TM120N02D N-Channel Enhancement Mosfet

General Description

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

Applications

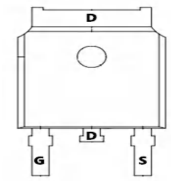
- Load switch
- PWM

General Features

V_{DS} = 20V I_D = 120A
$R_{DS(ON)}$=2.3mΩ(typ.) @ V_{GS}=4.5V

100% UIS Tested
100% R_g Tested

D:TO-252-3L



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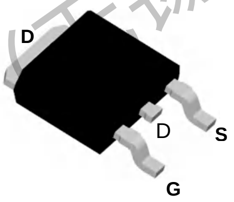
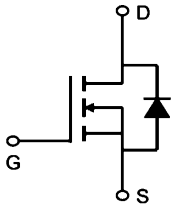




Absolute Maximum Ratings (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	120	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	72	A
I_{DM}	Pulsed Drain Current[2]	300	A
EAS	Single Pulse Avalanche Energy[3]	101	mJ
I_{AS}	Avalanche Current	26	A
P_D@T_C=25˚C	Total Power Dissipation[3]	108	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 [1]	---	62	˚C/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	6.6	˚C/W

Electrical Characteristics(T_J =25ºC unless otherwise noted)

Symbol	Parameter	Conditions		Value			Units
				Min	Typ	Max	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =250µA,V_{GS} =0V		20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =20V, V_{GS} =0V	T_J =25ºC			1	µA
			T_J =100ºC			25	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250µA		0.5	0.7	0.9	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance						
		V_{GS} =4.5V, I_D =30A			2.3	2.9	mΩ
		V_{GS} =2.5V, I_D =30A			3.0	3.5	mΩ
g_{FS}	Forward Transconductance	V_{DS} =10V, I_D =20A			15		S
V_{SD}	Diode Forward Voltage	I_S =46A, V_{GS} =0V				1	V
I_S	Maximum Body-Diode Continuous Current ^{B}					120	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =10V, f =1MH$_Z$			4066		pF
C_{oss}	Output Capacitance				1107		
C_{rss}	Reverse Transfer Capacitance				655		
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS} =10V,V_{DS} =10V, I_D =50A			118		nC
Q_{gs}	Gate Source Charge				7		
Q_{gd}	Gate Drain Charge				22		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =10V, I_D =50A, R_G =3Ω			12		ns
t_r	Turn-On Rise Time				11		
$T_{D(off)}$	Turn-Off Delay Time				39		
t_f	Turn-Off Fall Time				18		
t_{rr}	Body Diode Reverse Recovery Time	I_F =50A, di/dt =100A/µs			19		ns
Q_{rr}	Body Diode Reverse Recovery Charge				17		nC

A. Single pulse width limited by maximum junction temperature.
B. The maximum current rating is package limited.
C. The power dissipation P_D is based on $T_{J(MAX)}$ =175ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

Typical Performance Characteristics

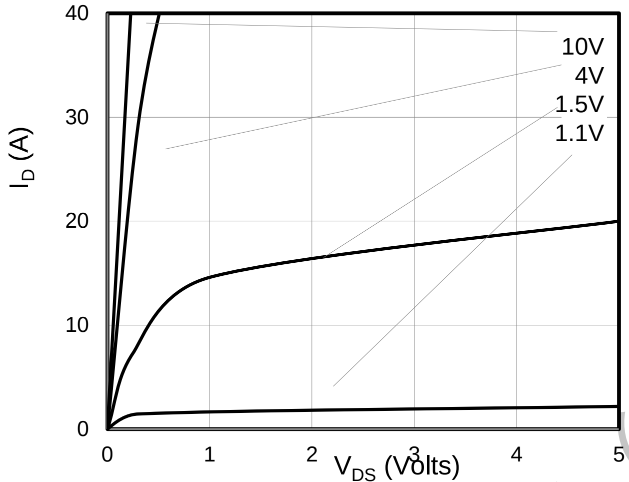


Figure 1: On-Region Characteristics

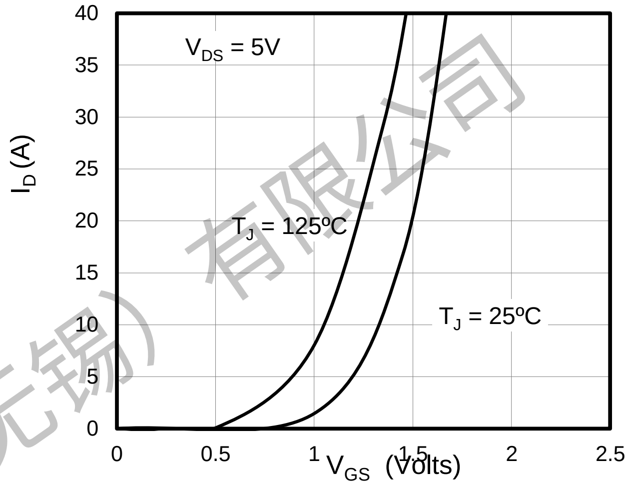


Figure 2: Transfer Characteristics

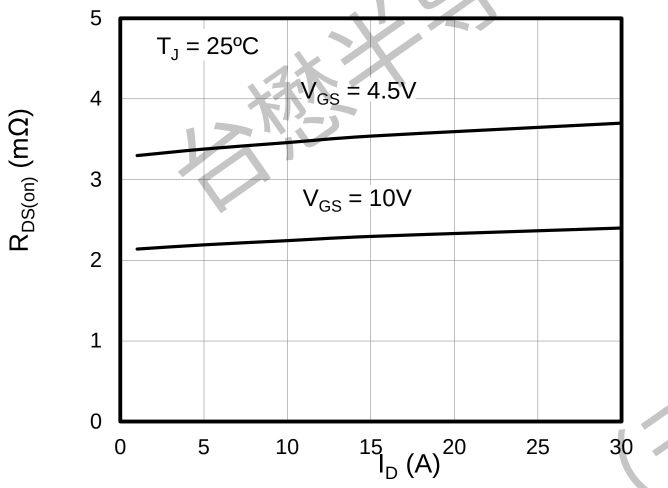


Figure 3: On-Resistance vs. Drain Current

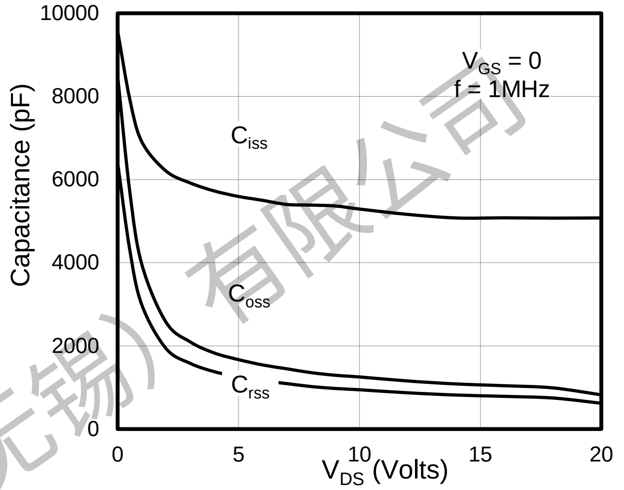


Figure 4: Capacitance Characteristics

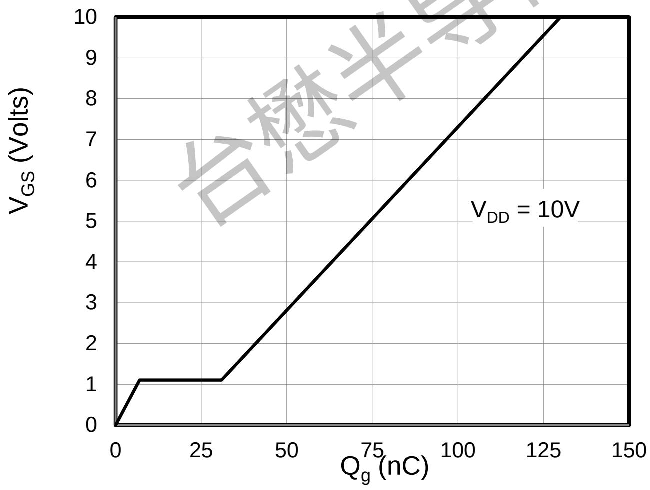


Figure 5: Gate Charge Characteristics

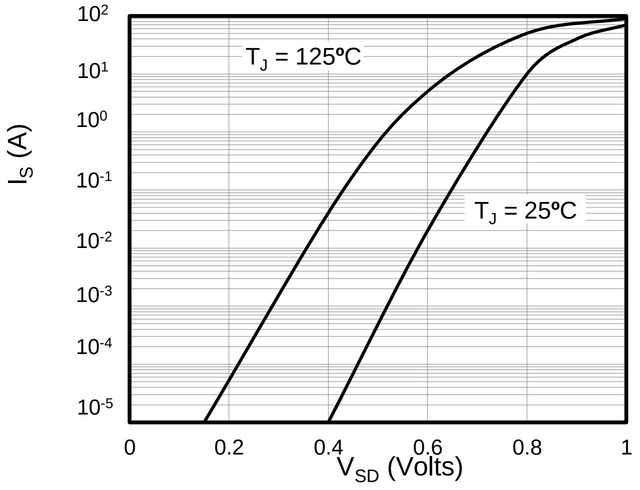


Figure 6: Body Diode Forward Voltage

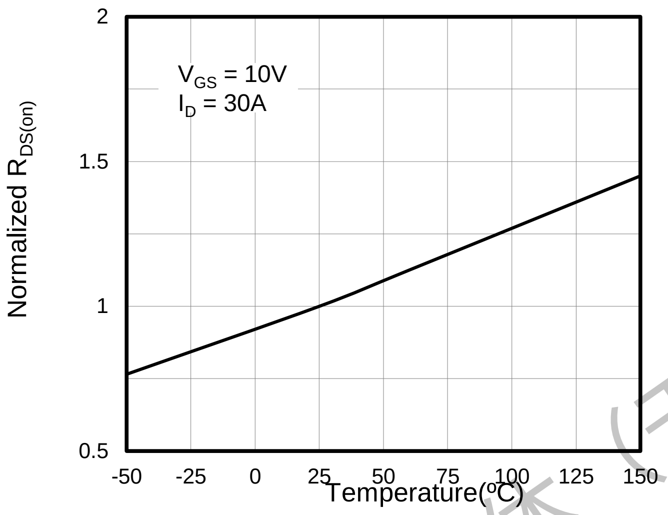


Figure 7: On-Resistance vs. Junction Temperature

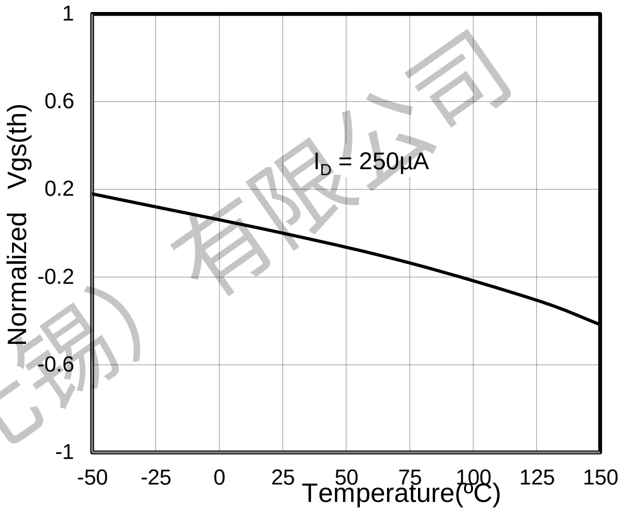


Figure 8: Vgs(th) vs. Junction Temperature

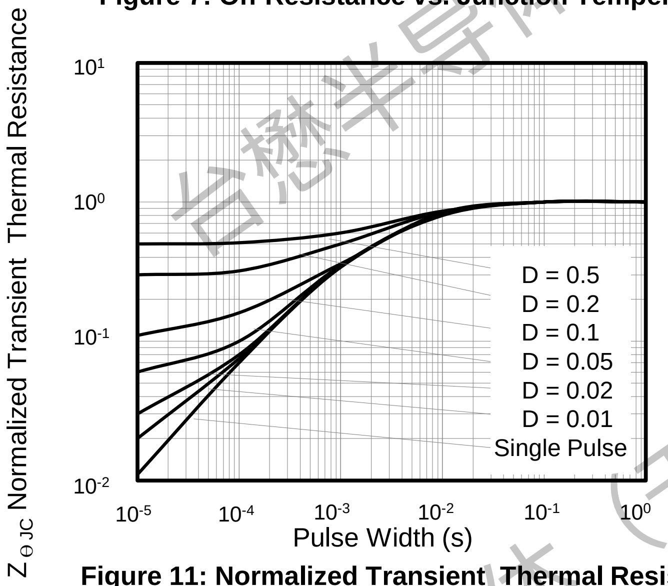


Figure 11: Normalized Transient Thermal Resistance

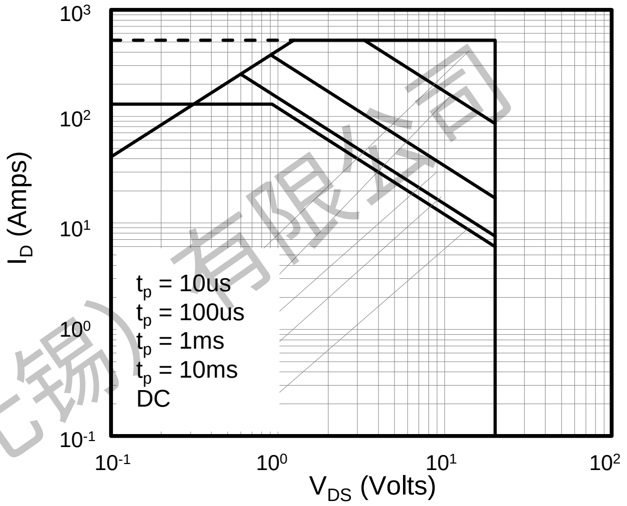
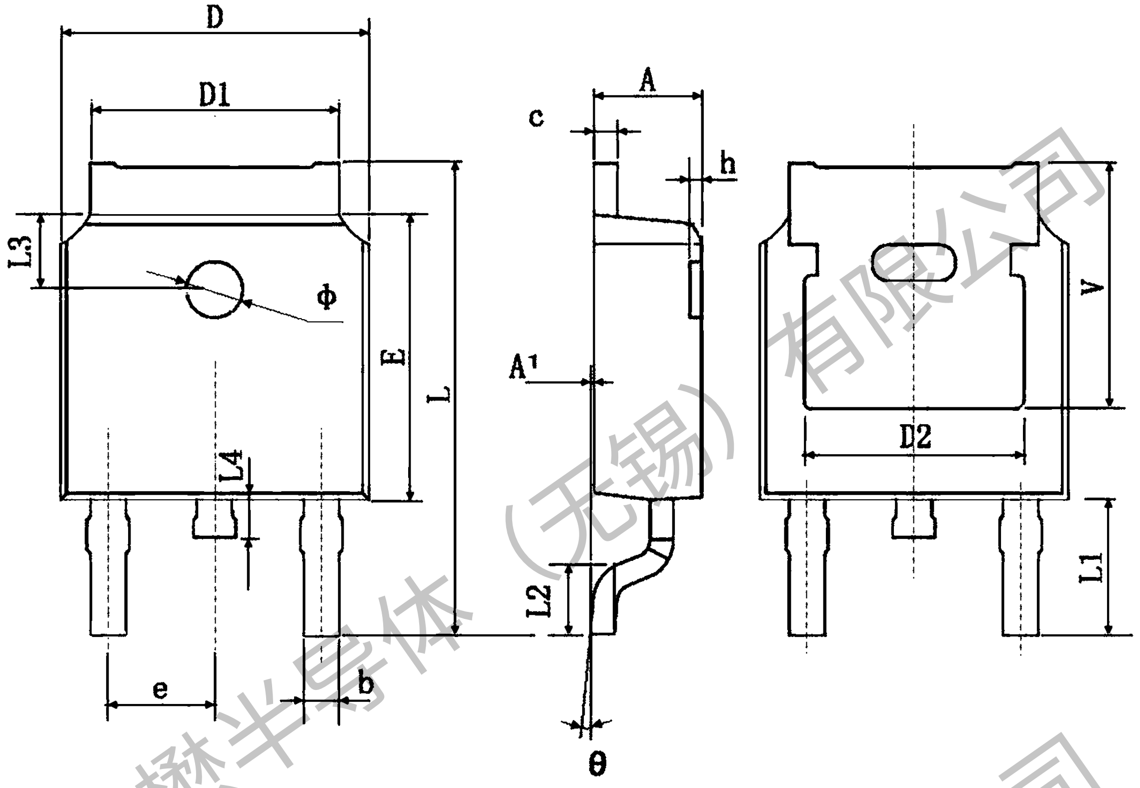


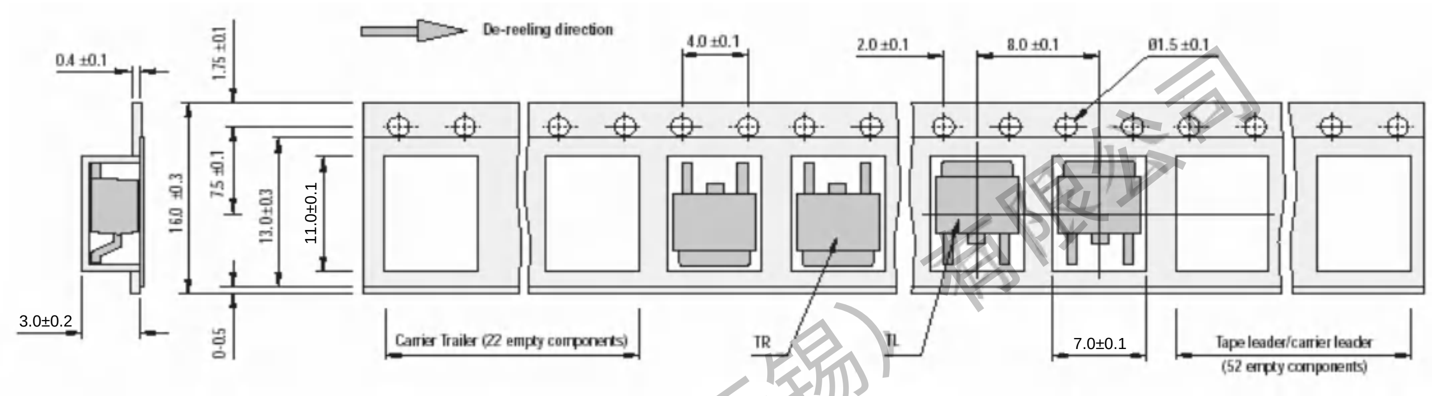
Figure 12: Safe Operating Area

Package Mechanical Data: TO-252-3L

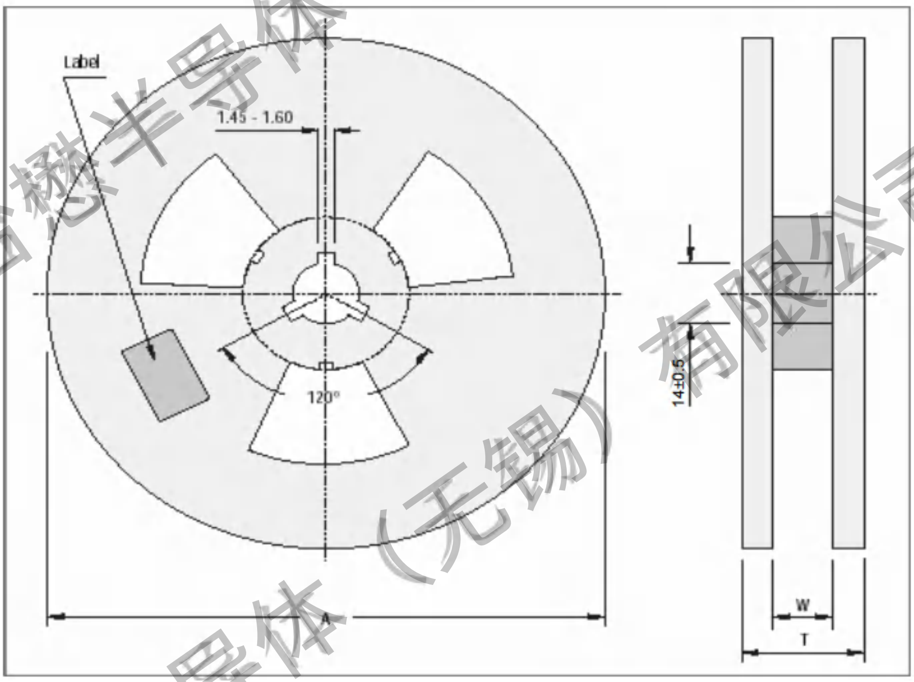


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	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
2024.06.15	24.06	Original	