

μPA2461T1Q

MOS FIELD EFFECT TRANSISTOR

R07DS0186EJ0100

Rev.1.00

Dec 06, 2010

Description

The μPA2461T1Q is a switching device, which can be driven directly by a 2.5 V power source.

The μPA2461T1Q 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
 - $R_{DS(on)1} = 21.5 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 4.5 \text{ V}$, $I_D = 3.0 \text{ A}$)
 - $R_{DS(on)2} = 22.0 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 4.0 \text{ V}$, $I_D = 3.0 \text{ A}$)
 - $R_{DS(on)3} = 25.0 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 3.1 \text{ V}$, $I_D = 3.0 \text{ A}$)
 - $R_{DS(on)4} = 32.0 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 2.5 \text{ V}$, $I_D = 3.0 \text{ A}$)
- Built-in G-S protection diode against ESD

Ordering Information

Part No.	LEAD PLATING	PACKING	Package
μPA2461T1Q-E1-AX *1	Ni/Pd/Au	8 mm embossed taping 3000 p/reel	8-pin HUSON (2720)

Note: *1. Pb-free (This product does not contain Pb in the external electrode and other parts.)

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)

Item	Symbol	N-CHANNEL	Unit
Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	±12	V
Drain Current (DC) *1	$I_{D(DC)}$	±6.5	A
Drain Current (pulse) *2	$I_{D(pulse)}$	±50	A
Total Power Dissipation (2 unit) *1	P_{T1}	1.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	−55 to +150	°C

Notes: *1. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

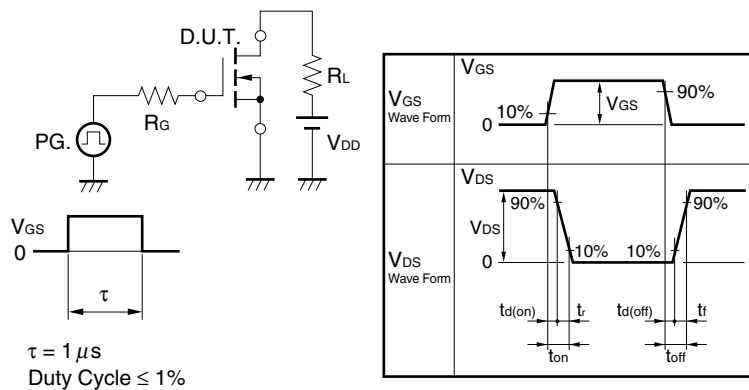
*2. $PW \leq 10 \text{ }\mu\text{s}$, Duty Cycle $\leq 1\%$

Electrical Characteristics (T_A = 25°C)

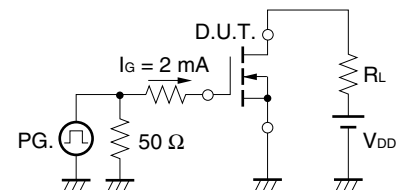
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}			1	μA	V _{DS} = 30 V, V _{GS} = 0 V
Gate Leakage Current	I _{GSS}			±10	μA	V _{GS} = ±12 V, V _{DS} = 0 V
Gate to Source Cut-off Voltage	V _{GS(off)}	0.5	1.0	1.5	V	V _{DS} = 10 V, I _D = 1 mA
Forward Transfer Admittance ^{*1}	y _{fs}	2.5			S	V _{DS} = 10 V, I _D = 3.0 A
Drain to Source On-state Resistance ^{*1}	R _{DS(on)1}	12	17.5	21.5	mΩ	V _{GS} = 4.5 V, I _D = 3.0 A
	R _{DS(on)2}	12.5	18	22	mΩ	V _{GS} = 4.0 V, I _D = 3.0 A
	R _{DS(on)3}	14	19.5	25	mΩ	V _{GS} = 3.1 V, I _D = 3.0 A
	R _{DS(on)4}	15.5	22.5	32	mΩ	V _{GS} = 2.5 V, I _D = 3.0 A
Input Capacitance	C _{iss}		840		pF	V _{DS} = 10 V,
Output Capacitance	C _{oss}		93		pF	V _{GS} = 0 V,
Reverse Transfer Capacitance	C _{rss}		65		pF	f = 1 MHz
Turn-on Delay Time	t _{d(on)}		3		μs	V _{DD} = 15 V, I _D = 3.0 A, V _{GS} = 4 V, R _G = 6 Ω
Rise Time	t _r		6		μs	
Turn-off Delay Time	t _{d(off)}		15		μs	
Fall Time	t _f		10		μs	
Total Gate Charge	Q _G		7.5		nC	V _{DD} = 24 V, V _{GS} = 4 V, I _D = 6.5 A
Gate to Source Charge	Q _{GS}		1.8		nC	
Gate to Drain Charge	Q _{GD}		2.8		nC	
Body Diode Forward Voltage ^{*1}	V _{F(S-D)}		0.83		V	I _F = 6.5 A, V _{GS} = 0 V

Note: *1. Pulsed

TEST CIRCUIT 1 SWITCHING TIME

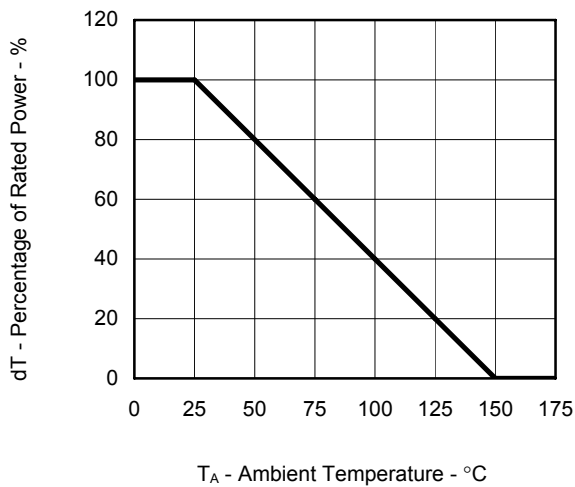


TEST CIRCUIT 2 GATE CHARGE

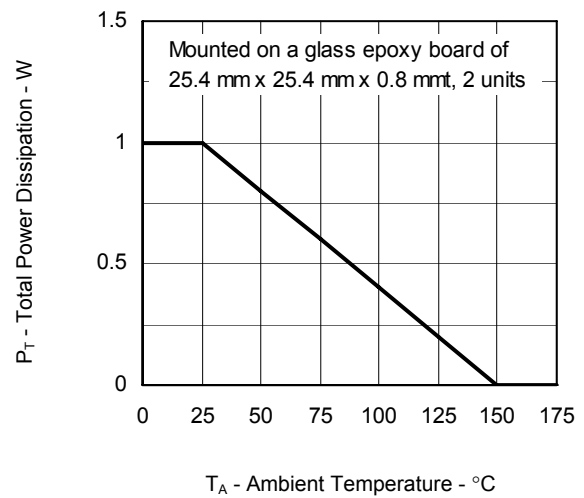


Typical Characteristics ($T_A = 25^\circ\text{C}$)

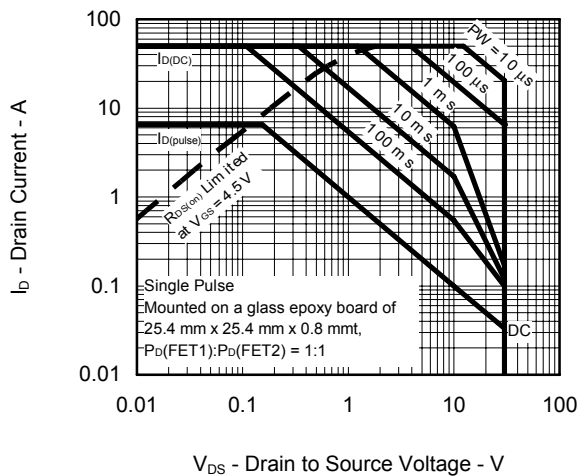
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



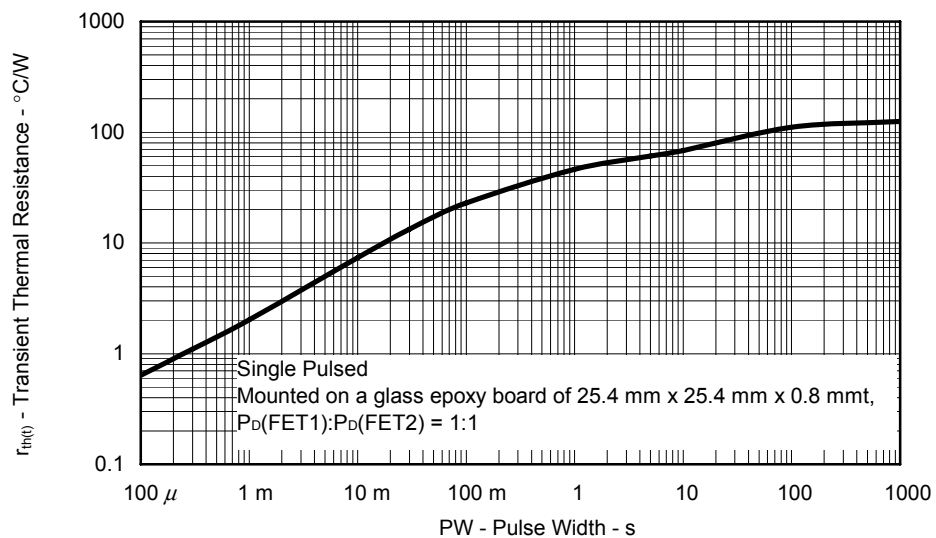
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



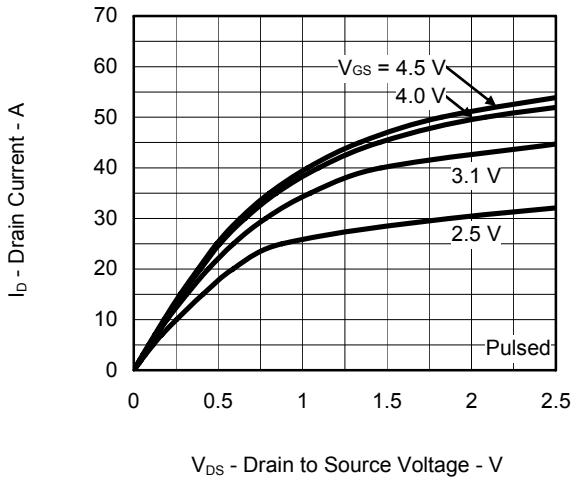
FORWARD BIAS SAFE OPERATING AREA



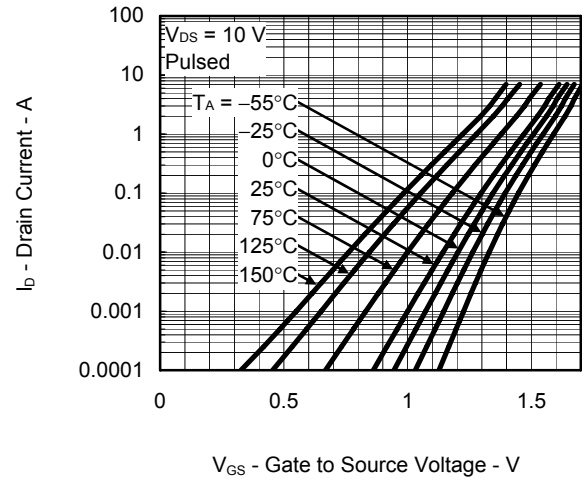
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



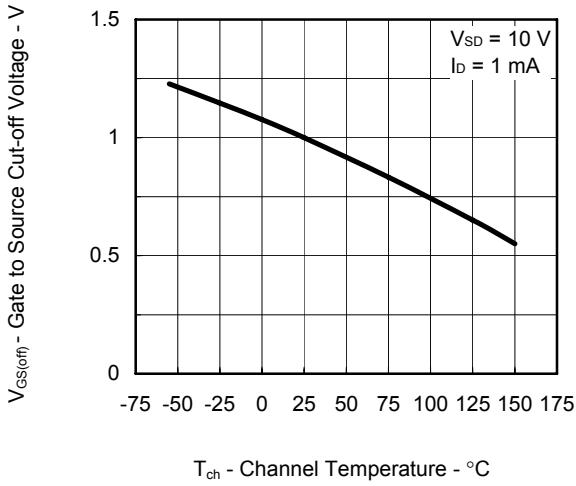
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



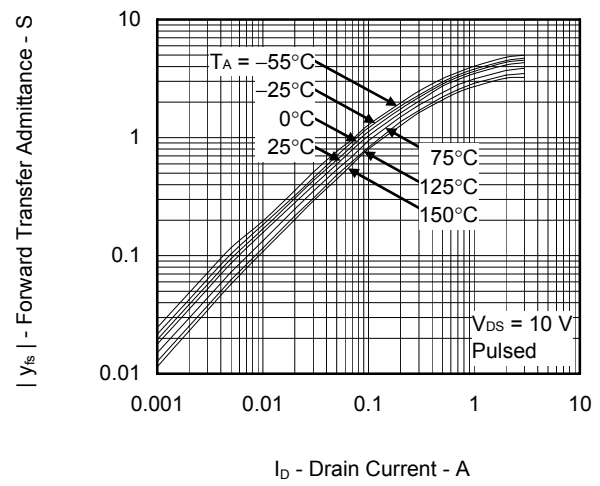
FORWARD TRANSFER CHARACTERISTICS



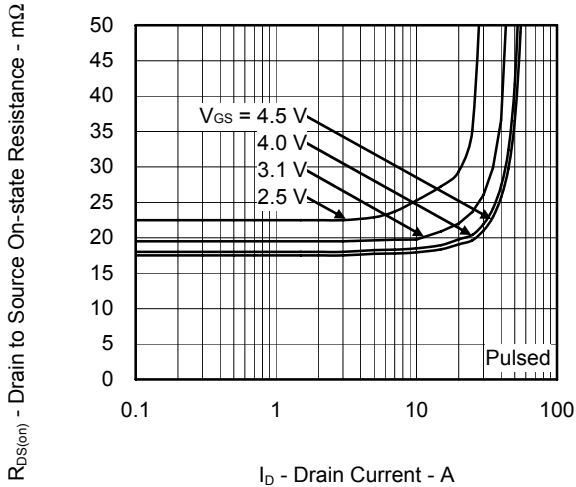
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



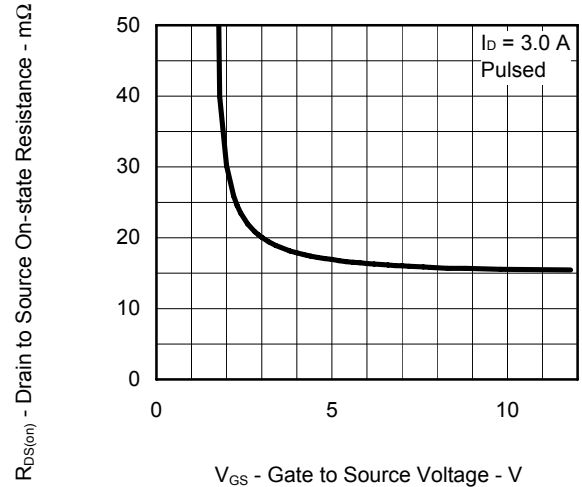
FORWARD TRANSFER ADMITTANCE vs. DRAIN
CURRENT



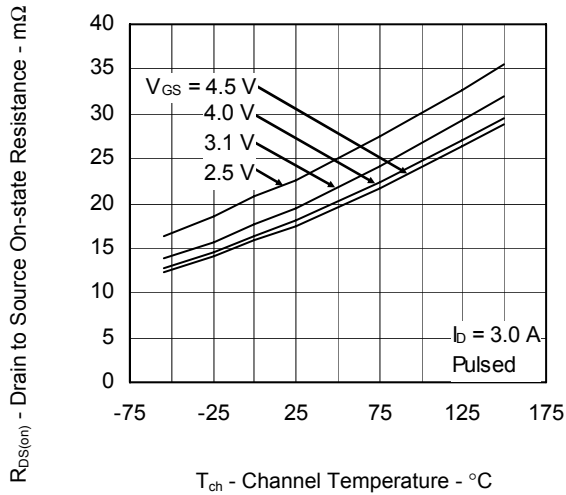
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



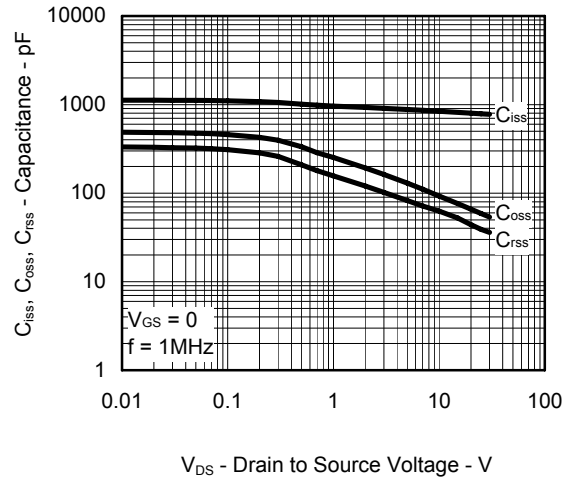
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



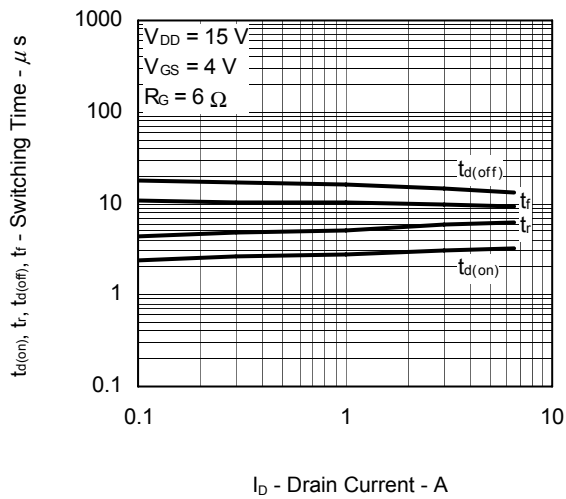
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. CHANNEL TEMPERATURE



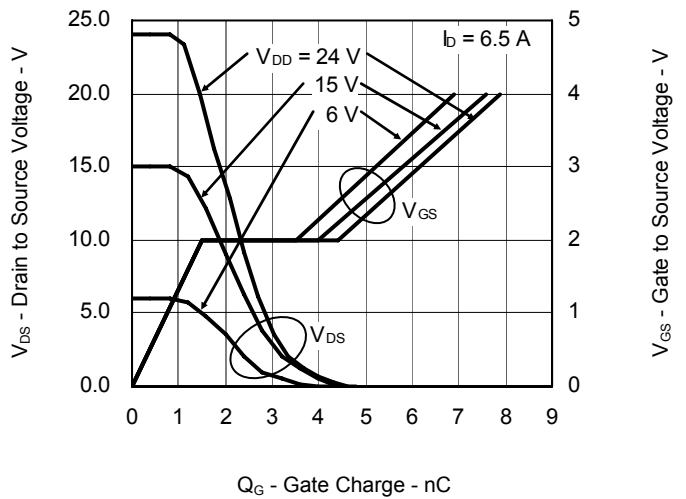
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



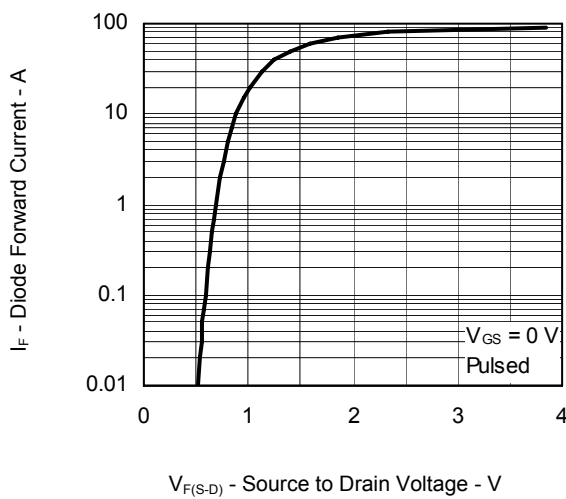
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS

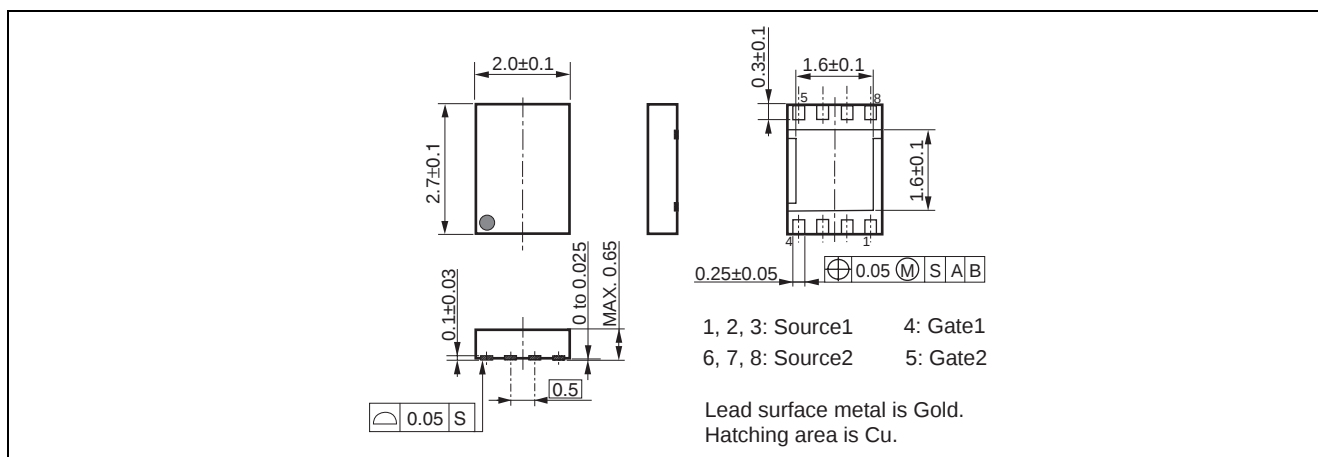


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

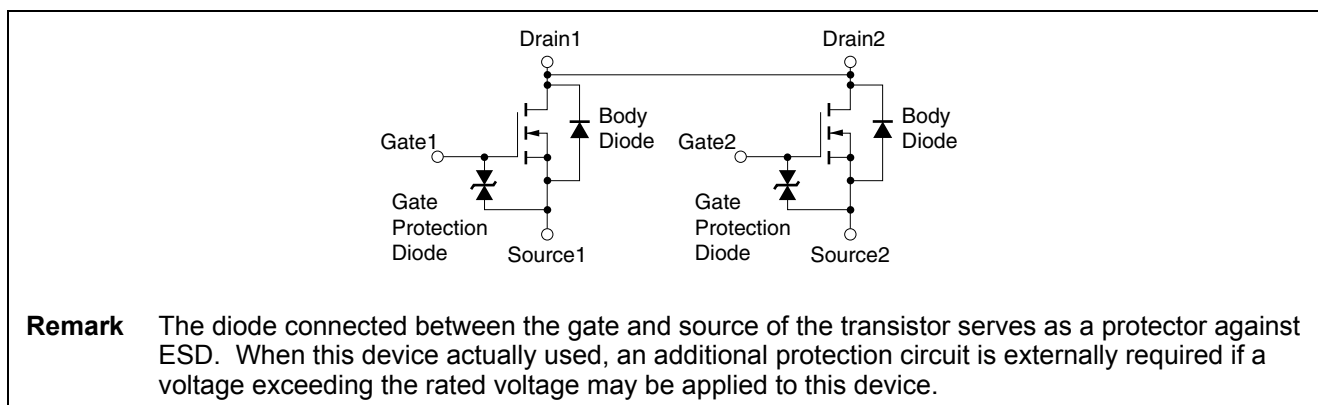


Package Drawings (Unit: mm)

8-pin HUSON (2720)



Equivalent Circuit

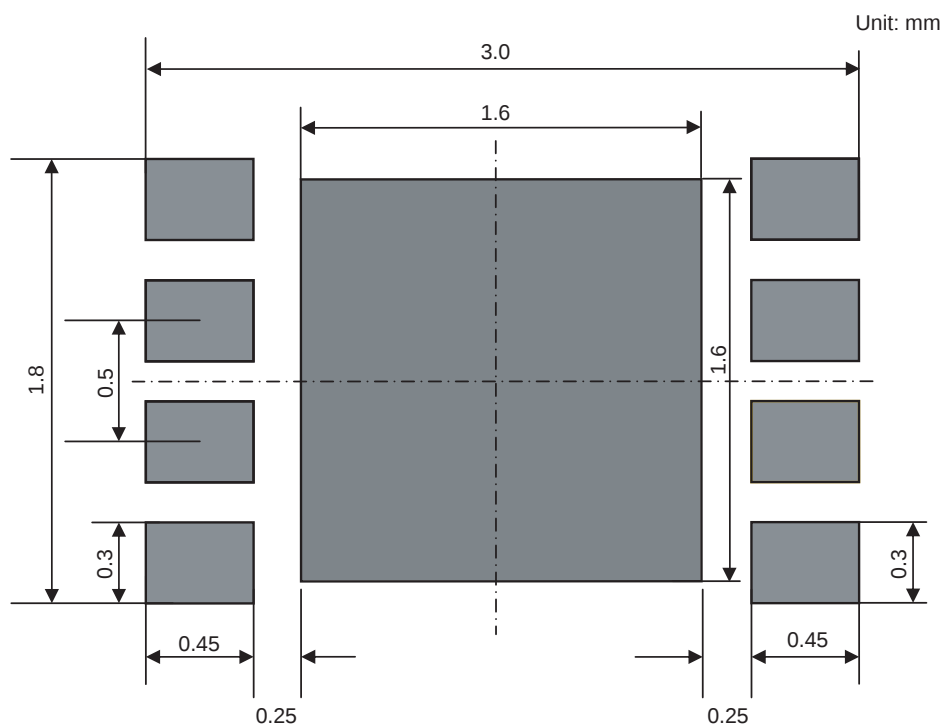


<Notes for using this device safely>

When you use this device, in order to prevent a customer's hazard and damage, use it with understanding the following contents. If used exceeding recommended conditions, there is a possibility of causing failure of the device and characteristic degradation.

1. When you mount the device on a substrate, carry out within our recommended soldering conditions of infrared reflow. If mounted exceeding the conditions, the characteristic of a device may be degraded and it may result in failure.
2. When you wash the device mounted the substrate, carry out within our recommended conditions. If washed exceeding the conditions, the characteristic of a device may be degraded and it may result in failure.
3. When you use ultrasonic wave to substrate after the device mounting, prevent from touching a resonance generator directly. If it touches, the characteristic of a device may be degraded and it may result in failure.
4. Please refer to **Figure 1** as an example of the land pattern. Optimize the land pattern in consideration of density, appearance of solder fillets, common difference, etc in an actual design.

Figure 1. Example of the land pattern



Revision History	μPA2461T1Q Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Dec 06, 2010	–	First Edition Issued

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Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.

7F, No. 363 Fu Shing North Road Taipei, Taiwan, R.O.C.
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

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Tel: +65-6213-0200, Fax: +65-6278-8001

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Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jin Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
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Renesas Electronics Korea Co., Ltd.

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