

Description:

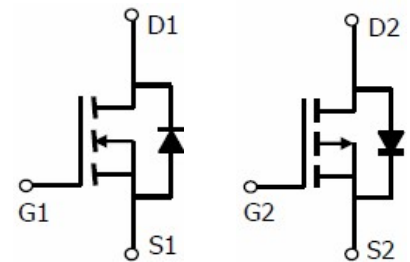
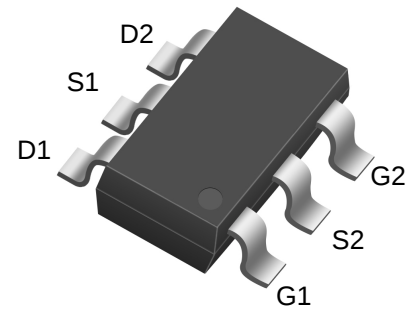
This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

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-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	1.2	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)

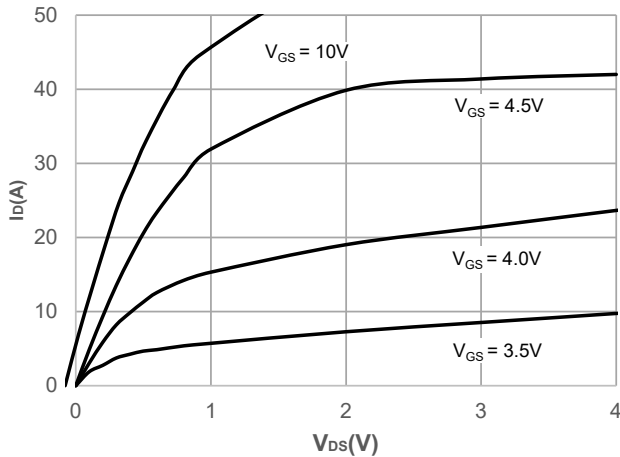


Figure 1: Output Characteristics

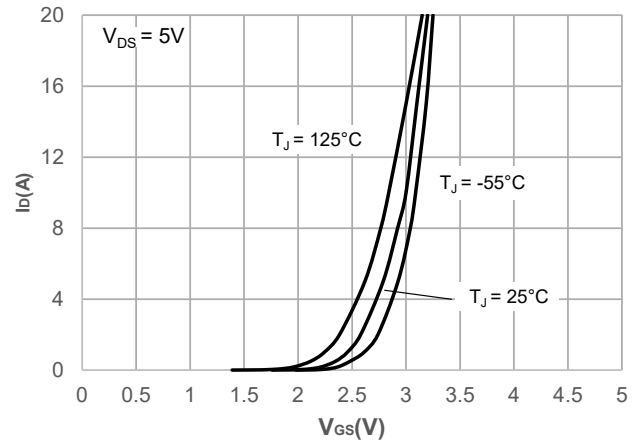


Figure 2: Typical Transfer Characteristics

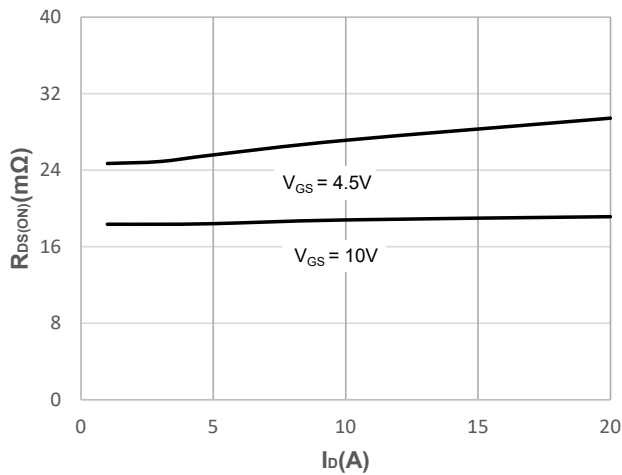


Figure 3: On-resistance vs. Drain Current

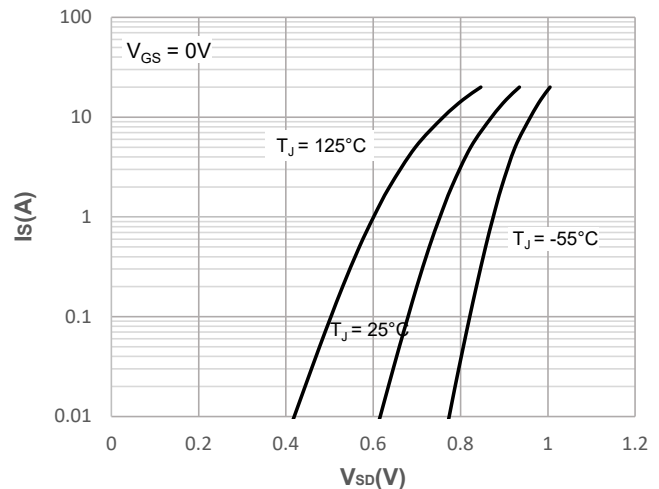


Figure 4: Body Diode Characteristics

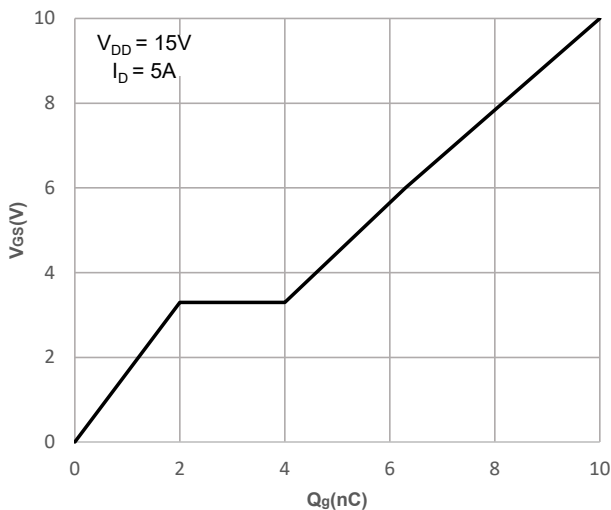


Figure 5: Gate Charge Characteristics

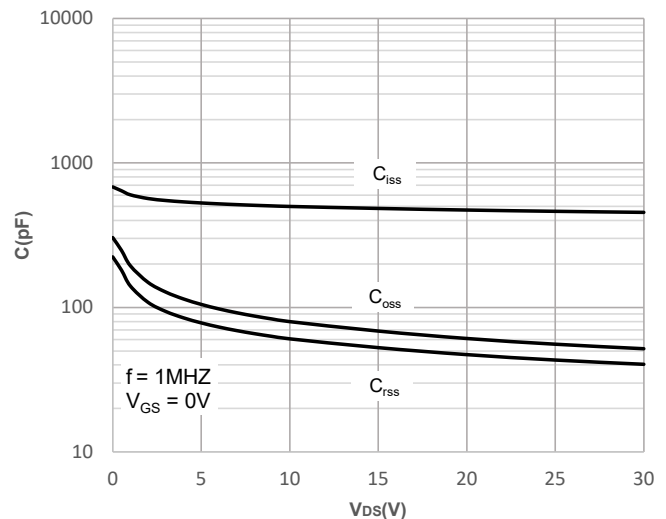


Figure 6: Capacitance Characteristics

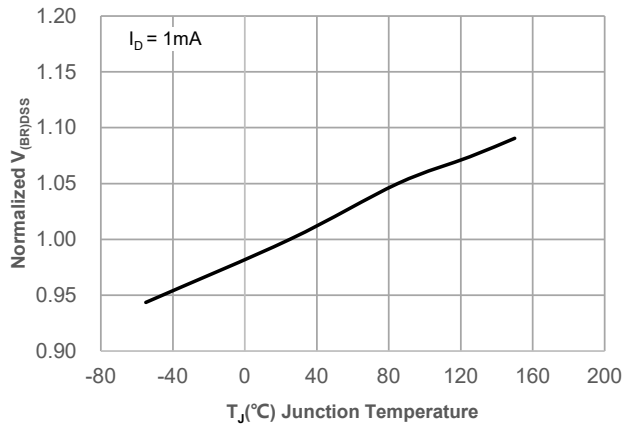


Figure 7: Normalized Breakdown voltage vs.

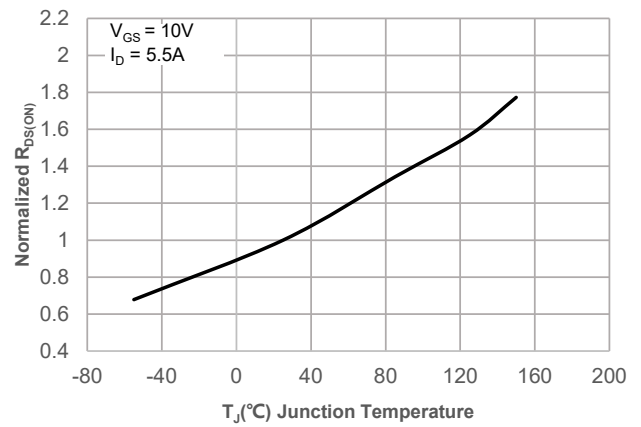


Figure 8: Normalized on Resistance vs.

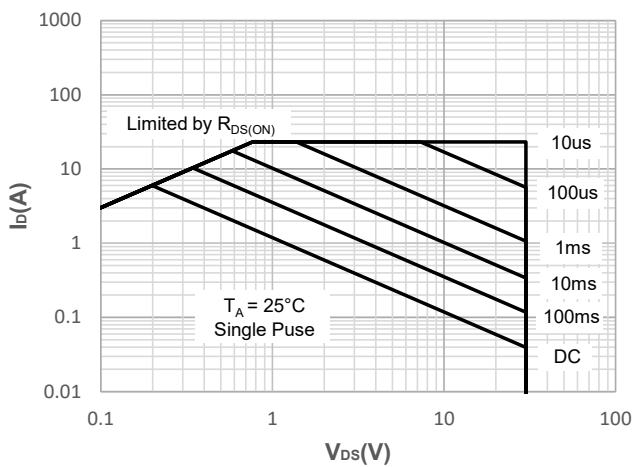


Figure 9: Maximum Safe Operating Area

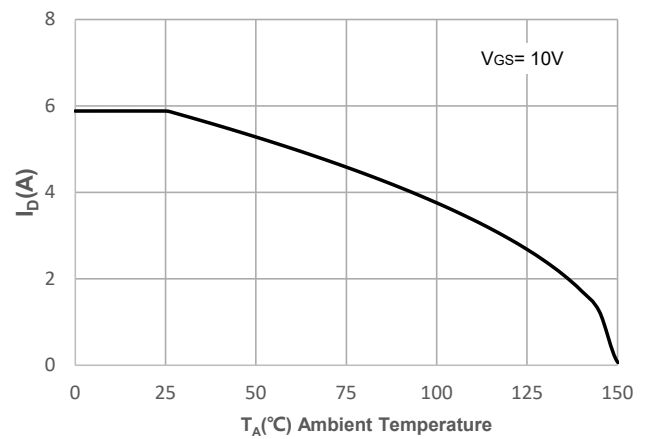


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

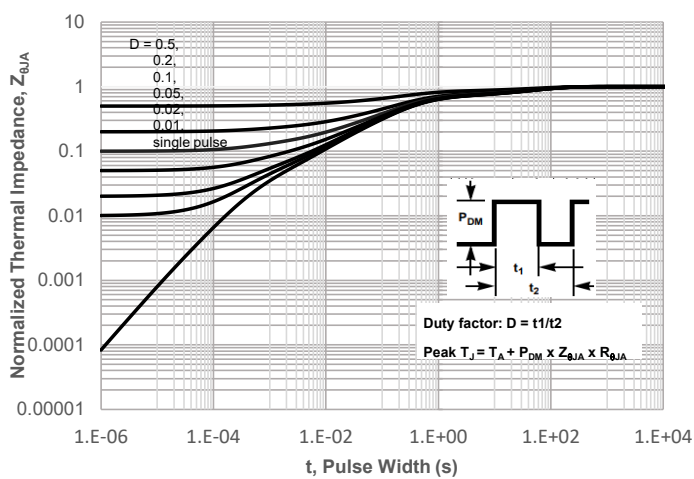


Figure 11: Normalized Maximum Transient Thermal Impedance

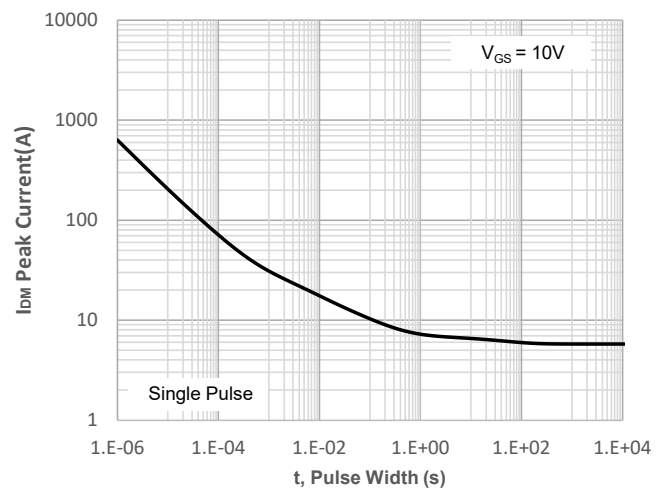


Figure 12: Peak Current Capacity

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)

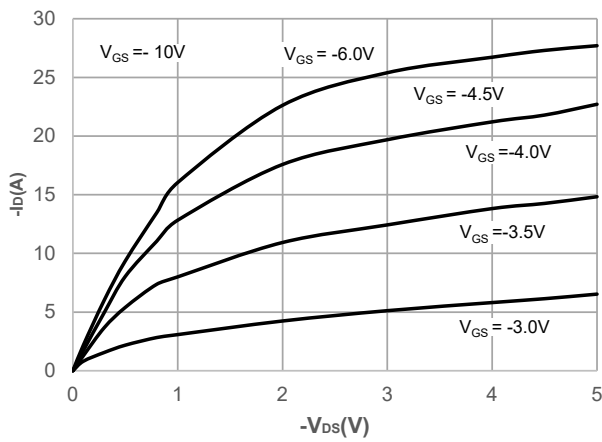


Figure 1: Output Characteristics

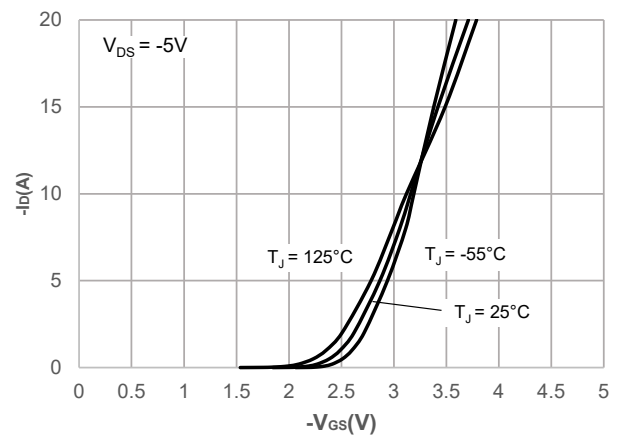


Figure 2: Typical Transfer Characteristics

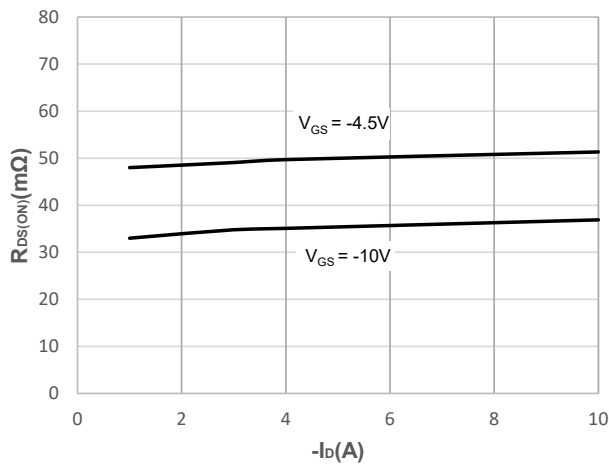


Figure 3: On-resistance vs. Drain Current

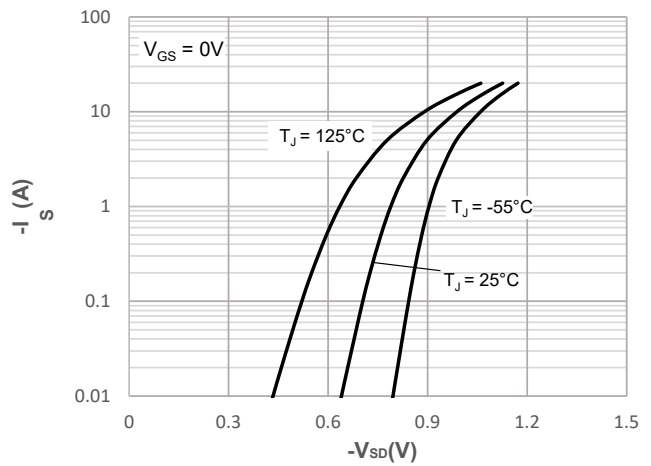


Figure 4: Body Diode Characteristics

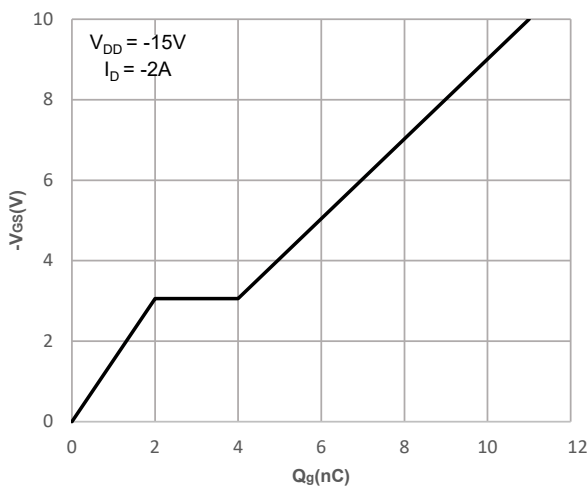


Figure 5: Gate Charge Characteristics

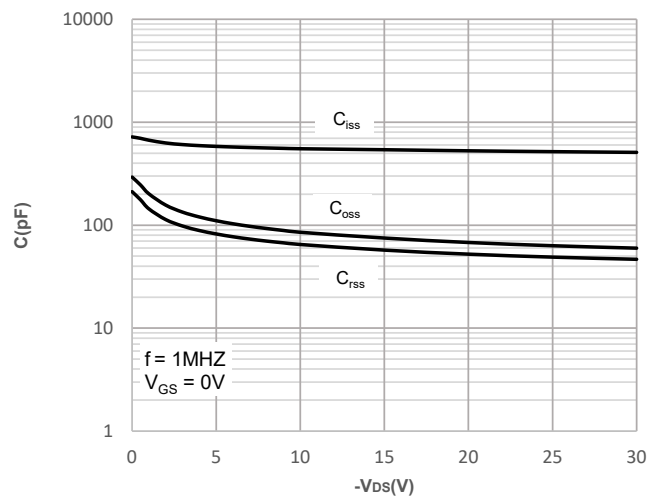


Figure 6: Capacitance Characteristics

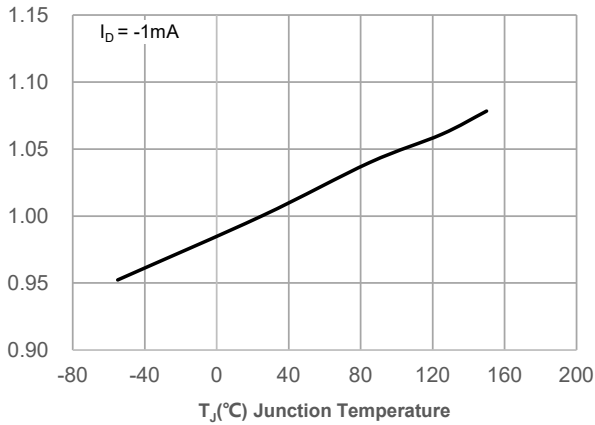


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

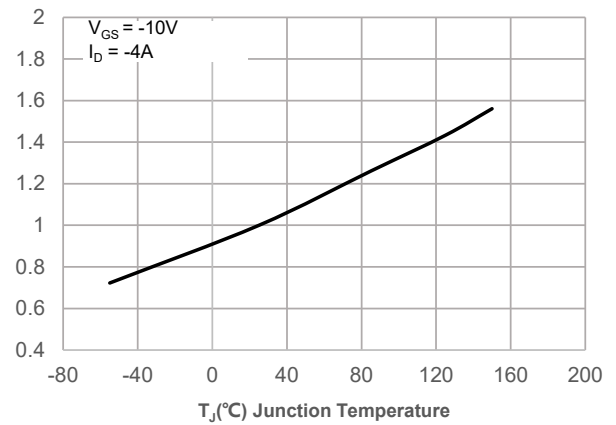


Figure 8: Normalized on Resistance vs. Junction Temperature

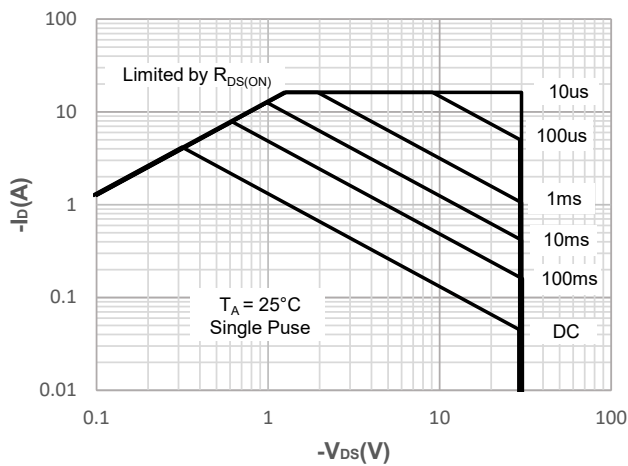


Figure 9: Maximum Safe Operating Area

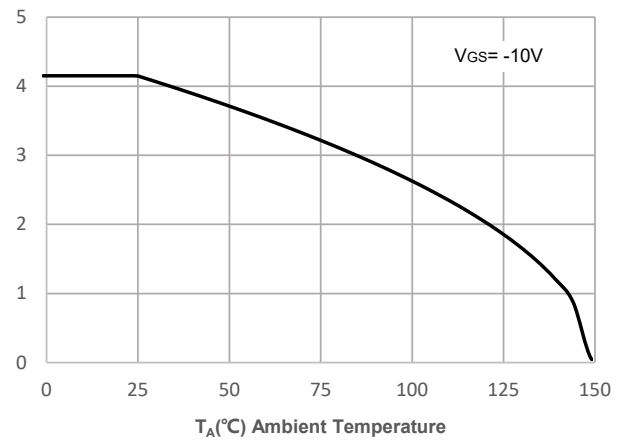


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

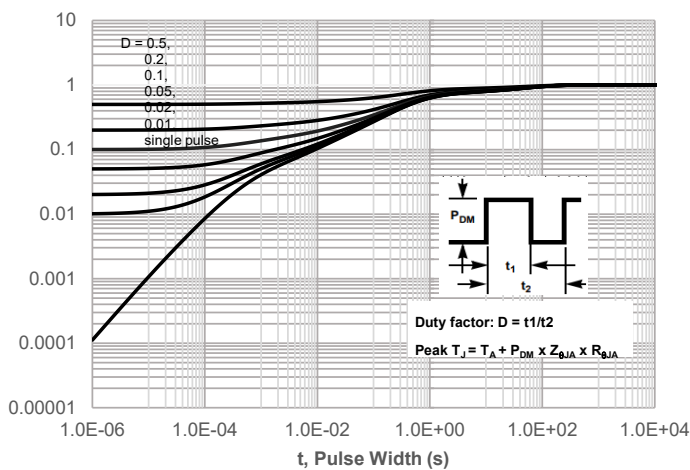


Figure 11: Normalized Maximum Transient Thermal Impedance

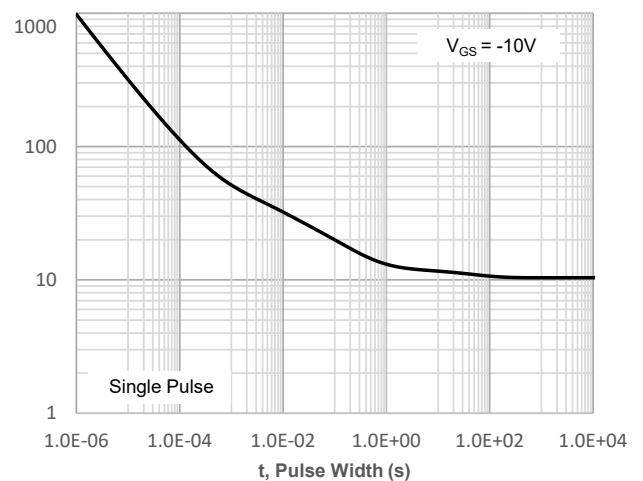
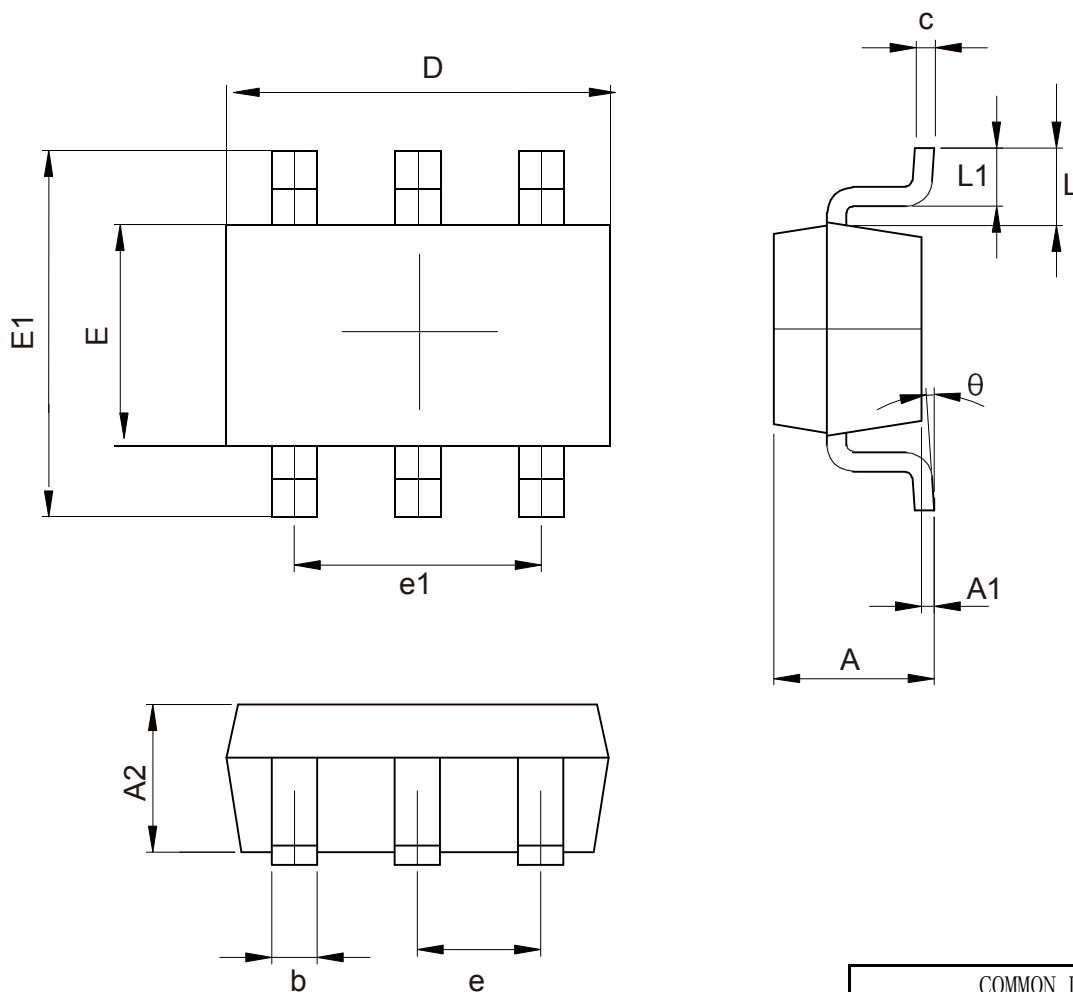


Figure 12: Peak Current Capacity

SOT-23-6D Package Outline Data

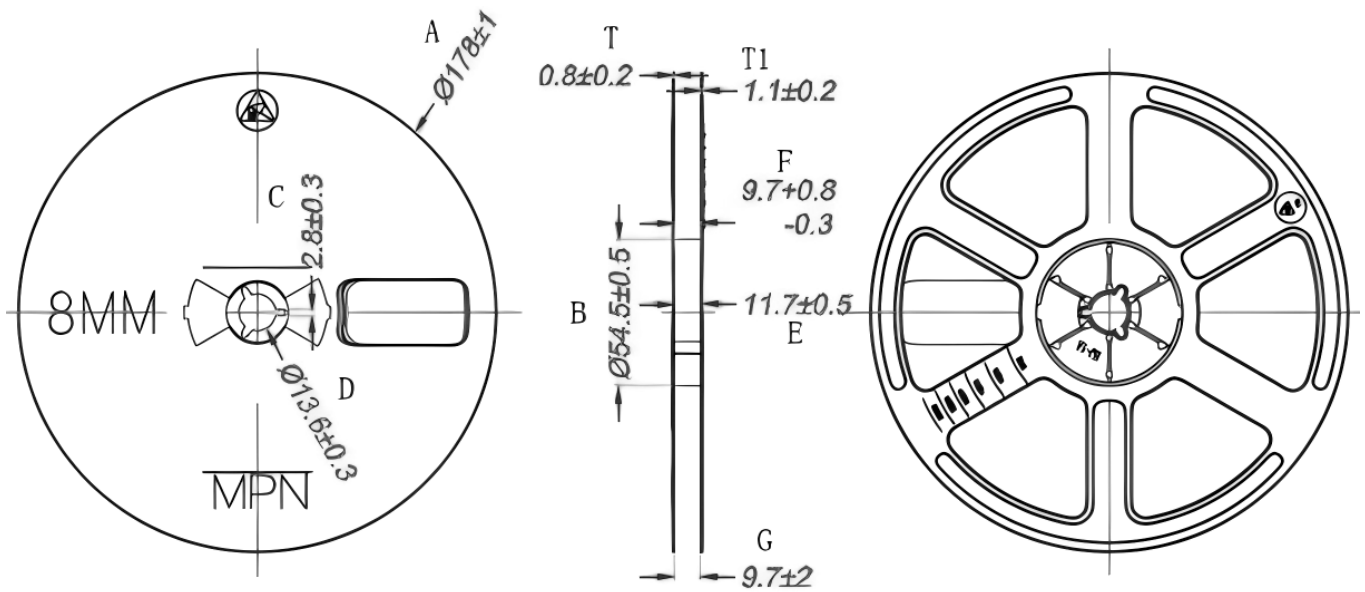


COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	1.050	—	1.300
A1	0.000	—	0.200
A2	1.050	—	1.200
b	0.300	0.400	0.500
c	0.100	—	0.200
D	2.820	2.900	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.6REF		
L1	0.300	0.450	0.600
θ	0°	—	8°

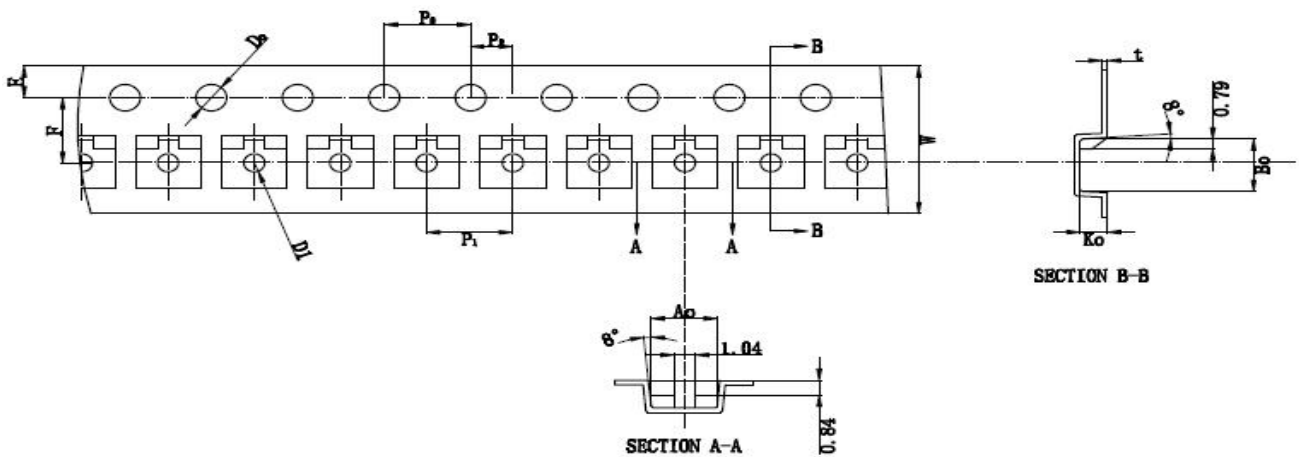
Unit:mm

Tape & Reel Information

Dimensions in mm

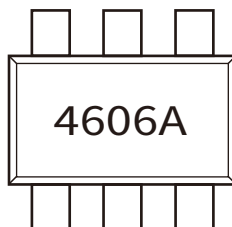


PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
SOT23-6	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00	3.13	3.22	1.30	0.20
Tolerance	± 0.2	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.2	± 0.1	± 0.1	± 0.1	± 0.1	± 0.03



Pulling direction 

Marking Information:



Previous Version

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

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