TMG12N12D

N-Channel Enhancement Mosfet

General Description

- Low R DS(ON)
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

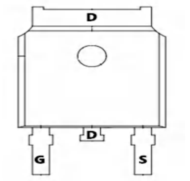
General Features

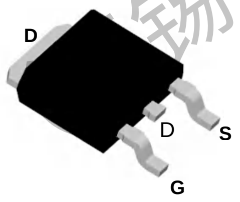
V_{DS} =120V I_D =12A

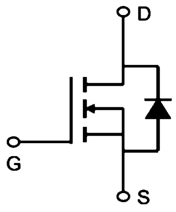
$R_{DS(ON)}$=85mΩ(typ.)@V_{GS}=10V

100% UIS Tested
100% R_g Tested

D:TO-252-3L







Marking G12N12

Absolute Maximum Ratings (T_C = 25°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˚C	Continuous Drain Current, V_{GS} @ 10V	12	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V	8.7	A
I_{DM}	Pulsed Drain Current	60	A
EAS	Single Pulse Avalanche Energy	22	mJ
P_D@T_C=25˚C	Total Power Dissipation	46	W
T_{STG}	Storage Temperature Range	-55 to 175	˚C
T_J	Operating Junction Temperature Range	-55 to 175	˚C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient	---	62	˚C/W
$R_{θJC}$	Thermal Resistance Junction-Case	---	6.6	˚C/W

Electrical Characteristics (T$_J$= 25℃ 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} = 100V, 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=5A	--	85	99	mΩ
		V_{GS}=4.5V,I_D=4A		---	---	mΩ

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=50V f=1.0MHz	--	248	--	pF
C_{oss}	Output Capacitance		--	60	--	
C_{rss}	Reverse Transfer Capacitance		--	2.0	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=10A, R_L=0.75Ω V_{DS}=50V V_{GS}= 10V R_G= 3Ω	--	9	--	ns
tr	Rise Time		--	18	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	19	--	
t_f	Fall Time		--	16	--	
Q_g	Total Gate Charge	V_{GS}=10V V_{DS}=50V I_D=10A	--	3.8	--	nC
Q_{gs}	Gate Source Charge		--	0.9	--	
Q_{gd}	Gate Drain Charge		--	1	--	

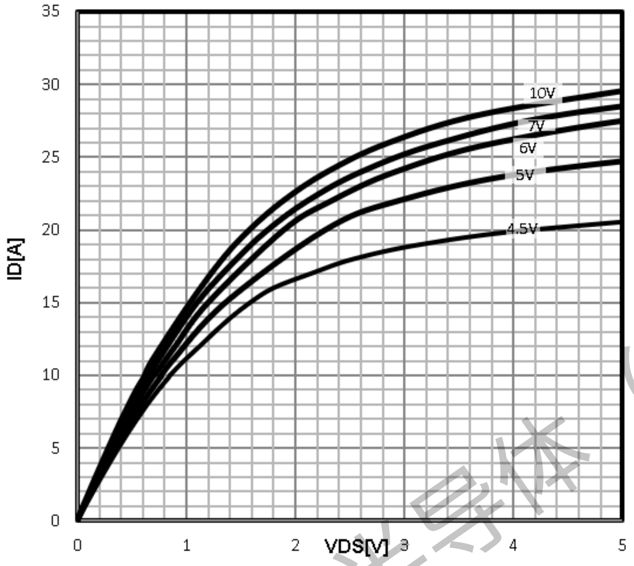
Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	T_C=25 °C	--	--	12	A
V_{SD}	Diode Forward Voltage	I_S=0.5A,V_{GS}=0V	--	--	1.2	V
t_{rr}	Reverse Recovery time	I_S=10A, V_{DD}=50V dI/dt=100A/μs	--	24	--	ns
Q_{rr}	Reverse Recovery Charge		--	20	--	nC

Characteristics Curve:

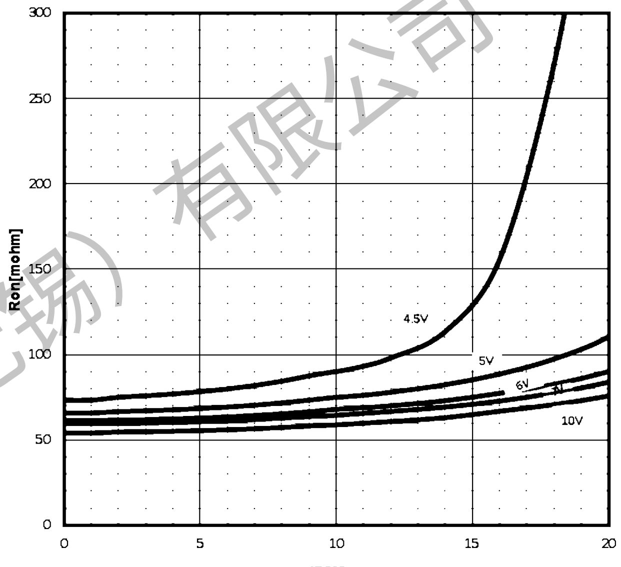
Typ. output characteristics

$I_D=f(V_{DS})$



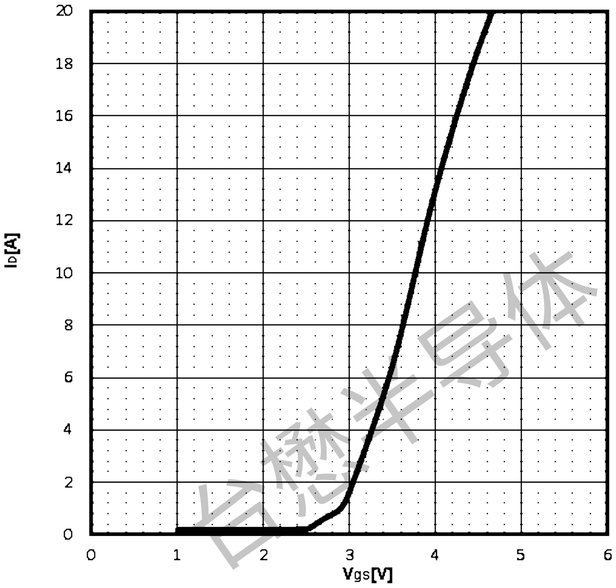
Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$



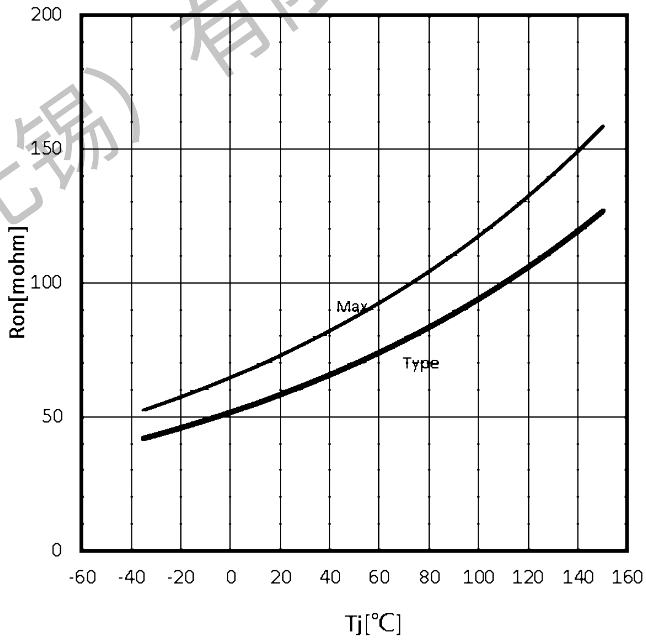
Typ. transfer characteristics

$I_D=f(V_{GS})$



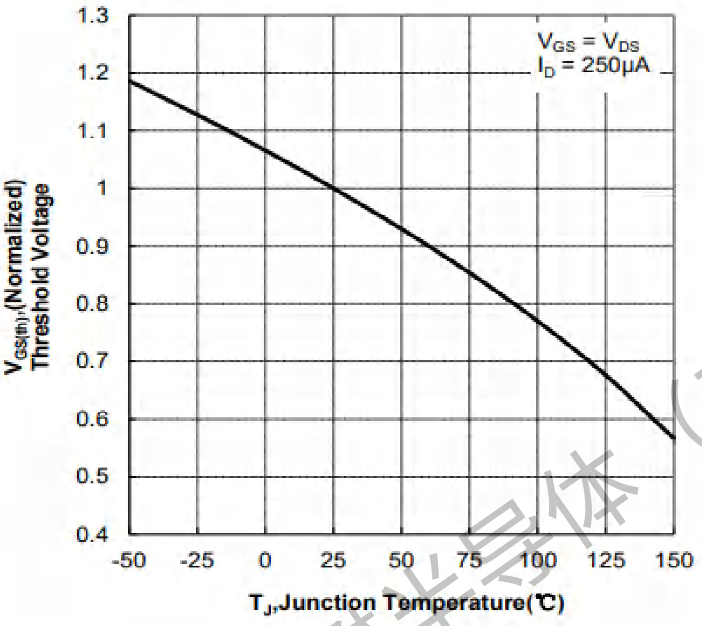
Drain-source on-state resistance

$R_{DS(on)}=f(T_j)$;I_D=5A; V_{GS}=10V



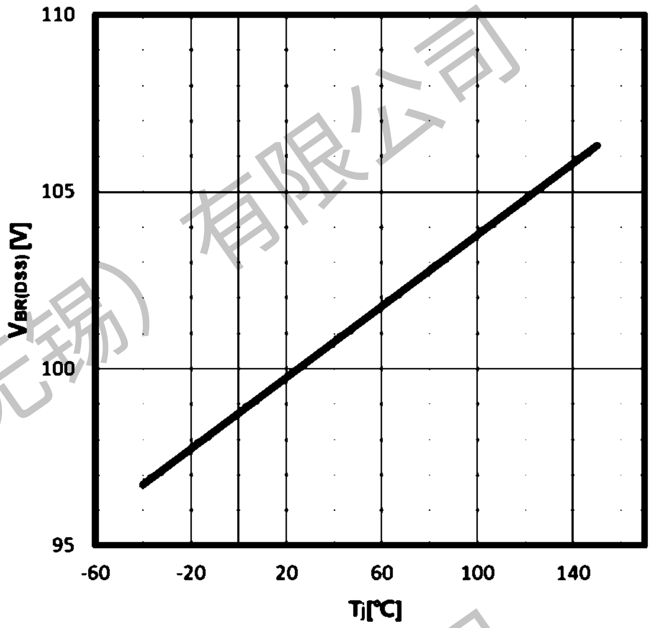
Gate Threshold Voltage

$V_{TH}=f(T_j)$; I_D=250uA



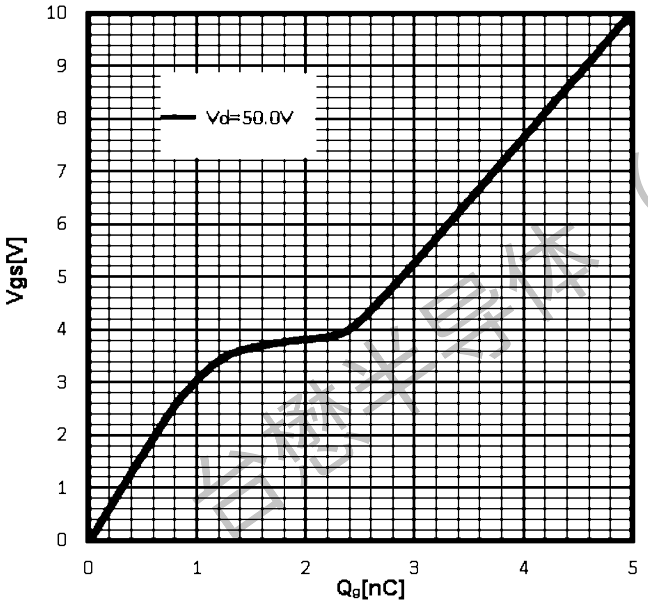
Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j)$; I_D=250uA



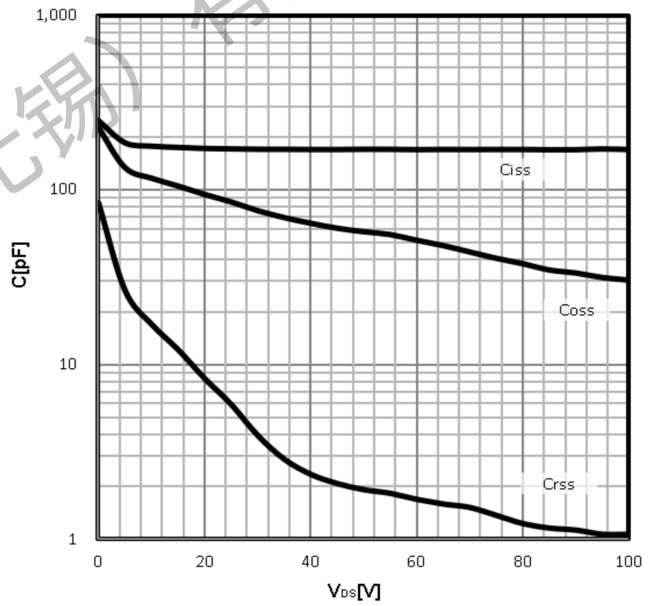
Typ. gate charge

$V_{GS}=f(Q_g)$; I_D=10A

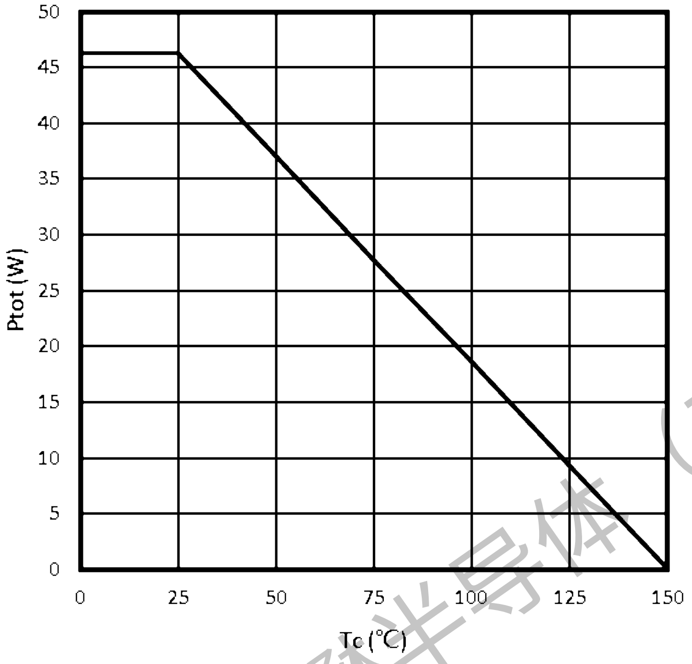


Typ. capacitances

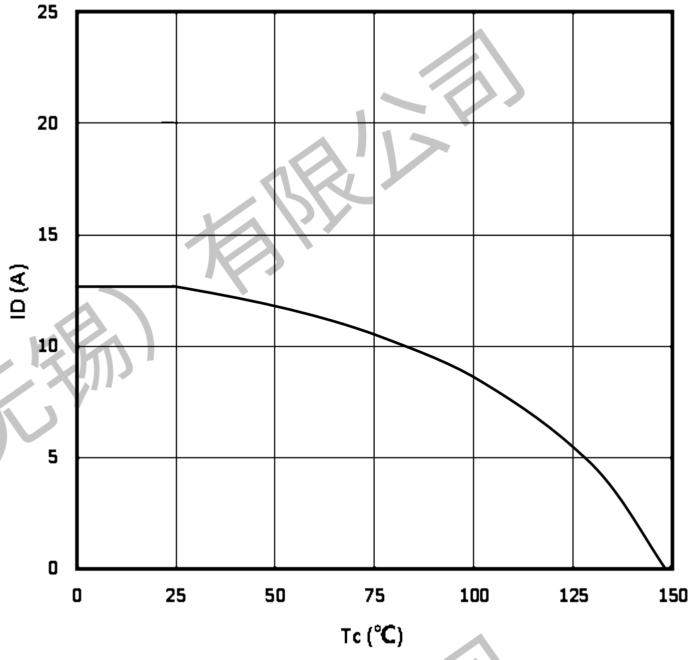
C =f(V_{DS}); V_{GS}=0V; f =1MHz



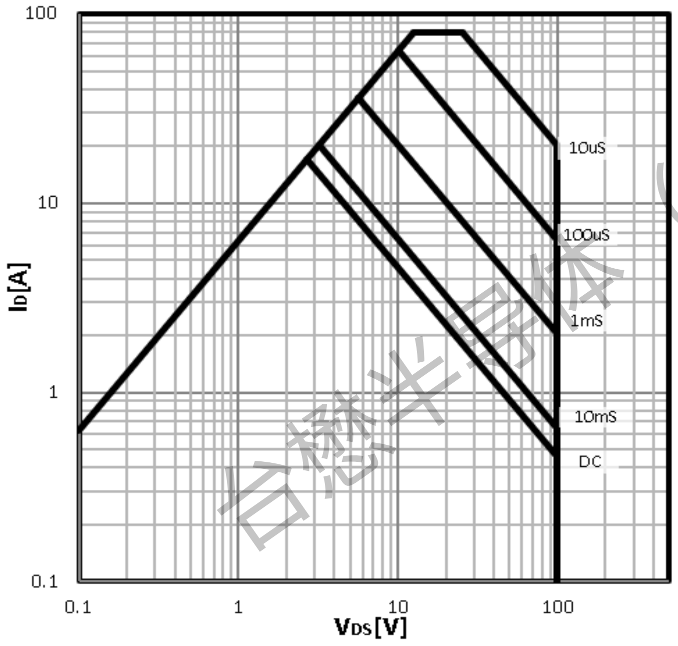
Power Dissipation
P_{tot}=f(T_C)



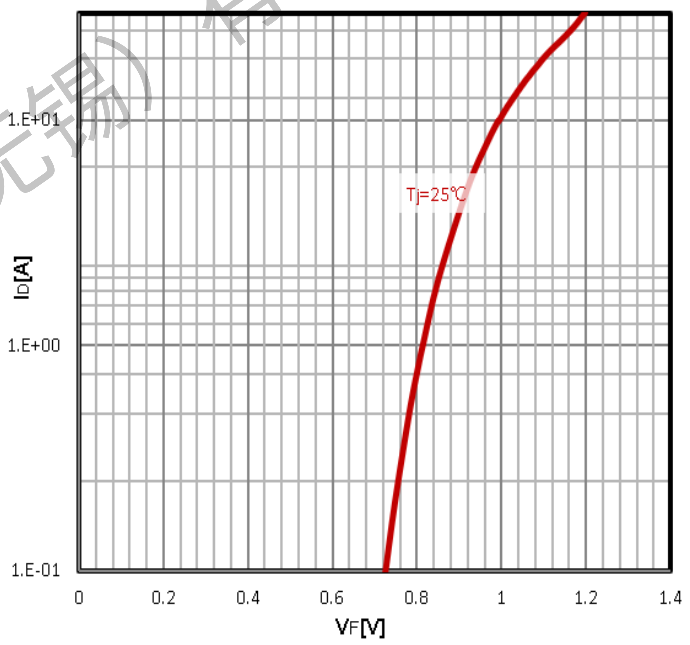
Maximum Drain Current I_D=f(T_C)



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

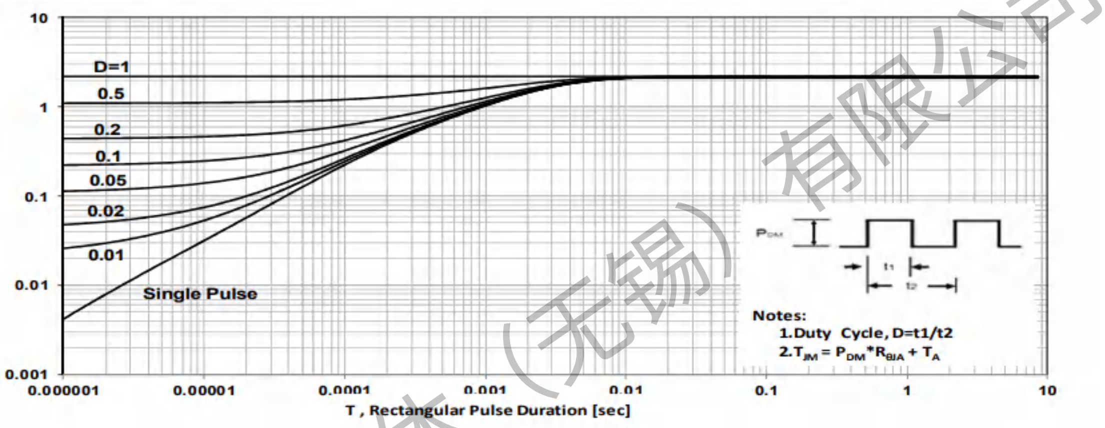


Body Diode Forward Voltage Variation
I_F=f(V_{GS})

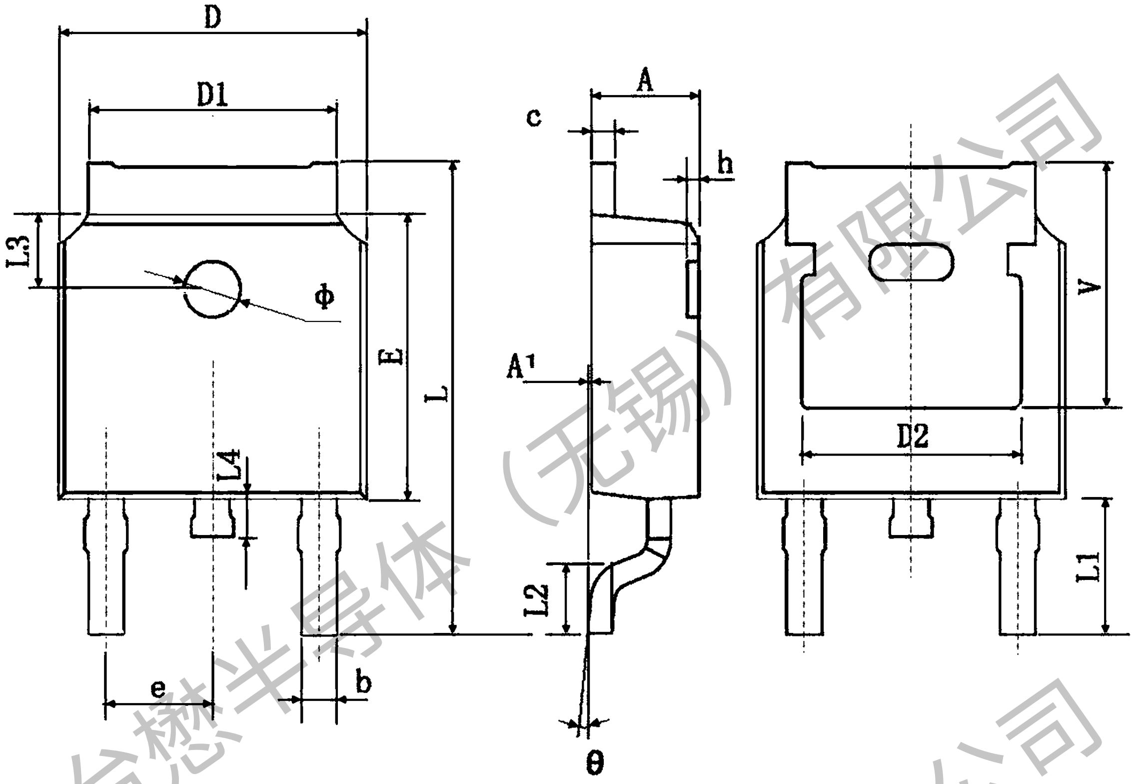


Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

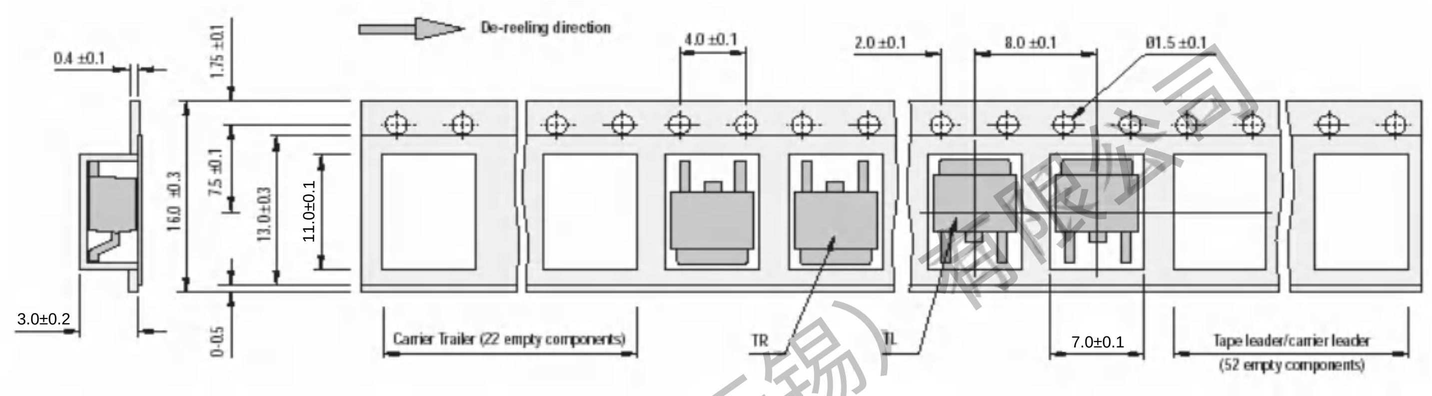


Package Mechanical Data: TO-252-3L

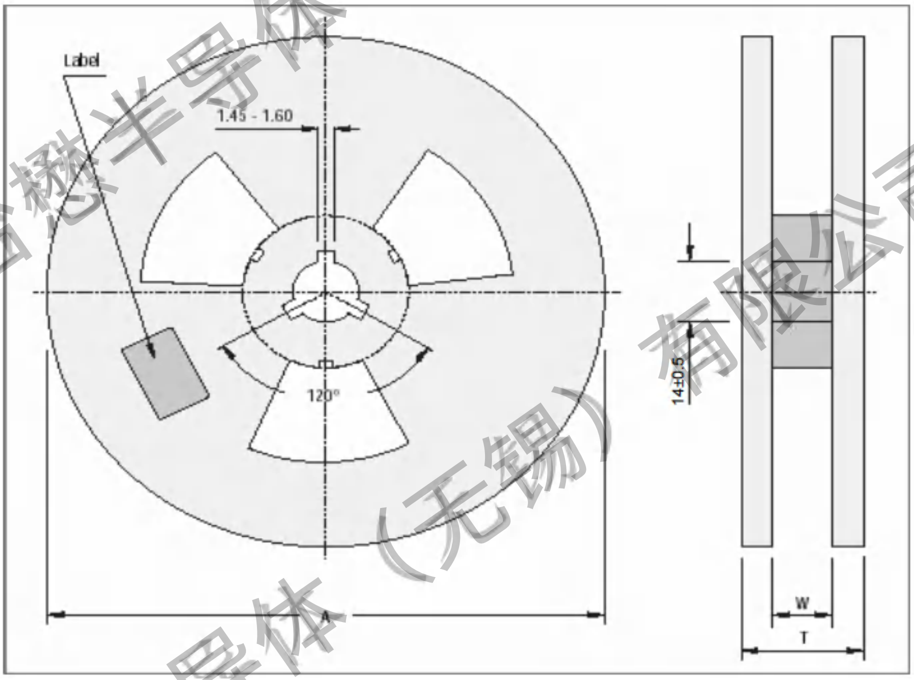


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

TO-252-3L Embossed Carrier Tape



TO-252-3L Reel



All Dimensions are in mm

Reel Specifications				
Package	Tape Width	Reel Dia. A - Max	Inside Thickness W	Reel Thickness T - max
TO-252-3L	16	330	18.0 ±1.5	20

Packaging Information

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13 inch	5,000 pcs	355×370×50	25,000 pcs	380×275×380	

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Revision history:

Date	Rev	Description	Page
2024.12.23	24.12	Original	