

# $\mu$ PA2764T1A

N-channel MOSFET 30 V , 130 A , 1.10 m $\Omega$ 

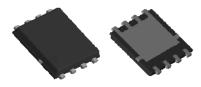
R07DS0881EJ0102 Rev.1.02 Nov 28, 2012

### **Description**

The  $\mu$  PA2764T1A is N-channel MOS Field Effect Transistor designed for high current switching application.

### **Features**

- $V_{DSS} = 30 \text{ V } (T_A = 25^{\circ}\text{C})$
- Low on-state resistance
  - $R_{DS(on)} = 1.10 \text{ m}\Omega$  MAX. ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 46 \text{ A}$ )
  - $R_{DS(on)} = 2.45 \text{ m}\Omega$  MAX. ( $V_{GS} = 4.5 \text{ V}$ ,  $I_D = 35 \text{ A}$ )
- 4.5 V Gate-drive available
- Thin type surface mount package with heat spreader
- Halogen free



8-pin HVSON(6051)

## **Ordering Information**

Part No.	LEAD PLATING	PACKING	Package	
μ PA2764T1A-E2-AY* <sup>1</sup>	Pure Sn	Tape 3000 p/reel	8-pin HVSON(6051)	
			0.1 g TYP.	

Note: \*1. Pb-free (This product does not contain Pb in external electrode.)

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

Item	Symbol	Ratings	Unit
Drain to Source Voltage (V <sub>GS</sub> = 0 V)	V <sub>DSS</sub>	30	V
Gate to Source Voltage (V <sub>DS</sub> = 0 V)	V <sub>GSS</sub>	±20	V
Drain Current (DC) (T <sub>C</sub> = 25°C)	I <sub>D(DC)</sub>	±130	Α
Drain Current (pulse) *1	I <sub>D(pulse)</sub>	±280	Α
Total Power Dissipation *2	P <sub>T1</sub>	1.5	W
Total Power Dissipation (PW = 10 sec) *2	P <sub>T2</sub>	4.6	W
Total Power Dissipation (T <sub>C</sub> = 25°C)	P <sub>T3</sub>	83	W
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	−55 to +150	°C
Single Avalanche Current *3	I <sub>AS</sub>	50	Α
Single Avalanche Energy *3	E <sub>AS</sub>	250	mJ

### **Thermal Resistance**

Channel to Ambient Thermal Resistance  $^{*2}$  R<sub>th(ch-A)</sub> 83.3 °C/W Channel to Case(Drain) Thermal Resistance R<sub>th(ch-C)</sub> 1.5 °C/W

Notes: \*1. PW  $\leq$  10  $\mu$ s, Duty Cycle  $\leq$  1%

\*2. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mmt

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

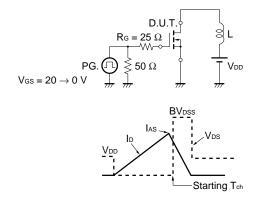
# Electrical Characteristics (T<sub>A</sub> = 25°C)

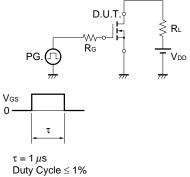
Item	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			10	μА	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V
Gate Leakage Current	I <sub>GSS</sub>			±100	nA	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$
Gate Cut-off Voltage	V <sub>GS(off)</sub>	1.0		2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance *1	y <sub>fs</sub>	27			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 35 A
Drain to Source On-state	R <sub>DS(on)1</sub>		0.90	1.10	mΩ	$V_{GS} = 10 \text{ V}, I_D = 46 \text{ A}$
Resistance *1	R <sub>DS(on)2</sub>		1.60	2.45	mΩ	$V_{GS} = 4.5 \text{ V}, I_D = 35 \text{ A}$
Input Capacitance	C <sub>iss</sub>		7930		pF	V <sub>DS</sub> = 10 V,
Output Capacitance	Coss		2900		pF	$V_{GS} = 0 V$ ,
Reverse Transfer Capacitance	C <sub>rss</sub>		2550		pF	f = 1 MHz
Turn-on Delay Time	t <sub>d(on)</sub>		47		ns	V <sub>DD</sub> = 15 V, I <sub>D</sub> = 35 A,
Rise Time	t <sub>r</sub>		160		ns	V <sub>GS</sub> = 10 V,
Turn-off Delay Time	$t_{d(off)}$		310		ns	$R_G = 10 \Omega$
Fall Time	t <sub>f</sub>		320		ns	
Total Gate Charge	$Q_G$		180		nC	V <sub>DD</sub> = 15 V,
Gate to Source Charge	$Q_{GS}$		25		nC	V <sub>GS</sub> = 10 V,
Gate to Drain Charge	$Q_{GD}$		70		nC	I <sub>D</sub> = 70 A
Body Diode Forward Voltage *1	$V_{F(S-D)}$		0.8	1.5	V	I <sub>F</sub> = 46 A, V <sub>GS</sub> = 0 V
Reverse Recovery Time	t <sub>rr</sub>		117		ns	I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0 V,
Reverse Recovery Charge	Q <sub>rr</sub>		157		nC	di/dt = 100 A/μs

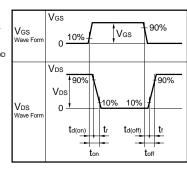
Note: \*1. Pulsed

### **TEST CIRCUIT 1 AVALANCHE CAPABILITY**

### **TEST CIRCUIT 2 SWITCHING TIME**



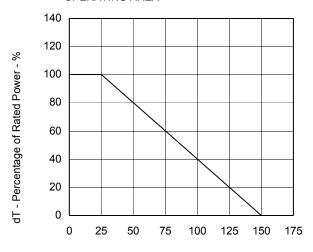




### TEST CIRCUIT 3 GATE CHARGE

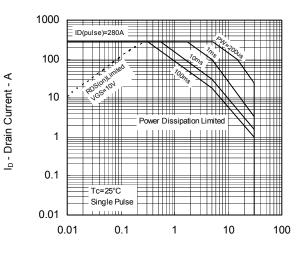
### TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



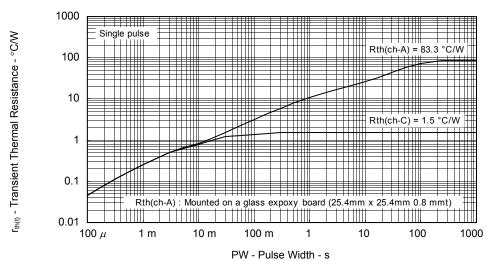
T<sub>C</sub> - Case Temperature - °C

#### FORWARD BIAS SAFE OPERATING AREA

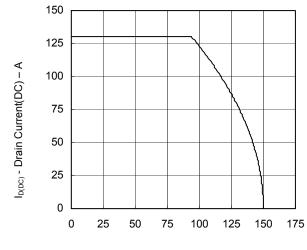


 $V_{\text{DS}}$  - Drain to Source Voltage – V

### TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

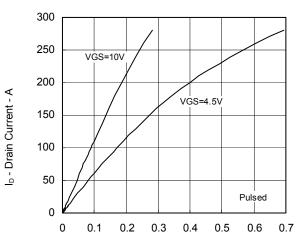


DRAIN CURRENT(DC) vs. CASE TEMPERATURE



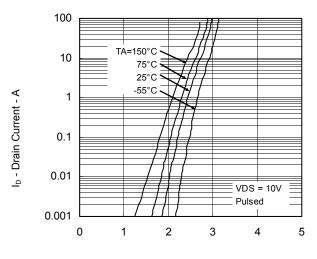
T<sub>C</sub> - Case Temperature - °C

DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



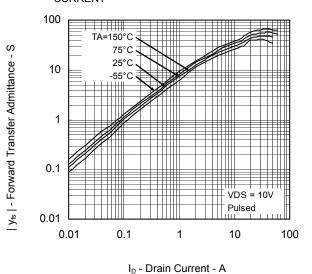
V<sub>DS</sub> - Drain to Source Voltage - V

#### FORWARD TRANSFER CHARACTERISTICS

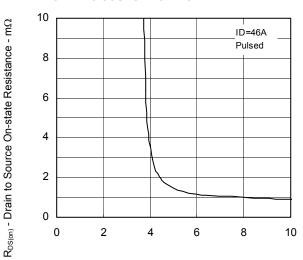


V<sub>GS</sub> - Gate to Source Voltage - V

# FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

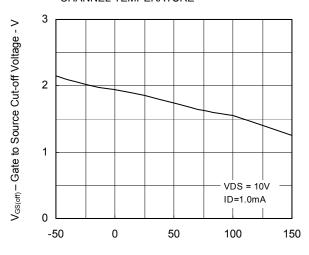


DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



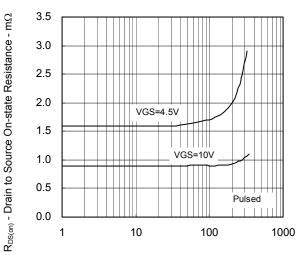
 $V_{\text{GS}}$  - Gate to Source Voltage - V

# GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



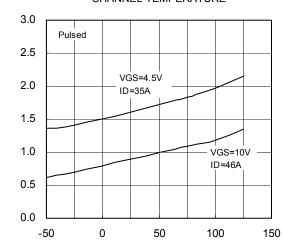
T<sub>ch</sub> - Channel Temperature - °C

# DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



I<sub>D</sub> - Drain Current - A

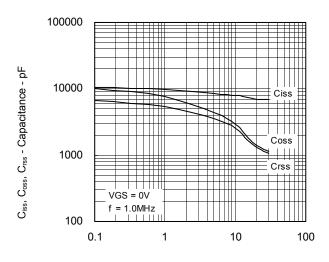
# DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



 $T_{ch}$  - Channel Temperature -  $^{\circ}C$ 

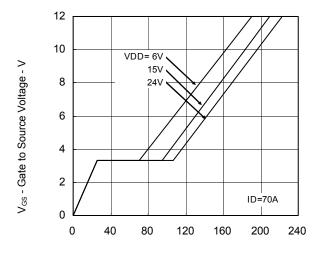
 $R_{DS(on)}$  - Drain to Source On-state Resistance -  $m\Omega$ 

### CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



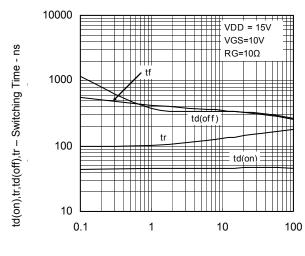
 $V_{\text{DS}}$  - Drain to Source Voltage - V

#### DYNAMIC INPUT CHARACTERISTICS



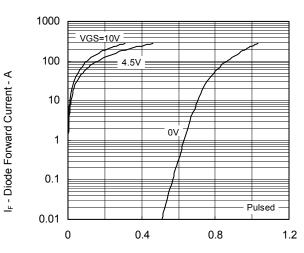
 $\ensuremath{\mathsf{Q}}_{\ensuremath{\mathsf{G}}}$  - Gate Charge - nC

### SWITCHING CHARACTERISTICS



ID - Drain Current - A

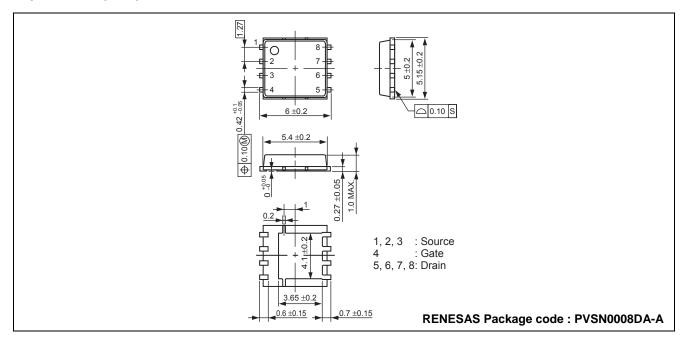
### SOURCE TO DRAIN DIODE FORWARD VOLTAGE



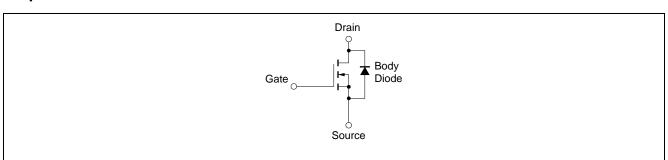
 $V_{F(S-D)}$  - Source to Drain Voltage - V

# Package Drawings (Unit: mm)

### 8pin-HVSON(6051)



# **Equivalent Circuit**



**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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