

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°C)

| | | | |
|---|-----------------------|-------------|----|
| Drain to Source Voltage (V _{GS} = 0 V) | V _{DSS} | -20 | V |
| Gate to Source Voltage (V _{DS} = 0 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 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |

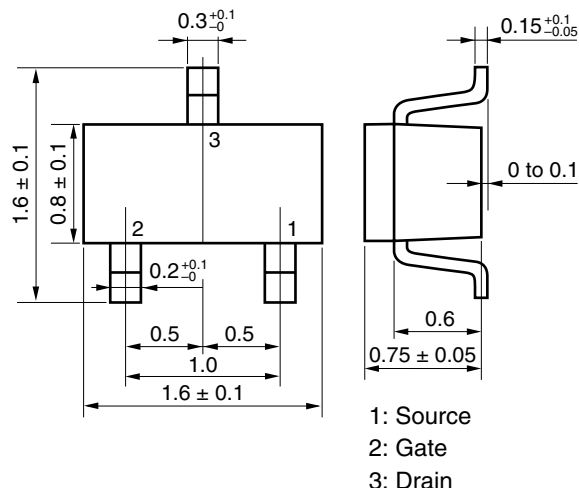
- Notes**
1. PW ≤ 10 μs, Duty Cycle ≤ 1%
 2. Mounted on ceramic substrate of 300 mm² x 0.64 mm.

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.

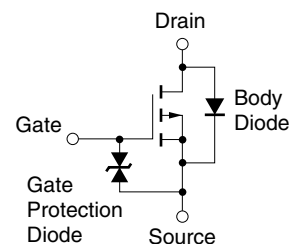
Caution This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge.
V_{ESD} = ±100 V TYP. (C = 200 pF, R = 0 Ω, Single pulse)

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★ PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

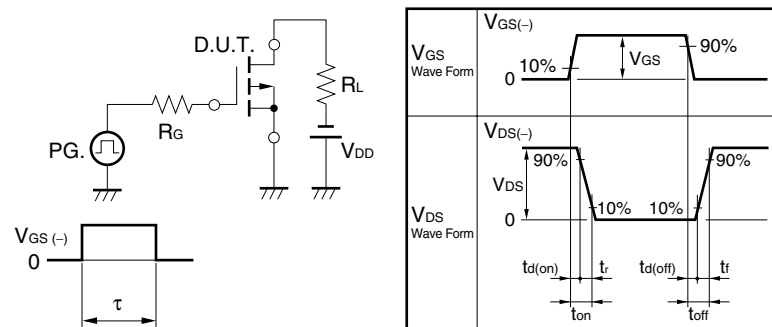


ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| 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%

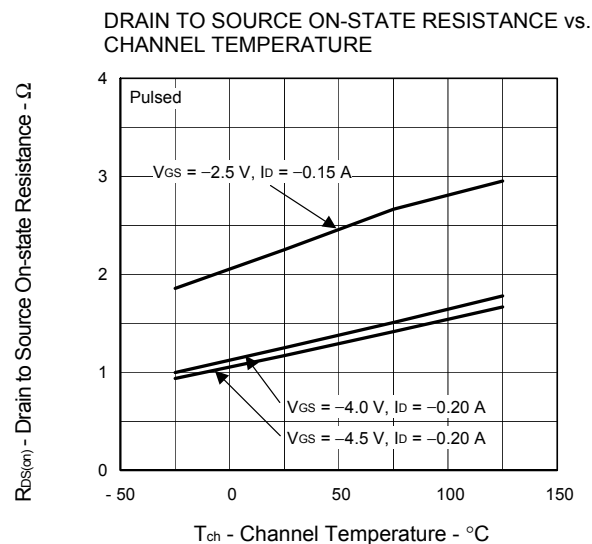
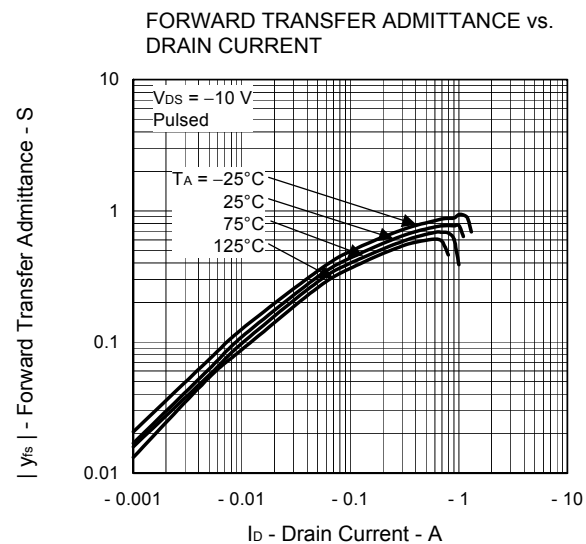
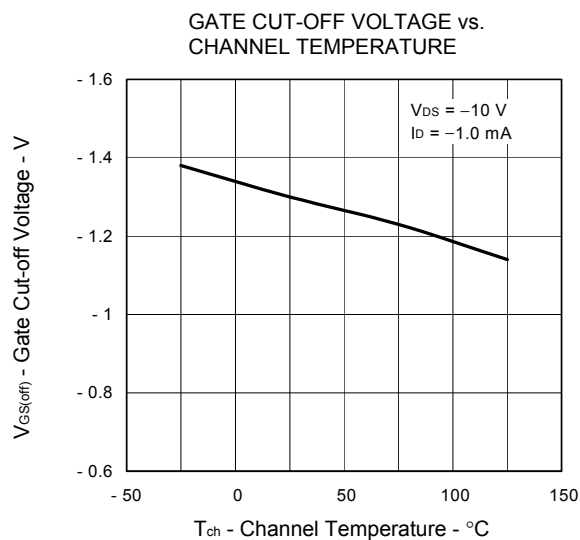
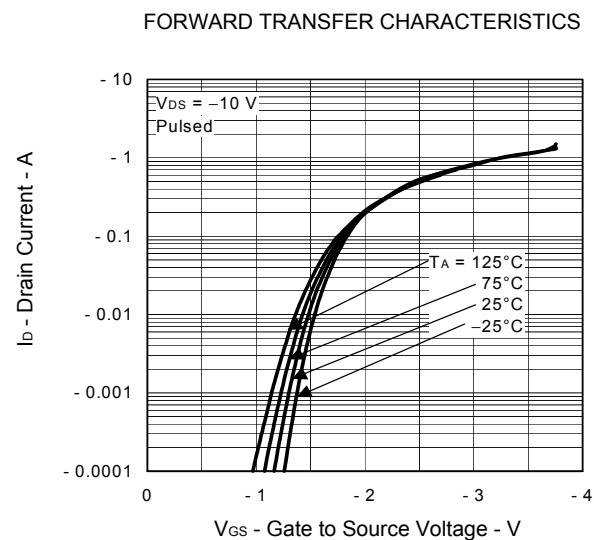
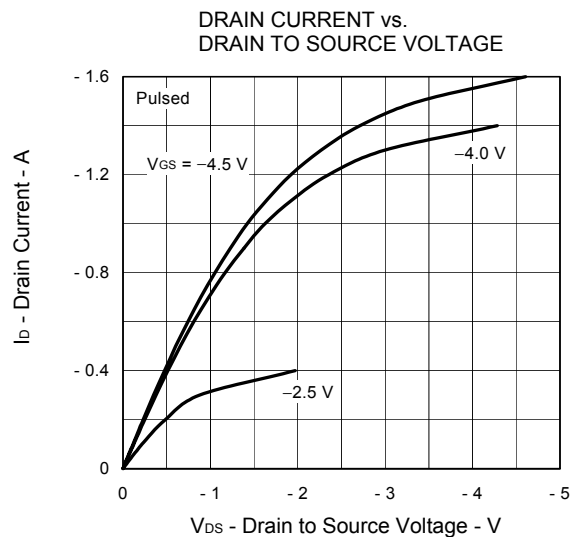
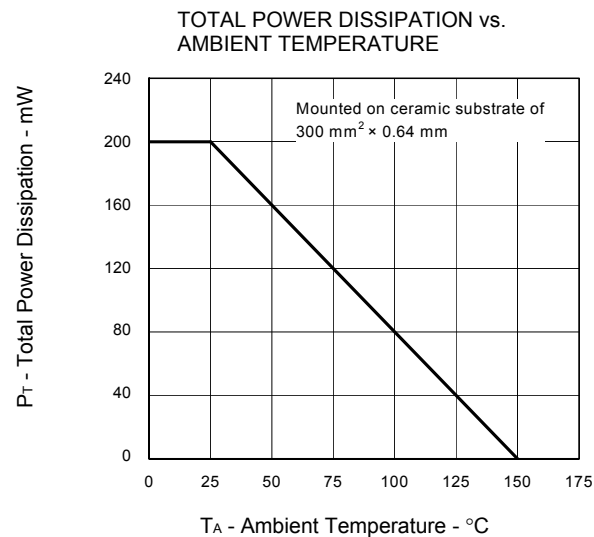
TEST CIRCUIT SWITCHING TIME



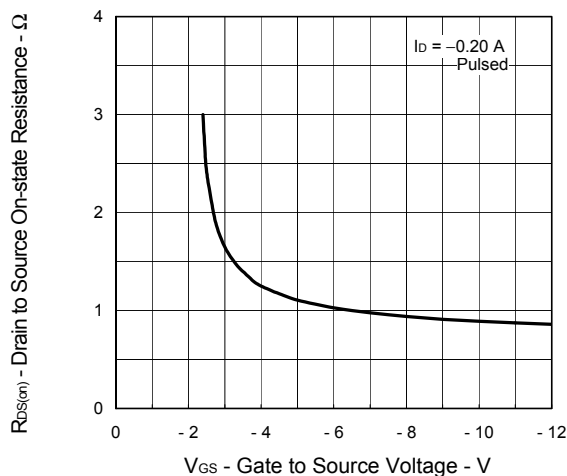
τ = 1 μs

Duty Cycle ≤ 1%

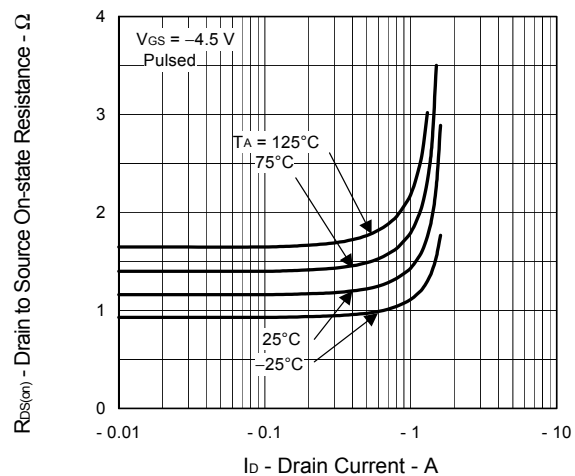
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



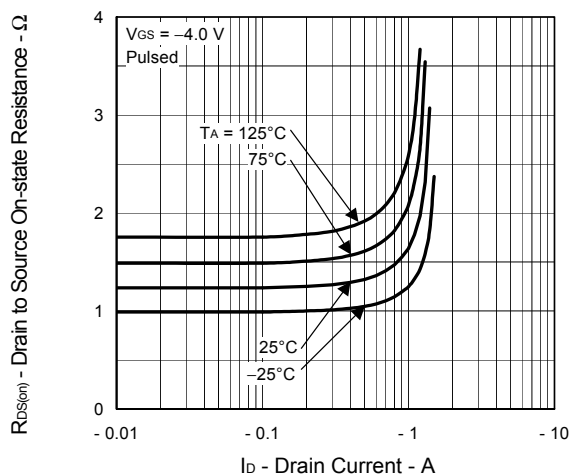
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



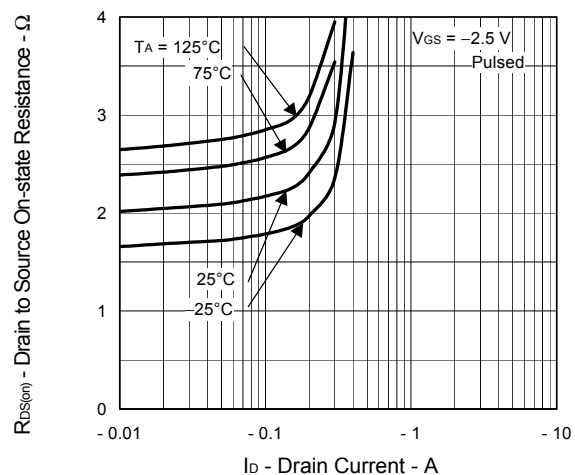
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



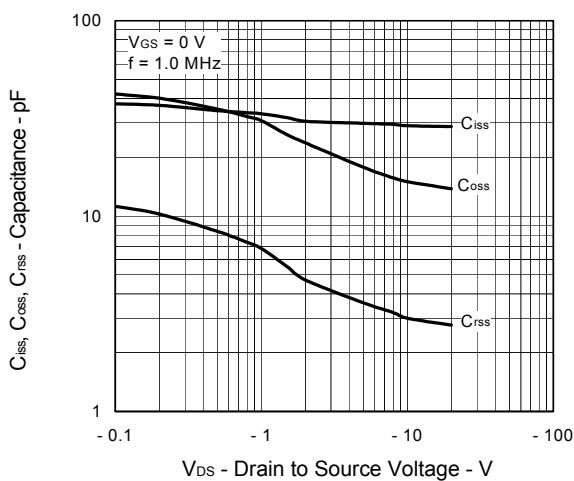
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



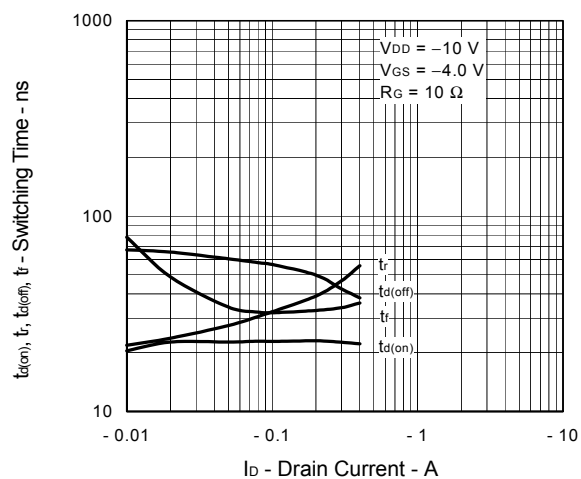
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT

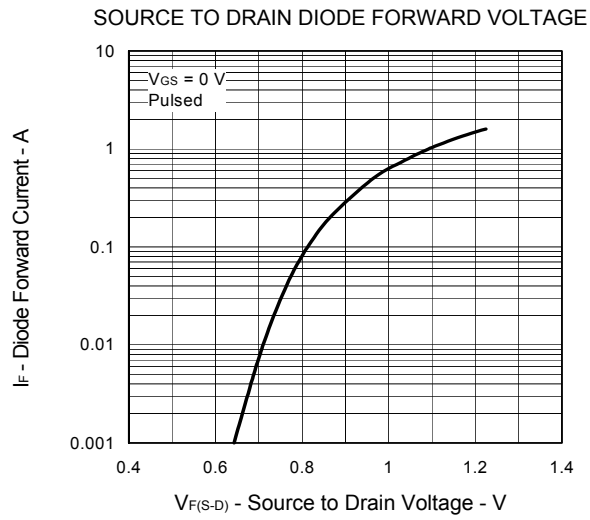


CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS





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