

Description:

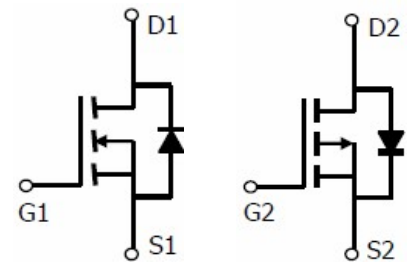
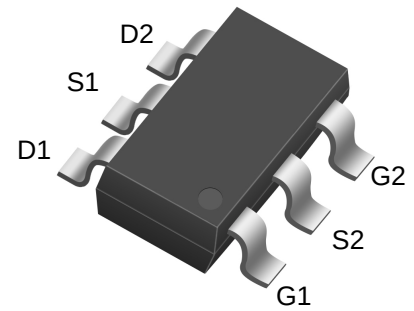
This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=30V, I_D=5A, R_{DS(on)} < 25m\Omega @ V_{GS}=10V$ (Typ: $20m\Omega$)
P-Channel: $V_{DS}=-30V, I_D=-4A, R_{DS(on)} < 65m\Omega @ V_{GS}=-10V$ (Typ: $50m\Omega$)

- 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.
- 5) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DO4606A	4606A	SOT-23-6D	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- $T_A=25^\circ\text{C}$	5	-4	A
	Continuous Drain Current- $T_A=100^\circ\text{C}$	3.5	-2.8	
I_{DM}	Pulsed Drain Current ¹	20	-16	A
P_D	Power Dissipation - $T_A=25^\circ\text{C}$	1.51	1.51	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 Cast	83	83	$^\circ\text{C}/\text{W}$

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	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	1.2	1.7	2.2	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =10V, I _D =5.5A	---	20	25	m Ω
		V _{GS} =4.5V, I _D =4.5A	---	28	42	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	360	---	pF
C _{oss}	Output Capacitance		---	57.6	---	
C _{rss}	Reverse Transfer Capacitance		---	44	---	
Q _g	Gate Charge	V _{GS} =10V , V _{DD} =15V I _D =5A	---	8.5	---	nC
Q _{gs}	Gate-Source Charge		---	1.68	---	
Q _{gd}	Gate-Drain Charge		---	1.68	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} =15V, I _D =5A, R _{REN} =3 Ω ,V _{GS} =10V	---	4.2	---	ns
t _r	Rise Time		---	11.5	---	ns
t _{d(off)}	Turn-Off Delay Time		---	14.7	---	ns
t _f	Fall Time		---	2.1	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	----	5	A
I _{SM}	Pulsed Drain to Source Diode	V _D =V _G =0V	---	---	20	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =5.8A	---	---	1.2	V
T _{rr}	Reverse Recovery Time	I _F =5A,	---	7.5	---	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/us	---	2	---	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. 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)

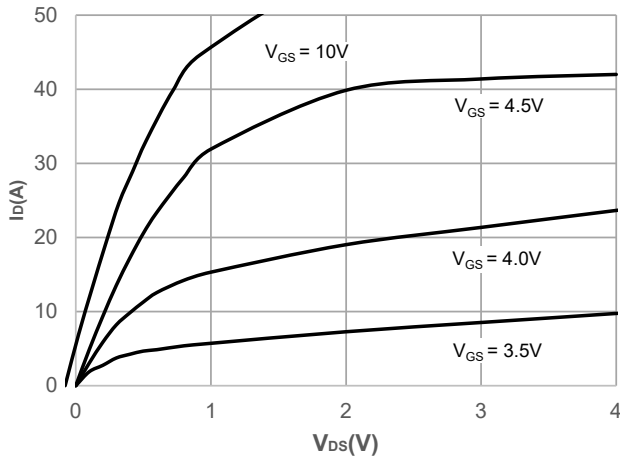


Figure 1: Output Characteristics

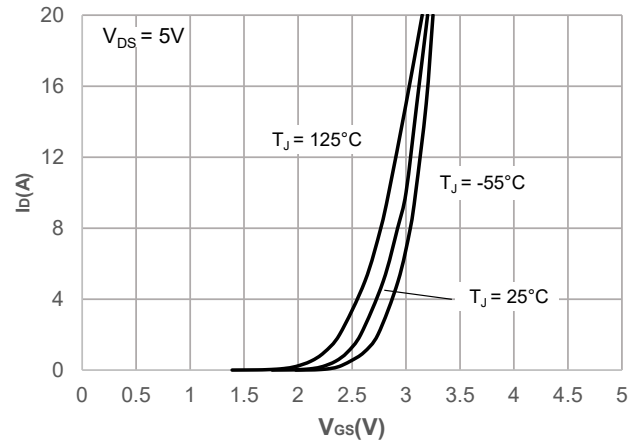


Figure 2: Typical Transfer Characteristics

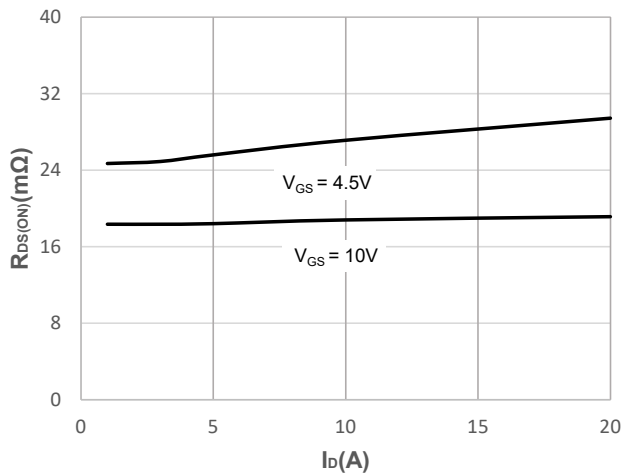


Figure 3: On-resistance vs. Drain Current

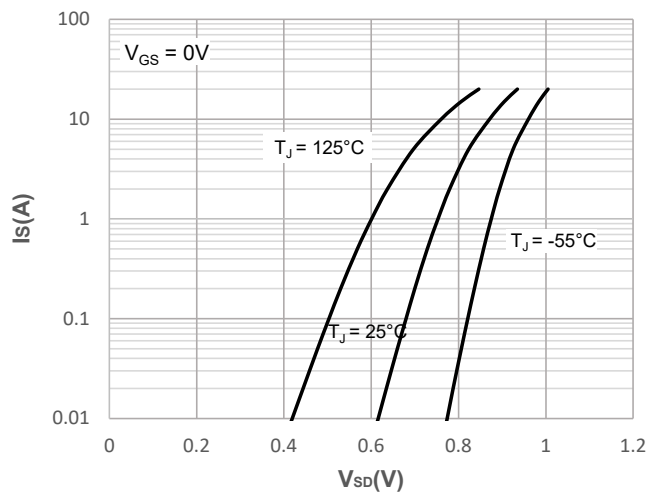


Figure 4: Body Diode Characteristics

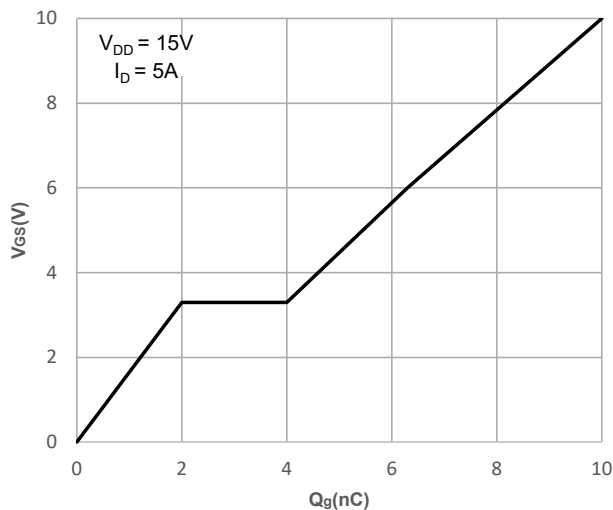


Figure 5: Gate Charge Characteristics

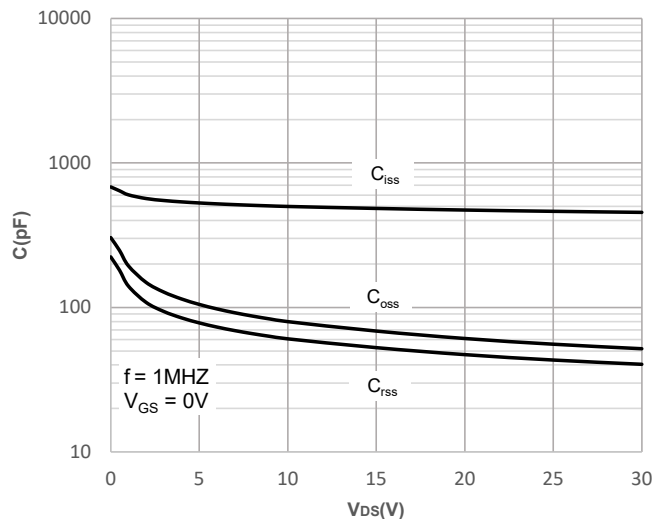


Figure 6: Capacitance Characteristics

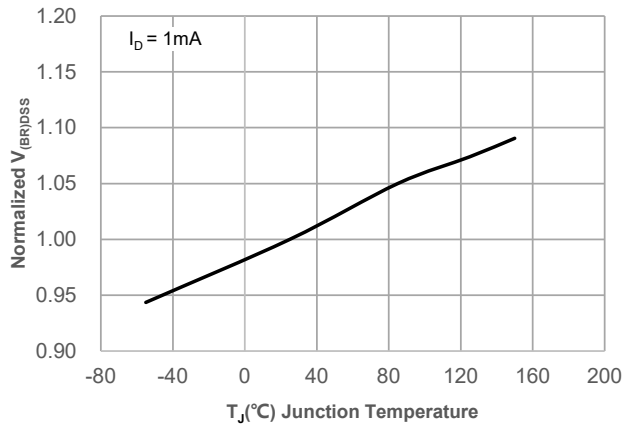


Figure 7: Normalized Breakdown voltage vs.

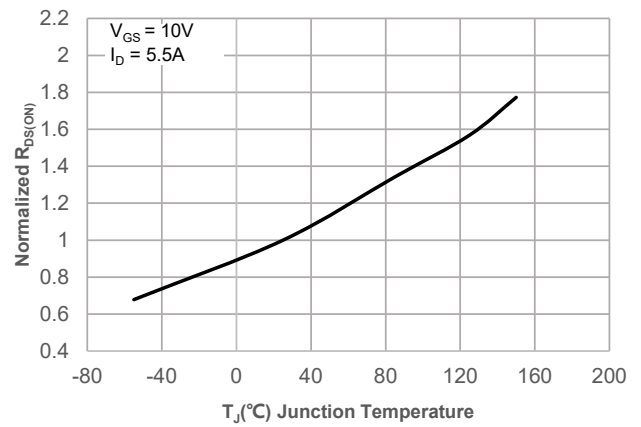


Figure 8: Normalized on Resistance vs.

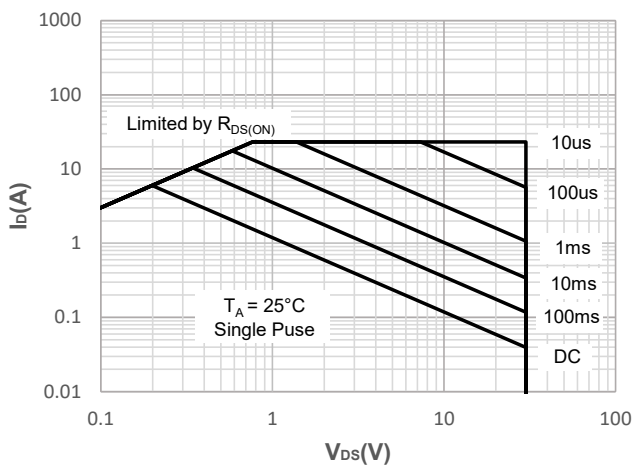


Figure 9: Maximum Safe Operating Area

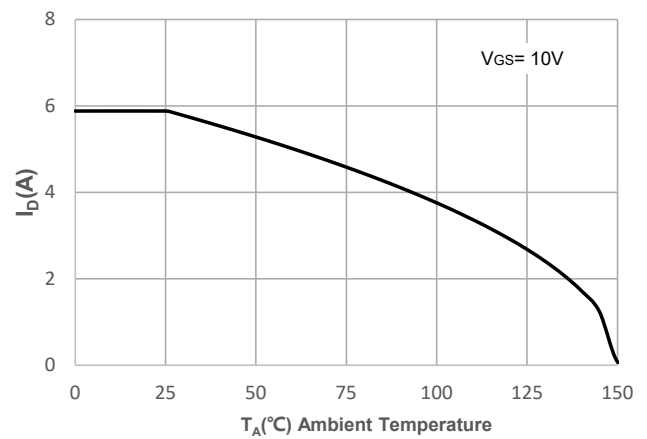


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

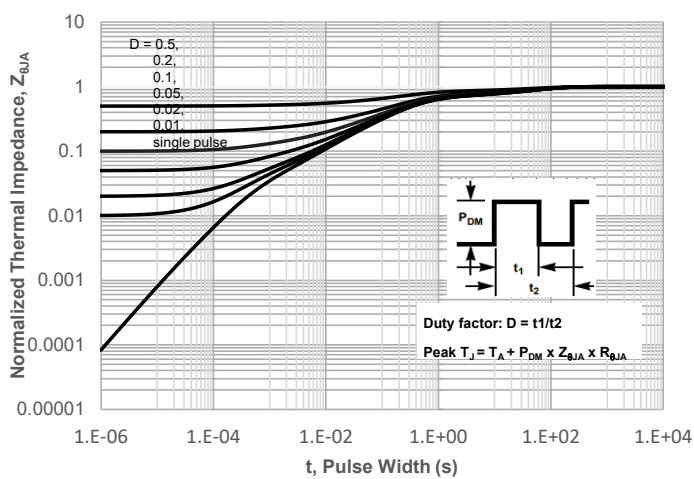


Figure 11: Normalized Maximum Transient Thermal Impedance

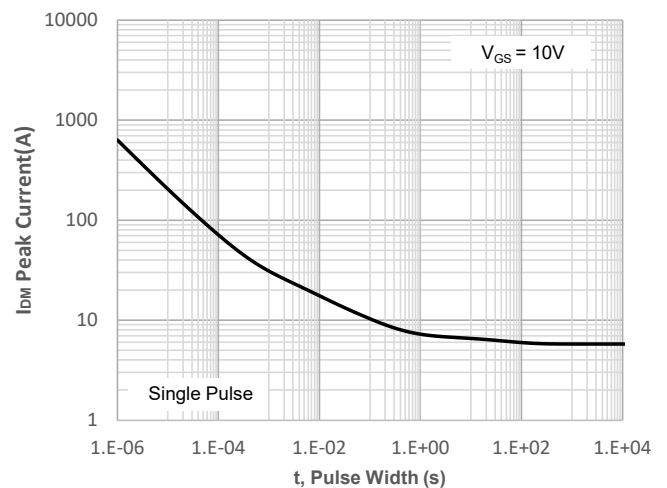


Figure 12: Peak Current Capacity

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	-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	-1.5	-2.1	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =-10V, I _b =-4.1A	---	50	65	m Ω
		V _{GS} =-4.5V, I _b =-4A	---	70	95	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	520	---	pF
C _{oss}	Output Capacitance		---	52	---	
C _{rss}	Reverse Transfer Capacitance		---	46	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -15V, R _L =-3.6 Ω V _{GS} = -10V, R _{GEN} =3 Ω	---	3	---	ns
t _r	Rise Time		---	2	---	ns
t _{d(off)}	Turn-Off Delay Time		---	26	---	ns
t _f	Fall Time		---	14.5	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-4A	---	10	---	nC
Q _{gs}	Gate-Source Charge		---	1.76	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	1.68	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-4	A
I _{SM}	Pulsed Drain to Source Diode		---	---	-16	---
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-4.1A	---	---	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

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

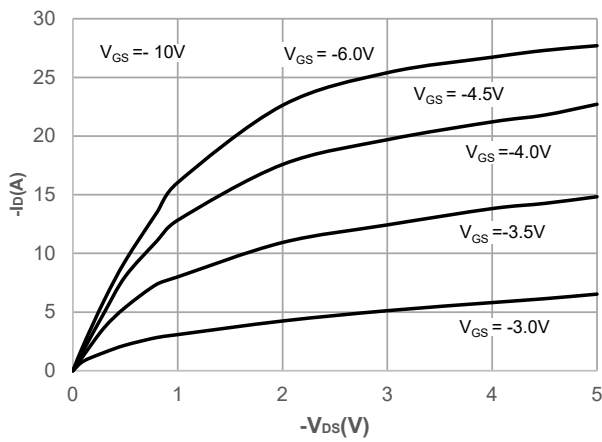


Figure 1: Output Characteristics

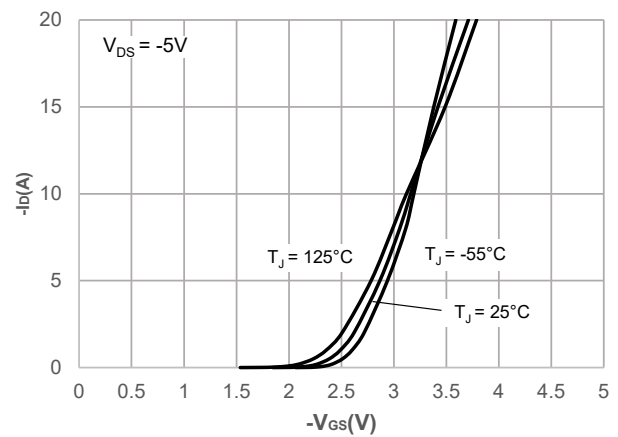


Figure 2: Typical Transfer Characteristics

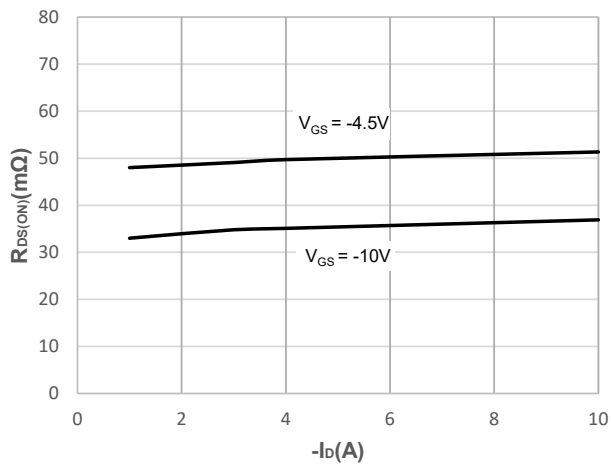


Figure 3: On-resistance vs. Drain Current

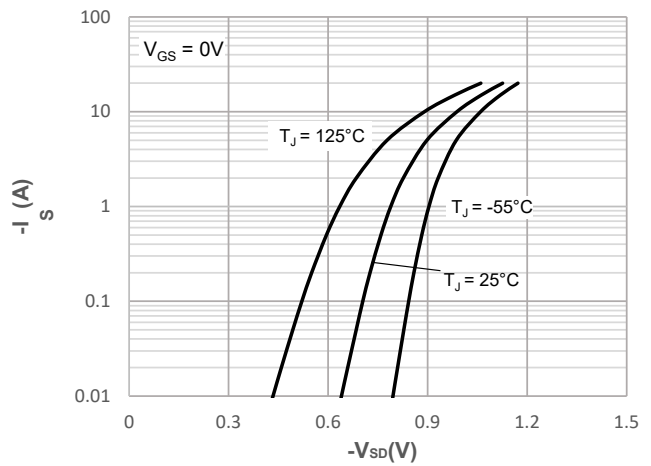


Figure 4: Body Diode Characteristics

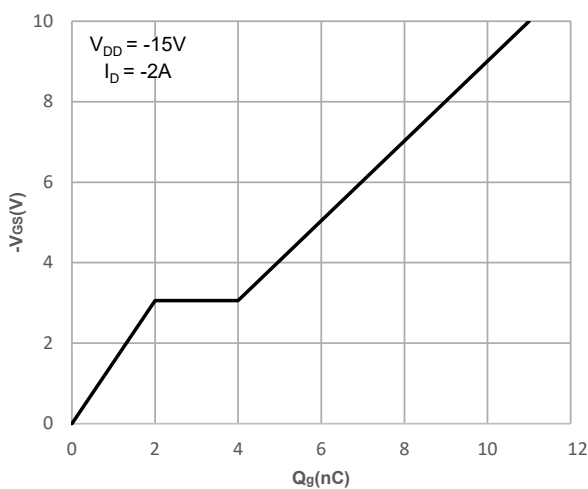


Figure 5: Gate Charge Characteristics

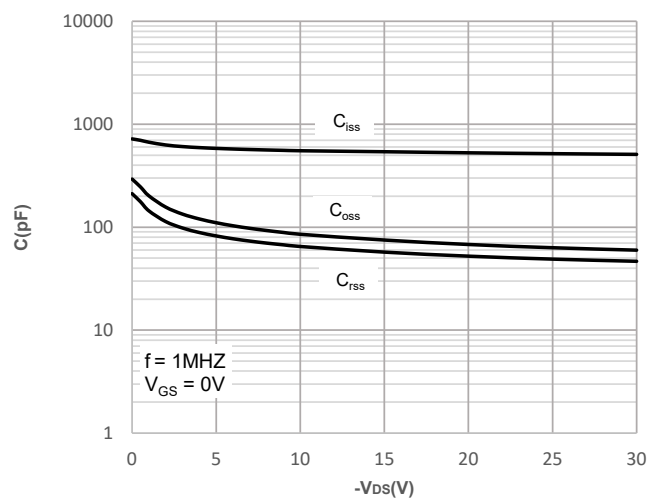


Figure 6: Capacitance Characteristics

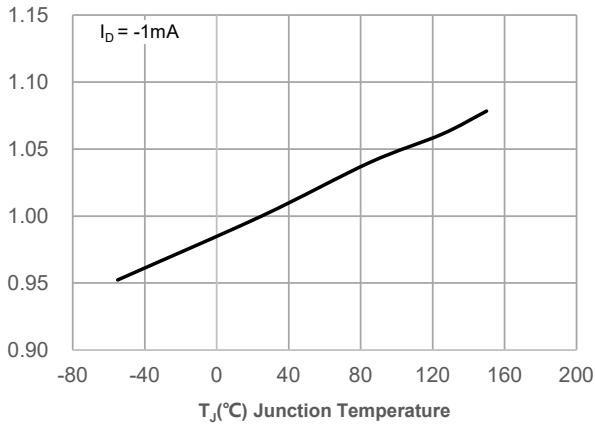


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

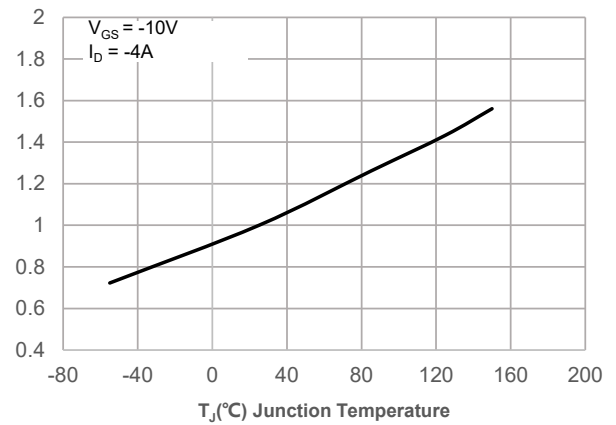


Figure 8: Normalized on Resistance vs. Junction Temperature

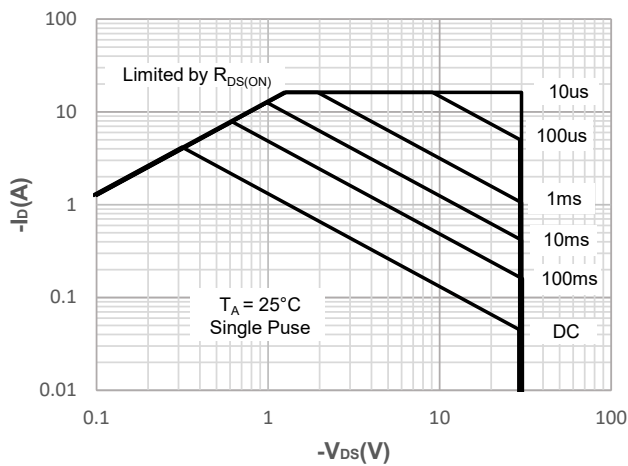


Figure 9: Maximum Safe Operating Area

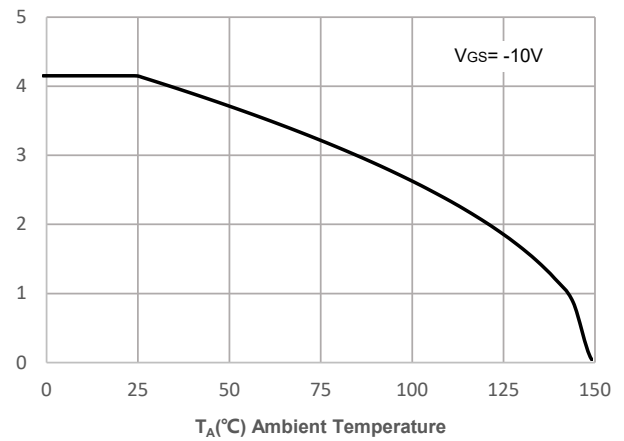


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

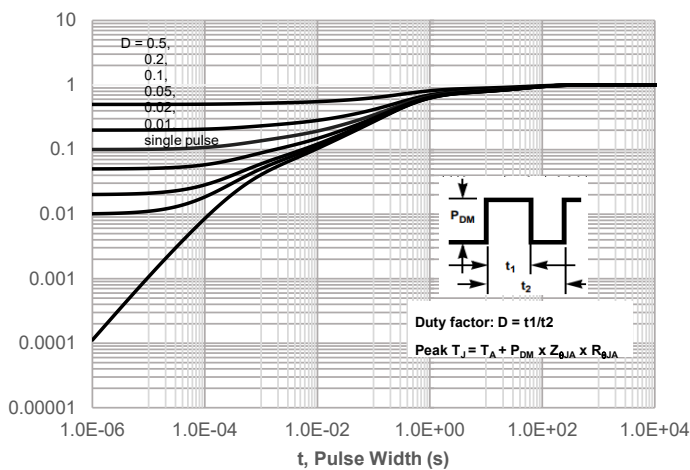


Figure 11: Normalized Maximum Transient Thermal Impedance

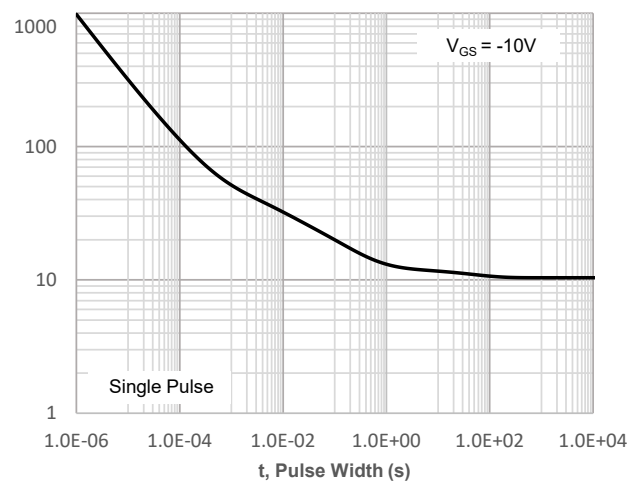
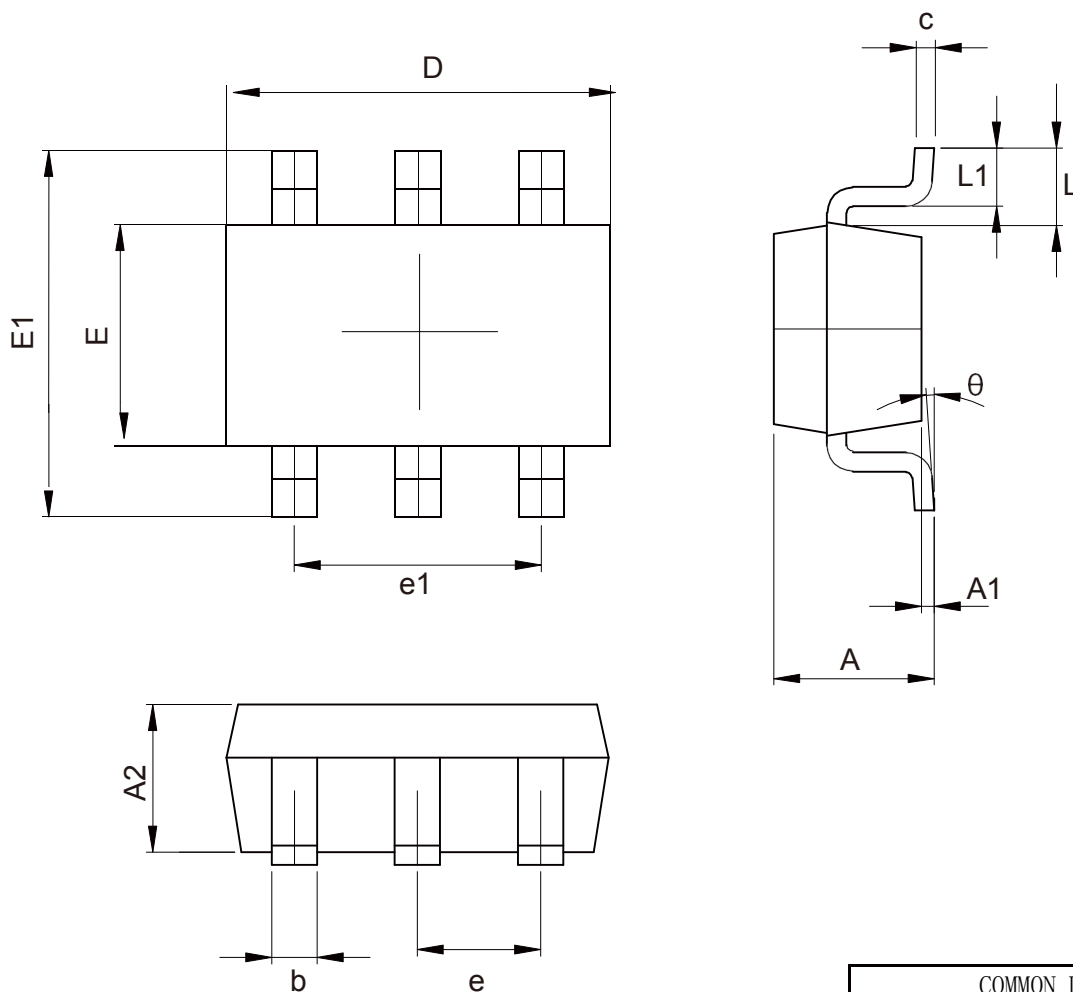


Figure 12: Peak Current Capacity

SOT-23-6D Package Outline Data

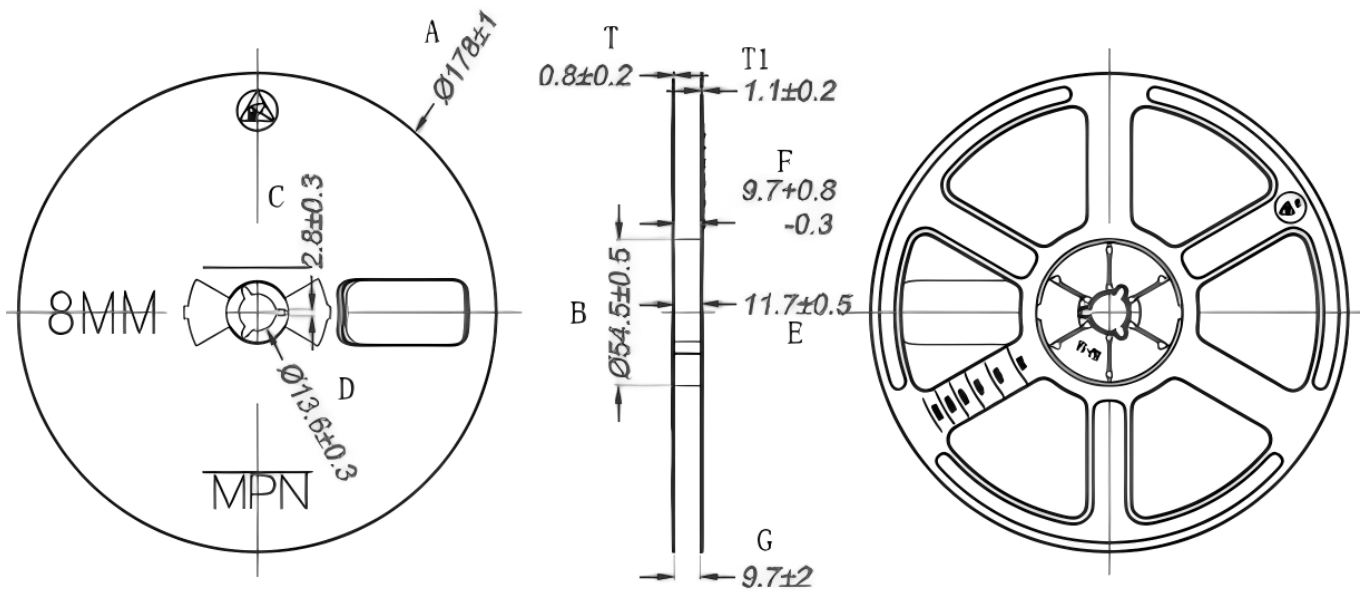


COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	1.050	—	1.300
A1	0.000	—	0.200
A2	1.050	—	1.200
b	0.300	0.400	0.500
c	0.100	—	0.200
D	2.820	2.900	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.6REF		
L1	0.300	0.450	0.600
θ	0°	—	8°

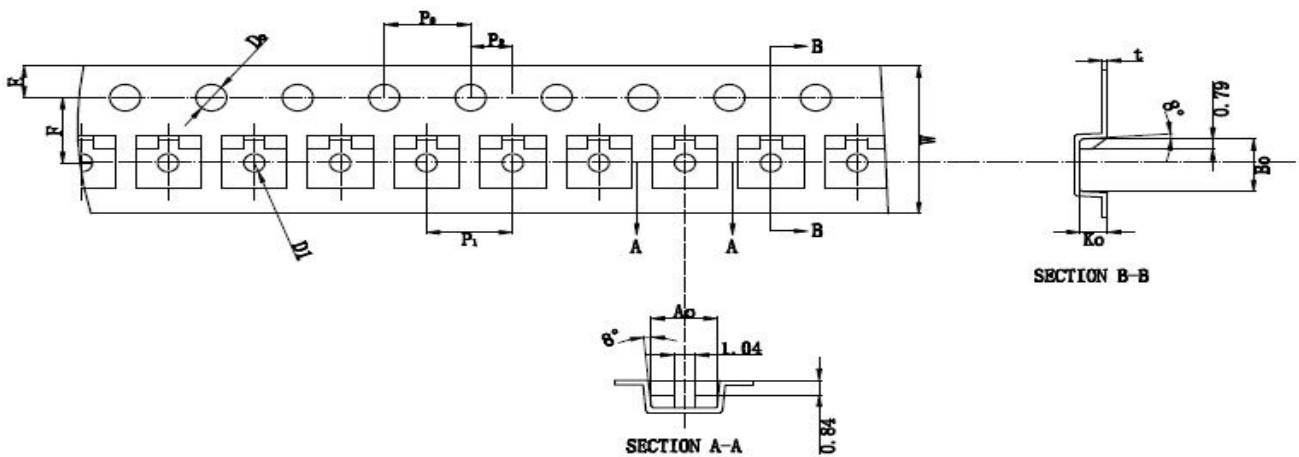
Unit:mm

Tape & Reel Information

Dimensions in mm

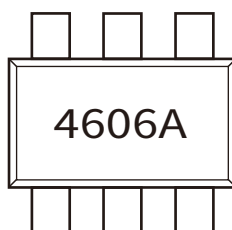


PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
SOT23-6	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00	3.13	3.22	1.30	0.20
Tolerance	± 0.2	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.2	± 0.1	± 0.1	± 0.1	± 0.1	± 0.03



Pulling direction 

Marking Information:



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2024-10-06	Release of final version

Attention :

- Information furnished in this document is believed to be accurate and reliable. However, Shenzhen Doingter Semiconductor Co.,Ltd. assumes no responsibility for the consequences of use without consideration for such information nor use beyond it.
 - Information mentioned in this document is subject to change without notice, apart from that when an agreement is signed, Shenzhen Doingter complies with the agreement. Products and information provided in this document have no infringement of patents.
 - Shenzhen Doingter assumes no responsibility for any infringement of other rights of third parties which may result from the use of such products and information. This document supersedes and replaces all information previously supplied.
-  Is a registered trademark of Shenzhen Doingter Semiconductor Co., Ltd. Copyright © 2013 Shenzhen Doingter Semiconductor Co.,Ltd. Printed All rights reserved.