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

DESCRIPTION

The μPA1855 is a switching device which can be driven directly by a 2.5 V power source.

The μPA1855 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

- Can be driven by a 2.5 V power source
- Low on-state resistance
 $R_{DS(on)1} = 23 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)2} = 24 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)3} = 29 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 3.0 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1855GR-9JG	Power TSSOP8

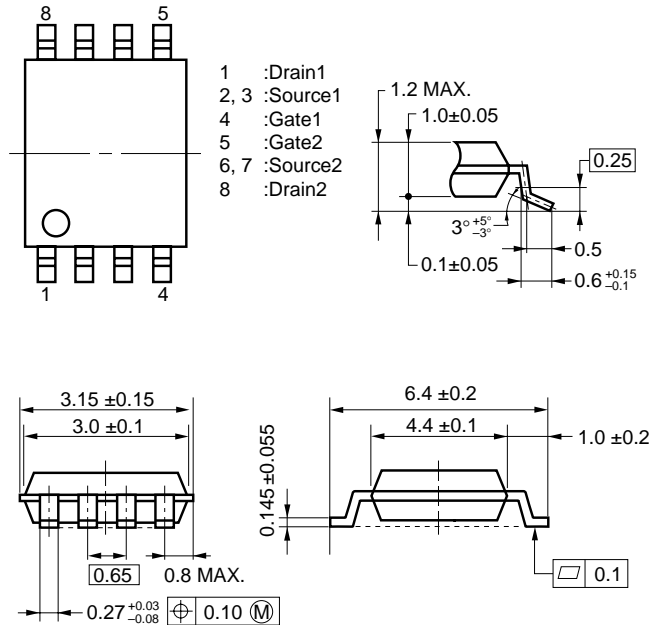
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage	V _{DSS}	20	V
Gate to Source Voltage	V _{GSS}	±12	V
Drain Current (DC)	I _{D(DC)}	±6.0	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±24	A
Total Power Dissipation ^{Note2}	P _T	2.0	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

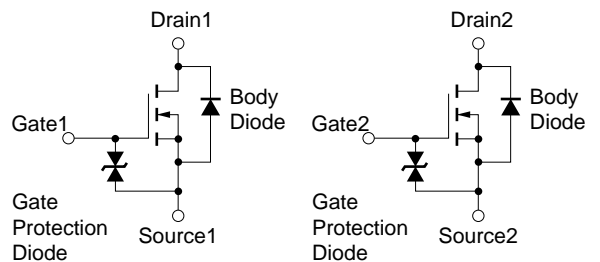
- Notes**
1. $PW \leq 10 \mu s$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of 5000 mm² x 1.1 mm

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.

PACKAGE DRAWING (Unit : mm)



EQUIVALENT CIRCUIT

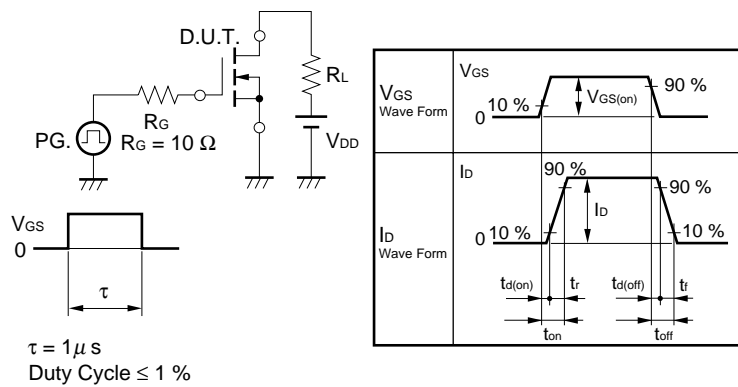


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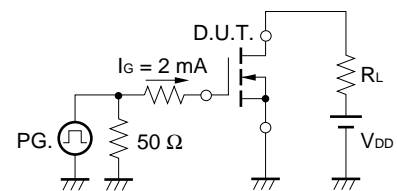
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			10	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 mA	0.5	1.0	1.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 3.0 A	1	13.3		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 3.0 A		17	23	mΩ
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 3.0 A		18	24	mΩ
	R _{DS(on)3}	V _{GS} = 2.5 V, I _D = 3.0 A		22	29	mΩ
Input Capacitance	C _{iSS}	V _{DS} = 10 V		980		pF
Output Capacitance	C _{oSS}	V _{GS} = 0 V		293		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		205		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V		86		ns
Rise Time	t _r	I _D = 3.0 A		247		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = 4.0 V		480		ns
Fall Time	t _f	R _G = 10 Ω		659		ns
Total Gate Charge	Q _G	V _{DD} = 10 V		8.8		nC
Gate to Source Charge	Q _{GS}	I _D = 6.0 A		2.2		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 4.0 V		3.2		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 6.0 A, V _{GS} = 0 V		0.82		V
Reverse Recovery Time	t _{rr}	I _F = 6.0 A, V _{GS} = 0 V		44		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 15 A/μs		2.2		nC

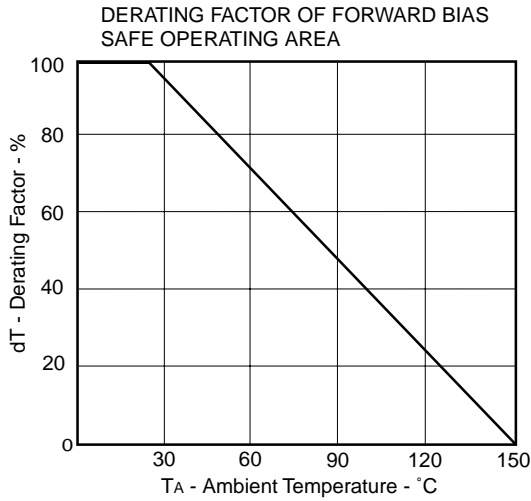
TEST CIRCUIT 1 SWITCHING TIME



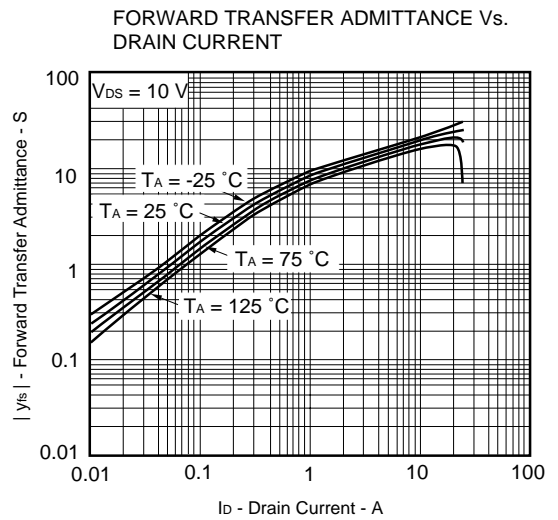
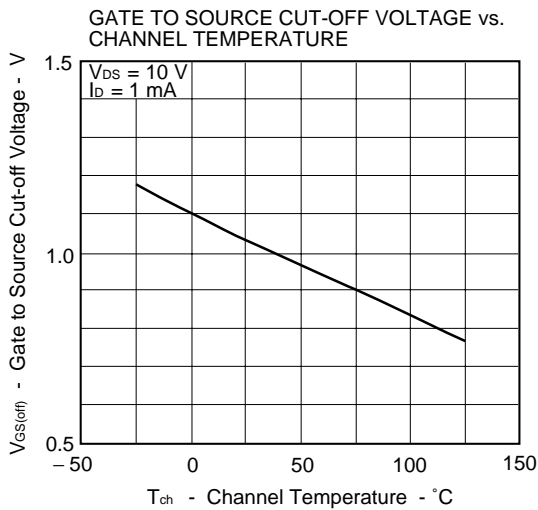
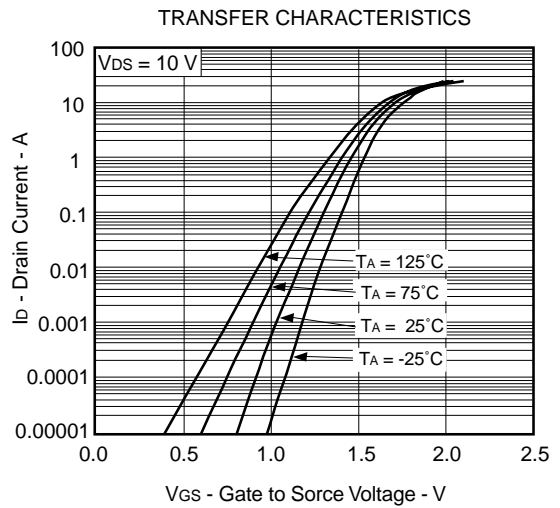
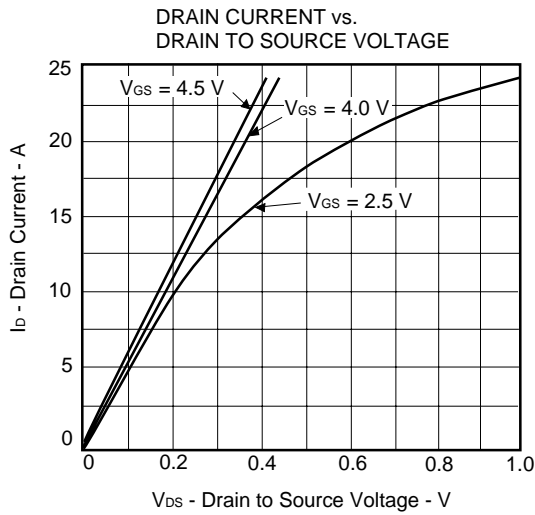
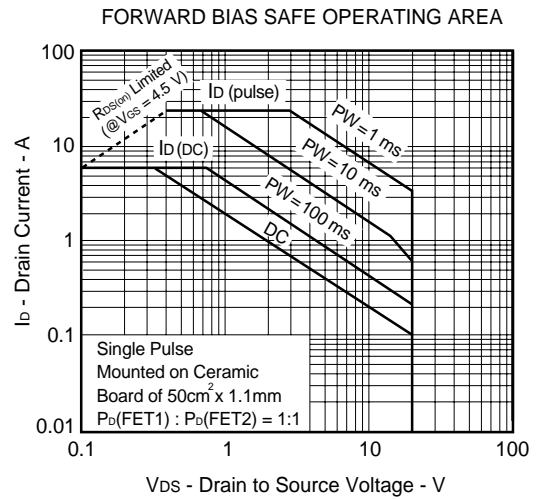
TEST CIRCUIT 2 GATE CHARGE

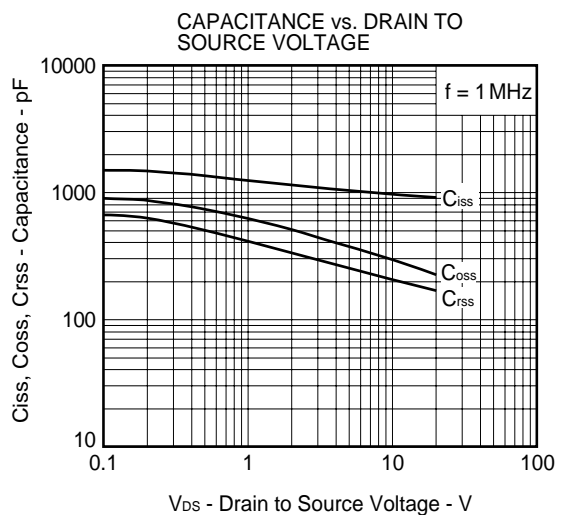
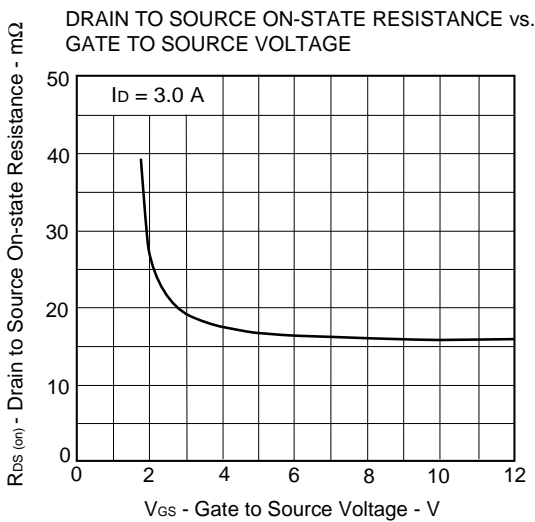
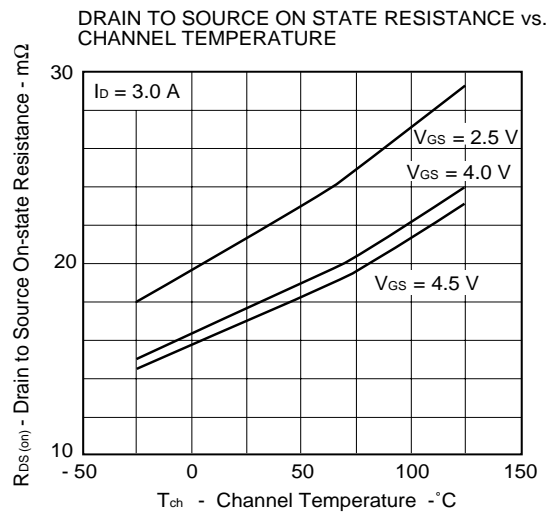
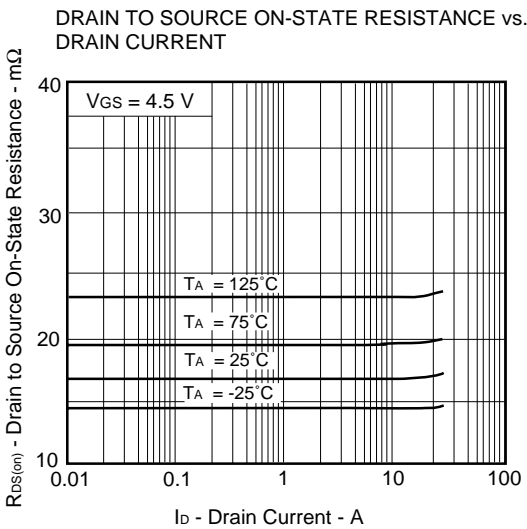
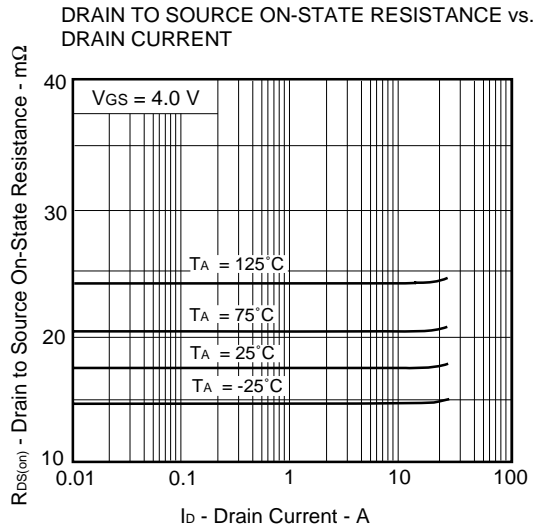
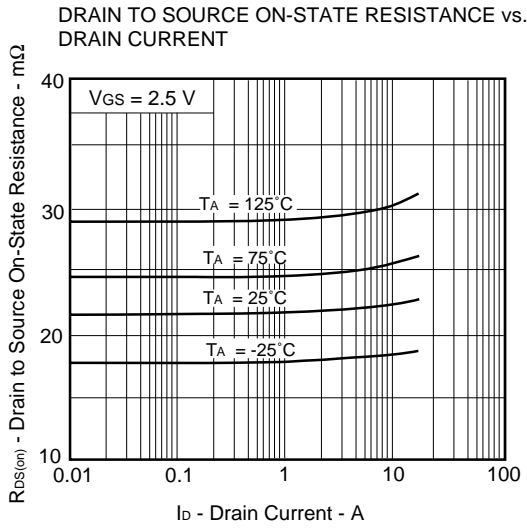


TYPICAL CHARACTERISTICS (T_A = 25°C)

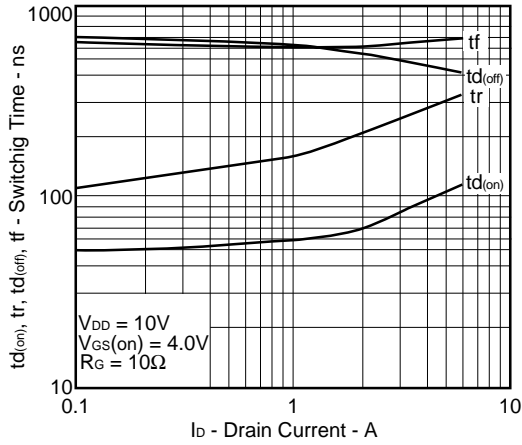


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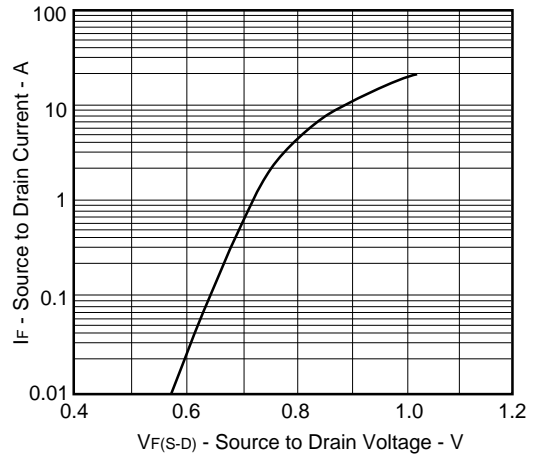




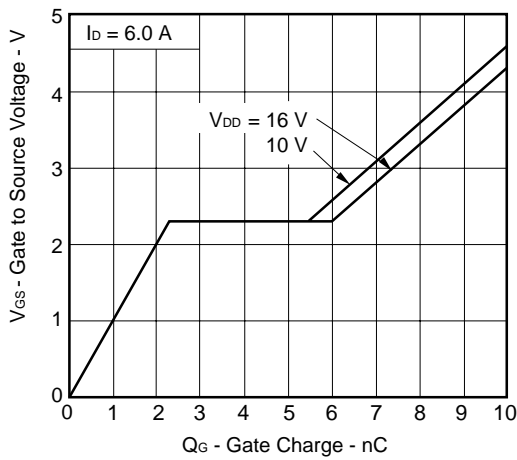
SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE

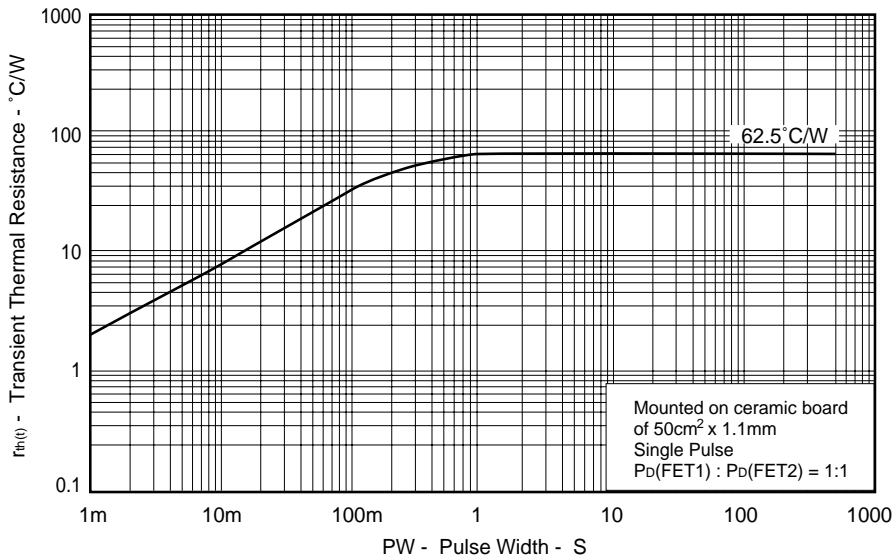


DYNAMIC INPUT CHARACTERISTICS



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TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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