

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<sub>A</sub> = 25°C)

Drain to Source Voltage (V <sub>GS</sub> = 0 V)	V <sub>DSS</sub>	-20	V
Gate to Source Voltage (V <sub>DS</sub> = 0 V)	V <sub>GSS</sub>	±12	V
Drain Current (DC)	I <sub>D(DC)</sub>	±0.4	A
Drain Current (pulse) <sup>Note1</sup>	I <sub>D(pulse)</sub>	±1.6	A
Total Power Dissipation <sup>Note2</sup>	P <sub>T</sub>	200	mW
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

- Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%  
 2. Mounted on ceramic substrate of 300 mm<sup>2</sup> x 0.64 mm.

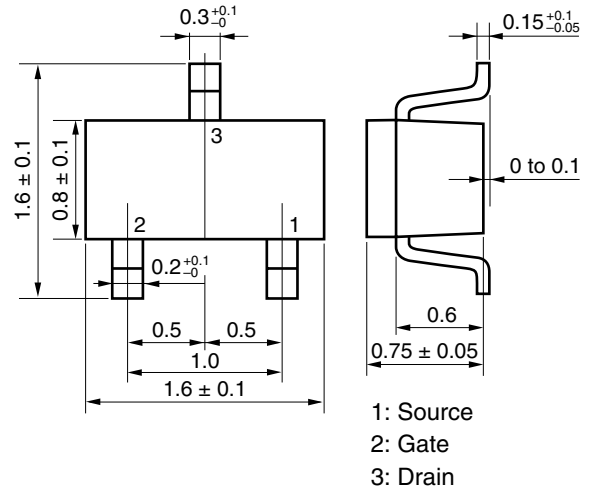
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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

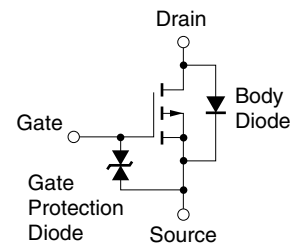
V<sub>ESD</sub> = ±100 V TYP. (C = 200 pF, R = 0 Ω, Single pulse)

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★ PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

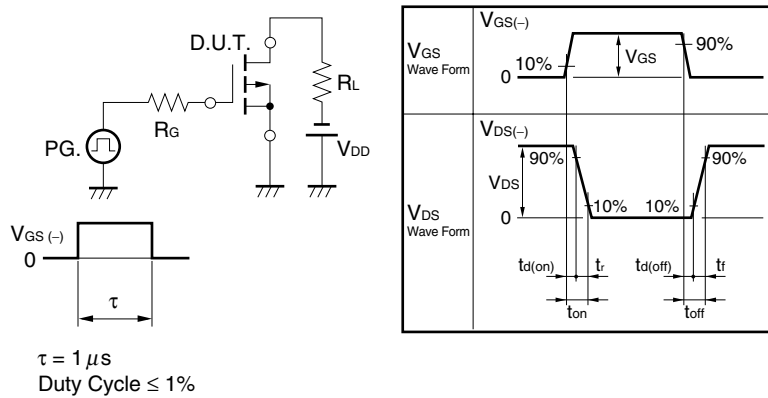


**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

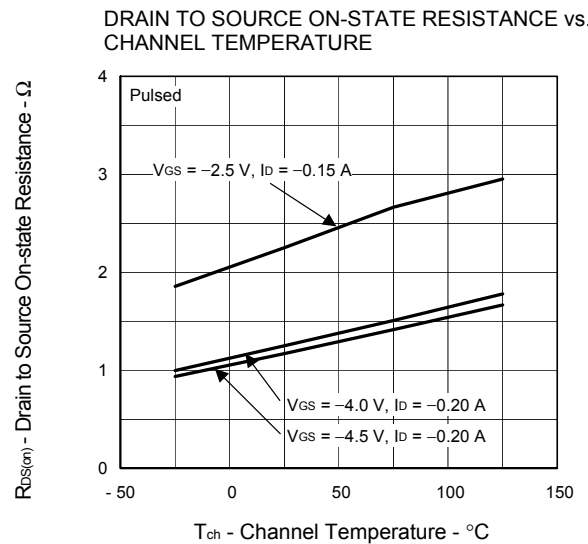
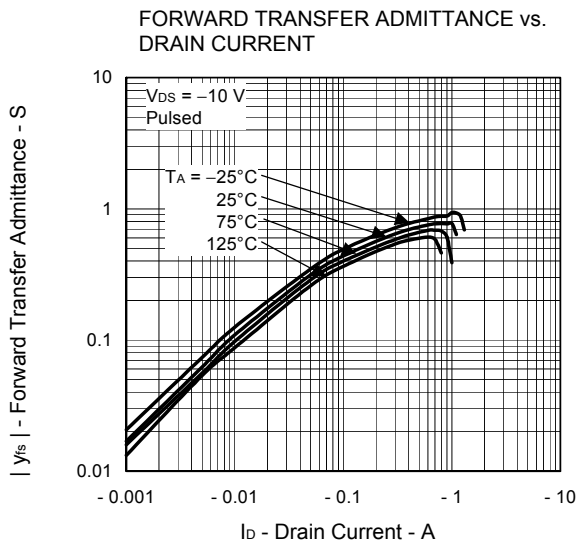
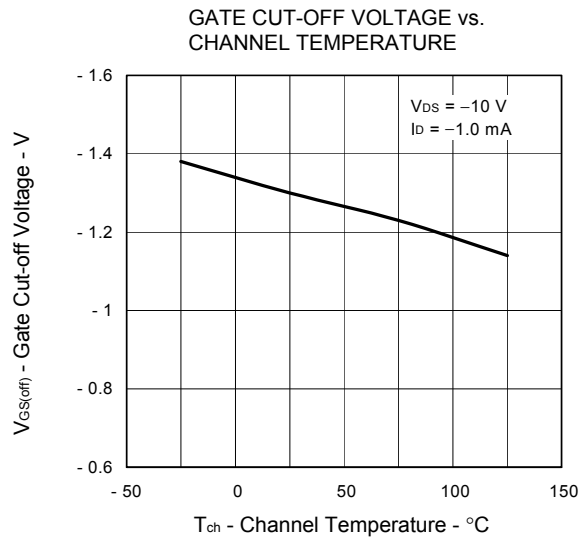
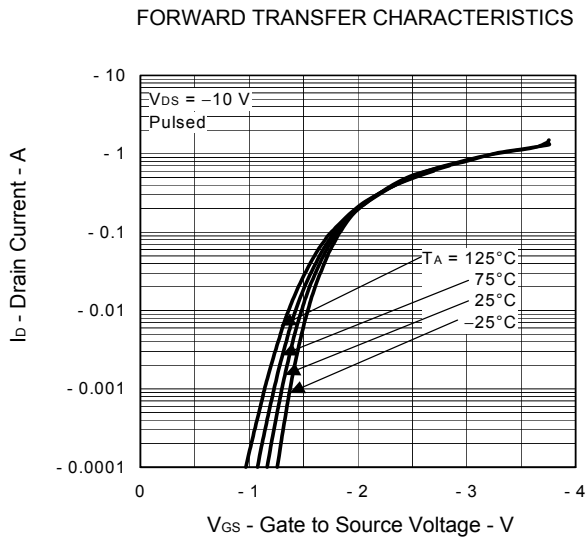
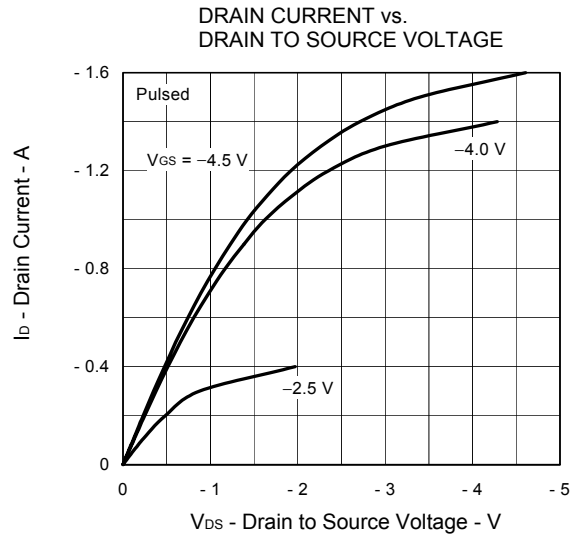
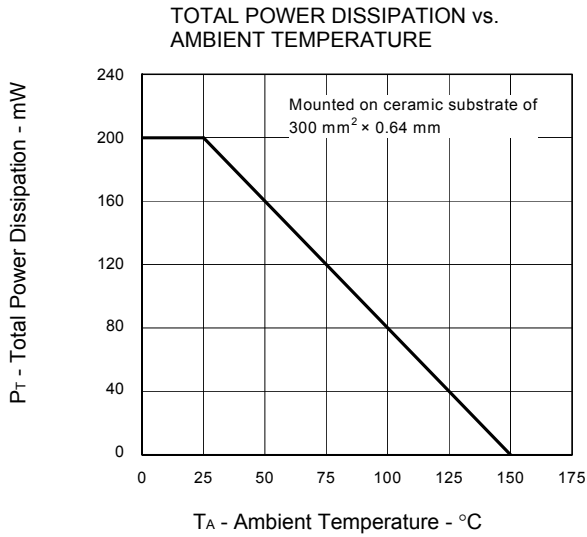
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-1.0	$\mu\text{A}$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \mp 12\text{ V}, V_{DS} = 0\text{ V}$			$\mp 10$	$\mu\text{A}$
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = -10\text{ V}, I_D = -1.0\text{ mA}$	-0.8	-1.3	-1.8	V
Forward Transfer Admittance <sup>Note</sup>	$ y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -0.2\text{ A}$	0.2	0.6		S
Drain to Source On-state Resistance <sup>Note</sup>	$R_{DS(on)1}$	$V_{GS} = -4.5\text{ V}, I_D = -0.2\text{ A}$		1.17	1.45	$\Omega$
	$R_{DS(on)2}$	$V_{GS} = -4.0\text{ V}, I_D = -0.2\text{ A}$		1.25	1.55	$\Omega$
	$R_{DS(on)3}$	$V_{GS} = -2.5\text{ V}, I_D = -0.15\text{ A}$		2.25	2.98	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = -10\text{ V}$		29		pF
Output Capacitance	$C_{oss}$	$V_{GS} = 0\text{ V}$		15		pF
Reverse Transfer Capacitance	$C_{rss}$	$f = 1\text{ MHz}$		3.0		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, I_D = -0.2\text{ A}$		23		ns
Rise Time	$t_r$	$V_{GS} = -4.0\text{ V}$		39		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		50		ns
Fall Time	$t_f$			33		ns
Body Diode Forward Voltage	$V_{F(S-D)}$	$I_F = 0.4\text{ A}, V_{GS} = 0\text{ V}$		0.93		V

**Note** Pulsed PW  $\leq 350\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$

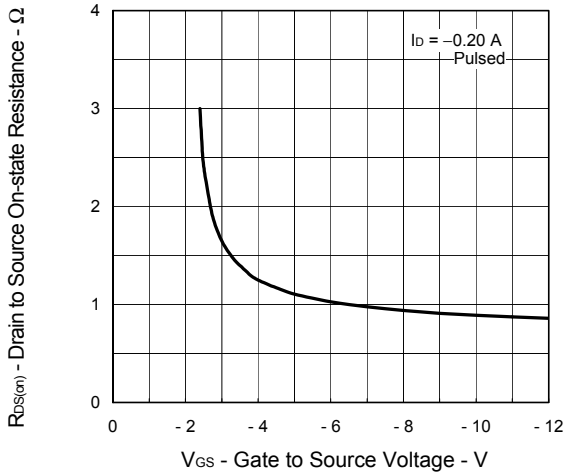
**TEST CIRCUIT SWITCHING TIME**



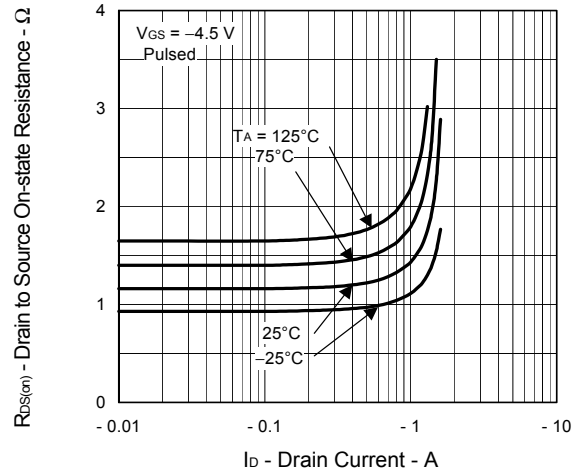
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



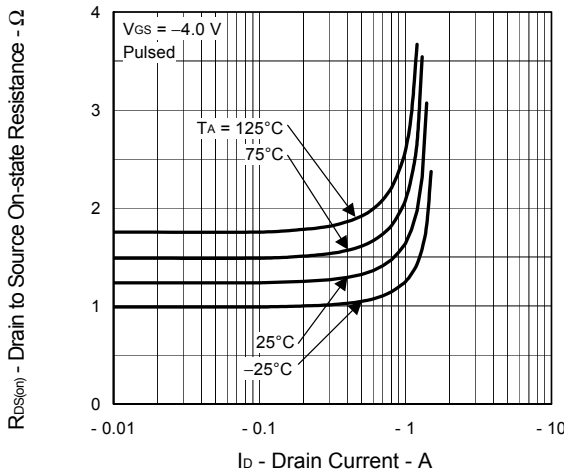
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



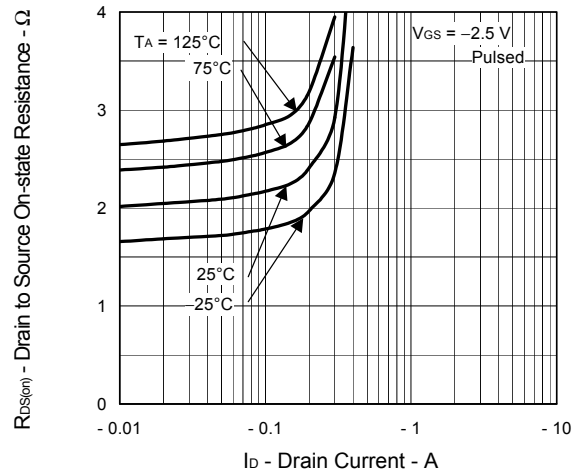
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



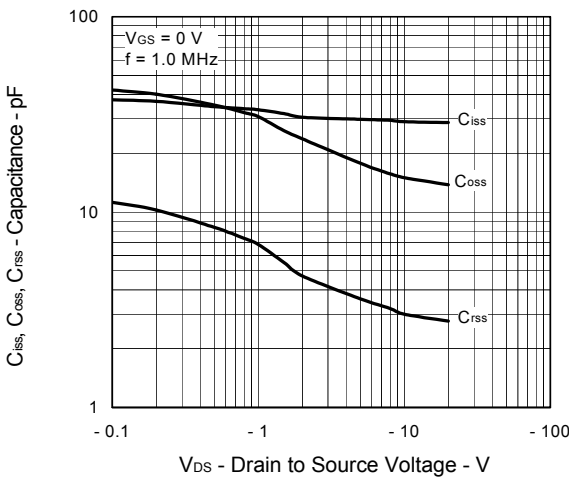
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



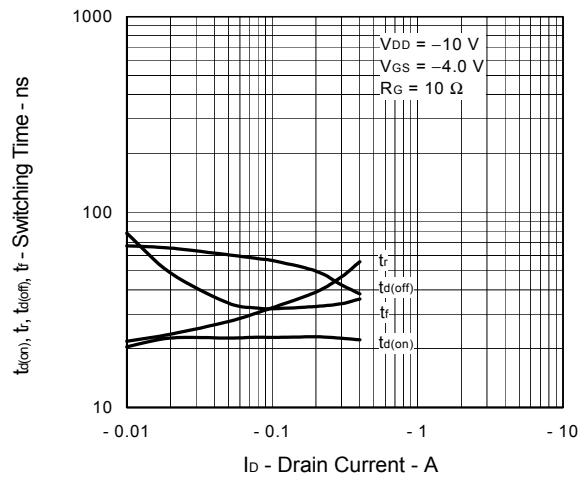
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

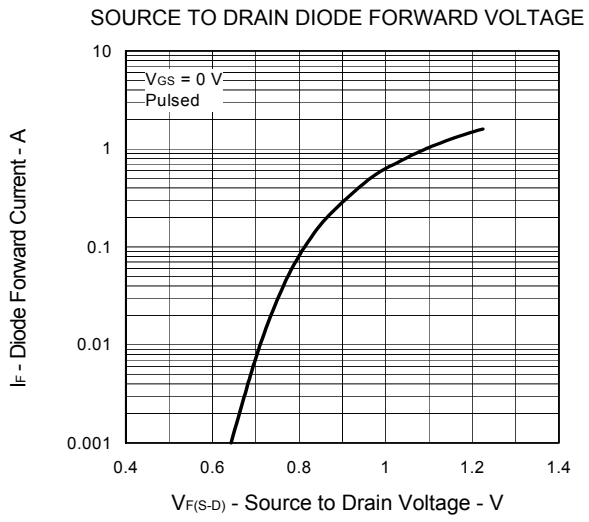


CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS





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