

TM120P02NF

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

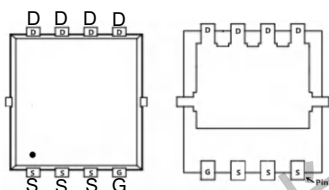
$V_{DS} = -20V$ $I_D = -120A$

$R_{DS(ON)} = 1.6m\Omega (typ.) @ V_{GS} = -10V$

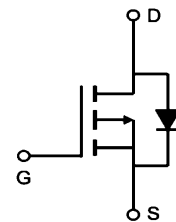
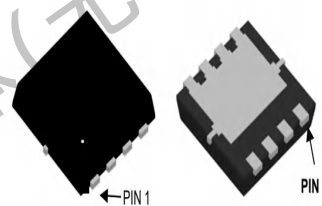
100% UIS Tested
100% R_g Tested



NF:DFN5x6-8L



Marking: 120P02 OR 6411



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-120	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-80	A
I_{DM}	Pulsed Drain Current ²	-388	A
EAS	Single Pulse Avalanche Energy ³	121	mJ
I_{AS}	Avalanche Current	-22	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	104	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	3.6	$^\circ C/W$

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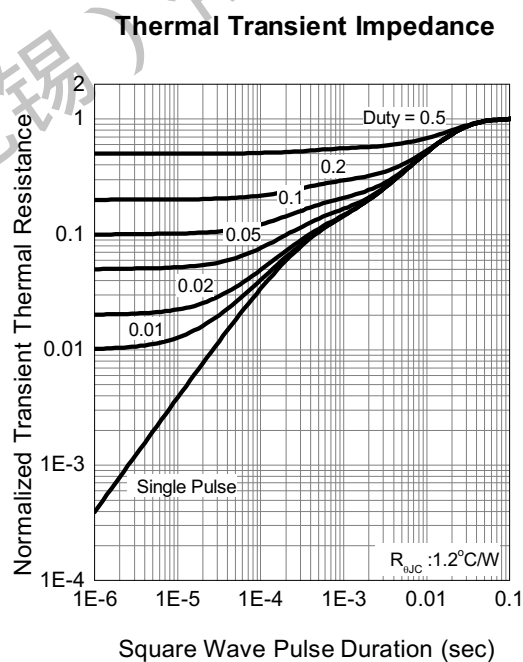
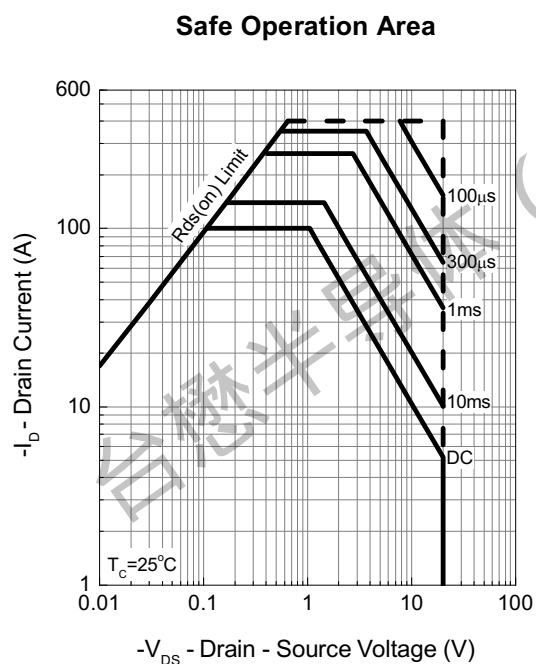
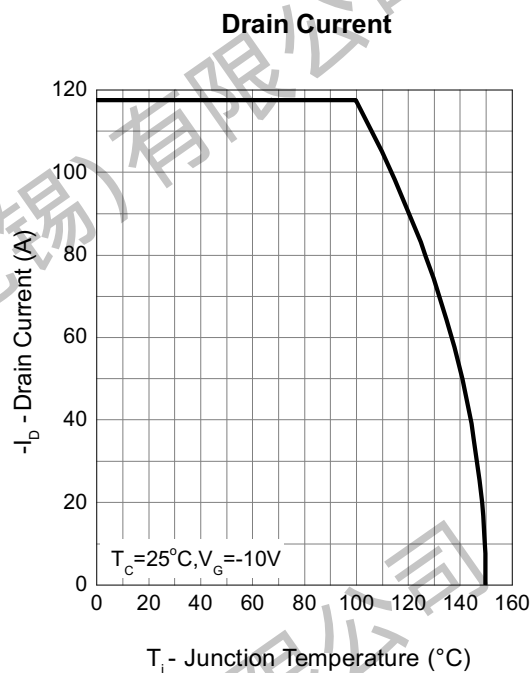
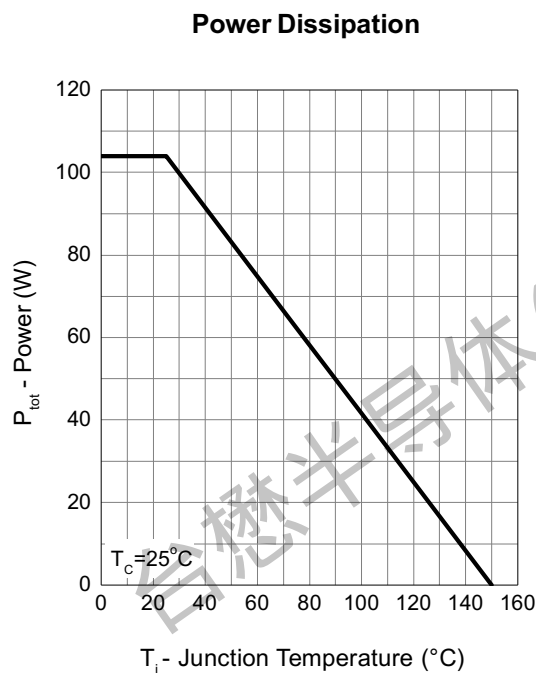
Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} = -250μA	-20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-16V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} = -250μA	-0.5	-0.85	-1.3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-20A	-	---	---	mΩ
		V _{GS} =-4.5V, I _{DS} =-20A	-	2	2.5	mΩ
		V _{GS} =-2.5V, I _{DS} =-20A	-	2.7	4.2	mΩ
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =-1A V _{GS} =0V	-0.4	-0.65	-1.0	V
t _{rr}	Reverse Recovery Time	I _{SD} =-20A, dI _{SD} /dt=100A/μs	-	75	-	ns
Q _{rr}	Reverse Recovery Charge		-	75	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2.3	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, Frequency=1.0MHz	-	9500		pF
C _{oss}	Output Capacitance		-	2450	-	
C _{rss}	Reverse Transfer Capacitance		-	2250	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-10V, R _L =10Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	23	42	ns
t _r	Turn-on Rise Time		-	29	53	
t _{d(OFF)}	Turn-off Delay Time		-	720	1300	
t _f	Turn-off Fall Time		-	330	600	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-4.5V, I _{DS} =-20A	-	140	196	nC
Q _{gs}	Gate-Source Charge		-	22	-	
Q _{gd}	Gate-Drain Charge		-	41	-	

Note e : Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note f : Guaranteed by design, not subject to production testing.

Typical Electrical And Thermal Characteristics (Curves)

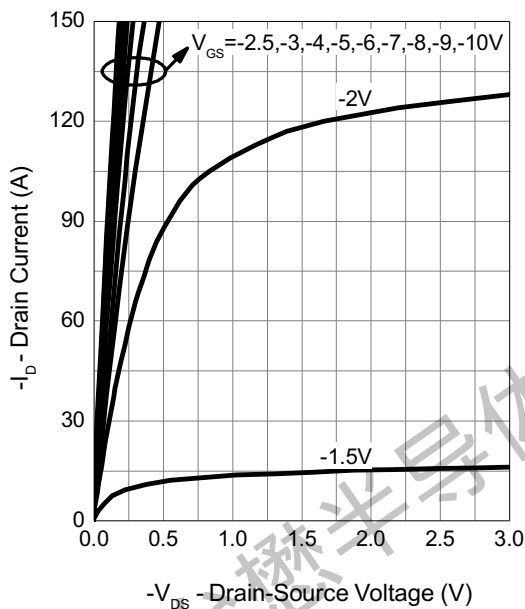




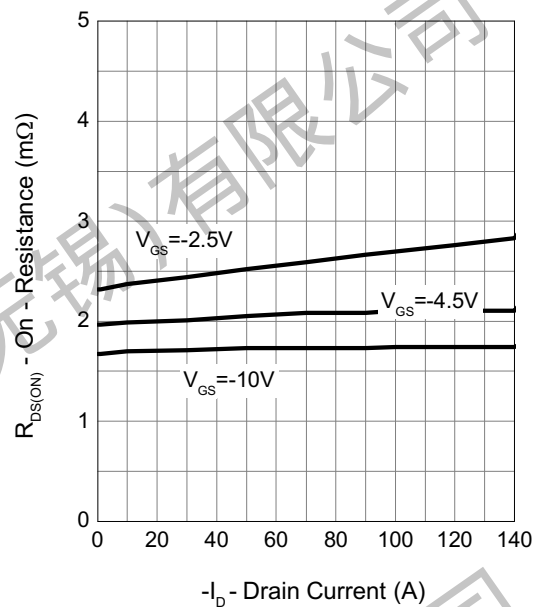
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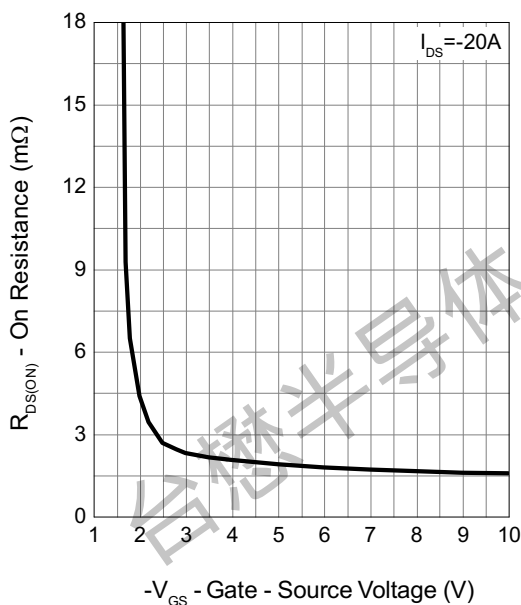
Output Characteristics



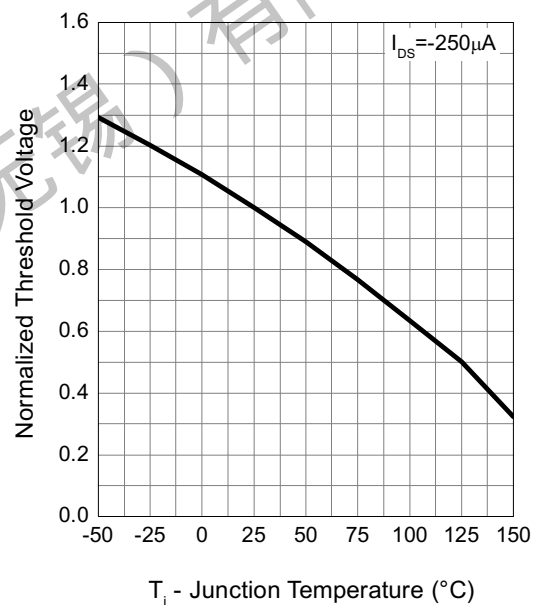
Drain-Source On Resistance



Gate-Source On Resistance



Gate Threshold Voltage

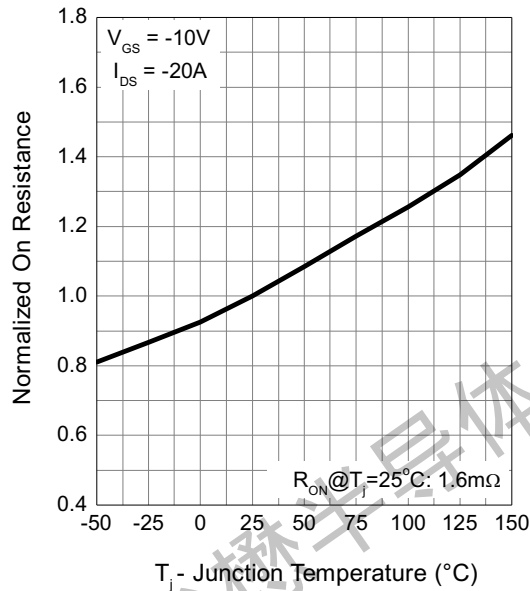




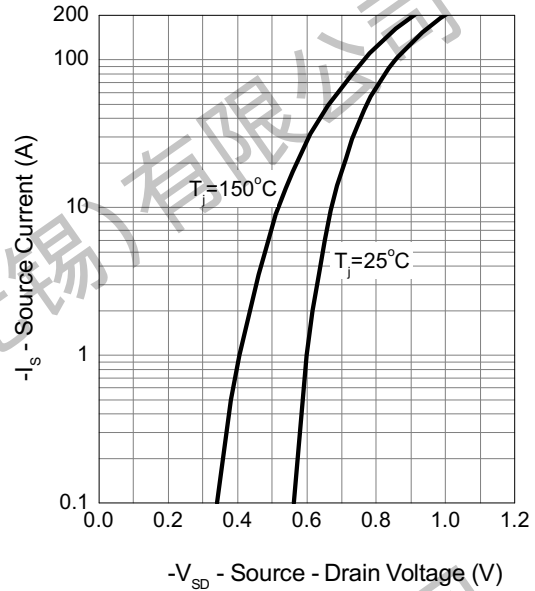
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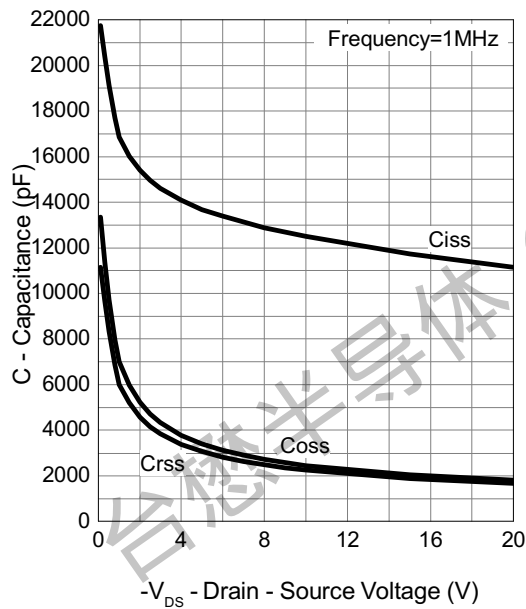
Drain-Source On Resistance



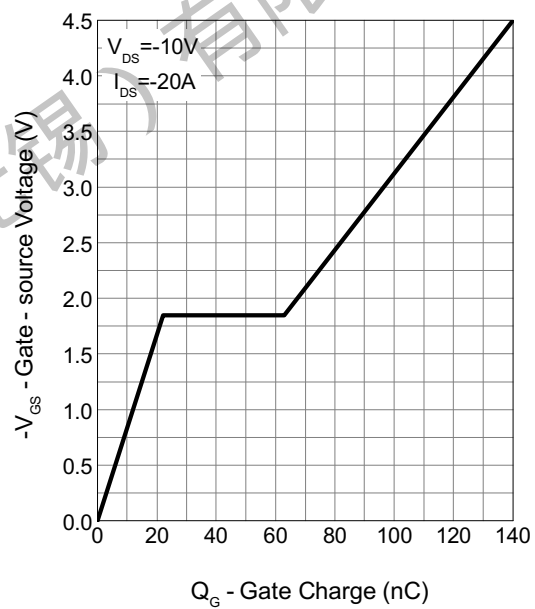
Source-Drain Diode Forward



Capacitance



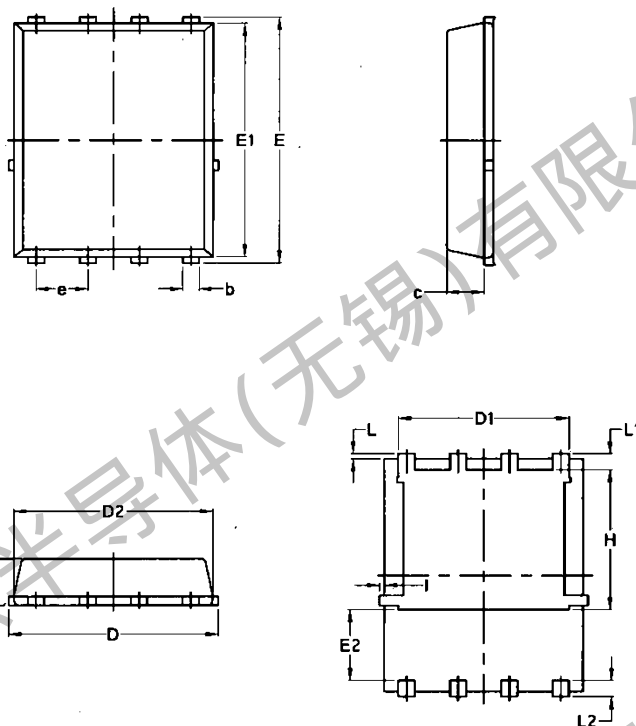
Gate Charge



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Package Mechanical Data:DFN5x6-8L

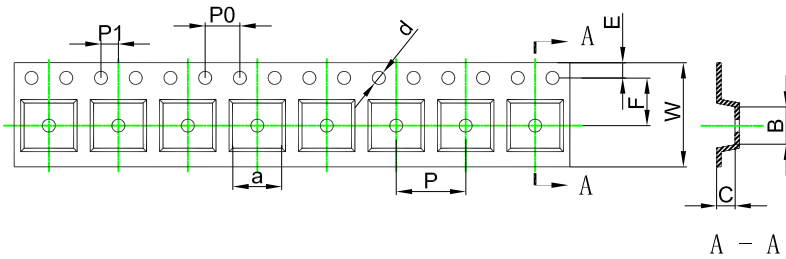


Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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PDFN5×6-8L Embossed Carrier Tape



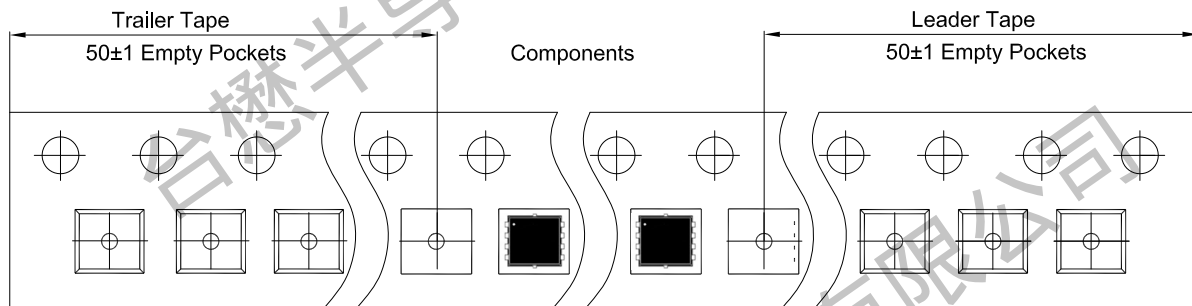
Packaging Description:

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).

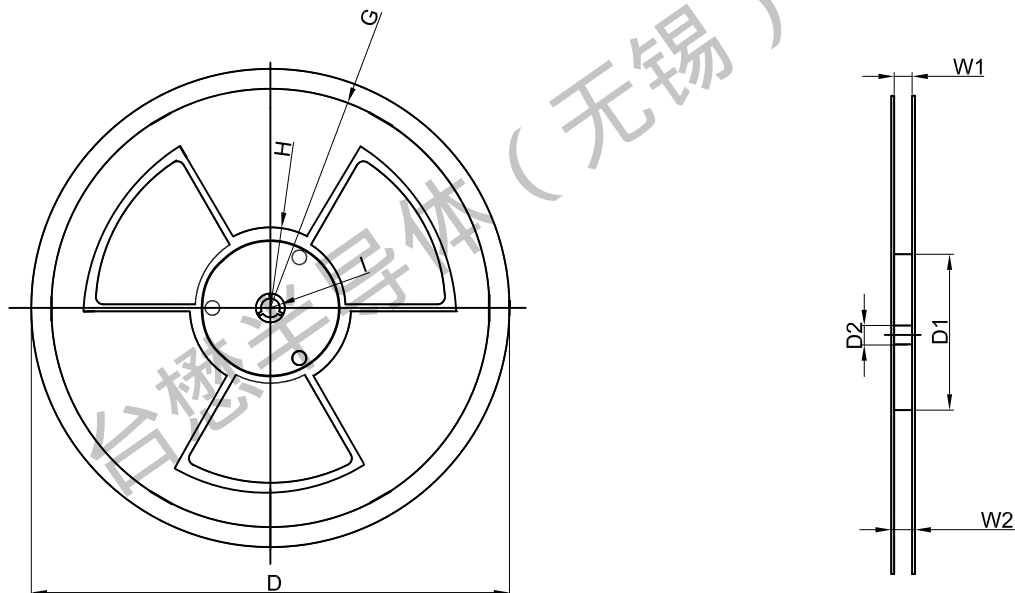
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
PDFN5×6-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN5×6-8L Tape Leader and Trailer



PDFN5×6-8L 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)
5,000 pcs	13 inch	10,000 pcs	370×355×52	50,000 pcs	400×360×368	

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Revision history:

Date	Rev	Description	Page
2024.05.14	24.05	Original	