



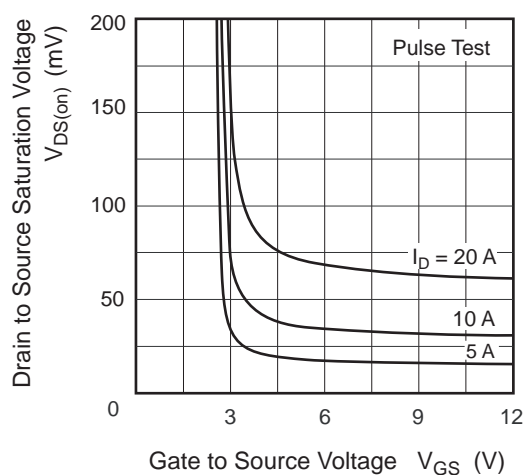
Typical Output Characteristics



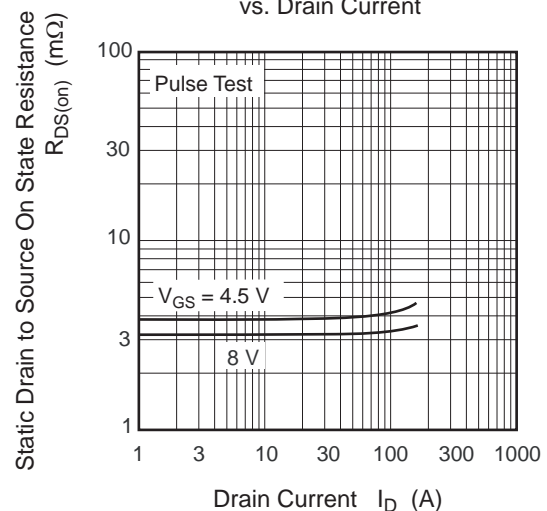
Typical Transfer Characteristics

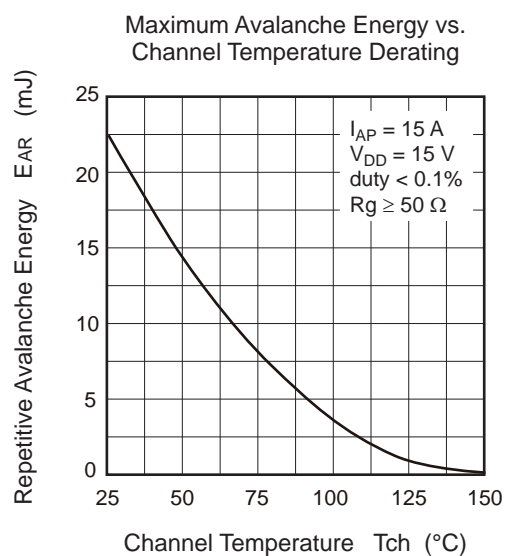
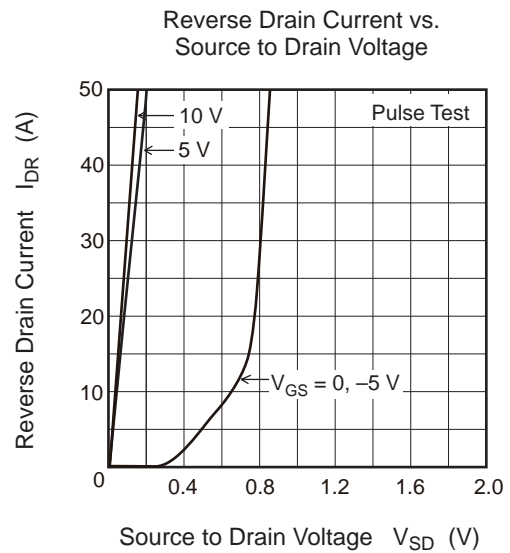
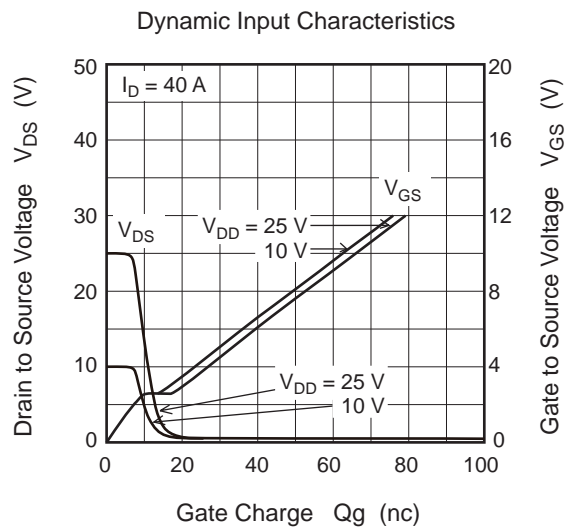
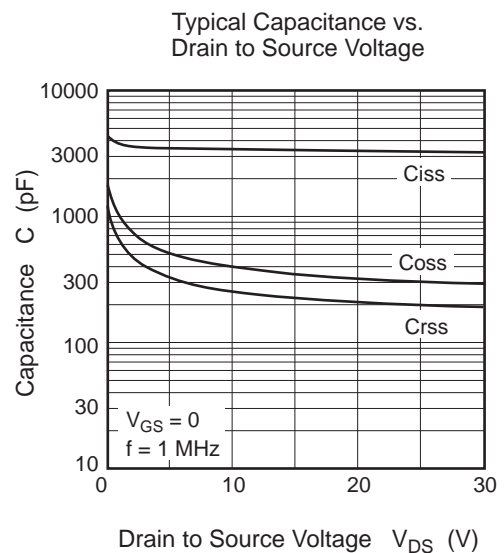
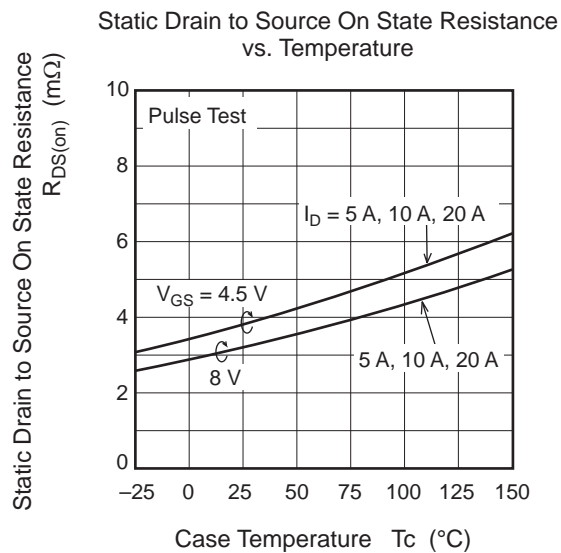


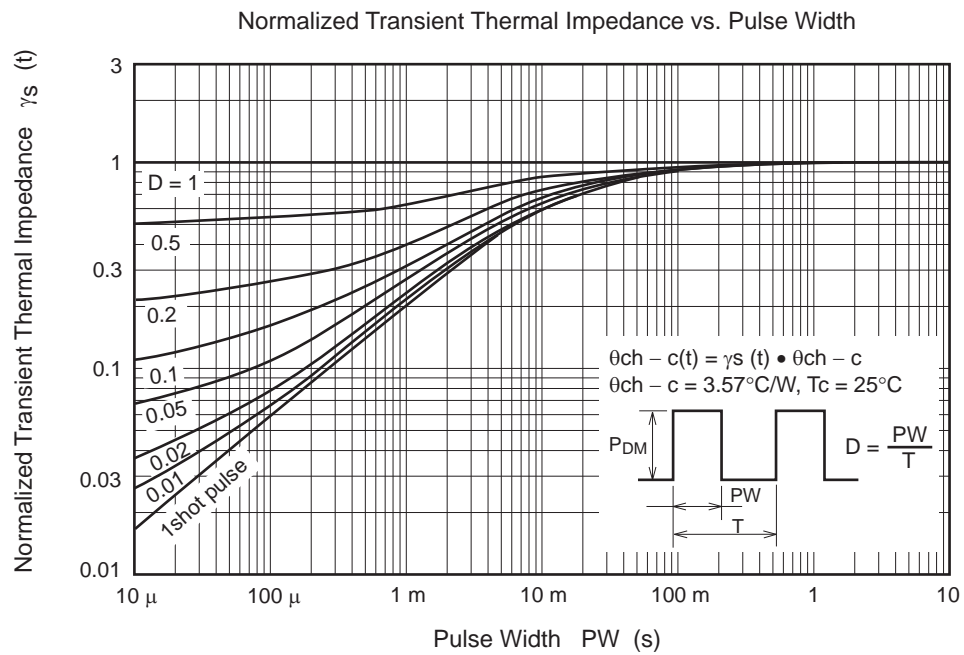
Drain to Source Saturation Voltage vs. Gate to Source Voltage



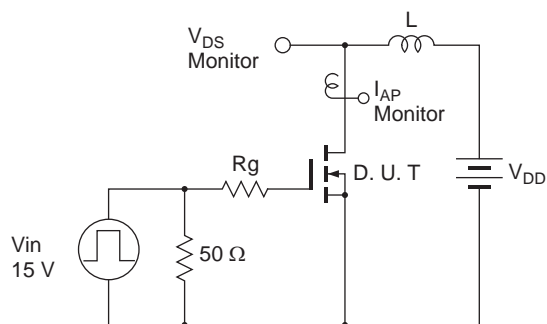
Static Drain to Source On State Resistance vs. Drain Current



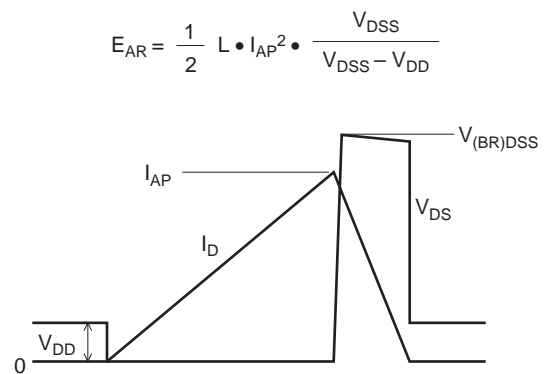




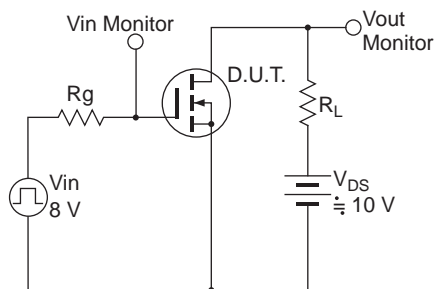
Avalanche Test Circuit



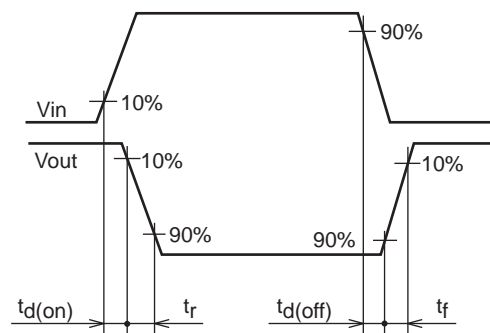
Avalanche Waveform



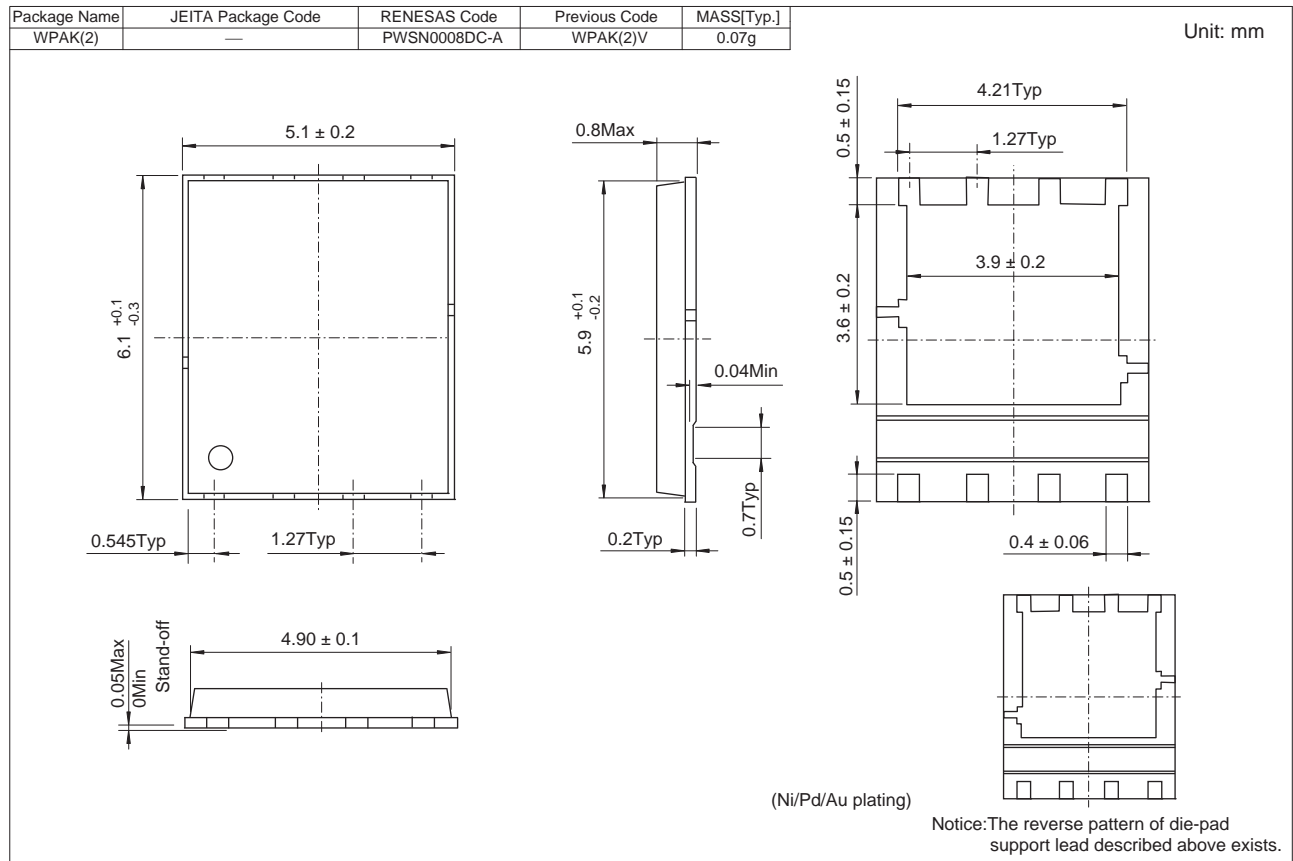
Switching Time Test Circuit



Switching Time Waveform



## Package Dimensions



## Ordering Information

Part No.	Quantity	Shipping Container
RJK03E5DPA-00-J53	3000 pcs	Taping

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