

# μPA2822T1L

R07DS0754EJ0100

Rev.1.00

## MOS FIELD EFFECT TRANSISTOR

May 25, 2012

### Description

The μPA2822T1L is N-channel MOS Field Effect Transistor designed for power management applications of a notebook computer and Lithium-Ion battery protection circuit.

### Features

- $V_{DSS} = 30\text{ V}$  ( $T_A = 25^\circ\text{C}$ )
- Low on-state resistance  
—  $R_{DS(on)} = 2.6\text{ m}\Omega$  MAX. ( $V_{GS} = 10\text{ V}$ ,  $I_D = 34\text{ A}$ )
- 4.5V Gate-drive available
- Small surface mount package (8-pin HVSON (3333))
- Pb-free, Halogen Free

### Ordering Information

Part No.	Lead Plating	Packing	Package
μPA2822T1L-E1-AT *1	Pure Sn (Tin)	Tape 3000 p/reel	8-pin HVSON (3333) typ. 0.028 g
μPA2822T1L-E2-AT *1			

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

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

Item	Symbol	Ratings	Unit
Drain to Source Voltage ( $V_{GS} = 0\text{ V}$ )	$V_{DSS}$	30	V
Gate to Source Voltage ( $V_{DS} = 0\text{ V}$ )	$V_{GSS}$	±20	V
Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )	$I_{D(DC)}$	±34	A
Drain Current (pulse) *1	$I_{D(pulse)}$	±150	A
Total Power Dissipation *2	$P_{T1}$	1.5	W
Total Power Dissipation (PW = 10 sec) *2	$P_{T2}$	3.8	W
Total Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_{T3}$	52	W
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C
Single Avalanche Current *3	$I_{AS}$	25	A
Single Avalanche Energy *3	$E_{AS}$	62.5	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.  $PW \leq 10\ \mu\text{s}$ , Duty Cycle  $\leq 1\%$

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

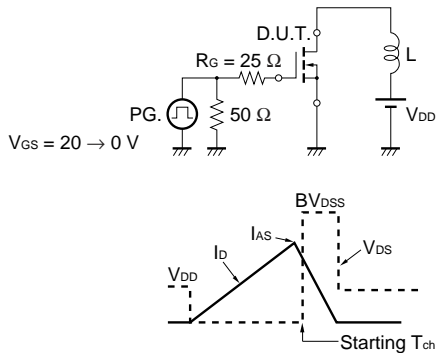
\*3. Starting  $T_{ch} = 25^\circ\text{C}$ ,  $V_{DD} = 15\text{ V}$ ,  $R_G = 25\ \Omega$ ,  $V_{GS} = 20 \rightarrow 0\text{ V}$ ,  $L = 100\ \mu\text{H}$

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

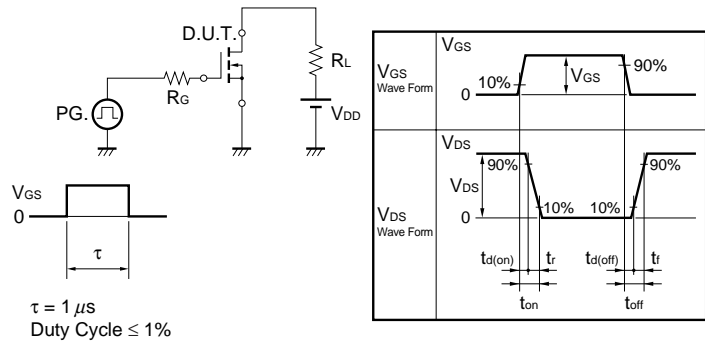
Item	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1	μA	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V
Gate Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V
Gate Cut-off Voltage	V <sub>GS(off)</sub>	1.0		2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance *1	y <sub>fs</sub>	16			S	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 8.5 A
Drain to Source On-state Resistance *1	R <sub>DS(on)1</sub>		1.9	2.6	mΩ	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 34 A
	R <sub>DS(on)2</sub>		3.5	7.5	mΩ	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 8.5 A
Input Capacitance	C <sub>iss</sub>		4660		pF	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz
Output Capacitance	C <sub>oss</sub>		1350		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		1170		pF	
Turn-on Delay Time	t <sub>d(on)</sub>		42		ns	V <sub>DD</sub> = 15 V, I <sub>D</sub> = 17 A, V <sub>GS</sub> = 10 V, R <sub>G</sub> = 10 Ω
Rise Time	t <sub>r</sub>		53		ns	
Turn-off Delay Time	t <sub>d(off)</sub>		126		ns	
Fall Time	t <sub>f</sub>		85		ns	
Total Gate Charge	Q <sub>G</sub>		83		nC	V <sub>GS</sub> = 10 V,
			51		nC	V <sub>GS</sub> = 5 V
Gate to Source Charge	Q <sub>GS</sub>		12		nC	V <sub>DD</sub> = 15 V, I <sub>D</sub> = 34 A
Gate to Drain Charge	Q <sub>GD</sub>		28		nC	
Body Diode Forward Voltage *1	V <sub>F(S-D)</sub>		0.8		V	I <sub>F</sub> = 34 A, V <sub>GS</sub> = 0 V
Reverse Recovery Time	t <sub>rr</sub>		61		ns	I <sub>F</sub> = 34 A, V <sub>GS</sub> = 0 V, di/dt = 100 A/μs
Reverse Recovery Charge	Q <sub>rr</sub>		64		nC	

Note: \*1. Pulsed

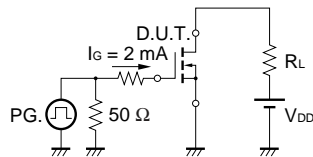
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



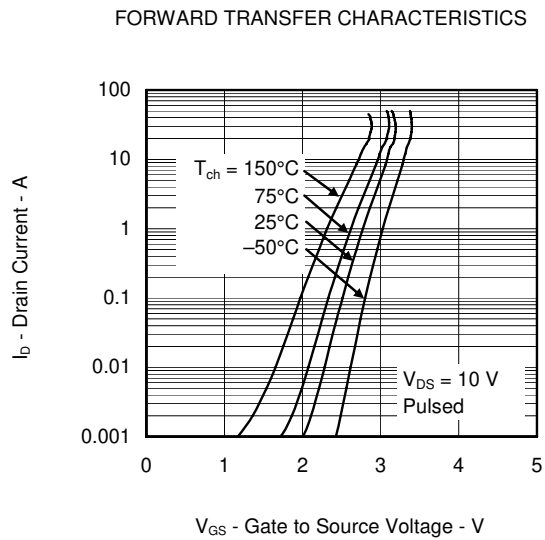
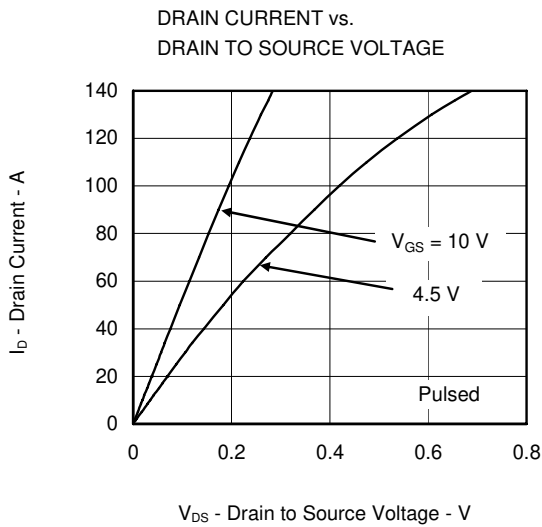
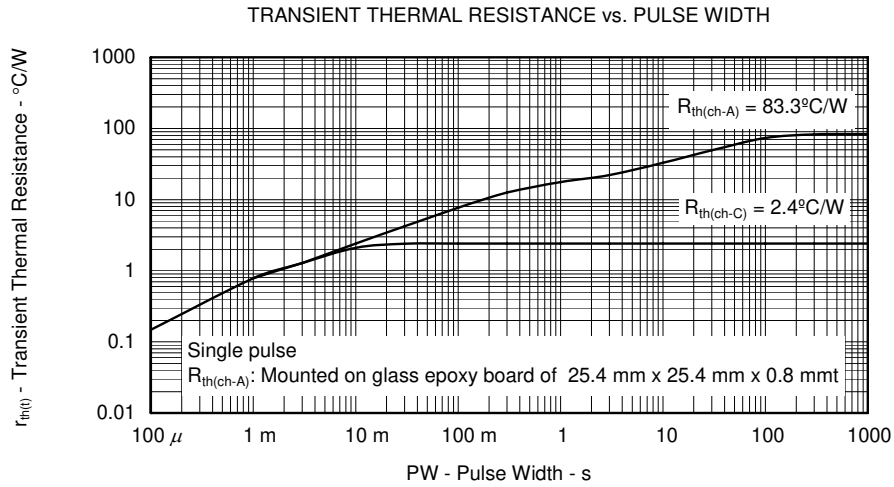
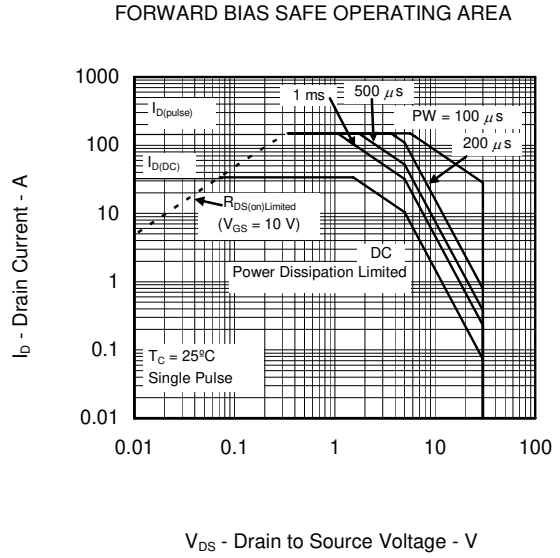
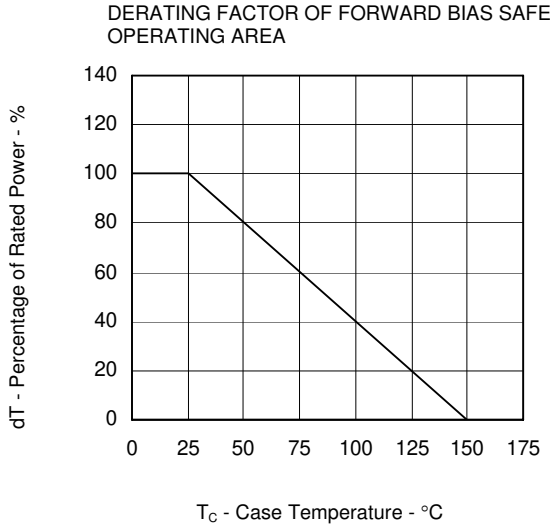
**TEST CIRCUIT 2 SWITCHING TIME**



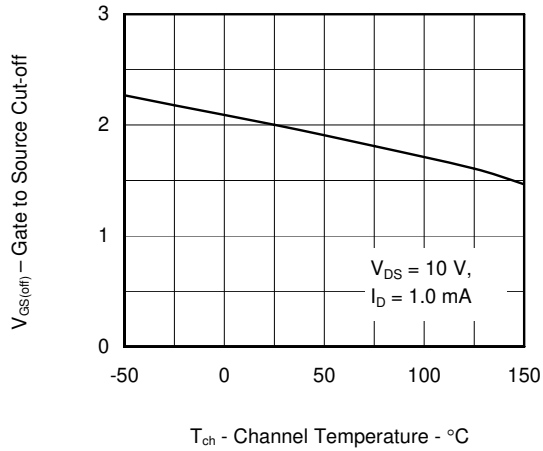
**TEST CIRCUIT 3 GATE CHARGE**



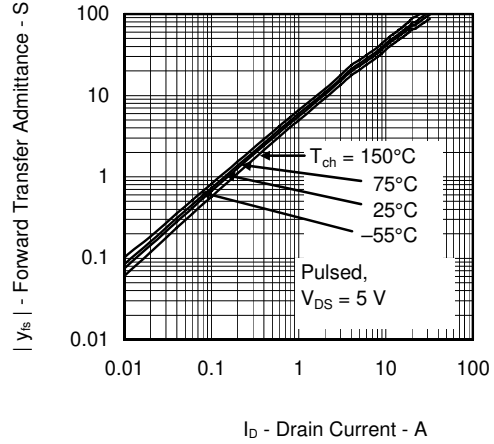
Typical Characteristics (T<sub>A</sub> = 25°C)



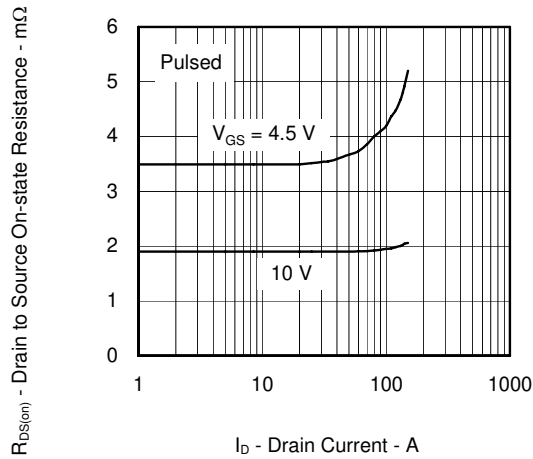
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



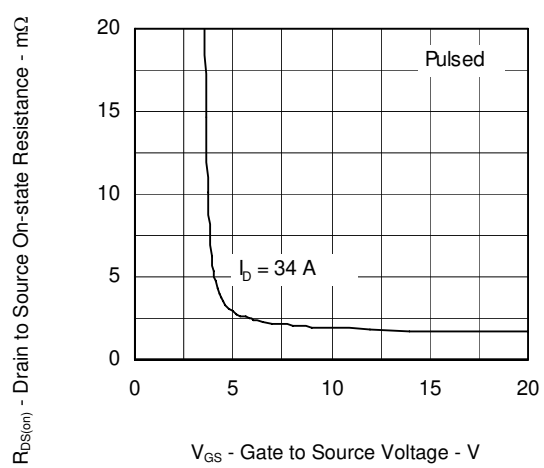
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



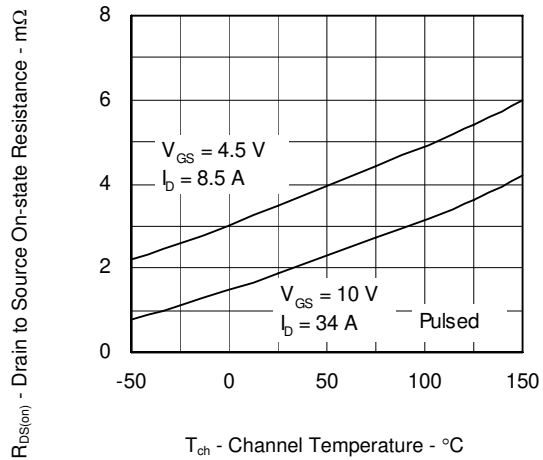
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



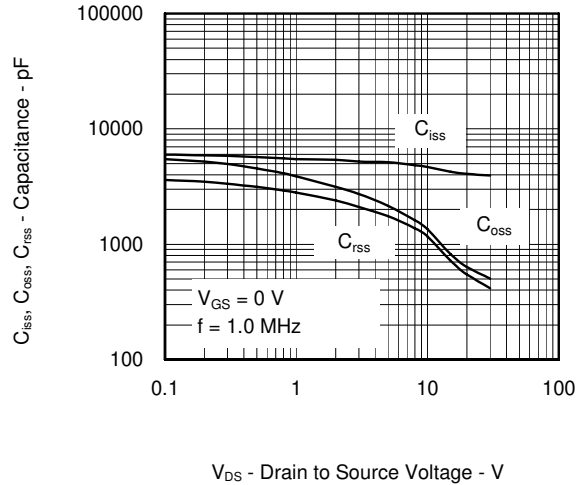
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



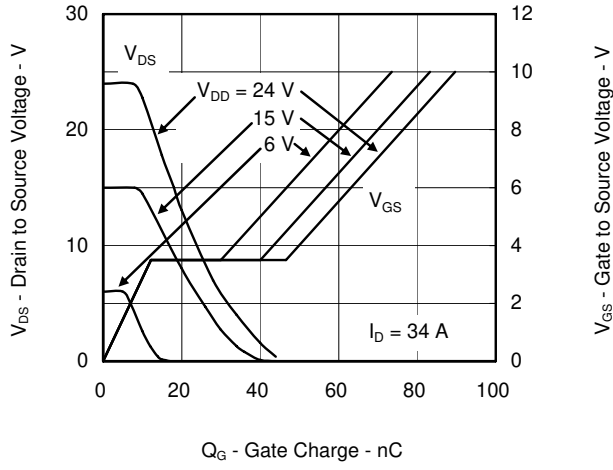
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



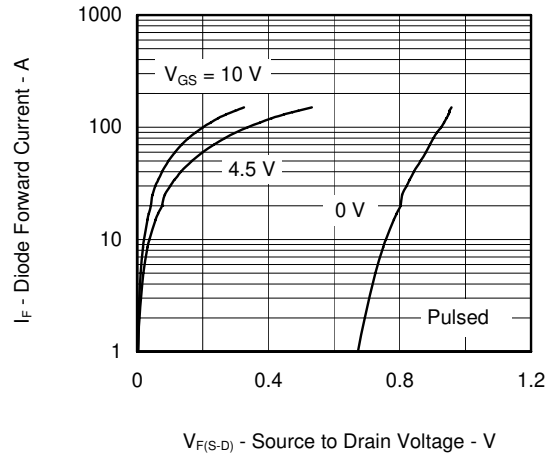
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS

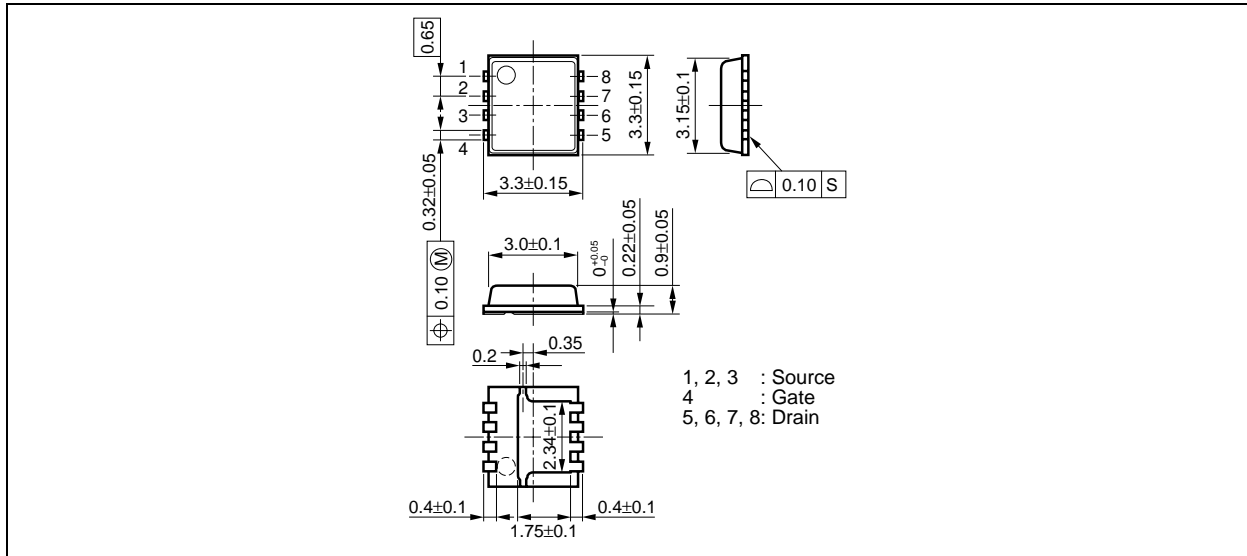


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

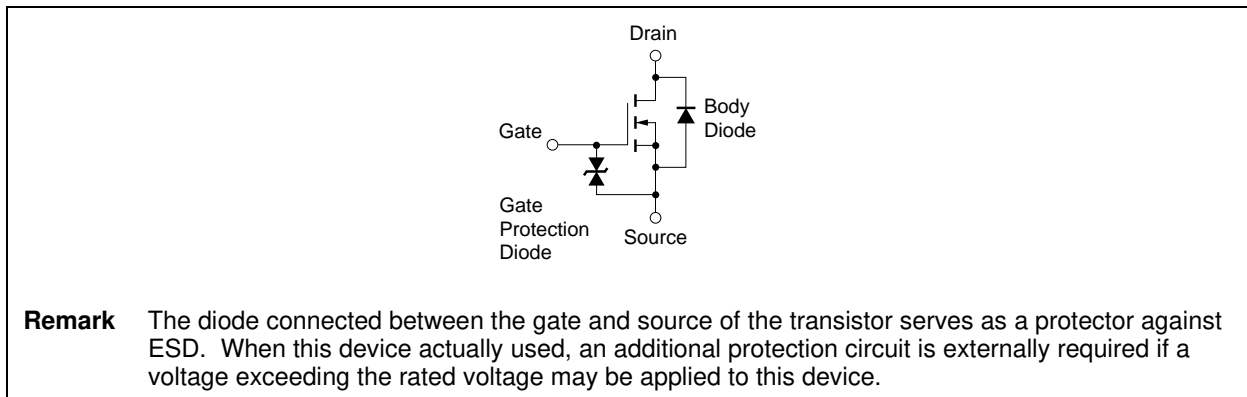


## Package Drawings (Unit: mm)

### 8-pin HVSON (3333)



## Equivalent Circuit



<b>Revision History</b>	<b><math>\mu</math>PA2822T1L Data Sheet</b>
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Rev.	Date	Description	
		Page	Summary
1.00	May 25, 2012	-	First Edition Issued

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