μPA2631T1R

P-CHANNEL MOSFET
–20 V, –8.0 A, 32 mΩ

R07DS0991EJ0100
Rev.1.00
Dec 27, 2012

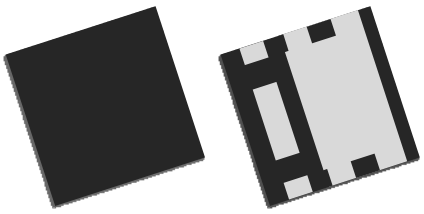
Description

The μPA2631T1R is P-channel MOS Field Effect Transistors for switching application.

This device 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

- –1.8V drive available
- Low on-state resistance
  - $R_{DS(on)1}$ = 32 mΩ MAX. (V_{GS} = –4.5 V, I_D = –3.0 A)
  - $R_{DS(on)2}$ = 41 mΩ MAX. (V_{GS} = –2.5 V, I_D = –3.0 A)
  - $R_{DS(on)3}$ = 62 mΩ MAX. (V_{GS} = –1.8 V, I_D = –3.0 A)
- Built-in gate protection diode
- Lead-free and Halogen-free



6pinHUSON2020

Ordering Information

Part Number	Package
μPA2631T1R-E2-AX*1	6pinHUSON2020

Note: ∗1.Pb-free (This product does not contain Pb in the external electrode and other parts.)

Absolute Maximum Ratings (T_A = 25°C)

Item	Symbol	Ratings	Unit
Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	–20	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	∓8	V
Drain Current (DC)	$I_{D(DC)}$	∓6.0	A
Drain Current (pulse) *1	$I_{D(pulse)}$	∓24	A
Total Power Dissipation (5 s) *2	P_T	2.5	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{STG}	–55 to +150	°C

Notes: ∗1. PW≤10 μs, Duty Cycle≤1%

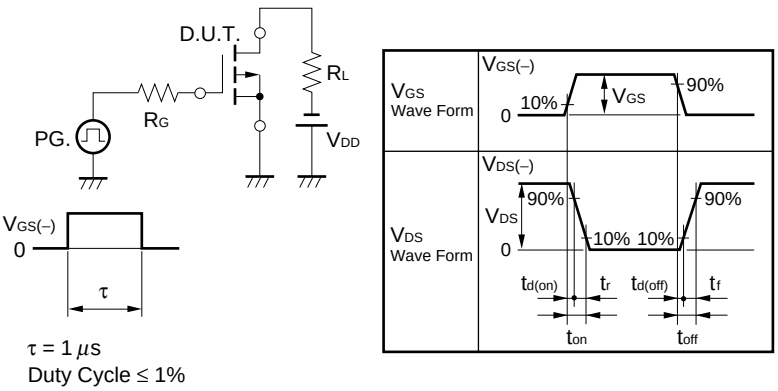
∗2. Mounted on glass epoxy board of 25.4mm x 25.4mm x 0.8mmt

Electrical Characteristics (T_A = 25°C)

Characteristics	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I_{DSS}			–1.0	μA	V_{DS} = –20 V, V_{GS} = 0 V
Gate Leakage Current	I_{GSS}			∓10	μA	V_{GS} = ∓8 V, V_{DS} = 0 V
Gate Cut-off Voltage	$V_{GS(off)}$	–0.4		–1.1	V	V_{DS} = –10 V, I_D = –1 mA
Forward Transfer Admittance *1	$\lvert y_{fs} \rvert$	8.0			S	V_{DS} = –5 V, I_D = –3.0 A
Drain to Source On-state Resistance *1	$R_{DS(on)1}$		23.7	32	mΩ	V_{GS} = –4.5 V, I_D = –3.0 A
	$R_{DS(on)2}$		29.0	41	mΩ	V_{GS} = –2.5 V, I_D = –3.0 A
	$R_{DS(on)3}$		37.9	62	mΩ	V_{GS} = –1.8 V, I_D = –3.0 A
Input Capacitance	C_{iss}		1240		pF	V_{DS} = –10 V, V_{GS} = 0 V, f = 1.0 MHz
Output Capacitance	C_{oss}		238		pF	
Reverse Transfer Capacitance	C_{rss}		184		pF	
Turn-on Delay Time	$t_{d(on)}$		9.5		ns	I_D = –3.0 A, V_{DD} = –10.0 V, V_{GS} = –4.0 V, R_G = 6 Ω
Rise Time	t_r		5.5		ns	
Turn-off Delay Time	$t_{d(off)}$		89		ns	
Fall Time	t_f		76		ns	
Total Gate Charge	Q_G		12.5		nC	I_D = –6.0 A , V_{DD} = –16 V, V_{GS} = –4.5 V
Gate to Source Charge	Q_{GS}		1.7		nC	
Gate to Drain Charge	Q_{GD}		4.0		nC	
Body Diode Forward Voltage *1	$V_{F(S-D)}$			1.5	V	I_F = 6.0 A, V_{GS} = 0 V

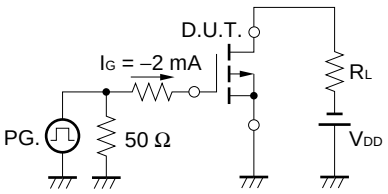
Note: ∗1. Pulsed

TEST CIRCUIT 1 SWITCHING TIME



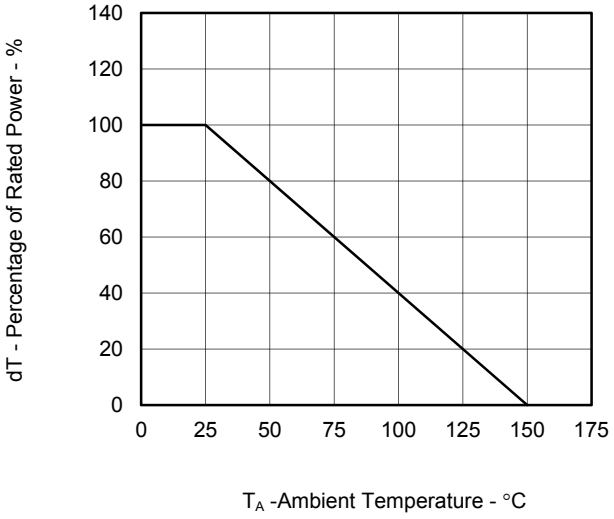
τ = 1 μs
Duty Cycle ≤ 1%

TEST CIRCUIT 2 GATE CHARGE

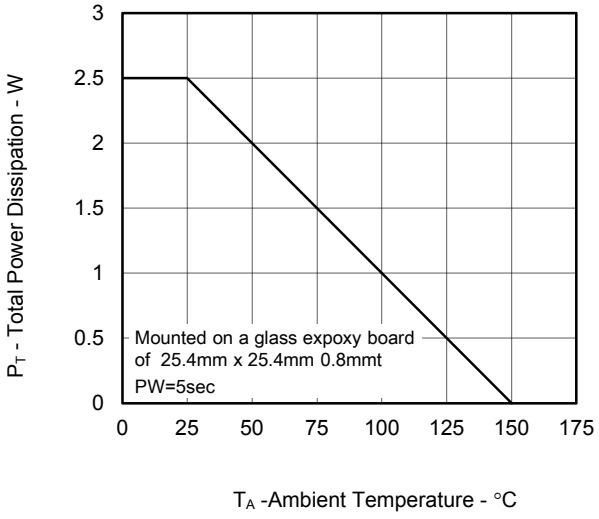


Typical Characteristics (T_A = 25°C)

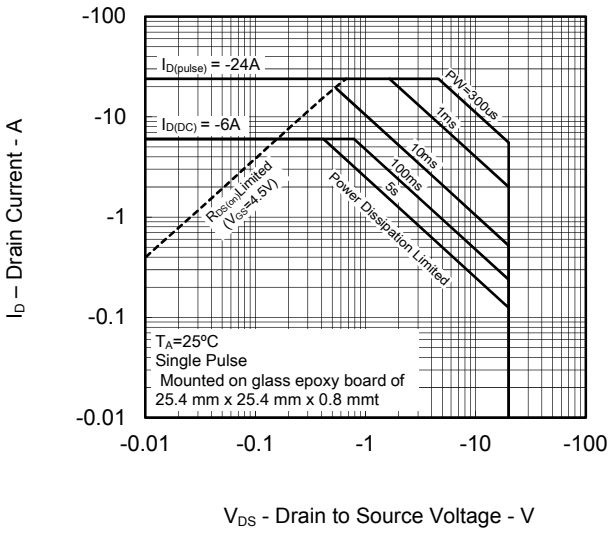
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



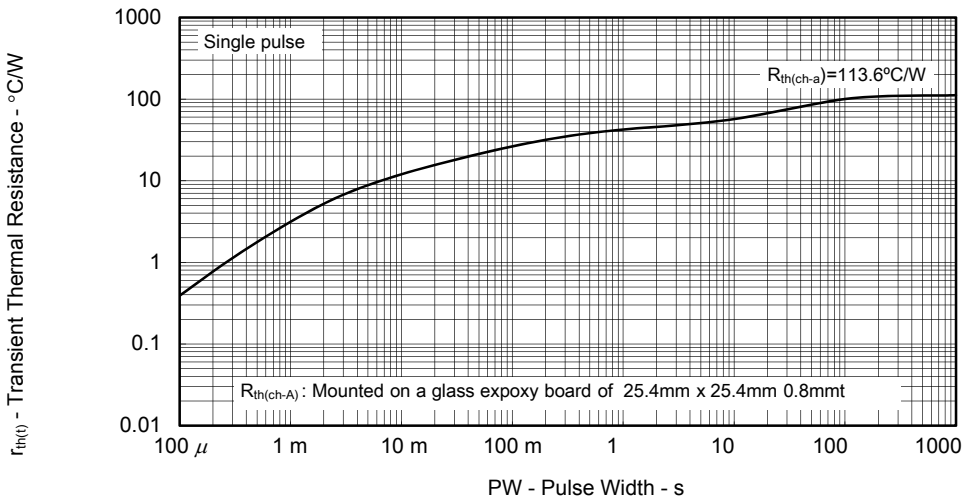
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



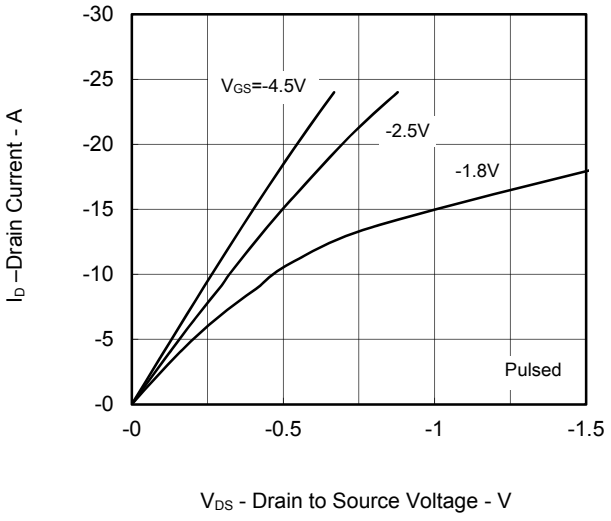
FORWARD BIAS SAFE OPERATING AREA



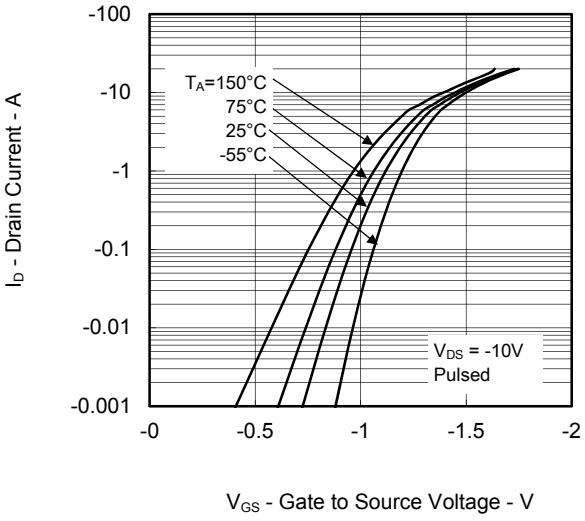
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



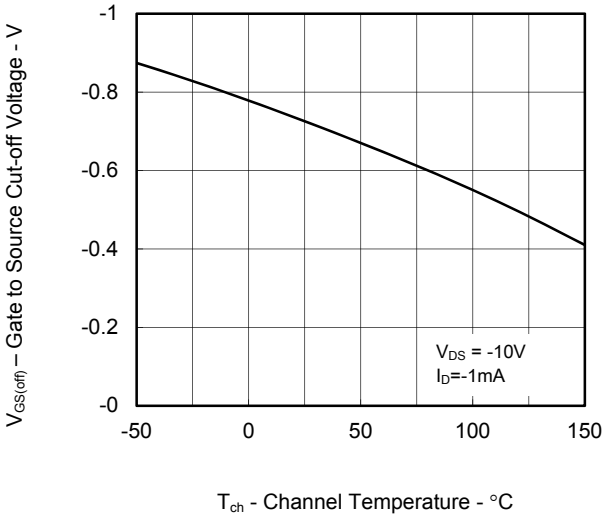
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



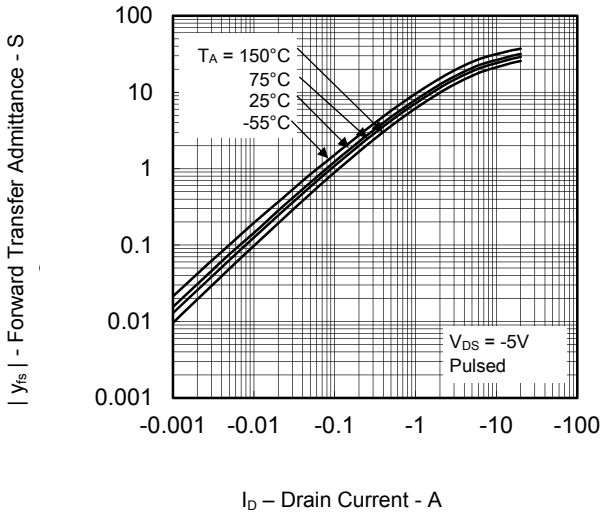
FORWARD TRANSFER CHARACTERISTICS



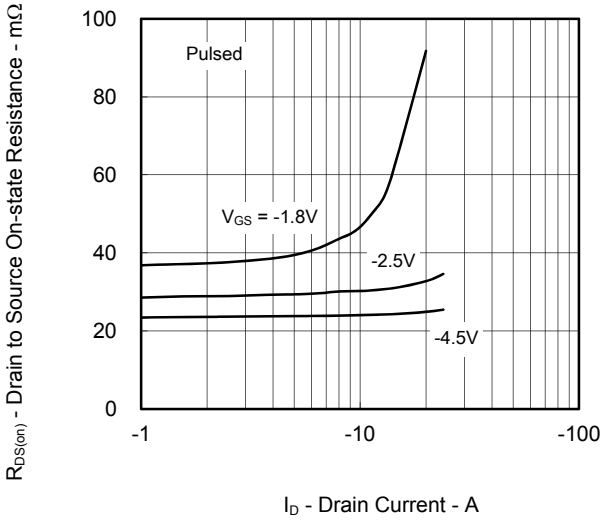
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



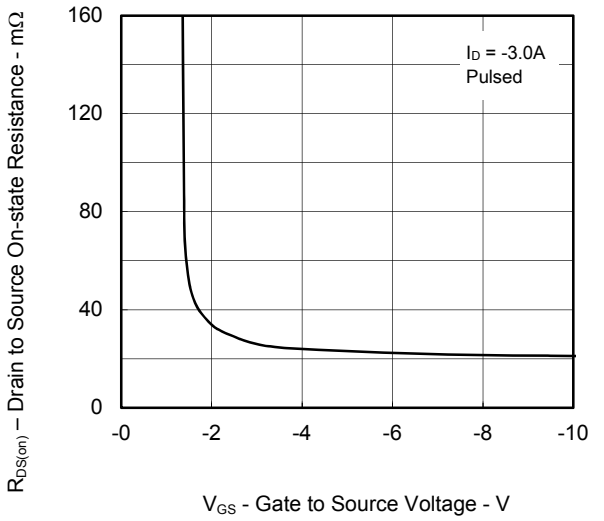
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



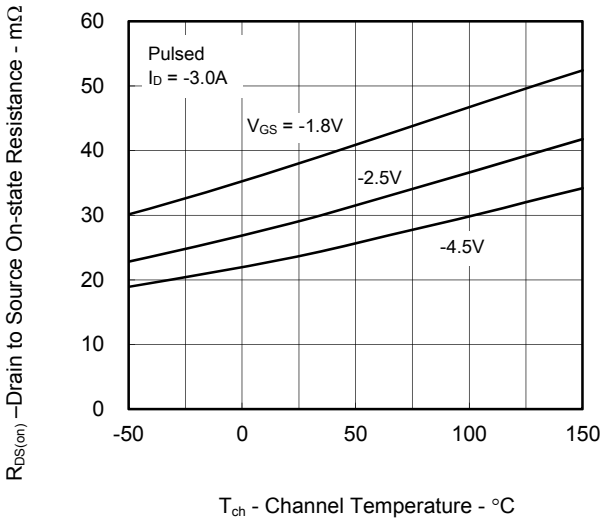
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



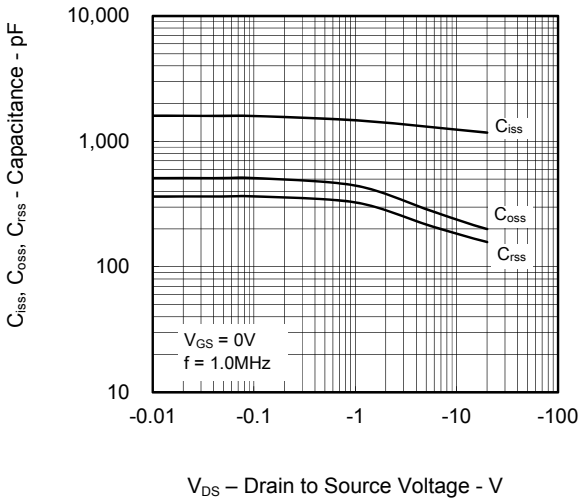
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



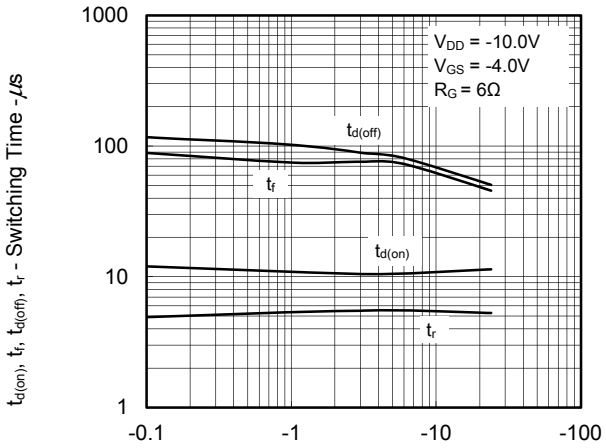
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



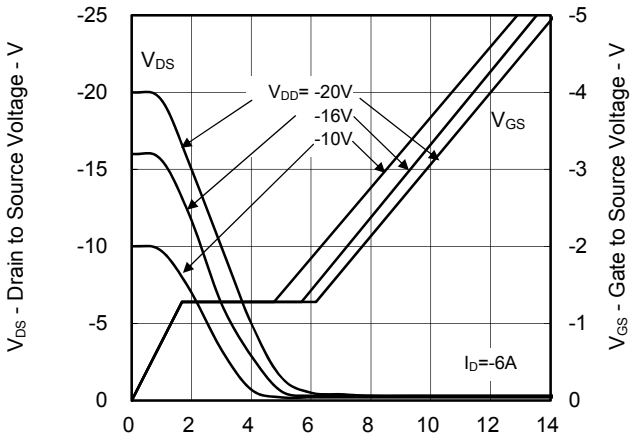
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



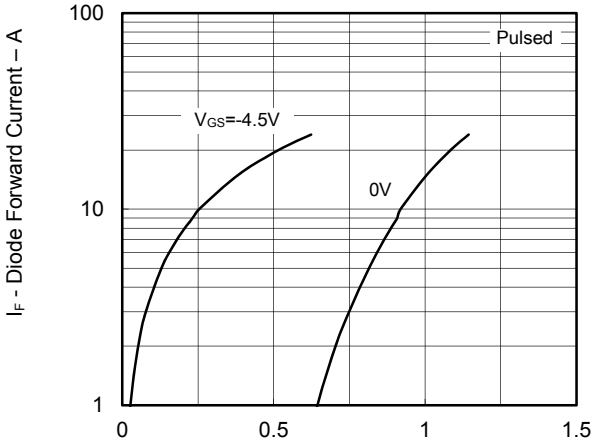
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



Package Drawings (Unit: mm)

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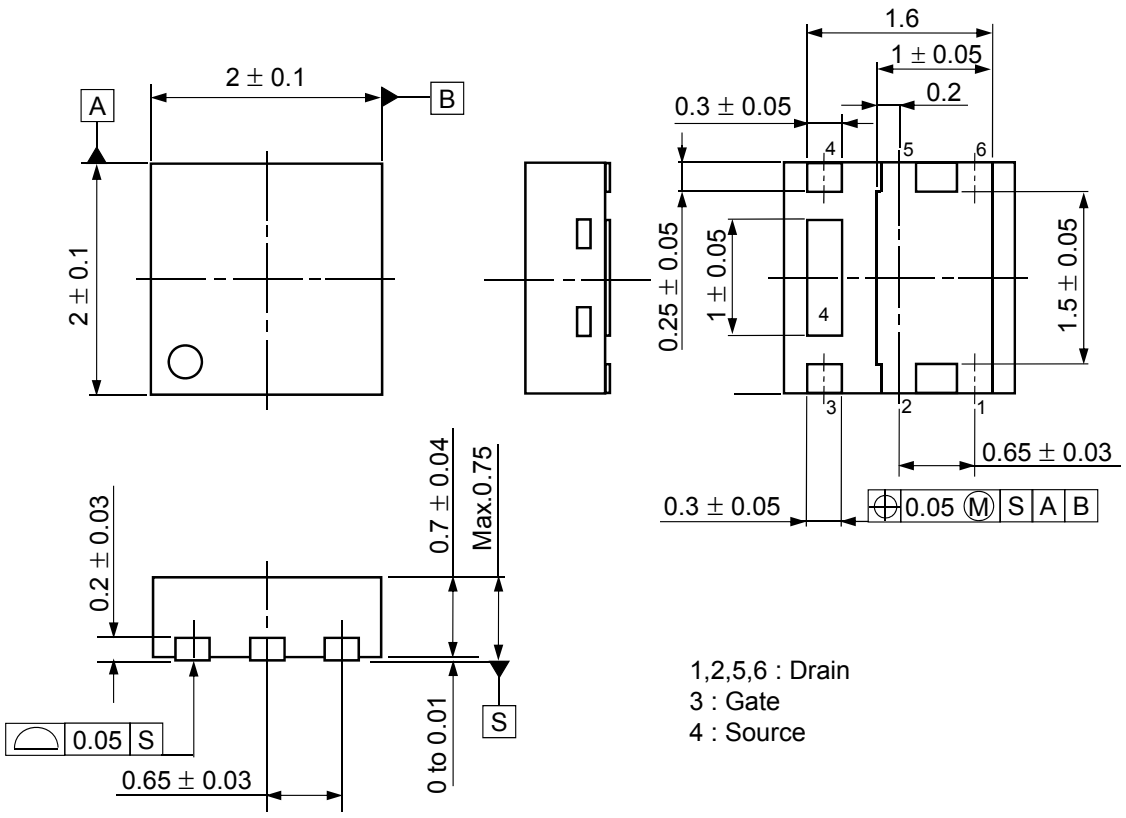
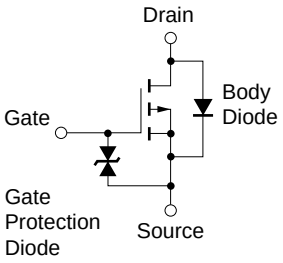


RENESAS Package code : PWSN0006JD-B

Equivalent Circuit



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.

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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