To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

MOS FIELD EFFECT TRANSISTOR
2SJ690

P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The 2SJ690 is a P-channel MOSFET designed for power switch of portable machine and so on.

FEATURES

- 2.5 V drive available
- Low on-state resistance
  $R_{DS(on)1}$ = 119 mΩ MAX. (V_{GS} = –4.5 V, I_D = –1.0 A)
  $R_{DS(on)2}$ = 217 mΩ MAX. (V_{GS} = –2.5 V, I_D = –1.0 A)
- Built-in gate protection diode

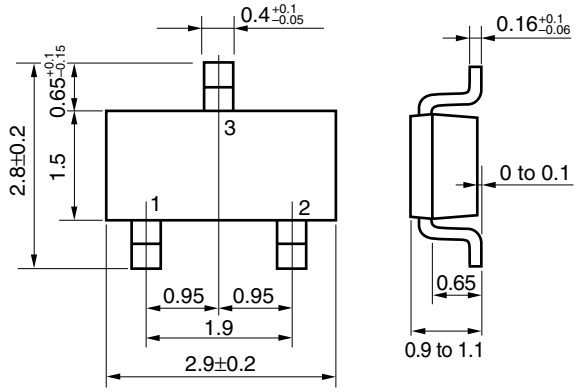
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SJ690-T1B-AT	SC-96 (Mini Mold Thin Type)

Remark "-AT" indicates Pb-free (This product does not contain Pb in external electrode and other parts.).
"-T1B" indicates the unit orientation.
(8 mm embossed carrier tape, 3000 pcs/reel)

Marking: XT

PACKAGE DRAWING (Unit : mm)

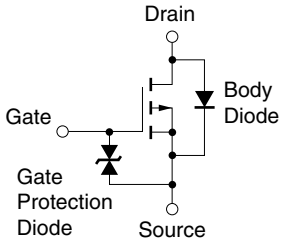


1: Gate
2: Source
3: Drain

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	–30	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	∓12	V
Drain Current (DC)	$I_{D(DC)}$	∓2.5	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	∓10	A
Total Power Dissipation	P_{T1}	0.2	W
Total Power Dissipation Note2	P_{T2}	1.25	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

EQUIVALENT CIRCUIT



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1 %
2. Mounted on FR-4 board, t ≤ 5 sec.

Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

Caution This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge.

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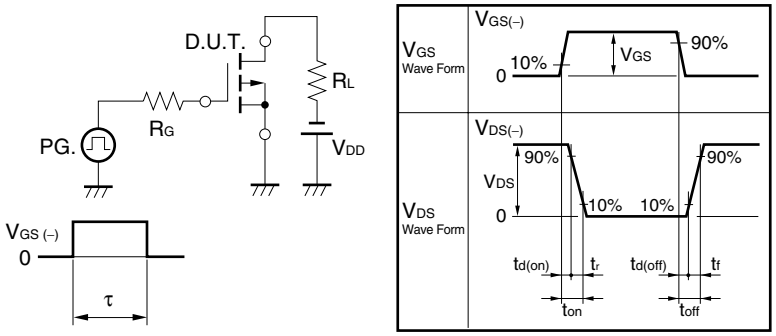
Date Published September 2009 NS
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I_{DSS}	V_{DS} = –30 V, V_{GS} = 0 V			–1	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ∓12 V, V_{DS} = 0 V			∓10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = –1.0 mA	–0.5		–1.5	V
Forward Transfer Admittance Note	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –1.0 A	2.0			S
Drain to Source On-state Resistance Note	$R_{DS(on)1}$	V_{GS} = –4.5 V, I_D = –1.0 A		87	119	mΩ
	$R_{DS(on)2}$	V_{GS} = –2.5 V, I_D = –1.0 A		120	217	mΩ
Input Capacitance	C_{iss}	V_{DS} = –10 V,		450		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V,		80		pF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		64		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = –15 V, I_D = –1.0 A,		12		ns
Rise Time	t_r	V_{GS} = –4.5 V,		5		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		38		ns
Fall Time	t_f			29		ns
Total Gate Charge	Q_G	V_{DD} = –24 V,		5.2		nC
Gate to Source Charge	Q_{GS}	V_{GS} = –4.5 V,		1.1		nC
Gate to Drain Charge	Q_{GD}	I_D = –2.5 A		2.3		nC
Diode Forward Voltage Note	$V_{F(S-D)}$	I_F = –2.5 A, V_{GS} = 0 V		0.9		V
Reverse Recovery Time	t_{rr}	I_F = –2.5 A, V_{GS} = 0 V,		37		ns
Reverse Recovery Charge	Q_{rr}	di/dt = –50 A/μs		14		nC

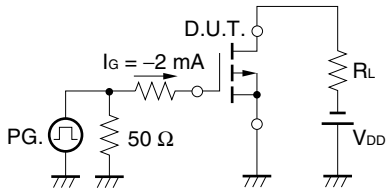
Note Pulsed

TEST CIRCUIT 1 SWITCHING TIME



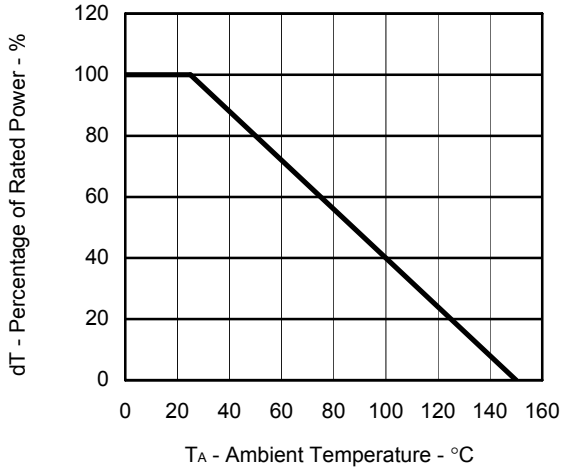
τ = 1 μs
Duty Cycle ≤ 1%

TEST CIRCUIT 2 GATE CHARGE

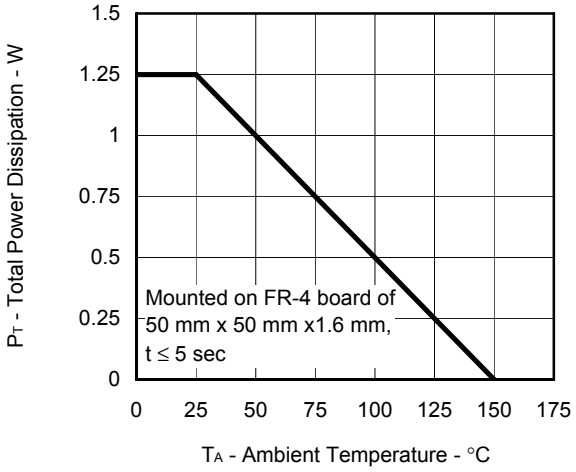


TYPICAL CHARACTERISTICS (T_A = 25°C)

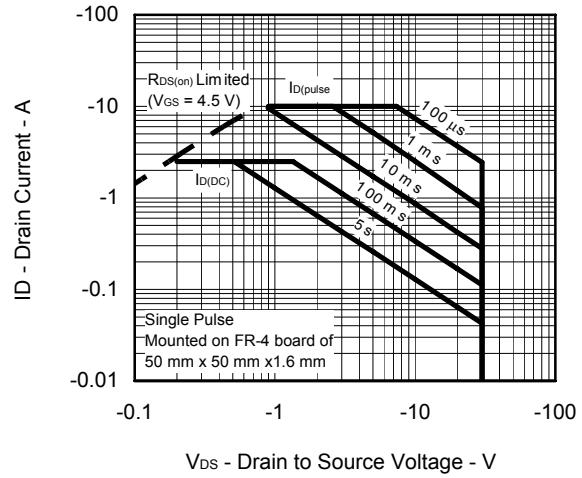
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



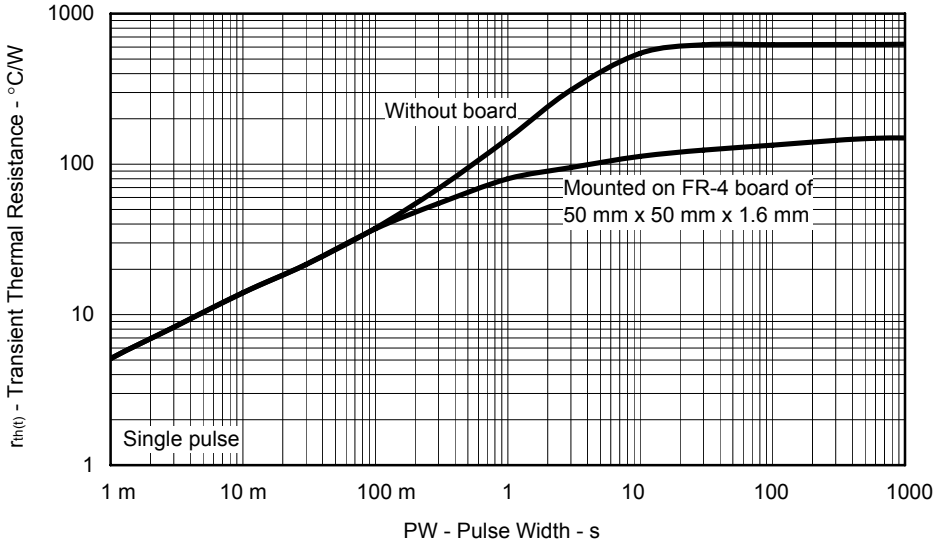
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



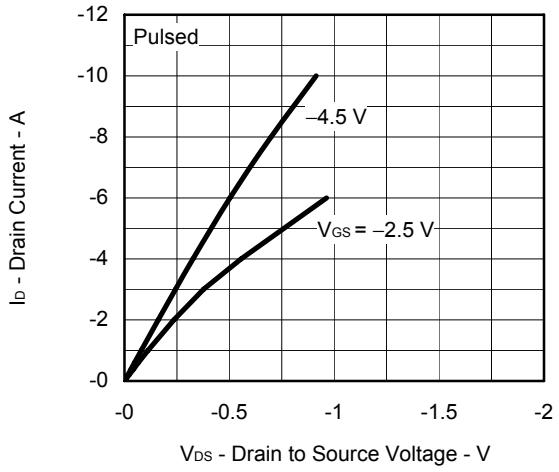
FORWARD BIAS SAFE OPERATING AREA



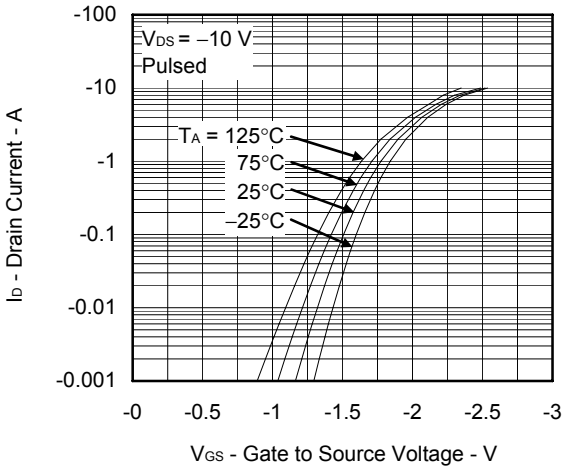
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



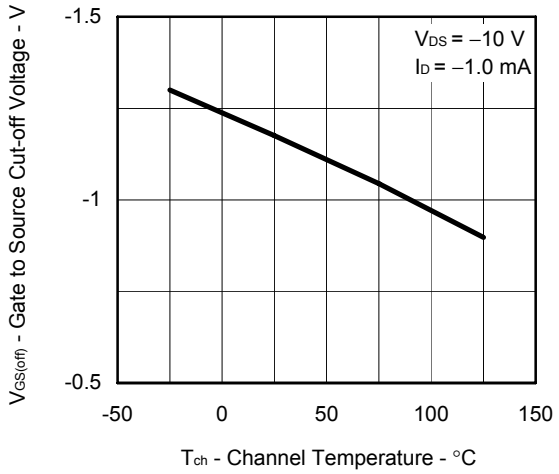
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



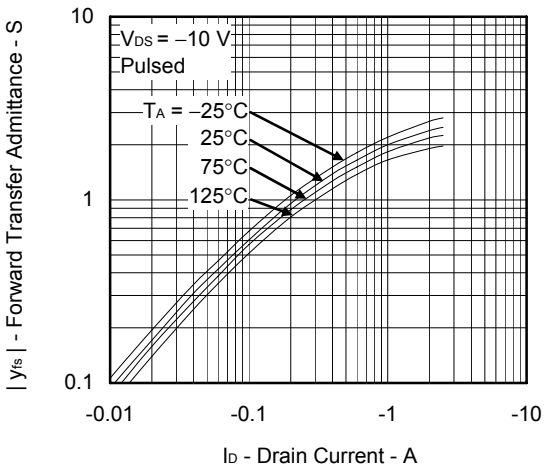
FORWARD TRANSFER CHARACTERISTICS



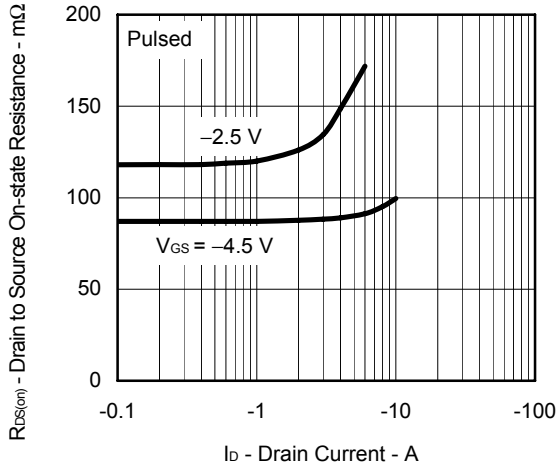
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



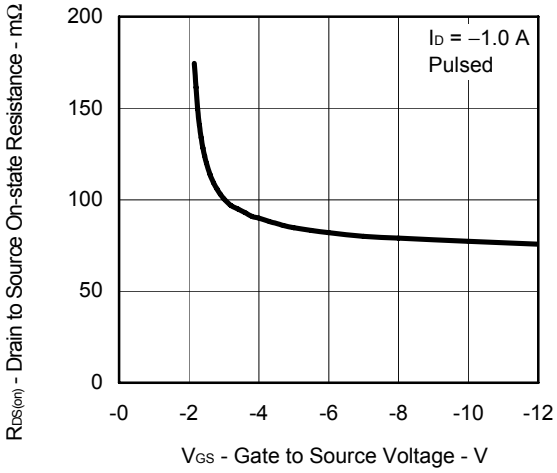
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



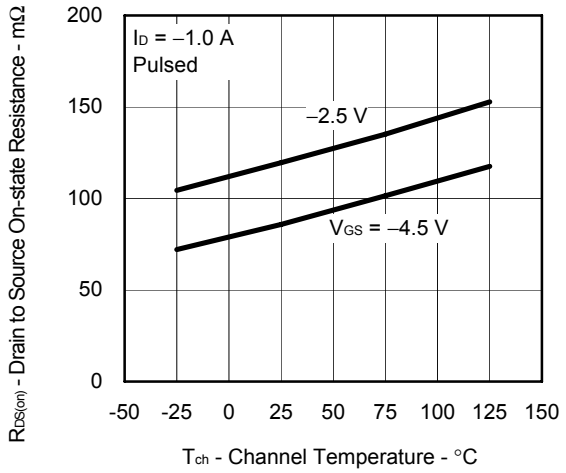
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



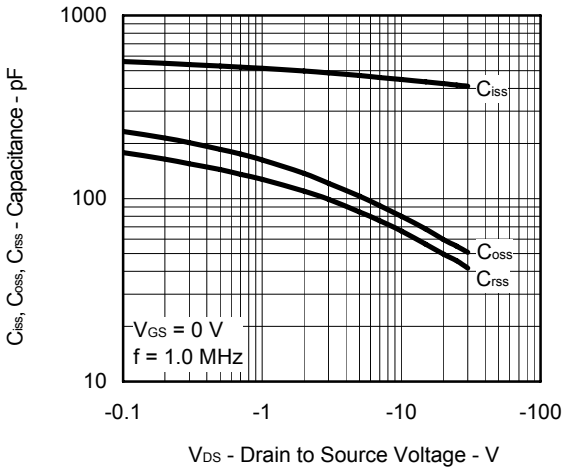
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



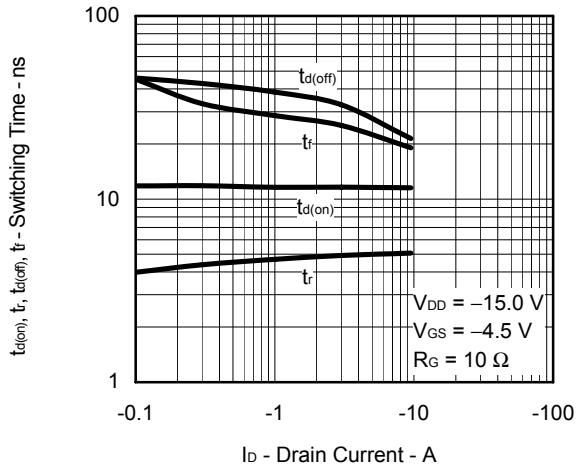
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



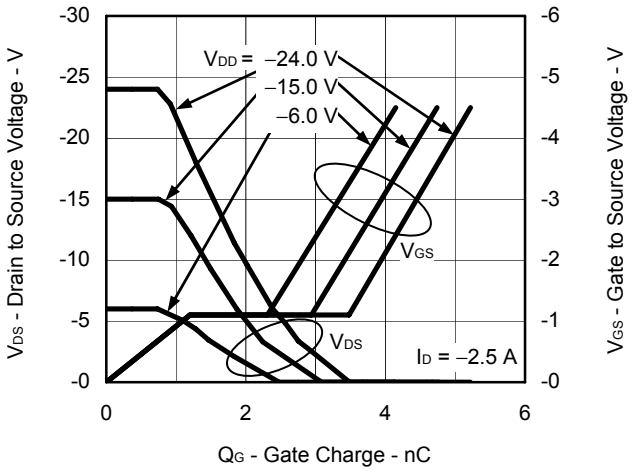
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



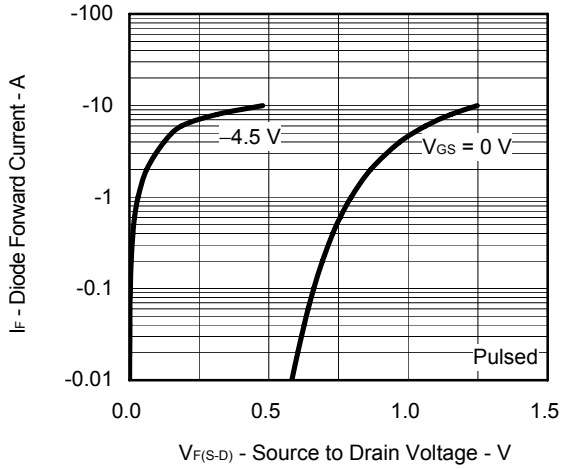
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT