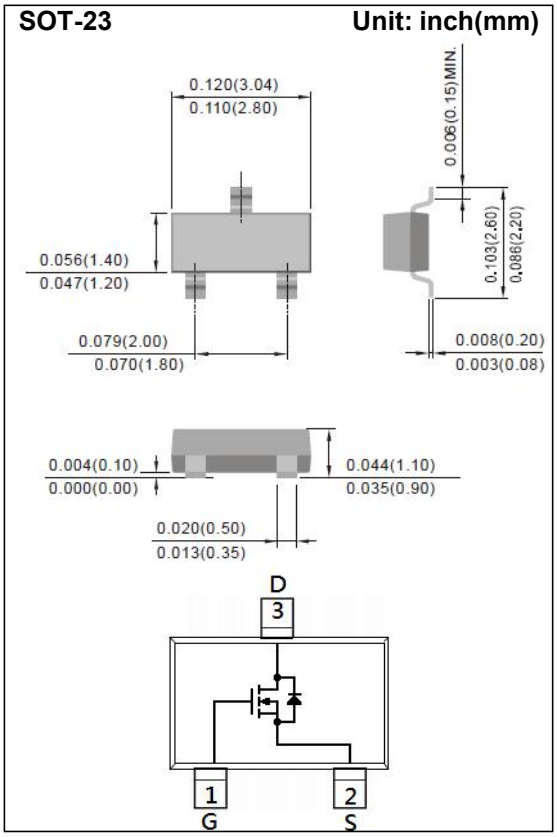
CAN CIRCLE SEMI

CSM212N4S23

20V N-Channel Enhancement Mode MOSFET

Voltage	20 V	Current	4.0A



Features

- $R_{DS(ON)}$, V_{GS}@4.5V, I_D@4.0A<56mΩ
- $R_{DS(ON)}$, V_{GS}@2.5V, I_D@2.8A<68mΩ
- $R_{DS(ON)}$, V_{GS}@1.8V, I_D@1.5A<95mΩ
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.

Mechanical Data

- Case : SOT-23 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0003 ounces, 0.0084 grams

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current		I_D	4.0	A
Pulsed Drain Current		I_{DM}	16.0	
Power Dissipation	T_a=25°C	P_D	1.25	W
	Derate above 25°C		10	mW/ °C
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55~150	°C
Typical Thermal Resistance - Junction to Ambient (Note 3)		$R_{\theta JA}$	100	°C/W

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Electrical Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	20	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	0.4	0.66	1.2	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=4.5V, I_D=4.0A	-	41	56	mΩ
		V_{GS}=2.5V, I_D=2.8A	-	50	68	
		V_{GS}=1.8V, I_D=1.5A	-	66	95	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
Dynamic (Note 5)						
Total Gate Charge	Q_g	V_{DS}=10V, I_D=4.0A, V_{GS}=4.5V (Note 1,2)	-	4.6	-	nC
Gate-Source Charge	Q_{gs}		-	0.8	-	
Gate-Drain Charge	Q_{gd}		-	1	-	
Input Capacitance	Ciss	V_{DS}=10V, V_{GS}=0V, f=1MHZ	-	350	-	pF
Output Capacitance	Coss		-	40	-	
Reverse Transfer Capacitance	Crss		-	29	-	
Turn-On Delay Time	$td_{(on)}$	V_{DD}=10V, I_D=4.0A, V_{GS}=4.5V, R_G=6Ω (Note 1,2)	-	4	-	ns
Turn-On Rise Time	tr		-	47	-	
Turn-Off Delay Time	$td_{(off)}$		-	18	-	
Turn-Off Fall Time	tf		-	10	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	-	-	1.5	A
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V	-	0.75	1.2	V

NOTES :

1. Pulse width≤300us, Duty cycle≤2%.
2. Essentially independent of operating temperature typical characteristics.
3. $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper.
4. The maximum current rating is package limited.
5. Guaranteed by design, not subject to production testing.

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TYPICAL CHARACTERISTIC CURVES

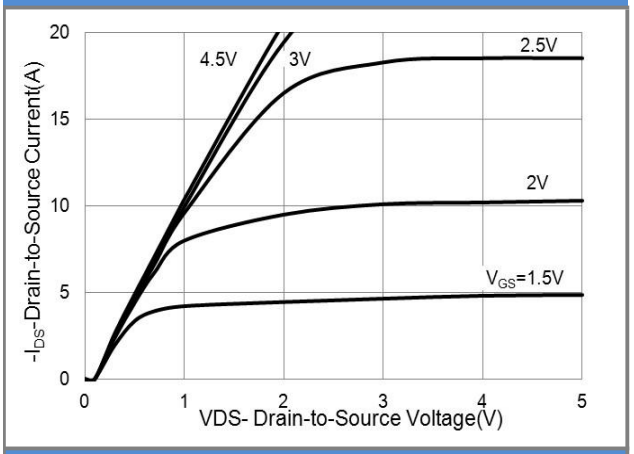

Fig.1 On-Region Characteristics

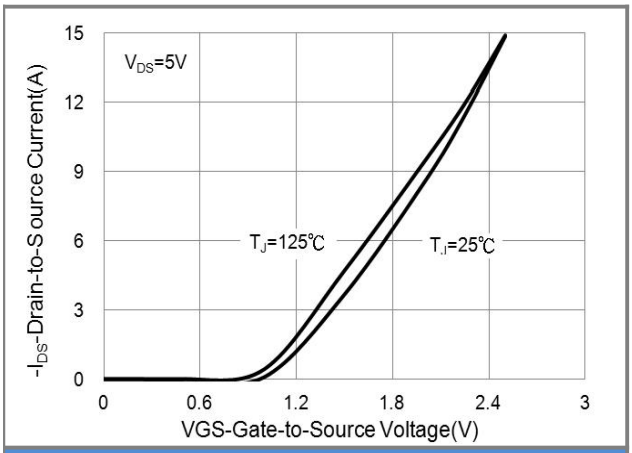

Fig.2 Transfer Characteristics

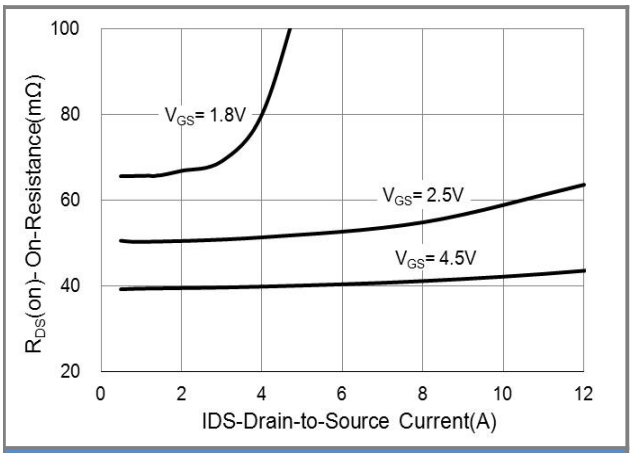

Fig.3 On-Resistance vs. Drain Current

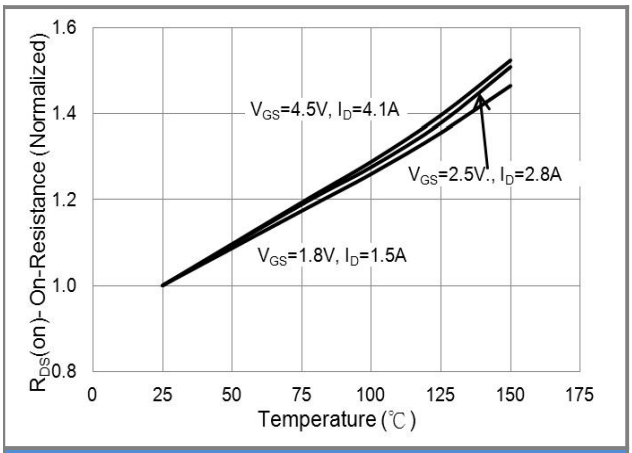

Fig.4 On-Resistance vs. Junction temperature

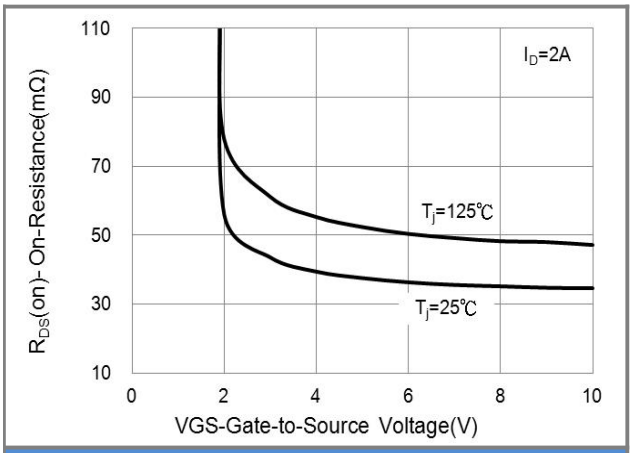

Fig.5 On-Resistance Variation with V_{GS}

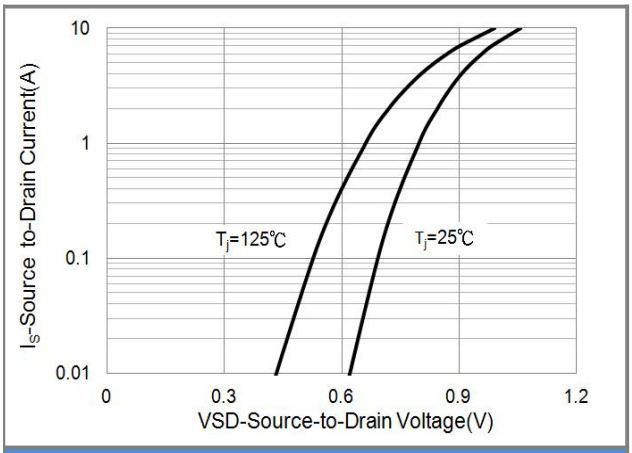

Fig.6 Body Diode Characteristics

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TYPICAL CHARACTERISTIC CURVES

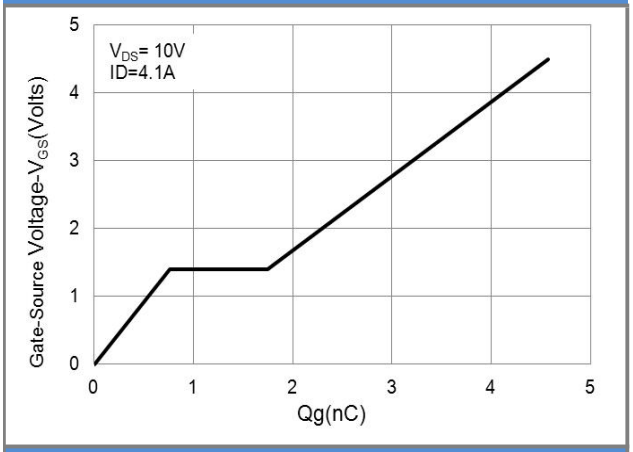

Fig.7 Gate-Charge Characteristics

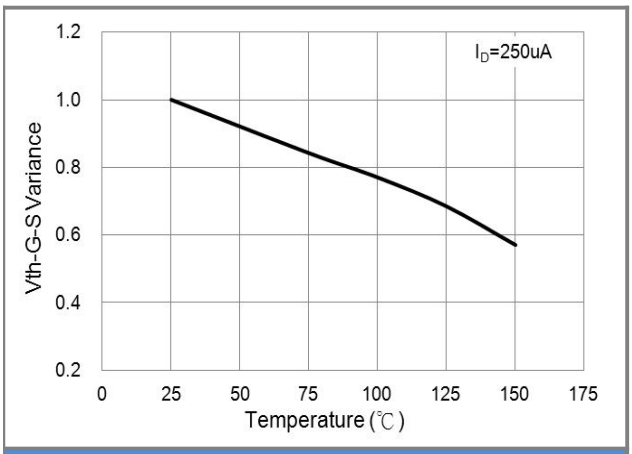

Fig.8 Threshold Voltage Variation with Temperature

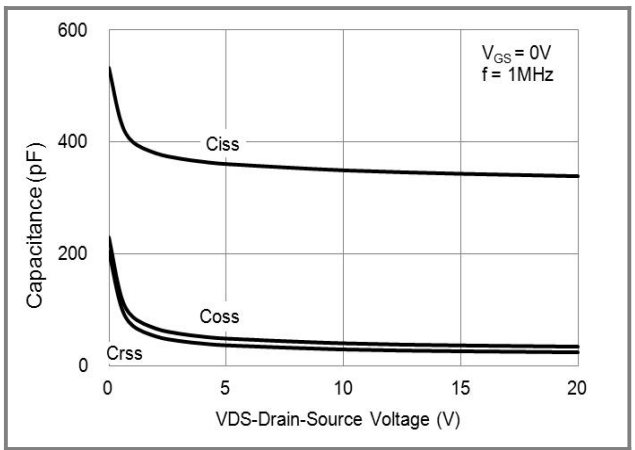

Fig.9 Capacitance vs. Drain-Source Voltage

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Part No Packing Code Version

Part No Packing Code	Package Type	Packing Type	Marking	Version
CSM212N4S23	SOT-23	3K pcs / 7” reel		Halogen free

Mounting Pad Layout