



ALPHA & OMEGA
SEMICONDUCTOR



AO4447

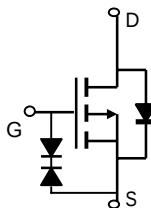
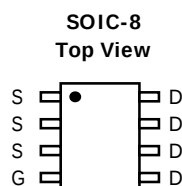
P-Channel Enhancement Mode Field Effect Transistor

General Description

The AO4447 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 AO4447 is Pb-free (meets ROHS & Sony 259 specifications). AO4447L is a Green Product ordering option. AO4447 and AO4447L are electrically identical.*

Features

V_{DS} (V) = -30V
 I_D = -15 A (V_{GS} = -10V)
Max $R_{DS(ON)}$ < 7.5m Ω (V_{GS} = -10V)
Max $R_{DS(ON)}$ < 12m Ω (V_{GS} = -4V)
ESD Rating: 4KV HBM



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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	I_D	-15	A
$T_A=25^\circ\text{C}$		-13.6	
$T_A=70^\circ\text{C}$		-13.6	
Pulsed Drain Current ^B	I_{DM}	-60	
Power Dissipation ^A	P_D	3.1	W
$T_A=25^\circ\text{C}$		3.1	
$T_A=70^\circ\text{C}$		2	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

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

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} =-30V, V _{GS} =0V T _J =55°C			-1 -10	μA
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	-1.3	-1.6	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-60			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-15A T _J =125°C		6.7 9.4	8 12	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-15A		60		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.69	-1	V
I _S	Maximum Body-Diode Continuous Current				5.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		5500	6600	pF
C _{oss}	Output Capacitance			745		pF
C _{rss}	Reverse Transfer Capacitance			473		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		3.1	4	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-15A		88.8	120	nC
Q _{g(4.5V)}	Gate Charge			45.2	60	nC
Q _{gs}	Gate Source Charge			10.1		nC
Q _{gd}	Gate Drain Charge			19.4		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =1.7Ω, R _{GEN} =3Ω		12		ns
t _r	Turn-On Rise Time			11.5		ns
t _{D(off)}	Turn-Off DelayTime			100		ns
t _f	Turn-Off Fall Time			40		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-15A, dI/dt=100A/μs		46.6	60	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-15A, dI/dt=100A/μs		67.7		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² 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 ≤ 10s thermal resistance rating.

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

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

Rev 1. June 2006

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

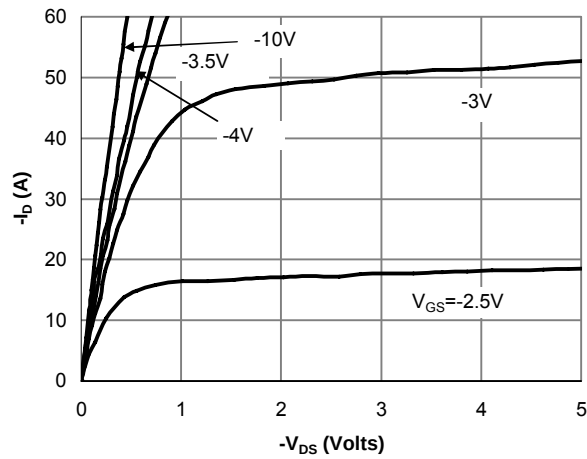


Fig 1: On-Region Characteristics

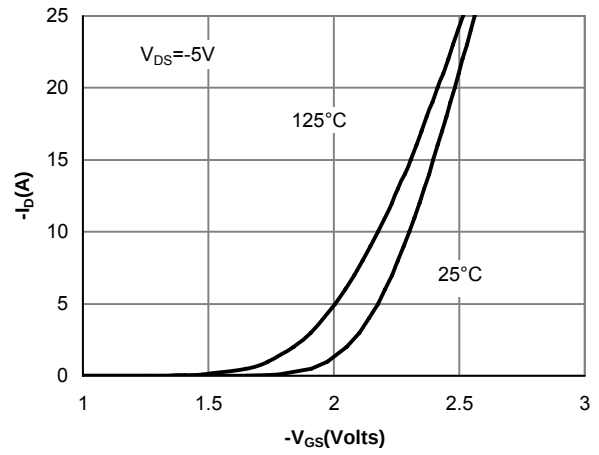


Figure 2: Transfer Characteristics

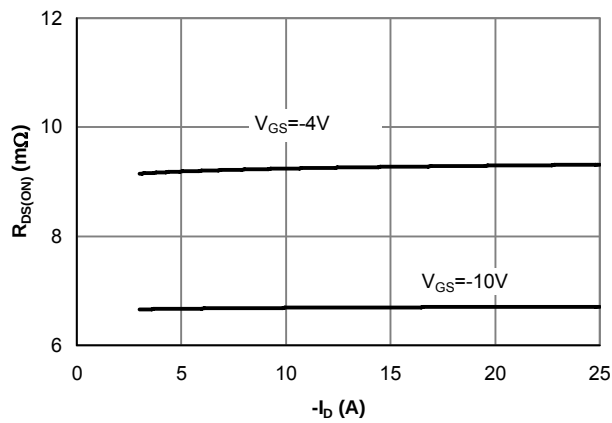


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

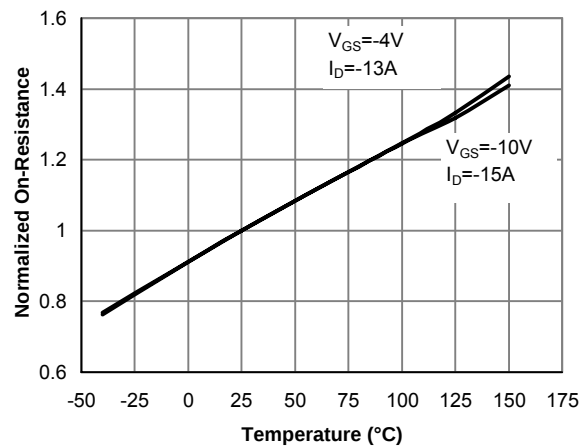


Figure 4: On-Resistance vs. Junction Temperature

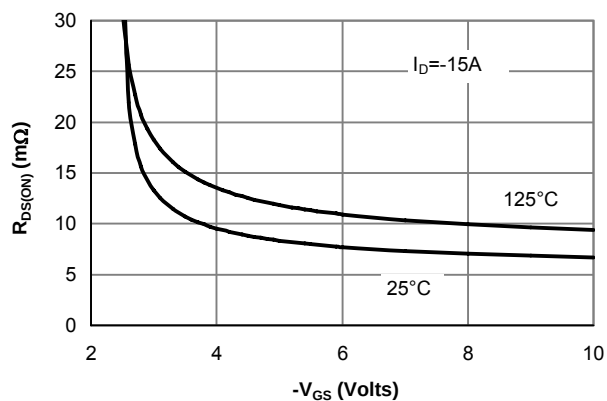


Figure 5: On-Resistance vs. Gate-Source Voltage

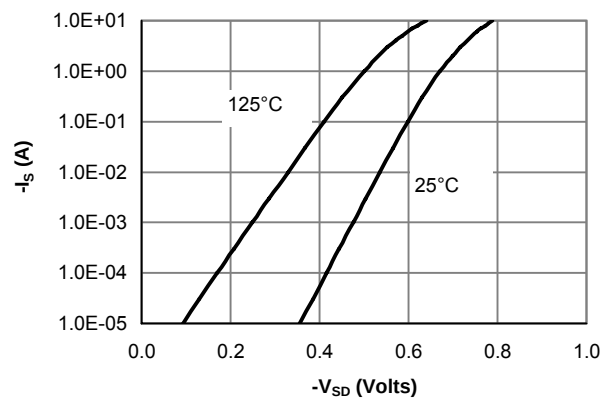


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

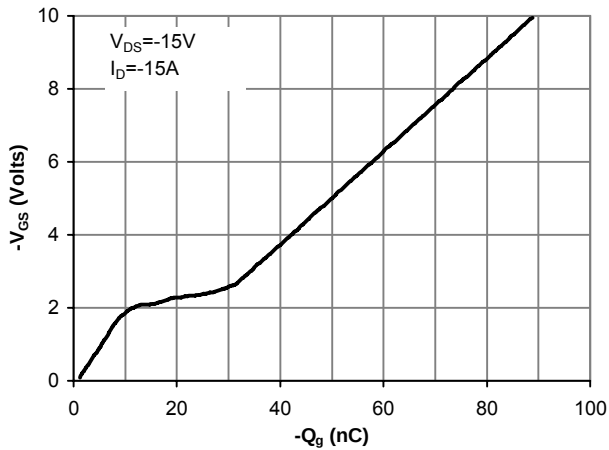


Figure 7: Gate-Charge Characteristics

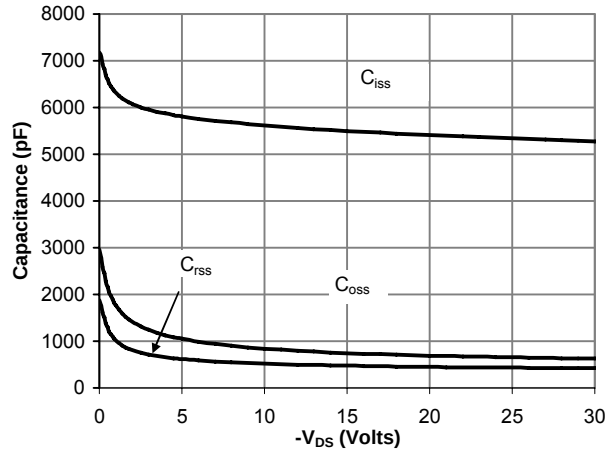


Figure 8: Capacitance Characteristics

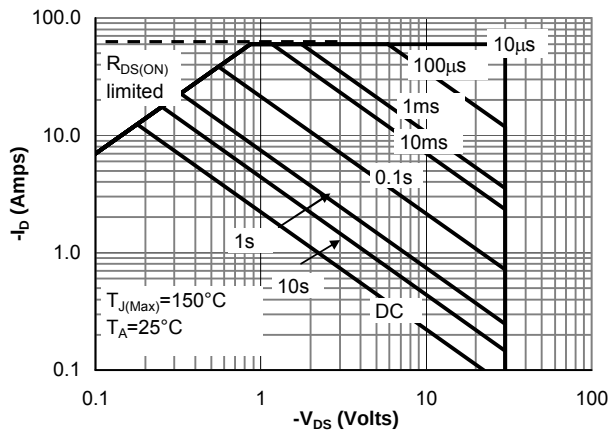


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

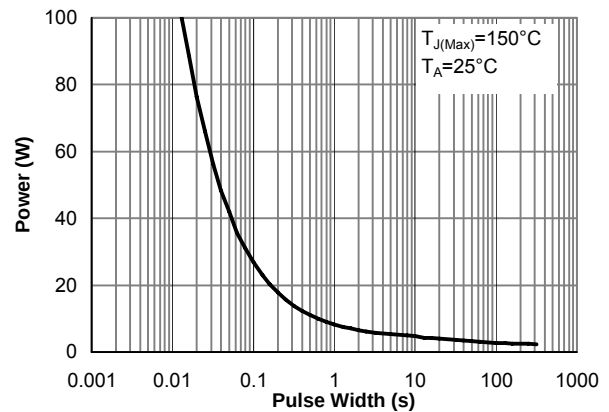


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

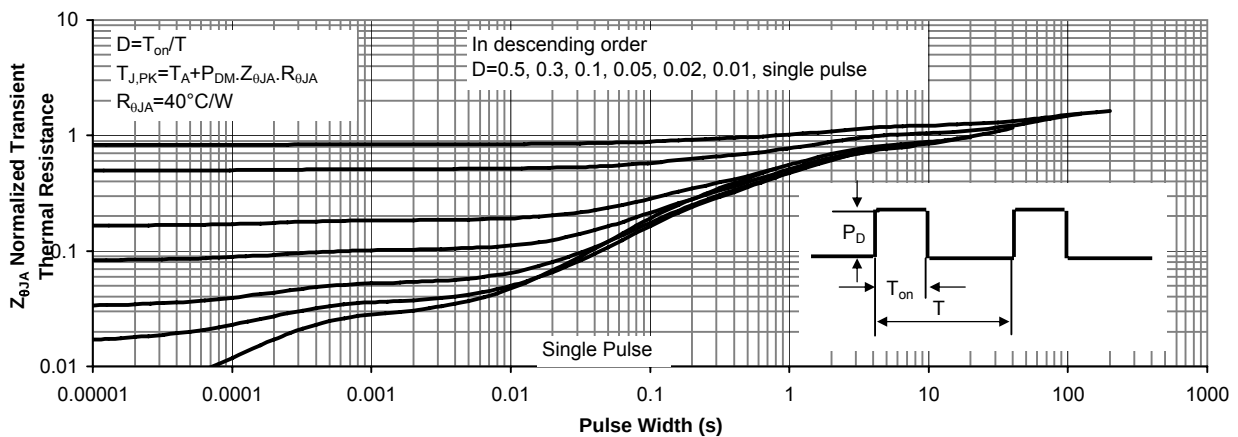
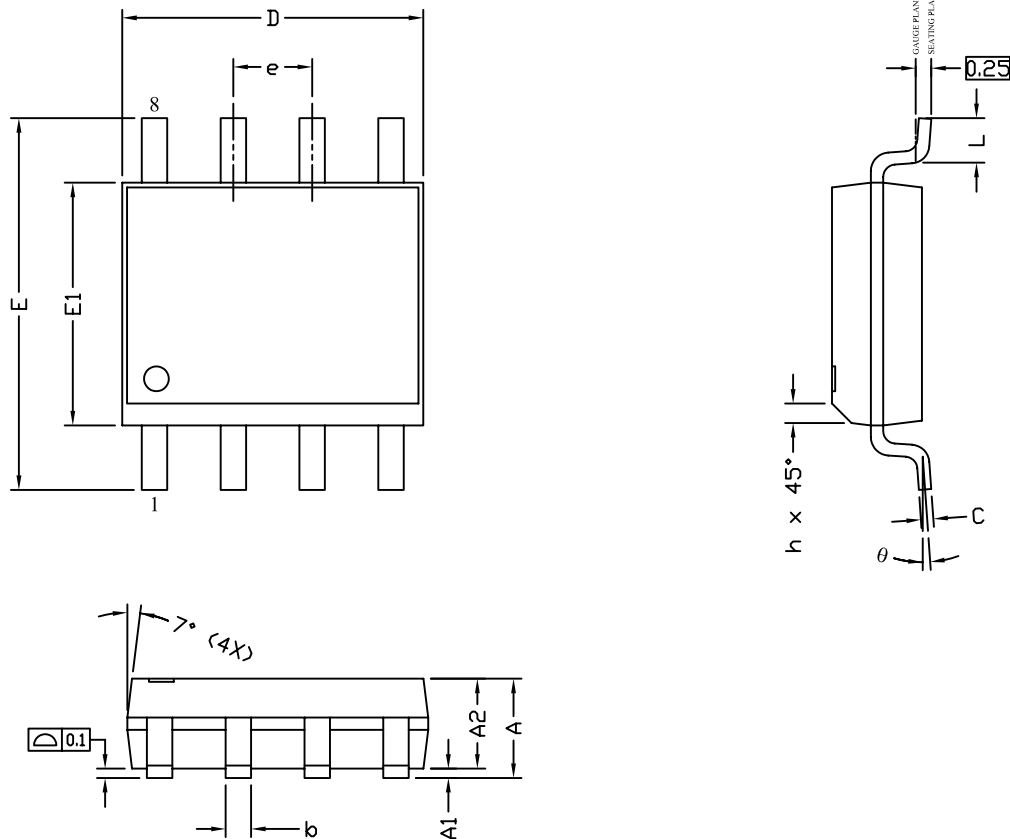


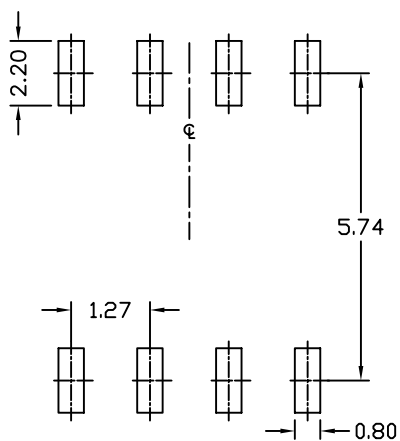
Figure 11: Normalized Maximum Transient Thermal Impedance



SO-8L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



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°

UNIT: mm

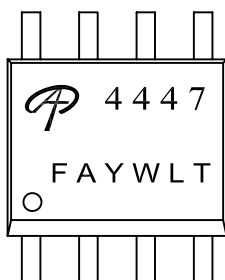
NOTE

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS.
4. DIMENSION L IS MEASURED IN GAUGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

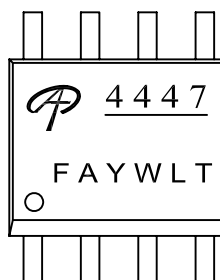


Document No.	PD-00427
Version	B
Title	AO4447 Marking Description

SO-8 PACKAGE MARKING DESCRIPTION



Standard product



Green product

NOTE:

LOGO - AOS Logo
4447 - Part number code
F - Fab code
A - Assembly location code
Y - Year code
W - Week code
L&T - Assembly lot code

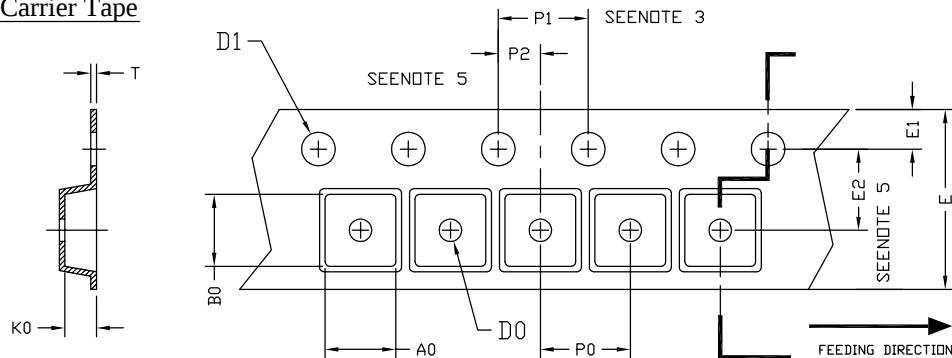
PART NO.	DESCRIPTION	CODE
AO4447	Standard product	4447
AO4447L	Green product	<u>4447</u>



ALPHA & OMEGA
SEMICONDUCTOR, LTD.

SO-8 Tape and Reel Data

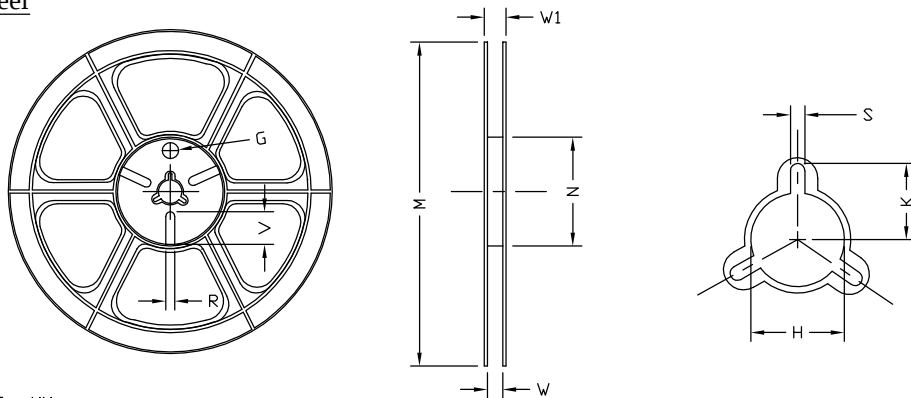
SO-8 Carrier Tape



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SO-8 (12 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	φ330	φ330.00 ±0.50	φ97.00 ±0.10	13.00 ±0.30	17.40 ±1.00	φ13.00 +0.50 -0.20	10.60	2.00 ±0.50	---	---	---

SO-8 Tape

Leader / Trailer
& Orientation

