

Description:

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

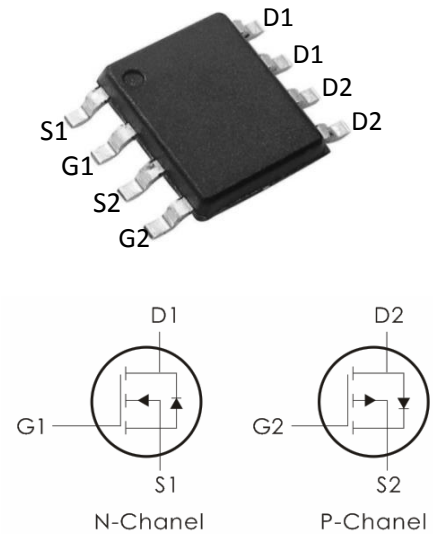
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=40V, I_D=6.7A, R_{DS(on)}<40m\Omega @V_{GS}=10V$

P-Channel: $V_{DS}=-40V, I_D=-6A, R_{DS(on)}<70m\Omega @V_{GS}=-10V$

- 1) High Power and current handing capability.
- 2) Lead free product is acquired.
- 3) Surface Mount Package.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOS4614S	S4616S	SOP-8D	3000 pcs/Reel

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

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Drain Current-Continuous	6.7	-6	A
$I_{DM (pluse)}$	Pulsed Drain Current ¹	26.8	-20	
P_D	Power Dissipation	2.5	2.5	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	-55 to +150	$^\circ C$

Thermal Characteristics:

Channel	Symbol	Parameter	Max	Units
N	$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	$^\circ C/W$
P	$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
ON/Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =40V	---	---	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	1.8	2.5	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =5A	---	28	40	m Ω
		V _{GS} =4.5V, I _D =3A	---	39	55	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	420	800	pF
C _{oss}	Output Capacitance		---	65	120	
C _{rss}	Reverse Transfer Capacitance		---	40	80	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{2.3}	V _{DS} =20V, I _D =1A, V _{GS} =4.5V, R _{GEN} =25 Ω	---	3.2	6	ns
t _r	Rise Time ^{2.3}		---	8.6	16	ns
t _{d(off)}	Turn-Off Delay Time ^{2.3}		---	18	36	ns
t _f	Fall Time ^{2.3}		---	6	12	ns
Q _g	Total Gate Charge ^{2.3}	V _{GS} =4.5V, V _{DS} =20V, I _D =3A	---	2.8	5.6	nC
Q _{gs}	Gate-Source Charge ^{2.3}		---	0.5	1	nC
Q _{gd}	Gate-Drain “Miller” Charge ^{2.3}		---	1.5	3	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ¹	V _{GS} =0V, I _S =1A	---	---	1	V
I _S	Continuous Source Current	V _G =V _D =0V	---	---	6.7	A
I _{SM}	Pulsed Source Current		---	---	26.8	A

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

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

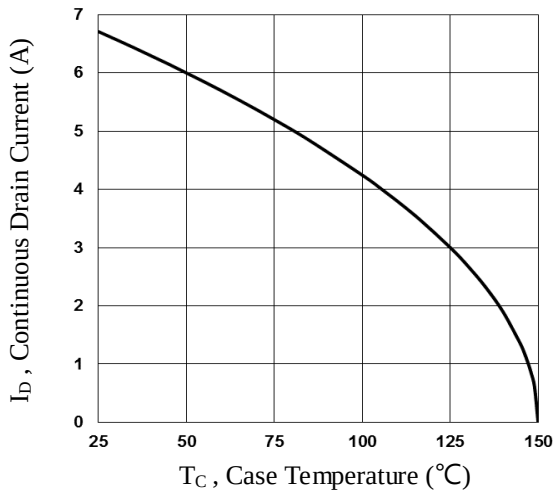


Fig.1 Continuous Drain Current vs. T_C

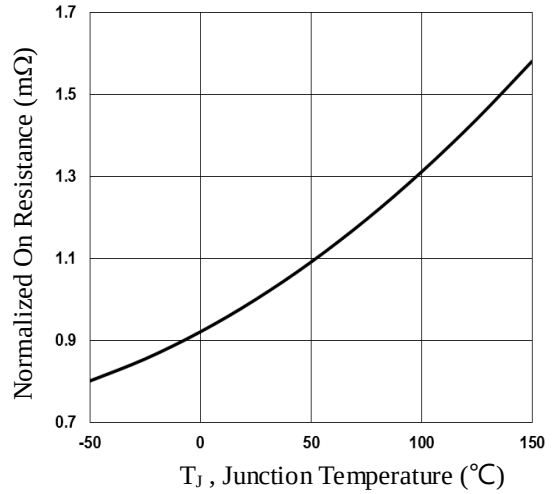


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

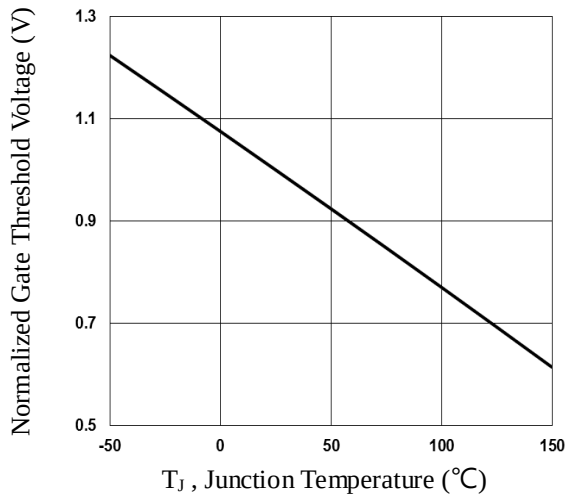


Fig.3 Normalized V_{th} vs. T_J

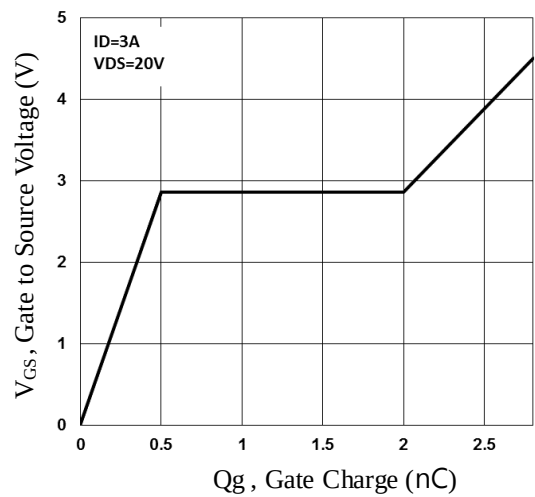


Fig.4 Gate Charge Waveform

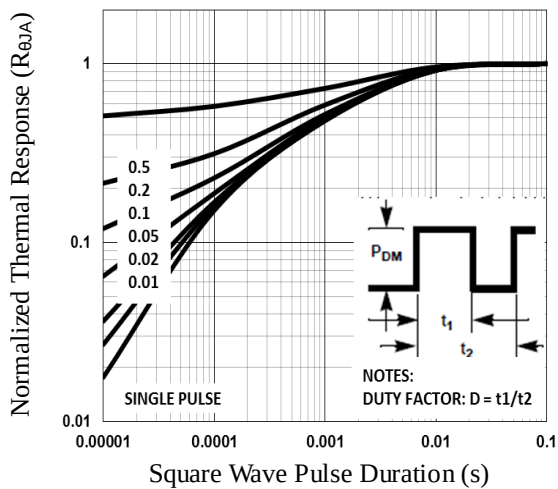


Fig.5 Normalized Transient Impedance

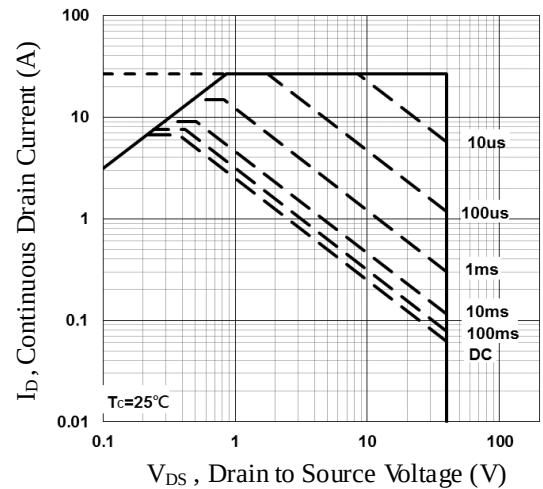


Fig.6 Maximum Safe Operation Area

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	-40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-40V	---	---	-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	-1.0	-1.6	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =-10V, I _D =-3A	---	56	70	m Ω
		V _{GS} =-4.5V, I _D =-2A	---	68	90	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	570	---	pF
C _{oss}	Output Capacitance		---	50	---	
C _{rss}	Reverse Transfer Capacitance		---	40	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =-20V, R _{GEN} =2.5 Ω , V _{GS} =-10V, I _D =-5A	---	6.3	---	ns
t _r	Rise Time		---	13	---	ns
t _{d(off)}	Turn-Off Delay Time		---	33	---	ns
t _f	Fall Time		---	17	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-3A	---	7	---	nC
Q _{gs}	Gate-Source Charge		---	1.3	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	1.7	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Forward Voltage	V _{GS} =0V, I _S =-5A	---	-0.8	-1.2	V
T _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S = -5A,	---	23	---	nS
Q _{rr}	Reverse Recovery Time	di/dt=100A/μs	---	25.2	---	nC
I _s	Continuous Source Current	V _G =V _D =0V	---	---	-6	A
I _{SM}	Pulsed Source Current		---	---	-20	A

Notes:

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

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

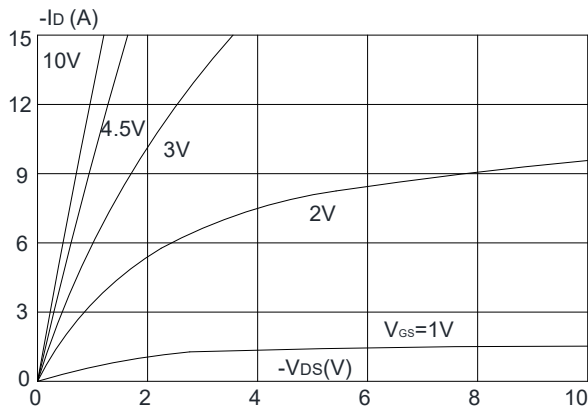


Figure1: Output Characteristics

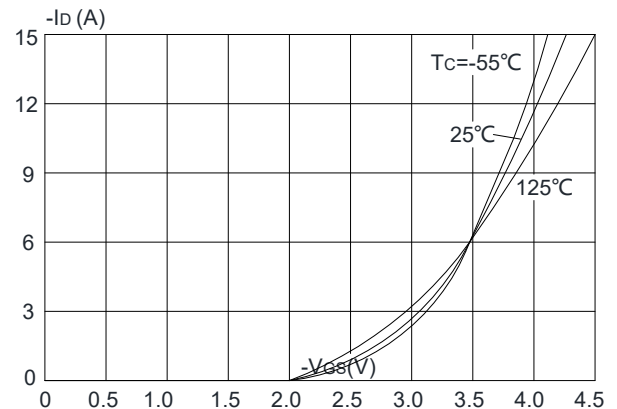


Figure 2: Typical Transfer Characteristics

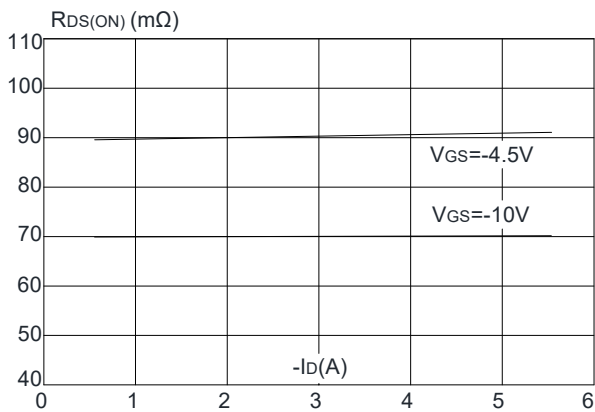


Figure 3: On-resistance vs. Drain Current

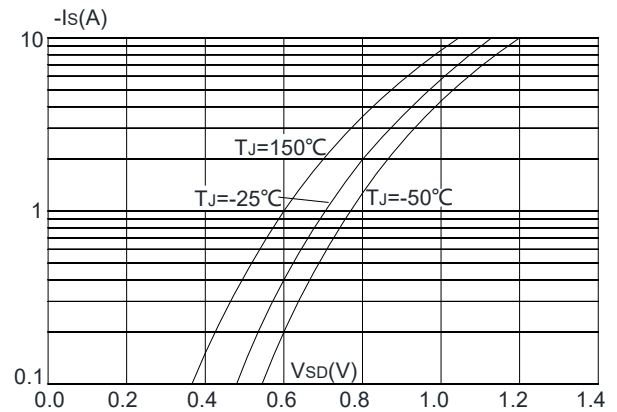


Figure 4: Body Diode Characteristics

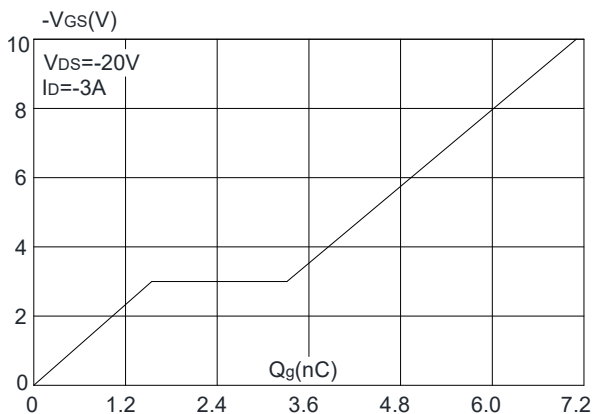


Figure 5: Gate Charge Characteristics

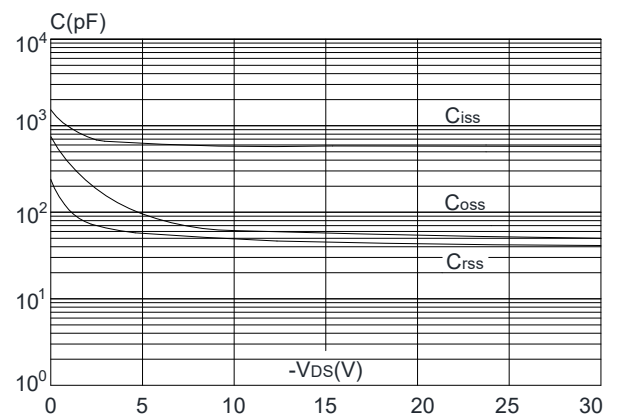


Figure 6: Capacitance Characteristics

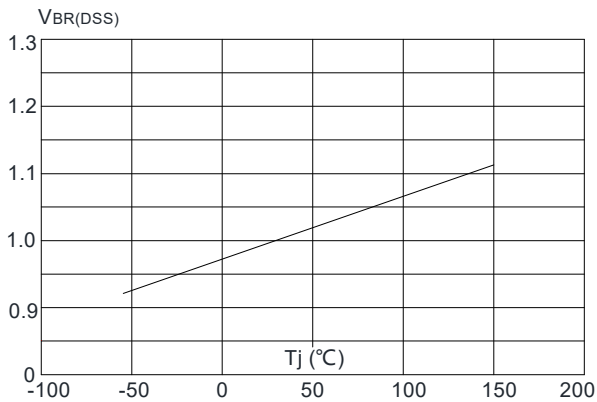


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

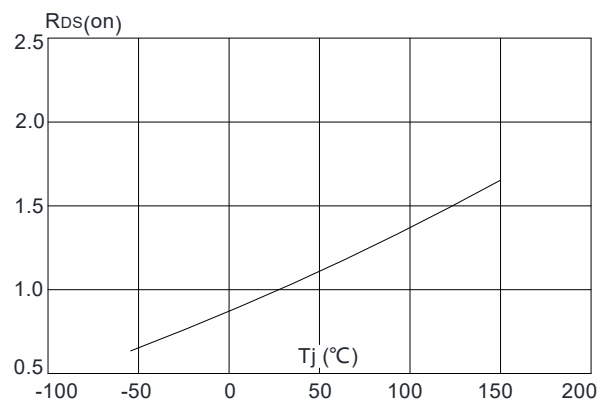


Figure 8: Normalized on Resistance vs. Junction Temperature

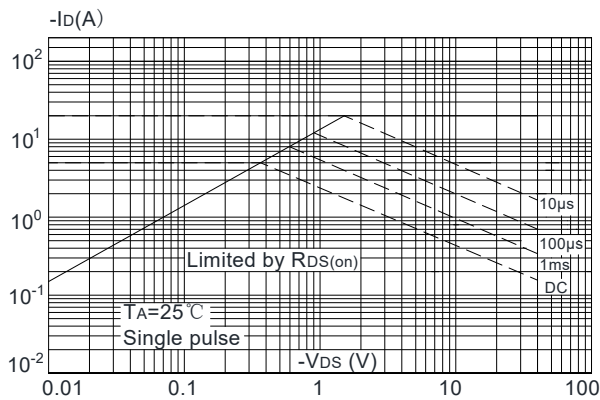


Figure 9: Maximum Safe Operating Area

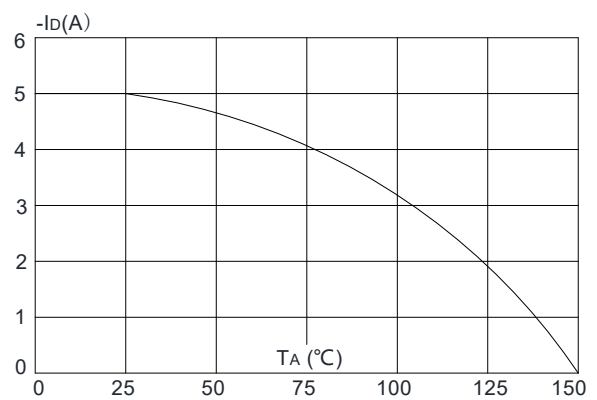


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

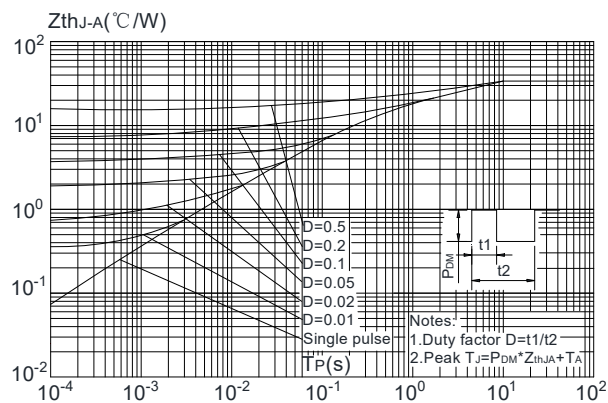
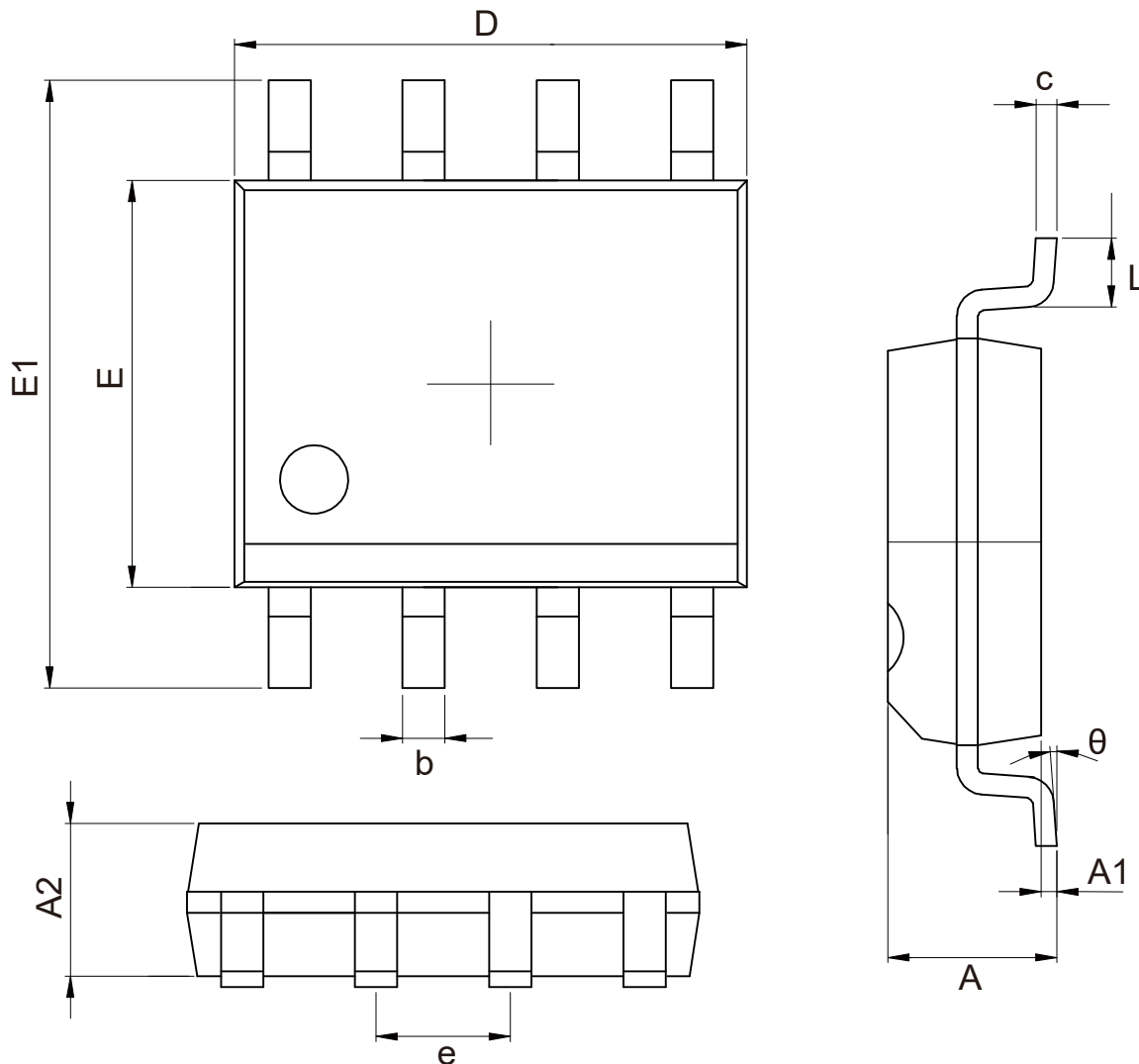


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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:

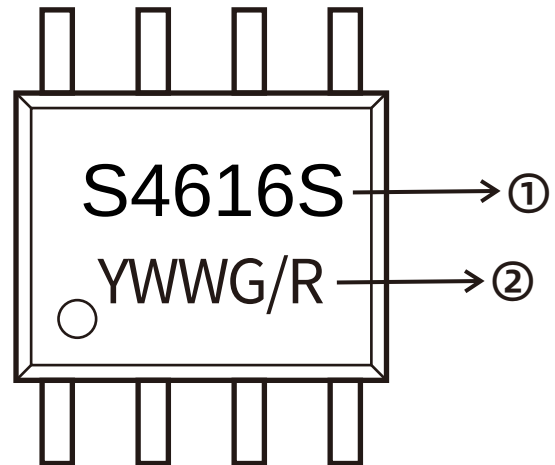
①. Part NO.

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	2024-04-1	Release of final version

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