

# 1.5V Drive Pch MOSFET

## RAL045P01

### ● Structure

Silicon P-channel MOSFET

### ● Features

- 1) Low On-resistance.
- 2) Small high power package.
- 3) Low voltage drive.(1.5V)

### ● Application

Switching

### ● Packaging specifications

Type	Package	Taping
	Code	TCR
	Basic ordering unit (pieces)	3000
RAL045P01		○

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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	-12	V	
Gate-source voltage	$V_{GSS}$	0 to -8	V	
Drain current	Continuous	$I_D$	±4.5	A
	Pulsed	$I_{DP}$ *1	±18	A
Source current (Body Diode)	Continuous	$I_S$	-0.8	A
	Pulsed	$I_{SP}$ *1	-18	A
Power dissipation	$P_D$ *2	1	W	
Channel temperature	$T_{ch}$	150	°C	
Range of storage temperature	$T_{stg}$	-55 to +150	°C	

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

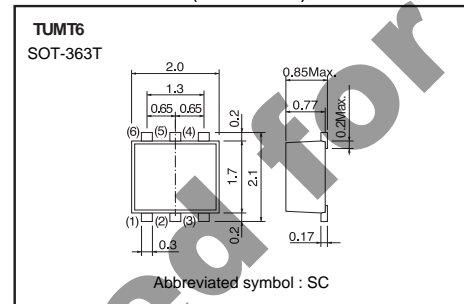
\*2 Mounted on a ceramic board.

### ● Thermal resistance

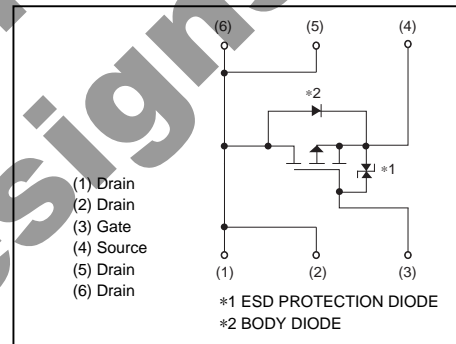
Parameter	Symbol	Limits	Unit
Channel to Ambient	$R_{th}(ch-a)^*$	125	°C / W

\*Mounted on a ceramic board.

### ● Dimensions (Unit : mm)



### ● Inner circuit



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	-10	$\mu A$	$V_{GS}=-8V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-12	-	-	V	$I_D=-1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	-	-	-10	$\mu A$	$V_{DS}=-12V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	-0.3	-	-1.0	V	$V_{DS}=-6V, I_D=-1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	22	30	m $\Omega$	$I_D=-4.5A, V_{GS}=-4.5V$
		-	28	39		$I_D=-2.2A, V_{GS}=-2.5V$
		-	38	57		$I_D=-2.2A, V_{GS}=-1.8V$
		-	50	100		$I_D=-0.9A, V_{GS}=-1.5V$
Forward transfer admittance	$ Y_{fs} $ *	5.5	-	-	S	$I_D=-4.5A, V_{DS}=-6V$
Input capacitance	$C_{iss}$	-	4200	-	pF	$V_{DS}=-6V$
Output capacitance	$C_{oss}$	-	350	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	330	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	16	-	ns	$I_D=-2.2A, V_{DD}=-6V$
Rise time	$t_r$ *	-	60	-	ns	$V_{GS}=-4.5V$
Turn-off delay time	$t_{d(off)}$ *	-	400	-	ns	$R_L=2.7\Omega$
Fall time	$t_f$ *	-	150	-	ns	$R_G=10\Omega$
Total gate charge	$Q_g$ *	-	40	-	nC	$I_D=-4.5A$
Gate-source charge	$Q_{gs}$ *	-	6.5	-	nC	$V_{DD}=-6V$
Gate-drain charge	$Q_{gd}$ *	-	6.0	-	nC	$V_{GS}=-4.5V$

\*Pulsed

## ● Body diode characteristics (Source-Drain) (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	$V_{SD}$ *	-	-	-1.2	V	$I_s=-4.5A, V_{GS}=0V$

\*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical output characteristics ( I )

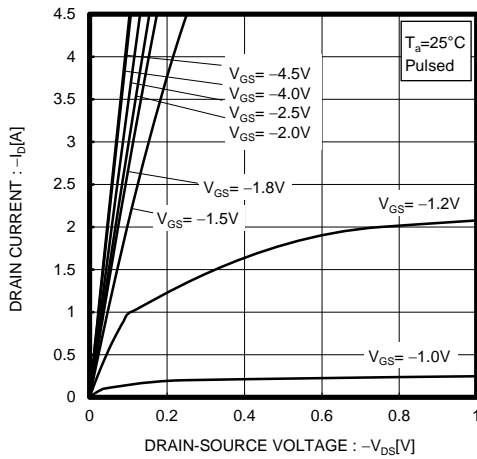


Fig.2 Typical output characteristics( II )

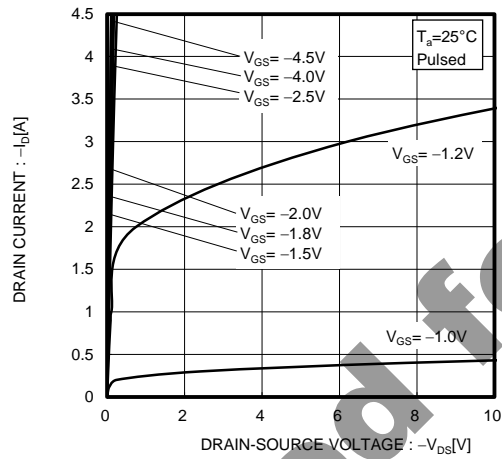


Fig.3 Typical Transfer Characteristics

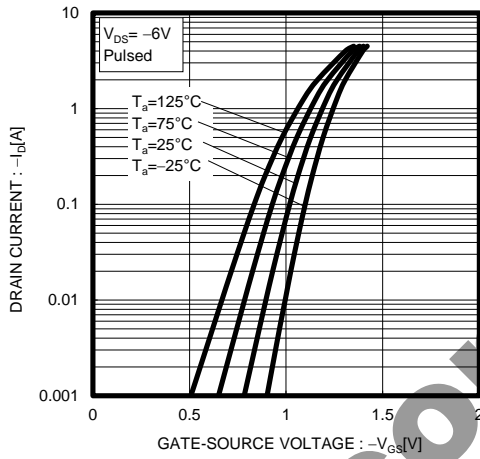


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current ( I )

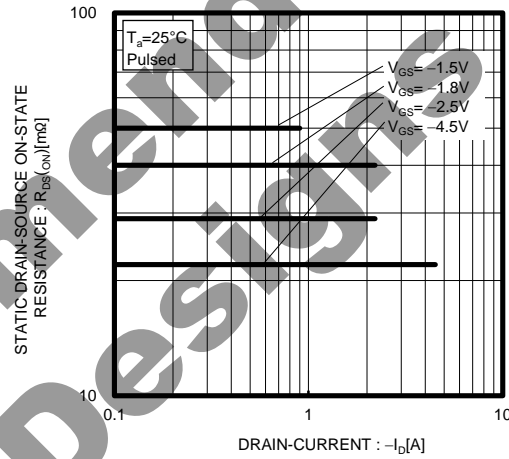


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current ( II )

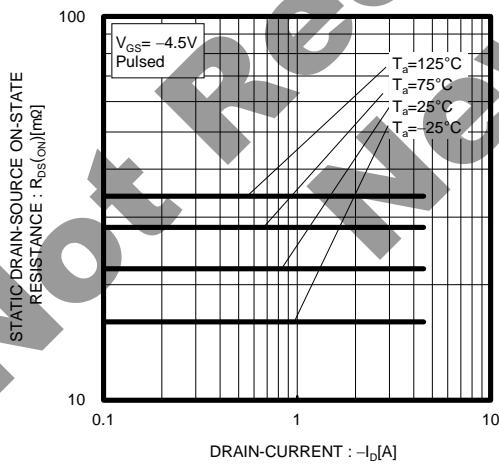


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

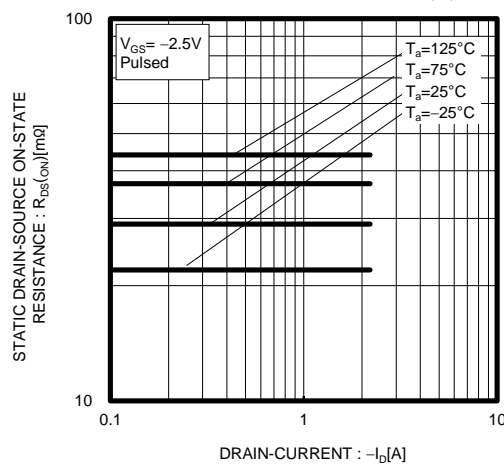


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(I<sub>D</sub>)

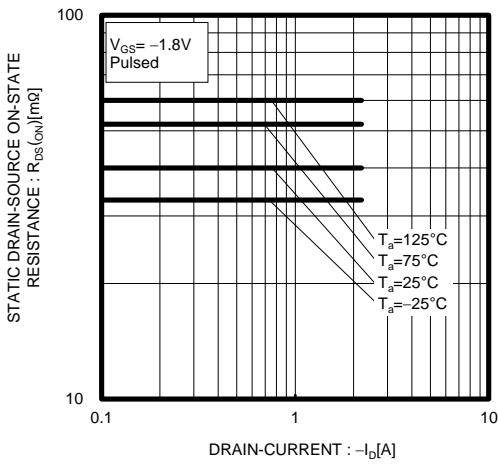


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(V)

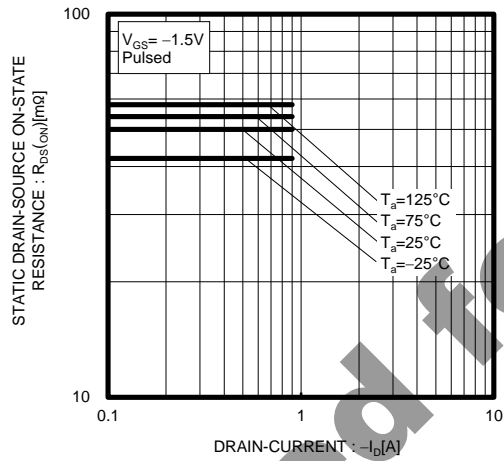


Fig.9 Forward Transfer Admittance vs. Drain Current

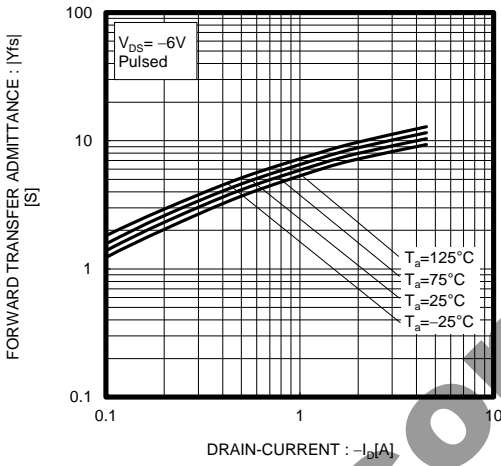


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

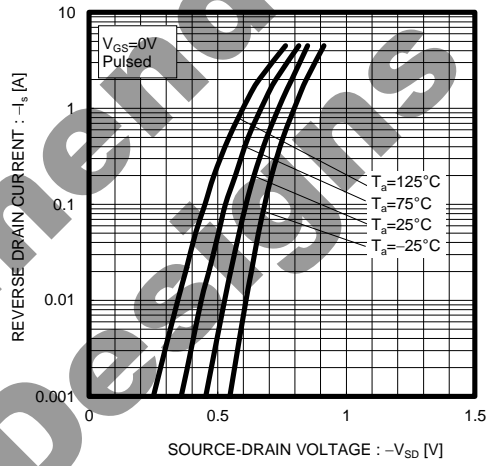


Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

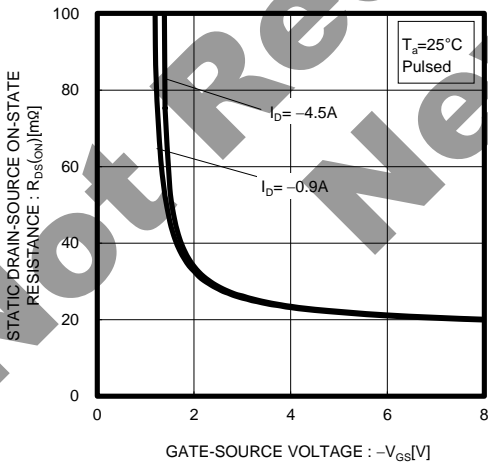


Fig.12 Switching Characteristics

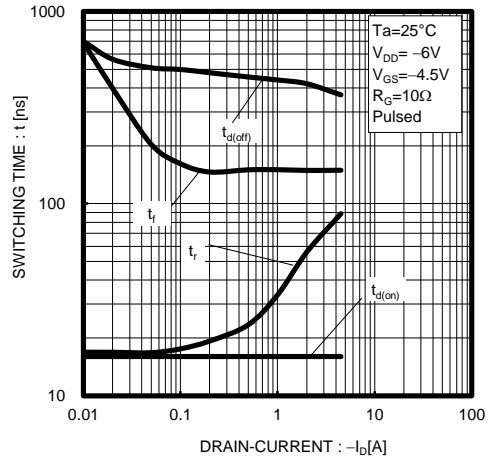


Fig.13 Dynamic Input Characteristics

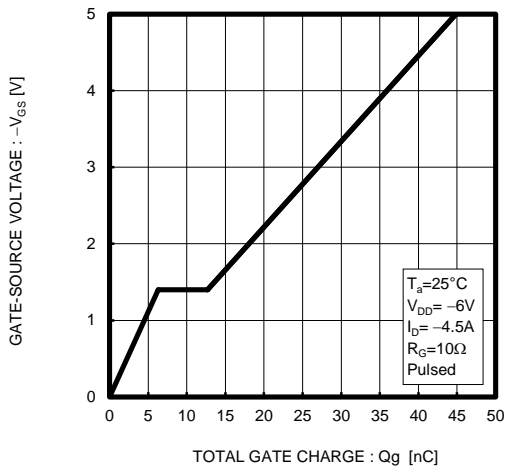
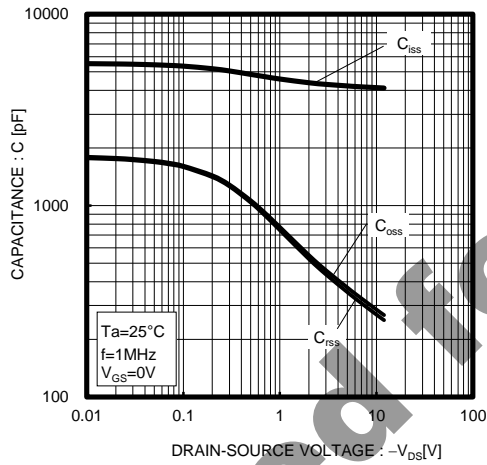


Fig.14 Typical Capacitance vs. Drain-Source Voltage



Not Recommended for New Designs

● Measurement circuits

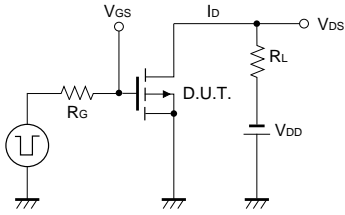


Fig.1-1 Switching Time Measurement Circuit

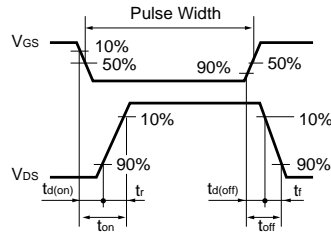


Fig.1-2 Switching Waveforms

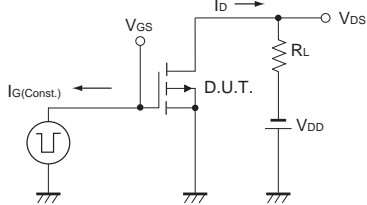


Fig.2-1 Gate Charge Measurement Circuit

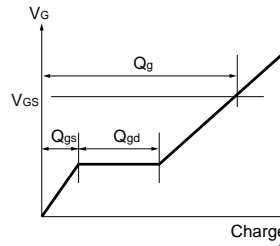


Fig.2-2 Gate Charge Waveform

● Notice

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Not Recommended for New Designs

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