μPA2600T1R

N-CHANNEL MOSFET
20 V, 7.0 A, 13.8 mΩ

R07DS0998EJ0101
Rev.1.01
Sep 04, 2013

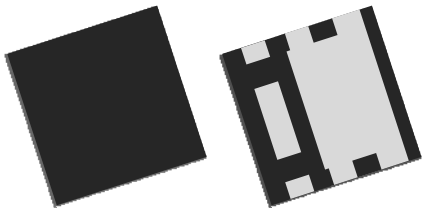
Description

The μPA2600T1R is N-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

- High Drain to Source Voltage
  - V_{DSS} = 20 V (V_{GS} = 0 V, T_A = 25°C)
- 2.5V drive available
- Low on-state resistance
  - $R_{DS(on)1}$ = 13.8 mΩ MAX. (V_{GS} = 4.5 V, I_D = 3.5 A)
  - $R_{DS(on)2}$ = 19.1 mΩ MAX. (V_{GS} = 2.5 V, I_D = 3.5 A)
- Built-in gate protection diode
- Lead-free and Halogen-free



6pinHUSON2020

Ordering Information

Part Number	Package
μPA2600T1R-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}	±12	V
Drain Current (DC) (T_C = 25 °C)	$I_{D(DC)}$	±7.0	A
Drain Current (pulse) *1	$I_{D(pulse)}$	±28	A
Total Power Dissipation (5 s) *2	P_T	2.4	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

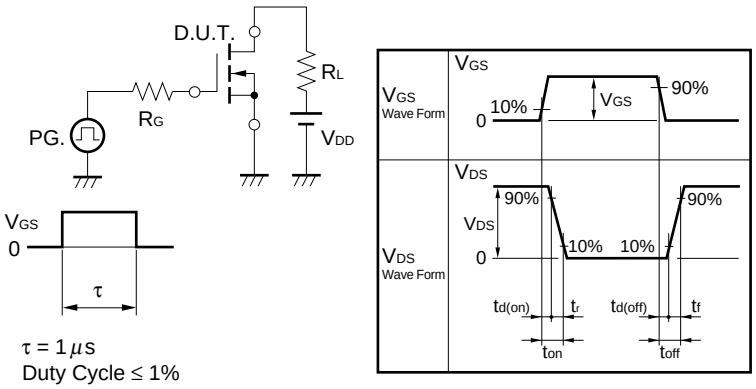
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Electrical Characteristics (T_A = 25°C)

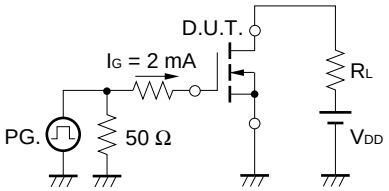
Characteristics	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I_{DSS}			1.0	μA	V_{DS} = 20 V, V_{GS} = 0 V
Gate Leakage Current	I_{GSS}			±10	μA	V_{GS} =±10 V, V_{DS} = 0 V
Gate Cut-off Voltage	$V_{GS(off)}$	0.5		1.5	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance *1	$\|y_{fs}\|$	6.5			S	V_{DS} = 5V, I_D = 3.5 A
Drain to Source On-state Resistance *1	$R_{DS(on)1}$		11.1	13.8	mΩ	V_{GS} = 4.5 V, I_D = 3.5 A
	$R_{DS(on)2}$		14.4	19.1	mΩ	V_{GS} = 2.5 V, I_D = 3.5 A
Input Capacitance	C_{iss}		870		pF	V_{DS} = 10 V, V_{GS} = 0 V, f = 1.0 MHz
Output Capacitance	C_{oss}		170		pF	
Reverse Transfer Capacitance	C_{rss}		110		pF	
Turn-on Delay Time	$t_{d(on)}$		12		ns	I_D = 3.5 A, V_{DD} = 10 V, V_{GS} = 4 V, R_G = 6 Ω
Rise Time	t_r		10		ns	
Turn-off Delay Time	$t_{d(off)}$		42		ns	
Fall Time	t_f		9		ns	
Total Gate Charge	Q_G		7.9		nC	I_D = 7.0 A , V_{DD} = 16 V, V_{GS} = 10 V
Gate to Source Charge	Q_{GS}		1.7		nC	
Gate to Drain Charge	Q_{GD}		2.8		nC	
Body Diode Forward Voltage *1	$V_{F(S-D)}$			1.5	V	I_F = 7.0 A, V_{GS} = 0 V

Note: ∗1. Pulsed

TEST CIRCUIT 1 SWITCHING TIME



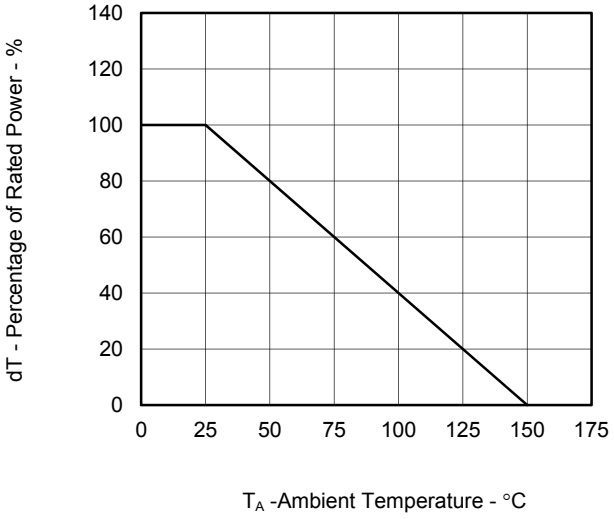
TEST CIRCUIT 2 GATE CHARGE



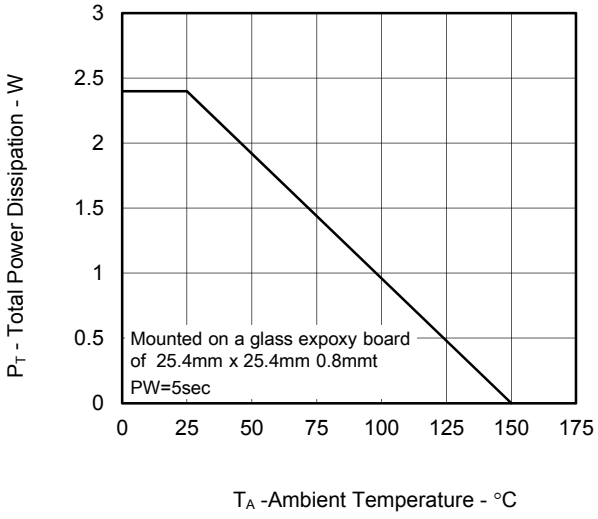
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Typical Characteristics (T_A = 25°C)

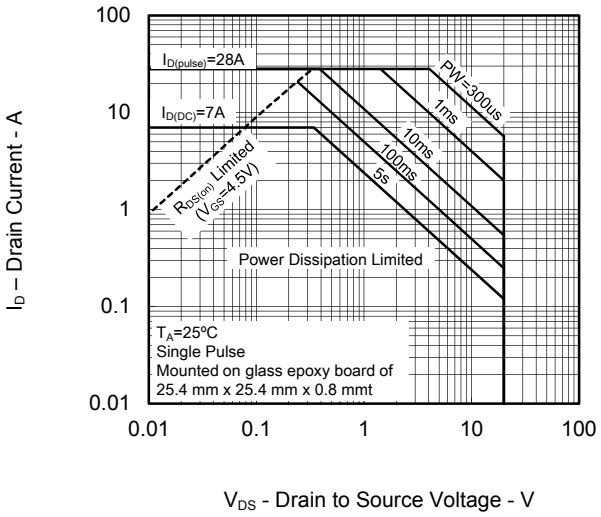
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



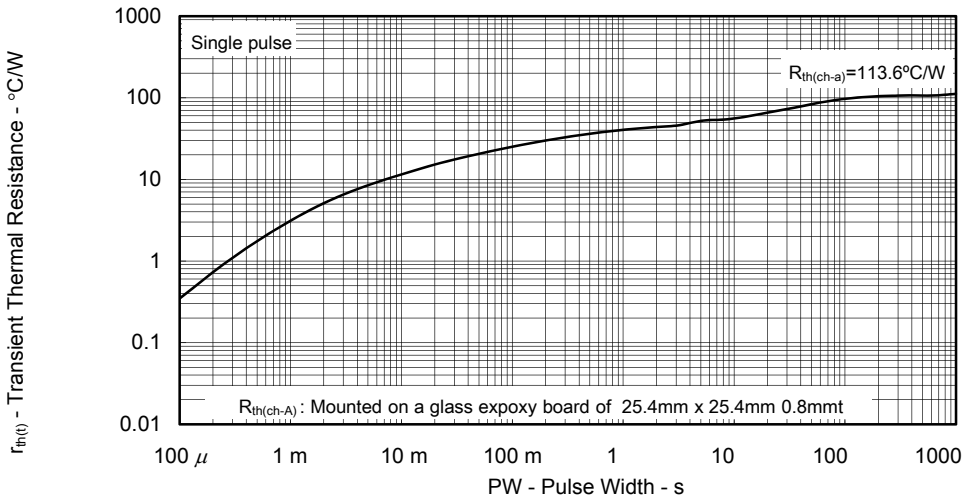
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA

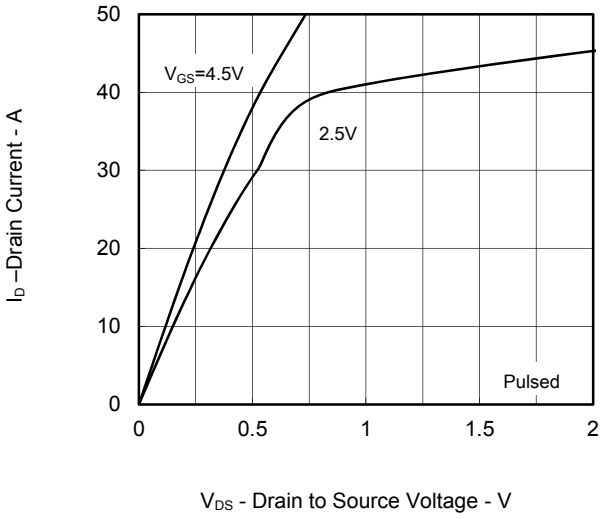


TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

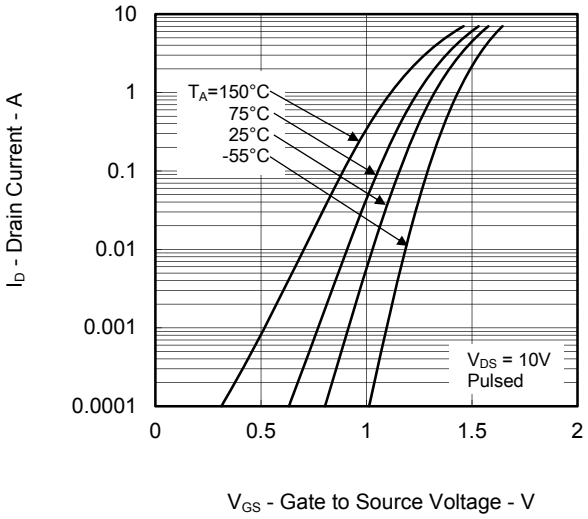


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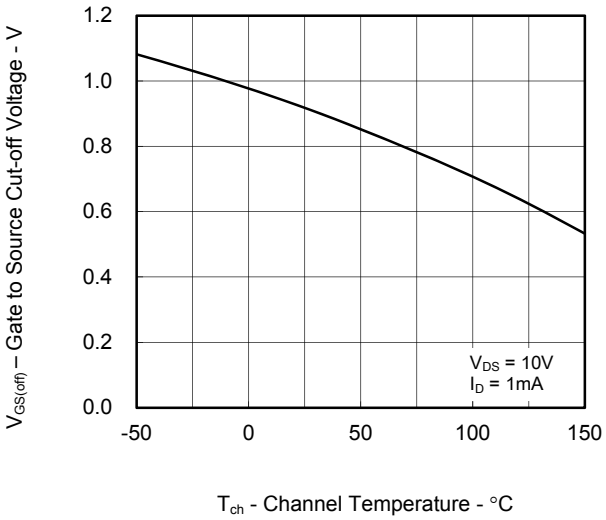
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



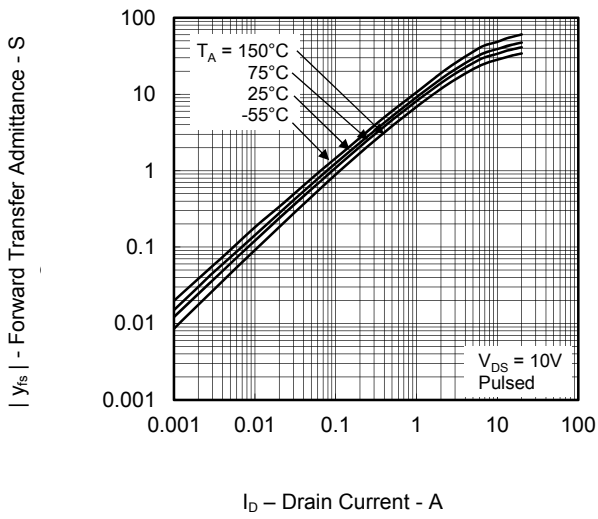
FORWARD TRANSFER CHARACTERISTICS



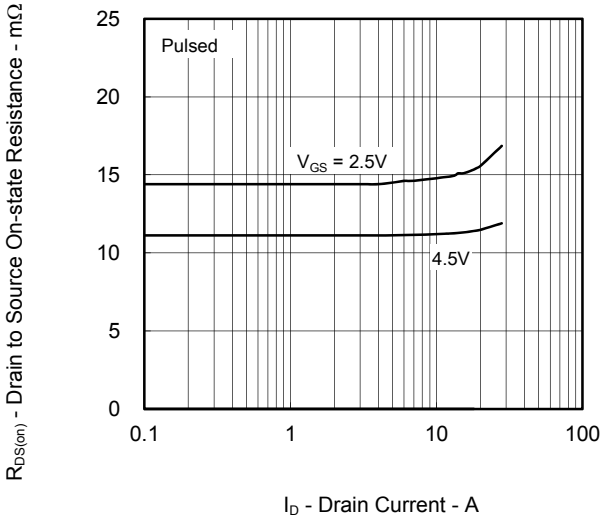
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



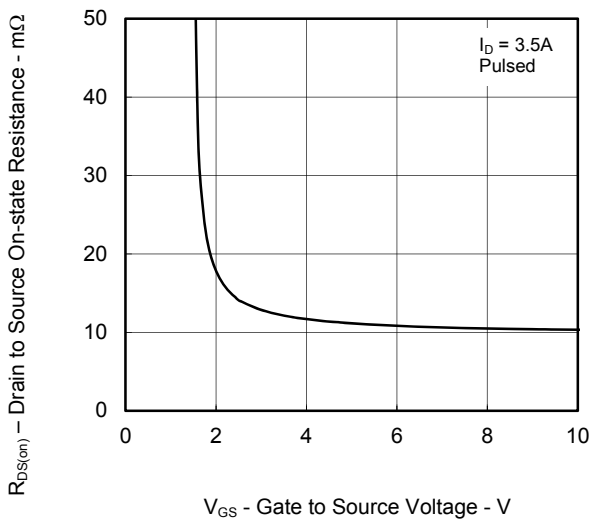
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT

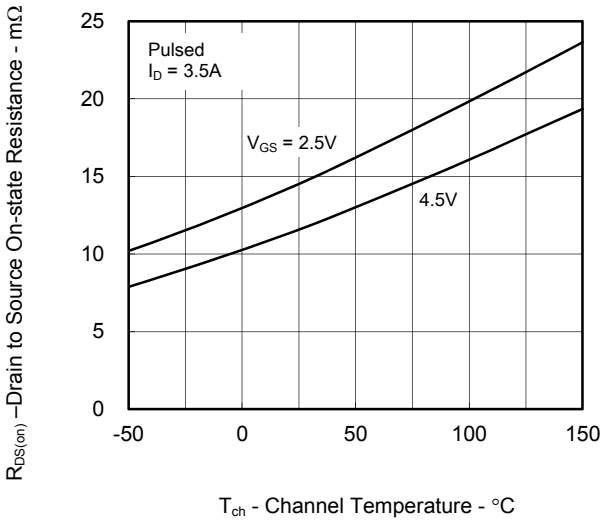


DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE

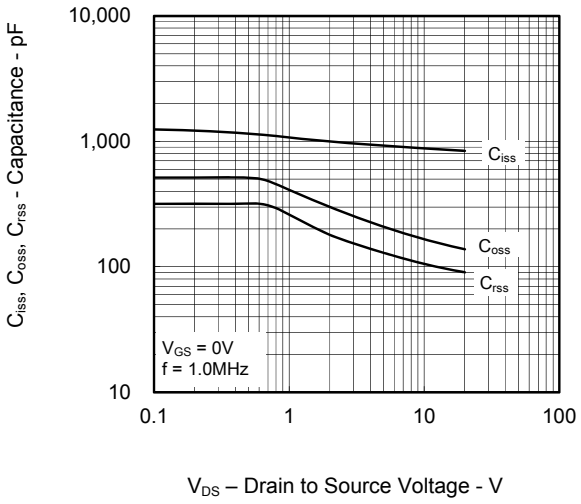


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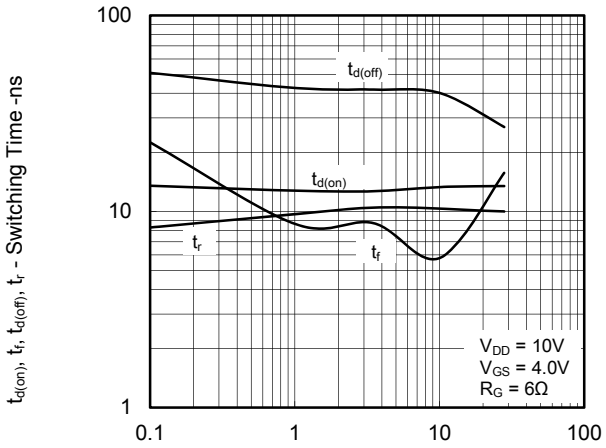
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



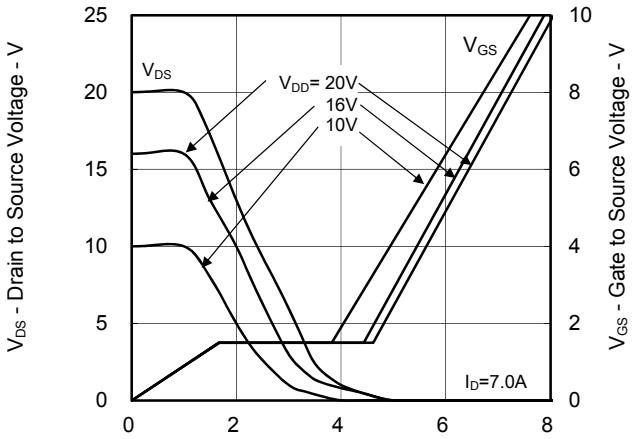
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



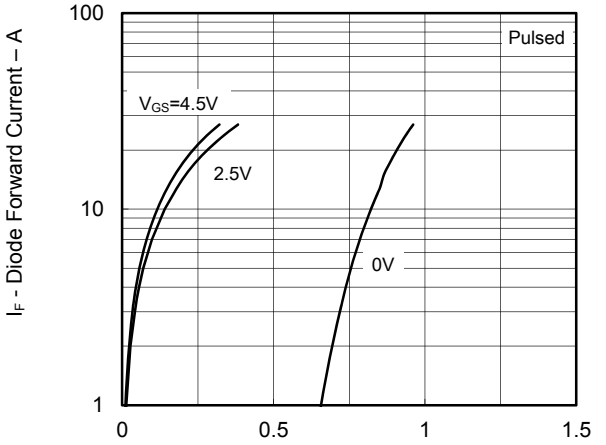
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



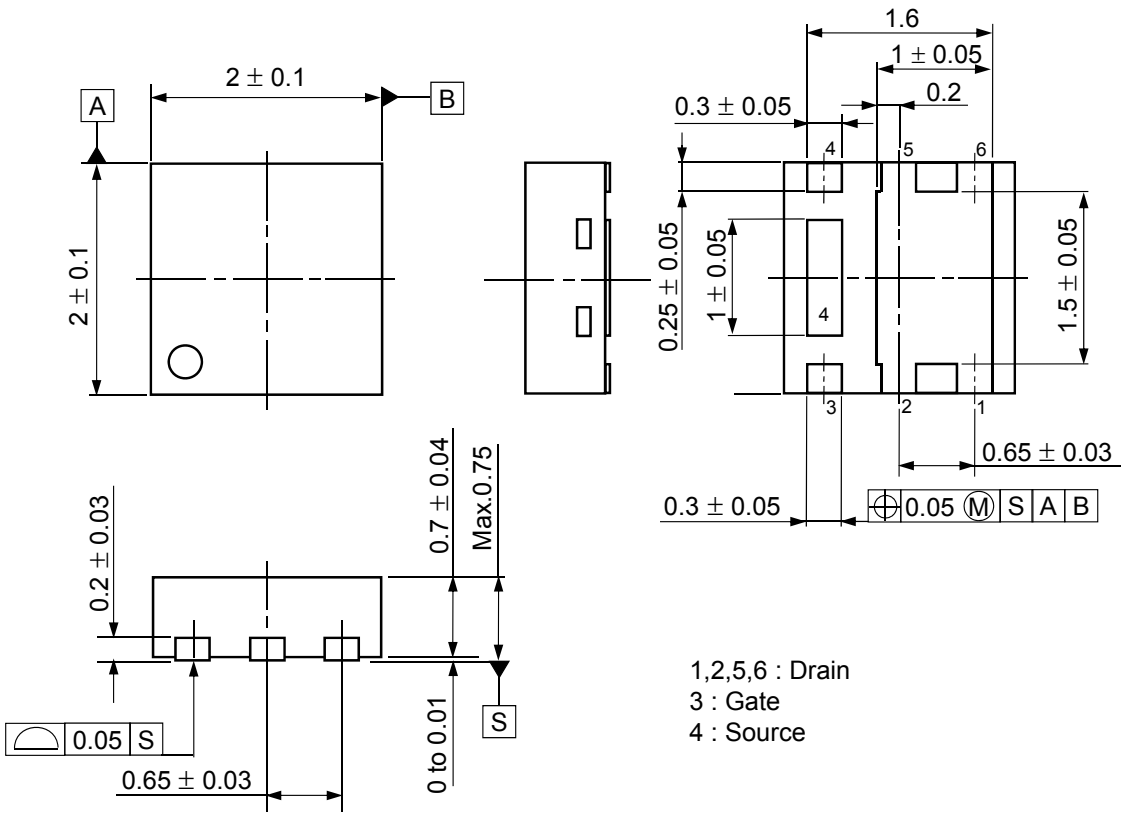
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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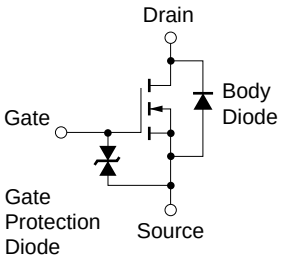
Package Drawings (Unit: mm)

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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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