

Description:

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

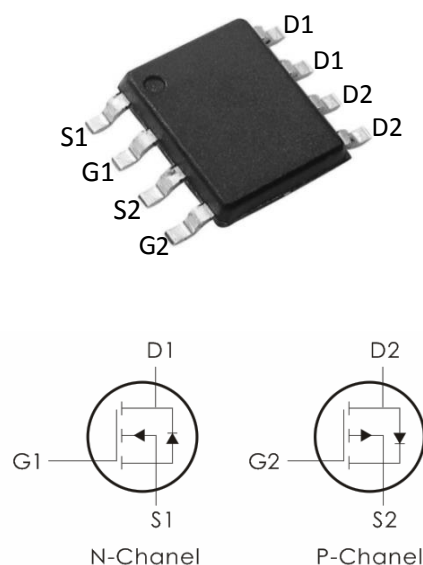
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=40V, I_D=9A, R_{DS(on)} < 15m\Omega @ V_{GS}=10V$

P-Channel: $V_{DS}=-40V, I_D=-10A, R_{DS(on)} < 18m\Omega @ V_{GS}=-10V$

- 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
DOS4618	S4618	SOP-8	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	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_A=25^\circ\text{C}$	9	-10	A
	Continuous Drain Current- $T_A=100^\circ\text{C}$	6	-6	
I_{DM}	Pulsed Drain Current ¹	38	40	A
E_{AS}	Single pulse avalanche energy ²	28.5	50	mJ
P_D	Power Dissipation - $T_A=25^\circ\text{C}$	1.55	2	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 ^{3N, 2P}	80.6	62.5	$^\circ\text{C}/\text{W}$

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-Sourctce 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	1.3	1.5	2.3	V
R _{DS(ON)}	Drain-Source On Resistance ⁴	V _{GS} =10V, I _D =10A	---	11.5	15	m Ω
		V _{GS} =4.5V, I _D =5A	---	14.5	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} =3 Ω ,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	---	----	9	A
I _{SM}	Pulsed Drain to Source Diode	V _D =V _G =0V	---	---	38	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =10A	---	---	1.2	V
T _{rr}	Reverse Recovery Time	I _F =-10A	---	10	---	ns
Q _{rr}	Reverse Recovery Charge	dl/dt=100A/us	---	6	---	nc

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J=25^{\circ}\text{C}$, $V_{DD}=20\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=11\text{A}$
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 $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

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

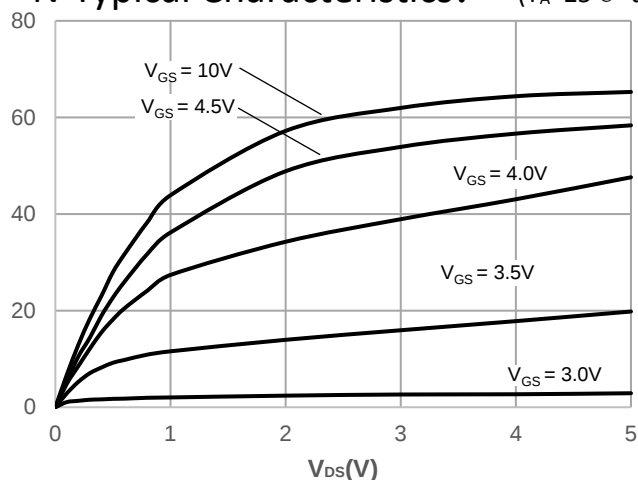


Figure 1: Output Characteristics

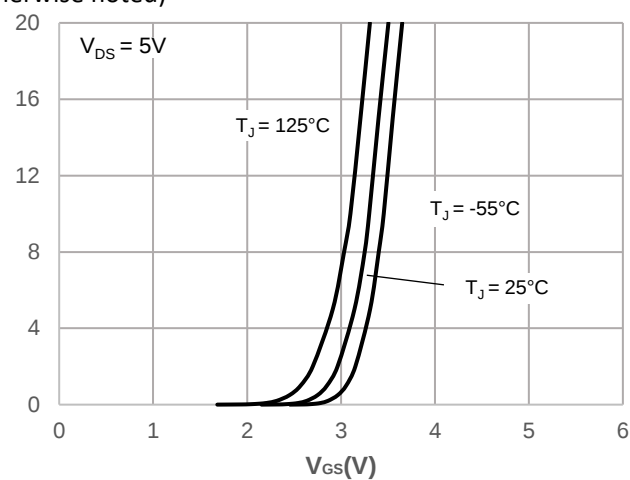


Figure 2: Typical Transfer Characteristics

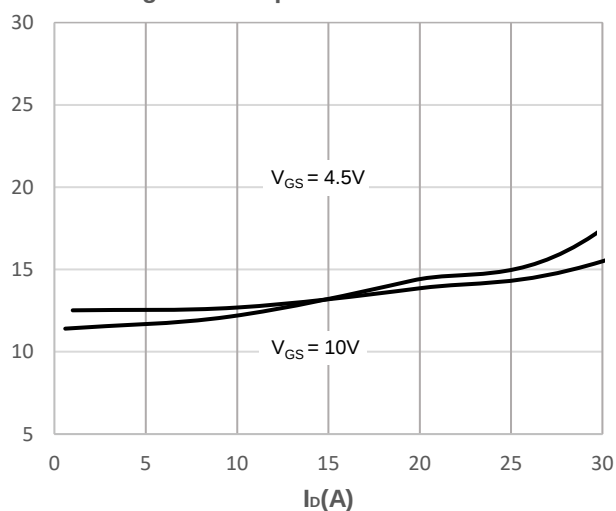


Figure 3: On-resistance vs. Drain Current

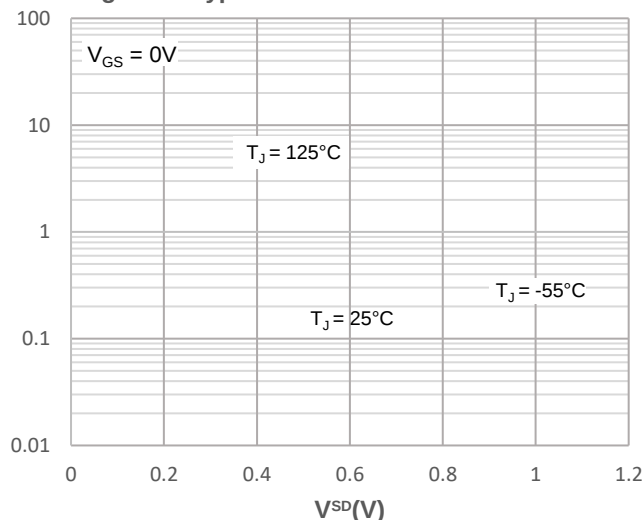


Figure 4: Body Diode Characteristics

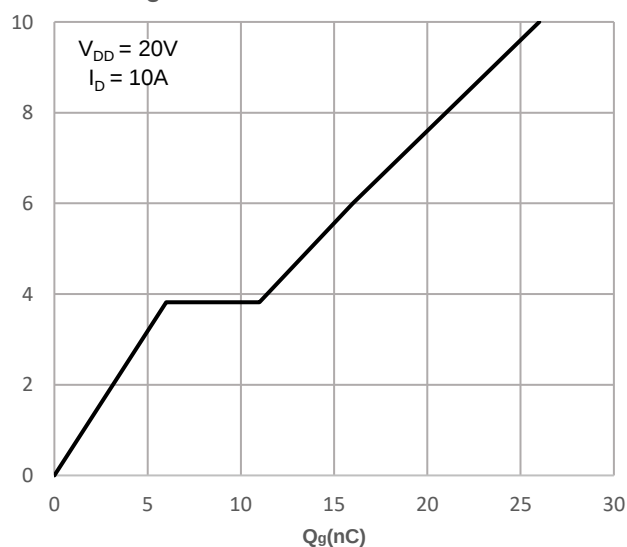


Figure 5: Gate Charge Characteristics

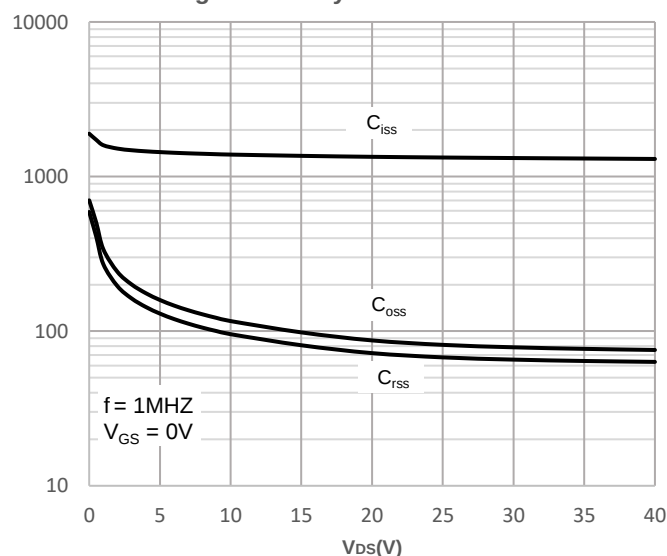


Figure 6: Capacitance Characteristics

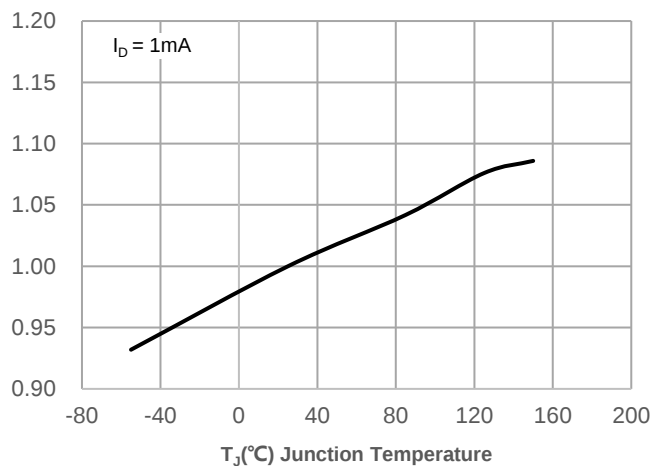


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

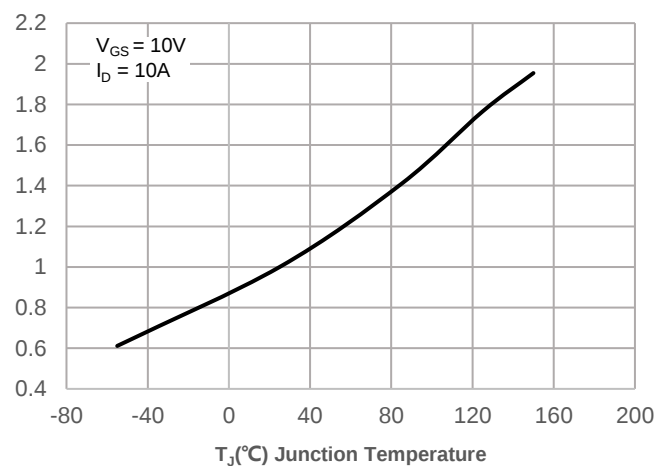


Figure 8: Normalized on Resistance vs. Junction Temperature

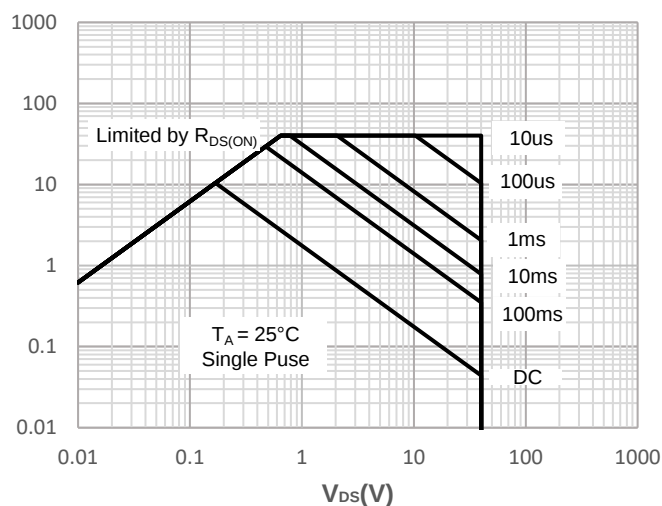


Figure 9: Maximum Safe Operating Area

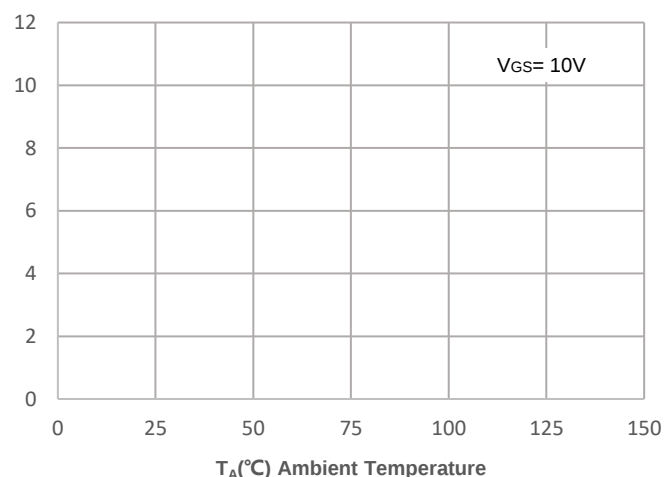


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

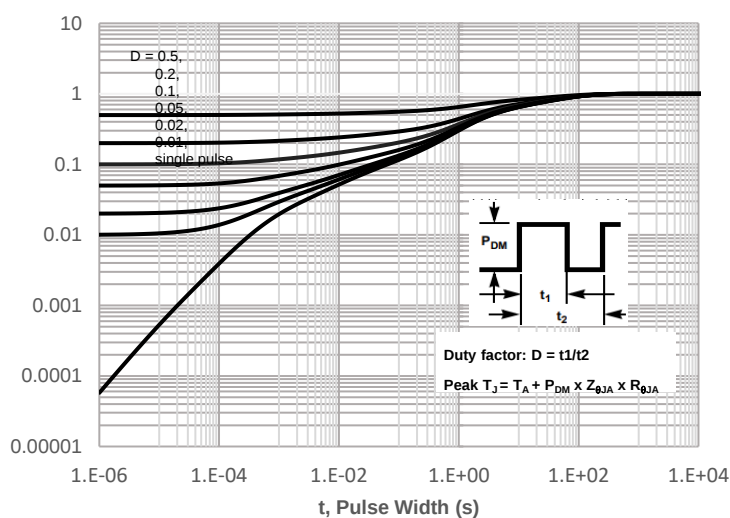


Figure 11: Normalized Maximum Transient Thermal Impedance

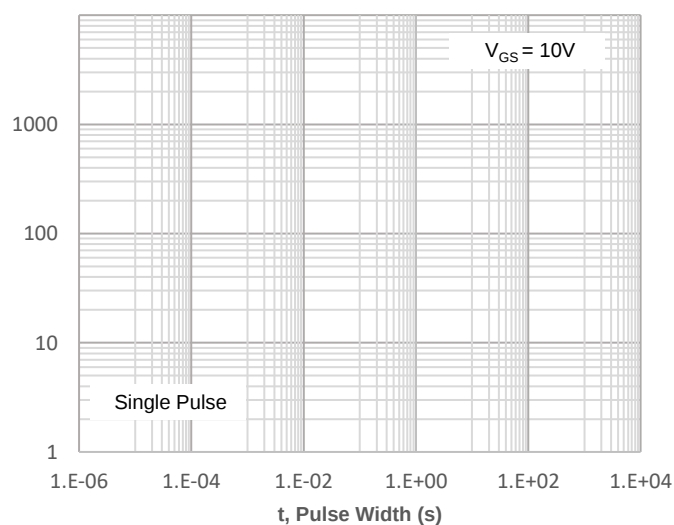


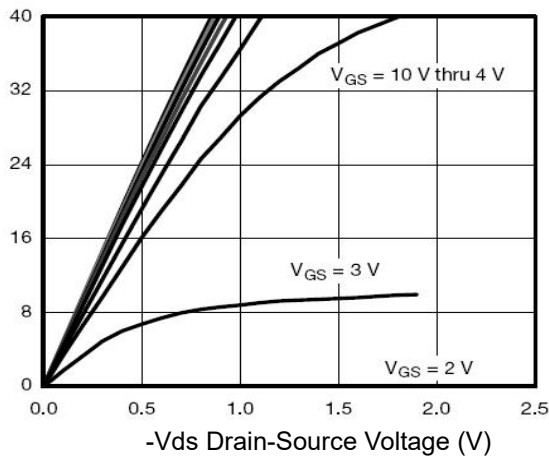
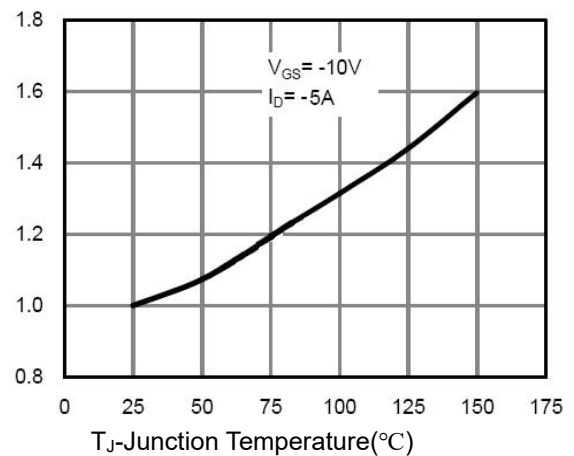
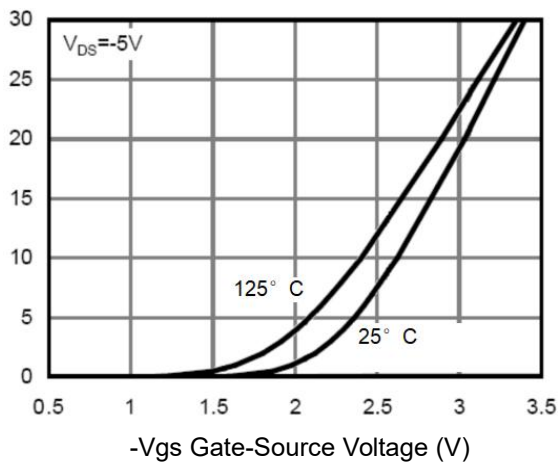
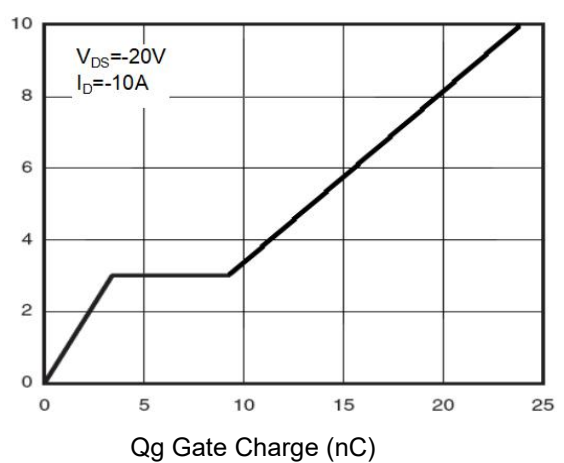
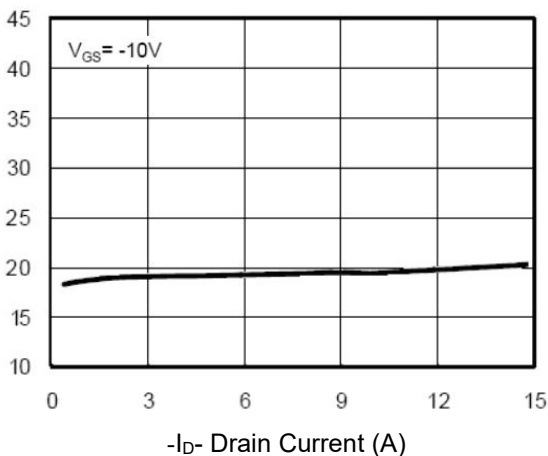
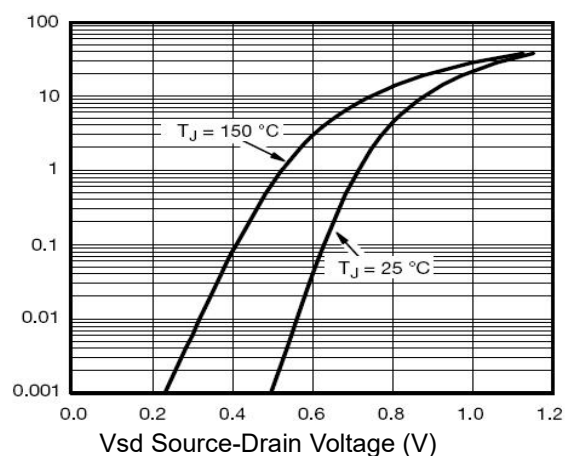
Figure 12: Peak Current Capacity

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-Sourctce 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 ³	V _{GS} =V _{DS} , I _D =250 μ A	-1.1	-1.7	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =-10V, I _D =-5A	---	14	18	m Ω
		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} =3 Ω R _L =2 Ω	---	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	---	---	-10	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

P-Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

Figure 1 Output Characteristics

Figure 4 Rds(on)-Junction Temperature

Figure 2 Transfer Characteristics

Figure 5 Gate Charge

Figure 3 Rds(on)- Drain Current

Figure 6 Source- Drain Diode Forward

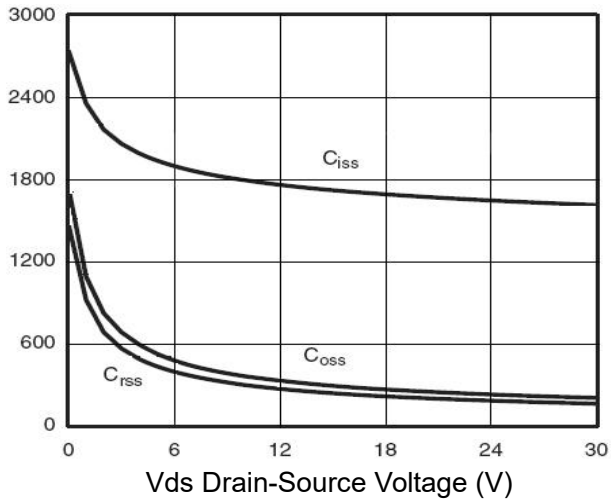


Figure 7 Capacitance vs Vds

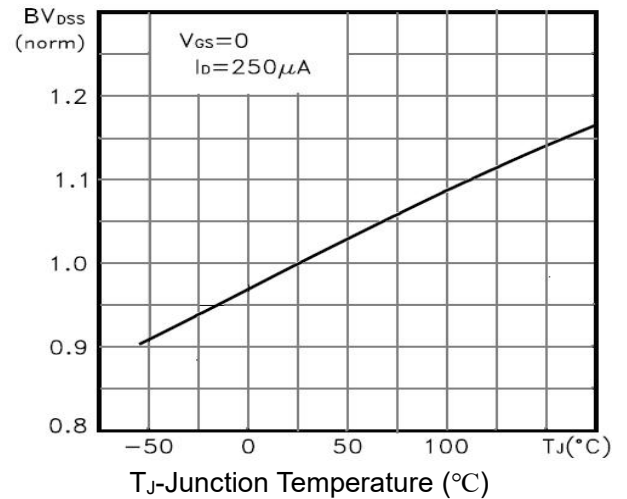


Figure 9 BV_{DSS} vs Junction Temperature

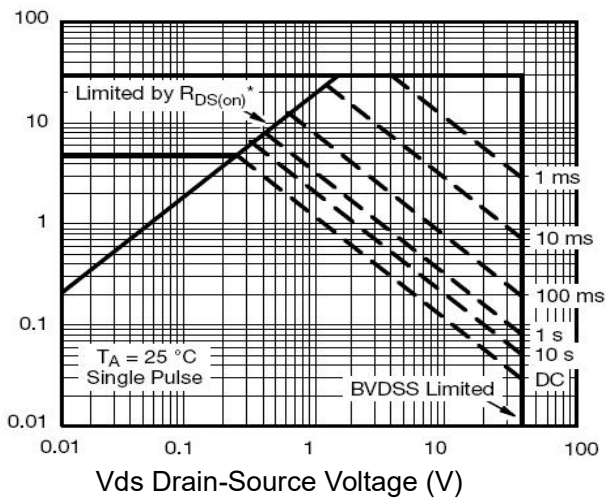


Figure 8 Safe Operation Area

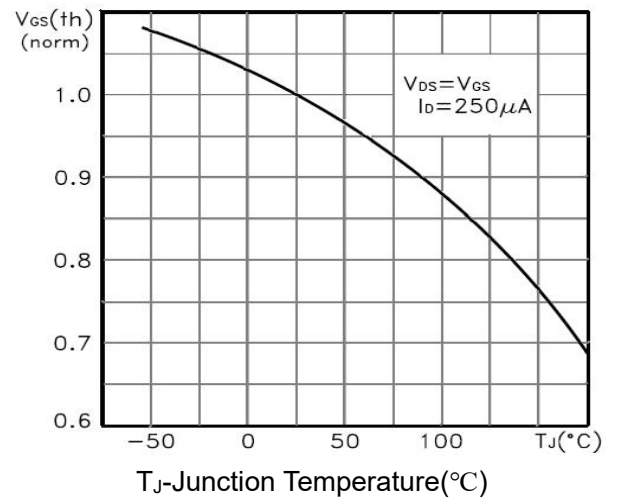


Figure 10 $V_{GS(th)}$ vs Junction Temperature

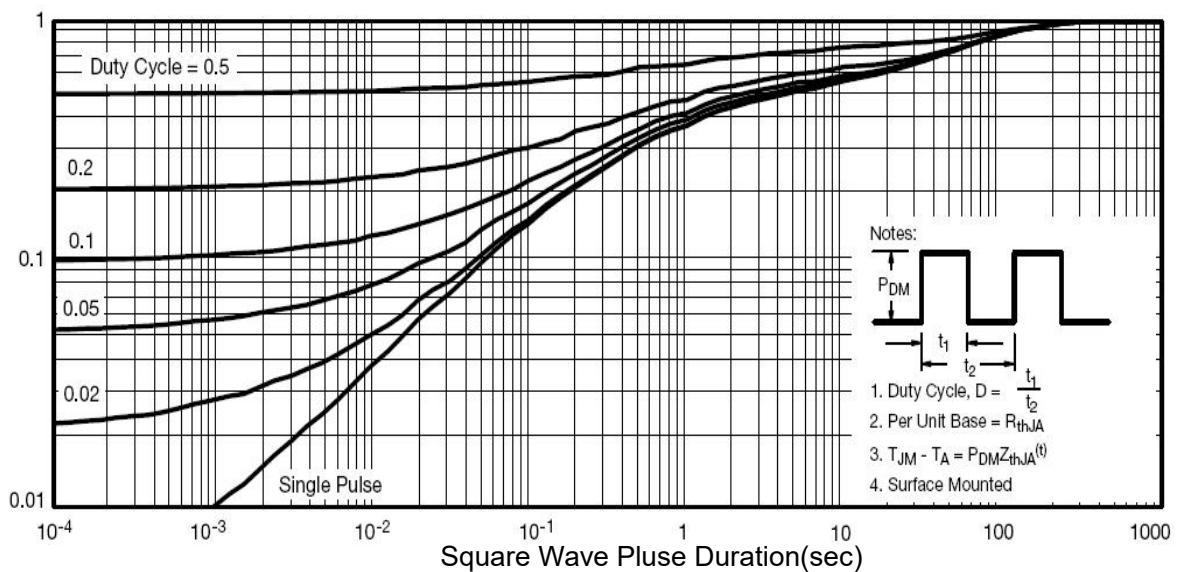
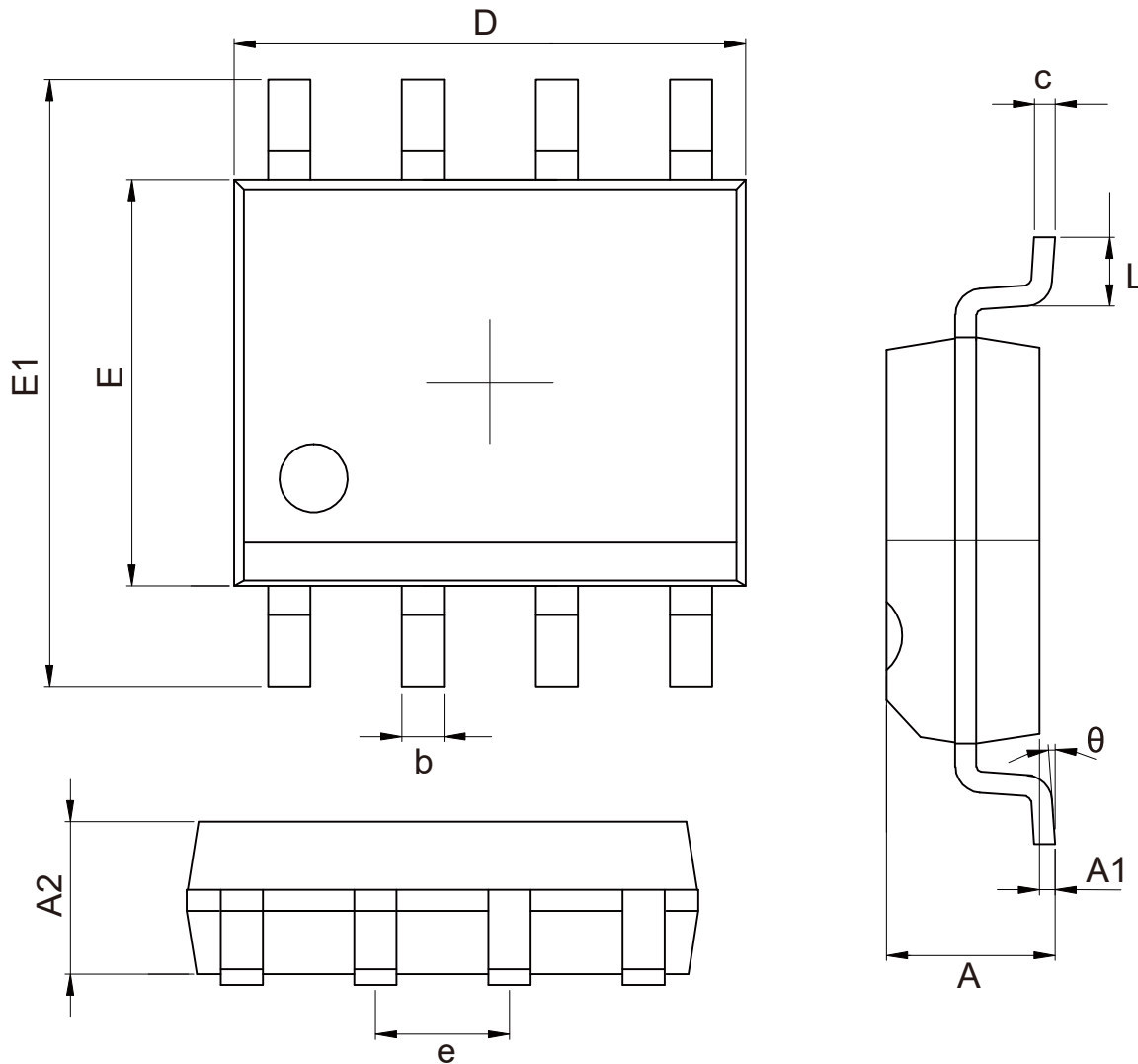


Figure 11 Normalized Maximum Transient Thermal Impedance

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:

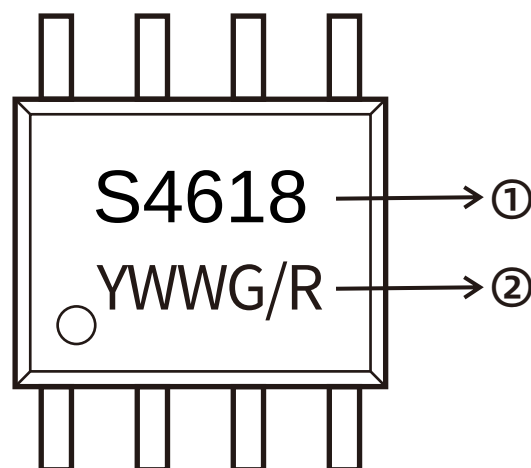
①. Part NO.

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	2024-05-08	Release of final version

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