TM4618A

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=12A

$R_{DS(ON)}$=12mΩ (typ.)@V_{GS}=10V

P Channel

V_{DS} = -40V,I_D=-11A

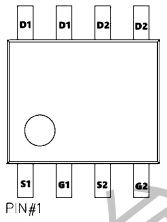
$R_{DS(ON)}$=14mΩ (typ.)@ V_{GS}=-10V

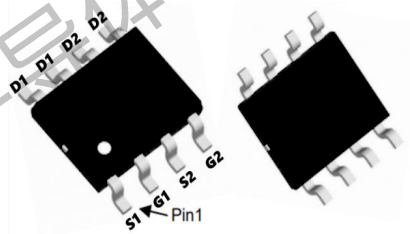
100% UIS Tested

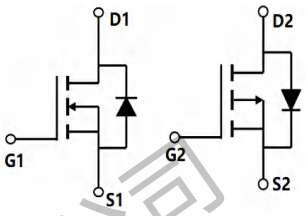
100% R_g Tested

Green Product

S:SOP-8L







Marking: 4618A

Absolute Maximum Ratings (T_A=25℃ 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℃	Continuous Drain Current, V_{GS} @ 10V	12	-11	A
I_D@T_A=100℃	Continuous Drain Current, V_{GS} @ 10V	6	-6	A
I_{DM}	Pulsed Drain Current[1]	38	-40	A
EAS	Single Pulse Avalanche Energy[2]	28.5	50	mJ
P_D@T_A=25℃	Total Power Dissipation	1.55	2	W
T_{STG}	Storage Temperature Range	-55 to 175	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	---	85	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	62.5	℃/W

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N-Channel Electrical Characteristics: (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	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[3]						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1.2	1.6	2.0	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=10V,I_D=10A	---	12	15	mΩ
		V_{GS}=4.5V,I_D=5A	---	15	20	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	1274	---	pF
C_{oss}	Output Capacitance		---	91.3	---	
C_{rss}	Reverse Transfer Capacitance		---	75.6	---	
Q_g	Gate Charge	V_{GS}=10V , V_{DS}=20V I_D=10A	---	27.3	---	nc
Q_{gs}	Gate-Source Charge		---	6.3	---	
Q_{gd}	Gate-Drain Charge		---	5.2	---	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=20V, I_D= 10A, R_{REN} =3Ω ,V_{GS}=10V	---	7.35	---	ns
t_r	Rise Time		---	11.55	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	27.3	---	ns
t_f	Fall Time		---	5.25	---	ns
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	V_D=V_G=0V	---	----	12	A
I_{SM}	Pulsed Drain to Source Diode	VD=VG=0V	---	---	38	A
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=10A	---	---	1.2	V
Trr	Reverse Recovery Time	I_F=-10A dI/dt=100A/us	---	10	---	ns
Qrr	Reverse Recovery Charge		---	6	---	nc

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=11A
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

N-Typical Characteristics

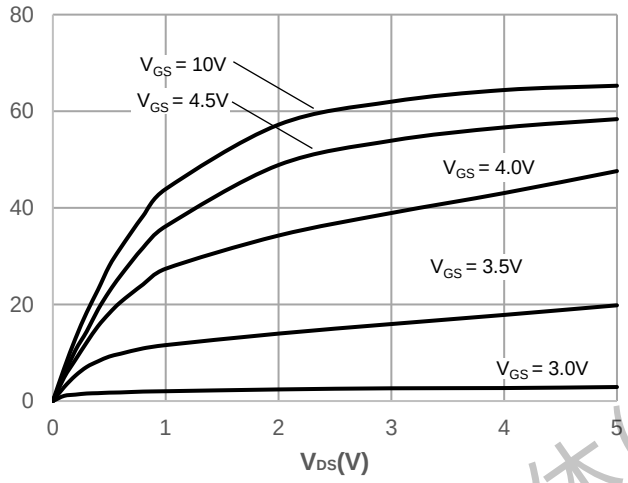

Figure 1: Output Characteristics

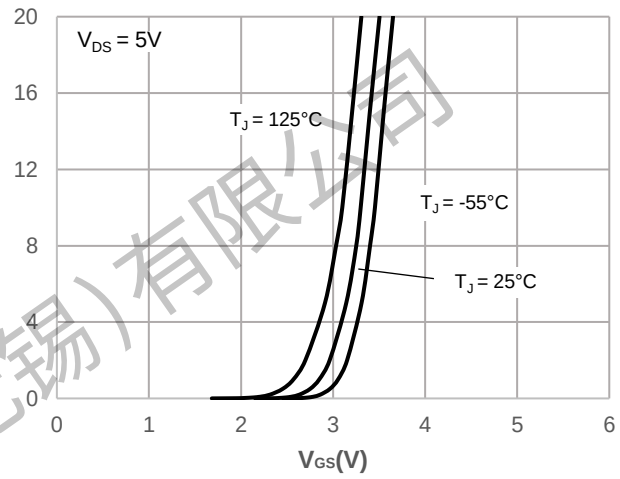

Figure 2: Typical Transfer Characteristics

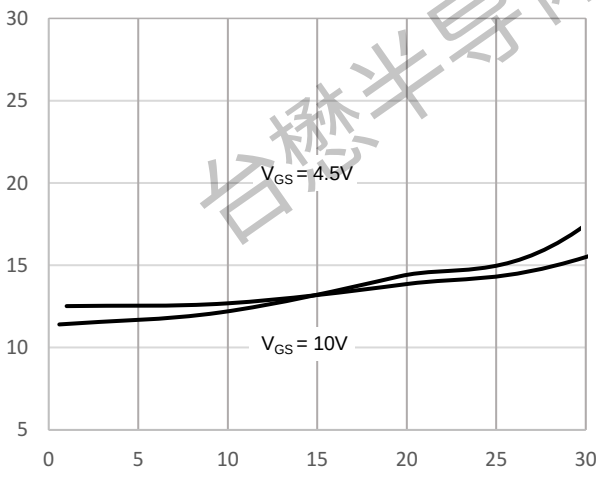

Figure 3: On-resistance vs. Drain Current

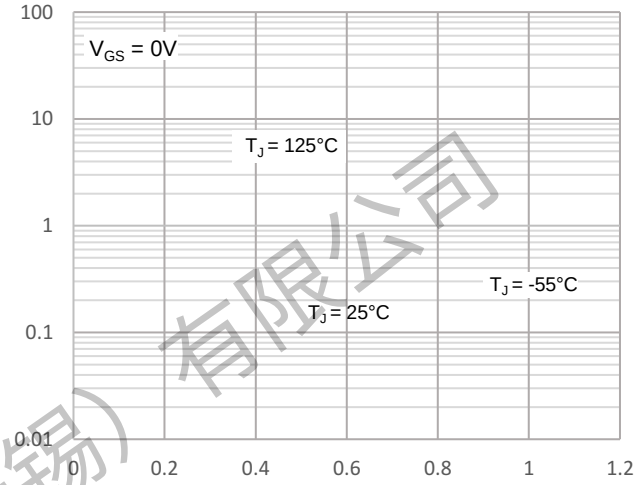

Figure 4: Body Diode Characteristics

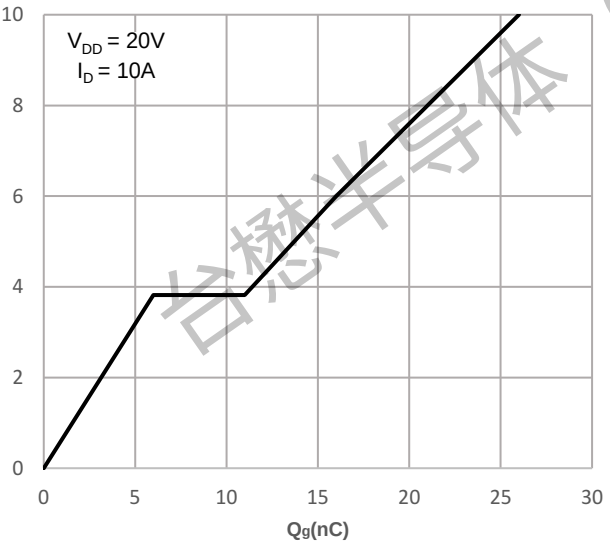

Figure 5: Gate Charge Characteristics

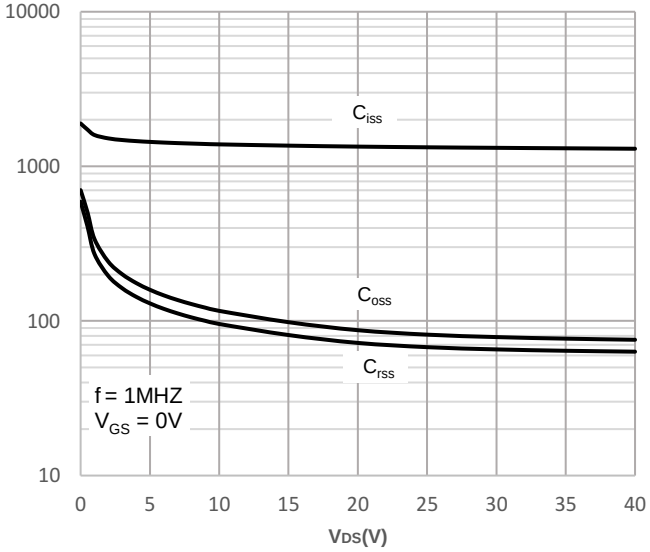

Figure 6: Capacitance Characteristics

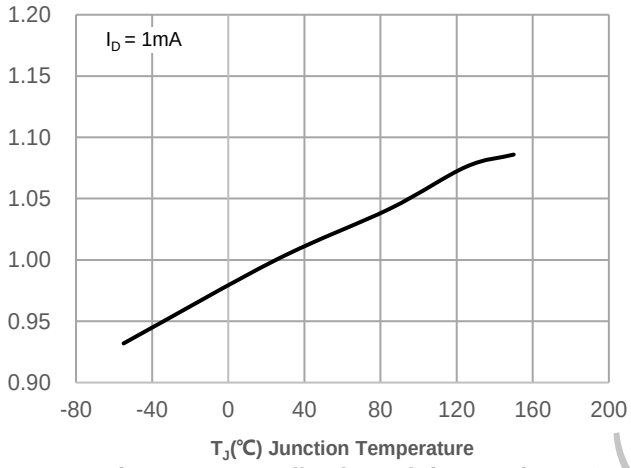

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

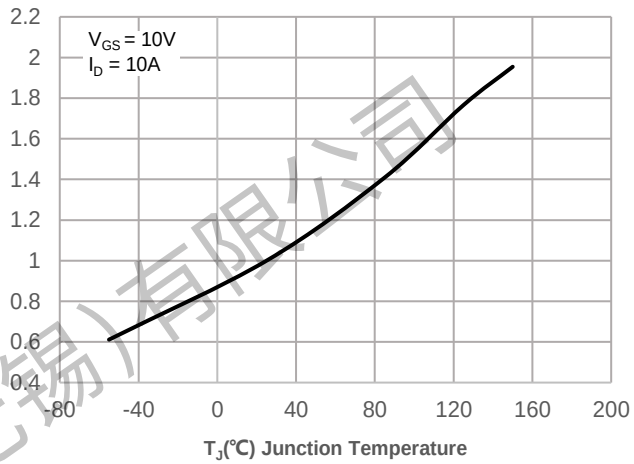

Figure 8: Normalized on Resistance vs. Junction Temperature

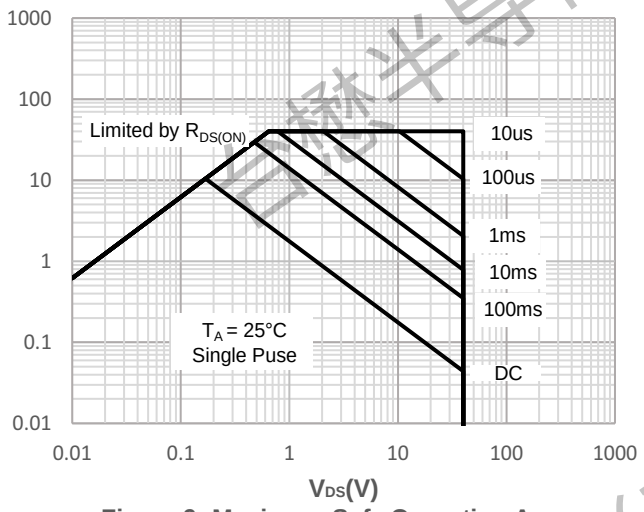

Figure 9: Maximum Safe Operating Area

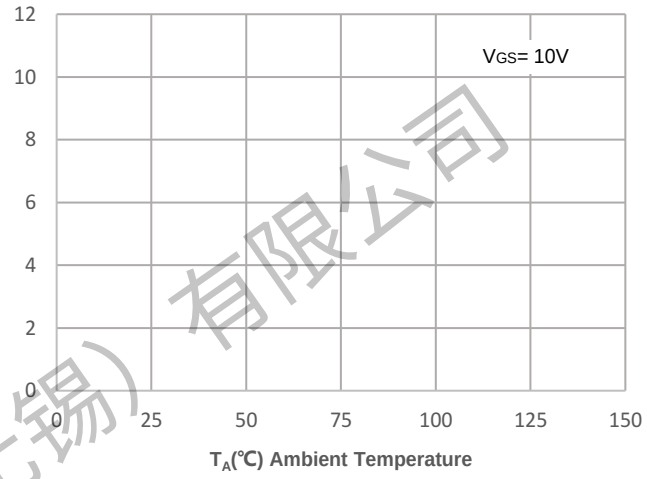

Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

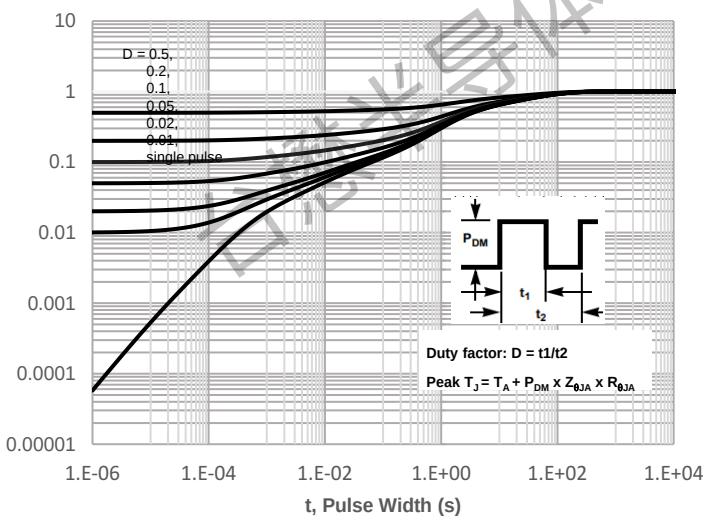

Figure 11: Normalized Maximum Transient Thermal Impedance

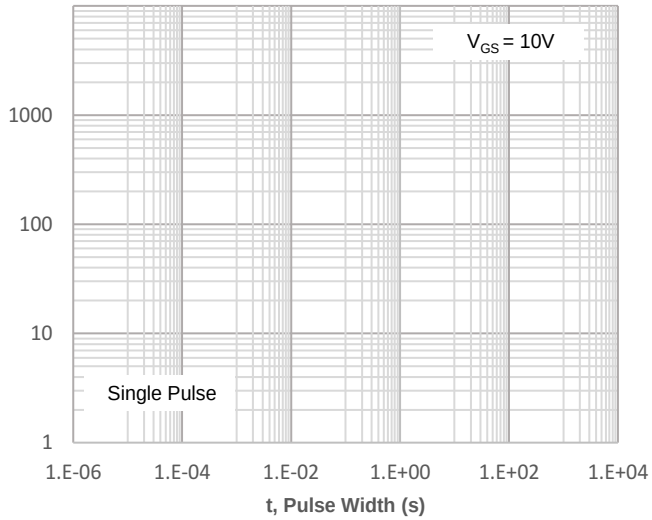

Figure 12: Peak Current Capacity

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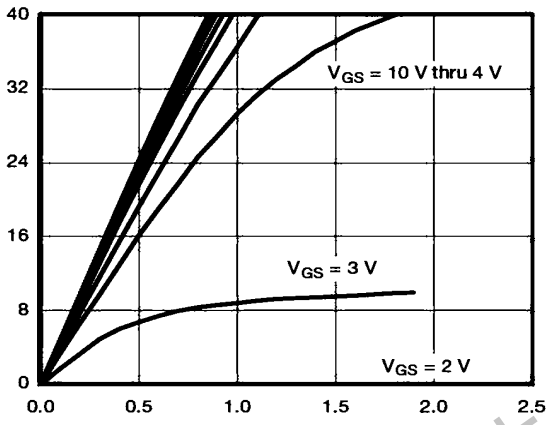
P-Channel Electrical Characteristics: (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-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[3]						
$V_{GS(th)}$	Gate-Source Threshold Voltage[3]	V_{GS}=V_{DS}, I_D=250μA	-1.0	-1.75	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=-10V,I_D=-5A	---	14	18	mΩ
		V_{GS}=-4.5V,I_D=-5A	---	20	24	
Dynamic Characteristics						
C_{iss}	Input Capacitance[4]	V_{DS}=-20V, V_{GS}=0V, f=1MHz	---	1290	---	pF
C_{oss}	Output Capacitance[4]		---	185	---	
C_{rss}	Reverse Transfer Capacitance[4]		---	140	---	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time[4]	V_{DD}= -20V V_{GS}= -10V, R_{GEN}=3Ω R_L=2Ω	---	7	---	ns
t_r	Rise Time[4]		---	6.6	---	ns
$t_{d(off)}$	Turn-Off Delay Time[4]		---	22	---	ns
t_f	Fall Time[4]		---	8	---	ns
Q_g	Total Gate Charge[4]	V_{GS}=-10V,V_{DS}=-20V, I_D=-5A	---	18	---	nC
Q_{gs}	Gate-Source Charge[4]		---	2.8	---	nC
Q_{gd}	Gate-Drain “Miller” Charge[4]		---	5	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode[2]	VD=VG=0V	---	---	-11	A
V_{SD}	Source-Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=-6A	---	---	1.2	V

Notes:

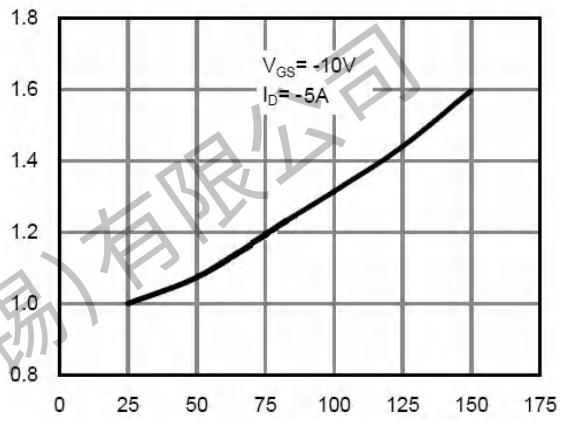
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

P-Typical Characteristics



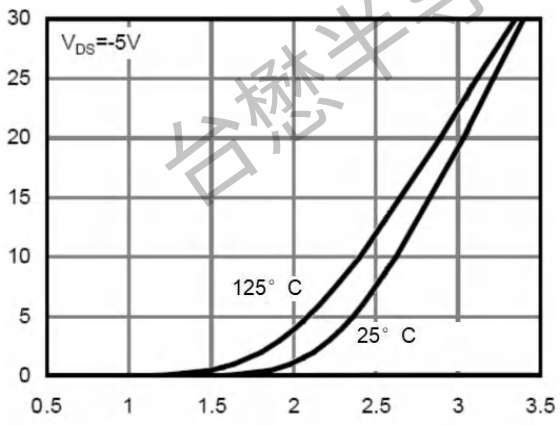
-Vds Drain-Source Voltage (V)

Figure 1 Output Characteristics



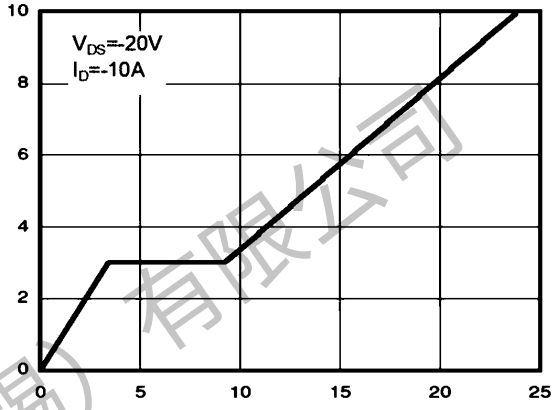
TJ-Junction Temperature(℃)

Figure 4 Rdson-Junction Temperature



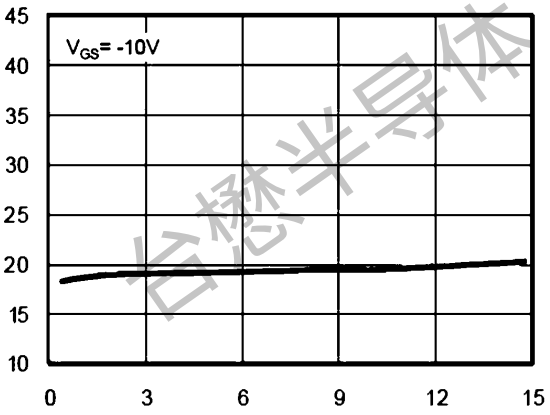
-Vgs Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



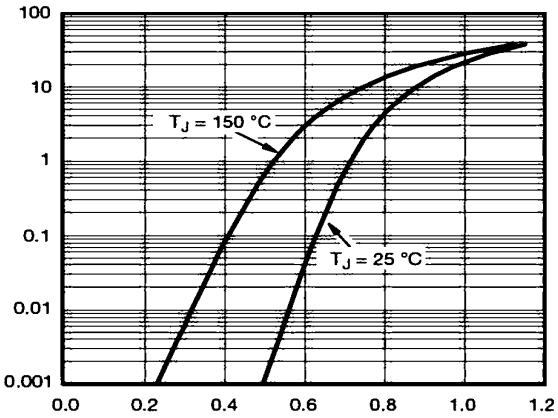
Qg Gate Charge (nC)

Figure 5 Gate Charge



-ID- Drain Current (A)

Figure 3 Rdson- Drain Current



Vsd Source-Drain Voltage (V)

Figure 6 Source- Drain Diode Forward

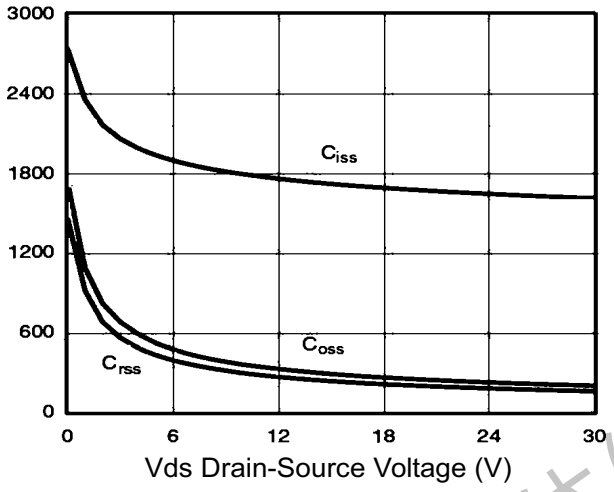


Figure 7 Capacitance vs Vds

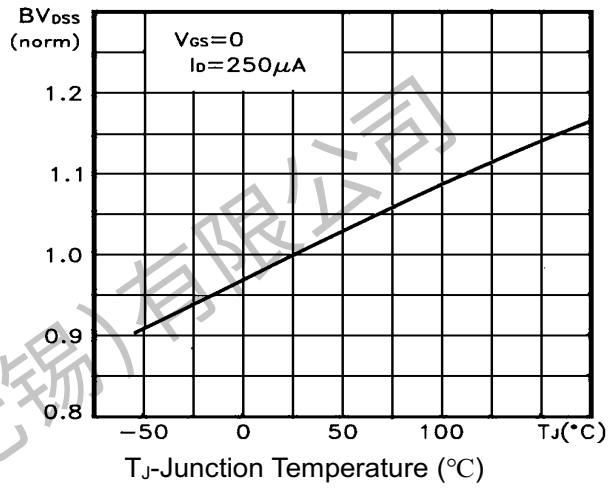


Figure 9 BV_{DSS} vs Junction Temperature

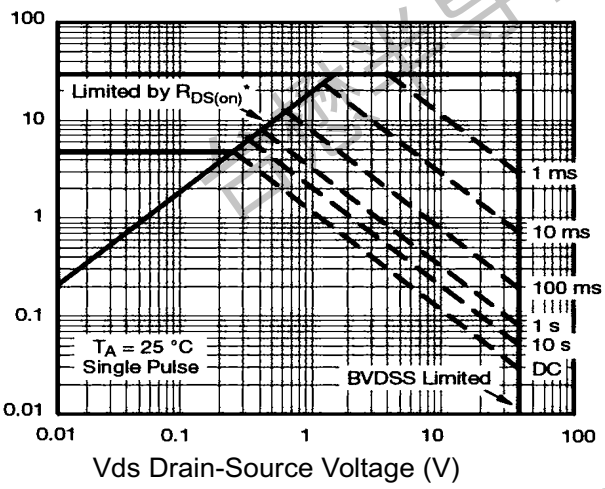


Figure 8 Safe Operation Area

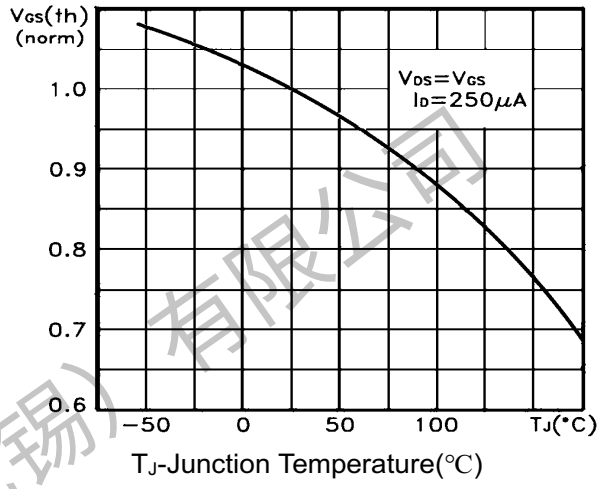


Figure 10 $V_{GS(th)}$ vs Junction Temperature

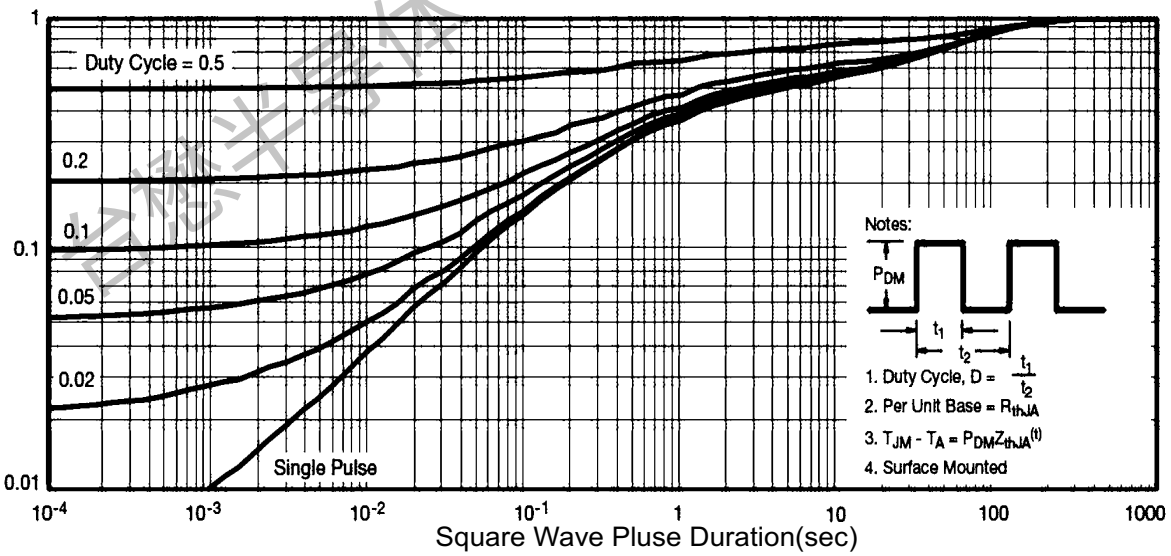
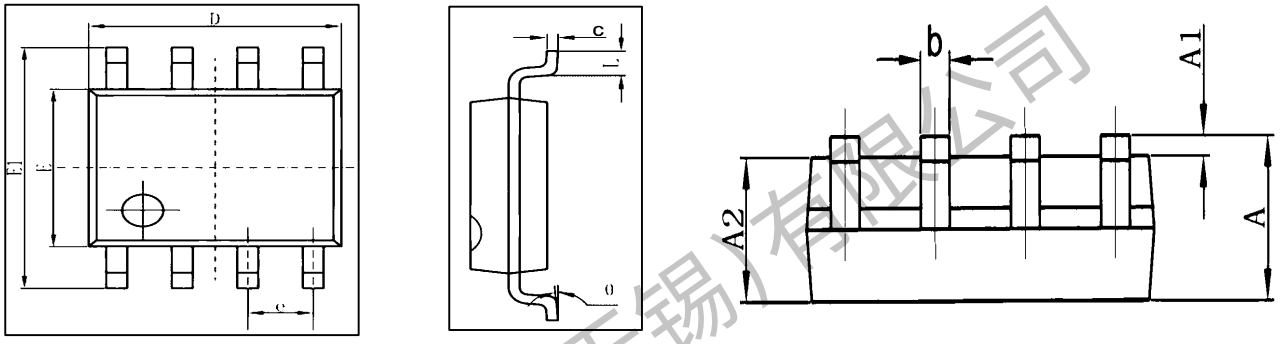
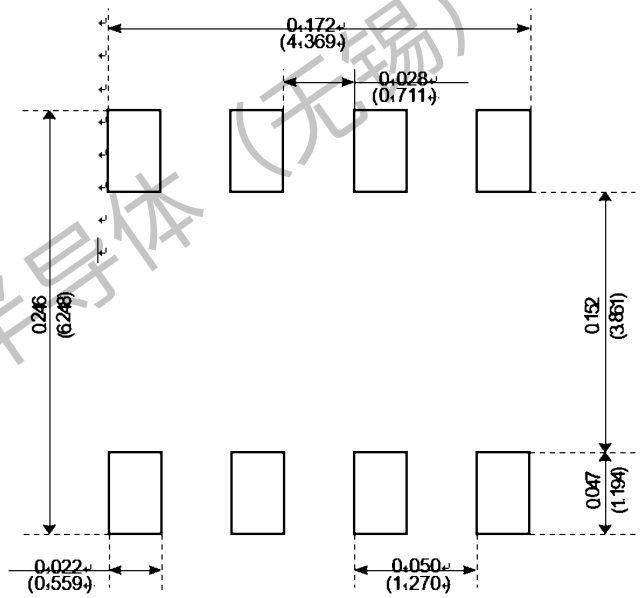


Figure 11 Normalized Maximum Transient Thermal Impedance

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°

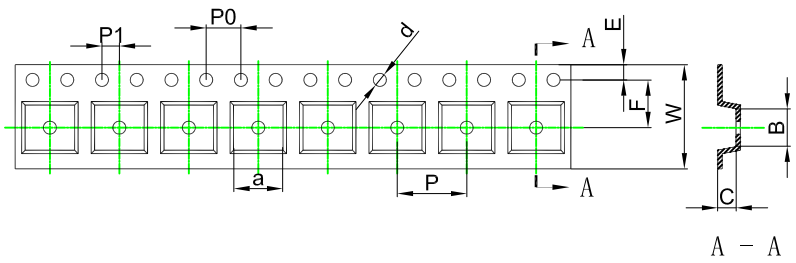


Recommended Minimum Pads

TM4618A

N+P-Channel Enhancement Mode Mosfet

SOP-8L Embossed Carrier Tape



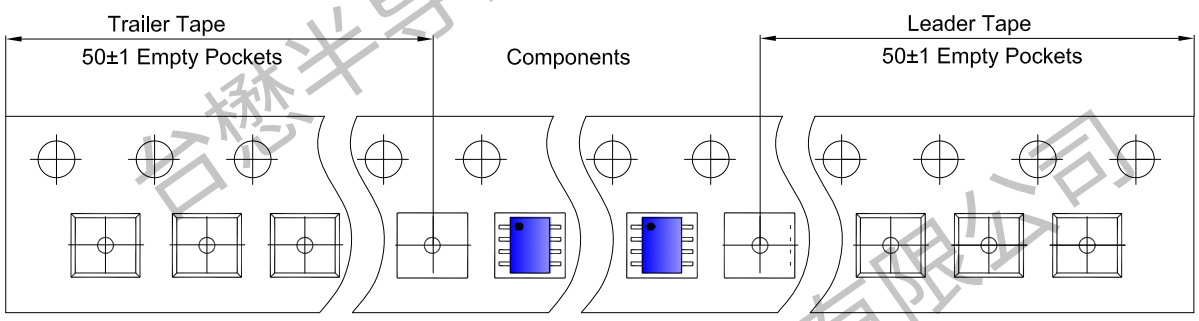
Packaging Description:

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).

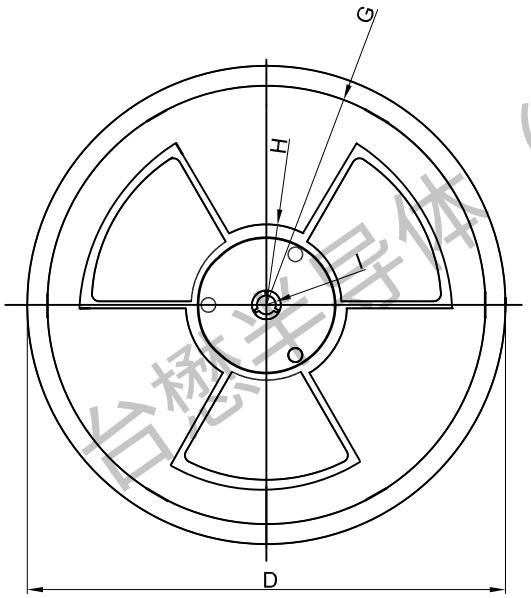
ALL DIM IN mm

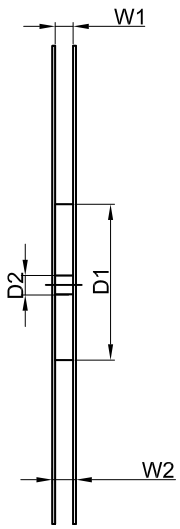
Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

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	

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Revision history:

Date	Rev	Description	Page
2023.11.04	23.11	Original	