



N-Channel Enhancement Mode MOSFET

GENERAL DESCRIPTION

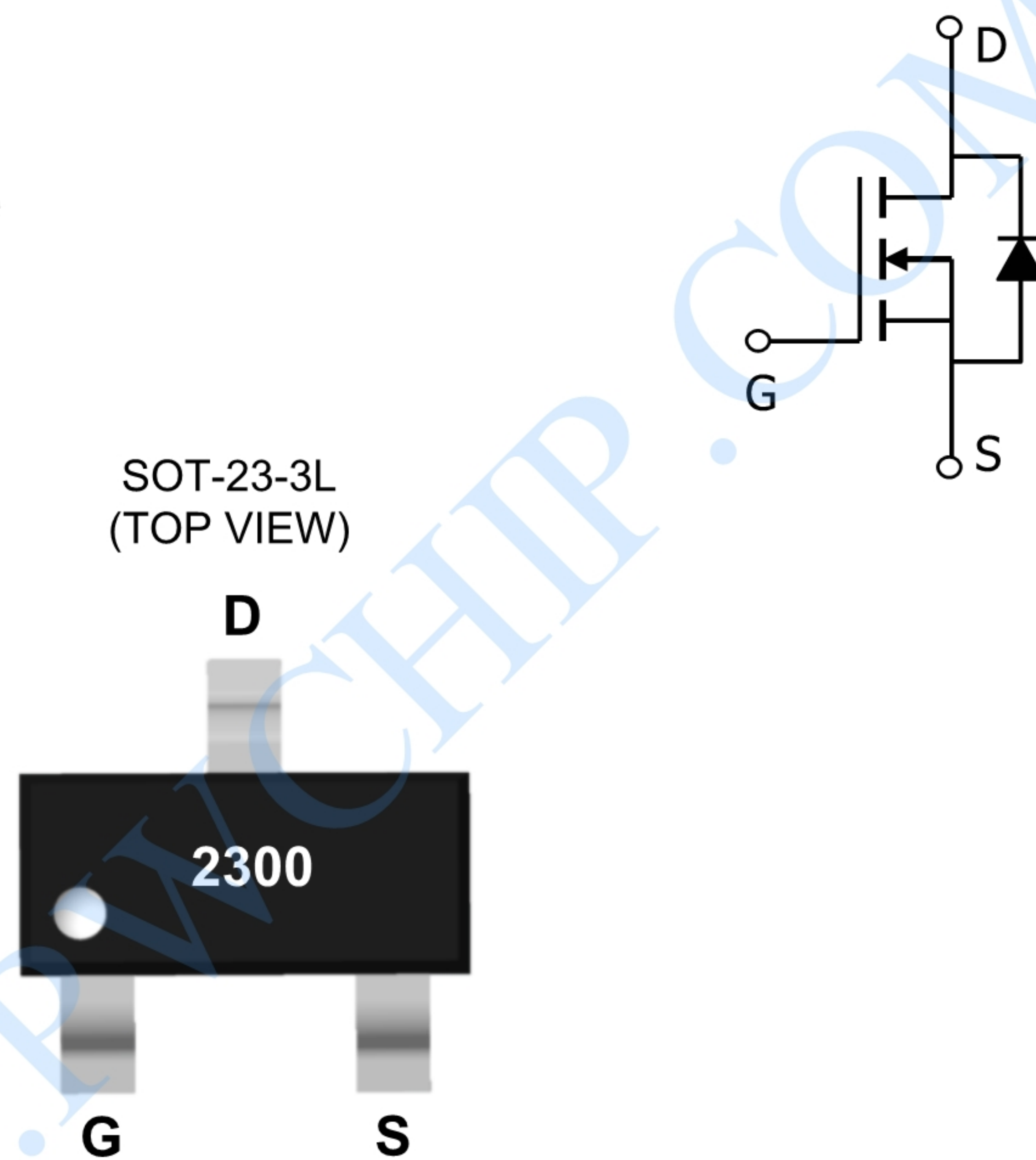
The SI2300 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application..

FEATURES

$V_{DS} = 20V$ $I_D = 3.3A$

$R_{DS(ON)} < 45m\Omega$ @ $V_{GS}=4.5V$

Available in a 3-Pin SOT23-3 Package



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
Pulsed Drain Current ²	I_{DM}	16	A
Total Power Dissipation ³	$P_o @TA=25^\circ C$	0.9	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	$R_{\theta JA}$	139	°C/W



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BVDSS	VGS=0V ID=250μA	20			V
Zero Gate Voltage Drain Current	IDSS	VDS=20V,VGS=0V			1	μA
Gate-Body Leakage Current	IGSS	VGS=±12V,VDS=0V			±100	nA
Gate Threshold Voltage	VGS(th)	VDS=VGS,ID=250μA	0.5	0.75	1.2	V
Drain-Source On-State Resistance	RDS(ON)	VGS=2.5V, ID=2.8A		35	60	mΩ
		VGS=4.5V, ID=3A		29	45	mΩ
Forward Transconductance	gFS	VDS=5V,ID=3A		8		S
Input Capacitance	Clss	VDS=10V,VGS=0V, F=1.0MHz		260		PF
Output Capacitance	Coss			48		PF
Reverse Transfer Capacitance	Crss			27		PF
Turn-on Delay Time	td(on)	VDD=10V, RL=3.3Ω VGS=4.5V,RGEN=6Ω		2.5		nS
Turn-on Rise Time	tr			3.2		nS
Turn-Off Delay Time	td(off)			21		nS
Turn-Off Fall Time	tf			3		nS
Total Gate Charge	Qg	VDS=10V,ID=3A, VGS=4.5V		2.9	5	nC
Gate-Source Charge	Qgs			0.4		nC
Gate-Drain Charge	Qgd			0.6		nC
Diode Forward Voltage (Note 3)	VSD	VGS=0V,IS=3.3A		0.75	1.2	V
Diode Forward Current (Note 2)	IS				3.3	A

Note :

- 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 $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- 4、 Guaranteed by design, not subject to production

Typical Characteristics

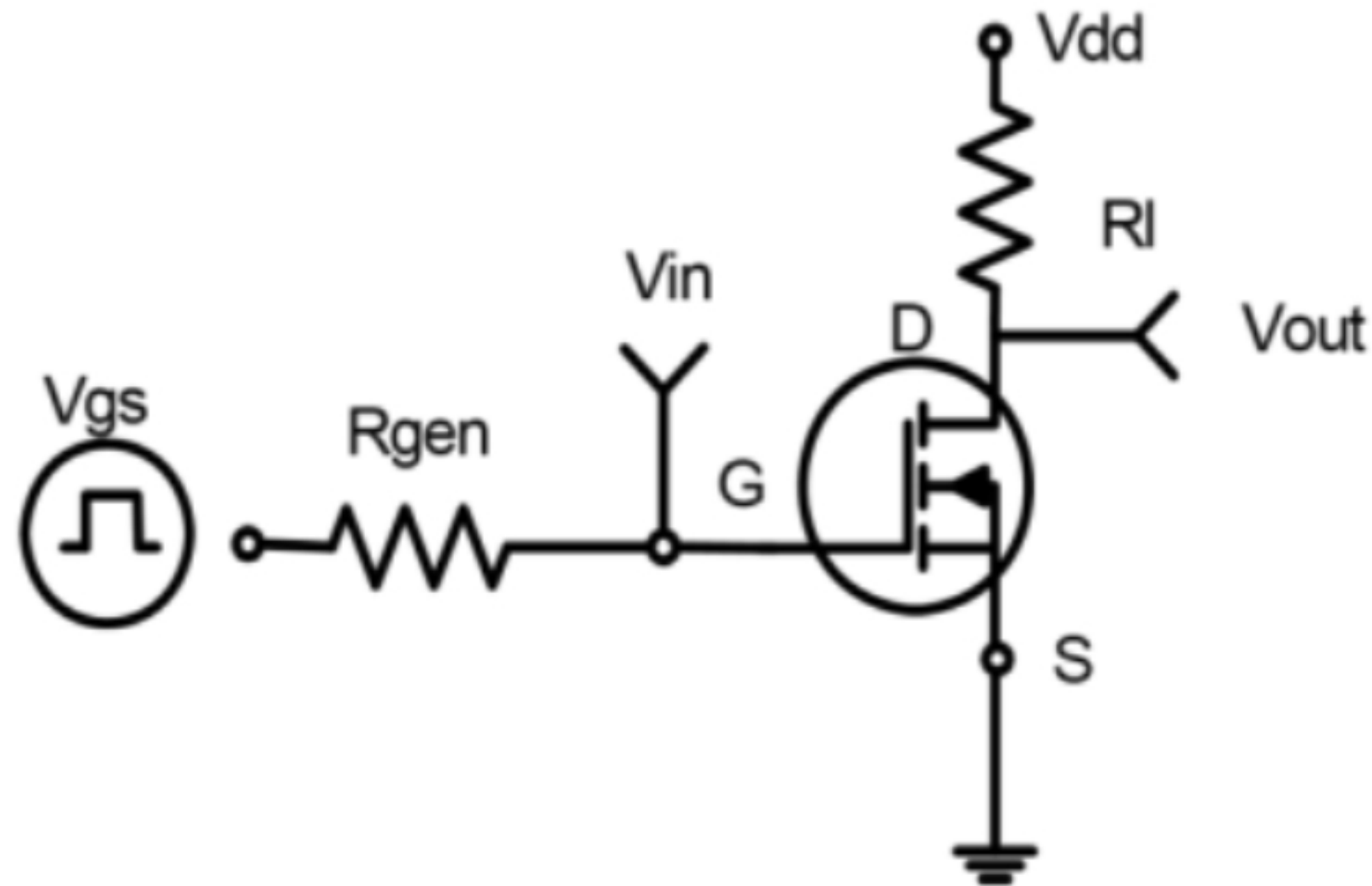


Figure 1: Switching Test Circuit

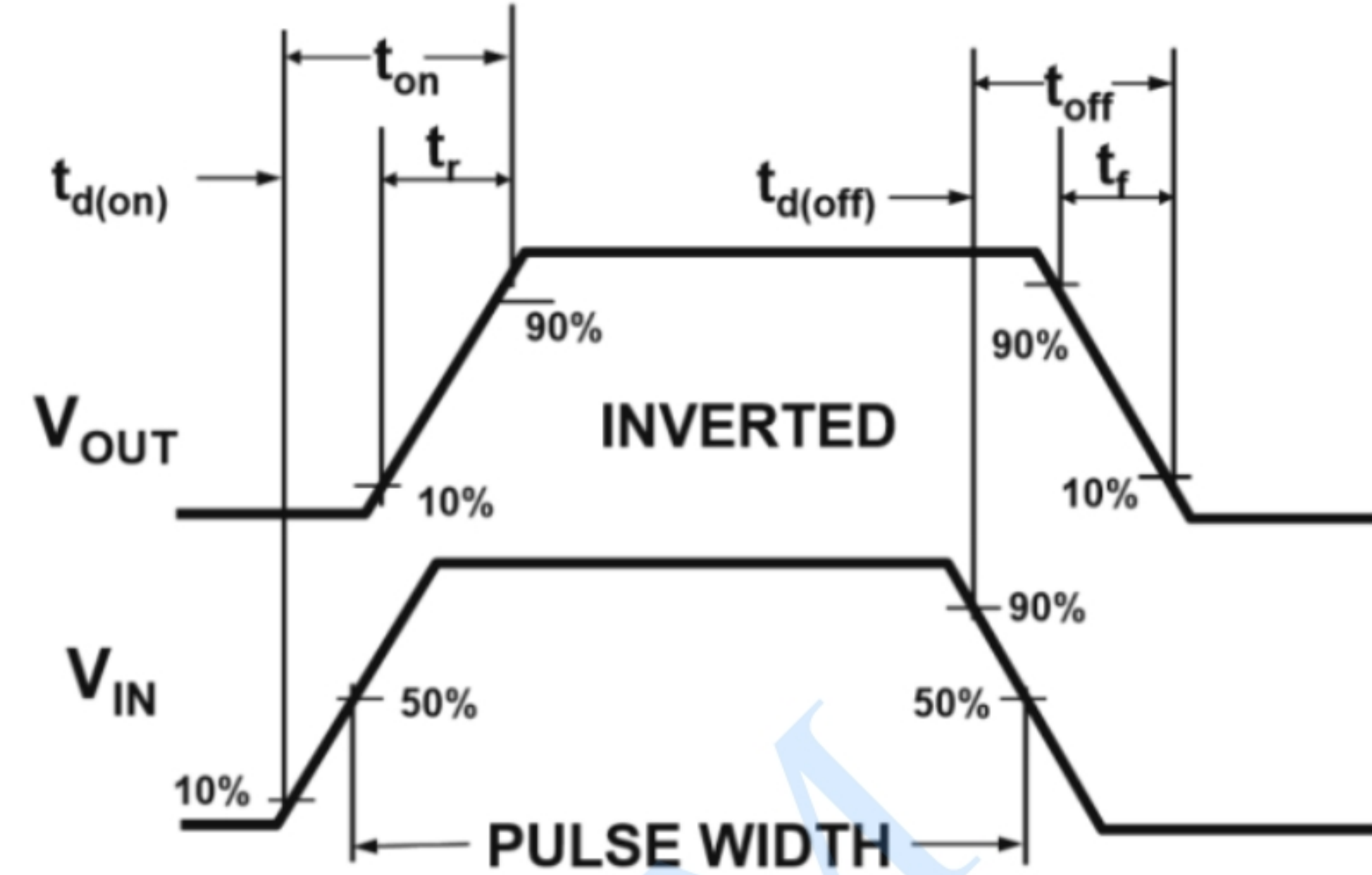


Figure 2: Switching Waveforms

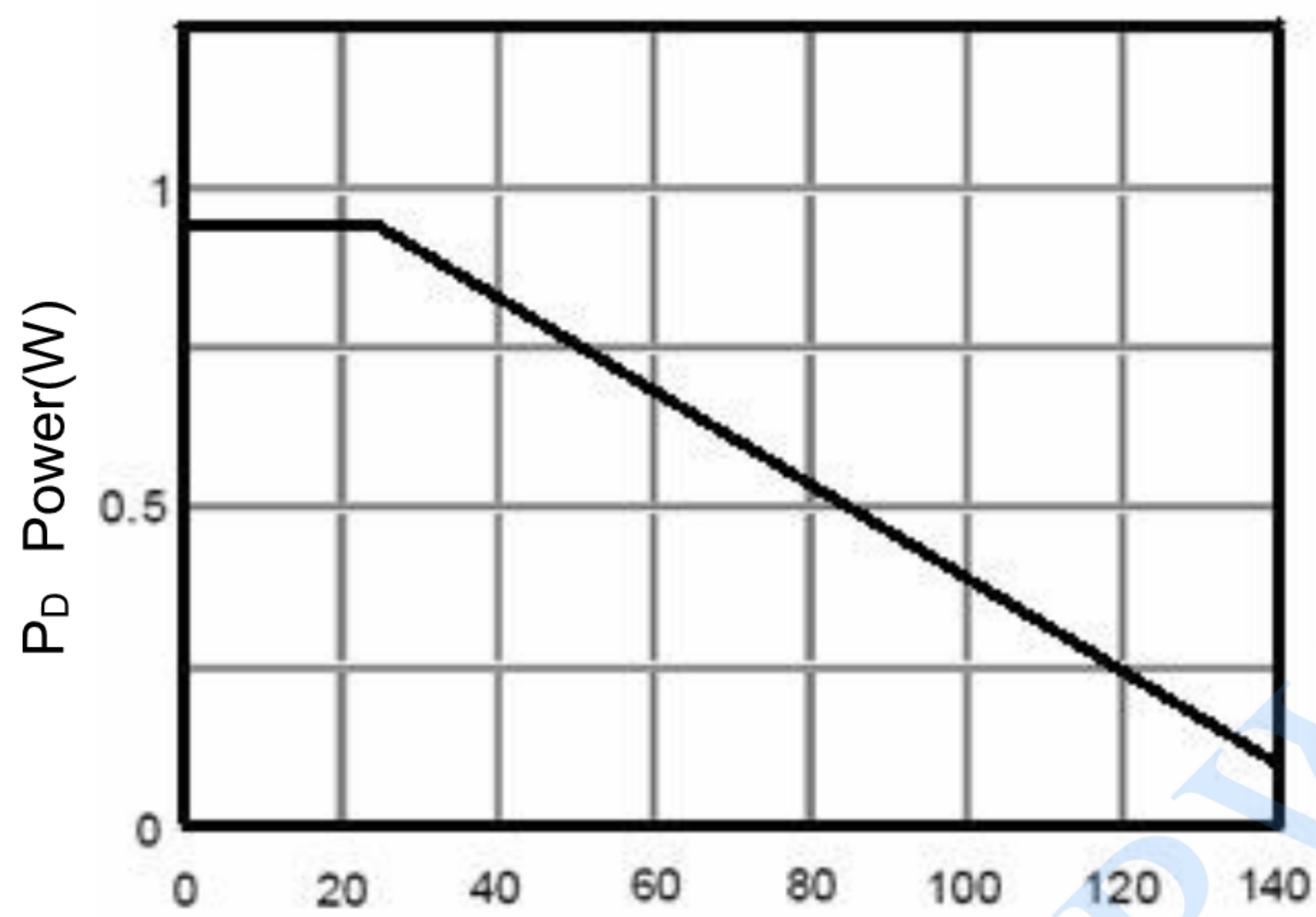
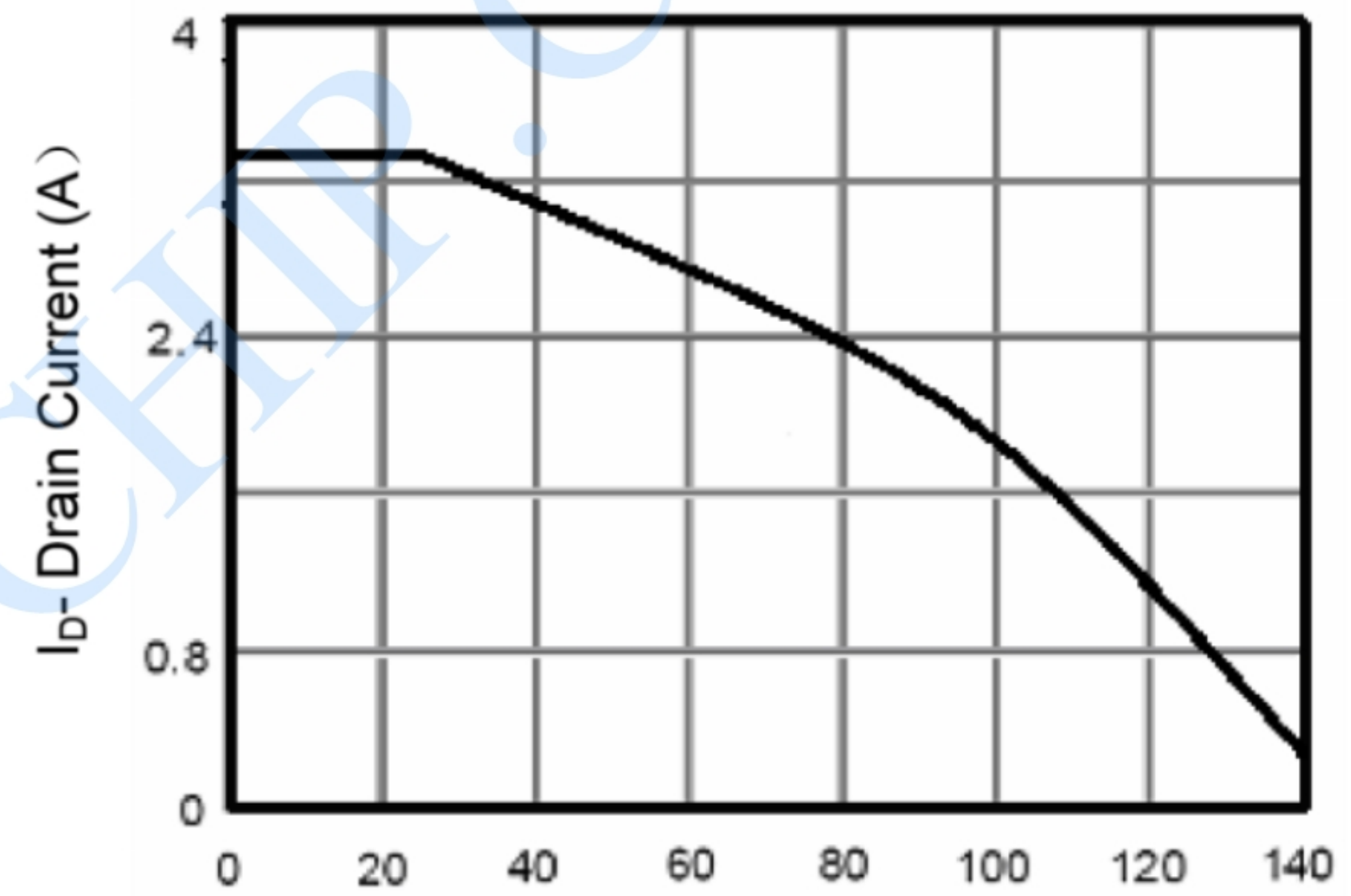
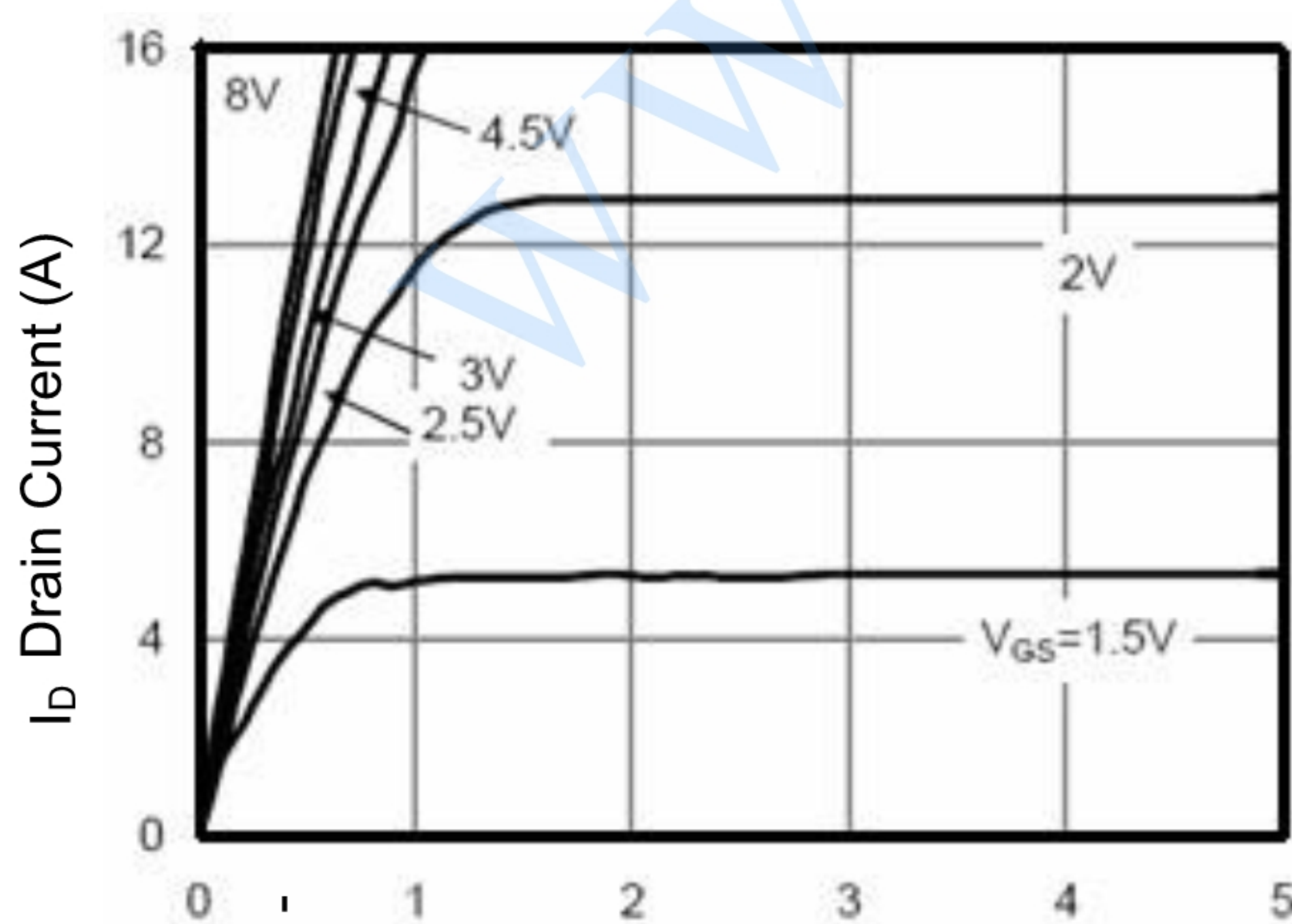


Figure 3 Power Dissipation



T_J-Junction Temperature(°C)

Figure 4 Drain Current



V_{ds} Drain-Source Voltage (V)

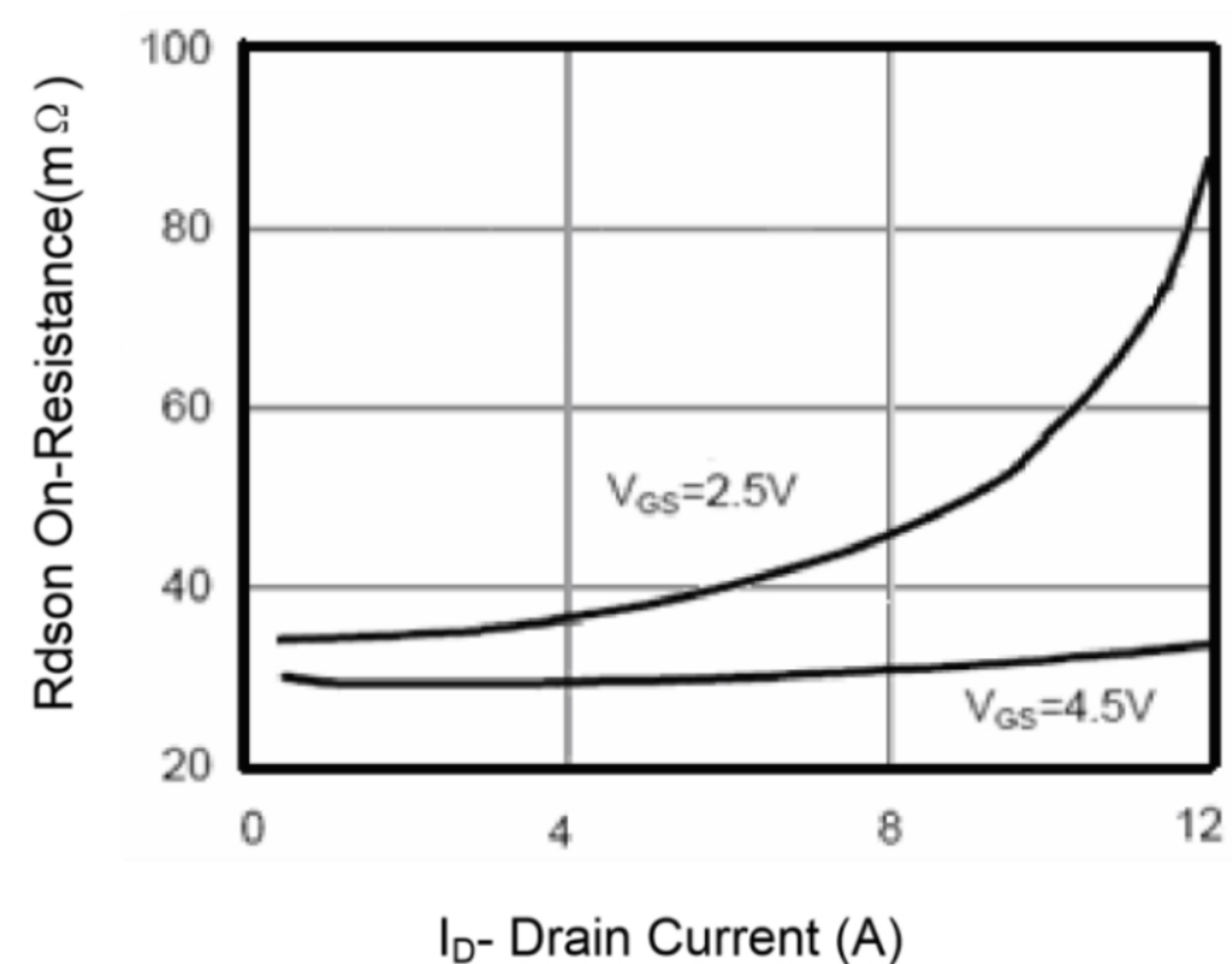
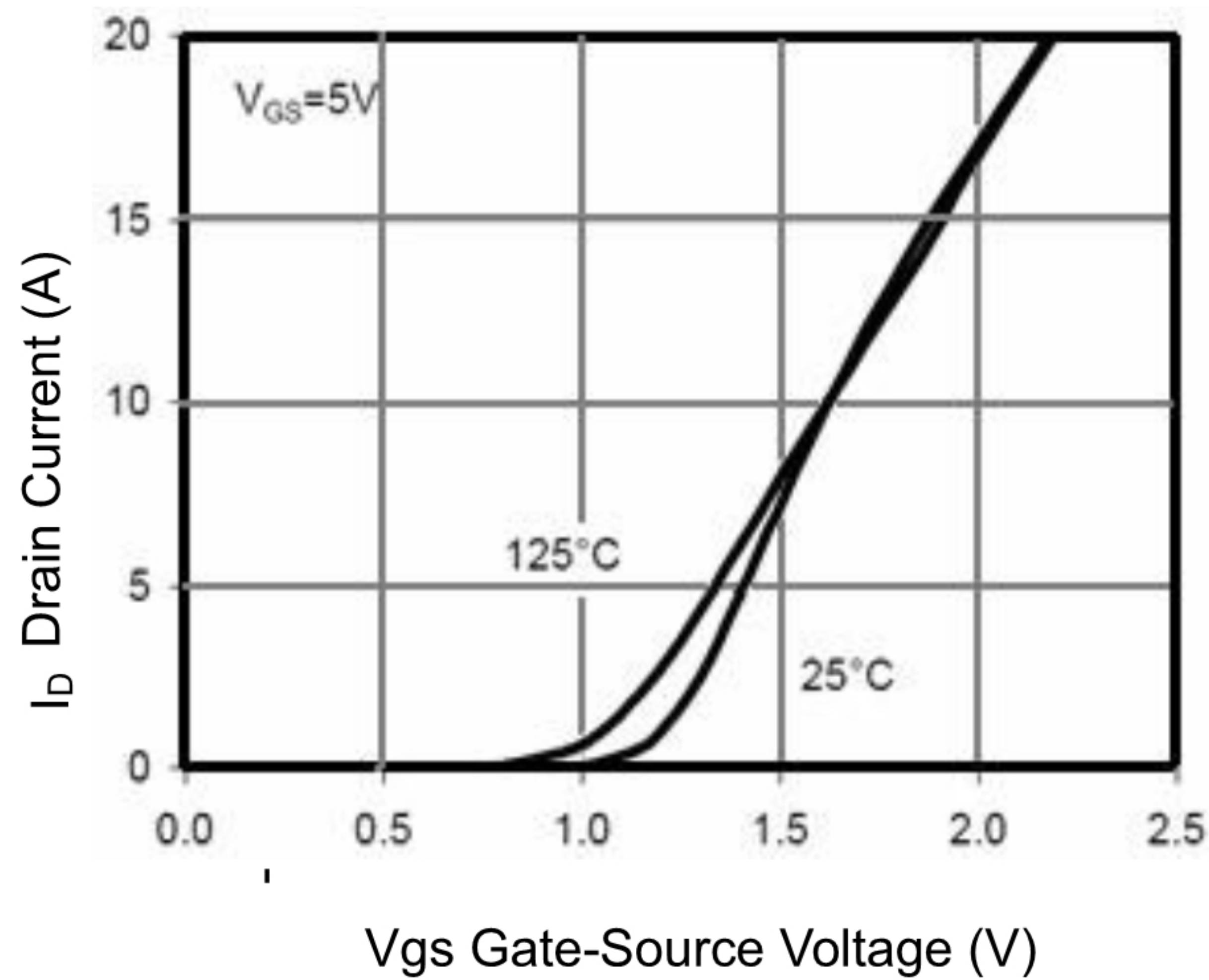
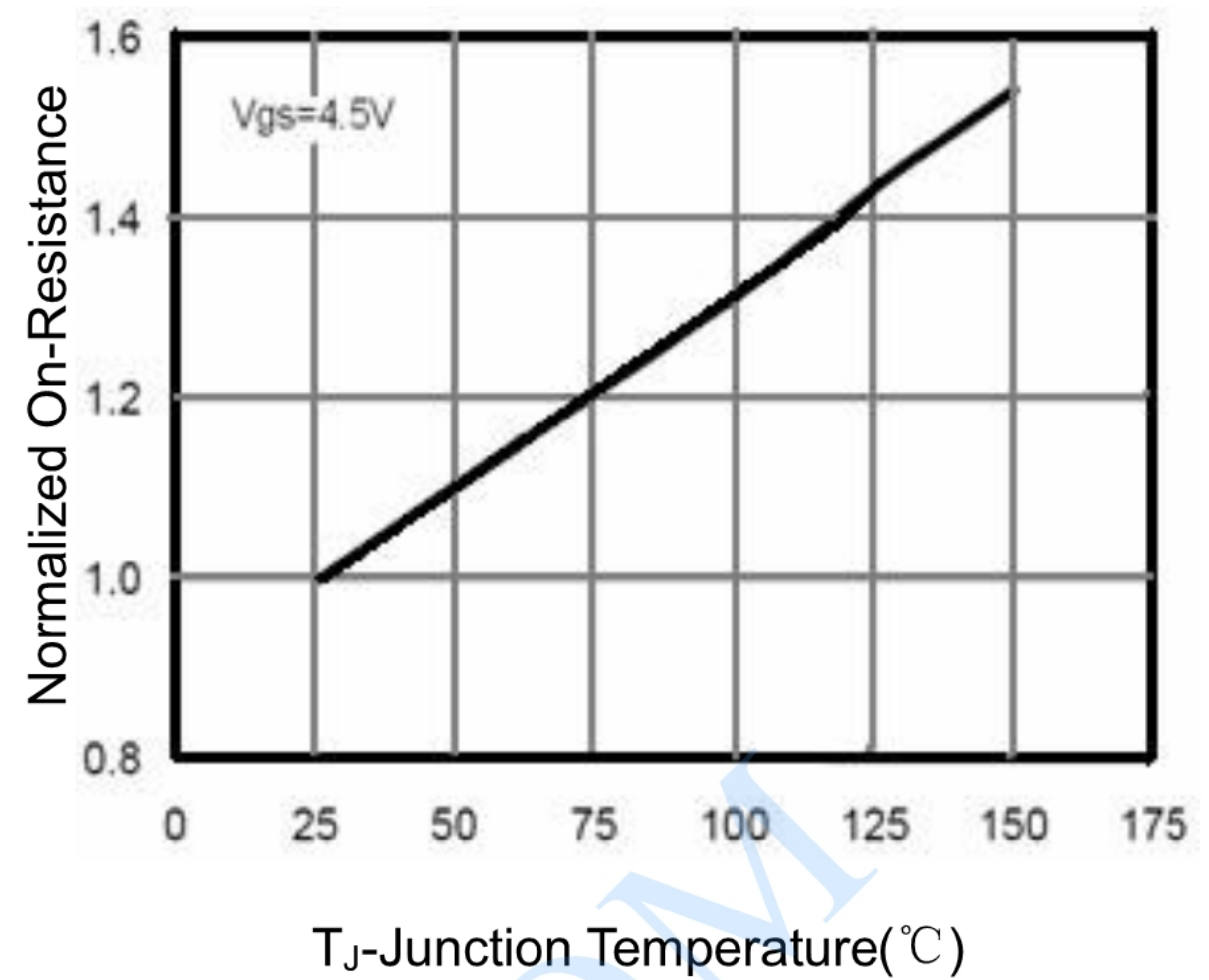
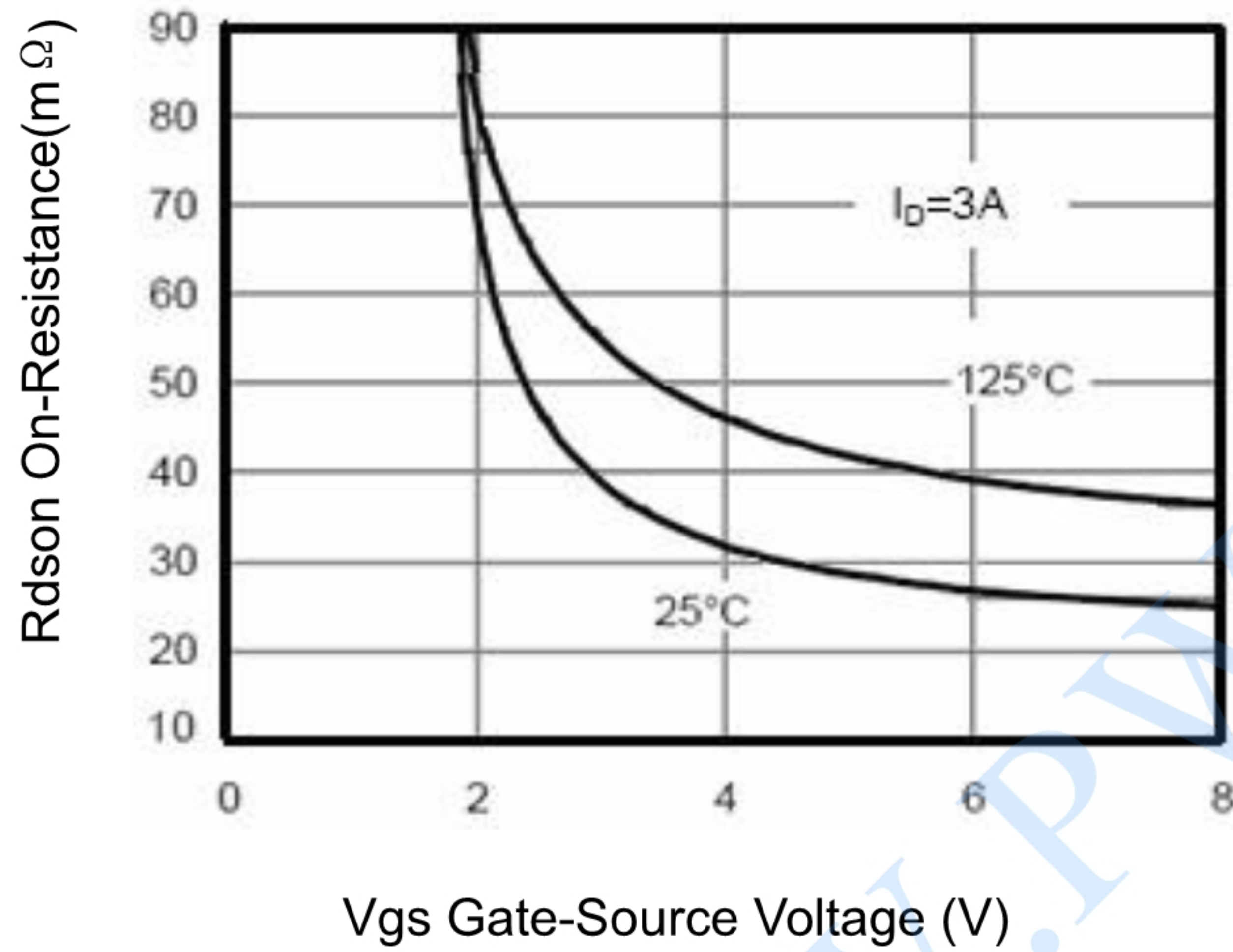
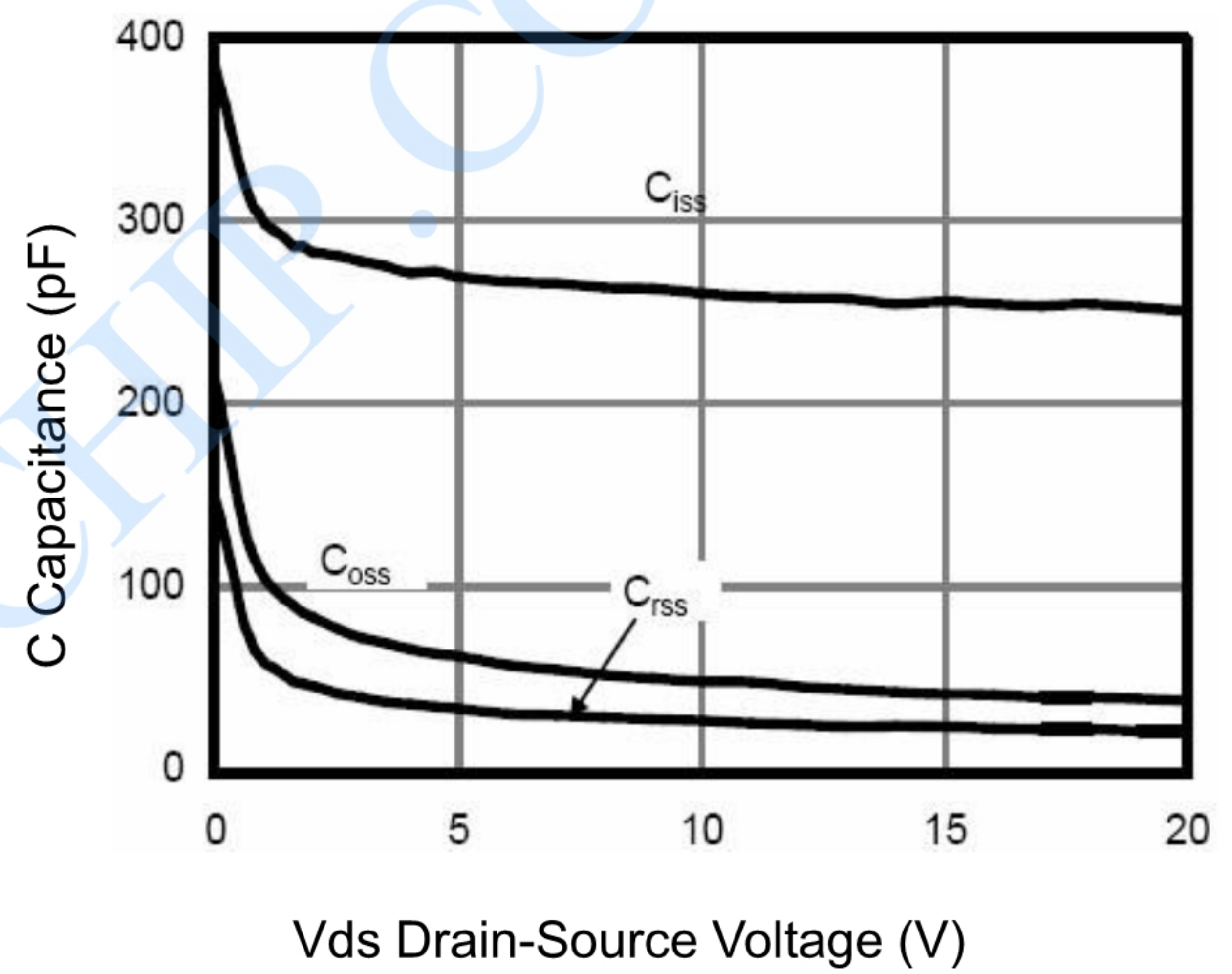
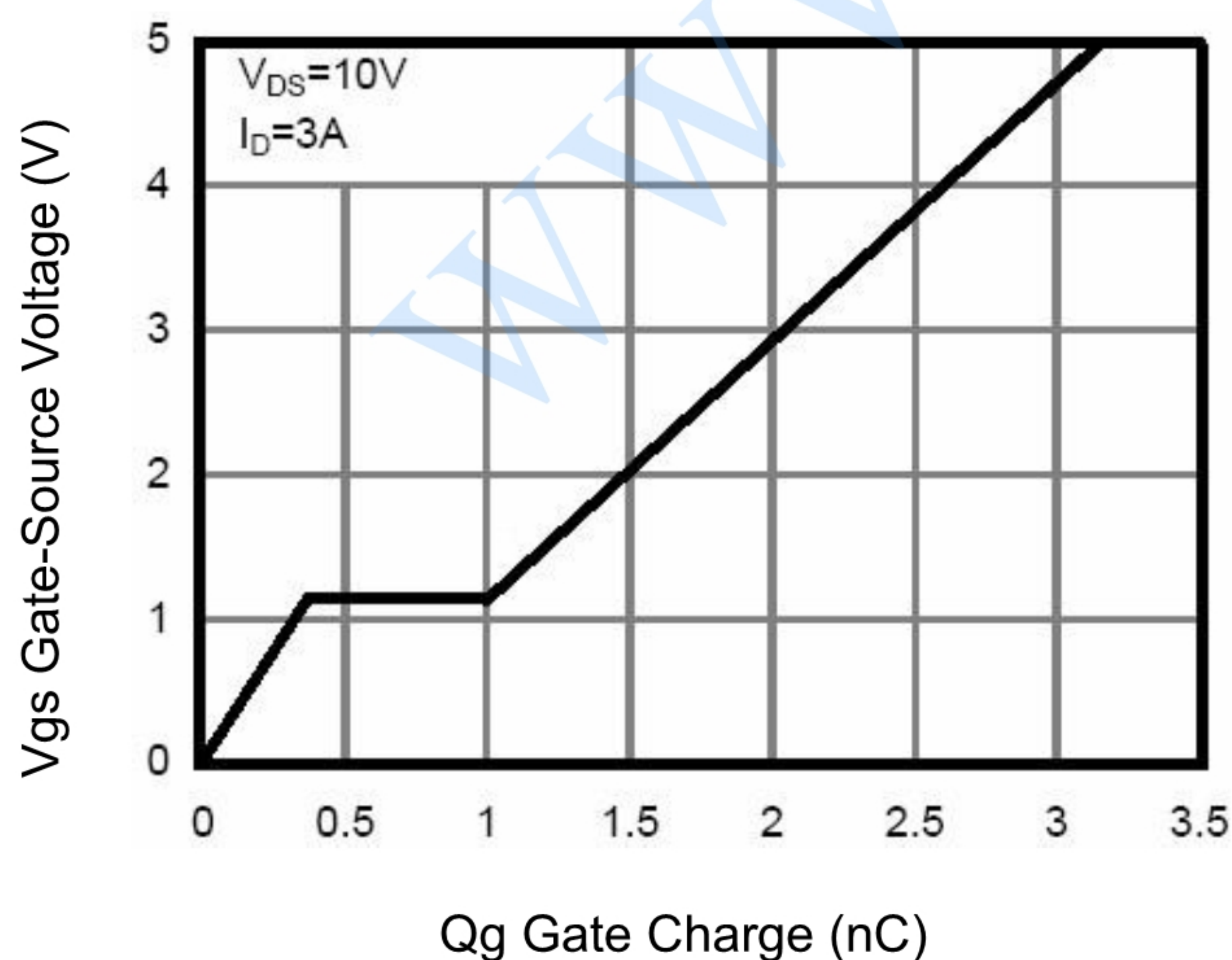
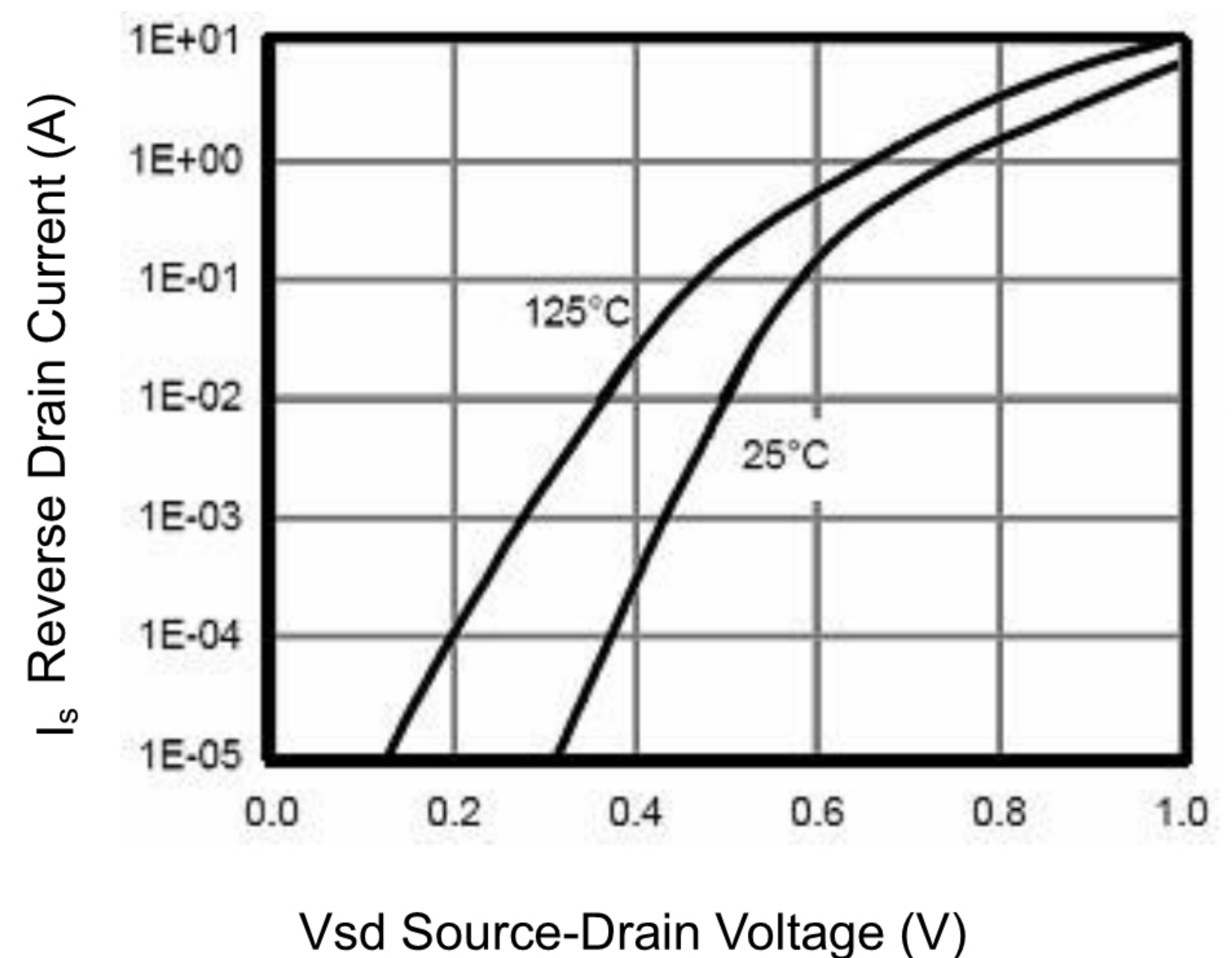
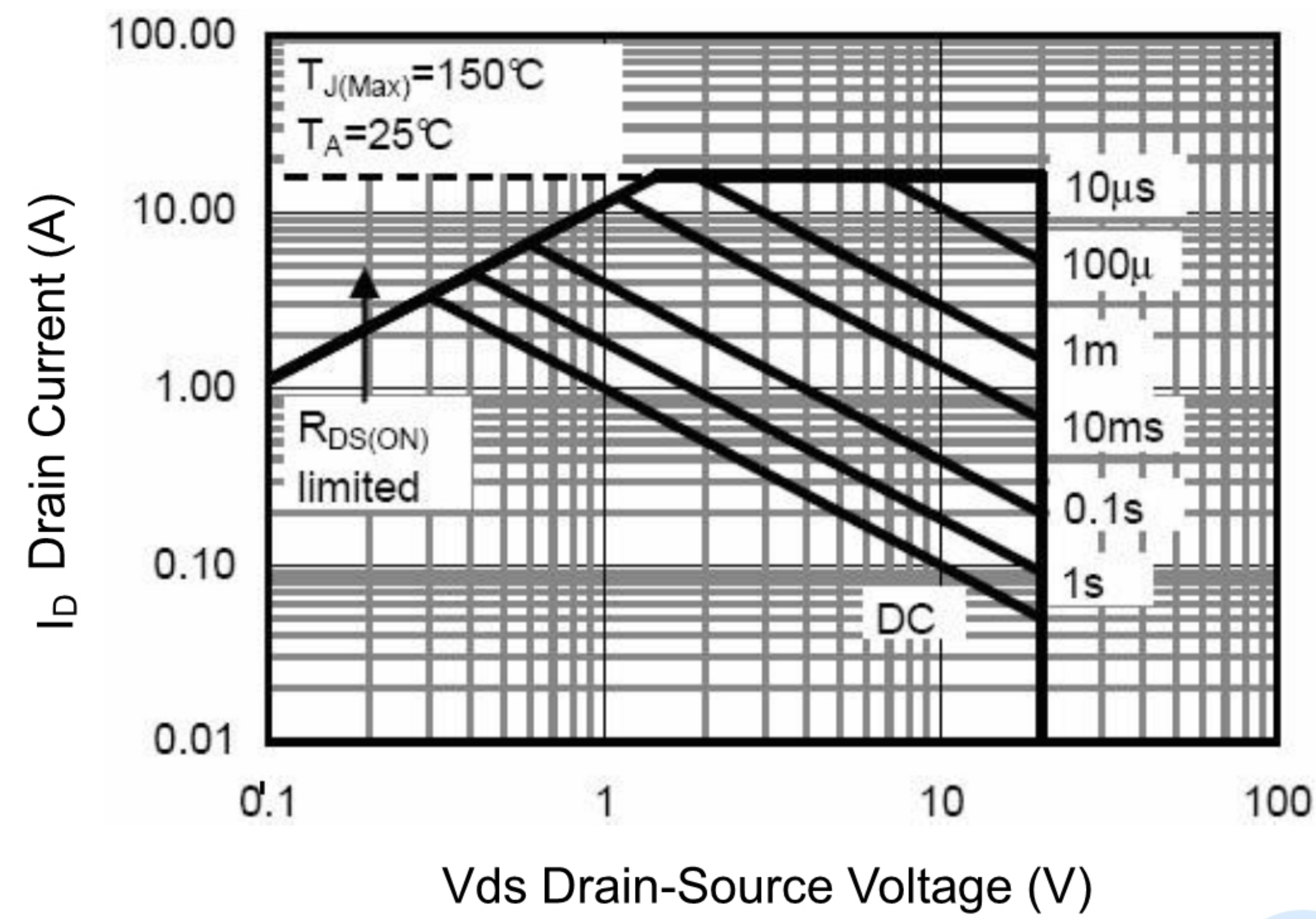
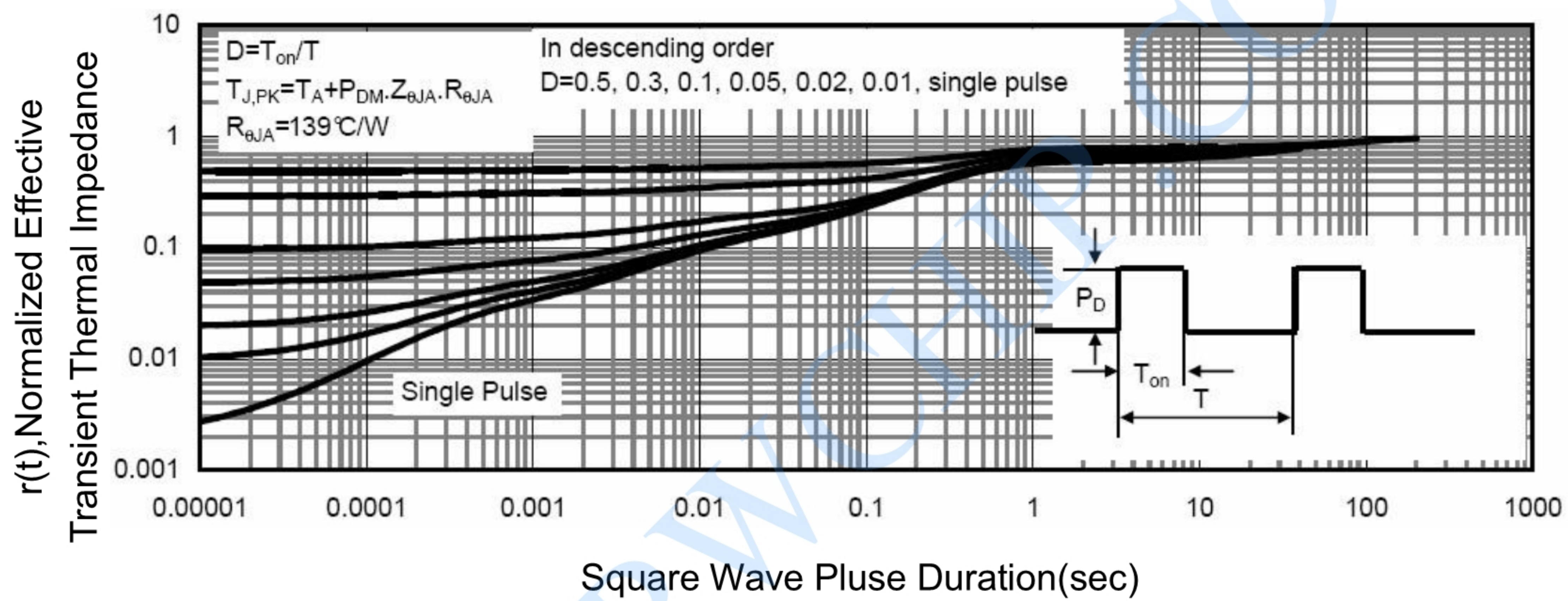


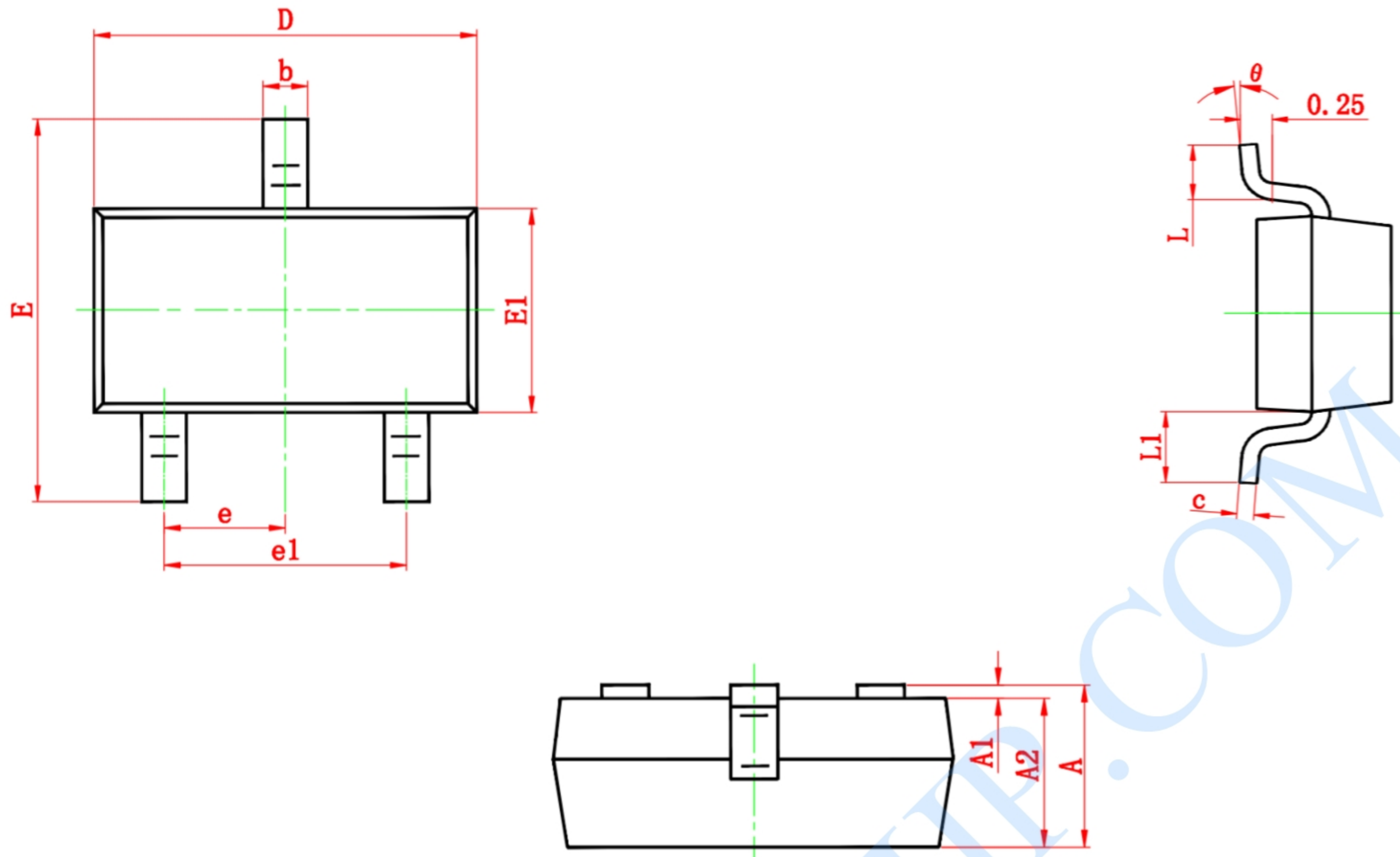
Figure 6 Drain-Source On-Resistance

**Figure 7 Transfer Characteristics****Figure 8 Drain-Source On-Resistance****Figure 9 $R_{DS(on)}$ vs V_{GS}** **Figure 10 Capacitance vs V_{DS}** **Figure 11 Gate Charge****Figure 12 Source- Drain Diode Forward**

**Figure 13 Safe Operation Area****Figure 14 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.