2SK4093

Silicon N Channel MOS FET
High Speed Power Switching

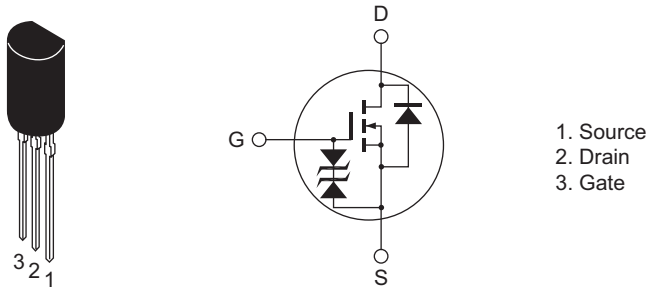
REJ03G1534-0300
Rev.3.00
Feb 01, 2008

Features

- Capable of 2.5V gate drive
- Low drive current
- Low on-resistance

Outline

RENESAS Package code: PRSS0003DC-A
(Package name: TO-92 Mod)



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GSS}	±10	V
Drain current	I_D Note1	1	A
Drain peak current	$I_{D\ (pulse)}$ Note2	2	A
Body-drain diode reverse drain current	I_{DR}	0.5	A
Body-drain diode reverse drain peak current	$I_{DR\ (pulse)}$ Note2	2	A
Channel dissipation	Pch	0.9	W
Channel to ambient thermal impedance	θ_{ch-a}	139	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 30%
2. PW ≤ 10 µs, duty cycle ≤ 1%

Electrical Characteristics

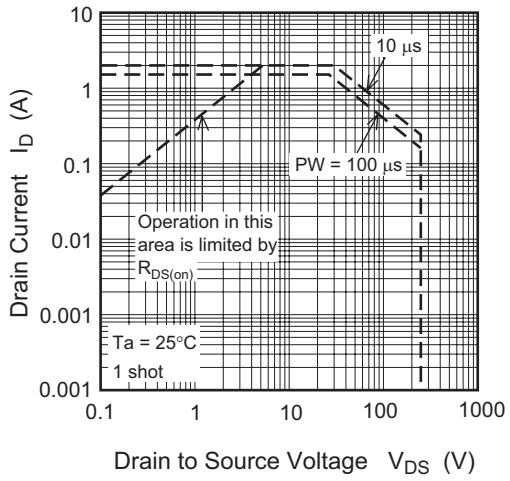
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±10	—	—	V	I_G = ±100 µA, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	µA	V_{DS} = 250 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±8 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	0.5	—	1.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	1.9	2.6	Ω	I_D = 0.5 A, V_{GS} = 4 V Note3
Static drain to source on state resistance	$R_{DS(on)}$	—	2.0	2.7	Ω	I_D = 0.5 A, V_{GS} = 2.5 V Note3
Input capacitance	Ciss	—	140	—	pF	V_{DS} = 25 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	18	—	pF	
Reverse transfer capacitance	Crss	—	6	—	pF	
Turn-on delay time	$t_{d(on)}$	—	14	—	ns	I_D = 0.5 A V_{GS} = 4 V R_L = 250 Ω R_g = 10 Ω
Rise time	t_r	—	17	—	ns	
Turn-off delay time	$t_{d(off)}$	—	46	—	ns	
Fall time	t_f	—	16	—	ns	
Total gate charge	Qg	—	5.5	—	nC	V_{DD} = 200 V V_{GS} = 4 V I_D = 1 A
Gate to source charge	Qgs	—	0.4	—	nC	
Gate to drain charge	Qgd	—	3.1	—	nC	
Body-drain diode forward voltage	V_{DF}	—	0.78	1.20	V	I_F = 0.5 A, V_{GS} = 0 Note3
Body-drain diode reverse recovery time	t_{rr}	—	80	—	ns	I_F = 0.5 A, V_{GS} = 0 di_F/dt = 100 A/µs

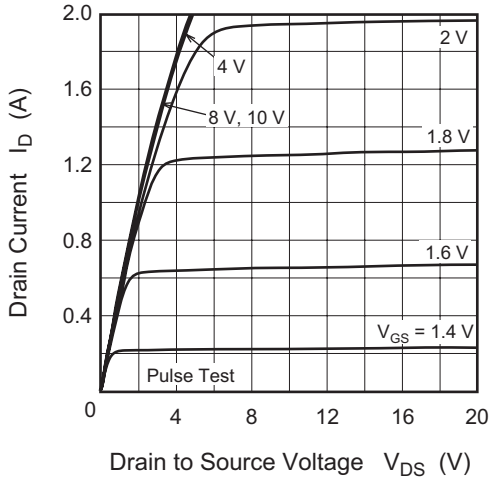
Notes: 3. Pulse test

Main Characteristics

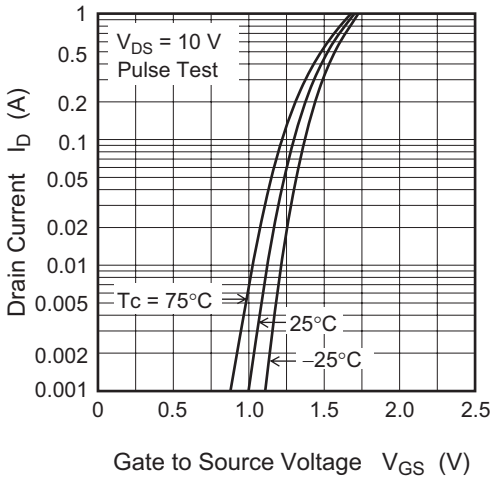
Maximum Safe Operation Area



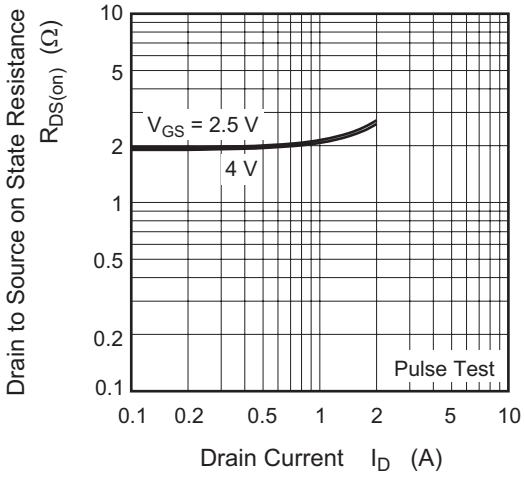
Typical Output Characteristics



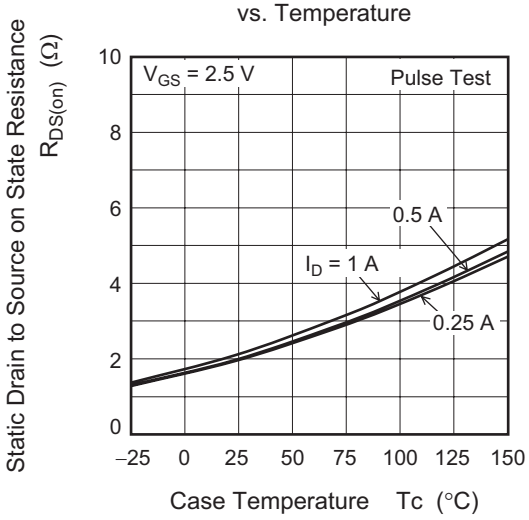
Typical Transfer Characteristics



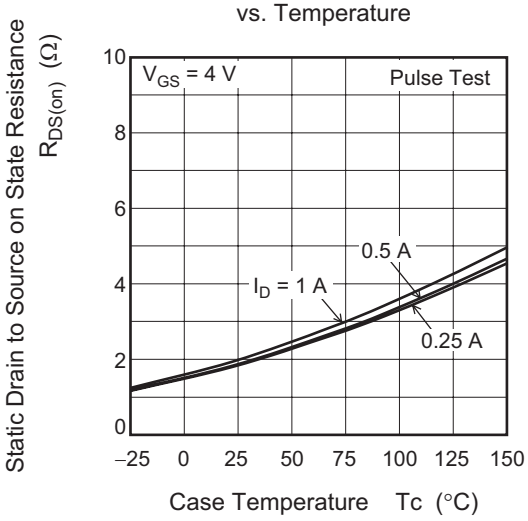
Static Drain to Source on State Resistance vs. Drain Current



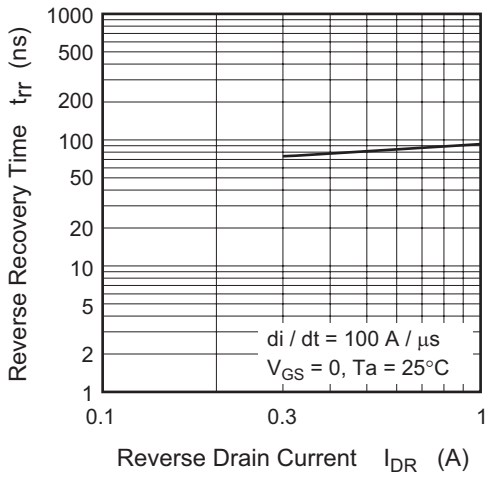
Static Drain to Source on State Resistance vs. Temperature



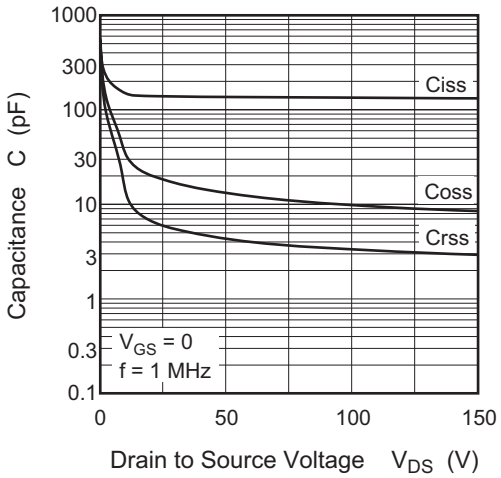
Static Drain to Source on State Resistance vs. Temperature



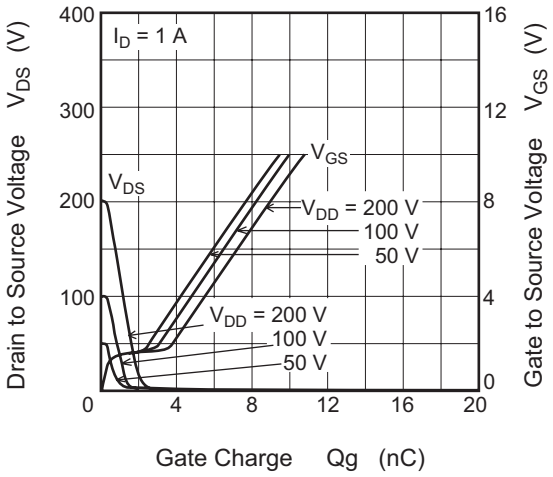
Body-Drain Diode Reverse Recovery Time



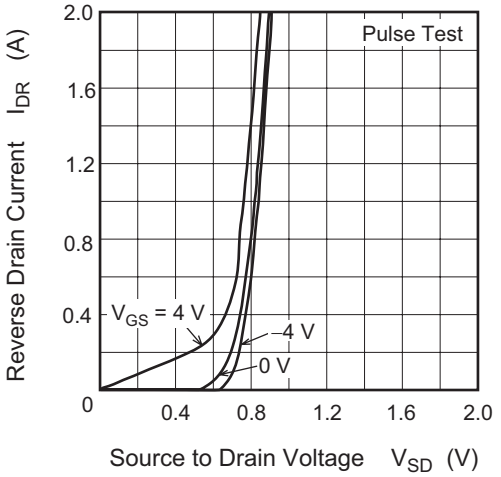
Typical Capacitance vs. Drain to Source Voltage



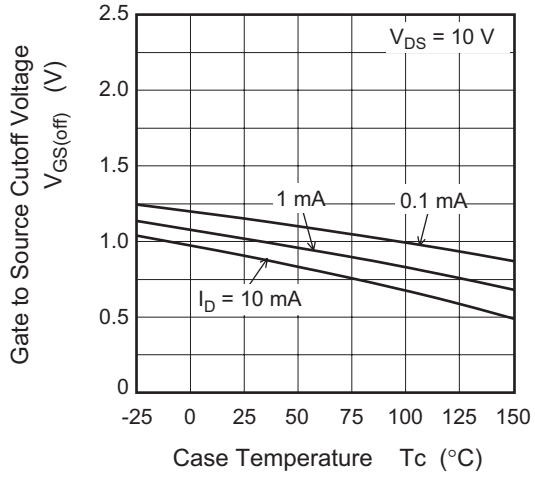
Dynamic Input Characteristics



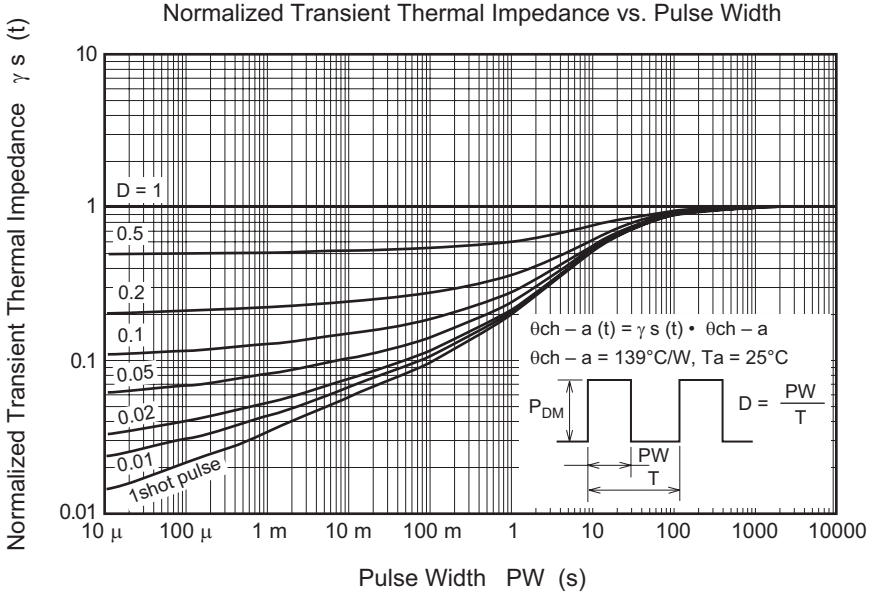
Reverse Drain Current vs. Source to Drain Voltage



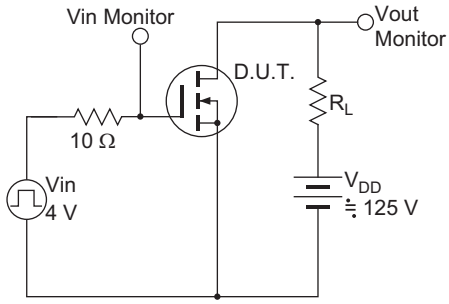
Gate to Source Cutoff Voltage vs. Case Temperature



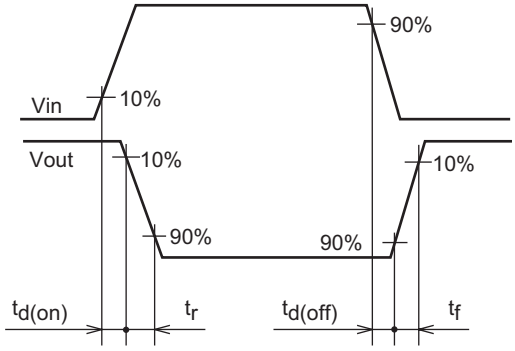
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



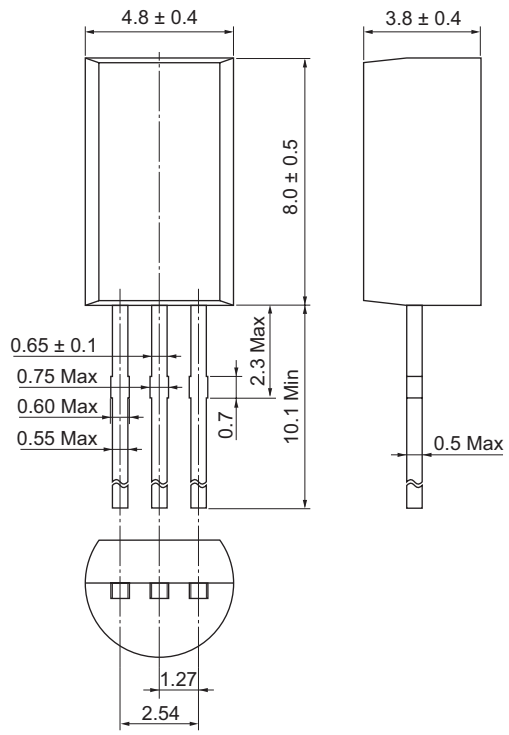
Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-92 Mod	SC-51	PRSS0003DC-A	TO-92 Mod / TO-92 ModV	0.35g

Unit: mm



Ordering Information

Part No.	Quantity	Shipping Container
2SK4093TZ-E	2500 pcs	Hold Box, Radial Taping