

RJK03M9DNS

Silicon N Channel Power MOS FET Power Switching

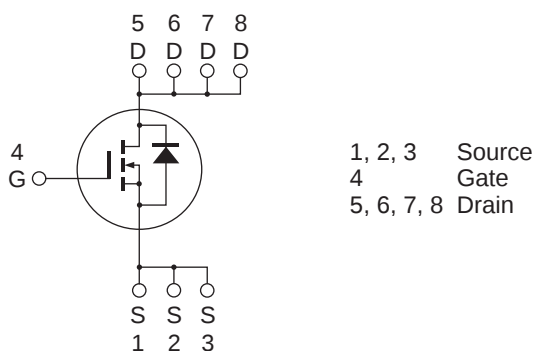
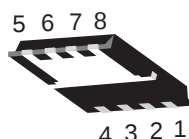
R07DS0775EJ0120
Rev.1.20
May 29, 2012

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 9.2 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Pb-free
- Halogen-free

Outline

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



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	14	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	56	A
Body-drain diode reverse drain current	I_{DR}	14	A
Avalanche current	I_{AP} ^{Note 2}	7	A
Avalanche energy	E_{AS} ^{Note 2}	4.9	mJ
Channel dissipation	P_{ch} ^{Note 3}	10	W
Channel to case thermal impedance	θ_{ch-c} ^{Note 3}	12.5	$^\circ\text{C/W}$
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. $T_c = 25^\circ\text{C}$

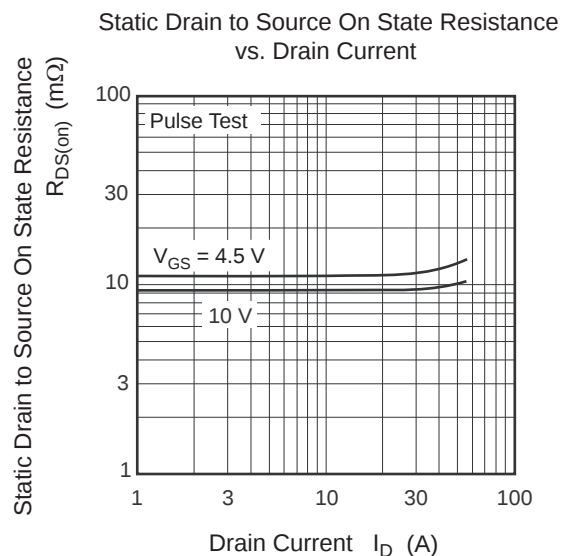
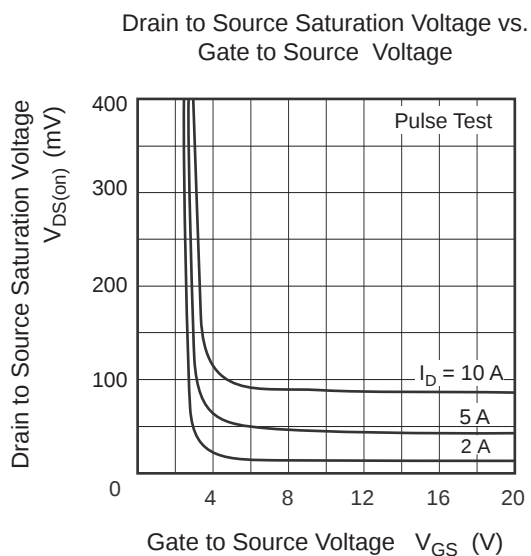
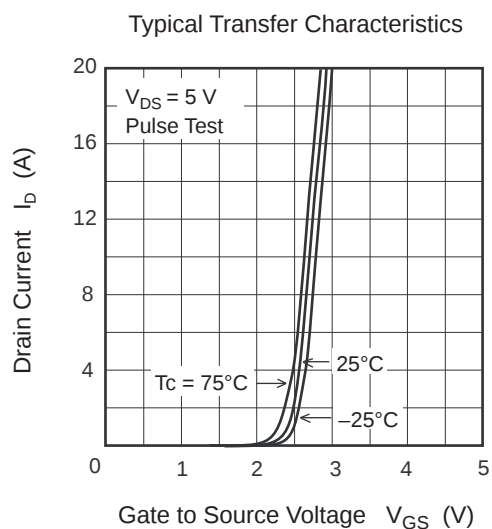
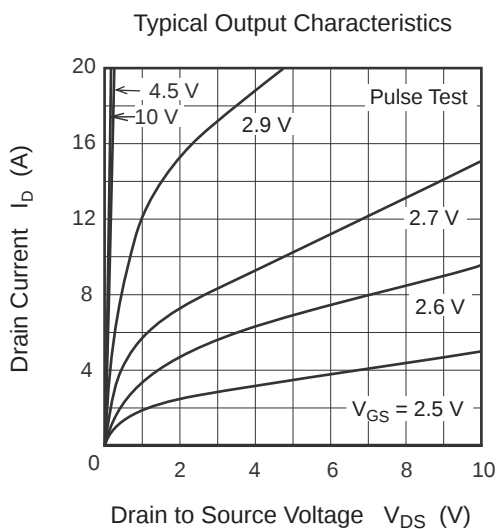
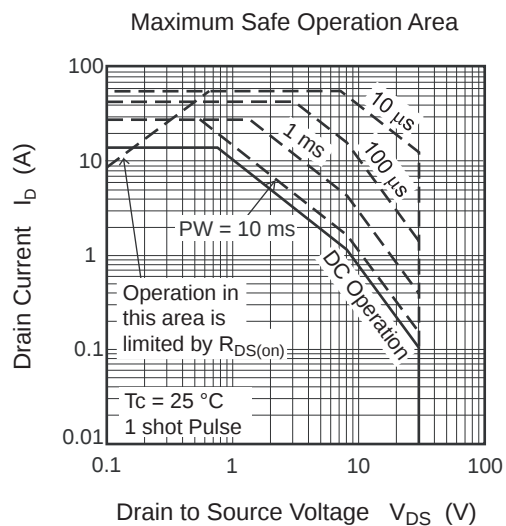
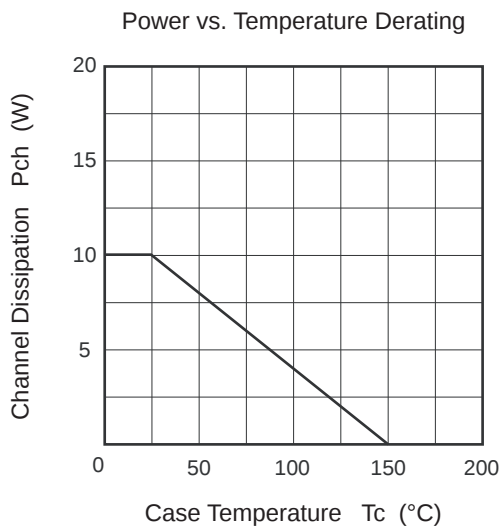
Electrical Characteristics

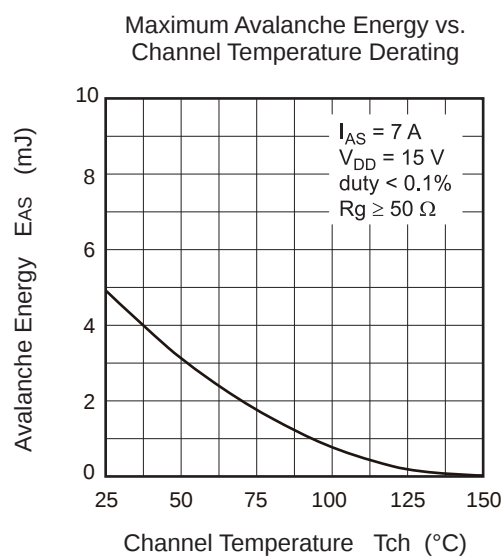
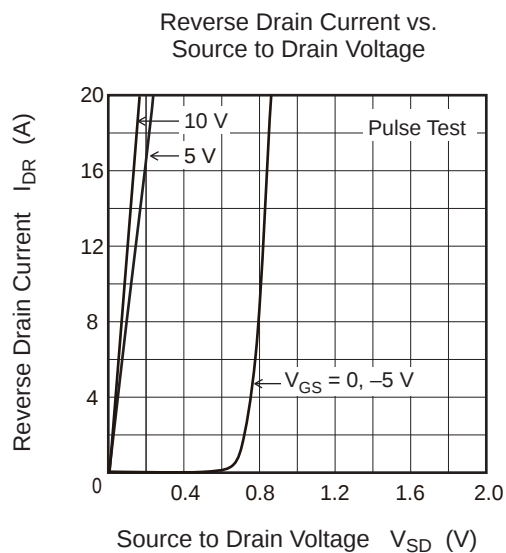
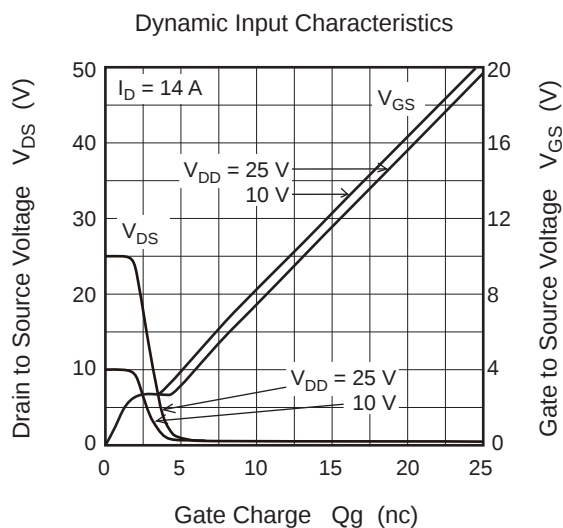
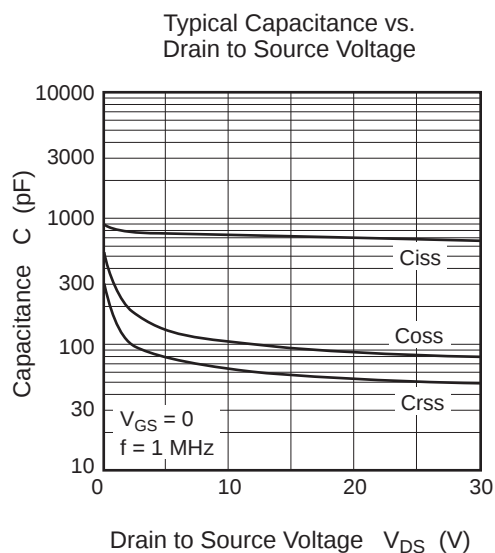
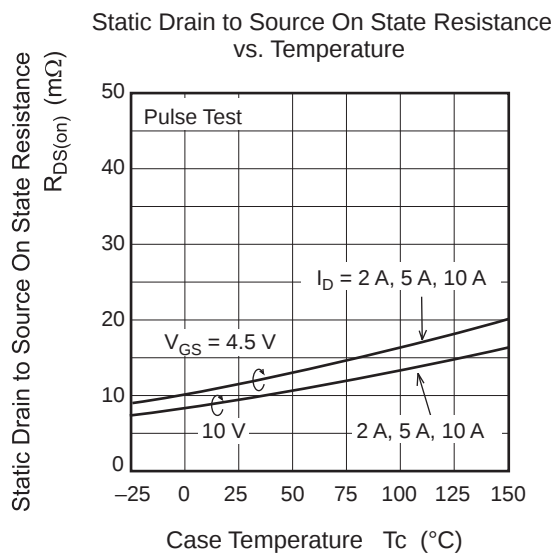
(Ta = 25°C)

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}	—	—	± 0.5	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 24 \text{ V}$, $V_{GS} = 0$
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	$R_{DS(on)}$	—	9.2	11.1	$\text{m}\Omega$	$I_D = 7 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	11.5	15	$\text{m}\Omega$	$I_D = 7 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	32	—	S	$I_D = 7 \text{ A}$, $V_{DS} = 5 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	700	980	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	120	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	65	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	R_g	—	1.6	3.2	Ω	
Total gate charge	Q_g	—	6.0	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	2.0	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	1.8	—	nC	$I_D = 14 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	2.4	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 7 \text{ A}$
Rise time	t_r	—	2.4	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	11.2	—	ns	$R_L = 1.43 \Omega$
Fall time	t_f	—	3.2	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.84	1.09	V	$I_F = 14 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	7.4	—	ns	$I_F = 14 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 500 \text{ A}/\mu\text{s}$

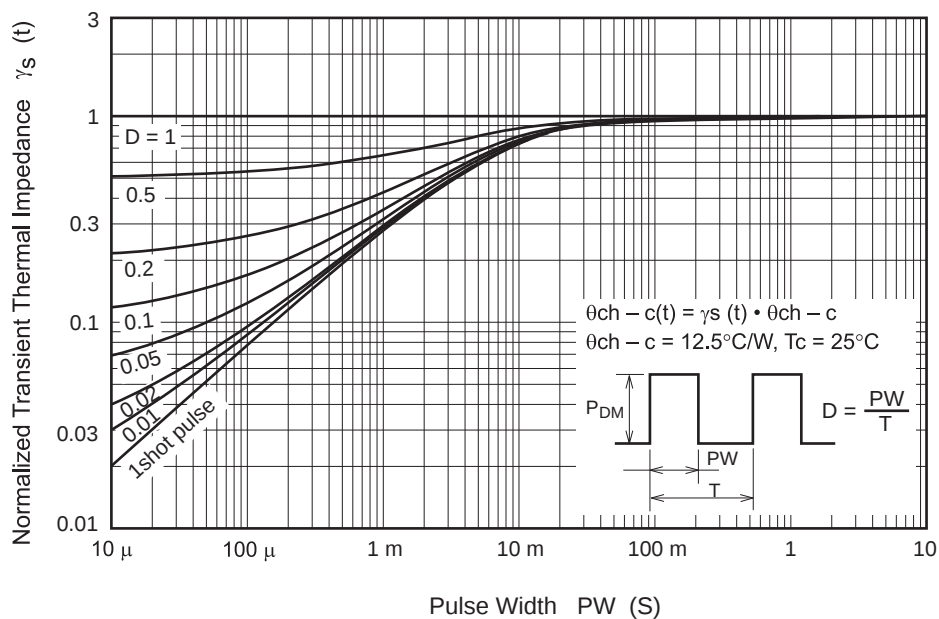
Notes: 4. Pulse test

Main Characteristics

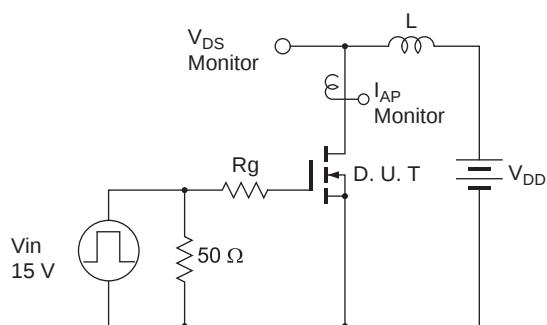




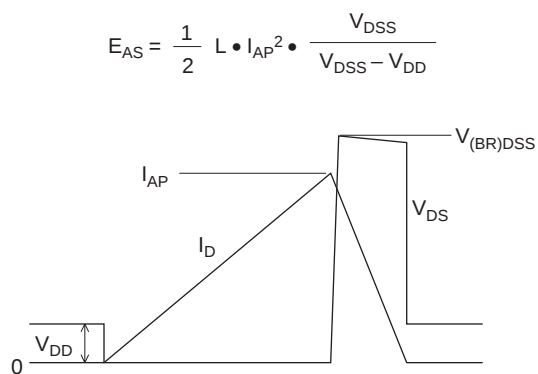
Normalized Transient Thermal Impedance vs. Pulse Width



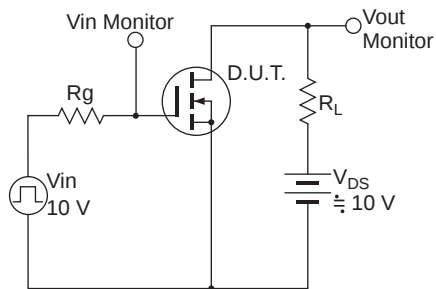
Avalanche Test Circuit



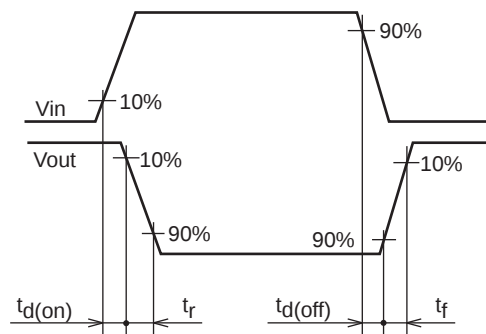
Avalanche Waveform



Switching Time Test Circuit



Switching Time Waveform



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