

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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MOS FIELD EFFECT TRANSISTOR

μPA2801

SWITCHING

N-CHANNEL POWER MOSFET

DESCRIPTION

The μPA2801 is N-channel MOSFET designed for DC/DC converter and power management applications of portable equipments.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 9.6 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 16 \text{ A)}$
 $R_{DS(on)2} = 15 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 8 \text{ A)}$
- Built-in gate protection diode
- Thin type surface mount package with heat spreader
- RoHS Compliant

ABSOLUTE MAXIMUM RATINGS (TA = 25°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)	$I_{D(DC)}$	±16	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	±96	A
Total Power Dissipation ^{Note2}	P_{T1}	1.5	W
Total Power Dissipation (PW = 10 sec) ^{Note2}	P_{T2}	3.8	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C
Single Avalanche Current ^{Note3}	I_{AS}	16	A
Single Avalanche Energy ^{Note3}	E_{AS}	25.6	mJ

THERMAL RESISTANCE

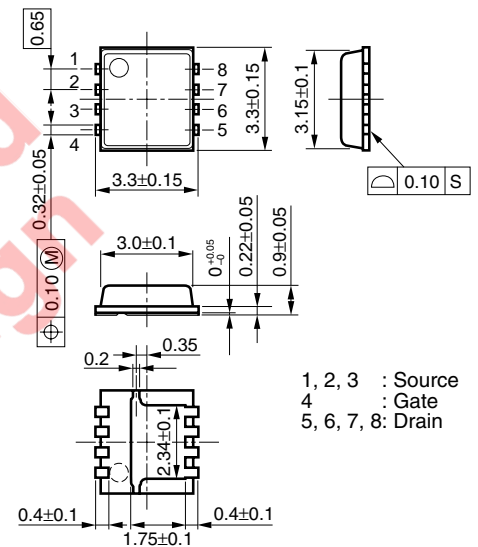
Channel to Ambient Thermal Resistance ^{Note2}	$R_{th(ch-A)}$	83.3	°C/W
Channel to Case (Drain) Thermal Resistance	$R_{th(ch-C)}$	2.4	°C/W

- Notes 1.** $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$
2. Mounted on FR-4 board of 25.4 mm x 25.4 mm x 0.8 mm
3. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 15 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 20 \rightarrow 0 \text{ V}$, $L = 100 \mu\text{H}$

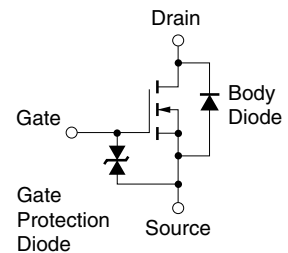
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

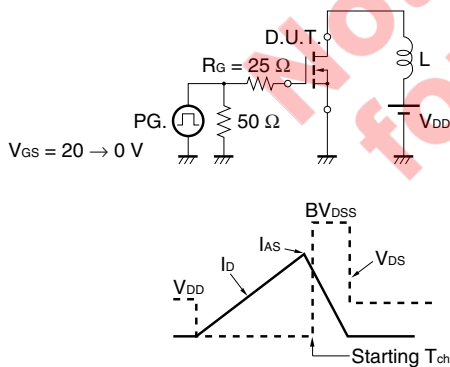


ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

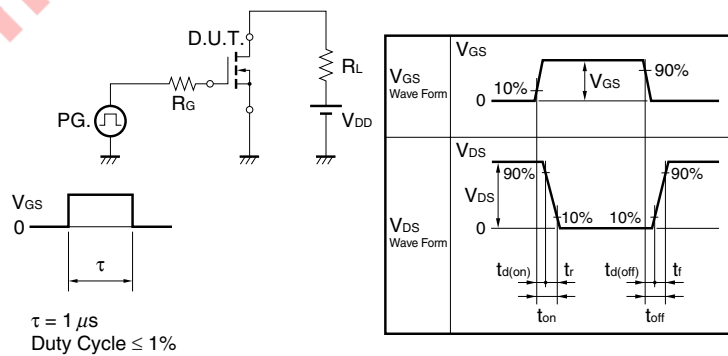
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.5		2.5	V
Forward Transfer Admittance ^{Note}	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 8\text{ A}$	6			S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 16\text{ A}$		7.6	9.6	mΩ
	$R_{DS(on)2}$	$V_{GS} = 4.5\text{ V}, I_D = 8\text{ A}$		10.5	15	mΩ
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V},$		1170		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V},$		250		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		90		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, I_D = 8\text{ A},$		13		ns
Rise Time	t_r	$V_{GS} = 10\text{ V},$		3.6		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		41		ns
Fall Time	t_f			8.0		ns
Total Gate Charge	Q_G	$V_{DD} = 15\text{ V},$		11.4		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 5\text{ V},$		4.0		nC
Gate to Drain Charge	Q_{GD}	$I_D = 16\text{ A}$		4.1		nC
Body Diode Forward Voltage ^{Note}	$V_{F(S-D)}$	$I_F = 16\text{ A}, V_{GS} = 0\text{ V}$		0.83		V
Reverse Recovery Time	t_{rr}	$I_F = 16\text{ A}, V_{GS} = 0\text{ V},$		27		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		23		nC
Gate Resistance	R_G	$f = 1\text{ MHz}$		2.2		Ω

Note Pulsed

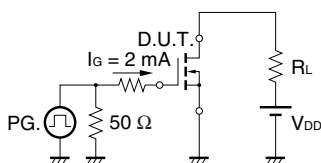
TEST CIRCUIT 1 AVALANCHE CAPABILITY



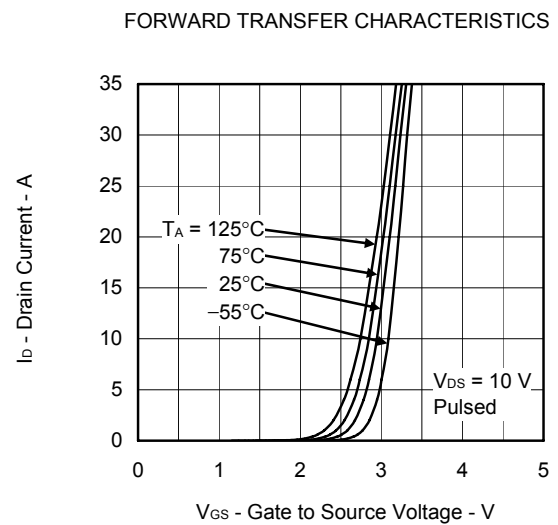
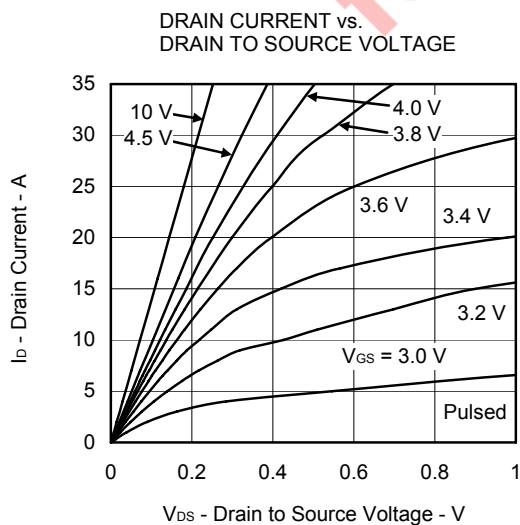
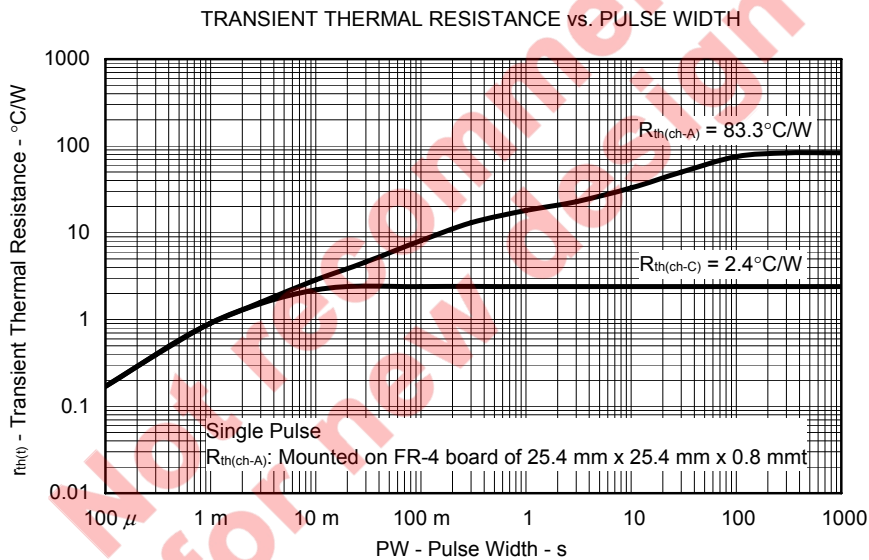
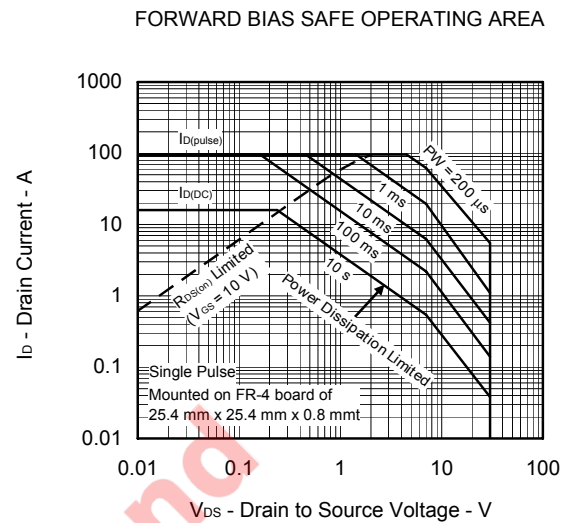
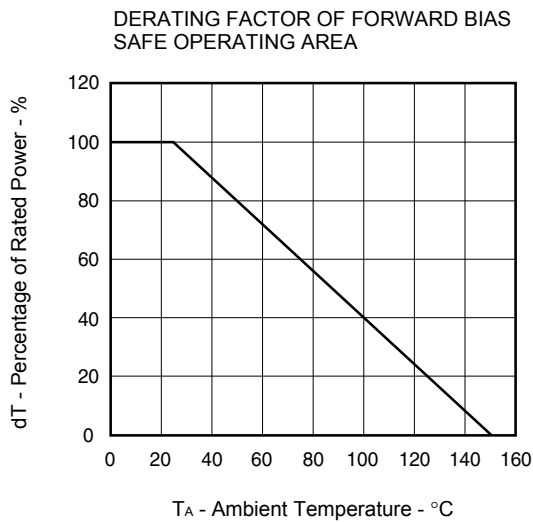
TEST CIRCUIT 2 SWITCHING TIME



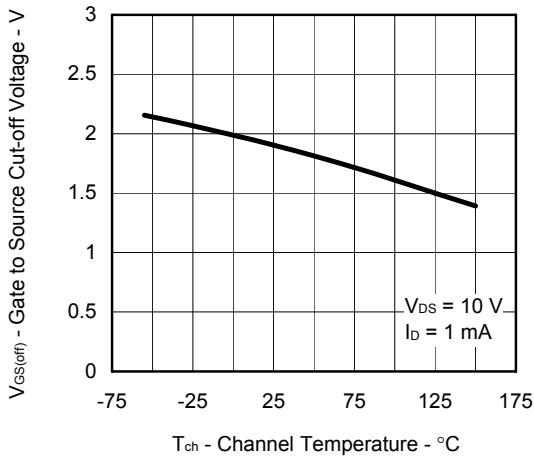
TEST CIRCUIT 3 GATE CHARGE



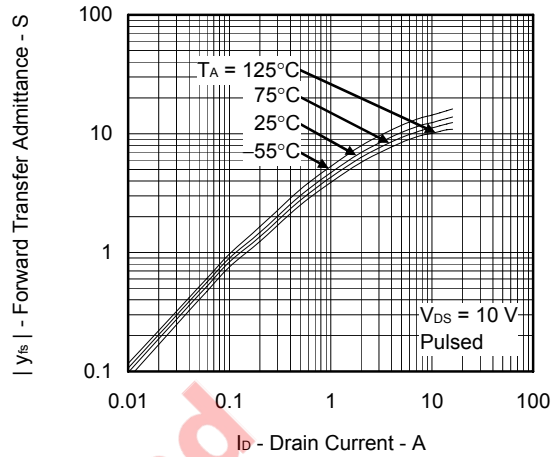
TYPICAL CHARACTERISTICS (T_A = 25°C)



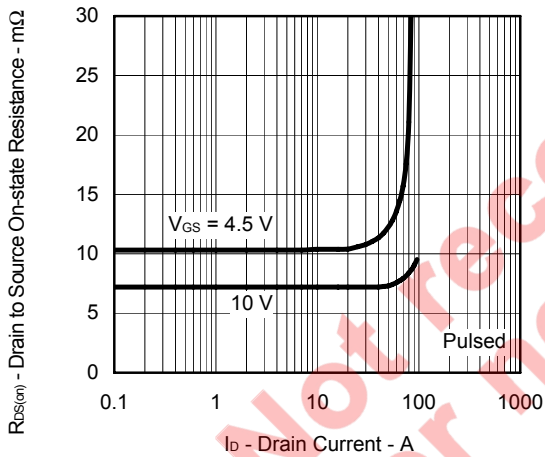
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



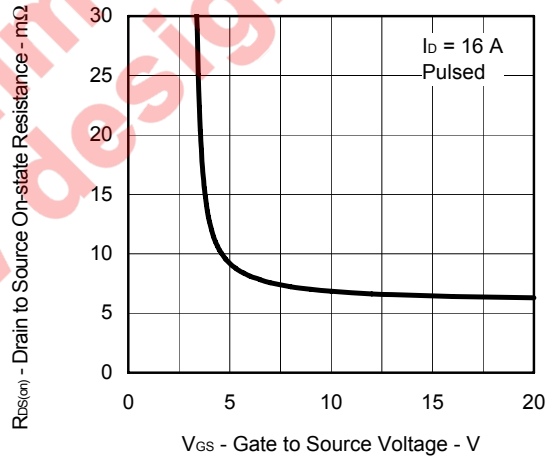
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



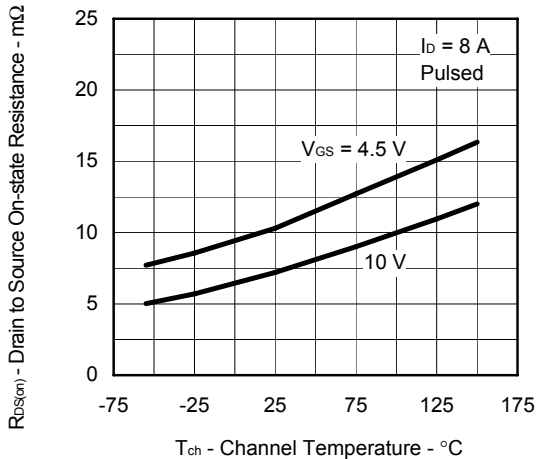
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



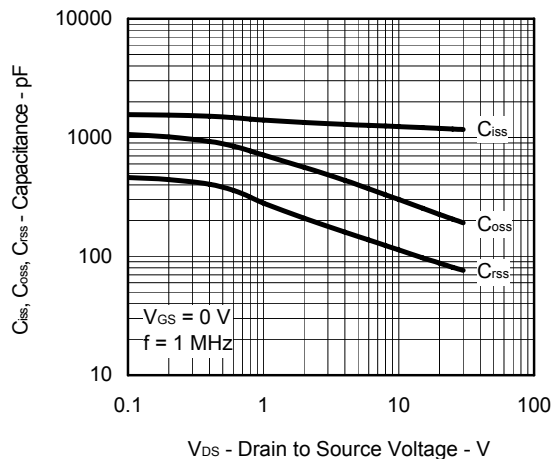
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



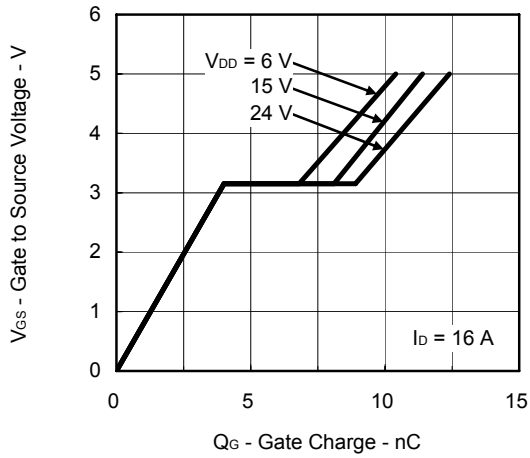
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



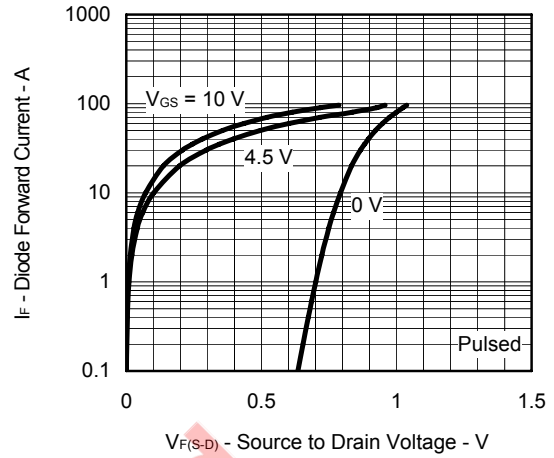
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
μPA2801T1L-E1-AY <small>Note</small>	Pure Sn	Tape 3000 p/reel	8-pin HVSON (3333) 0.028 g TYP.
μPA2801T1L-E2-AY <small>Note</small>			

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

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