

μ PA2812T1L

P-channel MOSFEF

-30 V, -30 A, 4.8 mΩ

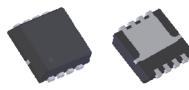
R07DS0762EJ0101 Rev.1.01 May 28, 2013

Description

The μ PA2812T1L is P-channel MOS Field Effect Transistor designed for DC/DC converter and power management applications of portable equipment.

Features

- $V_{DSS} = -30 \text{ V } (T_A = 25^{\circ}\text{C})$
- Low on-state resistance
 - --- $R_{DS(on)}$ = 4.8 mΩ MAX. (V_{GS} = -10 V, I_D = -30 A)
- 4.5 V Gate-drive available
- Small & thin type surface mount package with heat spreader
- Pb-free and Halogen free



8-pin HVSON(3333)

Ordering Information

Part No.	Lead Plating	Packing	Package
μPA2812T1L-E2-AT *1	Pure Sn	Tape 3000 p/reel	8-pin HVSON (3333)
			typ. 0.028 g

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

Absolute Maximum Ratings (T_A = 25°C)

Item	Symbol	Ratings	Unit
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 _C = 25°C)	I _{D(DC)}	∓30	А
Drain Current (pulse) *1	I _{D(pulse)}	∓120	А
Total Power Dissipation *2	P _{T1}	1.5	W
Total Power Dissipation (PW = 10 sec) *2	P _{T2}	3.8	W
Total Power Dissipation (T _C = 25°C)	P _{T3}	52	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	−55 to +150	°C
Single Avalanche Current *3	I _{AS}	25	А
Single Avalanche Energy *3	E _{AS}	62	mJ

Thermal Resistance

Channel to Ambient Thermal Resistance *2 $R_{th(ch-A)}$ 83.3 °C/W Channel to Case (Drain) Thermal Resistance $R_{th(ch-C)}$ 2.4 °C/W

Notes: *1. PW \leq 10 μ 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 Ω , V_{GS} = -20 \rightarrow 0 V, L = 100 μH

Electrical Characteristics (T_A = 25°C)

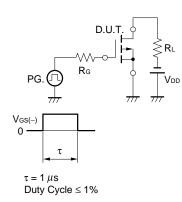
Item	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}			-1	μΑ	$V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}$
Gate Leakage Current	I _{GSS}			∓100	nA	$V_{GS} = \mp 20 \text{ V}, V_{DS} = 0 \text{ V}$
Gate Cut-off Voltage	$V_{GS(off)}$	-1.0		-2.5	V	$V_{DS} = -10 \text{ V}, I_{D} = -1 \text{ mA}$
Forward Transfer Admittance *1	y _{fs}	8.0			S	$V_{DS} = -10 \text{ V}, I_{D} = -15 \text{ A}$
Drain to Source On-state	R _{DS(on)1}		3.8	4.8	mΩ	$V_{GS} = -10 \text{ V}, I_D = -30 \text{ A}$
Resistance *1	R _{DS(on)2}		6.4	9.9	mΩ	$V_{GS} = -4.5 \text{ V}, I_D = -15 \text{ A}$
Input Capacitance	C _{iss}		3740		pF	$V_{DS} = -10 \text{ V},$
Output Capacitance	Coss		1775		pF	$V_{GS} = 0 V$,
Reverse Transfer Capacitance	C _{rss}		1500		pF	f = 1 MHz
Turn-on Delay Time	t _{d(on)}		24		ns	$V_{DD} = -15 \text{ V}, I_D = -15 \text{ A},$
Rise Time	t _r		53		ns	$V_{GS} = -10 \text{ V},$
Turn-off Delay Time	t _{d(off)}		176		ns	$R_G = 10 \Omega$
Fall Time	t _f		252		ns	
Total Gate Charge	Q_{G}		100		nC	$V_{DD} = -24 \text{ V},$
Gate to Source Charge	Q_{GS}		11		nC	$V_{GS} = -10 \text{ V},$
Gate to Drain Charge	Q_{GD}		48		nC	$I_D = -30 \text{ A}$
Body Diode Forward Voltage *1	$V_{F(S-D)}$		0.85		V	$I_F = 30 \text{ A}, V_{GS} = 0 \text{ V}$
Reverse Recovery Time	t _{rr}		196		ns	$I_F = 30 \text{ A}, V_{GS} = 0 \text{ V},$
Reverse Recovery Charge	Q _{rr}		297		nC	di/dt = 100 A/μs

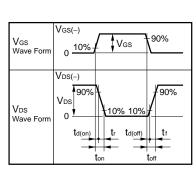
Note: *1. Pulsed

TEST CIRCUIT 1 AVALANCHE CAPABILITY

$PG. \bigcirc PG. \bigcirc PG.$

TEST CIRCUIT 2 SWITCHING TIME



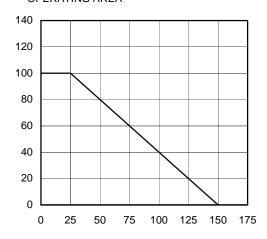


TEST CIRCUIT 3 GATE CHARGE

dT - Percentage of Rated Power - %

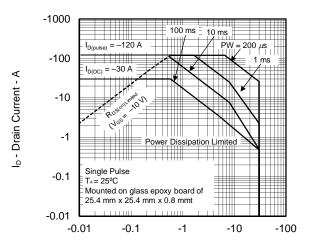
Typical Characteristics (T_A = 25°C)

DERATING FACTOR OF FORWARD BIAS SAFE **OPERATING AREA**



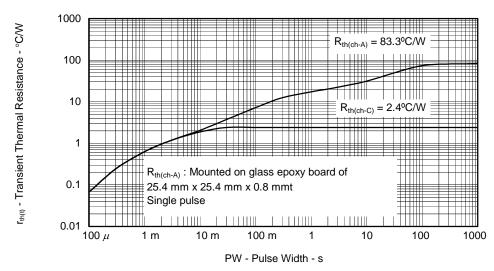
T_A - Ambient Temperature - °C

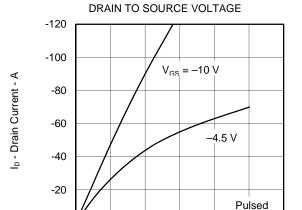
FORWARD BIAS SAFE OPERATING AREA



 V_{DS} - Drain to Source Voltage - V

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH





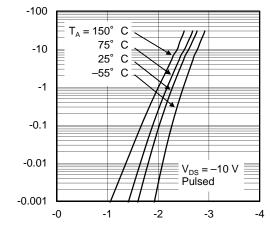
-0.4

DRAIN CURRENT vs.

-0.6 V_{DS} - Drain to Source Voltage - V

-0.8

FORWARD TRANSFER CHARACTERISTICS



 V_{GS} - Gate to Source Voltage - V

-0

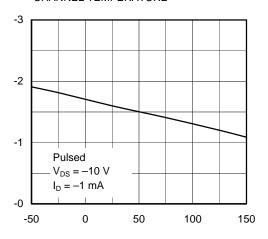
-0

-0.2

-1.2

 $V_{\text{GS}(\text{off})}-$ Gate to Source Cut-off Voltage - V

GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE

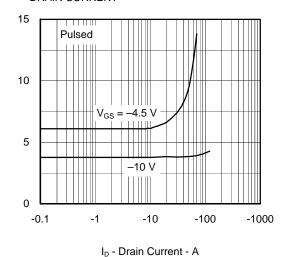


T_{ch} - Channel Temperature - °C

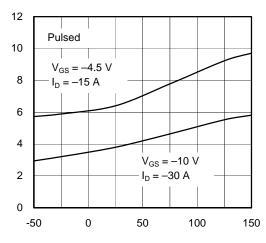
R_{DS(on)} - Drain to Source On-state Resistance - mΩ

R_{DS(on)} - Drain to Source On-state Resistance - mΩ

DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

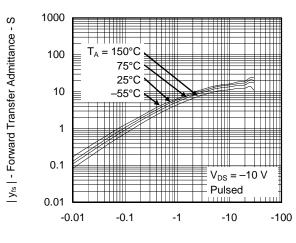


DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



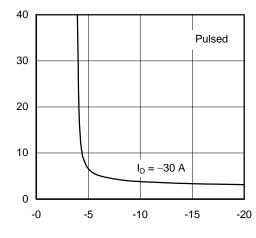
 T_{ch} - Channel Temperature - $^{\circ}\text{C}$

FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



ID - Drain Current - A

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

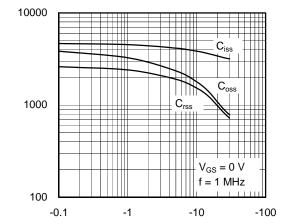


V_{GS} - Gate to Source Voltage - V

Coss, Crss - Capacitance - pF

R_{DS(on)} - Drain to Source On-state Resistance - mΩ

CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

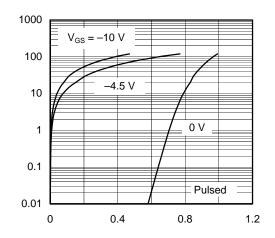


V_{DS} - Drain to Source Voltage - V

DYNAMIC INPUT/OUTPUT CHARACTERISTICS

-30 -12 V_{GS} V_{DS} - Drain to Source Voltage - V V_{DS} -10 -20 -8 -6 -10 -4 -2 $I_{D} = -30 \text{ A}$ -0 -0 0 20 40 60 80 100 Q_G - Gate Charge - nC

SOURCE TO DRAIN DIODE FORWARD VOLTAGE



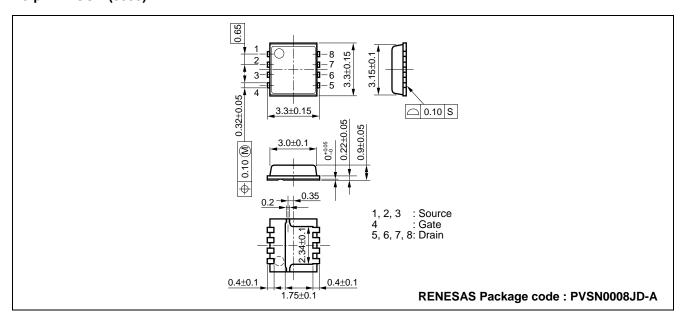
 $V_{\text{F(S-D)}}$ - Source to Drain Voltage - V

V_{GS} - Gate to Source Voltage - V

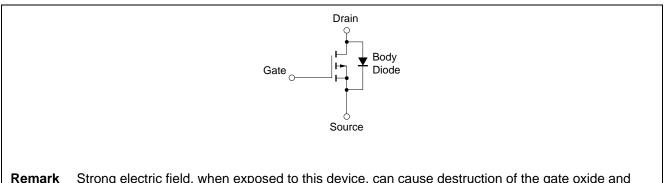
I_F - Diode Forward Current - A

Package Drawings (Unit: mm)

8-pin HVSON (3333)



Equivalent Circuit



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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