

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

## Product Summary



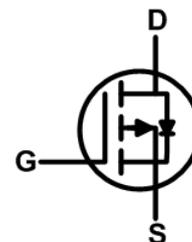
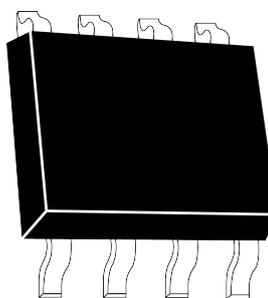
| BVDSS | RDSON | ID     |
|-------|-------|--------|
| -30V  | 15mΩ  | -10.0A |

## Description

The JH4435B is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The JH4435B meet the RoHS and Green Product requirement

## SOP8 Pin Configuration



## Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise specified)

| Symbol                            | Parameter                                       | Max.                   | Units |   |
|-----------------------------------|---|------------------------|-------|---|
| V <sub>DSS</sub>                  | Drain-Source Voltage                            | -30                    | V     |   |
| V <sub>GSS</sub>                  | Gate-Source Voltage                             | ±20                    | V     |   |
| I <sub>D</sub>                    | Continuous Drain Current                        | T <sub>A</sub> = 25°C  | -10   | A |
|                                   |   | T <sub>A</sub> = 100°C | -7.0  | A |
| I <sub>DM</sub>                   | Pulsed Drain Current <sup>note1</sup>           | -36                    | A     |   |
| E <sub>AS</sub>                   | Single Pulsed Avalanche Energy <sup>note2</sup> | 25                     | mJ    |   |
| P <sub>D</sub>                    | Power Dissipation                               | T <sub>A</sub> = 25°C  | 3.5   | W |
| R <sub>θJA</sub>                  | Thermal Resistance, Junction to Ambient         | 48                     | °C/W  |   |
| T <sub>J</sub> , T <sub>STG</sub> | Operating and Storage Temperature Range         | -55 to +150            | °C    |   |

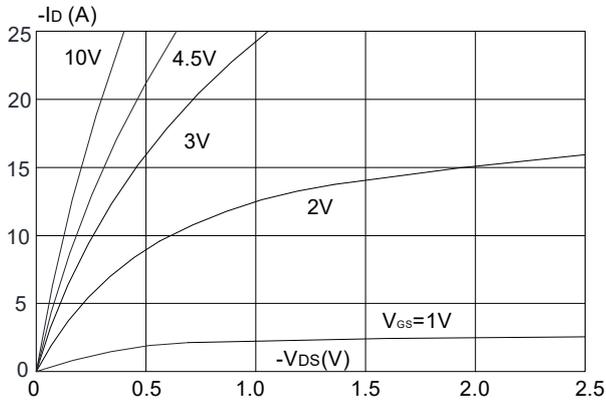
## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

| Symbol  | Parameter  | Test Condition   | Min. | Typ. | Max. | Units |
|---|--|--|------|------|------|-------|
| <b>Off Characteristic</b>                                     |  |  |      |      |      |       |
| V <sub>(BR)DSS</sub>  | Drain-Source Breakdown Voltage                           | V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA   | -30  | -    | -    | V     |
| I <sub>DSS</sub>  | Zero Gate Voltage Drain Current                          | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V,  | -    | -    | -1   | μA    |
| I <sub>GSS</sub>  | Gate to Body Leakage Current                             | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V  | -    | -    | ±100 | nA    |
| <b>On Characteristics</b>                                     |  |  |      |      |      |       |
| V <sub>GS(th)</sub>   | Gate Threshold Voltage                                   | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                  | -1.0 | -1.5 | -2.5 | V     |
| R <sub>DS(on)</sub>   | Static Drain-Source on-Resistance<br>Note3               | V <sub>GS</sub> =-10V, I <sub>D</sub> =-9A   | -    | 15   | 20   | mΩ    |
|   |  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A  | -    | 20   | 30   |       |
| <b>Dynamic Characteristics</b>                                |  |  |      |      |      |       |
| C <sub>iss</sub>  | Input Capacitance  | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                  | -    | 900  | -    | pF    |
| C <sub>oss</sub>  | Output Capacitance                                       |  | -    | 125  | -    | pF    |
| C <sub>rss</sub>  | Reverse Transfer Capacitance                             |  | -    | 109  | -    | pF    |
| Q <sub>g</sub>  | Total Gate Charge  | V <sub>DS</sub> = -15V, I <sub>D</sub> = -8A,<br>V <sub>GS</sub> = -10V                      | -    | 42   | -    | nC    |
| Q <sub>gs</sub>   | Gate-Source Charge                                       |  | -    | 8.8  | -    | nC    |
| Q <sub>gd</sub>   | Gate-Drain("Miller") Charge                              |  | -    | 7.3  | -    | nC    |
| <b>Switching Characteristics</b>                              |  |  |      |      |      |       |
| t <sub>d(on)</sub>  | Turn-on Delay Time                                       | V <sub>DD</sub> = -15V, I <sub>D</sub> = -1A,<br>V <sub>GS</sub> =-10V, R <sub>GEN</sub> =6Ω | -    | 13   | -    | ns    |
| t <sub>r</sub>  | Turn-on Rise Time  |  | -    | 15   | -    | ns    |
| t <sub>d(off)</sub>   | Turn-off Delay Time                                      |  | -    | 198  | -    | ns    |
| t <sub>f</sub>  | Turn-off Fall Time                                       |  | -    | 98   | -    | ns    |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |  |  |      |      |      |       |
| I <sub>S</sub>  | Maximum Continuous Drain to Source Diode Forward Current |  | -    | -    | -10  | A     |
| I <sub>SM</sub>   | Maximum Pulsed Drain to Source Diode Forward Current     |  | -    | -    | -36  | A     |
| V <sub>SD</sub>   | Drain to Source Diode Forward Voltage                    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -9A   | -    | -0.8 | -1.2 | V     |

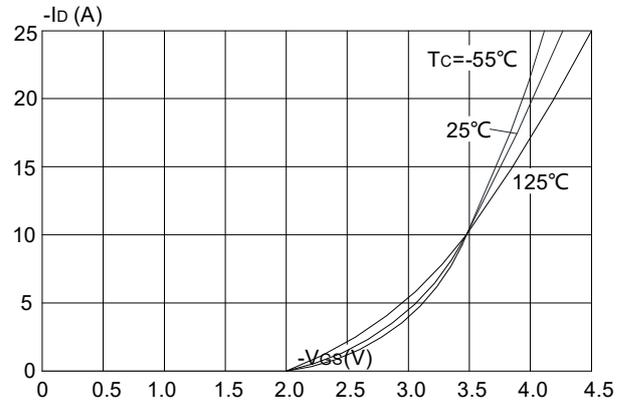
- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature  
 2. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=-15V, V<sub>G</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=-10A  
 3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

## Typical Performance Characteristics

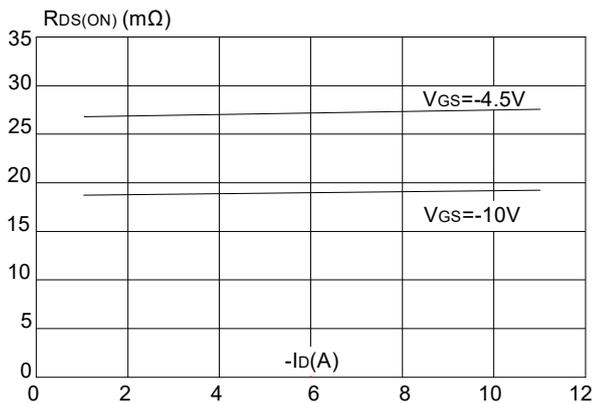
**Figure 1: Output Characteristics**



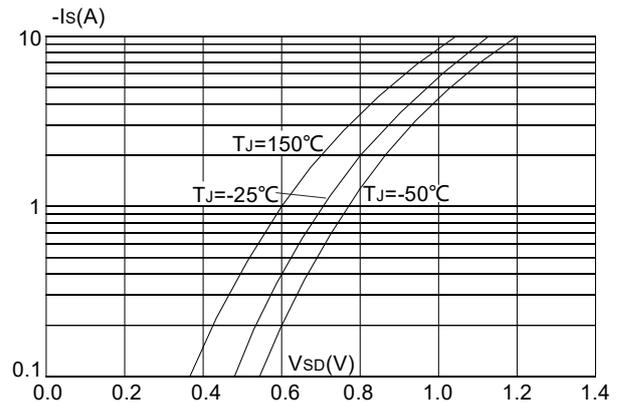
**Figure 2: Typical Transfer Characteristics**



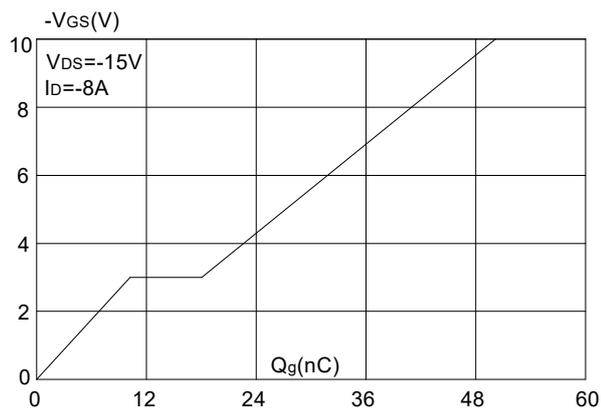
**Figure 3: On-resistance vs. Drain Current**



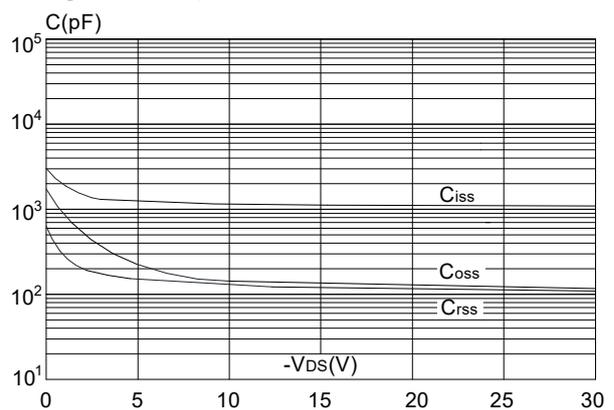
**Figure 4: Body Diode Characteristics**



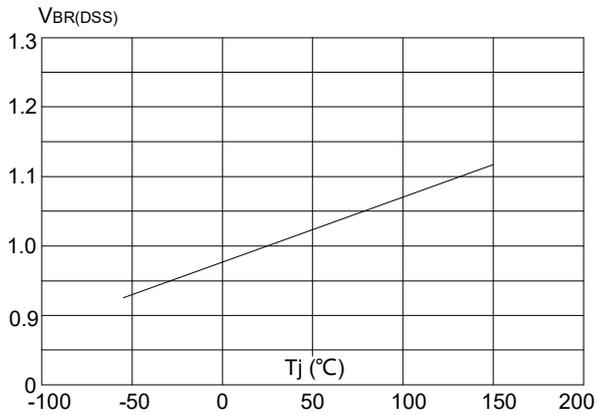
**Figure 5: Gate Charge Characteristics**



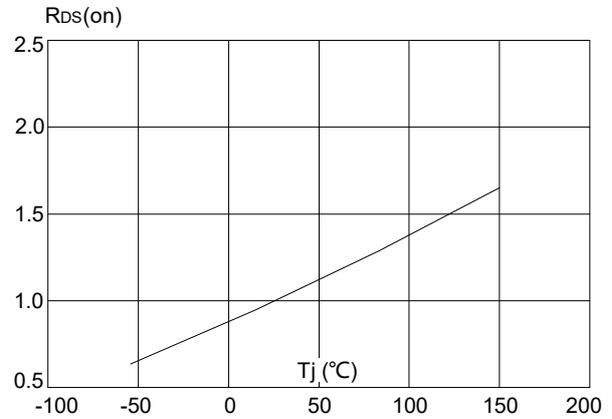
**Figure 6: Capacitance Characteristics**



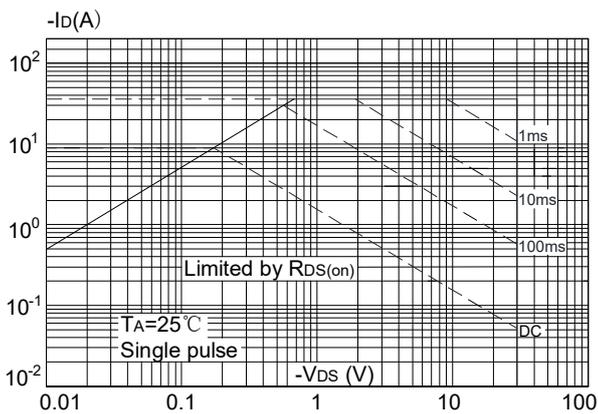
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



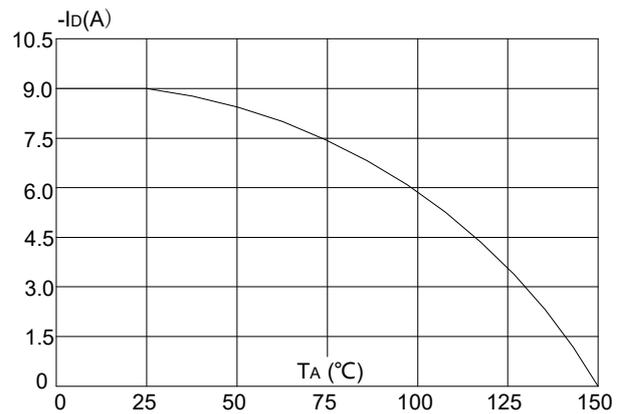
**Figure 8:** Normalized on Resistance vs. Junction Temperature



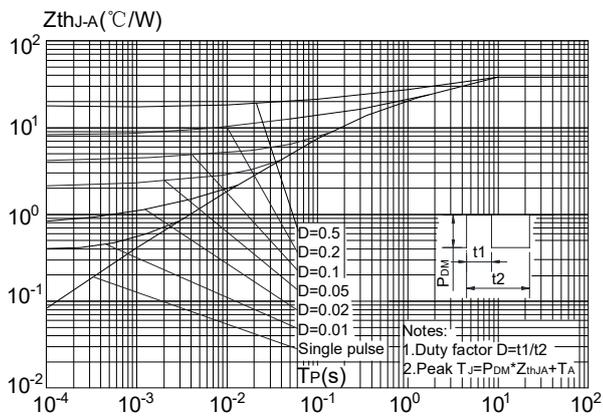
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## Test Circuit

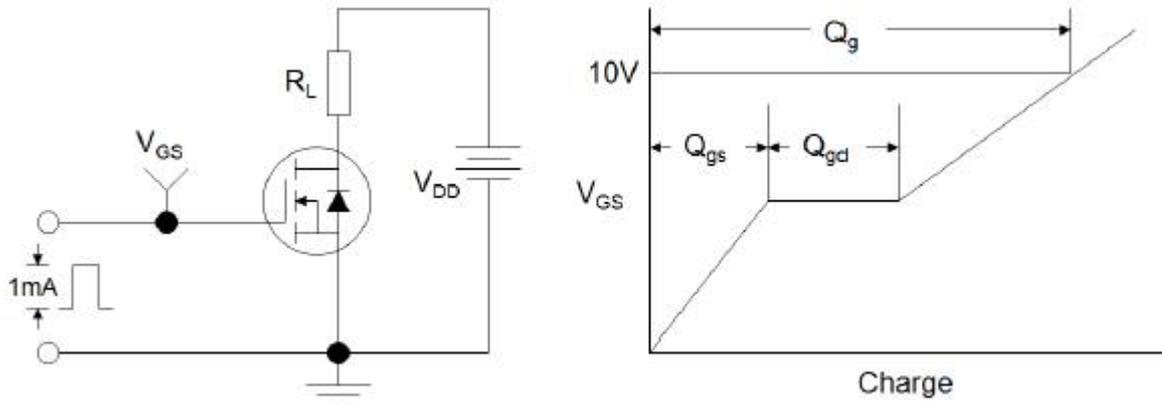


Figure1:Gate Charge Test Circuit & Waveform

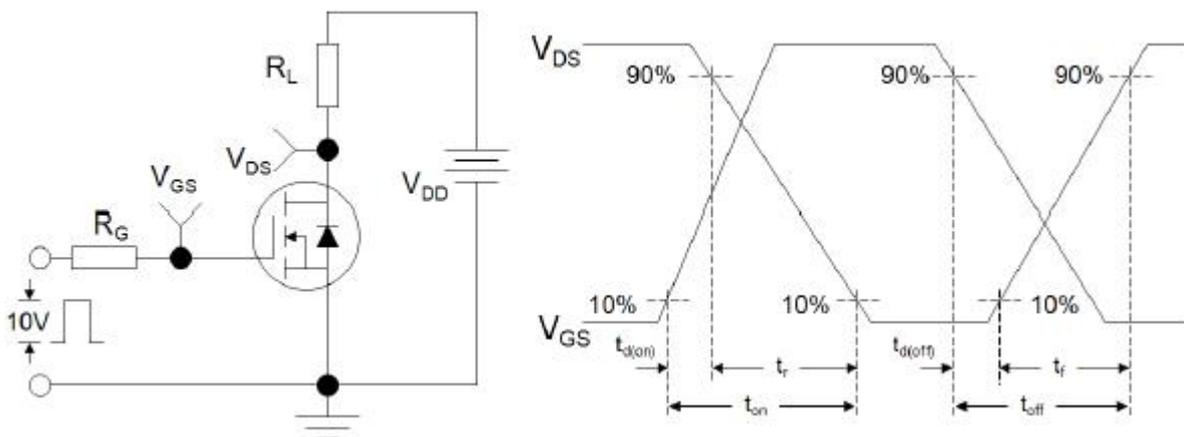


Figure 2: Resistive Switching Test Circuit & Waveforms

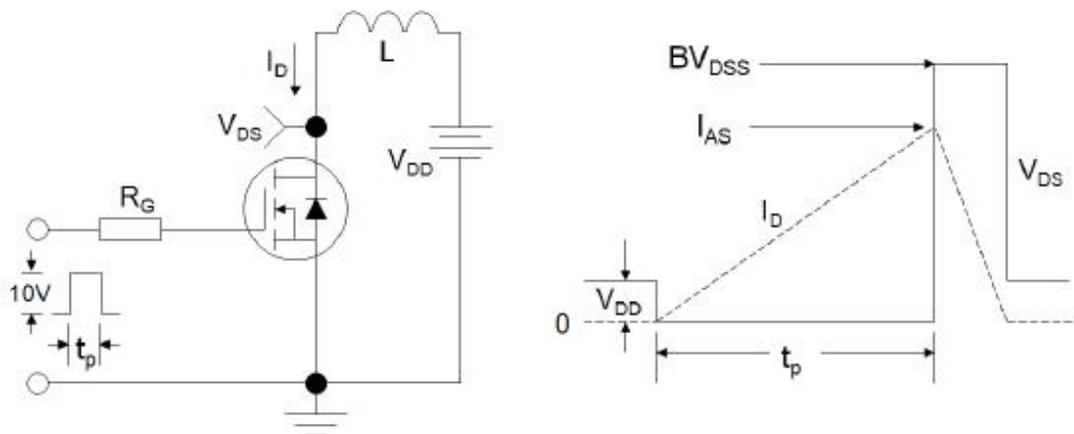
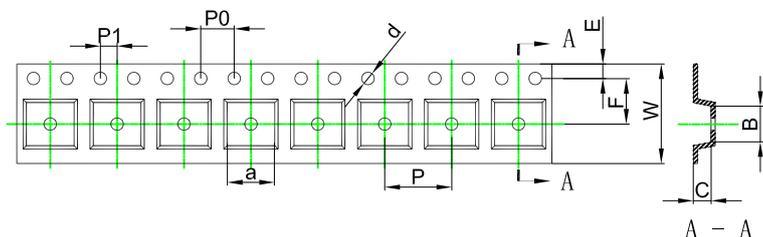


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

## SOP8 Tape and Reel Information

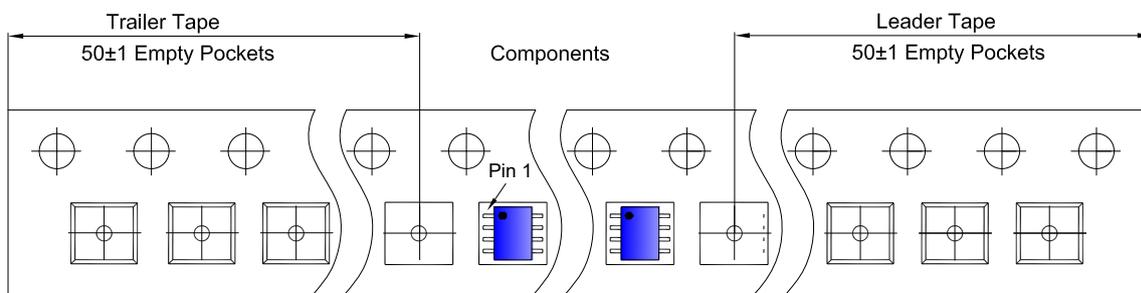
### Embossed Carrier Tape



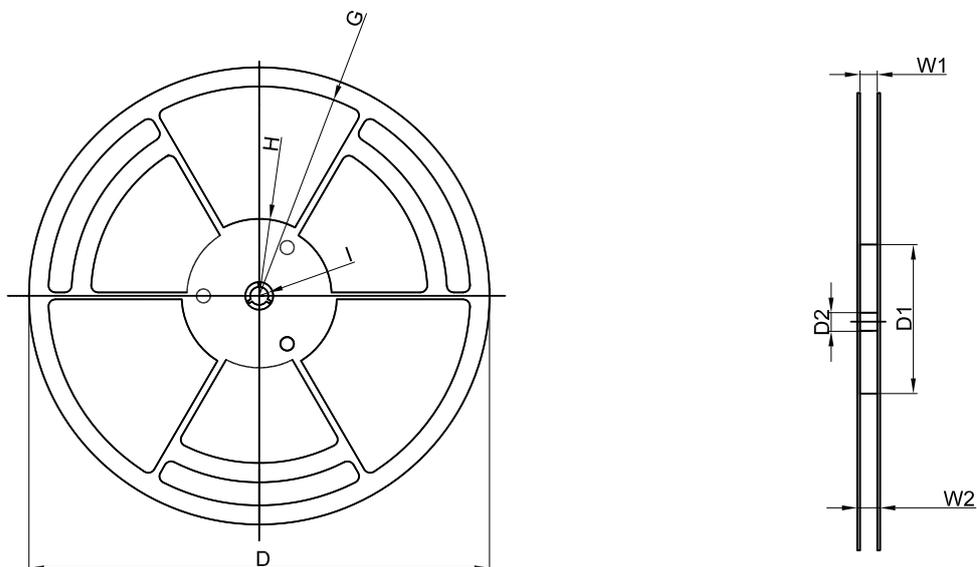
Dimensions are in millimeter

| Pkg type | a    | B    | C    | d     | E    | F    | P0   | P    | P1   | W     |
|----------|------|------|------|-------|------|------|------|------|------|-------|
| SOP8     | 6.40 | 5.40 | 2.10 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

### Tape Leader and Trailer



### Reel

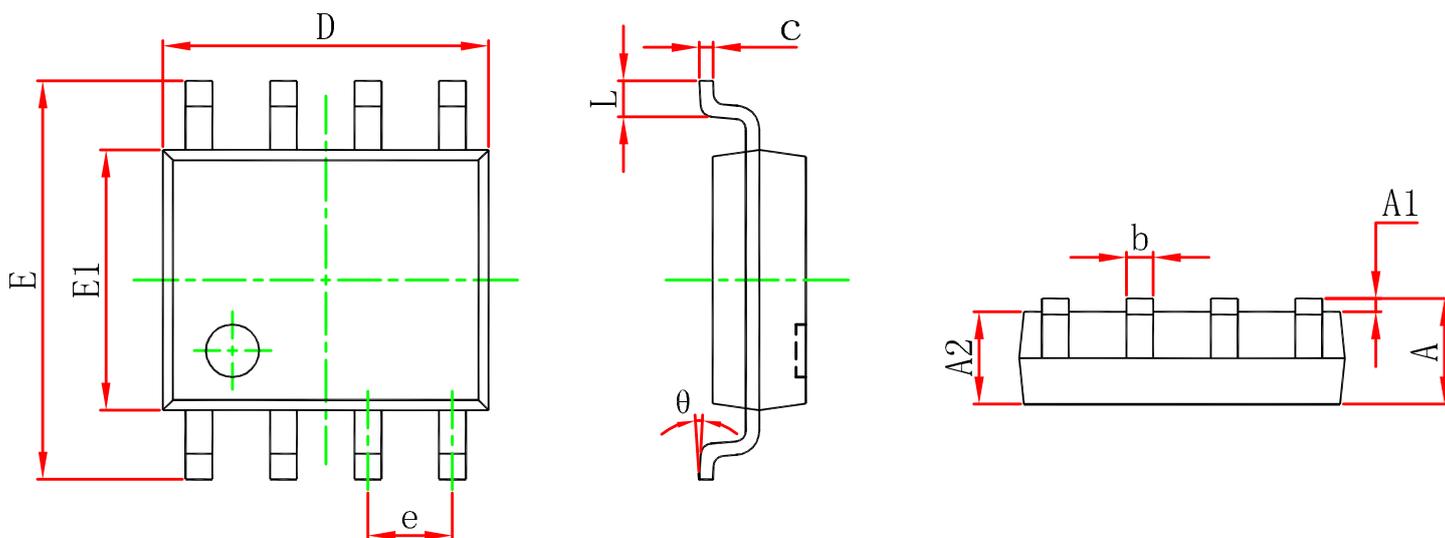


Dimensions are in millimeter

| Reel Option | D       | D1     | D2    | G       | H      | I     | W1    | W2    |
|-------------|---------|--------|-------|---------|--------|-------|-------|-------|
| 13" Dia     | Ø330.00 | 100.00 | 13.00 | R151.00 | R56.00 | R6.50 | 12.40 | 17.60 |

| REEL      | Reel Size | Box       | Box Size(mm) | Carton     | Carton Size(mm) | G.W.(kg) |
|-----------|-----------|-----------|--------------|------------|-----------------|----------|
| 3,000 pcs | 13 inch   | 6,000 pcs | 360×360×65   | 48,000 pcs | 565×380×390     |          |



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.450                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.007                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.201 |
| e      | 1.270 (BSC)               |       | 0.050 (BSC)          |       |
| E      | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1     | 3.800                     | 4.000 | 0.150                | 0.157 |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

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