TMP04N65D

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

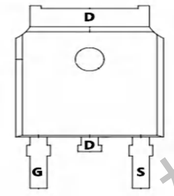
General Features

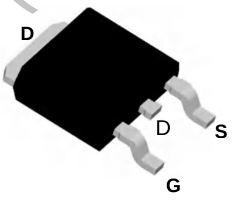
V_{DS} = 650V I_D = 4A

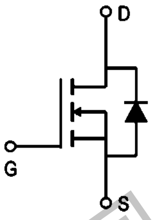
$R_{DS(ON)}$=2000mΩ(typ.)@ V_{GS}=10V

100% UIS Tested
100% R_g Tested

D:TO-252-3L







Marking: 4N65

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	4	A
I_{DM}	Pulsed Drain Current	25	A
EAS	Single Pulse Avalanche Energy	80	mJ
P_D	Total Power Dissipation	35	W
T_{STG}	Storage Temperature Range	-55 to175	℃
T_J	Operating Junction Temperature Range	-55 to175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient	---	62	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case	---	6.6	℃/W

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Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	650			V
$\Delta BV_{DSS}/\Delta T_J$	BreakdownVoltageTemperatureCoefficient	I_D=250μA, Referenced to 25°C		0.64		V/°C
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V			1	μA
		V_{DS} = 520 V, TC = 125°C			10	μA
IGSSF	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V			100	nA
IGSSR	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
VGS(TH)	Gate Threshold voltage	V_{DS}=V_{GS}, I_D =250 uA	2.0	3.0	4.0	V
RDS(On)	Drain-Source on-state resistance	V_{GS}=10 V, I_D =2A, T_J = 25°C		2000	2400	mΩ
gFS	Forward Transconductance	V_{DS}=40 V, I_D=2 A (Note 4)		3.8		S
C_{iss}	Input capacitance	V_{DS}=25V, V_{GS}=0 V, f=1.0 MHz		415		pF
C_{oss}	Output capacitance			58		pF
C_{rss}	Reverse transfer capacitance			1.4		pF
td(on)	Turn On Delay Time	V_{DD}=325V, ID=4A, R_G=25Ω (Note 4, 5)		7		ns
t_r	Rising Time			22		ns
td(off)	Turn Off Delay Time			15		ns
t_f	Fall Time			23		ns
Q_g	Total Gate Charge	V_{DS} = 520 V, ID = 4 A, V_{GS} = 10 V (Note 4, 5)		13		nC
Q_{gs}	Gate-Source Charge			4.9		nC
Q_{gd}	Gate-Drain Charge			2.3		nC
ISM	Maximum Pulsed Drain-Source Diode Forward Current				16	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 4 A			1.2	V
trr	Reverse Recovery Time	V_{GS} = 0 V, I_S = 4 A, dI_F / dt = 100 A/μs Note 4)		378		ns
Q_{rr}	Reverse Recovery Charge			1.35		μC

Typical Characteristics

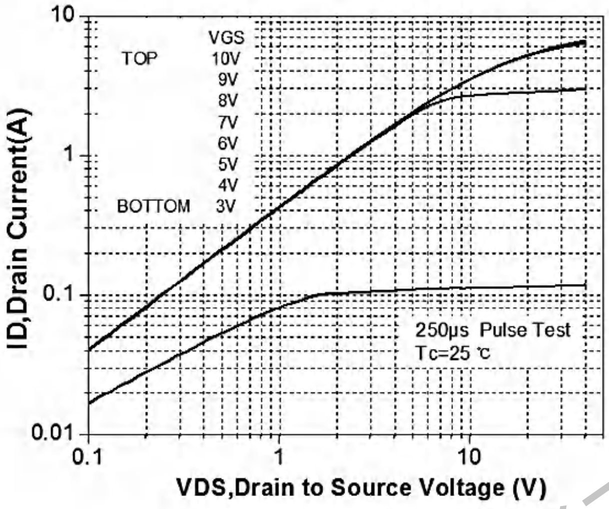


Figure 1. On-Region Characteristics

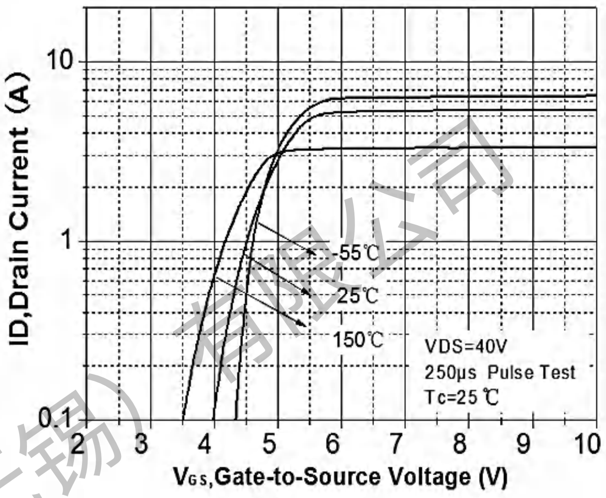
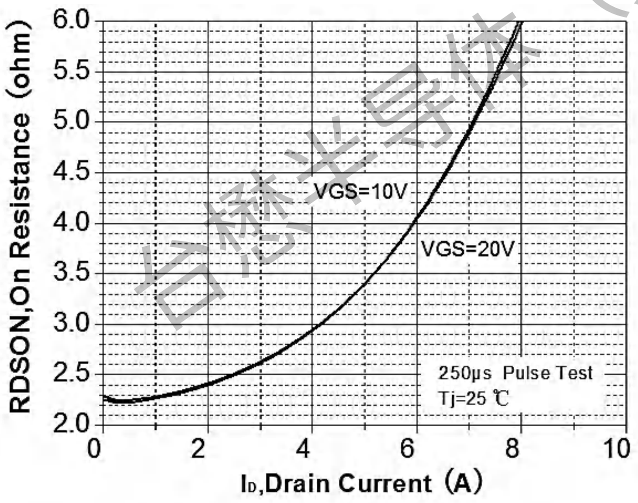


Figure 2. Transfer Characteristics



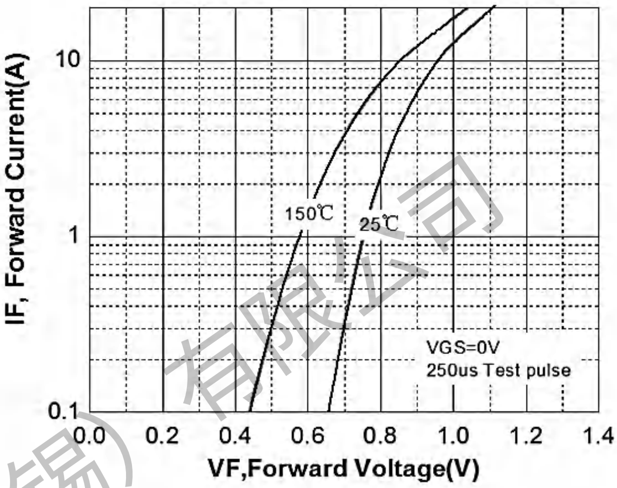


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

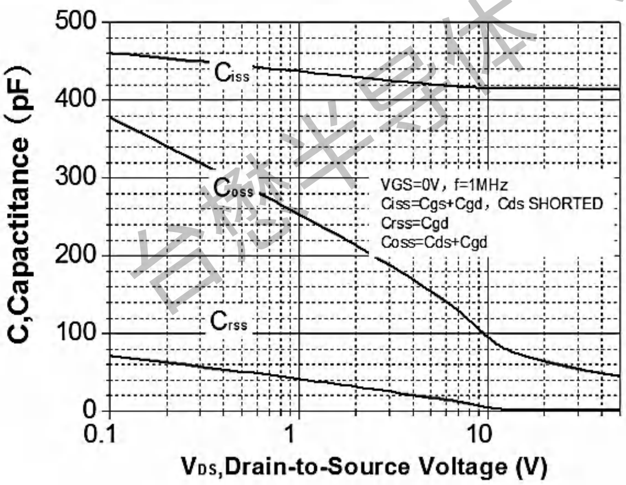


Figure 5. Capacitance Characteristics

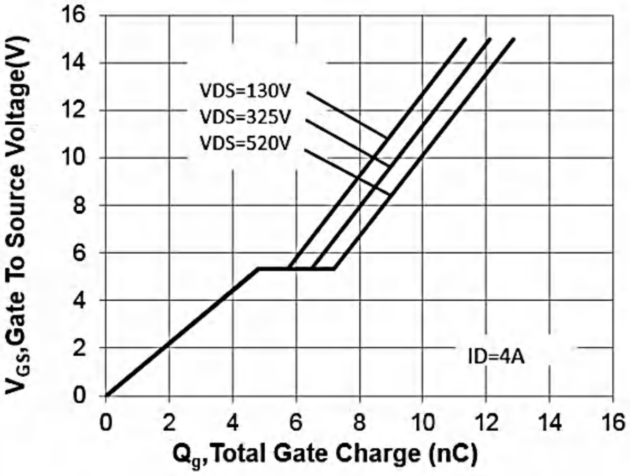


Figure 6. Gate Charge Characteristics

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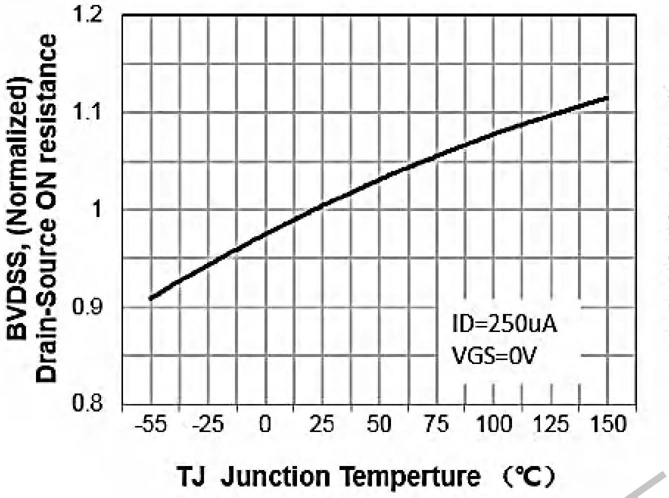


Figure 7. Breakdown Voltage Variation vs Temperature

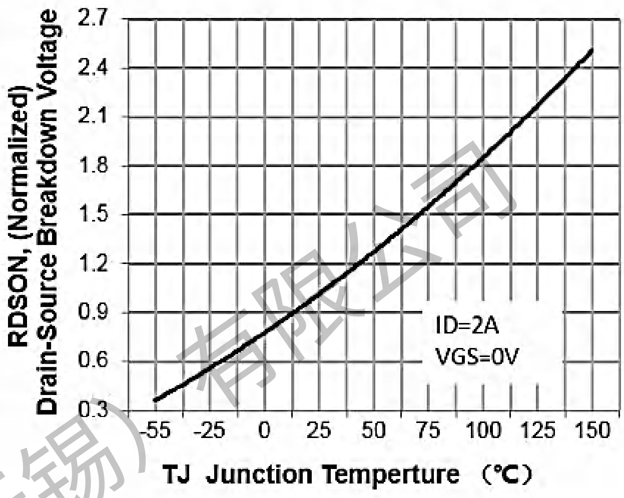


Figure 8. On-Resistance Variation vs Temperature

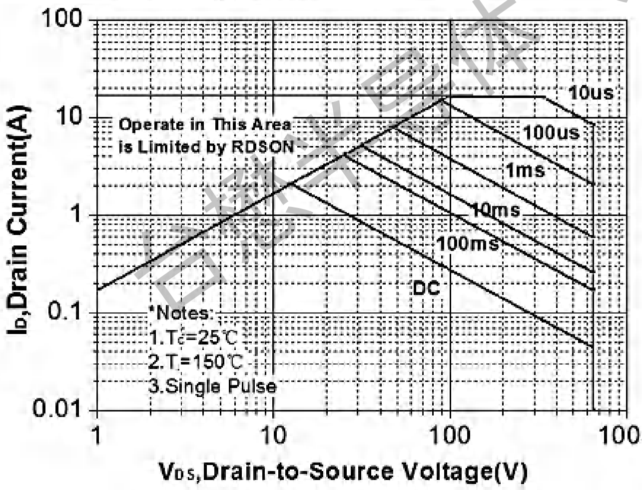


Figure 9. Maximum Safe Operating Area

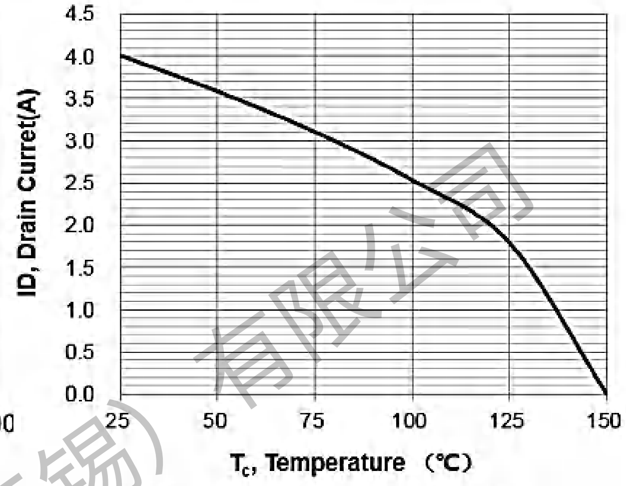


Figure 10. Maximum Drain Current vs Case Temperature

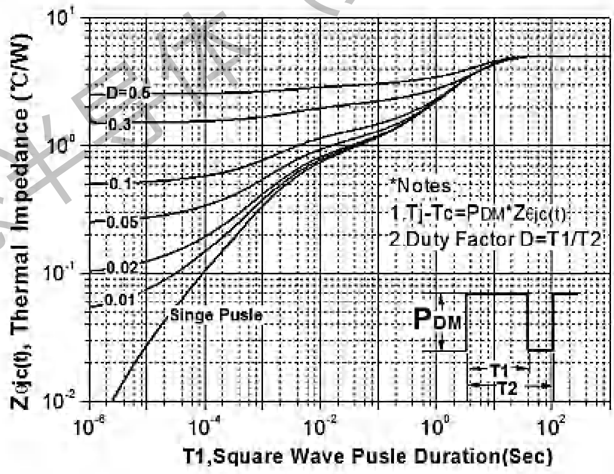
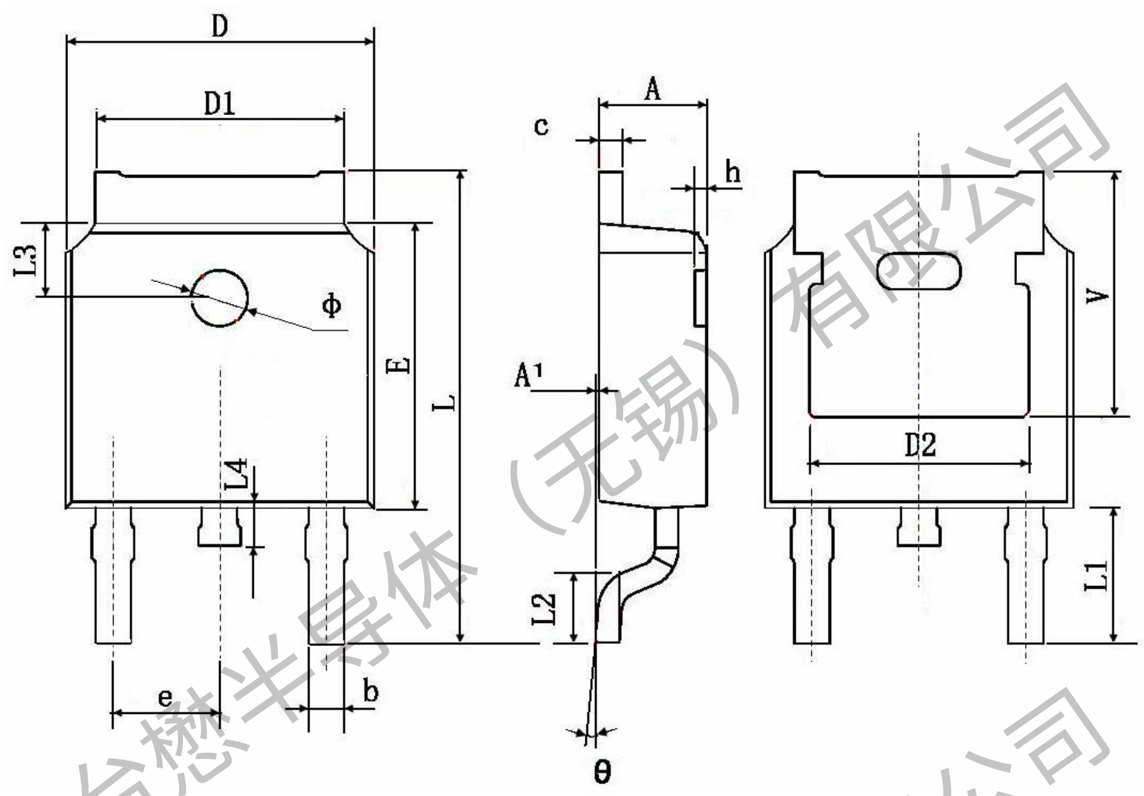


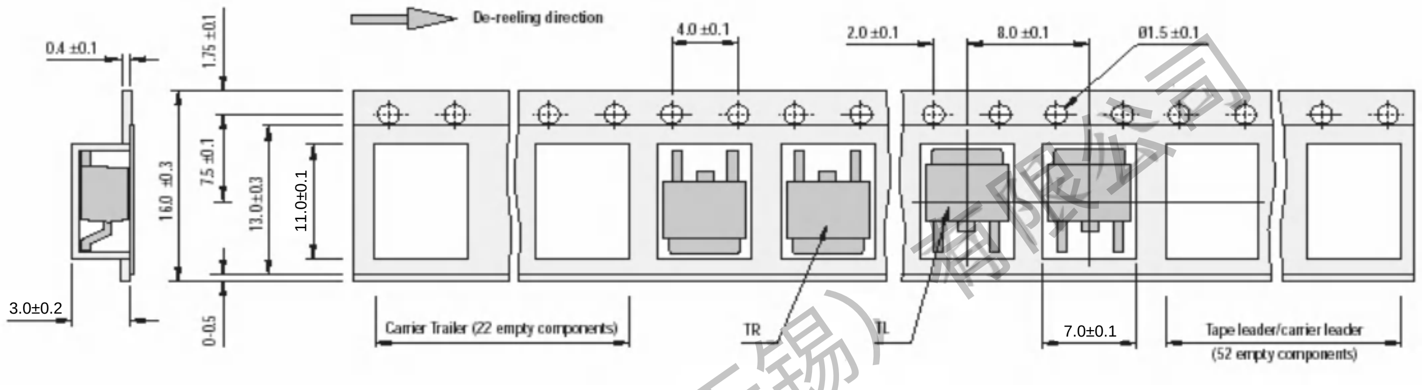
Figure 11. Transient Thermal Response Curve

Package Mechanical Data: TO-252-3L

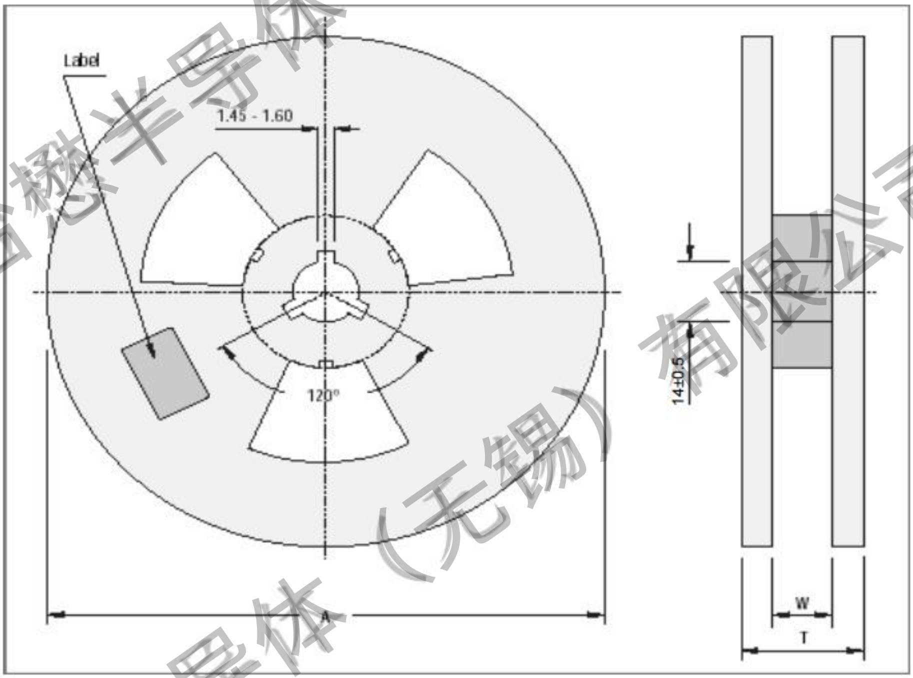


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	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
2025.06.05	25.06	Original	