

N-CHANNEL/P-CHANNEL MOS FET PAIR  
 FOR LOAD SWITCH

DESCRIPTION

The  $\mu$  PA1981 is a N-Channel/P-Channel MOS FET pair for compact power management in portable electronic equipment where 2.5 to 8 V input and 2.8 A output current capability are needed.

This load switch integrated a small N-Channel MOS FET (Q1), which drives a large P-Channel MOS FET (Q2) in one tiny package (SC-95).

FEATURES

- $V_{S2D21} = 0.2$  V MAX. ( $V_{S2S1} = 5.0$  V,  $I_{D2} = -2.8$  A,  $R_{D2S2(on)1} = 70$  m $\Omega$ )
- $V_{S2D22} = 0.2$  V MAX. ( $V_{S2S1} = 2.5$  V,  $I_{D2} = -1.9$  A,  $R_{D2S2(on)2} = 105$  m $\Omega$ )

ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA1981TE	SC-95 (Mini Mold Thin Type)

Marking: TZ

ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Source2 to Source1 Input Voltage Range	$V_{S2S1}$	2.5 to 8.0	V
Gate1 to Source1 On Voltage Range	$V_{G1S1}$	1.5 to 7.0	V
Drain2 Current (DC) <sup>Note1</sup>	$I_{D2(DC)}$	-2.8	A
Drain2 Current (pulse) <sup>Note2</sup>	$I_{D2(pulse)}$	-10.0	A
Total Power Dissipation <sup>Note1</sup>	$P_T$	1.0	W
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C

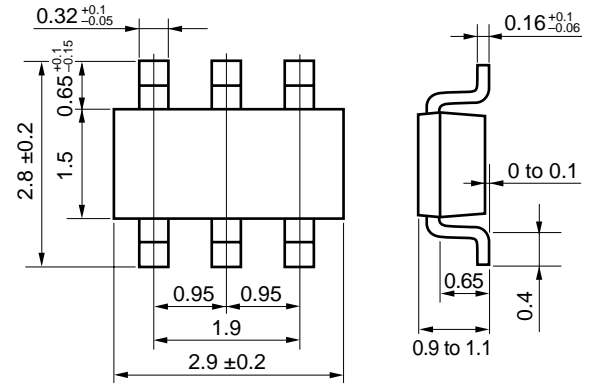
Notes 1. Mounted on FR-4 Board of 2500 mm<sup>2</sup> x 1.6 mm, t ≤ 5 sec

2. PW ≤ 10  $\mu$ s, Duty Cycle ≤ 1%

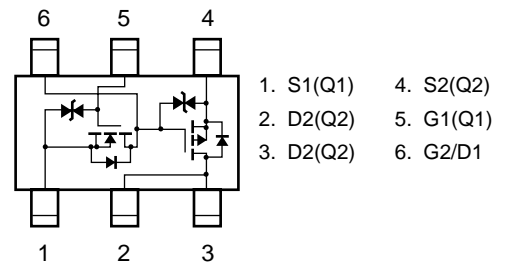
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD.

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)



PIN CONNECTION (Top View)



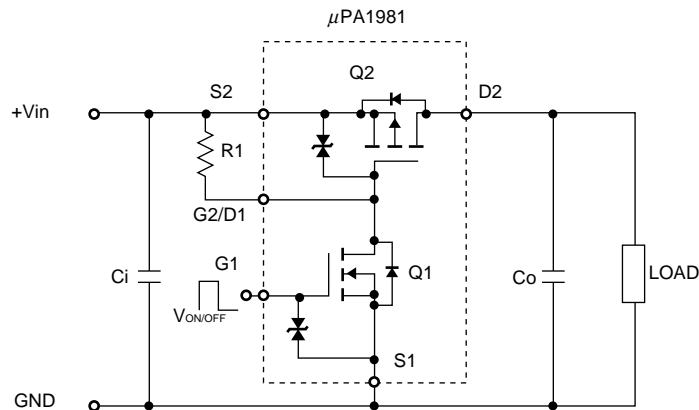
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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>OFF CHARACTERISTICS</b>						
Q2-S2 to D2 Leakage Current	I <sub>S2D2</sub>	V <sub>S2D2</sub> = 8.0 V, V <sub>G1S1</sub> = 0 V			1.0	μA
Q1-D1 to S1 Leakage Current	I <sub>D1S1</sub>	V <sub>D1S1</sub> = 8.0 V, V <sub>G1S1</sub> = 0 V			1.0	μA
<b>ON CHARACTERISTICS</b>						
Q2-S2 to D2 Voltage <sup>Note</sup>	V <sub>S2D21</sub>	V <sub>S2S1</sub> = 5.0 V, V <sub>G1S1</sub> = 3.3 V, I <sub>D2</sub> = -2.8 A		0.15	0.2	V
	V <sub>S2D22</sub>	V <sub>S2S1</sub> = 2.5 V, V <sub>G1S1</sub> = 3.3 V, I <sub>D2</sub> = -1.9 A		0.15	0.2	V
Q2-Static On-Resistance <sup>Note</sup>	R <sub>D2S2(on)1</sub>	V <sub>G2S2</sub> = -5.0 V, I <sub>D2</sub> = -2.8 A		52	70	mΩ
	R <sub>D2S2(on)2</sub>	V <sub>G2S2</sub> = -2.5 V, I <sub>D2</sub> = -1.9 A		76	105	mΩ
Q2-S2 to D2 Current <sup>Note</sup>	I <sub>S2D21</sub>	V <sub>S2D2</sub> = 0.2 V, V <sub>S2S1</sub> = 5.0 V, V <sub>G1S1</sub> = 3.3 V	2.8			A
	I <sub>S2D22</sub>	V <sub>S2D2</sub> = 0.2 V, V <sub>S2S1</sub> = 2.5 V, V <sub>G1S1</sub> = 3.3 V	1.9			A

**Note** Pulsed: PW ≤ 350 μs, Duty Cycle ≤ 2%

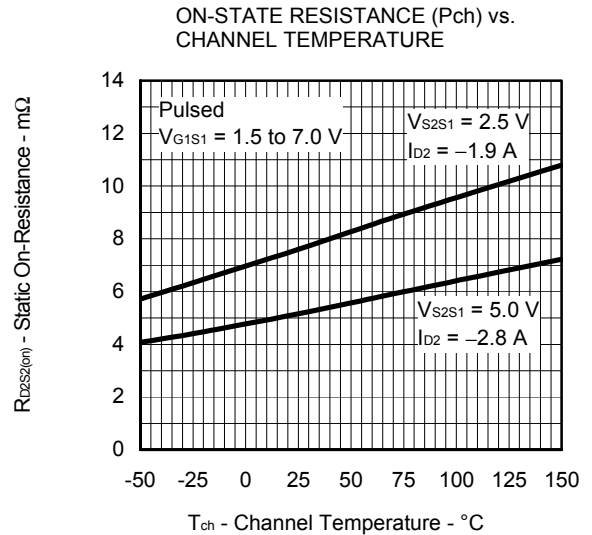
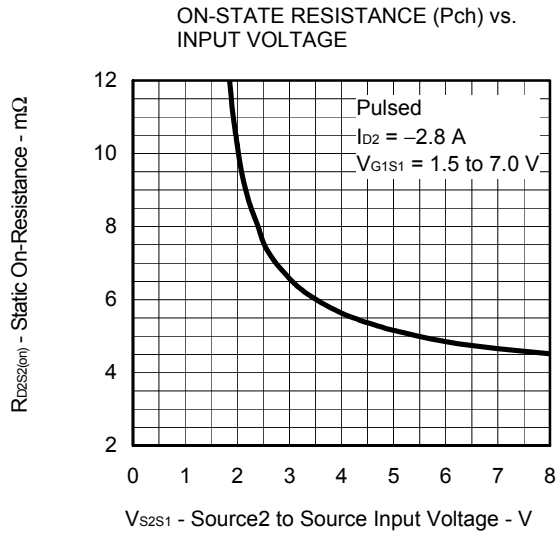
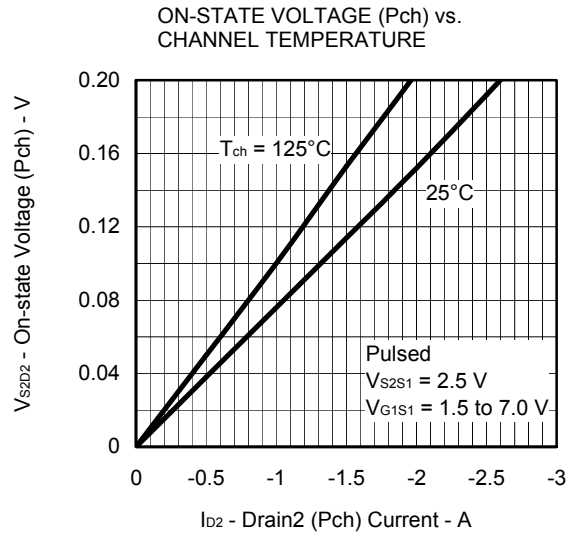
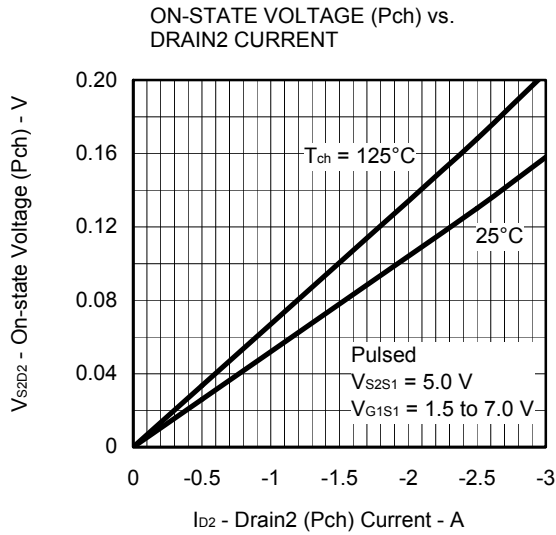
**CIRCUIT1 EXAMPLE OF APPLICATION CIRCUIT**



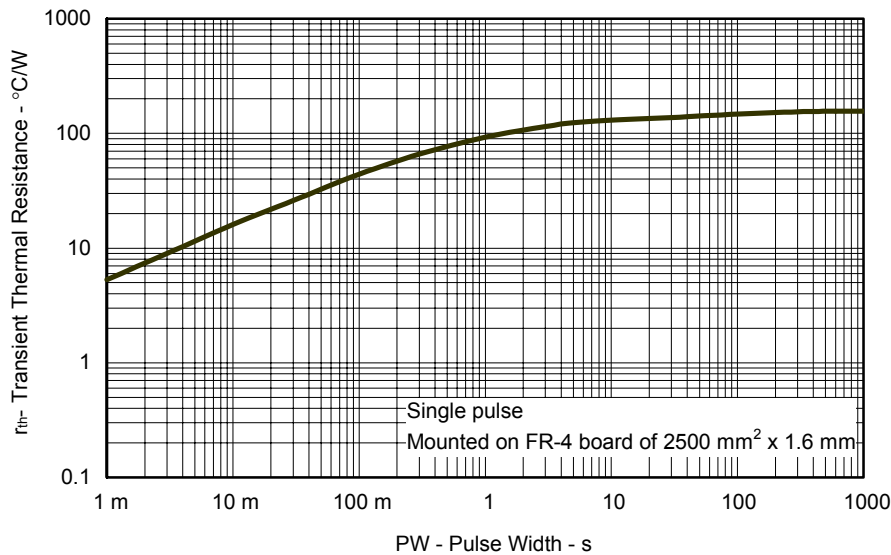
**RECOMMENDATION OF CIRCUIT1**

- Co ≤ 1 μF for applications
- R1 is required to turn Q2 off.
- Select R1 in the range of 10 to 470 kΩ.

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



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



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