

## N-Channel Enhancement Mode MOSFET

### GENERAL DESCRIPTION

The PW2324 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

### FEATURES

$V_{DS} = 100V$ ,  $I_D = 3.7A$

$R_{DS(ON)} < 240m\Omega$  @  $V_{GS} = 10V$

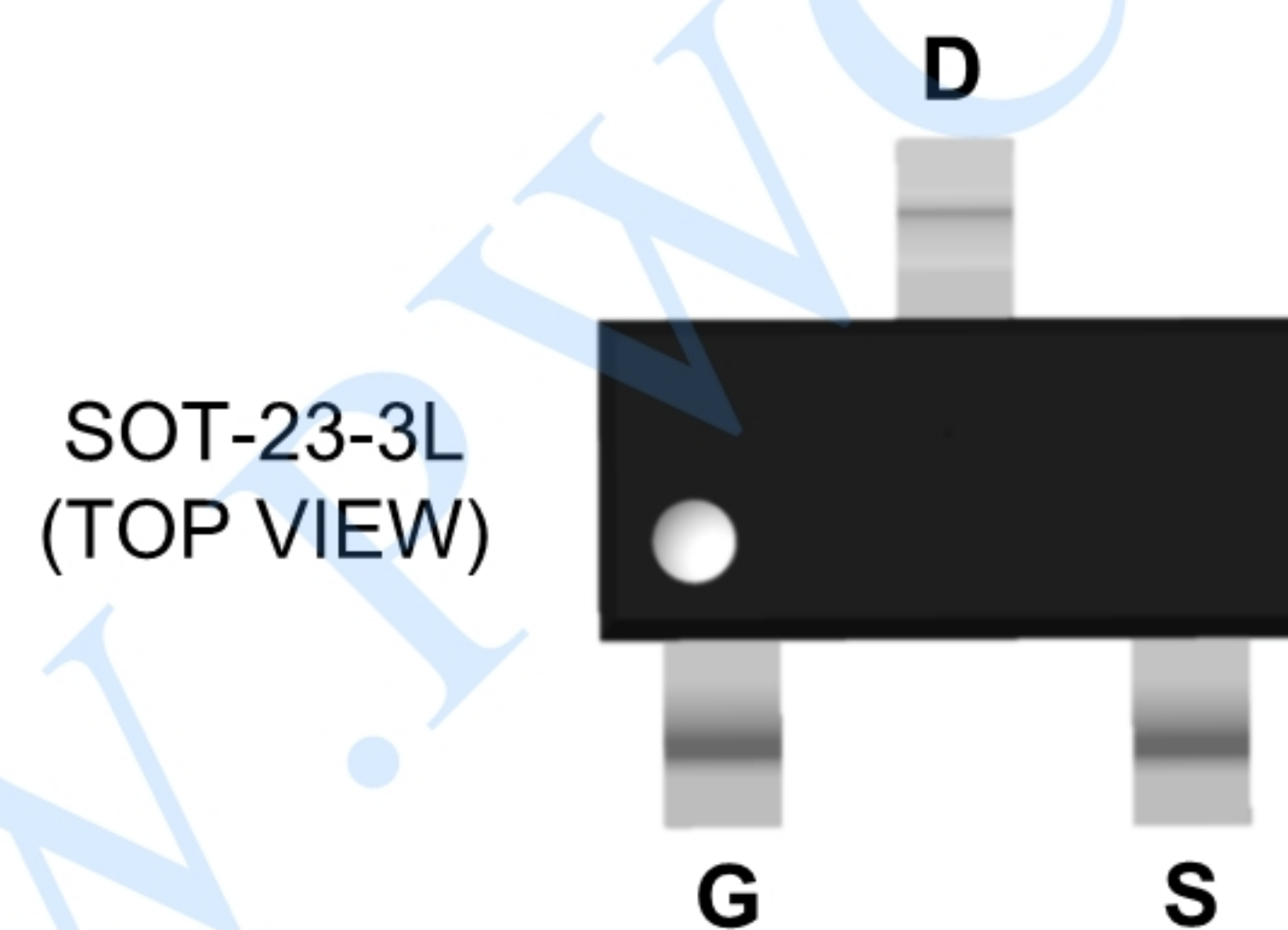
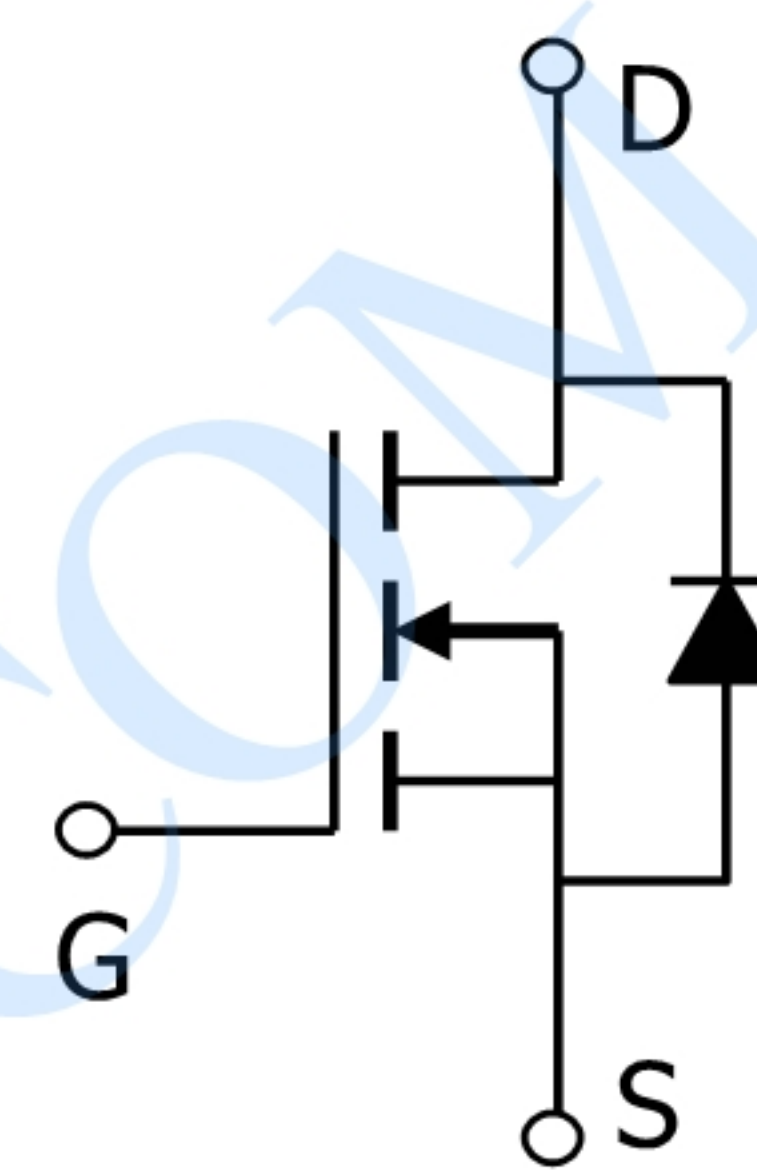
Available in a 3-Pin SOT23-3 Package

### Application

Battery protection

Load switch

Uninterruptible power supply



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ T_A = 25^\circ C$	3.8	A
	$I_D @ T_A = 100^\circ C$	2	
Pulsed Drain Current (NOTE1)	$I_{DM}$	8	A
Power Dissipation	$P_D @ T_A = 25^\circ C$	3.76	W
Power Dissipation – Derate above 25°C	$P_{DD}$	0.5	W/°C
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C
Thermal Resistance Junction-Ambient	$R_{\theta JA} (MAX)$	70	°C/W
Thermal Resistance Junction-Case	$R_{\theta JC} (MAX)$	30	°C/W

Note 1、 Repetitive Rating : Pulsed width limited by maximum junction temperature.





## ELECTRICAL CHARACTERISTICS

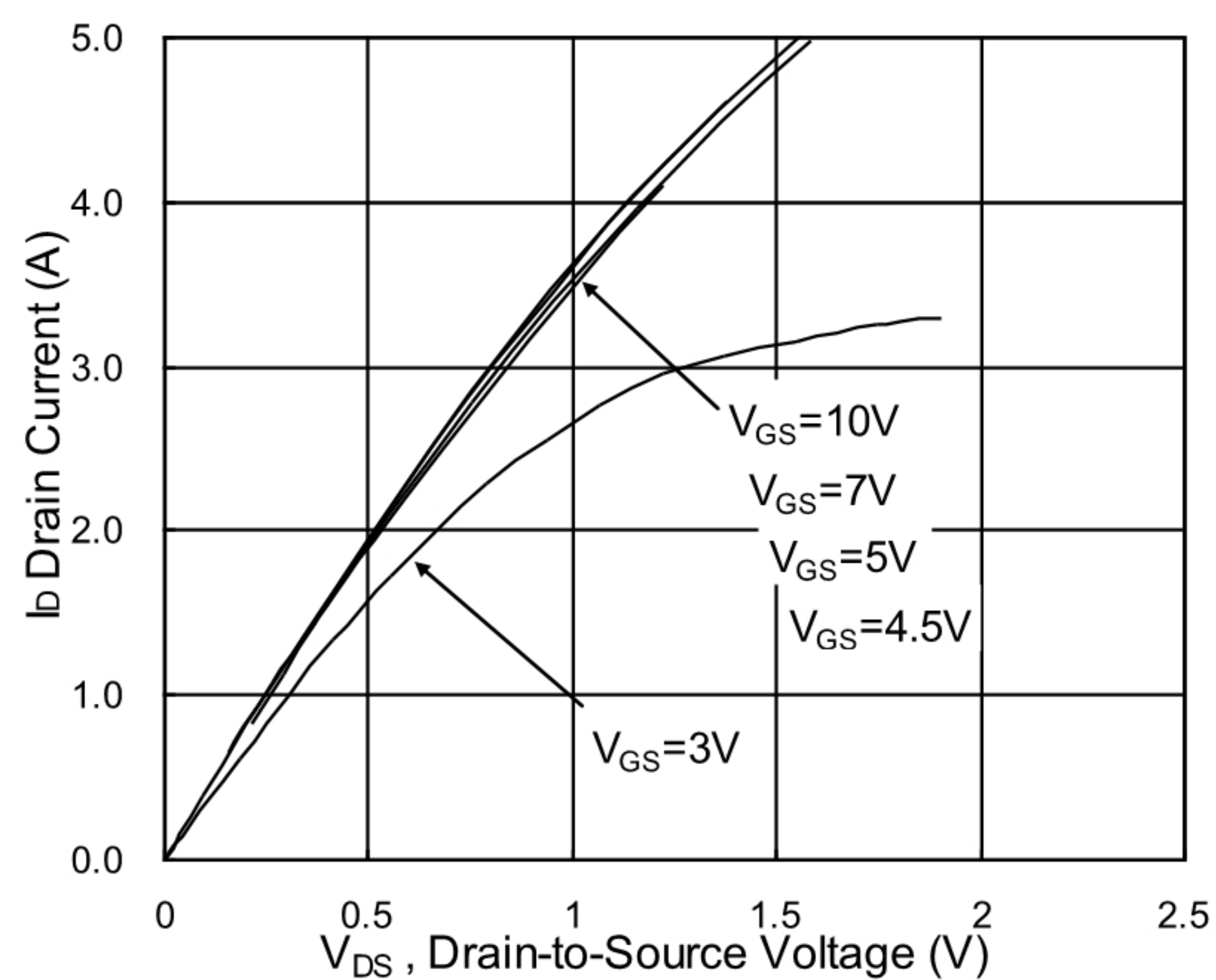
(TA = 25°C, unless otherwise noted.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =-250uA	100			V
$\Delta BV_{DSS}/\Delta T_J$	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =-1mA		0.09		V/°C
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =1A		210	240	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =0.5A		240	280	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	1.0	1.9	2.5	V
$\Delta V_{GS(th)}$	V <sub>GS(th)</sub> Temperature Coefficient			-5		mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =100V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C			1	uA
		V <sub>DS</sub> =80V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C			10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V			±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V , I <sub>D</sub> =2A		2.3		S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz		2.8	5.6	Ω
Q <sub>g</sub>	Total Gate Charge (NOTE1)	V <sub>DS</sub> =50V , V <sub>GS</sub> =10V , I <sub>D</sub> =1A		9	18	nC
Q <sub>gs</sub>	Gate-Source Charge (NOTE1)			2.3	4.6	nC
Q <sub>gd</sub>	Gate-Drain Charge (NOTE1)			1.1	2.5	nC
T <sub>d(on)</sub>	Turn-On Delay Time (NOTE1)	V <sub>DS</sub> =50V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3Ω , I <sub>D</sub> =1A		5.2	10	ns
T <sub>r</sub>	Rise Time (NOTE1)			6.8	12	ns
T <sub>d(off)</sub>	Turn-Off Delay Time (NOTE1)			14.5	28	ns
T <sub>f</sub>	Fall Time (NOTE1)			2.1	5	ns
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V , V <sub>GS</sub> =0V , f=1MHz		152	200	pF
C <sub>oss</sub>	Output Capacitance			17	20	pF
C <sub>rss</sub>	Reverse Transfer Capacitance			10	15	pF
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current			4	A
I <sub>SM</sub>	Pulsed Source Current				8	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C			1	V

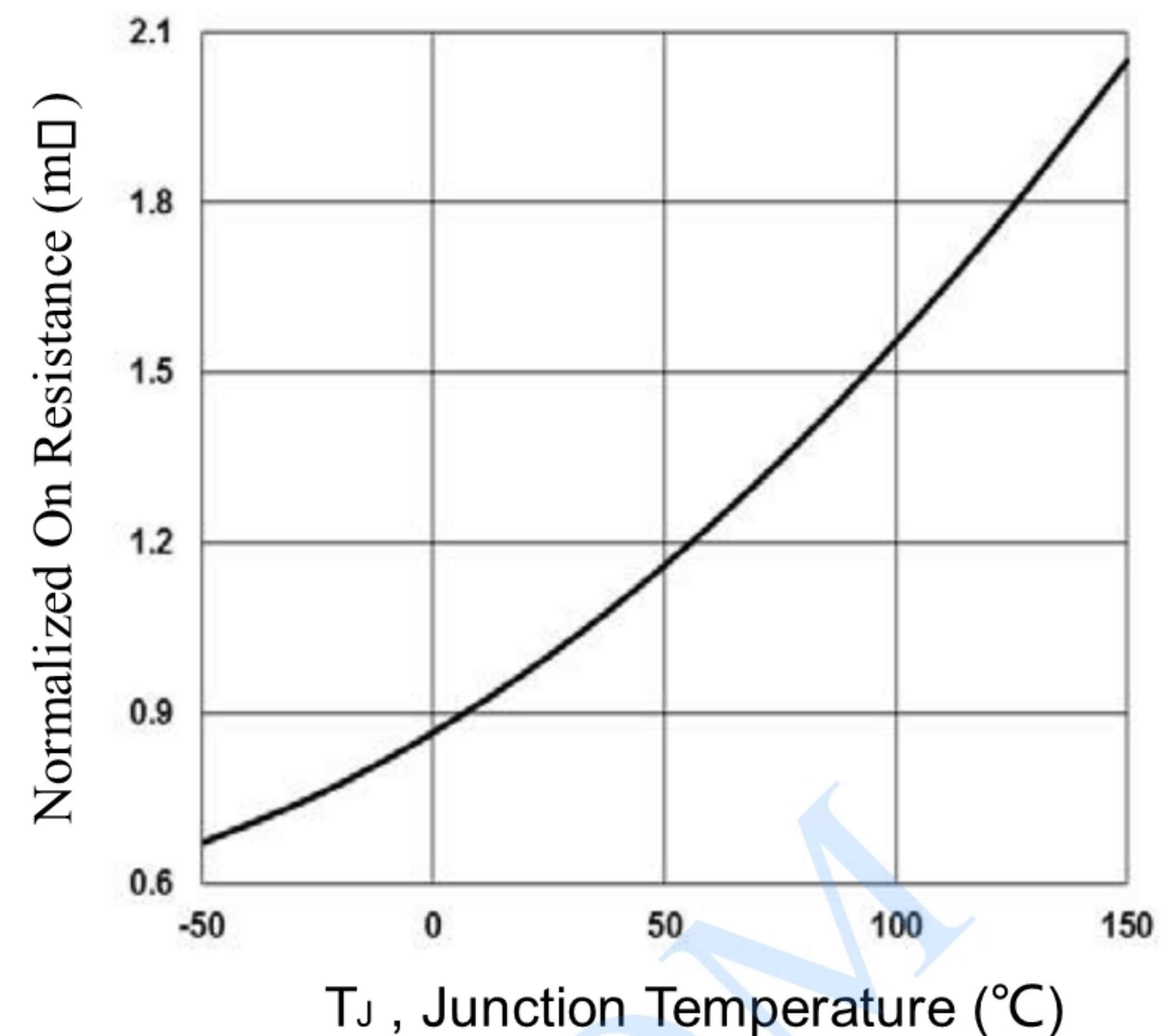
Note 1. Essentially independent of operating temperature. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.Note



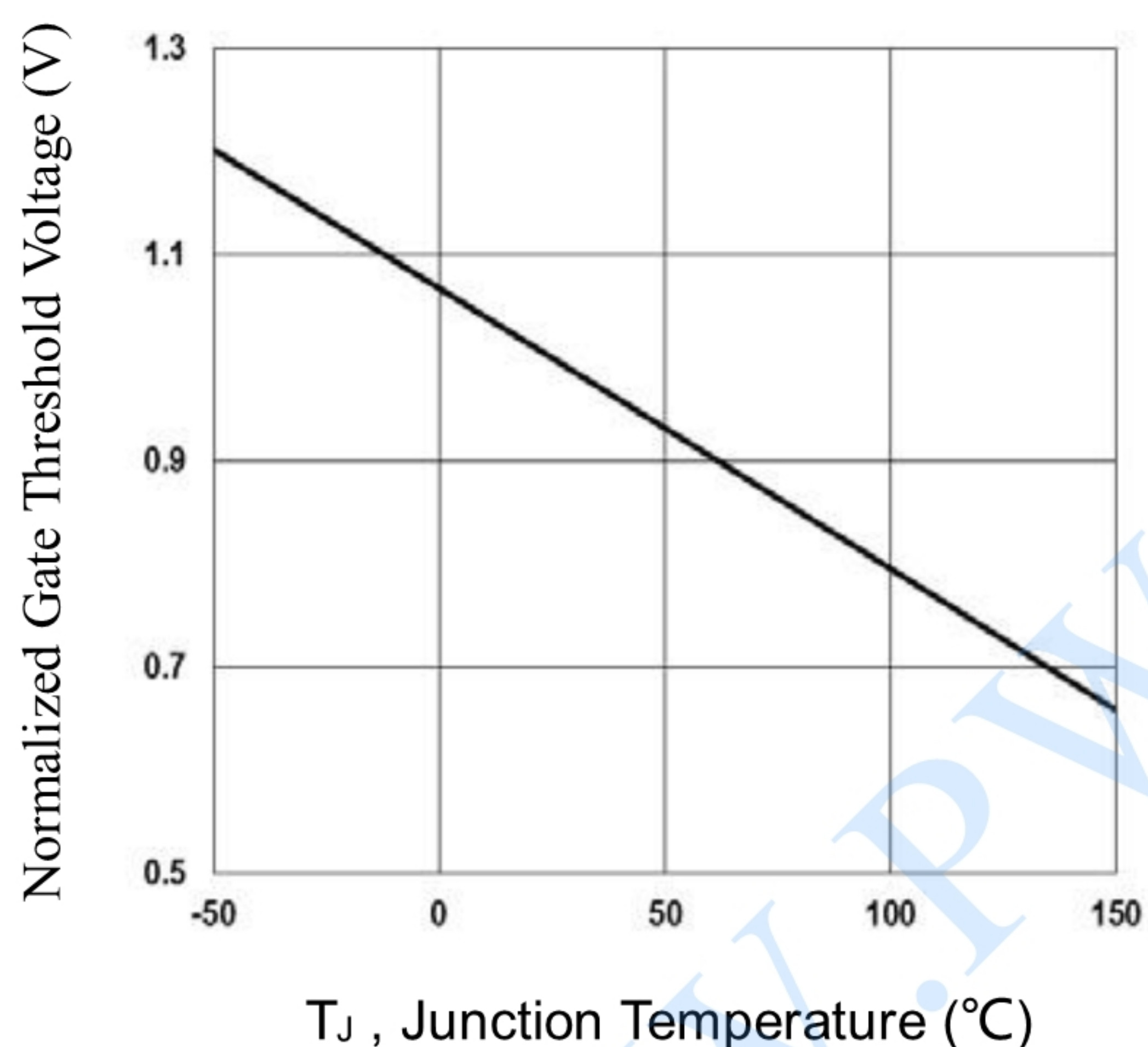
## Thermal Characteristics And Typical electrical



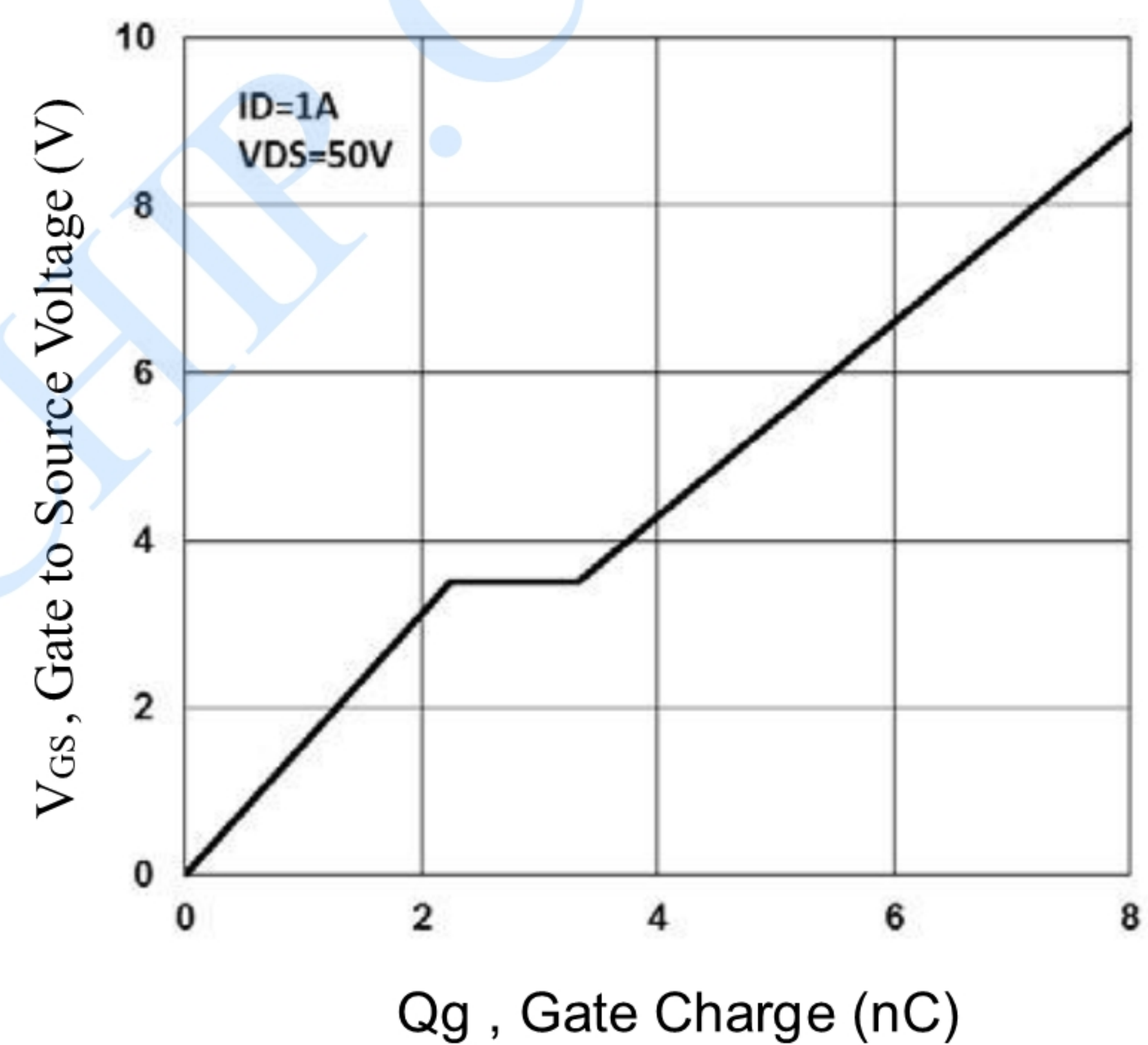
Typical Output Characteristics



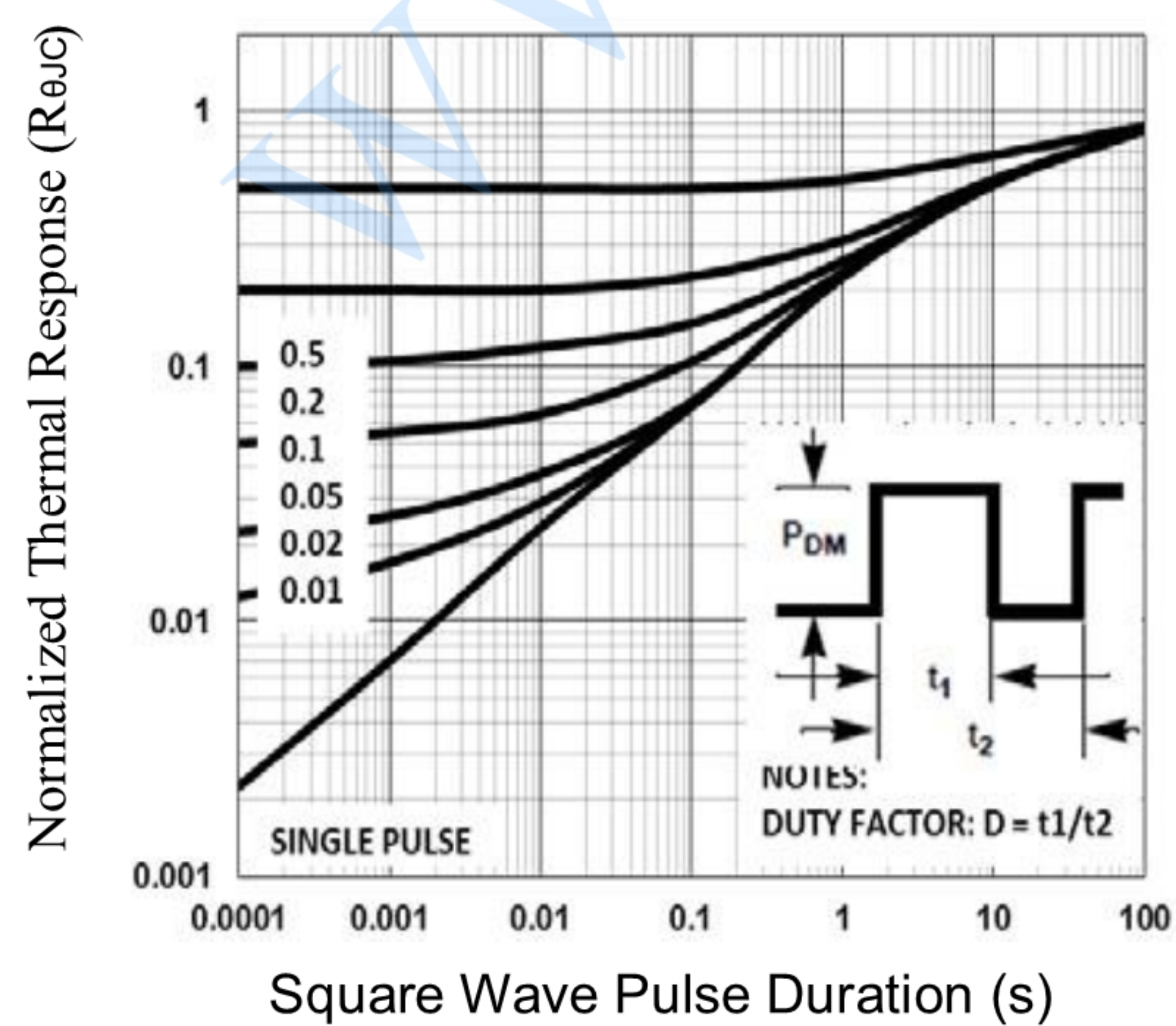
Normalized  $R_{DS(on)}$  vs.  $T_J$



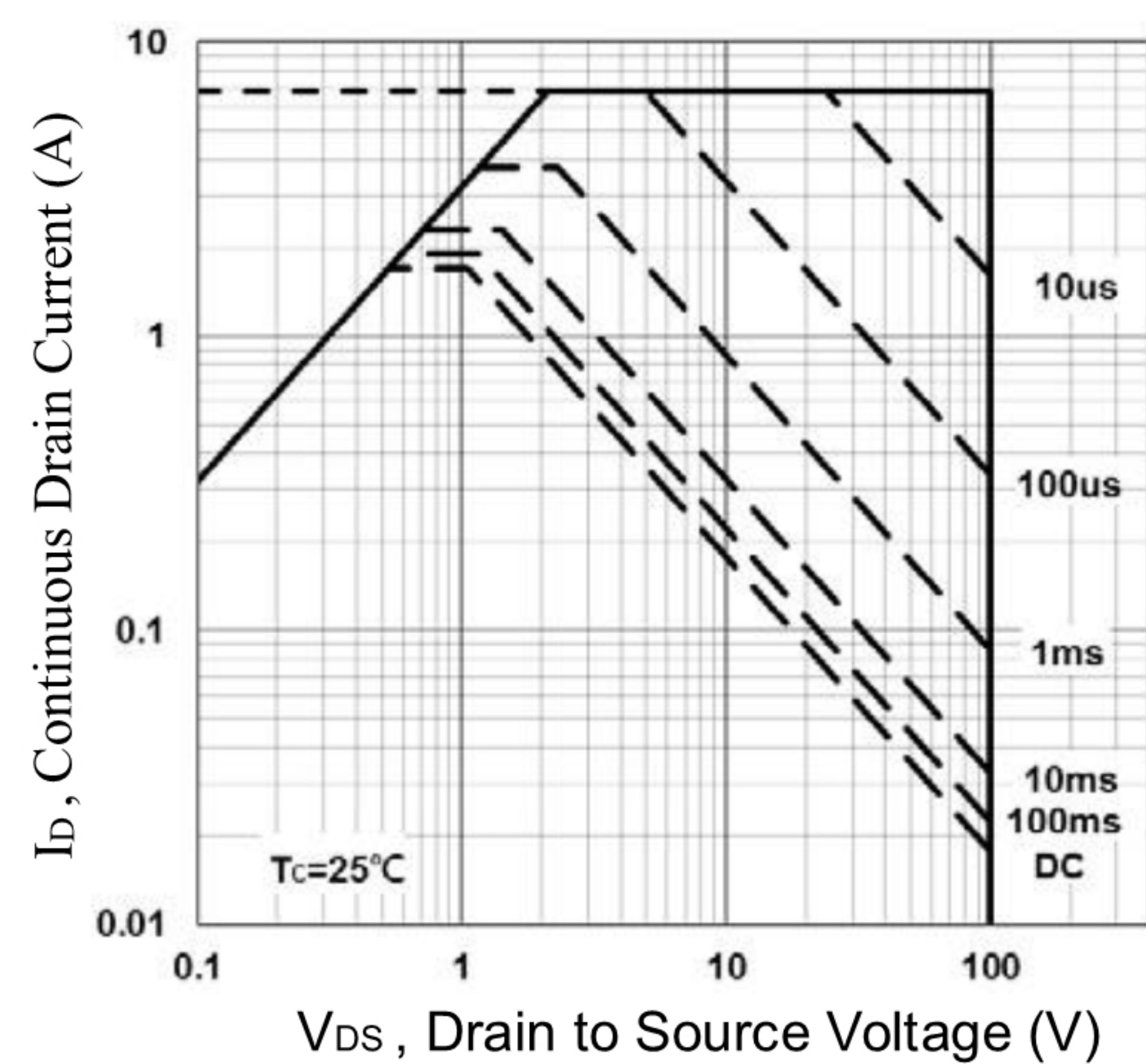
Normalized  $V_{th}$  vs.  $T_J$



Gate Charge Waveform

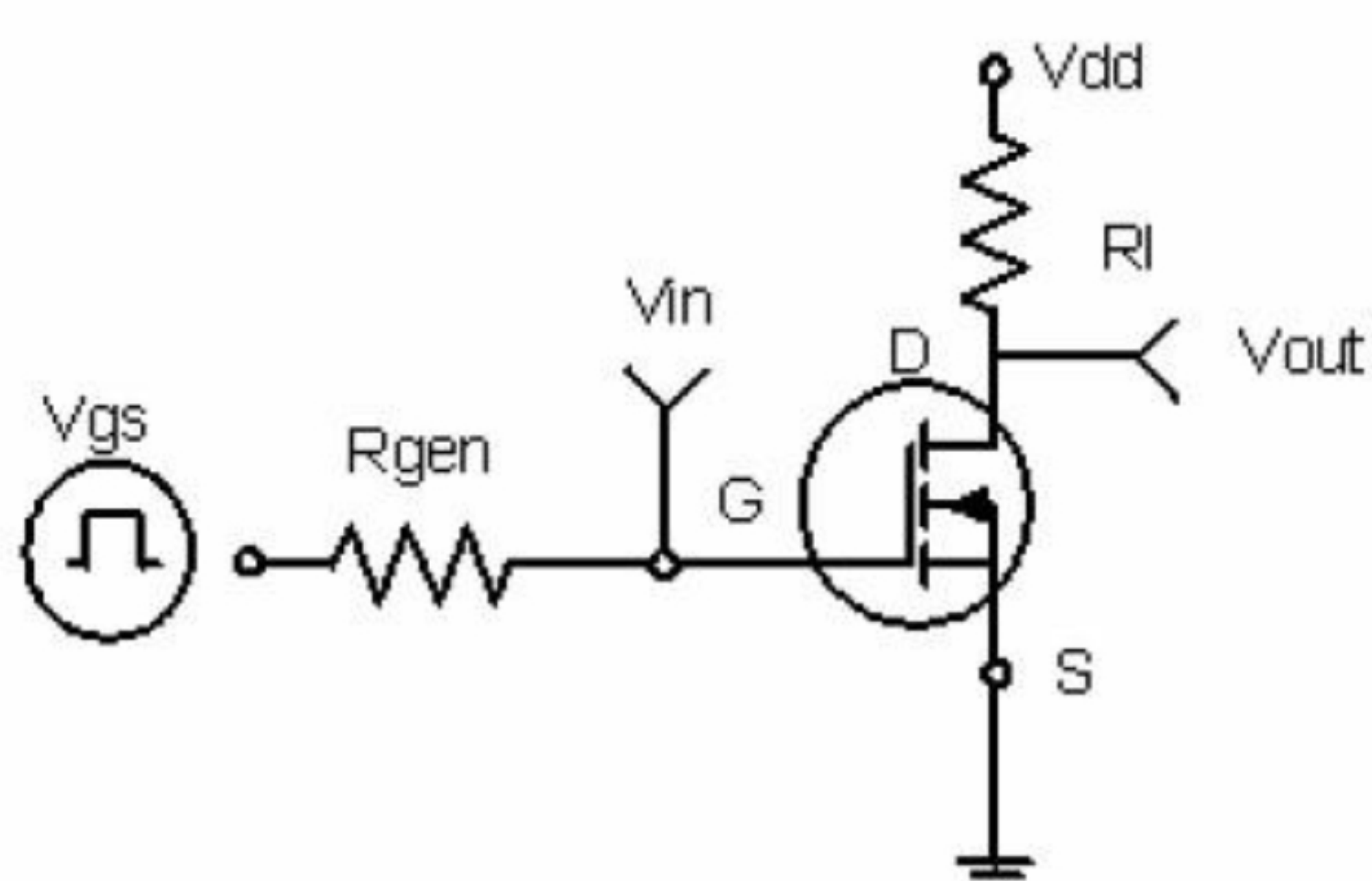


Normalized Transient Impedance

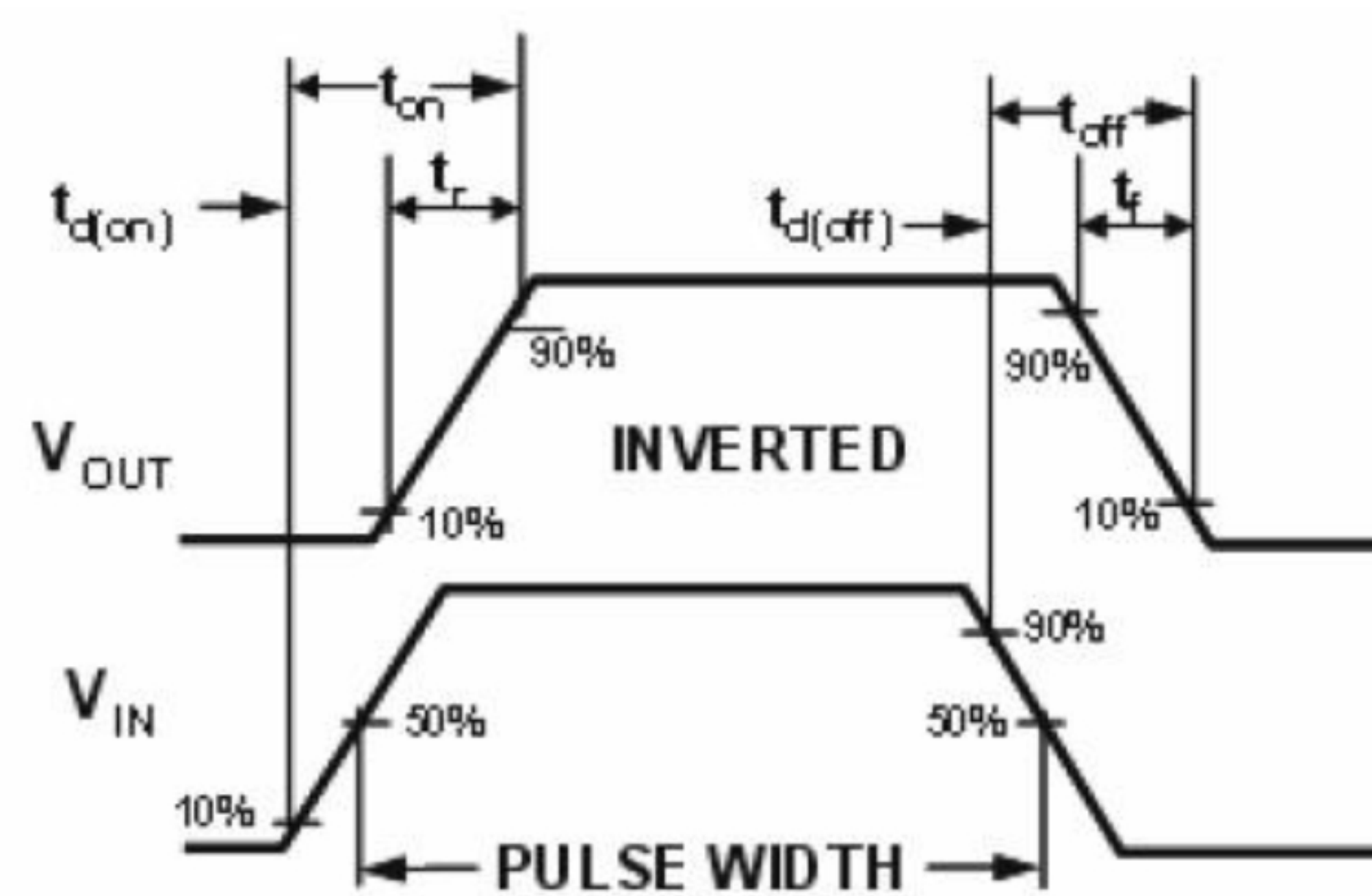


Maximum Safe Operation Area





Switching Test Circuit

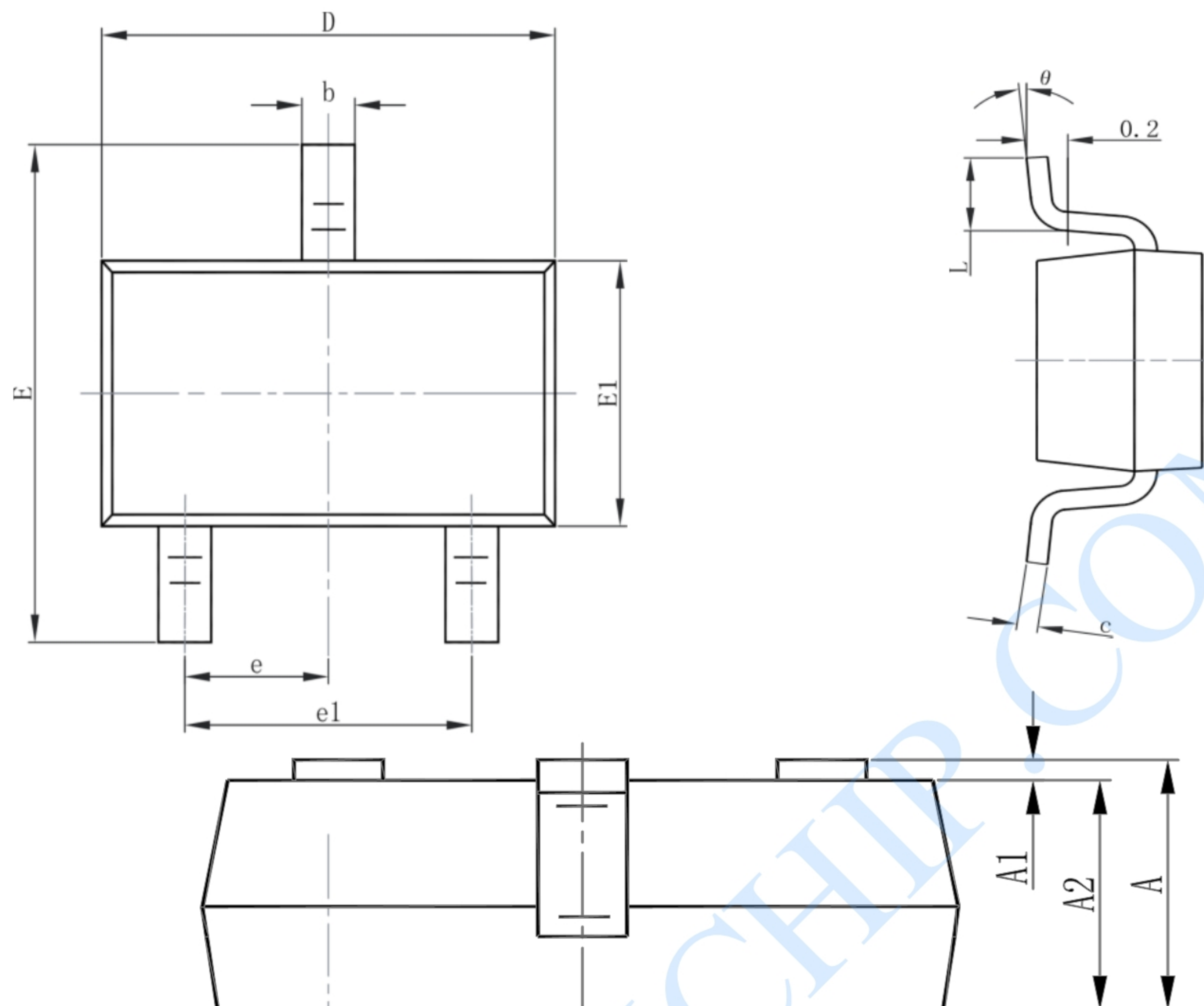


Switching Waveforms



## PACKAGE DESCRIPTION

### SOT23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
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.





---

## IMPORTANT NOTICE

Wuxi PWChip Semi Technology CO., LTD (PW) reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any products or services. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.

PW assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using PW components.

PW products are not authorized for use in safety-critical applications (such as life support devices or systems) where a failure of the PW product would reasonably be expected to affect the safety or effectiveness of that devices or systems.

The information included herein is believed to be accurate and reliable. However, PW assumes no responsibility for its use; nor for any infringement of patents or other rights of third parties which may result from its use.