

General Description

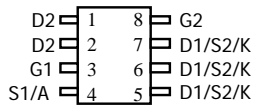
The AO4916 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The two MOSFETs make a compact and efficient switch and synchronous rectifier combination for use in DC-DC converters. A Schottky diode is co-packaged in parallel with the synchronous MOSFET to boost efficiency further. AO4916L (Green Product) is offered in a lead-free package.

Features

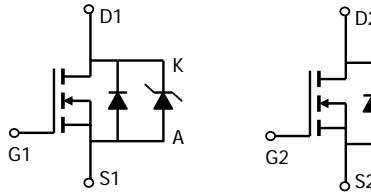
- V_{DS} (V) = 30V
- I_D = 8.5A
- $R_{DS(ON)} < 17m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 27m\Omega$ ($V_{GS} = 4.5V$)

SCHOTTKY

V_{DS} (V) = 30V, I_F = 3A, $V_F=0.5V@1A$



SOIC-8



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	MOSFET	Schottky	Units
Drain-Source Voltage	V_{DS}	30		V
Gate-Source Voltage	V_{GS}	± 20		V
Continuous Drain Current ^A	I_D	$T_A=25^\circ\text{C}$	8.5	A
		$T_A=70^\circ\text{C}$	6.6	
Pulsed Drain Current ^B	I_{DM}	40		
Schottky reverse voltage	V_{KA}		30	V
Continuous Forward Current ^A	I_F	$T_A=25^\circ\text{C}$	3	A
		$T_A=70^\circ\text{C}$	2	
Pulsed Forward Current ^B	I_{FM}		40	
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	2	W
		$T_A=70^\circ\text{C}$	1.28	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ\text{C}$

Parameter: Thermal Characteristics MOSFET		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$t \leq 10s$	$R_{\theta JA}$	48	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	Steady-State		74	110	
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	35	40	
Thermal Characteristics Schottky					
Maximum Junction-to-Ambient ^A	$t \leq 10s$	$R_{\theta JA}$	47.5	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	Steady-State		71	110	
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	32	40	

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$		0.005	1	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.8	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=8.5\text{A}$ $T_J=125^\circ\text{C}$		14	17	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=6\text{A}$		20	25	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=8.5\text{A}$		23		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.76	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance			1040	1250	pF
C_{oss}	Output Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		180		pF
C_{rss}	Reverse Transfer Capacitance			110		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	0.35	0.7	0.85	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge			19.2	24	nC
$Q_g(4.5\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=8.5\text{A}$		9.36	12	nC
Q_{gs}	Gate Source Charge			2.6		nC
Q_{gd}	Gate Drain Charge			4.2		nC
$t_{D(on)}$	Turn-On DelayTime			5.2	7.5	ns
t_r	Turn-On Rise Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.8\Omega$, $R_{GEN}=3\Omega$		4.4	6.5	ns
$t_{D(off)}$	Turn-Off DelayTime			17.3	25	ns
t_f	Turn-Off Fall Time			3.3	5	ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=8.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		16.7	21	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=8.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		9.3	11	nC
SCHOTTKY PARAMETERS						
V_F	Forward Voltage Drop	$I_F=1.0\text{A}$		0.45	0.5	V
I_{rm}	Maximum reverse leakage current	$V_R=30\text{V}$		0.007	0.05	mA
		$V_R=30\text{V}$, $T_J=125^\circ\text{C}$		3.2	10	
		$V_R=30\text{V}$, $T_J=150^\circ\text{C}$		12	20	
C_T	Junction Capacitance	$V_R=15\text{V}$		37		pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any a given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using 80 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

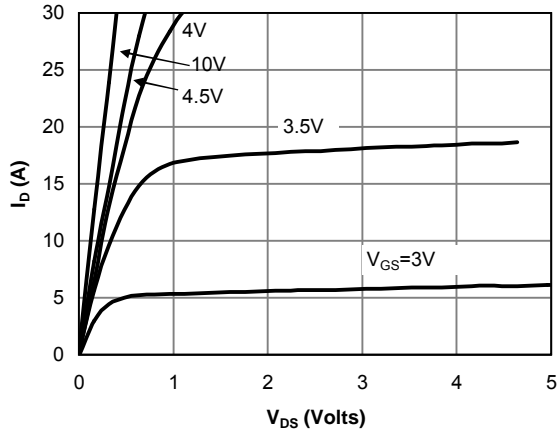


Fig 1: On-Region Characteristics

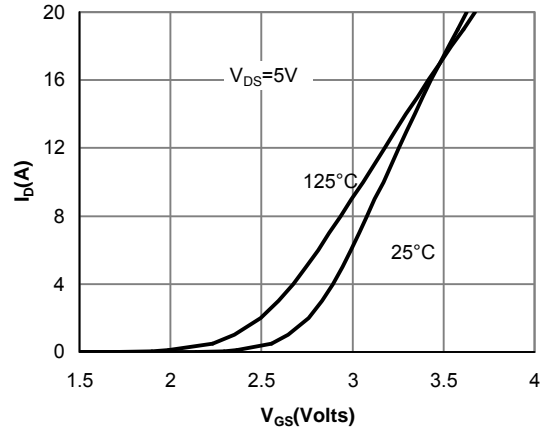


Figure 2: Transfer Characteristics

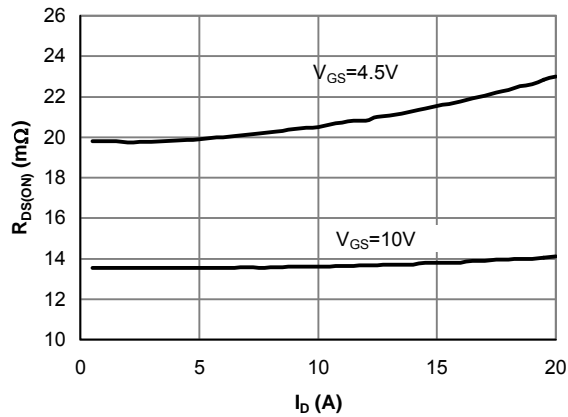


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

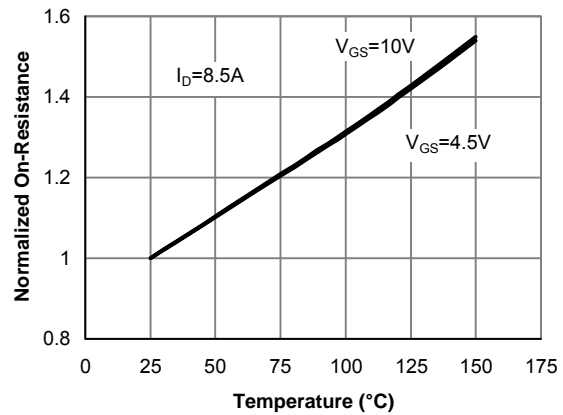


Figure 4: On-Resistance vs. Junction Temperature

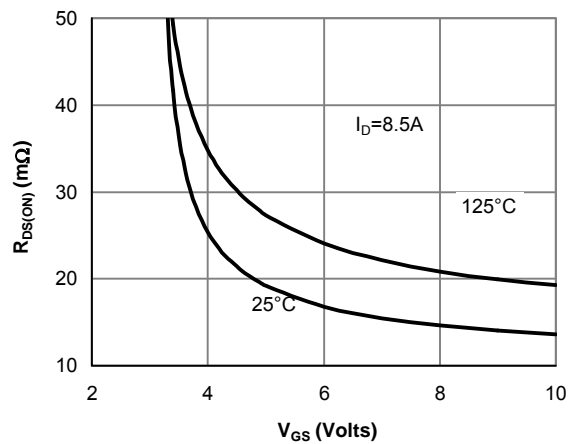


Figure 5: On-Resistance vs. Gate-Source Voltage

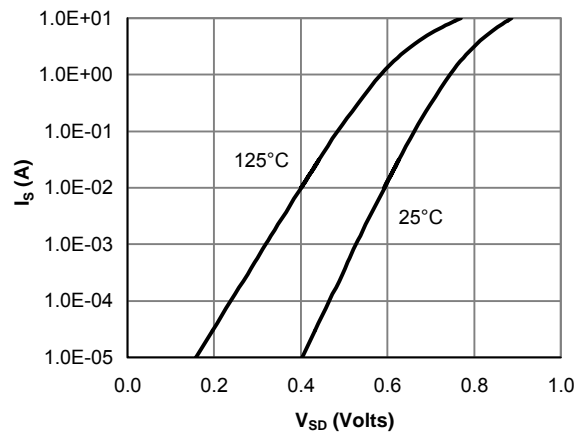


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

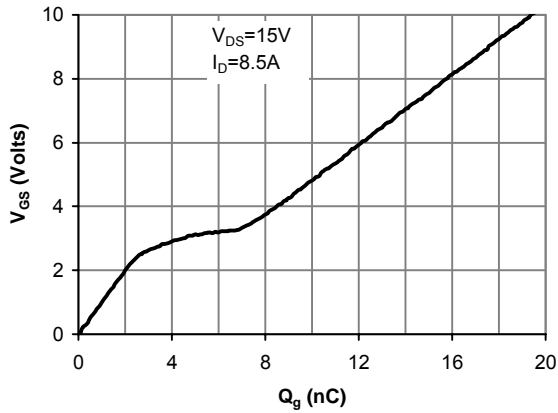


Figure 7: Gate-Charge Characteristics

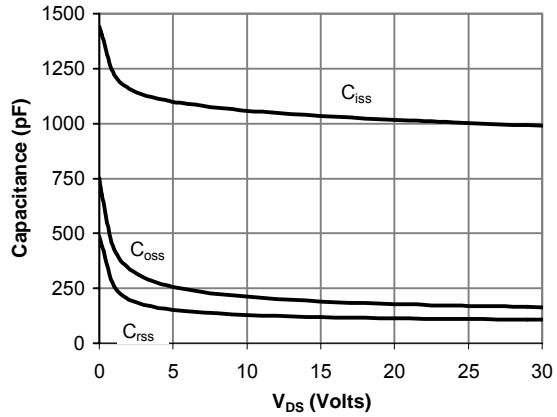


Figure 8: Capacitance Characteristics

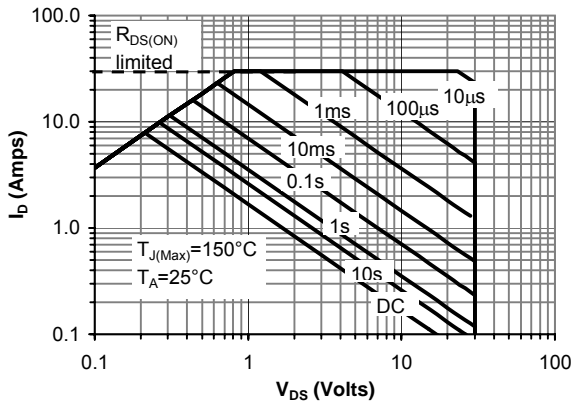


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

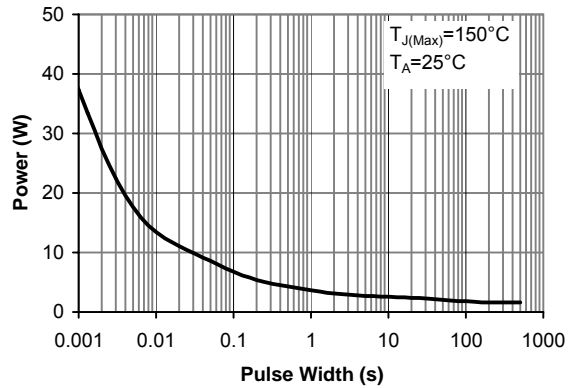


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

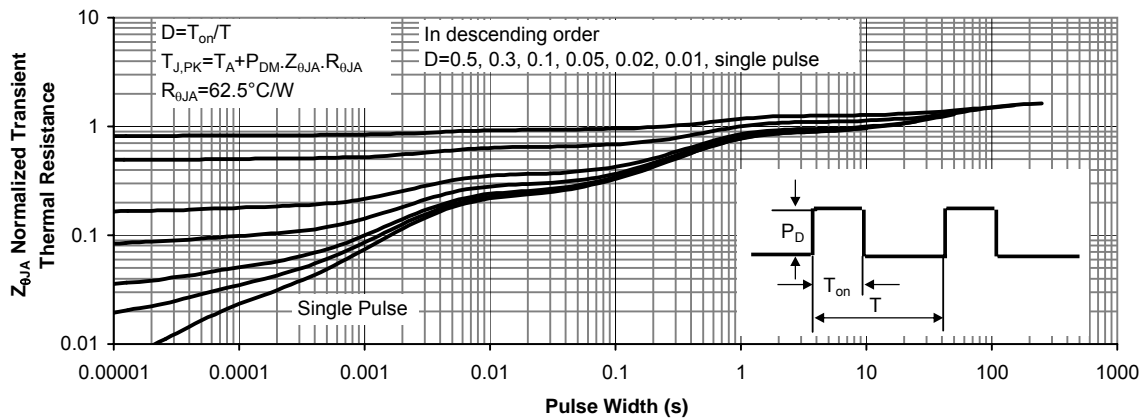
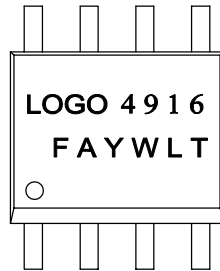
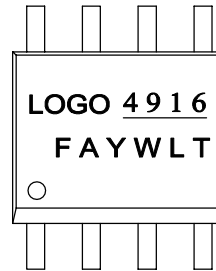


Figure 11: Normalized Maximum Transient Thermal Impedance

SO-8 PACKAGE MARKING DESCRIPTION



Standard product



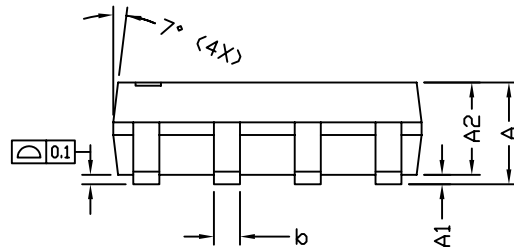
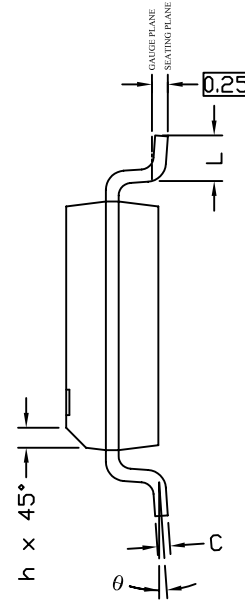
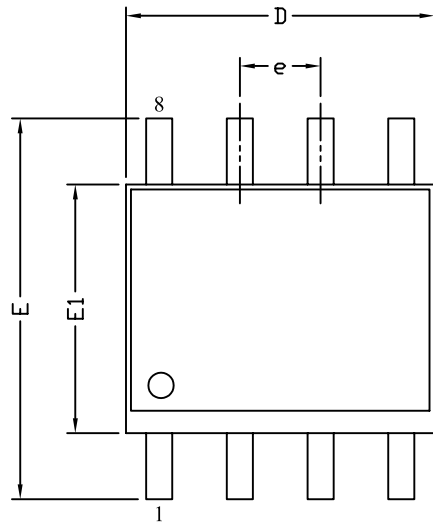
Green product

NOTE:

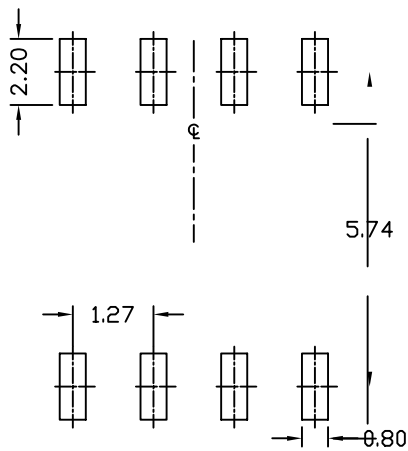
LOGO - AOS LOGO
 4916 - PART NUMBER CODE.
 F&A - FOUNDRY AND ASSEMBLY LOCATION
 Y - YEAR CODE
 W - WEEK CODE.
 L T - ASSEMBLY LOT CODE

PART NO.	DESCRIPTION	CODE
AO4916	Standard product	4916
AO4916L	Green product	<u>4916</u>

SO-8L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



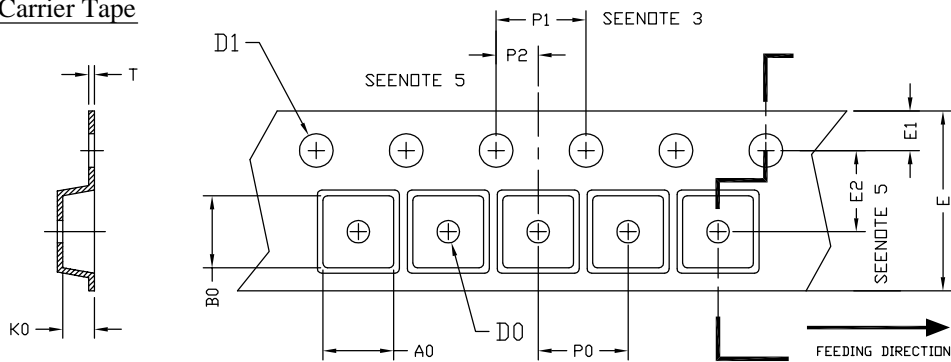
UNIT: mm

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°

NOTE

1. ALL DIMENSIONS ARE IN MILLIMETERS.
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.

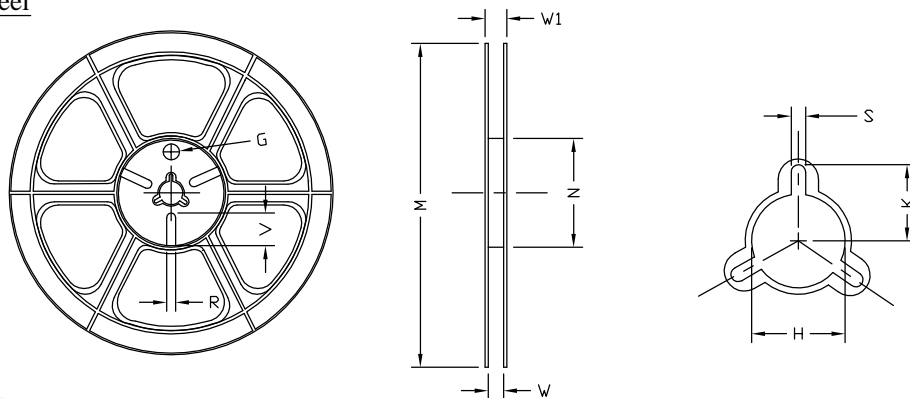
SO-8 Carrier Tape



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SD-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

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

