



## JX040 Series Sensitive gate SCRs

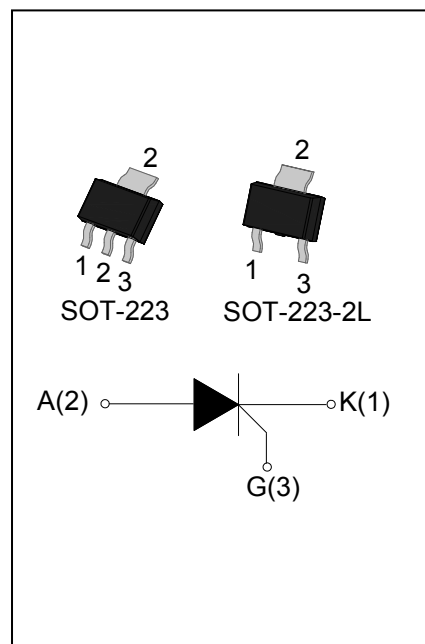
Rev.2.0

### DESCRIPTION:

The JX040 Series SCR provide high  $dv/dt$  rate with strong resistance to electromagnetic interface. They are especially recommended for use on straight hair, igniter etc. Package SOT-223 & SOT-223-2L are RoHS compliant. (2011/65/EU)

### MAIN FEATURES

| Symbol            | Value      | Unit    |
|-------------------|------------|---------|
| $V_{DRM}/V_{RRM}$ | 600        | V       |
| $I_{T(RMS)}$      | 2          | A       |
| $I_{GT}$          | $\leq 200$ | $\mu A$ |



### ABSOLUTE MAXIMUM RATINGS

| Parameter                                                    |                                                 | Symbol       | Value                  | Unit        |
|--------------------------------------------------------------|-------------------------------------------------|--------------|------------------------|-------------|
| Storage junction temperature range                           |                                                 | $T_{stg}$    | -40 - 150              | $^{\circ}C$ |
| Operating junction temperature range                         |                                                 | $T_j$        | -40 - 125 <sup>①</sup> | $^{\circ}C$ |
| Repetitive peak off-state voltage                            |                                                 | $V_{DRM}$    | 600                    | V           |
| Repetitive peak reverse voltage                              |                                                 | $V_{RRM}$    | 600                    | V           |
| RMS on-state current                                         | SOT-223/<br>SOT-223-2L<br>( $T_C=90^{\circ}C$ ) | $I_{T(RMS)}$ | 2                      | A           |
| Non repetitive surge peak on-state current<br>( $t_p=10ms$ ) |                                                 | $I_{TSM}$    | 25                     | A           |
| $I^2t$ value for fusing ( $t_p=10ms$ )                       |                                                 | $I^2t$       | 3.1                    | $A^2s$      |
| Critical rate of rise of on-state current                    |                                                 | $di/dt$      | 50                     | $A/\mu s$   |
| Peak gate current ( $t_p=20\mu s$ , $T_j=125^{\circ}C$ )     |                                                 | $I_{GM}$     | 1.2                    | A           |
| Peak gate power ( $t_p=20\mu s$ , $T_j=125^{\circ}C$ )       |                                                 | $P_{GM}$     | 2                      | W           |
| Average gate power dissipation( $T_j=125^{\circ}C$ )         |                                                 | $P_{G(AV)}$  | 0.2                    | W           |

**NOTE 1:** When we parallel connect a  $\leq 1K\Omega$  resistor between Gate and Cathode, the  $T_j$  can reach  $125^{\circ}C$ ; if without this resistor, the  $T_j$  only can reach  $110^{\circ}C$ .

ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol   | Test Condition                                                      | Value |      |      | Unit                   |
|----------|---------------------------------------------------------------------|-------|------|------|------------------------|
|          |                                                                     | MIN.  | TYP. | MAX. |                        |
| $I_{GT}$ | $V_D=12\text{V}$ $R_L=33\Omega$                                     | -     | 50   | 200  | $\mu\text{A}$          |
| $V_{GT}$ |                                                                     | -     | 0.6  | 0.8  | V                      |
| $V_{GD}$ | $V_D=V_{DRM}$ $T_J=125^{\circ}\text{C}$                             | 0.2   | -    | -    | V                      |
| $I_L$    | $I_G=1.2 I_{GT}$                                                    | -     | -    | 6    | mA                     |
| $I_H$    | $I_T=0.05\text{A}$                                                  | -     | -    | 5    | mA                     |
| $dV/dt$  | $V_D=2/3V_{DRM}$ $T_J=125^{\circ}\text{C}$ $R_{GK}=1\text{K}\Omega$ | 10    | -    | -    | $\text{V}/\mu\text{s}$ |

## STATIC CHARACTERISTICS

| Symbol    | Parameter                            |                           | Value(MAX) | Unit          |
|-----------|--------------------------------------|---------------------------|------------|---------------|
| $V_{TM}$  | $I_T=8\text{A}$ $t_p=380\mu\text{s}$ | $T_J=25^{\circ}\text{C}$  | 1.5        | V             |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$          | $T_J=25^{\circ}\text{C}$  | 5          | $\mu\text{A}$ |
| $I_{RRM}$ |                                      | $T_J=125^{\circ}\text{C}$ | 100        | $\mu\text{A}$ |

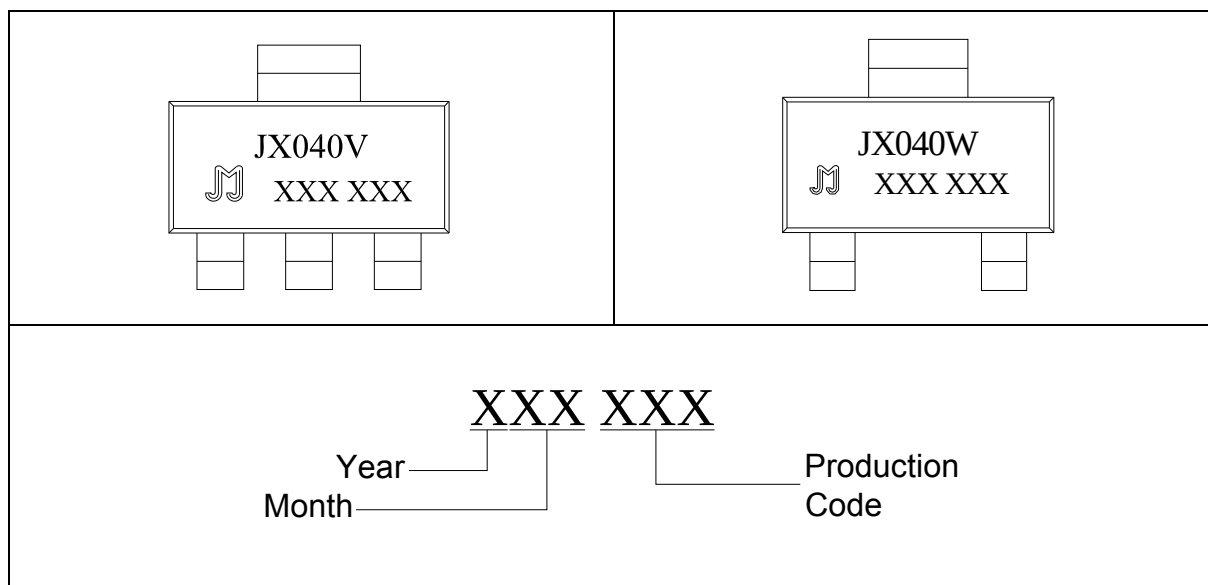
## THERMAL RESISTANCES

| Symbol        | Parameter           |                        | Value | Unit                        |
|---------------|---------------------|------------------------|-------|-----------------------------|
| $R_{th(j-c)}$ | junction to case    | SOT-223/<br>SOT-223-2L | 11.2  | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | junction to ambient |                        | 60    |                             |

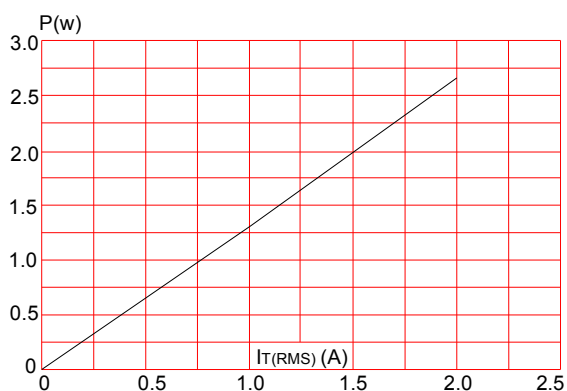
## ORDERING INFORMATION

|                                                                                                                                                                                                                                                                                            |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| <div> <div>J</div> <div>X</div> <div>040</div> <div>V</div> <div>-TR</div> </div> <div> <div>JieJie Microelectronics Co.,Ltd</div> <div>Sensitive gate SCRs</div> <div><math>I_{T(RMS)}:2\text{A}</math></div> <div>V:SOT-223<br/>W:SOT-223-2L</div> <div>TR: Tape &amp; Reel</div> </div> |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|

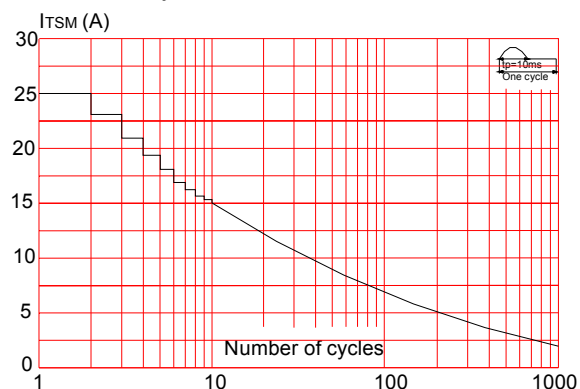
## MARKING



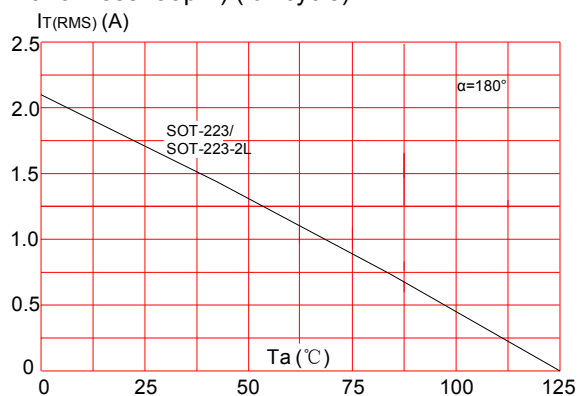
**FIG.1:** Maximum power dissipation versus RMS on-state current



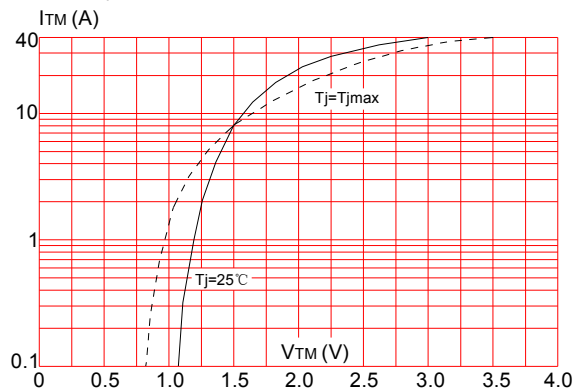
**FIG.3:** Surge peak on-state current versus number of cycles



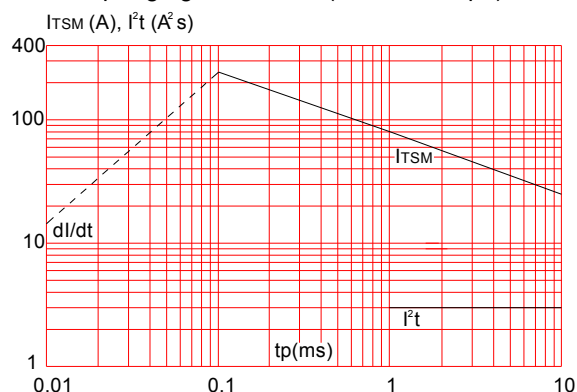
**FIG.2:** RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 $\mu$ m) (full cycle)



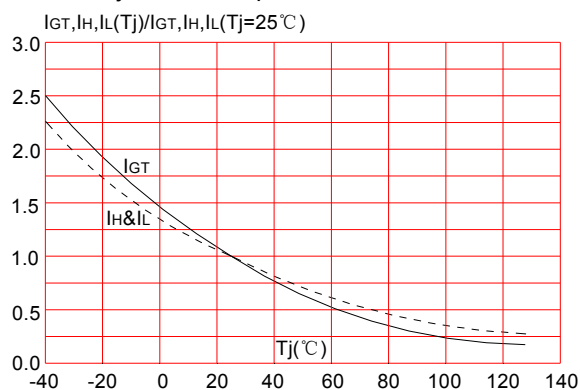
**FIG.4:** On-state characteristics (maximum values)



**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2t$  ( $dI/dt < 50\text{A}/\mu\text{s}$ )

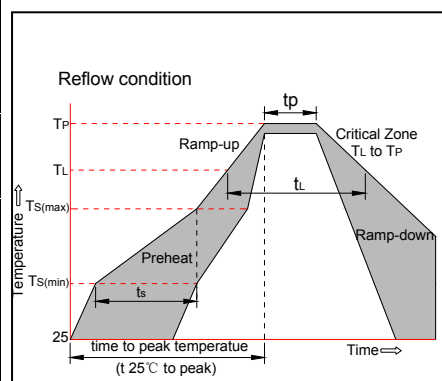


**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature



## SOLDERING PARAMETERS

| Reflow Condition                                               |                                    | Pb-Free assembly<br>(see figure at right) |
|----------------------------------------------------------------|------------------------------------|-------------------------------------------|
| Pre Heat                                                       | -Temperature Min ( $T_{s(\min)}$ ) | +150 $^{\circ}\text{C}$                   |
|                                                                | -Temperature Max ( $T_{s(\max)}$ ) | +200 $^{\circ}\text{C}$                   |
|                                                                | -Time (Min to Max) ( $t_s$ )       | 60-180 secs.                              |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)         |                                    | 3 $^{\circ}\text{C}/\text{sec. Max}$      |
| $T_{s(\max)}$ to $T_L$ - Ramp-up Rate                          |                                    | 3 $^{\circ}\text{C}/\text{sec. Max}$      |
| Reflow                                                         | -Temperature( $T_L$ ) (Liquidus)   | +217 $^{\circ}\text{C}$                   |
|                                                                | -Temperature( $t_L$ )              | 60-150 secs.                              |
| Peak Temp ( $T_P$ )                                            |                                    | +260(+0/-5) $^{\circ}\text{C}$            |
| Time within 5 $^{\circ}\text{C}$ of actual Peak Temp ( $t_p$ ) |                                    | 20-40secs.                                |
| Ramp-down Rate                                                 |                                    | 6 $^{\circ}\text{C}/\text{sec. Max}$      |
| Time 25 $^{\circ}\text{C}$ to Peak Temp ( $T_P$ )              |                                    | 8 min. Max                                |
| Do not exceed                                                  |                                    | +260 $^{\circ}\text{C}$                   |



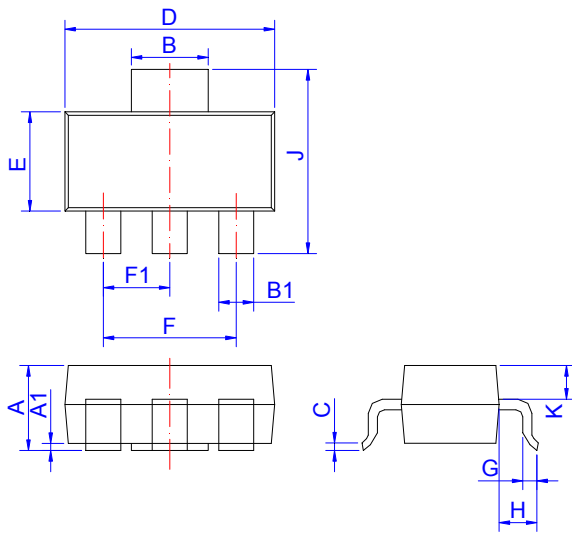
**ORDERING INFORMATION**

| Order code | Voltage<br>$V_{\text{DRM}}/V_{\text{RRM}}$<br>(V) | IGT( $\mu\text{A}$ ) | Package    | Base qty.<br>(pcs) | Delivery<br>mode |
|------------|---------------------------------------------------|----------------------|------------|--------------------|------------------|
| JX040V     | 600                                               | 200                  | SOT-223    | 4,000              | Tape & Reel      |
| JX040W     | 600                                               | 200                  | SOT-223-2L | 4,000              | Tape & Reel      |

**Document Revision History**

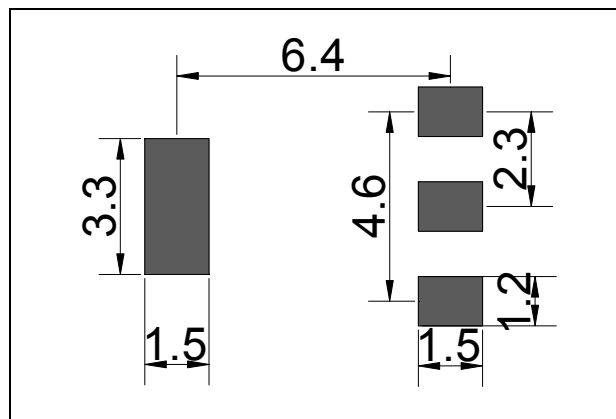
| Date           | Revision | Changes     |
|----------------|----------|-------------|
| April 17, 2021 | 2        | Last update |

## PACKAGE MECHANICAL DATA

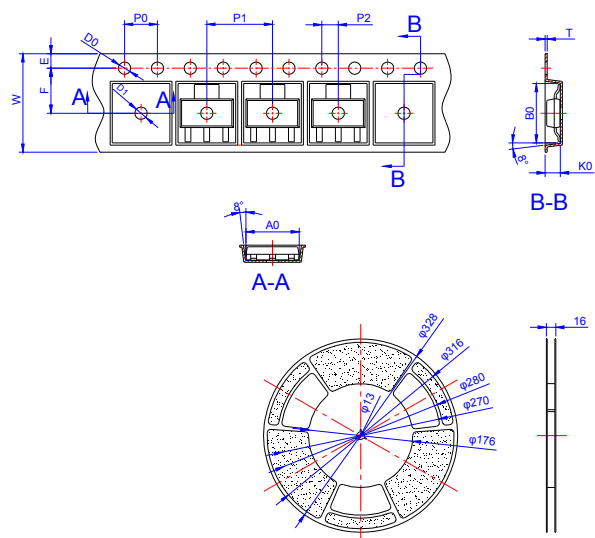


| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 1.5         | 1.6  | 1.8  | 0.059  | 0.063 | 0.071 |
| A1   | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| B    | 2.9         | 3.0  | 3.1  | 0.114  | 0.118 | 0.122 |
| B1   | 0.6         | 0.7  | 0.8  | 0.024  | 0.028 | 0.031 |
| C    | 0.22        | 0.26 | 0.32 | 0.009  | 0.010 | 0.013 |
| D    | 6.3         | 6.5  | 6.7  | 0.248  | 0.256 | 0.264 |
| E    | 3.3         | 3.5  | 3.7  | 0.130  | 0.138 | 0.146 |
| F    |             | 4.6  |      |        | 0.181 |       |
| F1   |             | 2.3  |      |        | 0.091 |       |
| G    | 0.7         | 0.9  | 1.1  | 0.028  | 0.035 | 0.043 |
| H    | 1.5         | 1.75 | 2.0  | 0.059  | 0.069 | 0.079 |
| J    | 6.7         | 7.0  | 7.3  | 0.264  | 0.276 | 0.287 |
| K    | 0.8         | 0.9  | 1.0  | 0.031  | 0.035 | 0.039 |

## FOOTPRINT-SOT-223 (dimensions in mm)



## DELIVERY MODE

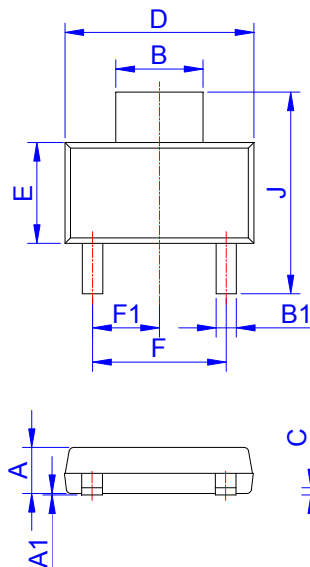


| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| W    | -           | 12.00 | 12.20 | -      | 0.472 | 0.480 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 5.45        | 5.50  | 5.55  | 0.215  | 0.217 | 0.219 |
| D0   | -           | 1.50  | 1.60  | -      | 0.059 | 0.063 |
| D1   | -           | 1.55  | 1.80  | -      | 0.061 | 0.071 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 7.90        | 8.00  | 8.10  | 0.311  | 0.315 | 0.319 |
| P2   | 1.95        | 2.00  | 2.05  | 0.077  | 0.079 | 0.081 |
| 10P0 | 39.80       | 40.00 | 40.20 | 1.567  | 1.575 | 1.583 |
| A0   | 6.73        | 6.83  | 6.93  | 0.265  | 0.269 | 0.273 |
| B0   | 7.30        | 7.40  | 7.50  | 0.287  | 0.291 | 0.295 |
| K0   | 1.78        | 1.88  | 1.98  | 0.070  | 0.074 | 0.078 |
| T    | 0.25        | 0.30  | 0.35  | 0.010  | 0.012 | 0.014 |

| PACKAGE | OUTLINE | REEL (PCS) | PER CARTON (PCS) | TAPE & REEL |
|---------|---------|------------|------------------|-------------|
| SOT-223 | TAPING  | 4,000      | 40,000           | 13 inch     |

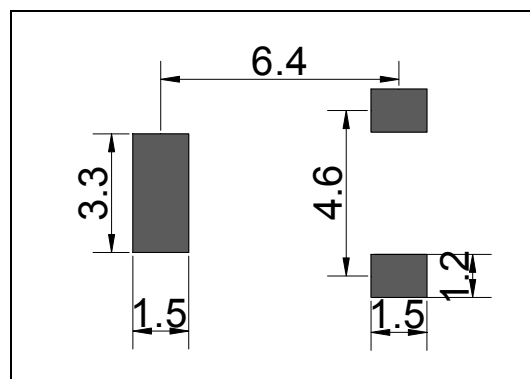


## PACKAGE MECHANICAL DATA

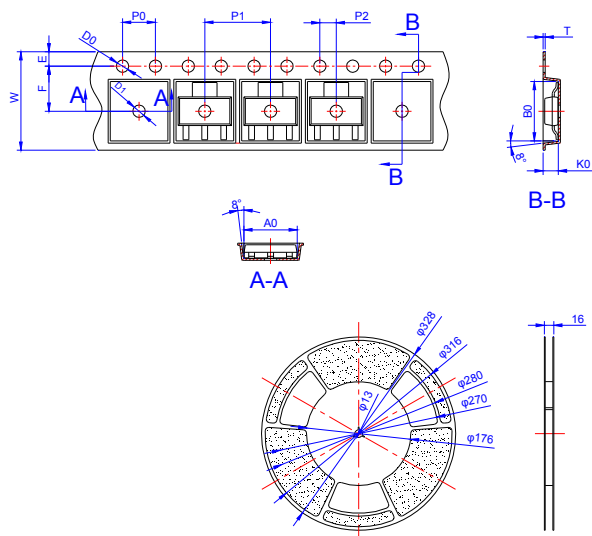


| Ref. | Dimensions  |       |      |        |       |       |
|------|-------------|-------|------|--------|-------|-------|
|      | Millimeters |       |      | Inches |       |       |
|      | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A    | 1.50        | 1.60  | 1.80 | 0.059  | 0.063 | 0.071 |
| A1   | 0.01        | 0.06  | 0.10 | 0.001  | 0.002 | 0.004 |
| B    | 2.90        | 3.00  | 3.10 | 0.114  | 0.118 | 0.122 |
| B1   | 0.60        | 0.70  | 0.80 | 0.024  | 0.028 | 0.031 |
| C    | 0.22        | 0.254 | 0.32 | 0.009  | 0.010 | 0.013 |
| D    | 6.30        | 6.50  | 6.70 | 0.248  | 0.256 | 0.264 |
| E    | 3.30        | 3.50  | 3.70 | 0.130  | 0.138 | 0.146 |
| F    |             | 4.60  |      |        | 0.181 |       |
| F1   |             | 2.30  |      |        | 0.091 |       |
| G    | 0.70        | 0.90  | 1.10 | 0.028  | 0.035 | 0.043 |
| H    | 1.50        | 1.75  | 2.00 | 0.059  | 0.069 | 0.079 |
| J    | 6.70        | 7.00  | 7.30 | 0.264  | 0.276 | 0.287 |
| K    |             | 0.90  |      |        | 0.035 |       |

## FOOTPRINT-SOT-223-2L (dimensions in mm)



## DELIVERY MODE



| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| W    | -           | 12.00 | 12.20 | -      | 0.472 | 0.480 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 5.45        | 5.50  | 5.55  | 0.215  | 0.217 | 0.219 |
| D0   | -           | 1.50  | 1.60  | -      | 0.059 | 0.063 |
| D1   | -           | 1.55  | 1.80  | -      | 0.061 | 0.071 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 7.90        | 8.00  | 8.10  | 0.311  | 0.315 | 0.319 |
| P2   | 1.95        | 2.00  | 2.05  | 0.077  | 0.079 | 0.081 |
| 10P0 | 39.80       | 40.00 | 40.20 | 1.567  | 1.575 | 1.583 |
| A0   | 6.73        | 6.83  | 6.93  | 0.265  | 0.269 | 0.273 |
| B0   | 7.30        | 7.40  | 7.50  | 0.287  | 0.291 | 0.295 |
| K0   | 1.78        | 1.88  | 1.98  | 0.070  | 0.074 | 0.078 |
| T    | 0.25        | 0.30  | 0.35  | 0.010  | 0.012 | 0.014 |

| PACKAGE    | OUTLINE | REEL (PCS) | PER CARTON (PCS) | TAPE & REEL |
|------------|---------|------------|------------------|-------------|
| SOT-223-2L | TAPING  | 4,000      | 40,000           | 13 inch     |



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