

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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Not recommended
for new design

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SWITCHING P-CHANNEL POWER MOSFET

DESCRIPTION

The μ PA2731UT1A is P-channel MOS Field Effect Transistor designed for power management applications of notebook computers and Li-ion battery protection circuit.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 3.3 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -22 \text{ A)}$
 $R_{DS(on)2} = 6.4 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -22 \text{ A)}$
- Low C_{iss} : $C_{iss} = 3620 \text{ pF TYP.}$
- Small and surface mount package (8pin HVSON)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA2731UT1A-E1-AZ ^{Note}	8pin HVSON
μ PA2731UT1A-E2-AZ ^{Note}	8pin HVSON

Note Pb-free (This product does not contain Pb in external electrode.)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	-30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±44	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	±180	A
Total Power Dissipation ^{Note2}	P_{T1}	1.5	W
Total Power Dissipation ($PW = 10 \text{ sec}$) ^{Note2}	P_{T2}	4.6	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C
Single Avalanche Current ^{Note3}	I_{AS}	-22	A
Single Avalanche Energy ^{Note3}	E_{AS}	48	mJ

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

2. Mounted on a glass epoxy board (25.4 mm x 25.4 mm x 0.8 mm)

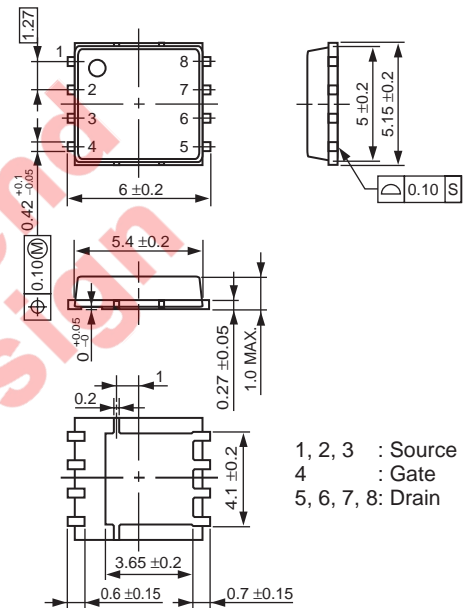
3. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = -15 \text{ V}$, $R_G = 25 \Omega$, $L = 100 \mu\text{H}$, $V_{GS} = -20 \rightarrow 0 \text{ V}$

Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

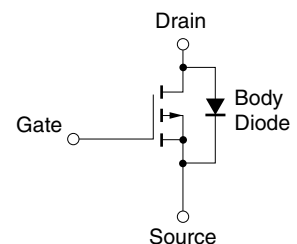
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PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

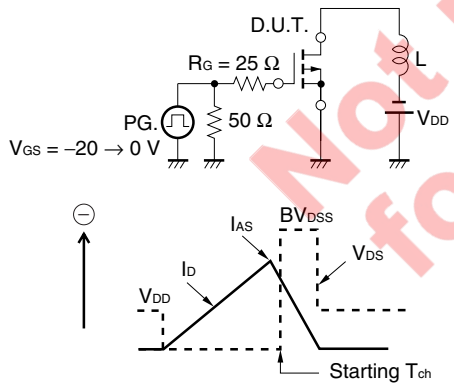


ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

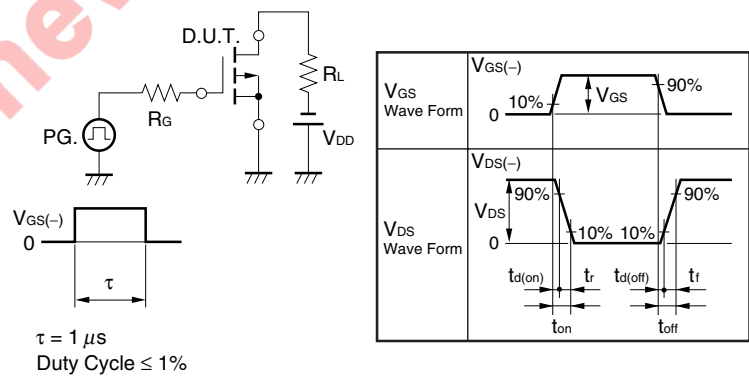
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V			-1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±100	nA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1 mA	-1.0		-2.5	V
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = -10 V, I _D = -22 A		2.6	3.3	mΩ
	R _{bS(on)2}	V _{GS} = -4.5 V, I _D = -22 A		4.2	6.4	mΩ
Input Capacitance	C _{iss}	V _{DS} = -10 V		3620		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		1540		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		630		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15 V, I _D = -22 A		15		ns
Rise Time	t _r	V _{GS} = -10 V		16		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		760		ns
Fall Time	t _f			510		ns
Total Gate Charge	Q _G	V _{DD} = -24 V		149		nC
Gate to Source Charge	Q _{GS}	V _{GS} = -10 V		17		nC
Gate to Drain Charge	Q _{GD}	I _D = -44 A		48		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 44 A, V _{GS} = 0 V		0.85		V
Reverse Recovery Time	t _{rr}	I _F = 44 A, V _{GS} = 0 V		87		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 50 A/μs		60		nC

Note Pulsed

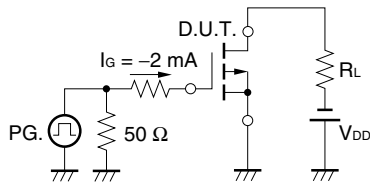
TEST CIRCUIT 1 AVALANCHE CAPABILITY



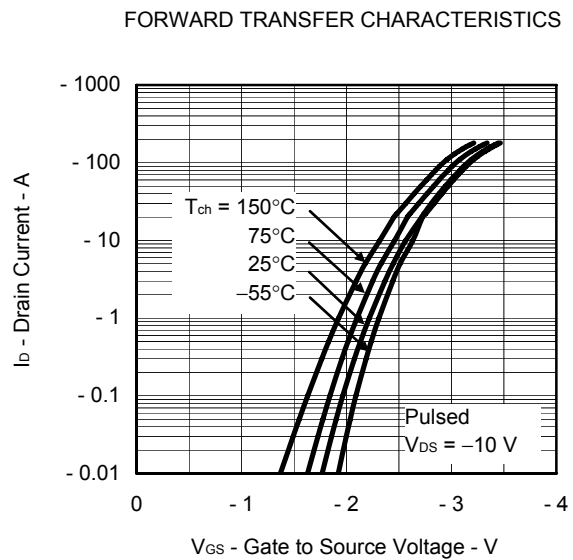
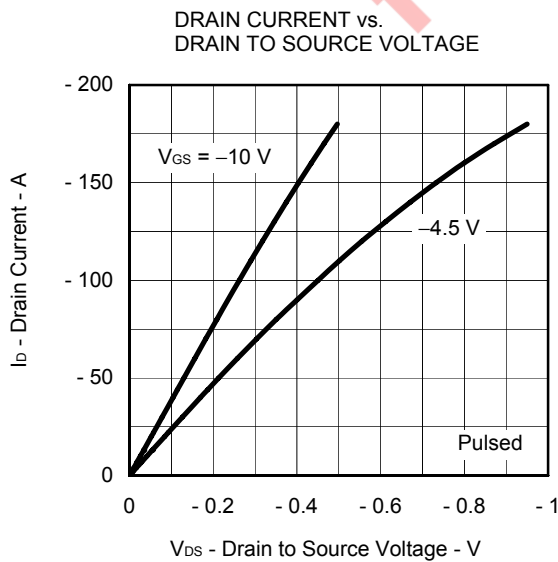
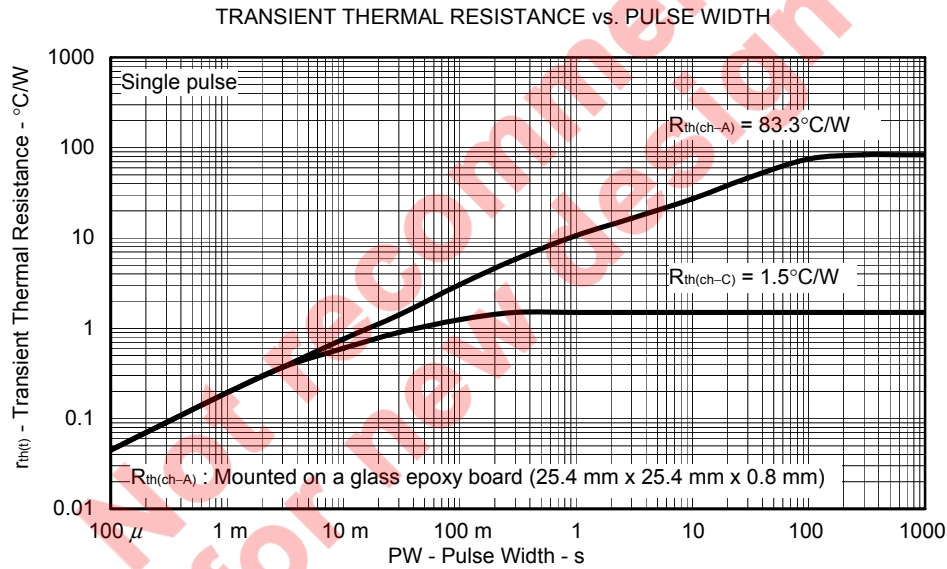
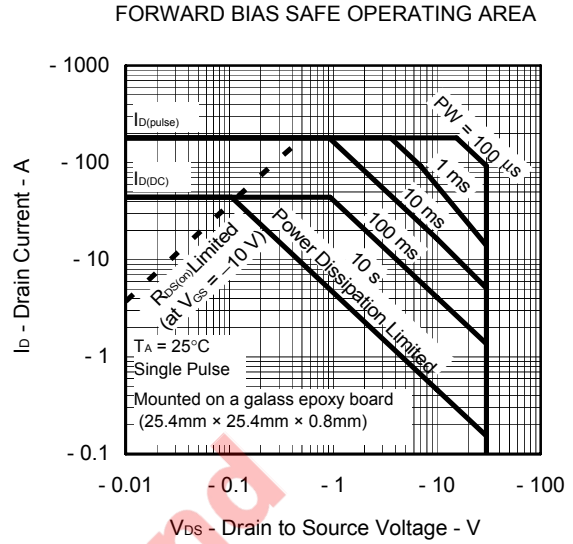
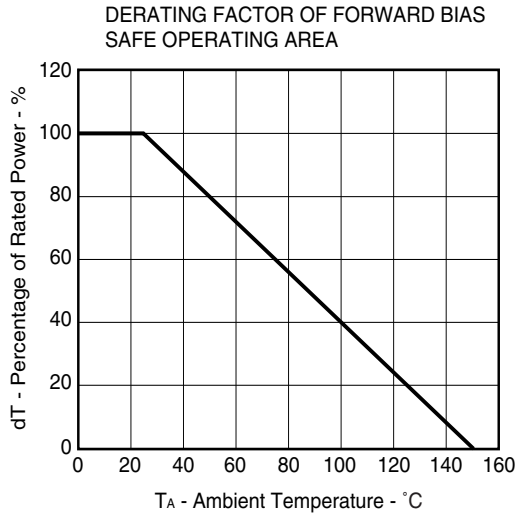
TEST CIRCUIT 2 SWITCHING TIME



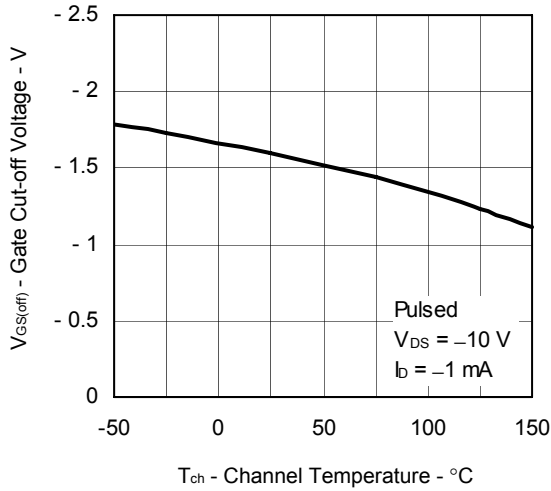
TEST CIRCUIT 3 GATE CHARGE



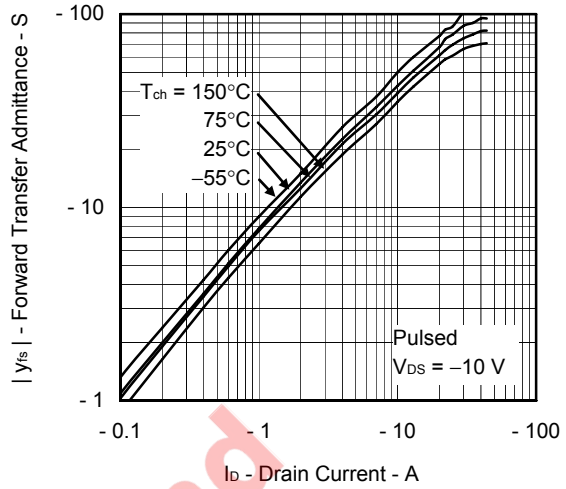
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



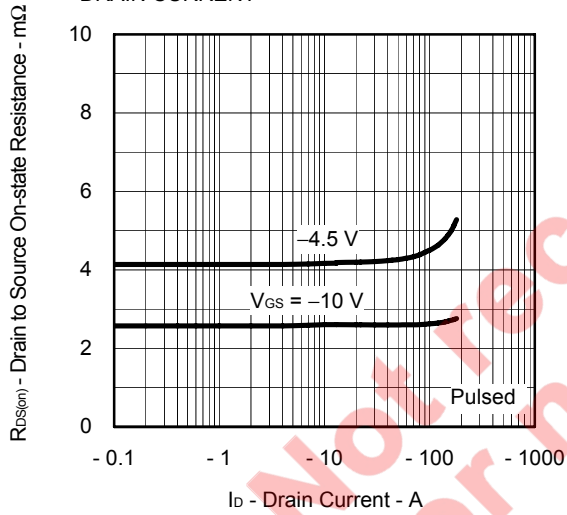
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



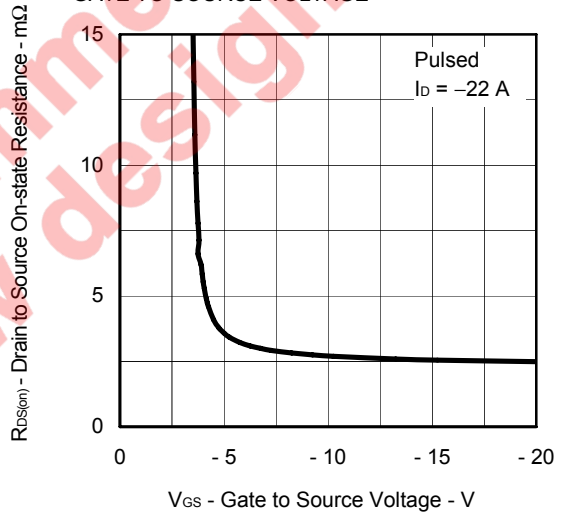
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



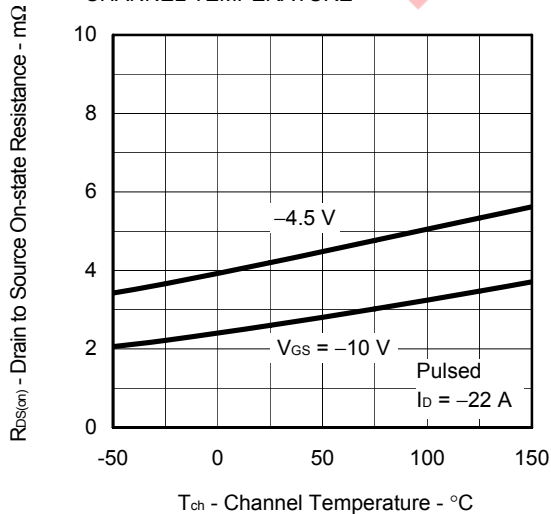
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



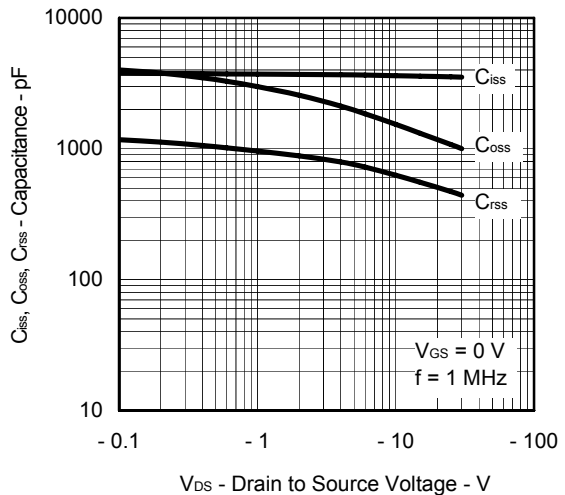
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



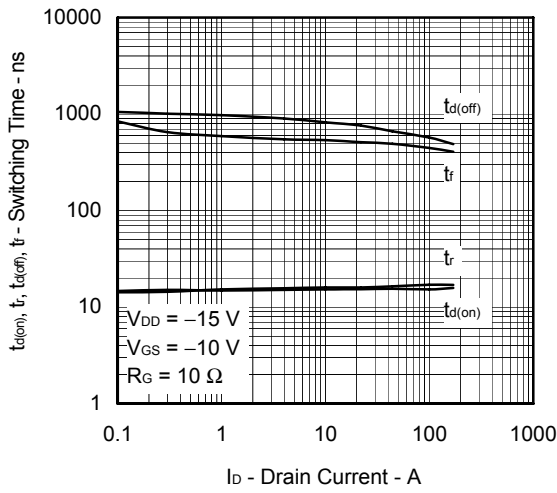
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



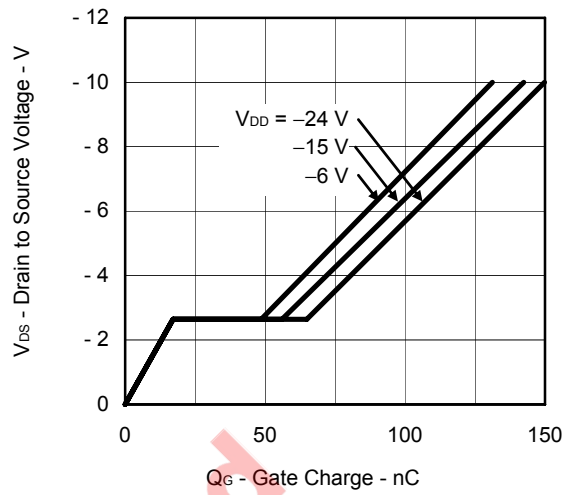
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



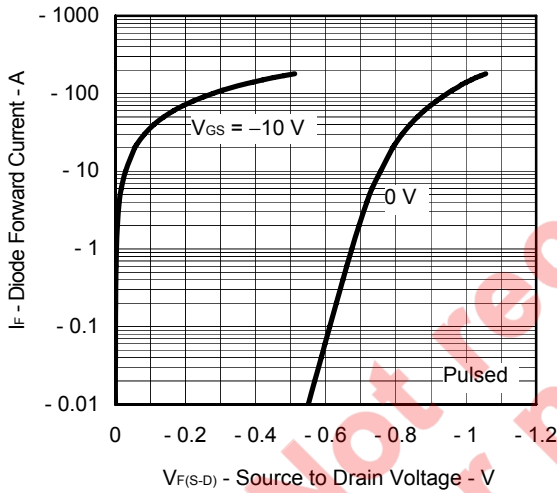
SWITCHING CHARACTERISTICS



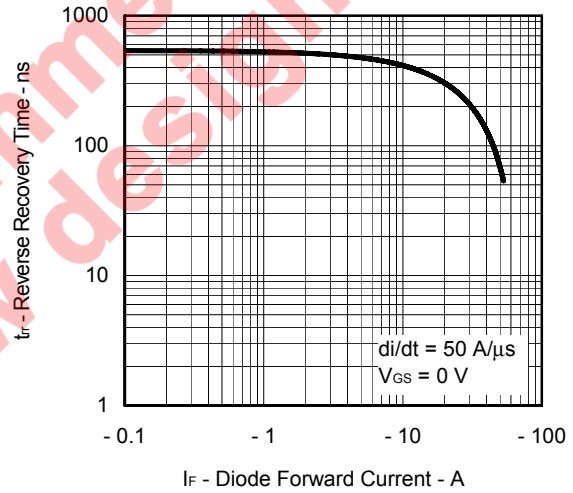
DYNAMIC INPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



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