

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		○

● Absolute maximum ratings (Ta = 25°C)

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

*1 $P_W \leq 10\text{W}$, Duty cycle ≤ 1%

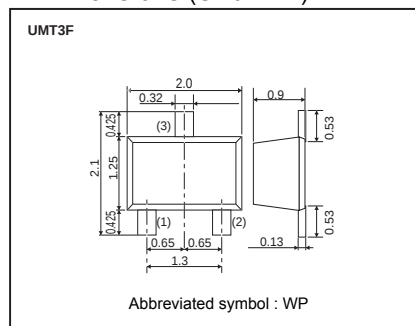
*2 Each terminal mounted on a reference land.

● Thermal resistance

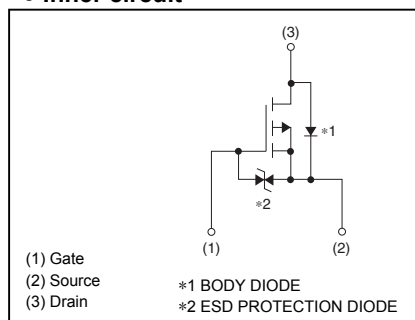
Parameter	Symbol	Limits	Unit
Channel to Ambient	$R_{th}(ch-a)^*$	625	°C / W

*Each terminal mounted on a reference land.

● Dimensions (Unit : mm)



● Inner circuit



● 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)

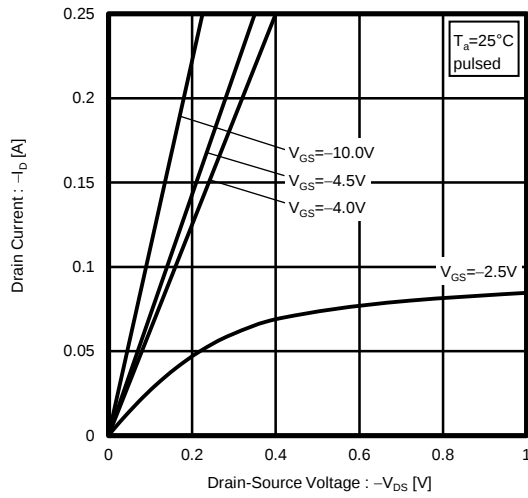


Fig.2 Typical Output Characteristics (II)

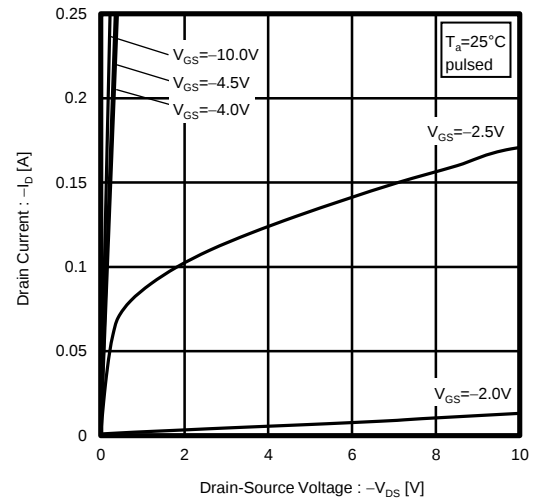


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

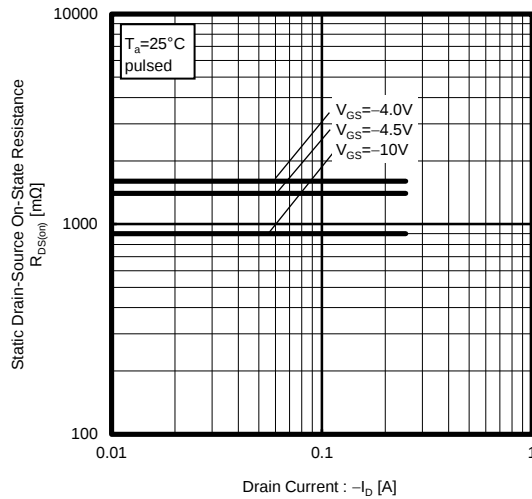


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

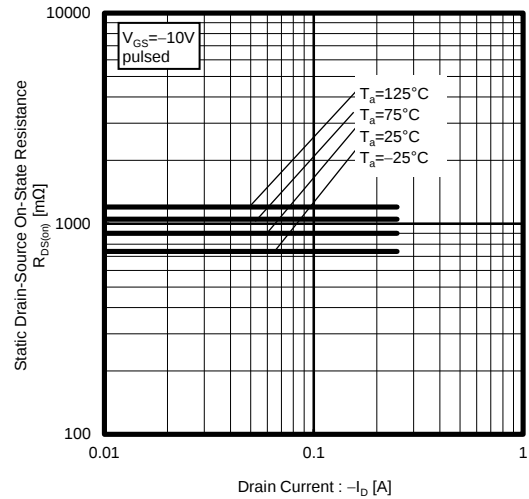


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

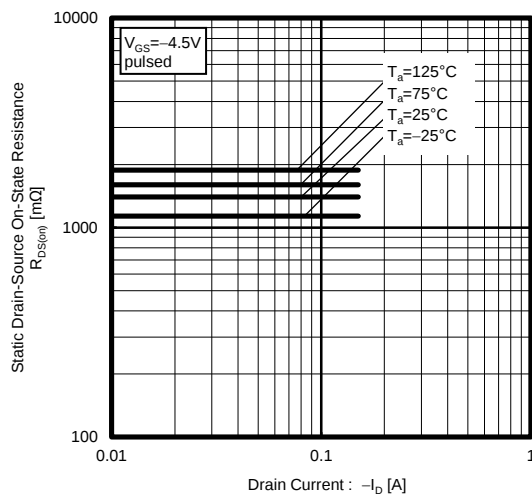


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

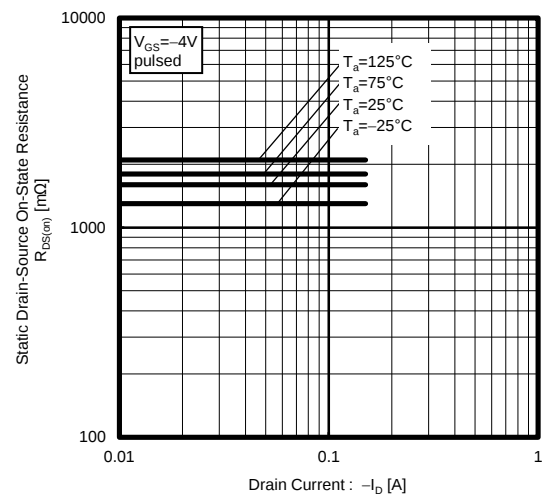


Fig.7 Forward Transfer Admittance vs. Drain Current

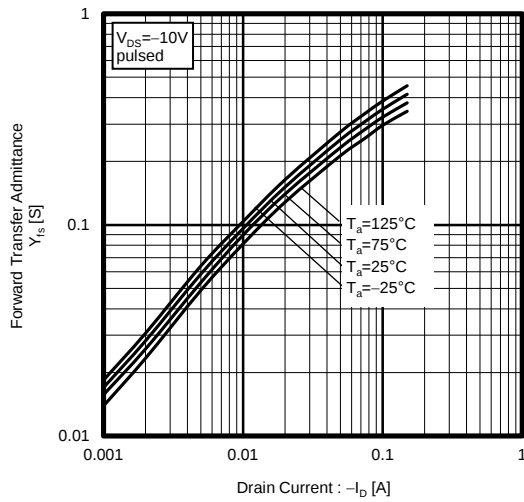


Fig.8 Typical Transfer Characteristics

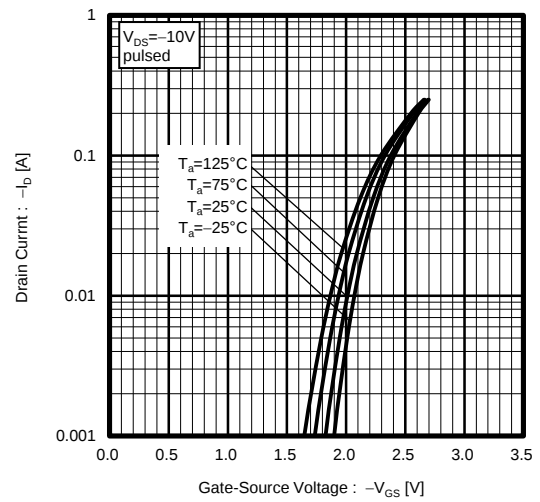


Fig.9 Source Current vs. Source-Drain Voltage

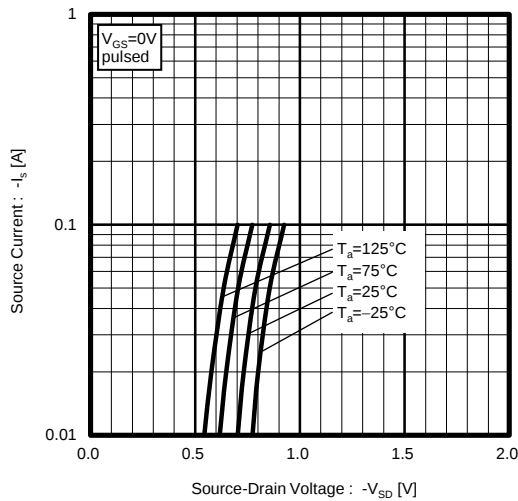


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

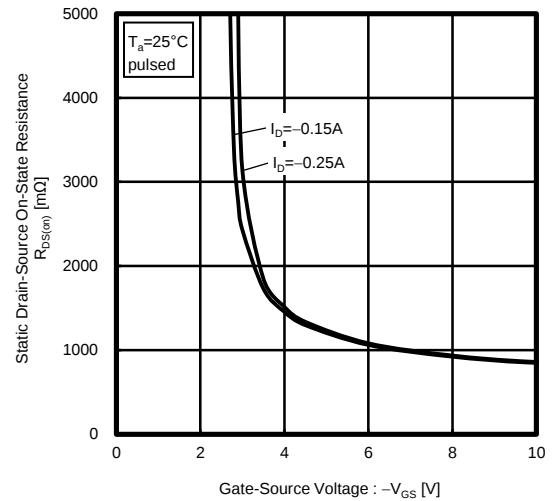


Fig.11 Switching Characteristics

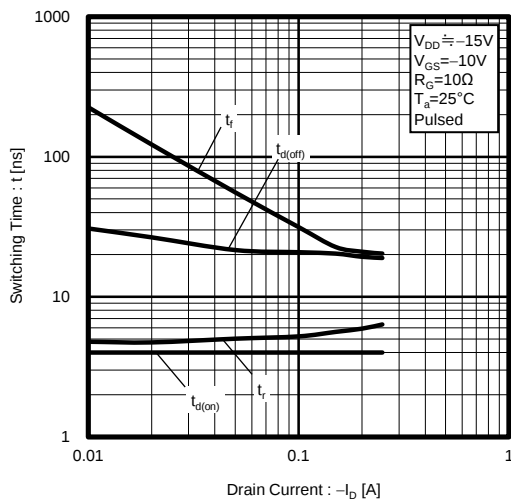
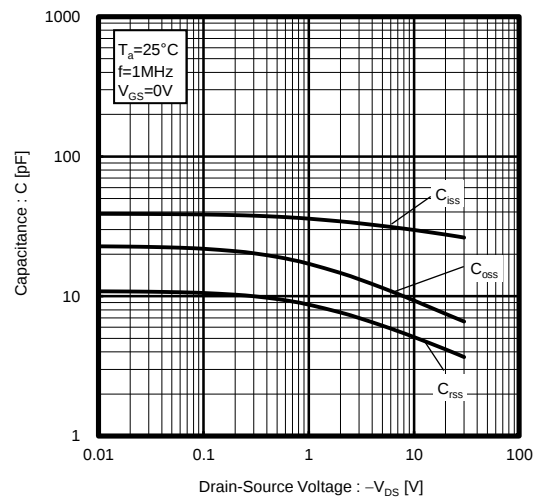


Fig.12 Typical Capacitance vs. Drain-Source Voltage



● **Measurement circuits**

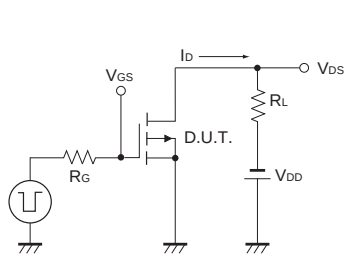


Fig.1-1 Switching Time Measurement Circuit

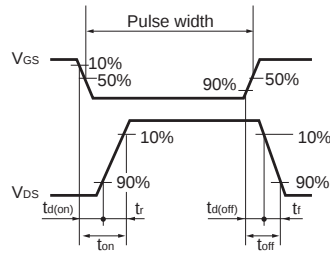


Fig.1-2 Switching Waveforms

● **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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