

TMG12N10S

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

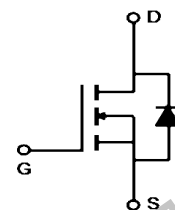
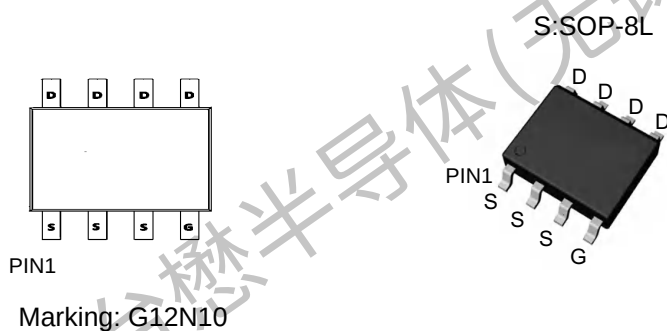
General Features

$V_{DS} = 100V$ $I_D = 12A$

$R_{DS(ON)} = 11m\Omega$ (typ.) @ $V_{GS} = 10V$

100% UIS Tested

100% R_g Tested



Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	12	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7.8	A
I_{DM}	Pulsed Drain Current ²	44	A
EAS	Single Pulse Avalanche Energy ³	45	mJ
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ⁴	3.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	80	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	25	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	100	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =100V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics ³						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1.0	2.0	3.0	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =12A	---	11	14	m Ω
		V _{GS} =4.5V, I _D =9A	---	---	---	
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	---	2145.8	---	pF
C _{oss}	Output Capacitance		---	305.7	---	
C _{rss}	Reverse Transfer Capacitance		---	9.6	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} =50V, I _D =10A, R _G =2Ω	---	19.5	---	ns
t _r	Rise Time		---	6.2	---	ns
t _{d(off)}	Turn-Off Delay Time	V _{GS} =10V	---	43.8	---	ns
t _f	Fall Time		---	9.3	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =11A	---	50	---	nC
Q _{gs}	Gate-Source Charge		---	6.2	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	11.8	---	nC
Drain-Source Diode Characteristics						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =12A	---	---	1.3	V
LS	Continuous Source Current	VGS\<Vth	---	---	12	A
LSp	Pulsed Source Current		---	---	44	
Trr	Reverse Recovery Time	I _S = 10 A,	---	59.3	---	NS
Qrr	Reverse Recovery Charge	di/dt= 100 A/μs	---	108.7	---	NC

Notes:

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction case thermal resistance.
- 4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25^\circ\text{C}$.
- 5) $V_{DD}=50V, R_G=50\Omega, L=0.3mH$, starting $T_J=25^\circ\text{C}$.

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Typical Performance Characteristics

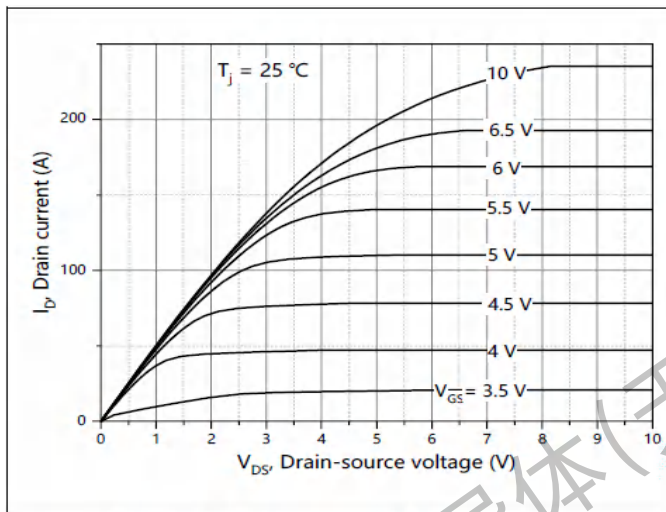


Figure 1, Typ. output characteristics

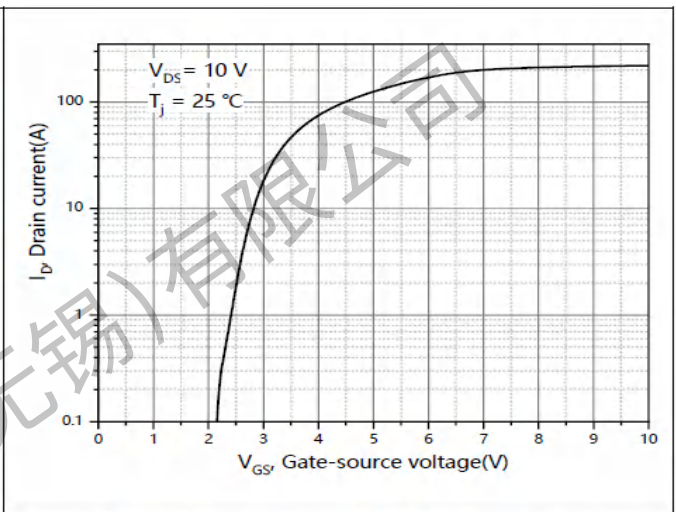


Figure 2, Typ. transfer characteristics

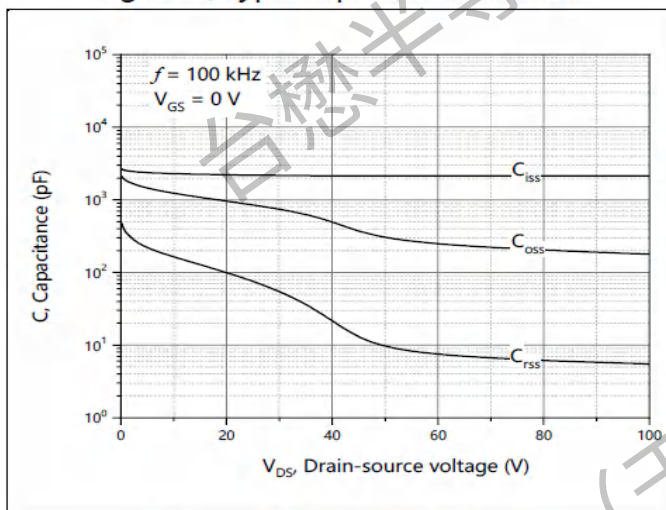


Figure 3, Typ. capacitances

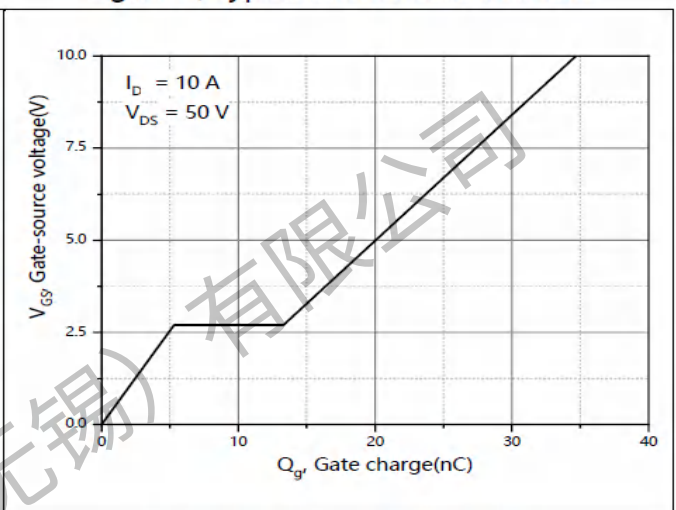


Figure 4, Typ. gate charge

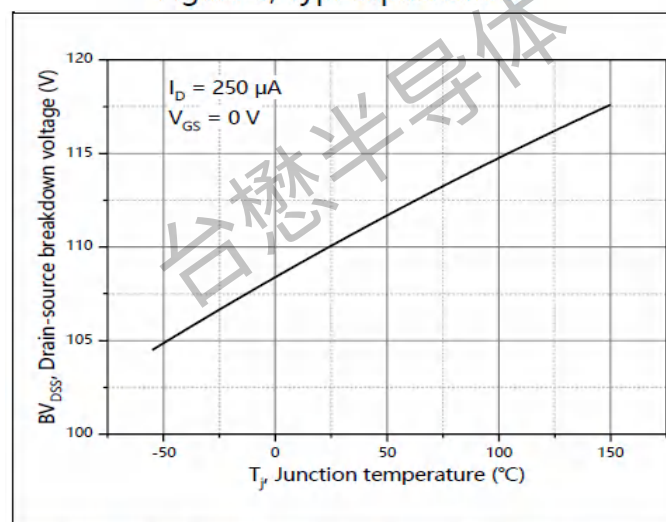


Figure 5, Drain-source breakdown voltage

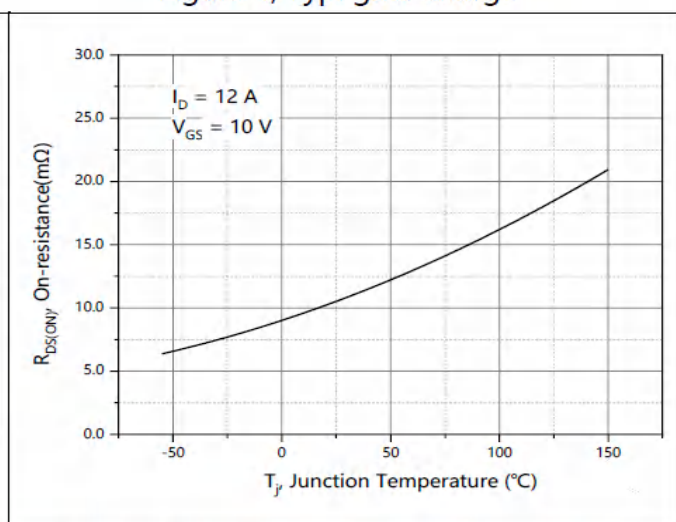


Figure 6, Drain-source on-state resistance

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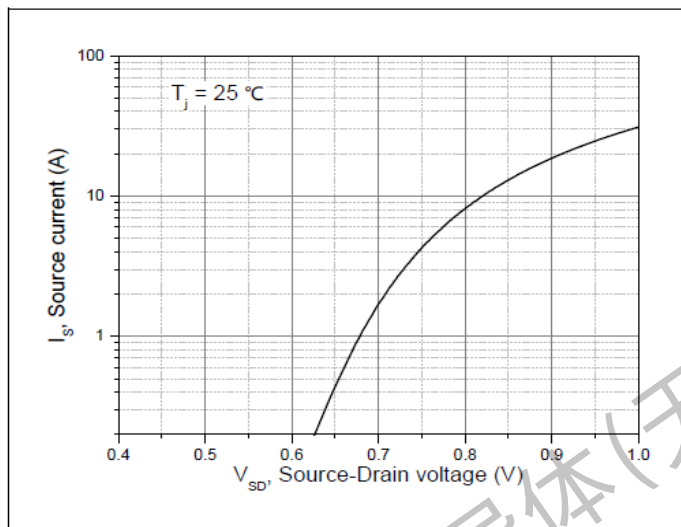


Figure 7, Forward characteristic of body diode

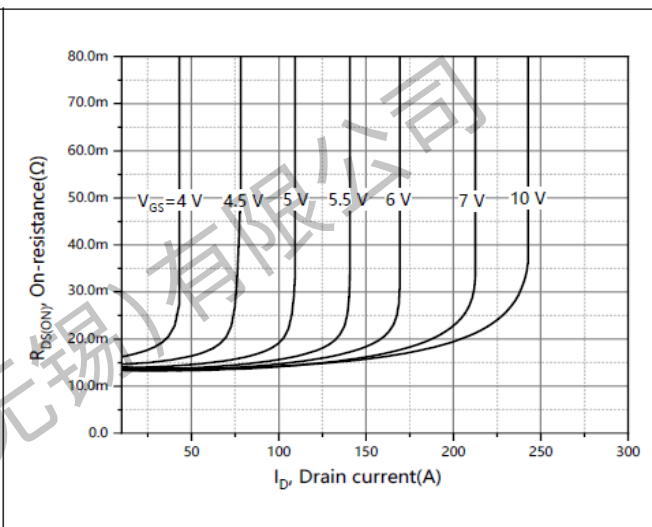


Figure 8, Drain-source on-state resistance

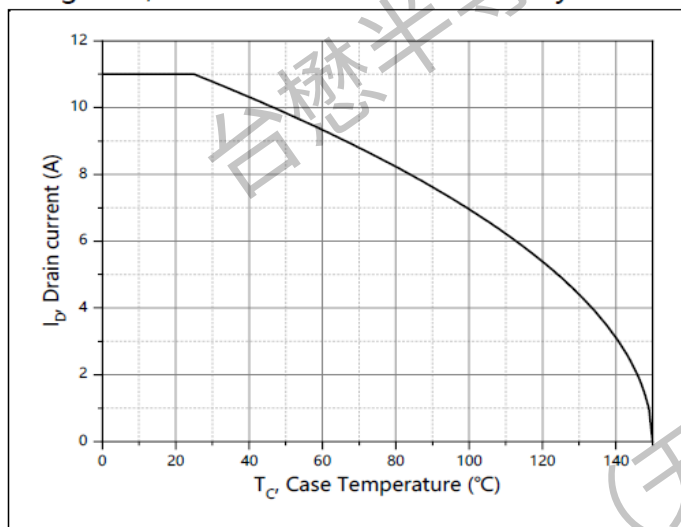


Figure 9, Drain current

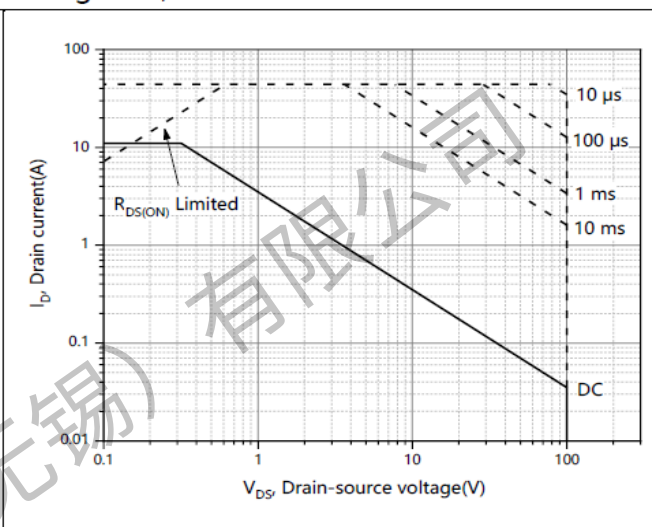
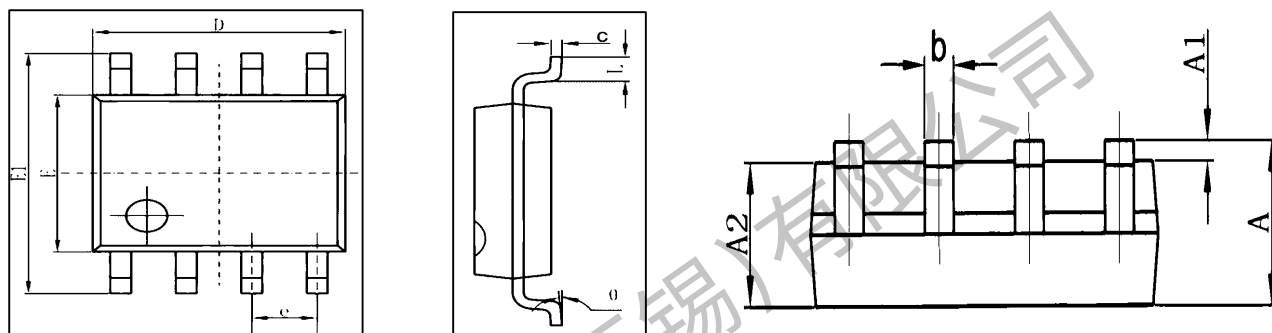


Figure 10, Safe operation area $T_C = 25\text{ }^{\circ}\text{C}$

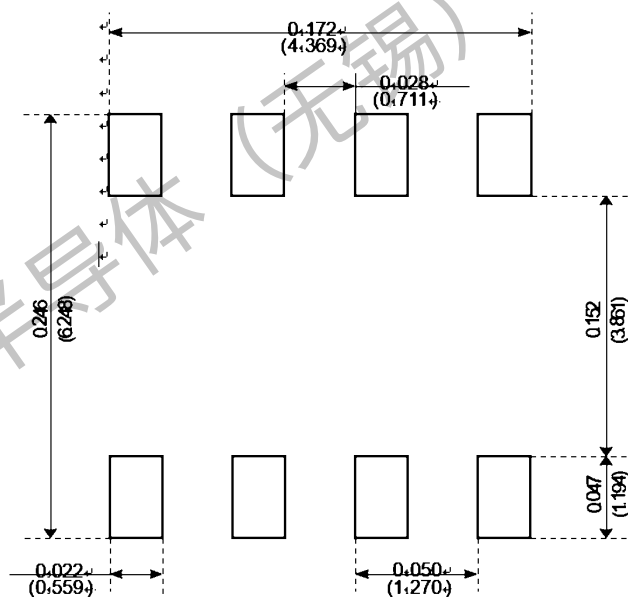
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Package Mechanical Data:SOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	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	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

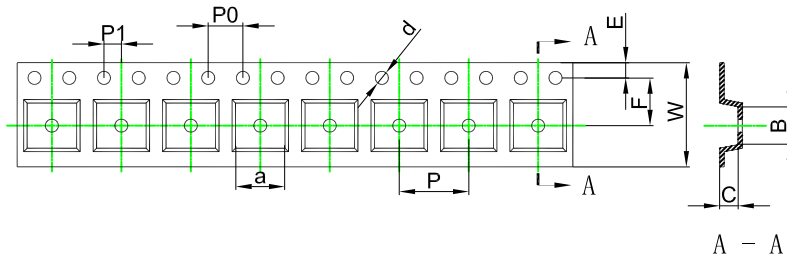


Recommended Minimum Pads

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SOP-8L Embossed Carrier Tape



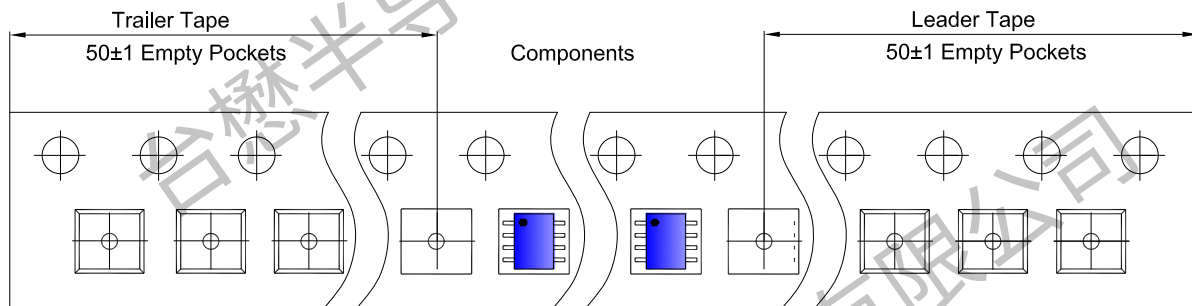
Packaging Description:

SOP-8L 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).

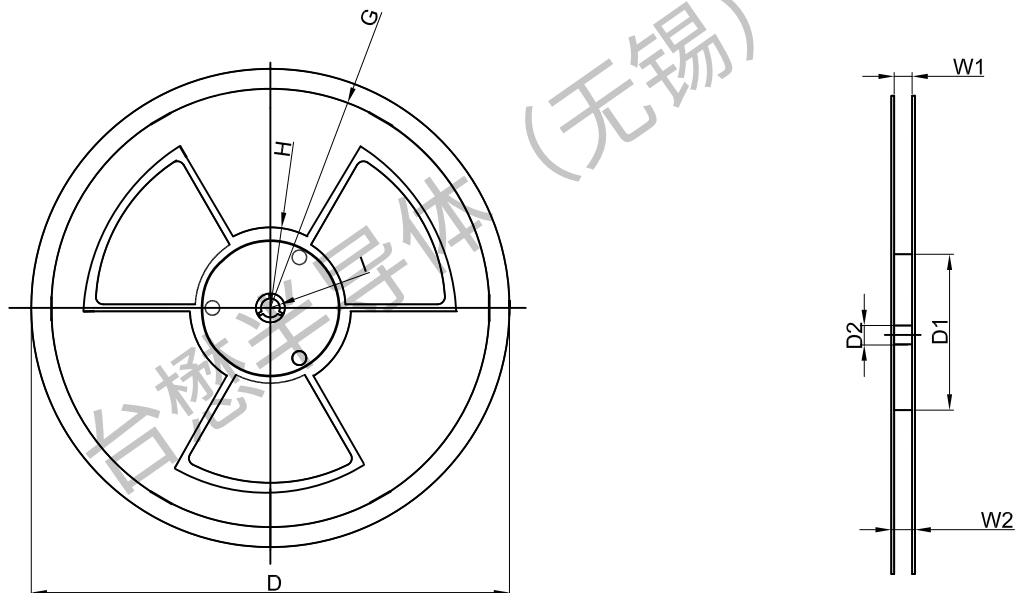
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOP-8L Tape Leader and Trailer



SOP-8L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R135.00	R55.00	R6.50	12.00	14.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3,000 pcs	13 inch	6,000 pcs	370×355×52	48,000 pcs	400×360×368	

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Revision history:

Date	Rev	Description	Page
2023.07.31	23.07	Original	