

MOS FIELD EFFECT TRANSISTOR μ PA1851

P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μ PA1851 is a switching device which can be driven directly by a 4.0-V power source.

The μ PA1851 features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

FEATURES

- Can be driven by a 4.0-V power source
- · Low on-state resistance

 $R_{DS(on)1}$ = 105 $m\Omega$ MAX. (Vgs = -10 V, Ip = -1.5 A)

 $R_{DS(on)2} = 210 \text{ m}\Omega \text{ MAX.}$ (Vgs = -4.5 V, ID = -1.5 A)

 $R_{DS(on)3} = 250 \text{ m}\Omega \text{ MAX.} \text{ (Vgs} = -4.0 \text{ V, Ip} = -1.5 \text{ A)}$

Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1851GR-9JG	Power TSSOP8

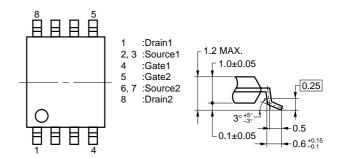
ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

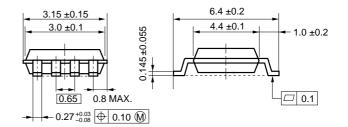
Drain to Source Voltage	VDSS	-20	V
Gate to Source Voltage	Vgss	-20/+5	V
Drain Current (DC)	ID(DC)	∓2.5	Α
Drain Current (pulse) Note1	D(pulse)	∓10	Α
Total Power Dissipation Note2	PT	2.0	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Notes 1. PW \leq 10 μ s, Duty Cycle \leq 1 %

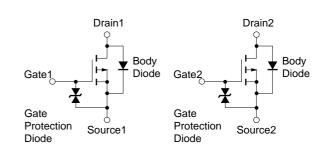
2. Mounted on ceramic substrate of 50 cm² x 1.1 mm

PACKAGE DRAWING (Unit: mm)





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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

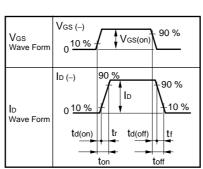
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.



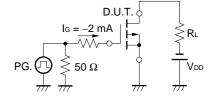
★ ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	Inss	V _{DS} = -20 V, V _{GS} = 0 V			-10	μΑ
Gate Leakage Current	lgss	$V_{GS} = \mp 20 \text{ V}, V_{DS} = 0 \text{ V}$			∓ 10	μΑ
Gate Cut-off Voltage	V _{GS(off)}	$V_{DS} = -10 \text{ V}, \text{ ID} = -1 \text{ mA}$	-1.0	-1.5	-2.5	V
Forward Transfer Admittance	yfs	V _{DS} = -10 V, I _D = -1.5 A	1	3.5		S
Drain to Source On-state Resistance	RDS(on)1	V _G s = -10 V, I _D = -1.5 A		83	105	mΩ
	R _{DS(on)2}	Vgs = -4.5 V, ID = -1.5 A		141	210	mΩ
	R _{DS(on)3}	Vgs = -4.0 V, ID = -1.5 A		163	250	mΩ
Input Capacitance	Ciss	Vps = -10 V		220		pF
Output Capacitance	Coss	V _G S = 0 V		240		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		50		pF
Turn-on Delay Time	td(on)	V _{DD} = -10 V		110		ns
Rise Time	tr	ID = -2.0 A		500		ns
Turn-off Delay Time	td(off)	$V_{GS(on)} = -4.0 \text{ V}$		160		ns
Fall Time	t _f	$R_G = 10 \Omega$		310		ns
Total Gate Charge	Q _G	V _{DD} = -10 V		8.3		nC
Gate to Source Charge	Qgs	I _D = -2.5 A		2.4		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = -4.0 V		4.7		nC
Diode Forward Voltage	V _F (S-D)	I _F = 2.5 A, V _{GS} = 0 V		0.82		V
Reverse Recovery Time	trr	IF = 2.5 A, Vgs = 0 V		40		ns
Reverse Recovery Charge	Qrr	di/dt = 20 A / μs		6.5		nC

★ TEST CIRCUIT 1 SWITCHING TIME

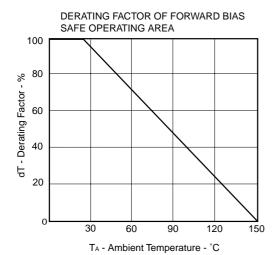


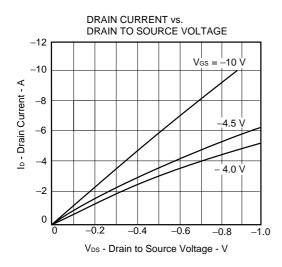
TEST CIRCUIT 2 GATE CHARGE

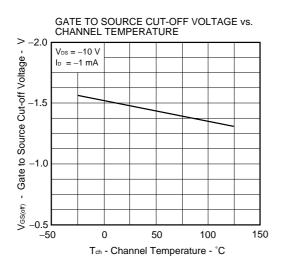


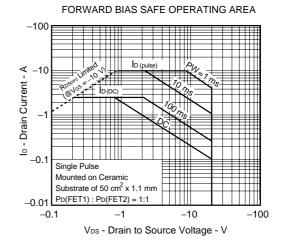


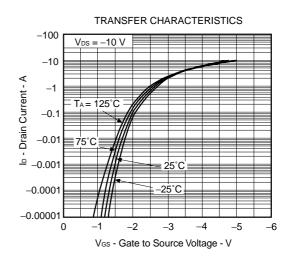
★ TYPICAL CHARACTERISTICS (T_A = 25°C)

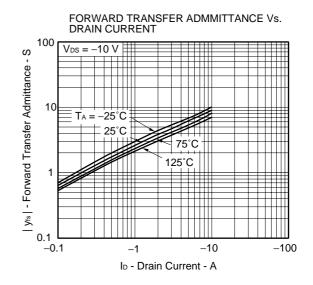




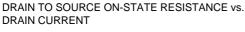


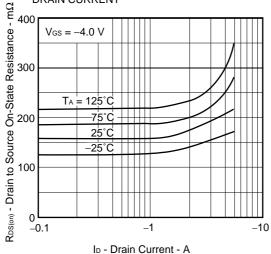




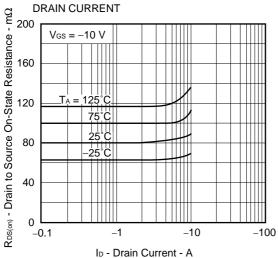


3

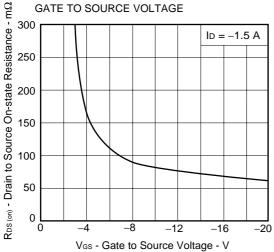




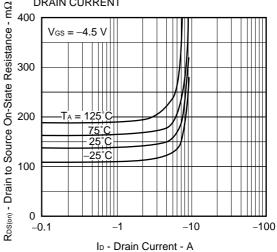
DRAIN TO SOURCE ON-STATE RESISTANCE vs.



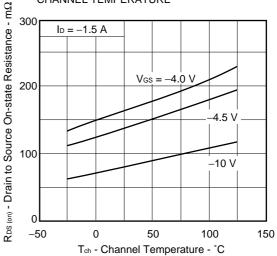
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



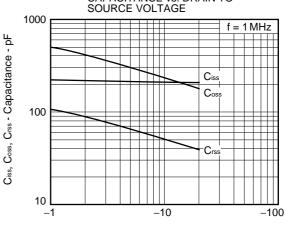
DRAIN TO SOURCE ON-STATE RESISTANCE vs. **DRAIN CURRENT**



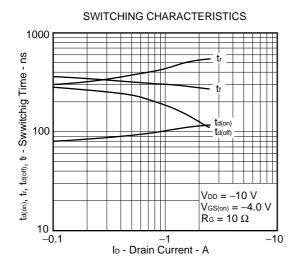
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



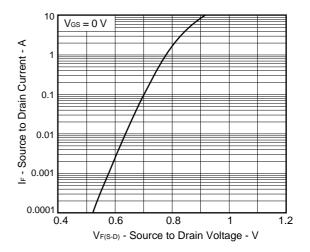
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE 1000

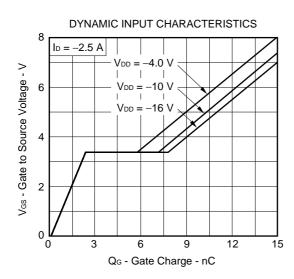


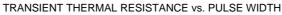
V_{DS} - Drain to Source Voltage - V

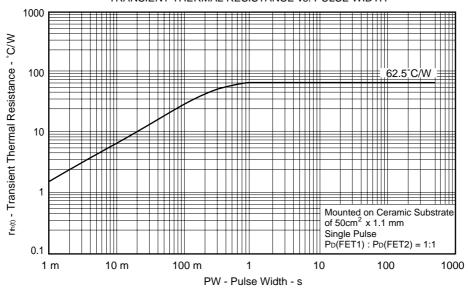


SOURCE TO DRAIN DIODE FORWARD VOLTAGE









5

NEC

 μ PA1851

[MEMO]

NEC μ PA1851

[MEMO]

- The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.
- NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property
 rights of third parties by or arising from use of a device described herein or any other liability arising from use
 of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other
 intellectual property rights of NEC Corporation or others.
- Descriptions of circuits, software, and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software, and information in the design of the customer's equipment shall be done under the full responsibility of the customer. NEC Corporation assumes no responsibility for any losses incurred by the customer or third parties arising from the use of these circuits, software, and information.
- While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.
- NEC devices are classified into the following three quality grades:
 - "Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.
 - Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
 - Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
 - Specific: Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

M7 98.8