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# 4.5V Drive Nch MOSFET

## RMW180N03

### ● Structure

Silicon N-channel MOSFET

### ● Features

- 1) High Power package(PSOP8).
- 2) High-speed switching, Low On-resistance.
- 3) Low voltage drive(4.5V drive).

### ● Application

Switching

### ● Packaging specifications

Type	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
RMW180N03		○

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

Parameter		Symbol	Limits	Unit
Drain-source voltage		$V_{DS}$	30	V
Gate-source voltage		$V_{GS}$	$\pm 20$	V
Drain current	Continuous	$I_D$	$\pm 18$	A
	Pulsed	$I_{DP}$ *1	$\pm 72$	A
Source current (Body Diode)	Continuous	$I_S$	2.5	A
	Pulsed	$I_{SP}$ *1	72	A
Power dissipation		$P_D$ *2	3.0	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  $\leq 1\%$ 

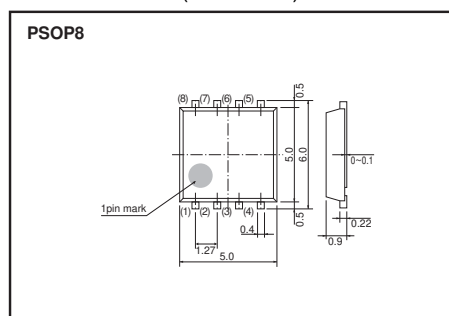
\*2 MOUNTED ON 40mm × 40mm Cu BOARD

### ● Thermal resistance

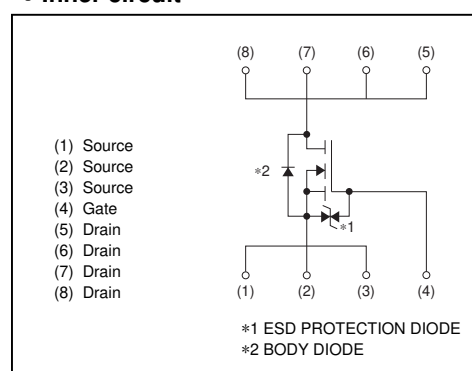
Parameter	Symbol	Limits	Unit
Channel to Ambient	$R_{th(ch-a)}$ *	41.7	°C / W

\* MOUNTED ON 40mm × 40mm Cu BOARD

### ● Dimensions (Unit : mm)



### ● Inner circuit



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	$\pm 10$	$\mu A$	$V_{GS} = \pm 20V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	-	-	V	$I_D = 1mA, V_{GS} = 0V$
Zero gate voltage drain current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	-	2.5	V	$V_{DS} = 10V, I_D = 1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	4.0	5.6	$m\Omega$	$I_D = 18A, V_{GS} = 10V$
		-	5.5	7.7		$I_D = 18A, V_{GS} = 4.5V$
Forward transfer admittance	$ Y_{fs} $ *	15	-	-	S	$I_D = 18A, V_{DS} = 10V$
Input capacitance	$C_{iss}$	-	1250	-	pF	$V_{DS} = 15V$
Output capacitance	$C_{oss}$	-	400	-	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	-	145	-	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	14	-	ns	$I_D = 9A, V_{DD} \approx 15V$
Rise time	$t_r$ *	-	39	-	ns	$V_{GS} = 10V$
Turn-off delay time	$t_{d(off)}$ *	-	39	-	ns	$R_L = 1.67\Omega$
Fall time	$t_f$ *	-	12	-	ns	$R_G = 10\Omega$
Total gate charge	$Q_g$ *	-	24	-	nC	$I_D = 18A, V_{DD} \approx 15V$
Gate-source charge	$Q_{gs}$ *	-	4.4	-	nC	$V_{GS} = 10V$
Gate-drain charge	$Q_{gd}$ *	-	4.7	-	nC	

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	$V_{SD}$ *	-	-	1.2	V	$I_s = 2.5A, V_{GS} = 0V$

\*Pulsed

# ●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics( I )

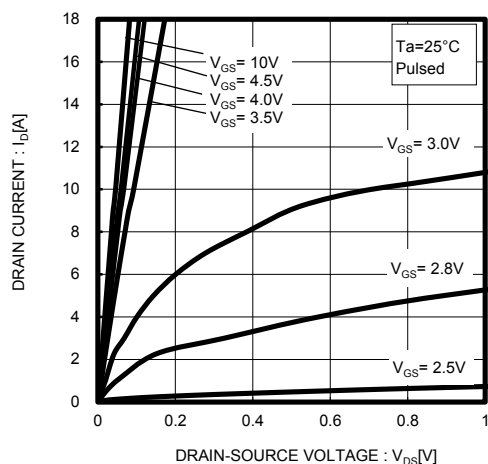


Fig.2 Typical Output Characteristics( II )

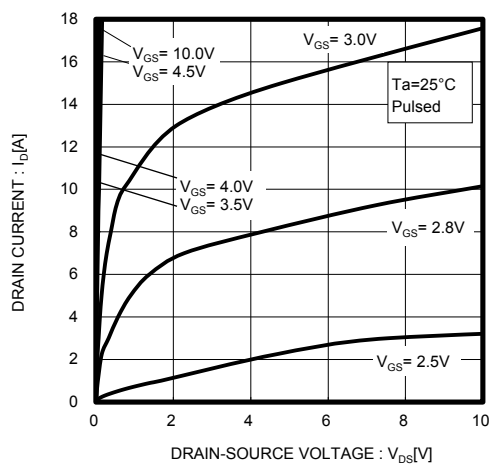


Fig.3 Typical Transfer Characteristics

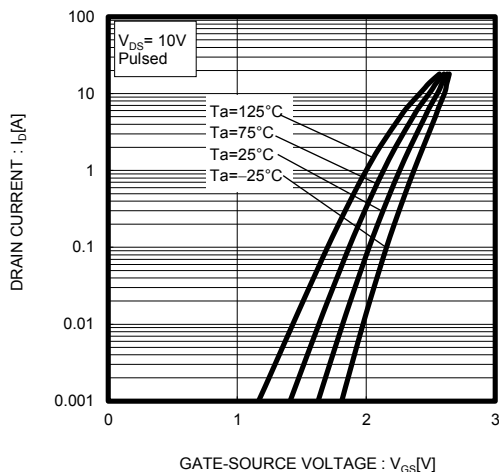


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

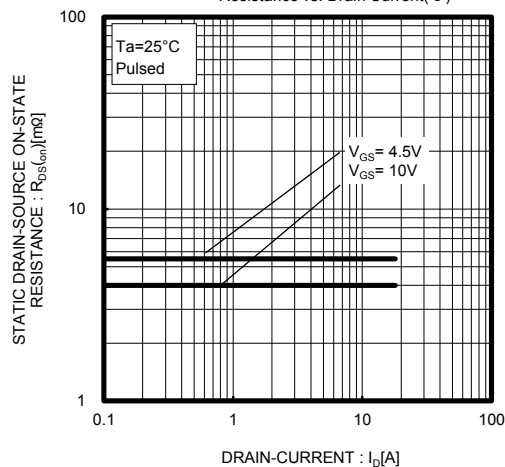


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

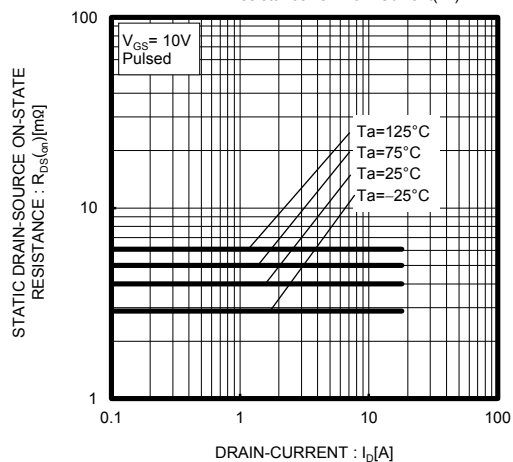


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

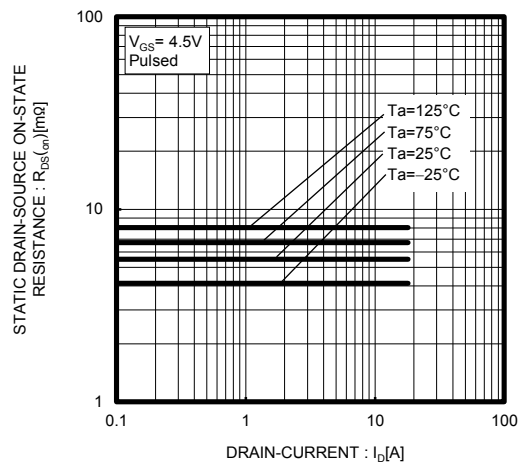




Fig.7 Forward Transfer Admittance vs. Drain Current

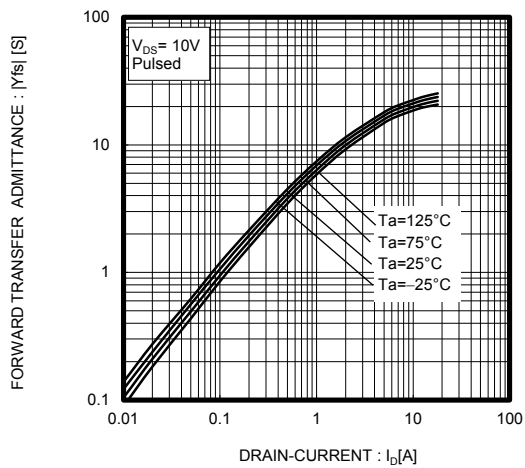


Fig.8 Reverse Drain Current vs. Source-Drain Voltage

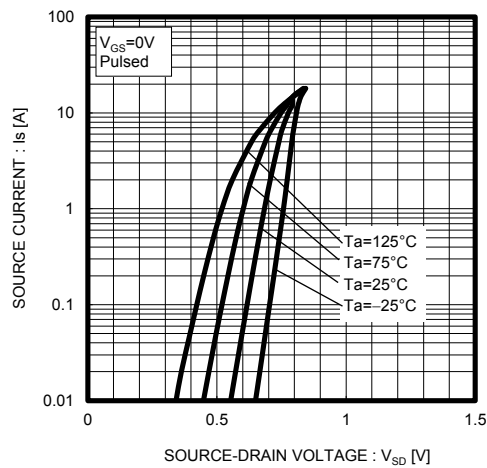


Fig.9 Static Drain-Source On-State Resistance vs. Gate Source Voltage

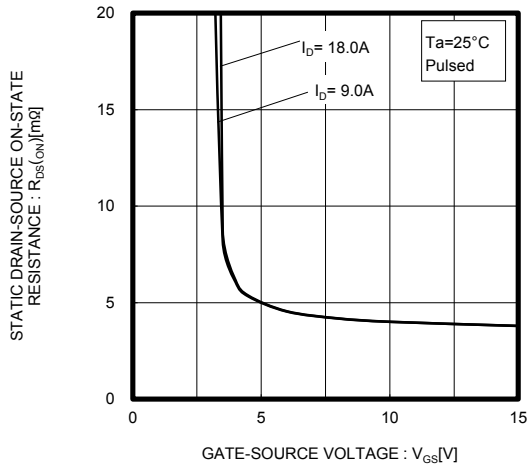


Fig.10 Switching Characteristics

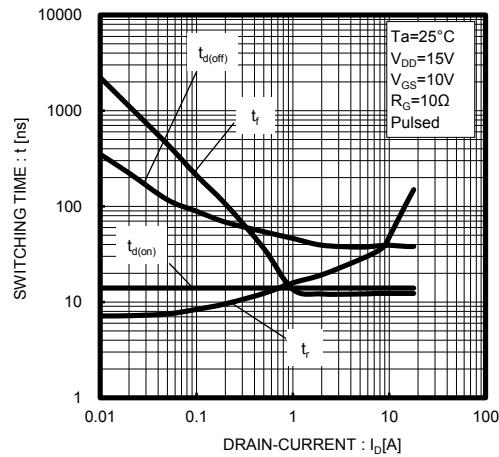


Fig.11 Dynamic Input Characteristics

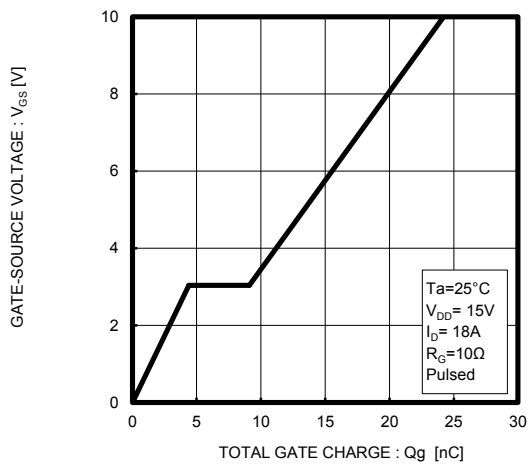


Fig.12 Typical Capacitance vs. Drain-Source Voltage

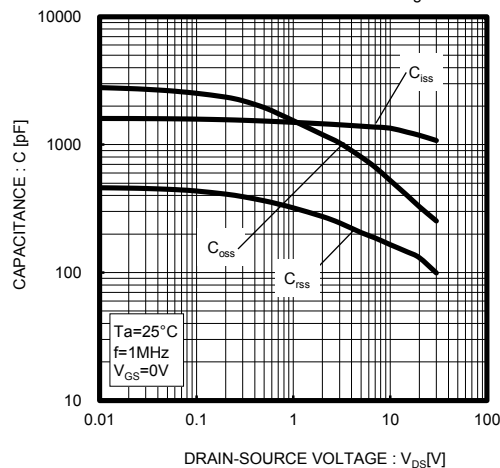


Fig.13 Maximum Safe Operating Area

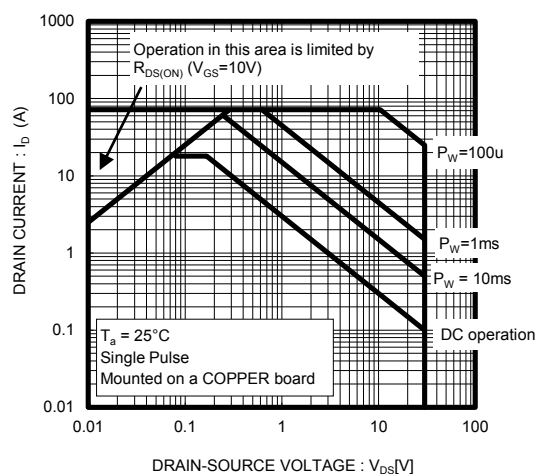
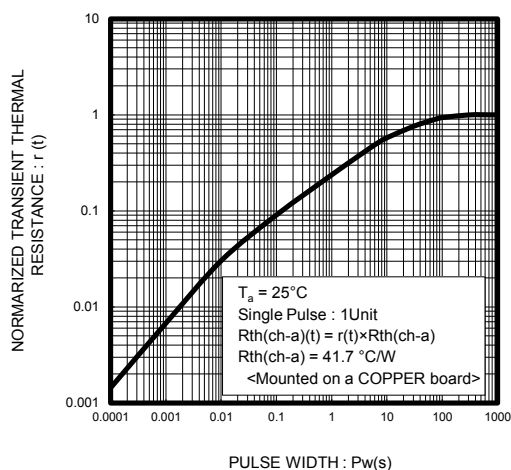


Fig.14 Normalized Transient Thermal Resistance vs. Pulse Width



## ● Measurement circuits

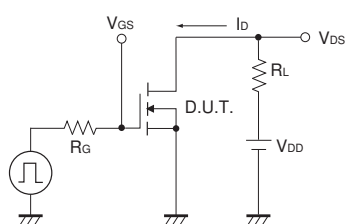


Fig.1-1 Switching Time Measurement Circuit

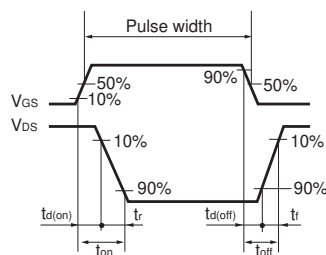


Fig.1-2 Switching Waveforms

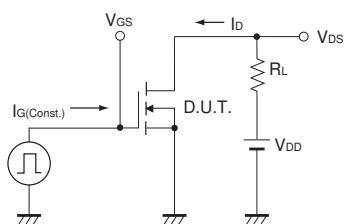


Fig.2-1 Gate Charge Measurement Circuit

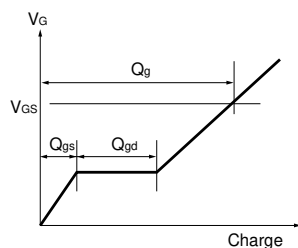


Fig.2-2 Gate Charge Waveform

## ● Notice

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

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