

# μ PA2806

## MOS FIELD EFFECT TRANSISTOR

R07DS0008EJ0100

Rev.1.00

June 01, 2010

### Description

The μ PA2806 is N-channel MOSFET designed for DC/DC converter and power management applications.

### Features

- Low on-state resistance
  - $R_{DS(on)1} = 57 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$ )
  - $R_{DS(on)2} = 70 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 8 \text{ V}, I_D = 10 \text{ A}$ )
- Low  $C_{iss}$ :  $C_{iss} = 780 \text{ pF TYP.}$  ( $V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ )
- Built-in gate protection diode
- Thin type surface mount package with heat spreader (8-pin HVSON)
- RoHS Compliant

### Ordering Information

Part No.	LEAD PLATING	PACKING	Package
μ PA2806T1L-E1-AY *1	Pure Sn (Tin)	Tape 3000 p/reel	8-pin HVSON (3333) typ. 0.028 g
μ PA2806T1L-E2-AY *1			

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

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

Item	Symbol	Ratings	Unit
Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	100	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )	$I_{D(DC)}$	$\pm 21$	A
Drain Current (pulse) *1	$I_{D(pulse)}$	$\pm 31$	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 ( $T_C = 25^\circ\text{C}$ ) *2	$P_{T3}$	52	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$
Single Avalanche Current *3	$I_{AS}$	14.3	A
Single Avalanche Energy *3	$E_{AS}$	20.4	mJ

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  $T_{ch} = 25^\circ\text{C}$ ,  $V_{DD} = 50 \text{ V}$ ,  $R_G = 25 \Omega$ ,  $V_{GS} = 20 \rightarrow 0 \text{ V}$ ,  $L = 100 \mu\text{H}$

### Thermal Resistance

Channel to Ambient Thermal Resistance *1	$R_{th(ch-A)}$	83.3	$^\circ\text{C/W}$
Channel to Case (Drain) Thermal Resistance	$R_{th(ch-C)}$	2.4	$^\circ\text{C/W}$

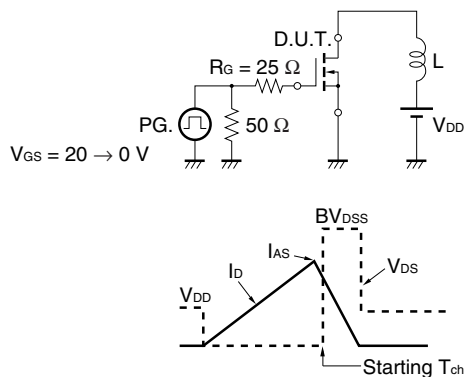
Note: \*1. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

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

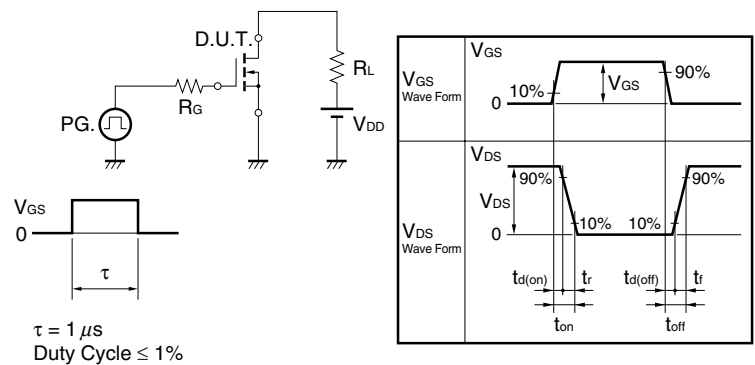
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			10	μA	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V
Gate Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V
Gate Cut-off Voltage	V <sub>GS(off)</sub>	2.0		4.0	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance *1	y <sub>fs</sub>	5			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 10 A
Drain to Source On-state Resistance *1	R <sub>DS(on)1</sub>		47	57	mΩ	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 A
	R <sub>DS(on)2</sub>		49	70	mΩ	V <sub>GS</sub> = 8 V, I <sub>D</sub> = 10 A
Input Capacitance	C <sub>iss</sub>		780		pF	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz
Output Capacitance	C <sub>oss</sub>		150		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		51		pF	
Turn-on Delay Time	t <sub>d(on)</sub>		20		ns	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 10 A, V <sub>GS</sub> = 10 V, R <sub>G</sub> = 10 Ω
Rise Time	t <sub>r</sub>		10		ns	
Turn-off Delay Time	t <sub>d(off)</sub>		46		ns	
Fall Time	t <sub>f</sub>		7		ns	
Total Gate Charge	Q <sub>G</sub>		18		nC	V <sub>DD</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 21 A
Gate to Source Charge	Q <sub>GS</sub>		5		nC	
Gate to Drain Charge	Q <sub>GD</sub>		6		nC	
Body Diode Forward Voltage *1	V <sub>F(S-D)</sub>		0.88		V	I <sub>F</sub> = 21 A, V <sub>GS</sub> = 0 V
Reverse Recovery Time	t <sub>rr</sub>		50		ns	I <sub>F</sub> = 21 A, V <sub>GS</sub> = 0 V, di/dt = 100 A/μs
Reverse Recovery Charge	Q <sub>rr</sub>		110		nC	
Gate Resistance	R <sub>G</sub>		2.2		Ω	f = 1 MHz

Note: \*1. Pulsed

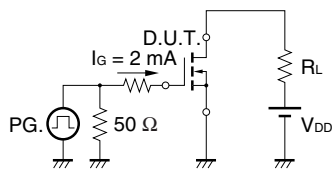
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



**TEST CIRCUIT 2 SWITCHING TIME**

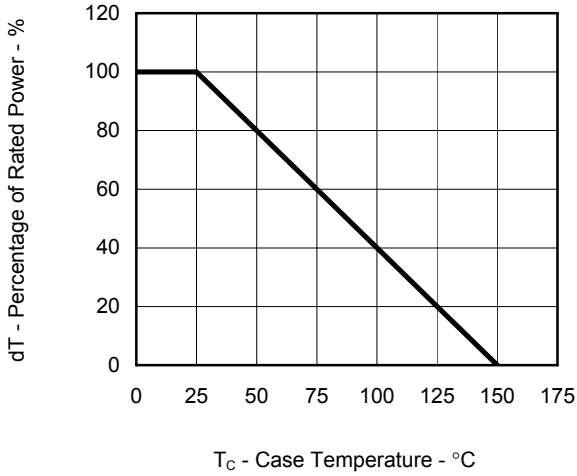


**TEST CIRCUIT 3 GATE CHARGE**

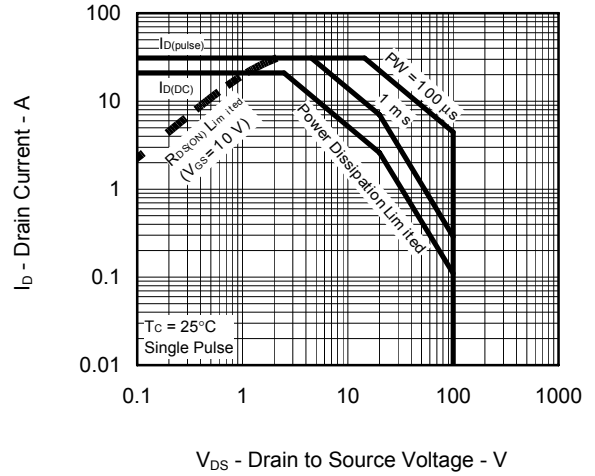


Typical Characteristics (T<sub>A</sub> = 25°C)

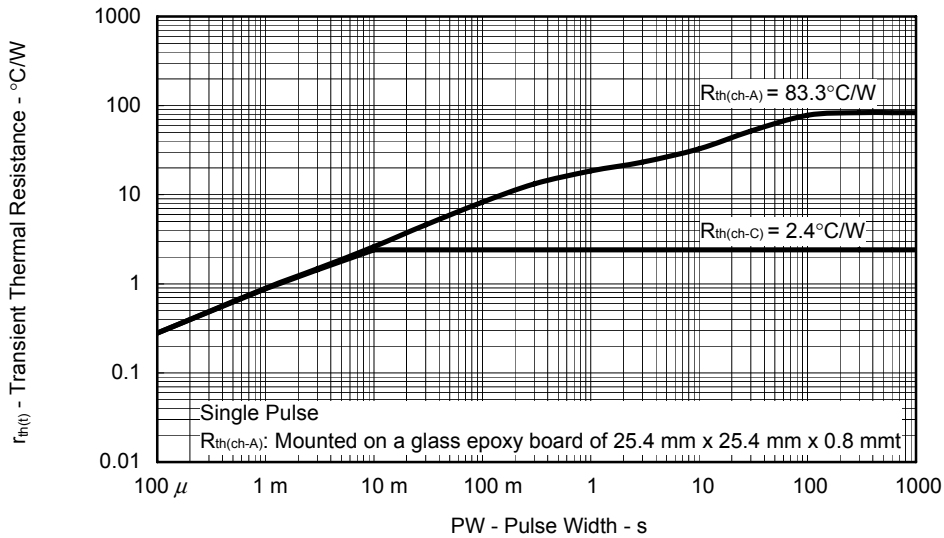
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



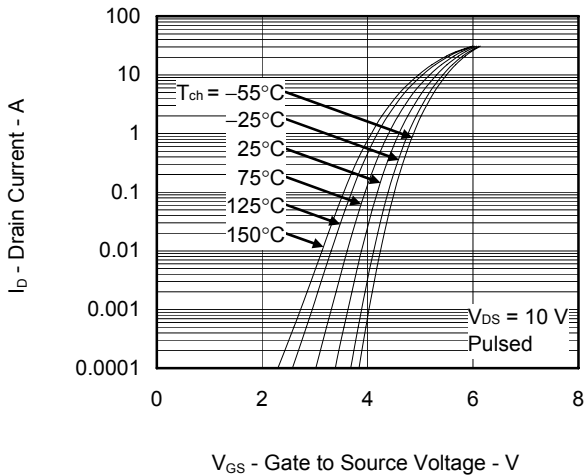
FORWARD BIAS SAFE OPERATING AREA



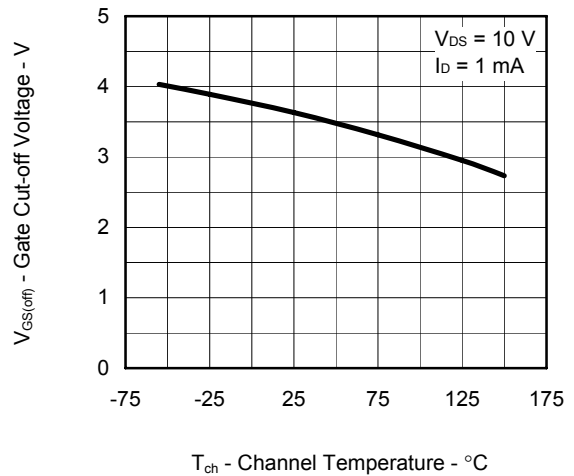
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



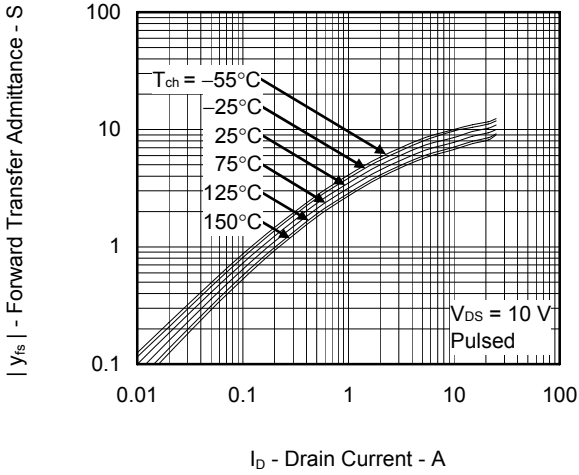
FORWARD TRANSFER CHARACTERISTICS



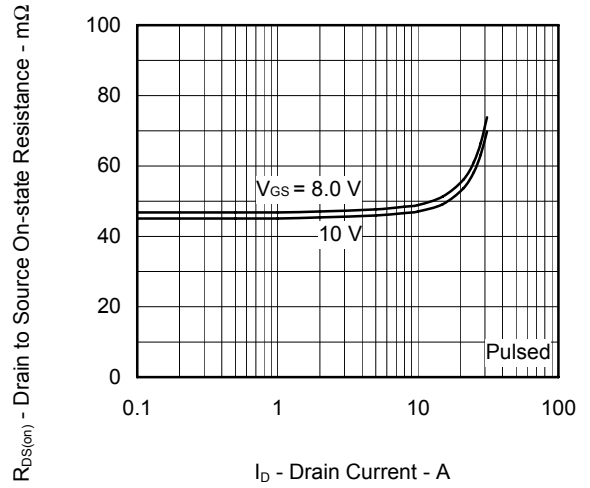
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



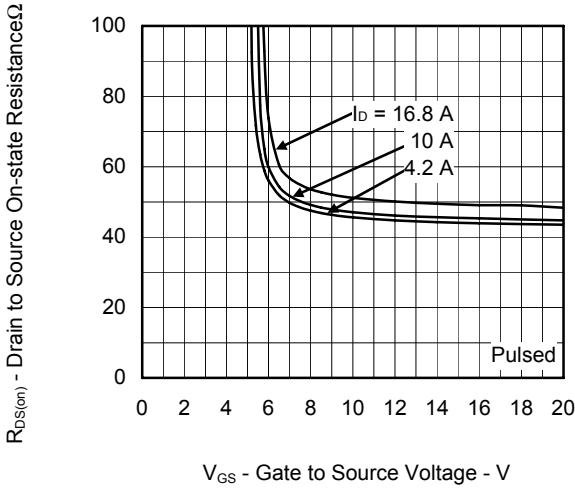
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



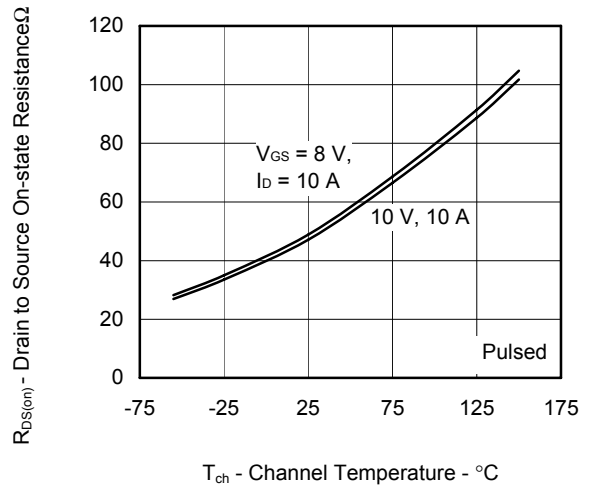
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



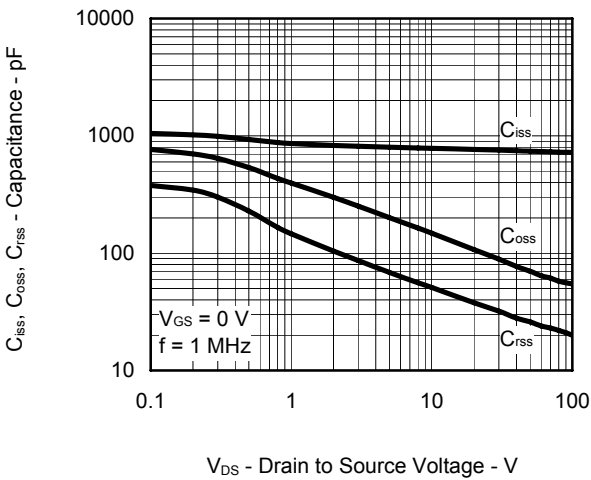
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



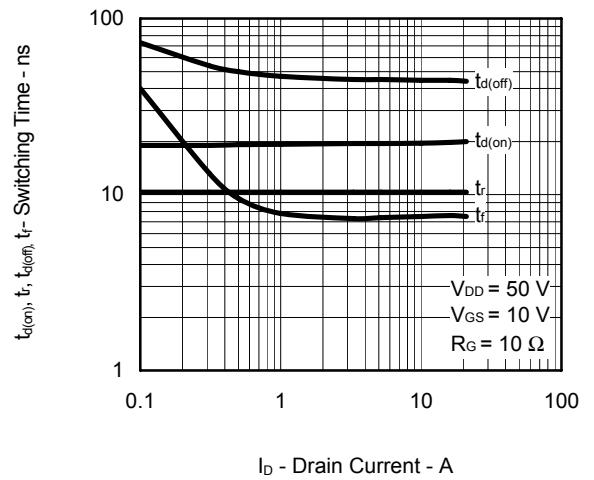
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



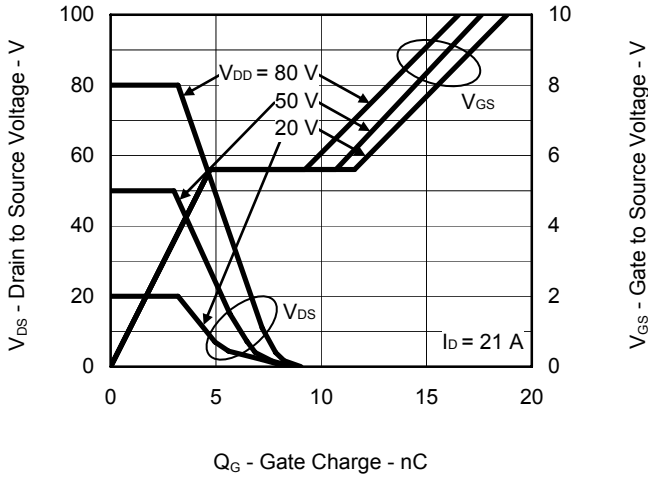
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



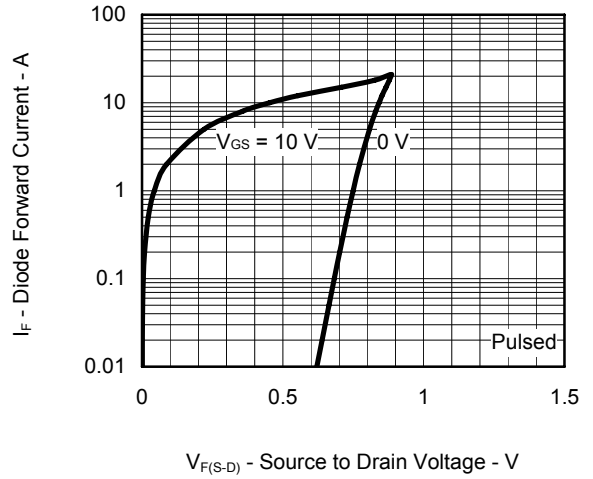
SWITCHING CHARACTERISTICS



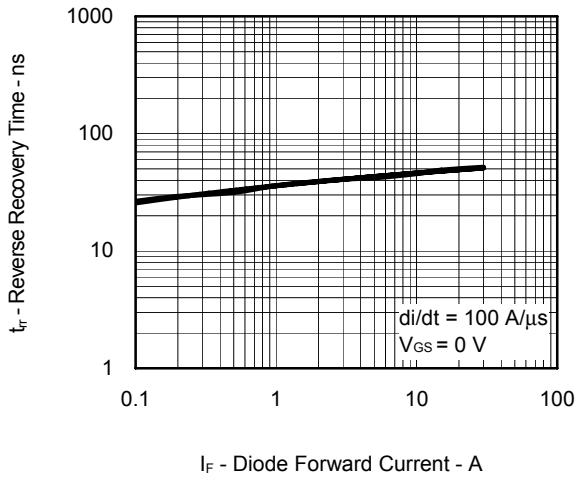
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



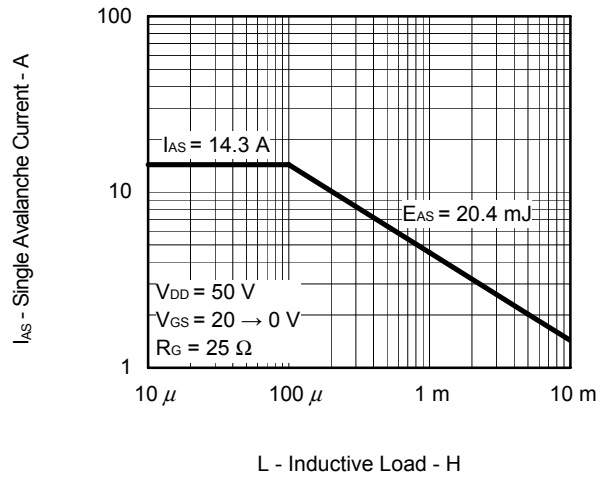
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT

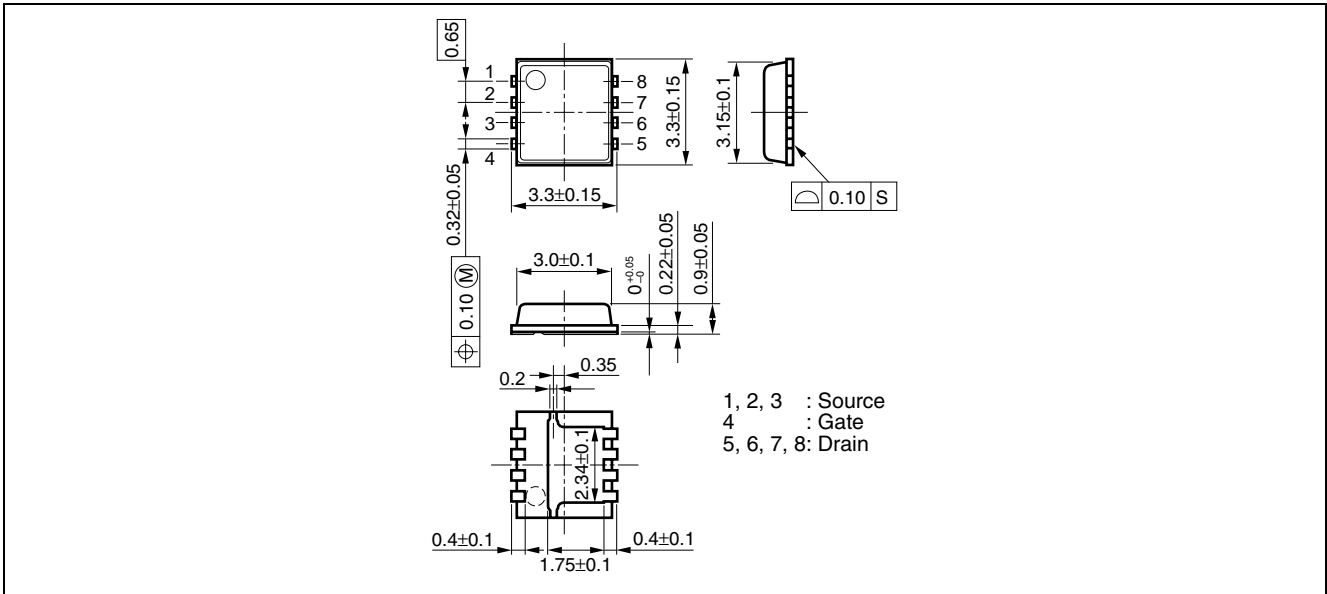


SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD

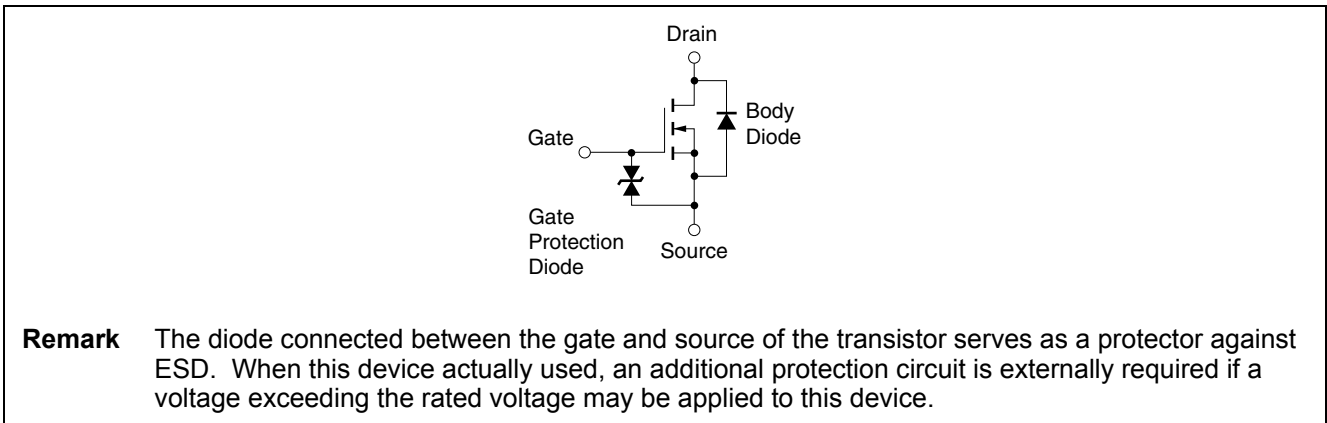


### Package Drawings (Unit: mm)

#### 8-pin HVSON (3333)



### Equivalent Circuit



<b>Revision History</b>	<b>μPA2806</b>
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Rev.	Date	Description	
		Page	Summary
1.00	June 01, 2010	-	First Eddition Issued

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