

TMG25P06D

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

$V_{DS} = -60V$ $I_D = -25A$

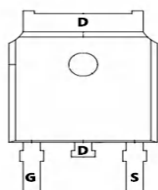
$R_{DS(ON)} = 40m\Omega$ (typ.) @ $V_{GS} = -10V$

100% UIS Tested

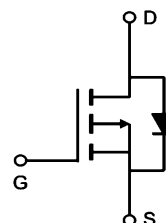
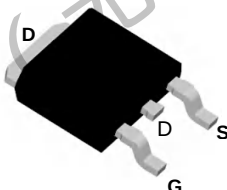
100% R_g Tested



D:TO-252-3L



Marking: G25P06



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, $V_{GS} @ -10V$	-25	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-16	A
I_{DM}	Pulsed Drain Current	-100	A
EAS	Single Pulse Avalanche Energy	48	mJ
P_D	Total Power Dissipation	40	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 Characteristic ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=-60V, V_{GS}=0V$	--	--	1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=-20V, V_{DS}=0V$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=+20V, V_{DS}=0V$	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-2.0	-3.0	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-10V, I_D=-10A$	--	40	48	$m\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-5.0A$	--	49	59	$m\Omega$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = -30V$ $f = 1.0MHz$	--	667	--	pF
C_{oss}	Output Capacitance		--	114	--	
C_{rss}	Reverse Transfer Capacitance		--	5.2	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}$ Open	--	5.0	--	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D = -10A$ $V_{DS} = -30V$ $V_{GS} = -10V$ $R_G = 3\Omega$	--	10	--	ns
t_r	Rise Time		--	6	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	40	--	
t_f	Fall Time		--	13	--	
Q_g	Total Gate Charge	$V_{GS} = -10V$ $V_{DS} = -30V$ $I_D = -10A$	--	11.6	--	nC
Q_{gs}	Gate Source Charge		--	2.4	--	
Q_{gd}	Gate Drain Charge		--	1.5	--	

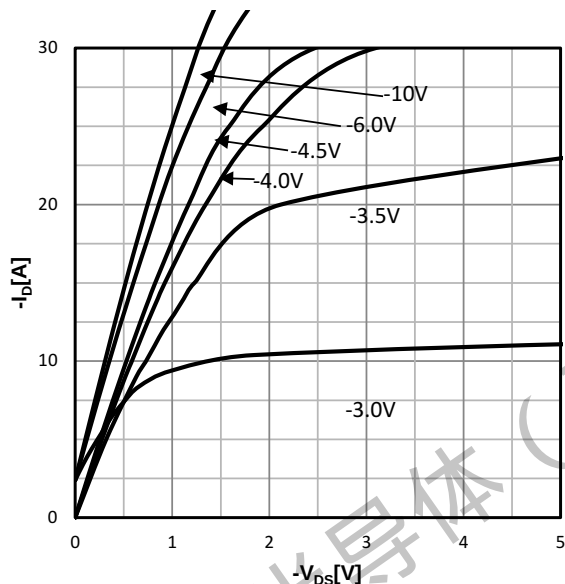
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	--	--	-25	A
I_{SM}	Diode Pluse Current		--	--	-100	A
V_{SD}	Diode Forward Voltage	$I_S = -10A, V_{GS} = 0V$	--	--	-1.2	V
t_{rr}	Reverse Recovery time	$I_S = -10A, V_{DD} = -30V,$ $di/dt = 100A/us$	--	28	--	ns
Q_{rr}	Reverse Recovery Charge		--	40	--	nC

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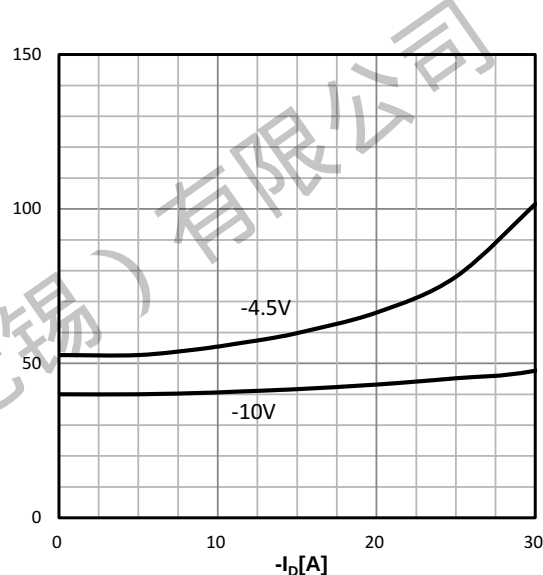
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General Description:

Figure 1: Typ. output characteristics

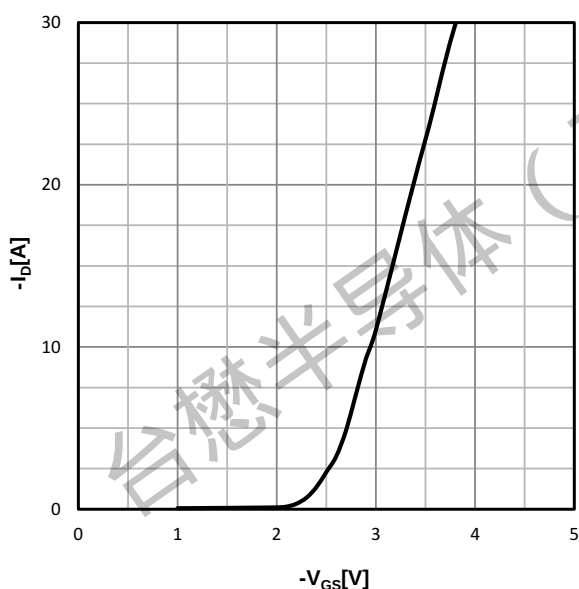


$$I_D = f(V_{DS}), T_j = 25^\circ\text{C}; \text{ parameter: } V_{GS}$$



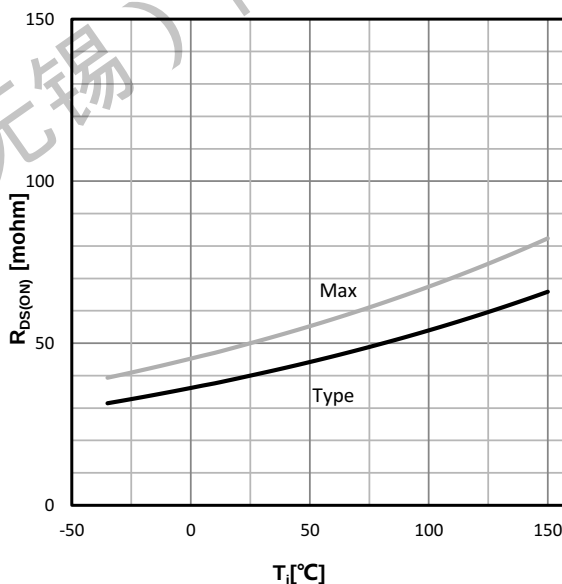
$$R_{DS(on)} = f(I_D), T_j = 25^\circ\text{C}; \text{ parameter: } V_{GS}$$

Figure 3: Typ. transfer characteristics



$$I_D = f(V_{GS}), |V_{DS}| > 2|I_D|R_{DS(on)max};$$

Figure 4: drain-source on resistance

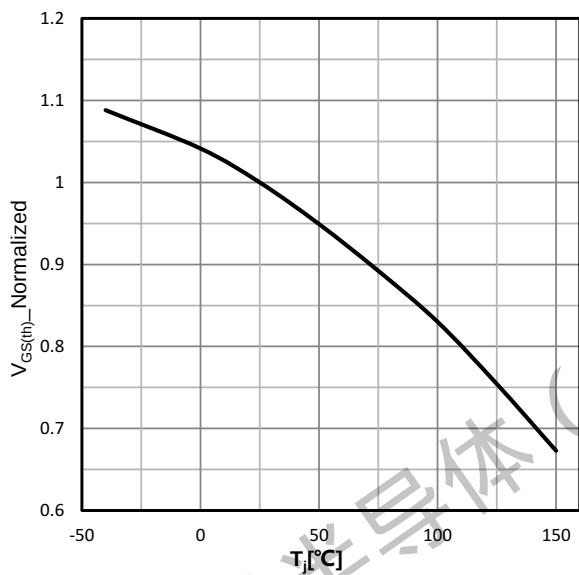


$$R_{DS(on)} = f(T_j), I_D = -10A, V_{GS} = -10V;$$

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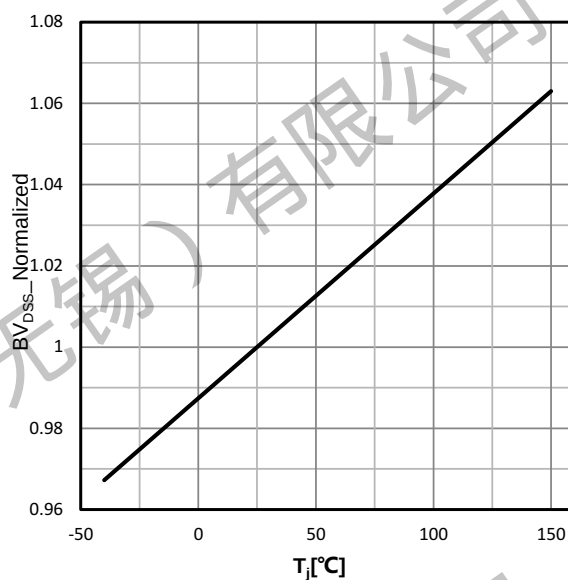
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Figure 5: Typ. gate threshold voltage



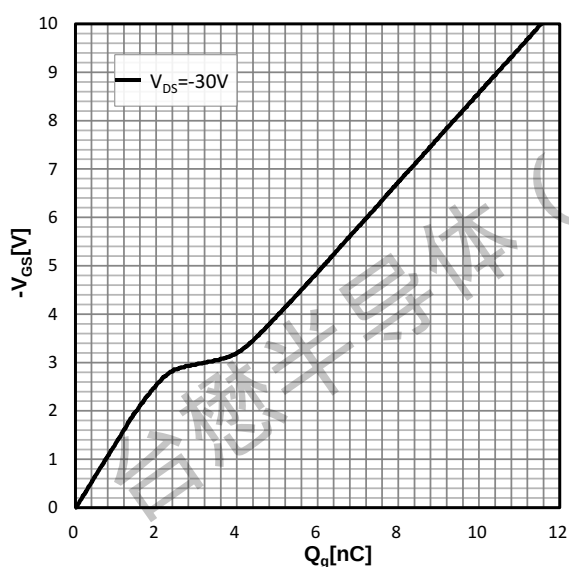
$$V_{GS} = f(T_J), V_{GS} = V_{DS}, I_D = -250 \mu A;$$

Figure 6: Drain-source breakdown voltage



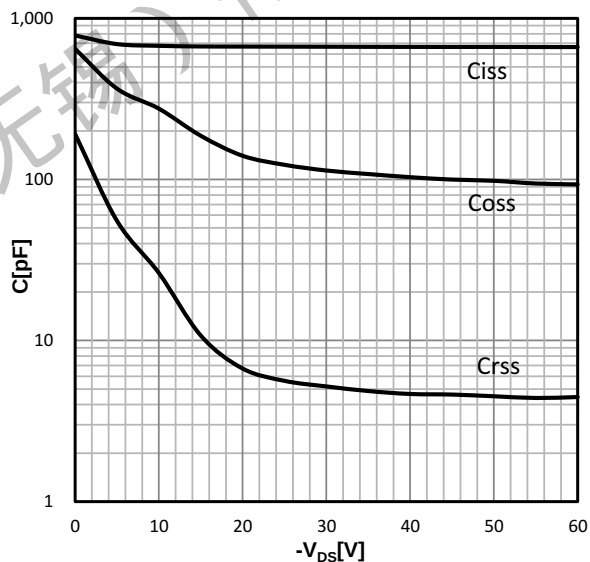
$$V_{BR(DSS)} = f(T_J); I_D = -250 \mu A;$$

Figure 7: Typ. gate charge



$$V_{GS} = f(Q_g), I_D = -10A, T_J = 25^\circ C; \text{ parameter: } V_{DS}$$

Figure 8: Typ. Capacitances



$$C = f(V_{DS}); V_{GS} = 0V; f = 1.0 \text{ MHz};$$

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Figure 9: Power dissipation

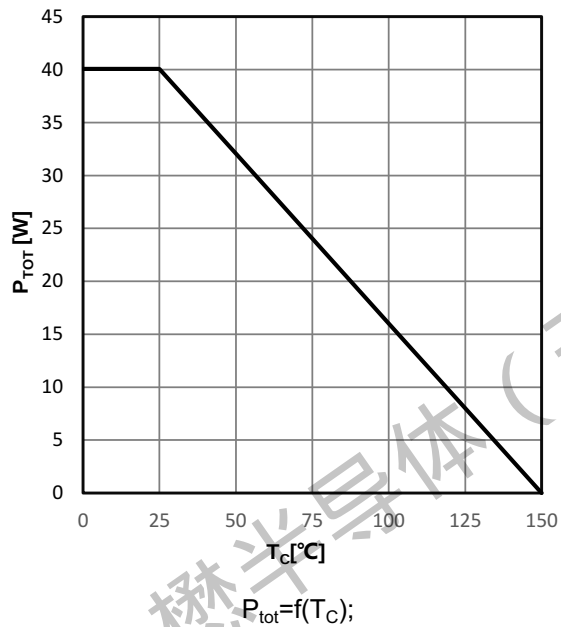


Figure 10: Drain current

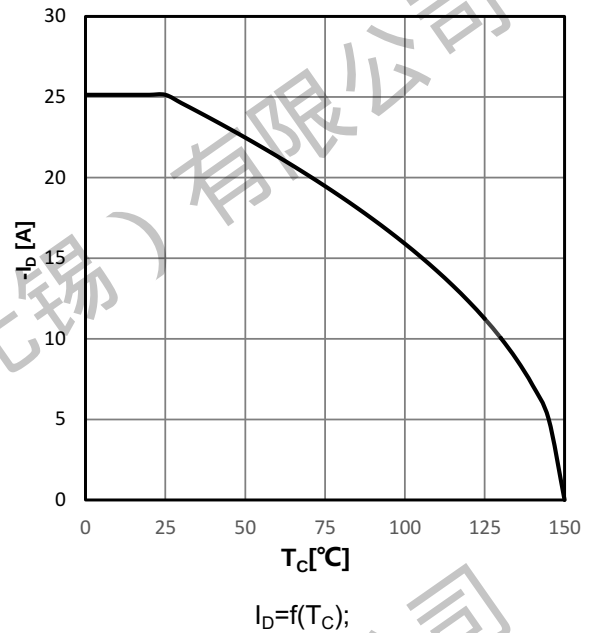


Figure 11: Safe operating area

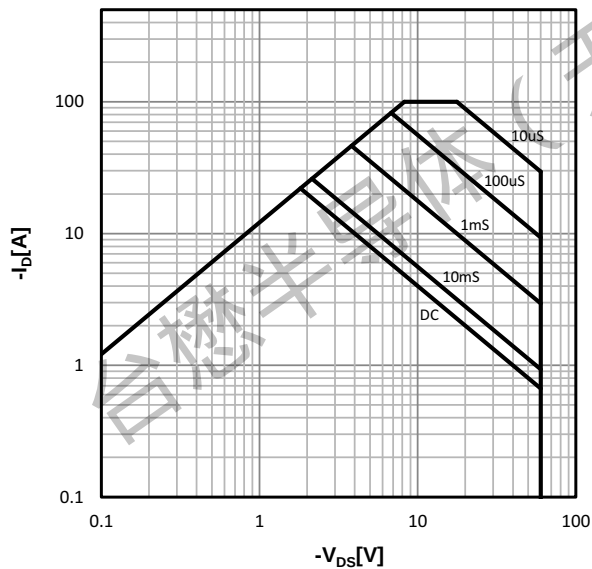
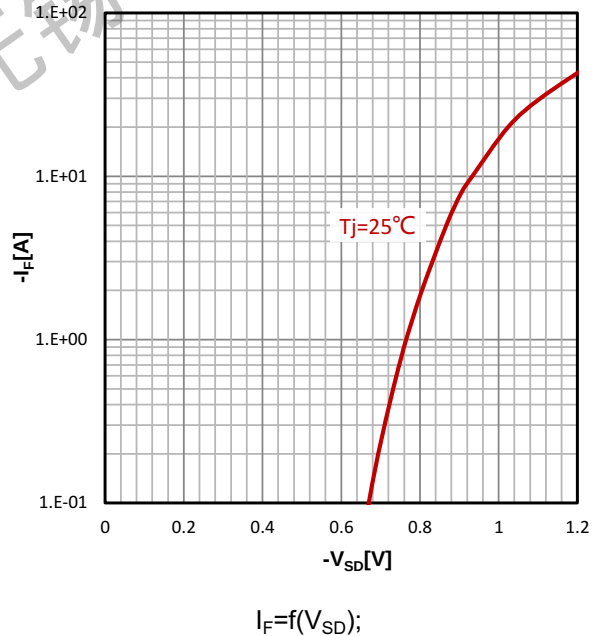


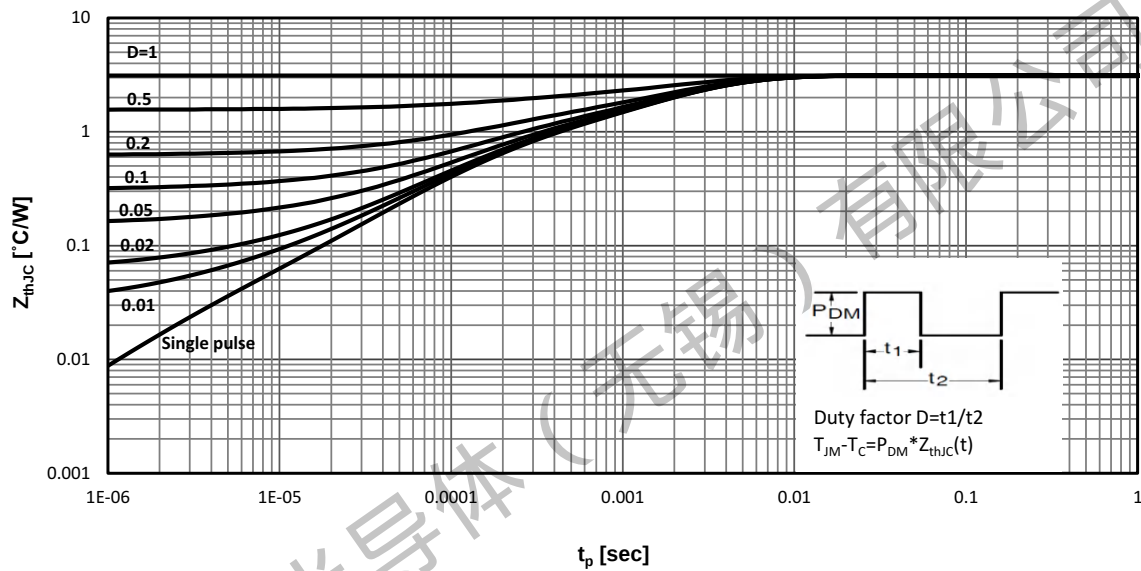
Figure 12: Typ. forward characteristics



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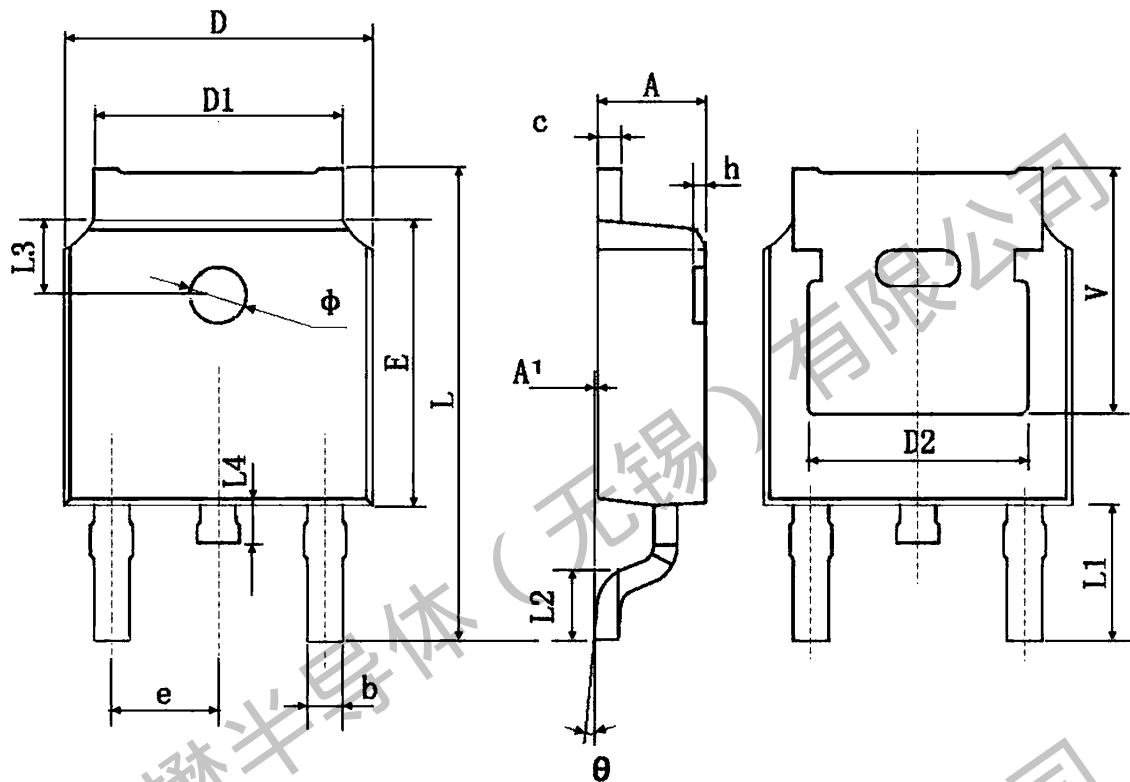
Figure 13: Max. Transient Thermal Impedance



$$Z_{thJC} = f(t_p); \text{ parameter: } D$$

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Package Mechanical Data: TO-252-3L

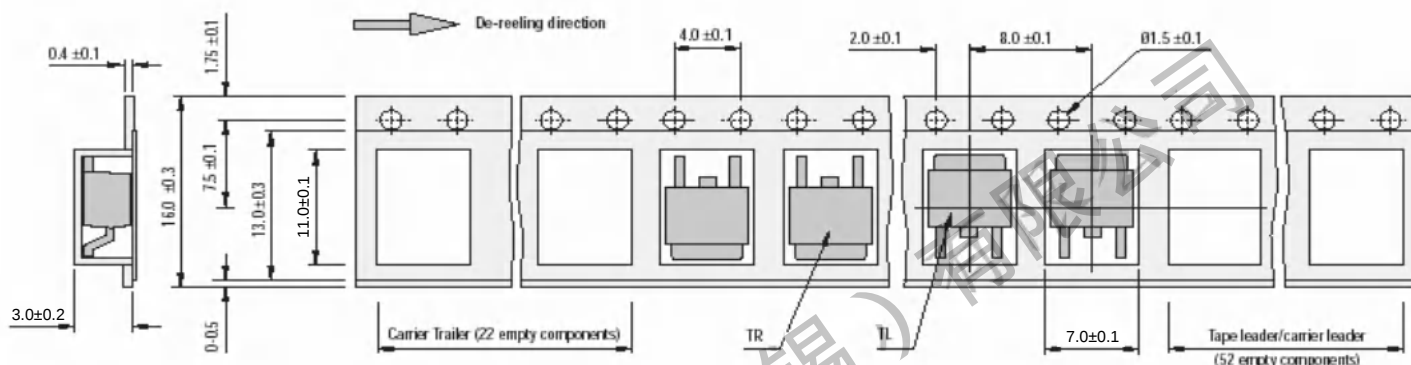


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386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

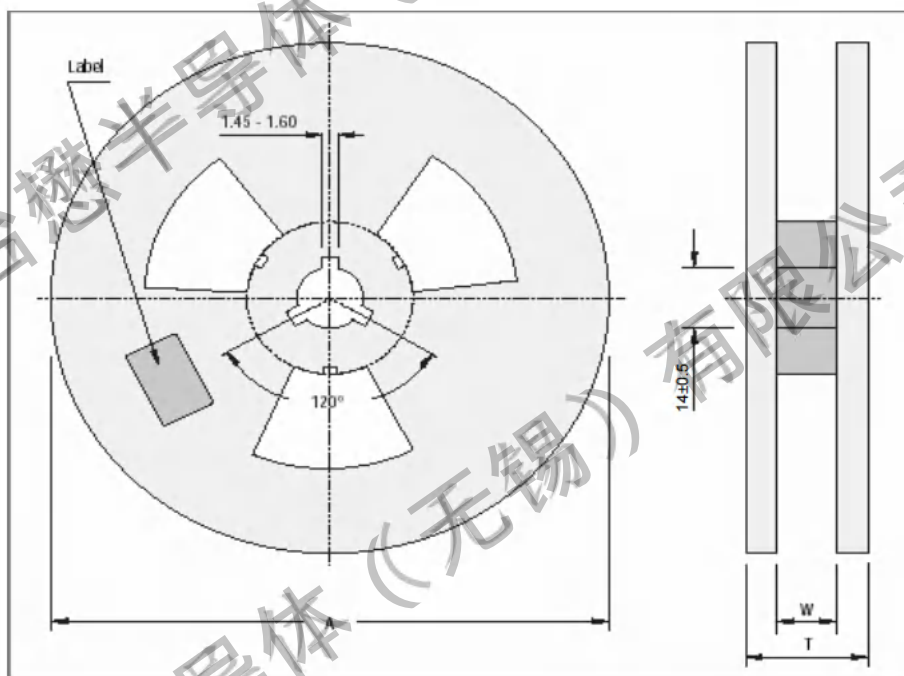
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TO-252-3L Embossed Carrier Tape



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
2024.06.15	24.06	Original	