


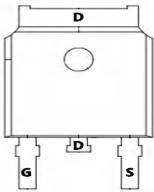
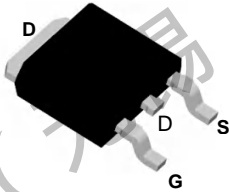
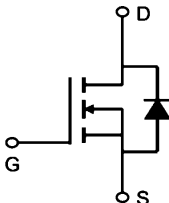


TM90N06HD

N-Channel Enhancement Mosfet

<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS} = 60V$ $I_D = 90A$</p> <p>$R_{DS(ON)} = 5.3 m\Omega (typ.) @ V_{GS} = 10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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D:TO-252-3L

Marking: 90N06

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	± 25	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	90	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	52	A
I_{DM}	Pulsed Drain Current ²	220	A
EAS	Single Pulse Avalanche Energy ³	169	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ³	108	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 ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	6.6	$^\circ C/W$



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Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	$V_{GS}=10V, I_D=30A$	-	5.3	7.5	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V,$ $f=1.0MHz$	-	3136	-	pF
C_{oss}	Output Capacitance		-	286	-	pF
C_{rss}	Reverse Transfer Capacitance		-	257	-	pF
Q_g	Total Gate Charge	$V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$	-	90	-	nC
Q_{gs}	Gate-Source Charge		-	9	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge		-	18	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=30V, I_D=30A,$ $R_G=1.8\Omega, V_{GS}=10V$	-	9	-	ns
t_r	Turn-on Rise Time		-	7	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	40	-	ns
t_f	Turn-off Fall Time		-	15	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	320	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F=30A, di/dt=100A/\mu s$	-	33	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	46	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=26A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



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Typical Performance Characteristics

Figure 1: Output Characteristics

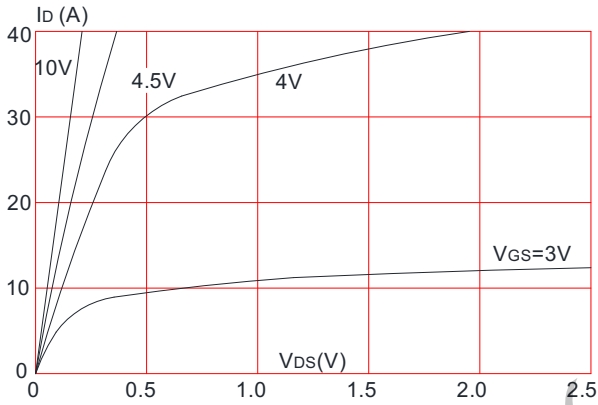


Figure 2: Typical Transfer Characteristics

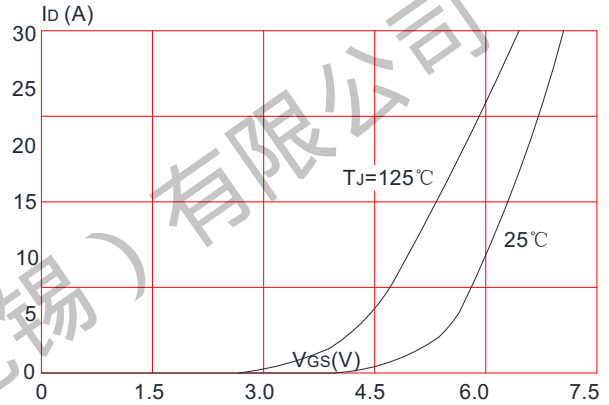


Figure 3: On-resistance vs. Drain Current

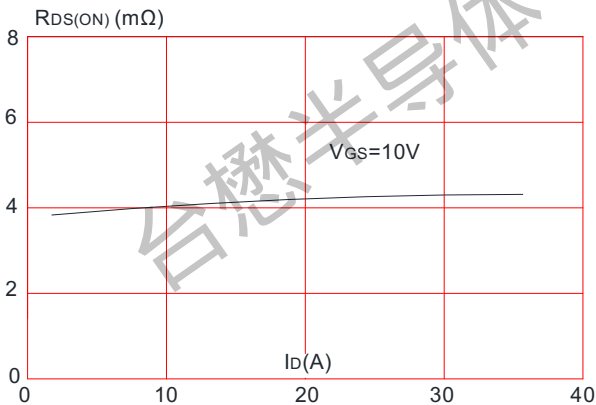


Figure 4: Body Diode Characteristics

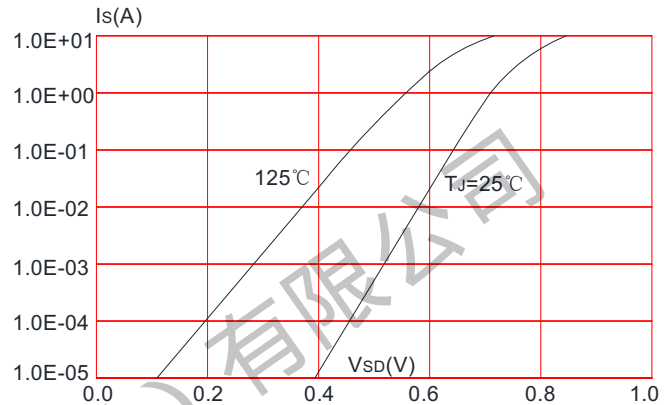


Figure 5: Gate Charge Characteristics

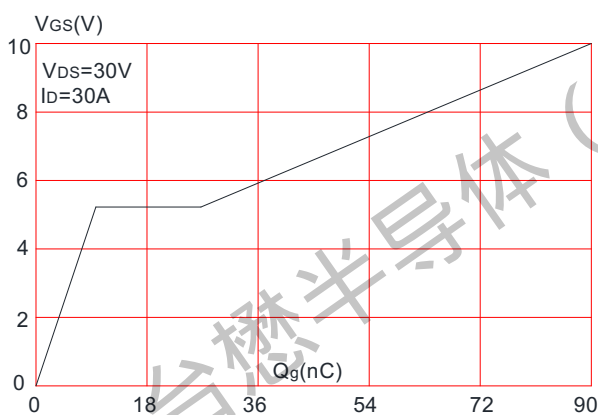
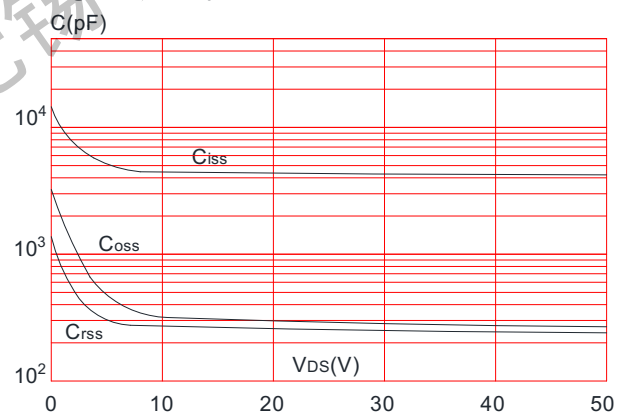


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

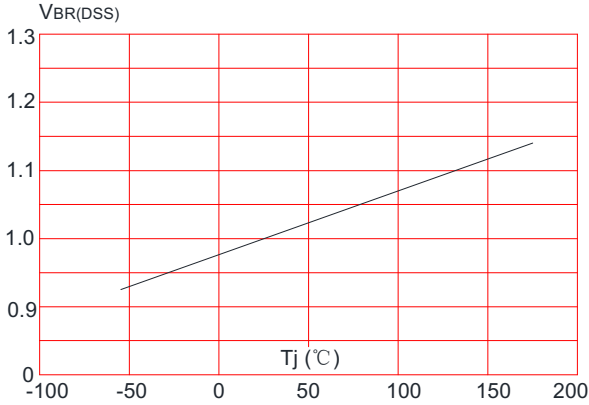


Figure 8: Normalized on Resistance vs. Junction Temperature

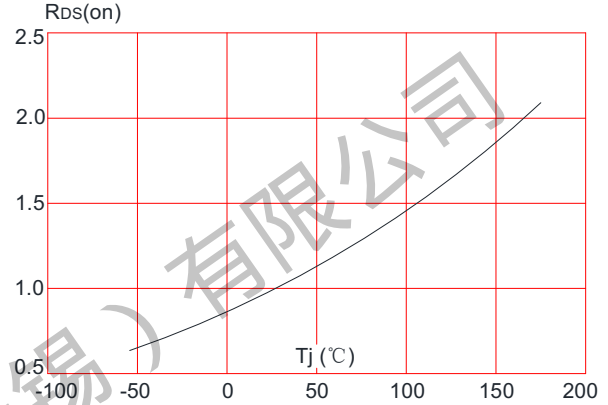


Figure 9: Maximum Safe Operating Area

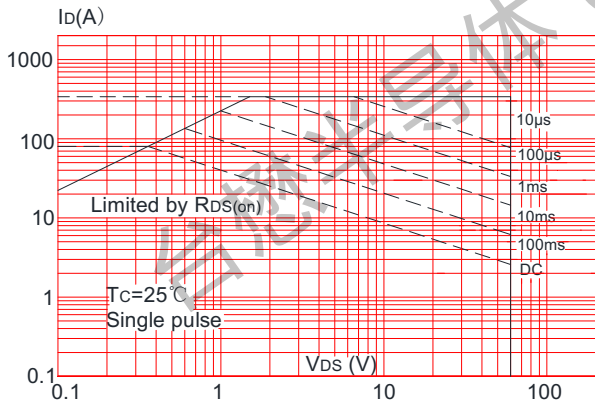


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

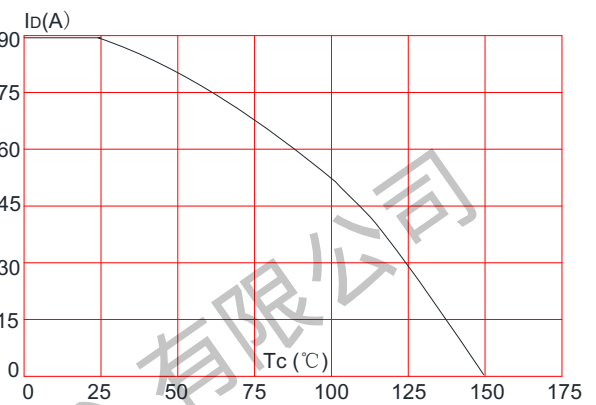
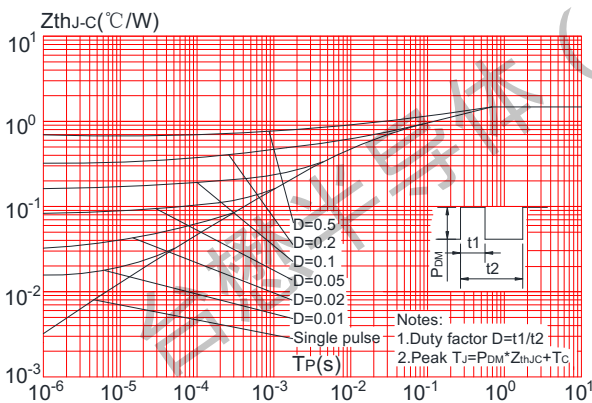


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

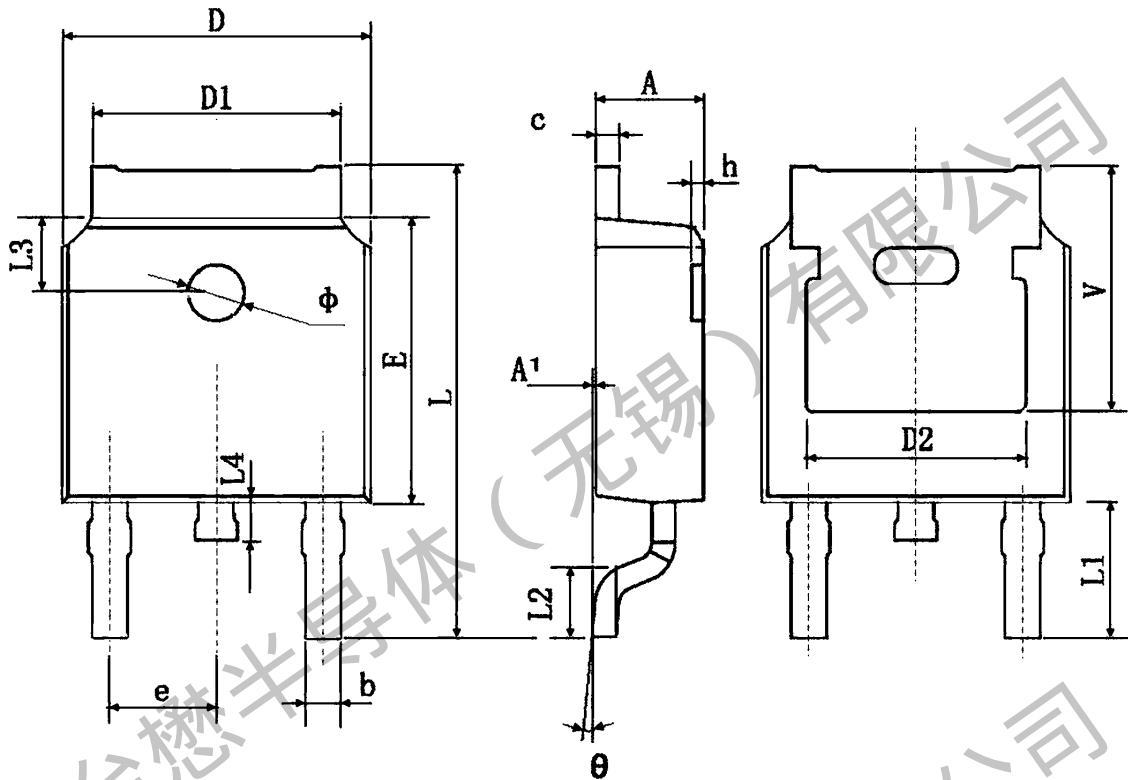




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N-Channel Enhancement Mosfet

Package Mechanical Data: TO-252-3L

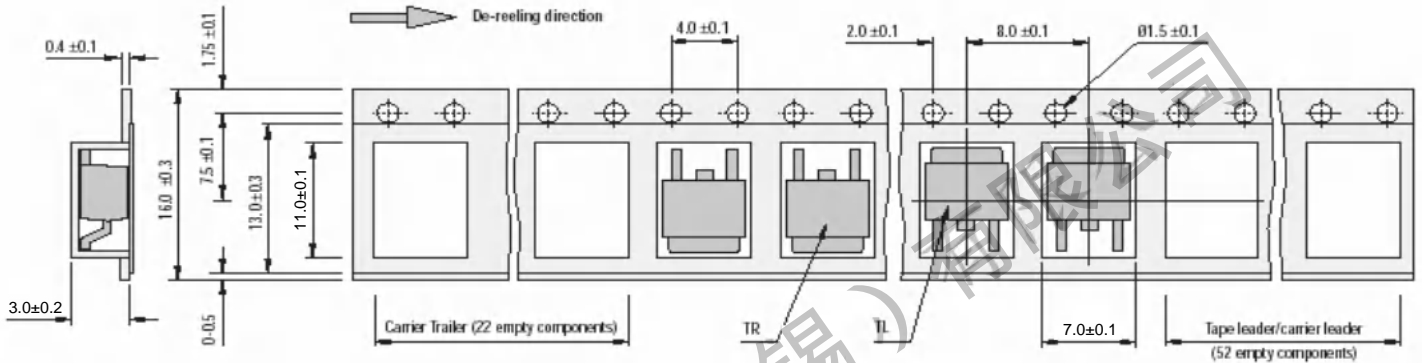


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386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

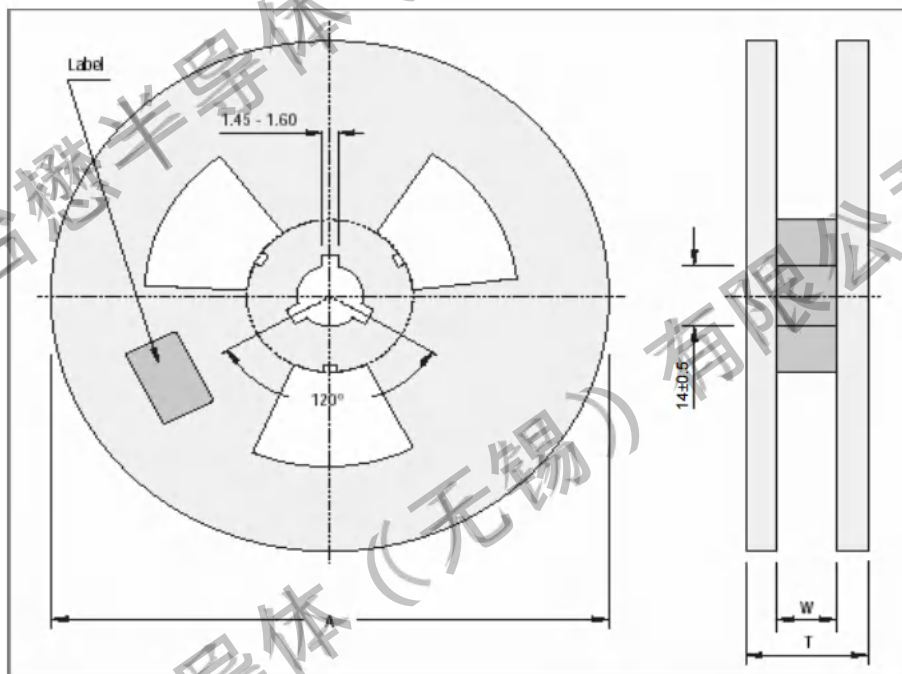
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TO-252-3L Embossed Carrier Tape



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
2023.11.05	23.11	Original	