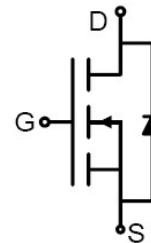




## N-Channel Enhancement Mode Power MOSFET

### Feature

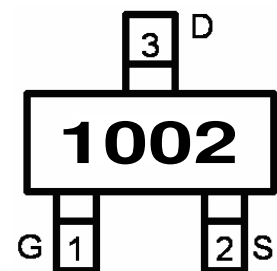
- 100V,2A  
 $R_{DS(ON)} < 273m\Omega @ V_{GS}=10V$  TYP:210 m $\Omega$   
 $R_{DS(ON)} < 338m\Omega @ V_{GS}=4.5V$  TYP:260 m $\Omega$
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



Schematic Diagram

### Application

- PWM applications
- Load Switch
- Power management
- P/N suffix V means AEC-Q101 qualified, e.g:RM1002V
- Halogen-free



SOT-23

### Package Marking and Ordering Information

| Device Marking | Device  | Device Package | Packaging Code | Reel Size | Quantity (PCS) |
|----------------|---------|----------------|----------------|-----------|----------------|
| 1002           | RM1002V | SOT23          | -T             | 7inch     | 3000           |

### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^{\circ}C$ unless otherwise noted)

| Parameter                                       | Symbol          | Value     | Unit          |
|-------------------------------------------------|-----------------|-----------|---------------|
| Drain-Source Voltage                            | $V_{DS}$        | 100       | V             |
| Gate-Source Voltage                             | $V_{GS}$        | $\pm 20$  | V             |
| Continuous Drain Current ( $T_a=25^{\circ}C$ )  | $I_D$           | 2         | A             |
| Continuous Drain Current ( $T_a=100^{\circ}C$ ) | $I_D$           | 1.3       | A             |
| Pulsed Drain Current <sup>(1)</sup>             | $I_{DM}$        | 8         | A             |
| Power Dissipation                               | $P_D$           | 2.3       | W             |
| Thermal Resistance from Junction to Ambient     | $R_{\theta JA}$ | 54        | $^{\circ}C/W$ |
| Junction Temperature                            | $T_J$           | 150       | $^{\circ}C$   |
| Storage Temperature                             | $T_{STG}$       | -55~ +150 | $^{\circ}C$   |

## MOSFET ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                 | Symbol               | Test Condition                                                                    | Min | Type | Max  | Unit |
|-------------------------------------------|----------------------|-----------------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics                    |                      |                                                                                   |     |      |      |      |
| Drain-source breakdown voltage            | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                       | 100 | -    | -    | V    |
| Zero gate voltage drain current           | I <sub>DSS</sub>     | V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V                                       | -   | -    | 1    | μA   |
| Gate-body leakage current                 | I <sub>GSS</sub>     | V <sub>GS</sub> =± 20V, V <sub>DS</sub> = 0V                                      | -   | -    | ±100 | nA   |
| Gate threshold voltage <sup>(2)</sup>     | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                          | 0.8 | 1.3  | 2.0  | V    |
| Drain-source on-resistance <sup>(2)</sup> | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =2A                                          | -   | 210  | 273  | mΩ   |
|                                           |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A                                         | -   | 260  | 338  |      |
| Dynamic characteristics                   |                      |                                                                                   |     |      |      |      |
| Input Capacitance                         | C <sub>iss</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz                                | -   | 113  | -    | pF   |
| Output Capacitance                        | C <sub>oss</sub>     |                                                                                   | -   | 49.6 | -    |      |
| Reverse Transfer Capacitance              | C <sub>rss</sub>     |                                                                                   | -   | 6    | -    |      |
| Switching characteristics                 |                      |                                                                                   |     |      |      |      |
| Turn-on delay time                        | t <sub>d(on)</sub>   | V <sub>DD</sub> =50V, I <sub>D</sub> =2A,V <sub>GS</sub> =10V, R <sub>G</sub> =2Ω | -   | 4.6  | -    | ns   |
| Turn-on rise time                         | t <sub>r</sub>       |                                                                                   | -   | 5.5  | -    |      |
| Turn-off delay time                       | t <sub>d(off)</sub>  |                                                                                   | -   | 24.9 | -    |      |
| Turn-off fall time                        | t <sub>f</sub>       |                                                                                   | -   | 10.5 | -    |      |
| Total Gate Charge                         | Q <sub>g</sub>       | V <sub>D</sub> S=50V, I <sub>D</sub> =2A,<br>V <sub>G</sub> S=10V                 | -   | 3.0  | -    | nC   |
| Gate-Source Charge                        | Q <sub>gs</sub>      |                                                                                   | -   | 0.6  | -    |      |
| Gate-Drain Charge                         | Q <sub>gd</sub>      |                                                                                   | -   | 0.82 | -    |      |
| Source-Drain Diode characteristics        |                      |                                                                                   |     |      |      |      |
| Diode Forward voltage <sup>(2)</sup>      | V <sub>DS</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =1A                                           | -   | -    | 1.2  | V    |
| Diode Forward current <sup>(3)</sup>      | I <sub>S</sub>       |                                                                                   | -   | -    | 1    | A    |

### Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. Surface Mounted on FR4 Board,  $t \leq 10$  sec

## Test Circuit

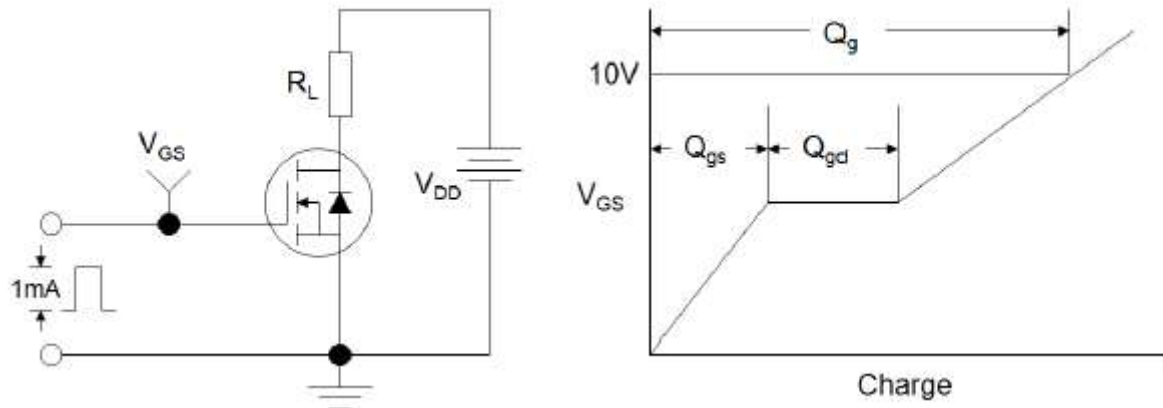


Figure1:Gate Charge Test Circuit & Waveform

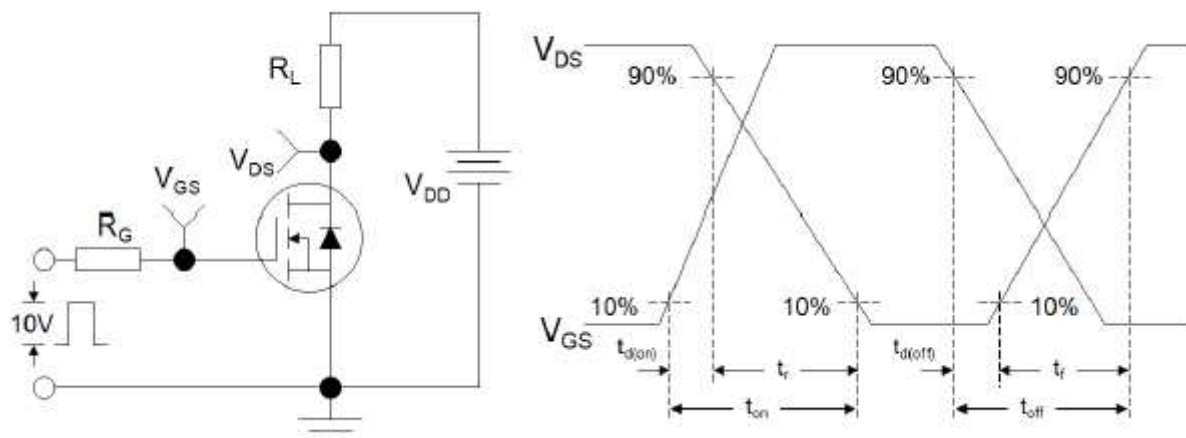


Figure 2: Resistive Switching Test Circuit & Waveforms

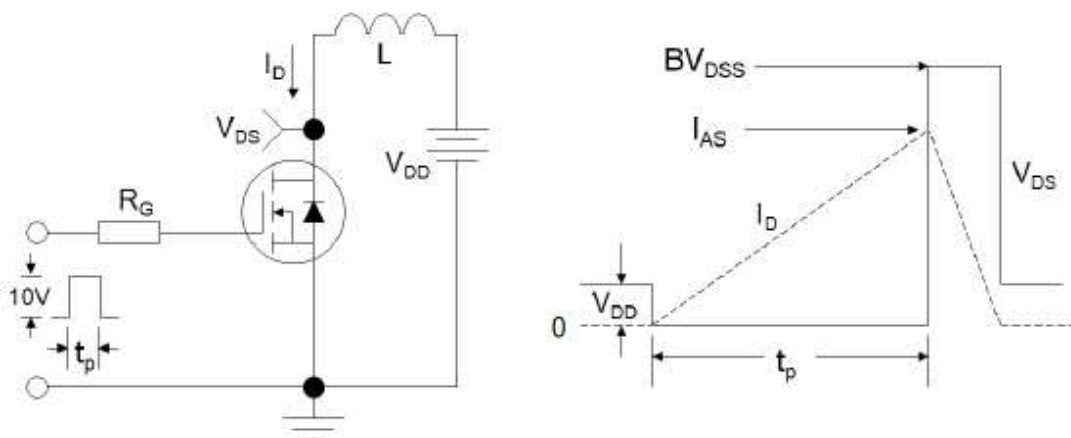
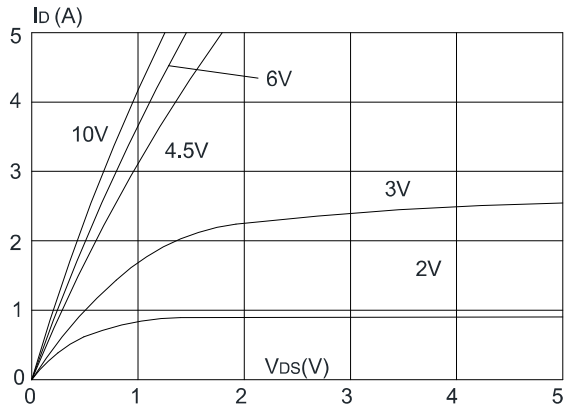


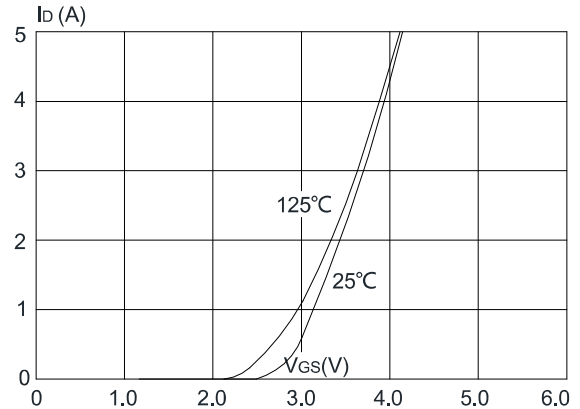
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

## RATING AND CHARACTERISTICS CURVES (RM1002V)

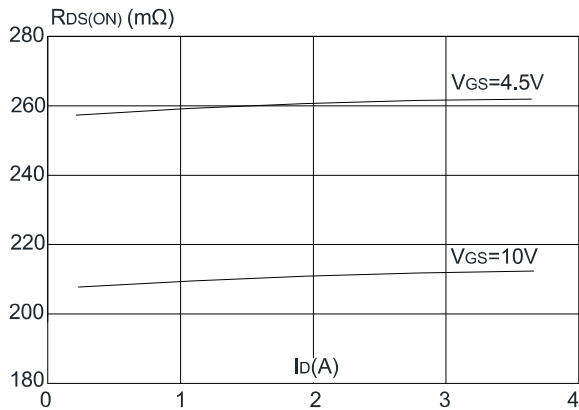
**Figure1:** Output Characteristics



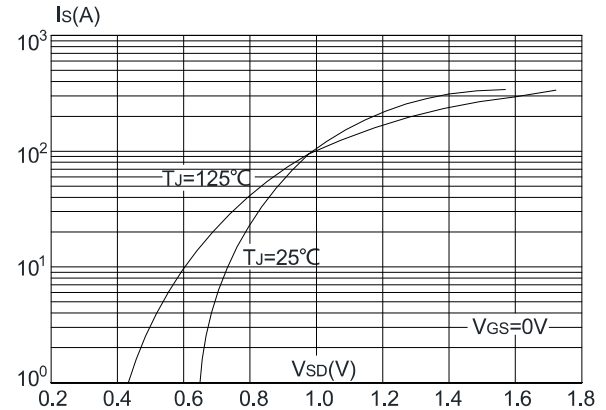
**Figure 2:** Typical Transfer Characteristics



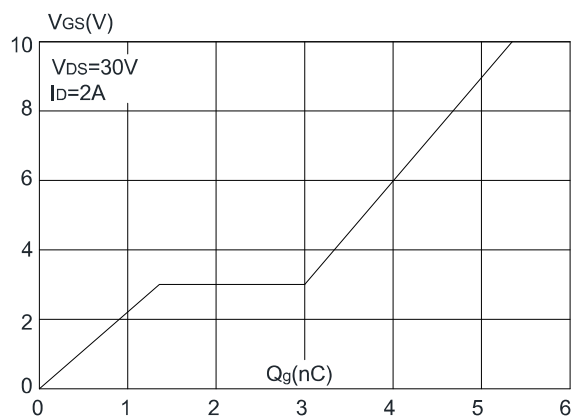
**Figure 3:** On-resistance vs. Drain Current



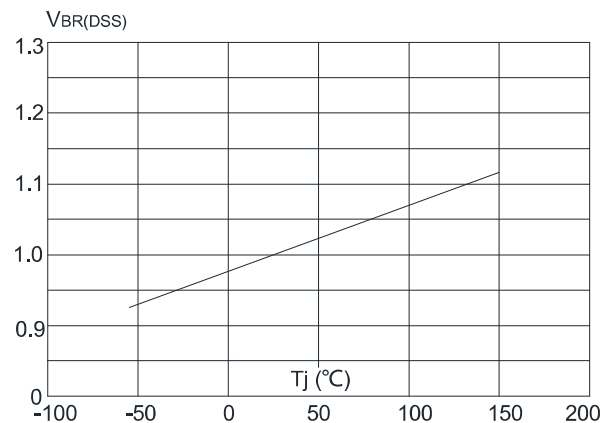
**Figure 4:** Body Diode Characteristics



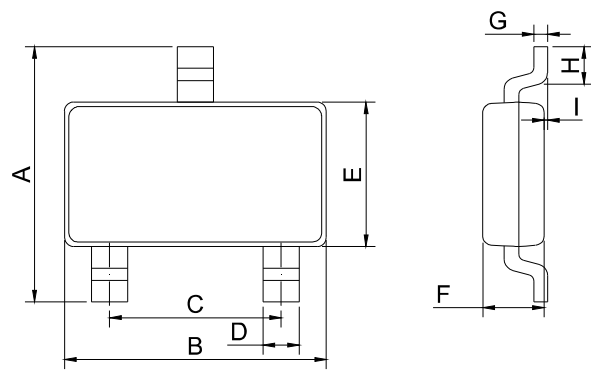
**Figure 5:** Gate Charge Characteristics



**Figure 6:** Normalized Breakdown Voltage vs. Junction Temperature



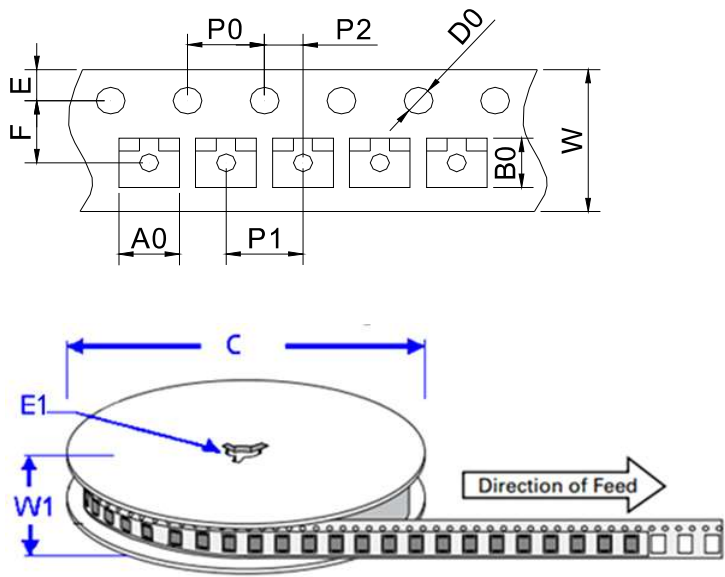
SOT-23 Package Information



SOT-23

| Ref. | Dimensions  |      |      |           |       |       |
|------|-------------|------|------|-----------|-------|-------|
|      | Millimeters |      |      | Inches    |       |       |
|      | Min.        | Typ. | Max. | Min.      | Typ.  | Max.  |
| A    | 2.30        | 2.40 | 2.50 | 0.091     | 0.095 | 0.098 |
| B    | 2.80        | 2.90 | 3.00 | 0.110     | 0.114 | 0.118 |
| C    | 1.90 REF    |      |      | 0.075 REF |       |       |
| D    | 0.35        | 0.40 | 0.45 | 0.014     | 0.016 | 0.018 |
| E    | 1.20        | 1.30 | 1.40 | 0.047     | 0.051 | 0.055 |
| F    | 0.90        | 1.00 | 1.10 | 0.035     | 0.039 | 0.043 |
| G    |             | 0.10 | 0.15 |           | 0.004 | 0.006 |
| H    | 0.20        |      |      | 0.008     |       |       |
| I    | 0           |      | 0.10 | 0         |       | 0.004 |

Package Information-SOT-23



| Ref. | Dimensions  |               |
|------|-------------|---------------|
|      | Millimeters | Inches        |
| A0   | 3.15 ± 0.3  | 0.124 ± 0.012 |
| B0   | 2.77 ± 0.3  | 0.109 ± 0.012 |
| C    | 178         | 7.0           |
| D0   | 1.50±0.1    | 0.059 ± 0.004 |
| E    | 1.75 ± 0.2  | 0.069 ± 0.008 |
| E1   | 13.3±0.3    | 0.524± 0.012  |
| F    | 3.5 ± 0.2   | 0.138 ± 0.008 |
| P0   | 4.00 ± 0.2  | 0.157 ± 0.008 |
| P1   | 4.00 ± 0.2  | 0.157 ± 0.008 |
| P2   | 2.00 ± 0.2  | 0.079 ± 0.008 |
| W    | 8.00 ± 0.2  | 0.315 ± 0.008 |
| W1   | 11.5±1.0    | 0.453 ± 0.039 |

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