

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



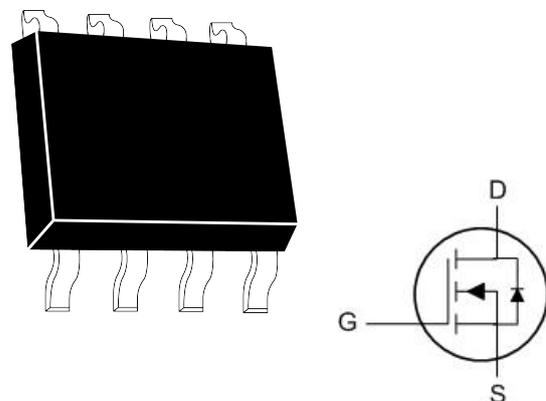
| BVDSS | RDSON | ID |
|-------|-------|----|
| 40V | 12mΩ | 9A |

Description

The JH4009S is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The JH4009S meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

SOP8 Pin Configuration



Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--------------------------------------------------|-----------------------------------|------------|------|
| Drain-Source Voltage | V _{DS} | 40 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Drain Current-Continuous | I _D | 9 | A |
| Drain Current-Continuous(T _C =100°C) | I _D (100°C) | 6.4 | A |
| Pulsed Drain Current | I _{DM} | 40 | A |
| Maximum Power Dissipation | P _D | 2 | W |
| Operating Junction and Storage Temperature Range | T _J , T _{STG} | -55 To 150 | °C |

Thermal Characteristic

| | | | |
|-------------------------------------------------------------|------------------|------|------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | R _{θJA} | 62.5 | °C/W |
|-------------------------------------------------------------|------------------|------|------|

N-CH Electrical Characteristics (T_A=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|-------------------------------------------|---------------------|------------------------------------------------------------------------------------------|-----|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 40 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =40V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 1 | 1.5 | 2.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =8A | - | 12 | 16 | mΩ |
| | | V _{GS} =4.5V, I _D =4A | - | 19 | 24 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =5V, I _D =8A | 33 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =20V, V _{GS} =0V, F=1.0MHz | - | 964 | - | PF |
| Output Capacitance | C _{oss} | | - | 109 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 96 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =20V, R _L =2.5Ω V _{GS} =10V, R _{GEN} =3Ω | - | 5.5 | - | nS |
| Turn-on Rise Time | t _r | | - | 14 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 24 | - | nS |
| Turn-Off Fall Time | t _f | | - | 12 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =20V, I _D =8A, V _{GS} =10V | - | 22.9 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 3.5 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 5.3 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =9A | - | 0.8 | 1.2 | V |

N- Channel Typical Electrical and Thermal Characteristics (Curves)

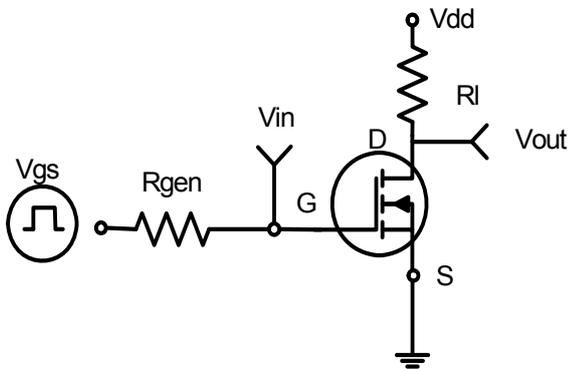


Figure 1: Switching Test Circuit

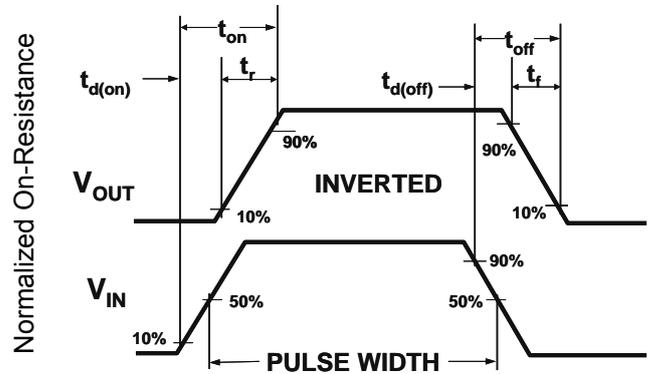


Figure 2: Switching Waveforms

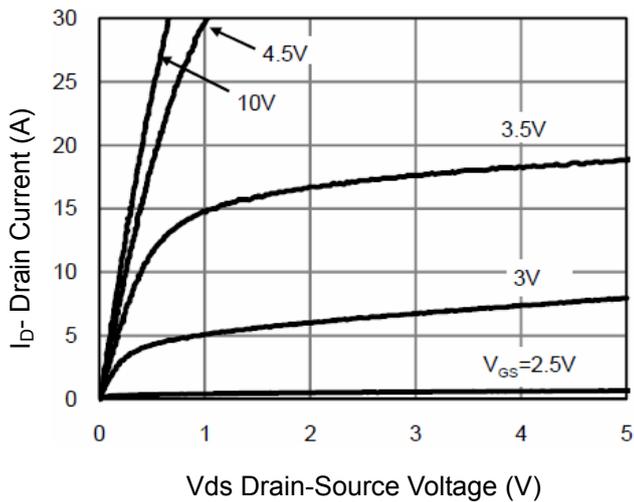


Figure 3 Output Characteristics

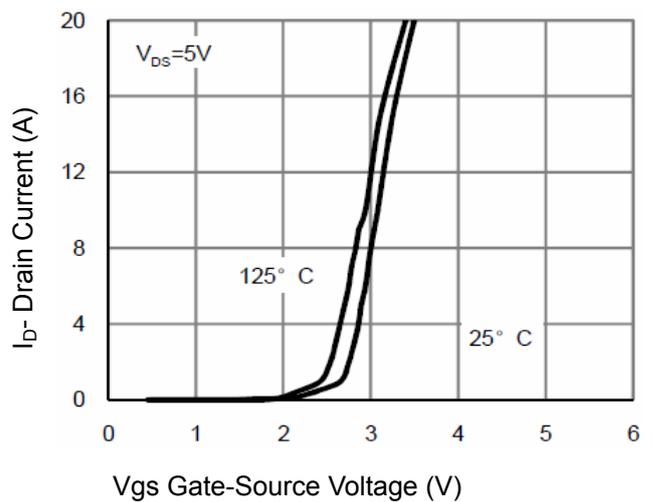


Figure 4 Transfer Characteristics

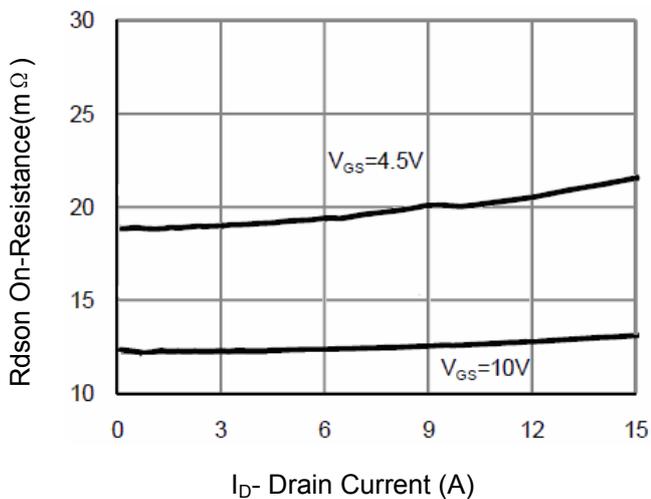


Figure 5 Drain-Source On-Resistance

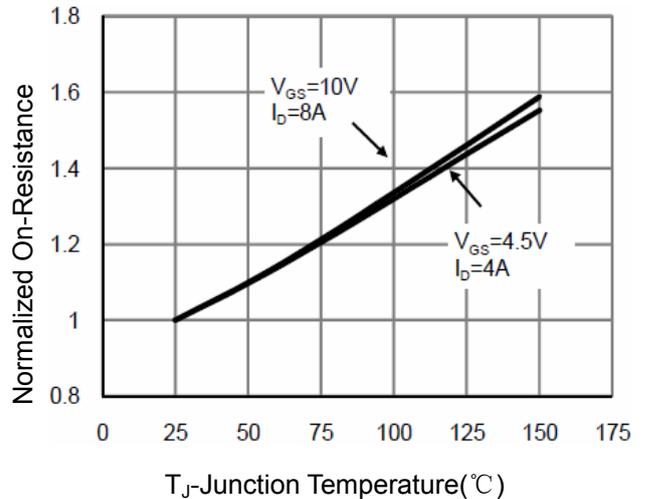
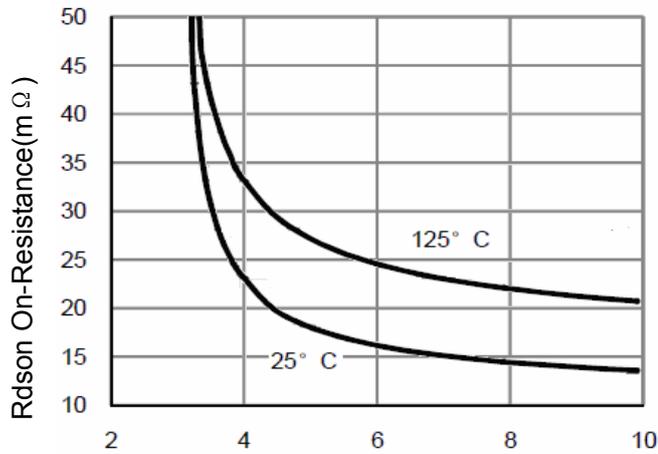
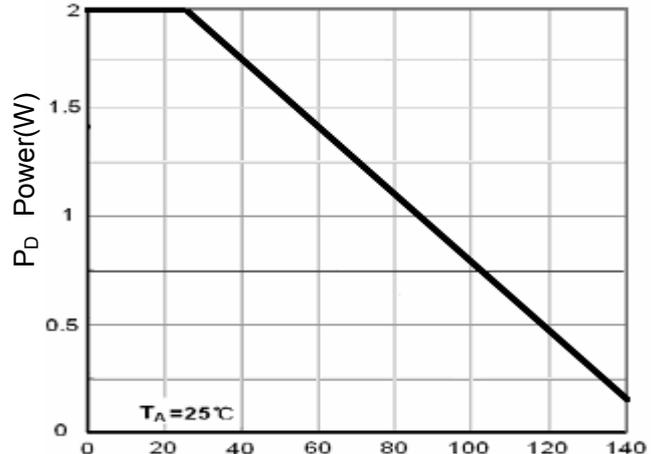


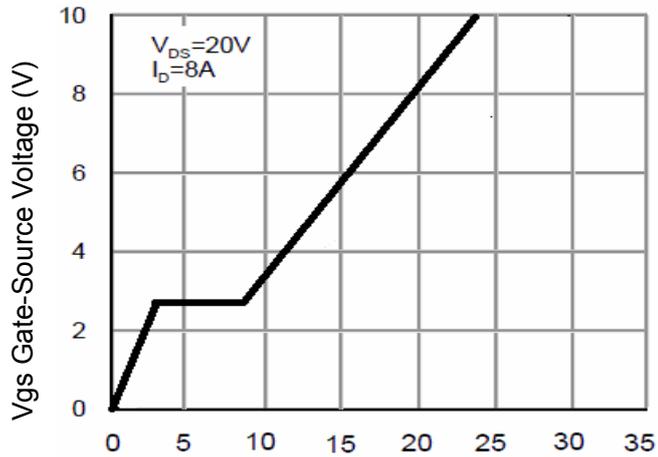
Figure 6 Drain-Source On-Resistance



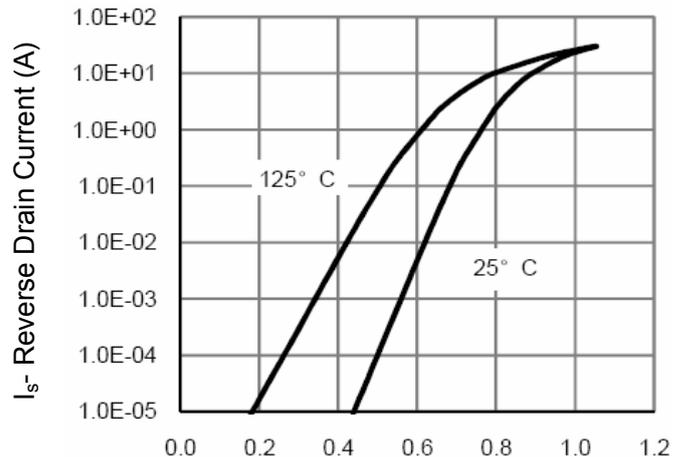
Vgs Gate-Source Voltage (V)
Figure 7 Rdson vs Vgs



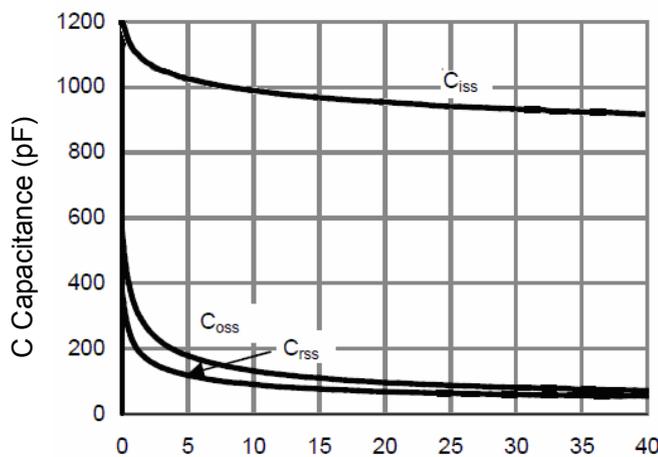
T_J-Junction Temperature(°C)
Figure 8 Power Dissipation



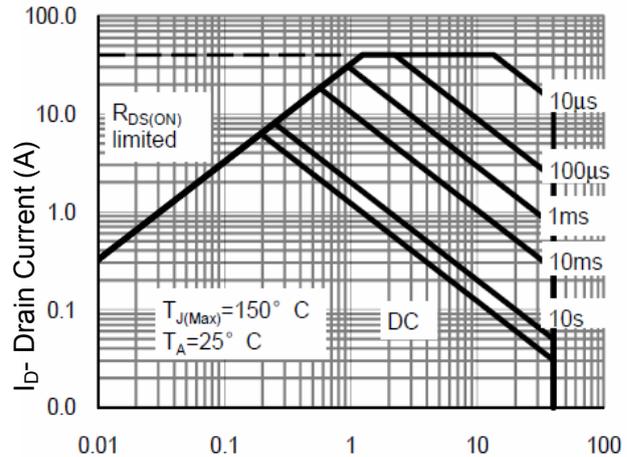
Qg Gate Charge (nC)
Figure 9 Gate Charge



Vds Drain-Source Voltage (V)
Figure 10 Source- Drain Diode Forward



Vds Drain-Source Voltage (V)
Figure 11 Capacitance vs Vds



Vds Drain-Source Voltage (V)
Figure 12 Safe Operation Area

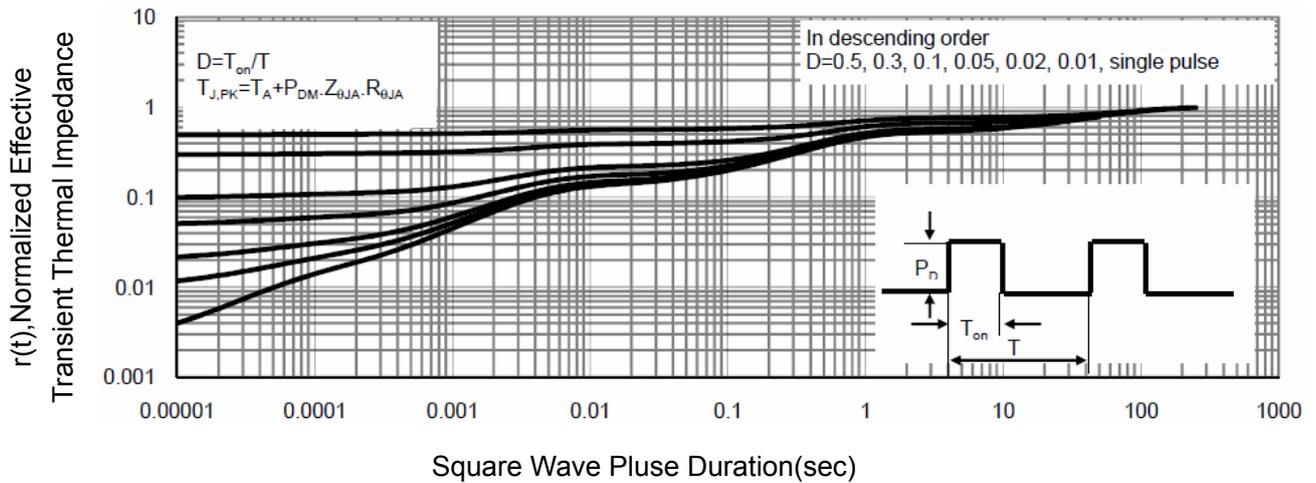
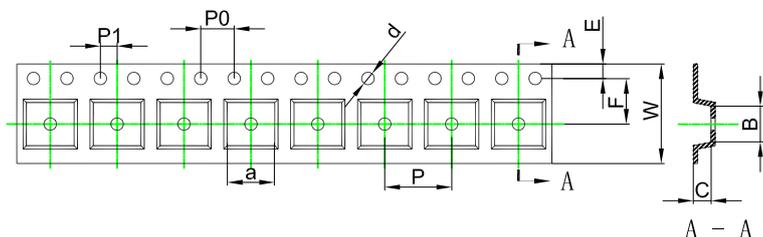


Figure 13 Normalized Maximum Transient Thermal Impedance

SOP8 Tape and Reel Information

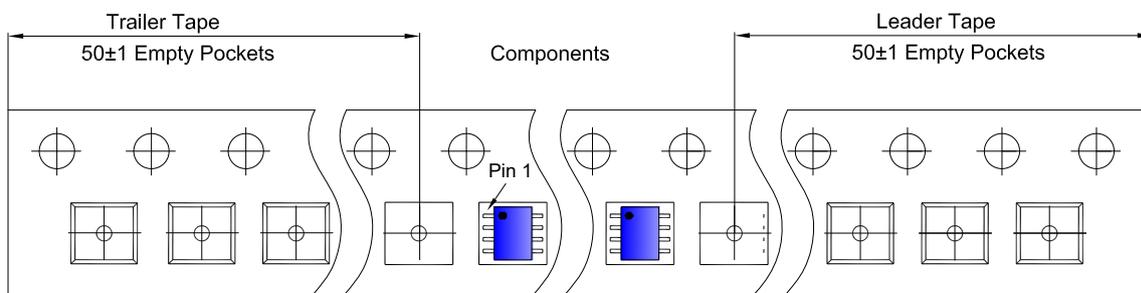
Embossed Carrier Tape



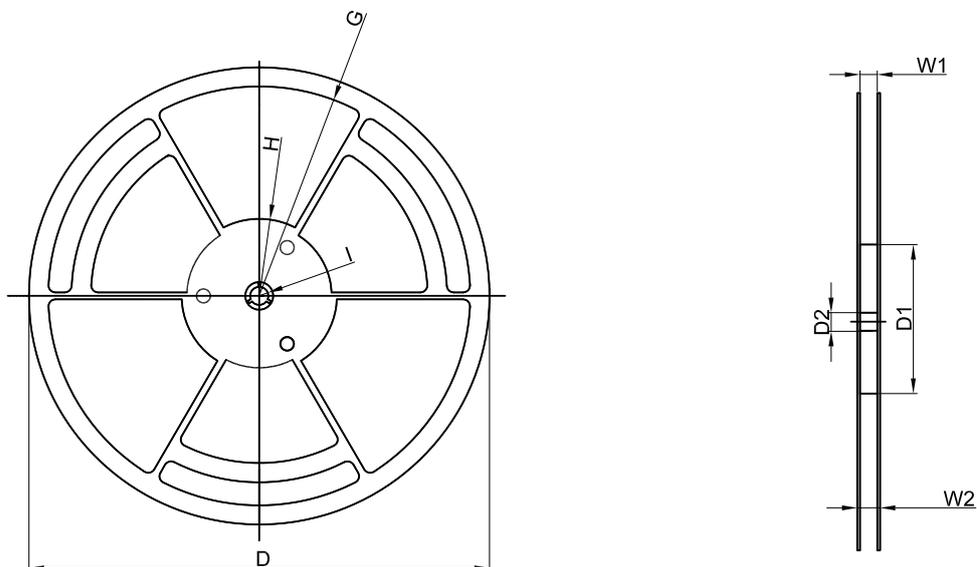
Dimensions are in millimeter

| 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



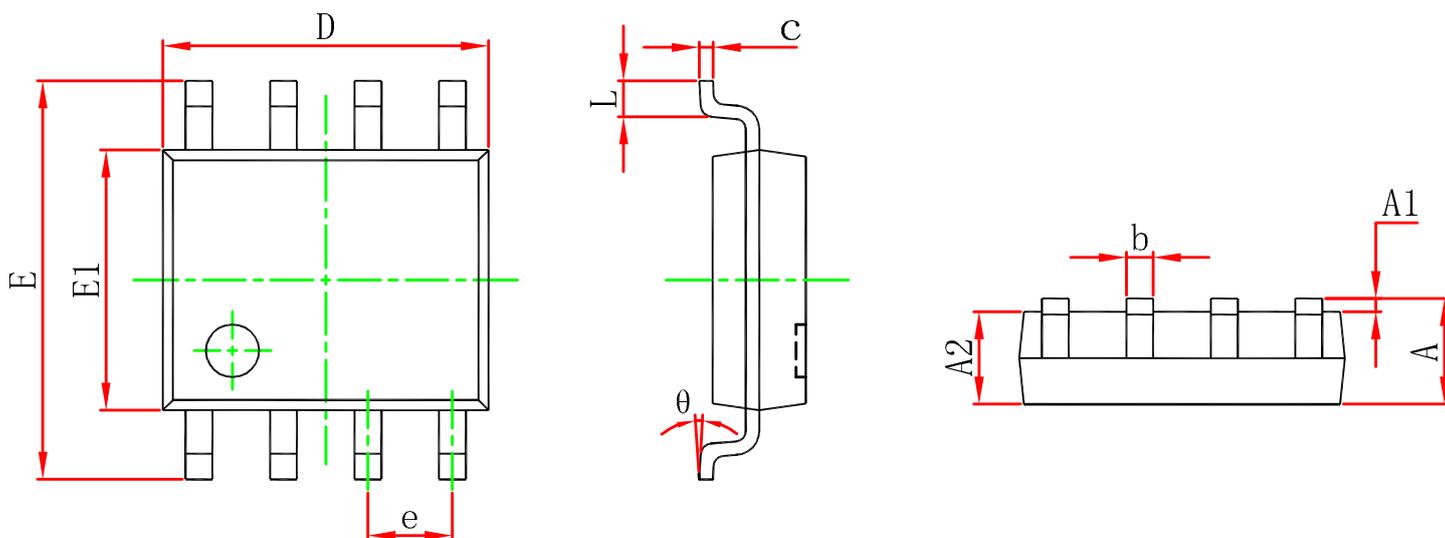
Reel



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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