SZCJ

Shenzhen Changji Semiconductor Co., LTD.

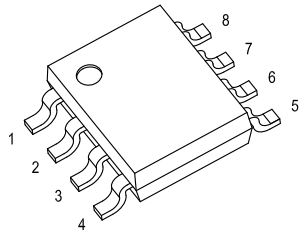
JSCJ

# SOP8 Plastic-Encapsulate MOSFETS

## CJQ014SN06AL N-Channel Power MOSFET

| $V_{(BR)DSS}$ | $R_{DS(on)}$TYP | $I_D$ |
|---|---|---|
| 60 | 9.4mΩ@10V | 12A |
| | 13.3mΩ@4.5V | |

SOP8



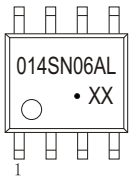

### DESCRIPTION

The CJQ014SN06AL uses shielded gate trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

### APPLICATIONS

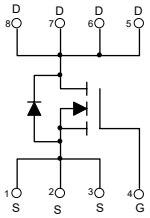
- High side switch in SMPS
- Load Switch

### MARKING




014SN06AL = Device code
Solid dot = Green molding compound device, if none, the normal device
XX = Code

### Equivalent Circuit




### MAXIMUM RATINGS ( $T_a$=25℃ unless otherwise noted )

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $I_D$ ① | 12 | A |
| Pulsed Drain Current | $I_{DM}$ ② | 42 | A |
| Single Pulsed Avalanche Energy | $E_{AS}$ ③ | 31 | mJ |
| Power Dissipation | $P_D$ ⑥ | 2.3 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ ⑥ | 55 | ℃/W |
| Operating Junction and Storage Temperature Range | $T_J$ ,$T_{stg}$ | -55~+150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS

**$T_a$=25℃ unless otherwise specified**

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Off characteristics** | | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)\,DSS}$ | $V_{GS}$ = 0V, $I_D$ =250uA | | 60 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =60V, $V_{GS}$ =0V | $T_J$ =25℃ | | | 1.0 | μA |
| | | | $T_J$ =125℃ | | | 50 | |
| Gate-body leakage current | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±20V | | | | ±100 | nA |
| **On characteristics** ④ | | | | | | | |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250uA | | 1.3 | 1.8 | 2.5 | V |
| Static drain-source on-sate resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =12A | | | 9.4 | 11.5 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =10A | | | 13.3 | 16.5 | mΩ |
| **Dynamic characteristics** ④⑤ | | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ =30V,$V_{GS}$ =0V, f =1MHz | | | 960 | | pF |
| Output capacitance | $C_{oss}$ | | | | 406 | | |
| Reverse transfer capacitance | $C_{rss}$ | | | | 32.5 | | |
| Gate resistance | $R_g$ | f =1MHz | | | 1.2 | | Ω |
| **Switching characteristics** ④⑤ | | | | | | | |
| Total gate charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=30V, $I_D$=10A | | | 18.2 | | nC |
| Gate-source charge | $Q_{gs}$ | | | | 2.9 | | |
| Gate-drain charge | $Q_{gd}$ | | | | 4.6 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DS}$=30V,$I_D$=10A , $V_{GS}$=10V,$R_G$=10Ω | | | 6.7 | | ns |
| Turn-on rise time | $t_r$ | | | | 4.2 | | |
| Turn-off delay time | $t_{d(off)}$ | | | | 27.8 | | |
| Turn-off fall time | $t_f$ | | | | 14.9 | | |
| **Drain-Source Diode Characteristics** | | | | | | | |
| Drain-source diode forward voltage | $V_{SD}$ ④ | $V_{GS}$ =0V, $I_S$=14A | | | 0.83 | 1.0 | V |
| Continuous drain-source diode forward current | $I_S$ ① | | | | | 12 | A |
| Pulsed drain-source diode forward current | $I_{SM}$ ② | | | | | 42 | A |
| Reverse recovery time | trr | $di_S/dt$ = 100A/μs, $I_S$ = 12A, $V_{DD}$ =30V | | | 31.4 | | ns |
| Reverse recovery charge | Qrr | | | | 17.1 | | nC |

Notes:

1.$T_C$=25℃ Limited only by maximum temperature allowed.

2.$P_W$≤10μs, Duty cycle≤1%.

3.EAS condition: $V_{DD}$=40V,$V_{GS}$=10V, L=0.1mH, $R_g$=25Ω Starting $T_J$ = 25°℃.

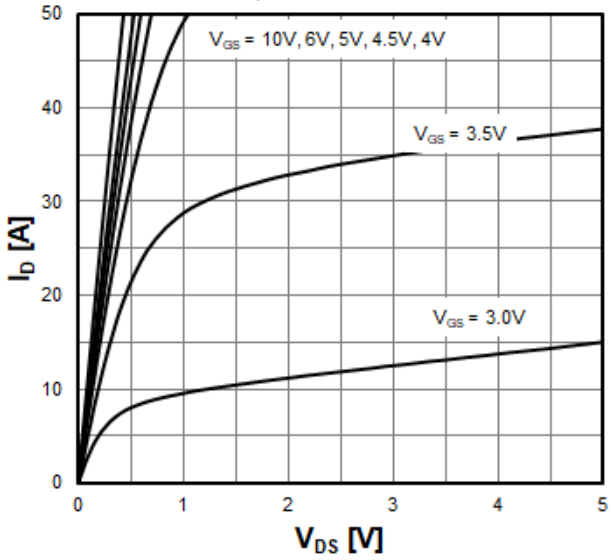
4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

5.Guaranteed by design, not subject to production.

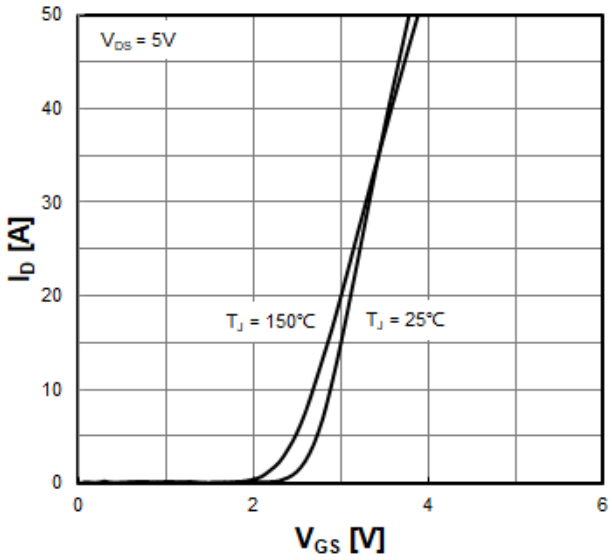
6.The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a$=25℃,t ≤10sec.

## Typical Characteristics

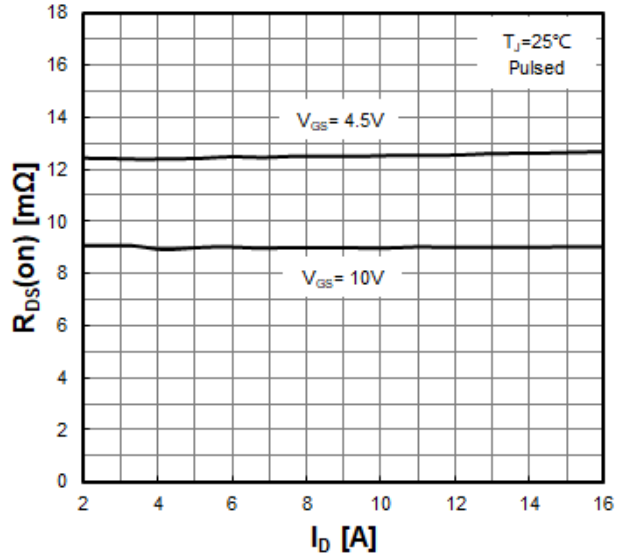
**Output Characteristics**



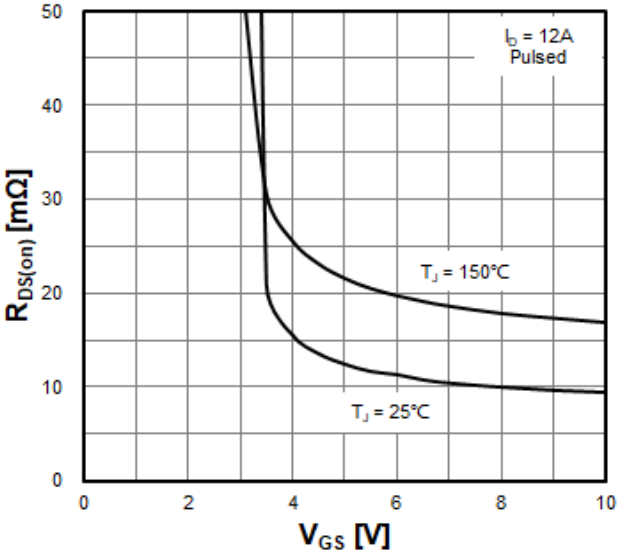

**Transfer Characteristics**



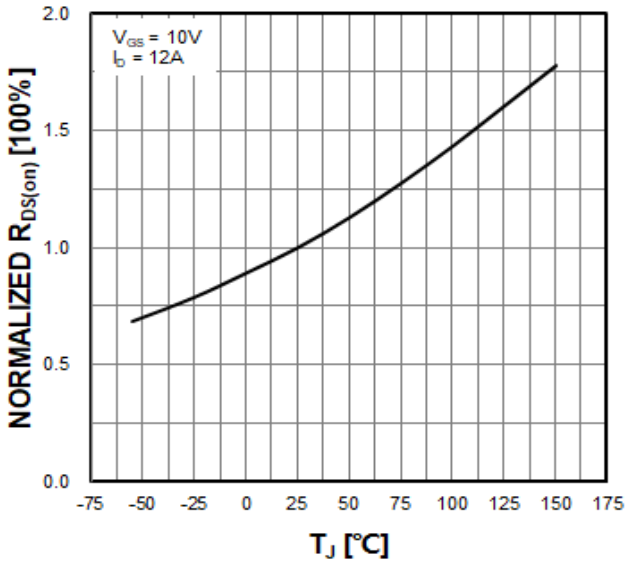

**$R_{DS(ON)}$ —— $I_D$**



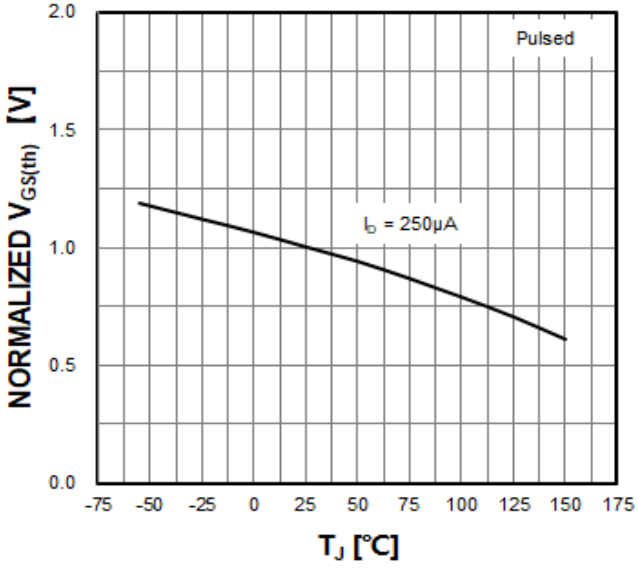

**$R_{DS(ON)}$—— $V_{GS}$**




**$R_{DS(ON)}$—— $T_J$**

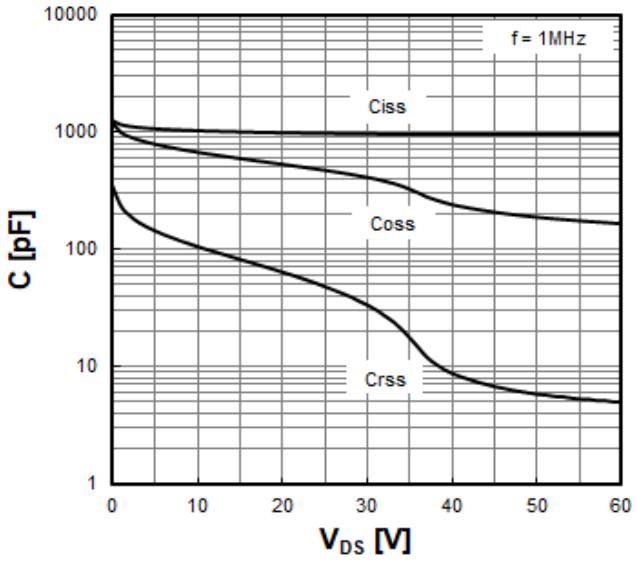



**Threshold Voltage**

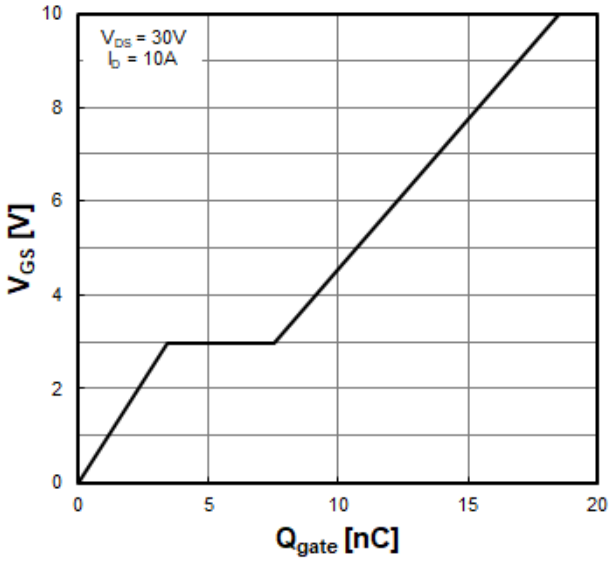


## Typical Characteristics

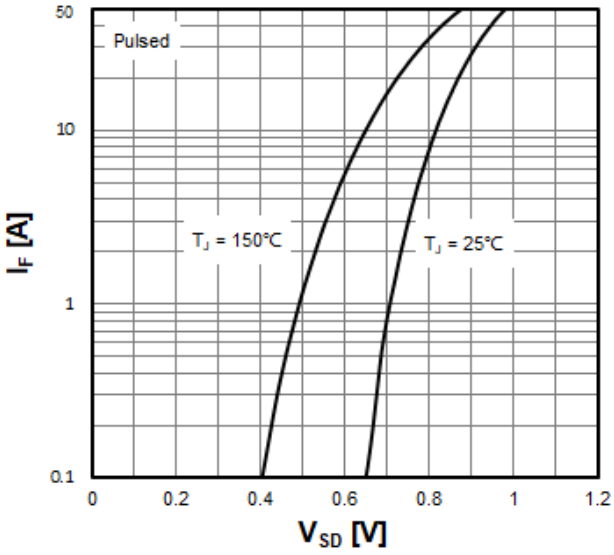
**Capacitances**



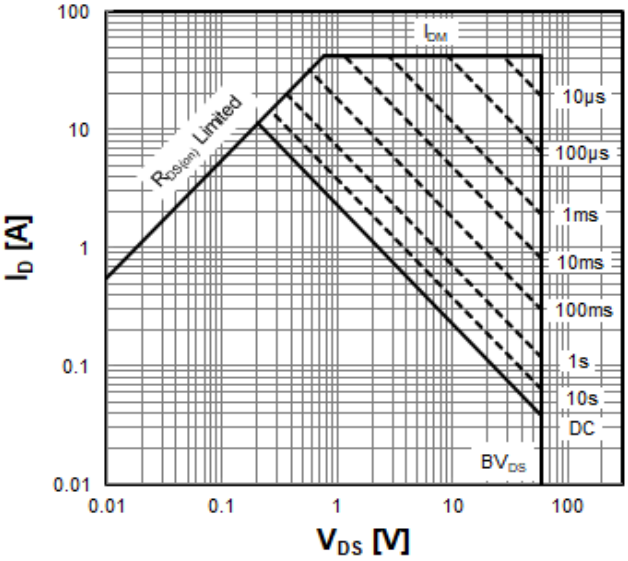

**Gate Charge**



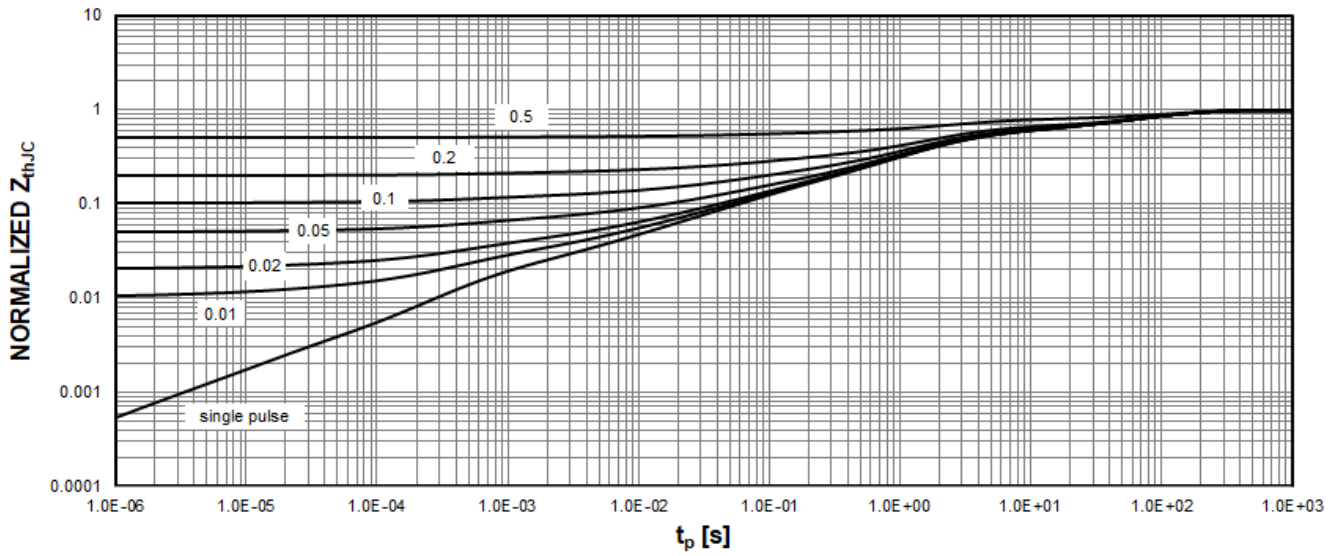

**$I_S$ —— $V_{SD}$**



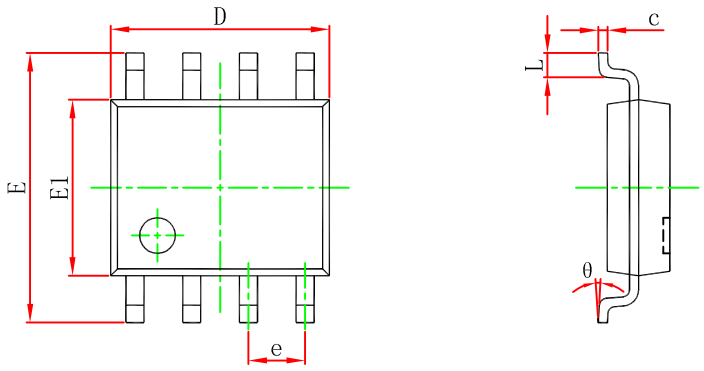

**Maximum Safe Operating Area**

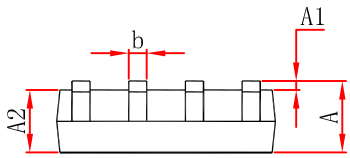



**Transient Thermal Impedance, Junction-Ambient**



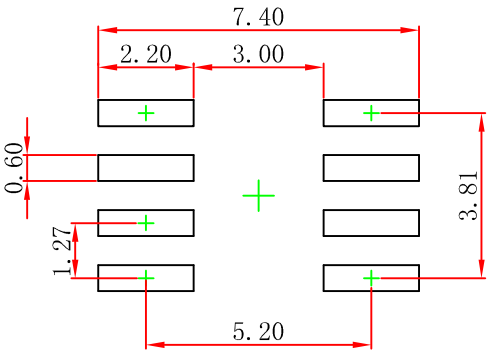
## SOP8 Package Outline Dimensions




| 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° |

## SOP8 Suggested Pad Layout



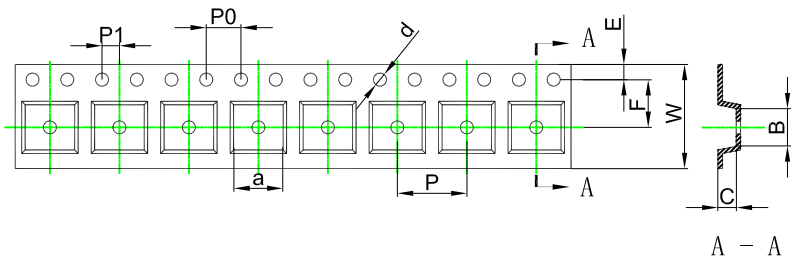

Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

NOTICE

SZCJ reserves the right to make modifications,enhan nts,improvements,corrections or other es without further notice to any product herein. SZCJ does not assume any liability arising out of the application or use of any product described h

## SOP8 Tape and Reel

### SOP8 Embossed Carrier Tape



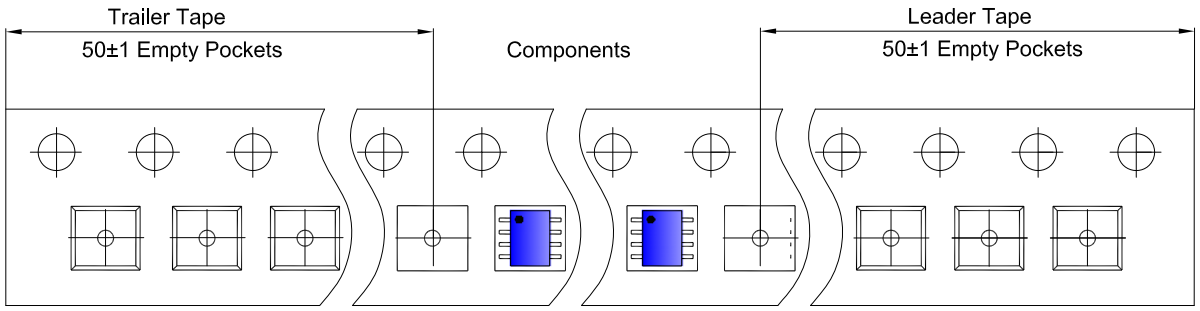

Packaging Description:

SOP8 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 4,000 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

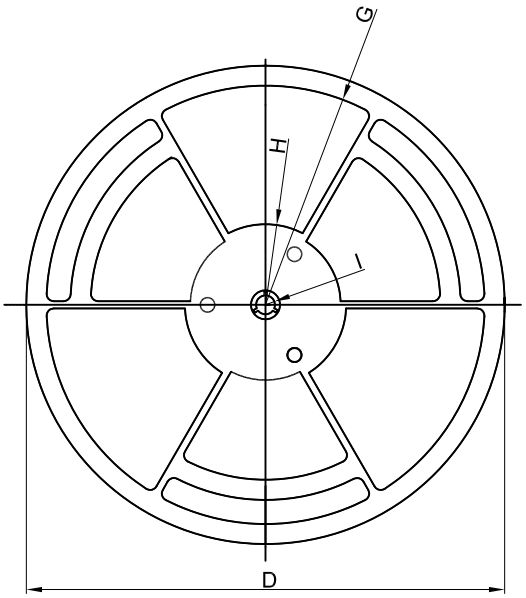
ALL DIM IN mm

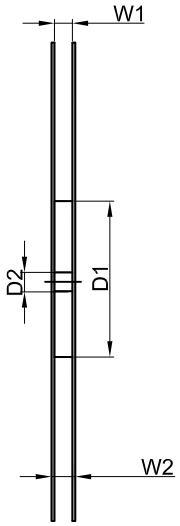
| Dimensions are in millimeter | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pkg type | a | B | C | d | E | F | P0 | P | P1 | W |
| SOP8 | 6.40 | 5.40 | 2.10 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

### SOP8 Tape Leader and Trailer




### SOP8 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) |
|---|---|---|---|---|---|---|
| 4,000 pcs | 13 inch | 8,000 pcs | 360×360×65 | 4,0000 pcs | 378×358×382 | |