

## CSM2301S23

### 20V P-Channel Enhancement Mode MOSFET

**Voltage**

**-20 V**

**Current**

**-3A**

#### Features

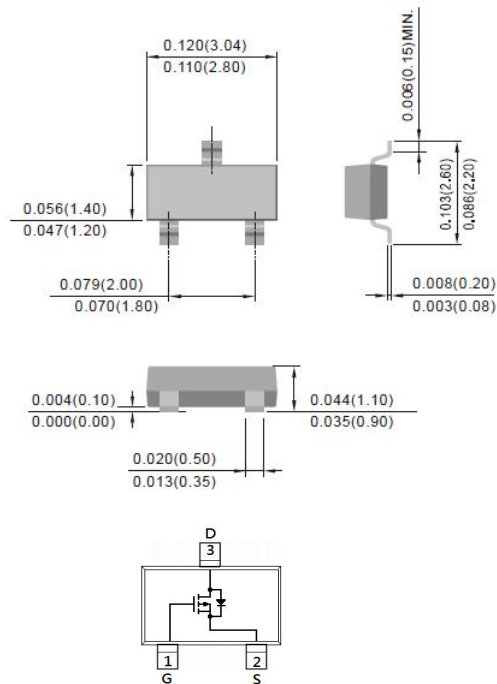
- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V$ ,  $I_D@-3.1A < 100m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-2.5V$ ,  $I_D@-2.0A < 135m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-1.8V$ ,  $I_D@-1.1A < 190m\Omega$
- Advanced Trench Process Technology

#### Mechanical Data

- Case: SOT-23 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

**SOT-23**

**Unit: inch(mm)**



### Maximum Ratings and Thermal Characteristics ( $T_A=25^{\circ}C$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		$V_{DS}$	-20	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	V
Continuous Drain Current		$I_D$	-3	A
Pulsed Drain Current		$I_{DM}$	-12.5	A
Power Dissipation	$T_a=25^{\circ}C$	$P_D$	1.25	W
	Derate above $25^{\circ}C$		10	mW/ $^{\circ}C$
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~150	$^{\circ}C$
Typical Thermal Resistance Junction to Ambient (Note 3)		$R_{\theta JA}$	100	$^{\circ}C/W$

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### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.4	-0.71	-1.2	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.1A	-	84	100	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.0A	-	104	135	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-1.1A	-	134	190	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-0.01	-1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	±10	±100	nA
Dynamic						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3.1A, V <sub>GS</sub> =-4.5V (Note 1,2)	-	5.4	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.7	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	1.3	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1.0MHZ	-	416	-	pF
Output Capacitance	C <sub>oss</sub>		-	43	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	32	-	
Switching						
Turn-On Delay Time	td <sub>(on)</sub>	V <sub>DD</sub> =-10V, I <sub>D</sub> =-3.1A, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =6Ω (Note 1,2)	-	4	-	ns
Turn-On Rise Time	tr		-	27	-	
Turn-Off Delay Time	td <sub>(off)</sub>		-	78	-	
Turn-Off Fall Time	tf		-	45	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>	---	-	-	-1.5	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1.0A, V <sub>GS</sub> =0V	-	0.8	-1.2	V

#### NOTES :

1. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
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

## CSM2301S23

### TYPICAL CHARACTERISTIC CURVES

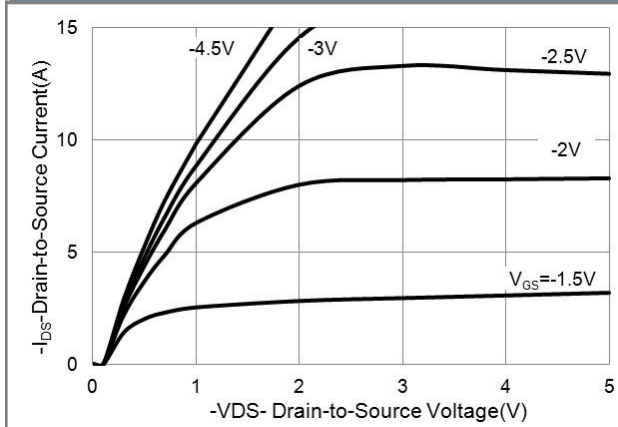


Fig.1 On-Region Characteristics

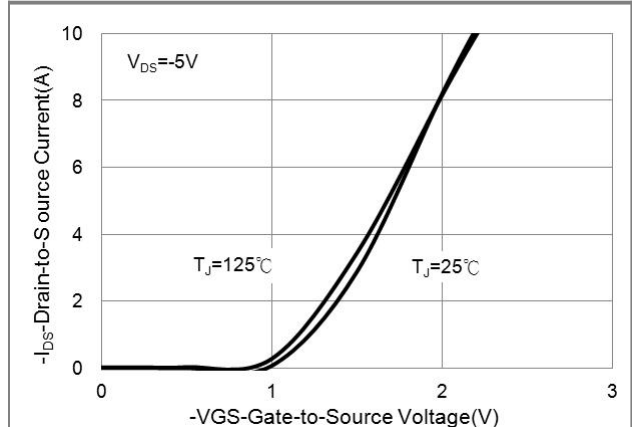


Fig.2 Transfer Characteristics

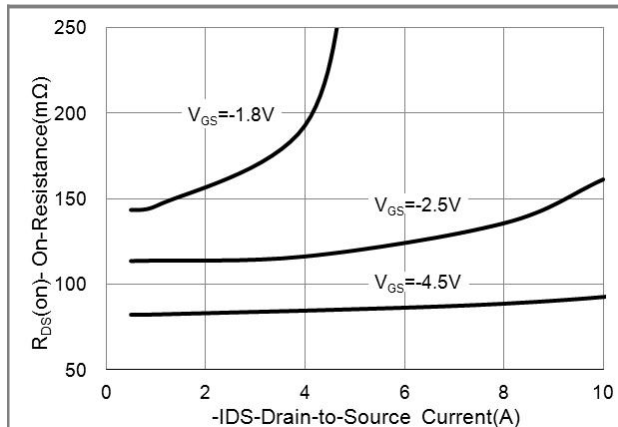


Fig.3 On-Resistance vs. Drain Current

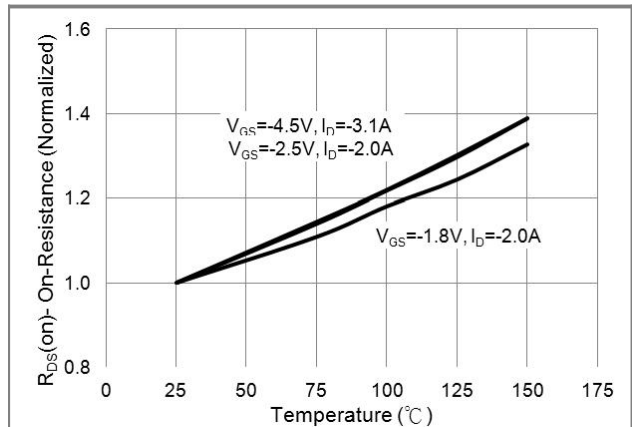


Fig.4 On-Resistance vs. Junction temperature

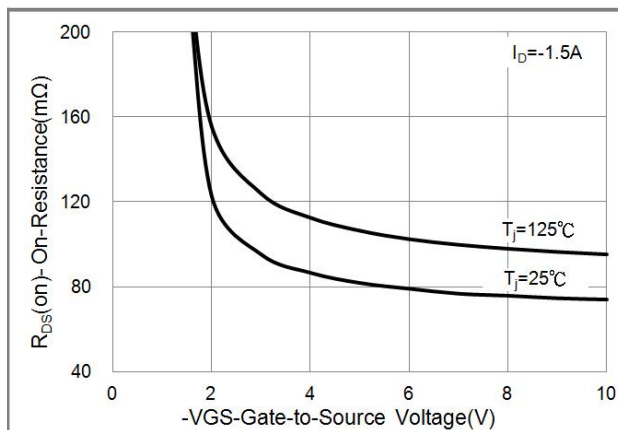


Fig.5 On-Resistance Variation with V\_GS.

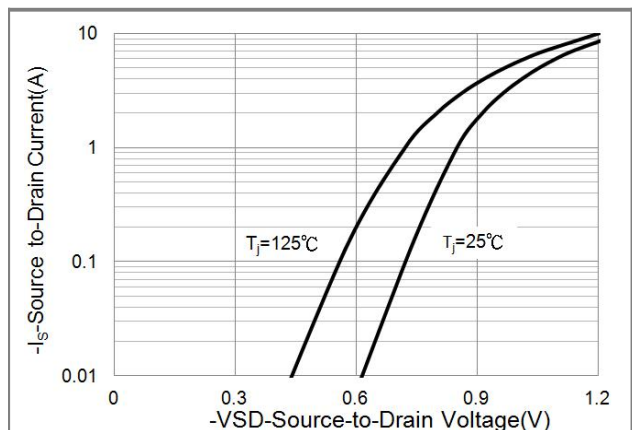


Fig.6 Body Diode Characteristics

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### TYPICAL CHARACTERISTIC CURVES

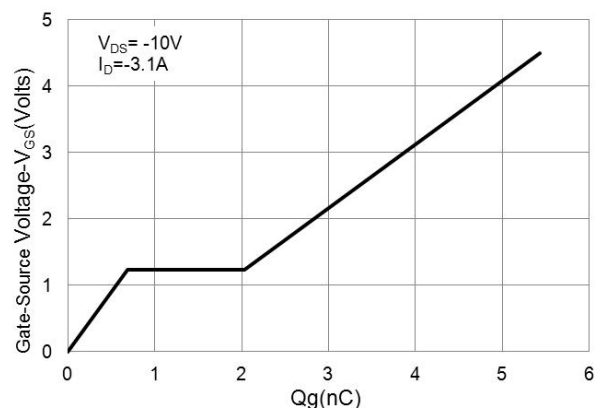


Fig.7 Gate-Charge Characteristics

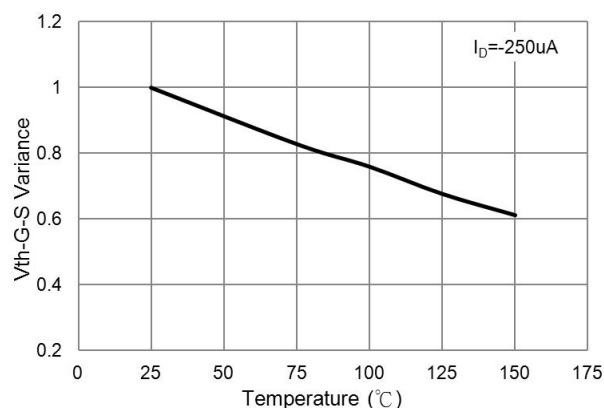


Fig.8 Threshold Voltage Variation with Temperature.

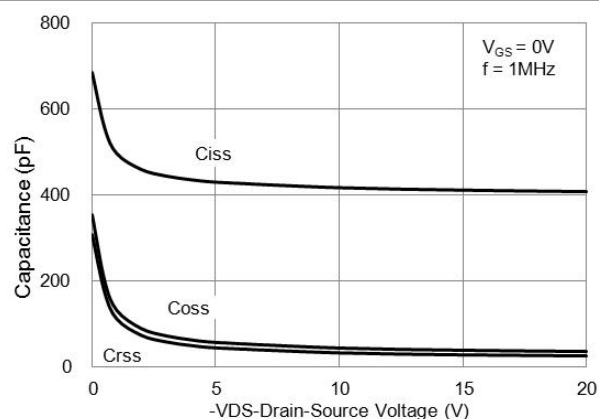
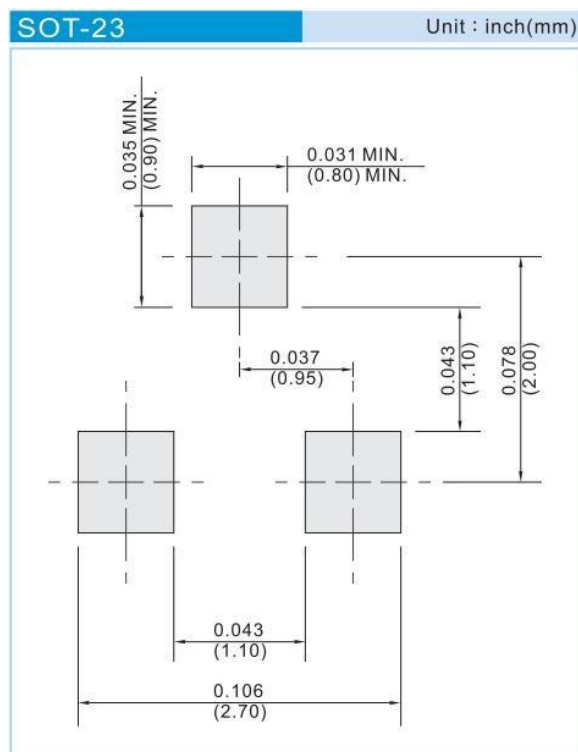


Fig.10 Capacitance vs. Drain-Source Voltage.

## CSM2301S23

### MOUNTING PAD LAYOUT



## **CSM2301S23**

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