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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DESCRIPTION

The 2SJ687 is P-channel MOSFET device and a excellent switch that can be driven by a low power-supply voltage.

FEATURES

- Low on-state resistance
  \[ R_{DS(on)} = 7.0 \text{ m} \Omega \text{ MAX. (VGS} = -4.5 \text{ V, Id} = -10 \text{ A)} \]
  \[ R_{DS(on2)} = 9.0 \text{ m} \Omega \text{ MAX. (VGS} = -3.0 \text{ V, Id} = -10 \text{ A)} \]
  \[ R_{DS(on3)} = 20 \text{ m} \Omega \text{ MAX. (VGS} = -2.5 \text{ V, Id} = -10 \text{ A)} \]
- 2.5 V drive available
- Avalanche capability ratings

ORDERING INFORMATION

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<th>LEAD PLATING</th>
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<td>Tape 2500 p/reel</td>
<td>TO-252 (MP-3ZK) 0.27 g TYP.</td>
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<td>2SJ687-ZK-E2-AY</td>
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Note Pb-free (This product does not contain Pb in external electrode.)

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

- Drain to Source Voltage (VGS = 0 V) \( V_{GSS} \)
- Gate to Source Voltage (VDS = 0 V) \( V_{GSS} \)
- Drain Current (DC) (TC = 25°C) \( I_{D(DC)} \)
- Drain Current (pulse) \( I_{D(pulse)} \) \(^{Note1}\)
- Total Power Dissipation (TC = 25°C) \( P_{T1} \)
- Total Power Dissipation (TA = 25°C) \( P_{T2} \)
- Channel Temperature \( T_{ch} \)
- Storage Temperature \( T_{stg} \)
- Single Avalanche Current \( I_{AS} \) \(^{Note2}\)
- Single Avalanche Energy \( E_{AS} \) \(^{Note2}\)

Notes

1. PW \( \leq 10 \mu s \), Duty Cycle \( \leq 1\% \)
2. Starting \( T_{ch} = 25^\circ C \), \( V_{dd} = -10 \text{ V}, R_{g} = 25 \text{ } \Omega, V_{GS} = -12 \rightarrow 0 \text{ V} \)

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The mark <R> shows major revised points.
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ELECTRICAL CHARACTERISTICS (TA = 25°C)

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<td>1.5</td>
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<tr>
<td>Reverse Recovery Time</td>
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<td></td>
</tr>
<tr>
<td>Reverse Recovery Charge</td>
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<td>nC</td>
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Note  Pulsed

TEST CIRCUIT 1 AVALANCHE CAPABILITY

TEST CIRCUIT 2 SWITCHING TIME

TEST CIRCUIT 3 GATE CHARGE
TYPICAL CHARACTERISTICS (TA = 25°C)

DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA

TOTAL POWER DISSIPATION vs. CASE TEMPERATURE

FORWARD BIAS SAFE OPERATING AREA

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH
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

Data Sheet D18719EJ2V0DS
SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD

- $I_{AS} = -20\, A$
- $E_{AS} = 40\, mJ$
- Starting $T_{ch} = 25^\circ C$
- $V_{DD} = -10\, V$
- $R_G = 25\, \Omega$
- $V_{GS} = -12 \rightarrow 0\, V$

SINGLE AVALANCHE ENERGY DERATING FACTOR

- $V_{DD} = -10\, V$
- $R_G = 25\, \Omega$
- $V_{GS} = -12 \rightarrow 0\, V$
- $I_{AS} \leq -20\, A$

Starting $T_{ch}$ - Starting Channel Temperature - °C

Energy Derating Factor - %
PACKAGE DRAWING (Unit: mm)

TO-252 (MP-3ZK)

EQUIVALENT CIRCUIT

Remark: Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.
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