

N-Channel Enhancement Mode MOSFET

GENERAL DESCRIPTION

The PW2302A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application..

FEATURES

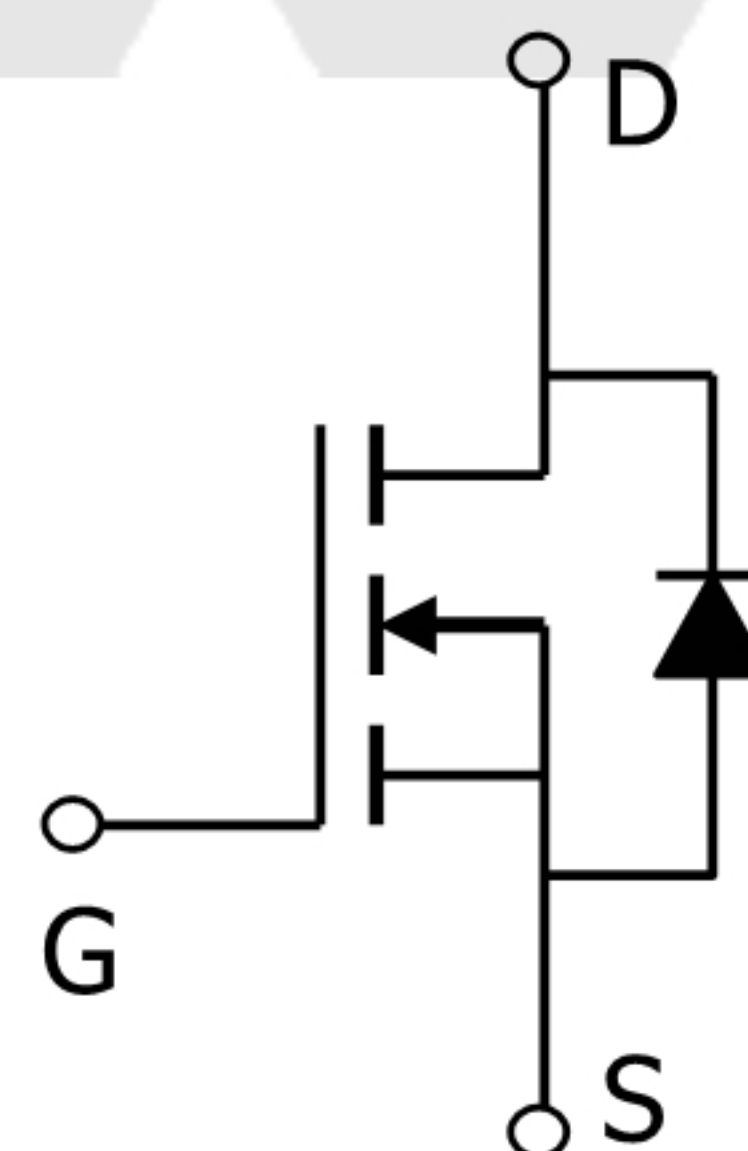
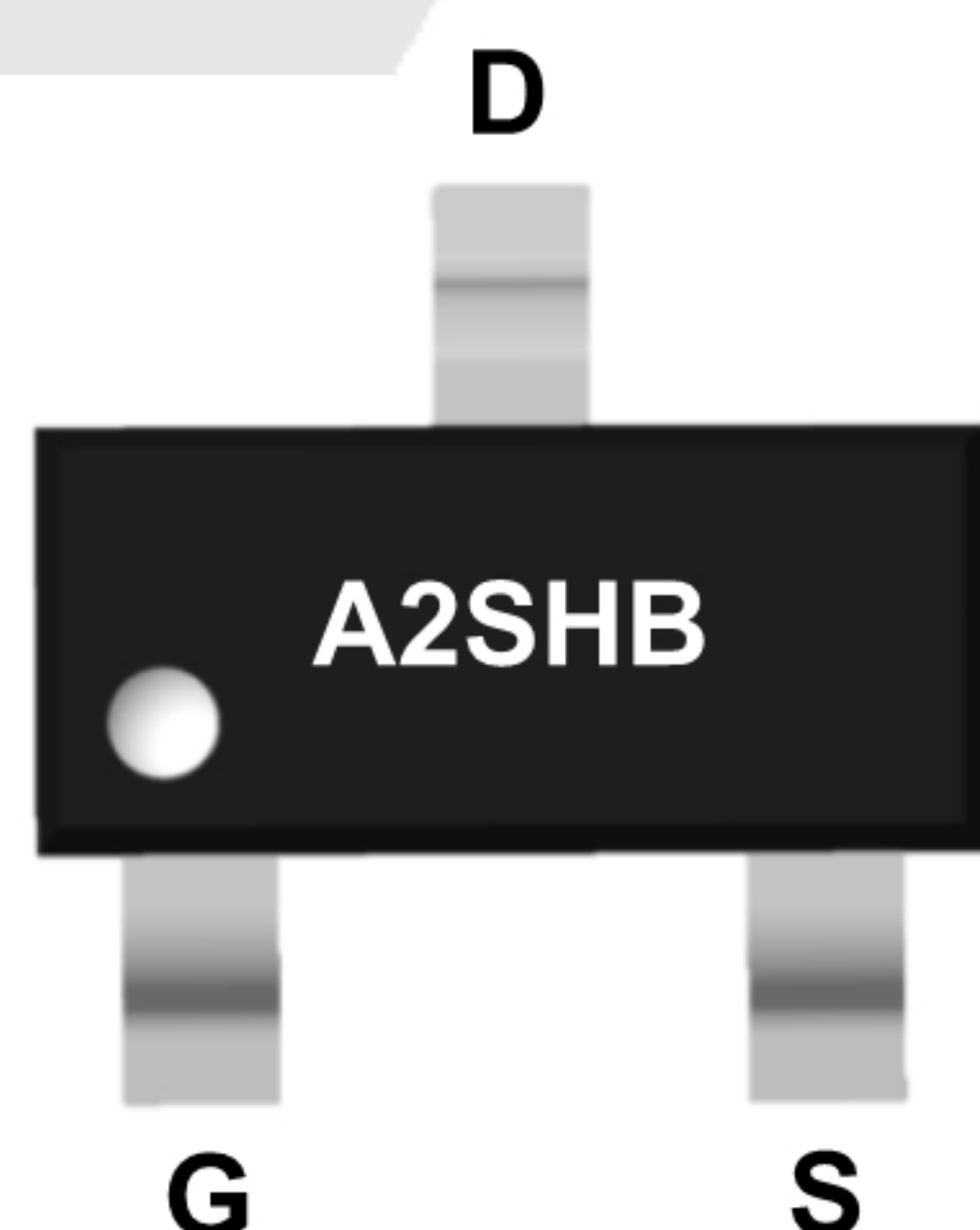
$V_{DS} = 20V$ $I_D = 3.2A$

$R_{DS(ON)} < 32m\Omega$ @ $V_{GS}=4.5V$

Available in a 3-Pin SOT23-3 Package



SOT-23-3L
(TOP VIEW)



Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current, $V_{GS} @ 4.5V$ ¹	$I_{D@TA=25^\circ C}$	3.2	A
Continuous Drain Current, $V_{GS} @ 4.5V$ ¹	$I_{D@TA=70^\circ C}$	2.8	A
Pulsed Drain Current ²	I_{DM}	14.4	A
Total Power Dissipation ³	$P_D @ TA=25^\circ C$	1	W
Storage Temperature Range	T_{STG}	-55 To 150	°C
Operating Junction Temperature Range	T_J	-55 To 150	°C
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	125	°C/W
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	80	

ELECTRICAL CHARACTERISTICS

(TA = 25°C, unless otherwise noted.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	20	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V , I _D =3A	---	23	32	mΩ
		V _{GS} =2.5V , I _D =2A	---	29	35	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.4	0.7	1.2	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =16V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =16V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =3A	---	10.5	---	S
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V , V _{GS} =4.5V , I _D =3A	---	4.6	---	nC
Q _{gs}	Gate-Source Charge		---	0.7	---	
Q _{gd}	Gate-Drain Charge		---	1.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =10V , V _{GS} =4.5V , R _G =3.3Ω I _D =3A	---	1.6	---	ns
T _r	Rise Time		---	42	---	
T _{d(off)}	Turn-Off Delay Time		---	14	---	
T _f	Fall Time		---	7	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	310	---	pF
C _{oss}	Output Capacitance		---	49	---	
C _{rss}	Reverse Transfer Capacitance		---	35	---	
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V , Force Current	---	---	3.6	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

Note :

- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、 The power dissipation is limited by 150°C junction temperature
- 4、 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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Typical Characteristics

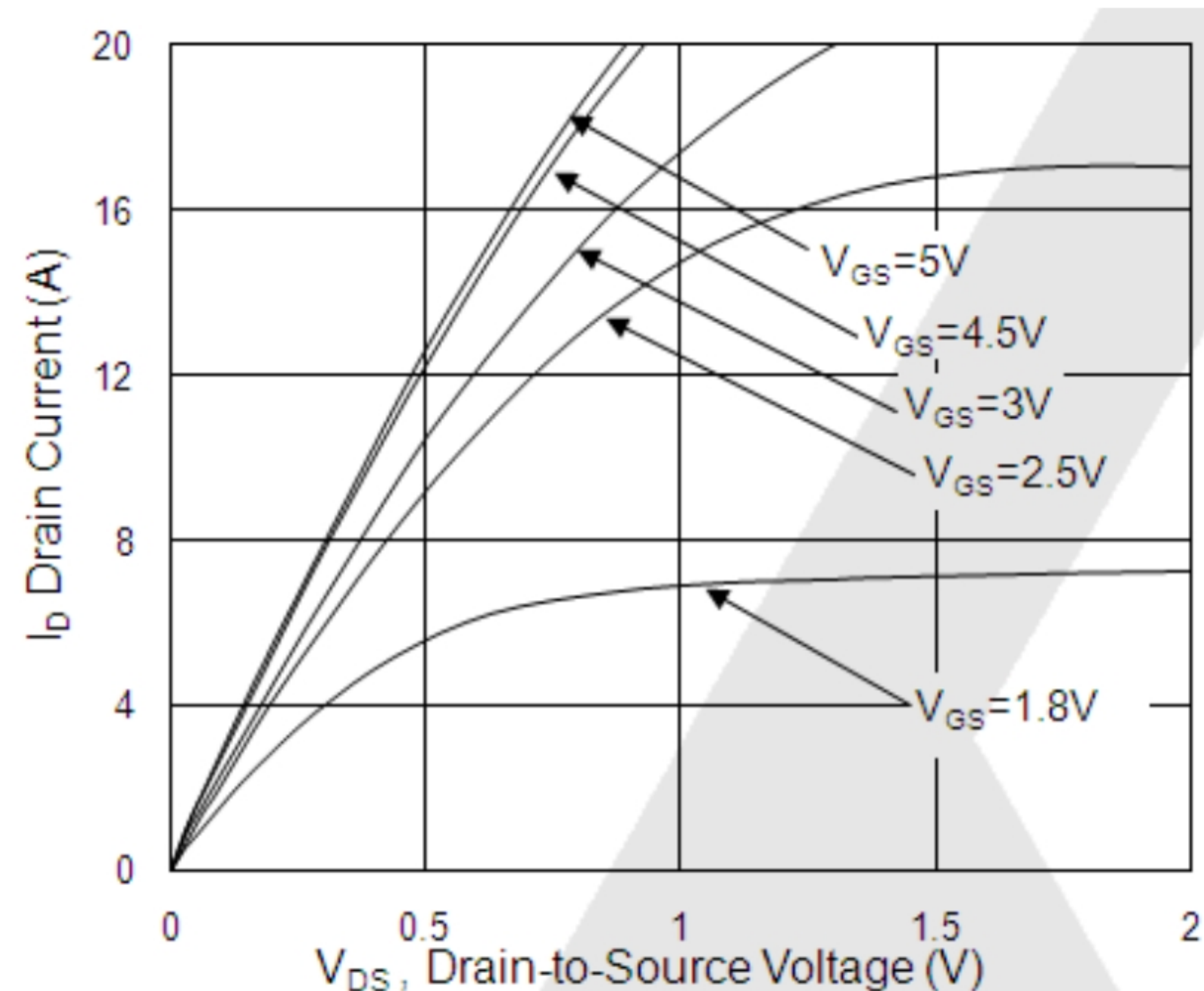


Fig.1 Typical Output Characteristics

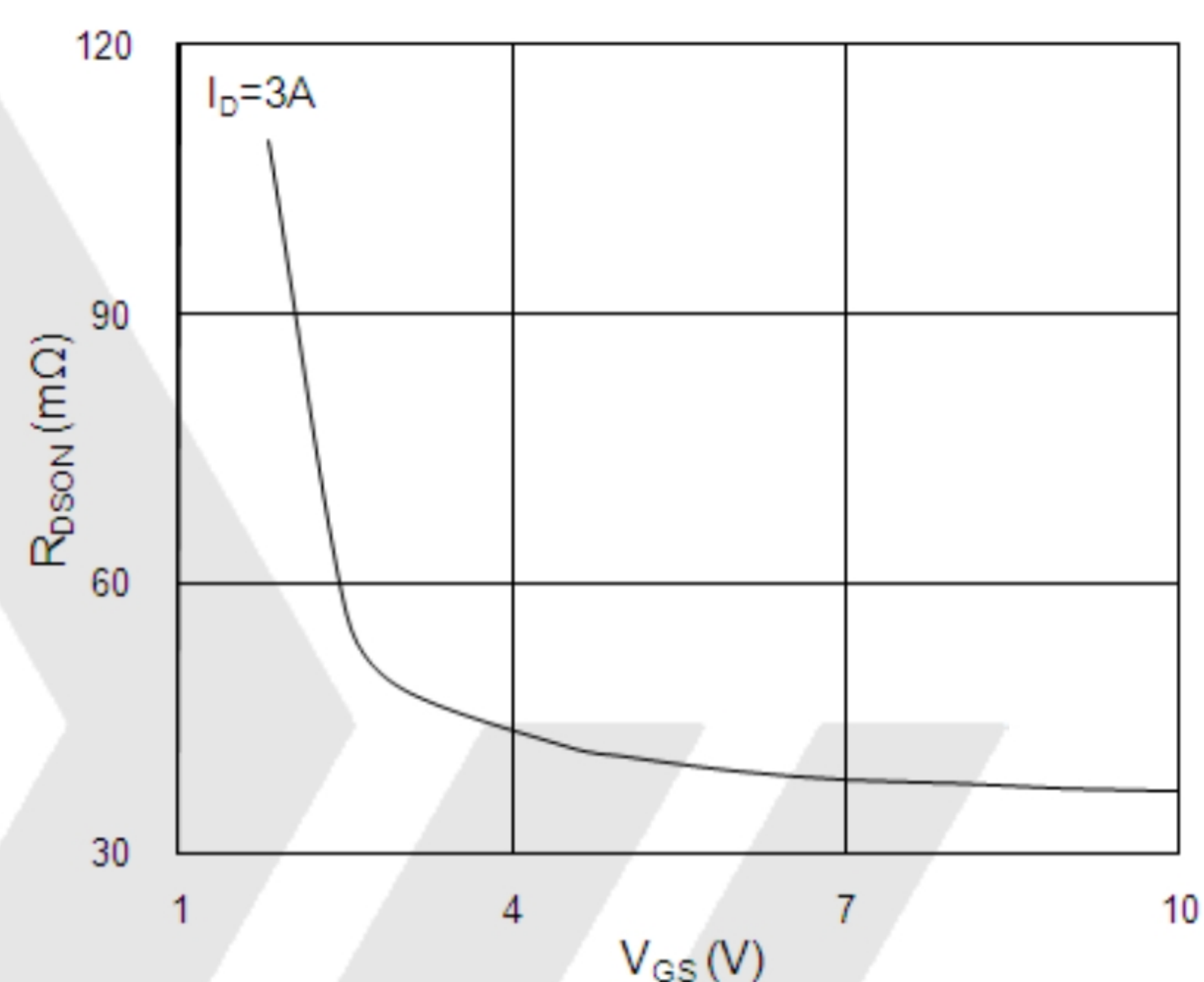


Fig.2 On-Resistance vs. G-S Voltage

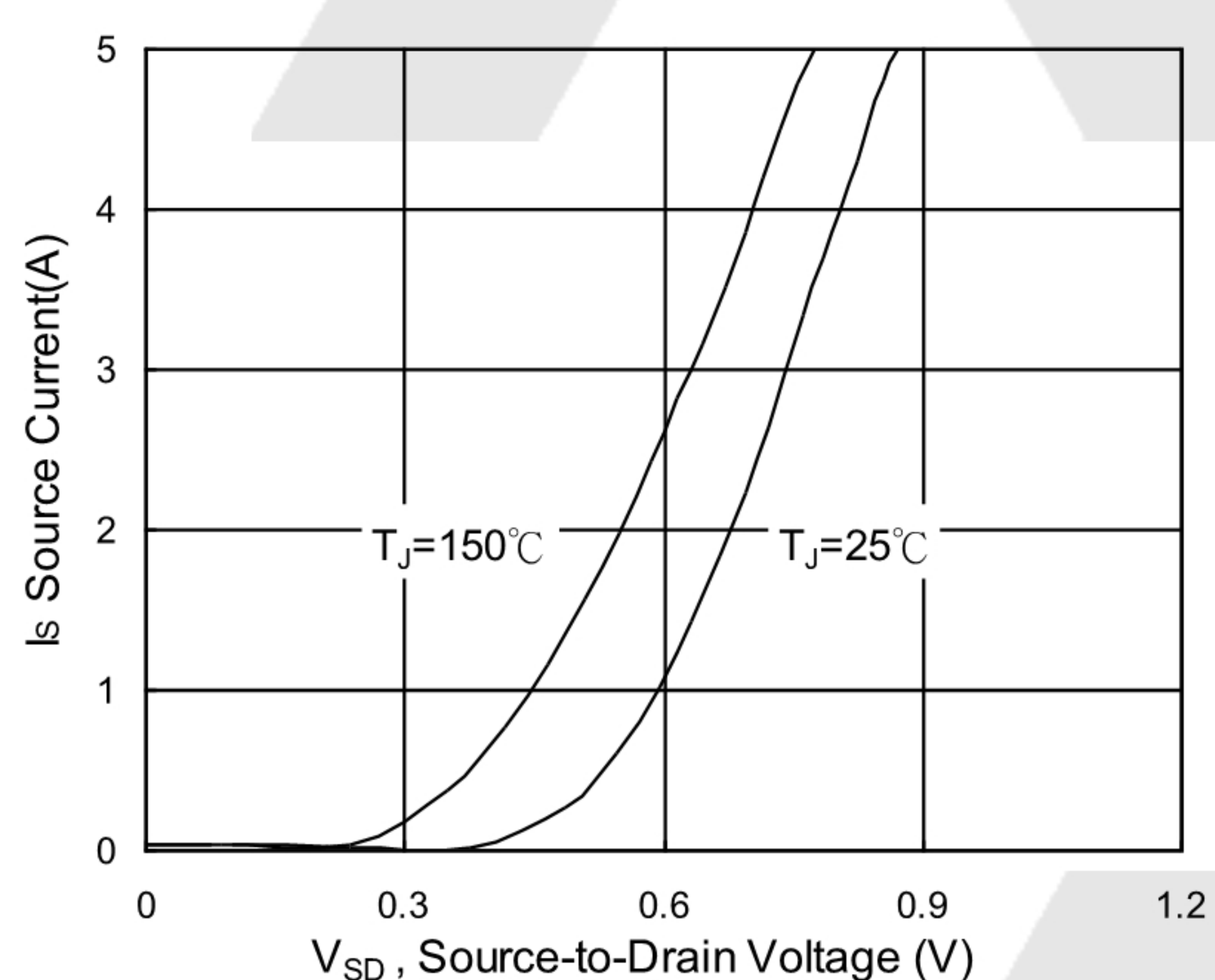


Fig.3 Source Drain Forward Characteristics

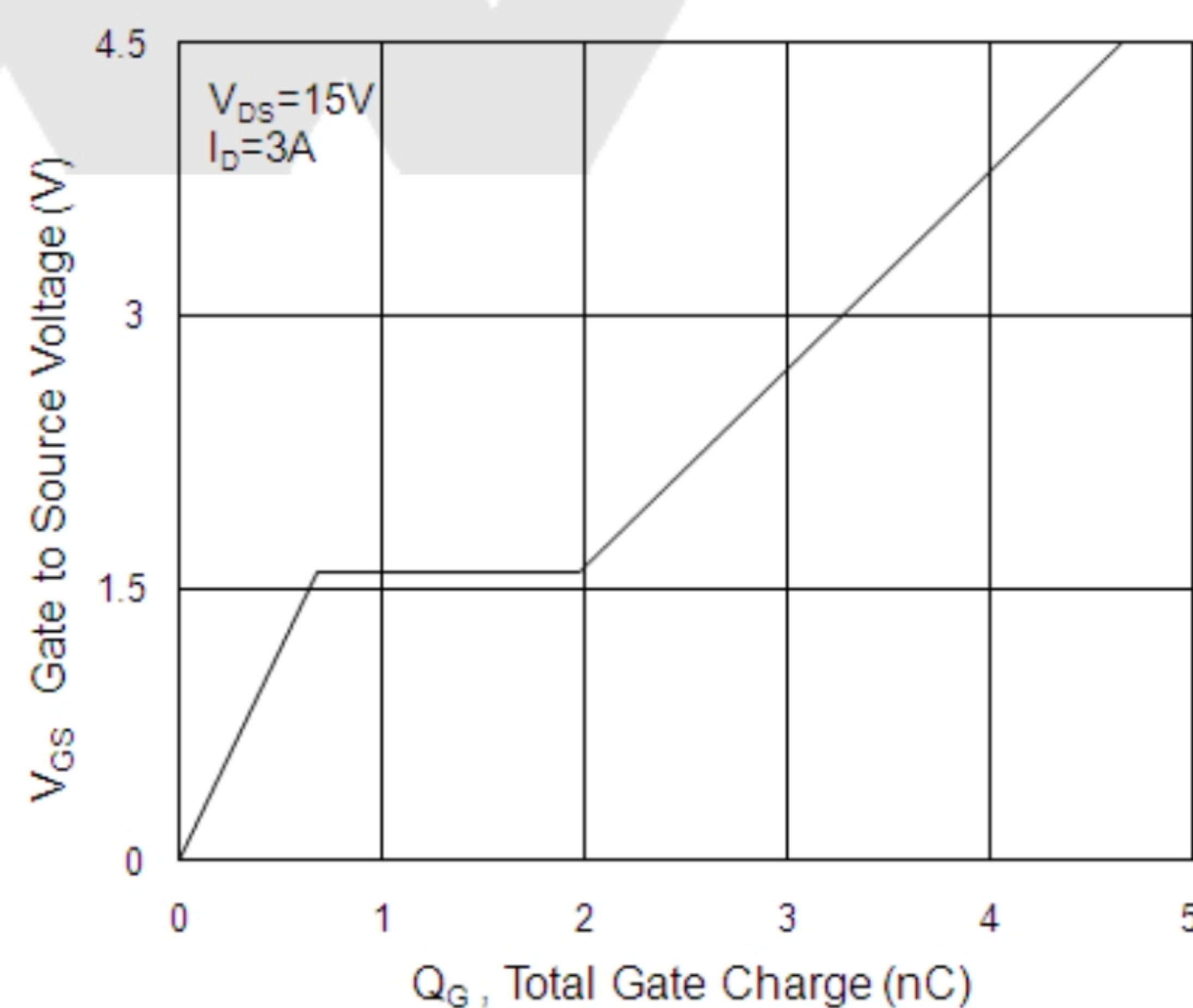


Fig.4 Gate-Charge Characteristics

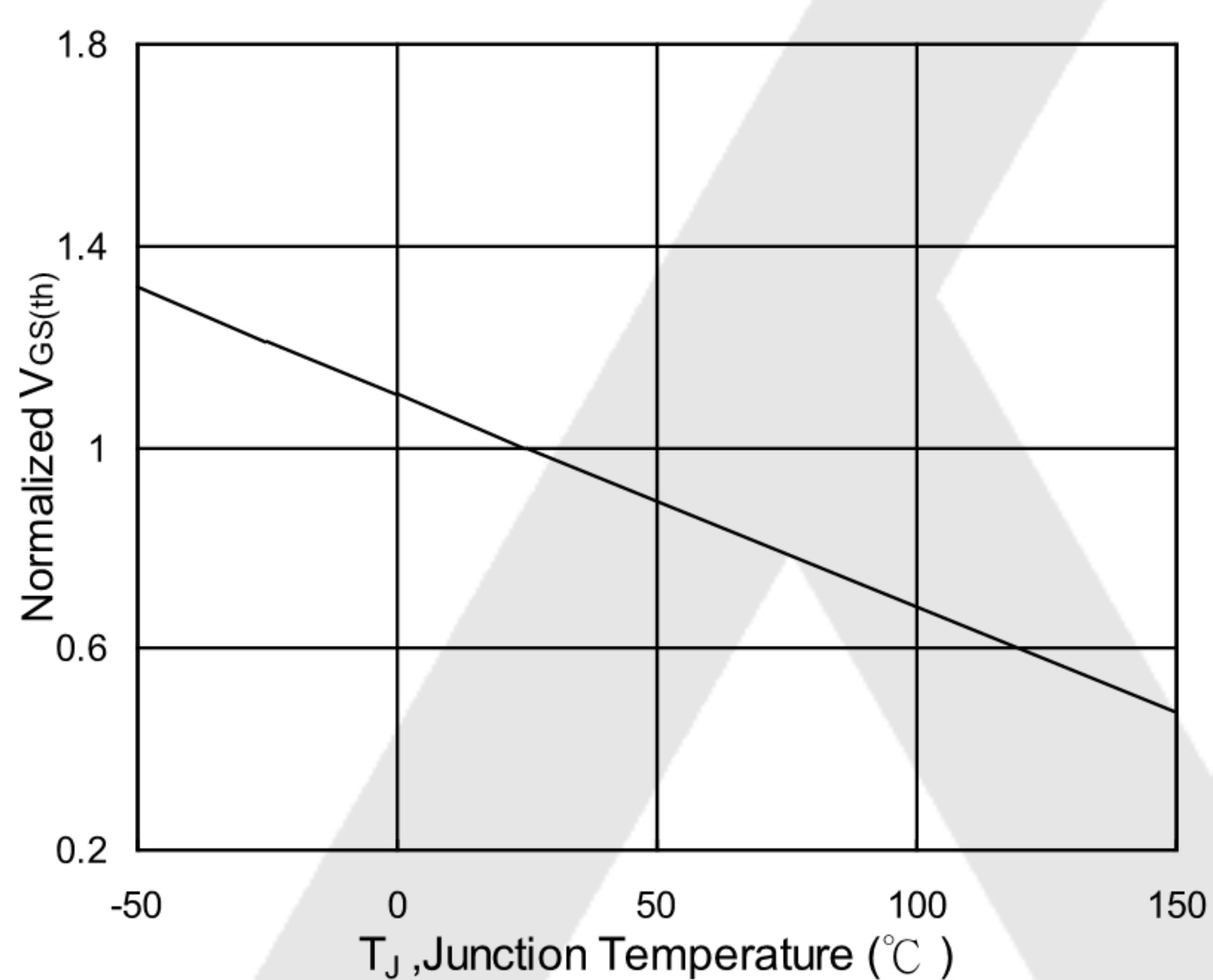


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

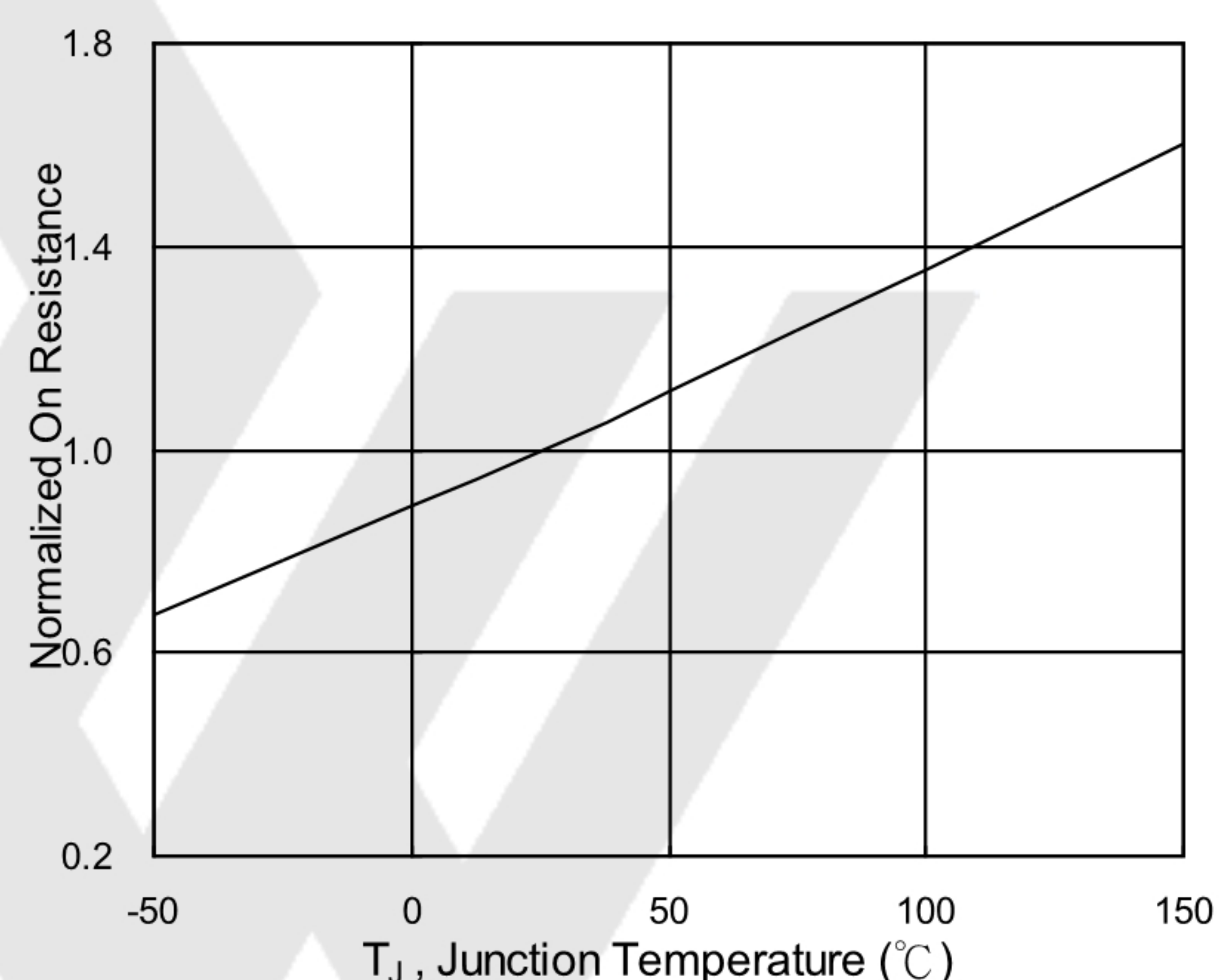


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

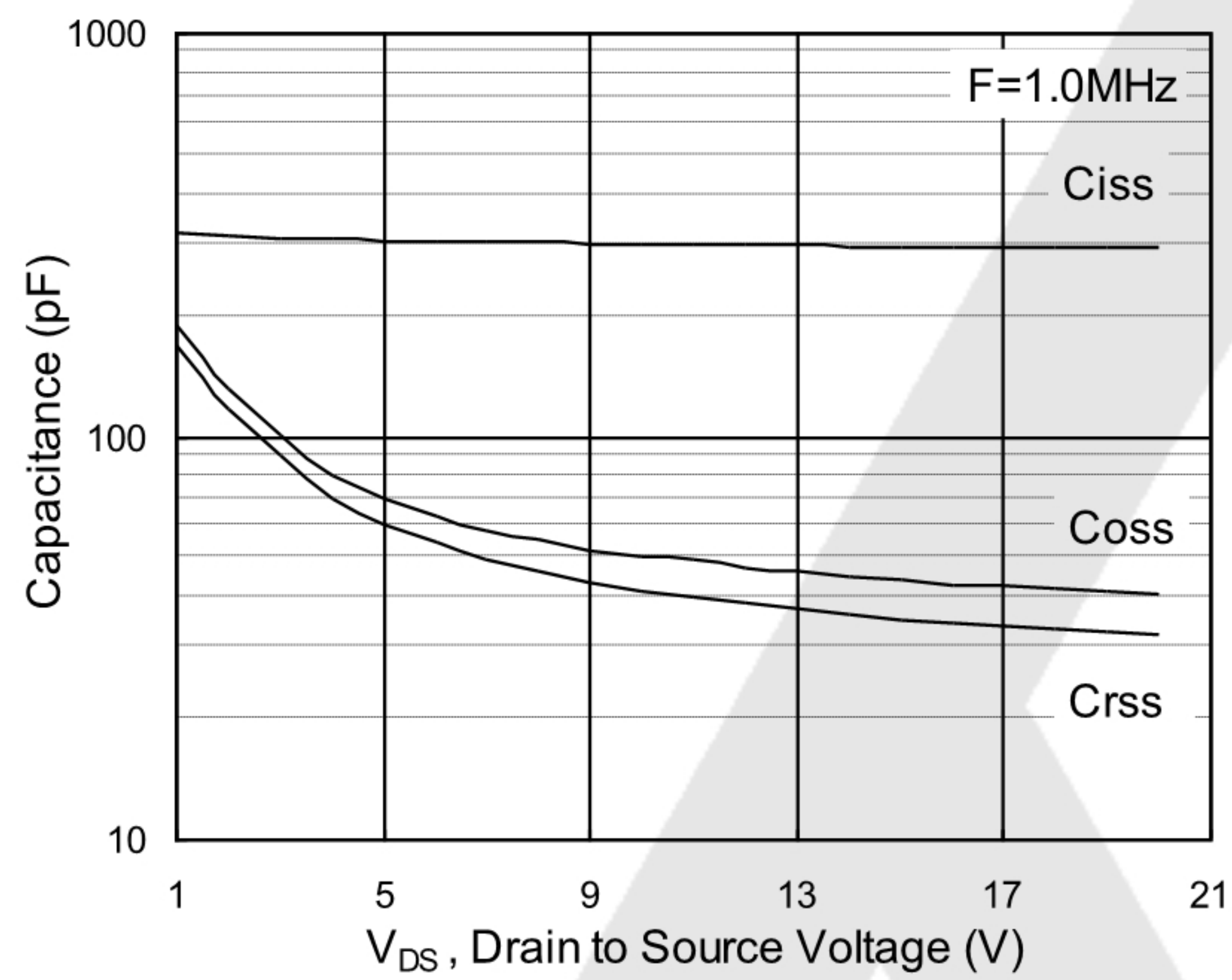


Fig.7 Capacitance

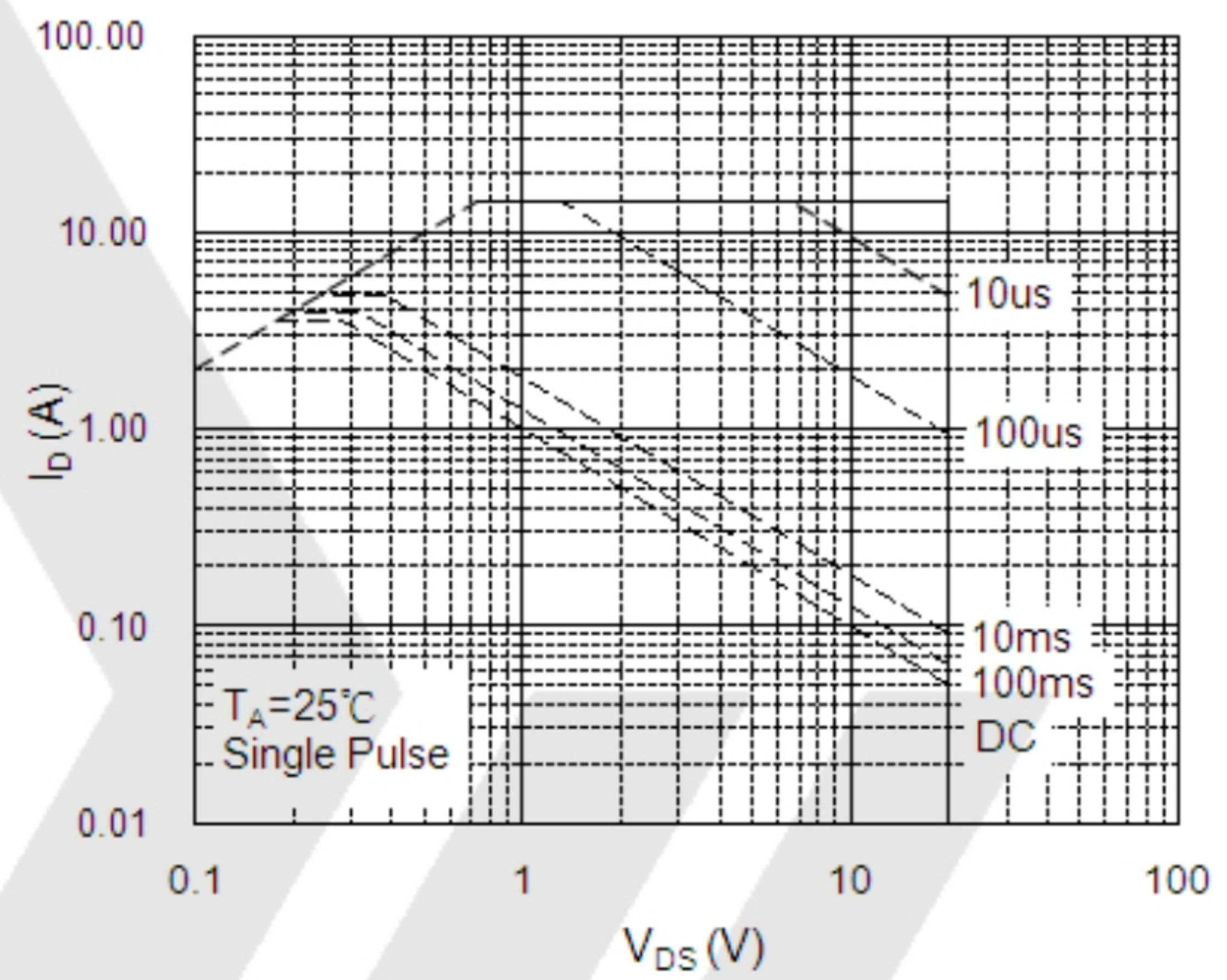


Fig.8 Safe Operating Area

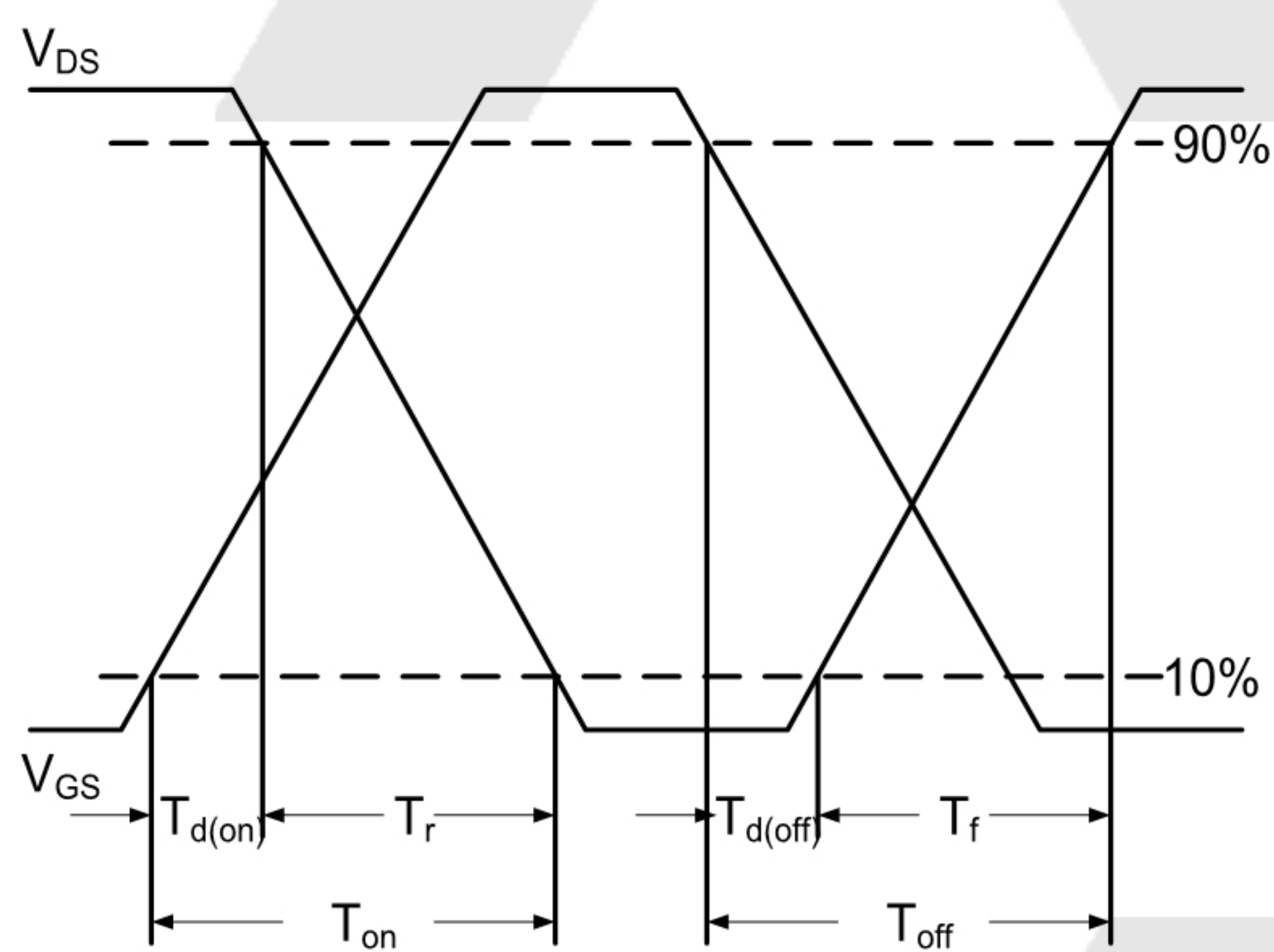


Figure 9 Switching Time Waveform

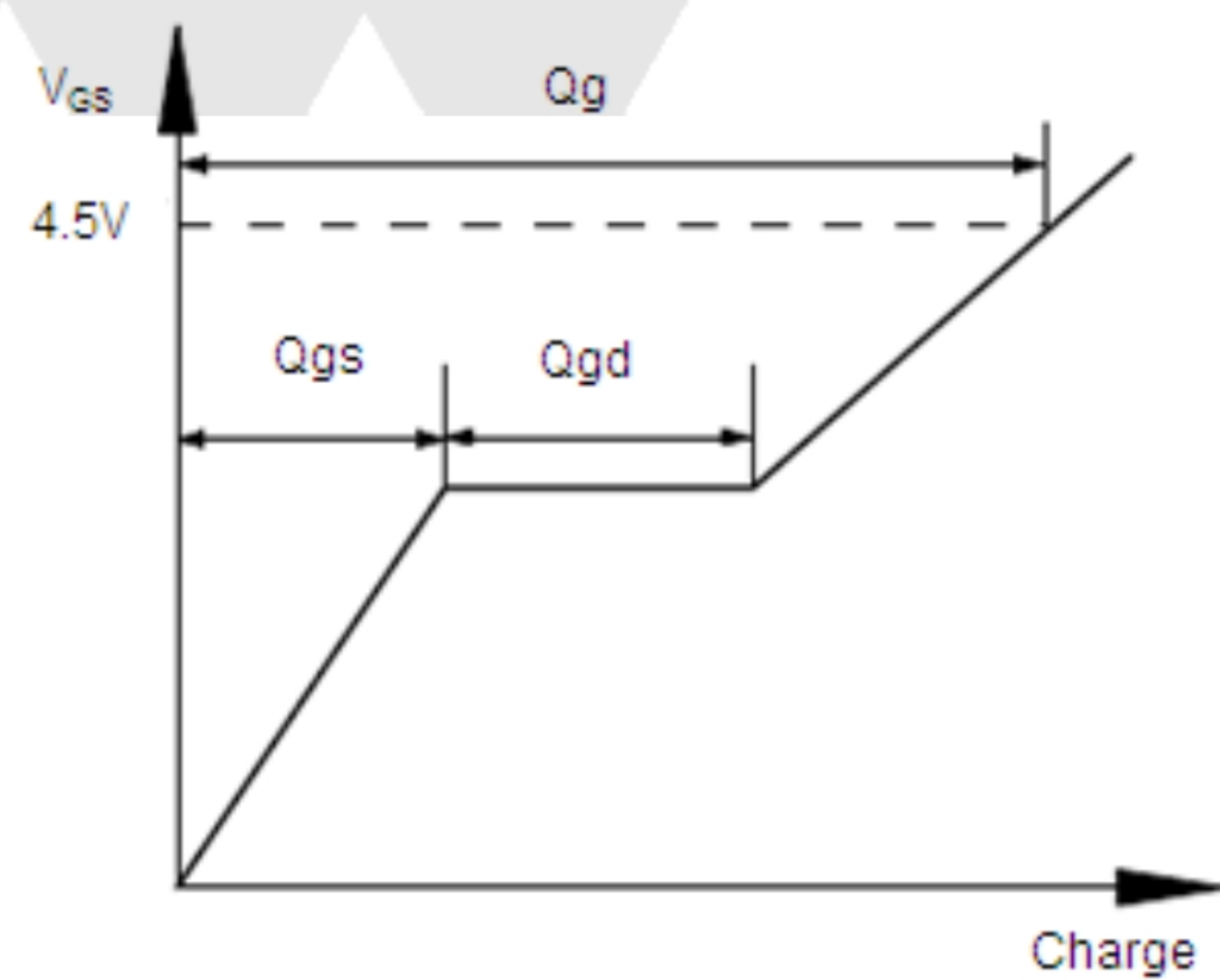


Figure 10 Gate Charge Waveform

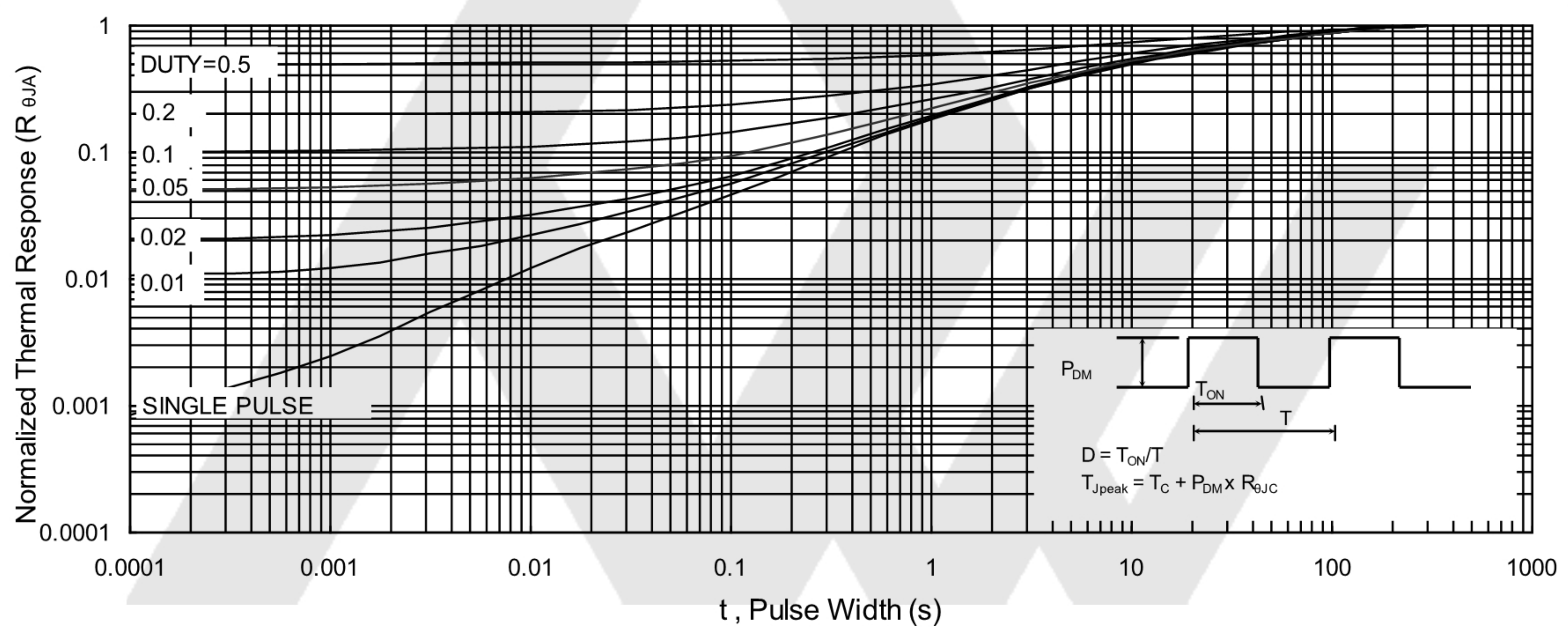
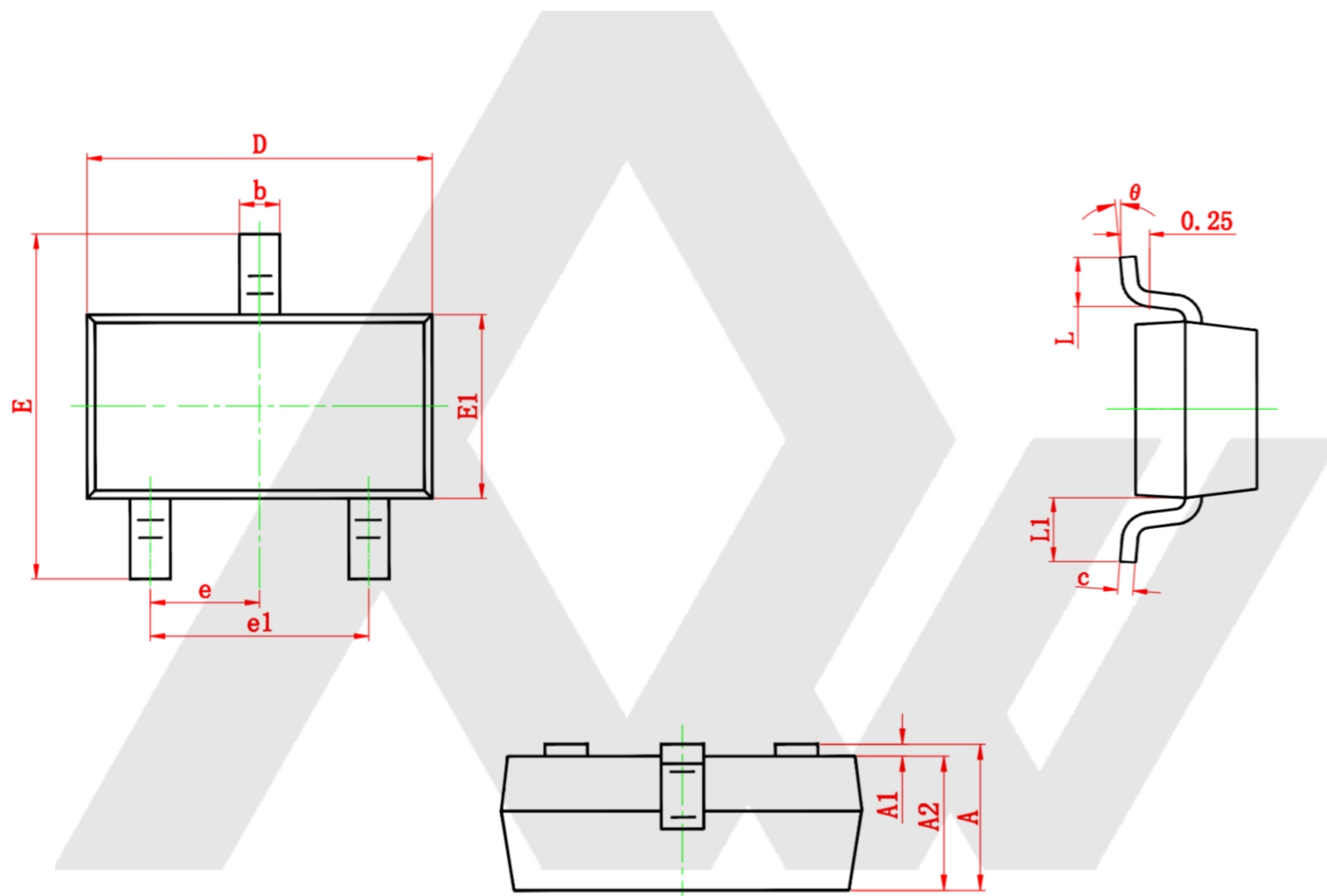


Figure 11 Normalized Maximum Transient Thermal Impedance

PACKAGE DESCRIPTION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
L1	0.550 REF.		0.022 REF.	
θ	0°	8°	0°	8°

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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