

N-Channel Enhancement Mode MOSFET

GENERAL DESCRIPTION

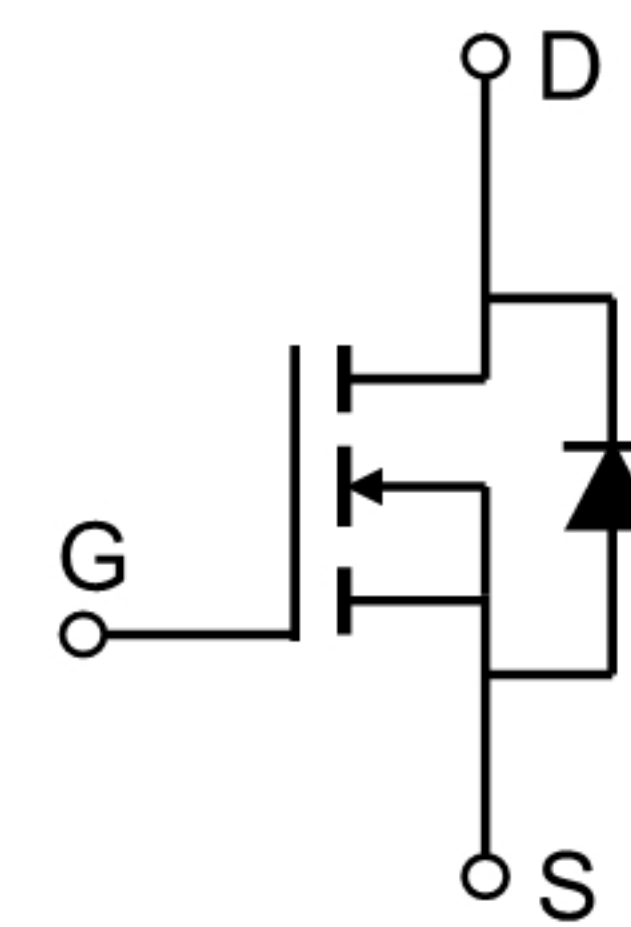
The PW4406A uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications

FEATURES

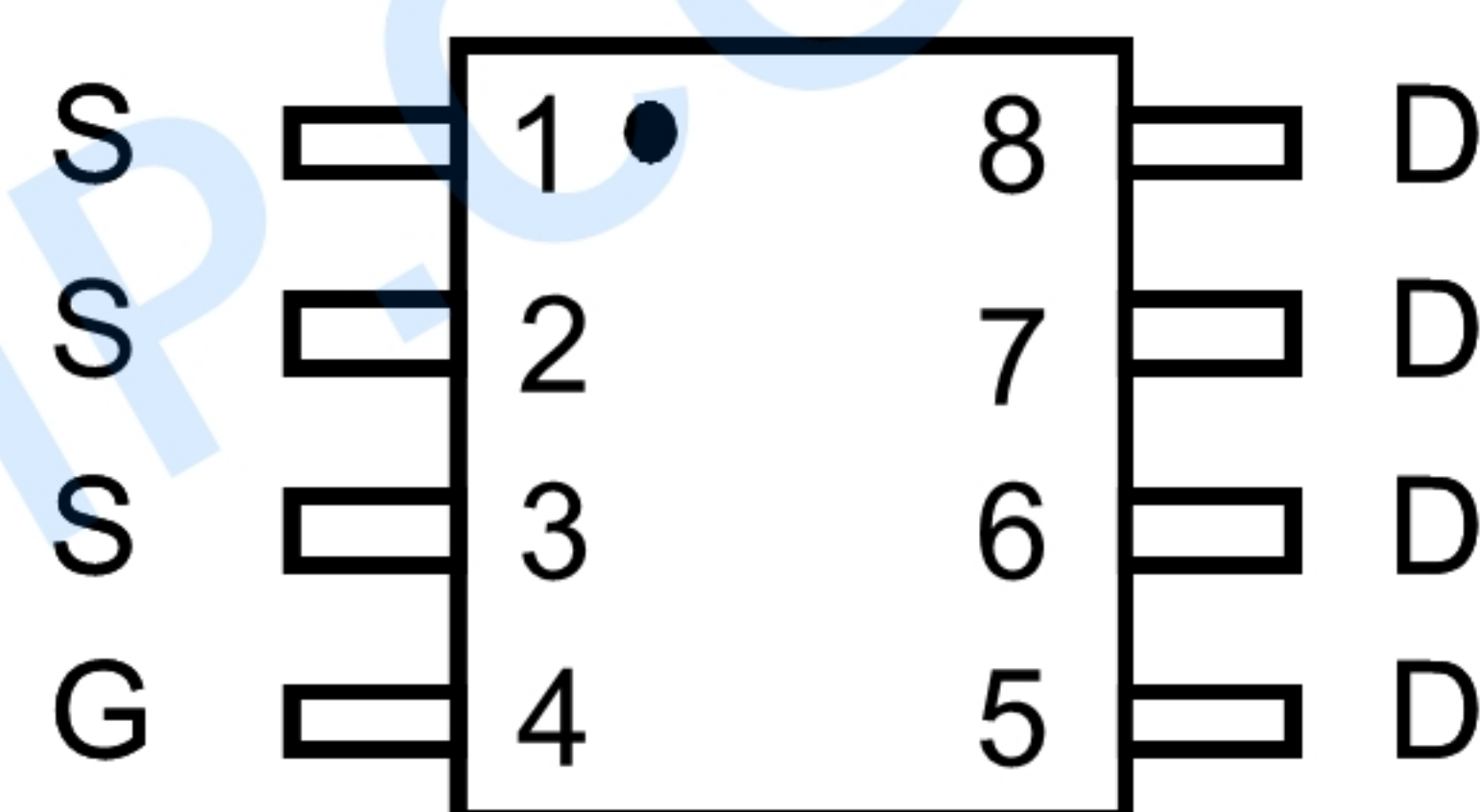
$V_{DS} = 30V$ $I_D = 13A$

$R_{DS(ON)} < 9.5m\Omega$ @ $V_{GS}=10V$

Available in a 8-Pin SOP Package



Top View



Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	13	A
Pulsed Drain Current	I_{DM}	52	A
Total Power Dissipation	PD	1.6	W
Storage Temperature Range	T_{STG}	-55 To 150	$^{\circ}C$
Operating Junction Temperature Range	T_J	-55 To 150	$^{\circ}C$
Thermal Resistance Junction-ambient ^{NOTE2}	$R_{\theta JA}$	77	$^{\circ}C/W$
Single pulse avalanche energy ^{NOTE5}	E_{AS}	36	mJ

ELECTRICAL CHARACTERISTICS

(TA = 25°C, unless otherwise noted.)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Gate Threshold Voltage (Note 3)	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.6	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =13A		9.5	12	mΩ
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =10A		14.5	20	mΩ
Input Capacitance (Note4)	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz		1002		PF
Output Capacitance	C _{oss}			131		PF
Reverse Transfer Capacitance	C _{rss}			105		PF
Turn-on Delay Time (Note 4)	t _{d(on)}	V _{DD} =15V, I _D =13A V _{GS} =10V, R _{GEN} =3Ω		6		nS
Turn-on Rise Time	t _r			19		nS
Turn-Off Delay Time	t _{d(off)}			22		nS
Turn-Off Fall Time	t _f			5		nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =13A, V _{GS} =0 to 10V		20		nC
Gate-Source Charge	Q _{gs}			4		nC
Gate-Drain Charge	Q _{gd}			5		nC
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =13A			1.2	V
Diode Forward Current (Note 2)	I _S				13	A
Maximum Pulsed Drain to Source Diode Forward Current	I _{SM}				52	A
Body Diode Reverse Recovery Time	t _{rr}	I _F =13A, di/dt=100A/μs		8		ns
Body Diode Reverse Recovery Charge	Q _{rr}			2		nC

Note :

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.
4. EAS condition: T_j=25°C, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25Ω

Typical Electrical and Thermal Characteristics (Curves)

Figure 1: Output Characteristics

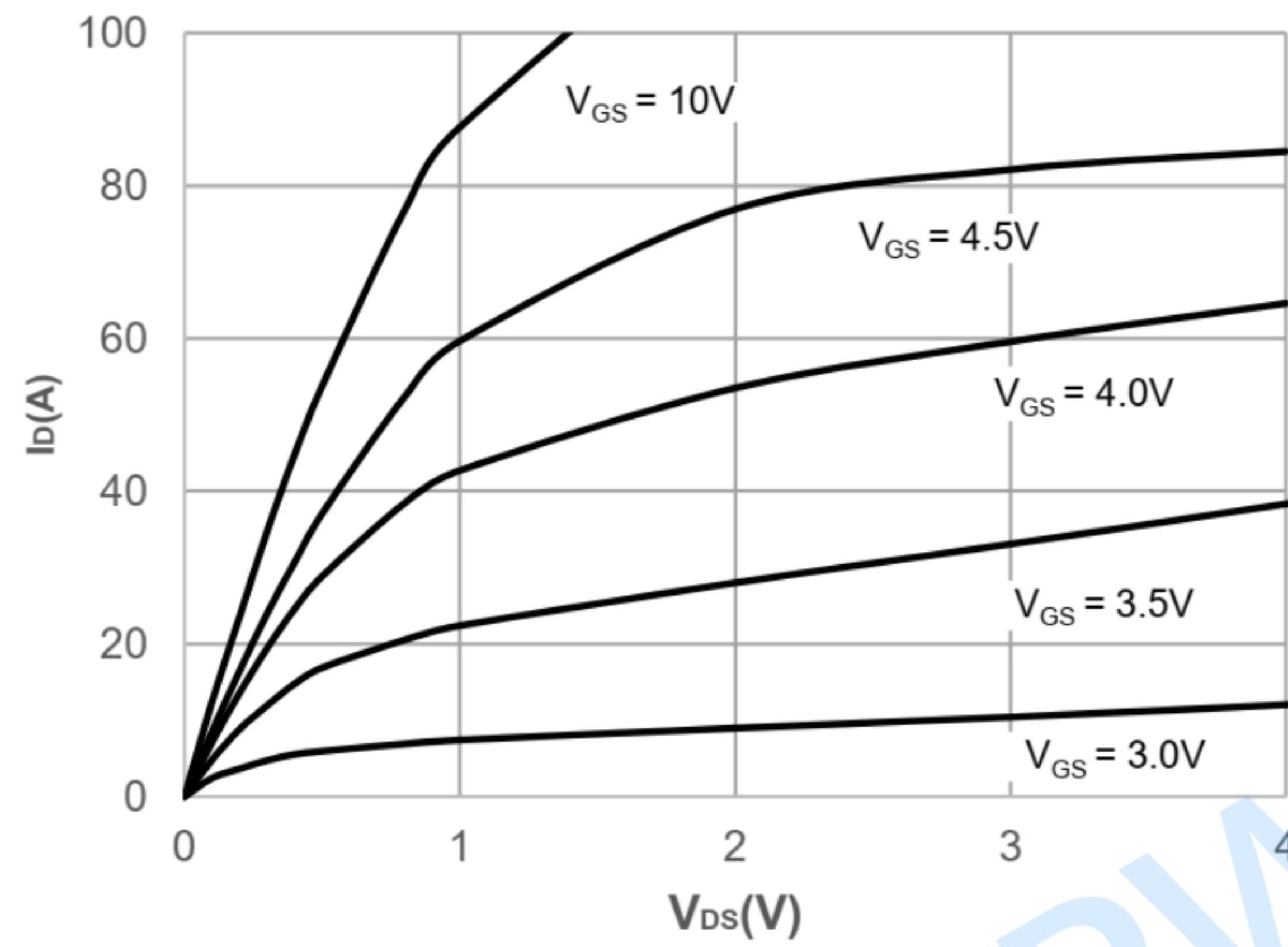


Figure 2: Typical Transfer Characteristics

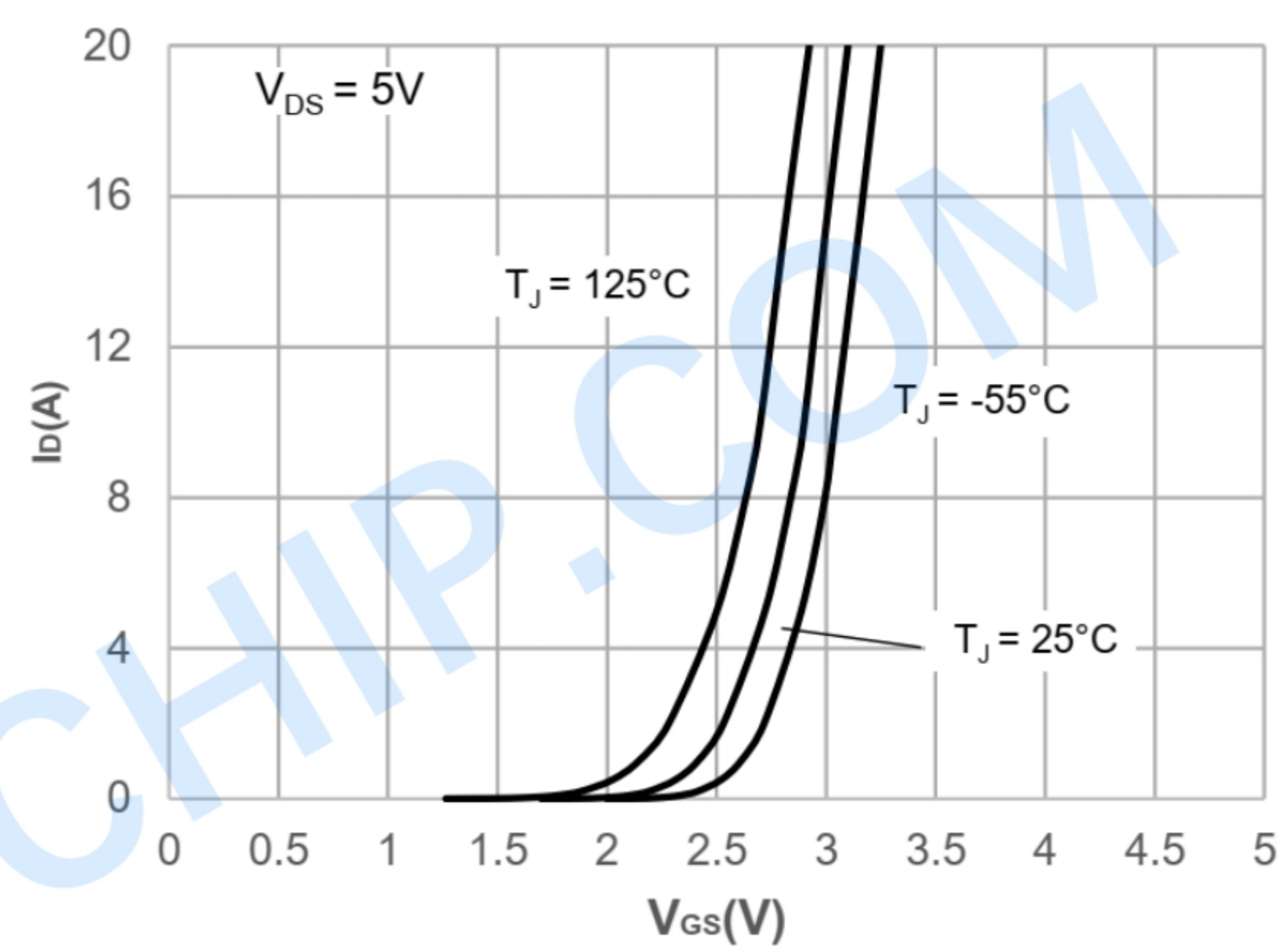


Figure 3: On-resistance vs. Drain Current

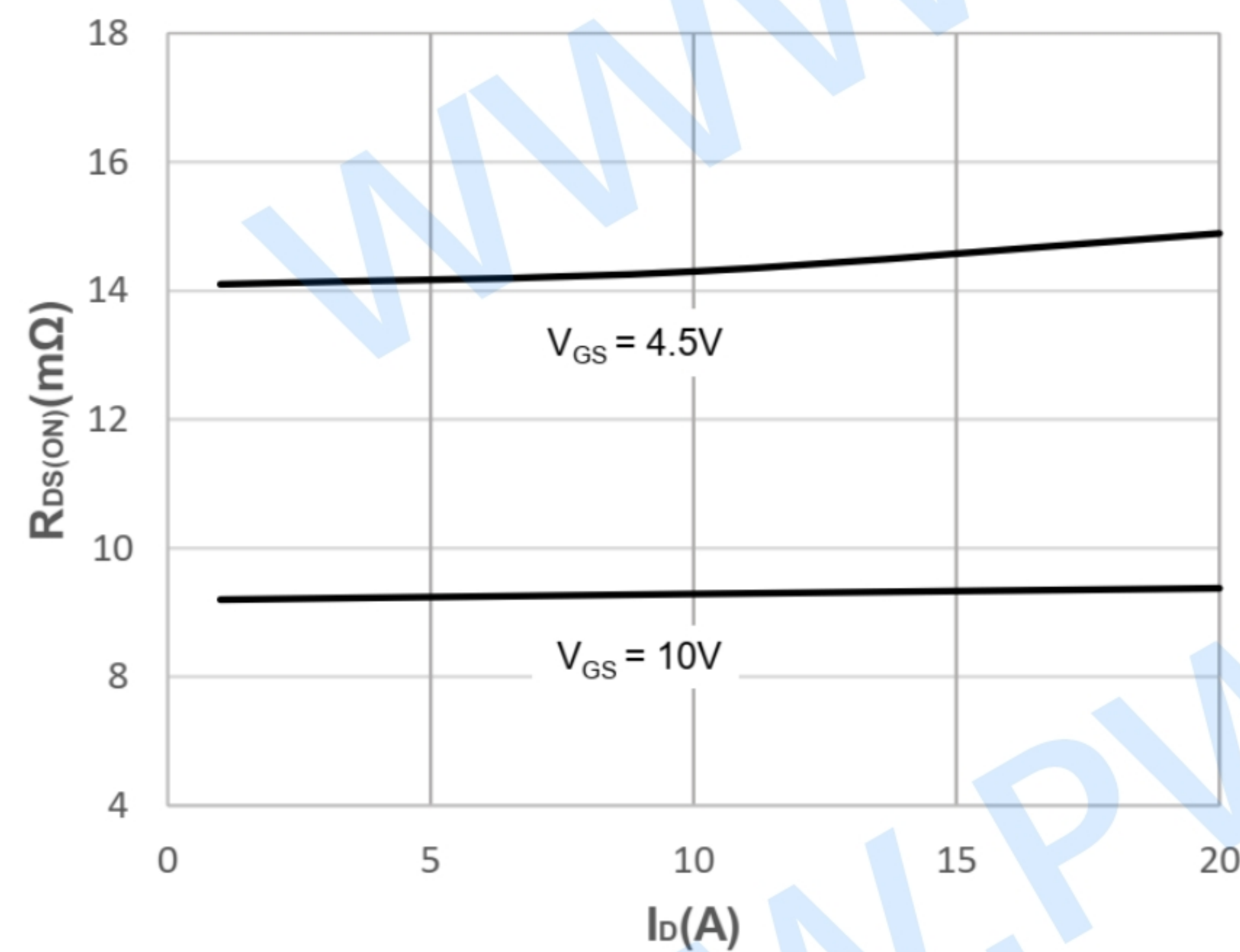


Figure 4: Body Diode Characteristics

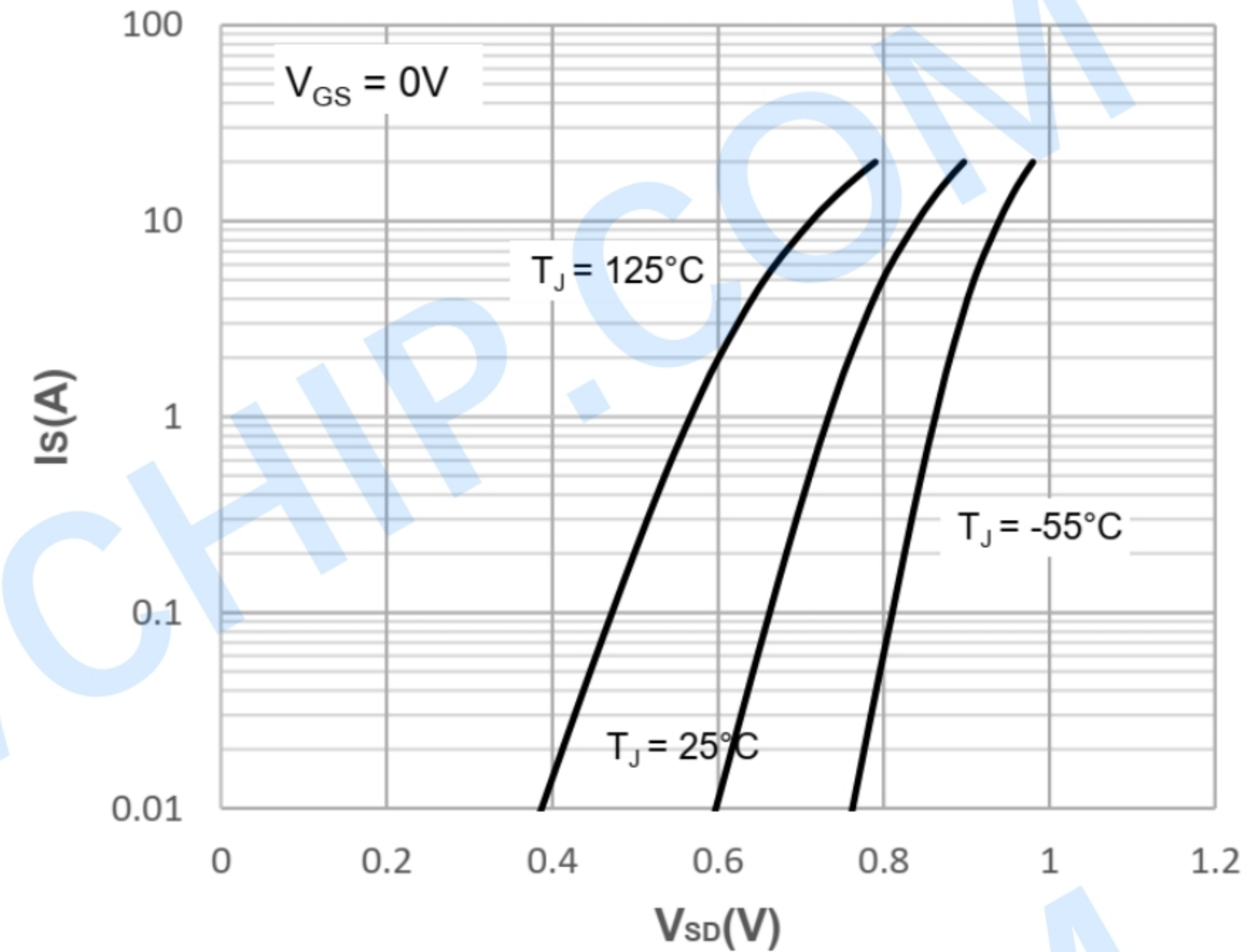


Figure 5: Gate Charge Characteristics

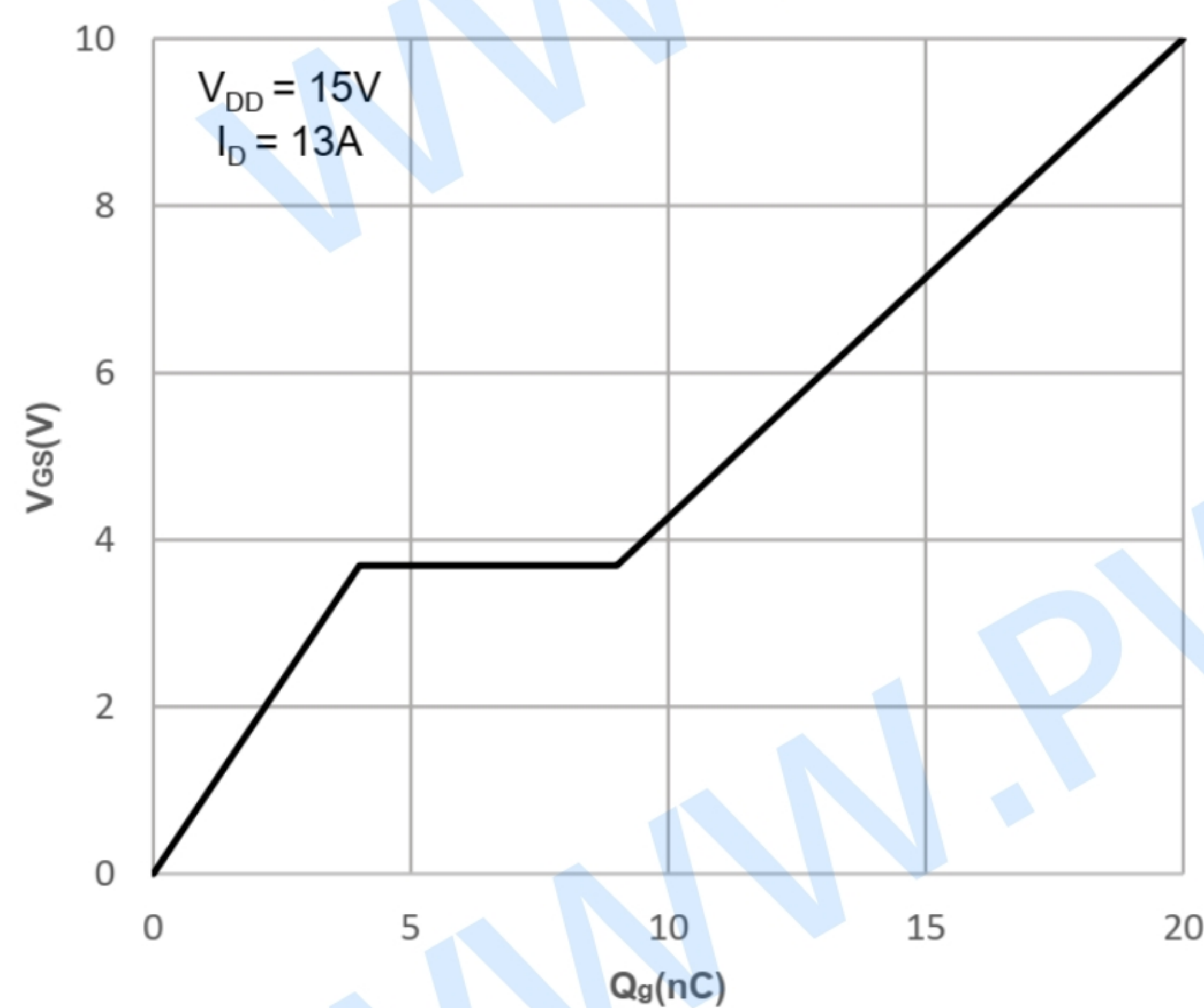


Figure 6: Capacitance Characteristics

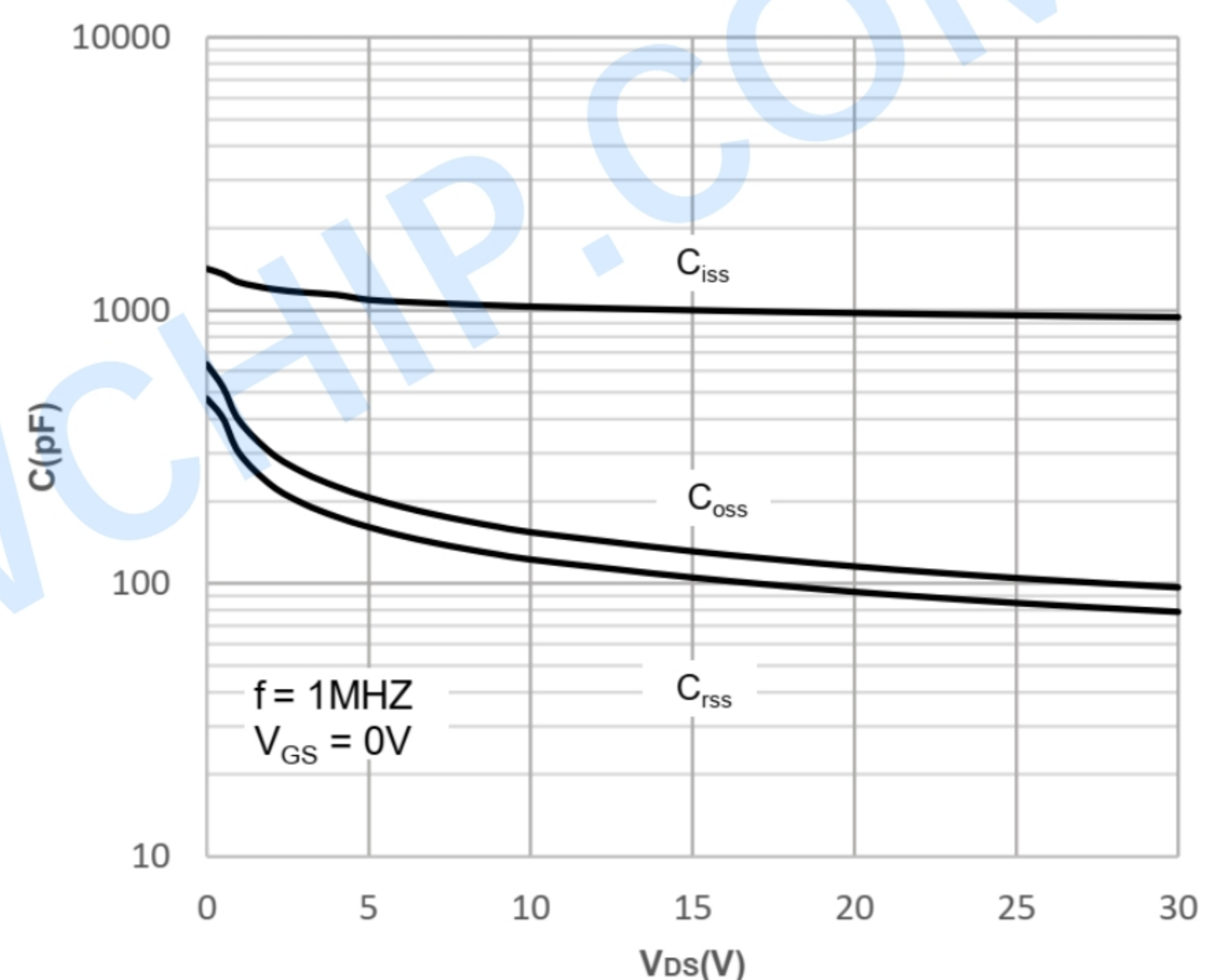


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

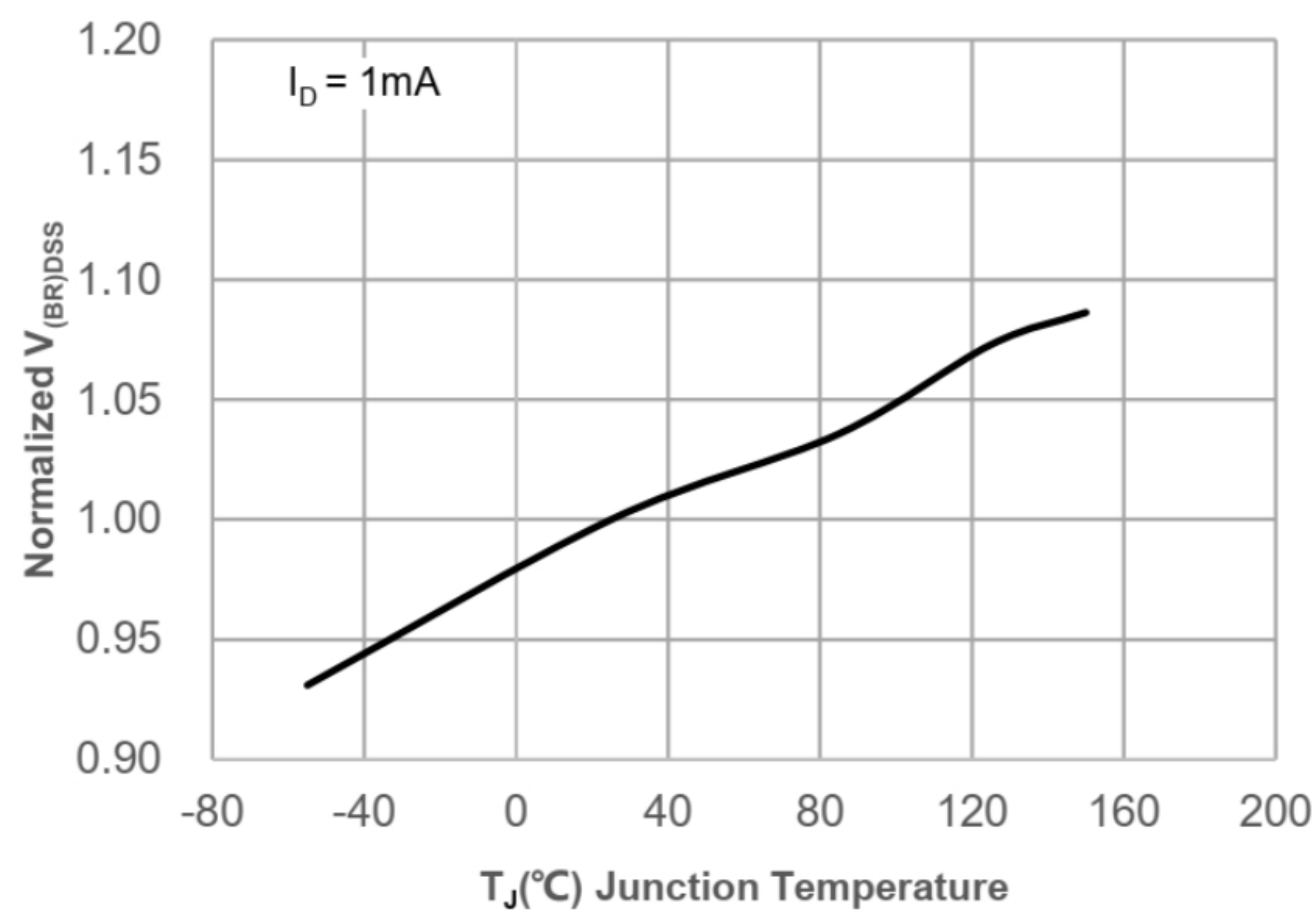


Figure 8: Normalized on Resistance vs. Junction Temperature

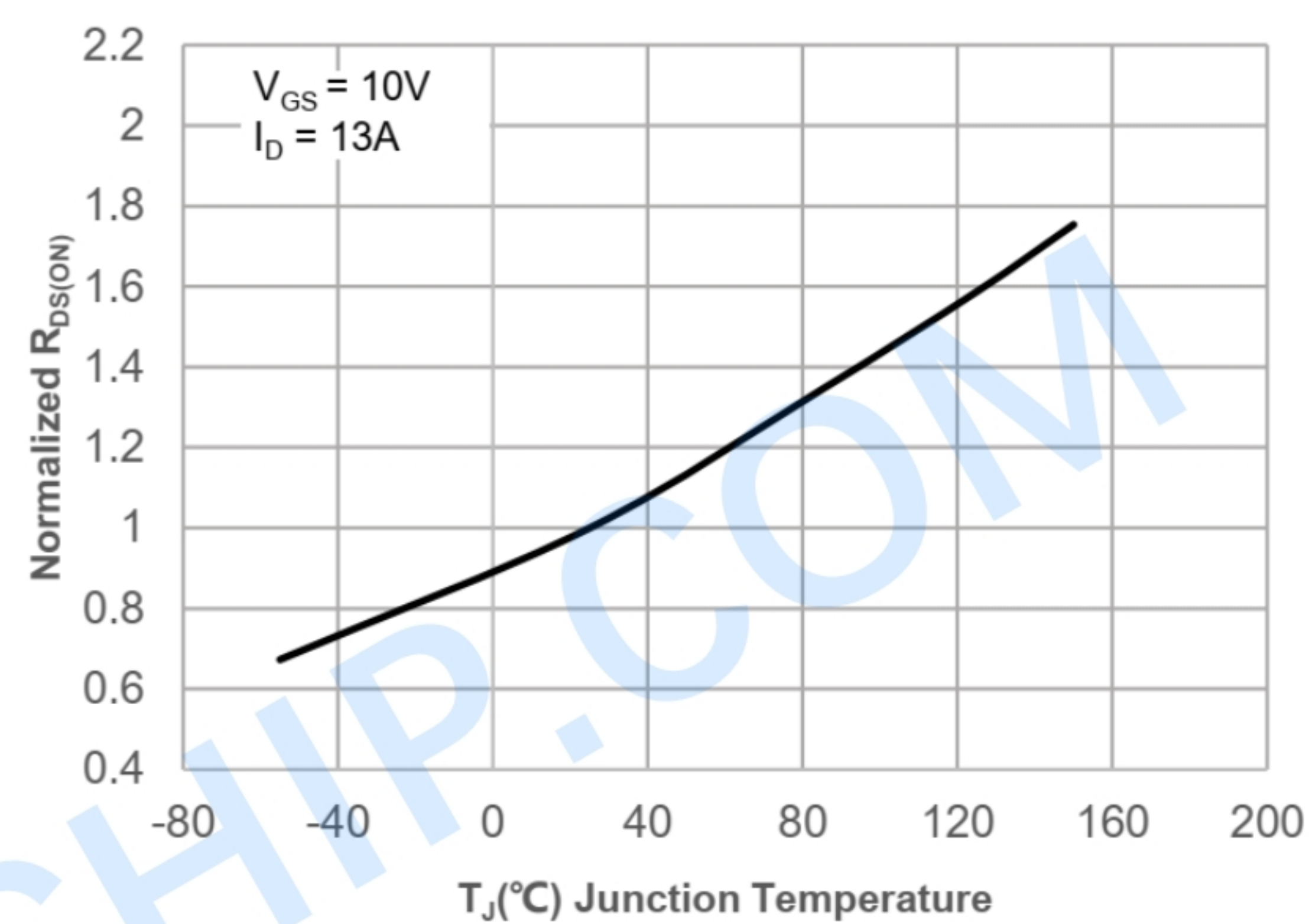


Figure 9: Maximum Safe Operating Area

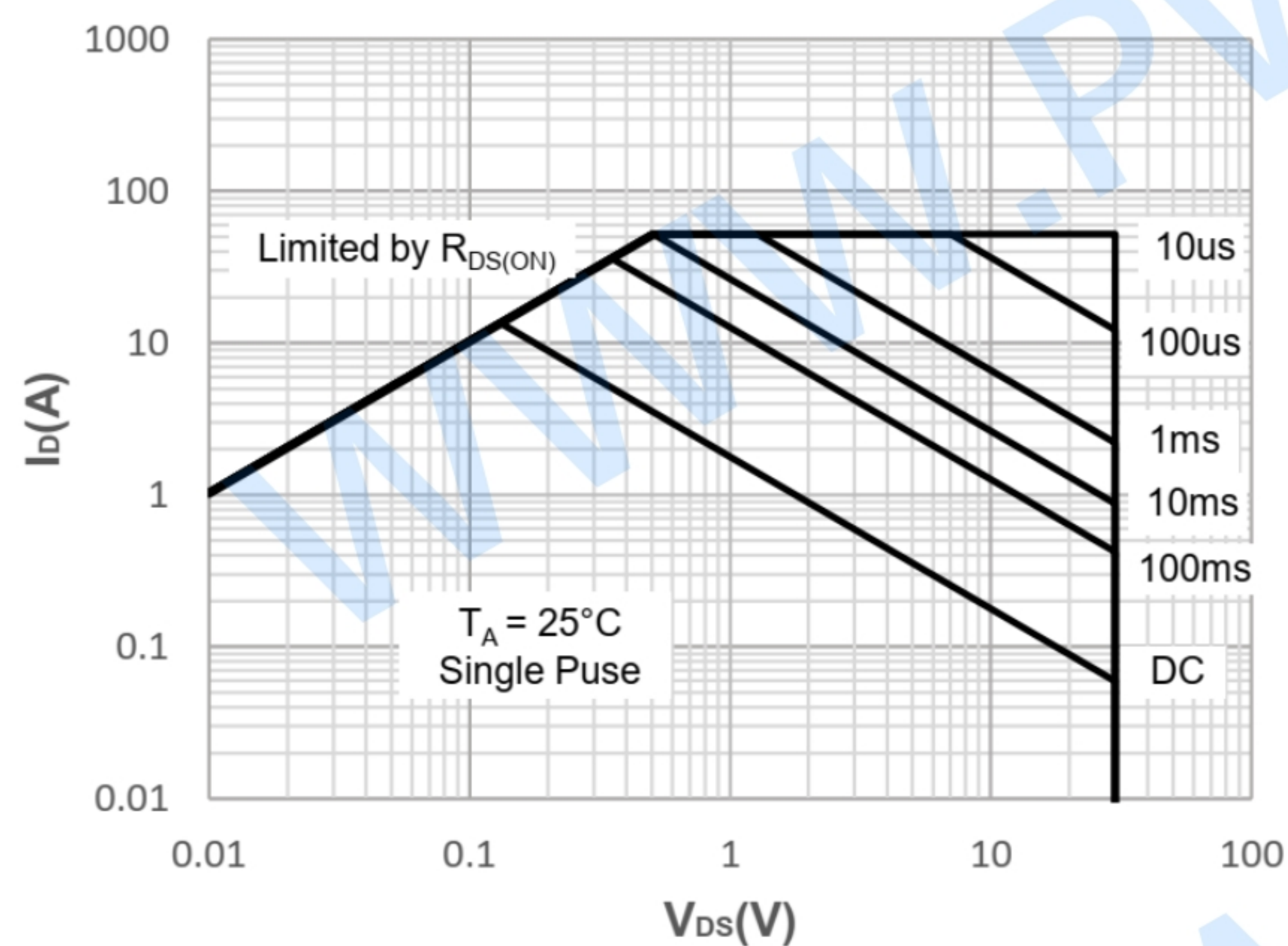


Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

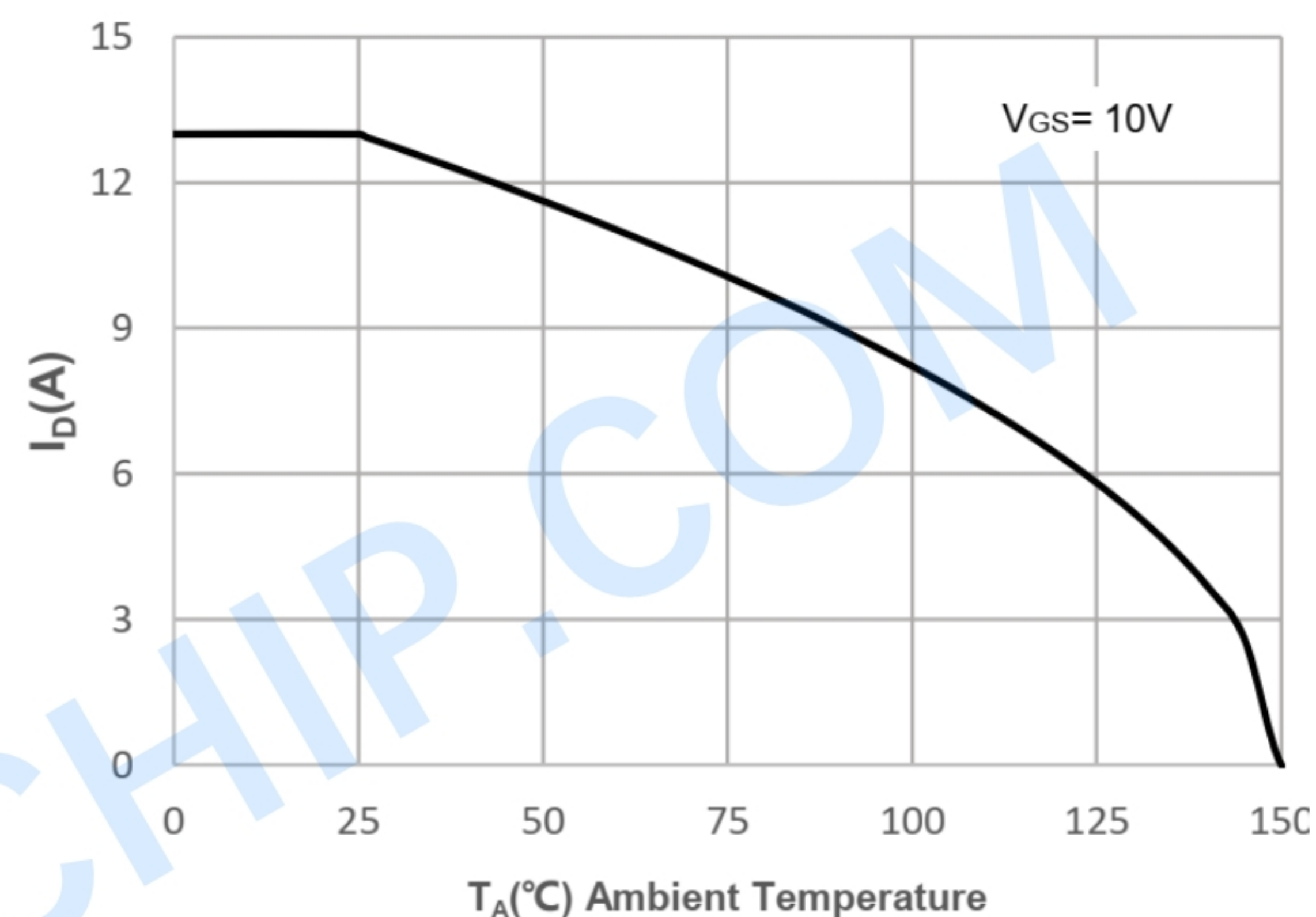


Figure 11: Normalized Maximum Transient Thermal Impedance

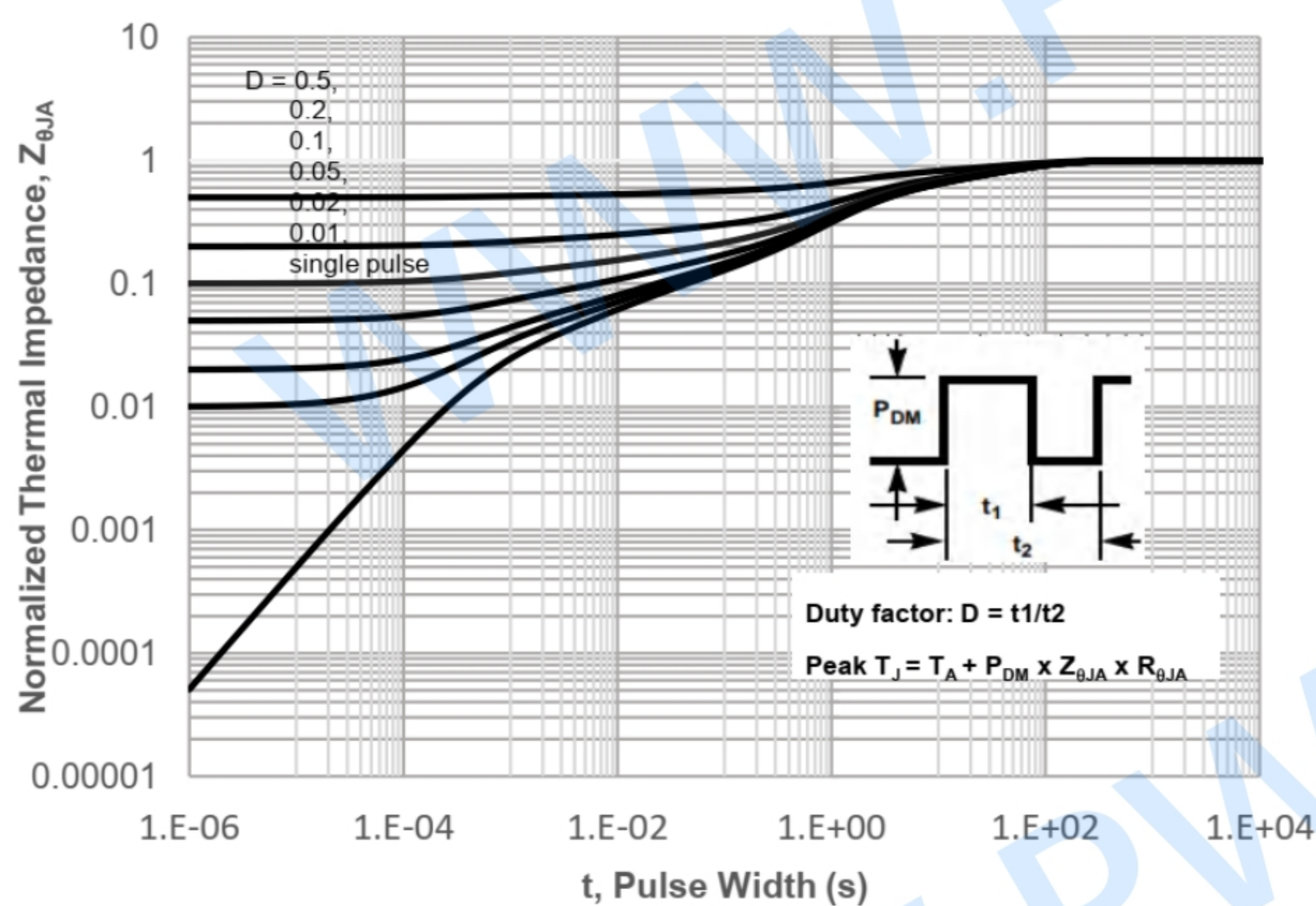
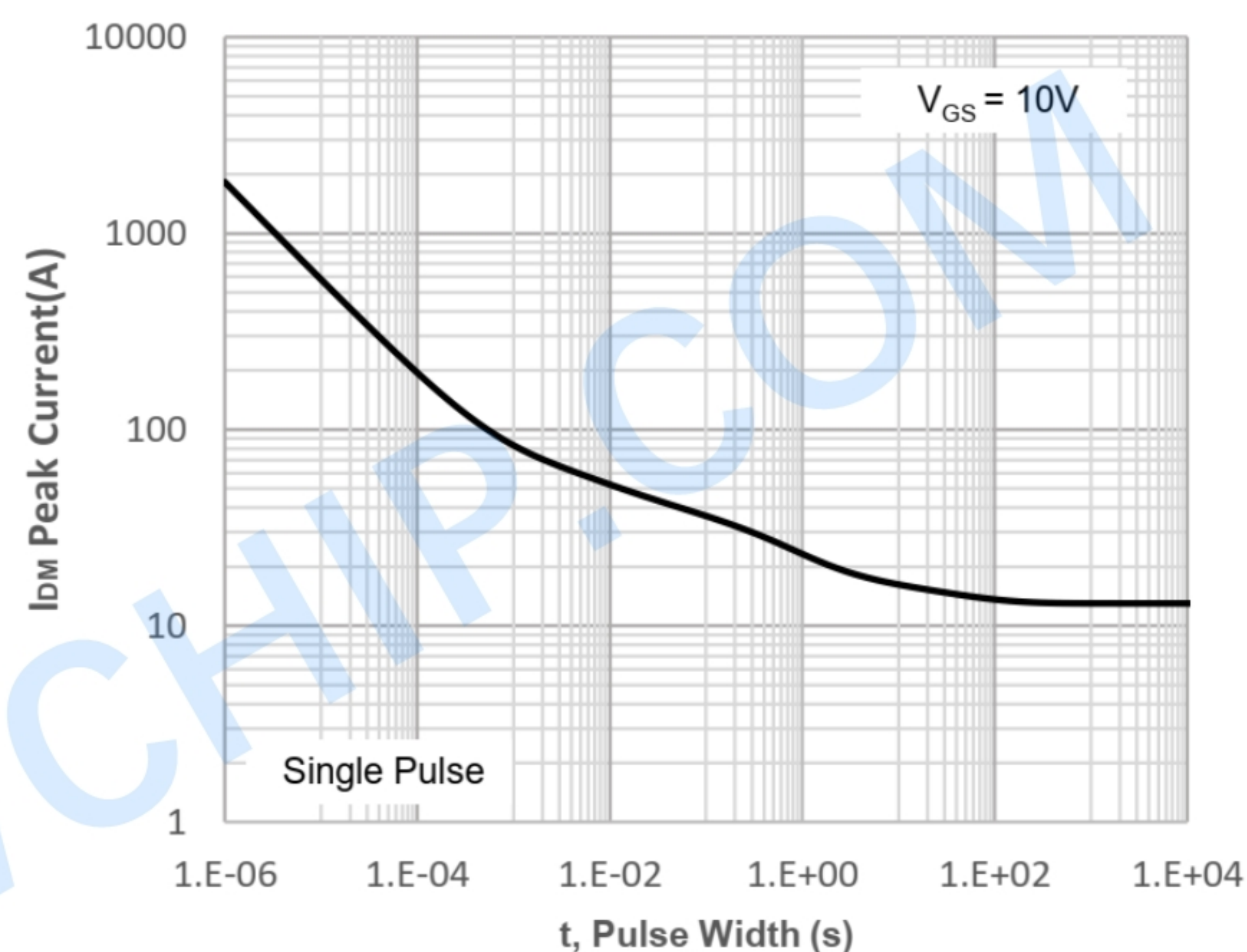


Figure 12: Peak Current Capacity



Test Circuit

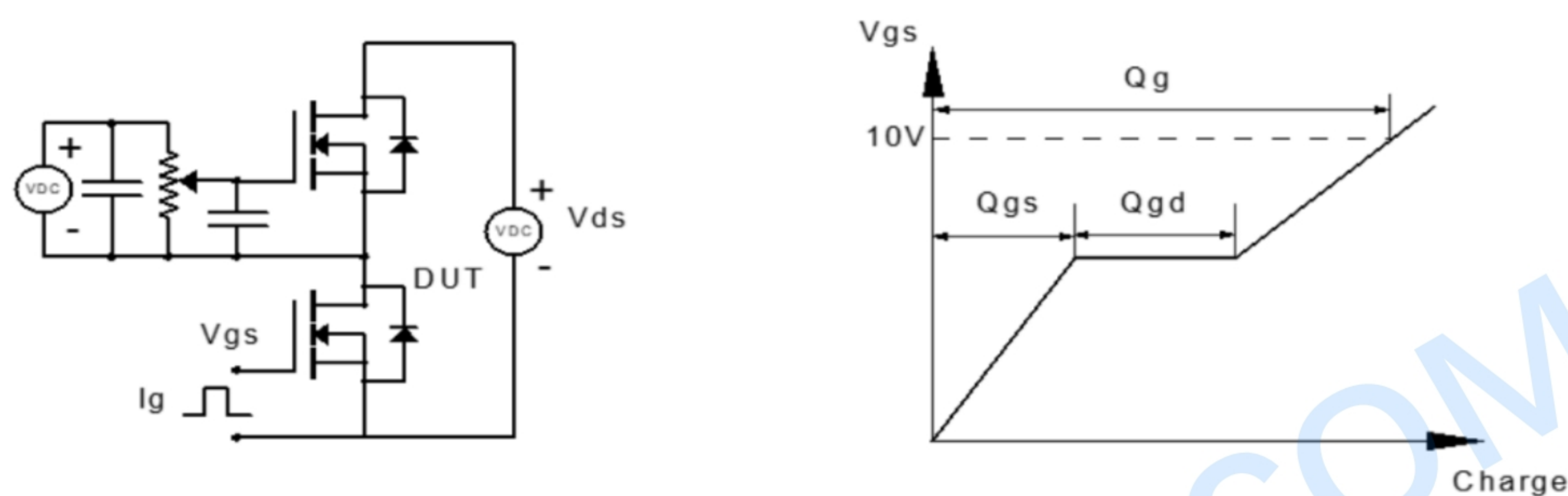


Figure 1: Gate Charge Test Circuit & Waveform

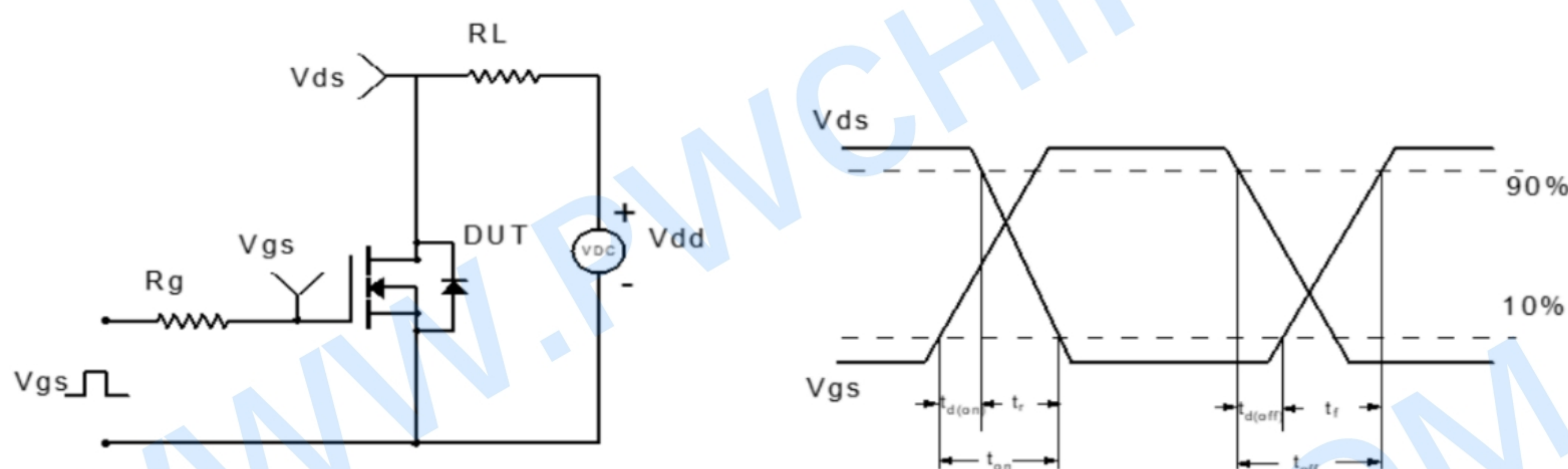


Figure 2: Resistive Switching Test Circuit & Waveform

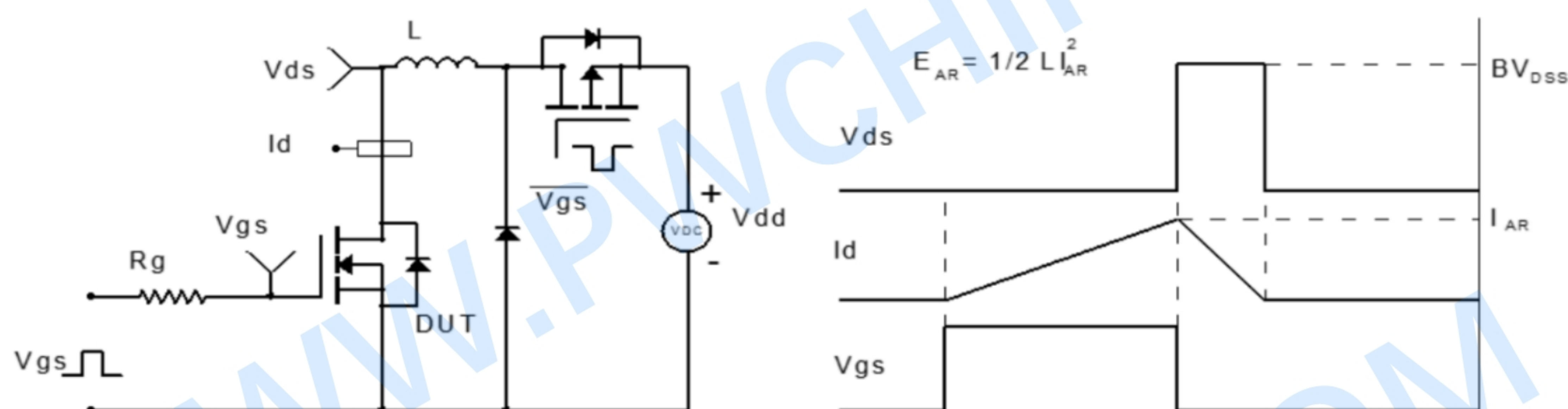


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

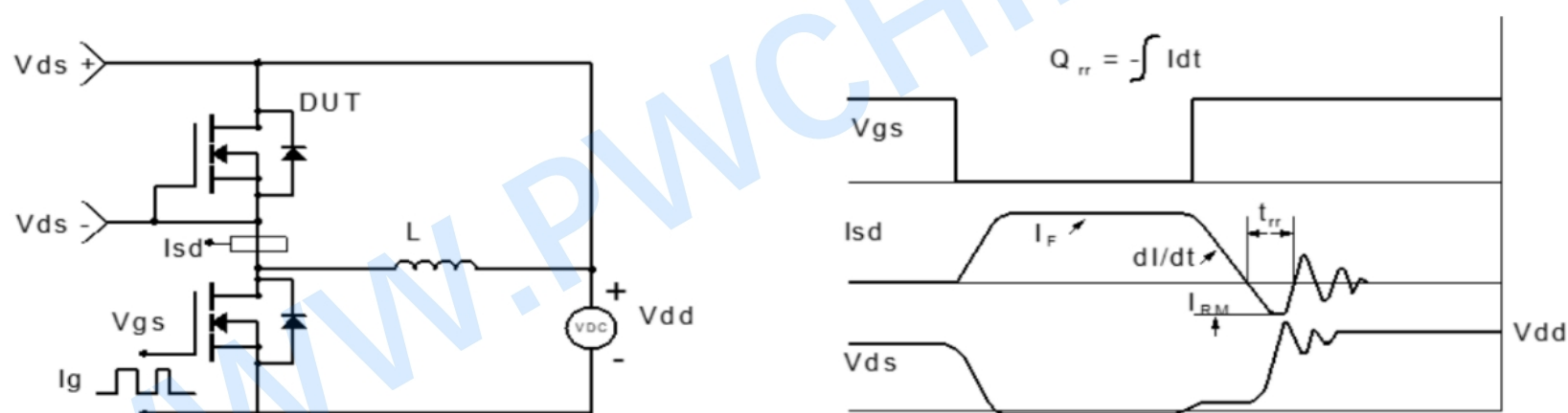
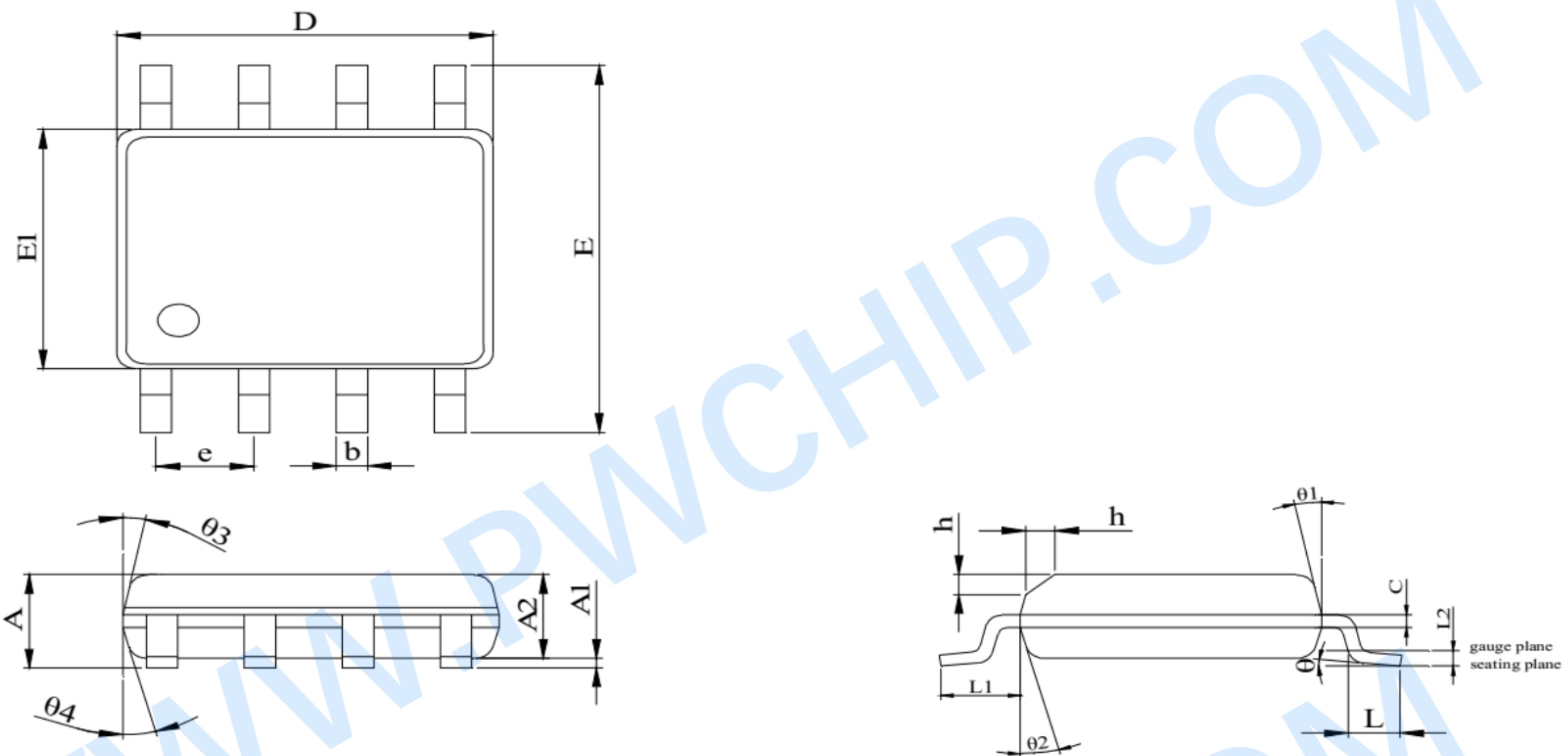


Figure 4: Diode Recovery Test Circuit & Waveform

PACKAGE DESCRIPTION

SOP8



DIM	MILLIMETER		
	MIN.	NOM.	MAX.
A	1.35	1.50	1.65
A1	0.05	0.10	0.15
A2	1.35	1.40	1.50
b	0.38	--	0.50
c	0.17	--	0.25
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27(BSC)		
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25 BSC		
h	0.30	0.40	0.50
θ	0°	--	8°
θ1	10°	12°	14°
θ2	8°	10°	12°
θ3	10°	12°	14°
θ4	8°	10°	12°

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