NEC

MOS FIELD EFFECT TRANSISTOR

μPA2705GR

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The μPA2702GR is N-Channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

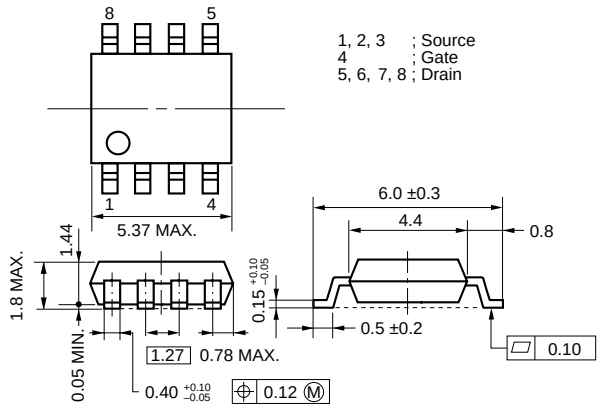
FEATURES

- Low on-state resistance
  $R_{DS(on)1}$ = 9.2 mΩ MAX. (V_{GS} = 10 V, I_D = 7.0 A)
  $R_{DS(on)2}$ = 14.8 mΩ MAX. (V_{GS} = 4.5 V, I_D = 7.0 A)
- Low C_{iss}: C_{iss} = 900 pF TYP. (V_{DS} = 10 V, V_{GS} = 0 V)
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA2705GR	Power SOP8

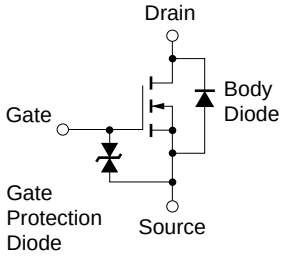
PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected.)

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)	$I_{D(DC)}$	±13	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±52	A
Total Power Dissipation (T_A = 25°C) Note2	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current Note3	I_{AS}	13	A
Single Avalanche Energy Note3	E_{AS}	16.9	mJ

EQUIVALENT CIRCUIT



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on ceramic substrate of 1200 mm² x 2.2 mm
3. Starting T_{ch} = 25°C, V_{DD} = 15 V, R_G = 25 Ω, L = 100 μH, V_{GS} = 20 → 0 V

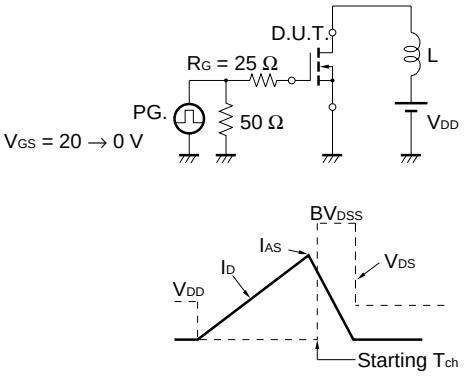
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

Document No. G16305EJ1V0PM00 (1st edition)
Date Published July 2002 NS CP(K)
Printed in Japan

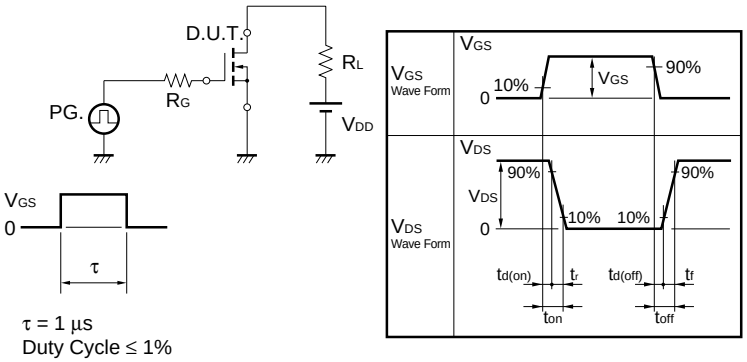
ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	1.5		2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 7.0 A	7	13		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 10 V, I_D = 7.0 A		7.3	9.2	mΩ
	$R_{DS(on)2}$	V_{GS} = 4.5 V, I_D = 7.0 A		11.1	14.8	mΩ
	$R_{DS(on)3}$	V_{GS} = 4.0 V, I_D = 7.0 A		12.7	17.0	mΩ
Input Capacitance	C_{iss}	V_{DS} = 10 V		900		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		380		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		120		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15 V, I_D = 7.0 A		9		ns
Rise Time	t_r	V_{GS} = 10 V		5		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		35		ns
Fall Time	t_f			8		ns
Total Gate Charge	Q_G	V_{DD} = 15 V		9		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 5 V		3		nC
Gate to Drain Charge	Q_{GD}	I_D = 13 A		4		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 13 A, V_{GS} = 0 V		0.82	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 13 A, V_{GS} = 0 V		28		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		22		nC

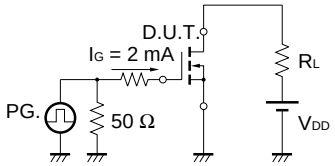
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME



TEST CIRCUIT 3 GATE CHARGE



[MEMO]

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