

# 4V Drive Pch MOSFET

## RU1E002SP

### ● Structure

Silicon P-channel MOSFET

### ● Features

- 1) High-speed switching.
- 2) Small package (UMT3F).
- 3) 4V drive.

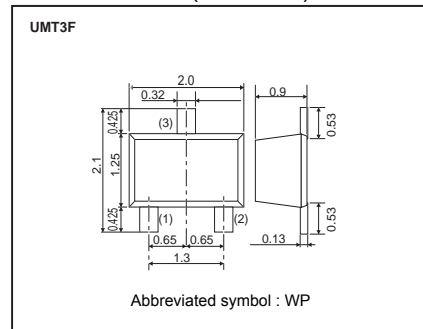
### ● Application

Switching

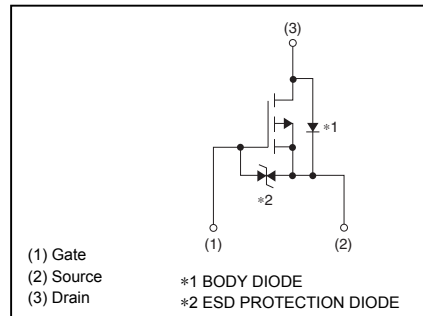
### ● Packaging specifications

Type	Package	Taping
	Code	TCL
	Basic ordering unit (pieces)	3000
RU1E002SP		○

### ● Dimensions (Unit : mm)



### ● Inner circuit



### ● Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DSS}$	-30	V
Gate-source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	Continuous	$I_D$	$\pm 0.25$ A
	Pulsed	$I_{DP}$ *1	$\pm 0.5$ A
Power dissipation	$P_D$ *2	0.2	W
Channel temperature	Tch	150	°C
Range of storage temperature	Tstg	-55 to +150	°C

\*1  $P_W \leq 10 \mu s$ , Duty cycle  $\leq 1\%$

\*2 Each terminal mounted on a reference land.

### ● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Ambient	Rth (ch-a)*	625	°C / W

\*Each terminal mounted on a reference land.

● **Electrical characteristics** (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	±10	μA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-30	-	-	V	$I_D=-1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	-	-	-1	μA	$V_{DS}=-30V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	-1	-	-2.5	V	$V_{DS}=-10V, I_D=-1mA$
Static drain-source on-state resistance	$R_{DS(on)}^*$	-	0.9	1.4	Ω	$I_D=-0.25A, V_{GS}=-10V$
		-	1.4	2.1		$I_D=-0.15A, V_{GS}=-4.5V$
		-	1.6	2.4		$I_D=-0.15A, V_{GS}=-4V$
Forward transfer admittance	$ Y_{fs} ^*$	0.2	-	-	S	$V_{DS}=-10V, I_D=-0.15A$
Input capacitance	$C_{iss}$	-	30	-	pF	$V_{DS}=-10V$
Output capacitance	$C_{oss}$	-	10	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	5	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	4	-	ns	$V_{DD}=-15V, I_D=-0.15A$
Rise time	$t_r^*$	-	6	-	ns	$V_{GS}=-10V$
Turn-off delay time	$t_{d(off)}^*$	-	20	-	ns	$R_L=100\Omega$
Fall time	$t_f^*$	-	23	-	ns	$R_G=10\Omega$

\*Pulsed

● **Body diode characteristics** (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	$V_{SD}^*$	-	-	-1.2	V	$I_S=-0.1A, V_{GS}=0V$

\*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics ( I )

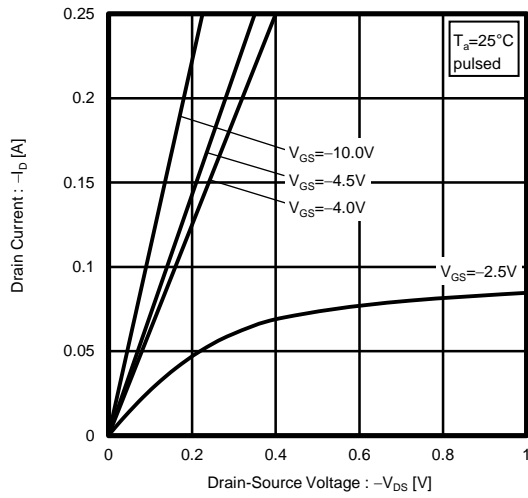


Fig.2 Typical Output Characteristics ( II )

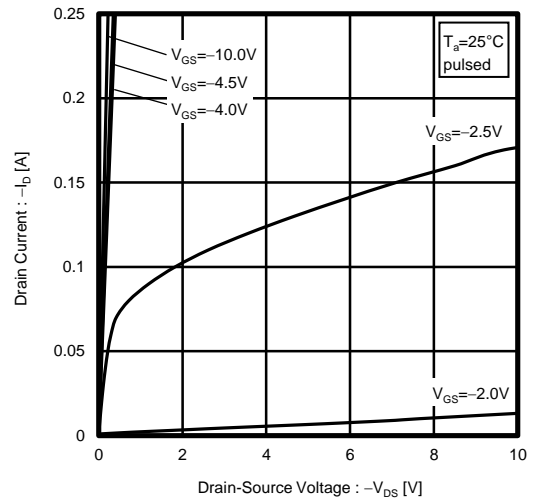


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

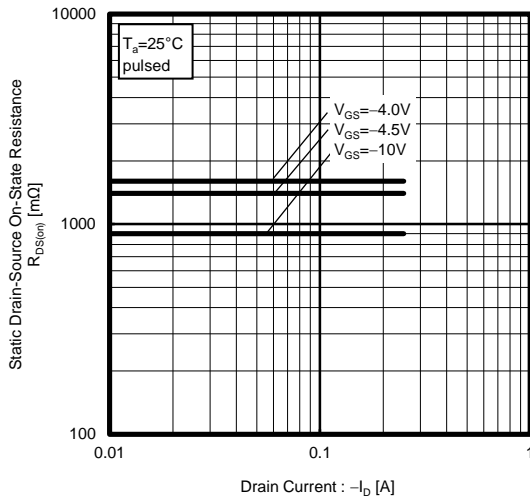


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

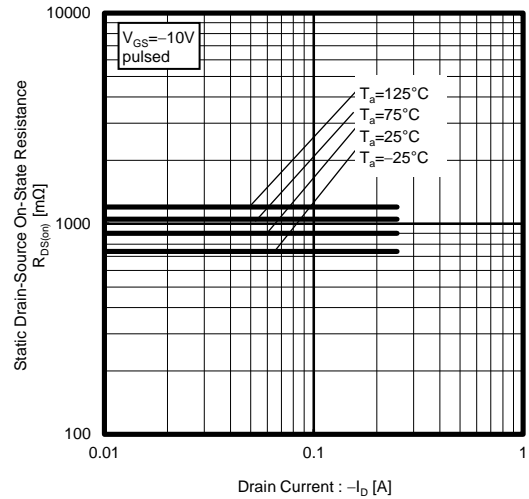


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

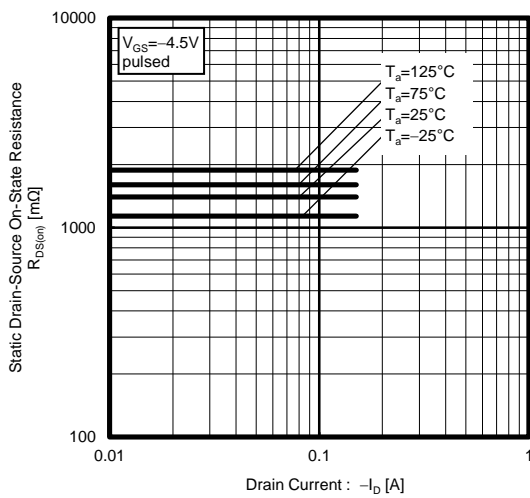


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

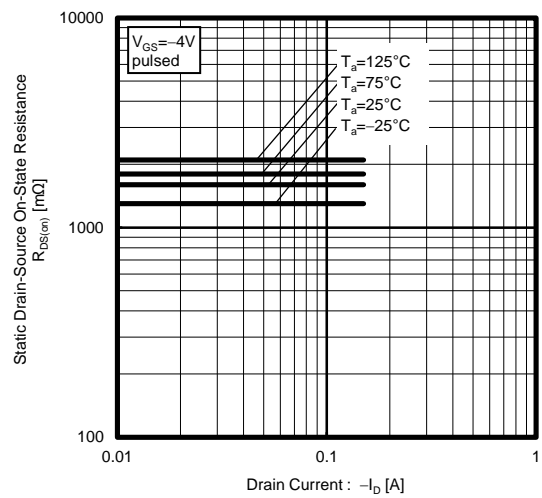


Fig.7 Forward Transfer Admittance vs. Drain Current

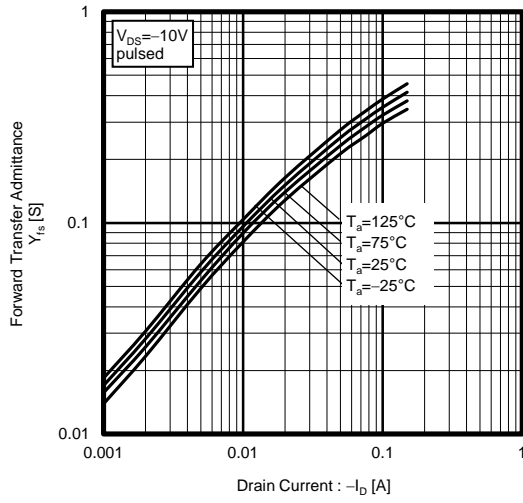


Fig.8 Typical Transfer Characteristics

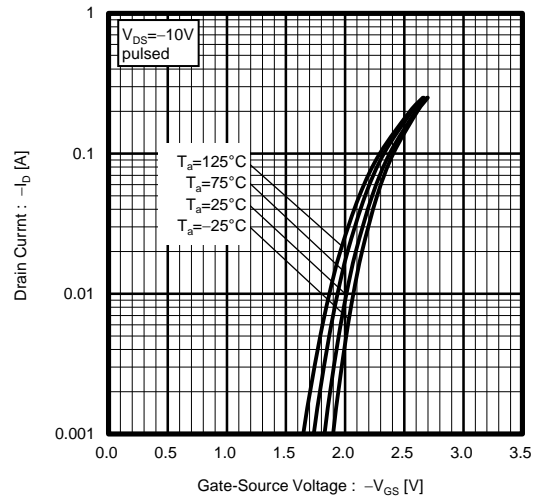


Fig.9 Source Current vs. Source-Drain Voltage

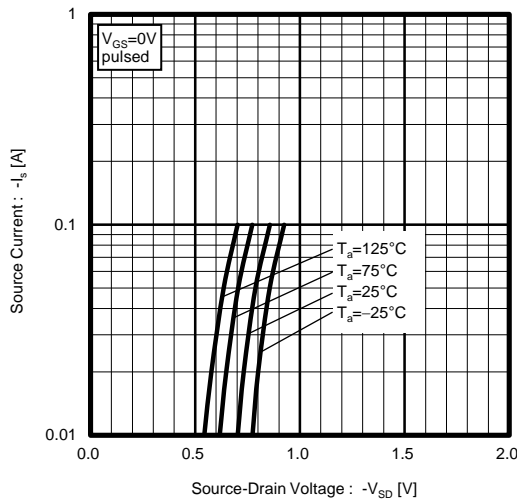


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

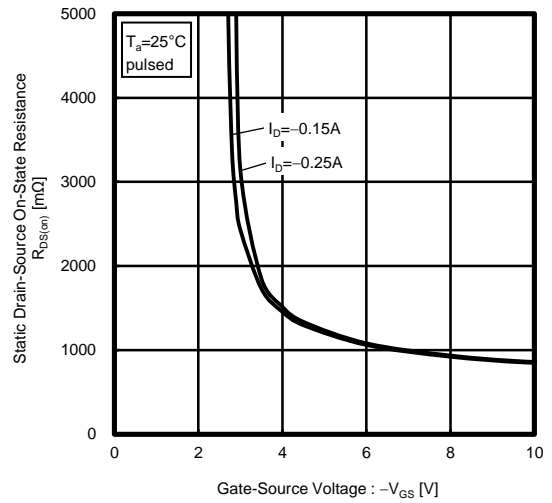


Fig.11 Switching Characteristics

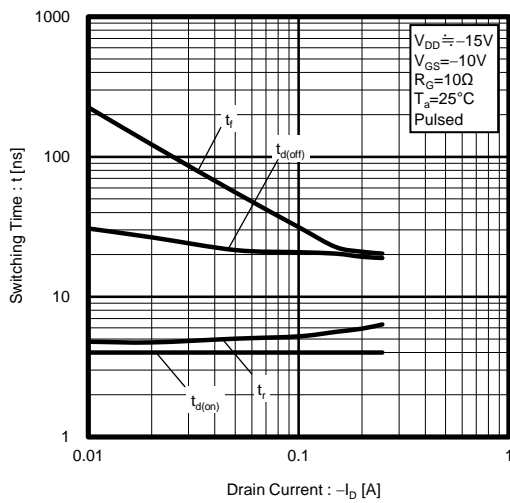
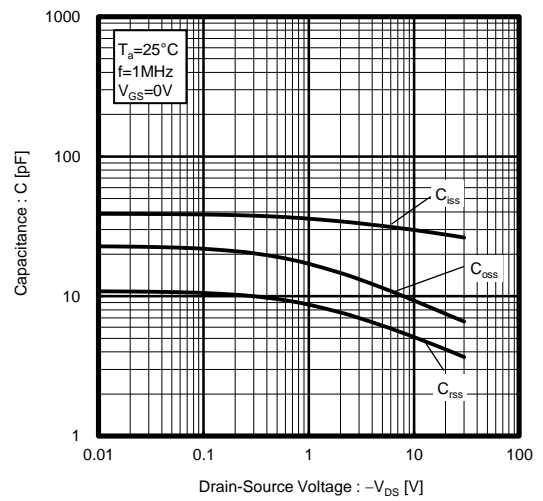


Fig.12 Typical Capacitance vs. Drain-Source Voltage



● Measurement circuits

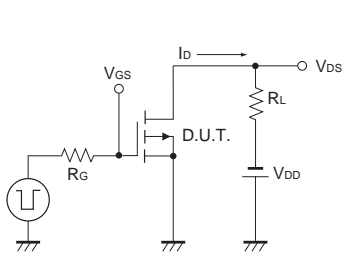


Fig.1-1 Switching Time Measurement Circuit

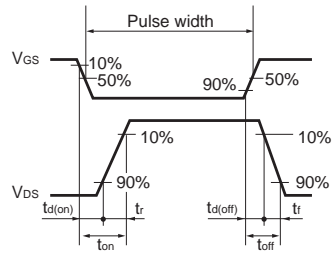


Fig.1-2 Switching Waveforms

● Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

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