

To our customers,

Old Company Name in Catalogs and Other Documents

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

DESCRIPTION

The μPA1830 is a switching device which can be driven directly by a 4.0 V power source.

This device features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power management of notebook computers and so on.

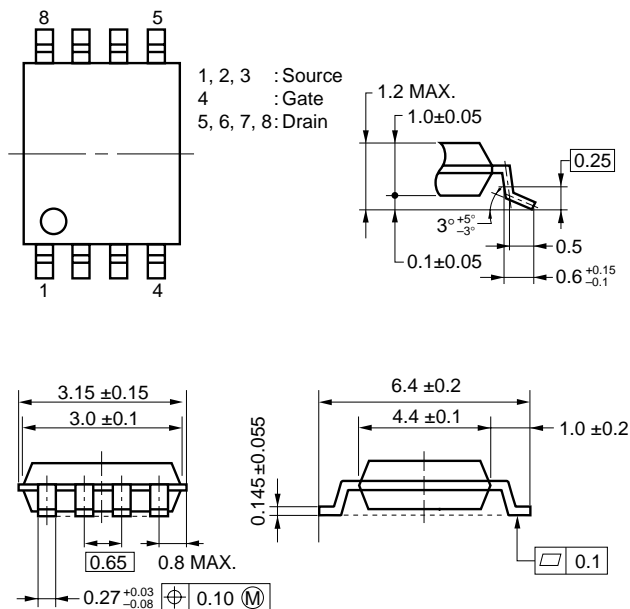
FEATURES

- 4.0 V drive available
- Low on-state resistance
 $R_{DS(on)1} = 17 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -4.5 \text{ A)}$
 $R_{DS(on)2} = 24.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -4.5 \text{ A)}$
 $R_{DS(on)3} = 28 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -4.5 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1830GR-9JG	Power TSSOP8

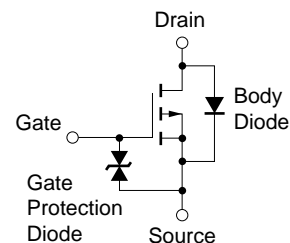
PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	-30	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±20	V
Drain Current (DC) (T _A = 25°C)	I _{D(DC)}	±9.0	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±36	A
Total Power Dissipation ^{Note2}	P _T	2.0	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

EQUIVALENT CIRCUIT



- Notes**
1. $PW \leq 10 \mu s$, Duty Cycle $\leq 1\%$
 2. Mounted on ceramic substrate of $5000 \text{ mm}^2 \times 1.1 \text{ mm}$

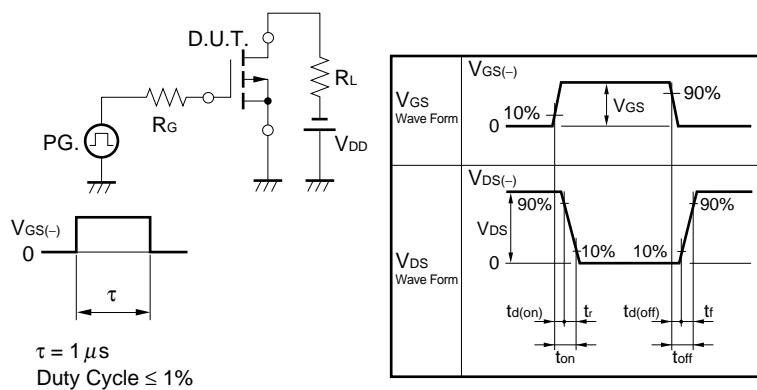
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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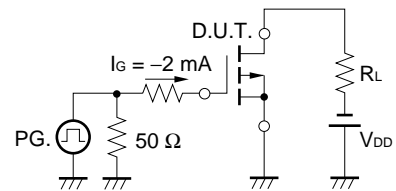
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V			-1.0	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1.0 mA	-1.0	-2.0	-2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -4.5 A	8.0	17.4		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -10 V, I _D = -4.5 A		13.7	17	mΩ
	R _{DS(on)2}	V _{GS} = -4.5 V, I _D = -4.5 A		18.5	24.5	mΩ
	R _{DS(on)3}	V _{GS} = -4.0 V, I _D = -4.5 A		21	28	mΩ
Input Capacitance	C _{iss}	V _{DS} = -10 V		1950		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		570		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		350		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15 V, I _D = -4.5 A		17		ns
Rise Time	t _r	V _{GS} = -10 V		16		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		140		ns
Fall Time	t _f			150		ns
Total Gate Charge	Q _G	V _{DD} = -24 V		38		nC
Gate to Source Charge	Q _{GS}	V _{GS} = -10 V		4.5		nC
Gate to Drain Charge	Q _{GD}	I _D = -9.0 A		12		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 9.0 A, V _{GS} = 0 V		0.84		V
Reverse Recovery Time	t _{rr}	I _F = 9.0 A, V _{GS} = 0 V		60		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		40		nC

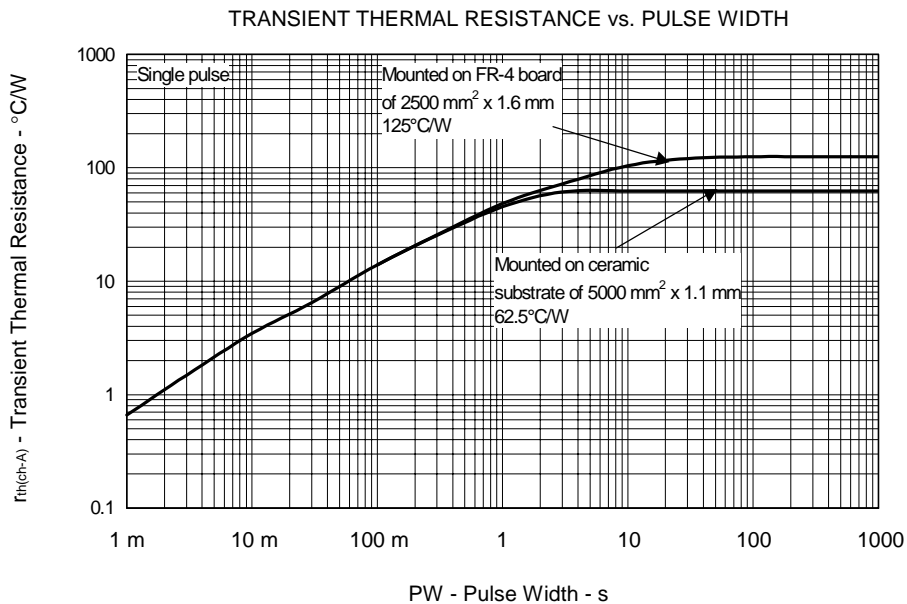
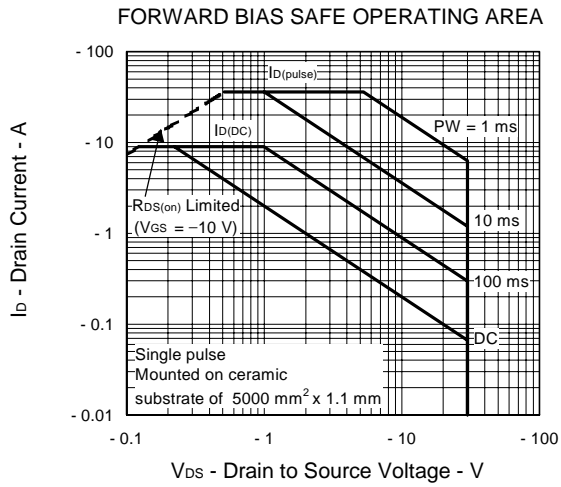
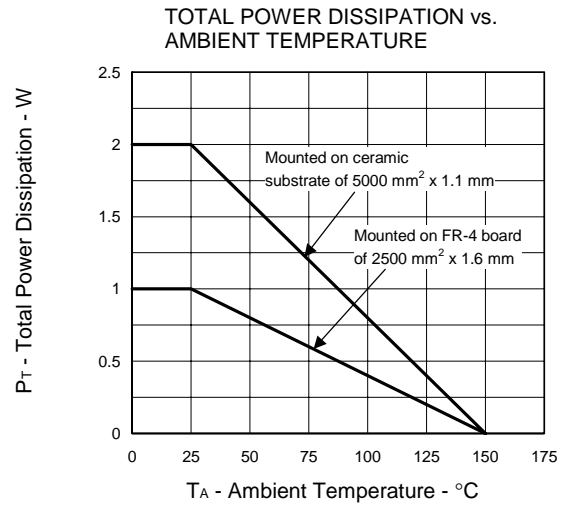
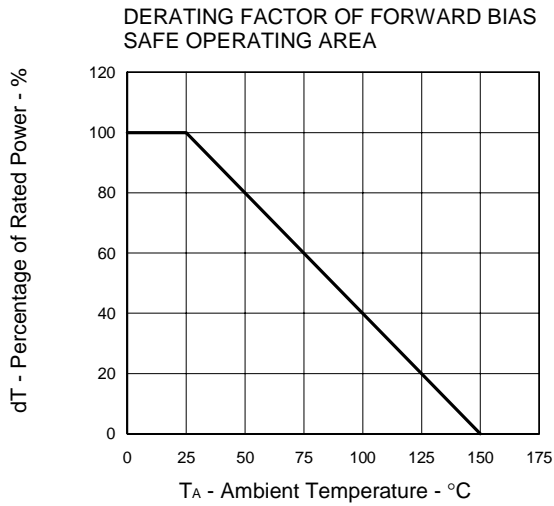
TEST CIRCUIT 1 SWITCHING TIME



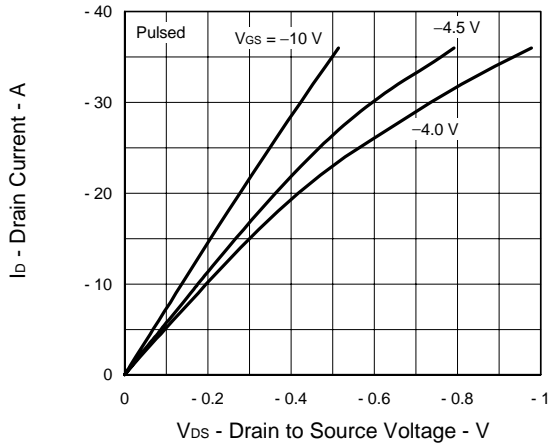
TEST CIRCUIT 2 GATE CHARGE



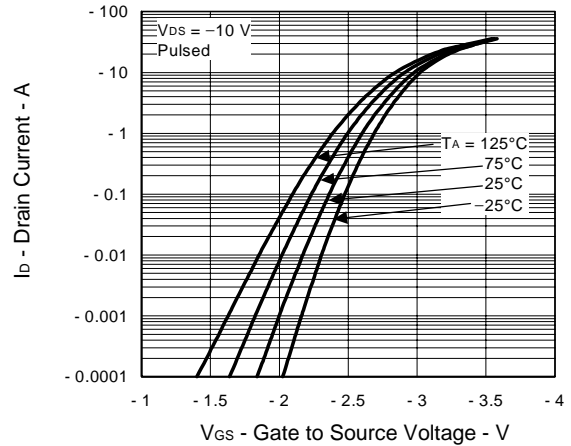
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



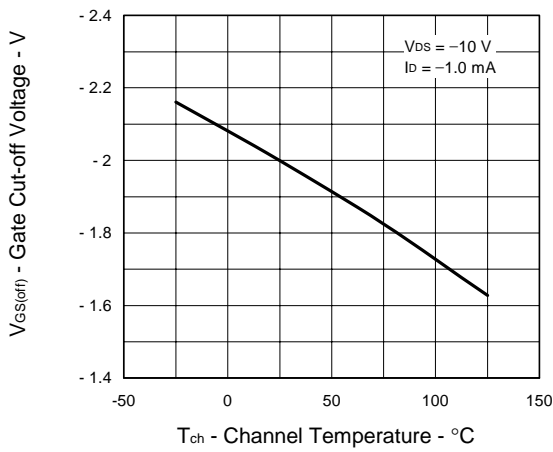
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



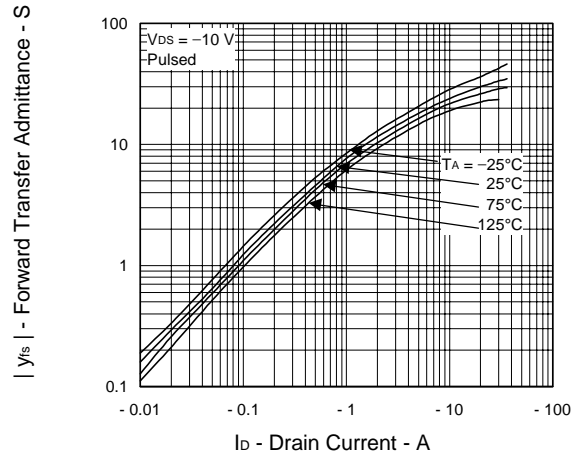
FORWARD TRANSFER CHARACTERISTICS



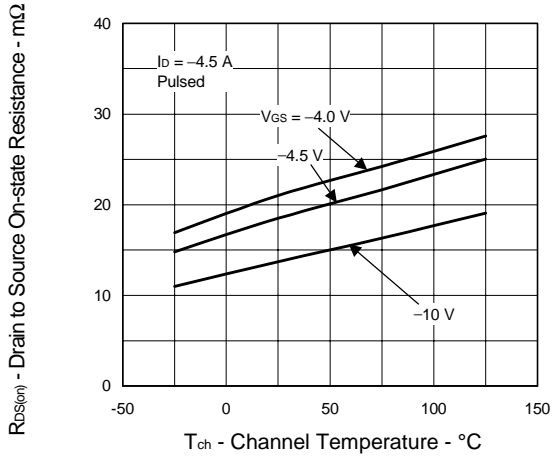
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



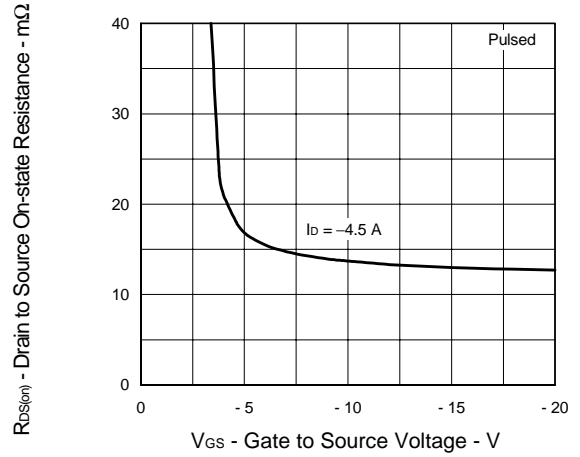
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



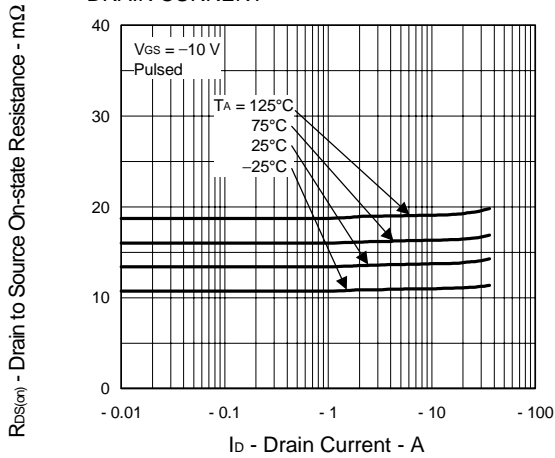
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



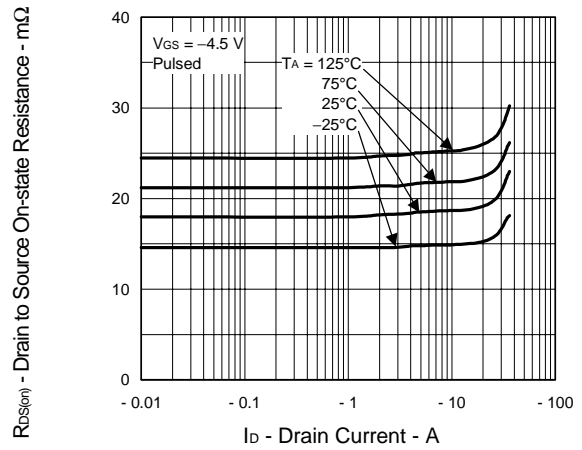
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



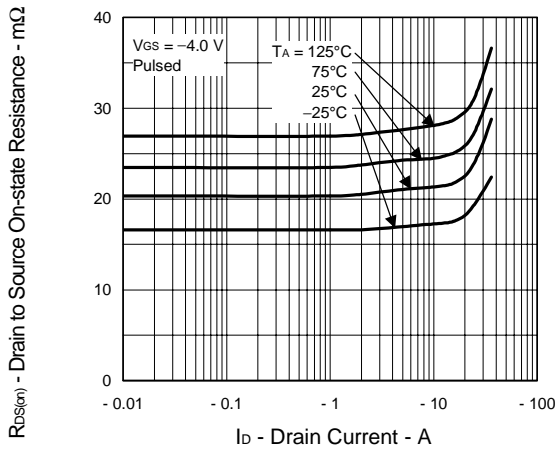
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



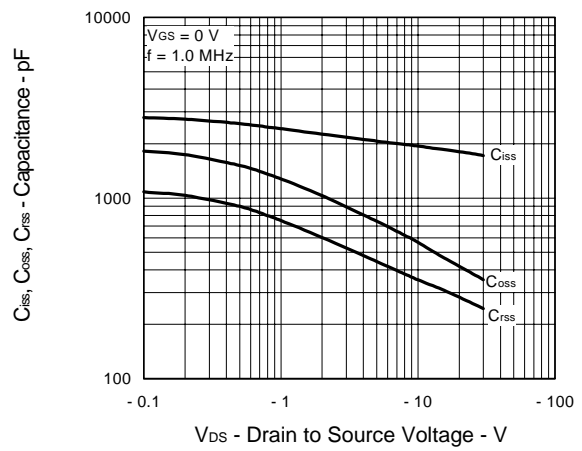
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



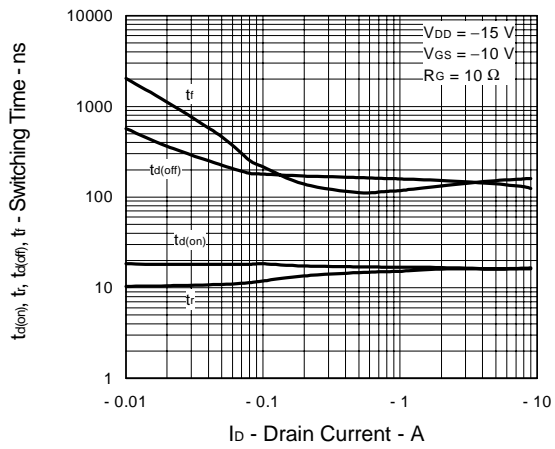
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



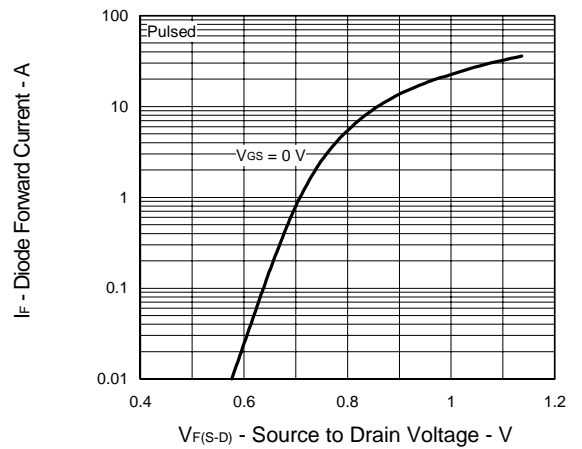
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

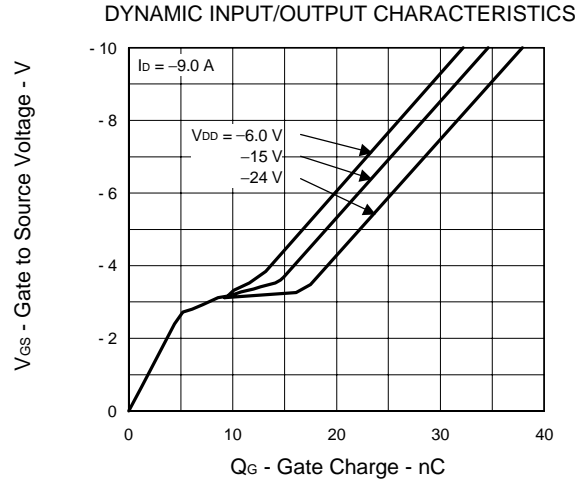


SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE





[MEMO]

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