

TMG90N12NF

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

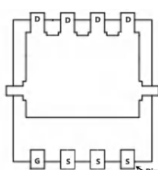
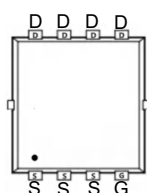
General Features

$V_{DS} = 120V$ $I_D = 90A$

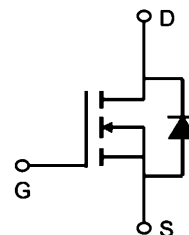
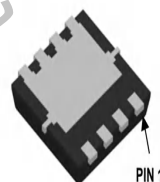
$R_{DS(ON)} = 7.7m\Omega (typ.) @ V_{GS} = 10V$

100% UIS Tested

100% R_g Tested



NF:DFN5x6-8L



Marking: G90N12

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	90	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	59	A
I_{DM}	Pulsed Drain Current	333	A
EAS	Single Pulse Avalanche Energy	300	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	105	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	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	3.6	$^\circ C/W$

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

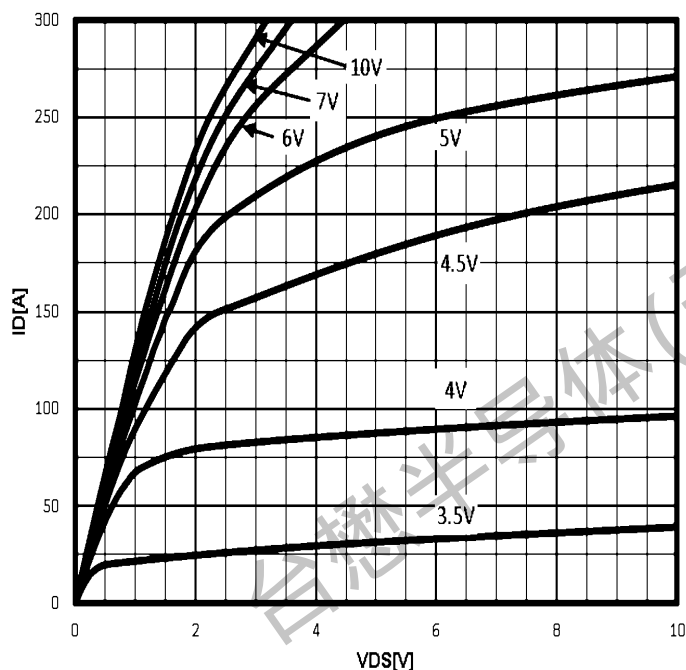
Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	120	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 120V, V _{GS} = 0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-20V	--	--	-100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = 250μA	2.0	2.5	3.0	V
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =20A	--	7.7	9.5	mΩ
		V _{GS} =4.5V, I _D =10A	--	---	---	mΩ
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 60V f = 1.0MHz	--	2410	--	pF
C _{oss}	Output Capacitance		--	282	--	
C _{rss}	Reverse Transfer Capacitance		--	8	--	
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =20A V _{DS} = 60V V _{GS} = 10V R _G = 5Ω	--	20	--	ns
t _r	Rise Time		--	15	--	
t _{d(OFF)}	Turn-Off Delay Time		--	32	--	
t _f	Fall Time		--	10	--	
Q _g	Total Gate Charge	V _{GS} =0~10V V _{DS} = 60V I _D =20A	--	41	--	nC
Q _{gs}	Gate Source Charge		--	12	--	
Q _{gd}	Gate Drain Charge		--	10	--	
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	90	A
V _{SD}	Diode Forward Voltage	I _S =20A, V _{GS} =0V	--	0.83	1.2	V
t _{rr}	Reverse Recovery time	I _S =40A, dI/dt=100A/μs	--	65	--	ns
Q _{rr}	Reverse Recovery Charge		--	109	--	nC

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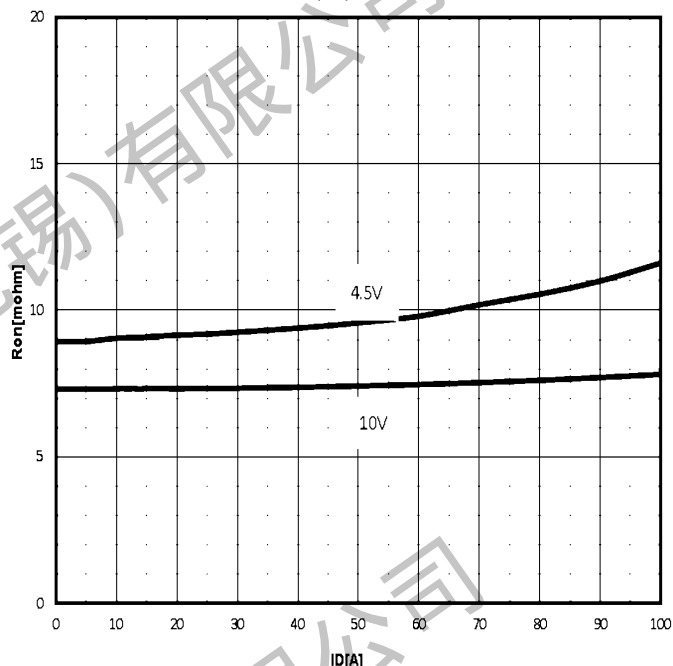
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Characteristics Curve:

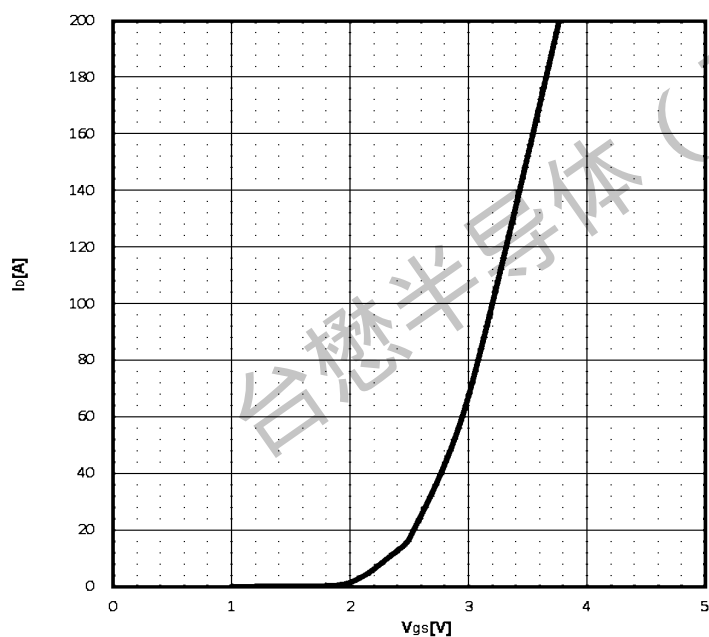
Typ. output characteristics
 $I_D = f(V_{DS})$



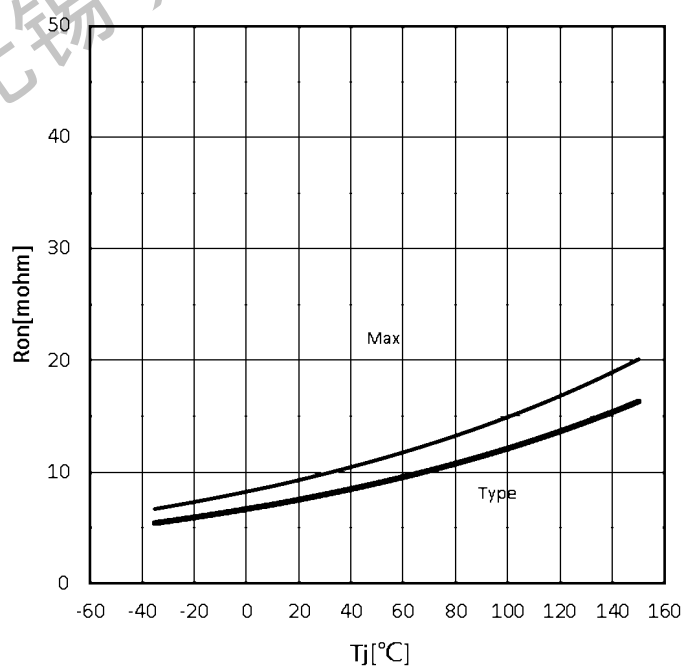
Typ. drain-source on resistance
 $R_{DS(on)} = f(I_D)$



Typ. transfer characteristics
 $I_D = f(V_{GS})$



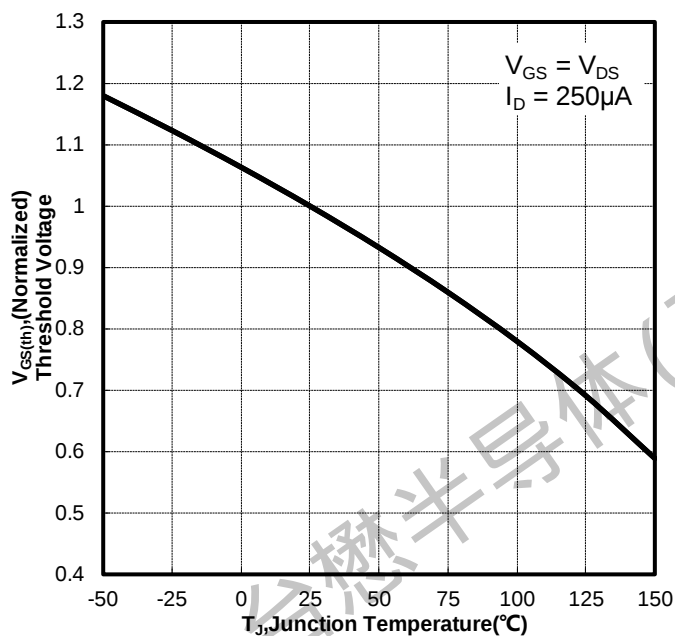
Drain-source on-state resistance
 $R_{DS(on)} = f(T_j)$; $I_D = 20A$; $V_{GS} = 10V$



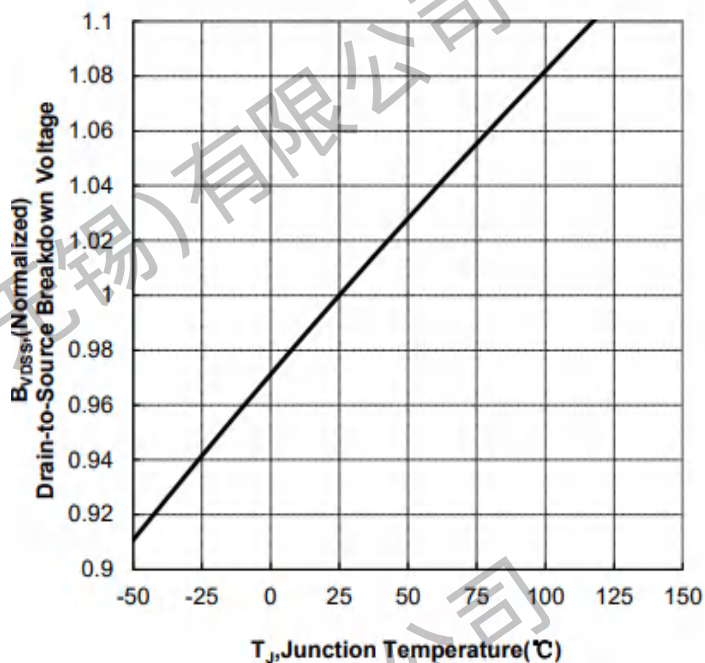
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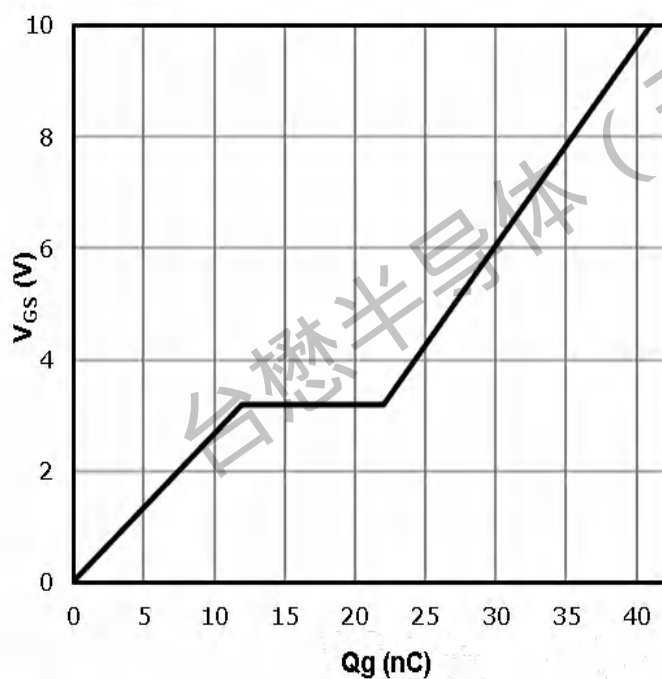
Gate Threshold Voltage
 $V_{TH}=f(T_j)$;
 $I_D=250\mu A$



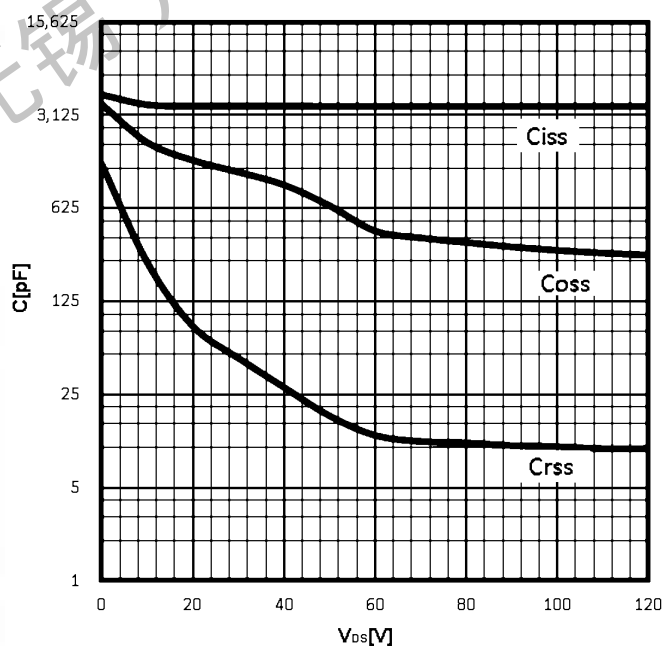
Drain-source breakdown voltage
 $V_{BR(DSS)}=f(T_j)$; $I_D=250\mu A$



Typ. gate charge
 $V_{GS}=f(Q_{gate})$



Typ. capacitances
 $C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$

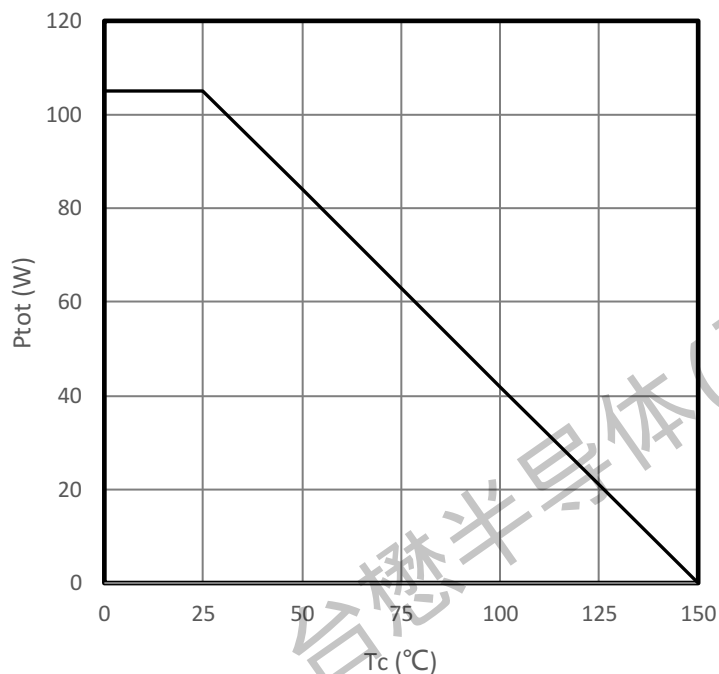


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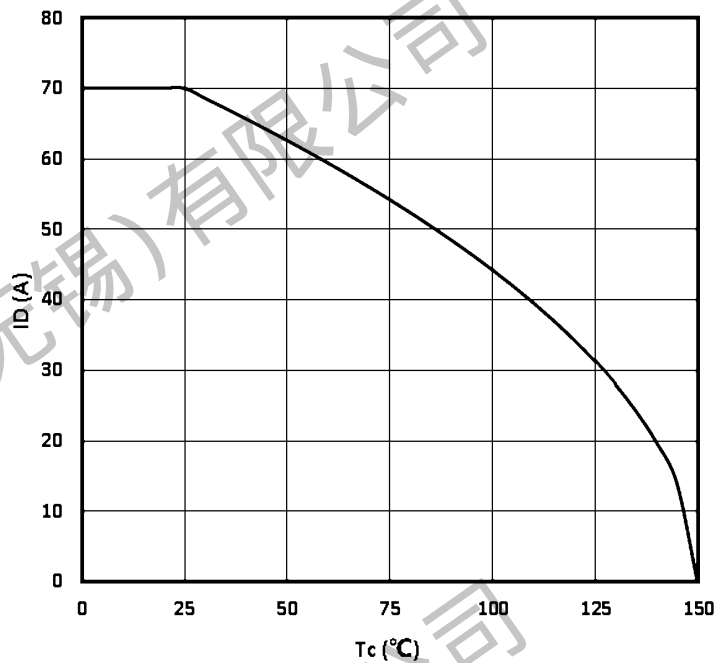
Power Dissipation

$$P_{tot}=f(T_j)$$

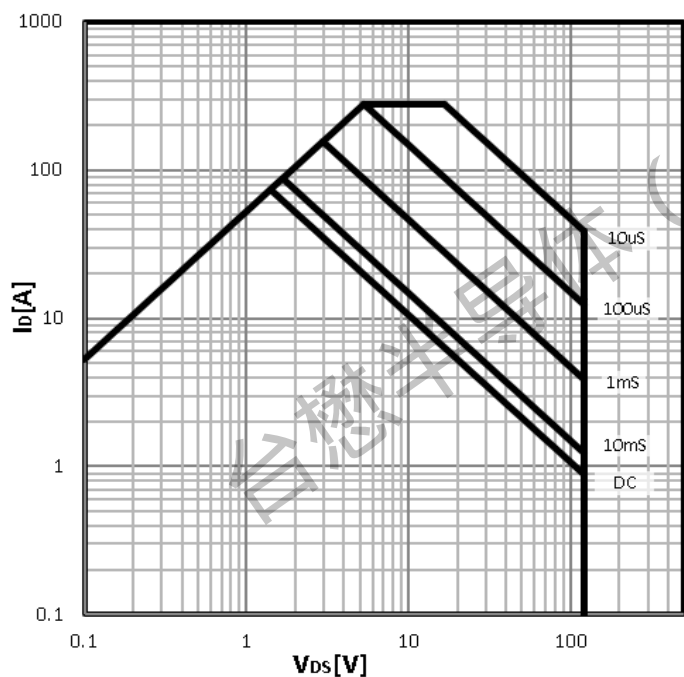


Maximum Drain Current

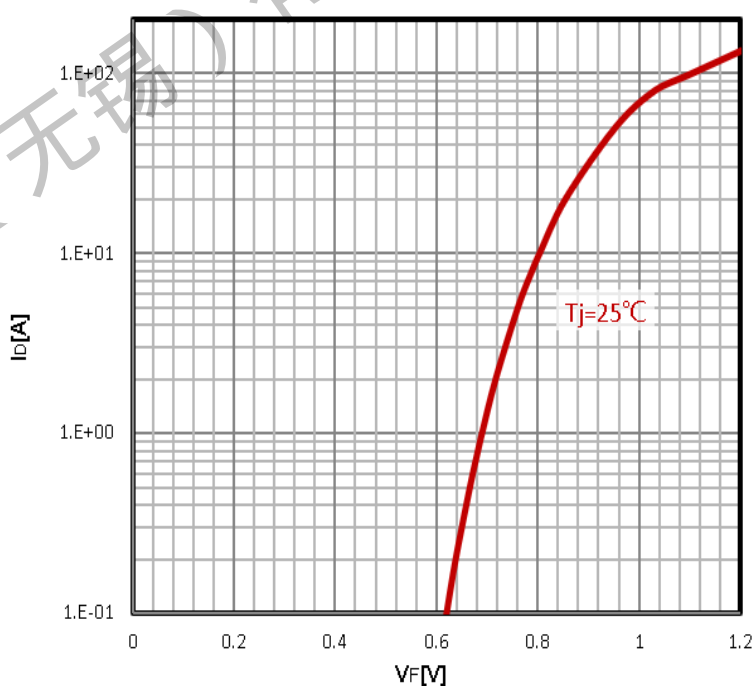
$$I_D=f(T_C)$$



Safe operating area $I_D=f(V_{DS})$



Body Diode Forward Voltage Variation $I_F=f(V_{GS})$

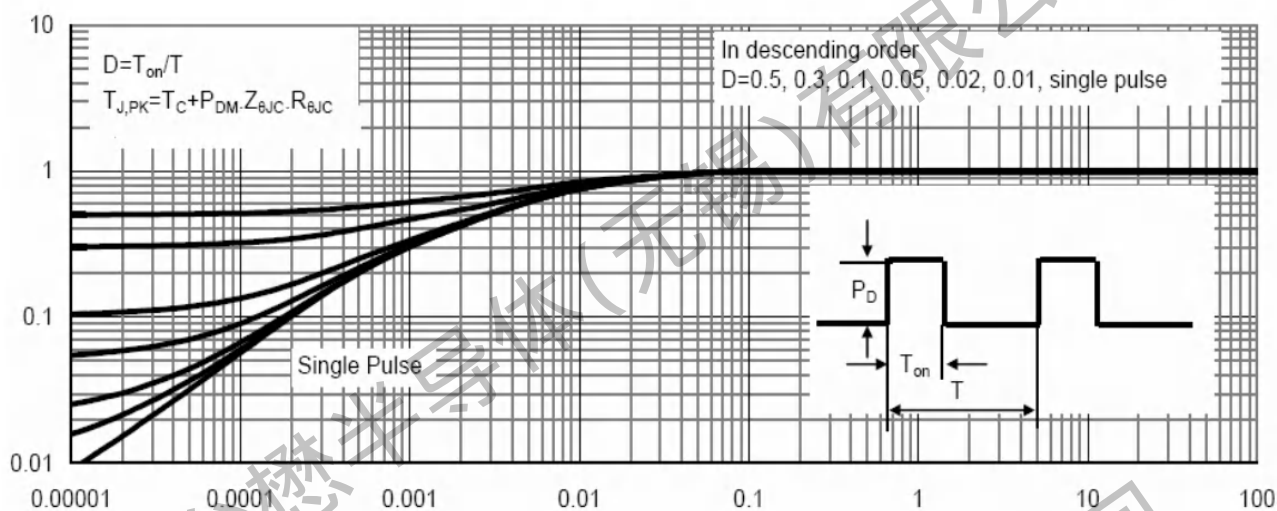


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Max. transient thermal impedance

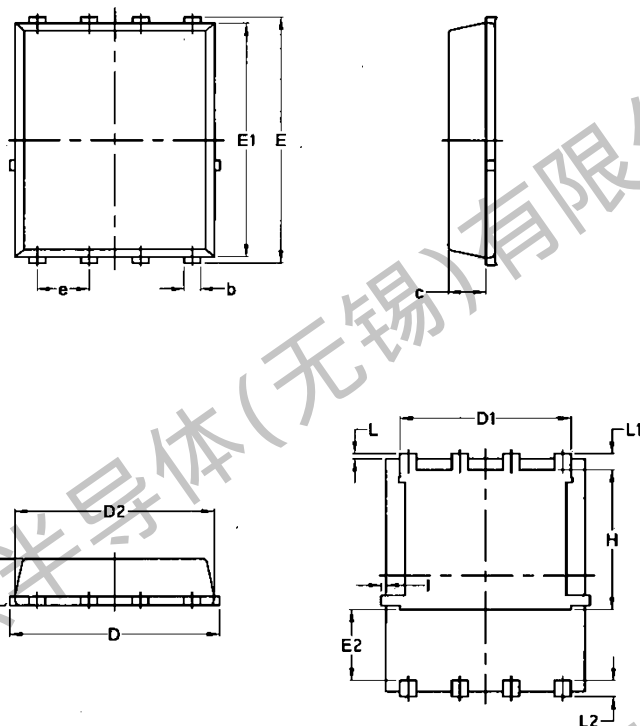
$$Z_{thJC}=f(t_p)$$



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Package Mechanical Data:DFN5x6-8L

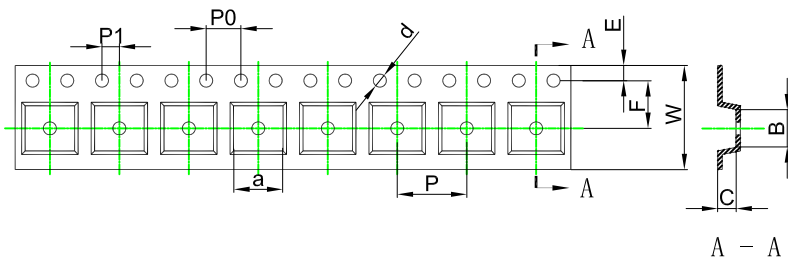


Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L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



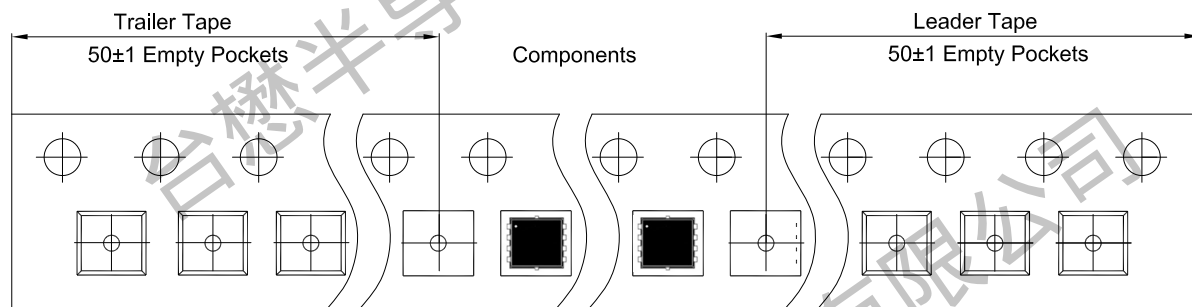
Packaging Description:

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).

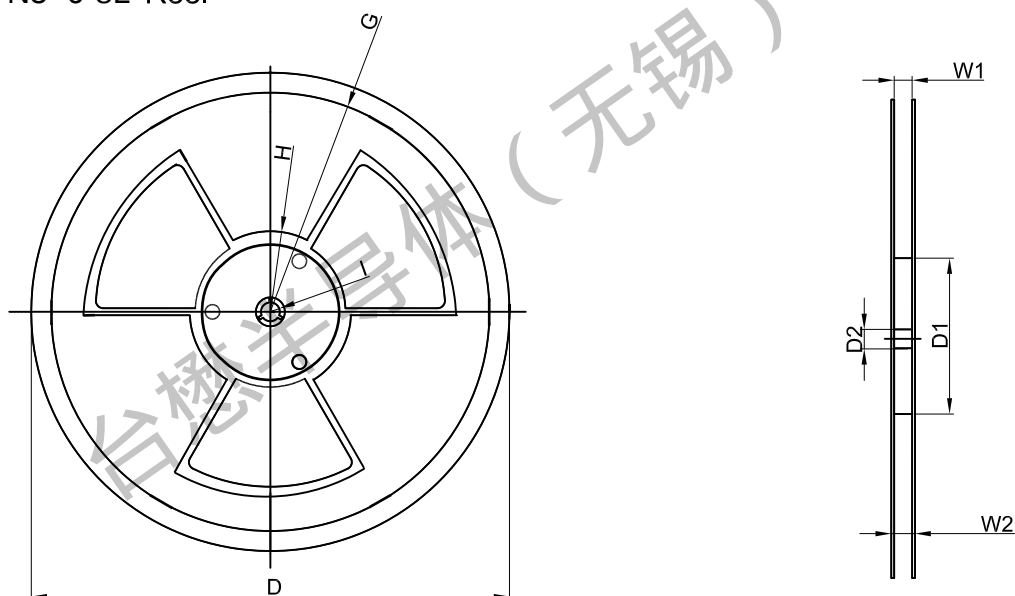
ALL DIM IN mm

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
2023.07.10	23.07	Original	