

Description:

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

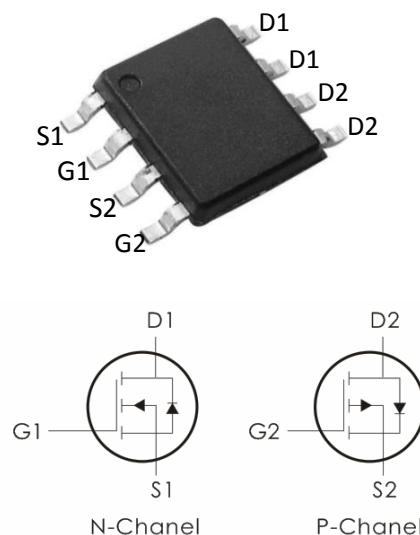
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=40V, I_D=8A, R_{DS(on)} < 22m\Omega @ V_{GS}=10V$

P-Channel: $V_{DS}=-40V, I_D=-7.2A, R_{DS(on)} < 40m\Omega @ V_{GS}=-10V$

- 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.



Absolute Maximum Ratings: ($T_A=25^\circ\text{C}$ 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	Continuous Drain Current- $T_A=25^\circ\text{C}$	8	-7.2	A
I_{DM}	Pulsed Drain Current ^{note1}	32	-28.8	A
P_D	Power Dissipation - $T_A=25^\circ\text{C}$	2	2.5	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	62.5	62.5	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information:

Part NO.	Marking	Package
DOS4614H	S4614H	SOP-8D

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	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 ³						
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 ^{note3}	V _{GS} =10V, I _D =8A	---	17	22	m Ω
		V _{GS} =4.5V, I _D =5A	---	25	35	
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	620	---	pF
C _{oss}	Output Capacitance		---	65	---	
C _{rss}	Reverse Transfer Capacitance		---	55	---	
Q _g	Gate Charge	V _{GS} =8V V _{DS} =20V I _D =10A	---	12	---	nC
Q _{gs}	Gate-Source Charge		---	3.2	---	
Q _{gd}	Gate-Drain Charge		---	3.1	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DS} =20V, R _L =2.5 Ω R _{REN} =3 Ω , V _{GS} =10V	---	4	---	ns
t _r	Rise Time		---	3	---	ns
t _{d(off)}	Turn-Off Delay Time		---	15	---	ns
t _f	Fall Time		---	2	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	VG=VD=0V	---	----	8	A
I _{SM}	Pulsed Drain to Source Diode	VG=VD=0V	---	---	32	A

V_{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =2.5A	---	---	1.2	V
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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 Performance Characteristics-N

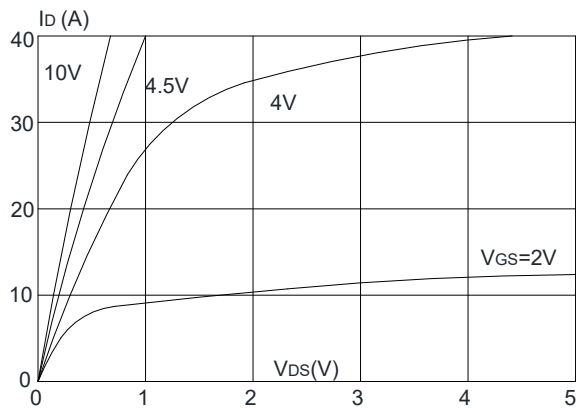


Figure 1: Output Characteristics

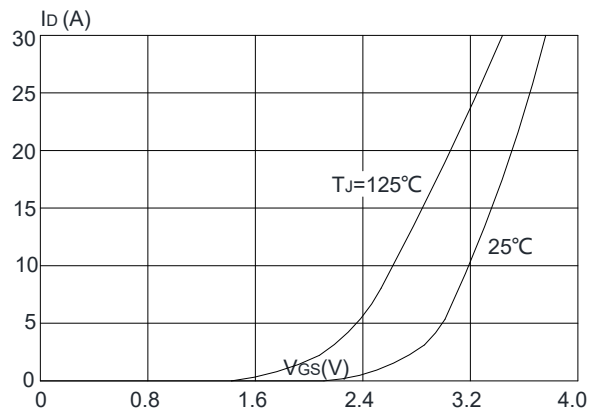


Figure 2: Typical Transfer Characteristics

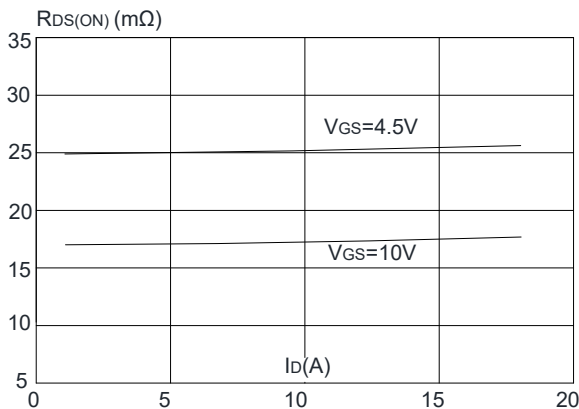


Figure 3: On-resistance vs. Drain Current

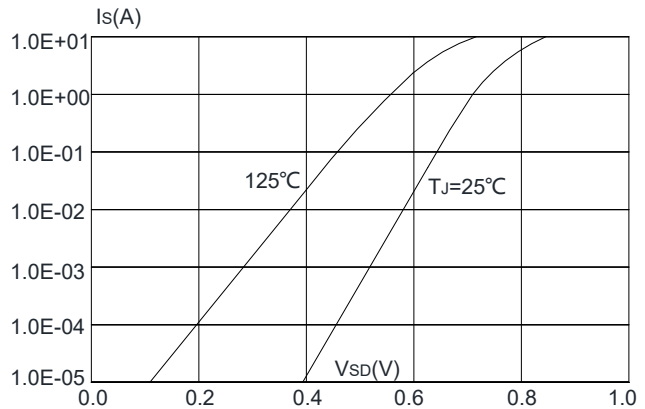


Figure 4: Body Diode Characteristics

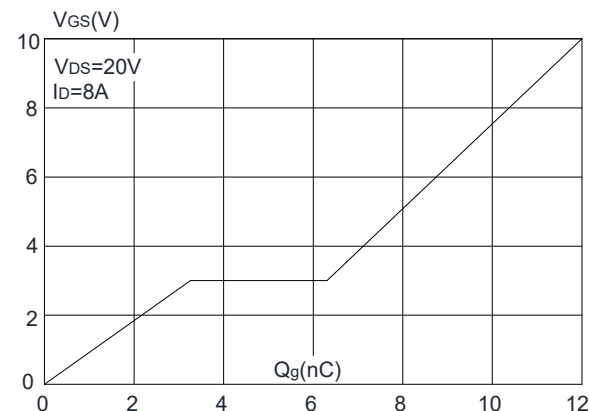


Figure 5: Gate Charge Characteristics

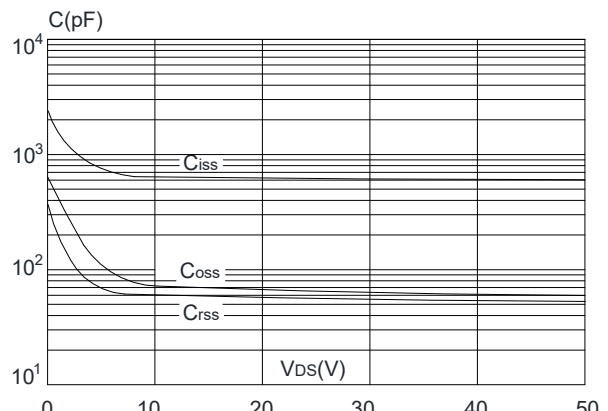


Figure 6: Capacitance Characteristics

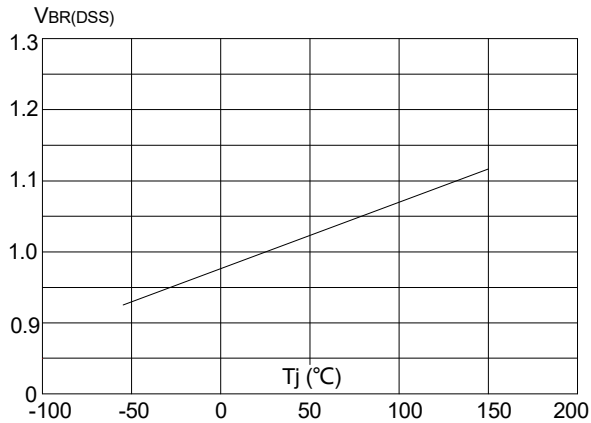


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

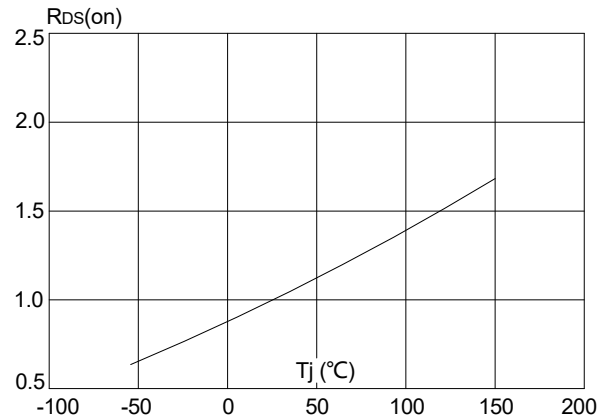


Figure 8: Normalized on Resistance vs. Junction Temperature

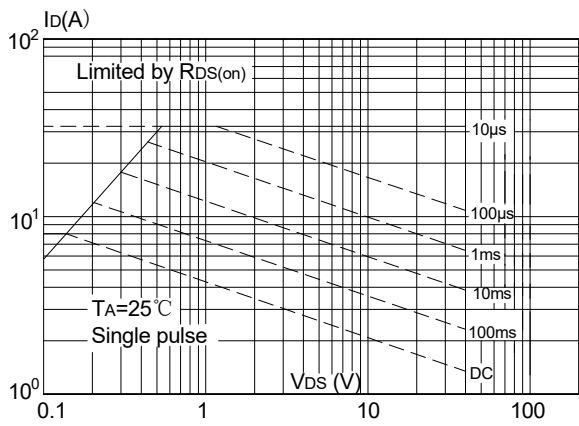


Figure 9: Maximum Safe Operating Area

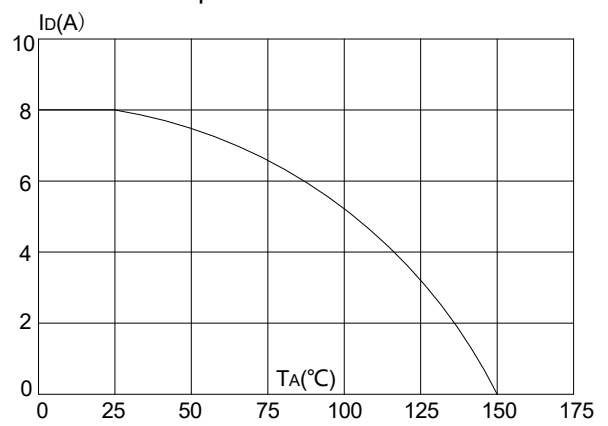


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

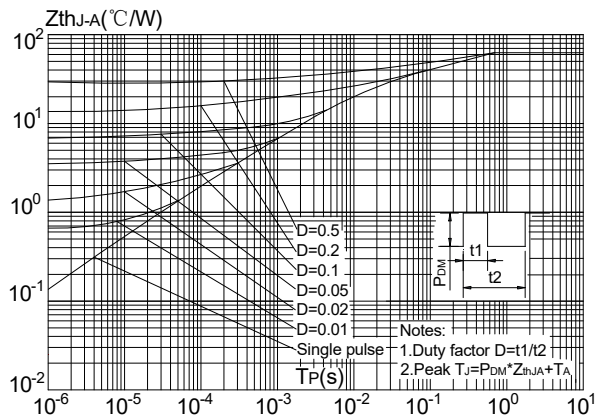


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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	-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 ³						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	-1	-1.5	-2.4	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =-10V, I _D =-4A	---	32	40	m Ω
		V _{GS} =-4.5V, I _D =-2A	---	55	75	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	1050	1600	pF
C _{oss}	Output Capacitance		---	110	160	
C _{rss}	Reverse Transfer Capacitance		---	80	120	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{GS} = -4.5V, R _{GEN} =25 Ω V _{DS} =-20V, I _D =-1A	---	20	40	ns
t _r	Rise Time		---	12	24	ns
t _{d(off)}	Turn-Off Delay Time		---	46	80	ns
t _f	Fall Time		---	6	12	ns
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-20V, I _D =-2A	---	8	16	nC
Q _{gs}	Gate-Source Charge		---	2.1	4.2	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	3.6	7.2	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _G =V _D =0V	---	---	-7.2	A
I _{SM}	Pulsed Drain to Source Diode	V _G =V _D =0V	---	---	-28.8	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-1A	---	---	-1	V

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)

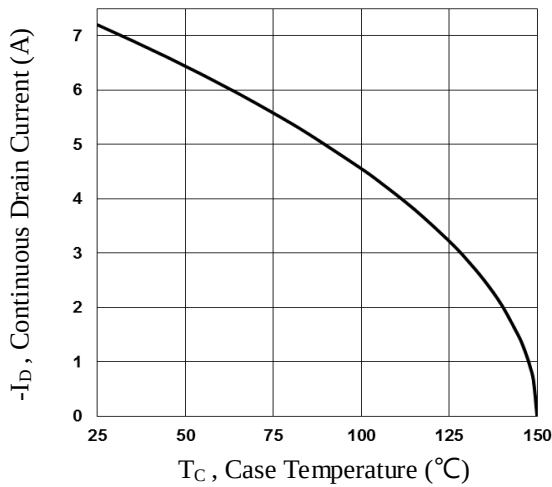


Fig.1 Continuous Drain Current vs. T_C

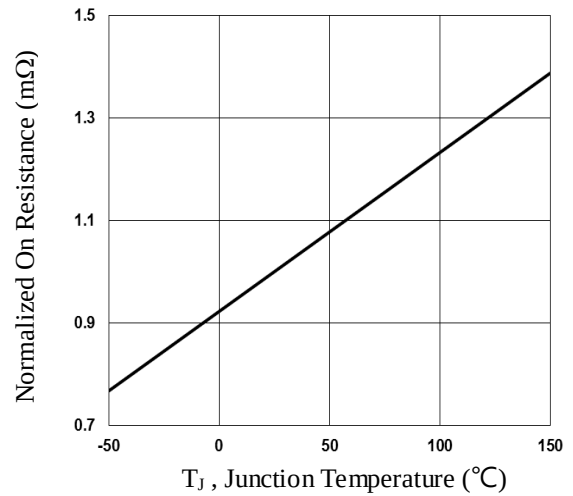


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

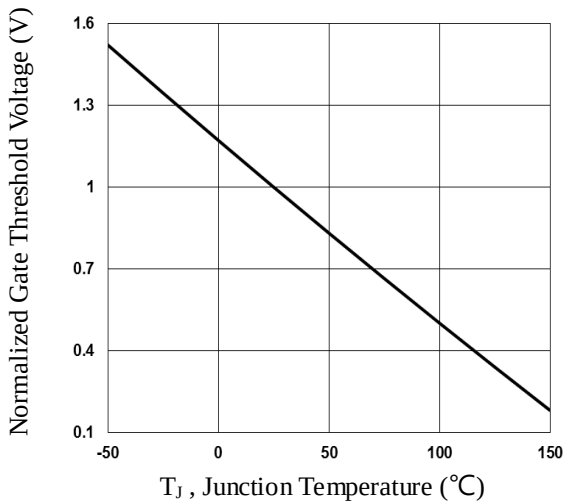


Fig.3 Normalized V_{th} vs. T_J

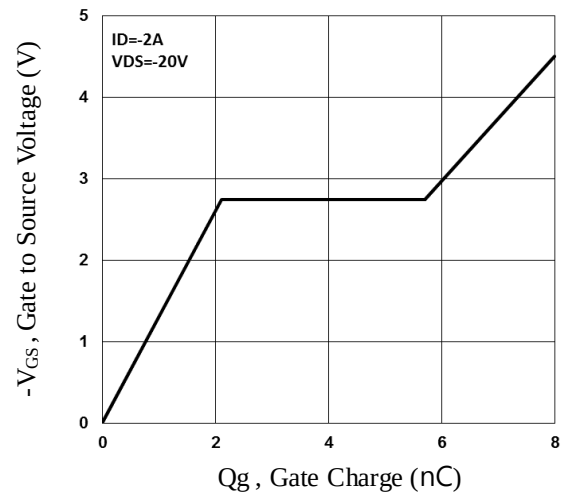


Fig.4 Gate Charge Waveform

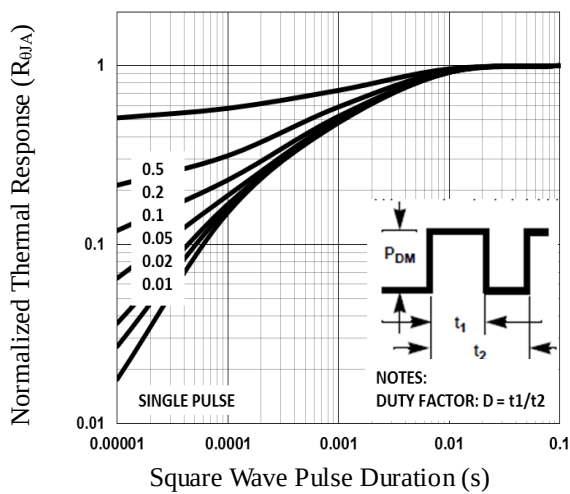


Fig.5 Normalized Transient Impedance

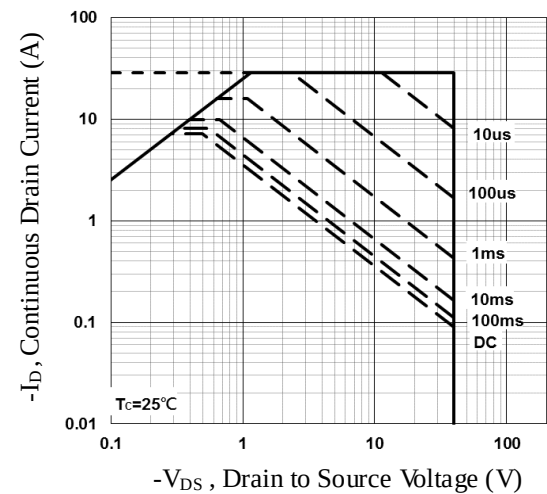


Fig.6 Maximum Safe Operation Area