

**TMG230N04NF**

**N-Channel Enhancement Mosfet**

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 40V</math> <math>I_D = 230A</math></p> <p><math>R_{DS(ON)} = 1.1m\Omega</math>(typ) <math>V_{GS}=10V</math></p> <p>100% UIS Tested 100% <math>R_g</math> Tested</p>
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NF: DFN5x6-8L

Marking: G230N04

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	230	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	182	A
$I_{DM}$	Pulsed Drain Current	840	A
EAS	Single Pulse Avalanche Energy	450	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation	114	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	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	3.6	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	48		V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		1.1	1.3	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$		1.4	1.8	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$		2.7		$\Omega$
Maximum Body-Diode Continuous Current	$I_S$				230	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=300\text{KHz}$		8300		pF
Output Capacitance	$C_{oss}$			1510		
Reverse Transfer Capacitance	$C_{rss}$			130		
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=32V, I_D=20A$		127		nC
Gate-Source Charge	$Q_{gs}$			35		
Gate-Drain Charge	$Q_{gd}$			26		
Reverse Recovery Charge	$Q_{rr}$	$I_F=25A, di/dt=100A/\mu s$		163		
Reverse Recovery Time	$t_{rr}$			100		
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=20V, I_D=25A$ $R_{GEN}=2\Omega$		22.5		ns
Turn-on Rise Time	$t_r$			6.7		
Turn-off Delay Time	$t_{d(off)}$			80.3		
Turn-off fall Time	$t_f$			26.9		



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## Typical Performance Characteristics

Figure.1 Typical Output Characteristics

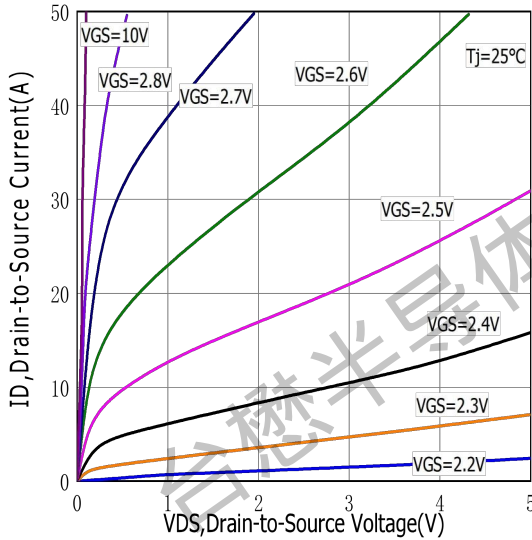


Figure.2 Typical Gate Charge vs Gate to Source Voltage

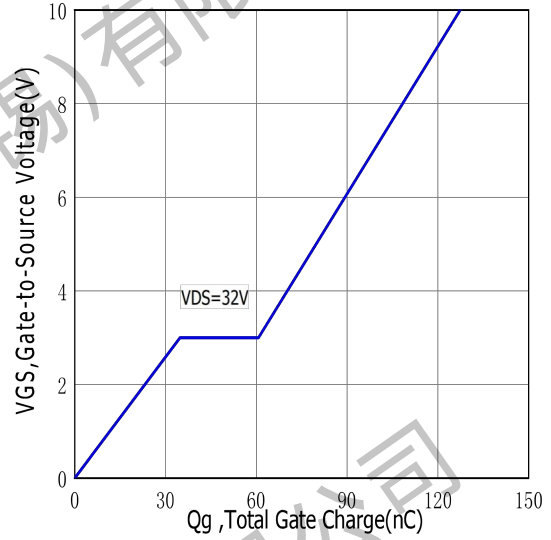


Figure.3 Typical Body Diode Transfer Characteristics

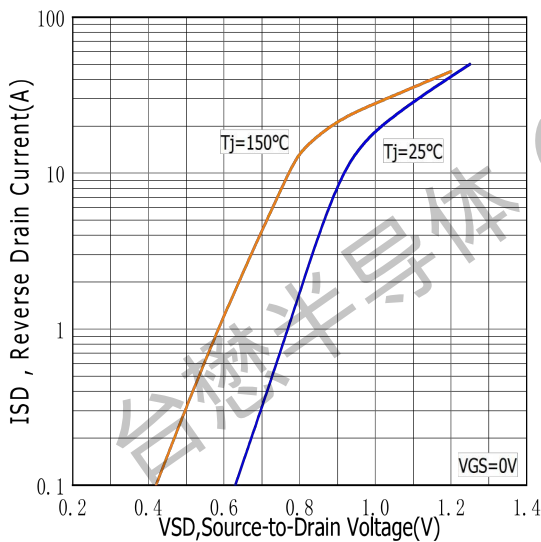
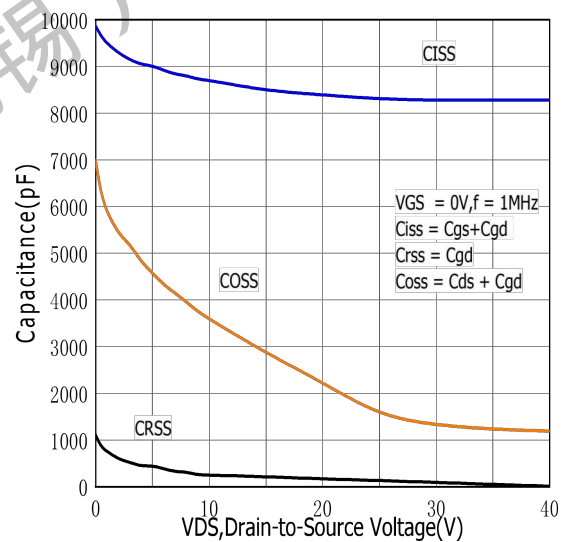


Figure.4 Typical Capacitance vs Drain to Source Voltage



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Figure.5 Typical Breakdown Voltage vs Junction Temperature

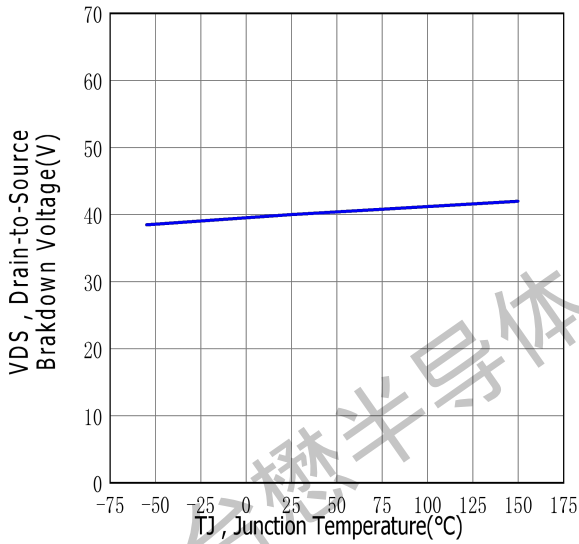


Figure.6 Typical Drain to Source on Resistance vs Junction Temperature

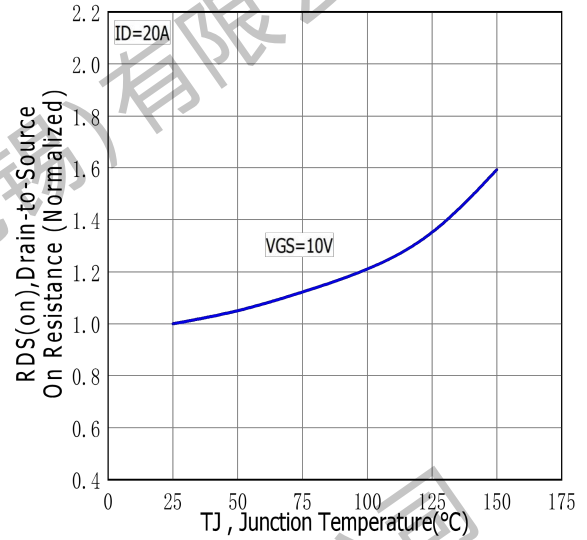


Figure.7 Maximum Forward Bias Safe Operating Area

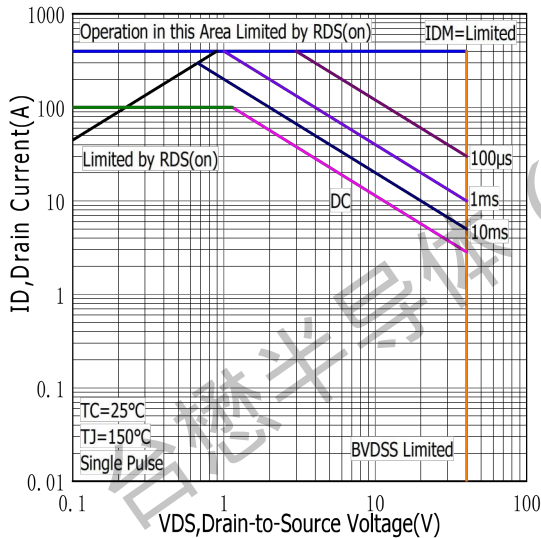
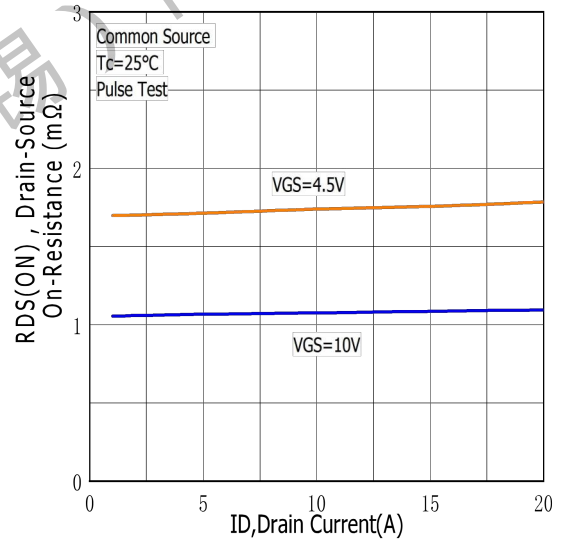


Figure.8 Typical Drain to Source ON Resistance vs Drain Current



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Figure.9 Maximum EAS vs Channel Temperature

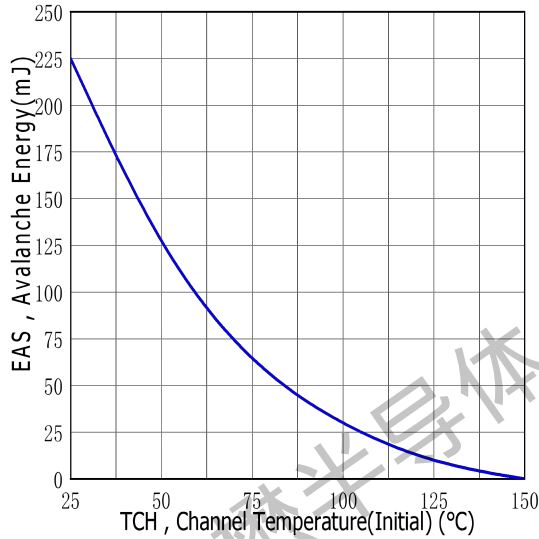


Figure.10 Typical Threshold Voltage vs Case Temperature

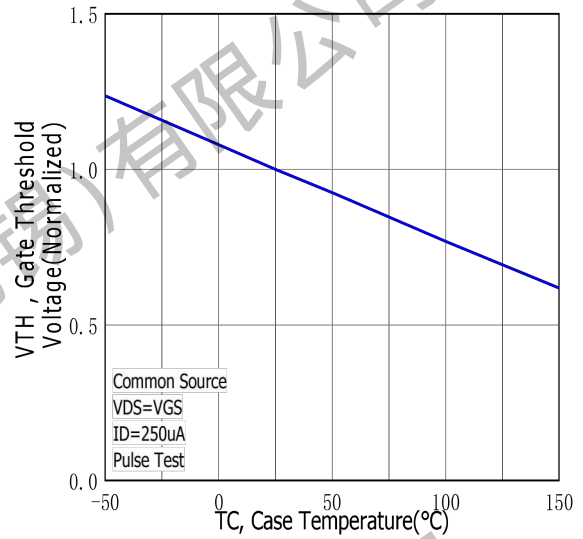


Figure.11 Typical Transfer Characteristics

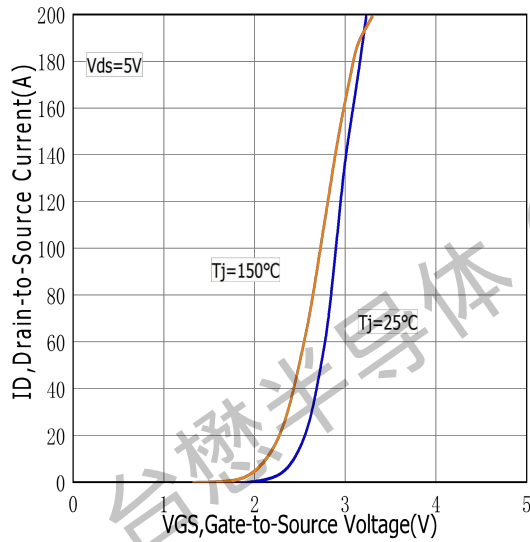
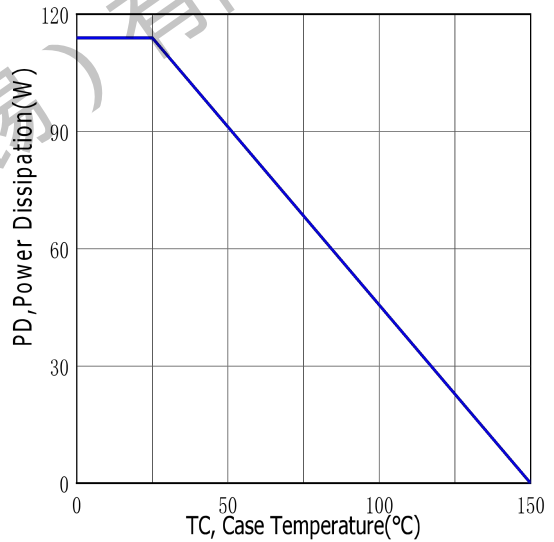


Figure.12 Maximum Power Dissipation vs Case Temperature

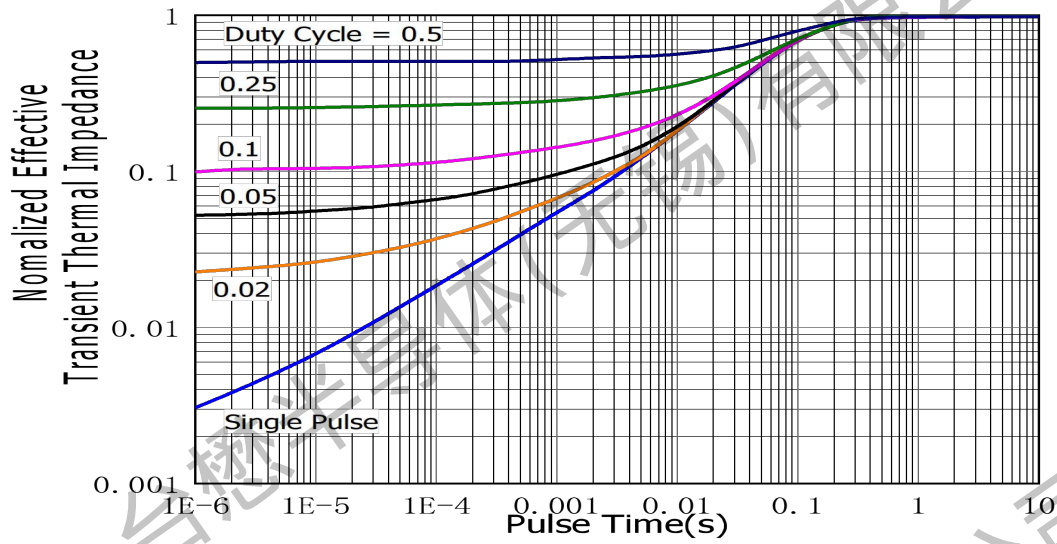




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## N-Channel Enhancement Mosfet

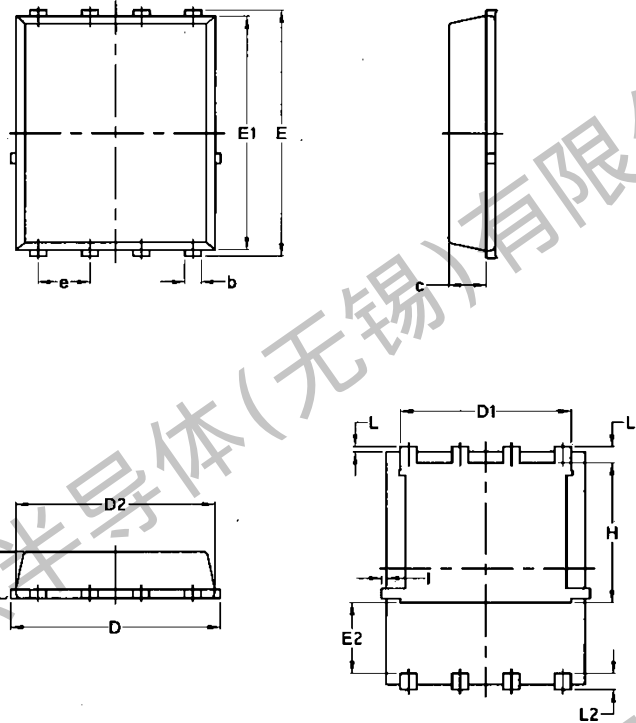
Figure.13 Maximum Effective Thermal Impedance , Junction to Case



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**Package Mechanical Data:DFN5x6-8L**

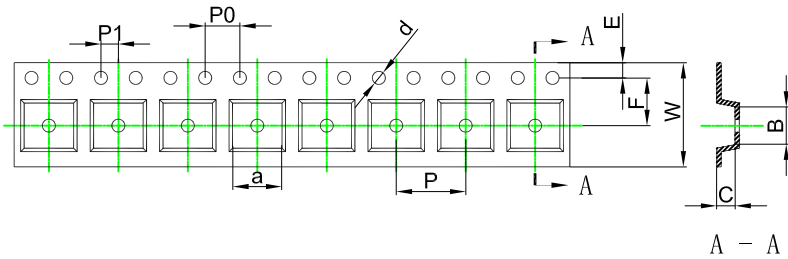


Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	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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PDFN5x6-8L Embossed Carrier Tape



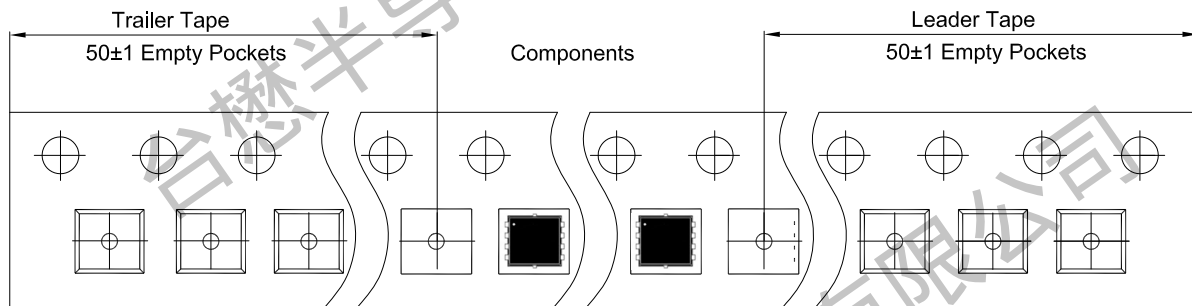
Packaging Description:

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).

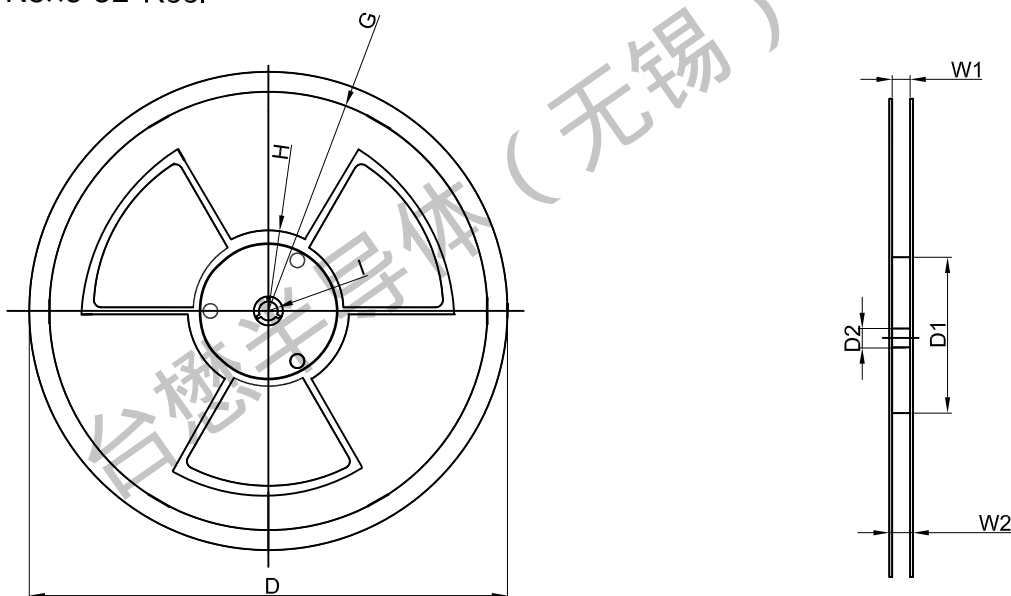
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
PDFN5x6-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN5x6-8L Tape Leader and Trailer



PDFN5x6-8L 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
2023.08.05	23.08	Original	