RJK03M1DPA

30V, 50A, 2.3mΩmax.
N Channel Power MOS FET
High Speed Power Switching

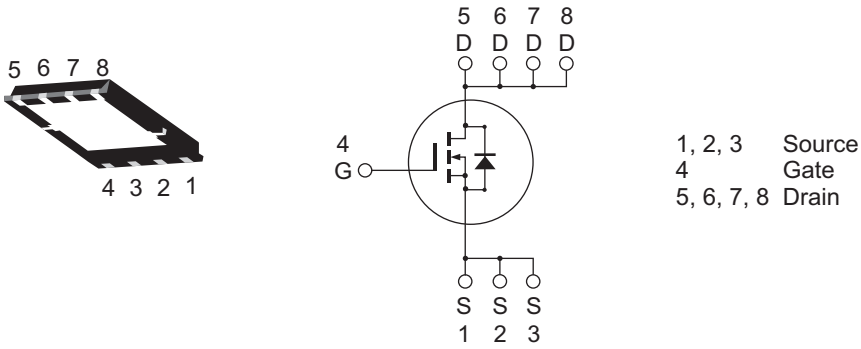
R07DS0765EJ0200
Rev.2.00
Feb 08, 2013

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
- Pb-free
- Halogen-free

Outline

RENESAS Package code: PWSN0008DE-A
(Package name: WPAK(3F))



Absolute Maximum Ratings

(Ta = 25°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	50	A
Drain peak current	$I_{D(pulse)}$ Note1	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Avalanche current	I_{AP} Note 2	21	A
Avalanche energy	E_{AS} Note 2	44.1	mJ
Channel dissipation	Pch Note3	45	W
Channel to case thermal impedance	θch-c Note3	2.8	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tch = 25°C, Rg ≥ 50 Ω
3. Tc = 25°C

Electrical Characteristics

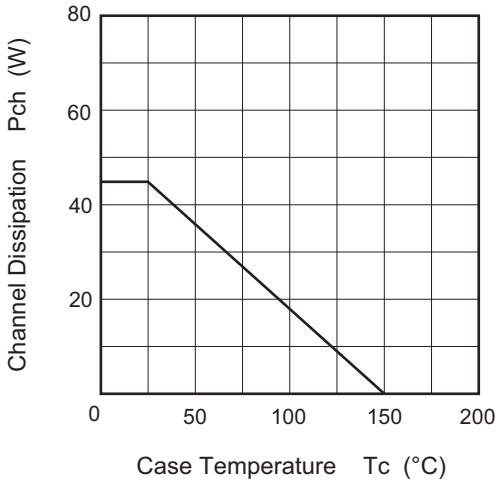
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	± 0.5	μA	V_{GS} = ±20 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	V_{DS} = 24 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.2	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	1.9	2.3	mΩ	I_D = 25 A, V_{GS} = 10 V Note4
	$R_{DS(on)}$	—	2.4	3.1	mΩ	I_D = 25 A, V_{GS} = 4.5 V Note4
Forward transfer admittance	$\|y_{fs}\|$	—	130	—	S	I_D = 25 A, V_{DS} = 5 V Note4
Input capacitance	Ciss	—	3370	4720	pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	560	—	pF	
Reverse transfer capacitance	Crss	—	315	—	pF	
Gate Resistance	Rg	—	1.5	3.0	Ω	
Total gate charge	Qg	—	25.0	—	nC	V_{DD} = 10 V V_{GS} = 4.5 V I_D = 50 A
Gate to source charge	Qgs	—	9.2	—	nC	
Gate to drain charge	Qgd	—	7.1	—	nC	
Turn-on delay time	$t_{d(on)}$	—	6.1	—	ns	V_{GS} = 10 V, I_D = 25 A V_{DD} ≅ 10 V R_L = 0.4 Ω Rg = 4.7 Ω
Rise time	t_r	—	4.4	—	ns	
Turn-off delay time	$t_{d(off)}$	—	57.5	—	ns	
Fall time	t_f	—	18.4	—	ns	
Body–drain diode forward voltage	V_{DF}	—	0.81	1.05	V	I_F = 50 A, V_{GS} = 0 Note4
Body–drain diode reverse recovery time	t_{rr}	—	9.8	—	ns	I_F =50 A, V_{GS} = 0 di_F/dt = 500 A/μs

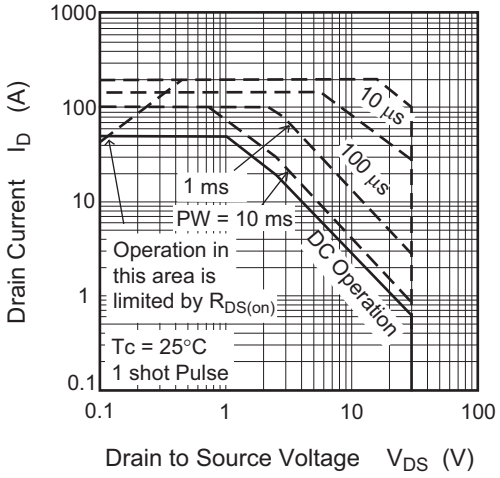
Notes: 4. Pulse test

Main Characteristics

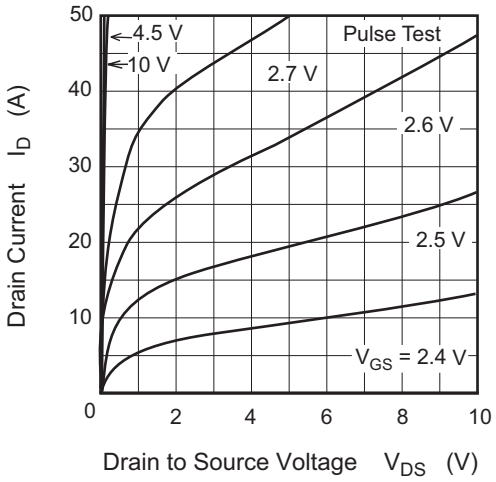
Power vs. Temperature Derating



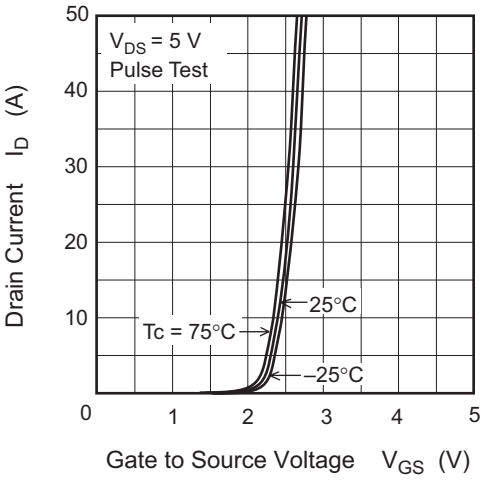
Maximum Safe Operation Area



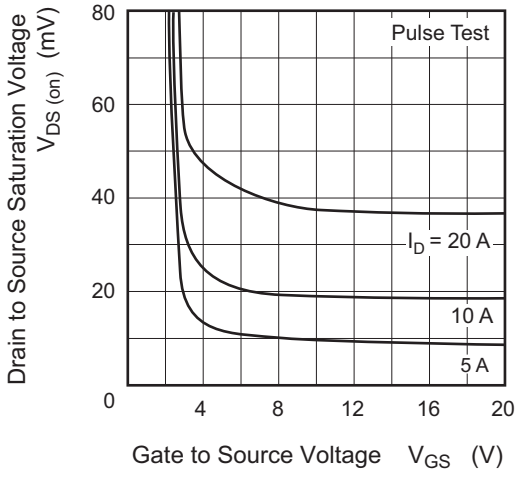
Typical Output Characteristics



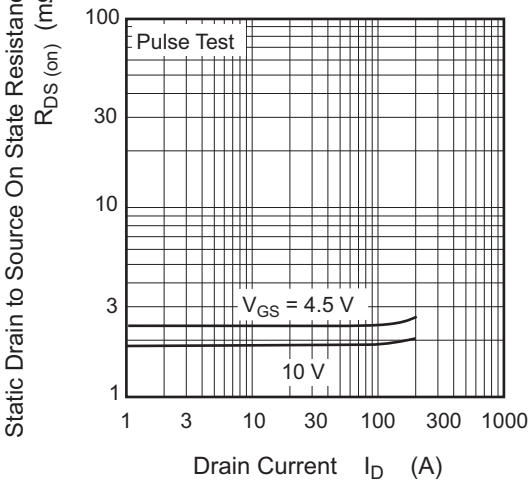
Typical Transfer Characteristics



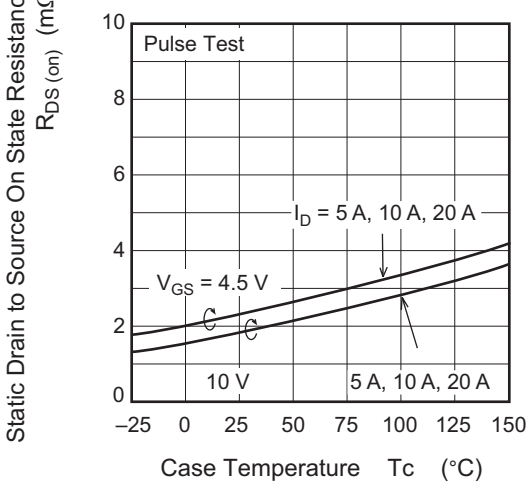
Drain to Source Saturation Voltage vs. Gate to Source Voltage



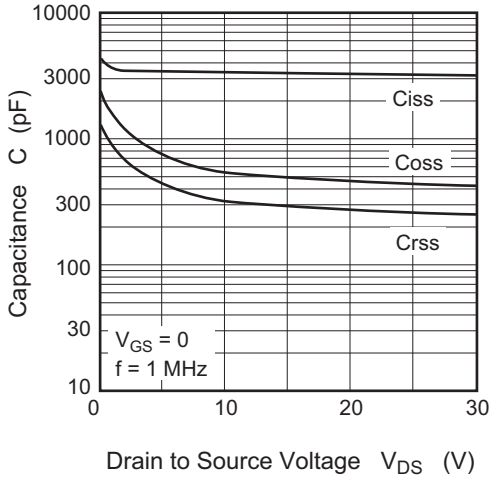
Static Drain to Source On State Resistance vs. Drain Current



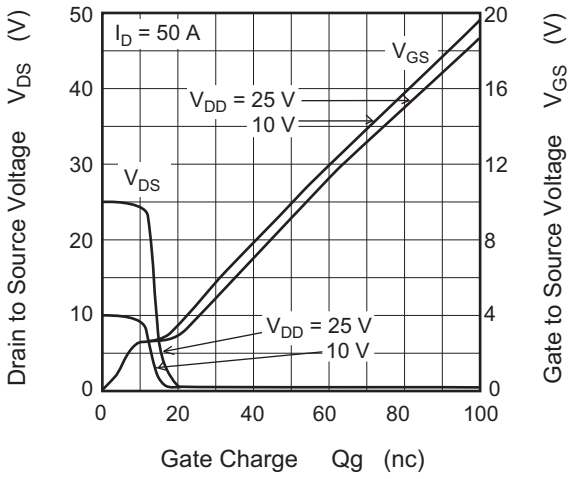
Static Drain to Source On State Resistance vs. Temperature



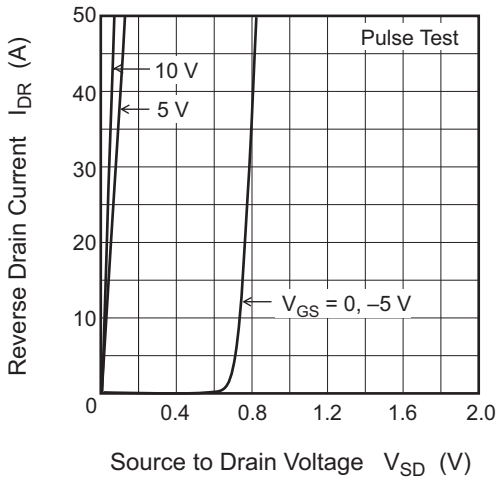
Typical Capacitance vs. Drain to Source Voltage



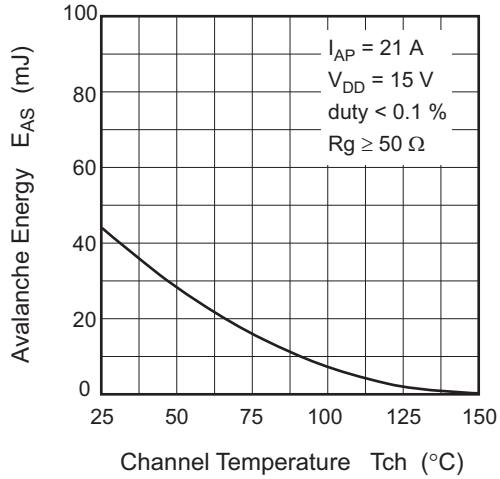
Dynamic Input Characteristics



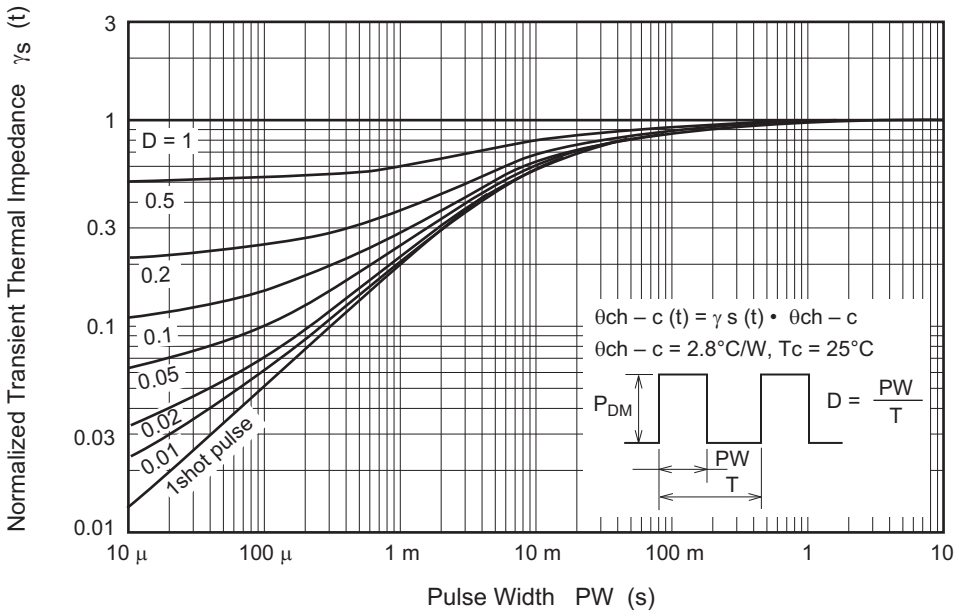
Reverse Drain Current vs. Source to Drain Voltage



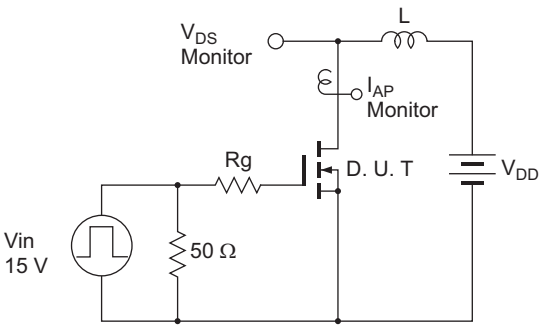
Maximum Avalanche Energy vs. Channel Temperature Derating



Normalized Transient Thermal Impedance vs. Pulse Width

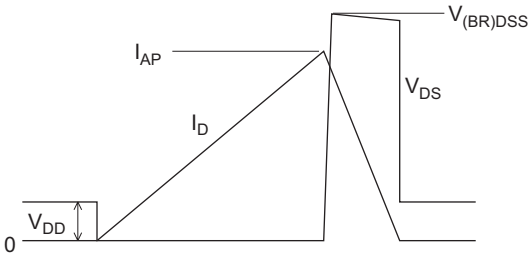


Avalanche Test Circuit

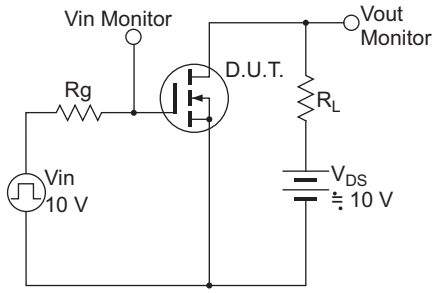


Avalanche Waveform

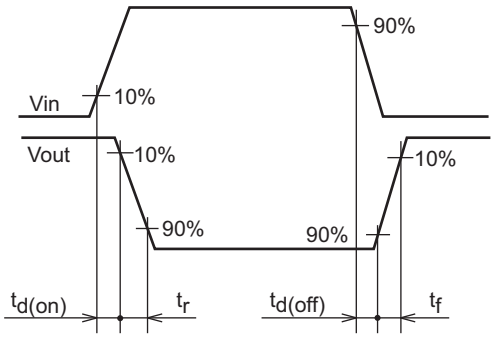
$$E_{AS} = \frac{1}{2} L \bullet I_{AP}^2 \bullet \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit



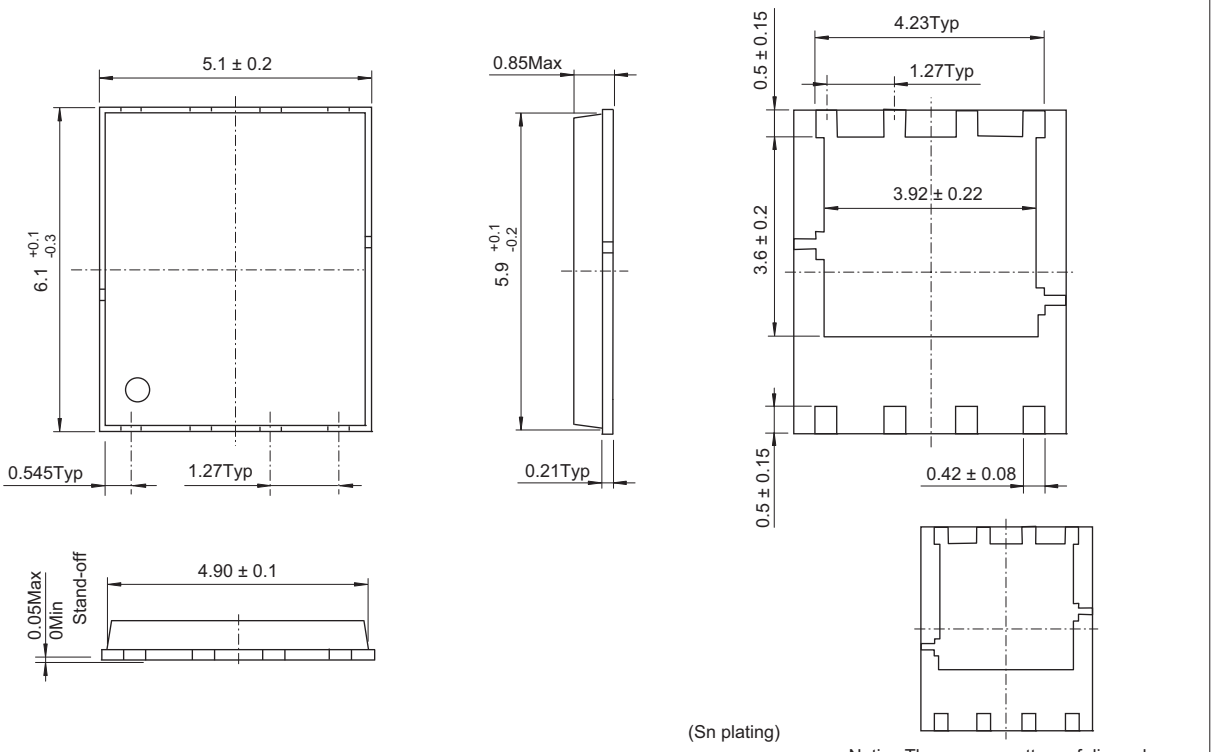
Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
WPAK(3F)	—	PWSN0008DE-A	WPAK(3F)V	0.075g

Unit: mm



Notice:The reverse pattern of die-pad support lead described above exists.

Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK03M1DPA-00-J5A	3000 pcs	Taping

Note: The symbol of 2nd "-" is occasionally presented as "#".

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