

## CSM320P4S23

### 30V P-Channel Enhancement Mode MOSFET

**Voltage**

**-30 V**

**Current**

**-4A**

#### Features

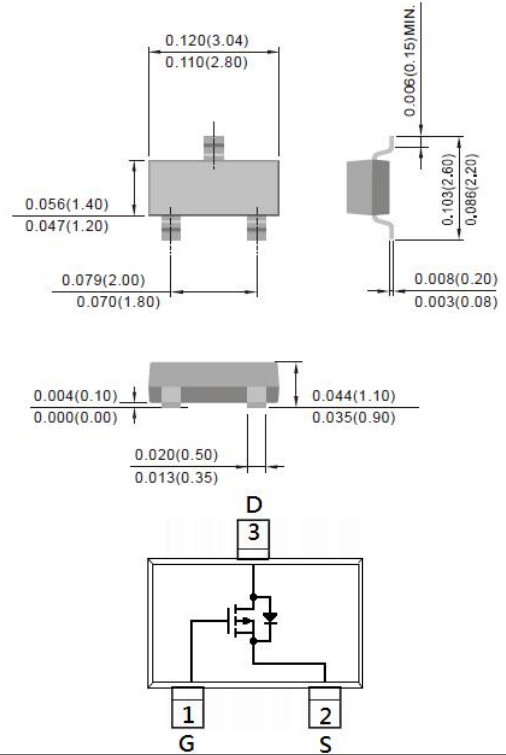
- $R_{DS(ON)}$ ,  $V_{GS}@-10V$ ,  $I_D@-3.6A < 54m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V$ ,  $I_D@-2.3A < 65m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-2.5V$ ,  $I_D@-1.4A < 86m\Omega$
- Advanced Trench Process Technology

#### Mechanical Data

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

**SOT-23**

**Unit: inch(mm)**



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

| PARAMETER                                        |                      | SYMBOL                           | LIMIT   | UNITS  |
|--------------------------------------------------|----------------------|----------------------------------|---------|--------|
| Drain-Source Voltage                             |                      | V <sub>DS</sub>                  | -30     | V      |
| Gate-Source Voltage                              |                      | V <sub>GS</sub>                  | ±20     | V      |
| Continuous Drain Current                         |                      | I <sub>D</sub>                   | -4      | A      |
| Pulsed Drain Current                             |                      | I <sub>DM</sub>                  | -14.4   | A      |
| Power Dissipation                                | T <sub>a</sub> =25°C | P <sub>D</sub>                   | 1.25    | W      |
|                                                  | Derate above 25°C    |                                  | 10      | mW/ °C |
| Operating Junction and Storage Temperature Range |                      | T <sub>J</sub> ,T <sub>STG</sub> | -55~150 | °C     |
| Typical Thermal Resistance                       |                      | R <sub>θJA</sub>                 | 100     | °C/W   |
| - Junction to Ambient (Note 3)                   |                      |                                  |         |        |

# CSM320P4S23

## 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                                       | -30  | -     | -    | V     |
| Gate Threshold Voltage                                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA                         | -0.5 | -1    | -1.3 | V     |
| Drain-Source On-State Resistance                      | R <sub>DS(on)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-3.6A                                      | -    | 45    | 54   | mΩ    |
|                                                       |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.3A                                     | -    | 65    | 70   |       |
|                                                       |                     | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1.4A                                     | -    | 71    | 86   |       |
| Zero Gate Voltage Drain Current                       | I <sub>DSS</sub>    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                        | -    | -     | -1   | uA    |
| Gate-Source Leakage Current                           | I <sub>GSS</sub>    | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V                                        | -    | -     | ±100 | nA    |
| Dynamic (Note 5)                                      |                     |                                                                                   |      |       |      |       |
| Total Gate Charge                                     | Q <sub>g</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-3.6A,<br>V <sub>GS</sub> =-10V (Note 1,2) | -    | 19    | -    | nC    |
| Gate-Source Charge                                    | Q <sub>gs</sub>     |                                                                                   | -    | 2.0   | -    |       |
| Gate-Drain Charge                                     | Q <sub>gd</sub>     |                                                                                   | -    | 2.2   | -    |       |
| Input Capacitance                                     | C <sub>iss</sub>    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V,<br>f=1.0MHZ                           | -    | 994   | -    | pF    |
| Output Capacitance                                    | C <sub>oss</sub>    |                                                                                   | -    | 78    | -    |       |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    |                                                                                   | -    | 58    | -    |       |
| Turn-On Delay Time                                    | td <sub>(on)</sub>  | V <sub>DD</sub> =-15V, I <sub>D</sub> =-3.6A,<br>V <sub>GS</sub> =-10V,           | -    | 4.6   | -    | ns    |
| Turn-On Rise Time                                     | tr                  |                                                                                   | -    | 22    | -    |       |
| Turn-Off Delay Time                                   | td <sub>(off)</sub> |                                                                                   | -    | 41    | -    |       |
| Turn-Off Fall Time                                    | tf                  | R <sub>G</sub> =6Ω (Note 1,2)                                                     | -    | 25    | -    |       |
| 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                                        | -    | -0.79 | -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
5. Guaranteed by design, not subject to production testing

## CSM320P4S23

### TYPICAL CHARACTERISTIC CURVES

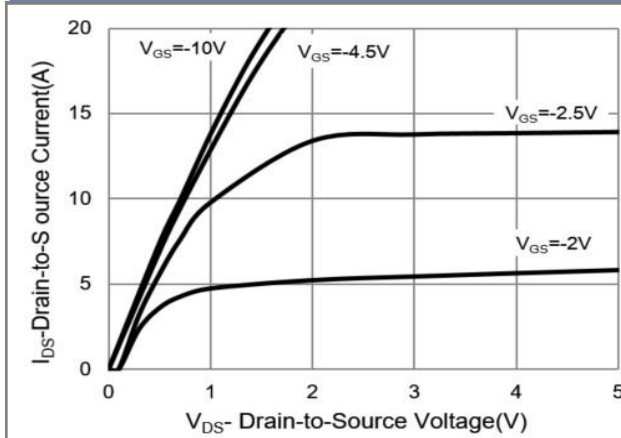


Fig.1 On-Region Characteristics

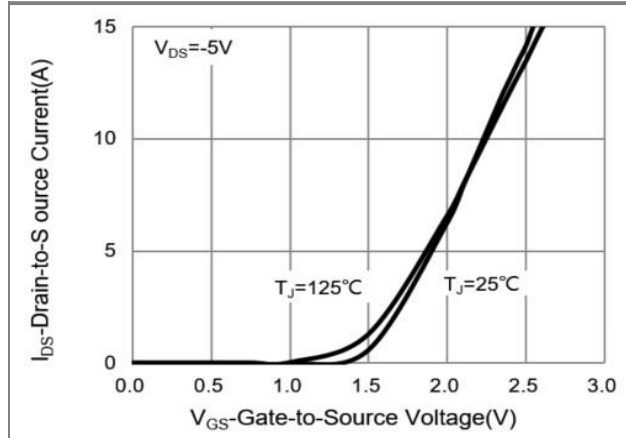


Fig.2 Transfer Characteristics

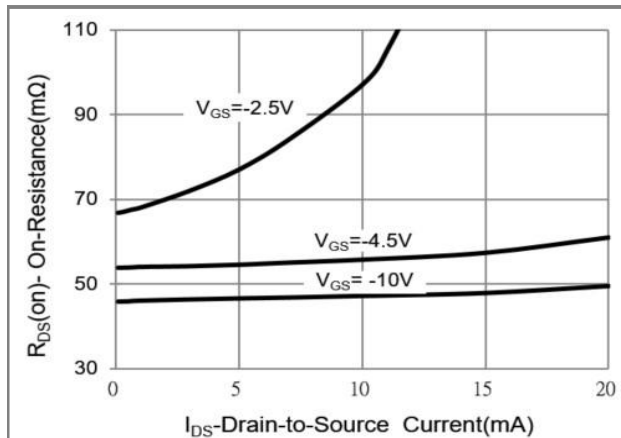


Fig.3 On-Resistance vs. Drain Current

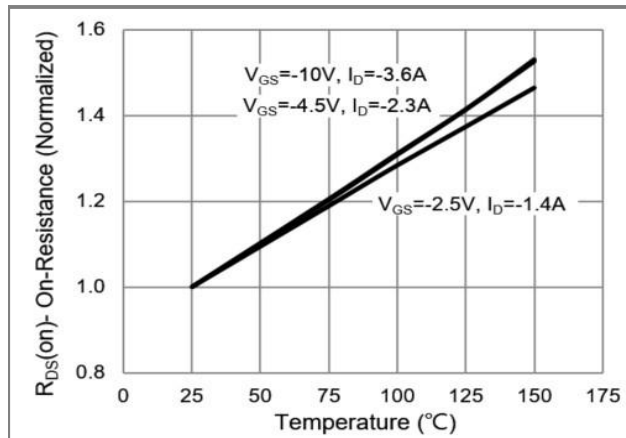


Fig.4 On-Resistance vs. Junction temperature

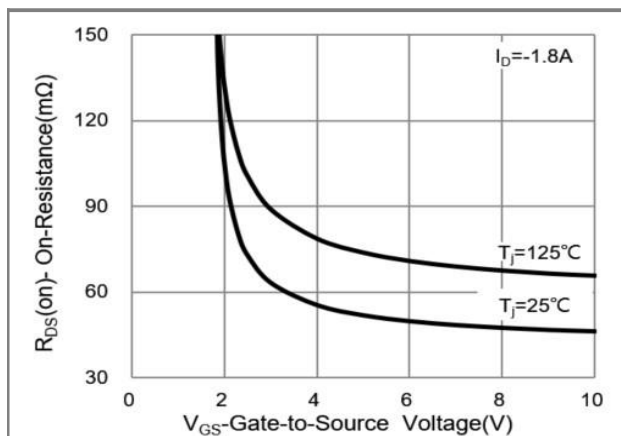


Fig.5 On-Resistance Variation with VGS.

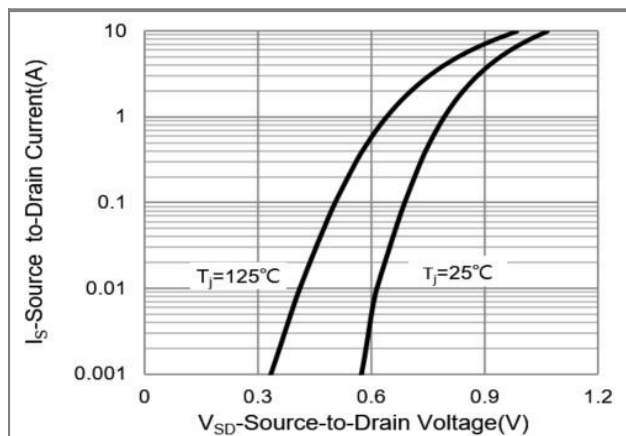


Fig.6 Body Diode Characteristics

## CSM320P4S23

### TYPICAL CHARACTERISTIC CURVES

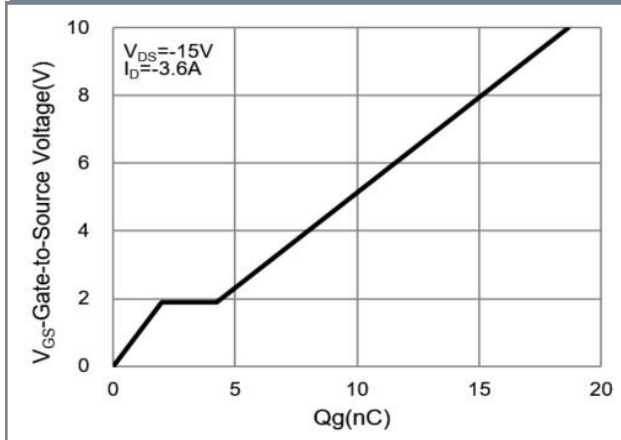


Fig.7 Gate-Charge Characteristics

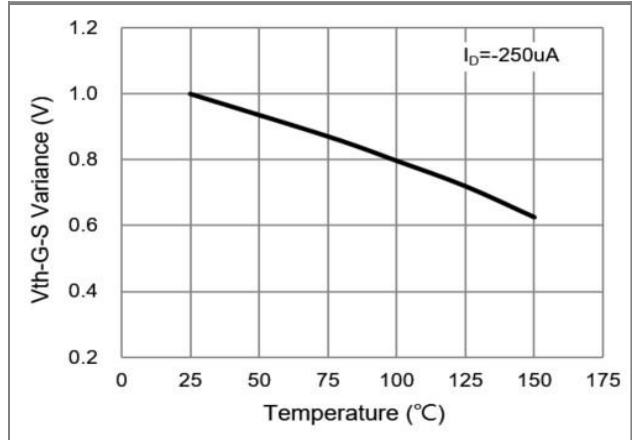


Fig.8 Threshold Voltage Variation with Temperature.

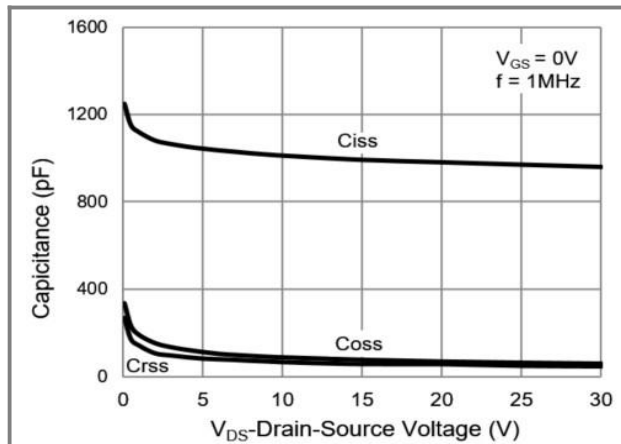


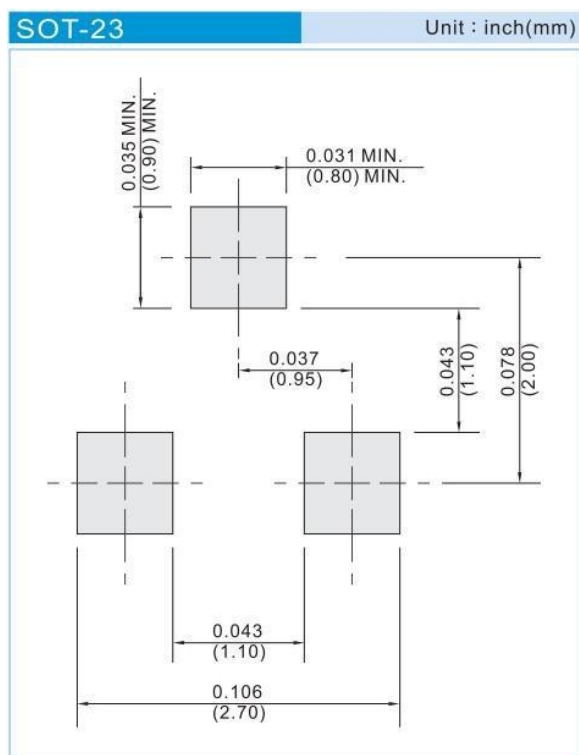
Fig.9 Capacitance vs. Drain-Source Voltage.

## CSM320P4S23

### PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing Type     |
|----------------------|--------------|------------------|
| CSM320P4S23          | SOT-23       | 3K pcs / 7" reel |

### MOUNTING PAD LAYOUT



## **CSM320P4S23**

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