10V Drive Nch MOSFET

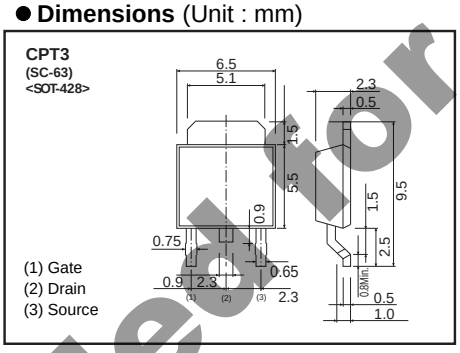
R4008AND

● Structure
Silicon N-channel MOSFET

● Features
1) Low on-resistance.
2) High-speed switching.
3) Wide SOA.
4) Drive circuits can be simple.
5) Parallel use is easy.

● Application
Switching

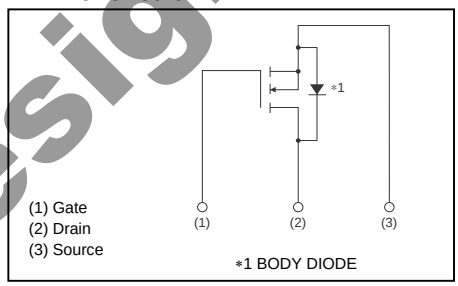
● Dimensions (Unit : mm)



● Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	2500
R4008AND		○

● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	400	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	Continuous	I_D *4	±8	A
	Pulsed	I_{DP}	±32 *1	A
			±48 *2	
Source current (Body Diode)	Continuous	I_S *4	8	A
	Pulsed	I_{SP}	32 *1	A
			48 *2	
Avalanche current		I_{AS} *3	4	A
Avalanche energy		E_{AS} *3	4.3	mJ
Power dissipation		P_D *5	20	W
Channel temperature		T_{ch}	150	°C
Range of storage temperature		T_{stg}	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%

*2 Pw≤1μs, Duty cycle≤1% Limited by Safe Operating Area.(V_{DS}≤30V)

*3 L≒500μH, V_{DD}=50V, R_G=25Ω, T_{ch}=25°C

*4 Limited only by maximum temperature allowed.

*5 T_C=25°C

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th\ (ch-c)}$	6.25	°C / W

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±100	nA	V_{GS}=±30V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	400	-	-	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	100	μA	V_{DS}=400V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	2.5	-	4.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	-	0.73	0.95	Ω	I_D=4A, V_{GS}=10V
Forward transfer admittance	$\|Y_{fs}\|$*	2	-	-	S	V_{DS}=10V, I_D=4A
Input capacitance	C_{iss}	-	500	-	pF	V_{DS}=25V
Output capacitance	C_{oss}	-	280	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	25	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$ *	-	20	-	ns	V_{DD}≒200V, I_D=4A
Rise time	t_r *	-	20	-	ns	V_{GS}=10V
Turn-off delay time	$t_{d(off)}$ *	-	48	-	ns	R_L=50Ω
Fall time	t_f *	-	16	-	ns	R_G=10Ω
Total gate charge	Q_g *	-	15	-	nC	V_{DD}≒200V
Gate-source charge	Q_{gs} *	-	3.5	-	nC	I_D=8A
Gate-drain charge	Q_{gd} *	-	7	-	nC	V_{GS}=10V

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD} *	-	-	1.5	V	I_S=8A, V_{GS}=0V

*Pulsed

●Electrical characteristic curves

Fig.1 Maximum Safe Operating Aera

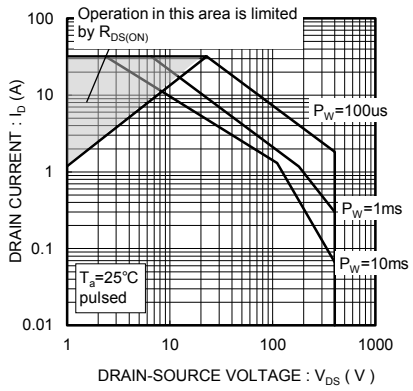


Fig.2 Typical Output Characteristics (Ⅰ)

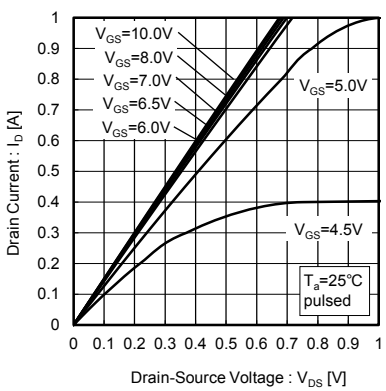


Fig.3 Typical Output Characteristics (Ⅱ)

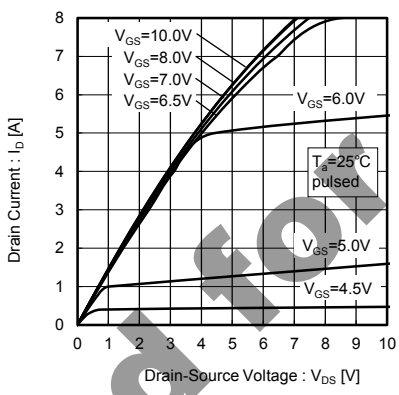


Fig.4 Typical Transfer Characteristics

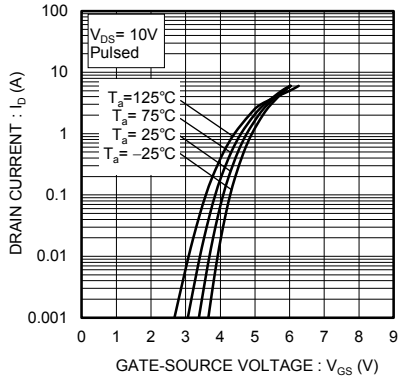


Fig.5 Gate Threshold Voltage vs. Channel Temperature

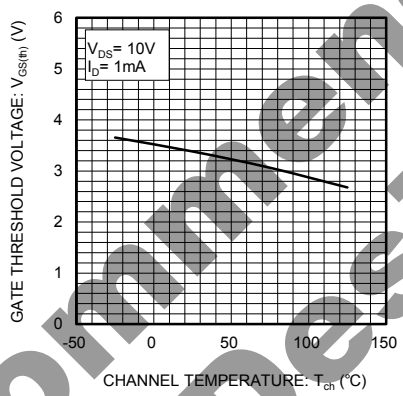


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

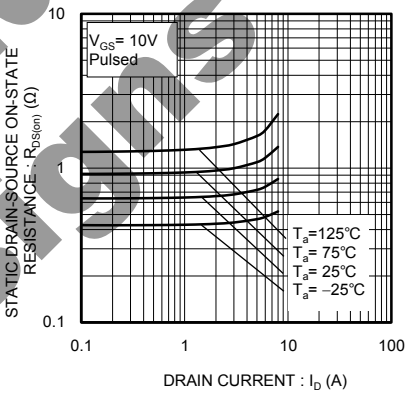


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

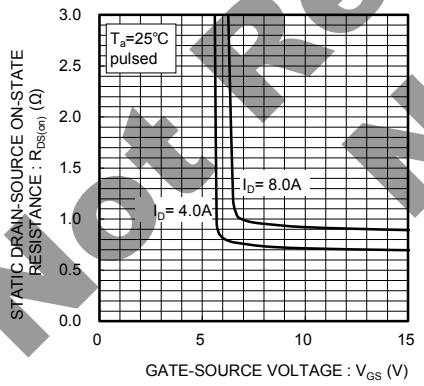


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

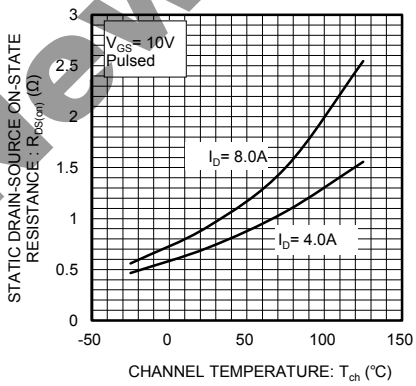


Fig.9 Forward Transfer Admittance vs. Drain Current

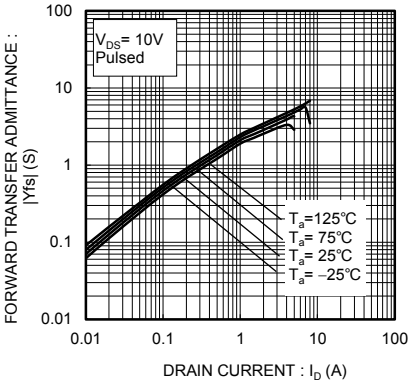


Fig.10 Reverse Drain Current vs. Sourse-Drain Voltage

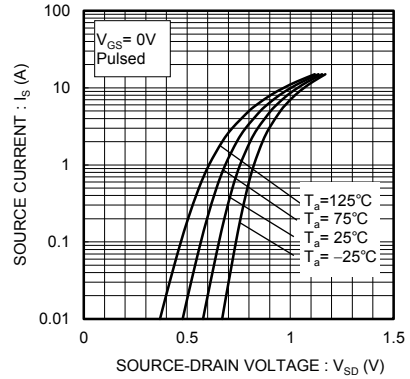


Fig.11 Typical Capacitance vs. Drain-Source Voltage

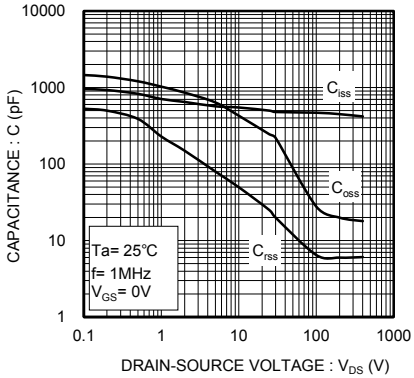


Fig.12 Dynamic Input Characteristics

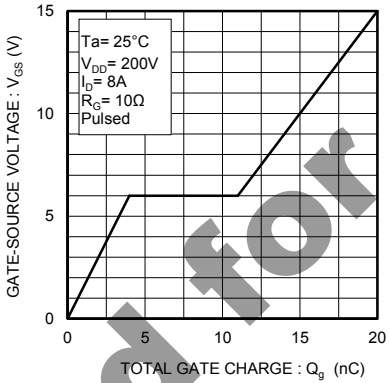


Fig.13 Reverse Recovery Time vs.Source Current

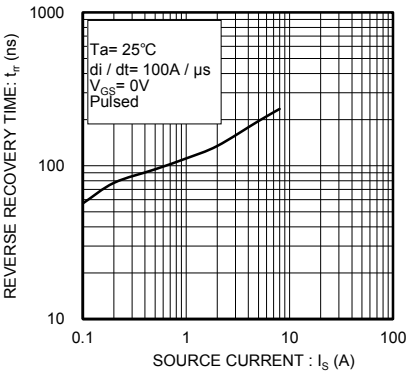


Fig.14 Switching Characteristics

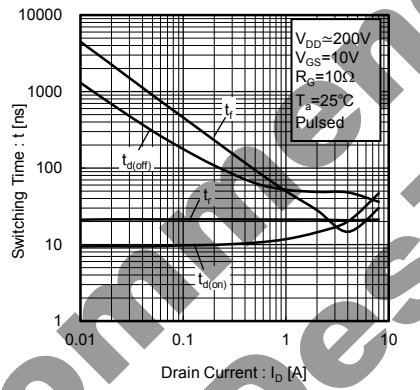
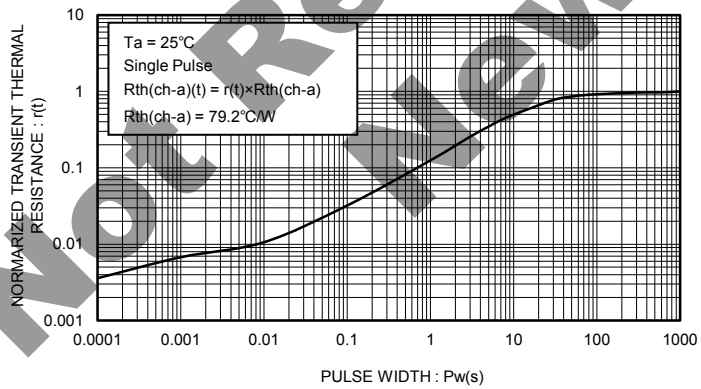


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width



● **Measurement circuits**

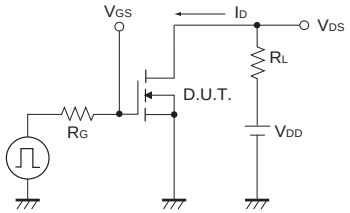


Fig.1-1 Switching Time Measurement Circuit

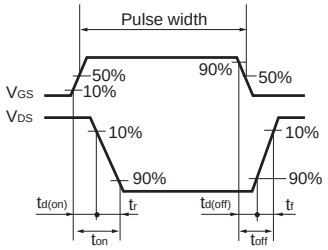


Fig.1-2 Switching Waveforms

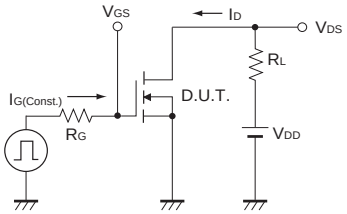


Fig.2-1 Gate Charge Measurement Circuit

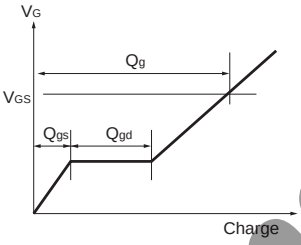


Fig.2-2 Gate Charge Waveform

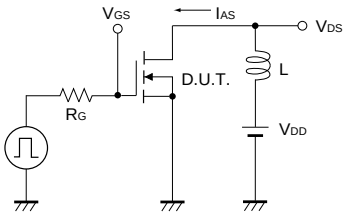


Fig.3-1 Avalanche Measurement Circuit

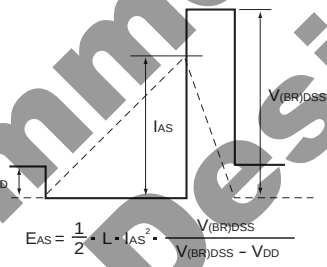


Fig.3-2 Avalanche Waveform

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