NEC

MOS FIELD EFFECT TRANSISTOR
μPA611TA

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR HIGH SPEED SWITCHING

DESCRIPTION

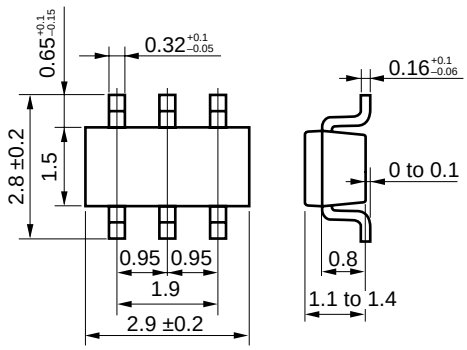
The μPA611TA is a switching device which can be driven directly by a 2.5-V power source.

The μPA611TA has excellent switching characteristics, and is suitable for use as a high-speed switching device in digital circuits.

FEATURES

- Can be driven by a 2.5-V power source
- Low gate cut-off voltage

PACKAGE DRAWING (Unit : mm)

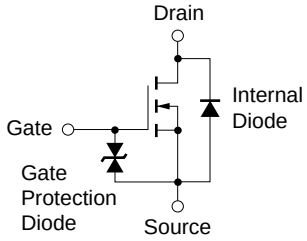


ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA611TA	SC-74 (Mini Mold)

EQUIVALENT CIRCUIT

(1/2 Circuit)

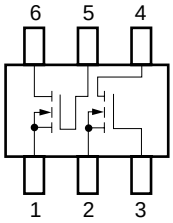


ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±0.1	A
Drain Current (pulse) **Note**	$I_{D(pulse)}$	±0.4	A
Total Power Dissipation	P_T	300 (TOTAL)	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note PW ≤ 10 μs, Duty Cycle ≤ 1 %

PIN CONNECTION (Top View)



1. Source 1
2. Source 2
3. Gate 2
4. Drain 2
5. Gate 1
6. Drain 1

Marking : IB

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.

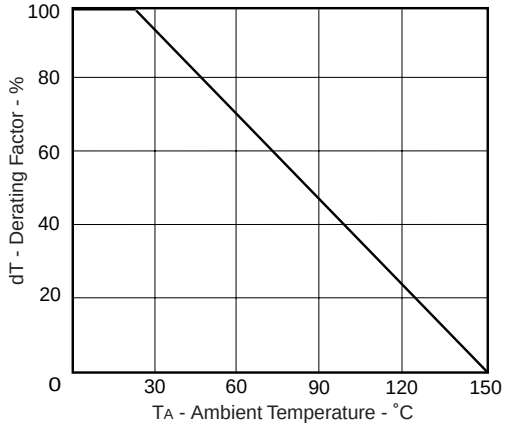
Document No. D11707EJ1V0DS00 (1st edition)
Date Published August 1999 NS CP(K)
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

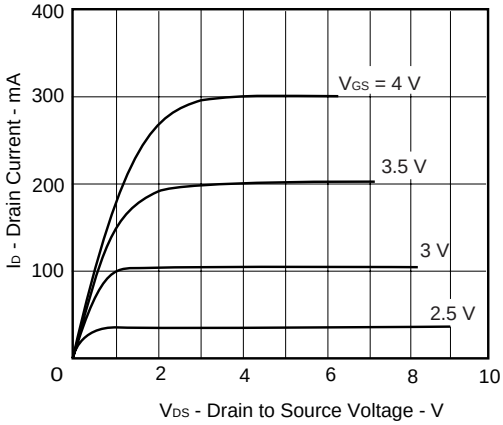
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 3 V, I_D = 10 μA	1.0	1.4	1.8	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 3 V, I_D = 10 m A	20			mS
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 2.5 V, I_D = 1 m A		8	15	Ω
	$R_{DS(on)2}$	V_{GS} = 4 V, I_D = 10 mA		4	8	Ω
	$R_{DS(on)3}$	V_{GS} = 10 V, I_D = 10 mA		3	5	Ω
Input Capacitance	C_{iss}	V_{DS} = 3 V		9		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		12		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		2.1		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 3 V		40		ns
Rise Time	t_r	I_D = 10 mA		55		ns
Turn-off Delay Time	$t_{d(off)}$	$V_{GS(on)}$ = 4 V		68		ns
Fall Time	t_f	R_G = 10 Ω, R_L = 300 Ω		64		ns

TYPICAL CHARACTERISTICS (T_A = 25 °C)

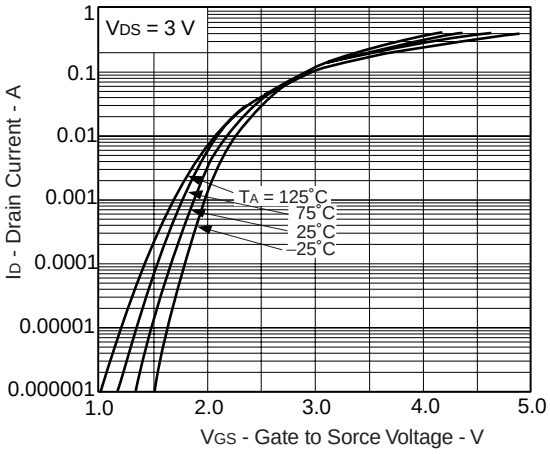
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



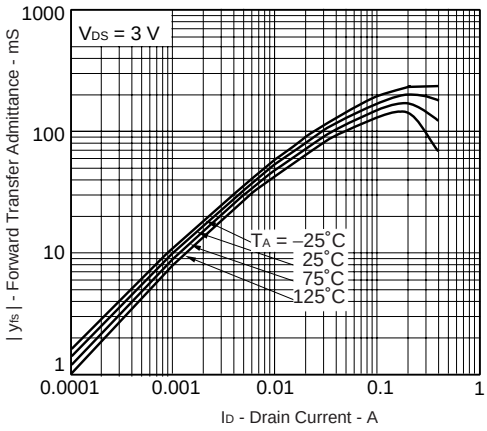
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



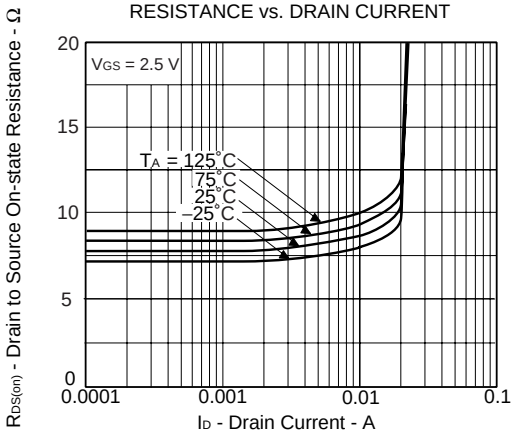
TRANSFER CHARACTERISTICS



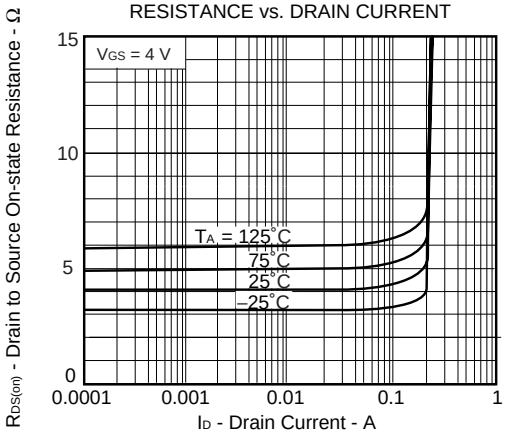
FORWARD TRANSFER ADMMITTANCE Vs. DRAIN CURRENT



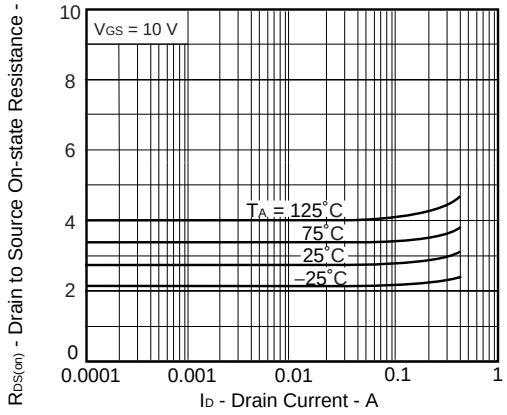
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



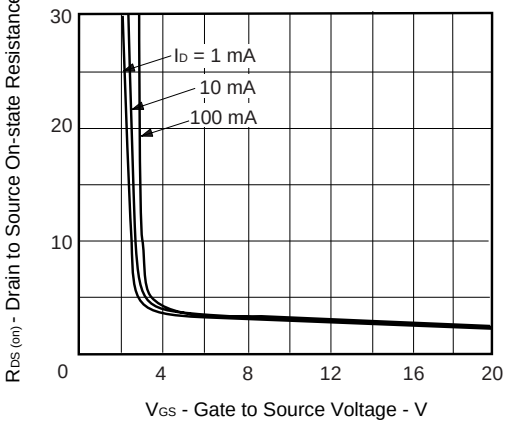
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



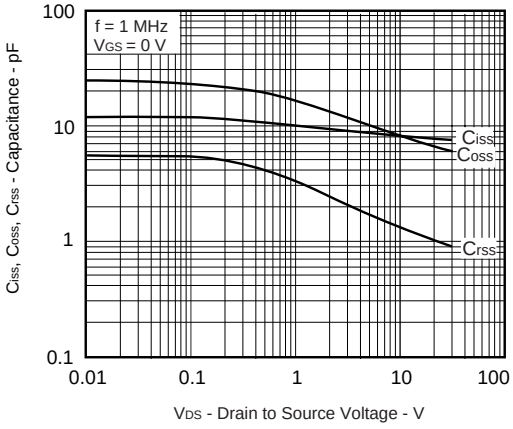
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



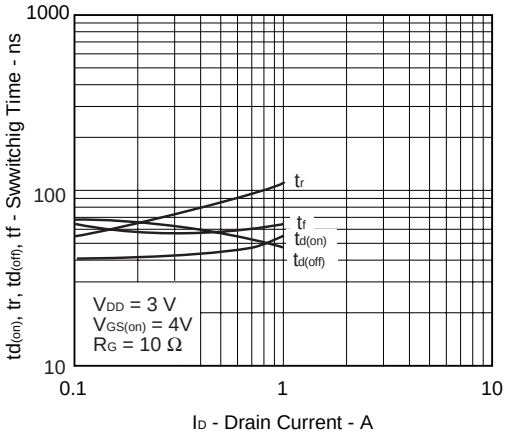
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



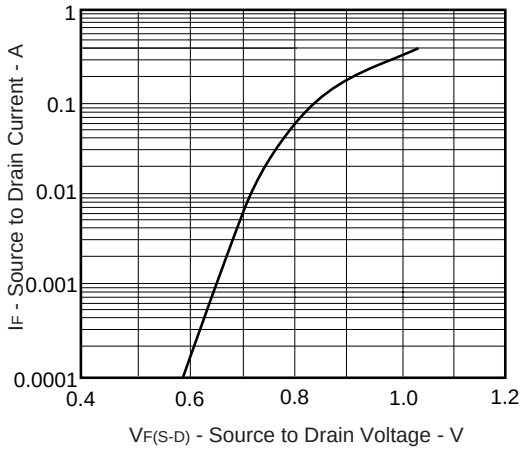
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REFERENCE

Document Name	Document No.
NEC semiconductor device reliability / quality control system	TEI-1202
Quality grade on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E

[MEMO]

[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.