

4V Drive Pch MOSFET

RP1E090RP

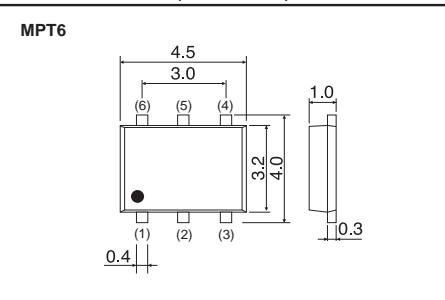
● Structure

Silicon P-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small Surface Mount Package (MPT6).

● Dimensions (Unit : mm)



● Application

Switching

● Packaging specifications

Type	Package	Taping
	Code	TR
RP1E090RP	Basic ordering unit (pieces)	1000

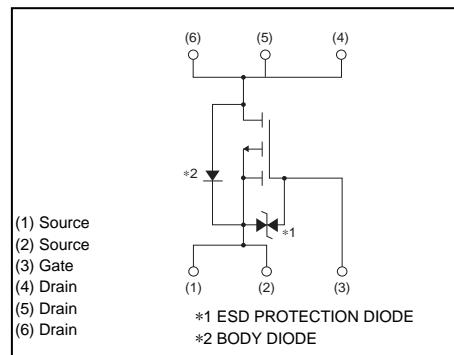
● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V _{DSS}	-30	V
Gate-source voltage		V _{GSS}	±20	V
Drain current	Continuous	I _D	±9	A
	Pulsed	I _{DP}	*1 ±36	A
Source current (Body Diode)	Continuous	I _S	-1.6	A
	Pulsed	I _{SP}	*1 -36	A
Power dissipation		P _D	*2 2.0	W
Channel temperature		T _{ch}	150	°C
Range of storage temperature		T _{stg}	-55 to +150	°C

*1 P_w≤10μs, Duty cycle≤1%

*2 Mounted on a ceramic board.

● Inner circuit



● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Ambient	R _{th} (ch-a)*	62.5	°C / W

*Mounted on a ceramic board.

● 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	$V_{GS(\text{th})}$	-1.0	-	-2.5	V	$V_{DS}=-10V, I_D=-1mA$
Static drain-source on-state resistance	$R_{DS(\text{on})}^*$	-	13	16.9	$m\Omega$	$I_D=-9A, V_{GS}=-10V$
		-	18	25.2		$I_D=-9A, V_{GS}=-4.5V$
		-	21	29.4		$I_D=-9A, V_{GS}=-4.0V$
Forward transfer admittance	$ Y_{fs} ^*$	10	-	-	S	$I_D=-9A, V_{DS}=-10V$
Input capacitance	C_{iss}	-	3000	-	pF	$V_{DS}=-10V$
Output capacitance	C_{oss}	-	360	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	360	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	20	-	ns	$I_D=-4.5A, V_{DD}=-15V$
Rise time	t_r^*	-	30	-	ns	$V_{GS}=-10V$
Turn-off delay time	$t_{d(off)}^*$	-	135	-	ns	$R_L=3.3\Omega$
Fall time	t_f^*	-	80	-	ns	$R_G=10\Omega$
Total gate charge	Q_g^*	-	30	-	nC	$I_D=-9A$
Gate-source charge	Q_{gs}^*	-	7	-	nC	$V_{DD}=-15V$
Gate-drain charge	Q_{gd}^*	-	11	-	nC	$V_{GS}=-5V$

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}^*	-	-	-1.2	V	$I_s=-9A, V_{GS}=0V$

*Pulsed

● Electrical characteristic curves

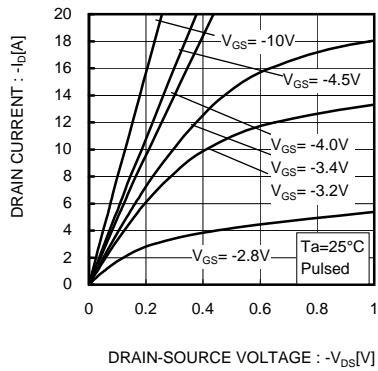


Fig.1 Typical output characteristics (I)

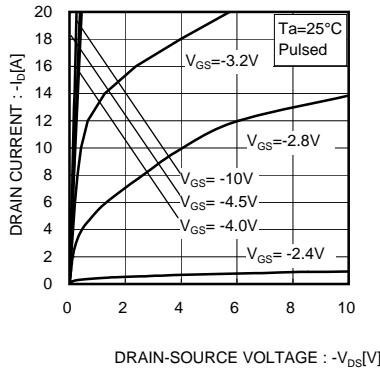


Fig.2 Typical output characteristics (II)

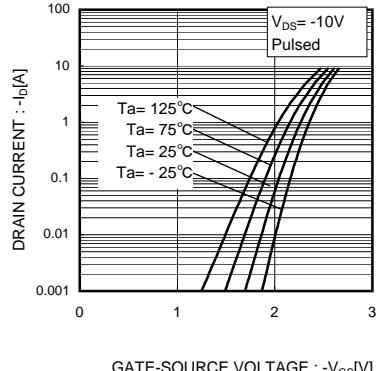


Fig.3 Typical Transfer Characteristics

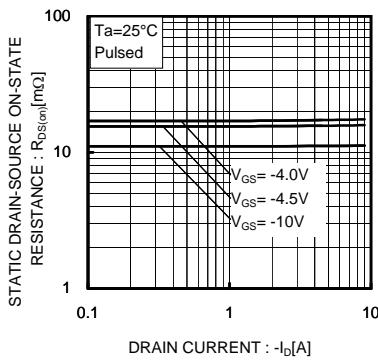


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (I)

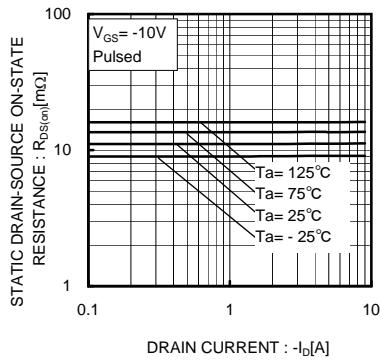


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (II)

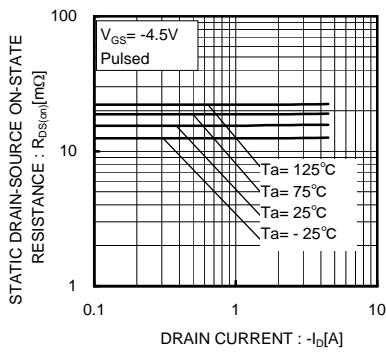


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (III)

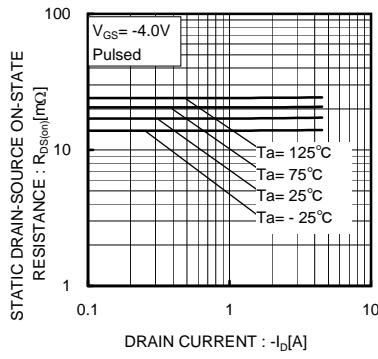


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current

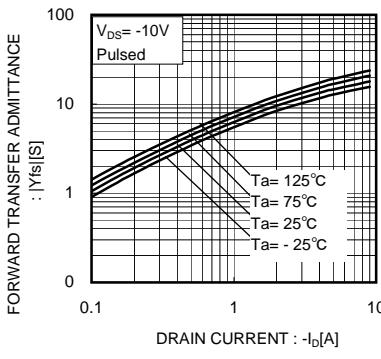


Fig.8 Forward Transfer Admittance vs. Drain Current

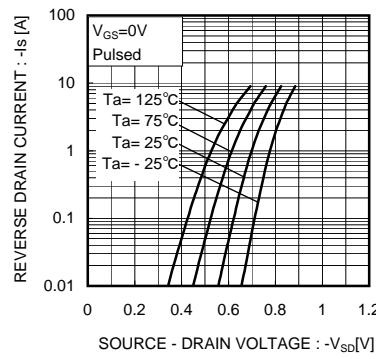
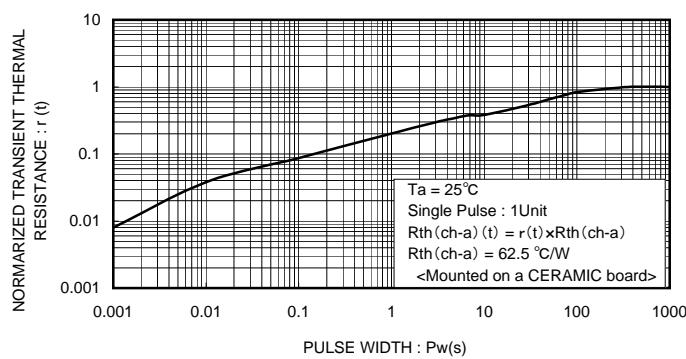
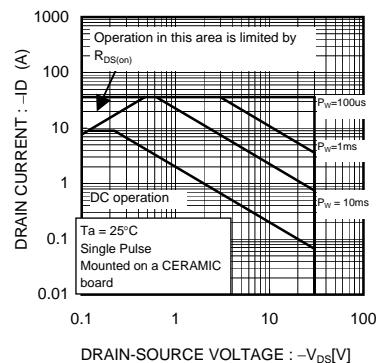
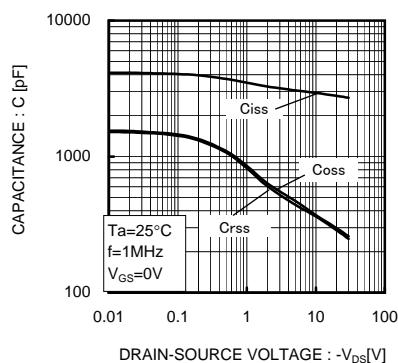
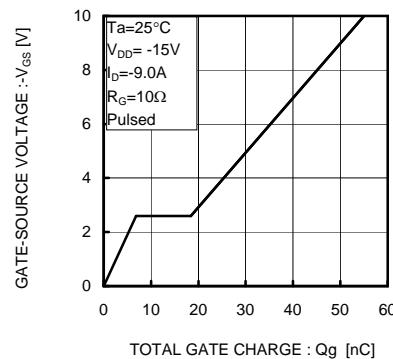
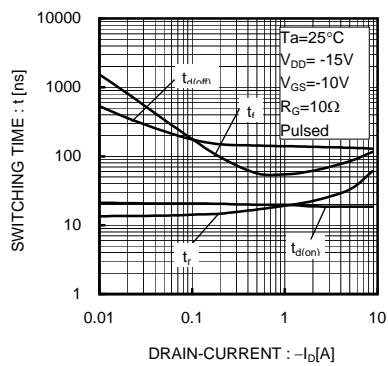
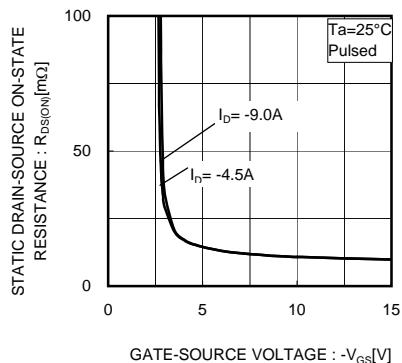


Fig.9 Reverse Drain Current vs. Source-Drain Voltage



● Measurement circuits

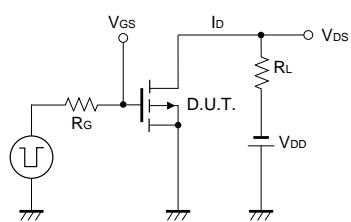


Fig.1-1 Switching Time Measurement Circuit

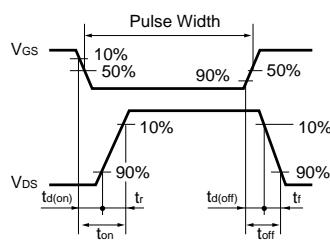


Fig.1-2 Switching Waveforms

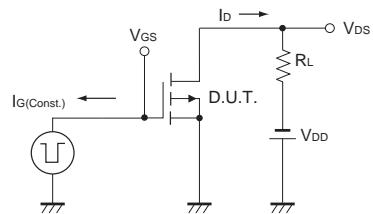


Fig.2-1 Gate charge measurement circuit

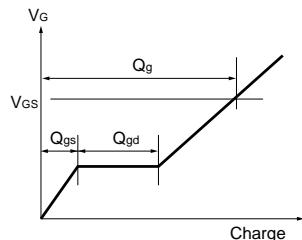


Fig.2-2 Gate Charge Waveform

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