TM12N15D

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

V_{DS} =150V I_D =12A

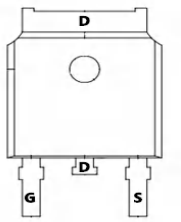
$R_{DS(ON)}$ = 200mΩ(typ.) @ V_{GS} = 10V

100% UIS Tested

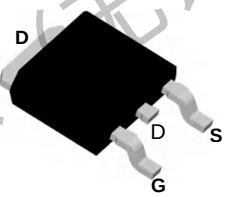
100% R_g Tested

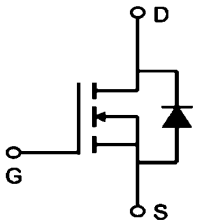
Green Product

D:TO-252-3 L



Marking:12N15





Absolute Maximum Ratings (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	12	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	6.5	A
I_{DM}	Pulsed Drain Current	35	A
EAS	Single Pulse Avalanche Energy	9.8	mJ
P_D@T_C=25℃	Total Power Dissipation	40.3	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	3.1	℃/W

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	150	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = 150V, V_{GS} = 0V	-	-	1	μA
	T_J=100°C			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	2.5	3.0	V
Drain-Source on-Resistance		$R_{DS(on)}$	V_{GS} = 10V, I_D = 4A	-	200	220	mΩ
Forward Transconductance		g_{fs}	V_{DS} = 10V, I_D = 4A	-	14.5	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} = 75V, V_{GS} =0V, f =1MHz	-	465	-	pF
Output Capacitance		C_{oss}		-	23	-	
Reverse Transfer Capacitance		C_{rss}		-	14	-	
Gate Resistance		R_g	f =1MHz	-	2	-	Ω
Switching Characteristics							
Total Gate Charge		Q_g	V_{GS} = 10V,V_{DS} = 75V, I_D= 4A	-	14	-	nC
Gate-Source Charge		Q_{gs}		-	1.6	-	
Gate-Drain Charge		Q_{gd}		-	4	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD}=75V, R_G = 3Ω, I_D= 4A	-	5.8	-	ns
Rise Time		t_r		-	2.2	-	
Turn-off Delay Time		$t_{d(off)}$		-	16.9	-	
Fall Time		t_f		-	2.6	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage		V_{SD}	I_S = 1A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	12	A

Typical Characteristics

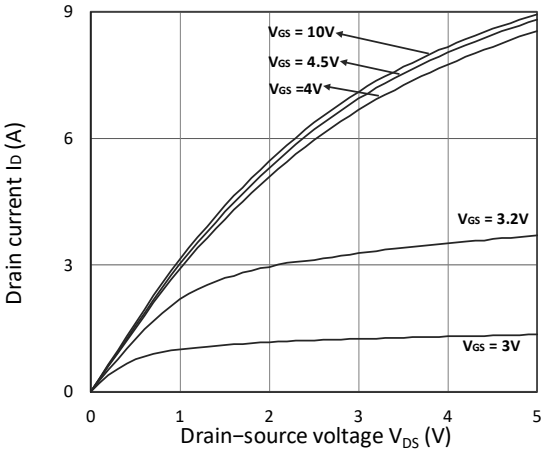


Figure 1. Output Characteristics

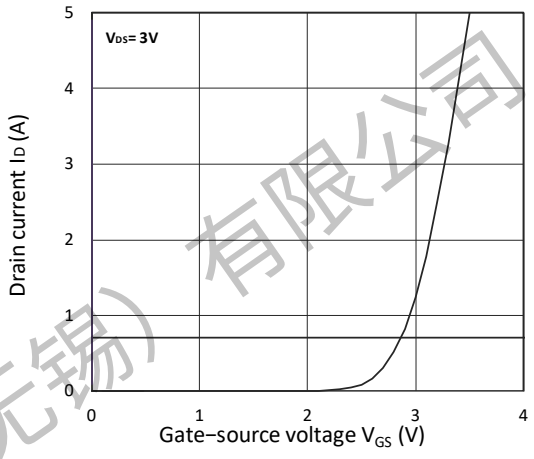


Figure 2. Transfer Characteristics

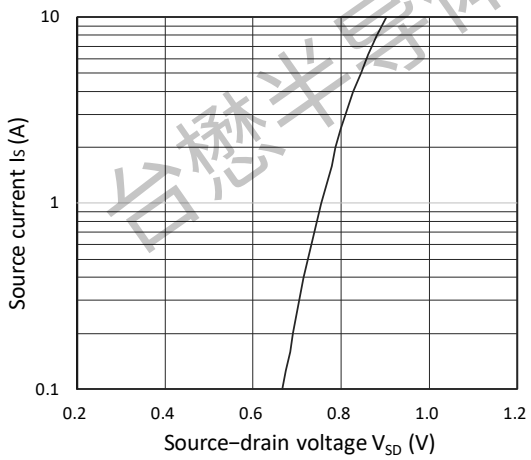


Figure 3. Forward Characteristics of Reverse

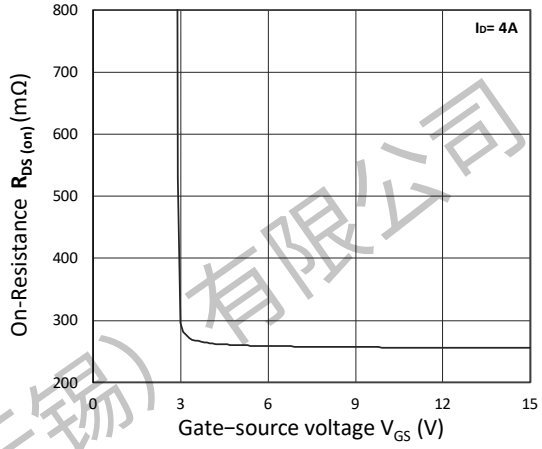


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

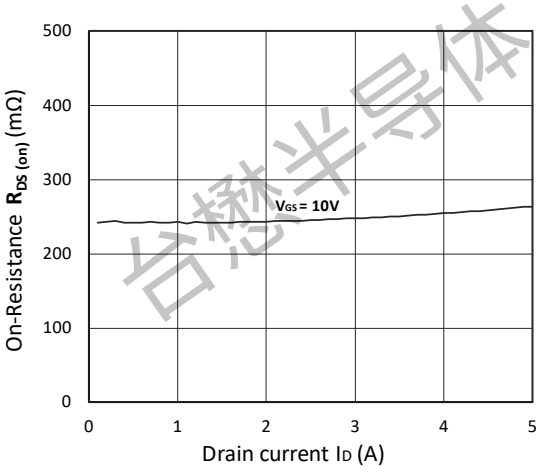


Figure 5. $R_{DS(ON)}$ vs. I_D

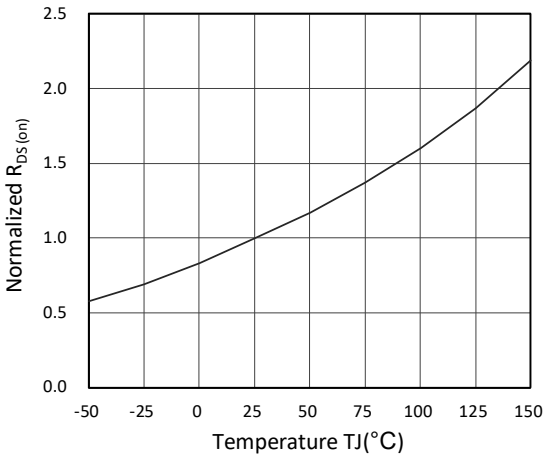


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

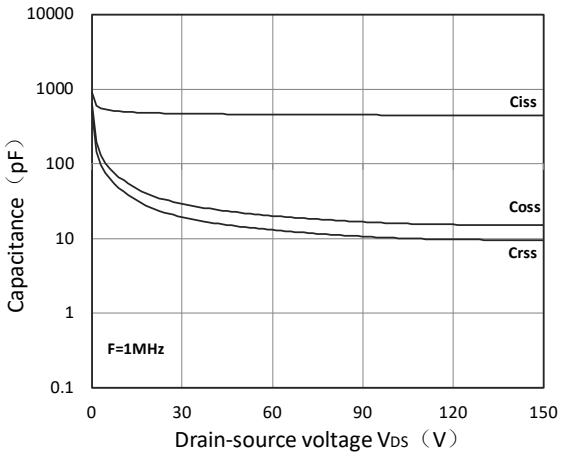


Figure 7. Capacitance Characteristics

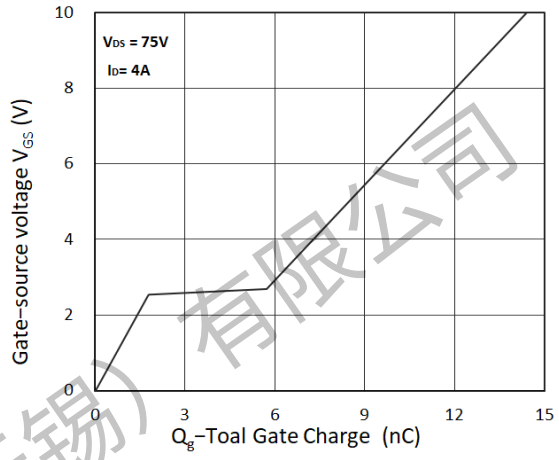


Figure 8. Gate Charge Characteristics

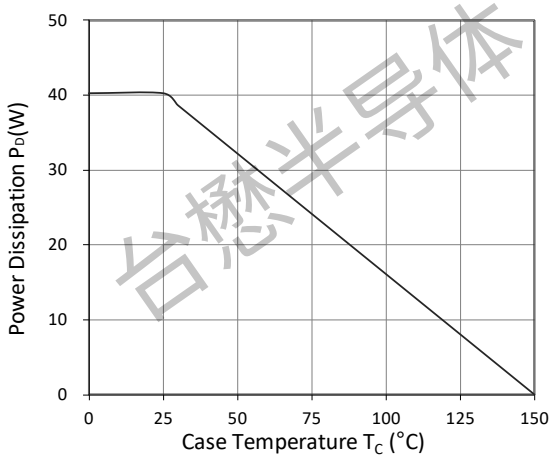


Figure 9. Power Dissipation

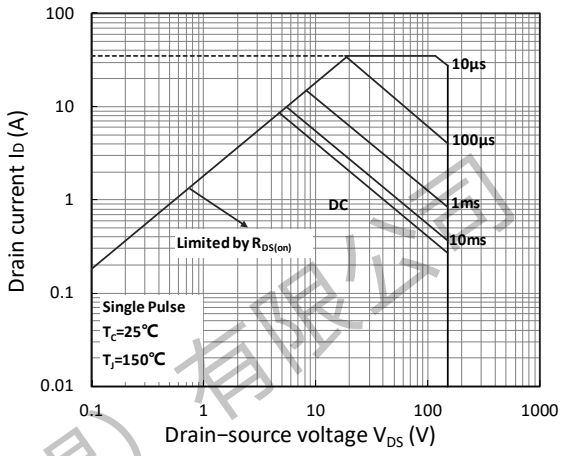


Figure10. Safe Operating Area

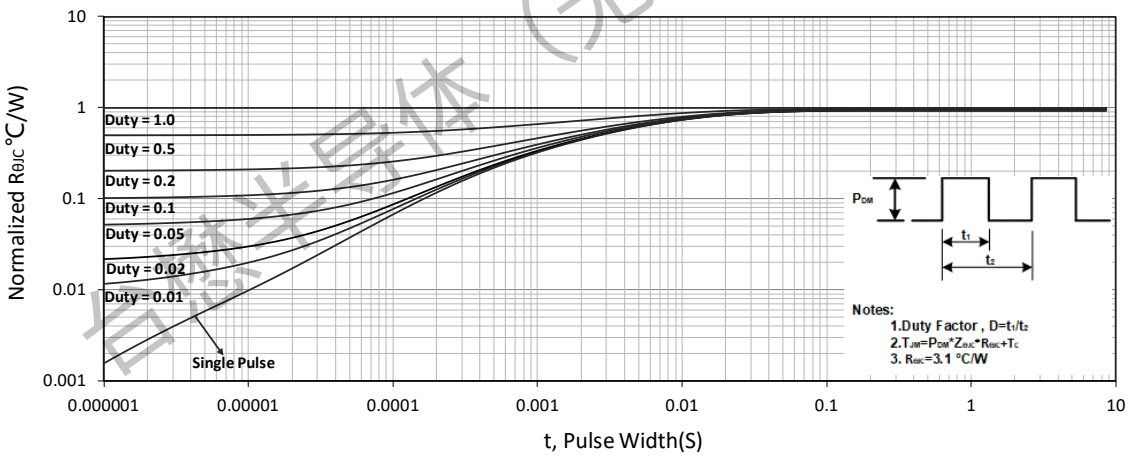
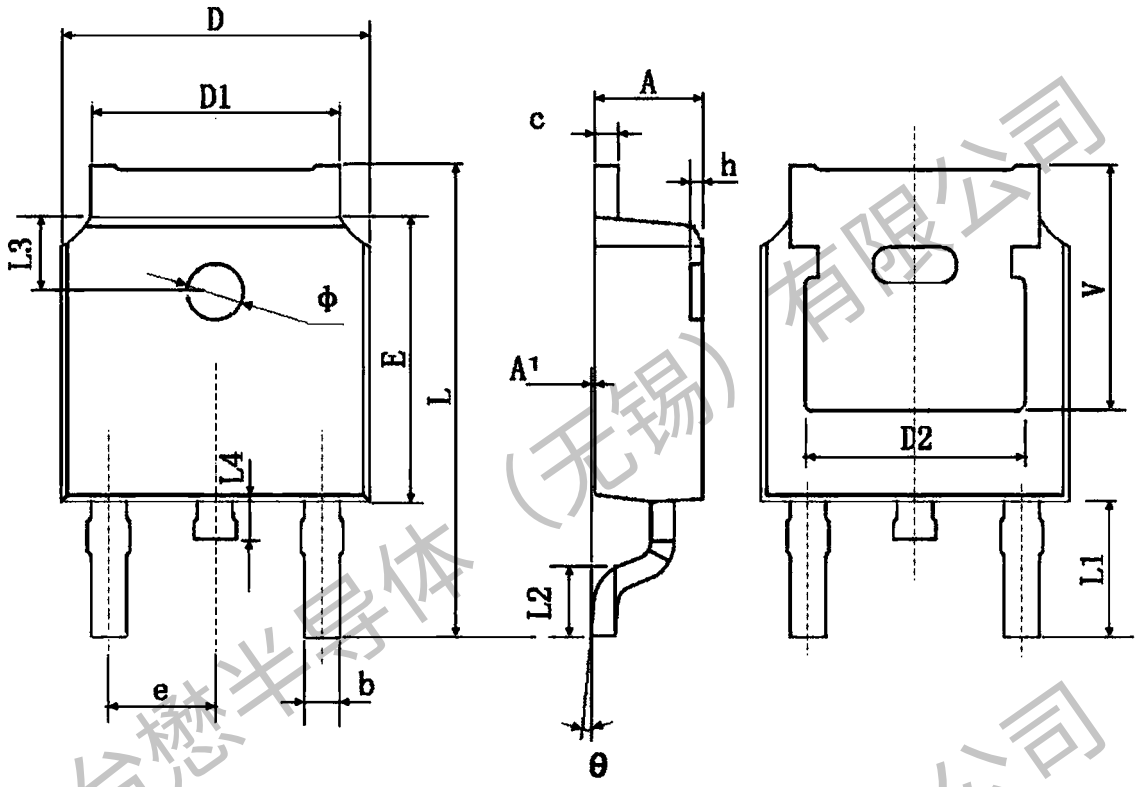


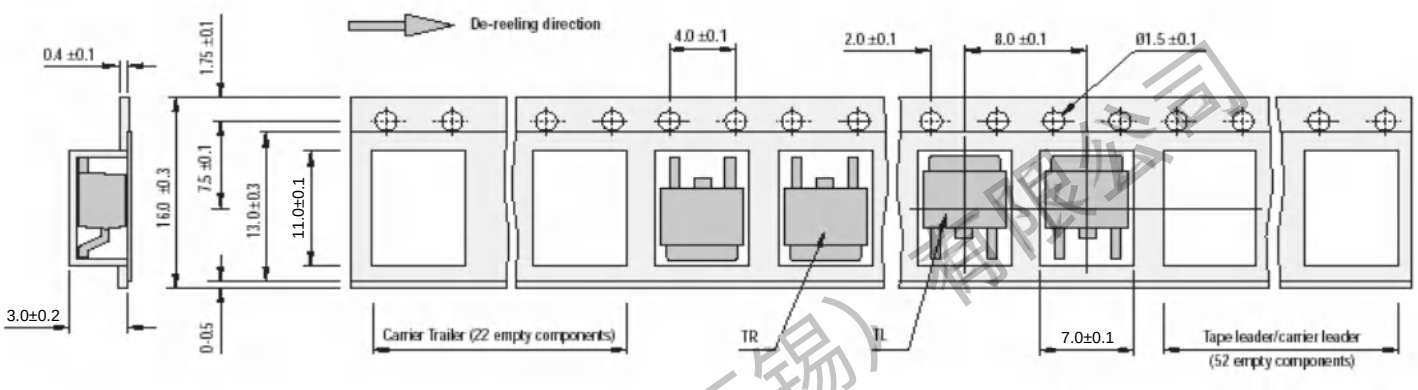
Figure 11. Normalized Maximum Transient Thermal Impedance

Package Mechanical Data: TO-252-3L

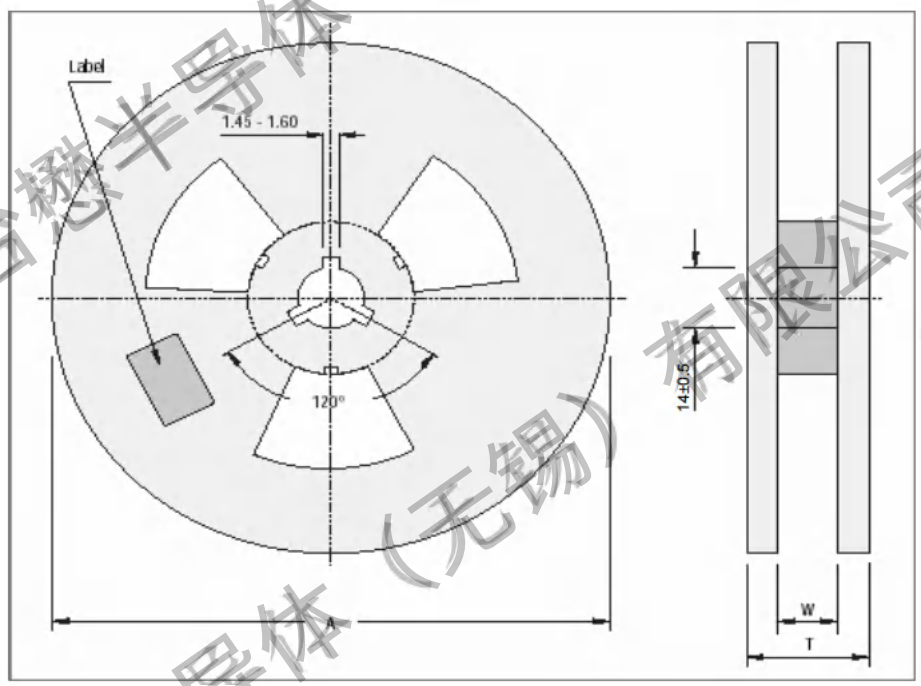


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	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
2023.09.09	23.09	Original	