

Description:

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

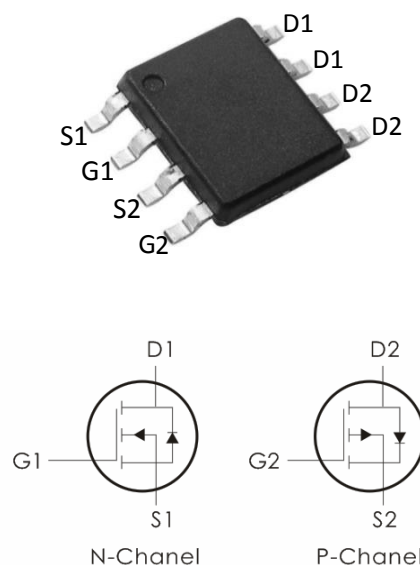
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=30V, I_D=6.3A, R_{DS(on)}<24m\Omega @V_{GS}=10V$

P-Channel: $V_{DS}=-30V, I_D=-6A, R_{DS(on)}<40m\Omega @V_{GS}=-10V$

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 4) Excellent package for good heat dissipation.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOS4606H	S4606H	SOP-8D	3000 pcs/Reel

Absolute Maximum Ratings: ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_A=25^\circ\text{C}$	6.3	-6	A
	Continuous Drain Current- $T_A=100^\circ\text{C}$	4.5	-3.6	
I_{DM}	Pulsed Drain Current ¹	36	-20.4	A
P_D	Power Dissipation - $T_A=25^\circ\text{C}$	2.7	2.15	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	46.3	58	$^\circ\text{C}/\text{W}$

N-Channel Electrical Characteristics: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μ A
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 μ A	1	1.5	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =10V, I _D =5A	---	18	24	m Ω
		V _{GS} =4.5V, I _D =3A	---	27	34	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	489	---	pF
C _{oss}	Output Capacitance		---	78	---	
C _{rss}	Reverse Transfer Capacitance		---	60	---	
Q _g	Gate Charge	V _{GS} =10V , V _{DS} =15V I _D =5A	---	5.1	---	nC
Q _{gs}	Gate-Source Charge		---	0.8	---	
Q _{gd}	Gate-Drain Charge		---	1.2	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DS} =15V, I _D =3A, R _{REN} =3 Ω ,V _{GS} =10V	---	4.4	---	ns
t _r	Rise Time		---	2.4	---	ns
t _{d(off)}	Turn-Off Delay Time		---	14.4	---	ns
t _f	Fall Time		---	3.4	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	----	6.3	A
I _{SM}	Pulsed Drain to Source Diode	V _D =V _G =0V	---	---	36	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =6.3A	---	0.9	1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J=25^{\circ}\text{C}$, $V_{DD}=15\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$, $I_{AS}=7\text{A}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

N-Typical Characteristics: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

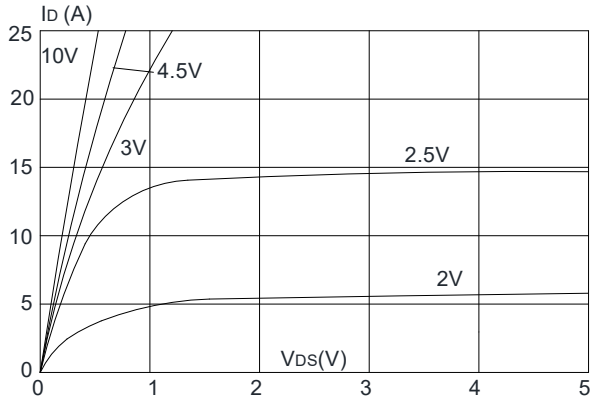


Figure 1: Output Characteristics

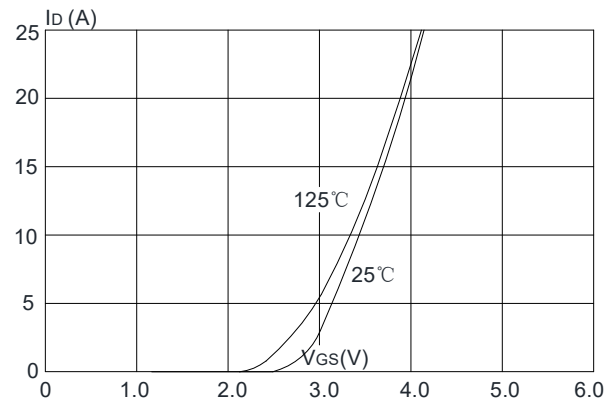


Figure 2: Typical Transfer Characteristics

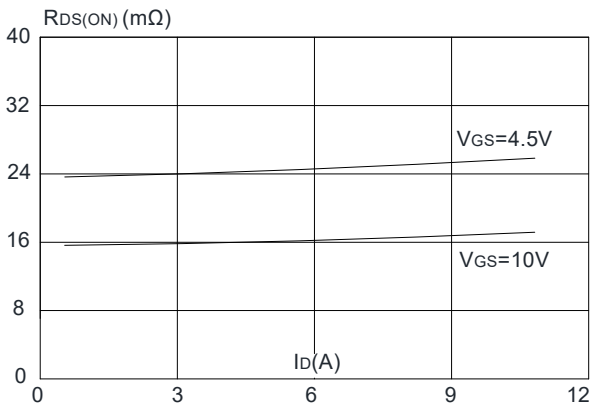


Figure 3: On-resistance vs. Drain Current

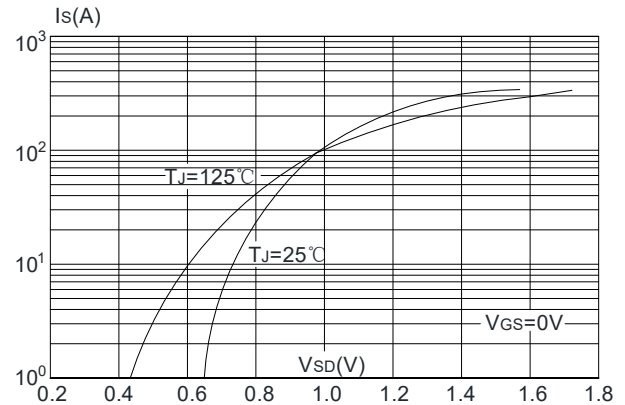


Figure 4: Body Diode Characteristics

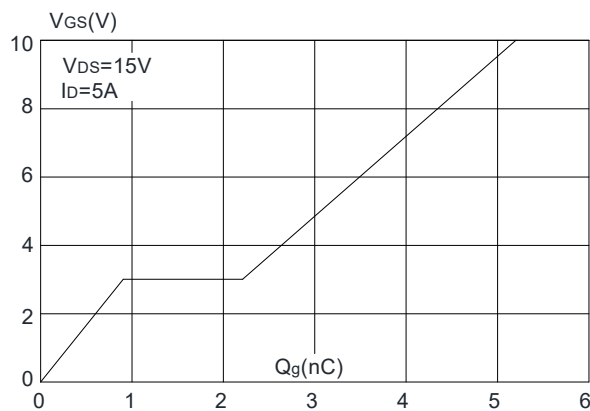


Figure 5: Gate Charge Characteristics

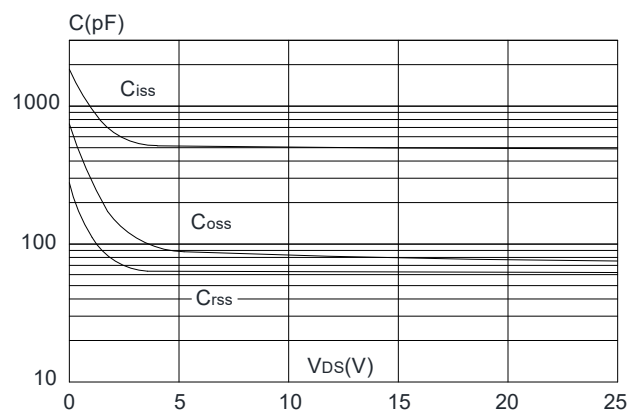


Figure 6: Capacitance Characteristics

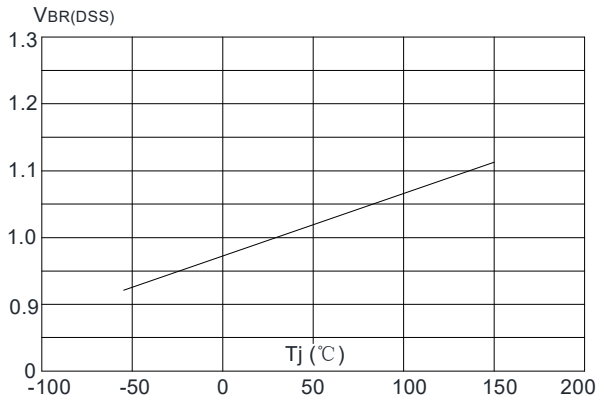


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

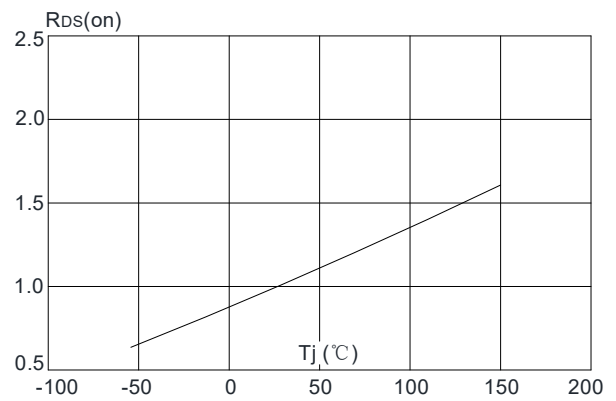


Figure 8: Normalized on Resistance vs. Junction Temperature

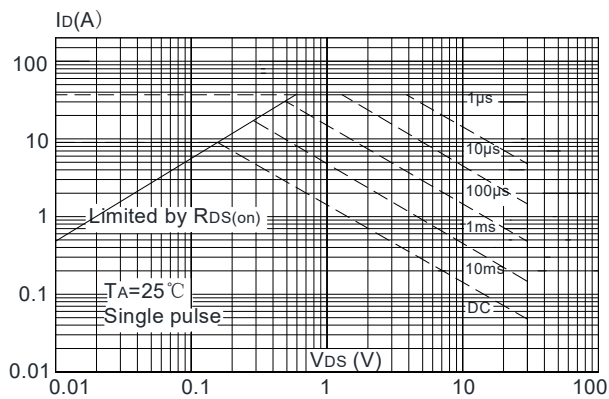


Figure 9: Maximum Safe Operating Area

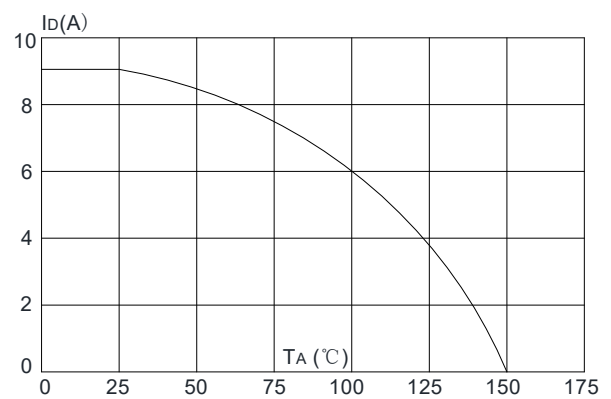


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

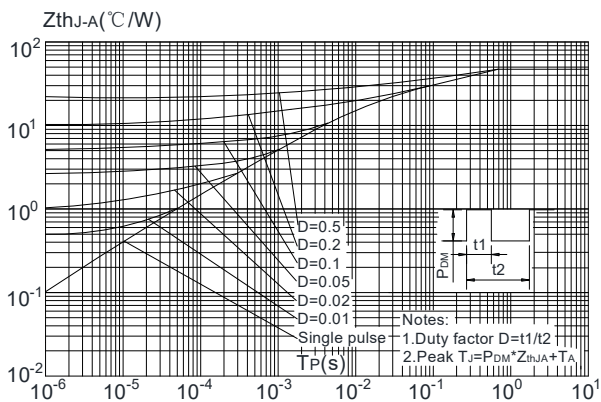


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	-30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-30V	---	---	-1	μ A
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 =250 μ A	-1	-1.6	-2.5	V
R _{DS(on)}	Drain-Source On Resistance ²	V _{GS} =-10V, I _D =-5A	---	30	40	m Ω
		V _{GS} =-4.5V, I _D =-4A	---	46	60	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	579	---	pF
C _{oss}	Output Capacitance		---	97	---	
C _{rss}	Reverse Transfer Capacitance		---	73	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -15V V _{GS} = -10V, R _{GEN} =2.5 Ω	---	13	---	ns
t _r	Rise Time		---	60	---	ns
t _{d(off)}	Turn-Off Delay Time		---	18	---	ns
t _f	Fall Time		---	9	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-5.1A	---	6.7	---	nC
Q _{gs}	Gate-Source Charge		---	0.9	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	1.3	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-6	A
I _{SM}	Pulsed Drain to Source Diode	V _D =V _G =0V	---	---	-20.4	---
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-6A	---	-0.8	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

P-Typical Characteristics: ($T_A=25^\circ\text{C}$ unless otherwise noted)

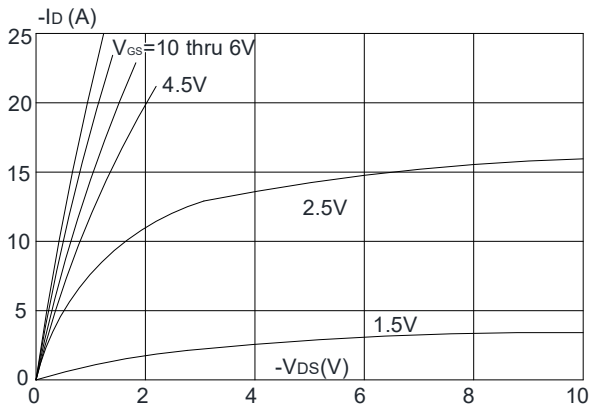


Figure 1: Output Characteristics

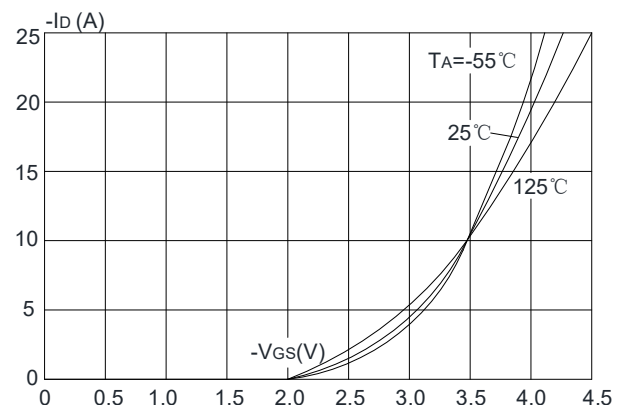


Figure 2: Typical Transfer Characteristics

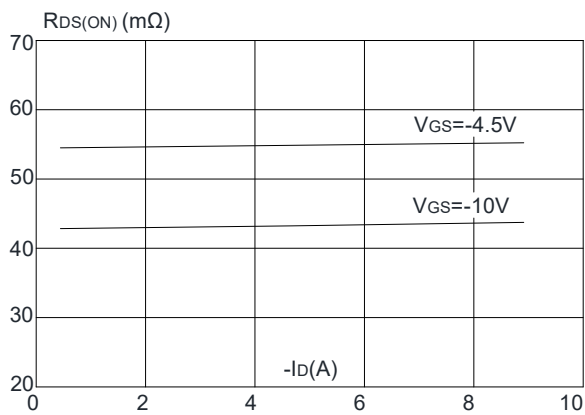


Figure 3: On-resistance vs. Drain Current

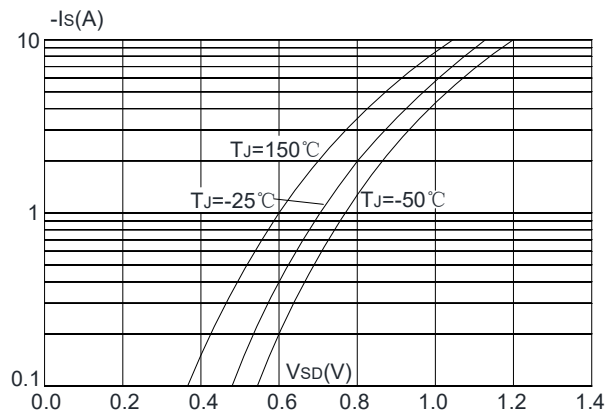


Figure 4: Body Diode Characteristics

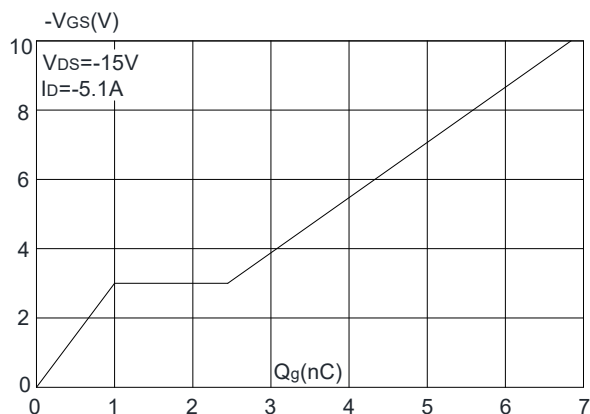


Figure 5: Gate Charge Characteristics

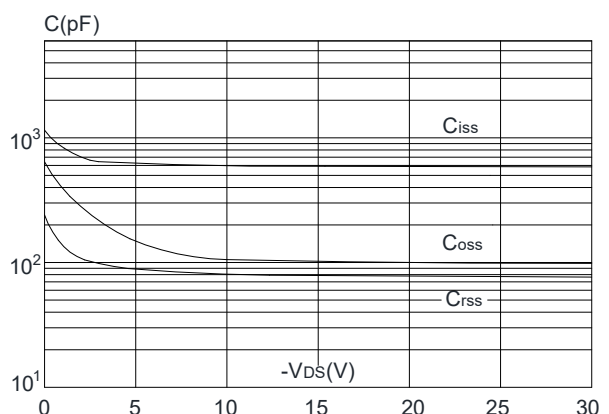


Figure 6: Capacitance Characteristics

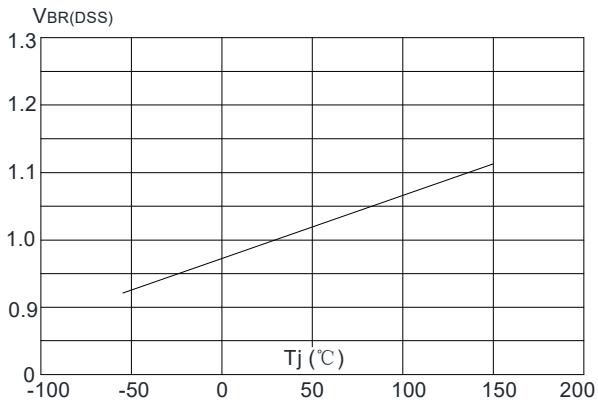


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

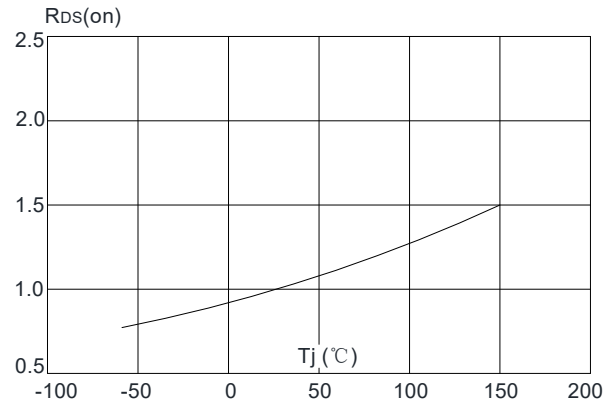


Figure 8: Normalized on Resistance vs. Junction Temperature

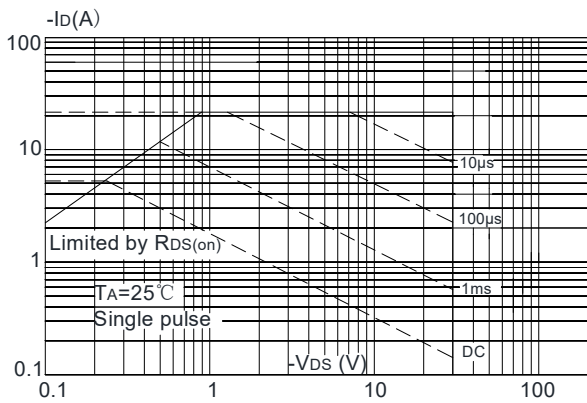


Figure 9: Maximum Safe Operating Area

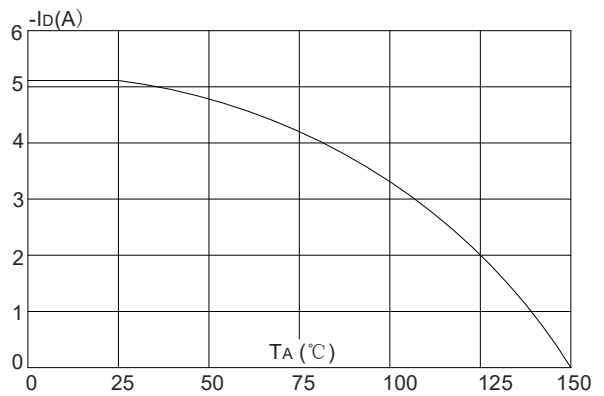


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

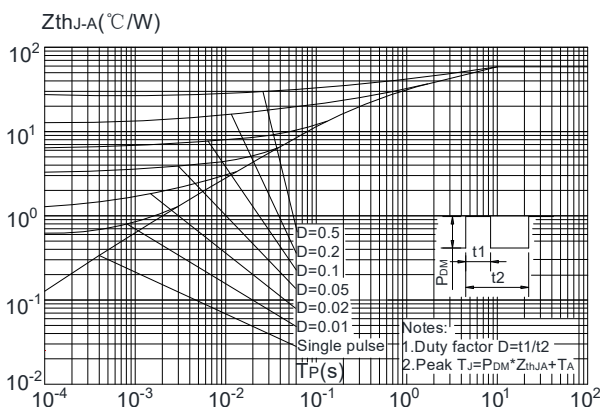
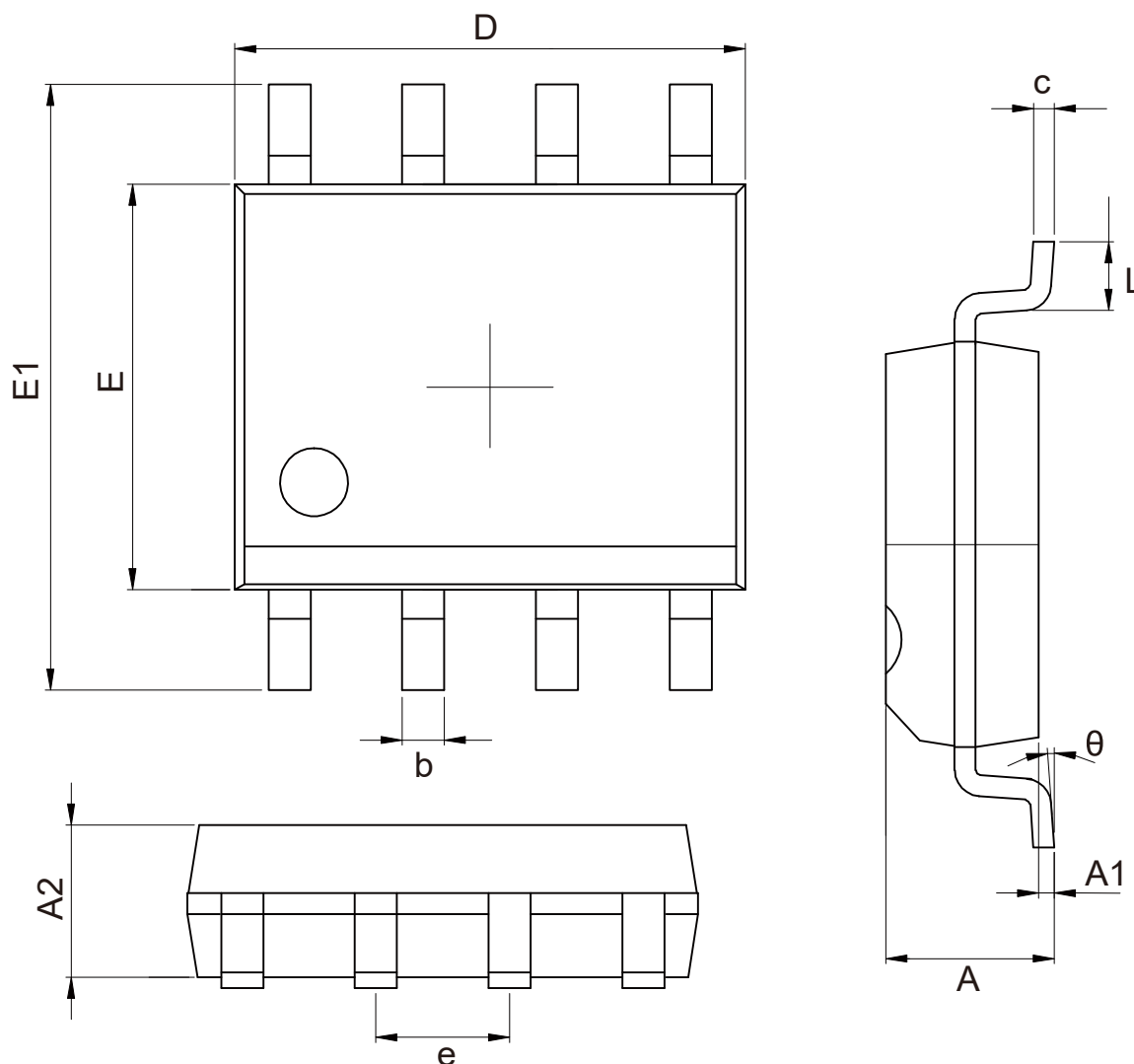


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SOP-8D Package Information:



COMMON DIMENSIONS			
CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	1.350	—	1.750
A1	0.100	—	0.250
A2	1.350	—	1.550
b	0.330	—	0.510
c	0.170	—	0.250
D	4.700	—	5.100
E	3.800	3.900	4.000
E1	5.800	—	6.200
e	1.270BSC		
L	0.400	—	1.270
θ	0°	—	8°

Unit:mm

Marking Information:

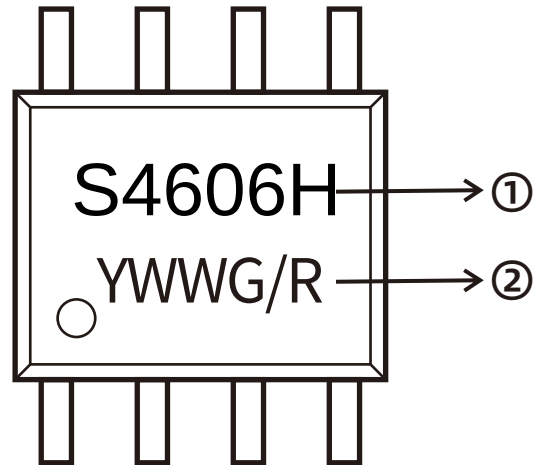
①. Part NO.

②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)



Previous Version

Version	Date	Subjects (major changes since last revision)
2.0	2024-07-18	Release of final version

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