

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# 2SK4151

Silicon N Channel MOS FET  
High Speed Power Switching

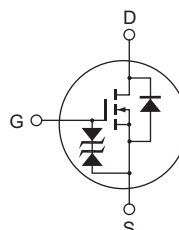
REJ03G1901-0100  
Rev.1.00  
Mar 15, 2010

## Features

- Capable of 2.5 V gate drive
- Low drive current
- Low on-resistance  
 $R_{DS(on)} = 1.5 \Omega$  typ. (at  $I_D = 0.5$  A,  $V_{GS} = 4$  V,  $T_a = 25^\circ\text{C}$ )

## Outline

RENESAS Package code: PRSS0003DA-A  
(Package name: TO-92(1))



1. Source
2. Drain
3. Gate

## Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	150	V
Gate to source voltage	$V_{GSS}$	$\pm 10$	V
Drain current	$I_D$ <sup>Note1</sup>	1	A
Drain peak current	$I_{D(pulse)}$ <sup>Note2</sup>	4	A
Body-drain diode reverse drain current	$I_{DR}$ <sup>Note1</sup>	1	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note2</sup>	4	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	0.75	W
Channel to ambient thermal impedance	$\theta_{ch-a}$	166.7	$^\circ\text{C/W}$
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  $\leq 30\%$

2.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$

## Electrical Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	150	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 10$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 150 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.5	—	1.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	1.5	1.95	$\Omega$	$I_D = 0.5 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	1.9	2.5	$\Omega$	$I_D = 0.5 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	98	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	31	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	14	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	3.5	—	nC	$V_{DD} = 100 \text{ V}$
Gate to source charge	$Q_{gs}$	—	0.5	—	nC	$V_{GS} = 4 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	1.8	—	nC	$I_D = 1 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	8	—	ns	$V_{GS} = 4 \text{ V}$
Rise time	$t_r$	—	12	—	ns	$I_D = 0.5 \text{ A}$
Turn-off delay time	$t_{d(off)}$	—	34	—	ns	$R_L = 60 \text{ }\Omega$
Fall time	$t_f$	—	19	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	1.0	1.5	V	$I_F = 1 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	60	—	ns	$I_F = 1 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

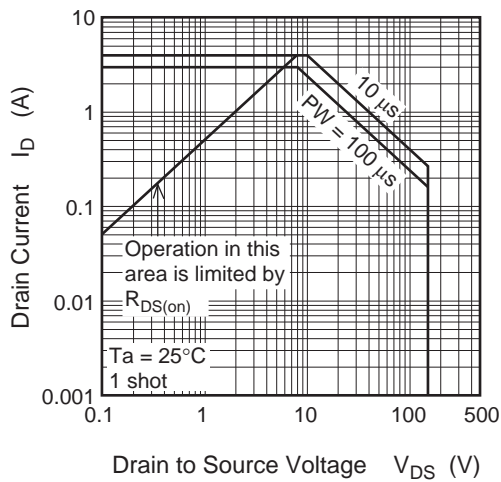
Notes: 3. Pulse test

4. This device is sensitive to electrostatic discharge.

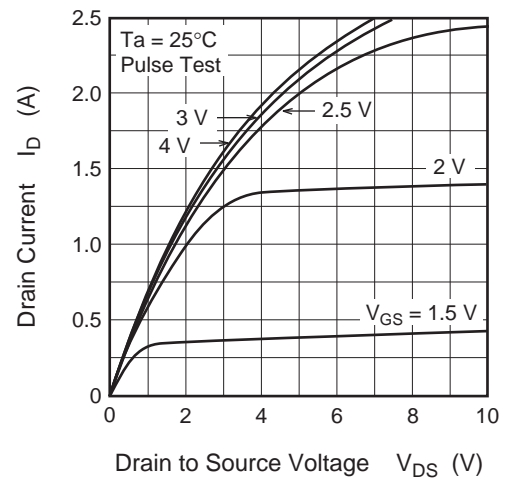
It is recommended to adopt appropriate cautions when handling this product.

## Main Characteristics

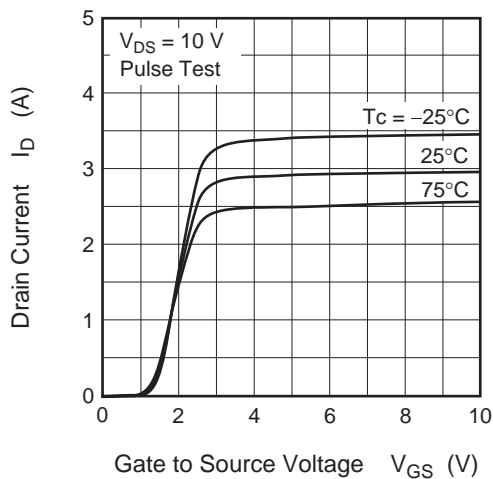
Maximum Safe Operation Area



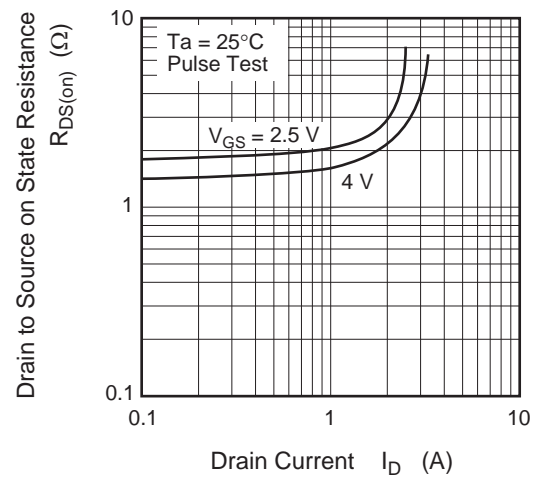
Typical Output Characteristics



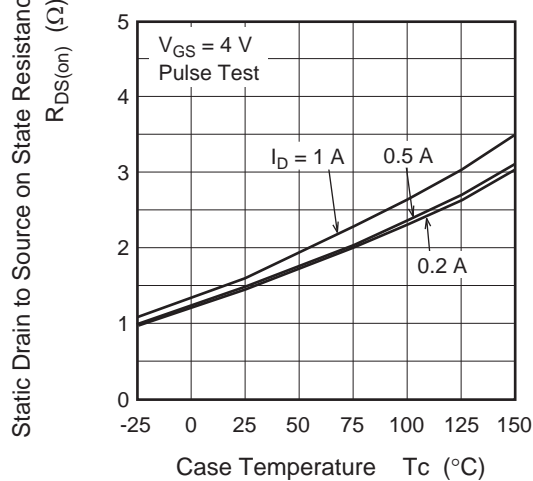
Typical Transfer Characteristics



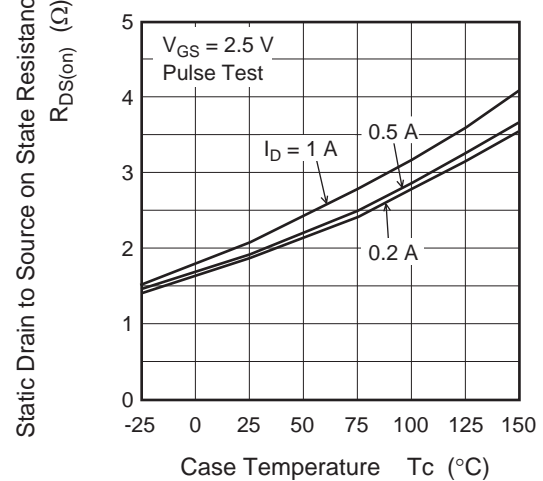
Static Drain to Source on State Resistance vs. Drain Current (Typical)



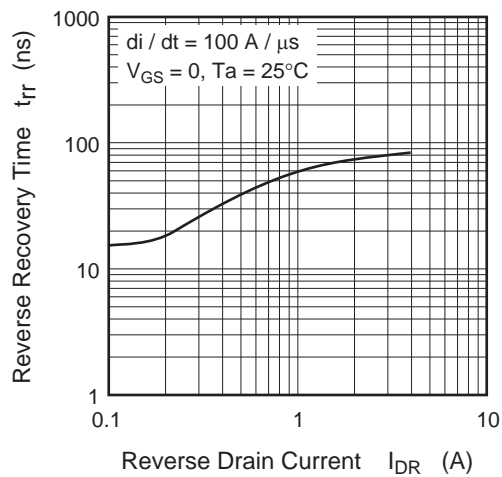
Static Drain to Source on State Resistance vs. Temperature (Typical) (1)



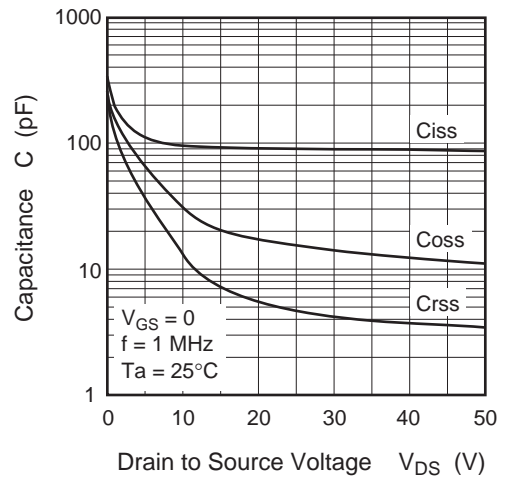
Static Drain to Source on State Resistance vs. Temperature (Typical) (2)



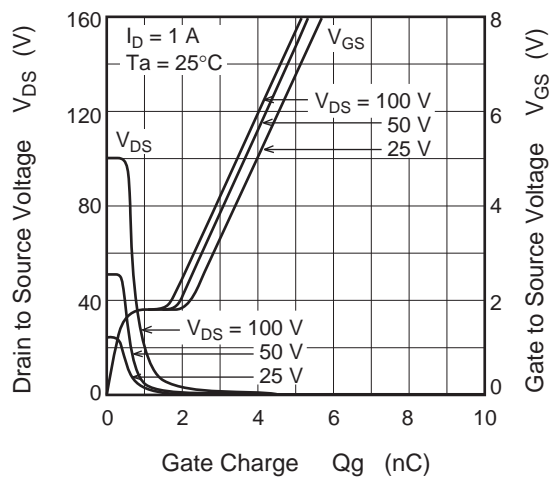
Body-Drain Diode Reverse Recovery Time (Typical)



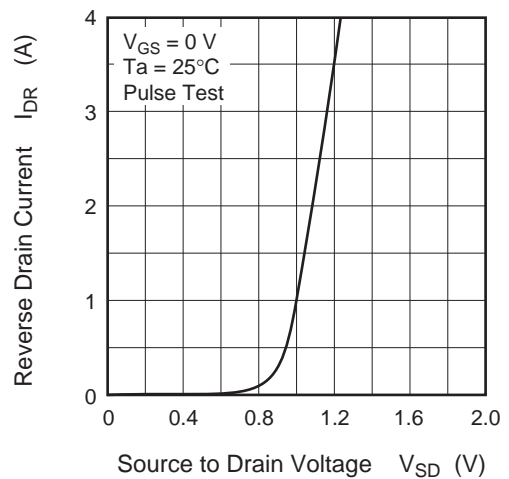
Typical Capacitance vs. Drain to Source Voltage



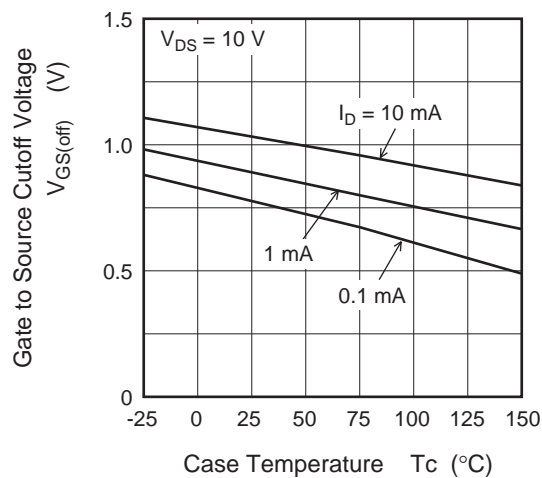
Dynamic Input Characteristics (Typical)

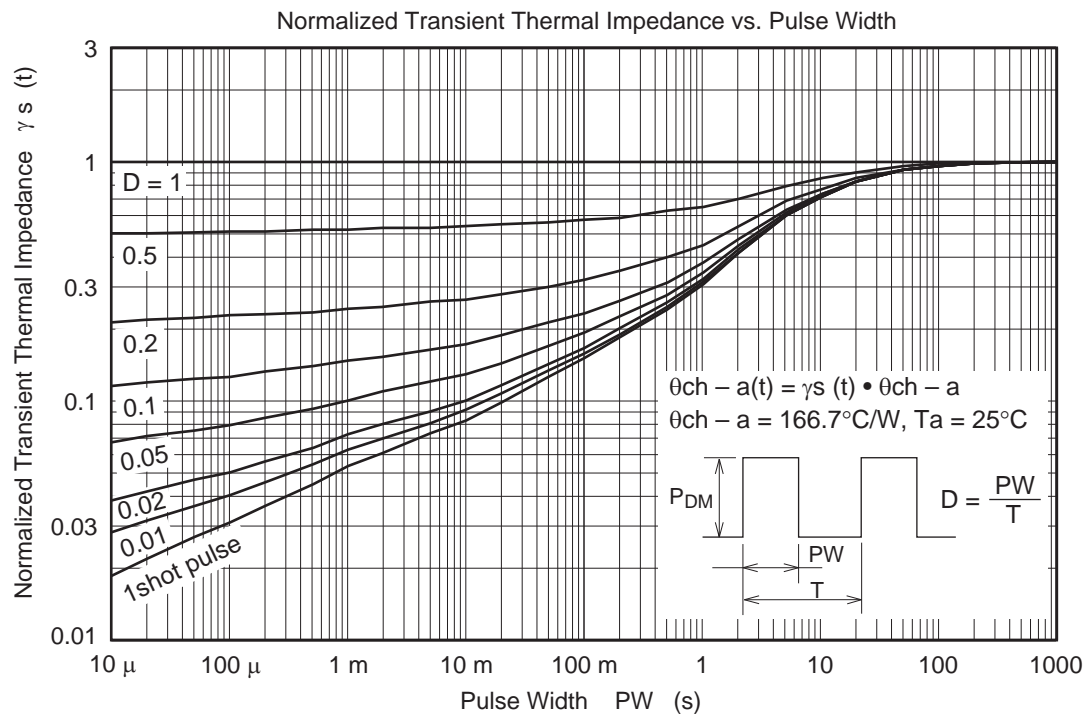


Reverse Drain Current vs. Source to Drain Voltage (Typical)

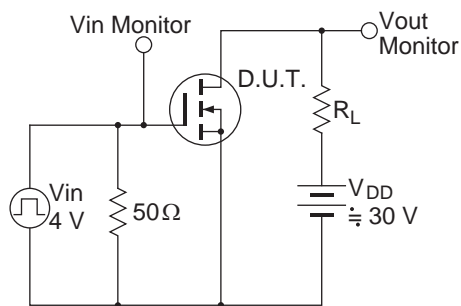


Gate to Source Cutoff Voltage vs. Case Temperature (Typical)

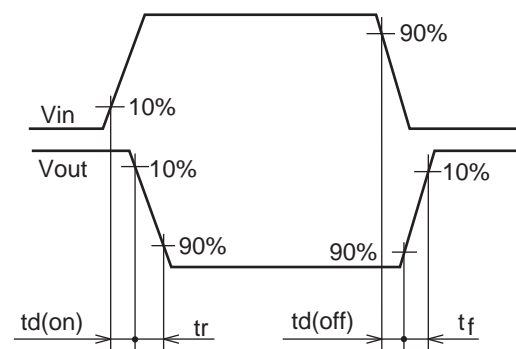




Switching Time Test Circuit



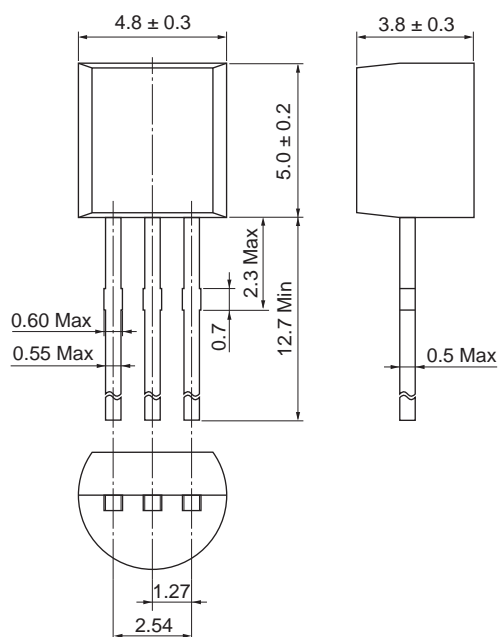
Waveform



## Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-92(1)	SC-43A	PRSS0003DA-A	TO-92(1) / TO-92(1)V	0.25g	

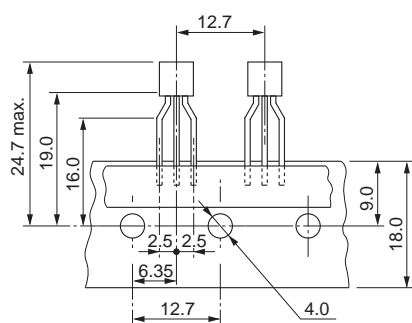
Unit: mm



## Ordering Information

Part No.	Quantity	Shipping Container
2SK4151TZ-E	2500 pcs	Hold box, Radial taping

Note: Leads is forming applied as following figure.



Unit: mm



Notes:

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