ALPHA & OMEGA SEMICONDUCTOR

AO4429
P-Channel Enhancement Mode Field Effect Transistor

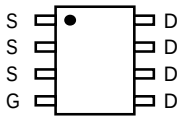
General Description

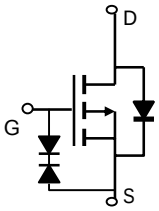
The AO4429 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge. This device is suitable for use as a load switch. The device is ESD protected. *Standard Product AO4429 is Pb-free (meets ROHS & Sony 259 specifications). AO4429L is a Green Product ordering option. AO4429 and AO4429L are electrically identical.*

Features

V_{DS} (V) = -30V
I_D = -15 A (V_{GS} = -10V)
Max $R_{DS(ON)}$ < 7.7mΩ (V_{GS} = -10V)
Max $R_{DS(ON)}$ < 12mΩ (V_{GS} = -4.5V)
ESD Rating: 4KV HBM

SOIC-8
Top View





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [A]	T_A=25°C	I_D	-15	A
	T_A=70°C		-12.8	
Pulsed Drain Current [B]		I_{DM}	-80	
Power Dissipation [A]	T_A=25°C	P_D	3.1	W
	T_A=70°C		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	26	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		50	75	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	14	24	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250µA, V_{GS}=0V	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V			-1	µA
		T_J=55°C			-10	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±20V			±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-1.4	-1.8	-2.7	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-15A		6.4	7.7	mΩ
		T_J=125°C		8.1		
		V_{GS}=-4.5V, I_D=-10A		9	12	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-15A		50		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.71	-1	V
I_S	Maximum Body-Diode Continuous Current				-5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		5355	6400	pF
C_{oss}	Output Capacitance			970		pF
C_{rss}	Reverse Transfer Capacitance			620		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.8	4	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-15V, I_D=-15A		91	120	nC
Q_g(4.5V)	Gate Charge			46	60	nC
Q_{gs}	Gate Source Charge			16		nC
Q_{gd}	Gate Drain Charge			21		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=1Ω, R_{GEN}=3Ω		15		ns
t_r	Turn-On Rise Time			15		ns
$t_{D(off)}$	Turn-Off DelayTime			82.5		ns
t_f	Turn-Off Fall Time			34		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-15A, dI/dt=100A/µs		38	50	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-15A, dI/dt=100A/µs		38		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =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≤ 10s thermal resistance rating.
B: Repetitive rating, pulse width limited by junction temperature.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
D. The static characteristics in Figures 1 to 6,12,14 are obtained using 80µs pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating. Rev2: August 2005

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

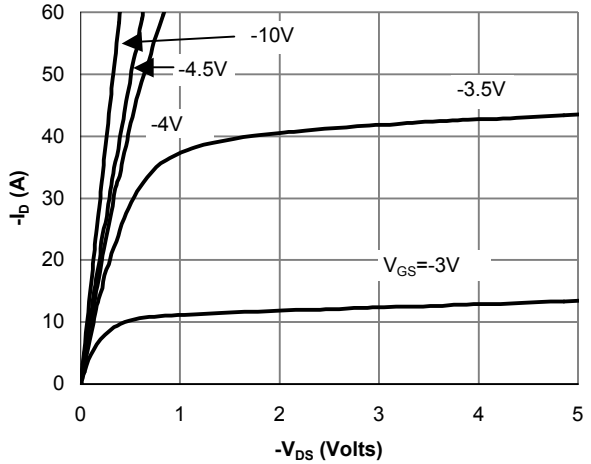


Fig 1: On-Region Characteristics

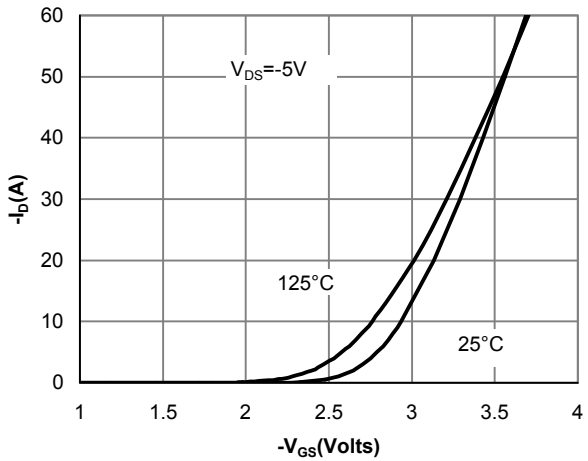


Figure 2: Transfer Characteristics

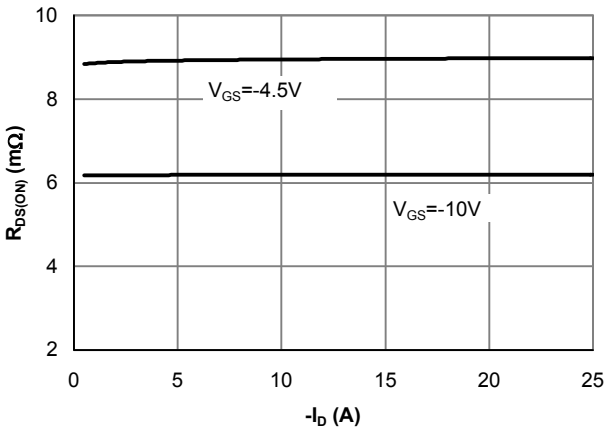


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

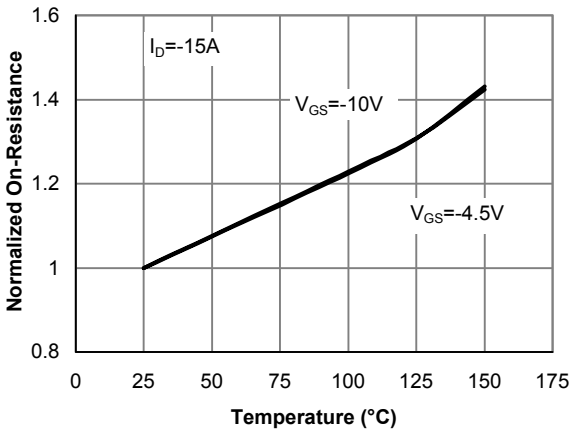


Figure 4: On-Resistance vs. Junction Temperature

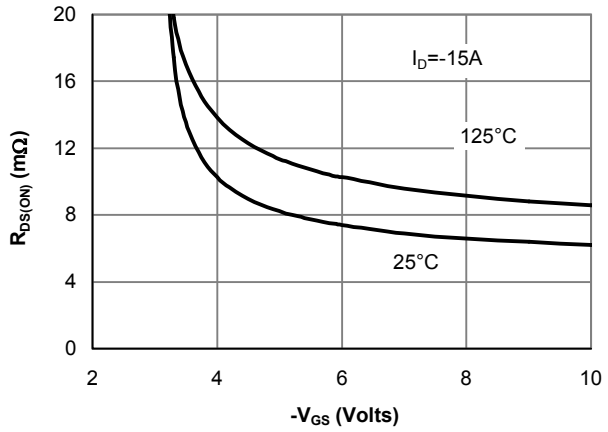


Figure 5: On-Resistance vs. Gate-Source Voltage

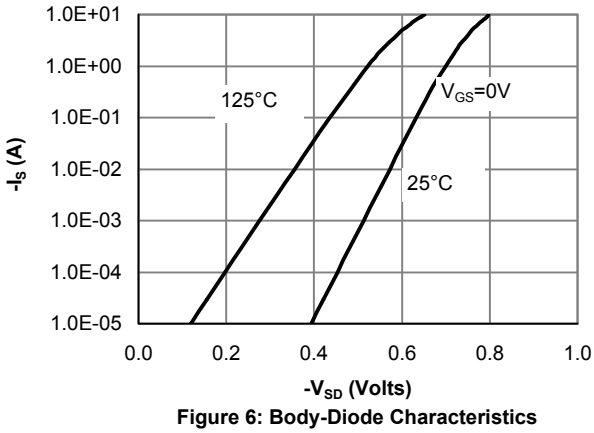


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

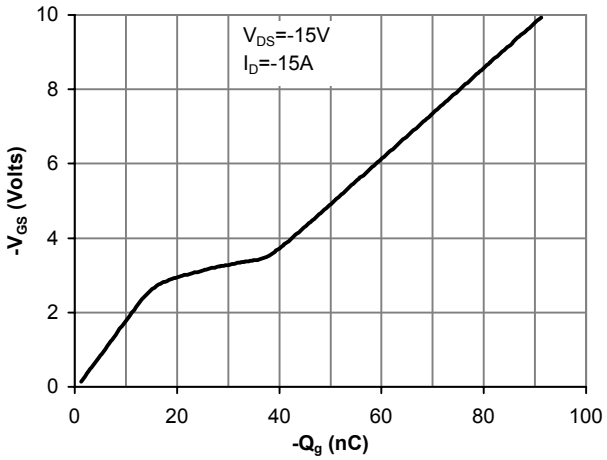


Figure 7: Gate-Charge Characteristics

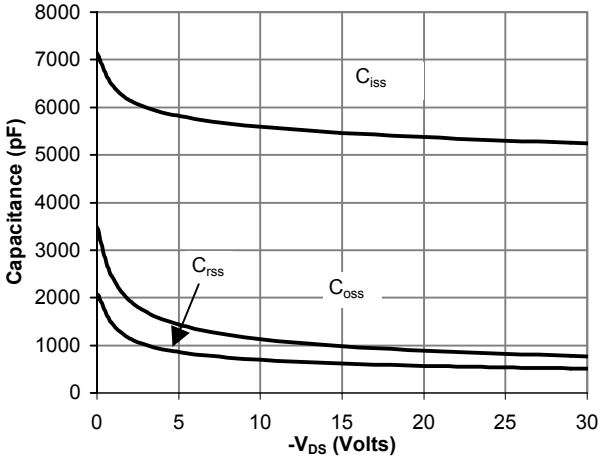


Figure 8: Capacitance Characteristics

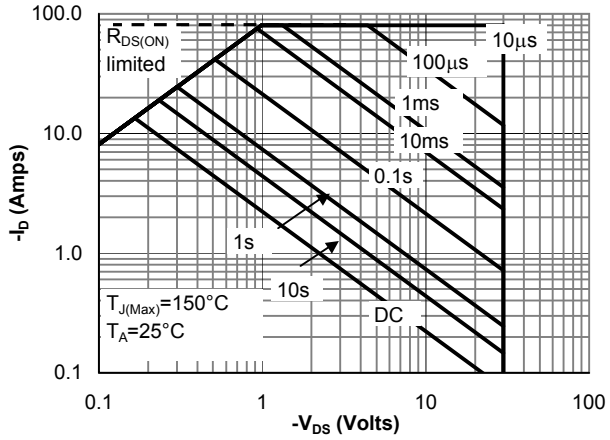


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

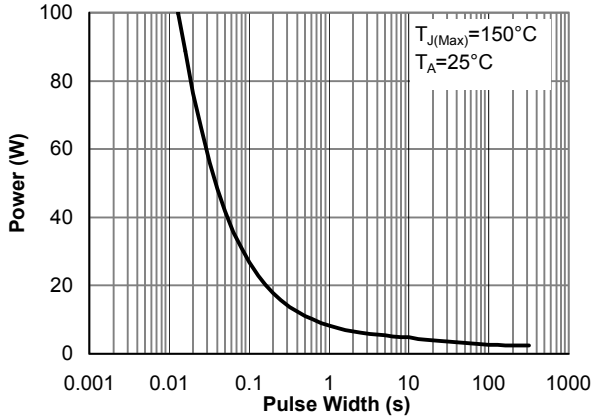


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

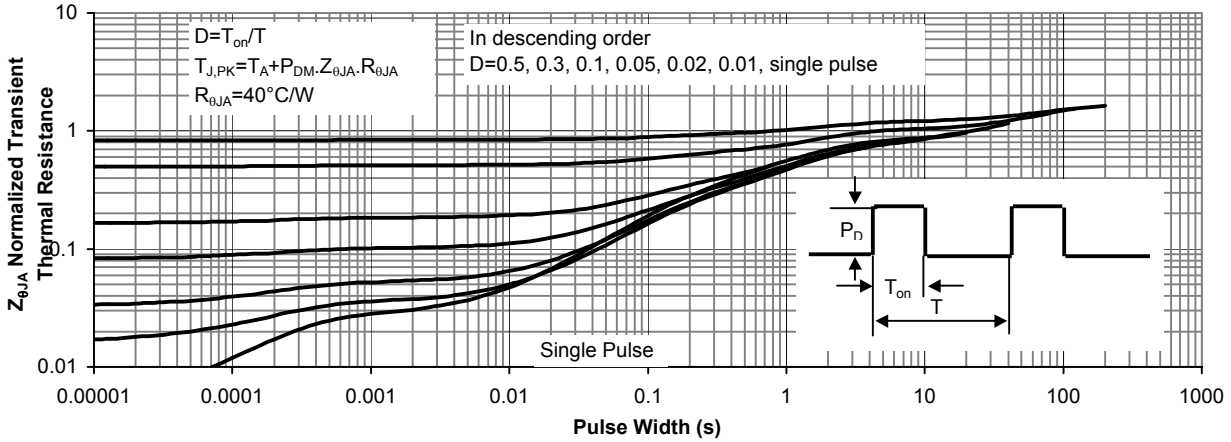
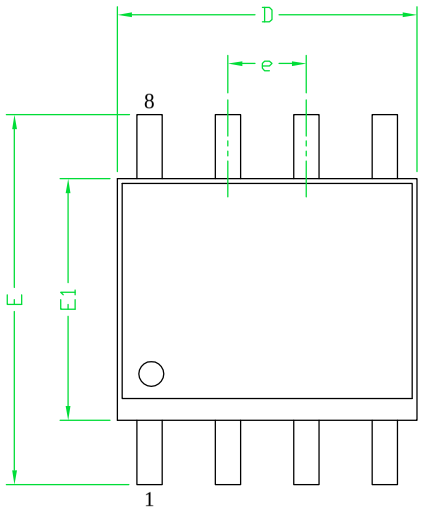
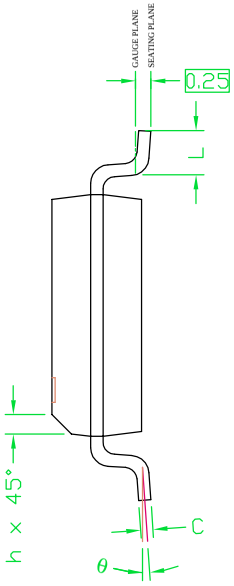
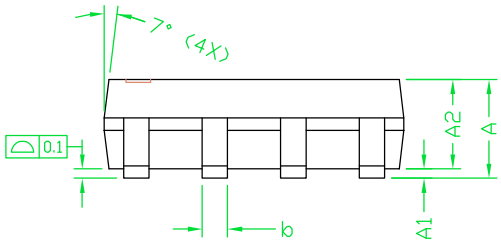


Figure 11: Normalized Maximum Transient Thermal Impedance



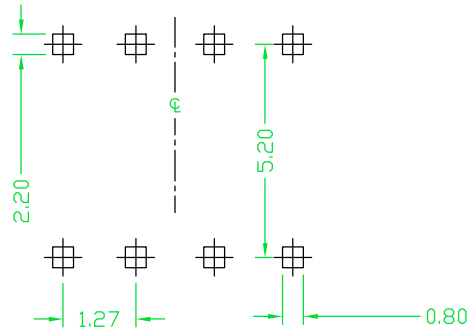




NOTE
1. ALL DIMENSIONS ARE IN MILLMETERS.
2.DIMENSIONS ARE INCLUSIVE OF PLATING.
3.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
4. DIMENSION L IS MEASURED IN GAUGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.65	1.75	0.053	0.065	0.069
A1	0.10	——	0.25	0.004	——	0.010
A2	1.25	1.50	1.65	0.049	0.059	0.065
b	0.31	——	0.51	0.012	——	0.020
c	0.17	——	0.25	0.007	——	0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27 BSC			0.050 BSC		
E	5.80	6.00	6.20	0.228	0.236	0.244
h	0.25	——	0.50	0.010	——	0.020
L	0.40	——	1.27	0.016	——	0.050
θ	0°	——	8°	0°	——	8°

RECOMMENDED LAND PATTERN



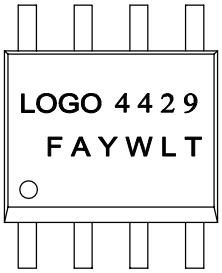
UNIT: mm

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMAL X.X ± X.XX ± X.XXX ± ANGULAR ± INTERPRET DIM AND TOL PER ASME Y14.5M – 1994 PRINTING IS SCALED TO FIT DO NOT SCALE DRAWING	THIRD ANGLE PROJECTION	ALPHA & OMEGA SEMICONDUCTOR, LTD.
	Document No.	PD–00004
	Version	rev C
	Title	SO–8 PACKAGE OUTLINE

Document No.	PD-00268
Version	rev A
Title	AO4429 Marking Description

ALPHA & OMEGA
SEMICONDUCTOR, LTD.

SO-8 PACKAGE MARKING DESCRIPTION



Standard product



Green product

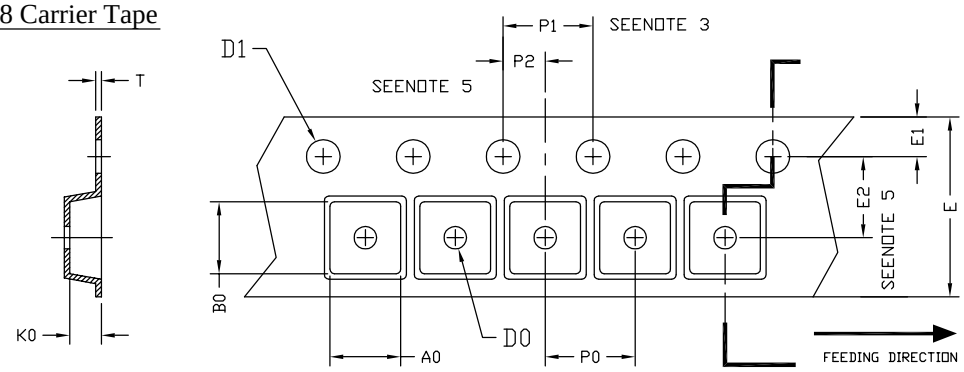
NOTE:
LOGO - AOS LOGO
4429 - PART NUMBER CODE.
F&A - FOUNDRY AND ASSEMBLY LOCATION
Y - YEAR CODE
W - WEEK CODE.
L T - ASSEMBLY LOT CODE

PART NO.	DESCRIPTION	CODE
AO4429	Standard product	4429
AO4429L	Green product	4429

ALPHA & OMEGA
SEMICONDUCTOR, LTD.

SOP-8 Tape and Reel Data

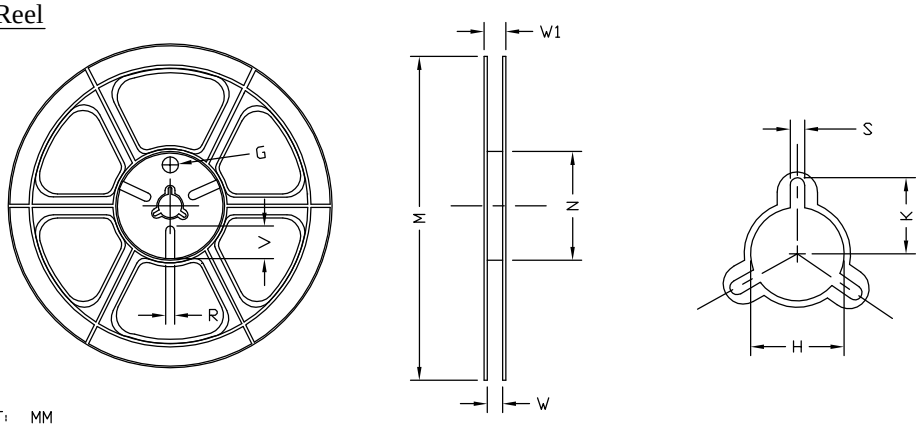
SOP-8 Carrier Tape



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SO-8 (12 mm)	6.40 ±0.10	5.20 ±0.10	2.10 ±0.10	1.60 ±0.10	1.50 +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

SOP-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	---	---	---

SOP-8 Tape

Leader / Trailer & Orientation

