

TMG60P06D

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

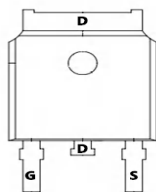
General Features

$V_{DS} = -60V$ $I_D = -60A$
 $R_{DS(ON)} = 12m\Omega$ (Typ.) @ $V_{GS} = -10V$

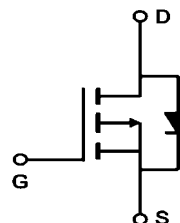
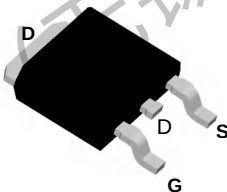
100% UIS Tested
100% R_g Tested



D:TO-252-3L



Marking: G60P06



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-60	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-39	A
I_{DM}	Pulsed Drain Current	-172	A
EAS	Single Pulse Avalanche Energy	337	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	100	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	---	6.6	$^\circ C/W$



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Electrical Characteristics ($T_J = 25^\circ\text{C}$ 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	-60	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = -60V, 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	-1.0	-2.0	-3.0	V
R _{DS(ON)} ₁	Drain-to-Source On-Resistance	V _{GS} =-10V, I _D =-20A	--	12	17	mΩ
R _{DS(ON)} ₂	Drain-to-Source On-Resistance	V _{GS} =-4.5V, I _D =-10A	--	18	24	mΩ
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} =0V V _{DS} =-30V f=1.0MHz	--	2200	--	pF
C _{oss}	Output Capacitance		--	484	--	
C _{rss}	Reverse Transfer Capacitance		--	9.4	--	
R _g	Gate resistance	V _{GS} =0V, V _{DS} Open	--	12.5	--	Ω
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =-10A, R _L =3.0Ω V _{DS} = -30V V _{GS} = -10V R _G = 3Ω	--	20	--	ns
t _r	Rise Time		--	25	--	
t _{d(OFF)}	Turn-Off Delay Time		--	60	--	
t _f	Fall Time		--	30	--	
Q _g	Total Gate Charge	V _{GS} =-10V V _{DS} =-30V I _D =-10A	--	38	--	nC
Q _{gs}	Gate Source Charge		--	6.9	--	
Q _{gd}	Gate Drain Charge		--	4.98	--	
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	-60	A
V _{SD}	Diode Forward Voltage	I _S =-5.0A, V _{GS} =0V	--	--	-1.2	V
t _{rr}	Reverse Recovery time	I _S =-10A, V _{DD} =-30V	--	50	--	ns
O _{rr}	Reverse Recovery Charge	dI/dt=100A/μs	--	80	--	nC

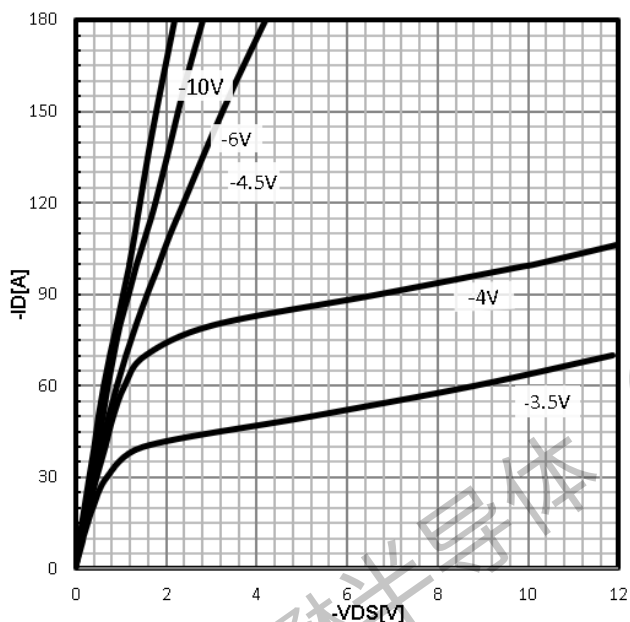
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Characteristics Curve:

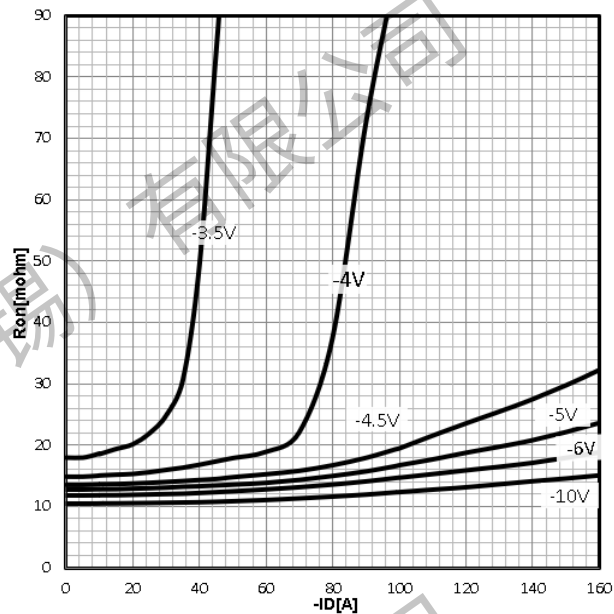
Typ. output characteristics

$$-I_D = f(-V_{DS})$$



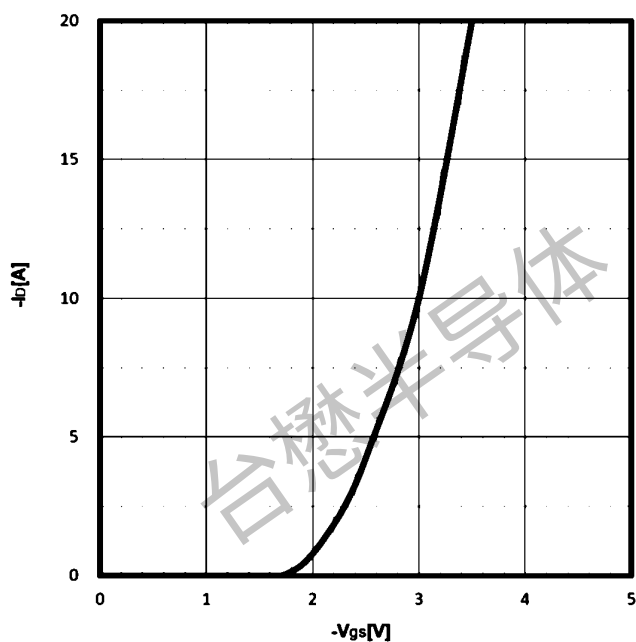
Typ. drain-source on resistance

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



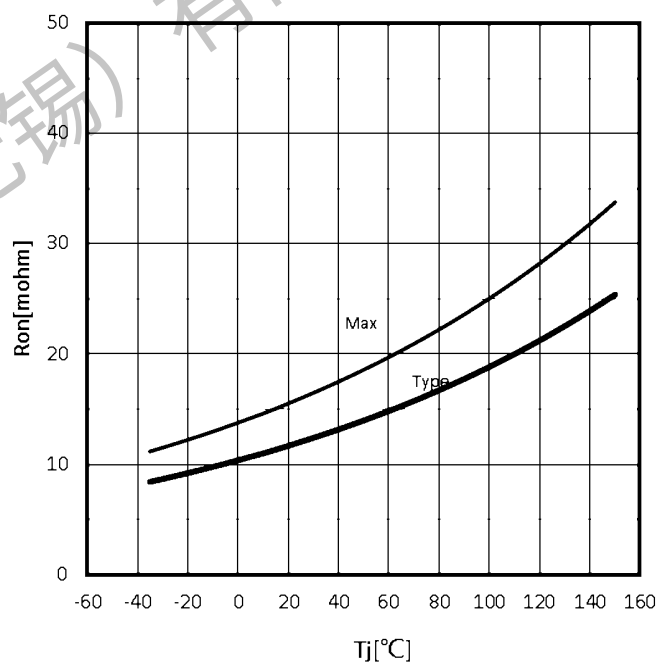
Typ. transfer characteristics

$$-I_D = f(-V_{GS})$$



Drain-source on-state resistance

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

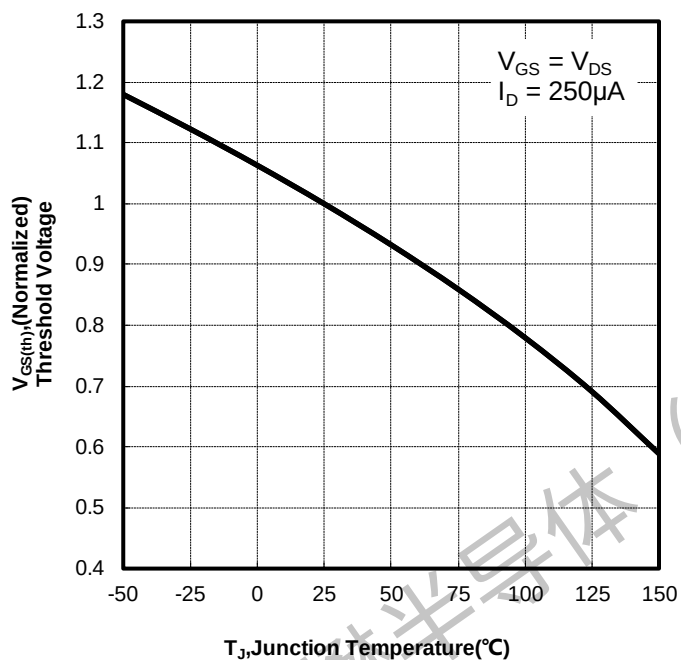


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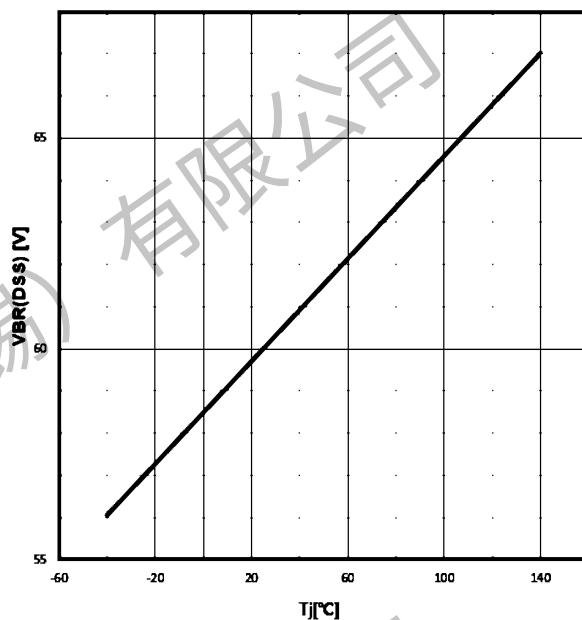
Gate Threshold Voltage

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



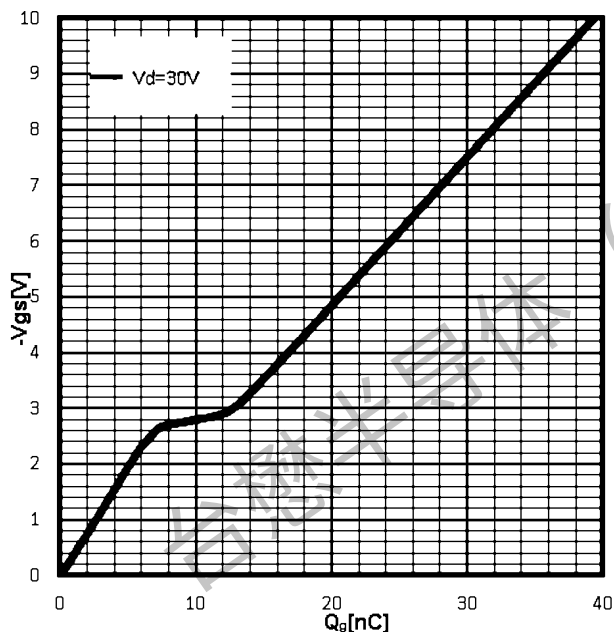
Drain-source breakdown voltage

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



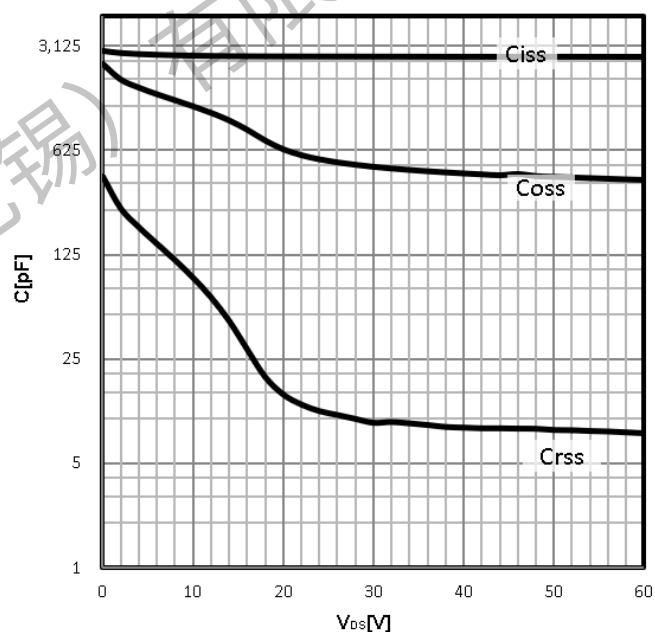
Typ. gate charge

$$V_{GS}=f(Q_{gate}); I_D=-10A$$



Typ. Capacitances

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

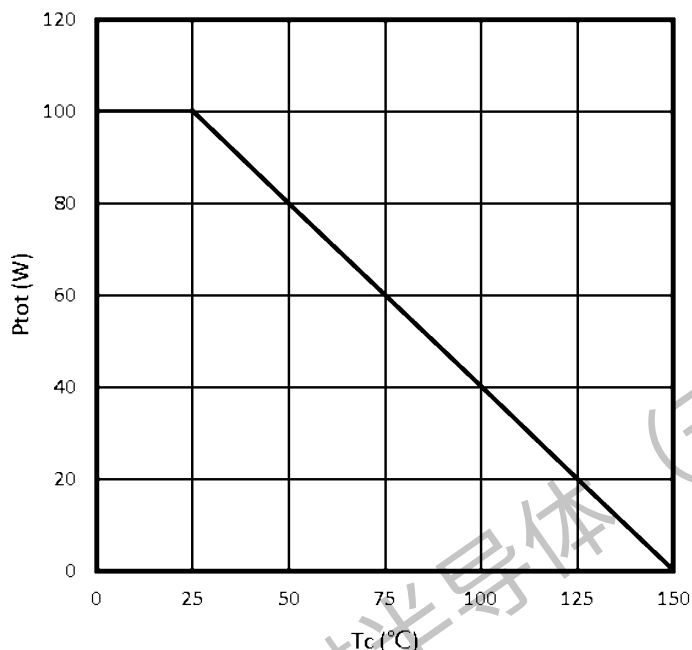


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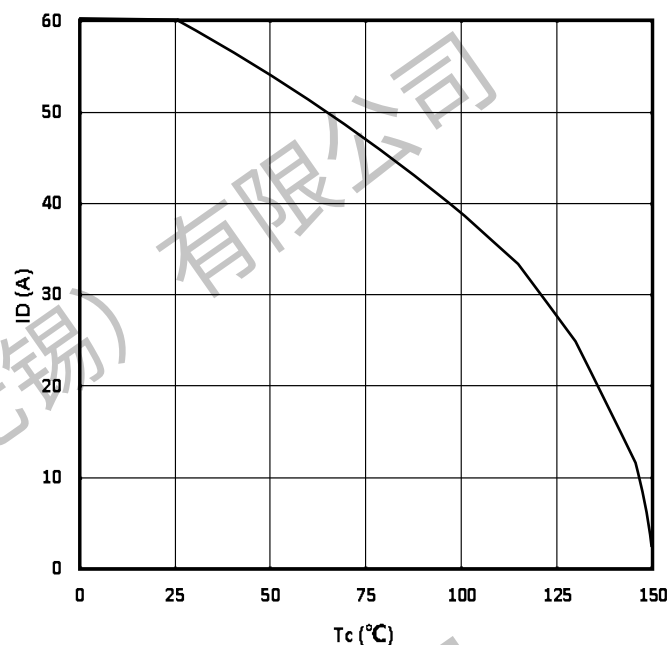
Power Dissipation

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



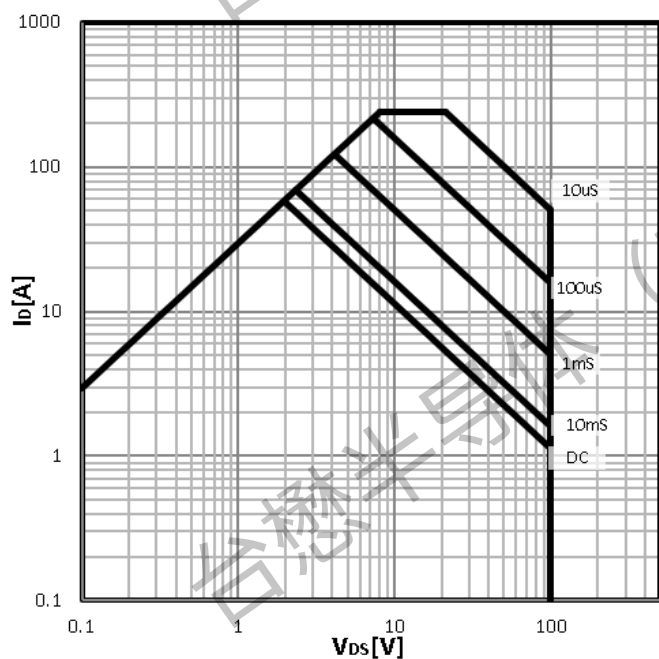
Maximum Drain Current

$$-I_D=f(T_C)$$



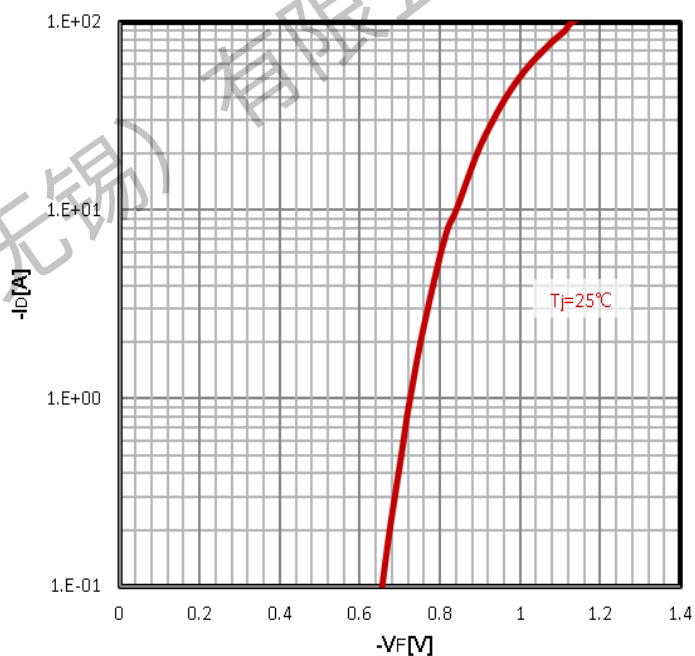
Safe operating area

$$-I_D=f(-V_{DS})$$



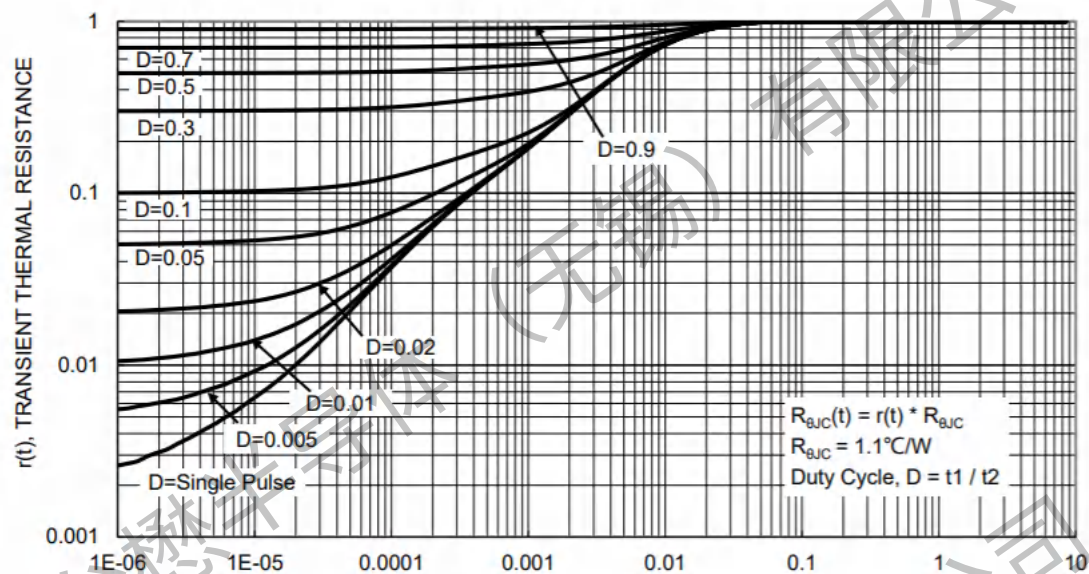
Body Diode Forward Voltage Variation

$$-I_F=f(-V_{DS})$$



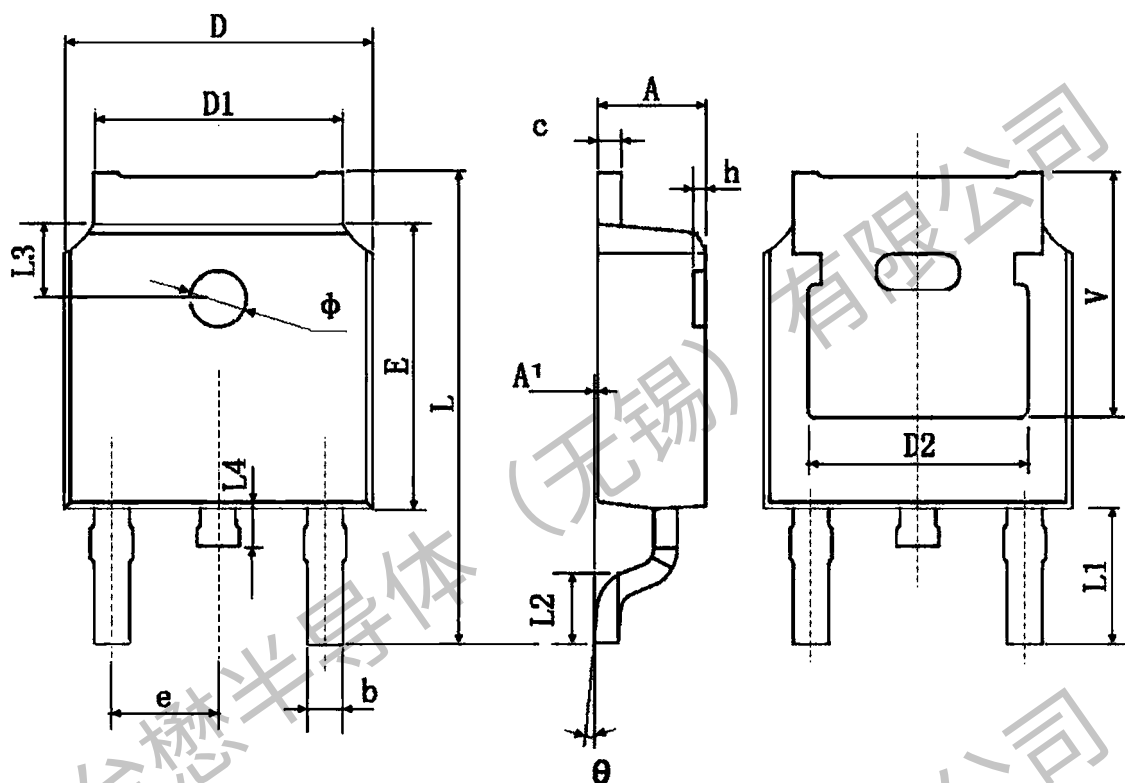
Max. transient thermal impedance

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



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Package Mechanical Data: TO-252-3L

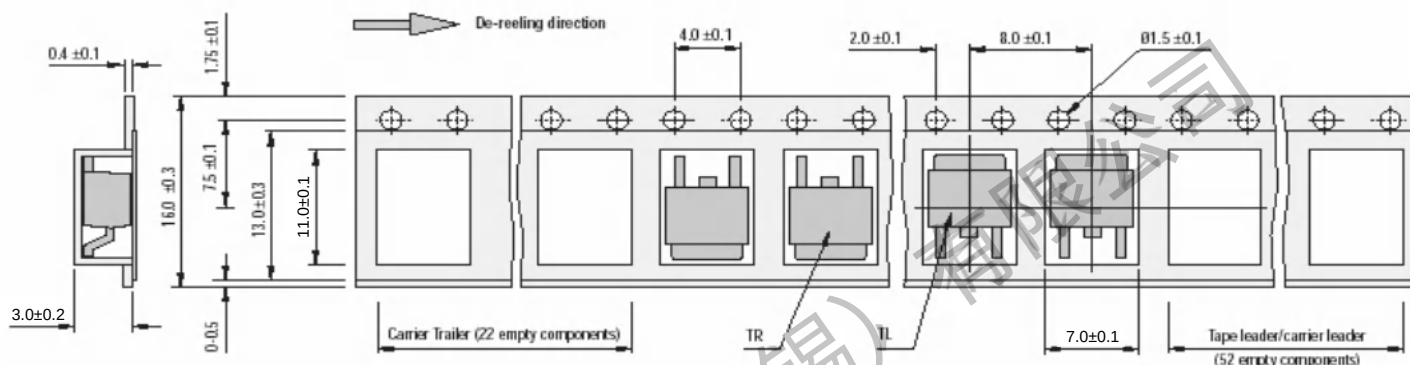


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	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.	

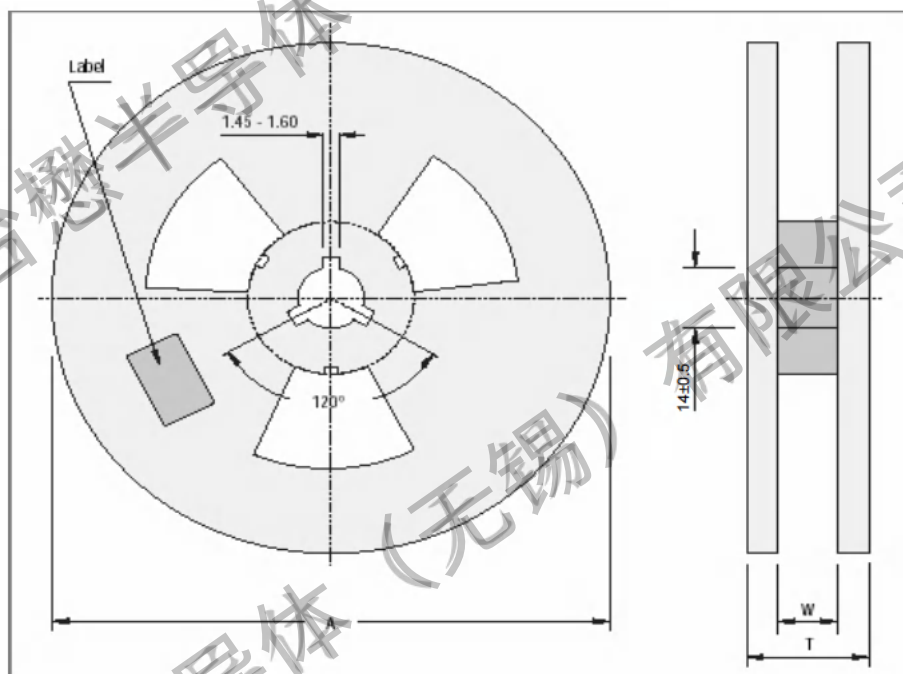
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TO-252-3L Embossed Carrier Tape



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
2023.06.08	23.06	Original	