

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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MOS FIELD EFFECT TRANSISTOR

2SJ557A

P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

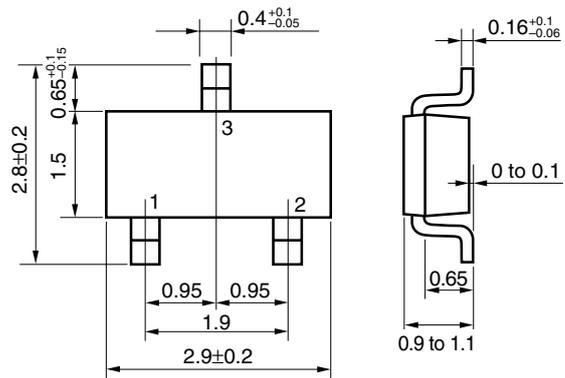
The 2SJ557A is a switching device which can be driven directly by a 4 V power source.

The 2SJ557A features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

FEATURES

- 4 V drive available
- Low on-state resistance
 $R_{DS(on)1} = 100 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -1.0 \text{ A)}$
 $R_{DS(on)2} = 134 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -1.0 \text{ A)}$
 $R_{DS(on)3} = 166 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -1.0 \text{ A)}$
- Built-in gate protection diode

PACKAGE DRAWING (Unit : mm)



1: Gate
2: Source
3: Drain

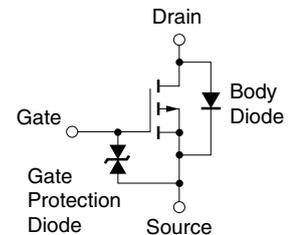
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SJ557A	3-pin Mini Mold (Thin Type) (SC-96)

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}	±20	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



<R> Marking: XS

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1 %

<R> **2.** Mounted on FR-4 board of 2500 mm² x 1.6 mm, copper foil 100%, 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.

V_{ESD} ±180 V TYP. at C = 200 pF, R = 0 Ω, Single Pulse.

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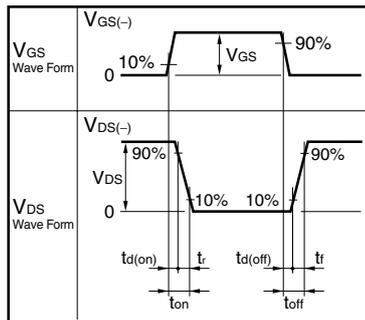
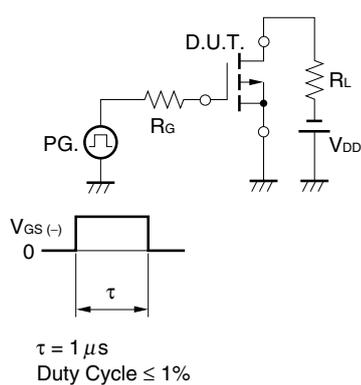
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

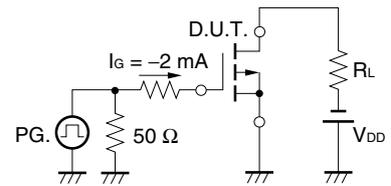
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V			-10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1.0 mA	-1.0	-1.5	-2.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = -10 V, I _D = -1.5 A	1.0	3.0		S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = -10 V, I _D = -1.0 A		72	100	mΩ
	R _{DS(on)2}	V _{GS} = -4.5 V, I _D = -1.0 A		91	134	mΩ
	R _{DS(on)3}	V _{GS} = -4.0 V, I _D = -1.0 A		113	166	mΩ
Input Capacitance	C _{iss}	V _{DS} = -10 V,		315		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		78		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		63		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10 V, I _D = -1.0 A,		7		ns
Rise Time	t _r	V _{GS} = -10 V,		3.5		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		37		ns
Fall Time	t _f			20		ns
Total Gate Charge	Q _G	V _{DD} = -10 V,		3.2		nC
Gate to Source Charge	Q _{GS}	V _{GS} = -4.0 V,		1.1		nC
Gate to Drain Charge	Q _{GD}	I _D = -2.5 A		1.5		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		13		nC

Note Pulsed

TEST CIRCUIT 1 SWITCHING TIME

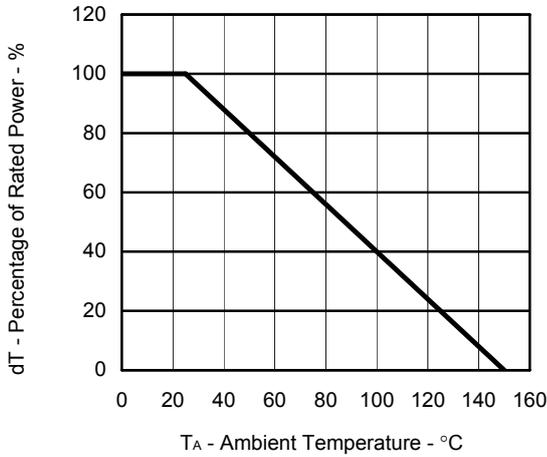


TEST CIRCUIT 2 GATE CHARGE

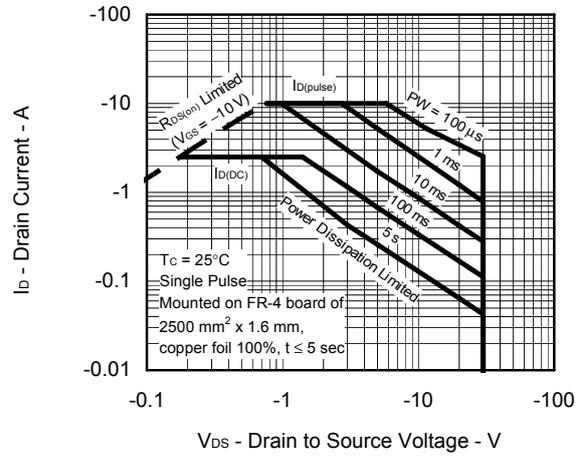


TYPICAL CHARACTERISTICS (T_A = 25°C)

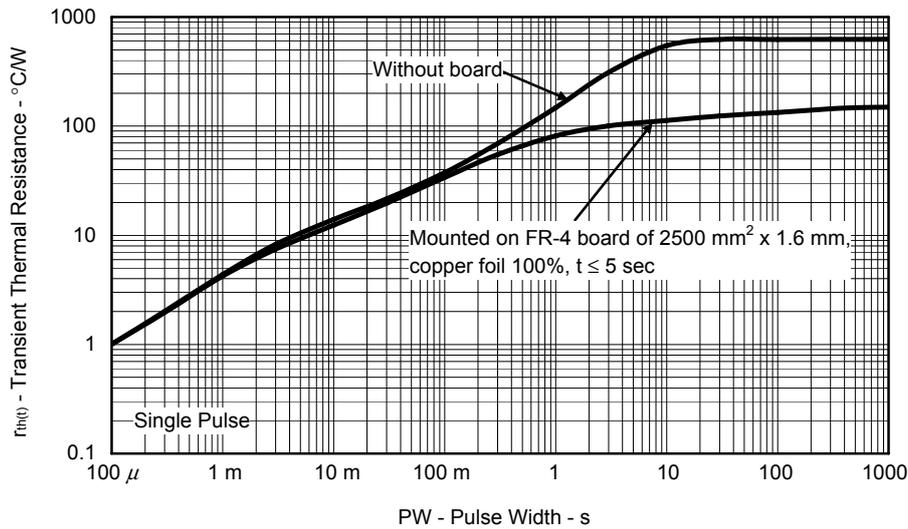
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



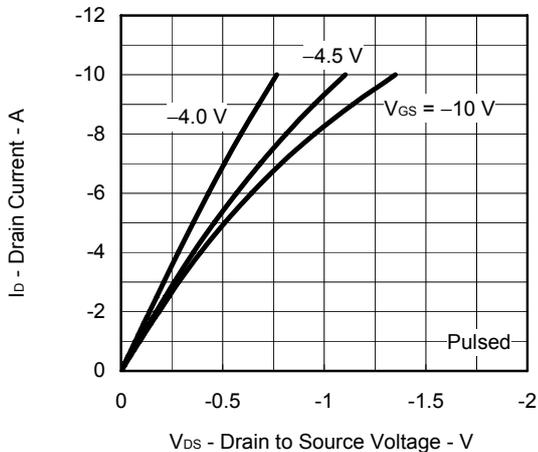
<R> FORWARD BIAS SAFE OPERATING AREA



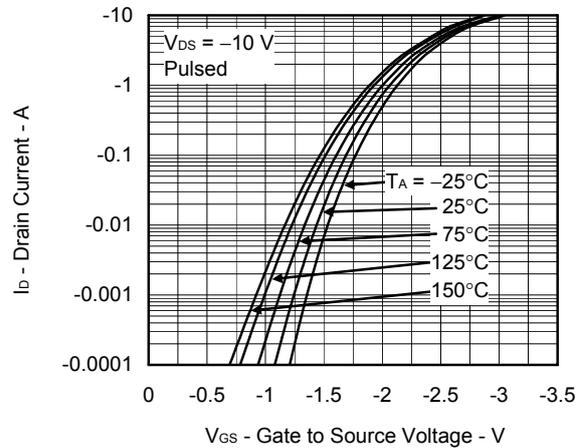
<R> TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



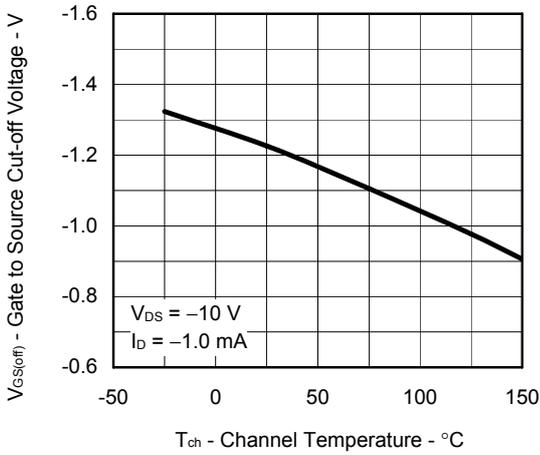
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



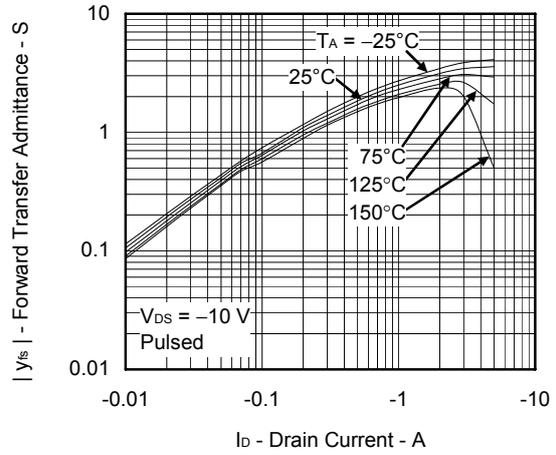
FORWARD TRANSFER CHARACTERISTICS



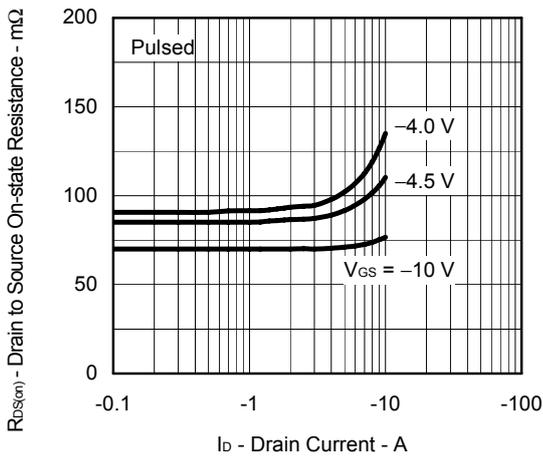
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



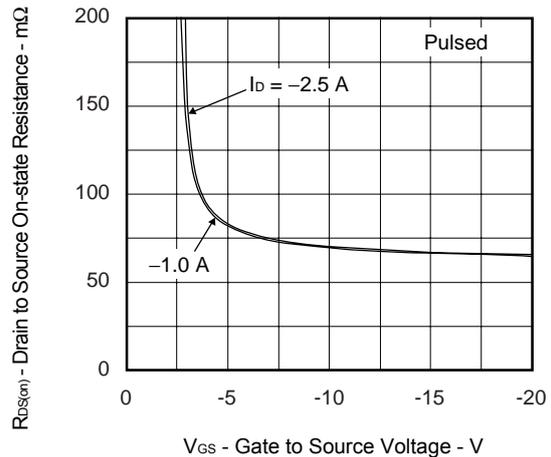
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



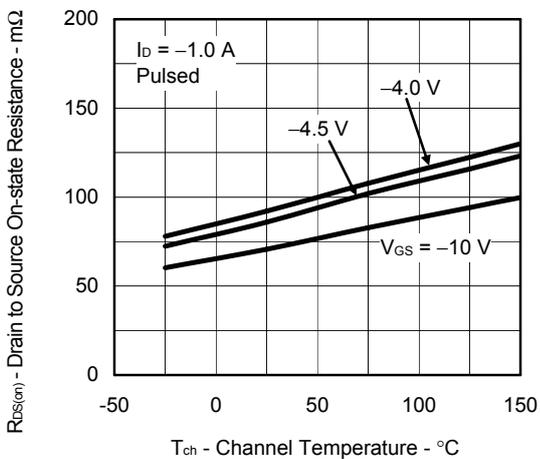
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



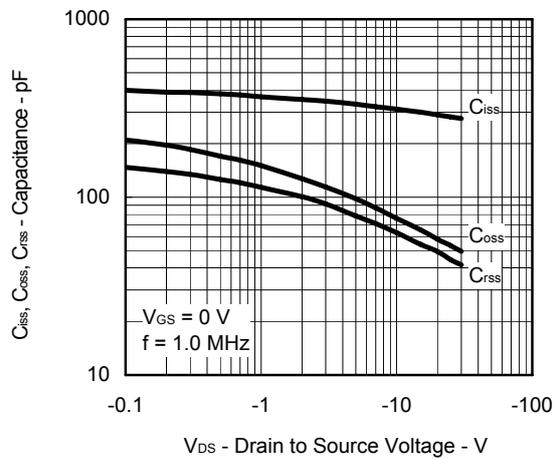
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



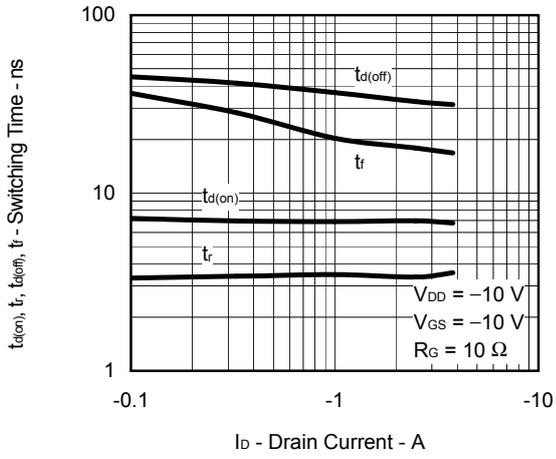
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



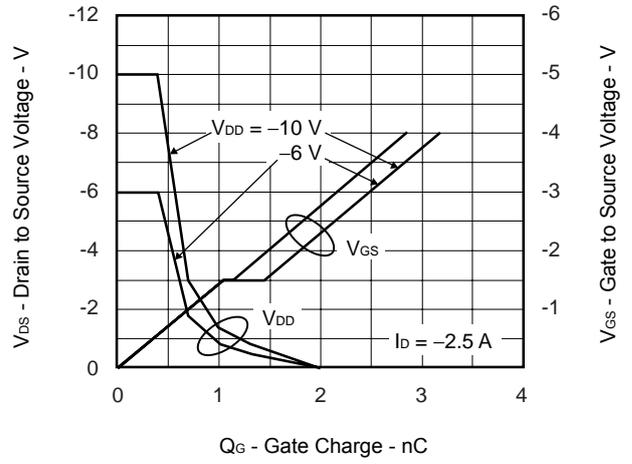
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



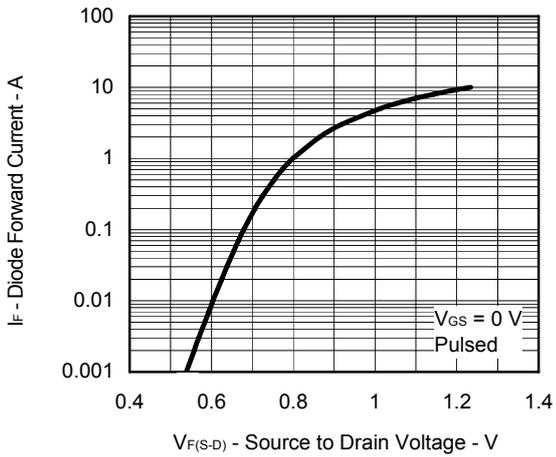
SWITCHING CHARACTERISTICS



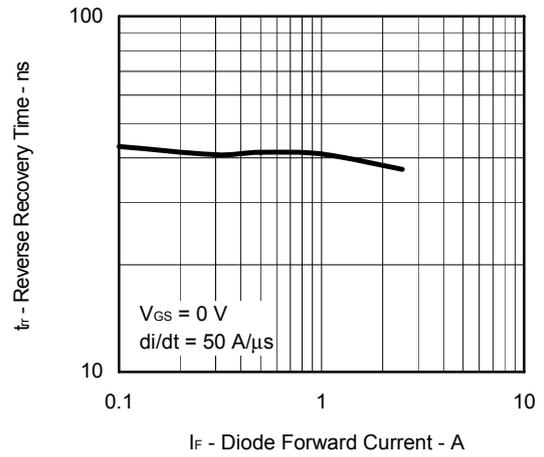
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



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