

### P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

#### DESCRIPTION

The  $\mu$ PA1914 is a switching device which can be driven directly by a 4 V power source.

The  $\mu$ PA1914 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 V power source
- Low on-state resistance

$R_{DS(on)1} = 57 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -2.5 \text{ A)}$

$R_{DS(on)2} = 86 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -2.5 \text{ A)}$

$R_{DS(on)3} = 96 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -2.5 \text{ A)}$

#### ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA1914TE	6-pin Mini Mold (Thin Type)

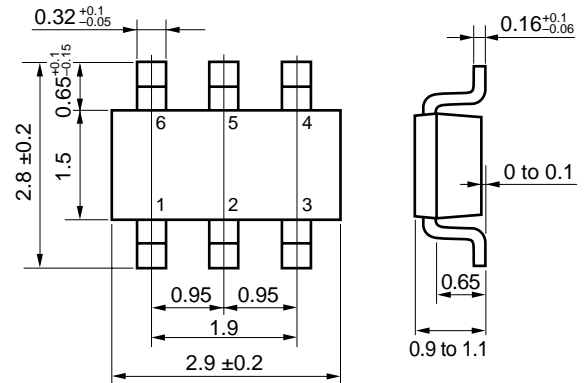
#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Drain to Source Voltage	$V_{DSS}$	-30	V
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 4.5$	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 18$	A
Total Power Dissipation	$P_{T1}$	0.2	W
Total Power Dissipation <sup>Note2</sup>	$P_{T2}$	2	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

- Notes 1.**  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1 \%$   
**2.** Mounted on FR-4 Board,  $t \leq 5 \text{ sec.}$

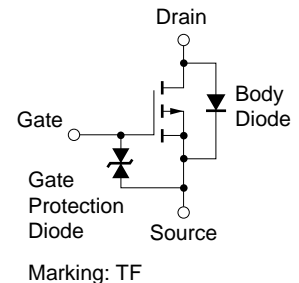
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

#### PACKAGE DRAWING (Unit : mm)



1, 2, 5, 6 : Drain  
 3 : Gate  
 4 : Source

#### EQUIVALENT CIRCUIT

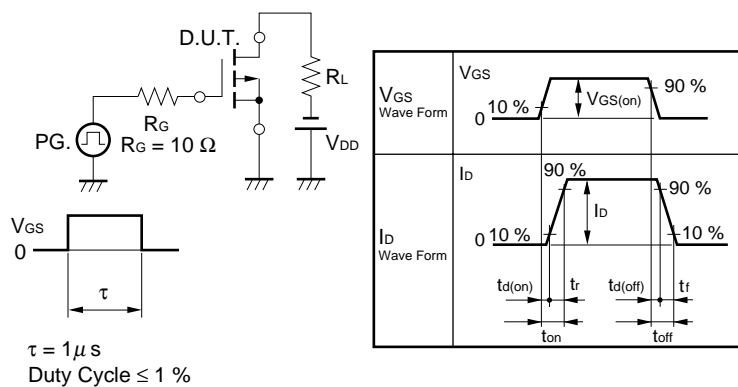


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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

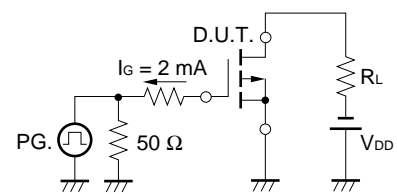
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0 V			-10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V			±10	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA	-1.0	-1.6	-2.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -2.5 A	1	7.1		S
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -2.5 A		43	57	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -2.5 A		58	86	mΩ
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -2.5 A		64	96	mΩ
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = -10 V		589		pF
Output Capacitance	C <sub>oSS</sub>	V <sub>GS</sub> = 0 V		210		pF
Reverse Transfer Capacitance	C <sub>rSS</sub>	f = 1 MHz		86		pF
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = -25 V		546		pF
Output Capacitance	C <sub>oSS</sub>	V <sub>GS</sub> = 0 V		148		pF
Reverse Transfer Capacitance	C <sub>rSS</sub>	f = 1 MHz		65		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -15 V		16		ns
Rise Time	t <sub>r</sub>	I <sub>D</sub> = -2.5 A		57		ns
Turn-off Delay Time	t <sub>d(off)</sub>	V <sub>GS(on)</sub> = -10 V		63		ns
Fall Time	t <sub>f</sub>	R <sub>G</sub> = 10 Ω		80		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = -24 V		11		nC
Gate to Source Charge	Q <sub>GS</sub>	I <sub>D</sub> = -4.5 A		1.5		nC
Gate to Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = -10 V		2.8		nC
Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 4.5 A, V <sub>GS</sub> = 0 V		0.88		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 4.5 A, V <sub>GS</sub> = 0 V		22		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		11		nC

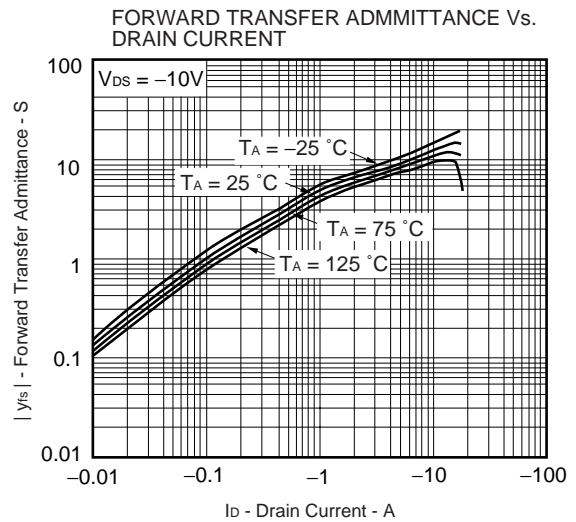
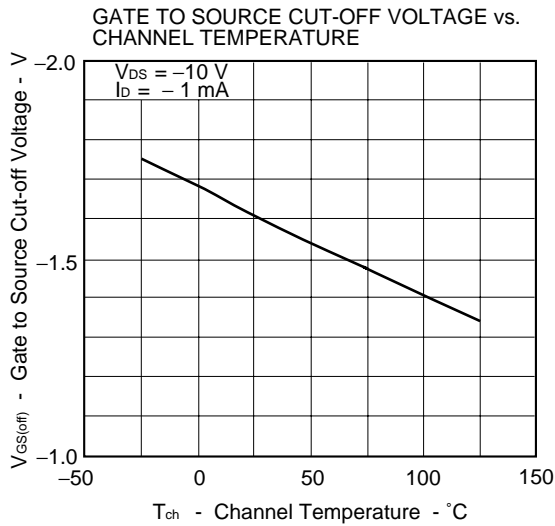
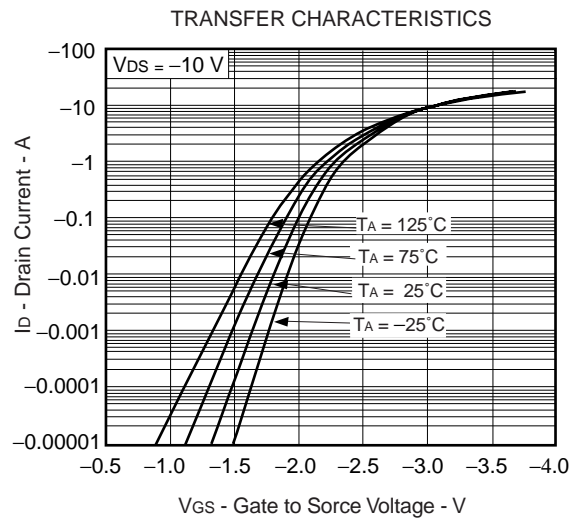
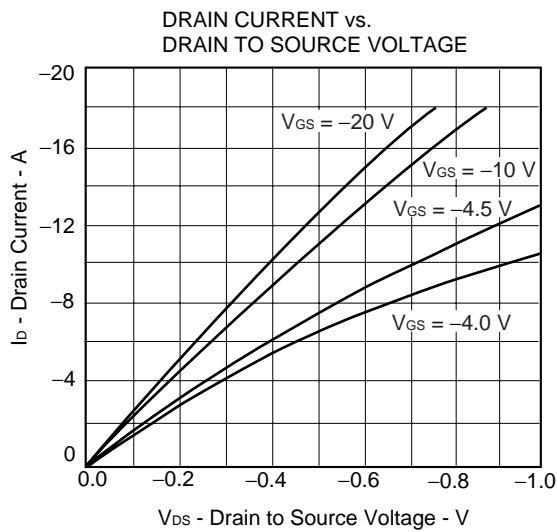
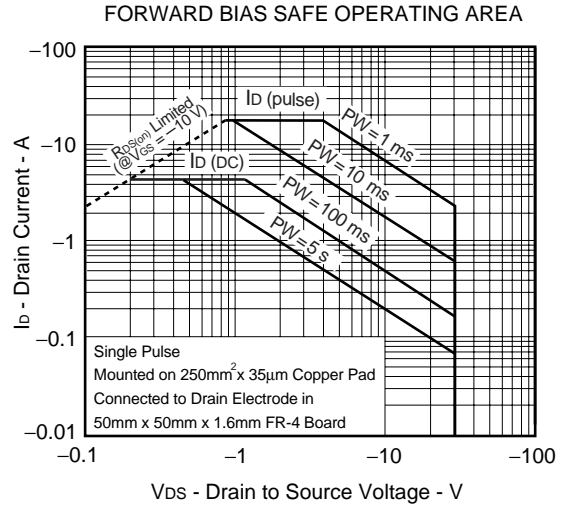
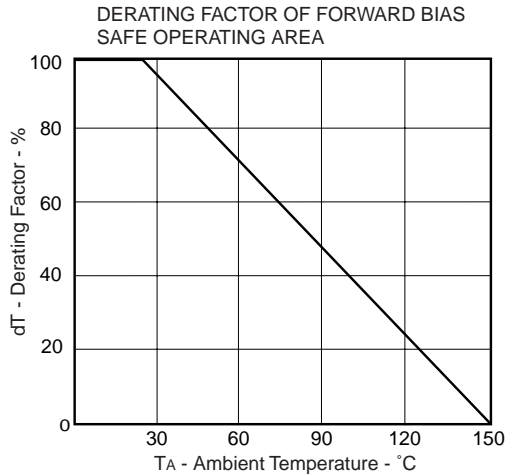
**TEST CIRCUIT 1 SWITCHING TIME**



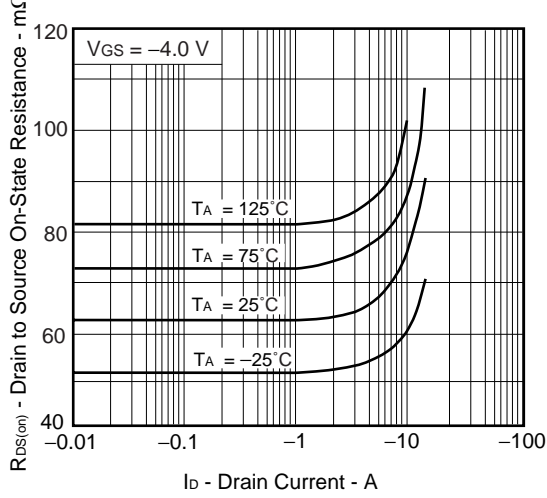
**TEST CIRCUIT 2 GATE CHARGE**



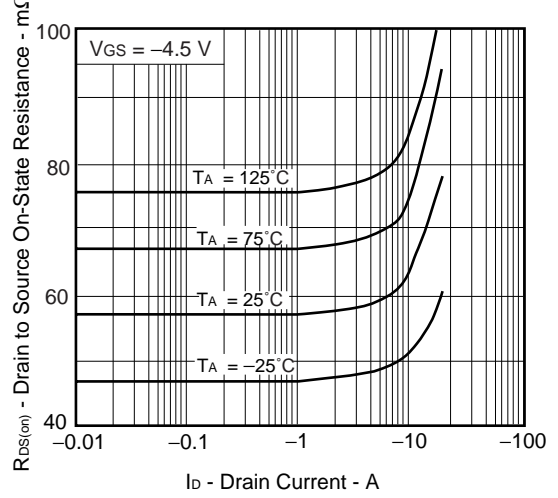
TYPICAL CHARACTERISTICS (TA = 25°C)



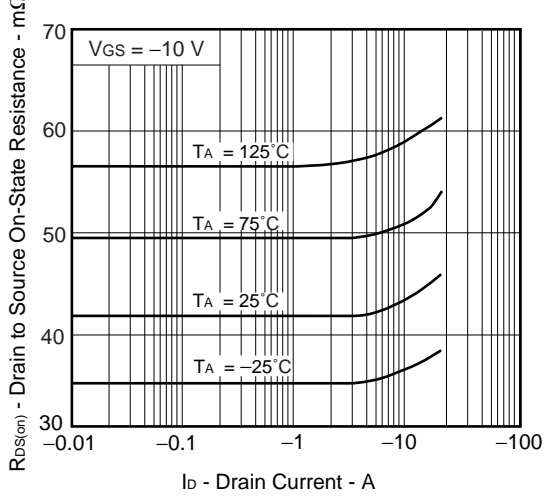
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



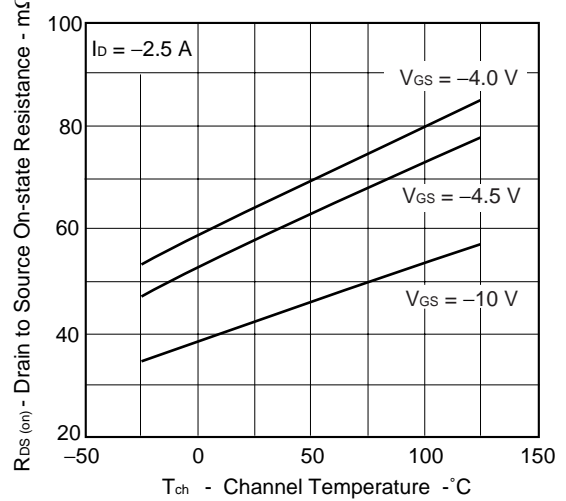
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



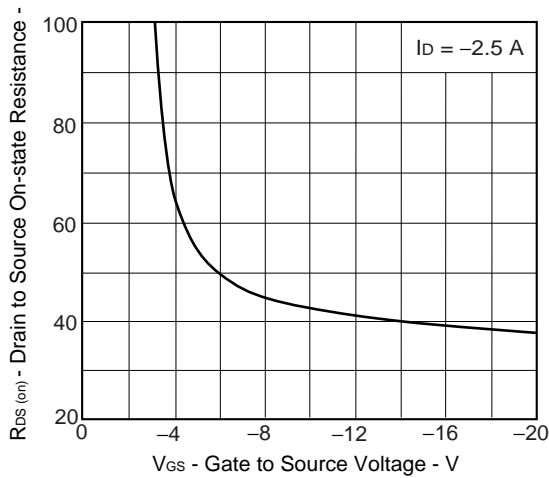
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



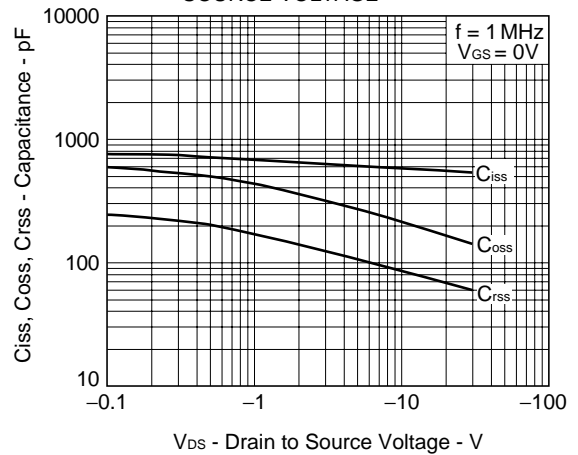
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



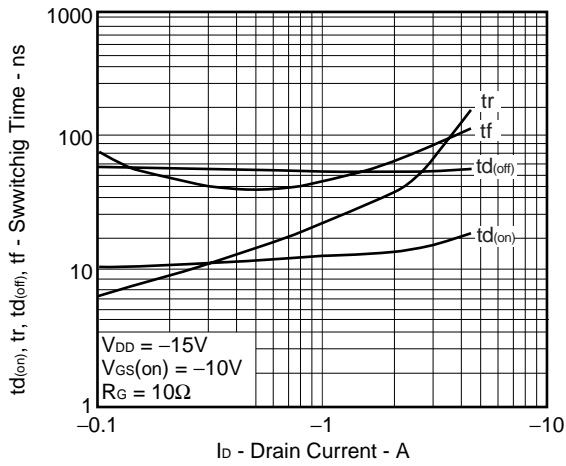
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



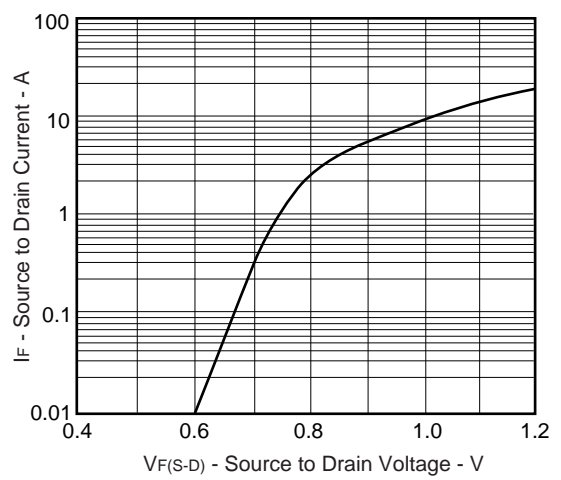
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



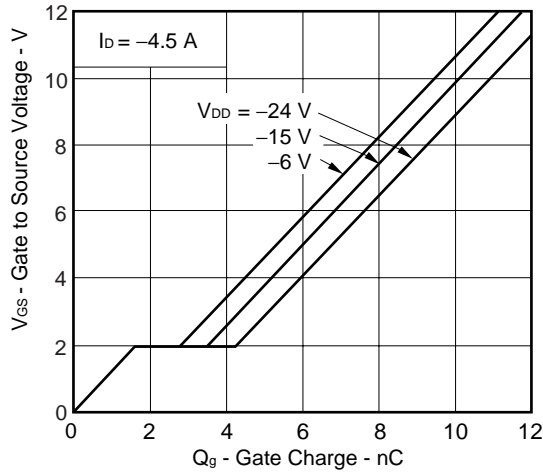
SWITCHING CHARACTERISTICS



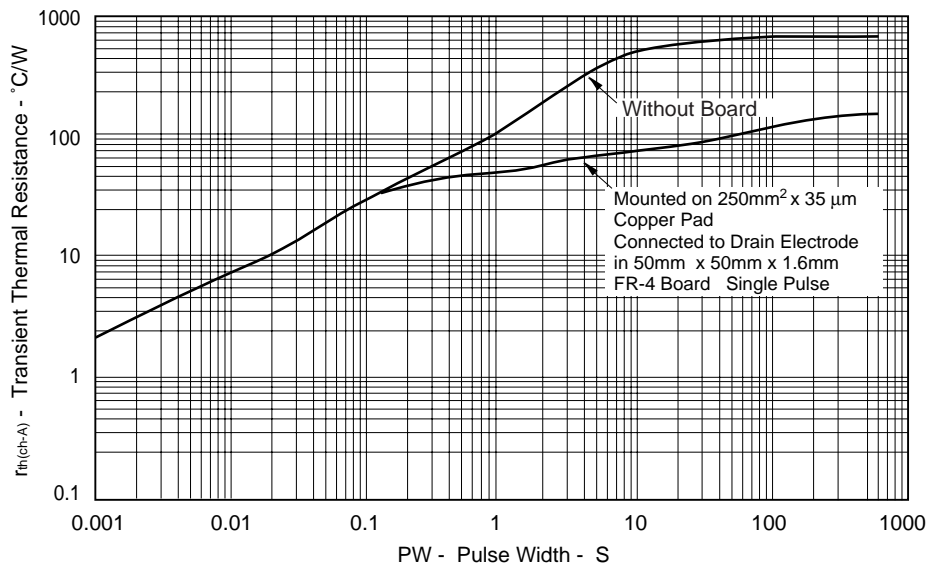
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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