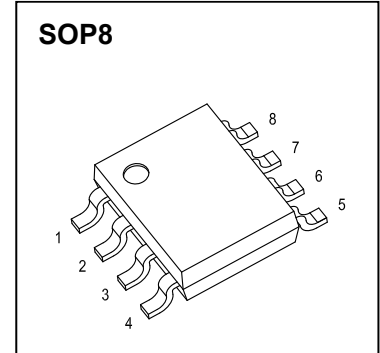




## SOP8 Plastic-Encapsulate MOSFETS

### CJQ9R9SN065AL N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
65V	7.5mΩ@10V	11A
	8.4mΩ@6V	
	9.7mΩ@4.5V	



#### DESCRIPTION

The CJQ9R9SN065AL uses SGT technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

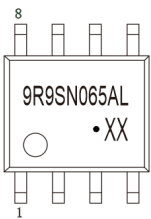
#### FEATURES

- High density cell design for ultra low  $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

#### APPLICATIONS

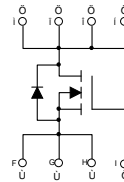
- Battery and loading switching

#### MARKING



9R9SN065AL = Part No.  
 Solid dot = Pin1 indicator.  
 XX = Code.

#### EQUIVALENT CIRCUIT



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	65	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$ ①	11	A
Pulsed Drain Current	$I_{DM}$ ①②	44	A
Single Pulsed Avalanche Energy	$E_{AS}$ ③	100	mJ
Power Dissipation	$P_D$ ①	2.6	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$ ⑤	48	°C/W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	°C

# MOSFET ELECTRICAL CHARACTERISTICS

$T_J=25^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
<b>Off characteristics</b>							
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	65	-	-	V	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 52V, V_{GS} = 0V$	$T_J = 25^\circ\text{C}$	-	-	1.0	$\mu A$
			$T_J = 125^\circ\text{C}$	-	-	100	
Gate-body leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA	
<b>On characteristics</b> <sup>④</sup>							
Gate-threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.3	1.7	2.5	V	
Static drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	-	7.5	9.9	m $\Omega$	
		$V_{GS} = 6V, I_D = 10A$	-	8.4	12	m $\Omega$	
		$V_{GS} = 4.5V, I_D = 8A$	-	9.7	15	m $\Omega$	
<b>Dynamic characteristics</b>							
Input capacitance	$C_{iss}$	$V_{DS} = 30V, V_{GS} = 0V, f = 1\text{MHz}$	-	1180	-	$\mu F$	
Output capacitance	$C_{oss}$		-	554	-		
Reverse transfer capacitance	$C_{rss}$		-	14.6	-		
Gate resistance	$R_g$	$f = 1\text{MHz}$	-	2.0	-	$\Omega$	
<b>Switching characteristics</b>							
Total gate charge	$Q_g$	$V_{GS} = 4.5V, V_{DD} = 30V, I_D = 10A$	-	11.8	-	nC	
Total gate charge	$Q_g$	$V_{GS} = 10V, V_{DD} = 30V, I_D = 10A$	-	23	-		
Gate-source charge	$Q_{gs}$		-	1.9	-		
Gate-drain charge	$Q_{gd}$		-	5.0	-		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, V_{GS} = 10V, R_L = 5\Omega, R_g = 10\Omega$	-	6.7	-	ns	
Turn-on rise time	$t_r$		-	25.2	-		
Turn-off delay time	$t_{d(off)}$		-	19.7	-		
Turn-off fall time	$t_f$		-	8.7	-		
<b>Drain-Source Diode Characteristics</b>							
Drain-source diode forward voltage	$V_{SD}$ <sup>④</sup>	$V_{GS} = 0V, I_S = 10A$	-	-	1.0	V	
Continuous drain-source diode forward current	$I_S$ <sup>①</sup>		-	-	11	A	
Pulsed drain-source diode forward current	$I_{SM}$ <sup>①②</sup>		-	-	44	A	
Reverse recovery time	$t_{rr}$	$di_S/dt = 100A/\mu s, I_S = 10A, V_{DD} = 30V$	-	35	-	ns	
Reverse recovery charge	$Q_{rr}$		-	37	-	nC	

Notes:

1.  $T_C = 25^\circ\text{C}$ .

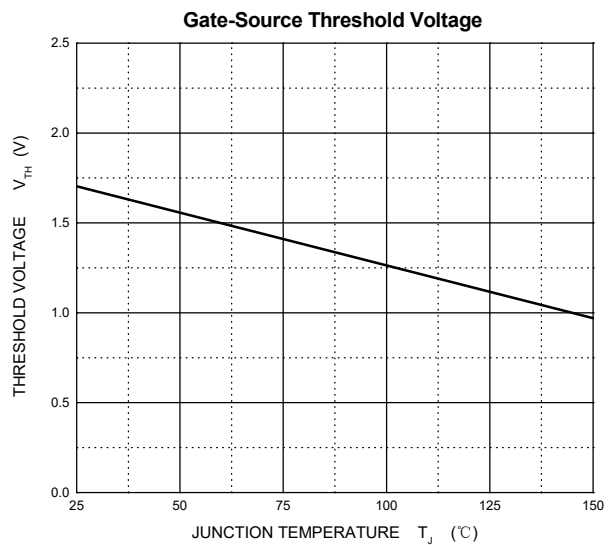
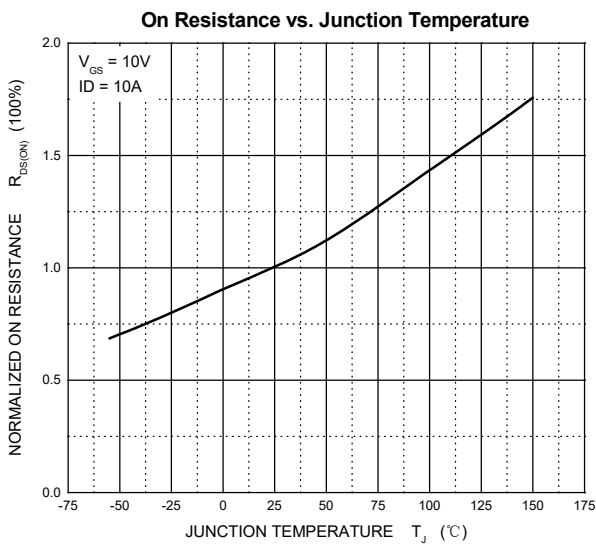
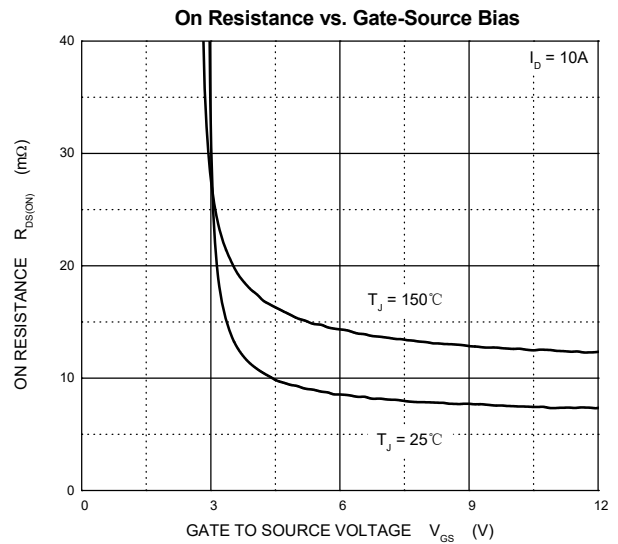
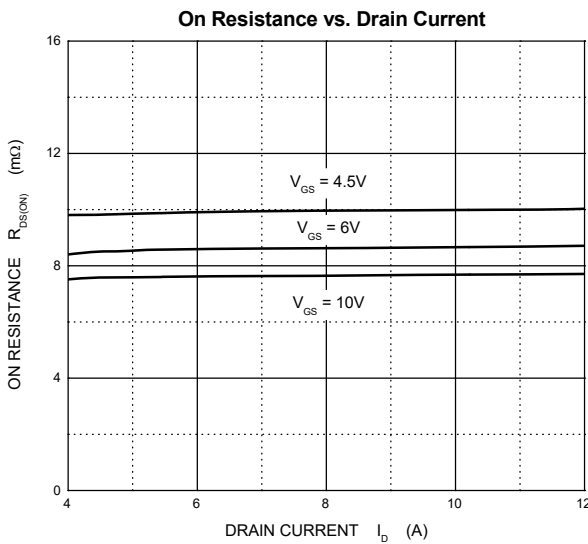
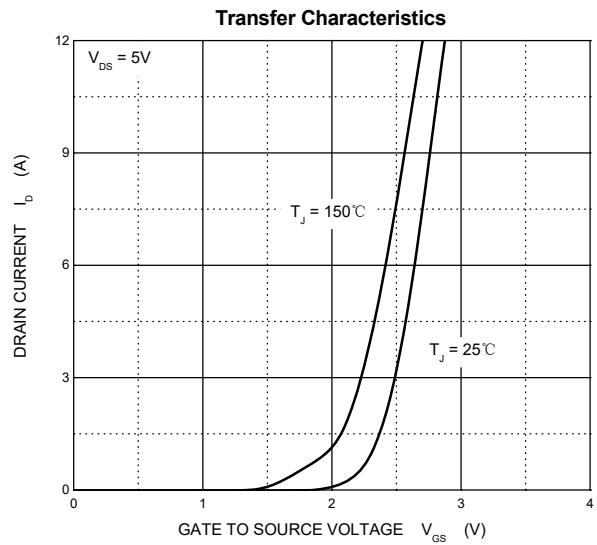
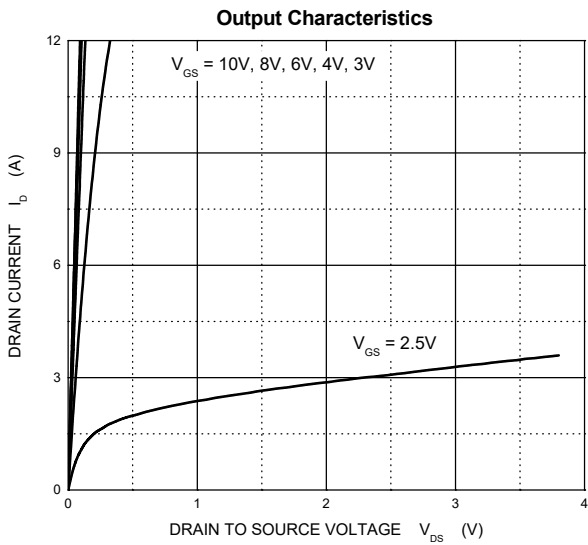
2. Limited only by maximum temperature allowed.

3.  $V_{DD} = 30V, V_{GS} = 10V, L = 0.5\text{mH}, R_g = 25\Omega$  Starting  $T_J = 25^\circ\text{C}$ .

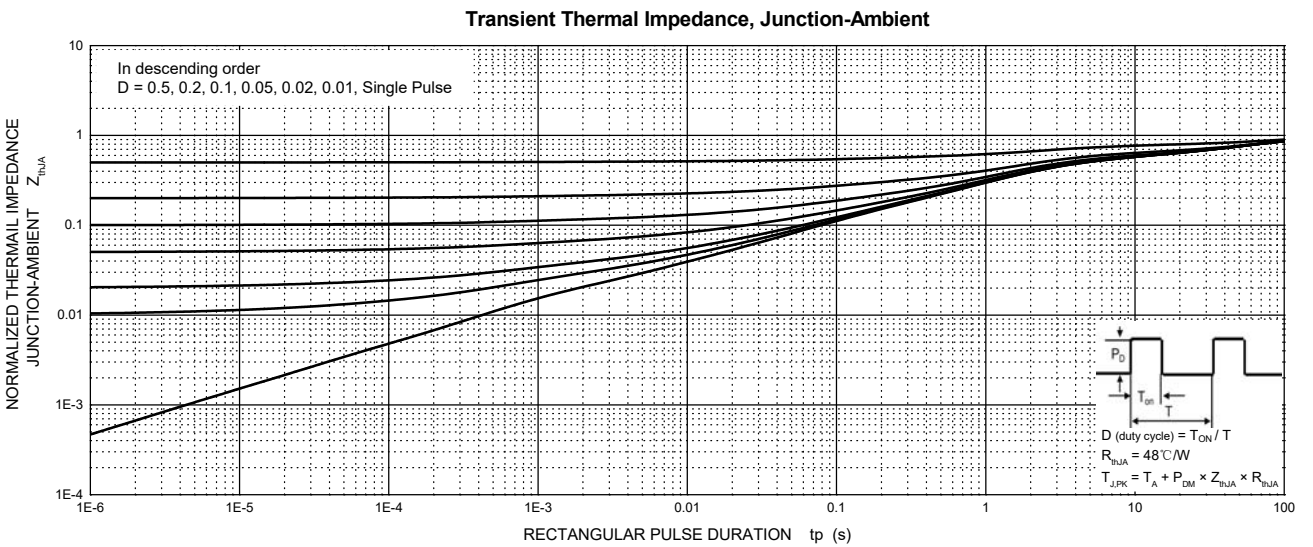
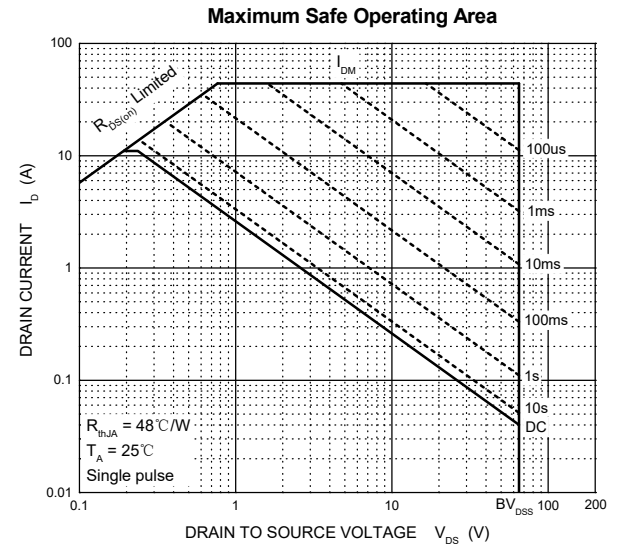
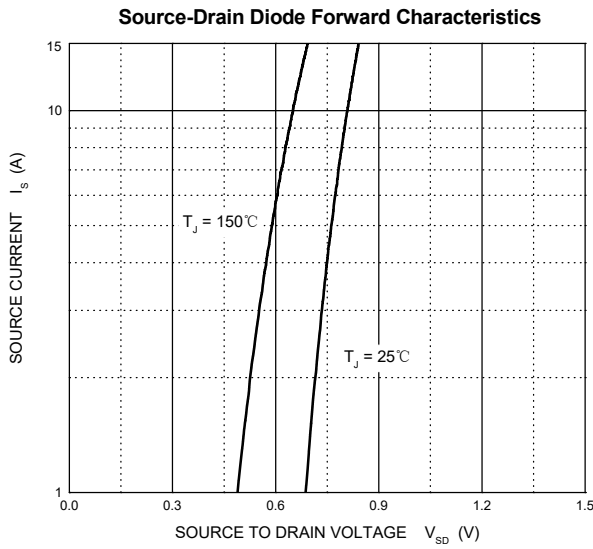
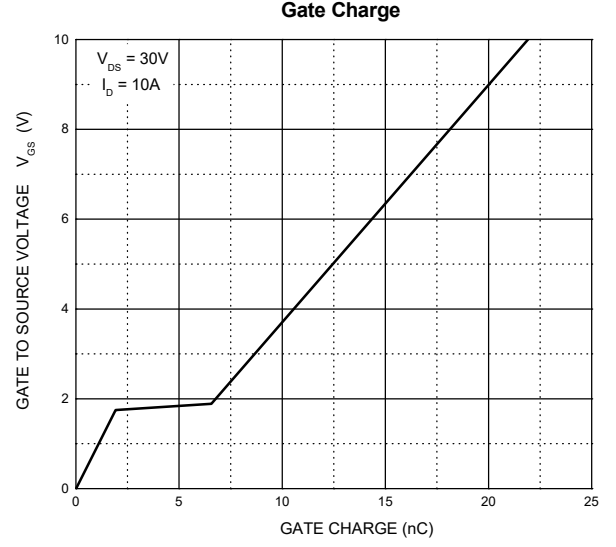
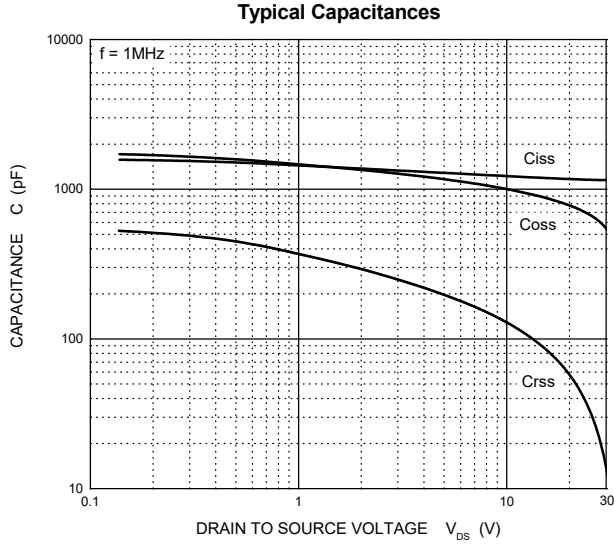
4. Pulse Test : Pulse Width  $\leq 380\mu s$ , duty cycle  $\leq 2\%$ .

5. Device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. single-sided Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

# Typical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)



# Typical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

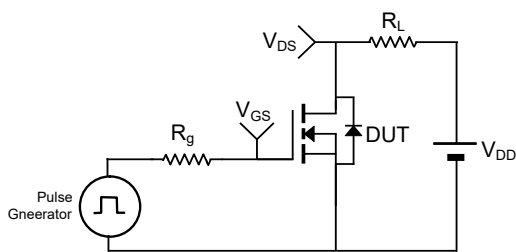


# TEST CIRCUIT AND WAVEFORMS

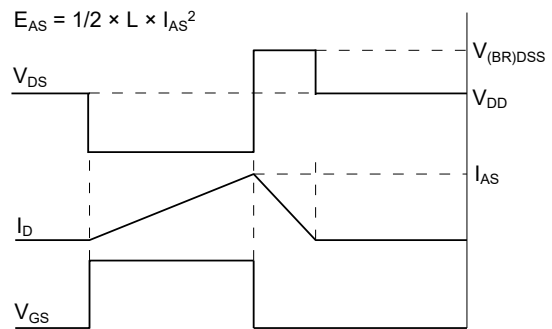
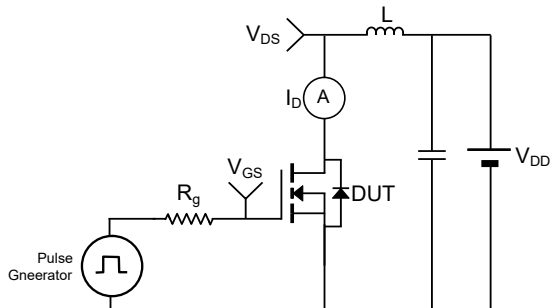
## Gate Charge



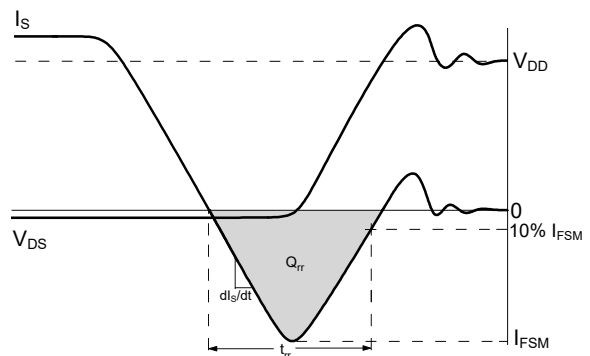
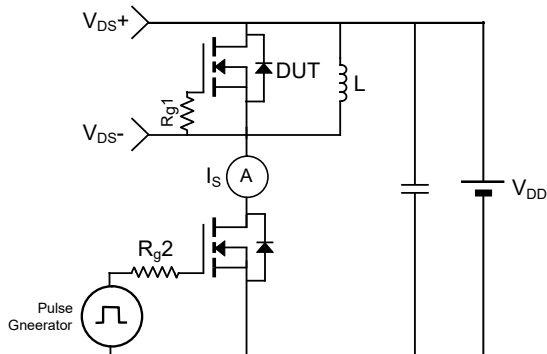
## Resistive Load Switching Time



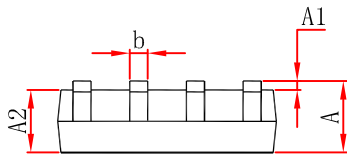
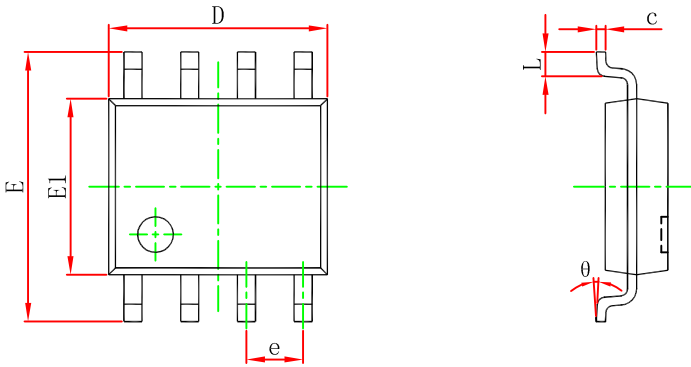
## Un-clamped Inductive Load Switching



## Drain-Source Body Diode Reverse Recovery

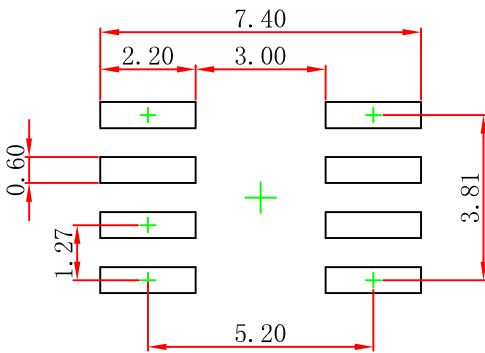


## SOP8 Package Outline Dimensions



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:

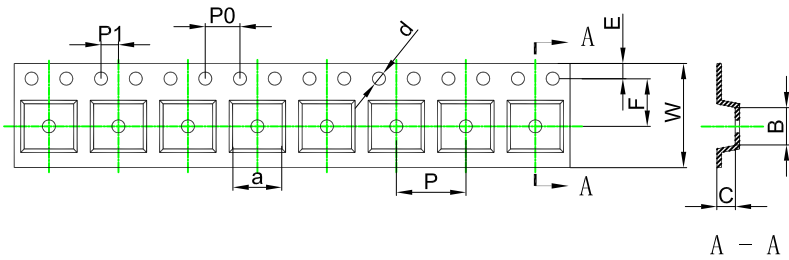
1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

### NOTICE

JSCJ reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. JSCJ does not assume any liability arising out of the application or use of any product described herein.

# SOP8 Tape and Reel

## SOP8 Embossed Carrier Tape



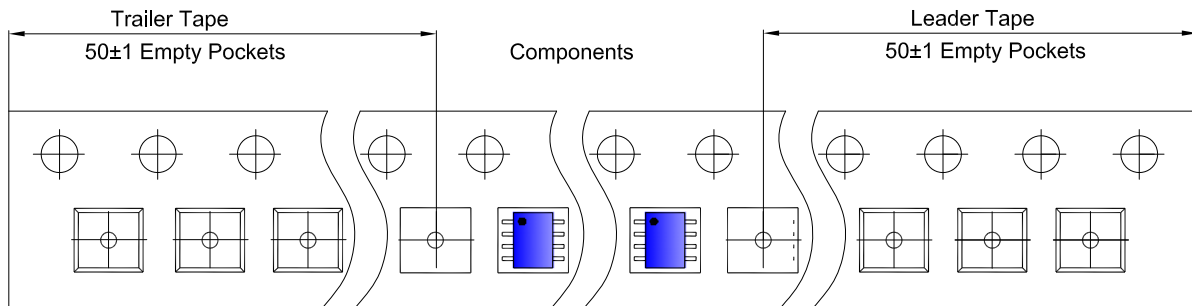
### Packaging Description:

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 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

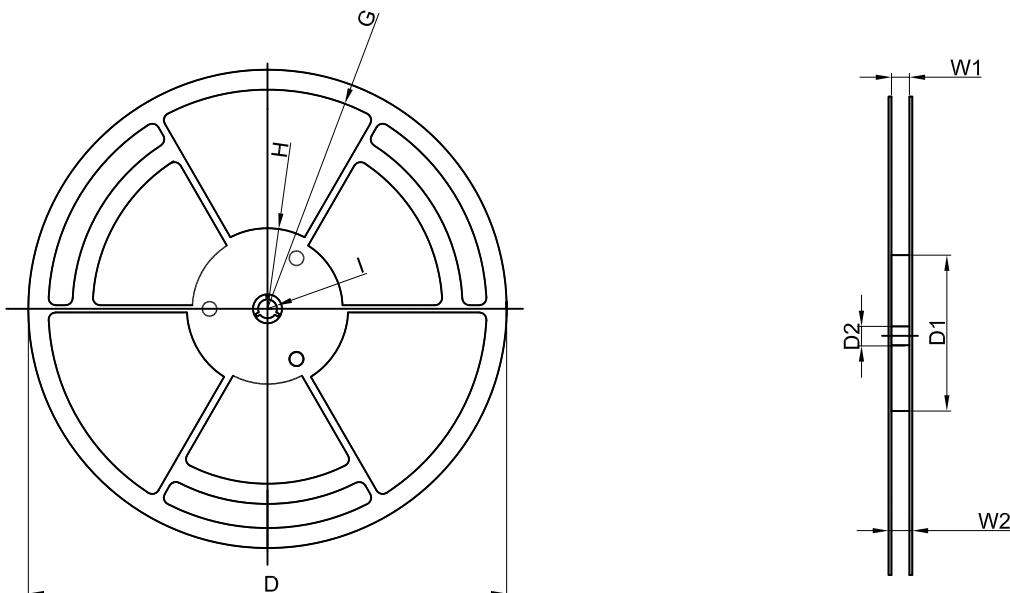
ALL DIM IN mm

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	