TM4606A

N+P-Channel Enhancement Mode Mosfet

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

Applications
- Load switch
- PWM

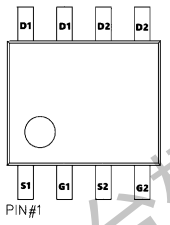
General Features
N Channel
V_{DS} = 30V I_D =8.6A
$R_{DS(ON)}$=16.7mΩ(typ) @V_{GS}=10V

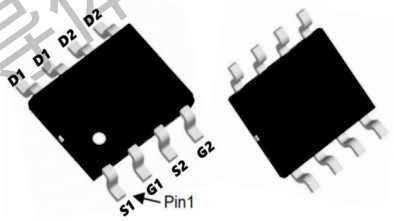
P Channel
V_{DS} = -30V I_D =-7.5A
$R_{DS(ON)}$=32mΩ(typ) @V_{GS}=-10V

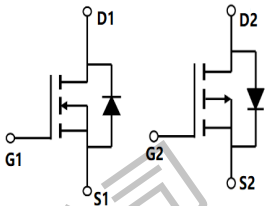
100% UIS Tested
100% R_g Tested

Green Product

S:SOP-8L







Marking: 4606A

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V	8.6	-7.5	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V	6.2	-5.5	A
I_{DM}	Pulsed Drain Current	21.5	-18.7	A
EAS	Single Pulse Avalanche Energy	12	43	mJ
I_{AS}	Avalanche Current	9	17	A
P_D@T_A=25°C	Total Power Dissipation	2	2	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
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	---	85	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	62.5	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	μA
		T_J=55℃			5	
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	1.2	1.6	2.0	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	64			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=7.2A		16.7	20	mΩ
		V_{GS}=4.5V, I_D=5A		22	36	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=7.2A		20		S
V_{SD}	Diode Forward Voltage	I_S=2.5A,V_{GS}=0V		0.74	1	V
I_S	Maximum Body-Diode Continuous Current				8.6	A
I_{SM}	Pulsed Body-Diode Current[B]				64	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		373	448	pF
C_{oss}	Output Capacitance			67		pF
C_{rss}	Reverse Transfer Capacitance			41		pF
R_g (Note.H)	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.8	2.8	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=7.2A		7.2	11	nC
Q_g(4.5V)	Total Gate Charge			3.5		nC
Q_{gs}	Gate Source Charge			1.3		nC
Q_{gd}	Gate Drain Charge			1.7		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=2.1Ω, R_{GEN}=3Ω		4.5		ns
t_r	Turn-On Rise Time			2.7		ns
$t_{D(off)}$	Turn-Off DelayTime			14.9		ns
t_f	Turn-Off Fall Time			2.9		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=7.2A, dI/dt=100A/μs		10.5	12.6	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=7.2A, dI/dt=100A/μs		4.5		nC

N-Channel Typical Characteristics

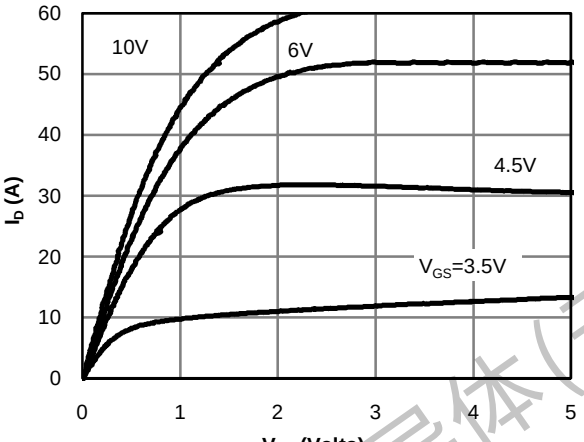

Fig 1: On-Region Characteristics

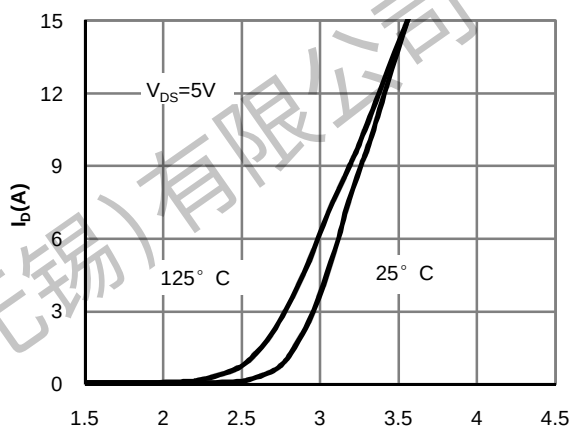

Figure 2: Transfer Characteristics

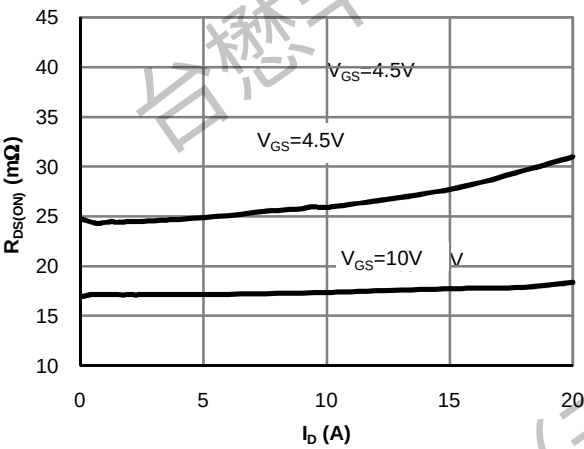

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

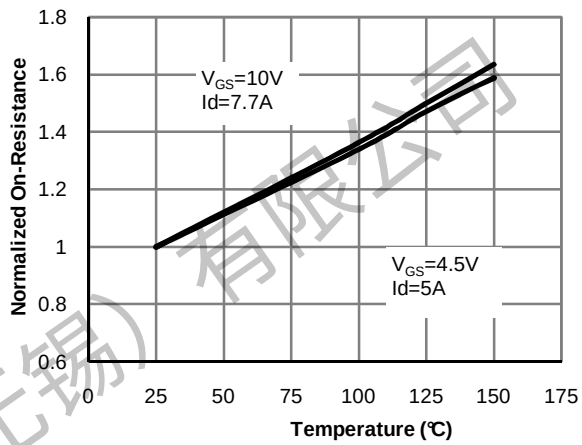

Figure 4: On-Resistance vs. Junction Temperature

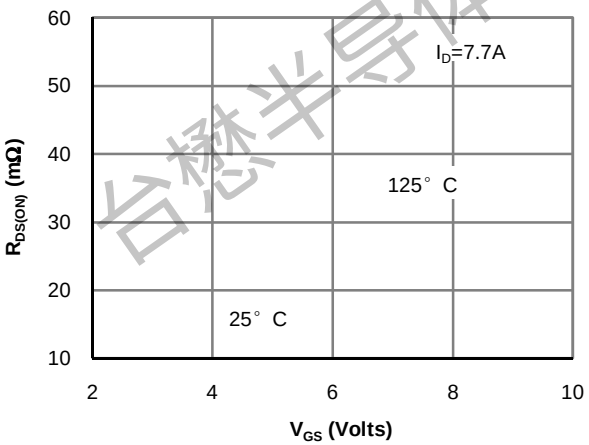

Figure 5: On-Resistance vs. Gate-Source Voltage

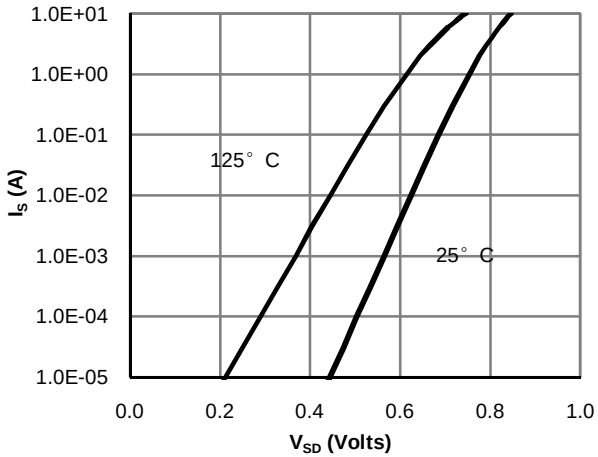

Figure 6: Body-Diode Characteristics

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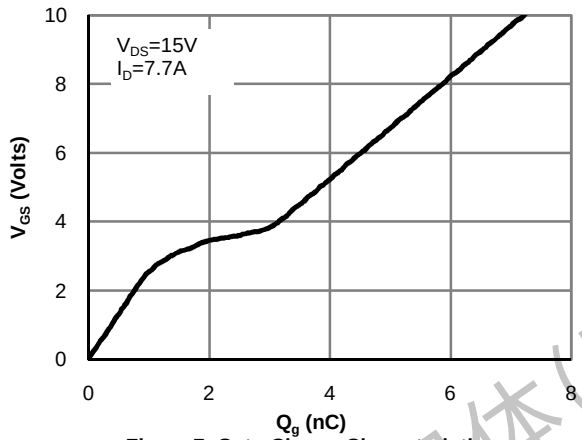

Figure 7: Gate-Charge Characteristics

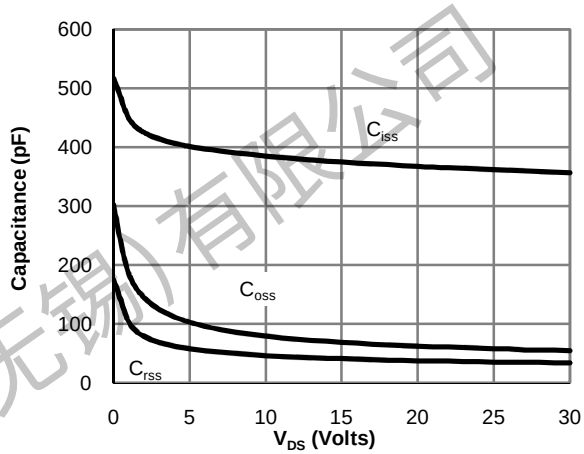

Figure 8: Capacitance Characteristics

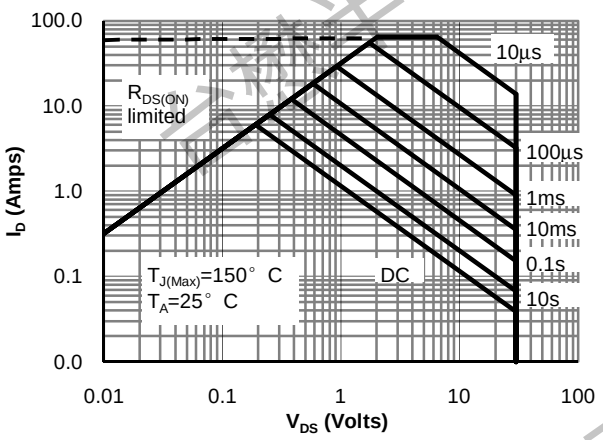

Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

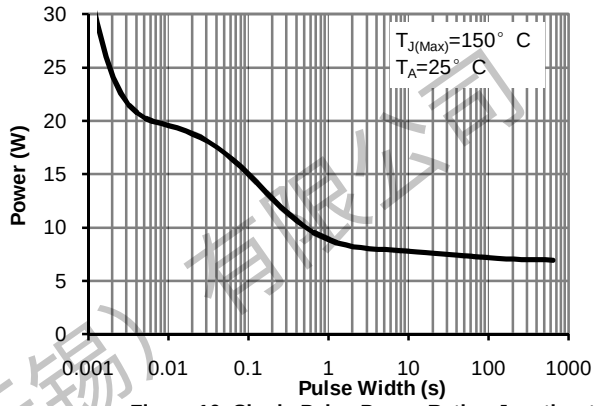

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

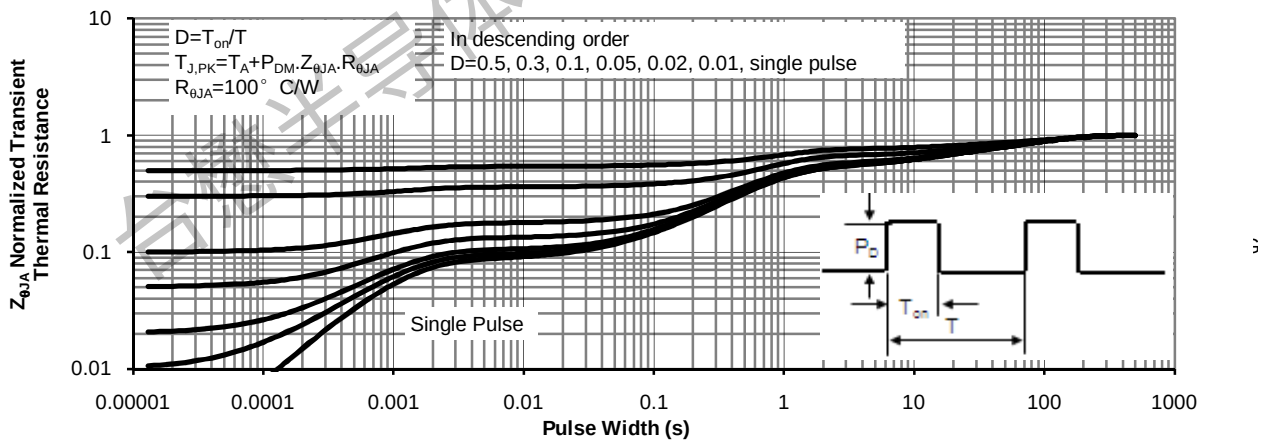

Figure 11: Normalized Maximum Transient Thermal Impedance

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250μA, V_{GS}=0V	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V			-1	μA
		T_J=55℃			-5	
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	-1.0	-1.5	-2.0	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-6.3A		32	38	mΩ
		V_{GS}=-4.5V, I_D=-4.5A		39	49	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-5.3A		19		S
V_{SD}	Diode Forward Voltage	I_S=-3.5A,V_{GS}=0V		-0.8	-1	V
I_S	Maximum Body-Diode Continuous Current				-7.5	A
I_{SM}	Pulsed Body-Diode Current[B]				-40	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		760		pF
C_{oss}	Output Capacitance			140		pF
C_{rss}	Reverse Transfer Capacitance			95		pF
R_g (Note.H)	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		3.2	5	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge (10V)	V_{GS}=-10V, V_{DS}=-15V, I_D=-5.3A		13.6	16	nC
Q_g(4.5V)	Total Gate Charge (4.5V)			6.7		nC
Q_{gs}	Gate Source Charge			2.5		nC
Q_{gd}	Gate Drain Charge			3.2		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=2.8Ω, R_{GEN}=3Ω		8		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(off)}$	Turn-Off DelayTime			17		ns
t_f	Turn-Off Fall Time			5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-5.3A, dI/dt=100A/μs		15		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-5.3A, dI/dt=100A/μs		9.7		nC

P-Typical Characteristics

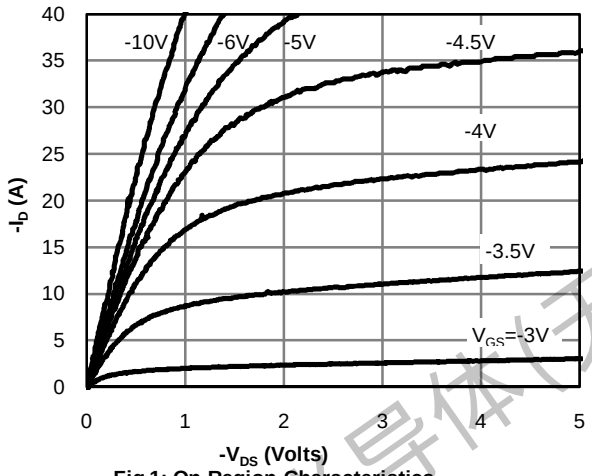

Fig 1: On-Region Characteristics

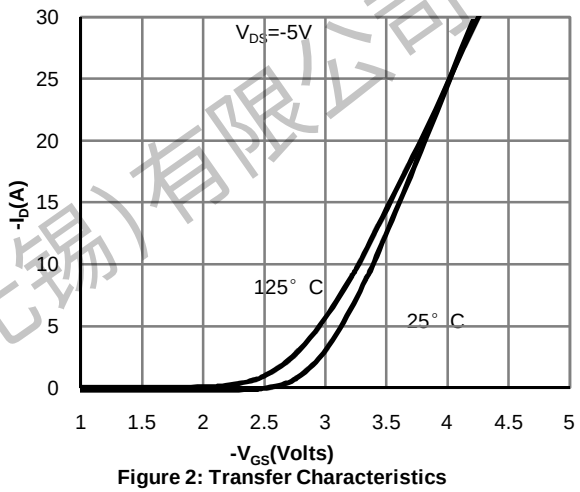

Figure 2: Transfer Characteristics

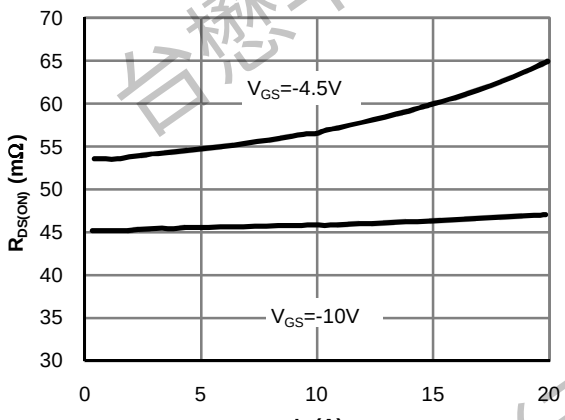

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

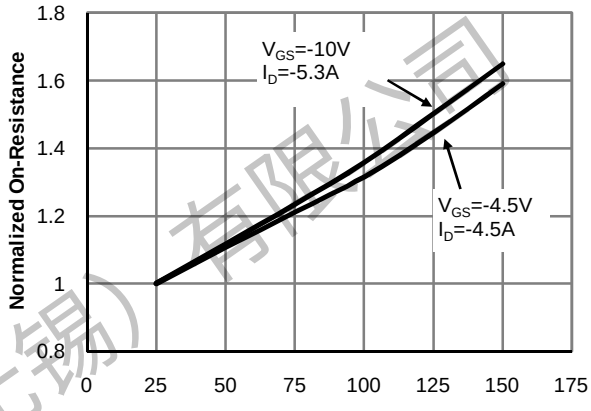

Figure 4: On-Resistance vs. Junction Temperature

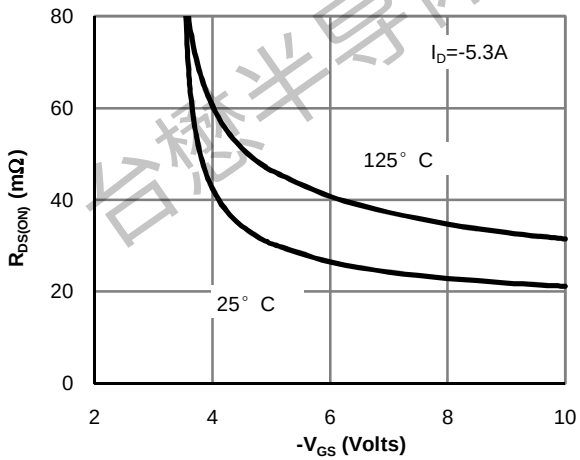

Figure 5: On-Resistance vs. Gate-Source Voltage

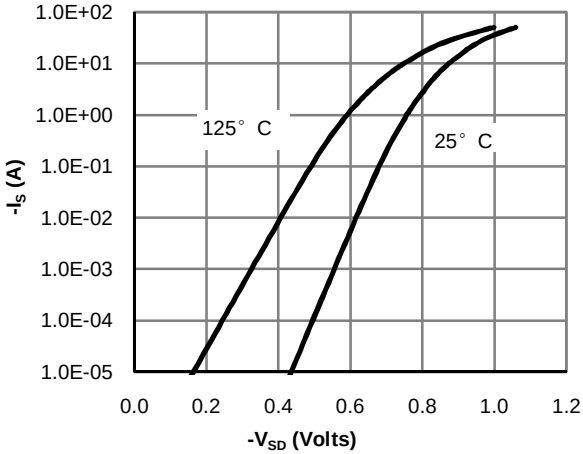

Figure 6: Body-Diode Characteristics

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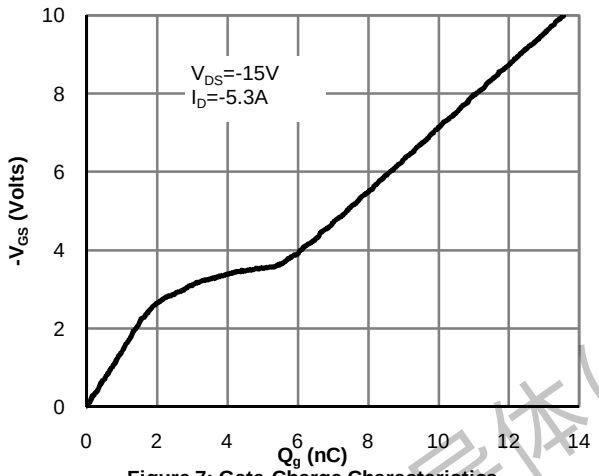

Figure 7: Gate-Charge Characteristics

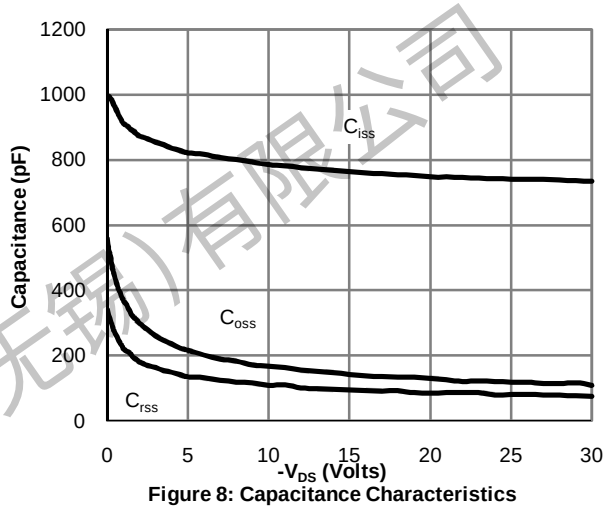

Figure 8: Capacitance Characteristics

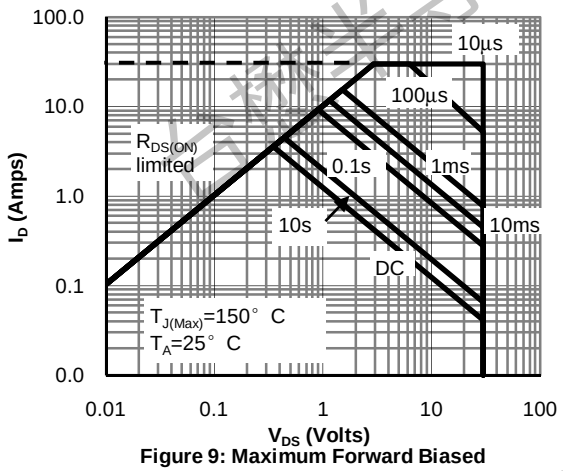

Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

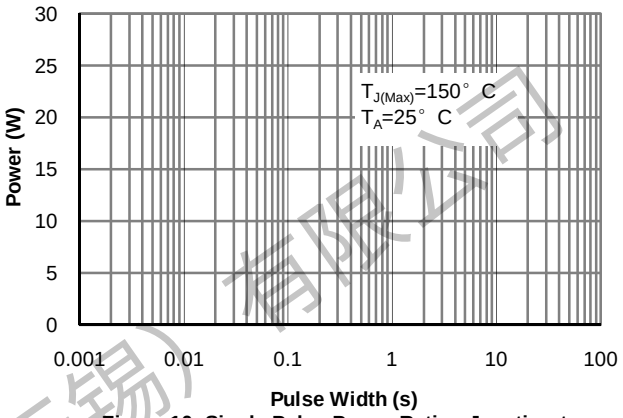

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

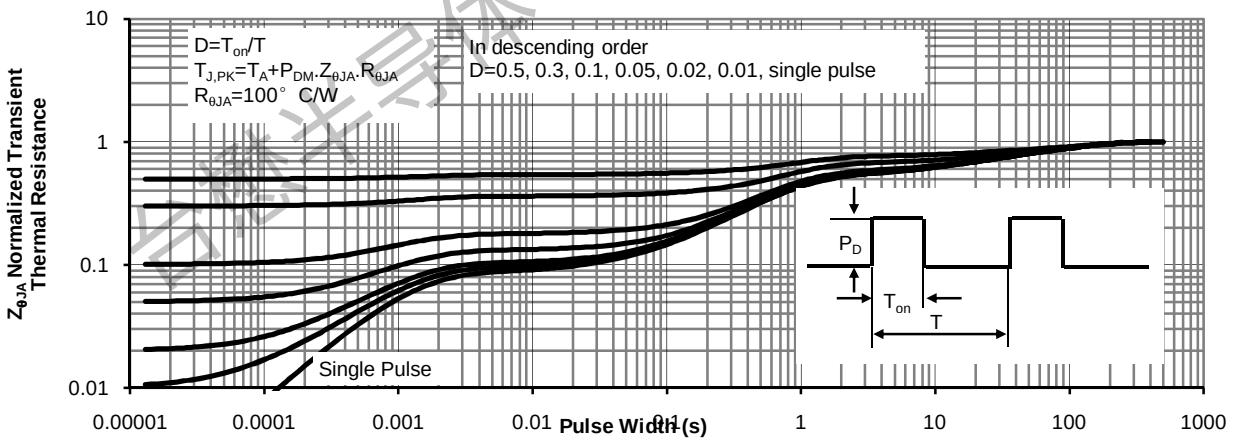

Figure 11: Normalized Maximum Transient Thermal Impedance

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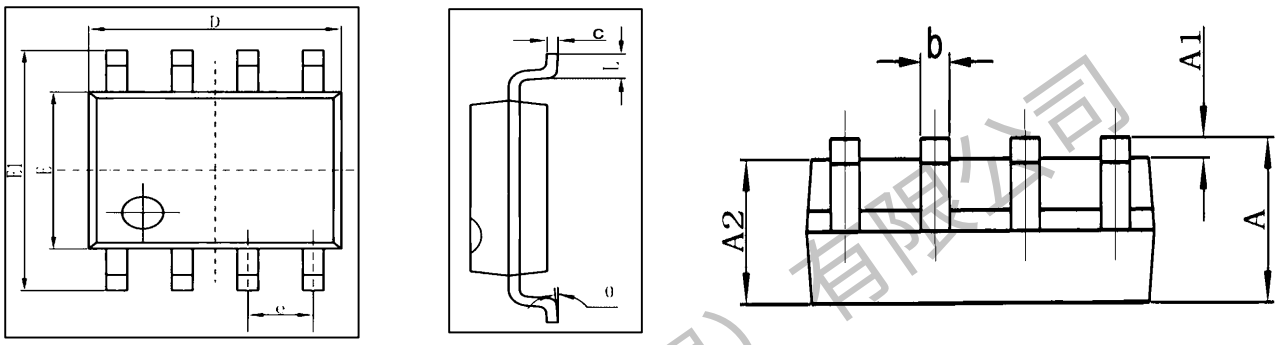
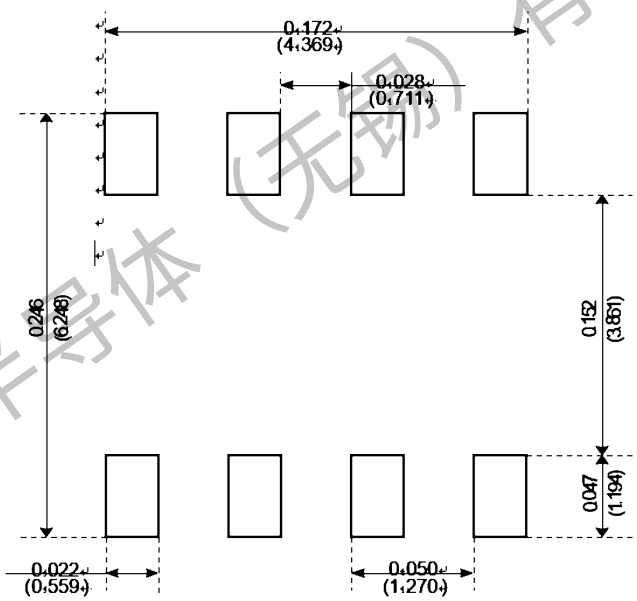
Package Mechanical Data:SOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads

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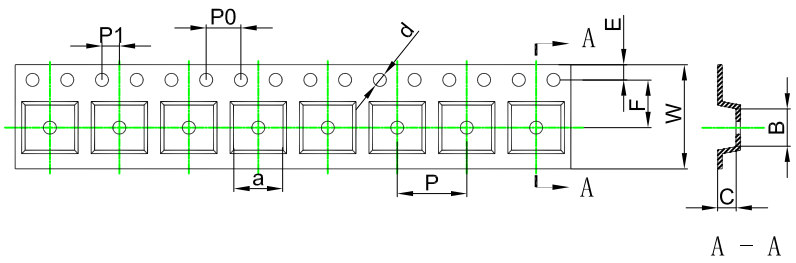
SOP-8L Embossed Carrier Tape



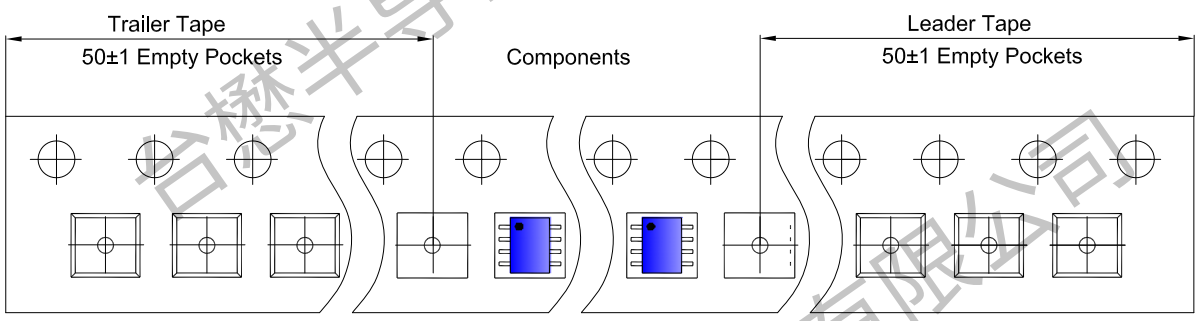
Packaging Description:

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).

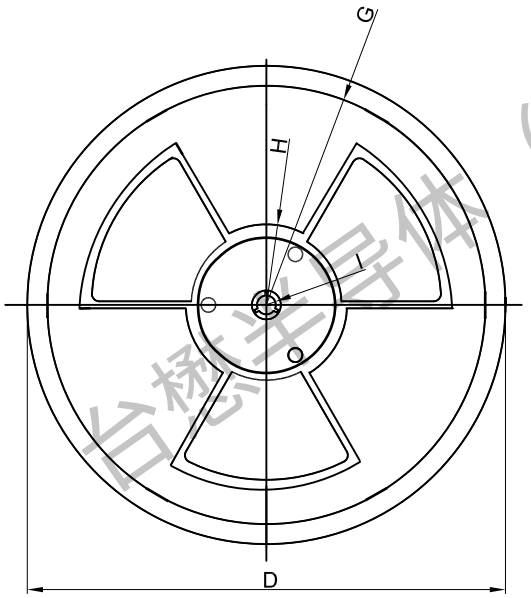
ALL DIM IN mm

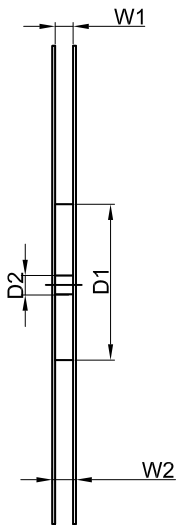
Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOP-8L Tape Leader and Trailer



SOP-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)
3,000 pcs	13 inch	6,000 pcs	370×355×52	48,000 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.

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- 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
2024.06.04	24.06	Original	