TM15G10GD

N+P-Channel Enhancement Mode Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

N Channel

V_{DS} = 100V I_D =15A

$R_{DS(ON)}$ =105mΩ (typ.) @ V_{GS} = 10V

P Channel

V_{DS} = -100V I_D =-15A

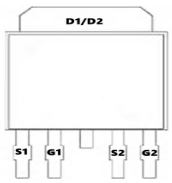
$R_{DS(ON)}$ =180mΩ (typ.) @ V_{GS}=-10V

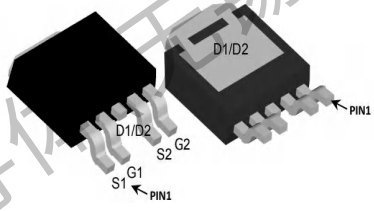
100% UIS Tested

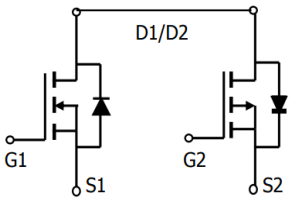
100% R_g Tested

Green Product

GD:TO-252-4L







Marking: 15G10

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@Ta=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	15	-15	A
I_D@Ta=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	9	-9	A
I_{DM}	Pulsed Drain Current[2]	45.4	-50	A
P_D@T_C=25°C	Total Power Dissipation[4]	30	30	W
T_{STG}	Storage Temperature Range	-55 to 175	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	48	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	5	°C/W

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N-CH Electrical Characteristics: (T_C=25℃ unless otherwise noted)

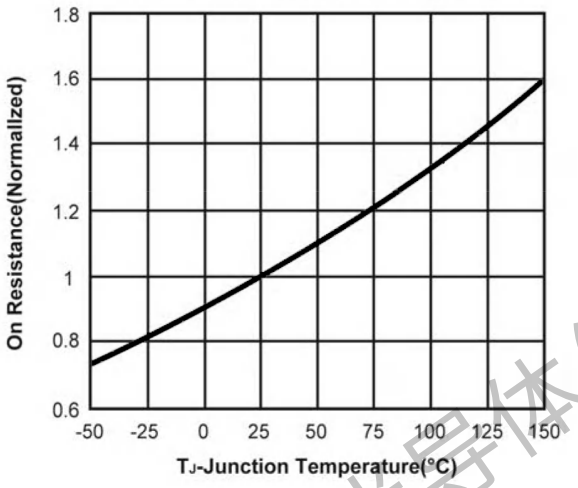
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=100V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics[3]						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	2	3	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=8A	---	105	118	mΩ
		V_{GS}=4.5V,I_D=4A	---	119	130	
Dynamic Characteristics[4]						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	500	---	pF
C_{oss}	Output Capacitance		---	48	---	
C_{rss}	Reverse Transfer Capacitance		---	27	---	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=30V,R_{GEN}=2.5Ω, V_{GS}=10V	---	12.4	---	ns
t_r	Rise Time[2,3]		---	12	---	ns
$t_{d(off)}$	Turn-Off Delay Time[2,3]		---	27.3	---	ns
t_f	Fall Time[2,3]		---	2.6	---	ns
Q_g	Total Gate Charge[2,3]	V_{GS}=10V, V_{DS}=30V, I_D=3A	---	16.8	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	5	---	nC
Q_{gd}	Gate-Drain "Miller" Charge[2,3]		---	4	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=1A, T_J=25℃	---	---	1.1	V
I_S	Continuous Source Current[2]	VD=VG=0V	---	---	15	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current	VD=VG=0V	---	---	45.4	A

Notes:

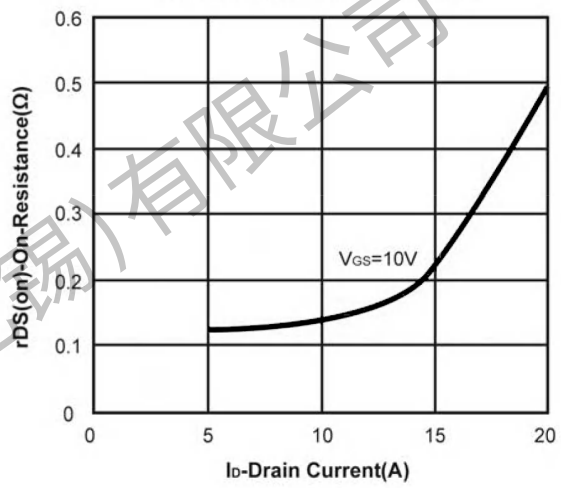
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Characteristics-N

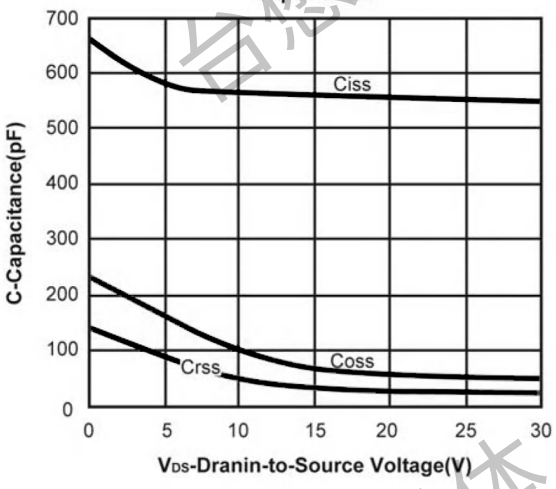
On Resistance vs. Junction Temperature



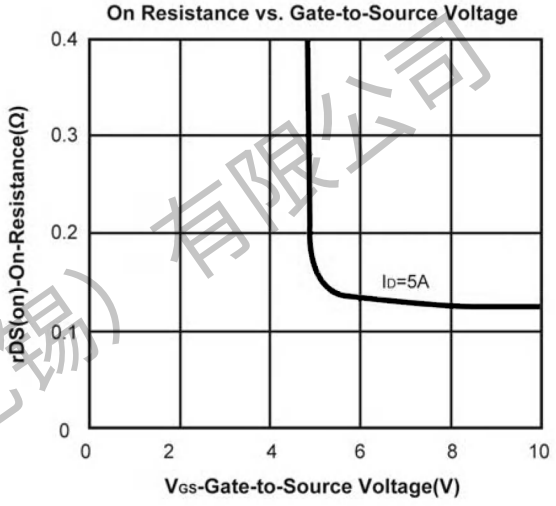
On Resistance vs. Drain Current



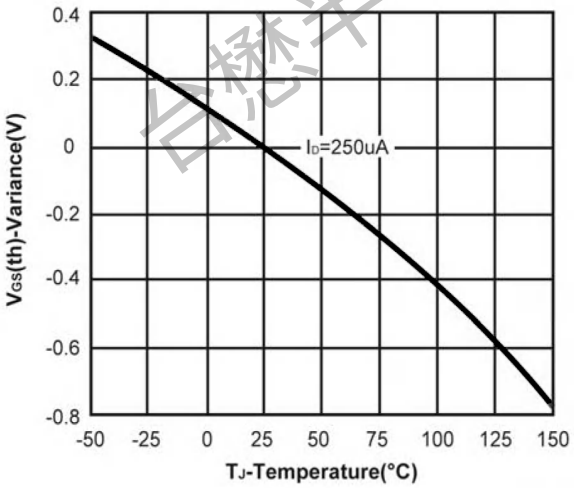
Capacitance



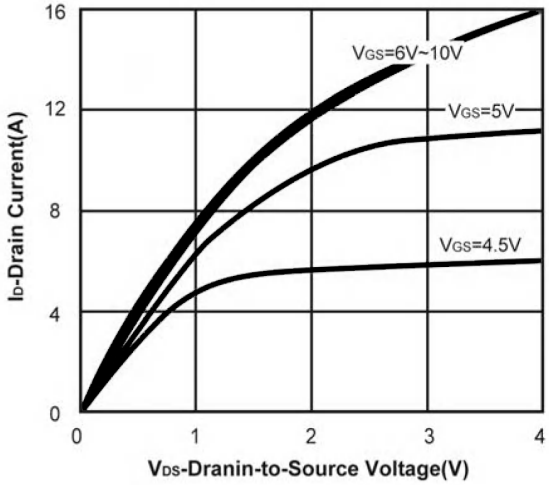
On Resistance vs. Gate-to-Source Voltage



Threshold Voltage



On-Region Characteristics



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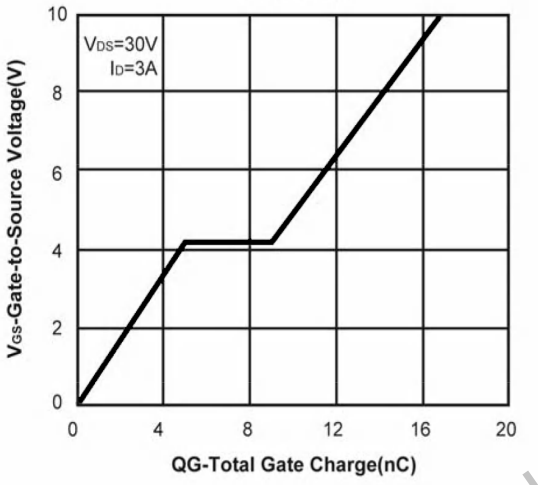
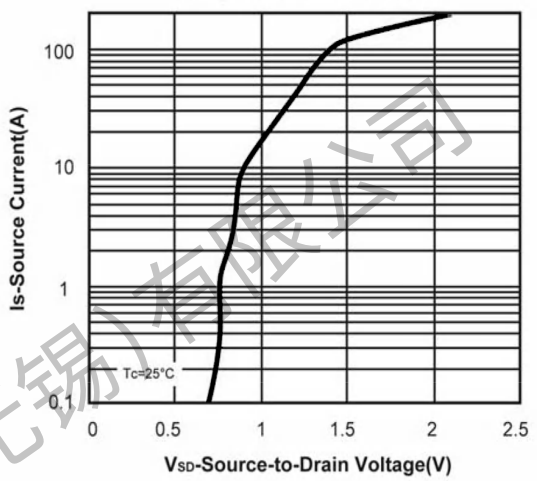
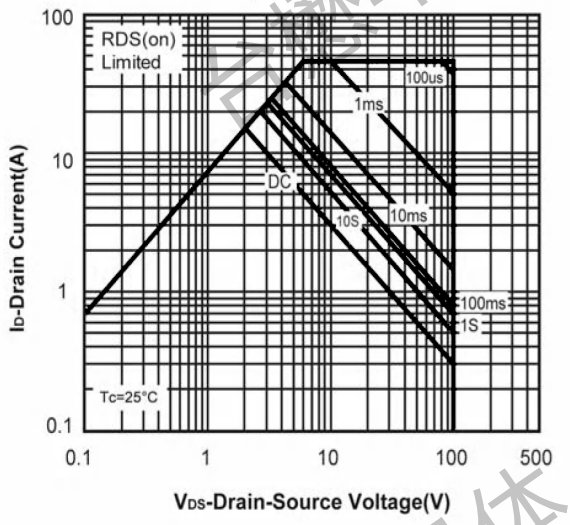
Gate Charge



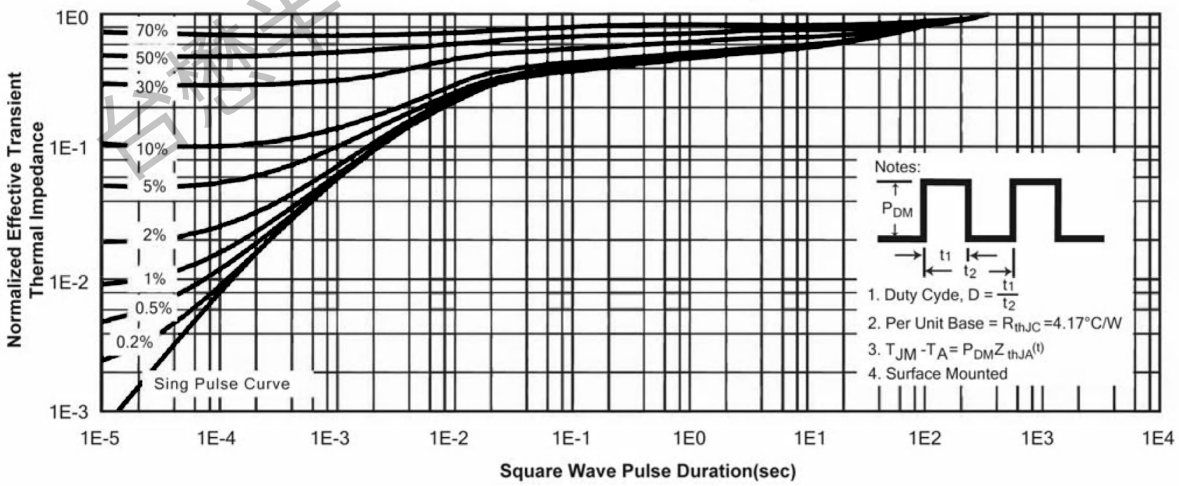
Body-diode characteristics



Maximum Forward Biased Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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P-CH Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-100V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics[3]						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1	-2	-3	V
$R_{DS(ON)}$	Drain-Source On Resistance[2,]	V_{GS}=-10V,I_D=-7A	---	180	190	mΩ
		V_{GS}=4.5V,I_D=-6A	---	192	220	
Dynamic Characteristics[4]						
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	---	1485	---	pF
C_{oss}	Output Capacitance		---	126	---	
C_{rss}	Reverse Transfer Capacitance		---	103	---	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=-50V, I_D=-7A, R_{GEN}=6Ω , V_{GS}=-10V	---	7	---	ns
t_r	Rise Time[2,3]		---	7	---	ns
$t_{d(off)}$	Turn-Off Delay Time[2,3]		---	62	---	ns
t_f	Fall Time[2,3]		---	25	---	ns
Q_g	Total Gate Charge[2,3]	V_{GS}=-4.5V, V_{DS}=-50V, I_D=-7A	---	24	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	6.8	---	nC
Q_{gd}	Gate-Drain “Miller” Charge[2,3]		---	11	---	nC
Drain-Source Diode Characteristics						
I_s	MaximumContinuousDraintoSource Diode Forward Current	VD=VG=0V	---	---	-15	A
I_{sM}	Maximum Pulsed Drain to Source Diode Forward Current	VD=VG=0V	---	---	-50	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, IS = -7A	---	---	-0.86	V

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

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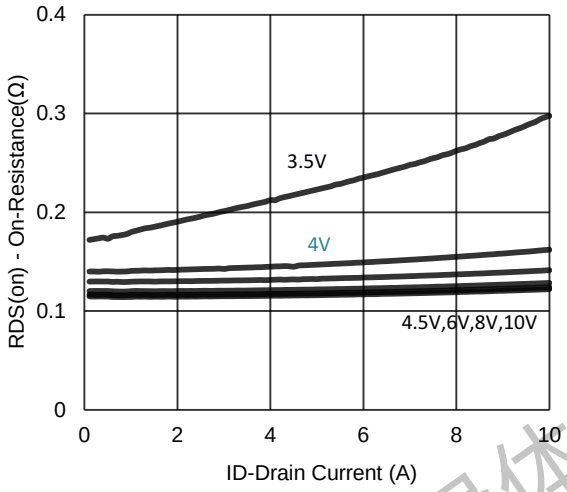
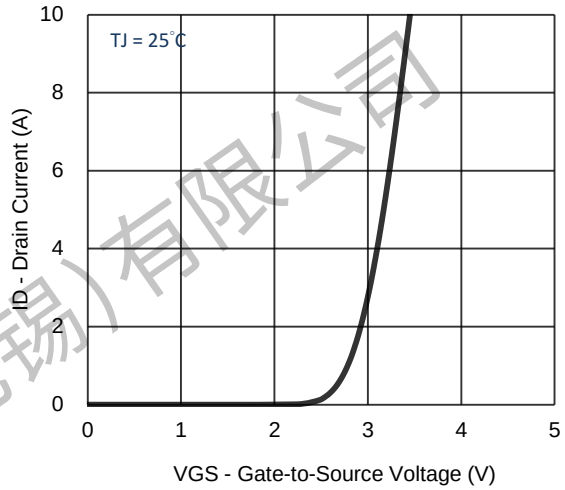
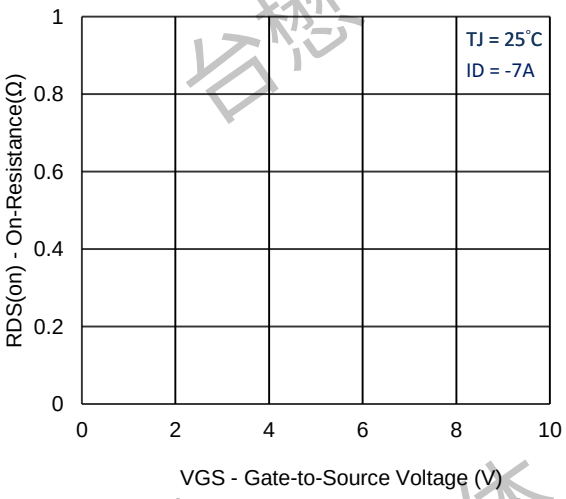
Typical Characteristics-P



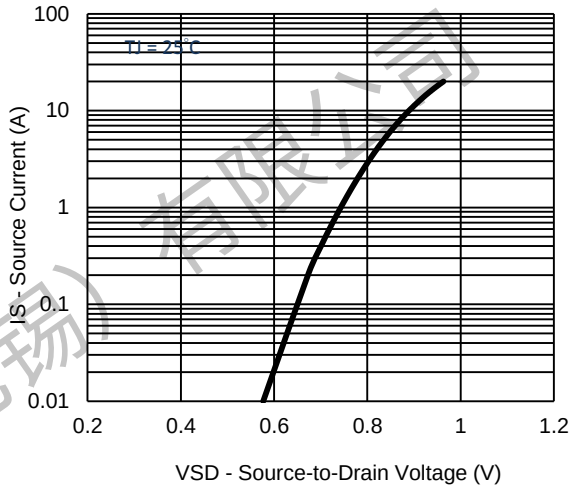
1. On-Resistance vs. Drain Current



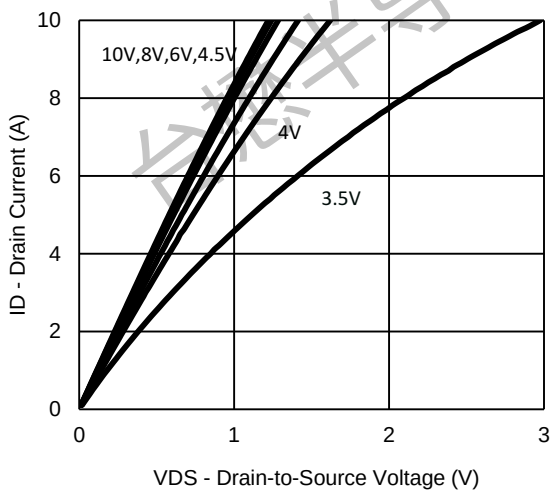
2. Transfer Characteristics



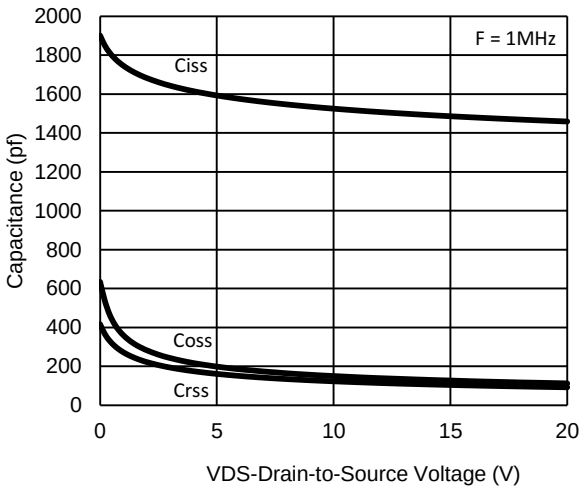
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics



6. Capacitance

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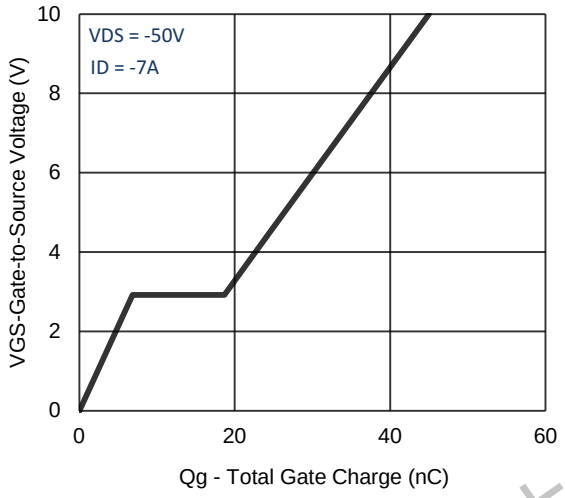
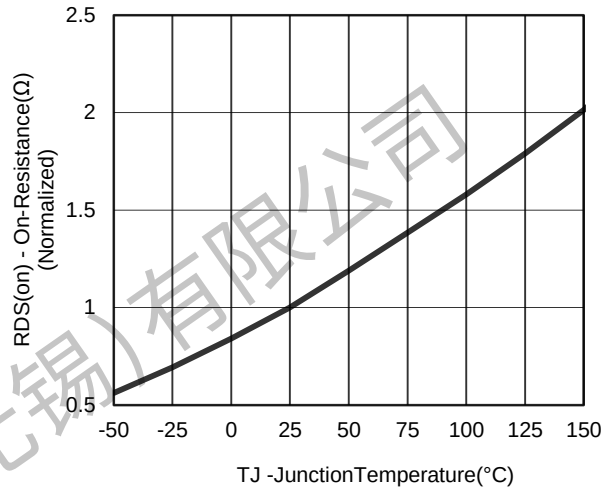
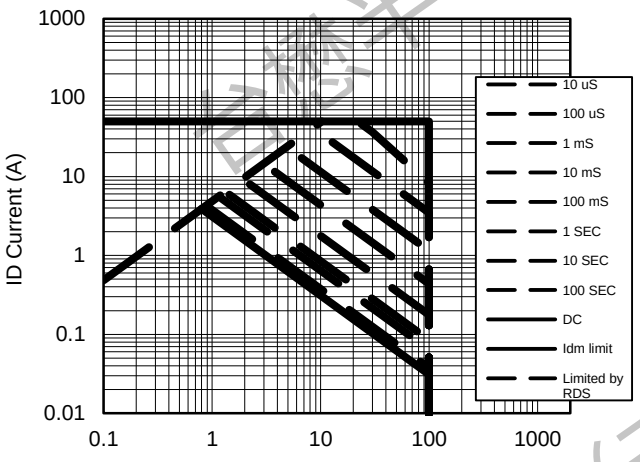


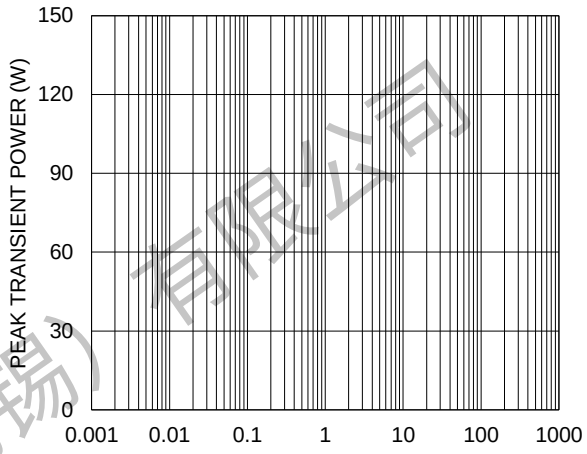
7. Gate Charge



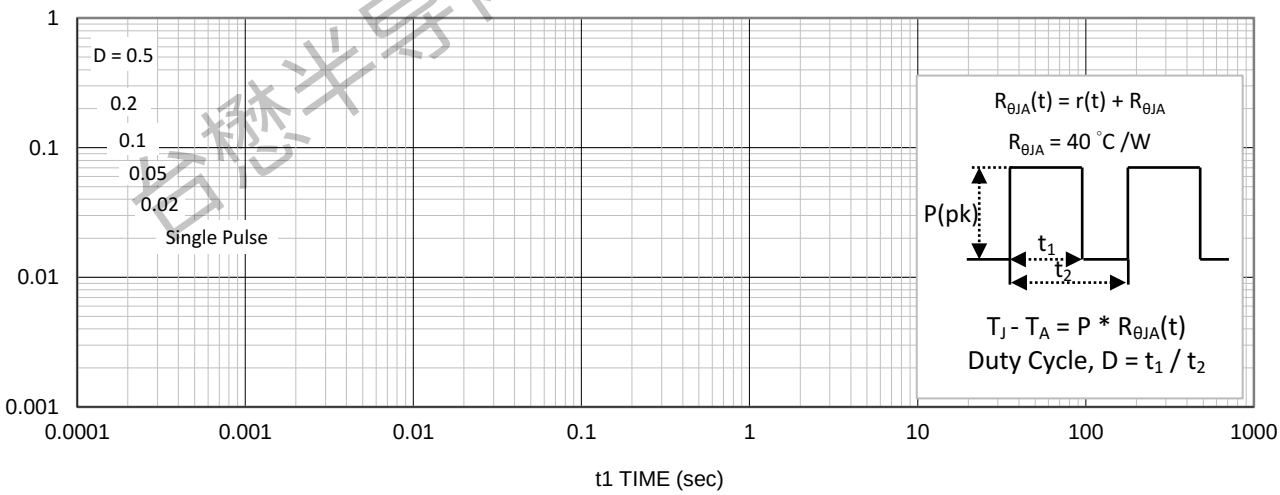
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

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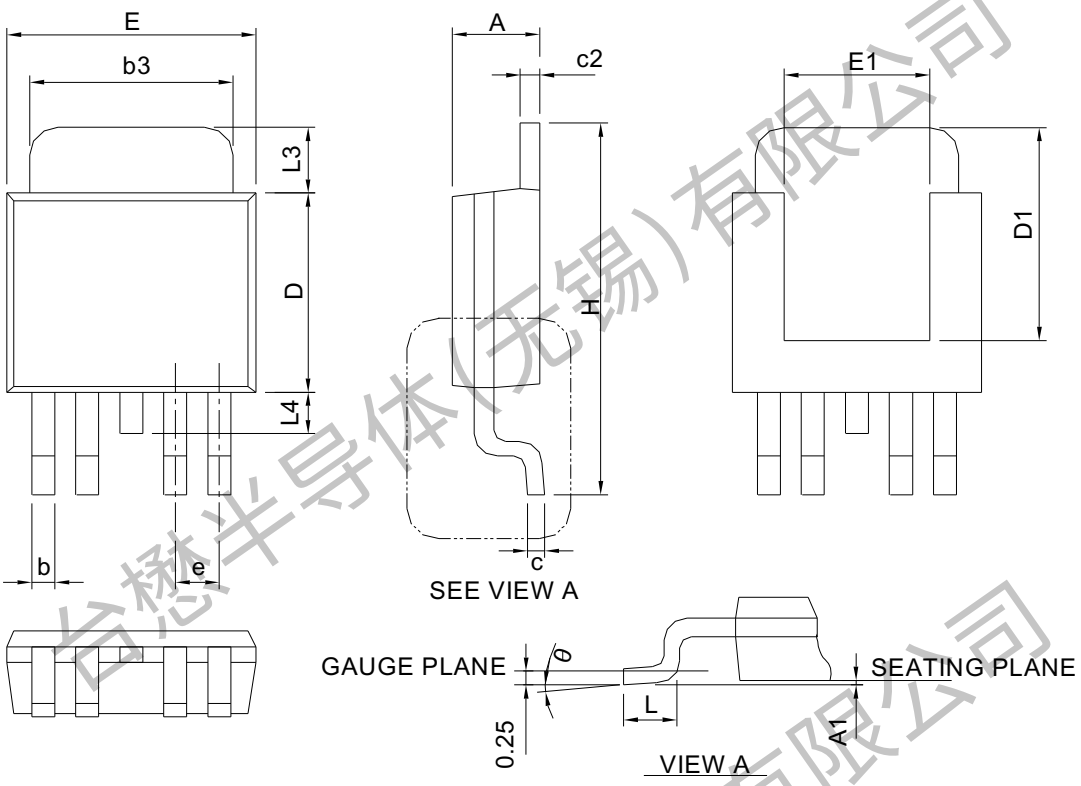
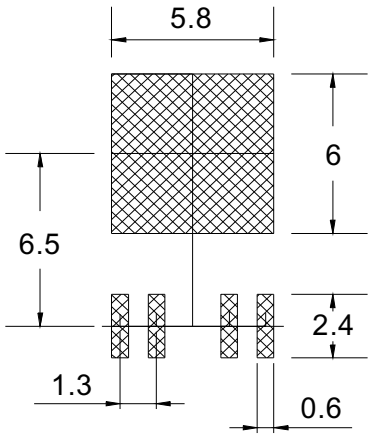
Package Mechanical Data:TO-252-4L



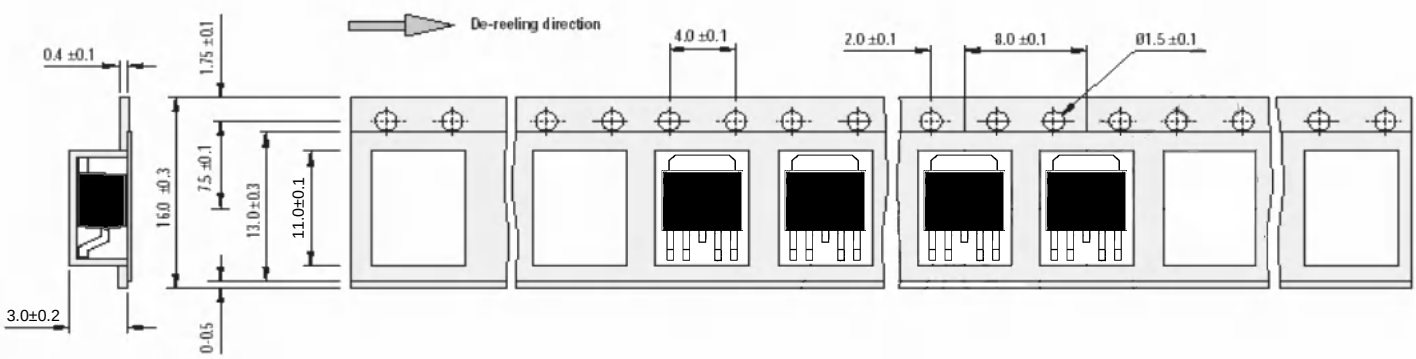
SYMBOL	TO-252-4			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.2	-	0.008
b	0.50	0.71	0.020	0.028
b3	4.32	5.46	0.170	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	1.30 BSC		0.051 BSC	
H	9.40	10.41	0.370	0.410
L	1.40	1.78	0.055	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN

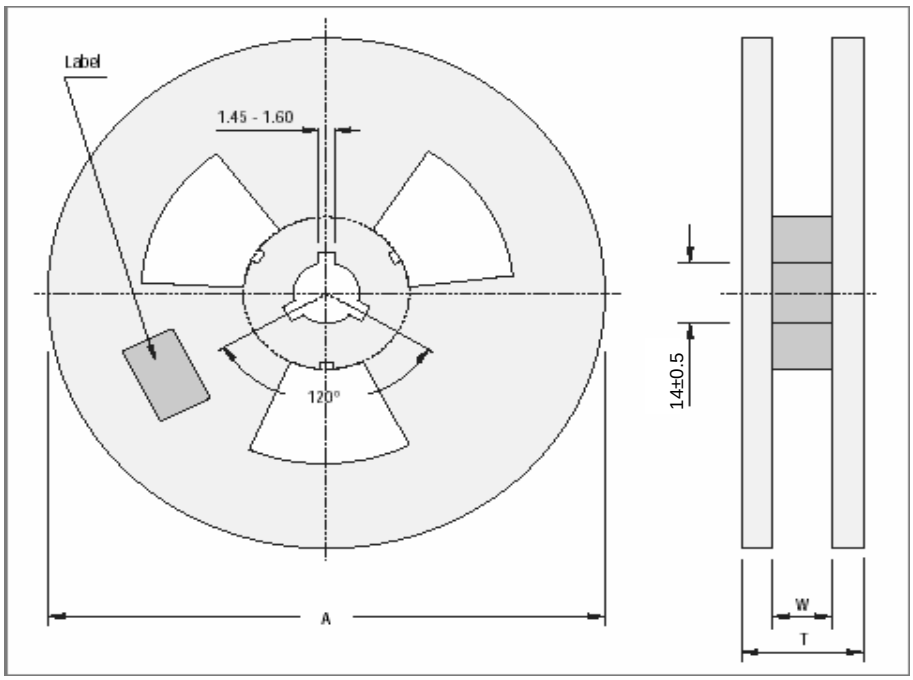


UNIT: mm

TO-252-4L Embossed Carrier Tape



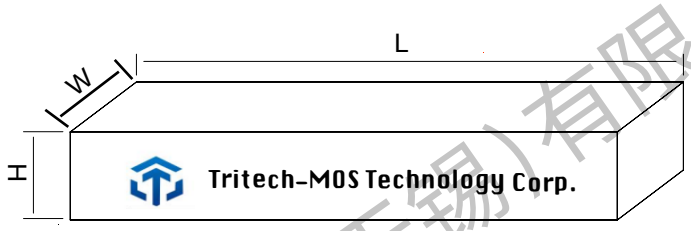
TO-252-4L ReeL



1.TO-252-4L Packaging

Package	Packing Form	Quantity		
		ReeL	Inner Box	Outbox
TO-252-4L	ReeL	2500	5	1

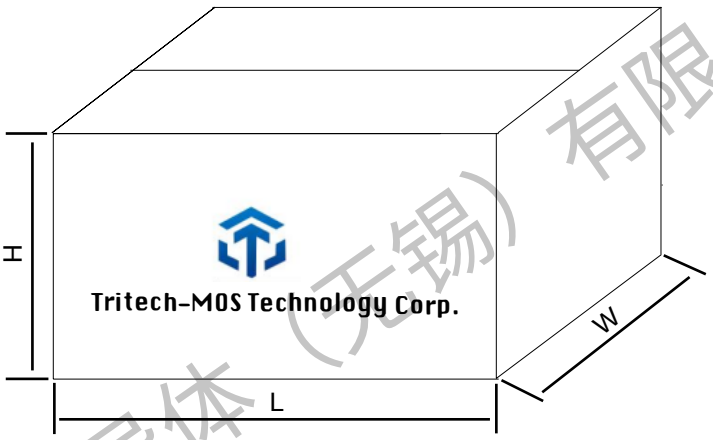
Inner Box



Dimension : 370 (L)×355(W) ×50(H) mm

Quantity : 2500 × 2Ea = 5000pcs

Outer Box



Dimension : 380(L)×380(W) ×275(H) mm

Quantity : 5000 × 5Ea = 25000pcs

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Revision history:

Date	Rev	Description	Page
2023.08.10	23.08	Original	