

To our customers,

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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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P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The 2SJ648 is a switching device which can be driven directly by a 2.5 V power source.

The 2SJ648 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

- 2.5 V drive available
- Low on-state resistance
 - $R_{DS(on)1} = 1.45 \Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -0.2 \text{ A)}$
 - $R_{DS(on)2} = 1.55 \Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -0.2 \text{ A)}$
 - $R_{DS(on)3} = 2.98 \Omega \text{ MAX. (} V_{GS} = -2.5 \text{ V, } I_D = -0.15 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SJ648	SC-75 (USM)

Marking: H1

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	-20	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 12	V
Drain Current (DC)	$I_{D(DC)}$	± 0.4	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 1.6	A
Total Power Dissipation ^{Note2}	P_T	200	mW
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

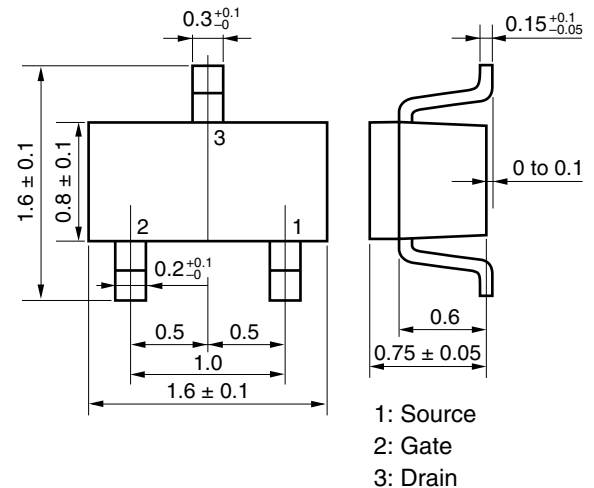
- Notes**
1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$
 2. Mounted on ceramic substrate of $300 \text{ mm}^2 \times 0.64 \text{ mm}$.

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.

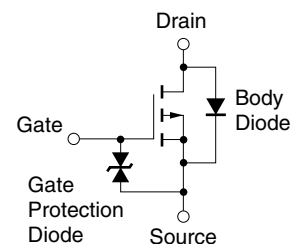
Caution This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge.
 $V_{ESD} = \pm 100 \text{ V TYP. (} C = 200 \text{ pF, } R = 0 \Omega, \text{ Single pulse)}$

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★ PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

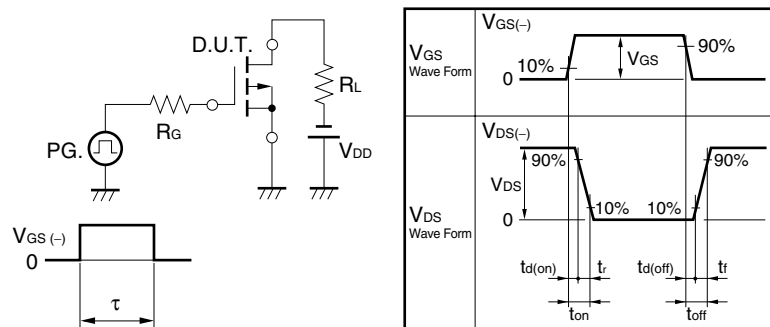


ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -20 V, V _{GS} = 0 V			-1.0	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1.0 mA	-0.8	-1.3	-1.8	V
Forward Transfer Admittance Note	y _{fs}	V _{DS} = -10 V, I _D = -0.2 A	0.2	0.6		S
Drain to Source On-state Resistance Note	R _{DS(on)1}	V _{GS} = -4.5 V, I _D = -0.2 A		1.17	1.45	Ω
	R _{DS(on)2}	V _{GS} = -4.0 V, I _D = -0.2 A		1.25	1.55	Ω
	R _{DS(on)3}	V _{GS} = -2.5 V, I _D = -0.15 A		2.25	2.98	Ω
Input Capacitance	C _{iss}	V _{DS} = -10 V		29		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		15		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		3.0		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10 V, I _D = -0.2 A		23		ns
Rise Time	t _r	V _{GS} = -4.0 V		39		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		50		ns
Fall Time	t _f			33		ns
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 0.4 A, V _{GS} = 0 V		0.93		V

Note Pulsed PW ≤ 350 μs, Duty Cycle ≤ 2%

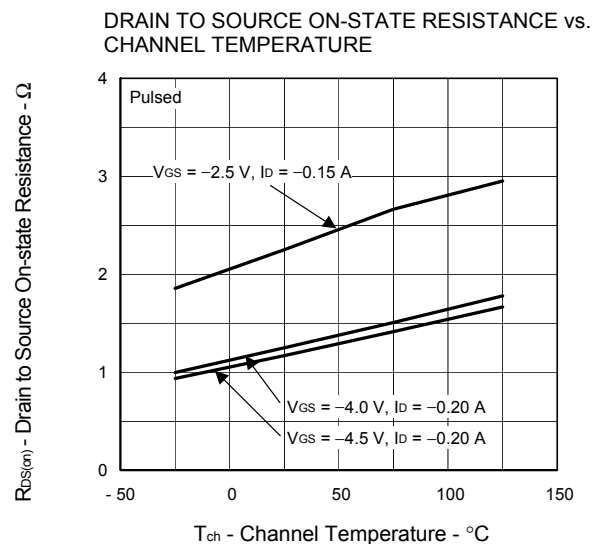
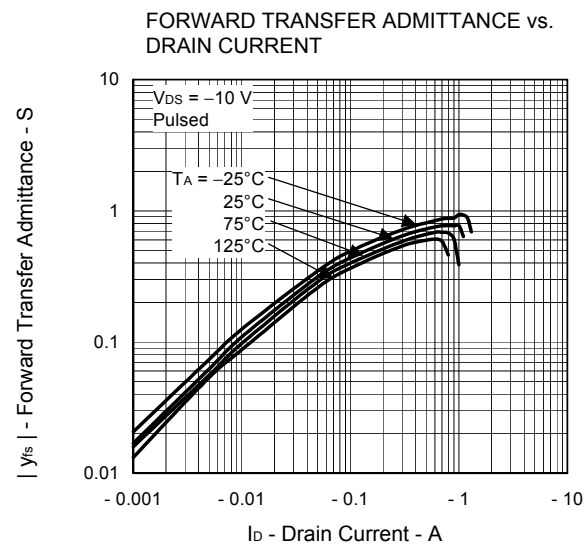
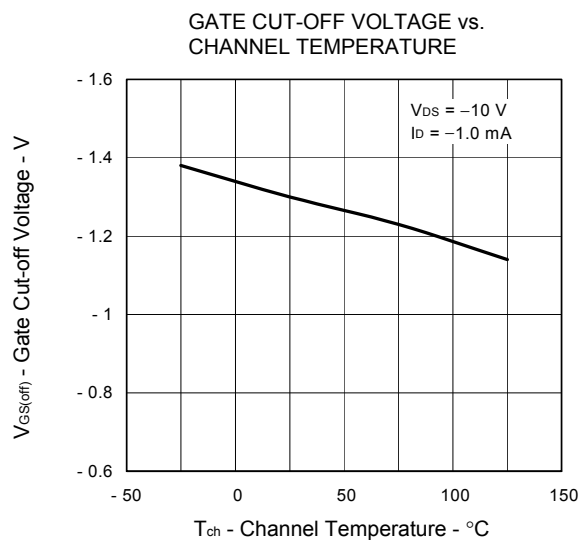
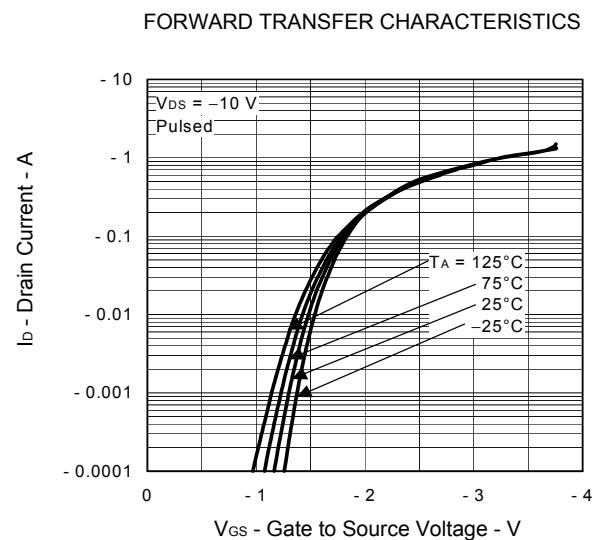
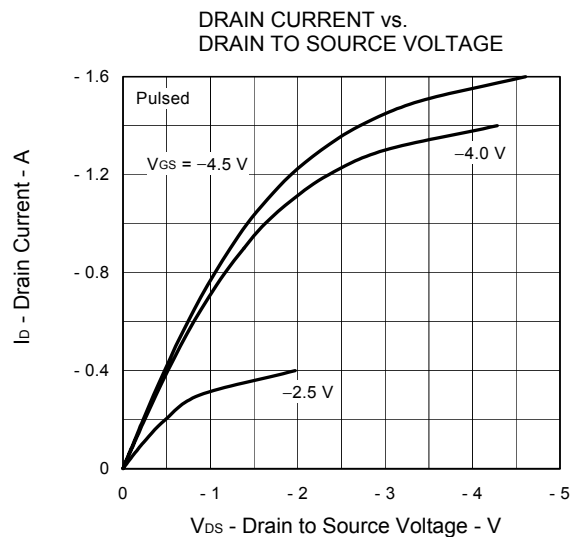
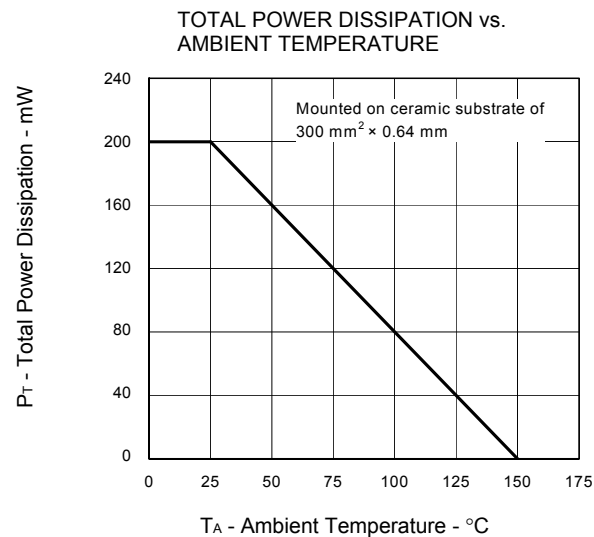
TEST CIRCUIT SWITCHING TIME



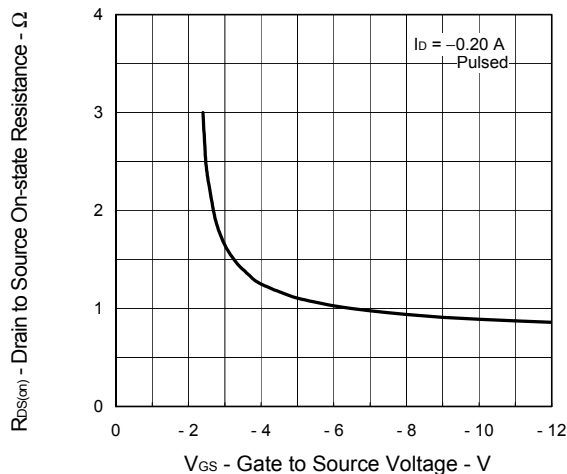
τ = 1 μs

Duty Cycle ≤ 1%

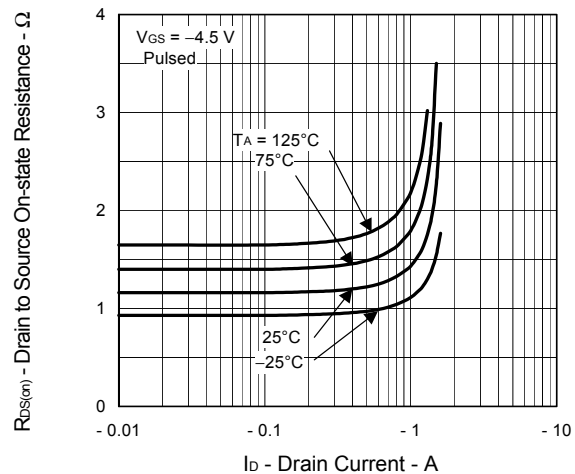
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



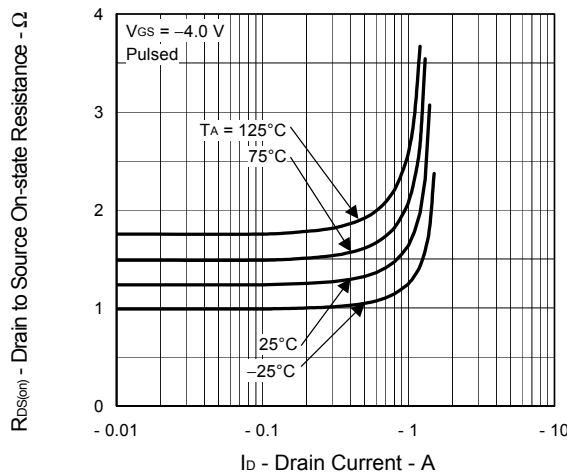
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



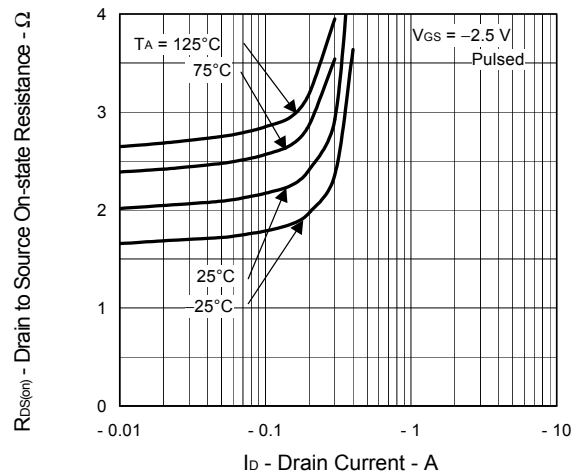
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



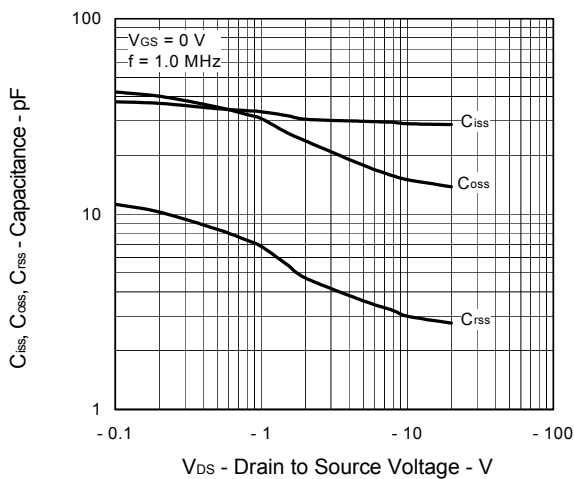
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



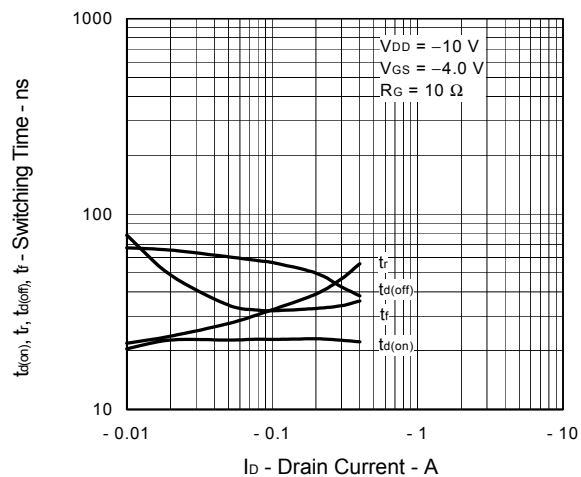
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT

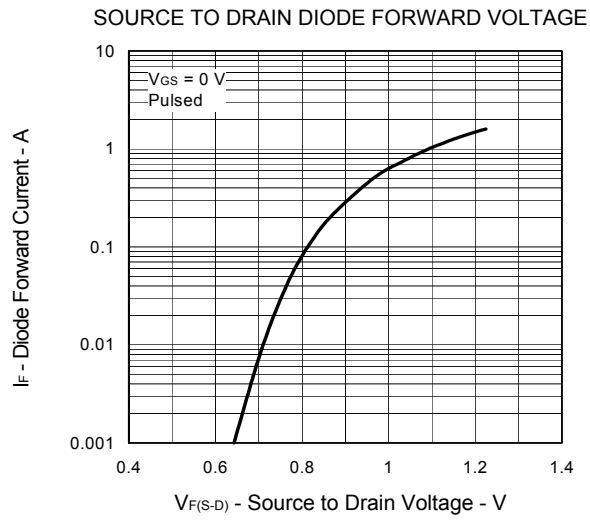


CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS





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