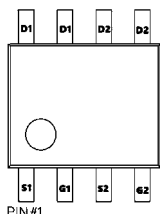
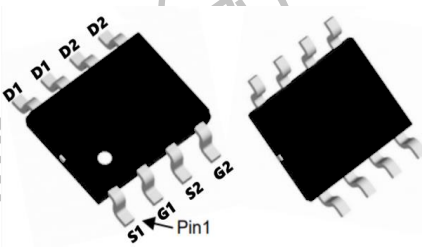
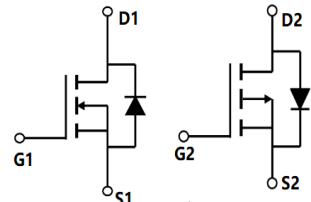


TM4614A

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 $V_{DS} = 40V, I_D = 9.8A$ $R_{DS(ON)} = 16m\Omega (typ.) @ V_{GS} = 10V$ P Channel $V_{DS} = -40V, I_D = -7.5A$ $R_{DS(ON)} = 35m\Omega (typ.) @ V_{GS} = -10V$ 100% UIS Tested 100% R_g Tested 
--	---

 Marking: 4614A	S:SOP-8L 	
--	--	--

Absolute Maximum Ratings ($T_A = 25^\circ C$ 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
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	9.8	-7.5	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	6.5	-5.8	A
I_{DM}	Pulsed Drain Current ²	28	-24	A
EAS	Single Pulse Avalanche Energy ³	16.2	39	mJ
I_{AS}	Avalanche Current	22	-28	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ⁴	1.67	1.67	W
T_{STG}	Storage Temperature Range	-55 to 175	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	-55 to 175	$^\circ C$
Thermal Data				
Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	85	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	62.5	$^\circ C/W$



TM4614A

N+P-Channel Enhancement Mode Mosfet

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	40	---	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.034	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =5A	---	16	18	mΩ
		V _{GS} =4.5V , I _D =4A	---	19	25	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.0	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	-4.56	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =32V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =32V , V _{GS} =0V , T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =5V , I _D =5A	---	14	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.6	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V , V _{GS} =4.5V , I _D =5A	---	5.5	---	nC
Q _{gs}	Gate-Source Charge		---	1.25	---	
Q _{gd}	Gate-Drain Charge		---	2.5	---	
Td(on)	Turn-On Delay Time	V _{DD} =20V , V _{GS} =10V , R _G =3.3Ω I _D =1A	---	8.9	---	ns
T _r	Rise Time		---	2.2	---	
Td(off)	Turn-Off Delay Time		---	41	---	
T _f	Fall Time		---	2.7	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	593	---	pF
C _{oss}	Output Capacitance		---	76	---	
C _{rss}	Reverse Transfer Capacitance		---	56	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	9.8	A
ISM	Pulsed Source Current ^{2,5}		---	---	23	A
VSD	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1mH,IAS=17.8A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

TM4614A

N+P-Channel Enhancement Mode Mosfet

P-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-40	---	---	V
$\Delta BVDSS/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.02	---	V/ $^\circ\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-6A$	---	35	39	m Ω
		$V_{GS}=-4.5V, I_D=-3A$	---	40	47	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.75	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3.72	---	mV/ $^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-32V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-6A$	---	13	---	S
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-6A$	---	11.5	---	nC
Q_{gs}	Gate-Source Charge		---	3.5	---	
Q_{gd}	Gate-Drain Charge		---	3.3	---	
$T_d(on)$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	22	---	ns
T_r	Rise Time		---	15.7	---	
$T_d(off)$	Turn-Off Delay Time		---	59	---	
T_f	Fall Time		---	5.5	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	1215	---	pF
C_{oss}	Output Capacitance		---	134	---	
C_{rss}	Reverse Transfer Capacitance		---	102	---	
I_s	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-7.5	A
ISM	Pulsed Source Current ^{2,5}		---	---	-22	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_s=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-27.2A$
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

TM4614A

N+P-Channel Enhancement Mode Mosfet

N-Channel Typical Characteristics

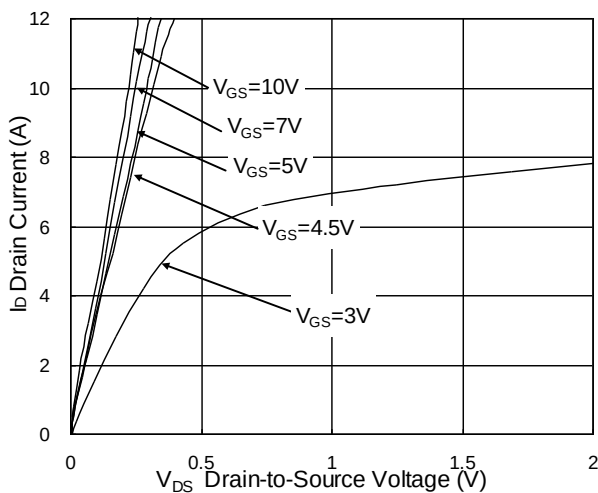


Fig.1 Typical Output Characteristics

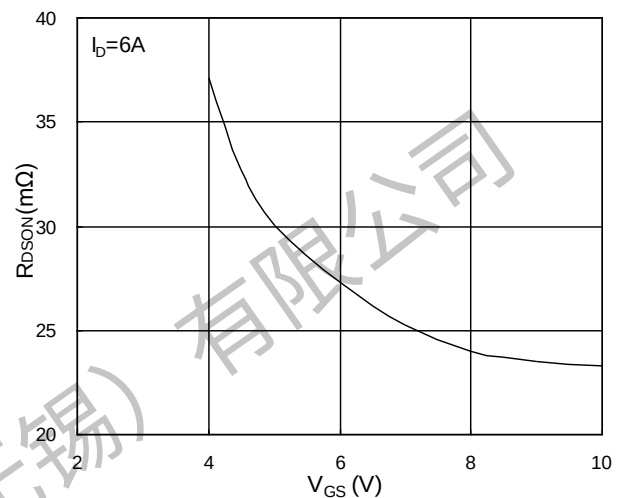


Fig.2 On-Resistance vs. G-S Voltage

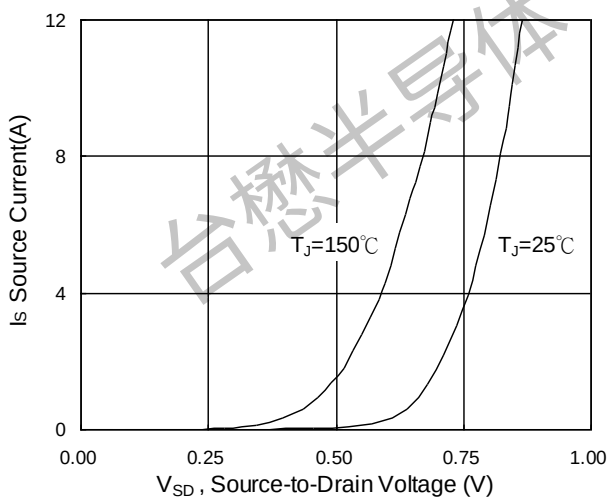


Fig.3 Source Drain Forward Characteristics

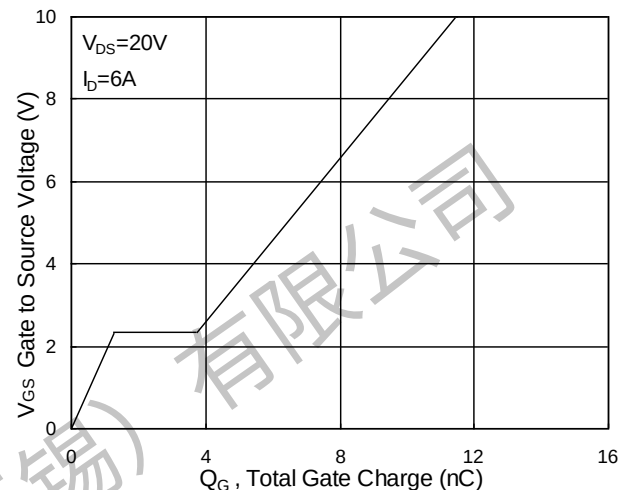


Fig.4 Gate-Charge Characteristics

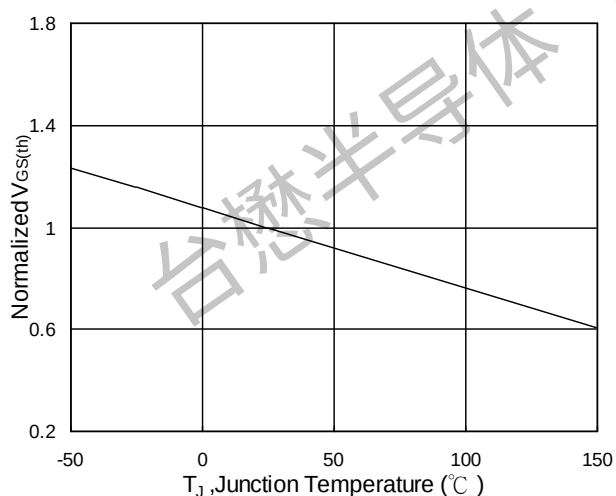


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

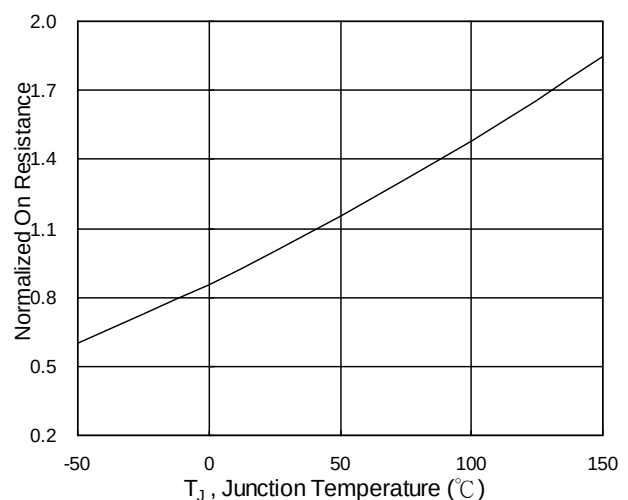


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



TM4614A

N+P-Channel Enhancement Mode Mosfet

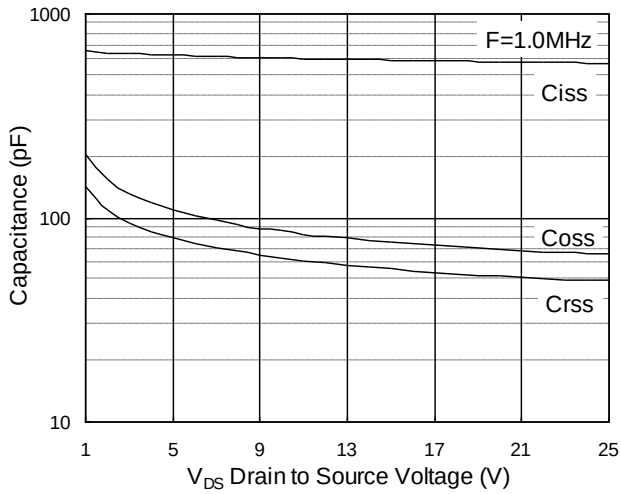


Fig.7 Capacitance

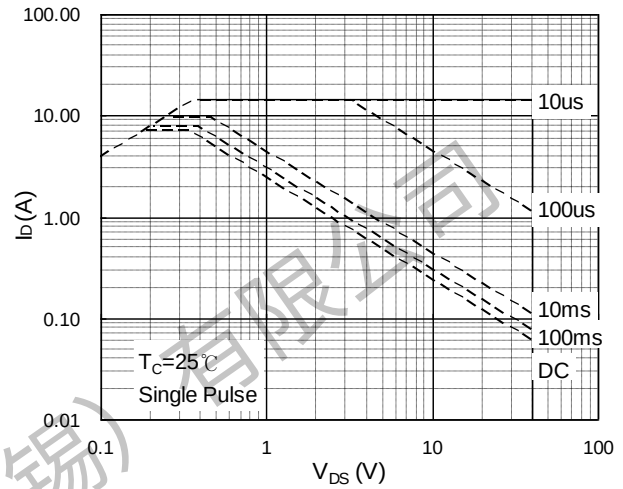


Fig.8 Safe Operating Area

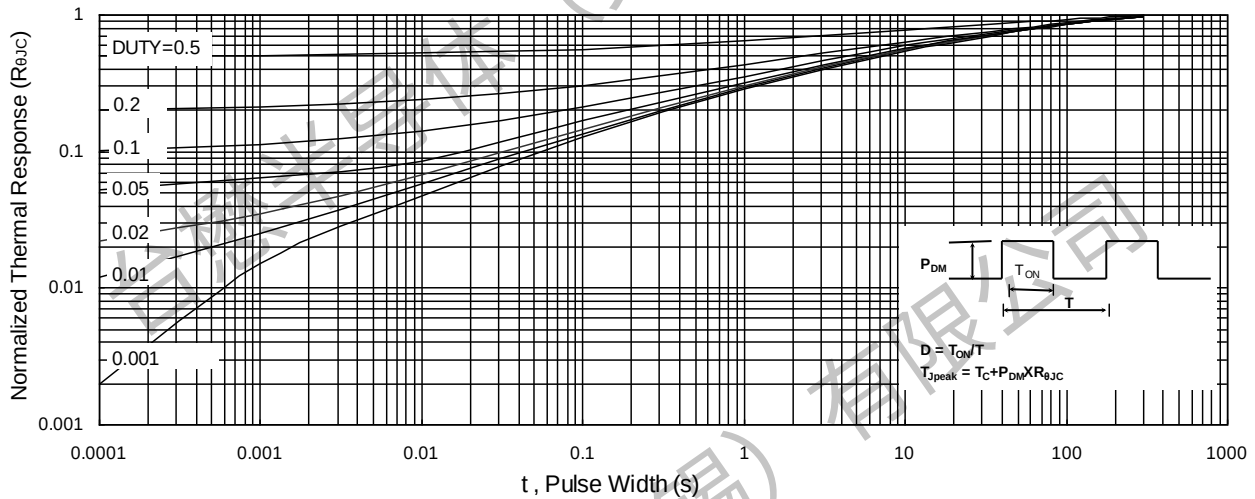


Fig.9 Normalized Maximum Transient Thermal Impedance

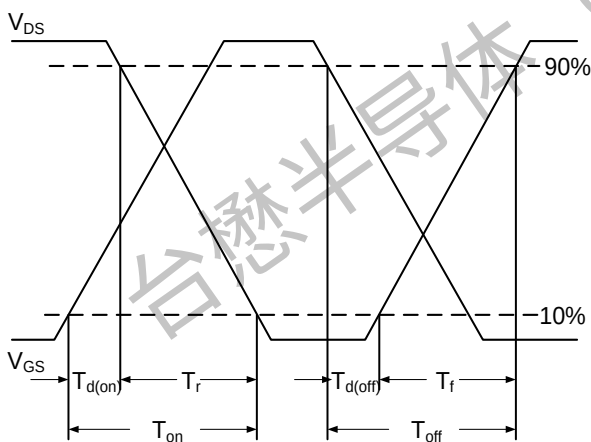


Fig.10 Switching Time Waveform

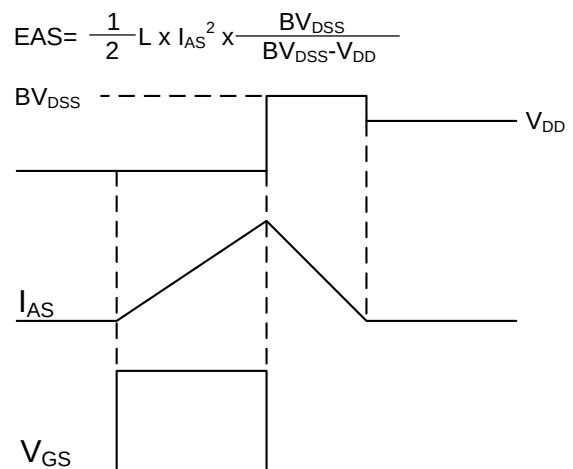


Fig.11 Unclamped Inductive Waveform

TM4614A

N+P-Channel Enhancement Mode Mosfet

P-Channel Typical Characteristics

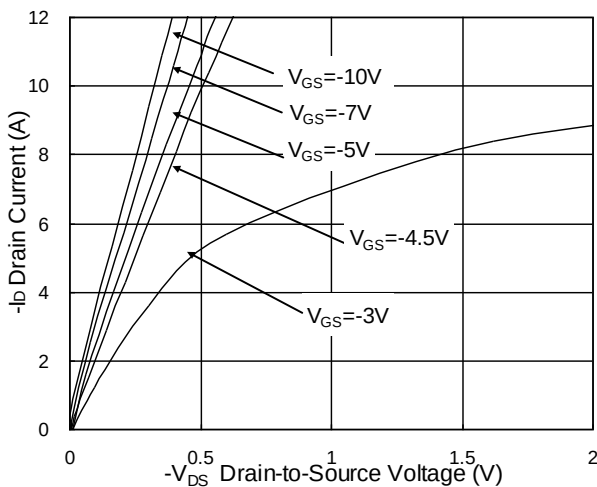


Fig.1 Typical Output Characteristics

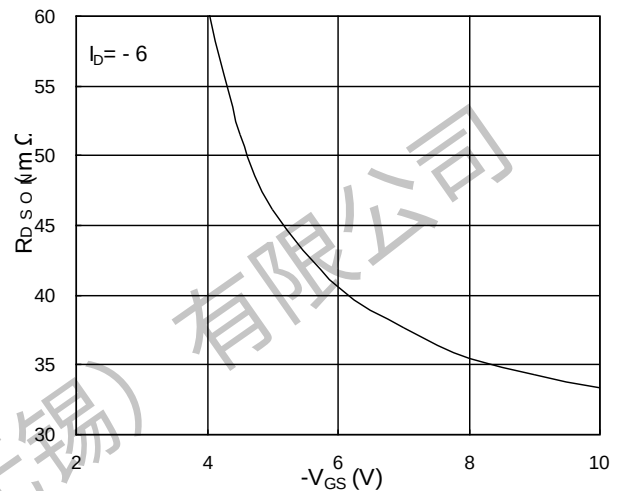


Fig.2 On-Resistance vs. G-S Voltage

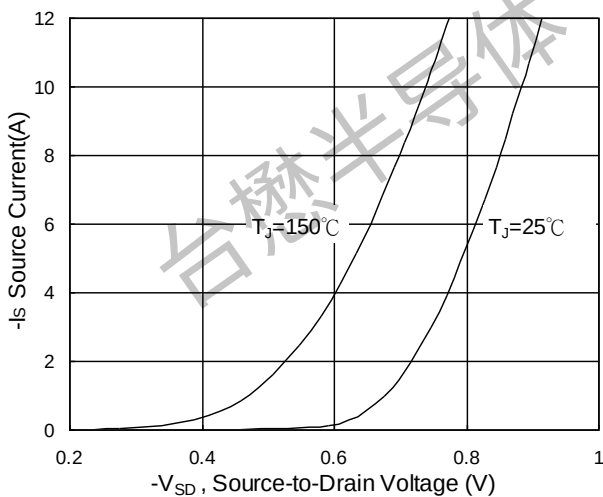


Fig.3 Source Drain Forward Characteristics

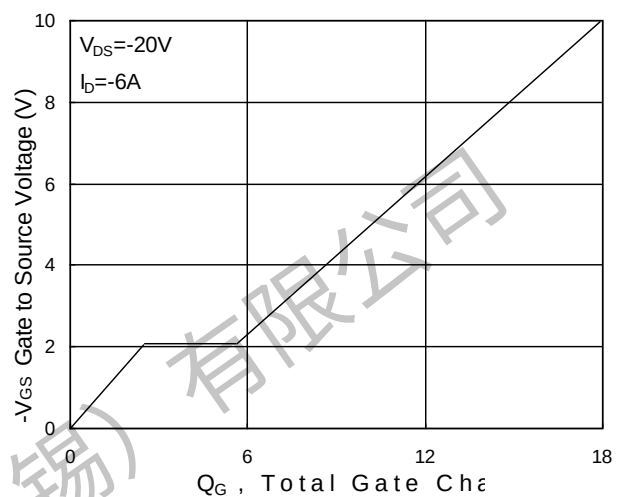


Fig.4 Gate-Charge Characteristics

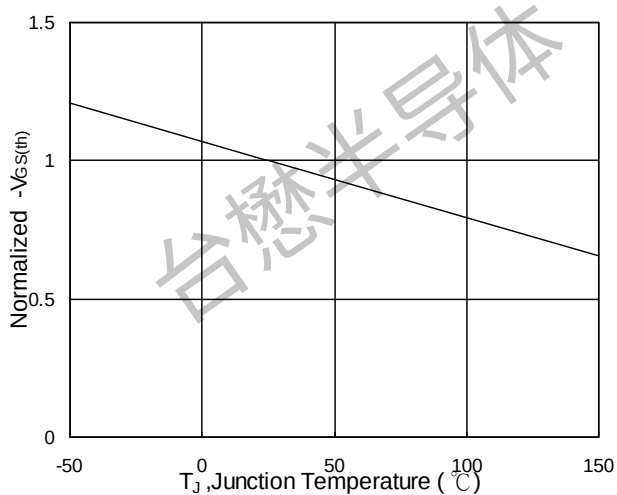


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

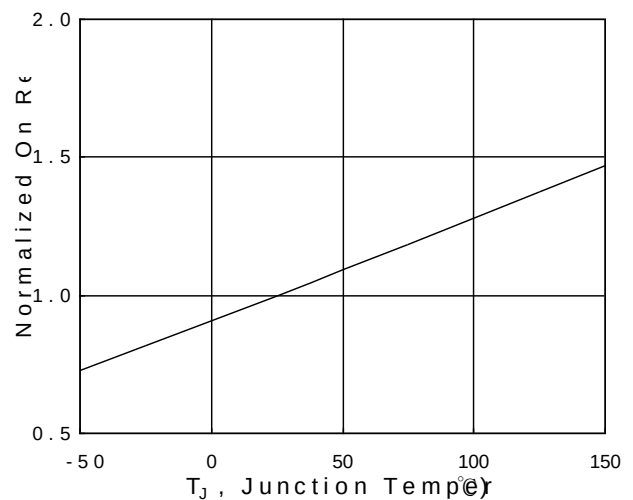


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

TM4614A

N+P-Channel Enhancement Mode Mosfet

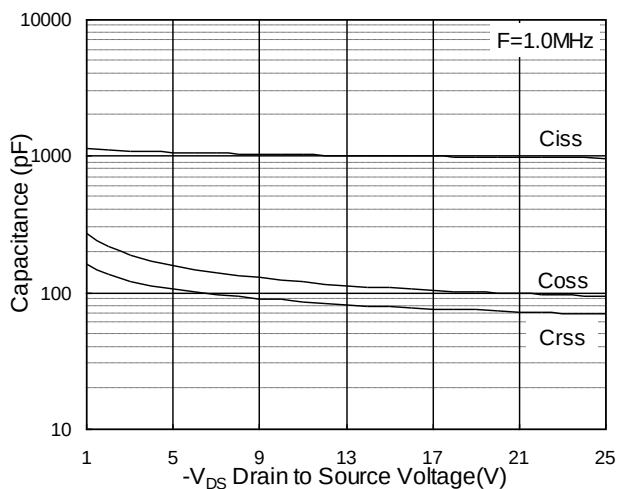


Fig.7 Capacitance

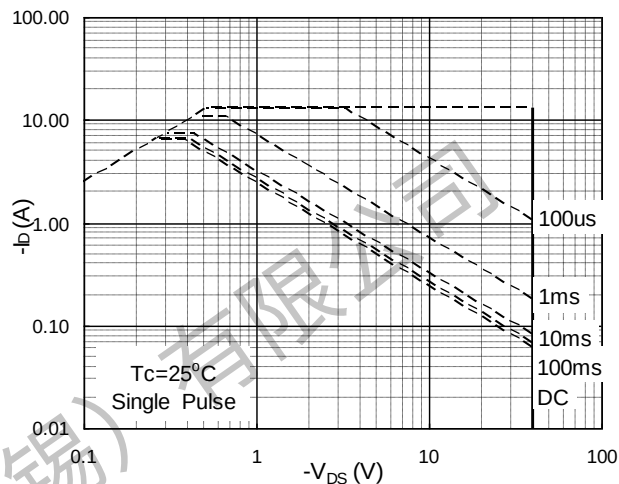


Fig.8 Safe Operating Area

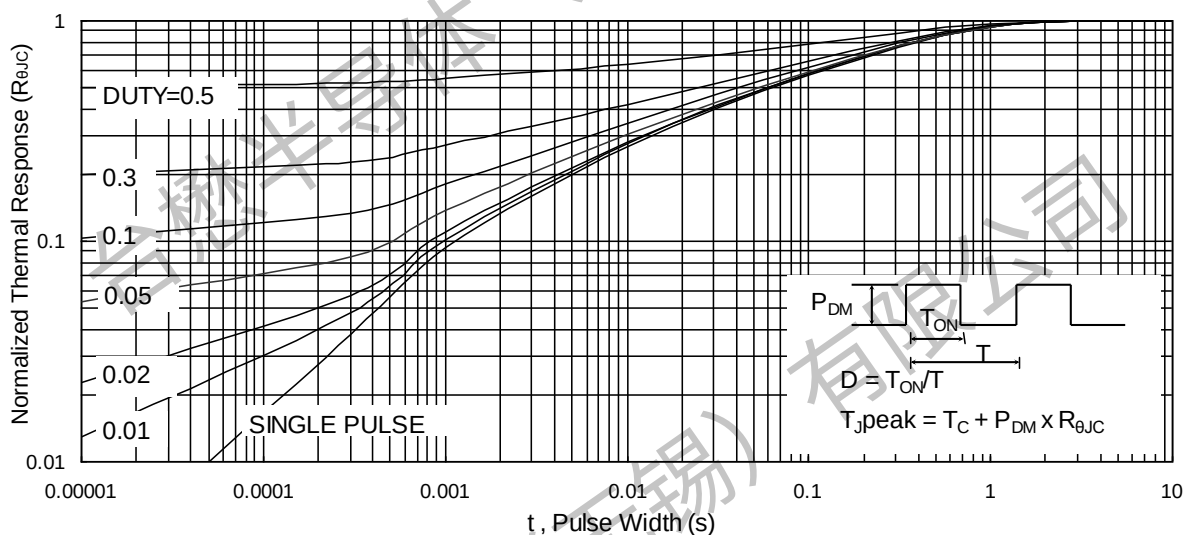


Fig.9 Normalized Maximum Transient Thermal Impedance

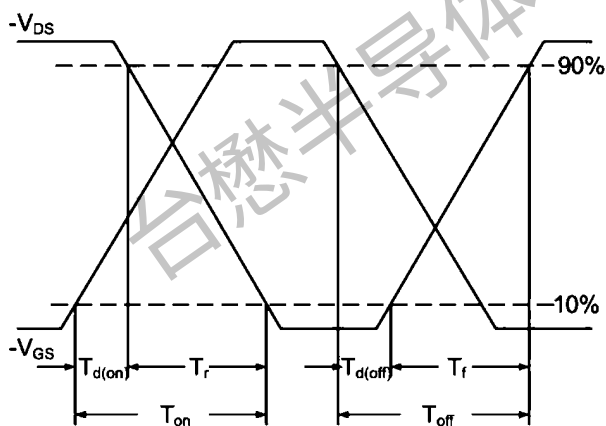


Fig.10 Switching Time Waveform

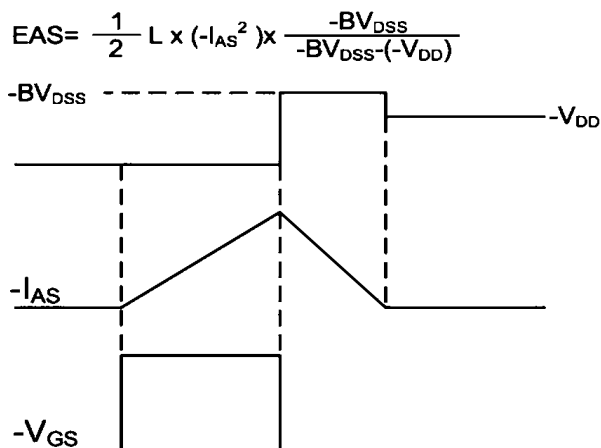
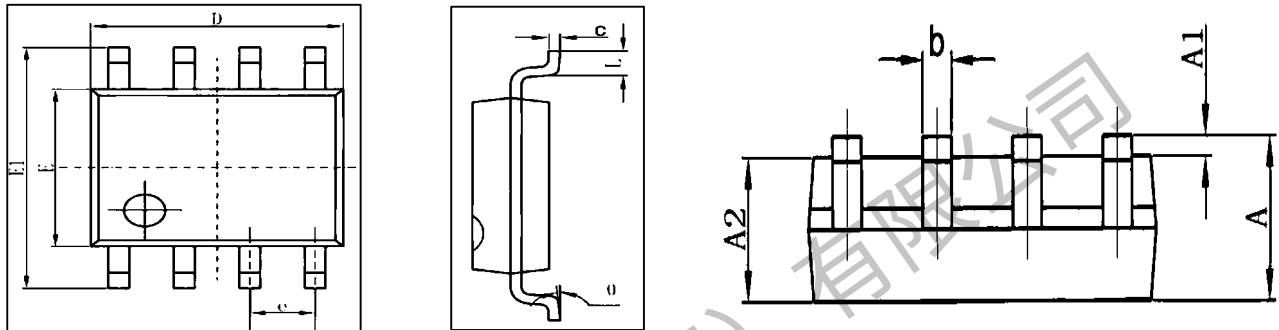


Fig.11 Unclamped Inductive Waveform

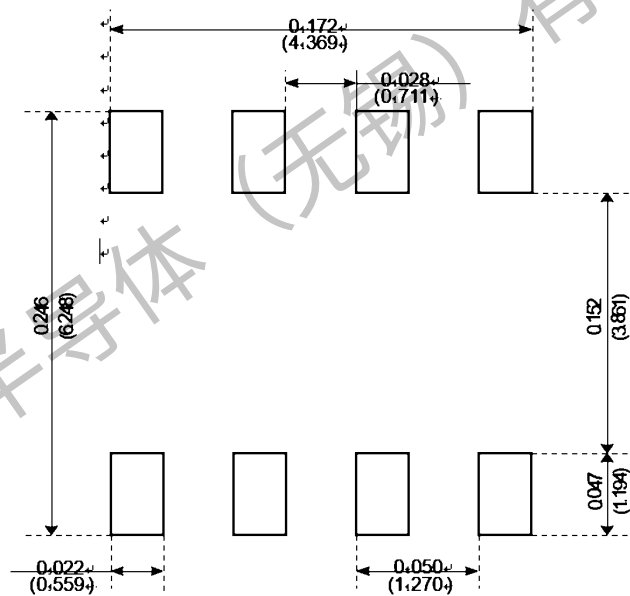
TM4614A

N+P-Channel Enhancement Mode Mosfet

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°

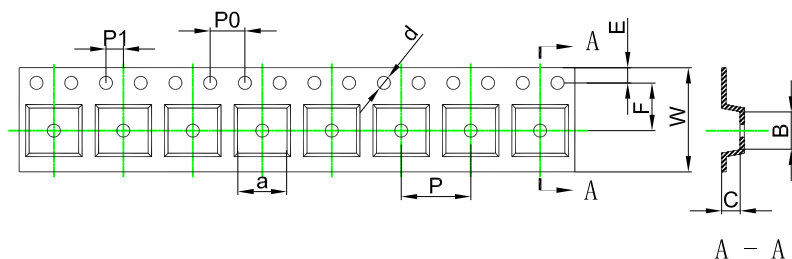


Recommended Minimum Pads

TM4614A

N+P-Channel Enhancement Mode Mosfet

SOP-8L Embossed Carrier Tape



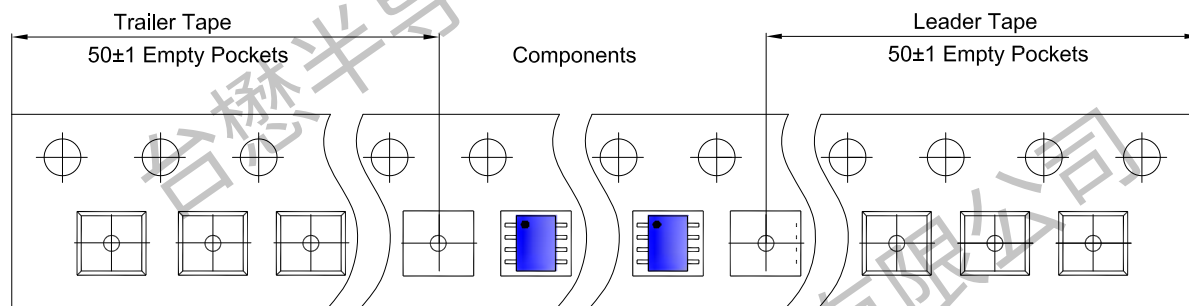
Packaging Description:

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).

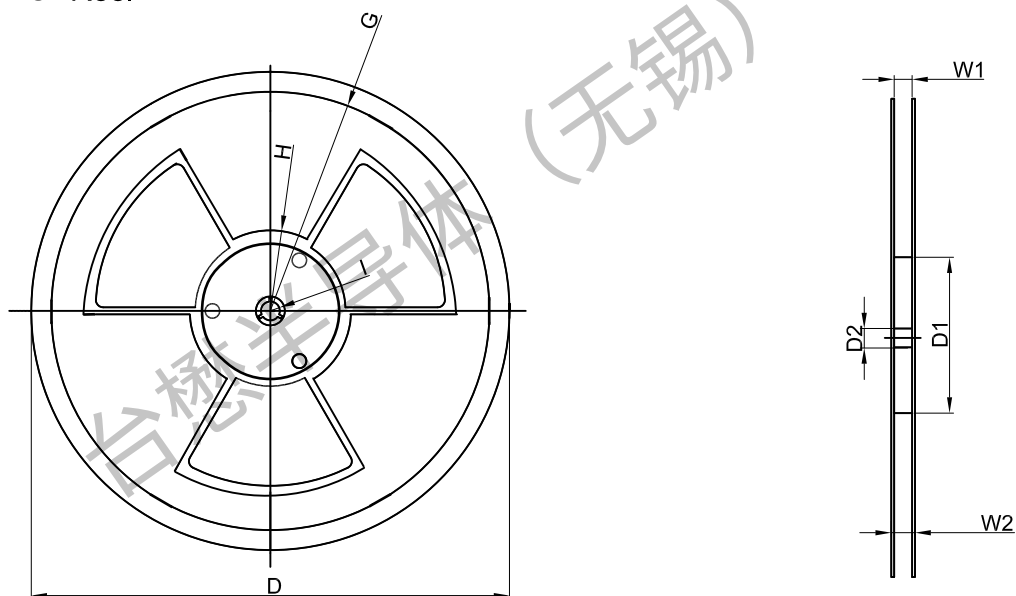
ALL DIM IN mm

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 this document, 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
2024.05.14	24.05	Original	