

# μPA3753GR

R07DS0758EJ0100

Rev.1.00

## MOS FIELD EFFECT TRANSISTOR

May 25, 2012

### Description

The μPA3753GR is Dual N-channel MOS Field Effect Transistors designed for switching application.

### Features

- Dual chip type
- Low on-state resistance
  - $R_{DS(on)} = 56 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 2.5 \text{ A}$ )
  - $R_{DS(on)} = 72 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 4.5 \text{ V}$ ,  $I_D = 2.5 \text{ A}$ )
- Low gate charge
  - $Q_G = 13.4 \text{ nC TYP.}$  ( $V_{GS} = 10 \text{ V}$ )
- Small and surface mount package (Power SOP8)

### Ordering Information

Part No.	Lead Plating	Packing	Package
μPA3753GR-E1-AT <sup>*1</sup>	Pure Sn (Tin)	Tape 2500 p/reel	Power SOP8 0.08 g TYP.
μPA3753GR-E2-AT <sup>*1</sup>			

Note: <sup>\*1</sup>. Pb-Free (This product does not contain Pb in the external electrode and other parts.)  
 “-E1”, “-E2” indicates the unit orientation.

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

Item	Symbol	Ratings	Unit
Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	60	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	±20	V
Drain Current (DC)	$I_{D(DC)}$	±5.0	A
Drain Current (pulse) <sup>*1</sup>	$I_{D(pulse)}$	±20	A
Total Power Dissipation (1unit) <sup>*2</sup>	$P_{T1}$	0.85	W
Total Power Dissipation (2units) <sup>*2</sup>	$P_{T2}$	1.12	W
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C
Single Avalanche Current <sup>*3</sup>	$I_{AS}$	5.0	A
Single Avalanche Energy <sup>*3</sup>	$E_{AS}$	2.5	mJ

Notes: <sup>\*1</sup>.  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$

<sup>\*2</sup>. Mounted on glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

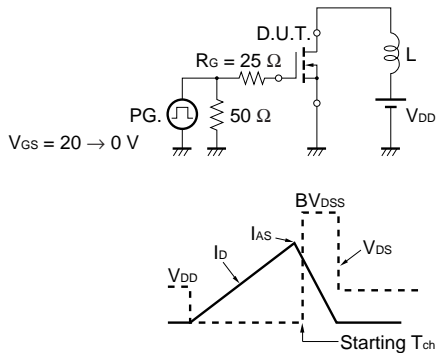
<sup>\*3</sup>. Starting  $T_{ch} = 25^\circ\text{C}$ ,  $V_{DD} = 30 \text{ V}$ ,  $R_G = 25 \Omega$ ,  $V_{GS} = 20 \rightarrow 0 \text{ V}$ ,  $L = 100 \mu\text{H}$

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

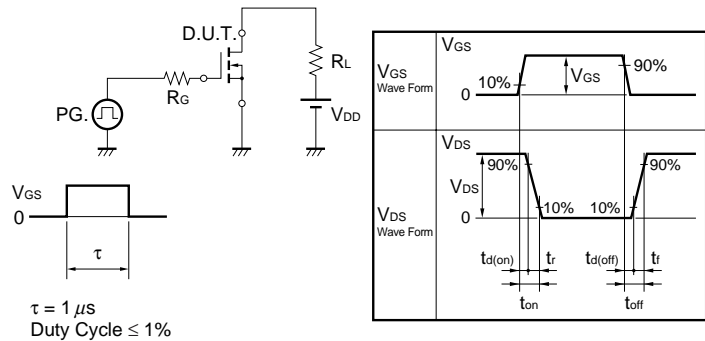
Item	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1.0	μA	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V
Gate Leakage Current	I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V
Gate Cut-off Voltage	V <sub>GS(off)</sub>	1.5		2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance *1	y <sub>fs</sub>	2.5			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2.5 A
Drain to Source On-state Resistance *1	R <sub>DS(on)1</sub>		44	56	mΩ	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.5 A
	R <sub>DS(on)2</sub>		49	72	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.5 A
Input Capacitance	C <sub>iss</sub>		640		pF	V <sub>DS</sub> = 10 V,
Output Capacitance	C <sub>oss</sub>		72		pF	V <sub>GS</sub> = 0 V,
Reverse Transfer Capacitance	C <sub>rss</sub>		32		pF	f = 1.0 MHz
Turn-on Delay Time	t <sub>d(on)</sub>		8.5		ns	I <sub>D</sub> = 2.5 A, V <sub>DD</sub> = 30 V, V <sub>GS</sub> = 10 V, R <sub>G</sub> = 10 Ω
Rise Time	t <sub>r</sub>		3.7		ns	
Turn-off Delay Time	t <sub>d(off)</sub>		30		ns	
Fall Time	t <sub>f</sub>		5.1		ns	
Total Gate Charge	Q <sub>G</sub>		13.4		nC	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A , V <sub>DD</sub> = 48 V
Gate to Source Charge	Q <sub>GS</sub>		1.6		nC	
Gate to Drain Charge	Q <sub>GD</sub>		3.1		nC	
Body Diode Forward Voltage *1	V <sub>F(S-D)</sub>			1.2	V	I <sub>F</sub> = 5.0 A, V <sub>GS</sub> = 0 V
Reverse Recovery Time	t <sub>rr</sub>		22		ns	I <sub>F</sub> = 5.0 A, V <sub>GS</sub> = 0 V, di/dt = 100 A/μs
Reverse Recovery Charge	Q <sub>rr</sub>		36		nC	

Note: \*1. Pulsed

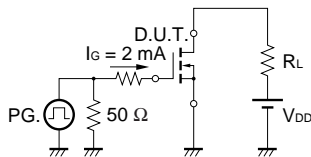
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



**TEST CIRCUIT 2 SWITCHING TIME**

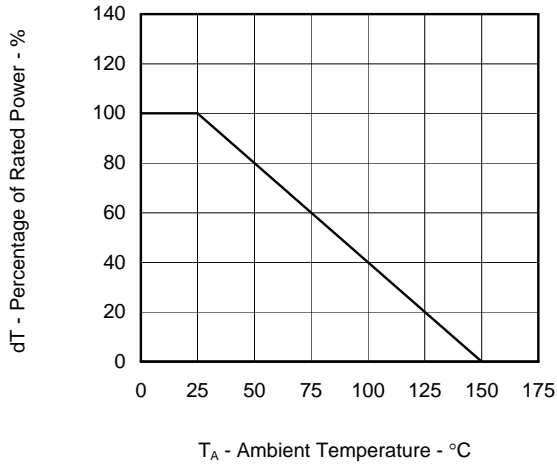


**TEST CIRCUIT 3 GATE CHARGE**

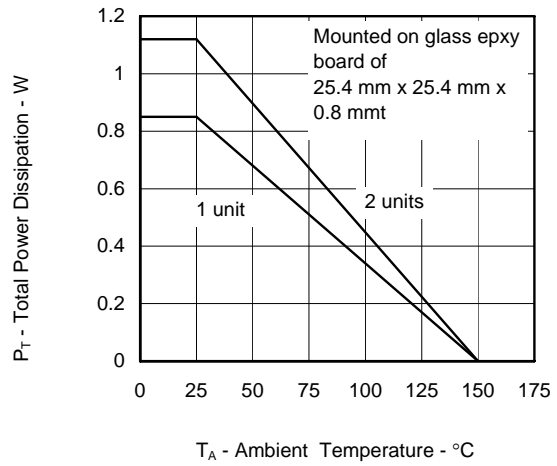


Typical Characteristics (T<sub>A</sub> = 25°C)

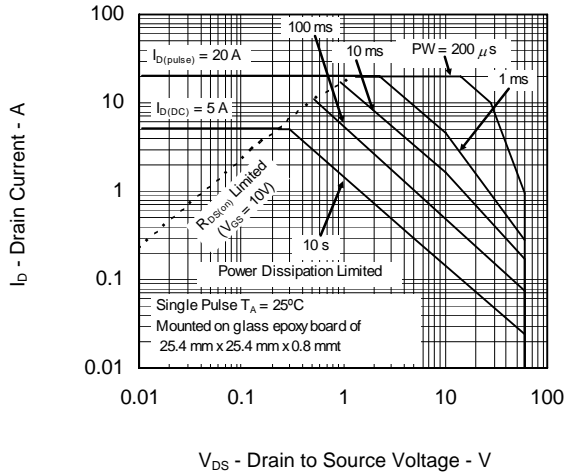
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



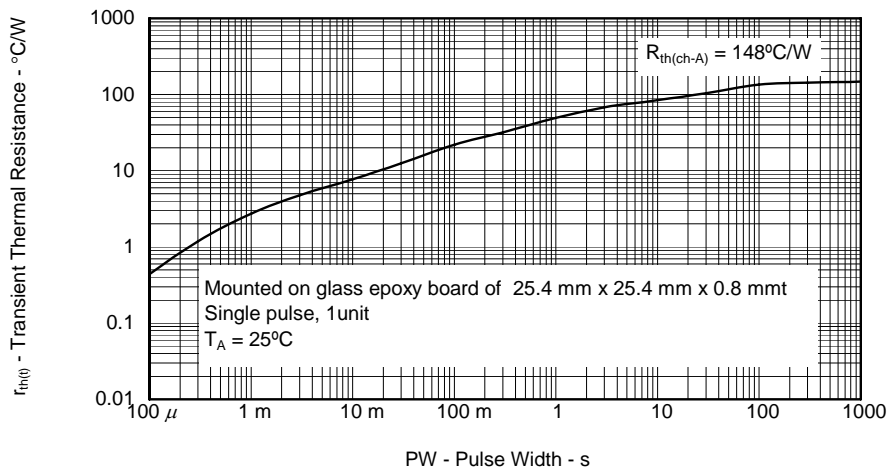
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



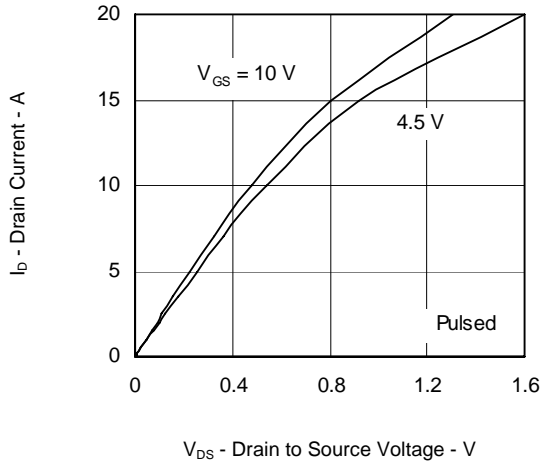
FORWARD BIAS SAFE OPERATING AREA



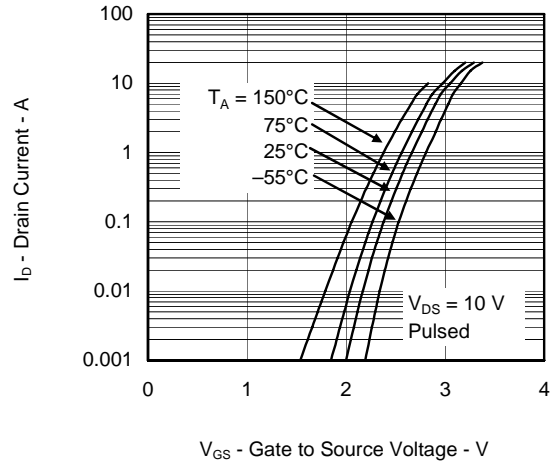
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



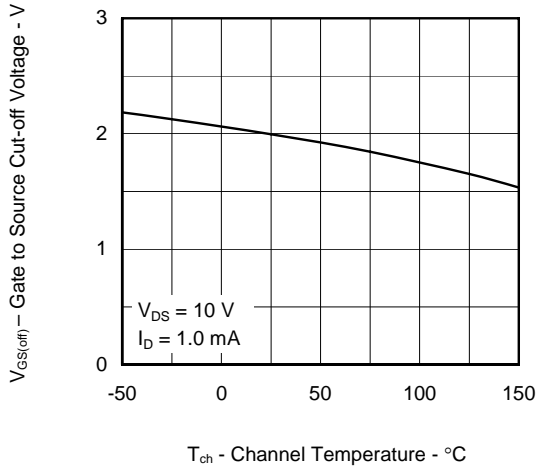
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



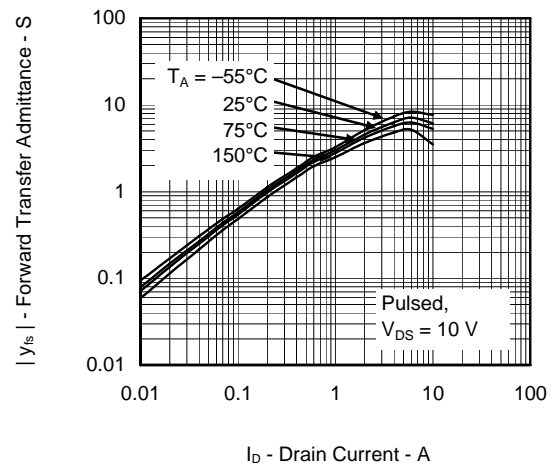
FORWARD TRANSFER CHARACTERISTICS



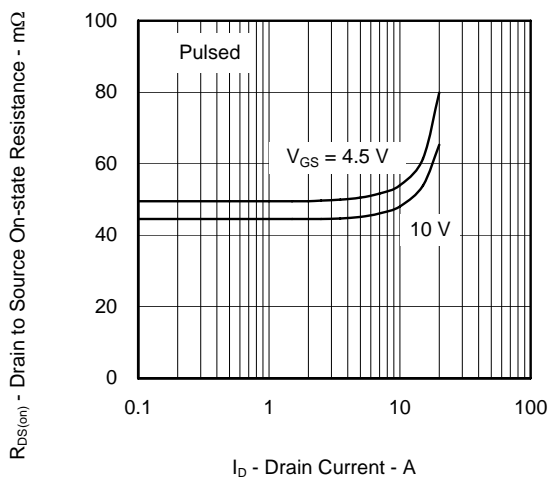
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



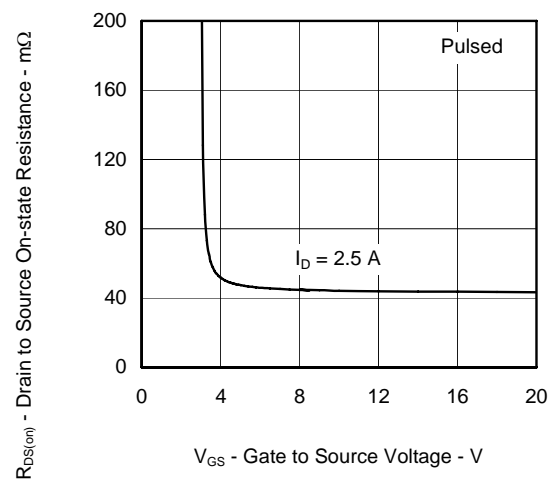
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



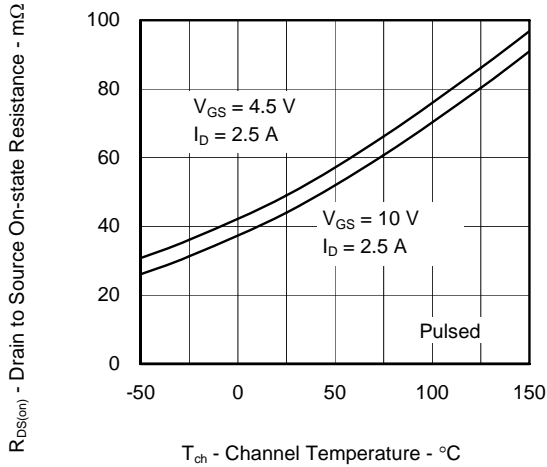
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



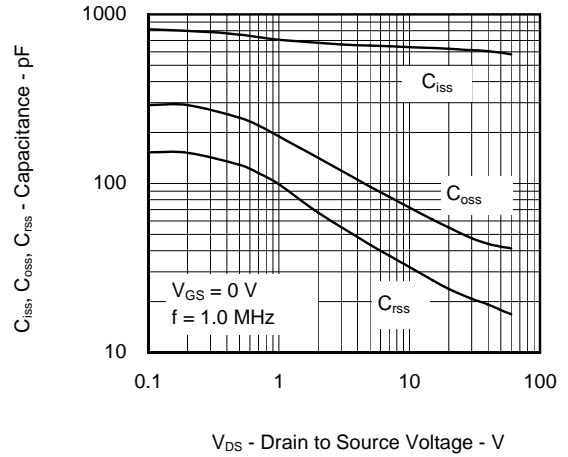
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



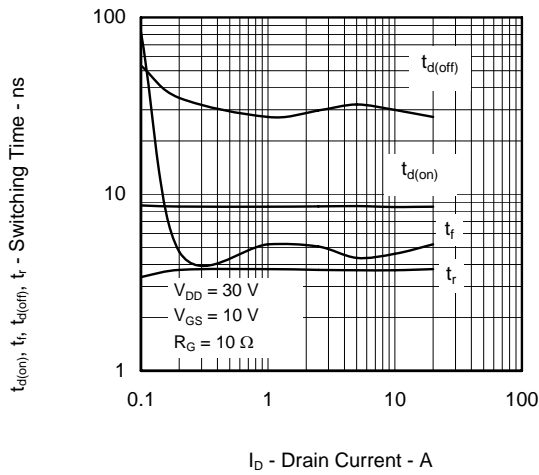
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



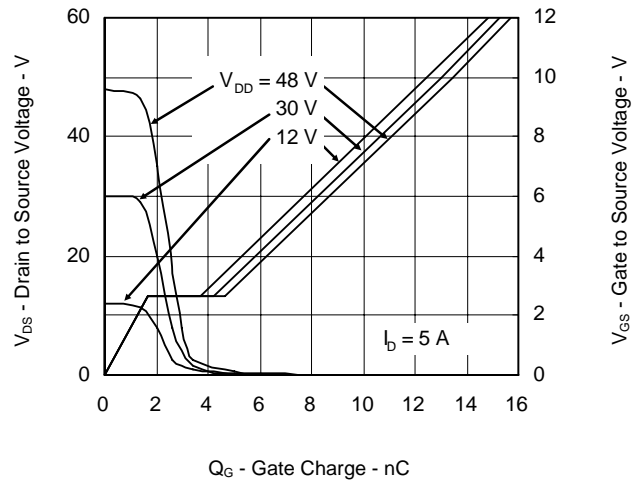
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



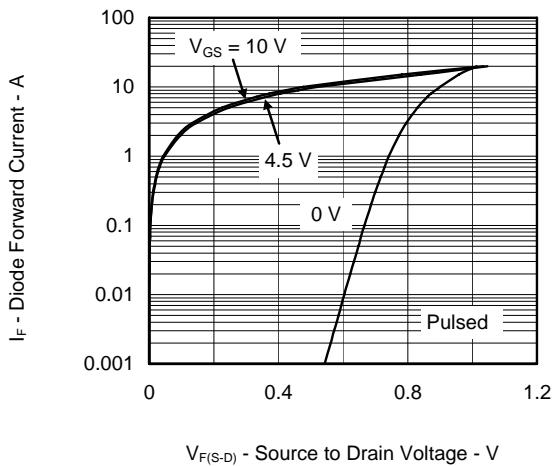
SWITCHING CHARACTERISTICS



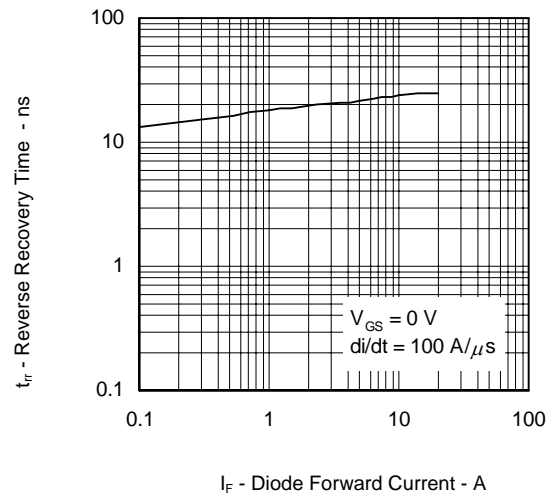
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE

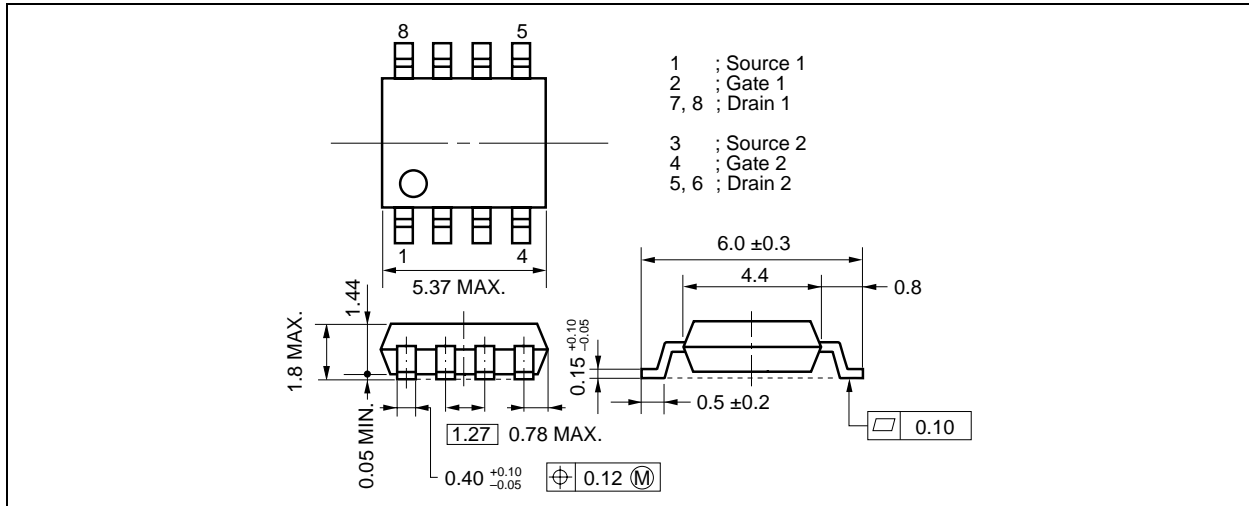


REVERSE RECOVERY TIME vs DIODE FORWARD CURRENT

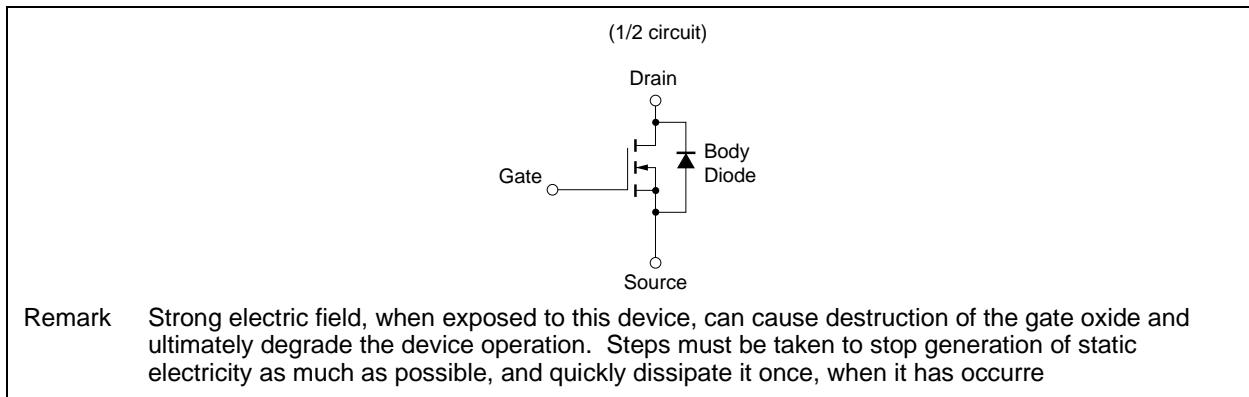


## Package Drawings (Unit: mm)

### Power SOP8



### Equivalent Circuit



<b>Revision History</b>	<b><math>\mu</math>PA3753GR Data Sheet</b>
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Rev.	Date	Description	
		Page	Summary
1.00	May 25, 2012	-	First Edition Issued

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