



# ALPHA & OMEGA

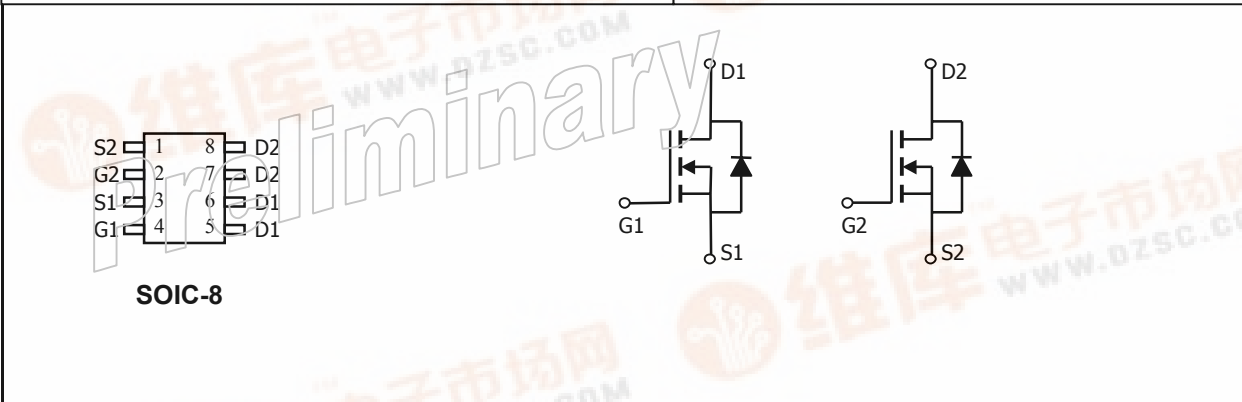
## SEMICONDUCTOR, INC.

Jan 2003

### AO9926A

#### Dual N-Channel Enhancement Mode Field Effect Transistor

<p><b>General Description</b></p> <p>The AO9926A uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math> and low gate charge. They offer operation over a wide gate drive range from 1.8V to 8V. The two devices may be used individually, in parallel or to form a bidirectional blocking switch.</p>	<p><b>Features</b></p> <p><math>V_{DS}</math> (V) = 20V  <math>I_D</math> = 7A  <math>R_{DS(ON)} &lt; 26m\Omega</math> (<math>V_{GS} = 4.5V</math>)  <math>R_{DS(ON)} &lt; 33m\Omega</math> (<math>V_{GS} = 2.5V</math>)  <math>R_{DS(ON)} &lt; 42m\Omega</math> (<math>V_{GS} = 1.8V</math>)</p>
---	---



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted			
Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current <sup>A</sup>	$I_D$	$T_A=25^\circ C$	7
		$T_A=70^\circ C$	6
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	40	A
Power Dissipation	$P_D$	$T_A=25^\circ C$	2
		$T_A=70^\circ C$	1.44
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

Thermal Characteristics					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$t \leq 10s$	$R_{\theta JA}$	48	62.5	$^\circ C/W$
	Steady-State		74	110	
Maximum Junction-to-Lead <sup>C</sup>	Steady-State	$R_{\theta JL}$	35	40	$^\circ C/W$



**AO9926A**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			1 5	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V			100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250μA	0.3	0.5	0.8	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =5V	30			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A		21.6	26	mΩ
		T <sub>J</sub> =125°C		29.2	36	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =5A		26.4	33	mΩ
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =4A		33.3	42	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =5A		22		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A		0.76	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				3	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1MHz		1050		pF
C <sub>OSS</sub>	Output Capacitance			163		pF
C <sub>rSS</sub>	Reverse Transfer Capacitance			129		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		4		Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, I <sub>D</sub> =7A		15.2		nC
Q <sub>gs</sub>	Gate Source Charge			1		nC
Q <sub>gd</sub>	Gate Drain Charge			4		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =5V, V <sub>DS</sub> =10V, R <sub>L</sub> =1.5Ω, R <sub>GEN</sub> =3Ω		6.5		ns
t <sub>r</sub>	Turn-On Rise Time			9		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			56.5		ns
t <sub>f</sub>	Turn-Off Fall Time			13.2		ns
t <sub>rr</sub>	Body Diode Reverse Recovery time	I <sub>F</sub> =5A, dI/dt=100A/μs		21		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery charge	I <sub>F</sub> =5A, dI/dt=100A/μs		7.1		nC

- A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the t<sub>s</sub> ≤ 10s thermal resistance rating.
- B: Repetitive rating, pulse width limited by junction temperature.
- C. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.
- D. The static characteristics in Figures 1 to 6 are obtained using 80μs pulses, duty cycle 0.5% max.
- E. These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

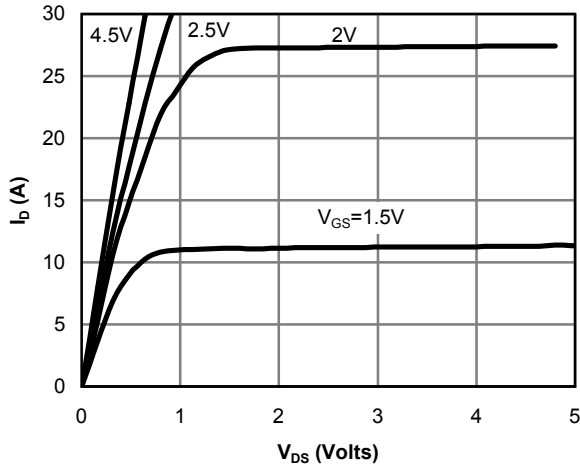


Fig 1: On-Region Characteristics

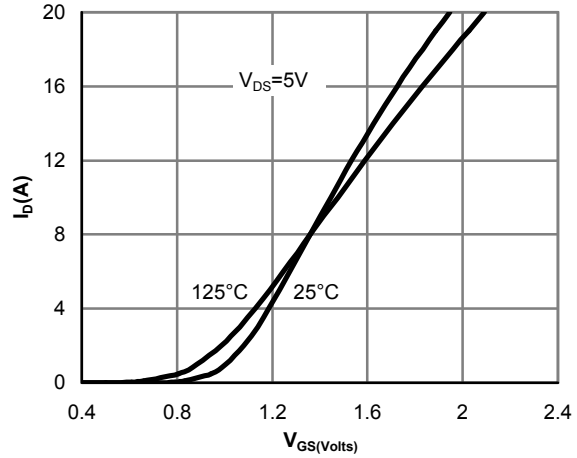


Figure 2: Transfer Characteristics

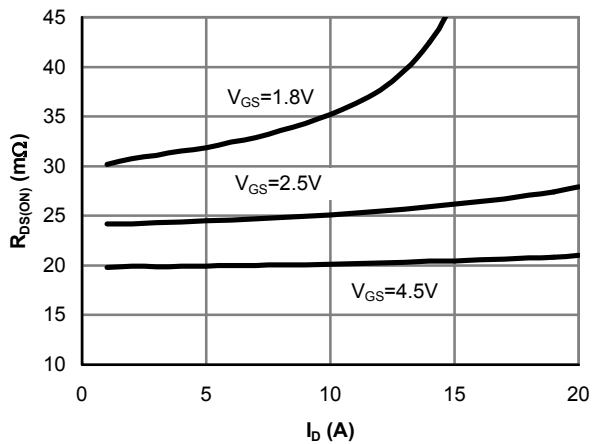


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

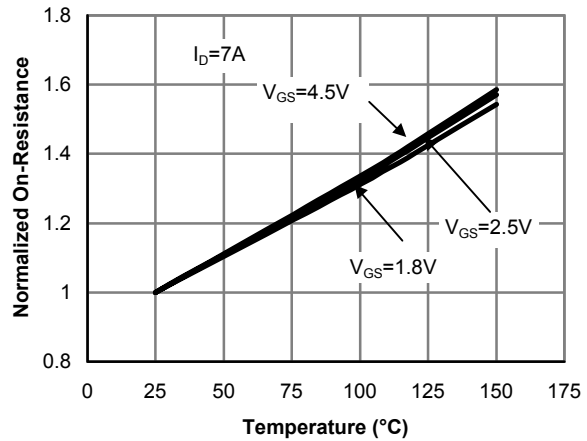


Figure 4: On-Resistance vs. Junction Temperature

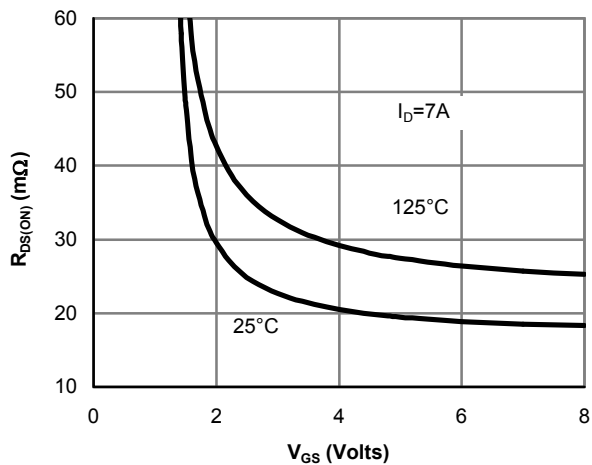


Figure 5: On-Resistance vs. Gate-Source Voltage

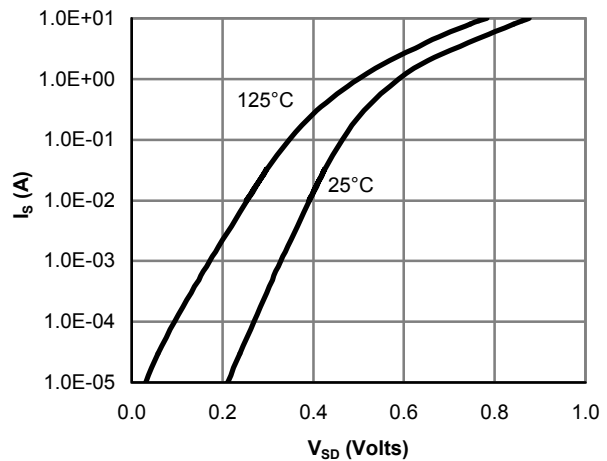


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

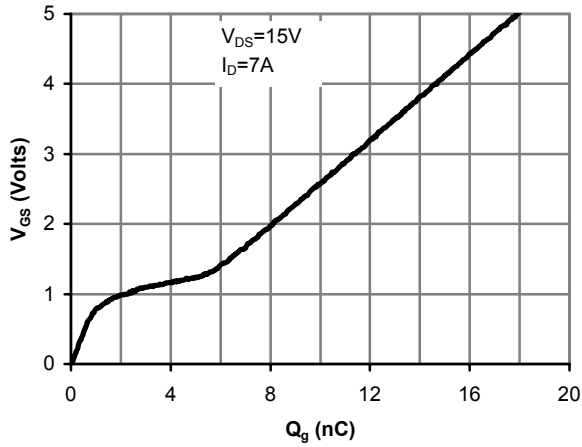


Figure 7: Gate-Charge Characteristics

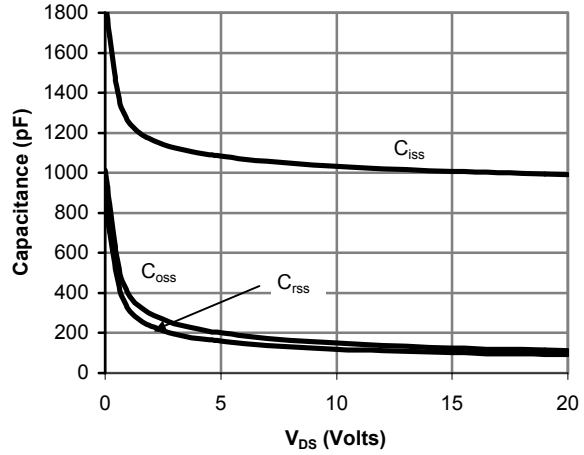


Figure 8: Capacitance Characteristics

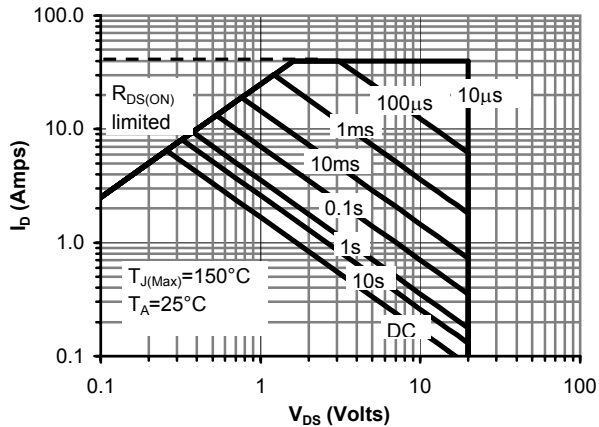


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

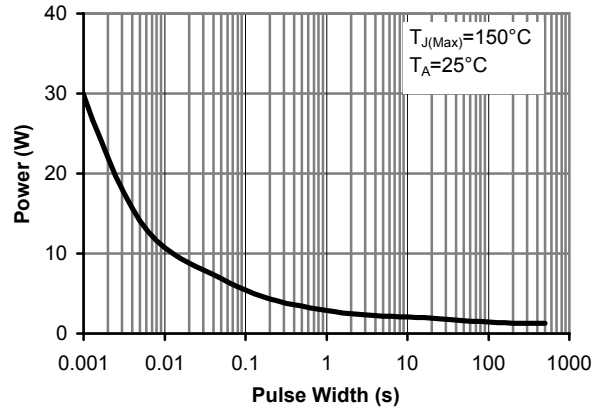


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

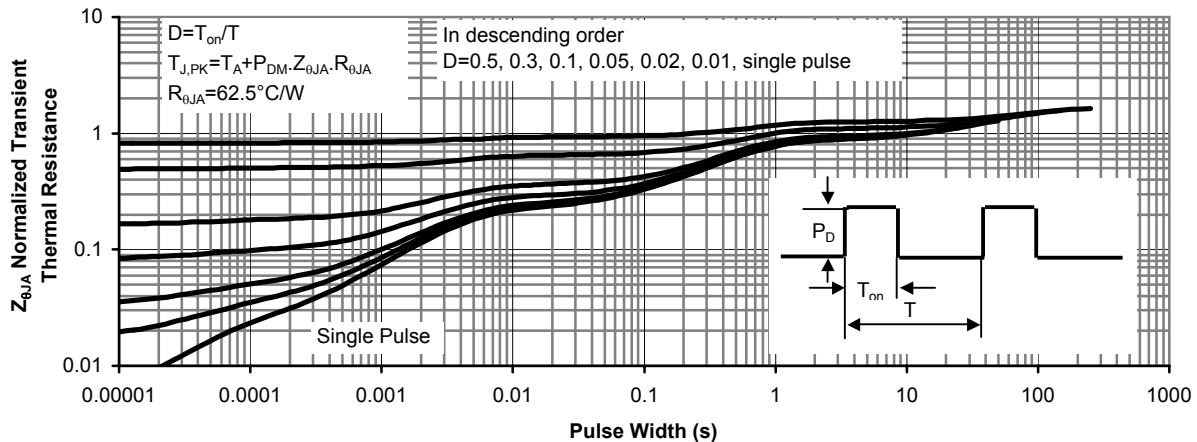
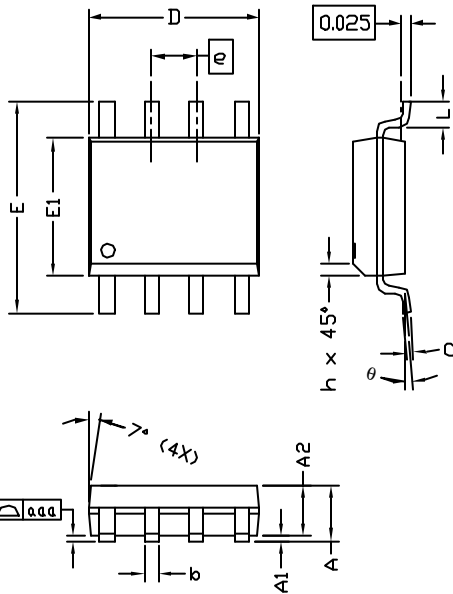


Figure 11: Normalized Maximum Transient Thermal Impedance



**ALPHA & OMEGA**  
SEMICONDUCTOR, INC.

## SO-8 Package Data



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.45	1.50	1.55	0.057	0.059	0.061
A1	0.00	---	0.10	0.000	---	0.004
A2	---	1.45	---	---	0.057	---
b	0.33	---	0.51	0.013	---	0.020
c	0.19	---	0.25	0.007	---	0.010
D	4.80	---	5.00	0.189	---	0.197
E1	3.80	---	4.00	0.150	---	0.157
e	1.27 BSC			0.050 BSC		
E	5.80	---	6.20	0.228	---	0.244
h	0.25	---	0.50	0.010	---	0.020
L	0.40	---	1.27	0.016	---	0.050
aaa	---	---	0.10	---	---	0.004
θ	0°	---	8°	0°	---	8°

- NOTE:
- LEAD FINISH: 150 MICROINCHES ( 3.8 um) MIN. THICKNESS OF Tin/Lead (SOLDER) PLATED ON LEAD
  - TOLERANCE ±0.10 mm (4 mil) UNLESS OTHERWISE SPECIFIED
  - COPLANARITY : 0.10 mm
  - DIMENSION L IS MEASURED IN GAGE PLANE

### PACKAGE MARKING DESCRIPTION

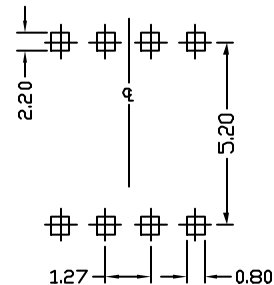


- NOTE:
- LOGO - AOS LOGO
  - 9926A - PART NUMBER CODE.
  - F - FAB LOCATION
  - A - ASSEMBLY LOCATION
  - Y - YEAR CODE
  - W - WEEK CODE.
  - L C - ASSEMBLY LOT CODE

### SO-8 PART NO. CODE

PART NO.	CODE
AO9926A	9926A

### RECOMMENDED LAND PATTERN



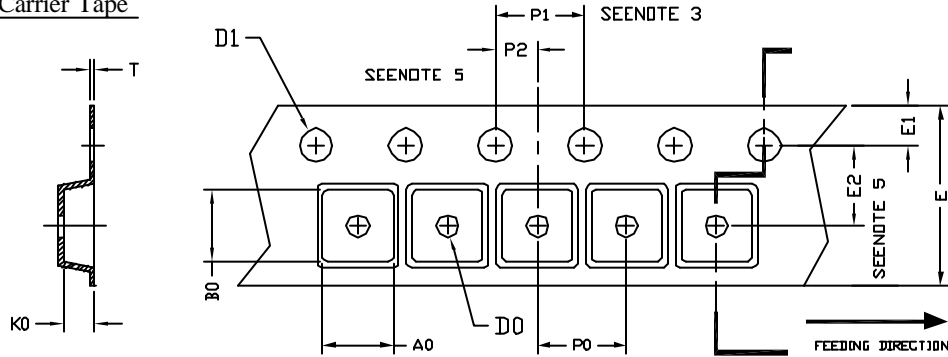
UNIT: mm



**ALPHA & OMEGA**  
SEMICONDUCTOR, INC.

## SO-8 Tape and Reel Data

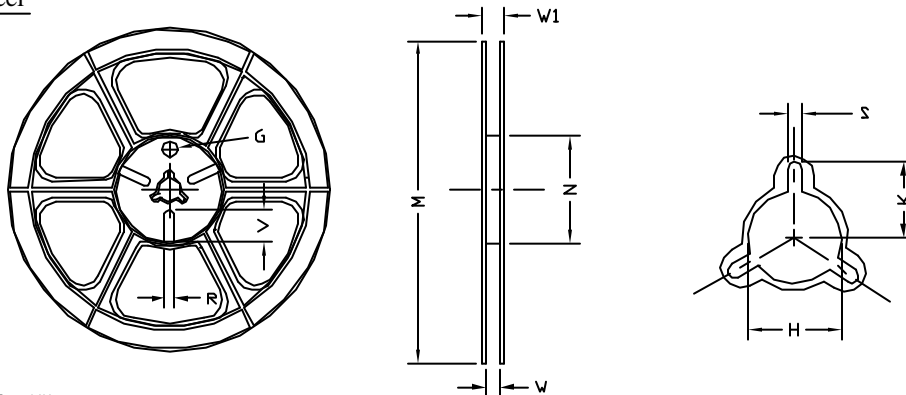
### SO-8 Carrier Tape



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SO-8 (12 nm)	6.40 ±0.10	5.20 ±0.10	2.10 ±0.10	1.60 ±0.10	1.30 ±0.10	12.00 ±0.30	1.75 ±0.10	5.50 ±0.05	8.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.25 ±0.05

### SO-8 Reel



UNIT: MM

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	ø330	ø330.00 ±0.50	ø97.00 ±0.10	13.00 ±0.30	17.40 ±1.00	ø13.00 +0.50 -0.20	10.60	2.00 ±0.50	---	---	---

### SO-8 Tape

Leader / Trailer  
& Orientation

