

# RJK03E1DNS

## Silicon N Channel Power MOS FET Power Switching

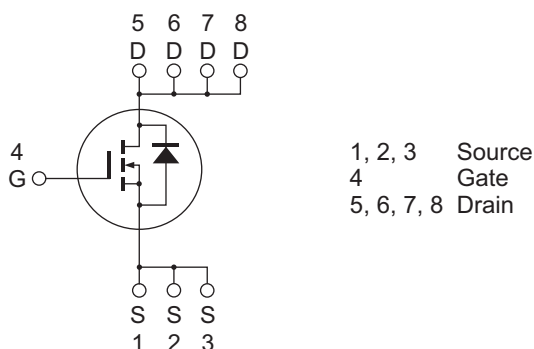
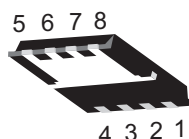
REJ03G1903-0200  
Rev.2.00  
Apr 06, 2010

### Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)} = 5.3 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )
- Pb-free
- Halogen-free

### Outline

RENESAS Package code: PWSN0008JB-A  
(Package name: HWSN-8)



### 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	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	25	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	100	A
Body-drain diode reverse drain current	$I_{DR}$	25	A
Avalanche current	$I_{AP}$ <sup>Note 2</sup>	12	A
Avalanche energy	$E_{AR}$ <sup>Note 2</sup>	14.4	mJ
Channel dissipation	$P_{ch}$ <sup>Note 3</sup>	15	W
Channel to case thermal impedance	$\theta_{ch-c}$ <sup>Note 3</sup>	8.33	$^\circ\text{C/W}$
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

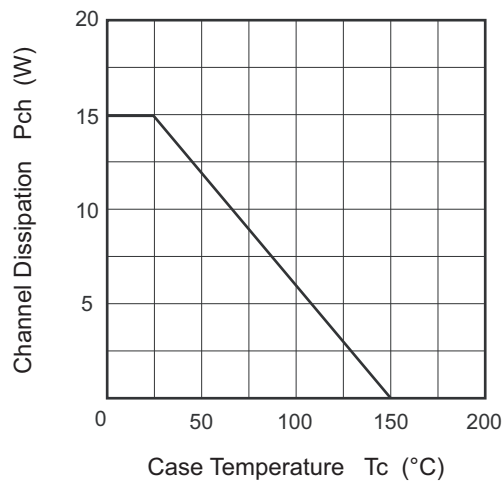
(Ta = 25°C)

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	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$
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	$R_{DS(on)}$	—	5.3	6.9	$\text{m}\Omega$	$I_D = 12.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	7.0	9.8	$\text{m}\Omega$	$I_D = 12.5 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	—	48	—	S	$I_D = 12.5 \text{ A}$ , $V_{DS} = 5 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	1640	2300	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	220	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	113	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	$R_g$	—	1.0	2.2	$\Omega$	
Total gate charge	$Q_g$	—	10.7	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	$Q_{gs}$	—	4.9	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	2.5	—	nC	$I_D = 25 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	9.4	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 12.5 \text{ A}$
Rise time	$t_r$	—	4.5	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	36	—	ns	$R_L = 0.8 \Omega$
Fall time	$t_f$	—	5.1	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	$V_{DF}$	—	0.84	1.10	V	$I_F = 25 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	15	—	ns	$I_F = 25 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

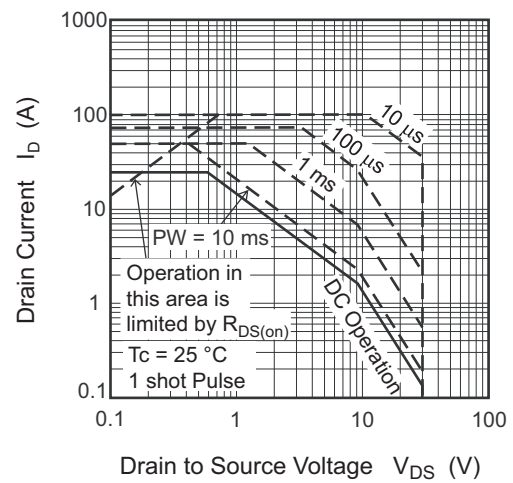
Notes: 4. Pulse test

## Main Characteristics

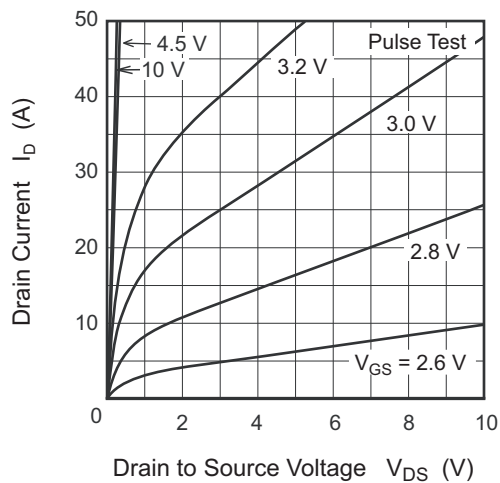
Power vs. Temperature Derating



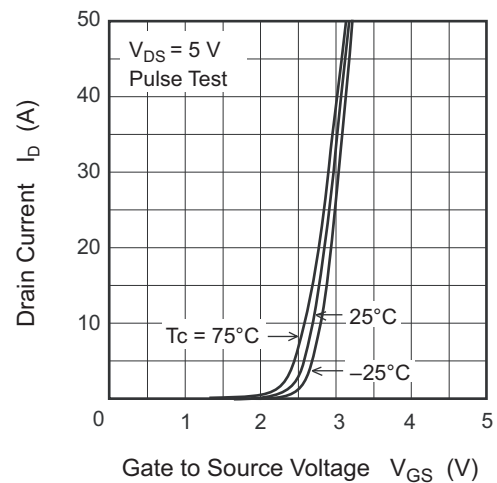
Maximum Safe Operation Area



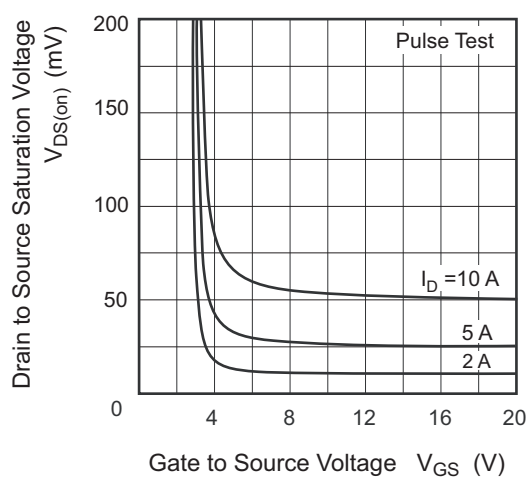
Typical Output Characteristics



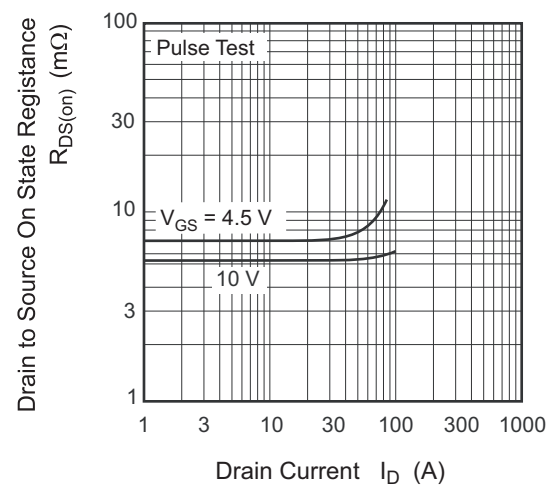
Typical Transfer Characteristics



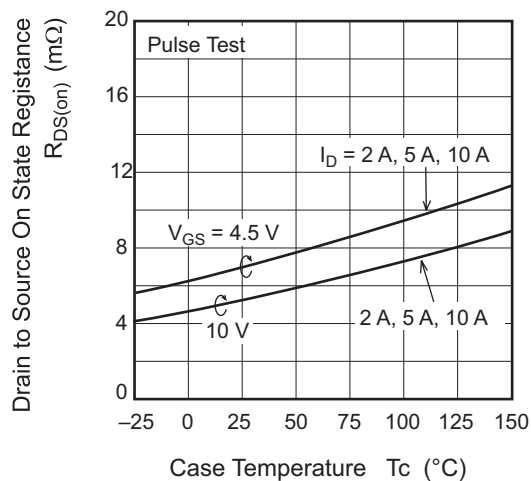
Drain to Source Saturation Voltage vs. Gate to Source Voltage



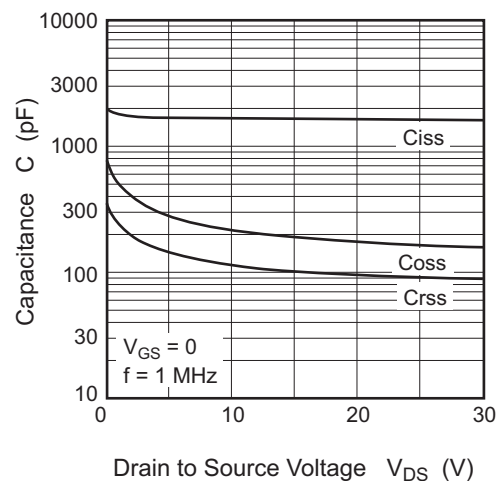
Static Drain to Source on State Resistance vs. Drain Current



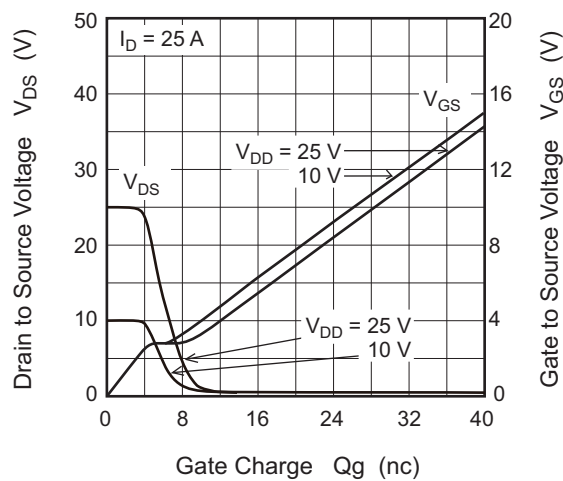
Static Drain to Source on State Resistance vs. Temperature



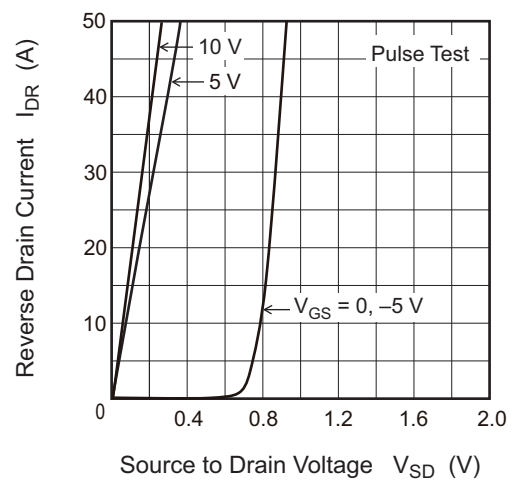
Typical Capacitance vs. Drain to Source Voltage



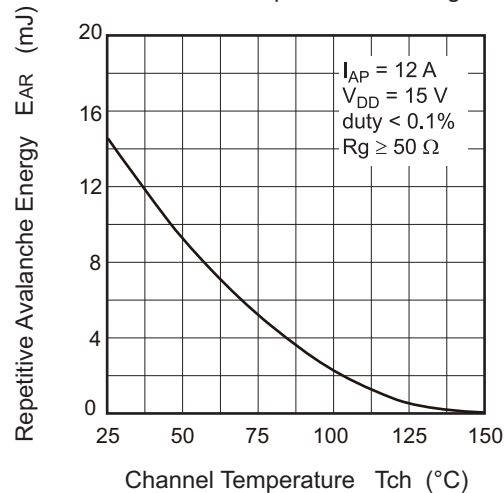
Dynamic Input Characteristics



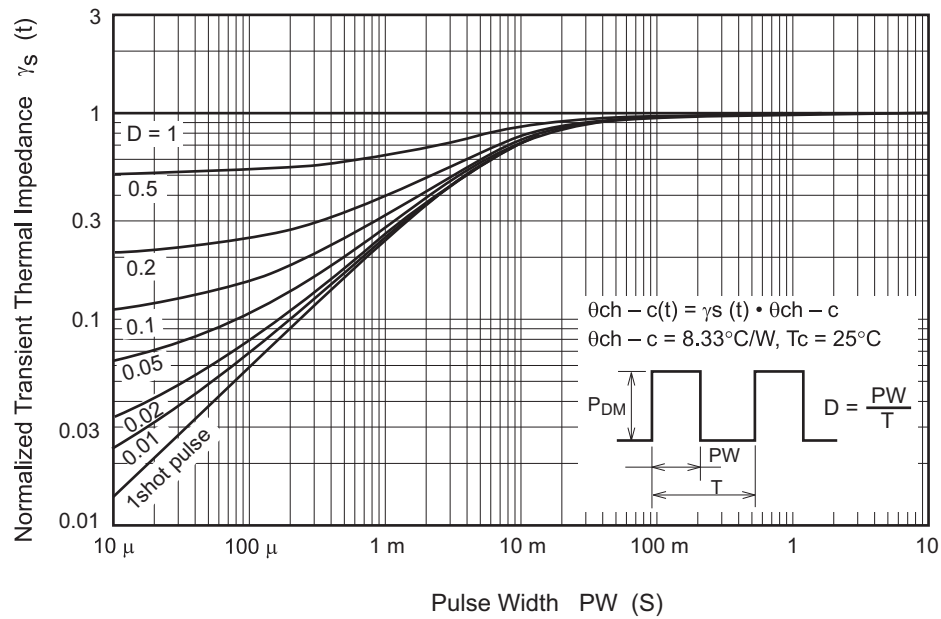
Reverse Drain Current vs. Source to Drain Voltage



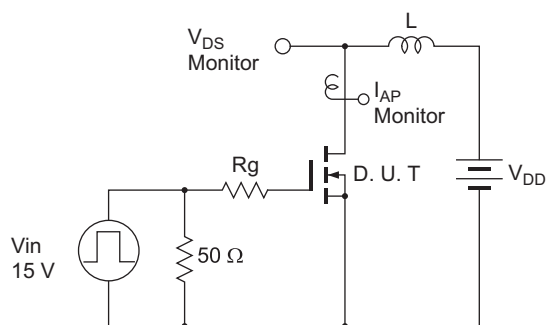
Maximum Avalanche Energy vs. Channel Temperature Derating



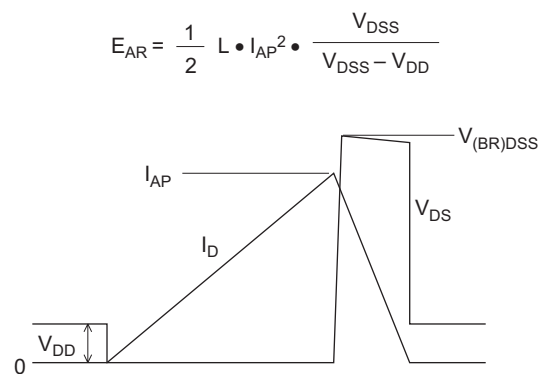
Normalized Transient Thermal Impedance vs. Pulse Width



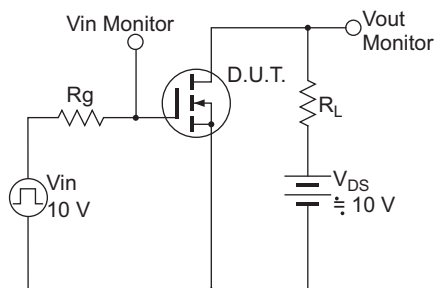
Avalanche Test Circuit



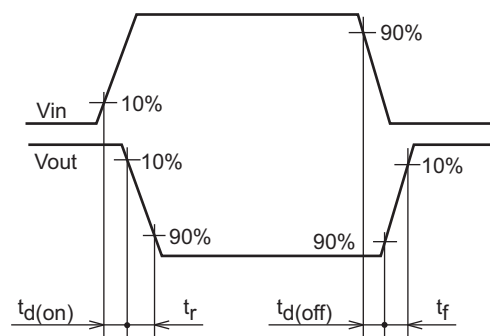
Avalanche Waveform



Switching Time Test Circuit

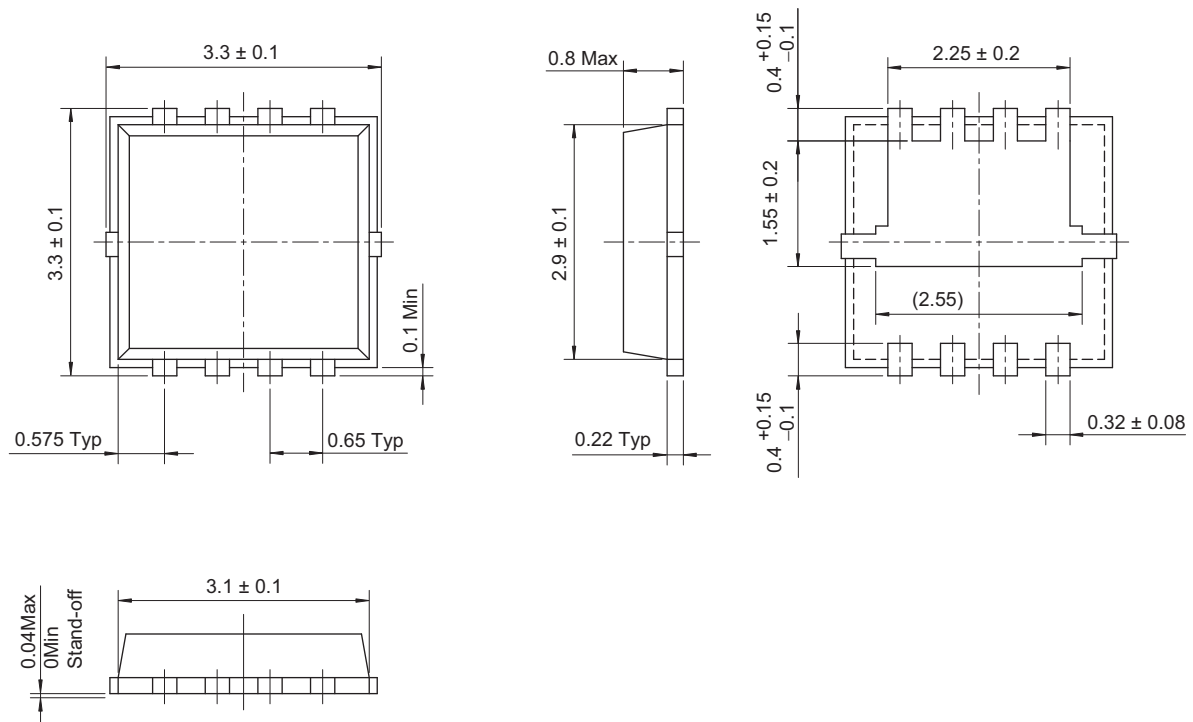


Switching Time Waveform



## Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
HWSN-8	P-HWSN8-2.9x3.1-0.65	PWSN0008JB-A	—	0.022g



## Ordering Information

Part No.	Quantity	Shipping Container
RJK03E1DNS-00-J5	5000 pcs	Taping

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