

## SOT-23 Plastic-Encapsulate MOSFET

### 30V N-Channel MOSFET

#### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 30V           | 34mΩ@10V        | 4A    |
|               | 37mΩ@4.5V       |       |
|               | 45mΩ@2.5V       |       |

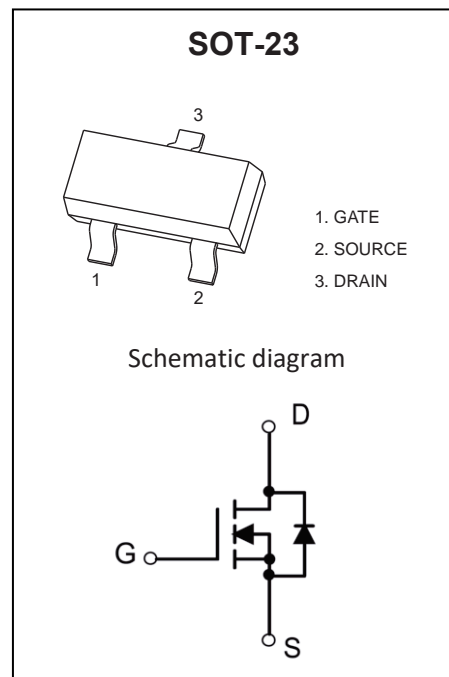
#### Feature

- TrenchFET Power MOSFET
- Excellent  $R_{DS(on)}$  and Low Gate Charge

#### Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

#### MARKING:



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

| Parameter  | Symbol          | Value     | Unit                 |
|--|-----------------|-----------|----------------------|
| Drain-Source Voltage                                       | $V_{DS}$        | 30        | V                    |
| Gate-Source Voltage  | $V_{GS}$        | ±12       | V                    |
| Continuous Drain Current                                   | $I_D$           | 4         | A                    |
| Pulsed Drain Current <sup>(1)</sup>                        | $I_{DM}$        | 15        | A                    |
| Power Dissipation  | $P_D$           | 0.35      | W                    |
| Thermal Resistance from Junction to Ambient <sup>(2)</sup> | $R_{\theta JA}$ | 357       | $^{\circ}\text{C/W}$ |
| Junction Temperature                                       | $T_J$           | 150       | $^{\circ}\text{C}$   |
| Storage Temperature  | $T_{STG}$       | -55~ +150 | $^{\circ}\text{C}$   |

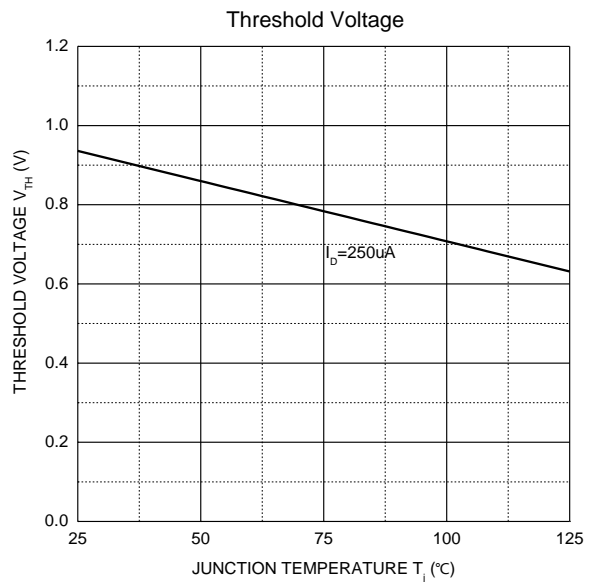
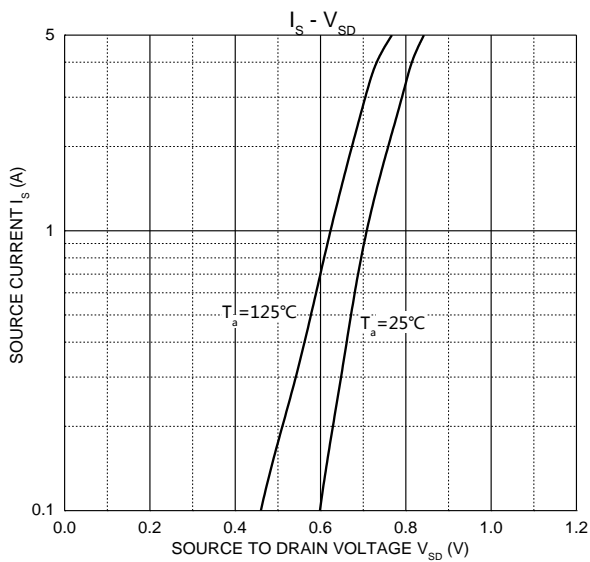
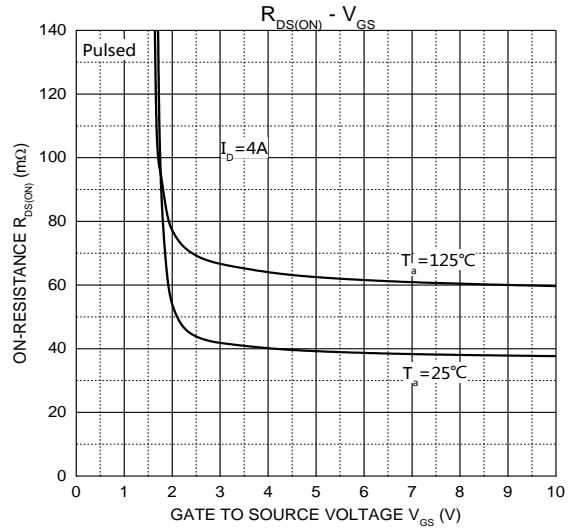
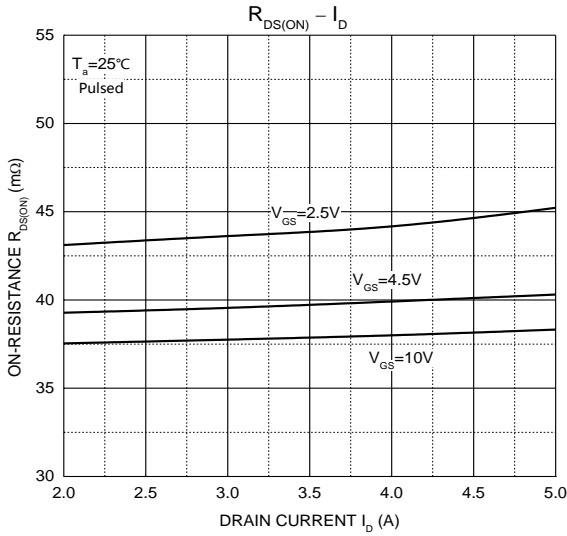
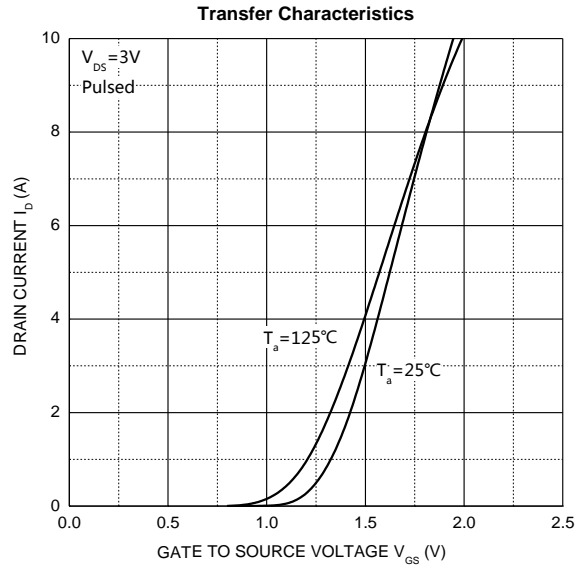
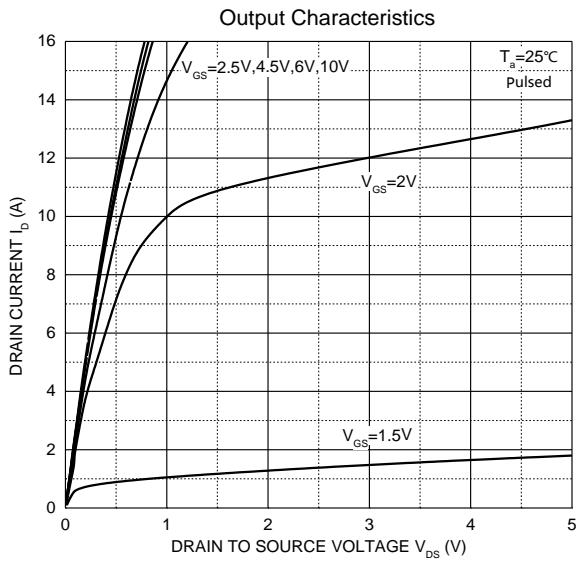
## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter                                      | Symbol        | Test Condition   | Min | Type | Max       | Unit       |
|--|---------------|--|-----|------|-----------|------------|
| <b>STATIC CHARACTERISTICS</b>                  |               |  |     |      |           |            |
| Drain-source breakdown voltage                 | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$  | 30  |      |           | V          |
| Zero gate voltage drain current                | $I_{DSS}$     | $V_{DS} = 30V, V_{GS} = 0V$  |     |      | 1         | $\mu A$    |
| Gate-body leakage current                      | $I_{GSS}$     | $V_{GS} = \pm 12V, V_{DS} = 0V$  |     |      | $\pm 100$ | nA         |
| Gate threshold voltage <sup>(3)</sup>          | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                                      | 0.5 | 0.9  | 1.5       | V          |
| Drain-source on-resistance <sup>(3)</sup>      | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 4A$   |     | 34   | 52        | m $\Omega$ |
|  |               | $V_{GS} = 4.5V, I_D = 3A$  |     | 37   | 65        |            |
|  |               | $V_{GS} = 2.5V, I_D = 2A$  |     | 45   | 85        |            |
| Forward tranconductance <sup>(3)</sup>         | $g_{FS}$      | $V_{DS} = 5V, I_D = 3.6A$  |     | 13   |           | S          |
| <b>DYNAMIC CHARACTERISTICS<sup>(4)</sup></b>   |               |  |     |      |           |            |
| Input Capacitance                              | $C_{iss}$     | $V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$                                  |     | 389  |           | pF         |
| Output Capacitance                             | $C_{oss}$     |  |     | 54   |           |            |
| Reverse Transfer Capacitance                   | $C_{rss}$     |  |     | 40   |           |            |
| Gate resistance                                | $R_g$         | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$                                   |     | 3.5  |           | $\Omega$   |
| <b>SWITCHING CHARACTERISTICS<sup>(4)</sup></b> |               |  |     |      |           |            |
| Turn-on delay time                             | $t_{d(on)}$   | $V_{GS} = 10V, V_{DS} = 15V,$<br>$R_L = 3.75\Omega, R_{GEN} = 6\Omega$ |     | 3.5  |           | ns         |
| Turn-on rise time                              | $t_r$         |  |     | 1.2  |           |            |
| Turn-off delay time                            | $t_{d(off)}$  |  |     | 22   |           |            |
| Turn-off fall time                             | $t_f$         |  |     | 2.2  |           |            |
| Total gate charge                              | $Q_g$         | $V_{DS} = 15V, V_{GS} = 4.5V, I_D = 4A$                                |     | 4.4  |           | nC         |
| Gate-source charge                             | $Q_{gs}$      |  |     | 0.7  |           |            |
| Gate-drain charge                              | $Q_{gd}$      |  |     | 1.3  |           |            |
| <b>SOURCE-DRAIN DIODE CHARACTERISTICS</b>      |               |  |     |      |           |            |
| Body Diode Voltage <sup>(3)</sup>              | $V_{SD}$      | $I_S = 1A, V_{GS} = 0V$  |     |      | 1         | V          |
| Continuous Source-Drain Diode Current          | $I_S$         | $T_C = 25^\circ\text{C}$   |     |      | 1.5       | A          |
| Body diode reverse recovery time               | $t_r$         | $I_F = 4A, di/dt = 100A/\mu s$   |     | 1.3  |           | ns         |
| Body diode reverse recovery charge             | $Q_{rr}$      |  |     |      | 6.2       |            |

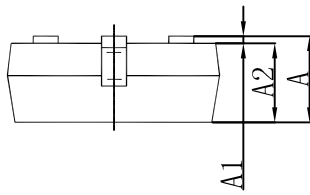
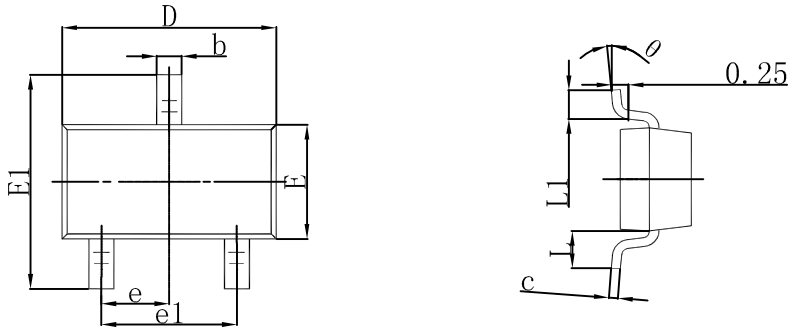
### Notes:

1. Repetitive rating : Pulse width limited by junction temperature.
2. Surface mounted on FR4 board ,  $t_s \leq 10s$ .
3. Pulse Test : Pulse Width  $\leq 80\mu s$ , Duty Cycle  $\leq 0.5\%$ .
4. Guaranteed by design, not subject to producing.

# Typical Characteristics

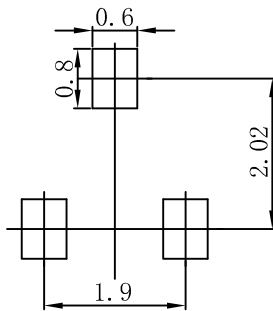


## SOT-23 Package Outline Dimensions



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                     | 1.050 | 0.035                | 0.041 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| c        | 0.080                     | 0.150 | 0.003                | 0.006 |
| D        | 2.800                     | 3.000 | 0.110                | 0.118 |
| E        | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1       | 2.250                     | 2.550 | 0.089                | 0.100 |
| e        | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.550 REF                 |       | 0.022 REF            |       |
| L1       | 0.300                     | 0.500 | 0.012                | 0.020 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23 Suggested Pad Layout



### Note:

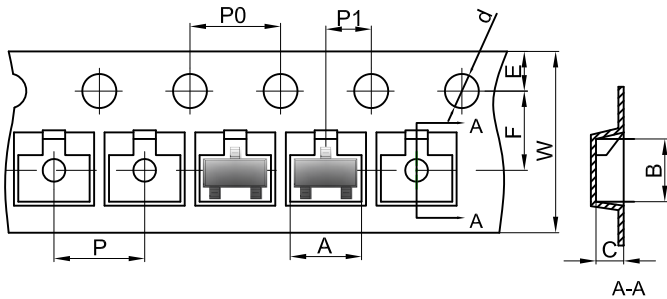
1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

### NOTICE

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# Reel Taping Specifications For Surface Mount Devices-SOT-23

## SOT-23 Embossed Carrier Tape

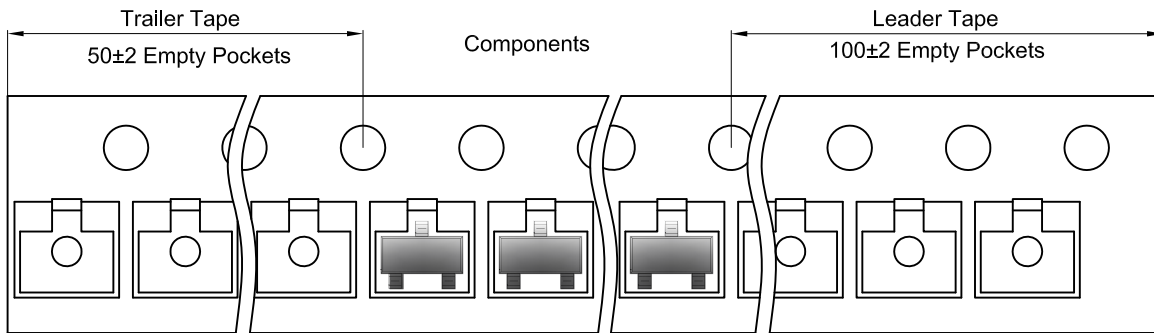


### Packaging Description:

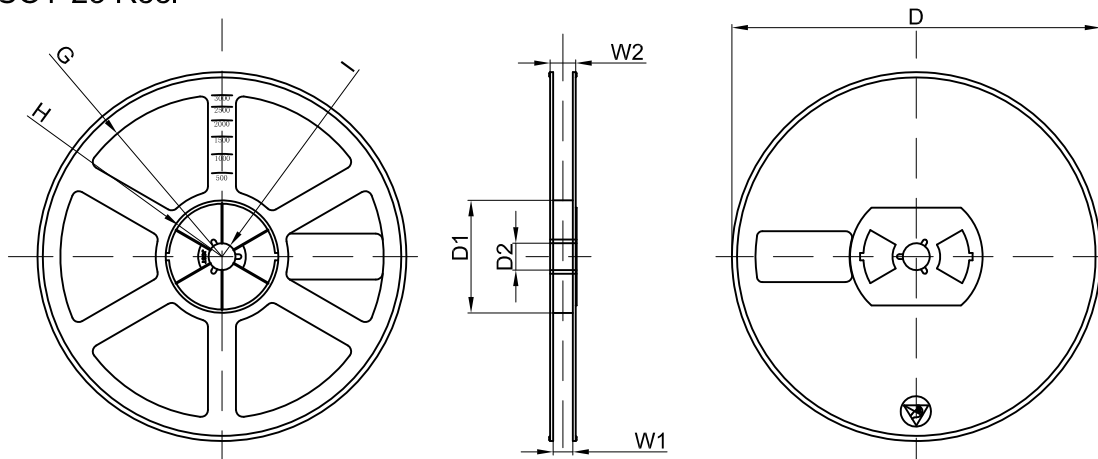
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-23                       | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

## SOT-23 Tape Leader and Trailer



## SOT-23 Reel



| Dimensions are in millimeter |         |       |       |        |        |       |      |       |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option                  | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
| 7"Dia                        | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 45,000 pcs | 203×203×195  | 180,000 pcs | 438×438×230     |          |

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