μPA2806

MOS FIELD EFFECT TRANSISTOR

R07DS0008EJ0100
Rev.1.00
June 01, 2010

Description

The μPA2806 is N-channel MOSFET designed for DC/DC converter and power management applications.

Features

- Low on-state resistance
  - $R_{DS(on)1}$ = 57 mΩ MAX. (V_{GS} = 10 V, I_D = 10 A)
  - $R_{DS(on)2}$ = 70 mΩ MAX. (V_{GS} = 8 V, I_D = 10 A)
- Low C_{iss}: C_{iss} = 780 pF TYP. (V_{DS} = 10 V, V_{GS} = 0 V, f = 1 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
μPA2806T1L-E1-AY *1	Pure Sn (Tin)	Tape 3000 p/reel	8-pin HVSON (3333) typ. 0.028 g
μPA2806T1L-E2-AY *1			

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

Absolute Maximum Ratings (T_A = 25°C)

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

Notes: *1. PW ≤ 10 μs, Duty Cycle ≤ 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} = 50 V, R_G = 25 Ω, V_{GS} = 20 → 0 V, L = 100 μH

Thermal Resistance

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

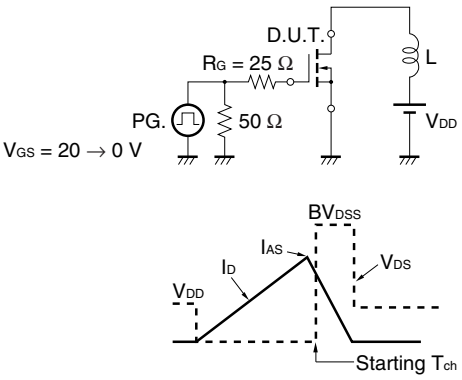
Note: *1. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mmt

Electrical Characteristics (T_A = 25°C)

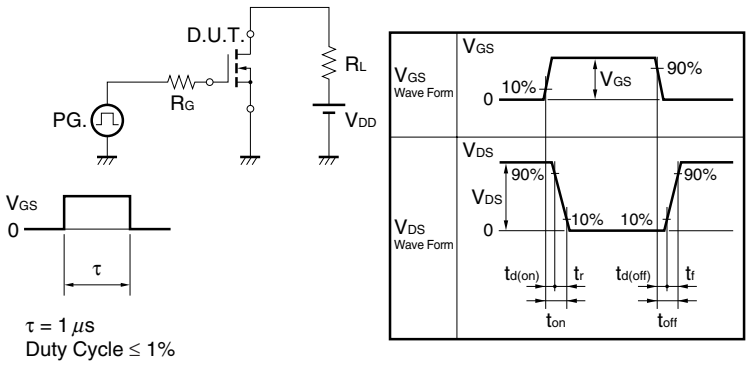
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I_{DSS}			10	μA	V_{DS} = 100 V, V_{GS} = 0 V
Gate Leakage Current	I_{GSS}			±10	μA	V_{GS} = ±20 V, V_{DS} = 0 V
Gate Cut-off Voltage	$V_{GS(off)}$	2.0		4.0	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance *1	$\|y_{fs}\|$	5			S	V_{DS} = 10 V, I_D = 10 A
Drain to Source On-state Resistance *1	$R_{DS(on)1}$		47	57	mΩ	V_{GS} = 10 V, I_D = 10 A
	$R_{DS(on)2}$		49	70	mΩ	V_{GS} = 8 V, I_D = 10 A
Input Capacitance	C_{iss}		780		pF	V_{DS} = 10 V,
Output Capacitance	C_{oss}		150		pF	V_{GS} = 0 V,
Reverse Transfer Capacitance	C_{rss}		51		pF	f = 1 MHz
Turn-on Delay Time	$t_{d(on)}$		20		ns	V_{DD} = 50 V, I_D = 10 A,
Rise Time	t_r		10		ns	V_{GS} = 10 V,
Turn-off Delay Time	$t_{d(off)}$		46		ns	R_G = 10 Ω
Fall Time	t_f		7		ns	
Total Gate Charge	Q_G		18		nC	V_{DD} = 50 V,
Gate to Source Charge	Q_{GS}		5		nC	V_{GS} = 10 V,
Gate to Drain Charge	Q_{GD}		6		nC	I_D = 21 A
Body Diode Forward Voltage *1	$V_{F(S-D)}$		0.88		V	I_F = 21 A, V_{GS} = 0 V
Reverse Recovery Time	t_{rr}		50		ns	I_F = 21 A, V_{GS} = 0 V,
Reverse Recovery Charge	Q_{rr}		110		nC	di/dt = 100 A/μs
Gate Resistance	R_G		2.2		Ω	f = 1 MHz

Note: *1. Pulsed

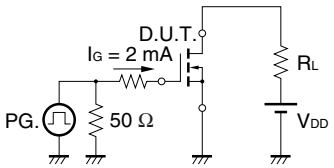
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

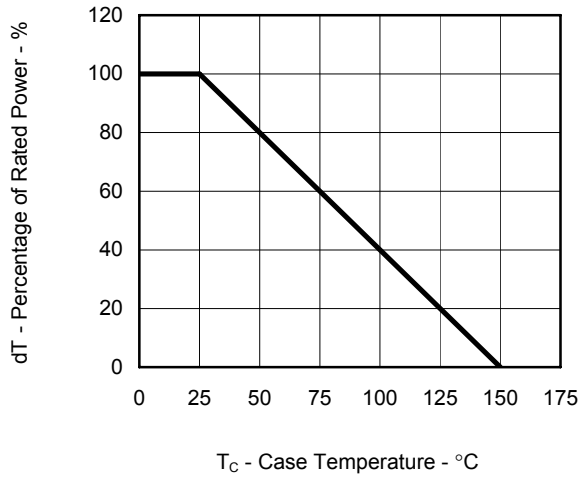


TEST CIRCUIT 3 GATE CHARGE

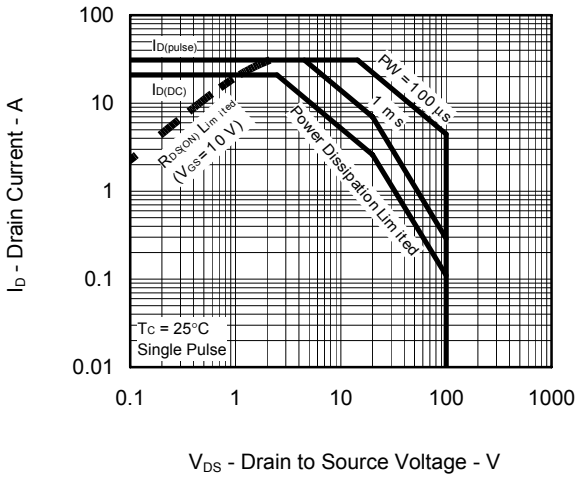


Typical Characteristics (T_A = 25°C)

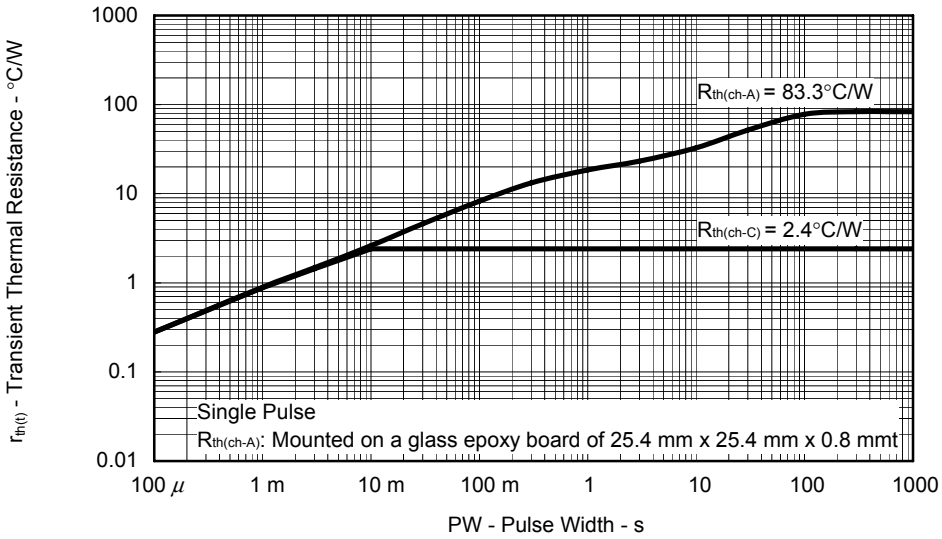
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



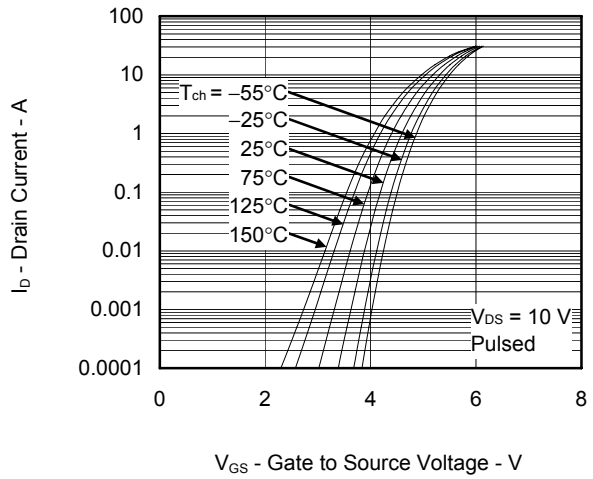
FORWARD BIAS SAFE OPERATING AREA



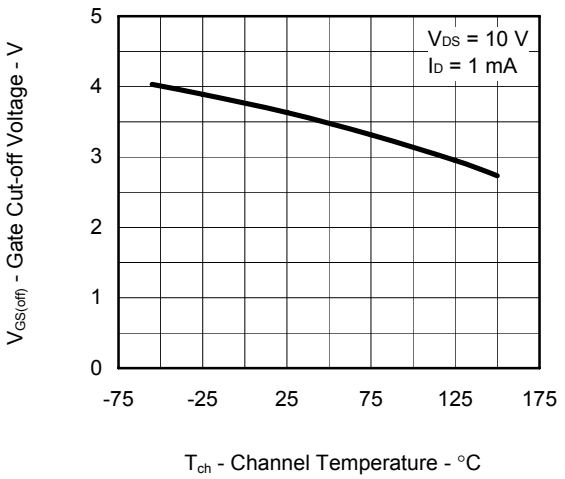
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



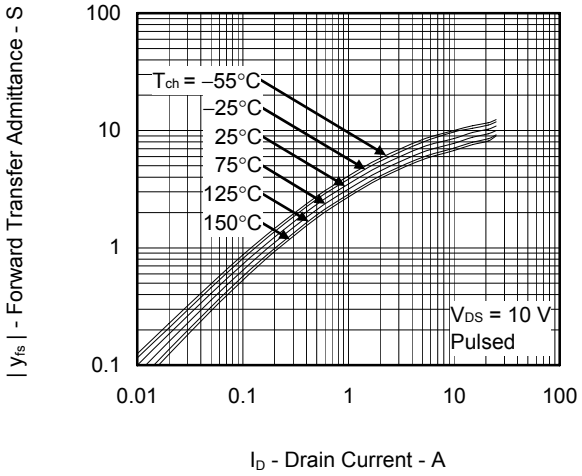
FORWARD TRANSFER CHARACTERISTICS



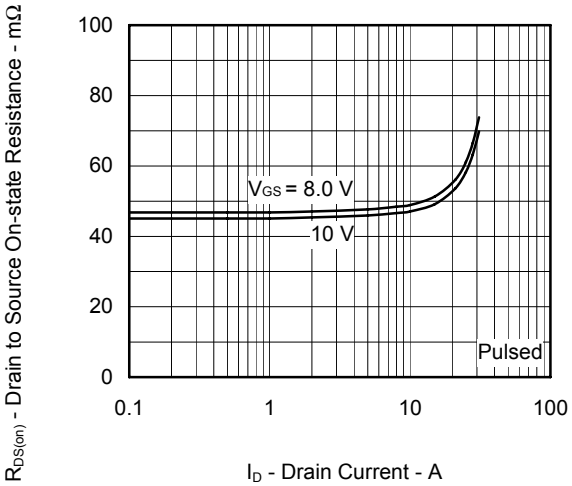
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



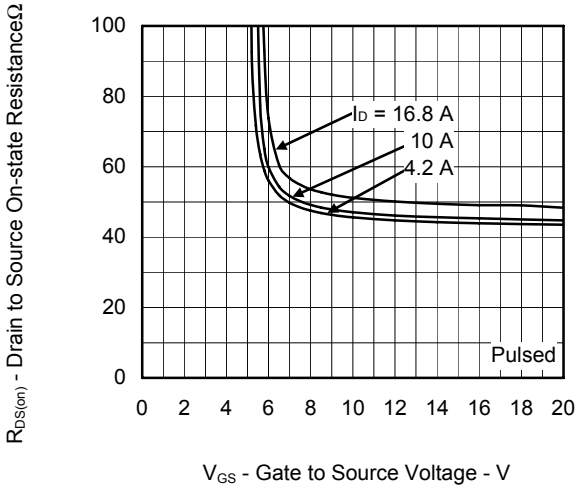
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



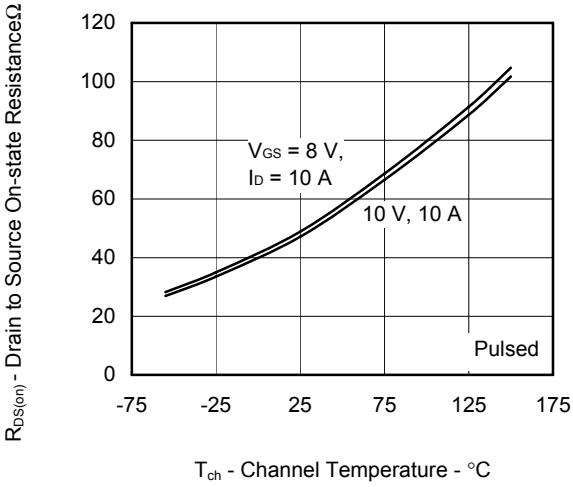
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



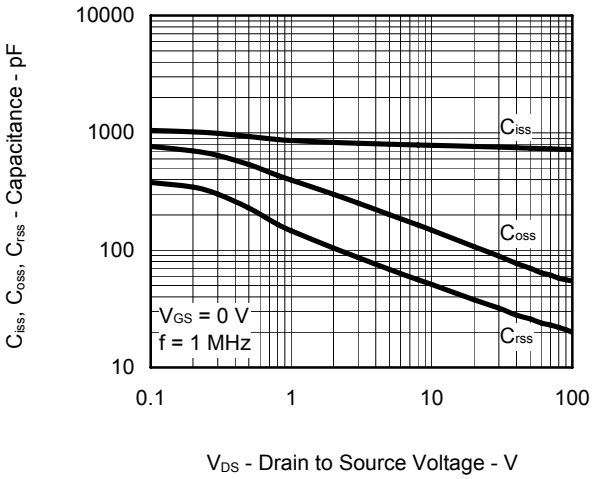
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



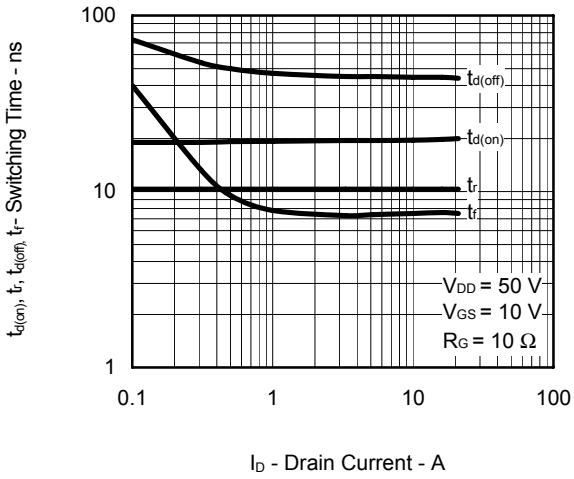
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



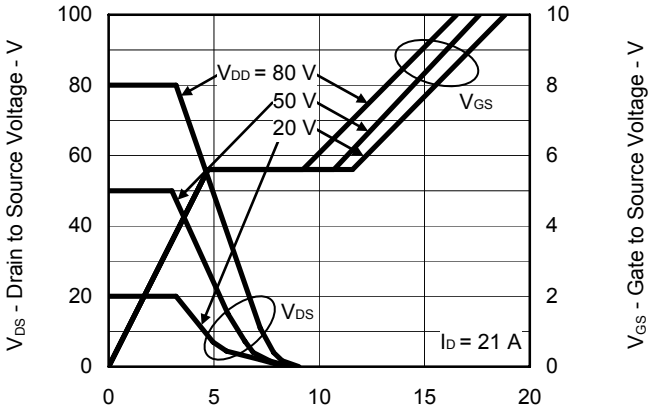
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS

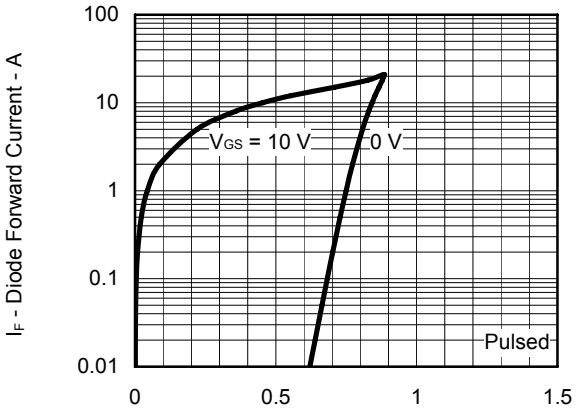


DYNAMIC INPUT/OUTPUT CHARACTERISTICS



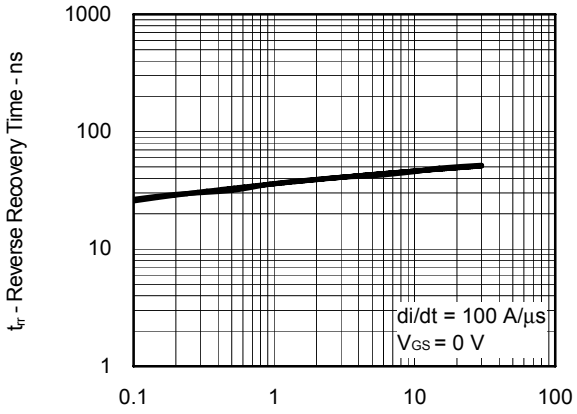
QG - Gate Charge - nC

SOURCE TO DRAIN DIODE FORWARD VOLTAGE



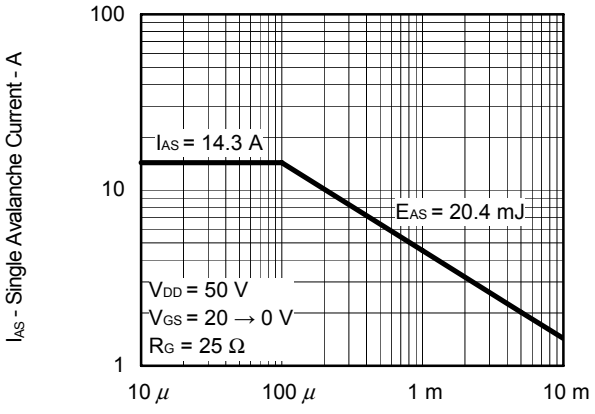
VF(S-D) - Source to Drain Voltage - V

REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



IF - Diode Forward Current - A

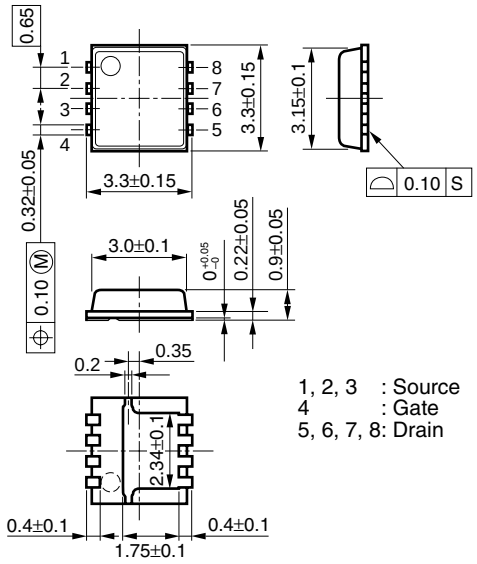
SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD



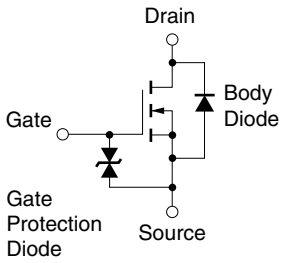
L - Inductive Load - H

Package Drawings (Unit: mm)

8-pin HVSON (3333)



Equivalent Circuit



Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

Revision History	μPA2806

Rev.	Date	Description	
		Page	Summary
1.00	June 01, 2010	–	First Eddition Issued

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