TM20G04DF

N+P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

N Channl

V_{DS} =40V, I_D =20A

$R_{DS(ON)}$=18mΩ @ V_{GS}=10V

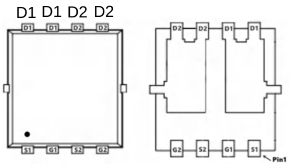
P Channl

V_{DS} = -40V,I_D = -20A

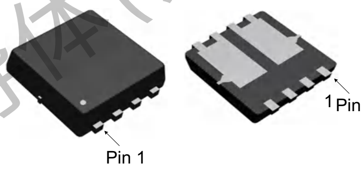
$R_{DS(ON)}$=32mΩ @ V_{GS}=-10V

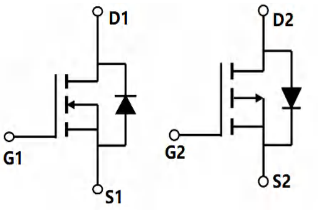
100% UIS Tested

100% R_g Tested



DF:DFN3x3-8L





Marking :20G04

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

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V	20	-20	A
I_D@T_A=100˚C	Continuous Drain Current, V_{GS} @ 10V	14	-14	A
I_{DM}	Pulsed Drain Current	80	-80	A
P_D@T_C=25˚C	Total Power Dissipation	28	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
$R_{\theta JC}$	Thermal Resistance,Junction to Cast	4.5	4.167	˚C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	62	˚C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250 μA	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=400V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250 μA	1.2	1.6	2.0	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=8A	---	18	22	mΩ
		V_{GS}=4.5V,I_D=5A	---	20	26	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	925	---	pF
C_{oss}	Output Capacitance		---	65	---	
C_{rss}	Reverse Transfer Capacitance		---	55	---	
Q_g	Gate Charge	V_{GS}=10V, V_{DS}=20V I_D=10A	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	3.2	---	
Q_{gd}	Gate-Drain Charge		---	3.1	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=20V, R_L=2.5Ω, R_{REN} =3Ω,V_{GS}=10V	---	4	---	ns
t_r	Rise Time		---	3	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	15	---	ns
t_f	Fall Time		---	2	---	ns
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	VD=VG=0V	---	----	20	A
I_{SM}	Pulsed Drain to Source Diode	VD=VG=0V	---	---	80	A
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=3A	---	---	1.2	V

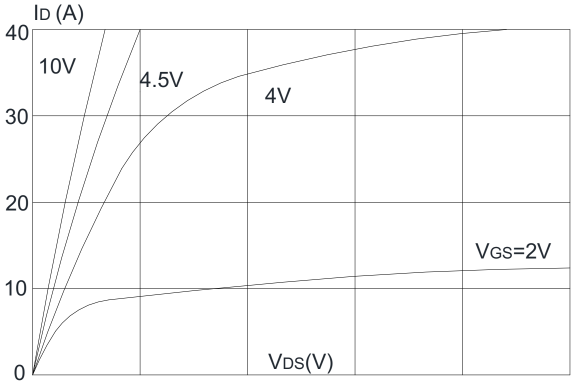


Figure1: Output Characteristics

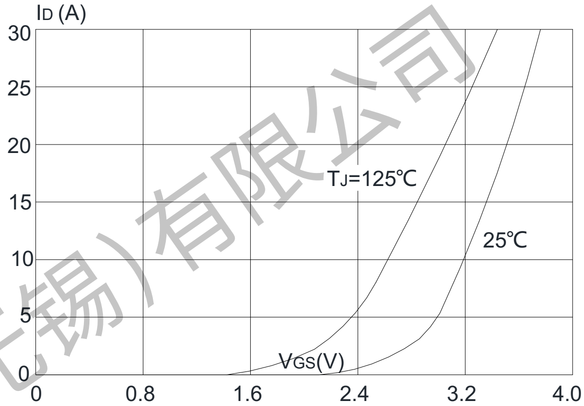


Figure 2: Typical Transfer Characteristics

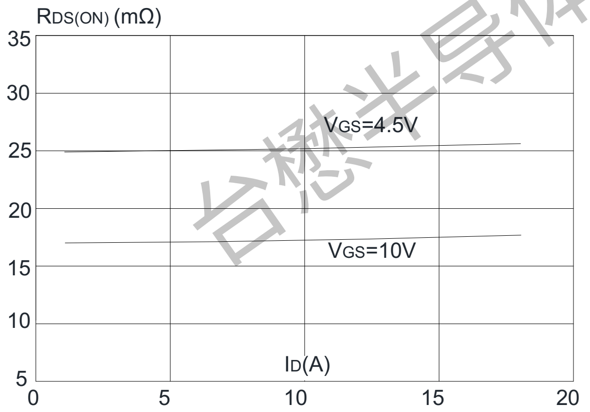


Figure 3: On-resistance vs. Drain Current

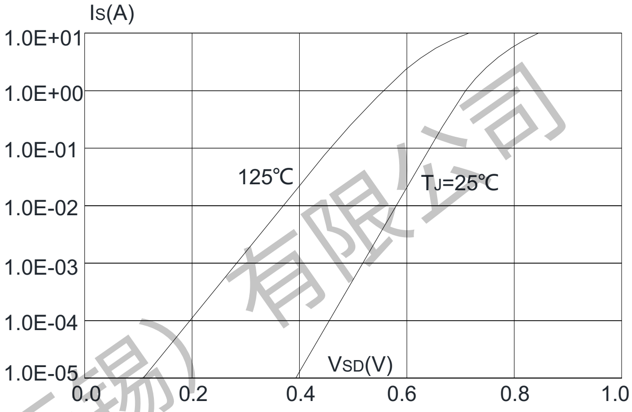


Figure 4: Body Diode Characteristics

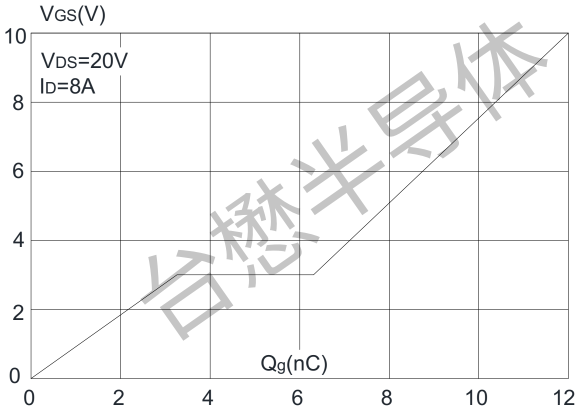


Figure 5: Gate Charge Characteristics

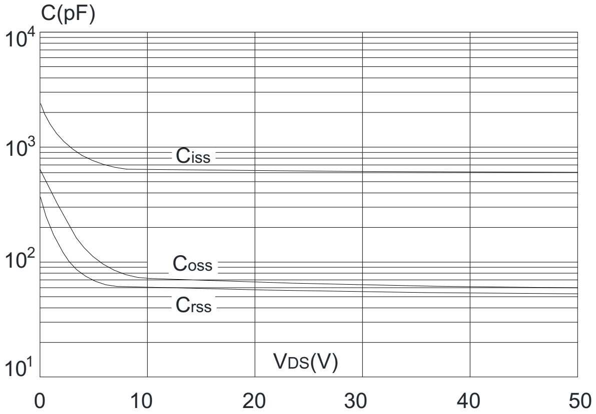


Figure 6: Capacitance Characteristics

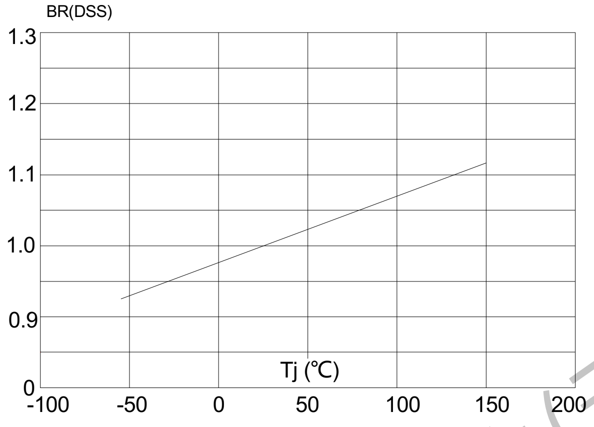


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

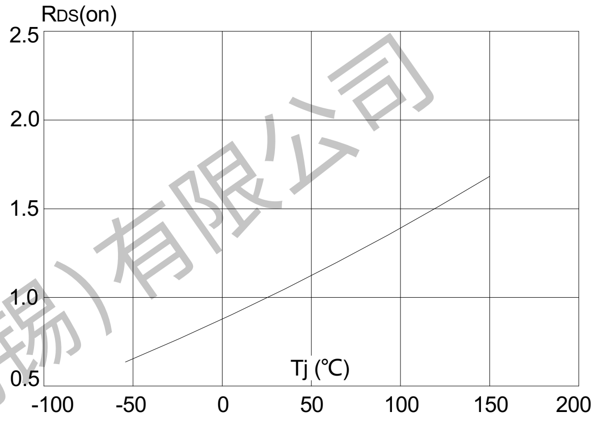


Figure 8: Normalized on Resistance vs. Junction Temperature

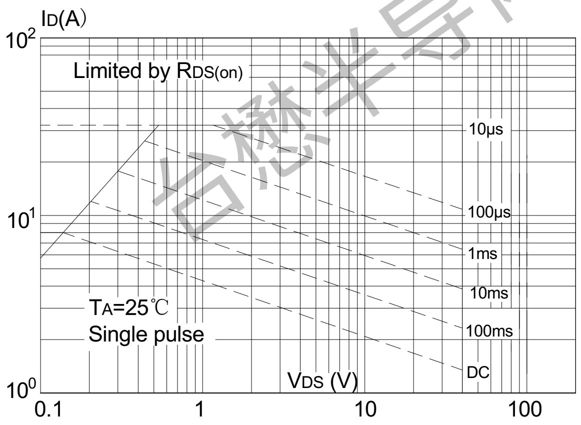


Figure 9: Maximum Safe Operating Area

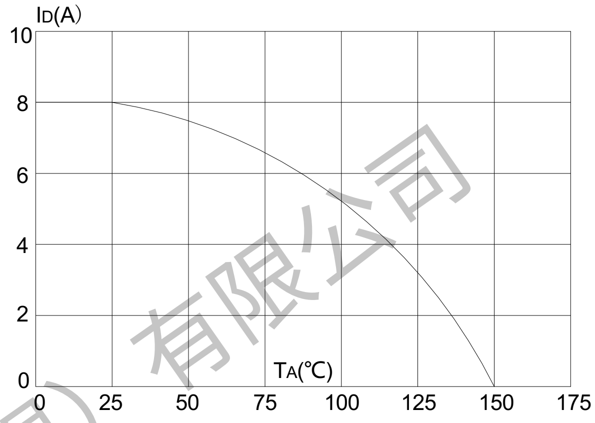


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

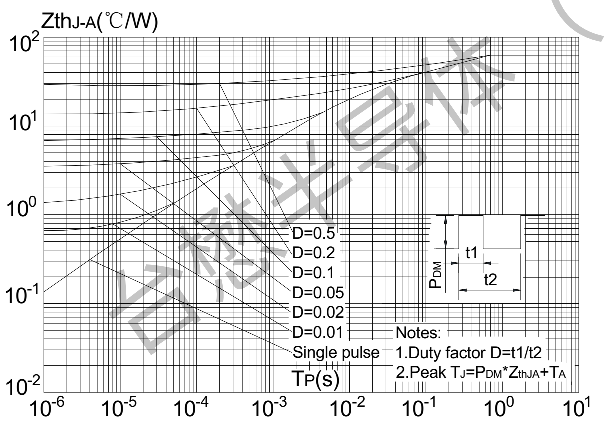


Figure.11: Maximum Effective
Transient Thermal Impedance, Junction-to-Ambient

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250 μA	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-40V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250 μA	-1.0	-1.75	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=-10V,I_D=-10A	---	32	40	mΩ
		V_{GS}=-4.5V,I_D=-5A	---	39	50	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-20V, V_{GS}=0V, f=1MHz	---	1100	---	pF
C_{oss}	Output Capacitance		---	106	---	
C_{rss}	Reverse Transfer Capacitance		---	79.4	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}= -20V，I_D=-5A V_{GS}= -10V, R_L=2.4Ω	---	9	---	ns
t_r	Rise Time		---	21	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	26	---	ns
t_f	Fall Time		---	34	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-20V, I_D=-5A	---	14	---	nC
Q_{gs}	Gate-Source Charge		---	3	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	2	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	VD=VG=0V	---	---	-20	A
I_{SM}	Pulsed Drain to Source Diode		---	---	-80	---
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V, I_{SD}=-6A	---	---	-1.2	V
Trr	Reverse Recovery Time	I_F=-5A,T_J=25 dI/dt=100A/us	---	14	---	ns
Qrr	Reverse Recovery Charge		---	9	---	nC

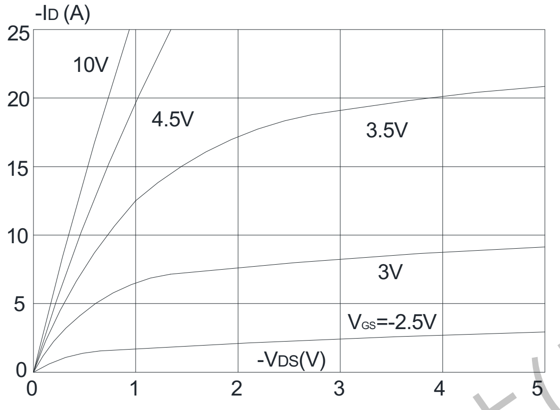


Figure1: Output Characteristics

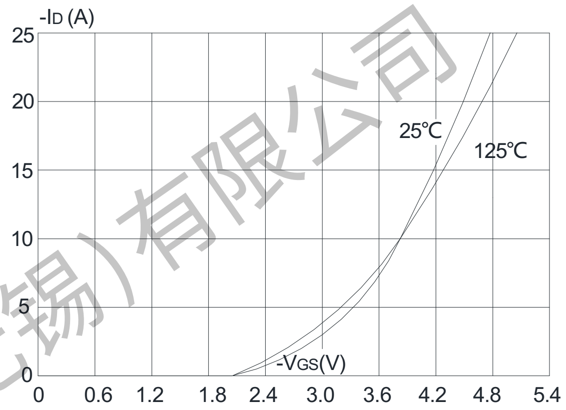


Figure 2: Typical Transfer Characteristics

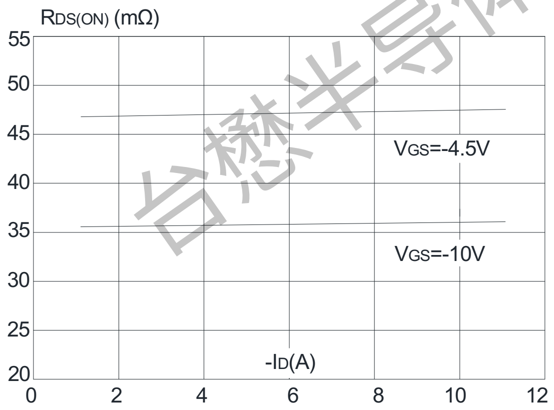


Figure 3: On-resistance vs. Drain Current

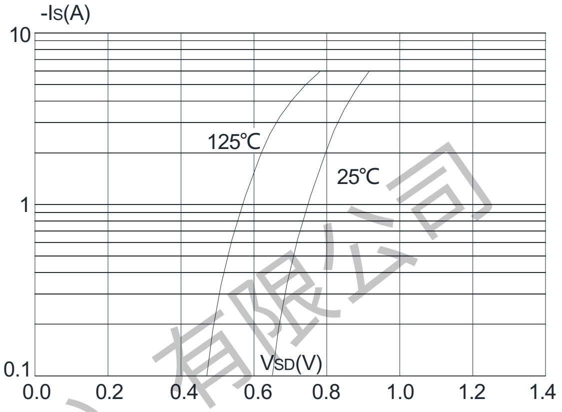


Figure 4: Body Diode Characteristics

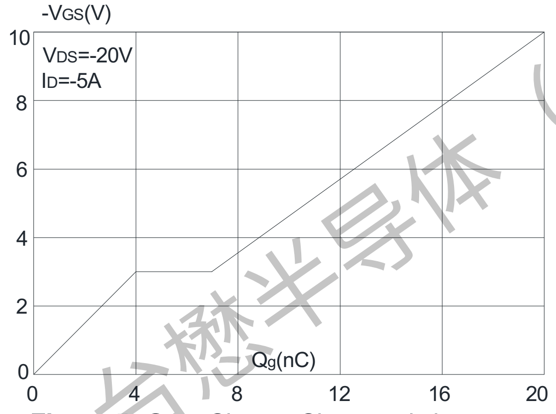


Figure 5: Gate Charge Characteristics

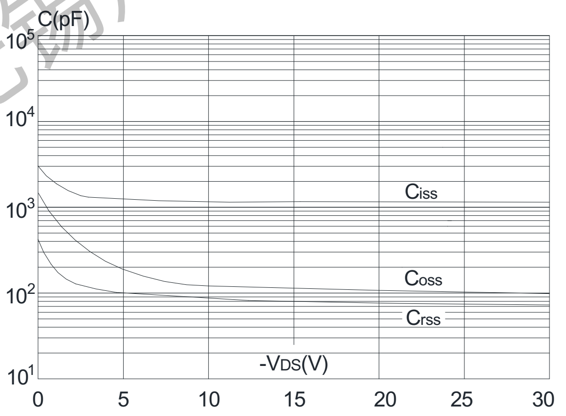


Figure 6: Capacitance Characteristics

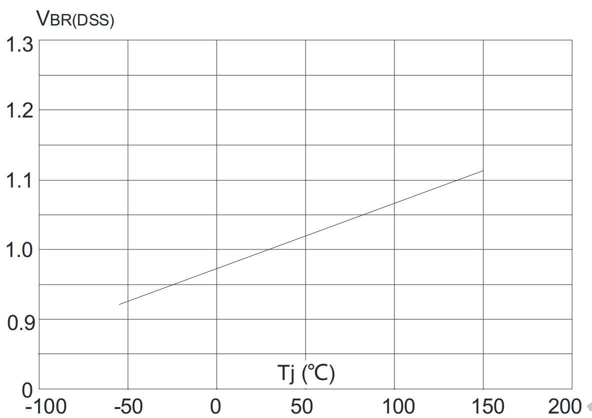


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

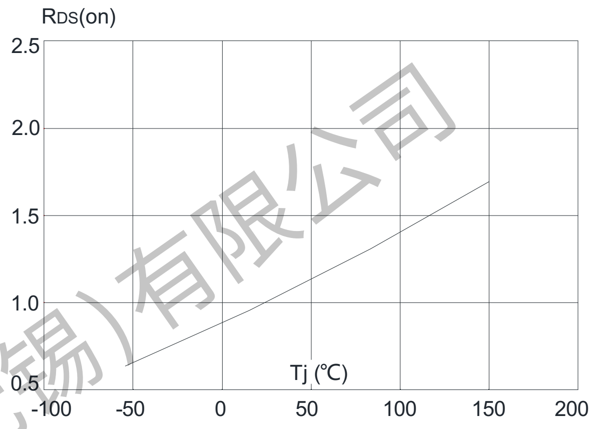


Figure 8: Normalized on Resistance vs. Junction Temperature

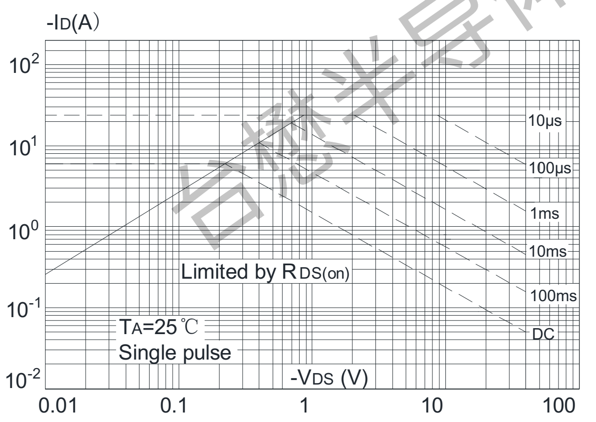


Figure 9: Maximum Safe Operating Area

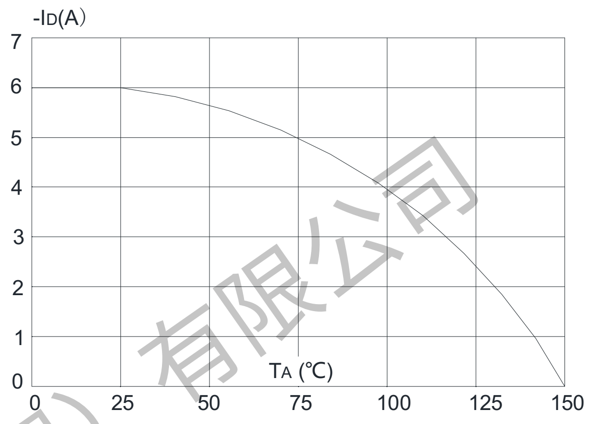


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

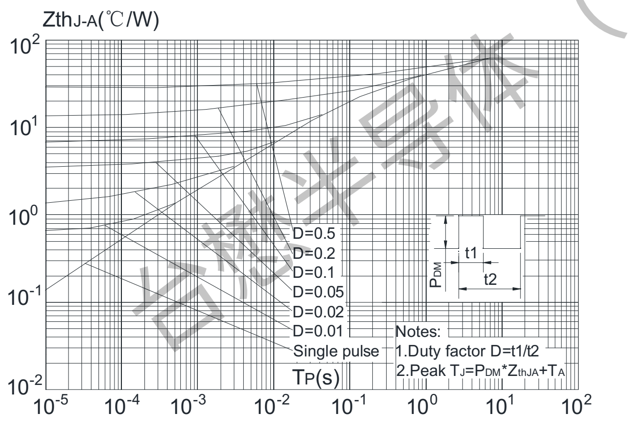
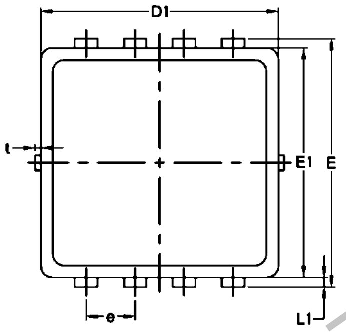
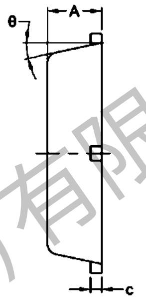
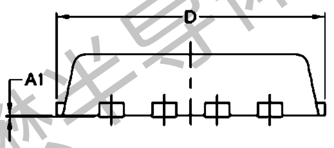


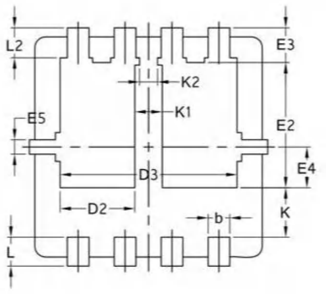
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Mechanical Data:DFN3x3−8L



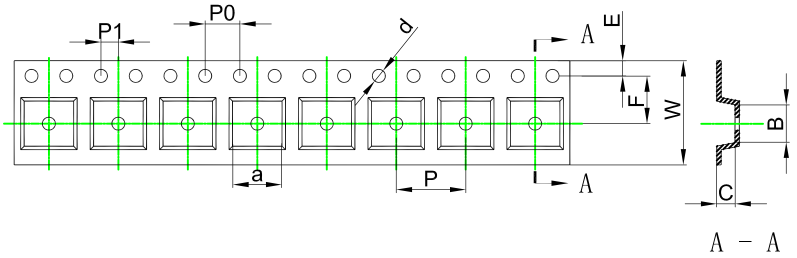






Symbol	Common		
	Mm		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
Φ	10°	12°	14°

PDFN3×3-8L Embossed Carrier Tape



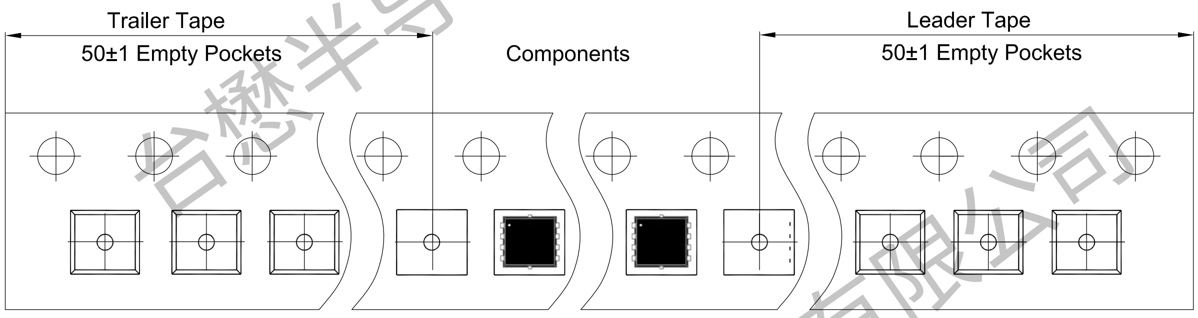
Packaging Description:

SOP-8L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

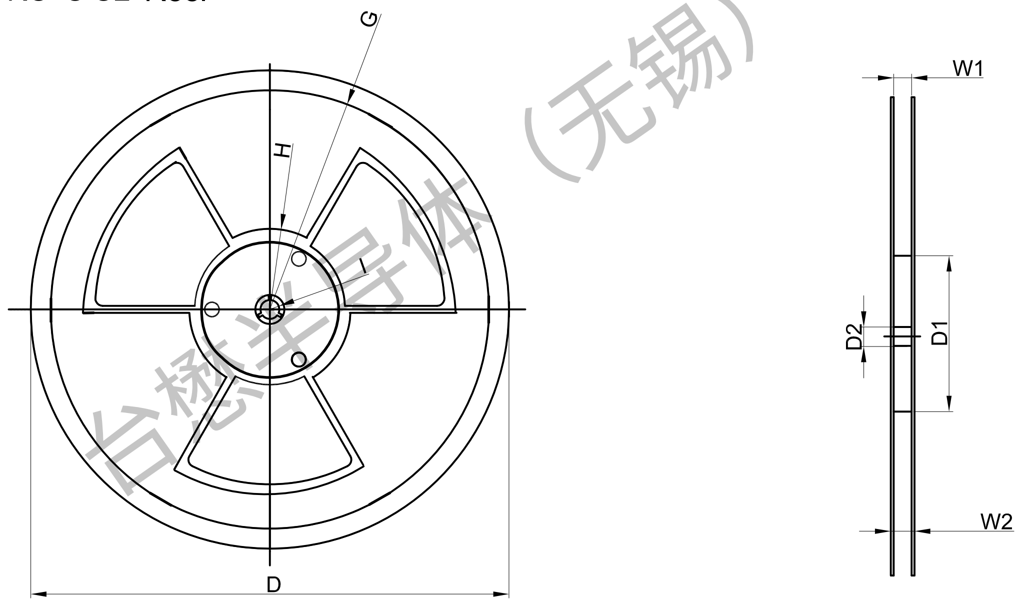
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
PDFN3×3-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN3×3-8L Tape Leader and Trailer



PDFN3×3-8L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R135.00	R55.00	R6.50	12.00	14.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
5,000 pcs	13 inch	10,000 pcs	370×355×52	50,000 pcs	400×360×368	

Important Notices and Disclaimers

- Tritech-MOS Technology Corp.reserves the right to change thisdocument, its products, and specifications at any time without prior notice.
- Before final design, purchase, or use, customers should obtain and confirm the latest product information and specifications.

- Tritech-MOS Technology Corp. makes no warranties, representations or warranties regarding the suitability of its products for any specific purpose, and Tritech-MOS Technology Corp. does not assume any responsibility for application assistance or customer product design.

- Tritech-MOS Technology Corp. does not guarantee or assume any responsibility for the purchase or use of any unexpected or unauthorized products.
- Any intellectual property rights of Tritech-MOS Technology Corp. are not licensed through implicate or other means.

- Products of Tritech-MOS Technology Corp. are not included as critical components in life support equipment or systems without explicit written approval from Tritech-MOS Technology Corp.

Revision history:

Date	Rev	Description	Page
2023.08.11	23.08	Original	