

### N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

#### DESCRIPTION

The  $\mu$ PA620TT is a switching device which can be driven directly by a 2.5 V power source.

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

- 2.5 V drive available
- Low on-state resistance
  - $R_{DS(on)1} = 38 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 2.5 \text{ A)}$
  - $R_{DS(on)2} = 39 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 2.5 \text{ A)}$
  - $R_{DS(on)3} = 54 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 2.5 \text{ A)}$

#### ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA620TT	6 pin WSOF (1620)

Marking: WA

#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

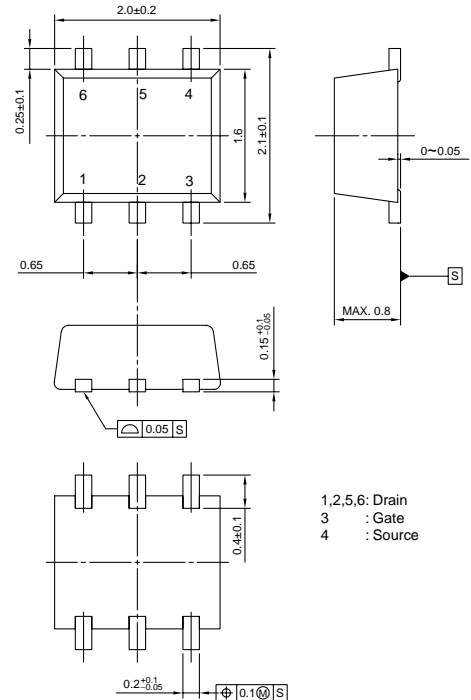
Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	20	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 12$	V
Drain Current (DC) ( $T_A = 25^\circ\text{C}$ )	$I_{D(DC)}$	$\pm 5.0$	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 20$	A
Total Power Dissipation	$P_{T1}$	0.2	W
Total Power Dissipation <sup>Note2</sup>	$P_{T2}$	1.5	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \text{ to } +150$	$^\circ\text{C}$

**Notes** 1.  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$

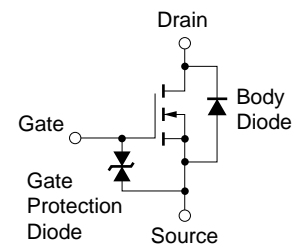
2. Mounted on FR-4 board of  $5000 \text{ mm}^2 \times 1.1 \text{ mm}$ ,  $t \leq 5 \text{ sec}$ .

**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.

#### PACKAGE DRAWING (Unit: mm)



#### EQUIVALENT CIRCUIT

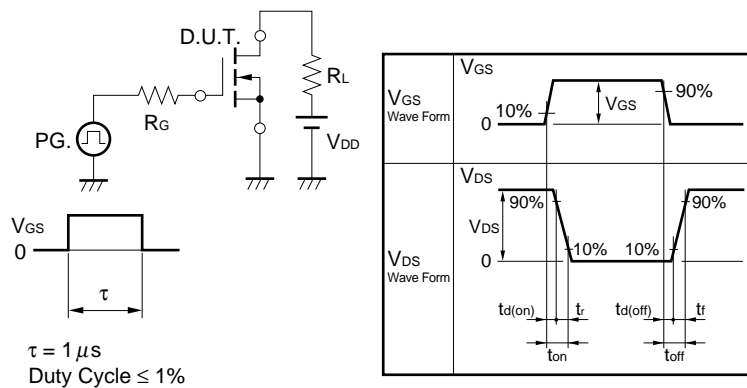


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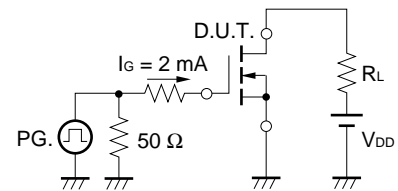
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V			10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±12 V, V <sub>DS</sub> = 0 V			±10	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2.5 A	3.0	6.0		S
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 2.5 A		30	38	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 2.5 A		31	39	mΩ
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 2.5 A		40	54	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		450		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		130		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1.0 MHz		90		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, I <sub>D</sub> = 2.5 A		36		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 4.0 V		210		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		150		ns
Fall Time	t <sub>f</sub>			200		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = 16 V		5.5		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = 4.0 V		1.0		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = 5.0 A		2.8		nC
Body Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 5.0 A, V <sub>GS</sub> = 0 V		0.87		V

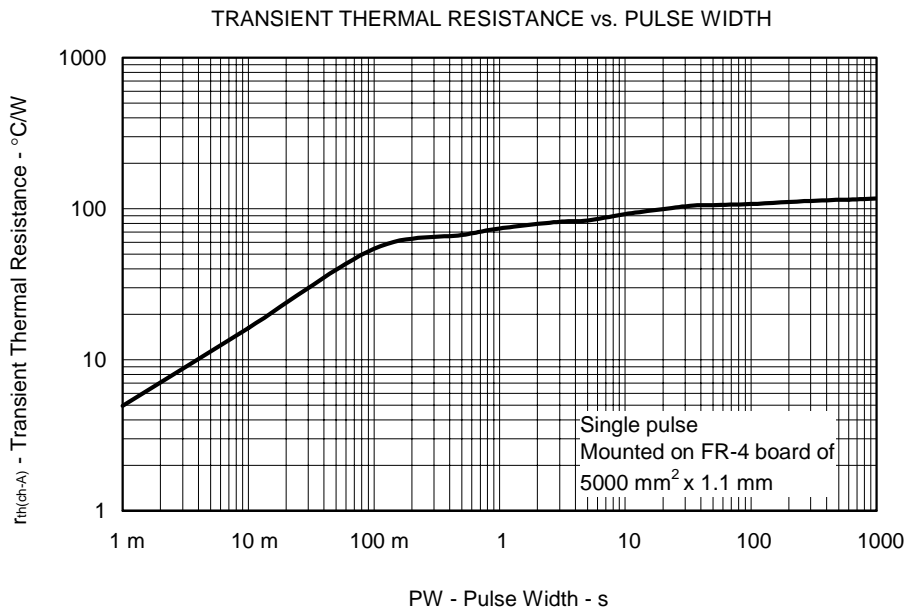
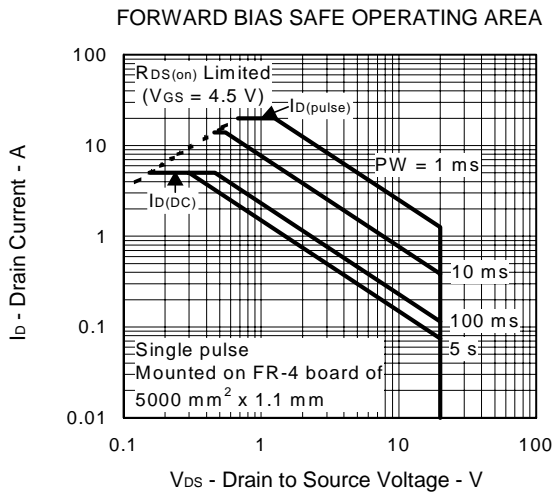
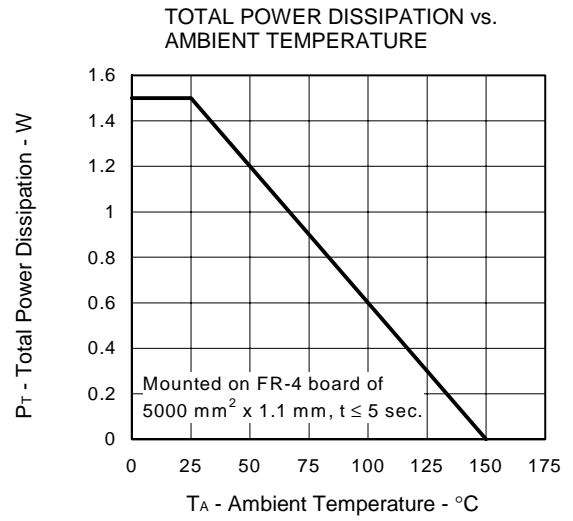
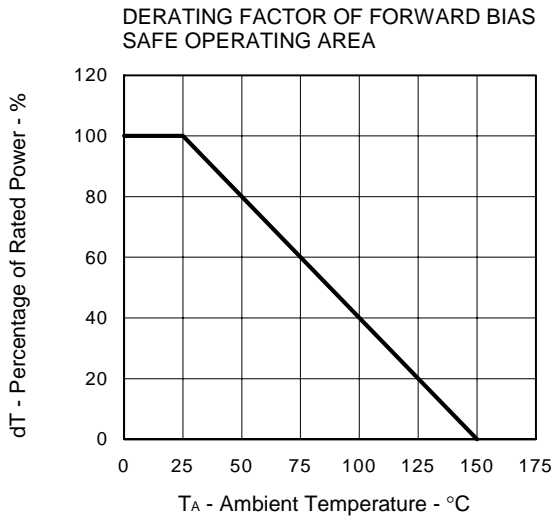
**TEST CIRCUIT 1 SWITCHING TIME**



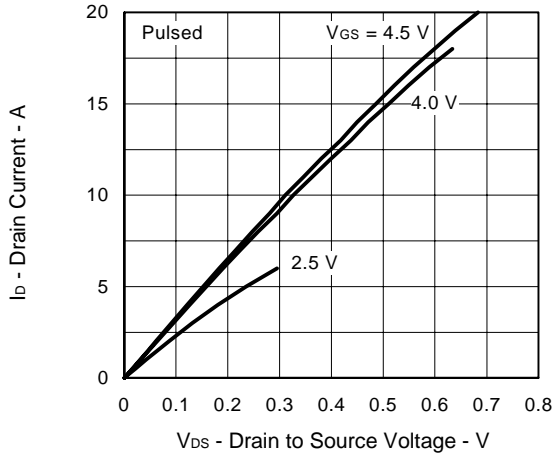
**TEST CIRCUIT 2 GATE CHARGE**



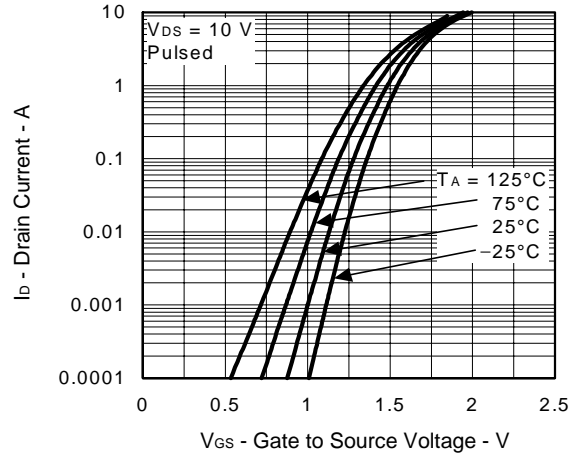
TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )



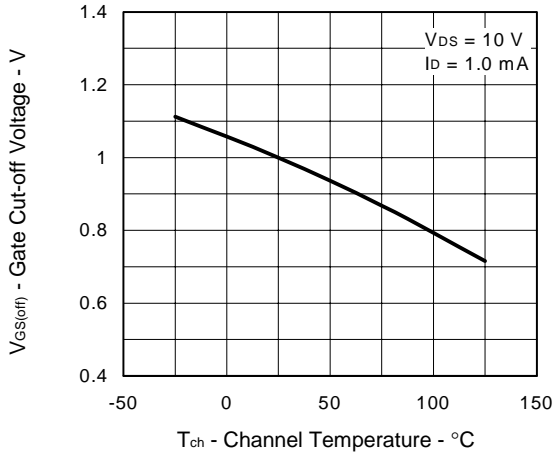
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



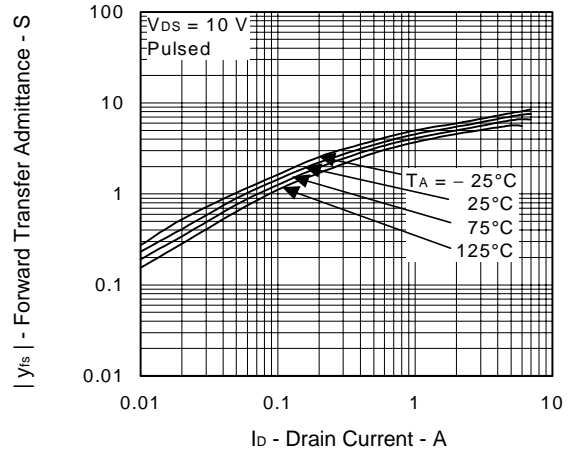
FORWARD TRANSFER CHARACTERISTICS



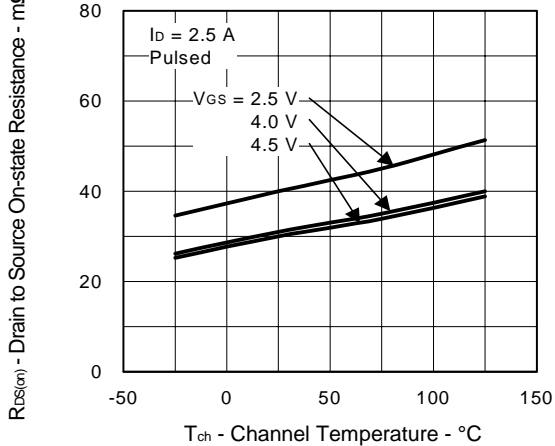
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



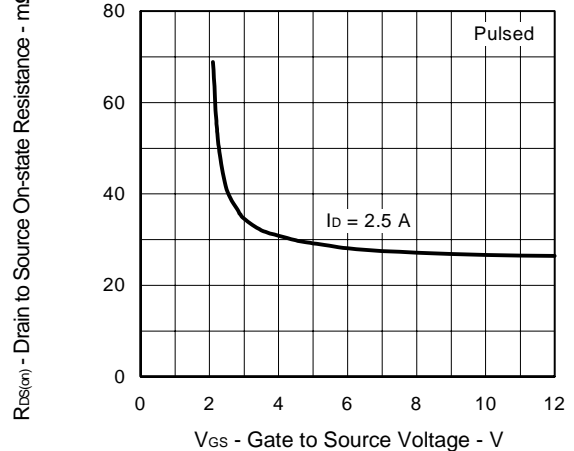
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

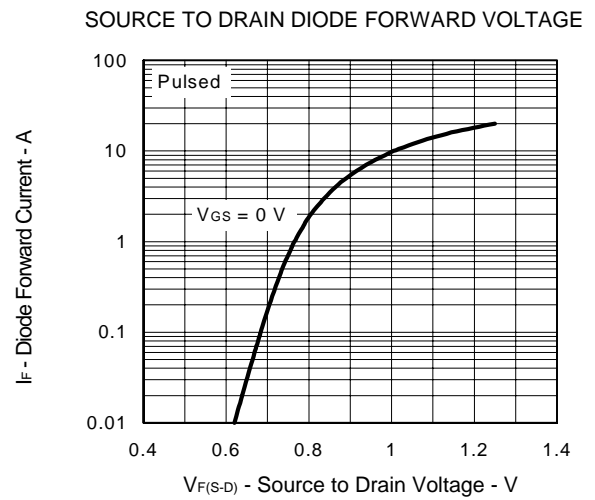
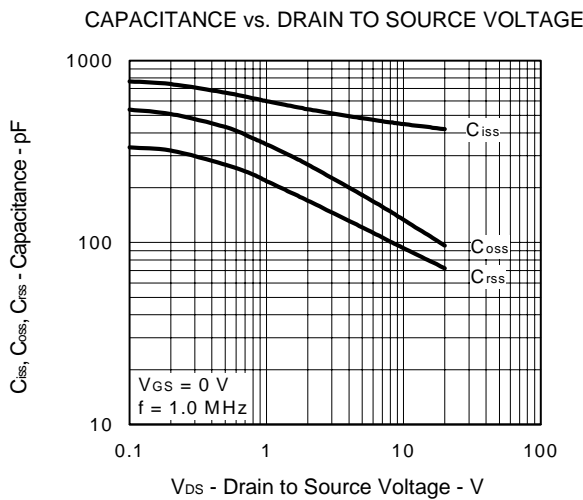
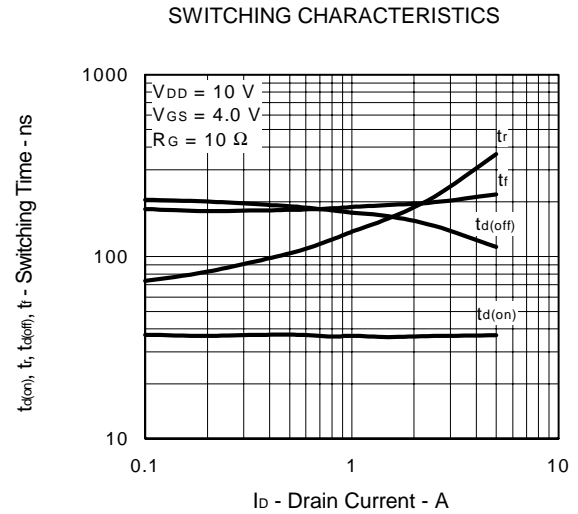
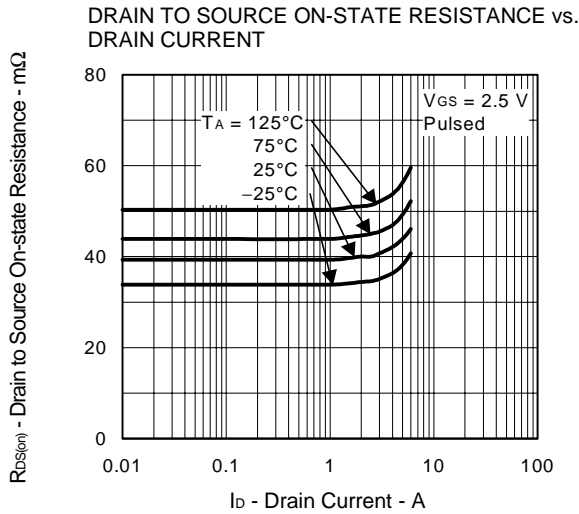
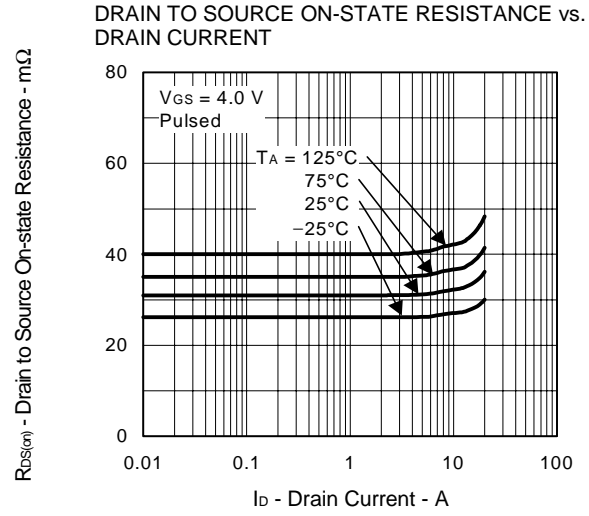
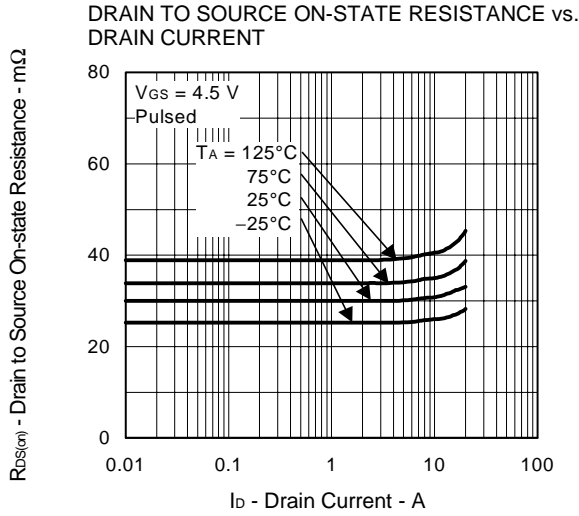


DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE

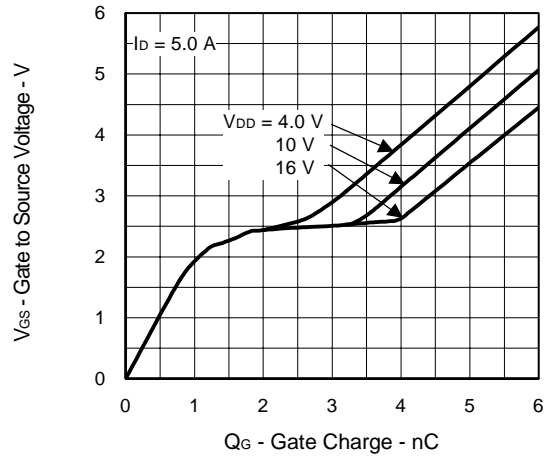


DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE





DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

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